AN ARCHAEOBOTANICAL ANALYSIS OF SILCHESTER AND THE WIDER REGION ACROSS THE LATE IRON AGE–ROMAN TRANSITION

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Abstract

An archaeobotanical analysis of Silchester and the wider region across the Late Iron Age-Roman transition

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The separation of agricultural practice from urban communities has long been understood as a key defining feature of urban societies. This thesis investigates the relationship between developments in agriculture and urbanisation in Late Iron Age and Roman Britain. The Late Iron Age period saw the rise of oppida, characterised by extensive dyke systems, the presence of elites and imported material culture. Three models of the agricultural basis of oppida are currently available: agricultural innovations, surplus production, and non-arable settlements. These three models have been evaluated through three methods: the analysis of charred, waterlogged and mineralised plant remains from Silchester, an oppidum and civitas capital in southern Britain; the quantitative analysis of secondary archaeobotanical data from the regional area of the Hampshire Downs and the Thames Valley; and the synthesis of archaeobotanical evidence for food and agriculture at oppida and Roman towns in Britain.

Key findings are that spelt wheat and barley were cultivated at Late Iron Age Silchester in combination with a new crop (flax), new management techniques (hay meadows) and the consumption of new plant foods (olives, celery and coriander). Following the establishment of the Roman civitas capital, the agricultural basis continued unchanged for several decades before a re-organisation c. AD70/80, whereby crop-processing ceased within Silchester. The regional crop-processing and weed ecology analysis shows that arable farming was conducted at Silchester, and that large-scale handling of cereals was not occurring unlike at earlier hillforts, and later towns. The evidence for animal stabling, flax cultivation, haymaking, and new plant foods from Silchester are interpreted as representing the coalescence of a rural population, developing new farming techniques to cope with the nucleated population, and therefore supportive of internal models of oppida development.

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Chapter 1: Introduction

1.1 Urbanisation and agriculture

This thesis focuses on the relationship between urbanisation and agriculture at the edge of the Roman world, through the case study of the agricultural basis of oppida in Britain. Oppida are the first proto-urban settlements to develop in western Europe, appearing in the second century BC (Collis 2000; Moore et al. 2013). Oppida emerge within Britain in the Late Iron Age, from c. 100BC-AD70 and, whilst diverse in form (Moore 2012; Woolf 1993), have shared characteristics of imported material culture, craft production, ritual activities, the presence of elites and enclosures or extensive dyke systems (Haselgrove 2000; Pitts 2010). Explanations for the emergence of this new settlement class have traditionally been framed as a debate between external versus internal influences (Haselgrove 1976; Hawkes 1959; Hill 2007). Whilst much recent research has focussed on the role of oppida as landscape features (Bryant 2007; Garland 2012; Moore 2012), knowledge of the internal layout of these settlements and the organisation of the resident social groups is still lacking (Hill 2011).

Models of agriculture in southern Britain have been interlinked with those of oppidum development since the late 1970s (Jones 1981), with agricultural change considered both within long term cycles of settlement dispersal and agglomeration (Haselgrove 1996; Kristiansen 1998), and as related to short term needs to fulfil exchange relationships with the Roman world (Cunliffe 1976) and within southern Britain (Sharples 2011). The types of cereal crops grown, how they were cultivated, and the exchange of crops across the landscape are considered as reactions to shifts in the location and character of settlements, rather than as causal factors in the emergence of proto-urban centres (Jones 1981; Van der Veen and Jones 2006). Hence, identifying the agricultural basis of oppida should provide insights into their origins.

Whilst previous studies of urbanisation used the lack of agricultural activity as a defining factor (Childe 1950; Christaller 1933; Finley 1981; Weber 1958), much greater variation is now recognised in the character of urban settlements and the degree to which the population was active in food production, both in the past (Cowgill 2004: 540; Mattingly and Sterry 2013; McIntosh 2005; Moore et al. 2013) and the present (Deelstra and Herbert 2000). Recent approaches to urbanism have moved away from earlier checklist-style approaches, highlighting instead the importance of urban centres in re-routing everyday life (Yoffee 2005: 61-62), and the creation of distinct urban versus rural identities (Cowgill 2004; Taylor 2013a). Participation in the cultivation, processing and consumption of foodstuffs, as key activities of daily life, are vital for the shaping of such identities (Bogaard et al. 2011; Van der Veen 2008), as well as the expression and reproduction of social structure (Bogaard 2004: 3), through different cultivation or land tenure practices (Bogaard et al. 2011; Jones 2005). Whilst the relationship between agriculture and the development of oppida is not usually given prominence in archaeological debates, the varying perspectives on plant food production have here been grouped into three models of arable farming.

1.2 Model 1: Agricultural innovations

Agricultural innovations are improvements to the volume and quality of plant or animal products, or the resolution of problems, through the adoption or adaption of new crops or breeds of domesticated plants, new animals, new crop growing conditions, new implements, and new management techniques (Van der Veen 2010). The concept of agricultural innovations has been incorporated into 'internal' models of oppidum development. Settlement expanded onto previously under occupied areas of tertiary geologies in the first millennium BC, with oppida often located at the intersection of light and heavy soils (Collis 1984: 174; Haselgrove 1976: 40). New innovations and strategies are considered to have been necessary for the cultivation of these marginal soils (Haselgrove and Millett 1997; Hill 2007; Jones 1981), and also more likely to have been adopted by the more 'open' groups moving

into these areas (Hill 1995b: 60-62, 84). Jones associated the innovations of bread wheat cultivation, field drainage and the cultivation of clay soils with the later first millennium BC, whilst new plant foods and horticulture were restricted to the Roman period (Jones 1981). Jones' 1981 paper drew on a dataset of 53 sites from Lowland Iron Age Britain based on the contemporary archaeobotanical work of Green, Monk, Murphy and Jones, as well as the earlier work of Helbaek (Green 1979a; Helbaek 1952; Monk 1978; Murphy 1977). Jones' broad chronology depicting innovation in the Late Iron Age, stagnation in the Early Roman period and further change in the Mid/Late Roman period, continues to be largely accepted, but with Early Roman stagnation reconfigured as a period of expansion utilising Late Iron Age innovations (Campbell and Hamilton 2000; Taylor 2012).

Whilst acknowledging that the recognition of agricultural innovations from archaeobotanical data is unlikely until they become widespread and regular practices (Van der Veen 2010), the evaluation of the 'innovation' model against quantitative analysis of archaeobotanical data has been limited. Hill's synthesis of the Late Iron Age refers to the qualitative synthesis of Jones (Hill 1995b; Jones 1985a), and the quantitative analysis of crops and weeds in north-east England by Van der Veen (1992). Jones' work assessed the proportional changes of indicator weeds over time. More recent work by Campbell on plant remains from the Danebury environs has identified the further innovations of mono-cropping and spring sowing in the Late Iron Age (Campbell 2000a; Campbell 2008a), but this analysis did not incorporate rigorous crop-processing or weed ecology analysis. In general, field conditions and cultivation practices have been inferred from the proportions of a few weed taxa, rather than the analysis of the ecological characteristics of all weeds present (autecology). Crucially, agricultural innovations have been identified not from oppida themselves, but from rural settlements.

1.3 Model 2: Surplus production

All agricultural societies must produce an agricultural surplus to deal with seasonal harvest fluctuations and to maintain social relationships (Halstead 1989). The production of a surplus beyond the needs of the residential group is commonly associated with movements towards market exchange (Bakels 1996; Van der Veen and O'Connor 1998). The surplus production of arable crops has been interpreted from archaeobotanical assemblages at Mid Iron Age hillfort settlements, initially as a form of social redistribution (Jones, M. 1984), and later for communal feasting (Van der Veen 2007a). The interpretation of communal feasting is based on the presence of grain-rich samples and storage pits (Van der Veen and Jones 2006). The apparent absence of these features in the Late Iron Age is seen as evidence for the movement of grain surpluses beyond the region, in exchange for Roman ceramics, glass and imported foodstuffs such as wine (Van der Veen and Jones 2006: 226; Van der Veen and Jones 2007: 427). This model is very similar to the core-periphery models of the 1970s-80s, which drew on the writings of Strabo, whereby cereals, cattle and slaves were suggested as exports to the Roman world in exchange for glassware, ceramics and amphorae-born goods (Haselgrove 1982; Strabo).

Whilst the initial model of Iron Age Hampshire discussed grain surpluses leaving the Hampshire chalk (Cunliffe 2000: 191-192), the imported material culture types specified, by Van der Veen and Jones, are strongly correlated with oppida and associated high status burials (Pitts 2010). The model can hence be expanded to suggest that surplus production of arable crops for trade was taking place at oppida due to the presence of imported material culture.

Archaeobotanical data have been used sparingly to support this model. High-density cereal grain-rich samples are stated as evidence for large-scale consumption or production, but no named examples other than Danebury are given (Van der Veen and Jones 2006, 2007). A lack of quantitative sample level data analysis limits the evaluation of this model. Due to the

chance nature of archaeobotanical preservation of storage deposits, storage pits are perceived as more reliable indicators of large-scale grain storage (Van der Veen and Jones 2006). Yet it has been argued that storage pits, as well as grain-rich deposits, are still present in the Late Iron Age Hampshire region (Campbell 2008a).

1.4 Model 3: Non-arable

In contrast to models 1 and 2, the third model of arable farming at oppida is that the residents of oppida had, in fact, little involvement in crop production. This model is expressed in two ways. First, through an assertion that oppida, using Silchester (*Calleva Atrebatum*) as an example, were reliant on the farming settlements of the Hampshire Downs or the Upper Thames for the majority of their food supply (Cunliffe 2012; Sharples 2010: 173), and second, through an association of oppida with pastoral activities. Creighton suggests that the extensive earthworks of some oppida may have enclosed grazing land for horses, again with reference to Silchester (Creighton 2000: 72; Mattingly 2007: 59). Similarly, Moore has argued that the early stages of territorial oppida and poly-focal settlements were situated in unoccupied areas away from prime agricultural land in order to facilitate managed seasonal interaction, with an emphasis on stock movement (Moore 2012: 411). Archaeobotanical data have not been integrated into these arguments, although Creighton does refer to palynological studies undertaken at the Late Iron Age forum-basilica site at Silchester (Creighton 2000: 72; Wooders and Keith-Lucas 2000).

1.5 Previous evaluation of models of arable farming

A key factor in the infrequent use of archaeobotanical data within the models outlined above is the lack of systematically sampled plant macrofossils from oppida within Britain (Burnham et al. 2001). Of the eighteen oppida listed by Pitts (2010), few have undergone intensive archaeobotanical or other bioarchaeological investigation. Whilst some charred plant remains

are available from sites such as Abingdon Vineyard (Stevens 1996), these datasets suffer from poor publication, low numbers of samples, and a paucity of waterlogged plant remains to illuminate the non-arable aspects of agriculture. Planning Policy Guidance Note 1: Archaeology and Planning (PPG16), instigated in 1990, required developers to fund the excavation and publication of archaeology destroyed through development (Fulford and Holbrook 2011), with guidelines on environmental sampling issued by English Heritage (English Heritage 1998). Whist this has led to a significant increase in the quantity of archaeobotanical records produced, a decline in the quality of archaeobotanical results has been noted, with little quantitative synthesis conducted (Van der Veen et al. 2007; Van der Veen et al. 2013). Without quantitative analysis of these data, agricultural practices identified at oppida cannot be placed within a regional context. While broader archaeological research is taking steps to utilise developer-funded data to construct long-term interactions between settlements, landscape and social organisation, archaeobotanical data have yet to be successfully integrated into such studies (Fulford and Holbrook 2011; Gosden et al. 2012; Rippon et al. 2013). As part of this lacuna, there is a also a need to place greater consideration on the environs of oppida, rather than just the nucleated settlement centres (Moore et al. 2013).

Whatever the agricultural practices underlying oppida, they were in place for only approximately 100 years before the Claudian Invasion of AD43, and the subsequent development of Roman towns. A comparison of the agricultural basis of oppida with that of Roman towns is vital for identifying the agricultural innovations which developed at oppida as opposed to those introduced by the military and imperial Roman administration. Furthermore, archaeobotanical evidence from Roman towns provides an example of centralised food supply with which to compare the presence or absence of an agricultural basis of oppida. Thus far, the majority of the debate has focussed on food supply to the military throughout the Roman period (Fulford 1989a; Fulford 2000; Millett 1990; Sauer 2002). The staple civilian food supply is understood to be derived from rural hinterlands, but the mechanisms of surplus extraction

have not been explored (Roskams 1999), nor the local context of towns considered (Taylor 2013b). Whist PPG16 contributed to a vast increase in the quantity of archaeobotanical data produced from Roman towns, synthesis has focussed on new plant foods rather than staple crops and fodder (Van der Veen et al. 2008). Understanding the agricultural basis of oppida is important for evaluating models of their origins and exploring their social organisation. However, without detailed archaeobotanical data from oppida themselves, quantitative comparisons with archaeobotanical data from the regional area, and chronological comparisons with subsequent Roman towns, models of arable farming at oppida cannot be investigated.

1.6 Research methods and study area

The three models of agriculture at oppida have firstly been evaluated through the quantitative analysis of plant macrofossils from a primary dataset from the University of Reading Insula IX 'Town Life' Project excavations within the Late Iron Age oppidum and Roman civitas capital of *Calleva Atrebatum* or Silchester. Silchester is located in central-southern Britain (Fig 1-1), in an area of tertiary geology between the Hampshire Downs and the Mid Thames Valley (Fig 1-2). As one of the most systematically excavated and sampled Late Iron Age and Roman urban sites within Britain, and, arguably the Roman Empire, Silchester allows for the study of arable farming and food supply to the settlement over nearly 500 years (Boon 1957; Fulford and Clarke 2011; Fulford and Timby 2000; Fulford et al. 2006). Published data from the Mid and Late Roman phases of Insula IX (Robinson et al. 2006; Robinson 2011) and the forum-basilica excavations (Jones 2000) furthers the spatial and chronological coverage of the town. A detailed analysis of plant macrofossils, using univariate analysis and qualitative contextual analysis, has enabled a spatial and chronological analysis of the use of plant foods and resources. The evaluation of crop-processing models using ratio analysis, discriminant analysis and correspondence analysis has allowed the identification of crops, crop-processing, and crop cultivation practices. The plant remains studied from the Society of Antiquaries excavations of

the entire town have also been reassessed in order to evaluate the early identifications of plant foods (Reid 1899, 1901-1909).

Agricultural practices from the surrounding region have also been investigated to evaluate the relationship between crops, and their processing and cultivation strategies, and Silchester. An emphasis has been placed on the production of crops rather than on any secondary processing such as for malt. Secondary archaeobotanical data have been collated from excavations of Mid Iron Age to Late Roman date in the regional study area. Given the overlapping socio-political groupings in this region (Lambrick and Robinson 2009: 371), an arbitrary radius of 40km around Silchester was selected, extending north to Oxfordshire, east to Slough, and south-west to Winchester (Fig 1-2). This area includes sites that have been used as key examples in models of arable farming in this period (Barton Court Farm, Danebury, Danebury environs, and Mount Farm), as well as multiple oppida (Abingdon and Oram's Arbour), Roman towns (Abingdon, Staines - *Pontes* and Winchester – *Venta Belgarum*) and rural settlements. Furthermore, the area encompasses environmental variation, allowing the evaluation of the effects of socio-economic and landscape factors on agricultural regimes. The application of ratio, discriminant and correspondence analysis to charred crop-processing remains have enabled the evaluation of crop husbandry and processing practices against site type, environmental and chronological factors. The cultivation of non-cereal crops has been investigated by univariate analysis. In order to assess the validity of the trajectories of agricultural and urban change for the Silchester region, as well as to provide a comparison, summary archaeobotanical data have been collected from other oppida and major Roman towns within Britain. Palaeoenvironmental and artefactual data have also been utilised, to support inferences made from archaeobotanical data. This three-fold methodology has produced a detailed primary dataset from a key site type and the first quantitative synthesis of a long studied area.

Plant remains preserved by charring, calcium-phosphate mineralisation and waterlogging have been investigated. Charred plant remains preserve well in temperate to arid areas, hence they are present at all site types, and the results of their analysis can be compared with settlements across the Roman world (Kreuz 2004; Murphy et al. 2013; Pelling 2012). They provide evidence for the processing of cereals, which is a common identifier of rural as opposed to urban communities, as well as cultivation practices. Waterlogged plant remains inform upon the complementary themes of settlement vegetation, foddering practices and diet, which are not usually evidenced by charred plant remains. Unfortunately, this type of preservation is geographically limited to the 'North Sea crescent' (Carver 1993) and occasional deep features within settlements. Finally mineralised plant remains are included as, although they are relatively rare, they can provide direct evidence for plant food consumption.

Whilst plant microfossils can provide very useful evidence for plant food production, phytolith and starch research face problems of differential preservation, complex taphonomy, destructive processing techniques, modern contamination, and limitations in identification to species-level (Crowther 2012; Crowther et al. 2014; Shillito 2011). Crucially, samples for phytolith and starch analysis are rarely taken in research or developer-funded excavations within Britain. Although plant macrofossils also have limitations in identification, preservation and analysis, the systematic sampling for their recovery has been undertaken in some areas of Britain from the mid 1970s, resulting in a substantial national dataset for the study period (Van der Veen et al. 2007). A long history of research also provides the theoretical and methodological tools with which to analyse plant macrofossil data (Jacomet and Kreuz 1999).

1.7 Structure of thesis

Chapter 2 provides an overview of the current understanding of oppida and agriculture in Late Iron Age Britain and a summary of the framework of archaeobotanical analysis. The environmental and archaeological context of Silchester and the regional study area are

described in Chapter 3. Chapter 4 presents the methodology used for the collection of primary data from Silchester Insula IX, and secondary data from the regional study area. The methods of univariate and multivariate analysis are summarised. Chapter 5 presents an overview of archaeobotanical data from Silchester, contrasting the three modes of preservation and highlighting the main taxa present at Insula IX, and presenting a reassessment of the Society of Antiquaries dataset. Chapter 6 provides a detailed analysis of the Insula IX archaeobotanical assemblage in order to identify the plant-foods consumed, their processing, and cultivation practices, as well as foddering and vegetation. Chapter 7 presents an analysis of the Silchester results amongst the regional dataset. Chapter 8 compares the trajectory of agricultural change identified at Silchester with archaeobotanical datasets from other oppida and major towns in Roman Britain. Chapter 9 addresses the research models and integrates the results into broader discussions of urbanisation and agricultural change in the north-western Roman provinces. Chapter 10 summarises the key findings of this thesis and contains recommendations for further work. All tables and figures are provided after the text. The catalogues contain supplementary material consisting of: raw archaeobotanical data from Insula IX (Catalogue 1), archaeobotanical identifications from Insula IX (Catalogue 2), supporting data for the weed ecology analysis conducted in chapters 6 and 7 (Catalogue 3), archaeobotanical data from the Society of Antiquaries collection (Catalogue 4), a list of regional settlements and crop-processing calculations (Catalogue 5), and a list of major Roman town sites which provided archaeobotanical data (Catalogue 6).

Chapter 2: Overview of Urban Forms, Agriculture and Archaeobotany

2.1 Urban forms in southern Britain

2.1.1 Oppida

The Latin term *oppidum* originates from Caesar's descriptions of fortified settlements during the Gallic Wars (Caesar), and was also used to designate the settlements captured by Vespasian during the Roman conquest of Britain (Suetonius). However, *oppidum* was also used more generally by classical authors for any town other than Rome (Lewis and Short 1975: 1271). The term has since been used to describe a range of large fortified sites in Late Iron Age western and central Europe (Collis 1984), although variability in size, organisation and chronology has lead to criticism of this use (Woolf 1993). Oppida within Britain date from c. 100BC–AD70, and are mainly located in southern and eastern England (Fig 1-1) (Pitts 2010). The classification of territorial oppida, enclosed oppida, nucleated sites and ports-of-trade (Cunliffe 1976), is still largely adhered to (Haselgrove 2000; Pitts 2010).

Enclosed oppida are situated in valleys or on promontories, with an area of 20-50ha enclosed by a continuous earthwork. Limited excavations have been undertaken at most sites such as Abingdon, Dyke Hills and Oram's Arbour (Haselgrove 2000). Large excavations at Abingdon Vineyard are unpublished (Allen 1990, 1993). Contrastingly, territorial oppida have discontinuous earthworks enclosing extensive areas, as at Camulodunum, Chichester and Verulamium. These sites are characterised as areas of multiple activity foci, including agriculture, religion, craft working and burial (Haselgrove 2000; Haselgrove and Millett 1997). Recently, the ritual and symbolic importance of these sites has been highlighted (Bryant 2007; Garland 2013; Rogers 2008). Whilst useful, the shift in emphasis towards the symbolic aspects of oppida is largely based on landscape level interpretations of earthworks and limited areas of

excavation. Without systematic excavations of occupation areas within oppida, we lack any detailed understanding of the settlement character and activities undertaken.

In the mid twentieth century, Late Iron Age cultural change was attributed to the immigration of Belgic people from Gaul (Hawkes and Dunning 1931). External influence was interpreted in line with the core-periphery models of the 1970s which suggested that increased trade was a direct stimulus to urbanisation in southern Britain (Cunliffe 1976; Haselgrove 1976). Later, a more specific form of prestige gift exchange was seen to lead to the emergence of chiefdoms (Cunliffe 1988; Haselgrove 1982). These models place much importance on the small amounts of foreign material culture used as evidence for prestige-gift exchange (Fitzpatrick 2001). A shift towards internal explanations is exemplified by Hill's model of long-term population movement in East Anglia (Hill 2007).

Oppida are currently understood as products of population movement into previously uninhabited areas where people congregated in neutral meeting places for sacred and/or craft activities, such as metal working (Haselgrove and Millett 1997: 283; Sharples 2010: 172). Yet these later interpretations tend to downplay the role of the expanding Roman Empire (Mattingly 2007: 83-84), and such a focus on regional Iron Age research has been linked with the lack of new large-scale explanatory models (Moore 2007: 79). The exception to this is Creighton's emphasis on individual political relationships with Rome from c. 50BC onwards as a driving factor in urbanisation (Creighton 2000, 2006). The possibility that small-scale population movements from northern Gaul were a contributing factor is also gaining wider acceptance, with possible immigrants from Gaul choosing to locate themselves on political boundaries, such as at Silchester (Fulford and Timby 2000: 564; Pitts and Perring 2006: 207).

The existence of a hierarchical social organisation at oppida was advocated through the core-periphery models of the 1970s and 80s (Haselgrove 1995) and the use of historical literature to

reconstruct 'Celtic' societies (Cunliffe 1984; Karl 2008). These assumptions have been thoroughly critiqued for the rest of the Iron Age (Hill, J. D. 1989, 1996) and replaced with regional, rather than over-arching, social models (Moore and Armada 2011). The presence of 'kings' at oppida is, however, widely accepted (Creighton 2000, 2006), due to coin legends naming individuals and mint sites (Mattingly 2007: 73) and very wealthy burials such as at Folly Lane (Verulamium) and Stanway (Camulodunum) (Crummy et al. 2007; Niblett 1999). These local elites are thought to have only moved from their traditional lands to the oppida once the new settlements had become permanently settled (Haselgrove 2000; Haselgrove and Millett 1997).

The social organisation of the rest of these residents at oppida is not often explicitly stated, but most recent discussions have depicted Iron Age societies as heterarchies structured on the household-level mode of production (Crumley 1995; Hill 2011). In contrast, the organisation of burials at Verulamium has been interpreted as non kin-based, indicative of an increasingly dispersed social grouping, possibly related to outsiders migrating into oppida (Haselgrove and Millett 1997). Haselgrove has suggested a caste system was present at the oppida of northern France, based on evidence of internal settlement division and craft specialisation (Haselgrove 2007). Hill has highlighted that land tenure and the organisation of agricultural production provide another way to investigate social organisation (Hill 2011: 246, 253). Thus, the investigation of farming practice at Silchester provides much needed new insights into social organisation at oppida.

2.1.2 Roman towns

Roman towns within Britain are subdivided into the categories of coloniae, civitas capitals and municipia. All contain some aspects of classical Mediterranean cities: public buildings, fortification and street grids, and had several roles as places of trade, craft production, religion and administration (Jones 2004). The origins of Roman towns were traditionally thought to lie

in military vici or forts (Wacher 1974: 17-23). Whilst for many towns in northern Britain this interpretation still holds, in southern Britain more emphasis is placed on continuity from Late Iron Age settlements. Following Millett's reassessment of Roman Britain, the location of oppida beneath subsequent Roman towns was interpreted as evidence for continuity of settlement layout and elites (Millett 1990: 69). The presence of the military and Roman administration, however, is still considered an urbanising factor (Jones 2004; Perring 2011). Small towns emerged from the Mid Roman period. Their origin has been attributed to the need to supply major towns with rural produce (Burnham and Wacher 1990), and the emergence of centres of local industry such as pottery or mineral extraction (Jones 2004).

There have been recent shifts towards the study of social and economic life within towns, rather than their physical character (Jones 2004). Roman towns are understood to have been home to diverse social groups, including the military, traders, native elites and rural visitors, although few inscriptions have survived to support or disprove this theory (Jones 2004). At Early Roman civitas capitals, the continued presence of a Late Iron Age elite is likely, as demonstrated by Pitt's analysis of ceramic forms at Colchester which showed the continuation of Late Iron Age consumption patterns until AD60/61 (Pitts and Perring 2006: 205). Civitas capitals were thought to be the direct continuation of social groupings from Late Iron Age tribal groupings (Millett 1990), but this notion has been criticised on the basis that coinage distributions do not correlate with ethnic identities, and that the expression of regional power was connected to client kings only in the decades around AD43 (Moore 2011).

Urban housing styles were initially very simple, consisting of shops or workshops, with larger courtyard-style single household residences present from the mid second century AD (Jones 2004). Domestic groupings are thought to have consisted of two to three related family groups (Allason-Jones 2004). Recent studies have highlighted the cosmopolitan character of later Romano-British towns. Human isotope analysis has demonstrated the presence of non-British

born residents in Roman York (Leach et al. 2010; Müldner et al. 2011) and material culture studies have begun to suggest the presence of immigrants, from items such as cooking vessels or brooches (Eckardt 2012; Timby 2012), although ethnic groupings cannot be identified through single artefactual categories (Fulford 2010). Furthermore, rural residents were also frequently present in towns, as were traders and craftsmen (Taylor 2013b).

Research still needs to progress beyond what is and is not a town, to the specific roles of individual towns and their spatial organisation (Millett 2001). Some research has been undertaken on the effect of urban forms on social discourse (Creighton 2006: 83-6) and the sensory experience of town life (Betts 2011; Macaulay-Lewis 2011), but more consideration of daily life in towns, through food consumption and production, would highlight the creation of urban identities in opposition to rural lifestyles (Taylor 2013b). Of utmost importance is the investigation of the earliest Claudio-Neronian occupation phases of towns with good organic preservation (Burnham et al. 2001) in providing evidence of the social groupings present and their lifestyles, such as at 1 Poultry, London (Hill and Rowsome 2011), and in this thesis at Silchester.

2.1.3 Late Iron Age and Roman agriculture

2.1.3.1 Crops

The Iron Age has been understood to be a period of expansion in the range of crops grown, with the addition of bread wheat and oats (Jones 1981, 2007). The introduction of bread wheat has been associated with the intensification of agriculture (Jones 1981) and long-distance transport in the Late Iron Age and Roman period (Van der Veen and O'Connor 1998). Yet the identifications upon which Jones based his argument have been questioned (Campbell and Straker 2003) and many subsequent Late Iron Age records have produced Saxon, Medieval or modern radiocarbon dates (Carruthers 2011: 31; Van der Veen 1992: 69, 74). Other minor

crops are also considered more likely to have been cultivated during the Late Iron Age, such as oat, pea and celtic bean (Lambrick and Robinson 2009: 254), although Bronze Age records of some of these crops exist (Campbell and Straker 2003).

2.1.3.2 Tillage

Evidence for cultivation equipment in the Iron Age is rare (Lambrick and Robinson 2009: 240). Simple wooden ards, which dragged a wooden share through the soil, were used for ploughing. Numerous iron shares have been recorded from southern England, with examples recovered from Early/Mid Iron Age Berrick Salome (Wilson 2008), and Mid Iron Age Danebury (Cunliffe and Poole 1991). Beneath Grims Ditch at Mongewell, probable Iron Age cord-rig and cross-cutting ard marks were preserved (Cromarty et al. 2006: 162-172). The ard continued to be used in the Roman period, with ard marks identified from Drayton (Barclay et al. 2003) and Anslow's Cottage, Burghfield (Butterworth and Lobb 1992). An Iron coulter was discovered at Late Roman Dorchester (Manning 1984), but iron share-tips continued to be used in the Roman period, as at Gatehampton Farm (Jennings 1995) and Roman Frilford (Bradford and Goodchild 1939: 13). Jones argued that mouldboard ploughing was an innovation of the third and fourth centuries AD (Jones 1981; Rees 1979). Yet, there is no clear evidence for mouldboard ploughing from Roman Britain. The first secure evidence from the Thames Valley is at Late Saxon Drayton where parallel strips of overturned clay and gravel indicate the use of a mouldboard plough (Barclay et al. 2003: 115-116).

2.1.3.3 Crop cultivation practices

No detailed analysis of weed ecology has taken place from Iron Age or Roman central-southern England, other than the work of Stevens (1996), which failed to identify the crop-processing stage from which samples derived (Van der Veen and Jones 2006). General trends have been highlighted, mainly the increase in weeds of leguminous species at several sites (Ashville,

Gravelly Guy, Mount Farm) throughout the Iron Age and Roman periods, indicative of decreasing soil fertility (Jones 1991, 1996; Stevens 1996), and expansion onto damp soils (Ashville, Mount Farm) (Jones 1978, 1988a). Alternatively, Lambrick has argued that manuring was taking place during the Late Iron Age and Early Roman periods based on pottery scatters (Lambrick 1992). It is thought that barley and spelt or emmer wheat were sown as autumn mixed crops (maslins) for much of the Iron Age, with suggestions that spring sown monocrops were being cultivated in the Late Iron Age on the Hampshire Chalk. This assertion is based on the frequencies per period and the percentages of individual samples of *Avena* spp. and *Bromus* spp. (Campbell 2000a). Accurate inference of crop cultivation can only be made from autecological analysis of identified weed taxa from the same crop-processing by-product (Jones et al. 2010), which has not yet been applied to any datasets from central-southern Britain.

2.1.3.4 Harvesting, storage and processing

A range of iron blades, classified as 'reaping hooks', were used for harvesting during the Iron Age and Roman period. These ranged from small curved knives to larger hooks at Ashville, Gravelly Guy and Thornhill (Lambrick and Robinson 2009: 237). Results from the Danebury environs projects showed crops were harvested by uprooting until the end of the Mid Iron Age, after which crops were cut with sickles (Campbell 2000a). During the Mid Iron Age, bell-shaped pits and four post structures were present at settlements in the Thames Valley and Hampshire Chalk. The pits have long been interpreted as being utilised for grain storage (Bersu 1940; Reynolds 1979), but it has been recently argued that they were more likely used for storage of grain intended for communal feasts than for seed corn (Fenton 1983; Van der Veen and Jones 2006). Storage pits are largely absent from the Late Iron Age onwards, although some four post structures are present at sites in the Upper Thames, and storage pits continued to be used in the Mid Thames (Booth et al. 2007: 288-289). Corn drying ovens became common across this region in the Mid and Late Roman periods (Taylor 2007: 116). They tend to be

associated with villa sites such as Hambleden, but also occur at rural settlements on the Thames gravels (Booth et al. 2007: 290). Corn driers are thought to have been used for various functions, primarily the drying of grain prior to dehusking, and the drying of malted grain for brewing (Van der Veen 1989).

2.1.3.5 Specialisation

Whilst the consumer versus producer debate has now been discounted on an archaeobotanical basis (**2.3.7**) (Stevens 2003; Van der Veen and Jones 2006), palaeoenvironmental evidence and settlement form still suggest that pastoral sites were present during the Mid Iron Age in the north of the Upper Thames Valley at Claydon Pike and Thornhill Farm (Lambrick and Robinson 2009: 389). There are also thought to have been specialist pastoral sites in the Mid Thames Valley, such as at Cippenham, Slough (Ford et al. 2003). Similarly, there have been suggestions of agricultural specialisation found on the Hampshire Chalk from the Mid Iron Age onwards. At the banjo enclosure at Nettlebank Copse, the over-wintering of animals was highlighted by the presence of bracken in combination with an autumn peak in sheep-mortality (Campbell 2000d).

From the Mid Roman periods onwards, settlements which were focused on the production of hay also emerged, with archaeobotanical evidence from Claydon Pike and Farmoor, and several Late Roman scythes identified from both the Upper and Mid Thames Valleys (Booth et al. 2007: 294; Robinson 2007b). More common are villas specialised in large-scale cereal production. The small villas at Barton Court Farm and Claydon Pike in the Upper Thames Valley both had corn driers and millstones (Miles 1984; Miles et al. 2007). On the Hampshire Chalk, aisled halls were present from the Mid Roman period, many of which developed into Late Roman villas with corn driers, such as Thruxton and Grateley (Cunliffe and Poole 2008).

2.1.3.6 New plant foods

That the consumption of new plant foods took place in the Roman period has been known since the early work of Clement Reid at Silchester (Reid 1899, 1901-1909; Robinson 2012). New fruits and flavourings have been recorded from numerous sites in the Mid and Upper Thames Valley (Jones and Robinson 1984; Robinson 2007a). New plant foods have been interpreted as evidence for a more 'Romanised' community (Booth et al. 2007: 293; Robinson 1992a: 58), gardening (Murphy and Scaife 1991), and the integration of rural areas in to a market economy (Van der Veen and O'Connor 1998). We now know that approximately 50 new plant foods were consumed in Britain during the Roman period (Van der Veen et al. 2008). The consumption of imported food plants at Late Iron Age oppida has long been suspected (Jones 1981, 2000). The lack of waterlogged samples from oppida, however, has precluded any evaluation of non-cereal plant food diet and has been highlighted as a research priority (Van der Veen et al. 2007).

2.2 Archaeobotanical framework

2.2.1 History of study

Archaeobotany has a long history within Britain, yet its methodological development has been subject to limited critical historiography, unlike Iron Age and Roman archaeology (Hingley 1996; Sharples 2011). The pioneering phase of archaeobotany in the nineteenth and twentieth centuries saw material collected from archaeological sites passed on to botanists. A typical example is the identification of box leaves adhering to a cremation urn from a tumulus at Bartlow Hills (Gage 1839). The first large-scale archaeobotanical investigation was conducted at Silchester by Lyell and Reid (Robinson 2012). Reid was mainly interested in long term changes in the Pleistocene flora (Reid 1899), but provided the foundation evidence for Roman plant introductions for much of the twentieth century (Godwin 1975). Whilst research focused on the developing field of palynology in the early twentieth century AD, small hand collected

samples continued to be studied for charred and waterlogged remains from prehistoric sites and Roman towns (Grimes 1968; Reid 1917). Helbaek undertook the first synthesis of ceramic impression and charred cereal evidence for prehistoric Britain, associating changes in crops with incoming Beaker people, Belgae and Roman soldiers within the dominant cultural-history model (Helbaek 1952, 1964).

The 1970s saw the rise of systematic sampling alongside criticisms of previous broad cultural-historical interpretations (Dennell 1976a). Murphy's 1977 thesis profited from the introduction of systematic flotation to southern Britain. The application of presence and dominance analysis to archaeobotanical data highlighted changes in crops and related these to socio-political circumstances (Murphy 1977). The focus of development and subsequent rescue archaeology on the river terraces combined with the involvement of archaeobotanists resulted in key studies of charred and waterlogged plant remains from the Upper Thames Valley (Fulford 1992; Robinson 1992a). The identification of changes in crops and agricultural practice was integrated into both site specific and regional models (Jones 1981; Robinson 1981). Similarly, the study of charred plant remains from Danebury in the 1980s emphasised the modes of production of the settlement (Jones 2007). Crop-processing models based on ethnographic observations (Hillman 1981, 1984; Jones, G. 1984, 1987) were applied to a case study of Iron Age and Roman arable farming in north-eastern England (Van der Veen 1992). Developments in urban archaeology focussed on waterlogged plant remains. The consumption of new plant foods was highlighted in London (Willcox 1977) and detailed analysis of waterlogged plant remains was undertaken in York (Hall and Kenward 1990; Hall et al. 1980; Kenward and Williams 1979). These studies focussed on detailed ecological interpretations rather than producing explanatory models of social change.

2.2.2 Archaeobotanical preservation

The major categories of archaeobotanical preservation encountered in Britain are charring, calcium-phosphate mineralisation and anoxic waterlogging. The contrasting situations in which these modes of preservation occur biases the types of plant material that are likely to be preserved. Waterlogging occurs when plant material is deposited in permanently waterlogged anoxic conditions, through the rapid deposition of organic refuse in wet climates, in areas of permanent standing water, or through local hydrological changes. Waterlogging preserves a diverse range of plant material, deposited through either natural or human agency, providing a wide range of evidence for both natural vegetation and human activities (Green 1982). Thus, waterlogged deposits commonly provide evidence for settlement vegetation, settlement activities (animal stabling, textiles working) and plant foods.

In contrast, charring only occurs when plant material is heated in a reducing atmosphere and is largely reduced to elemental carbon (Märkle and Rösch 2008: 257). These circumstances are almost always due to human activity, where plant materials become exposed to heat during fuel use, food preparation, food storage, waste disposal or the destruction of damaged crops (Van der Veen 2007b). These activities can be deliberate, resulting in a higher densities of charred material, or routine every-day activities, resulting in lower densities of charred material (Van der Veen and Jones 2006). Because of this, charred plant remains can be directly related to human activities, yet charred assemblages provide evidence for a restricted range of activities, mainly the processing of staple cereal crops.

Whilst several types of mineralisation have been encountered in archaeological deposits (Jacomet and Kreuz 1999: 62; McCobb et al. 2001), calcium-phosphate mineralisation is the most common (Green 1979b). This type of preservation has been frequently observed in latrine pits, where phosphate is present through the decay of organic material and calcium from bones, shell or calcareous building material (Robinson et al. 2006). The calcium-

phosphate composition of such plant-macrofossils has been demonstrated by elemental analysis (McCobb et al. 2001). Extensive mineralisation requires reasonably rapid levels of decay and a fluctuating water table. Hence, mineralisation most commonly preserves plant remains which have been ingested by humans (Smith 2013), although calcium phosphate mineralised remains have also been studied from middens incorporating animal faecal material (Carruthers 2000).

The mode of preservation also biases which types of plant tissues are more likely to survive. The initial decay of labial material through autolysis and fermentation in waterlogged contexts consumes any available oxygen, prohibiting further microbial activity (Kenward and Hall 2000; Kenward and Hall 2008). The products of this type of preservation are commonly referred to as 'macrofossils', yet no change in composition, and hence no fossilization *per se* has occurred. Seeds with a more lignified composition are more likely to survive fluctuating water conditions, typically fruits with a hardened endocarp such as fruit stones and nutshells, but delicate remains also survive. Waterlogging rarely preserves cereal grains or pulses (Tomlinson and Hall 1996). Cereal chaff and straw are also likely to be under-represented due to their delicate structure (Robinson 1989).

Charring generally preserves a much smaller range of plant material, within which plant taxa and parts differentially survive. Fragile lighter elements, such as rachis internodes and culm nodes are less likely to remain than grains and glume bases, as they turn to ash at lower temperatures (Boardman and Jones 1990). Fruit and vegetable flesh are unlikely to become charred due to their low carbon content, whilst they are also unlikely to be exposed to charring conditions. Oily seeds, such as flax, tend to burn quickly and explode (Wilson 1984). Charring is, however, considered to be the optimal preservation condition for pulses (Van der Veen 2007b: 185; Wiethold 2003: 270). Dense, heavy items, such as grains and nutshells, are also more likely to fall through fires and become protected in ashy layers (Hillman 1981: 140).

The types of plant remains that tend to become mineralised vary with the biochemical and anatomical characteristics of the plant tissues and the extent to which decay has taken place. Where little decay has occurred, only seeds with a permeable seed coat are likely to become mineralised, such as *Malus*. Those with tougher seed coats (*Prunus*, *Rubus*) would not decay and still be impermeable to calcium and phosphate. Where extensive decay has occurred, the preservation of seeds is dependent on the characteristics of the seed coat. A seed coat that is less resilient and simply structured will decay quicker and become mineralised along with the embryo (*Urtica*). Seeds with a more decay-resistant and complex seed coat are less likely to become mineralised, such as *Sambucus* and *Rubus,* and only their embryos will be preserved (McCobb et al. 2001; Robinson et al. 2006).

The contrasting biases of the three modes of preservation are well understood. However, no systematic comparisons of differing preservation type from one site has been undertaken since the work of Green (Green 1982). Syntheses of archaeobotanical evidence for archaeobotany are often undertaken using one type of preservation (Parks 2013), yet changes in cereal cultivation are often paralleled by changes in the use of other plant resources more likely to be evidenced by waterlogging, such as hay (Williamson 2003: 169).

2.3 Interpretation of archaeobotanical remains

Charred, mineralised and waterlogged plant remains are all recovered from archaeological sites through the well-established processes of sediment sampling and flotation, followed by sample sorting and identification of plant macrofossil remains with low power microscopy (Jacomet and Kreuz 1999; Wilkinson and Stevens 2008). The interpretation of the resultant sample level data varies for the three modes of preservation.

2.3.1 Charred plant remains

It was observed early on in the study of charred plant remains that most charred assemblages consist of cereal grain, chaff and arable weeds, along with wood charcoal (Knörzer 1971; Körber-Grohne 1981). Hence, a common origin in the activity of cereal-processing is accepted, although other sources have been identified, including the burning of turves, peat and dung (Charles 1998; Hall 2003). Ethnographic work by Jones and Hillman described the series of crop-processing stages needed to produce clean cereal grain and the composition of each by-product and product (Hillman 1981; Jones, G. 1984). Jones undertook ethnographic study of traditional farming on the Greek island of Amorgos and demonstrated that the physical characteristics of weed seeds vary between crop-processing stages (Jones, G. 1984).

Attempts have been made to use simplified versions of these ethnographic models to identify consumer or producer sites based on the percentages of grain, weed and chaff (Hillman 1981, 1984; Jones 1995), and the proportion of small to large weed seeds (Stevens 2003). These approaches are unsatisfactory due to the mixing of weeds from different crops as well as the differing ratios and survivability of glume wheat, and free-threshing cereal grain and chaff (Jones 1990; Van der Veen and Jones 2006). The combination of ratios of different crop parts (Van der Veen and Jones 2006) and discriminant analysis of physical weed seed types in comparison with ethnographic data (Jones, G. 1984) are the optimal methods for distinguishing crop-processing stages (Bogaard 2004: 65). The pathway between charring and deposition is often not fully explored (Hill 1995a: 22). Some archaeobotanists argue that the majority of charred plant remains derive from repeated daily activities (Fuller and Stevens 2009), whilst others place more emphasis on occasional accidents (Van der Veen and Jones 2006; Van der Veen 2007b). Either way, as long as the internal ratios and physical weed types are consistent with a single crop-processing stage, the contents of a sample can be interpreted as representing a single activity (Bogaard 2011: 151; Hillman 1984: 13), but not necessarily undertaken at one time.

Cultivation practices and the conditions of fields can be deduced from the arable weeds associated with crop remains. Phytosociology, the hierarchical classification of vegetation into communities, has been applied to archaeobotanical assemblages through the identification of indicator species (Jones 1988b), yet phytosociology is unable to deal with changes in weed communities through time. There is a lack of direct correlation between a vegetation unit in an arable field and the taxa that are present in a sample, and phytosociology cannot detect the determining ecological factors affecting the arable flora (Bogaard 2004: 5-7; Van der Veen 1992: 106-108). Alternatively, autecology provides an assessment of the tolerance of individual taxa present in a sample to different environmental conditions, most commonly through the assignment of Ellenberg numbers, thus combatting the problems of phytosociology (Van der Veen 1992: 108).

The Functional Interpretation of Botanical surveys (FIBS) approach lessens the limitations of autecology, the changing plant ecology through time and the blurring of tolerances and requirements, by identifying links between functional attributes and major ecological variables (Bogaard 2004: 7). Functional attributes of plants are direct or indirect measurements of ecological characteristics. The measurement of leaf area, for example, is an indication of plant growth rate (Jones et al. 2005). While FIBS has been successfully applied to several archaeological case studies (Bogaard 2004; Jones et al. 2010), no FIBS field survey data are currently available for Britain. The use of localised Ellenberg values (Hill et al. 1999, 2004) alongside specific plant characteristics, allows for some specific links to be made between weeds and cultivation practices, whilst also investigating broad tolerances to soil fertility, acidity and moisture content (Van der Veen 1992).

2.3.2 Mineralised plant remains

The major interpretative challenge with mineralised assemblages lies in determining whether they reflect the deposition of faecal waste and, if so, human or animal in origin, the *in situ*

preservation of a seed bank, as at the Bronze Age midden at Potterne (Carruthers 2000), or a combination of sources, such as in the Worcester barrel latrine (Greig 1981). In Roman and later sites this problem occurs less often as the construction of pits and material culture associated with them can indicate a latrine pit (Smith 2013). In prehistoric sites the separation is not clear, as at Lains Farm, Andover (Carruthers 1991). Useful criteria are the presence or absence of faecal calcretions, mineralised rootlets, wild vegetation and imported plant foods (Smith 2013), as well as pollen, animal bones, insects and parasite ova (Greig 1981).

2.3.3 Waterlogged plant remains

Unlike charred plant remains, no quantitative interpretative models can be applied to waterlogged plant remains as assemblages usually reflect multiple inputs of anthropogenic and non-anthropogenic origin (Hall et al. 1980; Kenward et al. 1986; Smith and Kenward 2012). Taxa are usually assigned to habitat groups, with several origins then suggested. The most detailed approach has been through the application of abundance indicator values by Hall, which aimed to provide semi-quantitative estimations of the sources of plant remains (Hall and Kenward 1990: 434; Kenward and Hall 1995). However, semi-quantified estimations were produced of a wide range of habitats, many of which would not have been present (Robinson pers. comm.).

Correspondence analysis, an explorative multivariate statistical analysis, has been usefully applied to waterlogged plant remains from several large datasets, facilitating the recognition of patterns (Kooistra 1996; Lange 1990). Recently the identification of 'indicator groups' of bioarchaeological remains, and 'indicator packages' of bioarchaeological and archaeological remains, has been advocated, and it has been suggested that many deposits could result from a single origin, such as stable-manure (Hall and Kenward 1998; Kenward and Hall 1997).

2.3.4 Interpretative basis

Environmental archaeology has been accused of being atheoretical and lacking an engagement with social theory (Thomas 1990). To a certain extent this is still true; many journal articles lack any engagement with social theory when relating archaeobotanical results to broader social changes. Archaeobotany does, however, have a clear theoretical basis. Current archaeobotanical theory owes much to the development of New Archaeology in the 1960s and 70s, where the understanding of culture as a product of human adaptation to the environment and climate placed importance on environmental archaeology (Binford 1972; Higgs 1975). Archaeobotany is an example of 'good' middle range theory, where observations of present day plant ecology can be used to interpret archaeobotanical assemblages (Bogaard 2004: 2-5). These are the identification of plant remains through comparison with modern reference material, and the subsequent knowledge of plant ecology gained through these identifications. As these connections do not directly relate to broader understandings of human behaviour (Charles and Halstead 2001), they are safe from criticisms of formal analogies (Bogaard 2004: 4). Underlying archaeobotany is an acceptance of uniformitarianism, that natural processes observed today operated the same way in the past (Lyell 1830). Thus, species behaviour, and the effects of different modes of preservation, are considered to be the same today as in the past. The resulting archaeobotanical data can be interpreted using models developed from ethnographic and historical observations (Hillman 1981; Jones, G. 1984).

There has also been some limited applications of social theory to archaeobotany. Most focus has been placed on the importance of food consumption, drawing on various post-structural theories to investigate social relations, gender, status and identity (Palmer and Van der Veen 2002; Van der Veen 2008). Bogaard has used practice theory, drawn from Bourdieu, to argue for the agency of farming in the reproduction of social organisation (Bogaard 2004: 3-4; Bourdieu 1977, 1990). The importance of everyday routine action was used to identify different social groupings based on their differing cultivation practices (Bogaard et al. 2011).

Similarly, the distribution of charred plant remains has been used to investigate the organisation of domestic space as a symbolic code (Hodgson et al. 2001; Smith et al. 2001).

2.3.5 Food consumption

Archaeobotany can be used to investigate food consumption, usually with the aim of establishing social identity (Dietler and Hayden 2000; Goody 1982; Twiss 2007). Food is used as a way to emphasise both similarities and differences in social groups (Van der Veen 2007a). In spite of this, the consumption of food is only one aspect of the construction of identity (Jones 1997), and needs to be investigated alongside artefactual and settlement evidence (Meadows 2001). The identification of a plant part as a food is only definitive in exceptional preservation circumstances, such as when plant remains are found within the intestinal tracts of deceased humans, as with the Lindow bog men (Holden 1995). In general, however, the recovery of a cultivated plant part from a settlement context is taken as evidence that it was intended for consumption. Cereals are only considered as crops when they are the dominant crop within a sample (typically 70%) (cf. Bogaard 2004: 67). The consumption of wild plant foods is more challenging to identify, but typically based on frequencies within a site (Bakels 2009; Van der Veen et al. 2008).

At an individual site level, the role of plants in the construction of social identities can be investigated through spatial analysis, as demonstrated by Bogaard's study of the Early Neolithic settlement of Vaihingen (Bogaard et al. 2011), and Bakels' study of the adoption of Roman flavourings at Oss-Ussen in the Netherlands (Bakels et al. 1997). The range of food plants present can be assessed against those consumed in the wider region, leading to the identification of 'luxury' plant foods which are rare and associated with high status communities (Van der Veen 2003). The detailed analysis of the distribution of new plant foods in Roman Britain has demonstrated the presence of several consumer groups through the range of taxa present and chronological patterns of food consumption. Whilst this approach

does allow the comparison of the plant food diet of individual communities within broader distributions, the focus on introduced plant foods instils a bias towards recognising urban styles of consumption (Taylor 2013a).

2.3.6 Food production

The production of food is mainly investigated through the identification of crop-processing stages and cultivation practices from charred plant remains. Once crop-processing stages have been accurately established, samples can be analysed spatially to infer the organisation of social activities within a settlement. Examples are the identification of household food storage at Çatalhöyük (Bogaard et al. 2009), and hand cleaning of grain prior to baking at the Northfleet roadside settlement (Stevens 2011). The lack of free-standing remains in British archaeology limits the application of spatial approaches, although an analysis of the spatial distribution of grain, weed and chaff within Danebury hillfort did produce some correlations with storage structures and housing (Hill 1995a: 23; Jones and Nye 1991).

Crop cultivation practices also have a role in social organisation, through the 'agency of farming practice' (Bogaard et al. 2011: 296). Different household groupings may have invested different labour into their crops through tillage, manuring, weeding and harvesting, and may have had access to different areas of the landscape. These differences would be reflected in the arable weeds. A study of the Early Neolithic settlement of Vaihingen in the Neckar region of southern Germany, demonstrated that different clan groups, identified through their material culture, had unequal access to infield areas and practiced different cultivation strategies (Bogaard et al. 2011: 405). On an inter-settlement scale, Van der Veen has demonstrated a separation between spelt-cultivating, centralised societies inhabiting enclosures south of the Tyne, and groups within small hillforts who practised intensive emmer cultivation (Van der Veen 1992). The importance of land tenure in both the formation and

expression of social bonds has been highlighted recently within Iron Age (Hill 2011) and Roman archaeology (Taylor 2013a, 2013b).

2.3.7 Food exchange

Archaeobotanical evidence for food exchange can also elucidate how settlements were engaged with other socio-economic groupings. Firstly, the identification of non-native food plants demonstrates food importation. The clearest examples are in the case of Roman plant food introductions (Van der Veen et al. 2008). Similarly, the identification of non-native grains and weed seeds indicates that they were imported, such as at Caerleon, London and York (Helbaek 1964; Davis 2004; Straker 1984; Williams 1979). On a more local basis, the identification of arable weeds with strong soil preferences can indicate that crops were moved across geological zones. At Danebury, the presence of weeds of acid and damp ground contributed to the construction of models of redistribution networks (Jones, M. 1984: 488).

The regional patterning of crop-processing remains has been used to indicate the exchange of crops between settlements. Jones has argued that settlements on the gravel terraces of the Upper Thames with grain-dominated samples were producer sites, whilst pastoral settlements on the floodplain were consumer sites, where grain was precious and less likely to be wasted (Jones 1985a). Contrastingly, Stevens argued that sites with more small than large weed seeds were contributing part of their harvest to 'large seeded' sites (Stevens 1996: 248-251). The simplification of archaeobotanical data within these models makes the crop-processing stages represented unidentifiable (Jones 1990; Van der Veen and Jones 2006). Nonetheless, the analysis of regional patterning in the densities of crop products and by-products can be informative in demonstrating regional trade patterns, as demonstrated for Roman East Anglia (Parks 2013).

Archaeobotanical data can also contribute to the identification of market-orientated production. The identification of surplus production beyond the needs of the social group can be based on several factors: calculations of population, area of agricultural land, the cultivation of monocrops, excessive storage space, evidence for the import of grains elsewhere and agricultural buildings (corn driers, watermills) (Bakels 1996; Van der Veen and O'Connor 1998). Horticultural production can be inferred from archaeological remains of garden plots and tools (Van der Veen et al. 2008: 102-104) and the frequency and abundance of archaeobotanical remains of the crops, be it herbs, fruits or nuts (Van der Veen and O'Connor 1998: 135).

2.4 Conclusion

The development of proto-urban oppida and Roman towns in Britain has received much research focus, yet there are still lacuna in the understandings of their physical and social organisation. Whilst a broad understanding of Late Iron Age and Roman agriculture is in place, changes in the cultivation and processing of crops have been highlighted at only individual intensively studied sites. Rigorous quantitative analysis, incorporating multivariate statistics and autecological analysis has yet to be undertaken. Archaeobotany has a long history of study in central-southern Britain providing a large dataset of material. Well-established methodologies and interpretations are in place, and studies of food consumption, production and exchange provide examples of how archaeobotanical data from Silchester and its region can be used to address the three models of arable farming at oppida presented in Chapter 1.

Chapter 3: Environmental and Archaeological Context of Silchester and the Wider Region

3.1 Climate and chronology

The earlier first millennium BC in Britain is often considered to have been a period of climatic deterioration with cooler and wetter weather, based on literary and palaeoenvironmental evidence (Cunliffe 2005: 33; Lamb 1981, 1995; Robinson 2013b: 140). Recent climatic studies indicate cooler summer temperatures than today. Central European tree ring data point to a depression in June to August temperatures from 350-50BC (Büntgen et al. 2011), and chironomid larvae from lake sediments in Northern Britain indicate cooling from 800–450BC (Langdon et al. 2004). The first millennium BC was also wetter, as indicated by peat bog surfaces across north-west Europe (Mauqouy et al. 2008), and palaeoenvironmental records from Britain (Charman 2010). The proposed 'Roman warm period', from c. 150BC-AD400, where olive and vine cultivation limits extended northwards (Lamb 1981, 1995), is demonstrated in a period of temperatures of around 1 °C higher in the later first millennium BC based on British multi-proxy data (Charman 2010; McDermott et al. 2001).

The phasing of Iron Age Britain is problematic due to aspects of the ceramic chronology and plateaus in the radiocarbon calibration curve between 800-400BC (Moore and Armada 2011). The dating scheme followed here is that of Cunliffe (2005), using the broad categories of Early (800-400BC), Middle (400/300-100BC) and Late (100BC-AD43) Iron Ages. Central-southern England has a well defined Late Iron Age, through the presence of imported amphorae, ceramics, coinage and metalware, which can be dated through links with dated contexts on the continent (Willis 2002), although the continuation of Mid Iron Age ceramic forms combined with the absence of imports makes the Late Iron Age indistinguishable at some sites in the Thames Valley (Lambrick and Robinson 2009: 12).

This thesis follows the chronological divisions used by other recent archaeobotanical studies of Roman Britain to ease comparison: Early Roman (first century AD and continuing into the second century AD), Middle (second and third centuries AD) and Late (fourth century AD including those settlements that begin in the third century) (Parks 2013; Van der Veen et al. 2007, 2008) (Table 3-1).

3.2 Description of Silchester

3.2.1 Geology, climate and hydrology

Silchester is situated upon the south-eastern edge of a gravel terrace of the river Kennet (Fig 3-1) (Mathers and Smith 2000). The terrace gravels consist of subangular to rounded flints, with some quartz and quartzite pebbles (Gibbard 1985). The gravel spur overlies a regional area of Tertiary deposits at the edge of the London basin, consisting of various formations of clays and sands (Fig 3-1) (Mathers and Smith 2000). The youngest formation is the Bracklesham Group, including the Bagshot Sands, which are widespread in the Silchester area. In the area between the Kennet and the Loddon Valleys, sands, silts and clays are interbedded, representing either the down cutting of the Bagshot Formation into the London Clay, or a change in the nature of the London Clay itself. Cretaceous chalk emerges to the north-west (Berkshire Downs) and south (Hampshire Chalk) (Fig 3-1). A thin area of Langley Silt (clayey and sandy silt) surrounds the gravel plateau, extending in a triangle between Brimpton, Silchester and Burghfield.

The soils around Silchester are locally variable due to these numerous geological formations. Well-drained, acidic stony sandy brown earth soils are situated over the area of gravel plateau (Fig 3-2), extending around 5km north of Silchester and 20km to the west. To the east of the Silchester gravel plateau lies 5km of slowly permeable loamy clayey soils running down to the River Loddon (Jarvis et al. 1979). Soils of the Kennet Valley are peaty and often flooded.

The Silchester area currently experiences warm summers, with maximum July temperatures of around 20°C and minimum January temperatures of 0.5-3°C. The area receives 650-750mm of rainfall a year (Jarvis et al. 1979) and an average of 1550-1600 hours of sunlight (Met Office 2012). The river Kennet flows 6km to the north-west of Silchester and the river Loddon 6km to the east. A number of springs arise along the southern town walls at the edge of the plateau, providing a limited water supply. Elsewhere within the settlement wells were relied on to provide water.

3.2.2 Local flora and land use

The Holocene flora around Silchester has been largely transformed due to past and modern human activity. Heathland and pine plantations today cover the well-drained brown earth soils of the gravel plateau. Heathland vegetation consists of *Calluna vulgaris* – *Ulex minor* and *Ulex minor* – *Agrostis curtisii* heaths at Tadley and Silchester commons (Crawley 2005). Limited areas of deciduous woodland are still present on areas of acidic clay and sand, consisting of oak, ash and coppiced hazel. These are mainly *Quercus robus* - *Pteridium aquilinium* - *Rubus* sect. *Glandulosus* woodland; grading into *Quercus* spp. – *Betula* spp. – *Deschampsia flexuosa* (Crawley 2005). Away from the plateau gravels, the majority of land is grassland, but there is much local variability, with numerous small arable fields in drier areas around Silchester. Small areas of hay meadow are at present adjacent to the Loddon Valley (Brewis et al. 1996: 43). It is likely that such areas were more common in the river valleys before modern day drainage for pasture (Lodge 1907: 221).

Land within the Thames Basin Heaths NCA is perceived as being very unproductive due to the sandy, clay and acid soils (Natural England 2012a). The gravel plateau soils are free-draining but very stony and acidic, the head deposits around the gravel plateau are both wet and stony, and the clay soils are hard in the summer and impermeable in the winter (Jarvis et al. 1979). Some areas of finer textured soil with better drainage are more suitable for cultivation. One

example is the Titchfield series located around the south-east side of Silchester (Jarvis 1968). Land use statistics for the Thames Basin Heaths in 2009, between Newbury and Weybridge, state that of 767 farm holdings in 2009, 280 were involved with horses or grazing, and 260 with livestock. Only 22% of the total agricultural land contained cereal crops. The main livestock category was dairy (Natural England 2014c). Whilst the type of land use is influenced by environmental factors, the location of modern towns, transport links and the local population also has an influence.

Some palaeoenvironmental evidence is available from Silchester itself (Keith-Lucas 1984; Sheddon 1980; Van Scheepen 1989; Wooders and Keith-Lucas 2000) and from the surrounding floodplains and low gravel terraces (Bradley et al. 1980; Keith-Lucas 1997; Robinson 1992b, 1992c), indicating woodland clearance in the Late Iron Age. There is evidence for medieval open-field systems on the Kennet floodplain terraces at Aldermaston, Ufton Nervet and Sulhamstead (Jarvis 1968: 14), as well as on Silchester common (Boon 1974: 36). In the late eighteenth century, records show parts of the generally wooded region were converted to tillage and improved though the application of chalk and loam (Jarvis 1968: 16). Valleys were also drained, as with the Loddon Valley at Stratfield Saye (Curtler 1912: 505).

3.2.3 Late Iron Age Silchester

Knowledge of Late Iron Age Silchester draws mainly on field surveys, numismatic evidence and archaeological excavations over the last century (Boon 1969; Collis 1983; Fulford and Timby 2000). Coins of the British Q series, commonly referred to as representing the 'southern kingdom', link Silchester with the seat of power of the Atrebates. The COMMIOS on these coins has been associated with the historical Commius who is thought to have been the King of the Atrebates in Gaul before fleeing to Britain. Rulers claiming to be his sons also minted coins at Calleva (Boon 1957; Creighton 2006). The main settlement area is located on the edge of the gravel plateau within the 32ha enclosed by the Inner Earthwork (Fig 3-3). The

discontinuous Outer Earthwork covers a wider area. The Inner Earthwork is currently dated to c. 1AD. A more extensive series of earthworks, including Grim's Bank, are located in the wider area (Astill 1980).

Late Iron Age settlement covered much of the area within the Inner Earthwork. On the Victorian town plan (Fig 3-4), there is a wide distribution of buildings on the Old Town Plan alignment as opposed to that of the Roman street grid, suggesting Late Iron Age structures were distributed across a similar area (Fulford 2003). Late Iron Age occupation has been identified at the edges of the plateau, on the south side of the Inner Earthwork (Boon 1969) and around the South Gate (Fulford 1984). The most detailed evidence for the character of Late Iron Age settlement is provided by the forum-basilica excavations, which uncovered undisturbed Late Iron Age occupation within a 425m^2 area. Period 1 occupation was dated from c. 25BC and consisted of several wells and roundhouses on a planned north-east – south-west oriented layout. Period 2, c. 15BC–AD44 saw the continuation of this layout, with metalled streets, palisaded enclosures and rubbish pits added. The material culture confirms the presence of a high status Late Iron Age settlement with imported Gallo-Belgic finewares, iron and copper alloy brooches, and several luxury glass and shale objects. The food remains were also distinctive, including a high proportion of pig bones, an abundance of shellfish, a very large briquetage assemblage, and olive oil, fish sauce and wine amphorae (Fulford and Timby 2000). A small dataset of charred and waterlogged plant remains was studied from the Forum-Basilica, indicating limited crop-processing activity, the minor presence of bread wheat and cultivated oat, and the introduction of *Agrostemma githago* (Jones 2000). It has been argued that Silchester represents an implanted settlement, potentially of Gallic migrants (Fulford and Timby 2000: 546; Pitts and Perring 2006: 192), with Creighton placing a greater emphasis on the possibility of direct dynastic links with *obsides* educated at the Roman imperial court (Creighton 2006).

3.2.4 Roman Silchester

The Roman civitas capital was located directly over the Late Iron Age oppidum. Roman Silchester had several major public structures including a forum-basilica, public baths in Insula XXXIIA, a large Inn or Praetorium in Insula VIII, several Romano-Celtic temples across the city and a possible Christian church near the Forum in Insula IV (Fig 3-4). An amphitheatre stands outside the north-east walls of the city. Whilst these are part of one of the most apparently complete town plans in the Roman Empire, the Society of Antiquaries excavators were unable to understand deeply stratified archaeology or recognise timber buildings (Fulford et al. 2002). Subsequent excavations have refined the chronology of several structures within the town (Fig 3-5). The first timber phase of the forum-basilica is dated to c. AD43-60 and was succeeded by a major aisled timber structure c. AD85, followed by a masonry structure in the mid second century AD (Fulford and Timby 2000). The amphitheatre was constructed c. AD55-75 (Fulford 1989b) and the town walls in the late second century AD (Fulford 1984).

Silchester is thought to have been ruled as a client kingdom in the post-conquest period (Fulford 2003), and only following Boudica's rebellion in AD60/61 did the town become a civitas capital and a program of imperial building take place (Fulford 2008). Boon understood Silchester as a largely agricultural town, highlighting the presence of corn-drying ovens and possible granaries, barns and threshing floors within the town (Boon 1974). In Insula IX, the density of settlement is now understood to be much greater, however animal husbandry was probably taking place within at least the Outer Earthwork (Fulford and Clarke 2011, Fulford et al. 2006).

3.2.5 Silchester hinterland

The extent of the Silchester hinterland is usually given as the area between the Kennet river, Loddon river, Mid Thames Valley and the Hampshire Downs (Fig 3-6) (Boon 1974: 244). Sites within this area all produce flint-tempered Silchester ware (Fulford and Timby 2000), yet there

is little occupation within a 8km radius of the oppidum (Corney 1984; Preston 2011). A relatively dense Mid/Late Iron Age settlement pattern is being increasingly recognised at the boundaries of this area, through developer-funded archaeology. Sites cluster at the edge of the Hampshire Chalk around Basingstoke, such as at Brighton Hill South and Popley (Fasham et al. 1995; Wright et al. 2009) and on the river gravels of the lower Kennet Valley such as at Pingewood, Aldermaston Wharf and Ufton Nervet (Brossler et al. 2013: 129-130). There was little settlement on the Silchester gravel plateau itself during the Iron Age (Ford and Hopkins 2011; Timby 2012). A mirror burial at nearby Latchmere Green has been dated to 360-110BC (Fulford and Creighton 1998; Garrow et al. 2010), and there was some Late Iron Age occupation at Little London Road and in the area of Mortimer Hill Farm, evidenced through the presence of Silchester ware and other pottery (Fulford 2011). Boon has argued that Late Iron Age Silchester could have supported itself agriculturally from this hinterland (Boon 1974: 53), whilst others have suggested that Silchester was reliant on the Hampshire Chalk for agricultural produce (Sharples 2010: 173).

During the Roman period, Latchmere Green became a small roadside settlement and there was some minor occupation at Mortimer Hill Road and Little London Farm, but no major settlement until the sites at Aldermaston Wharf, Upton Nervet, Meales Farm and Sulhamstead in the Kennet Valley (Brossler et al. 2013). Whilst Boon speculated that the *territorium*, extending 3 km to the north-west and 6.5 km to the south, was farmed by the occupants of Silchester (Boon 1957), it is now considered that cereals must have been imported from beyond the hinterland controlled by the town in the second to fourth centuries AD (Fulford 2011: 3), potentially through passing trade or taxation from the estates of tribal aristocrats (Fulford 1992: 27). The increased range of ceramic vessel types and the presence of regional imports at nearby settlements has been interpreted as showing that the processing of foodstuffs was now taking place in the region rather than within Silchester itself (Timby 2012: 146).

3.2.6 Archaeobotanical preservation at Silchester

Plant remains preserved by charring, mineralisation and waterlogging have previously been identified from Silchester (Jones 2000; Robinson et al. 2006; Robinson 2011). Waterlogged plant macrofossils are preserved due to the local geology of well-drained sandy flint gravels overlying London clay (Mathers and Smith 2000), which produce a perched water table around two metres below the modern ground surface. Wells appear to have been in use throughout the occupation, and many contain organic material preserved in anoxic conditions. Calcium-phosphate mineralised plant remains were present in samples from some Mid and Late Roman cesspits in Insula IX which experienced episodes of waterlogging (Robinson et al. 2006). Charred plant remains were rare from Mid and Late Roman Insula IX, but identified more frequently from Late Iron Age phases at the forum-basilica site (Jones 2000).

3.3 Insula IX 'Town Life' Project

3.3.1 Overview

The University of Reading 'Town Life' project has excavated a 50 x 50m area in the north-eastern part of Insula IX (Fig 3-5), bordered by the main north-south and a subsidiary east-west street through the city. Thus far, the results of the Late Roman archaeology, c. AD250/300-400/500 (Fulford et al. 2006) and Mid Roman archaeology, c. AD125/150-250/300 (Fulford and Clarke 2011) have been published with recent interim reports also available (Fulford et al. 2011, 2012, 2013). The chronology is summarised in Table 3-1. The Late Roman period is referred to here as Period 5. A brief review of the key results is summarised below.

3.3.2 Period 0 Late Iron Age c. 40BC - AD44

Whilst much of the Late Iron Age archaeology is still under excavation, three phases of occupation have been recognised. Phase 1 consists of a v-profiled ditch running north-west – south-east across the trench dated to c. 40-20BC, with several perpendicular divisions running

off it. During phase 2, c. 20BC–AD10/20, a 'Great Hall' was constructed overlying the southern end of the Phase 1 ditch (Fig 3-7). To the north of the hall was well 10421 and a yard or another building. The subsequent Phase 3 occupation overlies the Great Hall, and consists of a north-west – south-east lane and associated pits, wells and boundaries (Fig 3-7). Several rectangular buildings were present alongside a larger building overlying the previous Great Hall. Continuity of occupation from this period to the beginning of Period 1 is currently unclear, although well 8328 is securely dated to AD25-50 (Fulford et al. 2013).

3.3.3 Period 1 Early Roman c. AD44 - AD70/80

A potential military phase has been proposed for the late AD40s, consisting of the north-south street, a sub-rectangular latrine pit, other possible sub-rectangular pits, a series of postholes in the north-east of the trench and many military artefacts (Fig 3-8). Coupled with the presence of a timber building constructed c. AD44-49 underlying the latest forum-basilica (Fulford and Timby 2000), it has thus been suggested the excavation area lies towards the northern border of a military encampment. Within the rest of the excavation area, settlement continued mostly along the same alignment as Period 0. Numerous rectangular and circular timber-framed buildings were present, evidenced mainly by their clay floors. Several had hearths constructed of ceramic building material, but the buildings were probably timber and roofed with thatch. The north-west - south-east and north-east - south-west lanes continued to be used, demarcated by a series of large pits. At least five wells were present, including one with a barrel lining. The end of Period 1 was marked by widespread destruction evidenced by backfilled wells, burnt floors and burnt material beneath the east-west street (Fulford and Clarke 2011).

3.3.4 Period 2 Early Roman c. AD70/80 - AD125/150

Following the previous destruction phase, new structures were laid out within the Insula (Fig 3-9). Two sets of buildings were present, aligned north-east - south-west and separated by a gravelled yard. The northern group consisted of three structures. Early Roman Timber Building (ERTB) 2, the central structure, was a single storey, probably high status, town house with a central reception room. ERTB 3 to the south-west was a round house with a central hearth and votive deposits. ERTB 1 to the north-east was a single roomed building with a tiled hearth and an *opus signinum* floor, interpreted as a service building for ERTB 2. Only one well, 1293, and one cesspit, 5251, were associated with these structures. Of the four south-eastern buildings, ERTB 6 was a probable high status large timber-framed building built on substantial clay wall-footing. ERTBs 5, 7 and 8 were smaller clay-floored structures with central gravel hearths (Fulford and Clarke 2009).

3.3.5 Period 3/4 Mid Roman c. AD125/150 - AD250/300

The settlement layout of Period 3 was largely a continuation from Period 2. Masonry Buildings (MB) 1 and MB 2 replaced ERTB 2 and 3. The buildings were both multi-roomed with geochemical traces of metal working. ERTB 1 remained standing to the north-east of MB 1, which was now used for animal stabling. In the south-east corner, two timber, clay-floored structures of unclear function, MRTB 2 and 3, were built aligned to the north-south street. During the early third century AD, MB 1 and 2 were demolished and replaced with MB 3, a masonry town house with veranda (Fig 3-10). In the south-east, MRTB 2 and 3 were demolished and replaced with MRTB 4 and 5 (Fulford and Clarke 2011).

3.3.6 Period 5 Late Roman c. AD250/300 - AD500/700

Period 5 saw a complete reorganisation of settlement along the north-south - east-west alignment (Fig 3-11). The area was divided into two properties by an east-west boundary

evidenced by a post-hole alignment. To the south stood a masonry building (Building 1), with mixed workshop and living space functions. Structural evidence from the northern area was less clear, with possible timber buildings present. Disturbance to the archaeological deposits hindered the dating of the end of occupation, but artefactual evidence suggested settlement continued at least until the mid fifth century AD and possibly later (Fulford et al. 2006).

3.4 Environmental and archaeological context of the regional hinterland

The regional study area encompasses the broader hinterlands of Silchester in a roughly 40km radius (Fig 1-2). This zone includes parts of several National Character Areas (NCA) (Natural England 2014a) (Fig 3-12). The Thames Valley NCA (115) is referred to as the Mid Thames Valley, and the Upper Thames Clay Vales NCA (108) is referred to as the Upper Thames Valley. To the south-west is the Hampshire Downs NCA, and Silchester is situated within the Thames Basin Heaths NCA (Fig 3-12). Brief overviews are given below of evidence for the environmental setting and settlement pattern.

3.4.1 Regional environments

3.4.1.1 Mid Thames Valley and Thames Basin Heaths

The Middle Thames Valley runs between the Goring Gap and Kingston upon Thames. The floodplain is covered by alluvial clay soils and is bordered by gravel terraces composed of flint, producing acidic free draining soils (Booth et al. 2007: 7) (Fig 3-13). Between the Thames and the calcareous North Downs are the Thames Basin Heaths, areas of tertiary geology (Fig 3-14), producing a mix of free draining acidic soils, heavy stony soils and areas of free draining loam soils (Branch and Green 2004). There is little evidence for flooding during the Iron Age other than at Dorney Lake, Eton (Lambrick and Robinson 2009: 32), with more extensive alluviation evidenced in the later Roman period at Dorney and Staines (Booth et al. 2007: 18-19). Palaeoenvironmental evidence is limited. The study of palaeochannels at Dorney showed

increasing arable activity and potentially managed grassland in the first century AD (Parker and Robinson 2003), whilst Mid Roman evidence from Thorpe Lea Nurseries suggested local arable and heathland (Booth et al. 2007: 26). Away from the Thames, palynological studies of buried soils at Frensham Common, Farnham indicated a development towards heathland during the Iron Age and Roman periods (Branch and Green 2004).

In the Mid Thames Valley, only 33% of the area is considered grade 3 agricultural land, with much non-agricultural and urban land (Fig 3-15). Overall, farming is limited, with pasture being the main use, along with horticulture and arable. Similar numbers of livestock and arable/horticultural land holdings currently exist (Natural England 2012b). There is a similar picture from the Thames Basin Heaths, with only rough grazing on the gravel plateaus, and arable, pasture and water meadows in the valleys (**3.2.2**) (Natural England 2014c).

3.4.1.2 Upper Thames Valley

The Upper Thames Valley runs from Cricklade to the Goring Gap. Unlike the Mid Thames the gravel terraces consist of limestone gravel, producing calcareous or circumneutral free-draining soils. Likewise, most soils of the Upper Thames terraces are calcareous or circumneutral. Away from the river area are clay soils (Fig 3-13). Detailed palaeoenvironmental evidence is available for the Upper Thames Valley. By the Mid Iron Age, the gravel terraces were largely open and utilised for mixed agriculture, with the floodplains mostly exploited for grazing. Seasonal flooding was taking place by the Mid Iron Age as well. The Late Iron Age saw an increasing intensity of arable land cultivation with numerous hedged enclosures and ditched trackways (Lambrick and Robinson 2009).

The Upper Thames Valley is considered more fertile than the Mid Thames, with dense prehistoric settlement evidenced (Lambrick and Robinson 2009). Good arable land is located on the gravel terraces (Fig 3-15), and in the Vale of the White Horse to the north of the

Berkshire Downs. Grazing land is the most common agricultural land use (50%), followed by cereal cultivation (31%). Higher proportions of grade 2 agricultural land use are present than in the other areas (16%) (Natural England 2014d).

3.4.1.3 Hampshire Downs

The Hampshire and Berkshire and Malborough Downs NCAs are part of a belt of Jurassic and Cretaceous sedimentary chalk (Fig 3-14). They are covered by clay with flints on top of the hilltops of north Hampshire and also on the Berkshire Downs. Elsewhere, they have thin calcareous soils today (Fig 3-13), but colluvial deposits suggest a deeper covering of soil in prehistory. Studies of molluscan sequences, colluvial deposits and pollen sequences show that the chalk was largely open downland, and imply cultivation was underway from the Mid Bronze Age (Allen and Scaife 2007). The Hampshire Chalk has a scarp edge running west-east, with undulating chalk downs running south which are cut by several river valleys (Cunliffe and Poole 2000). The Berkshire Downs also have a west-east scarp edge facing the Vale of the White Horse to the north and are drained to the south by the rivers Lambourn and Kennet. The light soils of the Hampshire Chalk have been cultivated since the Neolithic. From the medieval period onwards, much arable farming and sheep grazing has taken place, with water meadows in the valleys. Today, the majority of the land is grade 3 agricultural land (Fig 3-15), and cereals are the main land use, taking up 46% of farmland. Sheep are the most common livestock (Natural England 2014b).

3.4.2 Mid Iron Age settlement

3.4.2.1 Mid Thames Valley and Thames Heaths

The Iron Age regional study are is summarised in Fig 3.16, locating key site types in each area.

Rural settlement is generally rarer in the Mid Thames due to poorer acidic soils in comparison to the calcareous gravels of the Upper Thames Valley (Booth et al. 2007: 69). The only

examples of open settlements are the unpublished sites at Brooklands and Taplow. Settlement at Thorpe Lea Nurseries consisted of postholes, small pits, four post structures and waterholes, whilst settlement at Perry Oaks and Caesar's Camp on the gravel terraces consisted of pennanular and other enclosures (Poulton 2004: 252). There is limited evidence for occupation in the north-west Surrey heathlands, whilst several hamlets with enclosure systems, wells and water-holes have been excavated in the Blackwater Valley (Tongham Nurseries, Runfold) (Lambrick and Robinson 2009: 130). Several hillforts have been recognized at Danesfield, Taplow, St Ann's Hill, and St George's Hill in the Wey Valley but are poorly understood (Poulton 2004) and several are present to the north of the Kennet Valley but have received little excavation (Sharples 2010: 83).

3.4.2.2 Upper Thames Valley

The Upper Thames Valley appears densely settled during the Mid Iron Age with the continuation of Late Bronze Age or Early Iron Age settlements (Lambrick and Robinson 2009). These are characterised by dense pit distributions interpreted as storage pits, small enclosures and four post structures. They are often situated on the higher gravel terraces and interpreted as mixed farming settlements. Examples in the Dorchester area include Ashville/Wyndyke Furlong (Parrington 1978), sites surrounding Castle Hill, Little Wittenham (Allen et al. 2010), and, away from the Thames, at Halfpenny Lane (Ford 1990) and Woodcote Road (Timby et al. 2005) (Fig 3-16). Open settlements and small farmsteads occur on the floodplain and lower terraces. These areas are characterised by houses marked by penannular enclosures, small enclosures and paddocks. They are thought to be mainly for pastoral settlement. Several hillforts were present at Castle Hill, Little Wittenham and Rams Hill, Wantage (Lambrick and Robinson 2009).

3.4.2.3 Hampshire Downs and Berkshire and Marlborough Downs

Mid Iron Age settlement on the Hampshire Downs was dominated by 'developed' hillforts, which had emerged in the Early Iron Age. The intensively studied area around Danebury shows surrounding smaller hillforts were abandoned in the third century BC as population moved into the larger hillfort. Enclosed settlements with storage pits and four post structures, such as Lains Farm and Houghton Down, were also abandoned (Cunliffe and Poole 2008). To the east, in the area around Winchester, enclosed farming settlements continued (Collis 2001). On the Berkshire Downs, hillforts constructed in the Early Iron Age were remodelled at the beginning of the Mid Iron Age, and there is limited evidence for enclosures and cultivation (Miles et al. 2003).

3.4.3 Late Iron Age settlement

3.4.3.1 Mid Thames and Thames Heaths

The Late Iron Age largely saw the continuation of Mid Iron Age settlement in the Mid Thames, with enclosed settlements on the London clay of East Berkshire, in the lower Kennet Valley at Thames Valley Park, Reading (Barnes et al. 1997), in the Blackwater Valley at Tongham, and further east, at Perry Oaks and Ashford Prison (Lambrick and Robinson 2009: 118). The only oppidum was Silchester.

3.4.3.2 Upper Thames Valley

The Late Iron Age of the Upper Thames was characterized by increasingly concentrated settlement activity. Settlements were mostly surrounded by sub-rectangular ditched enclosures, either alone or grouped within larger systems of enclosures and trackways. There is a general lack of evidence for roundhouses and storage pits (Booth et al. 2007: 35). Several 'enclosed' oppida were present in the valley bottom: Cassington, Abingdon and Dyke Hills,

Dorchester. The only territorial oppida were on the uplands to the north of the valley at Bagendon and Grim's Ditch (Lambrick and Robinson 2009).

3.4.3.3 Hampshire Downs

The Late Iron Age on the Hampshire Downs is marked by the abandonment of Danebury and the reoccupation of surrounding enclosed settlements such as Suddern Farm (Cunliffe and Poole 2000). New forms of settlements also emerged, including small rectangular enclosures (Winnall Down) and further banjo enclosures (Gussage All Saints), which appeared first in the Mid Iron Age (Sharples 2010). An increasing number of banjo enclosures can also be recognised on the Berkshire Downs (Winton 2003), where there does not appear to be any continued occupation of the hillforts (Lambrick and Robinson 2009: 61).

3.4.4 Roman settlement

3.4.4.1 Mid Thames Valley and Thames Heaths

The Roman regional study are is summarised in Fig 3.17, locating key site types in each area. The main Roman road from London to Silchester crossed the Thames at Staines, where a small town developed from the mid first century AD (McKinley 2004), yet rural settlement shows a continuation from the Late Iron Age. There was an increase in the number of settlements on gravel terraces and floodplains, particularly between the Kennet and Loddon and east of Slough, possibly associated with the use of pasture. As with the Upper Thames, there are suggestions of settlement discontinuity in the second century AD. Examples can be found at Park Farm, Binfield (Roberts 1995), Ufton Nervet and Bath Road Slough (Booth et al. 2007: 66). A number of villa-type buildings were present in later periods, such as at Basildon, Maidenhead, and around Henley. Some of these had corn driers, but these were investigated prior to the development of modern excavation techniques (Booth et al. 2007: 59).

3.4.4.2 Upper Thames Valley

Following the Roman invasion, a vexillation fort was constructed at Alchester to the north of the valley (Sauer 2000) and a possible fort at Dorchester (Booth et al. 2007: 36). Roads were constructed from Silchester, north-west across the Berkshire Downs to Cirencester, possibly north to Dorchester and onwards to Alchester, avoiding most of the valley bottom. Small towns developed along these at Dorchester, and possibly at Abingdon, from at least the mid second century AD.

Evidence for rural settlement in the lower half of the Upper Thames is not as clear as the well-studied sites in the north-western half, but settlements such as Barton Court Farm, Ashville and Mount Farm do show continuation from the Late Iron Age. Discontinuity in settlement occurs in the early second century AD, first noted by Lambrick (Lambrick 1992) at Barton Court Farm, and later at Appleford and in the Vale of the White Horse at Watchfield (Birbeck 2001). New settlements were established in the second-fourth centuries AD on the Corallian ridge and to the east of Abingdon. Land use also intensified with evidence found for horticulture, haymaking, and more field systems and trackways. Villas were constructed in the area around Dorchester, including at Barton Court Farm, and in the Goring Gap (Booth et al. 2007).

3.4.4.3 Hampshire Downs and Berkshire and Marlborough Downs

The Claudian invasion had little obvious effect on the Hampshire Downs and Late Iron Age settlements continued. The civitas capital of *Venta Belgarum* at Winchester developed on the site of the oppidum Oram's Arbour on the southern edge of the chalk and a small town at Neatham on the eastern edge of the Chalk along the road from Silchester to Chichester (Millett and Graham 1986). In the Mid-Late Roman period numerous villa estates developed in the Test Valley on the site of Late Iron Age settlements. These were aisled buildings with both agricultural and domestic functions such as Grateley and Fullerton (Cunliffe and Poole 2008).

The Berkshire Downs have little evidence for villas other than at Maddle Farm, whilst several were located at base of the scarp in the Vale of the White Horse (Gaffney and Tingle 1989).

3.5 Conclusions

The location of Silchester within a landscape of tertiary geology and marginal agricultural land explains why a non-agricultural basis (Model 3) of the settlement has been advocated. Yet the local environment does encompass much variation, with opportunities for arable and pasture, which must be evaluated against archaeobotanical data. The Insula IX 'Town Life' Project provides a suitable case study for exploring archaeobotanical change through time against the background of the local environment. Variation is also marked in the regional study area, both in environmental conditions and archaeological settlement between the Mid Iron Age and Late Roman periods. The multiple variables of chronology, landscape setting and settlement type allows for the full analysis of the models proposed in Chapter 1, in order to establish where agricultural changes are strongly associated with oppida, or grounded in local environmental and social strategies.

Chapter 4: Methodology

4.1 On-site sampling at Insula IX, Silchester

4.1.1 Sampling strategy

The primary dataset used to evaluate the models of arable farming at oppida is archaeobotanical data from Insula IX, Silchester. The initial plant macrofossil sampling strategy, established in 1997, consisted of bulk samples of 10-20 litres (L) taken from a range of contexts for charred plant remains (Robinson et al. 2006). The size of bulk samples decreased over time, to around 6L in 2009. Following the commencement of this thesis in 2010, 40L samples were taken where possible. Bulk samples were taken from a wide range of contexts from all feature types in all areas of the excavation. For extensive features, separate samples were taken from each grid square. This systematic sampling method, which took samples to the agreed strategy (Campbell et al. 2011: 11), resulted in samples from a wide spread of feature types from across the excavation area. Bulk samples were also taken for mineralised plant remains from phosphate-rich soils and sewage deposits, initially of 10-20L. Concentrated sewage deposits were additionally sampled by smaller samples of 1L distributed across the deposit (Robinson 2011). 10L samples were initially taken from waterlogged deposits, but these later increased to 20L due to the low concentration of waterlogged plant remains (Robinson 2011: 281).

4.1.2 Sample processing

The majority of bulk samples were processed on-site in a modified 'Siraf' flotation tank (Williams 1973), with the sample volume recorded in litres. Due to the length of the project and staffing variations, minor changes in the heavy residue mesh and flot sieve sizes occurred over time (Table 4-1). The relatively large residue mesh size (2mm) was used due to the large proportion of small gravel, and the large flot mesh size (0.5mm) due to the high proportion of

clay sediment which caused sieve blockages. The biases which may have led to the loss of small items from samples, such as *Juncus* spp. seeds, have been incorporated into the discussion of the archaeobotanical data. Most waterlogged samples were also processed on site due to the large sample sizes. The associated risk of modern contamination (Keepax 1977) was minimised by the regular cleaning of equipment and the efficient storage of waterlogged flots in jars of water. Samples from sewage deposits were floated on-site with a smaller mesh (Table 4-1), and the entire residue was retained. Flots from mineralised samples were stored in water due to the potential presence of semi-waterlogged material.

4.2 Waterlogged plant remains

4.2.1 Sample selection

All waterlogged flots from Periods 0, 1 and 2 wells were assessed using a binocular microscope (10-40x), and the abundance of waterlogged plant remains was recorded. The chronological and spatial selection of samples was limited to those wells where ancient plant remains were identified. Limited work had been undertaken previously on two Late Iron Age wells (8328 and 10421) (Lodwick 2010). Further samples from these wells were selected for study, alongside all samples from the four remaining Early Roman wells. Waterlogged plant remains were also present in the flot of a sewage deposit (8059) from Early Roman well 15034. Previously published data from waterlogged, charred and mineralised samples from the Mid and Late Roman periods were integrated into this study (Robinson 2011; Robinson et al. 2006).

4.2.2 Identification and quantification

Waterlogged samples were sub-sampled if assessment had indicated that more than 400 items were present (Kenward et al. 1980). Flots were suspended in water within a 0.25mm sieve and half of the contents were removed until a suitable sample size was obtained. The 0.25mm size fraction often contained a hyper abundance of *Juncus* spp. seeds and frequently required sub-

sampling. Waterlogged seeds were sorted and extracted under 20-40x magnification using a binocular microscope. Two approaches were taken to quantification due to the varied contents of waterlogged samples. Samples with good preservation and a large number of items were fully quantified. If seeds were fragmented, certain features were selected per seed to establish a minimum number of individuals (MNI). Vegetative plant remains, such as *Pteridium aquilinium* fronds, were semi-quantified using a four-point scale of abundance (+ = 1-10, ++ = 11-50, +++ = 51-250, ++++ = 250+). Samples with poorer quality preservation from wells that already had several fully quantified samples were semi-quantified using the same scale.

Any archaeobotanical remains obtained from sorted residues were added to the sample counts. Waterlogged seeds were identified using the seed reference collection housed in the Oxford University Museum of Natural History (OUM), with reference to published seed atlases (Cappers et al. 2012; Neef et al. 2011) and available keys (Juncaceae key – Robinson pers. comm.). Nomenclature was based on Stace (1997). The term 'seed' has been used to refer to any reproductive unit produced by a plant, including nutlets, fruits and achenes, in order to simplify discussion. The term cf. has been used where identification is not definite, but most likely. Wild taxa are referred to in text with their Latin binomial; the common name is supplied in Catalogue 1. Cultivated and collected plants are initially referred to by their Latin binomial and subsequently by their common name. A catalogue of identified plant items is provided in Catalogue 2, detailing individual identification criteria. All of the seeds in fully quantified samples were extracted and stored in 70% ethanol solution within glass tubes, and labelled with their site code, sample number and context number. Waterlogged plant remains from semi-quantified samples were returned to jars of water in a cool dark place. Modern seeds were distinguished due to their inflated appearance, intact endosperms or cotyledons, bright colour and more rigid appendages (Robinson 1989).

The results from multiple samples from one context were combined in order to produce summary tables and to conduct univariate and multivariate analysis. The assignment of wells to period is securely based on ceramic spot dating and stratigraphy. No further chronological breakdown is available for the Period 1 wells, but may be obtainable through continuing post-excavation analysis, and will be published in forthcoming excavation monographs expected 2016-2020 (Fulford pers. comm.).

4.2.3 Univariate analysis and habitat codes

In terms of their depositional processes, wells have an intermediate position between lake-shore settlement deposits (Jacomet 2013) and natural sequences of sediments (Birks 2014), as multiple human and natural processes contribute to the assemblages of plant remains (Greig 1988b). Common sources of plant remains include soil wash, animals, local vegetation and domestic and agricultural refuse (Hall et al. 1980; Kenward et al. 1986; Smith and Kenward 2012). Hence, in order to disentangle the origin of each sample, various methods have been used. The following summary statistics were calculated for individual taxa grouped by periods and features: total number of items, frequency and maximum number of items per context. Particular attention was paid to the presence of potential food, medicinal and other economic plants. The range of cultivated plant foods available in Iron Age and Roman Britain are well known (Booth et al. 2007; Van der Veen et al. 2008), and any additions were identified with reference to Mediterranean evidence (Dalby 2003).

Whilst no evidence is available for Iron Age medicines, various sources of information are available for Roman medicine (Table 4-2), namely classical encyclopaedias (Celsus: De Medicina; Pliny: Natural History), herbals (Dioscorides: De Materia Medica) and pharmacological works (Galen; Grant, M. 2000). Yet extrapolation from these to archaeobotanical material is hindered by mistranslations, uncertainties of modern botanical

equivalents and a lack of information on which plant part was used (Totelin 2010). Collyrium stamps contain the names of salves, the contents of which are occasionally described in the literary works (Baker 2011; Boon 1983), yet medicinal practice and salve ingredients are known to have varied throughout the empire (Baker 2011: 159; Davies 1970: 102). Artefactual studies from Britain have, however, demonstrated that Roman style medicine was practiced (Boon 1983; Jackson 2007; Morrison 2013). The small number of previous archaeobotanical identifications of medicinal plants in the Roman world rely on chance finds of exceptionally preserved plant remains, rather than directed analysis (Bosi et al. 2011; Buurman 1988; Ciaraldi 2000; Davies 1970; Knörzer 1967). Potential medicinal taxa are summarised in Table 4-2. The frequency, abundance and distribution of these taxa have been assessed, alongside the evaluation of 'structured deposits'.

The majority of waterlogged samples consist of non-economic taxa derived from diverse vegetation types. To investigate broad patterns, the approach of placing taxa into habitat groups was utilised. Taxa were placed into one of seven groups (Table 4-3) based on information drawn from the British flora (Stace 1997) and local flora (Brewis et al. 1996; Crawley 2005). The assigned groups represent where the taxa most likely occurred in the Silchester environs, with unlikely habitats such as shingle banks or mountain slopes excluded. The habitat groupings were used to calculate the sum of taxa per group per context, as well as the average diversity of the group per period, and the frequency per period at which any member of the habitat group were present. The same groupings have been used to classify taxa in correspondence analysis plots (**4.2.4**).

4.2.4 Correspondence analysis

Correspondence analysis has been used to explore variation in the waterlogged dataset. It is a type of pattern searching multivariate statistical analysis, particularly useful for exploring large

complex datasets where the extrinsic variables are not known. Of the range of pattern searching approaches available (Cluster Analysis, Primary Component Analysis), correspondence analysis is the most suitable because it deals well with zeros (Kooistra 1996: 35) and displays the variation in taxa and samples on the same axis (Lange 1990). It has been used successfully to explore variation in waterlogged assemblages from settlements (Kooistra 1996; Lange 1990).

The statistics are calculated on the proportions of taxa present within samples rather than their individual abundances. The variation within the dataset is displayed along four axes, with the first displaying the most significant variation. The most common taxa and similar samples group in the centre of the plot. Taxa or samples that are the most dissimilar plot at the opposite end of the axes. Correspondence analysis was performed using CANOCO version 4.5 and the results were plotted using CANODRAW version 4.1 (Ter Braak and Ŝmilauer 2002). Samples from the same contexts were combined prior to analysis, to avoid biasing the analysis by essentially repeating a data point (Jones, G. 1991). In order to maximise the amount of data which could be included, reduction of the waterlogged dataset was undertaken. All cf. identifications were merged with definite identifications and taxa present in under 5% of samples were excluded (Table 4-4). Family codes refer to the first three letters of the botanical family (e.g. API = Apiaceae), following Stace (1997). A summary of the samples and taxa included are provided with each plot. Samples or taxa located on the extreme edges of the distribution, or the 'noise', were removed as they were causing an exaggerated effect on the plot. In order to interpret the ordering principles of each axis, taxa were coded by their habitat group. Samples were coded by their well, deposit type (**4.2.6**) and period. Numerous analyses have been run, but only those most successful in exploring the distribution of samples have been included in this thesis.

4.2.5 Identification of plant communities

The contents of samples have been considered against the groupings of the National Vegetation Communities (NVC) scheme (Rodwell 2006). The application of phytosociological classifications to archaeobotanical data are limited by the changing biogeographical range of taxa over time, the mixed nature of archaeological samples, and the likely existence of different vegetation management systems in the past (Hodgson et al. 1999). Yet the scheme is based on data from the British Isles and does provide a broad interpretative tool. Plant communities have been suggested through comparison of archaeobotanical sample contents with NVC taxa floristic tables, which list the frequency and abundance of taxa.

4.2.6 Qualitative investigation

Alongside univariate and multivariate analysis, qualitative investigation of samples has been conducted. The identification of indicator groups has become an increasingly popular approach to the analysis of waterlogged plant remains, resting on the concept that characteristic death assemblages of plants and animal remains represent an activity or ecology (Hall and Kenward 1998; Hall and Kenward 2003; Kenward and Hall 1997; Kenward and Hall 2012). A key limitation of applying this approach is that palaeoentomological data are currently only available for well 8328 (Robinson 2013a), but artefactual and stratigraphic information was available from the Silchester Integrated Archaeological Database (Fisher et al. 2010).

Prior to the evaluation of each context for the presence of potential indicator groups, the formation processes of each well were considered in order to allow a more accurate interpretation of the origin of the plant remains. The locations of the well shafts have been assessed in relation to other structures, and any evidence for well lining has been considered in order to understand when material could have entered. The stratigraphic, contextual and

artefactual information have been analysed to discern whether each context represents a primary fill, gradual accumulation or organic/non-organic dump with reference to published work on pit (Bersu 1940; Cunliffe 1995; Hill 1995a) and well formation processes (Greig 1988b; Hall et al. 1980; Van Haasteren and Groot 2013) (Table 4-5). The contents of samples from the first two categories are more likely to represent local vegetation and daily activities occurring in the area around the well shaft, whilst those in the second two categories are more likely to represent 'packages' of associated sediments and artefacts, such as middens. The contents of these deposits were considered against the identification criteria for indicator groups described in the archaeobotanical literature (Hall and Kenward 2003; Kenward and Hall 1997).

Utilising the contextual artefactual data, contexts containing waterlogged assemblages were also investigated for the presence of 'structured' deposits. These are assemblages, usually in pits and wells, where the contents have been interpreted as the 'ritual' deposition of deliberately placed 'rubbish' (Chadwick 2012; Garrow 2012; Hill 1995a). The separation of 'ritual' and 'mundane' assemblages has been thoroughly critiqued (Bradley 2005; Brück 1999), and the concept of ritualisation (Bell 1992) is now used to explore depositional activities (Chadwick 2012). Structured deposition has been increasingly recognised in Late Iron Age and Roman wells and pits, including examples from Silchester (Eckardt 2006, 2011; Fulford 2001). The possibility that plant remains represent an aspect of ritualised deposition has been suggested by some authors (Fulford 2001; Van Haasteren and Groot 2013), but not integrated into many individual case studies of structured deposition. Whilst the restriction of waterlogged plant remains to well fills limits any comparison with any 'non-ritual' signature from the surrounding settlement (cf. Cool and Richardson 2013), wells do represent major depositional foci. In order to assess the involvement of plant remains within ritualised deposits, methods for examining artefacts and zooarchaeological remains have been extended to archaeobotanical remains, namely assessing co-occurrences, separate occurrences and

repetitions of food and potential medicinal taxa (Table 4-2) (Cool and Richardson 2013; Hingley 2006; Roskams et al. 2013; Van Haasteren and Groot 2013).

Densities of individual samples have been used to evaluate the presence of these plant remains in contexts where finds assemblages indicate ritualised deposition (intact pots, quernstones, animal bone groups and rare artefacts) (Fulford and Timby 2001; Morris 2008; Shaffrey 2003). Based on previous identifications of plant remains from ritualised depositions, criterion of 20 items/L is suggested here as a tangible human deposit – roughly a handful (Robinson 2002: 98) spread over a context.

4.3 Charred plant remains

4.3.1 Sample selection

Assessment was undertaken of the 1195 charred flots available at the end of 2012 which chronologically pre-dated Period 3 (Table 3-1). The rough abundances of cereal grain, chaff and weed seeds, and any modern contamination, were recorded. In order to investigate crop-processing and cultivation practices, samples should contain at least 30 identifiable weed seeds and 50 crop items (Bogaard 2004), and ideally 300-400 items to be sure that the contents of the sample are a statistically significant representation of the entire contents of the context (Van der Veen and Fieller 1982). The study of samples from primary deposits is also preferable, as they are more likely to be unmixed and therefore provide information on cultivation practices.

There were low numbers of charred plant remains (<25) in most samples, especially those deriving from the later first century AD. Only 4% of the available samples contained more than 25 charred plant remains, all of which were selected for analysis. Samples were also analysed

which contained rare food plants (*Olea europaea*, *Prunus domestica*). Details of all assessed samples are held in the project archive.

4.3.2 Identification and quantification

The charred flots selected from Periods 0-2 were fully sorted under a binocular microscope at 10-40x magnification. All plant remains were extracted. No sub-sampling was required, as few samples contained over 400 plant remains. Charred plant remains from previously sorted residues were combined with the flots. Identification was undertaken with comparison to the OUM seed reference collection and available cereal identification guides (Hillman et al. 1996; Jacomet 2006). Nomenclature is based on Stace (1997), with cereal names following traditional terminology (Zohary et al. 2012: 29). Identification criteria are listed in Catalogue 2. The identification of cereal grains was problematic due to the overlap in grain morphology between species and distortion caused by charring.

The following MNI counts were applied to fragmented cereal items: the embryo end for cereal grains, the tops of rachis internodes for rachis fragments, the base of glume bases for spikelets, and culm nodes for straw. This approach was adopted as these are the parts most likely to survive in poorly preserved material (Jones, G. 1990). Charred nutshell was quantified as number of fragments. All identified items were extracted from samples and stored within a glass tube, labelled with site code, sample number and context number.

Results were summed from multiple samples per context, and are referred to by the lower sample number. The phasing of Period 2 contexts in this study is considered correct. Period 0 and 1 phasing is based on ceramic spot dating and stratigraphic interpretation. Some contexts may be reassigned between Period 0 and 1 at a later date, but phasing is considered largely

secure (Fulford et al. 2011, 2013, pers. comm.). Any subsequent refinement in phasing will be detailed in forthcoming excavation monographs.

4.3.3 Summary statistics

Initial data standardisation merged all cf. and definite identifications. The first stage of analysis was the calculation of summary statistics for individual taxa grouped by period: total number of items, frequency and maximum number of items per sample. The density of each sample has been calculated as the number of items per L, or the number of crop items (excluding cereal indet. grains) where stated, and compared between feature types and periods. Density can reflect the rate of deposition, rate of burial, distance for site of burning and use as fuel (Van der Veen 2007b). It has been argued that the relative density of charred crop remains within a region shows the scale of cereal processing and consumption taking place (Van der Veen and Jones 2006).

Further data standardisation was undertaken (Table 4-6), in order to amalgamate rare categories. The cereal component of each sample has been grouped by crop category, whilst the remaining sample contents have been grouped into 'cultivated', 'wild' and 'woodland/other' groups (Table 4-6). These groups have been used to plot sample pie charts on spatial plans of the excavation area in order to explore variation in sample composition.

4.3.4 Correspondence analysis

Correspondence analysis (CA) (**4.2.4**) was applied to the reduced charred dataset, in order to investigate the patterning within the assemblage. Samples were classified by the proportion of the dominant crop type, harvest height and total items to ensure that these factors were not contributing to the variation displayed on the plot.

4.3.5 Identification of non-arable components

The potential origins of plant remains from ritualised activity and medicinal use has been explored (**4.2.3**). Charred plant remains have been identified from ritual deposits in several contexts in the Roman world, including public temples (Zach 2002), Romano-Celtic temples (Vandorpe and Jacomet 2011) and in domestic settings (Robinson 2002). Charred cereal grains in Iron Age storage pits and four post structures have also been attributed a 'ritual' origin (Van de Noort et al. 2007; Williams 2003). The recognition of plant offerings is usually based on the identification of dense deposits of plant foods not usually exposed to fire during processing, combined with architectural associations, and written or artistic sources. Criteria have here been adapted from artefactual and spatial studies of ritualised activity (Hingley 2006; Smith 2001), to examine the spatial distribution, density, and abundance of plant foods and medicinal taxa. The spatial distribution of potential medicinal taxa (Table 4-2) has allowed their status to be evaluated further.

4.3.6 Assignment of arable status

The origin of charred plant remains is usually considered to be crop-processing by-products in Britain, although charred dung (Carruthers 2010: 71), turves (Hall 2003), fodder (Van der Veen 2007b: 983-984), hay (Fairbairn and Austin 2001) and heathland fuel (Campbell and Pelling 2012) have been occasionally identified. In order to identify such sources, the ecology of taxa, whose common habitat in floras was not arable or waste ground (Clapham et al. 1962; Stace 2010), were considered based on their flowering time, ecology, and behaviour in correspondence analysis (Table 4-7). The same criteria were applied to the less frequent taxa which had been removed from the reduced dataset, but that were still utilised for discriminant analysis. Some of the archaeobotanical taxa identified include species whose arable status is unclear (*Stellaria palustris*), but that cannot commonly be separated from probable arable weeds (*Stellaria graminea*). In these cases the arable status of the most frequent species

within the merged archaeobotanical taxa were considered. Ecological data were extracted from various sources (Clapham et al. 1962; Grime et al. 1988; Hanf 1983; Hill et al. 2004; Stace 2010; Streeter 2009). *Eleocharis palustris*, whilst not recorded in modern arable conditions, is frequent in the region, has been observed in damp field edges (Robinson pers. comm.), and is widely accepted as an arable weed of fields abutting flood plains (Jones 1978: 109; Jones 1988a: 45). *Brassica* sp. contains taxa that are consistent as arable weeds, but that also represent potential food resources. Samples with a high proportion of *Brassica* sp. were removed. *Veronica hederifolia* was excluded as it frequently derives from modern contamination, unless it had been clearly identified as charred. *Lithospermum arvense* was removed when it plotted as an outlier, as it preferentially survives the charring process (Robinson and Straker 1991: 7).

4.3.7 Ratio analysis

Following the exclusion of samples which were not derived primarily from crop-processing by-products or products, each sample has been assigned to a crop type. When chaff and grain of one crop type (Table 4-8) were both present, the maximum number of chaff or grain items present was used. Each sample was assigned a crop type and level of contamination dependent on the percentage of one crop type present (Table 4-9). Samples containing a mix of crop types (spelt and barley) were removed from consideration as they cannot be derived one crop-processing stage, and so cannot be used in the following weed ecology analysis. Ratios of barley grains to barley rachis and glume wheat grains to glume wheat glume bases were calculated (Table 4-10). Ratios are limited by the preservational biases between cereal chaff and grain (Boardman and Jones 1990), but as it is known that chaff is under-represented, this has been integrated into the interpretation of ratios. These ratios were utilised to separate fine-sieve products containing mainly clean grain (FSP), from fine-sieve by-products containing

spelt glume bases removed after de-husking (FSBP), and early stage by-products containing barley rachis (ESBP).

4.3.8 Discriminant analysis

To complement the results of ratio calculations, discriminant analysis (DA), a form of canonical ordination analysis (Jones, G. 1991), has been used. Weed seeds were classified by characteristics relevant to their behaviour during crop-processing: aerodynamic qualities, headedness and size. Measurements of the second largest dimension of a seed were taken from several sources (Beijerinck 1947; Berggren 1969, 1981; Nesbitt 2006). After considering the taxa present in uncontaminated FSP and FSBP samples, a size boundary of 2mm was set between 'small' and 'big' weed seeds.

Weeds were categorised based on previous physical groupings (small vs big, headed vs free, heavy vs light) (Catalogue 3) (Jones, G. 1984; Van der Veen 1992). 'Headed' weed seeds remain as a cluster, spike or head after threshing, whilst free seeds do not. 'Light' weed seeds have a low density and aerodynamic shape, and are most likely to travel upwards during winnowing. 'Heavy' weed seeds are denser and less aerodynamic, and fall to the ground sooner during winnowing (Jones, G. 1984: 55). All weeds considered as arable taxa were included in the analysis. The discriminant scores were obtained by running a discriminant analysis in IBM SPSS Statistics Version 21 using the Amorgos ethnographic data as control groups (winnowing by-product, coarse-sieve by-product, fine-sieve by-product, fine-sieve product). Samples were entered that contained at least ten seeds that had been categorised into one of Jones' groups. These were then classified using the discriminant scores. P values of ≥ 0.9 were classified as high probability results (Bogaard 2011: 155).

The results from ratio and discriminant analysis have been combined to assign a single crop-processing stage to each sample. Corresponding results were accepted as correct. On some occasions, ratio analysis classified a sample as a FSBP, and DA produced the result of FSP. This category has been described as 'pre-sieved FSBP'. These most likely represent fine-sieve by-products from the dehusking of spikelets which had previously been sieved to remove most small weeds. The possibility of 'pre-sieved' spikelets was raised initially by Stevens (Stevens 2003: 69-71), and whilst the simplified approach used to investigate their presence has been critiqued, the potential variation between clean spikelets and un-sieved spikelets has been advocated (Bogaard 2011: 152; Van der Veen and Jones 2006: 110).

4.3.9 Investigation of cultivation practices

Autecological methods have been used to investigate cultivation practices. In this study, autecological data have been collected from local floras (Brewis et al. 1996; Crawley 2005; Stace 2010) and other ecological publications of British Ellenberg numbers (Fitter and Peat 1994; Hill et al. 2004) (Table 4-11). A summary of the autecological data used for the Silchester and regional data analysis are provided in Catalogue 3. As crop-processing affects the ecological characteristics of weeds present at each stage (Hillman 1981, 1984; Jones, G. 1984, 1987), weed ecologies have only been investigated in samples classified by ratio analysis and DA as deriving from the same crop-processing stage (Bogaard 2004: 64-66). The weed contents of samples were entered into correspondence analysis (CA). Sample plots were coded by period and feature type, and taxa plots coded by various autecological values in order to explore the relationship between archaeological and ecological variables.

4.4 Mineralised plant remains

Mineralised plant remains were the final category of plant macrofossils investigated from Insula IX. The only sewage deposit to produce mineralised remains was sample <2304> (8059)

from well 15033. During the assessment for charred plant remains, mineralised remains were also observed in a flot from well 5100, which was subsequently selected for analysis. Ceramic spot dates and stratigraphic analysis place wells 5100 and 15033 in Period 1.

The large mineralised residue from sample <9078> (15033) was divided into size-fractions (4mm, 2mm, 1mm, 0.5mm) and then sub-sampled using a riffle box. Sub-samples varied in proportion, from 1/8th of the 2-4mm fraction to 1/64th of the 0.5-1mm fraction. Items were identified in comparison with the OUM reference material, often aided by the removal of layers of cells from modern seeds. Many small seeds were unidentifiable due to the absence of a seed coat.

In order to establish whether calcium-phosphate remains derived from primary deposits of human faeces or mixed midden material, the mineralised assemblages have been considered against the criteria derived from studies of mineralised remains elsewhere in Britain (Carruthers 1988, 2008b; Smith 2013).

4.5 Society of Antiquaries dataset

Plant remains from the Society of Antiquaries excavations at Silchester were studied by Clement Reid and Arthur Lyell, and published within the annual excavation reports (Reid 1901-1909). Samples consisted of a spade of sediment taken from undisturbed contexts at specific depths in wells and pits. Samples were wet-sieved though sieves of maximum aperture 0.16 cm. The plant remains were dried, and then sorted by eye, before full identification by Reid (Boon 1976). The plant remains were transferred to Reading Museum in 1925 (Amsden and Boon 1975; Jones 2000). The collection contained mounted archaeobotanical remains, alongside charcoal, wood, and an extensive seed and wood reference collection. All ancient plant remains were re-identified in comparison to the modern reference collection housed in the OUM. A few charred and mineralised items were present. However the majority of items

consisted of dried out waterlogged plant remains mounted on cardboard slides, making identification challenging. Hence, many of the identifications have been recorded as cf. but were probably originally accurate. The number of items per slide was recorded, but probably reflects arrangements for museum display (Thomson 1924).

All information written on the slides or labels was also recorded: Latin name, common name, year of excavation, Insula, feature number and depth of sample (Catalogue 4). Additional information was gained from the published annual reports and a reanalysis of the coarse wear ceramic collection which provided dates for some sampled features (Timby 2012). Scope for reanalysis of the dataset was limited, due to the little contextual information available. Most taxa were not recorded again after an initial identification, so presence and absence by Insula could not be ascertained. Nevertheless, limited inferences have been made on the co-occurrence of taxa, and the point in the excavation campaign that taxa were first identified.

4.6 Regional study area

4.6.1 Data sources

The regional study covered an area of c. 40km radius around Silchester (Fig 1-2), including sites dated to the Mid Iron Age – Late Roman periods (Table 4-12). An overview of the regional environment and archaeology was provided in Chapter 3. Archaeobotanical reports were collected from regional archaeological journals from the last thirty years: *Berkshire Archaeological Journal*, *Proceedings of the Hampshire Field Club and Archaeological Society*, *Oxoniensia*, *Records of Buckinghamshire* and the *Surrey Archaeological Collections*. Excavation monographs were also consulted, and unpublished data were kindly supplied by archaeobotanists working in the region. Grey literature was also supplied by *The rural settlement of Roman Britain* project (Allen pers. comm.; Fulford and Holbrook 2011) and through online repositories of commercial archaeology units.

Numerous excavation reports only contained assessment level archaeobotanical reports. Where these contained species level identifications they were included. Sites where modern contamination was highlighted were excluded, as were evaluation trenches with poorly understood stratigraphy. Fully quantified sample by sample data were collected from charred, mineralised and waterlogged samples and entered into an excel spreadsheet. Each period at a site was listed as a separate record with a unique record number, and full bibliographic information is supplied in Catalogue 5. Every sample was ascribed a unique sample number. Report quality was assessed following Van der Veen et al. 2007.

Metadata were also collected: site type (Table 4-13), feature type, sample size/L, preservation, type of excavation and national grid reference (NGR). The National Character Area (NCA) that a site is present in was also recorded. These are divisions created by Natural England, based on both cultural, economic and landscape factors (Natural England 2014a). A more detailed landscape classification was gained from assessing geology, soil, hydrology and elevation (Cranfield Soil and Agrifood Institute 2014; NERC 2014) (Table 4-14). The following GIS shape files were used: watercourses (Ordnance Survey 2013b), digital terrain model (Ordnance Survey 2013c), National Character Areas (Natural England 2014a), geology (EDINA 2014), soil (LandIS 2014), Roman road network (Ancient World Mapping Center 2014) and UK administrative boundaries (Ordnance Survey 2013a). The following copyright statement applies to all figures. *Contains Ordnance Survey data © Crown copyright and database right [2014]. Geological Map Data © NERC 2014.*

4.6.2 Taxa standardisation and reallocations

Due to the various archaeobotanical terminology used over the last 30 years, standardisation of identification categories was necessary:

- All cereal/Poaceae and chaff indet. were excluded
- All *Triticum aestivum*, *Triticum aestivum-compactum*, and free-threshing type was recorded as free-threshing wheat grain
- All *Triticum spelta*/*aestivum*, *Triticum* hexaploid was recorded as *Triticum* sp.

Data reallocation was undertaken so as to retain species level ecological information, but to ensure as much information could be entered into CA (Table 4-15). Taxa proportionately reallocated between seeds identified to species or genus level in the same sample were the following: *Bromus*/*Avena* sp., Chenopodiaceae indet., Cyperaceae indet., *Galium* sp., *Papaver* sp., *Plantago* sp., *Ranunculus* sp., *Stellaria* sp., *Urtica* sp. and *Veronica* sp.

4.6.3 Data analysis

The presence of plant foods in the regional study area has been assessed through spatial distribution, and the frequency by site category and period over time. The analysis of crop-processing stages has been conducted following the method outlined above (**4.3.6-8**). The distribution of crops, arable weeds and plant foods through the landscape has been assessed using ArcGIS Desktop.

4.7 Oppida and Roman town comparison

4.7.1 Chronological and spatial definitions

Summary archaeobotanical data were collected from all oppida within Britain (Pitts 2010), including those phases dated to the Mid and Late Iron Age. Data were collected from all major Roman towns, utilising the same chronological subdivisions as the regional study area (Table 4-12). The definition of major town used was all colonia, municipia and civitas capitals: Caerwent,

Cirencester, Colchester, Dorchester, Exeter, Leicester, Lincoln, London, Silchester, Verulamium, Winchester, Wroxeter and York (Mattingly 2007).

4.7.2 Data collection methodology and analysis

Summary archaeobotanical data were collected from published archaeobotanical reports from major town excavations. Reports were located through the *Environmental Archaeology Bibliography* (University of York 2008), the *Archaeobotanical Computer Database* (Tomlinson and Hall 1996) and recent theses (Livarda 2008a; Parks 2013). Presence data of food plants were collected on a 'record' basis, following the methodology of Van der Veen et al. (2008), with each record consisting of the plant remains present per preservation category per period of one site. In addition to the presence of cultivated and wild plant foods, records of fodder remains, exotic weed seeds and the presence of broad categories of crop-processing remains (clean grain, late stage product, late stage by-product, early stage by-product) were recorded. The standardisation of plant foods followed Van der Veen et al. 2008. NGR and the number of samples per record were also recorded. Report quality was assessed following Van der Veen et al. 2007. The analysis of the town comparisons was restricted to univariate analysis and qualitative comparison. The frequency of plant foods per period and per town category has been displayed with bar charts.

Chapter 5: Overview of the Silchester Archaeobotanical Assemblage

5.1 Archaeobotanical sampling locations

This chapter presents a summary of the archaeobotanical samples studied from Silchester Insula IX and a comparison of the categories of plant remains identified within the waterlogged, charred and mineralised datasets. A reassessment of the archaeobotanical assemblage studied by Clement Reid from Silchester is then given. A total of 105 samples were analysed from the Late Iron Age and Early Roman phases of Insula IX. The addition of published samples from the Mid and Late Roman phases produced a total of 124 samples (Table 5.1).

5.1.1 Waterlogged samples

Waterlogged samples were analysed from six Period 0 and 1 wells and data were provided for three previously analysed Period 4 and 5 wells (Table 5.2).

Well 10421: Period 0 well located in the centre of the excavation area, to the north of the Great Hall (Fig 5-1). The well was an unlined circular shaft. Four contexts were studied, dated to c. 20/10BC-AD10/20.

Well 8328: Period 0 well located in the north-west corner of the excavation area (Fig 5-1). The well was an unlined 3.7m deep circular shaft. Five contexts were studied dated to c. AD30-55.

Well 1586: Period 1 well located at the southern edge of the north-east – south-west Iron Age lane (Fig 5-2). The well was an unlined 2.95m deep circular shaft. Two contexts were studied.

Well 3171: Period 1 well located on the eastern edge of the Insula between two clay-floored buildings (Fig 5-2). The well was an unlined 3.6m deep circular shaft. Seven contexts were studied.

Well 5100: Period 1 well located in the centre of the excavation, between two clay floored buildings (Fig 5-2). The well was lined with a reused barrel.

Well 5791: Period 1 well located in the western half of the excavation (Fig 5-2). The well was an oval-shaped shaft, over 2m deep.

Well 5735: Period 4 well adjacent to the north-south street (Fig 5-3). The well was a circular 2.1m deep shaft. Two contexts were studied (Robinson 2011). The well was in use from the beginning to the end of the first quarter of the third century AD.

Well 1750: Period 4 well adjacent to the north-south street (Fig 5-3). The well was a circular 4m deep shaft. The well had been largely excavated by the Victorians, leaving just two basal contexts which were both studied (Robinson 2011). The well was constructed in the first half of the 3rd century AD and was backfilled in the late third century AD.

Well 1300: Period 5 well adjacent to the east-west street in the north-west corner of the excavation area (Fig 5-4). The well was a 2.55m deep ovoid shaft. Two contexts were studied (Robinson et al. 2006).

5.1.2 Charred samples

Charred samples were analysed from 81 contexts, most of which were from Late Iron and Early Roman Periods 0-2 (Table 5.3). Phasing is clarified in section **4.3.2**.

Period 0: Samples were studied from 22 contexts, mainly from ditches and refuse pits in the western half of the excavation area (Fig 5-5).

Period 1: Samples were studied from 32 contexts, primarily from refuse pits (Fig 5-6).

Period 2: Samples were studied from 20 contexts, largely from hearths and occupation deposits within ERTBs 1-3, 5-6, and 8 (Fig 5-7).

Period 4: Samples were studied from two pits with secure phasing at the southern and western edges of the excavation (Fig 5-8) (Robinson 2011).

Period 5: Samples were studied from five pits with secure phasing, located in the open areas to the west of several buildings (Fig 5-9) (Robinson et al. 2006).

5.1.3 Mineralised samples

Mineralised samples were studied from nine contexts.

Period 1: Samples were studied from two contexts from backfilled wells 15034 and 5100 in the eastern half of the excavation (Fig 5-10).

Period 2: Samples were studied from two contexts within the large cesspit 5251, adjacent to the east-west street (Fig 5-11) (Robinson 2011).

Period 5: Samples were studied from five contexts from cesspits in the open areas to the west of several buildings (Fig 5-12) (Robinson et al. 2006).

5.2 Comparison of modes of preservation

Full results of the analysis of waterlogged, charred and mineralised samples are available in Catalogue 1. Given the uneven chronological and spatial distribution of samples containing differentially preserved plant remains, the composition of each preservation group has first been investigated. The biases of the three modes of preservation mean different plant remains are more likely to be represented in the three different datasets (**2.2.2**). These biases have been reassessed using the Insula IX material.

5.2.1 Types of plant macrofossil

The frequency of different types of plant macrofossil clearly varies between preservation types (Table 5-4). Cereal grain, chaff and arable seeds are present in over 48% of charred samples, whilst all other categories occur in less than 15% of samples. The oil-rich seeds *Linum usitatissimum* (flax), *Papaver somniferum* (opium poppy) and *Brassica sp.* (mustards) only occur in several samples, and pulses are only present in 7% of samples. Their low frequency may be due to cooking techniques or their fragility (Green 1982: 42). Most categories are more frequent in the waterlogged assemblage, such as oily seeds, fruit stones and nutshell. Cereal

chaff is more frequent than grain, and pulses are completely absent, highlighting the increased likelihood of seeds with large endosperms, but without woody exteriors, to decay quickly. Although the mineralised assemblage is much smaller, pulses and fruit stones (interior casts) are at their most frequent, and oily seeds and cereal grain are also common. Nutshell is absent, as it would not have decayed until after mineralisation had taken place. Furthermore, there are no vegetative items present, other than *Pteridium aquilinum* (bracken) fronds. The presence of lignified seeds (*Rubus* sp.), and seeds with simple (*Urtica* sp.) and permeable (*Pyrus/Malus* sp.) seed coats confirms the findings of McCobb et al. (McCobb et al. 2001). Whilst the physical biases of each preservation mode clearly do contribute to the range of taxa present, they do not explain the low frequency of nutshell and fruit-stones from charred samples, indicating that other factors are involved.

5.2.2 Location of preservation

Charred remains were recovered mainly from pits, ditches, well back-fills and levelling deposits, as well as some primary deposits in hearths and occupation layers. Hence most of the charred assemblage represents plant remains deposited away from where charring occurred. The distribution of waterlogging was much more limited, only occurring in deep wells and some deep pit contexts in association with mineralised remains. In the latter, only fruit stones with hardened endocarps (*Prunus* sp.), and seeds with lignified testas (*Rubus* sp.) were present, indicating fluctuating anoxic conditions in which delicate remains were not preserved. Similarly, mineralisation was almost completely restricted to sewage deposits, which were identified due to the dense, sticky sediment with visible plant remains and small bones. The Mid and Late Roman sewage deposits were recovered from latrine pits (Robinson 2011; Robinson et al. 2006), where as the Early Roman sewage deposits are currently interpreted as dumps in backfilled wells (Fulford et al. 2013). The disparity between mineralisation and waterlogging supports assertions that mineralisation takes place in deposits with fluctuating water conditions, where only decay resistant plant remains are preserved anoxically (Carruthers

1993; Kenward and Hall 1995: 717-719). The key preservational filter in the charred assemblage was the initial charring process, whilst anything that was deposited purposefully or accidentally into wells and cesspits was preserved respectively by waterlogging or mineralisation.

5.2.3 Habitat grouping

The sorting of taxa into habitat groups reveals further patterns (Table 5-5) when combined with the frequency of the most common taxa (Table 5-6), present in at least eight samples. Cultivated plants are present in over 70% of all samples, yet the type of cultivated plants differ: cereal chaff and grain in charred samples, oil seeds, fruit stones, nutshell and cereal chaff in waterlogged samples, and fruit stones, pulses, cereal grain and oil seeds in mineralised samples (cf. Table 5.6). Regarding the non-cultivated plants, all habitat groups are most frequent in the waterlogged assemblage.

Plants of permanent waste ground habitats, the 'disturbed' category, are very frequent in waterlogged samples (91%), but only in 67% of mineralised samples and 20% of charred. Nine different taxa were present only in waterlogged samples, but only *Urtica dioica* and *Atropa belladonna* were present only in the charred and mineralised samples (Table 5-6). Contrastingly, annuals of disturbed nitrogen-rich ground ('disturbed arable' category) are present in over 70% of all samples. In waterlogged samples, the most common taxa are *Urtica urens* (79%), *Polygonum aviculare* (74%) and *Stellaria media* (71%). In charred samples, *Bromus secalinus* (48%), *Chenopodium album* (32%) and *Polygonum aviculare* (27%) are most common. In mineralised samples, the most frequent taxa are *Urtica urens* (78%), *Stellaria media* (56%) and *Bromus secalinus* (44%). There is a surprising similarity in species, indicating shared sources, which could be either arable weeds, dung from animals fed on crop-processing by-products and/or high seed producing weeds that were growing within the settlement.

Grassland plants were also most frequent in the waterlogged assemblage (97%), originating from varied habitats. These include plants of dry sandy or gravelly soils (*Ornithopus* sp. and *Rumex acetosella* agg.), calcareous soils (*Daucus carota* and *Scabiosa columbaria)*, and damp grassland (*Filipendula ulmaria* and *Rhinanthus* sp.). Grassland plants are also present in 47% of charred samples, but the most frequent taxa are small legumes, which could have been arable weeds, *Medicago lupulina* (21%) and *Trifolium* sp. (21%). Other grassland taxa are not so frequent, but occasionally abundant – *Prunella vulgaris* (10%, n=22), *Ranunculus acris*/*repens*/*bulbosus* (*a. r. b*.) (9%, n=46) and *Stellaria graminea* (5%, n=17). A smaller range of grassland taxa are represented in mineralised samples by lower numbers of items: *Medicago lupulina* (22%, n=1), *Prunella vulgaris* (11%, n=1).

Heathland plants were largely restricted to waterlogged samples. The most frequent are bracken fronds, *Danthonia decumbens* seeds, *Calluna vulgaris* seeds and shoots, and *Ulex europaeus* (gorse) spines. A bracken frond is present in one mineralised samples, and Ericaceae indet. capsules were recorded in one charred sample. A restricted range of woodland taxa is also present largely in the waterlogged and mineralised samples. The most common taxa in the waterlogged assemblage are *Rubus* sect. *Glandulosus* (71%), *Corylus avellana* (hazel nutshell) (38%) and *Betula* (35%). *Rubus* sect. *Glandulosus* (7%) and hazel nutshell (6%) are also the most frequent in charred samples. The three species present in mineralised samples are all edible: *Rubus* sect. *Glandulosus* (56%), *Fragaria vesca* (wild strawberry) (44%) and *Crataegus* sp. (hawthorn) (1%).

Similarly, plants of wetland are far more frequent in waterlogged samples. These included aquatic plants (*Ranunculus* subg. *Batrachium*), bankside plants (*Lycopus europaeus*) and marshland plants (*Apium nodiflorum*). The most common were *Eleocharis palustris* (91%), *Ranunculus flammula* (65%) and *Mentha aquatica* (41%). *Eleocharis palustris* is present in 58% of charred samples, but other wetland plants are only present in single samples:

Schoenoplectus lacustris (n=8), Iridaceae indet. (n=1) and *Persicaria hydropiper* (n=1). These plants are absent from the waterlogged assemblage. In the mineralised assemblage, only *Eleocharis palustris* was recorded (22%). Several broad identification categories are frequent across all preservation types, the most common of which were *Carex* sp. and *Rumex* sp.

The waterlogged assemblage contains a high frequency and diversity of many habitat groups, strongly suggesting that many samples contained plant remains from a range of sources. Contrastingly, a low diversity of non-cereal components is present in the charred assemblages, many of which were likely to have been arable weeds. The range of non-cultivated plants in the mineralised assemblage largely represents wild plant foods or arable weeds consumed alongside cultivated foods.

5.2.4 Comparison of preservation through correspondence analysis

Correspondence analysis was conducted on all Insula IX samples containing 15 items or more, and all taxa occurring in at least eight samples (Table 5-6). Charred samples are located on the positive x-axis, mineralised samples plot mainly on the negative y-axis, and waterlogged samples plot in a tight group on the positive y-axis (Fig 5-13). Hence the type of preservation is the most important factor in explaining variation in sample composition, yet there is some overlap between charred and waterlogged, and charred and mineralised samples. This overlap is explained when the contents of each sample are classified by their habitat group (Fig 5-14). The charred and mineralised samples at the positive end of the x-axis contain cultivated and disturbed (arable) taxa. The waterlogged samples at the negative end, and the charred samples closest to them, contain wetland and various taxa, but also plants of disturbed (arable) habitats. The subsequent classification of cultivated plants by their food group shows that the pattern is mainly explained by the presence of grain and chaff at the positive end of the x-axis, the limited presence of flavourings and fruits at the negative end of the x-axis, and flavourings and fruits on the negative y-axis (Fig 5-15).

In order to explore the overlap at the positive end of the x-axis, the mineralised samples were removed (Fig 5-16). The separation between the charred and waterlogged samples on the x-axis is largely retained, but a few charred samples group with the waterlogged samples at the negative end. Variation on the x-axis is still controlled by the presence of cereal grain and chaff at the positive end, and their absence at the negative end (Fig 5-17). The distribution of samples of both preservation types along the y-axis is now explained by the presence of disturbed (arable) taxa at the positive end and grassland, wetland and various taxa at the negative end (Fig 5-18). The charred samples which plot amongst the waterlogged samples, <1533>, <1681>, <1917>, contain small proportions of cultivated taxa, and more various, wetland and grassland taxa.

5.2.5 Concluding remarks on preservational differences

Whilst the type of plant remains and location of preservation are significant, the most important factor affecting sample composition is human activity. Charred samples are mainly composed of cereal grain, chaff and arable weeds, most likely derived from crop-processing. Mineralised samples contain foods most likely to have been consumed by humans, and the diversity of the waterlogged assemblage strongly suggests a range of plant resources were transported into Silchester by the inhabitants.

The biases of each preservation type have clear implications for the evaluation of the three models of agriculture at Silchester. Each preservation category does contain atypical plant macrofossils: non-edible seeds in mineralised samples, seeds of wetland and grassland taxa in charred samples, and cereal remains in waterlogged samples. Yet the usefulness of these components is limited. Cereal remains within the waterlogged assemblages are too mixed amongst other vegetation types to facilitate the detailed investigation of crop-processing stages or cultivation practices. The presence of charred plant remains in all periods has facilitated the investigation of cereal production, but the presence of wetland and grassland

taxa requires a detailed analysis of the formation processes. The investigation of foddering practices and on-site/off-site vegetation through waterlogged plant remains is restricted to Periods 0-1 and 4-5. The investigation of plants foods beyond cereals is possible in all periods, but the absence of mineralised samples from Period 0 has limited the recognition of pulse and fruit consumption.

5.3 Society of Antiquaries data

5.3.1 Reassessment of the collection

The archaeobotanical collection of Clement Reid, housed in the Reading Museum, contained a total of 302 slides and containers, resulting in around 1000 re-identifications summarised in Table 5-7. Plant remains were first recovered from the north-eastern Insulae excavated in 1899, and thereafter all areas subsequently excavated up to 1908 (Fig 5-19). The confirmation and reidentification of cultivated taxa and plant foods are described here. The presence of several archaeophytes was also confirmed; *Chenopodium hybridum*, *Chenopodium murale*, *Coronopus squamatus* and *Onopordum acanthium* (Preston et al. 2004). Reid's identification of *Chenopodium bonus-henricus* was incorrect.

The identification of many of the seeds published by Reid was confirmed by the reassessment of the collection. These taxa are marked 'AR' in Table 5-7. Significant confirmations are two single stones of *Mesiplus germanica* (medlar), both from Insula XXXIII (Fig 5-20). Other confirmed cultivated and collected plants were *Apium graveolens*, *Anethum graveolens*, *Coriandrum sativum* (Fig 5-21), *Ficus carica*, *Pyrus/Malus*, *Morus nigra, Prunus spinosa* and *Vitis vinifera*. The box leaves described by Reid from Pit XIII in 1902 were present in the collection alongside unlabelled leaves, potentially those mentioned in the publication of the 1908 excavations of the north-east Insulae. Some of Reid's identifications could not be confirmed as the items in the collection were in poor condition. *Apium graveolens* from Pit

XVII Insula 23 was recorded as Apiaceae indet. Four seeds identified by Reid as *Brassica campestris* (turnip) from pit 8 in Insula 27 could only be identified as *Brassica* sp.

Further items in the collection were reidentified. Stones of the evergreen shrub *Prunus lusitanica* (portuguese laurel) were identified by Reid in samples from the northern area of the town, and from the baths Insula XXXIII. The single specimen present in the archive was identified as *Prunus* sp. and *Prunus lusitanica* is very unlikely (Fig 5-22). Reid claimed to have identified pea from the centre of the town (Reid 1908: 211), yet only a box of unlabelled celtic bean was present in the collection. Reid identified large plum stones on several occasions and described them as similar to the Orleans plum (Reid 1905: 368). From the collection of *Prunus* stones in the museum collection, *Prunus domestica* ssp. *domestica* was only reidentified from the area excavated in 1907 to the south and east of the Forum, probably from the latrine deposit in House 3, Insula XXXV. All other *Prunus* stones were identified as sloe, damson and sweet cherry. The items identified by Reid as *Brassica alba* (white mustard) from a well in Insula 22 were reidentified as fungal bodies (Fig 5-23).

Several collected taxa identified by Reid were absent from the collection. *Rubus idaeus* (raspberry), *Crataegus* sp. (hawthorn) and *Corylus avellana* (most likely nutshell) were identified from the northern Insulae excavated between 1899-1900, but were not present. Reid also recorded a single flax capsule from the northern Insulae, and a flax seed from the north-east area, but these were also absent from the archive. Finally, several taxa were present in the collection in addition to those published by Reid (1899-1909). An intact *Pinus pinea* (stone pine) cone and numerous bracts and seeds were present in the collection. They appear to be genuine archaeological material based on the presence of iron staining, consistent with previously waterlogged material, but were only included in Boon's publication (Boon 1957).

5.3.2 Range of taxa present

The range of cultivated plants was broadly similar to Insula IX. As flotation was not used, very few charred plant remains were recovered (Table 5-7). Spelt wheat was identified from two pits in the north-east and south-east areas. Those plants identified later on in the excavations can be interpreted as rarer within the town. Pear/apple, bullace/damson, celery, coriander, dill, fig, grape, plum and sweet cherry were all recorded in the initial study of the northern Insulae 1899 (Reid 1901), suggesting they were common in Roman Silchester. Contrastingly, *Mespilus germanica* (medlar) was only identified from the baths Insula XXXIII 1903/4 (Reid 1905) (Fig 5-19). Hazel nutshell, raspberry and wild strawberry were recorded in the initial report (Reid 1901) but not mentioned again. Blackberry, opium poppy and sloe were present in a probable latrine deposit excavated in room No. 4 of House No. 3 on the northern edge of Insula XXXV, alongside cherry, fig and plum, indicating that wild plants food were also consumed (Reid 1908: 213). Black mustard was identified from Insula XXXIV (Reid 1907). Of the at least 54 samples studied by Reid, the remains of several cultivated plants were notably absent: fennel, flax seeds, olive and cereal chaff. However, no phasing information was available for any of the wells containing cultivated plant remains (Timby 2012).

5.4 Summary of archaeobotanical data from Silchester

Correspondence analysis has shown that the key variable governing the contents of each sample is the mode of preservation. Hence the distribution and quality of each assemblage will strongly effect the evaluation of the models of arable farming. The waterlogged dataset from Insula IX is very good, spanning occupation at the site, and is also spatially diverse in Period 1. The anaerobically preserved plant remains are characterised by wild plants, especially those of grassland, and a wide range of plant foods. The charred dataset is largely restricted to Periods 0-2, and the small sample size has limited the evaluation of crops, crop-processing and cultivation practice in the following chapter. The mineralised assemblage has provided the

strongest evidence for a range of plant foods, although all deposits are dated to the Roman period.

Assessment of the Clement Reid collection has shown that the archaeobotanical identifications made were largely accurate, and that there is concurrence between the published reports and the surviving archaeobotanical material. Whilst the dataset lacks contextual and chronological detail, it does provide good evidence for the diversity of plant foods consumed, which will be integrated into the synthesis of plant foods at major towns in Chapter 8.

Chapter 6: Analysis of the Insula IX Archaeobotanical Assemblage

6.1 Waterlogged plant remains

6.1.1 Univariate and multivariate analysis

The composition of waterlogged samples from individual wells is now summarised. Cultivated plants were present in small quantities in all periods. These included cereal chaff of the Iron Age crops spelt and barley, and potential wild food resources hazel nutshell, blackberry and elderberry. A range of flavourings and fruits were also recorded which have previously only been identified from Britain post AD43 (Van der Veen et al. 2008), including olives, cherry, celery, coriander, dill and fennel. However, the most abundant and frequent taxa in the waterlogged samples were annual weeds, and grassland and wetland plants. A list of samples studied, with the number of taxa, total number and density of seeds identified, is provided in Table 6-1. *Juncus* ssp. and Poaceae indet. seeds have been excluded as, although these were hyper-abundant, their small size means that their relative proportions may have been affected by the variation in sieve sizes. Table 6-2 summarises by period the sum, frequency, and maximum number per sample of all taxa identified. The composition of summed samples per context has been displayed stratigraphically. Poaceae indet. and *Juncus* ssp. seeds were excluded from these totals as they were hyper-abundant, as were indet. seeds as there abundance was strongly affected by the quality of preservation. Vegetative plants remains have not been included in the graphs as the quantifications methods are not comparable to seeds.

6.1.1.1 Period 0 wells

The three basal contexts from well 10421 (10442, 10441, 10439) were dominated by disturbed-arable taxa (Fig 6-1). The sample from context (10436) is not discussed as it

contained fewer than 10 seeds. The most abundant species were *Capsella bursa-pastoris* (n=531), *Polygonum aviculare* agg. (n=267), *Stellaria media* gp. (n=217), *Urtica urens* (n=111) and *Chenopodium album* (n=73). The two taxa (cf. *Sisymbrium* and *Fallopia convolvulus*), which were uniquely present waterlogged in well 10421, are both annuals of waste/rough ground or arable weeds. *Fallopia convolvulus* was also present in both the charred and mineralised assemblages. Context (10438) contained a low-density (4 seeds/L) of poorly preserved plant remains, which were dominated by *Sagina* sp. There were small proportions of disturbed ground, grassland (*Hypochaeris* sp. and *Ranunculus repens*) and wetland plants present (*Eleocharis palustris* and *Isolepis setacea*). The two lowest contexts (10442, 10441) produced introduced food plants: two endocarp fragments of *Olea europaea* (olive) in context (10442), *Apium graveolens* (celery) in both contexts, and one seed of *Coriandrum sativum* (coriander) in context (10441).

Well 8328 contained a more diverse range of taxa (Fig 6-2A). The lowest fill (9663) examined was dominated by annuals of disturbed (arable) ground, mainly *Capsella bursa-pastoris* and *Polygonum aviculare*. The next fill, (9309), was visibly rich in organic material. The samples investigated consisted almost entirely of laminated vegetative material and cereal bran, accompanied by abundant seeds. This context had an increased proportion of cultivated plants, largely flax seeds and capsules. There was also an increased proportion of disturbed ground (*Sagina* sp. and *Urtica dioica*), grassland (*Prunella vulgaris*, *Ranunculus repens*, *Rhinanthus minor*) and wetland taxa (*Eleocharis palustris*, *Ranunculus flammula*). In context (9258), the increased proportion of wetland plants was due to the abundance of *Eleocharis palustris* (34%), and *Urtica dioica* (20%) accounted for the increased representation of the disturbed ground group. Context (9257) was dominated by the wetland taxa *Eleocharis palustris* and *Mentha aquatic*a (combined 56%). The last context to produce plant remains (9152), contained a much lower density (14.3 seeds/L), and largely consisted of poorly preserved *Solanum* sp. seeds (30%), indicating that the composition was affected by poor preservation. This well was the

only one to produce *Calluna vulgaris* (heather) shoots, seeds and capsules, and contained the most diverse range of heathland plants (bracken, gorse). Celery and coriander were again present, as well as flax seeds and capsules, *Triticum spelta/dicoccum* (spelt/emmer) glume bases, *Anethum graveolens* (dill) and a single *Malus* sp. (apple) pip. In sample <3219> from context (9309), flax remains co-occurred with *Spergula arvensis*, a typical weed of flax fields (Campbell and Robinson 2009). The inclusion of all vegetative items (eg. bracken fronds), *Juncus* spp. and Poaceae indet. seeds has highlighted the importance of heathland, grassland and wetland vegetation in well 8328 (Fig 6-2B). However, this had reduced the proportion of cultivated and disturbed ground taxa. As such only seeds (excluding Poaceae indet. and Juncus spp.) are displayed in the following graphs, but the presence of vegetative items is discussed in text.

6.1.1.2 Period 1 wells

Both contexts from well 1586 contained similar quantities of disturbed (arable), wetland and grassland plants (Fig 6-3). The two fills, contexts (3932) and (3981), were characterised by a low-density of plant remains (average 24.8 seeds/L), but a wide diversity of taxa, including grassland plants (*Filipendula ulmaria*, *Prunella vulgaris, Ranunculus repens*) and disturbed (arable) plants (*Aphanes arvensis*, *Solanum nigrum*, *Stellaria media*). The most abundant taxa were plants of disturbed (arable) ground: *Polygonum* aviculare (n=50), *Urtica* urens (n=20) and *Capsella bursa-pastoris* (n=14). The cultivated plants present were celery, coriander and spelt glume bases.

The lowest three contexts of well 3171 were mainly composed of disturbed (arable) taxa, whilst the upper three contexts were gradual accumulations with a more mixed composition (Fig 6-4). In the well as a whole, plants of disturbed ground were the most abundant: *Urtica urens* (n=1234, 57%), *Stellaria media* (n=401, 43%), *Urtica dioica* (n=378, 43%) and *Polygonum aviculare* (n=274, 43%). Heathland plants, cereal chaff and bran were absent, and only a small

range of wetland and grassland plants were present. Cultivated plant remains were particularly frequent, especially coriander (43%), flax seeds (43%) and dill (29%), along with the only waterlogged *Prunus avium* (sweet cherry).

The silty backfill of the barrel-well 5100 (7828) was the only context from this feature to produce a small assemblage of plant remains, consisting mainly of *Eleocharis palustris* (n=6), *Urtica dioica* (n=5) and *Taraxacum* sp. (n=3) (Fig 6-5).

Finally, Period 1 well 5791 produced the most diverse and well-preserved assemblage of plant remains. The composition of all contexts was similar, with the most abundant habitat groups being disturbed (arable), various, grassland, wetland and cultivated (Fig 6-6). The range of disturbed (arable) plants was the most diverse of all the wells and, alongside the common plants *Stellaria media* (n=247, 100%) and *Urtica urens* (n=154, 100%), several taxa were unique to this well, including *Odontites vernus* (60%) and *Valerianella locusta* (30%).

There was a consistent presence of grassland taxa, the most frequent of which were *Filipendula ulmaria* (90%), *Prunella vulgaris* (90%), *Ranunculus repens* (80%) and *Rhinanthus minor* (80%). The highest diversity of grassland taxa was recorded from contexts in this well (6482), (6485) and (6917), which were also the only contexts to contain *Centaurea nigra*, *Leucanthemum vulgare* and *Picris hieracioides*. The wetland group was also most diverse in these contexts: (6484), (6485) and (6917), including *Caltha palustris*, *Pulicaria* sp., *Ranunculus flammula* and *Thalictrum flavum*. This co-occurrence implies that there was a shared origin for these contexts, probably from wet grassland. There was also a unique range of vegetative parts of grassland plants: a *Centaurea nigra* seed head, Asteraceae seed head and *Vicia*/*Lathyrus* seed pods and tendrils. A limited range of heathland plants was also present: bracken fronds, *Danthonia decumbens* seeds and Ericaceae capsules. The range of woodland plants contained a nearly constant presence of *Betula* sp. and hazel nutshell, and potentially

Luzula sp. Celery (90%) and coriander (70%) were particularly frequent, and dill, fennel, flax, barley and spelt chaff, and abundant cereal bran were also recorded in various contexts. Again, *Spergula arvensis* co-occurred with flax remains in several samples, <1284> (6482), <1328> (6485) and <1656> (6917).

6.1.1.3 Period 4-5 wells

Samples from the Period 4-5 wells have been discussed in detail in Robinson et al. 2006 and Robinson 2011. The single sample from well 1750 contained a limited range of taxa, belonging mainly to the disturbed (arable) and grassland groups (Fig 6-7). The most abundant taxa were annuals of disturbed arable ground: *Chenopodium album* (n=86), *Atriplex* sp. (n=14) and *Stellaria media* (n=12). Alongside 5735, this was the only well to contain *Agrimonia eupatoria* (n=1), a plant of grassy disturbed places. There was an absence of heathland material, and only a small range of grassland and wetland plants.

Both contexts of well 5735 contained mainly disturbed (arable) and disturbed ground taxa, with some grassland, wetland and cultivated plants (Fig 6-8). This pattern is reflected in the most abundant taxa, which were the usual range of disturbed ground taxa: *Stellaria media* (n=236*), Urtica dioica* (n=193), *Sambucus nigra* (n=151) and *Urtica urens* (n=111). Several plant foods were only recorded from this well: *Brassica nigra* (black mustard), *Ficus carica* (fig), *Prunus domestica* ssp. *domestica* (plum), *Prunus domestica* ssp. *insititia* (bullace/damson) and *Vitis vinifera* (grape), alongside celery, dill and coriander. The only *Buxus sempervirens* (box) leaf fragment was identified here.

The two samples from the latest well studied from Insula IX, Period 5 well 1300, were very similar, with the wetland, disturbed (arable), disturbed and various habitat groups being the largest groups (Fig 6-9) (Robinson 2006). The most abundant taxa were *Carex* sp. (n=72), *Eleocharis palustris* (n=37), *Rubus* sect. *Glandulosus* (n=34) and *Ranunculus flammula* (n=21). A

few cultivated food plants were present, including *Juglans regia* (walnut), coriander and cherry/bullace. Heathland plants were absent, and only a small range of grassland and wetland plants were present.

6.1.1.4 Patterns in the distribution of waterlogged plant remains

Overall, the wells produced low densities of waterlogged plant remains, other than numerous contexts in wells 8328 and 5791, and context (10441) of well 10421 and context (1646) of well 5735 (Table 6-1). These contexts contained both high densities of plant remains (>50 seeds/L) and abundant vegetative plant material. Some taxa were common across all periods: *Carex* sp., *Eleocharis palustris*, and *Stellaria media*, but there are key variations between periods. The Late Iron Age Period 0 samples are characterised by disturbed (arable) taxa and heathland plants (Table 6-3). The Early Roman Period 1 wells show a marked diversity of grassland and wetland taxa alongside the disturbed (arable) plants present in Period 0. Much of this diversity was, however, contained within well 5791, and to a lesser extent, well 1586. Numerous grassland, wetland and likely arable weeds were only present in well 5791. The Mid and Late Roman wells are marked by more frequent permanent disturbed ground plants, a decrease in the wet grassland plants frequent in Period 1, and an absence of any heathland plants or flax. A wider range of other cultivated plants were, however, present.

6.1.1.5 Correspondence analysis – waterlogged plant remains

Correspondence analysis was utilised to further explore the variation in sample composition. Analysis was undertaken of the waterlogged samples from Insula IX, alongside the waterlogged data from Late Iron Age wells 718 and 762 in the forum-basilica (Jones 2000). The dataset was reduced to 36 samples and 34 taxa, following Table 4-4, retaining samples containing over 16 seeds, and taxa present in at least 12 contexts. Classification of the sample plot by individual well shows three groupings of samples (Fig 6-10). At the positive end of the x-axis are samples

from wells 10421, 768, 712, and 1750, with some samples from wells 3171, 5375 and 8328. In the centre of the x-axis and the negative y-axis are located samples from wells 3171 and 5735. At the negative end of the x-axis, plot all samples from wells 1300, 1586 and 5100, and the majority of samples from 5791, 3171.

Fig 6-11 shows the taxa plot coded by habitat group. Taxa at the positive end of the x-axis are mainly plants of disturbed (arable) ground: *Capsella bursa-pastoris, Chenopodium album* and *Polygonum aviculare.* All of the grassland and wetland taxa are at the negative end of the x-axis, the most negative of which are *Eleocharis palustris, Filipendula ulmaria, Mentha aquatica* and *Ranunculus acris*. Taxa located on the negative y-axis are several disturbed ground plants (*Ballota nigra, Urtica dioica*) and disturbed (arable) ground plants (*Solanum nigrum*, *Sonchus asper, Stellaria media* and *Urtica urens*). The two cultivated taxa, celery and coriander, plot towards the centre, contributing little to the variation within the dataset. The representation of each sample as pie chart, with each taxa classified by a habitat group, clarifies the variation in the plot (Fig 6-12). Samples on the positive x-axis consist of disturbed (arable) taxa, samples on the negative y-axis contain disturbed (arable) and some disturbed (ground) taxa, whilst samples on the negative x-axis have a more mixed composition of wetland, grassland and disturbed (arable) taxa.

Thus, seeds of annual plants of nitrogen-rich ground dominate the first group of samples from wells 10421, 768, 712, and 1750. The second group of samples, from wells 3171 and 5735, contain taxa of more permanent waste ground, whilst the third group of samples, from wells 1300, 1586 and 5100, contain a diverse range of grassland and wetland plants. Classification of the wells by period (Fig 6-13) shows that the first group of samples are all from Period 0 and Period 1, the second group are from Period 1 and 4/5, and the last group is a mix from all periods. The Period 0 samples located in the final group are from well 8328, which is chronologically later than well 10421, and the two forum-basilica wells 712 and 768.

Correspondence analysis confirmed the findings of the univariate analysis, with chronological change from disturbed (arable) taxa (well 10421), to grassland and wetland assemblages (wells 1586, 5791, 8328) and later taxa of less frequently disturbed ground (well 5735).

6.1.2 Sources of waterlogged plant remains

The activities that resulted in these distributions are now investigated. Each well fill has been assigned a deposition type, through the assessment of the well sections, contextual detail available on the Silchester IADB (Table 4.5). A qualitative analysis of the co-occuring taxa within each context explores the potential sources of the assemblages of plant remains.

6.1.2.1 Medicinal plants

The presence of plants with potential medicinal properties in waterlogged settlement deposits is often highlighted, but rarely systematically investigated (Hall and Kenward 2003). The medicinal use of the most likely medicinal taxa (Table 4-2) usually involves leaves, stems and flowers, which are unlikely to survive even in waterlogged contexts due to their delicate nature. However, the presence of seeds may imply the local cultivation of plants purposefully selected for their medicinal attributes, or the presence of whole plants. Hence, the distribution and frequency of the seeds was investigated.

Figs 6-14 to 6-20 illustrate that most contexts contained one to three medicinal plants. Only contexts (9309) and (6484) contained four taxa, and both were organic dumps containing a diverse grassland and wet ground assemblage. The presence of members of the Solanaceae family in these contexts is most likely due to these plants growing in nitrogen-rich conditions when the organic material was deposited in midden heaps. Overall, medicinal taxa were present at densities of less than one seed per litre, and they did not co-occur with any distinctive artefacts. Fig 6-21 illustrates the presence of medicinal taxa by deposit type.

Medicinal members of the Solanaceae family and the flavourings are present in most deposition categories, suggesting they had a consistent presence around wells, probably as vegetation. Mallow/poppy are absent from the primary fills and gradual accummulations, but present in dumps. However, all potential medicines are always present alongside corresponding vegetation types. Evidence for any of these plants having been used as medicines at Silchester is inconclusive.

6.1.2.2 Food plants

A wide range of cultivated plant foods was identified from the wells within Insula IX. The lack of evidence for medicinal uses, combined with well-established evidence for the diversification of diet in the Roman period (Cool 2006), indicates that these were introduced as foods. The question remains, however, of whether the waterlogged remains represent waste from food consumption or horticulture. The Period 0 identifications of celery, coriander and olive are all the earliest records of these foods in Britain, and hence must represent imported foods (Lodwick 2014) rather than seeds from vegetable plots. Celery is native to Britain, but usually occurs in damp brackish coastal locations and inland only at salt springs (Cole 2000; Stace 1997: 511), indicating that it too was introduced to Silchester. The Period 1 records of dill and fennel are also introduced, whilst the status of sweet cherry (*Prunus avium*) is debated, but it may well be introduced (Moffett et al. 1989).

Whilst the early records of plant foods must represent waste from food consumption, the high overall frequency of celery, coriander and dill (Fig 6-22) in the well fills raises the possibility of horticulture based on the criteria of abundance and frequency (Fig 6-23) (Van der Veen and O'Connor 1998). 15% of sample <1682> from the primary fill of well 5791 consisted of celery, suggesting there was a consistent source in the vicinity. Sample <739> from the upper fill of well 3171 (4838) contained 47 poorly preserved cf. dill seeds, which may suggest local cultivation, or the deposition of food preparation waste. Considering all of the samples, celery

and coriander are present in just under half of the primary fills and gradual accumulations, strongly suggesting that they were growing within the settlement and entering deposits through soil wash (Fig 6-23). Contrastingly, dill and fennel were restricted to dumps, suggesting an origin in food waste. Overall the flavourings were most frequent in Period 1 well 5791. The well was situated in an open area in the western part of the excavation (Fig 5-2) which may have been used a small garden. Forthcoming post-excavation analysis of the archaeological deposits in this area will help to further evaluate this suggestion.

The high frequency and low-density remains of seeds of flavourings indicate background food waste from regular food preparation or cultivation (cf. Murphy et al. 2013). Other plant food remains are single examples of table waste from non-organic and organic dumps: an apple pip, cherry stone and olive stone (Fig 6-24). There is currently no evidence for co-occurring dining ware or particular animals bones which could indicate feasting (Ralph 2007). Yet it must be highlighted that Late Iron Age Silchester was the centre of the Atrebatic kingdom and imported tablewares, amphorae, oysters, mussels and domestic fowl were present at the forum-basilica site and Insula IX (Fulford and Timby 2000; Fulford pers. comm.). It is therefore very likely that high status dining activities were taking place, but the plant remains offer inconclusive evidence for how they were used.

In addition to the introduced plant foods, some taxa in the 'woodland' habitat group may have also entered the wells as food waste (Fig 6-25). Apple, blackberry, elderberry, hazel nutshell and sloe are present in all deposit categories (Fig 6-26). Wild strawberry was only recorded from a single 'organic dump'. Whilst hazelnut and sloe were usually only single items in samples, blackberry and elderberry, were sometimes very abundant, as in sample <739> from well 3171 context (4838), which contained 14.5% blackberry and 11% elderberry. Yet both taxa are resistant to decay due to their lignified testa, and are considered to be over-represented in waterlogged deposits. Whilst the abundance of these taxa is inconclusive, their high frequency

in all deposit types does show that they were regular aspects of background settlement waste. Sloe and hazelnut are less likely to have grown within the settlement and hence must have been collected. Only a single apple pip (*Malus* sp.) from sample <3217> from well 8328 context (9309) was identified, and it is unclear whether it was cultivated or wild.

Seeds of several herbaceous plants may represent collected foods, the most likely being *Daucus carota* (carrot), black mustard and *Mentha* sp. (mints) (Fig 6-25). *Mentha spicata* (spear mint) is considered the species of mint referred to in classical literature (Vaughan et al. 2009). All *Mentha* sp. seeds at Silchester that could be identified were *Mentha aquatica,* a perennial herb of damp places. Mint was most common in dumps from wells (Fig 6-27), suggesting it was present in refuse material, but there is no evidence that it was consumed. *Daucus carota* (wild carrot) was identified from several samples, being slightly more common in dumps. Cultivated carrot seeds – *Daucus carota* ssp. *carota* are indistinguishable from wild carrot seeds – *Daucus carota* ssp. *sativus* (Robinson pers. comm.). The low number of seeds recovered does not provide strong evidence for food use. Black mustard, an annual of rough ground, was identified from both contexts of Period 4 well 5735. Black mustard is known to have been collected since the Mid Iron Age (Green 1981; de Moulins 1995) but, as it also occurs as a weed, this is inconclusive evidence for consumption. Finally, opium poppy is a frequent occurrence in 'dump' deposits (Fig 6-27). Opium poppy was introduced to Britain in the Neolithic (Campbell and Robinson 2007), but was also consumed in Roman Italy (Dalby 2003). Whilst these potential foods are present amongst refuse material in dumps, this is not enough evidence to show that they were consumed.

6.1.2.3 Cereals and flax

The staple crops consumed at Insula IX identified in the charred assemblage (**6.2.2**) also contributed to the well fills. Spelt/emmer glume bases, barley rachis, cereal culm and cereal bran were all identified with frequency and in abundance. Cereals were most common in well

5791, the Period 1 well with distinctive grassland and wet ground taxa. Some members of the disturbed (arable) habitat group most likely entered the well as arable weed seeds within crop-processing by-products. *Agrostemma githago* was a recent Mid Iron Age introduction to Britain (Campbell 2000a), whilst *Anthemis arvensis* is an arable weed usually found on calcareous soil, unlikely to have been growing in the surrounding area. Cereal chaff and grain were most frequent in organic dumps (Fig 6-28), indicating that they were deposited amongst dense and diverse plant remains.

Flax seeds and capsules were also frequent, being particularly abundant in context (9309) from well 8328, and context (4850) from well 3171. Flax is an annual herbaceous plant used for linen textiles, linseed oil and linseeds across the old world (Zohary et al. 2012). The different usages of flax have very different implications. The consumption of food and oil implies a diversification of diet. Alternatively, the production of textiles suggests craft specialisation and market level production. The co-occurrence of flax remains alongside aquatic plants may indicate retting for fibre production (Hall and Kenward 2003), but the noxious and polluting nature of this activity (Robinson 2003) makes it an unlikely source for the plant remains. The occurrence of flax seeds and capsules in all deposit types (Fig 6-28), but particularly in organic dumps, suggests the remains represent processing by-products and seeds used regularly within the settlement. Seeds and capsules usually occur together, suggesting they originated as by-products rather than food consumption waste.

Morphometric analysis has been utilised to separate flax cultivated for oil from textiles (Herbig and Maier 2011; Larsson 2013). A comparison of the width and breadth measurements of the Insula IX seeds with the available European archaeological data (Fig 6-29) shows that the Silchester seeds have a wide size range. This method is, however, problematic as there is no clear separation between textile and oil seeds, as 'textile' seeds from Mutina (Latalowa and Rączkowski 1999) are much larger than seeds from a food store at Colchester (Murphy 1992a).

Seed size can vary with harvest time (Valamoti 2011), density of sowing (Obeid et al. 1967), and the existence of dual purpose crops (Chauhan et al. 2009). Finally, oil-rich seeds burn easily and may be disfigured (Wilson 1984), making the comparison between waterlogged and charred seed measurements problematic.

6.1.2.4 Aquatic and woodland plants

Beyond food and fodder, seeds and vegetative parts were identified from numerous plants, which were unlikely to have been growing within Silchester. Bracken, gorse and heather could have been gathered from nearby heathland areas on the gravel plateau for various uses. Bracken has been used in modern periods for packaging, food preservation, medicine, fuel, compost, potash and litter (Campbell and Pelling 2013; Hartley 2012; Mabey 1977; Rymer 1976). Young gorse shoots have been used for fodder (Rymer 1979), and also as animal and human bedding alongside heather (Mabey 1977). Significantly, these heathland plants co-occur in diverse assemblages of grassland and wetland plants in wells 8328 and 5791. Aside from the possible use of bracken and gorse as fuel, various woodland plants may have been transported into the settlement with firewood, such as seeds of the trees *Alnus glutinosa, Fraxinus excelsior* and *Salix* sp., and also from the understory plants *Fragaria vesca* and *Luzula* sp. Ash twigs and leaves have been observed as being used for fodder in various ethnographic works (Figueiral and Séjalon 2014). *Ilex aquifolium* leaves, recorded in wells 8328, 1586, 5791 and 5735 may also have been used as fodder (Spray 1981). Charcoal analysis from Late Iron Age and Roman phases of the forum-basilica and the Mid and Late Roman phases of insula IX show oak to be the main wood used for fuel, with smaller quantities of alder and hazel (Straker 2000; Veal 2012).

Seeds of wetland plants may have derived from stems collected for thatching or flooring as is practiced in recent times (Letts 1999). It is likely that many tall-growing plants would have been utilised, but most of the most abundant plants are low growing, including *Eleocharis*

palustris and *Juncus articulatus.* Only four cereal culms were identified from the wells, yet straw would be a typical material in thatching and flooring. The frequent presence of ceramic building material within the Insula from Period 1 onwards, suggests roofs would have been tiled rather than thatched. Overall, there is no strong evidence that aquatic plants were used as thatching and flooring.

Seeds of low-growing aquatic plants may have originated from animal dung. The diversity of wetland plants was highest in wells 5791 and 8328, and wetland taxa co-occur with cereal bran in the two fills from 1586 (*Apium nodiflorum, Isolepis setaceae, Ranunculus flammula*), (9309) (*Apium nodiflorum*, *Mentha aquatica, Ranunculus flammula*), and several contexts in well 5791, suggesting a shared origin in dung. Plants such as *Apium nodiflorum, Hydrocotyle vulgaris*, *Lycopus europaeus* and *Ranunculus flammula* grow both on banksides and in wet meadows. These are areas where animals may have grazed, and seeds could have been ingested when animals were drinking water or grazing. Horses can graze very close to the ground (Pilliner 1992) and many seeds can survive the digestive process (Wallace and Charles 2013).

6.1.2.5 Stable manure material

The co-occurrences between several categories of material (bracken, cereal bran, flax, wet ground plants, cereal chaff) in wells 5791 and 8328 strongly suggest that these assemblages originated from one activity (Table 6-4). Based on the comparison with 'indicator groups', the deposits in several wells can be interpreted to have been stable-manure (Hall and Kenward 1998; Kenward and Hall 1997). The term 'stable-manure' refers to coarse-textured organic material, which accumulated within a byre or stable, where animals were housed. The range of plants discussed in the proceeding sections correlate with the categories of botanical remains expected in stable-manure: bedding, fodder, hay and dung, as well as nitrophilous weeds which may have grown on middens of mucked-out stable-manure (Fig 6-30). In deposits (9309) well 8328 and (6485) well 5791, the material was still compacted, with laminations of bedding

and cereal bran. The presence of fragmented *Agrostemma githago* seeds and legume pods is considered indicative of digested plant material (Kenward and Hall 2012: 8). Archaeological inclusions within the well deposits, such as vivianite, nails, and animal bones and teeth, enable the identification of the 'indicator package' of stable-manure. The coarse-texture of the material and the presence of cereal chaff suggests the material originated from horses as their digestive tract is not as successful in digesting plant remains as cattle or caprines (Derreumaux 2005; Wilson 1979). Flax is also often recommended as horse feed (Ertuğ 2010; Horlacher 1939), and it seems probable that flax, or at least processing by-products, were used as fodder at Silchester.

Some palaeoentomological data are currently available. The insect assemblage from well 8328 has been studied, and consists mainly of scarabeoid dung beetles, hydrophilid and staphylinid beetles of wet foul organic matter, and beetles of indoor habitats. There was not an extensive range of grassland insects, but some phytophagous beetles were present including *Sitona* cf. *suturalis*, which feeds upon *Vicia*/*Lathyrus* (Robinson 2013a). The presence of scarabeoid dung beetles indicates dung from animals grazed on pasture. *Lathridius minutus* gp. and *Ptinus fur* suggest mouldy plant material such as straw and hay was present. In comparison with the indicator package for 'stable-manure', house fauna and grassland feeding weevils were under-represented by the insects, indicating dung and litter from a nearby enclosure within a stable or shelter, rather than an enclosed stable. A limited insect assemblage from well 5375 contained dung beetles (*Aphodius* sp.), woodworm beetle (*Anobium punctatum*), and some beetles of decaying organic material (Robinson 2011).

The stable-manure assemblages identified from Periods 0 and 1 (Table 6-4) were very similar, containing both flax and heathland material. Contrastingly, the Period 4 assemblage only contained bracken, with flax absent. Whilst the complete indicator group was not present in other samples, aspects of it, such as hay, bracken and wet ground plants, were.

6.1.2.6 Hay

The co-occurrence of seeds of grassland and wetland taxa within the stable-manure contexts, but also elsewhere, indicates cut grassland material was present, similar in character to modern hay. The correspondence analysis showed that grassland and wetland taxa, such as *Filipendula ulmaria* and *Mentha aquatica* accounted for much of the variation within the waterlogged assemblage (**6.1.1.5**). Furthermore, intact pieces of grassland vegetation were identified: a *Centaurea nigra* seed head, numerous *Trifolium* calyx and *Medicago* capsules (Fig 6-30). Based on comparison with the British NVC groups (Rodwell 1993), the co-occurrence of *Centaurea nigra, Filipendula ulmaria, Leucanthemum vulgare, Lychnis flos-cuculi* and *Rhinanthus minor* has been identified previously as a hay meadow community (Table 6-5) (Greig 1984, 1988a; Robinson 2007b). MG4 *Alopecurus pratensis-Sanguisorba officinalis* occurs today when areas of grassland on seasonally flooded alluvial soil are closed to grazing animals in spring, cut for hay in July, and then grazed from early August. It is characterised by a species-rich community including many tall dicotyledonous plants. MG5 *Centaureo-Cynosuretum cristati* is managed very similarly, with the addition of light manure in April. It is found on deep brown clayey or loamy soils (Rodwell 1993). Many of the other plants identified at Silchester could also have also come from hay meadows, such as *Caltha palustris, Juncus* spp., *Luzula sp.* and *Thalictrum flavum*.

There are numerous limitations to identifying managed grassland material through comparison with present day ecology. Some seeds would have been released from hay before cutting, and some are less likely to survive digestion and subsequent deposition in wells (Greig 1984). The criticisms of phytosociology apply here as well (**2.3.1**). A FIBs approach has been applied to Greig's synthetic grassland data (1988a). Modern hay communities were successfully reclassified based on the presence of biennials, an intermediate to tall canopy height and low stress index (Hodgson et al. 1999).

Table 6-5 summarises this information for the main taxa in the Silchester samples. Based on flowering time, the hay was probably cut in July, in agreement with medieval and early modern hay management (Stuart 1995; Williamson 2003). Some tall growing taxa were present, including *Centaurea nigra*, *Leucanthemum vulgare* and *Rhinanthus minor*. Most of the taxa are perennials, but some biennials were present such as *Rhinanthus minor* and *Scabiosa columbaria*. The stress index of most taxa is low, although some species such as *Filipendula ulmaria* do cope well with stress. Furthermore, the presence of low growing plants, such as *Eleocharis palustris* and *Linum catharticum*, which are not listed components of MG4 or MG5 today (Rodwell 1993), suggests either management practices were different, or that other material entered the same deposits, such as seeds of grazed pasture through animal dung.

Several areas around Silchester would have been suitable for such a plant community in prehistory and hay meadows are still managed locally today. The SSSI of Ron Ward's meadow is situated 4km to the south-west of Silchester in an area of neutral hay meadow (Natural England 2012c). Extensive areas of hay meadow are recollected as being present in the areas between Tadley and Pamber (Tadley and District History Society 2013). The Kennet and Loddon valleys both have alluvial soils and suffer seasonal inundation (Cranfield Soil and Agrifood Institute 2014). On the southern edge of the Silchester plateau, the Silchester brook may have also provided appropriate land for hay meadow management due to the presence of river alluvium and moist ground. In contrast, the single identification of the perennial grassland plant *Scabiosa columbaria* from Period 1 (6917) is a possible indicator of non-local hay. Small scabious is largely restricted today to calcareous grassland and rocky places (Stace 1997), but in the alluvial meadows of the Upper Test, the plant is only a rare occurrence (Brewis et al. 1996, 228). The regional distribution of calcareous soils has been affected by soil improvements undertaken in the 17th-19th centuries, with calcareous marl present in the floodplain of the Loddon today (Cranfield Soil and Agrifood Institute 2014). The calcareous soils of the Hampshire Downs are a possible source for hay.

6.1.2.7 Settlement vegetation

Although many plant remains entered the wells as aspects of the stable-manure assemblage, some plant remains must be derived from settlement vegetation in the vicinity of the well shaft. The inherent mixed nature of well deposits hinders the identification of discrete plant communities (Green 1982; Hall 1988). Furthermore plant communities that were likely to have existed within Silchester would have been adapted to similar conditions as those contributing to stable-manure; arable weeds cope with regular disturbance and pasture plants cope with trampling. The most succinct methodology advocated to deal with this problem is from Hall (1988), who suggested looking at the contextual associations of plants, constant species, abundances, and comparison between samples from the same deposition categories.

The most frequently recognised NVC groups of open ground at Silchester are summarised in Table 6-6 (Rodwell 2000). In only three communities were multiple constants all present: OV14, OV24, OV25 and OV26. These are communities of vegetable crops, nutrient-rich soils and track-side ditches. The most common co-occurrence was *Polygonum aviculare* and *Stellaria media* (OV9), which occur together in 34 samples in all periods and deposit types. OV9 is a community of disturbed and nutrient-rich well drained soils, arable fields, market gardens, farmyards and waysides. Similarly, *Capsella bursa-pastoris* and *Polygonum aviculare* (OV18) occur together in 15 samples from all periods and deposits, indicating the presence of trampled ground. *Aphanes australis* and *Rumex acetosella* (OV1) co-occur in 12 samples in all periods and deposits, suggesting disturbed nutrient poor soils. *Plantago major*, *Polygonum aviculare, and Ranunculus repens* (OV21C), co-occur in 10 samples in all periods and deposit types, indicating heavily trampled ground. Other types of vegetation probably present were temporary wet areas (M35) and damp track-side ditches (OV26). Considering only the primary fills, OV9 is the most common, followed by OV18. These are also the most common communities identified in gradual accumulations, accompanied by OV1 and OV21c.

Pinpointing changes in vegetation types through time is difficult due to the discrepancies in the number and size of samples (Table 6-1). Three communities are restricted to Period 1: OV25 of nutrient-rich soils, OV14 of vegetable crops and light soils, and OV10 of open, cultivated and trampled ground. These suggest cultivated soils were present within the Period 1 Insula, furthering the previous discussion of horticulture (**6.1.2.2**). When abundances are taken into account rather than co-occurrences, the most abundant taxa in well 10421s primary fill indicated disturbance and trampling (*Capsella bursa-pastoris*, *Polygonum aviculare, Stellaria media* and *Urtica urens*) (**6.1.1.1**). The small sample from the primary fill of Period 1 well 3171 was dominated by *Polygonum aviculare*, indicating trampling. This was also the case with the primary fill of well 5791.

A further type of vegetation, not present in the NVC, is the 'urban flora' observed in various Roman and medieval archaeobotanical studies, containing *Atropa belladonna, Hyoscyamus niger* and *Solanum nigrum* (Carruthers 2010: 80; Hall 1988). These species only co-occur in well 3171 context (4850). Based on presence, these are all present in Period 0, with *Conium maculatum* added in AD30-50. These plants indicate a nitrogen-rich environment was present within the Insula, probably associated with the presence of animals. Following the identification of the sources of waterlogged plant remains, the sequence of each well fill is now discussed.

6.1.3 Interpretation of the formation of individual wells

6.1.3.1 Well 10421

The primary fill (10442) accumulated contemporary to the Great Hall c. 20-10BC (Fig 6-14). Seeds from local disturbed ground vegetation entered the well through soil wash, along with some table waste (celery, hazelnut and olive), perhaps from nearby dining activities. A complete coarseware cooking pit and a partially complete Silcheseterware beaker were then

placed in the well, suggesting ritualised deposition. The first backfill deposit (10441), contained a similar range of plant remains deriving from plants growing in frequently disturbed and more nitrogen-rich ground, alongside more table waste (celery, coriander and hazelnut). This suggests the well was backfilled with sediment collected from the surrounding area and middens. Whilst a wider range of potentially poisonous plants and foods were present in the material dumped alongside the complete pots, they were all at low concentrations, and the most distinctive food, olive, was present in the proceeding context. Hence there is no correlation between the plant remains and the structured deposit. At some point after 20-10BC, the well shaft partially collapsed forming context (10440), after which it was backfilled with a series of non-organic dumps (10439) and (10438) containing poorly preserved plant remains either dumped or washed into the well, but still indicating the presence of disturbed ground vegetation. Crop-processing was also taking place in the vicinity, as charred remains were present in several upper fills.

6.1.3.2 Well 8328

Well 8328 may have been sunk after well 10421 went out of use, or perhaps a few decades later (Fig 6-15). Whilst the well was in use, c. AD30 or before, a primary fill accumulated of gravel and clay sediment (9680) (unsampled). Three complete pots were then placed on top of the accumulated material c. AD30-50. They were then covered with an organic dump, (9663), consisting of a mix of stable-manure, which had probably been collected into a weed colonised midden, along with silty clay sediment, animal bone, pottery and table waste (celery). Soon after, more stable-manure was dumped into the well from the south-east, containing dung, hay, heathland material and straw. Burnt fragments of quernstone and a small complete pierced pot were placed into the well shaft amongst the stable-manure. Several possible 'ritual' plants (**4.2.6**) were present in context (9309) (*Hyoscyamus niger*, *Malva sylvestris* and *Solanum nigrum*), but they were all present at low concentrations (other than flax), and members of the Solanaceae family were probably derived from the midden of stable-manure.

A large intact pot was placed on the edge of the secondary well shaft as more midden-type material entered the well (9258), containing pottery, animal bone and leather, with plant remains indicating disturbed and wet vegetation, and possibly dung. Opium poppy was quite abundant in (9258), but only at a density of eight seeds/L. A small deposit of probable sewage was dumped on top (9257), containing possible dung-derived wetland plants, and charred crop-processing waste.

6.1.3.3 Well 1586

Well 1586 was sunk around 15m to the south of well 8328, perhaps after it was abandoned in post-conquest Period 1 (Fig 6-16). A primary fill of silty gravel accumulated during use (unsampled). Organic material and gravel then entered the well through soil wash and accumulated in lenses. Weed communities of disturbed and trampled ground were present around the well, and some food waste, celery, coriander and hazel nut-shell also fell into the well. Some stables or a midden containing stable-manure may have been present nearby, as aspects of hay and dung washed into the well. Several intact pots and flagons were then placed on top of the accumulated organic material (3932), representing the ritual decommissioning of the well. The assemblage of plant remains was very similar between the 'non-ritual' and 'ritual' deposit, and the potential ritual plants were at low concentrations and consistent with surrounding weed communities. Subsequently, silty gravel was dumped into the well.

6.1.3.4 Well 3171

Contemporary with well 1586, another circular shaft was sunk in the eastern area of the Insula between two areas of clay floors (Fig 6-17). A small amount of gravel built up whilst the well was in use (4866), containing possible food remains (elderberry and flax), and seeds of local trampled ground vegetation. Gravel continued to accumulate and more domestic waste fell

into the well (4851), including food remains (coriander, flax, hazel nutshell and a sloe stone). An organic dump containing a high-density of plant remains was then placed into the well (4850), indicating that it had fallen out of use. A similar range of plant remains were present in the refuse material, but from a wider range of sources, with more food waste (celery, coriander, cherry, hazelnut, cultivated brassica) and permanent waste ground plants such as *Hyoscyamus niger* and *Lapsana communis*. The well then gradually silted up and small quantities of plant material entered the well. Poor preservation limits interpretation, but some food waste (coriander, dill, elderberry) and disturbed ground vegetation were probably present around the well. Dill may have been cultivated nearby, or a handful of seeds may have been dropped into the well.

6.1.3.5 Well 5791

A further well was also in use to the north of Building D (Fig 6-18). A small amount of clay accumulated in the base of the shaft as the well was in use. Disturbed nitrogen-rich ground was present around the well and celery may have been cultivated nearby. The well was then purposefully backfilled with a serious of non-organic dumps mainly consisting of building material. Stable-manure was also dumped into the well on some occasions (6921), (6897) and on others only hay was disposed of alongside building waste (6917). A possible clay capping was placed over these lower dumps (6486), after which more silty gravel material and stable-manure was dumped in. Unlike many wells, no ritualised deposition has been detected in the character of the fills, yet a wide range of potential 'ritual' plants were present, suggesting that there is no correlation between the plant remains and the deposition of intact pots (Fig 6-18).

Hay and stable waste may have been present nearby and in need of disposal. Yet as the backfilling appears organised, waste may have been brought in from another Insula along with building rubble to backfill the well. A birch tree and a herb garden were present close to the well, as birch, celery and coriander seeds were nearly always present in the backfills of well 5791. More plants of permanent disturbed ground were present in the upper fills, suggesting

that less activity was happening around the well, or that material for backfill was sourced from a wider area.

6.1.3.6 Well 5100

A few metres to the south of well 3171, a well was sunk and lined with a timber barrel, perhaps to deal with the collapse of gravels shafts experienced in the other wells in the Insula. The well appears to have been kept clean during use as only a few plant remains were present in the silty primary fill (7828). Some human faecal waste was dumped into the well (**6.3.4**), and soon after the upper gravel shaft collapsed.

