APPENDIX S1. Supplementary methods

(1) Morphological criteria for identifying stridulatory mechanisms

Although all stridulatory mechanisms reported here have been identified as such in the publications describing them, it is necessary that we provide key criteria that enable morphologists to establish the links between morphology and sound production, when behavioural data are not available.

The presence of (*i*) a series of modified, strongly sclerotised ultrastructures, typically raised ridges, spines, pegs, or tubercles, which are morphologically distinct from the surrounding cuticle, (*ii*) bilateral and isomorphic [even though asymmetries are occasionally present, e.g. in right-to-left stridulating crickets (Duncan *et al.*, 2021)], and (*iii*) can be found in many, if not all specimens of a species (either in a single sex, or both), are typical diagnostic characteristics of a stridulatory mechanism. We note that in some rare cases, not all specimens of a population possess the stridulatory mechanism (Zuk *et al.*, 2006), and of course, not all repeatable ultrastructures are stridulatory, as they could be chemosensory, glands (Davranoglou *et al.*, 2019*b*), part of the wing mechanism (Papáček *et al.*, 1990), or of other, uncertain function. A further crucial characteristic of stridulatory mechanisms is that (*iv*) they are bipartite – that is, they require friction with another structure to produce sound. Each stridulatory structure involved usually has different ultrastructural morphology from its opposing one, although sometimes, especially in the cheliceral mechanisms of many arachnids, the morphology of the opposing components might be identical (see Table 2). Additionally (*v*), the sclerotised nature of stridulatory structures often renders them darker than their surrounding structures (e.g. Uetz & Stratton, 1982; Lis & Heyna, 2001), which makes them more conspicuous and easier to identify.

We should also comment on the definition of stridulitrum *versus* plectrum. Following the terminology of Ashlock & Lattin (1963), we term the mobile component of the stridulatory mechanism as the plectrum (typically a spine, tubercle, stiff hair, granule or a series thereof; occasionally also a file), and the stationary component the stridulitrum (usually, but not always, a file). However, some authors use the term stridulitrum or *pars stridens* to refer exclusively to file-like structures, whereas the term plectrum is reserved only for a spine, tubercle, hair, or lip (e.g. Jannson, 1972; Jocqué, 2005; Lis & Heyna, 2001). We have selected the terminology of Ashlock & Lattin (1963) as it is biomechanically inclusive, given that it identifies the mobile and stationary components regardless of their morphology.

It should also be noted that certain stridulatory structures fall outside the bipartite category of plectrum *versus* stridulitrum, regardless of the terminology employed. In some Orthoptera, the mandibles interact with each other (Field, 1993), the maxillae (Günther, 1992), or the labrum (Lloyd & Gurney, 1975) to produce sound, in the absence of specialised structures. Some theraphosine tarantulas use setal entanglement – a mechanism that is found in no other organism (Marshall *et al.*, 1995). In this mechanism, described in *Theraphosa blondi*, modified setae on the pedipalp and legs possess filaments on their stem and hooks in their distal portion. When these setae are rubbed against their counterparts on opposing legs, the setal hooks of one leg become entangled with the setal filaments of the opposing leg, and then get pulled apart, producing a loud hiss – much like the sound produced by unzipping Velcro (Marshall *et al.*, 1995). Whether this mechanism represents stridulation *sensu stricto* or a different class of motion should be considered in future experimental and theoretical studies.

Overall, the extreme consistency in the morphology of stridulatory structures across arthropods has allowed them to be readily identifiable in unrelated groups – from arachnids to millipedes and crustaceans. It is generally accepted among morphologists and bioacousticians that although the biomechanics and behavioural contexts of stridulation in many arthropods (excluding Orthoptera) may have remained poorly studied or unknown, the presence of stridulatory mechanisms is a reliable indicator of sound production in a given species. By default, authors describing a structure as stridulatory assume that it is involved in sound production, even if no signal has been heard. This assumption is based on three lines of evidence: (*i*) in most cases where an animal has been heard singing, subsequent morphological and bioacoustic experiments confirmed the involvement of stridulatory organs (e.g. Field *et al*., 1987; Leston, 1957; Marshall *et al*., 1995; Moulet, 1991; Taylor *et al*., 2019; Uhl & Schmitt, 1996; Zych *et al*., 2012); (*ii*) when structures on preserved specimens were described as stridulatory and were subsequently bioacoustically investigated, their role in sound production was confirmed (e.g. Liao *et al*., 2019; Luo & Wei, 2015); (*iii*) stridulatory mechanisms are reliable indicators of sound production to the degree that their morphology can be used to reconstruct the singing pattern in preserved specimens (Woodrow *et al*., 2022), and even from Jurassic fossils (Gu *et al*., 2012), in the absence of behavioural data.

Based on the above, we argue that the assumption that the presence of stridulatory organs is correlated with the presence of sound production is justified.

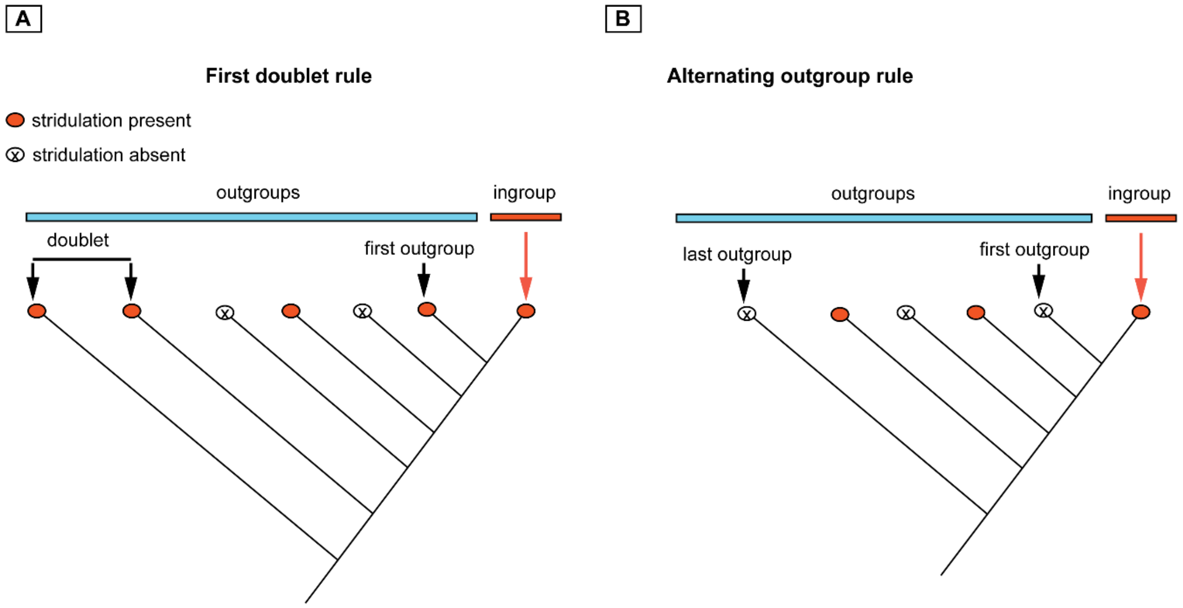

Fig. S1. Basic principles of the two-step parsimony rule of Maddison *et al*. (1984), using a hypothetical scenario of stridulatory evolution. (A) If the characters of the first outgroup and two consecutive outgroups (= doublet) agree in state, then the most parsimonious hypothesis is that this is the ancestral state for the entire group – in this case the presence of a stridulatory mechanism. (B) When doublets are absent, if the state of the first and last outgroups are shared, then that is the ancestral condition, in this case, the absence of stridulation.

APPENDIX S2. Rationale for our estimates of the number of times that stridulation evolved in each of the examined groups

(1) Detailed explanation for Heteroptera (Table 1)

We list all known heteropteran stridulatory mechanisms and the numbers of times they evolved in Table 1, which represents the most detailed analysis available of stridulation in this group of insects. Table 1 offers conservative and relaxed estimates of the number of times stridulatory mechanisms have evolved in Heteroptera. The conservative estimate excludes taxa whose stridulatory mechanism is either poorly described or unlikely to be involved in sound production, due to experimental or other evidence.

We also documented the presence of vibrational signalling across Heteroptera. The fusion or modification of abdominal tergites 1–2 into a tremulatory tergal plate [TTP; not to be confused with the immobile tergal plate of some Aradidae (Usinger & Matsuda, 1959)] has been demonstrated in several groups of Heteroptera to act as a vibrational organ (Gogala, 1984). We therefore suggest that the presence of a TTP is a reliable indicator of vibrational signalling in taxa which have not been examined experimentally.

Extensive justification for our interpretations is summarised for each infraorder below.

Dipsocoromorpha

Peculiar structures on the dorsal surface of the fore wings of several Schizopteridae were initially interpreted as being part of a stridulatory mechanism (China, 1946). However, as no opposing structures (i.e. forming a plectrum) could be found, their location makes them unlikely to function as stridulatory organs (Emsley, 1969). Subsequent acoustic experiments also failed to find any evidence of acoustic signals (Emsley, 1969). It has been suggested that metacoxal pads (otherwise thought to form part of the jumping mechanism) can act as stridulatory organs (Emsley, 1969), although this is speculative and requires confirmation. Based on the above, we treat Dipsocoromorpha as currently lacking any type of stridulatory mechanism.

There are no reports of vibrational signalling in this infraorder. However, the presence of a TTP on the dipsocoromorphan abdomen (Sweet, 1996), suggests that vibrational signalling may have not yet been discovered in this infraorder.

Enicocephalomorpha

A possible coxal stridulitrum was described in three genera of Enicocephalidae (Baňař & Štys, 2006; Štys & Baňař, 2006, 2007). Serrate microsculpture on the dorsal surface of the fore coxa was interpreted as representing a stridulitrum, which supposedly rubs against the prosternum, the latter acting as the plectrum. It has been suggested that this tentative stridulatory mechanism is universally present in the family Enicocephalidae, but this claim has not been formally tested (Štys & Baňař, 2007).

Based on the presence of a tergal plate (Davranoglou *et al.*, 2017), it is likely that Enicocephalomorpha use vibrational signals.

Gerromorpha

Two gerromorphan families are known to possess stridulatory mechanisms. In Veliidae, three genera of Veliinae (*Angilovelia*, *Paravelia*, *Stridulivelia*) and two in Rhagoveliinae (*Chenevelia*, *Rhagovelia lugubris*) possess an abdominal stridulitrum–leg plectrum (Table 1). We suggest that stridulatory mechanisms in Veliidae have evolved at least four times: once in *Chenevelia* (Rhagoveliinae) [due to parsimony, as Rhagoveliinae is separated from Veliinae by four nodes that lack this stridulatory mechanism, which is present in only a subset of the genus *Chenevelia* (Damgaard, 2008; Zettel, 1996)], once in *Rh. lugubris* (due to the possession of a different mechanism compared to *Chenevelia*), once in *Paravelia*, as the plectrum is located on the metatrochanter (while in the other taxa it is on the metafemur) and once between *Angilovelia* and *Paravelia* (Table 1). Although previous studies have suggested that the stridulatory mechanism in *Angilovelia* and *Paravelia* evolved independently (Andersen, 1981, 1982; Polhemus, 1994; Zettel, 1996), we find no evidence for this; the location of the stridulatory mechanism and its ultrastructure are the same, and their phylogenetic relationships are poorly understood (Andersen, 1981, 1982; Burguez Floriano *et al.*, 2017). Among Gerridae, a thoracic stridulitrum (metaacetabulum)–leg plectrum (metatrochanter) is known from half of the species of *Metrobates* (Trepobatinae), and an abdominal stridulitrum–leg plectrum defines the genus *Stridulobates* (Ptilomerinae) (Table 1) (Polhemus, 1991, 1994; Polhemus & Polhemus, 1993; Zettel & Thirumalai, 2000). Due to the different type of stridulatory mechanism used, we suggest that acoustic signalling has evolved twice in gerrids.

Vibrational signals in the form of water surface ripples are widespread in both gerrids and veliids (Polhemus, 1990*b*, 1991; Wilcox, 1979). We suggest that vibrational signals are probably used by most, if not all gerromorphans, and that the few stridulating taxa represent secondary developments.

Nepomorpha

Stridulatory mechanisms are particularly complex and diverse in the Nepomorpha (Table 1), and have been extensively reviewed (Aiken, 1985; Polhemus, 1994). Due to the presence of many distinct stridulatory types (Table 1), most nepomorphan stridulatory mechanisms are easily distinguished as separate evolutionary developments. Only special cases are discussed below.

Corixids stridulate using a leg–head mechanism (Jansson, 1989; Polhemus, 1994). A structure of the sixth tergum misleadingly termed as the strigil, is not used in sound production (Jansson, 1989). Besides stridulation, some corixids also use leg-induced vibrations in mating (Jansson, 1989). The family Diaprepocoridae has a unique forceps-like structure which has been interpreted as a stridulatory mechanism (Hale, 1922). Due to its similarity to the corixid ‘strigil’, we doubt the diaprepocorid organ is involved in sound production. All Micronectidae use a unique mechanism involving the genitalia (paramere plectrum–tergum 8 stridulitrum) (Jansson, 1972, 1989; Tinerella, 2008, 2013).

The situation in Notonectidae is particularly complex. In all species of the genera *Anisops* and *Buenoa*, the males possess a leg–head stridulatory mechanism (Polhemus, 1994). Based on parsimony, the mechanism likely evolved once in the common ancestor of the two genera, as systematic (Ye *et al.*, 2019; Zhang *et al.*, 2012) and morphological (Truxal, 1952) studies identified them as sister groups, and the stridulatory structure is identical. Secondary developments include the evolution of two morphologically distinct types of abdomen–leg (in males) and two distinct types of wing edge–leg mechanisms (in females) in African and Madagascan species of *Anisops*, supplementing the pre-existing leg–head mechanism (Polhemus, 1994). These mechanisms are identified as independent events due to their considerable structural differences (ultrastructural; location on abdomen, etc.) (Polhemus, 1994). In addition, most, but not all species of *Buenoa* have an additional leg–leg stridulatory mechanism. Species of the genera *Enithares* and *Martarega* have unique abdomen–leg and wing edge–leg mechanisms respectively, whose structure is dissimilar to mechanisms found in other Notonectidae (Polhemus, 1994). Based on the above, stridulatory organs have evolved in Notonectidae at least eight times. Interestingly, *Notonecta*, the sister group to all other Notonectidae (Zhang *et al.*, 2012), lacks stridulatory mechanisms, indicating that acoustic signalling may be a derived trait in this family or secondarily lost in this genus.

The thorax–thorax mechanism shared by the Pleidae and two tribes of the Helotrephidae (Helotrephini and Limnotrephini) is considered as a synapomorphy of the two families (Papáček *et al.*, 1990), as they have been recovered as sister groups in systematic studies (Hebsgaard *et al.*, 2004) and the structure of the mechanism is identical. However, its scale-like morphology is similar to wing-locking devices found in other Heteroptera, and its role in stridulation is ambiguous (Papáček *et al.*, 1990). Another mechanism in the Limnotrephini, which involves a supposed stridulitrum on the wing base striking against a plectrum on the cephalonotum is also similar to a wing-locking device (Polhemus, 1990*a*) and its role in stridulation is unlikely. The distinct morphology of the wing edge–leg mechanism of helotrephids (Polhemus, 1990*a*) is easily identified as an independent evolutionary development from other wing-edge mechanisms in the Nepomorpha. The same holds true for the abdomen–leg mechanism of certain *Limnocoris* (Pleidae) (Polhemus, 1994).

The Naucoridae are the first aquatic bugs for which stridulation was recorded, and possess two strongly autapomorphic mechanisms (Table 1), which we treat as having evolved independently. Acoustic signals are only known from the males of *Ilyocoris cimicoides* (Aiken, 1985), and although widely assumed to be used in mating (Gooderham & Tsyrlin, 2002), their precise role is yet to be determined. However, as these stridulatory organs are only known in males, which we have heard signalling in the absence of any disturbance (L.-R. Davranoglou, personal observations), we tentatively suggest they are used in a sexual context (see Table S5). Experimental confirmation of the behavioural context of the signals of Naucoridae is urgently required.

The Nepoidea (Belostomatidae and Nepidae), which have consistently been recovered as the sister group to all other Nepomorpha by several phylogenetic studies (Hebsgaard *et al.*, 2004; Schuh & Weirauch, 2020; Ye *et al.*, 2019), communicate primarily by vibrations: several belostomatids engage in body-pumping during courtship (Kraus, 1989) and a possible tergal plate produces abdominal vibrations, again in a mating context (Barber, 1971). Given that stridulation in the Nepoidea is known only from four, closely related species of *Ranatra* (Nepidae) (Aiken, 1985), we suggest that it represents a derived behaviour in this group. In addition, based on the fact that each nepomorphan family possesses its own types of stridulatory mechanism (with the possible exception of the related Helotrephidae–Pleidae), and they usually represent convergent developments, we suggest that acoustic signalling is a derived behaviour that has evolved multiple times in Nepomorpha.

