

Introducing FeedSax: Bioarchaeological Explorations of an Early Medieval Agricultural Revolution

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The agricultural revolution of early modern Britain is well known: farming practices were rationalized, intensified and technologized and, perhaps most infamously, this process saw the eventual enclosure of most of England's open field systems. Less well known but equally significant is the revolution that occurred several centuries earlier, which witnessed the genesis of those same open fields, and which again fed a rising population – a population which had reached unprecedented levels by the thirteenth century. In a pattern which recurred across much of medieval Europe, cereal cultivation expanded as never before, powering demographic and economic growth. Scholars have been studying these crucial developments for over 100 years, yet even now there is no consensus as to when, where, how and why they occurred. Indeed, even the question of whether there really was a revolution, or rather an evolutionary process, remains unresolved. There is no shortage of excellent landscape-historical studies in recent literature but these often profoundly disagree with each other, despite using very similar evidence.¹ Could the application of innovative methodologies, drawing upon new evidence, finally break the impasse?

A major new project, **Feeding Anglo-Saxon England (FeedSax)**, is pursuing exactly this aim. An Advanced Grant from the European Research Council is funding four years of bioarchaeological research (2017-2021) at the Universities of Oxford and Leicester, led by Helena Hamerow, Oxford's Professor of Early Medieval Archaeology. The bioarchaeological evidence – charred crop deposits, animal bones, and pollen – will bring us closer than ever before to the very plants that grew, and the livestock that grazed, in the fields and meadows of Anglo-Saxon England. Such evidence has been studied to great effect for periods of prehistory and for the 'improvements' of early modern farming.

The very same methodologies, being based upon the systematic impact of farming upon the natural world, are equally applicable to the early medieval countryside.

More than 25 years of development-led excavations in Britain, in advance of building works, have produced a rich bioarchaeological dataset for the FeedSax team to draw upon. A pilot study in 2016, for instance, identified more than 250 sites across England with preserved early medieval plant remains spanning the eighth to twelfth centuries – and more evidence is undoubtedly waiting to be unearthed in the mass of archive reports that now abound.²

One key strand of the FeedSax project will concern archaeobotanical analysis, the study of charred plant remains from excavated settlements. The arable weeds preserved amongst the harvested cereals, with their distinct ecological preferences, provide a unique insight into the growing environments of early medieval crops and, thus, into the husbandry strategies that were employed. Practices such as manuring and irrigation also affect the biochemistry of crops in distinctive ways, so we will be conducting parallel analyses of carbon and nitrogen stable isotopes from cereal grains, using a mass spectrometer at Oxford's Research Laboratory for Archaeology and the History of Art. Where sheep were grazed on the aftermath of arable fields, the altered biochemistry of the cereals would consequently have affected the chemical composition of ovine skeletons. Isotopic analyses of sheep bones will therefore be used to identify and trace this approach to grazing. Animal bones will also be invaluable in tracing the use of the heavy mouldboard plough. Nature did not intend for cattle to pull ploughs, and such labours invariably take their toll on bovine skeletons. A study of limb bone pathologies from large bone assemblages will therefore provide another powerful tool in tracking the spread of this 'disruptive technology' across early medieval England. The joint application of all these techniques to the material from a series of case study sites (yet to be identified) will be used to reconstruct detailed models of cereal husbandry strategies – including modes of ploughing, manuring, and sowing – across different areas of England.

To set these intensive case studies within a wider context, we will also be compiling a national dataset of bioarchaeological information, garnered from the so-called grey literature of excavation archive reports, as well as published data, along with a wide-ranging study of settlement plans from the same sources. The results of the case studies will provide a foil to help us to interpret these wider patterns more precisely. At the same time, other members of the team will be extracting and analysing pollen cores from across the country. Whereas charred crop deposits and animal bones elucidate the flora and fauna that found their way into excavated settlements, pollen sequences represent the wider floral ecosystems of the past, in both farmed and wild landscapes. The construction of a national model of medieval land-use from this resource – the first of its kind – will provide a vital canvas against which to set the localized evidence from individual settlements. Ultimately, the combination of all these strands will enable us to investigate geographical variation in the planning of farmsteads, cropping regimes and animal husbandry across the whole of England, allowing comparisons between, for example, the heavy champion heartlands of open field farming in the Midlands and the lighter soils of East Anglia.

Last but not least, the bioarchaeological evidence of charred seeds, animal bones and pollen cores offers one further advantage: such items are directly dateable through the application of radiocarbon analysis. The predictable, systematic decay of carbon isotopes in organic substances provides a well-established means of determining how long bioarchaeological material has been in the ground, through measurement in a mass spectrometer. Even greater chronological precision is now attainable through a statistical approach – known as Bayesian analysis – that exploits the stratigraphic and mathematical relationships between radiocarbon determinations to devise a more closely dated sequence. Crucially, this part of the project will enable us to obtain specific date-ranges for the developments identified in the other strands, and so address long-standing questions about when, and how quickly, different innovations occurred in the Anglo-Saxon and Norman periods.

The analyses of charred plant remains, both ecological and molecular, will further benefit from a parallel study of comparable material from the Rhine valley, through collaboration with Dr Tanja Zerl of the University of Cologne. The inclusion of this German material offers two exciting opportunities to expand the scope of the project: first, through a comparison of early medieval developments on both sides of the Channel; and second, because of the extremely long chronology of the Rhenish material (from Neolithic to Medieval), to examine such developments within the *longue durée* of agrarian history. All this is possible because the project methodologies are applicable to any period of history, and practically anywhere in the world, that produces sufficient bioarchaeological material. Hence there is strong potential for similar future studies around the whole of the British Isles, and indeed across much of Europe.

The project team comprises Prof. Helena Hamerow, Prof. Amy Bogaard, Dr Mike Charles, Prof. Christopher Bronk Ramsey, Dr Emily Forster and Dr Mark McKerracher at the University of Oxford, and Dr Richard Thomas and Dr Mathilda Holmes at the University of Leicester.

For more information, please visit the project website: <http://feedsax.arch.ox.ac.uk/>

You can also find us on Twitter (@FeedSax) and follow our blog: <http://feedsax.wordpress.com>

Footnotes

¹ Recent notable works include, for instance: T Williamson, R Liddiard and T Partida, *Champion. The making and unmaking of the English Midland landscape* (Liverpool University Press, 2013), and D Hall, *The open fields of England* (Oxford University Press, 2014).

² M McKerracher, 'Playing with fire? Charred grain as a proxy for cereal surpluses in early medieval England', *Medieval Settlement Research* 31, (2016), pp. 63-6.