6.1.3.7 Well 5375

The next well to contain waterlogged plant remains was sunk in Period 4 c. AD200-250/300, between timber buildings in the south-east corner (Fig 6-19). A layer of silt accumulated whilst the well was in use (6960), indicating the presence of more permanent vegetation around the well shaft, with *Urtica dioica* and *Sambucus nigra* bushes. Food waste washed into the well (blackberry, black mustard and celery) along with a box leaf, suggesting ornamental gardens were present nearby. The well shaft was then backfilled with a dump of sandy clay (6436), containing probable stable-manure and food waste (black mustard, bullace/damson, celery, dill, fig, grape, plum and walnut). A concentration of 'special' finds were present in (6960): a copper jug handle, a leather shoe, an iron bucket handle and a maple writing tablet, which may suggest ritualised deposition (Eckardt 2011). The range of 'ritual' plants is larger in (6960), but all were present at a density of less than one item/L, showing no correlation with the artefacts deposited. The well was then backfilled with dumps of silty gravel that did not produce any waterlogged plant remains.

6.1.3.8 Well 1750

A timber lined well was constructed following the backfill of 5375. Sediment from the well shaft accumulated whilst the well was in use. Some food waste (blackberry, coriander and hazel nutshell) and seeds from surrounding nitrogen-rich disturbed ground vegetation entered the well. A distinctive assemblage of animal bones (dog, raven and red deer) and a leather shoe were also placed into the well, probably reflecting a ritualised deposition.

6.1.3.9 Well 1300

Following further settlement reorganisation, a well was sunk in the north-west area (Fig 6-20). Loamy gravel accumulated within the well whilst it was in use (1621), with lenses of organic peat like material. A small amount of food waste washed into the well (blackberry, bullace/cherry, coriander and sloe), alongside a few decay-resistant plant remains, such as *Carex sp.* and *Eleocharis palustris*, of unclear origin. A pierced flagon was placed onto the primary-fill, but few 'ritual' plant remains were present. Further silty sand and gravel accumulated in the well, before backfilling began with a dump of loam clay and gravel (1619). This dump contained a very similar range of plant remains, indicating the backfill was collected from the immediate area.

6.1.3.10 Conclusion of deposition

The integration of the archaeobotanical evidence with the formation of each well has illuminated the probable sources of the groups of plant remains identified. These include plant assemblages, which provide vital evidence for the agricultural activities practiced at Silchester, including flax processing and haymaking, which allow the evaluation of the three models of agricultural practice at oppida. Consideration of ritualised deposition has not demonstrated any correlation between evidence for ritualised deposition and the presence of distinctive taxa. Overall, members of the Solanaceae (nightshade) family and flavourings were common in

'ritual' deposits, yet this is far more likely to be due to the better preservation conditions at the base of wells where most ritualised deposition takes place, and the occurrence of stable-manure and its associated midden taxa in many 'ritual' deposits. The 'ritual' plant remains on their own are never at a high enough density to be considered a tangible item of 'perishable material culture' (Livarda 2013). However the presence of the stable-manure 'assemblage' of plant remains may be significant. Pierced and intact pots are always covered with some form of backfill, and the deposition of midden material containing stable-manure would have produced a significant sensory experience and strong memories (Hamilakis 2011; Waddington 2012). The significance of sewage in ritual shafts has been highlighted before (Maltby 2010) and deserves wider consideration. Overall, ritualised deposition took place after the wells fell out of use, and the wells were then backfilled with a range of materials, including building waste and stable-manure. Wells with no evidence for ritualised deposition either filled up gradually (3171) or were purposefully backfilled (5791).

6.2 Charred plant remains

6.2.1 Chronological and spatial distribution based on density

In contrast to the waterlogged assemblage, charred plant remains were recovered from a range of features across Insula IX. Chronologically, similar numbers of charred samples were analysed from Periods 0-2 (Table 6-7). Small numbers studied from Periods 3-5 were due to a genuine absence of charred plant remains in the assessed samples (Robinson 2011; Robinson et al. 2006). There was a range in density between feature types and periods. Two exceptionally dense samples were recovered, which were over seven times as dense as all others. Sample <8956> (13595) originated from a Period 1 small pit in the open area between the Late Iron Age streets, and had a density of 751.6 items/L. Sample <1740> (6825) was from a Period 2 hearth in the open area in the north-west corner of the excavation area, and had a density of 718.2 items/L. Both samples were from contexts with in-situ burning and contained

many spelt glume bases and probable arable weeds. These samples were removed from the following plots.

Fig 6-31 shows that some Period 0-2 samples had densities over 10 items/L, and that the highest density Period 1 and 2 samples were denser than those from Period 0. Yet, some samples from all periods have densities lower than 10 items/L. The few samples from Period 4 and 5 all contained fewer than 10 items/L. The classification of samples by feature type (Fig 6-32) demonstrates that most of the samples with densities over 30 items/L, originated from pits and wells. Few occupation or levelling deposits, hearths or postholes produced samples with densities over 10 items/L, and the majority of ditch samples were below 10 items/L. Furthermore, cereal grains ranged from "epidermis incomplete" to "clinkered" in preservation (Hubbard and Al Azm 1990). The generally low densities of remains in samples from Insula IX suggests that the charred plant remains derived from regular daily activities, rather than large-scale consumption or production events (Van der Veen and Jones 2006). The problem of low sample volume from Period 2 contexts (Fig 6-33) means samples from contexts with low densities of plant remains have been excluded from the later stages of analysis, whilst Period 0 samples from contexts with the same densities have been included due to the larger sample volumes. Regarding the change from a 0.25mm to a 0.5mm sieve size from 2004 onwards, it is relevant that several seeds with dimensions below 0.5mm were rare, and only present in Periods 0-1: *Capsella bursa-pastoris, Isolepis setaceae, Juncus* ssp., *Lychnis flos-cuculi* and *Sagina* sp. Hence, the chronological distribution of small seeded taxa has not been effected, but their proportional representation within Period 0 and 1 samples may have been.

6.2.2 Crop plants and collected resources

As highlighted in the discussion of modes of preservation (**5.2.3**), charred samples from Insula IX are characterised by the presence of cereal grain, cereal chaff and arable weeds. Several domesticated cereals and pulses were identified. As no storage contexts with high densities of

clean grains or pulses were recovered, the main crops could not be ascertained through proportional analysis of individual samples (Dennell 1976b). Instead, summary statistics have been assessed for each potential cereal and pulse crop: the maximum number of items, frequency and sum per period (Bogaard 2011) (Tables 6-8). It must though be held in mind that crops which do not require heat for processing will be under represented, such as barley and free-threshing wheat (Jones 1987).

6.2.2.1 Cereals

Spelt wheat – *Triticum spelta* L.

Spelt wheat was the main wheat crop recovered from Insula IX. Spelt grains were present in 36% of Period 0 samples (n=20), 41% of Period 1 samples (n=65), 25% of Period 2 (n=315) and 43% of Periods 4/5 (n=9). Spelt glume bases were well represented across all periods: in 59% of Period 0 samples (n=77), in 44% of Period 1 samples (n=870), in 25% of Period 2 samples (n=798) and 20% of Period 4/5 samples (n=4). Many spelt/emmer glume bases could not be identified to species due to poor preservation resulting in a lack of definition of keel shape and glume surface.

Several grains of a short round form of spelt, commonly referred to as short-grained, were also recorded. 10 grains were identified from Period 2 hearth <1740> (6825), alongside 295 typical spelt grains, and one grain was identified from Period 1 pit <5622> (11687) alongside 10 typical spelt grains. Short-grained spelt has been previously identified from Iron Age and 3rd-4th century AD sites in the Danebury environs area (Campbell 2000a, 2008a), and Roman Tiddington, Warwickshire (Moffett 1986). Its presence has been associated with a reliance on local grain supply (Campbell 2008a). At Insula IX, it is clearly present as a variant within the spelt fields rather than a separate crop. The absence of the short-grained variety from Period 0 may suggest that it was imported from elsewhere, perhaps the Hampshire Downs, during Period 1.

Emmer wheat – *Triticum dicoccum* L.

Emmer grain was present in six samples (27%) in Period 0, but was recorded in just one Period 2 sample <1740> (6825), and no Period 1, 4 or 5 samples. Within Period 0, emmer grains were always out numbered by at least double the number of spelt grains, and the maximum abundance is only four items. Emmer glume bases were present in four Period 0 samples (18%) and nine Period 1 samples (16%), but were absent thereafter. The total sum per Period 0 and 1 of emmer glume bases is much lower than that of spelt; respectively eight and 149, and nine and 870 items, and spelt glume bases always outnumbered emmer on an individual sample basis. Hence there is no evidence that emmer was a crop in its own right. More likely, it was present within the local spelt population.

Free-threshing wheat – *Triticum* cf. *aestivum* L.

Free-threshing wheat grains were present in several samples in Periods 0-2, but only in small quantities, and were always outnumbered by barley and glume wheat. Exceptions are sample <1917> (7183) – a Period 2 burnt deposit, where no cereal remains were present other than a single free-threshing wheat grain alongside many small weeds, and sample <1337> (6520), a Period 2 occupation deposit, containing possible three free-threshing wheat grains, one spelt/emmer grain and a few weed seeds. Free-threshing wheat rachis was only identified from two Period 1 samples, totalling three items. These were one hexaploid rachis fragment from the rich spelt glume base-dominated sample <8956>, and two free-threshing rachis fragments from<1838> (6810), a Period 1 occupation deposit, containing two glume bases, one spelt grain and one *Triticum* sp. grain. The very small quantity of rachis identified shows that free-threshing wheat was not being cultivated at Silchester. Furthermore, within a spelt population, genetic variation is likely to produce some free-threshing rachis (cf. Miller 1987). Hence, free-threshing wheat remains have been excluded from subsequent crop analysis in Insula IX.

Six-row hulled barley – *Hordeum vulgare* L.

Barley was represented in higher abundances and frequencies than the combined glume wheats. Barley grains were present in 82% of Period 0 samples (n=156), 66% of Period 1 samples (n=121), 50% of Period 2 samples (n=66) and 43% of Period 4/5 samples (n=5). Barley grain was often mixed with glume wheat chaff, but does also occur without glume wheat in all periods. Barley rachis was present in smaller quantities: 36% of Period 0 samples (n=36) and 22% of Period 1 samples (n=76). Barley was clearly cultivated as a crop. Lateral, straight and hulled grains were identified, indicating all barley was all of the six-row hulled variety.

Rye – *Secale cereale* L.

A single cf. rye grain was identified from sample <5805> from Period 1 pit (10786) and 1 certain rye grain from sample <1591> from Period 2 hearth (6711), where they were vastly outnumbered by glume wheat material. Hence, rye represented only a minor crop contaminant.

6.2.2.2 Pulses

Pea – *Pisum sativum* L.

Individual peas were present in two Period 1 samples: a cf. identification from sample <5622> from Period 1 pit (11687) and a cf. identification from sample <9519> from Period 1 pit (14616), the latter of which also contained three olive stone fragments. Single peas/beans were also present in sample <6843> from Period 0 ditch (11650) and sample <1681> from Period 2 levelling deposit (7137).

Celtic bean – *Vicia faba* var. *minor* L.

A single celtic bean was identified from sample <4191> from Period 1 pit (10265). The importance of pulses in agriculture at Silchester cannot be assessed due to their low representation in the charred assemblage.

Lentil – *Lens culinaris* L.

One definite and one cf. lentil were identified from sample <3779> from Period 1 levelling deposit (8944), which contained burnt sheep/goat bones. This deposit is likely to represent ritualised deposition.

6.2.2.3 Oil crops

Flax – *Linum usitatissimum* L.

Flax seeds were present in three samples from both Periods 0 and 1, but were absent there after. Five flax seeds were also found in sample <7616> from Period 1 pit (12461) on the western edge of the excavation area. Flax was much better represented in the waterlogged and mineralised assemblage, as oily seeds do not preserve well by charring (Wilson 1984).

Other plant foods

Several flavourings and fruits were recorded in individual samples: celery in Period 1 sample <5542> (11680), cf. *Brassica nigra* (black mustard) in Period 1 sample <5249> (11108), *Carum carvi* (caraway) in Period 1 sample <9078> (15033), *Olea europaea* (olive) in Period 1 sample <9519> (14616), *Prunus domestica* (plum/damson) in Period 2 sample <1925> (7867) and *Vitis vinifera* (grape) in Period 5 sample <315> (2385) (Robinson et al. 2006). Notably 16 *Brassica/Sinapsis* (mustards) seeds were identified from a Period 5 pit <374> (2699) (Robinson et al. 2006). These categories of macrofossil were all better represented in the mineralised and waterlogged assemblages (**5.2.1**).

The high frequency of barley and glume wheat material in the Insula IX samples strongly suggests that many wild taxa were arable weeds, harvested alongside the cereals. Yet woody perennials are unlikely to have originated this way as they do not produce seeds within arable fields. Hazel nutshell fragments were recovered in several samples in all periods. The nutshell

was always amongst much larger quantities of cereal remains. *Rubus* sect. *Glandulosus* was recorded in a few samples from Periods 0-2. *Sambucus nigra* was more common, present in 19% of Period 1 and 20% of Period 2 samples.

6.2.3 Distribution of crops and wild plants by feature type and period

Summary statistics have been calculated for all taxa present, as many plant foods and wild taxa were rare. Spatial analysis has been undertaken using a reduced dataset (Table 4-6). Taxa that were present in four or more samples, which contained 30 or more items identified to family, were included. Samples are displayed which contained 10 or more items following reallocation are displayed. All non-woodland taxa have been treated as potential arable weeds at this stage in the analysis.

6.2.3.1 Period 0

Six samples were studied from the upper ditch fill across the length of the Late Iron Age ditch in the south-west corner of the excavation, the earliest feature in Insula IX (samples 5956, 5976, 6147, 7232, 7556, 7621) (Fig 6-34). Plant remains were present at a low average density of 5.3 items/L and the composition of samples along the ditch was very similar. The largest component of samples was arable weeds, the most frequent of which were *Avena* sp., *Bromus secalinus*, *Chenopodium album, Eleocharis palustris, Polygonum aviculare* and *Rumex* sp. Several wild taxa were recorded only from the ditch: *Persicaria maculosa*, *Persicaria lapathifolia*, *Lychnis flos-cuculi* and *Persicaria hydropiper*. Barley grain occurred consistently in all samples at abundances between 6-15%, and spelt glume bases contributed 4-23%. Barley rachis was present in just 1-2% in four samples. Spelt grain occurred in smaller quantities, 2.5-7%. Two of the five identifications of cereal culm from all periods originated from two ditch samples, <5956> and <6147>. Woodland material was more prominent in the central sections of the ditch, occurring between 0 and 23%, consisting of buds. Indet. seed capsules were also

present in the adjacent context <5956>. Non-cereal plant foods were recorded from two contexts: one flax seed and one pea/bean from <5956>, and one flax seed from <7556>.

Eleven samples were studied from Period 0 well backfills and pits, in the western half of the excavation (Fig 6-34). These had a more varied composition than the ditch samples. Arable weeds were still the most abundant category, making up 36-96%. The most frequent were *Avena* sp*., Bromus secalinus, Carex* sp., *Eleocharis palustris, Rumex* sp. and *Vicia/Lathyrus*. Samples consist of 0-40% barley grain, with higher proportions in well 8328 and the pits around the central section of the Late Iron Age ditch. Spelt glume bases were either absent, or present at 13-53% of samples, such as in the well 10421 backfills and the pits around the Late Iron Age ditch. Barley rachis was present in four samples at 3.4-9% abundant, three of which were well backfills. A single cereal culm was identified from well backfill <3216>, and no pulse or oil crops were identified. Woodland material, buds and leaf abscission pads, constituted a substantial proportion of samples from pits around the southern end of the 'Great Hall', and to a lesser extent samples from the well 8328 backfills.

Samples from three Period 0 postholes and one silt deposit were also studied, from the western half of the excavation (Fig 6-34). Two posthole samples had atypical compositions: sample <7539> contained a high proportion of spelt grain (45.5%, n=5), and sample <6171> had a high proportion of woodland material – eight buds and three *Sambucus nigra*. These may reflect household activities. Samples <7269> and <6025> had a more typical composition, of arable weeds, spelt glume bases and spelt grain. Although a small number of items, <7269> contained a high proportion of non-cereal food plants, one flax seed in 30 items.

6.2.3.2 Period 1

21 samples were studied from Period 1 pits, from across the excavation area. 20 samples contained 10 or more items after data standardisation (Fig 6-35). The samples were again

dominated by arable weeds, the most frequent of which were *Avena* sp., *Bromus secalinus*, *Chenopodium album, Medicago/Trifolium* sp. and *Tripleurospermum inodorum*. Spelt glume bases were present in around a quarter of several pit samples from the central part of the excavation area, especially three fills of pit 11612 (samples 5750, 7673, 7703). Glume bases were, however, absent from pits in the eastern half of the excavation. Spelt grain was usually present in small quantities, between 4 and 20% of samples. Barley grain was often only present in small proportions and barley rachis was rare, being only a small component in the large samples from pit fills <8956> and <5622> in the centre of the excavation. Sample <3125> from a pit fill did contain 80% spelt grains, but only had a total of 10 items. Sample <8956> had an exceptionally high-density of plant remains (757 items/L). These consisted mainly of spelt glume bases, *Avena* sp., *Bromus secalinus,* and large Poaceae. Five flax seeds were present in samples <6767>, <6868>, <7616> from context (12461) alongside *Carex* sp., *Filipendula ulmaria, Medicago/Trifolium, Rhinanthus minor* and *Sambucus nigra*. This range of atypical wild taxa may indicate that the sample represents non crop-derived material, perhaps fodder. Sample <9519> from a pit or hearth contained three olive stone fragments, one pea and a few arable weeds. Sample <5991> from pit fill (11681) contained 902 Ericaceae indet. capsules, alongside some spelt grains and other wild taxa. A seed of *Reseda lutea* (wild mignotte) was also present in this sample, which is a rare occurrence in southern Britain. It is a plant of waste and arable ground, especially on calcareous soils (Stace 1997).

Samples studied from occupation deposits and postholes were broadly similar to those from pits, consisting mainly of arable weeds alongside small proportions of barley grain, spelt glume bases, spelt grain and woodland material (Fig 6-35). Three samples from occupation deposits (<629>, <4631>, <6816>) were most similar to the pit fills, consisting of arable weeds, barley grain, spelt glume bases and grain, woodland material and small amounts of barley rachis. Alternatively, sample <5762> from a clay floor in the eastern half of the excavation was mainly composed of barley grain (n=19) with a few arable weeds, and a sample from a southern

occupation deposit <4191>, contained one celtic bean, a few arable weed seeds and a few cereal grains. Samples from the southern area have a higher content of wild taxa. A sample from a burnt silt deposit <3225> contained *Carex* sp., *Polygonum aviculare* and *Rumex* sp. Hearth layer <6109> contained *Bromus*/*Avena, Urtica dioica* and small legumes.

6.2.3.3 Period 2

Five samples were studied from Period 2 interior hearths (<1858>, <1533>, <1917>, 2166>, <3365>) (Fig 6-36). These consisted of mainly arable weeds, such as *Carex* sp., *Eleocharis palustris* and *Rumex acetosella* agg. Cereal chaff was absent. The woodland category consisted of buds <3365>, *Sambucus nigra* <1917> and dung/bread lumps <1858>. Two distinctive samples originated from a purpose built external hearth in a gravelled area in the north-west area of the trench. The primary fill <1740> contained a high-density (730 items/L) of spelt glume bases, spelt grains, arable weeds and some barley grains. The upper context within the hearth <1591>, had a lower density of 4.1 items/L. This could represent the use of crop-processing waste as fuel, to dry spelt and barley grains, or for another reason. Both samples had a similar composition, although they were separated by several contexts, suggesting a similar use of the hearth through time.

Eight samples were studied from interior and exterior occupation deposits. These also consisted mainly of wild taxa, with very small quantities of barely grain, spelt grain and spelt glume bases (Fig 6-36). No barley rachis and just a few spelt glume bases were present. Small weed seeds were abundant, the most common being *Atriplex* sp., *Chenopodium album* and *Urtica dioica*. Three samples contained similar assemblages of grassland plants – <818> and <780> from ERTB 5 and <1428> from ERTB 3. They all produced many *Medicago lupulina, Prunella vulgaris, Ranunculus a. r. b.* and *Rhinanthus minor*, as well as barley grain. Two other small samples had atypical compositions. A small sample from a cesspit <856> contained 25% spelt grains, but only five items, and sample <1925> from a clay fill of a drain cut possibly

associated with the round house ERTB 3, contained 24% spelt glume bases, 17% *Sambucus nigra* and one plum/damson stone.

6.2.3.4 Periods 4/5

These samples have been discussed at length in Robinson et al. 2006 and Robinson 2011. Only one Period 4 sample contained more than 10 reclassified items, sample <374> from well 2234 backfill (2320) (Robinson 2011), which contained 62% weed seeds and 26% spelt glume bases (Fig 6-37). Five Period 5 samples were studied from pits in the backyards of houses along the north-south street (Fig 6-38), none of which were beehive shaped storage pits. Three samples were dominated by individual wild taxa: *Brassica/Sinapsis* <374>, *Spergula arvensis* <315>, and *Bromus secalinus* <99>. The other two samples <378> and <392>, from cesspit 5235 in the back yard of Building 1, consisted of mainly *Bromus secalinus* weeds, 18-30% spelt grains and 8-16% spelt glume bases. The contexts were separated by other fills, indicating that similar charred plant remains were dumped into the pit over time. The only seed of the arable weed *Anthemis cotula,* a Late Iron Age introduction to Britain, was recorded from sample <315>.

6.2.4 Correspondence analysis – charred plant remains

In order to further explore the variation within the charred dataset, correspondence analysis was conducted using the reduced taxa in Table 4-6, and all samples containing at least 30 items. Pea/bean and *Brassica* sp. (both present in two samples) were also included to explore their behaviour. On the taxa plot (Fig 6-39), arable weeds, pea/bean and flax, woodland taxa and barley grain plot at the positive end of the x-axis. Weed seeds, spelt glume bases, spelt grain and barley rachis plotted at the negative end of the x-axis. The sample pie plot (Fig 6-40) shows that samples located at the positive end of the x-axis were dominated by arable weeds with some barley grain. Samples at the negative end of the x-axis contained arable weeds, with more spelt glume bases and spelt grain. Samples in the centre of the plot contained arable

weeds, spelt glume bases and barley grain. The deletion of outlying weed-rich samples resulted in further weed-rich samples becoming outliers. Woodland and cultivated plants contributed little to the variation within the dataset, plotting within a large group of arable taxa on the positive x-axis, and were subsequently removed.

The removal of the non-cereal cultivated and woodland taxa in the charred dataset produced very similar taxa and sample plots (Figs 6-41 and 6-42). On the taxa plot, the positive end of the x-axis was again characterised by smaller weeds, barley grain and cereal culm. At the negative end of the x-axis are spelt grain, spelt glume bases, barley rachis, and larger weed seeds. Again, the variation within the plot was controlled by weed-dominated samples at the positive end of the x-axis, samples with barley grain in the centre of the plot, and samples with more spelt glume bases at the negative x-axis. Variation on the y-axis was again unclear, and probably due to weed seed type.

Classification of the samples by period (Fig 6-43) shows most samples at the most positive points on the x-axis are from Early Roman Period 2 and the Mid-Late Roman periods, as are most at the negative end of the x-axis. Rather than a unidirectional chronological pattern, samples from post AD70/80 represent the extremes of the assemblage, with higher proportions of either spelt grain or weeds. The earlier samples represent repeated activities producing similar assemblages containing spelt glume bases and barley grain, whilst occasional accidents in the later period produced atypical samples. The classification of samples by broad deposit type shows the same pattern (Fig 6-44). The internal samples, which are mostly Period 2, plot across the x-axis. Refuse samples from all periods are located across the plot.

In conclusion, correspondence analysis has shown that most variation in the assemblage is explained by the presence of spelt glume bases, spelt grain and barley rachis as opposed to arable weed and barley grain. The separation of barley and spelt grain suggests differences in

crop-processing or cultivation practices, which are now further explored. Prior to the detailed analysis of crop-processing stages, the other potential sources are examined.

6.2.5 Investigating non crop-processing sources

6.2.5.1 Fuel

The presence of seeds of woody perennials (*Rubus* sect. *Glandulosus*, *Sambucus nigra*) and frequent buds suggests that scrub vegetation may have been collected for tinder. Yet none of the Period 1 burnt deposits contains any of these plant remains, and the only Period 2 burnt deposit, sample <1917>, to do so contained *Sambucus* alongside many probable arable weeds such as *Eleocharis palustris*. Charcoal analysis of the Late Iron Age forum-basilica and Late Roman Insula IX has shown that *Quercus* sp. was the main fuel wood used at Silchester (Straker 2000; Veal 2012), but forthcoming analysis of the Insula IX assemblages may indicate the use of more scrubby material as well. Fuel remains may have been redeposited in various contexts throughout the area, or these seeds may represent accidentally charred wild foods. Nevertheless, the correspondence analysis plot indicated that woodland materials contributed little to the variation in the dataset (**6.2.4**), and these aspects are excluded from crop-processing analysis.

6.2.5.2 Medicine

The origin of charred plant remains from medicinal usages was evaluated through the spatial distributions of taxa with the most conspicuous medicinal properties (Table 4-2). Overall, there were few charred records of these taxa. In Period 0, *Solanum* cf. *nigrum* was only recorded from the Late Iron Age ditch backfill (11650) (n=1) (Fig 6-45). *Atropa belladonna* was identified from another section of the ditch (11592) (n=2). *Plantago lanceolata* was recorded from several contexts, always alongside much more abundant crop-processing waste. Period 1 produced slightly more records: *Atropa belladonna* from Period 1 pit (11687) (n=2) and *Malva*

sylvestris from the overlying pit fill (11680) (n=1) (Fig 6-46). Well backfill (15033) had a more distinctive composition, containing a single caraway seed, four *Plantago lanceolata* and some weed seeds amongst faecal waste (**6.3.4**). Yet the small number of items (n=11) restricts any further interpretation. The numerous hearths from Period 2 did produce several records of medicinal taxa: *Solanum* cf. *nigrum* (n=3) and *Papaver somniferum* (n=2) from external hearth (6825) in the north-west open area, and *Plantago lanceolata* from occupation deposit (7181) (Fig 6-47). The first contained abundant crop-processing waste, and the second many grassland taxa. Overall, there are no abundances or spatial patterns providing any strong evidence that these seeds derived from medicinal as opposed to arable sources.

6.2.5.3 Ritualised deposition

Spatial patterns were also utilised to highlight any distinctive plant assemblages that may have derived from ritualised activities. Sample <9519> from a charcoal-rich pit fill (14616) within a Period 1 building at the southern edge of the excavation, contained three olive endocarp fragments (Fig 6-48), one pea and several weeds. The pit also contained a copper-alloy brooch, pottery and animal bone. Thus, the only record of charred olive from Insula IX derives from a household context with a small find and strong evidence for burning. Similarly, the only charred plum/bullace stone (Fig 6-48) was identified from sample <1925> from the clay fill of a drain cut (7867) associated with the Period 2 round house ERTB 3. The roundhouse produced evidence for ritualised activity, including an infant burial, two intact pots and cremated sheep/goat bones (Fulford and Clarke 2009). Finally, a Period 1 'ring of fire pit' (8944) contained two lentils (Fig 6-48), alongside partially burnt sheep/goat bones and glass fragments, considered strongly suggestive of 'ritual' offerings (Ingrem 2009). Again, this is the only charred record of lentil from Insula IX.

The plant taxa present are all rare in the entire Insula IX assemblage. These could also represent the occasional consumption of exotic plant foods (Van der Veen 2007a), but none of

these plant parts come into contact with fire during food preparation. None of these plant foods have been previously identified from 'ritual' offerings in Britain (lentil has been identified from the East London cemetery (Davis and de Moulins 2000), but there are parallels in Pompeii of olives, *Prunus* fruits and lentils being identified from domestic offerings (Robinson 2002). A clear understanding of these deposits cannot be attained until post-excavation work has been completed. Yet, regardless of whether 'ritual' as opposed to food preparation was the motivation behind these foods being burnt, they do not represent crop-processing activity, and hence, are excluded from further analysis.

6.2.5.4 Food consumption

Whilst the samples containing lentil, olive and plum may have a more special interpretation, other charred remains represent food waste. A charred celery seed was identified from Period 1 pit fill (11680), a caraway seed was recorded from Period 1 cessy well backfill (15033), and flax seeds were found in several samples from within and around the Late Iron Age ditch (**6.2.3.1**) (Fig 6-49). Aside from the caraway seed, these samples were all dominated by crop-processing waste. It is likely that the flavourings became accidentally charred during food preparation, and were then disposed of alongside the by-products of crop-processing, either intentionally as fuel or through accidental charring. Whilst no storage deposits of cereals were recovered, the one floor context sample studied, Period 1 <5762>, was dominated by barley grain, implying human use. Due to the ubiquity and abundance of spelt and barley grain and chaff, we can infer that these crops were being regularly handled within the settlement, and the most likely consumers were humans.

6.2.5.5 Fodder

However, cereals may have been used also as animal fodder. Overall, plants associated with waterlogged stable-manure are infrequent in the charred assemblage. For example,

Rhinanthus minor is present in 45% of Period 1 waterlogged samples, but only 3% of the charred samples. Yet several charred samples were identified as containing numerous taxa of grassland habitats (Fig 6-50). Period 0 pit fill <3279> (9025) contained many small legumes, *Ranunculus a. r. b*., *Stellaria graminea* and barley grain. Period 1 pit fill <5991> (11681) contained many Ericaceae indet. capsules, *Medicago lupulina, Ranunculus a. r. b.*, small legumes, and many spelt grains. Three Period 2 samples: <818> (5606) and <780> (5123) from ERTB 5 and <1428> (6682) from ERTB 3, also contained many small legumes, *Medicago lupulina*, *Prunella vulgaris*, *Ranunculus a. r. b., Rhinanthus minor* and barley grain. These assemblages could represent a combination of cereal grains and cut grass represented fodder, or barley grains and their accompanying arable weeds, which was burnt as refuse. The application of ratio and discriminant analysis to these samples (Table 6-9) showed that none of these samples derived from a single crop-processing stage, and an origin of fodder is probable. The majority of samples contain barley grain, indicating barley was utilised as fodder from Periods 0-2. Alternatively one sample from Period 1 did contain spelt grain alongside many Ericaceae indet. capsules, showing that spelt was also sometimes used as fodder. The presence of *Rhinanthus minor* and *Prunella vulgaris* in Period 2 samples indicate that hay was also being used at Silchester in a period where waterlogged plant remains are absent.

There were also several aquatic taxa in the assemblage, which may have derived from fodder or animal dung (Table 6-9). Eight seeds of *Schoenoplectus lacustris*, were identified from a silty deposit <791> (5155) within Period 2 ERTB 7, alongside several cereal grains and *Rumex* sp. seeds. One seed of *Persicaria hydropiper* was identified from the Late Iron Age ditch fill <7232> (1111). Both plants grow in shallow water of rivers and lakes, a habitat unlikely to have existed on the free-draining gravel plateau. Single seeds of *Isolepis setacea* were recorded from a Period 0 well backfill <2978> (9170), and a Period 1 occupation deposit, <629> (3580), both alongside barley grains. *Isolepis setacea* grows in wet open ground by ponds and lakes. These seeds only represent small components of samples dominated by cereal remains and taxa

consistent with arable fields. These plants could represent the wet borders of low-lying arable weeds in the Loddon Valley. Alternatively, they could derive from burnt dung, which was identified from Period 3 floors (Banerjea 2011), or thatching/flooring material that was accidentally burnt. Future phytolith and micromorphology work may well provide further insights. The aquatic taxa have been excluded from crop-processing analysis. Heathland material was also recovered from a single charred sample, <5991> (11681), which contained 902 Ericaceae indet. capsules, showing that the heathland material collected for animal bedding (**6.1.2.5**) was also occasionally charred. Alternatively, this could represent an occasional use of heathland material as fuel for drying spelt grains.

6.2.6 Investigating crop-processing derivation

The crop and arable content of the charred samples was investigated in order to interpret the cereal processing activities that were taking place at Silchester and to identify samples which can be used in weed ecology analysis. The inclusion of wild taxa as arable weeds was undertaken following section **4.3.6**. Whilst most samples from Insula IX are from redeposited material in pits and ditches, if the composition of the sample is consistent with one crop-processing activity, it can be utilised in weed ecology analysis (Bogaard 2011: 151; Hillman 1984). Due to the low-density of charred plant remains and small sample sizes at Silchester, a low threshold of 30 or more items after data standardisation was adopted for the inclusion of samples. This low number of items will limit the reliability of interpretations made. The dominant crop type was calculated for all samples containing more than 10 barley and spelt/emmer items (**4.3.7**), resulting in 19 spelt samples, 10 barley samples, and five samples of mixed composition (Fig 6-51). Samples representing one crop type were entered into ratio analysis, but those containing less than 10 items from one crop type were excluded. To complement crop ratio analysis, discriminant analysis was carried out (**4.3.8**). The weed content of Silchester samples was plotted using the discriminant function extracted from the Amorgos samples (Jones, G. 1984). The results of ratio and DA analysis were compiled to

assign each sample a single crop-processing stage, with associated levels of contamination (from ratio analysis) and probability (from DA) (Table 6-10).

The majority of samples were classified as fine-sieve by-products (FSBP), with low grain: glume base ratios and many small free heavy weed seeds (Fig 6-52). These samples are interpreted as the by-product of fine sieving following grain dehusking. Some samples with FSBP ratios were classified by DA as fine-sieve products due to the abundance of big-free heavy seeds. These were interpreted as FSBP from pre-sieved spikelets. One sample was interpreted as spelt spikelets, due to the intermediate ratio of grain: glume bases. Two samples were identified as spelt fine-sieve products (FSP) due to high grain: glume base ratios and big free and heavy weed seeds (Fig 6-52). Just one barley FSP was identified. 16 samples did not produce complementary ratio and DA results. Nine samples had greater numbers of barley grain than rachis, but these were accompanied by small free and heavy weed seeds. These two categories of plant remains do not occur together in any barley crop-processing stage. Rachis is removed at earlier stages of crop-processing (Hillman 1981; Jones, G. 1984), and is more likely to disintegrate at lower temperatures than grain (Boardman and Jones 1990). Yet the complete absence of rachis from any of the barley samples indicates that the grains and weeds derive from different processes, namely clean grain mixed with grassland fodder plants (**6.2.5.5**). Over time, spelt FSBP were present in Periods 0 and 1, but at low densities (<10 items/L), representing small-scale daily activities (Van der Veen and Jones 2006). A higher proportion of Period 1 spelt FSBP were pre-sieved, but too few samples were analysed for conclusions to be inferred. In Period 2, spelt FSBP were only recovered from a hearth, where chaff was presumably being used as fuel. The only Period 4 and 5 samples represent the accidental burning of spelt grain and/or the remaining larger weed seeds.

6.2.7 Weed ecology and cultivation practices

In order to explore the arable weeds present alongside the crops, crop items were removed from the reduced dataset (Table 4-6), and correspondence analysis was conducted on all samples containing over 10 crop items. This low sample threshold limits the reliability of the results. Poaceae indet. were removed at this point as they provide little useful ecological information. The separation between barley and spelt samples is again evident. All barley samples plot at the positive end of the x-axis (Fig 6-53), with spelt samples plotting across the length of the axis. Samples were classified by their assigned crop-processing stage to explore this variation. All barley samples, containing grain and small free heavy (SFH) weeds, are located on the positive x-axis, along with nearly all un-sieved spelt FSBP. On the negative x-axis are the two spelt FSP, and nearly all pre-sieved spelt FSBP (Fig 6-54).

The barley samples highlighted as containing possible fodder components (**6.2.5.5**) are located on the far end of the x-axis, in the same area as various grassland taxa such as *Prunella vulgaris* and *Ranunculus a. r. b* (Fig 6-55). The two samples containing *Isolepis setaceae*, <629> and <2970>, do plot amongst spelt FSBP, and appear to have derived from crop-processing. The barley samples located in the centre of the plot (samples 629, 2978, 5542, 5976 and 7556) have comparable weed contents to the un-sieved spelt FSBP. They most likely represent barley grain mixed with the small weeds from the fine-sieving of intact spelt spikelets.

As the previous plot cannot be used to investigate crop cultivation practices, the weed content of the spelt samples was investigated separately. Unfortunately, the major variation within the plot was derived from crop-processing, with un-sieved spelt FSBP located on the positive x-axis, and spelt FSP on the negative x-axis (Fig 6-56). Due to the generally low sample size, and subsequently the small number of samples with assigned crop-processing stages, correspondence analysis has not been successful in identifying changes in the cultivation practices undertaken at Silchester. Instead, the proportion of weeds grouped into

autecological categories per sample was examined. The autecological categories are explained in Table 4-11 and the values of individual taxa are listed in Catalogue 3. Taxa codes follow Table 4-6.

First, all samples contain a mix of taxa in the three flowering categories (Fig 6-57) and there is no chronological change over time. The presence of some short and early taxa does though imply that an autumn sowing time was more likely (Charles pers. comm.). All samples contain mostly annual taxa (*Chenopodium album, Polygonum aviculare*, *Stellaria media* and *Tripleurospermum inodorum*), alongside smaller proportions of perennials (*Atropa/Solanum*, *Eleocharis palustris* and *Prunella vulgaris*), indicating cultivation was at an intermediate level of disturbance (Fig 6-58). The presence of low growing taxa, under 30cm, in nearly all samples (*Prunella vulgaris* and *Rumex acetosella*) shows harvesting was low on the stalk, with straw being collected as well as the ears (Fig 6-59). All samples contain a mix of taxa indicating dry soils, with F values of 3-5 (*Bromus secalinus*, *Fallopia convolvulus*), and smaller proportions of values of 6-9, indicating intermediate to wet soils (Fig 6-60). Period 2 sample <1740> does contain very small proportions of F 6-9 taxa (Eleocharis palustris). However, this was the only sample of this date, and was dominated by large grasses, which indicate drier soils. Overall, fields were probably located at the edge of damper areas, explaining the mix of dry and wet taxa.

Several calcifuges (*Rumex acetosella* and *Spergula arvensis*) and calciphiles (*Medicago lupulina* and *Prunella vulgaris*) are present, suggesting variability within the areas of fields used. All samples contain a mix of moderately acidic soil indicators (R 3-6) and taxa of weakly acidic to basic soils (R 7-9) (Fig 6-61). Correspondingly, all samples contain a mix of taxa of intermediate fertility (N 2-6), and fewer taxa indicating richly fertile conditions (*Avena* sp., *Chenopodium album*, *Stellaria media*) (Fig 6-62). These two factors suggest soil fertility was maintained, but not maximised. It is likely that some of this variation derives from spelt grown in different

areas under slightly different cultivation regimes, but the lack of weed rich samples and different crop-processing stages represented between periods limits any further clarification of this pattern. The analysis of the spelt FSBP alongside by-products from the regional study area in Chapter 7 will inform how the areas cultivated and practices of cultivation compare to those practiced at Silchester.

6.3 Mineralised plant remains

Calcium-phosphate mineralised plant remains were recovered from a small number of contexts. The assemblage was dominated by cultivated plant foods, with some woodland and disturbed (arable) plants and various seeds present as well (Table 6-11).

6.3.1 Period 1

A large assemblage of mineralised remains from the sewage deposit context (15033) produced a diverse range of plant foods, with a total of 43 taxa identified and a density of 896 items/L. The abundance of items from sub-samples of the smaller size fractions have been multiplied up (**4.4**). Five categories of plant foods were present: cereals (barley grain, spelt/emmer grain, spelt spikelet), flavourings (celery, coriander, dill, flax), fruit pips (apple/pear, blackberry, fig, mulberry), fruit stones (plum, cherry/bullace) and pulses (lentil, pea). The most abundant taxa were celery (n=7664), fig (n=7096) and blackberry (n=5714). Cereal bran, fruit skin, plant stems, earthworm cocoons and a fly puparia were present, as well as a 'mystery object', which is an item commonly recognised in mineralised samples from cesspits and thought to be derived from the digestive tract (Carruthers 1988; Robinson pers. comm.). A small number of poorly preserved waterlogged remains were also identified: opium poppy, damson/plum, elder, *Arctium* sp., and hundreds of blackberry seeds, of which some could be identified as *Rubus idaeus* (raspberry). In contrast, only 16 plant remains were recovered from context (8059)

from well 5100: cherry/bullace stones, apple/pear pips, one lentil and one spelt/emmer grain, along with some cereal bran.

6.3.2 Period 2

Mineralised plant remains were recovered from a large cesspit dated to the end of Period 2 c. AD125, and have been discussed extensively elsewhere (Robinson 2011). The most abundant items were fig (n=150), cherry/plum (*Prunus* sp.) (n=128) and blackberry (n=79). Context (5276), the main cesspit fill, contained many more cultivated plants than (5303), a band of timber around the edge of the cut. The same range of plant foods were present as in (8059), with the addition of grape and summer savory. Seeds of various disturbed (arable) ground and grassland plants were also recorded and a wider range of waterlogged plant remains were also present including blackberry, bullace/damson, elderberry, plum, raspberry and sloe. A single seed of the dye-plant *Reseda luteola* (weld) was identified from (5276).

6.3.3 Period 5

Mineralised plant remains were present in five pits from Period 5, discussed at length elsewhere (Robinson et al. 2006). The composition of seeds in these samples varied from over 90% cultivated plant foods to over 90% non-cultivated plants. Over all, the most abundant seeds were apple/pear pips (n=107), lentil (n=40), hemlock (n=27) and spelt/emmer grain (n=26). However, indet. hulled cereal (n=178) and cf. *Malus* skin (n=443) were the most abundant items. A similar range of plants was present as in the preceding periods: cereals (barley grains, spelt/emmer grain, spelt/emmer spikelets), flavourings (celery, dill, coriander, summer savory), fruit pips (apple/pear, cucumber, fig, grape, wild strawberry), fruit stones (plum/cherry) and pulses (lentil, bean). Flax and pea were absent. No waterlogged plant remains were recovered.

6.3.4 Formation of the mineralised assemblage

In comparison to the charred and waterlogged assemblage, the mineralised plant remains from Insula IX largely derived from the single source of human faecal material. Rootlet fragments and a diverse assemblage of seeds reflecting in situ preservation were not present (Carruthers 2008b), whilst small fruit pips, flavourings, fruit stones and cereal brans were abundant (Fig 6-63). The presence of calcium-phosphate encrustation, cereal bran and mystery objects in Period 1 (15033) further demonstrate the presence of concentrated faecal remains (Fig 6-64). Several of the previously suggested wild plant foods (**6.1.2.2**) were recorded in mineralised deposits. These include hawthorn (Period 1), wild strawberry (Period 5), and abundant blackberry in all periods. *Mentha sp.* was also recorded from Periods 1 and 2.

Some of the weed seeds present may be flour contaminants missed by hand-cleaning such as *Bromus secalinus*. Other plants may have been growing in the nitrogen-rich areas around cesspits, such as *Urtica dioica* and *Urtica urens*, whilst grassy material may have been added to dampen the smell (*Prunella vulgaris, Rhinanthus minor*). The intact pulses and spikelets are unusually small examples of material, which would have survived food processing, rather than indicators of food preparation techniques. *Conium maculatum* was present in Period 1 (15033), Period 2 (5276) and (5303), and Period 5 (2920), (2913) and (2686). Hemlock is a poisonous plant (Table 4-2). The alkaloids are found in the leafy material, vegetative organ and seeds (Vetter 2004), and it is unlikely that so many seeds would survive processing for medicinal use and digestion. Considering that hemlock grows in damp nitrogen-rich waste ground, it seems much more likely that stands of the plant were common around cesspits.

6.4 Chronological change at Silchester

The analysis of archaeobotanical remains from Insula IX, Silchester allows the reconstruction of agricultural activities and plant food consumption at the site across 500 years (Fig 6-65). Furthermore, the derivation of the plant remains from three modes of preservation counteracts the biases of each mode towards particular types of plant macrofossils derived

from different activities (**5.2**). At the Late Iron Age oppidum (Period 0) the main crops cultivated were spelt wheat, with a small component of emmer, and six-row hulled barley. Low densities of charred processing by-products including chaff and grain of both crops were recovered from refuse deposits across the excavation, indicating the regular dehusking of spelt spikelets was conducted, and the accidental charring of barley grains during food preparation. Whilst charred crop remains were not recovered from primary storage or domestic contexts, their high frequency implies they were crops intended for human consumption. However, spelt glume bases were utilised as fodder, as demonstrated by their inclusion in a stable-manure deposit from well 8328. The weed seeds present alongside the charred spelt dehusking waste indicate that the wheat was cultivated in damp, slightly acidic soils that were not calcareous. The wheat was probably autumn sown. A small quantity of charred free-threshing wheat grains were identified, suggesting it was present only as a crop contaminant.

However, the oil-crop flax was also cultivated. Seeds and capsule fragments were identified from waterlogged samples from well 8328, and several charred seeds were also recovered. Pulses were also cultivated, as indicated by the identification of pea/bean. Additional plant foods were imported from the continent, as the introduced plants celery, coriander and olive were identified from waterlogged contexts (Fig 6-66). Hazel nutshell was present in the charred and waterlogged assemblage, indicating the collection for food of this wild resource, and the seeds of other woodland fruits, sloe, apple and blackberry, may also indicate that they were consumed. The presence of stable-manure deposits from well 8328 also evidenced the collection of heathland material and cut grass from managed hay meadows, whilst importantly showing evidence for the stabling of animals within the settlement. These deposits dated to c. AD30-55, and the absence of charred hay meadow taxa *Filipendula ulmaria* and *Rhinanthus minor* from Period 0 shows that the management of hay was instigated towards the end of Period 0.

Period 1, c. AD44-70/80, mainly shows continuity in the range of crops, agricultural practices and other plant foods. Spelt wheat and six-row hulled barley were the major crops, evidenced by chaff and grain from all three datasets. Again, low-density charred crop remains were recovered from refuse deposits across the excavation, indicating the regular dehusking of spelt spikelets and preparation of barley grain. The ubiquity of these crops indicates they were primarily intended for human consumption, but again chaff was recovered from waterlogged stable-manure deposits, indicating the use of by-products as fodder. Spelt wheat continued to be sown and cultivated as in Period 0, although the two waterlogged seeds of *Anthemis arvensis* tentatively suggests some resources (crops or fodder) may have been imported from calcareous areas. Very small proportions of free-threshing wheat grain, and now also rachis, were again identified, as well as a single rye grain. Flax seeds and capsules continued to be frequent in waterlogged samples, with seeds occurring also charred and mineralised. Pea and bean were slightly more frequent in charred samples, and lentil was also recorded. Whilst a ritualised activity is the likely source of the charred lentil, they were also identified, alongside pea/bean, in the latrine deposit indicating human consumption. Celery, coriander, with the addition of dill and fennel were recovered from the wells. Celery, coriander and dill were also common in the latrine deposit, whilst single seeds of celery and caraway were identified from charred samples. Introduced fruits were mainly restricted to the mineralised assemblage, with mulberry, fig, plum/damson and apple/pear all present. In contrast, one sweet cherry stone was recovered from well 5791, and several charred olive stones were identified from one pit or hearth. This strong contrast between the contents of the latrine deposit in well 15034, and the waterlogged and charred Period 1 assemblages suggests the assemblages were derived from different social groups. The presence of stable-manure is, however, widespread in wells, and again heathland material, hay, flax and cereal chaff continued to be utilised.

During Period 2, the agricultural activities taking place within the Insula began to change, although the main crops continued to be spelt and six-row hulled barley, with very rare free-

threshing wheat and rye grains. Spelt glume bases were now far less frequent, with only one rich deposit present. Many barley-dominated charred samples represented mixed fodder deposits, and most spelt-dominated samples were mixed. However, these would have still been the main crop consumed. Just one spelt sample was available for weed ecology analysis, and it indicated similar conditions and cultivation practices as in the previous periods. A single pea/bean was identified, but flax was absent from the charred assemblage, and present in lower quantities from the latrine deposit studied. Additional plant foods were identified from this mineralised material, with summer savory and grape adding to the range of fruits and flavourings already consumed. The absence of waterlogged samples from this period precluded any evaluation of wider presence of these foods. Similarly, no stable manure was present, although charred fodder deposits containing barley grain and grassland taxa were identified.

The paucity of data also affects comparison with Periods 3-5 (Robinson et al. 2006; Robinson 2011). The few charred plant remains present indicate that spelt wheat and six-row hulled barley continued to be the main crops. However, the overall rareness of charred plant remains strongly suggests that crop-processing was no longer taking place within the Insula, and only the crop-processing stage evidenced was the hand cleaning of grain. Whilst it is possible that crop-processing waste was utilised as fodder (cf. Campbell 2000: 55) or used for manure in this period, the very low frequency and densities of cereal chaff make it unlikely that much crop-processing waste was present within this part of the settlement. The only indication of field conditions is the identification of *Anthemis cotula* from Period 5, pointing to the cultivation of clay soils. Furthermore, crop-processing by-products were absent from the stable-manure deposit studied from Period 4 well 5735, but the collection of heathland and grassland resources were still evidenced. The oil crop, flax was absent, and pea/bean were confined to the Period 5 latrine deposits, although this may be a reflection of the small archaeobotanical dataset from these periods. A diverse range of fruits and flavourings continued to be

consumed, with pear/apple, fig, grape, plum/damson, walnut, celery, coriander, dill and summer savory recovered variously from wells or latrine deposits.

Overall, there is continuity in the range of staple crops cultivated and consumed over c. 500 years of occupation at Silchester. However, after c. AD70/80 processing, and presumably location cultivation ceases, and cereals must have been cultivated elsewhere. The use of flax as a human and animal food ceased after the Early Roman period, but peas and beans continued to be grown. Interestingly, the most frequent and abundant flavourings remained as celery, coriander and dill from the Late Iron Age onwards. Likewise, the collection of heathland and grassland resources for animal bedding and fodder was evidenced in most periods. The careful evaluation of the charred and waterlogged datasets for indications of the use of wild plants as medicines and foods did not prove any taxa were derived from specific uses. The consideration of ritualised deposition did however indicate that the sequence of plant materials deposited in wells and the charring of rare plant foods could be significant.

Chapter 7: Agricultural Practice in the Silchester Region

7.1 Overview of the regional dataset

In order to evaluate the relationship between agricultural practices and the development of Silchester, archaeobotanical evidence for crop choice, crop-processing, crop cultivation and the use of other plant foods and resources in the wider region has been evaluated. The regional dataset consists of 1138 samples from 167 site phases of 92 sites. In text, sites are referred to a record code (R_) (following Van der Veen et al. 2007), for which bibliographic information is provided in Catalogue 5A. Whilst the study area is relatively small, there are disparities in the derivation, quality and preservation of archaeobotanical data, much of which derives from the uneven excavation focus in these regions as well as different settlement distributions in the past. Fig 7-1 shows the number of records by area and type of excavation. The Hampshire Downs has the most records, followed by similar numbers from the Upper and Mid Thames Valley, and fewer from the Berkshire Downs, Thames Heaths and Chilterns. Nearly a third of records from the Hampshire Downs were derived from research excavations, whilst no records were research derived from the Mid Thames.

The Berkshire Downs and Chilterns both suffer from a small number of records, of which none are rated 'good' (Fig 7-2). Sites in the Berkshire Downs and Chilterns have been subsequently combined with the Hampshire Downs, due to their similar geology. Whilst the Thames Heaths and Mid Thames Valley have fewer records than the Hampshire Downs, a reasonable proportion is rated 'good'. Charred records are common in all regions, but there are only small numbers of mineralised assemblages overall. There are some waterlogged samples in all areas (Table 7-1).

The distribution of records by period shows that most records derive from the Mid Iron Age, Early Roman and Late Roman periods (Table 7-1). These periods also have the most mineralised and waterlogged records. The Late Iron Age has fewer records overall, partly due to the dating problems (**3.1**), and no mineralised records, thus limiting the examination of non-cereal plant foods. There are some 'good' Late Iron Age records, but these are only from three sites: Barton Court Farm, Brighton Hill South and Silchester Insula IX.

The largest number of records derives from enclosed settlements, unclear features and field systems (Fig 7-3). Comparable numbers of records are available from hillforts, oppida, major towns, small towns, villas and open settlements, some of which are 'good' quality. A high proportion of villa records are 'poor', largely due to the publication of summed samples from Castle Copse villa. No mineralised records are available from many site types due to the absence of suitable soil conditions (**2.2.2**), including hillforts and villas, and the majority of waterlogged samples are constrained to towns and enclosed and open settlements near to rivers (Fig 7-4).

Overall, the ability to evaluate plant foods other than cereals is limited by the lack of mineralised records from the Late Iron Age and most settlements other than towns. Waterlogged samples are also lacking from similar areas, and are less common in the Iron Age than the Roman period. The paucity of waterlogged samples also hinders the investigation of foddering and the use of non-cereal crops. Furthermore, the small proportion of 'good' records, with over 10 samples per phase, limits the potential for detailed studies of crop-processing and cultivation practices. Charred samples are, however, reasonably well distributed by period, site type and area, allowing arable production to be evaluated chronologically and regionally.

7.2 Cereal crop choice

7.2.1 Crop presence in the region

In order to investigate the production of cereals in the regional area, the main crops were identified by assessing the frequency and abundance of crop items within the 939 fully quantified samples (Table 7-2). Barley grain was the most common crop item, present in 634 samples, and in all areas. Barley rachis was identified in only 209 samples, but was similarly widespread across all areas and periods. Where identifiable, barley grain and rachis were almost always six-row hulled barley. The two-rowed rachis internodes identified at Mid Iron Age Bury Hill (R31), Late Iron Age Suddern Farm (R138) and Mid Roman Castle Copse Villa (R33) were present alongside larger numbers of six-rowed rachis. Similarly, naked barley grains were identified at Mid Iron Age Bury Hill (R31) and Roman Watchfield (R163), alongside larger numbers of hulled and indeterminate grains. These indicate that there was some local variation in the barley grown, rather than different crops.

Spelt grains were present in 263, and spelt glume bases in 341 samples. These items were identified from sites in all areas and periods. Emmer wheat was present in fewer samples, 71 with grains present, and 61 with glume bases, but again across all regions and time periods. Emmer grain and chaff was always present alongside much larger quantities of spelt, spelt/emmer and free-threshing wheat. Emmer rarely outnumbered spelt, and did so in only six samples where more than 10 glume wheat items were present. Hence, emmer was not cultivated as a separate crop, but was present as a component of spelt crops. Therefore, emmer and spelt have been combined as a glume wheat category.

Free-threshing wheat was rarer; grains were identified in 149, and rachis in 31 samples. In only six samples did free-threshing wheat items outnumber glume wheat, and number over 10 items. These samples derived from just four sites: High St Staines (R69-71), Northgate House Winchester (R106-108), Abingdon Vineyard (R158-160) and Old Kempshott Lane (R110-111).

At the first three sites, subsequent medieval occupation raises the problem of contamination, as was considered likely at Winchester (Carruthers 2011). Overall, the Iron Age distribution of free-threshing wheat items was limited, having been identified at a few sites in all areas. There was a wider distribution in the Roman period, with records clustered around the towns of Staines, Silchester, Abingdon and Dorchester. The distribution of rachis is even more limited. The chronological distribution of free-threshing wheat is discussed further below (**7.4.4**).

Two other potential crops were present in low quantities. Rye grain was recorded in 14 samples from towns and rural sites in Late Iron Age onwards. All records consisted of a few grains, other than High St Staines (R70-71), Perry Oaks (R120) and All Souls Farm (R4), where more than five grains were identified from individual samples. Although there is strong potential for the rye grains from Staines to be derived from medieval activity. Rye rachis was only recorded at four rural sites. Several of the sites with rye were located close to the Roman road network, indicating rye may have been spread as a new weed through the movement of people and draught animals. Cultivated oat grains were identified from only seven samples, and floret bases from six samples. The sites where cultivated oat has been recorded range across a diverse area, and are those where large archaeobotanical assemblages have been studied (Hascombe Hillfort R66, Perry Oaks R117, Suddern Farm R138). Whilst cultivated oat grains are difficult to identify, in no samples did *Avena* sp. grains dominate assemblages (>70%). Hence, any oat cultivation was very limited. It is clear that spelt wheat and six-row hulled barley were the major crops cultivated in the study area, and free-threshing wheat may have been a minor crop.

7.2.2 Reduced dataset for crop-processing analysis

The dataset was reduced to 291 samples containing at least 100 standardised cereal grains, chaff, frequent arable weeds (>2.5%) and collected plant resources, following the reallocation stages and taxa codes outlined in Chapter 4 (**4.6.2**) (Table 4-15) and the assessment of arable

weeds (**4.3.6**). Sample codes (eg SIX-005) refer to the contextual information available in Catalogue 5B. Bibliographic information for each site is available in Catalogue 5A. The chronological and regional distribution of the reduced dataset is summarised in Table 7-3. Samples from the Hampshire Downs and the Upper Thames Valley dominate the dataset, with much lower numbers from the Mid Thames Valley and Thames Heaths (Figs 7-5 – 7-9). The Mid Iron Age, Early Roman and Late Roman periods are the best represented.

The reduced dataset, containing crop, arable, and collected items, was entered into correspondence analysis. Fig 7-10 displays the composition of charred samples, including collected materials such as hazel nutshell, Ericaceae indet. fruits, Rosaceae thorns and buds. These collected items contribute little to the variation within the dataset, as most taxa plot amongst numerous arable weeds and cereal chaff on the negative y-axis (Fig 7-11). These samples can be inferred to represent refuse deposits. Pea/bean was present amongst grain-rich samples on the positive y-axis, representing charred products, further demonstrating that pea/bean were cultivated as crops (Fig 7-11).

Following the removal of collected items from the reduced dataset, the location of species and samples was virtually unchanged on the correspondence analysis plot, validating the removal of these taxa (Fig 7-12). Within the area of grain-rich samples on the positive y-axis, barley grain and free-threshing wheat grain are located around the origin, whilst glume wheat grain samples are located on the negative x-axis. The chaff-rich samples on the negative y-axis contain mainly glume wheat glume bases. The limited number of samples containing significant proportions of barley rachis occur on the most negative y-axis. Cereal culm and free-threshing wheat rachis occur only in very small quantities. Classification of crops by crop item has shown that variation within the dataset is explained by proportions of grain and chaff of the dominant crop type (Fig 7-12).

7.3 Crop-processing analysis

7.3.1 Crop type

Crop-processing calculations were undertaken following the stages outlined in Chapter 4 (**4.3.4-4.3.8**). The crop contents of each sample were assigned to crop type: glume wheat, barley, and free-threshing wheat (Table 4-8) and the maximum number of grain or chaff of one crop type was used to calculate the percentage of each crop type (**4.3.7**). Variation by crop type was explored through correspondence analysis of only the crop content of samples. All samples are displayed in Fig 7-13 and all taxa in Fig 7-14. Fig 7-15 displays all 285 samples, with their crop content classified by crop type. The majority of samples form a gradient from barley-rich samples in the positive x positive y area, to glume wheat-rich samples in the negative y area. Samples in between contain decreasing quantities of barley and increasing quantities of glume wheat. Two samples in the positive x, negative y area are dominated by free-threshing wheat, and one sample in the negative x positive y area is a low probability barley sample.

7.3.2 Ratio and discriminant analysis

Whilst nearly all barley samples plot in one area of Fig 7-15, there is clear variation within the spelt-rich samples which must derive from variation in the crop-processing stage represented. The crop-processing stage from which each sample derived was assigned through the calculation of ratios for all samples where over 10 items of the dominant crop type were present within a sample (**4.3.7**). The majority of glume wheat samples had a ratio of grain: glume base of <0.8, indicating higher proportions of glume bases than within the intact cereal. These 166 samples are likely to be fine-sieving by-products (FSBP). 20 samples have grain: glume base ratios between 0.8 and 1.5. These samples were considered to represent intact spikelets, due to the similarity of ratios with that of an intact spelt spikelet (2 grains: 2 glume

bases). 43 samples had grain: glume base ratios of over 1.5, and were interpreted as fine-sieve products (FSP).

The majority of barley samples had a grain: rachis ratio much higher than 0.5. These samples were interpreted as FSP. The three free-threshing wheat samples contained only grain, and were classified as FSP. All samples containing more than 10 weed taxa with physical seed categories were entered into discriminant analysis (DA) (**4.3.8**), alongside the ethnographic data from Amorgos (Jones, G. 1984). Results were obtained for 255 samples, and are reported in Catalogue 5B.

7.3.3 Combined approaches

The combination of the ratio and DA classifications resulted in the assignment of each sample to a crop-processing stage, with attached levels of contamination from the crop type, and probability from the DA (Table 7-4). The resultant glume wheat categories were fine-sieve by-products (FSBP), grain-rich fine-sieve products (FSP), pre-sieved spikelets with mainly 'big' seeds, 'un-sieved spikelets' with 'big' and 'small' seeds, and pre-sieved FSBP, containing 'big' seeds such as *Agrostemma githago and Fallopia convolvulus*. These most likely represent fine-sieve by-products from the dehusking of spikelets, which had previously been sieved to remove most small weeds. Fig 7-16, a CA plot of arable weeds in all spelt samples which were assigned to a crop-processing stage, clearly shows the weed content of spelt FSBP is distinctive from FSP and pre-sieved FSBP, with samples only occurring on the negative y-axis. Alternatively, spelt FSP and FSBP (sieved) have the same distribution on the plot, hence a comparable weed content.

The contents of samples classified by DA as winnowing by-products were assessed for the presence of straw and rare taxa. Where the second DA group was FSBP, these were assigned as low probability FSBP. Where many small grass seeds, indicative of genuine winnowing by-

products, or the ratio classification was FSP, these samples were assigned as mixed. The majority of barley samples (18) were classified as FSP by ratio and DA analysis. FLT-010, a potential early-stage barley by-product, originated from the stoke hole of a corn drier which also contained mixed fuel (Campbell 2008b), and so was classified as mixed.

The classification of each sample by its assigned crop-processing stage corresponds with variation by crop item (Fig 7-17, 7-18). The majority of barley samples contain mainly barley grains, whilst glume wheat sample composition varies between samples rich in glume wheat grains in the positive x negative y area, and those rich in glume bases in the negative x area of the plot. Two samples at the positive x end of the glume wheat-rich group have high proportions of free-threshing wheat grain, and three samples at the upper end of glume base-rich samples consist of over a quarter barley rachis. The samples classified as spelt spikelets are located equidistant between the areas of glume wheat grain-rich samples and glume wheat glume base-rich samples.

7.4 Exploration of regional crop-processing variation

7.4.1 Chronological patterns

The spatial and chronological variation in the crop-processing stages represented has now been explored, through examination of the CA plot, bar charts of sample composition, average percentage values for crop items for various site variables (Table 7-5) and the density of crop items/L. Classification of each sample by its period indicates that samples from all periods are present in all areas of the plot, representing barley products, spelt FSP, and spelt FSBP (Fig 7-19). A high proportion of samples in the spelt FSP area (negative y) of the plot are dated to the Late Roman period and this period has the highest average percentage of spelt grain (39.5%). This pattern is due to the large number of samples from corn driers and ovens, where cereal grains have been accidentally burnt during processing prior to dehusking or malting. The

composition of samples is broadly similar across periods, with samples containing mainly spelt glume bases, followed by spelt grain, barley grain, barley rachis and then free-threshing wheat grain (Fig 7-20). Percentages of barley grain are higher at Mid and Late Iron Age sites, and barley rachis is highest at Late Iron Age sites (Table 7-5). This pattern is partly due to the increased proportions of spelt grain at Mid-Late Roman specialised processing sites. The only chronological difference is that more free-threshing wheat grain is present from the Early Roman period.

7.4.2 National Character Area

The broad geographic area that a sample derives from does have some influence on its composition. A higher proportion of samples in the spelt FSP area derive from the Hampshire Downs (Fig 7-21). Samples from the Thames Heaths are restricted to the barley FSP and spelt FSBP area of the plot, with none present in the spelt FSP zone. The proportion of crop items reflects this pattern, with samples from the Thames Heath contain more barley grain (average 22.4%) and more barley rachis (average 2.3%) than elsewhere (Fig 7-22) (Table 7-5). Yet this pattern is largely due to the barley content of samples from Silchester.

7.4.3 Landscape category

Assignment of a more detailed landscape category indicates further variation (Fig 7-23). Samples from areas of the upland chalk with clay capping are nearly all restricted to the spelt FSBP and spelt FSP areas of the plot (Fig 7-23). These are from the sites of Grateley and Houghton Down where many samples derived from corn driers. In contrast, samples from lowland chalk are limited to the spelt FSBP and barley FSP area, where the average percentage of barley grain is highest (26.2%). The increased proportions of barley grain at lowland chalk sites are also indicated by Fig 7-24. However, these samples are mainly from the open settlement at Ashville and the town at Winchester. Samples on upper river terraces, lower

river terraces and the upland chalk are present in all areas of the plot. Examination of the proportions of crop items (Fig 7-24) shows broad similarity in the proportions of spelt glume bases, spelt grain and barley grain. There is also variation in the proportion of barley rachis, which is consistently present at non-chalk upland sites (average 3.2%), (mainly Silchester), but present in lower proportions on the lowland chalk (average 0.9%) (mainly Ashville).

7.4.4 Site type

Whilst some regional geographic patterns are emerging, Fig 7-25 highlights key variations in the proportions of crop items present at different sites types. First, there is a difference in the distribution of hillfort and oppida samples in the CA plot. Oppida samples cluster in the spelt FSBP area of the plot, and are absent from the spelt FSP area. Hillfort samples are present in all areas of the plot. Fig 7-26 shows that samples from hillforts contain higher proportions of spelt (average 40.8%) and barley grains (average 26.6%), and lower proportions of spelt glume bases (30.1%) and barley rachis (0.5%) than oppida samples. Turning to the density of crop items per L, samples from hillforts have a bimodal distribution (Fig 7-30). Most samples have densities of less than 10 items/L, indicating small-scale handling of cereal grain. Contrastingly, one spelt spikelet sample from Bury Hill and two spelt FSP samples from Hascombe hillfort have high densities, and following Van der Veen and Jones (2006), these can be interpreted as representing the large-scale consumption or production of spelt wheat. Spelt FSBP from Mid Iron Age Abingdon Vineyard range from low (under 10 items/L) to high-density, indicating a medium-scale of spelt dehusking. Samples from Late Iron Age Silchester are all low densities, suggesting spelt dehusking was conducted at a small-scale.

Another important contrast is between Iron Age oppida and Roman towns. The location of oppida and town samples on the CA plot shows that samples from towns are present in all areas of the plot, indicating charred barley and spelt FSP, and spelt FSBP, whilst oppida are restricted to the spelt FSBP and barley FSP area (Fig 7-27). The proportion of crop items shows

that samples from towns contain far more free-threshing wheat grain compared to all other site types, and the highest average percentage of 10% (Table 7-5). These samples derive from the towns of Abingdon and Winchester, where subsequent Saxon and modern occupation raise the potential of contamination between phases. The density of samples from Early Roman Abingdon Vineyard show the same pattern as the Mid Iron Age, ranging from low to high densities (Fig 7-31). Continuity is also shown at Silchester, where most samples are low-density, other than the two exceptionally dense FSBP samples from a Period 1 pit and a Period 2 hearth (**6.2.1**). The small number of samples from Winchester shows the same pattern, of low-density and very high-density samples.

Whilst the presence of barley rachis contributes little to the variation displayed in the CA plot, Fig 7-26 does indicate an increased proportions of barley rachis at enclosed settlements (average 2.4%) compared to open settlements (0.8%). This corresponds with the increased proportion of barley rachis on the Hampshire Downs (2.3%), where many of the enclosed settlements are located. This finding reflects previous suggestions that charred barley was deposited in ditches of enclosed settlements in this area (Campbell 2000a).

7.4.5 Silchester hinterland

Finally, a comparison must be made between Silchester itself and the settlements within its hinterland in order to establish whether the oppidum and town was receiving crops from nearby rural settlements. Within the probable hinterland of the site (**3.2.5**), a c. 20km radius, archaeological sites cluster around modern day Newbury, Basingstoke, Bracknell, Reading and the Goring Gap. Samples of Iron Age date derive largely from the Basingstoke area, from the sites of Viables Farm, Old Kempshott Lane and Brighton Hill South. The highlighting of these samples on the CA plot shows that samples from Basingstoke are located in all areas of the plot, but mainly the spelt spikelet and spelt FSP zones. In contrast, samples from Silchester are confined to the spelt FSBP area (Fig 7-28). Spelt FSP and spikelet samples from Viables Farm

are very dense, and one Barley FSP from Brighton Hill South also had a 'high'-density of just over 15 items/L. The samples from Viables Farm all derive from a storage pit, which also contained an inhumation burial. Overall, samples on the Hampshire Downs are much denser than from the Mid and Upper Thames (Fig 7-32); the majority of Iron Age rural samples from the Upper and Mid Thames derive from Ashville. The absence of storage pits and hence stored grain deposits at Ashville, due to its location on the floodplain, may be a contributing factor to the lower density of charred plant remains.

Samples from the Roman hinterlands are again present in all areas of the CA plot (Fig 7-29), yet those from Bracknell and Newbury are restricted to the spelt FSBP area. The only samples present in the spelt FSP area are from the Basingstoke area, specifically the sites of Brighton Hill South, where spelt products and by-products were recovered from storage pits. There are also high-density samples from a Late Roman corn-drier at Bagnor Road, Newbury (Fig 7-33). Across the areas, densities of crop items are much higher than during the Iron Age, indicating that the scale of crop-processing was now higher.

7.4.6 Landscape context

Variation by crop type has also been investigated in a landscape context through the use of GIS. The sum of crop items per site per period has been displayed as a pie chart and site codes are listed in Table 7.4 and Catalogue 5B. During the Mid Iron Age, 18 sites are represented, located mainly on the Hampshire Downs and in the Upper Thames Valley. The most abundant category is glume wheat glume bases, followed by glume wheat grain and then barley grain (Fig 7-34). Barley rachis is present in the highest proportions in sites on the Hampshire Downs. These sites are Easton Lane (n =1), Suddern Farm (n=1), Rowbury Farm (n=3) and Brighton Hill South (n=3). These sites are both open and enclosed, but the small number of samples limits any firm conclusions. Fig 7-34 also indicates that settlements closer to the Thames Valley contain more glume wheat grain; these are Old Kempshott Lane (n=5), Viables Farm (n=5), Berrick Salome

(n=1) and Hascombe Hillfort (n=2). Again, these include a range of site types. Also, variation in the composition of samples within one landscape category, i.e. upland chalk group A, is greater than between landscape categories. The geographical pattern appears to largely be a product of low sample numbers, although the presence of spelt grain-rich samples at Old Kempshott Lane and Viables Farm does appear genuine. Also, the hillforts present (BRH, DAN and HSC) do contain more spelt grain than the oppida at AVY. Berrick Salome also contains the only noticeable proportion of pea/beans.

In the Late Iron Age (Fig 7-35), 10 sites are represented. These are concentrated on the Hampshire Downs, but some sites are also located in the Mid Thames Valley, Thames Heaths and Upper Thames. Spelt glume bases still make up the highest proportion of sites, followed by barley grain and spelt glume bases. Proportions of barley rachis are higher, but are noticeably present at Silchester as well as the sites on the Hampshire Downs. Several of these sites contain multiple samples: SDF (n=5), NTB (n=8), TRX (n=1) and GRT (n=3), increasing the reliability of this pattern. The increased proportion of barley rachis cuts across several landscape categories (upland chalk, upland chalk with head deposits, upland river terrace at Silchester).

In the Early Roman period (Fig 7-36), 17 sites are represented, distributed across the study area. The majority of sites contain mainly glume wheat glume bases, with smaller proportions of glume wheat grain. These are distributed across several landscape categories, including floodplain, low and high river terrace and upland. There are several exceptions to this pattern. Brighton Hill South and Old Kempshott Lane consist of mainly glume wheat grain. Woolbury, and to a lesser extent Brighton Hill South and Rowbury Farm contain increased proportions of barley grain. Samples from the small town site of High St Staines have a distinctive composition due to the presence of free-threshing wheat grain, barley grain and pea/bean.

Six sites are present in the Mid Roman period (Fig 7-37), two in the Mid Thames Valley, two on the Hampshire Downs, and one each in the Thames Heaths and the Upper Thames Valley. Five of these sites are very similar, containing mainly glume wheat glume bases, with smaller quantities of glume wheat grain. Again, High St Staines has a distinctive composition, containing barley grains, pea/beans, glume wheat grains and free-threshing wheat grains.

Finally, a contrasting picture emerges from the Late Roman period (Fig 7-38). 13 sites were included, located mainly in the Upper Thames Valley and on the Hampshire Downs. Whilst glume wheat glume bases are overall the best represented, glume wheat grains are present in higher proportions, as are barley grains. At most of these sites at least some grain-rich samples originate from corn driers, ovens or kilns: BCF (n=7), BLK (n=1), BRS (n=4), FLT (n=5), GRT (n=20) and PPH (n=1). At other sites, corn driers have produced glume base-rich assemblages: BGR (n=5) and WSD (n=1). This contrast depends on whether the crop being heated or the chaff utilised as fuel becomes charred. Barley rachis is rare, but continues to be present at Fullerton and Berrick Salome. These sites have consistently produced more barley across periods. Yet the landscape context of these two sites is different - the first lying on an upper river terrace, and the latter on a lower river terrace - as is the type of settlement, the first an open settlement and the second a villa.

7.5 Crop harvest height

The presence of low growing weeds in samples from the Danebury environs area indicated that crops were harvested by uprooting (Campbell 2000a). The presence of waterlogged straw and culm at Silchester similarly demonstrates that harvest height was low and that straw was being used as a resource. It is important to consider harvest height on an individual sample basis, as it may affect weed composition (Bogaard 2011: 58). Samples were grouped into three categories based on the lowest maximum height of taxa per sample (Table 7-6). The majority of samples fall into the <40cm category, indicating sickle harvesting low on the straw. Some

samples had a lowest height of 40-70cm. These are mainly FSP consisting of BFH weeds that have taller maximum heights, such as *Bromus* subg. *Bromus* and *Galium aparine*. Importantly, variation in harvest height was not linked to period or geographical area. The classification of each sample by harvest height category has been undertaken on each weed ecology correspondence analysis plot to evaluate any contribution to the variation.

7.6 Crop cultivation practices

The successful assignment of 237 samples to a single crop-processing stage, albeit with varying levels of contamination and probability, allowed the weed content of these samples to be investigated for evidence for the location of arable land and type of cultivation practiced. As illustrated above, the ability to model the agricultural basis of individual sites is limited by the small number of selected samples per site. Weed ecology analysis has been undertaken on samples from comparable crop-processing stages to remove any ecological biases deriving from crop-processing (Jones, G. 1984). Ecological variables have been summarised into two or three groups, and are displayed as pie charts representing the composition of each sample. The selected ecological variables are described in Table 4-11, and the data for each taxa is available in Catalogue 3. Taxa codes follow Table 4-15 and site codes Table 7-4.

Due to the relation of fertility attributes to flowering period, flowering onset and duration have been evaluated before soil fertility (N and R values) (Bogaard et al. 2001). All plots initially include taxa in 5% of samples, before subsequent reduction to 10% accompanied by the removal of broad Fabaceae categories (*Medicago*/*Trifolium*, *Vicia*/*Lathyrus*). Whilst ideally samples should only be utilised which contain over 30 arable weeds (Bogaard 2004: 62), this would have reduced the number of samples significantly. The cut-off point is around 10 items, but varies between plots.

7.6.1 Barley cultivation

The investigation of barley cultivation utilised 21 FSP samples and 29 taxa present in at least 5% of samples. The sample plot produced four groups of samples (Fig 7-39), and the taxa are shown in Fig 7-40. The main weed taxa of barley cultivation in this region were *Avena* sp., *Bromus* subg. *Bromus, Galium aparine, Polygonum aviculare, Rumex* sp., *Tripleurospermum inodorum* and *Vicia/Lathyrus* sp. On the positive x and y-axes were three Roman samples (group A). Lower down the y-axis was group B, containing rural samples from the Iron Age and Roman periods. At the bottom of the plot, on the negative y-axis, were three Iron Age samples (group C), and on the negative x-axis were five rural samples from various periods (group D). Hence, the y-axis separates Roman (positive) from Iron Age (negative), but the variation on the x-axis is unclear. Groups A-C and D were separated by a higher proportion of perennials and indet. taxa on the positive x-axis, and more annuals on the negative x-axis (Fig 7-41). Samples in group D contained higher proportions of taxa with lower F values between 3-5 (Fig 7-42), and also lower proportions of *Medicago*/*Trifolium* and *Vicia*/*Lathyrus*. Samples in group B also contained the highest proportions of taxa with N values between 2-6 (Fig 7-43), and corresponding R values between 4-6. No taxa classification separated the Iron Age and Roman samples.

Overall, barley was cultivated on moist soils of intermediate fertility. The samples in group D indicate barley was cultivated under drier conditions with more disturbance at Mid Iron Age Brighton Hill South, Mid Iron Age Berrick Salome, Late Roman Fullerton and Roman Thorpe Lea Nurseries. However, these sites, other than Berrick Salome, of which other samples were present in groups A and B, were all represented by single samples. The single Early Roman barley sample from Silchester (group A) indicates damp, but fertile conditions, with lower levels of soil disturbance. The presence of numerous samples with medium and high levels of contamination, along with the higher number of taxa than samples, limits conclusions from this plot.

7.6.2 Spelt cultivation – fine-sieve by-products

The cultivation of spelt was investigated first through the analysis of the weed content of FSBP. 50 FSBP samples were selected, which contained 45 taxa present in at least 5% of samples. The main weed taxa of spelt crops in the region, present in this and the subsequent plot (**7.6.3**), were *Atriplex* sp., *Avena* sp., *Bromus* subg. *Bromus*, *Carex* sp., *Chenopodium album, Eleocharis palustris*, *Fallopia convolvulus*, *Galium aparine, Polygonum aviculare, Rumex* sp., *Tripleurospermum inodorum* and *Vicia/Lathyrus* sp. Several outlying samples were removed due to the high proportions of *Anthemis cotula* (TPS-001, TPS-002, BCF-004). Four groups of samples were identified (Fig 7-44), and the taxa are shown in Fig 7-45. Group A, in the positive x-y area, consisted mainly of Roman samples from the Hampshire Downs, with single samples from the Upper and Mid Thames. Group B, on the positive x and negative y-axes, consisted of Iron Age samples from the Hampshire Downs (Fig 7-44, 7-46). Samples from the same sites are present in each group (GRT and HTD). Group D, located on the far end of the negative x-axis, contains five Roman samples from the Mid and Upper Thames. Group C, on the negative x and y-axes, consists of a large group of samples mainly from the Upper Thames in all periods. All oppida samples are contained within group D (Fig 7-47). The main variation is separation on the x-axis between rural settlements on the Hampshire Downs and rural settlements and oppida in the Upper Thames. Within each region, later samples move in different directions; in the Upper Thames more negative y, in Hampshire more positive y, and in the Mid Thames more negative x.

Considering the clear geographical separation on the x-axis (Fig 7-44), the distribution of taxa that tolerate or avoid chalk or clay geologies was investigated. Taxa preferring calcareous soil conditions (*Anthemis arvensis*, *Arenaria serpyllifolia*, *Sherardia arvensis*) were present in samples in groups A and B, whilst calcifuges (*Rumex acetosella*, *Spergula arvensis*) were present in samples in groups C and D (Fig 7-48). Hence the presence of geologically specific arable floras contributes to the separation of samples from the Hampshire Downs and Thames

Valley. Furthermore, the presence of the one taxa specific to heavy clay soils (*Anthemis cotula*) was restricted to samples in groups D and the nearby section of group C (Fig 7-49). The separation of groups A and B from C and D is further explained by the higher proportion of *Medicago*/*Trifolium* and *Vicia*/*Lathyrus* in groups C and D (Fig 7-50). N values support this indication that areas cultivated in the Upper Thames had a lower nutrient status as taxa in the N 2-4 category are more abundant in groups D (Fig 7-51). Similarly, R values are slightly higher in groups C and D (Fig 7-52), and taxa with high F values between 7-9 are present (Fig 7-53) Finally, some variation is also explained by life form. Fig 7-54 shows that perennials (mainly *Rumex* sp.) are more abundant in group A than group B samples.

In order to assess the validity of these interpretations, *Medicago*/*Trifolium*, *Vicia*/*Lathyrus* and taxa present in under 10% of samples were removed to check whether there is any underlying variation in flowering time. Samples were grouped into the same categories: group A containing Roman rural settlements from the Hampshire Downs, group B containing Iron Age settlements from the Hampshire Downs, group C on the negative y-axis containing samples from the Upper Thames, and group D containing Late Roman samples from several regions (Fig 7-55), with a similar taxa plot (Fig 7-56). Classification by flowering onset and duration (Fig 7-57), showed that there is no correlation between samples with previously high proportions of Fabaceae (group C), and flowering onset and durations consistent with autumn sowing, which would favour taxa with low fertility attributes (Fig 7-58). The higher proportion of taxa with lower N and R values and higher F values in group C is now more marked (Figs 7-59, 60, 61). Again, group A has the greatest proportion of perennials.

The main variation within the spelt FSBP between the Hampshire Downs and the other areas is explained by less fertile, damper soil conditions in the Upper Thames, Mid Thames and Thames Heaths. Over time, cultivation on the Hampshire Downs involved lower levels of disturbance. Within group D, there is no clear chronological variation in soil dampness, as

argued by Jones (Jones 1981), with *Montia fontana* and *Eleocharis palustris* present in Mid Iron Age (AVY-049), Late Iron Age samples at Silchester (SIX-009, SIX-012), Early Roman samples at Abingdon Vineyard (AVY-134, AVY-161) and Denchworth Road (DWR-001).

7.6.3 Spelt cultivation – fine-sieve products and pre-sieved fine-sieve by-products

An alternative picture of spelt cultivation is provided through an examination of the arable weeds from spelt FSP, sieved spikelets and pre-sieved FSBP. The plot shows samples in a broad continuum between three points on the positive x and y-axes (group A), positive x negative y-axes (group B), and negative x-axis (group C) (Fig 7-62). Separation between regions, periods and site types is not clear, but oppida are mostly present in group A, hillforts in groups B and C, and towns in groups A and B (Fig 7-63). Late Iron Age and Early Roman Silchester samples occur in group B. More samples from the Upper Thames are located in group A, and more from Hampshire in groups B and C, but the separation is not clear.

Classification of taxa by their flowering onset and duration shows a clear gradient from samples dominated by short and early taxa in group B, to long and late samples in the centre of the plot (Fig 7-64). Hence, any gradients in N or R values will be dictated by this variation in flowering time. Group A samples contained high proportions of *Medicago*/*Trifolium* and *Vicia*/*Lathyrus* (Fig 7-65). As these identification categories are too broad to indicate flowering onset and duration, they were removed from the plot along with taxa present in under 10% of samples.

Samples were now distributed along the x and y-axes (Fig 7-66), as were taxa (Fig 7-67). Group A, at the far end of the positive y-axis contained mostly Late Roman rural samples, but also one sample from Mid Iron Age Hascombe hillfort, a Late Roman town sample from Abingdon, and an Early Roman sample from All Souls Farm (Fig 7-68, 69, 70). Group B, located on the positive x and y-axes, contained a mix of rural and town samples from Hampshire Downs and

the Upper Thames. Samples in group C, on the positive x and negative y-axes, were all dated to the Iron Age and Early Roman periods, and originated mainly from rural sites, but also included several hillforts and towns and all Silchester samples. Group D, on the negative x, negative y-axes, contained mainly Iron Age and Early Roman rural settlements from Hampshire. Group E, on the negative x positive y-axes, contained mainly samples from the Upper Thames across all periods. Most samples from oppida and towns were located in this group.

There is again clear variation derived from flowering onset and duration (Fig 7-71). Samples in groups B, C, and the most negative y areas of group D, mainly consist of short and early taxa. Samples in groups D contain a mix of all three categories, whilst group A mainly consists of long and late taxa. Hence, flowering onset and duration is contributing to variation on both the x and y-axes. Samples which contained over 20% *Medicago/Trifolium* and *Vicia/Lathyrus* are now present in several areas of the plot (Fig 7-72). Many are present in group E, where late and long flowering onset and duration indicate spring sowing is likely. Spring sowing favours fast growing members of the Chenopodiaceae class, which grow in fertile conditions. Hence, the presence of legumes here indicates spring sowing in areas of low soil fertility. Alternatively, the presence of many legumes in samples in groups C and D is likely due to the presence short and early flowering taxa that can survive with autumn sown crops over the winter, and therefore indicate low soil fertility.

Classification of taxa by their N values indicates that there is variation between groups (Fig 7-73). Group D contains more taxa with N values between 7 and 9 (richly fertile), whilst groups B, and to a lesser extent C, contain more taxa with values between 1 and 6 (low to intermediate fertility). Hence, samples in group C indicate autumn sowing, but also comparably lower levels of soil fertility. This contrast between groups C and D is further demonstrated by classification by F values, with group D containing more taxa with F 6-9 (moist to wet) (Fig 7-74).

The major variation within the large group of samples is explained though flowering onset and duration and, hence, sowing time. Silchester is located in group C, indicating autumn sowing and low to intermediate levels of soil fertility. Alternatively, samples from Abingdon Vineyard are located in group E, indicating probable spring sowing. Most of the samples in group E, interpreted as definite spring sown crops, are Late Roman in date.

7.7 Regional summary of cereal crops

Following the identification of patterns in crop choice, crop-processing and crop cultivation, these are now summarised chronologically, drawing on sites which contributed larger numbers of samples to the crop-processing and weed ecology analysis (Table 7-7).

7.7.1 Mid and Late Iron Age rural sites

During the Mid and Late Iron Age, the main crops cultivated were spelt wheat, with a minor component of emmer, and six-row hulled barley. The majority of charred samples represent spelt fine-sieve by-products from grain dehusking, with some barley grain and spelt grain-rich deposits also identified. In general, the distribution of these sample types was not controlled by environmental or site type, but several key patterns were identified. Some hillfort samples were high-density and grain-rich, confirming the pattern highlighted by Van der Veen and Jones (2006). This can be interpreted as the large-scale consumption or production of cereals was taking place. As these samples all derive from storage pits, it is more likely that these represent stored grain for consumption. It must, however, be noted that samples from hillforts on the Berkshire Downs (Segsbury R130 and Uffington R152) produced very sparse charred assemblages, although the area excavated here was much smaller than at Danebury. The accidental nature of stored grain charring means we cannot expect grain-rich deposits at all sites where large-scale consumption or production was taking place, yet variability in the uses of hillforts is also likely.

Dense grain-rich deposits were also identified at enclosed settlements on the north-east of the Hampshire Downs. These samples represent the presumably accidental charring of grain in storage pits, although the potential ritual derivation of grain-rich deposits in storage pits has been suggested (Thurston 2009; Williams 2003), but rarely systematically assessed. Whether the large-scale consumption or production of cereals was taking place is unclear. Grain is most likely to have been transported in spikelet form. Yet as these dense samples appear pre-sieved, and Late Iron Age Silchester samples appear unsieved (Table 7-4), it is unlikely that excess crops were being produced for the oppidum.

Finally, there is a higher representation of barley at some rural settlements on the Hampshire Downs and at Silchester. Barley rachis was most abundant in the Late Iron Age period, suggesting barley was more common, and rachis was becoming charred more frequently. One explanation is that this proposed rise in barley was cultivated for fodder (Van der Veen 2007), and its cultivation was linked to providing fodder for horses, used for drawing chariots and riding, at Late Iron Age settlements (Hamilton 2000). Horse remains have been identified from several sites in the Danebury environs region including Houghton Down, Nettlebank and Suddern Farm. Yet, the higher proportions of barley rachis at Insula IX are matched with low proportions of horse skeletal remains in comparison to sites at Ashville and Barton Court Farm (Grant, A. 2000), although mould fragments for horse gear were recovered from the forum-basilica site (Fulford and Timby 2000: 31).

Analysis of the weed composition of spelt fine-sieve by-products, showed that environmental contrasts explained the variation in weed assemblages, as opposed to local cultivation practices, contra to the finds of Van der Veen in the north-east of England (1992). The weeds of crops grown on calcareous soils separated from those cultivated on damp less fertile soils of the gravel terrace and the tertiary geologies (Fig 7-75). Differences were pinpointed in sowing times, with several sites producing both autumn and spring sown samples, plotting in

disparate areas of Fig 7-66. These sites included the open settlement at Ashville, and enclosed settlements such as Brighton Hill South, Old Kempshott Lane and Weston Down. Many of the sites contributing higher number of samples to the weed ecology analysis do indicate multiple sowing times. However, the consistency in sowing times represented by large numbers of samples from Mid Iron Age Abingdon Vineyard shows that there is a genuine archaeological pattern. A diversification in sowing time does seem to be a common theme at enclosed settlements. This could be associated with more 'individualistic' communities, having to rely on more specialised crop and husbandry techniques to counter the loss of shared labour available from 'open' settlements. However, there are insufficient samples available from earlier Iron Age open settlements in the dataset to allow this hypothesis to be evaluated.

7.7.2 Oppida

The variation in settlement form and material culture between oppida and rural settlements is contrasted with a continuation in the cultivation of the same staple crops, spelt wheat and six-row hulled barley. The majority of charred samples from Silchester and Abingdon Vineyard were fine-sieve by-products, showing that the inhabitants were undertaking their own dehusking, and most likely their own cultivation of crops. Furthermore, the higher than average presence of barley rachis at Silchester implies that the oppidum was also involved in barley cultivation. The lack of high-density spelt fine-sieve by-products from Silchester shows that spelt dehusking was not taking place on a large-scale, whilst the evidence from Abingdon is more varied.

The presence of spelt dehusking waste at Silchester and grain-rich samples at enclosures on the edge of the Hampshire Downs could potentially imply that spelt spikelets were being moved from the latter to Silchester, agreeing with Sharples and Cunliffe (Cunliffe 2012; Sharples 2010: 173). Aside from the Mid Iron Age dates of the Hampshire sites, the weeds present at Silchester indicate crops grown on local damp, medium fertility, and samples did

not contain the weed flora of rural settlements on the Hampshire Downs (Fig 7-44). Hence local cereal production was taking place at oppida. A further insight from weed ecology is the consistency in sowing times at Silchester (autumn) and Abingdon Vineyard (spring), although only a small number of AD43-70/80 samples from Silchester are the basis of this inference. The implication is that the residents at the two oppida were cultivating their crops in the same way, perhaps through communal organisation.

7.7.3 Early Roman period

Crop growing in the Early Roman period of this region shows a great deal of continuity from the Iron Age. The same crops were cultivated, although free-threshing wheat grains has moved from being a minor contaminant, to representing an average of 10% of town samples, albeit with the concerns of later contamination. Early Roman Period 1 samples from Silchester continue to be characterised as low-density spelt fine-sieved by-products, consistent in the proportion of crop items to typical rural sites. High-density grain-rich samples continue to be present at enclosed settlements on the north-eastern Hampshire Downs. However, the arable weeds from spelt FSBP samples from Silchester continue to group with soils of lower fertility damp soils, in contrast to those from the closest rural settlement, Marnel Park, whose weeds group with other settlements on the Hampshire Downs (Fig 7-44). The practice of both autumn and spring sowing is again evidenced at the enclosed settlements Brighton Hill South and Merton Rise.

7.7.4 Mid-Late Roman period

The key change in the Mid-Late Roman period is that of the scale of crop production. The main crops continue to be spelt wheat and six-row hulled barley, although the former is better represented due to many spelt-rich samples from corn-driers and ovens. Only a few samples are included from towns due to the overall low presence of charred plant remains from

Abingdon, Silchester and Winchester. A contemporary shift to the development of towns is the emergence of corn-driers, both at villas (Barton Court Farm, Grateley) and in rural enclosure systems (Balksbury, Bagnor Road). High-density grain-rich samples and glume base-rich samples were recovered. The weed analysis also showed that spelt wheat cultivated on clay soils were being processed in corn-driers at Barton Court Farm, in the Upper Thames Valley, and Bagnor Road, in the north-west of the Thames Heaths. Both sites are situated on river gravels, yet areas of clay soils are actually available within several 100ms of the corn-driers at both sites (Jones 1984). Although this does not mean that crops were gathered from a long-distance to be processed, it does show that the more difficult clay soils were being cultivated. Finally, spelt fine-sieveing product samples from other sites with corn driers (Berrick Salome, Grateley) show that these settlements were also cultivating crops sown at different times of the year. Whilst the overwhelming absence of charred plant remains from the mid and late Roman phases of towns negates an analysis of where the crops generated by increases in processing technologies, and expansion of land cultivated, went, we can infer that it was to towns. This investigation has focussed on assessing regional patterns in the representation of crop-processing products and by-products, and evidence for crop cultivation practices. Whilst the methods employed here have successfully identified a mid-late Roman increase in the scale of arable production, the further processing of these crops, for malt (Campbell 2008a) or for flour have been beyond the scope of this thesis.

7.7.5 Summary

Key contrasts have been established between hillforts and oppida, and Iron Age and Roman rural arable production. Yet, the soil conditions of the arable fields of individual farming communities are more affected by the regional environment, than individual cultivation practices. Significantly, no clear contrast was established between the weed ecologies of 'open' and 'enclosed' settlements, implying that the establishment of smaller defined communities was more about ideological than socio-economic separation (Moore 2007). Whilst this detailed

analysis has provided new insights into crop-processing and cultivation, the inclusion both of samples with low item counts, and sites with low samples counts, weakens the analysis. Also, the local variability of superficial and basal geology in the study region lessens the ability of weed seeds to locate the presence of cultivation areas.

7.8 New weed taxa

Above, the entire weed content of samples have been used in order to explore the soil conditions under which different crops were cultivated, yet the presence of individual taxa have also been used to identify the movement of crops across regions (Jones, M. 1984). *Agrostemma githago* is an annual arable weed spread as a crop impurity (Preston et al. 2004). Although present in Germany and Austria from the Neolithic (Hellmund 2008), it spread to the edges of north-west Europe in the later first millennium BC. In the study region, several Mid and Late Iron Age records have been recorded from the Hampshire Downs, Silchester and Barton Court Farm (Fig 7-77). The weed spreads further into the Mid Thames and Upper Thames Valley from the Roman period onwards. There is a clear increase in frequency from the Mid (5%) to Late Iron Age (35%), which is an increase from two to six sites. There are a comparable number of Late Iron Age (n=6) and Early Roman (n=9) records. Corncockle is absent from Mid Roman charred samples, probably due to fewer grain-rich assemblages (Fig 7-76), but was recorded from waterlogged deposits at Mid Roman Insula IX Silchester (R134) and Brook St Winchester (R30). The highest frequency is recorded from the Late Roman period (40%).

Another new weed introduction, *Anthemis cotula,* is an arable weed of heavy clay soils (Kay 1971). Whilst it has been considered a Roman introduction (Robinson 1981), there are now numerous records in the regional area from the Mid Iron Age period (Fig 7-78) including in the Mid Thames Valley (Perry Oaks, Thames Valley Park), the Upper Thames Valley (Ashville, Berrick Salome, Abingdon Vineyard) and the Hampshire Downs (Brighton Hill South, Old

Kempshott Lane, Lains Farm). These represent a mixture of site types, indicating the dispersal of new weeds took place widely. Records of *Anthemis cotula* are in fact more frequent during the Mid Iron Age (25%) than during the Late Iron Age (11%) (Fig 7-76). The introduction of these two weeds took place in the Iron Age, and both taxa clearly became established as successful arable weeds. Yet the presence of these taxa cannot be taken as evidence for one settlement's increased contact with the continent.

7.9 Introduced, cultivated and wild plant foods

7.9.1 Introduced flavourings and fruits

The consumption of introduced flavourings and fruits in the regional study area around Silchester is restricted chronologically to post AD43, and spatially to the towns and surroundings of the towns of Abingdon, Staines and Winchester. Evidence for these foods is largely derived from waterlogged and mineralised assemblages (Table 7-8). Rural sites without waterlogged or mineralised preservation are unlikely to produce evidence for these foods. In the Early Roman period, celery was recorded at Abingdon (R2), and coriander at nearby rural Mount Farm (R97). Flavourings are present at a wider range of sites in the Mid Roman period, such as celery at Mount Farm (R98), and celery and coriander at Winchester Brook Street (R30). In the Late Roman period, dill and coriander were present at Barton Court Farm (R17), coriander at the small town of Neatham (R101), and fennel at Staines (R71). Of the range of imported fruits at Silchester, most were recorded at other towns, as well as occasionally at rural sites. Damsons/plums were the most common, and were present at two Late Roman rural settlements in the Upper Thames. Apple/Pear, considered more likely to be derived from the introduced cultivated apple and pears (Van der Veen 2008: 104), were only identified from towns in this region.

Although flavourings, fruits and nuts are far more likely to preserve by mineralisation or waterlogging, several charred records are also present in the study area: grape at Early Roman All Souls Farm (R4), fig and olive at Late Roman Castle Copse villa (R32), pine nut at Late Roman Fullerton (R58), and olive at Early Roman Silchester. The rareness of these foods is due to a combination of their low likelihood of becoming charred, and their restriction to high status settlements. Overall, the distribution of imported fruits and nuts appears widest in the Mid Roman period, but the limited number of mineralised and waterlogged samples limits these conclusions.

7.9.2 Legumes

Legumes are rare and, outside of Silchester, they have only been identified from charred assemblages. Pea and celtic bean were both consumed in southern Britain during the Bronze Age (Campbell and Straker 2003). Pea has been recorded from 14 sites. There is an increase in frequency from the Mid to Late Iron Age, but no clear pattern thereafter (Fig 7-79). Pea is abundant and persistently present at Staines (R69-71), but small numbers have also been identified at a range of enclosed settlements, enclosures and towns (Abingdon, Silchester and Winchester) (Fig 7-80). The suggestion that peas were more frequent in Hampshire and beans in Oxfordshire (Campbell pers. comm. in (Green 2010)) is supported by these data. Peas were most frequent on the Hampshire Downs (13%), and least frequent in the Upper Thames (2.5%) (Fig 7-81). The distribution of celtic bean is much more limited, having been identified only from Mid Iron Age Winnall Down (R169), the towns of Neatham, Staines, Silchester and Winchester, and at the Early Roman cemetery at Watchfield (R164). Hence, there is no association of bean with the area of Oxfordshire in the Upper Thames region included within this dataset.

The difficulty of separating charred peas and beans, due to the common absence of the hilum, is shown by the numerous identifications of pea/bean from sites in all periods. Several sites

are notable. Five samples from Merton Rise and Marnel Park (R91, R92), both on the northern edge of the Hampshire Downs, contained pea/bean, whilst at Berrick Salome in the Upper Thames Valley, seven samples did (R20). Also on the Hampshire Downs, two samples from Nettlebank produced pea/bean (R103) and 46 peas/beans and peas were identified from Suddern Farm (R138). Hence, there are tentative associations of pea and pea/bean with enclosed rather than open settlements. Lentil is only present at Early Roman Silchester, Late Roman Fullerton (R58) and Berrick Salome (R23), yet the abundance of mineralised lentils at Silchester in comparison to the charred record (**6.3.4**) highlights how little evidence for pulse cultivation is preserved by charring in this region.

7.9.3 Flax

Whilst characteristic of the Period 0-1 waterlogged deposits at Silchester, flax was rare in the regional study area. Furthermore, flax has been observed as absent more widely during the Iron Age, after a Neolithic introduction (Campbell and Straker 2003; Lambrick and Robinson 2009: 254). Waterlogged seeds were recorded at one or two sites in each period: Mid Iron Age Lower Bolney (R84), Early Roman Mount Farm (R96), Reading Business Park (R125), and Late Roman Barton Court Farm (R17) and Appleford (R7) (Fig 7-82). Capsules were also present at the first four sites. Considering the criteria discussed in Chapter 6 (**6.1.2.3**), the only indication of flax production for textiles is from Lower Bolney. Here, a high-density of flax seeds and capsules were recovered from sediments at a high-density of 20 items/L within a submerged wattle-lined pit, which is strongly suggestive of flax retting (Campbell 1992).

Flax was present at a low-density at the other sites, and only Mount Farm produced several bone implements and loomweights indicating some textile manufacture (Lambrick 2010: 102). At Reading Business Park and Appleford, flax seeds were present amongst mixed settlement vegetation, suggesting local cultivation. In contrast, at Barton Court Farm, a high-density of flax seeds and capsules was present (49 items/L) alongside some cereal chaff and hay, indicating a

probable origin as fodder. Flax was notably absent from waterlogged samples from multi period sites in the east of the Mid Thames (All Souls Farm R4-6, Perry Oaks R116-121), and charred flax seeds were completely absent from the Mid Thames (Fig 7-82).

Single charred flax seeds were recovered from Late Iron Age Milton Hill North (R95) and Late Roman Barton Court Farm (R17), as well as a single charred capsule from Early Roman Abingdon Vineyard (R158) (Fig 7-83). Considering the paucity of charred in comparison to waterlogged flax at Insula IX, flax use may actually have been significant at Milton Hill North and nearby Abingdon. The most abundant find of flax seeds, at Castle Copse villa, was present alongside various other plant foods, indicating food preparation waste (R32, 34). Overall, flax seeds and capsules were much more frequent and abundant from the Saxon period in this region, with intact bundles of flax found in palaeochannels providing strong evidence for linen production (Hey 2004: 214; Robinson 2003). There is no comparable evidence for the current study period, and flax was probably cultivated as a multi-use crop, both for human consumption and fodder use. Although, in other regions, such as Late Bronze Age Denmark, interpretations of oil use from occasional charred seeds were amended after recent finds of retting pits (Andresen and Karg 2011). As with other agricultural innovations, new practices need to reach a certain scale before they will be widely detected in the archaeobotanical record (Van der Veen 2010), and the reliance on charred data alone from most sites will certainly underestimate the extent to which flax was used due to the strong preservation biases (Fuller 2008).

7.9.4 Wild plant foods

Wild plant foods are understood to have been consumed much more frequently in the Roman than Iron Age period (Van der Veen et al. 2008). This assertion is based on national frequency changes rather than quantitative evidence from individual sites. Direct evidence for Iron Age wild plant food consumption from mineralised remains is sparse. An assemblage from Lains

Farm did include *Brassica* sp. and *Papaver* sp., which may represent wild plants collected for flavourings (R81). At Halfpenny Lane, *Brassica* sp. was identified from pits, but a range of arable weeds were present (R64). More convincingly, a mineralised deposit from Mid Iron Age Staple Gardens, Winchester (R136), included *Brassica* sp., wild strawberry, apple and elder. Few Roman mineralised assemblages are available from the region, occurring only at Early and Mid Roman Staines (R69-70) and Late Roman Winchester (R68). Blackberry was present at Winchester, elder at both sites, wild strawberry at Staines, but apple only at Silchester. These data show wild fruits were being consumed in towns, but considering the vagaries of mineralised preservation, no further inferences can be made.

Charred evidence for wild plant foods is equally limited. Several sites produced samples with exceptional numbers of charred *Brassica* sp. seeds. An Early Roman feature at Brighton Hill South contained 211 seeds (R26), and Iron Age pits at Balksbury Camp (R13) and Abingdon Vineyard (R156) contained respectively 480 seeds and 564 seeds. These sites strongly suggest that wild *Brassica* were collected for food or that *Brassica* was cultivated. Evidence for the collection of hazelnut is also widespread. Hazelnut was more common at hillforts, oppida and towns (Fig 7-84), and was most frequent in the Late Iron Age, before decreasing in frequency (Fig 7-85). Hazel nutshell was more frequent in the Hampshire Downs and Thames Heaths than the Upper Thames Valley (Fig 7-86).

Whilst limited in the regional area, waterlogged samples also demonstrate the consumption of wild plant foods. Bramble and elder are present in all periods, but they are also common aspects of scrub vegetation found around settlement and are over-represented in waterlogged assemblages due to their lignified testas. Wild strawberry is rare, present only at Roman Abingdon (R3) and Late Roman Barton Court Farm (R17). At the latter site, 23 seeds were found amongst the moss lining a well and alongside deciduous leaf fragments and bud scales, suggesting that the material was collected from woodland undergrowth and was not food.

Raspberry was recorded only at Early Roman Perry Oaks (R118) and Silchester, and at Mid Roman Brook St, Winchester (R30). Sloe was present at more sites, including from occupation deposits at Mid Roman Winchester and hundreds of stones from a well at Neatham (R101).

7.9.5 Regional food ways

This review of non-cereal plant foods in the regional area has shown that the range of new plant foods consumed at Silchester was distinctive, with caraway, cucumber, medlar and mulberry unique to the settlement. Equally, charred olive stones were only recovered at a single additional high status site, Castle Copse Villa. Silchester is the only settlement where introduced plant foods were present in the Late Iron Age, although no waterlogged samples have been studied from Abingdon Vineyard or Oram's Arbour. Hence, the distribution of new plant foods is focussed on high status settlements. Despite previous suggestions (Campbell 2000a), no alternate pattern of hazelnut at low status Iron Age sites during the was identified. The range of new plant foods recorded at regional rural sites includes those most commonly identified at Silchester: celery, coriander and dill. Surrounding settlements may have adopted these from Silchester. The north-western areas of the Upper Thames Valley, beyond the regional study area, do however provide a more varied picture of dietary diversification, including the role of the military (Booth et al. 2007: 280-294).

There are regional patterns in food consumption. Hazelnut was most frequent in the Hampshire Downs and Thames Heaths, flax was absent from the Mid Thames, Thames Heaths and Hampshire Downs, other than Silchester and Castle Copse Villa, and pea was most frequent on the Hampshire Downs. At Silchester, flax, hazelnut and pea were all consumed, showing that the settlement adopted aspects of food ways of several of the surrounding regions.

7.10 Garden crops and fodder

7.10.1 Horticulture

The cultivation of celery and coriander during Period 1 at Insula IX was inferred from the frequency and abundance of flavourings in waterlogged samples (**6.1.2.2**). The presence of mulberry may also indicate local orchards, as their softness limits storage and transportation (Cool 2006: 122; Livarda 2008b). The abundance of mineralised apple pips from Late Roman occupation was also considered suggestive of local cultivation (Robinson et al. 2006). A few regional sites also indicate the cultivation of fruits and flavourings. At Mount Farm, a sample from a Roman waterhole contained 15% (n=229) waterlogged celery seeds, and one charred seed (Robinson and Greig 2010: 20). Many freshly cut black mustard stems were identified from a Late Roman pit at High St, Staines (McKinley 2004: 55). Another potential horticultural crop is the coastal plant *Beta vulgaris* (beet). A single capsule was identified from silts overlying an oven at Mid Roman Victoria Rd, Winchester (R155). It is underrepresented in the archaeobotanical record as only the leaves are usually consumed and the plant becomes inedible once it has fruited (Bakels 2009).

Whilst legumes are generally underrepresented, pea/bean was frequent and abundant at Mid Iron Age Berrick Salome. Finds of lentil from Late Roman ovens at Berrick Salome (R23) and Fullerton (R58) may suggest it was growing alongside cereal fields. Lentil is generally presumed to be imported, yet it can be cultivated in Britain, as recorded for nineteenth century Oxfordshire (Young 1969: 165). The occasional finds of waterlogged remains of introduced fruits at Late Roman Appleford (R7) and Barton Court Farm have been attributed to local horticulture (Booth et al. 2007: 294), yet only a few remains were present at each site. More convincing evidence comes from waterlogged samples from a Late Roman well at Neatham (R101). Several hundred plum, bullace, wild cherry, sloe and hawthorn stones were identified. The deposits were interpreted as domestic waste (Murphy 1986), but the concentrated number of fruit stones indicates locally growing fruit trees.

7.10.2 Fodder and hay

Abundant evidence for the collection of bedding and fodder for animal stabling was identified at Silchester (**6.1.2.5**). Several Mid and Late Iron Age sites on the Hampshire Downs have produced charred remains of bracken fronds, including Easton Lane, Grateley, Houghton Down, Nettlebank and Thruxton. These have been interpreted as evidence for the over-wintering of animals (Campbell 2000a). In the Roman period, waterlogged samples from several sites have produced evidence for aspects of the stable-manure package. At Thorpe Lea Nurseries, waterlogged bracken, gorse, *Filipendula ulmaria*, *Leucanthemum vulgare, Trifolium* flowers and spelt chaff were recorded from a Roman waterhole (R145). At Roman Perry Oaks, a waterhole contained hay meadow taxa and straw, and sparse cereal chaff (R121). Less conclusive evidence for stable-manure comes from Early Roman Staines (R69). Several burnt deposits contained a range of grassland taxa, including the hay meadow plants *Plantago lanceolata* and *Rhinanthus minor*. In the Mid Roman period, varied surface deposits also included some hay meadow taxa (*Filipendula ulmaria, Rhinanthus minor*) (R70). At other sites, only hay is present amongst settlement vegetation. A Late Roman well at Appleford produced a *Trifolium* calyx and several seeds of hay meadow species (*Centaurea nigra, Leucanthemum vulgare, Lychnis flos-cuculi*) (R7). Deposits of the same date from Barton Court Farm also contained a few seeds of *Filipendula ulmaria and Leucanthemum vulgare,* several *Trifolium* calyxes and *Vicia* pod fragments (R17). Finally, at Late Roman All Souls Farm, several possible hay meadow plants (*Prunella vulgaris, Rhinanthus* sp.) were present alongside plants of disturbed ground (R6).

At sites without waterlogged preservation, small quantities of hay may become charred through fuel use or by accident. For instance at Silchester, *Rhinanthus minor* was present in 45% of waterlogged and 3% of charred samples, and *Filipendula ulmaria* was present in respectively 70% and 6% of samples. Some charred possible hay taxa were present at Iron Age and Roman Abingdon Vineyard: *Leucanthemum vulgare*, *Prunella vulgaris* and *Scabiosa*

columbaria, but in small numbers and in different samples (R156-160). At Fullerton villa, seeds of *Centaurea nigra*, *Prunella vulgaris* and *Rhinanthus minor* were recorded from ovens and corn drier stoke holes, suggesting hay had been used as fuel (Campbell 2008b) (R58). *Filipendula ulmaria* and *Rhinanthus minor*, the taxa most clearly associated with stable-manure at Silchester, were rare elsewhere. The former is only present at Silchester, Staines and Fullerton, and *Filipendula ulmaria* only at the above sites with waterlogged stable-manure, as well as Reading Business Park (R125).

By the Late Roman period, hay was in use, and presumably managed, at a range of rural settlement sites in the region. These included the low status settlement of Thorpe Lea Nurseries, and villas such as Barton Court Farm and Fullerton. The only convincing first century AD evidence is from Silchester. At first century AD Silchester management of grassland for hay production provides evidence of innovation and new farming practices, although the lack of waterlogged samples elsewhere limits the reliability of this conclusion.

7.11 Summary of regional study

The charred dataset from Silchester contributed a small number of samples to an extensive regional analysis, which demonstrated continuity in crop choice, some site-based variation in the presence and scale of crop-processing activity, but above all, no patterning which implies the large-scale production and movement of crops in the region until the Mid-Late Roman period. Furthermore, the weed ecology analysis showed that the spelt wheat processed at Insula IX was cultivated in the local area, and not on the Hampshire Downs. In contrast, the waterlogged and mineralised datasets from Insula IX contribute far more to the knowledge of horticultural crops and animal foddering than the rest of the available archaeobotanical data from the region. The much wider range of plant foods recovered from Silchester is partly a product of this discrepancy in sample availability. Patterns were identified in the consumption

in the Iron Age and Roman region of wild plant foods and some of the new flavourings and fruits identified at Silchester.

Pea, celtic bean and flax were all cultivated throughout the study period, but remain very under represented in the charred record. Regional patterns in the consumption of flax, pea and celtic bean were identified, and the use of flax as a multi-use fodder and food crop was considered likely. Finally, hay production is first evidenced at Late Iron Age Silchester, expanding in scale in the Late Roman period. The ability to correlate foddering strategies with arable practices is hindered by very limited evidence of the latter. The presence of hay at the Late Roman villa sites of Barton Court Farm and Fullerton is complementary with the implications of larger scale arable production implied by the presence of corn driers, and hence the need for good quality fodder for draught animals. Yet the wider correlation of arable and pastoral practice cannot be established on an archaeobotanical basis alone.

Chapter 8: Food and Agriculture at Oppida and Major Towns

8.1 Agricultural basis of oppida

After consideration of agricultural practices in the Silchester region, the three models of agricultural practice at oppida are now evaluated against archaeobotanical evidence from other oppida (Fig 1-1) and Roman towns in Britain. The evidence presented from Insula IX demonstrates a combination of Late Iron Age subsistence agriculture with some innovations, with no evidence for surplus production or large-scale grain import. As the level of Late Iron Age settlement development and imported material culture at Silchester is exceptional, the comparison with archaeobotanical data from Silchester with those available from other oppida is essential. The datasets and references available are listed in Table 8.1.

It is important to state that the classification of these sites is by no means simple (Woolf 1993), and they should be better understood as a continuum from nucleated oppida to multi-focal settlements (Moore 2012). There is also a variation in the time of peak settlement activity. Occupation at Oram's Arbour is now considered to be focused in the Mid Iron Age (Qualmann 2004), whilst the stone built phase at Stanwick spans AD43 (Haselgrove forthcoming). The quantity and quality of archaeobotanical data are affected by several factors. First, green field sites clearly have produced many more samples, due to the ease with which open area excavation can take place. Yet samples from Dragonby had inconsistencies in their processing (Van der Veen 1996), and only semi-quantified data were reported from Stanway (Murphy and Fryer 2007) and Hengistbury Head (Nye and Jones 1987). There are datasets available from modern town sites, yet they suffer from having unpublished archaeological sequences (Abingdon Vineyard) (Stevens 1996), consisting of a small number of samples from small excavations across a wide area (Oram's Arbour), and the potential for contamination from

later occupation (Campbell 2008a; Carruthers 2011). Nevertheless, broad discussions can be conducted regarding the range of plant foods consumed and agricultural practices followed.

8.1.1 Agricultural practices

8.1.1.1 Crop-processing

A lack of fully quantified large charred assemblages limits the discussion of crop choice and crop-processing to a few sites. At most sites, an evaluation is not possible due to the few samples available which only contain low numbers of charred plant remains, as is the case at Camulodunum, Fishbourne, Oram's Arbour and Skeleton Green. The staple crops at Abingdon Vineyard, Dragonby, Hengistbury Head and Stanwick were six-row hulled barley and spelt wheat. Free-threshing wheat grains were identified at Dragonby and Hengistbury Head, but due to the absence of rachis, they must be treated with caution. As at Silchester, it appears that no oppida were engaged in the consumption of new staple crops.

The dominance of small seeds in both Mid Iron Age and Late Iron Age/Roman samples at Abingdon was interpreted as showing the household storage of un-sieved spikelets (Stevens 2003). Reanalysis of the Abingdon samples based on the proportion of all crop items and physical weed types demonstrates that most samples were derived from fine-sieved by-products of spelt spikelets. The samples at Hengistbury Head were initially interpreted following Jones' model of consumer and producer sites (Jones 1985a), whereby the co-occurrence of grain, weed and chaff-dominated samples in the latest Iron Age period were interpreted as representing a wide-range of crop-processing activities, including bulk grain handling. This methodology has been critiqued in Chapter two (**2.3.1**), and the lack of published data restricts any reanalysis. The application of ratio and discriminant analysis at Stanwick has identified a range of crop-processing by-products, dominated by spelt fine-sieving by-products. Finally, the low-density scatter of cereal grain, chaff, and arable weeds

alongside charred roots and buds at Stanway indicated some crop-processing was happening locally. Hence, the final stages of crop-processing were evidently taking place at oppida.

Evidence for the further processing of grain is generally absent in prehistoric Britain, with no pre-conquest evidence of malting yet identified (Stevens et al. 2011). However, this may be due to the type of brewing technique used (cf. Campbell et al. 2013). Early Iron Age brewing at Hochdorf, south-western Germany, was undertaken in specialised ditches (Stika 2011), and similar features in Britain may have evaded focussed sampling. Ceramic evidence does suggest that beer was being consumed in Late Iron Age communities (Cool 2006: 264; Pitts 2005). It may be that malting was not conducted at a large enough scale to be detected through archaeobotanical methods.

8.1.1.2 Crop cultivation practices

Whilst the range of crops cultivated at oppida remained consistent with Iron Age practices, the lack of available quantified data limits a full discussion of crop husbandry. The only detailed study of weed ecology is by Van der Veen at Stanwick, where autecological values for moisture, pH, nitrogen and life form were used to evaluate the weed assemblages. Due to the presence of perennial weeds, and taxa which grow in conditions with low nitrogen availability, it was inferred that the cultivation regime involved little soil disturbance and did not maintain soil fertility (Van der Veen forthcoming), although doubt has been cast on whether the charred plant assemblage derives from crop-processing or turf burning (Hall 2003). The autecological analysis conducted at Abingdon Vineyard had methodological problems (Van der Veen and Jones 2006), but did also identify an increase in the presence of perennials during the Late Iron Age, interpreted as low disturbance cultivation of light soils (Stevens 1996: 230, 234). Autecological analysis conducted in Chapter 7 demonstrated that the soils cultivated at Abingdon Vineyard were damp and of medium fertility (**7.6.2**).

8.1.1.3 Animal stabling and foddering

At Silchester, grassland was being managed and heathland resources were collected to enable the on-site penning of animals. The availability of waterlogged samples to evaluate this practice at other sites is restricted to Late Iron Age Dragonby, where a single sample did not contain any plant macrofossils indicative of collected grassland or heathland resources. Yet, Silchester has demonstrated that the regular use of hay and heathland material at a site will result in some material becoming accidentally charred. At Stanwick, charred *Calluna vulgaris* (heather) and *Erica* sp. flowers were quite common throughout all phases, and interpreted as bedding or thatching. Similarly, heather capsules, flowers, *Ulex europaeus* (gorse) spines and *Eriophorum* sp. (cotton grass) seeds were recorded at Hengistbury Head, with heather described as prominent. The plant remains may, however, have derived from vegetation around the settlement or from turf burning. The non-crop aspects of charred assemblages do not often receive much discussion in reports, so it is unclear to what extent these occurrences are atypical of the southern British Iron Age. The identification of heathland components in the regional study area has been interpreted as evidence for the over-wintering of animals (**7.10.2**). Hence tentative conclusions can be drawn that the stabling or over-wintering of animals was an activity at oppida.

8.1.1.4 Townscape and waste disposal

Archaeobotanical evidence for the townscape of oppida further informs upon the range of agricultural activities taking place within these settlements. Again, this investigation is limited to the few waterlogged samples from Dragonby. A similar range of habitat groups were present as at Silchester, including the midden plants *Hyoscyamus niger*, *Sambucus nigra* and *Solanum nigrum*, as well as the plants tolerant of frequent disturbance *Polygonum aviculare* and *Aphanes arvensis*, and grassland plants *Potentilla* sp. and *Ranunculus* subg. *Ranunculus*. These groups were outnumbered by the aquatic plants *Ranunculus* subg. *Batrachium* and

Polygonum hydropiper in the Mid Iron Age well at Dragonby. This pattern is probably indicative of formation processes rather than a major difference in the proto-urban palaeoenvironment.

The presence of calcium-phosphate mineralised plant remains usually indicates the disposal of human or animal faecal material within a settlement, informing upon the character and organisation of settlement space. Campbell has suggested that the absence of mineralised remains from the Late Iron Age Danebury environs settlements may suggest the utilisation of faecal waste for manure (Campbell 2000a: 58). Yet, this point cannot be confirmed without evidence from the crops or fields themselves. Furthermore the collection of faecal material may actually show it was being gathered for a purpose, rather than immediately disposed of around the edge of the settlement. Of the sites surveyed, mineralised remains were only identified within a Mid Iron Age posthole at Staple Gardens, Oram's Arbour. As this is only one context from a much larger settlement area no conclusions can be drawn on waste management. Also, due to the necessity of calcareous material for the mineralisation process from bone, shell or soils, the local absence of on-site mineralisation cannot necessarily be attributed to the utilisation of waste as manure. At Silchester, the absence of mineralised plant remains in Period 0 may be due to their use as manure, the absence of calcareous soil, or the location of cesspits beyond the excavation area.

8.1.1.5 Oppida hinterlands

The limitations of on-site archaeobotanical evidence from oppida in reconstructing past crop-processing and cultivation practices can be addressed with off-site evidence for the palaeoenvironment of their hinterlands. The common assertion, that oppida were situated in marginal zones including marshy and forested areas (Haselgrove and Millett 1997: 284), does not correlate well with the need to feed agglomerated populations, which included craft specialists and elites, nor the possibility that surpluses were exchanged for imported material culture and foods (cf. Van der Veen and Jones 2006). Previous discussions of human impact on

vegetation in the wider landscape during the late first millennium BC and early first millennium AD have been focussed on northern Britain (Dumayne 1994; Hanson 1996) and, whilst the distribution of well-dated pollen sequences in central-southern Britain is limited (Dark 2000: 71, 97), some are available from the vicinity of oppida, alongside other palaeoenvironmental proxies.

Pollen profiles from Crosby Warren, 1km south-east of Dragonby in the north-east of England indicate an episode of woodland clearance and increased pastoral and arable indicators. The profile was poorly dated, but has been linked to settlement expansion at Dragonby in the Late Iron Age (Van der Veen 1996). Late Iron Age woodland clearance is evidenced much more strongly at Silchester. On the basis of place name evidence, Silchester is hypothesised to have been built in a wooded landscape (Boon 1974: 19, 36; Rivet and Jackson 1970), although previous activity on the gravel plateau is demonstrated by the presence of probable Early or Middle Bronze Age barrows on Mortimer Common (Bradley and Fraser 2010; Grinsell 1936, 1939). The earliest on-site data derive from well F762 at the forum-basilica site, where a pollen sample from basal context 2099 (c. 15BC) contained 47% arboreal pollen, which decreased to 6% in the late first century BC fills of well F718/719 (Wooders and Keith-Lucas 2000). The range of vegetation indicated by the pollen, charcoal and waterlogged plant remains included alder carr, arable, pasture and heathland. Again, pollen samples from the buried podzolised soil beneath the amphitheatre floor, c. AD30-50, indicate a range of grassland types and low arboreal content (4-20%).

Contemporary to this decrease in woodland, the waterlogged assemblage from well 8328 indicates the presence of heathland, woodland and hay meadows, whilst the Period 0 and 1 charred assemblage shows local damp slightly acidic soils were being cultivated. It is most likely that these soils were located on the damp sandy clay soils to the south-east of Silchester, rather than the brown earth soils of the gravel plateau (Fig 3-2). Areas of earthworks are more

extensive to the north-west of settlement-foci at Silchester, and if heathland development had begun prior to the Late Iron Age expansion, as in similar regions in southern Britain (Groves et al. 2012), the upland area would have been more suitable for grazing than arable cultivation.

The trend towards more pasture and arable land use in the landscape by c. AD200 is confirmed due to very low tree and shrub percentages and very high percentages of non-cereal Poaceae pollen from buried marshland soil at the south-east gate (Keith-Lucas 1984). The only off-site sequence to confirm this pattern of increasing woodland clearance and landscape management is from the buried ground surface beneath Grim's Dyke situated 3km to the north-west of Silchester (Astill 1980). The samples are indicative of pasture and rough grazing, and are considered to be of Late Iron Age date (Wooders and Keith-Lucas 2000).

Palaeoenvironmental datasets from other oppida are dated to the decades either side of the Roman conquest, thus providing a picture of the landscape several decades after initial occupation. Palynological data from the turves used to construct the Stanway burial mound at Camulodunum c. AD35-50 originated from a herb-rich grassland, with some arable land nearby and very few trees (Wiltshire 2007), although the turves would have had to have been derived from an open part of the landscape. Analysis of charcoal from the mortuary enclosures showed the presence of some *Corylus, Fraxinus* and *Quercus* in the local area (Bojko and Crummy 2007). Similarly, pollen analysis from turves in the backfill of the funerary shaft at Folly Lane, Verulamium, and charcoal and charred plant remains from the burial pit and shaft, indicate pasture and meadows, with some areas of heathy grassland, hedges or scrub and the minor presence of oak and hazel woodland (Niblett 1999). Across the river Ver at St Michaels, palynological analysis of waterlogged sediments buried by an Early Roman building suggested a more open landscape, dominated by grassland and arable land (Dimbleby 1978). This brief summary has demonstrated that the environments of oppida were far more varied than previously presumed. Whilst a chronological picture can only be provided for Silchester, it

would appear that after several decades of occupation, the landscape around Verulamium and Camulodunum was also open and managed.

8.1.2 High status food consumption

8.1.2.1 New plant foods

A key insight from Silchester was the diversification of Late Iron Age diet through the consumption of new flavourings and olives. The limited number of waterlogged samples from Dragonby and Hengistbury Head hinders a direct comparison. Although, fig has been identified from Hengistbury Head site 3, a coastal marsh adjacent to the trading settlement (Robinson in Cunliffe 1987: 339). Given the cross-channel trade indicated by imported ceramics, it is possible that the pips represent the faecal remains of a travelling merchant (Van der Veen 2008: 89). However, no published information is available to assess the validity of the record. The only other bioarchaeological remains of imported foods are bones of *Scomber colias* (Spanish mackerel) from Skeleton Green, Braughing (Wheeler 1981), although the presence of a range of transport amphorae and storage jars at oppida indicate that wine, olive oil, and other processed food plants were widely imported (Fitzpatrick and Timby 2002). Yet, as highlighted for amphorae, the actual volume of new foods being consumed may have been quite low (Fitzpatrick 2001). The presence of pre-conquest food plants from Silchester is therefore unique. They do prove that the type of foods consumed were changing alongside the ceramics used for their consumption.

8.1.2.2 Pulses and oil plants

Alongside recently introduced plant foods, pulses and oil plants were also consumed at Late Iron Age Silchester, which may be another aspect of a diversified plant food diet. Celtic bean, pea and flax were all present in the Bronze Age in southern Britain (Clapham 1999; Pelling 2011; Stevens 2006). Pea and celtic bean were both identified at Hengistbury Head, although

their abundance and frequency is unclear. Despite large-scale sampling, no cultivated pulses were identified from Stanwick or Abingdon Vineyard. A single celtic bean was identified from an Iron Age context at Dragonby. Given that most records consist of single identifications, and there is a preservational bias against charred pulses, no pattern can currently be extrapolated regarding their consumption. The distribution of charred flax is limited to Hengistbury Head, but again preservational biases mean flax is far more likely to preserve under waterlogged conditions. Elsewhere, there is some correlation between settlement nucleation and flax cultivation, as flax seeds and capsule fragments were recorded from a Late Iron Age well amongst field systems at Slough House Farm, near to the nucleated settlement at Heybridge, Essex (Wiltshire and Murphy 1998).

8.1.2.3 Wild plant foods

The diversification of diet during the Roman period through the consumption of new plant foods has been correlated with the increased consumption of wild plant foods (Van der Veen et al. 2008). Yet this assertion is based on the frequencies of wild plant foods at all sites per period, rather than on an individual site basis. Charred hazel nutshell and elderberry were recorded from Hengistbury Head, Silchester, Stanwick and Abingdon Vineyard. Also, sloe was recorded at Stanwick, hawthorn at Dragonby and blackberry at Silchester. When compared to the frequencies of these foods in British records as a whole (figures in brackets taken from Van der Veen 2008: 100), percentage frequencies do appear higher amongst records from oppida: hazel nutshell in 65% (23.5%), elderberry in 42% (10.5%), sloe in 23% (6.2%) and hawthorn in 12% (4.3%) of samples. The lower number of records from oppida (n=28) and the inclusion of records from funerary enclosures (Stanway and Folly Lane) limit any firm conclusions and may introduce a bias to this data.

The single mineralised deposit from an oppidum other than Silchester originated from a posthole fill at Staple Gardens, Oram's Arbour. Mineralised remains contained several edible

plant foods including apple/pear, wild strawberry, *Brassica* sp. and elderberry, and the co-occurrence of fish bones suggests that the deposit did represent human faecal remains (Biddle 2004).

The more accurate identification of wild plant foods, through concentrations in particular contexts such as storage bins, is not possible due to a lack of such features at oppida. Tentative conclusions can be made that wild plant foods were consumed at oppida in the Late Iron Age and as part of a diversified plant food diet.

8.2 Feeding Roman towns

The trends in agricultural practice and food consumption identified at oppida are now contrasted against data from Roman Britain, in order to characterise pre- and post- conquest developments. A substantial amount of data are available (Table 8-2), yet their distribution is heavily biased towards London and York (Van der Veen et al. 2008). Several sites, such as Cirencester and Exeter, lack virtually any archaeobotanical studies. The location of most Roman towns beneath modern urban centres necessitates small excavations, and thus only small numbers of samples are taken. There is also a lack of synthetic study. Notably, Van der Veen et al. focussed on the presence of imported foodstuffs, highlighting the rare and exotic foods (Witcher 2013), yet excluding pulse and oil crops that are more indicative of 'rural' styles of food consumption. This comparative analysis in this study encompasses complementary aspects of food supply to those covered in Van der Veen et al; staple foods, crop-processing, animal foddering and the urban townscape. Each site phase (or records following Van der Veen et al. 2007) is referred to by a record code (T_). Full bibliographic details are provided in Catalogue 6.

8.2.1 Food production

8.2.1.1 Horticulture

The identification of horticulture based on archaeobotanical evidence is problematic and is often based instead on the presence of upstanding architecture in Italy (Wilson 2009) or small enclosures in Britain (Taylor 2007). Horticulture is sometimes inferred from the presence of evergreen trees (cf. Murphy and Scaife 1991), but as these are associated with ornamental rather than food production, such finds as Box leaves will not be discussed here. Horticultural crops are unlikely to become charred (Murphy and Scaife 1991: 85), and waterlogged assemblages are usually of mixed origin (Hall 1988). The only criteria that can be used for the identification of horticulture are the abundance and frequency of cultivated species (Van der Veen and O'Connor 1998), and assemblages with low species diversity (Cowan and Hinton 2008: 78). On this basis, the cultivation of celery and coriander was identified at Period 1 Insula IX (**6.1.2.2**), as was the presence of an apple orchard in the Late Roman period (**7.10.1**). The only other town to produce comparable evidence for horticulture is London. A Pomoideae stump was discovered in the backyard of a supposed Roman house in the Upper Walbrook Valley, c. AD63-85 (Goodburn 2012). Abundant *Beta vulgaris* (Beet) seeds were present in a first century AD shop at 1 Poultry (T37), but they may have been sold for cultivation in rural or urban areas. A beet capsule was also identified from Mid Roman Victoria Rd, Winchester (T114).

8.2.1.2 Crop-processing

The supply of town populations with pre-processed grain is often used as an indicator of how 'urban' settlements were (Robinson 2002). The supply of Roman towns with grain from the rural hinterland is acknowledged, but the mechanisms of exchange have not been fully explored (Jones 2004; Roskams 1999). The chronology established from Insula IX, the de-husking of spelt wheat until c. AD70-80, can be compared with results from smaller

excavations of other major towns. Early Roman period charred assemblages from Colchester, Dorchester, Leicester and Winchester produced some fine-sieving by-products dominated by glume wheat glume bases: County Hall Dorchester (T19) (grain: glume base ratio 0.07), Causeway Lane Leicester (T27) (ratio 0.04-0.2), Northgate House Winchester (T108) (ratio 0.1-0.07) and Head Street Colchester (T10) (ratio 2.1). All Mid and Late Roman samples from these sites consisted of cereal grain and weed seeds representing low-density background scatters from the hand cleaning of cereal grain.

The same trajectory is evidenced at London. At 1 Poultry, there was a high frequency of waterlogged and charred cereal chaff from the Early Roman occupation (T37), c. AD55-120, such as chaff-rich dumps in open area 75 (Smith and Davis 2011). Elsewhere, samples dominated by glume wheat chaff are recorded at AD80s Leadenhall court (T70) (grain: glume base ratio 0.16-1.2) and Mid Roman Copthall Avenue (T44) (grain: glume ratio 0.05-0.46). Contrastingly, charred samples from various Mid and Late Roman sites are low-density and consist largely of cereal grain and large weed seeds from hand cleaning: Mid Roman Bishopsgate (T50), Mid and Late Roman Paternoster Square (T81, 82) and Late Roman Canon St (T62). Based on this brief summary of the current evidence available, dehusking of spelt wheat and the fine-sieving of cereals was taking place in towns in the first century AD, after which grain was imported with only large weed seeds remaining. Where occupation at the edge of settlements has been studied, such as at Winchester Pilgrim's School (T111) and Dorchester County Hospital (T17), fine-sieving by-products were present, suggesting crop cleaning may have occurred at the periphery of urban settlements (Fuller and Stevens 2009).

8.2.1.3 Crop storage

Whilst the absence of crop-processing by-products from urban sites may be due to their utilisation as fodder or flooring, further confirmation that clean grain was transported to towns comes from the presence of burnt stores of clean grain in towns. Charred grain deposits

tend to be identified during excavation due to visibly abundant grain, and are highlighted as such in reports. Here only such deposits identified by the report authors are referred to, rather than any new ratio analysis. The distribution of clean grain deposits is confined to Colchester, London, Verulamium and York, all sites where widespread fire events took place or individual granaries burnt down (Table 8-3). The deposits predominately contain spelt wheat. Two emmer stores were identified within the colonia at Colchester in addition to one barley store within a burnt granary or possible malthouse at Insula XIII Verulamium, and one in the cellar of a building in north-west Southwark, London. Nearly all deposits consisted of clean grain, with very few glume bases or barley rachis present. The single case of spikelet storage was again at the possible malthouse in Verulamium, where spikelet storage would have been preferable to ensure the protection of the embryo for malting.

No charred grain stores have been identified from Silchester, perhaps due to the lack of widespread burning. Furthermore, no grain pests have yet been identified from the wells that were studied for insect remains: waterlogged samples from Period 0/1 well 8328 and Period 4 well 5375, mineralised samples from Period 1 sewage deposit (15033), Period 2 cesspit 5251 and Late Roman sewage deposits. Finally, no charred grain has any evidence of grain weevil holes, although there is not a direct relationship between the presence of bored grains and insect pests (Smith and Kenward 2011: 255). In contrast, a Late Roman deposit of charred free-threshing wheat from Late Roman Northgate House, Winchester (T110), did show evidence for grain pest damage (Carruthers 2011: 185). The evidence available implies that Silchester was not involved in the bulk storage and market level redistribution of cereal grain, unlike London, Colchester, York and Verulamium. Perhaps the local grain supply networks to Silchester continued along pre-conquest patterns, remaining separate from the military supply networks (Fulford 1989a).

A number of weed taxa are considered to be Roman period introductions, such as *Agrostemma githago, Chenopodium murale, Conium maculatum, Lathyrus nissolia* and *Scandix pectin-veneris* (Campbell 2008a; Preston et al. 2004; Stevens et al. 2011; Witcher 2013). These assertions are often based on now out dated evidence (Godwin 1975), and individual sites show a small-scale presence of some of these taxa in the first millennium BC (Campbell 2000c; Robinson 1991, 2006) (**7.8**). The co-occurrence of several of these taxa provides the most convincing evidence for foreign import. A deposit of charred grain from a structure within the civilian settlement bordering the legionary fortress of Isca, Caerleon had a clear Mediterranean origin, due to the presence of lentil, *Agrostemma githago, Lathyrus cicera*, *Raphanus raphanistrum* and *Vicia sativa* amongst others (Helbaek 1964). The grain from the London Forum contained spelt wheat, emmer, einkorn, barley, free-threshing wheat, *Vicia ervilia* (bitter vetch), *Agrostemma githago* and lentil (T47, 85). Also, the late first/early second century AD warehouse near to the legionary fortress at Coney Street, York (T119), was considered to have had a southern origin due to the presence of *Agrostemma githago*, *Consolida* spp., *Delphinium, Lathyrus aphaca* and *Raphanus raphanistrum* (Williams 1979).

Elsewhere, the presence of single taxa is suggestive of the general bulk movement of grain. At Silchester, *Agrostemma githago* was identified from waterlogged deposits at the forum-basilica site c. 25BC-15BC, and from well 8328 in Insula IX AD30-55. Clement Reid identified *Scandix pectin-veneris* from Silchester Insula XXVIII or XXXV (**5.3**). *Agrostemma githago* is quite frequent in London, being present in first century grain stores in north-west Southwark (T78), the Early Roman dumps at 1 Poultry AD45-55 (T37) and post-Boudican occupation at Leadenhall Court AD75-80 (T70). At Colchester, *Agrostemma githago* was present in several prime grain stores that were burnt during the Boudican destruction (T4), and is also in Early Roman records at County Hospital Dorchester alongside *Lathyrus nissolia* (T16). Yet the regional study showed that *Agrostemma githago* was present from the Mid Iron Age (**7.8**). More conclusive evidence for foreign grain import comes from the identification of *Tribolium*

castaneum (red flour beetle) from Early Roman 1 Poultry, as it cannot overwinter in unheated granaries (Hill and Rowsome 2011: 353).

8.2.1.4 Milling and malting, baking and brewing

The composition of charred assemblages from major towns shows that most urban populations were not engaged in any pounding, dehusking or sieving of grain. It would seem expedient to investigate whether there is any evidence for the further specialisation of food production through milling or brewing, and the creation of specialist professions (Wilson 2011: 162). Specialised milling and baking is thought to have taken place from c. 170BC in Rome (Thurmond 2006: 43), and the presence of various bakeries in Pompeii show that the entire processing of cereals to bread had become specialised. The identification of milling and baking through archaeobotanical remains is difficult as the final hand cleaning of grain does not require heat, and only dough enters the oven. The regular identification of hand cleaning products (large weed seeds) would imply that the final pre-milling cleaning was taking place at various places and times across a settlement. In his study of charred plant remains from Springhead roadside settlement, Kent, Stevens associated samples dominated by large weed seeds and occasional grains with 'dough' production, due to their spatial association with small ovens (Stevens 2011). At a few sites, comparable hand-cleaning by-products can be associated with domestic architecture. For example, at Head Street, Colchester, samples from the floor of a kitchen contained large weed seeds suggested final cleaning was conducted at a domestic level (T10). Contrastingly, large grain stores in Early Roman Southwark show no indication that baking or milling was taking place nearby (T73).

The distribution of quern stones provides a complimentary picture of milling. The quern assemblage from Silchester is dominated by rotary querns, showing centralised milling was very limited (Shaffrey 2003). However, the identification of two fragments of a Pompeian-style mill stone reused as post packing from Early Roman Insula IX suggests some centralised milling

did take place (Allen 2012). The only strong evidence for centralised milling comes from London, where Pompeian-style mills have been recovered from various sites around the Walbrook Valley and a probable bakery was excavated at 1 Poultry dating to c. AD70-120 (Hall 2005: 139-140; Hill and Rowsome 2011: 318-319). The limited distribution of Pompeian mills has been characterised as the small-scale production of Mediterranean delicacies (Williams and Peacock 2011), rather than the centralised milling of grain for urban populations.

The alternative use of cereal for beer production may represent further specialisation in urban food production. Specialised brewers were resident at military settlements (Bowman and Thomas 1994) and corn-driers were widespread at rural settlements from the Mid Roman period onwards, some of which would have been used for malting (Reynolds and Langley 1979; Van der Veen 1989). Malting requires the germination of wheat within spikelets, which is then halted through heating. Germination can be accidental or intentional for brewing (Parks 2013: 129). Hence, strict identification criteria of 70% germination rate of cereal grains (Van der Veen 2007b) and uniform sprout length (Murphy 1992b: 282) are applied to the brief overview here, although variation can be expected in the sprout length of a genetically diverse wheat population (cf. Campbell 2000a) and what would have been accepted by brewers in the Roman period.

Only accidental germination was identified at Silchester Insula IX, from Period 1 sample <8956>. Similarly, single samples suggested as malting waste at Northgate House Winchester (T108) and County Hospital Dorchester (T16) contained less than 70% sprouted grain. The only definitive evidence from within major towns is the Early Roman colonia at Colchester (T5), and Mid/Late Roman evidence from Insula XIII Verulamium (T97-98), due to the presence of germinated grains, detached embryos and ovens. Evidence from small towns and rural settlements is far more abundant, with notable examples being Northfleet Villa (Stevens et al. 2011), Alcester (Colledge 1985) and Whitelands Farm, Bicester (Martin 2011). Stevens et al.

have suggested that Early Roman malting was conducted at road side settlements for travellers, and only moved into towns in the later Roman period (Stevens et al. 2011). The limited archaeobotanical data summarised here supports this statement.

8.2.1.5 Animal stabling and foddering

A complementary aspect of urban food production is the presence of animals within a settlement to provide both meat and dairy products. Whilst zooarchaeology provides detailed evidence of animal management, archaeobotanical evidence can also show where animals were living and what materials they were foddered on. Foddering is generally underexplored in the study of the Roman agricultural economy. Kron has focussed on the management of artificial meadows, using a single archaeobotanical example from Opplontis, but based largely on writings of the classical agronomists (Kron 2004). Within British archaeobotany, the recognition of an indicator group of bioarchaeological remains derived from stable-manure has led to the increased identification of bedding and foddering materials (Kenward and Hall 1997, 2012), as seen at Insula IX (**6.1.2.5**). Waterlogging is more likely to preserve the delicate plant remains, which typically constitute bedding and fodder, but examples of charred foddering materials are also present from Roman towns.

The entire botanical side of the stable-manure assemblage has been identified at several sites: Early Roman Silchester, Early and Mid Roman London and Late Roman York (Table 8-4). Heathland material (bracken, gorse, heather) was used at all of these towns presumably as bedding. Fodder was represented as hay in all of the assemblages, supplemented by flax at Silchester and York, and cereal chaff at London, Silchester and York. Elsewhere, only the fodder aspect is present. At Early Roman Leadenhall (T70) and Mid Roman Lincoln (T35), waterlogged hay is present in external dumps, whilst at Mid Roman Copthall Avenue (T44) waterlogged hay in sunken hearths was interpreted as flooring material. Charred hay and wheat grain and chaff have been recorded from internal floors at Early Roman Head Street

Colchester (T10), Early Roman Culver Street Colchester (T5) and Mid Roman Castle Street Leicester (T25).

Hay was being used by civilians (Silchester) from the earliest Roman period onwards, as well as by the military (Culver Street, Colchester). Mainly glume wheat chaff, but also barley chaff, was utilised as fodder. In the Early Roman period, the final stages of crop-processing were still conducted within towns, hence a local supply of chaff for fodder would have been available. In the Mid and Late Roman periods, crop-processing disappears from towns, yet chaff is still present in some stable-manure assemblages, such as at Causeway Lane, Leicester, and Silchester. This suggests crop-processing by-products may have been purposefully imported into towns as a commodity (Foxhall 1998). Whilst not providing direct evidence for the local presence of animals, the use of hay as flooring material at several sites also indicates that hay was being managed and brought into towns.

The long distance transport of hay is suggested from the deposit of stable-manure at the Bedern Well, York due to the presence of several true bugs beyond their current British range (Kenward et al. 1986). Elsewhere, possible fodder crops have been identified. *Vicia ervilia* (bitter vetch), a cultivated pulse crop of the Mediterranean, was present in the Forum grain and at County Hospital Dorchester, alongside lentil and *Agrostemma githago* in both cases. *Vicia sativa* ssp. *nigra* is considered native to Britain (Stace 2010), but *Vicia sativa* ssp. *sativa* is also a Mediterranean pulse crop (Tereso et al. 2013). From Leicester, charred *Vicia sativa*/*tetrasperma* and *Vicia sativa*/*hirsuta* were identified from hay at Causeway Lane (T28) and mixed settlement waste at St Marks' Church (T35) respectively. *Vicia sativa* ssp. *sativa* has only been securely identified from a charred sample from an oven in Late Roman Cirencester, alongside free-threshing wheat grain and hulled barley (T3). The unusual lack of any glume wheat in the sample has cast doubt on this sample's Roman date (Carruthers 2008a). There are medieval records of *Vicia sativa* ssp. *sativa* from Britain (Campbell and Robinson 2009),

alongside documentary evidence (Currie 1988). On balance, these records more likely represent grain contaminants rather than pure fodder crops, due to the low abundance of the particular taxa within the samples.

8.2.1.6 Townscape

Palaeoenvironmental evidence can be used to gain an understanding of what range of agricultural activities were conducted within Roman towns. Quantitative analysis is virtually impossible due to the mixed nature of urban waterlogged deposits (Hall 1988), and little exploration of waterlogged data are typically undertaken in archaeobotanical reports. From the Early Roman farmyard at Leadenhall, London, some taxa indicate the local build up of nitrogen-rich waste. These are *Chenopodium glaucum*/*rubrum* and *Conium maculatum* (T70). Similarly, first century AD buried soils at Cathedral Green Winchester (T103) contained frequent *Conium maculatum* and *Papaver* sp. At the London amphitheatre in the Mid Roman period (T54), the frequency of nitrogen loving plants increases over time, suggesting the areas were becoming overgrown or local cultivation might have been occuring. A similar picture comes from the Late Roman well at Skeldergate York (T127), where the presence of *Atropa belladonna, Conium maculatum* and *Hyoscyamus niger* all indicate nutrient-rich ground.

These broad generalisations are supported by the frequent identification of stable-manure in purposefully dumped deposits within towns, either as levelling material at 1 Poultry, or dumped on the Lincoln waterfront (Dobney et al. 1999). Similarly, the deposition of human faeces was controlled, with faeces identified from mineralised plant remains in pits at various sites. This pattern is illustrated by specialised masonry structures such as Church St sewer in York (Whitwell 1976) and a Late Roman stone lined cesspit at Henley Rd Winchester (Green 2010). There is a clear contrast between Roman and Saxon towns, where trace mineralisation is present in occupation deposits, indicating the trampling of latrine deposits (Carruthers 2011),

and where nitrogen loving plants such as *Atriplex* sp. and *Chenopodium* sp. are hyper-abundant (Kenward et al. 1986).

8.2.2 Food consumption

The recent synthesis by Van der Veen et al. of new plant foods in Roman Britain provided a detailed analysis of chronological and spatial variation in consumption practices (2008). The selection of sites for the study is slightly unclear. No catalogue of sites was published with the study, and the selection criteria states both that sites were not recorded if they did not contain any food plants, and that only 42% of records contained one or more food plant (Van der Veen et al. 2008: 14). The range of taxa included was restricted to plant foods introduced during the Roman period, thus excluding celtic bean, flax and pea. This overview includes the British dataset within Livarda 2008a, upon which the synthetic papers were largely based. The taxa included are those which were analysed by Van der Veen et al. 2008. Various vegetables and other wild herbs have been identified from Roman urban and rural sites (Dickson 1994; Tomlinson and Hall 1996), but as their interpretation more greater contextual interpretation (**8.2.1.1**) than imported fruits they have not been included here. Whilst a replication of Van der Veen's work has not been conducted, the distribution of those plants not included has been investigated, alongside a comparison of specific towns, in order to investigate the range of plant foods consumed within each town.

8.2.2.1 Imported fruits and nuts

A range of fruits and nuts were imported to Britain and consumed mainly by urban populations and the military (Van der Veen et al. 2008: 32), the most common being fig, grape, olive and pine nut (Table 8-5). Boudican destruction deposits at Colchester and London show that these imported fruits and nuts were being consumed by some urban communities in the decades following the Claudian invasion, as at Silchester. Of the range of imported fruits and nuts

available, Silchester is intermediate. It has more than other civitas capitals, such as Dorchester (fig, grape, plum/cherry, apple/pear) (T14, T19, T20) and Winchester (fig, walnut, bullace/damson, grape, plum) (T106, T100, T102, T111, T112), yet Silchester has more waterlogged and mineralised samples than both sites. The widespread sampling of Clement Reid means we can be confident that the very rare exotics, date and pomegranate, were unlikely to have been consumed at Silchester. These appear to have been restricted to London and Colchester (Table 8-5).

The record of charred olive at Silchester is, however, distinctive, as charred plant remains have been recovered from nearly all towns. Within Early Roman records, olives are only present in London at Building 1 in Southwark AD50-70 (T73), in an external sewer draining a probable tavern at 1 Poultry, c. AD45-65 (T37), as well as from destruction material associated with the same building c. AD65-99. However, a 1st century A.D. London 555 amphora found off the north coast of Kent contained 6,206 olive stones (Sealey and Tyers 1989), indicates the import of olives to Britain. Silchester is also the only settlement where medlar has been identified, from the baths in Insula XXXIII. The medlar tree is thought to have originated from Asia Minor (Vaughan et al. 2009), but archaeobotanical records are very rare in Roman Europe (Pollmann and Jacomet 2012). The fruit needs to be bletted (rotted) before consumption (Baird and Thieret 1989) and, so, could probably have been transported whilst still hard (Robinson pers. comm.) Nationally, imports of plants that cannot be cultivated in Britain decrease in frequency from the Early Roman period, olive and pine nut increase then decrease, and pear/apple, cherries and plums increase over time (Van der Veen et al. 2008). Similarly at Silchester, the widest diversity of imported plant foods is in the Early Roman period, but this is also when the most samples are available. Hence, the diversification in plant foods consumed is an aspect of all Early Roman towns.

8.2.2.2 Flavourings

A wide range of new flavourings were consumed in Roman towns from the immediate post-conquest period onwards, with coriander recorded in refuse dumps at 1 Poultry dated to AD45-55 (T37). Celery, coriander and dill were very common in major towns and military sites, with coriander recorded in around 50% of all Mid Roman waterlogged town records (Van der Veen et al. 2008: 20). Fennel is only present in twelve major town records (Van der Veen et al. 2008: 17) (addition of Head Street Colchester T11, Silchester T94 and 1 Poultry T37), and this rareness is reflected at Silchester where only two waterlogged seeds have been identified from Period 1. Some flavourings were only available in London (T37) and Colchester (T13), where exceptional preservation of burnt pottery shops preserved examples of *Nigella sativa* (black cumin), *Oreganum vulgare* (marjoram) and *Pimpinella anisum* (aniseed). Interestingly, Silchester is the only town where *Carum* carvi (caraway) has been recorded, and no archaeobotanical records have been previously identified from Britain (Preston et al. 2004). The European distribution of caraway is centred on the Roman limes in Germany, in both military and nearby rural and urban settlements (Livarda 2008a: 109), leading to the suggestion that it was not a major aspect of Roman cuisine (Livarda and Van der Veen 2008: 206). Silchester also differs from the national pattern in so far as celery, coriander and dill are very frequent in Period 1, whereas nationally they are most frequent in the Mid Roman period. Although lower numbers of samples have been studied, these flavourings have not been recovered from first century AD waterlogged deposits at Winchester. The inhabitants of Roman Silchester were using the most widely adopted flavourings in their food, from the earliest occupation. However the range of different herbs and spices used appears to have been more restricted when compared with London and Colchester.

8.2.2.3 Flax and legumes

Linseed oil and flax seeds were not major components of Italian Roman cuisine, and were considered rural foods by Pliny (Dalby 2003: 196). Flax was always present as a rare crop in the

regional study area (**7.9.3**), yet flax capsules rarely survive charring, and flax seeds tend to explode (Wilson 1984). Charred flax seeds are present in just over 10% of Early Roman charred records, and decrease in frequency over time (Fig 8-1). In Early Roman Insula IX, flax seeds were recorded in three samples, but were absent in the following periods. An almost pure collection of flax seeds was present in a Claudio-Neronian storage building at Cups Hotel (T7), and seeds were also present amongst grassy flooring material and food remains at Head Street (T9), both in Colchester. Similarly, at Mid Roman Causeway Lane, Leicester (T28), charred flax seeds and one capsule fragment were present alongside charred hay. In Late Roman Insula XIII Verulamium, flax seeds were present amongst a clean sample of barley. Hence, evidence for the consumption of flax is limited. Furthermore, the only definite mineralised identification indicating human consumption is from Silchester, with a waterlogged or mineralised seed also recorded from a Mid Roman pit at St Thomas Wharf, London (T84).

In contrast, flax seeds occur more frequently in waterlogged deposits (Fig 8-3). Seeds are present at a range of towns from the Early Roman period onwards, AD65-95 at 1 Poultry (T37), and the ground surface outside the fort at Cirencester (T2). Flax capsules are much more rare, occurring in only five records other than Silchester. Within London, they are only present at the amphitheatre site. Flax could have been used for food, textile, fodder or an oil crop (Zohary et al. 2012). Seed morphometrics have not been recorded in Britain beyond Silchester and Colchester (**6.1.2.3**). Where seeds occur without capsules, it is unlikely that pure flax was imported as fodder crop. Furthermore, flax seeds are often present alongside other flavourings, indicating their use as human food. In addition, the chronological patterning of waterlogged flax seeds (Fig 8-3) is very similar to that of flavourings. Alternatively, where capsules were frequent such as the General Accident site, York (T120), they co-occur with stable-manure, suggesting their use for fodder. Hence, it is likely that the records of flax from major towns in Roman Britain represent both human and animal consumption.

Lentil was included in Van der Veen et al.'s overview, where it was classified as an import. Its distribution is confined to major towns, military sites and rural settlements in the south-east, and the presence of lentil decreases in frequency over time. Charred remains are present at most sites where bulk sampling for charred plant remains has been conducted such as Colchester, Dorchester, Leicester and London. Earlier suggestions that it may have been a crop contaminant (Straker 1984) are now considered less likely after hundreds were identified from Boudican destruction deposits at 1 Poultry. Furthermore, its identification in mineralised assemblages from Newarke Street, Leicester (T32), St Thomas St London (T84) and Insula IX confirm it was consumed.

Unlike lentil, both pea and celtic bean were already consumed in Britain during the Bronze and Iron Age (**7.9.2**). Pea has again been recovered from most sites where bulk sampling has been undertaken, but is notably absent from Colchester. Furthermore, pea has been identified more frequently from civitas and municipia than London (Fig 8-2), and has a consistent presence throughout the Roman period (Fig 8-1). Celtic bean has been recorded from a smaller range of towns than pea, and is also absent from any mineralised assemblages outside of Silchester. The chronological and spatial distributions are, however, similar. Whilst the likelihood of legumes being preserved by charring is low, when all of the records are considered together, it seems pea and celtic bean were more common at major towns other than London.

8.3 Conclusion

The synthesis of archaeobotanical remains from oppida and major towns in Britain has highlighted several trends. Oppida communities were consuming a wider range of plant foods, with wild fruits being consumed alongside imported plant foods. Yet they continued to produce their own crops, and the weed floras from Silchester and Stanwick suggest no attempts to increase production through intensive tillage or manuring were undertaken. Where available, palaeoenvironmental evidence shows the impact of local agricultural

communities on the landscape. Innovations are only evidenced at Silchester in the form of hay and flax cultivation, but these activities are unlikely to be shown in the small charred datasets present at other sites. Weed floras are consistent with local cultivation. Hence, there is no support for the model of oppida producing an agricultural surplus, nor importing the bulk of their staple crops.

The inhabitants of Roman towns were consuming a wide range of new foodstuffs. Whilst the most exotic foods were confined to London, celtic bean, flax and pea appear more frequent elsewhere, suggesting urban food ways varied between towns. Further variation is demonstrated in the chronology of food supply. Most towns were supplied with spikelets during the first century AD, after which only clean grain was supplied to towns. Some towns lack evidence for large-scale grain storage, but this may be due to the absence of destruction deposits. Some occupants of towns were engaged in growing their own non-staple plant foods, and milling and baking were largely conducted on a household basis. The major innovations that supported urban populations were the bulk supply of clean grain and hay. Foodstuffs originating from beyond Gaul were limited to London and Colchester, although stone pine cones, probably intended for ritual use, were more widespread. The long distance bulk supply of grain cannot be proven beyond the well-known examples at Isca, Coney Street and the London forum, but the spread of new weed species and supply of clean grain to towns shows strong connections between urban and rural areas.

Chapter 9: Discussion

9.1 Evaluation of models of the agricultural basis of oppida

The consideration of archaeobotanical data from Silchester, the regional study area of central-southern Britain, and oppida and Roman towns conducted in this thesis here enables a full evaluation of the three models of the agricultural basis of oppida proposed in Chapter 1. The implications for the origins of oppida and the social organisation of oppida communities are investigated, and the implications for longer term change in crop cultivation are summarised. Insights gained through the comparison of oppida and Roman towns into the networks of food supply supporting them are also explored.

9.1.1 Model 1: Agricultural innovations

The diversification of the crop spectra and the adoption of new cultivation techniques has been linked to the expansion of settlement, including oppida, onto tertiary geologies in the later first millennium BC (Hill 1995b; Jones 1981). Several innovations have been identified at Silchester. Flax cultivation was evidenced by charred, mineralised and waterlogged plant macrofossils at Insula IX after being rarely evidenced in the study region during the Iron Age, although the low proportion of regional waterlogged assemblages limits this conclusion (**7.9.3**). The only other oppidum to produce records of flax was Hengistbury Head, although the crop was also being cultivated near to the nucleated settlement of Heybridge. There is no evidence from the regional study area or towns to support the cultivation of flax for textiles. No correlation between flax remains and flax processing tools, such as iron spikes, scutching knives and loom weights (Andresen and Karg 2011) was observed, and only three possible pieces of linen textile have been recovered from Roman Britain (Wild 2002: 18). Hence, it is suggested that flax was used for both fodder and as a flavouring, and was associated with both the diversification of diet and a focus on animals.

The decision to grow flax was not an obvious choice to increase food production. Flax is often described as an intensive crop, requiring fertile and moist soils due to its small root run (Carruthers 2006: 6; Valamoti 2011), and is grown in rotation by modern farmers (Bond and Hunter 1987). Flax is also described as damaging to the land where it grows by both ancient and modern authors (Columella 2.10.17; Pliny XIX.2). The difficulty of flax cultivation highlights the importance of foddering and food diversification at Silchester.

No other new staple crops were being cultivated at Silchester or at any other oppida. Free-threshing wheat (bread wheat), whilst long associated with the Late Iron Age (Jones 1981), was present in very small proportions at Insula IX. The regional study showed that bread wheat grains have been identified from numerous sites from the Mid Iron Age onwards, but only Roman towns produce substantial proportions of the crop (**7.4.4**). The potential for contamination from later occupation in towns limits the significance of this pattern.

By contrast, the introduction of new plant foods to Late Iron Age oppida has been identified for the first time. Celery, coriander and olive were identified from a well in Insula IX dated to 20/10BC–10/20AD. The presence of new plant foods at oppida has long been suspected (Jones 1985b; Van der Veen et al. 2008), and the analysis of waterlogged samples from Silchester has shown that the previous lack of study of such samples (Burnham et al. 2001; Van der Veen et al. 2007) was the main factor limiting their identification. Although strongly associated with an Italian, 'Roman' diet through the works of ancient authors (Apicius; Dalby 2003), these flavourings were also being adopted elsewhere in north-western Europe in the decades prior to official Roman annexation (Kreuz 2004; Van der Veen 2008).

The consumption of new flavourings could be associated with several models of the origins of Silchester. A similar range of foods were being consumed at Nemetacum, the capital of the Atrebates in northern France (Derreumaux et al. 2008), so immigrants arriving at Silchester

may have carried their foods with them (Fulford and Timby 2000: 564). Alternatively, the adoption of Gallic ceramic forms by native groups as a way to forge new identities (Hill 2007) may also apply to new flavourings. These options can only be fully explored alongside other categories of evidence for food at Silchester. Regardless, the evidence for new foods suggests that food production at Silchester was aimed at the quality rather than solely on the quantity of food that could be produced.

No innovations were observed in the ways spelt and barley were cultivated or processed at Silchester or Stanwick. Although limited, weed ecology analysis at Silchester showed that spelt was cultivated in slightly acidic damp local soils, with levels of soil fertility maintained but not increased (**6.2.7**). Detailed weed analysis of the regional study areas showed that field conditions at Silchester were comparable to those of the Upper Thames Valley, with damp conditions and medium levels of soil fertility (**7.6.2**). In fact, variation derived from the geological situation of sites was far greater than any changes in crop husbandry. The practice of spring sowing was identified in the weed flora of spelt fine-sieve products from several sites (**7.6.3**), yet as these date from the beginning of the study period, it is not clear when this innovation took place, or indeed if there was even a change in sowing time. If autumn sowing is taken as the norm (Campbell 2000a), then the 'innovation' of spring sowing was undertaken at a broad range of site types, including the oppidum at Abingdon Vineyard, Iron Age and Roman enclosed settlements and Late Roman villas.

Innovations increasing the scale of arable farming are not evidenced until the Mid-Late Roman period. First, high-density spelt wheat grain or glume base samples were present in corn driers, demonstrating large-scale processing of cereals for beer or flour. Second, the cultivation of clay soils was evidenced at Mid and Late Roman settlements around modern day Newbury, and at Barton Court Farm in the Upper Thames Valley. The presence of *Anthemis cotula* clearly indicates that clay soils were being cultivated, implying that the areas of land cultivated

expanded on to the less desirable soils. The Mid Roman date of these innovations implies rural arable production did not increase to match urban demand until after the first century of Roman urban settlement. This change correlates with the disappearance of crop-processing by-products from Roman towns and links arable expansion and corn-driers with the provision of clean grain to urban populations.

Whereas arable crop cultivation at Late Iron Age Silchester was consistent with that at Mid and Late Iron Age rural settlements, the management of plant resources aimed at animals does indicate new practices. The seasonal penning of animals at banjo enclosures during the Iron Age (**7.10.2**) may reflect movements towards these activities evidenced at Silchester. At Silchester, hay was first identified from well 8328, from contexts dated to AD30-50 (**6.1.2.6**). The key indicator plants, *Filipendula ulmaria* and *Rhinanthus minor*, were absent from the Period 0 charred and waterlogged assemblages, yet experiments have demonstrated that it takes over twenty years of hay meadow management for succession from weed and wasteland to take place, or slightly quicker from grazed pasture (McDonald 2007). So, the collection of cut grassland material must have begun pre-conquest. No earlier evidence for hay meadows was identified in the regional study area, and no evidence is known of from the rest of Britain. Hence, the management of grassland was a Late Iron Age innovation, rather than a military introduction as suggested elsewhere (Kreuz 1999).

A caveat to this argument is the reliance of MG4 hay meadow development on over bank alluviation (Lambrick and Robinson 1988). The hydrological development of the Kennet or Loddon rivers is unclear. However, the presence of MG5 type communities, which do not rely on flooding, is possible. The presence of hay, both with and without the stable-manure package, in Period 1 Insula IX indicates that hay meadow management continued at Silchester in the Early Roman period.

The presence of hay within numerous Roman towns (**8.2.1.5**) shows that its management was associated with dense settlements, where animals could not be taken out to pasture. The increased management of grassland also would have allowed arable expansion into previous areas of rough pasture (Williamson 2003: 169) and the adequate supply of fodder has been recognised as a characteristic of agricultural growth and development in the Roman world (Bowman and Wilson 2013: 5). Hence there is an association between the cultivation of damp areas of medium fertility at Silchester and the management of hay meadows. An increased quality of fodder would have contributed to better animal nutrition, and perhaps increased animal size (MacKinnon 2010: 71). The combined evidence for fodder, hay and heathland material within stable-manure indicates another innovation at Silchester of animal stabling, the earliest such evidence from Britain (Kenward and Hall 2012). This is clearly associated with the emergence of 'proto-urban' settlement at Silchester. If occupation did cover the whole area within the Inner Earthwork (Fulford 2003), residents at the centre of Late Iron Age oppida would have needed to travel 0.5km to access grazing land beyond the Inner Earthwork. The stabling of animals adjacent to household units would improve access to secondary products, facilitate long distance transport, and also allow individual households or groups to maintain control over their stock.

The Late Iron Age inhabitants of Silchester were cultivating some new crops, consuming new plant foods, and managing grassland and heathland resources to facilitate the stabling of animals. In comparison with archaeobotanical evidence from Roman towns, there are several innovations that had not yet been developed. First, there is no evidence for the centralisation of bulk grain supply. No oppidum has produced evidence for the storage of clean grain. In contrast, the available charred data show spelt spikelets were being brought into oppida. Dense grain deposits from Roman town sites such as Southwark, London and Balkerne Lane, Colchester (**8.2.1.3**) show grain was being cleaned elsewhere, and stored within towns. Another innovation associated with centralisation is post-harvest processing. There is no

evidence for milling, malting, baking or brewing from oppida. If any of these activities were taking place at a scale beyond the household level of organisation we can expect their detection in the archaeobotanical and archaeological record. Although, there are some indications of centralised milling in the Walbrook Valley in Roman London (Hill and Rowsome 2011: 318-319) and at Silchester (Allen 2012).

9.1.2 Model 2: Surplus production

The second model of the agricultural basis of oppida associates the presence of imported material culture and foodstuffs with the trade of cereal grain surpluses (Cunliffe and Poole 2000: 191-192; Van der Veen and Jones 2006). Criteria for the analysis of surplus production can be used to evaluate the evidence available from oppida (Bakels 1996). Firstly, storage is commonly used as an indicator of surplus production, typified in the Iron Age as bell-shaped storage pits and four-poster structures (Van der Veen and Jones 2006). At Silchester, only a single possible storage pit has been excavated so far, and at Stanwick no four-post structures or pits have been highlighted, although full publication of both sites is forthcoming (Fulford and Timby 2000; Haselgrove and Turnbull 1983; Wheeler 1954). No storage pits and only several possible four-post structures were identified at Hengistbury Head, whilst the distribution of storage pits within Oram's Arbour is spatially variable and dependent on the underlying geology. A storage pit has been recorded at Oram's Arbour Park (Qualmann 2004: 43), but none were identified at Northgate House (Ford et al. 2011).

Secondly, grain-rich deposits are seen as indicators of large-scale grain handling (Van der Veen and Jones 2006). No clean grain samples were identified from Period 0 Insula IX. The only dense clean grain sample from any oppidum was recorded from a building at Skeleton Green, Braughing. 103 grains of *Triticum* sp. were identified close to quern stone fragments. At Stanwick, a few grain-rich samples were identified from post pits, but as at Skeleton Green, this suggests household-based grain consumption rather than large-scale production for trade.

The regional analysis demonstrated that no grain-rich samples were present at the two oppida studied, yet occasional, dense, grain-rich deposits were present at Bury Hill and Hascombe hillfort. This contrast means large-scale grain handling was taking place at hillforts, most likely for consumption (Van der Veen 2007a), but not at oppida. Furthermore, the spelt dehusking waste present at Silchester was present at low densities in comparison to the region, indicating the daily preparation of spelt spikelets for household consumption, rather than the preparation of grain for export. The presence of higher density spelt products in the regional area could indicate (**7.7.1**) that large-scale production was taking place, with the intention of trading cereals with Silchester and the continent. However, the lack of correlation between the weed seeds recorded at these sites and Silchester (**7.7.1**), and the absence of any storage structures or high density crop deposits indicating grain handling at Silchester, mean that no model of regional crop movement can be supported.

As a by-product of large-scale above-ground grain storage, insect infestation of grain can also be used as an indicator of surplus production (Van der Veen and O'Connor 1998). There is a complete absence of both grain pests themselves and insect-damaged grains from pre-conquest Britain. Yet the major grain pests of the Roman period are all introduced species to Britain, and would have required regular cross-channel grain movement to sustain populations. Furthermore, grain pests would not be able to breed within storage pits due to the high levels of carbon dioxide (Smith and Kenward 2011).

Finally, the presence of imported grain with a non-local flora is an indicator of surplus production elsewhere (Bakels 1999). The native British flora is very restricted and the spread of arable weeds is usually in the north-west direction throughout prehistoric Europe (Hellmund 2008; Wiethold 2012). Thus, very few weeds are present in Britain and absent from the near continent, limiting the ability to identify the export of grain from Britain to the continent. The assertion that surplus grain was being traded for imported ceramics, glass and

foods does not explicitly state where surplus grain was being traded, but the origin of the imported products is probably north-western Gaul (Timby 2012). No weed floras from north-western Europe have been identified as having a British origin, although Kooistra's exclusion of Britain as a potential source for grain exports to the Netherlands based on the perceived absence of pre Roman *Agrostemma githago* must be reassessed (Kooistra 2009).

Other surplus criteria are more challenging to evaluate. The identification of local excess production over consumption requires accurate estimations of past land use, cultivation practices and populations (Bakels 1996) which are beyond the archaeological and palaeoenvironmental data available for the Silchester region. The identification of mono-cropping is also very difficult. Whilst the shift from emmer to spelt as the dominant wheat in central-southern Britain had largely been completed by the Mid Iron Age, the shift may well have been an unconscious product of repeated cultivation practices (Van der Veen and Palmer 1997), and does not demonstrate a decision to cultivate mono-crops. The switch from growing barley and wheat as a maslin to mono-crops is very difficult to evaluate, as the ratios between the two crops would be affected by annual variations in weather and cultivation. Also different processing decisions can produce separate products (Jones and Halstead 1995). The absence of any unmixed samples representing barley products or by-products at Silchester precludes the contrast of growing conditions through comparison with the weed content of spelt samples (Van der Veen 1995). Likewise, none of the charred assemblages available from oppida contain enough unmixed crop samples to evaluate whether mono-cropping was practised or not.

Furthermore, the assumption that imported ceramics, amphorae and glassware must be counterbalanced by an export of cereal grain is based on a presumed "balance of trade" rooted in classical economic theory (Fitzpatrick 2003). The actual volume of incoming material culture is challenging to quantify into values of grain exported, and a wide variety of social

exchange mechanisms can facilitate the movement of material culture. For instance many items could have been gifts from Rome to client Kings (cf. Creighton 2006), or represent the belongings of merchants (Fitzpatrick 2001) or immigrants (Timby 2012). There is no evidence that oppida were engaged in large-scale agricultural production beyond the needs of the individual settlements.

9.1.3 Model 3: Non-arable oppida

In contrast to the models of oppida societies as agricultural innovators and surplus producers is the assertion that oppida, namely Silchester, were reliant on nearby agricultural areas of the Hampshire Downs and the Upper Thames for food supply (Cunliffe 2012; Sharples 2010: 173). A complementary viewpoint is that oppida were focussed on animals rather than agriculture (Creighton 2000; Moore 2012).

Systematic archaeobotanical study at Late Iron Age Silchester has proven that the settlement was engaged in arable production. The charred plant remains show that the dehusking of un-sieved spelt spikelets was being undertaken. These crops were cultivated in the acidic sandy clay soils of the immediate hinterland between Silchester and the Loddon Valley. The presence of barley rachis as a small component of spelt by-products indicates that the early stages of barley processing were also being undertaken, and the higher average percentages of barley at Silchester (Table 7-7) suggest it may have been a more important crop than elsewhere in the region. The regional analysis has shown that the proportions of cereal grains and chaff at Silchester were consistent with the presence of spelt fine-sieveing by-products at contemporary rural settlements (**7.4.5**). Early-stage by-products were extremely rare in the regional archaeobotanical dataset. Although the presence of fine-sieveing by-products could conceivably derive from a settlement receiving glume wheat spikelets from elsewhere, given that their presence represents the typical archaeobotanical signature of a rural settlement, the recovery of this crop-processing waste from Late Iron Age-Early Roman Silchester and

Abingdon Vineyard implies that the type of agricultural activity was the same as contemporaneous rural settlements. Furthermore, regional weed ecology analysis showed that the crops were not derived from calcareous areas.

Animals were stabled within Silchester and foddered on the by-products of cereal and flax-processing. The presence of nitrogen-rich ground, trampling and frequent disturbance, all indicative of a rural settlement, are evidenced by the waterlogged plant remains from wells (**6.1.2.7**). Evidence from other oppida shows the same – spelt fine-sieving by-products at Stanwick, and palaeoenvironmental evidence at Camulodunum and Verulamium also indicates an open landscape (**8.1.1.5**).

The rural character of Silchester continues until settlement reorganisation at the end of Period 1 c. AD70/80. Spelt spikelets continued to be dehusked, although on a smaller scale and with more pre-sieving having taken place. Flax cultivation and hay management were frequent activities. The suggestion that Silchester was also producing some of its own produce on-site corresponds with ceramic evidence from the Silchester hinterlands which suggests Silchester was self-sufficient in terms of food until the Mid/Late Roman period (Timby 2012). Intensive local agriculture or horticulture in the immediate area around the town walls has also been suggested by the steep decline in the distribution of pottery beyond 500m, indicating localised manuring (Ford and Hopkins 2011).

Supporting evidence for the active role of some inhabitants of Silchester in crop cultivation comes from artefactual evidence. The hoard from a pit in Insula I contained agricultural tools, plough coulters, mowers anvils and a hipposandal (horse hoof-protector) (Evans 1894), whilst gardening tools have been recovered from various excavations (Crummy 2011; Fox and Hope 1901: 246; Richards 2000). After AD70/80, the residents of Insula IX must have been importing mainly clean grain, although it was still ground on a household level using rotary querns

(Shaffrey 2003). Other urban settlements display the same trajectory of initial involvement in crop-processing, before an absence from the late first century AD onwards. At Roman towns, several fine-sieve by-products from spelt dehusking have been identified from Early Roman sites in Colchester, Dorchester, Leicester and Winchester (**8.2.1.2**). In contrast, all Mid and Late Roman samples contained only cereal grain and weeds from hand-cleaning, although evidence for crop-processing has been recovered from the outskirts of towns (**8.2.1.2**).

Whilst the agricultural reliance of Silchester on the Hampshire Downs or Upper Thames Valley in the Late Iron Age and Early Roman period has not been proven, there is some evidence for agricultural interactions. The presence of waterlogged seeds of *Anthemis arvensis* and *Scabiosa columbaria* from Period 1 wells indicates that some hay or arable crops were sourced from areas of calcareous soils (Fig 9-1). Correspondingly, the identification of a short-grained form of spelt wheat in Periods 1 and 2 suggests contact with the Hampshire Downs, where it has been identified from the Danebury environs area (Campbell 2000a, 2008a). Furthermore, the consumption of flax, which is absent from the Mid Thames, and pea, which is not very frequent in the Upper Thames, indicates a greater similarity of food ways at Silchester with the Hampshire Downs than the Mid or Upper Thames Valley (**7.9.5**).

Whist it has been argued that Late Iron Age oppida did participate in arable production, the emphasis on animals has also been demonstrated. At Silchester, waterlogged plant remains showed that heathland and grassland material was collected for animal stabling, and flax was cultivated partially for fodder. The charred assemblage also indicated these activities, with hay meadow taxa occurring at low frequencies and the higher proportion of barley than in the region potentially being linked to the use of barley as a fodder crop (cf. Van der Veen 2007b). The abundance of hay in Period 1 wells shows that the emphasis on animals continued. The well-preserved organic remains from well 8328 indicate that the stable-manure was most likely to originate from horse stabling (**6.1.2.5**), due to the large pieces of grassland vegetation

and fodder. Thus, the importance of the role of animals has been identified, but not to the extent that it supplanted the arable basis of oppida.

9.1.4 Implications for origins

Silchester was engaged in the cultivation and processing of cereals, the cultivation of flax, the management of hay meadows and the stabling of animals. Whilst these practices were not evidenced at the forum-basilica, the earlier dating of these wells c. 20BC (Fulford and Timby 2000: 16) may indicate hay and flax management had not yet begun. Alternatively spatial differentiation within the settlement may account for the different archaeobotanical results of the forum-basilica and Insula IX. The strong rural character demonstrated at Late Iron Age Silchester, and suggested by the limited archaeobotanical data from elsewhere, implies that origin models featuring a coalescence of rural populations are the most valid. The occupants of Silchester developed new grassland management techniques as a reaction to the new nucleated form of settlement, fitting with Hill's suggestion of innovations to cope with new environments (Hill 1995b). Until post-excavation is complete, population instability or continuity cannot be ascertained. From the archaeobotanical data, we know that flax, spelt and barley cultivation was underway c. 20BC, based on the samples from refuse deposits in the Late Iron Age ditch. The cultivation and processing of the same crops is also evidenced by waterlogged deposits from well 8328, c. AD30-50. Hence, there was relative stability of the agricultural basis of Silchester for 50 years.

Based on this new analysis, the 'external' models of oppidum development, based on the export of goods, including surplus grain, and the import of ceramics and foods as a form of prestige gift exchange (Haselgrove 1982), is not supported. Large-scale cereal production was not taking place at Silchester. Whilst some new weed species were present (*Agrostemma githago*), the regional study showed how this species was already present in the area from the Mid Iron Age (**7.8**). The production for exchange of other products, such as ironwork, cannot

be ruled out, but we can ascertain that there was no 'balance of trade' between cereals and imported material culture.

In some case studies relating to periods in prehistory, agricultural practices have been demonstrated to be a contributory factor to both the endurance and fragmentation of social groups (Bogaard et al. 2011). However, none of the agricultural innovations associated with Silchester were identified in the regional area during the Mid Iron Age, apart for some limited evidence for flax. Staple crops and their cultivation were, in fact, continuous from the Mid Iron Age. As these practices would have accounted for a large proportion of time spent during food production, they are likely to have had the biggest effect on social organisation. Hence agricultural changes were not contributory factors to the agglomeration of social groups resulting in the formation of oppida, and can be considered instead as reactions to the emergence of a nucleated settlement.

Some aspects of agricultural practice may in fact have been gradual changes, associated with generational level alterations. On a large-scale, the appearance of Silchester in a relatively sparsely settled area may be a due to the 'filling up' of better quality arable land elsewhere, as a product of regional population increase in the Thames Valley (Lambrick and Robinson 2009: 377), whilst on a smaller scale the expansion of the Silchester population over time may have lead to the expansion of fields onto damper soils. This process is mirrored in northern France, where population increase has been linked to expansion of agricultural onto plateau soils and the cultivation of spelt wheat (Haselgrove 2007).