Leptopodomorpha

Among Leptopodidae, a stridulatory tergal plate (STP) can be found in all genera other than *Leotichius*, the purported sister group to all other genera in the family (Pericart & Polhemus, 1990) (Table 1). The absence of an STP in *Leotichius* is considered either a plesiomorphy (making its presence in other taxa a derived trait), or a secondary loss (Pericart & Polhemus, 1990). It should be noted that the stridulitrum on the hind wing of Leptopodidae is on vein 3A, whereas in Pentatomomorpha possessing an STP, the stridulitrum is located on vein PCu (Leston, 1954, 1957; Pericart & Polhemus, 1990).

In Saldidae, a wing edge–leg mechanism is found in the subfamily Saldinae, subdivided into three stridulitral and four plectral types (Polhemus, 1985) with unique morphological characteristics. In a cladistic analysis, the evolution of each type of stridulatory mechanism was coded in the phylogeny and was found to represent a derived trait, having arisen at least six times independently in the genera *Chartoscirta, Ioscytus, Macrosaldula, Rupisalda*, *Saldoida* (Saldoidini) and *Lampracanthia* (Saldini) (Polhemus, 1985) (Table 1).

We are not aware of any studies examining the presence of vibrational signals in the Leptopodomorpha, although the presence of fused tergites 1–2 into a tergal plate in several taxa (Sweet, 1996), makes its presence in this infraorder likely.

Cimicomorpha

In Cimicomorpha, stridulatory organs have arisen most frequently in the Miridae, the largest family of the infraorder (Table 1). Wing edge–leg stridulatory mechanisms are present in the Cylapinae (*Euchilofulvius* and *Samoafulvius;* Gorczyca, 1998, 2004), Deraecorinae (*Obudua*; Akingbohungbe, 1979), Orthotylinae (*Renodaeus*; Henry, 2015), and the Phylinae [between certain Hallodapini and Leucophoropterini (Schuh, 1974, 1984;, Yasunaga *et al.*, 2019)], and can generate acoustic signals of up to 2.1 kHz (Yasunaga *et al.*, 2019) (Table 1). Due to parsimony [all stridulatory species/tribes separated from each other by tens of nodes lacking this trait (Jung & Lee, 2012; Menard *et al.*, 2014)], taxonomic disparity, and morphological differences in the mechanisms of the examined taxa, we suggest that wing-edge mechanisms have appeared at least four times independently in the Miridae – at least once in each mentioned subfamily. Although certain studies suggest that wing-edge mechanisms may have evolved several times within the Phylinae (Yasunaga *et al.*, 2019), given the overall structural similarity of the mechanism, we tentatively treat this mechanism as having evolved once in this subfamily, until a formal cladistic analysis coding this character is available. An abdominal stridulitrum (plectrum unknown, although likely the hind femur) also appears twice in the Miridae: once in the Orthotylinae among the genera allied to *Renodaeus* (but not *Renodaeus* itself; Henry, 2015), and once in the Phylinae, in the tribe Leucophoropterini (Schuh, 1984), which we interpret as independent events, due to parsimony [separated by many nodes lacking this trait (Jung & Lee, 2012; Menard *et al.*, 2014)]. We suggest that the abdomen–leg mechanism of Leucophoropterini arose once in the tribe, as the two genera possessing it (*Arafuramiris* and *Waterhouseana*) are separated by only two non-stridulatory nodes in a cladistic analysis (Menard & Schuh, 2011; Menard & Woolley, 2014).

Reduviidae possess the best-known stridulatory mechanism among the Cimicomorpha and the most widespread in Heteroptera as a whole. The vast majority of species possess a prosternal stridulitrum which is rubbed by a labial plectrum (Cai *et al.*, 1994). This stridulitrum is used in defensive and possibly mating contexts (Manrique & Lazzari, 1994). The prothoracic–labial mechanism is thought to have arisen once in the phylogeny of reduviids (Leston, 1957; Cai *et al.*, 1994), with at least 12 independent losses (Cai *et al.*, 1994).

In Tingidae, acoustic signals of up to 6 kHz have been recorded from *Corythucha ciliata*, probably produced by a wing edge stridulitrum–abdominal plectrum mechanism (Gogala, 1984). There are no reports of other stridulatory organs in this family.

In the remaining Cimicomorpha, two different types of stridulatory mechanisms are known from the Lasiochilidae (Table 1), and one in the Anthocoridae; the latter was tentatively reported in the genera *Guayascoris* and *Nidicola* (Carpintero & Dellapé, 2012) and we interpret it as having evolved at least once.

Low-frequency vibrations are known from the Miridae (Gemeno *et al.*, 2015; Koczor & Čokl, 2014), Reduviidae (Gogala, 1985) and Tingidae (Cocroft, 2001), the first two operated by a tergal plate, the third being unknown.

Pentatomomorpha

Aradoidea

There are two stridulatory mechanisms in the Aradidae: a thorax–leg mechanism, which has appeared once in *Aradacanthia*, and an abdomen–leg mechanism which, based on differences in the type of ultrastructure used and the position of both the stridulitrum and plectrum on different leg and abdominal segments, has evolved at least six times independently (Usinger & Matsuda, 1959) (Table 1).

No vibrational signals are known from the Aradoidea.

Coreoidea

Few stridulatory organs are known from the Coreoidea. A group of Nearctic and two Old World genera of Alydidae are characterised by a wing edge–leg device, which, in the absence of a recent phylogeny of the family (Moulet, 1991; Schaefer *et al.*, 2015), is interpreted as having evolved at least once. An STP is the only known stridulatory structure in the Rhopalidae, reported from *Jadera* (Zych *et al.*, 2012). The situation is more complex in Coreidae. A pronotal stridulitrum–fore wing plectrum can be found in several genera belonging to the "CGPP' tribes "Coreini" (*Centrocoris*, *Coreus*, *Enoplops*, *Haploprocta*, *Spathocera*, *Syromastus*), "Gonocerini" (*Cletoliturus*, *Cletomorpha*, *Cletoscellus*, *Cletus*), Phyllomorphini (*Pephricus*, *Phyllomorpha*, *Tongorma*) and Prionotylini (*Prionotylus*) (Forthman, 2022; Moulet, 1991; Schaefer, 1962; Štys, 1961). An upcoming phylogenomic study specifically investigating the origins of the stridulatory mechanisms of Coreidae will show that the mechanism arose once, at the base of the "CGPP" clade (Forthman, 2022). For this reason, we interpret the mechanism as having evolved once (Table 1). It should be noted that although the genus *Euthochtha* (Acanthocerini) was previously reported to possess the abovementioned pronotal stridulitrum–fore wing plectrum (Schaefer, 1962), subsequent morphological examination by Forthman (2022) showed that no such mechanism is present in this genus.

Tremulatory signals are known from coreids, rhopalids, and alydids (Gogala, 1984, 1990).

Lygaeoidea

The evolution of stridulation in Lygaeoidea is complex due to significant taxonomic changes since the first study examining this topic (Ashlock & Lattin, 1963). Stridulatory structures evolved only once in certain families (Colobathristidae, Blissidae, Piesmatidae; Table 1). Stridulation has arisen most frequently in the Rhyparochromidae, a largely ground-dwelling group (Table 1). Stridulatory organs are distributed in a few members of different subfamilies, and the type of mechanism is usually different, allowing for their recognition as independent evolutionary events (Table 1). Poorly studied or complex conditions are discussed below.

Following phylogenetic studies (Malipatil, 1981, 1983), an abdomen–leg stridulatory mechanism is present in almost every clade of Cleradini. It is reduced independently in *Navarrus* and *Pholeolygaeus* (Malipatil, 1981), and is absent in only a few genera (once in *Arlecda–Neoclerada* and once in *Laticlerada*). Given that all genera lacking the stridulatory mechanism are separated by less than two non-stridulatory nodes from taxa that possess it (Malipatil, 1983), the most parsimonious explanation is that they represent four independent losses.

Among the Myodochinae, a wing edge–metafemur device and a prothorax–leg mechanism are autapomorphies of the genera *Villalobosothignus* and *Pseudocnemodus*, respectively (Dellapé, 2003; Harrington, 1980) (Table 1). All other stridulating genera are characterised by an abdomen–leg mechanism (Harrington, 1980) (Table 1) which, based on their phylogenetic position and our criterion of parsimony, has evolved at least five times independently: twice between the genera *Eucosmetus* and *Stridulocoris* (separated from each other by many nodes where this stridulatory mechanism is absent; Harrington, 1980), and once in each of three groups of related genera (once in *Slaterobius*, *Ligyrocoris*, *Froeschneria*, once in *Pseudopamera*, *Erlacda*, *Afrovertanus*, and once in *Ashlockaria*. Each of these groups is separated by multiple outgroup nodes that lack this trait (Harrington, 1980), and based on the first doublet rule of Maddison *et al*. (1984), the most parsimonious explanation is that they represent three independent developments. A phylogenetic study of the Myodochinae considers the absence of stridulation as the plesiomorphic state of the subfamily and codes stridulatory organs as derived traits (Harrington, 1980).

Wing edge–leg and abdomen–leg mechanisms also occur sporadically in other tribes of Rhyparochromidae (Drymini, Ozophorini and Rhyparochromini) but the presence of the latter on different segments, the taxonomic distance between the taxa that possess them and their general disparity (i.e. present in very few species, whose relatives lack stridulatory mechanisms) indicate that they represent independent evolutionary events. The tribe Plinthisini is characterised by the possession of an STP, and at least one species has additionally developed a unique type of thorax–leg mechanism (Table 1).

Vibrational signals have been demonstrated in several Lygaeoidea, and are generated by a tergal plate (Gogala, 2006; Minghetti *et al*., 2020). The presence of a tergal plate in many examined species (Table 1) suggests that vibrational signalling is widespread in this group.

Idiostoloidea

There are no reports of stridulatory organs from Idiostoloidea. It is possible that the closely associated tergites 1–2 may form a tergal plate (Schaefer, 1965); vibrational signalling is thus likely in this group, although it awaits behavioural confirmation.

Pentatomoidea

The Pentatomoidea is a megadiverse group whose systematics are notoriously difficult to reconstruct. An STP is the most frequently encountered stridulatory mechanism, found in several families such as the Canopidae, some Scutelleridae, Tessaratomidae (not in Oncomerinae) and Urostilididae, which have arisen independently (separated from each other by more than two non-stridulatory nodes) (Grazia *et al*., 2008). Problematic groups possessing an STP are the so-called cydnoid families (Corimelaenidae, Cydnidae, Parastrachiidae, and Thaumastellidae), whose relationships are contentious (Grazia *et al.*, 2008). Following phylogenetic work using both morphological and molecular characters (Grazia *et al.*, 2008), the families Corimelaenidae and Parastrachiidae were combined into a broadly defined Cydnidae; we tentatively suggest that the STP shared by these taxa evolved once. The evolution of stridulatory structures in Thaumastellidae is ambiguous. Morphological data support a sister group relationship to the cydnoid complex (Štys, 1964; Jacobs, 1989), whereas molecular data recovered thaumastellids as unrelated to the cydnoid group (Grazia *et al.*, 2008). We cautiously interpret their STP as a convergence, until their relationships are elucidated by future studies.

Scutellerids are particularly diverse with respect to stridulatory organs. An STP is present in some Pachycorinae and Scutellerinae (Sphaerocorini) which, based on parsimony (separated by many non-stridulatory nodes; Wu *et al.*, 2017), has evolved at least twice (Table 1). Based on parsimony, segmental and ultrastructural differences, an abdomen–leg mechanism present in some Hoteinae, Odontotarsinae and Pachycorinae, has evolved at least three times independently (Carapezza, 2009; Wu *et al.*, 2017).

Vibrational signals in the Pentatomoidea are the best studied among Heteroptera, with *Nezara viridula* (Pentatomidae) a model organism for biotremological studies (Gogala, 1984; Moraes *et al.*, 2005).

Pyrrhocoroidea

A characteristic wing edge–leg stridulitrum can be found in the largid *Arrhaphe*, and it is considered an autapomorphy of that genus (Lattin, 1958). Two other types of tentative stridulatory mechanisms are found in other largids (Table 1). In Pyrrhocoridae, a unique type of tentative prothoracic–wing edge–leg stridulitrum is reported from *Dindymus* (Table 1).

Abdominal-based tremulatory signals are known from pyrrhocorids (Benediktov, 2007).

(2) Detailed explanation for the arthropod outgroups (Table 2)

(*a*) Arachnida

(*i*) Pedipalpi (Amblypygi, Schizomida, Thelyphonida)

A chelicera–chelicera mechanism is known from certain genera in the families Phrynidae and Phrynichidae (Table 2). Based on the few available phylogenies of Amblypygi, these families are sister groups; within these families, the stridulation-bearing genera are also sister groups to each other (*Acanthophrynus*–*Paraphrynus*; *Euphrynichus*–*Musicodamon*–*Phrynichus*) (Weygoldt, 1996). We therefore tentatively suggest that stridulation arose at least once in this order.

The orders Schizomida and Thelyphonida possess a chelicera–chelicera (Cokendolpher & Sites, 1988) and a chelicera–pedipalp (Barrales-Alcalá *et al.*, 2018) mechanism respectively (Table 2), which involve different appendages and are therefore independent innovations. The chelicera–chelicera mechanisms in the Amblypygi and Schizomida are interpreted as independent innovations, as they are present only in two families of the former, which are nested deeply within the phylogeny of that order (Weygoldt, 1996), and are separated by many non-stridulating nodes from the latter order.

(*ii*) Araneae

Mygalomorphae

Barychelidae

At least two genera (*Aurecocrypta*, *Idiommata*) of this family possess a stridulitrum on chelicera–plectrum on pedipalp coxa mechanism (Table 2). Raven (1994) considered that this mechanism was not homologous between the two genera. Furthermore, some taxa within the sister group of Barychelidae, the Theraphosidae (Opatova *et al.*, 2020) also possess this stridulatory structure (Table 2; see below). Given that a detailed phylogeny of Barychelidae is not available, and that most genera in this family lack this stridulatory mechanism, we cautiously interpret it as having evolved at least once within the family (rather than having been lost independently by all other genera, which is less parsimonious). Whether this mechanism is homologous to that of Theraphosidae should be investigated further, although we tentatively treat it as having evolved independently.

Dipluridae

Members of this family generally possess a stridulitrum on chelicera–plectrum on pedipalp coxa mechanism (Table 2). As the other mygalomorphan families possessing this mechanism (e.g. Barychelidae, Theraphosidae) are distantly related to Dipluridae (Opatova *et al.*, 2020), we interpret this character as having evolved at least once in this family.

Hexathelidae

The genus *Macrothele* possesses a stridulatory mechanism involving setae on the palpal trochanter–setae on trochanter of first leg mechanism (Table 2). As we did not find any records in the literature of close relatives (as recovered by Opatova *et al.*, 2020) possessing this mechanism, we interpret this character as having evolved at least once.

Theraphosidae

Studying the evolution of stridulation in tarantulas is particularly challenging, not only due to the often conflicting phylogenies available (Foley *et al.*, 2019; Lüddecke *et al.*, 2018; Raven, 1985; West *et al.*, 2012), but also due to the complex (and occasionally inconsistent) terminology employed to describe the stridulatory mechanisms involved. A mechanism involving setae on chelicera–setae on pedipalp coxa (also known as the maxillary lyra) is widespread in the subfamilies Selenocosmiinae, Thrigmopoeinae, present in some Ornithoctoninae, in at least one genus of Harpactirinae, in some Poecilotheriinae, and many Aviculariinae (Table 2) (e.g. Gallon, 2002; Rao *et al.*, 2006; Raven, 1985; West *et al.*, 2008, 2012), while it is absent in the Stromatopelminae (Gallon, 2003). Phylogenetic analyses coding this stridulatory mechanism in morphological data sets have recovered it as a homoplastic character (Raven, 1985; West *et al.*, 2008), that has been reduced or lost many times independently (West *et al.*, 2012). Although theraphosid phylogeny is still in flux, and whether this mechanism is homologous throughout the family is not uncontested (e.g. Gallon, 2003), we tentatively suggest that this mechanism has evolved once, until future morphological, developmental, and systematic studies clarify the situation.