9.2 Social organisation

Beyond the exploration of the role of agriculture in the development of oppida, an aim of this thesis was to explore the implications of agricultural practices for the social organisation of the residents at oppida. The implications of three of these practices are now discussed.

9.2.1 Cereal cultivation and processing

The archaeobotanical data have shown that at least some of the inhabitants of Late Iron Age Silchester were engaged in the cultivation and processing of cereals. Preparation of the fields, ploughing, sowing, tillage and harvesting would require labouring together throughout the year. Although specific crop cultivation practices could not be identified, the medium levels of soil fertility imply that intensive household based, garden-style cultivation was not practiced. The presence of damp weeds and some perennials imply farming practice lent towards the 'extensive' end of the scale. Furthermore, only one sowing season was identified (**7.7.2**), indicating all fields were managed in the same way. Hence ploughing, tillage and harvesting would have required labour beyond individual household groups, and probably the sharing of plough oxen and tools at certain times of the year.

This means that the residents of Silchester shared the same daily and annual rhythms of life as the typical Iron Age farmers and that, through working in the fields together, social bonds were formed beyond the immediate household group. The location of the fields is unclear, but likely locations are to the south and east off of the gravel plateau. More favourable soil formations for arable are located here, such as the Titchfield series (Jarvis 1968), and ceramic scatters indicative of manuring are limited to an area of 500m around the walls (Corney 1984; Ford and Hopkins 2011). We can envisage that on a daily basis, residents of Silchester walked a few 100ms to their fields and engaged in various agricultural tasks. After AD70/80, the residents of Insula IX were no longer engaged in cereal cultivation and processing. The lack of regular co-operation during ploughing, sowing, tillage and harvesting would have lead to the disintegration of social bonds beyond the kin group. Livelihoods may have become more focussed on specific individual craft activities, such as leather or metal working.

9.2.2 Haymaking and social organisation

The management of hay meadows was undertaken at Silchester from c. AD30. The decision to enclose an area of alluvial meadow in order to exclude animals in Feb/March time would require consensus amongst those previously using the area for grazing. Once the hay was ready for cutting, rapid labour mobilisation would be required to harvest the hay in the short time window in July when hay ripens. In recent times, this has been described as a two-day window (Hartley 2012: 203). Drying of the hay prior to storage would also need to be undertaken (Kron 2004), requiring consensus over ownership and protection. The transport of hay to Silchester would also require the sharing of draught animals and carts, presuming that these resources were not owned on household basis. Although these activities would have all required intensive co-operation beyond the immediate kin group, the practice of hay meadow management may also indicate the presence of a hierarchical power controlling access to areas of land. The association of rulers with agricultural improvements has been made across time (Dalby 2000). The availability of fodder would benefit the resident king at Silchester in terms of both feeding animals well for food and transport, as well as maintaining the leader's authority, given the perception of horses as symbols of royal power (Creighton 2000: 22). If Creighton's argument is correct, then during their time spent in Rome (Creighton 2000, 2006), *obsides* may have learnt of the writings of Roman agronomists, including the recommendations for hay meadow management written by Cato in the second century BC (Cato). On their return home, these political leaders may well have wanted to implement these practices.

The presence of agricultural innovations at Late Iron Age Silchester also hints at the importance of the settlement connectivity. The siting of Silchester at the intersection of the Thames Valley and Wessex (Cunliffe 2012) would facilitate the movement of new foods (flax and flavourings) as well as the movement of new agricultural knowledge. Likewise, sites at nodal points were more likely to receive imported pottery in the post-conquest period (Pitts

2008). Once the Roman road network was established, Silchester lay at the hub of several road routes (Laurence 2001), including the roads to south Wales and the south-west from London, and the requirement to provide fodder for travelling horses would have been heightened. The increased volume of travellers passing through towns would have facilitated the spread of new agricultural methods and ideas (Wacher 1974: 68).

9.2.3 Flax cultivation and social organisation

The harvesting and processing of flax for linen textiles is a labour-intensive task, requiring the time-demanding harvesting method of uprooting, and various processing stages necessitating labour pooling at several points (Andresen and Karg 2011). Evidence, however, indicates that flax was cultivated as a food crop for humans and animals at Silchester, as well as in the regional area and at major towns. The few records of flax from the Iron Age regional study area (**7.9.3**), suggest that the cultivation of flax at Silchester would still require the learning of new cultivation skills and experimentation in finding suitable areas of soil for the demanding crop. The recovery of flax from three Period 0/1 wells in Insula IX suggests multiple households were engaged in the cultivation of the new crop, perhaps indicating a shared decision to begin cultivation.

9.2.4 Annual labour

Following the identification of various agricultural activities at Silchester, it is now possible to reconstruct the annual cycle (Fig 9-2), in the manner of similar reconstructions for the Danebury environs (Campbell 2000a; Campbell and Hamilton 2000). At Silchester, weed ecology suggesting autumn sowing was more likely (**6.2.7**), and this was confirmed in the regional analysis (**7.7.2**). Wild fruits and nuts, such as blackberry, elderberry and hazelnut would be collected in early autumn as food resources. Bracken is harvested for animal bedding in autumn once it has turned brown (Rymer 1976: 167), and other heathland material would

also have been collected at this time for the over-wintering of animals. Throughout the winter, the fields would have been tilled. The legume crops, celtic bean and pea, are usually sown in spring (Bowie 2013; Groot and Kooistra 2009). Around the same time, the meadows would be shut up to allow the hay to grow tall before harvest in early July (Greig 1984; Robinson 2007b).

The next task would be to sow flax, which usually takes place in Britain from late April to early May. Hay cutting would have taken place in July, just before when the spelt and barley harvest occurred, requiring the mobilisation of labour including much of the population of Silchester based on the number of households present in the Late Iron Age town. The demands of labour would continue with the flax harvest in August or early September (Bond and Hunter 1987), and, if collected for fodder, heather is also gathered in the summer (Gimingham 1960). The combination of hay cutting, spelt, barley and flax cultivation in July-August would soon be followed by the processing of cereals through threshing and winnowing of crops up to the point of 'un-sieved' spelt spikelets. Soon after, fields for autumn sowing would need preparation in the form of ploughing and manuring. Whilst the spring cultivation of celtic bean, flax and pea would have helped to distribute labour demands over the year, these activities would result in labour peaks in July and the autumn, requiring collaboration beyond individual households.

9.3 European comparisons

The arable and animal-focussed basis of oppida in central-southern Britain is now contrasted with the evidence from oppida in north-western Europe. Overall, the quantity of archaeobotanical and palaeoenvironmental data are limited. Two oppida have been investigated in the Aisne Valley, northern France, which palynological evidence shows was mostly pasture in the Later Iron Age (Haselgrove 2007). Archaeological evidence for the rural character of Condé-sur-Suippe and Villeneuve-St. Germain rests on the similarity of craft activities with those at rural sites and the spatial plan representing an agglomeration of rural

farmsteads, as at Manching on the Danube in Bavaria (Wendling 2013: 473). Preliminary archaeobotanical data from the two settlements provide only a list of crops. Interestingly, Condé-sur-Suippe provides evidence for the first cultivation of flax in the Aisne Valley (Bakels 1999). Manching has also produced evidence for flax, alongside beans, peas, lentils, barley, spelt and emmer, the latter of which were being dehusked and stored within the settlement (Küster 1991).

More detailed archaeobotanical evidence is available from Bibracte, the hilltop oppidum in the Morvan, southern Burgundy. The crops cultivated during the Late Iron Age were consistent with nearby rural areas, consisting of emmer, spelt, free-threshing wheat, barley and millet. A similar range of new plants as Silchester (coriander, fig and olive) were introduced at the Late Iron Age/Roman transition (Durand and Wiethold 2014). Large-scale cereal storage has been identified at the Early Roman Pâture du Couvent, dominated by emmer, barley and free-threshing wheat (Wiethold 1996). In this period, the long distance trade of crops is also evidenced by the presence of the non-local weed *Orlaya grandiflora* (Durand and Wiethold 2014). No archaeobotanical results of large-scale sampling are currently available to assess the presence of crop-processing activities. Whilst the availability of data is limited, it is evident that other oppida continued to cultivate the same crops as their region, with the addition of new flavourings and new oil crops. Evidence for large-scale storage and long distance trade is currently only available from the Early Roman period at Bibracte, mirroring the situation in Britain (**8.2.1.3**).

9.4 Crop choice in Iron Age and Roman Britain

Unlike north-western Europe, where bread-wheat and millet cultivation is evidenced (Durand and Wiethold 2014), the major crops grown across Iron Age and Roman Britain remained largely consistent. The regional study area considered in this thesis showed that spelt wheat and six-row hulled barley were the major crops throughout this period, with emmer already a

minor component by the beginning of the Mid Iron Age. Whilst reasonably frequent, free-threshing wheat-dominated samples are very rare, and confined to towns, where the problems of later contamination are substantial. Elsewhere, it is free-threshing wheat grains that are far more common than rachis, and the difficulty with which free-threshing wheat, glume wheat, and in particular short-grained spelt can be separated, limits interpretations (Straker and Campbell 2003). In the north-east of England, spelt wheat and six-row hulled barley were also the principal crops during the Iron Age – Roman period, although with the continuation of greater proportions of emmer wheat at some sites. Most deposits of charred grain from granaries consists of spelt wheat, such as at Coney Street, York. Again, although introduced towards the end of the Iron Age, free-threshing wheat grain-dominated assemblages are very rare, and largely restricted to military sites, primarily the South Shields granary (Van der Veen 1988). Flax, oats and rye are only present as minor contaminants in samples (Hall and Huntley 2007; Van der Veen 1992).

A broadly similar picture of crop choice was provided by a recent synthetic analysis of Iron Age and Roman East Anglia (Parks 2013). Whilst spelt wheat and six-row hulled barley were the major crops, emmer cultivation persisted into the Mid Iron Age in the south-east and on the Isle of Ely. Some free-threshing wheat cultivation was interpreted in the Mid Iron Age period, although samples were all small or of uncertain identification (Parks 2013: 75). There was no increase in bread wheat cultivation during the Roman period, and flax and rye were very rare. More widely, stronger regional differences have been indicated in the cultivation of hulled or naked barley and emmer or spelt (Campbell and Straker 2003), but these stem from areas such as the south-west and south-east (Giorgi 2006) from which archaeobotanical data have not been quantitatively synthesised.

9.5 Late Iron Age food supply networks

9.5.1 Grain supply

The arguments of Sharples and Cunliffe, that oppida relied on more fertile areas for their food supply (Cunliffe 2012; Sharples 2010: 173), are unconvincing given the regional archaeobotanical evidence (**7.7.2**)**.** The crop-processing stages represented, and arable weeds present at Late Iron Age Insula IX have been interpreted as showing local crop production, most likely undertaken by the residents of the oppidum given the lack of other settlement in the immediate hinterland (**3.2.5**). The weed flora at Hengistbury Head was interpreted as being derived from separate areas of calcareous and acidic soils (Nye and Jones 1987). The lack of sample-level data prevents an assessment of this statement. Similarly, the presence of *Anthemis arvensis* from an unphased context at the site was held as evidence for grain import from the continent, but the presence of Roman activity means it cannot be assigned to the Iron Age occupation. *Agrostemma githago* is securely recorded in Late Iron Age contexts at Silchester Insula IX and forum-basilica, and at Northgate House, Winchester, and has been used to argue for pre-conquest cross-channel trade (Fulford 2004), yet it has been recorded earlier on the Hampshire Downs, from a securely stratified pit fill at the Mid Iron Age Bury Hillfort (Campbell 2000b) and a securely stratified pit fill at Late Iron Age Suddern Farm (Campbell 2000c). Trade may therefore have been internal rather than cross-channel. Based on the evidence currently available, there is no evidence for the long-distance supply of crops to British oppida.

9.5.2 New plant foods

In contrast, the movement of new plant foods was evidenced. The presence of new plant foods complements the ceramic evidence in highlighting the diversity of trade contacts of Late Iron Age Silchester (Timby 2012). The olive stone from well 10421 would have originated from an area of olive production in the Mediterranean (Mattingly 1996). Haltern 70 amphorae,

which have been suggested as containers for olives (Fitzpatrick 2003), were recorded from Period 2 at the forum-basilica site (Timby 2012). They originate from southern Spain, but were probably traded through Northern France (Fitzpatrick and Timby 2002). Fruits of celery, coriander and dill can be stored and transported as dried seeds. Their consumption had already spread to northern Gaul prior to Roman annexation: celery is recorded at Damary c. 250BC-20BC (Bakels 1999), celery and dill at Bibracte 150-30BC (Wiethold 1996) and coriander at a La Tène D well at Fosse des Pandours, Alsace (Kreuz and Wiethold 2010). Potential transport vessels for flavourings are central Gaulish coarse micaceous ware jars, which were produced in the Morvan, central France (Cool 2006: 166; Tyers 1996: 142), but amphorae, wooden crates or sacks are possibilities (Thurmond 2006). Hence, all imported plant foods to Late Iron Age Silchester would have been available in Northern France.

The fig recorded from Hengistbury Head would similarly have been transported in an amphora through Northern France. Fig was present in southern France from the Mid Neolithic period, and cultivation was probably underway from the Iron Age, if not before (Figueiral and Séjalon 2014). Whilst the absence of waterlogged preservation at other sites restricts any further conclusions, the presence of similar imported ceramic assemblages to Silchester at other oppida would suggest imported foods may have been a widespread occurrence (Pitts 2010). The mechanisms through which these new plant foods moved is unclear. As mentioned above, a similar range of foods was being consumed at Nemetacum, the civitas capital of the Atrebates in northern France (Derreumaux et al. 2008), so immigrants arriving at Silchester may have carried their foods with them (Fulford and Timby 2000: 564). Alternatively, plant foods may have moved in cross-channel gift exchange between kin groups.

9.6 Roman food supply networks

9.6.1 Consumer or producer city?

A major discussion area within the study of Roman urbanism has been around the consumer versus producer city; whether or not there are distinct types of settlements which either rely on the productivity of the surrounding rural area or support themselves. Whilst this simplistic dichotomy has been thoroughly critiqued (Mattingly and Salmon 2000; Whittaker 1990; Wilson 2002), it is still accepted that Roman cities would have been reliant on a combination of the grain market and local rural producers for their staple food supply (Bowman and Wilson 2013; Erdkamp 2012). How rural areas reacted to this growing demand for agricultural surplus through agricultural innovation or expansion is rarely discussed in detail, with assertions made that agriculture was intensified based largely on textual and architectural evidence (Kron 2012). The movement of food supplies around the empire and the involvement of multiple tradesmen, producers, bakers and merchants are part of the Mediterranean-centric discussion of the Roman economy (Kron 2012). The use of archaeobotanical data to highlight the specialisation of the food economy within Britain, and the integration of its urban centres in the empire-wide food trade, facilitates the incorporation of Roman Britain into empire-wide debates.

9.6.2 Grain supply

The absence of cereal chaff from Roman towns from the second century AD onwards (**8.2.1.2**), combined with the presence of dense charred grain assemblages (**8.2.1.3**), provides evidence for the bulk supply and storage of cereal grain. The transport and storage of dehusked glume wheat is considered to be a short-term option due to its increased vulnerability to grain pests and rodents (Hillman 1981; Sigaut 1988: 7). Dehusking is likely to damage the embryo, killing the grain and exposing it to mould and fungal attack. Grain stored in this Mediterranean system needs to be kept dry and ventilated to reduce the risk of grain pests and to limit

germination (Sigaut 1988). In Rome and Ostia, these conditions were maintained through large masonry granaries with thick walls and large internal windows for ventilation (Aldrete and Mattingly 1999: 179-181; Thurmond 2006: 29). In Britain, many Early Roman charred grain deposits derive largely from wattle and daub or timber buildings, such as at Building 1, Site 24, Southwark. This contrast in storage conditions probably contributed to the high frequency of grain pests in urban areas in Britain (Smith and Kenward 2011).

Supporting evidence for the transport of dehusked wheat grains comes from the late second century AD shipwreck near the fort of Laurium on the lower Rhine. Clean emmer grains were transported loose in the boat's hull and were infested with various grain pests (Pals and Hakbijl 1992). The conclusions drawn from this study are the same as for towns in Britain; the decrease in grain quality and loss in volume resulting from the transport of clean grain must have been counterbalanced by the reduced cost of transport. In addition, the quality of clean grain would have been easier to inspect (Fuller and Stevens 2009).

The transport of clean grain also has implications for the organisation of rural agricultural production. A portion of the harvest may have been fully processed specifically to send to towns, as once dehusked it could not have been stored as seed corn. Alternatively, the dehusking of spelt spikelets may have been conducted away from farms, perhaps in the suburbs of major towns. Recent excavations at road-side settlements on the outskirts of London at Croydon (Taylor et al. 2011), Brentford (Cowie et al. 2013), Enfield (Dearne 2008) and Hunts Hill (de Moulins 2005) have produced archaeobotanical evidence for the dehusking of glume wheat. Likewise, corn driers were located at several sites in the Danebury region, probably to process grain to supply Winchester (Campbell 2008a). Those around Newbury and in the Mid Thames were probably supplying grain to Silchester.

Whilst there is evidence for the bulk movement of grain in Roman Britain, identification of the sources of this grain is problematic. The presence of *Agrostemma githago* has been linked with the increased scale of cross-channel grain movement (Fulford 2004). In the Netherlands, the arrival of *Agrostemma githago* has also been associated with the Roman conquest, with a suggested origin of northern France where it had been present from c. 500BC (Bakels 2010). Yet the pre-conquest presence of this noxious weed seed in the regional area complicates this interpretation. Furthermore, corncockle has to be sown with seed corn in order to spread and survive due to the seed's short period of viability (Hellmund 2008). Its presence amongst clean grain in London, which would not have been used as seed corn, would not facilitate the spread of corncockle as an arable weed. Its presence in rural settlements must be from the exchange and sowing of semi-clean wheat spikelets and with large weed seeds still present. Corncockle would also have been spread along the road network as wheat spikelets were transported. The presence of corncockle within urban sites is probably due to a combination of import from rural areas where increased exchange had lead to the spread of corncockle, and some import from Gaul.

9.6.3 Fodder supply

The requirements for bulk fodder supply to Rome have been recognised (Aldrete and Mattingly 1999), but it is unclear to what extent the towns of Roman Britain would also have required organised fodder supply. There were three main fodder categories in the Roman world: crop-processing by-products, hay, and specific fodder crops (Foxhall 1998; Kron 2004). In the Mediterranean, Kron has argued that crops such as alfalfa were purposefully sown (Kron 2004). In Britain, hay meadow vegetation is considered to have developed due to specific management regimes (Greig 1988a; Robinson 2007b). In the regional area, hay was identified at Silchester itself, but the strongest evidence from rural sites is not until the Late Roman period (**7.10.2**).

Whether hay was moving from these sites to towns is unclear. Hay was only identified from a few individual samples at each site. It is only possible to identify the scale of hay production when numerous waterlogged samples are studied from multiple features, as at Insula IX and Claydon Pike, in the north-west Upper Thames Valley (Robinson 2007a). Artefactual evidence tentatively supports the chronology of initial, first century AD, hay management. One Late Iron Age or Early Roman scythe-like implement has been recovered from Dorney (Allen 2002), although this does not necessarily imply hay management as opposed to arable harvesting. Contrastingly, several fourth century AD scythes have been identified from Farmoor (Lambrick and Robinson 1979), Caversham (Frere et al. 1989: 319) and Appleford (Hinchliffe and Thomas 1980), as well as a model scythe from Gatehampton Farm (Jennings 1995). As evidence for hay cultivation in the area increases, the availability of waterlogged samples from Silchester and Winchester decreases, making the exploration of the regional movement of hay impossible.

The movement of other foddering resources is likely. Cereal chaff continues to be identified from stable-manure deposits in Roman towns after the crop-processing stages, which would have resulted in these by-products, cease to be undertaken within towns (**8.2.1.5**). Flax was also recovered from several stable-manure assemblages of Early, Mid and Late Roman date. If the inference that flax was partially cultivated as a fodder crop is correct, we can envisage various crops and by-products being transported into towns in addition to foods for the human population.

9.6.4 New plant foods

The overview of the use and production of plant resources within towns has highlighted the reliance of urban centres on local exchange networks for their food supply. There is also evidence for the long distance supply of foodstuffs. The plant foods found at most towns other than London can either be cultivated in Britain or easily imported in amphorae. Walnut is generally considered to have been cultivated, as records increase in frequency through the Roman period and walnut has been identified from rural settlements (Van der Veen et al.

2008). Furthermore, walnut pollen has been found at several sites within London (Sidell 2008: 66). More evidence is available for viticulture, focussed in the Northamptonshire area. Several vineyards have been identified, based on the identification of bedding trenches, sometimes supported by palynological evidence (Brown 2010, Brown et al. 2001; Williams 1977). Fig cannot be grown in Britain, as only the parthenocarpic varieties can grow in the climate and these do not produce seeds (Dickson and Dickson 1996). Figs were probably transported dried due to their high sugar content (Thurmond 2006: 174). Although the identification of mulberry from Silchester was considered as evidence for local cultivation (**7.10.1**), it is possible that it represents mulberries imported in wine (Dickson 1994). The only import that would have definitely not been available in Gaul is cucumber, which was present at Late Roman Silchester. Cucumbers originated from northern India and could be cultivated outside during the summer in the Mediterranean, leading to the suggestion that they may have been imported from Spain (Robinson et al. 2006: 215).

The more exotic imports originating from the eastern Mediterranean and beyond are confined to London: black pepper from southern India, anise from Greece or Egypt and black cumin from Egypt (Dalby 2003). The stockpiling of black pepper in the *horrea piperatoria* in Rome by the Emperor Domitian has been associated with the imperial control of exotic foods (Pollard 2009). The absence of exotic plant foods at most major towns may be due to several factors; either the foods were too costly for inhabitants to purchase, or the trade in these goods moved along separate supply networks. For instance the restriction of olive at Silchester to Periods 0 and 1 hints that olives were later redirected through imperial or military supply systems as opposed to the previous cross-channel trade links with Northern Gaul, although fewer samples were available from the later periods. Similarly, the supply of ceramics to oppida and Early Roman towns in the initial conquest period differs, with samian concentrated in the latter (Pitts and Perring 2006). Furthermore, at the Curry's Pottery shop in Colchester (coriander, dill, anise, celery, poppy) (Murphy 1977), and at Building 23 at 1 Poultry (mustard,

dill, fennel, coriander, black cumin (Hill and Rowsome 2011: 294-304), pre-consumption deposits (Fulford 2014) of samian ware and glassware were found alongside imported flavourings, indicating that these were arriving along the same supply routes. Alternatively, the higher level of sampling at London combined with in-situ Boudican burning deposits may just be highlighting the presence of rare foods.

The widespread consumption of a range of new flavourings and fruits in Roman Britain indicates that horticulture must have taken place. The production of fruits, flavourings and vegetables is largely discussed as an activity of the urban hinterland (Parks 2013: 268; Van der Veen et al. 2008). Kron has argued that the advanced storage and packaging of fruits would not require orchards to be close to towns (Kron 2012), and does not consider the cost of in-land transport to be a hindrance. Evidence indicates, however, that market gardening was also a common urban activity during the medieval period (Dyer 2006; Livarda 2008a). Where horticulture was in fact taking place is significant for both the socio-economic organisation of food production within towns, and the extent to which rural areas were engaged in market exchange.

In the Silchester hinterland, horticulture was identified at Silchester, Mount Farm, and Neatham (**7.10.1**). Archaeobotanical evidence identified the cultivation of celery, coriander, apple and mulberries at Silchester itself, fruit trees in London, and possible beet elsewhere (**8.2.1.1**). Archaeological evidence also tentatively indicates wider urban horticultural activity. A garden bed was identified near Newgate based on the presence of spade marks, and micromorphological analysis indicated the manuring of linear ridges at Whittington Avenue (Cowan and Hinton 2008). Numerous *ollae perforatae* have also been found in London, indicating the purchase of horticultural or ornamental plants from nurseries in Kent (Macaulay-Lewis 2006). Putative late first century AD cultivation beds at Culver Street,

Colchester (Crummy and Brooks 1984: 138-141), have, however, been reinterpreted as building debris based on micromorphological evidence (Murphy and Scaife 1991: 84).

Generally, evidence for horticulture is more frequent in rural areas, forts and small towns, as for coriander cultivation at Carlisle (Huntley 1989: 76), *Brassica* sp. at Chesterholm fort (Blackburn 1970), and various plants at Bancroft villa (Williams and Zeepvat 1994: 581). Much evidence is emerging from areas of Cambridgeshire and Northamptonshire for viticulture, and perhaps other horticultural crops (Brown 2010; Brown et al. 2001). Whilst horticulture was not restricted to either urban or rural areas, it seems likely that urban populations were in part supplying themselves with non-staple food plants, and assertions of rural engagement in urban supply need to be carefully considered. There is often an implicit assumption that the urban market would have stimulated the production of horticultural goods in nearby rural areas, without consideration of whether rural dwellers would want to maximise their production (Kron 2012: 165), yet the strategies chosen by farmers are affected by various social and economic factors (Van der Veen 2010; Van der Veen and O'Connor 1998). The idea that rural dwellers' innate desire to fully exploit their land was given the go ahead by the emergence of urban demand further places a complete explanatory emphasis on urban communities, removing any agency from the rural populations (Taylor 2013b). The decision to cultivate intensive crops for purely monetary gain cannot be presumed.

Chapter 10: Conclusion

10.1 Agriculture practice at oppida

Until now, the understanding of the agricultural basis of oppida, the first proto-urban settlements in Britain, was based largely on conjecture. The absence of a large-scale archaeobotanical dataset (Burnham et al. 2001; Van der Veen et al. 2007) negated the full evaluation of the role of agriculture in the development of oppida and understandings of their social organisation. This thesis addressed this research lacuna by presenting the analysis of the first waterlogged, charred, and mineralised dataset from a British oppidum. Silchester is a site of national importance, due to the continuity of occupation over c. 500 years, the absence of later disturbance and the co-occurrence of the three modes of preservation. The key trends identified from Silchester Insula IX were the local cultivation and on-site processing of spelt wheat, the use of six-row hulled barley and flax. Hay meadows were managed, which produced fodder for stabling animals. New flavourings and foods were imported from Europe. These trends continued until c. AD70/80. Furthermore, the first reassessment of the plant remains studied from the Society of Antiquaries excavations confirmed the validity of the identifications, and highlighted the diverse range of plant foods present at Roman Silchester.

This thesis also presented the first quantitative synthesis of central-southern Iron Age and Roman archaeobotanical data, incorporating detailed crop-processing and weed ecology analysis. Spelt wheat and six-row hulled-barley were the main crops throughout the period, with small proportions of free-threshing wheat, pea, celtic bean and flax more frequent in some areas. The crop-processing stages represented were mainly governed by site type, with key contrasts established between hillforts, oppida, towns and contemporaneous rural settlements. Regional geological variations were the key variable in the composition of weeds from spelt fine-sieve by-products, and sowing time was the most important factor for the

weeds of spelt fine-sieve products. The compilation of archaeobotanical data from other oppida in Britain demonstrated that crop-processing was a common activity, diet was being diversified through pulses, oil crops and wild plant foods, and the representation of heathland material indicated the over-wintering of animals was taking place beyond Silchester. In comparison to the archaeobotanical signature of Roman major towns, oppida lack any evidence for the bulk supply of cereal grain, centralised post-harvest processing and the consumption of a diverse range of imported plant foods .

10.2 Model 1: Agricultural innovations

Internal models of oppidum development (Hill 2007) link the emergence of oppida in areas of poor tertiary soil with the adoption of new agricultural innovations and strategies (Haselgrove and Millett 1997; Jones 1981), namely new crops and the ability to cultivate damp and clay soils. This thesis has shown that whilst no changes in the staple crop spectra occurred at any oppida or in the study region, new hay management strategies were developed, flax was cultivated and new plant foods were imported. Hence these changes were aimed at increasing the quality not quantity of the food consumed, and facilitating the on-site stabling of animals.

10.3 Model 2: Surplus production

In contrast, external models of oppidum development have inferred the large-scale production of cereals was undertaken at oppida, to be exchanged with the continent for imported ceramics and processed foodstuffs (Cunliffe 2000; Haselgrove 1982; Van der Veen and Jones 2006). No high-density, grain-rich deposits were identified from Silchester, or other oppida. Furthermore, there was an absence of evidence for storage facilities, insect infestation or mono-cropping (Bakels 1999; Van der Veen and O'Connor 1998). Oppida were not engaged in the large-scale production of cereals for exchange.

10.4 Model 3: Non-arable oppida

Recent scholarship has depicted Silchester as reliant on the Hampshire Downs or the Upper Thames for cereal supply (Cunliffe 2012; Sharples 2010: 173), or as focussed on animal management (Creighton 2000; Moore 2012). Charred plant remains from Silchester showed that the regular dehusking of spelt wheat was undertaken c. 40BC-AD70/80, which was a typical activity of regional rural settlements. Weed ecology analysis showed that crops were not derived from the Hampshire Downs. The earliest management of hay meadows in Britain, the collection of heathland resources, the cultivation of flax and an emphasis on barley cultivation were all undertaken to facilitate the on-site stabling of animals. However, these practices were taking place alongside the cultivation of cereal crops. The presence of short-grained spelt, and seeds of calciphilous arable and grassland plants in Period 1 indicated that there was some interaction between Silchester and the regions beyond the Thames Heaths.

10.5 Oppida and urbanisation

These findings fit best with the 'internal' model of oppidum development, whereby communities moved into new areas and continued to cultivate the same crops, but adopted new management techniques to cope with settlement agglomeration and pastoral activities, and used new foods to create new identities (Hill 2007). Hence, the development of Silchester can be understood as a coalescence of rural farmers into a nucleated settlement. The earliest archaeobotanical data from the Late Iron Age ditch, c. 40/20BC, indicate that Silchester had an agricultural basis from the earliest occupation, but the existence of an initial period of elite settlement, which attracted communities from a wider region, cannot yet be chronologically defined. Indeed, the presence of high status occupants, as indicated by the new plant foods, may well be due to small-scale immigration from Northern France (Fulford and Timby 2000), or even through direct contact with Rome (Creighton 2006).

This picture of rural settlement coalescence is reflected in studies of the oppida in the Aisne Valley in Northern France (Haselgrove 2007). The presence of a nucleated rural population with elite residences and craft-working further contributes to the diverse range of proto-urban settlements grouped together as oppida (Moore et al. 2013). Whilst the physical characteristics of Silchester, such as a street-grid and coin minting, place it in a proto-urban category, the agricultural practices identified in the Late Iron Age indicate the continuation of seasonal crop growing, communal labour, and the reproduction of 'traditional' Iron Age social identities. There was not yet a separation between 'urban' and 'rural' lifestyles (Cowgill 2004; Taylor 2013b), for at least some of Silchester's inhabitants. However, after the 'Boudican' destruction of the client kingdom and the reorganisation of the settlement c. AD70/80, arable farming ceased at Silchester. The seasonal patterns of communal labour, in place for generations, ended, most likely linked to the establishment of a *civitas* capital at Silchester (Fulford 2008).

10.6 Methodological discussion

The detailed analysis of three forms of archaeobotanical preservation has also provided insights into the extent to which agricultural practices can be identified through the archaeobotanical record (Table 10-1). Without the evidence from waterlogged plant remains, the consumption of new plant foods or the stabling of animals would not have been identified, which are the most distinctive practices at Silchester, in contrast to the surrounding region. Alternatively, without charred plant remains, we would have only restricted insights on crop choice from the small quantity of cereal remains from waterlogged deposits. Whilst waterlogging did provide crucial evidence for the presence of new innovations (Model 1), and mineralised plant remains showed the diversification of diet in the Early Roman period, it was difficult to evaluate these regionally due to the very limited distribution of similarly preserved plant remains.

The analysis of waterlogged plant remains from Insula IX focussed on the identification of deposition stages, using methods adapted from studies of 'structured deposition' (Hill 1995a; Roskams et al. 2013; Van Haasteren and Groot 2013). This approach proved valuable in the identification of organic deposits containing stable-manure, hay and evidence for local horticulture. A detailed consideration of archaeobotanical remains within 'structured deposits' provided insights into the practice of ritualised deposition, and should be conducted more widely. The application of interpretative criteria to aspects of the waterlogged assemblage proved problematic. Flax morphometrics did not provide a rigorous analytical tool (**6.1.2.3**) and the identification of settlement vegetation communities was very difficult. Overall, qualitative evaluation of waterlogged plant remains was more useful than rigorous quantitative analysis.

Bulk sampling for charred plant remains involved a large expenditure of labour and time during excavation, yet small in comparison to the recording of archaeological features and recovery of artefacts. The cultivation and processing of staple crops was evidenced, although many plant foods were under represented. Due to limitations of sample size and the low-density of crop remains, inferences on weed ecology were limited until the Silchester samples were integrated within the regional dataset. The spatial analysis of charred plant remains allowed different patterns of crop-processing activities to be recognised within the Insula, and allowed the preliminary identification of ritualised deposits incorporating food plants (**6.2.5.3**). Whilst no patterns of food consumption waste or medicinal taxa were identified, such an approach has proven highly insightful elsewhere (Bogaard et al. 2011). The use of correspondence analysis confirmed the patterns identified by spatial analysis, although the low sample numbers and sizes limited the reliability of the conclusions. The application of discriminant analysis clarified the presence of non-crop-processing derived fodder assemblages.

The identification of the agricultural basis of the Silchester region clearly benefited from the incorporation of data derived from both developer-funded and research excavations. Yet the intermediate cut-off point (100 arable and crop items) used in the crop-processing study removed a large proportion of samples where low numbers of items were present, due to a combination of low sample size, few available samples and small excavation size. Reports were also excluded due to the observation of much modern contamination within samples (Carruthers 1993b), whilst archaeobotanical assemblages from unpublished excavations in the Mid Thames Valley remain unstudied (Robinson pers. comm.). 70% of samples were derived from developer-funded sites, most of which, were from pre-PPG16 excavations at Ashville and Abingdon Vineyard, where many large samples were taken. Although the integration of small numbers of samples from many sites did allow the evaluation of regional factors of environment, chronology and site type for the crop-processing and weed ecology analysis, the reliability of these results, and the establishment of intra-site variability was reduced. A less rigorous approach incorporating smaller sample sizes has proven useful elsewhere in identifying chronological and regional patterns (Parks 2013), albeit less reliably.

10.7 Future research

In order to test the conclusions established in this thesis, several steps should be taken. Of utmost importance is the integration of the archaeobotanical results in the Insula IX post-excavation programme, full publication of which is expected 2016-2020 (Fulford pers. comm.). This large-scale archaeobotanical analysis needs to be repeated at other oppida to ensure the relationship between agricultural change and urban developments is fully explored. Waterlogged plant remains should receive detailed investigation when present, but much of this research will need to rely on the quantitative analysis of charred plant remains. Autecological analysis is useful in identifying crop cultivation practices, but can only compare sites where the same crop-processing stages are represented, and one cultivation practice (for example sowing time), can obscure any further variation in soil conditions and cultivation

practices (**7.6.3**). For these reasons, the application of crop-stable isotope analysis (Bogaard et al. 2007, 2013; Fraser et al. 2011) may present a fruitful new avenue of research. In parallel, the reanalysis, and preferably radio-carbon dating, of archived plant-macrofossils is necessary to confirm the presence of rare cereal crops, and provide more detailed weed identifications. Whereas charred plant remains can provide valuable insights into cereal production, palaeoenvironmental investigations into the landscapes of Silchester, and other oppida, are required to investigate the scale and character of land use (Moore et al. 2013).

The limitations of developer-funded derived archaeobotanical datasets, including small assemblages and lack of publication, were encountered in this thesis (Van der Veen et al. 2007, 2013). Focussed sampling and laboratory analysis on samples from large sites with good preservation of plant remains, for instance through a development tax approach (Van der Veen et al. 2013: 178), would provide more useful datasets. There were also limitations from the research derived samples which should be addressed in the future. Summed data categories were published for some sites (Clapham and Gleason 1997; Jones and Nye 1991) and at long-term excavation projects, as at Silchester, sample sizes can decrease over time where annual archaeobotanical supervision is lacking. Finally, a problem across all data sources is the availability of published data, whether present on microfiches, data tables held in archives of commercial units (Gibson and Knight 2007), or simply retained by the specialist. The problem of long term data archiving and accessibility is a major issue that needs to be addressed in archaeobotany, as in broader science (Vines et al. 2014).

10.8 Closing remarks

The first detailed systematic analysis of charred and waterlogged plant remains from a British oppidum has pinpointed the key agricultural innovation of haymaking, diversification of diet, and demonstrated local crop production. Thus internal models of the development of oppida have been supported. These inferences have only been verified through the quantitative

analysis of regional data. This thesis has demonstrated the continuing usefulness of rigorous applications of the well-established techniques of archaeobotanical recovery and analysis to new sites and existing datasets, in order to gain a fuller understanding of the complex interplay between socio-economic change, the environment and agriculture.

Bibliography

Aldrete, G. and Mattingly, D. 1999. Feeding the city: the organization, operation, and scale of the supply system for Rome. In D. Potter and D. Mattingly (eds.) *Life, Death, and Entertainment in the Roman Empire*: 171-204. Ann Arbor: The University of Michigan Press.

Allason-Jones, L. 2004. The family in Roman Britain. In M. Todd (ed.) *A Companion to Roman Britain*: 273-287. Oxford: Blackwell Publishing.

Allen, J. 2012. A Rhenish Pompeiian-style mill from Early Roman Silchester (Calleva Atrebatum). *Britannia* 43: 260-268.

Allen, M. and Scaife, R. 2007. A new downland prehistory: long-term environmental change on the southern English chalkands. In A. Fleming and R. Hingley (eds.) *Prehistoric and Roman Landscapes*: 16-32. Oxford: Windgather Press.

Allen, T. 1990. Abingdon Vineyard redevelopment. *South Midlands Archaeology* 20: 73-78.

Allen, T. 1993. Abingdon, Abingdon Vineyard 1992: Areas 2 and 3, the early defences. *South Midlands Archaeology* 23: 64–66.

Allen, T. 2002. Eton College rowing course at Dorney Lake. *Current Archaeology* 181: 20–21.

Allen, T., Cramp, K., Lamdin-Whymark, H. and Webley, L. 2010. *Castle Hill and its Landscape; Archaeological Investigations at the Wittenhams, Oxfordshire*. Oxford: Oxford Archaeology Monograph No. 9.

Amsden, A.F. and Boon, G.C., 1975. C.O. Waterhouse's list of insects from Silchester (with a note on early identifications of insects in archaeological contexts). *Journal of Archaeological Science* 2: 129-136.

Ancient World Mapping Center. 2014. *Roads*. Available at: http://awmc.unc.edu/wordpress/map-files/ [Accessed September 04, 2013].

Andresen, S.T. and Karg, S. 2011. Retting pits for textile fibre plants at Danish prehistoric sites dated between 800 B.C. and A.D. 1050. *Vegetation History and Archaeobotany* 20 (6): 517–526.

Apicus (translated by Grocock, W. and Grainger, S. 2006) *De Re Coquinaria*. Totnes: Prospect

Astill, G. 1980. Excavations at Grim's Bank, Aldermaston, 1978. *Berkshire Archaeological Journal* 90: 57–65.

Baird, J.R. and Thieret, J.W. 1989. The Medlar (Mespilus germanica Rosaceae) from Antiquity to obscurity. *Economic Botany* 43 (3): 328–372.

Bakels, C. 1996. Growing grain for others or how to detect surplus production? *Journal of European Archaeology* 4: 329–335.

Bakels, C. 1999. Archaeobotanical investigations in the Aisne valley, northern France, from the Neolithic up to the early Middle Ages. *Vegetation History and Archaeobotany* 8: 71–77.

Bakels, C. 2009. Crops grown on the sandy soils of Eastern Brabant (the Netherlands) before, during and after the Roman occupation. *Analecta Praehistorica Leidensia* 41: 57–72.

Bakels, C. 2010. The earliest finds of corncockle (Agrostemma githago L.) in the Netherlands. In C. Bakels, K Fennema, W. Out and C. Vermeeren (eds.) *Of Plants and Snails. A Collection of Papers Presented to Wim Kuijper in Gratitude for Forty Years of Teaching and Identifying*: 13-20. Leiden: Sidestone Press.

Bakels, C., Wesselingh, D. and Amen, I. 1997. Acquiring a taste: the diet of Iron Age and Roman period farmers at Oss-Ussen, the Netherlands. *Analecta Praehistorica Leidensia* 29: 193–211.

Baker, P. 2011. Collyrium stamps: an indicator of regional practices in Roman Gaul. *European Journal of Archaeology* 14 (1): 158–189.

Banerjea, R. 2011. Microscopic perspectives on the use of period 3 MRTB 1/ERTB 1. In M. Fulford, A. Clarke and M. Matthews (eds.) *Silchester: City in Transition: the Mid-Roman Occupation of Insula IX c. A.D. 125-250/300: a Report on Excavations Undertaken Since 1997*: 63-95. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 25.

Barclay, A., Lambrick, G., Moore, J. and Robinson, M. 2003. *Lines in the Landscape: Cursus Monuments in the Upper Thames Valley: Excavations at the Drayton and Lechlade Cursuses*. Oxford: Oxford Archaeology Thames Valley Landscapes 15.

Barnes, I., Butterworth, C. A., Hawkes, J. H. and Smith, L. 1997. *Excavations at Thames Valley Park, Reading, 1986-88*. Salisbury: Wessex Archaeology.

Barros, L., Carvalho, A. M. and Ferreira, I. 2010. Leaves, flowers, immature fruits and leafy flowered stems of Malva sylvestris: a comparative study of the nutraceutical potential and composition. *Food and Chemical Toxicology : An International Journal Published for the British Industrial Biological Research Association* 48 (6): 1466–1472.

Beijerinck, W. 1947. *Zadenatlas der Nederlandsche Flora. Ten Behoeve van de Botanie, Palaeontologie, Bodemcultuur en Warenkennis, Omvattende Naast de Inheemsche Flora onze Belangrijkste Cultuugewassen en Verchillende Adventiefsoorten*. Wageningen: Veenman en Zonen.

Bell, C. 1992. *Ritual Theory, Ritual Practice*. Oxford: Oxford University Press.

Berggren, G. 1969. *Atlas of Seeds and Small Fruits of North-west-European Plant Species, with Morphological Descriptions, Part 2, Cyperaceae*. Stockholm: Swedish Natural Science Research Council.

Berggren, G. 1981. *Atlas of Seeds and Small Fruits of North-west-European Plant Species, with Morphological Descriptions, Part 3, Saliacaeae-Cruciferae*. Stockholm: Swedish Museum of Natural History.

Bersu, G. 1940. Excavations at Little Woodbury, Wiltshire: part 1, the settlement as revealed by excavation. *Proceedings of the Prehistoric Society* 6: 30–111.

Betts, E. 2011. Towards a multisensory experience of movement in the city of Rome. In R. Laurence and D. Newsome (eds.) *Rome, Ostia, Pompeii: Movement and Space*: 118-132. Oxford: Oxford University Press.

Biddle, B. 2004. Staple gardens. In K. E. Qualmann, H. Rees, G. D. Scobie and R. Whinney. (eds.) *Oram's Arbour: The Iron Age Enclosure at Winchester. Volume 1: Investigations 1950-1999*: 75. Winchester: Winchester Museums Service and English Heritage.

Binford, L. 1972. *An Archaeological Perspective*. Harcourt: New York.

Birbeck, V. 2001. Excavations at Watchfield, Shrivenham, Oxfordshire, 1998. *Oxoniensia* 66: 221–288.

Birks, H.J.B. 2014. Challenges in the presentation and analysis of plant-macrofossil stratigraphical data. *Vegetation History and Archaeobotany* 23 (3): 309–330.

Blackburn, K. 1970. Report of wood samples from the well in the HQB, 1933. In R. Birley. Excavations at Chesterholm Vindolanda 1996-1969. *Archaeologia Aeliana* 48: 145.

Boardman, S. and Jones, G. 1990. Experiments on the effects of charring on cereal plant components. *Journal of Archaeological Science* 17 (1): 1–11.

Bogaard, A. 2004. *Neolithic Farming in Central Europe: an Archaeobotanical Study of Crop Husbandry Practices*. London: Routledge.

Bogaard, A. 2011. *Plant Use and Crop Husbandry in an Early Neolithic Village: Vaihingen an der Enz, Baden-Württemberg*. Bonn: Habelt.

Bogaard, A., Charles, M., Twiss, K., Fairbairn, A., Yalman, N., Filipović, D., Arzu Demirergi, A., Ertuğ, Russell, N. and Henecke, J. 2009. Private pantries and celebrated surplus: storing and sharing food at Neolithic Çatalhöyük, central Anatolia. *Antiquity* 83: 649–668.

Bogaard, A., Heaton, T., Poulton, P. and Merbach, I. 2007. The impact of manuring on nitrogen isotope ratios in cereals: archaeological implications for reconstruction of diet and crop management practices. *Journal of Archaeological Science* 34 (3): 335–343.

Bogaard, A., Jones, G., Charles, M. and Hodgson, J. 2001. On the archaeobotanical inference of crop sowing time using the FIBS method. *Journal of Archaeological Science* 28 (11): 1171–1183.

Bogaard, A., Krause, R. and Strien, H. 2011. Towards a social geography of cultivation and plant use in an early farming community: Vaihingen an der Enz, south-west Germany. *Antiquity* 85: 395–416.

Bogaard, A. et al. 2013. Crop manuring and intensive land management by Europe's first farmers. *Proceedings of the National Academy of Sciences*. 110 (31): 12589-12594.

Bogaard, A. et al. 2013. Locating land use at Neolithic Çatalhöyük, Turkey: the implications of 87 Sr/86 Sr signatures in plants and sheep tooth sequences. *Archaeometry*. DOI: 10.1111/arcm.12049

Bojko, A.-M. and Crummy, N. 2007. The wood and leather remains. In P. Crummy, S. Benfield, N. Crummy, V. Rigby and D. Shimmin (eds.) *Stanway: an Elite Burial Site at Camulodunum*: 388-393. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 24.

Bond, J. and Hunter, J. 1987. Flax-growing in Orkney from the Norse period to the 18th century. *Proceedings of the Society of Antiquaries Scotland* 117: 175–181.

Boon, G. 1957. *Roman Silchester*. London: Max Parrish and Co.

Boon, G. 1969. Belgic and Roman Silchester: excavations of 1954-8 with an excursus on the early history of Calleva. *Archaeologia* 102: 1-81.

Boon, G. 1974. *Silchester: the Roman Town of Calleva*. Newton Abbot: David and Charles.

Boon, G. 1976. Edwardian management and excavation costs in Britain. *Antiquity* 49: 51–54.

Boon, G. 1983. Potters, oculists and eye-troubles. *Britannia* 14: 1–12.

Booth, P., Dodd, D., Robinson, M. and Smith, A. 2007. *The Thames Through Time: the Archaeology of the Gravel Terraces of the Upper and Middle Thames: the Early Historical Period, AD 1-1000*. Oxford: Oxford University School of Archaeology.

Bosi, G., Mazzanti, M.B., Florenzano, A., N'siala, I. M., Pederzoli, A., Rinaldi, R., Torri, P. and Mercuri, A.M. 2011. Seeds/fruits, pollen and parasite remains as evidence of site function: piazza Garibaldi – Parma (N Italy) in Roman and Mediaeval times. *Journal of Archaeological Science* 38 (7): 1621-1633.

Bosi, G., Rinaldi, R. and Mazzanti, M. 2011. Flax and weld: archaeobotanical records from Mutina (Emilia Romagna, Northern Italy), dated to the Imperial Age, first half 1st century A.D. *Vegetation History and Archaeobotany* 20 (6): 543-548.

Bourdieu, P. 1977. *Outline of a Theory of Practice*. Cambridge: Cambridge University Press.

Bourdieu, P. 1990. *The Logic of Practice*. Cambridge: Polity Press.

Bowie, G. 2013. Vetches in medieval farming. *Rural History Today* 24: 1.

Bowman, A. and Thomas, J.D. 1994. *The Vindolanda Writing-Tablets (Tabulae Vindolandenses II).* London: British Museum Press for the Trustees of the British Museum.

Bowman, A. and Wilson, A. 2013. Introduction: quantifying Roman agriculture. In A. Bowman and A. Wilson (eds.) *The Roman Agricultural Economy: Organization, Investment, and Production*: 1-32. Oxford: Oxford University Press.

Bradford, J. and Goodchild, R. 1939. Excavations at Frilford, Berks. 1937-8. *Oxoniensia* 4: 1–70.

Bradley, R. 2005. *Ritual and Domestic Life in Prehistoric Europe*. London: Routledge.

Bradley, R. and Fraser, E. 2010. Bronze Age barrows on the heathlands of southern England: construction, forms and interpretations. *Oxford Journal of Archaeology* 29 (1): 15–33.

Bradley, R., Lobb, S., Richards, J. and Robinson, M. 1980. Two Late Bronze Age settlements on the Kennet Gravels: excavations at Aldermaston Wharf and Knight's Farm, Burghfield, Berkshire. *Proceedings of the Prehistoric Society* 46: 217–295.

Branch, N. and Green, C. 2004. The environmental history of Surrey. In J. Cotton, G. Crocker and A. Graham (eds.) *Aspects of Archaeology and History in Surrey: Towards a Research Framework for the County*: 1-18. Guildford: Surrey Archaeological Society.

Brewis, A., Bowman, P. and Rose, F. 1996. *The Flora of Hampshire*. Colchester: Harley Books.

Brossler, A., Guttman, E. and Brown, F. 2013. *Prehistoric Settlement in the Lower Kennet Valley: Excavations at Green Park (Reading Business Park), Phase 3 and Moores Farm, Burghfield, Berkshire*. Oxford: Oxford Archaeology Thames Valley Landscapes Monograph No. 37.

Brown, A., Meadows, I., Turner, S.D. and Mattingly, D.J. 2001. Roman vineyards in Britain: stratigraphic and palynological data from Wollaston in the Nene Valley, England. *Antiquity* 75: 745–757.

Brown, J. 2010. *A Possible Roman Vineyard on Land off Tavistock Avenue Ampthill Bedfordshire*. Northamptonshire Archaeology Report 10/132.

Brück, J. 1999. Ritual and rationality: some problems of interpretation in European archaeology. *European Journal of Archaeology* 2 (3): 313–344.

Bryant, S. 2007. Central places or special places? The origins and development of "oppida" in Hertfordshire. In C. Haselgrove and T. Moore (eds.) *The Later Iron Age in Britain and Beyond*: 62-80. Oxford: Oxbow.

Büntgen, U. et al. 2011. 2500 years of European climate variability and human susceptibility. *Science* 331 (6017): 578–582.

Burnham, B., Collis, J., Dobinson, C., Haselgrove, C. and Jones, M. 2001. Themes for urban research, c 100 BC to AD 200. In S. James and M. Millett (eds). *Britons and Romans: Advancing an Archaeological Agenda*: 67-76. York: Council for British Archaeology.

Burnham, B. and Wacher, J. 1990. *The "Small Towns" of Roman Britain*. London: B.T. Batsford Ltd.

Butterworth, C. and Lobb, S. 1992. *Excavations in the Burghfield Area, Berkshire: Developments in the Bronze Age and Saxon Landscapes*. Salisbury: Wessex Archaeology.

Buurman, J. 1988. Roman medicine from Uitgeest. In H. Küster (ed.) *Der Prähistorische Mensch und seine Umwelt. Fetschrift für Udelgard Körber Grohne zum 65. Geburtstag*: 341-351. Stuttgart: Konrad Theiss Verlag.

Caesar (translated by Hammond, C. 1996) *De Bello Gallico*. Oxford: Oxford University Press.

Campbell, G. 2000a. Plant utilization: the evidence from charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme. The Prehistory of a Wessex Landscape*. *Volume 1: Introduction*: 45-59. Oxford: Institute of Archaeology.

Campbell, G. 2000b. Charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme: the Prehistory of a Wessex Landscape. Volume 2 - pt. 2. Bury Hill, Upper Clatford, Hants, 1990*: 73-77. Oxford: Institute of Archaeology.

Campbell, G. 2000c. The charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme: the Prehistory of a Wessex Landscape. Volume 2 - pt. 3. Suddern Farm, Middle Wallop, Hants, 1991 and 1996*: 193-198. Oxford: Institute of Archaeology.

Campbell, G. 2000d. Charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme: the Prehistory of a Wessex Landscape. Volume 2 – pt. 5. Nettlebank Copse, Wherwell, Hants, 1993*: 116-127. Oxford: Institute of Archaeology.

Campbell, G. 2008a. Plant utilization in the countryside around Danebury: a Roman perspective. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Roman Programme. A Wessex Landscape in the Roman era, Volume 1: Overview*: 53-74. Oxford: Oxford University School of Archaeology.

Campbell, G. 2008b. Charred plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman era, Volume 2 pt. 3. Fullerton, Hants, 2000 and 2001*: 161-164. Oxford: English Heritage and Oxford University School of Archaeology.

Campbell, G. and Hamilton, J. 2000. Danebury environs: agricultural change in the Iron Age. In G. Bailey, R. Charles and N. Winder (eds.) *Human Ecodynamics: Proceedings of the Association for Environmental Archaeology Conference 1998 held at the University of Newcastle upon Tyne*: 114-122. Oxford: Oxbow.

Campbell, G. and Pelling, R. 2013. *The Palaeothnobotany of Pteridium aquilinium (L.) Kuhn (Bracken): Myriad Past and Present Uses from Documentary Evidence and the Archaeobotanical Record*. IWGP 2013. Unpublished poster. Available at: http://iwgp-2013.web.auth.gr/images/Posters/campbell%20and%20pelling.pdf [Accessed April 04, 2013].

Campbell, G. and Robinson, M. 2009. Plant and invertebrate remains. In M. Audouy and A. Chapman (eds.). *Raunds: the Origin and Growth of a Midland Village AD450-1500*: 222-44. Oxford: Oxbow Books.

Campbell, G. and Robinson, M. 2007. Environment and land use in the valley bottom. In J. Harding and F. Healy (eds.) *The Raunds Area Project. A Neolithic and Bronze Age Landscape in Northamptonshire*: 18-34. Swindon: English Heritage.

Campbell, G. and Straker, V. 2003. Prehistoric crop husbandry and plant use in southern England: development and regionality. In K. Robson Brown (ed.) *Archaeological Sciences 1999. Proceedings of the Archaeological Sciences Conference, University of Bristol, 1999*: 14-30. Oxford: Archaeopress.

Campbell, G. 1992. Excavation at Lower Bolney, Harpsden, south Oxfordshire, 1991. *Oxoniensia* 57: 29–42.

Cappers, T., Bekker, R. and Jans, J. 2012. *Digital Seed Atlas of the Netherlands*. Groningen: Barkhuis.

Carruthers, W. 1988. Mystery object number 2 – animal, mineral or vegetable? *Circaea* 6 (1): 20.

Carruthers, W. 1991. The carbonised and mineralised plant remains. In P. Bellamy. Investigations of the prehistoric landscape along the route of the A303. *Proceedings of the Hampshire Field Club and Archaeological Society* 47: 36–41.

Carruthers, W. 1993. Carbonised, mineralised and waterlogged plant remains. In W. Hawkes and M. Heaton (eds.) *A Closed-Shaft Garderobe and Associated Medieval Structures at Jennings Yard, Windsor, Berkshire*: 82-90. Salisbury: Trust for Wessex Archaeology.

Carruthers, W. 1993b. Appendix II: seed and pollen analysis, a summary. In S.J. Lobb and E.L. Morris. Investigation of Bronze Age and Iron Age features at Riseley Farm, Swallowfield. *Berkshire Archaeological Journal* 74: 66-67.

Carruthers, W. 1995. Plant remains. In P. Fasham, G. Keevill, D. Coe and R. Newman (eds.) *Brighton Hill South (Hatch Warren): an Iron Age Farmstead and Deserted Medieval Village in Hampshire*: 56-60. Salisbury: Trust for Wessex Archaeology.

Carruthers, W. 2000. Mineralised plant remains. In A. J. Lawson (ed.) *Potterne 1982-5: Animal Husbandry in Later Prehistoric Wiltshire*: 72-84. Salisbury: Wessex Archaeology.

Carruthers, W. 2006. Waterlogged plant remains from Perry Oaks. In J. Lewis and Framework Archaeology (eds.) *Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 1. Perry Oaks.* CD Rom. Oxford: Oxford Archaeology.

Carruthers, W. 2008a. Charred plant remains. In N. Holbrook (ed.) *Excavations and Observations in Roman Cirencester 1998-2007 with a Review of Archaeology in Cirencester 1958-2008*: 79-80. Cirencester: Cotswold Archaeology.

Carruthers, W. 2008b. Mineralised plant remains. In C. Ellis and A. Powell (eds.) *An Iron Age Settlement Outside Battlesbury Hillfort, Warminster, and Sites Along the Southern Range Road*: 102-114. Salisbury: Wessex Archaeology and Defence Estates.

Carruthers, W. 2010. Charred and waterlogged plant remains. In Framework Archaeology (ed.) *Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2*. CD Rom. Oxford and Salisbury: Framework Archaeology.

Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations Between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*: 363-373. Oxford: Oxford Archaeology.

Carver, M. 1993. *Arguments in Stone: Archaeological Research and the European Town in the First Millennium AD (being the Dalrymple Lectures for 1990)*. Oxford: Oxbow.

Cato (translated by Dalby, A., 1998). *De Agricultura*. Blackawton: Prospect Books.

Celsus (translated by Spencer, W. G., 1971). *De Medicina*. Cambridge, Massachusetts: Harvard University Press.

Chadwick, A.M. 2012. Routine magic, mundane ritual: towards a unified notion of depositional practice. *Oxford Journal of Archaeology* 31 (3): 283–315.

Charles, M. 1998. Fodder from dung: the recognition and interpretation of dung-derived plant material from archaeological sites. *Environmental Archaeology* 1: 111-122.

Charles, M. and Halstead, P. 2001. Biological resource exploitation: problems of theory and method. In D. Brothwell and A. Pollard (eds.) *Handbook of Archaeological Sciences*: 365-378. Chichester: John Wiley and Sons.

Charman, D.J. 2010. Centennial climate variability in the British Isles during the mid–late Holocene. *Quaternary Science Reviews* 29 (13): 1539–1554.

Chauhan, M.P., Singh, S. and Singh, A.K. 2009. Post harvest uses of Linseed. *Journal of Human Ecology* 28 (3): 217–219.

Childe, V.G. 1950. The urban revolution. *The Town Planning Review* 21 (1): 3–17.

Christaller, W. 1933. *Die Zentralen Orte in Süddeutschland: eine Ökonomisch-Geographische Untersuchung über die Gesetzmässigkeit der Verbreitung und Entwicklung der Siedlungen mit Städtischen Funktionen*. Jena: Gustav Fischer.

Ciaraldi, M. 2000. Drug preparation in evidence? An unusual plant and bone assemblage from the Pompeian countryside, Italy. *Vegetation History and Archaeobotany* 9: 91–98.

Clapham, A.J. 1999. Plant reports. In A. Fitzpatrick, C.A. Butterworth and J. Grove. *Prehistoric and Roman Sites in East Devon: The A30 Honiton to Exeter Improvement DBFO, 1996 Volume 1: The Prehistoric sites (Wessex Archaeology Report 16)*: 51, 83, 112-9, 134-5, 152-5, 184-8 Trowbridge: Wessex Archaeology.

Clapham, A. and Gleason, K. 1997. Archaeobotanical evidence. In E. Hostetter and T.N. Howe (eds.) *The Romano-British Villa at Castle Copse, Great Bedwyn*: 345-354. Bloomington: Indiana University Press.

Clapham, A.R., Tutin, T.G. and Warburg, E.F. 1962. *Flora of the British Isles*. Cambridge: Cambridge University Press.

Cole, A. 2000. Marcham, merece and the millennium: the wild celery story. *Fritillary* 2: 24–25.

Colledge, S. 1985. Alcester, Coulter's Garage, the carbonised remains. In P. Booth. Roman store buildings at Alcester. *Transactions of the Birmingham and Warwickshire Archaeological Society* 94: 88-91.

Collis, J. 1983. Excavations at Silchester, Hants 1968. *Proceedings of the Hampshire Field Club and Archaeological Society* 39: 57–68.

Collis, J. 1984. *Oppida: Earliest Towns North of the Alps*. Sheffield: University of Sheffield.

Collis, J. 2000. "Celtic" oppida. In M. Hansen (ed.) *A Comparative Study of Thirty City-State Cultures: an Investigation Conducted by the Copenhagen Polis Centre*: 229-239. Copenhagen: Kongelige Dansk Videnskabernes Selskab.

Collis, J. 2001. Danebury, its environs, and the Iron Age in Hampshire. *Landscape History* 23 (1): 91–94.

Columella (translated by Ash, H. B. and Forster, E. S., 1968) *Des Rustica*. London: W. Heinemann.

Cool, H. 2006. *Eating and Drinking in Roman Britain*. Cambridge: Cambridge University Press.

Cool, H. and Richardson, J. 2013. Exploring ritual deposits in a well at Rothwell Haigh, Leeds. *Britannia* 44: 191–217.

Corney, M. 1984. A field survey of the extra-mural territory. In M. Fulford (eds) *Silchester: Excavations on the Defences 1974-80*: 239-297. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 5.

Cowan, C. and Hinton, P. 2008. The Roman garden in London. In J. Clark and H. Sheldon (eds) *Londinium and Beyond: Essays on Roman London and its Hinterland for Harvey Sheldon*: 75-81. York: Council for British Archaeology Research Report 156.

Cowgill, G. 2004. Origins and development of urbanism: archaeological perspectives. *Annual Review of Anthropology* 33: 525–549.

Cowie, R., Thorp, A. and Ward, A. 2013. *Roman Roadside Settlement and Rural Landscape at Brentford: Archaeological Investigations at Hilton London Syon Park Hotel, 2004-10*. London: MOLA Archaeology Studies Series 29.

Cranfield Soil and Agrifood Institute, 2014. *Soilscapes*. Available at: http://www.landis.org.uk/soilscapes/index.cfm [Accessed July 14, 2014].

Crawley, M. 2005. *The Flora of Berkshire*. Harpenden: Brambley Books.

Creighton, J. 2000. *Coins and Power in Late Iron Age Britain*. Cambridge: Cambridge University Press.

Creighton, J. 2006. *Britannia: the Creation of a Roman Province*. Cambridge: Cambridge University Press.

Cromarty, A., Bayliss, A., Allen, L. and Collett, L. 2006. *Late Bronze Age Ritual and Habitations on a Thames Eyot at Whitecross Farm, Wallingford: the Archaeology of the Wallingford Bypass, 1986-92*. Oxford: Oxford Archaeology Thames Valley Landscapes Monograph 22.

Crowther, A. 2012. The differential survival of native starch during cooking and implications for archaeological analyses: a review. *Archaeological and Anthropological Sciences* 4 (3): 221–235.

Crowther, A., Haslam, M., Oakden, N., Walde, D. and Mercader, J. 2014. Documenting contamination in ancient starch laboratories. *Journal of Archaeological Science* 49: 90-104.

Crumley, C. 1995. Building an historical ecology of Gaulish polities. In B. Arnold and D. Gibson (eds.) *Celtic Chiefdom, Celtic State*: 26-33. Cambridge: Cambridge University Press.

Crummy, N. 2011. The small finds. In M. Fulford and A. Clarke (eds.) *Silchester: City in Transition: the Mid-Roman Occupation of Insula IX c. A.D. 125-250/300: a Report on Excavations Undertaken Since 1997*: 100-132. London: Society for the Promotion of Roman Studies. Britannia Monograph No. 25.

Crummy, P., Benfield, S., Crummy, N., Rigby, V. and Shimmin, D. 2007. *Stanway: an Elite Burial Site at Camulodunum*. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 24.

Crummy, P. and Brooks, H., 1984. *Excavations at Lion Walk, Balkerne Lane, and Middleborough, Colchester, Essex*. Colchester: Colchester Archaeological Trust.

Cunliffe, B. 1976. The origins of urbanisation in Britain. In B. Cunliffe and T. Rowley (eds.) *Oppida: the Beginnings of Urbanisation in Barbarian Europe*: 136-161. Oxford: British Archaeological Reports International Series 11.

Cunliffe, B. 1984. Iron Age Wessex: continuity and change. In B. Cunliffe and D. Miles (eds.) *Aspects of the Iron Age in Central Southern Britain:* 12-45. Oxford: Oxford University Committee for Archaeology Monograph 2.

Cunliffe, B. 1987. *Hengistbury Head, Dorset. Volume 1: The Prehistoric and Roman Settlement, 3500BC-AD 500*. Oxford: Oxford University Committee for Archaeology.

Cunliffe, B. 1988. *Greeks, Romans and Barbarians*. London: Guild Publishing.

Cunliffe, B. 1995. *Danebury: an Iron Age Hillfort in Hampshire. Volume 6: A Hillfort Community in Perspective*. London: Council for British Archaeology Research Report 102.

Cunliffe, B. 2005. *Iron Age Communities in Britain*. Abingdon: Routledge.

Cunliffe, B. 2012. Calleva in context. In M. Fulford (ed.) *Silchester and the Study of Romano-British Urbanism*: 15-21. Portsmouth, Rhode Island: Journal of Roman Archaeology Supplementary Series Number 90.

Cunliffe, B. and Poole, C. 1991. *Danebury: an Iron Age Hillfort in Hampshire. Volume 5: The Excavations 1979-1988: the Finds*. London: Council for British Archaeology.

Cunliffe, B. and Poole, C. 2000. *The Danebury Environs Programme: the Prehistory of a Wessex Landscape. Volume 1 - Introduction*. Oxford: English Heritage and Oxford University Committee for Archaeology.

Cunliffe, B. and Poole, C. 2008. *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman era Volume 1 – Overview*. Oxford: English Heritage and Oxford University School of Archaeology.

Currie, C.R.J. 1988. Early vetches in medieval England: a note. *Economic History Review* 41(1):114-116.

Curtler, W.H.R. 1912. Agriculture. In W. Page (ed.) *The Victoria History of Hampshire and the Isle of Wight. Volume V*: 493-511. London: Constable and Company Limited.

Dalby, A. 2000. To feed a king. Tyrants, kings and the search for quality in agriculture and food. *Pallas* 52: 133–144.

Dalby, A. 2003. *Food in the Ancient World from A to Z*. London: Routledge.

Dark, P. 2000. *The Environment of Britain in the First Millennium A.D*. London: Gerald Duckworth and Co. Ltd.

Davies, R. 1970. Some Roman medicine. *Medical History* 14 (1): 101–106.

Davis, A. 2004. The plant remains. In L. Dunwoodie (ed.) *Pre-Boudican and Later Activity on the Site of the Forum*: 54-57. London: Museum of London Archaeology Service Archaeology Studies Series 13.

Davis, A. and de Moulins, D. 2000. The plant remains. In B. Barber and D. Bowsher (eds.) *The Eastern Cemetery of Roman London: Excavations 1983-90*: 368-378. London: Museum of London Archaeology Service Monograph Series 4.

Dearne, M. 2008. Roman Enfield: a redistributive role for roadside settlements? In J. Clark and H. Sheldon (eds.) *Londinium and Beyond: Essays on Roman London and its Hinterland for Harvey Sheldon*: 90-95. London: Council for British Archaeology Research Report 156.

Deelstra, T. and Herbert, G. 2000. Urban agriculture and sustainable cities. In N. Bakker (ed.) *Growing Cities, Growing Food. Urban Agriculture on the Policy Agenda*: 43-66. Feldafing: Deutsche Stiftung für Internationale Entwicklung, Zentralstelle für Ernährung und Landwirtschaft.

de Moulins, D. 1995. Charred plant remains. In G.J. Wainwright and S.M. Davies (eds.) *Balksbury Camp, Hampshire. Excavations 1973 and 1981*: 87-92. London: English Heritage Archaeological Report 4.

de Moulins, D. 2005. Prehistoric landscape to Roman villa. In I. Howell (ed.) *Prehistoric Landscape to Roman Villa: Excavations at Beddington, Surrey 1981-7*: 101-113. London: MoLAS Monograph 26.

Dennell, R. 1976a. Prehistoric crop cultivation in southern England: a reconsideration. *The Antiquaries Journal* 56 (1): 11–23.

Dennell, R. 1976b. The economic importance of plant resources represented on archaeological sites. *Journal of Archaeological Science* 3 (3): 229–247.

Derreumaux, M. 2005. How to detect fodder and litter? A case study from the Roman site “Le Marais de Dourges,” France. *Vegetation History and Archaeobotany* 14 (4): 375–385.

Derreumaux, M. and Lepetz, S. 2008. Food supply at two successive military settlements in Arras (France): an archaeobotanical and archaeozoological approach. In S. Stallibrass, S. and R. Thomas (eds.) *Feeding the Roman Army. The Archaeology of Production and Supply in NW Europe*: 52-68. Oxford: Oxbow Books.

Dickson, C. 1994. Macroscopic fossils of garden plants from British Roman and Medieval deposits. In D Moe, J.H. Dickson and P.M. Jorgensen (eds.) *Garden History: Garden Plants, Species, Forms & Varieties from Pompeii to 1800*: 47-72. Rixensart: PACT Belgium.

Dickson, C. 2011. *Distinguishing seeds of Brassica spp. characters selected from Berggren 1962 and 1981*. Unpublished guide. Available at http://www.english-heritage.org.uk/content/imported-docs/a-e/awg-brassica-identification.pdf. [Accessed 18/07/2012].

Dickson, J. and Dickson, C. 1996. Ancient and modern occurrences of common fig (Ficus carica L.) in the British Isles. *Quaternary Science Reviews* 15: 623–633.

Dietler, M. and Hayden, B. 2000. *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics and Power*. Washington (DC): Smithsonian Institute Press.

Dimbleby, G. 1978. A pollen analysis from Verulamium (St. Michael's 1996). *Hertfordshire Archaeology* 6: 112–115.

Dioscorides (translated by Beck, L., 2005) *De Materia Medica*. Hildesheim: Olms-Weidmann.

Dobney, K., Hall, A. and Kenward, H. 1999. It's all garbage ... A review of bioarchaeology in the four English colonia towns. In H. Hurst (ed.) *The Coloniae of Roman Britain: New Studies and a Review*: 15-35. Portsmouth: Journal of Roman Archaeology Supplementary Series 36.

Dumayne, L. 1994. The effect of the Roman occupation on the environment of Hadrian's Wall: a pollen diagram from Fozy Moss, Northumbria. *Britannia* 25: 217–224.

Durand, F. and Wiethold, J. 2014. Social status and food diet in Bibracte, Morvan (Burgundy, France). In A. Chevalier, E. Marinova and L. Peña-Chocarro (eds.) *Plants and People: Choices and Diversity Through Time (Earth Series)*: 412-420. Oxford: Oxbow Books.

Dyer, C. 2006. Gardens and garden produce in the Later Middle Ages. In C. Woolgar, D. Serjeantson and T. Waldron (eds.) *Food in Medieval England*: 27-40. Oxford: Oxford University Press.

Eckardt, H. 2006. The character, chronology, and use of the Late Roman pits: the Silchester finds assemblage. In M. Fulford, A. Clarke and H. Eckardt (eds.) *Life and Labour in Late Roman Silchester: Excavations in Insula IX Since 1997*: 221-245. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 22.

Eckardt, H. 2011. The Mid-Roman pits in context. In M. Fulford and A. Clarke (eds.) *Silchester: City in Transition: the Mid-Roman Occupation of Insula IX c. A.D. 125-250/300: a Report on Excavations Undertaken Since 1997*: 301-318. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 25.

Eckardt, H. 2012. Foreigners and locals in Calleva. In M. Fulford (ed.) *Silchester and the Study of Romano-British Urbanism*: 236-256. Portsmouth, Rhode Island: Journal of Roman Archaeology Supplementary Series, 90.

EDINA, 2014. *DIGIMAP*. Available at: http://www.digimap.edina.ac.uk/digimap/home [Accessed 18/07/2013].

English Heritage, 1998. *Managing Archaeological Projects ('MAP2')*. Available at http://www.eng-h.gov.uk/guidance/map2/index.htm [Accessed 9/11/2013].

Erdkamp, P. 2012. A forum on trade - The grain trade in the Roman world. In W. Scheidl (ed.) *The Cambridge Companion to the Roman Economy*: 304-308. Cambridge: Cambridge University Press.

Ertuğ, F. 2010. Linseed oil and oil mills in central Turkey: Flax/Linum and Eruca, important oil plants of Anatolia. *Anatolian Studies* 50: 171–185.

Evans, J. 1894. On some Iron tools and other articles formed of iron found at Silchester in the year 1890. *Archaeologia* 54: 139–156.

Fairbairn, A. and Austin, P. 2001. Archaeobotanical evidence. In A. Barber and N. Holbrook. A Romano-British settlement to the rear of Denchworth road, Wantage, Oxfordshire: evaluation and excavation in 1996 and 1998. *Oxoniensia* 66: 325–333.

Fasham P., Keevil, G., Coe, D. and Newman, R. 1995. *Brighton Hill South (Hatch Warren): an Iron Age Farmstead and Deserted Medieval Village in Hampshire*. Salisbury: Trust for Wessex Archaeology.

Fairweather, A.D. and Ralston, I.B.M. The Neolithic timber hall at Balbridie, Grampian region Scotland: the building, the date, the plant macrofossils. *Antiquity* 67: 313-23.

Fenton, A. 1983. Grain storage in pits: experiment and fact. In A. O'Connor and D.V. Clarke (eds.) *From the Stone Age to the 'forty-five'*: 567-588. Edinburgh: John Donald.

Figueiral, I. and Séjalon, P. 2014. Archaeological wells in southern France: Late Neolithic to Roman plant remains from Mas de Vignoles IX (Gard) and their implications for the study of settlement, economy and environment. *Environmental Archaeology* 19 (1): 23–38.

Finley, M. 1981. The ancient city: from Fustel de Coulanges to Max Weber and beyond. In R. Saller and B. Shaw (eds.) *Economy and Society in Ancient Greece*: 3-23. London: Chatto and Windus.

Fisher, C., Terras, M. and Warwick, C. 2010. Integrating new technologies into established systems: a case study from Roman Silchester. In B. Frischer, J. Webb Crawford and D. Koller (eds.) *Making History Interactive. Computer Applications and Quantitative Methods in Archaeology (CAA). Proceedings of the 37th International Conference, Williamsburg, Virginia, United States of America, March 2-26, 2009*: 1-18. The Netherlands: British Archaeological Reports International Series 2079.

Fitter, A. and Peat, H. 1994. The ecological flora database. *Journal of Ecology* 82: 415–425.

Fitzpatrick, A. 2001. Cross-channel exchange, Hengistbury Head, and the end of hillforts. In J. Collis (ed.) *Society and Settlement in Iron Age Europe*: 82-97. Sheffield: J.R. Collis Publications.

Fitzpatrick, A. 2003. Roman amphorae in Iron Age Britain. *Journal of Roman Pottery Studies* 10: 10–25.

Fitzpatrick, A. and Timby, J. 2002. Roman pottery in Iron Age Britain. In A. Woodward and J.D. Hill (eds.) *Prehistoric Britain: the Ceramic Basis*: 161-172. Oxford: Oxbow Books.

Ford, B., Teague, S. and Biddulph, E. 2011. *Winchester - a City in the Making: Archaeological Excavations Between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*. Oxford: Oxford Archaeology.

Ford, S. 1990. The archaeology of the Cleeve-Didcot pipeline, South Oxfordshire, 1989. *Oxoniensia* 60: 1-40.

Ford, S., Entwhistle, R. and Taylor, K. 2003. *Excavations at Cippenham, Slough, Berkshire, 1995-7*. Reading: Thames Valley Archaeological Services Monograph 3.

Ford, S. and Hopkins, H. 2011. Silchester field survey University of Reading student projects, Hampshire, 1981-89. In S. Preston (ed.) *Archaeological Investigations in the Silchester Hinterland: Exploring Landscape Use Around the Roman Town*: 20-30. Reading: Thames Valley Archaeological Services Monograph 9.

Fox, G. and Hope, W.S.J. 1901. Excavations on the site of the Roman city at Silchester, Hants, in 1900. *Archaeologia* 57: 229–256.

Foxhall, L. 1998. Snapping up the unconsidered trifles: the use of agricultural residues in Ancient Greek and Roman farming. *Environmental Archaeology* 1: 35–40.

Fraser, R.S. et al. 2011. Manuring and stable nitrogen isotope ratios in cereals and pulses: towards a new archaeobotanical approach to the inference of land use and dietary practices. *Journal of Archaeological Science* 38 (10): 2790–2804.

Frere, S., Hassall, M. and Tomlin, R. 1989. Roman Britain in 1988. *Britannia* 20: 257–345.

Fryer, V. 2007. The charred plant macrofossils and other remains from site D. In P. Crummy, S. Benfield, N. Crummy, V. Rigby and D. Shimmin (eds.) *Stanway: An Elite Burial Site at Camulodunum*: 420–422. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 24.

Fulford, M. 1984. *Silchester: Excavations on the Defences 1974-80*. London: Society for Antiquaries. Britannia Monograph Series No. 5.

Fulford, M. 1989a. The economy of Roman Britain. In M. Todd (ed.) *Research on Roman Britain 1960-89*: 175-201. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 11.

Fulford, M. 1989b. *The Silchester Amphitheatre: Excavations of 1979-85*. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 10.

Fulford, M. 1992. Iron Age to Roman: a period of radical change on the gravels In M. Fulford and E. Nichols. *Developing Landscapes of Lowland Britain. The Archaeology of the British Gravels: A Review*: 23-38. London: Society of Antiquaries.

Fulford, M. 1993. Silchester: the early development of a civitas capital. In S.J. Greep (ed.) *Roman Towns: The Wheeler Inheritance*: 16-33. York: Council for British Archaeology.

Fulford, M. 2000. The organisation of legionary supply: the Claudian invasion of Britain. In R. Brewer (ed.) *Roman Fortresses and their Legions*: 41-50. London: Society of Antiquaries.

Fulford, M. 2001. Links with the past: pervasive "ritual" behaviour in Roman Britain. *Britannia* 32: 199–218.

Fulford, M. 2003. Julio-Claudian and Early Flavian Calleva. In P. Wilson (ed.) *The Archaeology of Roman Towns*: 95-104. Oxford: Oxbow Books.

Fulford, M. 2004. Economic structures. In M. Todd (ed.) *A Companion to Roman Britain*: 309-327. Oxford: Blackwell.

Fulford, M. 2008. Nero and Britain: the palace of the client King at Calleva and Imperial policy towards the province after Boudicca. *Britannia* 39: 1-13.

Fulford, M. 2010. Roman Britain: immigration and material culture. In H. Eckardt (eds.) *Roman Diasporas: Archaeological Approaches to Mobility and Diversity in the Roman Empire*: 99-130. Portsmouth, Rhode Island: Journal of Roman Archaeology Supplementary Series No. 78.

Fulford, M. 2011. The Silchester hinterland: introduction. In S. Preston (ed.) *Archaeological Investigations in the Silchester Hinterland: Exploring Landscape Use Around the Roman Town*: 1-4. Reading: Thames Valley Archaeological Services Monograph 9.

Fulford, M. 2014. Shops, stalls, stores: pre-consumption deposits and centrally organised distribution in Antonine Britain. *Britannia* doi:10.1017/S0068113X14000221X

Fulford, M. and Clarke, A. 2002. Victorian excavation methodology: the Society of Antiquaries at Silchester in 1893. *The Antiquaries Journal* 82: 285–306.

Fulford, M. and Clarke, A. 2009. *Silchester Insula IX. The "Town Life" Project 2006-2009*. Reading: Department of Archaeology, University of Reading.

Fulford, M. and Clarke, A. 2011. *Silchester: City in Transition: the Mid-Roman Occupation of Insula IX c. A.D. 125-250/300: a Report on Excavations Undertaken Since 1997*. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 25.

Fulford, M., Clarke, A. and Eckardt, H. 2006. *Life and Labour in Late Roman Silchester: Excavations in Insula IX since 1997*. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 22.

Fulford, M., Clarke, A. and Lucas, S. 2012. *Silchester Insula IX: The "Town Life" Project 2011*. Reading: Department of Archaeology, University of Reading.

Fulford, M., Clarke, A. and Taylor, F. 2011. *Silchester Insula IX. The "Town Life" Project 2009-2010*. Reading: Department of Archaeology, University of Reading.

Fulford, M. and Creighton, J. 1998. A Late Iron Age mirror burial from Latchmere Green, near Silchester, Hampshire. *Proceedings of the Prehistoric Society* 64: 331–342.

Fulford, M. and Holbrook, N. 2011. Assessing the contribution of commercial archaeology to the study of the Roman period in England, 1990-2004. *The Antiquaries Journal* 91: 323–45.

Fulford, M., Clarke, A., Pankhurst, N. and Lucas, S. 2013. *Silchester Insula IX: the "Town Life" Project 2012*. Reading: Department of Archaeology, University of Reading.

Fulford, M. and Timby, J. 2000. *Late Iron Age and Roman Silchester: Excavations on the Site of the Forum Basilica, 1977, 1980-86.* London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 15.

Fulford, M. and Timby, J. 2001. Timing devices, fermentation vessels, "ritual" piercings? A consideration of deliberately "holed" pots from Silchester and elsewhere. *Britannia* 32: 293-297.

Fuller, D. 2008. The spread of textile production and textile crops in India beyond the Harappan zone: an aspect of the emergence of craft specialization and systematic trade. In T. Osada and A. Uesugi (eds.) *Linguistics, Archaeology and the Human Past*: 1-26. Kyoto: Research Institute for Humanity and Nature.

Fuller, D. and Stevens, C. 2009. Agriculture and the development of complex societies: an archaeobotanical agenda. In A. Fairbairn and E. Weiss (eds.) *From Foragers to Farmers: Papers in Honour of Gordon C. Hillman*: 37-57. Oxford: Oxbow Books.

Gaffney, V. and Tingle, M. 1989. *The Maddle Farm Project: an Integrated Survey of Prehistoric and Roman Landscapes on the Berkshire Downs*. Oxford: British Archaeological Reports British Series 200.

Gage, J. 1839. A letter from John Gage, Esq. F.R.S., Director, to Hudson Gurney, Esq. F.R.S. V.P. and c. containing an account of further discoveries of Roman sepulchral relics at the Bartlow Hills. *Archaeologia* 28 (1): 1–6.

Garland, N. 2012. Boundaries and change: the examination of the Late Iron Age-Roman transition. In M. Duggan, F. McIntosh and D. Rohl (eds.) *TRAC 2011: Proceedings of the Twenty First Theoretical Roman Archaeology Conference Newcastle 2011*: 91-104. Oxford: Oxbow Books.

Garland, N. 2013. Ritual landscapes of Pre-Roman Britain: the margins of practice on the margins of the Empire. In A. Bokern, M. Bolder-Boos, S. Krmnicek, D. Maschek and S. Page (eds.) *TRAC 2012: Proceedings of the Twenty-Second Theoretical Roman Archaeology Conference Frankfurt 2012*: 183-198. Oxford: Oxbow Books.

Garrow, D. 2012. Odd deposits and average practice. A critical history of the concept of structured deposition. *Archaeological Dialogues* 19 (2): 85–115.

Garrow, D., Gosden, C., Hill, J.D. and Bronk-Ramsey, C. 2010. Dating Celtic art: a major radiocarbon dating programme of Iron Age and Early Roman metalwork in Britain. *Archaeological Journal* 166: 79–123.

Gibbard, P. 1985. *The Pleistocene History of the Middle Thames Valley*. Cambridge: Cambridge University Press.

Gibson, C. and Knight, S. 2007. A Middle Iron Age settlement at Weston Down Cottages, Weston Colley, near Winchester, Hampshire. *Proceedings of the Hampshire Field Club and Archaeological Society* 62: 1-34.

Gimingham, C. 1960. Calluna Salisb. *Journal of Ecology* 48 (2): 455-483.

Giorgi, J. 2006. The plant remains from White Horse Stone. In J. Giorgi (ed.) *Palaeoenvironmental Evidence From Section 1 of the Channel Tunnel Rail Link, Kent*. CTRL Scheme-wide Specialist Report Series.

Godwin, H. 1975. *The History of the British Flora: a Factual Basis for Phytogeography*. Cambridge: Cambridge University Press.

Goodburn, D. 2012. Worked wood. In J. Leary and J. Butler (eds.) *Roman Archaeology in the Upper Reaches of the Walbrook Valley: Excavations at 6-8 Tokenhouse Yard, London EC2*: 48-56. London: Pre-Construct Archaeology Limited, Monograph No. 14.

Goody, J. 1982. *Cooking, Cuisine and Class: a Study in Comparative Sociology*. Cambridge: Cambridge University Press.

Gosden, C., Cooper, A., Creswell, M., Green, C., ten Harkel, L., Kamash, Z., Morley, L. Pybus, J. and Xiong, X. 2012. The English Landscape and Identities Project. *Antiquity* 86: 332.

Grant, A. 2000. Diet, economy and ritual: evidence from the faunal remains. In M. Fulford and J. Timby (eds.) *Late Iron Age and Roman Silchester. Excavations on the Site of the Forum-Basilica 1977, 1980-86*: 425-482. Society for the Promotion of Roman Studies. Britannia Monograph Series No. 15.

Grant, M. 2000. *Galen on Food and Diet*. London: Routledge.

Green, F. 1979a. *Mediaeval Plant Remains from Wessex*. University of Southampton. MPhil thesis.

Green, F. 1979b. Phosphatic mineralisation of seeds from archaeological sites. *Journal of Archaeological Science* 6: 279–284.

Green, F. 1981. The botanical remains. In S.M. Davies (ed.) Excavations at Old Down Farm, Andover, Part II: Prehistoric and Roman. *Proceedings of the Hampshire Field Club and Archaeological Society* 37: 153–156.

Green, F. 1982. Problems of interpreting differentially preserved plant remains from excavations of medieval urban sites. In A. Hall and H. Kenward (eds.) *Environmental Archaeology in the Urban Context*: 40-46. London: Council for British Archaeology.

Green, F. 2004. Sites in the western suburbs. In K. Qualmann, H Rees, G. Scobie and R. Whinney (eds.) *Oram's Arbour: the Iron Age Enclosure at Winchester Volume 1: Investigations 1950-1999*: 75-78. Winchester: Winchester Museums Service and English Heritage.

Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed.) *Feeding a Roman town: Environmental Evidence from Excavations in Winchester, 1972-1985*: 327-342. Winchester: Winchester Museums.

Greig, J. 1981. The investigation of a medieval barrel-latrine from Worcester. *Journal of Archaeological Science* 8: 265-282.

Greig, J. 1984. The palaeoecology of some British hay meadow types. In W. van Zeist and W.A. Casparie (eds.) *Plants and Ancient Man: Studies in Palaeoethnobotany*: 213-226. Rotterdam: A. A. Balkema.

Greig, J. 1988a. Some evidence of the development of grassland plant communities. In M. Jones (ed.) *Archaeology and the Flora of the British Isles*: 39-52. Oxford: Oxford University Committee for Archaeology Monograph No. 14.

Greig, J. 1988b. The interpretation of some Roman well fills from the midlands of England. In H. Küster (ed.) *Der Prähistorische Mensch und seine Umwelt. Fetschrift für Udelgard Körber Grohne zum 65. Geburtstag*: 367-381. Stuttgart: Theiss.

Grieve, M. 1992. *A Modern Herbal*. London: Tiger Books International.

Grime, J., Hodgson, J.G. and Hunt, R. 1988. *Comparative Plant Ecology. A Functional Approach to Common British Species*. London: Unwin-Hyman.

Grimes, W. 1968. *The Excavation of Roman and Mediaeval London*. London: Routledge and Kegan Paul.

Grinsell, L.V. 1936. An analysis and list of Berkshire barrows. *Berkshire Archaeological Journal* 40: 20–58.

Grinsell, L.V. 1939. Berkshire barrows. Part IV. - agenda and corrigenda. *Berkshire Archaeological Journa*l 43: 9-21.

Groot, M. and Kooistra, L. 2009. Land use and the agrarian economy in the Roman Dutch river area. *Internet Archaeology* 27. doi.org/10.11141/ia.27.5.

Groves, J., Waller, M. Grant, M., and Schofield, J. 2012. Long-term development of a cultural landscape: the origins and dynamics of lowland heathland in southern England. *Vegetation History and Archaeobotany* 21 (6): 453-470.

Hall, A. 1988. Problems of reconstructing past urban floras and vegetation. In M. Jones (ed.) *Archaeology and the Flora of the British Isles*: 93-95. Oxford: Oxford University Committee for Archaeology Monograph No. 14

Hall, A. 2003. *Recognition and Characterisation of Turves in Archaeological Occupation Deposits by Means of Macrofossil Plant Remains*. English Heritage Centre for Archaeology Report 16/2003.

Hall, A. and Huntley, J. 2007. *A Review of the Evidence for Macrofossil Plant Remains from Archaeological Deposits in Northern England*. English Heritage Research Department Report Series no. 87-2007.

Hall, A. and Kenward, H. 1990. *Environmental Evidence from the Colonia: Tanner Row and Rougier Street*. London: Council for British Archaeology.
Hall, A. and Kenward, H. 1998. Disentangling dung: pathways to stable manure. *Environmental Archaeology* 1: 123–126.

Hall, A. and Kenward, H. 2003. Can we identify biological indicator groups for craft, industry and other activities? In P. Murphy and P.E.J. Wiltshire (eds.) *The Environmental Archaeology of Industry. Symposia of the Association for Environmental Archaeology 20*: 114-130. Oxford: Oxbow Books.

Hall, A., Kenward, H. and Williams, D. 1980. *Environmental Evidence from Roman Deposits in Skeldergate*. London: Council for British Archaeology.

Hall, J. 2005. The shopkeepers and craft-workers of Roman London. In A. MacMahon and J. Price (eds.) *Roman Working Lives and Urban Living*: 125-144. Oxford: Oxbow Books.

Halstead, P. 1989. The economy has a normal surplus. In P. Halstead and J. O'Shea (eds.) *Bad Year Economics*: 183-196. Cambridge: Cambridge University Press.

Hamilakis, Y. 2011. Archaeology of the senses. In T. Insoll (ed.) *Oxford Handbook of the Archaeology of Ritual and Religion*: 208-225. Oxford: Oxford University Press.

Hamilton, J. 2000. Animal husbandry: the evidence from the animal bones. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme: The Prehistory of a Wessex Landscape. Volume 1 Introduction*: 59-76. Oxford: English Heritage and Oxford University Committee for Archaeology Monograph No. 48.

Hanf, M. 1983. *The Arable Weeds of Europe with their Seedlings and Seeds*. BASF Aktiengeselschaft: Ludwigshafren.

Hanson, W.S. 1996. Forest clearance and the Roman army. *Britannia* 27: 354–358.

Hartley, D. 2012. *Lost World: England 1933-1936: Dispatches to the Daily Sketch*. Totnes: Prospect.

Haselgrove, C. 1976. External trade as a stimulus to urbanisation. In B. Cunliffe and T. Rowley (eds.) *Oppida: the Beginnings of Urbanisation in Barbarian Europe*: 25-49. Oxford: British Archaeological Reports (Supplementary Series 11).

Haselgrove, C. 1982. Wealth, prestige and power: the dynamics of Late Iron Age political centralization in south-east England. In A. Renfrew and S. Shennan (eds.) *Ranking, Resource and Exchange*: 79-88. Cambridge: Cambridge University Press.

Haselgrove, C. 1995. Late Iron Age society in Britain and north-west Europe: structural transformation or superficial change? In B. Arnold and D.B. Gibson (eds.) *Celtic Chiefdom, Celtic State*: 81-87. Cambridge: Cambridge University Press.

Haselgrove, C. 1996. Roman impact on rural settlement and society in southern Picardy. In N. Roymans (ed.) *From the Sword to the Plough: Three Studies on the Earliest Romanisation of Northern Gaul*: 127-187. Amsterdam: Amsterdam University Press.

Haselgrove, C. 2000. The character of oppida in Iron Age Britain. In V. Guichard, S. Sievers and O. Urban (eds.) *Les Processus d'Urbanisation à L'Âge du Fer: Actes du Colloque Glux-en-Glenne, 8–11 Juin 1998 (Glux-en-Glenne)*: 103-110. Glux-en-Glenne: Centre archéologique européen du Mont Beuvray.

Haselgrove, C. 2007. The age of enclosure: Later Iron Age settlement and society in northern France. In C. Haselgrove and T. Moore (eds.) *The Later Iron Age in Britain and Beyond*: 492-522. Oxford: Oxbow Books.

Haselgrove, C. forthcoming. *Stanwick*.

Haselgrove, C. and Millett, M. 1997. Verlamion reconsidered. In A. Gwilt and C. Haselgrove (eds.) *Reconstructing Iron Age Societies*: 282-296. Oxford: Oxbow Monograph 71.

Haselgrove, C. and Turnbull, P. 1983. *Stanwick: Excavations and Fieldwork. Interim Report 1981-83*. Durham: University of Durham, Department of Archaeology. Occasional Paper Number 4.

Hawkes, C. 1959. The A B C of the British Iron Age. *Antiquity* 33: 170–182.

Hawkes, C. and Dunning, G. 1931. The Belgae of Gaul and Britain. *Archaeological Journal* 87: 150–335.

Helbaek, H. 1952. Early crops in southern England. *Proceedings of the Prehistoric Society* 18: 194–233.

Helbaek, H. 1964. The Isca grain, a Roman plant introduction in Britain. *New Phytologist* 63 (2): 158–164.

Hellmund, M. 2008. The Neolithic records of Onopordum acanthium, Agrostemma githago, Adonis cf. aestivalis and Claviceps purpurea. *Vegetation History and Archaeobotany* 17: 123-130.

Herbig, C. and Maier, U. 2011. Flax for oil or fibre? Morphometric analysis of flax seeds and new aspects of flax cultivation in Late Neolithic wetland settlements in southwest Germany. *Vegetation History and Archaeobotany* 20 (6): 527–533.

Hey, G. 2004. *Yarnton: Saxon and Medieval Settlement and Landscape: Results of Excavations 1990-96*. Oxford: Oxford University School of Archaeology.

Higgs, E. 1975. *Papers in Economic Prehistory*. Cambridge: Cambridge University Press.

Hill, J.D. 1989. Re-thinking the Iron Age*. Scottish Archaeological Review* 6: 16-24.

Hill, J.D. 1995a. *Ritual and Rubbish in the Iron Age of Wessex*. Oxford: British Archaeological Reports 242.

Hill, J.D. 1995b. The Pre-Roman Iron Age in Britain and Ireland (ca. 800 B.C. to A.D. 100): an overview. *Journal of World Prehistory* 9 (1): 47–98.

Hill, J.D. 1996. Hill-forts and the Iron Age of Wessex. In T. Champion and J. Collis (eds.) *The Iron Age in Britain and Ireland: Recent Trends*: 95-116. Sheffield: J.R. Collis Publications.

Hill, J.D. 2007. The dynamics of social change in Later Iron Age eastern and south-eastern England c. 300 BC-AD 43. In C. Haselgrove and T. Moore (eds.) *The Later Iron Age in Britain and Beyond*: 16-40. Oxford: Oxbow Books.

Hill, J.D. 2011. How did British Middle and Late Pre-Roman Iron Age societies work (if they did)? In T. Moore and X. Armada (eds.) *Atlantic Europe in the First Millennium BC: Crossing the Divide*: 242-263. Oxford: Oxford University Press.

Hill, J. and Rowsome, P. 2011. *Roman London and the Walbrook Stream Crossing: Excavations at 1 Poultry and Vicinity, City of London Part 2*. London: MoLA Monograph 37.

Hill, M., Mountford, J., Roy, D. and Bunce, R. 1999. *Ellenberg's Indicator Values for British Plants. ECOFACT Volume 2, Technical Annex*. Huntingdon: Institute of Terrestrial Ecology.

Hill, M., Preston, C. and Roy, D. 2004*. PLANTATT. Attributes of British and Irish Plants: Status, Size, Life History, Geography and Habitats*. Huntingdon: Centre for Ecology and Hydrology.

Hillman, G. 1981. Reconstructing crop husbandry practices from charred remains of crops. In R. Mercer (ed.) *Farming Practice in British Prehistory*: 123-162. Edinburgh: Edinburgh University Press.

Hillman, G. 1984. Interpretation of archaeological plant remains: the application of ethnographic models from Turkey. In W. van Zeist and W.A. Casparie (eds.) *Plants and Ancient Man: Studies in Palaeoethnobotany*: 1-42. Rotterdam: A. A. Balkema.

Hillman, G., Mason, S., de Moulins, D. and Nesbitt, M. 1996. Identification of archaeological remains of wheat: the 1992 London workshop. *Circaea* 12 (2): 195–209.

Hinchliffe, J. and Thomas, R. 1980. Archaeological investigations at Appleford. *Oxoniensia* 45: 9–111.

Hingley, R. 1996. The "legacy" of Rome: the rise, decline, and fall of the theory of Romanization. In J. Webster and N. Cooper (eds.) *Roman Imperialism: Post-Colonial Perspectives*: 34-48. Leicester: School of Archaeological Studies, University of Leicester.

Hingley, R. 2006. The deposition of iron objects in Britain during the later prehistoric and Roman periods: contextual analysis and the significance of iron. *Britannia* 37: 213–257.

Hodgson, J., Halstead, P., Wilson, P. J. and Davis, S. 1999. Functional interpretation of archaeobotanical data: making hay in the archaeological record. *Vegetation History and Archaeobotany* 8: 261–271.

Hodgson, N., Stobbs, G. and Van der Veen, M. 2001. An Iron Age settlement and remains of earlier prehistoric date beneath South Shields Roman fort, Tyne and Wear. *Archaeological Journal* 158: 62–160.

Holden, T. 1995. The last meals of the Lindow Bog men. In R. Turner and R. Scaife (eds.) *Bog Bodies: New Discoveries and New Perspectives*: 76-82. London: British Museum Press.

Horlacher, J. 1939. Feeding and management of thoroughbreds. *Journal of Animal Science* 1939 (1): 91–93.

Hubbard, R.N.L.B. and al Azm, A. 1990. Quantifying preservation and distortion in carbonized seeds; and investigating the history of friké production. *Journal of Archaeological Science* 17 (1): 103–106.

Huntley, J. 1989. The plant and wood remains. In M. McCarthy (ed.) *Roman and Medieval Carlisle: the Southern Lanes*: 71-79. Carlisle: Carlisle Archaeology Limited.

Ingrem, C. 2009. *Assessment of the Animal Bone From Period 1 (c. AD40-50 - c. AD70-80) Deposits at Insula IX, Silchester, Hampshire*. University of Reading Unpublished report.

Jackson, R. 1990. A new collyrium stamp from Cambridge and a corrected reading of the stamp from Caistor-by-Norwich. *Britannia* 21: 275-283.

Jackson, R. 2007. The surgical instruments. In P. Crummy, S. Benfield, N. Crummy, V. Rigby and D. Shimmin. 2007 (eds.) *Stanway: An Elite Burial Site at Camulodunum*: 236-252. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 24.

Jacomet, S. 2006. *Identification of Cereal Remains from Archaeological Sites.* 2nd edition. Basel: Archaeobotany Lab, IPAS, Basel University.

Jacomet, S. 2013. Archaeobotany: analyses of plant remains from waterlogged archaeological sites. In F. Menotti and A. O'Sullivan (eds.) *The Oxford Handbook of Wetland Archaeology*: 497-514. Oxford: Oxford University Press.

Jacomet, S. and Kreuz, A. 1999. *Archäobotanik: Aufgaben, Methoden und Ergebnisse Vegetations- und Agrargeschichtlicher Forschung*. Stuttgart: Utb Gmbh.

Jarvis, R. 1968. *Soils of the Reading District*. Harpenden: Agricultural Research Council.

Jarvis, M., Hazelden, J. and Mackney, D. 1979. *Soils of Berkshire*. Harpenden: Soil Survey.

Jennings, D. 1995. Iron objects. In T. Allen (ed.) *Lithics and Landscape: Archaeological Discoveries on the Thames Water Pipeline at Gatehampton Farm, Goring Oxfordshire 1985-92*: 99. Oxford: Oxford Archaeological Unit Thames Valley Landscapes Monograph No. 7.

Jones, G. 1984. Interpretation of archaeological plant remains: ethnographic models from Greece. In W. Casparie and W. Van Zeist (eds.) *Plants and Ancient Man: Studies in Palaeoethnobotany*: 43-61. Rotterdam: A. A. Balkema.

Jones, G. 1987. A statistical approach to the archaeological identification of crop processing. *Journal of Archaeological Science* 14 (3): 311–323.

Jones, G. 1990. The application of present-day cereal processing studies to charred archaeobotanical remains. *Circaea* 6 (2): 91–96.

Jones, G. 1991. Numerical analysis in archaeobotany. In W. van Zeist, K. Wasylikowa and K.E. Behre (eds.) *Progress in Old World Palaeoethnobotany*: 63-80. Rotterdam: A. A. Balkema.

Jones, G. 2005. Garden cultivation of staple crops and its implications for settlement location and continuity. *World Archaeology* 37 (2): 164–176.

Jones, G., Charles, M., Bogaard, A. and Hodgson, J. 2010. Crops and weeds: the role of weed functional ecology in the identification of crop husbandry methods. *Journal of Archaeological Science* 37 (1): 70–77.

Jones, G., Charles, M., Bogaard, A., Hodgson, J. and Palmer, C. 2005. The functional ecology of present-day arable weed floras and its applicability for the identification of past crop husbandry. *Vegetation History and Archaeobotany* 14 (4): 493–504.

Jones, G. and Halstead, P. 1995. Maslins, mixtures and monocrops: on the interpretation of archaeobotanical crop samples of heterogeneous composition. *Journal of Archaeological Science* 22: 103–114.

Jones, M. 1978. The plant remains. In M. Parrington (ed.) *The Excavation of an Iron Age Settlement, Bronze Age Ring-Ditches and Roman Features at Ashville Trading Estate, Abingdon (Oxfordshire) 1974-76*: 93-110. Oxford: Oxford Archaeological Unit.

Jones, M. 1981. The development of crop husbandry. In M. Jones and G. Dimbleby (eds.) *The Environment of Man: the Iron Age to the Anglo-Saxon Period*: 95-127. Oxford: British Archaeological Reports (British Series) 87.

Jones, M. 1984. The plant remains. In B. Cunliffe (ed.) *Danebury: an Iron Age Hillfort in Hampshire Volume 2: the Excavations, 1969-1978: the Finds*: 483-95. London: Council for British Archaeology Research Report 52.

Jones, M. 1985a. Archaeobotany beyond subsistence reconstruction. In G. Barker and C. Gamble (eds.) *Beyond Domestication in Prehistoric Europe*: 107-128. London: Academic Press.

Jones, M. 1985b. The plant remains. In M. Fulford (ed.) *Guide to the Silchester Excavations. The Forum Basilica 1982-84*: 33-34. Reading: Department of Archaeology, University of Reading.

Jones, M. 1988a. The arable field: a botanical battleground. In M. Jones (ed.) *Archaeology and the Flora of the British Isles*: 86-92. Oxford: Oxford University Committee for Archaeology Monograph No. 14

Jones, M. 1988b. The phytosociology of early arable weed communities with special reference to southern England. In H. Küster (ed.) *Der Prähistorische Mensch und seine Umwelt. Fetschrift für Udelgard Körber Grohne zum 65. Geburtstag.* Geburtstag: 43-51. Stuttgart: Konrad Theiss Verlag.

Jones, M. 1991. Food production and consumption - plants. In R.F.J. Jones (ed.) *Roman Britain: Recent Trends*: 21-27. Sheffield: J. R. Collis Publications.

Jones, M. 1995. Patterns in agricultural practice: the archaeobotany of Danebury in its wider context. In B. Cunliffe (ed.) *Danebury: an Iron Age Hillfort in Hampshire. Volume 6: A Hillfort Community in Perspective*: 43-50. London: Council for British Archaeology Research Report 102.

Jones, M. 1996. Plant exploitation. In T. Champion and J. Collis (eds.) *The Iron Age in Britain and Ireland: Recent Trends*: 29-40. Sheffield: Sheffield Academic.

Jones, M. 2000. The plant remains. In M. Fulford and J. Timby (eds.) *Late Iron Age and Roman Silchester: Excavations on the Site of the Forum Basilica, 1977, 1980-86*: 505-512. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 15.

Jones, M. 2007. A feast of Beltain? Reflections on the rich Danebury harvests. In C. Gosden, H. Hamerow, P. de Jersey and G. Lock (eds.) *Communities and Connections: Essays in Honour of Barry Cunliffe*: 142-153. Oxford: Oxford University Press.

Jones, M. and Nye, S. 1991. The plant remains: a quantitative analysis of crop debris. In B. Cunliffe and C. Poole (eds.) *Danebury: an Iron Age Hillfort in Hampshire. Volume 5: The Excavations 1979-1988: the Finds*: 439-447. London: Council for British Archaeology Research Report No. 73.

Jones, M. and Robinson, M. 1984. The crop plants. In D. Miles (ed.) *Archaeology at Barton Court Farm, Abingdon, Oxon*: 9:E10:9:F8. Oxford: Oxford Archaeological Unit and Council for British Archaeology.

Jones, M.J. 2004. Cities and urban life. In M. Todd (ed.) *A Companion to Roman Britain*: 162-192. Oxford: Blackwell.

Jones, S. 1997. *The Archaeology of Ethnicity: Constructing Identities in the Past and Present*. London: Routledge.

Karl, R. 2008. Random coincidences? Or: the return of the Celtic to Iron Age Britain. *Proceedings of the Prehistoric Society* 74: 69–78.

Kay, Q. 1971. *Anthemis cotula* L. *Journal of Ecology* 59 (2): 623–636.

Keepax, C. 1977. Contamination of archaeological deposits by seeds of modern origin with particular reference to the use of flotation machines. *Journal of Archaeological Science* 4 (3): 221–229.

Keith-Lucas, M. 1984. Analysis of pollen from south-east gate. In M. Fulford (ed.) *Silchester Defences 1974-80*: 215-221. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 5.

Keith-Lucas, M. 1997. Pollen. In I. Barnes, C.A. Butterworth, J.H. Hawkes and L. Smith (eds.) *Excavations at Thames Valley Park, Reading, 1986-88: Prehistoric and Romano-British Occupation of the Floodplain and a Terrace of the River Thames*: 99-106. Salisbury: Wessex Archaeology.

Kenward, H. and Hall, A. 1995. *Biological Evidence from 16-22 Coppergate*, London: Council for British Archaeology.

Kenward, H. and Hall, A. 1997. Enhancing bioarchaeological interpretation using indicator groups: stable manure as a paradigm. *Journal of Archaeological Science* 24: 663–673.

Kenward, H. and Hall, A. 2000. Decay of delicate organic remains in shallow urban deposits: are we at a watershed? *Antiquity* 74: 519–525.

Kenward, H. and Hall, A. 2008. Urban organic archaeology: an irreplaceable palaeoecological archive at risk. *World Archaeology* 40 (4): 584–596.

Kenward, H. and Hall, A. 2012. Dung and stable manure on waterlogged archaeological occupation sites: some ruminations on the evidence from plant and invertebrate remains. In R. Jones (ed.) *Manure Matters: Historical, Archaeological and Ethnographic Perspectives*: 79-95. Farnham: Ashgate Publishing Limited.

Kenward, H., Hall, A. and Jones, A. 1980. A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits. *Science and Archaeology* 22: 3–15.

Kenward, H. and Williams, D. 1979. *Biological Evidence from the Roman Warehouses in Coney Street*. London: Council for British Archaeology.

Kenward, H., Addyman, P., Hall, A. and Jones, A. 1986. *Environmental Evidence from a Roman Well and Anglian Pits in the Legionary Fortress*. London: Council for British Archaeology.

Knörzer, K.-H., 1967. Die Römerzeitliche heilkräuterfund aus Neuss/Rh. *Archaeo-Physika* 2: 65-75.

Knörzer, K.-H., 1971. Urgeschichtliche unkräuter im Rheinland ein beitrag zur entstehungsgeschichte der segetalgesellschaften. *Vegetatio* 2: 89–111.

Kooistra, L. 1996. *Borderland Farming: Possibilities and Limitations of Farming in the Roman Period and Early Middle Ages Between the Rhine and Meuse*. Amersfoort: ROB.

Kooistra, L. 2009. The provenance of cereals for the Roman Army in the Rhine delta based on archaeobotanical evidence. *Beihefte der Bonner Jahrbücher* 58: 219–237.

Körber-Grohne, U. 1981. Crop husbandry and environmental change in the Feddersen Wierde, near Bremerhaven, north west Germany. In M. Jones and G. Dimbleby (eds.) *The Environment of Man: the Iron Age to Anglo-Saxon Period*: 287-307. Oxford: British Archaeological Reports (British Series) 87.

Kreuz, A. 1999. Becoming a Roman farmer: preliminary report on the environmental evidence from the Romanization project. In J. Creighton, R. Wilson and D. Krausse (eds.) *Roman Germany: Studies in Cultural Interaction*: 71-98. Portsmouth, Rhode Island: Journal of Roman Archaeology Supplementary Series Number 32.

Kreuz, A. 2004. Landwirtschaft im umbruck? Archäobotanische untersuchungen zu den jahrhunderten um christi geburt in Hessen and Mainfranken. *Bericht der Römisch-Germanischen Kommision* 85: 97–292.

Kreuz, A. and Wiethold, J. 2010. Archäobotanische ergebnisse der eisen- und kaiserzeitlichen siedlung Mardorf 23, Lkr. Marburg-Biedenkopf. Hinweise auf kulturelle beziehungen nach süden und norden. In E. Jérem, M. Schönfelder and G. Wieland (eds.) *Nord-Süd, Ost-West Kontakte Während der Eisenzeit in Europa. Akten der Internationalen Tagungen der AG Eisenzeit in Hamburg und Sorpron 2002*: 151-163. Budapest: Archaeolingua.

Kristiansen, K. 1998. *Europe Before History*. Cambridge: Cambridge University Press.

Kron, G. 2004. A deposit of carbonized hay from Oplontis and Roman fodder quality. *Mouseion Series III* 4: 275–331.

Kron, G. 2012. Food production. In W. Scheidel (ed.) *The Cambridge Companion to the Roman Economy*: 156–174. Cambridge: Cambridge University Press.

Küster, H. 1991. The history of vegetation. In S. Moscati (ed.) *The Celts*: 426-428. Milano: Bompiani.

Lamb, H. 1981. Climate from 1000 BC to 1000 AD. In M. Jones and G. Dimbleby (eds.) *The Environment of Man: the Iron Age to the Anglo-Saxon Period*: 53-65. Oxford: British Archaeological Reports British Series 67.

Lamb, H. 1995. *Climate, History and the Modern World*. London: Routledge.

Lambrick, G. 1992. The development of late Prehistoric and Roman farming on the Thames gravels. In M. Fulford and E. Nichols (eds.) *Developing Landscapes of Lowland Britain. The Archaeology of the British Gravels: A Review*: 78-105. London: Society of Antiquaries.

Lambrick, G. 2010. *Neolithic to Saxon Social and Environmental Change at Mount Farm Berinsfield, Dorchester-on-Thames*. Oxford: Oxford Archaeology and English Heritage.

Lambrick, G. and Robinson, M. 1979. *Iron Age and Roman Riverside Settlements at Farmoor, Oxford*. London: Council for British Archaeology Research Report 32.

Lambrick, G. and Robinson, M. 1988. The development of flood plain grassland in the Upper Thames Valley. In M. Jones (ed.) *Archaeology and the Flora of the British Isles*: 55-75. Oxford: Oxford University Committee for Archaeology Monograph No. 14.

Lambrick, G. and Robinson, M. 2009. *The Thames Through Time: The Archaeology of the Gravel Terraces of the Upper and Middle Thames: The Thames Valley in Late Prehistory, 1500 BC-AD 50*. Oxford: Oxford University School of Archaeology.

LandIS, 2014. *NATMAP*. Available at: http://www.landis.org.uk/data/natmap.cfm [Accessed 18/07/2014].

Langdon, P.G., Barber, K.E. and Lomas-Clarke, S.H. 2004. Reconstructing climate and environmental change in northern England through chironomid and pollen analyses: evidence from Talkin Tarn, Cumbria. *Journal of Paleolimnology* 32: 197-213.

Lange, A. G. 1990. *De Horden Near Wijk bij Duurstede: Plant Remains From a Native Settlement at the Roman Frontier: a Numerical Approach*. Amersfoort: ROB.

Larsson, M. 2013. Cultivation and processing of Linum usitatissimum and Camelina sativa in southern Scandinavia during the Roman Iron Age. *Vegetation History and Archaeobotany* 22 (6): 509–520.

Latalowa, M. and Rączkowski, W. 1999. New data on Early Medieval Flax cultivation: an archaeobotanical record from Northern Poland. *Environmental Archaeology* 4: 33–40.

Laurence, R. 2001. The creation of geography: an interpretation of Roman Britain. In C. Adams and R. Laurence (eds.) *Travel and Geography in the Roman Empire*: 67-94. London: Routledge.

Leach, S., Eckardt, H., Chenery, C. and Lewis, M. 2010. A lady of York: migration, ethnicity and identity in Roman Britain. *Antiquity* 84: 131–145.

Lee, M.R. 2006. Solanaceae III: henbane, hags and Hawley Harvey Crippen. *The Journal of the Royal College of Physicians of Edinburgh* 36 (4): 366–373.

Lee, M.R. 2007. Solanaceae IV: Atropa belladonna, deadly nightshade. *Journal of the Royal College of Physicians of Edinburgh* 37: 77–84.

Letts, J. 1999. *Smoke Blackened Thatch: a Unique Source of Late Medieval Plant Remains from Southern England*. London: English Heritage.

Lewis, C.T. and Short, C. 1975. *A Latin Dictionary: Founded on Andrews' Edition of Freund's Latin Dictionary*. Oxford: Clarendon Press.

Livarda, A. 2008a*. Introduction and Dispersal of Exotic Food Plants into Europe During the Roman and Medieval Periods*. University of Leicester. Unpublished PhD thesis.

Livarda, A. 2008b. New temptations? Olive, cherry and mulberry in Roman and Medieval Europe. In S. Baker, M. Allen, S. Middle and K. Poole (eds.) *Food and Drink in Archaeology 1*: 73-83. Totnes: Prospect Books.

Livarda, A. 2013. Date, rituals and socio-cultural identity in the north-western Roman provinces. *Oxford Journal of Archaeology* 32 (1): 101–117.

Livarda, A. and Van der Veen, M. 2008. Social access and dispersal of condiments in North-West Europe from the Roman to the Medieval period. *Vegetation History and Archaeobotany* 17 (S1): S201–S209.

Lodge, E.C. 1907. Social and economic history. In P.H. Ditchfield (ed.) *The Victoria History of Berkshire Volume 2*: 167-234. London: Archibald Constable and Company Limited.

Lodwick, L. 2010. *Sifting Through Silchester: How "Roman" are the Late Iron Age Macroscopic Plant Remains?* University of Oxford. Unpublished MSt thesis.

Lodwick, L. 2014. Condiments before Claudius: new plant foods at the Late Iron Age oppidum at Silchester, UK. *Vegetation History and Archaeobotany* 23: 543-549.

Lyell, C. 1830. *Principles of Geology, : Being an Attempt to Explain the Former Changes of the Earth's Surface, by Reference to Causes Now in Operation*. London: John Murray.

Mabey, R. 1977. *Plants with a Purpose: a Guide to the Everyday Uses of Wild Plants*. London: Collins.

Macaulay-Lewis, E. 2006. The role of ollae perforatae in understanding horticulture, planting techniques, garden design, and plant trade in the Roman World. In J. Morel, J. Juan and J. Matamala (eds.) *The Archaeology of Crop Fields and Gardens: Proceedings of the 1st Conference on Crop Fields and Gardens Archaeology, University of Barcelona, Barcelona, Spain, 1-3 June 2006*: 207-220. Bari: EdiPuglia.

Macaulay-Lewis, E. 2011. The city in motion: walking for transport and leisure in the city of Rome. In R. Laurence and D. Newsome (eds.) *Rome, Ostia, Pompeii: Movement and Space*: 262-289. Oxford: Oxford University Press.

MacKinnon, M. 2010. Cattle "breed" variation and improvement in Roman Italy: connecting the zooarchaeological and ancient textual evidence. *World Archaeology* 42 (1): 55–73.

Maltby, M. 2010. Integrating social and environmental archaeologies: reconsidering deposition. In J. Morris and M. Maltby (eds.) *Zooarchaeology and the Interpretation of Depositions in Shafts*: 24-32. Oxford: British Archaeological Reports International Series 2077.

Manning, W.H. 1984. Objects of iron. In S. Frere Excavations at Dorchester on Thames, 1963. *Archaeological Journal* 141: 139-52.

Märkle, T. and Rösch, M. 2008. Experiments on the effects of carbonization on some cultivated plant seeds. *Vegetation History and Archaeobotany* 17 (S1): 257–263.

Martin, J. 2011. Prehistoric, Romano-British, and Anglo-Saxon activity at Whitelands Farm, Bicester. *Oxoniensia* 76: 173–240.

Mathers, S. and Smith, N. 2000. *Geology of the Reading District - a Brief Explanation of the Geological Map. Sheet Explanation of the British Geological Survey. 1:50,000 Sheet 268 Reading (England and Wales).* Nottingham: British Geological Survey.

Mattingly, D. 1996. First fruit? The olive in the Roman world. In G. Shipley and J. Salmon (eds.) *Human Landscapes in Classical Antiquity: Environment and Culture*: 213-253. London: Routledge.

Mattingly, D. 2007. *An Imperial Possession: Britain in the Roman Empire, 54 BC-AD 409*. London: Penguin.

Mattingly, D. and Salmon, J. 2000. The productive past. Economies beyond agriculture. In D. Mattingly and J. Salmon (eds.) *Economies Beyond Agriculture in the Classical World*: 3-14. London: Routledge.

Mattingly, D. and Sterry, M. 2013. The first towns in the central Sahara. *Antiquity* 87: 503–518.

Mauquoy, D., Yeloff, D., van Geel, B., Charman, D.J. and Blundell, A. 2008. Two decadally resolved records from north-west European peat bogs show rapid climate changes associated with solar variability during the mid-late Holocene. *Journal of Quaternary Science* 23: 745-763.

McCobb, L., Briggs, D., Evershed, R., Hall, A. and Hall, R. 2001. Preservation of fossil seeds from a 10th Century AD cess pit at Coppergate, York. *Journal of Archaeological Science* 28 (9): 929-940.

McDermott, F., Mattey, D. and Hawkesworth, C. 2001. Centennial-scale Holocene climate variability revealed by a high-resolution speleothem $\delta^{18}O$ record from SW Ireland. *Science* 294: 1328-1331.

McDonald, A.W. 2007. The effect of management on the biodiversity of a recreated floodplain meadow in the Upper Thames valley: a case study of Somerford Mead. *Fritillary* 5: 79–95.

McIntosh, R. 2005. *Ancient Middle Niger: Urbanism and the Self-Organizing Landscape.* Cambridge: Cambridge University Press.

McKinley, J.I. 2004. "Welcome to Pontibus ... gateway to the West." *Surrey Archaeological Collections* 91: 1–69.

Meadows, K.I. 2001. *The Social Context of Eating and Drinking at Native Settlements in Early Roman Britain*. University of Sheffield. Unpublished PhD thesis.

Merlin, M.D. 2003. Archaeological evidence for the tradition of psychoactive plant use in the old world. *Economic Botany* 57 (3): 295–323.

Met Office, 2012. *Southern England: Climate*. Available at: http://www.metoffice.gov.uk/climate/uk/so/ [Accessed 16/10/2012].

Miles, D. 1984. *Archaeology at Barton Court Farm, Abingdon, Oxon*. Oxford: Oxford Archaeological Unit and Council for British Archaeology.

Miles, D., Palmer, S., Lock, G., Gosden, C. and Cromarty, A.M. 2003. *Uffington White Horse and its Landscape: Investigations at White Horse Hill Uffington, 1989-95 and Tower Hill Ashbury, 1993-4*. Oxford: Oxford Archaeology Thames Valley Landscapes Monograph No. 18.

Miles, D., Palmer, S., Smith, A. and Edgeley Long, G. 2007. *Iron Age and Roman Settlement in the Upper Thames Valley: Excavations at Claydon Pike and Other Sites within the Cotswold Water Park:* 355-364. Oxford: Oxford University School of Archaeology.

Miller, T. 1987. Systematics and evolution. In F.G.H Lupton (ed.) *Wheat Breeding*. *Its scientific basis*: 1-30. London: Chapman and Hall.

Millett, M. 1990. *The Romanization of Britain: an Essay in Archaeological Interpretation*. Cambridge: Cambridge University Press.

Millett, M. 2001. Approaches to urban societies. In S. James and M. Millett (eds.) *Britons and Romans: Advancing an Archaeological Agenda*: 60-66. London: Council for British Archaeology Research Report 125.

Millett, M. and Graham, D. 1986. *Excavations on the Romano-British Small Town at Neatham, Hampshire 1969-1979*. England: Hampshire Field Club in co-operation with the Farnham and District Museum Society.

Minniti, C., Valenzuela-Lamas, S., Evans, J. and Albarella, U. 2014. Widening the market. Strontium isotope analysis on cattle teeth from Owslebury (Hampshire, UK) highlights changes in livestock supply between the Iron Age and the Roman period. *Journal of Archaeological Science* 42: 305–314.

Moffett, L. 1986. *Crops and Crop Processing in a Romano-British Village at Tiddington: the Evidence from the Charred Plant Remains*. London: English Heritage, Ancient Monument Laboratory Report New Series 15/86.

Moffett, L., Robinson, M. and Straker, V. 1989. Cereals, fruit and nuts: charred plant remains from Neolithic sites in England and Wales and the Neolithic economy. In N. Gardner, A. Milles and D. Williams (eds.) *The Beginnings of Agriculture*: 243-261. Oxford: British Archaeological Reports International Series 496.

Monk, M. 1978. *The Plant Economy and Agriculture of the Anglo-Saxon Periods in Southern Britain, with Particular Reference to the Mart Settlements at Southampton and Winchester*. University of Southampton. Unpublished MPhil thesis.

Monk, M. 1981. Cereal grains. In C. Partridge (ed.) *Skeleton Green. A Late Iron Age and Romano-British Site*: 204-205. London: Society for the Promotion of Roman Studies.

Moore, T. 2007. Perceiving communities: exchange, landscapes and social networks in the Later Iron Age of Western Britain. *Oxford Journal of Archaeology* 26 (1): 79–102.

Moore, T. 2011. Detribalizing the later prehistoric past: concepts of tribes in Iron Age and Roman studies. *Journal of Social Archaeology* 11 (3): 334–360.

Moore, T. 2012. Beyond the oppida: polyfocal complexes and Late Iron Age societies in southern Britain. *Oxford Journal of Archaeology* 31 (4): 391–417.

Moore, T. and Armada, X.L. 2011. Crossing the divide: opening a dialogue on approaches to western European first millennium BC studies. In T. Moore and X.L. Armada (eds.) *Atlantic Europe in the First Millennium BC: Crossing the Divide*: 3-77. Oxford: Oxford University Press.

Moore, T., Braun, A., Creighton, J., Cripps, L. Haupt, P., Klenner, I., Nouvel, P., Ponroy, C. and Schönfelder, M. 2013. Oppida, agglomerations, and suburbia: the Bibracte environs and new perspectives on Late Iron Age urbanism in central-eastern France. *European Journal of Archaeology* 16 (3): 491–517.

Morris, J. 2008. Associated bone groups; one archaeologist's rubbish is another's ritual deposition. In O. Davis, N. Sharples and K. Waddington (eds.) *Changing Perspectives on the First Millennium BC*: 83-98. Oxford: Oxbow.

Morrison, W.A. 2013. A fresh eye on familiar objects: rethinking toiletry sets in Roman Britain. *Oxford Journal of Archaeology* 32 (2): 221–230.

Müldner, G., Chenery, C. and Eckardt, H. 2011. The "Headless Romans": multi-isotope investigations of an unusual burial ground from Roman Britain. *Journal of Archaeological Science* 38 (2): 280–290.

Murphy, C., Thompson, G. and Fuller, D. 2013. Roman food refuse: urban archaeobotany in Pompeii, Regio VI, Insula 1. *Vegetation History and Archaeobotany* 22(5): 409–419.

Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa. 800 B.C. - 400 A.D.* University of Southampton. Unpublished MPhil thesis.

Murphy, P. 1986. Fruits and seeds from four Roman wells (Area B). In M. Millett and D. Graham (eds.) *Excavations on the Romano-British small town at Neatham, Hampshire 1969-1979*: 149-150. Hampshire Field Club in co-operation with the Farnham and District Museum Society.

Murphy, P. 1992a. Charred cereals and flax from Building 152. In P. Crummy (ed.) *Colchester Archaeological Report 6: Excavations at Culver Street, the Gilberd School, and Other Sites 1971-85*: 330-333. Colchester: Colchester Archaeological Trust.

Murphy, P. 1992b. Environmental Studies: Culver Street. In P. Crummy (ed.) *Colchester Archaeological Report 6: Excavations at Culver Street, the Gilberd School, and Other Sites 1971-85*: 273-287. Colchester: Colchester Archaeological Trust.

Murphy, P. and Fryer, V. 1999. Plant macrofossils. In R. Niblett (ed.) *The Excavation of a Ceremonial Site at Folly Lane, Verulamium*: 384-388. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 14.

Murphy, P. and Fryer, V. 2007. The plant macrofossils. In P. Crummy, S. Benfield, N. Crummy, V. Rigby and D. Shimmin (eds.) *Stanway: an Elite Burial Site at Camulodunum*: 384-387. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 24.

Murphy, P. and Scaife, R. 1991. The environmental archaeology of gardens. In A.E. Brown (ed.) *Garden Archaeology*: 83-99. London: Council for British Archaeology Research Report 78.

Natural England, 2012a. *NCA 129: Thames Basin Heaths Key Facts and Data*. Available at: http://www.naturalengland.org.uk/Images/129_Thames_Basin_Heaths_tcm6-32140.pdf [Accessed 22/08/2013].

Natural England, 2012b. *NCA Profile: 115 Thames Valley (NE379)*. Available at: http://publications.naturalengland.org.uk/publication/3865943?category=587130. [Accessed 14/05/2014].

Natural England, 2012c. *Ron Ward's Meadow with Tadley Pastures-Unit 1*. Available at: http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1007701. [Accessed 30/12/2012].

Natural England, 2014a. *National Character Areas - Defining England's Natural Boundaries*. Available at: http://www.naturalengland.org.uk/publications/nca/default.aspx [Accessed 14/05/2014].

Natural England, 2014b. *NCA Profile: 130. Hampshire Downs (NE549)*. Available at: http://publications.naturalengland.org.uk/publication/6738147345956864?category=587130 [Accessed 25/04/2014].

Natural England, 2014c. *National Character Area Profile: 129. Thames Basin Heaths*. Available at: http://publications.naturalengland.org.uk/publication/4685559624630272?category=587130 [Accessed 23/04/2014].

Natural England, 2014d. *NCA Profile: 108 Upper Thames Clay Vales (NE570)*. Available at: http://publications.naturalengland.org.uk/publication/5865554770395136?category=587130 [Accessed 25/4/2014].

Neef, R., Cappers, E. and Bekker, R. 2011. *Digital Atlas of Economic Plants in Archaeology*. Groningen: Barkhuis.

Nencini, P. 1997. The rules of drug taking: wine and poppy derivatives in the ancient world. VIII. Lack of evidence of opium addiction. *Substance Use & Misuse* 32 (1): 1581-1586.

NERC, 2014. *Geology of Britain Viewer*. Available at: http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html?src=topNav [Accessed 14/07/2014].

Nesbitt, M. 2006. *Identification Guide for Near Eastern Grass Seed*s. London: Institute of Archaeology, UCL.

Niblett, R. 1999. *The Excavation of a Ceremonial Site at Folly Lane, Verulamium*. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 14.

Nye, S. and Jones, M. 1987. The carbonised plant remains. In B. Cunliffe (ed.) *Hengistbury Head, Dorset. Volume 1: The Prehistoric and Roman Settlement 3500 BC-AD 500*: 323-328. Oxford: Oxford University Committee for Archaeology.

Obeid, M., Machin, D. and Harper, J. 1967. Influence of density on plant variation in fiber flax, Linum usitatissimum L. *Crop Science* 7 (5): 471–473.

Ordnance Survey, 2013a. *Boundary-Line.* Available at: http://www.ordnancesurvey.co.uk/business-and-government/products/boundary-line.html [Accessed September 3, 2013].

Ordnance Survey, 2013b. *Meridian 2*. Available at http://data.gov.uk/dataset/meridian-2 [Accessed September 3, 2013]

Ordnance Survey, 2013c. *Land-Form PANORAMA*. Available at http://www.ordnancesurvey.co.uk/business-and-government/products/land-form-panorama.html [Accessed September 3, 2013]

Palmer, C. and Van der Veen, M. 2002. Archaeobotany and the social context of food. Acta *Palaeobotanica* 42 (2): 195–202.

Pals, J.-P. and Hakbijl, T. 1992. Weed and insect infestation of a grain cargo in a ship at the Roman fort of Laurium in Woerden (Province of Zuid-Holland). *Review of Palaeobotany and Palynology* 73: 287-300.

Parker, A. and Robinson, M. 2003. Palaeoenvironmental investigations on the Middle Thames at Dorney, UK. In A.J. Howard, M. Macklin and D.G. Passmore (eds.) *Alluvial Archaeology in Europe*: 43-60. Rotterdam: Lisse.

Parks, K. 2013. *Iron Age and Roman Arable Practice in the East of England*. University of Leicester. Unpublished PhD thesis.

Parrington, M. 1978. *The Excavation of an Iron Age Settlement, Bronze Age Ring-Ditches and Roman Features at Ashville Trading Estate, Abingdon (Oxfordshire) 1974-6*. London: Oxford Archaeological Unit Report 1, CBA Research Report 28.

Pelling, R. 2005. Seeds and charcoals. In D. Manley and J. Rudkin. A pre-A.D. 43 ditch at Fishbourne Roman palace, Chichester. *Britannia* 36: 86.

Pelling, R. 2011. Charred plant remains. In K. Egging Dinwiddy and P. Bradley. *Prehistoric Activity and a Romano-British Settlement at Poundbury Farm, Dorchester, Dorset*: 142-158. Salisbury: Wessex Archaeology.

Pelling, R., 2012. Garamantian agriculture and its significance in a wider North African context: The evidence of the plant remains from the Fazzan project. *The Journal of North Africa* 10 (3-4): 397–412.

Perring, D. 2011. Two studies on Roman London: A. London's military origins B. Population decline and ritual landscapes in Antonine London. *Journal of Roman Archaeology* 24: 249–282.

Pilliner, S. 1992. *Horse Nutrition and Feeding*. Oxford: Blackwell Scientific.

Pitts, M. 2005. Pots and pits: drinking and deposition in Late Iron Age south-east Britain. *Oxford Journal of Archaeology* 24 (2): 143–161.

Pitts, M. 2008. Globalizing the local in Roman Britain: an anthropological approach to social change. *Journal of Anthropological Archaeology* 27 (4): 493-506.

Pitts, M. 2010. Re-thinking the southern British oppida: networks, kingdoms and material culture. *European Journal of Archaeology* 13 (1): 32–63.

Pitts, M. and Perring, D. 2006. The making of Britain's first urban landscapes: the case of Late Iron Age and Roman Essex. *Britannia* 37: 189-212.

Pliny (translated by Rackham, H. and Jones, W.H.S., 1963) *Natural History*. London: W. Heinemann.

Pollard, E.A. 2009. Pliny's Natural History and the Flavian Templum Pacis: botanical imperialism in first-century C.E. Rome. *Journal of World History* 20 (3): 309-338.

Pollmann, B. and Jacomet, S. 2012. First evidence of Mespilus germanica L. (medlar) in Roman Switzerland. *Vegetation History and Archaeobotany* 21 (1): 61-68.

Poulton, R. 2004. Iron Age Surrey. In J. Cotton, G. Crocker and A. Graham (eds.) *Aspects of Archaeology and History in Surrey: Towards a Research Framework for the County*: 51-64. Guildford: Surrey Archaeological Society.

Preston, C., Pearman, D. and Hall, A. 2004. Archaeophytes in Britain. *Botanical Journal of the Linnean Society* 145: 257-294.

Preston, S. 2011 *Archaeological Investigations in the Silchester Hinterland: Exploring Landscape Use Around the Roman Town*. Reading: Thames Valley Archaeological Services Monograph 9.

Qualmann, K.E., Rees, H., Scoobie, G.D. and Whinny, R. 2004. *Oram's Arbour: the Iron Age Enclosure at Winchester Volume 1: Investigations 1950-1999*. Winchester: Winchester Museums Service.

Ralph, S. 2007. *Feasting and Social Complexity in Later Iron Age East Anglia*. Oxford: British Archaeological Reports British Series 451.

Ramoutsaki, I.A, Askitopoulou, H. and Konsolaki, E. 2002. Pain relief and sedation in Roman Byzantine texts: Mandragoras officinarum, Hyoscyamus niger and Atropa belladonna. *International Congress Series 1242*: 43–50.

Rees, S. 1979. *Agricultural Implements in Prehistoric and Roman Britain*. Oxford: British Archaeological Reports 69.

Reid, C. 1899. *The Origin of the British Flora*. London: Dulau.

Reid, C. 1901. Notes on the plant remains of Roman Silchester. In G.E. Fox and W.H. St. John Hope. Excavations on the site of the Roman city at Silchester in 1900. *Archaeologia* 57 (2): 252-256.

Reid, C. 1902. The plant remains. In W.H. St. John Hope. Excavations on the site of the Roman city at Silchester in 1901. *Archaeologia* 58 (1): 34-36.

Reid, C. 1903. The plant remains. In W.H. St. John Hope. Excavations on the site of the Roman city at Silchester in 1902. *Archaeologia* 58 (2): 425-428.

Reid, C. 1905. The plant remains. In W.H. St. John Hope. Excavations on the site of the Roman city at Silchester in 1903 and 1904. *Archaeologia* 59 (2): 367-368.

Reid, C. 1906. The plant remains. In W.H. St. John Hope. Excavations on the site of the Roman city at Silchester in 1905. *Archaeologia* 60 (1): 164.

Reid, C. 1907. The plant remains. In W.H. St. John Hope. Excavations on the site of the Roman city at Silchester in 1906. *Archaeologia* 60 (2): 449.

Reid, C. 1908. The plant remains. In W.H. St. John Hope. Excavations on the site of the Roman city at Silchester in 1907. *Archaeologia* 61 (1): 210-213.

Reid, C. 1909. The plant remains. In W.H St. John Hope. Excavations on the site of the Roman city at Silchester in 1908. *Archaeologia* 61 (2): 485.

Reid, C. 1917. Plants, wild and cultivated. In A. Bulleid and H. St George Gray (eds.) *The Glastonbury Lake Village 2*: 625-630. Avon: The Glastonbury Antiquarian Society.

Reynolds, P.J. 1979. *Iron-Age Farm: the Butser Experiment*. London: British Museum Publications.

Reynolds, P. and Langley, J. 1979. The Romano-British corn-drying oven: an experiment. *Archaeological Journal* 136: 27–42.

Richards, D. 2000. The ironwork. In M. Fulford and J. Timby (eds.) *Late Iron Age and Roman Silchester. Excavations on the Site of the Forum-Basilica 1977, 1980-86*: 360-79. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 15.

Rippon, S., Smart, C., Pears, B. and Fleming, F. 2013. The fields of Britannia: continuity and discontinuity in the Pays and regions of Roman Britain. *Landscapes* 14 (1): 33–53.

Rivet, A. and Jackson, K. 1970. The British section of the Antonine Itinerary. *Britannia* 1: 34–82.

Roberts, M. R. 1995. Excavations at Park Farm, Binfield, 1990: an Iron Age and Romano-British settlement and two Mesolithic flint scatters. In I. Barnes, W.A. Boisnier, R.M.J. Cleal, A.P. Fitzpatrick and M.R. Roberts (eds.) *Early Settlement in Berkshire. Mesolithic-Roman Occupation in the Thames and Kennet Valleys*: 93–132. Salisbury: Trust for Wessex Archaeology.

Robinson, M. 1981. The Iron Age to Early Saxon environment of the Upper Thames terraces. In M. Jones and G. Dimbleby (eds.) *The Environment of Man: the Iron Age to the Anglo-Saxon Period*: 251-277. Oxford: British Archaeological Reports British Series 87.

Robinson, M. 1989. Seeds and other plant macrofossils. In P. Ashbee, M. Bell and E. Proudfoot, (eds.) *Wilsford Shaft: Excavations 1960-62*: 78-90. London: Historic Buildings and Monuments Commission for England.

Robinson, M. 1991. The Neolithic and Late Bronze Age insect assemblages. In S. Needham (ed.) *Excavation and Salvage at Runnymede Bridge 1978, The Late Bronze Age Waterfront Site*: 277-326. London: British Museum.

Robinson, M. 1992a. Environmental archaeology of the river gravels: past achievements and future directions. In M. Fulford and E. Nichols (eds.) *Developing Landscapes of Lowland Britain*: 47-62. London: Society of Antiquaries.

Robinson, M. 1992b. Insect assemblages. In C.A. Butterworth and S.J. Lobb (eds.) *Excavations in the Burghfield Area, Berkshire: Developments in the Bronze Age and Saxon Landscapes*: 143-149. Salisbury: Wessex Archaeology.

Robinson, M. 1992c. Insect remains from two Late Bronze Age waterlogged features. In J. Moore and D. Jennings (eds.) *Reading Business Park: a Bronze Age Landscape*: 112-116. Oxford: Oxford University Committee for Archaeology.

Robinson, M. 2002. Domestic burnt offerings and sacrifices at Roman and pre-Roman Pompeii, Italy. *Vegetation History and Archaeobotany* 11: 93–99.

Robinson, M. 2003. Saxon flax retting in river channels and the apparent lack of water pollution. In P. Murphy and P.E.J. Wiltshire (eds.) *The Environmental Archaeology of Industry. Symposia of the Association for Environmental Archaeology 20*: 141-142. Oxford: Oxbow Books.

Robinson, M. 2006. Macroscopic plant and invertebrate remains. In A.M. Cromarty, A. Barclay, G. Lambrick and M. Robinson (eds) *Late Bronze Age Ritual and Habitation on a Thames Eyot at Whitecross Farm, Wallingford: The Archaeology of the Wallingford Bypass, 1986-92*: 110-141. Oxford: Oxford University School of Archaeology.

Robinson, M. 2007a. The environmental archaeology of the Cotswold Water Park. In D. Miles, S. Palmer, A. Smith and G. Edgeley Long (eds.) *Iron Age and Roman Settlement in the Upper Thames Valley: Excavations at Claydon Pike and Other Sites within the Cotswold Water Park:* 355-364. Oxford: Oxford University School of Archaeology.

Robinson, M. 2007b. The paleoecology of alluvial hay meadows in the Upper Thames Valley. *Fritillary* 5: 47–57.

Robinson, M. 2011. The macroscopic plant and invertebrate remains. In M. Fulford and A. Clarke (eds.) *Silchester: City in Transition: the Mid-Roman Occupation of Insula IX c. A.D. 125-250/300: a Report on Excavations Undertaken Since 1997*: 281-293. London: Society for the Promotion of Roman Studies. Britannia monograph Series No. 25.

Robinson, M. 2012. The place of Silchester in archaeobotany. In M. Fulford (ed.) *Silchester and the Study of Romano-British Urbanism*: 213-225. Portsmouth: Journal of Roman Archaeology Supplementary Series Number 9.

Robinson, M. 2013a. *Insect Remains from the Late Iron Age/Early Roman Well 8328*, Silchester. Oxford University Museum of Natural History. Unpublished report.

Robinson, M. 2013b. The relative abundance of Onthophagus species in British assemblages of dung beetles as evidence for Holocene climate change*. Environmental Archaeology* 18 (2): 132-142.

Robinson, M., Fulford, N. and Tootell, K. 2006. Macroscopic plant remains. In M. Fulford, A. Clarke and H. Eckardt (eds.) *Life and Labour in Late Roman Silchester: Excavations in Insula IX since 1997*: 206-218. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 22.

Robinson, M. and Greig, J. 2010. Food procurement and farming. In G. Lambrick (ed.) *Neolithic to Saxon Social and Environmental Change at Mount Farm Berinsfield, Dorchester-on-Thames*: 13-24. Oxford: Oxford Archaeology and English Heritage. Appendix 1.

Robinson, M. and Straker, V. 1991. Silica skeletons and macroscopic plant remains from ash. In J. Renfrew (ed.) *New Light on Early Farming: Recent Developments in Palaeoethnobotany*: 3-13. Edinburgh: Edinburgh University Press.

Rodwell, J. 1993. *British Plant Communities Volume 3: Grassland and Montane Communities*. Cambridge: Cambridge University Press.

Rodwell, J. 2000. *British Plant Communities Volume 5: Maritime Communities and Vegetation of Open Habitats*. Cambridge: Cambridge University Press.

Rodwell, J. 2006. *National Vegetation Classifications: Users' Handbook*. Peterborough: Joint Nature Conservation Committee.

Rogers, A. 2008. Religious place and its interaction with urbanization in the Roman era. *Journal of Social Archaeology* 8 (1): 37-62.

Roskams, S. 1999. The hinterlands of Roman York: present patterns and future strategies. In H. Hurst (ed.) *The Coloniae of Roman Britain: New Studies and a Review*: 45-72. Portsmouth, Rhode Island: Journal of Roman Archaeology Supplementary Series 36.

Roskams, S., Neal, C., Richardson, J. and Leary, R. 2013. A Late Roman well at Heslington East, York: ritual or routine practices? *Internet Archaeology* 34. doi.org/10.11141/ia.34.5.

Rymer, L. 1976. The history and ethnobotany of bracken. *Botanical Journal of the Linnean Society* 73: 151–176.

Rymer, L. 1979. Ethnobotany and native distribution of Gorse (Ulex europaeus L.) in Britain. *Environmental conservation* 6 (3): 211–213.

Salisbury, E. 1961. *Weeds and Aliens*. London: Collins.

Sauer, E. 2000. Alchester, a Claudian "Vexillation fortress" near the western boundary of the Catuvellauni: new light on the Roman invasion of Britain. *Archaeological Journal* 157: 1–78.

Sauer, E. 2002. The Roman invasion of Britain (AD 43) in imperial perspective: a response to Frere and Fulford*. Oxford Journal of Archaeology* 21 (4): 333–363.

Sealey, P.R. and Tyers, P.A. 1989. Olives from Roman Spain: a unique amphora find in British waters. *Antiquaries Journal* 69: 53–72.

Shaffrey, R. 2003. The rotary querns from the Society of Antiquaries' excavations at Silchester, 1890-1909. *Britannia* 34: 143–174.

Sharples, N. 2010. *Social Relations in Later Prehistory: Wessex in the First Millennium BC*. Oxford: Oxford University Press.

Sharples, N. 2011. Boundaries, status and conflict: an exploration of Iron Age research in the twentieth century. In T. Moore and X.L. Armada (eds.) *Atlantic Europe in the First Millennium BC: Crossing the Divide*: 668-681. Oxford: Oxford University Press.

Sheddon, K. 1980. Pollen analysis. In G. Astill. Excavations at Grim's Bank, Aldermaston, 1978. *Berkshire Archaeological Journal* 80: 57–65.

Shillito, L.-M. 2011. Grains of truth or transparent blindfolds? A review of current debates in archaeological phytolith analysis. *Vegetation History and Archaeobotany* 22 (1): 71–82.

Sidell, J. 2008. Londinium's landscape. In J. Clark and H. Sheldon *Londinium and Beyond: Essays on Roman London and its Hinterland for Harvey Sheldon*: 62-68. York: Council for British Archaeology Research Report 156.

Sigaut, F. 1988. A method for identifying grain storage techniques and its application for European agricultural history. *Tools and Tillage* 6 (1): 3–32.

Smith, A. 2001. *The Differential Use of Constructed Sacred Space in Southern Britain, from the Late Iron Age to the 4th Century AD*. Oxford: British Archaeological Reports British Series 318.

Smith, D. 2013. Defining an indicator package to allow identification of "cesspits" in the archaeological record. *Journal of Archaeological Science* 40 (1): 526–543.

Smith, D. and Davis, A. 2011. Cereal processing and the pests of stored products. In J. Hill and P. Rowsome (eds.) *Roman London and the Walbrook Stream Crossing: Excavations at 1 Poultry and Vicinity, City of London Part 2*: 353-354. London: Museum of London Archaeology Monograph 37.

Smith, D. and Kenward, H. 2011. Roman grain pests in Britain: implications for grain supply and agricultural production. *Britannia* 42: 243–262.

Smith, D. and Kenward, H. 2012. "Well, Sextus, what can we do with this?" The disposal and use of insect-infested grain in Roman Britain. *Environmental Archaeology* 17 (2): 141–150.

Smith, H., Marshall, P. and Parker Pearson, M. 2001. Reconstructing house activity areas. In U. Albarella (ed.) *Environmental Archaeology: Meaning and Purpose*: 249-270. Kluwer: Dordrecht.

Smith, W. 1999. Criteria to distinguish capsule fragments of Flax/Linseed (Linum usitatissimum L.) from Wild Radish (Raphanus raphanistrum L.). *Environmental Archaeology* 4: 19–24.

Spray, M. 1981. Holly as a fodder in England. *The Agricultural History Review* 29(2): 97-110.

Stace, C. 1997. *New Flora of the British Isles* 2nd edition. Cambridge: Cambridge University Press.

Stace, C. 2010. *New Flora of the British Isles* 3rd edition. Cambridge: Cambridge University Press.

Stevens, C. 1996. *Iron Age and Roman Agriculture in the Upper Thames Valley: Archaeobotanical and Social Perspectives.* University of Cambridge. Unpublished DPhil thesis.

Stevens, C. 2003. An investigation of agricultural consumption and production models for prehistoric and Roman Britain. *Environmental Archaeology* 8: 61–76.

Stevens, C. 2006. The Charred Plant Remains from Saltwood Tunnel, Kent CTRL. Specialist Report Series. London and Continental Railways.

Stevens, C. 2011. Charred plant remains from Springhead. In C. Barnett, J. McKilney, E. Stafford, J. Grimm and C. Stevens (eds.) *Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. The Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 3: Late Iron Age to Roman Human Remains and Environmental Reports*: 95-105. Oxford: Oxford Wessex Archaeology.

Stevens, C., Grimm, J. and Worley, F. 2011. Agriculture, food and drink. In P. Andrews, R. Biddulph, A. Hardy and R. Brown (eds.) *Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. The Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 1: The Sites*: 236-243. Oxford: Oxford Wessex Archaeology.

Stika, H.-P. 2011. Early Iron Age and Late Medieval malt finds from Germany - attempts at reconstruction of early Celtic brewing and the taste of Celtic beer. *Archaeological and Anthropological Sciences* 3: 41–48.

Strabo (translated by Jones, H.L., 1949), *Geography*. London: William Heinmann Ltd.

Straker, V. 1984. First and second century carbonised grain from Roman London. In W. Van Zeist and W. Casparie (eds.) *Plants and Ancient Man: Studies in Palaeoethnobotany*: 323-329. Rotterdam: A. A. Balkema.

Straker, V. 2000. Charcoal. In M. Fulford and J. Timby (eds.) *Late Iron Age and Roman Silchester: Excavations on the Site of the Forum Basilica, 1977, 1980-86*: 512-522. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 15.

Streeter, D. 2009. *Collins Flower Guide*. London: HarperCollins Publishers.

Stuart, R. 1995. *Hay Making and Meadow Management, 1580-1660*. Bristol: Stuart Press.

Suetonius (translated by Graves, R. and Grant, M. 2003), *The Twelve Caesars*. London: Penguin.

Tadley and District History Society, 2013. *Memories*. Available at: http://www.tadshistory.com/memories.html [Accessed October 10, 2013].

Taylor, J. 2007. *An Atlas of Roman Rural Settlement in England. York*: Council for British Archaeology.

Taylor, J. 2012. The idea of the villa. Reassessing villa development in south-east Britain. In N. Roymans and T. Derks (eds.) *Villa Landscapes in the Roman North: Economy, Culture and Lifestyles*: 179-194. Amsterdam: Amsterdam University Press.

Taylor, J. 2013a. Encountering Romanitas: characterising the role of agricultural communities in Roman Britain. *Britannia* 44: 171–190.

Taylor, J. 2013b. Roman urbanism: a view from the countryside. *Oxford Journal of Archaeology* 32 (4): 413–432.

Taylor, J., Gray, L., Poole, I., Lyne, M., Yeomans, L., Brown, J., Bishop, B., Major, H. and Hayward, K. 2011. Crop processing and burnt grain in Roman Croydon. *Surrey Archaeological Collections* 96: 191–214.

Ter Braak, C.J.F. and Ŝmilauer, P. 2002. *CANOCO Reference Manual and CanoDraw for Windows User's Guide.* Wageningen: Biometris.

Tereso, J., Ramil-Rego, P., De Carvalho, T.P., Almeida-da-Solva, R. and Costa Vaz, F. 2013. Crops and fodder: evidence for storage and processing activities in a functional area at the Roman settlement of Monte Mozinho (northern Portugal). *Vegetation History and Archaeobotany* 22 (6): 479–492.

Thomas, J. 1990. Silent running: the ills of environmental archaeology. *Scottish Archaeological Review* 7: 2–7.

Thomson, J. 1924. *A Great Free City: the Book of Silchester; the Dramatic Complemental History of the Remarkable Atrebatian Stronghold which Became the Imperial Municipality Called Calleva Atrebatum, the Third Free City of the Romano-Britannic Province, More Commonly Known as the Ruins of Silchester*. London: Simpkin, Marshall, Hamilton, Kent and co.

Thurmond, D. 2006. *A Handbook of Food Processing in Classical Rome: for her Bounty no Winter*. Leiden: Brill.

Thurston, T. 2009. Unity and diversity in the European Iron Age: out of the mists, some clarity? *Journal of Archaeological Research* 17 (4): 347-423.

Timby, J. 2012. The language of pots: an overview of pottery supply to Silchester and its hinterland. In M. Fulford (ed.) *Silchester and the Study of Romano-British Urbanism*: 127-150. Portsmouth, Rhode Island: Journal of Roman Archaeology Supplementary Series, 90.

Timby, J., Stansbie, D., Norton, A. and Walsh, K. 2005. Excavations along the Newbury reinforcement pipeline: Iron Age-Roman activity and a Neolithic pit group. *Oxoniensia* 70: 203-307.

Tomlinson, P. and Hall, A. 1996. A review of the archaeological evidence for food plants from the British Isles: an example of the use of the Archaeobotanical Computer Database (ABCD). *Internet Archaeology* 1. doi:10.11141/ia.1.5.

Totelin, L. 2010. A recipe for a headache: translating and interpreting ancient Greek and Roman remedies. In A. Imhausen and T. Pommerening (eds.) *Writings of Early Scholars in the Ancient Near East, Egypt and Greece: Zur Übersetzbarkeit von Wissenschaftssprachen des Altertums*: 219-237. Berlin: De Gruyter.

Twiss, K. 2007. *The Archaeology of Food and Identity*. Carbondale: Southern Illinois University Carbondale Occasional Paper No. 34.

Tyers, P. 1996. *Roman Pottery in Britain*. London: B T Batsford Ltd.

University of York. 2008. *Environmental archaeology bibliography (EAB)* [data-set]. York: Archaeology Data Service [distributor] (doi:10.5284/1000225)

Valamoti, S.M. 2011. Flax in Neolithic and Bronze Age Greece: archaeobotanical evidence. *Vegetation History and Archaeobotany* 20 (6): 549–560.

Van de Noort, R., Chapman, H.C. and Collis, J.R. 2007. *Sutton Common: the Excavation of an Iron Age "Marsh Fort*,". York: Council for British Archaeology Research Report 154.

Van der Veen, M. 1988. Carbonised grain from a Roman granary at South Shields, North-East England. In H. Küster (ed.) *Der Prähistorische Mensch und seine Umwelt. Fetschrift für Udelgard Körber Grohne zum 65. Geburtstag*: 353-365. Stuttgart: Konrad Theiss Verlag.

Van der Veen, M. 1989. Charred grain assemblages from Roman-period corn driers in Britain. *Archaeological Journal* 146: 302-19.

Van der Veen, M. 1992. *Crop Husbandry Regimes: an Archaeobotanical Study of Farming in Northern England 1000 BC - AD 500*. Sheffield: J. R. Collis Publications.

Van der Veen, M. 1995. The identification of maslin crops. In H. Kroll and R. Pasternak (eds.) *Res Archaeobotanicae. International Workgroup for Palaeoethnobotany: Proceedings of the Nineth Symposium Kiel 1992*: 335-343. Kiel: Oetker – Voges – Verlag.

Van der Veen, M. 1996. The plant macrofossils from Dragonby. In J. May (ed.) *Dragonby, Report on the Excavations at an Iron Age and Romano-British Settlement in North Lincolnshire*: 173-214. Oxford: Oxbow Books.

Van der Veen, M. 2003. When is food a luxury? *World Archaeology* 34 (3): 405–427.

Van der Veen, M. 2007a. Food as an instrument of social change: feasting in Iron Age and Early Roman southern Britain. In K. Twiss (ed.) *The Archaeology of Food and Identity*: 112-129. Carbondale: Southern Illinois University Carbondale Occasional Paper No. 34.

Van der Veen, M. 2007b. Formation processes of desiccated and carbonized plant remains - the identification of routine practice. *Journal of Archaeological Science* 34 (6): 968–990.

Van der Veen, M. 2008. Food as embodied material culture: diversity and change in plant food consumption in Roman Britain. *Journal of Roman Archaeology* 21: 83–109.

Van der Veen, M. 2010. Agricultural innovation: invention and adoption or change and adaptation? *World Archaeology* 42 (1): 1–12.

Van der Veen, M. forthcoming. The arable economy. In C. Haselgrove (ed.) *Stanwick*.

Van der Veen, M. and Fieller, N. 1982. Sampling seeds. *Journal of Archaeological Science* 9 (3): 287–298.

Van der Veen, M., Hill, A. and Livarda, A. 2013. The archaeobotany of Medieval Britain (c AD 450–1500): identifying research priorities for the 21st century. *Medieval Archaeology* 57: 151–182.

Van der Veen, M. and Jones, G. 2006. A re-analysis of agricultural production and consumption: implications for understanding the British Iron Age. *Vegetation History and Archaeobotany* 15 (3): 217–228.

Van der Veen, M. and Jones, G. 2007. The production and consumption of cereals: a question of scale. In C. Haselgrove and T. Moore (eds.) *The Later Iron Age in Britain and Beyond*: 419-429. Oxford: Oxbow Books.

Van der Veen, M., Livarda, A. and Hill, A. 2008. New plant foods in Roman Britain - dispersal and social access. *Environmental Archaeology* 13 (1): 11–36.

Van der Veen, M., Livarda, A. and Hill, A. 2007. The archaeobotany of Roman Britain: current state and identification of research priorities. *Britannia* 38: 181–210.

Van der Veen, M. and O'Connor, T.P. 1998. The expansion of agricultural production in Late Iron Age and Roman Britain. In J. Bayley (ed.) *Science in Archaeology: an Agenda for the Future*: 127-143. London: English Heritage Occasional Paper 1.

Van der Veen, M. and Palmer, C. 1997. Environmental factors and the yield potential of ancient wheats. *Journal of Archaeological Science* 24: 163–82.

Vandorpe, P. and Jacomet, S. 2011. Remains of burnt vegetable offerings in the temple area of Roman Oedenburg (Biesheim-Kunheim, Haut-Rhin, Alsace). First results. In J. Wiethold (ed.) *Carpologia: Articles Réunis à la Mémoire de Karen Lundström-Baudais: Actes des Rencontres d'Archéobotanique, Organisées par Bibracte, Centre Archéologique Européen et le Centre de Recherches Archéologiques de la Vallée de l'Oise, 9-12 juin 2005, Glux-en-Glenne*: 87-100. Glux-en-Glenne: Bibracte 20.

Vaughan, J., Geissler, B., Nicholson, B., Dowle, E. and Rice, E. 2009. *The New Oxford Book of Food Plants*. Oxford: Oxford University Press.

Veal, R. 2012. Examining continuity in landscape exploitation: Late Roman fuel consumption in Silchester's Insula IX. In M. Fulford (ed.) *Silchester and the Study of Romano-British Urbanism*: 227-245. Portsmouth: Journal of Roman Archaeology Supplementary Series Number 90.

Van Haasteren, M. and Groot, M. 2013. The biography of wells: a functional and ritual life history. *Journal of Archaeology in the Low Countries* 4 (2): 25–51.

Van Scheepen, A. 1989. The evidence of pollen for the environment of the Amphitheatre. In M. Fulford (ed.) *The Silchester Amphitheatre: Excavations of 1979-85*: 147-159. London: Society for Antiquaries. Britannia Monograph Series No. 10.

Vetter, J. 2004. Poison hemlock (Conium maculatum L.). *Food and chemical toxicology: an international journal published for the British Industrial Biological Research Association* 42 (9): 1373-82.

Vines, T.H, Albert, A., Andrew, R., Débarre, F., Bock, D.G., Franklin, M.T., Gilbert, K.J., Moore, J-S., Renaut, S. and Rennison, D.J. 2014. The availability of research data decline rapidly with article age. *Current Biology* 24: 94-97.

Wacher, J. 1974. *The Towns of Roman Britain*. London: Book Club Associates.

Waddington, K. 2012. (Re)cycles of life in Late Bronze Age southern Britain. In R. Jones (ed.) *Manure Matters: Historical, Archaeological and Ethnographic Perspectives*: 41-59. Farnham: Ashgate Publishing Limited.

Wallace, M. and Charles, M. 2013. What goes in does not always come out: the impact of the ruminant digestive system of sheep on plant material, and its importance for the interpretation of dung-derived archaeobotanical assemblages. *Environmental Archaeology* 18 (1): 18–30.

Weber, M. 1958. *The City translated by D. Martindale and G. Neuwirth*. New York: Free Press.

Wendling, H. 2013. Manching reconsidered: new perspectives on settlement dynamics and urbanization in Iron Age central Europe. *European Journal of Archaeology* 16 (3): 459–490.

Wheeler, A. 1981. Fish bones. In C. Partridge (ed.) *Skeleton Green. A Late Iron Age and Romano-British Site*. London: Society for the Promotion of Roman Studies: 242-243. Britannia Monograph Series No. 2.

Wheeler, M. 1954. *The Stanwick Fortifications, North Riding of Yorkshire*. London: Society of Antiquaries London Research Report 17.

Whittaker, C. 1990. The consumer city revisited: the vicus and the city. *Journal of Roman Archaeology* 3: 110–118.

Whitwell, J. 1976. *The Church Street Sewer and an Adjacent Building*. London: Council for British Archaeology.

Wiethold, J. 1996. Late Celtic and Early Roman plant remains from the oppidum of Bibracte, Mont Beuvray (Burgundy, France). *Vegetation History and Archaeobotany* 5: 105–116.

Wiethold, J. 2003. How to trace the Romanisation of central Gaul by archaeobotanical analysis? - some considerations on new archaeobotanical results from France centre-est. In F. Favory and A. Vignot (eds.) *Actualité de la Recherche en Histoire et Archéologie Agraires, Actes du Colloque International AGER V, Septembre 2000. Annales Littéraires, 764. Série "Environnement, Sociétés et Archéologie."*: 269-282. Besançon: Presses Universitaires Franc-Comtoises.

Wiethold, J. 2012. Hirse, hanf und hohldotter – pflanzenfunde aus einem römischen brunnen in Otterbach, Kr. Kaiserslautern. In A. Stobbe and U. Tegtmeier (eds.) *Verzweigungen. Eine Würdigung für A. J. Kalis und J. Meurers-Balke*: 311-323. Frankfurt a. M./Köln: Frankfurter Archäologische Schriften 18.

Wild, J.P. 2002. The textile industries of Roman Britain. *Britannia* 33: 1-42.

Wilkinson, K. and Stevens, C. 2008. *Environmental Archaeology: Approaches, Techniques and Application*s. Stroud: Tempus Publishing Ltd.

Willcox, G. 1977. Exotic plants from Roman waterlogged sites in London. *Journal of Archaeological Science* 4 (3): 269–282.

Williams, D. 1973. Flotation at Siraf. *Antiquity* 47: 288–292.

Williams, D. 1977. A consideration of the sub-fossil remains of "Vitis vinifera" L. as evidence for viticulture in Roman Britain. *Britannia* 8: 327–334.

Williams, D. 1979. The plant remains. In H.K. Kenward and D. Williams (eds.) *Biological Evidence from the Roman Warehouses in Coney Street*: 52-62. York: Council for British Archaeology.

Williams, D. and Peacock, D. 2011. Pompeian style mills in Britain. In D. Williams and D. Peacock (eds.) *Bread for the People: the Archaeology of Mills and Milling. Proceedings of a Colloquium Held in the British School at Rome 4th-7th November 2009*: 117-122. Oxford: British Archaeological Reports International Series 2274.

Williams, M. 2003. Growing metaphors: the agricultural cycle as metaphor in the later prehistoric period of Britain and north-western Europe. *Journal of Social Archaeology* 3 (2): 223–255.

Williams, R. and Zeepvat, R. 1994. *Bancroft: a Late Bronze Age/Iron Age Settlement, Roman Villa and Temple Complex*. Aylesbury: Buckinghamshire Archaeological Society.

Williamson, T. 2003. *Shaping Medieval Landscapes: Settlement, Society, Environment*. Macclesfield: Windgather Press.

Willis, S. 2002. A date with the past: Late Bronze and Iron Age pottery and chronology. In A. Woodward and J. D. Hill (eds.) *Prehistoric Britain: the Ceramic Basis*: 4-21. Oxford: Oxbow Books.

Wilson, A. 2011. City sizes and urbanization in the Roman Empire. In A. Bowman and A. Wilson (eds.) *Population, Settlement, and the Roman Economy*: 161-195. Oxford: Oxford University Press.

Wilson, A. 2002. Urban production in the Roman world: the view from North Africa. *Papers of the British School at Rome* 70: 231–273.

Wilson, A. 2009. Villas, horticulture and irrigation infrastructure in the Tiber Valley. In F. Coarelli and H. Patterson (eds.) *Mercator Placidissimus: the Tiber Valley in Antiquity: New Research in the Upper and Middle River Valley*: 731-768. Rome: Quasar.

Wilson, D. 1979. Horse dung from Roman Lancaster, a botanical report. *Archaeo-Physika* 8: 331–349.

Wilson, D. 1984. The carbonisation of weed seeds and their representation in macrofossil assemblages. In W. Van Zeist and W. Casparie (eds.) *Plants and Ancient Man: Studies in Palaeoethnobotany*: 201-206. Rotterdam: A. A. Balkema.

Wilson, T. 2008. *A Narrow View Across the Upper Thames Valley in Late Prehistoric and Roman Times: Archaeological Excavations Along the Chalgrove to East Ilseley Gas Pipeline*. Oxford: British Archaeological Reports British Series 467.

Wiltshire, P. 2007. The palynological analysis of the palaeoturf forming the collapsed mound in the chamber CF42. In P. Crummy, S. Benfield, N. Crummy, V. Rigby and D. Shimmin. (eds.) *Stanway: An Elite Burial Site at Camulodunum*: 398-399*. London: Society for the Promotion of Roman Studies*. Britannia Monograph Series No. 24.

Wiltshire, P. and Murphy, P. 1998. An analysis of plant microfossils and macrofossils from waterlogged deposits at Slough House and Chigborough Farms. In S. Wallis and M. Waughman (eds.) *Archaeology and Landscape in the Lower Blackwater Valley*: 172-196. Gressehall: East Anglian Archaeology Report 82.

Winton, H. 2003. Possible Iron Age "banjo" enclosures on the Lambourn Downs. *Oxoniensia* 68: 15–26.

Witcher, R. 2013. On Rome's ecological contribution to British flora and fauna: landscape, legacy and identity. *Landscape History* 34 (2): 5–26.

Wooders, J. and Keith-Lucas, M. 2000. Iron Age pollen. In M. Fulford and J. Timby (eds.) *Late Iron Age and Roman Silchester: Excavations on the Site of the Forum-Basilica 1977, 1980-86*: 523-533. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 15.

Woodward, P. and Woodward, A. 2004. Dedicating the town: urban foundation deposits in Roman Britain. *World Archaeology* 36 (1): 68–86.

Woolf, G. 1993. Rethinking the oppida. *Oxford Journal of Archaeology* 12 (2): 223–234.

Wright, J., Powell, A. and Barclay, A. 2009. *Excavation of Prehistoric and Romano-British Sites at Marnel Park and Merton Rise (Popley) Basingstoke, 2004-8*. Salisbury: Wessex Archaeology.

Yoffee, N. 2005. *Myths of the Archaic State: Evolution of the Earliest Cities, States and Civilizations*. Cambridge: Cambridge University Press.

Young, A. 1969. *General View of the Agriculture of Oxfordshire (1813)*. Newton Abbot: David and Charles Reprints.

Zach, B. 2002. Vegetable offerings on the Roman sacrificial site in Mainz, Germany - short report on the first results. *Vegetation History and Archaeobotany* 11: 101–106.

Zohary, D., Hopf, M. and Weiss, E. 2012. *Domestication of Plants in the Old World: the Origin and Spread of Domesticated Plants in South-West Asia, Europe, and the Mediterranean Basin*. Oxford: Oxford University Press.

Chapter 3 Tables

Table 3.1 Chronological phasing of Insula IX, Silchester

Period	Phase	Date
0	Late Iron Age	c. 40BC – c. AD44
1	Early Roman 1	c. AD44 – AD70/80
2	Early Roman 2	AD70/80 – AD125/150
3	Mid Roman 1	AD125/150 – c. AD200
4	Mid Roman 2	c. AD200 – AD250/300
5	Late Roman	AD250/300 – AD500/700

Chapter 4 Tables

Table 4.1 Sieve and mesh size used for flotation at Insula IX

Period	Excavation years	Charred		Mineralised		Waterlogged	
		Flot sieve/ mm	Residue mesh/ mm	Flot sieve/ mm	Residue mesh/ mm	Flot sieve/ mm	Residue mesh/ mm
Late Roman	1997-2001	0.25	2	0.5	2	0.1	2
Period 3/4	1999-2008	0.25	2	0.25	0.25	0.25	2
Period 1/2	2004-2013	0.5	2	0.25	0.5	0.25	2
Period 0	2010-2012	0.5	2	0.25	0.5	0.25	2

Table 4.2 Summary of the medicinal uses of selected plants

Plant	Common Name	Description of classical use	Description of post-Roman use	Parts used	Key References
Atropa belladonna	Deadly nightshade	Antispasmodic, Bacchanalian rituals, poison, sedative	Antispasmodic, diuretic, eye dilation, narcotic, sedative	Flowers, leaves, roots	Grieve 1992 Lee 2007 Pliny NH 21.177-182 Ramoutsaki et al. 2002
Chelidonium majus	Greater celandine		Used to cure warts and corns	Juice	Salisbury 1961
Conium maculatum	Hemlock	Caustic, erodent	Antispasmodic, herpes, sedative, tumours	Seeds, vegetative parts	Celsus 5.6 Grieve 1992 Vetter 2004
Hyoscyamus niger	Henbane	Anaesthetic, headaches, pain relief	Sleep, toothache	Leaves, seeds	Celsus 3:18, 3:27 Dioscorides 1.42 Galen 12.557 Grieve 1992 Lee 2006 Pliny NH 25.104
Hypericum perforatum	St John's-worts	Hip ailments, sickness	Pulmonary and urinary problems, depression, anxiety	Flowers, leaves, seeds	Dioscorides 4.68 Grieve 1992
Malva sylvestris	Common mallow	Bee stings, enema, poisoning	Infusions, poultices, urinary problems	Flowers, leaves, roots, stems	Barros et al. 2010 Celsus 2.12 Dioscorides 2.118 Grieve 1992
Papaver somniferum	Opium poppy	Anaesthetic, eye treatments, inflammations	Antispasmodic, hypnotic, sedative	Flowers, latex from capsule, leaves	Celsus 3.18 Dioscorides IV.64 Grieve 1992 Jackson 1990 Nencini 1997

Plant	Common Name	Description of classical use	Description of post-Roman use	Parts used	Key References
Plantago lanceolata	Ribwort plantain	Colic, diarrhoea, poultices, toothache	Bleeding, fevers	Leaves, roots, seeds	Dioscorides 2.126 Grieve 1992
Solanum nigrum	Black nightshade	Herpes, skin diseases	-	-	Grieve 1992

Table 4.3 Habitat groups used to classify waterlogged plant remains

Habitat Group		Description
C	Cultivated	Cultivated cereals, oil crops, introduced plant foods
D	Disturbed	Perennials of permanent waste ground communities
D(a)	Disturbed (arable)	Annuals of nitrogen rich ground, also arable weeds
G	Grassland	Marshy grassland, meadows, pastures, short grassland
H	Heathland	Lowland heathland
Wet	Wetland	Aquatic plants, bankside plants of seasonally inundated conditions
W	Woodland	Dry and wet woodland, scrub

Table 4.4 Taxa reallocation for the Insula IX waterlogged dataset

Family	Name	CANOCO code	Family	Name	CANOCO code
	Cultivated				
API	*Apium graveolens*	APIUGRA	API	*Coriandrum sativum*	CORISAT
	Disturbed				
LAM	*Ballota nigra*	BALLNIG	URT	*Urtica dioica*	URTIDIO
	Disturbed (arable)				
ROS	*Aphanes arvensis*	APAHARV	ROS	*Aphanes australis*	APHAUS
CHE	*Atriplex* sp.	ATRISP	POA	*Bromus secalinus*	BROMSEC
BRA	*Capsella bursa-pastoris*	CAPSBUR	CHE	*Chenopodium album*	CHENALB
POL	*Polygonum aviculare*	POLYAVI	RAN	*Ranunculus sardous*	RANUSAR
SOL	*Solanum nigrum*	SOLANIG	AST	*Sonchus asper*	SONCASP
CAR	*Stellaria media*	STELMED	UR	*Urtica urens*	URTIURE
	Grassland				
ROS	*Filipendula ulmaria*	FILIULM	ROS	*Potentilla erecta*	POTEERE
LAM	*Prunella vulgaris*	PRUNVUL	RAN	*Ranunculus acris*	RANUACR
RAN	*Ranunculus repens*	RANUREP			
	Wetland				
CYP	*Carex* sp.	CARESP	CYP	*Eleocharis palustris*	ELEOPAL
LAM	*Mentha aquatica*	MENTAQU	RAN	*Ranunculus flammula*	RANUFLA
	Woodland				
BET	*Corylus avellana*	CORYAVE	ROS	*Rubus* sect. *Glandulosus*	RUBUFRU
	Various				
API	Apiaceae indet.	APICIND	CHE	Chenopodiaceae indet.	CHENOPO
RAN	*Ranunculus parviflorus*	RANUPAR	RAN	*R.* subg. *Ranunculus*	RANURAN
POL	*Rumex acetosella*	RUMEACE	POL	*Rumex* sp.	RUMESP
CAP	*Sambucus nigra*	SAMBNIG			

Table 4.5 Classification of well deposit types

Deposit type	Origins	Stratigraphic description	Bulk finds	Key references
Primary fill	Sediment accumulated during well use	Base of well shaft, homogeneous sediment, consistent with upper well shaft	Few archaeological inclusions, objects for drawing water, ladders, lost personal items	Greig 1988 Van Haasteren & Groot 2013
Gradual accumulation	Post abandonment accumulation	Lenses of silty material, horizontal context boundaries	Objects for drawing water, ladders, lost personal items, settlement waste; pottery, animal bones, charcoal	Greig 1988 Van Haasteren & Groot 2013
Non-organic dump	Dumps of non-organic material	Deep contexts with sloping boundaries, heterogeneous material	Settlement waste; pottery, animal bones, charcoal, stone, building material	Kenward et al 1986: 259 Robinson 2011: 281
Organic dump	Dumps of organic material	Deep contexts with sloping boundaries, peaty material, visible plant remains	Wood, charcoal, animal bones	Kenward et al. 1986: 259

Table 4.6 Crop and weed reallocation for the Insula IX charred dataset

Family	Name	CANOCO code	Contents
	Crop		
CER	Cereal indet. culm	CINDC	Cereal indet. culm
CER	*Hordeum* sp. grain	HORSPG	*Hordeum* grain
CER	*Hordeum* sp. rachis	HORR	*Hordeum* rachis
CER	*Triticum spelta* glume base	TRSPLGB	*T. spelta*, *T. dicoccum*, *T. spelta/dicoccum*
CER	*Triticum spelta* grain	TRSPLG	*T. spelta*, *T. dicoccum*, *T. spelta/dicoccum*, *T.* sp. grain
	Cultivated		
FAB	*Pisum*/*Vicia* sp.	PISUVIC	*Pisum sativum*, *Vicia faba*
LIN	*Linum usitatissimum*	LINUUSI	
	Woodland/Other		
BET	*Corylus avellana* (nutshell)	CORYAVE	
CAP	*Sambucus nigra*	SAMBNIG	
-	Bread/dung	BRDDNG	
-	Bud	BUD	*Salix* sp. bud
-	Leaf abscission pads	LFABCPD	
	Wild		
AST	*Tripleurospermum inodorum*	TRIPINO	
BRA	*Brassica* sp.	BRASSP	*B. nigra*, *Brassica*/*Sinapsis* sp.
CAR	*Spergula arvensis*	SPERARV	
CAR	*Stellaria graminea*	STELGRA	
CAR	*Stellaria media* gp.	STELMED	
CHE	Chenopodiaceae indet.	CHENOPO	*Atriplex* sp., *Chenopodium ficifolium*, *C. polyspermum*
CHE	*Chenopodium album*	CHENALB	
CYP	*Carex* sp.	CARESP	
CYP	Cyperaceae indet.	CYPEIND	*Isolepis setacea*, *Schoenoplectus lacustris*
CYP	*Eleocharis palustris*	ELEOPAL	
FAB	*Medicago lupulina*	MEDILUP	
FAB	*Medicago*/*Trifolium*/*Melilotus* sp.	MEDITRI	*Melilotus* sp., *Trifolium*/*Lotus* sp., *Medicago*/*Trifolium* sp.
FAB	*Vicia*/*Lathyrus* sp.	VICILAT	*Lathyrus nissolia*
LAM	*Prunella vulgaris*	PRUNVUL	
LIN	*Linum catharticum*	LINUCAT	
MAL	*Malva* sp.	MALVSP	*Malva sylvestris*, Malvaceae indet.
PLA	*Plantago lanceolata*/*major*	PLANLAN	
POA	*Avena* sp.	AVENSP	
POA	*Bromus secalinus*	BROMSEC	*Bromus* sp.
POA	*Bromus*/*Avena* sp.	BROMAVE	
POA	Poaceae indet.	POACIND	
POA	Poaceae indet. (large)	POACINL	
POA	Poaceae indet. (small)	POACINDS	

Family	Name	CANOCO code	Contents
POL	*Fallopia convolvulus*	FALLCON	
POL	*Persicaria lapathifolia/maculosa*	PERSLAM	*Persica lapathifolia*, *P. maculosa*
POL	*Polygonum aviculare* agg.	POLYAVI	
POL	*Rumex acetosella* agg.	RUMEACT	
POL	*Rumex* sp.	RUMESP	
POR	*Montia fontana*	MONTFON	*Montia fontana* Ssp. *chondrosperma*
RAN	*Ranunculus* subg. *acris*/repens/bulbosus	RANUARB	*Ranunculus repens*
ROS	*Rubus* sect. *Glandulosus*	RUBUFRU	
RUB	*Galium aparine*	GALIAPA	
SCR	*Euphrasia*/*Odontites* sp.	EUPHODO	*Odontites vernus*
SOL	*Atropa*/*Solanum* sp.	ATROSOL	*Atropa belladonna*, *Solanum nigrum*
URT	*Urtica dioica*	URTIDIO	

Table 4.7 Assessment of arable weed status for Silchester and regional weed taxa.
*** samples with marked abundances removed from the analysis**

Taxa	Flowering with arable	Modern habitats	Modern arable or waste	Decision
Collected				
Brassica sp.	Y	Arable, waste ground	Y	Y*
Hyoscyamus niger	Y	Manure, rough ground	Y	Y*
Sambucus nigra	Y	Hedges, rough and waste ground	-	N
Grassland				
Arenaria serpyllifolia	Y	Open ground	Y	Y
Carduus/ Cirsium sp.	Y	Grassland	Y	Y
Galium album/verum	Y	Grassland, scrub	Y	Y
Linum catharticum	Y	Grassland	Y	Y
Medicago lupulina	Y	Grassland	Y	Y
Plantago lanceolata	Y	Grassland	Y	Y
Plantago media	Y	Grassland	Y	Y
Potentilla reptans	Y	Grassland, hedges, rough ground	-	Y
Prunella vulgaris	Y	Grassland	Y	Y
Stellaria graminea	Y	Grassland, heath, woodland	Y	Y
Wetland				
Carex sp.	M	Wetland	Y	Y
Eleocharis palustris	Y	Damp grassland, ditches	-	Y
Juncus sp.	Y	Wet places	Y	Y
Luzula sp.	N	Grassland, woodland	-	N
Montia fontana	Y	Damp places, streams, damp hollows	Y	Y
Ranunculus flammula	Y	Wet places	-	N

Table 4.8 Crop categories utilised in the Silchester and regional studies

Category	Contents
Glume wheat grains	Grains of emmer/spelt wheat
Glume wheat glume bases	Glume bases of emmer/spelt wheat
Barley grains	Grains of naked, hulled or indet. barley
Barley rachis	Rachis internodes of naked, hulled or indet. six-row barley
Free-threshing wheat grains	Grains of Triticum aestivum or free-threshing wheat
Free-threshing wheat rachis	Rachis internodes of Triticum aestivum or free-threshing wheat
Cereal culm	Indet. cereal culm

Table 4.9 Levels of sample contamination used in the Silchester and regional studies

Crop category	Contamination
> 90% Glume Wheat	-
> 70% Glume Wheat	Low
> 60% Glume Wheat	High
> 90% Barley	-
> 70% Barley	Low
> 50% Barley	High
> 90% Free-threshing Wheat	-
> 70% Free-threshing Wheat	Low

Table 4.10 Ratio calculations used to assess crop-processing derivation

Ratio	Values	Origin
Barley grains/ barley rachis	>0.5	Fine sieve product
	<0.5	Early stage by-product
Glume wheat grains/ glume wheat glume bases	>1.5	Fine sieve product
	0.8-1.5	Spikelets
	<0.8	Fine sieve by-product

Table 4.11 Autecological categories used in weed ecology analysis

Cultivation practice	Autecological categories used	Sources of information	Previous studies
Calcareous soils	Preference for calcareous soil No preference for calcareous soil	Brewis et al. 1996 Crawley 2005 Stace 1997	Jones 1984
Clay soils	Preference for clay No preference for clay	"	Jones 1981 Jones 1989
Wet soils	F values 8-10 - wet F values 4-7 - intermediate F values 1-3 - dry	Hill et al. 1999	Jones 1978 Van der Veen 1992
Nitrogen rich soils	N values 7-9 - richly fertile N values 4-6 - intermediate R values 7-9 - weakly acid to basic R values 4-6 - moderately acidic	"	"
Infertile soils	N values 1-4 - infertile R values 1-3 - acid	"	"
Sowing season	Early onset and short duration of flowering period (*Jan-June for 1-3 months*) - Autumn Late flowering (*July or later*) - Spring Long flowering (*Jan-June for >5 months*) - Spring Medium flowering onset and duration (*April/June flowering for 4-5 months*) - Intermediate	Fitter and Peat 1994	Bogaard et al. 2001
Disturbance	Annuals and perennials that can regenerate Perennials	Stace 1997	Van der Veen 1992

Table 4.12 Chronological subdivisions used in the regional study

Period	Calendar Years
Mid Iron Age	400/300 BC – 100 BC
Late Iron Age	100 BC – c. AD 43
Early Roman	c. AD 43 – end first century AD, and those extending into the second century AD
Mid Roman	Second and third centuries AD
Late Roman	Fourth century AD, including those beginning in the third century AD

Table 4.13 Site categories used in the regional study

Classification	Description
Hillfort	Hilltop settlements with ramparts (Lambrick and Robinson 2009: 348-361)
Oppida	Settlements with extensive enclosures, imported material culture and high status activity (Pitts 2010)
Major town	Coloniae, civitas capitals, municipia. Legal, administrative functions and major public amenities (Jones 2004)
Small town	Settlements with internal street networks, economic specialisation and possible public functions (Booth et al. 2007: 38-42; Burnham and Wacher 1990)
Roadside settlement	Strip plots extending from road, no street network (Taylor 2007: 111-112)
Villa	Rural building with 'Roman' characteristics; masonry rectangular structure, mosaic decoration, bathhouse, hypocausts (Mattingly 2007: 369-375)
Cemetery	Cremation or inhumation burials (Mattingly 2007: 476-479).
Open settlement	Rural settlement with no enclosing ditches. Often characterised by extensive pitting and post structures (Cunliffe 2000: 167-189; Lambrick and Robinson 2009,
Enclosed settlement	Houses, pens and paddocks within single or multiple enclosure ditches (Lambrick and Robinson: 115-130; Cunliffe 2000: 167-189).
Unclear settlement	Isolated settlement features
Field system	Ditched enclosures with no settlement features

Table 4.14 Landscape categories used in the regional study

	Category	Soils
A	Upland chalk >70m OD	Calcareous, free draining
B	Upland chalk >70m (acidic head deposits)	Slightly acid, free draining
C	Upland other (greensand, gravel) >70m OD	Slightly to very acid, free draining or slightly impeded
D	Upper River Terrace	Slightly acid, free drainage
E	Lower River Terrace/floodplain/clay	Slightly acid or clay, impeded drainage to wet
F	Lowland chalk <70m OD	Calcareous, free draining

Table 4.15 Crop and weed reallocation for the regional dataset

Family	Name	CANOCO code	Contents
Crop			
CER	Cereal indet. culm	CINDC	Cereal indet. culm
CER	*Hordeum* sp. grain	HORSPG	*Hordeum* sp. grain
CER	*Hordeum* sp. rachis	HORR	*Hordeum* sp. rachis
CER	*Triticum spelta* glume base	TRSPLGB	*T. spelta*, *T. dicoccum*, *T. spelta/dicoccum*
CER	*Triticum spelta* grain	TRSPLG	*T. spelta*, *T. dicoccum*, *T. spelta/dicoccum*, *T.* sp. grain
CER	Free threshing wheat grain	FTWG	*Triticum* free threshing grain
CER	Free threshing wheat rachis	FTWR	*Triticum* free threshing rachis
Collected			
BET	*Corylus avellana*	CORYAVE	*Corylus avellana* nutshell
CAP	*Sambucus nigra*	SAMBNIG	*Sambucus nigra*
ERI	Ericaceae indet.	ERICIND	Ericaceae indet. (fruit)
FAB	*Pisum sativum*/*Vicia faba* sp.	PISUVIC	*Pisum sativum*, *P.* sp., *Vicia faba*, *Pisum*/*Vicia* sp.
ROS	*Crataegus* sp.	CRATSP	*Crataegus* sp.
ROS	Rosaceae indet.	ROSACET	Rosaceae indet. (thorn)
-	Bud		*Salix* sp. bud, Bud indet.
-	Bracken/Heather	PTERERI	*Calluna vulgaris* (leaf and shoot), *Erica* sp. leaf, *Pteridium aquilinum*
Arable			
AST	*Anthemis arvensis*	ANTHARV	*Anthemis arvensis*
AST	*Anthemis cotula*	ANTHCOT	*Anthemis cotula*
AST	*Carduus*/*Cirsium* sp.	CARDCIR	*Carduus* sp., *Cirsium* sp., *Carduus/Cirsium* sp.
AST	*Centaurea cyanus*/*nigra*	CENTCYN	*Centaurea cyanus, C. nigra*, *C.* sp.
AST	*Chrysanthemum segetum*	CHRYSEG	*Chrysanthemum segetum*
AST	*Lapsana communis*	LAPSCOM	*Lapsana communis*
AST	*Torilis* sp.	TORSP	*Torilis arvensis*, *T. japonica*, *T. nodosa, T.* sp.
AST	*Tripleurospermum inodorum*	TRIPNO	*Tripleurospermum inodorum*, *T. maritimum*, *T.* sp.
BOR	*Lithospermum arvense*	LITHARV	*Lithospermum arvense*
BRA	*Brassica nigra*	BRASNIG	*Brassica nigra*
BRA	*Brassica* sp.	BRASSP	*Brassica* sp.

Family	Name	CANOCO code	Contents
Arable			
CAR	*Agrostemma githago*	AGROGIT	*Agrostemma githago*
CAR	*Arenaria serpyllifolia*	ARENSER	*Arenaria serpyllifolia*
CAR	*Cerastium* sp.	CERASSP	*Cerastium fontanum*, *C*. sp.
CAR	*Silene* sp.	SILESP	*Silene alba, S. dioica*, *S. gallica*, *S. latifolia*, *S. vulgaris*, *S*. sp.
CAR	*Spergula arvensis*	SPERARV	*Spergula arvensis*
CAR	*Stellaria graminea/palustris*	STELGRP	*Stellaria graminea*, *S. palustris*, *S. graminea/palustris*
CAR	*Stellaria media*	STELMED	*Stellaria media*
CHE	*Atriplex patula/prostrata*	ATRISP	*Atriplex* sp., *Atriplex patula/prostrata*
CHE	*Chenopodium album*	CHENALB	*Chenopodium album*, *C. ficifolium*, *C. murale*, *C. polyspermum, C. urbicum*, *C*. sp.
CYP	*Carex* sp.	CARESP	*Carex* sp.
CYP	*Eleocharis palustris*	ELEOPAL	*Eleocharis palustris*, *E*. sp.
FAB	*Medicago lupulina*	MEDILUP	*Medicago lupulina*
FAB	*Medicago/Trifolium* sp.	MEDITRI	*Medicago* sp., *Trifolium* sp. *T. pratense*, *T. pratense/repens*, *T. repens/arvense* etc.
FAB	*Vicia/Lathyrus* sp.	VICILAT	*Lathyrus nissolia*, *L*. sp., *Vicia hirsuta*, *V. sativa* ssp. *nigra*, *V. sativa* ssp. *angustifolia, V. tetrasperma*, *V*. sp., *Vicia/Lathyrus* sp.
FUM	*Fumaria* sp.	FUMASP	*Fumaria* sp.
JUN	Juncus indet.	JUNCIND	*Juncus articulatus*, *J. bufonius*, *J. effusus*, *J*. sp.
LAM	*Galeopsis* sp.	GALESP	*Galeopsis tetrahit*, *G*. sp.
LAM	*Prunella vulgaris*	PRUNVUL	*Prunella vulgaris*
LIN	*Linum catharticum*	LINUCAT	*Linum catharticum*
MAL	*Malva sylvestris*	MALVSYL	*Malva sylvestris*, *M*. sp., Malvaceae indet.
PAP	*Papaver argemone*	PAPAARG	*Papaver argemone*
PAP	*Papaver rhoeas* type	PAPARHO	*Papaver rhoeas* type
PAP	*Papaver somniferum*	PAPASOM	*Papaver somniferum*
PLA	*Plantago lanceolata/media*	PLANLAM	*Plantago lanceolata*, *P. media*
PLA	*Plantago major*	PLANMAJ	*Plantago major*
POA	*Avena* sp.	AVENSP	*Avena* sp.

Family	Name	CANOCO code	Contents
POA	*Bromus* subg. *Bromus*	BROMBRO	*Bromus eubromus*, *Bromus hordeaceus*, *Bromus* subg. *eubromus*, *Bromus* subg. *genea*, *Bromus secalinus*, *Bromus* sp., *Bromus* subg. *Bromus*
POA	*Lolium perenne*	LOLIPER	*Lolium perenne*, *L*. sp.
POA	*Poa* sp.	POASP	*Poa annua*, *P. pratensis/trivalis*, *P*. sp.
POA	Poaceae indet.	POACIND	Poaceae indet.
POA	Poaceae indet. (small)	POACINS	*Agrostis* sp., *Alchemilla vulgaris*, *Alopecurus* sp., *Alopecurus/Holcus*, *Anthoxanthum* sp., *Dactylis glomerata*, *Dactylis/Holcus* sp., *Danthonia decumbens*, *Deschampsia* sp., *Melica uniflora*, *Phleum pratense*, *Phleum* sp., *Poa/Agrostis* sp., *Poa/Phleum* sp., Poaceae indet. (small)
POA	Poaceae indet. (large)	POACINL	*Anisantha* sp., *Anisantha sterilis*, *Anthoxanthum* sp., *Arrhenatherum/Avena* sp., *Festuca* sp., *Festuca/Lolium* sp., *Hordeum secalinum/murinum*, *Trisetum flavescens*, Poaceae indet. (large)
POL	*Fallopia convolvulus*	FALLCON	*Fallopia convolvulus*
POL	*Persicaria lapathifolia/maculosa*	PERSLAM	*Persicaria lapathifolia*, *P. maculosa*, *P*. sp.
POL	*Polygonum aviculare* agg.	POLYAVI	*Polygonum aviculare*, *P*. sp.
POL	*Rumex* sp.	RUMESP	*Rumex acetosa*, *R. crispus*, *R. crispus/longifolius*, *R*. sp.
POR	*Montia fontana* ssp.	MONTFON	*Montia fontana* ssp. *chondrosperma*, *M. fontana* ssp.
RAN	*Ranunculus a. r. b*.	RANUARB	*Ranunculus acris, R. bulbosus*, *R. repens*, *R. a. r. b*.
ROS	*Aphanes arvensis/australis*	APHAARV	*Aphanes arvensis*, *A. australis*, *A*. sp.
ROS	*Potentilla* sp.	POTESP	*Potentilla palustris*, *P. reptans*, *P*. sp.
RUB	*Galium album/verum/ palustre*	GALIAVP	*Galium mollugo*, *G. palustre*, *G. verum*
RUB	*Galium aparine*	GALIAPA	*Galium aparine*
RUB	*Sherardia arvensis*	SHERARV	*Sherardia arvensis*
SCR	*Odontites vernus*	ODONVER	*Euphrasia/Odontites* sp., *O. vernus*, *O*. sp.
SCR	*Veronica arvensis*	VEROARV	*Veronica arvensis*
SCR	*Veronica hederifolia*	VEROHED	*Veronica hederifolia*
SOL	*Hyoscyamus niger*	HYOSNIG	*Hyoscyamus niger*
URT	*Urtica dioica*	URTIDIO	*Urtica dioica*

Family	Name	CANOCO code	Contents
URT	*Urtica urens*	URTIURE	*Urtica urens*
VAL	*Valerianella dentata*	VALEDEN	*Valerianella dentata*
VIO	*Viola* sp.	VIOLSP	*Viola arvensis/tricolor*, *V*. subg. *Melanium*, *V*. subg. *Viola*, *V*. sp.
Woodland			
JUN	*Luzula* sp.	LUZUSP	*Luzula campestris*, *L*. sp.

Chapter 5 Tables

Table 5.1 Summary of all samples studied from Insula IX

Preservation	Period 0	Period 1	Period 2	Period 4	Period 5	Total
Charred	22	32	20	2	5	81
Mineralised	-	2	2	-	5	9
Waterlogged	9	20	-	3	2	34

Table 5.2 Summary of waterlogged samples from Insula IX

Well	Period	No. of contexts	Average item/L	∑ (seeds)	Ritual deposits
10421	0	4	21.9	1600	2 Complete pots, 1 pierced fragment
8328	0	5	155.4	2045	4 Whole (2 pierced), 2 fragmented pots
1586	1	2	24.1	404	Intact flagon and butt beaker
3171	1	7	9.8	3997	-
5100	1	1	1.5	22	-
5791	1	10	27.8	4378	-
1750	4	1	34.7	208	Raven, dog, red deer
5735	4	2	31.6	1341	Flagon handle, writing tablet
1300	5	2	15.9	317	Complete flagon

Table 5.3 Summary of charred samples from Insula IX

	Period					Total
	0	**1**	**2**	**3/4**	**5**	
∑ (items)	6487	2586	5292	75	300	
Average item/L	37.4	9.3	49.0	5.0	3.0	
Total no. of contexts	22	32	20	2	5	81
Burnt deposit/Hearth		3	7			10
Ditch/Gully	6		1			7
Levelling/Demolition		1	3			4
Occupation/Accumulation	2	6	6			14
Pit/Well backfill	11	21	2	2	5	41
Posthole	3	1	1			5

Table 5.4 Ubiquity of physical plant types by preservation mode at Insula IX

	Charred (n=81)	Mineralised (n=9)	Waterlogged (n=34)
Seeds	94	100	100
Seeds (thickened testa)	39	89	100
Pulses	7	56	0
Cereal grain	84	67	15
Cereal chaff	48	33	38
Cereal bran	0	22	18
Oily seeds	12	56	59
Fruit stones	2	32	89
Nut shell	6	0	38
Twigs	0	0	9
Vegetative parts	12	22	56
Moss	0	0	41

Table 5.5 Ubiquity of habitat groups by preservation mode at Insula IX

	Charred (n=81)	Mineralised (n=9)	Waterlogged (n=34)
Cultivated	89	100	79
Disturbed	20	67	91
Disturbed (arable)	76	89	97
Grassland	47	22	97
Heathland	1	22	44
Wetland	60	22	97
Woodland	12	56	100

Table 5.6 Ubiquity of common taxa by preservation mode at Insula IX.

	Charred (n=81)	Mineralised (n=9)	Waterlogged (n=34)
Cultivated			
Barley grain			
Barley rachis	19		15
Celery	1	33	53
Coriander	67	0	47
Cereal indet. grain		44	8
Dill	33		18
Flax (seeds)	7	22	29
Spelt grain	36	33	
Spelt/emmer grain	44	33	
Spelt/emmer glume base			
Triticum sp. grain	24	22	3
Disturbed			
Atropa belladonna	2		29
Ballota nigra			47
Hyoscyamus niger			29
Urtica dioica	16	67	74
Disturbed (arable)			
Agrostemma githago	1	22	29
Aphanes arvensis	2		38
Aphanes australis			38
Atriplex sp.	12	33	44
Avena sp.	27	33	6
Bromus secalinus	48	44	35
Bromus/Avena sp.	42	11	
Capsella bursa-pastoris	1		47
Chenopodium album	32	11	62
Chenopodium sp.	3	22	3
Chenopodiaceae indet.	21	22	35
Lamium sp.	1	22	29
Odontites vernus	4	22	18
Papaver argemone			32
Papaver rhoeas type	2		29
Papaver somniferum	1	44	32
Polygonum aviculare	27	22	74
Ranunculus sardous	1		53
Solanum nigrum	2		35
Sonchus asper			35
Spergula arvensis	7		18
Stellaria media	19	56	71
Tripleurospermum inodorum	26		21
Urtica urens	2	78	79

	Charred (n=81)	**Mineralised (n=9)**	**Waterlogged (n=34)**
Grassland			
Filipendula ulmaria	2		50
Leontodon sp.			29
Linum catharticum	7	11	35
Medicago lupulina	21	22	3
Medicago/Trifolium sp.	20		
Plantago major	2		35
Potentilla erecta	1		38
Prunella vulgaris	10	11	59
Ranunculus acris			38
Ranunculus repens	1	22	71
Rhinanthus sp.	4	11	32
Stellaria graminea	5		29
Trifolium sp.	21		3
Vicia/Lathyrus sp.	36	11	0
Wetland	12	33	44
Eleocharis palustris	58	22	91
Mentha aquatica			41
Montia fontana	11	22	29
Ranunculus flammula	2		65
Woodland			
Betula pendula/pubescens			35
Corylus avellana (nutshell)	6		38
Rubus sect. *Glandulosus*	7	56	71
Various			
Apiaceae indet.	3	33	41
Brassicaceae indet.	6	11	12
Carduus/Cirsium sp.	2	22	26
Carex sp.	48	44	91
Cerastium fontanum			26
Conium maculatum		67	21
Daucus carota			29
Malvaceae indet.	6	11	12
Polygonaceae indet.	7	11	18
Ranunculus parviflorus			38
Ranunculus subg. *Ranunculus*	5	22	53
Rumex acetosella agg.	37	11	68
Rumex sp.	56	56	50
Solanum sp.			26
Viola sp.	1		26

Table 5.7 Summary of waterlogged plant remains confirmed and reidentified from the Clement Reid collection
A = published in Archaeologia R = confirmed or reidentified in Reading

Year published	1901	1902	1903	1905	1906	1907	1908	1909	-	No date
Year excavated	1899-1900	1901	1902	1903-4	1905	1906	1907	1908	1909	No date
Insulae	XXIII, XXI, XXV, XXVI	XXII, XXVII	XXX, XXIX, XXXI, XXXII	XXIII	V, VI	XXXIV	XXVIII, XXXV	XXIX, XXXVI, XXXVII	City walls	-
Cultivated										
Bullace/Damson	A	R		R			R		R	R
Celery	A									
Celtic Bean										R
Coriander	AR									
Dill	R		R	R	A					R
Fig	AR		R				A			
Flax		A								
Flax (capsule)	A									
Grape	AR									
Medlar				AR						
Mulberry			AR							
Pea							A			
Pear/Apple	AR			R			A			R
Plum	A			A			AR		R	R
Raspberry	A									
Stone pine (bracts/nutshell)										R
Sweet Cherry	A	R		R			AR		R	R
Collected										
Brassica nigra						R	R			
Brassica sp.	R	AR				R				
Corylus avellana (nutshell)	A									
Crataegus sp.	A									
Fragaria vesca	A									
Prunus sp.		A								R
Prunus spinosa	AR	R		R			AR		R	R
Rubus sect. *Glandulosus*	A	AR					A			R
Sambucus nigra	A	A		R						R
Other										
Buxus sempervirens (leaf)			AR						R	
Ilex aquifolium (leaf)					AR					
Charred										
Bromus secalinus		R								
Triticum sp. (grain)	A	AR		R						
Triticum spelta (grain)				R						
T. dicoccum/spelta (grain)		R								
Cereal indet. (grain)	R									

Chapter 6 Tables

Table 6.1 Summary sample statistics for waterlogged samples from Insula IX. GA = gradual accumulation, ID = non-organic deposit, OD = organic deposit, PF = primary fill, as described in Table 4.5

Period	Well	Samples	Context	Fill type	Number of taxa (seeds)	∑ (seeds)	Density of seeds/L
0	10421	4068	10438	ND	5	69	4.3
0	10421	4085	10439	ND	12	21	6.0
0	10421	4141	10441	ND	42	917	131
0	10421	4165	10442	PF	38	593	64.2
0	8328	3191	9152	ND	19	186	14.3
0	8328	3216	9257	OD	25	433	108.3
0	8328	3195, 3198	9258	ND	33	355	355.0
0	8328	3217, 3219, 3293	9309	OD	69	804	268.0
0	8328	3322, 3335, 3341	9663	OD	24	267	31.4
1	1586	612	3932	GA	41	174	19.3
1	1586	615	3981	GA	40	230	28.8
1	3171	738	4837	GA	5	17	3.4
1	3171	739	4838	GA	17	219	8.1
1	3171	741	4845	GA	4	13	0.4
1	3171	749	4846	GA	9	47	1.2
1	3171	754, 755	4850	OD	65	3595	51.7
1	3171	758, 759	4851	GA	23	63	1.9
1	3171	761	4866	PF	12	43	1.8
1	5100	2799	7828	PF	9	22	1.5
1	5791	1284	6482	OD	70	583	36.4
1	5791	1320	6484	OD	92	936	93.6
1	5791	1216, 1328	6485	OD	89	1305	40.8
1	5791	1554, 1555	6487	ND	53	141	9.4
1	5791	1296	6504	ND	45	216	14.4
1	5791	1584	6897	ND	31	73	12.2
1	5791	1594	6905	ND	25	66	3.7
1	5791	1656	6917	ND	76	935	55.0
1	5791	1662	6921	ND	33	81	5.4
1	5791	1682	6923	PF	15	42	7.0
4	1750	386	2778	PF	27	208	34.7
4	5735	1646	6436	OD	64	982	43.7
4	5735	1715	6960	PF	34	359	19.4
5	1300	90	1619	ND	29	161	16.1
5	1300	92	1621	PF	27	156	15.6

Table 6.2 Summary of taxa identified in waterlogged samples from Insula IX

	Period 0			Period 1			Period 4/5		
No. of contexts			9			20			5
Average items/L			109.2			19.8			25.9
∑ (seeds)			3642			8801			1866
	∑	**Ubiq (%)**	**Max**	**∑**	**Ubiq (%)**	**Max**	**∑**	**Ubiq (%)**	**Max**
Food plants									
Black mustard							6	40	4
Brassica cultivar				1	5	1			
Bullace/Damson							1	20	1
Celery	11	44	8	44	60	10	4	40	2
Cereal indet. grain				8	15	5	2	40	1
Coriander	4	22	3	36	55	12	3	60	1
Damson/Plum							1	20	1
Dill	6	11	6	65	20	47	11	20	11
Fennel				2	10	1			
Fig							14	40	12
Flax	61	11	61	84	45	62			
Grape							1	20	1
Olive	1	11	1						
Plum							1	20	1
Prunus sp.							3	40	2
Sweet cherry				2	10	1			
Walnut							2	40	1
Wheat				1	5	1			
Crop-processing waste									
Barley rachis				5	25	1			
Cereal bran		11			25				
Cereal culm node				1	5	1			
Flax capsules	46	22	38	7	20	3			
Spelt/emmer glume bases	27	22	8	34	50	5	2	20	2
Disturbed ground									
Atropa belladonna	16	44	8	15	30	9			
Ballota nigra	10	44	4	180	50	157	38	40	35
Chelidonium majus				1	5	1			
Coronopus squamatus							1	20	1
Hyoscyamus niger	3	22	2	17	20	13	17	80	13
Lapsana communis				3	15	1			
Malva sylvestris	6	11	6						
Sagina sp.	128	55	64	22	15	16			
Urtica dioica	109	66	72	611	75	371	210	80	146
Disturbed (arable) ground									
Aethusa cynapium				40	10	39			
Agrostemma githago	5	33	3	8	30	2	1	20	1
Anagallis arvensis							1	20	1
Anisantha sterilis				1	5	1			
Anthemis arvensis				2	5	2			
Anthriscus caucalis	11	33	9	31	15	28			
Aphanes arvensis	10	44	4	14	40	4	2	20	2
Aphanes australis	23	33	16	76	45	16	3	20	3
Atriplex sp.	5	11	5	25	50	10	35	80	19
Avena sp.				2	10	1			
Bromus secalinus	9	22	8	33	45	11	1	20	1
Capsella bursa-pastoris	592	33	307	61	55	19	4	40	3
Chenopodium album	98	55	58	77	60	37	102	80	86
Chenopodium ficifolium	1	11	1	28	10	27			
Chenopodium rubrum							8	60	4
Chenopodium polyspermum	6	22	5	22	10	21	4	40	2
Fallopia convolvulus	1	11	1				1	20	1

	Period 0			Period 1			Period 4/5		
	Σ	**Ubiq (%)**	**Max**	**Σ**	**Ubiq (%)**	**Max**	**Σ**	**Ubiq (%)**	**Max**
Disturbed (arable) ground									
Fumaria sp.	24	44	17	17	15	11			
Galeopsis tetrahit				2	10	1	1	20	1
Galium aparine				16	5	16	1	20	1
Lamium sp.	6	22	4	33	30	24	6	40	5
Legousia hybrida	5	11	5	2	5	2			
Odontites vernus				37	30	16			
Papaver argemone	5	22	4	173	45	58			
Papaver rhoeas	19	56	9	47	25	25			
Papaver somniferum	18	67	8	12	25	5			
Persicaria lapathifolia	3	11	3	1	5	1	1	20	1
Plantago major	5	44	2	17	35	6	1	20	1
Polygonum aviculare agg.	503	67	205	426	70	251	51	100	19
Potentilla reptans	1	11	1				1	20	1
Polygonum sp.	3	22	2						
Ranunculus sardous	2	11	2	108	70	25	7	60	3
Raphanus raphanistrum				7	5	7	3	40	2
Rumex crispus				3	5	3	3	20	3
Rumex obtusifolius				2	10	1	46	40	42
Scleranthus annuus				1	5	1			
Silene latifolia							3	40	2
Silene vulgaris				1	5	1			
Sisymbrium sp.	11	22	7						
Solanum nigrum	7	33	5	193	40	173	11	20	11
Sonchus asper	2	22	1	32	40	21	6	40	5
Sonchus oleraceus				65	15	63			
Spergula arvensis	4	22	2	7	20	4			
Stellaria media gp.	235	56	141	663	80	393	248	60	174
Thlaspi arvense	4	33	2	5	20	2			
Torilis sp.	2	11	2	7	25	2			
Tripleurospermum inodorum	3	33	1	12	20	5			
Urtica urens	243	67	120	1408	80	1218	121	100	75
Valerianella locusta				8	15	5			
Valerianella rimosa				1	5	1			
Valerianella dentata	1	11	1	5	15	3			
Viola Subg. *Melanium*	3	22	2	12	25	3	1	20	1
Grassland									
Achillea millefolium				1	5	1			
Agrimonia eupatoria							1	20	1
Centaurea nigra	1	11	1	18	15	16	1	20	1
Centaurea nigra (flower head)					5				
Filipendula ulmaria	6	11	6	289	70	126	3	40	2
Hypochaeris sp.	4	11	4	13	25	4	6	40	4
Lathyrus pratensis				1	5	1			
Leontodon sp.	7	11	7	60	35	23	2	40	1
Leucanthemum vulgare				3	15	1			
Linum catharticum	7	11	7	30	50	9	2	20	2
Medicago lupulina				1	5	1			
Medicago sp.				3	10	2			
Medicago sp. (pod)					15				
Oenanthe pimpinelloides				5	20	2	1	20	1
Ornithopus sp.	2	11	2						
Picris hieracioides				3	10	2			
Plantago sp.				5	10	3			

	Period 0			Period 1			Period 4/5		
	Σ	**Ubiq (%)**	**Max**	**Σ**	**Ubiq (%)**	**Max**	**Σ**	**Ubiq (%)**	**Max**
Grassland									
Poaceae indet. (culm base)					5				
Poaceae indet.	2939	89	1201	3965	85	1717	18	40	11
Potentilla anserina				4	15	2	2	40	1
Potentilla erecta	9	22	7	12	40	3	25	60	13
Prunella vulgaris	32	56	24	89	65	28	10	40	8
Ranunculus acris	5	11	5	68	40	15	13	80	5
Ranunculus bulbosus				2	5	2			
Ranunculus repens	29	56	13	163	70	59	46	100	20
Rhinanthus minor	11	22	10	83	45	29			
Scabiosa columbaria				1	5	1			
Stellaria graminea	5	22	3	17	35	5	3	20	3
Trifolium sp. (flower)		22			20			40	
Trifolium sp. (calix)		11			35			40	
Asteraceae indet. (flower head)					5				
Fabaceae indet. (pod fragment)					10				
Vicia/Lathyrus sp. (pod fragment)					20			40	
Vicia/Lathyrus sp. (tendril)					10				
Vicia/Lathyrus sp. (flower)					5				
Viola sp. (capsule fragment)					5				
Heathland									
Calluna vulgaris	8	22	7						
Calluna vulgaris (shoots)		11							
Calluna vulgaris (seed capsules)		11							
Danthonia decumbens	1	11	1	14	30	5			
Erica sp.	15	11	15						
Ericaceae indet. (heather)		11			5				
Ericaceae indet. (leaf)		11							
Pteridium aquilinium (frond)		22			25			20	
Sphagnum sp. (bud)		22			5				
Sphagnum sp. (leaf)		33			15				
Ulex europaeus (spine)		44							
Wetland									
Alisma plantago-aquatica	1	11	1						
Alisma sp.	1	11	1	1	5	1			
Apium nodiflorum	4	33	2	12	30	4			
Caltha palustris				12	15	9			
Eleocharis palustris	481	89	238	873	90	202	90	100	41
Glyceria type				1	5	1			
Hydrocotyle vulgaris				7	25	2	1	20	1
Isolepis setacea	4	11	4	1	5	1			
Juncus effusus gp.	1408	89	688	3491	80	752	20	20	20
Lychnis flos-cuculi	1	11	1	1	5	1			
Lycopus europaeus				5	15	3	1	20	1
Lythrum salicaria				1	5	1			
Mentha aquatica	105	44	97	42	40	13	9	40	5
Oenanthe fistulosa				4	5	4			
Pulicaria sp.	1	11	1	5	10	4			
Ranunculus flammula	17	44	14	128	65	32	29	100	14

	Period 0			Period 1			Period 4/5		
	Σ	Ubiq (%)	Max	Σ	Ubiq (%)	Max	Σ	Ubiq (%)	Max
Wetland									
Ranunculus subg. *Batrachium*	1	11	1	1	5	1			
Thalictrum flavum				6	25	2	9	60	5
Veronica Sect. *beccabunga*				3	10	2			
Woodland									
Alnus glutinosa				1	5	1			
Betula pendula/pubescens	8	22	5	41	50	16			
Buxus sempervirens (leaf)								20	
Corylus avellana (nutshell)	12	4	5	11	30	6	3	60	1
Crataegus sp.				1	5	1			
Fragaria vesca				1	5	1			
Fraxinus excelsior				2	10	1			
Ilex aquifolium (leaf)	11	12	1	3	15	1		20	
Luzula sp.				5	15	3	2	40	1
Malus sp.	1	11	1						
Prunus/Crataegus sp.	1	11	1						
Prunus spinosa	4	33	2	5	10	4	2	40	1
Quercus sp. (wood)	1	11							
Rubus sect. *Glandulosus*	34	78	11	73	60	29	75	100	38
Rubus sp. (thorn)					10				
Salix sp. (bud)					5			20	
Viola subg. *Viola*				3	10	2		20	
Bark		11			5				
Deciduous tree leaf		11			35				
Various									
Arctium sp.	2	11	2	5	20	2			
Arenaria sp.				4	5	4			
Carduus sp.				2	10	1	2	40	1
Carduus/Cirsium sp.				16	10	8			
Carex sp.	88	78	30	282	95	69	148	100	69
Cerastium fontanum	7	11	7	29	40	12			
Cirsium sp.				6	25	2			
Conium maculatum	1	11	1	2	10	1	16	80	12
Crepis capillaris	1	11	1	1	5	1			
Daucus carota	1	11	1	10	25	4	4	80	1
Epilobium sp.				4	10	3			
Galium sp.				6	15	4			
Hypericum sp.	5	11	5	6	15	4			
Juncus articulatus gp.	2347	78	1994	14099	75	3600	136	80	80
Juncus bufonius gp.	633	78	304	5175	65	2592			
Mentha sp.	16	33	10	3	10	2			
Montia fontana ssp.	88	43	59	75	25	59	1	20	1
Myosotis sp.				7	15	3			
Ranunculus parviflorus	2	22	1	25	55	6			
Ranunculus Subg. *Ranunculus*	6	44	3	174	55	47	31	60	21
Rumex acetosella agg.	100	56	73	564	65	268	35	100	12
Rumex conglomeratus	1	11	1	45	25	27	1	20	1
Rumex sp.	32	56	25	185	45	127	99	60	88
Sambucus nigra	51	56	18	135	60	71	172	100	148
Senecio sp.				6	25	2			
Silene sp.				1	5	1			
Solanum dulcamara	1	11	1	3	10	2	1	20	1
Taraxacum sp.	3	33	1	5	15	3	1	20	1

Table 6.3 Average diversity and ubiquity of habitat groups per period in waterlogged samples

	Average diversity (seeds)			Frequency		
Period	**0**	**1**	**4/5**	**0**	**1**	**4/5**
Cultivated	7	12	13	56	85	100
Disturbed	6	7	4	100	90	80
Disturbed (arable)	34	45	28	100	95	100
Grassland	12	24	13	67	90	100
Heathland	3	0	0	22	30	0
Wetland	10	17	7	89	90	100
Woodland	5	9	4	89	85	100
Various	17	26	12	100	100	100

Table 6.4 Samples containing the stable manure indicator package from Insula IX

Context	Well	Period	Dung	Fodder					Litter	
			Cereal bran	Flax seeds/ capsules	Wheat grains/ chaff	Barley grains/ chaff	Grassland plants	Holly leaves	Bracken/ gorse	Leaves/ buds
8328	9309	0	+	+	+		+	+	+	+
1586	3932	1	+		+		+	+		
5791	6485	1	+	+	+	+	+		+	+
5791	6897	1	+		+		+		+	+
5735	6436	4	+		+		+		+	+

Table 6.5 NVC communities and functional attributes of potential hay taxa
A = Annual, B= Biennial, P = Perennial. Constancy measured on a scale from 1 to 5.

Taxa	MG4 constant species	MG5 constant species	Flowering onset and duration	Canopy height/ mm	Life history	Stress index
Centaurea nigra	+3	+5	Jun-04	301-600	P	-1.4
Cerastium fontanum	+4	+3	Aug-06	<300	P	-0.3
Danthonia decumbens		+5	Jul-01	101-299	P	
Eleocharis palustris			May-03	300-599	P	
Filipendula ulmaria	+5	+1	Jun-03	>600	P	1.2
Hypochaeris sp.	+1	+3	Jun-04	<300	P	
Leontodon sp.	+4	+4	Jun-04	<100-299	P	
Leucanthemum vulgare	+2	+3	Jun-03	301-600	P	-1.4
Linum catharticum			Jun-04	<300	B/A	1.5
Potentilla erecta		+5	Jun-04	201-299	P	

Taxa	MG4 constant species	MG5 constant species	Flowering onset and duration	Canopy height/ mm	Life history	Stress index
Prunella vulgaris	+2	+4	Jun-04	<300	P	-0.2
Ranunculus acris	+5	+4	May-03	<300	P	-0.5
Ranunculus bulbosus	+1	+3	May-02	<300	P	0.0
Ranunculus repens	+3	+2	May-02	<300	P	-1.0
Rhinanthus minor	+3	+2	May-04	301-600	A/B	-0.2
Scabiosa columbaria			Jul-02	<300	B/P	-0.2

Table 6.6 Summary of NVC groups identified in the waterlogged assemblage from Insula IX
Identifications based on the co-occurrence of taxa in bold.

NVC Group	Description	Constants (4 or 5)	No. of Samples						
			Period			Deposit type			
			0	1	4-5	PF	GA	ID	OD
OV1	Arable crops, impoverished soils	**APHAUS,** VIOLASP, **RUMEACE**	2	9	1	1	2	4	5
OV9	Disturbed, well-drained ground	**POLYAVI, STELMED,** TRIPMAR	9	20	5	7	7	12	8
OV14	Vegetable crops, light soils	**CAPSBUR, CHENALB, SENECSP, STELMED**		4				2	2
OV18	Trampled ground	**CAPSBUR,** MATRREC, **POLYAVI**	3	10	2	3	2	5	5
OV19c	Moderately trampled ground	**ATRISP, CHENALB,** MEDILUP, **PLANMAJ, POLYAVI,** SONCHSP, TRIPMAR		5	1		1	1	4
OV21c	Heavily trampled ground	**PLANMAJ, POLYAVI, RANUREP,** TRIFSP	2	7	1	1	2	3	4
OV24	Nutrient-rich soils	**GALIAPA, URTIDIO**		1	1	1		1	
OV25	Nutrient-rich soils, bare ground	**CARDCIR, URTIDIO**		2				1	1
OV26	Track-side ditches	**URTIDIO, EPILOSP**		2				1	1
M35	Temporary wet areas	**MONTFON,** RANUBAT, **RANUFLA**	3	5	1			4	5

Table 6.7 Summary sample statistics for charred samples from Insula IX

Period	Samples	Context	Feature category	No. taxa	Σ	Items/L
0	3279	9025	Pit	29	372	31.0
0	2978	9170	Well	17	57	5.0
0	3216	9257	Well	14	80	20.0
0	4029	10436	Well	6	14	0.5
0	4068	10438	Well	30	188	11.8
0	4085	10439	Well	6	18	9.0
0	5249	11108	Pit	3	11	1.4
0	7232	11111	Ditch	25	285	7.0
0	5425	11117	Pit	7	12	12.0
0	7556, 7557	11592	Gully	25	102	2.6
0	5976, 6015	11649	Ditch	16	72	1.9
0	5956, 6445, 6843	11650	Ditch	33	229	3.8
0	6171	11790	Posthole	5	11	0.6
0	6025	11905	Posthole	16	115	2.3
0	6147, 6937	11996	Ditch	31	213	4.1
0	7140	12177	Pit	19	55	2.6
0	7269	12137	Silt deposit	14	42	2.6
0	7068	12678	Pit	32	531	27.9
0	6326	12682	Accumulation/Occupation	5	5	0.8
0	6530	12714	Pit	3	13	0.9
0	7539	12843	Posthole	6	14	0.8
0	7621	12847	Ditch	14	40	5.0
1	629, 1834, 1933	3580	Burnt deposit	22	78	2.4
1	635	3766	Well	11	8	0.4
1	3864	5236	Demolition/Levelling	4	5	0.4
1	1429	6676	Burnt deposit	3	14	28.0
1	1838	6810	Accumulation/Occupation	3	7	1.2
1	3125	8239	Pit	3	17	3.4
1	3098	8368	Pit	3	17	3.4
1	3779	8944	Demolition/Levelling	1	2	0.2
1	3225	9012	Burnt deposit	5	13	2.2
1	4631	10164	Pit	18	46	7.7
1	4191	10265	Accumulation/Occupation	10	16	2.7
1	4976, 4977	10730	Pit	8	13	1.2
1	5117	10755	Pit	6	19	2.4
1	5805, 6052	10786	Pit	15	40	1.5
1	4712	11032	Posthole	5	7	1.4
1	7673	11598	Pit	16	37	1.4
1	5750, 7668	11604	Pit	20	69	1.2
1	7703	11611	Pit	12	36	0.9
1	5542	11680	Pit	30	229	45.8
1	5991	11681	Pit	23	1119	62.2
1	5622	11687	Pit	22	493	82.2
1	6264	11750	Floor	5	10	0.5
1	5762	11878	Floor	3	21	3.5
1	6311	11927	Pit	8	57	3.8

Period	Samples	Context	Feature category	No. taxa	Σ	Density/L
1	6299, 6952, 7388	12009	Pit	16	74	1.5
1	6644	12435	Pit	11	53	3.5
1	6767, 6868, 7616	12461	Pit	24	80	1.5
1	6816	12476	Accumulation/Occupation	13	46	2.9
1	6109	12663	Hearth	13	36	2.6
1	8956	13595	Pit	25	3758	751.6
1	9519	14616	Pit	10	16	0.9
1	9078	15033	Pit	6	11	0.3
2	780	5123	Accumulation/Occupation	22	137	15.2
2	791	5155	Silt deposit	2	13	1.3
2	856	5324	Pit	7	32	3.2
2	847	5545	Layer	7	43	1.5
2	818	5606	Accumulation/Occupation	20	132	13.2
2	973	5743	Demolition/Levelling	4	9	0.8
2	1337	6520	Accumulation/Occupation	5	10	2.9
2	1428	6682	Pit	26	527	52.7
2	1591	6711	Hearth	9	32	4.0
2	1740	6825	Hearth	23	3591	718.2
2	1489	6852	Posthole	5	7	1.2
2	1858	6936	Hearth	6	26	4.3
2	1533	7114	Hearth	5	38	6.3
2	1681	7137	Demolition/Levelling	16	246	41.0
2	2216	7181	Silt deposit	6	7	1.1
2	1917	7183	Burnt deposit	12	64	21.3
2	2596	7704	Accumulation/Occupation	6	36	9.0
2	1925	7867	Gully	11	20	40.0
2	2166	8148	Burnt deposit	2	5	1.0
2	3365	9507	Burnt deposit	8	15	3.8
4	2320	324	Well	14	48	8.0
4	4041	643	Pit	5	10	0.6
5	99	1624	Pit	4	43	1.3
5	315	2385	Pit	14	108	9.0
5	378	2686	Pit	7	43	1.7
5	374	2699	Pit	1	16	0.7
5	392	2913	Pit	13	104	3.4

Table 6.8 Summary of taxa identified in charred samples from Insula IX

	Period 0			Period 1			Period 2			Period 4/5		
No. of samples			22			32			20			7
Average density items/L			7.5			8.8			11.8			3.5
∑ items			2843			6179			2414			2414
	∑	**Ubiq (%)**	**Max**	**∑**	**Ubiq (%)**	**Max**	**∑**	**Ubiq (%)**	**Max**	**∑**	**Ubiq (%)**	**Max**
Glume wheat												
Spelt grain	20	36	4	65	41	26	315	25	309	9	423	6
Emmer grain	9	27	4				3	5	3			
Spelt/emmer grain	45	55	9	69	47	20	163	35	148	4	29	3
Glume wheat grain	77	59	17	144	53	48	485	40	464	13	43	9
Spelt glume base	149	59	47	870	44	825	798	25	786	17	57	6
Emmer glume base	8	18	4	9	18	3						
Spelt/emmer glume base	141	50	37	667	38	619	816	20	808	13	43	7
Glume wheat glume base	298	64	88	1546	50	1447	1614	35	1594	30	57	13
Free-threshing wheat												
Free-threshing wheat grain	2	9	1	3	6	2	5	15	3			
Free-threshing wheat rachis				3	6	2						
Barley												
Barley grain	156	82	28	131	66	30	66	50	16	5	423	3
Barley rachis	36	36	13	76	22	59						
Rye grain				1	3	1	1	5	1			
Cereal culm	3	14	1	1	3	1				4	14	
Food plants												
Black mustard	3	5	3									
Caraway				1	3	1						
Celery				1	3	1						
Celtic bean				1	3	1						
Flax	3	13	1	7	9	5						
Grape										1	14	1
Lentil				2	3	2						
Mustards				1	3	1				17	28	16
Olive				3	3	3						
Pea				2	6	1						
Pea/Celtic bean	1	5	1				1	5	1			
Plum/Damson							1	5	1			
Disturbed ground												
Atropa belladonna	2	5	2	2	3	2						
Malva sylvestris				1	3	1						
Urtica dioica	4	14	2	15	16	11	8	20	4	1	14	1
Disturbed (arable)												
Agrostemma githago										1	14	1
Anthemis cotula										1	14	1
Aphanes arvensis				3	6	2						
Atriplex sp.	5	9	3	1	3	1	25	25	21	3	9	2
Avena sp.	51	50	10	57	31.3	24	10	5	10			
Bromus secalinus	136	68	53	266	56	204	165	15	163	94	43	38
Capsella bursa-pastoris				1	3.1	1						
Chenopodium album	61	50	20	13	28	3	69	30	42			

	Period 0			Period 1			Period 2			Period 4/5		
	Σ	Ubiq (%)	Max	Σ	Ubiq (%)	Max	Σ	Ubiq (%)	Max	Σ	Ubiq (%)	Max
Disturbed (arable)												
Chenopodium ficifolium							1	5	1			
Chenopodium polyspermum							1	5	1			
Fallopia convolvulus	3	5	3	2	6.3	1	2	5	2			
Fumaria sp.							1	5	1			
Galeopsis tetrahit	1	5	1									
Galium aparine	2	9	1	2	6	1	2	5	2	1	14	1
Lamium sp.	1	5	1									
Odontites vernus	1	5	1				15	10	14			
Papaver rhoeas	1	5	1				2	5	2			
Papaver somniferum							2	5	2			
Persicaria lapathifolia	2	9	1									
Persicaria maculosa	4	14	2									
Persicaria sp.	3	14	1									
Plantago major	1	5	1	1	3	1						
Polygonum aviculare agg.	52	46	20	19	22	8	33	25	28			
Ranunculus sardous				1	3	1						
Reseda lutea				1	3	1						
Scleranthus annuus	1	5	1				3	5	3			
Sherardia arvensis							1	5	1			
Solanum nigrum	1	5	1				3	5	3			
Spergula arvensis	3	14	1	1	3	1	2	5	2	81	14	81
Stellaria media	17	32	8	6	15	2	7	15	5			
Thlaspi arvense				1	3	1						
Tripleurospermum inodorum	11	36	2	21	28	5	33	20	28			
Urtica urens	2	9	1									
Valerianella dentata	1	5	1	2	3	2	1	5	1			
Viola subg. *Melanium*	1	5	1									
Grassland												
Filipendula ulmaria				2	6	1						
Lathyrus nissolia	1	5	1				1	5	1			
Leucanthemum vulgare										1	14	1
Linum catharticum				3	9	1	2	10	1	1	14	
Medicago lupulina	15	27	4	10	19	3	14	15	8	2	29	1
Medicago/Trifolium/Melilotus sp.	25	27	16	21	22	8	28	15	17			
Plantago lanceolata	7	18	4	6	9	4	4	5	4			
Poaceae indet.	465	2	134	1257	75	692	716	75	596	17	71	10
Potentilla erecta				1	3	1						
Prunella vulgaris	14	9	13	1	3	1	6	20	2	1	14	
Ranunculus a. r. b.	11	9	10	16	6	15	19	15	13			
Ranunculus repens	1	5	1									
Rhinanthus minor				1	3	1	8	10	7			

	Period 0			Period 1			Period 2			Period 3/4		
	Σ	**Ubiq (%)**	**Max**	**Σ**	**Ubiq (%)**	**Max**	**Σ**	**Ubiq (%)**	**Max**	**Σ**	**Ubiq (%)**	**Max**
Stellaria graminea	13	9.1	12	3	3	3	1	5	1			
Trifolium sp.	62	18	51	21	31			3	15	26	8	2
Viola subg. *Viola*	3	5	3									
Heathland												
Ericaceae indet. seed capsules				902	3	902						
Wetland												
Eleocharis palustris	121	68	27	42	56	7	168	60	85	5	29	2
Iridaceae indet.	1	5	1									
Isolepis setacea	1	5	1	1	3	1						
Lychnis flos-cuculi	1	5	1									
Wetland												
Persicaria hydropiper	1	5	1									
Ranunculus flammula							1	5	1	1	14	1
Schoenoplectus lacustris							8	5	8			
Woodland												
Corylus avellana (nutshell)	3	9	2	1	3	1	1	5	1	1	14	1
Luzula sp.				1	3	1						
Rubus sect. *Glandulosus*	2	9	1	2	6	1	2	10	1			
Salix sp. (bud)				1	3	1						
Various												
Arctium sp.	1	5	1									
Carduus/Cirsium sp.	1	5	1				2	5	2			
Carex sp.	50	64	16	26	41	9	51	45	13	13	43	2
Cerastium fontanum	1	5	1									
Cyperaceae indet.	1	5	1	18	16	14	19	10	18	3	14	
Euphrasia/ Odontites sp.	1	5	1									
Galium sp.	1	5	1				1	5	1	1	14	1
Juncus indet	1	5	1	1	3	1						
Montia fontana ssp.	5	14	2	3	9	1	5	15	2			
Potentilla sp.	2	5	2									
Ranunculus subg. *Ranunculus*	2	5	2	3	6	2	1	5	1	6	14	
Rumex acetosella agg.	38	41	19	25	3	10	59	45	25	2	29	1
Rumex sp.	135	73	34	51	53	11	303	50	270	5	29	2
Sambucus nigra	3	4.5	3	27	19	19	17	20	9			
Silene sp.				1	3.1	1						
Vicia/Lathyrus sp.	53	55	29	16	31	3	59	30	29	1	14	1
Bread/dung	3	9	2									
Bread/porridge	1	5	1	5	9	3	8	15	4			
Bud	68	55	18	47	44	7	4	15	2			
Indet. seed capsules	39	5	39	14	6	13						
Leaf abscission pads	9	9	7	4	9	2						

Table 6.9 Assessment of charred fodder samples from Insula IX

Period	Sample	Context	Crop items	Non-typical contents	Crop-processing result
0	2978	9170	Barley grain	*Isolepis setacea*	mixed
0	3279	9025	Barley grain	*Ranunculus a. r. b.*, *Stellaria graminea*	mixed
1	629	3580	Barley grain	*Isolepis setacea*	mixed
1	5991	11681	Spelt grain	Ericaceae indet. capsules, *Medicago lupulina*, *Ranunculus a. r. b.*	mixed
2	780	5123	Barley grain	*Prunella vulgaris*, *Ranunculus a. r. b.*, *Rhinanthus minor*	mixed
2	818	5606	Barley grain	*Medicago lupulina*, *Prunella vulgaris*, *Ranunculus a. r. b*, *Rhinanthus minor*	mixed
2	1428	6682	Barley grain	*Ranunculus a. r. b.*, *Rhinanthus minor*, *Rumex* sp.	mixed

Table 6.10 Results of crop type, ratio and discriminant analysis of charred samples from Insula IX
***Low levels of contamination, ** High levels of contamination, H = high probability, L = no probability, svd = pre-sieved**

Period	Sample	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	Ratio Outcome	DA 1st group	P Value	DA 2nd group	Combined outcome	Crop items/L
0	2978	Barley*	-	-	-	3	0.98	4	Mixed	1.3
0	3216	Spelt**	0	2.7	Spelt** FSBP	3	0.99	4	Spelt** FSBP H	2.5
0	3279	Barley	-	12	Barley FSP	3	1	4	Mixed	1.0
0	4068	Spelt*	0.2	0.6	Spelt* FSBP	3	0.91	4	Spelt* FSBP H	4.0
0	5956	Spelt*	0.2	4	Spelt* FSBP	3	0.99	4	Spelt* FSBP H	1.2
0	5976	Barley*	-	10	Barley* FSP	3	1	4	Mixed	0.3
0	6025	Spelt*	0.1	-	Spelt* FSBP	4	0.65	3	Spelt* FSBP svd L	3.8
0	6147	Spelt*	0.3	6.5	Spelt* FSBP	3	0.99	4	Spelt* FSBP H	1.1
0	7068	Spelt*	0.2	3	Spelt* FSBP	4	0.99	3	Spelt* FSBP svd H	7.5
0	7140	Spelt*	0.3	-	Spelt* FSBP	3	0.99	1	Spelt* FSBP H	1.2
0	7232	Mixed	0.2	7	-	3	0.97	4	Mixed	1.7
0	7556	Barley**	-	11	Barley** FSP	3	0.99	4	Mixed	0.5
1	629	Barley*	-	12	Barley* FSP	3	0.57	4	Mixed	0.6
1	4631	Mixed	-	-	-	4	0.99	3	Mixed	2.3
1	5542	Barley**	1.5	7.5	Barley** FSP	3	0.98	4	Mixed	6.4
1	5622	Mixed	2.3	3.8	-	4	0.99	3	Mixed	14.0
1	5750	Mixed	0.5	10	-	3	0.97	4	Mixed	0.5
1	5762	Barley	-	19	Barley FSP	-	-	-	Barley FSP no	3.2
1	5805	Spelt	0	-	Spelt FSBP	4	0.86	3	Spelt FSBP svd L	0.4
1	5991	Spelt	27	-	Spelt FSP	3	0.99	4	Mixed	1.6
1	6299	Spelt*	0.5	-	Spelt* FSBP	3	0.99	4	Spelt* FSBP H	0.4

Period	Sample	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	Ratio Outcome	DA 1st group	P Value	DA 2nd group	Combined outcome	Crop items/L
1	6816	Mixed	-	-	-	3	0.84	4	Mixed	1.0
1	7673	Spelt*	0.1	-	Spelt* FSBP	4	0.78	3	Spelt* FSBP svd L	0.7
1	7703	Spelt*	0.2	-	Spelt* FSBP	-	-	-	Spelt* FSBP	0.4
1	8956	Spelt	0.1	0.1	Spelt FSBP	4	0.99	3	Spelt FSBP svd H	312.8
2	780	Barley*	-	16	Barley* FSP	3	1	4	Mixed	2.0
2	818	Barley*	-	13	Barley* FSP	3	0.99	1	Mixed	1.6
2	1428	Barley	-	12	Barley FSP	3	1	4	Mixed	1.3
2	1591	Spelt	1.2	-	Spelt spikelets	-	-	-	Spelt spike svd no	2.6
2	1740	Spelt	0.3	-	Spelt FSBP	4	0.99	3	Spelt FSBP svd H	419.8
4	324	Spelt	0	-	Spelt FSBP	3	1	4	Spelt FSBP H	2.7
5	378	Spelt	2.3	-	Spelt FSP	4	0.99	3	Spelt FSP H	0.4
5	392	Spelt	1.9	-	Spelt FSP	4	0.99	3	Spelt FSP H	1.3

Table 6.11 Summary of taxa identified in mineralised samples from Insula IX

	Period 1			Period 2			Period 5		
No. of samples			2			2			5
Average items/L			449.2			14.8			142.5
∑ items			34966			1853			694
	∑	**Presence**	**Max**	**∑**	**Presence**	**Max**	**∑**	**Presence**	**Max**
Cereals									
Barley grain	1	1	1	2	1	2	25	2	24
Emmer grain							6	2	5
Spelt grain				4	1	4	9	2	8
Spelt/emmer grain	1	1	1				11	2	6
Triticum sp.	32	1	32	5	1	5			
Cereal indet. grain	160	1	160	82	1	82	178	2	167
Cereal bran	1129	2	1128						
Emmer/spelt glume base	2	1	2	10	1	10	4	1	4
Spelt glume base	16	1	16	6	1	6	18	1	18
Food plants									
Brassica/Sinapsis sp.				2	1	2	2	2	1
Celery	7664	1	7664	25	1	25	4	1	4
Celtic bean				1	1	1	2	1	2
Coriander	73	1	73	19	1	19	5	4	2
Cucumber							1	1	1
Dill	536	1	536	46	1	46	1	1	1
Fig	7096	1	7096	150	1	150	2	1	2
Flax	32	1	32	1	1	1			
Grape				5	1	5	2	1	2
Lentil	83	2	82	3	1	3	40	2	36
Mulberry	65	1	65	14	1	14			
Pea	9	1	9	66	1	66			
Bean/ Pea	40	1	40				2	1	2
Plum/Damson	9	1	9	2	1	2	1	1	1
Plum/Cherry	354	2	348	128	2	127			
Sweet cherry				1	1	1	7	2	6
All Prunus	363	2	357	131	2	130	8	3	6
Pear/Apple	193	2	186	3	1	3	107	5	67
Summer savory				1	1	1	1	1	1
Disturbed (arable)									
Agrostemma githago				1	1	1	1	1	1
Atriplex sp.				2	1	2	9	2	8
Avena sp.	24	1	24	1	1	1	2	1	2
Bromus secalinus	64	1	64	3	1	3	3	2	2
Chenopodium sp.				5	2	3	1	1	1
Fallopia convolvulus	1	1	1				1	1	1
Galium aparine				2	1	2			
Lamium sp.							5	2	4
Odontites vernus	64	1	64				1	1	1
Papaver somniferum	32	1	32	6	2	5	1	1	1
Polygonum aviculare				3	2	2			
Reseda luteola				1	1	1			
Scleranthus annuus	32	1	32						
Stellaria media gp.	32	1	32	1	1	1	5	3	2
Torilis sp.							1	1	1
Urtica dioica	1536	1	1536	32	2	29	3	3	1
Urtica urens	352	1	352	12	2	10	9	4	6

	Period 1			Period 2			Period 5		
	∑	Presence	Max	∑	Presence	Max	∑	Presence	Max
Grassland									
Linum catharticum	288	1	288						
Medicago lupulina							2	2	1
Medicago sp.	64	1	64	1	1	1	1	1	1
Plantago lanceolata				1	1	1			
Prunella vulgaris				1	1	1			
Ranunculus repens							2	2	1
Rhinanthus minor	32	1	32						
Poaceae indet.	936	1	936	17	2	16	7	4	3
Heathland									
Bracken (frond)				2	1	2	1	1	1
Woodland									
Crataegus sp.	1	1	1						
Fragaria vesca							20	1	20
Rubus sect. *Glandulosus*	5417	1	5417	79	1	79	4	3	2
Wetland									
Eleocharis palustris	64	1	64				1	1	1
Various									
Carduus/*Cirsium* sp.				71	1	71	2	1	2
Carex sp.				7	2	6	2	2	1
Conium maculatum	464	1	464	6	2	5	27	3	14
Juncus indet.	256	1	256						
Lithospermum arvense	32	1	32	1	1	1	1	1	1
Malva sp.							1	1	1
Mentha sp.	320	1	320	3	1	3			
Potentilla sp.	32	1	32	2	2	1			
Ranunculus sp.	32	1	32	9	1	9	2	1	2
Rumex acetosella				1	1	1			
Rumex sp. (not *acetosella*)	160	1	160	28	2	20	2	2	1
Vicia/Lathyrus sp.	64	1	64						

Chapter 7 Tables

Table 7.1 Number of regional records studied by period and area (charred/mineralised/waterlogged records)

Area	Period						
	Mid Iron Age	Late Iron Age	Early Roman	Mid Roman	Late Roman	Roman	Iron Age/ Roman
Hampshire Downs	24/2/-	10/1/-	14/-/4	8/-/5	10/1/1	7/-/-	3/-/-
Mid Thames	3/-/2	1/-/1	8/1/2	4/1/1	5/1/3	4/-/3	-/-/-
Thames Heaths	3/-/-	2/-/2	2/1/1	3/-/1	3/1/1	2/-/2	-/-/-
Upper Thames	11/1/-	4/-/-	10/-/3	4/-/1	7/-/2	4/-/-	2/-/-
Total	39/3/2	17/1/3	34/2/10	19/1/8	25/3/7	17/-/5	5/-/-

Table 7.2 Summary of crop items within fully quantified samples in the regional study

Crop item	Sample count	Sum
Spelt grain	263	8397
Spelt glume base	341	19150
Emmer grain	71	476
Emmer glume base	61	298
Barley grain	634	14324
Barley rachis	209	2824
Free-threshing wheat grain	149	1360
Free-threshing wheat rachis	31	46
Rye grain	14	61
Rye rachis	4	14
Cultivated oat	7	11
Cultivated oat floret base	6	36
Flax seed	7	11

Table 7.3 Summary of regional samples selected for crop-processing and weed ecology analysis by period and region

	No. of samples in crop-processing analysis/ No. of samples in weed ecology analysis				
	Area				
Period	**Hampshire Downs**	**Mid Thames**	**Thames Heaths**	**Upper Thames**	**Total**
MIA	43/33		3/2	51/39	97/74
LIA	22/16	2/1	6/4	4/2	34/23
ER	16/ 10	12/9	7/4	32/26	67/49
MR	3/2	2/1	3/0	1/1	9/4
LR	30/17	1/0	5/4	15/12	51/33
R	9/ 6	2/0	2/2	6/6	19/14
IA/R	1/1			13/12	14/13
Total	130/85	19/11	26/16	122/98	291/210

Table 7.4 Results of regional crop-processing analysis

Site	Abbreviation	Period	Barley FSP	Spelt FSBP	Spelt FSBP (sieved)	Spelt FSP	Spelt spikelets (sieved)	Spelt spikelets	Mixed
All Souls Farm	ASF	ER		2	1				
		LR				1			
Ashville	ASV	MIA	5		17				7
		LIA	1						2
		R			2	1	1		
Abingdon Vineyard	AVY	MIA		4	8				2
		IA/R		3	5		2		1
		ER		7	6	5			5
		LR					1		
Abingdon West Central	AWC	ER		1	1				
		R					2		
Barton Court Farm	BCF	LIA				1			
		LR		1	1	1		2	2
Bagnor Road	BGR	LR		4			1		
Brighton Hill South	BHS	MIA	1		1				1
		LIA	1		1				2
		ER		1	1	2			2
Balksbury	BLK	MIA				1			1
		LR							1
Bury Hill	BRH	MIA	2				2		2
Berrick Salome	BRS	MIA	2						1
		LR	1		2	1			
Bath Rd, Thatcham	BTR	MR							1
Castle Hill Landscape	CHL	MIA			2		1		2
Community Hospital	CMH	ER			1				
Danebury	DAN	MIA			2	1	1		
		LIA				1			
Denchworth Rd	DWR	ER		2					
		MR		2					
		LR		1					
Easton Lane	ESL	MIA			1				
Enwick Shaw	EWS	MIA				1			
		R			1				
Fir Hill, Bossington	FHB	IA/R			1				
Fullerton	FLT	LR	1	1					3
Gatehampton Farm	GHF	R			1				
Grateley	GRT	LIA	1	1	1				
		ER		1	1				
High St, Staines	HST	ER		1					1
Jennett's Park	JNP	ER		1					

Site	Abbreviation	Period	Barley FSP	Spelt FSBP	Spelt FSBP (sieved)	Spelt FSP	Spelt spikelets (sieved)	Spelt spikelets	Mixed
Merton Rise	MRR	ER			3				
		R		1					
Nettlebank Copse	NTB	MIA			1				
		LIA	2		4				2
Old Kempshott Lane	OKL	MIA				2			3
		ER				1			
Park Farm	PKF	ER			1				
Park Prewett Hospital	PPH	LR					1		
Perry Oaks	PRO	LIA		1		1			
		ER			5				
		MR		1					
		R							1
Reading Business Park	RBP	R	1						
Rowbury Farm	RWF	MIA		1	2				
		ER			1				
		R			1				
Suddern Farm	SDF	MIA		1					
		LIA	1		2	1			1
		MR			1				
Silchester, Insula IX	SIX	LIA		3	1				2
		ER	1		2				3
Thorpe Lea Nurseries	TLN	MIA							1
		R	1		1				
Turnpike School	TPS	MR		1				1	
Thruxton	TRX	LIA		1					
Viables Farm	VBF	MIA				2	3		
Watchfield	WCF	ER			4	1			
Woodcote Rd	WCR	IA/R			1				
Woolbury	WLB	ER	1						
Northgate House, Winchester	WNH	ER	1	1					
		LR							1
Weston Down	WSD	MIA			6				
		LR			1				

Table 7.5 Average percentage of crop items within the regional study

	No. of samples/ sites	Spelt grain	Spelt glume base	Barley grain	Barley rachis	FTW grain	FTW rachis
Period							
MIA	91/19	24.8%	54.3%	17.9%	1.5%	1.4%	0.1%
LIA	32/10	22.1%	46.3%	26.4%	4.0%	0.7%	0.5%
ER	105/18	21.7%	59.3%	12.5%	1.6%	4.7%	0.2%
MR	8/6	16.3%	75.0%	4.5%	0.3%	3.6%	0.3%
LR	50/13	39.5%	41.9%	12.3%	1.8%	3.7%	0.7%
R	19/11	15.5%	65.6%	17.0%	1.4%	0.2%	0.4%
IA/R	14/4	26.1%	63.0%	8.4%	0.4%	2.0%	0.0%
NCA							
Hampshire Downs	118/24	28.6%	53.0%	13.3%	2.3%	2.4%	0.5%
Mid Thames	19/6	19.3%	62.3%	11.9%	1.5%	4.6%	0.5%
Thames Heaths	24/6	23.2%	51.4%	22.4%	2.6%	0.3%	0.0%
Upper Thames	119/10	24.1%	54.5%	17.4%	1.1%	2.8%	0.2%
Landscape category							
A Upland chalk	74/16	23.3%	57.4%	15.3%	2.3%	1.4%	0.3%
B Upland chalk/head	36/3	45.2%	47.0%	5.7%	1.0%	1.2%	0.0%
C Upland other	21/5	23.7%	52.1%	20.3%	3.2%	0.5%	0.1%
D Upper terrace	87/10	24.4%	56.3%	13.3%	1.8%	3.7%	0.5%
E Lower terrace/floodplain	21/8	21.7%	57.3%	19.3%	1.1%	0.5%	0.0%
F Lowland chalk	41/4	17.8%	49.3%	26.2%	0.9%	5.4%	0.3%
Site type							
Hillfort	11/11	40.8%	30.1%	26.6%	2.0%	0.5%	0.0%
Oppida	20/2	17.1%	62.3%	17.1%	3.3%	0.2%	0.0%
Towns	38/5	22.8%	50.9%	15.0%	1.3%	10.0%	0.0%
Villas	32/3	47.9%	35.9%	11.2%	1.9%	2.0%	1.1%
Enclosed	74/17	22.7%	62.0%	11.1%	2.4%	1.4%	0.4%
Open	40/6	21.9%	47.3%	27.1%	0.8%	2.7%	0.3%
Rural other	60/22	20.3%	62.8%	15.2%	1.4%	0.2%	0.2%

Table 7.6 Classification by period of samples by the lowest maximum weed height per sample

Lowest maximum weed height/cm	MIA	LIA	ER	MR	LR	R	IA/R
<40	82	33	53	3	24	12	13
40-70	10	1	10	5	17	7	1
>70	5	0	4	1	9		

Table 7.7 Summary of regional crop analysis results

	Site Type	Site & Landscape	Main c-p stages	Spelt FSBP - soil type	Spelt FSP – sowing time	Pulses	Flax	Corn driers	Average % spelt	Average % barley	Average % FTW
Mid/Late Iron Age	Hillforts	Danebury (MIA) (n=3)	Spelt FSBP & spikelets - *sieved, low density*	-	Autumn				83	15	2
	Open settlements	Ashville (MIA) (n=29)	Barley FSP, Spelt FSBP - *sieved, low density*	-	Autumn/ Spring				63	33	4
	Enclosed settlements	Brighton Hill South (MIA) (n=3)	Barley FSP, Spelt FSBP - *sieved, low-high density*	-	Autumn/ Spring				59	41	0
		Weston Down (MIA) (n=6)	Spelt FSBP, - *sieved, low-high density*	-	Autumn/ Spring				97	3	0
	Oppida	Abingdon Vineyard (MIA) (n=14)	Spelt FSBP - *some sieved, low-high density*	Marginal damp soil types, low land areas	Spring				88	11	1
		Silchester (LIA) (n=6)	Spelt FSBP - *low density*	Marginal damp soil types, low land areas	Autumn	+	+		59	40	1
Early Roman	Towns	Abingdon Vineyard (ER) (n=23)	Spelt FSBP, Spelt FSP - *some sieved, low-high density*	Marginal damp soil types, low land areas	Spring	+	+		70	15	15
		Silchester (ER) (n=6)	Barley FSP, Spelt FSBP - *sieved, low-high density*	Marginal damp soil types, low land areas	Autumn	+	+		64	35	1
	Enclosed settlements	Brighton Hill South (ER) (n=6)	Spelt FSP, FSBP - *sieved, high density*	-	Autumn/ Spring				73	27	0
		Marnel Park (R) (n=4)	Spelt FSBP	Marginal damp soil types, low land areas	-	+		+	99	1	0
		Merton Rise (ER) (n=3)	Spelt FSBP - *sieved*	-	Autumn/ Spring	+			96	4	0
Late Roman	Villas	Grateley Villa (LR) (n=20)	Spelt FSP, spikelets & FSP - *sieved, high density*	Chalk, fertile, drier	Autumn/ Spring	+		+	92	5	3
		Barton Court Farm Villa (LR) (n=7)	Spelt spikelets, FSBP, FSP - *sieved, high density*	Clay	-	+	+	+	75	23	2
	Rural field systems	Bagnor Road (LR) (n=5)	Spelt spikelets, FSBP - *high density*	Clay	Autumn			+	92	8	0
		Berrick Salome (LR) (n=4)	Barley FSP, Spelt FSP, Spelt FSBP - *sieved, high density*	-	Autumn/ Spring			+	59	41	0

Table 7.8 Summary of mineralised and waterlogged rural/town records of introduced flavourings, fruits and nuts in the regional study

	Celery	Coriander	Dill	Fennel	Pear/Apple	Damsons/ Plums	Sweet Cherry	Fig	Grape	Medlar	Mulberry	Pine nut	Walnut
Late Iron Age	-/1	-/1	-/1		-/1								
Early Roman	-/2	1/2	-/1	-/1	-/1	-/1	-/1	4/-	1/-		-/1	-/1	-/1
Mid Roman	1/2	-/2	-/1			-/2	-/1	3/-	1/2			-/1	-/2
Late Roman	-/1	1/2	1/1	-/1	-/2	2/2	-/2	3/-					-/2
Roman		2/-								-/1			

Chapter 8 Tables

Table 8.1 Summary of archaeobotanical records from oppida. G = good, S = satisfactory, P = poor.

Site	Oppida	Site type	Preservation	No. of samples	Quality	Reference
Mid Iron Age						
Vineyard	Abingdon	Settlement	C	64	G	Stevens 1996
Stanway	Camulodunum	Burial	C	14	S	Murphy & Fryer 2007
Dragonby	Dragonby	Settlement	C	44	S	Van der Veen 1996
Staple Gardens	Oram's Arbour	Settlement	M	1	P	Biddle 2004
Staple Gardens	Oram's Arbour	Settlement	C	1	P	"
Sussex Street	Oram's Arbour	Settlement	C	3	P	Green 2004
Northgate House	Oram's Arbour	Settlement	C	10	S	Carruthers 2011
Late Iron Age						
Skeleton Green	Braughing	Settlement	C	1	P	Monk 1981
Stanway, site D	Camulodunum	Cremations	C	8	P	Fryer 2007
Stanway, site D	Camulodunum	Unclear	C	7	P	"
Fishbourne	Chichester	Unclear	C	2	P	Pelling 2005
Dragonby	Dragonby	Settlement	W	1	G	Van der Veen 1996
Hengistbury Head	Hengistbury Head	Trading site	C	-	S	Nye and Jones 1987
Hengistbury Head	Hengistbury Head	Trading site	W	-	P	Robinson unpubd.
Forum-Basilica	Silchester	Settlement	C	6	S	Jones 2000
Forum-Basilica	Silchester	Settlement	W	5	S	"
Insula IX	Silchester	Settlement	C	20	G	This thesis
Insula IX	Silchester	Settlement	W	9	G	"
Site 9	Stanwick	Settlement	C	74	G	Van der Veen fc
Folly Lane	Verulamium	Burial	C	9	S	Murphy & Fryer 1999
Late Iron Age/Roman						
Stanway	Camulodunum	Burial	C	7	S	Murphy & Fryer 2007
Vineyard	Abingdon	Oppida	C	40	G	Stevens 1996

Table 8.2 Summary of archaeobotanical records from major towns

Town	Classification	No. of records			No. of samples		
		Charred	Mineralised	Waterlogged	Charred	Mineralised	Waterlogged
Caerwent	Civitas			1			8
Cirencester	Civitas	1			1		
Colchester	Colonia	10	1		107	2	
Dorchester	Civitas	7	3		92	15	
Leicester	Municipum	11	3		52	6	
Lincoln	Colonia	2		3	4		5
London	Capital	35	8	47	293	14	363
Silchester	Civitas	4	2	4	65	9	80
Verulamium	Municipum	4			19		
Winchester	Civitas	7	1	8	34	2	19
Wroxeter	Civitas	1			14		
York	Colonia	5		15	100+		

Table 8.3 Charred clean grain deposits from major towns
*** Indicates spikelets. ? Indicates crop items were not quantified**

Record	Site	Context	Dominant crop			
			Spelt (emmer)	Emmer (spelt)	Barley	Bread wheat
	Early Roman					
T4	Balkerne Lane, Colchester	Pre-Boudican building 38	+			
T4	Balkerne Lane, Colchester	Pre-Boudican building 41		+		
T4	Balkerne Lane, Colchester	Pre-Boudican building 45	+			
T7	Cups Hotel, Colchester	Pre-Boudican building 152		+		
T5	Culver Street, Colchester	Pre-Boudican building 78	+			
T85	The Forum, London	Pre-Boudican building	+			
T47	168 Fenchurch Street, London	Pre-Boudican building 2	+			
T47	168 Fenchurch Street, London	Post-Boudican building 9	+			
T72	Monument House, London	Deposit of grain over fire debris	?			

Record	Site	Context	Dominant crop			
			Spelt (emmer)	Emmer (spelt)	Barley	Bread wheat
	Early Roman					
T37	Site C, 1 Poultry, London	Granary				+
T37	1 Poultry, London	Pre-Boudican building 13	+			
T37	1 Poultry, London	Bag of grain, open area 22	+		+	
T77	Site 23, Southwark, London	Pre-Boudican building 7	+		+	
T77	Site 24, Southwark, London	Building 1	+			
T78	Site C, NW Southwark	Building 9 cellar			+	
	Mid Roman					
T119	Coney Street, York	Military granary	+			
T124	5 Rougier Street, York	Burnt layer from granary	+			
T78	Site 23, Southwark, London	Buildings 30 and 31	?			?
T86	The Waterfront, London	Deposit sealed by building dumps	+			
T97	Insula XIII, Verulamium	Deposit in burnt granary, room 10, <6>	*			
T97	Insula XIII, Verulamium	Deposit in burnt granary, room 10, <5>			+	
T99	Verulamium	Foundations of granary	+			

Table 8.4 Composition of stable manure and fodder deposits from major towns

Record	Site	Context	Preservation	Component									
				Heathland material	Flax seeds	Flax capsules	Straw	Barley grain	Barley chaff	Spelt grain	Spelt chaff	Hay	Salt marsh pasture
	Late Iron Age												
	Insula IX, Silchester	Well 8328	W	■	■	■	■				■	■	
	Early Roman												
T5	Culver Street, Colchester	Floor in building 77	C									■	
T10	Head Street, Colchester	Floor	C								■	■	
T70	Leadenhall Court, London	External dump/midde	W									■	
T79	Paternoster Square, London	Various features	C					■		■	■	■	
T37	1 Poultry, London	Open area 19	W	■						■	■	■	■
T94	Insula IX, Silchester	Well 5791	W	■	■	■	■		■		■	■	
	Mid Roman												
T6	Culver Street, Colchester	Occupation deposits in	C					■			■	■	
T25	Castle Street, Leicester	Floor 18	C							■		■	
T28	Causeway Lane, Leicester	Ditch and rubbish pit	C		■	■	■	■	■	■	■	■	
T36	Lincoln Waterside	Gully fill	W									■	
T40	Arthur Street, London	Waterfront dumps <6>,	W				■					■	
T95	Insula IX, Silchester	Well 5375	W	■							■	■	
T97	Insula XIII, Verulamium	Floor	C					■		■	■	■	
T44	15-35 Copthall Avenue, London	Sunken hearth (222)	W									■	
T124	Tanner Row, York	Organic surface	W	■	■		■	■	■	■	■	■	
	Late Roman												
T29	Causeway Lane, Leicester	Quarry fill F766	C									■	
T129	The Bedern well, York	Well	W	■	■							■	■

Table 8.5 Presence of imported fruits, nuts, flavourings, oil seeds and pulses at major towns

	Caerwent	Cirencester	Colchester	Dorchester	Exeter	Leicester	Lincoln	London	Silchester	Verulamium	Winchester	Wroxeter	York
Imported fruits & nuts													
Almond								■					
Date			■					■					
Fig			■	■		■	■	■	■		■		■
Grape			■	■		■		■	■		■	■	■
Medlar									■				
Mulberry			■					■	■				■
Olive			■			■			■				■
Peach								■					
Pine nut			■					■	■	■	■		■
Pomegranate								■					
Walnut			■					■		■	■		■
Cultivated fruits & nuts													
Pear/Apple				■		■		■	■		■		■
Plum/Cherry			■	■		■		■	■		■		
Bullace/Damson							■	■	■		■		■
Peach													
Plum								■	■		■		■
Sweet cherry								■	■		■		■
Flavourings & oil crops													
Anise			■					■					
Black cumin								■					
Black pepper								■					
Caraway									■				
Celery			■				■	■	■		■		■
Coriander	■		■			■	■	■	■		■		■
Dill	■		■				■	■	■				■
Fennel	■		■					■	■				■
Flax		■	■			■		■	■	■			■
Gold of pleasure			■					■					
Marjoram								■					
Opium poppy	■		■		■	■		■	■		■		■
Summer savory								■	■				■
White horehound								■					■
Pulses													
Celtic bean		■		■		■		■	■	■			■
Lentil			■	■		■		■	■				■
Pea	■			■		■		■	■	■	■		■

	Caerwent	Cirencester	Colchester	Dorchester	Exeter	Leicester	Lincoln	London	Silchester	Verulamium	Winchester	Wroxeter	York
Wild fruits & nuts													
Blackberry	■		■	■		■	■	■	■		■		■
Currant								■					
Elderberry	■		■		■	■	■	■	■		■	■	■
Hawthorn								■	■				
Hazelnut	■	■	■	■		■	■	■	■	■	■	■	■
Raspberry	■							■	■		■		■
Sloe	■			■		■	■	■	■	■	■		■
Wild Strawberry					■	■		■	■				■

Chapter 10 Tables

Table 10.1 Key insights from each mode of preservation at Insula IX

	Charred	Mineralised	Waterlogged
Late Iron Age food imports		-	+
Animal stabling			+
Cereal crop choice	+		(+)
Flax	(+)	(+)	+
Cultivation practices	+		
Landscape utilisation	(+)		+

Chapter 1 Figures

Figure 1-1 Location of Silchester and other oppida in Britain

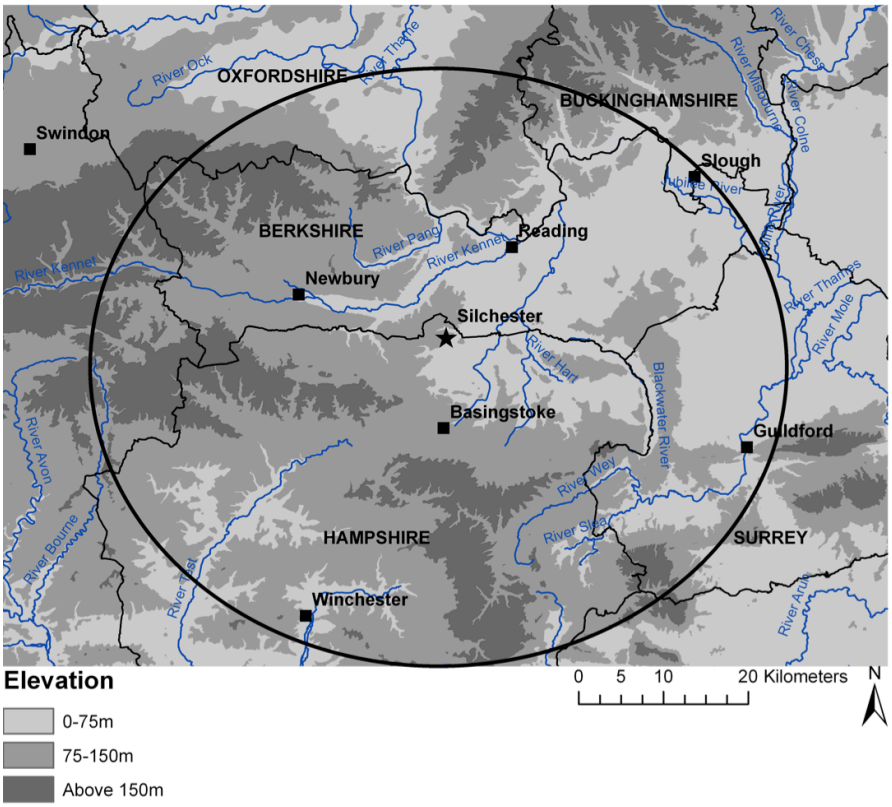

Figure 1-2 Modern location of Silchester and the regional study area

Chapter 3 Figures

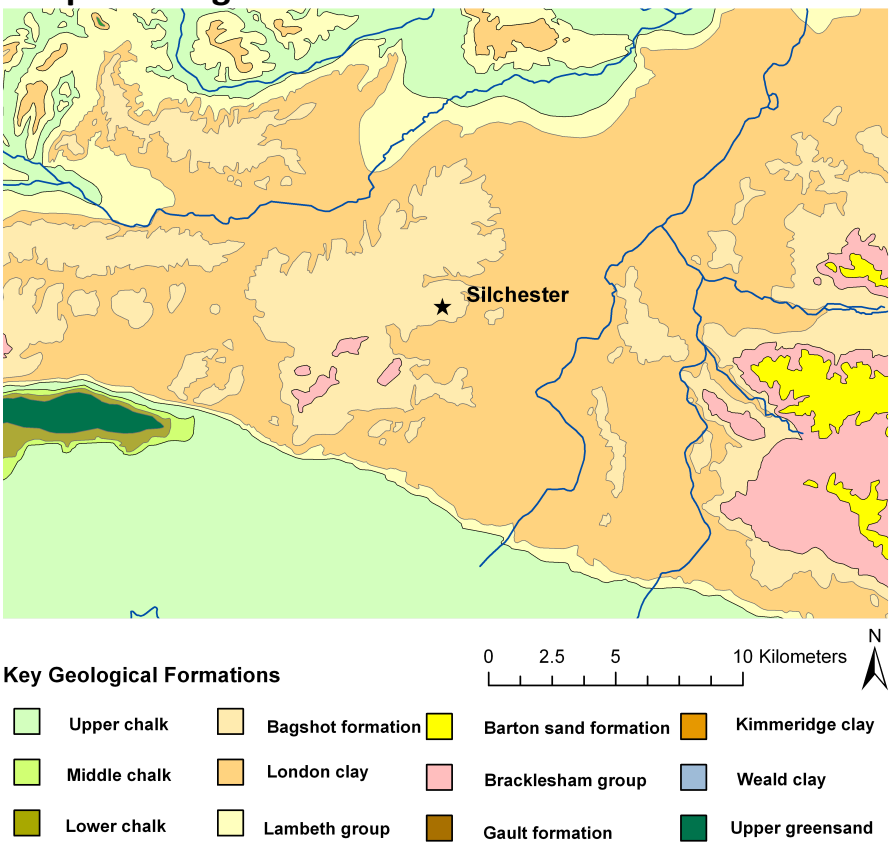

Figure 3-1 Geological map of the Silchester hinterland

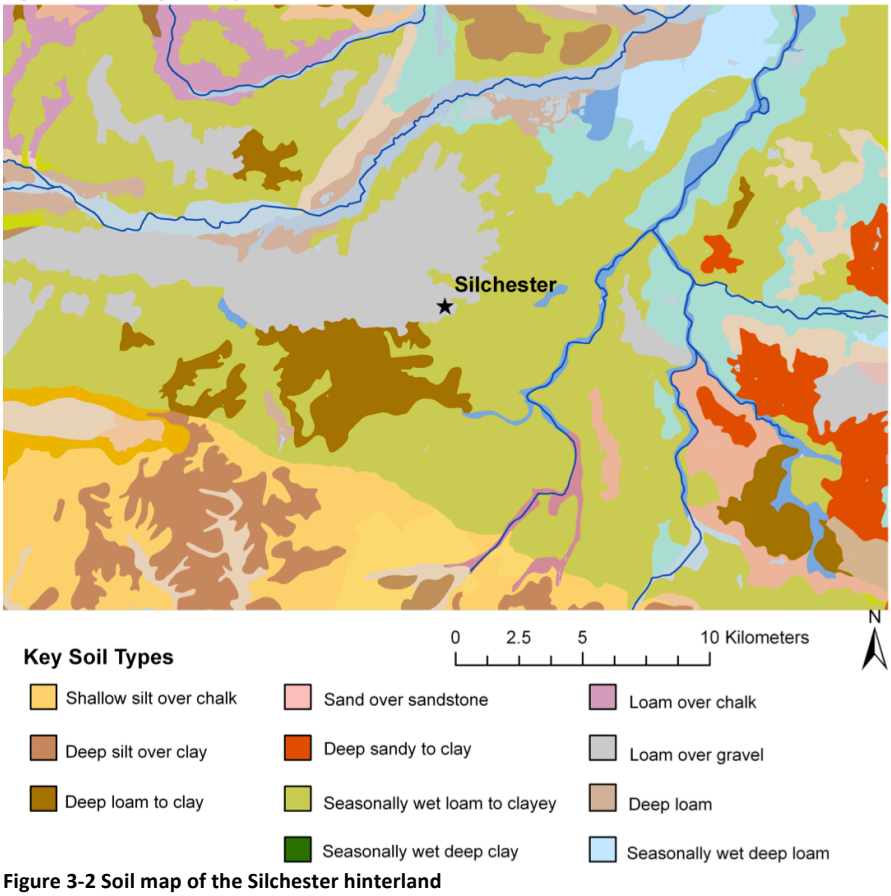

Figure 3-2 Soil map of the Silchester hinterland

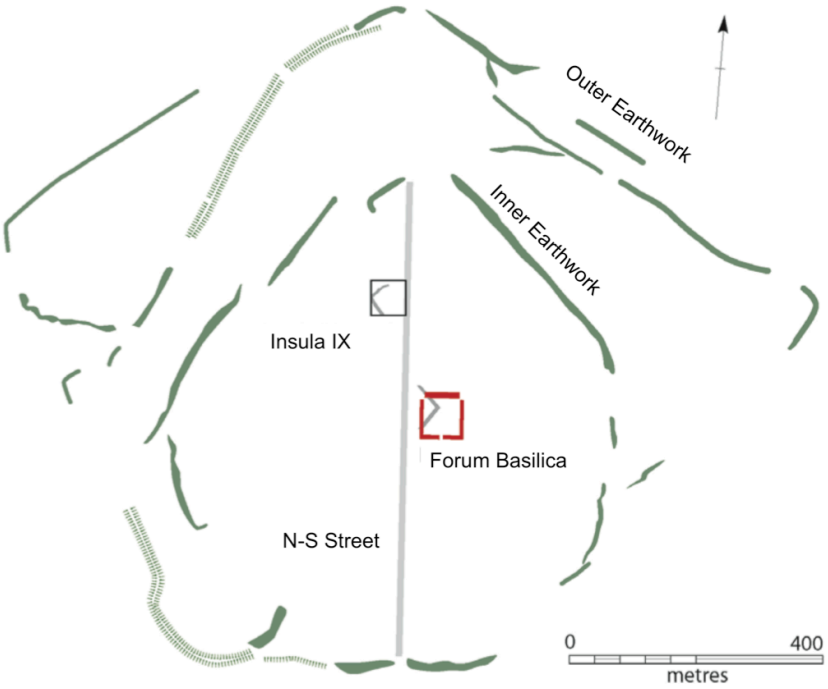

Figure 3-3 Plan of Late Iron Age Silchester showing the location of the Insula IX and Forum Basilica excavations, the path of the initial north-south street through the town, and the location of the Inner and Outer Earthworks

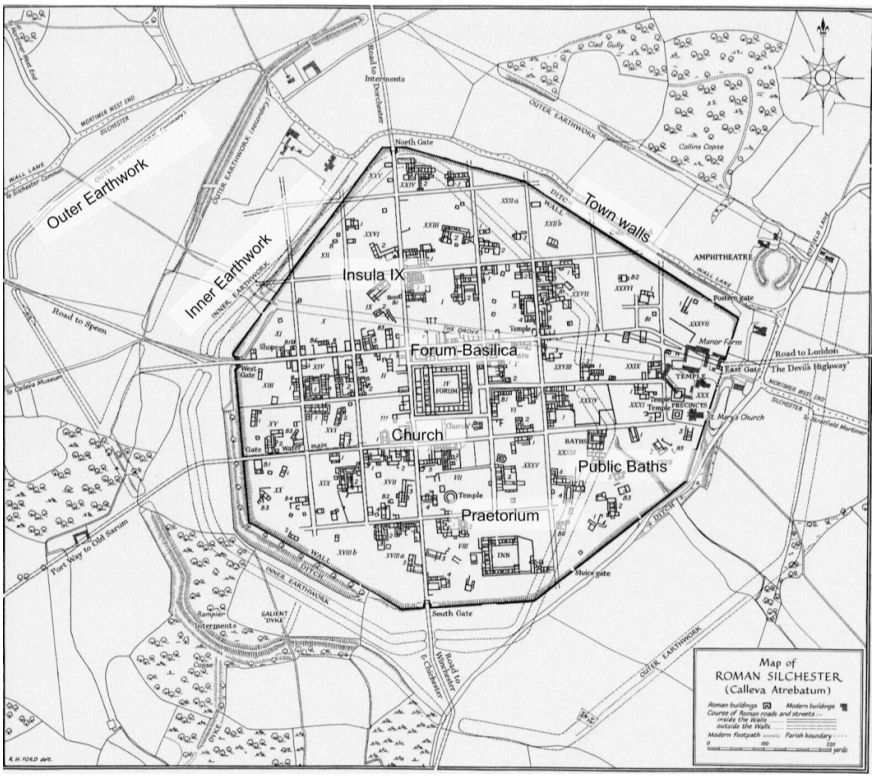

Figure 3-4 Plan of the Society of Antiquaries excavations at Silchester indicating the locations of the places mentioned in the text

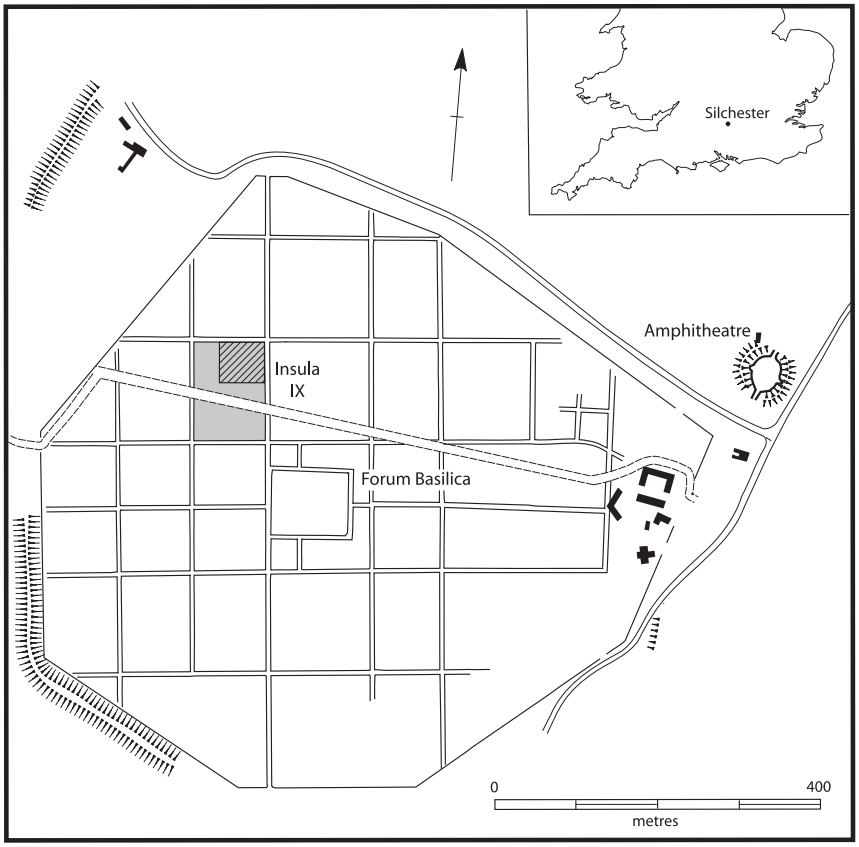

Figure 3-5 Plan of Roman Silchester, indicating the location of recent excavations

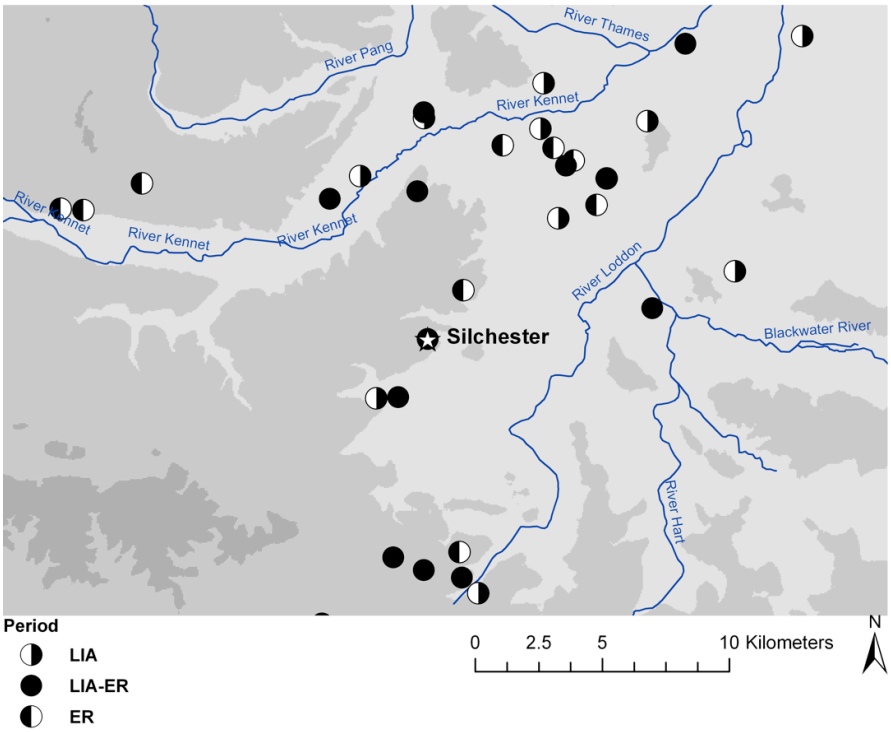

Figure 3-6 Late Iron Age and Early Roman settlement in the Silchester hinterland
Following Timby 2012, Fig 8.12-8.14

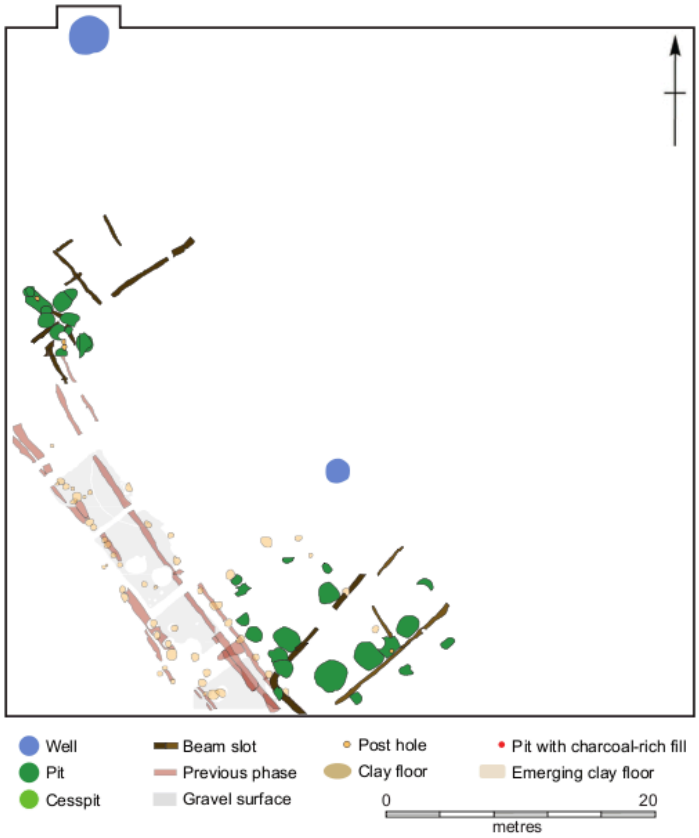

Figure 3-7 Plan of Period 0 Insula IX c. 20BC - AD20

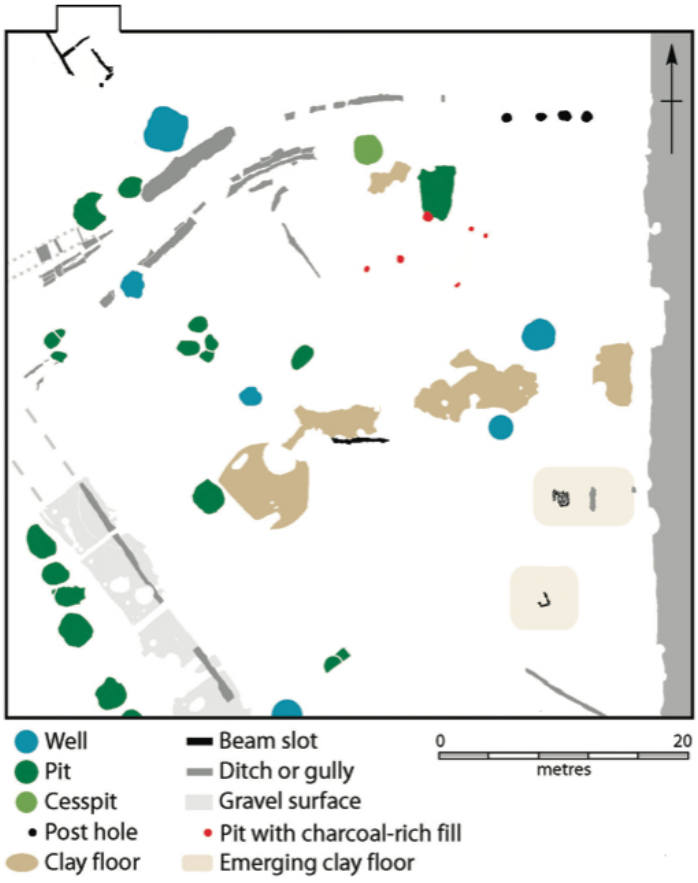

Figure 3-8 Plan of Period 1 Insula IX c. AD44 - AD70/80

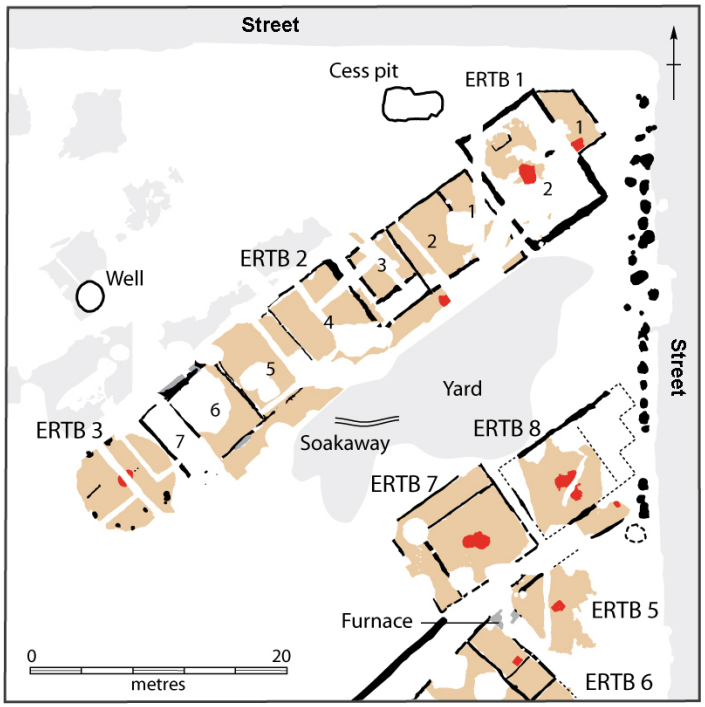

Figure 3-9 Plan of Period 2 Insula IX c. AD70/80 - AD125

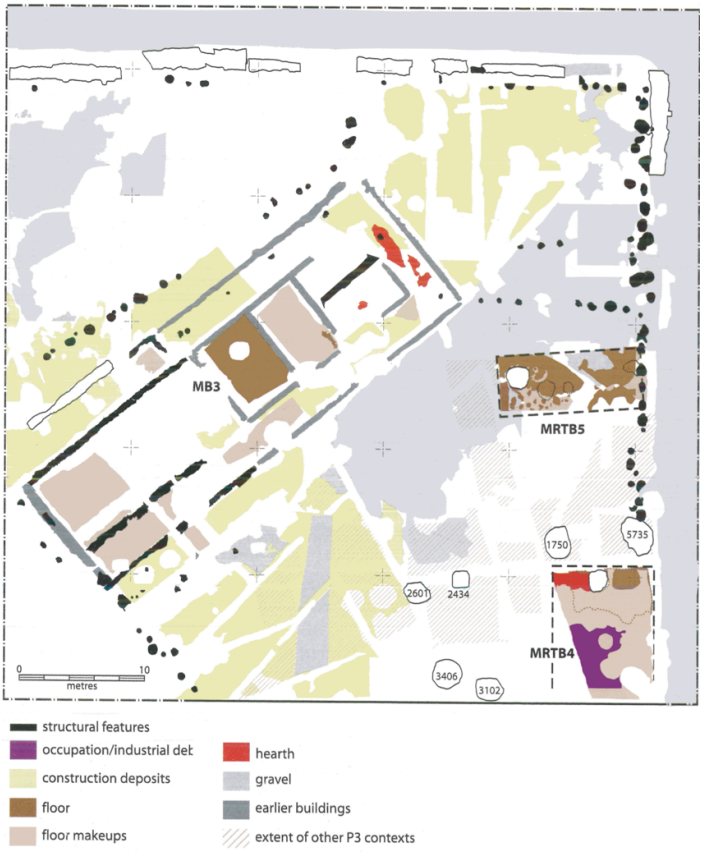

Figure 3-10 Plan of Period 4 Insula IX c. AD200 - AD250/300

Figure 3-11 Plan of Period 5 Insula IX c. AD250 - AD400/500

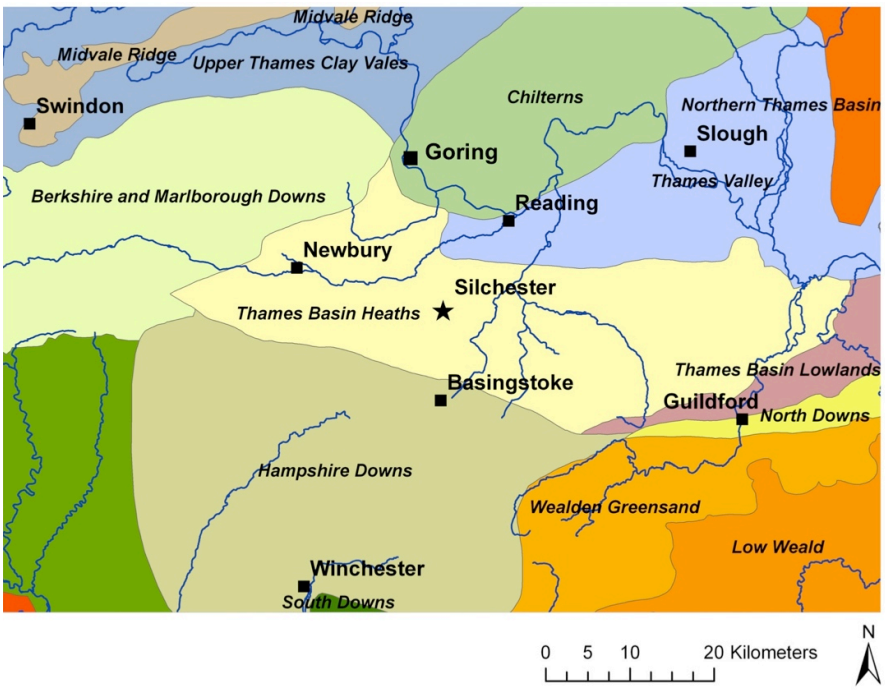

Figure 3-12 Map of National Character Areas in the regional study area

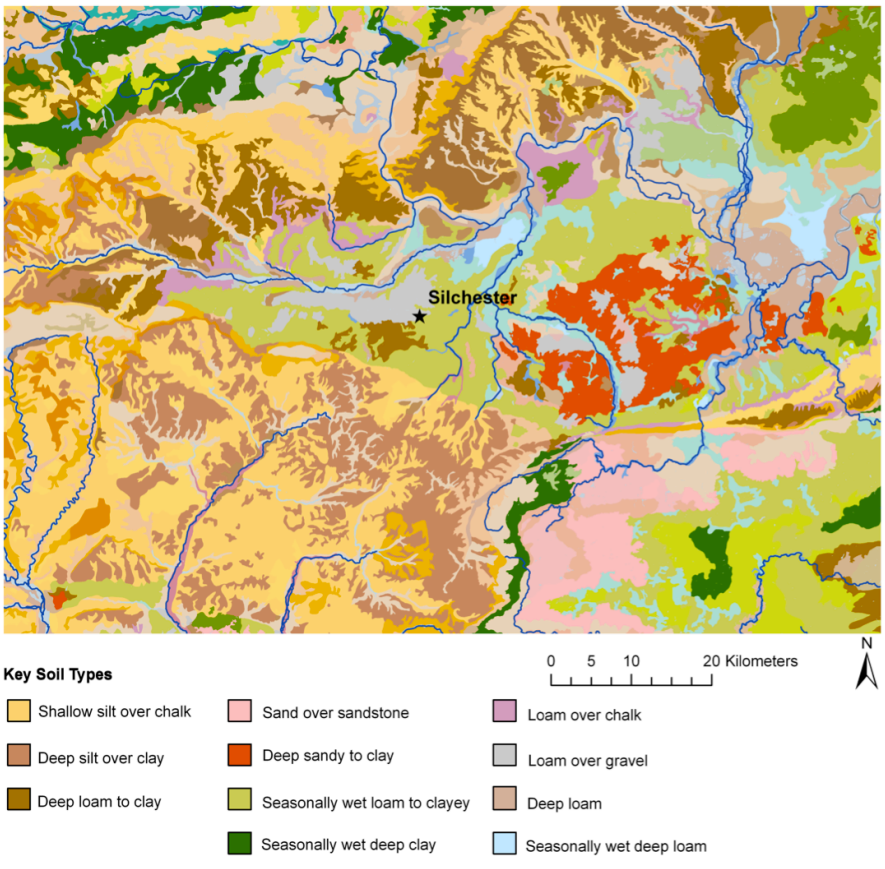

Figure 3-13 Soil map of the regional study area

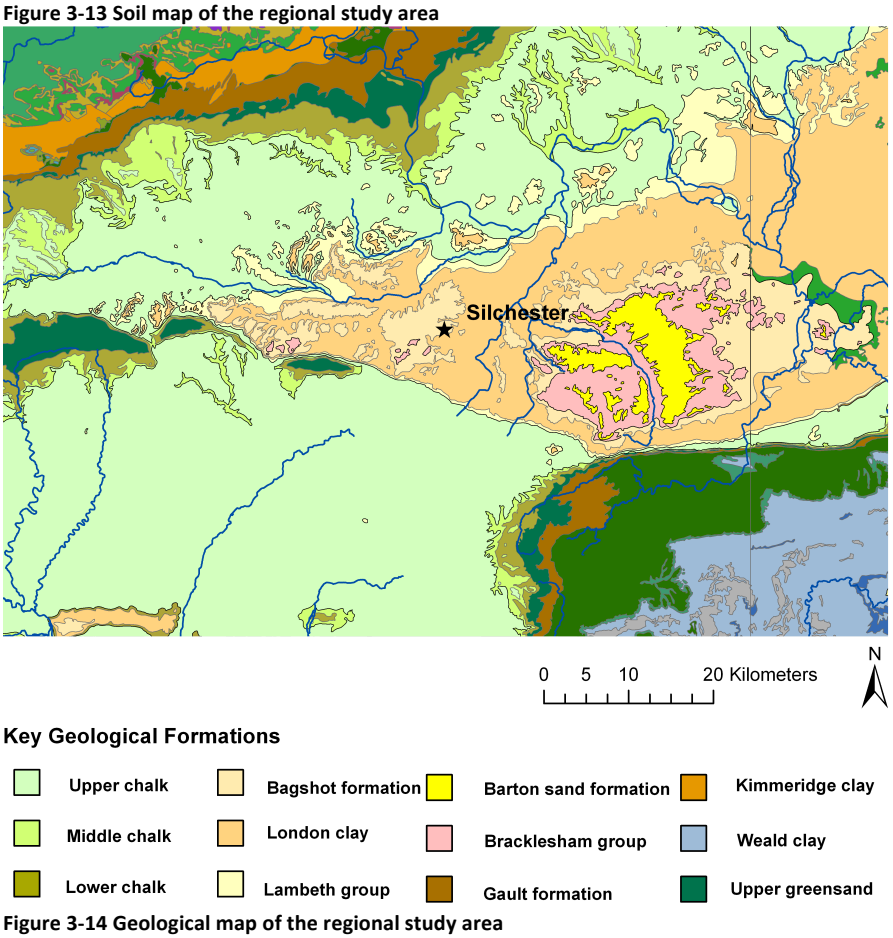

Figure 3-14 Geological map of the regional study area

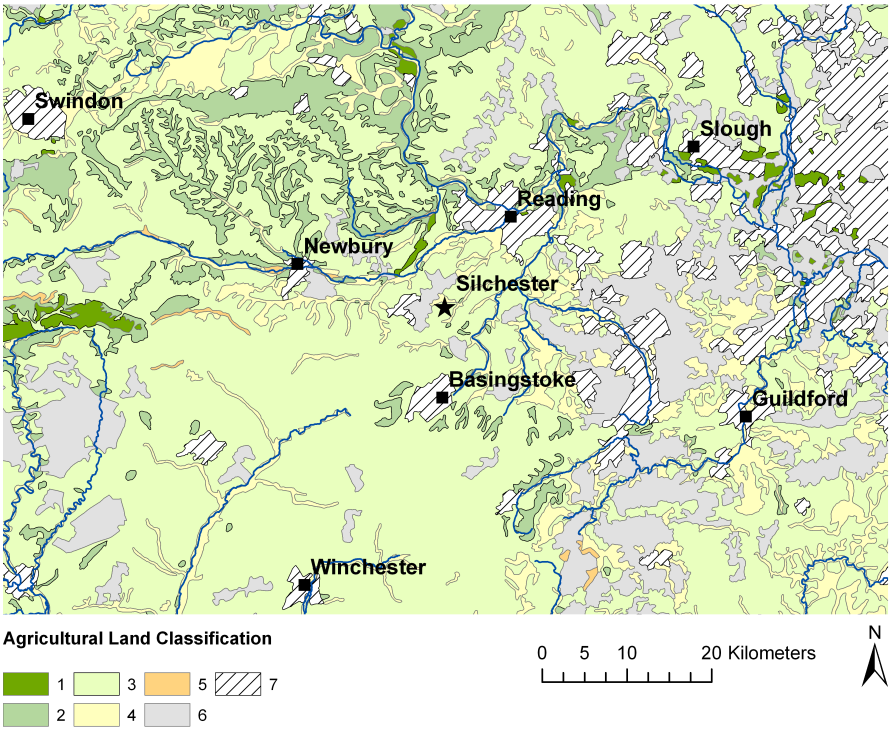

Figure 3-15 Map of Agricultural Land Classification in the regional study area
1 is best quality, 5 is poorest, 6 and 7 are non-agricultural land

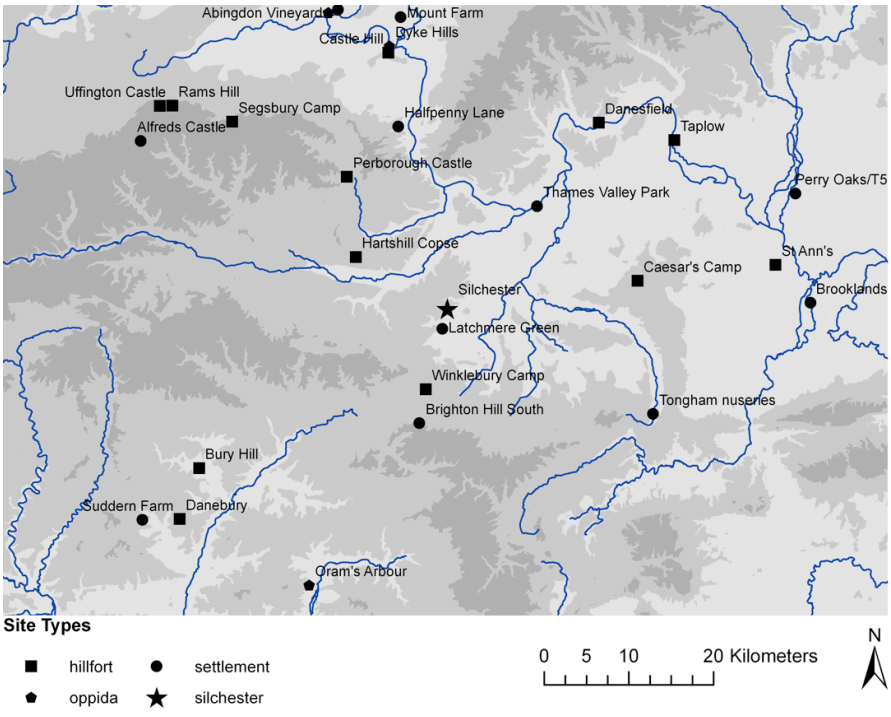

Figure 3-16 Socio-political map of the Iron Age regional study area

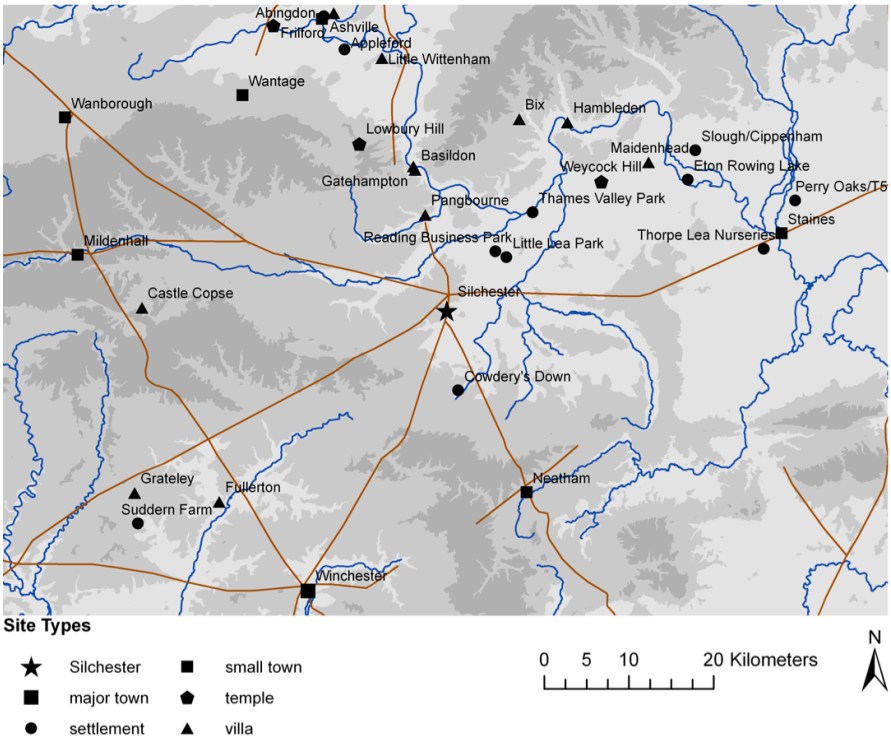

Figure 3-17 Socio-political map of the Roman regional study area

Chapter 5 Figures

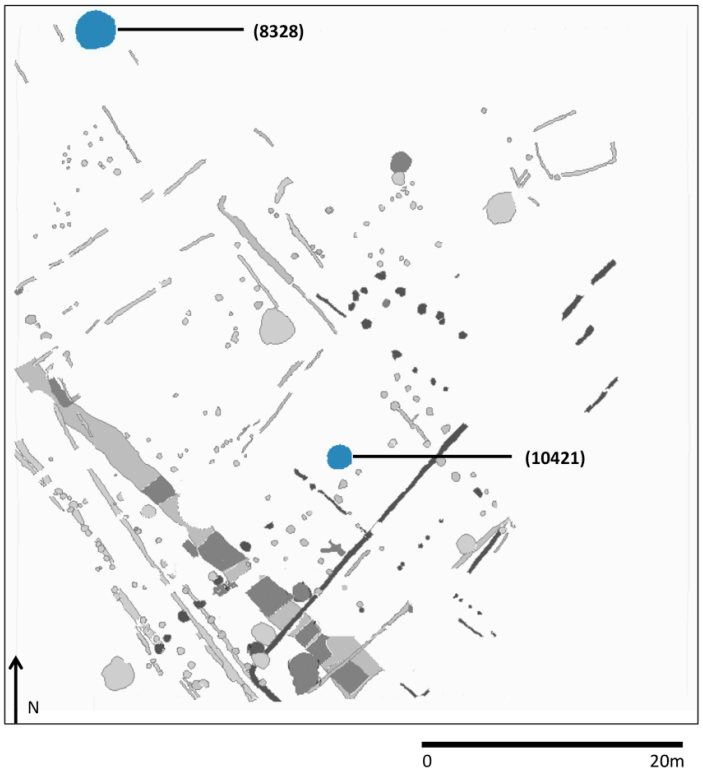

Figure 5-1 Waterlogged sampling locations in Period 0 Insula IX

Figure 5-2 Waterlogged sampling locations in Period 1 Insula IX

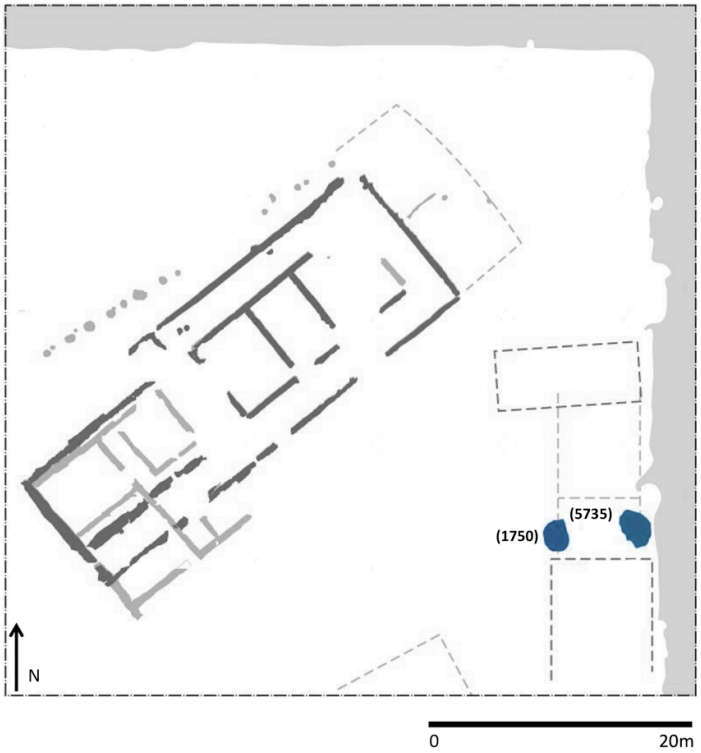

Figure 5-3 Waterlogged sampling locations in Period 4 Insula IX

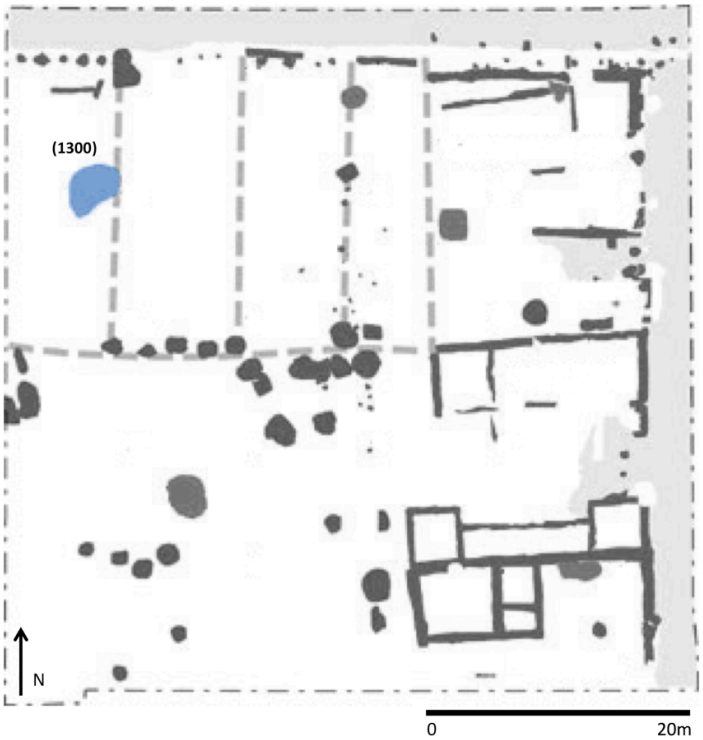

Figure 5-4 Waterlogged sampling locations in Period 5 Insula IX

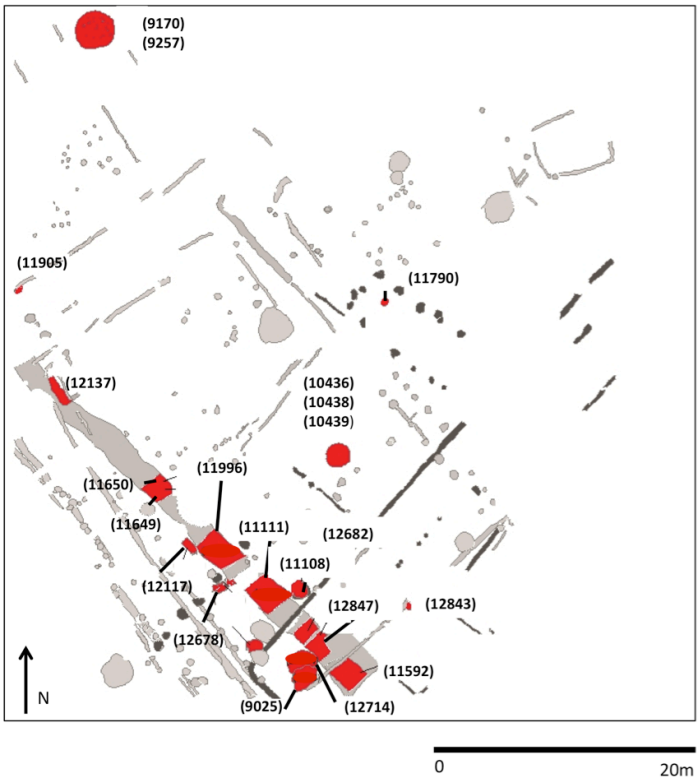

Figure 5-5 Charred sampling locations in Period 0 Insula IX

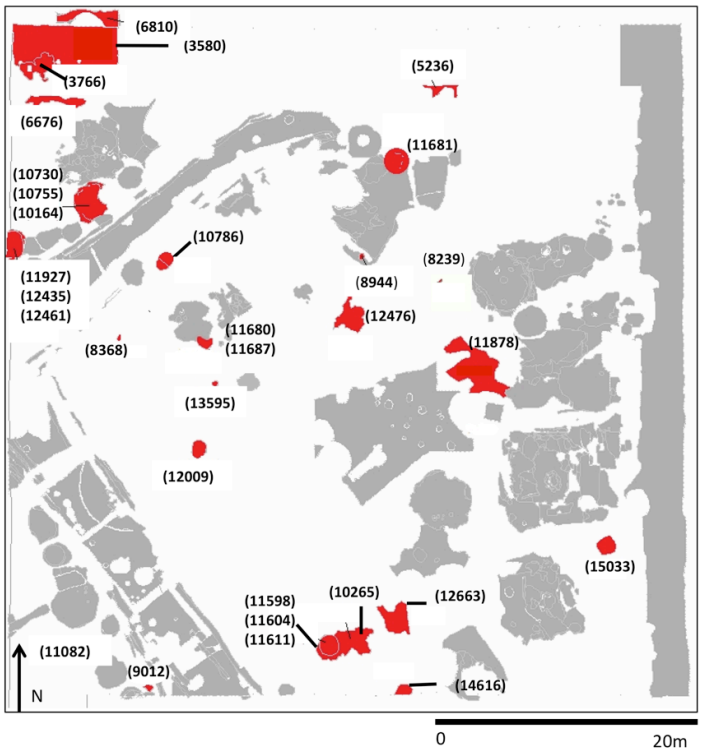

Figure 5-6 Charred sampling locations in Period 1 Insula IX

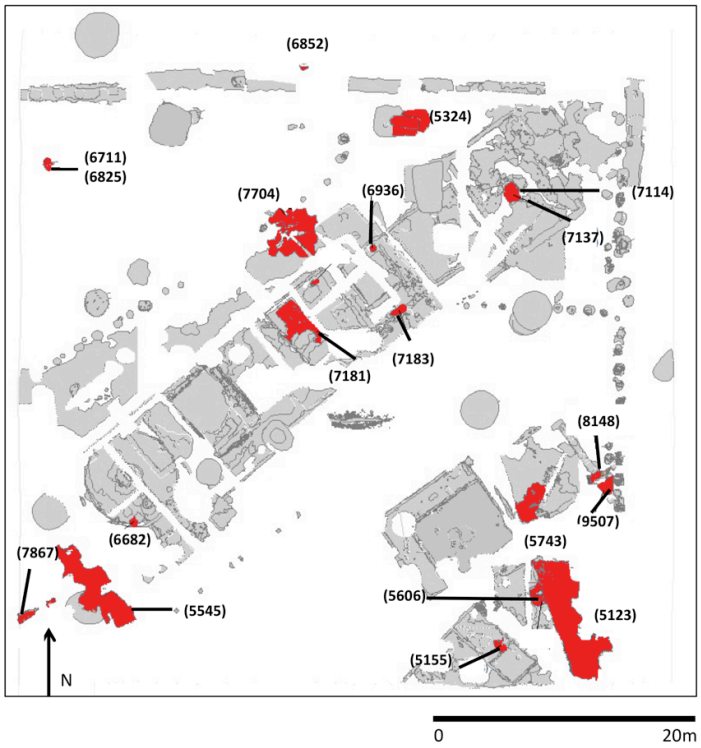

Figure 5-7 Charred sampling locations in Period 2 Insula IX

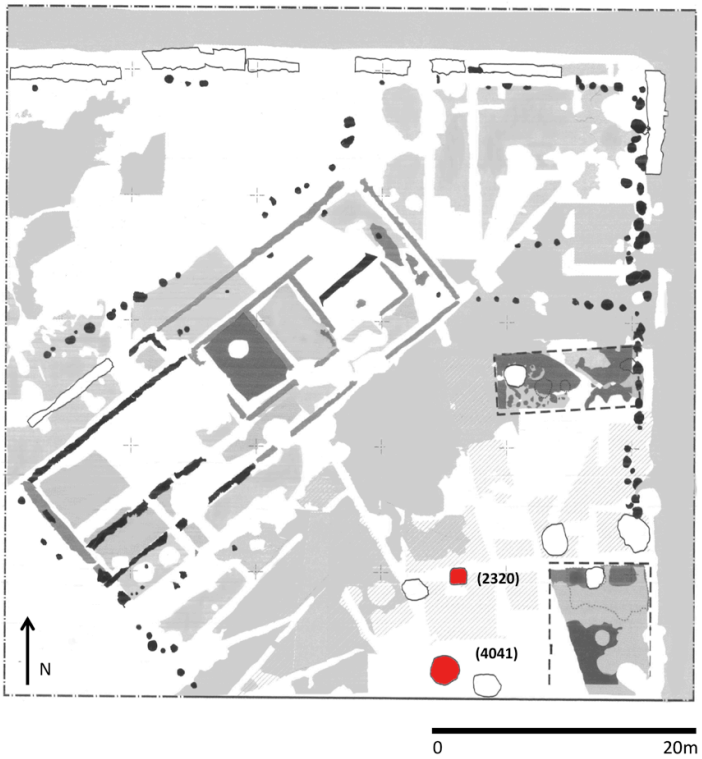

Figure 5-8 Charred sampling locations in Period 4 Insula IX

Figure 5-9 Charred sampling locations in Period 5 Insula IX

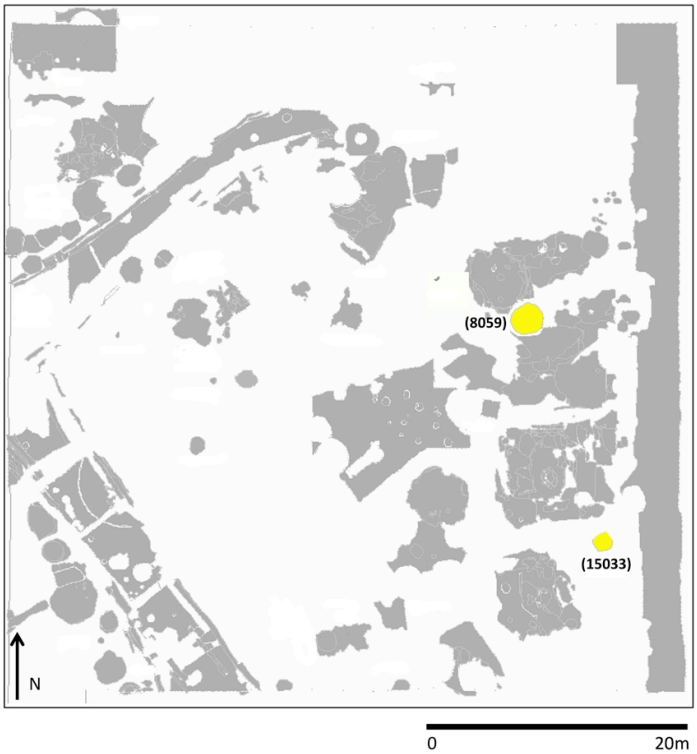

Figure 5-10 Mineralised sampling locations in Period 1 Insula IX

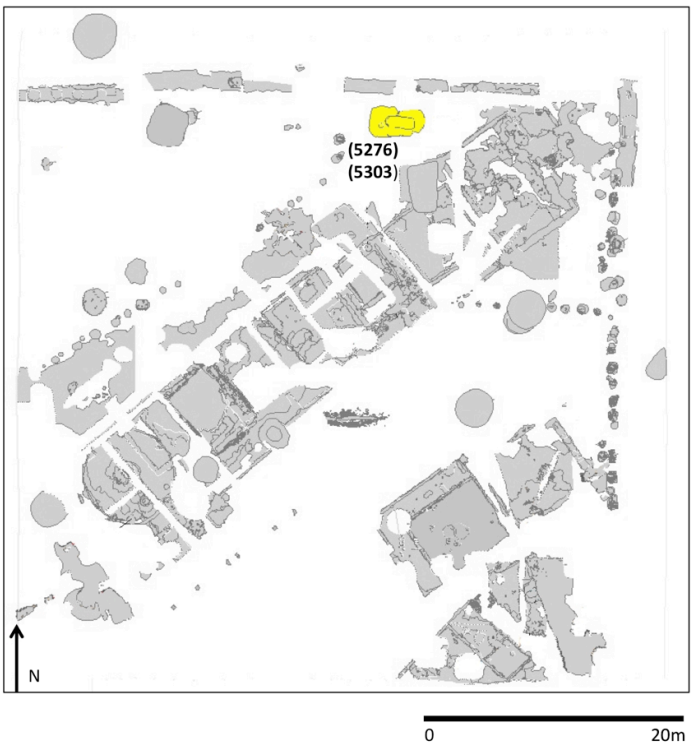

Figure 5-11 Mineralised sampling locations in Period 2 Insula IX

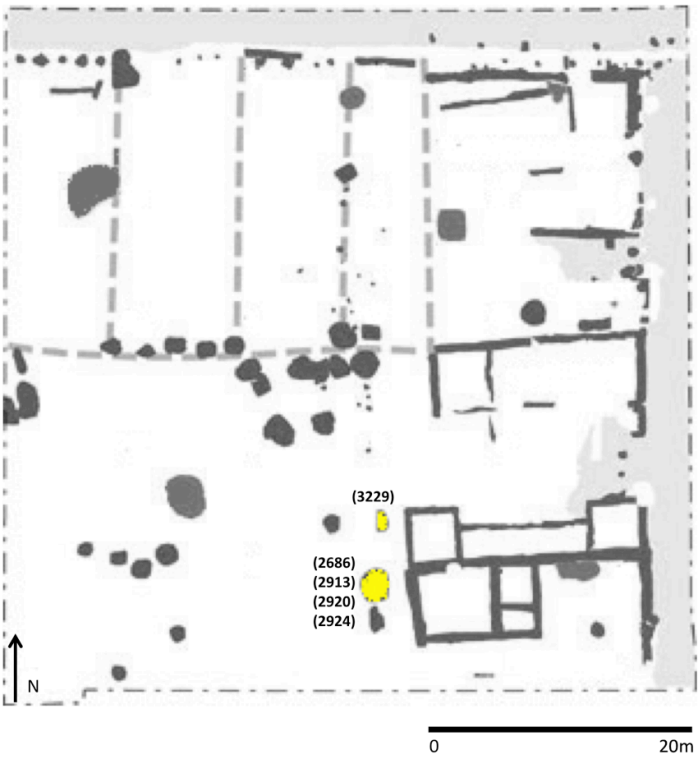

Figure 5-12 Mineralised sampling locations in Period 5 Insula IX

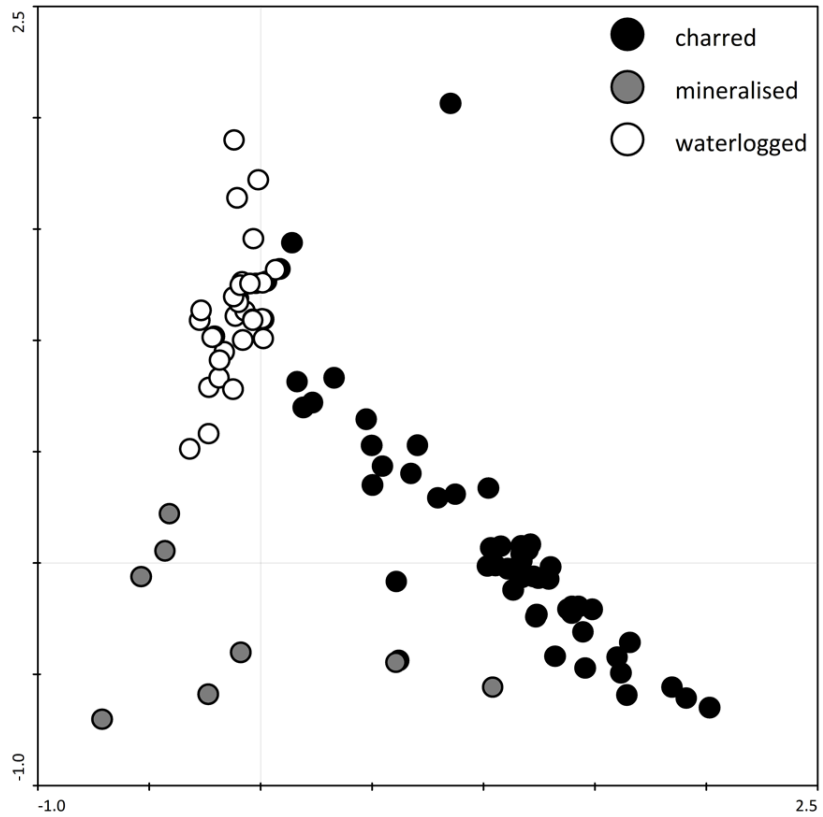

Figure 5-13 CA plot of all Insula IX samples, samples classified by preservation type. 1st and 2nd axis. 94 samples, 79 taxa. Min 15, Max 18099.

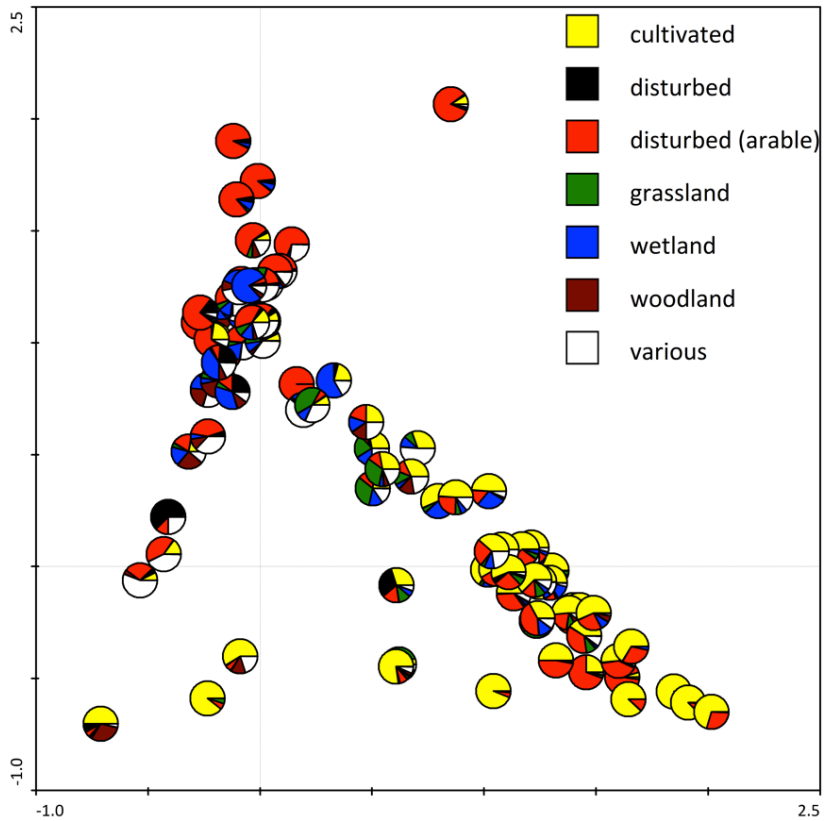

Figure 5-14 CA plot of all Insula IX samples, sample pies classified by habitat group. 1st and 2nd axis. 94 samples, 79 taxa. Min 15, Max 18099.

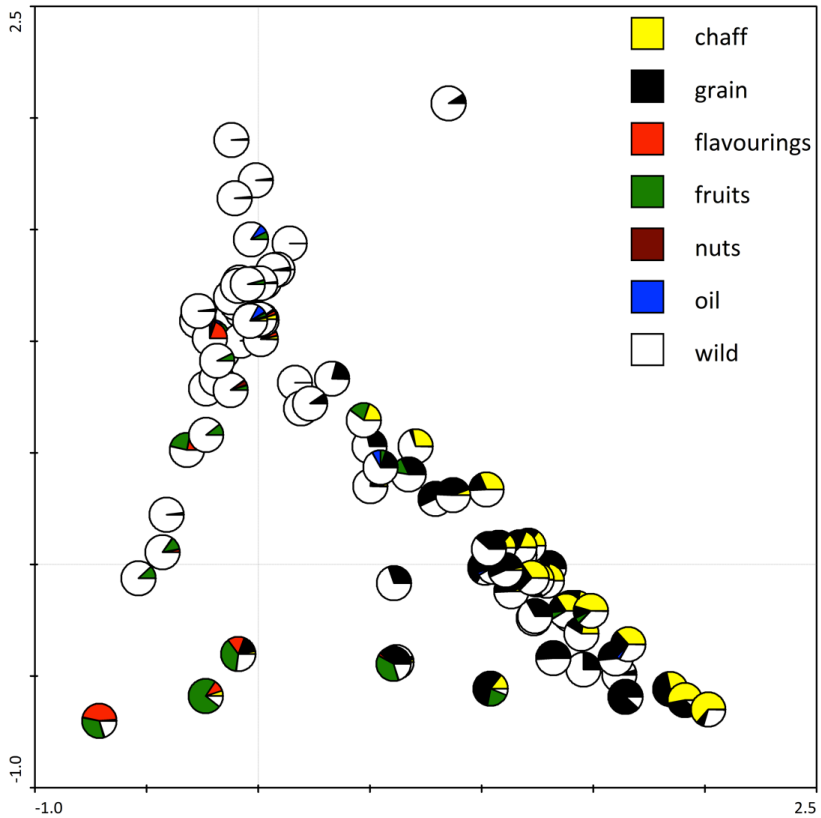

Figure 5-15 CA plot of all Insula IX samples, sample pies classified by food type. 1st and 2nd axis. 94 samples, 79 taxa. Min 15, Max 18099.

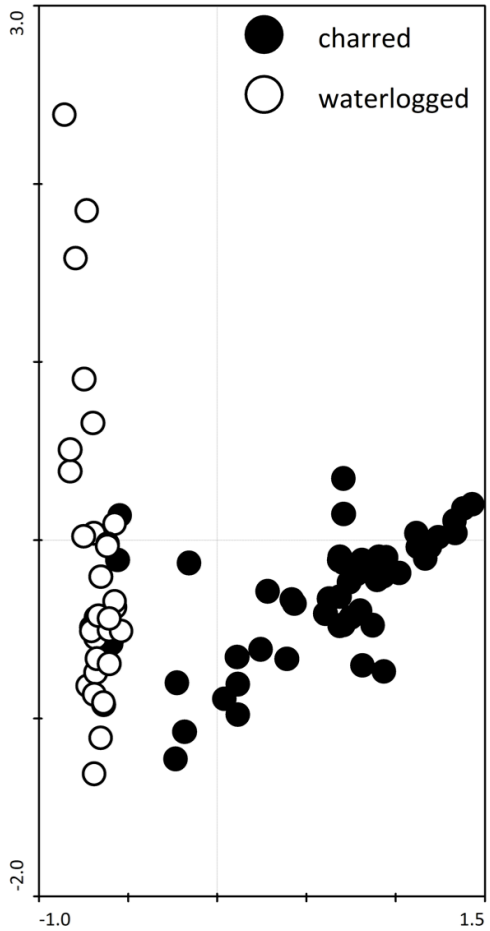

Figure 5-16 CA plot of Insula IX charred and waterlogged samples.
1st and 2nd axis. 82 samples, 79 taxa. Min 15, Max 3357.

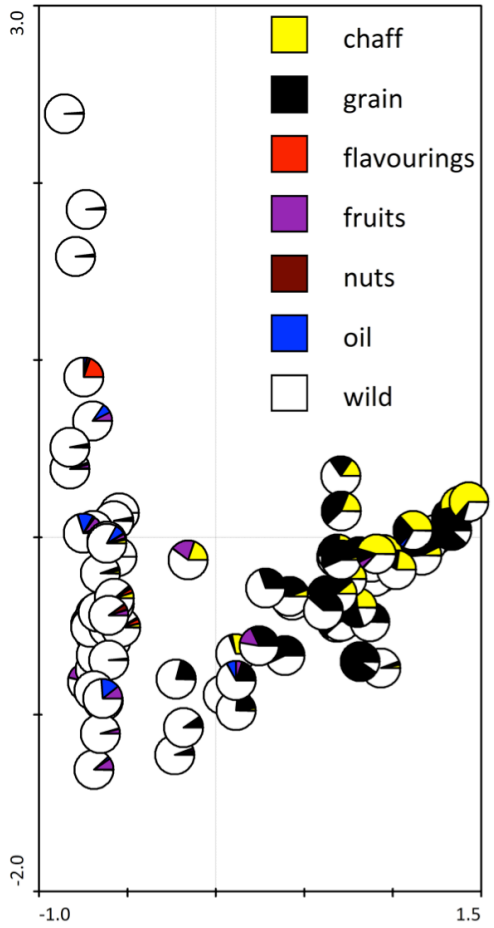

Figure 5-17 CA plot of Insula IX charred and waterlogged samples, sample pies classified by food type.
1st and 2nd axis. 82 samples, 79 taxa. Min 15, Max 3357.

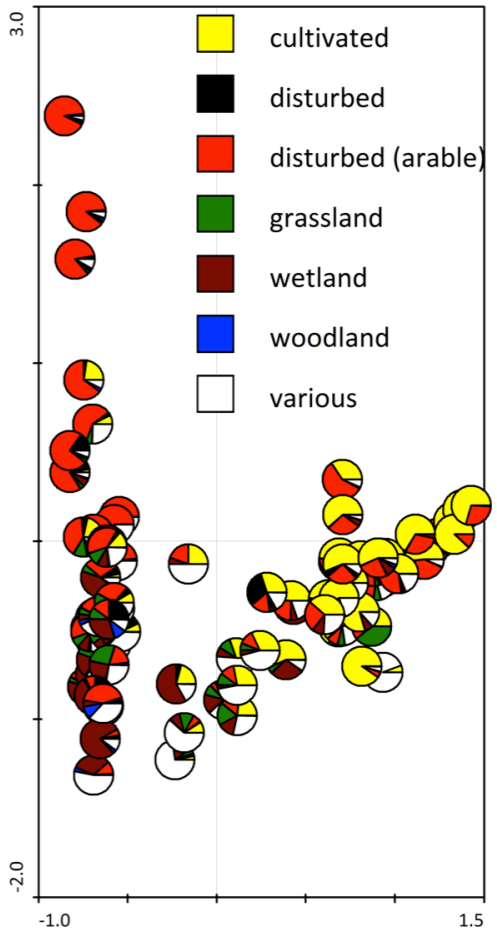

Figure 5-18 CA plot of Insula IX charred and waterlogged samples, sample pies classified by habitat group.
1st and 2nd axis. 82 samples, 79 taxa. Min 15, Max 3357.

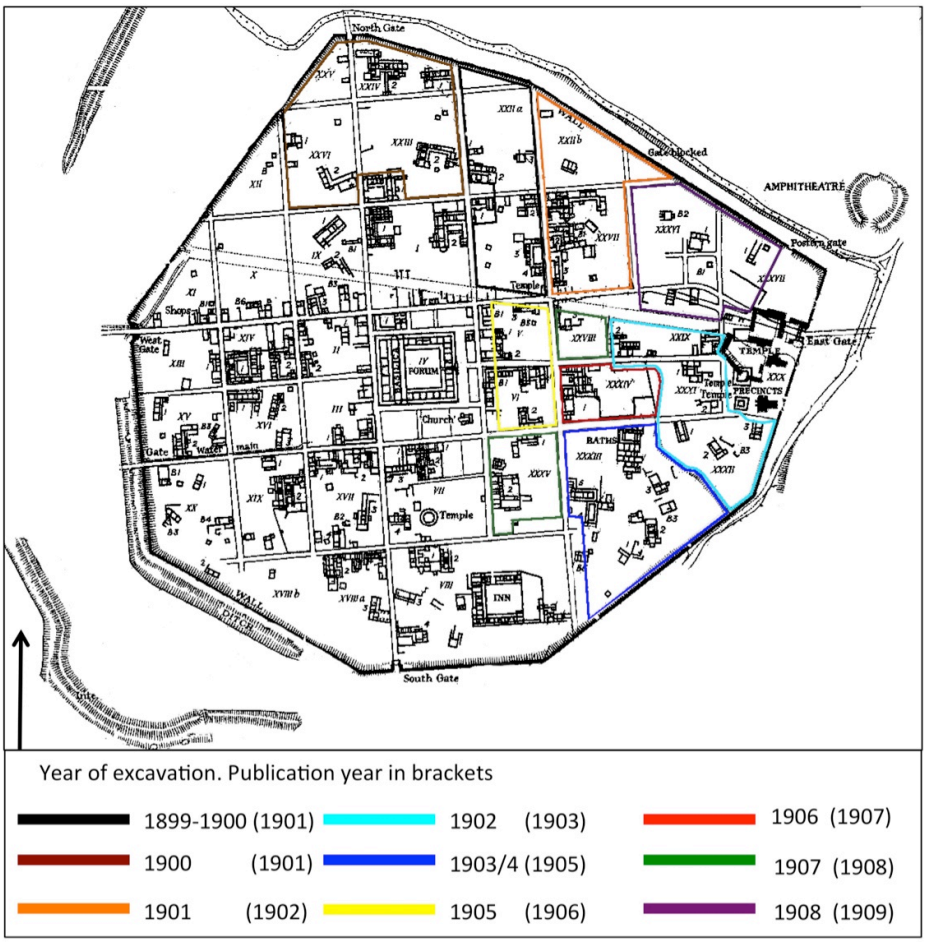

Figure 5-19 Society of Antiquaries plan of Silchester indicating areas sampled for plant remains by year

Figure 5-20 Mesiplus germanica confirmed from the Clement Reid collection © Reading Museum. Permission to reproduce this image has been granted by the Reading Museum.

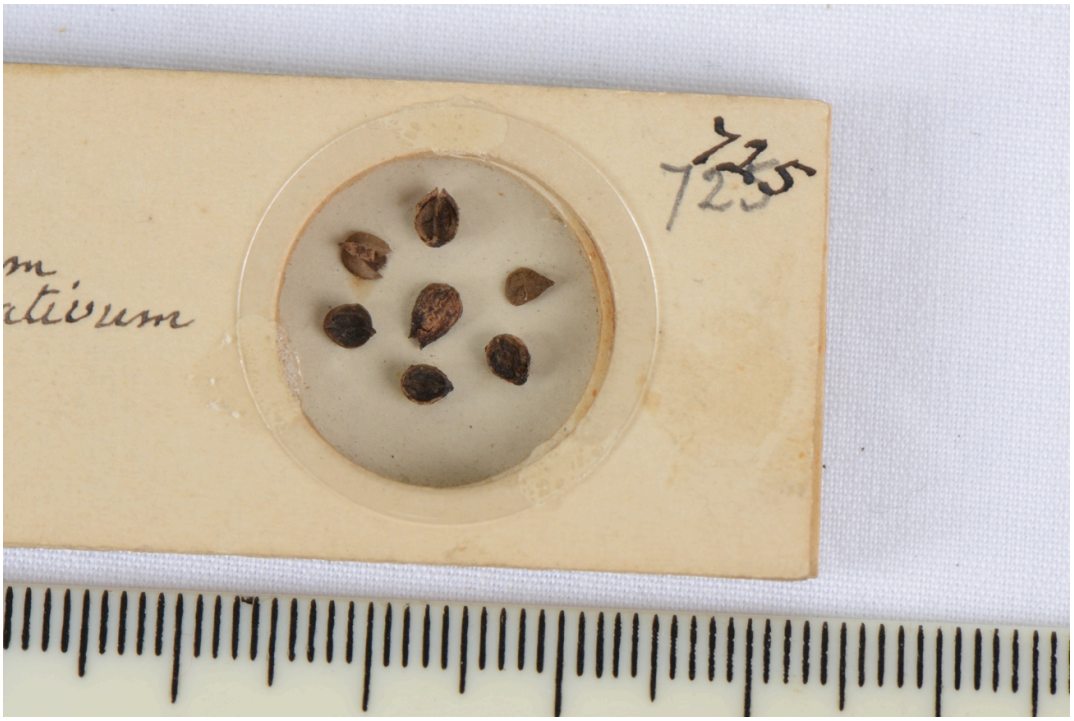

Figure 5-21 Coriandrum sativum confirmed form the Clement Reid collection © Reading Museum. Permission to reproduce this image has been granted to by the Reading Museum.

Figure 5-22 Prunus sp. (reidentified from Prunus lusitanica) from the Clement Reid collection © Reading Museum. Permission to reproduce this image has been granted by the Reading Museum.

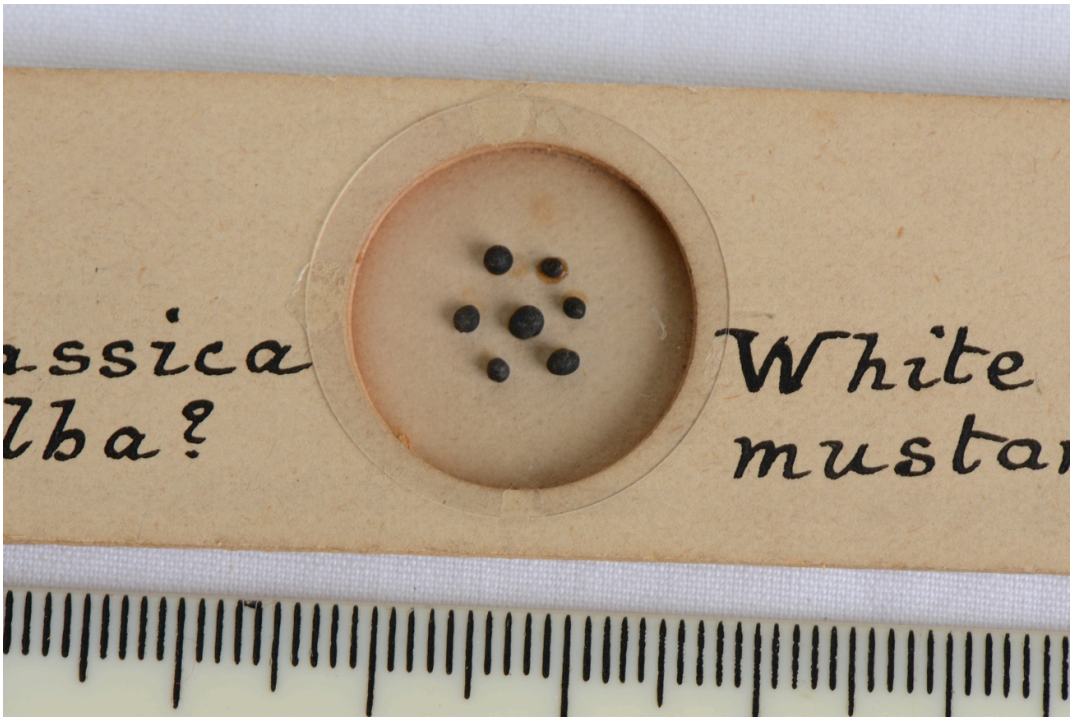

Figure 5-23 Fungal bodies (reidentified from Brassica alba) from the Clement Reid collection © Reading Museum. Permission to reproduce this image has been granted by the Reading Museum.

Chapter 6 Figures

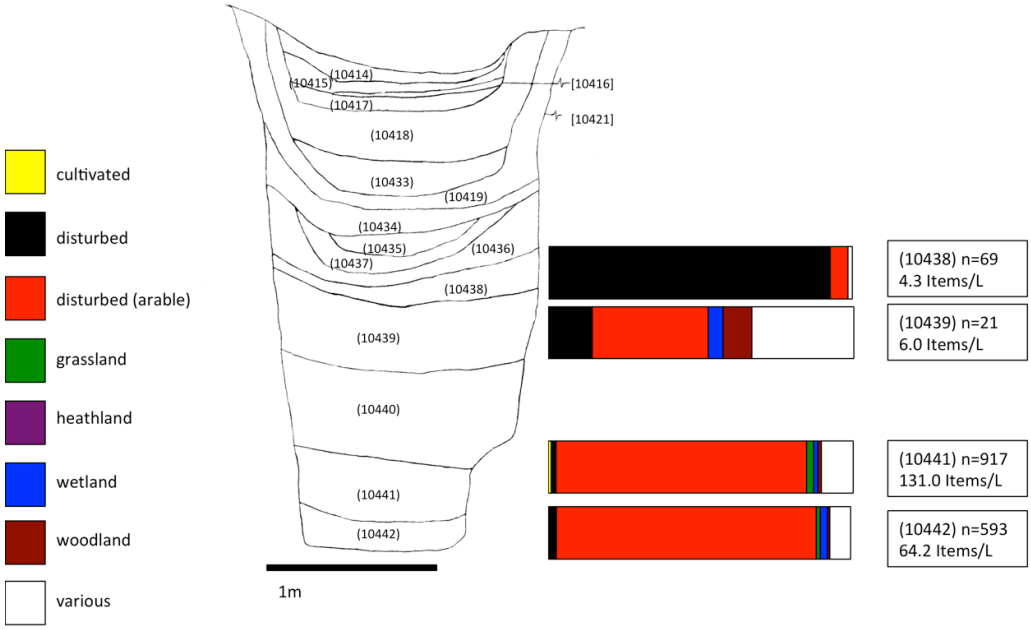

Figure 6-1 Proportion of seeds classified by habitat group in well 10421. Sample <4029> (10436) is not included as it contained fewer than 10 items.

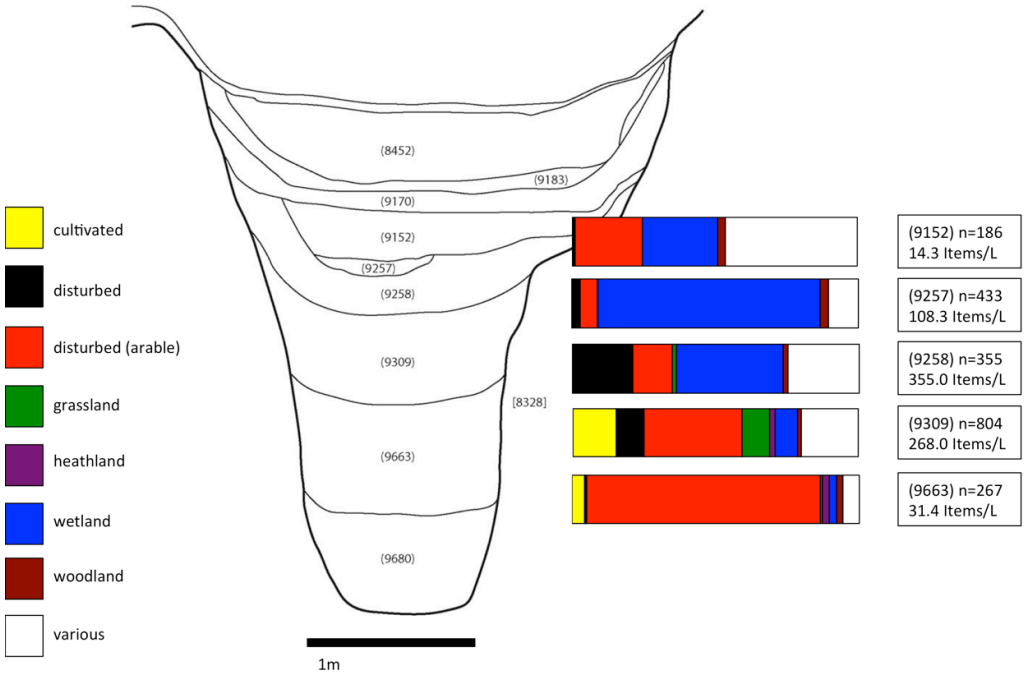

Figure 6-2A Proportion of seeds classified by habitat group in well 8328. Seeds only.

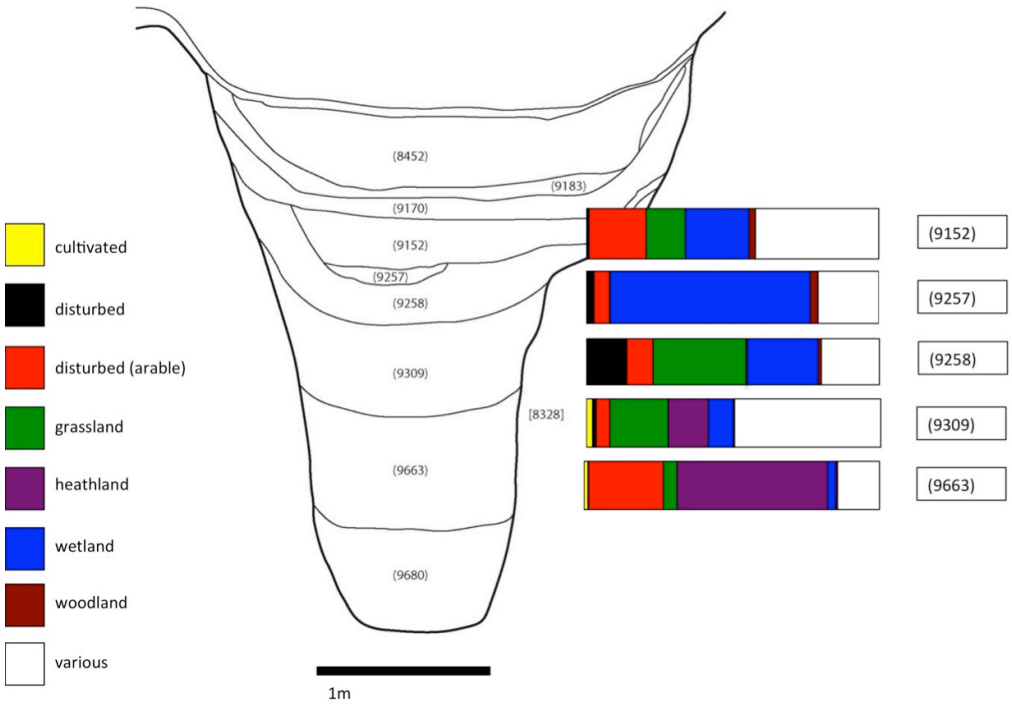

Figure 6-2B Proportion of seeds classified by habitat group in well 8328. All vegetative items, Juncus spp. and Poaceae indet. included.

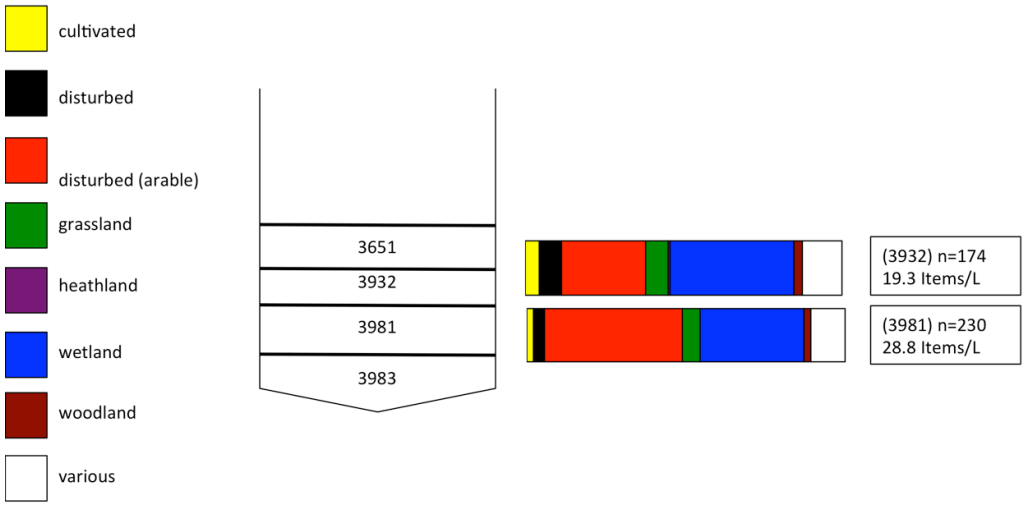

Figure 6-3 Proportion of seeds classified by habitat group in well 1586 (schematic section)

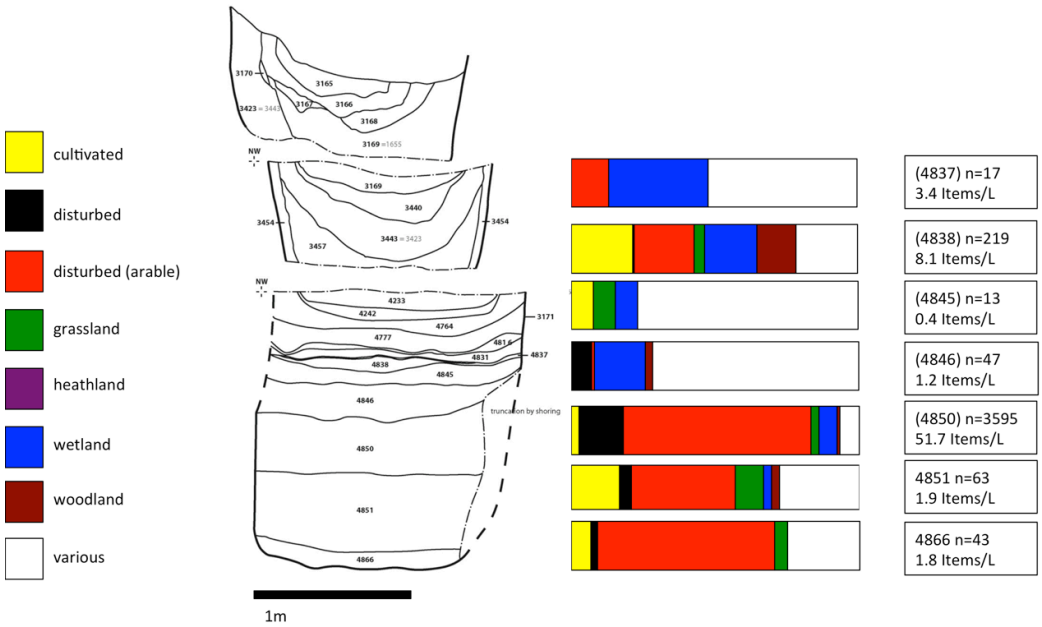

Figure 6-4 Proportion of seeds classified by habitat group in well 3171

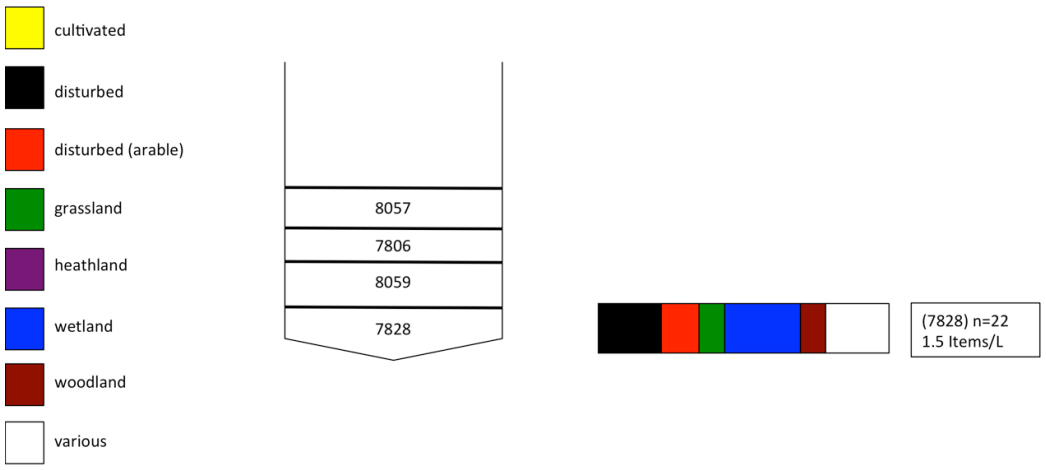

Figure 6-5 Proportion of seeds classified by habitat group in well 5100 (schematic section)

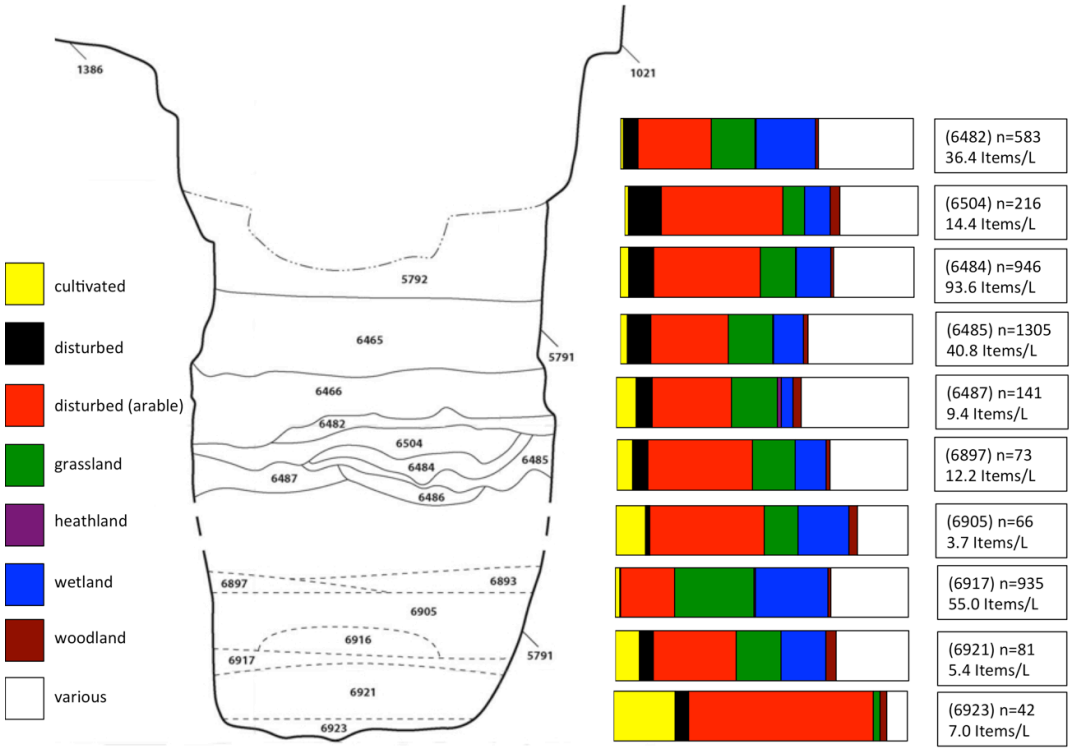

Figure 6-6 Proportion of seeds classified by habitat group in well 5791

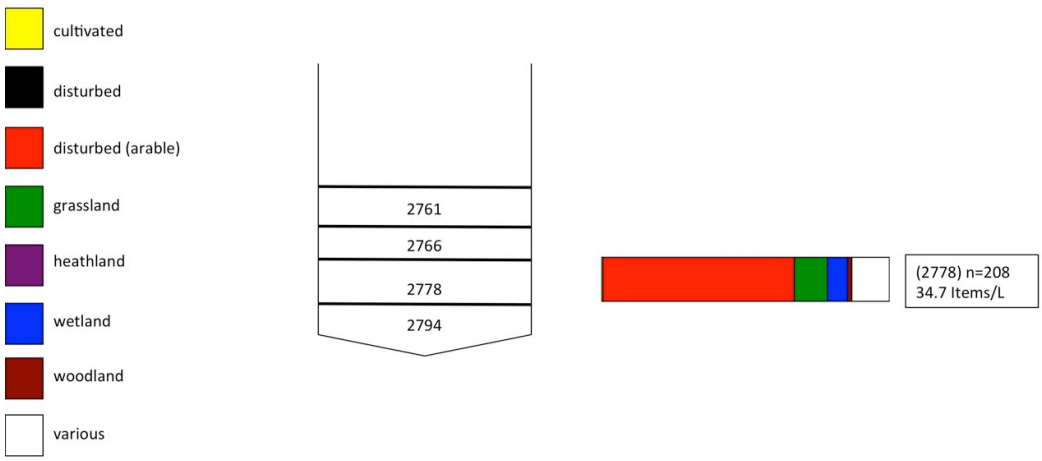

Figure 6-7 Proportion of seeds classified by habitat group in well 1750 (schematic section)

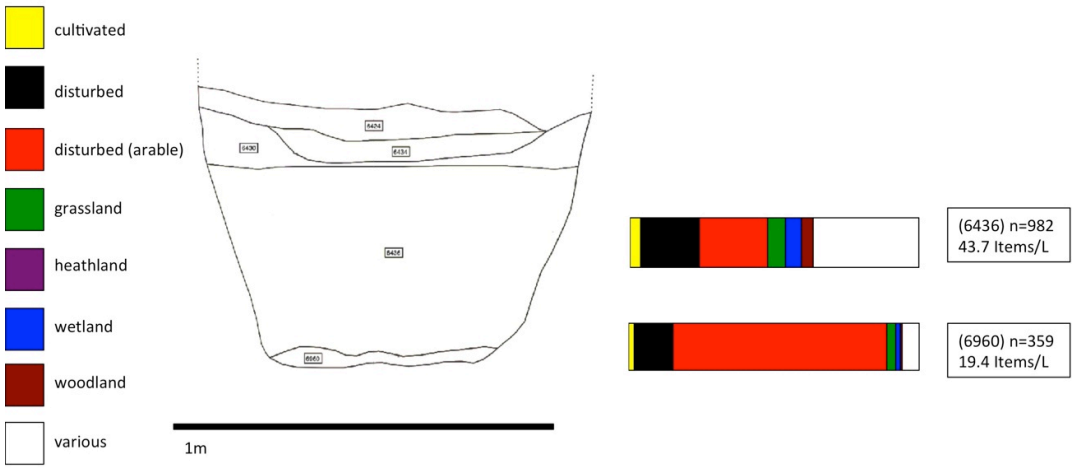

Figure 6-8 Proportion of seeds classified by habitat group in well 5735

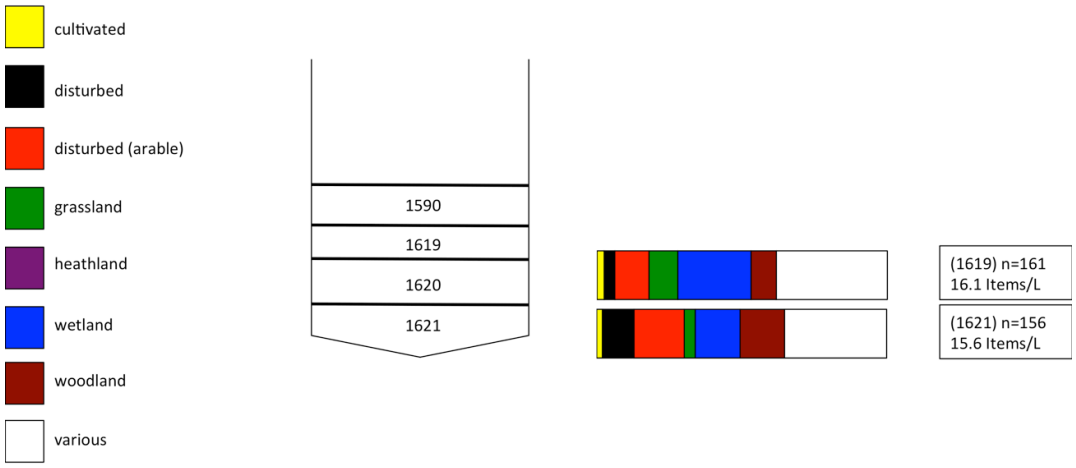

Figure 6-9 Proportion of seeds classified by habitat group in well 1300 (schematic section)

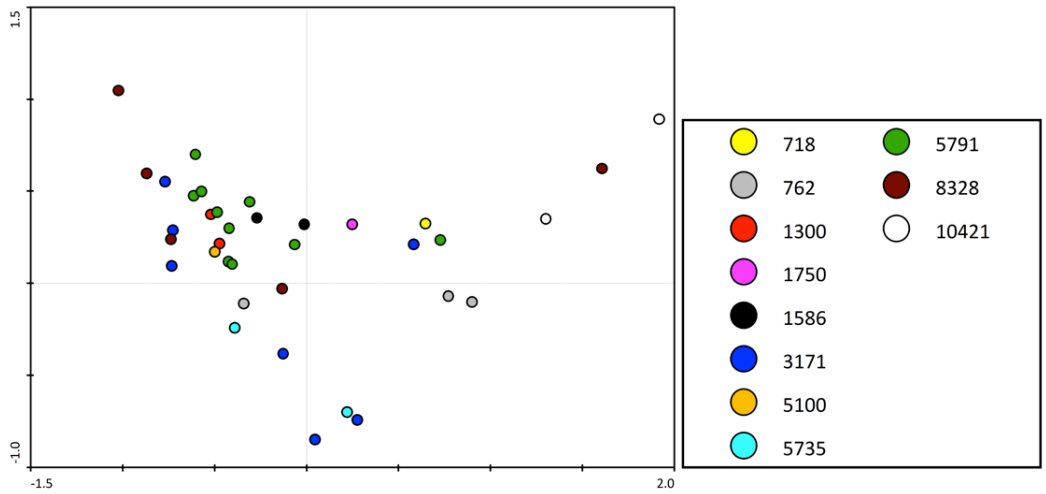

Figure 6-10 CA plot of waterlogged samples from Silchester, samples classified by well.
1st and 2nd axis. 36 samples, 34 taxa. Min 16, Max 2587.