Another class of stridulatory mechanism involves the modified setae of some Theraphosinae, which produce a unique form of stridulation known as setal entanglement (Marshall *et al.*, 1995). At least 10 types of modified setae are thought to be stridulatory (Galleti-Lima & Guadanucci, 2018, 2019), even though the involvement of each type in stridulation has not yet been experimentally demonstrated. Furthermore, we cannot ascertain the number of times these stridulatory structures have evolved, for several reasons. First, these setae have been recovered as homoplastic in phylogenetic studies, and second, the topology of major theraphosine clades has remained unresolved (Galleti-Lima & Guadanucci, 2018). Finally, in the absence of developmental data, it cannot be demonstrated whether each setal type represents a variant from a shared bauplan, or an independent development. We therefore interpret stridulatory setae as having evolved at least once in Theraphosinae, due to limited data. It is evident that the morphological criteria used to define what constitutes a stridulatory mechanism (see Appendix S1) are difficult to apply in the case of theraphosine modified setae.

Potentially similar setae of alleged stridulatory function exist in other theraphosids. In Harpactirinae, most genera possess setae on the chelicera and the palpal trochanters that are considered stridulatory, while the genus *Trichognatha* possesses an additional type of stridulatory setae on its chelicera (Table 2; Gallon, 2002). Eumenophorinae possess a mechanism involving setae on the pedipalpal coxa–setae on coxa of legs 1 and/or 2, which has been considered autapomorphic (Raven, 1985). Estimating whether these mechanisms evolved independently from those of Theraphosinae is challenging, as the two available phylogenies for the group (Foley *et al.*, 2019; Lüddecke *et al.*, 2018) have recovered inconsistent topologies. If we use the most recent and strongly supported cladogram (Foley *et al.*, 2019), Eumenophorinae and Harpactirinae are separated by multiple nodes both from each other, and from Theraphosinae. This suggests that stridulatory setae may have evolved twice outside Theraphosinae – once in Eumenophorinae, and once in Harpactirinae, assuming that the distribution of these characters has been adequately mapped in Theraphosidae as a whole.

A chelicera–chelicera mechanism found in an unidentified genus of Theraphosidae is interpreted as having evolved once, as it has not been found in any other member of this family (Table 2).

Araneomorphae

Synspermiata

Many families of the Synspermiata (Diguetidae, Ochyroceratidae, Sicariidae, Pholcidae, Plectreuridae) and their sister groups, the Gradungulidae, the CY Spigot clade (Austrochilidae) and the Palpimanoidea (Huttoniidae, Mechysmaucheniidae, Palpimanidae) (Wheeler *et al.*, 2017), are defined by the presence of a cheliceral stridulitrum–palpal femur plectrum (Labarque & Ramírez, 2012) (Table 2). Due to its very broad phylogenetic distribution, we tentatively interpret this mechanism as having arisen once in all these related lineages.

Dysderoidea

Segestriidae

Several genera possess a carapace–femur stridulatory mechanism (Table 2), which is absent in related families (Wheeler *et al.*, 2017) and has likely evolved once.

Scytodoidea

Ochyroceratidae

A plectrum on the pedicel of *Ochyrocera* is not found in close relatives (Baptista *et al.*, 2008), and likely represents an autapomorphy.

Lost Tracheae clade

Pholcidae

The females of certain genera possess a stridulitrum on carapace–plectrum on abdomen mechanism (Huber, 1995) (Table 2) not found in closely related families (Wheeler *et al.*, 2017) and has likely evolved only once.

Archoleptonetidae–Gradungulidae clade

Archoleptonetidae

The genus *Darkoneta* possesses a plectrum on carapace–stridulitrum on dorsal surface of abdomen mechanism (Ledford *et al.*, 2011) (Table 2), which cannot be found in close relatives (Wheeler *et al.*, 2017) (Table 2) and is interpreted here as having evolved only once.

Palpimanoidea

Archaeidae

Most species in this family possess a unique stridulitrum on petiole–plectrum on abdomen mechanism (Griswold *et al.*, 2005; Wood & Scharff, 2018) which is absent in all related families of Palpimanoidea (Wheeler *et al.*, 2017) (Table 2), and has likely evolved only once.

Synspermiata *incertae sedis*

The genus *Kinku* in the family Telemidae possesses a stridulitrum on anteroventral surface of abdomen–plectrum on coxa 4 mechanism (Dupérré & Tapia, 2015) (Table 2). Although the systematic position of this family is uncertain, the uniqueness of this mechanism, found in no other member of the Synspermiata (Table 2), suggests it evolved only once.

Araneoidea

Within Araneoidea, stridulatory mechanisms have been found at least in the following families: Araneidae, Anapidae, Cyatholipidae, Linyphidae, Malkaridae, Mimetidae, Mysmenidae, Physoglenidae, Pimoidae, Theridiidae and Tetragnathidae (Table 2).

A carapace stridulitrum–abdominal plectrum is known from the Cyatholipidae, most genera of Physoglenidae, and most Theridiidae (Table 2). As Cyatholipidae and Physoglenidae are sister groups (Wheeler *et al.*, 2017), we interpret that this mechanism arose at least once in the common ancestor of the two families. Theridiidae are very distantly related to the latter families (separated by five non-stridulating nodes; Wheeler *et al.*, 2017), and the carapace–abdomen mechanism likely arose independently in this family.

In Araneoidea, there are several groups that possess a cheliceral stridulitrum (Table 2). However, given that each group uses a different plectrum (on pedipalpal trochanter or pedipalp femur), we interpret them as independent developments. An exception might be the cheliceral stridulitrum found in most Linyphiidae and some Pimoidae (Table 2), which we treat as having evolved only once, as these are recovered as sister groups (Wheeler *et al.*, 2017).

A book lung stridulitrum–coxa of fourth leg plectrum exists in *Micrathena* (Araneidae; Hinton & Wilson, 1970), Nanometinae (Tetragnathidae; Álvarez-Padilla & Hormiga, 2011) and some Linyphiidae (Jocqué, 2005; Miller, 2007) (Table 2). Since these families are only distantly related, and are separated by many nodes that lack this trait (Wheeler *et al.*, 2017), this mechanism likely arose three times.

The remaining mechanisms that can be found in the Araneoidea are morphologically unique, involving different body parts and segments, and are therefore interpreted as having evolved independently (Table 2).

Former Deinopoidea

Uloboridae

A few related genera possess a pedipalpal endite stridulitrum–palpal tarsus plectrum mechanism (Opell, 1979) found nowhere else in the Arachnida (Table 2), that is interpreted as having evolved once.

Titanoecoidea

This clade consists of Phyxelididae and Titanoecidae, which may or may not be sister groups (Wheeler *et al.*, 2017). Although both families are characterised by stridulatory mechanisms involving the chelicera, the morphology of the structures are different (Table 2), suggesting they evolved independently: in Phyxelididae, the chelicera bears stridulitral scales which are plucked by plectral setae on the pedipalp femur (Griswold *et al.*, 2012), whereas in Titanoecidae, stiff stridulatory setae are present on the chelicera, which are plucked by stridulatory granules on the pedipalp femur (Almeida-Silva *et al.*, 2009, 2010).

Marronoid clade – Zodarioidea

A carapace stridulitrum–abdominal plectrum mechanism can be found in some Zodariidae (Jocqué, 2005) and certain Hahniidae (Bosmans, 1982; Galán-Sánchez & Alvarez-Padilla, 2017; Uetz & Stratton, 1982) (Table 2). Given that these two families are distantly related, separated by many nodes lacking this trait, and the fact that Hahniidae is deeply nested within the marronoid clade (Wheeler *et al.*, 2017), the two mechanisms are almost certainly independent developments.

The remaining stridulatory mechanisms that can be found in the marronoid clade and the Zodarioidea are highly divergent morphologically and involve different body parts and segments, and are treated as having evolved independently (Table 2). Remarkably, a species of *Mallinella* (Zodariidae) possesses six distinct stridulatory mechanisms, which is the highest recorded number in the animal kingdom (Jocqué, 2005).

Oval Calamistrum clade

Lycosidae

Two very distinct stridulatory mechanisms predominate in this family (Table 2), which we have not found in any of the related families within the Oval Calamistrum clade (Wheeler *et al.*, 2017), and they therefore likely represent two independent evolutionary events.

Dionycha part B

Species of the genus *Castianeira* (Corinnidae) possess a carapace stridulitrum–abdominal plectrum (Montgomery, 1909). Uetz & Stratton (1982) refer to these species as part of the Gnaphosidae, as the original work of Montgomery (1909) referred to them as “drassids”, now a synonym of the latter family. They also mention that the same mechanism is found in the Clubionidae, citing the same work of Montgomery. However, Montgomery (1909) makes no mention of such a mechanism in any species that is now part of the Clubionidae. We therefore suggest that reports by Uetz & Stratton (1982) of a carapace stridulitrum–abdominal plectrum (“type a”) in the Clubionidae and Gnaphosidae should be treated as invalid. We have not found any other reports of stridulatory mechanisms in these two families.

Although a carapace stridulitrum–abdominal plectrum is also known from Salticidae, given that that in both families these mechanisms are present in just a few species, and the two genera that possess them (*Habronattus*, Salticidae; *Castianeira*, Corinnidae) are separated by multiple nodes lacking this mechanism, we treat them as independent developments. The remaining stridulatory organs in the Salticidae are strongly divergent from any other member of the Dionycha part B clade (Table 2), and are treated here as having evolved independently.

(*iii*) Opiliones

Dyspnoi

At least four distinct mechanisms can be found in the families Ischyropsalididae and Nemastomatidae (Table 2). Since they involve different body parts, appendages, and segments, we treat them as independent developments.

A stridulitrum on pedipalpal femur–plectrum on cheliceral segment 1 mechanism in *Ceratolasma* (Ischyropsalididae; Gruber, 1978) and certain Cosmetidae (Townsend *et al.*, 2019) and Epedanidae (Šilhavý, 1978) are treated as independent developments, as the latter families are deeply nested within Laniatores (Fernández *et al.*, 2017), and are thus very distantly related.

Laniatores

The abovementioned pedipalpal femur–plectrum on cheliceral segment 1 mechanism is shared between the families Cosmetidae and Epedanidae, which are distantly related and separated by multiple nodes of species lacking this trait (Fernández *et al.*, 2017), and is therefore interpreted as independently evolved.

A chelicera–chelicera mechanism is known from certain Guasiniidae (Pinto-da-Rocha & Kury, 2003), Stygnopsidae (*Panzosus*) (Gruber, 1976; Martens, 1978), Travuniidae (Martens, 1978) and Triaenonychidae (Lawrence, 1937) (Table 2). Although the last two families are closely related, since the stridulatory mechanism is on a different cheliceral segment, we treat it as having evolved twice. Although no recent phylogeny of Guasiniidae is available, they are reportedly close to Zalmoxidae (Pinto-da-Rocha & Kury, 2003), which is distantly related to Stygnopsidae, Travuniidae and Triaenonychidae (Fernández *et al.*, 2017). Therefore, all these chelicera–chelicera mechanisms likely represent independent developments.

Certain members of the families Phalangodidae and Zalmoxidae possess a stridulitrum on ocularium–plectrum on tibia of leg 3 mechanism (Šilhavý, 1978) (Table 2), which due to their very distant relationship (more than eight consecutive nodes/outgroups lacking this trait; Fernández *et al.*, 2017), is interpreted as having evolved twice.

(*iv*) Scorpiones

Bothriuridae

Two genera of bothriurids possess a tergum–tergum mechanism (Ochoa & Ojanguren Affilastro, 2007; Acosta & Maury, 1990) that has so far not been found in any other family of scorpions (Table 2), and thus is interpreted as having evolved once.

Buthidae

This family possesses at least two highly distinct types of stridulatory mechanisms (Alexander, 1957*a*; Esposito *et al.*, 2018; Lourenço & Cloudsley-Thompson, 1995) (Table 2), which have not been found in any other scorpion lineage and have therefore evolved twice.

Diplocentridae and Scorpionidae

Within Scorpionidae, the genus *Opisthophthalmus* possesses two distinct stridulatory mechanisms (Alexander, 1957*a*) that are found nowhere else among the Scorpiones (Table 2) and are therefore treated as distinct.

A group of related genera in the family Scorpionidae (*Heterometrus*, *Pandinus*, *Scorpio*) (Alexander, 1957*a*, 1958; Acosta & Maury, 1990) and Diplocentridae (*Oiclus*) (Acosta & Maury, 1990) possess very similar stridulatory mechanisms on the coxa of the leg 1–coxa of the pedipalp (Table 2). The stridulatory structures on these body parts may differ (e.g. stiff setae *versus* denticles), although the segments involved are the same. However, the locations of the stridulatory structures on these segments are not the same, and the behavioural contexts in which they evolved are also thought to differ, leading previous authors to suggest that they evolved independently (Alexander, 1958).

Based on the above, we find that the number of times these organs have evolved is equivocal (Table 2).

(*v*) Solifugae

The chelicera–chelicera mechanism is nearly ubiquitous in the Solifugae, but is not found in related orders, and is therefore interpreted as having evolved once (Hrušková-Martišová *et al.*, 2008; Stidham, 2020).

(*b*) Myriapoda

(i) **Chilopoda**

The bending of the ultimate legs of some Scolopendridae (*Alipes*, *Rhysida*) (Kronmüller & Lewis, 2015) and Scutigeridae (Dumortier, 1963) can generate stridulatory sound (Table 2). Given that the Scolopendromorpha and Scutigeromorpha are not closely related (Miyazawa *et al.*, 2014), this mechanism is interpreted as having evolved twice.

(ii) **Diplopoda**

Most Arthrosphaeridae stridulate using a mechanism that is unique across Myriapoda (Wesener *et al.*, 2011; Moritz & Wesener, 2017) (Table 2) and has therefore evolved once.

(c) **Pancrustacea**

(i) **Eumalacostraca**

Peracarida (Amphipoda and Isopoda)

Stridulatory mechanisms are rare in the Peracarida, with only seven different types occurring in seven lineages (Table 2). Within Amphipoda, the families Aoridae, Melitidae, Photidae, and Talitridae with stridulatory mechanisms are very distantly related (Lowry & Myers, 2017) and possess completely different mechanisms (Table 2), and their convergence is readily established. Ischyroceridae and Photidae are more closely related (separated by three nodes lacking this trait) (Myers & Lowry, 2003), but their stridulatory mechanisms are clearly distinct, with the stridulitrum located on the coxal plate (Hiroyuki, 2009) and the coxa (Jung *et al.*, 2017) of gnathopod 2 respectively (Table 2), and are therefore non-homologous.

In Isopoda, the two stridulating families use distinct mechanisms (Table 2), clearly demonstrating that they represent independent developments.

Decapoda

Achelata, Astacidea, Dendrobranchiata and Gebiidea

Each of these groups contain lineages that are characterised by five entirely distinct types of stridulatory mechanisms (Table 2), which following our criteria of non-homology, have all evolved independently.

Anomura

At least three distinct types of stridulatory mechanisms exist in three families of the Anomura (Coenobitidae, Diogenidae, Pylochelidae) (Table 2), which involve different segments of the cheliped and the pereopod. Following our criterion of non-homology, all three of them likely evolved independently.

Brachyura

The stridulatory mechanisms in each of the following taxa belong to entirely different types that have no parallels elsewhere within Brachyura, and are readily recognised as independent developments: *Mursia* (Calappidae), Eriphiidae, certain *Ovalipes* (Portunidae), Potamonautidae, Pseudothelphusidae, *Dotilla* (Dotillidae), Ocypodidae (Table 2).

A stridulatory mechanism involving the cheliped striking against an infraorbital protuberance can be found in the Heterotremata [*Psopheticus* (Goneplacidae), Menippidae] and Thoracotremata [Varunidae, Macrophthalmidae, *Ilyoplax* (Dotillidae)] (Table 2). The cheliped–infraorbital protruberance mechanism is similar between the Mennipidae and Goneplacidae (Guinot-Dumortier & Dumortier, 1960) (Table 2), but given that they are very distantly related, separated by tens of nodes lacking this trait (Tsang *et al.*, 2014), we interpret that this mechanism evolved twice independently in the

Heterotremata. Within Thoracotremata, given that Macrophthalmidae and Varunidae possess an identical mechanism, and they are also sister groups (Tsang *et al.*, 2014), we tentatively suggest that the cheliped–infraorbital protruberance mechanism evolved at least once. In *Ilyoplax* (Dotillidae), the stridulitrum is on a different cheliped segment, the carpus (Guinot-Dumortier & Dumortier, 1960) (Table 2), and it is therefore non-homologous with the corresponding mechanism of other thoracotrematans.