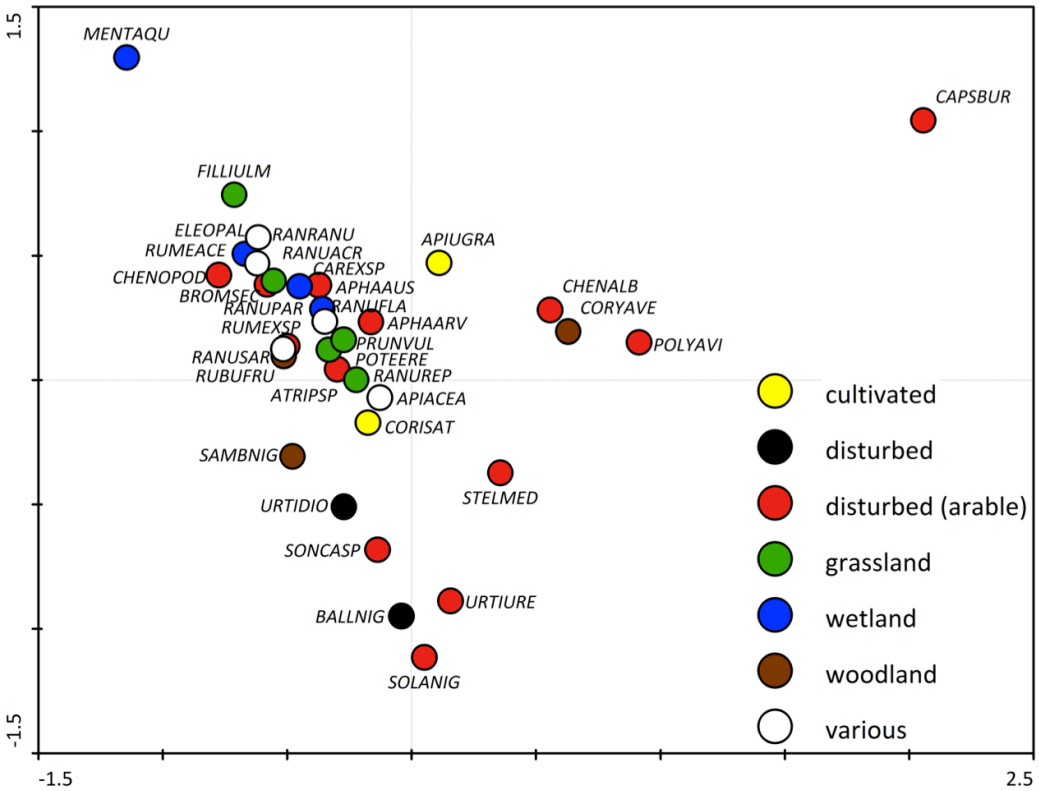

Figure 6-11 CA plot of waterlogged samples from Silchester, taxa classified by habitat group.
1st and 2nd axis. 36 samples, 34 taxa. Min 16, Max 2587.

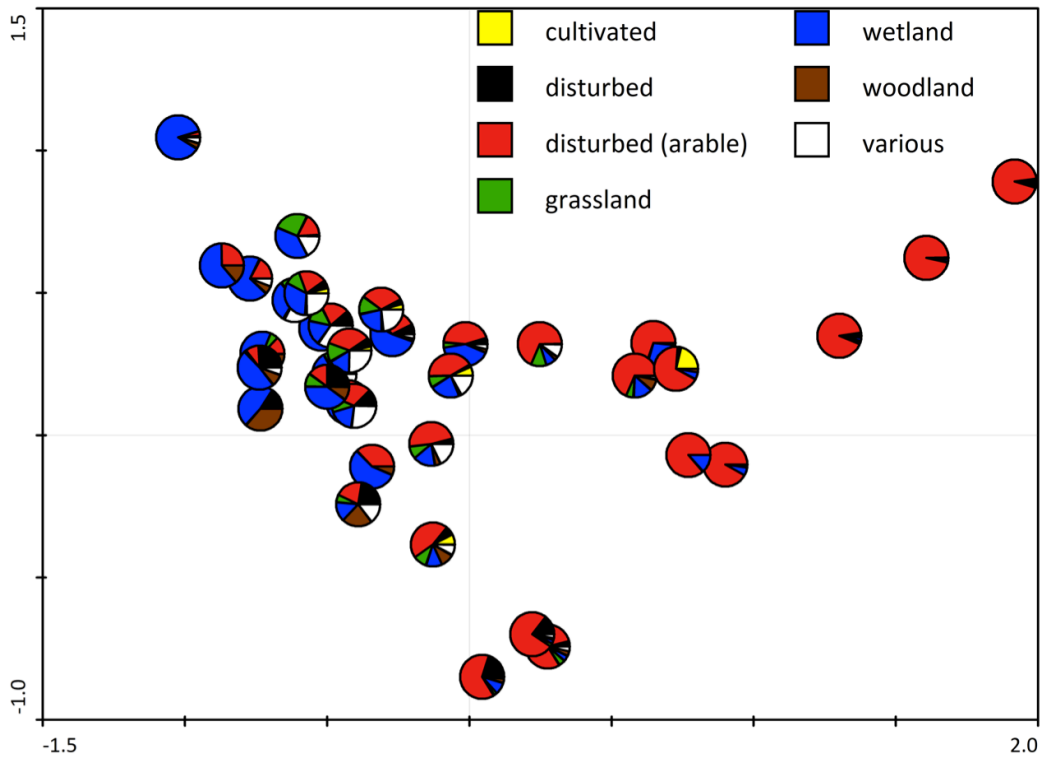

Figure 6-12 CA plot of waterlogged samples from Silchester, sample pies classified by habitat group. 1st and 2nd axis. 36 samples, 34 taxa. Min 16, Max 2587.

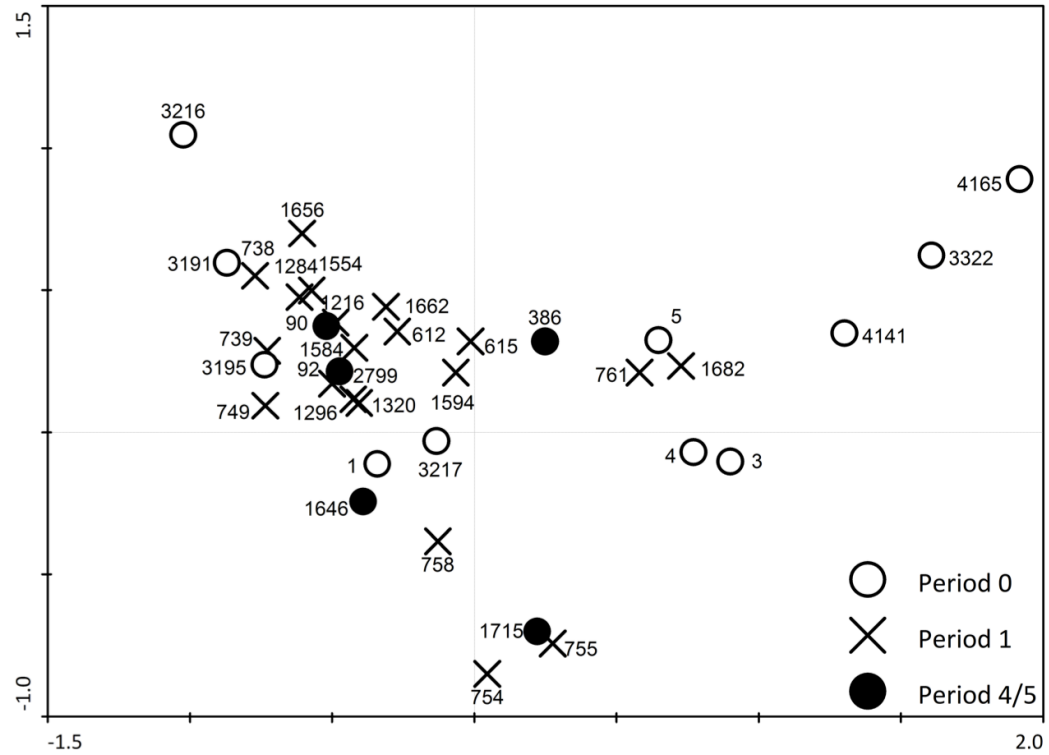

Figure 6-13 CA plot of waterlogged samples from Silchester, samples classified by period. 1st and 2nd axis. 36 samples, 34 taxa. Min 16, Max 2587.

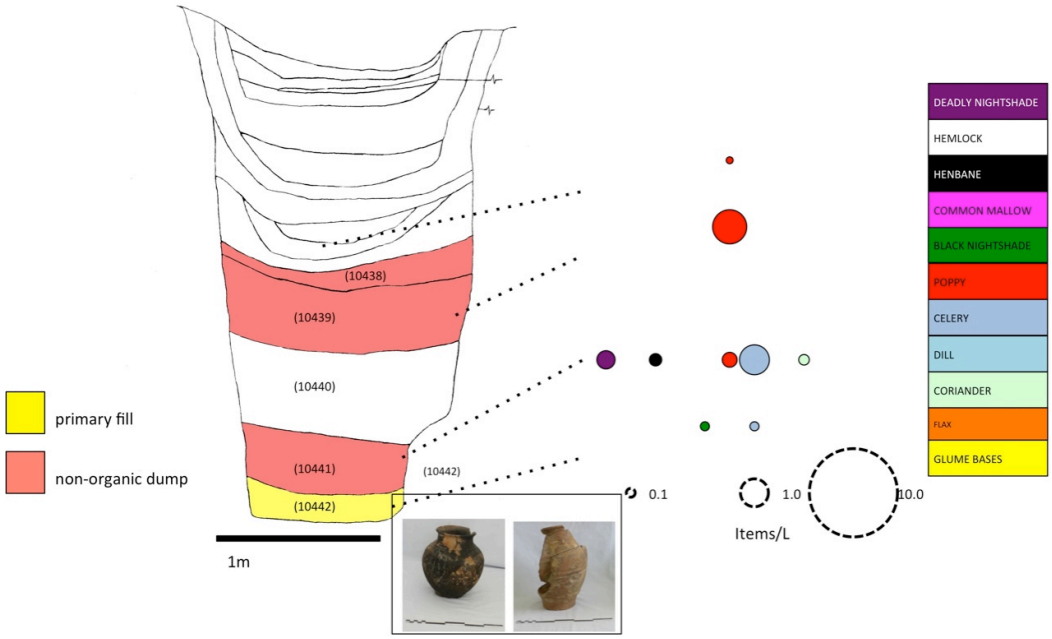

Figure 6-14 Well 10421 section indicating the presence and abundance of 'ritual' plants and key artefacts

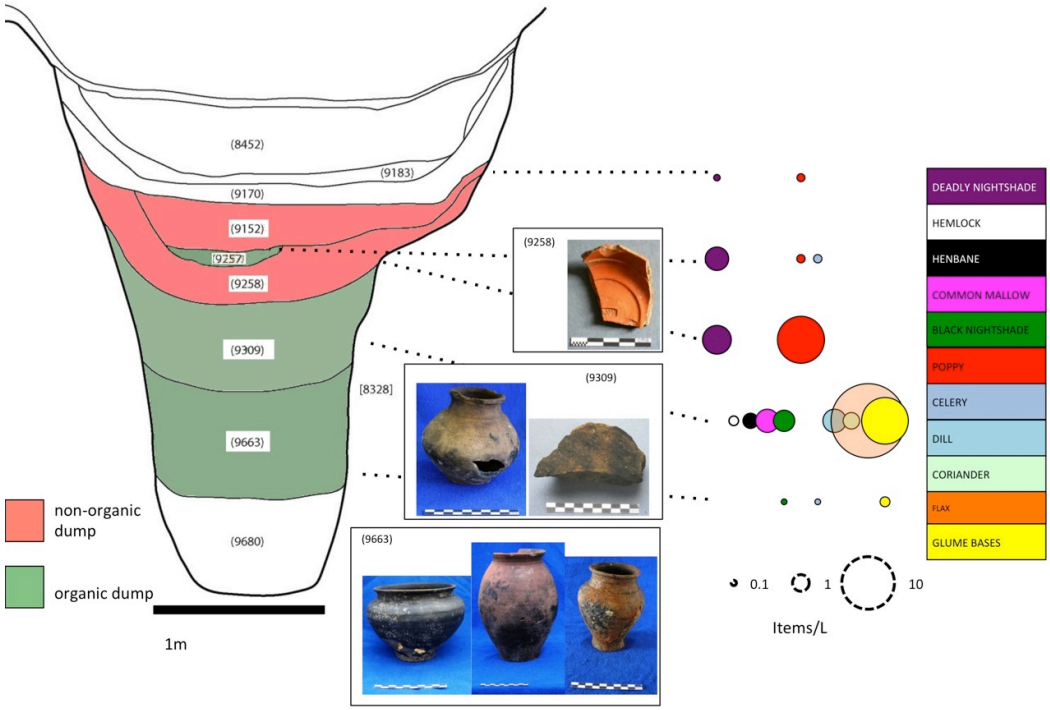

Figure 6-15 Well 8328 section indicating the presence and abundance of 'ritual' plants and key artefacts

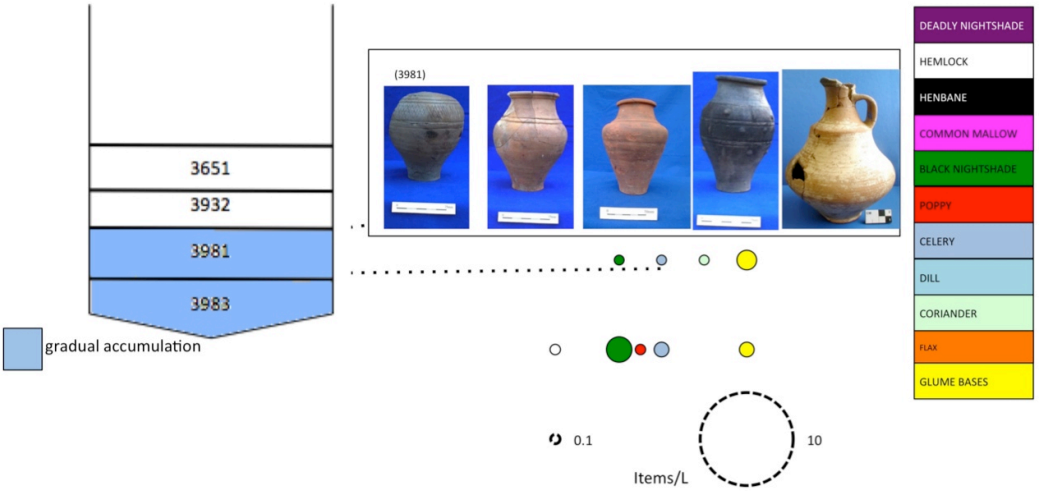

Figure 6-16 Well 1586 section indicating the presence and abundance of 'ritual' plants and key artefacts

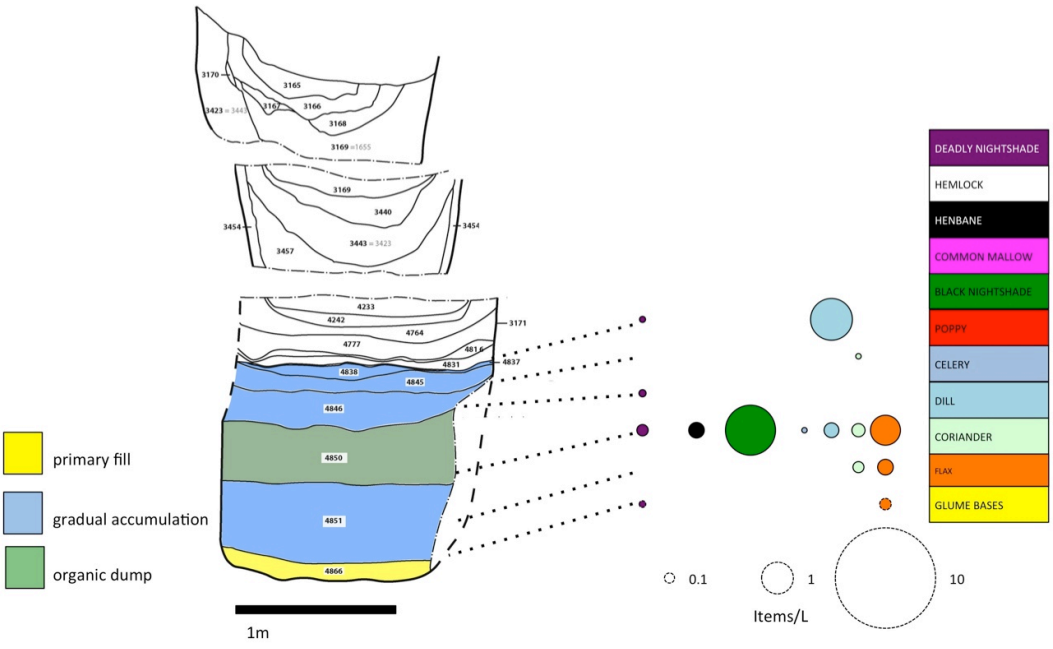

Figure 6-17 Well 3171 section indicating the presence and abundance of 'ritual' plants and key artefacts

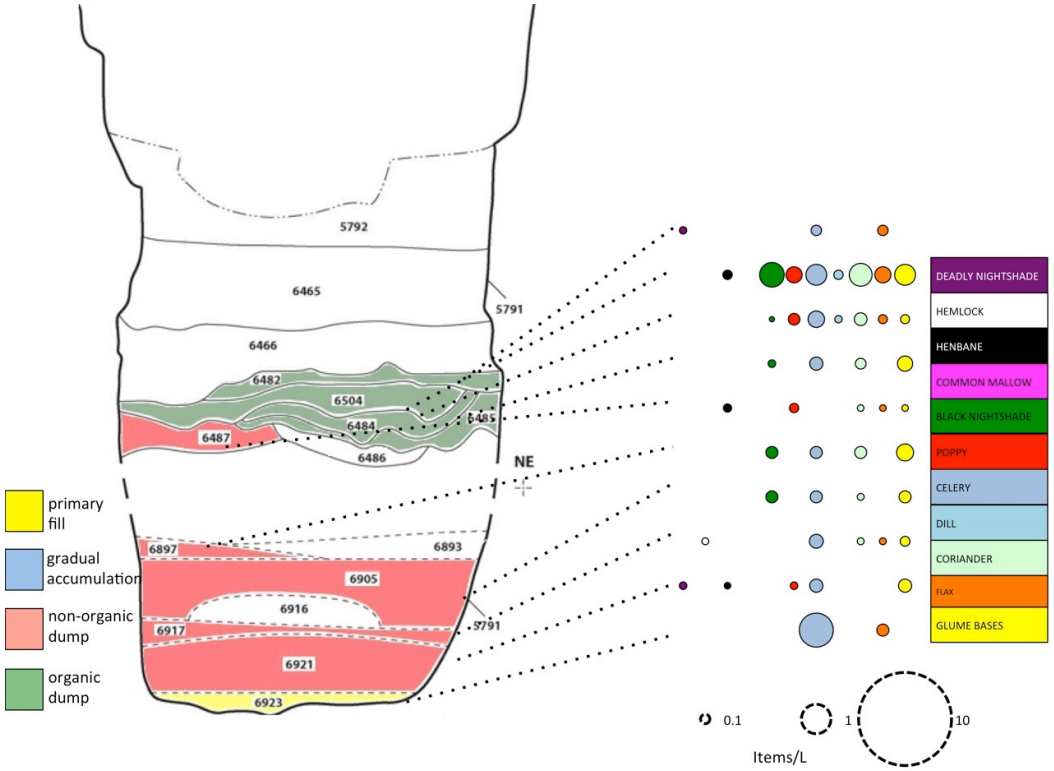

Figure 6-18 Well 5791 section indicating the presence and abundance of 'ritual' plants and key artefacts

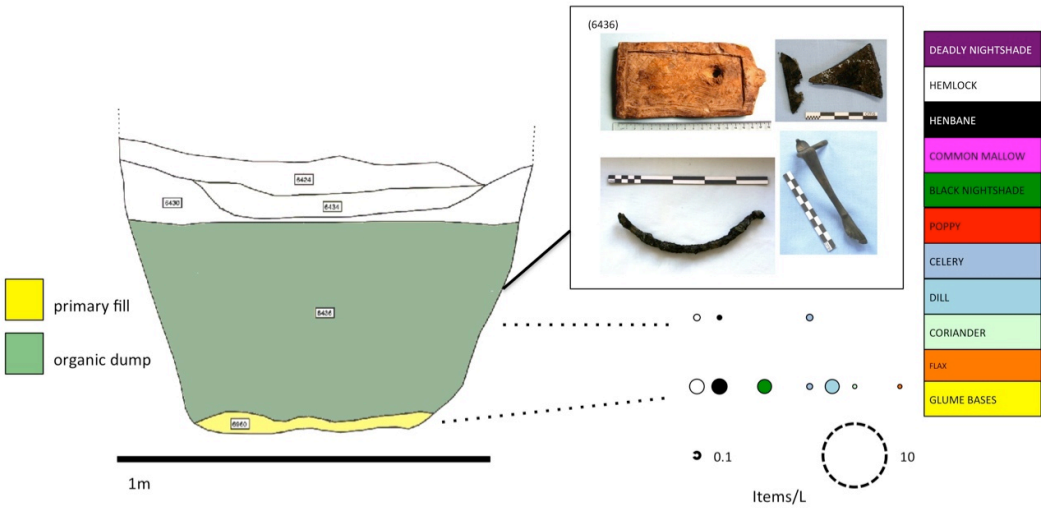

Figure 6-19 Well 5735 section indicating the presence and abundance of 'ritual' plants and key artefacts

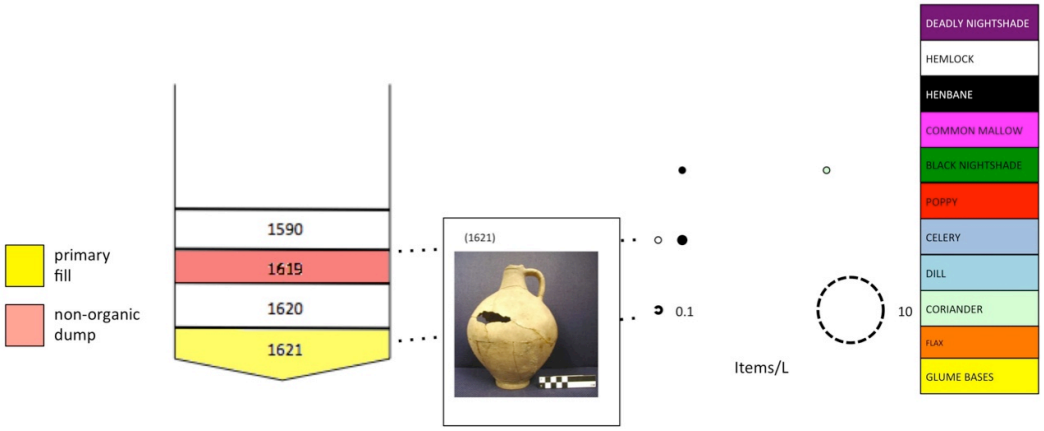

Figure 6-20 Well 1300 section indicating the presence and abundance of 'ritual' plants and key artefacts

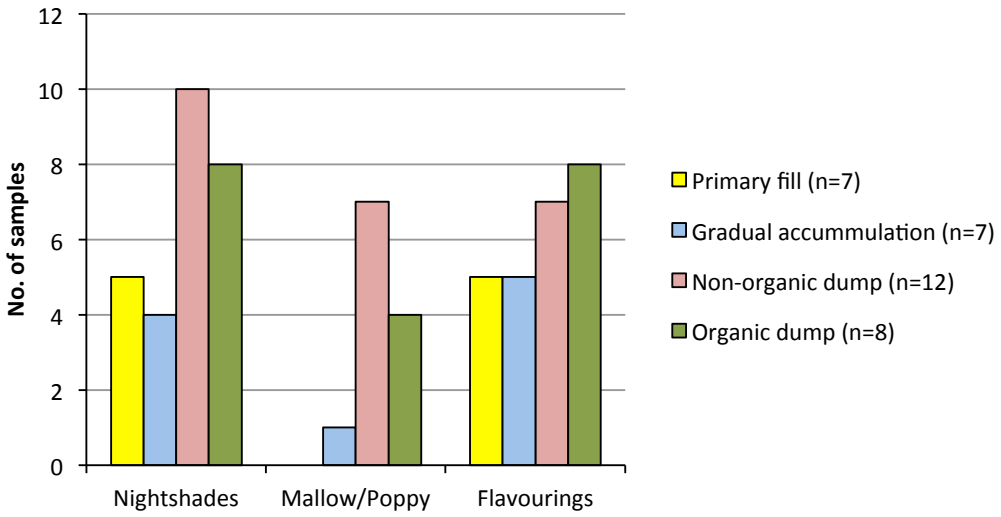

Figure 6-21 Frequency of summed 'ritual' categories by well deposit type

Figure 6-22 Waterlogged flavourings identified from Periods 0-1 Insula IX
A: Anethum graveolens, B: Apium graveolens, C: Foeniculum vulgare, D: Coriandrum sativum.
All scale bars = 2mm.

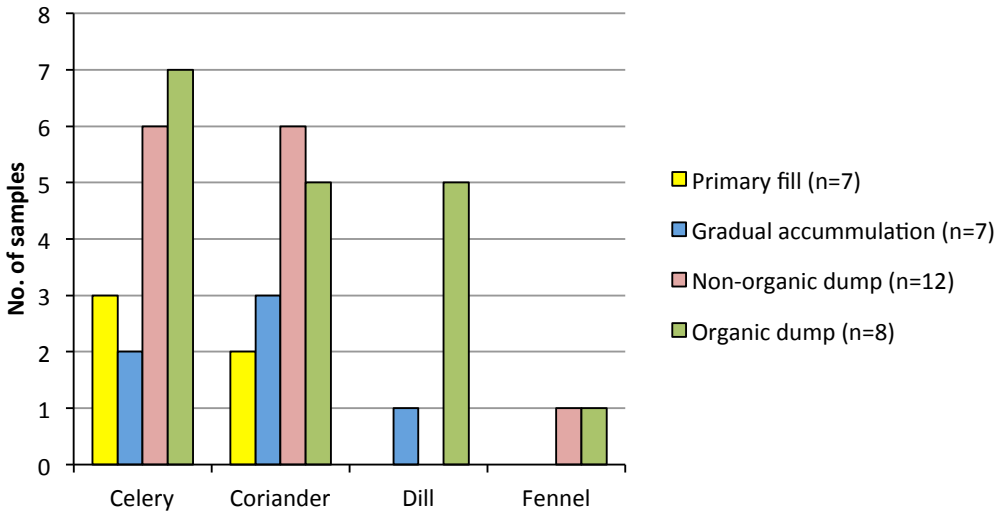

Figure 6-23 Frequency of flavourings by well deposit type

Figure 6-24 Waterlogged table waste from Periods 0-1 Insula IX
A: Malus sp., B: Prunus avium, C: Olea europaea. All scale bars = 2mm.

Figure 6-25 Waterlogged wild plant foods from Periods 0-1 Insula IX
A: Rubus Sect. Glandulosus B: Sambucus nigra C: Mentha aquatica D: Daucus carota. All scale bars = 2mm.

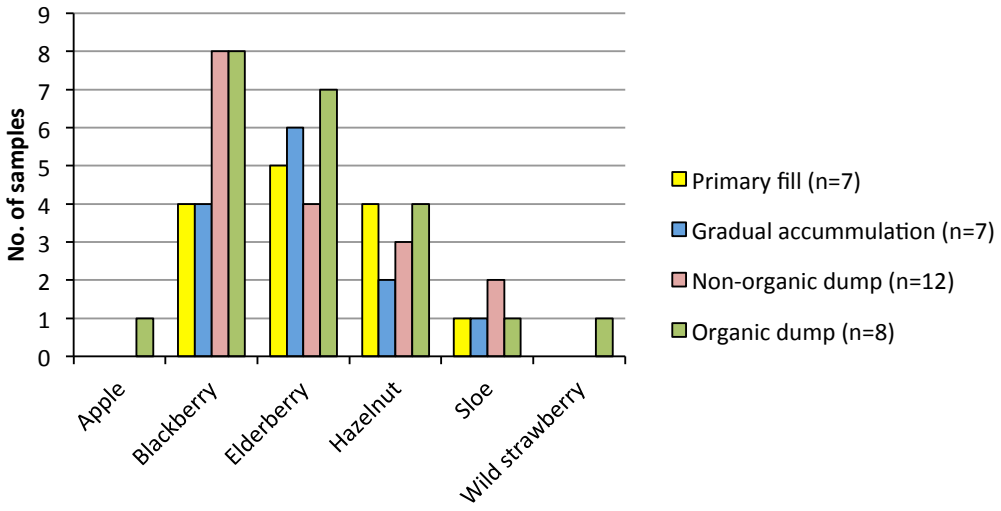

Figure 6-26 Frequency of wild fruits and nuts by well deposit type

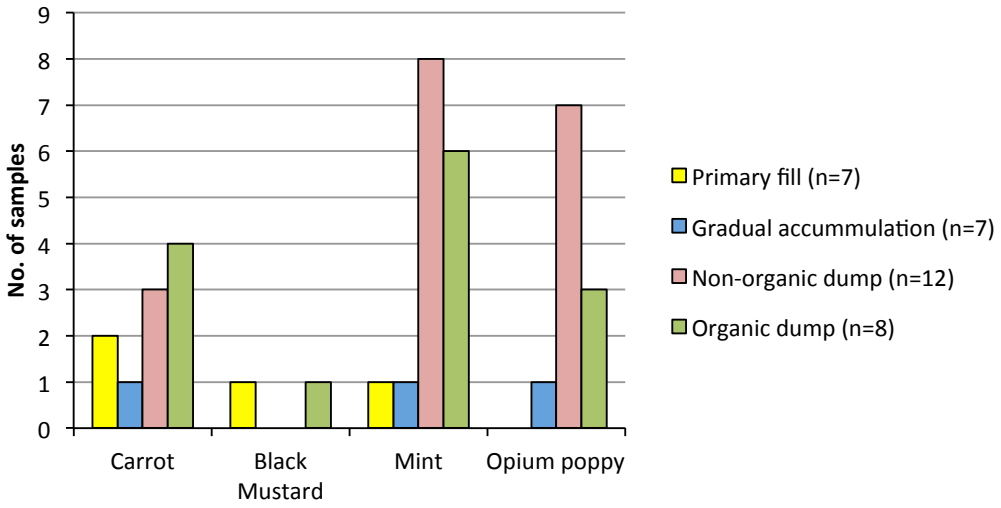

Figure 6-27 Frequency of wild flavourings by well deposit type

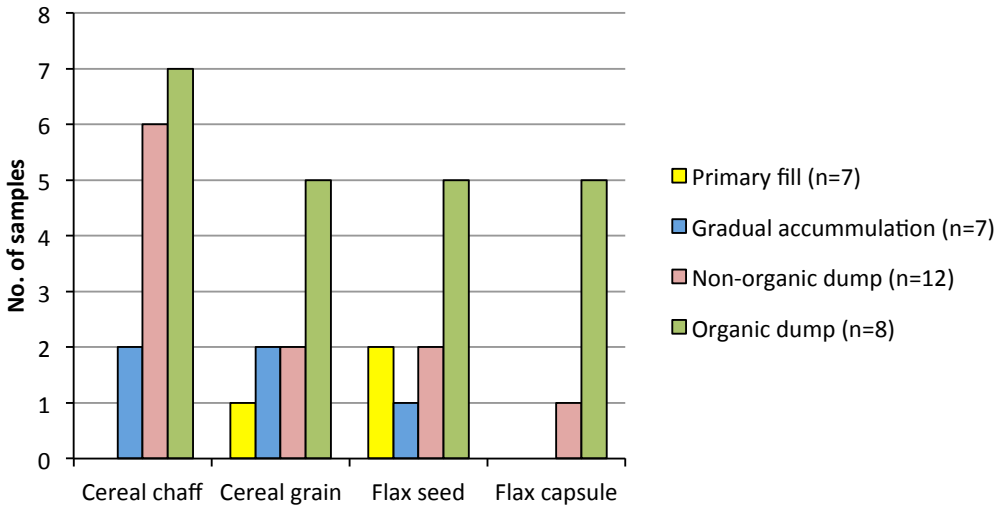

Figure 6-28 Frequency of cereals and flax by well deposit type

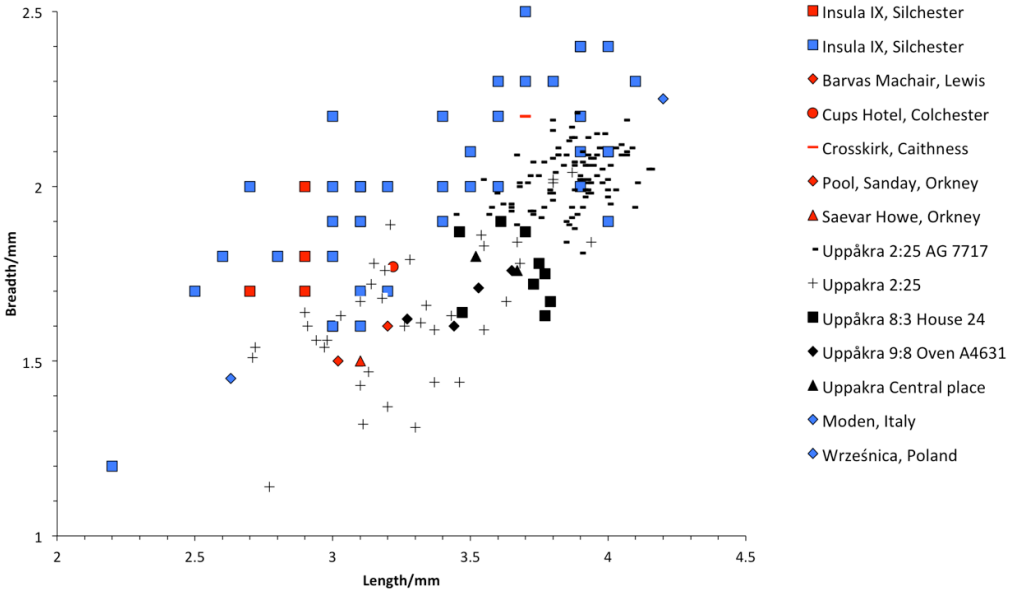

Figure 6-29 Length and width measurements of flax seeds from Silchester and elsewhere
Barvas Machair, Crosskirk, Pool, Saevar Howe (Bond and Hunter 1987), Cups Hotel (Murphy 1992), Uppåkra (Larsson 2013), Modena (Bosi et al. 2011), Września (Latalowa 1998). Blue = waterlogged, red and black = charred.

Figure 6-30 Components of the stable-manure package identified at Periods 0-1 Insula IX
A-C Heathland material. A: Sphagnum sp., B: Ulex europaeus spine, C: Pteridium aquilinium frond. D-I: Crop-processing material D: cereal culm, E: Agrostemma githago fragment, F: Triticum spelta spikelet, G: Hordeum rachis, H: Linum usitatissimum seed, I: Linum usitatissimum capsule. J-R: Hay meadow taxa J: Centaurea nigra bract, K: Medicago sp. capsule, L: Trifolium calyx, M: Fabaceae indet. pod fragment, N: Rhinanthus minor, O: Lychnis flos-cuculi, P: Linum catharticum, Q: Prunella vulgaris, R: Filipendula ulmaria. S-V Marshy grassland components: S: Eleocharis palustris, T: Caltha palustris, U: Pulicaria sp., V: Myosotis sp. All scale bars = 2mm.

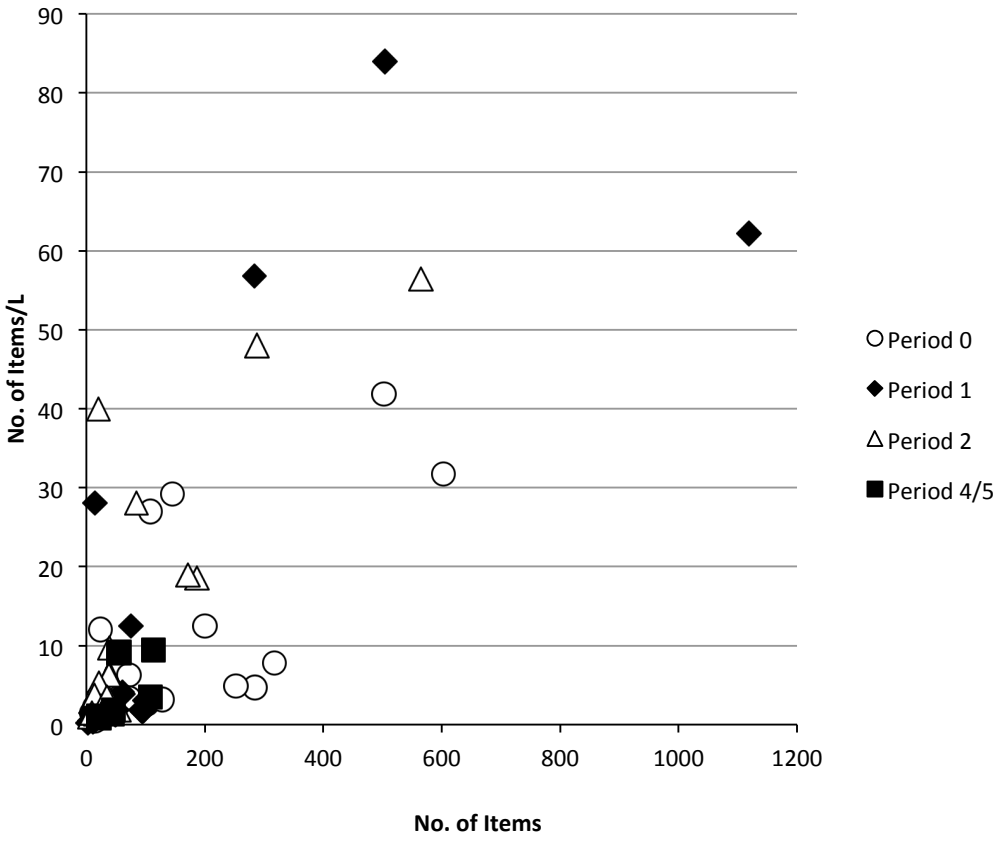

Figure 6-31 Graph showing no. of items and density of charred samples, classified by period

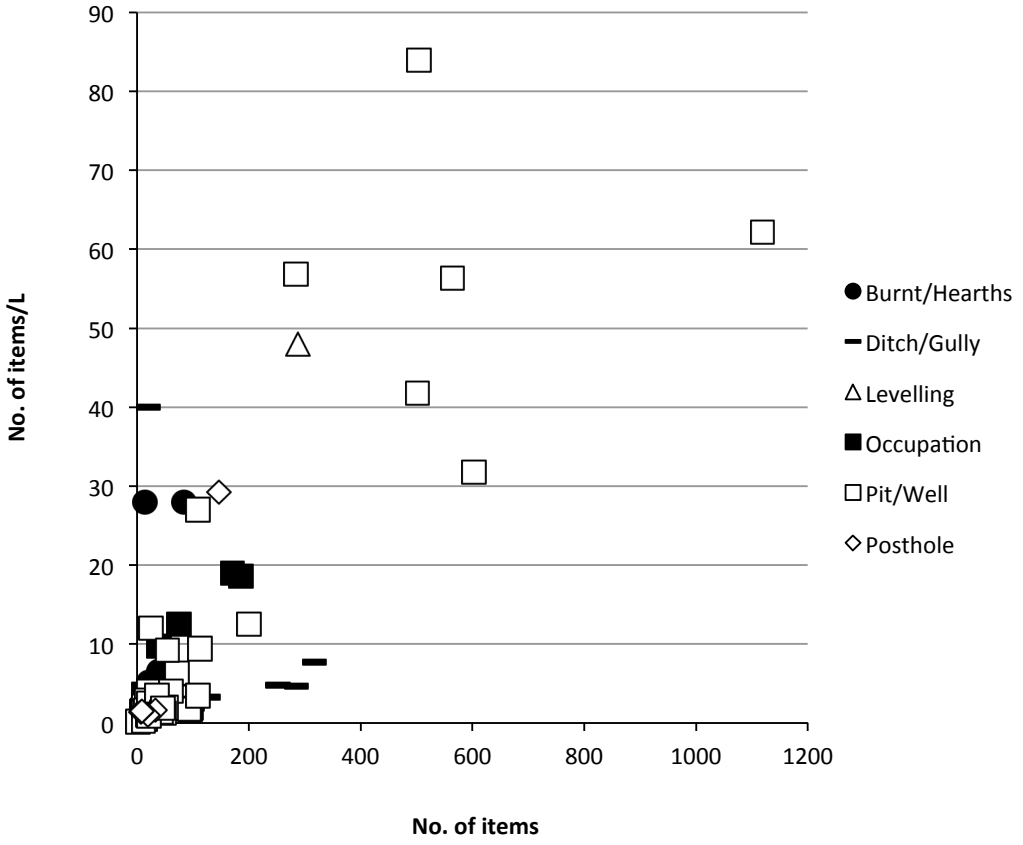

Figure 6-32 Graph showing no. of items and density of charred samples, classified by feature type

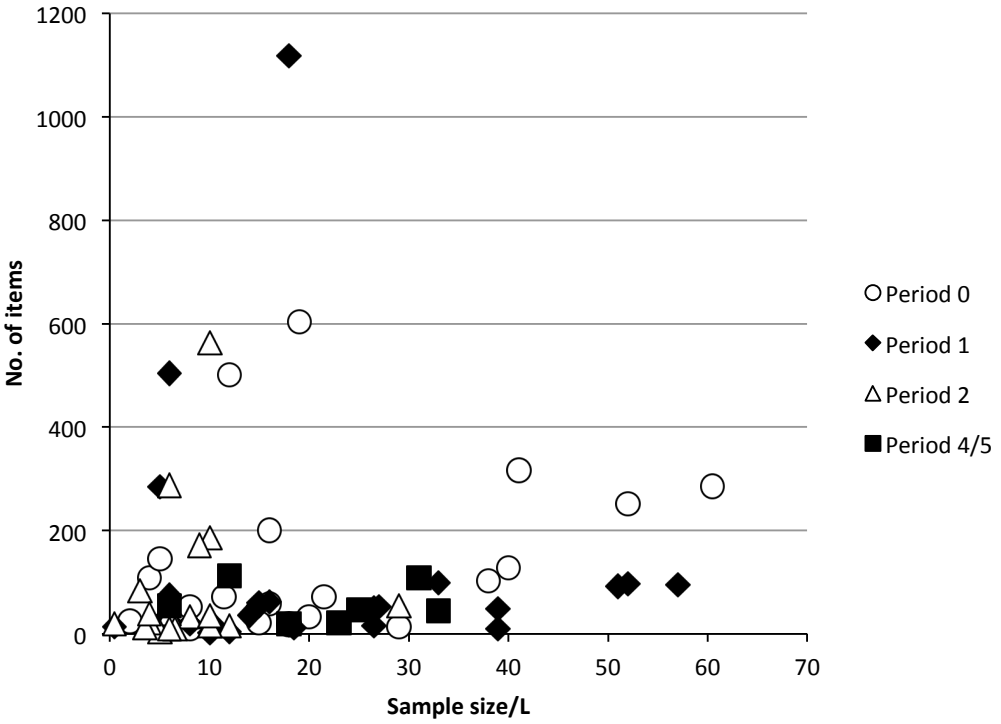

Figure 6-33 Graph showing size and no. of items of charred samples, classified by period

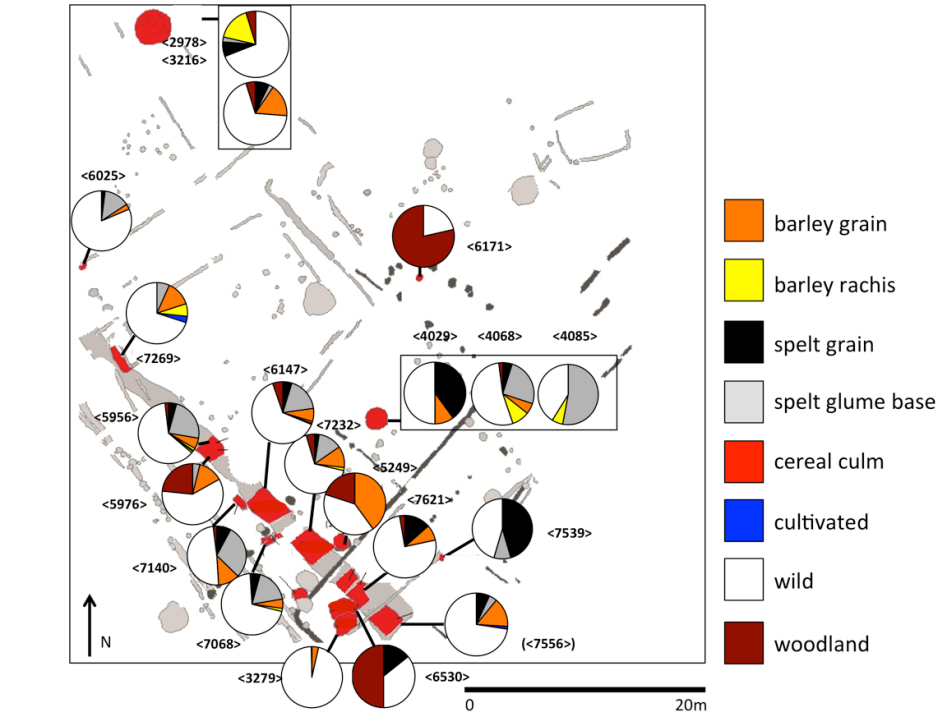

Figure 6-34 Spatial plan of charred samples from Period 0 Insula IX

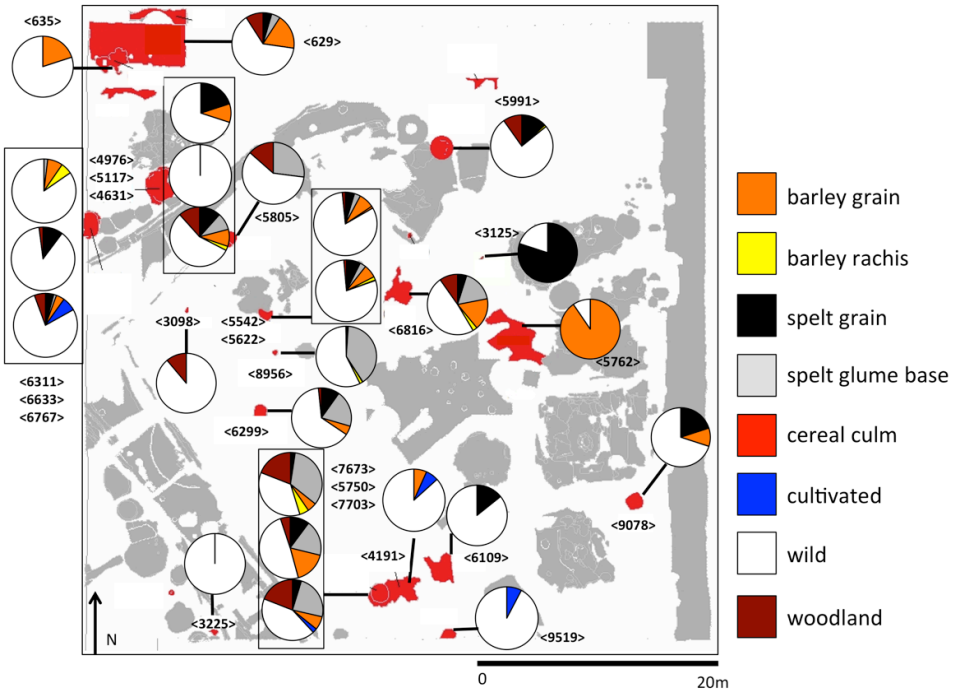

Figure 6-35 Spatial plan of charred samples form Period 1 Insula IX

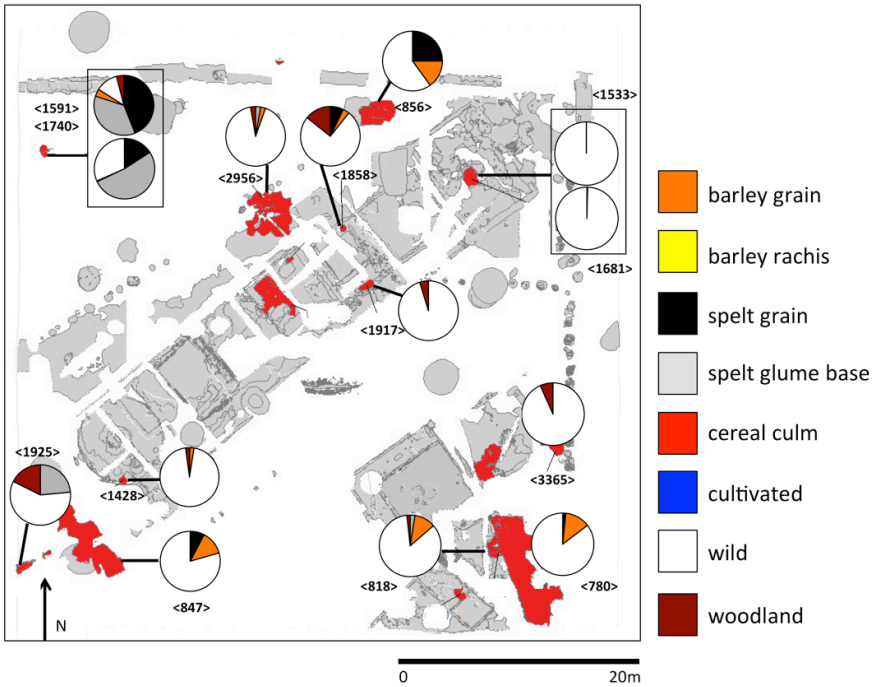

Figure 6-36 Spatial plan of charred samples from Period 2 Insula IX

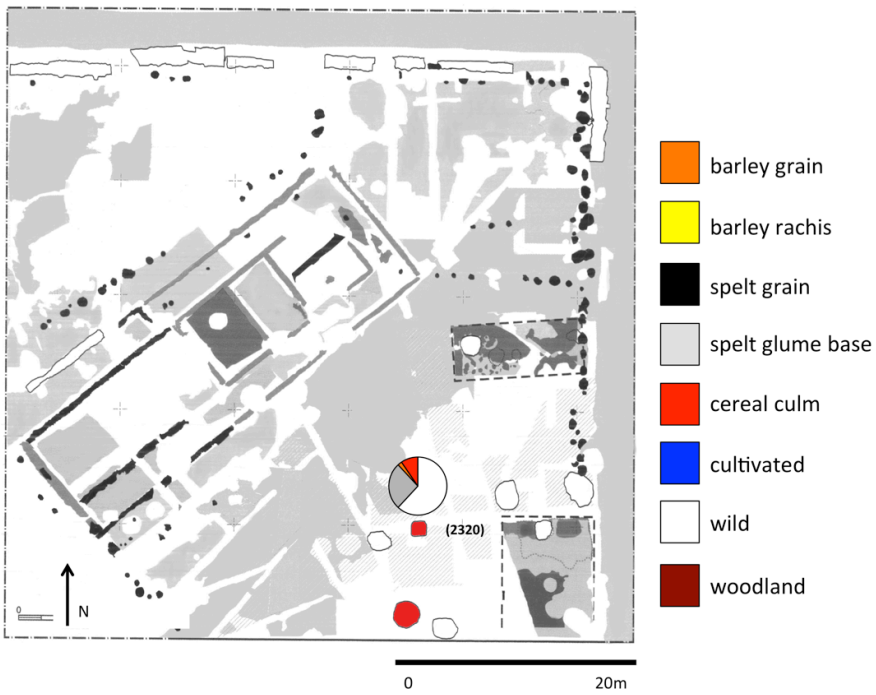

Figure 6-37 Spatial plan of charred samples from Period 4 Insula IX

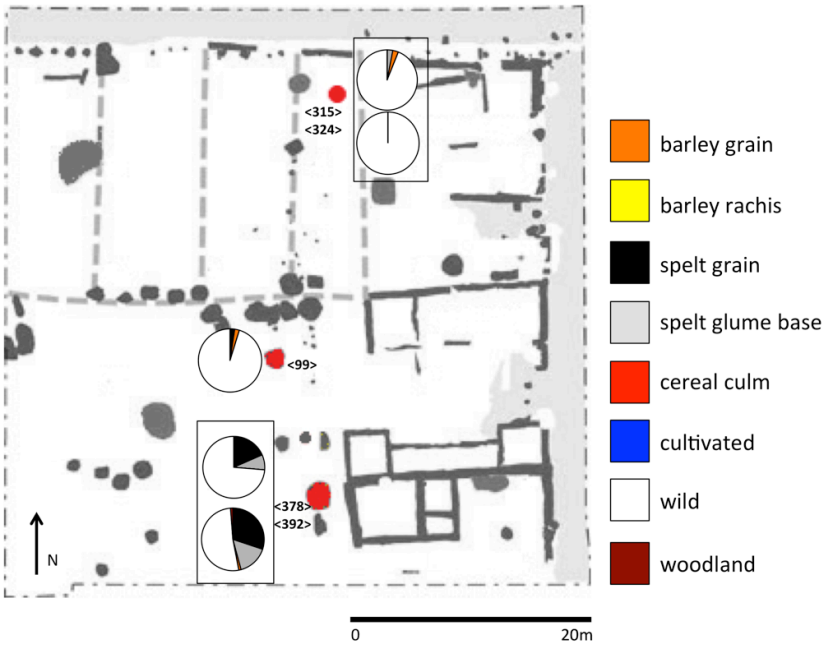

Figure 6-38 Spatial plan of charred samples from Period 5 Insula IX

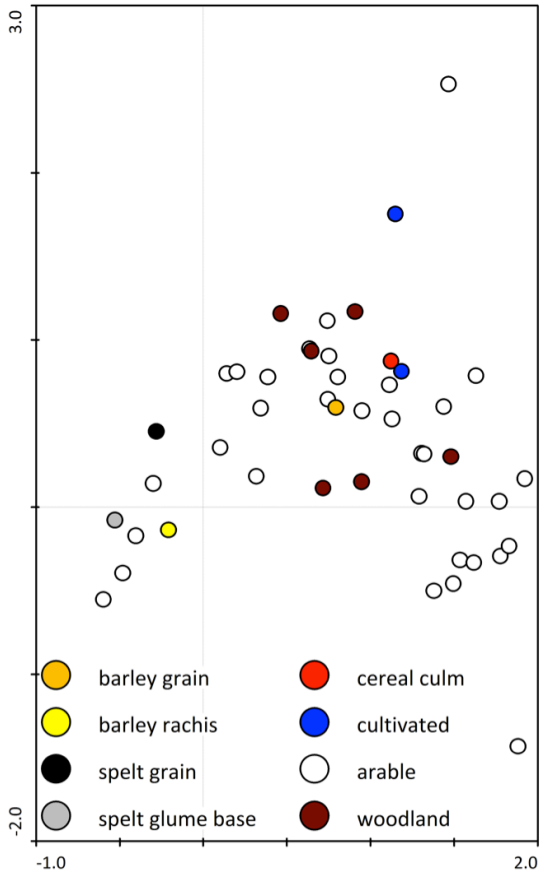

Figure 6-39 CA plot of all contents of charred samples from Insula IX, taxa classified by crop type.
1st and 2nd axis. 40 samples, 47 taxa. Min 30, Max 3640.

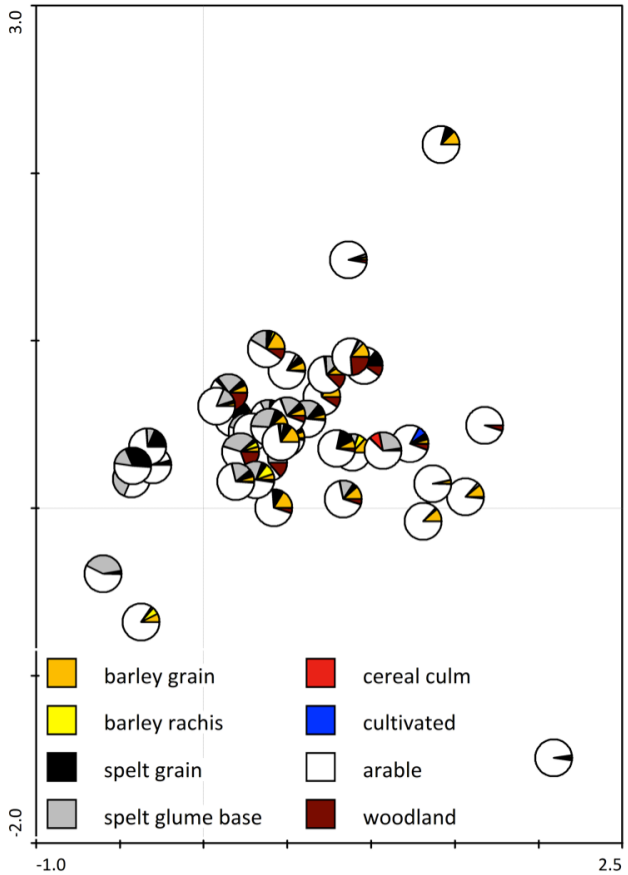

Figure 6-40 CA plot of all contents of charred samples from Insula IX, sample pies classified by crop type.
1st and 2nd axis. 40 samples, 47 taxa. Min 30, Max 3640.

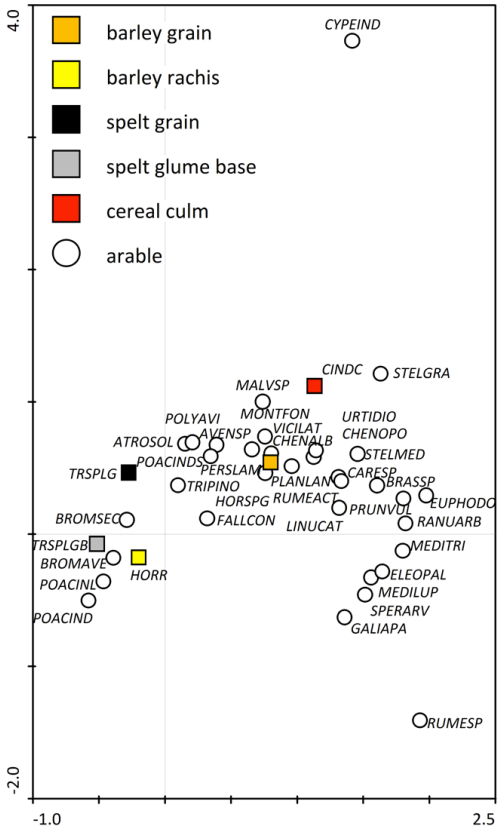

Figure 6-41 CA plot of crop and arable contents of charred samples from Insula IX, taxa classified by crop type. For explanation of taxa codes see Table 4.6. 1st and 2nd axis. 40 samples, 39 taxa. Min 29, Max 3640.

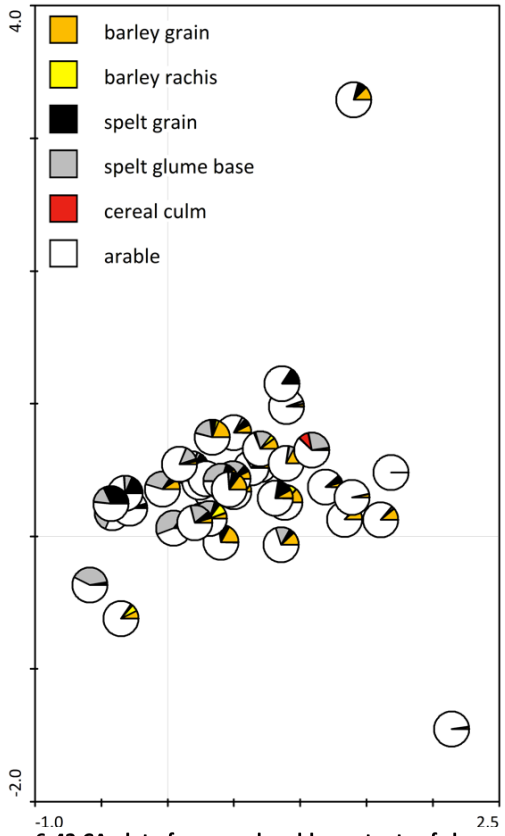

Figure 6-42 CA plot of crop and arable contents of charred samples from Insula IX, sample pies classified by crop type.

1st and 2nd axis. 40 samples, 47 taxa. Min 30, Max 3640.

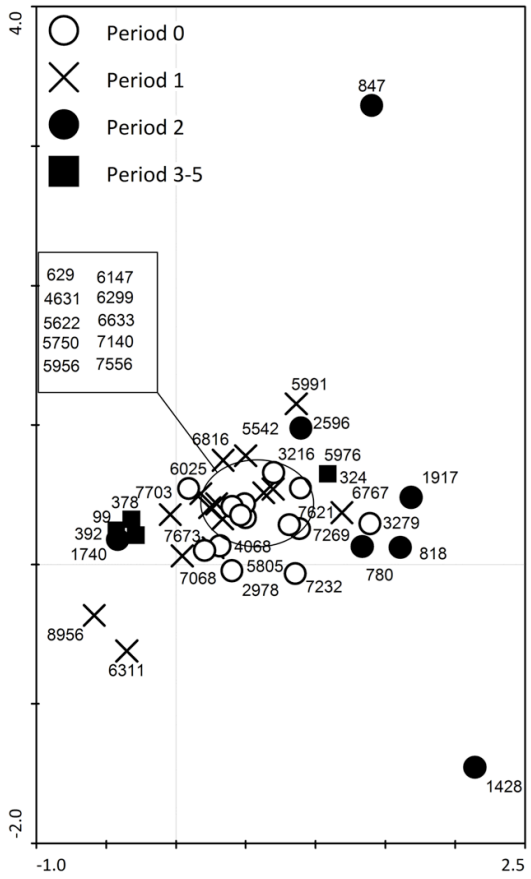

Figure 6-43 CA plot of crop and arable contents of charred samples from Insula IX, samples classified by period.
1st and 2nd axis. 40 samples, 39 taxa. Min 29, Max 3640.

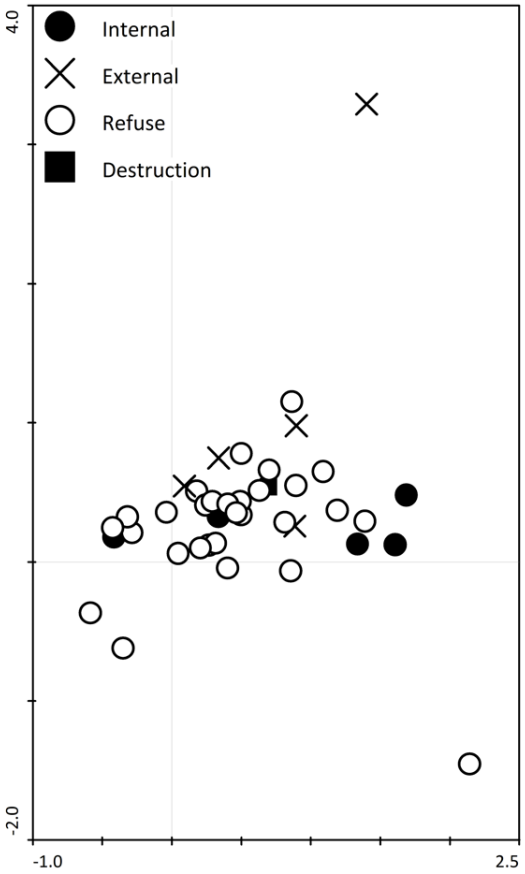

Figure 6-44 CA plot of crop and arable contents of charred samples from Insula IX, samples classified by feature type.
1st and 2nd axis. 40 samples, 39 taxa. Min 29, Max 3640

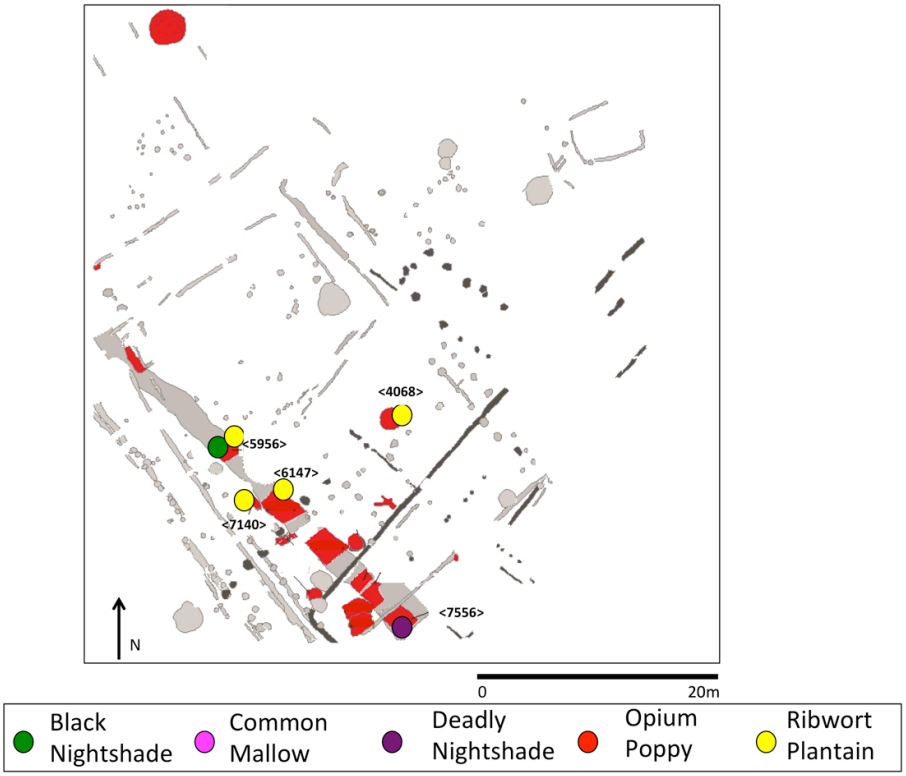

Figure 6-45 Spatial distribution of medicinal taxa in Period 0 Insula IX

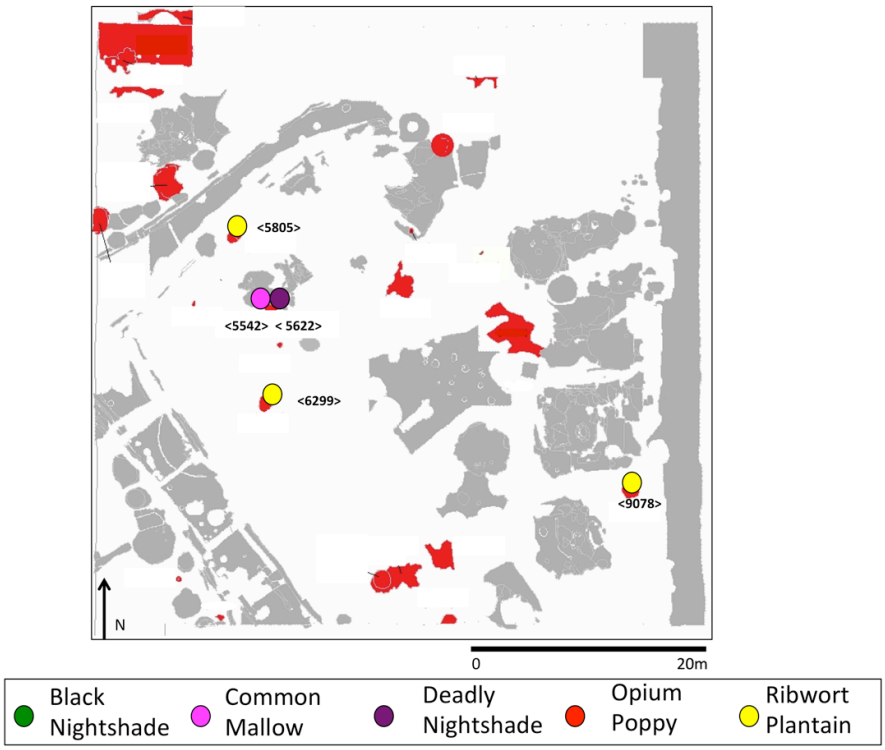

Figure 6-46 Spatial distribution of medicinal taxa in Period 1 Insula IX

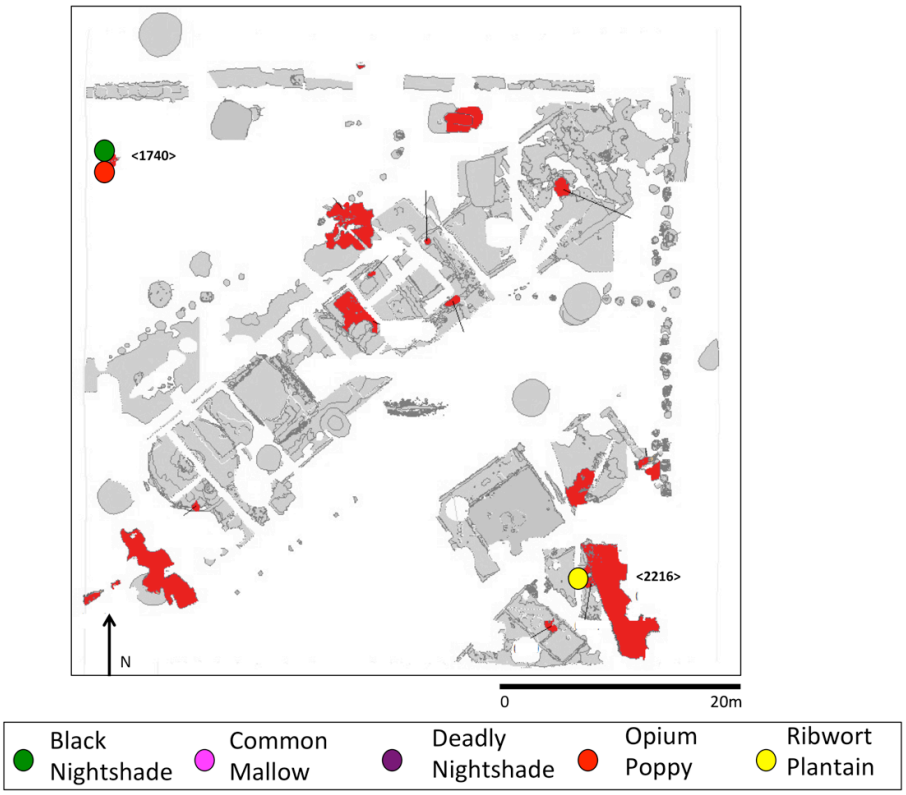

Figure 6-47 Spatial distribution of medicinal taxa in Period 2 Insula IX

Figure 6-48 'Ritual' taxa from Insula IX
A: Olea europaea, B: Lens culinaris, C: Prunus domestica. All scale bars = 2mm.

Figure 6-49 Charred plant foods from Insula IX
A: Linum usitatissimum, B: Carum carvi, C: Pisum sativum, D: Vicia faba. All scale bars = 2mm.

Figure 6-50 Charred fodder taxa from Insula IX
A: Rhinanthus minor, B: Filipendula ulmaria, C: Linum catharticum, D: Prunella vulgaris. All scale bars = 2mm.

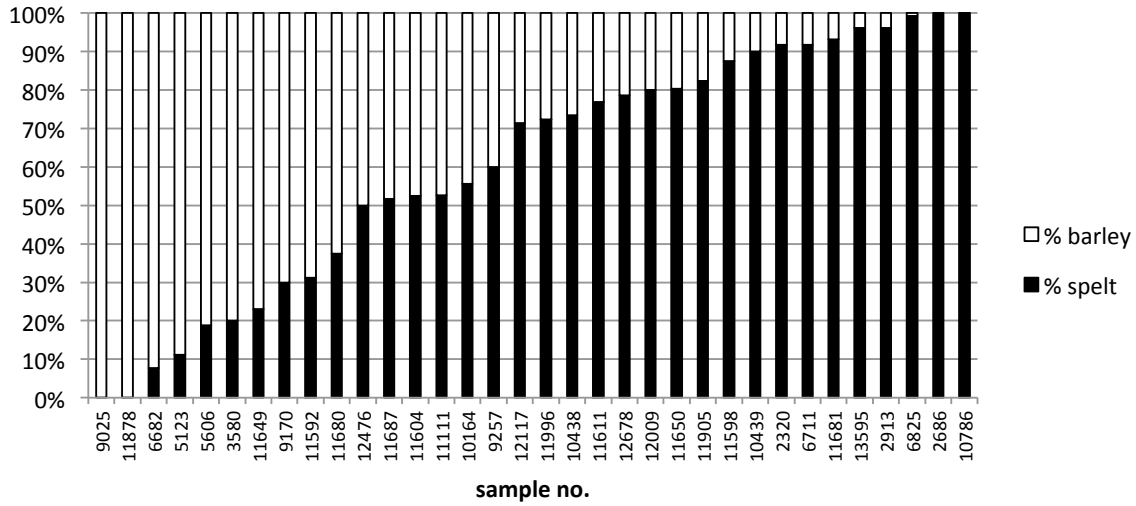

Figure 6-51 Proportion of the maximum no. of barley and spelt crop items in Insula IX charred samples

Figure 6-52 Charred crop-processing remains from Insula IX
A-B Early stage by-products A: cereal culm, B: Hordeum rachis.
C-H Fine-sieve by-products C: Triticum spelta glume base, D: Triticum spelta spikelet, E: Rumex sp., F: Scleranthus annuus, G: Eleocharis palustris, H: Chenopodium album.
I-L Fine sieve products I: Galium aparine, J: Avena sp. in lemma and palea, K: c. Agrostemma githago capsule fragment. All scale bars = 2mm.

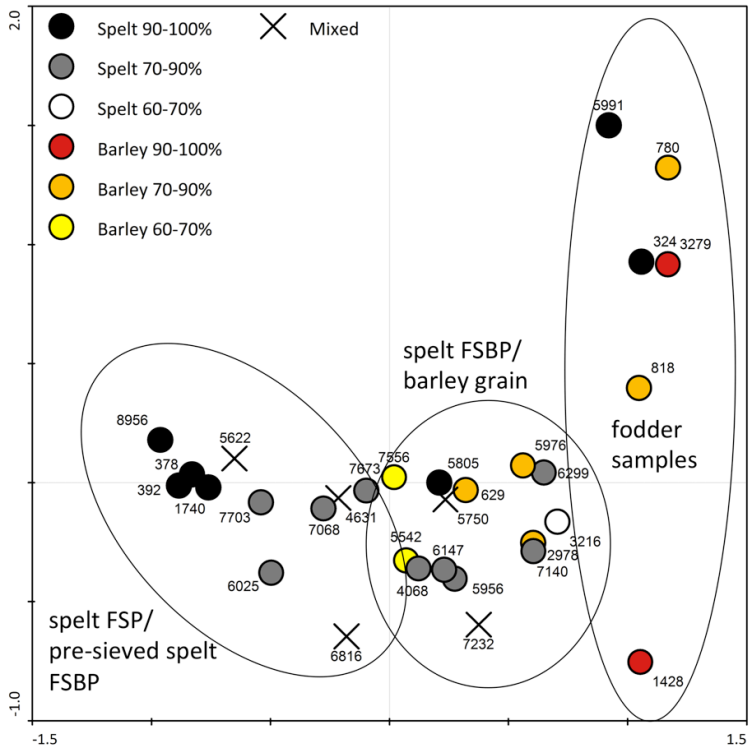

Figure 6-53 CA plot of arable weeds from Insula IX charred samples, samples classified by crop type. 1st and 2nd axis. 31 samples, 35 taxa. Min 9, Max 701.

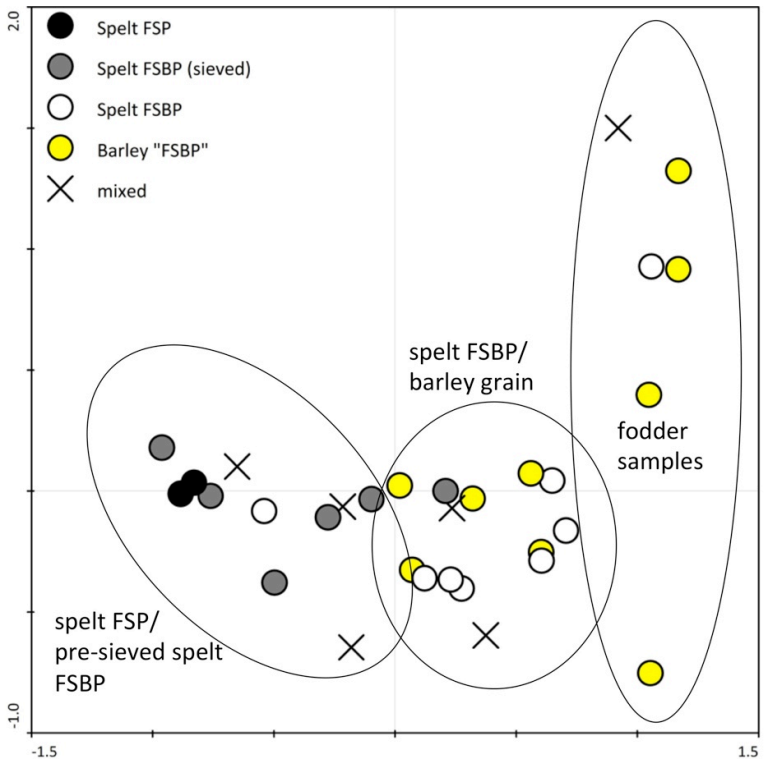

Figure 6-54 CA plot of arable weeds from Insula IX crop samples, samples classified by crop type. 1st and 2nd axis. 31 samples, 35 taxa. Min 9, Max 701.

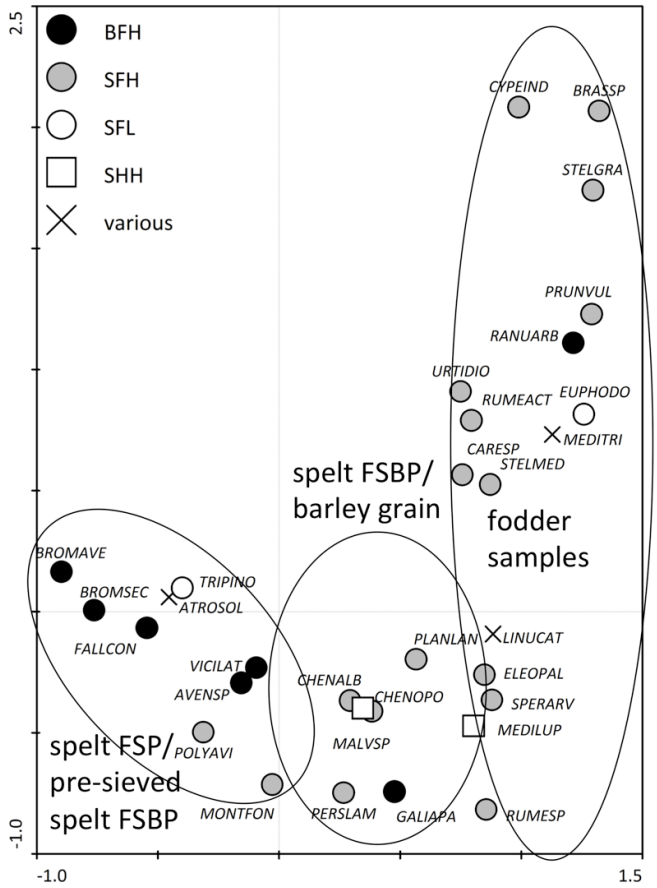

Figure 6-55 CA plot of arable weeds from Insula IX charred samples, taxa classified by weed type.
1st and 2nd axis. 31 samples, 35 taxa. Min 9, Max 701.

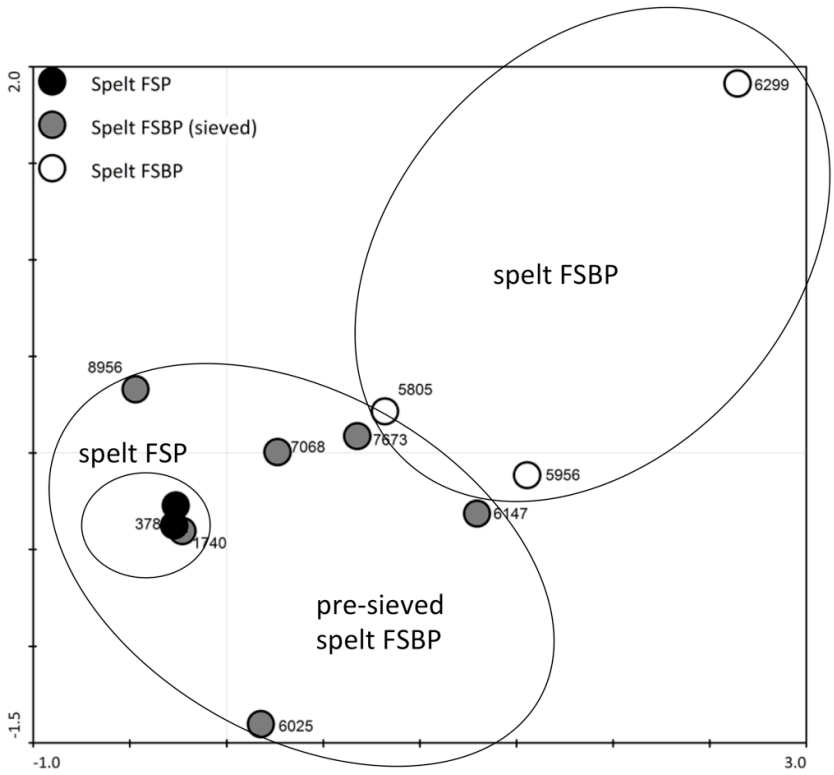

Figure 6-56 CA plot of arable weeds from Insula IX charred spelt samples, samples classified by crop-processing stage.
1st and 2nd axis. 12 samples, 32 taxa. Min 14, Max 701.

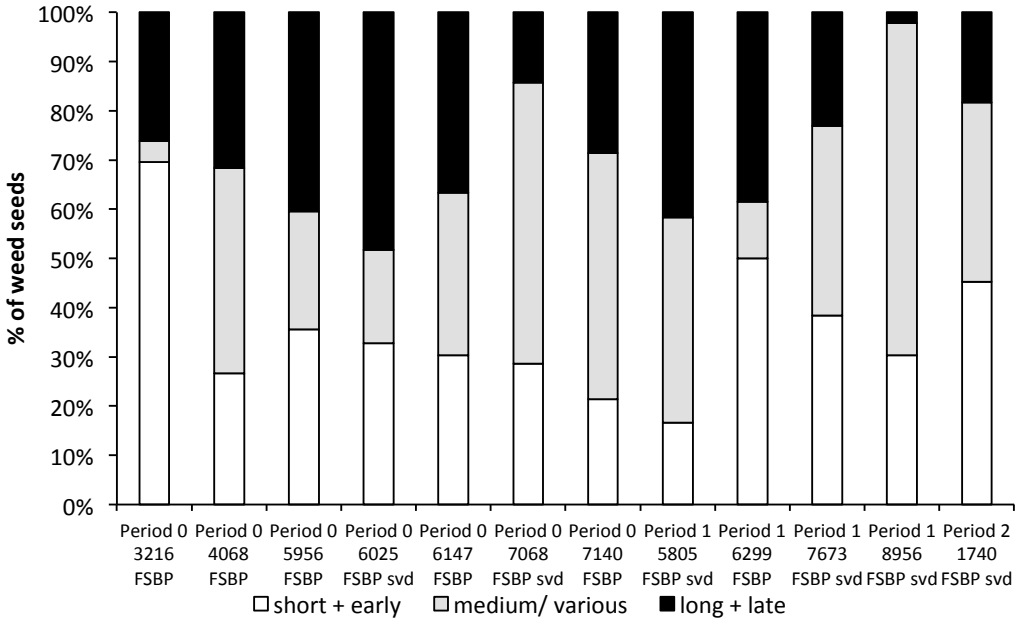

Figure 6-57 Weed contents of Silchester spelt by-products, classified by flowering duration and onset

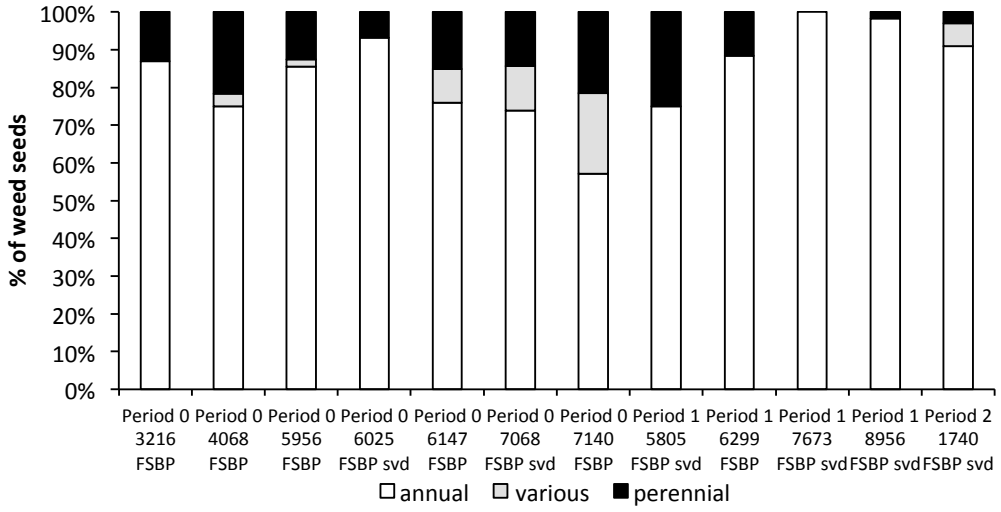

Figure 6-58 Weed content of Silchester spelt by-products, classified by life form

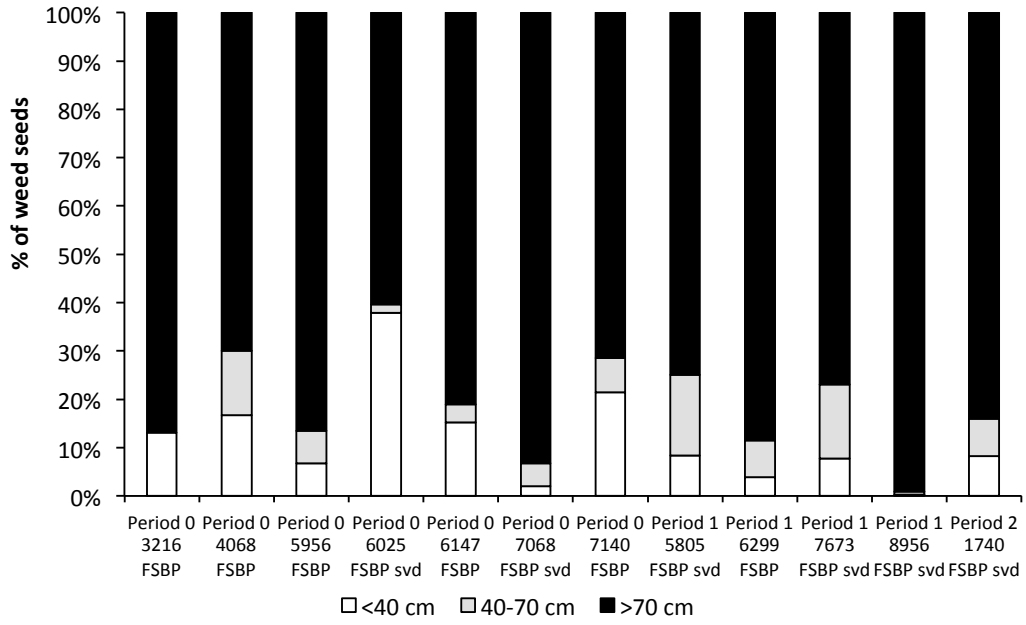

Figure 6-59 Weed content of Silchester spelt by-products, classified by maximum height

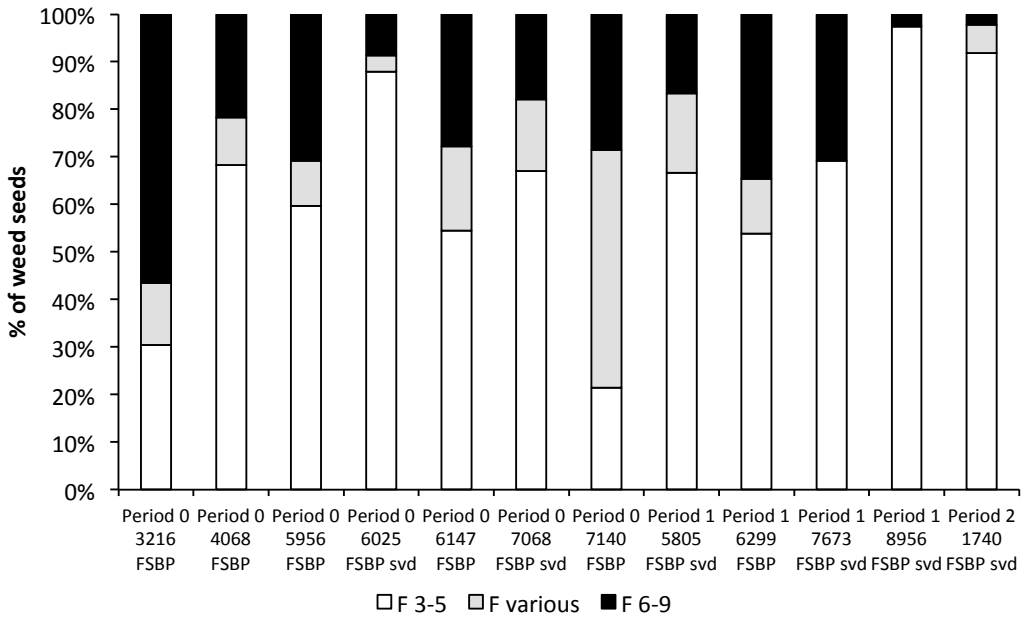

Figure 6-60 Weed content of Silchester samples, classified by F values

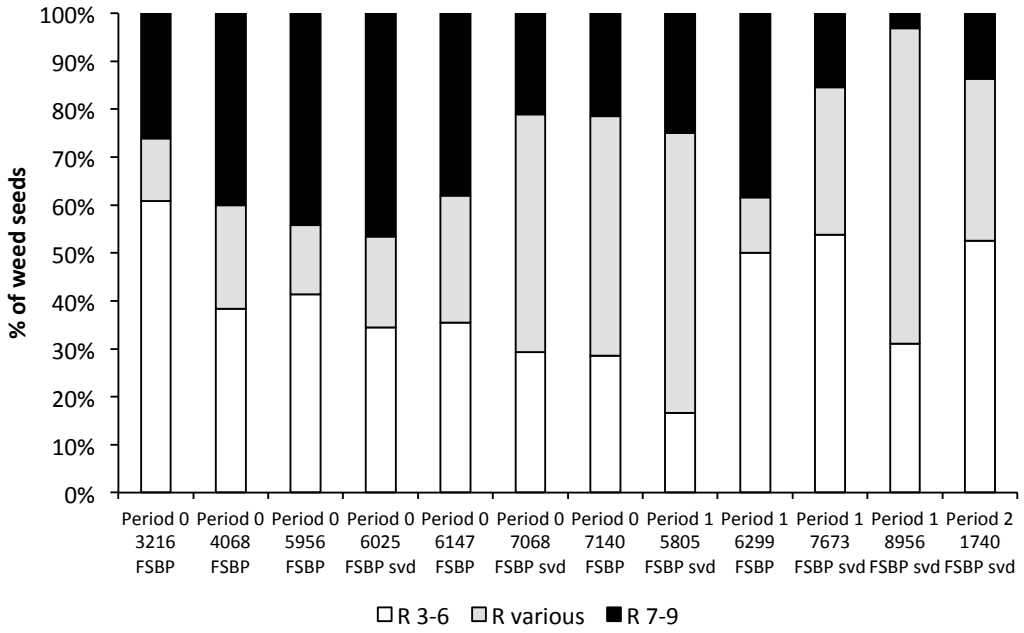

Figure 6-61 Weed content of Silchester samples, classified by R values

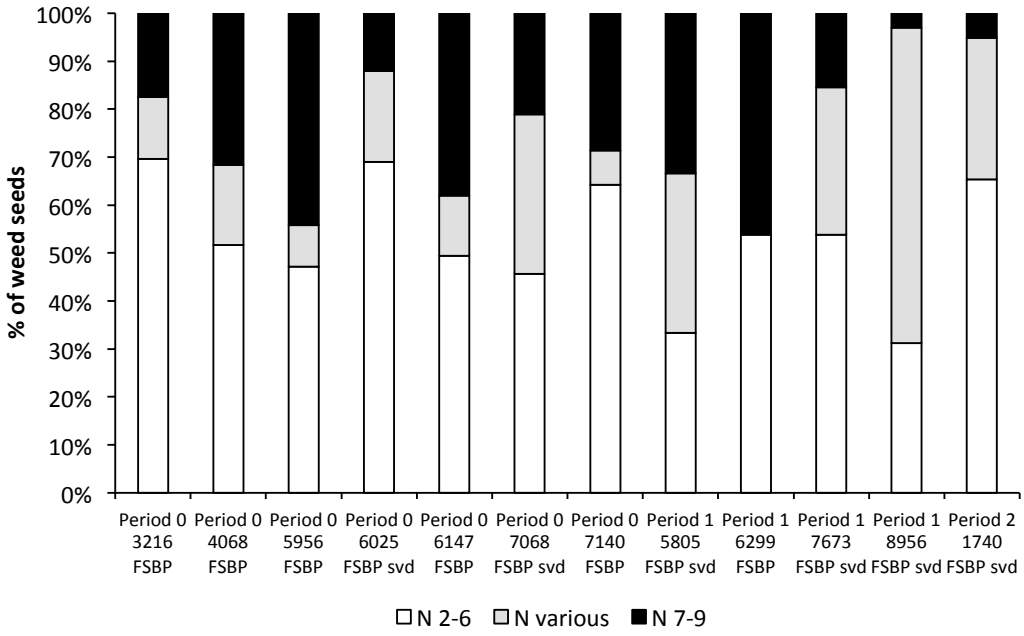

Figure 6-62 Weed content of Silchester samples, classified by N values

Figure 6-63 Mineralised plant foods and wild taxa from (15034) Insula IX
A-G Fruits A: Ficus carica, B: Pyrus/Malus, C: Morus nigra, D: Rubus fruticosus, E = Crataegus sp., F = Prunus sp., G: Prunus domestica.
H-K Flavourings H: Anethum graveolens, I: Apium graveolens, J: Linum usitatissimum, K: Papaver somniferum.
L-O Pulses and cereals L: Lens culinaris, M: Pisum sativum, N: Triticum spelta grain, O: Triticum spelta spikelet
P-S Wild taxa P: Stellaria media Q: Medicago lupulina R: Rhinanthus minor S: Conium maculatum.
All scale bars = 2mm.

Figure 6-64 Mineralised faecal indicators
A: Pyrus/Malus and encrustation, B: fruit skin, C: mystery object. All scale bars = 2mm.

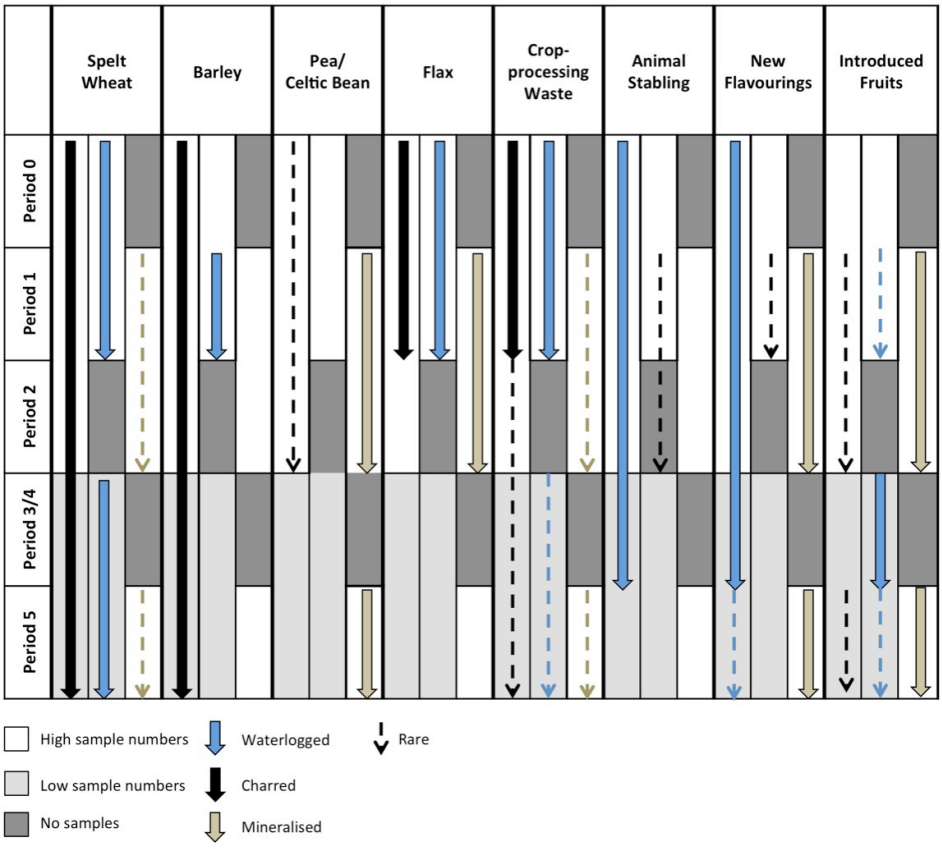

Figure 6-65 Summary of archaeobotanical results from Insula IX

Figure 6-66 Late Iron Age plant foods from wells 10421 and 8328
A: Apium graveolens, B: Coriandrum sativum, C: Anethum graveolens, D: Olea europaea. All scale bars = 2mm.

Chapter 7 Figures

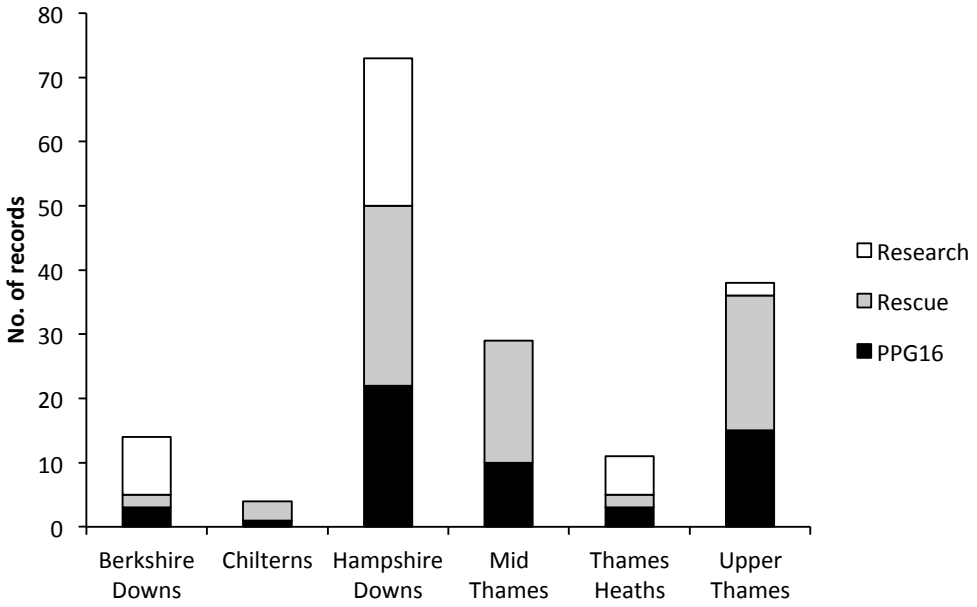

Figure 7-1 No. of records by excavation type and NCA in the regional study area. Research = data deriving from academic or community research excavations. Rescue = data deriving from excavations in advance of development before 1990. PPG16 = data deriving from excavations undertaken after PPG16 in 1990.

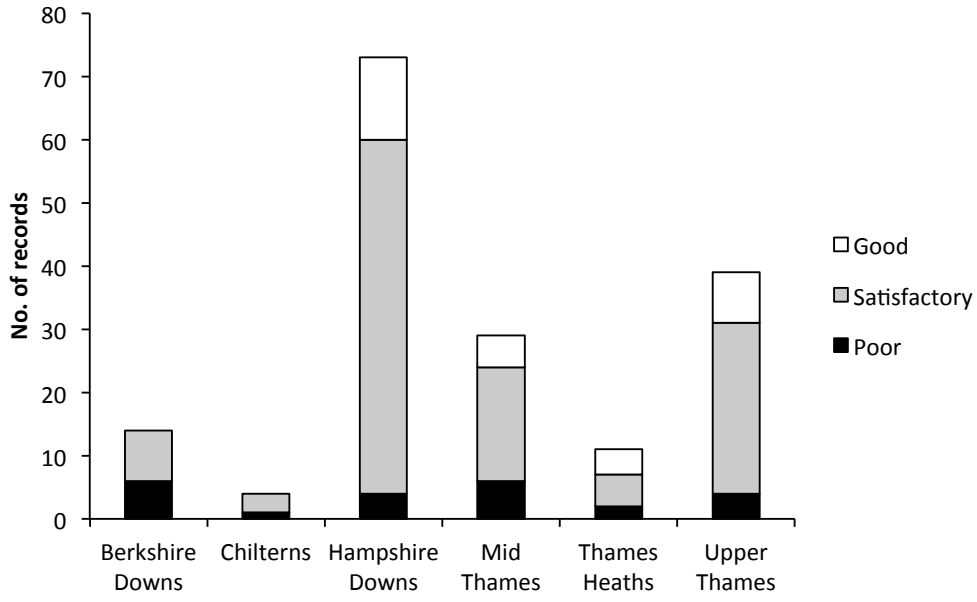

Figure 7-2 No. of records by quality and NCA in the regional study area

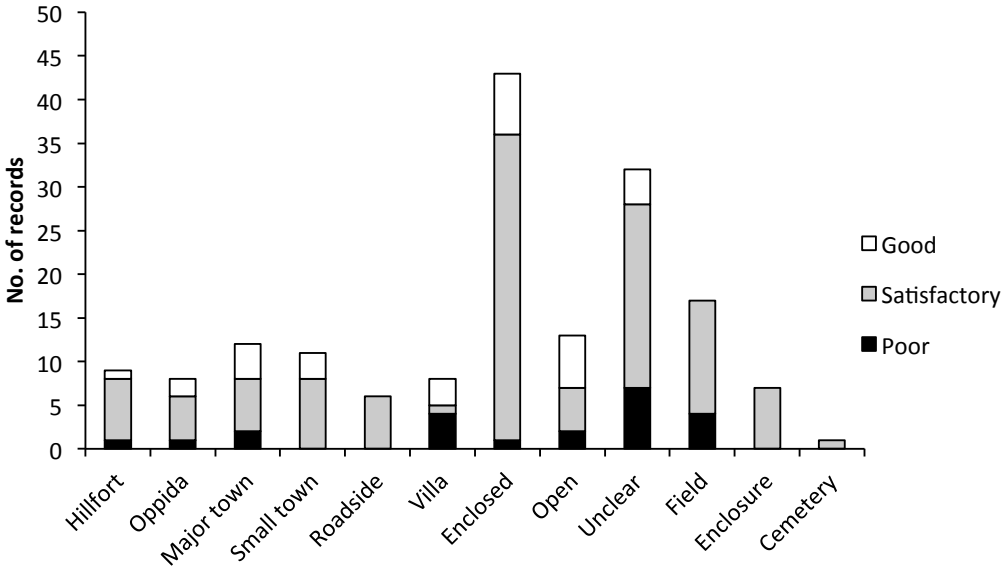

Figure 7-3 No. of records by quality and site type in the regional study area

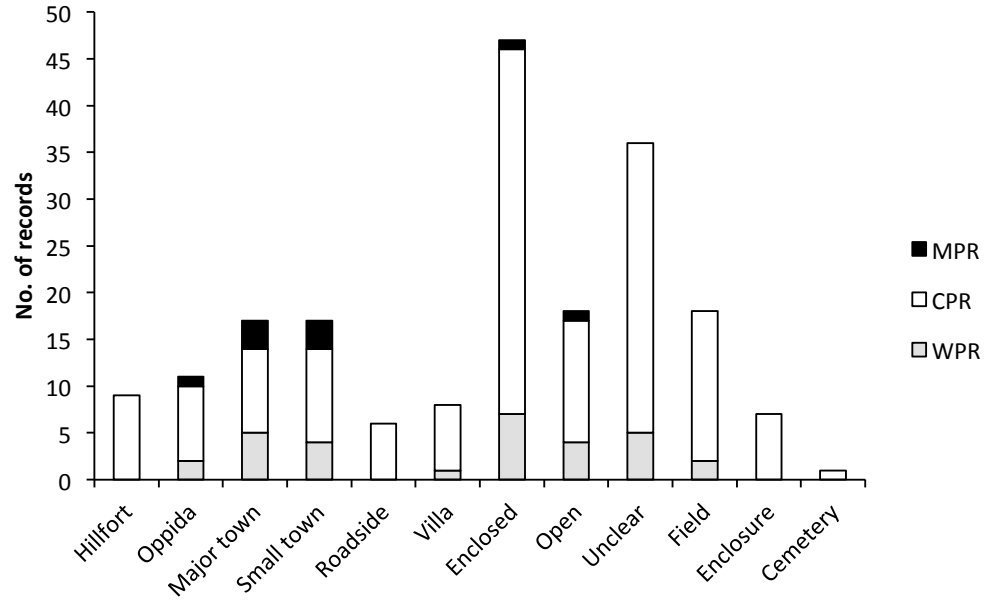

Figure 7-4 No. of records by mode of preservation and site type in the regional study area

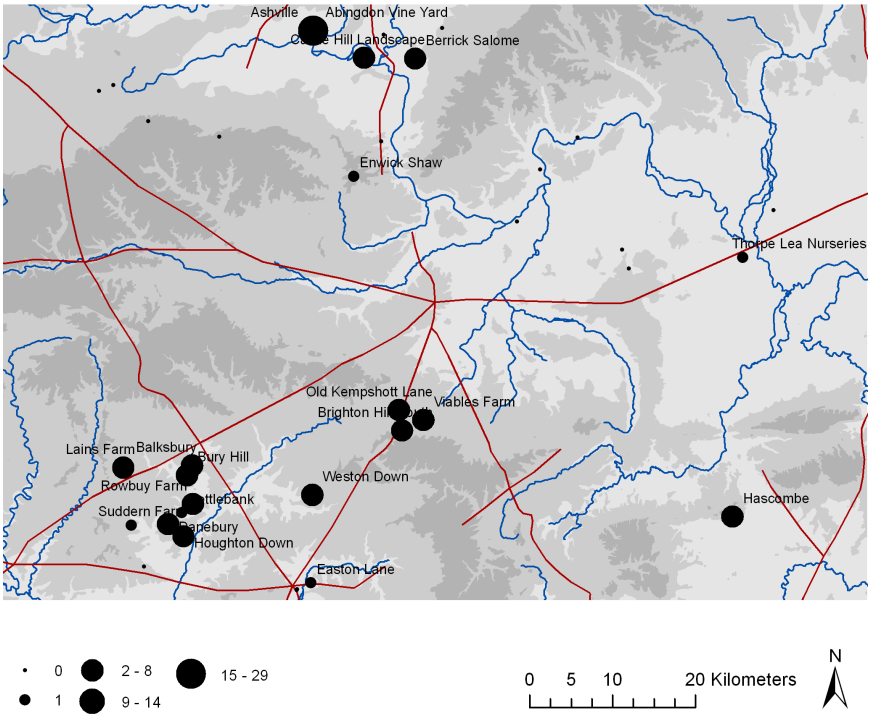

Figure 7-5 Distribution of Mid Iron Age samples in the reduced regional dataset

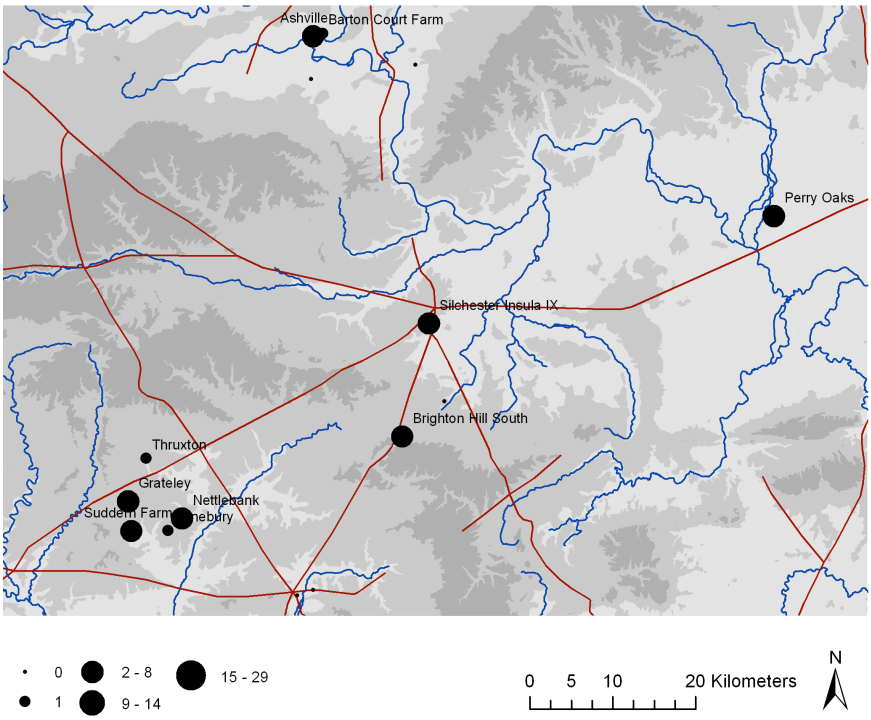

Figure 7-6 Distribution of Late Iron Age samples in the reduced regional dataset

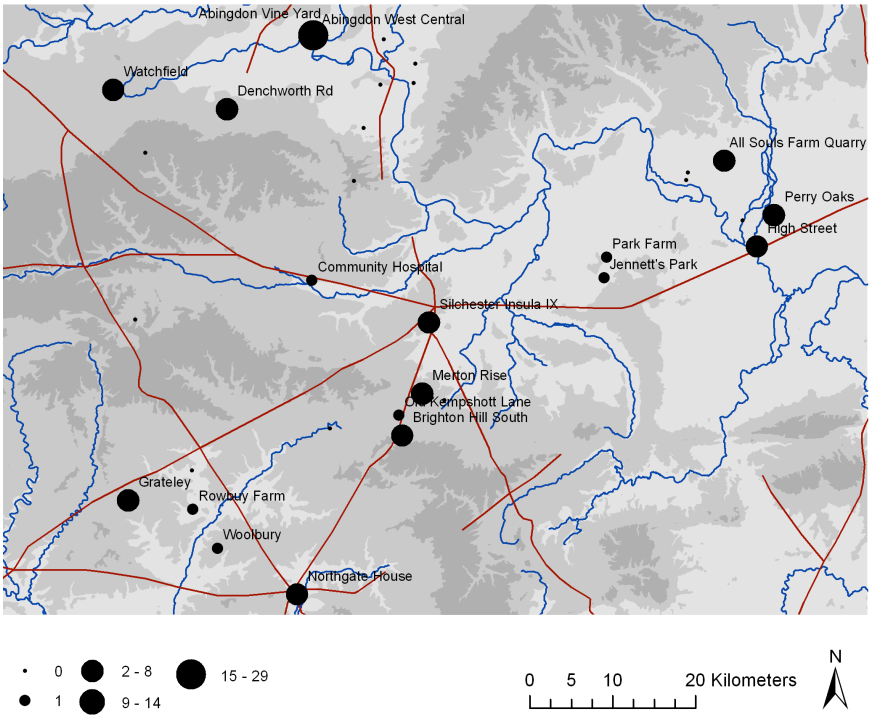

Figure 7-7 Distribution of Early Roman samples in the reduced regional dataset

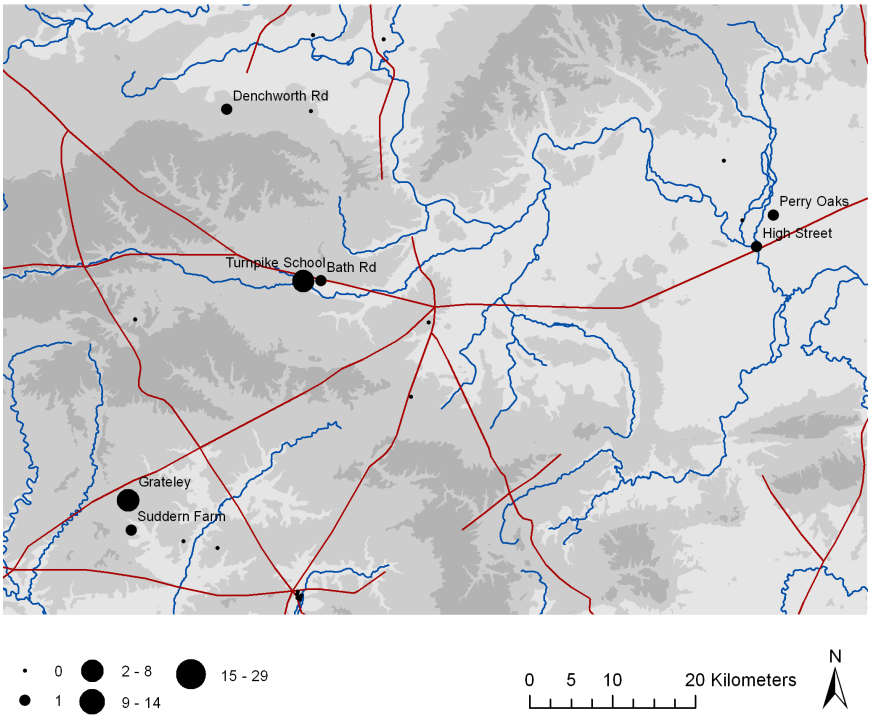

Figure 7-8 Distribution of Mid Roman samples in the reduced regional dataset

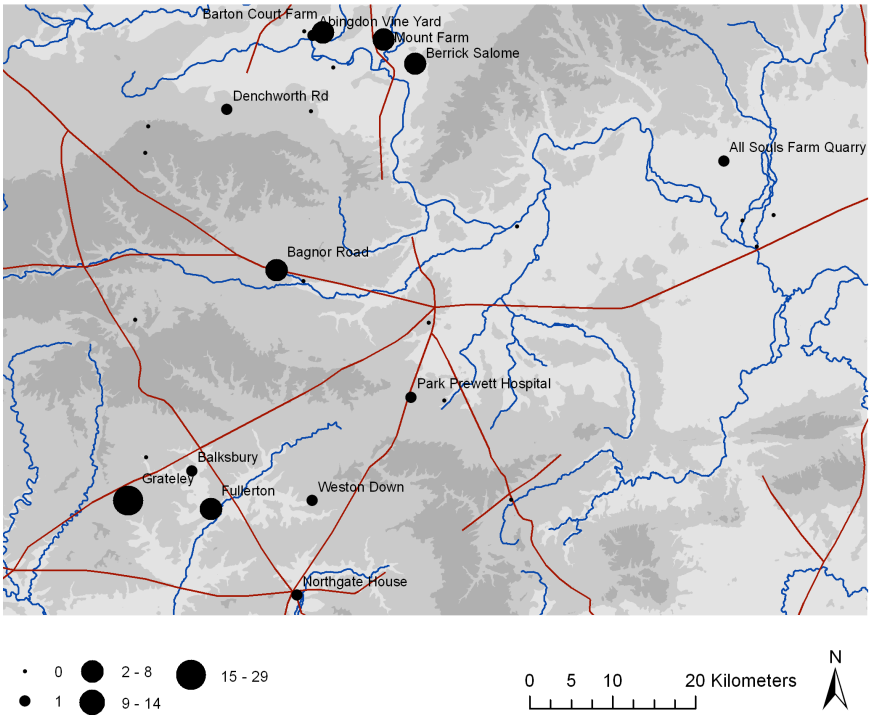

Figure 7-9 Distribution of Late Roman samples in the reduced regional dataset

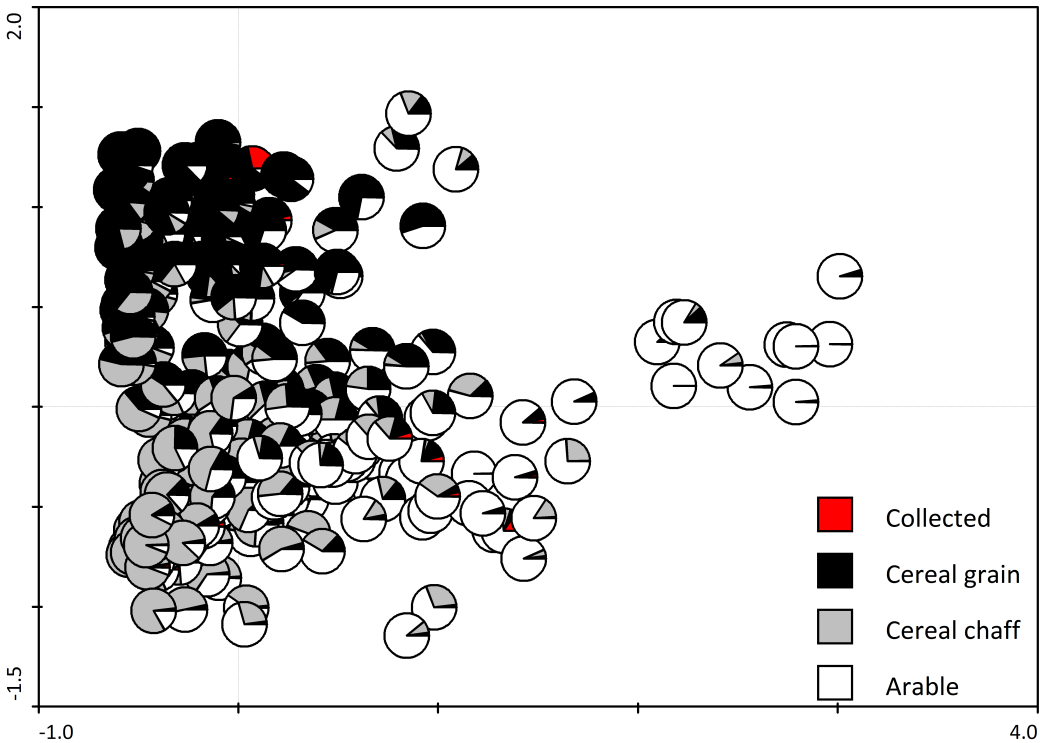

Figure 7-10 CA plot of collected, arable and crop contents of regional charred samples, sample pies classified by broad categories.
1st and 2nd axis. 287 samples, 86 taxa. Min 102, Max 9090.

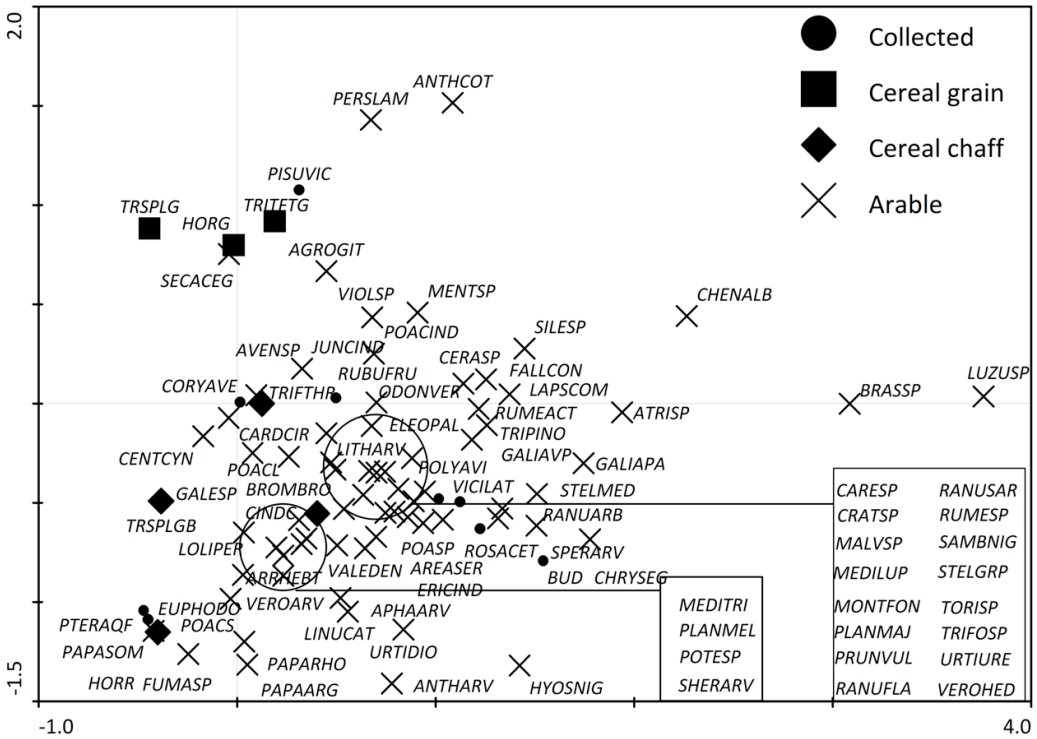

Figure 7-11 CA plot of collected, arable and crop content of regional charred samples, taxa classified by broad categories.
1st and 2nd axis. 287 samples, 86 taxa. Min 102, Max 9090.

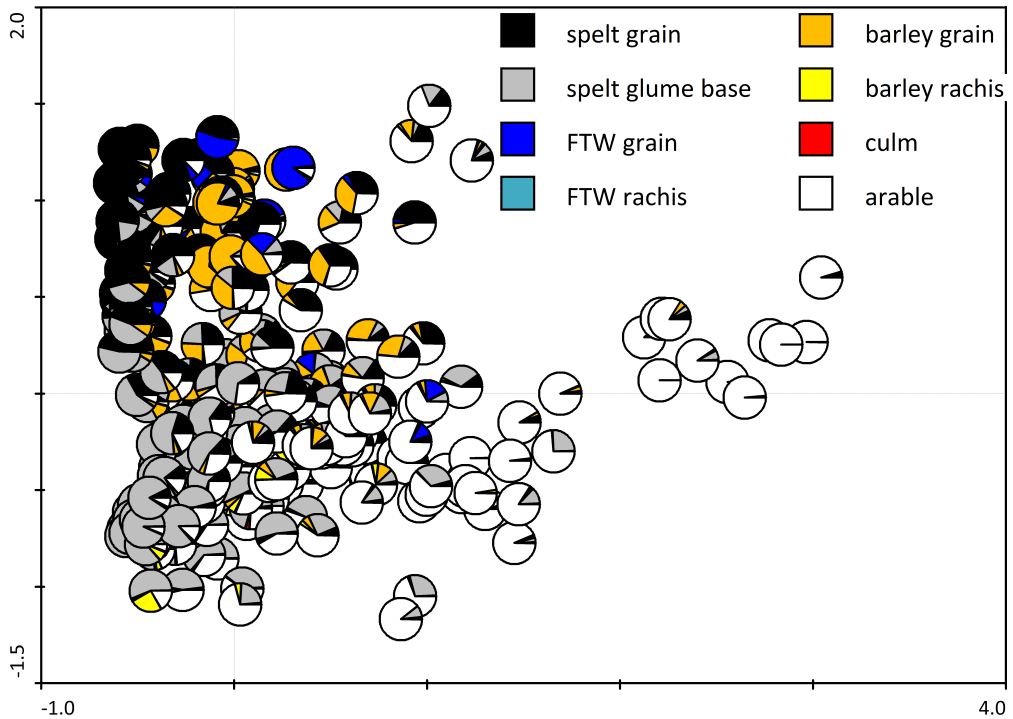

Figure 7-12 CA plot of crop and arable content of regional charred samples, sample pies classified by crop type.
1st and 2nd axis. 287 samples, 72 taxa. Min 102, Max 9089.

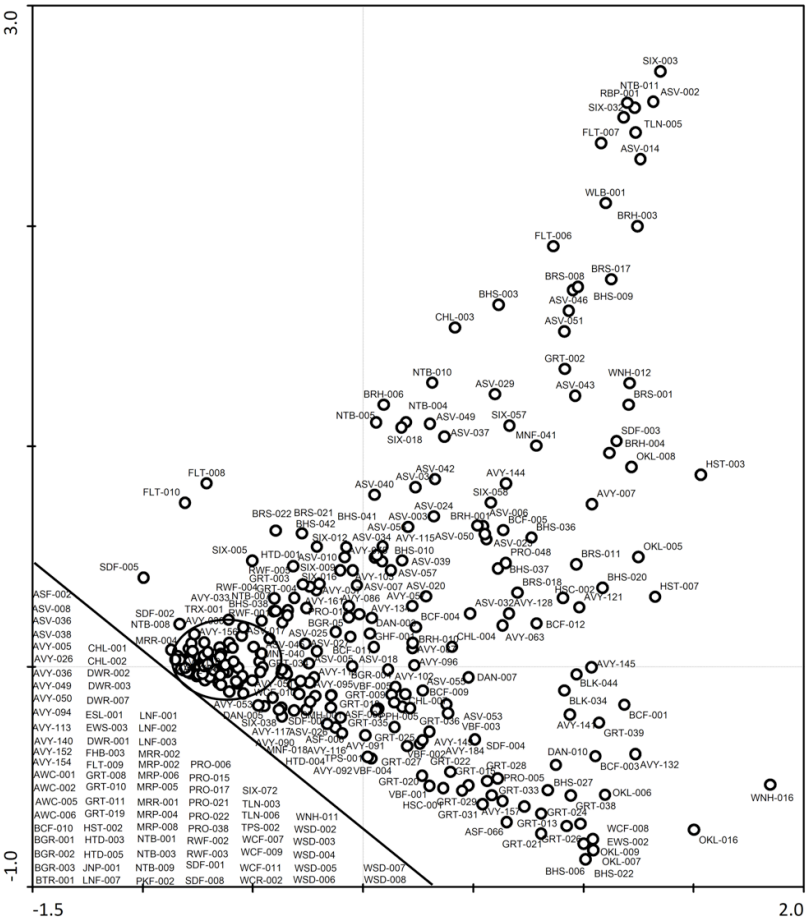

Figure 7-13 CA plot of crop content of regional charred samples.
1st and 2nd axis. 285 samples, 7 taxa. Min 1, Max 8197.

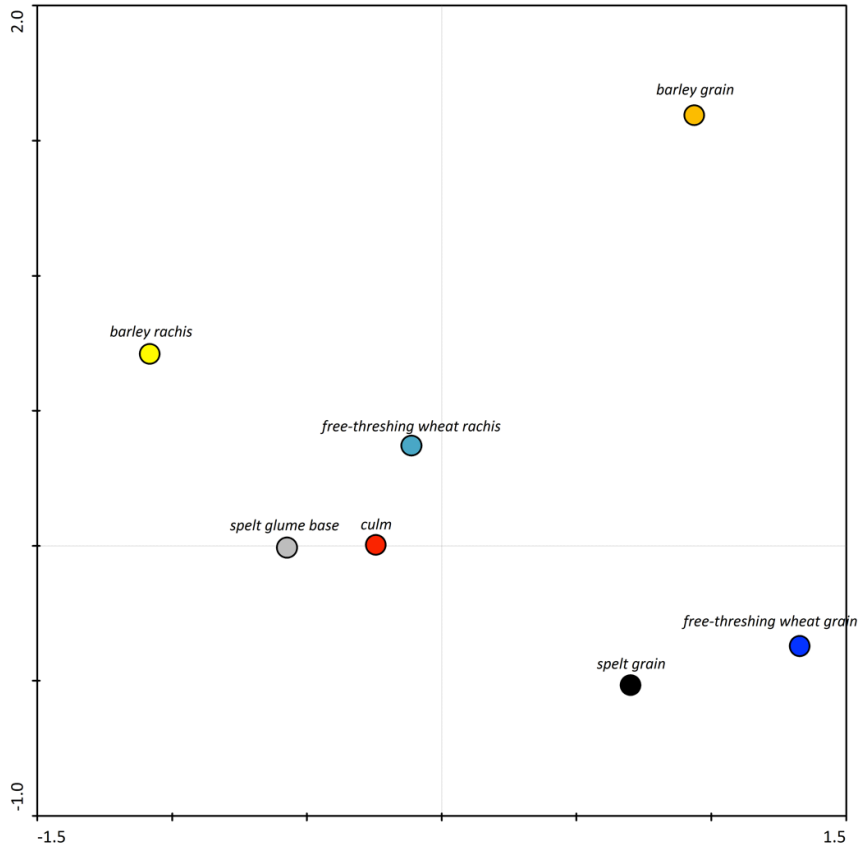

Figure 7-14 CA plot of crop content of regional charred samples, taxa plot.
1st and 2nd axis. 285 samples, 7 taxa. Min 1, Max 8197.

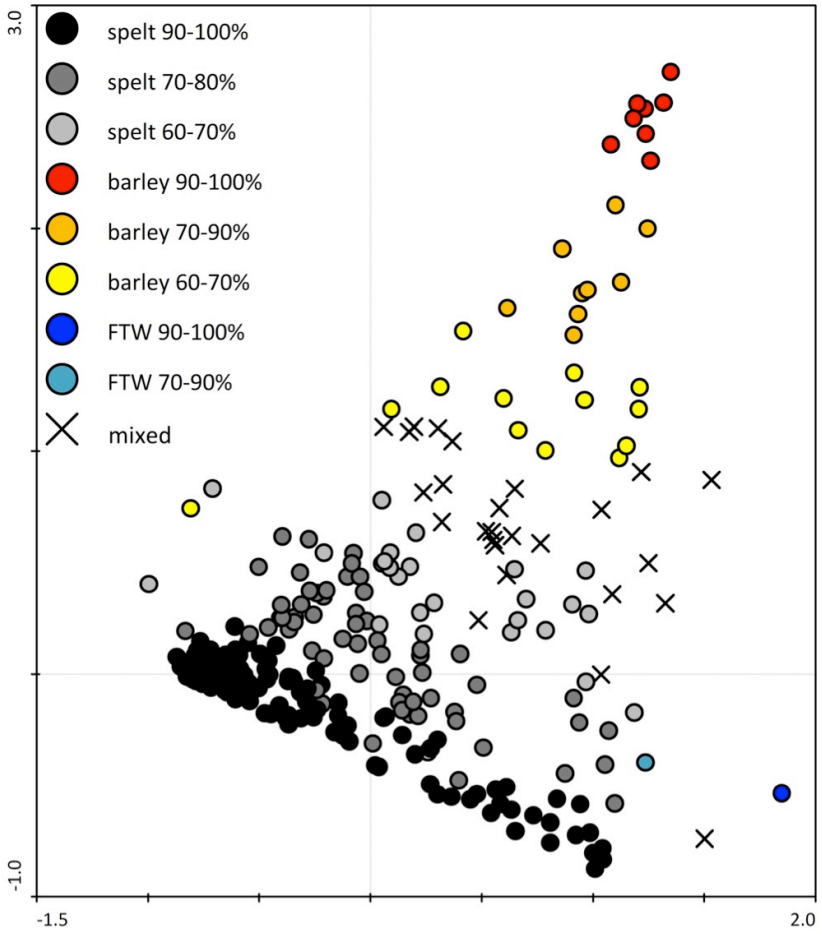

Figure 7-15 CA plot of crop content of regional charred samples, samples classified by crop type.
1st and 2nd axis. 285 samples, 7 taxa. Min 1, Max 8197.

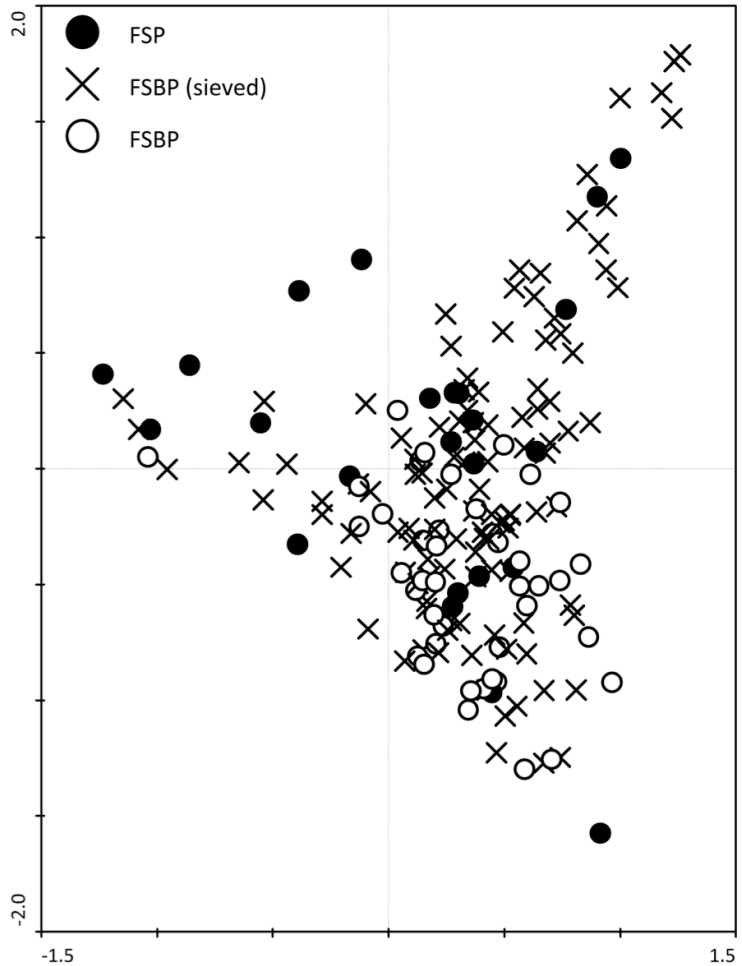

Figure 7-16 CA plot of arable weed content of regional charred spelt samples, samples classified by crop-processing stage
1st and 2nd axis. 179 samples, 43 taxa. Min 10, Max 359.

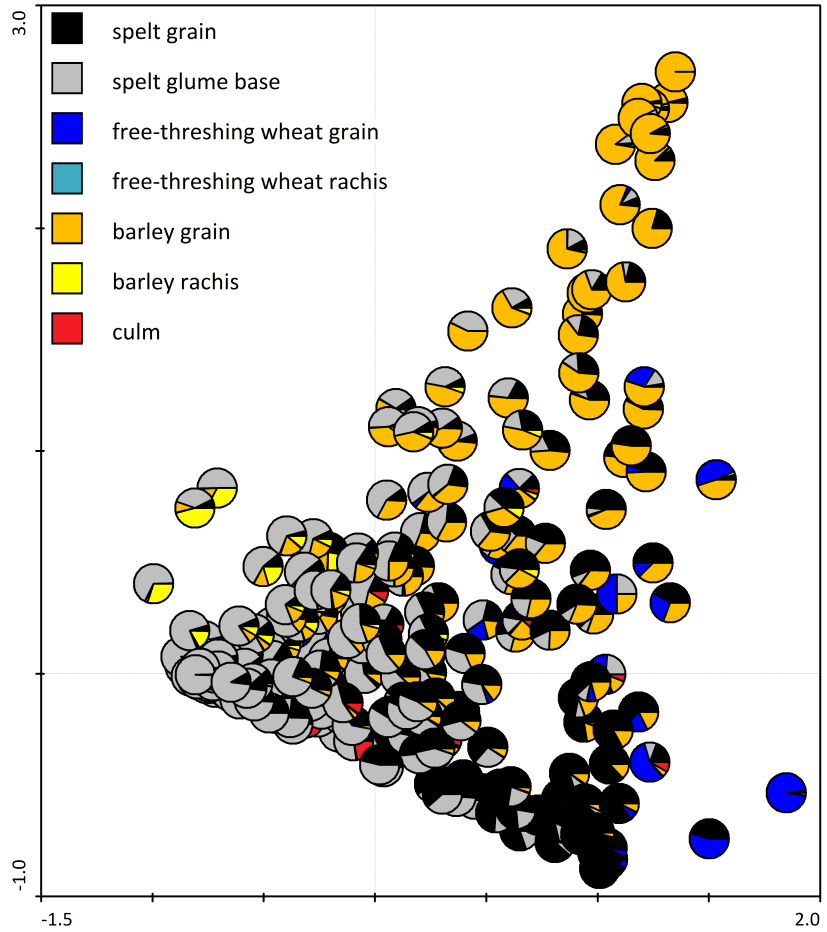

Figure 7-17 CA plot of crop content of regional charred samples, sample pies classified by crop type.
1st and 2nd axis. 285 samples, 7 items. Min 1, Max 8197.

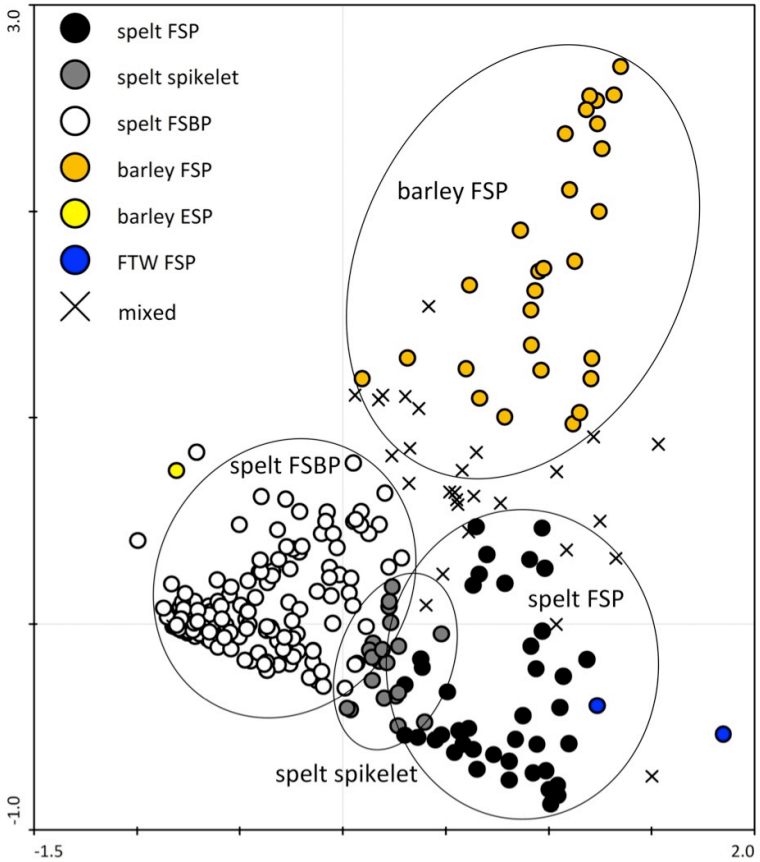

Figure 7-18 CA plot of crop content of regional charred samples, samples classified by crop-processing stage.
1st and 2nd axis. 285 samples, 7 taxa. Min 1, Max 8197.

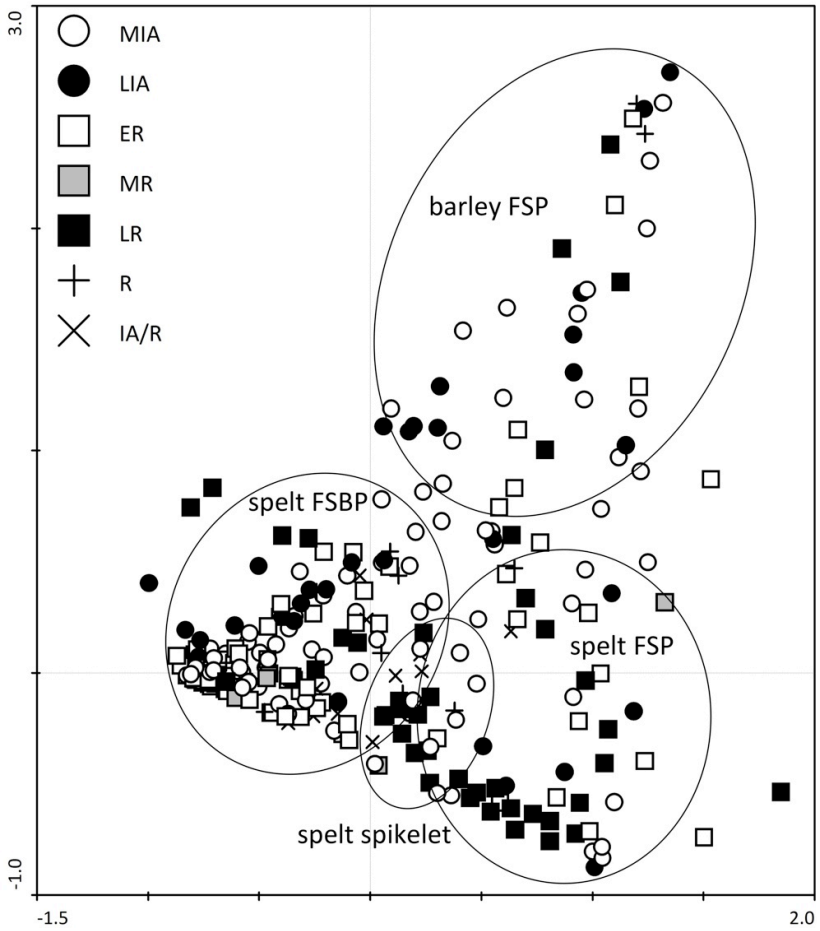

Figure 7-19 CA plot of crop content of regional charred samples, samples classified by period. 1st and 2nd axis. 285 samples, 7 taxa. Min 1, Max 8197.

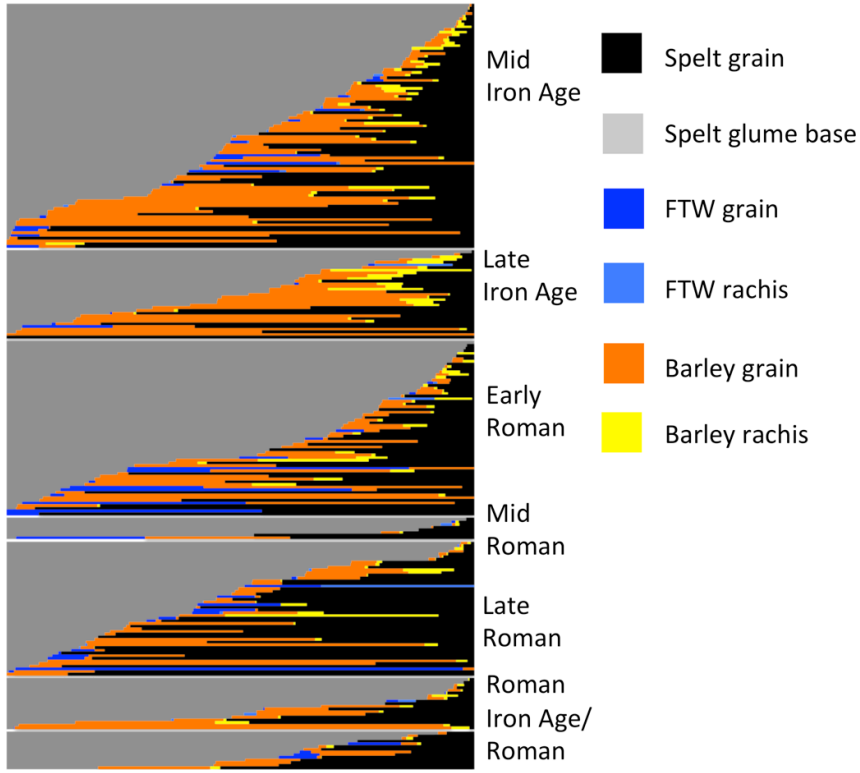

Figure 7-20 Proportions of crop items in regional charred samples, sorted by period

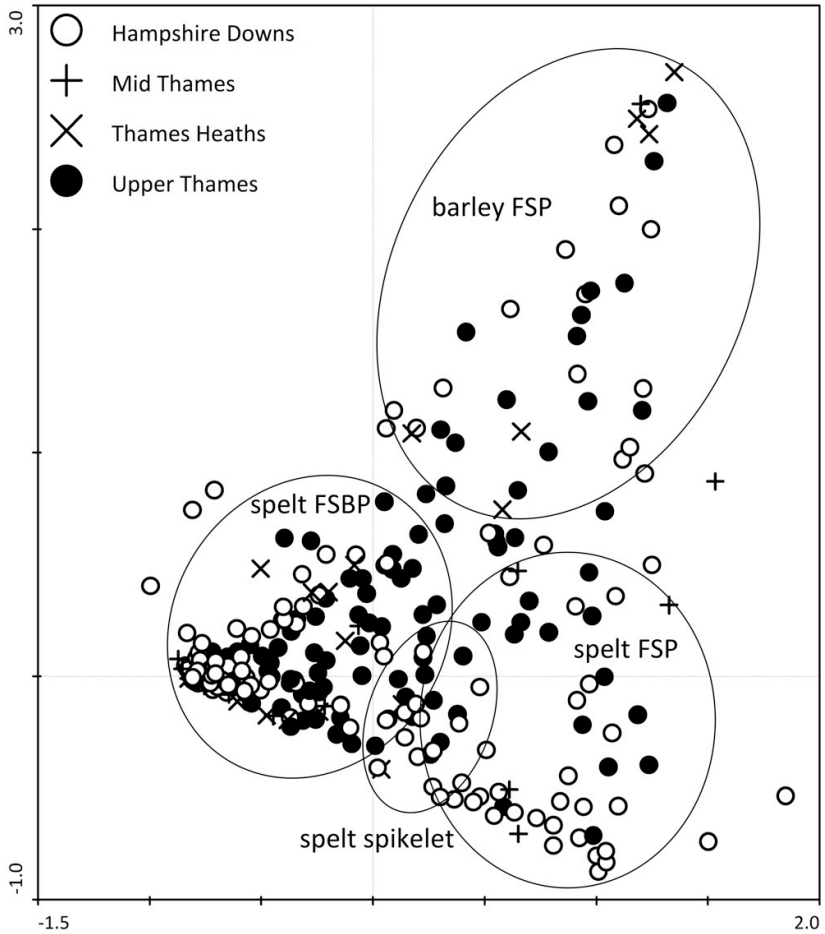

Figure 7-21 CA plot of crop content of regional charred samples, samples classified by NCA. 1st and 2nd axis. 285 samples, 77 taxa. Min 1, Max 8197.

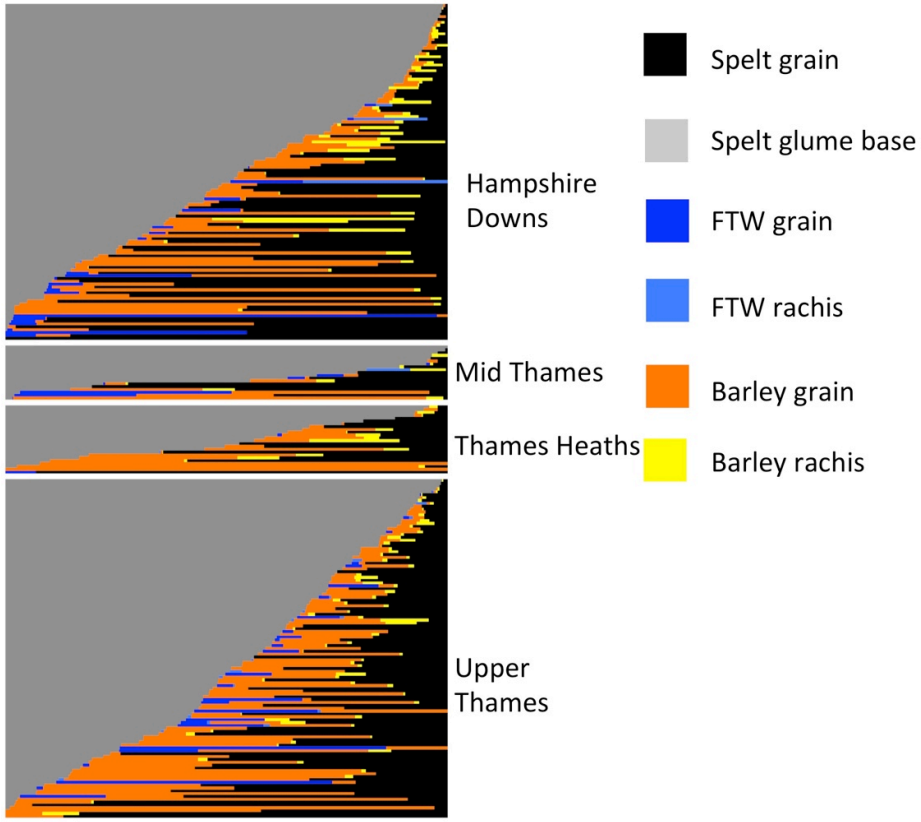

Figure 7-22 Proportion of crop items in regional charred samples, sorted by NCA.

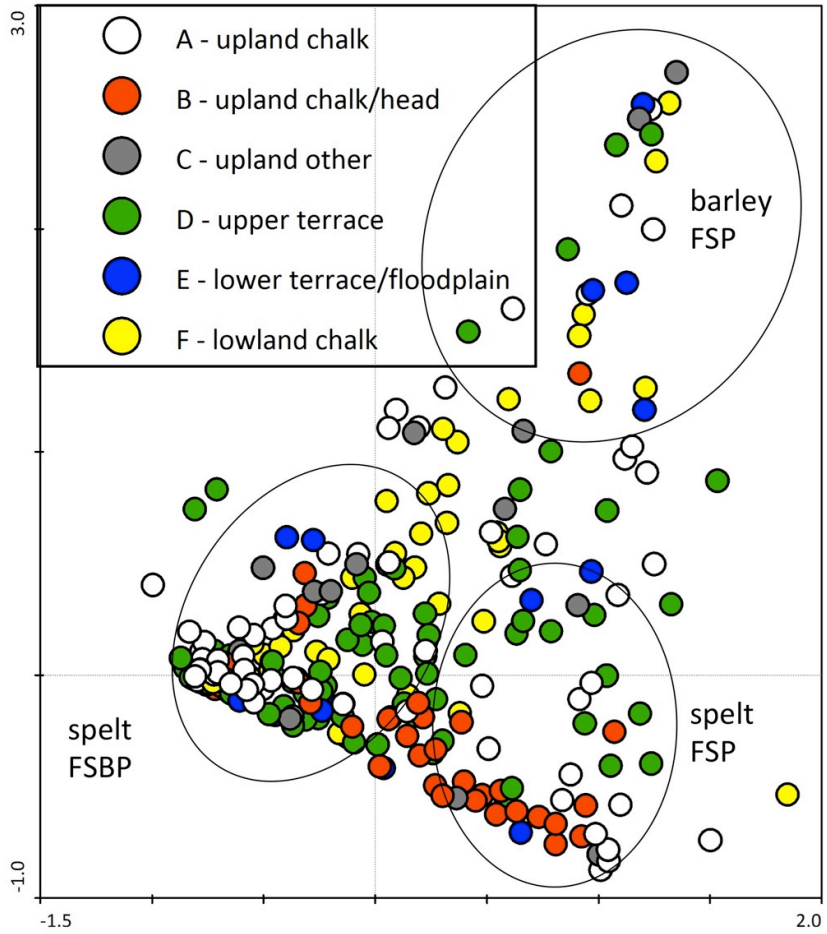

Figure 7-23 CA plot of crop content of regional charred samples, samples classified by landscape category.
1st and 2nd axis. 295 samples, 7 taxa. Min 1, Max 8197.

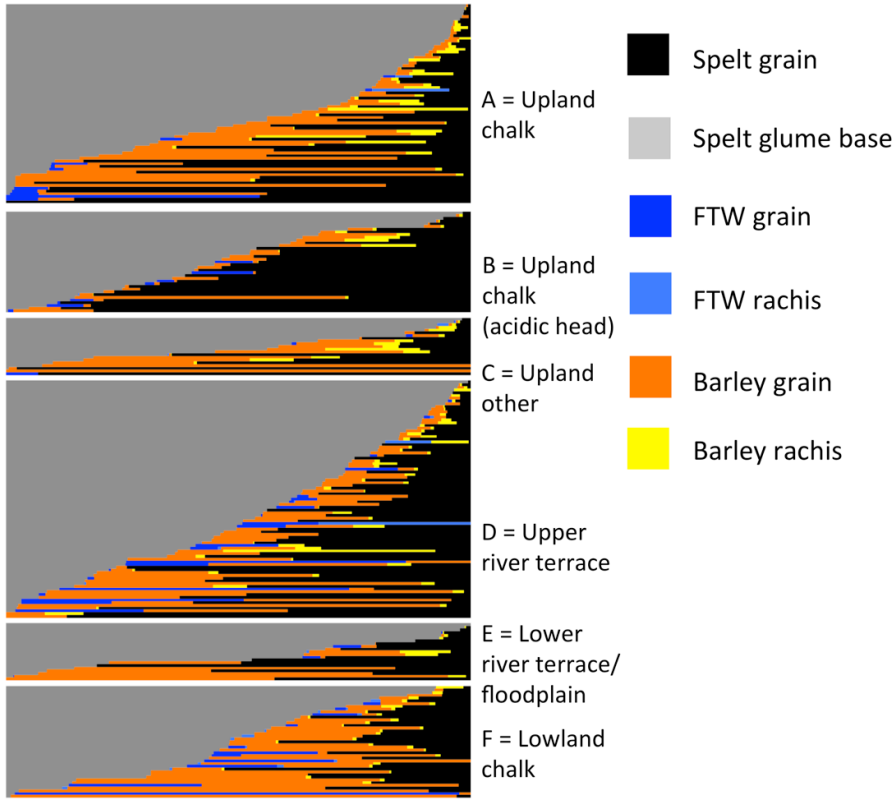

Figure 7-24 Proportion of crop items in regional charred samples, sorted by landscape category.

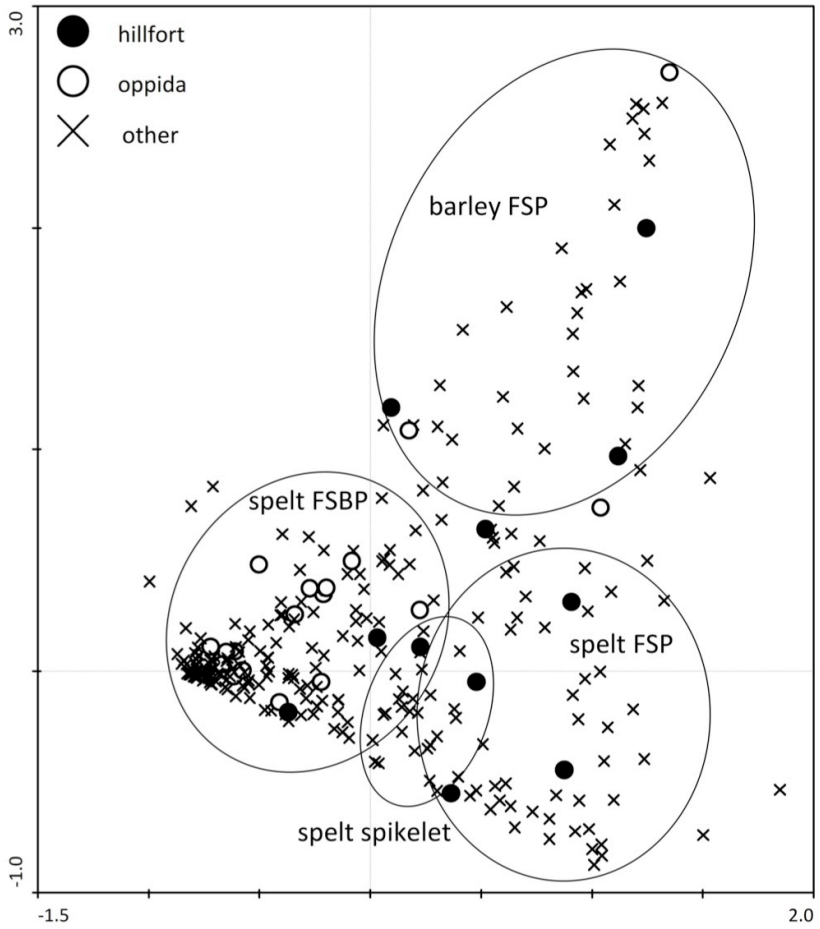

Figure 7-25 CA plot of crop content of regional charred samples, samples classified by site type.
1st and 2nd axis. 295 samples, 7 taxa. Min 1, Max 8197.

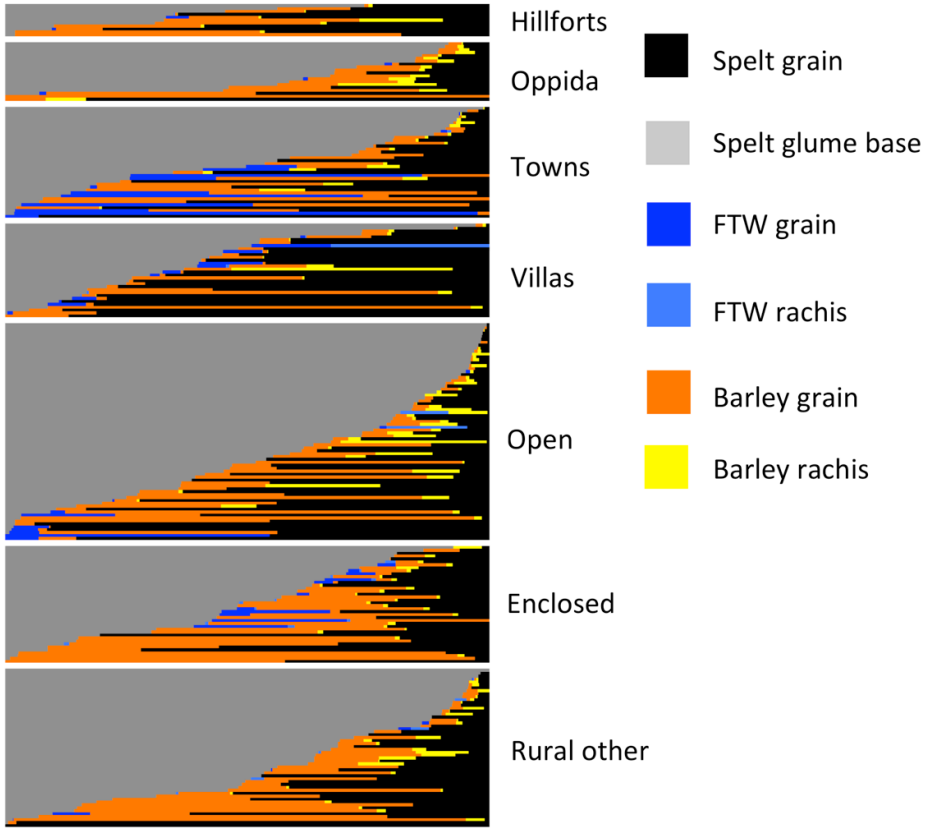

Figure 7-26 Proportion of crop items in regional charred samples, sorted by site type.

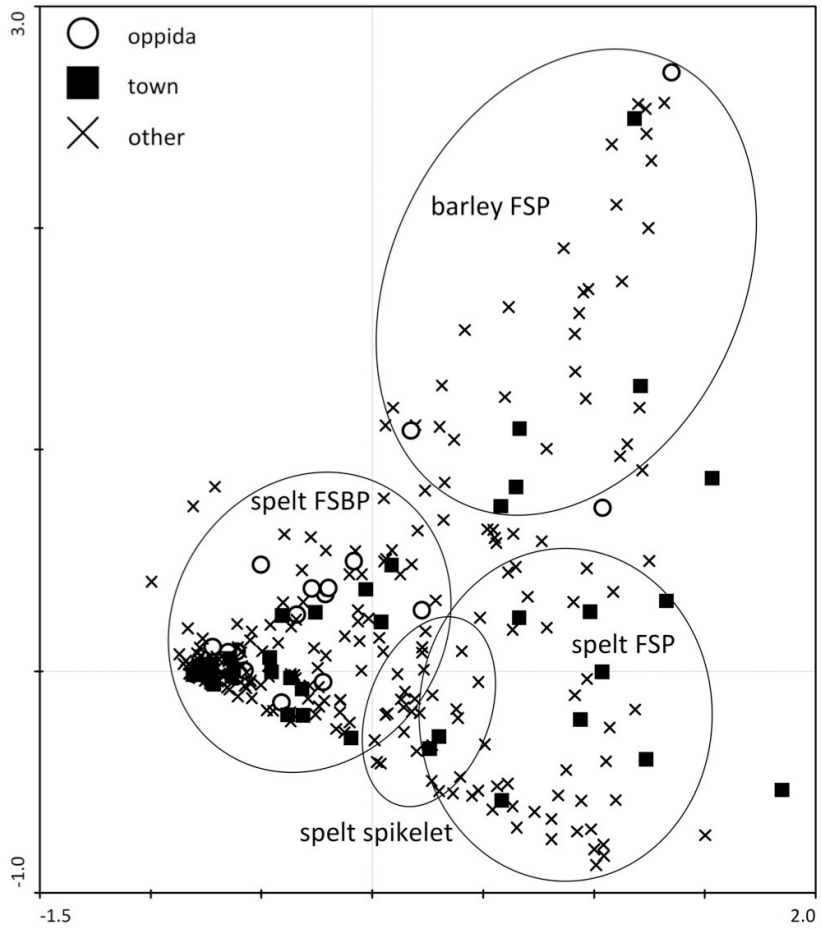

Figure 7-27 CA plot of crop content of regional charred samples, samples classified by site type.
1st and 2nd axis. 285 samples, 7 taxa. Min 1, Max 8197.

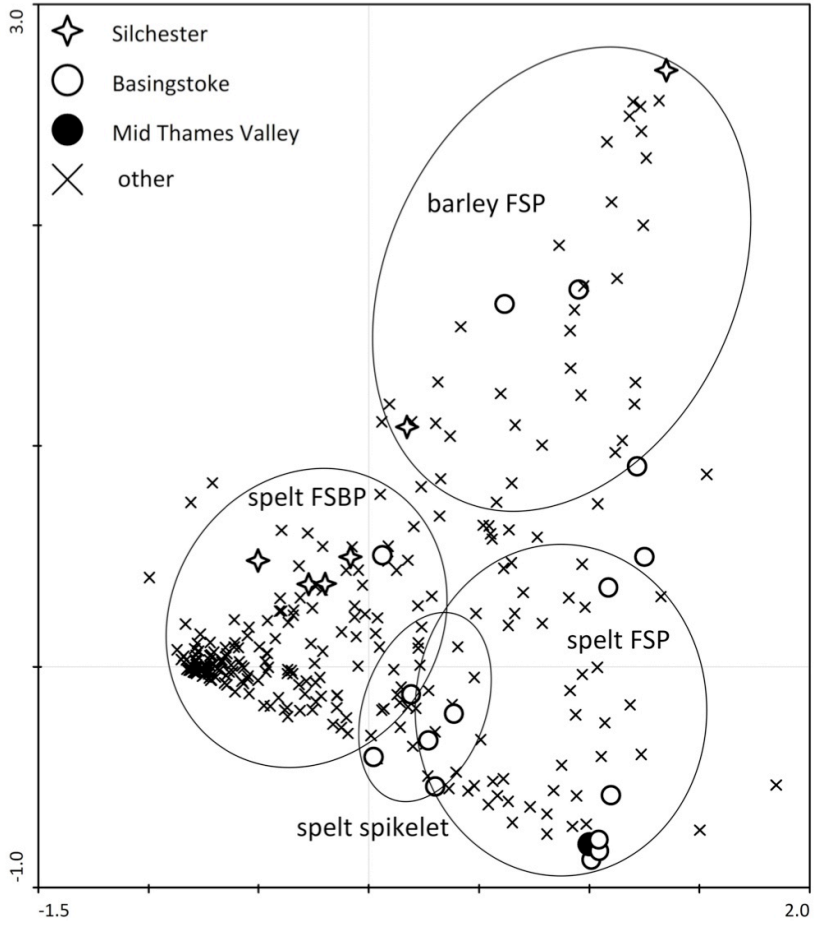

Figure 7-28 CA plot of crop content of regional charred samples, samples classified by Iron Age hinterland area.
1st and 2nd axis. 285 samples, 7 taxa. Min 1, Max 8197.

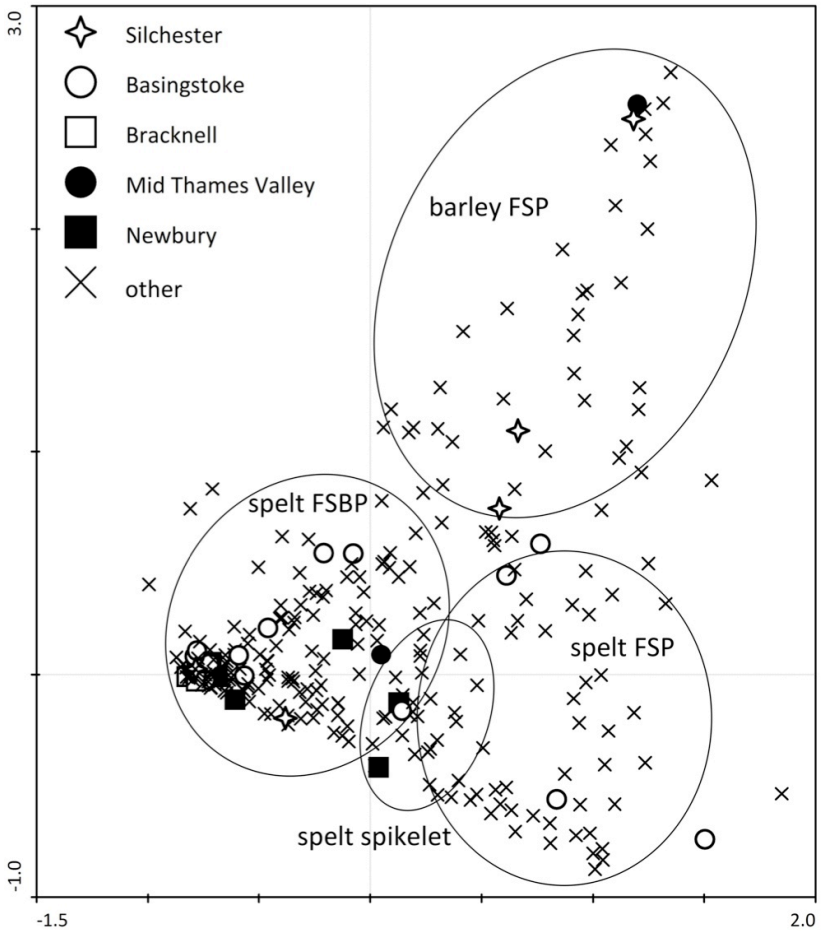

Figure 7-29 CA plot of crop content of regional charred samples, samples classified by Roman hinterland area.
1st and 2nd axis. 285 samples, 7 taxa. Min 1, Max 8197.

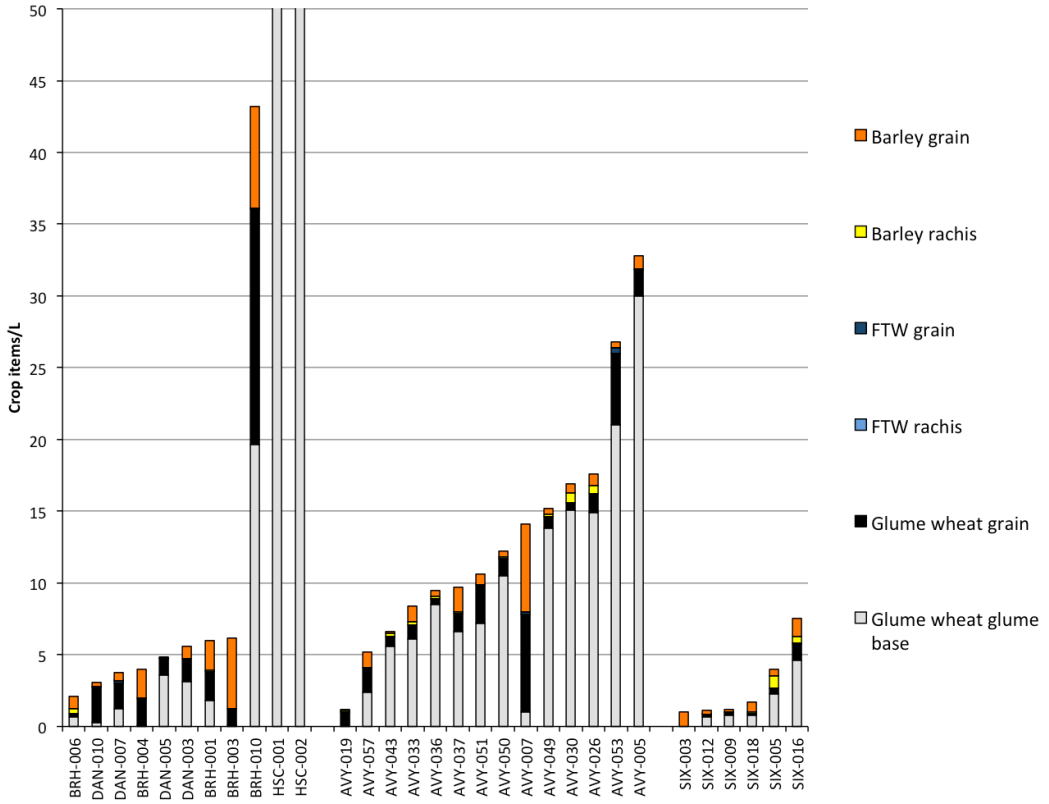

Figure 7-30 Composition and density of crop content of samples from hillforts (L) and oppida (R)

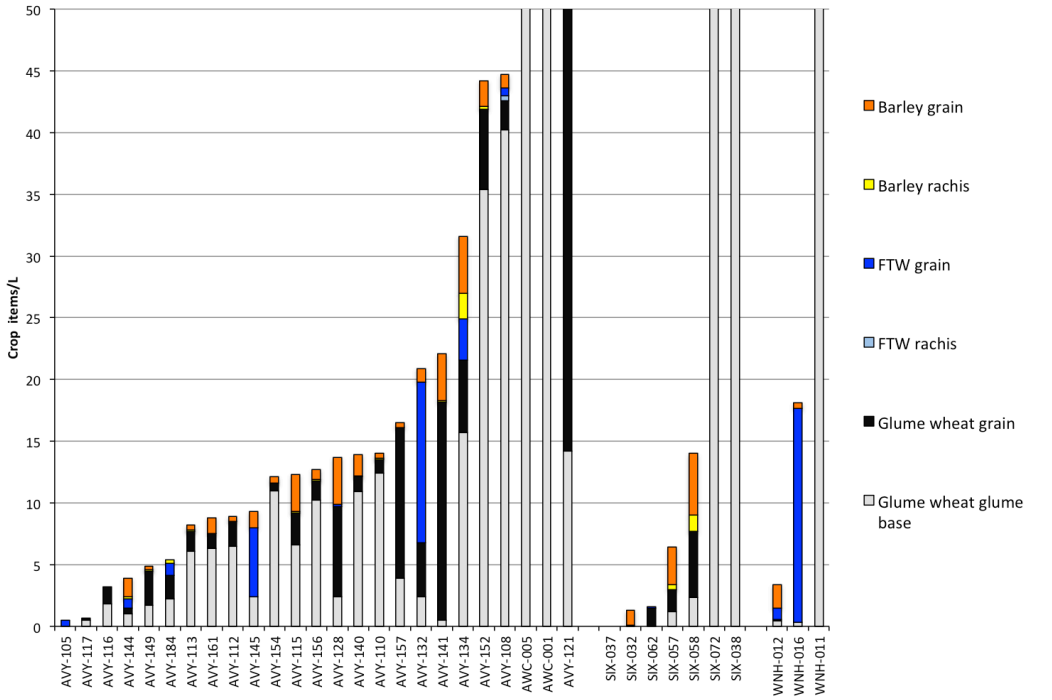

Figure 7-31 Composition and density of crop content of samples from Abingdon Vineyard (left), Silchester (centre) and Winchester (right)

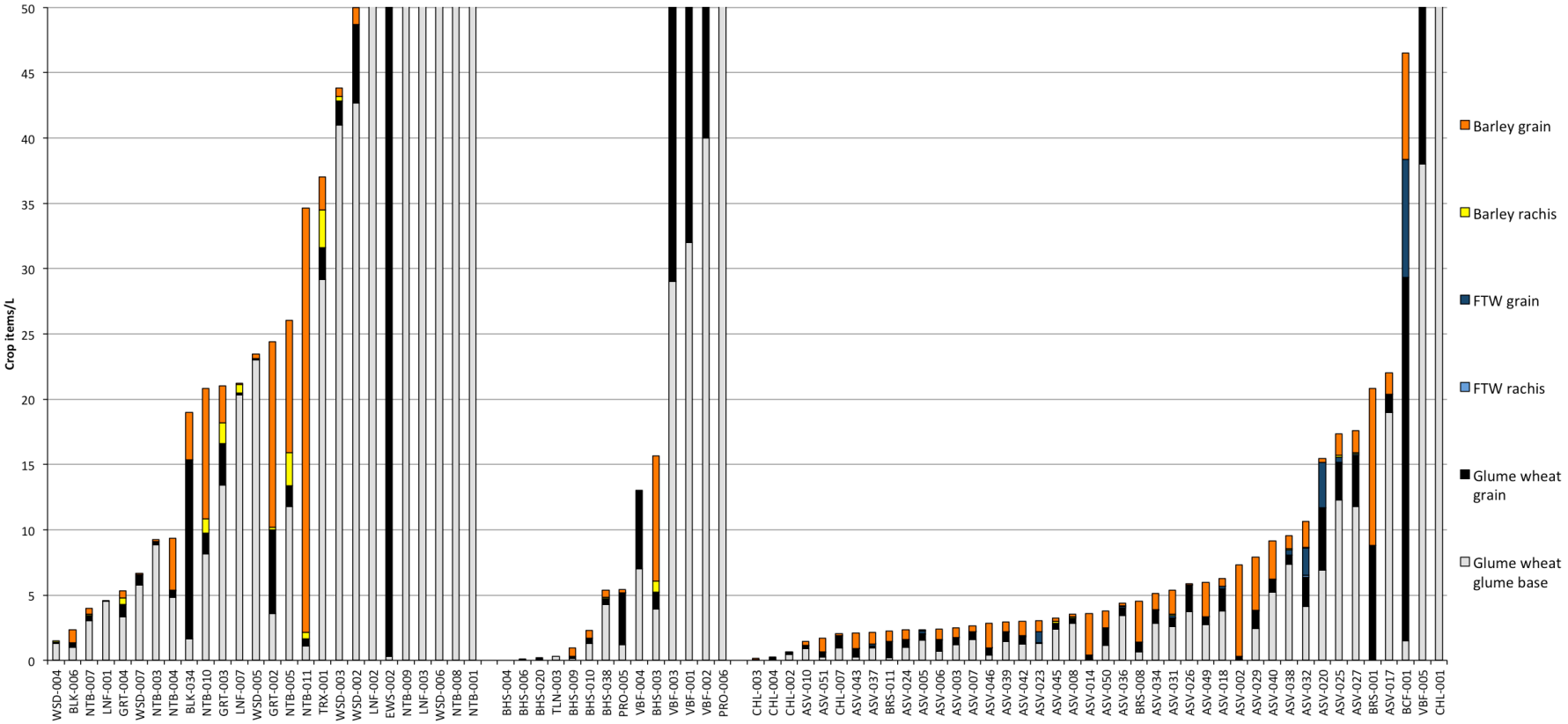

Figure 7-32 Composition and density of crop content of samples from the Iron Age region.
Left = Hampshire Downs, centre = Silchester hinterland, Right = Mid and Upper Thames.

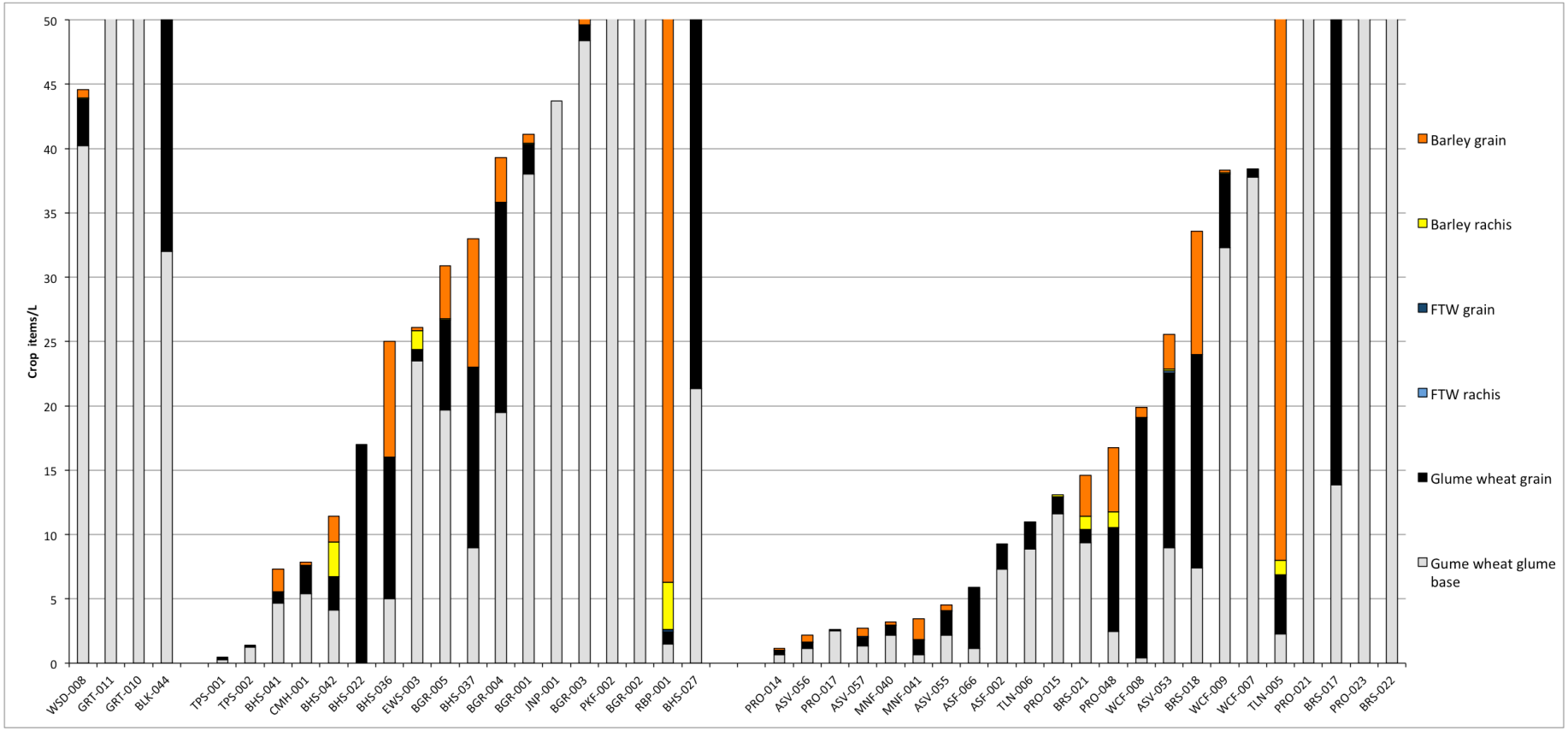

Figure 7-33 Composition and density of crop content of samples from the Roman region.
Left = Hampshire Downs, centre = Silchester hinterland, right = Mid and Upper Thames

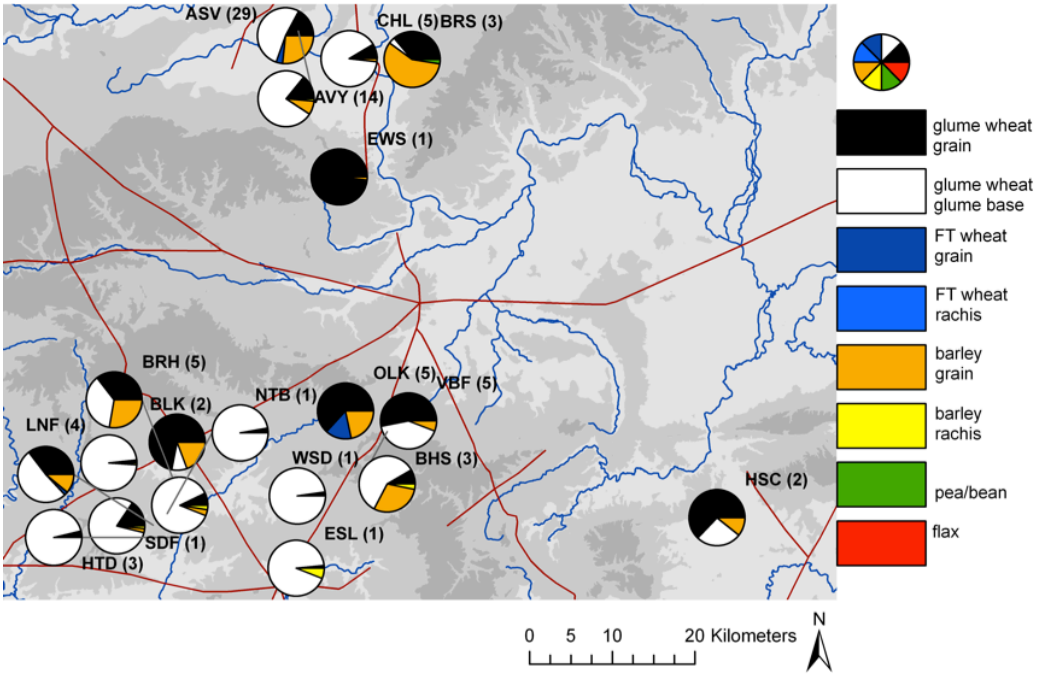

Figure 7-34 Sum of crop items present per site in the Mid Iron Age period

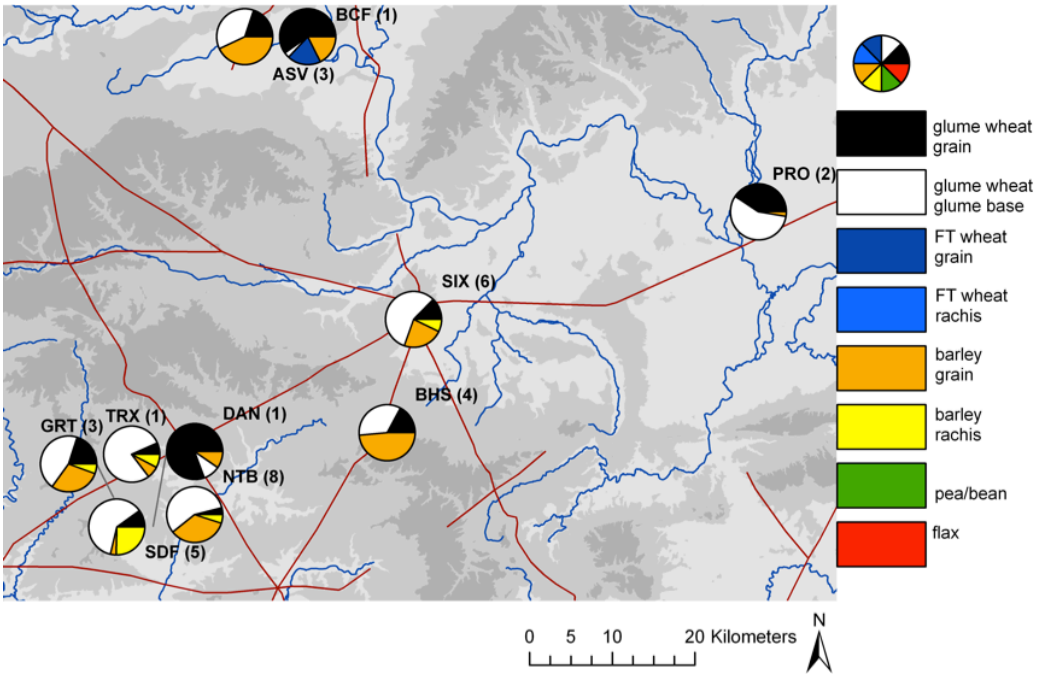

Figure 7-35 Sum of crop items present per site in the Late Iron Age period

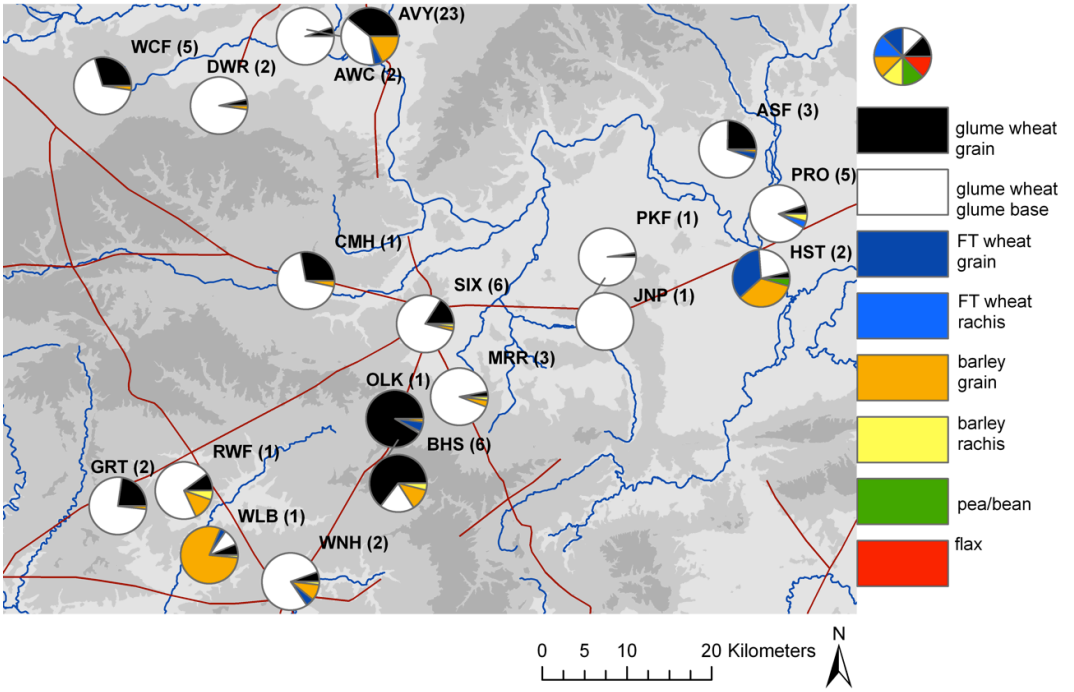

Figure 7-36 Sum of crop items present per site in the Early Roman period

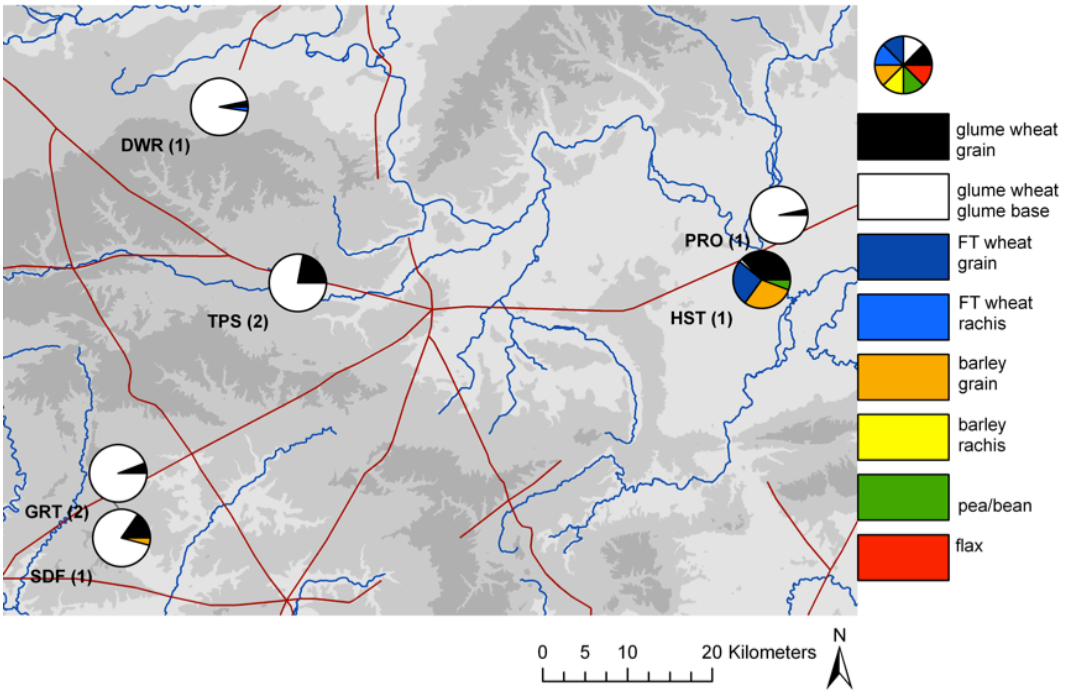

Figure 7-37 Sum of crop items present per site in the Mid Roman period

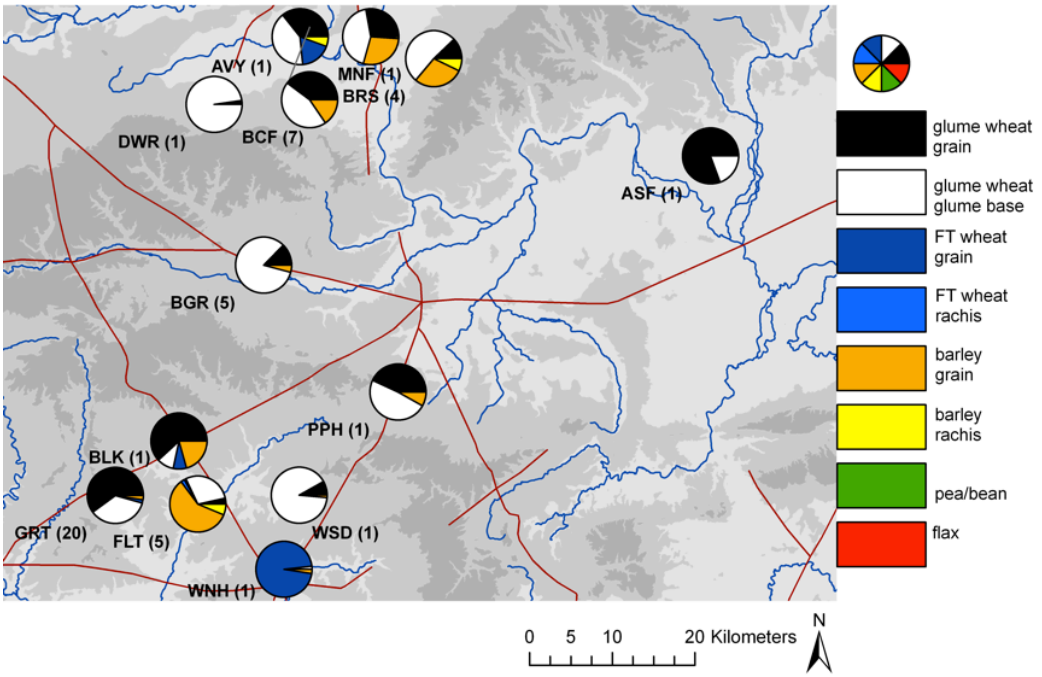

Figure 7-38 Sum of crop items present per site in the Late Roman period

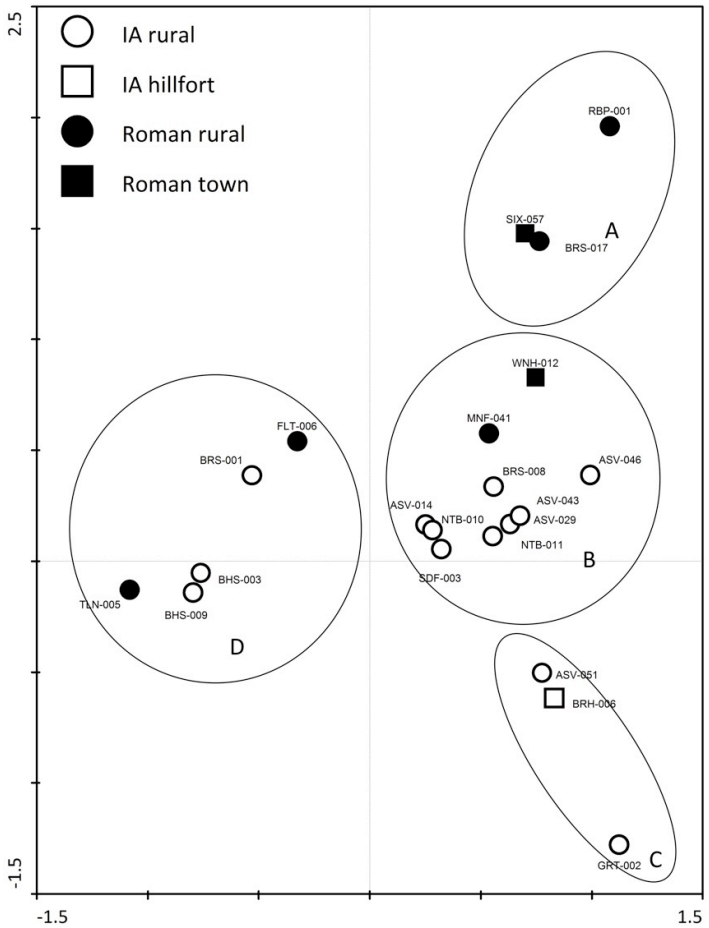

Figure 7-39 CA plot of arable weeds from regional barley FSP, samples classified by period and site type. 1st and 2nd axis. 21 samples, 29 taxa. Min 8, Max 49.

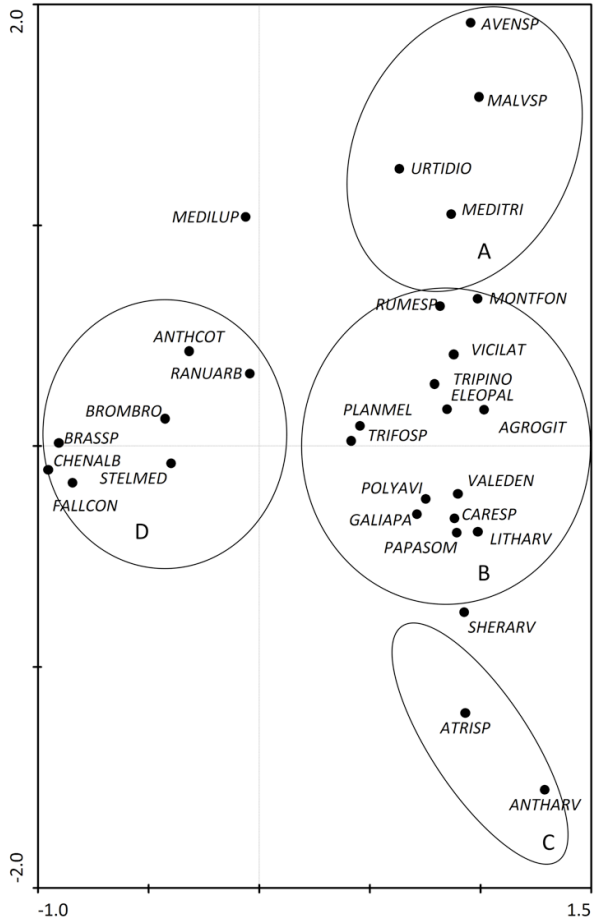

Figure 7-40 CA plot of arable weeds from regional barley FSP, taxa plot.
1st and 2nd axis. 21 samples, 29 taxa. Min 8, Max 497.

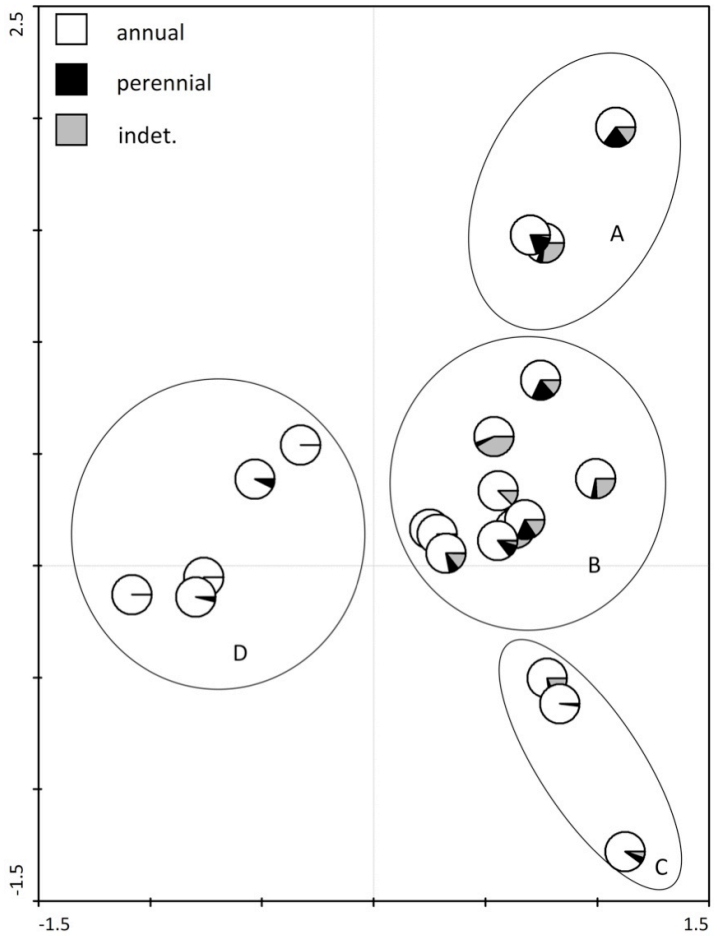

Figure 7-41 CA plot of arable weeds from regional barley FSP, sample pies classified by life form.
1st and 2nd axis. 21 samples, 29 taxa. Min 8, Max 497.

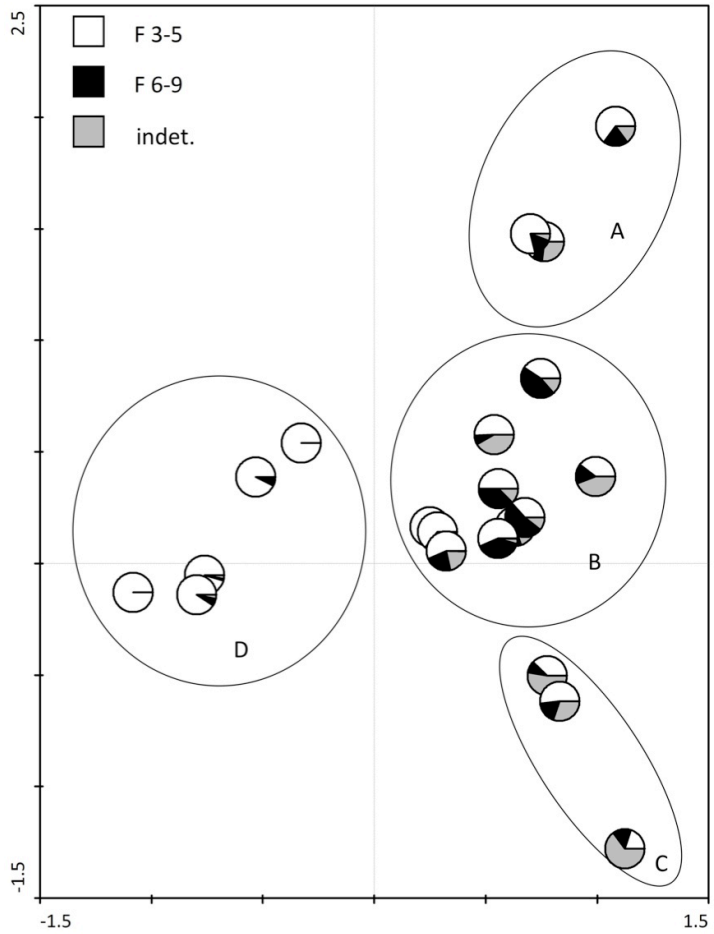

Figure 7-42 CA plot of arable weeds from regional barley FSP, sample pies classified by F values.
1st and 2nd axis. 21 samples, 29 taxa. Min 8, Max 497.

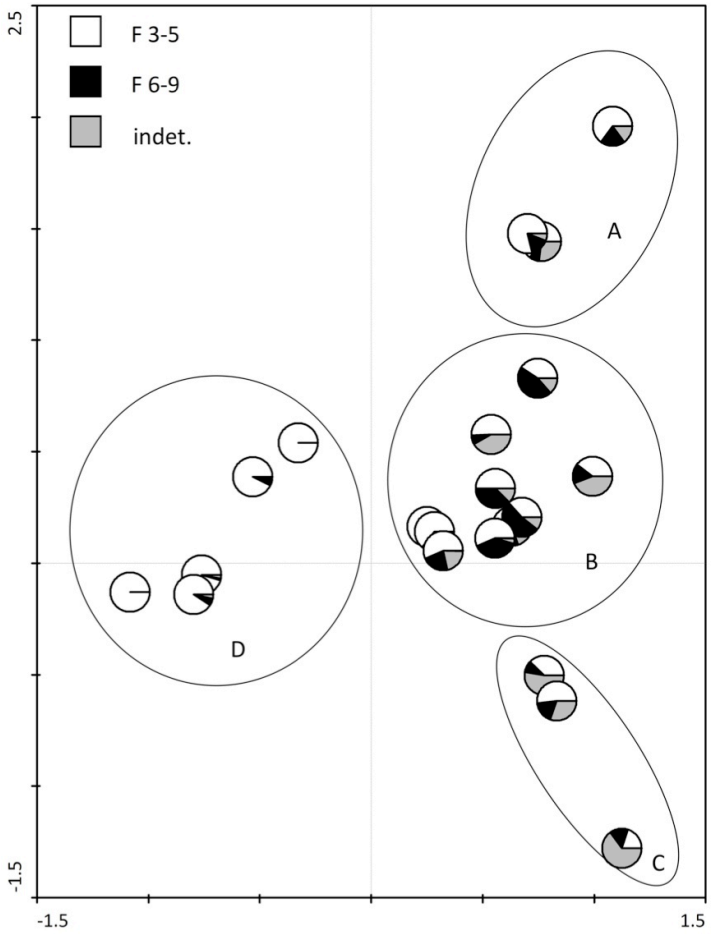

Figure 7-43 CA plot of arable weeds from regional barley FSP, sample pies classified by N values.
1st and 2nd axis. 21 samples, 29 taxa. Min 8, Max 497.

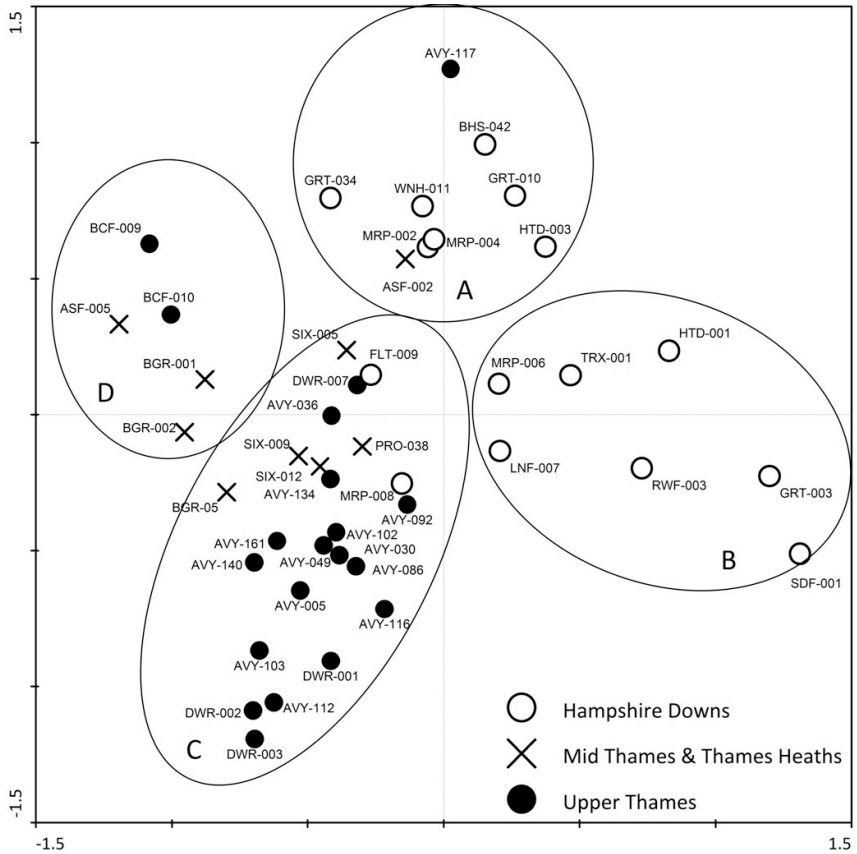

Figure 7-44 CA plot of arable weeds from regional spelt FSBP, samples classified by NCA. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

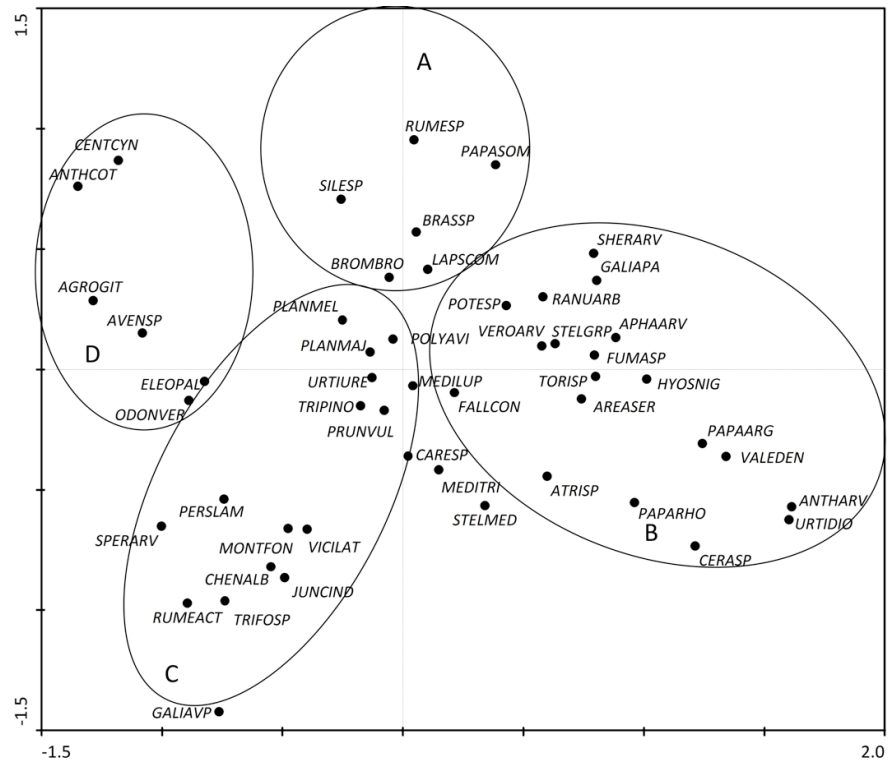

Figure 7-45 CA plot of arable weeds from regional spelt FSBP, taxa plot. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

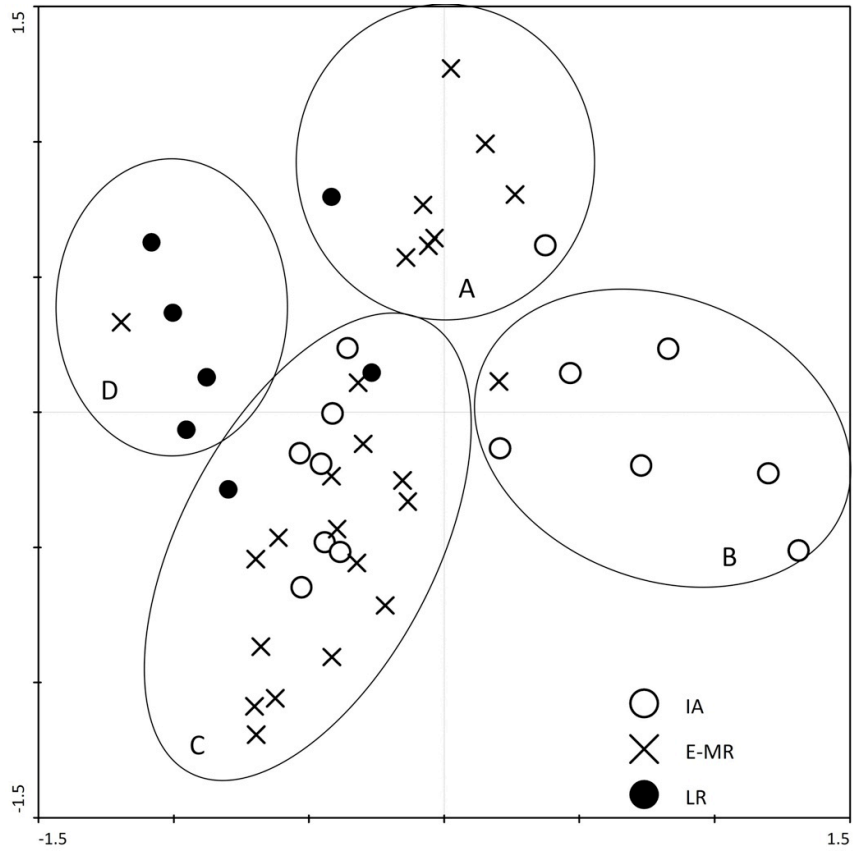

Figure 7-46 CA plot of arable weeds from regional spelt FSBP, samples classified by period. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

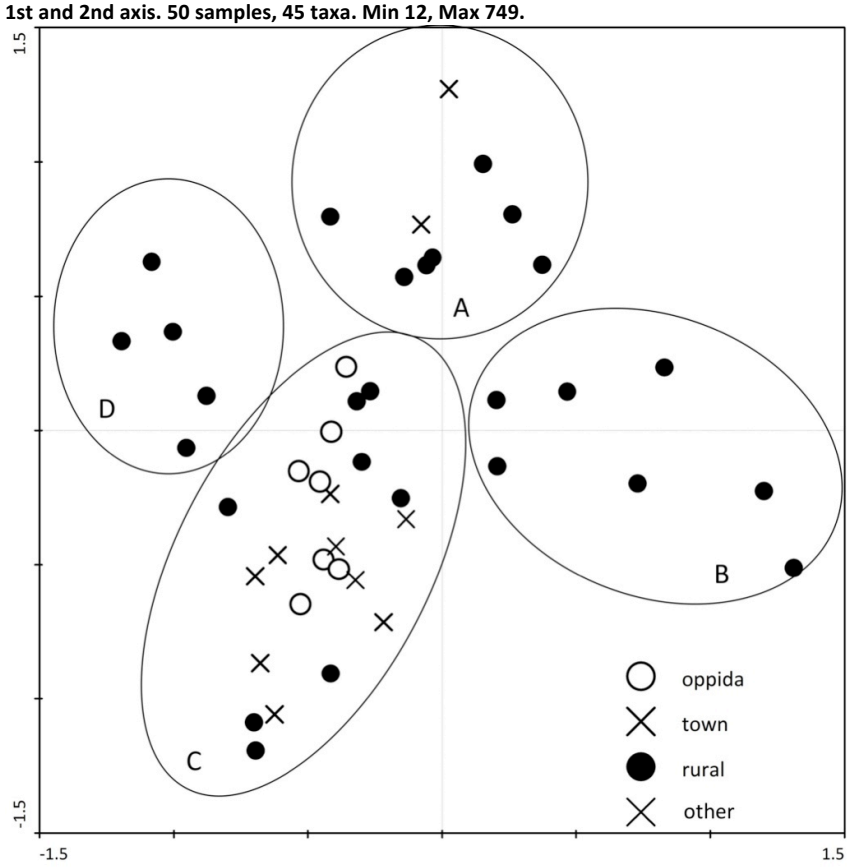

Figure 7-47 CA plot of arable weeds from regional spelt FSBP, samples classified by site type. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

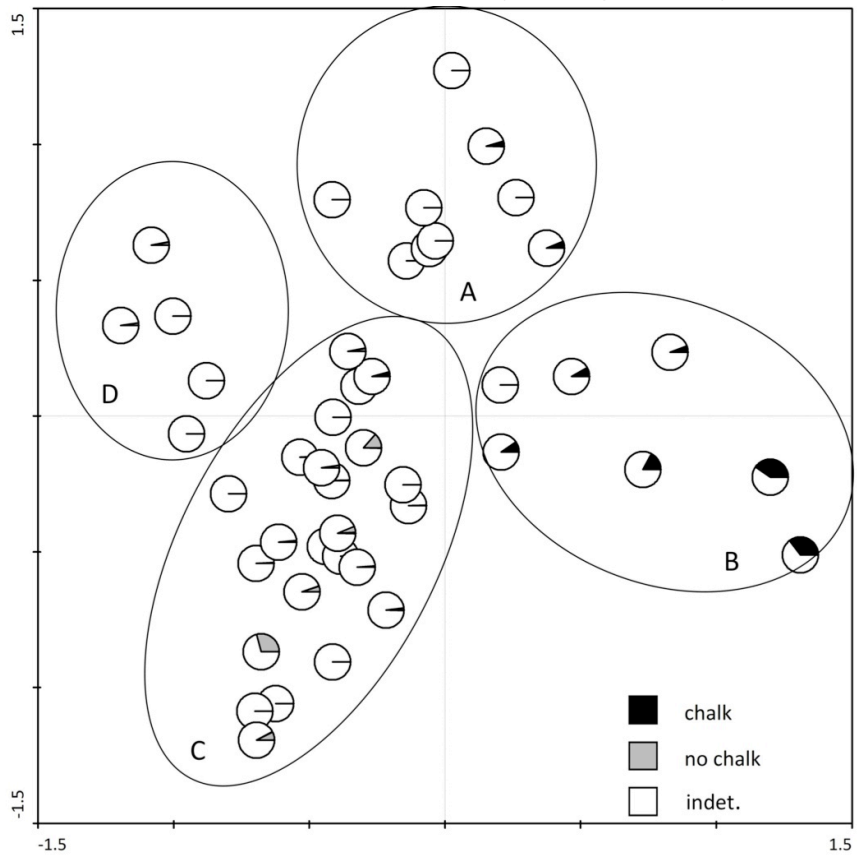

Figure 7-48 CA plot of arable weeds from regional spelt FSBP, sample pies classified by chalk preference. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

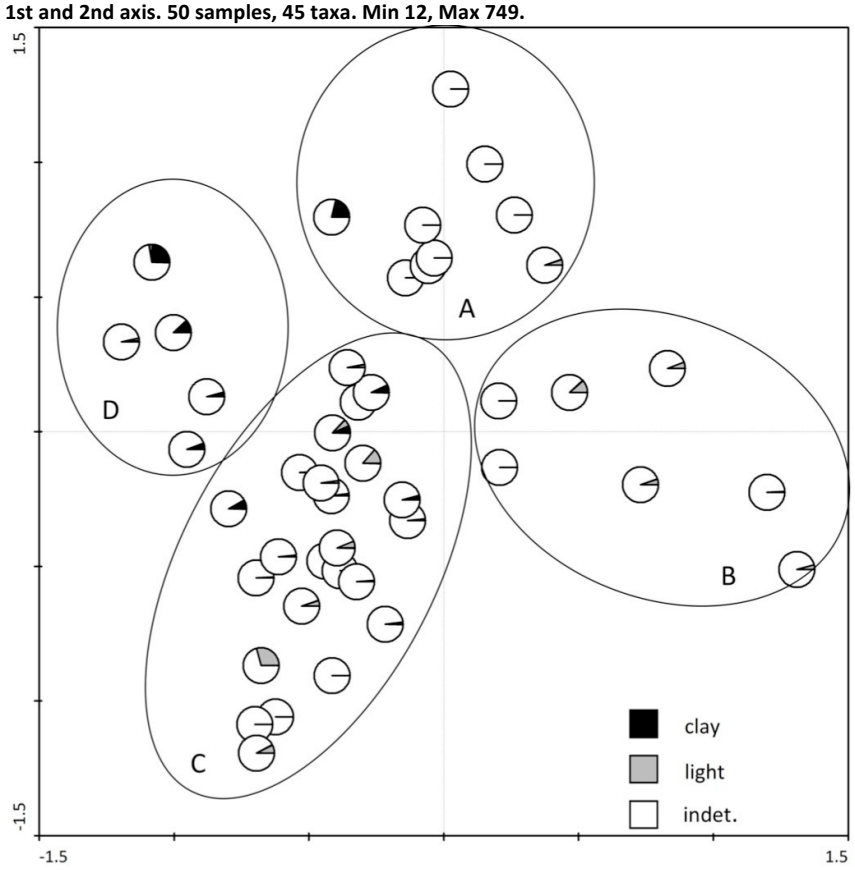

Figure 7-49 CA plot of arable weeds from regional spelt FSBP, taxa classified by soil preference. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

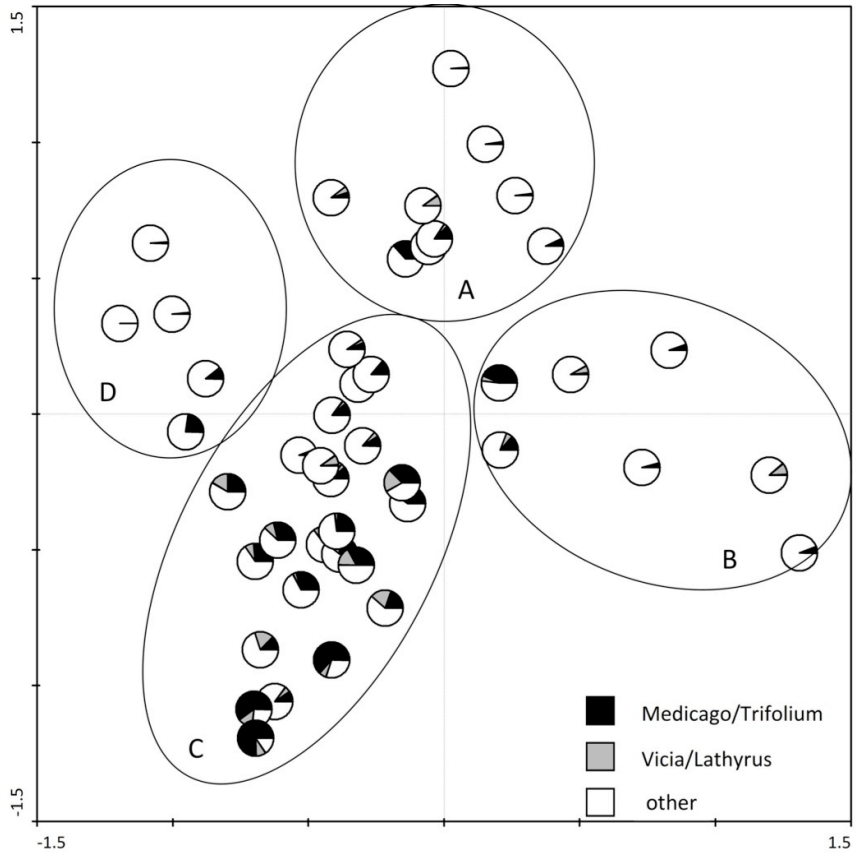

Figure 7-50 CA plot of arable weeds from regional spelt FSBP, sample pies classified by the presence of leguminous taxa. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

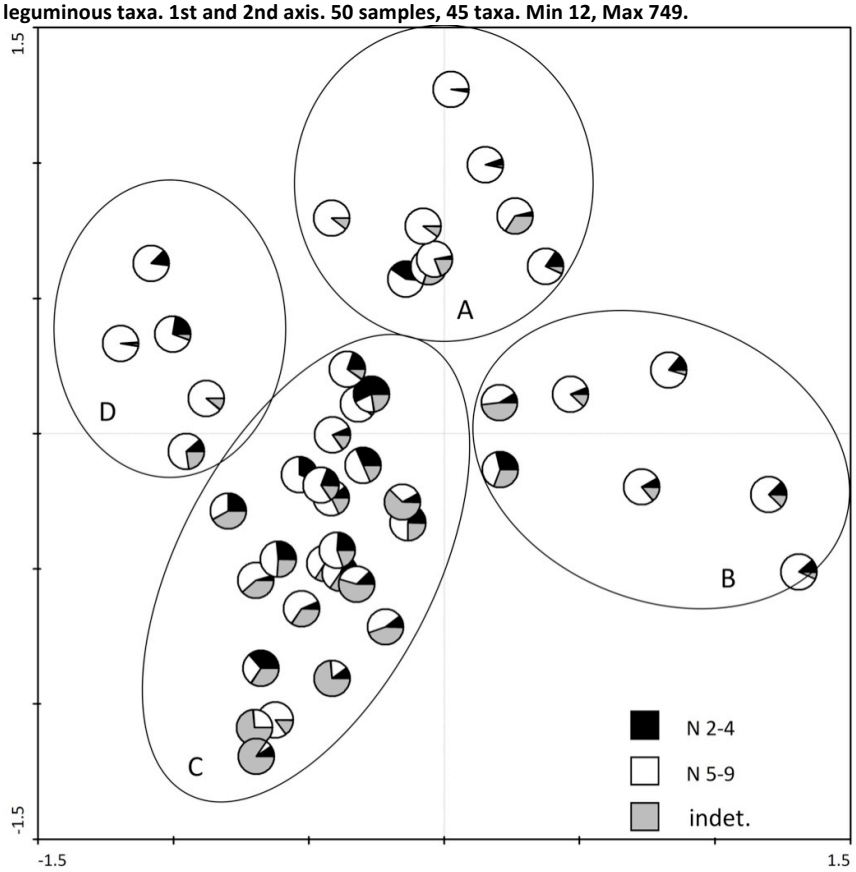

Figure 7-51 CA plot of arable weeds from regional spelt FSBP, sample pies classified by N values. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

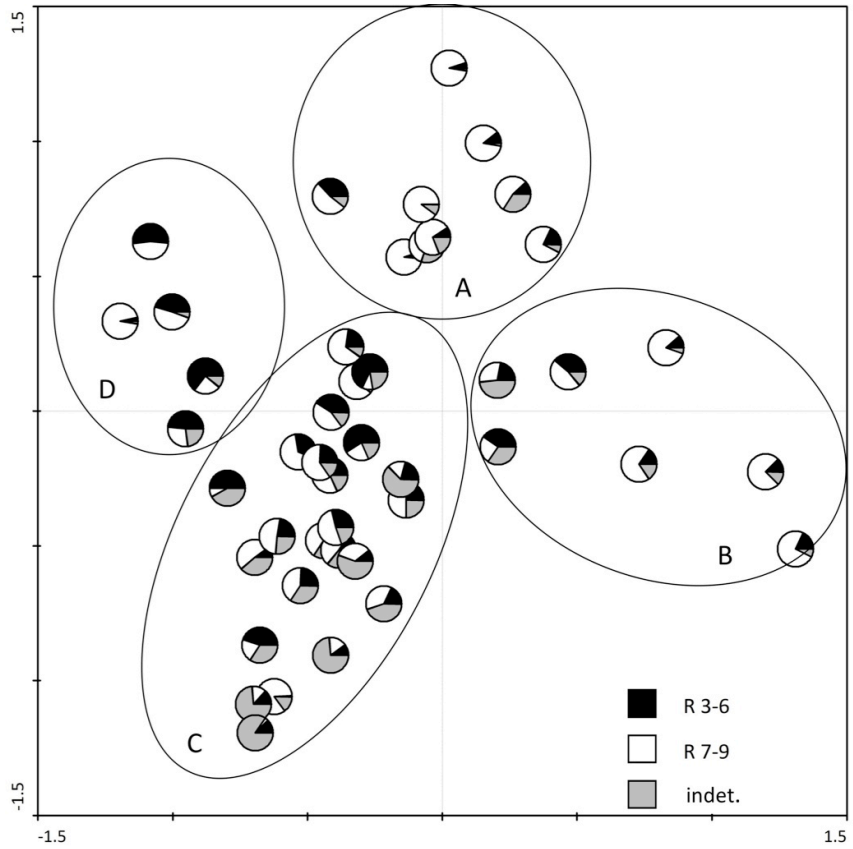

Figure 7-52 CA plot of arable weeds from regional spelt FSBP, sample pies classified by R values. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

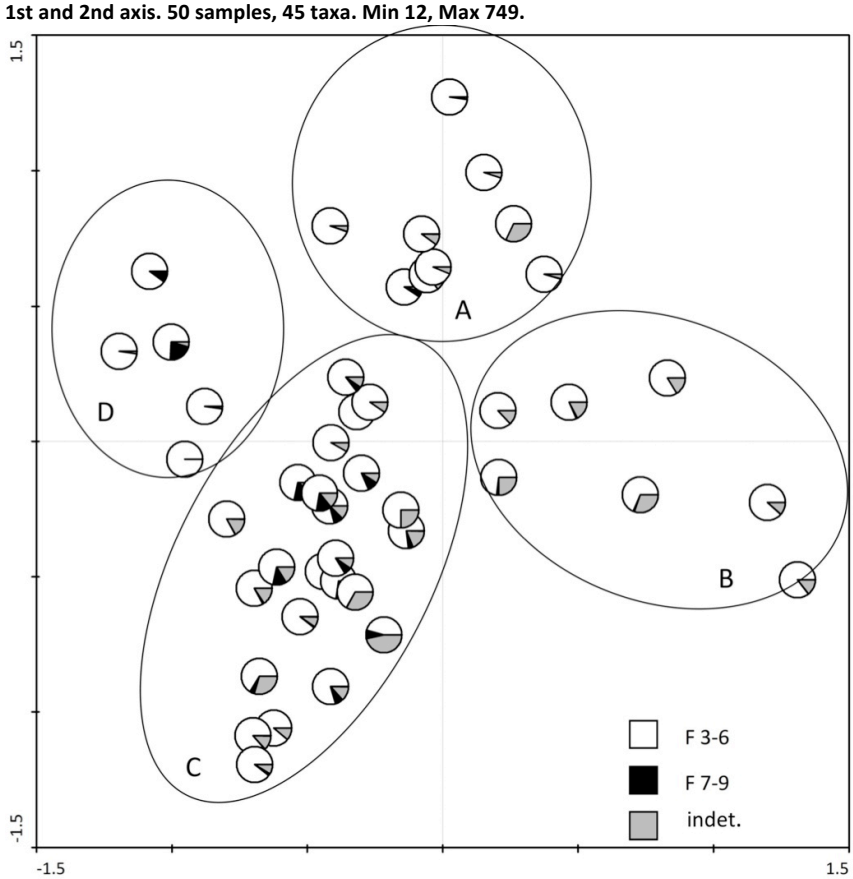

Figure 7-53 CA plot of arable weeds from regional spelt FSBP, sample pies classified by F values. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

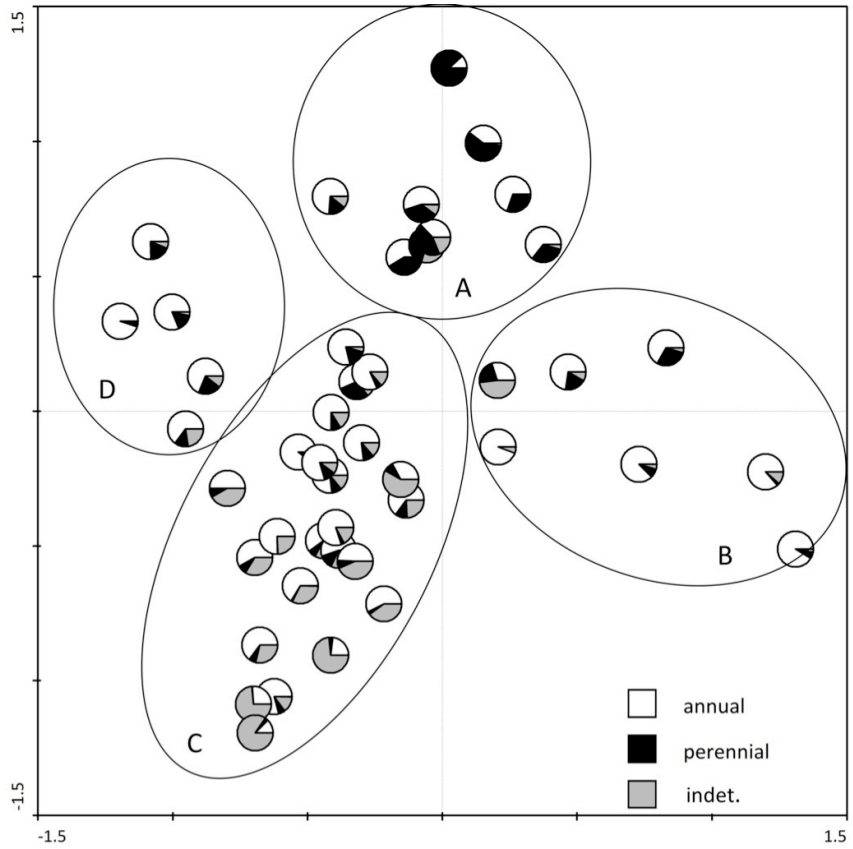

Figure 7-54 CA plot of arable weeds from regional spelt FSBP, sample pies classified by life form. 1st and 2nd axis. 50 samples, 45 taxa. Min 12, Max 749.

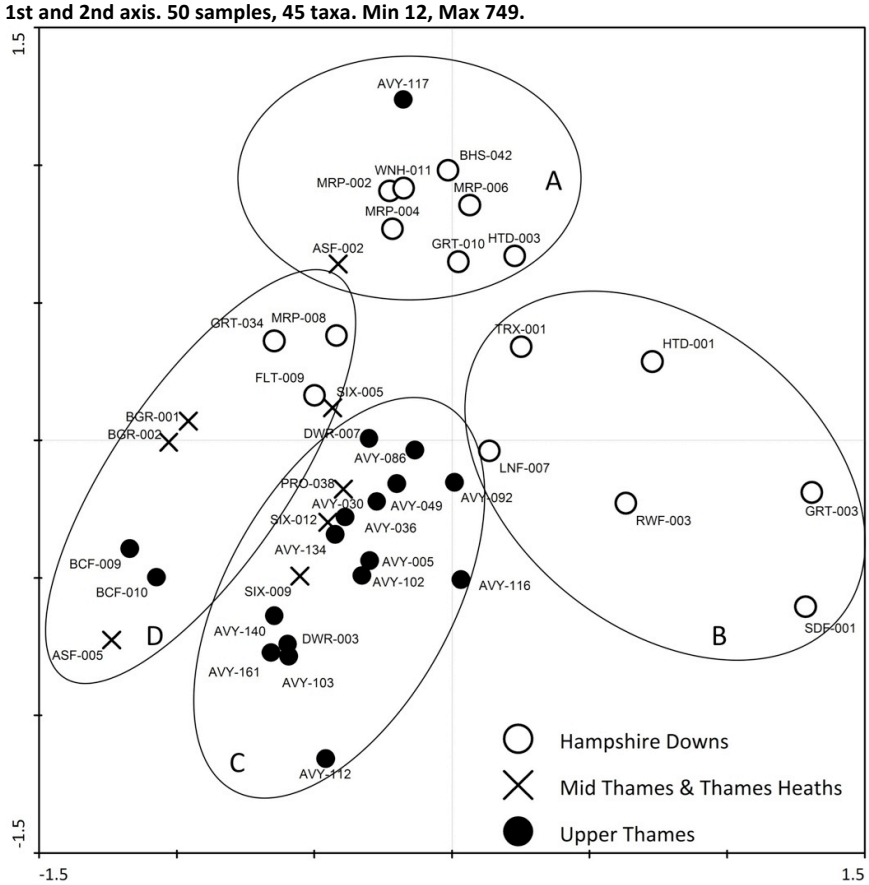

Figure 7-55 CA plot of arable weeds from regional spelt FSBP, sample pies classified by region. 1st and 2nd axis. 42 samples, 35 taxa. Min 10, Max 679.

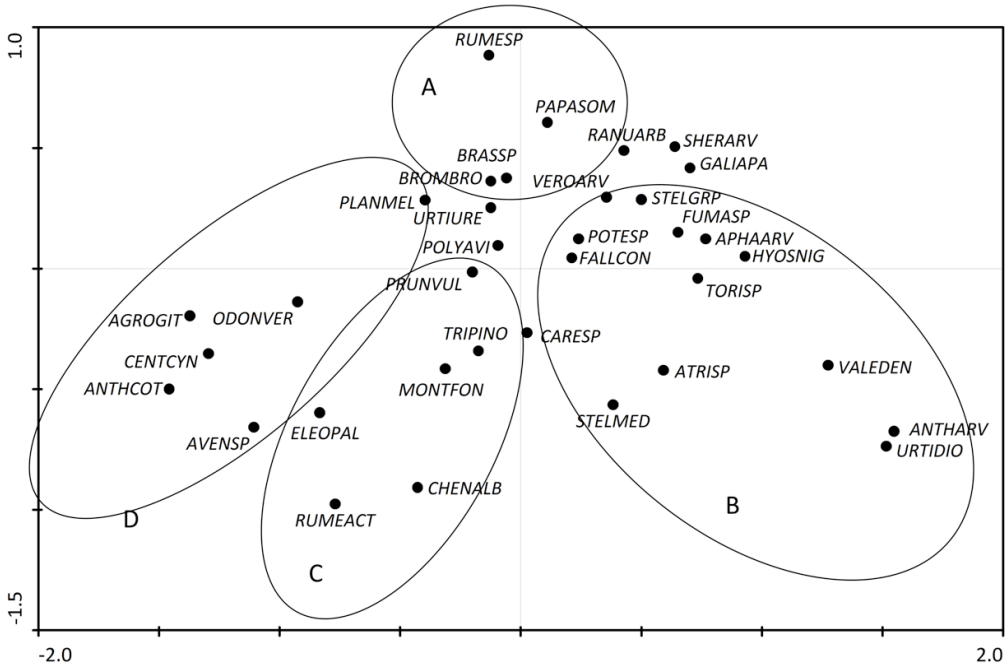

Figure 7-56 CA plot of arable weeds from regional spelt FSBP, taxa plot.
1st and 2nd axis. 42 samples, 35 taxa. Min 10, Max 679.

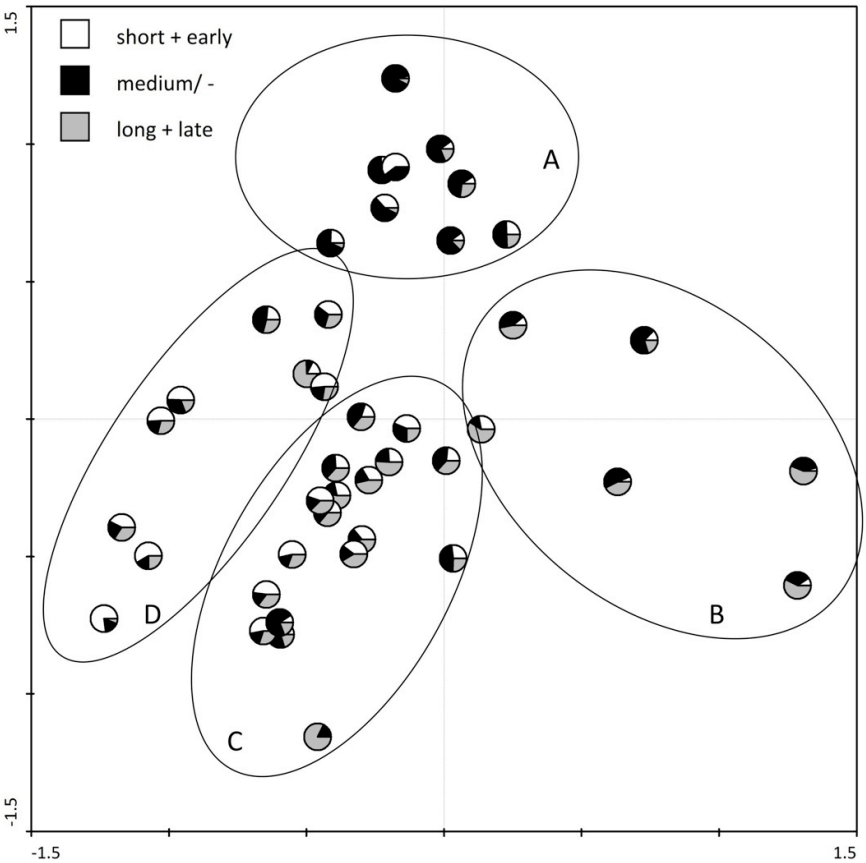

Figure 7-57 CA plot of arable weeds from regional spelt FSBP, sample pies classified by flowering duration and onset.
1st and 2nd axis. 42 samples, 35 taxa. Min 10, Max 679.

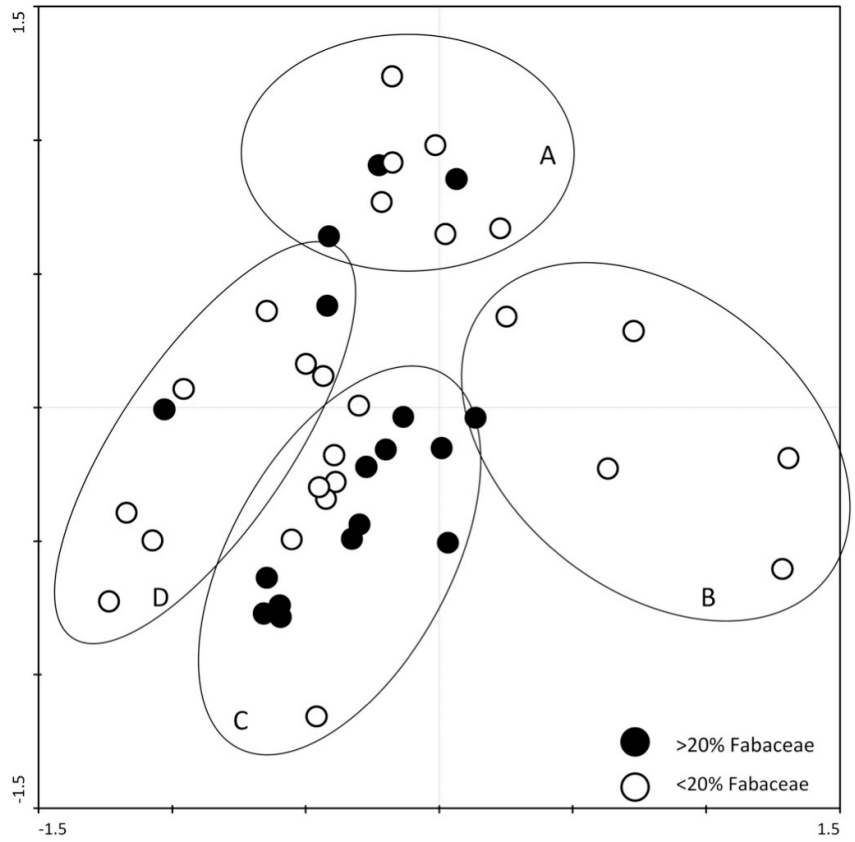

Figure 7-58 CA plot of arable weeds from regional spelt FSBP, samples classified by % of leguminous taxa. 1st and 2nd axis. 42 samples, 35 taxa. Min 10, Max 679.

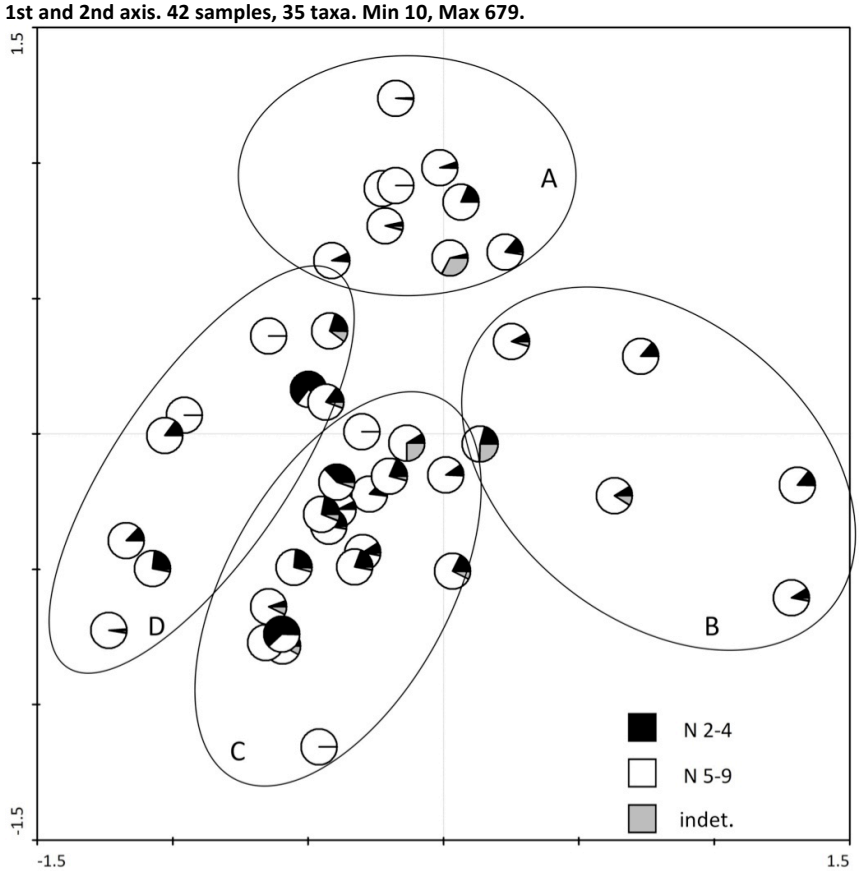

Figure 7-59 CA plot of arable weeds from regional spelt FSBP, sample pies classified by N values. 1st and 2nd axis. 35 taxa, 42 samples. Min 10, Max 679.

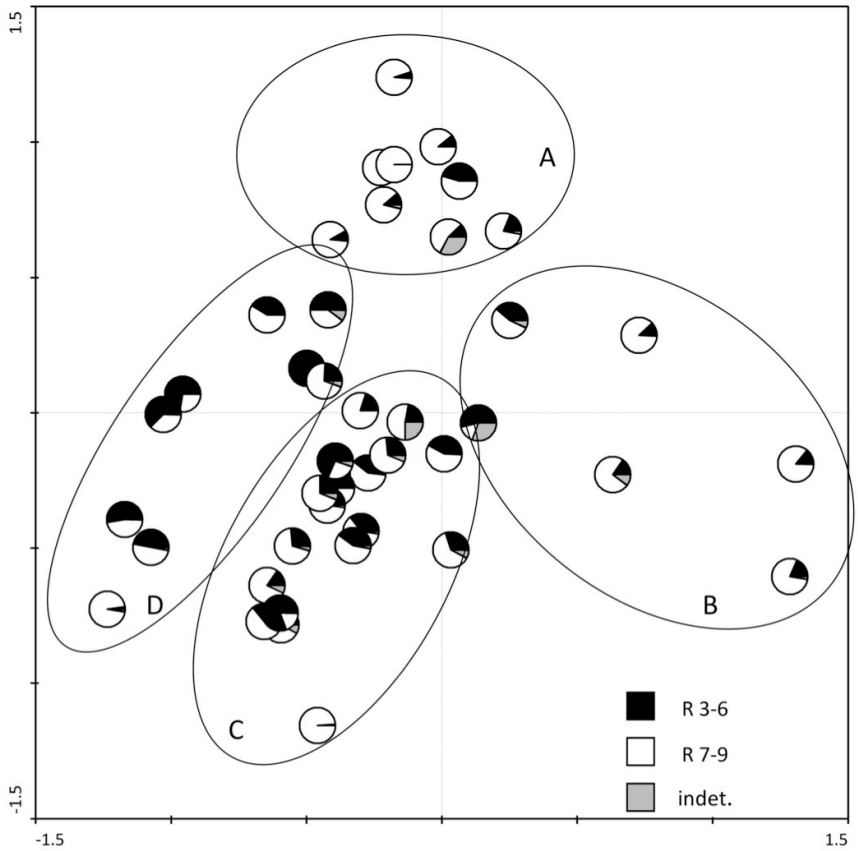

Figure 7-60 CA plot of arable weeds from regional spelt FSBP, sample pies classified by R values. 1st and 2nd axis. 42 samples, 35 taxa. Min 10, Max 679.

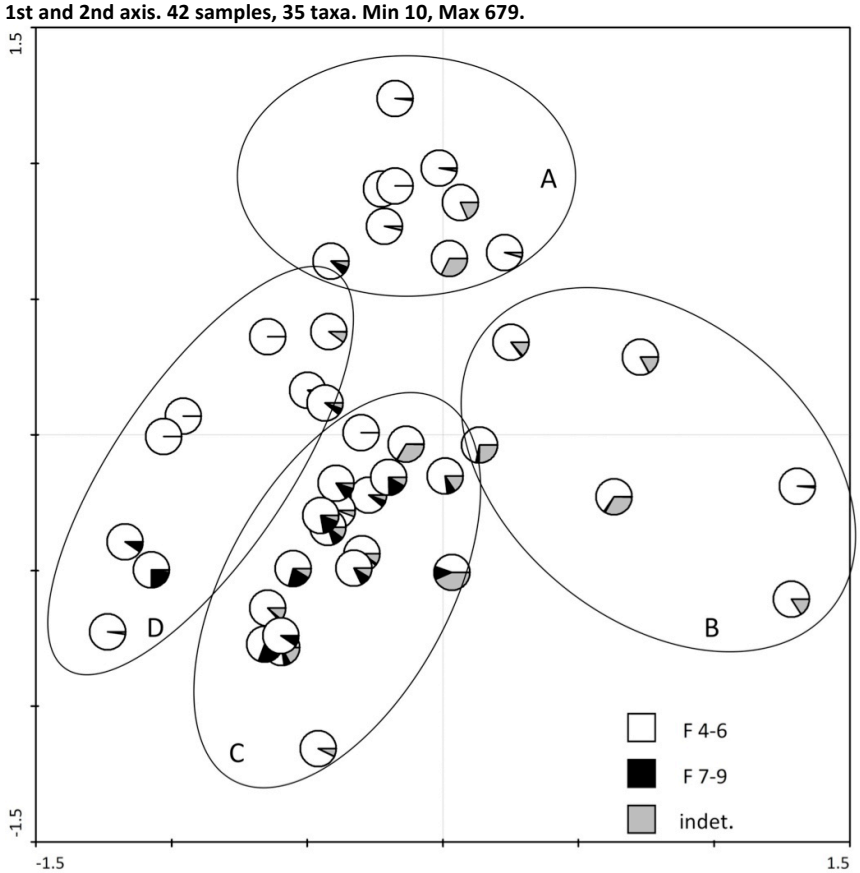

Figure 7-61 CA plot of arable weeds from regional spelt FSBP, sample pies classified by F values. 1st and 2nd axis. 42 samples, 35 taxa. Min 10, Max 679.

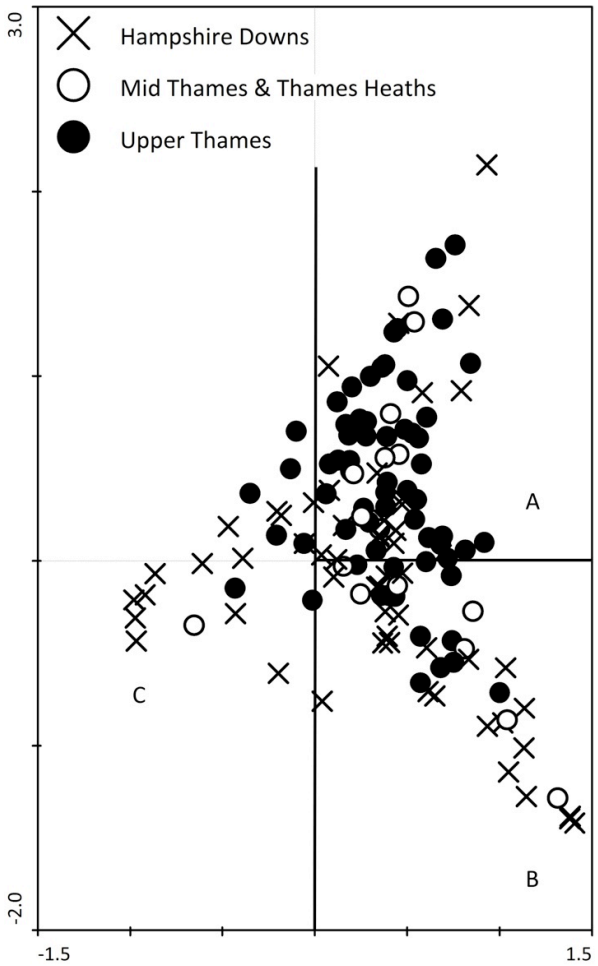

Figure 7-62 CA plot of arable weeds from regional spelt FSP, samples classified by NCA. 1st and 2nd axis. 138 samples, 42 taxa. Min 10, Max 2356.

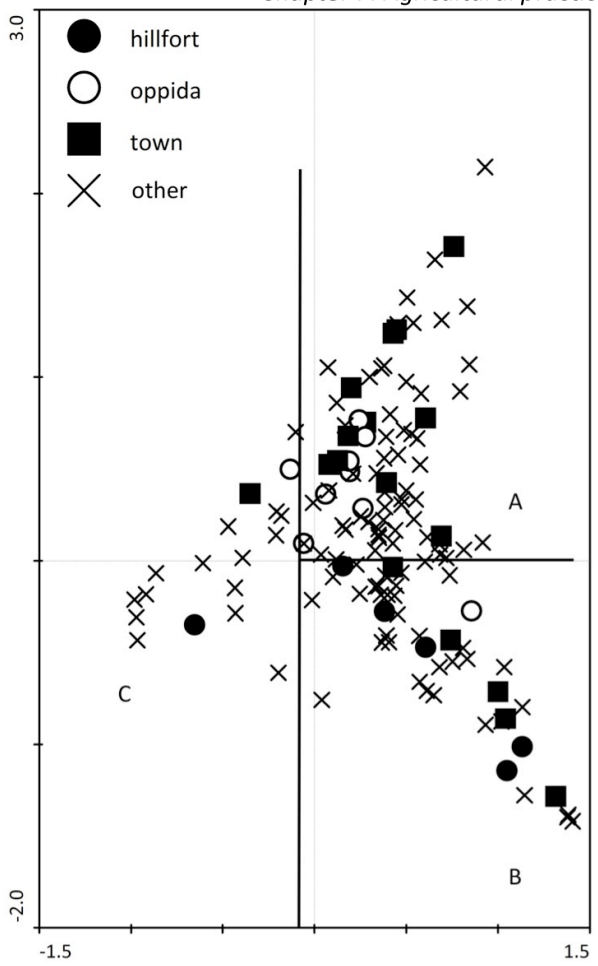

Figure 7-63 CA plot of arable weeds from regional spelt FSP, samples classified by site type. 1st and 2nd axis. 138 samples, 42 taxa. Min 10, Max 2356.

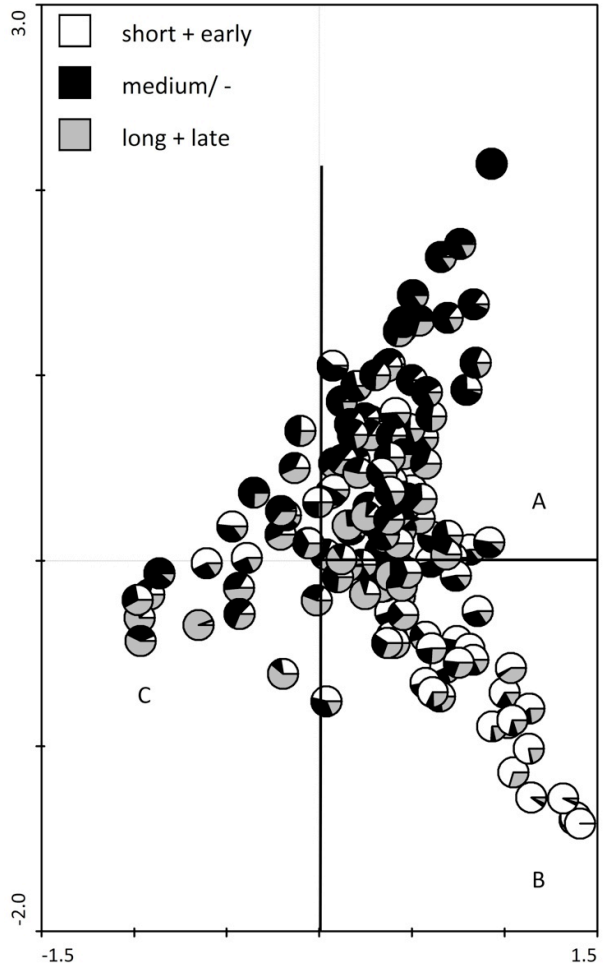

Figure 7-64 CA plot of arable weeds from regional spelt FSP, sample pies classified by flowering duration and onset.
1st and 2nd axis. 138 samples, 42 taxa. Min 10, Max 2356.

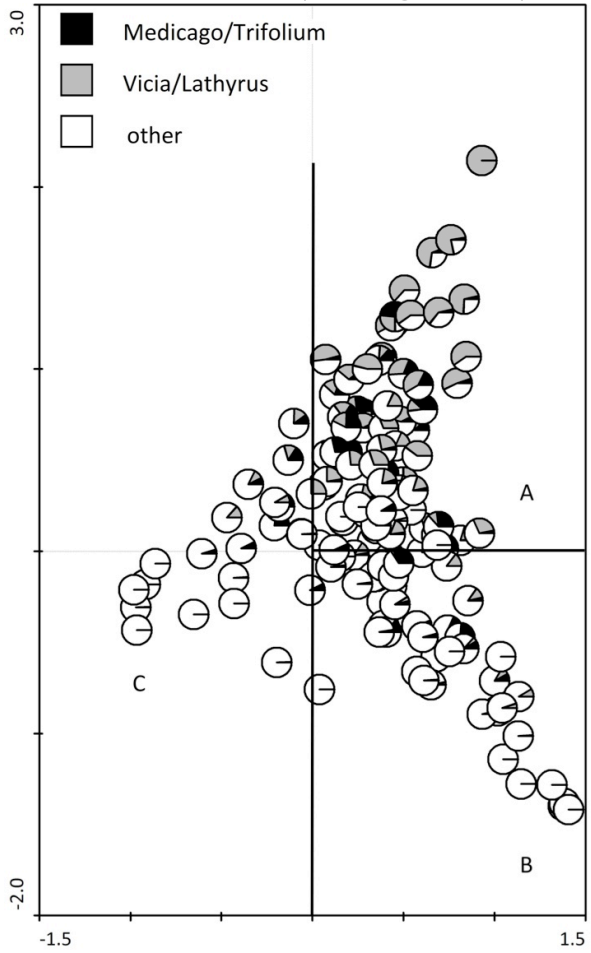

Figure 7-65 CA plot of arable weeds from regional spelt FSP, samples pies classified by presence of leguminous taxa.
1st and 2nd axis. 138 samples, 42 taxa. Min 10, Max 2356.

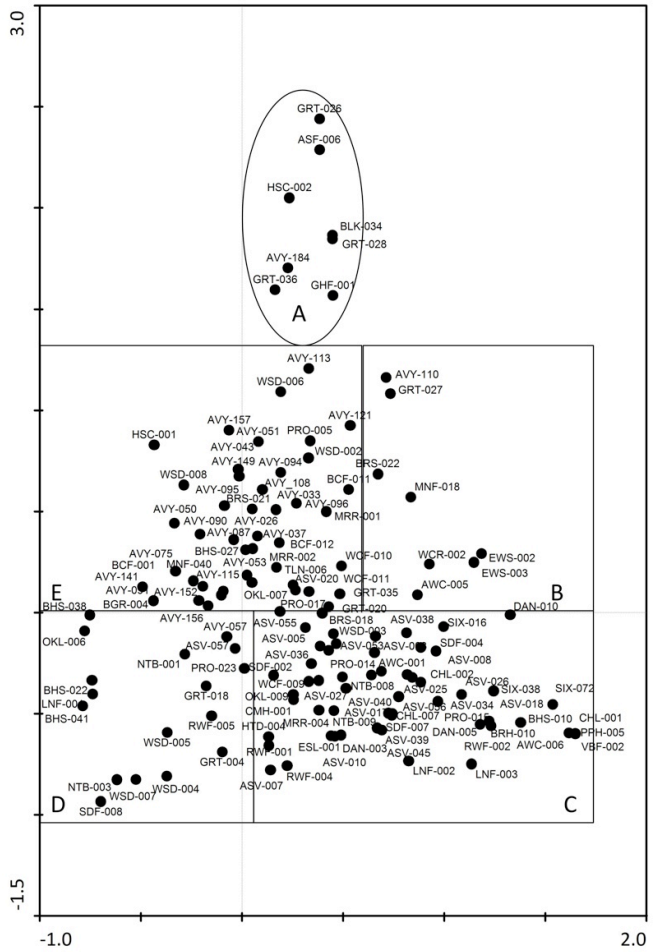

Figure 7-66 CA plot of arable weeds from regional spelt FSP, samples labelled. 1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

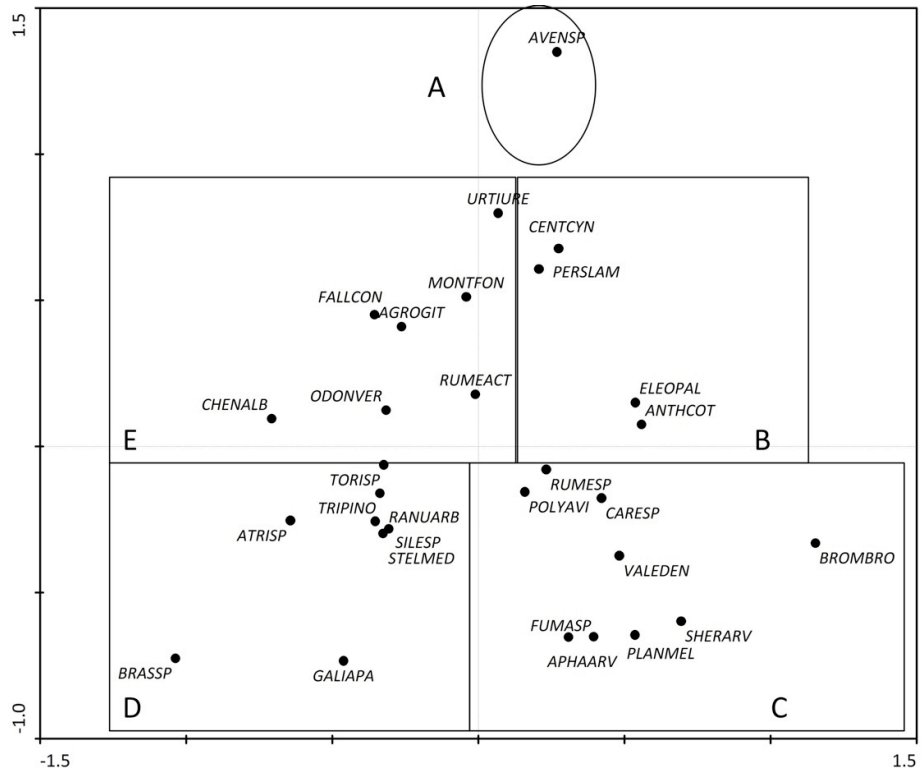

Figure 7-67 CA plot of arable weeds from regional spelt FSP samples, taxa labelled. 1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

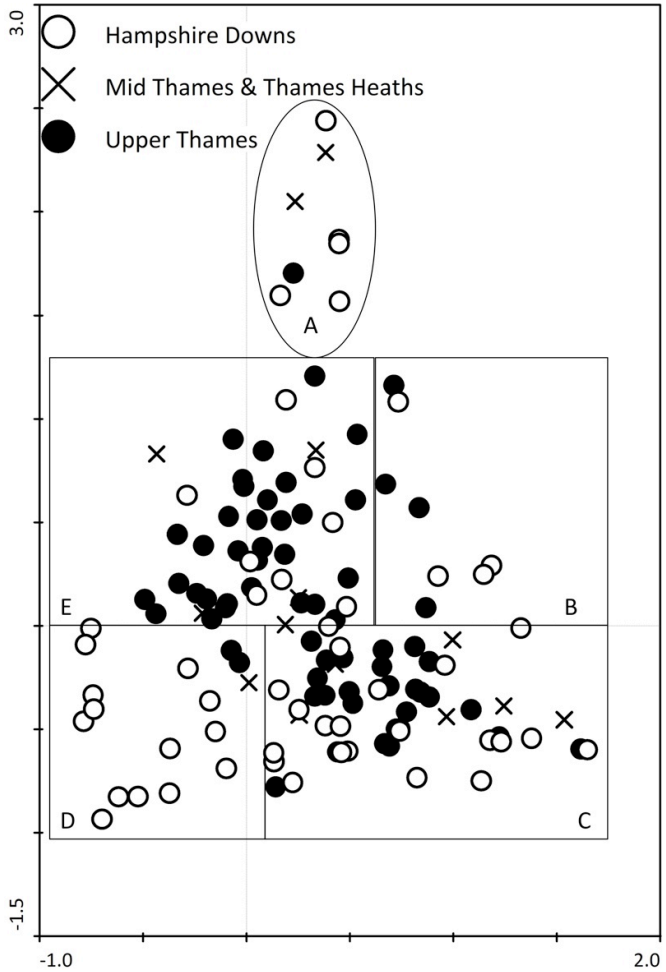

Figure 7-68 CA plot of arable weeds from regional spelt FSP, samples classified by NCA. 1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

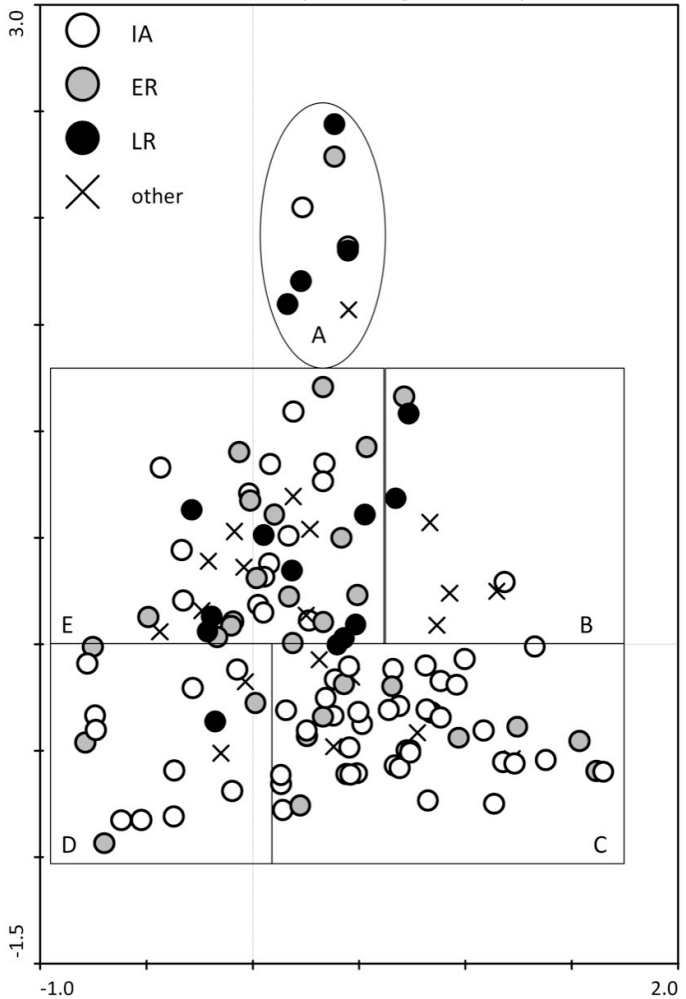

Figure 7-69 CA plot of arable weeds from regional spelt FSP, samples classified by period. 1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

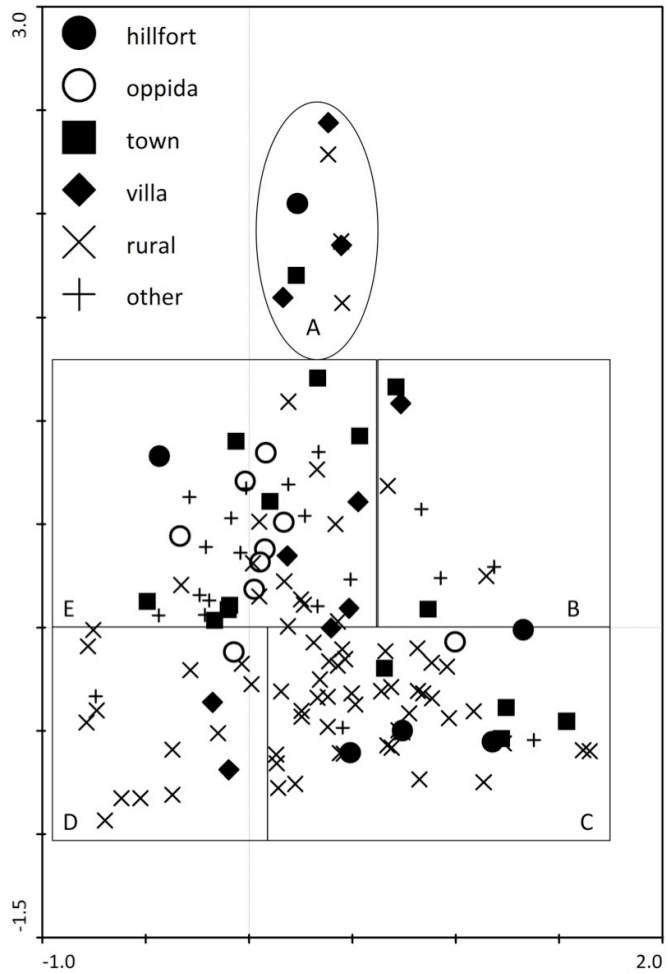

Figure 7-70 CA plot of arable weeds from regional spelt FSP, samples classified by site type.
1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

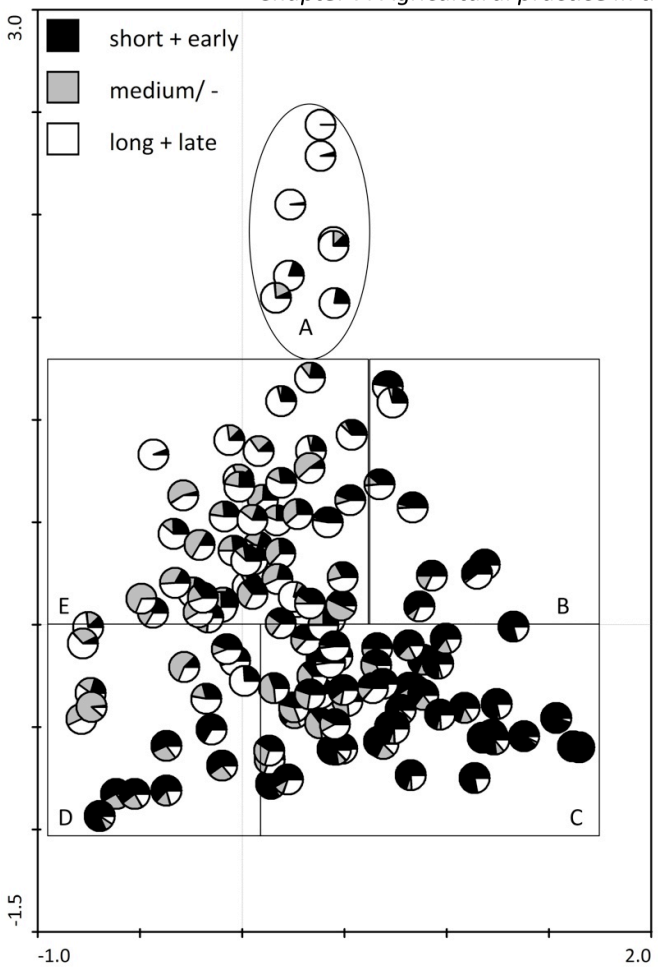

Figure 7-71 CA plot of arable weeds from regional spelt FSP, samples classified by flowering duration and onset.
1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

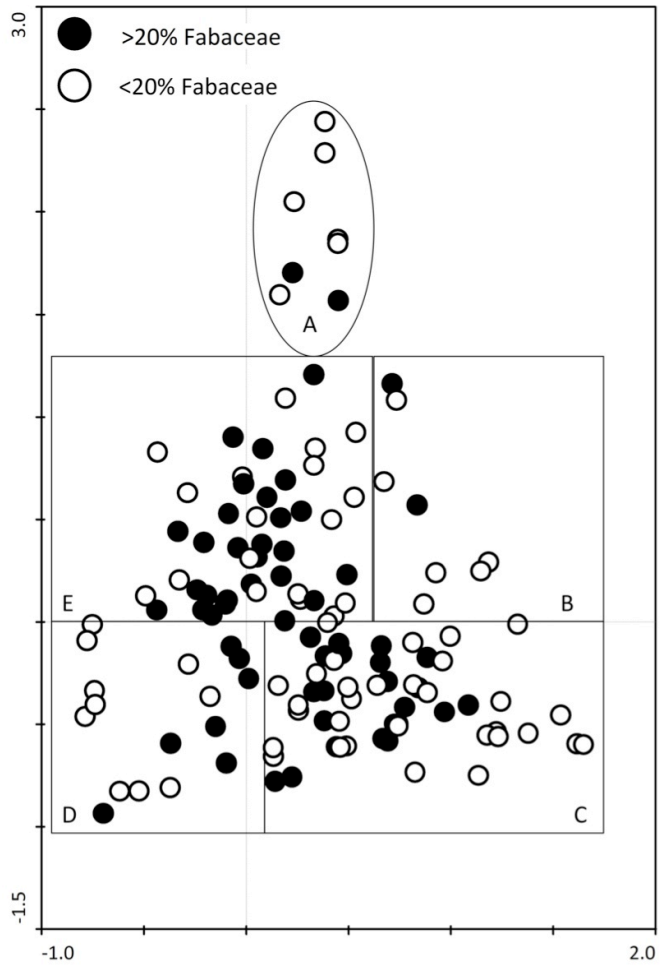

Figure 7-72 CA plot of arable weeds from regional spelt FSP, samples classified by % of Fabaceae.
1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

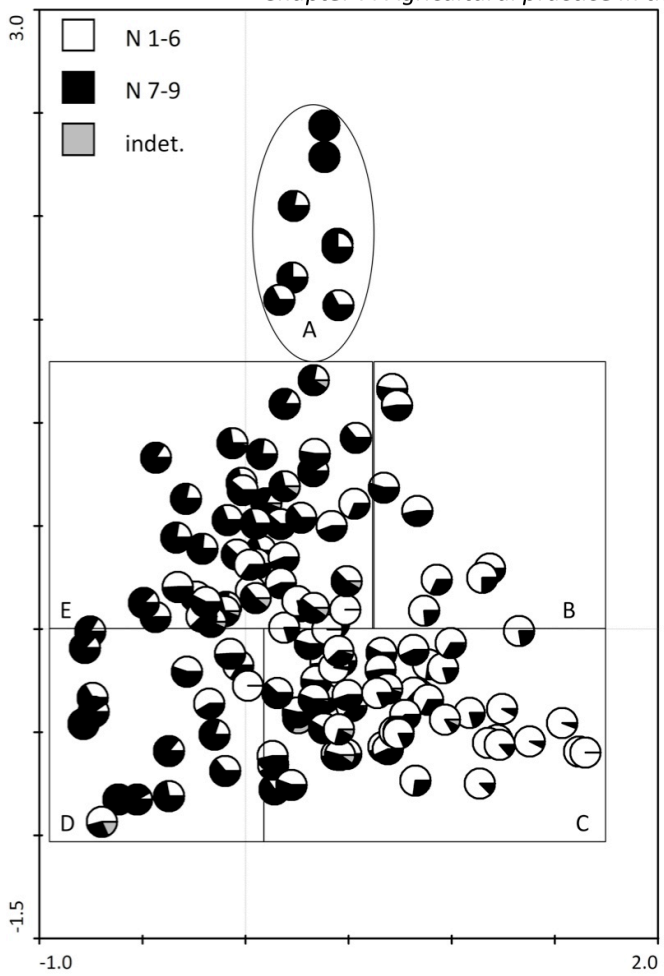

Figure 7-73 CA plot of arable weeds from regional spelt FSP, sample pies classified by N values.
1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

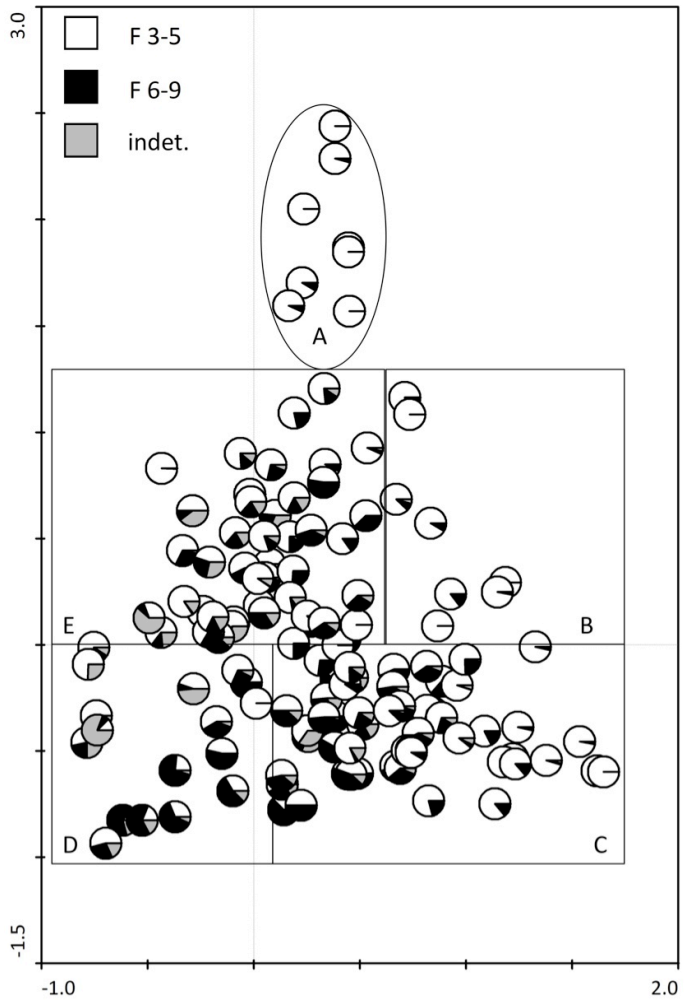

Figure 7-74 CA plot of arable weeds from regional spelt FSP, classified by F values. 1st and 2nd axis. 132 samples, 29 taxa. Min 10, Max 231.

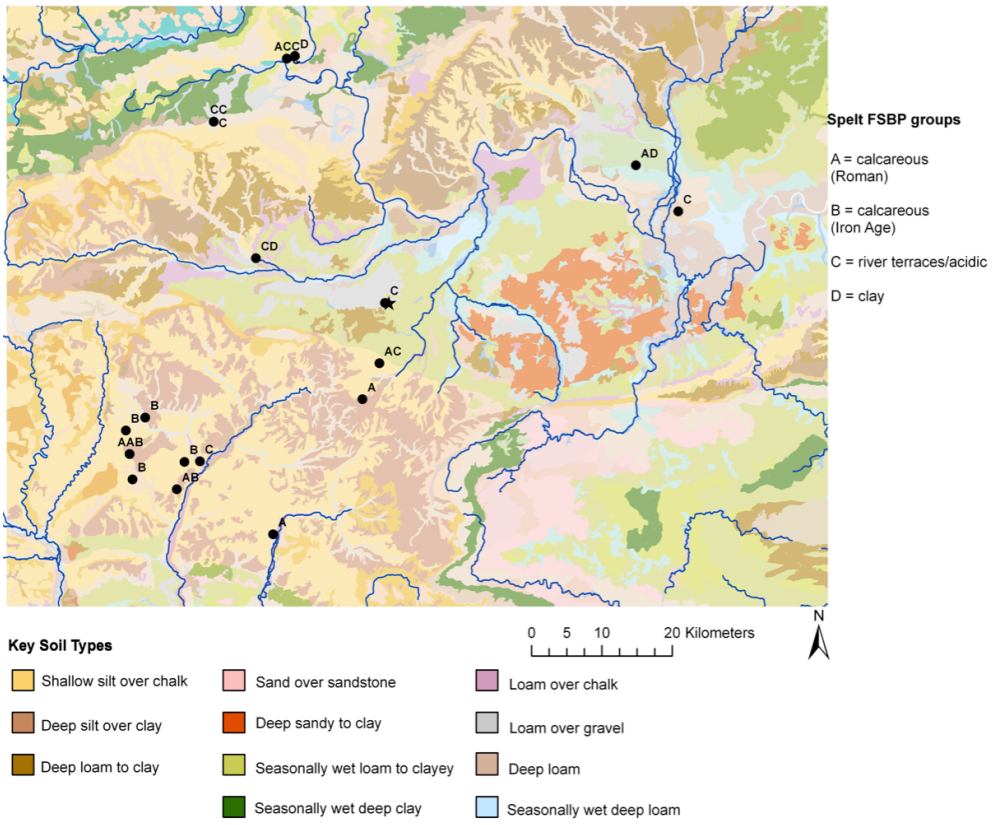

Figure 7-75 Distribution of spelt FSBP groups against regional soil types

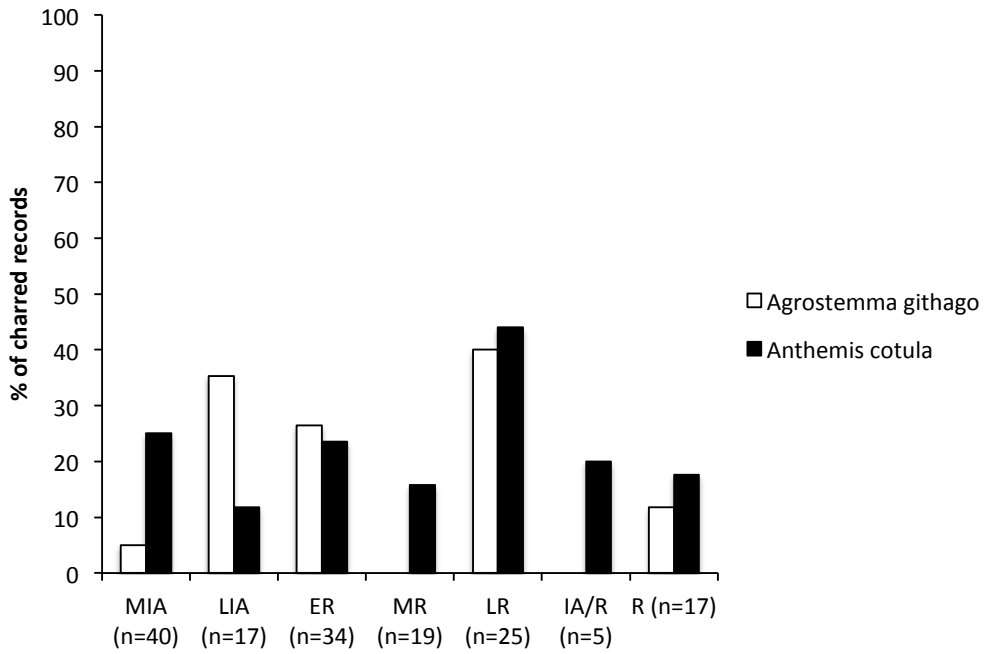

Figure 7-76 Frequency of charred Agrostemma githago and Anthemis cotula in the regional study area, by period

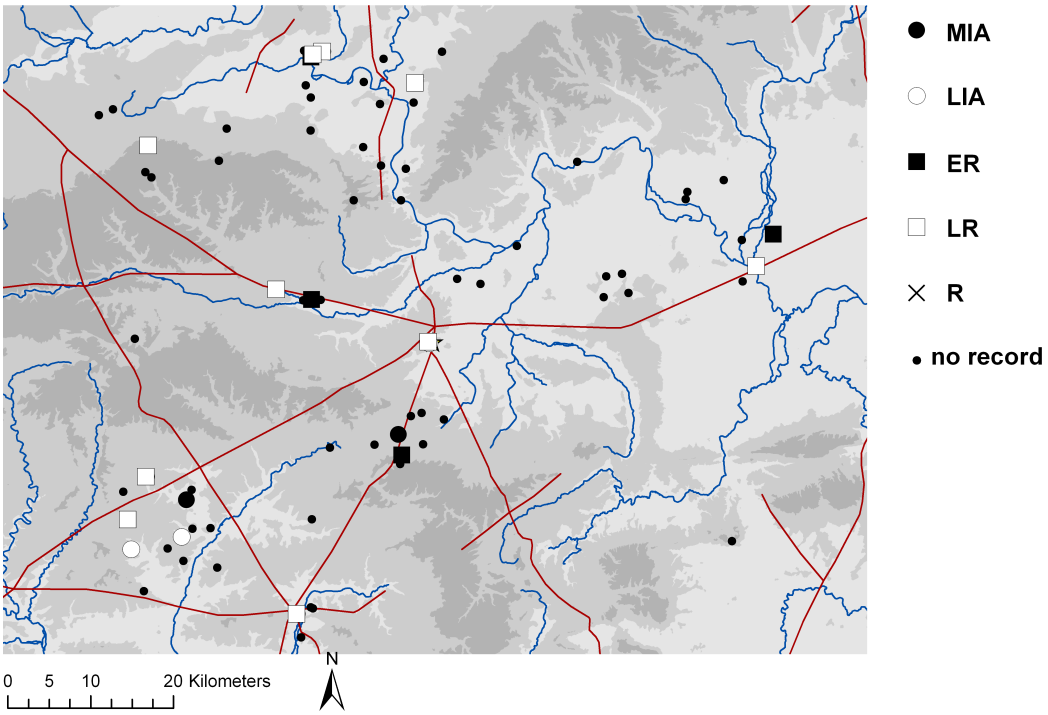

Figure 7-77 Distribution of charred Agrostemma githago in the regional study area, by period

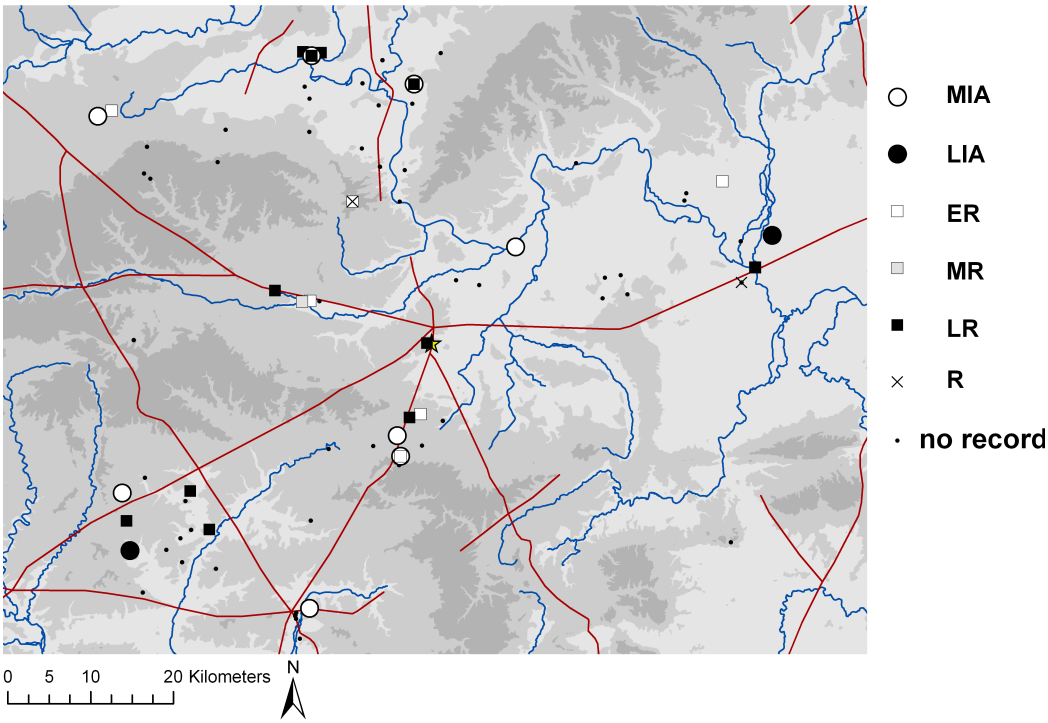

Figure 7-78 Distribution of charred Anthemis cotula in the regional study area, by period

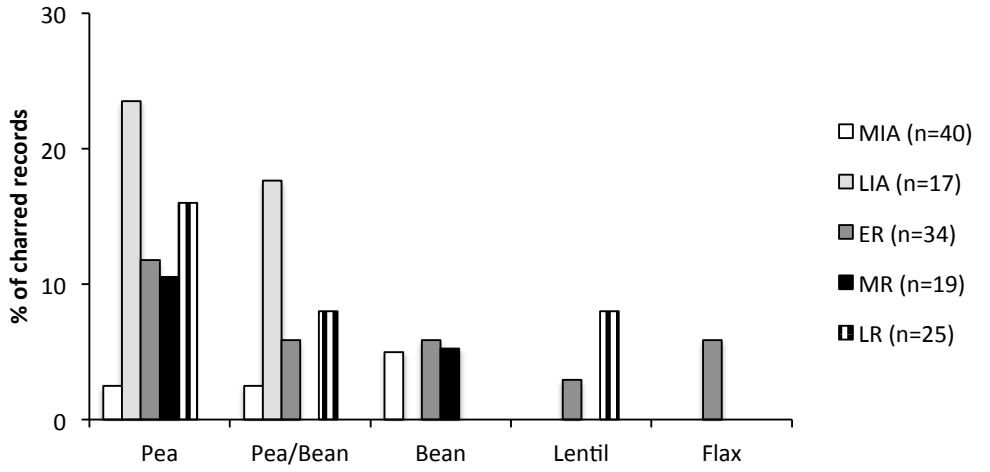

Figure 7-79 Frequency of pulses and flax per period in the regional study area, by period

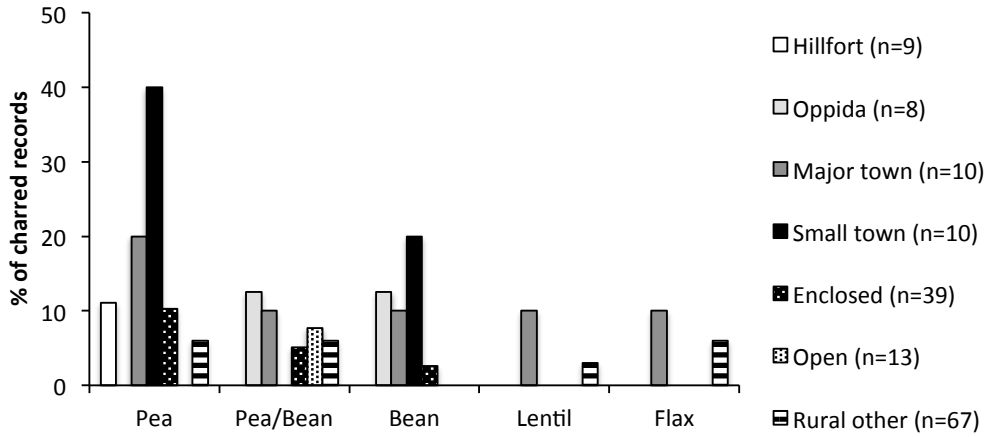

Figure 7-80 Frequency of pulses and flax in the regional study area, by site type

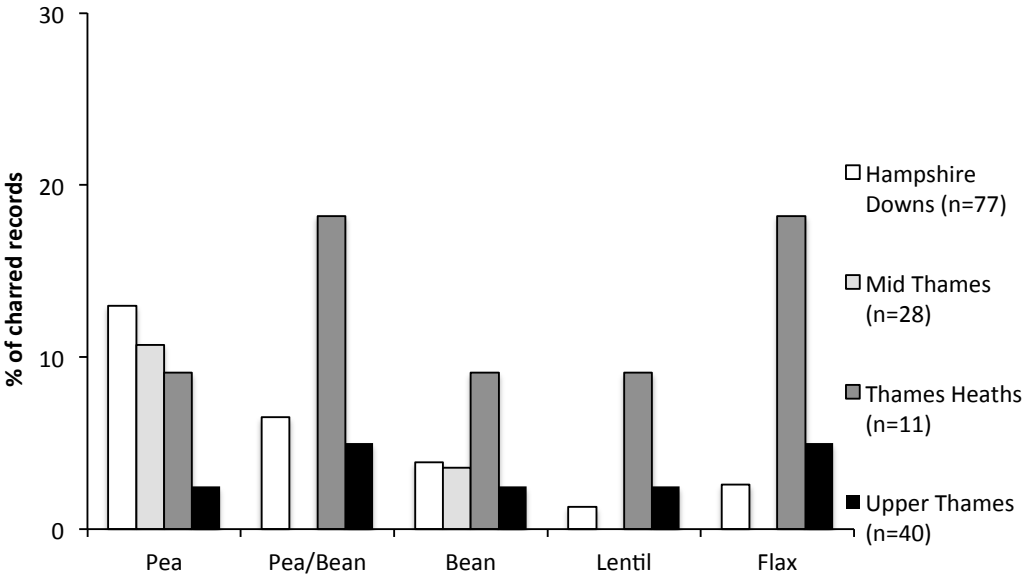

Figure 7-81 Frequency of pulses and flax in the regional study area, by NCA

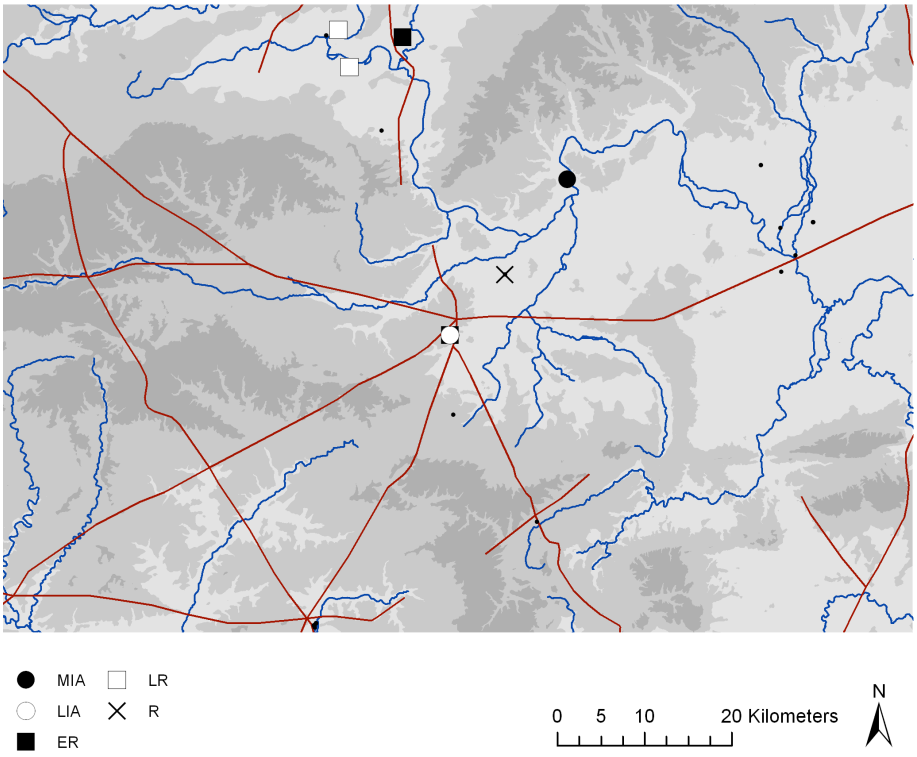

Figure 7-82 Distribution of waterlogged flax seeds in the regional study area, by period

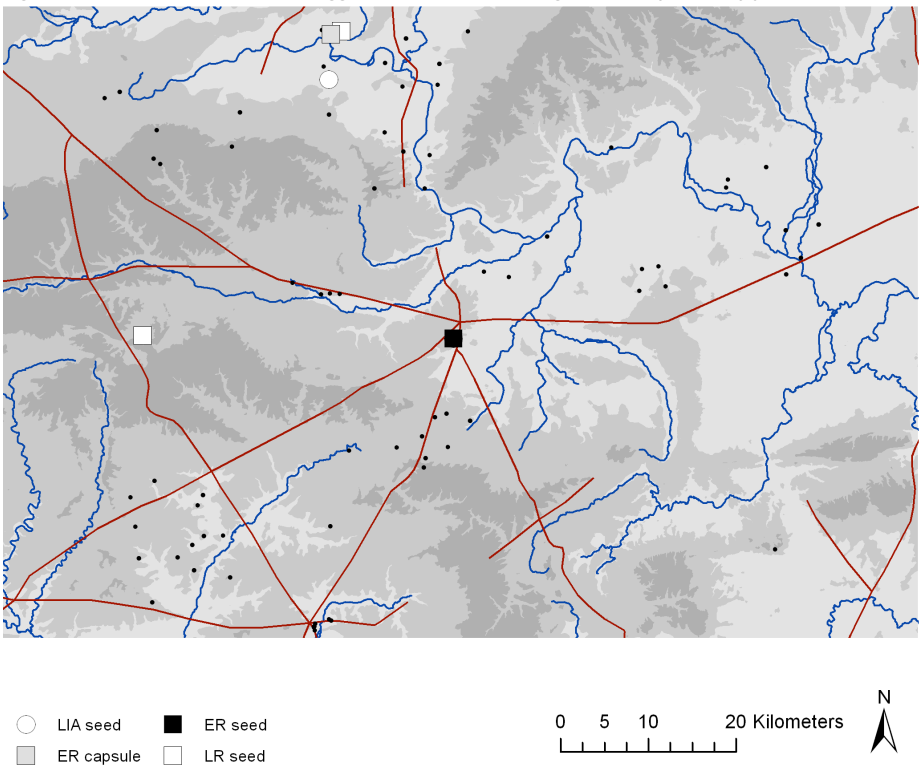

Figure 7-83 Distribution of charred flax seeds in the regional study area, by period

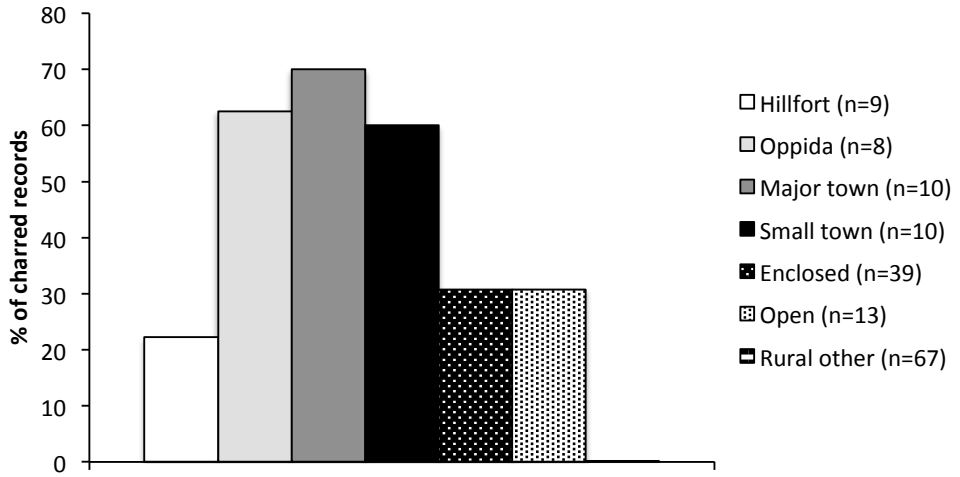

Figure 7-84 Frequency of charred hazelnut shell in the regional study area, by site type

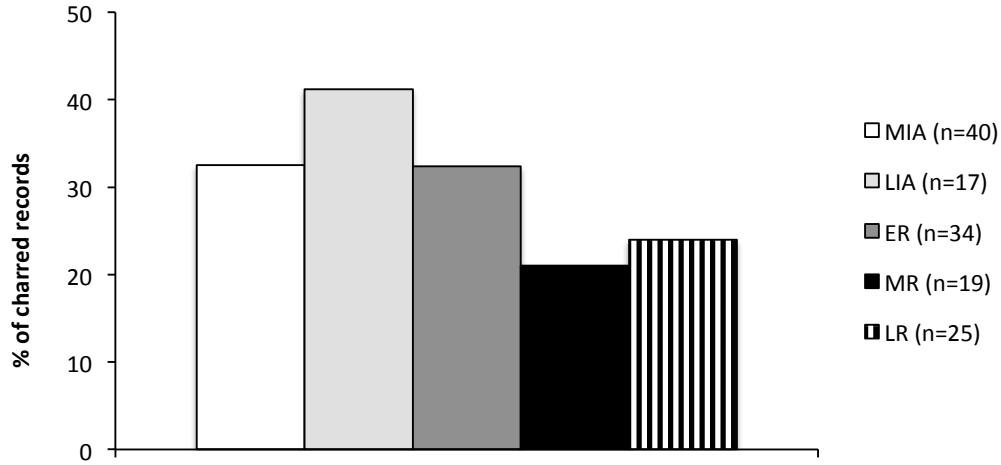

Figure 7-85 Frequency of charred hazelnut shell in the regional study area, by period

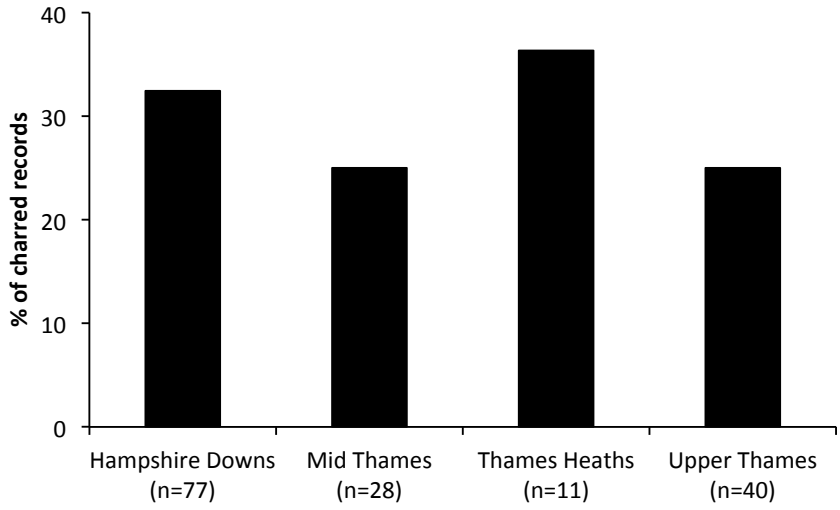

Figure 7-86 Frequency of charred hazelnut shell in the regional study area, by NCA

Chapter 8 Figures

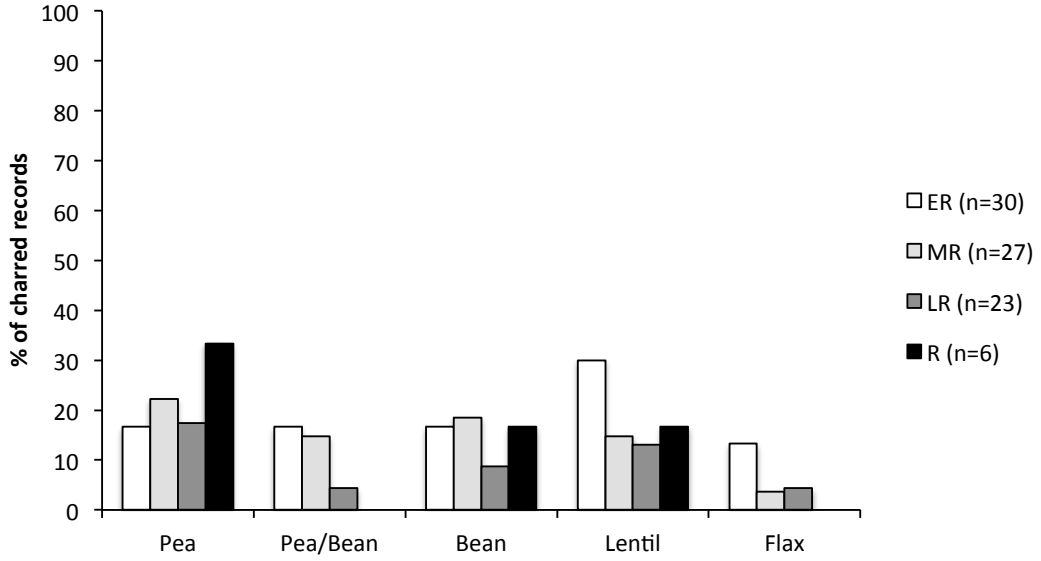

Figure 8-1 Frequency of charred flax and pulses from major towns, by period

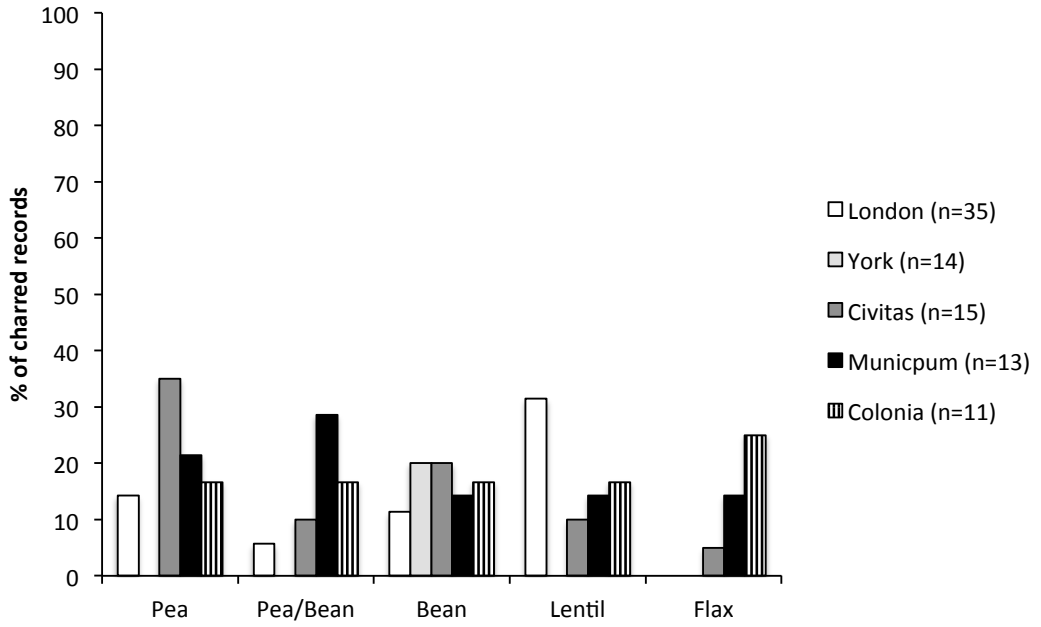

Figure 8-2 Frequency of charred flax and pulses from major towns, by site type

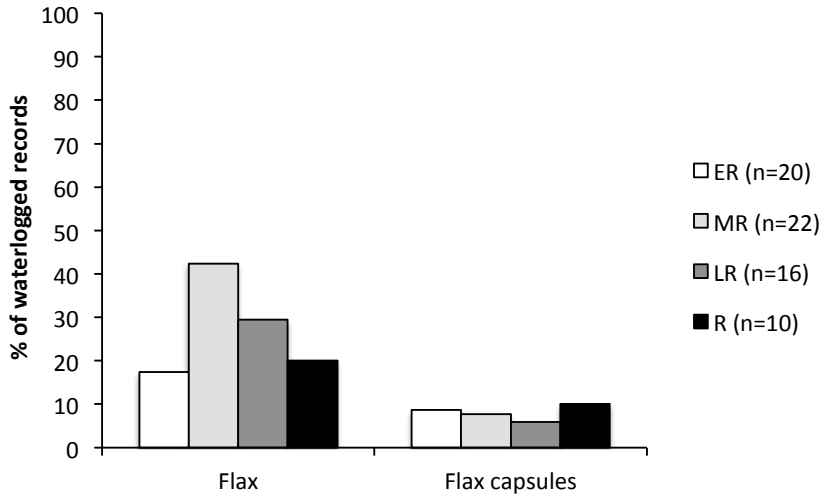

Figure 8-3 Frequency of waterlogged flax from major towns, by period

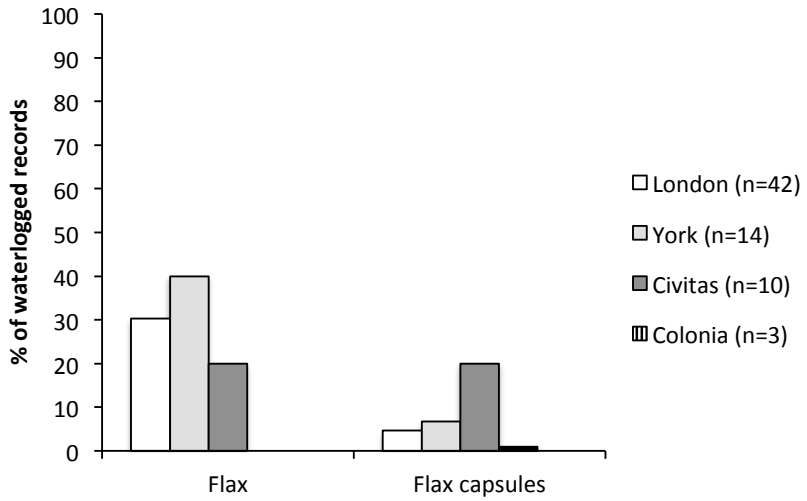

Figure 8-4 Frequency of waterlogged flax from major towns, by site type

Chapter 9 Figures

Figure 9-1 Calciphilous seeds identified from Insula IX (L) Anthemis arvensis (R) Scabiosa columbaria. Scale bar = 2mm.

J	F	M	A	M	J	J	A	S	O	N	D
							spelt harvest		autumn spelt sowing		
							barley harvest		autumn barley sowing		
		pea sown									
		bean sown									
	meadows closed					hay harvest					
			flax sown				flax harvest				
								bracken harvest			
								wild fruit collection			

Figure 9-2 Distribution of labour throughout the year at Period 0 and 1 Insula IX, Silchester

Samples containg charred plant remains have been ordered by period and then sample number.
Taxa have been ordered by cereal grain, cereal chaff, food plants and then wild plants, and within these categories taxanomically following Stace (1997).

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Feature	Well	Well	Pit	Well	Well	Well	Pit	Pit	Ditch	Ditch	Ditch	Posthole	Ditch	Posthole	Occup	Ditch	Pit	Ditch
	Sample	2978	3216	3279	4029	4068	4085	5249	5425	5956	5976	6015	6025	6147	6171	6326	6445	6530	6843
	Context	9170	9257	9025	10436	10438	10439	11108	11117	11650	11649	11649	11905	11996	11790	12682	11650	12714	11650
	Sample volume/L	11.5	4	12	29	16	2	8	6	18.5	19	19	5	17	20	6	27	15	15
	Total items	66	109	492	14	201	24	13	13	92	46	57	147	53	33	9	54	22	141
	Density Items/L	5.7	27.3	41.0	0.5	12.6	12.0	1.6	2.2	5.0	2.4	3.0	29.4	3.1	1.7	1.5	2.0	1.5	9.4
Cereal grain																			
Hordeum vulgare L. (hulled lateral)	Six-row Hulled Barley		2		1	1				1							1		1
Hordeum vulgare L. (lateral)	Six-row Barley			1						2		1							
Hordeum sp. (hulled)	Hulled Barley	5	4	8		3		2		2	1	2	3	3			1		1
Hordeum sp. (hulled, cf. germinated)	Hulled Barley																		
Hordeum sp. (hulled, straight)																			
Hordeum sp. (straight)	Barley		2	2		1				1		2							
Hordeum sp. (straight, germinated)	Barley	1																	
Hordeum sp.	Barley			1		3		2	1	2	1	3				1			
Hordeum sp. (cf. germinated)	Barley																		
cf. *Hordeum* sp.	Barley	1																	
Triticum spelta L.	Spelt				2	2				1			2				1		2
Triticum spelta L. (grain in spikelet)	Spelt																		
Triticum spelta L. (germinated)	Spelt	2																	
Triticum spelta L. (cf. germinated)	Spelt																		
Triticum spelta/dicoccum	Spelt/Emmer	1			2	3				3						1	1		
Triticum spelta/dicoccum (cf. germinated)	Spelt/Emmer																		
Triticum dicoccum Schübl.	Emmer																		1
Triticum cf. *dicoccum* Schübl.	Emmer					1													
Triticum spelta L. (short)	Spelt																		
cf. *Triticum spelta* L. (short)	Spelt																		
Triticum sp. L.(short or free-threshing)	Wheat																		
Triticum sp. (short free-threshing)	Free-threshing Wheat																		
Triticum sp. cf. (free-threshing)	Free-threshing Wheat	1																	
Triticum sp.	Wheat					1												2	
Secale cereale L.	Rye																		
cf. *Secale cereale* L.	Rye																		
Cereal indet.	Cereal	5		10	4	37	1	3	5	10	6	6	12	1	4		7	6	6
Cereal chaff																			
Avena sp. (lemma)	Oat		1																
Avena sp. (awn)	Oat																		
Avena fatua/ludoviciana (floret base)	Oat																		
Hordeum vulgare L. (rachis)	Six-row Barley					1													
Hordeum vulgare L. (lax-eared rachis)	Six-row Barley																		
Hordeum sp. (lax-eared rachis)	Barley		3			4													
Hordeum sp. (rachis)	Barley					8	1			2				1					1
Hordeum sp. (lemma and palea)	Barley																		
Secale/Hordeum (rachis)	Rye/Barley					5													

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Feature	Well	Well	Pit	Well	Well	Well	Pit	Pit	Ditch	Ditch	Ditch	Posthole	Ditch	Posthole	Occup	Ditch	Pit	Ditch
	Sample	2978	3216	3279	4029	4068	4085	5249	5425	5956	5976	6015	6025	6147	6171	6326	6445	6530	6843
	Context	9170	9257	9025	10436	10438	10439	11108	11117	11650	11649	11649	11905	11996	11790	12682	11650	12714	11650
	Sample volume/L	11.5	4	12	29	16	2	8	6	18.5	19	19	5	17	20	6	27	15	15
	Total items	66	109	492	14	201	24	13	13	92	46	57	147	53	33	9	54	22	141
	Density Items/L	5.7	27.3	41.0	0.5	12.6	12.0	1.6	2.2	5.0	2.4	3.0	29.4	3.1	1.7	1.5	2.0	1.5	9.4
Triticum dicoccum Schübl. (glume base)	Emmer									1									
Triticum cf. *dicoccum* Schübl. (glume base)	Emmer												1						
Triticum dicoccum Schübl. (spikelet base)	Emmer																		
Triticum spelta L. (glume base)	Spelt	1	9			14	2			13	1	1	9	3			2		10
Triticum spelta L. (spikelet base)	Spelt																		
Triticum spelta/dicoccum (glume base)	Spelt/Emmer		3			22	7			12		1	4	1			2		9
Triticum spelta/dicoccum (spikelet base)	Spelt/Emmer																		
Triticum spelta L. (rachis)	Spelt																		
Triticum spelta L. (basal rachis)	Spelt																		
Triticum spelta/dicoccum (rachis)	Spelt/Emmer																		
Triticum sp. (free-threshing hexaploid rachis)	Free-threshing Wheat																		
Triticum sp. (free-threshing rachis)	Free-threshing Wheat																		
Triticum sp. (hexaploid rachis)	Wheat																		
Triticum sp. (hexaploid basal rachis)	Wheat																		
Triticum sp. (rachis)	Wheat												1						1
Triticum sp. (basal spikelet)	Wheat					1													
Cereal indet. (free-threshing rachis)	Cereal																		
Cereal indet. (culm node)	Cereal		1														1		
Food plants																			
cf. *Brassica nigra* (L.) W.D.J. Koch	Black Mustard							3											
Prunus domestica L.	Damson/Plum																		
Lens culinaris L.	Lentil																		
cf. *Lens culinaris* L.	Lentil																		
Vicia faba var. *minor* L.	Celtic Bean																		
Pisum sativum/Vicia faba	Pea/Bean																		1
cf. *Pisum sativum* L.	Garden Pea																		
Vitis vinifera L.	Grape																		
Linum usitatissimum L.	Flax																1		
Apium graveolens L.	Celery																		
Carum carvi L.	Caraway																		
Olea europaea L.	Olive																		
cf. Nut cotyledons	Nut																		
Wild plants																			
Ranunculus sardous Crantz	Hairy Buttercup																		
Ranunculus cf. *repens* L.	Creeping Buttercup																		
Ranunculus sp.	Buttercups										1								
Ranunculus flammula L.	Lesser Spearwort																		
Ranunculus acris/repens/bulbosus	Meadow/Bulbosus Buttercups			10															
Ranunculus subg. *ranunculus*	Buttercups	2																	
Papaver rhoeas type	Common Poppy																		

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Feature	Well	Well	Pit	Well	Well	Well	Pit	Pit	Ditch	Ditch	Ditch	Posthole	Ditch	Posthole	Occup	Ditch	Pit	Ditch
	Sample	2978	3216	3279	4029	4068	4085	5249	5425	5956	5976	6015	6025	6147	6171	6326	6445	6530	6843
	Context	9170	9257	9025	10436	10438	10439	11108	11117	11650	11649	11649	11905	11996	11790	12682	11650	12714	11650
	Sample volume/L	11.5	4	12	29	16	2	8	6	18.5	19	19	5	17	20	6	27	15	15
	Total items	66	109	492	14	201	24	13	13	92	46	57	147	53	33	9	54	22	141
	Density Items/L	5.7	27.3	41.0	0.5	12.6	12.0	1.6	2.2	5.0	2.4	3.0	29.4	3.1	1.7	1.5	2.0	1.5	9.4
Papaver somniferum L.	Opium Poppy																		
Fumaria sp.	Fumitories																		
Urtica urens L.	Small Nettle			1		1													
Urtica dioica L.	Common Nettle			1															1
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot																		
Chenopodium polyspermum L.	Many-seeded Goosefoot																		
Chenopodium album L.	Fat-hen	1		1		1			1	3	5	1		2			3		14
Chenopodium sp.	Goosefoots																		
Atriplex sp.	Oraches									2									1
Chenopodiaceae indet.	Goosefoot family	1				1					1	2				1			1
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks												1	1					
Montia fontana ssp.	Blinks												1						
Stellaria media gp. (L.) Vill.	Common Chickweed			8		2					1	1		1					1
Stellaria graminea L.	Lesser Stitchwort			12															1
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear																		
Scleranthus annuus L.	Annual Knawel										1								
Spergula arvensis L.	Corn Spurrey		1	1		1													
Lychnis flos-cuculi L.	Ragged-Robin																		
Agrostemma githago L.	Corncockle																		
Silene noctiflora/nutans	Catchfly																		
Caryophallaceae indet.	Pink family			4															
Persicaria maculosa Gray	Redshank									1									1
Persicaria lapathifolia (L.) Gray	Pale Persicaria									1									
Persicaria lapathifolia/maculosa	Pale Persicaria/Redshank																		
Persicaria sp.	Knotweeds													1					
Persicaria hydropiper (L.) Spach	Water-pepper																		
Polygonum aviculare agg. L.	Knotgrass		2			4			1				20				1		3
Fallopia convolvulus (L.) Á. Löve	Black-bindweed																		
Rumex acetosella agg. L.	Sheep's Sorrel			19		1			1		3	2					1		
Rumex sp. (not *acetosella)*	Docks	4		22		10			1	2	2		2	3		1	5		1
Polygonaceae indet.	Knotweed family	6	2																
Malva sylvestris L.	Common Mallow																		
Malvaceae indet.	Mallow family	2																	
cf. *Viola* subg. *Melanium*	Wild Pansey etc.			1															
cf. *Viola* subg. *Viola*	Common Violet etc.			3															
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse																		
Thlaspi arvense L.	Field Penny-cress																		
Brassica sp.	Cabbages																		
Brassica/Sinapsis sp.	Mustard																		
Reseda lutea L.	Wild Mignonette																		

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Feature	Well	Well	Pit	Well	Well	Well	Pit	Pit	Ditch	Ditch	Ditch	Posthole	Ditch	Posthole	Occup	Ditch	Pit	Ditch
	Sample	2978	3216	3279	4029	4068	4085	5249	5425	5956	5976	6015	6025	6147	6171	6326	6445	6530	6843
	Context	9170	9257	9025	10436	10438	10439	11108	11117	11650	11649	11649	11905	11996	11790	12682	11650	12714	11650
	Sample volume/L	11.5	4	12	29	16	2	8	6	18.5	19	19	5	17	20	6	27	15	15
	Total items	66	109	492	14	201	24	13	13	92	46	57	147	53	33	9	54	22	141
	Density Items/L	5.7	27.3	41.0	0.5	12.6	12.0	1.6	2.2	5.0	2.4	3.0	29.4	3.1	1.7	1.5	2.0	1.5	9.4
Brassicaceae indet.	Cabbage family																		
cf. Brassicacae indet.	Cabbage family																		
Filipendula ulmaria (L.) Maxim.	Meadowsweet																		
Rubus Sect. *Glandulosus*	Bramble																		
cf. *Rubus* sp.	Brambles/Raspberries etc.					1													
cf. Potentilla sp.	Cinqufoils			2															
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil																		
Aphanes arvensis L.	Parsley-piert																		
Lathyrus nissolia L.	Grass Vetchling																		
Vicia/Lathyrys sp.	Vetches/Peas			4		1			1	1					1				1
cf. *Vicia/Lathyrus* sp.	Vetches/Peas					1													
Medicago cf. *lupulina* L.	Black Medick																		
cf. *Medicago lupulina* L.	Black Medick	1		1	1	4				1							1		2
Trifolium sp.	Clovers			2															
cf. *Trifolium* sp.	Clovers	1																	
Medicago/Trifolium/Melilotus sp.	Medicks/Clovers/ Melilots			16								3							
Small *Trifolium/Lotus pedunctus*	Clovers/Greater Bird's-foot-trefoil			49															
Small legume indet.																			
Linum catharticum L.	Fairy Flax																		
Apiaeceae indet.	Carrot family			1		1													
Atropa belladonna L.	Deadly Nightshade																		
Solanum nigrum L.	Black Nightshade																		
Solanum cf. *nigrum* L.	Black Nightshade											1							
cf. *Lamium* sp.	Dead-Nettles																		
Galeopsis tetrahit L.	Common Hemp-nettle																		
Prunella vulgaris L.	Self Heal			13															
Plantago major L.	Greater Plantain																1		
Plantago lanceolata L.	Ribwort Plantain					4													1
Odontites vernus (Bellardi) Dumort.	Red Bartsia																		
Euphrasia/Odontites sp.	Eyebright/Bartsia			1															
Rhinanthus cf. *minor* L.	Yellow-rattle																		
Sherardia arvensis L.	Field Madder																		
Galium aparine L.	Cleavers																		
Galium sp.	Bedstraws			1															
Sambucus nigra L.	Elder														3				
Valernianella dentata (L.) Pollich.	Narrow-fruited Corn Salad			1															
Carduus/Cirsium sp.	Thistles														1				
cf. *Arctium* sp.	Burdocks												1						
Leucanthemum vulgare Lam.	Oxeye Daisy																		

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Feature	Well	Well	Pit	Well	Well	Well	Pit	Pit	Ditch	Ditch	Ditch	Posthole	Ditch	Posthole	Occup	Ditch	Pit	Ditch
	Sample	2978	3216	3279	4029	4068	4085	5249	5425	5956	5976	6015	6025	6147	6171	6326	6445	6530	6843
	Context	9170	9257	9025	10436	10438	10439	11108	11117	11650	11649	11649	11905	11996	11790	12682	11650	12714	11650
	Sample volume/L	11.5	4	12	29	16	2	8	6	18.5	19	19	5	17	20	6	27	15	15
	Total items	66	109	492	14	201	24	13	13	92	46	57	147	53	33	9	54	22	141
	Density Items/L	5.7	27.3	41.0	0.5	12.6	12.0	1.6	2.2	5.0	2.4	3.0	29.4	3.1	1.7	1.5	2.0	1.5	9.4
Anthemis cotula L.	Stinking Mayweed																		
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed					2		1		1			1				1		
Juncus articulatus gp.	Creeping Rushes					1													
Juncus indet.	Rushes																		
Luzula sp.	Wood-rushes																		
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush		13	22		3				3	1	2	1	5	1	1	2		14
Schoenoplectus lacustris (L.) Palla	Common Club-rush																		
Isolepis setacea (L.) R. Br.	Bristle Club-rush	1																	
Carex sp.	Sedge	1	3	16		3	1						2	1			1		3
cf. *Carex* sp.	Sedge				1														
Cyperaceae indet.	Sedge family		1																
cf. Cyperaceae indet.	Sedge family																		
Poaceae indet.	Grass family	15		18															
Poaceae indet. (large)	Grass family			8			2				4	1	5	5			1	1	2
Poaceae indet. (small)	Grass family		29	98		16	2			8	6	5	20	9	1		7	1	8
Avena fatua/ludoviciana (grain in lemma)	Wild Oat																		
Avena sp.	Wild Oat		3	1		5				3			3						
cf. *Avena* sp.	Wild Oat		1	2								1	2				1		5
Bromus cf. *secalinus* L.	Rye Brome	1		1		7	2			7	3		11				4	2	3
cf. *Bromus secalinus* L.	Rye Brome	1											5						
Bromus sp.	Bromes				3	3													
cf. *Bromus/Avena* sp.	Bromes/Oat					7			1	3			9	2			2	1	
Iridaceae indet.	Iris family																		
Seed indet.		13	18	129		12	6			2	3	9	31	12	14	4	6	1	6
Various																			
Corylus avellana L. (nut shell)	Hazel		1			2													
Salix sp. (bud)	Willow																		
cf. *Agrostemma githago* L. (capsule frags)	Corncockle																		
Ericaceae indet. (seed capsules)	Heath family																		
Poaceae indet. (culm node)	Grass family																		
Cereal indet. (germinated coleoptile)	Cereal																		
Cereal indet. (coleoptile)	Cereal																		
Indet. (bud)			3	1					1	3	5	13		2	8			7	
Indet. (seed capsules)																			39
Indet. (leaf abscission pads)		2	7																
Indet. (tubor)											1								
Bread cf. *Triticum* sp.																			
Bread/dung								2		1								1	
cf. Bread																			
Bread/porridge																			

Samples containg charred plant remains have been ordered by period and then sample n																			
Taxa have been ordered by cereal grain, cereal chaff, food plants and then wild plants, a																			
	Period	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Feature	Ditch	Pit	Pit	Ditch	Silt	Posthole	Gully	Gully	Ditch	Occup	Well	Burnt	Occup	Occup	Occup	Pit	Pit	Burnt
	Sample	6937	7068	7140	7232	7269	7539	7556	7557	7621	629	635	1429	1834	1838	1933	3098	3125	3225
	Context	11996	12678	12117	11111	12137	12843	11592	11592	12847	3580	3766	6676	3580	6810	3580	8368	8239	9012
	Sample volume/L	35	19	21.5	41	16	18	19	21	8	25	26.5	0.5	4	6	4	5	5	6
	Total items	199	601	73	319	58	19	33	95	52	69	15	14	14	12	16	20	20	17
	Density Items/L	5.7	31.6	3.4	7.8	3.6	1.1	1.7	4.5	6.5	2.8	0.6	28.0	3.5	2.0	4.0	4.0	4.0	2.8
Cereal grain																			
Hordeum vulgare L. (hulled lateral)	Six-row Hulled Barley	5			5														
Hordeum vulgare L. (lateral)	Six-row Barley		4		3				2										
Hordeum sp. (hulled)	Hulled Barley	3	10		11	1			2	2	5		1	2		1			
Hordeum sp. (hulled, cf. germinated)	Hulled Barley																		
Hordeum sp. (hulled, straight)																			
Hordeum sp. (straight)	Barley	2	2	1	3					1									
Hordeum sp. (straight, germinated)	Barley																		
Hordeum sp.	Barley		8	5	6	3		1	6			1	2	1					
Hordeum sp. (cf. germinated)	Barley																		
cf. *Hordeum* sp.	Barley										3	1							
Triticum spelta L.	Spelt	4	2						1		1			1	1			5	
Triticum spelta L. (grain in spikelet)	Spelt																		
Triticum spelta L. (germinated)	Spelt		1																
Triticum spelta L. (cf. germinated)	Spelt																		
Triticum spelta/dicoccum	Spelt/Emmer	5	9	2	6		5	3		4						1		1	
Triticum spelta/dicoccum (cf. germinated)	Spelt/Emmer																		
Triticum dicoccum Schübl.	Emmer		4	1						1									
Triticum cf. *dicoccum* Schübl.	Emmer								1										
Triticum spelta L. (short)	Spelt																		
cf. *Triticum spelta* L. (short)	Spelt																		
Triticum sp. L.(short or free-threshing)	Wheat																		
Triticum sp. (short free-threshing)	Free-threshing Wheat																		
Triticum sp. cf. (free-threshing)	Free-threshing Wheat		1								1								
Triticum sp.	Wheat		5	1											1			2	
Secale cereale L.	Rye																		
cf. *Secale cereale* L.	Rye																		
Cereal indet.	Cereal	19	29	2	53	12	3	12	16	4	5		6	2		1		7	2
Cereal chaff																			
Avena sp. (lemma)	Oat																		
Avena sp. (awn)	Oat																		
Avena fatua/ludoviciana (floret base)	Oat																		
Hordeum vulgare L. (rachis)	Six-row Barley																		
Hordeum vulgare L. (lax-eared rachis)	Six-row Barley																		
Hordeum sp. (lax-eared rachis)	Barley	1	3		4	2													
Hordeum sp. (rachis)	Barley		5																
Hordeum sp. (lemma and palea)	Barley																		
Secale/Hordeum (rachis)	Rye/Barley	3	1		1														

	Period	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Feature	Ditch	Pit	Pit	Ditch	Silt	Posthole	Gully	Gully	Ditch	Occup	Well	Burnt	Occup	Occup	Occup	Pit	Pit	Burnt
	Sample	6937	7068	7140	7232	7269	7539	7556	7557	7621	629	635	1429	1834	1838	1933	3098	3125	3225
	Context	11996	12678	12117	11111	12137	12843	11592	11592	12847	3580	3766	6676	3580	6810	3580	8368	8239	9012
	Sample volume/L	35	19	21.5	41	16	18	19	21	8	25	26.5	0.5	4	6	4	5	5	6
	Total items	199	601	73	319	58	19	33	95	52	69	15	14	14	12	16	20	20	17
	Density Items/L	5.7	31.6	3.4	7.8	3.6	1.1	1.7	4.5	6.5	2.8	0.6	28.0	3.5	2.0	4.0	4.0	4.0	2.8
Triticum dicoccum Schübl. (glume base)	Emmer		2	2															
Triticum cf. *dicoccum* Schübl. (glume base)	Emmer																		
Triticum dicoccum Schübl. (spikelet base)	Emmer		1																
Triticum spelta L. (glume base)	Spelt	20	41	3	11	2	1				1			1	2	1			
Triticum spelta L. (spikelet base)	Spelt		3																
Triticum spelta/dicoccum (glume base)	Spelt/Emmer	10	37	10	20			3											
Triticum spelta/dicoccum (spikelet base)	Spelt/Emmer																		
Triticum spelta L. (rachis)	Spelt			1															
Triticum spelta L. (basal rachis)	Spelt																		
Triticum spelta/dicoccum (rachis)	Spelt/Emmer																		
Triticum sp. (free-threshing hexaploid rachis)	Free-threshing Wheat																		
Triticum sp. (free-threshing rachis)	Free-threshing Wheat														2				
Triticum sp. (hexaploid rachis)	Wheat				2														
Triticum sp. (hexaploid basal rachis)	Wheat																		
Triticum sp. (rachis)	Wheat		3																
Triticum sp. (basal spikelet)	Wheat																		
Cereal indet. (free-threshing rachis)	Cereal	6	4																
Cereal indet. (culm node)	Cereal	1																	
Food plants																			
cf. *Brassica nigra* (L.) W.D.J. Koch	Black Mustard																		
Prunus domestica L.	Damson/Plum																		
Lens culinaris L.	Lentil																		
cf. *Lens culinaris* L.	Lentil																		
Vicia faba var. *minor* L.	Celtic Bean																		
Pisum sativum/Vicia faba	Pea/Bean																		
cf. *Pisum sativum* L.	Garden Pea																		
Vitis vinifera L.	Grape																		
Linum usitatissimum L.	Flax					1			1										
Apium graveolens L.	Celery																		
Carum carvi L.	Caraway																		
Olea europaea L.	Olive																		
cf. Nut cotyledons	Nut																		
Wild plants																			
Ranunculus sardous Crantz	Hairy Buttercup																		
Ranunculus cf. *repens* L.	Creeping Buttercup				1														
Ranunculus sp.	Buttercups																		
Ranunculus flammula L.	Lesser Spearwort																		
Ranunculus acris/repens/bulbosus	Meadow/Bulbosus Buttercups		1																
Ranunculus subg. *ranunculus*	Buttercups										2								
Papaver rhoeas type	Common Poppy			1															

	Period	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Feature	Ditch	Pit	Pit	Ditch	Silt	Posthole	Gully	Gully	Ditch	Occup	Well	Burnt	Occup	Occup	Occup	Pit	Pit	Burnt
	Sample	6937	7068	7140	7232	7269	7539	7556	7557	7621	629	635	1429	1834	1838	1933	3098	3125	3225
	Context	11996	12678	12117	11111	12137	12843	11592	11592	12847	3580	3766	6676	3580	6810	3580	8368	8239	9012
	Sample volume/L	35	19	21.5	41	16	18	19	21	8	25	26.5	0.5	4	6	4	5	5	6
	Total items	199	601	73	319	58	19	33	95	52	69	15	14	14	12	16	20	20	17
	Density Items/L	5.7	31.6	3.4	7.8	3.6	1.1	1.7	4.5	6.5	2.8	0.6	28.0	3.5	2.0	4.0	4.0	4.0	2.8
Papaver somniferum L.	Opium Poppy																		
Fumaria sp.	Fumitories																		
Urtica urens L.	Small Nettle																		
Urtica dioica L.	Common Nettle								2							1			
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot																		
Chenopodium polyspermum L.	Many-seeded Goosefoot																		
Chenopodium album L.	Fat-hen	10	9		8	1			1		1								
Chenopodium sp.	Goosefoots			2					2										
Atriplex sp.	Oraches				2														
Chenopodiaceae indet.	Goosefoot family	3	2		7				1		1	1							
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks				2														
Montia fontana ssp.	Blinks																		
Stellaria media gp. (L.) Vill.	Common Chickweed	1				1			1										
Stellaria graminea L.	Lesser Stitchwort																		
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear								1										
Scleranthus annuus L.	Annual Knawel																		
Spergula arvensis L.	Corn Spurrey																		
Lychnis flos-cuculi L.	Ragged-Robin	1																	
Agrostemma githago L.	Corncockle																		
Silene noctiflora/nutans	Catchfly																		
Caryophallaceae indet.	Pink family																		
Persicaria maculosa Gray	Redshank	1			1														
Persicaria lapathifolia (L.) Gray	Pale Persicaria				1														
Persicaria lapathifolia/maculosa	Pale Persicaria/Redshank		1							1									
Persicaria sp.	Knotweeds																		
Persicaria hydropiper (L.) Spach	Water-pepper				1														
Polygonum aviculare agg. L.	Knotgrass	7		1	6			1	5	1									1
Fallopia convolvulus (L.) Á. Löve	Black-bindweed		3																
Rumex acetosella agg. L.	Sheep's Sorrel	2	5	1	3														1
Rumex sp. (not *acetosella)*	Docks	5	30	2	34	3	1	1	1	5	4	1		1					
Polygonaceae indet.	Knotweed family	2	9								6								
Malva sylvestris L.	Common Mallow																		
Malvaceae indet.	Mallow family					1					2								
cf. *Viola* subg. *Melanium*	Wild Pansey etc.																		
cf. *Viola* subg. *Viola*	Common Violet etc.																		
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse																		
Thlaspi arvense L.	Field Penny-cress																		
Brassica sp.	Cabbages																		
Brassica/Sinapsis sp.	Mustard																		
Reseda lutea L.	Wild Mignonette																		

	Period	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Feature	Ditch	Pit	Pit	Ditch	Silt	Posthole	Gully	Gully	Ditch	Occup	Well	Burnt	Occup	Occup	Occup	Pit	Pit	Burnt
	Sample	6937	7068	7140	7232	7269	7539	7556	7557	7621	629	635	1429	1834	1838	1933	3098	3125	3225
	Context	11996	12678	12117	11111	12137	12843	11592	11592	12847	3580	3766	6676	3580	6810	3580	8368	8239	9012
	Sample volume/L	35	19	21.5	41	16	18	19	21	8	25	26.5	0.5	4	6	4	5	5	6
	Total items	199	601	73	319	58	19	33	95	52	69	15	14	14	12	16	20	20	17
	Density Items/L	5.7	31.6	3.4	7.8	3.6	1.1	1.7	4.5	6.5	2.8	0.6	28.0	3.5	2.0	4.0	4.0	4.0	2.8
Brassicaceae indet.	Cabbage family																		
cf. Brassicacae indet.	Cabbage family	1																	
Filipendula ulmaria (L.) Maxim.	Meadowsweet																		
Rubus Sect. *Glandulosus*	Bramble	1																	
cf. *Rubus* sp.	Brambles/Raspberries etc.																		
cf. Potentilla sp.	Cinqufoils																		
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil																		
Aphanes arvensis L.	Parsley-piert											1							
Lathyrus nissolia L.	Grass Vetchling		1																
Vicia/Lathyrys sp.	Vetches/Peas	7	29	3				1		1	1	1	3			1			
cf. *Vicia/Lathyrus* sp.	Vetches/Peas				1	1													
Medicago cf. *lupulina* L.	Black Medick																		
cf. *Medicago lupulina* L.	Black Medick				4						1								
Trifolium sp.	Clovers		4						1										
cf. *Trifolium* sp.	Clovers										1								
Medicago/Trifolium/Melilotus sp.	Medicks/Clovers/ Melilots	1	2			1			2										
Small *Trifolium/Lotus pedunctus*	Clovers/Greater Bird's-foot-trefoil		3						2										
Small legume indet.			1																
Linum catharticum L.	Fairy Flax																		
Apiaeceae indet.	Carrot family																		
Atropa belladonna L.	Deadly Nightshade								2										
Solanum nigrum L.	Black Nightshade																		
Solanum cf. *nigrum* L.	Black Nightshade																		
cf. *Lamium* sp.	Dead-Nettles			1															
Galeopsis tetrahit L.	Common Hemp-nettle		1																
Prunella vulgaris L.	Self Heal	1														1			
Plantago major L.	Greater Plantain																		
Plantago lanceolata L.	Ribwort Plantain	1		1															
Odontites vernus (Bellardi) Dumort.	Red Bartsia			1															
Euphrasia/Odontites sp.	Eyebright/Bartsia																		
Rhinanthus cf. *minor* L.	Yellow-rattle																		
Sherardia arvensis L.	Field Madder																		
Galium aparine L.	Cleavers	1	1																
Galium sp.	Bedstraws																		
Sambucus nigra L.	Elder																1		
Valernianella dentata (L.) Pollich.	Narrow-fruited Corn Salad																		
Carduus/Cirsium sp.	Thistles																		
cf. *Arctium* sp.	Burdocks																		
Leucanthemum vulgare Lam.	Oxeye Daisy																		

	Period	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Feature	Ditch	Pit	Pit	Ditch	Silt	Posthole	Gully	Gully	Ditch	Occup	Well	Burnt	Occup	Occup	Occup	Pit	Pit	Burnt
	Sample	6937	7068	7140	7232	7269	7539	7556	7557	7621	629	635	1429	1834	1838	1933	3098	3125	3225
	Context	11996	12678	12117	11111	12137	12843	11592	11592	12847	3580	3766	6676	3580	6810	3580	8368	8239	9012
	Sample volume/L	35	19	21.5	41	16	18	19	21	8	25	26.5	0.5	4	6	4	5	5	6
	Total items	199	601	73	319	58	19	33	95	52	69	15	14	14	12	16	20	20	17
	Density Items/L	5.7	31.6	3.4	7.8	3.6	1.1	1.7	4.5	6.5	2.8	0.6	28.0	3.5	2.0	4.0	4.0	4.0	2.8
Anthemis cotula L.	Stinking Mayweed																		
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed		2		1				1	1									
Juncus articulatus gp.	Creeping Rushes																		
Juncus indet.	Rushes																		
Luzula sp.	Wood-rushes													1					
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush	5	12	2	27	2			2	3					1		1		
Schoenoplectus lacustris (L.) Palla	Common Club-rush																		
Isolepis setacea (L.) R. Br.	Bristle Club-rush										1								
Carex sp.	Sedge	3	6	1	4	2				2	1								4
cf. *Carex* sp.	Sedge																		
Cyperaceae indet.	Sedge family											1							
cf. Cyperaceae indet.	Sedge family																		
Poaceae indet.	Grass family		11																
Poaceae indet. (large)	Grass family		16	2	7		1	1	10		1			1		2			4
Poaceae indet. (small)	Grass family	27	64	9	16	5	1	1	4	8	14	3				1	15		
Avena fatua/ludoviciana (grain in lemma)	Wild Oat																		
Avena sp.	Wild Oat	1	9		9				1	2									
cf. *Avena* sp.	Wild Oat	1	1																
Bromus cf. *secalinus* L.	Rye Brome	6	52		18	2	1		1	3	1								1
cf. *Bromus secalinus* L.	Rye Brome	3	1			2					1								
Bromus sp.	Bromes																		
cf. *Bromus/Avena* sp.	Bromes/Oat	4	78		9		1	3	6	1		1	2			4		2	
Iridaceae indet.	Iris family			1															
Seed indet.		18	67	16	21	16	5	6	20	11	13	4			2	2	2	3	4
Various																			
Corylus avellana L. (nut shell)	Hazel																		
Salix sp. (bud)	Willow																		
cf. *Agrostemma githago* L. (capsule frags)	Corncockle																		
Ericaceae indet. (seed capsules)	Heath family																		
Poaceae indet. (culm node)	Grass family																		
Cereal indet. (germinated coleoptile)	Cereal																		
Cereal indet. (coleoptile)	Cereal																		
Indet. (bud)		7	5	1	11					1				4	3		1		
Indet. (seed capsules)																			
Indet. (leaf abscission pads)											2								
Indet. (tubor)																			
Bread cf. *Triticum* sp.																			
Bread/dung																			
cf. Bread																			
Bread/porridge																			

Samples containg charred plant remains have been ordered by period and then sample n																			
Taxa have been ordered by cereal grain, cereal chaff, food plants and then wild plants, a																			
	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Feature	Levelling	Levelling	Pit	Occup	Posthole	Pit	Pit	Pit	Pit	Pit	Pit	Floor	Pit	Pit	Pit	Hearth	Floor	Pit
	Sample	3779	3864	4191	4631	4712	4976	4977	5117	5542	5622	5750	5762	5805	5991	6052	6109	6264	6299
	Context	8944	5236	10265	10164	11032	10730	10730	10755	11680	11687	11604	11878	10786	11681	10786	12663	11750	12009
	Sample volume/L	10	12	6	6	5	5	5.5	8	5	6	12	6	6	18	20.5	14	18.5	18
	Total items	2	5	19	75	7	5	11	20	284	515	23	24	34	1120	16	36	12	41
	Density Items/L	0.2	0.4	3.2	12.5	1.4	1.0	2.0	2.5	56.8	85.8	1.9	4.0	5.7	62.2	0.8	2.6	0.6	2.3
Cereal grain																			
Hordeum vulgare L. (hulled lateral)	Six-row Hulled Barley									2	7		3						1
Hordeum vulgare L. (lateral)	Six-row Barley										2		4						
Hordeum sp. (hulled)	Hulled Barley									6	11	2	11		1				
Hordeum sp. (hulled, cf. germinated)	Hulled Barley																		
Hordeum sp. (hulled, straight)																			
Hordeum sp. (straight)	Barley							1		1	5								
Hordeum sp. (straight, germinated)	Barley																		
Hordeum sp.	Barley		1	1	4					6	5		1		1			1	1
Hordeum sp. (cf. germinated)	Barley																		
cf. *Hordeum* sp.	Barley																		
Triticum spelta L.	Spelt				3	1				2	10				10		1		
Triticum spelta L. (grain in spikelet)	Spelt																		
Triticum spelta L. (germinated)	Spelt																		
Triticum spelta L. (cf. germinated)	Spelt																		
Triticum spelta/dicoccum	Spelt/Emmer				2					6	20	1			5		3		1
Triticum spelta/dicoccum (cf. germinated)	Spelt/Emmer																		
Triticum dicoccum Schübl.	Emmer																		
Triticum cf. *dicoccum* Schübl.	Emmer																		
Triticum spelta L. (short)	Spelt										1								
cf. *Triticum spelta* L. (short)	Spelt																		
Triticum sp. L.(short or free-threshing)	Wheat																		
Triticum sp. (short free-threshing)	Free-threshing Wheat																		
Triticum sp. cf. (free-threshing)	Free-threshing Wheat											2							
Triticum sp.	Wheat							2		1	1				12			1	
Secale cereale L.	Rye																		
cf. *Secale cereale* L.	Rye													1					
Cereal indet.	Cereal			1	4	1	1	1	4	33	61	2		5	12		7	1	6
Cereal chaff																			
Avena sp. (lemma)	Oat																		
Avena sp. (awn)	Oat																		
Avena fatua/ludoviciana (floret base)	Oat										1								
Hordeum vulgare L. (rachis)	Six-row Barley																		
Hordeum vulgare L. (lax-eared rachis)	Six-row Barley																		
Hordeum sp. (lax-eared rachis)	Barley										3								
Hordeum sp. (rachis)	Barley				1					2	5								
Hordeum sp. (lemma and palea)	Barley										1								
Secale/Hordeum (rachis)	Rye/Barley				3						3								

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Feature	Levelling	Levelling	Pit	Occup	Posthole	Pit	Pit	Pit	Pit	Pit	Pit	Floor	Pit	Pit	Pit	Hearth	Floor	Pit
	Sample	3779	3864	4191	4631	4712	4976	4977	5117	5542	5622	5750	5762	5805	5991	6052	6109	6264	6299
	Context	8944	5236	10265	10164	11032	10730	10730	10755	11680	11687	11604	11878	10786	11681	10786	12663	11750	12009
	Sample volume/L	10	12	6	6	5	5	5.5	8	5	6	12	6	6	18	20.5	14	18.5	18
	Total items	2	5	19	75	7	5	11	20	284	515	23	24	34	1120	16	36	12	41
	Density Items/L	0.2	0.4	3.2	12.5	1.4	1.0	2.0	2.5	56.8	85.8	1.9	4.0	5.7	62.2	0.8	2.6	0.6	2.3
Triticum dicoccum Schübl. (glume base)	Emmer																		2
Triticum cf. *dicoccum* Schübl. (glume base)	Emmer											1							
Triticum dicoccum Schübl. (spikelet base)	Emmer																		
Triticum spelta L. (glume base)	Spelt				2	2				3	8	1		3				2	1
Triticum spelta L. (spikelet base)	Spelt																		
Triticum spelta/dicoccum (glume base)	Spelt/Emmer				2					3	6	2		5		2			4
Triticum spelta/dicoccum (spikelet base)	Spelt/Emmer																		
Triticum spelta L. (rachis)	Spelt										6								
Triticum spelta L. (basal rachis)	Spelt																		
Triticum spelta/dicoccum (rachis)	Spelt/Emmer																		
Triticum sp. (free-threshing hexaploid rachis)	Free-threshing Wheat																		
Triticum sp. (free-threshing rachis)	Free-threshing Wheat																		
Triticum sp. (hexaploid rachis)	Wheat																		
Triticum sp. (hexaploid basal rachis)	Wheat																		
Triticum sp. (rachis)	Wheat																		
Triticum sp. (basal spikelet)	Wheat																		
Cereal indet. (free-threshing rachis)	Cereal																		
Cereal indet. (culm node)	Cereal					1													
Food plants																			
cf. *Brassica nigra* (L.) W.D.J. Koch	Black Mustard																		
Prunus domestica L.	Damson/Plum																		
Lens culinaris L.	Lentil	1																	
cf. *Lens culinaris* L.	Lentil	1																	
Vicia faba var. *minor* L.	Celtic Bean			1															
Pisum sativum/Vicia faba	Pea/Bean																		
cf. *Pisum sativum* L.	Garden Pea										1								
Vitis vinifera L.	Grape																		
Linum usitatissimum L.	Flax																	1	
Apium graveolens L.	Celery									1									
Carum carvi L.	Caraway																		
Olea europaea L.	Olive																		
cf. Nut cotyledons	Nut			2															
Wild plants																			
Ranunculus sardous Crantz	Hairy Buttercup																		
Ranunculus cf. *repens* L.	Creeping Buttercup																		
Ranunculus sp.	Buttercups																		
Ranunculus flammula L.	Lesser Spearwort																		
Ranunculus acris/repens/bulbosus	Meadow/Bulbosus Buttercups														15				
Ranunculus subg. *ranunculus*	Buttercups				1														
Papaver rhoeas type	Common Poppy																		

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Feature	Levelling	Levelling	Pit	Occup	Posthole	Pit	Pit	Pit	Pit	Pit	Pit	Floor	Pit	Pit	Pit	Hearth	Floor	Pit
	Sample	3779	3864	4191	4631	4712	4976	4977	5117	5542	5622	5750	5762	5805	5991	6052	6109	6264	6299
	Context	8944	5236	10265	10164	11032	10730	10730	10755	11680	11687	11604	11878	10786	11681	10786	12663	11750	12009
	Sample volume/L	10	12	6	6	5	5	5.5	8	5	6	12	6	6	18	20.5	14	18.5	18
	Total items	2	5	19	75	7	5	11	20	284	515	23	24	34	1120	16	36	12	41
	Density Items/L	0.2	0.4	3.2	12.5	1.4	1.0	2.0	2.5	56.8	85.8	1.9	4.0	5.7	62.2	0.8	2.6	0.6	2.3
Papaver somniferum L.	Opium Poppy																		
Fumaria sp.	Fumitories																		
Urtica urens L.	Small Nettle																		
Urtica dioica L.	Common Nettle									1							11		
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot																		
Chenopodium polyspermum L.	Many-seeded Goosefoot																		
Chenopodium album L.	Fat-hen									1					3				1
Chenopodium sp.	Goosefoots																		
Atriplex sp.	Oraches													1					
Chenopodiaceae indet.	Goosefoot family																		
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks				1					1									
Montia fontana ssp.	Blinks																		
Stellaria media gp. (L.) Vill.	Common Chickweed			1				1		1							1		1
Stellaria graminea L.	Lesser Stitchwort														3				
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear																		
Scleranthus annuus L.	Annual Knawel																		
Spergula arvensis L.	Corn Spurrey																		
Lychnis flos-cuculi L.	Ragged-Robin																		
Agrostemma githago L.	Corncockle																		
Silene noctiflora/nutans	Catchfly																		
Caryophallaceae indet.	Pink family														1				
Persicaria maculosa Gray	Redshank																		
Persicaria lapathifolia (L.) Gray	Pale Persicaria																		
Persicaria lapathifolia/maculosa	Pale Persicaria/Redshank																		
Persicaria sp.	Knotweeds																		
Persicaria hydropiper (L.) Spach	Water-pepper																		
Polygonum aviculare agg. L.	Knotgrass							1		5	1							2	
Fallopia convolvulus (L.) Á. Löve	Black-bindweed																		
Rumex acetosella agg. L.	Sheep's Sorrel			2		1				3	3				10		1		
Rumex sp. (not *acetosella)*	Docks			1	2	1				6	10			1	2	1	1		1
Polygonaceae indet.	Knotweed family									4									
Malva sylvestris L.	Common Mallow									1									
Malvaceae indet.	Mallow family									4									1
cf. *Viola* subg. *Melanium*	Wild Pansey etc.																		
cf. *Viola* subg. *Viola*	Common Violet etc.																		
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse		1																
Thlaspi arvense L.	Field Penny-cress																		
Brassica sp.	Cabbages									1									
Brassica/Sinapsis sp.	Mustard																		
Reseda lutea L.	Wild Mignonette														1				

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Feature	Levelling	Levelling	Pit	Occup	Posthole	Pit	Pit	Pit	Pit	Pit	Pit	Floor	Pit	Pit	Pit	Hearth	Floor	Pit
	Sample	3779	3864	4191	4631	4712	4976	4977	5117	5542	5622	5750	5762	5805	5991	6052	6109	6264	6299
	Context	8944	5236	10265	10164	11032	10730	10730	10755	11680	11687	11604	11878	10786	11681	10786	12663	11750	12009
	Sample volume/L	10	12	6	6	5	5	5.5	8	5	6	12	6	6	18	20.5	14	18.5	18
	Total items	2	5	19	75	7	5	11	20	284	515	23	24	34	1120	16	36	12	41
	Density Items/L	0.2	0.4	3.2	12.5	1.4	1.0	2.0	2.5	56.8	85.8	1.9	4.0	5.7	62.2	0.8	2.6	0.6	2.3
Brassicaceae indet.	Cabbage family									1	1								1
cf. Brassicacae indet.	Cabbage family																		
Filipendula ulmaria (L.) Maxim.	Meadowsweet																1		
Rubus Sect. *Glandulosus*	Bramble									1									
cf. *Rubus* sp.	Brambles/Raspberries etc.																		
cf. Potentilla sp.	Cinqufoils																		
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil																		
Aphanes arvensis L.	Parsley-piert																		
Lathyrus nissolia L.	Grass Vetchling																		
Vicia/Lathyrys sp.	Vetches/Peas			1	1						1		1				1		
cf. *Vicia/Lathyrus* sp.	Vetches/Peas																		
Medicago cf. *lupulina* L.	Black Medick									1									
cf. *Medicago lupulina* L.	Black Medick							1	3						1				
Trifolium sp.	Clovers										1				3				
cf. *Trifolium* sp.	Clovers			1	1				3					1					
Medicago/Trifolium/Melilotus sp.	Medicks/Clovers/ Melilots									2	2				5	1	2		
Small *Trifolium/Lotus pedunctus*	Clovers/Greater Bird's-foot-trefoil										1				6		1		
Small legume indet.																			
Linum catharticum L.	Fairy Flax								1	1									
Apiaeceae indet.	Carrot family																		
Atropa belladonna L.	Deadly Nightshade										2								
Solanum nigrum L.	Black Nightshade																		
Solanum cf. *nigrum* L.	Black Nightshade																		
cf. *Lamium* sp.	Dead-Nettles																		
Galeopsis tetrahit L.	Common Hemp-nettle																		
Prunella vulgaris L.	Self Heal																		
Plantago major L.	Greater Plantain									1									
Plantago lanceolata L.	Ribwort Plantain															1			1
Odontites vernus (Bellardi) Dumort.	Red Bartsia																		
Euphrasia/Odontites sp.	Eyebright/Bartsia																		
Rhinanthus cf. *minor* L.	Yellow-rattle																		
Sherardia arvensis L.	Field Madder																		
Galium aparine L.	Cleavers																		
Galium sp.	Bedstraws																		
Sambucus nigra L.	Elder													1	19	1			
Valernianella dentata (L.) Pollich.	Narrow-fruited Corn Salad																		
Carduus/Cirsium sp.	Thistles																		
cf. *Arctium* sp.	Burdocks																		
Leucanthemum vulgare Lam.	Oxeye Daisy																		

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Feature	Levelling	Levelling	Pit	Occup	Posthole	Pit	Pit	Pit	Pit	Pit	Pit	Floor	Pit	Pit	Pit	Hearth	Floor	Pit
	Sample	3779	3864	4191	4631	4712	4976	4977	5117	5542	5622	5750	5762	5805	5991	6052	6109	6264	6299
	Context	8944	5236	10265	10164	11032	10730	10730	10755	11680	11687	11604	11878	10786	11681	10786	12663	11750	12009
	Sample volume/L	10	12	6	6	5	5	5.5	8	5	6	12	6	6	18	20.5	14	18.5	18
	Total items	2	5	19	75	7	5	11	20	284	515	23	24	34	1120	16	36	12	41
	Density Items/L	0.2	0.4	3.2	12.5	1.4	1.0	2.0	2.5	56.8	85.8	1.9	4.0	5.7	62.2	0.8	2.6	0.6	2.3
Anthemis cotula L.	Stinking Mayweed																		
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed						1			1	5				5		1		
Juncus articulatus gp.	Creeping Rushes																		
Juncus indet.	Rushes																		
Luzula sp.	Wood-rushes																		
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush			1	1					2		1			6		1		4
Schoenoplectus lacustris (L.) Palla	Common Club-rush																		
Isolepis setacea (L.) R. Br.	Bristle Club-rush																		
Carex sp.	Sedge				2			1		2	1			1	1				
cf. *Carex* sp.	Sedge																		
Cyperaceae indet.	Sedge family														14				
cf. Cyperaceae indet.	Sedge family								1										
Poaceae indet.	Grass family		2							2	6	4							
Poaceae indet. (large)	Grass family			1						8	22			1	8	1			
Poaceae indet. (small)	Grass family			4	4		1	1		77	180			7	66	1		2	5
Avena fatua/ludoviciana (grain in lemma)	Wild Oat																		
Avena sp.	Wild Oat				2					12	14								1
cf. *Avena* sp.	Wild Oat									12			1	1					
Bromus cf. *secalinus* L.	Rye Brome				4			1	4	9	10				5				1
cf. *Bromus secalinus* L.	Rye Brome								2	3				1					
Bromus sp.	Bromes				1														
cf. *Bromus/Avena* sp.	Bromes/Oat		1	1	5				1		84				2	3	4		
Iridaceae indet.	Iris family																		
Seed indet.				1	11		2	1		53	8	4	3	3		4		2	8
Various																			
Corylus avellana L. (nut shell)	Hazel											1							
Salix sp. (bud)	Willow											1							
cf. *Agrostemma githago* L. (capsule frags)	Corncockle																		
Ericaceae indet. (seed capsules)	Heath family														902				
Poaceae indet. (culm node)	Grass family																		
Cereal indet. (germinated coleoptile)	Cereal																		
Cereal indet. (coleoptile)	Cereal																		
Indet. (bud)					4					2	3	1		2		1			
Indet. (seed capsules)					13				1										
Indet. (leaf abscission pads)					1														
Indet. (tubor)																			
Bread cf. *Triticum* sp.																			
Bread/dung											3								
cf. Bread															1				
Bread/porridge																			