Another stridulatory mechanism that is common in the Brachyura involves the cheliped striking against the pterygostomial region, and this is found in the Heterotremata [Calappidae (part), Goneplacidae (part), Euryplacidae, Portunidae (part), Pseudoziidae] and Thoracotremata (Gecarcinidae) (Table 2). The cheliped–pterygostomial mechanism involves different segments of the cheliped and is therefore not homologous between the Calappidae (plectrum on cheliped manus) (Schmitz, 2002), part of the Goneplacidae (plectrum on cheliped dactyl) (Guinot-Dumortier & Dumortier, 1960), the Pseudoziidae (plectrum on cheliped carpus) (Guinot-Dumortier & Dumortier, 1960), and the Gecarcinidae (plectrum on cheliped propodus) (Lawrence *et al.*, 1973) (Table 2). Based on the above, we suggest that this mechanism has evolved independently in each of these families. The plectrum of the cheliped–pterygostomial mechanism is located on the same segment (cheliped merus) only in the Euryplacidae, part of the Portunidae (certain *Ovalipes*), and part of the Goneplacidae (*Ommatocarcinus*) (Guinot-Dumortier & Dumortier, 1960) (Table 2). However, given that these three families are very distantly related, separated by tens of non-stridulating nodes (Tsang *et al.*, 2014), we interpret that this stridulatory mechanism evolved three times independently.

(*ii*) Hexapoda – Insecta

Palaeoptera

The only stridulatory mechanism we are aware of in the Palaeoptera is recorded from the larva of *Epiophlebia* (Odonata: Epiophlebidae) (Aiken, 1985; Carle, 2012), and has no homologue with any other mechanism among the insects we have examined in this study.

Neoptera

Dictyoptera

Blattaria

All stridulatory mechanisms found among cockroaches belong to distinct types, and consequently, they are interpreted as being non-homologous. The sole exception is the wing–pronotal mechanism that can be found in the Oxyhaloinae and Panchlorinae (Table 2): the mechanism is identical, and both subfamilies are separated from each other by three non-stridulating nodes (Evangelista *et al.*, 2021). We therefore tentatively treat the evolution of this mechanism as equivocal: there is an equal chance that it may or may not have evolved independently.

The mechanisms responsible for the production of stridulatory signals in *Aptera fusca* (Blaberidae: Epilamprinae) and *Archiblatta* (Blattidae) are unknown (Roth & Hartman, 1967). The proposed mechanisms make sense morphologically (Table 2), but we treat them as ambiguous in the absence of experimental confirmation and detailed ultrastructural data.

Mantodea

A tegminal–metafemur stridulatory mechanism can be found in the Empusidae and certain Mantidae (*Hierodula*, *Sphodropoda*) (Ramsay, 1990; Wood-Mason, 1878). A tegminal–abdomen mechanism is also known in several Mantidae (Hill, 2007; Ramsay, 1990), while a hindwing–abdomen mechanism has been found in the Hymenopodidae (*Pseudocreobotra*).

The evolutionary origins of both of these mechanisms are uncertain, as the phylogenetic relationships between these families are ambiguous. A systematic study included the tegminal plectrum (without its corresponding abdominal/femoral component) in a phylogenetic analysis, and it was recovered as having evolved once (Wieland, 2013). However, Wieland (2013) noted that the results should be interpreted with caution, as these two stridulatory mechanisms have a very uneven phylogenetic distribution, being both present and absent in different species of the same genus (implying either multiple losses or multiple gains). We cautiously interpret the tegminal–metafemur and the tegminal–abdomen stridulatory mechanisms to have evolved once each.

A mechanism involving a stridulitrum on the lateral margin of pronotum–plectrum on the fore femur can be found in *Choeradodis* (Mantidae) (Ramsay, 1990; Wieland, 2013) and has no counterpart in the Mantodea nor the Dictyoptera as a whole (Table 2), and is therefore interpreted as having evolved once. A wing stridulatory mechanism in *Hestiasula* (Hymenopodidae) is treated as ambiguous, as its opposable counterpart has remained unknown.

Hemiptera (non-Heteroptera)

Outside Heteroptera, stridulatory mechanisms are rare in the Hemiptera. In the Psylloidea, acoustic signals are thought to be generated by an axillary plectrum striking against a stridulitrum on the mesothorax (Liao *et al.*, 2019, 2022). However, as the precise mechanism remains to be identified (Liao *et al.*, 2019), and acoustic signalling appears to be nearly ubiquitous in Psylloidea, we conservatively treat their likely stridulatory mechanism as having evolved once (Table 2).

The cicadas have evolved several stridulatory mechanisms. The genital stridulatory mechanism in *Carineta*, the pronotal collar stridulitrum–axillary plectrum of *Cyclochila*, the fore wing–hind wing mechanism of *Maroboduus*, and the wing–scutellar mechanism of *Moana*, all are distinct species- or genus-specific mechanisms (Table 2), and are interpreted as having evolved once each. The fore wing–mesonotal mechanism is present in Tibicininae and certain tribes of Cicadinae (e.g. Zammarini), which are separated by multiple nodes of non-stridulating taxa (Marshall *et al.*, 2018; Moulds, 2005), suggesting that they have evolved at least twice independently (Table 2; M.S. Moulds, personal communication).

A supposed stridulatory structure on the hind wings of planthoppers in the family Derbidae has been recently reinterpreted as a chemosecretory or wax-producing organ (Davranoglou *et al.*, 2019*b*).

Orthoptera

Caelifera:

Acridoidea

A tegmen–wing mechanism is present in the Romaleidae, Pamphagodidae and Pamphagidae (Table 2). We interpret that this mechanism arose twice independently: once in the common ancestor of Pamphagidae–Pamphagodidae, as they are sister groups (Song *et al.*, 2020), and once in the Romaleidae, which are very distantly related to the latter two families (Song *et al.*, 2020).

The tegmen–metafemur mechanism that defines many Acridoidea, was recovered as having evolved twice in a phylogenomic study (Song *et al.*, 2020): once in the Acrididae, and once in the Ommexechidae. This result should be treated as tentative, as there are at least two distinct morphological types of this mechanism in the Acrididae (Table 2). Similarly, the Krauss organ that can be found in the majority of Pamphagidae (Table 2), was recovered as having evolved once by the same study (Song *et al.*, 2020).

The following mechanisms are very characteristic of certain lineages and fall into distinct types, and are therefore interpreted as having evolved once each (Table 2): (1) tegmen–mesotibia [Euryparyphini

(Pamphagidae)]; (2) abdomen–metatibia [once in Egnatiinae (Acrididae)]; (3) abdomen–metafemur [once in Gomphocerinae (Acrididae)]; (4) hind wing–mesotibia [once in Akicerinae (Pamphagidae)]; (5) metanotum–basalar sclerite (certain Pamphagidae)

A tegmen–metatibia mechanism is found in certain Acrididae and in Porthetinae (Pamphagidae) (Table 2). As the two families are separated by a large number of nodes of non-stridulating lineages (Song *et al.*, 2020), we interpret that this mechanism evolved once independently in each of the two families.

Pneumoroidea–Tanaoceroidea–Trigonopterygoidea

These three superfamilies are defined by a stridulitrum on third tergum–plectrum on metafemur mechanism (Table 2), which a phylogenomic study (Song *et al.*, 2020) recovered as having evolved once in their common ancestor.

Tridactyloidea

A tegmino–abdominal and mandibulo-maxillary mechanism in the Tridactylidae and Cylindrachetidae respectively (Table 2), were each recovered as having evolved once independently by a phylogenomic study (Song *et al.*, 2020). Note that the mechanism of the Tridactylidae was erroneously mentioned as tegmino-alary in the latter study (Song *et al.*, 2020).

Ensifera

A phylogenomic study recovered the abdomen–femur mechanism to have evolved once in the common ancestor of Stenopelmatoidea (Anostomatidae, Gryllacrididae, Stenopelmatidae) and Schizodactyloidea (Schizodactylidae) (Song *et al.*, 2020). We also found an abdomen–femur mechanism in Conocephalinae (Tettigoniidae) (Table 2) not mentioned in the aforementioned study. Due to the great evolutionary distance between Conocephalinae and the Stenopelmatoidea–Schizodactyloidea clade (Song *et al.*, 2020), we interpret the abdomen–femur mechanism as having evolved once independently in each of these two lineages.

The tegmino–tegminal mechanism is a defining feature of the Ensifera as a whole. There is conflicting evidence as to the number of times this mechanism evolved. A phylogenomic study suggests it arose once (Song *et al.*, 2020), while a detailed morphological study suggested it evolved four times (Desutter-Grandcolas *et al.*, 2017). Taking both of these studies into consideration, we interpret the tegmino–tegminal mechanism as having evolved between one and four times.

The remaining stridulatory mechanisms in the Ensifera belong to highly distinct types (Table 2), and are therefore interpreted here as having evolved independently.

Phasmatodea

There are three highly distinct stridulatory types in the Phasmatodea (Table 2), which we interpret as having evolved three times independently.

(*iii*) Stomatopoda

An uropod–telson mechanism has been found in the Squillidae and Nannosquillidae (Table 2). However, as these families are distantly related (separated by at least four non-stridulating nodes) (Van Der Wal *et al.*, 2017), we interpret this mechanism as having evolved at least twice in the Stomatopoda.

(*iv*) Sessilia

A mechanism that has no parallel among Crustacea is known from certain species of *Balanus* (Table 2), and we interpret it as having evolved at least once.

Table S1. Taxonomic diversity of Heteroptera and percentage of stridulating species per infraorder. Approximate species number of each family is provided in parentheses. Henry (2009) and Schuh & Weirauch (2020) were the primary references for the estimation of species diversity in all heteropteran families.

Infraorder	**Stridulating taxa**	**Key reference(s)**
Dipsocoromorpha		
All families (337)	0	
Total species number: 337	**Total stridulating species: 0 (0%)**	
Enicocephalomorpha		
Aenictopecheidae (21)	0	Štys & Baňař (2013)
Enicocephalidae (410)	3	Štys & Baňař (2007)
Total species number: 431	**Total stridulating species: 3 (0.69 %)**	
Gerromorpha		
Hebridae (221)	0	Kment *et al.* (2016)
Paraphrynoveliidae (2)	0	Schuh & Weirauch (2020)
Macroveliidae (3)	0	Schuh & Weirauch (2020)
Mesoveliidae (46)	0	
Hydrometridae (126)	0	
Hermatobadatidae (9)	0	Schuh & Weirauch (2020)
Veliidae (>960)	14	Burguez Floriano *et al.* (2017); Zettel (1996)
Gerridae (>750)	9	Polhemus (1994); Zettel & Thirumalai (2000)
Total species number: 2,117	**Total stridulating species: 23 (1.08%)**	
Nepomorpha		
Belostomatidae (160)	0	Polhemus & Polhemus (2008)
Nepidae (>270)	4	Polhemus (1994)
Gelastocoridae (111)	87	Cassis & Silveira (2001, 2002); Polhemus & Lindskog (1994)
Ochteridae (70)	0	
Corixidae (>450)	> 100	Chen *et al*. (2005); Jansson (1972)
Diaprepocoridae (8)	0	Schuh & Weirauch (2020)
Micronectidae (>200)	200	Tinerella (2013)
Potamocoridae (11)	0	Herrera & Springer (2014)
Naucoridae (391)	73	Nieser *et al.* (2013); Polhemus (1994)
Aphelocheiridae (104)	0	Millán *et al.* (2016); Tran & Nguyen (2016)
Notonectidae (400)	> 200	Chen *et al*. (2005); Padilla-Gil (2003); Polhemus (1994); Polhemus & Polhemus (2008)
Pleidae (38)	1	Polhemus (1994); Polhemus & Polhemus (2008)
Helotrephidae (185)	>10	Polhemus (1994); Zettel (2012); Zetel *et al*. (2011)
Total species number: 2,398	**Total stridulating species: ≥ 675 (28.15%)**	
Leptopodomorpha		
Leptopodidae (39)	32	Pericart & Polhemus (1990); Polhemus & Polhemus (2008)

Saldidae (335)	20	Polhemus & Polhemus (2008); Polhemus (1985)
Omaniidae (6)	0	Polhemus & Polhemus (2008)
Aepophilidae (1)	0	Polhemus & Polhemus (2008)
Total species number: 381	**Total stridulating species: 52 (13.64%)**	
Cimicomorpha		
Pachynomidae (21)	0	Schuh *et al.* (2015*a*)
Reduviidae (6,878)	6,864	Cai *et al.* (1994)
Velocipedidae (25)	0	
Microphysidae (25)	0	
Joppeicidae (1)	0	
Curaliidae (1)	0	
Thaumastocoridae (19)	0	
Miridae (>10,400)	>140	Schuh (1974, 1984); Yasunaga *et al.* (2019)
Tingidae (2,124)	1	Gogala (1984)
Medocostidae (1)	0	
Nabidae (386)	0	
Lasiochilidae (62)	13	Carpintero (2014)
Plokiophilidae (20)	0	Schuh *et al.* (2015*b*)
Lyctocoridae (27)	0	
Anthocoridae (>445)	8	Carpintero & Dellapé (2012)
Cimicidae (110)	0	
Polyctenidae (32)	0	
Total species number: 20,577	**Total stridulating species: 7,026 (34.15%)**	
Pentatomomorpha		
Aradoidea		
Aradidae (>1,930)	>53	Kormilev (1971); Usinger & Matsuda (1959)
Termitaphidiidae (9)	0	
Total species number: 1,939	**Total stridulating species: 53 (2.73 %)**	
Pentatomoidea		
Acanthosomatidae (184)	0	
Aphylidae (3)	0	
Canopidae (8)	8	Grazia *et al.* (2008)
Cydnidae (765)	761	Lis & Heyna (2001)
Dinidoridae (82)	0	
Lestoniidae (2)	0	
Megaridiidae (16)	0	
Pentatomidae (4,700)	>66	Leston (1957); Schuh & Weirauch (2020)
Phloeidae (3)	0	
Plataspididae (560)	0	
Scutelleridae (450) (Henry, 2009)	>155	Carapezza (2009); Leston (1957); Wu *et al.* (2017)
Tessaratomidae (240)	180	Grazia *et al.* (2008)
Thaumastellidae (3)	3	Jacobs (1989)
Urostylididae (170)	80	Grazia *et al.* (2008)
Saileriolidae (3)	0	Schuh & Weirauch (2020)
Total species number: 7,189	**Total stridulating species: 1,253 (17.43%)**	
Lygaeoidea		

Berytidae (175)	0	Schuh & Weirauch (2020)
Colobathristidae (96)	6	Coscarón & Dellapé (2003); Schuh & Weirauch (2020)
Blissidae (435)	1	Ashlock & Lattin (1963)
Lygaeidae (968)	59	Ashlock & Lattin (1963); Dellapé (2019)
Rhyparochromidae (1,850)	>210	Dellapé (2019)
Artheneidae (20)	0	
Geocoridae (274)	17	Ashlock & Lattin (1963); Dellapé (2019)
Meschiidae (5)	0	Malipatil (2014)
Cryptorhamphidae (4)	0	
Heterogastridae (105)	0	
Ninidae (13)	0	
Oxycarenidae (147)	0	
Pachygrontidae (78)	0	
Cymidae (76)	0	
Malcidae (29)	0	
Piesmatidae (44)	8	Leston (1957); Jorigtoo *et al.* (1998)
Total species number: 4,319	**Total stridulating species: 301 (6.97%)**	
Idiostoloidea		
Idiostolidae (5)	0	
Henicocoridae (5)	0	
Total species number: 10	**Total stridulating species: 0 (0%)**	
Pyrrhocoroidea		
Largidae (130)	42	Lattin (1958); Stehlík (2005); Stehlík & Jindra (2006); Stehlík & Brailovsky (2016)
Pyrrhocoridae (340)	5	Stehlík (2005); Stehlík & Jindra (2006)
Total species number: 470	**Total stridulating species: 47 (10.00%)**	
Coreoidea		
Alydidae (254)	7	Numata *et al.* (1989); Moulet (1991); Schaefer *et al.* (2015)
Coreidae (1,884)	54	CoreoideaSFTeam (2019); Moulet (1991); Schaefer (1962)
Hyocephalidae (3)	0	
Rhopalidae (209)	1	Zych *et al.* (2012)
Stenocephalidae (30)	0	Schuh & Weirauch (2020)
Total species number: 2,380	**Total stridulating species: 62 (2.60%)**	
Heteroptera total species number: 42,548	**Heteroptera total stridulating species number: ≥9,493 (22.31%)**	

Table S2. List of types of stridulatory mechanisms in Heteroptera. [A] denotes structures whose function as stridulatory mechanisms is ambiguous or doubtful. Note that each stridulatory type can be further divided into subtypes, which are included in column 3, and correspond to the codes used in Fig. 4. For example, an abdominal stridulitrum–leg plectrum mechanism can be subdivided into additional types, depending on the abdominal segment used, and whether the plectrum is on the coxa, trochanter, femur, or tibia of the fore, mid or hind legs.