Samples containg charred plant remains have been ordered by period and then sample n																			
Taxa have been ordered by cereal grain, cereal chaff, food plants and then wild plants, a																			
	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
	Feature	Pit	Pit	Pit	Occup	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Occup	Silt	Occup	Layer
	Sample	6311	6644	6767	6816	6868	6952	7388	7616	7668	7673	7703	8956	9078	9519	780	791	818	847
	Context	11927	12435	12461	12476	12461	12009	12009	12461	11604	11598	11611	13595	15033	14616	5123	5155	5606	5545
	Sample volume/L	15	15	19	16	19	16	17	14	45	27	39	5	39	18	9	10	10	29
	Total items	61	55	5	62	8	11	40	84	72	52	53	3293	11	19	171	16	186	55
	Density Items/L	4.1	3.7	0.3	3.9	0.4	0.7	2.4	6.0	1.6	1.9	1.4	658.6	0.3	1.1	19.0	1.6	18.6	1.9
Cereal grain																			
Hordeum vulgare L. (hulled lateral)	Six-row Hulled Barley	2			2											1		4	1
Hordeum vulgare L. (lateral)	Six-row Barley				1														
Hordeum sp. (hulled)	Hulled Barley				3	1		1	1			2				9		2	
Hordeum sp. (hulled, cf. germinated)	Hulled Barley												2						
Hordeum sp. (hulled, straight)																			1
Hordeum sp. (straight)	Barley	2			1				1	5						1		1	
Hordeum sp. (straight, germinated)	Barley												2						
Hordeum sp.	Barley									3	2	1		1		5		6	3
Hordeum sp. (cf. germinated)	Barley												3						
cf. *Hordeum* sp.	Barley																		
Triticum spelta L.	Spelt		1	1	1											1			1
Triticum spelta L. (grain in spikelet)	Spelt												2						
Triticum spelta L. (germinated)	Spelt												8						
Triticum spelta L. (cf. germinated)	Spelt												16						
Triticum spelta/dicoccum	Spelt/Emmer		1		1			5	2	5	1	2	2			1			
Triticum spelta/dicoccum (cf. germinated)	Spelt/Emmer												10						
Triticum dicoccum Schübl.	Emmer																		
Triticum cf. *dicoccum* Schübl.	Emmer																		
Triticum spelta L. (short)	Spelt																		
cf. *Triticum spelta* L. (short)	Spelt																		
Triticum sp. L.(short or free-threshing)	Wheat																		
Triticum sp. (short free-threshing)	Free-threshing Wheat																		
Triticum sp. cf. (free-threshing)	Free-threshing Wheat																		
Triticum sp.	Wheat		3											2					
Secale cereale L.	Rye																		
cf. *Secale cereale* L.	Rye																		
Cereal indet.	Cereal	4	5	1	9		2	5	4	6	1	2	107			12	4	10	4
Cereal chaff																			
Avena sp. (lemma)	Oat																		
Avena sp. (awn)	Oat												8						
Avena fatua/ludoviciana (floret base)	Oat												1						
Hordeum vulgare L. (rachis)	Six-row Barley																		
Hordeum vulgare L. (lax-eared rachis)	Six-row Barley												3						
Hordeum sp. (lax-eared rachis)	Barley																		
Hordeum sp. (rachis)	Barley	3			1						2		56						
Hordeum sp. (lemma and palea)	Barley																		
Secale/Hordeum (rachis)	Rye/Barley																		

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
	Feature	Pit	Pit	Pit	Occup	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Occup	Silt	Occup	Layer
	Sample	6311	6644	6767	6816	6868	6952	7388	7616	7668	7673	7703	8956	9078	9519	780	791	818	847
	Context	11927	12435	12461	12476	12461	12009	12009	12461	11604	11598	11611	13595	15033	14616	5123	5155	5606	5545
	Sample volume/L	15	15	19	16	19	16	17	14	45	27	39	5	39	18	9	10	10	29
	Total items	61	55	5	62	8	11	40	84	72	52	53	3293	11	19	171	16	186	55
	Density Items/L	4.1	3.7	0.3	3.9	0.4	0.7	2.4	6.0	1.6	1.9	1.4	658.6	0.3	1.1	19.0	1.6	18.6	1.9
Triticum dicoccum Schübl. (glume base)	Emmer											1							
Triticum cf. *dicoccum* Schübl. (glume base)	Emmer										2		3						
Triticum dicoccum Schübl. (spikelet base)	Emmer																		
Triticum spelta L. (glume base)	Spelt				1			4		3	8	2	743					3	
Triticum spelta L. (spikelet base)	Spelt												40						
Triticum spelta/dicoccum (glume base)	Spelt/Emmer	1			6			1	1	4	4	7	435						
Triticum spelta/dicoccum (spikelet base)	Spelt/Emmer												92						
Triticum spelta L. (rachis)	Spelt											2	177						
Triticum spelta L. (basal rachis)	Spelt												6						
Triticum spelta/dicoccum (rachis)	Spelt/Emmer												167						
Triticum sp. (free-threshing hexaploid rachis)	Free-threshing Wheat												1						
Triticum sp. (free-threshing rachis)	Free-threshing Wheat																		
Triticum sp. (hexaploid rachis)	Wheat																		
Triticum sp. (hexaploid basal rachis)	Wheat											1							
Triticum sp. (rachis)	Wheat												33						
Triticum sp. (basal spikelet)	Wheat																		
Cereal indet. (free-threshing rachis)	Cereal																		
Cereal indet. (culm node)	Cereal																		
Food plants																			
cf. *Brassica nigra* (L.) W.D.J. Koch	Black Mustard																		
Prunus domestica L.	Damson/Plum																		
Lens culinaris L.	Lentil																		
cf. *Lens culinaris* L.	Lentil																		
Vicia faba var. *minor* L.	Celtic Bean																		
Pisum sativum/Vicia faba	Pea/Bean																		
cf. *Pisum sativum* L.	Garden Pea														1				
Vitis vinifera L.	Grape																		
Linum usitatissimum L.	Flax								5			1							
Apium graveolens L.	Celery																		
Carum carvi L.	Caraway													1					
Olea europaea L.	Olive														3				
cf. Nut cotyledons	Nut																		
Wild plants																			
Ranunculus sardous Crantz	Hairy Buttercup												1						
Ranunculus cf. *repens* L.	Creeping Buttercup																		
Ranunculus sp.	Buttercups																	1	
Ranunculus flammula L.	Lesser Spearwort																		
Ranunculus acris/repens/bulbosus	Meadow/Bulbosus Buttercups														1	4			
Ranunculus subg. *ranunculus*	Buttercups																		
Papaver rhoeas type	Common Poppy																		

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
	Feature	Pit	Pit	Pit	Occup	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Occup	Silt	Occup	Layer
	Sample	6311	6644	6767	6816	6868	6952	7388	7616	7668	7673	7703	8956	9078	9519	780	791	818	847
	Context	11927	12435	12461	12476	12461	12009	12009	12461	11604	11598	11611	13595	15033	14616	5123	5155	5606	5545
	Sample volume/L	15	15	19	16	19	16	17	14	45	27	39	5	39	18	9	10	10	29
	Total items	61	55	5	62	8	11	40	84	72	52	53	3293	11	19	171	16	186	55
	Density Items/L	4.1	3.7	0.3	3.9	0.4	0.7	2.4	6.0	1.6	1.9	1.4	658.6	0.3	1.1	19.0	1.6	18.6	1.9
Papaver somniferum L.	Opium Poppy																		
Fumaria sp.	Fumitories																		
Urtica urens L.	Small Nettle																		
Urtica dioica L.	Common Nettle									1					1	4			
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot																		
Chenopodium polyspermum L.	Many-seeded Goosefoot																		
Chenopodium album L.	Fat-hen				1			2	1		1	1	1						
Chenopodium sp.	Goosefoots																		
Atriplex sp.	Oraches															1			
Chenopodiaceae indet.	Goosefoot family						2	1											
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks		1																
Montia fontana ssp.	Blinks																		
Stellaria media gp. (L.) Vill.	Common Chickweed							1								1			
Stellaria graminea L.	Lesser Stitchwort																		1
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear																		
Scleranthus annuus L.	Annual Knawel																		
Spergula arvensis L.	Corn Spurrey									1									
Lychnis flos-cuculi L.	Ragged-Robin																		
Agrostemma githago L.	Corncockle																		
Silene noctiflora/nutans	Catchfly	1																	
Caryophallaceae indet.	Pink family																		
Persicaria maculosa Gray	Redshank																		
Persicaria lapathifolia (L.) Gray	Pale Persicaria																		
Persicaria lapathifolia/maculosa	Pale Persicaria/Redshank																		
Persicaria sp.	Knotweeds																		
Persicaria hydropiper (L.) Spach	Water-pepper																		
Polygonum aviculare agg. L.	Knotgrass				8					1									
Fallopia convolvulus (L.) Á. Löve	Black-bindweed					1							1						
Rumex acetosella agg. L.	Sheep's Sorrel	1									1		2			5		5	
Rumex sp. (not *acetosella)*	Docks	1	2			1		1	1	1			11		1	4	1	9	2
Polygonaceae indet.	Knotweed family																		
Malva sylvestris L.	Common Mallow																		
Malvaceae indet.	Mallow family																		
cf. *Viola* subg. *Melanium*	Wild Pansey etc.																		
cf. *Viola* subg. *Viola*	Common Violet etc.																		
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse																		
Thlaspi arvense L.	Field Penny-cress									1									
Brassica sp.	Cabbages																		
Brassica/Sinapsis sp.	Mustard																		
Reseda lutea L.	Wild Mignonette																		

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
	Feature	Pit	Pit	Pit	Occup	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Occup	Silt	Occup	Layer
	Sample	6311	6644	6767	6816	6868	6952	7388	7616	7668	7673	7703	8956	9078	9519	780	791	818	847
	Context	11927	12435	12461	12476	12461	12009	12009	12461	11604	11598	11611	13595	15033	14616	5123	5155	5606	5545
	Sample volume/L	15	15	19	16	19	16	17	14	45	27	39	5	39	18	9	10	10	29
	Total items	61	55	5	62	8	11	40	84	72	52	53	3293	11	19	171	16	186	55
	Density Items/L	4.1	3.7	0.3	3.9	0.4	0.7	2.4	6.0	1.6	1.9	1.4	658.6	0.3	1.1	19.0	1.6	18.6	1.9
Brassicaceae indet.	Cabbage family																		
cf. Brassicacae indet.	Cabbage family																		
Filipendula ulmaria (L.) Maxim.	Meadowsweet								1										
Rubus Sect. *Glandulosus*	Bramble										1								
cf. *Rubus* sp.	Brambles/Raspberries etc.																		
cf. Potentilla sp.	Cinqufoils																		
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil								1										
Aphanes arvensis L.	Parsley-piert												2						
Lathyrus nissolia L.	Grass Vetchling																		
Vicia/Lathyrys sp.	Vetches/Peas				2										3			2	
cf. *Vicia/Lathyrus* sp.	Vetches/Peas																		
Medicago cf. *lupulina* L.	Black Medick																		
cf. *Medicago lupulina* L.	Black Medick								3									5	
Trifolium sp.	Clovers													1		6		4	
cf. *Trifolium* sp.	Clovers																		
Medicago/Trifolium/Melilotus sp.	Medicks/Clovers/ Melilots								8	1						4		7	
Small *Trifolium/Lotus pedunctus*	Clovers/Greater Bird's-foot-trefoil								1							4		3	
Small legume indet.									5							6		3	
Linum catharticum L.	Fairy Flax		1																
Apiaeceae indet.	Carrot family																		
Atropa belladonna L.	Deadly Nightshade																		
Solanum nigrum L.	Black Nightshade																		
Solanum cf. *nigrum* L.	Black Nightshade																		
cf. *Lamium* sp.	Dead-Nettles																		
Galeopsis tetrahit L.	Common Hemp-nettle																		
Prunella vulgaris L.	Self Heal															2		1	
Plantago major L.	Greater Plantain																		
Plantago lanceolata L.	Ribwort Plantain													4				4	
Odontites vernus (Bellardi) Dumort.	Red Bartsia															1		14	
Euphrasia/Odontites sp.	Eyebright/Bartsia																		
Rhinanthus cf. *minor* L.	Yellow-rattle								1							1		7	
Sherardia arvensis L.	Field Madder																		
Galium aparine L.	Cleavers								1		1								
Galium sp.	Bedstraws															1			
Sambucus nigra L.	Elder					2			1		1		1						
Valernianella dentata (L.) Pollich.	Narrow-fruited Corn Salad												2						
Carduus/Cirsium sp.	Thistles																		
cf. *Arctium* sp.	Burdocks																		
Leucanthemum vulgare Lam.	Oxeye Daisy																		

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
	Feature	Pit	Pit	Pit	Occup	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Occup	Silt	Occup	Layer
	Sample	6311	6644	6767	6816	6868	6952	7388	7616	7668	7673	7703	8956	9078	9519	780	791	818	847
	Context	11927	12435	12461	12476	12461	12009	12009	12461	11604	11598	11611	13595	15033	14616	5123	5155	5606	5545
	Sample volume/L	15	15	19	16	19	16	17	14	45	27	39	5	39	18	9	10	10	29
	Total items	61	55	5	62	8	11	40	84	72	52	53	3293	11	19	171	16	186	55
	Density Items/L	4.1	3.7	0.3	3.9	0.4	0.7	2.4	6.0	1.6	1.9	1.4	658.6	0.3	1.1	19.0	1.6	18.6	1.9
Anthemis cotula L.	Stinking Mayweed																		
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed		1							1	2		4					1	
Juncus articulatus gp.	Creeping Rushes																		
Juncus indet.	Rushes								1										
Luzula sp.	Wood-rushes																		
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush	1	2	1	2		1	2	1		3	1	6	1	3	17		15	6
Schoenoplectus lacustris (L.) Palla	Common Club-rush																8		
Isolepis setacea (L.) R. Br.	Bristle Club-rush																		
Carex sp.	Sedge		1						9	1			1		1	13		3	
cf. *Carex* sp.	Sedge																		
Cyperaceae indet.	Sedge family			1									1			1			18
cf. Cyperaceae indet.	Sedge family																		
Poaceae indet.	Grass family	16												1		2			4
Poaceae indet. (large)	Grass family		3						2	3		2	622			26		1	
Poaceae indet. (small)	Grass family	25	20		4	1	3	8	14	9	2	7	70		1	2		18	
Avena fatua/ludoviciana (grain in lemma)	Wild Oat												3						
Avena sp.	Wild Oat									3			6						
cf. *Avena* sp.	Wild Oat				1							1							
Bromus cf. *secalinus* L.	Rye Brome		5		1			2	3	2	1	3	152		1				
cf. *Bromus secalinus* L.	Rye Brome				1								52						
Bromus sp.	Bromes																		
cf. *Bromus/Avena* sp.	Bromes/Oat		7						2		4	3	457			2		3	
Iridaceae indet.	Iris family																		
Seed indet.		4			12	2	2	7	14	21	9	6	15		3	34	3	51	12
Various																			
Corylus avellana L. (nut shell)	Hazel																		
Salix sp. (bud)	Willow																		
cf. *Agrostemma githago* L. (capsule frags)	Corncockle												5						
Ericaceae indet. (seed capsules)	Heath family																		
Poaceae indet. (culm node)	Grass family																	1	
Cereal indet. (germinated coleoptile)	Cereal												2						
Cereal indet. (coleoptile)	Cereal		1																
Indet. (bud)			1		4		1				6	7	7					2	
Indet. (seed capsules)																			
Indet. (leaf abscission pads)				1															
Indet. (tubor)																			
Bread cf. *Triticum* sp.																			
Bread/dung												1							
cf. Bread																			
Bread/porridge																			

Samples containg charred plant remains have been ordered by period and then sample n																			
Taxa have been ordered by cereal grain, cereal chaff, food plants and then wild plants, a																			
	Period	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4
	Feature	Pit	Levelling	Occup	Pit	Posthole	Hearth	Hearth	Levelling	Hearth	Hearth	Burnt	Gully	Burnt	Silt	Occup	Burnt	Well	Pit
	Sample	856	973	1337	1428	1489	1533	1591	1681	1740	1858	1917	1925	2166	2216	2596	3365	324	643
	Context	5324	5743	6520	6682	6852	7114	6711	7137	6825	6936	7183	7867	8148	7181	7704	9507	2320	4041
	Sample volume/L	10	12	3.5	10	6	6	8	6	5	6	3	0.5	5	6.5	4	4	6	18
	Total items	35	16	13	564	9	39	34	288	3541	42	84	20	8	10	39	21	55	20
	Density Items/L	3.5	1.3	3.7	56.4	1.5	6.5	4.3	48.0	708.2	7.0	28.0	40.0	1.6	1.5	9.8	5.3	9.2	1.1
Cereal grain																			
Hordeum vulgare L. (hulled lateral)	Six-row Hulled Barley				2					1								1	
Hordeum vulgare L. (lateral)	Six-row Barley									1									
Hordeum sp. (hulled)	Hulled Barley	3			4					4						1			
Hordeum sp. (hulled, cf. germinated)	Hulled Barley																		
Hordeum sp. (hulled, straight)																			
Hordeum sp. (straight)	Barley				2					1	1								
Hordeum sp. (straight, germinated)	Barley																		
Hordeum sp.	Barley				4			1		6					1				
Hordeum sp. (cf. germinated)	Barley																		
cf. *Hordeum* sp.	Barley																		
Triticum spelta L.	Spelt	2						2		295									
Triticum spelta L. (grain in spikelet)	Spelt																		
Triticum spelta L. (germinated)	Spelt									4									
Triticum spelta L. (cf. germinated)	Spelt																		
Triticum spelta/dicoccum	Spelt/Emmer	1		1				9		148	2			1					
Triticum spelta/dicoccum (cf. germinated)	Spelt/Emmer																		
Triticum dicoccum Schübl.	Emmer									3									
Triticum cf. *dicoccum* Schübl.	Emmer																		
Triticum spelta L. (short)	Spelt																		
cf. *Triticum spelta* L. (short)	Spelt									10									
Triticum sp. L.(short or free-threshing)	Wheat	1								1									
Triticum sp. (short free-threshing)	Free-threshing Wheat			3						1		1							
Triticum sp. cf. (free-threshing)	Free-threshing Wheat																		
Triticum sp.	Wheat			2						26									
Secale cereale L.	Rye							1											
cf. *Secale cereale* L.	Rye																		
Cereal indet.	Cereal	12	1	1	4			7		520	2			2					
Cereal chaff																			
Avena sp. (lemma)	Oat																		
Avena sp. (awn)	Oat																		
Avena fatua/ludoviciana (floret base)	Oat																		
Hordeum vulgare L. (rachis)	Six-row Barley																		
Hordeum vulgare L. (lax-eared rachis)	Six-row Barley																		
Hordeum sp. (lax-eared rachis)	Barley																		
Hordeum sp. (rachis)	Barley																		
Hordeum sp. (lemma and palea)	Barley																		
Secale/Hordeum (rachis)	Rye/Barley																		

	Period	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4
	Feature	Pit	Levelling	Occup	Pit	Posthole	Hearth	Hearth	Levelling	Hearth	Hearth	Burnt	Gully	Burnt	Silt	Occup	Burnt	Well	Pit
	Sample	856	973	1337	1428	1489	1533	1591	1681	1740	1858	1917	1925	2166	2216	2596	3365	324	643
	Context	5324	5743	6520	6682	6852	7114	6711	7137	6825	6936	7183	7867	8148	7181	7704	9507	2320	4041
	Sample volume/L	10	12	3.5	10	6	6	8	6	5	6	3	0.5	5	6.5	4	4	6	18
	Total items	35	16	13	564	9	39	34	288	3541	42	84	20	8	10	39	21	55	20
	Density Items/L	3.5	1.3	3.7	56.4	1.5	6.5	4.3	48.0	708.2	7.0	28.0	40.0	1.6	1.5	9.8	5.3	9.2	1.1
Triticum dicoccum Schübl. (glume base)	Emmer																		
Triticum cf. *dicoccum* Schübl. (glume base)	Emmer																		
Triticum dicoccum Schübl. (spikelet base)	Emmer																		
Triticum spelta L. (glume base)	Spelt				1			7		706						1		6	
Triticum spelta L. (spikelet base)	Spelt									40									
Triticum spelta/dicoccum (glume base)	Spelt/Emmer							2		676			4		2			5	
Triticum spelta/dicoccum (spikelet base)	Spelt/Emmer									66									
Triticum spelta L. (rachis)	Spelt																		
Triticum spelta L. (basal rachis)	Spelt																		
Triticum spelta/dicoccum (rachis)	Spelt/Emmer																		
Triticum sp. (free-threshing hexaploid rachis)	Free-threshing Wheat																		
Triticum sp. (free-threshing rachis)	Free-threshing Wheat																		
Triticum sp. (hexaploid rachis)	Wheat																		
Triticum sp. (hexaploid basal rachis)	Wheat																		
Triticum sp. (rachis)	Wheat																		
Triticum sp. (basal spikelet)	Wheat																		
Cereal indet. (free-threshing rachis)	Cereal																		
Cereal indet. (culm node)	Cereal																	4	
Food plants																			
cf. *Brassica nigra* (L.) W.D.J. Koch	Black Mustard																		
Prunus domestica L.	Damson/Plum												1						
Lens culinaris L.	Lentil																		
cf. *Lens culinaris* L.	Lentil																		
Vicia faba var. *minor* L.	Celtic Bean																		
Pisum sativum/Vicia faba	Pea/Bean								1										
cf. *Pisum sativum* L.	Garden Pea																		
Vitis vinifera L.	Grape																		
Linum usitatissimum L.	Flax																		
Apium graveolens L.	Celery																		
Carum carvi L.	Caraway																		
Olea europaea L.	Olive																		
cf. Nut cotyledons	Nut																		
Wild plants																			
Ranunculus sardous Crantz	Hairy Buttercup																		
Ranunculus cf. *repens* L.	Creeping Buttercup																		
Ranunculus sp.	Buttercups																		
Ranunculus flammula L.	Lesser Spearwort																1		
Ranunculus acris/repens/bulbosus	Meadow/Bulbosus Buttercups				13								2						
Ranunculus subg. *ranunculus*	Buttercups																	6	
Papaver rhoeas type	Common Poppy									2									

	Period	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4
	Feature	Pit	Levelling	Occup	Pit	Posthole	Hearth	Hearth	Levelling	Hearth	Hearth	Burnt	Gully	Burnt	Silt	Occup	Burnt	Well	Pit
	Sample	856	973	1337	1428	1489	1533	1591	1681	1740	1858	1917	1925	2166	2216	2596	3365	324	643
	Context	5324	5743	6520	6682	6852	7114	6711	7137	6825	6936	7183	7867	8148	7181	7704	9507	2320	4041
	Sample volume/L	10	12	3.5	10	6	6	8	6	5	6	3	0.5	5	6.5	4	4	6	18
	Total items	35	16	13	564	9	39	34	288	3541	42	84	20	8	10	39	21	55	20
	Density Items/L	3.5	1.3	3.7	56.4	1.5	6.5	4.3	48.0	708.2	7.0	28.0	40.0	1.6	1.5	9.8	5.3	9.2	1.1
Papaver somniferum L.	Opium Poppy									2									
Fumaria sp.	Fumitories								1										
Urtica urens L.	Small Nettle																		
Urtica dioica L.	Common Nettle		1						2		1								
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot								1										
Chenopodium polyspermum L.	Many-seeded Goosefoot											1							
Chenopodium album L.	Fat-hen				1		19		42	1		4	2						
Chenopodium sp.	Goosefoots																		
Atriplex sp.	Oraches							1	21				1				1		
Chenopodiaceae indet.	Goosefoot family					1	9		133			10					1		
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks								2			1	1						
Montia fontana ssp.	Blinks												1						
Stellaria media gp. (L.) Vill.	Common Chickweed				1							5							
Stellaria graminea L.	Lesser Stitchwort																		
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear																		
Scleranthus annuus L.	Annual Knawel									3									
Spergula arvensis L.	Corn Spurrey				2														
Lychnis flos-cuculi L.	Ragged-Robin																		
Agrostemma githago L.	Corncockle																		
Silene noctiflora/nutans	Catchfly																		
Caryophallaceae indet.	Pink family																		
Persicaria maculosa Gray	Redshank																		
Persicaria lapathifolia (L.) Gray	Pale Persicaria																		
Persicaria lapathifolia/maculosa	Pale Persicaria/Redshank																		
Persicaria sp.	Knotweeds																		
Persicaria hydropiper (L.) Spach	Water-pepper																		
Polygonum aviculare agg. L.	Knotgrass				1	1	1			28							2		
Fallopia convolvulus (L.) Á. Löve	Black-bindweed								2										
Rumex acetosella agg. L.	Sheep's Sorrel				7		8		25	2		2	1				4	1	
Rumex sp. (not *acetosella)*	Docks	4	1		270					8				2		2		3	
Polygonaceae indet.	Knotweed family																		
Malva sylvestris L.	Common Mallow																		
Malvaceae indet.	Mallow family																		
cf. *Viola* subg. *Melanium*	Wild Pansey etc.																		
cf. *Viola* subg. *Viola*	Common Violet etc.																		
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse																		
Thlaspi arvense L.	Field Penny-cress																		
Brassica sp.	Cabbages																		
Brassica/Sinapsis sp.	Mustard																		
Reseda lutea L.	Wild Mignonette																		

	Period	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4
	Feature	Pit	Levelling	Occup	Pit	Posthole	Hearth	Hearth	Levelling	Hearth	Hearth	Burnt	Gully	Burnt	Silt	Occup	Burnt	Well	Pit
	Sample	856	973	1337	1428	1489	1533	1591	1681	1740	1858	1917	1925	2166	2216	2596	3365	324	643
	Context	5324	5743	6520	6682	6852	7114	6711	7137	6825	6936	7183	7867	8148	7181	7704	9507	2320	4041
	Sample volume/L	10	12	3.5	10	6	6	8	6	5	6	3	0.5	5	6.5	4	4	6	18
	Total items	35	16	13	564	9	39	34	288	3541	42	84	20	8	10	39	21	55	20
	Density Items/L	3.5	1.3	3.7	56.4	1.5	6.5	4.3	48.0	708.2	7.0	28.0	40.0	1.6	1.5	9.8	5.3	9.2	1.1
Brassicaceae indet.	Cabbage family																		
cf. Brassicacae indet.	Cabbage family																		
Filipendula ulmaria (L.) Maxim.	Meadowsweet																		
Rubus Sect. *Glandulosus*	Bramble				1	1													
cf. *Rubus* sp.	Brambles/Raspberries etc.																		
cf. Potentilla sp.	Cinqufoils																		
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil																		
Aphanes arvensis L.	Parsley-piert																		
Lathyrus nissolia L.	Grass Vetchling															1			
Vicia/Lathyrys sp.	Vetches/Peas		2		6				1	19						29			
cf. *Vicia/Lathyrus* sp.	Vetches/Peas																		
Medicago cf. *lupulina* L.	Black Medick				1														
cf. *Medicago lupulina* L.	Black Medick	1			7														
Trifolium sp.	Clovers				8														
cf. *Trifolium* sp.	Clovers																	2	6
Medicago/Trifolium/Melilotus sp.	Medicks/Clovers/ Melilots				17														
Small *Trifolium/Lotus pedunctus*	Clovers/Greater Bird's-foot-trefoil				18														
Small legume indet.					6														
Linum catharticum L.	Fairy Flax				1				1									1	
Apiaeceae indet.	Carrot family																		
Atropa belladonna L.	Deadly Nightshade																		
Solanum nigrum L.	Black Nightshade																		
Solanum cf. *nigrum* L.	Black Nightshade									3									
cf. *Lamium* sp.	Dead-Nettles																		
Galeopsis tetrahit L.	Common Hemp-nettle																		
Prunella vulgaris L.	Self Heal				2				1									1	
Plantago major L.	Greater Plantain																		
Plantago lanceolata L.	Ribwort Plantain																		
Odontites vernus (Bellardi) Dumort.	Red Bartsia																		
Euphrasia/Odontites sp.	Eyebright/Bartsia																		
Rhinanthus cf. *minor* L.	Yellow-rattle																		
Sherardia arvensis L.	Field Madder				1														
Galium aparine L.	Cleavers				2														1
Galium sp.	Bedstraws																		
Sambucus nigra L.	Elder				9					2		3	3						
Valernianella dentata (L.) Pollich.	Narrow-fruited Corn Salad											1							
Carduus/Cirsium sp.	Thistles												2						
cf. *Arctium* sp.	Burdocks																		
Leucanthemum vulgare Lam.	Oxeye Daisy																		1

	Period	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4
	Feature	Pit	Levelling	Occup	Pit	Posthole	Hearth	Hearth	Levelling	Hearth	Hearth	Burnt	Gully	Burnt	Silt	Occup	Burnt	Well	Pit
	Sample	856	973	1337	1428	1489	1533	1591	1681	1740	1858	1917	1925	2166	2216	2596	3365	324	643
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	Sample volume/L	10	12	3.5	10	6	6	8	6	5	6	3	0.5	5	6.5	4	4	6	18
	Total items	35	16	13	564	9	39	34	288	3541	42	84	20	8	10	39	21	55	20
	Density Items/L	3.5	1.3	3.7	56.4	1.5	6.5	4.3	48.0	708.2	7.0	28.0	40.0	1.6	1.5	9.8	5.3	9.2	1.1
Anthemis cotula L.	Stinking Mayweed																		
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed				3					28			1						
Juncus articulatus gp.	Creeping Rushes																		
Juncus indet.	Rushes																		
Luzula sp.	Wood-rushes																		
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush	5			85		1		1		14	21	1		1		1	3	
Schoenoplectus lacustris (L.) Palla	Common Club-rush																		
Isolepis setacea (L.) R. Br.	Bristle Club-rush																		
Carex sp.	Sedge			1	8				5	3	4	10					4	10	2
cf. *Carex* sp.	Sedge																		
Cyperaceae indet.	Sedge family																	3	
cf. Cyperaceae indet.	Sedge family																		
Poaceae indet.	Grass family	2		1	8					95								2	
Poaceae indet. (large)	Grass family		1		3	1				135	1								
Poaceae indet. (small)	Grass family		3		28	2			7	366	1	5			1	2	1		
Avena fatua/ludoviciana (grain in lemma)	Wild Oat																		
Avena sp.	Wild Oat																		
cf. *Avena* sp.	Wild Oat									10									
Bromus cf. *secalinus* L.	Rye Brome			1						120					1				
cf. *Bromus secalinus* L.	Rye Brome									43									
Bromus sp.	Bromes																		
cf. *Bromus/Avena* sp.	Bromes/Oat					1		2		102					1				
Iridaceae indet.	Iris family																		
Seed indet.		3	7	3	37	2	1	1	42	60	12	20			3	2	5	7	10
Various																			
Corylus avellana L. (nut shell)	Hazel				1														
Salix sp. (bud)	Willow																		
cf. *Agrostemma githago* L. (capsule frags)	Corncockle																		
Ericaceae indet. (seed capsules)	Heath family																		
Poaceae indet. (culm node)	Grass family																		
Cereal indet. (germinated coleoptile)	Cereal																		
Cereal indet. (coleoptile)	Cereal																		
Indet. (bud)																1	1		
Indet. (seed capsules)																			
Indet. (leaf abscission pads)																			
Indet. (tubor)																			
Bread cf. *Triticum* sp.								1											
Bread/dung																			
cf. Bread																			
Bread/porridge											4			3					

Samples containg charred plant remains have been ordered by period and then sample n						
Taxa have been ordered by cereal grain, cereal chaff, food plants and then wild plants, a						
	Period	5	5	5	5	5
	Feature	Pit	Pit	Pit	Pit	Pit
	Sample	99	315	374	378	392
	Context	1624	2385	2699	2686	2913
	Sample volume/L	33	12	23	25	31
	Total items					
	Density Items/L					
Cereal grain						
Hordeum vulgare L. (hulled lateral)	Six-row Hulled Barley		2			
Hordeum vulgare L. (lateral)	Six-row Barley					
Hordeum sp. (hulled)	Hulled Barley					1
Hordeum sp. (hulled, cf. germinated)	Hulled Barley					
Hordeum sp. (hulled, straight)						
Hordeum sp. (straight)	Barley					
Hordeum sp. (straight, germinated)	Barley					
Hordeum sp.	Barley		1			
Hordeum sp. (cf. germinated)	Barley					
cf. *Hordeum* sp.	Barley					
Triticum spelta L.	Spelt	1			2	6
Triticum spelta L. (grain in spikelet)	Spelt					
Triticum spelta L. (germinated)	Spelt					
Triticum spelta L. (cf. germinated)	Spelt					
Triticum spelta/dicoccum	Spelt/Emmer				1	3
Triticum spelta/dicoccum (cf. germinated)	Spelt/Emmer					
Triticum dicoccum Schübl.	Emmer					
Triticum cf. *dicoccum* Schübl.	Emmer					
Triticum spelta L. (short)	Spelt					
cf. *Triticum spelta* L. (short)	Spelt					
Triticum sp. L.(short or free-threshing)	Wheat					
Triticum sp. (short free-threshing)	Free-threshing Wheat					
Triticum sp. cf. (free-threshing)	Free-threshing Wheat					
Triticum sp.	Wheat				4	16
Secale cereale L.	Rye					
cf. *Secale cereale* L.	Rye					
Cereal indet.	Cereal	2	6		5	18
Cereal chaff						
Avena sp. (lemma)	Oat					
Avena sp. (awn)	Oat					
Avena fatua/ludoviciana (floret base)	Oat					
Hordeum vulgare L. (rachis)	Six-row Barley					
Hordeum vulgare L. (lax-eared rachis)	Six-row Barley					
Hordeum sp. (lax-eared rachis)	Barley					
Hordeum sp. (rachis)	Barley					
Hordeum sp. (lemma and palea)	Barley					
Secale/Hordeum (rachis)	Rye/Barley					

	Period	5	5	5	5	5
	Feature	Pit	Pit	Pit	Pit	Pit
	Sample	99	315	374	378	392
	Context	1624	2385	2699	2686	2913
	Sample volume/L	33	12	23	25	31
	Total items					
	Density Items/L					
Triticum dicoccum Schübl. (glume base)	Emmer					
Triticum cf. *dicoccum* Schübl. (glume base)	Emmer					
Triticum dicoccum Schübl. (spikelet base)	Emmer					
Triticum spelta L. (glume base)	Spelt		2		3	6
Triticum spelta L. (spikelet base)	Spelt					
Triticum spelta/dicoccum (glume base)	Spelt/Emmer		1			7
Triticum spelta/dicoccum (spikelet base)	Spelt/Emmer					
Triticum spelta L. (rachis)	Spelt					1
Triticum spelta L. (basal rachis)	Spelt					
Triticum spelta/dicoccum (rachis)	Spelt/Emmer					
Triticum sp. (free-threshing hexaploid rachis)	Free-threshing Wheat					
Triticum sp. (free-threshing rachis)	Free-threshing Wheat					
Triticum sp. (hexaploid rachis)	Wheat					
Triticum sp. (hexaploid basal rachis)	Wheat					
Triticum sp. (rachis)	Wheat					
Triticum sp. (basal spikelet)	Wheat					
Cereal indet. (free-threshing rachis)	Cereal					
Cereal indet. (culm node)	Cereal					
Food plants						
cf. *Brassica nigra* (L.) W.D.J. Koch	Black Mustard					
Prunus domestica L.	Damson/Plum					
Lens culinaris L.	Lentil					
cf. *Lens culinaris* L.	Lentil					
Vicia faba var. *minor* L.	Celtic Bean					
Pisum sativum/Vicia faba	Pea/Bean					
cf. *Pisum sativum* L.	Garden Pea					
Vitis vinifera L.	Grape		1			
Linum usitatissimum L.	Flax					
Apium graveolens L.	Celery					
Carum carvi L.	Caraway					
Olea europaea L.	Olive					
cf. Nut cotyledons	Nut					
Wild plants						
Ranunculus sardous Crantz	Hairy Buttercup					
Ranunculus cf. *repens* L.	Creeping Buttercup					
Ranunculus sp.	Buttercups					
Ranunculus flammula L.	Lesser Spearwort					1
Ranunculus acris/repens/bulbosus	Meadow/Bulbosus Buttercups					
Ranunculus subg. *ranunculus*	Buttercups					
Papaver rhoeas type	Common Poppy					

	Period	5	5	5	5	5
	Feature	Pit	Pit	Pit	Pit	Pit
	Sample	99	315	374	378	392
	Context	1624	2385	2699	2686	2913
	Sample volume/L	33	12	23	25	31
	Total items					
	Density Items/L					
Papaver somniferum L.	Opium Poppy					
Fumaria sp.	Fumitories					
Urtica urens L.	Small Nettle					
Urtica dioica L.	Common Nettle		1			
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot					
Chenopodium polyspermum L.	Many-seeded Goosefoot					
Chenopodium album L.	Fat-hen					
Chenopodium sp.	Goosefoots					
Atriplex sp.	Oraches		2			1
Chenopodiaceae indet.	Goosefoot family					
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks					
Montia fontana ssp.	Blinks					
Stellaria media gp. (L.) Vill.	Common Chickweed					
Stellaria graminea L.	Lesser Stitchwort					
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear					
Scleranthus annuus L.	Annual Knawel					
Spergula arvensis L.	Corn Spurrey		81			
Lychnis flos-cuculi L.	Ragged-Robin					
Agrostemma githago L.	Corncockle		1			
Silene noctiflora/nutans	Catchfly					
Caryophallaceae indet.	Pink family					
Persicaria maculosa Gray	Redshank					
Persicaria lapathifolia (L.) Gray	Pale Persicaria					
Persicaria lapathifolia/maculosa	Pale Persicaria/Redshank					
Persicaria sp.	Knotweeds					
Persicaria hydropiper (L.) Spach	Water-pepper					
Polygonum aviculare agg. L.	Knotgrass					
Fallopia convolvulus (L.) Á. Löve	Black-bindweed					
Rumex acetosella agg. L.	Sheep's Sorrel		1			
Rumex sp. (not *acetosella)*	Docks		2			
Polygonaceae indet.	Knotweed family					
Malva sylvestris L.	Common Mallow					
Malvaceae indet.	Mallow family					
cf. *Viola* subg. *Melanium*	Wild Pansey etc.					
cf. *Viola* subg. *Viola*	Common Violet etc.					
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse					
Thlaspi arvense L.	Field Penny-cress					
Brassica sp.	Cabbages					
Brassica/Sinapsis sp.	Mustard			16		1
Reseda lutea L.	Wild Mignonette					

	Period	5	5	5	5	5
	Feature	Pit	Pit	Pit	Pit	Pit
	Sample	99	315	374	378	392
	Context	1624	2385	2699	2686	2913
	Sample volume/L	33	12	23	25	31
	Total items					
	Density Items/L					
Brassicaceae indet.	Cabbage family					1
cf. Brassicacae indet.	Cabbage family					
Filipendula ulmaria (L.) Maxim.	Meadowsweet					
Rubus Sect. *Glandulosus*	Bramble					
cf. *Rubus* sp.	Brambles/Raspberries etc.					
cf. Potentilla sp.	Cinqufoils					
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil					
Aphanes arvensis L.	Parsley-piert					
Lathyrus nissolia L.	Grass Vetchling					
Vicia/Lathyrys sp.	Vetches/Peas				1	
cf. *Vicia/Lathyrus* sp.	Vetches/Peas					
Medicago cf. *lupulina* L.	Black Medick					
cf. *Medicago lupulina* L.	Black Medick	1	1			
Trifolium sp.	Clovers					
cf. *Trifolium* sp.	Clovers					
Medicago/Trifolium/Melilotus sp.	Medicks/Clovers/ Melilots					
Small *Trifolium/Lotus pedunctus*	Clovers/Greater Bird's-foot-trefoil					
Small legume indet.						
Linum catharticum L.	Fairy Flax					
Apiaeceae indet.	Carrot family					
Atropa belladonna L.	Deadly Nightshade					
Solanum nigrum L.	Black Nightshade					
Solanum cf. *nigrum* L.	Black Nightshade					
cf. *Lamium* sp.	Dead-Nettles					
Galeopsis tetrahit L.	Common Hemp-nettle					
Prunella vulgaris L.	Self Heal					
Plantago major L.	Greater Plantain					
Plantago lanceolata L.	Ribwort Plantain					
Odontites vernus (Bellardi) Dumort.	Red Bartsia					
Euphrasia/Odontites sp.	Eyebright/Bartsia					
Rhinanthus cf. *minor* L.	Yellow-rattle					
Sherardia arvensis L.	Field Madder					
Galium aparine L.	Cleavers					
Galium sp.	Bedstraws					1
Sambucus nigra L.	Elder					
Valernianella dentata (L.) Pollich.	Narrow-fruited Corn Salad					
Carduus/Cirsium sp.	Thistles					
cf. *Arctium* sp.	Burdocks					
Leucanthemum vulgare Lam.	Oxeye Daisy					

	Period	5	5	5	5	5
	Feature	Pit	Pit	Pit	Pit	Pit
	Sample	99	315	374	378	392
	Context	1624	2385	2699	2686	2913
	Sample volume/L	33	12	23	25	31
	Total items					
	Density Items/L					
Anthemis cotula L.	Stinking Mayweed		1			
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed					
Juncus articulatus gp.	Creeping Rushes					
Juncus indet.	Rushes					
Luzula sp.	Wood-rushes					
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush		2			
Schoenoplectus lacustris (L.) Palla	Common Club-rush					
Isolepis setacea (L.) R. Br.	Bristle Club-rush					
Carex sp.	Sedge				1	
cf. *Carex* sp.	Sedge					
Cyperaceae indet.	Sedge family					
cf. Cyperaceae indet.	Sedge family					
Poaceae indet.	Grass family	1	3		1	10
Poaceae indet. (large)	Grass family					
Poaceae indet. (small)	Grass family					
Avena fatua/ludoviciana (grain in lemma)	Wild Oat					
Avena sp.	Wild Oat					
cf. *Avena* sp.	Wild Oat					
Bromus cf. *secalinus* L.	Rye Brome	38			13	9
cf. *Bromus secalinus* L.	Rye Brome				12	22
Bromus sp.	Bromes					
cf. *Bromus/Avena* sp.	Bromes/Oat					
Iridaceae indet.	Iris family					
Seed indet.		1	5	5	3	4
Various						
Corylus avellana L. (nut shell)	Hazel					1
Salix sp. (bud)	Willow					
cf. *Agrostemma githago* L. (capsule frags)	Corncockle					
Ericaceae indet. (seed capsules)	Heath family					
Poaceae indet. (culm node)	Grass family					
Cereal indet. (germinated coleoptile)	Cereal					
Cereal indet. (coleoptile)	Cereal					
Indet. (bud)						
Indet. (seed capsules)						
Indet. (leaf abscission pads)						
Indet. (tubor)						
Bread cf. *Triticum* sp.						
Bread/dung						
cf. Bread						
Bread/porridge						

	Period	1	1	1	1	1	1	1	2
	Feature	Well	Well	Well	Well	Well	Well	Well	Pit
	Sample	2304	9078	9078	9078	9078	9078	9078	857
	Context	8059	15033	15033	15033	15033	15033	15033	5276
	Sample volume/L	10	39	39	39	39	39	39	4
	Total items	17	127	199	467	283	3	34778	840
	Density items/L	1.7	3.3	5.1	12.0	7.3	0.1	891.2	210.0
	Size Fraction	-	>4mm	2-4mm	1-2mm	0.5-1mm	Flot	Corrected	-
	Portion sorted	All	All	1/8	1/32	1/64	All	-	All
Cereals									
Triticum spelta L. (single grain spikelet)	Spelt			1				8	
Triticum spelta L. (spikelet)	Spelt								2
Triticum spelta L. (glume)	Spelt								
Triticum cf. *spelta* L.	Spelt								4
*Triticum spelta/dicoccum (*grain)	Spelt/Emmer	1							
Triticum spelta/dicoccum (single grain spikelet)	Spelt/Emmer		1					1	
Triticum spelta/dicoccum double grain spikelet)	Spelt/Emmer								2
Triticum cf. *dicoccum* Schübl. (grain)	Emmer wheat								
Triticum sp. (grain)	Wheat				1			32	5
Hordeum vulgare L. (hulled lateral grain)	Six-row Hulled Barley		1					1	1
Hordeum sp. (hulled median grain)	Hulled Barley								
Hordeum sp. (hulled grain)	Hulled Barley								1
Cereal indet. (hulled grain)			1	8				65	56
Cereal indet. (grain)				12	2			160	21
Food plants									
Morus nigra L.	Black Mulberry				2		1	65	
Ficus carica L.	Fig			3	99	61		7096	55
Prunus domestica L.	Damson/Plum			1				8	
Prunus cf. *domestica* L.	Damson/Plum								
cf. *Prunus domestica* L.	Damson/Plum		1					1	
Prunus avium (L.) L.	Sweet Cherry								
Prunus cf. *avium* (L.) L.	Sweet Cherry								1
cf. *Prunus avium* (L.) L.	Sweet Cherry								
Prunus sp.	Cherry/Damson/Plum	6	84	33				348	46
Pyrus/Malus sp.	Pear/Apple	7	2	15				122	
cf. *Pyrus/Malus* sp.	Pear/Apple				2			64	
cf. *Pyrus/Malus* sp. (embryo)	Pear/Apple		2	2	1			50	
cf. *Malus* sp. (skin)	Apple								
Lens culinaris Medik.	Lentil	1	2	6				50	1
cf. *Lens culinaris* Medik.	Lentil			4				32	1
Pisum sativum L.	Pea		1	1				9	6
cf. *Pisum sativum* L.	Pea								56
Vicia faba L.	Celtic Bean								
Vicia faba/Pisum sativum	Celtic Bean/Pea		8	4				40	
Vitis vinifera L.	Grape								3
Linum usitatissimum L.	Flax				1			32	
Coriandrum sativum L.	Coriander		1	1	1		1	42	6
cf. *Coriandrum sativum* L.	Coriander				1			32	4
Anethum graveolens L.	Dill				6			192	5
cf. *Anethum graveolens* L.	Dill			3	10			344	23
Apium graveolens L.	Celery			2	22	33		2832	1
cf. *Apium graveolens* L.	Celery				47	52		4832	1
Satureja hortensis L.	Summer savory								
Wild									
Ranunculus cf. *repens* L.	Creaping Buttercup								
Ranunculus S. Ranunculus sp.	Buttercups								2
Ranunculus sp.	Buttercups				1			32	
Papaver somniferum L.	Opium Poppy				1			32	
Papaver sp. (not *somniferum)*	Poppy					2		128	
Papaver sp.	Poppy					1		64	
cf. *Papaver* sp.	Poppy					2		128	
Urtica dioica L.	Common Nettle				5	20		1440	
cf. *Urtica dioica* L.	Common Nettle				3			96	
Urtica urens L.	Small Nettle				3	4		352	4
Chenopodium album L.	Fat-hen								
Chenopodium sp.	Goosefoot etc.								1
Atriplex sp.	Oraches								
Chenopodiaceae indet.	Goosefoot family								
Stellaria media gp.	Chickweed				1			32	1
Agrostemma githago L.	Corncockle								1
Scleranthus annus L.	Annual Knawel				1			32	
Polygonum aviculare agg.	Knotgrass								
Fallopia convolvulus (L.) Á. Löve	Black-bindweed	1							
cf. *Fallopia convolvulus* (L.) Á. Löve	Black-bindweed								
Rumex acetosella agg.	Sheep's sorrel								
Rumex sp. (not *acetosella)*	Docks				1	2		160	
Polygonaceae indet.	Knotweed family				1			32	
Malva sp.	Mallow								
Malvaceae indet.	Mallow family								

	Period	1	1	1	1	1	1	1	2
	Feature	Well	Well	Well	Well	Well	Well	Well	Pit
	Sample	2304	9078	9078	9078	9078	9078	9078	857
	Context	8059	15033	15033	15033	15033	15033	15033	5276
	Sample volume/L	10	39	39	39	39	39	39	4
	Total items	17	127	199	467	283	3	34778	840
	Density items/L	1.7	3.3	5.1	12.0	7.3	0.1	891.2	210.0
	Size Fraction	-	>4mm	2-4mm	1-2mm	0.5-1mm	Flot	Corrected	-
	Portion sorted	All	All	1/8	1/32	1/64	All	-	All
Cucumis sativus L.	Cucumber								
Brassica/Sinapsis sp.	Mustards								2
Brassicaceae indet.	Cabbages				5			160	
Reseda luteola L.	Weld								
Rubus sect. *Glandulosus*	Blackberry			5	136	16	1	5417	4
cf. *Rubus* sect. *Glandulosus*	Blackberry								17
Potentilla sp.	Cinquefoils								
cf. *Potentilla* sp.	Cinquefoils				1			32	
cf. *Fragaria vesca* L.	Wild strawberry								
Crataegus sp.	Hawthorn		1					1	
Medicago lupulina L.	Black medick								
Medicago sp.	Medicks				1			32	
cf. *Medicago* sp.	Medicks				1			32	1
Vicia/Lathyrus sp.	Vetches/Peas				2			64	
Linum catharticum L.	Fairy Flax				3	3		288	
Conium maculatum L.	Hemlock			2	14			464	1
Torilis sp.	Hedge parsley								
Apiaceae indet.	Carrot family			1	15	2		616	104
cf. Solanaceae indet.	Nightshade								
Lithospermum arvense L.	Corn gromwell								
cf. *Lithospermum* sp.	Gromwells				1			32	
Lamium sp.	Dead-nettle								
Prunella vulgaris L.	Selfheal								
Mentha sp.	Mint				6	2		320	
Lamiaceae indet.	Dead-nettle family								
cf. Lamiaceae indet.	Dead-nettle family				1			32	
cf. *Plantago lanceolata* L.	Ribwort plantain								
Odontites vernus (Bellardi) Dumort.	Red Bartsia					1		64	
Rhinanthus cf. *minor*	Yellow-rattle				1			32	
Galium aparine L.	Cleavers								2
Carduus/Cirsium sp.	Thistles								
cf. *Carduus/Cirsium* sp.	Thistles								32
Asteraceae indet.	Daisy family								
Juncus indet.	Rush					4		256	
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush					1		64	
Carex sp.	Sedge								1
Avena sp.	Oats			3				24	1
Bromus cf. *secalinus* L.	Rye Brome				2			64	2
cf. *Avena/Bromus* sp.	Oat/Rye Brome			5				40	
Poaceae indet.	Grass			1	1	14		936	2
Fruit stone indet.			2					2	
cf. Fruit stone indet.									
cf. Fruit stone/Pea etc.			20	61	9			796	311
Large legume indet.									
Small legume indet.									
Seed indet.				3	23	63		4792	49
Various									
Bryophyta indet. (stem with leaves)	Moss								
Bryophyta indet. (fragments)	Moss								
Pteridium aquilinum (L.) Kuhn (frond)	Bracken								1
Cereal indet. (bran)		1		9	33			1128	+
cf. *Malus* sp. (fruit skin)	Apple			7				56	
Indet. (fruit skin)				6				48	
Indet. (leaf frag)									
Indet. (plant stem)			+	++					+
Indet. (wood fragment)			+						+
Mystery object		1		1				8	
Earthworm coccoons		2							
Indet. fly puparia		1							
Waterlogged plant remains									
Papaver somniferum L.	Opium Poppy						1		
Rubus fruticosus agg. L.	Bramble						106		
Rubus idaeus L.	Raspberry						72		
Rubus sp.	Bramble						90		
cf. *Prunus domestica* L.	Damson/Plum						1		
Prunus sp.	Cherry/Damson/Plum						2		
Sambucus nigra L.	Elder				1		1		
Arctium sp.	Burdocks						1		
Sphagnum sp. (flower)	Peat Moss				1				
Juncus articulatus gp.	Creeping Rush				1				

	Period	2	2	2	2	5	5	5	5	5
	Feature	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit
	Sample	855.3	852.3	792	804	466	398	395	392	378
	Context	5276	5276	5276	5303	3229	2924	2920	2913	2686
	Sample volume/L	1	1	4	19	11	1	1	31	25
	Total items	115	43	533	144	29	688	271	34	40
	Density items/L	115.0	43.0	133.3	7.6	2.6	688.0	271.0	1.1	1.6
	Size Fraction	-	-	-	-	-	-	-	-	-
	Portion sorted	All	All	All	All	All	All	All	All	All
Cereals										
Triticum spelta L. (single grain spikelet)	Spelt						6			
Triticum spelta L. (spikelet)	Spelt		1							
Triticum spelta L. (glume)	Spelt						6			
Triticum cf. *spelta* L.	Spelt						1	8		
Triticum spelta/dicoccum (grain)	Spelt/Emmer						5	6		
Triticum spelta/dicoccum (single grain spikelet)	Spelt/Emmer			2			2			
Triticum spelta/dicoccum double grain spikelet)	Spelt/Emmer			1						
Triticum cf. *dicoccum* Schübl. (grain)	Emmer wheat						1	5		
Triticum sp. (grain)	Wheat									
Hordeum vulgare L. (hulled lateral grain)	Six-row Hulled Barley					1	5			
Hordeum sp. (hulled median grain)	Hulled Barley						3			
Hordeum sp. (hulled grain)	Hulled Barley						16			
Cereal indet. (hulled grain)							167	11		
Cereal indet. (grain)			2	3						
Food plants										
Morus nigra L.	Black Mulberry			14						
Ficus carica L.	Fig	9	2	84				2		
Prunus domestica L.	Damson/Plum			1					1	
Prunus cf. *domestica* L.	Damson/Plum			1						
cf. *Prunus domestica* L.	Damson/Plum									
Prunus avium (L.) L.	Sweet Cherry						+			
Prunus cf. *avium* (L.) L.	Sweet Cherry									
cf. *Prunus avium* (L.) L.	Sweet Cherry					6	1			
Prunus sp.	Cherry/Damson/Plum	6	5	70	1					
Pyrus/Malus sp.	Pear/Apple					8	67	21	1	4
cf. *Pyrus/Malus* sp.	Pear/Apple		1	2						
cf. *Pyrus/Malus* sp. (embryo)	Pear/Apple									
cf. *Malus* sp. (skin)	Apple						281	162		
Lens culinaris Medik.	Lentil			1			7			
cf. *Lens culinaris* Medik.	Lentil						29	4		
Pisum sativum L.	Pea			1						
cf. *Pisum sativum* L.	Pea			3						
Vicia faba L.	Celtic Bean			1			1			
Vicia faba/Pisum sativum	Celtic Bean/Pea									
Vitis vinifera L.	Grape			2		2				
Linum usitatissimum L.	Flax	1								
Coriandrum sativum L.	Coriander			2			1	2		1
cf. *Coriandrum sativum* L.	Coriander	1		6		1				
Anethum graveolens L.	Dill			8						
cf. *Anethum graveolens* L.	Dill	3		7		1				
Apium graveolens L.	Celery	2		1			1			
cf. *Apium graveolens* L.	Celery	5	1	14			3			
Satureja hortensis L.	Summer savory			1				1		
Wild										
Ranunculus cf. *repens* L.	Creaping Buttercup						1	+		
Ranunculus S. Ranunculus sp.	Buttercups	1		6					2	
Ranunculus sp.	Buttercups									
Papaver somniferum L.	Opium Poppy	2		3	1		1			
Papaver sp. (not *somniferum)*	Poppy									
Papaver sp.	Poppy	1		1			2	1		
cf. *Papaver* sp.	Poppy									
Urtica dioica L.	Common Nettle	1		2	29		1	+	1	
cf. *Urtica dioica* L.	Common Nettle									
Urtica urens L.	Small Nettle	1		5	2		1	+	1	6
Chenopodium album L.	Fat-hen							+		
Chenopodium sp.	Goosefoot etc.			2	2					
Atriplex sp.	Oraches	1		1			+			8
Chenopodiaceae indet.	Goosefoot family	3		4				+		
Stellaria media gp.	Chickweed						2	+	2	
Agrostemma githago L.	Corncockle							1		
Scleranthus annus L.	Annual Knawel									
Polygonum aviculare agg.	Knotgrass		2		1					
Fallopia convolvulus (L.) Á. Löve	Black-bindweed									
cf. *Fallopia convolvulus* (L.) Á. Löve	Black-bindweed						1			
Rumex acetosella agg.	Sheep's sorrel				1					
Rumex sp. (not *acetosella)*	Docks				8		1	1		
Polygonaceae indet.	Knotweed family									
Malva sp.	Mallow						+			
Malvaceae indet.	Mallow family					1				

	Period	2	2	2	2	5	5	5	5	5
	Feature	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit	Pit
	Sample	855.3	852.3	792	804	466	398	395	392	378
	Context	5276	5276	5276	5303	3229	2924	2920	2913	2686
	Sample volume/L	1	1	4	19	11	1	1	31	25
	Total items	115	43	533	144	29	688	271	34	40
	Density items/L	115.0	43.0	133.3	7.6	2.6	688.0	271.0	1.1	1.6
	Size Fraction	-	-	-	-	-	-	-	-	-
	Portion sorted	All	All	All	All	All	All	All	All	All
Cucumis sativus L.	Cucumber						1			
Brassica/Sinapsis sp.	Mustards					1	1			
Brassicaceae indet.	Cabbages									
Reseda luteola L.	Weld	1								
Rubus sect. *Glandulosus*	Blackberry	3	2	18			1	2	1	
cf. *Rubus* sect. *Glandulosus*	Blackberry	6	2	27						
Potentilla sp.	Cinquefoils			1	1					
cf. *Potentilla* sp.	Cinquefoils									
cf. *Fragaria vesca* L.	Wild strawberry							20		
Crataegus sp.	Hawthorn									
Medicago lupulina L.	Black medick						1	+		
Medicago sp.	Medicks									
cf. *Medicago* sp.	Medicks					1				
Vicia/Lathyrus sp.	Vetches/Peas									
Linum catharticum L.	Fairy Flax									
Conium maculatum L.	Hemlock	1		3	1			+	12	14
Torilis sp.	Hedge parsley							1		
Apiaceae indet.	Carrot family	18	5	42				1		
cf. Solanaceae indet.	Nightshade			1						
Lithospermum arvense L.	Corn gromwell	1					1			
cf. *Lithospermum* sp.	Gromwells									
Lamium sp.	Dead-nettle						1		4	
Prunella vulgaris L.	Selfheal			1						
Mentha sp.	Mint			3						
Lamiaceae indet.	Dead-nettle family	1							1	
cf. Lamiaceae indet.	Dead-nettle family									
cf. *Plantago lanceolata* L.	Ribwort plantain			1						
Odontites vernus (Bellardi) Dumort.	Red Bartsia							+		
Rhinanthus cf. *minor*	Yellow-rattle									
Galium aparine L.	Cleavers									
Carduus/Cirsium sp.	Thistles									
cf. *Carduus/Cirsium* sp.	Thistles	4	3	32						
Asteraceae indet.	Daisy family				1					
Juncus indet.	Rush							2		
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush							+		
Carex sp.	Sedge	1	2	2	1		1	+		
Avena sp.	Oats						2			
Bromus cf. *secalinus* L.	Rye Brome		1				2	1		
cf. *Avena/Bromus* sp.	Oat/Rye Brome									
Poaceae indet.	Grass	5		9	1		2	3	1	1
Fruit stone indet.										
cf. Fruit stone indet.							25	5	4	
cf. Fruit stone/Pea etc.		14	4	84						
Large legume indet.							2			
Small legume indet.		1								
Seed indet.		22	10	58	94	7	25	11	3	6
Various										
Bryophyta indet. (stem with leaves)	Moss			1			1			
Bryophyta indet. (fragments)	Moss						3			
Pteridium aquilinum (L.) Kuhn (frond)	Bracken			1			5			
Cereal indet. (bran)		+		+						
cf. *Malus* sp. (fruit skin)	Apple									
Indet. (fruit skin)										
Indet. (leaf frag)							1			
Indet. (plant stem)		+		+			+	+		
Indet. (wood fragment)		+					+			
Mystery object										
Earthworm coccoons										
Indet. fly puparia										
Waterlogged plant remains										
Papaver somniferum L.	Opium Poppy									
Rubus fruticosus agg. L.	Bramble									
Rubus idaeus L.	Raspberry									
Rubus sp.	Bramble									
cf. *Prunus domestica* L.	Damson/Plum									
Prunus sp.	Cherry/Damson/Plum									
Sambucus nigra L.	Elder									
Arctium sp.	Burdocks									
Sphagnum sp. (flower)	Peat Moss									
Juncus articulatus gp.	Creeping Rush									

Samples containg waterlogged plant remains have been ordered by period, well and then context number. F-B 1 = Jones 2000 data.

Taxa have been ordered by food plants, cereal chaff and then wild plants, and within these categories taxanomically following Stace (1997).

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Well	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	10421	10421	10421	10421	10421	1586	1586	3171	3171	3171	3171	3171	3171	3171
	Sample	3191	3216	3195	3198	3217	3219	3293	3322	3335	3341	3380	4029	4068	4085	4141	4165	612	615	738	739	741	749	754	755	758
	Context	9152	9257	9258	9258	9309	9309	9309	9663	9663	9663	9663	10436	10438	10439	10441	10442	3932	3981	4837	4838	4845	4846	4850	4850	4851
	Sample volume/L	13	4	-	1	0.06	0.5	2.5	2	0.5	2	4	29	16	2	7	9.5	9	8	5	27	34	39	37	32.5	18
	Total items	195	477	337	35	51	473	344	37	201	5	36	7	69	26	928	600	179	241	17	219	13	47	2866	738	62
	Density Items/L	15.0	119.3	-	35.0	850.0	946.0	137.6	18.5	402.0	2.5	9.0	0.2	4.3	13.0	132.6	63.2	19.9	30.1	3.4	8.1	0.4	1.2	77.5	22.7	3.4
Food plants																										
Juglans regia L.	Walnut																									
Brassica cf. *cultivar*	Cultivated Brassica																							1		
Ficus carica L.	Fig																									
Prunus domestica L. ssp. *domestica*	Plum																									
Prunus domestica L. ssp. *insititia* (L.) B. & L.	Bullace/Plum																									
Prunus domestica L.	Plum etc.																									
Prunus avium (L.) L.	Sweet Cherry																							1		
Coriandrum sativum L.	Coriander						1	2								1		1				1			12	4
Vitis vinifera L.	Grape																									
Linum usitatissimum L.	Flax						12	49																	62	8
Linum usitatissimum L. (capsule fragments)	Flax						23	15				8													3	
Foeniculum vulgare Mill.	Fennel																									
Anethum graveolens L.	Dill							6																2	13	
cf. *Anethum graveolens* L.	Dill																				47					
Apium graveolens L.	Celery								1							8	1	1	2					1	1	
Apium cf. *graveolens* L.	Celery		1																							
cf. *Apium graveolens* L.	Celery																									
Olea europaea L.	Olive																1									
cf. *Triticum* sp.	Wheat																									
Cereal indet. (grain)																										
Crop																										
Triticum spelta L. (glume base)	Spelt						4	13	2									3	2							
Triticum spelta L. (spikelet fork)	Spelt																									
Triticum spelta/dicoccum (glume base)	Spelt/Emmer						4	3	1				2					1								
Hordeum sp. (rachis)	Barley																									
Hordeum sp. (lax-eared rachis)	Barley																									
cf. *Hordeum* sp. (rachis)	Barley																									
Hordeum sp. (lemma and palea)	Barley																									
cf. Cereal indet. (culm node)	Cereal																									
Wild plants																										
Caltha palustris L.	Marsh-marigold																									
Ranunculus cf. *acris* L.	Meadow Buttercup						2	3											3						6	
Ranunculus cf. *repens* L.	Creeping Buttercup		1	1		1	8	2								13	3	4	1		7	1		49	10	
Ranunculus cf. *bulbosus* L.	Bulbous Buttercup																									
Ranunculus sardous Crantz	Hairy Buttercup						1											1	9	3	15			10	2	
Ranunculus cf. *sardous* Crantz	Hairy Buttercup							1																13		
Ranunculus parviflorus L.	Small-flowered Buttercup							1								1		1							5	
Ranunculus cf. *parviflorus* L.	Small-flowered Buttercup																									

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Well	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	10421	10421	10421	10421	10421	1586	1586	3171	3171	3171	3171	3171	3171	3171
	Sample	3191	3216	3195	3198	3217	3219	3293	3322	3335	3341	3380	4029	4068	4085	4141	4165	612	615	738	739	741	749	754	755	758
	Context	9152	9257	9258	9258	9309	9309	9309	9663	9663	9663	9663	10436	10438	10439	10441	10442	3932	3981	4837	4838	4845	4846	4850	4850	4851
	Sample volume/L	13	4	-	1	0.06	0.5	2.5	2	0.5	2	4	29	16	2	7	9.5	9	8	5	27	34	39	37	32.5	18
	Total items	195	477	337	35	51	473	344	37	201	5	36	7	69	26	928	600	179	241	17	219	13	47	2866	738	62
	Density Items/L	15.0	119.3	-	35.0	850.0	946.0	137.6	18.5	402.0	2.5	9.0	0.2	4.3	13.0	132.6	63.2	19.9	30.1	3.4	8.1	0.4	1.2	77.5	22.7	3.4
Ranunculus flammula L.	Lesser Spearwort			1		2	3	9		1						1		11	32		1			17	3	
Ranunculus subg. *Ranunculus*	Buttercups		3			1									1		1	1								
Ranunculus subg. *Batrachium* (DC.) A. Gray	Crowfoots																1								1	
Ranunculus sp.	Buttercups	1		2																						
Thalictrum flavum L.	Common Meadow-rue																	1								
Papaver somniferum L.	Opium Poppy	3	1	8										1	3	2			1							
Papaver rhoeas type	Common Poppy	4	1	9											2	3			1							
Papaver argemone L.	Prickly Poppy	4		1														1	1							
Papaver sp.	Poppy														2											
Chelidonium majus L.	Greater Celandine																									
Fumaria sp.	Fumitories	1					1									17	5				4			8	3	
Urtica dioica L.	Common Nettle		3	72		1	12	4							1	9	7	9	8				5	368	3	1
Urtica urens L.	Small Nettle		5	4			35	85		3						84	27	13	7		2		1	982	236	12
Betula pendula/pubescens	Silver/Downy Birch									5						3			1							
Alnus glutinosa (L.) Gaertn.	Alder																									
Chenopodium rubrum L.	Red Goosefoot																									
Chenopodium polyspermum L.	Many-seeded Goosefoot		5		1																			21		
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot															1								27		1
Chenopodium album L.	Fat-hen		3			3	14	1		3		1				58	15	1	10					37		
Chenopodium sp.	Goosefoots																		3							
Atriplex sp.	Oraches		5																1					8	2	
Chenopodiaceae indet.	Goosefoot family	26		15	2		5	1						2			1							8	1	
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks					2				13						41	11							8		
Montia fontana (not *chondrosperma)*	Blinks																									
Montia fontana	Blinks															18	3									
Arenaria sp.	Sandworts																									
Stellaria media gp. (L.) Vill.	Common Chickweed	2				6	7	1	1	1						141	76	5	8					255	134	6
Stellaria media gp. (L.) Vill. cf. *neglecta*	Greater Chickweed																								4	
Stellaria graminea L.	Lesser Stitchwort						1	1								3			1					1	1	
Stellaria sp.	Stitchworts			1																						
Cerastium fontanum Baumg.	Common Mouse-ear																									
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear						7											1								
Cerastium sp. (not *fontanum*)	Mouse-ears																1									
Sagina sp.	Pearlworts						56	1	1		1			64	2		3	4								
Scleranthus annus L.	Annual Knawel																									
Spergula arvensis L.	Corn Spurrey					1	1									2										
Lychnis flos-cuculi L.	Ragged-robin						1																			
Agrostemma githago L.	Corncockle			1		1	1	1		1									1							
Silene cf. *vulgaris* Garcke	Bladder Campion																									
Silene cf. *latifolia* Poir	White Campion																									
Silene sp.	Campions																									
Caryophyllaceae indet.	Pink family																							1		
Persicaria lapathifolia (L.) Gray	Pale Persicaria					1	1	1																	1	

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Well	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	10421	10421	10421	10421	10421	1586	1586	3171	3171	3171	3171	3171	3171	3171
	Sample	3191	3216	3195	3198	3217	3219	3293	3322	3335	3341	3380	4029	4068	4085	4141	4165	612	615	738	739	741	749	754	755	758
	Context	9152	9257	9258	9258	9309	9309	9309	9663	9663	9663	9663	10436	10438	10439	10441	10442	3932	3981	4837	4838	4845	4846	4850	4850	4851
	Sample volume/L	13	4	-	1	0.06	0.5	2.5	2	0.5	2	4	29	16	2	7	9.5	9	8	5	27	34	39	37	32.5	18
	Total items	195	477	337	35	51	473	344	37	201	5	36	7	69	26	928	600	179	241	17	219	13	47	2866	738	62
	Density Items/L	15.0	119.3	-	35.0	850.0	946.0	137.6	18.5	402.0	2.5	9.0	0.2	4.3	13.0	132.6	63.2	19.9	30.1	3.4	8.1	0.4	1.2	77.5	22.7	3.4
Polygonum aviculare agg. L.	Knotgrass		1	1		1	59	22	25	102	2	23				205	62	11	39					173	78	2
Polygonum sp.	Knotgrasses			2		1																				
Fallopia convolvulus (L.) Á. Löve	Black-bindweed															1										
Rumex acetosella agg. L.	Sheep's Sorrel		14	10			71	2							1	2		2	6					31	5	1
Rumex crispus L.	Curled Dock																									
Rumex cf. *crispus/conglomeratus*	Curled/Clustered Dock							3																		
Rumex conglomeratus Murray.	Clustered Dock						1																			
Rumex obtusifolius L.	Broad-leaved Dock																									
Rumex sp. (not *acetosella)*	Docks			4		10	4	8		1					1	1								1	3	1
Polygonaceae indet.	Knotweed family		1								1					22	1	1						58		
Hypericum sp.	St John's-worts						5											4								
Malva sylvestris L.	Common Mallow							6																		
Malvaceae indet.	Mallows																								2	
Viola subg. *Melanium*	Wild Pansey etc.															2	1								1	
Viola subg. *Viola*	Common Violet etc.																				1					
Viola sp.	Violets																									
cf. *Sisymbrium* sp.	Rockets															4	7									
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse									61						224	307	7	7						1	
Thlaspi arvense L.	Field Penny-cress						1	1		1							1								2	1
Coronopus squamatus (Forsk.) Asch.	Swine Cress																									
Brassica nigra (L.) Koch	Black Mustard																									
Raphanus raphanistrum L.	Radish																								7	
Brassicaceae indet.	Cabbages						2									2	17									
Calluna vulgaris (L.) Hull	Heather							1	5	2																
Erica sp.	Heaths						3	12																		
cf. *Anagallis arvensis* L.	Pimpernel																									
Filipendula ulmaria (L.) Maxim.	Meadowsweet							6										2	1						1	4
Rubus Sect. *Glandulosus*	Bramble	5	11	4	2		1	4		1					2	4		2	4		29		3	14	11	
Potentilla anserina L.	Silverweed																	1							2	
Potentilla erecta (L.) Raeusch.	Tormentil						7																			
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil			2																	1				2	
Potentilla reptans L.	Creeping Cinquefoil						1																			
Potentilla cf. *reptans* L.	Creeping Cinquefoil																									
cf. *Fragaria vesca* L.	Wild Strawberry																									
Agrimonia eupatoria L.	Agrimony																									
Aphanes arvensis L.	Parsley-piert			2				3							1	4		1						2		1
Aphanes australis Rydb.	Slender Parsley-piert			2			16										5	4	3					10		
Prunus spinosa L.	Sloe		1					2								1								2		1
Prunus cf. *spinosa* L.	Sloe																							2		
Prunus sp.	Sloe, Plum																									
Malus sp.	Apples							1																		
Crataegus sp.	Hawthorn																									

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Well	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	10421	10421	10421	10421	10421	1586	1586	3171	3171	3171	3171	3171	3171	3171
	Sample	3191	3216	3195	3198	3217	3219	3293	3322	3335	3341	3380	4029	4068	4085	4141	4165	612	615	738	739	741	749	754	755	758
	Context	9152	9257	9258	9258	9309	9309	9309	9663	9663	9663	9663	10436	10438	10439	10441	10442	3932	3981	4837	4838	4845	4846	4850	4850	4851
	Sample volume/L	13	4	-	1	0.06	0.5	2.5	2	0.5	2	4	29	16	2	7	9.5	9	8	5	27	34	39	37	32.5	18
	Total items	195	477	337	35	51	473	344	37	201	5	36	7	69	26	928	600	179	241	17	219	13	47	2866	738	62
	Density Items/L	15.0	119.3	-	35.0	850.0	946.0	137.6	18.5	402.0	2.5	9.0	0.2	4.3	13.0	132.6	63.2	19.9	30.1	3.4	8.1	0.4	1.2	77.5	22.7	3.4
Ornithopus sp.	Bird's Foot						2																			
cf. *Lathyrus pratensis* L.	Meadow Vetchling																									
Vicia/Lathyrus sp.	Vetches/Peas																									
cf. *Medicago lupulina* L.	Black Medick												1													
Medicago sp.	Medicks																									
Trifolium sp.	Clovers																									1
Lythrum salicaria L.	Purple-loosestrife																									
Epilobium sp.	Willowherbs																									
cf. *Epilobium* sp.	Willowherbs																									
Linum catharticum L.	Fairy Flax						5	2										3	3							1
Hydrocotyle vulgaris L.	Marsh Pennywort																									
Anthriscus caucalis M. Bieb	Bur Chervil	1					6	3									1		2					28		
Oenanthe fistulosa L.	Tubular Water-dropwort																									
Oenanthe pimpinelloides L.	Corky-fruited Water-dropwort																	1								
Aethusa cynapium L.	Fool's Parsley																							35	4	
Conium maculatum L.	Hemlock						1												1							
Apium nodiflorum (L.) Lag.	Fool's-water-cress			1			2									1			1							
Apium cf. *nodiflorum* (L.) Lag.	Fool's-water-cress																									
Apium sp.	Marshworts			4															3							
Torilis sp.	Hedge-parsleys					1		1																		
Daucus carota L.	Carrots							1																	4	
cf. *Daucus carota* L.	Carrots																				1					
Apiaceae indet.	Carrot family		1	1			1	1									1	1	2	1					8	2
Atropa belladonna L.	Deadly Nightshade	2	8	2	1											3					1		2	8	1	
Hyoscyamus niger L.	Henbane						2									1								7	6	
Solanum nigrum L.	Black Nightshade																	1	6							
Solanum cf. *nigrum* L.	Black Nightshade						3	2		1							1							147	26	
Solanum dulcamara L.	Bittersweet																				2					
Solanum cf. *dulcamara* L.	Bittersweet																1									
Solanum sp.	Nightshades	54	1																							
cf. *Solanum* sp.	Nigthshades			35																						
Solanaceae indet.	Nightshade family																								1	
Myosotis sp.	Forget-me-nots																									
cf. *Myosotis* sp.	Forget-me-nots																									
Stachys sp.	Woundworts																									
Ballota nigra L.	Black Horehound		1				2	1								2	4						1	148	9	1
cf. *Ballota nigra* L.	Black Horehound																									
Lamium sp.	Dead-nettles															4	2				24					
Galeopsis tetrahit L.	Common Hemp-nettle																									
Prunella vulgaris L.	Self Heal				1	2	21	1				1				5	1	1	3					14	9	1
Lycopus europaeus L.	Gypsywort																							3		
Mentha sp.	Mints	3		10		1		2																		
Mentha aquatica L.	Water Mint																		1							

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Well	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	10421	10421	10421	10421	10421	1586	1586	3171	3171	3171	3171	3171	3171	3171
	Sample	3191	3216	3195	3198	3217	3219	3293	3322	3335	3341	3380	4029	4068	4085	4141	4165	612	615	738	739	741	749	754	755	758
	Context	9152	9257	9258	9258	9309	9309	9309	9663	9663	9663	9663	10436	10438	10439	10441	10442	3932	3981	4837	4838	4845	4846	4850	4850	4851
	Sample volume/L	13	4	-	1	0.06	0.5	2.5	2	0.5	2	4	29	16	2	7	9.5	9	8	5	27	34	39	37	32.5	18
	Total items	195	477	337	35	51	473	344	37	201	5	36	7	69	26	928	600	179	241	17	219	13	47	2866	738	62
	Density Items/L	15.0	119.3	-	35.0	850.0	946.0	137.6	18.5	402.0	2.5	9.0	0.2	4.3	13.0	132.6	63.2	19.9	30.1	3.4	8.1	0.4	1.2	77.5	22.7	3.4
Mentha cf. *aquatica* L.	Water Mint		97		4		2	1								1										
Lamiaceae indet.	Dead-nettle family																							1		
Plantago major L.	Greater Plantain	1								1						1	2	2	2							
Plantago sp.	Plantains																									
cf. *Plantago* sp.	Plantains																									
Fraxinus excelsior L.	Ash																	1								
Veronica sect. *Beccabunga*	Brooklime																									
Veronica sp.	Speedwells																									
cf. *Veronica* sp.	Speedwells																1									
Odontites vernus (Bellardi) Dumort.	Red Bartsia																									
Rhinanthus cf. *minor* L.	Yellow-rattle			1			1	9																3		
Rhinanthus minor L.	Yellow-rattle																									
Rhinanthus sp.	Yellow-rattles									1																
cf. *Rhinanthus* sp.	Yellow-rattles					1																				
Legousia hybrida (L.) Delarbe	Venus's-looking glass		5																							
Legousia sp.	Venus's-looking-glasses																									
Galium aparine L.	Cleavers																									
Galium sp.	Bedstraws																		1							
Sambucus nigra L.	Elder	10	5	16	2		11	5									2		1	1	24	10	13	65	6	4
Sambucus sp.	Elder																									
Valerianella locusta (L.) Laterr.	Common Cornsalad																									
Valerianella rimosa Bastard	Broad-fruited Cornsalad																									
Valernianella dentata (L.) Pollich.	Narrow-fruited Cornsalad	1																								
Valerianella sp.	Cornsalads	1																								
Scabiosa columbaria L.	Small Scabious																									
Arctium sp.	Burdocks							2																1		
Carduus sp.	Thistles																									
cf. *Carduus* sp.	Thistles																	1								
Cirsium sp.	Thistles																	1	1							
cf. *Cirsium* sp.	Thistles																									
Carduus/Cirsium sp.	Thistles																							8		
Centaura nigra L.	Common Knapweed																									
Centaurea cf. *nigra* L.	Common Knapweed							1																		
Lapsana communis L.	Nipplewort																								1	
Hypochaeris sp.	Cat's-ears																4									
Leontodon saxatilis Lam.	Lesser Hawkbit						1																			
Leontodon sp.	Hawkbits						3	4											1						1	
Picris hieracioides L.	Hawkweed Oxtongue																									
Sonchus oleraceus L.	Smooth Sow-thistle																							60	3	1
Sonchus asper (L.) Hill	Prickly Sow-thistle													1		1		1						20	1	1
Taraxacum sp.	Dandelion									1				1			1						1			
Crepis capillaris (L.) Wallr.	Smooth Hawk's Beard						1											1								
Pulicaria sp.	Fleabanes									1																

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Well	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	10421	10421	10421	10421	10421	1586	1586	3171	3171	3171	3171	3171	3171	3171
	Sample	3191	3216	3195	3198	3217	3219	3293	3322	3335	3341	3380	4029	4068	4085	4141	4165	612	615	738	739	741	749	754	755	758
	Context	9152	9257	9258	9258	9309	9309	9309	9663	9663	9663	9663	10436	10438	10439	10441	10442	3932	3981	4837	4838	4845	4846	4850	4850	4851
	Sample volume/L	13	4	-	1	0.06	0.5	2.5	2	0.5	2	4	29	16	2	7	9.5	9	8	5	27	34	39	37	32.5	18
	Total items	195	477	337	35	51	473	344	37	201	5	36	7	69	26	928	600	179	241	17	219	13	47	2866	738	62
	Density Items/L	15.0	119.3	-	35.0	850.0	946.0	137.6	18.5	402.0	2.5	9.0	0.2	4.3	13.0	132.6	63.2	19.9	30.1	3.4	8.1	0.4	1.2	77.5	22.7	3.4
Achillea millefolium L.	Yarrow																									
Achillea sp.	Yarrows																	1								
Anthemis arvensis L.	Corn Chamomile																									
Leucanthemum vulgare Lam.	Oxeye Daisy																									
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed						1									1	1									
Senecio sp.	Ragworts																									
Asteraceae indet.	Daisy family															1										
cf. Asteraceae indet.	Daisy family																									
Alisma plantago-aquatica L.	Water-plantain								1																	
Alisma sp.	Water-plantains		1																							
Juncus bufonius gp.	Toad rushes	++		++		56	100	41	4	28	10			32	304	47	10	160	11		2592					
Juncus articulatus gp.	Creaping rushes	+++		++++		378	492	1124	2	27	16			16	112	112	67	480	11	1	3600					
Juncus effusus gp.	Tussock rushes	++++	2	+++		56	232	204	1	2	15			96	688	51	60	84	5	1	752			1		
Juncus indet.	Rush	+++	15	+++		264	136	473		10	12			896	1312	89	48	44	6		13248		2	2		
Luzula sp.	Wood-rushes																									
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush	49	238	104	18	15	6	27		1		3			1	10	9	60	38	8	39	1	20	187	15	2
Isolepis setacea (L.) R. Br.	Bristle Club-rush																4		1							
Carex sp.	Sedges	18	20	5	2		25	5							4	8	1	7	13	4	20		1	25	7	4
cf. *Carex* sp.	Sedges												1													
Cyperaceae indet.	Sedge family																								6	
cf. *Glyceria* type	Sweet-grasses																								1	
cf. *Avena* sp.	Oats																									
Bromus cf. *secalinus* L.	Rye Brome			1			3	5													1					
Bromus sp.	Bromes												3													
Anisantha sterilis (L.) Neveski	Barren Brome																	1								
Danthonia decumbens (L.) DC	Heath-grass						1											1								
Poaceae indet.	Grass family	30		168		131	314	756	2	24	2			679	719	75	39	273	66	5	143				3	1
Seed indet.		9	43	15	2		1				1				5	9	2		9							
Plant fragments other than seeds																										
Pteridium aquilinium (L.) Kuhn (rachis)	Bracken						3																			
Pteridium aquilinium (L.) Kuhn (frond fragments)	Bracken						212	603	16	242		5														
Pteridium aquilinium (L.) Kuhn (petiole)	Bracken						1	2	1	5																
Pteridium aquilinium (L.) Kuhn (stem/stipe)	Bracken									5																
Pteridium aquilinium (L.) Kuhn (charred stem/stipe)	Bracken									1																
Quercus sp. (wood)	Oak																1									
Corylus avellana L. (nut shell)	Hazel		1				1	3 (1)								2	5	1						2	4	1
Corylus avellana L. (wood)	Hazel																									
Rumex acetosella agg. (perianths)	Sheep's Sorrel																									
Rumex conglomeratus Murray (perianths)	Clustered Dock																									
Rumex sp. (stem)	Dock																									
Viola subg. *Melanium* (capsule)	Wild Pansies etc.							1																		
Viola sp. (capsule fragment)	Violet/Pansy																									

	Period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
	Well	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	8328	10421	10421	10421	10421	10421	1586	1586	3171	3171	3171	3171	3171	3171	3171
	Sample	3191	3216	3195	3198	3217	3219	3293	3322	3335	3341	3380	4029	4068	4085	4141	4165	612	615	738	739	741	749	754	755	758
	Context	9152	9257	9258	9258	9309	9309	9309	9663	9663	9663	9663	10436	10438	10439	10441	10442	3932	3981	4837	4838	4845	4846	4850	4850	4851
	Sample volume/L	13	4	-	1	0.06	0.5	2.5	2	0.5	2	4	29	16	2	7	9.5	9	8	5	27	34	39	37	32.5	18
	Total items	195	477	337	35	51	473	344	37	201	5	36	7	69	26	928	600	179	241	17	219	13	47	2866	738	62
	Density Items/L	15.0	119.3	-	35.0	850.0	946.0	137.6	18.5	402.0	2.5	9.0	0.2	4.3	13.0	132.6	63.2	19.9	30.1	3.4	8.1	0.4	1.2	77.5	22.7	3.4
Salix sp. (bud)	Willow																									
Ericaceae indet. (capsule)	Heath Family									2																
Ericaceae indet. (leaf)	Heath Family									1																
Calluna vulgaris (L.) Hull (shoots)	Heather						17	10																		
Calluna vulgaris (L.) Hull (terminal shoot/sprig)	Heather						5																			
Calluna vulgaris (L.) Hull (seed capsules)	Heather							2																		
Rubus sp. (thorn)	Brambles																	1						1		
Malus sp. (endocarp/core)	Apple																									
Prunus/Crataegus sp. (thorny twig)	Cherry/Hawthorn															1										
Vicia/Lathyrus sp. (pod fragment)	Vetches/Peas																									
cf. *Vicia/Lathyrus* sp. (pod)	Vetches/Peas																									
Vicia/Lathyrus sp. (tendril)	Vetches/Peas																									
cf. *Vicia/Lathyrus* sp. (flower)	Vetches/Peas																									
Medicago sp. (pod)	Medicks																									
Trifolium sp. (calyx)	Clover						1	2										1								
cf. *Trifolium* sp. (calyx)	Clover																									
Trifolium sp. (flower)	Clover							1		11																
Trifolium sp. (seed pod)	Clover																									
Ulex europaeus L. (spine)	Gorse			2			13		7	135		4				1										
Fabaceae indet. (hilum)	Pea family																									
Fabaceae indet. (pod)	Legume																									
Ilex aquifolium L. (leaf fragment)	Holly							1										3								
Buxus sempervirens L. (leaf fragment)	Box																									
Centaurea cf. *nigra* L. (flower head)	Common Knapweed																									
Asteraceae indet. (flower head)	Daisy family																									
Asteraceae indet. (seed head)	Daisy family																									
Carex sp. (utricle)	Sedges																									
Cereal indet. (bran)							P	P	P	50-100								++	+							
Cereal indet. (culm node)																										
Poaceae indet. (culm base)	Grass																									
Indet. (leaf abscission pad)					1	1	1	1											++						1	
Indet. (bark)							2	1																		
Indet. (deciduous tree leaf)								1										+++	+++							
Indet. (bud scale)			13	24	4	3		23	1			3				1	3	+++	+++		6			4	55	6
Indet. (bud)					2	3						1						+	++					3	4	
Indet. (wood chips)								+																		
Bryophyta indet. (stem with leaves)	Moss						24	58	67	18						10	8									
Bryophyta indet. (leaves)	Moss																	++	++							
Sphagnum (stem with leaves)	Peat Moss						4					5														
Sphagnum (bud)	Peat Moss						2										1	+								
Sphagnum (leaf)	Peat Moss							7		18							2	+++	++							
Earthworm cocooons																								+		

Samples containg waterlogged plant remains have been ordered by period, well and the																										
Taxa have been ordered by food plants, cereal chaff and then wild plants, and within the																										
	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	5	5	F-B 1
	Well	3171	3171	5100	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5735	5735	5735	1750	1300	1300	F762
	Sample	759	761	2799	1284	1320	1216	1328	1243	1554	1555	1556	1296	1563	1584	1594	1656	1662	1682	1646	1581	1715	386	90	92	
	Context	4851	4866	7828	6482	6484	6485	6485	6486	6487	6487	6487	6504	6893	6897	6905	6917	6921	6923	6436	6436	6960	2778	1619	1621	1660
	Sample volume/L	15	23	15	16	10	20	12	6	15	1.5	-	20	6	6	18	18	15	6	5	17.5	18.5	6	10	10	3
	Total items	2	43	23	585	952	591	721	-	146	0	-	221	-	75	69	938	86	43	619	503	379	218	180	196	27
	Density Items/L	0.1	1.9	1.5	36.6	95.2	29.6	60.1	-	9.7	0	-	11.1	-	12.5	3.8	52.1	5.7	7.2	123.8	28.7	20.5	36.3	18.0	19.6	9.0
Food plants																										
Juglans regia L.	Walnut																			1				1		
Brassica cf. *cultivar*	Cultivated Brassica																									
Ficus carica L.	Fig																			5	7			2		
Prunus domestica L. ssp. *domestica*	Plum																			1						
Prunus domestica L. ssp. *insititia* (L.) B. & L.	Bullace/Plum																			1						
Prunus domestica L.	Plum etc.																			1						
Prunus avium (L.) L.	Sweet Cherry						1																			
Coriandrum sativum L.	Coriander					6	2	4		2			1		1	1	1			1			1		1	
Vitis vinifera L.	Grape																			1						
Linum usitatissimum L.	Flax		3		2	3	1	2					1				1		1							
Linum usitatissimum L. (capsule fragments)	Flax				1		2										+									
Foeniculum vulgare Mill.	Fennel					1											1									
Anethum graveolens L.	Dill					1	1	1												5						
cf. *Anethum graveolens* L.	Dill																			6						
Apium graveolens L.	Celery				2	5	6	4	+	3				+	1	3	4	3	8	1		1				
Apium cf. *graveolens* L.	Celery																									
cf. *Apium graveolens* L.	Celery																			1		1				
Olea europaea L.	Olive																									
cf. *Triticum* sp.	Wheat					1																				
Cereal indet. (grain)					1	5		2																		
Crop																										
Triticum spelta L. (glume base)	Spelt					3			2	1				1			1			3						
Triticum spelta L. (spikelet fork)	Spelt																1			1						
Triticum spelta/dicoccum (glume base)	Spelt/Emmer					2	3			3			1		2	3		3								
Hordeum sp. (rachis)	Barley						1										1	1								
Hordeum sp. (lax-eared rachis)	Barley					1																				
cf. *Hordeum* sp. (rachis)	Barley									1																
Hordeum sp. (lemma and palea)	Barley																+									
cf. Cereal indet. (culm node)	Cereal						1																			
Wild plants																										
Caltha palustris L.	Marsh-marigold					2	1										9									
Ranunculus cf. *acris* L.	Meadow Buttercup				15	14	3	4		8		+	3				12			4		2	2	5		
Ranunculus cf. *repens* L.	Creeping Buttercup		2		8	11	13	30		2		+	3	+	1	1	20			15	5	4	9	10	3	
Ranunculus cf. *bulbosus* L.	Bulbous Buttercup				2																					
Ranunculus sardous Crantz	Hairy Buttercup				3	14	8	7		6		+	3			1		1	1	2				2	3	
Ranunculus cf. *sardous* Crantz	Hairy Buttercup													+			11									
Ranunculus parviflorus L.	Small-flowered Buttercup				2	2	4	2		3				+	1	1	1	1								
Ranunculus cf. *parviflorus* L.	Small-flowered Buttercup												2													

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	5	5	F-B 1
	Well	3171	3171	5100	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5735	5735	5735	1750	1300	1300	F762
	Sample	759	761	2799	1284	1320	1216	1328	1243	1554	1555	1556	1296	1563	1584	1594	1656	1662	1682	1646	1581	1715	386	90	92	
	Context	4851	4866	7828	6482	6484	6485	6485	6486	6487	6487	6487	6504	6893	6897	6905	6917	6921	6923	6436	6436	6960	2778	1619	1621	1660
	Sample volume/L	15	23	15	16	10	20	12	6	15	1.5	-	20	6	6	18	18	15	6	5	17.5	18.5	6	10	10	3
	Total items	2	43	23	585	952	591	721	-	146	0	-	221	-	75	69	938	86	43	619	503	379	218	180	196	27
	Density Items/L	0.1	1.9	1.5	36.6	95.2	29.6	60.1	-	9.7	0	-	11.1	-	12.5	3.8	52.1	5.7	7.2	123.8	28.7	20.5	36.3	18.0	19.6	9.0
Ranunculus flammula L.	Lesser Spearwort				5	13	10	6		3			1	+	2	6	17	1		4	1	1	2	14	7	
Ranunculus subg. *Ranunculus*	Buttercups		1		19	28	3	34		9	+		7	+	9	7	47	9		16	5	3	7			
Ranunculus subg. *Batrachium* (DC.) A. Gray	Crowfoots																									
Ranunculus sp.	Buttercups																									
Thalictrum flavum L.	Common Meadow-rue				2	1		1									1			3			5	1		
Papaver somniferum L.	Opium Poppy					3	2	3					2					1								
Papaver rhoeas type	Common Poppy				6	6	14	11					9													
Papaver argemone L.	Prickly Poppy				11	57	22	36	+	1		+	34	+	1		9									
Papaver sp.	Poppy				22	19	12	4									1									
Chelidonium majus L.	Greater Celandine							1																		
Fumaria sp.	Fumitories		2																							
Urtica dioica L.	Common Nettle	1		5	26	69	42	41	+	7	+		17		4	1	2	2		26	120	47		1	16	
Urtica urens L.	Small Nettle	1			24	44	29	24	+	1	+	+	13	+	6	4	6	2	1	35	1	75	1	4	5	5
Betula pendula/pubescens	Silver/Downy Birch				4	2	10	6	+	2	+		4	+	1	1	9	1								
Alnus glutinosa (L.) Gaertn.	Alder					1																				
Chenopodium rubrum L.	Red Goosefoot																			4		2	2			
Chenopodium polyspermum L.	Many-seeded Goosefoot					1															2	2				1
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot																									
Chenopodium album L.	Fat-hen				3	6	5	1		2			2	+	§	2	5	2	1	12	1		86	1	2	
Chenopodium sp.	Goosefoots																									4
Atriplex sp.	Oraches				1	1	1	1	+				1	+	5		2	1	1	14	5	1	14		1	
Chenopodiaceae indet.	Goosefoot family		1		6	3		1		1							2									
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks					3				1																1
Montia fontana (not *chondrosperma)*	Blinks						1										4							1		
Montia fontana	Blinks						58																			
Arenaria sp.	Sandworts																4									
Stellaria media gp. (L.) Vill.	Common Chickweed		2	2	25	103		48	++	3	+		16	+	4	4	33	5	6	61	1	174	12			1
Stellaria media gp. (L.) Vill. cf. *neglecta*	Greater Chickweed																									
Stellaria graminea L.	Lesser Stitchwort				2	4	1			2							5			2	1					
Stellaria sp.	Stitchworts																									
Cerastium fontanum Baumg.	Common Mouse-ear					9	1	11	+	2																
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear		1		2												1	1								
Cerastium sp. (not *fontanum*)	Mouse-ears																			1		1			2	
Sagina sp.	Pearlworts					2		16																		
Scleranthus annus L.	Annual Knawel				1																					
Spergula arvensis L.	Corn Spurrey				1	1		1									4									
Lychnis flos-cuculi L.	Ragged-robin					1																				
Agrostemma githago L.	Corncockle				1	2	2			1	+		1							1						
Silene cf. *vulgaris* Garcke	Bladder Campion															1										
Silene cf. *latifolia* Poir	White Campion																			1			1			
Silene sp.	Campions				1																					
Caryophyllaceae indet.	Pink family				3	1	6	3					3													
Persicaria lapathifolia (L.) Gray	Pale Persicaria																							1		

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	5	5	F-B 1
	Well	3171	3171	5100	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5735	5735	5735	1750	1300	1300	F762
	Sample	759	761	2799	1284	1320	1216	1328	1243	1554	1555	1556	1296	1563	1584	1594	1656	1662	1682	1646	1581	1715	386	90	92	
	Context	4851	4866	7828	6482	6484	6485	6485	6486	6487	6487	6487	6504	6893	6897	6905	6917	6921	6923	6436	6436	6960	2778	1619	1621	1660
	Sample volume/L	15	23	15	16	10	20	12	6	15	1.5	-	20	6	6	18	18	15	6	5	17.5	18.5	6	10	10	3
	Total items	2	43	23	585	952	591	721	-	146	0	-	221	-	75	69	938	86	43	619	503	379	218	180	196	27
	Density Items/L	0.1	1.9	1.5	36.6	95.2	29.6	60.1	-	9.7	0	-	11.1	-	12.5	3.8	52.1	5.7	7.2	123.8	28.7	20.5	36.3	18.0	19.6	9.0
Polygonum aviculare agg. L.	Knotgrass		21		4	6	14	10	+	3				+	2	11	30	8	14	17	2	3	10	8	11	
Polygonum sp.	Knotgrasses																									
Fallopia convolvulus (L.) Á. Löve	Black-bindweed																						1			
Rumex acetosella agg. L.	Sheep's Sorrel				123	28	104	164	++	14		+	34	+	6	2	41	3		10	2	4	3	8	8	
Rumex crispus L.	Curled Dock																3			3						
Rumex cf. *crispus/conglomeratus*	Curled/Clustered Dock																									
Rumex conglomeratus Murray.	Clustered Dock				2	10				1							27				1					
Rumex obtusifolius L.	Broad-leaved Dock							1									1			41	1		4			
Rumex sp. (not *acetosella)*	Docks				4	127	7	2	+	5			4	+			34	2		61	27	3	8	1	1	
Polygonaceae indet.	Knotweed family																									
Hypericum sp.	St John's-worts					1											1									
Malva sylvestris L.	Common Mallow																									
Malvaceae indet.	Mallows					1													1	1						
Viola subg. *Melanium*	Wild Pansey etc.				3	3		2									3			1						
Viola subg. *Viola*	Common Violet etc.						2																			
Viola sp.	Violets						1																		4	
cf. *Sisymbrium* sp.	Rockets																									
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse				5	6	8	11		1		+	2		1		10		2	1		3				
Thlaspi arvense L.	Field Penny-cress		1										1													
Coronopus squamatus (Forsk.) Asch.	Swine Cress																			1						
Brassica nigra (L.) Koch	Black Mustard																			4	2					
Raphanus raphanistrum L.	Radish																						1	2		
Brassicaceae indet.	Cabbages																5									
Calluna vulgaris (L.) Hull	Heather																									
Erica sp.	Heaths																									
cf. *Anagallis arvensis* L.	Pimpernel																					1				
Filipendula ulmaria (L.) Maxim.	Meadowsweet			1	23	45	27	36	+	3	+		5	+	5	3	126	7		2		1				
Rubus Sect. *Glandulosus*	Bramble			1	1	3	1	1					1			1		1		9	29	1	2	11	23	1
Potentilla anserina L.	Silverweed																1							1	1	
Potentilla erecta (L.) Raeusch.	Tormentil				1																					
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil			1		1		1							2		3			13			10		2	
Potentilla reptans L.	Creeping Cinquefoil																									
Potentilla cf. *reptans* L.	Creeping Cinquefoil																								1	
cf. *Fragaria vesca* L.	Wild Strawberry							1																		
Agrimonia eupatoria L.	Agrimony																						1			
Aphanes arvensis L.	Parsley-piert				1	2		4		2							1			2						
Aphanes australis Rydb.	Slender Parsley-piert				9	16	7	6	+	4			1				16								3	
Prunus spinosa L.	Sloe																									
Prunus cf. *spinosa* L.	Sloe																							1	1	
Prunus sp.	Sloe, Plum																							1	2	
Malus sp.	Apples																									
Crataegus sp.	Hawthorn												1													

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	5	5	F-B 1
	Well	3171	3171	5100	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5735	5735	5735	1750	1300	1300	F762
	Sample	759	761	2799	1284	1320	1216	1328	1243	1554	1555	1556	1296	1563	1584	1594	1656	1662	1682	1646	1581	1715	386	90	92	
	Context	4851	4866	7828	6482	6484	6485	6485	6486	6487	6487	6487	6504	6893	6897	6905	6917	6921	6923	6436	6436	6960	2778	1619	1621	1660
	Sample volume/L	15	23	15	16	10	20	12	6	15	1.5	-	20	6	6	18	18	15	6	5	17.5	18.5	6	10	10	3
	Total items	2	43	23	585	952	591	721	-	146	0	-	221	-	75	69	938	86	43	619	503	379	218	180	196	27
	Density Items/L	0.1	1.9	1.5	36.6	95.2	29.6	60.1	-	9.7	0	-	11.1	-	12.5	3.8	52.1	5.7	7.2	123.8	28.7	20.5	36.3	18.0	19.6	9.0
Ornithopus sp.	Bird's Foot																									
cf. *Lathyrus pratensis* L.	Meadow Vetchling																1									
Vicia/Lathyrus sp.	Vetches/Peas											+														
cf. *Medicago lupulina* L.	Black Medick				1																					
Medicago sp.	Medicks					1		2																		
Trifolium sp.	Clovers																									
Lythrum salicaria L.	Purple-loosestrife					1																				
Epilobium sp.	Willowherbs					3																				
cf. *Epilobium* sp.	Willowherbs																1									
Linum catharticum L.	Fairy Flax				1	4	4	5		2						1	5	1		2						
Hydrocotyle vulgaris L.	Marsh Pennywort				1	1	2									1	2							1		
Anthriscus caucalis M. Bieb	Bur Chervil						1																			
Oenanthe fistulosa L.	Tubular Water-dropwort																4									
Oenanthe pimpinelloides L.	Corky-fruited Water-dropwort				2	1	1														1					
Aethusa cynapium L.	Fool's Parsley													+	1											
Conium maculatum L.	Hemlock																1			10	2	2	1	1		
Apium nodiflorum (L.) Lag.	Fool's-water-cress					4	1	1									2	2								
Apium cf. *nodiflorum* (L.) Lag.	Fool's-water-cress														1											
Apium sp.	Marshworts																									
Torilis sp.	Hedge-parsleys					1		2		1							2	1								
Daucus carota L.	Carrots					3				1							1			1		1	1	1		
cf. *Daucus carota* L.	Carrots																									
Apiaceae indet.	Carrot family				1	2				1			1				1									
Atropa belladonna L.	Deadly Nightshade		1		1													1								
Hyoscyamus niger L.	Henbane					1							2					1		2	11	1		2	1	
Solanum nigrum L.	Black Nightshade					5									1	3				10	1					
Solanum cf. *nigrum* L.	Black Nightshade					2		1		1																
Solanum dulcamara L.	Bittersweet									1		+														
Solanum cf. *dulcamara* L.	Bittersweet																			1						
Solanum sp.	Nightshades				4	1	2	6		1			1		1											
cf. *Solanum* sp.	Nigthshades																									
Solanaceae indet.	Nightshade family					1																				
Myosotis sp.	Forget-me-nots					1		3									2									
cf. *Myosotis* sp.	Forget-me-nots					1																				
Stachys sp.	Woundworts																									
Ballota nigra L.	Black Horehound				2	6	3	2	+	1			4	+					1	1	34			3		
cf. *Ballota nigra* L.	Black Horehound					1											1									
Lamium sp.	Dead-nettles					3	1	2		1			1		1					2	3	1				
Galeopsis tetrahit L.	Common Hemp-nettle														1		1							1		
Prunella vulgaris L.	Self Heal				3	6	5	12		2			1		1	1	28	2		8		2				
Lycopus europaeus L.	Gypsywort																1	1							1	
Mentha sp.	Mints							1					2													
Mentha aquatica L.	Water Mint																			3	2					

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	5	5	F-B 1
	Well	3171	3171	5100	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5735	5735	5735	1750	1300	1300	F762
	Sample	759	761	2799	1284	1320	1216	1328	1243	1554	1555	1556	1296	1563	1584	1594	1656	1662	1682	1646	1581	1715	386	90	92	
	Context	4851	4866	7828	6482	6484	6485	6485	6486	6487	6487	6487	6504	6893	6897	6905	6917	6921	6923	6436	6436	6960	2778	1619	1621	1660
	Sample volume/L	15	23	15	16	10	20	12	6	15	1.5	-	20	6	6	18	18	15	6	5	17.5	18.5	6	10	10	3
	Total items	2	43	23	585	952	591	721	-	146	0	-	221	-	75	69	938	86	43	619	503	379	218	180	196	27
	Density Items/L	0.1	1.9	1.5	36.6	95.2	29.6	60.1	-	9.7	0	-	11.1	-	12.5	3.8	52.1	5.7	7.2	123.8	28.7	20.5	36.3	18.0	19.6	9.0
Mentha cf. *aquatica* L.	Water Mint				3	7	8	5		2					2		13	1							4	
Lamiaceae indet.	Dead-nettle family																									
Plantago major L.	Greater Plantain				2	1		2		2							6			1						
Plantago sp.	Plantains				3			1																		
cf. *Plantago* sp.	Plantains						1																			
Fraxinus excelsior L.	Ash																	1								
Veronica sect. *Beccabunga*	Brooklime					2	1																			
Veronica sp.	Speedwells									1																
cf. *Veronica* sp.	Speedwells																									
Odontites vernus (Bellardi) Dumort.	Red Bartsia				5	9	8	8		5			1				1									
Rhinanthus cf. *minor* L.	Yellow-rattle				16	15	18	11	+	2	+		3				11									
Rhinanthus minor L.	Yellow-rattle														2	2										
Rhinanthus sp.	Yellow-rattles				1								1													
cf. *Rhinanthus* sp.	Yellow-rattles																									
Legousia hybrida (L.) Delarbe	Venus's-looking glass					2																				
Legousia sp.	Venus's-looking-glasses							1																		
Galium aparine L.	Cleavers																16							1		
Galium sp.	Bedstraws					4				1																
Sambucus nigra L.	Elder		3		3	1		3	+	1										20	128	3	2	8	11	
Sambucus sp.	Elder																									5
Valerianella locusta (L.) Laterr.	Common Cornsalad				2			5									1									
Valerianella rimosa Bastard	Broad-fruited Cornsalad				1																					
Valernianella dentata (L.) Pollich.	Narrow-fruited Cornsalad					3				1				+				1								
Valerianella sp.	Cornsalads				7	4		4					2		1	1										
Scabiosa columbaria L.	Small Scabious																1									
Arctium sp.	Burdocks				1	2				1																
Carduus sp.	Thistles																					1		1		
cf. *Carduus* sp.	Thistles																1									
Cirsium sp.	Thistles							1			+															
cf. *Cirsium* sp.	Thistles						1						1						1							
Carduus/Cirsium sp.	Thistles																8									
Centaura nigra L.	Common Knapweed																			1						
Centaurea cf. *nigra* L.	Common Knapweed				1			1									16									
Lapsana communis L.	Nipplewort							1					1													
Hypochaeris sp.	Cat's-ears				2	4	2	2		2							1			4		2				
Leontodon saxatilis Lam.	Lesser Hawkbit																									
Leontodon sp.	Hawkbits				5	8	5	14									23	3		1			1			
Picris hieracioides L.	Hawkweed Oxtongue						1										2									
Sonchus oleraceus L.	Smooth Sow-thistle																		1							
Sonchus asper (L.) Hill	Prickly Sow-thistle				1	2	2	1						+			1	2		5		1				
Taraxacum sp.	Dandelion			3	1																1					
Crepis capillaris (L.) Wallr.	Smooth Hawk's Beard																									
Pulicaria sp.	Fleabanes					1	4																			

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	5	5	F-B 1
	Well	3171	3171	5100	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5735	5735	5735	1750	1300	1300	F762
	Sample	759	761	2799	1284	1320	1216	1328	1243	1554	1555	1556	1296	1563	1584	1594	1656	1662	1682	1646	1581	1715	386	90	92	
	Context	4851	4866	7828	6482	6484	6485	6485	6486	6487	6487	6487	6504	6893	6897	6905	6917	6921	6923	6436	6436	6960	2778	1619	1621	1660
	Sample volume/L	15	23	15	16	10	20	12	6	15	1.5	-	20	6	6	18	18	15	6	5	17.5	18.5	6	10	10	3
	Total items	2	43	23	585	952	591	721	-	146	0	-	221	-	75	69	938	86	43	619	503	379	218	180	196	27
	Density Items/L	0.1	1.9	1.5	36.6	95.2	29.6	60.1	-	9.7	0	-	11.1	-	12.5	3.8	52.1	5.7	7.2	123.8	28.7	20.5	36.3	18.0	19.6	9.0
Achillea millefolium L.	Yarrow																		1							
Achillea sp.	Yarrows																									
Anthemis arvensis L.	Corn Chamomile					2																				
Leucanthemum vulgare Lam.	Oxeye Daisy				1			1									1									
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed				1	4	1	1									5									
Senecio sp.	Ragworts					1	1	1					1				1	1								
Asteraceae indet.	Daisy family																									
cf. Asteraceae indet.	Daisy family						2																			
Alisma plantago-aquatica L.	Water-plantain																									
Alisma sp.	Water-plantains					1																				
Juncus bufonius gp.	Toad rushes				496	912	18	432		++		+	160		152	16	184	40	1								
Juncus articulatus gp.	Creaping rushes	5			688	1968	80	2880	+++	++++	+++	+++	1776	++	784	176	1144	488	17	20	60	1		17	38	
Juncus effusus gp.	Tussock rushes	2			394	624	10	608	++	+++	+++	++	528	+	168	68	184	56	5		20					
Juncus indet.	Rush	6			3136	2192	44	2032	+++	++++	++	+++	1280	+++	440	164	84	280	4							
Luzula sp.	Wood-rushes					3				1			1	+								1		1		
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush			6	108	76	56	38	++	+++		+	18	++	3	5	184	8		31	10	5	7	25	12	2
Isolepis setacea (L.) R. Br.	Bristle Club-rush																									
Carex sp.	Sedges		5	2	24	29	20	28	+	11		+	2	+	3	2	69	4	2	53	16	3	4	43	29	7
cf. *Carex* sp.	Sedges																									
Cyperaceae indet.	Sedge family																									
cf. *Glyceria* type	Sweet-grasses																									
cf. *Avena* sp.	Oats							1		1																
Bromus cf. *secalinus* L.	Rye Brome			1	1	9	3	8		3			1		3		3					1				
Bromus sp.	Bromes					1																				
Anisantha sterilis (L.) Neveski	Barren Brome																									
Danthonia decumbens (L.) DC	Heath-grass				2	2		2		2							5									
Poaceae indet.	Grass family			++	272	1717	381	158	+++	+++		++	253	++	42	30	547	64	8	11		7				
Seed indet.					1	10							4					1								
Plant fragments other than seeds																										
Pteridium aquilinium (L.) Kuhn (rachis)	Bracken																									
Pteridium aquilinium (L.) Kuhn (frond fragments)	Bracken				+		++	+++		++					+++			++		13						
Pteridium aquilinium (L.) Kuhn (petiole)	Bracken																									
Pteridium aquilinium (L.) Kuhn (stem/stipe)	Bracken																									
Pteridium aquilinium (L.) Kuhn (charred stem/stipe)	Bracken																									
Quercus sp. (wood)	Oak																									
Corylus avellana L. (nut shell)	Hazel			1						1									1	1			1	1		
Corylus avellana L. (wood)	Hazel																									
Rumex acetosella agg. (perianths)	Sheep's Sorrel						3																			
Rumex conglomeratus Murray (perianths)	Clustered Dock						5						1													
Rumex sp. (stem)	Dock																			1			1			
Viola subg. *Melanium* (capsule)	Wild Pansies etc.																									
Viola sp. (capsule fragment)	Violet/Pansy						1	1																		

	Period	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	5	5	F-B 1
	Well	3171	3171	5100	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5791	5735	5735	5735	1750	1300	1300	F762
	Sample	759	761	2799	1284	1320	1216	1328	1243	1554	1555	1556	1296	1563	1584	1594	1656	1662	1682	1646	1581	1715	386	90	92	
	Context	4851	4866	7828	6482	6484	6485	6485	6486	6487	6487	6487	6504	6893	6897	6905	6917	6921	6923	6436	6436	6960	2778	1619	1621	1660
	Sample volume/L	15	23	15	16	10	20	12	6	15	1.5	-	20	6	6	18	18	15	6	5	17.5	18.5	6	10	10	3
	Total items	2	43	23	585	952	591	721	-	146	0	-	221	-	75	69	938	86	43	619	503	379	218	180	196	27
	Density Items/L	0.1	1.9	1.5	36.6	95.2	29.6	60.1	-	9.7	0	-	11.1	-	12.5	3.8	52.1	5.7	7.2	123.8	28.7	20.5	36.3	18.0	19.6	9.0
Salix sp. (bud)	Willow																1								1	
Ericaceae indet. (capsule)	Heath Family					1																				
Ericaceae indet. (leaf)	Heath Family																									
Calluna vulgaris (L.) Hull (shoots)	Heather																									
Calluna vulgaris (L.) Hull (terminal shoot/sprig)	Heather																									
Calluna vulgaris (L.) Hull (seed capsules)	Heather																									
Rubus sp. (thorn)	Brambles																									
Malus sp. (endocarp/core)	Apple																			2			2			
Prunus/Crataegus sp. (thorny twig)	Cherry/Hawthorn																									
Vicia/Lathyrus sp. (pod fragment)	Vetches/Peas					1		1					1				2									
cf. *Vicia/Lathyrus* sp. (pod)	Vetches/Peas																			2		1				
Vicia/Lathyrus sp. (tendril)	Vetches/Peas				1												++									
cf. *Vicia/Lathyrus* sp. (flower)	Vetches/Peas					6																				
Medicago sp. (pod)	Medicks					1							1				+									
Trifolium sp. (calyx)	Clover					5	3	3		1			3	+			++			3						
cf. *Trifolium* sp. (calyx)	Clover																		1							
Trifolium sp. (flower)	Clover				2					1			1				+			10		1				
Trifolium sp. (seed pod)	Clover				1																					
Ulex europaeus L. (spine)	Gorse																									
Fabaceae indet. (hilum)	Pea family																	1								
Fabaceae indet. (pod)	Legume														1											
Ilex aquifolium L. (leaf fragment)	Holly					1												1				1				
Buxus sempervirens L. (leaf fragment)	Box																					1				
Centaurea cf. *nigra* L. (flower head)	Common Knapweed																1									
Asteraceae indet. (flower head)	Daisy family						1																			
Asteraceae indet. (seed head)	Daisy family						1																			
Carex sp. (utricle)	Sedges						2						1													
Cereal indet. (bran)							++	+++							+++			+		+		+				
Cereal indet. (culm node)						3																				
Poaceae indet. (culm base)	Grass						1																			
Indet. (leaf abscission pad)				+		+		++						+	+		1			1	1					
Indet. (bark)													+													
Indet. (deciduous tree leaf)							+	+++		+			+		++			+								
Indet. (bud scale)			8	+	++	+	++	+++	+	++					++			+		4		13	16			
Indet. (bud)					+++	+		+	+					+			1									
Indet. (wood chips)																										
Bryophyta indet. (stem with leaves)	Moss			+	+	++	+++	++		+++			+++	+	+++			++		+		+				
Bryophyta indet. (leaves)	Moss										+															
Sphagnum (stem with leaves)	Peat Moss														++											
Sphagnum (bud)	Peat Moss																									
Sphagnum (leaf)	Peat Moss									++																
Earthworm cocooons			+																							

Samples containg waterlogged plant remains have been ordered by period, well and the
Taxa have been ordered by food plants, cereal chaff and then wild plants, and within the

	Period	F-B 1	F-B 1	F-B 1	F-B 1
	Well	F762	F762	F762	F718/719
	Sample				
	Context	1701	1917	2099	1607
	Sample volume/L	3	3	3	3
	Total items	229	112	74	217
	Density Items/L	76.3	37.3	24.7	72.3
Food plants					
Juglans regia L.	Walnut				
Brassica cf. *cultivar*	Cultivated Brassica				
Ficus carica L.	Fig				
Prunus domestica L. ssp. *domestica*	Plum				
Prunus domestica L. ssp. *insititia* (L.) B. & L.	Bullace/Plum				
Prunus domestica L.	Plum etc.				
Prunus avium (L.) L.	Sweet Cherry				
Coriandrum sativum L.	Coriander				
Vitis vinifera L.	Grape				
Linum usitatissimum L.	Flax				
Linum usitatissimum L. (capsule fragments)	Flax				
Foeniculum vulgare Mill.	Fennel				
Anethum graveolens L.	Dill				
cf. *Anethum graveolens* L.	Dill				
Apium graveolens L.	Celery				
Apium cf. *graveolens* L.	Celery				
cf. *Apium graveolens* L.	Celery				
Olea europaea L.	Olive				
cf. *Triticum* sp.	Wheat				
Cereal indet. (grain)					
Crop					
Triticum spelta L. (glume base)	Spelt				
Triticum spelta L. (spikelet fork)	Spelt				
Triticum spelta/dicoccum (glume base)	Spelt/Emmer				
Hordeum sp. (rachis)	Barley				
Hordeum sp. (lax-eared rachis)	Barley				
cf. *Hordeum* sp. (rachis)	Barley				
Hordeum sp. (lemma and palea)	Barley				
cf. Cereal indet. (culm node)	Cereal				
Wild plants					
Caltha palustris L.	Marsh-marigold				
Ranunculus cf. *acris* L.	Meadow Buttercup				
Ranunculus cf. *repens* L.	Creeping Buttercup				
Ranunculus cf. *bulbosus* L.	Bulbous Buttercup				
Ranunculus sardous Crantz	Hairy Buttercup				
Ranunculus cf. *sardous* Crantz	Hairy Buttercup				
Ranunculus parviflorus L.	Small-flowered Buttercup				
Ranunculus cf. *parviflorus* L.	Small-flowered Buttercup				

	Period	F-B 1	F-B 1	F-B 1	F-B 1
	Well	F762	F762	F762	F718/719
	Sample				
	Context	1701	1917	2099	1607
	Sample volume/L	3	3	3	3
	Total items	229	112	74	217
	Density Items/L	76.3	37.3	24.7	72.3
Ranunculus flammula L.	Lesser Spearwort				
Ranunculus subg. *Ranunculus*	Buttercups				
Ranunculus subg. *Batrachium* (DC.) A. Gray	Crowfoots				
Ranunculus sp.	Buttercups				31
Thalictrum flavum L.	Common Meadow-rue				
Papaver somniferum L.	Opium Poppy				
Papaver rhoeas type	Common Poppy				
Papaver argemone L.	Prickly Poppy				
Papaver sp.	Poppy				
Chelidonium majus L.	Greater Celandine				
Fumaria sp.	Fumitories				
Urtica dioica L.	Common Nettle				
Urtica urens L.	Small Nettle	182	21	11	5
Betula pendula/pubescens	Silver/Downy Birch				
Alnus glutinosa (L.) Gaertn.	Alder				
Chenopodium rubrum L.	Red Goosefoot				
Chenopodium polyspermum L.	Many-seeded Goosefoot				
Chenopodium ficifolium Sm.	Fig-leaved Goosefoot				
Chenopodium album L.	Fat-hen				
Chenopodium sp.	Goosefoots	9	10	6	4
Atriplex sp.	Oraches				
Chenopodiaceae indet.	Goosefoot family				
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	Blinks				
Montia fontana (not *chondrosperma)*	Blinks				
Montia fontana	Blinks				
Arenaria sp.	Sandworts				
Stellaria media gp. (L.) Vill.	Common Chickweed	5	1	7	1
Stellaria media gp. (L.) Vill. cf. *neglecta*	Greater Chickweed				
Stellaria graminea L.	Lesser Stitchwort				
Stellaria sp.	Stitchworts				
Cerastium fontanum Baumg.	Common Mouse-ear	4			1
Cerastium cf. *fontanum* Baumg.	Common Mouse-ear				
Cerastium sp. (not *fontanum*)	Mouse-ears				
Sagina sp.	Pearlworts				
Scleranthus annus L.	Annual Knawel				
Spergula arvensis L.	Corn Spurrey				
Lychnis flos-cuculi L.	Ragged-robin				
Agrostemma githago L.	Corncockle				1
Silene cf. *vulgaris* Garcke	Bladder Campion				
Silene cf. *latifolia* Poir	White Campion				
Silene sp.	Campions				
Caryophyllaceae indet.	Pink family				
Persicaria lapathifolia (L.) Gray	Pale Persicaria				

	Period	F-B 1	F-B 1	F-B 1	F-B 1
	Well	F762	F762	F762	F718/719
	Sample				
	Context	1701	1917	2099	1607
	Sample volume/L	3	3	3	3
	Total items	229	112	74	217
	Density Items/L	76.3	37.3	24.7	72.3
Polygonum aviculare agg. L.	Knotgrass	7	69	40	117
Polygonum sp.	Knotgrasses				
Fallopia convolvulus (L.) Á. Löve	Black-bindweed				
Rumex acetosella agg. L.	Sheep's Sorrel				
Rumex crispus L.	Curled Dock				
Rumex cf. *crispus/conglomeratus*	Curled/Clustered Dock				
Rumex conglomeratus Murray.	Clustered Dock				
Rumex obtusifolius L.	Broad-leaved Dock				
Rumex sp. (not *acetosella)*	Docks	1			2
Polygonaceae indet.	Knotweed family				
Hypericum sp.	St John's-worts				
Malva sylvestris L.	Common Mallow				
Malvaceae indet.	Mallows				
Viola subg. *Melanium*	Wild Pansey etc.				
Viola subg. *Viola*	Common Violet etc.				
Viola sp.	Violets				
cf. *Sisymbrium* sp.	Rockets				
Capsella bursa-pastoris (L.) Medik.	Shepherd's Purse				
Thlaspi arvense L.	Field Penny-cress				
Coronopus squamatus (Forsk.) Asch.	Swine Cress				
Brassica nigra (L.) Koch	Black Mustard				
Raphanus raphanistrum L.	Radish				
Brassicaceae indet.	Cabbages				
Calluna vulgaris (L.) Hull	Heather				
Erica sp.	Heaths				
cf. *Anagallis arvensis* L.	Pimpernel				
Filipendula ulmaria (L.) Maxim.	Meadowsweet				
Rubus Sect. *Glandulosus*	Bramble		2		1
Potentilla anserina L.	Silverweed				
Potentilla erecta (L.) Raeusch.	Tormentil				
Potentilla cf. *erecta* (L.) Raeusch.	Tormentil				
Potentilla reptans L.	Creeping Cinquefoil				
Potentilla cf. *reptans* L.	Creeping Cinquefoil				
cf. *Fragaria vesca* L.	Wild Strawberry				
Agrimonia eupatoria L.	Agrimony				
Aphanes arvensis L.	Parsley-piert				
Aphanes australis Rydb.	Slender Parsley-piert				
Prunus spinosa L.	Sloe				
Prunus cf. *spinosa* L.	Sloe				
Prunus sp.	Sloe, Plum				
Malus sp.	Apples				
Crataegus sp.	Hawthorn				

	Period	F-B 1	F-B 1	F-B 1	F-B 1
	Well	F762	F762	F762	F718/719
	Sample				
	Context	1701	1917	2099	1607
	Sample volume/L	3	3	3	3
	Total items	229	112	74	217
	Density Items/L	76.3	37.3	24.7	72.3
Ornithopus sp.	Bird's Foot				
cf. *Lathyrus pratensis* L.	Meadow Vetchling				
Vicia/Lathyrus sp.	Vetches/Peas				
cf. *Medicago lupulina* L.	Black Medick				
Medicago sp.	Medicks				
Trifolium sp.	Clovers				
Lythrum salicaria L.	Purple-loosestrife				
Epilobium sp.	Willowherbs				
cf. *Epilobium* sp.	Willowherbs				
Linum catharticum L.	Fairy Flax				
Hydrocotyle vulgaris L.	Marsh Pennywort				
Anthriscus caucalis M. Bieb	Bur Chervil				
Oenanthe fistulosa L.	Tubular Water-dropwort				
Oenanthe pimpinelloides L.	Corky-fruited Water-dropwort				
Aethusa cynapium L.	Fool's Parsley				
Conium maculatum L.	Hemlock				
Apium nodiflorum (L.) Lag.	Fool's-water-cress				
Apium cf. *nodiflorum* (L.) Lag.	Fool's-water-cress				
Apium sp.	Marshworts				
Torilis sp.	Hedge-parsleys				
Daucus carota L.	Carrots				
cf. *Daucus carota* L.	Carrots				
Apiaceae indet.	Carrot family				
Atropa belladonna L.	Deadly Nightshade				
Hyoscyamus niger L.	Henbane				
Solanum nigrum L.	Black Nightshade				
Solanum cf. *nigrum* L.	Black Nightshade				
Solanum dulcamara L.	Bittersweet				
Solanum cf. *dulcamara* L.	Bittersweet				
Solanum sp.	Nightshades				
cf. *Solanum* sp.	Nigthshades				
Solanaceae indet.	Nightshade family				
Myosotis sp.	Forget-me-nots				
cf. *Myosotis* sp.	Forget-me-nots				
Stachys sp.	Woundworts	1			
Ballota nigra L.	Black Horehound				
cf. *Ballota nigra* L.	Black Horehound				
Lamium sp.	Dead-nettles				
Galeopsis tetrahit L.	Common Hemp-nettle				
Prunella vulgaris L.	Self Heal				1
Lycopus europaeus L.	Gypsywort				
Mentha sp.	Mints				
Mentha aquatica L.	Water Mint				

	Period	F-B 1	F-B 1	F-B 1	F-B 1
	Well	F762	F762	F762	F718/719
	Sample				
	Context	1701	1917	2099	1607
	Sample volume/L	3	3	3	3
	Total items	229	112	74	217
	Density Items/L	76.3	37.3	24.7	72.3
Mentha cf. *aquatica* L.	Water Mint				
Lamiaceae indet.	Dead-nettle family				
Plantago major L.	Greater Plantain				
Plantago sp.	Plantains				
cf. *Plantago* sp.	Plantains				
Fraxinus excelsior L.	Ash				
Veronica sect. *Beccabunga*	Brooklime				
Veronica sp.	Speedwells				
cf. *Veronica* sp.	Speedwells				
Odontites vernus (Bellardi) Dumort.	Red Bartsia				
Rhinanthus cf. *minor* L.	Yellow-rattle				
Rhinanthus minor L.	Yellow-rattle				
Rhinanthus sp.	Yellow-rattles				
cf. *Rhinanthus* sp.	Yellow-rattles				
Legousia hybrida (L.) Delarbe	Venus's-looking glass				
Legousia sp.	Venus's-looking-glasses				
Galium aparine L.	Cleavers				
Galium sp.	Bedstraws				
Sambucus nigra L.	Elder				
Sambucus sp.	Elder	2	3		3
Valerianella locusta (L.) Laterr.	Common Cornsalad				
Valerianella rimosa Bastard	Broad-fruited Cornsalad	2		1	1
Valernianella dentata (L.) Pollich.	Narrow-fruited Cornsalad				
Valerianella sp.	Cornsalads				
Scabiosa columbaria L.	Small Scabious				
Arctium sp.	Burdocks				
Carduus sp.	Thistles				
cf. *Carduus* sp.	Thistles				
Cirsium sp.	Thistles				
cf. *Cirsium* sp.	Thistles				
Carduus/Cirsium sp.	Thistles				
Centaura nigra L.	Common Knapweed				
Centaurea cf. *nigra* L.	Common Knapweed				
Lapsana communis L.	Nipplewort				
Hypochaeris sp.	Cat's-ears				
Leontodon saxatilis Lam.	Lesser Hawkbit				
Leontodon sp.	Hawkbits				
Picris hieracioides L.	Hawkweed Oxtongue				
Sonchus oleraceus L.	Smooth Sow-thistle				
Sonchus asper (L.) Hill	Prickly Sow-thistle				
Taraxacum sp.	Dandelion				
Crepis capillaris (L.) Wallr.	Smooth Hawk's Beard				
Pulicaria sp.	Fleabanes				

	Period	F-B 1	F-B 1	F-B 1	F-B 1
	Well	F762	F762	F762	F718/719
	Sample				
	Context	1701	1917	2099	1607
	Sample volume/L	3	3	3	3
	Total items	229	112	74	217
	Density Items/L	76.3	37.3	24.7	72.3
Achillea millefolium L.	Yarrow				
Achillea sp.	Yarrows				
Anthemis arvensis L.	Corn Chamomile				
Leucanthemum vulgare Lam.	Oxeye Daisy				
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed				
Senecio sp.	Ragworts				
Asteraceae indet.	Daisy family				
cf. Asteraceae indet.	Daisy family				
Alisma plantago-aquatica L.	Water-plantain				
Alisma sp.	Water-plantains				
Juncus bufonius gp.	Toad rushes				
Juncus articulatus gp.	Creaping rushes				
Juncus effusus gp.	Tussock rushes				
Juncus indet.	Rush				
Luzula sp.	Wood-rushes				
Eleocharis palustris (L.) Roem. & Schult.	Common Spike-rush	9		1	17
Isolepis setacea (L.) R. Br.	Bristle Club-rush				
Carex sp.	Sedges	7	6	8	32
cf. *Carex* sp.	Sedges				
Cyperaceae indet.	Sedge family				
cf. *Glyceria* type	Sweet-grasses				
cf. *Avena* sp.	Oats				
Bromus cf. *secalinus* L.	Rye Brome				
Bromus sp.	Bromes				
Anisantha sterilis (L.) Neveski	Barren Brome				
Danthonia decumbens (L.) DC	Heath-grass				
Poaceae indet.	Grass family				
Seed indet.					
Plant fragments other than seeds					
Pteridium aquilinium (L.) Kuhn (rachis)	Bracken				
Pteridium aquilinium (L.) Kuhn (frond fragments)	Bracken				
Pteridium aquilinium (L.) Kuhn (petiole)	Bracken				
Pteridium aquilinium (L.) Kuhn (stem/stipe)	Bracken				
Pteridium aquilinium (L.) Kuhn (charred stem/stipe)	Bracken				
Quercus sp. (wood)	Oak				
Corylus avellana L. (nut shell)	Hazel				
Corylus avellana L. (wood)	Hazel				
Rumex acetosella agg. (perianths)	Sheep's Sorrel				
Rumex conglomeratus Murray (perianths)	Clustered Dock				
Rumex sp. (stem)	Dock				
Viola subg. *Melanium* (capsule)	Wild Pansies etc.				
Viola sp. (capsule fragment)	Violet/Pansy				

	Period	F-B 1	F-B 1	F-B 1	F-B 1
	Well	F762	F762	F762	F718/719
	Sample				
	Context	1701	1917	2099	1607
	Sample volume/L	3	3	3	3
	Total items	229	112	74	217
	Density Items/L	76.3	37.3	24.7	72.3
Salix sp. (bud)	Willow				
Ericaceae indet. (capsule)	Heath Family				
Ericaceae indet. (leaf)	Heath Family				
Calluna vulgaris (L.) Hull (shoots)	Heather				
Calluna vulgaris (L.) Hull (terminal shoot/sprig)	Heather				
Calluna vulgaris (L.) Hull (seed capsules)	Heather				
Rubus sp. (thorn)	Brambles				
Malus sp. (endocarp/core)	Apple				
Prunus/Crataegus sp. (thorny twig)	Cherry/Hawthorn				
Vicia/Lathyrus sp. (pod fragment)	Vetches/Peas				
cf. *Vicia/Lathyrus* sp. (pod)	Vetches/Peas				
Vicia/Lathyrus sp. (tendril)	Vetches/Peas				
cf. *Vicia/Lathyrus* sp. (flower)	Vetches/Peas				
Medicago sp. (pod)	Medicks				
Trifolium sp. (calyx)	Clover				
cf. *Trifolium* sp. (calyx)	Clover				
Trifolium sp. (flower)	Clover				
Trifolium sp. (seed pod)	Clover				
Ulex europaeus L. (spine)	Gorse				
Fabaceae indet. (hilum)	Pea family				
Fabaceae indet. (pod)	Legume				
Ilex aquifolium L. (leaf fragment)	Holly				
Buxus sempervirens L. (leaf fragment)	Box				
Centaurea cf. *nigra* L. (flower head)	Common Knapweed				
Asteraceae indet. (flower head)	Daisy family				
Asteraceae indet. (seed head)	Daisy family				
Carex sp. (utricle)	Sedges				
Cereal indet. (bran)					
Cereal indet. (culm node)					
Poaceae indet. (culm base)	Grass				
Indet. (leaf abscission pad)					
Indet. (bark)					
Indet. (deciduous tree leaf)					
Indet. (bud scale)					
Indet. (bud)					
Indet. (wood chips)					
Bryophyta indet. (stem with leaves)	Moss				
Bryophyta indet. (leaves)	Moss				
Sphagnum (stem with leaves)	Peat Moss				
Sphagnum (bud)	Peat Moss				
Sphagnum (leaf)	Peat Moss				
Earthworm cocooons					

Catalogue of identifications

This catalogue describes the identifications of archaeobotanical material from Periods 0-2 Insula IX, including all cultivated taxa, taxa of significance for agricultural practices and those present in >40% of waterlogged samples and/or with >10 charred identifications. The number of mineralised seeds are the raw numbers, with no multiplication to account for the fraction sub-sampled. Measurements are given in mm. Where waterlogged and charred taxa were both identified, measurements are for waterlogged material. Ecological and economic information, except where stated, is derived from Clapham, Tutin and Warbug 1962 and Stace 1997. Taxa are listed alphabetically by family and then alphabetically within family.

APIACEAE

Anethum graveolens L. – Dill

Preservation: M W
Measurements: 3.8 x 2.1 x 0.5
Description: Dorsally compressed schizocarps with thin dorsal ridges and winged lateral ridges.
Ubiquity: 50% (M), 17% (W)
No. of seeds: 19 (M), 71 (W)
Ecology and economy: Annual herb native to western and central Asia. Seeds and leaves used in Roman cooking. Recorded at a range of settlements in Roman Britain and Europe.
References: Dalby 2003; Van der Veen et al. 2008

Apium graveolens L. – Celery

Preservation: C M W
Measurements: 1.2 x 1 x 0.9
Description: Schizocarps with 5 ridges running vertically along the seeds. Ridges are slender in comparison to *Apium nodiflorum*. Laterally compressed.
Ubiquity: 1.4% (C), 50% (M), 55% (W)
No. of seeds: 1 (C), 156 (M), 59 (W)
Ecology and economy: Celery is a biennial herb native to Britain in damp brackish places close to the sea and at inland salt springs. Celery leaves and seeds were commonly used in Roman cooking and seeds have been recorded at a range of settlements in Roman Britain and Europe.
References: Cole 2000; Dalby 2003; Van der Veen et al. 2008

Carm carvi L. – Caraway

Preservation: C
Measurements: 3.3 x 1 x 0.9
Description: Elongate dorsally compressed schizocarp. The five distinctive ridges were no longer present on the single example. However, the bases were, and they were more substantial than in *Bupleurum* sp.
Ubiquity: 1% (C)
No. of seeds: 1 (C)
Ecology and economy: Biennial/perennial herb. Thought to have originated from Anatolia. Seeds used as a flavouring in Roman food. Rare in Roman north-western Europe, and its distribution is focused on Germany. Not previously recorded from Roman Britain, but present in the medieval period. Naturalised in fields and waste places.
References: Dalby 2003; Livarda 2008a; Preston et al. 2004; Van der Veen et al. 2008

Coriandrum sativum L. – Coriander

Preservation: M W
Measurements: 2.9 x 2.9 x 1.5
Description: Hemispherical, dorsally compressed schizocarps with distinctive zig-zag dorsal ridges.
Ubiquity: 50% (M), 45% (W)
No. of seeds: 5 (M), 40 (W)
Ecology and economy: Annual herb, thought to have originated from south-west Asia. Commonly used in Roman cooking. One of the most frequently recorded Roman introductions in Britain.
References: Dalby 2003; Van der Veen et al. 2008; Zohary et al. 2012

Foeniculum vulgare L. – Fennel

Preservation: W
Measurements: 4.1 x 2.3 x 0.5
Description: Elongate dorsally compressed schizocarps with thick prominent ridges running vertically along the seed.
Ubiquity: 7% (W)
No. of seeds: 2 (W)
Ecology and economy: Perennial herb, thought to be a Roman introduction to Britain. Leaves and seeds used in Roman food. Recorded mainly at towns, but also at rural sites in the Roman period.
References: Dalby 2003; Preston et al. 2004, Van der Veen et al. 2008

ASTERACEAE

Leucanthemum vulgare L. – Oxeye Daisy

Preservation: W
Measurements: 2.1 x 0.7 x 0.7
Description: Rod shaped achenes with translucent secretory canals running along the vertical length. Glossy appearance.
Ubiquity: 10% (W)
No. of seeds: 3 (W)
Ecology and economy: Perennial herb of grassy places. Highlighted for its occurrence in hay meadow communities.
References: Greig 1984

Tripleurospermum inodorum (L.) Sch. Bip. - Scentless Mayweed

Preservation: C W
Measurements: 1.6 x 0.6 x 0.7
Description: Bifacial achene. One face has three ribs separated by granular areas.
Ubiquity: 21% (C), 24% (W)
No. of seeds: 65 (C), 15 (W)
Ecology and economy: Annual herb. Common in waste places and cultivated land in lowland Britain.

BETULACEAE

Corylus avellana L. – Hazel (nut shell)

Preservation: C W
Measurements: c. 0.9mm thick
Description: Nut shell fragment including pale roughened attachment area. Smooth outer shell.
Ubiquity: 5% (C), 35% (W)
No. of fragments: 5 (C), 23 (W)
Ecology and economy: Small deciduous tree or large shrub. Native plant of scrub and woodland. Nuts were consumed in Roman Britain.
References: Van der Veen et al. 2008

BRASSICACEAE

Brassica nigra (L.) W.D.J. Koch – Black Mustard

Preservation: C
Measurements: 1.4 x 1.3 x 1.2
Description: Seeds. Globose. Reticulated cell pattern with high ribs. Square mesh shape.
Ubiquity: 1% (C)
No. of seeds: 3 (C)
Ecology and economy: Annual herb. Probably native. Found on sea cliffs, waste ground and river banks. Probably cultivated as a minor crop in the Iron Age.
References: Campbell 2000, Dickson 2011

Capsella bursa-pastoris (L.) Medik. – Shepherd's-purse

Preservation: C W
Measurements: 0.9 x 0.3 x 0.2
Description: Elliptic seed. Reticulate cell pattern running around edge.
Ubiquity: 1% (C), 48% (W)
No. of seeds: 1 (C), 657 (W)
Ecology and economy: Annual herb of arable and open ground.

CAPRIFOLIACEAE

Sambucus nigra L. – Elder

Preservation: C W
Measurements: 2.9 x 1.4 x 0.3
Description: Bullet shaped. Rugose surface pattern. Seeds contained within drupes.
Ubiquity: 15% (C), 59% (W)
No. of seeds: 47 (C), 186 (W)
Ecology and economy: Deciduous small tree/shrub. Found in hedges, woodland, waste and disturbed ground, especially on soils with a high nitrogen content. Edible berries, thought to have been consumed in Roman Britain.
References: Van der Veen et al. 2008

CARYOPHYLLACEAE

Agrostemma githago L. - Corncockle

Preservation: C (capsule fragment) W
Measurements: (frag) 3.1 x 2.5 x 0.3
Description: Seed from multi-seeded capsule. Thickened triangle in shape. Papillose surface texture. All seeds consisted of fragments, identifiable from the distinctive surface texture. Cf. *Agrostemma githago* capsule fragments recorded from sample <8596>. Thickened triangular shape.
Ubiquity: 1% (C), 31% (W)
No. of seeds: 1 (C), 13 (W)
Ecology and economy: Annual herb of cultivated and waste ground. Archaeophyte first recorded in southern Britain during the Iron Age.
References: Preston et al. 2004

Stellaria graminea L. – Lesser Stitchwort

Preservation: C W
Measurements: 0.9 x 0.8 x 0.4
Description: Seed from multi-seeded capsule-dry fruit. Circular, compressed kidney shaped seed. Surface covered with concentric rows of small, linear papilae.
Ubiquity: 4% (C), 31% (W)
No. of seeds: 16 (C), 22 (W)
Ecology and economy: Perennial herb of dry, grassy places.

Stellaria media gp. – Common Chickweed

Preservation: C M W
Measurements: 0.9 x 0.8 x 0.4
Description: Seed from multi-seeded capsule. Dry fruit. Circular, compressed kidney shaped seed. Surface covered with concentric rows of small, stelliform papilae.
Ubiquity: 21% (C), 50% (M), 72% (W)
No. of seeds: 30 (C), 1(M), 1134 (W)
Ecology and economy: Very common weed of disturbed and open ground.

CHENOPODIACEAE

Atriplex sp. – Oraches

Preservation: C W
Measurements: 2.1 x 1.8 x 0.5
Description: Circular/kidney shaped dry fruit. Attachment point on side. Black glossy appearance. Category excludes *A. halimus*, *A. portulacoides* and *A. pedunculata*.
Ubiquity: 11% (C), 40% (W)
No. of seeds: 31 (C), 50 (W)
Ecology and economy: Annual herbs/perennial shrubs. Genus includes coastal plants and those of cultivated/disturbed ground.

Chenopodium album L. – Fat-hen

Preservation: C W
Measurements: 1.3 x 1.1 x 0.6
Description: Circular/kidney shaped dry fruit. Attachment point in centre of seed. Black glossy appearance.
Ubiquity: 35% (C), 59% (W)
No. of seeds: 143 (C), 175 (W)
Ecology and economy: Annual herb of waste and cultivated ground.

CYPERACEAE

Carex spp. - Sedges

Preservation: C W
Measurements: 1.5 x 1.2 x 1.2
Description: Nutlets, sometimes with preserved papery utricle. Coarse surface cell pattern. Lenticular or trigonous shaped. No attempt was made to separate *Carex* spp. further.
Ubiquity: 50% (C), 90% (W)
No. of seeds: 127 (C), 442 (W)
Ecology and economy: Perennial rhizomatous herbs. Found in a wide-range of habitats including banksides, marshes, woodland, hedgerows and grassland.

Eleocharis palustris (L.) Roem. & Schult. – Common Spike-rush

Preservation: C M W
Measurements: 1.6 x 1. x 1
Description: Obovoid shape nutlet. Papery covering. Triangular attachment at widest end.
Ubiquity: 60% (C), 50% (M), 90% (W)
No. of seeds: 320 (C), 1 (M), 1400 (W)
Ecology and economy: Perennial herb. Found alongside or within ponds, marshes, ditches and riversides. Thought to be an arable weed in Iron Age Britain, associated with expansion onto marginal soils.
References: Jones 1988a

DENNSTAEDTIACEAE

Pteridium aquilinium (L.) Kuhn – Bracken fronds

Preservation: W
Measurements: Fronds c. 3.2mm wide
Description: Fronds are pinnae of robust erect leaves. Pinnae are deeply divided and each pinnule is pinnately veined. Dark brown in colour. Strong midribs.
Ubiquity: 24% (W)
No. of seeds: -
Ecology and economy: Perennial herb (fern) with underground rhizomes. Woods, heaths and moors, normally on dry acid soils. Used traditionally for animal bedding, thatching and packaging, partially due to it's insect repellent characteristics.
References: Campbell and Pelling 2013; Rymer 1976

DIPSACACEAE

Scabiosa columbaria L. – Small Scabious

Preservation: W
Measurements: 2.7 x 1.9 x 0.7
Description: Rod shaped achene with distinctive ridges**.** Hooks/bristles over the entire surface.
Ubiquity: 3% (W)
No. of seeds: 1 (W)
Ecology and economy: Perennial herb of dry calcareous grassland. A member of numerous calcareous and several mesotrophic grassland communities.
References: Rodwell 1992

ERICACEAE

Calluna vulgaris (L.) Hull – Heather

Preservation: W
Measurements: 0.5 x 0.2 x 0.2
Description: Seeds contained within a capsule (dry fruit). Circular to elliptic shape. Raised reticulate surface pattern. Capsules are rounded, hairy, and consist of four segments. Shoots are sessile, entire, triangular in cross section.
Ubiquity: 7% (W) seeds, 3% (W) shoots
No. of seeds: 8 (W) seeds
Ecology and economy: Evergreen shrub found in heaths, moors, bogs, open woodland, rocky places on sandy or peaty soil. Used traditionally for animal bedding.
References: Gimingham 1960; Mabey 1977

FABACEAE

Lens culinaris Medik. - Lentil

Preservation: C M
Measurements: 3.2 x 3.1 x 1.8
Description: Seeds contained within a pod/fruit. Round shape, flat in section. Thin and straight hilum.
Ubiquity: 1% (C), 100% (M)
No. of seeds: 2 (C), 13 (M)
Ecology and economy: Annual herb. Cultivated since the early Neolithic in the Near East, probably where domestication took place. Introduced to Britain during the Roman period. Cultivated in Britain in the nineteenth century. Naturalised in waste ground.
References: Van der Veen et al. 2008; Young 1969; Zohary et al. 2012

Medicago lupulina L. – Black Medick

Preservation: C W
Measurements: 1.5 x 0.9 x 0.6
Description: Seeds. Oval shape with 'nose' of varying lengths/protrusions. Identified due to the preservation of part of the seed pod which has a networked pattern.
Ubiquity: 3% (W), 19% (C)
No. of seeds: 1 (W), 38 (C)
Ecology and economy: Grassy places and rough ground.

Medicago/*Melilotus*/*Trifolium* - Clovers

Preservation: C
Measurements: 1.3 x 0.8 x 0.7
Description: Seeds. Oval shape with 'nose' of varying lengths/protrusions. Category are medium sized and rectangular.
Ubiquity: 74% (C)
No. of seeds: 16 (C)
Ecology and economy: Grassy places and rough ground.

Pisum sativum L. – Garden Pea

Preservation: C M
Measurements: 4.8 x 4.2 x 4.1
Description: Seeds contained within a pod/fruit. Globose in shape. Thin and smooth testa. Separated from *Vicia faba* on the basis of a short oval hilum.
Ubiquity: 3% (C), 50% (M)
No. of seeds: 2 (C), 2 (M)
Ecology and economy: Annual herb. Cultivated and domesticated in the early Neolithic in the Near East, Introduced to Britain during the Bronze Age, possibly in the

Neolithic, and becoming more common in the Iron Age, especially in East Kent. Naturalised in waste ground.
References: Campbell and Straker 2003; Tomlinson and Hall 1996.

Trifolium/*Lotus* - Clovers

Preservation: C
Measurements: 1.2 x 0.9 x 0.6
Description: Seeds. Oval shape with 'nose' of varying lengths/protrusions. Category includes small *Trifolium* (*dubium*) and *Lotus pedunculatus*. Compared to other small legumes, they are the smallest.
Ubiquity: 14% (C)
No. of seeds: 88 (C)
Ecology and economy: Annual and perennial herbs. Grassy and waste ground. Also coastal and rocky areas.

Trifolium sp. – Clovers

Preservation: C W
Measurements: 1.3 x 0.9 x 0.6
Description: Seeds. Oval shape with 'nose' of varying lengths/protrusions. Compared to other small legumes, they are medium sized and rounded. Smooth testa.
Ubiquity: 15% (C), 3% (W)
No. of seeds: 38 (C), 1 (W)
Ecology and economy: Annual and perennial herbs. Grassy and waste ground. Also coastal and rocky areas.

Ulex europaeus L. – Gorse (spine)

Preservation: W
Measurements: 4.8 x 0.5 x 0.3
Description: Pointed spines, parallel veined, translucent margin. Distinguished from *U. galli* and *U. minor* by strongly grooved spines.
Ubiquity: 14% (W)
No. of seeds: -
Ecology and economy: Deciduous shrub of heathland, open woods, grassland on sandy or peaty soil. Used for animal bedding, fuel and fodder.
References: Mabey 1977; Rymer 1979

Vicia faba var. *minor* L. – Celtic Bean

Preservation: C
Measurements: 8.5 x 5.9 x 6.8
Description: Seeds contained in a pod/fruit. Elongate, rectangular to circular shape. The presence of an elongate hilum separated the specimens from *Pisum sativum*.
Ubiquity: 1% (C)
No. of seeds: 1 (C)
Ecology and economy: Annual herb. Vicia faba like seeds found in the Early Neolithic of the Near East, currently unsure when domestication took place. Introduced to Britain during the Bronze Age and more common during the Bronze Age than the Iron Age. Considered a traditional food in Roman Italy, used in sacrificial offerings.
References: Campbell and Straker 2003; Dalby 2003; Zohary et al. 2012

Vicia/Lathyrus – Vetches/Tares

Preservation: C M
Measurements: 1.6 x 1.8 x 1.4
Description: Seeds. Globose shape. Lacking hilum and testa, limiting further identification.
Ubiquity: 28% (C), 50% (M)
No. of seeds: 128 (C), 2 (M)
Ecology and economy: Annual/perennial herbs. Grassy, waste and cultivated ground.

FAGACEAE

Betula pendula Roth/*pubescens* Ehrh. – Silver/Downy Birch

Preservation: W
Measurements: 2.4 x 2.1 x 0.5
Description: Obovate winged nutlet.
Ubiquity: 41% (W)
No. of seeds: 49 (W)
Ecology and economy: Woodland on light acidic soils, wet or dry.

JUNCACEAE

Juncus articulatus gp. (subg. *Septati – subnodulosus*, *pygmaeus*, *bulbosus*, *actuiflorus*, *articulatus*)

Preservation: C W
Measurements: 0.6 x 0.3 x 0.3
Description: Oval shape translucent seeds. Ladder like cell pattern with vertical rectangular spaces.
Ubiquity: 1% (C), 76% (W)
No. of seeds: 1 (C), 16527 (W)
Ecology and economy: Annual/perennial herbs (rushes). Submerged, wet and aquatic places, ranging from heaths to rivers.

Juncus bufonius gp. (subg. *Poiophylli – bufonius, ambiguous, foliosus*)

Preservation: W
Measurements: 0.4 x 0.2 x 0.2
Description: Oval shaped translucent seeds. Less distinct ladder like cell pattern than *J. articulatus* gp.. White ladder pattern visible on surface. Widest at centre of seed.
Ubiquity: 69% (W)
No. of seeds: 5808 (W)
Ecology and economy: Damp habitats, brackish and freshwater. Including muddy margins, ditches and marshes.

Juncus effusus gp. (*inflexus, effusus, conglomeratus*)

Preservation: W
Measurements: 0.5 x 0.3 x 0.3
Description: Asymmetrical oval seed, often twisted. Translucent seed coat. Ladder like cell pattern with horizontal rectangular windows.
Ubiquity: 83% (W)
No. of seeds: 4899 (W)
Ecology and economy: Various damp and wet places including damp woods, marshes, ditches, bogs, wet meadows and by water.

LAMIACEAE

Ballota nigra L. – Black Horehound

Preservation: W
Measurements: 1.9 x 0.6 x 0.6
Description: Obovoid nutlet. Red crystalline areas on surface. Central ridge which extends to base of nutlet.
Ubiquity: 48% (W)
No. of seeds: 190 (W)
Ecology and economy: Perennial herb of disturbed and rough ground.

Mentha aquatica L. – Water Mint

Preservation: W
Measurements: 0.9 x 0.5 x 0.4
Description: Nutlet**.** Obovoid shape. Slight ridge running down centre. Reticulate surface pattern.
Ubiquity: 41% (W)
No. of seeds: 147 (W)
Ecology and economy: Perennial herb found by water in marshes, ditches, fields and ponds. *Mentha* sp. treated as an introduced Roman plant food.
References: Van der Veen et al. 2008

Prunella vulgaris L. – Self Heal

Preservation: C W
Measurements: 1.5 x 0.8 x 0.5
Description: Obovoid nutlet. Vertical strip running down centre of nutlet on both sides.
Ubiquity: 10% (C), 62% (W)
No. of seeds: 21 (C), 131 (W)
Ecology and economy: Perennial herb of grassland, waste ground, woodland clearings.

LINACEAE

Linum usitatissimum L. – Flax (seeds)

Preservation: C M W
Measurements: 2 x 1.2 x 0.6
Description: Seeds contained within capsule (dry fruit). Oblong-ovate, sharp edges, thin with short beak. Shiny surface.
Ubiquity: 8% (C), 50% (M), 35% (W)
No. of seeds: 10 (C), 1 (M), 145 (W)
Ecology and economy: Annual herb. Domesticated in the early Neolithic Near East. Introduced to Britain during the Neolithic. Two varieties for oil and textile productions currently exist. Separate varieties also recognised from the Neolithic period onwards due to a separation of seed size. Utilised in the Roman period for textiles, oil and as a flavouring. Currently cultivated in Britain for oil.
References: Bosi et al. 2011, Zohary et al. 2012

Linum usitatissimum L. – Flax (capsule fragments)

Preservation: W
Measurements: 5.5 x 1.5 x 0.2
Description: V-shaped in cross section, pointed ends, Internal face has false septums. Smooth undulating exocarp.
Ubiquity: 21% (W)
No. of fragments: 53 (W)
Ecology and economy: see above
References: Smith 1999

MORACEAE

Ficus carica L. - Fig

Preservation: M
Measurements: 1.3 x 1.1 x 1.1
Description: Pointed globose shape
Ubiquity: 50% (M)
No. of seeds: 163 (M)
Ecology and economy: Stones of drupelets of a deciduous large shrub. Cultivated in the Mediterranean from at least the Early Bronze Age. First imported to Britain in the Late Iron Age. Mainly consumed at military sites and major towns in Roman Britain.
References: Van der Veen et al. 2008; Vaughan et al. 2009; Zohary et al. 2012

Morus nigra L. – Mulberry

Preservation: M
Measurements: 2.8 x 1.8 x 1.2
Description: Seeds from compound clusters of small drupes. Triangular shape, rounded apex, pointed base.
Ubiquity: 50% (M)
No. of seeds: 3 (M)
Ecology and economy: Small deciduous tree, thought to originate in south-eastern Europe. Only recorded from towns in north-west Roman Europe.
References:
Dalby 2003; Livarda 2008b; Vaughan et al 2009

OLEACEAE

Olea europaea L. – Olive

Preservation: C W
Measurements: (frag) 11 x7.5 x 7.4
Description: Endocarp fragments of small drupes of an evergreen tree**.** The two waterlogged olive stone halves are virtually symmetrical and probably derive from one olive stone. The surface shows the characteristic vascular network and the interior surface is smooth. Several fragments of charred olive stone had the same characteristics.
Ubiquity: 1% (C), 3% (W)
No. of seeds: 3 (C), 2 (W)
Ecology and economy: Olives were domesticated in the Chalcolithic Levant and were a major aspect of the Mediterranean diet. The distribution of olive in Roman Britain is limited to major town and military sites.
References:
Dalby 2003; Van der Veen et al. 2008

OROBANCHACEAE

Rhinanthus minor L. – Yellow-rattle

Preservation: C M W
Measurements: 2.8 x 1.5 x 0.3
Description: Seeds, contained within capsule (dry fruit). Discoid, elongate kidney shaped.
Ubiquity: 4% (C), 50% (M), 38% (W)
No. of seeds: 9 (C), 1 (M), 94 (W)
Ecology and economy: Annual herb of grassy places. Some ssp. prefer damp or calcareous grassland. Noted for its presence in several traditionally managed hay meadow communities.
References: Greig 1984

PAPAVERACEAE

Papaver somniferum L. - Opium Poppy

Preservation: C M W
Measurements: 0.9 x 0.9 x 0.7
Description: Round/kidney shaped seeds. Reticulate hexagonal cell network.
Ubiquity: 1% (C), 50% (M), 38% (W)
No. of seeds: 1 (2), 1 (M), 30 (W)
Ecology and economy: Annual plant producing oil-rich seeds. Introduced to Britain during the Neolithic, and now a common casual. Used as a flavouring in Roman food and as a medicine and narcotic.
References: Dalby 2007; Merlin 2003; Robinson 2007

PLANTAGINACEAE

Plantago lanceolata L. – Ribwort Plantain

Preservation: C
Measurements: 2.2 x 1.1 x 0.8
Description: Elongate seed. Smooth dorsal side, ventral side has thick rim running around edge with shallower central section. Distinguished from *P. media* by its glossy surface and more solid outer lip.
Ubiquity: 11% (C)
No. of seeds: 17 (C)
Ecology and economy: Perennial herb found in various grassy places.

POACEAE

Avena sp. – Wild-oat

Preservation: C M W
Measurements: 7.9 x 2.2 x 1.5
Description: Dry elongate grain. Pointed embryo and rounded apical end. Single floret base in <8956> identified as *Avena fatua* due to its horseshoe shape and hairiness. Based on the roughness of the lemma the grains in <8956> were also identified as *Avena fatua*. Elsewhere *Avena* sp. was identified due to a continuous ventral groove to the apical end, a pronounced ventral surface, and a discontinuous cells around the apical end.
Ubiquity: 31% (C), 50% (M), 7% (W)
No. of seeds: 118 (C), 3 (M), 2 (W)
Ecology and economy: Annual of grassland. Arable, waste and rough ground. Introduced during the Bronze Age, but cultivated oat was introduced in the Neolithic.
References: Fairweather 1993; Jacomet 2006; Preston et al. 2004

Bromus secalinus L. – Rye Brome

Preservation: C M W
Measurements: 6.7 x 2.1 x 1.2
Description: Dry elongate grain. Pointed embryo end and rounded apical end. Distinctive wavy cell pattern that is continuous around the apical end of the ventral face. Ventral groove splits before the apical end.
Ubiquity: 50% (C), 50% (M)**,** 38% (W)
No. of seeds: 567 (C), 2 (M), 41 (W)
Ecology and economy: Weed of waste and arable ground. Annual grass. Archaeophyte, earliest record from the Bronze Age.
References: Preston et al. 2004

Poaceae indet.

Preservation: C M W
Measurements: various
Description: Dry elongate fruits.
Ubiquity: 76% (C), 50% (M), 86% (W)
No. of seeds: 2936 (C), 16 (M), 6922 (W)
Ecology and economy: Dry elongate grain. Includes *Festuca*, *Lolium*, *Poa*, *Phleum*. No attempt at separation was made due to generally poor preservation. Wide range of habitats represented.

Hordeum vulgare subsp. *vulgare* – Six-row Hulled Barley

Preservation: C M W
Measurements:
Grain: 5.8 x 2.8 x 2
Rachis internode: 1.2 (thinnest) -1.8 (widest) x 0.2
Description: Grains identified due to the spindle shape, ventral groove/crease and lack of dorsal bulge. Hulled grains were identified due to angular vertical edges. Grains were classified as either straight, twisted or not defined. Whilst the overall proportions of twisted to straight grains are not strongly reflective of six-row barley, there was no basis to believe that two-rowed *Hordeum* was present. *Hordeum* rachis was identified due to a straight rachis in lateral view and narrow glume attachments. They were occasionally assigned to six-rowed due to the identification of three grain attachment points. Narrow elongate rachis-internodes were classified as lax-eared.
Ubiquity: Grain: 65% (C), 50% (M) **Rachis:** 21% (C), 17% (W)
No. of seeds: Grain: 345 (C), 1 (M) **Rachis:** 112 (C), 5 (W)
Ecology and economy: Barley was domesticated in the early Neolithic Near East and alongside wheat, is the key crop of European agriculture. Six-row hulled barley was introduced to Britain during the Early Neolithic and cultivation was continuous. Barley is it often considered as an inferior crop used for fodder or brewing, but can deal with poorer soil conditions than wheat.
References: Jacomet 2006, Zohary et al. 2012

Secale cereale L. – Rye

Preservation: C
Measurements: 5.3 x 2.3 x 2.2
Description: Cereal grain. Oval shape, relatively parallel sides. Blunt apical end. Long scutellum. Smooth surface.
Ubiquity: 3% (C)
No. of seeds: 2 (C)
Ecology and economy: Domesticated in the early Neolithic Near East. Several possible Bronze Age and Iron Age records from Britain, but not a common crop until the Saxon period. Drought resistant and copes well with sandy acidic soils.
References: Tomlinson and Hall 1996; Zohary et al. 2012

Triticum dicoccum L. – Emmer Wheat

Preservation: C
Measurements: 5.8 x 2.8 x 2.7
Description: Cereal grain. Grains were narrow, with a pronounced dorsal ridge. Glume bases had a sharply angled primary keel and more obtuse secondary keel. Glume bases were thin and tapering with few veins.
Ubiquity: Grain: 10% **Glume base:** 13% (C)
No. of seeds: Grain: 12 (C) **Glume base:** 17 (C)
Ecology and economy: Domesticated in the early Neolithic Near East. Cultivated in Britain since the Neolithic, but became less common during the Iron Age.
References: Campbell and Straker 2003; Zohary et al. 2012

Triticum spelta L. – Spelt Wheat

Preservation: C M W
Measurements: 6.6 x 3.2 x 3.0
Description: Grains had a rounded low dorsal profile, straight sides, rounded ends and were longer in length than width. Grains of short-grained spelt were shorter than usual spelt, but retained angularity and creases from being enclosed in glumes. Glume bases had rounded primary and secondary keels with distinctive veins running down the glumes.

Ubiquity: Grain: 36% (C) **Glume base:** 43% (C), 50% (M), 24% (W)
No. of seeds: Grain: 400 (C) **Glume base:** 1816 (C), 2 (M), 35 (W)
Ecology and economy: Spelt wheat is thought to have originated in the region of the SW Caspian sea around 6000-5000 BC. Spelt was introduced to southern Britain during the middle Bronze Age and gradually replaced emmer as the main wheat crop by the Iron Age.
References:
Campbell and Straker 2003
Zohary et al. 2012

Triticum sp. – Free-threshing Wheat

Preservation: C
Measurements: Grain**:** 4.4 x 2.9 x 2.7
Description: Free-threshing wheat grains were rounded and equal in width to length with no angularity. This identification category includes hexaploid (*aestivum*) and tetraploid (*durum*), although it is unlikely that any tetraploid wheat is present. Rachis internodes were identified as free-threshing due to the clean glume scars and clearly defined rachis attachments. One rachis was identified as hexaploid due to lines running down the abaxial surface and trapezoidal shape.
Ubiquity: Grain: 10% (C) **Rachis:** 3% (C)
No. of seeds: Grain: 10 (C) **Rachis:** 3 (C)
Ecology and economy: Free-threshing hexaploid wheat (*T. aestivum*) is currently thought to have evolved from hulled hexaploid wheat (*T. spelta*) around the 6th/5th millennium BC. Free-threshing wheat has probably been present in Britain from the Early Neolithic, but most identifications are problematic. Large deposits are only present from the Roman period, such as at the South Shields fort granary.
References: Hillman et al. 1996; Van der Veen 1988

POLYGONACEAE

Polygonum aviculare L. – Knotgrass

Preservation: C W
Measurements: 1.8 x 1.2 x 0.8
Description: Achenes. Trigonous shape with rounded angles and sides of unequal width. Bullate surface texture.
Ubiquity: 31% (C), 70% W
No. of seeds: 104 (C), 951 (W)
Ecology and economy: Annual of open ground.

Rumex spp. - Dock

Preservation: C M W
Measurements: 1.5 x 1.1 x 1.1
Description: Trigonous achene with sharp angles. Identification to species only possible when tepals were present, with distinctive tubercules and margins. Separated from *Carex* spp. by smooth surface cell pattern.
Ubiquity: 57% (C), 50% (M), 48% (W)
No. of seeds: 483 (C), 3 (M), 217 (W)
Ecology and economy: Perennial herbs of various habitats, including waste ground, grassland, wetland and woodland.

Rumex acetosella L. – Sheep's Sorrel

Preservation: C W
Measurements: 1 x 0.6 x 0.6
Description: Trigonous achene, shorter, more rounded than other *Rumex* spp. When present, tepals lack tubercules and are shorter than achenes.
Ubiquity: 39% (C), 62% (W)
No. of seeds: 122 (C), 680 (W)
Ecology and economy: Perennial herb of heathy open ground including arable land and short grassland. Mainly sandy acidic soils.

PORTULACACEAE

Montia fontana L. – Blinks

Preservation: C W
Measurements: 0.7 x 0.6 x0.4
Description: Seeds. Dark brown or black kidney/round shape. Surface covered in closely packed tubercles.
Ubiquity: 13% (C), 31% (W)
No. of seeds: 13 (C), 163 (W)
Ecology and economy: Annual/Perennial herb found in a range of damp places. Only ssp. *chondrosperma* was identified.

RANUNCULACEAE

Ranunculus flammula L. – Lesser Spearwort

Preservation: C W
Measurements: 1.8 x 1.1 x 0.7
Description: Achene. Coarse cell pattern. Obovate shape. Smaller diameter and thicker breadth in comparison to other *Ranunculus* spp. present.
Ubiquity: 1% (C), 59% (W)
No. of seeds: 1 (C), 151 (W)
Ecology and economy: Perennial herb. Grows in a wide range of wet places.

Ranunculus parviflorus L. – Small-flowered Buttercup

Preservation: W
Measurements: 2.1 x 2 x 0.5
Description: Achene. Obovate shape with short hooked beak. Tubercles with short hooked spines on both sides.
Ubiquity: 45% (W)
No. of seeds: 27 (W)
Ecology and economy: Annual herb, found in a wide range of open ground.

Ranunculus repens L. – Creeping Buttercup

Preservation: C W
Measurements: 2.3 x 2 x 0.7
Description: Achene with short curved beak. Obovate shape. If well preserved wing is still present. Larger cells than *Ranunculus acris/sardous/parviflorus*. Usually light in colour. Thick edge.
Ubiquity: 1% (C), 66% (W)
No. of seeds: 1 (C), 216 (W)
Ecology and economy: Wet grassland, marshes, woodland and stream sides.

Ranunculus sardous Crantz - Hairy Buttercup

Preservation: C W
Measurements: 2.3 x 2 x 0.6
Description: Achene. Obovate shape. Tubercules around the edge of the two faces. Curved beak.
Ubiquity: 1% (C), 52% (W)
No. of seeds: 1 (C), 110 (W)
Ecology and economy: Annual herb of grassland and cultivated land.

Ranunculus acris/repens/bulbosus.

Preservation: C
Measurements: 2 x 2.3 x 2.4
Description: Category included *acris*, *repens* and *bulbosus*, which cannot be separated in charred items due to a lack of surface detail.
Ubiquity: 10% (C)
No. of seeds: 46 (C)
Ecology and economy: Damp or dry grassland, woods and marshes.

Ranunculus subg. *Ranunculus* – Buttercups
Preservation: C W
Measurements: -
Description: Achene. Obovate shape. Broad category used for less well preserved *Ranunculus*. Includes *acris, repens, bulbosus, sardous* and *flammula.*
Ubiquity: 4% (C), 52% (W)
No. of seeds: 5 (C), 204 (W)
Ecology and economy: Range of habitats including grassland, wet ground, mashes, woodland, wet and dry.

ROSACEAE

Aphanes arvensis L. – Parsley-piert

Preservation: W
Measurements: 0.9 x 0.5 x 0.2
Description: Achene. Asymmetrical ovate shape. Slightly larger seeds than *A. australis*.
Ubiquity: 3% (C), 41% (W)
No. of seeds: 3 (C), 24 (W)
Ecology and economy: Annual herb of arable and open ground on well-drained soils.

Aphanes australis Rydb. – Slender Parsley-piert

Preservation: W
Measurements: 0.8 x 0.5 x 0.2
Description: Achene. Asymmetrical ovate shape. Slightly larger seeds than *A. australis*.
Ubiquity: 41% (W)
No. of seeds: 99 (W)
Ecology and economy: Annual herb of open and arable ground on well-drained soils, not often on base-rich soils.

Filipendula ulmaria (L.) Maxim – Meadowsweet

Preservation: C W
Measurements: 3.1 x 1.4 x 0.4
Description: Achenes with 1-2 seeds. Flat crescent shaped with one end pointed and one flattened. Thickened inner edge.
Ubiquity: 1% (C), 52% (W)
No. of seeds: 1 (C), 298 (W)
Ecology and economy: Perennial herb. Wide range of wet and damp places, including hay meadows and river-sides.

Fragaria vesca L. – Wild Strawberry

Preservation: W
Measurements: 1.1 x 0.6 x 0.3
Description: Achenes, originally positioned on swollen receptacle. Rounded-triangular shaped with slight hook. Distinguished from *Potentilla reptans* by a lack of tubercules and from *P. sterilis* by the striations running out from the corner of the achene.
Ubiquity: 1 (W)
No. of seeds: 3% (W)
Ecology and economy: Perennial herb, common in hedgerows, scrub and woodland. Edible fruits, consumed in Roman Britain.
References: Van der Veen et al. 2008

Prunus avium (L.) L. – Sweet Cherry

Preservation: W
Measurements: 7.5 x 6.0 x 2.1
Description: Stone of fleshy drupe with hardened endocarp. Smooth surface and rounded shape.
Ubiquity: 3% (W)
No. of seeds: 1 (W)
Ecology and economy: Deciduous tree, found in hedges and woodland edge. Generally considered native, but has been argued as a Roman introduction.
References: Moffett et al. 1989

Prunus domestica L. – Bullace/Plum

Preservation: C
Measurements: 10.7 x 7 (frag)
Description: Stone of fleshy drupe with hardened endocarp. Less coarse surface texture than *P. spinosa* and more pointed shape.
Ubiquity: 1% (C)
No. of seeds: 1 (C)
Ecology and economy: Deciduous large shrub or tree. Introduced to Britain in the Roman period.
References: Van der Veen et al. 2008

Prunus spinosa L. – Sloe

Preservation: W
Measurements: 7.9 x 6.1 x 5.2
Description: Stone of fleshy drupe with hardened endocarp. Globose to ovoid in shape. Distinguished from *Prunus avium* due to its rough surface texture.
Ubiquity: 17% (W)
No. of seeds: 9 (W)
Ecology and economy: Deciduous shrub of hedges, scrubs and woods. Edible berries, thought to have been consumed in Roman Britain.
References: Van der Veen et al. 2008

Pyrus/Malus sp.– Apple/Pear

Preservation: M W
Measurements: 6.7 x 5.1 x 3.8
Description: Elongate pips with oval based and pointed end. The single waterlogged specimen was identified as *Malus* sp. due to the broad shape of the pip. The mineralised specimens were identified as *Malus/Pyrus*.
Ubiquity: 100% (M), 3% (W)
No. of seeds: 26 (M), 1 (W)
Ecology and economy: *Malus sylvestris* is a native small tree of scrubland, hedges and woods. *Malus domestica* is a larger tree, now naturalised in hedges, scrub and waste

ground, spread to north-west Europe during the Roman period. The pip could not be identified to species.
References: Robinson et al. 2006

Rubus sect. *Glandulosus* – Bramble/Blackberry

Preservation: C M W
Measurements: 2.1 x 1.6 x 0.8
Description: Seeds of drupes with hardened endocarps. Raised network pattern. Some mineralised seeds had organic testa adhering, others only had a mineralised endosperm.
Ubiquity: 6% (C), 50% (M), 66% (W)
No. of seeds: 4 (C), 158 (M), 107 (W)
Ecology and economy: Deciduous/semi-evergreen spiny shrubs. Wide range of habitats, especially disturbed waste ground. Fruits consumed in Roman Britain.
References: Van der Veen et al. 2008

Rubus idaeus L. – Raspberry

Preservation: W
Measurements: 2.7 x 1.6 x 0.5
Description: Seeds of drupes with hardened endocarps. Raised network pattern. Elongate kidney shape. Very similar to Rubus fruticosus. Separation only possible with large population. More slender.
Ubiquity: 1 (W)
No. of seeds: 72 (W)
Ecology and economy: Woody biennials found in heaths, woods and waste ground.

SCROPHULARIACEAE

Odontites vernus (Bellardi) Dumort. – Red Bartsia

Preservation: C W
Measurements: 2.2 x 0.9 x 0.9
Description: Oval shape seeds. Ladder like cell pattern with vertical ridges. Distinguished from *Euphrasia* spp. by lower, less prominent vertical ridges.
Ubiquity: 4% (C), 21% (W)
No. of seeds: 16 (C), 37 (W)
Ecology and economy: Annual herb. Grassy places, arable and waste ground. Also rocky and coastal.

SOLANACEAE

Atropa belladonna L. – Deadly Nightshade

Preservation: C W
Measurements: 1.2 x 1.1 x 0.8
Description: Seed from a berry. Compact kidney shape. Cells with raised jagged borders run around the edge of the seed. Pale brown. In comparison to *Hyoscyamus*, smaller cells with less thick cells walls. In comparison to *Solanum*, larger cells with thicker cell walls.
Ubiquity: 3% (C), 35% (W)
No. of seeds: 4 (C), 10 (W)
Ecology and economy: Perennial herb of woodland, scrub, disturbed and cultivated ground. Probably native only on chalk and limestone.

Hyoscyamus niger L. – Henbane

Preservation: C W
Measurements: 1.3 x 1.1 x 0.5
Description: Seeds from capsule (dry fruit). Compact flat kidney shape. Cells with prominent reticulate borders run around the edge of the seed. Pale brown. In comparison to *Solanum*, larger cells, thicker cells walls and peaks on cell walls.
Ubiquity: 21% (W)
No. of seeds: 20 (W)
Ecology and economy: Annual/biennial herb of waste ground, especially nitrogen rich soils.

Solanum nigrum L. – Black Nightshade

Preservation: C W
Measurements: 2.1 x 1.5 x 0.2
Description: Seed from a berry. Asymmetrical ovate shape. Small cells with raised jagged borders around the edges. Yellow to pale brown colour. Seeds distinguished from *S. nigrum* by the more elongate and pointed shape and smaller vesicular surface pattern.
Ubiquity: 4% (C), 38% (W)
No. of seeds: 3 (C), 200 (W)
Ecology and economy: Annual herb of waste and cultivated ground.

URTICACEAE

Urtica dioica L. – Common Nettle

Preservation: C W
Measurements: 1.2 x 0.8 x 0.4
Description: Achene. Ovate shape. Symmetrical, unlike *Aphanes* spp.
Ubiquity: 17% (C), 50% (M), 72% (W)
No. of seeds: 27 (C), 28 (M), 913 (W)
Ecology and economy: Perennial herb found in range of habitats, all nitrogen rich, including woodland, fens and arable land.

Urtica urens L. – Small Nettle

Preservation: C M W
Measurements: 1.9 x 0.8 x 0.2
Description: Achene. Ovate shape. Papillose surface with red crystalline projections.
Ubiquity: 3% (C), 50% (M), 76% (W)
No. of seeds: 2 (C), 7 (M), 1762 (W)
Ecology and economy: Annual herb of cultivated and waste ground.

OTHER IDENTIFICATION CATEGORIES

Bread/dung lumps
Several intact lumps of carbonised material were identified in the assemblage. Tentative identifications of bread were made to pieces which included cereal bran and consisted of a vesicular material. A fragment from <6530> was identified as porridge based on the liquid appearance of the material. Cautious identifications of dung were made to pieces which include pieces of tough plant stem.

Table A: Classification of weed taxa into physical types for discriminant analysis: BFH (big free heavy), SFH (small free heavy), SFL (small free light), SHH (small headed heavy), SHL (small headed light).

Weed taxa	Weed type	Weed taxa	Weed type
Adonis annua	BFH	Dactylis glomerata	SFH
Aethusa cynapium	BFH	Danthonia decumbens	SFH
Agrostemma githago	BFH	Daucus carota	BFH
Anagallis arvensis	SFH	Eleocharis palustris	SFH
Anthemis arvensis	SHH	Eleocharis sp.	SFH
Anthemis cotula	SHH	Euphorbia exigua	SFH
Aphanes arvensis	SFH	Euphorbia platyphyllos	SFH
Aphanes australis	SFH	Euphrasia/Odontites sp.	SFL
Arenaria serpyllifolia	SFL	Fallopia convolvulus	BFH
Arrhenatherum elatius	SFH	Fumaria sp.	BFH
Arrhenatherum tuberosum	SFH	Galeopsis sp.	BFH
Artemesia vulgaris	SFH	Galeopsis tetrahit	BFH
Atriplex patula/prostrata	BFH	Galium aparine	BFH
Atriplex sp.	BFH	Galium mollugo	SFH
Avena sativa	BFH	Galium mollugo/verum	SFH
Avena sp.	BFH	Galium verum	SFH
Brassica nigra	SFH	Geranium dissectum	SFH
Brassica rapa ssp. Sylvestris	SFH	Geranium pusillum	SFH
Brassica sp.	SFH	Glechoma hederacea	SFH
Bromus eubromus	BFH	Hyoscyamus niger	SFH
Bromus hordaeceus	BFH	Juncus indet.	SFL
Bromus subg. Bromus	BFH	Juncus bufonius	SFL
Bromus subg. Eubromus	BFH	Juncus effusus	SFL
Bromus subg. Genea	BFH	Juncus articulatus gp.	SFL
Bromus secalinus	BFH	Lapsana communis	SFH
Bromus sp.	BFH	Lathyrus nissolia	BFH
Bromus/Avena sp.	BFH	Lathyrus sp.	BFH
Bupleurum rotundifolium	SFH	Leucanthemum vulgare	SHL
Campanula glomerata	SFL	Lolium perenne	SFH
Carex sp.	SFH	Malva sp.	SHH
Centaurea cyanus	SFH	Malva sylvestris	SHH
Centaurea nigra	SFH	Medicago lupulina	SHH
Cerastium fontanum	SFH	Medicago sp.	SHH
Chenopodium album	SFH	Mentha arvensis	SFL
Chenopodium ficifolium	SFH	Montia fontana Ssp.	SFH
Chenopodium murale	SFH	Odontites sp.	SFL
Chenopodium polyspermum	SFH	Odontites vernus	SFL
Chenopodium rubrum	SFH	Papaver rhoeas type	SHL
Chenopodium urbicum	SFH	Papaver somniferum	SHL
Chenopodium sp.	SFH	Papaver sp.	SHL
Chrysanthemum segetum	SHH	Papaver aregmone	SHL

Weed taxa	Weed type	Weed taxa	Weed type
Papaver argemone	SHL	Silene sp.	SHH
Persicaria lapathifolia	SFH	Silene vulgaris	SHH
Persicaria maculosa	SFH	Solanum nigrum	SFH
Phleum pratense	SFH	Spergula arvensis	SFH
Plantago lanceolata	SFH	Stachys sylvatica	SFH
Plantago major	SFH	Stellaria graminea	SFH
Plantago media	SFH	Stellaria media gp.	SFH
Plantago media/lanceolata	SFH	Stellaria sp.	SFH
Plantago sp.	SFH	Torilis arvensis	BFH
Poa annua	SFH	Torilis japonica	BFH
Polygonum aviculare agg.	SFH	Torilis nodosa	BFH
Potentilla erecta	SFH	Torilis sp.	BFH
Potentilla reptans	SFH	Trifolium pratense	SFH
Potentilla sp.	SFH	Trifolium pratense/repens	SFH
Prunella vulgaris	SFH	Trifolium sp.	SFH
Ranunculus acris	BFH	Tripleurospermum inodorum	SFL
Ranunculus bulbosus	BFH	Tripleurospermum maritimum	SFL
Ranunculus parviflorus	BFH	Tripleurospermum sp.	SFL
Ranunculus repens	BFH	Urtica dioica	SFH
Ranunculus subg. a. r. b.	BFH	Urtica sp.	SFH
Ranunculus subg. ranunculus	BFH	Urtica urens	SFH
Ranunculus sardous	BFH	Valeriana dioica	SFH
Rumex acetosa	SFH	Valerianella locusta	BFH
Rumex acetosella agg.	SFH	Valerianella rimosa	BFH
Rumex conglomeratus/obtusifolius/ sanguineus	SFH	Valerianella dentata	SFH
Rumex crispus	SFH	Veronica agrestis	SFH
Rumex crispus/longifolius	SFH	Veronica arvensis	SFH
Rumex sp.	SFH	Veronica serpyllifolia	SFH
Scleranthus annuus	SFH	Veronica sp.	SFH
Senecio vulgaris	SFL	Vicia hirsuta	BFH
Sherardia arvensis	SFH	Vicia sativa spp. nigra	BFH
Silene alba	SHH	Vicia sativa ssp. angustifolia	BFH
Silene dioica	SHH	Vicia sp.	BFH
Silene gallica	SHH	Vicia tetrasperma	BFH
Silene latifolia	SHH	Vicia/Lathyrus sp.	BFH

Table B: Autecological weed data: S = Silchester study, R = regional study, S+E = short and early, L+L = long and late, M = medium, A = annual, P = perennial, P(R) = regenerative perennial. For explanation of F (moisture) , R (reaction) and N (nitrogen) see Table 4.11.

Study	Family	Weed	Code	F	R	N	Flowering	Life form	Chalk	Clay	Height
R	AST	Anthemis cotula	AGROGIT	5	6	6	L+L	A		Y	40-70
R	CAR	Agrostemma githago	AGROGIT	5	6	5	M	A			>70
R	AST	Anthemis arvensis	ANTHARV	4	7	6	L+L	A	Y		40-70
R	ROS	Aphanes arvensis	APHAARV	4	6	4	L+L	A		N	<40
R	CAR	Arenaria serpyllifolia	ARENSER	3	7	5	M	A			>70
S R	CHE	Atriplex sp.	ATRISP	5-7	7	7	M	A			>70
S	SOL	Atropa/Solanum sp.	ATROSOL	4/5	8/7	6/8	-	-			-
S R	POA	Avena sp.	AVENSP	4	7	7	L+L	A			>70
S R	BRA	Brassica sp.	BRASSP	5	7	6	S+E	A			>70
S	POA	Bromus/Avena sp.	BROMAVE	4/5	5/7	4/7					>70
R	POA	Bromus subg. Bromus	BROMBRO	4	7	6	S+E	A			>70
S	POA	Bromus secalinus	BROMSEC	4	5	4	S+E	A			>70
R	AST	Carduus/Cirsium sp.	CARDCIR	4-8	5-8	3-7					>70
S R	CYP	Carex sp.	CARESP	3-10	1-8	1-7	S+E	P(R)			>70
R	AST	Centaurea cyanus	CENTCYN	5	6	7	S+E				4-70
R	CAR	Cerastium sp.	CERASSP	2-5	5-8	1-4					<40
S R	CHE	Chenopodium album	CHENALB	5	7	7	L+L	A			>70
S	CHE	Chenopodiaceae indet.	CHENOPO	5-7	6-7	7-8	L+L	A			>70
R	AST	Chrysanthemum segetum	CHRYSEG	5	6	5	S+E	A		N	40-70
S	CYP	Cyperaceae indet.	CYPERAC	7-9	5-6	0-3					
S R	CYP	Eleocharis palustris	ELEOPAL	10	6	4	S+E	P(R)			>70
S	SCR	Euphrasia/Odontites sp.	EUPHODO	4-7	5-8	2-5	-	A			40-70
R	POL	Fallopia convolvulus	FALLCON	4	7	5	L+L	A			>70
R	FUM	Fumaria sp.	FUMASP	3-5	6-8	5-6	L+L	A			>70
S R	RUB	Galium aparine	GALIAPA	6	7	8	S+E	A			>70
R	RUB	Galium album/ verum/palustre	GALIAVP	-	6	4	S+E	A			>70
R	SOL	Hyoscyamus niger	HYOSNIG	4	7	9	S+E	P			>70
R	JUN	Juncus indet.	JUNCIND	5-10	2-8	1-6	-	-			-
R	AST	Lapsana communis	LAPSCOM	4	7	7	L+L	A			>70

Study	Family	Weed	Code	F	R	N	Flowering	Life form	Chalk	Clay	Height
S R	LIN	Linum catharticum	LINUCAT	5	7	2	M	A	Y		<40
R	BOR	Lithospermum arvense	LITHARV	4	7	5	S+E	A			40-70
S R	MAL	Malva sp.	MALVSP	4	8	7	M	P			>70
S R	FAB	Medicago lupulina	MEDILUP	4	8	4	M	A			40-70
S R	FAB	Medicago/Trifolium sp.	MEDITRI	3-5	5-8	2-6	M	-			40-70
S R	POR	Montia fontana	MONTFON	9	5	3	L+L	A			<40
R	SCR	Odontites vernus	ODONVER	5	6	5	S+E	A			40-70
R	PAP	Papaver argemone	PAPAARG	4	6	5	S+E	A		N	40-70
R	PAP	Papaver rhoeas type	PAPARHO	4-5	6-8	4-6	-	A			40-70
R	PAP	Papaver somniferum	PAPASOM	4	7	8	-	A			>70
S R	POL	Persicaria lapathifolia/maculosa	PERSLAM	6	6	7	M	A			>70
R	PLA	Plantago lanceolata/media	PLANLAM	5	6	4	L+L	P(R)			<40
R	PLA	Plantago major	PLANMAJ	5	6	7	M	P			<40
S R	POL	Polygonum aviculare agg.	POLYAVI	5	7	6	L+L	A			<40
R	ROS	Potentilla sp.	POTESP	3-9	3-7	1-6	-	P(R)			>70
S R	LAM	Prunella vulgaris	PRUNVUL	5	6	4	M	P(R)			<40
S R	RAN	Ranunculus subg. a. r. b.	RANUARB	6	6	5	L+L	P(R)			40-70
S R	POL	Rumex acetosella agg.	RUMEACT	5	4	3	M	P(R)	N	N	<40
S R	POL	Rumex sp.	RUMESP	6	7	7	-	P			>70
R	RUB	Sherardia arvensis	SHERARV	4	6	4	L+L	A			40-70
R	CAR	Silene sp.	SILESP	4-6	6-8	5-7		P			>70
S R	CAR	Spergula arvensis	SPERARV	4	5	5	M	A	N	N	<40
S	CAR	Stellaria graminea	STELGRA	6	5	4	M				>70
R	CAR	Stellaria graminea/palustris	STELGRM	6-8	5-6	4	M	P (R)			>70
S R	CAR	Stellaria media gp.	STELMED	5	6	7	L+L	A			40-70
R	API	Torilis sp.	TORISP	5	7	6		A			>70
S R	AST	Tripleurospermum inodorum	TRIPINO	5	6	6	L+L	A			40-70
S R	URT	Urtica dioica	URTIDIO	6	7	8	M	P(R)			>70
S	URT	Urtica urens	URTIURE	5	6	7	L+L	A			40-70
R	SCR	Veronica arvensis	VEROARV	4	6	5	L+L	A			<40
S R	FAB	Vicia/Lathyrus sp.	VICILAT	3-8	5-8	3-6	M	-			>70

Identifications are given in alphabetical order by Reid's identification.

Key:

Plant part: C = capsule, L = leaf, P = propagule. Preservation: C = charred, M = mineralised, W = waterlogged.

Status: o = absent, + = present, ! = reidentified.

Latin name - Reid's identification	Latin name - confirmed or reidentified	Common name - confirmed or reidentified	Plant part	Preservation	Status	No. of items	Year labelled	Insula	Feature
Ajuga reptans L.	*Ajuga reptans* L.	Bugle	P	W	+	1	1902		
Alchemilla arvensis L.	*Aphanes arvensis* L.	Parsley-piert	P	W	+	2			
Alchemila arvensis L.	*Aphanes arvensis* L.	Parsley-piert			o		1900	23	Pit XVII at 1'
Alisma plantago L.	*Alisma plantago-aquatica* L.	Water-plantain	P	W	+	1	1905		Pit XII at 8'
Anagallis tenella	cf. Primulaceae indet.	Primrose family	P	W	+	1	1900		Pit XII
Anethum graveolens	*Anethum graveolens* L.	Dill	P	W, M	+	3	1903		Pit III at 11'
Anethum graveolens	*Anethum graveolens* L.	Dill	P	W/M	+	1	1900		Pit XVII
Anethum graveolens	*Anethum graveolens* L.	Dill	P	W	+	1	1900		Pit XVII
Anethum graveolens	*Anethum graveolens* L.	Dill	P	W	+	8	1900		Pit XVII
Anethum graveolens	*Anethum graveolens* L.	Dill	P	W	+	1	1902		Pit II sample 1
Anethum graveolens	*Anethum graveolens* L.	Dill	P	W	+	2			
Anethum graveolens	*Anethum graveolens* L.	Dill	P	W	+	1	1904		F
Apium graveolens L.	Apiaceae indet.	Carrot family			o		1900	23	Pit XVII
Apium nodiflorum Reichb.	*Apium nodiflorum* (L.) Lag.	Fool's-water-cress	P	W	+	7	1902		Pit II 2nd sample
Apium nodiflorum Reichb.	*Apium nodiflorum* (L.) Lag.	Fool's-water-cress	P	W	+	5	1906		No 3 tank
Arctium lappa L.	*Arctium* sp.	Burdocks	P	W	+	1	1900		Pit XXVII (well)
Atropa belladonna L.	*Atropa belladonna* L.	Deadly Nightshade	P	W	+	1	1902		Well B
Atriplex	*Chenopodium album* L.	Fat-hen	P	W	!	7			
Atriplex patula L.	*Atriplex* sp.	Oraches	P	W	+	7	1902		Pit XI
Atriplex patula L.	*Atriplex* sp.	Oraches	P	W	+	1	1902		Pit II sample 1
Atriplex patula L.	*Atriplex* sp.	Oraches	P	W	+	1	1902		Well A 17'
Atropa belladonna					o		1908		Pit X 16'-1' down
Atropa belladonna L.	*Atropa belladonna* L.	Deadly Nightshade	P	W	+	1	1902		Pit II
Atropa belladonna L.	*Atropa belladonna* L.	Deadly Nightshade	P	W	+	1	1902		Well E
Atropa belladonna L.	*Hyoscyamus niger* L.	Henbane	P	W	!	1	1900		Pit XIX
Ballota nigra L.	*Ballota nigra* L.	Black Horehound	P	W	+	1	1903		Pit V
Ballota nigra L.	*Ballota nigra* L.	Black Horehound	P	W	+	5		22	Well
Bidens tripartita L.	*Bidens tripartita* L.	Trifid Bur-marigold	P	W	+	1	1900	26	Well 1
Bidens tripartita L.	*Bidens tripartita* L.	Trifid Bur-marigold	P	W	+	1	1903		Pit III at 11'
Brassica alba? Boiss.	Fungal body			W	!	7		22	Well
Brassica campestris	*Brassica* sp.	Mustards	P	W	+	4		27	Pit VIII at 18' deep

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Brassica nigra Koch	*Brassica nigra* (L.) W.D.J. Koch	Black Mustard	P	W	+	1	1907	35	Square wood-lined well. SE side of house
Brassica nigra Koch	*Brassica nigra* (L.) W.D.J. Koch	Black Mustard	P	W	+	3	1906		No 3 tank
-	cf. *Brassica* sp.		P	W	!	2	1900	22	Well
Bryonia dioica L.	*Bryonia dioica* Jacq.	White Bryony	P	W	+	1	1903		Pit III 11'
Bryonia dioica L.	*Bryonia dioica* Jacq.	White Bryony	P	W	+	1	1900		Well called pit no 1
Buxus sempervirens	*Buxus sempervirens* L.	Box	L	W	+	1			
Calamintha arvensis Lam.	*Mentha* sp.	Mint	P	W	+	1	1902		Well E
Caltha palustris L.	*Caltha palustris* L.	Marsh-marigold	P	W	+	1	1901		Pit XVIII
Caltha palustris L.	*Caltha palustris* L.	Marsh-marigold			o		1900		Well called pit no 1
Caltha palustris L.	*Caltha palustris* L.	Marsh-marigold	P	W	+	1			
Carduus crispus L.	cf. *Carduus* sp.	Thistle	P	W	+	2	1906		Long Tank No 1
Carduus nutans	*Carduus* sp.	Thistle	P	W	+	4	1902		Pit II sample 1
Carduus nutans L.	*Carduus* sp.	Thistle	P	W	+	1	1902		Small black pot at bottom of well E
Carex	*Carex* sp.	Sedges	P	W	+	1	1899	22	Well, wood lined at 23'6" deep
Carex dioica L.	Cyperaceae indet.	Sedges	P	W	+	1	1902		Pit XIII
Carex muricata Linn.	*Carex* sp.	Sedges	P	W	+	1	1903		Pit II at 7'
Carex ovaslis? Good.	*Carex* sp.	Sedges	P	W	+	1	1902		Pit XIII
Carex panicea? L	*Carex* sp.	Sedges	P	W	+	1	1903		Pit II at 7'
Carex remota? L.					o		1903		Pit II at 7'
Carex riparia Curtis	*Carex* sp.	Sedges	P	W	+	2	1900		Pit XIX
Carex riparia Curtis				W	o	1	1902		Well A
Caucalis anthriscus Huds.	*Anthriscus caucaulis* M. Bieb	Bur Chervil	P	W	+	1	1902		Measley whole black pot - well B
Cauclia anthriscus Huds	*Anthriscus caucaulis* M. Bieb	Bur Chervil	P	W	+	1	1908		Well A
Centaurea nigra L.	*Centaurea nigra* L.	Common Knapweed	P	W	+	1	1902		Caistor pot well E
Centaurea nigra L.	cf. *Centaurea nigra* L.	Common Knapweed	P	W	+	1	1905		Pit XI at 15'
Chaerophyllum aureum L.	*Scandix pecten-veneris* L.	Shepherd's-needle	P	W	!	1			
Chenopodium bonus-henricus	*Chenopodium* cf. *hybridum* L.	Maple-leaved Goosefoot	P	W	!	2	1900		Pit XIX
Chenopodium album L.	*Chenopodium album* L.	Fat-hen	P	W	+	1	1902		Well E
Chenopodium hybridum	*Chenopodium hybridum* L.	Maple-leaved Goosefoot	P	W	+	1	1902		Well B

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Chenopodium murale L.	*Chenopodium* sp.	Goosefoots	P	W	+	4	1907	35	Square wood-lined well SE side of house
Chenopodium murale L.	*Chenopodium* sp.	Goosefoots	P	W	+	1	1907		
Chenopodium rubrum	*Chenopodium polyspermum* L.	Many-seeded Goosefoot	P	W	!	1	1903		Pit III at 11'
Chenopodium rubrum	Chenopodiaceae indet.	Goosefoot family	P	W	+	1			Pit XVIII
Chenopodium bonus-henricus	*Atriplex* sp.	Oraches	P	W	!	7		22	Well
Chrysanthemum leucanthemum L.	*Leucanthemum vulage* Lam.	Oxeye Daisy	P	W	+	1			
Chrysanthemum leucanthemum L.			P	W	o		1900		Well called pit no 1
Chrysanthemum leucanthemum L.	*Leucanthemum vulage* Lam.	Oxeye Daisy	P	W	+	1	1902		Pit II sample 1
Conium maculatum L.	*Conium maculatum* L.	Hemlock	P	W	+	3		22	Well
Conium maculatum L.	*Conium maculatum* L.	Hemlock	P	W	+	5	1900	26	Well 1
Conium maculatum L.	*Conium maculatum* L.	Hemlock	P	W	+	2	1900	23	Pit XVII
Conopodium denudatum Koch			P	W	o				
Coriandrum sativum	*Coriandrum sativum* L.	Coriander	P	W	+	7	1900	21	Small house
Crataegus oxyacantha L.					o		1900	23	Pit XVII
Crataegus oxyacantha	*Prunus avium/cerasus*	Sweet/Dwarf Cherry	S	W	!	1			Drain from bath
Cricus lanceolatus Hoffn.	*Cirsium* sp.	Thistles	P	W	+	4		22	Well
Cricus palustris Hoffn.	*Cirsium* sp.	Thistles	P	W	+	2	1905	6	Below floor of house no 1
Crisus arvensis	*Cirsium* sp.	Thistles	P	W	+	1	1902		Caistor pot well E
Crisus arvensis Hoffn.	*Carduus/Cirsum* sp.	Thistles	P	W	+	2	1902		Caistor pot well E
Crisus arvensis Hoffn.	*Cirsium* sp.	Thistles	P	W	+	2	1902		Caistor pot well E
Daucus carota L.	*Daucus carota* L.	Carrot	P	W	+	1	1902		Pit …
Daucus carota L.	*Daucus carota* L.	Carrot	P	W	+	1	1902		Pit XIII
Eleocharis	*Eleocharis palustris* (L.) Roem. & Schult. agg.	Common Spike-rush	P	W	+	3	1903		Pit II at 7'
Eleocharis palustris R. Br-	*Eleocharis palustris* (L.) Roem. & Schult. agg.	Common Spike-rush	P	W	+	2			
Ficus carica L.	*Ficus carica* L.	Fig	P	W	+	13	1902		Under foundations
Ficus carica L.	*Ficus carica* L.	Fig	P	W	+	21	1900	23	Pit XVII
Fragaria vesca	*Fragaria vesca* L.	Wild Strawberry	P	W	+	13	1900		Pit XVII
Fragaria vesca L.	*Fragaria vesca* L.	Wild Strawberry	P	M	+	45			
Fumaria officinalis L.	*Fumaria* sp.	Fumitories	P	W	+	2	1903		Pit II at 7'
Fumaria officinalis L.	*Fumaria* sp.	Fumitories	P	W	+	1	1900		Pit XII
Fumaria officinalis L.	*Fumaria* sp.	Fumitories	P	W	+	2	1900		Pit XIX
Galeopsis tetrahit L.	*Galeopsis tetrahit* agg.	Common Hemp-nettle	P	W	+	2	1905	6	Below foor of house no I
Galeopsis tetrahit L.	*Galeopsis tetrahit* agg.	Common Hemp-nettle	P	W	+	3			

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Galeopsis tetrahit L.	*Galeopsis tetrahit* agg.	Common Hemp-nettle	P	W	+	1	1900		Pit XII
Galeopsis tetrahit L.	*Galeopsis tetrahit* agg.	Common Hemp-nettle	P	W	+	1	1900		Pit XXVII (well)
Galium					o				
Galium aparine L.					o	1	1907		Pit I
Galium aparine L.					o		1902		... foundations
Galium palustre L.	*Galium* cf. *aparine* L.	Cleavers	P	W	+	4	1902		Pit 11'-14'
Galium palustre L.	*Galium* sp.	Bedstraws	P	W	+	1	1902		Pit 7
Galium verum L.	*Galium* sp.	Bedstraws	P	W	+	2	1902		.... XI 11-14
Galium verum L.	*Galium* cf. *verum* L.	Lady's Bedstraw	P	W	+	1	1902		Pit XIII
Galium verum L.	*Galium* cf. *verum* L.	Lady's Bedstraw	P	W	+	1	1902		Pit XI
Hydrocotyle vulgaris L.	*Hydrocotyle vulgaris* L.	Marsh Pennywort	P	W	+	3	1900		Well called pit no 1
Hypericum perforatum L.	*Hypericum* sp.	St. John's Wort	P	W	+	1			
Hypochaeris radicata	*Hypochaeris* sp.	Cat's-ears	P	W	+	1	1907		Pit 1
Ilex aquifolium	*Ilex aquifolium* L.	Holly	L	W	+	2	1905		Wooden well
Lamium purpurium L.	*Lamium* sp.	Dead-nettles	P	W	+	1	1903		Pit V
Lapsana communis L.	*Lapsana communis* L.	Nipplewort	P	W	+	2	1902		Caistor pot well E
Leontodon hispidus	*Leontodon* sp.	Hawkbits	P	W	+	1	1905		Pit XI at 15'
Leontodon hispidus L.	*Leontodon* sp.	Hawkbits	P	W	+	3	1900		Well called pit no 1
Lithospermum arvense L.	cf. *Lithospermum arvense* L.	Field Gromwell	P	W	+	1	1902		Pit II sample 1
Lychnis alba					o		1909		Pit below city wall
Lychnis alba Mill	*Silene* sp.	Campions	P	W	+	4	1900		Pit XIX
Lychnis flos-cuculi L.	*Silene* sp.	Campions	P	W	+				
Lychnis githago Lam.	*Agrostemma githago* L.	Corncockle	P	W	+	2	1900		Well called pit no 1
Lycopus europaeus L	*Lycopus europaeus* L.	Gypsywort	P	W	+	7	1903		Pit III at 11'
Lycopus europaeus L.	*Lycopus europaeus* L.	Gypsywort	P	W	+	1	1900		
Malva rotundifolia L.	*Malva* sp.	Mallows	P	W	+	2	1900	26	Well no 1
Mespilus germanica	*Mesiplus germanica* L.	Medlar	P	W	+	1	1904		
Montia fontana	*Montia fontana ssp. chondrosperma* (Fenzl) Walters	Blinks	P	W	+	8	1909		Pit below city wall
Montia fontana L.	*Montia fontana* ssp.	Blinks	P	W	+	2	1905	6	Below floors in house no 1
Morus nigra L.	*Morus nigra* L.	Mulberry	P	W	+	1	1902		Pit II
Morus nigra L.	*Morus nigra* L.	Mulberry	P	W	+	3	1902		Under foundation
Oenanthe	*Oenanthe pimpinelloides* gp.	Water-dropwort	P	W	+	1	1900		Pit XXVII (well)
Oenanthe fistulosa L.	*Oenanthe pimpinelloides* gp.	Water-dropwort	P	W	+	1	1907		
Oenanthe lachenalii	*Oenanthe pimpinelloides* gp.	Water-dropwort	P	W	+	1	1908		Pit X 16' - 17'
Oenanthe lachenalli or *croccoata*	*Oenanthe pimpinelloides* gp.	Water-dropwort	P	W	+	1	1900		
Onopordum acanthium L.	*Onopordum acanthium* L.	Cotton Thistle	P	W	+	1	1905		Pit IX no 5

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Papaver argemone	*Papaver argemone* L.	Prickly Poppy	P	W	+	1			
Papaver rhoeas L.					o		1900		Pit XXVII (well)
Papaver somniferum L.	*Papaver somniferum* L.	Opium Poppy	P	W	+	3	1904		
Plantago lanceolata					o	2	1905		Pit II at 13'
Plantago lanceolata L.	*Plantago lanceolata* L.	Ribwort Plantain	P	W	+	1	1900	25	Well no 1
Plantago lanceolata L.					o	4	1900		Pit XIX
Polygonum					o		1900	23	Pit XVII
Polygonum aviculare L.	*Polygonum aviculare* agg.	Knotgrass	P	W	+	1			
Polygonum aviculare L.	*Polygonum aviculare* agg.	Knotgrass	P	W	+	7		22	Well
Polygonum aviculare L.	*Persicaria maculosa* Gray	Redshank	P	W	+	1	1902		Pit II sample 1
Polygonum convolvulus L.	*Fallopia convolvulus* (L.) Á. Löve	Black-bindweed	P	W	+	3	1909		Pit below city wall
Polygonum convolvulus L.			P		o			27	Pit IX at 12'
Polygonum hydropiper L.	*Persicaria hydropiper* (L.) Spach	Water-pepper	P	W	+	1	1902		Pit II sample 1
Polygonum hydropiper L.			P		o		1900		Pit XXVII (well)
Polygonum hydropiper L.	*Persicaria hydropiper* (L.) Spach	Water-pepper	P	W	+	5	1902		Pit II sample 1
Polygonum lapathyfolium L.	*Persicaria lapathifolia* (L.) Gray	Pale Persicaria	P	W	+	1	1902		Pit XIII
Polygonum maculatum D & J.	*Persicaria maculosa* Gray	Redshank	P	W	+	1	1902		Well E
Polygonum persicaria	*Persicaria maculosa* Gray	Redshank	P	W	+	1	1900		Pit XXVII (well)
Polygonum persicaria L.	*Persicaria maculosa* Gray	Redshank	P	W	+	1	1906		Drain
Polygonum	*Persicaria maculosa* Gray	Redshank	P	W	+	1	1900		Pit XXVII (well)
Potamogeton	*Potamageton* sp.	Pondweeds	P	W	+	5	1909		Pit below city wall
Potentilla	*Potentilla* sp.	Cinquefoils	P	W	+	1	1900		Pit XXVII (well)
Potentilla					o		1900		Pit XXVII (well)
Potentilla tormentilla Neck.	*Potentilla* cf. *erecta* (L.) Raeusch	Tormentil	P	W	+	1			
Potentilla tormentilla Neck.	*Potentilla* cf. *erecta* (L.) Raeusch	Tormentil	P	W	+	2	1902		Pit II Sample 1
Potentilla tormentilla Neck.	*Potentilla* cf. *erecta* (L.) Raeusch	Tormentil	P	W	+	4		22	Well
Prunella vulgaris L.	*Prunella vulgaris* L.	Self Heal	P	W	+	1	1905		Pit XI at 13'
Prunella vulgaris L.	*Prunella vulgaris* L.	Self Heal	P	W	+	2			
Prunella vulgaris L.	*Prunella vulgaris* L.	Self Heal	P	W	+	2		22	Well
Prunus domestica L.	*Prunus domestica* ssp. *Insititia* (L.) Bonnier & Layens	Bullace/Damson	P	W	+	12			Drain from bath
Prunus domestica L.	*Prunus domestica* ssp. *Insititia* (L.) Bonnier & Layens / *Prunus spinosa* L.	Bullace/Damson /Sloe	P	W	+	19			
Prunus lusitanica L.	*Prunus* sp.		P	W	+	1	1904		
Prunus spinosa	*Prunus domestica* ssp. *Insititia* (L.) Bonnier & Layens / *Prunus spinosa* L.	Bullace/Damson /Sloe	P	W	+	60	1908		Pit XV
Prunus spinosa (A)	*Prunus spinosa* L.	Sloe	P	W	+	50		23	Pit XVII
Prunus spinosa (B)	*Prunus spinosa* L.	Sloe	P	W	+	60		23	Pit XVII

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Pteris aquilina	*Pteridium aquilinium* (L.) Kuhn	Bracken	L	W	+	2	1909		Pit below city wall
Pteris aquilina	*Pteridium aquilinium* (L.) Kuhn	Bracken	L	W	+	1	1900		Well XXVII
Pteris aquilina L.					o		1900		Pit XIX
Pteris aquilina L.	*Pteridium aquilinium* (L.) Kuhn	Bracken	L	W	+	1	1900		Pit XIX
Pyrus germanica L.	*Mesiplus germanica* L.	Medlar	P	W	+	1	1904		
Pyrus malus L.	*Malus* sp.	Apple	P	W	+	4		23	Pit XVII
Pyrus malus L.	*Malus* sp.	Apple	P	W	+	7	1900	23	Pit XVII
Pyrus malus L.	*Malus/Pyrus* sp.	Apple/Pear	P	W	+	1	1900	23	Pit XVII
Ranuculus sceleratus L.					o		1900		Pit XVII (well)
Ranunculus acris L.	*Ranunculus* cf. *acris* L.	Meadow Buttercup	P	W	+	1	1903		Pit II at 7'
Ranunculus aquatilis L.	*Ranunculus* subg. *Batrachium* (DC.) A. Gray	Buttercups	P	W	+	4	1909		Pit below city wall
Ranunculus aquatilis L.	*Ranunculus* subg. *Batrachium* (DC.) A. Gray	Buttercups	P	W	+	2	1905		Pit XX no 2, 6' to 7'
*Ranunculus flammul*a L.	*Ranunculus flammula* L.	Lesser Spearwort	P	W	+	6	1902		Pit XI 11'-14'
Ranunculus hederaceus	*Ranunculus* subg. *Batrachium* (DC.) A. Gray	Buttercups	P	W	+	3	1909		Pit below city wall
Ranunculus lingua	*Ranunculus lingua* L.	Greater Spearwort	P	W	+	4	1906		No 3 tank
Ranunculus repens L.	*Ranunculus* cf. *repens* L.	Creaping Buttercup	P	W	+	7	1899	22	Well
Ranunculus repens L.	*Ranunculus* cf. *repens* L.	Creaping Buttercup	P	W	+	4			
Ranunculus repens L.	*Ranunculus* cf. *repens* L.	Creaping Buttercup	P	W	+	1	1903		Pit III at 11'
Ranunculus sardous Crantz.	*Ranunculus sardous* Crantz	Hairy Buttercup	P	W	+	2	1900	16	Well no 1, below 10' from top
Ranunculus scleratus L.	*Ranunculus scleratus* L.	Celery-leaved Buttercup	P	W	+	3	1906		No 3 tank
Ranunculus acris	*Ranunculus* cf. *acris* L.	Meadow Buttercup	P	W	+	6	1902		… well black Pot at bottom of well E. pit I 11'
Ranunculus acris L.	*Ranunculus* cf. *acris* L.	Meadow Buttercup	P	W	+	4			
Ranunculus aquatilis	*Ranunculus* subg. *Batrachium* (DC.) A. Gray	Buttercups	P	W	+	1	1905		Pit IX
Ranunculus auricomus L.	*Ranunculus* subg. *Ranunculus*	Buttercups	P	W	+	1	1902		Pit XI…
Ranunculus flammula L.	*Ranunculus flammula* L.	Lesser Spearwort	P	W	+	2			
Ranunculus lingua L.	*Ranunculus lingua* L.	Greater Spearwort	P	W	+	7			
Ranunculus parviflorus L.	*Ranunculus parviflorus* L.	Small-flowered Buttercup	P	W	+	1	1908		Pit X 16' - 17'
Ranunculus parviflorus L.	*Ranunculus parviflorus* L.	Small-flowered Buttercup	P	W	+	1	1900		Pit XXVII (well)
Ranunculus sardous Crantz	*Ranunculus sardous* Crantz	Hairy Buttercup	P	W	+	1	1903		Pit II at 7'
Ranunculus sardous Crantz	*Ranunculus sardous* Crantz	Hairy Buttercup	P	W	+	7			
Raphanus raphanistrum	*Raphanus raphanistrum* L.	Radish	P	W	+	1	1908		Pit X
Raphanus raphanistrum L.	*Raphanus raphanistrum* L.	Radish	C+P	W	+	1	1904		
Raphanus raphanistrum L.	cf. *Raphanus* sp.	Radish	P	W	+	2	1902		Well A '
Rosa canina L.	*Rosa* sp.	Roses	P	W	+	7	1900	XXIII	Pit XVII

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Rubus fruticosus	*Rubus* sect. *Glandulosus*	Bramble	P	M	+	20			
Rubus fruticosus L.	*Rubus* sect. *Glandulosus*	Bramble	St	W	+	2	1903		Pit III
Rubus fruticosus L.					o				
Rubus fruticosus var.	*Rubus* sect. *Glandulosus*	Bramble	P	W	+	1			
Rubus fruticosus L.	*Rubus* sect. *Glandulosus*	Bramble	P	W	+	1		22	Well
Rumex	*Rumex* sp.	Docks	P	W	+	5		22	Well
Rumex	*Rumex* sp.	Docks	P	W	+	1	1900		Pit XXVII (well)
Rumex congomeratus Murr.	*Rumex conglomeratus* Murray	Clustered Dock	P	W	+	1	1902		Well A 17'
Rumex congomeratus Murr.	*Rumex conglomeratus* Murray	Clustered Dock	P	W	+	4			
Rumex crispus L.	*Rumex crispus* L.	Curled Dock	P	W	+	1	1900		Well called pit no 1
Rumex crispus L.	*Rumex* sp.	Docks	P	W	+		1900	26	Well no 1, below 10' from top
Rumex obtusifolius	*Rumex obtusifolius* L.	Broad-leaved Dock	P	W	+	1	1909		City ditch no 3
Rumex obtusifolius L.	*Rumex* cf. *obtusifolius* L.	Broad-leaved Dock	P	W	+	1	1902		Squashed pot. Pit XIII
Rumex obtusifolius L.	*Rumex obtusifolius* L.	Broad-leaved Dock	P	W	+	1	1902		Well B
Rumex obtusifolius L.	*Rumex obtusifolius* L.	Broad-leaved Dock	P	W	+	3	1900		Pit XXVII (well)
Rumex viredis ? Sibth	*Rumex* sp.	Docks	P	W	+	4	1902		Pit II sample 1
Rumex viredis Sibth ?	*Rumex* sp.	Docks	P	W	+	1	1906		No 3 tank
Sambucus nigra	*Sambucus nigra* L.	Elder	P	W	+	3	1903		Pit III at 11'
Sambucus nigra L.	*Sambucus nigra* L.	Elder	P	W	+	5			
Senebierea coronopus Poir.	*Coronopus squamtaus* (Forssk.) Asch.	Swine-cress	P	W	+	1	1900		Pit XXVII (well)
Senebierea cornopus Poir	*Coronopus squamtaus* (Forssk.) Asch.	Swine-cress	P	W	+	6		22	Well
*Sisymbrium alliari*a Scop.	Indet. insect eggs.					2	1902		Pit II
Solanum dulcamara L.	*Hyoscyamus niger* L.	Henbane	P	W	+	1		22	Well
Solanum nigrum L.	*Solanum* cf. *nigrum* L.	Black Nightshade	P	W	+	5	1902		Pit II
Sonchus asper Hoffn	*Sonchus asper* (L.) Hill	Prickly Sowthistle	P	W	+	1	1906		Drain
Sonchus asper Hoffn	*Sonchus asper* (L.) Hill	Prickly Sowthistle	P	W	+	2	1907		
Sonchus oleraceus L.	*Sonchus oleraceus* L.	Smooth Sowthistle	P	W	+	1	1900	23	Pit XVII
Sonchus oleraceus L.	*Sonchus oleraceus* L.	Smooth Sowthistle	P	W	+	2	1902		Caistor pot well E and well D
Sonchus palustris L.					o		1900		Well called pit no 1
Sonchus palustris L.	*Leontodon* sp.	Hawkbits	P	W	+	3	1902		
Sparganium ramosum/erectum	*Sparganium erectum* L.	Branched Bur-reed	P	W	+	1	1909		Pit below city wall (lower layer)
Sparganium simplex	*Sparganium* sp.	Bur-reeds	P	W	+	5	1909		Pit below city wall (lower layer)
Spergula arvensis L.	*Spergula arvensis* L.	Corn Spurrey	P	W	+	1		22	Well

Latin name - Reid's identification	Latin name - confirmed or reidentified	Common name - confirmed or reidentified	Plant part	Preservation	Status	No. of items	Year labelled	Insula	Feature
Spharganium simplex	*Sparganium* sp.	Bur-reeds	P	W	+	2	1909		Pit below city wall
Spiraea ulmaria L.	*Filipendula ulmaria* (L.) Maxim.	Meadowsweet	P	W	+	5	1907		Hole in courtyard of L shaped house. S W. corner of grass field 6
Stachys arvensis L.	*Stachys* sp.	Woundworts	P	W	+	1	1902		Pit II sample 1
Stachys arvensis L.	*Stachys* sp.	Woundworts	P	W	+	3	1903		Pit III at 11'
Stellaria aquatica	*Myosoton aquaticum* (L.) Moench	Water Chickweed	P	W	+	3	1905	6	Below floor of house No 1
Stellaria aquatica Scop.					o		1903		Pit V at 12'
Stellaria graminea	*Stellaria graminea* L.	Lesser Stitchwort	P	W	+	2	1902		Bottom of well A 17
Stellaria graminea L.	*Stellaria graminea* L.	Lesser Stitchwort	P	W	+	1	1902		Well A 7'
Stellaria graminea L.	*Stellaria graminea* L.	Lesser Stitchwort	P	W	+	3			
Stellaria media Cyr.	*Stellaria media* gp. (L.) Vill.	Common Chickweed	P	W	+	7			
Stellaria media Cyr.	*Stellaria media* gp. (L.) Vill.	Common Chickweed	P	W	+	2		22	Well
Stellaria uliginosa Murray					o		1905	6	Below floor in house no 1
Stellaria uliginosa Murray					o		1905	6	Below floor in house…
Taraxacum officinale	*Taraxacum* sp.	Dandelions	P	W	+	3	1909		City ditch NW no 3
Thalictrum flavum L.	*Thalictrum flavum* L.	Common Meadow-rue	P	W	+	3	1902		Pit XI
Thalictrum flavum L.	*Thalictrum flavum* L.	Common Meadow-rue	P	W	+	1	1900		Pit XIX
Thalictrum flavum L.	*Thalictrum flavum* L.	Common Meadow-rue	P	W	+	1			
Thlaspi arvense L.	*Thlaspi arvense* L.	Field Penny-cress	P	W	+	1	1903		Pit II at 7'
Thlaspi arvense L.	*Thlaspi arvense* L.	Field Penny-cress	P	W	+	1	1900		Pit XXVII (well)
Thlaspi arvense L.	*Thlaspi arvense* L.	Field Penny-cress	P	W	+	1			
Thlaspi arvense L.					o		1900		Pit XII
Triticum sativum	Cereal indet.		P	C	+	2	1900	23	Pit XVII
Triticum sativum L.	*Triticum spelta* L., *Triticum* sp.	Spelt Wheat	P	C	+	2	1903		Pit II
Triticum sativum L.	*Triticum spelta/dicoccum, Triticum sp.,* cf. *Bromus secalinus*	Spelt/Emmer Wheat, Brome grass	P	C	+	4		27	Pit IX at 12'
Urtica dioica L.	*Urtica dioica* L.	Common Nettle	P	W	+	2		22	Well
Urtica urens L.	*Urtica urens* L.	Small Nettle	P	W	+	9			Pit XVIII
Valeriana officinalis L.	*Sonchus asper* (L.) Hill	Prickly Sowthistle	P	W	!	4	1903		Pit III
Valeriana officinalis L.	*Sonchus asper* (L.) Hill	Prickly Sowthistle	P	W	!	1	1900	23	Pit XVII
Valerianella dentata	*Valerianella dentata* (L.) Pollich.	Narrow-fruited Cornsalad	P	W	+	1	1909		Pit below city wall
Valerianella dentata Poll.	*Valerianella dentata* (L.) Pollich.	Narrow-fruited Cornsalad	P	W	+	1	1900		Pit XII
Veronica hederaefolia L.	*Veronica hederifolia* L.	Ivy-leaved Speedwell	P		o	1	1900		Trench S of Insula XXIII
Viola	*Viola* sp.	Violets	P	W	+	3	1900	23	Pit XVII

Latin name - Reid's identification	**Latin name - confirmed or reidentified**	**Common name - confirmed or reidentified**	**Plant part**	**Preservation**	**Status**	**No. of items**	**Year labelled**	**Insula**	**Feature**
Vitis vinifera L.	*Vitis vinifera* L.	Grape	P	W	+	3	1900	23	XVII
-	*Prunus domestica* ssp. *insititia* (L.) Bonnier & Layens*, P. spinosa* L.*, P. avium* L.	Bullace/Damson, Sloe, Sweet Cherry	P	W	+	19	1901	3	Stones found in mortar
-	*Prunus spinosa* L.*, Prunus domestica* ssp. *insititia* (L.) Bonnier & Layen	Sloe, Bullace/Damson	P	W	+	50			
-	*Prunus avium* L., *P. spinosa* L.*, P. domestica* ssp. *insititia* (L.) Bonnier & Layen	Sweet Cherry, Sloe, Bullace/Damson	P	M/W	+	20			
Prunus spinosa	*Prunus spinosa* L., *P.* cf. *domestica* ssp. *insititia*, *P.* cf. *avium*	Sloe, Bullace/Damson, Sweet Cherry	P	W	+	65	1908		Pit XV
Prunus domestica	*Prunus spinosa* L.	Sloe	P	W	+	19			
Prunus spinosa	*Prunus spinosa* L.	Sloe	P	W	+	46		23	XVII
Prunus domestica	*Prunus domestica* ssp. *insititia* (L.) Bonnier & Layens	Bullace/Damson	P	W	+	12			Drains from bath
-	*Prunus avium* L., *Prunus spinosa* L.	Sweet Cherry, Sloe	P	W	+	28			-
-	*Prunus domestica* ssp. *domestica*	Plum	P	W	+	14			
-	Prunus domestica ssp. *insititia* (L.) Bonnier & Layens	Bullace/Damson	P	W	+	34			
-	*Prunus spinosa* L.	Sloe	P	W	+	41			Drain from bath
-	*Prunus domestica* ssp. i*nsititia* (L.) Bonnier & Layens	Bullace/Damson	P	W	+	7			-
-	*Prunus* sp., *Prunus spinosa*, *Pyrus/Malus*, *Prunus domestica* ssp. *insititia*	Sloe, Pear/Apple, Bullace/Damson	P	W	+	35			
-	*Prunus avium* L.	Sweet Cherry	P	W	+	27			
Crataegus oxyacantha	*Prunus spinosa* L.	Sloe	P	W	+	1			Drain from bath
-	*Prunus avium* L., *Prunus* sp.	Sweet Cherry	P	M,W	+	59			
-	*Prunus domestica* ssp. *insititia* (L.) Bonnier & Layens*, Prunus spinosa* L.	Bullace/Damson, Sloe	P	W	+	14			
-	*Prunus domestica* ssp. *insititia* (L.) Bonnier & Layens	Bullace/Damson	P	W	+	7			
-	*Buxus sempervirens* L.	Box	L	W	+	4	1902		Pit XIII
Prunus avium	*Prunus spinosa* L., *P. domestica* ssp. *insititia, Prunus avium*	Sloe, Bullace/Damson Sweet Cherry	P	W	+	12	1907		Pit 1 - 5' - 9'
-	*Vicia faba* var. *minor*	Celtic Bean	P	C	+	14			

Record No.	Site	E	N	Period	Site Type	Reference
1	21 The Moorelands	462020	191520	ER	Field	Cramp, L. 2005. Charred plant remains. In J. Pine. Early Roman occupation at Jubilee Villa, 21 The Moorelands, Benson, Oxfordshire. *Oxoniensia* 70: 127–128.
2	Abingdon West Central	449620	197020	ER	Small town	Pelling, R. 2007. The charred, mineralized, and waterlogged plant remains. In K. Brady, A. Smith and G. Laws. Excavations at Abingdon West Central redevelopment: Iron Age, Roman, Medieval, and Post-Medieval activity in Abingdon. *Oxoniensia* 72: 190–202.
3	Abingdon West Central	449620	197020	R	Small town	Pelling, R. 2007. The charred, mineralized, and waterlogged plant remains. In K. Brady, A. Smith and G. Laws. Excavations at Abingdon West Central redevelopment: Iron Age, Roman, Medieval, and Post-Medieval activity in Abingdon. *Oxoniensia* 72: 190–202.
4	All Souls Farm Quarry	499500	182150	ER	Open	McKenna, R. 2012. Carbonized and waterlogged plant macrofossils and charcoal. In S. Ford. Middle Bronze Age occupation and enclosure and Roman occupation at All Souls Farm Quarry, Wexham, Buckinghamshire. In S. Preston (ed.) *Settlement and Landscape Archaeology in the Middle Thames Valley: Slough and Environs*: 161-173. Reading: Thames Valley Archaeological Services Monograph 14.
5	All Souls Farm Quarry	499500	182150	MR	Open	McKenna, R. 2012. Carbonized and waterlogged plant macrofossils and charcoal. In S. Ford. Middle Bronze Age occupation and enclosure and Roman occupation at All Souls Farm Quarry, Wexham, Buckinghamshire. In S. Preston (ed.) *Settlement and Landscape Archaeology in the Middle Thames Valley: Slough and Environs*: 161-173. Reading: Thames Valley Archaeological Services Monograph 14.
6	All Souls Farm Quarry	499500	182150	LR	Open	McKenna, R. 2012. Carbonized and waterlogged plant macrofossils and charcoal. In S. Ford. Middle Bronze Age occupation and enclosure and Roman occupation at All Souls Farm Quarry, Wexham, Buckinghamshire. In S. Preston (ed.) *Settlement and Landscape Archaeology in the Middle Thames Valley: Slough and Environs*: 161-173. Reading: Thames Valley Archaeological Services Monograph 14.
7	Appleford	452300	193400	LR	Enclosed	Robinson, M. 1980. Roman waterlogged plant and invertebrate evidence. In J. Hinchliffe and R. Thomas. Archaeological Investigations at Appleford. *Oxoniensia* 45: 90–106.
8	Ashville	449850	197330	MIA	Open	Jones, M. 1978. The plant remains. In M. Parrington (ed.) *The Excavation of an Iron Age Settlement, Bronze Age Ring-ditches and Roman Features at Ashville Trading Estate, Abingdon (Oxfordshire) 1974-76*: 93–110. Oxford: Oxford Archaeological Unit.
9	Ashville	449850	197330	LIA	Field	Jones, M. 1978. The plant remains. In M. Parrington (ed.) *The Excavation of an Iron Age Settlement, Bronze Age Ring-ditches and Roman Features at Ashville Trading Estate, Abingdon (Oxfordshire) 1974-76*: 93–110. Oxford: Oxford Archaeological Unit.
10	Ashville	449850	197330	R	Field	Jones, M. 1978. The plant remains. In M. Parrington (ed.) *The Excavation of an Iron Age Settlement, Bronze Age Ring-ditches and Roman Features at Ashville Trading Estate, Abingdon (Oxfordshire) 1974-76*: 93–110. Oxford: Oxford Archaeological Unit.
11	Aston Tirrold	455930	186120	ER	Unclear	Carruthers, W. 1990. The carbonised and waterlogged plant remains. In S. Ford. The archaeology of the Cleeve-Didcot pipeline, South Oxfordshire, 1989. *Oxoniensia* 60: 38–40.
12	Bagnor Road	445440	168940	LR	Unclear	Ede, J. 2000. Charred plant remains from Bagnor Road. In V. Birbeck (ed.) *Archeological Investigations on the A34 Newbury Bypass, Berkshire/Hampshire, 1991-7: Technical reports*: 47–50. Salisbury: Wessex Archaeology.
13	Balksbury	435200	144700	MIA	Open	De Moulins, D. 1995. Charred plant remains. In G.J. Wainwright and S.M. Davies (eds.) *Balksbury Camp, Hampshire. Excavations 1973 and 1981*: 87–92. London: English Heritage Archaeological Report 4.
14	Balksbury	435200	144700	ER	Enclosed	De Moulins, D. 1995. Charred plant remains. In G.J. Wainwright and S.M. Davies (eds.) *Balksbury Camp, Hampshire. Excavations 1973 and 1981*: 87–92. London: English Heritage Archaeological Report 4.
15	Balksbury	435200	144700	LR	Unclear	De Moulins, D. 1995. Charred plant remains. In G.J. Wainwright and S M. Davies (eds.) *Balksbury Camp, Hampshire. Excavations 1973 and 1981*: 87–92. London: English Heritage Archaeological Report 4.
16	Barton Court Farm	451000	197700	LIA	Enclosed	Jones, M. and Robinson, M. 1984. The crop plants. In D. Miles (ed.) *Archaeology at Barton Court Farm, Abingdon, Oxon*: microfiche 9:E10 – 9:F8. Oxford: Oxford Archaeological Unit and Council for British Archaeology.
17	Barton Court Farm	451000	197700	LR	Villa	Jones, M. and Robinson, M. 1984. The crop plants. In D. Miles (ed.) *Archaeology at Barton Court Farm, Abingdon, Oxon*: microfiche 9:E10 – 9:F8. Oxford: Oxford Archaeological Unit and Council for British Archaeology.
18	Bath Rd	495120	180720	ER	Field	Letts, J. 2003. Plant remains. In L. Howell and T. Durden. A Late IronAge/Early Roman field system and other features at Bath Road, Slough, 1995. In S. Preston (ed.) *Prehistoric, Roman and Saxon sites in Eastern Berkshire: Excavations 1989-1997*: 116. Reading: Thames Valley Archaeological Services Monograph 2.
19	Bath Rd	450800	167650	MR	Roadside	Robinson, M. 2010. Environmental remains. In J. Pine. Excavation of the Silchester to Cirencester Roman road, and adjacent Roman occupation deposits, at 69, 71A and 73 Bath Road, Thatcham, 2007. In J. Pine (ed.) *Archaeological Investigations Along the Line of Ermin Street in West Berkhire, 1992-2008*: 30-31. Reading: Thames Valley Archaeological Services Monograph 12.
20	Berrick Salome	462220	193900	MIA	Open	Giorgi, J. 2008. Arable economy. In T. Wilson (ed.) *A Narrow View Across the Upper Thames Valley in Late Prehistoric and Roman Times*: 162–174. Oxford: British Archaeological Reports British Series 467.
21	Berrick Salome	462220	193900	LIA	Enclosed	Giorgi, J. 2008. Arable economy. In T. Wilson (ed.) *A Narrow View Across the Upper Thames Valley in Late Prehistoric and Roman Times*: 162–174. Oxford: British Archaeological Reports British Series 467.
22	Berrick Salome	462220	193900	ER	Field	Giorgi, J. 2008. Arable economy. In T. Wilson (ed.) *A Narrow View Across the Upper Thames Valley in Late Prehistoric and Roman Times*: 162–174. Oxford: British Archaeological Reports British Series 467.
23	Berrick Salome	462220	193900	LR	Field	Giorgi, J. 2008. Arable economy. In T. Wilson (ed.) *A Narrow View Across the Upper Thames Valley in Late Prehistoric and Roman Times*: 162–174. Oxford: British Archaeological Reports British Series 467.
24	Brighton Hill South	460600	148900	MIA	Enclosed	Carruthers, W. 1995. Plant remains. In P. Fasham, G. Keevil, D. Coe and R. Newman (eds.) *Brighton Hill South (Hatch Warren): an Iron Age Farmstead and Deserted Medieval Village in Hampshire*: 56–60. Salisbury: Trust for Wessex Archaeology.
25	Brighton Hill South	460600	148900	LIA	Unclear	Carruthers, W. 1995. Plant remains. In P. Fasham, G. Keevil, D. Coe and R. Newman (eds.) *Brighton Hill South (Hatch Warren): an Iron Age Farmstead and Deserted Medieval Village in Hampshire*: 56–60. Salisbury: Trust for Wessex Archaeology.
26	Brighton Hill South	460600	148900	ER	Enclosed	Carruthers, W. 1995. Plant remains. In P. Fasham, G. Keevil, D. Coe and R. Newman (eds.) *Brighton Hill South (Hatch Warren): an Iron Age Farmstead and Deserted Medieval Village in Hampshire*: 56–60. Salisbury: Trust for Wessex Archaeology.

Record No.	Site	E	N	Period	Site Type	Reference
27	Brightwell-cum-Sotwell	457966	191332	ER	Enclosed	Giorgi, J. 2008. The arable economy. In T. Wilson (ed.) *A Narrow View Across the Upper Thames Valley in Late Prehistoric and Roman Times*: 262–265. Oxford: British Archaeological Reports British Series 467.
28	Broad Street, Abingdon	448800	197800	LR	Small town	Jones, M. 1975. Seed report. In M. Parrington and C. Balkwill. Excavations at Broad Street, Abingdon *Oxoniensia* 40: 50–52.
29	Brook Street	448410	129550	ER	Civitas	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa. 800 B.C. - 400 A.D.* University of Southampton. Unpublished MPhil thesis.
30	Brook Street	448410	129550	MR	Civitas	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa. 800 B.C. - 400 A.D.* University of Southampton. Unpublished MPhil thesis.
31	Bury Hill	434600	143500	MIA	Hillfort	Campbell, G. 2000. Charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Progamme: the Prehistory of a Wessex Landscape. Volume 2 – Part 2. Bury Hill, Upper Clatford, Hants, 1990*: 73–77. Oxford: Institute of Archaeology.
32	Castle Copse Villa	428350	162950	ER	Villa	Clapham, A. and Gleason, K. 1997. Archaeobotanical evidence. In E. Hostetter and T.N. Howe (eds.) *The Romano-British Villa at Castle Copse, Great Bedwyn*: 345–358. Bloomington: Indiana University Press.
33	Castle Copse Villa	428350	162950	MR	Villa	Clapham, A. and Gleason, K. 1997. Archaeobotanical evidence. In E. Hostetter and T.N. Howe (eds.) *The Romano-British Villa at Castle Copse, Great Bedwyn*: 345–358. Bloomington: Indiana University Press.
34	Castle Copse Villa	428350	162950	LR	villa	Clapham, A. and Gleason, K. 1997. Archaeobotanical evidence. In E. Hostetter and T.N. Howe (eds.) *The Romano-British Villa at Castle Copse, Great Bedwyn*: 345–358. Bloomington: Indiana University Press.
35	Castle Hill	456000	194000	MIA	Hillfort	Smith, W., Robinson, M. and Harrold, B. 2010. In T. Allen, K. Cramp, H. Lamdin-Whymark and L. Webley. *Castle Hill and its Landscape; Archaeological Investigations at the Wittenhams, Oxfordshire*: 93-96. Oxford: Oxford Archaeology Monograph No. 9.
36	Castle Hill Landscape	456000	194000	MIA	Enclosed	Smith, W., Robinson, M. and Harrold, B. 2010. In T. Allen, K. Cramp, H. Lamdin-Whymark and L. Webley. *Castle Hill and its Landscape; Archaeological Investigations at the Wittenhams, Oxfordshire*: 93-96. Oxford: Oxford Archaeology Monograph No. 9.
37	Cathedral Car Park	448290	129350	MR	Major town	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa. 800 B.C. - 400 A.D.* University of Southampton. Unpublished Mphil thesis.
38	Cathedral Green	448200	129300	ER	Major town	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa. 800 B.C. - 400 A.D.* University of Southampton. Unpublished MPhil thesis.
39	Cathedral Green	448200	129300	MR	Civitas	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa. 800 B.C. - 400 A.D.* University of Southampton. Unpublished MPhil thesis.
40	Cippenham	494900	179820	ER	Open	Robinson, M. 2012. Carbonized plant remains. In A. Taylor. An early Neolithic pit, Bronze Age ocupation, Iron Age occupation and fields and Roman landscape features at Cippenham, Slough, Berkshire. In S. Preston (ed.) *Settlement and Landscape Archaeology in the Middle Thames Valley: Slough and Environs*: 36. Reading: Thames Valley Archaeological Services Ltd. Monograph 14.
41	Community Hospital	449700	167700	ER	Field	Druce, D. 2008. Charred plant remains. In A. Simmonds. The excavation of a 1st century AD field system and associated cremation burials at the community hospital, Newbury, west Berkshire. *Berkshire Archaeological Journal* 77: 28-30.
42	Cowdery's Down	465700	153200	LIA	Unclear	Green, F. 1983. The plant remains. In M. Millett and S. James. Excavations at Cowdery's Down Basingstoke, Hampshire. *Archaeological Journal* 140: 192.
43	Cowdery's Down	465700	153200	ER	Enclosed	Green, F. 1983. The plant remains. In M. Millett and S. James. Excavations at Cowdery's Down Basingstoke, Hampshire. *Archaeological Journal* 140: 192.
44	Cowdery's Down	465700	153200	LR	Field	Green, F. 1983. The plant remains. In M. Millett and S. James. Excavations at Cowdery's Down Basingstoke, Hampshire. *Archaeological Journal* 140: 192.
45	Danebury	432300	137600	MIA	Hillfort	Jones, M. 1984. The plant remains. In B. Cunliffe (ed.) *Danebury: an Iron Age Hillfort in Hampshire Volume 2: the Excavations, 1969-1978: the Finds*: 483–95. London: Council for British Archaeology Research Report 52.
46	Danebury	432300	137600	LIA	Hillfort	Jones, M. 1984. The plant remains. In B. Cunliffe (ed.) *Danebury: an Iron Age Hillfort in Hampshire Volume 2: the Excavations, 1969-1978: the Finds*: 483–95. London: Council for British Archaeology Research Report 52.
47	Danesfield Camp	481800	184350	MIA	Hillfort	Campbell, G. 1991. Charred plant remains. In G. Keevil and G. Campbell. Investigations at Danesfield Camp, Medmenham, Buckinghamshire. *Records of Buckinghamshire* 33: 97–98.
48	Denchworth Rd	439450	188370	ER	Roadside	Fairbairn, A. and Austin, P. 2001. Archaeobotanical evidence. In A. Barber and N. Holbrook. A Romano-British settlement to the rear of Denchworth road, Wantage, Oxfordshire: evaluation and excavation in 1996 and 1998. *Oxoniensia* 66: 325–333.
49	Denchworth Rd	439450	188370	MR	Roadside	Fairbairn, A. and Austin, P. 2001. Archaeobotanical evidence. In A. Barber and N. Holbrook. A Romano-British settlement to the rear of Denchworth road, Wantage, Oxfordshire: evaluation and excavation in 1996 and 1998. *Oxoniensia* 66: 325–333.
50	Denchworth Rd	439450	188370	LR	Roadside	Fairbairn, A. and Austin, P. 2001. Archaeobotanical evidence. In A. Barber and N. Holbrook. A Romano-British settlement to the rear of Denchworth road, Wantage, Oxfordshire: evaluation and excavation in 1996 and 1998. *Oxoniensia* 66: 325–333.
51	Easton Lane	449600	130500	MIA	Open	Carruthers, W. 1989. The carbonised plant remains. In P. Fasham, D. Farwell and R. Whinney (eds.) *The Archaeological Site at Easton Lane, Winchester*: 131–134. Winchester: Hampshire Field Club Monograph 6.
52	Enwick Shaw	454800	179700	MIA	Unclear	Huckerby, E. and Druce, D. 2005. Charred plant remains. In J. Timby, D. Stansbie, A. Norton and K. Walsh. Excavations along the Newbury Reinforcement pipeline: Iron Age-Roman activity and a Neolithic pit group. *Oxoniensia* 70: 293–298.
53	Enwick Shaw	454800	179700	ER	Field	Huckerby, E. and Druce, D. 2005. Charred plant remains. In J. Timby, D. Stansbie, A. Norton and K. Walsh. Excavations along the Newbury Reinforcement pipeline: Iron Age-Roman activity and a Neolithic pit group. *Oxoniensia* 70: 293–298.
54	Enwick Shaw	454800	179700	R	Field	Huckerby, E. and Druce, D. 2005. Charred plant remains. In J. Timby, D. Stansbie, A. Norton and K. Walsh. Excavations along the Newbury Reinforcement pipeline: Iron Age-Roman activity and a Neolithic pit group. *Oxoniensia* 70: 293–298.

Record No.	Site	E	N	Period	Site Type	Reference
55	Fairclough Farm	487200	170800	MIA	Unclear	Letts, J. 2003. Carbonized plant remains. In L. Torrance and T. Durden. A Middle Iron Age settlement at Fairclough Farm, Bracknell, 1994. In S. Preston (ed.) *Prehistoric, Roman and Saxon sites in Eastern Berkshire: Excavations 1989-1997*: 104. Reading: Thames Valley Archaeological Services Monograph 2.
56	Fir Hill, Bossington	429440	132450	MIA	Field	Stevens, C. 2009. Charred plant remains. In L. Brown. An unusual Iron Age enclosure at Fir Hill, Bossington and a Romano-British cemetery near Brook, Hampshire: the Broughton to Timsbury pipeline, part 2. *Proceedings of the Hampshire Field Club & Archaeological Society* 64: 61–64.
57	Fir Hill, Bossington	429440	132450	IA/R	Field	Stevens, C. 2009. Charred plant remains. In L. Brown. An unusual Iron Age enclosure at Fir Hill, Bossington and a Romano-British cemetery near Brook, Hampshire: the Broughton to Timsbury pipeline, part 2. *Proceedings of the Hampshire Field Club & Archaeological Society* 64: 61–64.
58	Fullerton	437490	140060	LR	Villa	Campbell, G. 2008. Charred plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex landscape During the Roman Era Volume 2 pt. 3. Fullerton, Hants, 2000 and 2001*: 161–164. Oxford: English Heritage and Oxford University School of Archaeology.
59	Gatehampton Farm	460500	179700	R	Unclear	Letts, J. 1995. Charred plant remains. In T. Allen (ed.) *Lithics and Landscape: Archaeological Discoveries on the Thames Water Pipeline at Gatehampton Farm, Goring, Oxfordshire 1985-92*: 107-109. Oxford: Oxford University Committee for Archaeology.
60	Grateley	442750	114110	LIA	Enclosure	Campbell, G. 2008. Plant remains. In B. Cunliffe (ed.), *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman Era Volume 2 pt. 2. Grateley South, Grateley, Hants, 1998 and 1999*: 128–130. Oxford: English Heritage and Oxford University School of Archaeology.
61	Grateley	442750	114110	ER	Enclosed	Campbell, G. 2008. Plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman Era Volume 2 pt. 2. Grateley South, Grateley, Hants, 1998 and 1999*: 128–130. Oxford: English Heritage and Oxford University School of Archaeology.
62	Grateley	442750	114110	MR	Enclosed	Campbell, G. 2008. Plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman Era Vol 2 pt. 2. Grateley South, Grateley, Hants, 1998 and 1999*: 128–130. Oxford: English Heritage and Oxford University School of Archaeology.
63	Grateley	442750	114110	LR	Villa	Campbell, G. 2008. Plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman Era Vol 2 pt. 2. Grateley South, Grateley, Hants, 1998 and 1999*: 128–130. Oxford: English Heritage and Oxford University School of Archaeology.
64	Halfpenny Lane	458100	183900	MIA	Open	Carruthers, W. 1990. The carbonised and mineralised plant remains, Halfpenny Lane. In S. Ford. Archaeology of the Cleeve-Didcot pipeline, South Oxfordshire. *Oxoniensia* 60: 19-25.
65	Halfpenny Lane	458100	183900	R	Unclear	Carruthers, W. 1990. The carbonised and mineralised plant remains, Halfpenny Lane. In S. Ford. Archaeology of the Cleeve-Didcot pipeline, South Oxfordshire. *Oxoniensia* 60: 19-25.
66	Hascombe	500500	138500	MIA	Hillfort	Murphy, P. 1979. Carbonized cereals and crop weeds. In F. Thompson. Three Surrey hillforts: excavations at Anstiebury, Holmbury, and Hascombe, 1972-1977. *Antiquaries Journal* 59: 311–313.
67	Henly's Garage	447959	129256	MR	Major town	Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed.) *Feeding a Roman Town: Environmental Evidence from Excavations in Winchester, 1972-1985*: 327-342. Winchester: Winchester Museums.
68	Henly's Garage	447959	129256	LR	Major town	Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed.) *Feeding a Roman Town: Environmental Evidence from Excavations in Winchester, 1972-1985:* 327-342. Winchester: Winchester Museums.
69	High Street	503450	171750	ER	Small town	McKinley, J.I. 2004. "Welcome to Pontibus ... gateway to the West." *Surrey Archaeological Collections* 91: 1–69.
70	High Street	503450	171750	MR	Small town	McKinley, J.I. 2004. "Welcome to Pontibus ... gateway to the West." *Surrey Archaeological Collections* 91: 1–69.
71	High Street	503450	171750	LR	Small town	McKinley, J.I. 2004. "Welcome to Pontibus ... gateway to the West." *Surrey Archaeological Collections* 91: 1–69.
72	Holybourne Depot	473604	140977	R	Small town	Wessex Archaeology 2009. *The Depot, Holybourne, Alton, Hampshire. Archaeological Post-excavation Assessment Report*. Salisbury: Wessex Archaeology.
73	Houghton Down	434200	136100	MR	Enclosed	Campbell, G. 2008. Plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman Era Volume 2 pt. 5. Rowbury Farm, Wherwell, Hants, 2003*: 128–130. Oxford: English Heritage and Oxford University School of Archaeology.
74	Houghton Down	434200	136100	MIA	Enclosed	Campbell, G. 2000. Charred and mineralized plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Roman Programme: Volume 2 pt. 1. Houghton Down, Longstock, Hants, 1997*: 146–154. Oxford: Institute for Archaeology.
75	Houghton Down	434200	136100	R	Enclosed	Campbell, G. 2000. Charred and mineralized plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Roman Programme: Volume 2 pt. 1. Houghton Down, Longstock, Hants, 1997*: 146–154. Oxford: Institute for Archaeology.
76	Jennett's Park	485000	168000	ER	Field	Smith, W. 2009. Charred plant remains. In A. Simmonds, S. Cook, E. Biddulph and D. Score (eds.) *Archaeology in the Park: Excavations at Jennett's Park, Bracknell, Berkshire*: 59–60. Oxford: Oxford Archaeology Occasional Paper Number 18
77	Kennel Farm	460413.00	147825	MIA	Enclosed	Deighton, K. 2002. Charred plant remains. In Northamptonshire Archaeology (ed.) *Excavation of an Iron Age and Roman Enclosure at Kennel Farm, Basingstoke, Hampshire 1998*: 37–45. Northampton County Council.
78	Kennel Farm	460413	147825	LIA	Enclosed	Deighton, K. 2002. Charred plant remains. In Northamptonshire Archaeology. *Excavation of an Iron Age and Roman Enclosure at Kennel Farm, Basingstoke, Hampshire 1998*: 37–45. Northampton County Council.
79	Knighton Bushes	429600	183100	ER	Field	Carruthers, W. 1989. The carbonised plant remains from the Maddle Farm Excavation. In V. Gaffney and M. Tingle (eds.) *The Maddle Farm Project: an Integrated Survey of Prehistoric and Roman Landscapes on the Berkshire Downs*: 179–182. Oxford: British Archaeological Reports British Series British Series 200.
80	Knighton Bushes	429600	183100	LR	Field	Carruthers, W. 1989. The carbonised plant remains from the Maddle Farm Excavation. In V. Gaffney and M. Tingle (eds.) *The Maddle Farm Project: an Integrated Survey of Prehistoric and Roman Landscapes on the Berkshire Downs*: 179–182. Oxford: British Archaeological Reports British Series 2000.
81	Lains Farm	426950	144450	MIA	Enclosed	Carruthers, W. 1991. The carbonised and mineralised plant remains. In P. Bellamy. *Investigations of the Prehistoric Landcape Along the Route of the A303. Proceedings of the Hampshire Field Club & Archaeological society* 47: 36–41.

Record No.	Site	E	N	Period	Site Type	Reference
82	London Rd	451910	149790	ER	Enclosed	Cramp, L. 2012. Carbonized plant remains. In A. Taylor. *Iron Age to Roman Landscape Features and a Saxon Building at London road, Overton, Hampshire.* Proceedings of the Hampshire Field Club & Archaeological Society 67: 194-196.
83	Long Crendon	469840	209210	MIA	Unclear	Carstairs, P. 1984. Iron Age occupation at Long Crendon. *Records of Buckinghamshire* 26: 92–101.
84	Lower Bolney	477308	180486	MIA	Unclear	Letts, J. 1992. Plant remains. In G. Campbell. Excavation at Lower Bolney, Harpsden, South Oxfordshire, 1991. *Oxoniensia* 57: 38–40.
85	Lower Brook Street	448420	129520	MR	Civitas	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa. 800 B.C. - 400 A.D.* University of Southampton. Unpublished MPhil thesis.
86	Maddle Farm	430360	182470	R	Villa	Carruthers, W. 1989. The carbonised plant remains from the Maddle Farm Excavation. In V. Gaffney and M. Tingle (eds.) *The Maddle Farm Project: an Integrated Survey of Prehistoric and Roman Landscapes on the Berkshire Downs*: 179–182. Oxford: British Archaeological Reports British series 200.
87	Manor Farm	501700	174900	ER	Unclear	Letts, J. 2003. Charred plant remains. In S. Ford and J. Pine. Neolithic ring ditches and Roman landscape features at Horton (1989-1996). In S. Preston (ed.) *Prehistoric, Roman and Saxon Sites in Eastern Berkshire: Excavations 1989-1997*: 82. Reading: Thames Valley Archaeological Services Monograph 2.
88	Manor Farm	501700	174900	MR	Unclear	Letts, J. 2003. Charred plant remains. In S. Ford and J. Pine. Neolithic ring ditches and Roman landscape features at Horton (1989-1996). In S. Preston (ed.) *Prehistoric, Roman and Saxon Sites in Eastern Berkshire: Excavations 1989-1997*: 82. Reading: Thames Valley Archaeological Services Monograph 2.
89	Manor Farm	501700	174900	LR	Unclear	Letts, J. 2003. Charred plant remains. In S. Ford and J. Pine. Neolithic ring ditches and Roman landscape features at Horton (1989-1996). In S. Preston (ed.) *Prehistoric, Roman and Saxon Sites in Eastern Berkshire: Excavations 1989-1997*: 82. Reading: Thames Valley Archaeological Services Monograph 2.
90	Manor Farm	501700	174900	R	Unclear	Letts, J. 2003. Charred plant remains. In S. Ford and J. Pine. Neolithic ring ditches and Roman landscape features at Horton (1989-1996). In S. Preston (ed.) *Preshistoric, Roman and Saxon Sites in Eastern Berkshire: Excavations 1989-1997*: 82. Reading: Thames Valley Archaeological Services Monograph 2.
91	Marnel Park	463000	154000	R	Unclear	Pelling, R. 2009. Charred plant remains. In J. Wright (ed.) *Excavation of Prehistoric and Romano-British Sites at Marnel Park and Merton Rise (Popley) Basingstoke, 2004-8*: 54–65. Salisbury: Wessex Archaeology.
92	Merton Rise	463000	154000	ER	Enclosure	Pelling, R. 2009. Charred plant remains. In J. Wright (ed.) *Excavation of Prehistoric and Romano-British Sites at Marnel Park and Merton Rise (Popley) Basingstoke, 2004-8*: 54–65. Salisbury: Wessex Archaeology.
93	Mill Street	449580	188140	MR	Roadside	Stevens, C. 1996. The Roman agricultural economy. In N. Holbrook and A. Thomas. The Roman and Early Anglo-Saxon Settlement at Wantage, Oxfordshire: excavations at Mill Street, 1993-4. *Oxoniensia* 61: 169–171.
94	Mill Street	449580	188140	LR	Roadside	Stevens, C. 1996. The Roman agricultural economy. In N. Holbrook and A. Thomas. The Roman and Early Anglo-Saxon Settlement at Wantage, Oxfordshire: excavations at Mill Street, 1993-4. *Oxoniensia* 61: 169–171.
95	Milton Hill North	449600	192130	LIA	Unclear	Cobain, S. 2012. Plant macrofossils. In J. Hart, E. McSloy and M. Alexander. The archaeology of the Cleeve to Fyfield water main, South Oxfordshire: Excavations in 2006-7. *Oxoniensia* 77: 265–266.
96	Mount Farm	458400	196800	MIA	Unclear	Jones, M. 2010. Charred plants. In G. Lambrick (ed.) *Neolithic to Saxon Social and Environmental Change at Mount Farm Berinsfield, Dorchester-on-Thames*: Appendix 19: 1-4. Oxford: Oxford Archaeology & English Heritage.
97	Mount Farm	458400	196800	ER	Unclear	Jones, M. 2010. Charred plants. In G. Lambrick (ed.) *Neolithic to Saxon Social and Environmental Change at Mount Farm Berinsfield, Dorchester-on-Thames*: Appendix 19: 1-4. Oxford: Oxford Archaeology & English Heritage.
98	Mount Farm	458400	196800	MR	Unclear	Jones, M. 2010. Charred plants. In G. Lambrick. *Neolithic to Saxon Social and Environmental Change at Mount Farm Berinsfield, Dorchester-on-Thames*: Appendix 19: 1-4. Oxford: Oxford Archaeology & English Heritage.; Robinson, M. 2010. Macroscopic waterlogged plant and invertebrate remains. In G. Lambrick. *Neolithic to Saxon Social and Environmental Change at Mount Farm Berinsfield, Dorchester-on-Thames*: Appendix 18: 1-3. Oxford: Oxford Archaeology & English Heritage.
99	Mount Farm	458400	196800	LR	Unclear	Jones, M. 2010. Charred plants. In G. Lambrick. *Neolithic to Saxon Social and environmental change at mount Farm Berinsfield, Dorchester-on-Thames*: Appendix 19: 1-4. Oxford: Oxford Archaeology & English Heritage. Robinson, M. 2010. Macroscopic waterlogged plant and invertebrate remains. In G. Lambrick. *Neolithic to Saxon Social and Environmental Change at Mount Farm Berinsfield, Dorchester-on-Thames*: Appendix 18: 1-3. Oxford: Oxford Archaeology & English Heritage.
100	Mount Farm	458400	196800	IA/R	Unclear	Jones, M. 2010. Charred plants. In G. Lambrick (ed.) *Neolithic to Saxon Social and Environmental Change at Mount Farm Berinsfield, Dorchester-on-Thames*: Appendix 19: 1-4. Oxford: Oxford Archaeology & English Heritage.
101	Neatham	473800	141200	LR	Small town	Murphy, P. 1986. Fruits and seeds from four Roman wells (Area B). In M. Millett and D. Graham (eds.) *Excavations on the Romano-British Small Town at Neatham, Hampshire 1969-1979*: 149–150. Hampshire Field Club Archaeological Society Monograph 3.
102	Nettlebank	434000	139000	MIA	Enclosed	Campbell, G. 2000. Charred plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: the Prehistory of a Wessex Landscape Volume 2 Pt 5. Nettlebank Copse, Wherwell, Hants, 1993*: 116–127. Oxford: English Heritage and Oxford University Committee for Archaeology.
103	Nettlebank	434000	139000	LIA	Enclosed	Campbell, G. 2000. Charred plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: the Prehistory of a Wessex Landscape Volume 2 Pt 5. Nettlebank Copse, Wherwell, Hants, 1993*: 116–127. Oxford: English Heritage and Oxford University Committee for Archaeology.
104	Northgate House	447900	129700	MIA	Oppida	Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations Netween 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*: 363–373. Oxford: Oxford Archaeology.

Record No.	Site	E	N	Period	Site Type	Reference
105	Northgate House	447900	129700	LIA	Oppida	Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations Between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*: 363–373. Oxford: Oxford Archaeology.
106	Northgate House	447900	129700	ER	Major town	Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*: 363–373. Oxford: Oxford Archaeology.
107	Northgate House	447900	129700	MR	Major town	Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*: 363–373. Oxford: Oxford Archaeology.
108	Northgate House	447900	129700	LR	Major town	Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*: 363–373. Oxford: Oxford Archaeology.
109	Oakridge	464200	153500	ER	Enclosed	Murphy, P. 1992. Fruits and seeds. In M. Oliver. Excavation of an Iron Age and Romano-British settlement site at Oakridge, Basingstoke, Hampshire, 1965-6. *Proceedings of the Hampshire Field Club & Archaeological Society* 48: 88.
110	Old Kempshott Lane	460200	151400	MIA	Enclosed	Allot, L. 2012. Archeobotanical analysis. In R. Haslam. Iron Age and Roman settlement and burial activity at Old Kempshott Lane, Basingstoke. *Proceedings of the Hampshire Field Club & Archaeological Society* 67 (1): 127–136.
111	Old Kempshott Lane	460200	151400	ER	Enclosed	Allot, L. 2012. Archeobotanical analysis. In R. Haslam. Iron Age and Roman settlement and burial activity at Old Kempshott Lane, Basingstoke. *Proceedings of the Hampshire Field Club & Archaeological Society* 67 (1): 127–136.
112	Park Farm	485300	170500	ER	Enclosed	Robinson, M. 1995. Carbonised plant remains. In M. Roberts. Excavations at Park Farm, Binfield, 1990: an Iron Age and Romano-British settlement and two Mesolithic flint scatters. In I. Barnes, W.A. Boismier, R.M.J. Cleal, A P. Fitzpatrick & M.R. Roberts (eds.) *Early Settlement in Berkshire. Mesolithic-Roman Occupation in the Thames and Kennet Valleys*: 118-119. Salisbury: Trust for Wessex Archaeology.
113	Park Prewett Hospital	461700	153600	MR	Enclosure	Robinson, M. 2011. Burnt plant remains. In S. Coles, J. Lowe and S. Ford. Excavation of a Roman enclosure at Park Prewett Hospital, Basingstoke, Hampshire. *Proceedings of the Hampshire Field Club & Archaeological Society* 66: 66–68.
114	Park Prewett Hospital	461700	153600	LR	Enclosure	Robinson, M. 2011. Burnt plant remains. In S. Coles, J. Lowe and S. Ford. Excavation of a Roman enclosure at Park Prewett Hospital, Basingstoke, Hampshire. *Proceedings of the Hampshire Field Club & Archaeological Society* 66: 66–68.
116	Perry Oaks	505500	175600	MIA	Open	Carruthers, W. 2010. Charred and waterlogged plant remains. In Framework Archaeology. *Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2*. Oxford and Salisbury: Framework Archaeology. CD Rom.
117	Perry Oaks	505500	175600	LIA	Enclosed	Carruthers, W. 2010. Charred and waterlogged plant remains. In Framework Archaeology. *Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2*. Oxford and Salisbury: Framework Archaeology. CD Rom.
118	Perry Oaks	505500	175600	ER	Enclosed	Carruthers, W. 2006. Charred and waterlogged plant remains. In Framework Archaeology (ed.) *Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2*. Oxford and Salisbury: Framework Archaeology. CD Rom. Carruthers, W. 2010. Charred and waterlogged plant remains. In *Framework Archaeology. Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 excavations Volume 2*. Oxford and Salisbury: Framework Archaeology. CD Rom.
119	Perry Oaks	505500	175600	MR	Enclosed	Carruthers, W. 2010. Charred and waterlogged plant remains. In Framework Archaeology. *Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2*. Oxford and Salisbury: Framework Archaeology. CD Rom.
120	Perry Oaks	505500	175600	LR	Enclosed	Carruthers, W. 2006. Charred and waterlogged plant remains. In Framework Archaeology. *Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2*. Oxford and Salsibury: Framework Archaeology. CD Rom. Carruthers, W. 2010. Charred and waterlogged plant remains. In *Framework Archaeology. Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2.* Oxford and Salisbury: Framework Archaeology. CD Rom.
121	Perry Oaks	505500	175600	R	Enclosed	Carruthers, W. 2006. Charred and waterlogged plant remains. In Framework Archaeology. *Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2*. Oxford and Salisbury: Framework Archaeology. CD Rom. Carruthers, W. 2010. Charred and waterlogged plant remains. In Framework Archaeology. Landscape Evolution in the Middle Thames Valley: Heathrow Terminal 5 Excavations Volume 2. Oxford and Salisbury: Framework Archaeology. CD Rom.
122	Pilgrim's School	448280	129040	ER	Major town	Smith, W. 2012. Waterlogged plant remains. In C. Champness, S. Teague and B. Ford. Holocene environmental change and Roman floodplain management at the Pigrim's school, Cathedral close, Winchester, Hampshire. *Proceedings of the Hampshire Field Club & Archaeological Society* 67 (1): 60–61.
123	Pilgrim's School	448280	129040	MR	Major town	Smith, W. 2012. Waterlogged plant remains. In C. Champness, S. Teague and B. Ford. Holocene environmental change and Roman floodplain management at the Pigrim's school, Cathedral close, Winchester, Hampshire. *Proceedings of the Hampshire Field Club & Archaeological Society* 67 (1): 60–61.
124	RAF Staff College	488000	168500	MIA	Open	Cramp, L. 2008. Carbonized plant remains and charcoal. In J. Lowe. *Middle Bronze Age and Middle Iron Age occupation and Post-Medieval limekilns at RAF Staff College, Bracknell, Berkshire*: 22–23. Reading: Thames Valley Archaeological services draft report.
125	Reading Business Park	470100	169600	R	Field	Campbell, G. 1992. Roman plant remains. In J. Moore and D. Jennings (eds.) *Reading Business Park: a Bronze Age Landscape*: 110–112. Oxford: Oxford University Committee for Archaeology.
126	Rectory Rd	457300	150150	IA/R	Unclear	Scales, R. and Smith, W. 2008. Charred plant remains. In A. Norton and A. Marshall. Iron Age and Roman activity at Rectory Road, Oakley, Hampshire. *Proceedings of the Hampshire Field Club & Archaeological Society* 63: 108.

Record No.	Site	E	N	Period	Site Type	Reference
127	Rowbury Farm	443530	114000	MIA	Enclosed	Campbell, G. 2008. Plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman era Volume 2 pt. 5. Rowbury Farm, Wherwell, Hants, 2003*: 128–130. Oxford: English Heritage and Oxford University School of Archaeology.
128	Rowbury Farm	443530	114000	ER	Enclosure	Campbell, G. 2008. Plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman era Volume 2 pt. 5. Rowbury Farm, Wherwell, Hants, 2003*: 128–130. Oxford: English Heritage and Oxford University School of Archaeology.
129	Rowbuy Farm	443530	114000	R	Enclosure	Campbell, G. 2008. Plant remains. In B. Cunliffe (ed.) *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman era Volume 2 pt. 5. Rowbury Farm, Wherwell, Hants, 2003*: 128–130. Oxford: English Heritage and Oxford University School of Archaeology.
130	Segsbury Hillfort	438500	184480	MIA	Hillfort	Ingham, D. and Robinson, M. 2005. Carbonised plant remains. In G. Lock, C. Gosden and P. Daly. *Segsbury Camp. Excavations in 1996 and 1997 at an Iron Age Hillfort on the Oxfordshire Ridgeway*: 200. Oxford: University of Oxford School of Archaeology Monograph 61.
131	Silchester Forum-Basilica	463930	162400	LIA	Oppida	Jones, M. 2000. The plant remains. In M. Fulford and J. Timby (eds.) *Late Iron Age and Roman Silchester: Excavations on the Site of the Forum Basilica, 1977, 80-86*: 505–512. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 15
132	Silchester Insula IX	463800	162600	LIA	Oppida	in thesis
133	Silchester Insula IX	463800	162600	ER	Major town	in thesis
134	Silchester Insula IX	463800	162600	MR	Major town	Robinson, M. 2011. The macroscopic plant and invertebrate remains. In M. Fulford and A. Clarke (eds.) *Silchester: City in Transition: the Mid-Roman Occupation of Insula IX c. A.D. 125-250/300: a Report on Excavations Undertaken Since 1997*: 281-293. London: Society for the Promotion of Roman Studies. Britannia monograph Series No. 25.
135	Silchester Insula IX	463800	162600	LR	Major town	Robinson, M., Fulford, N. and Tootell, K. 2006. Macroscopic plant remains. In M. Fulford, A. Clarke and H. Eckardt (eds.) *Life and Labour in Late Roman Silchester: Excavations in Insula IX since 1997*: 206-218. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 22.
136	Staple Gardens	447880	129600	MIA	Oppida	Biddle, B. 2004. Staple gardens. In K. Qualmann, H. Rees, G. Scobie and R. Whinney (eds.) *Oram's Arbour: The Iron Age Enclosure at Winchester. Volume 1: Investigations 1950-1999*: 75. Winchester: Winchester Museums Service & English Heritage.
137	Suddern Farm	427900	137500	MIA	Enclosed	Campbell, G. 2000. The charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme: the Prehistory of a Wessex Landscape. Suddern Farm, Middle Wallop, Hants, 1991 and 1996, Volume 2, Part 3*: 193–198. Oxford: Institute of Archaeology.
138	Suddern Farm	427900	137500	LIA	Enclosed	Campbell, G. 2000. The charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme: the Prehistory of a Wessex Landscape. Suddern Farm, Middle Wallop, Hants, 1991 and 1996, Volume 2, Part 3*: 193–198. Oxford: Institute of Archaeology.
139	Suddern Farm	427900	137500	MR	Enclosed	Campbell, G. 2000. The charred plant remains. In B. Cunliffe and C. Poole (eds) *The Danebury Environs Programme: the Prehistory of a Wessex Landscape. Suddern Farm, Middle Wallop, Hants, 1991 and 1996, Volume 2, Part 3*: 193–198. Oxford: Institute of Archaeology.
140	Sussex Street	447880	129600	MIA	Oppida	Green, F. 2004. Sites in the western suburbs. In K. Qualmann, H. Rees, G. Scobie and R. Whinney (eds.) *Oram's Arbour: The Iron Age Enclosure at Winchester. Volume 1: Investigations 1950-1999*: 75–78. Winchester: Winchester Museums Service & English Heritage.
141	Sutton Courtenay	449000	193600	R	Unclear	Hamerow, H., Hayden, C. and Hey, G. 2007. Anglo-Saxon and earlier settlement near Drayton Road, Sutton Courtenay, Berkshire. *Oxoniensia* 164: 109–196.
142	Thames Valley Park Terrace	474500	174200	MIA	Enclosed	Carruthers, W. 1997. Carbonised plant remains. In I. Barnes, C.A. Butterworth, J.W. Hawkes and L. Smith (eds.) *Excavations at Thames Valley Park, Reading, 1986-88*: 72–77. Salisbury: Wessex Archaeology.
143	Thames Valley Park Terrace	474500	174200	LR	Unclear	Carruthers, W. 1997. Carbonised plant remains. In I. Barnes, C.A. Butterworth, J.W. Hawkes and L. Smith (eds.) *Excavations at Thames Valley Park, Reading, 1986-88*: 72–77. Salisbury: Wessex Archaeology.
144	Thorpe Lea Nurseries	501800	169900	MIA	Open	Robinson, M. 2012. Macroscopic plant and invertebrate remains. In G. Hayman and R. Poulton. Archaeological excavation of Bronze Age, Iron Age and Roman field systems, enclosures, and settlements at Thorpe Lea Nurseries, Egham, Surrey. In G. Hayman, P. Jones and R. Poulton (eds.) *Settlement Sites and Sacred Offerings: Prehistoric and Later Archaeology in the Thames valley, Near Chertsey*: 180-4. Woking: SpoilHeap publications Monograph 4.
145	Thorpe Lea Nurseries	501800	169900	R	Open	Robinson, M. 2012. Macroscopic plant and invertebrate remains. In G. Hayman and R. Poulton. Archaeological excavation of Bronze Age, Iron Age and Roman field systems, enclosures, and settlements at Thorpe Lea Nurseries, Egham, Surrey. In G. Hayman, P. Jones and R. Poulton (eds.) *Settlement Sites and Sacred Offerings: Prehistoric and Later Archaeology in the Thames valley, Near Chertsey*: 180-4. Woking: SpoilHeap publications Monograph 4.
146	Thruxton	429700	146300	LIA	Enclosed	Summers, J. and Campbell, G. 2008. Charred plant remains. In B. Cunliffe. *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman era Volume 2 pt. 4. Thruxton, Hants, 2002*: 102–105. Oxford: English Heritage and Oxford University School of Archaeology.
147	Thruxton	429700	146300	LR	Villa	Summers, J. and Campbell, G. 2008. Charred plant remains. In B. Cunliffe. *The Danebury Environs Roman Programme: a Wessex Landscape During the Roman era Volume 2 pt. 4. Thruxton, Hants, 2002*: 102–105. Oxford: English Heritage and Oxford University School of Archaeology.
148	Turnpike School	448700	167600	MR	Unclear	Robinson, M. 2010. Environmental evidence. In J. Pine. A Late Bronze Age burnt mound and other prehistoric features, and Roman occupation, at Turnpike School, Gaywood drive, Newbury. In J. Pine (ed.) *Archaeological Investigations Along the Line of Ermin Street in West Berkshire, 1992-2008*: 14-15. Reading: Thame Valley Archaeological Services Monograph 12.
149	Turnpike School	448700	167600	LR	Unclear	Robinson, M. 2010. Environmental evidence. In J. Pine. A Late Bronze Age burnt mound and other prehistoric features, and Roman occupation, at Turnpike School, Gaywood drive, Newbury. In J. Pine (ed.) *Archaeological Investigations Along the Line of Ermin Street in West Berkshire, 1992-2008*: 14-15. Reading: Thame Valley Archaeological Services Monograph 12.

Record No.	Site	E	N	Period	Site Type	Reference
150	Twyford Down	448430	126860	ER	Field	Clapham, A. 2000. Plant remains. In K. Walker and D. Farwell (eds.), *Twyford Down, Hampshire Archaeological Investigations on the M3 Motorway from Bar End to Compton, 1990-3*: 148–150. Winchester: Hampshire Field Club in co-operation with the Trust for Wessex Archaeology and the Highways Agency.
151	Uffington Hillfort	429960	186330	MIA	Hillfort	Robinson, M. 2003. Charred plant remains. In D. Miles, S. Palmer, G. Lock, C. Gosden and A. Cromarty (eds.) *Uffington White Horse and its Landscape: Investigations at White Horse Hill Uffington, 1989-95 and Tower Hill Ashbury 1993-4*: 192–193. Oxford: Oxford Archaeology Thames Valley Landscapes Monograph No. 18.
152	Uffington Hillfort	429960	186330	LR	Hillfort	Robinson, M. 2003. Charred plant remains. In D. Miles, S. Palmer, G. Lock, C. Gosden and A. Cromarty (eds.) *Uffington White Horse and its Landscape: Investigations at White Horse Hill Uffington, 1989-95 and Tower Hill Ashbury 1993-4*: 192–193. Oxford: Oxford Archaeology Thames Valley Landscapes Monograph No. 18.
153	Viables Farm	463180	150200	MIA	Enclosed	Green, F. 1982. The plant remains. In M. Millett and D. Russell. An Iron Age burial from Viables Farm, Basingstoke. *Archaeological Journal* 139: 81–82.
154	Victoria Rd, Winchester	448000	130000	ER	Major town	Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed.) *Feeding a Roman Town: Environmental Evidence from Excavations in Winchester, 1972-1985*: 327–342. Winchester: Winchester Museums.
155	Victoria Rd, Winchester	448000	130000	MR	Major town	Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed.) *Feeding a Roman Town: Environmental Evidence from Excavations in Winchester, 1972-1985*: 327–342. Winchester: Winchester Museums.
156	Vineyard, Abingdon	449850	197330	MIA	Oppida	Stevens, C. 1996. *Iron Age and Roman Agriculture in the Upper Thames Valley: Archaeobotanical and Social Perspectives*. University of Cambridge. Unpublished DPhil thesis.
157	Vineyard, Abingdon	449850	197330	IA/R	Oppida	Stevens, C. 1996. *Iron Age and Roman Agriculture in the Upper Thames Valley: Archaeobotanical and Social Perspectives*. University of Cambridge. Unpublished DPhil thesis.
158	Vineyard, Abingdon	449850	197330	ER	Small town	Stevens, C. 1996. *Iron Age and Roman Agriculture in the Upper Thames Valley: Archaeobotanical and Social Perspectives*. University of Cambridge. Unpublished DPhil thesis.
159	Vineyard, Abingdon	449850	197330	MR	Small town	Stevens, C. 1996. *Iron Age and Roman Agriculture in the Upper Thames Valley: Archaeobotanical and Social Perspectives*. University of Cambridge. Unpublished DPhil thesis.
160	Vineyard, Abingdon	449850	197330	LR	Small town	Stevens, C. 1996. *Iron Age and Roman Agriculture in the Upper Thames Valley: Archaeobotanical and Social Perspectives*. University of Cambridge. Unpublished DPhil thesis.
161	Warpsgrove	465450	197650	MIA	Unclear	Robinson, M. 2006. Site 34 Charred plant remains. In K. Taylor and S. Ford. Late Bronze Age, Iron Age, Roman and Saxon sites along the Oxfordshire section. In S. Ford, I. Howell and K. Taylor (eds.) *The Archaeology of the Aylesbury-Chalgrove Gas Pipeline, and the Orchard, Walton Road, Aylesbury*: 47. Reading: Thames Valley Archaeological Services Monograph 5.
162	Watchfield	425700	190700	MIA	Enclosure	Hinton, P. 2001. Charred plant remains. In V. Birbeck. Excavations at Watchfield, Shrivenham, Oxfordshire, 1998. *Oxoniensia* 66: 280–283.
163	Watchfield	425700	190700	ER	Enclosed	Hinton, P. 2001. Charred plant remains. In V. Birbeck. Excavations at Watchfield, Shrivenham, Oxfordshire, 1998. *Oxoniensia* 66: 280–283.
164	Watchfield	425700	190700	ER	Cemetery	Hinton, P. 2001. Charred plant remains. In V. Birbeck. Excavations at Watchfield, Shrivenham, Oxfordshire, 1998. *Oxoniensia* 66: 280–283.
165	Watchfield	424000	190000	MIA	Enclosed	Huntley, J. 1992. Plant remains. In C. Scull. Excavations and survey at Watchfield, Oxfordshire, 1983-92. *Archaeological Journal* 149: 154–155.
166	Weston Down	449740	141130	MIA	Enclosed	Gibson, C. and Knight, S. 2007. A Middle Iron Age settlement at Weston Down Cottages, Weston Colley, near Winchester, Hampshire. *Proceedings of the Hampshire Field Club & Archaeological Society* 62: 1–34.
167	Weston Down	449740	141130	LR	Unclear	Gibson, C. and Knight, S. 2007. A Middle Iron Age settlement at Weston Down Cottages, Weston Colley, near Winchester, Hampshire. *Proceedings of the Hampshire Field Club & Archaeological Society* 62: 1–34.
168	Wickhams Field	467300	170200	R	Unclear	Scaife, R. 1996. Charred and waterlogged plant remains. In A. Crockett (ed.) *Iron Age to Saxon Settlement at Wickhams Field, near Reading, Berkshire: Excavations on the Site of the M4 Granada Reading Motorway Service Area*: 157–163. Salisbury: Wessex Archaeology.
169	Winnall Down	449850	130350	MIA	Enclosed	Monk, M. 1985. The plant economy. In P. Fasham (ed.) *The Prehistoric Settlement at Winnall Down, Winchester: Excavations of MARC3 Site R17 in 1976 and 1977*: 112–117. Winchester: Hampshire Field Club and Archaeological Society: Monograph 2.
170	Winnall Down	449850	130350	LIA	Enclosed	Monk, M. 1985. The plant economy. In P. Fasham (ed.) *The Prehistoric Settlement at Winnall Down, Winchester: Excavations of MARC3 Site R17 in 1976 and 1977*: 112–117. Winchester: Hampshire Field Club and Archaeological Society: Monograph 2.
171	Woodcote Rd	461100	183500	IA/R	Unclear	Huckerby, E. and Druce, D. 2005. Charred plant remains. In Timby, J., Stansbie, D., Norton, A. and Walsh, K. Excavations along the Newbury Reinforcement pipeline: Iron Age-Roman activity and a Neolithic pit group. *Oxoniensia* 70: 293-298.
172	Woolbury	438300	135300	ER	Enclosed	Campbell, G. 2000. Charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme: The Prehistory of a Wessex Landscape Volume 2 pt. 1. Woolbury and Stockbridge Down, Stockbridge, Hants, 1989*: 72–74. Oxford: English Heritage and Oxford University Committee for Archaeology.
173	Woolbury	438300	135300	MR	Enclosed	Campbell, G. 2000. Charred plant remains. In B. Cunliffe and C. Poole (eds.) *The Danebury Environs Programme: The Prehistory of a Wessex Landscape Volume 2 pt. 1. Woolbury and Stockbridge Down, Stockbridge, Hants, 1989*: 72–74. Oxford: English Heritage and Oxford University Committee for Archaeology.

*** = medium contamination, ** = high contamination. H = high probability, L = low probability. Svd = sieved. M = mixed**

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
All Souls Farm	ASF-002	ER	Mid Thames	E	10	366	pit 288	Spelt	0.26	-	-	3	0.98	4	Spelt FSBP H
All Souls Farm	ASF-005	ER	Mid Thames	E	20	1697	1629	Spelt*	0.29	-	-	3	0.92	4	Spelt FSBP H
All Souls Farm	ASF-006	ER	Mid Thames	E	21	1750	1629	Spelt	0.49	-	-	4	0.68	3	Spelt FSBP svd L
All Souls Farm	ASF-066	LR	Mid Thames	E	59	998	pit 617	Spelt	4.13	-	-	-	-	-	Spelt FSP -
Ashville	ASV-002	MIA	Upper Thames	F	40	89	pit	Barley	-	281.0	-	-	-	-	Barley FSP -
Ashville	ASV-003	MIA	Upper Thames	F	45	109	pit	Spelt**	0.44	-	-	4	0.99	3	Spelt** FSBP svd H
Ashville	ASV-005	MIA	Upper Thames	F	47	122	ditch	Spelt*	0.29	-	-	4	1	3	Spelt FSBP svd H
Ashville	ASV-006	MIA	Upper Thames	F	52	135	pit	-	-	-	-	4	0.99	3	M
Ashville	ASV-007	MIA	Upper Thames	F	53	139	pit	Spelt*	0.36	-	-	4	0.99	3	Spelt FSBP svd H
Ashville	ASV-008	MIA	Upper Thames	F	61	284	ditch	Spelt	0.14	-	-	4	0.99	3	Spelt FSBP svd H
Ashville	ASV-010	MIA	Upper Thames	F	67	317	pit	Spelt*	0.25	-	-	4	0.96	3	Spelt FSBP svd H
Ashville	ASV-014	MIA	Upper Thames	F	76	375	pit	Barley	-	127.0	-	-	-	-	Barley FSP -
Ashville	ASV-017	MIA	Upper Thames	F	80	416	pit	Spelt	0.07	-	-	4	-	3	Spelt FSBP svd H
Ashville	ASV-018	MIA	Upper Thames	F	83	442	pit	Spelt*	0.45	-	-	4	0.67	3	Spelt FSBP svd L
Ashville	ASV-020	MIA	Upper Thames	F	11	13	ditch (<11> and <13>)	Spelt**	0.69	-	-	4	0.60	3	Spelt** FSBP svd L
Ashville	ASV-023	MIA	Upper Thames	F	14	16	pit	-	-	-	-	4	0.90	3	M
Ashville	ASV-024	MIA	Upper Thames	F	15	20	ditch	-	-	-	-	4	0.99	3	M
Ashville	ASV-025	MIA	Upper Thames	F	16	25	pit	Spelt*	0.23	-	-	4	0.99	3	Spelt FSBP svd H
Ashville	ASV-026	MIA	Upper Thames	F	21	50	pit	Spelt	0.54	-	-	4	0.99	3	Spelt FSBP svd H
Ashville	ASV-027	MIA	Upper Thames	F	28	65	pit	Spelt*	0.33	-	-	4	0.97	3	Spelt FSBP svd H
Ashville	ASV-029	MIA	Upper Thames	F	30	68	pit	Barley**	-	105	-	4	0.88	3	Barley** FSP L
Ashville	ASV-031	MIA	Upper Thames	F	32	72	pit	-	-	-	-	4	0.93	3	M
Ashville	ASV-032	MIA	Upper Thames	F	33	73	pit (<33> and <334>)	-	-	-		3	0.55	4	M
Ashville	ASV-034	MIA	Upper Thames	F	38	80	pit	Spelt**	0.34	-	-	4	0.99	3	Spelt** FSBP svd H
Ashville	ASV-036	MIA	Upper Thames	F	43	102	pit	Spelt	0.17	-	-	4	1	3	Spelt FSBP svd H
Ashville	ASV-037	MIA	Upper Thames	F	57	273	ditch	-	-	-	-	4	0.95	3	M
Ashville	ASV-038	MIA	Upper Thames	F	58	280	ditch	Spelt*	0.10	-	-	4	0.99	3	Spelt FSBP svd H
Ashville	ASV-039	MIA	Upper Thames	F	64	300	pit	Spelt**	0.51	-	-	4	0.99	3	Spelt** FSBP svd H
Ashville	ASV-040	MIA	Upper Thames	F	65	308	pit	Spelt**	0.18	-	-	4	0.99	3	Spelt** FSBP svd H
Ashville	ASV-042	MIA	Upper Thames	F	69	327	pit	-	-	-	-	4	0.94	3	M

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
Ashville	ASV-043	MIA	Upper Thames	F	72	338	pit	Barley**	-	46.0	-	4	0.80	3	Barley** FSP L
Ashville	ASV-045	MIA	Upper Thames	F	79	387	pit	Spelt	0.20	-	-	4	0.99	3	Spelt FSBP svd H
Ashville	ASV-046	MIA	Upper Thames	F	81	418	pit	Barley*	-	74.0	-	4	1	3	Barley* FSP H
Ashville	ASV-049	LIA	Upper Thames	F	44	103	ditch	-	-	-	-	4	0.98	3	M
Ashville	ASV-050	LIA	Upper Thames	F	51	134	ditch	-	-	-	-	4	0.99	3	M
Ashville	ASV-051	LIA	Upper Thames	F	71	333	pit	Barley*	-	35.0	-	4	0.99	3	Barley* FSP H
Ashville	ASV-053	R	Upper Thames	F	85	202	pit	Spelt*	1.51	-	-	4	0.99	3	Spelt FSP H
Ashville	ASV-055	R	Upper Thames	F	87	197	pit	Spelt*	0.86	-	-	4	1	3	Spelt Spikelets svd H
Ashville	ASV-056	R	Upper Thames	F	88	198	well	Spelt**	0.36	-	-	4	0.99	3	Spelt** FSBP svd H
Ashville	ASV-057	R	Upper Thames	F	89	1018	ditch	Spelt**	0.46	-	-	4	0.88	3	Spelt** FSBP svd L
Abingdon Vineyard	AVY-005	MIA	Upper Thames	D	140	3051	pit	Spelt	0.06	-	-	3	0.79	4	Spelt FSBP L
Abingdon Vineyard	AVY-007	MIA	Upper Thames	D	138	3203	pit	-	-	-	-	4	0.56	3	M
Abingdon Vineyard	AVY-019	MIA	Upper Thames	D	182	3393	pit	Spelt	10.00	-	-	3	0.99	1	M
Abingdon Vineyard	AVY-026	MIA	Upper Thames	D	208	4082	pit	Spelt	0.09	-	-	4	0.66	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-030	MIA	Upper Thames	D	222	4109	gully	Spelt	0.03	-	-	3	0.96	4	Spelt FSBP H
Abingdon Vineyard	AVY-033	MIA	Upper Thames	D	213	4118	pit	Spelt*	0.16	-	-	4	0.99	3	Spelt FSBP svd H
Abingdon Vineyard	AVY-036	MIA	Upper Thames	D	226	4148	pit	Spelt	0.05	-	-	3	0.94	4	Spelt FSBP H
Abingdon Vineyard	AVY-037	MIA	Upper Thames	D	305	4156	layer	Spelt*	0.20	-	-	4	0.72	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-043	MIA	Upper Thames	D	247	4206	pit (oven)	Spelt	0.13	-	-	4	0.73	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-049	MIA	Upper Thames	D	406	5610	pit	Spelt	0.06	-	-	3	0.96	4	Spelt FSBP H
Abingdon Vineyard	AVY-050	MIA	Upper Thames	D	414	5613	pit	Spelt	0.11	-	-	4	0.51	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-051	MIA	Upper Thames	D	419	5619	pit	Spelt	0.38	-	-	4	0.87	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-053	MIA	Upper Thames	D	433	5633	ditch	Spelt	0.24	-	-	4	1	3	Spelt FSBP svd H
Abingdon Vineyard	AVY-057	MIA	Upper Thames	D	434	5701	pit	Spelt**	0.71	-	-	4	0.64	3	Spelt** FSBP svd L
Abingdon Vineyard	AVY-063	IA/R	Upper Thames	D	736	7836	pit	Spelt**	2.78	-	-	3	0.99	4	M
Abingdon Vineyard	AVY-075	IA/R	Upper Thames	D	248	4164	pit	Spelt*	0.22	-	-	4	0.64	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-086	IA/R	Upper Thames	D	422	5608	gully	Spelt*	0.28	-	-	3	0.99	4	Spelt FSBP H
Abingdon Vineyard	AVY-087	IA/R	Upper Thames	D	436	5626	ditch	Spelt*	0.88	-	-	4	0.97	3	Spelt Spikelets svd H
Abingdon Vineyard	AVY-090	IA/R	Upper Thames	D	507	6119	pit	Spelt	0.45	-	-	4	0.88	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-091	IA/R	Upper Thames	D	504	6150	pit	Spelt*	0.56	-	-	4	0.90	1	Spelt FSBP svd H
Abingdon Vineyard	AVY-092	IA/R	Upper Thames	D	508	6314	pit	Spelt*	0.15	-	-	3	0.91	4	Spelt FSBP H
Abingdon Vineyard	AVY-094	IA/R	Upper Thames	D	642	6396	ditch	Spelt	0.16	-	-	4	0.59	3	Spelt FSBP svd L

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
Abingdon Vineyard	AVY-095	IA/R	Upper Thames	D	604	6405	ditch	Spelt	0.52	-	-	4	0.99	3	Spelt FSBP svd H
Abingdon Vineyard	AVY-096	IA/R	Upper Thames	D	618	6425	pit	Spelt*	0.95	-	-	4	0.97	3	Spelt Spikelets svd H
Abingdon Vineyard	AVY-102	IA/R	Upper Thames	D	727	7834	pit	Spelt*	0.73	-	-	3	0.98	4	Spelt FSBP H
Abingdon Vineyard	AVY-103	ER	Upper Thames	D	734	7839	pit	Spelt*	0.33	-	-	3	1	4	Spelt FSBP H
Abingdon Vineyard	AVY-105	ER	Upper Thames	D	418	5265	ditch	FTW	-	-	-	3	0.99	4	M
Abingdon Vineyard	AVY-108	ER	Upper Thames	D	439	5640	gully (<439 and <438>)	Spelt	-	-		4	0.99	3	Spelt FSP H
Abingdon Vineyard	AVY-110	ER	Upper Thames	D	421	5662	gully	Spelt	0.09	-	-	4	0.84	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-112	ER	Upper Thames	D	601	6409	pit	Spelt	0.31	-	-	3	0.88	4	Spelt FSBP L
Abingdon Vineyard	AVY-113	ER	Upper Thames	D	619	6431	ditch	Spelt	0.26	-	-	4	0.98	3	Spelt FSBP svd H
Abingdon Vineyard	AVY-115	ER	Upper Thames	D	742	7864	gully	Spelt**	0.39	-	-	4	0.96	3	Spelt** FSBP svd H
Abingdon Vineyard	AVY-116	ER	Upper Thames	D	741	7871	hearth (<740> and <741>)	Spelt	0.78	-		3	0.94	4	Spelt FSBP H
Abingdon Vineyard	AVY-117	ER	Upper Thames	D	739	7877	ditch	Spelt	0.40	-	-	3	1	4	Spelt FSBP H
Abingdon Vineyard	AVY-121	ER	Upper Thames	D	136	3197	posthole	Spelt**	8.84	-	-	4	0.99	3	Spelt** FSP H
Abingdon Vineyard	AVY-128	ER	Upper Thames	D	153	3249	pit	Spelt**	3.04	-	-	3	0.63	4	M
Abingdon Vineyard	AVY-132	ER	Upper Thames	D	312	3805	pit	FTW*	-	-	130.5	3	0.97	4	M
Abingdon Vineyard	AVY-134	ER	Upper Thames	D	235	4068	pit	Spelt**	0.37	-	-	3	0.99	4	Spelt** FSBP H
Abingdon Vineyard	AVY-140	ER	Upper Thames	D	244	4199	pit	Spelt*	0.11	-	-	3	0.96	4	Spelt FSBP H
Abingdon Vineyard	AVY-141	ER	Upper Thames	D	261	4265	pit	Spelt*	35.40	-	-	4	0.99	3	Spelt FSP H
Abingdon Vineyard	AVY-144	ER	Upper Thames	D	265	5086	pit	-	-	-	-	3	0.99	4	M
Abingdon Vineyard	AVY-145	ER	Upper Thames	D	267	5087	ditch	-	-	-	-	3	0.66	4	M
Abingdon Vineyard	AVY-149	ER	Upper Thames	D	513	5626	ditch	Spelt	1.65	-	-	4	0.96	3	Spelt FSP H
Abingdon Vineyard	AVY-152	ER	Upper Thames	D	505	6084	layer	Spelt	0.18	-	-	4	0.77	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-154	ER	Upper Thames	D	608	6429	pit	Spelt	0.05	-	-	4	0.86	3	Spelt FSBP svd L
Abingdon Vineyard	AVY-156	ER	Upper Thames	D	609	6449	pit	Spelt	0.16	-	-	4	0.97	3	Spelt FSBP svd H
Abingdon Vineyard	AVY-157	ER	Upper Thames	D	623	6461	pit	Spelt	3.13	-	-	4	0.99	3	Spelt FSP H
Abingdon Vineyard	AVY-161	ER	Upper Thames	D	277	4004	layer	Spelt*	0.19	-	-	3	0.87	4	Spelt* FSBP L
Abingdon Vineyard	AVY-184	LR	Upper Thames	D	412	5611	pit	Spelt**	0.88	-	-	4	0.99	3	Spelt** Spikelets svd H
Abingdon West Central	AWC-001	ER	Upper Thames	E	59	7860	ditch	Spelt	0.05	-	-	4	0.95	3	Spelt FSBP svd H
Abingdon West Central	AWC-002	ER	Upper Thames	E	58	7652	ditch	Spelt	0.06	-	-	-	1	-	Spelt FSBP -
Abingdon West Central	AWC-005	R	Upper Thames	E	45	7019	ditch	Spelt	0.06	-	-	4	0.99	3	Spelt FSBP svd H
Abingdon West Central	AWC-006	R	Upper Thames	E	56	7895	ditch	Spelt	0.01	-	-	4	0.98	1	Spelt FSBP svd H
Barton Court Farm	BCF-001	LIA	Upper Thames	D		311	pit	Spelt**	18.53	-	-	4	1	3	Spelt** FSP H

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
Barton Court Farm	BCF-003	LR	Upper Thames	D		708	pit	Spelt*	93.00	-	-	3	0.99	4	M
Barton Court Farm	BCF-004	LR	Upper Thames	D		732	t-oven flue	Spelt**	0.81	-	-	3	0.90	1	Spelt** Spikelets H
Barton Court Farm	BCF-005	LR	Upper Thames	D		732	t-oven t-end	-	-	-	-	4	0.85	3	M
Barton Court Farm	BCF-009	LR	Upper Thames	D		849	t-oven flue	Spelt*	1.11	-	-	3	0.80	4	Spelt Spikelets L
Barton Court Farm	BCF-010	LR	Upper Thames	D		849	t-oven flue centre	Spelt	0.27	-	-	3	0.79	4	Spelt FSBP L
Barton Court Farm	BCF-011	LR	Upper Thames	D		849	t-oven t-end	Spelt*	0.40	-	-	4	0.42	3	Spelt FSBP svd L
Barton Court Farm	BCF-012	LR	Upper Thames	D		849	t-oven flue upper layer	Spelt**	3.39	-	-	4	1	3	Spelt** FSP H
Bagnor Rd	BGR-001	LR	Thames Heaths	D	10040	9121	stokehole	Spelt	0.06	-	-	1	1	3	Spelt FSBP L
Bagnor Rd	BGR-002	LR	Thames Heaths	D	10033	9118	stokehole	Spelt	0.02	-	-	1	0.50	3	Spelt FSBP L
Bagnor Rd	BGR-003	LR	Thames Heaths	D	10048	9149	flue	Spelt	0.02	-	-	-	0.98	-	Spelt FSBP -
Bagnor Rd	BGR-004	LR	Thames Heaths	D	10047	9150	floor	Spelt*	0.84	-	-	4	0.92	1	Spelt Spikelets svd H
Bagnor Rd	BGR-005	LR	Thames Heaths	D	10044	9082	pit	Spelt*	0.36	-	-	3	0.88	1	Spelt* FSBP L
Brighton Hill South	BHS-003	MIA	H'shire Downs	A		6124	6116	Barley*	-	11.0	-	4	0.99	3	Barley* FSP H
Brighton Hill South	BHS-004	MIA	H'shire Downs	A		6137	6166	-	-	-	-	4	1	3	M
Brighton Hill South	BHS-006	MIA	H'shire Downs	A		6554	6547	Spelt	-	-	-	4	0.65	3	M
Brighton Hill South	BHS-009	LIA	H'shire Downs	A		6245	-	Barley*	-	13.0	-	4	0.90	3	Barley* FSP H
Brighton Hill South	BHS-010	LIA	H'shire Downs	A		6246	-	Spelt**	0.33	-	-	4	1	3	Spelt** FSBP svd H
Brighton Hill South	BHS-020	LIA	H'shire Downs	A		5280	5279	-	-	-	-	4	0.86	3	M
Brighton Hill South	BHS-022	LIA	H'shire Downs	A		5321	5320	Spelt	17.00	-	-	4	0.88	1	Spelt FSP L
Brighton Hill South	BHS-027	ER	H'shire Downs	A		5294	-	Spelt	7.94	-	-	4	1	3	Spelt FSP H
Brighton Hill South	BHS-036	ER	H'shire Downs	A		5309	-	-	-	-	-	4	0.99	3	M
Brighton Hill South	BHS-037	ER	H'shire Downs	A		5310	-	-	-	-	-	4	1	3	M
Brighton Hill South	BHS-038	ER	H'shire Downs	A		5313	-	Spelt*	0.11	-	-	4	0.99	3	Spelt FSBP svd H
Brighton Hill South	BHS-041	ER	H'shire Downs	A		5324	SF208	Spelt*	0.19	-	-	4	0.70	3	Spelt FSBP svd L
Brighton Hill South	BHS-042	ER	H'shire Downs	A		5365	5288	Spelt**	0.62	-	-	3	0.87	4	Spelt** FSBP L
Balksbury Camp	BLK-006	MIA	H'shire Downs	A		36	-	-	-	-	-	3	0.99	1	M
Balksbury Camp	BLK-034	MIA	H'shire Downs	A		494	-	Spelt*	8.20	-	-	4	0.83	3	Spelt FSP L
Balksbury Camp	BLK-044	LR	H'shire Downs	A		511	corn drier	Spelt**	6.31	-	-	3	0.99	4	M
Bury Hill	BRH-001	MIA	H'shire Downs	A	94	P21/1	pit	-	-	-	-	3	0.89	4	M
Bury Hill	BRH-003	MIA	H'shire Downs	A	103	P39/5	pit	Barley*	-	123.0	-	-	-	-	Barley FSP -
Bury Hill	BRH-004	MIA	H'shire Downs	A	116	P45/3	pit	Barley**	-	50.0	-	3	0.99	4	M
Bury Hill	BRH-006	MIA	H'shire Downs	A	324	P57/8	pit	Barley**	-	2.3	-	4	0.68	3	Barley** FSP L

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
Bury Hill	BRH-010	MIA	H'shire Downs	A	106	F32/L16	ditch	Spelt*	0.84	-	-	4	0.53	3	Spelt Spikelets svd L
Berrick Salome	BRS-001	MIA	Upper Thames	E	188	8637	pit	Barley**	-	240.0	-	-	-	-	Barley** FSP -
Berrick Salome	BRS-008	MIA	Upper Thames	E	244	8757	pit	Barley*	-	94.0	-	-	-	-	Barley FSP -
Berrick Salome	BRS-011	MIA	Upper Thames	E	214	9387	pit	Spelt**	6.33	-	-	3	0.54	4	M
Berrick Salome	BRS-017	LR	Upper Thames	E	139	8712	pit	Barley*	-	259.0	-	4	1	3	Barley* FSP H
Berrick Salome	BRS-018	LR	Upper Thames	E	243	8720	kiln infill	Spelt**	2.23	-	-	4	0.99	3	Spelt** FSP H
Berrick Salome	BRS-021	LR	Upper Thames	E	339	9927	oven pit	Spelt*	0.11	-	-	4	1	3	Spelt FSBP svd H
Berrick Salome	BRS-022	LR	Upper Thames	E	340	9928	oven pit	Spelt*	0.07	-	-	4	1	3	Spelt FSBP svd H
Bath Rd, Thatcham	BTR-001	MR	Thames Heaths	E	7	176	124	Spelt	-	-	-	3	0.99	4	M
Castle Hill Landscape	CHL-001	MIA	Upper Thames	D	15002	15067	pit 15006	Spelt	0.02	-	-	4	0.99	3	Spelt FSBP svd H
Castle Hill Landscape	CHL-002	MIA	Upper Thames	D	122	49	pit 41	Spelt	0.21	-	-	4	1	3	Spelt FSBP svd H
Castle Hill Landscape	CHL-003	MIA	Upper Thames	D	123	69	pit 41	Barley**	-	-	-	4	0.97	1	M
Castle Hill Landscape	CHL-004	MIA	Upper Thames	D	124	72	pit 41	Spelt*	-	-	-	4	0.95	1	M
Castle Hill Landscape	CHL-007	MIA	Upper Thames	D	137	761	pit 769	Spelt*	0.97	-	-	4	1	3	Spelt Spikelets svd H
Community Hospital	CMH-001	ER	Thames Heaths	D	15	153	pit 152	Spelt	0.41	-	-	4	0.76	3	Spelt FSBP svd L
Danebury	DAN-003	MIA	H'shire Downs	A		472	layer F.472	Spelt*	0.51	-	-	4	0.99	3	Spelt FSBP svd H
Danebury	DAN-005	MIA	H'shire Downs	A		547	layer	Spelt	0.33	-	-	4	0.53	3	Spelt FSBP svd L
Danebury	DAN-007	MIA	H'shire Downs	A		1074	pit	Spelt*	1.42	-	-	-	0.54	-	Spelt Spikelets svd -
Danebury	DAN-010	LIA	H'shire Downs	A		1078	pit	Spelt*	8.33	-	-	4	1	3	Spelt FSP H
Denchworth Rd	DWR-001	ER	Upper Thames	C	16	1133	pit 1132	Spelt	0.06	-	-	3	0.98	4	Spelt FSBP H
Denchworth Rd	DWR-002	ER	Upper Thames	C	10	2033	ditch 2036	Spelt	0.02	-	-	3	0.95	1	Spelt FSBP H
Denchworth Rd	DWR-003	MR	Upper Thames	C	15	1122	lens	Spelt	0.03	-	-	3	1	4	Spelt FSBP H
Denchworth Rd	DWR-007	LR	Upper Thames	C	12	2059	posthole 2058	Spelt	0.02	-	-	3	0.94	4	Spelt FSBP H
Easton Lane	ESL-001	MIA	H'shire Downs	F			pit 4928	Spelt	0.02	-	-	4	0.95	3	Spelt FSBP svd H
Enswick Shaw Pit	EWS-002	MIA	H'shire Downs	C	2	28	pit 27	Spelt	186.00	-	-	4	1	3	Spelt FSP H
Enswick Shaw Pit	EWS-003	R	H'shire Downs	C	3	72	pit 69	Spelt	0.04	-	-	4	0.99	3	Spelt FSBP svd H
Fir Hill	FHB-003	IA/R	H'shire Downs	C	23002	20049	pit 20036	Spelt	0.14	-	-	4	0.55	3	Spelt FSBP svd L
Fullerton	FLT-006	LR	H'shire Downs	D	3892	F893/3	ditch	Barley*	-	25.1	-	-	-	-	Barley FSP -
Fullerton	FLT-007	LR	H'shire Downs	D	3895	F8821/	ditch	Barley	-	34.5	-	1	0.96	2	M
Fullerton	FLT-008	LR	H'shire Downs	D	3828	F919/2	corn drier central chamber	Spelt**	0.00	-		1	0.9	3	M
Fullerton	FLT-009	LR	H'shire Downs	D	3836	F920/2	corn drier flue	Spelt	0.01	-	-	3	0.99	1	Spelt FSBP H
Fullerton	FLT-010	LR	H'shire Downs	D	3833	F939/2	corn drier stokehole	Barley**	-	0.2	-	3	0.75	1	M

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
Gatehampton	GHF-001	R	H'shire Downs	D	7		corn drier	Spelt0	0.57	-	-	4	1	1	Spelt FSBP svd H
Grateley	GRT-002	LIA	H'shire Downs	B	2847	F708/3	-	Barley**	-	71.0	-	4	0.99	3	Barley** FSP H
Grateley	GRT-003	LIA	H'shire Downs	B	3141	F735/3	-	Spelt*	0.24	-	-	3	0.75	4	Spelt* FSBP L
Grateley	GRT-004	LIA	H'shire Downs	B	3362	F739/8	ritual shafts	Spelt*	0.28	-	-	4	1	3	Spelt FSBP svd H
Grateley	GRT-008	ER	H'shire Downs	B	2879	F736/2	oven	Spelt	0.06	-	-	-	-	-	Spelt FSBP -
Grateley	GRT-009	ER	H'shire Downs	B	2863	427	-	Spelt	0.58	-	-	-	-	-	Spelt FSBP svd -
Grateley	GRT-010	MR	H'shire Downs	B	3326	F827.1	CD1 left	Spelt	0.10	-	-	1	0.94	3	Spelt FSBP L
Grateley	GRT-011	MR	H'shire Downs	B	3447	F827/46	CD1 left	Spelt	0.02	-	-	-	-	-	Spelt FSBP -
Grateley	GRT-013	LR	H'shire Downs	B	3359	F820/7	CD2 left (<3359> and <3360>)	Spelt	5.22	-	-	1	1	3	M
Grateley	GRT-015	LR	H'shire Downs	B	3355	F819/8	CD2 right (<3355>, <3356>, <3357>)	Spelt	2.25	-	-	1	1	4	M
Grateley	GRT-018	LR	H'shire Downs	B	3325	F844/2	CD3 left	Spelt*	0.78	-	-	1	0.99	2	Spelt FSBP svd L
Grateley	GRT-019	LR	H'shire Downs	B	3349	F845/6/	CD 3 left	Spelt	0.07	-	-	1	0.99	3	Spelt FSBP L
Grateley	GRT-020	LR	H'shire Downs	B	3196	SQ1/1	corn drier CD4	Spelt	1.45	-	-	1	0.69	4	Spelt Spikelets svd L
Grateley	GRT-021	LR	H'shire Downs	B	3214	SQ2/2	corn drier CD4 (<3214 and <3218>)	Spelt	8.00	-	-	-	-	-	Spelt FSP -
Grateley	GRT-022	LR	H'shire Downs	B	3299	SQ2/1	corn drier CD4	Spelt*	1.16	-	-	-	-	-	Spelt Spikelets svd -
Grateley	GRT-024	LR	H'shire Downs	B	3219	SQ3/2	corn drier CD4	Spelt	5.73	-	-	-	-	-	Spelt FSP -
Grateley	GRT-025	LR	H'shire Downs	B	3205	SQ4/1	corn drier CD4	Spelt	0.97	-	-	-	-	-	Spelt Spikelets svd -
Grateley	GRT-026	LR	H'shire Downs	B	3223	SQ4/2	corn drier CD4	Spelt	9.32	-	-	4	0.99	3	Spelt FSP H
Grateley	GRT-027	LR	H'shire Downs	B	3209	SQ5/1	corn drier CD4	Spelt	1.15	-	-	4	0.99	3	Spelt Spikelets svd H
Grateley	GRT-028	LR	H'shire Downs	B	3227	SQ5/2	corn drier CD4	Spelt	2.84	-	-	4	1	3	Spelt FSP H
Grateley	GRT-029	LR	H'shire Downs	B	3210	SQ6/1	corn drier CD4	Spelt	1.95	-	-	-	-	-	Spelt FSP -
Grateley	GRT-031	LR	H'shire Downs	B	3300	flue/eas	corn drier CD4	Spelt	2.88	-	-	-	-	-	Spelt FSP -
Grateley	GRT-033	LR	H'shire Downs	B	3302	flue/we	corn drier CD4	Spelt	3.67	-	-	-	-	-	Spelt FSP -
Grateley	GRT-034	LR	H'shire Downs	B	3462	F769/6	oven	Spelt	0.28	-	-	1	0.93	3	Spelt FSBP L
Grateley	GRT-035	LR	H'shire Downs	B	3461	F782/2	oven	Spelt	0.78	-	-	4	1	3	Spelt FSBP svd H
Grateley	GRT-036	LR	H'shire Downs	B	3240	F783/1	oven (<3240> and <3243>)	Spelt*	1.02	-	-	4	0.99	1	Spelt Spikelets svd H
Grateley	GRT-038	LR	H'shire Downs	B	3446	F780/3	-	Spelt	17.90	-	-	-	-	-	Spelt FSP -
Grateley	GRT-039	LR	H'shire Downs	B	3295	3295	-	Spelt*	194.14	-	-	-	-	-	Spelt FSP -
Hascombe	HSC-001	MIA	Thames Heaths	C		H77/2/6	pit	Spelt	1.85	-	-	4	1	3	Spelt FSP H
Hascombe	HSC-002	MIA	Thames Heaths	C		H77/12/	pit	Spelt**	5.85	-	-	4	1	3	Spelt** FSP H
High St, Staines	HST-002	ER	Mid Thames	D		1510	burnt area	Spelt	0.02	-	-	3	1	4	Spelt FSBP H
High St, Staines	HST-003	ER	Mid Thames	D		2198	ditch 2461	-	-	-	-	4	0.95	3	M

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
High St, Staines	HST-007	MR	Mid Thames	D		3623	occupation	-	-	-	-	-	-	-	M
Houghton Down	HTD-001	MIA	H'shire Downs	B	2304	P331/8	pit	Spelt*	0.20	-	-	3	0.93	4	Spelt FSBP H
Houghton Down	HTD-003	MIA	H'shire Downs	B	2350	P364/9	pit	Spelt	0.02	-	-	3	0.96	4	Spelt FSBP H
Houghton Down	HTD-004	MIA	H'shire Downs	B	2360	P368/4	pit	Spelt	0.39	-	-	4	0.68	3	Spelt FSBP svd L
Houghton Down	HTD-005	R	H'shire Downs	B	2364	F204/2	corn drier	Spelt	0.06	-	-	-	-	-	Spelt FSBP svd -
Jennett's Park	JNP-001	ER	Mid Thames	E	19	19013	ditch 502225	Spelt	0.00	-	-	-	-	-	Spelt FSBP -
Lains Farm	LNF-001	MIA	H'shire Downs	A			pit 82/81	Spelt	0.01	-	-	4	0.99	3	Spelt FSBP svd H
Lains Farm	LNF-002	MIA	H'shire Downs	A			pit 5/16	Spelt	0.01	-	-	4	0.96	3	Spelt FSBP svd H
Lains Farm	LNF-003	MIA	H'shire Downs	A			pit 3/17	Spelt	0.02	-	-	4	0.99	3	Spelt FSBP svd H
Lains Farm	LNF-007	MIA	H'shire Downs	A			pit 73/91	Spelt	0.01	-	-	3	0.54	1	Spelt FSBP L
Mount Farm	MNF-018	IA/R	Upper Thames	D		a1	ditch F.3	Spelt	0.33	-	-	4	1	3	Spelt FSBP svd H
Mount Farm	MNF-040	LR	Upper Thames	D		(514)	pit F.514	Spelt	0.33	-	-	4	1	1	Spelt FSBP svd H
Mount Farm	MNF-041	LR	Upper Thames	D		(513)	ditch F.513	Barley**	-	32.5	-	4	1	3	Barley** FSP H
Marnel Park	MRP-002	R	H'shire Downs	A	D101	D4204	ditch D4024	Spelt	0.15	-		3	0.97	4	Spelt FSBP H
Marnel Park	MRP-004	R	H'shire Downs	A	D7052	D7052	pit D5725	Spelt	0.03	-	-	3	0.99	4	Spelt FSBP H
Marnel Park	MRP-005	R	H'shire Downs	A	D7053	D5727	pit D5725	Spelt	0.04	-	-	3	0.99	4	Spelt FSBP -
Marnel Park	MRP-006	R	H'shire Downs	A	D7070	D5227	pit D5232	Spelt	0.02	-	-	3	0.72	4	Spelt FSBP L
Marnel Park	MRP-008	R	H'shire Downs	A	D7081	D5200	pit D5107	Spelt	0.02	-	-	3	0.63	4	Spelt FSBP L
Merton Rise	MRR-001	ER	H'shire Downs	A	A2001		pit A55091	Spelt	0.07	-	-	4	1	3	Spelt FSBP svd H
Merton Rise	MRR-002	ER	H'shire Downs	A	A2004		pit A55108	Spelt	0.00	-	-	4	0.98	3	Spelt FSBP svd H
Merton Rise	MRR-004	ER	H'shire Downs	A	A2023		ditch A55642	Spelt	0.01	-	-	4	0.93	3	Spelt FSBP svd H
Nettlebank	NTB-001	MIA	H'shire Downs	A	1603	P275/12	pit	Spelt	0.03	-	-	4	0.99	3	Spelt FSBP svd H
Nettlebank	NTB-003	LIA	H'shire Downs	A	1515	P251/7	pit	Spelt	0.03	-	-	4	1	3	Spelt FSBP svd H
Nettlebank	NTB-004	LIA	H'shire Downs	A	1571	P272/1	oven	-	-	-	-	4	0.99	3	M
Nettlebank	NTB-005	LIA	H'shire Downs	A	1585	P274/3	quarry	-	-	-	-	4	0.94	3	M
Nettlebank	NTB-007	LIA	H'shire Downs	A	1617	P283/3	pit	Spelt*	0.13	-	-	-	-	-	Spelt* FSBP svd -
Nettlebank	NTB-008	LIA	H'shire Downs	A	1645	F148/0/	ditch	Spelt	0.04	-	-	4	0.99	3	Spelt FSBP svd H
Nettlebank	NTB-009	LIA	H'shire Downs	A	1648	F148/12	ditch	Spelt	0.03	-	-	4	0.92	3	Spelt FSBP svd H
Nettlebank	NTB-010	LIA	H'shire Downs	A	1658	F155/12	ditch	Barley**	-	8.9	-	4	0.99	3	Barley** FSP H
Nettlebank	NTB-011	LIA	H'shire Downs	A	1662	F155/24	ditch	Barley	-	62.5	-	4	0.99	3	Barley FSP H
Old Kempshott Lane	OKL-005	MIA	H'shire Downs	A	21	171	pit 219	-	-	-	-	-	-	-	M
Old Kempshott Lane	OKL-006	MIA	H'shire Downs	A	51	258	pit 242	Spelt*	111.00	-	-	4	0.98	3	Spelt FSP H

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
Old Kempshott Lane	OKL-007	MIA	H'shire Downs	A	42	223	pit 192	Spelt	52.38	-	-	3	0.99	4	Spelt FSP H
Old Kempshott Lane	OKL-008	MIA	H'shire Downs	A	43	235	pit 227	-	-	-	-	4	0.65	3	M
Old Kempshott Lane	OKL-009	MIA	H'shire Downs	A	46	244	pit 201	Spelt	73.07	-	-	4	1	3	Spelt FSP H
Old Kempshott Lane	OKL-016	ER	H'shire Downs	A	6	46	ditch 30	-	-	-	-	-	-	-	M
Park Farm	PKF-002	ER	Mid Thames	E	1040/C/		ditch 1040	Spelt	0.02	-	-	4	0.99	3	Spelt FSBP svd H
Park Prewett Hospital	PPH-005	LR	H'shire Downs	A	20	302	corn drier 1002	Spelt*	0.88	-	-	4	0.95	1	Spelt Spikelets svd H
Perry Oaks	PRO-005	LIA	Mid Thames	D	27030	678002	pit 678002	Spelt	3.27	-	-	4	0.99	3	Spelt FSP H
Perry Oaks	PRO-006	LIA	Mid Thames	D	18332	593201	well 593207	Spelt	0.01	-	-	-	-	-	Spelt FSBP -
Perry Oaks	PRO-014	ER	Mid Thames	D	25051	627043	waterhole 627402	Spelt*	0.46	-	-	4	0.91	1	Spelt FSBP svd H
Perry Oaks	PRO-015	ER	Mid Thames	D	25052	627046	waterhole 627402	Spelt	0.11	-	-	4	0.9	3	Spelt FSBP svd H
Perry Oaks	PRO-017	ER	Mid Thames	D	27027	677002	ditch 646073	Spelt	0.04	-	-	1	0.45	4	Spelt FSBP svd L
Perry Oaks	PRO-021	ER	Mid Thames	D	18384	617176	pit 617178	Spelt	0.00	-	-	4	0.88	3	Spelt FSBP svd L
Perry Oaks	PRO-023	ER	Mid Thames	D	18385	617177	pit 617178 (<18387> and <18389>)	Spelt	0.01	-		1	0.87	4	Spelt FSBP svd L
Perry Oaks	PRO-038	MR	Mid Thames	D	19155	553169	pit 553166	Spelt	0.03	-	-	3	0.92	4	Spelt FSBP H
Perry Oaks	PRO-048	R	Mid Thames	D	25003	666013	pit 666001	Spelt**	3.27	-	-	1	0.80	2	M
Reading Business Park	RBP-001	R	Mid Thames	E		2221	ditch	Barley	-	23.9	-	4	1	3	Barley FSP H
Rowbury Farm	RWF-001	MIA	H'shire Downs	A	4229	P408/9	pit	Spelt*	0.15	-	-	4	0.97	3	Spelt FSBP svd H
Rowbury Farm	RWF-002	MIA	H'shire Downs	A	4235	P418/6	pit	Spelt	0.12	-	-	4	0.99	3	Spelt FSBP svd H
Rowbury Farm	RWF-003	MIA	H'shire Downs	A	4239	P434/17	pit	Spelt	0.03	-	-	3	0.93	4	Spelt FSBP H
Rowbury Farm	RWF-004	ER	H'shire Downs	A	4197	P410/2	pit	Spelt*	0.14	-	-	4	0.63	3	Spelt FSBP svd L
Rowbury Farm	RWF-005	R	H'shire Downs	A	4235	F1185/3	ditch	Spelt*	0.19	-	-	4	0.99	3	Spelt FSBP svd H
Suddern Farm	SDF-001	MIA	H'shire Downs	A	356	P120/4	pit	Spelt	0.19	-	-	3	0.98	4	Spelt FSBP H
Suddern Farm	SDF-002	LIA	H'shire Downs	A	33	P89/3	pit	Spelt*	0.06	-	-	4	0.99	3	Spelt FSBP svd H
Suddern Farm	SDF-003	LIA	H'shire Downs	A	363	P128/1	pit	Barley**	-	51.0	-	4	1	3	Barley** FSP H
Suddern Farm	SDF-004	LIA	H'shire Downs	A	344	P104/4	pit	Spelt*	2.29	-	-	4	0.99	3	Spelt FSP H
Suddern Farm	SDF-005	LIA	H'shire Downs	A	346	P104/6	pit	Spelt**	0.01	-	-	1	0.51	4	M
Suddern Farm	SDF-007	LIA	H'shire Downs	A	332	P84/5	pit	Spelt	0.53	-	-	4	0.97	3	Spelt FSBP svd H
Suddern Farm	SDF-008	MR	H'shire Downs	A	340	F99/2	pit	Spelt	0.19	-	-	4	0.52	3	Spelt FSBP svd L
Insula IX, Silchester	SIX-003	LIA	Thames Heaths	C	3279	9025	pit	Barley	-	12.0	-	3	1	4	M
Insula IX, Silchester	SIX-005	LIA	Thames Heaths	C	4068	10438	well	Spelt*	0.19	-	-	3	0.86	4	Spelt* FSBP L
Insula IX, Silchester	SIX-009	LIA	Thames Heaths	C	5956	11650	ditch	Spelt*	0.18	-	-	3	0.96	4	Spelt FSBP H
Insula IX, Silchester	SIX-012	LIA	Thames Heaths	C	6147	11996	ditch	Spelt*	0.26	-	-	3	0.96	4	Spelt FSBP H

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
Insula IX, Silchester	SIX-016	LIA	Thames Heaths	C	7068	12678	pit	Spelt*	0.25	-	-	4	1	3	Spelt FSBP svd H
Insula IX, Silchester	SIX-018	LIA	Thames Heaths	C	7232	11111	ditch	-	-	-	-	3	0.92	4	M
Insula IX, Silchester	SIX-032	ER	Thames Heaths	C	1428	6682	pit	Barley	-	12.0	-	3	1	4	M
Insula IX, Silchester	SIX-037	ER	Thames Heaths	C	1681	7137	levelling	-	-	-	-	3	0.95	4	M
Insula IX, Silchester	SIX-038	ER	Thames Heaths	C	1740	6825	hearth	Spelt	0.31	-	-	4	0.99	3	Spelt FSBP svd H
Insula IX, Silchester	SIX-057	ER	Thames Heaths	C	5542	11680	pit	Barley**	-	7.5	-	3	0.98	4	Barley** FSP L
Insula IX, Silchester	SIX-058	ER	Thames Heaths	C	5622	11687	pit	-	-	-	-	4	0.99	3	M
Insula IX, Silchester	SIX-062	ER	Thames Heaths	C	6109	12663	hearth/floor	Spelt	27.0	-	-	3	0.98	4	M
Insula IX, Silchester	SIX-072	ER	Thames Heaths	C	8956	13595	pit	Spelt	0.03	-	-	4	0.99	3	Spelt FSBP svd H
Thorpe Lea Nurseries	TLN-003	MIA	Thames Heaths	D	62	2350	pit	Spelt	-	-	-	3	0.99	4	M
Thorpe Lea Nurseries	TLN-005	R	Thames Heaths	D	8	1773	bonfire	Barley	-	69.5	-	3	0.98	4	Barley FSP L
Thorpe Lea Nurseries	TLN-006	R	Thames Heaths	D	30	1962	pit	Spelt	0.24	-	-	1	0.95	4	Spelt FSBP svd L
Turnpike School	TPS-001	MR	Thames Heaths	E	1	250	pit 200	Spelt	0.89	-	-	2	0.76	1	Spelt Spike L
Turnpike School	TPS-002	MR	Thames Heaths	E	5	253	gully 202	Spelt	0.14	-	-	3	0.53	2	Spelt FSBP L
Thruxton	TRX-001	LIA	H'shire Downs	A	4072	F1128(1)	enclosure ditch	Spelt	0.08	-	-	3	0.95	4	Spelt FSBP H
Viables Farm	VBF-001	MIA	H'shire Downs	B	3	3	pit 5	Spelt	1.59	-	-	4	0.99	3	Spelt FSP H
Viables Farm	VBF-002	MIA	H'shire Downs	B	4	4	pit 5	Spelt	1.30	-	-	4	0.99	3	Spelt Spikelets svd H
Viables Farm	VBF-003	MIA	H'shire Downs	B	5	5	pit 5	Spelt*	1.52	-	-	-	-	-	Spelt FSP -
Viables Farm	VBF-004	MIA	H'shire Downs	B	6	6	pit 5	Spelt	0.86	-	-	-	-	-	Spelt Spikelets svd -
Viables Farm	VBF-005	MIA	H'shire Downs	B	7	7	pit 5	Spelt*	0.95	-	-	-	-	-	Spelt Spikelets svd -
Watchfield	WCF-007	ER	Upper Thames	A	20055	1356	pit 1365	Spelt	0.02	-	-	4	0.81	3	Spelt FSBP svd L
Watchfield	WCF-008	ER	Upper Thames	A	20061	1410	pit 1412	Spelt	46.75	-	-	-	-	-	Spelt FSP -
Watchfield	WCF-009	ER	Upper Thames	A	20007	757	718	Spelt	0.18	-	-	4	0.99	3	Spelt FSBP svd H
Watchfield	WCF-010	ER	Upper Thames	A	20014		-	Spelt	0.35	-	-	4	0.99	3	Spelt FSBP svd H
Watchfield	WCF-011	ER	Upper Thames	A	20001	732	pyre base 731	Spelt	0.24	-	-	4	1	3	Spelt FSBP svd H
Woodcote Rd	WCR-002	IA/R	Upper Thames	F	13	371	pit 368	Spelt	0.06	-	-	4	0.73	3	Spelt FSBP svd L
Woolbury	WLB-001	ER	H'shire Downs	A	1	11	ditch	Barley*	-	54.7	-	-	-	-	Barley FSP -
Northgate House	WNH-011	ER	H'shire Downs	F	169	CC1766	-	Spelt	0.07	-	-	3	0.59	4	Spelt FSBP L
Northgate House	WNH-012	ER	H'shire Downs	F	173	CC1762	trample	Barley**	-	74.0	-	4	0.91	3	Barley** FSP H
Northgate House	WNH-016	LR	H'shire Downs	F	67	NH1346	midden	FTW	-	-	156	-	-	-	M
Weston Down	WSD-002	MIA	H'shire Downs	A	39	5163	pit 5022	Spelt	0.14	-	-	4	0.79	3	Spelt FSBP svd L
Weston Down	WSD-003	MIA	H'shire Downs	A	42	5453	pit 5452	Spelt	0.04	-	-	4	0.99	3	Spelt FSBP svd H

Site Name	Sample	Period	Area	Landscape Category	Sample Number	Context	Feature	Crop Type	Glume wheat grain: Glume wheat glume base	Barley grain: Barley rachis	FTW grain: FTW rachis	DA 1st group	P values	DA 2nd group	Combined outcome for weed ecology
Weston Down	WSD-004	MIA	H'shire Downs	A	45	5561	pit 5560	Spelt	0.08	-	-	4	0.99	3	Spelt FSBP svd H
Weston Down	WSD-005	MIA	H'shire Downs	A	47	5518	pit 5360	Spelt	0.00	-	-	4	0.99	3	Spelt FSBP svd H
Weston Down	WSD-006	MIA	H'shire Downs	A	50	5573	pit 5360	Spelt	0.01	-	-	4	1	3	Spelt FSBP svd H
Weston Down	WSD-007	MIA	H'shire Downs	A	53	5677	pit 5669	Spelt	0.13	-	-	4	0.99	3	Spelt FSBP svd H
Weston Down	WSD-008	LR	H'shire Downs	A	69	5727	corn drier 5724	Spelt	0.09	-	-	4	0.99	3	Spelt FSBP svd H

Record No.	Site	Location	Period	Preservation	Reference
1	Caerwent	Caerwent	R	W	Reid, C. and Lyell, A. 1911. Seeds from the mud at the bottom of the well. In T. Ashby, A. Hudd and F. Hing (eds.) Excavations at Caerwent, Monmouthshire, in the years 1909 and 1910. *Archaeologia* 62 (2): 448.
2	Chester Street	Cirencester	ER	W	Connolly, A. 1982. Report on the plant macroremains from Cirencester. In J. Wacher and A. McWhirr (eds.) *Early Roman Occupation at Cirencester*: 228–231. Cirencester: Cirencester Excavations Committee.
3	Stepstairs Lane	Cirencester	LR	C	Carruthers, W. 2008. Charred plant remains. In N. Holbrook (ed.) *Excavations and Observations in Roman Cirencester 1998-2007 with a Review of Archaeology in Cirencester 1958-2008*: 79–80. Cirencester: Cotswold Archaeology.
4	Balkerne Lane	Colchester	ER	C	Murphy, P. 1984. The charred cereals from Building 41. In P. Crummy (ed.) *Colchester Archaeological Report 3: Excavations at Lion Walk, Balkerne Lane and Middleborough, Colchester, Essex*: 105. Colchester: Colchester Archaeological Trust.
5	Culver Street	Colchester	ER	CM	Murphy, P. 1992. Environmental studies: Culver Street. In P. Crummy (ed.) *Colchester Archaeological Report 6: Excavations at Culver Street, the Gilberd School, and Other Sites 1971-85*: 273–287. Colchester: Colchester Archaeological Trust.
6	Culver Street	Colchester	MR	C	Murphy, P. 1992. Environmental studies: Culver Street. In P. Crummy (ed.) *Colchester Archaeological Report 6: Excavations at Culver Street, the Gilberd School, and Other Sites 1971-85*: 273–287. Colchester: Colchester Archaeological Trust.
7	Cups Hotel	Colchester	ER	C	Murphy, P. 1992. Charred cereals and flax from Building 152. In P. Crummy (ed.) *Excavations at Culver Street, the Gilberd School, and Other Sites in Colchester 1971-85*: 330–333. Colchester: Colchester Archaeological Trust.
8	Gilberd School	Colchester	ER	C	Murphy, P. 1992. Environmental studies: Gilberd School. In P. Crummy (ed.) *Colchester Archaeological Report 6: Excavations at Culver Street, the Gilberd School, and Other Sites 1971-85*: 288–289. Colchester: Colchester Archaeological Trust.
9	Head Street (fort)	Colchester	ER	C	Fryer, V. 2004. Charred plant macrofossils and other remains. In H. Brooks. *Archaeological Excavation at 29-39 Head Street, Colchester, Essex May-September 2000*: 169–185. Colchester: Colchester Archaeological Trust Unpublished Report 268.
10	Head Street (intramural)	Colchester	ER	C	Fryer, V. 2004. Charred plant macrofossils and other remains. In H. Brooks. *Archaeological Excavation at 29-39 Head Street, Colchester, Essex May-September 2000*: 169–185. Colchester: Colchester Archaeological Trust Unpublished Report 268.
11	Head Street	Colchester	MR	C	Fryer, V. 2004. Charred plant macrofossils and other remains. In H. Brooks (ed.) *Archaeological Excavation at 29-39 Head Street, Colchester, Essex May-September 2000*: 169–185. Colchester: Colchester Archaeological Trust Unpublished Report 268.
12	Lion Walk	Colchester	ER	C	Murphy, P. 1984. Carbonised fruits from Building 5. In P. Crummy (ed.) *Colchester Archaeological Report 3: Excavations at Lion Walk, Balkerne Lane and Middleborough, Colchester, Essex*: 40. Colchester: Colchester Archaeological Trust.
13	45-46 High Street	Colchester	ER	C	Murphy, P. 1977. *Early Agriculture Environment on the Hampshire Chalklands: circa 800 B.C. - 400 A.D.*University of Southampton. Unpublished Mphil thesis.
14	Greyhound Yard	Dorchester	ER	CM	Jones, J. and Straker, V. 1993. Macroscopic plant remains. In P. Woodward, S. Davies and A. Graham (eds.) *Excavations at Greyhound Yard, Dorchester 1981-4*: 349–350. Dorchester: Dorset Natural History and Archaeological Society.
15	Greyhound Yard	Dorchester	LR	C	Jones, J. and Straker, V. 1993. Macroscopic plant remains. In P. Woodward, S. Davies and A. Graham (eds.) *Excavations at Greyhound Yard, Dorchester 1981-4*: 349–350. Dorchester: Dorset Natural History and Archaeological Society.
16	County Hospital Site	Dorchester	ER	C	Stevens, C. 2008. Charred plant remains. In M. Trevarthen (ed.) *Suburban Life in Roman Durnovaria: Excavations at the Former County Hospital Site Dorchester, Dorset 2000-2001. Additional Specialist Reports*: 1-5. Salisbury: Wessex Archaeology Ltd.
17	County Hospital Site	Dorchester	MR	C	Stevens, C. 2008. Charred plant remains. In M. Trevarthen (ed.) *Suburban Life in Roman Durnovaria: Excavations at the Former County Hospital Site Dorchester, Dorset 2000-2001. Additional Specialist Reports*: 1-5. Salisbury: Wessex Archaeology Ltd.
18	County Hospital Site	Dorchester	LR	CM	Stevens, C. 2008. Charred plant remains. In M. Trevarthen (ed.) *Suburban Life in Roman Durnovaria: Excavations at the Former County Hospital Site Dorchester, Dorset 2000-2001. Additional Specialist Reports*: 1-5. Salisbury: Wessex Archaeology Ltd.
19	County Hall	Dorchester	ER	CM	Ede, J. 1993. Plant remains. In R. Smith (ed.) *Excavations at County Hll, Colliton Park, Dorchester, Dorset, 1988 in the North West Quarter of Durnovaria*: 73–77. Salisbury: Trust for Wessex Archaeology Ltd.
20	County Hall	Dorchester	LR	C	Ede, J. 1993. Plant remains. In R. Smith (ed.) *Excavations at County Hll, Colliton Park, Dorchester, Dorset, 1988 in the North West quarter of Durnovaria*: 73–77. Salisbury: Trust for Wessex Archaeology Ltd.
21	Friernhay Street	Exeter	ER	W	Straker, V., Robinson, M. and Robinson, E. 1984. Biological investigations of waterlogged deposits in the Roman fortress ditch at Exeter. *Devon Archaeological Society Proceedings* 42*:* 59–69.
22	Bonners Lane	Leicester	MR	C	Monckton, A. 2004. Plant macrofossils. In N. Finn (ed.) *The Origins of a Leicester Suburb: Roman, Anglo-Saxon, Medieval and Post-Medieval Occupation on Bonners Lane*: 156–166. Oxford: British Archaeological Reports British Series 372.
23	Bonners Lane	Leicester	LR	C	Monckton, A. 2004. Plant macrofossils. In N. Finn (ed.) *The Origins of a Leicester Suburb: Roman, Anglo-Saxon, Medieval and Post-Medieval Occupation on Bonners Lane*: 156–166. Oxford: British Archaeological Reports British Series 372.

Record No.	Site	Location	Period	Preservation	Reference
24	Castle Street	Leicester	ER	C	Score, V., Browning, J., Johnson, E., Monckton, A. and Kipling, R. 2010. A Roman "delicatessen" at Castle Street, Leicester. *Transactions of the Leicestershire Archaeological and Historical Society* 84: 77–94.
25	Castle Street	Leicester	MR	CM	Score, V., Browning, J., Johnson, E., Monckton, A. and Kipling, R. 2010. A Roman "delicatessen" at Castle Street, Leicester. *Transactions of the Leicestershire Archaeological and Historical Society* 84: 77–94.
26	Castle Street	Leicester	LR	C	Score, V., Browning, J., Johnson, E., Monckton, A. and Kipling, R. 2010. A Roman "delicatessen" at Castle Street, Leicester. *Transactions of the Leicestershire Archaeological and Historical Society* 84: 77–94.
27	Causeway Lane	Leicester	ER	CM	Monckton, A. 1999. The plant remains. In A. Connor and R. Buckley (eds.) *Roman and Medieval Occupation in Causeway Lane, Leicester*: 346-362. Leicester: Leicester Archaeology Monograph 5.
28	Causeway Lane	Leicester	MR	C	Monckton, A. 1999. The plant remains. In A. Connor and R. Buckley (eds.) *Roman and Medieval Occupation in Causeway Lane, Leicester*: 346-362. Leicester: Leicester Archaeology Monograph 5.
29	Causeway Lane	Leicester	LR	C	Monckton, A. 1999. The plant remains. In A. Connor and R. Buckley (eds.) *Roman and Medieval Occupation in Causeway Lane, Leicester*: 346-362. Leicester: Leicester Archaeology Monograph 5.
30	Freeschool Lane	Leicester	ER	C	Radini, A. 2009. Plant Remains from Freeschool Lane, Leicester, Highcross Excavations. Unpublished ULAS report 2009-140.
31	Freeschool Lane	Leicester	LR	C	Radini, A. 2009. Plant Remains from Freeschool Lane, Leicester, Highcross Excavations. Unpublished ULAS report 2009-140.
32	Newarke Street	Leicester	ER	CM	Monckton, A. 1996. Charred and mineralized plant remains. In L. Cooper. A Roman Cemetery in Newarke Street, Leicester. *The Leicestershire Archaeological and Historical Society Transactions* 70: 74–78.
33	Brayford Wharf	Lincoln	R	C	Moffett, L. 1995. *Plant Remains from the Roman River Edge at Brayford Wharf East (BWE 82), Lincoln*. Ancient Monuments Laboratory Report 9/95.
34	Brayford Wharf	Lincoln	R	W	Moffett, L. 1995. *Plant Remains from the Roman River Edge at Brayford Wharf East (BWE 82), Lincoln*. Ancient Monuments Laboratory Report 9/95.
35	St Mark's Church	Lincoln	R	W	Moffett, L. 1995. *Plant Remains from St Mark's Church, (SM76), Lincoln*. Ancient Monuments Laboratory Report 11/95
36	Waterside	Lincoln	MR	W	Greig, J. 1989. The plant remains. In M.J. Jones. *Lincoln Archaeology 1988-89*: 11-12. Lincoln: City of Lincoln Archaeology Unit.
37	1 Poultry	London	ER	CW	Davis, A. 2011. Botanical remains. In J. Hill and P. Rowsome (eds.) *Roman London and the Walbrook Stream Crossing: Excavations at 1 Poultry and Vicinity, City of London Part II*: 524–533. London: Museum of London Archaeology Monograph 37.
38	1 Poultry	London	LR	CW	Davis, A. 2011. Botanical remains. In J. Hill and P. Rowsome (eds.) *Roman London and the Walbrook Stream Crossing: Excavations at 1 Poultry and Vicinity, City of London Part II*: 524–533. London: Museum of London Archaeology Monograph 37.
39	1 Poultry	London	MR	CW	Davis, A. 2011. Botanical remains. In J. Hill and P. Rowsome (eds.) *Roman London and the Walbrook Stream Crossing: Excavations at 1 Poultry and Vicinity, City of London Part II*: 524–533. London: Museum of London Archaeology Monograph 37.
40	12 Arthur Street	London	ER	W	Roberts, K. 2008. Plant remains. In D. Swift (ed.) *Roman Waterfront Development at 12 Arthur Street, City of London*: 67–70. London: Museum of London Archaeology Service Archaeology Studies Series 19.
41	12 Arthur Street	London	MR	W	Roberts, K. 2008. Plant remains. In D. Swift (ed.) *Roman Waterfront Development at 12 Arthur Street, City of London*: 67–70. London: Museum of London Archaeology Service Archaeology Studies Series 19.
42	12 Arthur Street	London	LR	W	Roberts, K. 2008. Plant remains. In D. Swift (ed.) *Roman Waterfront Development at 12 Arthur Street, City of London*: 67–70. London: Museum of London Archaeology Service Archaeology Studies Series 19.
43	15-23 Southwark St	London	ER	CMW	Pearson, E. and Giorgi, J. 1992. The plant remains. In C. Cowan. Excavations at 15-23 Southwark Str. 1980-86. *London and Middlesex Archaeological Society* 43: 165-170.
44	15-35 Copthall Avenue	London	MR	CW	De Moulins, D. 1990. The environmental analysis. In C. Maloney and D. de Moulins (eds.) *The Archaeology of Roman London: Vol 1, The Upper Walbrook Valley in the Roman Period*: 85-115. London: Council for British Archaeology Research Report 69.
45	15-35 Copthall Avenue	London	LR	CW	De Moulins, D. 1990. The environmental analysis. In C. Maloney and D. de Moulins (eds.) *The Archaeology of Roman London: Vol 1, The Upper Walbrook Valley in the Roman Period*: 85-115. London: Council for British Archaeology Research Report 69.
46	165 Great Dover Street	London	MR	C	Giorgi, J. 1997. The plant remains. In A. Mackinder (ed.) *A Romano-British Cemetery on Watling Street: Excavations at 165 Great Dover Street, Southwark, London*: 65–6. London: Museum of London Archaeology Service Archaeological Studies Series 4.

Record No.	Site	Location	Period	Preservation	Reference
47	168 Fenchurch	London	ER	C	Davis, A. 2004. The plant remains. In L. Dunwoodie (ed.) *Pre-Boudican and Later Activity on the Site of the Forum*: 54–57. London: Museum of London Archaeology Service Archaeology Studies Series 13.
48	199 Borough High Street	London	R	CW	Tyers, I. 1988. Environmental evidence from Southwark and Lambeth. In P. Hinton (ed) *Excavations in Southwark 1973-1976, Lambeth 1973-1979*: 443–477. London: London and Middlesex Archaeological Society and Surrey Archaeological Society Joint Publications no 3.
49	201 Bishopsgate	London	ER	W	Giorgi, J. 2003. Plant remains. In D. Swift (ed.) *Roman Burials, Medieval Tenements and Suburban Growth: 201 Bishopsgate, City of London*: 73–76. London: Museum of London Archaeology Service.
50	201 Bishopsgate	London	MR	CW	Giorgi, J. 2003. Plant remains. In D. Swift (ed.) *Roman Burials, Medieval Tenements and Suburban Growth: 201 Bishopsgate, City of London*: 73–76. London: Museum of London Archaeology Service.
51	201-211 Borough High Stret	London	R	W	Dean, M. 1978. Seeds, wood, insects, fish and molluscs. In E. Ferretti and A. Graham (eds.) *Southwark Excavations, 1972-1974. Volume 2.*: 168–72. London: London and Middlesex Archaeological Society and Surrey Archaeological Society Joint Publication.
52	3-9 Newgate St	London	LR	M/W	Davis, A. 2006. Plant remains. In K. Pitt (ed.) *Roman and Medieval Development South of Newgate: Excavations at 3-9 Newgate Street and 16-17 Old Bailey, City of London*: 70–71. London: Museum of London Archaeology Service Archaeology Studies Series 14.
53	64-70 Borough High Street	London	R	CW	Tyers, I. 1988. Environmental evidence from Southwark and Lambeth. In P. Hinton (ed.) *Excavations in Southwark 1973-1976, Lambeth 1973-1979*: 443–477. London: London and Middlesex Archaeological Society and Surrey Archaeological Society Joint Publications no 3.
54	Amphitheatre	London	MR	W	Gray, L. 2008. Plant remains. In N. Bateman, C. Cowan and R. Wroe-Brown (eds.) *London's Roman Amphitheatre: Guildhall Yard, City of London*: 212–213. London: Museum of London Archaeology Service.
55	Amphitheatre	London	LR	CW	Gray, L. 2008. Plant remains. In N. Bateman, C. Cowan and R. Wroe-Brown (eds.) *London's Roman Amphitheatre: Guildhall Yard, City of London*: 212–213. London: Museum of London Archaeology Service.
56	Baltic House	London	ER	W	Gray, L. 2002. The plant remains. In E. Howe (ed.) *Roman Defences and Medieval industry. Excavations at Baltic House, City of London*: 104–111. London: Museum of London Archaeological Service Monograph 7.
57	Baltic House	London	LR	CMW	Gray, L. 2002. The plant remains. In E. Howe (ed.) *Roman Defences and Medieval Industry. Excavations at Baltic House, City of London*: 104–111. London: Museum of London Archaeological Service Monograph 7.
58	Baltic House	London	MR	CMW	Gray, L. 2002.The plant remains. In E. Howe (ed.) *Roman Defences and Medieval Industry. Excavations at Baltic House, City of London*: 104–111. London: Museum of London Archaeological Service Monograph 7.
59	Billingsgate	London	MR	CW	Willcox, G. 1980. Environmental evidence. In D. Jones and M. Rhodes (eds.) *Excavations at Billingsgate Buildings (Triangle), Lower Thames Street, London, 1974*: 24–28. London: London & Middlesex Archaeological Society.
60	Borough High St	London	ER	CW	Gray, L. 2002. The botanical remains. In J. Drummond-Murray and P. Thompson (eds.) *Settlement in Roman Southwark. Archaeological Excavations (1991-98) for the London Underground Ltd. Jubilee Line Extension Project*: 242–259. London: Museum of London Archaeology Service Monograph 12.
61	Borough High St	London	MR	CMW	Gray, L. 2002. The botanical remains. In J. Drummond-Murray and P. Thompson (eds) *Settlement in Roman Southwark. Archaeological Excavations (1991-98) for the London Underground Ltd. Jubilee Line Extension Project*: 242–259. London: Museum of London Archaeology Service Monograph 12.
62	25 Canon St	London	LR	CMW	Gray, L. and Pipe, A. 2002. Food remains. In N. Elsden (ed.) *Excavations at 25 Cannon Street, City of London: from the Middle Bronze Age to the Great Fire*: 36. London: Museum of London Archaeological Service Studies Series.
63	Canon St	London	R	W	Norman, P. and Reader, F. Recent discoveries in connection with Roman London. *Archaeologia* 60 (1): 216-7.
64	Cripplegate	London	LR	C	Giorgi, J. 2004. The botanical remains. In E. Howe and D. Lakin (eds.) *Roman and Medieval Cripplegate, City of London. Archaeological Excavations 1992-8*: 128-129. London: Museum of London Archaeology Service Monograph Series 21.
65	Fennings Wharf	London	ER	W	Giorgi, J. 2001. The plant remains from Fennings Wharf. In B. Watson, T. Brigham and T. Dyson (eds.) *London Bridge: 2000 years of a River Crossing*: 220–227. London: Museum of London Archaeology Service Monograph 8.
66	Fennings Wharf	London	LR	CMW	Giorgi, J. 2001. The plant remains from Fennings Wharf. In B. Watson, T. Brigham and T. Dyson (eds.) *London Bridge: 2000 Years of a River Crossing*: 220–227. London: Museum of London Archaeology Service Monograph 8.
67	Finck Street	London	R	CW	Tyers, I. 1988. Environmental evidence from Southwark and Lambeth. In P. Hinton (ed.) *Excavations in Southwark 1973-1976, Lambeth 1973-1979*: 443–477. London: London and Middlesex Archaeological Society and Surrey Archaeological Society Joint Publications No 3.
68	Governor's House	London	MR	CW	Gray, L. 2001. The roman plant remains. In T. Brigham and A. Woodger (eds.) *Roman and Medieval Townhouses on the London Waterfront: Excavations at Governor's House, City of London*: 110–115. London: Museum of London Archaeology Service Monograph 9.
69	Governor's House	London	LR	W	Gray, L. 2001. The Roman plant remains. In T. Brigham and A. Woodger (eds.) *Roman and Medieval Townhouses on the London Waterfront: Excavations at Governor's House, City of London*: 110–115. London: Museum of London Archaeology Service Monograph 9.

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70	Leadenhall Court	London	ER	CMW	Davis, A. 1993. Plant remains. In G. Milne and A. Wardle Early Roman development at Leadenhall court. *London & Middlesex Archaeological Society* 44: 59–67.
71	Monument House	London	ER	C	Blair, I. and Sankey, D. 2007. *A Roman Drainage Culvert, Great Fire Destruction Debris and Other Evidence from Hillside Sites North-East of London Bridge: Excavations at Monument House and 13-21 Eastcheap, City of London*. London: Museum of London Archaeology Service Archaeology Studies Series 17.
72	Monument House	London	MR	CW	Blair, I. and Sankey, D. 2007. *A Roman Drainage Culvert, Great Fire Destruction Debris and Other Evidence from Hillside Sites North-East of London Bridge: Excavations at Monument House and 13-21 Eastcheap, City of London*. London: Museum of London Archaeology Service Archaeology Studies Series 17.
73	N Southwark	London	ER	CW	Giorgi, J. 2009. Plant remains. In C. Cowan, F. Seeley, A. Wardle, A. Westman and L. Wheeler (eds.) *Roman Southwark, Settlement and Economy: Excavations in Southwark, 1973-91*: 242–243. London: Museum of London Archaeology.
74	N Southwark	London	LR	CW	Giorgi, J. 2009. Plant remains. In C. Cowan, F. Seeley, A. Wardle, A. Westman and L. Wheeler (eds.) *Roman Southwark, Settlement and Economy: Excavations in Southwark, 1973-91*: 242–243. London: Museum of London Archaeology.
75	N Southwark	London	MR	CW	Giorgi, J. 2009. Plant remains. In C. Cowan, F. Seeley, A. Wardle, A. Westman and L. Wheeler (eds.) *Roman Southwark, Settlement and Economy: Excavations in Southwark, 1973-91*: 242–243. London: Museum of London Archaeology.
76	New Fresh Wharf	London	MR	W	Willcox, G. 1977. Exotic plants from Roman waterlogged sites in London. *Journal of Archaeological Science* 4 (3): 269–282.
77	North-West Roman Southwark	London	ER	C	Davis, A. 2003. The plant remains. In C. Cowan (ed.) *Urban Developments in North-West Roman Southwark: Excavations 1974-90*: 182–191. London: Museum of London Archaeology Service Monograph 16.
78	North-West Roman Southwark	London	MR	CW	Davis, A. 2003. The plant remains. In C. Cowan (ed.) *Urban Developments in North-West Roman Southwark: Excavations 1974-90*: 182–191. London: Museum of London Archaeology Service Monograph 16.
79	Paternoster Square	London	ER	CMW	Davis, A. 2006. The botanical remains. In S. Watson and K. Heard (eds.) *Development on Roman London's Western Hill. Excavations at Paternoster Square, City of London*: 107–112. London: Museum of London Archaeology Service Monograph Series 32.
80	Paternoster Square	London	LR	C	Davis, A. 2006. The botanical remains. In S. Watson and K. Heard (eds.) *Development on Roman London's Western Hill: Excavations at Paternoster Square, City of London*: 107–112. London: Museum of London Archaeology Service Monograph Series 32.
81	Paternoster Square	London	MR	CMW	Davis, A. 2006. The botanical remains. In S. Watson and K. Heard (eds.) *Development on Roman London's Western Hill: Excavations at Paternoster Square, City of London*: 107–112. London: Museum of London Archaeology Service Monograph Series 32.
82	Paternoster Square	London	LR	M/W	Davis, A. 2006. The botanical remains. In S. Watson and K. Heard (eds.) *Development on Roman London's Western Hill: Excavations at Paternoster Square, City of London*: 107–112. London: Museum of London Archaeology Service Monograph Series 32.
83	Roman Riverside Wall	London	MR	W	Willcox, G. 1977. Exotic plants from Roman waterlogged sites in London. *Journal of Archaeological Science* 4 (3): 269–282.
84	St Thomas St	London	MR	M	Willcox, G. 1977. Exotic plants from Roman waterlogged sites in London. *Journal of Archaeological Science* 4 (3): 269–282.
85	The Forum/160-162 Fenchurch St	London	ER	C	Straker, V. 1984. First and second century carbonised grain from Roman London. In W. Van Zeist and W. Casparie (eds.) *Plants and Ancient Man: Studies in Palaeoethnobotany*: 323–329. Rotterdam: A. A. Balkema.
86	The Waterfront	London	ER	C	Straker, V. 1984. First and second century carbonised grain from Roman London. In W. Van Zeist and W. Casparie (eds.) *Plants and Ancient Man: Studies in Palaeoethnobotany*: 323–329. Rotterdam: A. A. Balkema.
87	Tokenhouse Yard	London	ER	W	Branch, N. et al. 2012. Environmental evidence. In J. Leary and J Butler (eds.) *Roman Archaeology in the Upper Reaches of the Walbrook Valley*: 60–75. London: Pre-Construct Archaeology Limited, Monograph No. 14.
88	Tokenhouse Yard	London	MR	W	Branch, N. et al. 2012. Environmental evidence. In J. Leary and J Butler (eds.) *Roman Archaeology in the Upper Reaches of the Walbrook Valley*: 60–75. London: Pre-Construct Archaeology Limited, Monograph No. 14.
89	Triangle	London	ER	W	Willcox, G. 1977. Exotic plants from Roman waterlogged sites in London. *Journal of Archaeological Science* 4 (3): 269–282.
90	Triangle	London	MR	W	Willcox, G. 1977. Exotic plants from Roman waterlogged sites in London. *Journal of Archaeological Science* 4 (3): 269–282.
91	Winchester Palace	London	ER	W	Giorgi, J. 2005. Plant remains. In B. Yule (ed.) *A Prestigious Roman Building Complex on the Southwark Waterfront. Excavations at Winchester Palace, London, 1983-90*: 169–176. London: Museum of London Archaeology Service.
92	Silchester Society of Antiquaries	Silchester	R	CW	Reid, C. 1901-9. Notes on the plant remains of Roman Silchester. In W.H. and St J. Hope (with or without Fox, G.E.) Excavations on the site of the Roman City at Silchester in 1900-8. *Archaeologia* 57 (2)-61 (2).

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93	Forum-basilica	Silchester	R	CW	Jones, M. 2000. The plant remains. In M. Fulford and J. Timby (eds.) *Late Iron Age and Roman Silchester: Excavations on the Site of the Forum Basilica, 1977, 1980-86*: 505–512. London: Society for the Promotion of Roman Studies. Britannia Monograph Series No. 15
94	Insula IX	Silchester	ER	CMW	Lodwick, L. this thesis
95	Insula IX	Silchester	MR	CMW	Robinson, M. 2011. The macroscopic plant and invertebrate remains. In M. Fulford and A. Clarke (eds.) *Silchester: City in Transition*: 281–293. London: Society for the Promotion of Roman Studies.Britannia Monograph Series No. 25
96	Insula IX	Silchester	LR	CMW	Robinson, M., Fulford, N. and Tootell, K. 2006. Macroscopic plant remains. In M. Fulford, A. Clarke and H. Eckardt (eds.) *Life and Labour in Late Roman Silchester: Excavations in Insula IX since 1997*: 206–218. London: Society for the Promotion of Roman Studies.
97	Insula XIII	Verulamium	MR	C	Fryer, V. 2006. Charred cereals and other remains. In R. Niblett, W. Manning and C. Saunders. Verulamium: Excavations within the Roman town 1986-88. *Britannia* 37: 173-180.
98	Insula XIII	Verulamium	LR	C	Fryer, V. 2006. Charred cereals and other remains. In R. Niblett, W. Manning and C. Saunders. Verulamium: Excavations within the Roman town 1986-88. *Britannia* 37: 173-180.
99	Granary, Verulamium	Verulamium	MR	C	Helbaek, H. 1964. The Isca grain, a Roman plant introduction in Britain. *New Phytologist* 63 (2): 158–164.
100	Brook Street	Winchester	ER	W	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa 800 B.C. - 400 A.D.* University of Southampton. Unpublished Mphil thesis.
101	Brook Street	Winchester	MR	W	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa 800 B.C. - 400 A.D.* University of Southampton. Unpublished Mphil thesis.
102	Cathedral Car Park	Winchester	MR	W	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa 800 B.C. - 400 A.D.* University of Southampton. Unpublished Mphil thesis.
103	Cathedral Green	Winchester	ER	W	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa 800 B.C. - 400 A.D.* University of Southampton. Unpublished Mphil thesis.
104	Cathedral Green	Winchester	MR	W	Murphy, P. 1977. *Early Agriculture Environment on the Hampshire Chalklands: circa 800 B.C. - 400 A.D.* University of Southampton. Unpublished Mphil thesis.
105	Henly's Garage	Winchester	MR	C	Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed.) *Feeding a Roman Town: Environmental Evidence from Excavations in Winchester, 1972-1985*: 327–342. Winchester: Winchester Museums.
106	Henly's Garage	Winchester	LR	CM	Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed.) *Feeding a Roman Town: Environmental Evidence from Excavations in Winchester, 1972-1985*: 327–342. Winchester: Winchester Museums.
107	Lower Brook Street	Winchester	MR	W	Murphy, P. 1977. *Early Agriculture and Environment on the Hampshire Chalklands: circa 800 B.C. - 400 A.D.* University of Southampton. Unpublished Mphil thesis.
108	Northgate House	Winchester	ER	C	Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations Between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the former Winchester Library, Jewry St*: 363–373. Oxford: Oxford Archaeology.
109	Northgate House	Winchester	MR	C	Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*: 363–373. Oxford: Oxford Archaeology.
110	Northgate House	Winchester	LR	C	Carruthers, W. 2011. Charred and mineralised plant remains. In B. Ford, S. Teague and E. Biddulph (eds.) *Winchester - a City in the Making: Archaeological Excavations Between 2002 and 2007 on the Sites of Northgate House, Staple Gardens and the Former Winchester Library, Jewry St*: 363–373. Oxford: Oxford Archaeology.
111	Pilgrims' School	Winchester	ER	W	Smith, W. 2012. Waterlogged plant remains. In C. Champness, S. Teague and B. Ford. Holocene environmental change and Roman floodplain management at the Pigrims' school, Cathedral close, Winchester, Hampshire*. Proceedings of the Hampshire Field Club & Archaeological Society* 67 (1): 60–61.
112	Pilgrims' School	Winchester	MR	W	Smith, W. 2012. Waterlogged plant remains. In C. Champness, S. Teague and B. Ford. Holocene environmental change and Roman floodplain management at the Pigrims' school, Cathedral close, Winchester, Hampshire*. Proceedings of the Hampshire Field Club & Archaeological Society* 67 (1): 60–61.
113	Victoria Rd	Winchester	ER	C	Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed.) *Feeding a Roman town: Environmental Evidence from Excavations in Winchester, 1972-1985*: 327–342. Winchester: Winchester Museums.
114	Victoria Rd	Winchester	MR	C	Green, F. 2010. Roman plant remains from Winchester: evidence from the suburbs and defences. In M. Maltby (ed) *Feeding a Roman town: Environmental Evidence from Excavations in Winchester, 1972-1985*: 327–342. Winchester: Winchester Museums.
115	Wroxeter Baths Basilica	Wroxeter	LR	C	Charles, M., Colledge, S. and Monk, M. 1997. The Wroxeter plant remains. In P. Barker, R. White, R. Pretty, H. Bird and M. Corbishley (eds.) *Wroxeter, Shropshire: the Baths Basilica Excavations 1955-90*: 324–345. London: English Heritage.

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116	50 Picadilly	York	ER	W	Carrott, J., Dobney, K., Hall, A., Kenward, H. and Miles, A. 1992. An Evaluation of Environmental Evidence from Excavations at 50 Piccadilly, York (YAT/Yorkshire Museum site code: 1992.10). York: Environmental Archaeology Unit, University of York.
117	Blake Street	York	MR	C	Hall, R. 1997. *Excavations in the Praetentura: 9 Blake Street*. York: York Archaeological Trust.
118	Church St Sewer	York	LR	W	Greig, J. 1976. The plant remains. In P.C. Buckland (ed.) *The Environmental Evidence from the Church Street Roman Sewer System*: 23–8. London: Council for British Archaeology
119	Coney Street	York	ER	CW	Kenward, H. and Williams, D. 1979. *Biological Evidence from the Roman Warehouses in Coney Street*. London: Council for British Archaeology.
120	General Accident	York	MR	CW	Hall, A. and Kenward, H. 1990. *Environmental Evidence from the Colonia: Tanner Row and Rougier Street*. London: Council for British Archaeology.
121	General Accident	York	LR	CW	Hall, A. and Kenward, H. 1990. *Environmental Evidence from the Colonia: Tanner Row and Rougier Street*. London: Council for British Archaeology.
122	Layerthorpe	York	R	W	Hall, A., Kenward, H., Jacques, D. and Carrott, J. 2000. *Technical Report: Environment and Industry at Layerthorpe Bridge, York (site code YORYM 1996.345)*. York: Environmental Archaeology Unit, University of York
123	North Street	York	MR	W	Carrott, J., Hall, A., Issitt, M., Kenward, H. and Lancaster, S. 1993. *Assessment of Biological Remains from Samples of Roman to Medieval Riverside Deposits at North Street, York (YAT/Yorkshire Museum code 93.1)*. York: Environmental Archaeology Unit, University of York.
124	Rougier Street	York	MR	CW	Hall, A. and Kenward, H. 1990. *Environmental Evidence from the Colonia: Tanner Row and Rougier Street*. London: Council for British Archaeology.
125	Rougier Street	York	LR	W	Hall, A. and Kenward, H. 1990. *Environmental Evidence from the Colonia: Tanner Row and Rougier Street*. London: Council for British Archaeology.
126	Skeldergate	York	ER	W	Hall, A., Kenward, H. and Williams, D. 1980. *Environmental Evidence from Roman Deposits in Skeldergate*. London: Council for British Archaeology.
127	Skeldergate	York	LR	W	Hall, A., Kenward, H. and Williams, D. 1980. *Environmental Evidence from Roman Deposits in Skeldergate*. London: Council for British Archaeology.
128	St Saviourgate	York	LR	W	Carrott, J., Hall, A., Hughes, P., Jaques, D., Johnstone, C., Kenward, H. and Worthy, D. 1998. *An Assessment of Biological Remains from Excavations at St Saviourgate, York (site code: 1995.434)*. York: Environmental Archaeology Unit, University of York.
129	The Bedern	York	LR	W	Kenward, H., Addyman, P., Hall, A. and Jones, A. 1986. *Environmental Evidence from a Roman Well and Anglian Pits in the Legionary Fortress*. London: Council for British Archaeology.
130	Wellington Row	York	ER	W	Carrott, J. et al. 1995. *Assessment of Biological Remains from Excavations in Wellington Row, York (sitecode 1988-9.24)*. York: Environmental Archaeology Unit, University of York.