Stridulatory types in Heteroptera	**Taxonomic distribution**	**Subtype codes from Fig. 4**
Abdomen–leg	Widespread in Gerromorpha, Nepomorpha, Cimicomorpha, and Pentatomomorpha	Jop; Jopqr; Jqrs; Kno; Knop; Ko; Kop; Kp; Lop; Lnopqr; ?no; ?n; ?o
Abdomen–paramere mechanism	Nepomorpha: Micronectidae	Pu
Proctiger–sternite 9 mechanism	Nepomorpha: Gelastocoridae	Ov
Pygophore–conjunctiva mechanism	Pentatomomorpha: Scutelleridae: Sphaerocorini	QW
Stridulatory tergal plate	Widespread in Leptopodomorpha and Pentatomomorpha	Ml; Mm
Tergite–tergite mechanism[A]	Nepomorpha: Naucoridae: *Ilyocoris*	Nt
Wing edge–leg mechanism	Widespread in Nepomorpha, Leptopodomorpha, Cimicomorpha, and Pentatomomorpha	IKid; Ji; Ki
Wing edge–abdomen mechanism[A]	Cimicomorpha: Tingidae	Gn
Wing edge–pronotum mechanism	Pentatomomorpha: Coreidae	Gg
Head (infraocular region) –leg mechanism	Pentatomomorpha: Colobathristidae; Geocoridae	Bb
Head (maxillary plate)–leg mechanism	Nepomorpha: Corixidae	B*b*
Labium–leg mechanism	Nepomorpha: Notonectidae	Aa
Labium–prosternum mechanism	Cimicomorpha: Reduviidae	Cc
Coxa–prosternum mechanism[A]	Enicocephalomorpha	Ec
Leg–leg mechanism	Nepomorpha: Notonectidae; Cimicomorpha: Anthocoridae[A], Lasiochilidae[A]; Pentatomomorpha (Largidae: *Physopelta*[A])	Be; De

Mesepisternum–prosternum mechanism^A	Nepomorpha: Helotrephidae; Pleidae	Fh
Wing base–cephalonotum mechanism^A	Nepomorpha: Helotrephidae: Limnotrephini	Gh
Metapleuron–leg mechanism	Pentatomomorpha: Aradidae (*Aradacanthia*)	Kk
Propleuron–leg mechanism	Pentatomomorpha: Rhyparochromidae: Pllinthisinae (*Plinthisus*); Myodochini (*Pseudocnemodus)*	Bd
Acetabulum–leg mechanism	Gerromorpha: Gerridae: Trepobatinae; Nepomorpha: Nepidae	Ef; Lj

Table S3. Number of times each type of stridulatory mechanism has evolved independently in Heteroptera. The category 'Other' includes all stridulatory mechanisms that do not belong to the first three categories. We based our calculations on the minimum and the maximum estimates of parallel evolution of stridulatory mechanisms. The percentage given in parentheses indicates the fraction of the total events of independent stridulatory organ evolution accounted for by each particular stridulatory type.

Stridulatory mechanism	**Times evolved (minimum)**	**Times evolved (maximum)**
STP (stridulatory tergal plate)	12 (14.28%)	12 (12.90%)
Wing edge–leg	22 (26.19%)	24 (25.80%)
Abdomen–leg	35 (41.66%)	35 (37.63%)
Other	15 (17.85%)	22 (23.65%)

Table S4. Habitat occupancy of stridulating Heteroptera. Habitat descriptions only concern adults of the stridulating taxa of Table 1 and do not represent the entire suite of habitat preferences of the relevant families, subfamilies or tribes. Habitat associations are from Schuh & Weirauch (2020) unless stated otherwise.

Stridulating taxon	**Habitat type**	**Key reference(s)**
Enicocephalomorpha		
Enicocephalidae	Ground	
Gerromorpha		
All families	Water surface	Polhemus (1990*b*)
Nepomorpha		
All families other than Gelastocoridae and Ochteridae	Aquatic	
Gelastocoridae	Ground	
Leptopodomorpha		
All families	Ground	Polhemus (1985)
Cimicomorpha		

Anthocoridae	Ground, bark, plants	
Lasiochilidae	Ground, bark, plants	
Miridae		
Cylapinae (*Euchilofulvius*; *Samoafulvius*)	Bark	
Deraecorinae (*Obudua*)	Plants	Akingbohungbe (1979)
Orthotylinae (*Renodaeus* and allied genera)	Plants	Henry (2015)
Phylinae (Hallodapini; Leucophoropterini)	Plants	Menard & Schuh (2011)
Reduviidae	Bark, ground	Hwang & Weirauch (2012)
Tingidae	Plants	
Pentatomomorpha		
Aradidae	Bark	Usinger & Matsuda (1959)
Alydidae	Plants	
Rhopalidae	Plants	
Coreidae		
Phyllomorphini; Prionotylini	Ground	Moulet (1995)
Acanthocerini; Coreini; Gonocerini	Plants	
Largidae		
Larginae (*Arrhaphe*)	Ground	Stehlík & Brailovsky (2016)
Physopeltinae (*Delacampius*; *Physopelta*)	Plants, ground	Rédei *et al*. (2009)
Pyrrhocoridae	Ground	
Blissidae	Plants	
Colobathristidae	Plants	
Geocoridae		
Pamphantinae	Plants	Henry (2013)
Lygaeidae		
Orsillinae (Metrargini)	Ground	Malipatil (1979)
Ischnorrhynchinae	Plants	
Piesmatidae	Plants	
Rhyparochromidae	Ground	
Canopidae	Bark	
Cydnidae	Ground	
Pentatomidae		
(Mecideini; Diemeniini)	Plants	L.R. Davranoglou, personal observation
Discocephalinae		
Scutelleridae	Plants	
Tessaratomidae	Plants	
Thaumastellidae	Ground	Jacobs (1989)
Urostylididae	Plants	

Table S5. (see separate file: Table S5.xlsx) Behavioural context of stridulation-based vibroacoustic signals in Heteroptera, with percentages of the total incidence of each behaviour in all groups examined. Only structures whose function as stridulatory organs is reasonably certain are included here (i.e. ambiguous groups are excluded).

Table S6. (see separate file: Table S6.xlsx) Behavioural context of stridulation-based vibroacoustic signals in selected arthropod groups (Arachnida, Myriapoda, and selected Pancrustacea), with percentages of the total incidence of each behaviour in all groups examined.

REFERENCES

Acosta, L.E. & Maury, Y.E.A. (1990) Estridulación en *Timogenes elegans* (Mello-Leitão) (Scorpiones, Bothriuridae). *Boletin de la Sociedad de Biología de Concepción* **61**, 29–37.

Adams, R.J. (2014). *Field Guide to the Spiders of California and the Pacific Coast States*. Berkeley, University of California Press, 456 pp.

Agnarsson, I. (2004) Morphological phylogeny of cobweb spiders and their relatives (Araneae, Araneoidea, Theridiidae). *Zoological Journal of the Linnean Society* **141**, 447–626.

Aiken, R.B. (1985) Sound production by aquatic insects. *Biological Reviews* **65**(2), 163–211.

Akingbohungbe, A.E. (1979) A new genus and four new species of Hyaliodinae (Heteroptera: Miridae) from Africa with comments on the status of the subfamily. *Revue de Zoologie Africaine* **93**(2), 500–522.

Alexander, A.J. (1957*a*) On the stridulation of scorpions. *Behaviour* **12**(4), 339–352.

Alexander, A.J. (1958) A note on the evolution of stridulation within the family Scorpionidae. *Proceedings of the Zoological Society of London* **133**(3), 391–399.

Alexander, A.J. & van Staaden, M. (1989) Alternative sexual tactics in male bladder grasshoppers (Orthoptera, Pneumoridae). *Alternative Life-History Styles of Animals*, 261–277.

Alexander, R.D. (1961) Aggressiveness, territoriality, and sexual behavior in field crickets (Orthoptera: Gryllidae). *Behaviour* **17** (2–3), 130–223.

Almeida-Silva, L.M., Brescovit, A.D. & Dias, S.C. (2009) A new species of *Goeldia* (araneae: Titanoecidae) with notes on its natural history. *Zoologia*, **26**(2), 363–368.

Almeida-Silva, L.M., Griswold, C.E. & Brescovit, A.D. (2010) Revision of the Asian spider genus *Pandava* Lehtinen (Araneae: Titanoecidae): description of five new species and first record of Titanoecidae from Africa. *Zootaxa* **56**(2630**)**, 30–56.

Álvarez-Padilla, F. & Hormiga, G. (2011) Morphological and phylogenetic atlas of the orb-weaving spider family Tetragnathidae (Araneae: Araneoidea). *Zoological Journal of the Linnean Society* **162**(4), 713–879.

Andersen, N.M. (1981) A new genus of Veliinae and descriptions of new Oriental species of the subfamily (Hemiptera: Veliidae). *Entomologica Scandinavica* **12**, 339–356.

Andersen, N.M. (1982) The semiaquatic bugs. *Entomonograph* **3**, 1–455.

Ashlock, P.D. & Lattin, J.D. (1963) Stridulatory mechanisms in the Lygaeidae, with a new american genus of Orsillinae (Hemiptera: Heteroptera). *Annals of the Entomological Society of America* **56**(5), 693–703.

Ashlock, P.D. & Slater, J.A. (1982) A review of the genera of Western Hemisphere Ozophorini with two new genera from Central America (Hemiptera-Heteroptera: Lygaeidae). *Journal of the Kansas Entomological Society* **55**(4), 737–750.

Azman, B.A.R., Wongkamhaeng, K. & Dumrongrojwattana, P. (2014) Description of *Floresorchestia samroiyodensis*, a new species of landhopper (Crustacea, Amphipoda, Talitridae) from Thailand. *Zoosystematics and Evolution* **90**(1), 7–19.

Baňař, P. & Štys , P. (2006) A new species of *Pseudohenschiella* (Heteroptera: Enicocephalidae) from Madagascar. *Acta Entomologica Musei Nationalis Pragae* **46**, 7–14.

Baptista, R.L.C., González, A.P. & Tourinho, A.L. (2008) *Ochyrocera ibitipoca* (Araneae: Ochyroceratidae), a new spider species from Brazilian caves. *Studies on Neotropical Fauna and Environment* **43**(3), 243–246.

Barber, S.B. (1971) Ultrastructure of a fast, synchronous muscle in water bugs. *American Zoology* **2**, 673–674.

Barrales-Alcalá, D., Francke, O.F. & Prendini, L. (2018) Systematic revision of the giant vinegaroons of the *Mastigoproctus giganteus* complex (Thelyphonida: Thelyphonidae) of North America. *Bulletin of the American Museum of Natural History* **418**, 1–62 .

Benediktov, A.A. (2007) Tremulation of firebugs *Pyrrhocoris apterus* L. (Heteroptera, Pyrrhocoridae). *Moscow University Biological Sciences Bulletin* **62**, 186–187.

Bertani, R., Fukushima, C.S. & Da Silva, P.I. (2008) Two new species of *Pamphobeteus* Pocock 1901 (araneae: Mygalomorphae: Theraphosidae) from Brazil, with a new type of stridulatory organ. *Zootaxa* **1901**(1826), 45–58.

Binford, G.J., Callahan, M.S., Bodner, M.R., Rynerson, M.R., Núñez, P.B., Ellison, C.E. & Duncan, R.P. (2008) Phylogenetic relationships of *Loxosceles* and *Sicarius* spiders are consistent with Western Gondwanan vicariance. *Molecular Phylogenetics and Evolution* **49**(2), 538–553.

Boon, P.Y., Yeo, D.C.J. & Todd, P.A. (2009). Sound production and reception in mangrove crabs *Perisesarma* spp. (Brachyura: Sesarmidae). *Aquatic Biology* **5**(2), 107–116.

Bosmans, R.J.R. (1982) A new *Hahnia* from Ivory Coast with a note on stridulating organs in the Hahniidae (Araneida). *Bulletin of the British Arachnological Society* **5**(7), 319–323.

Boulard, M. (1976) Un type nouveau d'appareil stridulant accessoire pour les cicadoidea révision de la classification supérieure de la superfamille [Hom.]. *Journal of Natural History* **10**(4), 399–407.

Boulard, M. (1986) Une singulière évolution morphologique: celle d'un appareil stridulant sur les genitalia des males de *Carineta*. Description de cinq espèces nouvelles (Hom. Tibicinidae). *Annales de la societe entomologique de France* **22**(2), 191–204.

Bouwma, P.E. & Herrnkind, W.F. (2009) Sound production in Caribbean spiny lobster *Panulirus argus* and its role in escape during predatory attack by *Octopus briareus*. *New Zealand Journal of Marine and Freshwater Research* **43**(1), 3–13.

Bresseel, J. & Constant, J. (2015) The new genus of stick insect *Lobofemora* from Vietnam, with the description of three new species (Phasmida: Phasmatidae: Clitumnini). *European Journal of Taxonomy* **2015**(115), 1–25.

Brignoli, P.M. (1977) Two new spiders from Sumatra (Aranae, Telemidae and Ochyroceratidae). *Zoologische Mededelingen* **50**, 221–229.

Burguez Floriano, C.F., Figueiredo Moreira, F.F. & Conceição Bispo, P. Da. (2017) South American species of *Stridulivelia* (Hemiptera: Heteroptera: Veliidae): identification key, diagnoses, illustrations, and updated distribution. *Proceedings of the Entomological Society of Washington* **119**(1), 24–46.

Burtt, E. (1946) Observations on East African Pamphaginae (Orthoptera: Acrididae) with particular reference to stridulation. *Proceedings of the Royal Entomological Society of London A*, **21**, 51–54.

Buscaino, G., Gavio, A., Galvan, D., Filiciotto, F., Maccarrone, V., Vincenzi, G. De, Mazzola, S. & Orensanz, J.M. (2015) Acoustic signals and behaviour of *Ovalipes trimaculatus* in the context of reproduction. *Aquatic Biology* **24**(1), 61–73.

Cai, W., Chou, Y. & Lu, J. (1994) The morphology, postembryonic development and evolution of stridulitra in Reduviidae with special reference to their taxonomic importance (Heteroptera: Reduvioidea). *Entomologia Sinica* **1**, 1–16.

Carapezza, A. (2009) On some Old World Scutelleridae (Heteroptera). *La Nouvelle Revue d'Entomologie* **25**, 197–212.

Carbonell, C.S. (2007) The genus *Zoniopoda* Stål 1873 (Acridoidea, Romaleidae, Romaleinae). *Journal of Orthoptera Research* **16**(1), 1–33.

Carle, F.L. (2012) A new *Epiophlebia* (Odonata: Epiophlebioidea) from China with a review of epiophlebian taxonomy, life history, and biogeography. *Arthropod Systematics and Phylogeny* **70**(2), 75–83.

Carpintero, D.L. (2014) Western hemisphere Lasiochilinae (Hemiptera: Heteroptera: Anthocoridae) with comments on some extralimital species and some considerations on suprageneric relationships. *Zootaxa* **3871**(1), 1–87.

Carpintero, D.L. & Dellapé, P.M. (2012) Neotropical Scolopini (Hemiptera: Heteroptera: Anthocoridae): new taxa, diagnostic characters and a key to the genera of the tribe. *Acta Entomologica Musei Nationalis Pragae* **52**(1), 49–66.

Cassis, G. & Silveira, R. (2001) A revision and phylogenetic analysis of the *Nerthra alaticollis* species-group (Heteroptera: Gelastocoridae: Nerthrinae). *Journal of the New York Entomological Society* **109**(1), 1–46.

Cassis, G. & Silveira, R. (2002) A revision and phylogenetic analysis of the *Nerthra elongata* species-group (Heteroptera: Gelastocoridae: Nerthrinae). *Journal of the New York Entomological Society* **110**(2), 143–181.

Cervantes-Peredo, L. (2002) Description, biology, and maternal care of *Pachycoris klugii* (Heteroptera: Scutelleridae). *Florida Entomologist* **85**(3), 464–473.

Chen, P.-P., Nieser, N. & Zettel, H. (2005) *Fauna Malesiana 5: The aquatic and semi-aquatic bugs (Heteroptera: Nepomorpha & Gerromorpha) of Malesia*. Leiden, Brill, 556 pp.

China, W.E. (1946) New Cryptostemmatidae (Hemiptera) from Trinidad, British West Indies. *Proceedings of the Royal Entomological Society of London, Series B, Taxonomy* **15**, 148–154.

Cividini, S. & Montesanto, G. (2018) Aggregative behavior and intraspecific communication mediated by substrate-borne vibrations in terrestrial arthropods: An exploratory study in two species of woodlice. *Behavioural Processes*, **157**, 422–430.

Cloudsley-Thompson, J.L. (1961*a*) A new sound-producing mechanism in centipedes. *Entomologist's Monthly Magazine* **96**, 110–113.

Cocroft, R.B. (2001) Vibrational communication and the ecology of group-living herbivorous insects. *American Zoologist* **41**(5), 1215–1221.

Colmenares, P.A. & Tourinho, A.L. (2016) First Amazonian species of *Maracaynatum*, with comments on the genus (Opiliones: Laniatores: Samoidae). *Zootaxa* **4193**(3), 565–572.

Cokendolpher, J.C. & Sites, R.W. (1988) A new species of eyed Schizomus (Schizomida: Schizomidae) from Java. *Acta Arachnologica* **36**(2), 79–85.

Constantinou, C. & Cloudsley-Thompson, J.L. (1984) Stridulatory structures in scorpions of the families Scorpionidae and Diplocentridae. *Journal of Arid Environments* **7**(4), 359–364.

CoreoideaSFTeam (2019) Coreoidea Species File Online. Version 5.0/5.0. http://coreoidea.speciesfile.org [accessed on 2019-07-07].

Coscarón, M.D.E.L.C. & Dellapé, P.M. (2003) A new species of *Trichocenthrus* from Ecuador (Heteroptera: Colo-bathristidae), with a key to the species of the genus. *Zootaxa* **213**, 1–8.

Cramer, K.L. (2015) Activity patterns of a synanthropic population of the brown recluse spider, *Loxosceles reclusa* (Araneae : Sicariidae), with observations on feeding and mating. *The Journal of Arachnology* **43**(1), 67–71.

Damgaard, J. (2008) Phylogeny of the semiaquatic bugs (Hemiptera-Heteroptera-Gerromorpha). *Insect Systematics & Evolution* **39**(4), 431–460.

Davranoglou, L.-R., Taylor, G.K.T., Mortimer, B. & Malenovský, I. (2019*b*) The morphology of vibroacoustic mechanisms in derbid planthoppers (Hemiptera: Fulgoromopha: Derbidae). *Arthropod Structure & Development* **52**, 100880.

Davranoglou, L.-R., Baňař, P., Schlepütz, C.M., Mortimer, B. & Taylor, G.K. (2017) The pregenital abdomen of Enicocephalomorpha and morphological evidence for different modes of communication at the dawn of heteropteran evolution. *Arthropod Structure and Development*, **46**(6), 843–868.

De Carvalho, T. & Otte, D. (2006) Three new species of the cricket genus *Trigonidium* in Hawaii (Orthoptera: Gryllidae: Trigonidiinae). *Proceedings of the Academy of Natural Sciences of Philadelphia* **155**, 29–34.

Dellapé, P.M., Melo, M.C., Montemayor, S.I. & Kondorosy, E. (2017) A new genus of an Oriental Rhyparochromini (Heteroptera: Rhyparochromidae) to place *Caridops albomarginatus* (Scott, 1874) and the use of SDM to test an extra-Palaearctic record. *Zoologischer Anzeiger* **267**, 1–7.

Dellapé, P.M. (2003). A new species of *Ashlockobius* (Heteroptera: Rhyparochromidae: Myodochini) from Venezuela. *Zootaxa* **289**(1), 1–6.

Dellapé, P. (2019). Lygaeoidea Species File. Version 1.4. Species File Group. Checklist dataset https://doi.org/10.15468/krxm59. [accessed on 2022-02-27]

Desutter-Grandcolas, L. (1998) First analysis of a disturbance strudulation in crickets, *Brachytrupes tropicus* (Orthoptera: Grylloidea: Gryllidae). *Journal of Insect Behavior* **11**(1), 149–158.

Desutter-Grandcolas, L., Jacquelin, L., Hugel, S., Boistel, R., Garrouste, R., Henrotay, M., Warren, B.H., Chintauan-Marquier, I.C., Nel, P., Grandcolas, P. & Nel, A. (2017) 3-D imaging reveals four extraordinary cases of convergent evolution of acoustic communication in crickets and allies (Insecta). *Scientific Reports* **7**(1), 1–8.

Dimitrov, D. & Hormiga, G. (2011) An extraordinary new genus of spiders from Western Australia with an expanded hypothesis on the phylogeny of Tetragnathidae (Araneae). *Zoological Journal of the Linnean Society* **161**(4), 735–768.

Dirsh, V.M. (1955) XXXVI.—Tanaoceridae and Xyronotidae: Two new families of Acridoidea (Orthoptera). *Annals and Magazine of Natural History* **8**(88), 285–288.

Dirsh, V.M. (1961) A preliminary revision of the families and subfamilies of Acridoidea (Orthoptera, Insecta). *Bulletin of the British Museum (Natural History)* **10**, 351–419.

Dumortier, B. (1963) *Morphology of sound emission apparatus in Arthropoda*. In: Busnel, R.G. (ed.). Acoustic Behaviour of Animals. Amsterdam, Elsevier, pp. 346–373.

Duncan, J., Soulsbury, C.D. & Montealegre-Z, F. (2021) Differentiation between left and right wing stridulatory files in the field cricket *Gryllus bimaculatus* (Orthoptera: Gryllidae). *Arthropod Structure*

& Development **65**, 101076.

Dupérré, N. & Tapia, E. (2015) Discovery of the first telemid spider (Araneae, Telemidae) from South America, and the first member of the family bearing a stridulatory organ. *Zootaxa* **4020**(1), 191–196.

Edmunds, M. (1972) Defensive behaviour in Ghanaian praying mantids. *Zoological Journal of the Linnean Society* **51**, 1–32.

Elias, D.O., Mason, A.C., Maddison, W.P. & Hoy, R.R. (2003) Seismic signals in a courting male jumping spider (Araneae: Salticidae). *Journal of Experimental Biology* **206**(22), 4029–4039.

Emsley, M.G. (1969) The Schizopteridae (Hemiptera: Heteroptera) with the description of new species from Trinidad. *Memoirs of the American Entomological Society* **25**, 1–154.

Esposito, L.A., Yamaguti, H.Y., Pinto-da-Rocha, R. & Prendini, L. (2018) Plucking with the plectrum: phylogeny of the New World buthid scorpion subfamily Centruroidinae Kraus, 1955 (Scorpiones: Buthidae) reveals evolution of three pecten-sternite stridulation organs. *Arthropod Systematics and Phylogeny* **76**(1), 87–122.

Evangelista, D., Simon, S., Wilson, M.M., Kawahara, A.Y., Kohli, M.K., Ware, J.L., Wipfler, B., Béthoux, O., Grandcolas, P. & Legendre, F. (2021) Assessing support for Blaberoidea phylogeny suggests optimal locus quality. *Systematic Entomology* **46**(1), 157–171.

Fernández, R., Sharma, P.P., Tourinho, A.L. & Giribet, G. (2017) The Opiliones tree of life: shedding light on harvestmen relationships through transcriptomics. *Proceedings of the Royal Society B: Biological Sciences* **284**(1849), 20162340.

Fernández-Montraveta, C., Moya-Laraño, J. & Orta-Ocaña, J.M. (2000) An SEM study on pedipalpal stridulation in Iberian lycosids (genera *Lycosa* and *Hogna*; Araneae, Lycosidae). *Bulletin of the British Arachnological Society* **11**, 289–292.

Field, L.H. (1993) Structure and evolution of stridulatory mechanisms in New Zealand wetas (Orthoptera : Stenopelmatidae). *International Journal of Insect Morphology and Embryology* **22**, 163–183.

Field, L.H. & Bailey, W.J. (1997) Sound production in primitive orthoptera from western australia: sounds used in defence and social communication in *Ametrus* sp. and *Hadrogryllacris* sp. (Gryllacrididae: Orthoptera). *Journal of Natural History* **31**(7), 1127–1141.

Field, L.H., Evans, A. & Macmillan, D.L. (1987) Sound production and stridulatory structures in hermit crabs of the genus *Trizopagurus*. Journal of the Marine Biological Association of the United Kingdom **67**(1), 89–110.

Fischer, M.L., Čokl, A., Ramires, E.N., Marques-da-Silva, E., Delay, C., Fontana, J.D., Donatti, L., Schneider, V.F. & Marques, F. de A. (2009) Sound is involved in multimodal communication of *Loxosceles intermedia* Mello-Leitão, 1934 (Araneae; Sicariidae). *Behavioural Processes* **82**(3), 236–243.

Foley, S., Lüddecke, T., Cheng, D.-Q., Krehenwinkel, H., Künzel, S., Longhorn, S.J., Wendt, I., von Wirth, V., Tänzler, R., Vences, M. & Piel, W.H. (2019) Tarantula phylogenomics: A robust phylogeny of deep theraphosid clades inferred from transcriptome data sheds light on the prickly issue of urticating setae evolution. *Molecular Phylogenetics and Evolution* **140**(9), 106573.

Forster, R., Platnick, N. & Coddington, J. (1990) A proposal and review of the spider family Synotaxidae (Araneae, Araneoidea), with notes on theridiid interrelationships. *Bulletin of the American Museum of Natural History* **193**(193), 1–116.

Forthman, M. (2022) *What's the buzz? Surveying a stridulatory mechanism in "Coreidae" with consideration of recent phylogenomic results*. Online conference talk, IHS True Bug Tuesdays.

Friedemann, K., Wipfler, B., Bradler, S. & Beutel, R.G. (2012) On the head morphology of *Phyllium* and the phylogenetic relationships of Phasmatodea (Insecta). *Acta Zoologica* **93**(2), 184–199.

Galán-Sánchez, M.A. & Alvarez-Padilla, F. (2017) Three new species of comb-tailed spiders (Araneae: Hahniidae) from a Mexican oak forest with comments on their natural history and sexual behavior. *The Journal of Arachnology* **45**(3), 376–394.

Galleti-Lima, A. & Guadannuci, J.P.L. (2018) Morphology of setae on the coxae and trochanters of theraphosine spiders (Mygalomorphae: Theraphosidae). *Journal of Arachnology* **46**, 214–225.

Galleti-Lima, A. & Guadannuci, J.P.L. (2019) Comparative morphology of stridulating setae of Theraphosinae (Araneae: Theraphosidae). *Zoologischer Anzeiger* **283**, 58–68.

Galil, B. & Spiridonov, V.A. (1998) *Mursia zarenkovi* new species (Decapoda , Calappidae) from the Southeastern Pacific. *Crustaceana* **71**(8), 904–908.

Gallon, R.C. (2002) Revision of the African genera *Pterinochilus* and *Eucratoscelus* (Araneae, Theraphosidae, Harpactirinae) with description of two new genera. *Bulletin-British Arachnological Society* **12**, 201–232.

Gallon, R.C. (2003) A new African arboreal genus and species of theraphosid spider (Araneae, Theraphosidae, Stromatopelminae) which lacks spermathecae. *Bulletin of the British Arachnological Society* **12** (9), 405–411.

García, M.D., Gómez, R., Clemente, M.E. & Presa, J.J. (2014) Sound production in the genus *Acinipe* Rambur, 1832 (Orthoptera: Pamphagidae). *Italian Journal of Zoology* **81**(2), 264–270.

Gemeno, C., Baldo, G., Nieri, R., Valls, J., Alomar, O. & Mazzoni, V. (2015) Substrate-borne vibrational signals in mating communication of *Macrolophus* bugs. *Journal of Insect Behavior* **28**(4), 482–498.

Gertsch, W.J. (1958) The spider family Diguetidae. *American Museum Novitates*, 1–24.

Giroti, A.M. & Brescovit, A.D. (2015) Revalidation of the spider genus *Citharoceps* Chamberlin, 1924 (Araneae, Segestriidae). *ZooKeys* **495**, 1–19.

Gogala, M. (1984) Vibration producing structures and songs of terrestrial Heteroptera as systematic characters. *Biologi Vestnik* **32**, 19–36.

Gogala, M. (1985) *Vibrational songs of land bugs and their production*. In: Kalmring, K. & Elsner, N. (eds.) Acoustic and Vibrational Communication in Insects. Berlin, Paul Parey Verlag, pp. 143–150.

Gogala, M. (1990) Distribution of low frequency vibrational songs in local Heteroptera. *Scopolia, Supplement 1*, 125–132.

Gogala, M. (2006) *Vibratory signals produced by Heteroptera - Pentatomorpha and Cimicomorpha*. In: Drosopoulos S. & Claridge, M.F. (eds.) Insect sounds and communication: physiology, behavior, ecology, and evolution. Contemporary topics in entomology. Boca Raton, Florida, CRC Press, pp. 275–295.

Gogala, M., Čokl, A., Drašlar , K. & Blazevic, A. (1974) Substrate-borne sound communication in Cydnidae (Heteroptera). *Journal of Comparative Physiology* **94**(1), 25–31.

Gooderham, J. & Tsyrlin, E. (2002) *The waterbug book: a guide to the freshwater macroinvertebrates of temperate Australia*. Clayton, CSIRO Publishing, 240 pp.

Gorczyca, J. (1998) A revision of *Euchilofulvius* (Heteroptera: Miridae: Cylapinae). *European Journal of Entomology* **95**(1), 93–98.

Gorczyca, J. (2004) A new remarkable genus of Fulviini from Samoa (Heteroptera : Miridae : Cylapinae). *Genus* **15**(1), 25–29.

Grazia, J., Schuh, R.T. & Wheeler, W.C. (2008) Phylogenetic relationships of family groups in

Pentatomoidea based on morphology and DNA sequences (Insecta : Heteroptera). *Cladistics* **24**(6), 932–976.

Griswold C.E. (1997) *Scharffia*, a remarkable new genus of spiders from East Africa (Araneae, Cyatholipidae). *Journal of Arachnology* **25**(3), 269–287.

Griswold, C.E., Ramírez, M.J., Coddington, J.A. & Platnick, N.I. (2005) Atlas of phylogenetic data for entelegyne spiders (Araneae : Araneomorphae : Entelegynae) with comments on their phylogeny. *Proceedings of the California Academy of Sciences* **56**(2), 1–324.

Griswold, C.E., Wood, H.M. & Carmichael, A.D. (2012) The lace web spiders (Araneae, Phyxelididae) of Madagascar: Phylogeny, biogeography and taxonomy. *Zoological Journal of the Linnean Society*, **164**(4), 728–810.

Gruber, J. (1976) Ergebnisse zoologischer Sammelreisen in die Türkei. Zwei neue Nemastomidenarten mit Stridulationsorganen, nebst Anmerkungen zur systematischen Gliederung der Familie (Opiliones, Arachnida). *Annalen des Naturhistorischen Museums in Wien*, **80**, 781–801.

Gruber, J. (1978) Redescription of *Ceratolasma tricantha* Goodnight and Goodnight, with notes on the family Ischyropsalidae (Opiliones, Palpatores). *Journal of Arachnology* **6**(2), 105–124.

Gu, J.-J., Montealegre-Z, F., Robert, D., Engel, M.S., Qia, G.-X. & Ren, D. (2012) Wing stridulation in a Jurassic katydid (Insecta, Orthoptera) produced low-pitched musical calls to attract females. *PNAS* **109**(10), 3868–3873.

Guinot-Dumortier, D. & Dumortier, B. (1960) La stridulation chez les crabes. *Crustaceana* **1**(2), 117–155.

Günther, K.K. (1992) Revision der familie Cylindrachetidae Giglio-Tos, 1914 (Orthoptera, Tridactyloidea). *Deutsche Entomologische Zeitschrift* **39**, 233–291.

Gwinner-Hanke, H. (1970) The behavior of two stridulating spiders (*Steatoda bipunctata* L. and *Teutona grossa* Koch, Theridiidae, Araneae), with special reference to reproductive behavior. *Zeitschrift für Tierpsychologie* **27**, 649–678.

Gwynne, D.T. & Dadour, I.R. (1985) A new mechanism of sound production by courting male jumping spiders (Araneae: Salticidae, Saitis michaelseni Simon). *Journal of Zoology* **207**, 35–42.

Hale, H.M. (1922) Studies in Australian aquatic Hemiptera. No.1. *Records of the South Australian Museum* **2**, 309–330.

Harrington, B.J. (1980) A generic level revision and cladistic analysis of the Myodochini of the world (Hemiptera, Lygaeidae, Rhyparochrominae). *Bulletin of the American Museum of Natural History* **167**, 49.

Hartman, H.B. & Roth, L.M. (1967) Stridulation by the cockroach *Nauphoeta cinerea* during courtship behaviour. *Journal of Insect Physiology* **13**(4), 579–582.

Haskell, P.T. (1957) Stridulation and its analysis in certain Geocorisae (Hemiptera Heteroptera). *Proceedings of the Zoological Society of London* **129**(3), 351–358.

Heath, G.L. (1980) Rearing and studying the praying mantids. *Amateur Entomologist's Society leaflet* **36**, 1–15.

Hebsgaard, M.B., Andersen, N.M. & Damgaard, J. (2004) Phylogeny of the true water bugs (Nepomorpha: Hemiptera-Heteroptera) based on 16S and 28S rDNA and morphology. *Systematic Entomology* **29**(4), 488–508.

Heller, K.G. (1996) Unusual abdomino-alary, defensive stridulatory mechanism in the bushcricket *Pantecphylus cerambycinus* (Orthoptera, Tettigonioidea, Pseudophyllidae). *Journal of Morphology* **227**(1), 81–86.

Henry, G.M. (1942) Three remarkable stridulatory mechanisms in Acrididae (Orthoptera. *Proceedings of the Royal Entomological Society of London. Series A, General Entomology* **17**, 59–62.

Henry, T.J. (2009) *Biodiversity of Heteroptera*. In: Foottit, P. & Adler, R. (eds.) Insect Biodiversity: Science and Society. 1st edition. Oxford, Blackwell, pp. 222–263

Henry, T.J. (2013) *Cymapamphantus valentineorum*, a new genus and species of Pamphantinae (Heteroptera: Lygaeoidea: Geocoridae) from the British Virgin Islands, with a checklist of the species and keys to the tribes and genera of the subfamily. *Proceedings of the Entomological Society of Washington* **115**(4), 392–401.

Henry, T.J. (2015) Revision of the ceratocapsine *Renodaeus* group: *Marinonicoris*, *Pilophoropsis, Renodaeus*, and *Zanchisme*, with descriptions of four new genera (Heteroptera, Miridae, Orthotylinae). *ZooKeys* **490**, 1–156.

Herrera, F. & Springer, M. (2014) New species of *Potamocoris* Hungerford (Heteroptera, Potamocoridae) from Costa Rica and a key to the species. *Zootaxa* **3884**(5), 492–496.

Hill, S.A. (2007) Sound generation in *Mantis religiosa* (Mantodea: Mantidae): stridulatory structures and acoustic signal. *Journal of Orthoptera Research* **16**(1), 35–49.

Hinton, H.E. & Wilson, R.S. (1970) Stridulatory organs in spiny orb-weaver spiders. *Journal of Zoology* **162**, 481–484.

Hiroyuki, A. (2009) Species of the genus *Erichthonius* (Crustacea: Amphipoda: Ischyroceridae) from Western Japan with description of a new species. *Bulletin of the Osaka Museum of Natural History* **3**, 15–36.

Hoffart, C.J., Jones, K., Hill, P.S.M. (2002) Comparative morphology of the stridulatory apparatus of the Gryllotalpidae (Orthoptera) of the continental United States. *Journal of the Kansas entomological society*, **75**, 123–131.

Hormiga, L.L.G. (2015) Out of the twilight zone: phylogeny and evolutionary morphology of the orb-weaving spider family Mysmenidae, with a focus on spinneret spigot morphology in symphytognathoids (Araneae, Araneoidea). *Zoological Journal of the Linnean Society* **173**(3), 527–586.

Hrušková-Martišová, M., Pekár, S. & Gromov, A. (2008) Analysis of the stridulation in solifuges (Arachnida: Solifugae). *Journal of Insect Behavior* **21**(5), 440–449.

Huber, B.A. (1995) Copulatory mechanism in *Holocnemus pluchei* and *Pholcus opilionoides*, with notes on male cheliceral apophyses and stridulatory organs in Pholcidae (Araneae). *Acta Zoologica* **76**(4), 291–300.

Hwang, W.S. & Weirauch, C. (2012) Evolutionary history of assassin bugs (Insecta: Hemiptera: Reduviidae): insights from divergence dating and ancestral state reconstruction. *PLoS ONE* 7(9), e45523.

Imafuku, M. & Ikeda, H. (1990) Sound Production in the land hermit crab *Coenobita purpureus* Stimpson , 1858 (Decapoda , Coenobitidae). *Crustaceana*, **58**, 168–174.

Jacobs, D.H. (1989) A new species of *Thaumastella* with notes on the morphology, biology and distribution of the two southern African species (Heteroptera: Thaumastellidae). *Journal of the Entomological Society of Southern Africa* **52**(2), 301–316.

Jansson, A. (1972) Mechanisms of sound production and morphology of the stridulatory apparatus in the genus *Cenocorixa* (Hemiptera, Corixidae). *Annales Zoologici Fennici* **9**, 120–129.

Jansson, A. (1973) Stridulation and its significance in the genus *Cenocorixa* (Hemiptera, Corixidae). *Behaviour* **46**(1-2), 1–36.

Jansson, A. (1989) Stridulation of Micronectinae (Heteroptera, Corixidae). *Annales Zoologici Fennici*, **55**(2), 161–175.

Jocqué, R. (2005) Six stridulating organs on one spider (Araneae, Zodariidae): is this the limit? *Journal of Arachnology* **33**(2), 597–603.

Jocqué, R. & Dippenaar-Schoeman, A.S. (2003) *Spider families of the world*. Royal Museum for Central Africa, Tervuren, 336 pp.

Johnsen, P. (1973) Alar-notal and tegmino-alar sound production in the African *Glauia* and *Acinipe* (Acridoidea: Pamphagidae), with notes on other behaviour. *Natur Jutlandica* **16**, 59–80.

Jorigtoo, N., Schaefer, C.W. & Lockwood, J.A. (1998) Stridulatory apparatus of *Piesma* Le Peletier & Serville (Hemiptera: Piesmatidae). *Annals of the Entomological Society of America* **91**(6), 848–851.

Jung, S. & Lee, S. (2012) Molecular phylogeny of the plant bugs (Heteroptera: Miridae) and the evolution of feeding habits. *Cladistics* **28**(1), 50–79.

Jung, T.W., Choi, H.K., Kim, M.S. & Yoon, S.M. (2017) Two new species of amphipods (Crustacea: Amphipoda: Photidae) from Korean waters with a redescription of *Gammaropsis longipropodi*. *Zootaxa* **4300**(3), 380–402.

Kemp, S. (1913) *An account of the Crustacea Stomatopoda of the Indo-Pacific region based on the collection in the Indian Museum ... with which are issued illustrations of the zoology of the R.I.M.S.S. "Investigator"*. Calcutta, Memoirs of the Indian Museum, v.4, pt. 1, 217 pp.

Kment, P., Jindra, Z. & Berchi, G.M. (2016) Review of West-Palaearctic Hebridae with description of a new species and redescription of *Hebrus fulvinervis* (Hemiptera: Heteroptera). *Zootaxa* **4147**(3), 201–239.

Koczor, S. & Čokl, A. (2014) Percussion signals of *Lygus rugulipennis* Poppius (Heteroptera: Miridae). *Central European Journal of Biology* **9**(5), 543–549.

Kormilev, N.A. (1971) Mezirinae of the Oriental Region and South Pacific. *Pacific Insects Monographs* **26**, 1–165.

Korsakoff, M. (1941) Contribution à l'étude des Pamphaginae de l'Afrique du Nord. *Bulletin de la Société d'Histoire naturelle d'Afrique du Nord, Alger* **32**, 352–369.

Korsunovskaya, O., Berezin, M., Heller, K.-G., Tkacheva, E., Kompantseva, T., Zhantiev, R. (2020) Biology, sounds and vibratory signals of hooded katydids (Orthoptera: Tettigoniidae: Phyllophorinae). *Zootaxa* **4852**(3), 309–322.

Kowalski, K.N., Lakes-Harlan, R., Lehmann, G.U.C. & Strauß, J. (2014) Acoustic defence in an insect: characteristics of defensive stridulation and differences between the sexes in the tettigoniid *Poecilimon ornatus* (Schmidt 1850). *Zoology* **117**(5), 329–336.

Kraus, W.F. (1989) Surface wave communication during courtship in the giant water bug, *Abedus indentatus* (Heteroptera: Belostomatidae). *Journal of the Kansas entomological society* **62**(3), 316–328.

Kronestedt, T. (1973) Study of a stridulatory apparatus in *Pardosa fulvipes* (Collett) (Araneae, Lycosidae) by scanning electron microscopy. *Zoologica Scripta* **2**(1), 43–47.

Kronmüller, C. & Lewis, J.G.E. (2015) On the function of the ultimate legs of some Scolopendridae (Chilopoda, Scolopendromorpha). *ZooKeys* **2015**(510), 269–278.

Kury, A.B. (2014) Why does the Tricommatinae position bounce so much within Laniatores? A cladistic analysis, with description of a new family of Gonyleptoidea (Opiliones, Laniatores). *Zoological Journal of the Linnean Society* **172**(1), 1–48.

Labarque, F.M. & Ramírez, M.J. (2012) The placement of the spider genus *Periegops* and the phylogeny of Scytodoidea (Araneae: Araneomorphae). *Zootaxa* **3312**(1), 1–44.

Lattin, J.D. (1958) A stridulatory mechanism in *Arhaphe cicindeloides* Walker (Hemiptear: Heteroptera: Pyrrhocoridae). *The Pan-Pacific Entomologist* **34**, 217–219.

Lawrence, A., Robinson, M.H. & Robinson, B. (1973) Observations on sound production by two species of crabs from Panama (Decapoda, Gecarcinidae and Pseudothelphusidae. *Crustaceana* **25**(2), 147–152.

Lawrence, R.F. (1937) Stridulating organ in harvest-spiders. *Annals and Magazine of Natural History* **20**, 364–369.

Ledford, J., Paquin, P., Cokendolpher, J., Campbell, J. & Griswold, C. (2011) Systematics of the spider genus *Neoleptoneta* Brignoli, 1972 (Araneae : Leptonetidae) with a discussion of the morphology and relationships for the North American Leptonetidae. *Invertebrate Systematics* **25**(4), 334–388.

LeLong, P. (1995) L'appareil stridulatoire chez certain especes de *Phyllium* (Phasmatodea:Phylliidae). *Le Monde des Phasmes*, **32**, 12–13.

Leston, D.L. (1954) Strigils and stridulation in Pentatomoidea (Hem.): some new data and a review. *Entomologist's Monthly Magazine* **90**, 49–56.

Leston, D.L. (1957) The stridulatory mechanisms in terrestrial species of Hemiptera Heteroptera. *Proceedings of the Zoological Society of London* **128**, 369–386.

Liao, Y.C., Wu, Z.Z. & Yang, M.M. (2019) Vibrational behavior of psyllids (Hemiptera: Psylloidea): Functional morphology and mechanisms. *PLoS ONE* **14**(9), 1–14.

Liao, Y.C., Percy, D.M. & Yang, M.M. (2022) Biotremology: vibrational communication of Psylloidea. *Arthropod Structure and Development* **66**, 101138.

Lis, J.A. & Heyna, J. (2001) The metathoracic wing stridulitrum of the Cydnidae (Hemiptera: Heteroptera). *Polish Journal of Entomology* **70**, 221–245.

Lissner, J. (2018) A new pirate spider of the genus *Ero* (Araneae: Mimetidae) from the Canary Islands, with contributions on other Palaearctic Species . *Arachnology* **17**(8), 410–418.

Líznarová, E., Sentenská, L., Šťáhlavský, F. & Pekár, S. (2018) Stridulation can suppress cannibalism in a specialised araneophagous predator. *Behavioral Ecology and Sociobiology* **72**, 127.

Lloyd, J.E. (1976) Coxo-sternal stridulation in Phyllophora (Orthoptera: Tettigonioidea; Phyllophoridae). *Entomological News* **87**(9–10), 285–286.

Lloyd, J.E., Gurney, A.B. (1975) Labral stridulation in a katydid (a coconut-infesting "treehopper") (Orthoptera: Tettigoniidae: Mecopodinae). *Entomological News* **86**(3–4), 47–50.

López, H., García, M.D., Clemente, E., Presa, J.J. & Oromí, P. (2008) Sound production mechanism in pamphagid grasshoppers (Orthoptera). *Journal of Zoology* **275**(1), 1–8.

Lorier, E., García, M.D., Clemente, M.E. & Presa, J.J. (2002) Calling behavior and morphology of the stridulatory apparatus in neotropical grasshoppers (*Aleuas* Stål; Orthoptera). *Studies on Neotropical Fauna and Environment* **37**(1), 71–78.

Lorier, E., Clemente, M.E., García, M.D. & Presa, J.J. (2010) El comportamiento acústico de *Fenestra bohlsii* Giglio-Tos (Orthoptera: Acrididae: Gomphocerinae). *Neotropical Entomology* **39**(6), 839–853.

Lourenço, W.R. & Cloudsley-Thompson, J.L. (1995) Stridulatory apparatus and the evolutionary significance of sound production in *Rhopalurus* species (Scorpiones: Buthidae). *Journal of Arid Environments* **31**(4), 423–429.

Lowry, J.K. & Myers, A.A. (2017) A phylogeny and classification of the amphipoda with the establishment of the new order Ingolfiellida (Crustacea: Peracarida). **3610**(1), 1–80.

Lüddecke, T., Krehenwinkel, H., Canning, G., Glaw, F., Longhorn, S.J., Tänzler, R., Wendt, I. & Vences, M. (2018) Discovering the silk road: Nuclear and mitochondrial sequence data resolve the phylogenetic relationships among theraphosid spider subfamilies. *Molecular Phylogenetics & Evolution* **119**, 63–70.

Luo, C. & Wei, C. (2015) Stridulatory sound-production and its function in females of the cicada *Subpsaltria yangi*. *PLoS ONE* **10**(2), 1–13.

Maddison, W.P. (1987) *Marchena* and other jumping spiders with an apparent leg-carapace stridulatory mechanism (Araneae, Salticidae, Heliophaninae and Thiodininae). *Bulletin of the British Arachnological Society* **7**(4), 101–106.

Maddison, W.P., Donoghue, M.J. & Maddison, D.R. (1984) Outgroup analysis and parsimony. *Systematic Zoology* **33**(1), 83–103.

Maddison, W.P. & Stratton, G.E. (1988) Sound production and associated morphology in male jumping spiders of the *Habronattus agilis* species group (Araneae, Salticidae). *The Journal of Arachnology* **16**(2), 199–211.

Malipatil, M.B. (1977) Additions to the Drymini of new zealand (Heteroptera: Lygaeidae). *New Zealand Journal of Zoology* **4**(2), 177–182.

Malipatil, M.B. (1979) An unusual orsilline genus from New Zealand (Heteroptera: Lygaeidae). *New Zealand Journal of Zoology* **6**(2), 237–239.

Malipatil, M.B. (1981) Revision of Australian Cleradini (Heteroptera: Lygaeidae). *Australian Journal of Zoology* **29**(5), 773–819.

Malipatil, M.B. (1983) Revision of world Cleradini (Heteroptera: Lygaeidae), with a cladistic analysis of relationships within the tribe. *Australian Journal of Zoology* **31**(2), 205–225.

Malipatil, M.B. (2014) Meschiidae, a new family of Lygaeoidea (Hemiptera: Heteroptera) from India and Australia, with descriptions of a new genus and two new species. *Zootaxa* **3815**(2), 233–248.

Manrique, G. & Lazzari, C.R. (1994) Sexual behaviour and stridulation during mating in *Triatoma infestans* (Hemiptera: Reduviidae). *Memórias do Instituto Oswaldo Cruz* **89**(4), 629–633.

Marilyn, P. (1977) The role of stridulation in the behavior of the shore crab, *Hemigrapsus oregonensis*. Unpublished PhD thesis, Oregon State University.

Marshall, D.C., Moulds, M., Hill, K.B.R., Price, B.W., Wade, E.J., Owen, C.L., Goemans, G., Marathe, K., Sarkar, V., Cooley, J.R., Sanborn, A.F., Kunte, K., Villet, M.H. & Simon, C. (2018) A molecular phylogeny of the cicadas (Hemiptera: Cicadidae) with a review of tribe and subfamily classification. *Zootaxa* **4424**(1), 1–64 pp.

Marshall, S. D., Thoms, E. M. & Uetz, G. W. (1995) Setal entanglement: an undescribed method of stridulation by a neotropical tarantula (Araneae: Theraphosidae). *Journal of Zoology* **235**, 587–595.

Martens, J. (1978) *Spinnentiere, Arachnida: Weberknechte, Opiliones*. Jena, Veb Gustav Fischer Verlag, 464 pp.

Massa, B. (2012) The role of the Krauss's organ in sound production in Pamphagidae (Caelifera: Orthoptera). *Italian Journal of Zoology* **79**(3), 441–449.

McDonald, F.J.D. (1979) The male abdominal strigil of *Uncinala tau* (Hemiptera: Pentatomidae). *Annals of the Entomological Society of America* **72**(3), 448–449.

Mclaughlin, P.A. & Lemaitre, R. (2008) Larvae of two species of *Trizocheles* (Decapoda: Anomura: Paguroidea: Pylochelidae: Trizochelinae), description of the adult of one, and preliminary implications of development on pylochelid phytogeny. *Zootaxa* **1911**(1), 52–68.

Menard, K.L. & Schuh, R.T. (2011) Revision of Leucophoropterini: Diagnoses, key to genera, description of the Australian Fauna, and descriptions of new Indo-Pacific genera and species (Insecta: Hemiptera: Miridae). *Bulletin of the American Museum of Natural History* **361**, 159 pp.

Menard, K.L., Schuh, R.T. & Woolley, J.B. (2014) Total-evidence phylogenetic analysis and reclassification of the Phylinae (Insecta: Heteroptera: Miridae), with the recognition of new tribes and subtribes and a redefinition of Phylini. *Cladistics* **30**(4), 391–427.

Menard, K.L. & Woolley, J.B. (2014) A phylogenetic study of the generic relationships within the subtribe Leucophoropterina Schuh (Miridae: Phylinae: Leucophoropterini). *Systematic Entomology* **39**(3), 412–430.

Millán, A., Mohdi, O.L., Carbonell, J.A., Taybi, A.F. & Dakki, M. (2016) A new species of *Aphelocheirus* (Hemiptera: Heteroptera: Aphelocheiridae) from Morocco. *Zootaxa* **4173**(6), 577–582.

Miller, J.A. (2007) Review of Erigonine spider genera in the Neotropics (Araneae: Linyphiidae, Erigoninae). *Zoological Journal of the Linnean Society* **149**(Issue suppl_1), 1–263.

Minghetti, E., Braun, H., Matt, F., Dellapé, P.M. (2020) *Tympanoblissus ecuatorianus* Dellapé & Minghetti, gen. et sp. nov, a new apterous genus of chinch bug (Hemiptera: Blissidae) from Ecuador: the only known blissid with an abdominal mechanism for sound production. *Austral Entomology* **59**, 535–540.

Miyazawa, H., Ueda, C., Yahata, K. & Su, Z.-H. (2014) Molecular phylogeny of Myriapoda provides insights into evolutionary patterns of the mode in post-embryonic development. *Scientific reports* **4**, 4127.

Montesanto, G. (2018) Presence of a stridulatory apparatus in the manca stages of isopods (Crustacea, Isopoda, Oniscidea). *ZooKeys* **2018**, 501–518.

Montgomery, T.H. (1909) Further studies on the activities of araneads, II. *Proceedings of the Academy of Natural Sciences of Philadelphia* **61**, 548–569.

Moraes, M.C.B., Laumann, R.A., Čokl, A. & Borges, M. (2005) Vibratory signals of four Neotropical stink bug species. *Physiological Entomology* **30**(2), 175–188.

Morris, G.K. & Gwynne, D.T.T. (1978) Geographical distribution and biological observations of *Cyphoderris* (Orthoptera: Haglidae) with a description of a new species. *Psyche* **85**, 147–167.

Morris, G.K., Kerr, G.E. & Gwynne, D.T. (1975) Calling song function in the bog katydid, *Metrioptera sphagnorum* (F. Walker) (Orthoptera, Tettigoniidae): female phonotaxis to normal and altered song. *Zeitschrift für Tierpsychologie* **37**, 502–514.

Morris, G.K., DeLuca, P.A., Norton, M. & Mason, A.C. (2002) Calling-song function in male haglids (Orthoptera: Haglidae, Cyphoderris). *Canadian Journal of Zoology* **80**, 271–285.

Moritz, L. & Wesener, T. (2017) Integrative description of two new species of Malagasy chirping giant pill-millipedes, genus *Sphaeromimus* (Diplopoda: Sphaerotheriida: Arthrosphaeridae). *European Journal of Taxonomy* **381**, 1–25.

Moulds, M.S. (2005) An appraisal of the higher classification of cicadas (Hemiptera: Cicadoidea) with special reference to the Australian fauna. *Records of the Australian Museum* **57**(3), 375–446.

Moulet, P. (1991) De la stridulation chez les Coreoidea. *Bulletin de la société d'étude des sciences naturelles de Vaucluse* **1991**, 29–33.

Moulet, P. (1995) *Hemipteres Coreoidea (Coreidae, Rhopalidae, Alydidae, Pyrrhocoridae, Stenocephalidae)*. Paris, Faune de France et regions limitrophes, 336 pp.

Mukai, H., Hironaka, M., Tojo, S. & Nomakuchi, S. (2014) Maternal vibration: an important cue for embryo hatching in a subsocial shield bug. *PLoS ONE* **9**(1), e87932.

Myers, A.A. & Lowry, J.K. (2003) A phylogeny and a new classification of the Corophiidea Leach, 1814 (Amphipoda). *Journal of Crustacean Biology*, **23**(2), 443–485.

Nakamachi, T., Ishida, H. & Hirohashi, N. (2015) Sound production in the aquatic isopod *Cymodoce japonica* (Crustacea: Peracarida). *Biological Bulletin* **229**, 167–172.

Nickle, D.A. & Carlysle, T.C. (1975) Morphology and function of female sound-producing structures in ensiferan Orthoptera with special emphasis on the Phaneropterinae. *International Journal of Insect Morphology and Embryology* **4**, 159–168.

Nieser, N., Chen, P.-P. & de Melo, A.L. (2013) A new species and new synonymy in *Limnocoris* (Hemiptera: Heteroptera: Naucoridae) from Brazil. *Acta Musei Moraviae, Scientiae Biologicae* **98**(2), 335–346.

Nischk, F. & Otte, D. (2000) Bioacoustics, ecology and systematics of Ecuadorian rainforest crickets (Orthoptera: Gryllidae: Phalangopsinae), with a description of four new genera and ten new species. *Journal of Orthoptera Research* **9**, 229.

Numata, H., Kon, M., Fujii, H. & Hidaka, T. (1989) Sound production in the bean bug, *Riptortus clavatus* Thunberg (Heteroptera: Alydidae). *Applied Entomology and Zoology* **24**, 169–173.

Ochoa, J.A. & Ojanguren Affilastro, A.A. (2007) Systematics and distribution of *Brachistosternus* (*Brachistosternus*) *ehrenbergii* (Gervais, 1841), with the first record of stridulation in this genus *Brachistosternus* (Scorpiones: Bothriuridae). *Studies on Neotropical Fauna and Environment* **42**(1), 61–69.

Oliveira, P.A.P., Simoes, P.C. & Quartau, J.A. (2001) Calling songs of certain orthopteran species (Insecta, Orthoptera) in southern Portugal. *Animal Biodiversity and Conservation* **24**, 65–79.

Opatova, V., Hamilton, C.A., Hedin, M., De Oca, L.M., Král, J. & Bond, J.E. (2020) Phylogenetic systematics and evolution of the spider infraorder Mygalomorphae using genomic scale data. *Systematic Biology* **69**(4), 671–707.

Opell, B.D. (1979) Revision of the genera and tropical American species of the spider family Uloboridae. *Bulletin of the Museum of Comparative Zoology* **148**, 443–549.

Orster, T.F., Latnick, P., Grismado, C.J. & Lopardo, L. (2000) Nuevos datos sobre la distribución geográfica de las familias australes de arañas Malkaridae y Mecysmaucheniidae. (Arachnida: Araneae), con la descripción de la hembra de *Mecysmauchenius thayerae* Forster & Platnick. *Revista ibérica de aracnología* **8**, 37–43.

Otte, D. (1970) *A comparative study of communicative behavior in grasshoppers*. Ann Arbor, Miscellaneous Publications of the Museum of Zoology. 141, 168 pp.

Özkütük, R.S., Marusik, Y.M., Kunt, K.B. & Elverici, M. (2017) Taxonomic notes on two sibling species of *Metellina* from Asia (Araneae, Tetragnathidae). *ZooKeys* **695**, 75–88.

Padilla-Gil, D. N. (2003) Dos nuevas especies de *Buenoa* (Heteroptera: Notonectidae) de Colombia. *Agronomía Colombiana* **21**(1–2), 49–53.

Papáček, M., Štys, P. & Tonner, M. (1990) Ventrolateral thoracic region and thoracico-abdominal junction of some Helotrephidae (Heteroptera, Nepomorpha). *Acta societatis zoologica Bohemoslovaca* **54**, 107–129.

Pedroso, D.R., de Miranda, G.S. & Baptista, R.L.C. (2019) Further advancements in the taxonomy of *Trechona* spiders (Araneae: Dipluridae): two new species, redescription of *Trechona uniformis* Mello-Leitão, 1935, additions to descriptions of *Trechona rufa* Vellard, 1924 and *Trechona venosa* (Latreille, 1832) and key. *Austral Entomology* **58**(1), 204–219.

Pérez-Miles, F., Oca, L.M. de, Postiglioni, R. & Costa, F.G. (2005) The stridulatory setae of *Acanthoscurria suina* (Araneae, Theraphosidae) and their possible role in sexual communication: an experimental approach. *Iheringia. Série Zoologia* **95**(4), 365–371.

Pericart, J. & Polhemus, J.T. (1990) Un appareil stridulatoire chez les Leptopodidae de l'ancien monde (Heteroptera). *Annales de la societe entomologique de France* **26**(1), 9–17.

Pinto-da-Rocha, R. & Kury, A.B. (2003) Third species of Guasiniidae (Opiliones, Laniatores) with comments on familial relationships. *Journal of Arachnology* **31**(3), 394–399.

Polhemus, J.T. (1985) *Shore bugs (Hemiptera, Heteroptera, Saldidae). A world overview of middle American forms*. Niantic, Different Drummer Publishing, 252 pp.

Polhemus, J.T. (1990*a*) A new tribe, a new genus and three new species of Helotrephidae (Heteroptera) from Southeast Asia, and a world checklist. *Acta Entomologica Bohemoslovaca* **87**, 45–63.

Polhemus, J.T. (1990*b*) Surface wave communication in water striders. *Journal of the New York Entomological Society* **98**(3), 383–384.

Polhemus, J.T. (1991) Two new Neotropical genera of Trepobatinae (Gerridae, Heteroptera). *Journal of the New York Entomological Society* **99**(1), 78–86.

Polhemus, J.T. (1994) Stridulatory mechanisms in aquatic and semiaquatic Heteroptera. *Journal of the New York Entomological Society* **102**(2), 274–275.

Polhemus, J.T. & Lindskog, P. (1994) The stridulatory mechanism of *Nerthra* Say, a new species, and synonymy (Heteroptera: Gelastocoridae). *Journal of the New York Entomological Society* **102**(2), 242–248.

Polhemus, J.T. & Polhemus, D.A. (1988). Zoogeography, ecology, and systematics of the genus *Rhagovelia* Mayr (Heteroptera: Veliidae) in Borneo, Celebes, and the Moluccas. *Insecta Mundi* **2**(3), 161–230.

Polhemus, J.T. & Polhemus, D.A. (1993) The Trepobatinae (Heteroptera: Gerridae) of New Guinea and surrounding regions, with a review of the world fauna. Part 1. Tribe Metrobatini. *Entomologica Scandinavica* **24**(3), 241–284.

Polhemus, J.T. & Polhemus, D.A. (2008) Global diversity of true bugs (Heteroptera; Insecta) in freshwater. *Hydrobiologia* **595**(1), 379–391.

Pomini, A.M., Machado, G., Pinto-da-Rocha, R., Macías-Ordóñez, R. & Marsaioli, A.J. (2010) Lines of defense in the harvestman *Hoplobunus mexicanus* (Arachnida: Opiliones): aposematism, stridulation, thanatosis, and irritant chemicals. *Biochemical Systematics and Ecology* **38**(3), 300–308.

Prendini, L. (2004) The systematics of southern African *Parabuthus* Pocock (Scorpiones, Buthidae): revisions to the taxonomy and key to the species. *Journal of Arachnology* **32**(1), 109–187.

Puranik, P.G., Ahmed, A. & Siddiqui, M.A. (1981) The mechanism of sound production in the pentatomid bug *Tesseratoma javanica* Thunberg. *Proceedings of the Indian Academy of Sciences: Animal Sciences* **90**(2), 173–186.

Quintero, D., Journal, S. & Spring, N. (2010) The amblypygid genus *Phrynus* in the Americas (Amblypygi, Phrynidae). *American Arachnological Society* **9**, 117–166.

Ramsay, G.W. (1990) Mantodea (Insecta), with a review of aspects of functional morphology and biology. *Fauna of New Zealand* **19**, 1–96.

Rao, K.T., Bastawade, D.B., Javed, S.M.M. & Krishna, I.S.R. (2006) Description of two new species of spiders of the genus *Poecilotheria* Simon (Araneae: Theraphosidae) and *Tmarus* Simon (Araneae: Thomisidae) from Nallamalai hills, Eastern Ghats, Andhra Pradesh, India. *Records of the Zoological Survey of India* **106** (Part-I), 49–54.

Raven, R.J. (1985) The spider infraorder Mygalomorphae (Araneae): cladistics and systematics.

Bulletin of the American Museum of Natural History, **182**, 1.

Raven, R.J. (1994) Mygalomorph spiders of the Barychelidae in Australia and the Western Pacific. *Memoirs of the Queensland Museum* **35**, 291–706.

Rédei, D., Tsai, J.-F. & Yang, M.-M. (2009) *Heteropteran fauna of Taiwan: Cotton stainers and relatives (Hemiptera: Heteroptera: Pyrrhocoroidea)*. Taichung, National Chung Hsing University, 52 pp.

Rehn, J.A.G. (1957) The description of the female sex of *Pterinoxylus spinulosus*, with notes on stridulation in the female sex of this genus (Orthoptera ; Phasmatidae ; Phibalosomatinae). *Transactions of the American Entomological Society* **83**, 185–194.

Rengifo-Correa, L., Brailovsky, H., Henry, T.J. & Morrone, J.J. (2014) Phylogenetics and evolutionary morphology of the Neotropical true bug genus *Epipolops* (Hemiptera: Heteroptera: Geocoridae). *Systematic Entomology*, **39**(1), 127–140.

Rentz, D. (2017) Sound production in an Australian cockroach, *Megazosteria patula* (Walker) (Blattodea: Blattidae: Polyzosteriinae). *Zootaxa* **4231**(4), 567–568.

Reshmi, R. & Bijukumar, A. (2010) First report of the hermit crabs *Coenobita brevimanus* and *Coenobita rugosus* (Crustacea: Decapoda: Anomura) from the Indian coast. *Marine Biodiversity Records* **3**, 1–4.

Rix, M.G. & Harvey, M.S. (2010) The spider family Micropholcommatidae (Arachnida, Araneae, Araneoidea): A relimitation and revision at the generic level. *ZooKeys* **36**, 1–321.

Rix, M.G., Roberts, J.D. & Harvey, M.S. (2009) The spider families Synotaxidae and Malkaridae (Arachnida: Araneae: Araneoidea) in Western Australia. *Records of the Western Australian Museum* **25**(3), 295.

Robinson, M.H. (1968) The defensive behavior of *Pterinoxylus spinulosus* a winged stick insect from Panama (Phasmatodea). *Psyche* **75**(3), 195–207.

Robinson, M.H. (1969) The defensive behaviour of some orthopteroid insects from Panama. *Transactions of the Royal Entomological Society of London* **121**(7), 281–303.

Roth, L.M. & Hartman, H.B. (1967) Sound production and its evolutionary significance in the Blattaria. *Annals of the Entomological Society of America* **60**(4), 740–752.

Rypstra, A.L., Schlosser, A.M., Sutton, P.L. & Persons, M.H. (2009) Multimodal signalling: the relative importance of chemical and visual cues from females to the behaviour of male wolf spiders (Lycosidae). *Animal Behaviour* **77**(4), 937–947.

Salmon, M. & Atsaides, S.P. (1968) Visual and acoustical signalling during courtship by fiddler crabs (Genus *Uca*). *American Zoologist* **8**(3), 623–639.

Sandeman, D.C. & Wilkens, L.A. (1982) Sound production by abdominal stridulation in the Australian Murray River crayfish, *Euastacus armatus*. *Journal of Experimental Biology* **99**, 469–472.

Sandow, J.D. & Bailey, W.J. (1978) An experimental study of defensive stridulation in *Mygalopsis ferruginea* Redtenbacher (Orthoptera: Tettigoniidae). *Animal Behaviour* **26**(4), 1004–1011.

Schaefer, C.W. (1962) The occurrence of an axillary spur in the Heteroptera and its function in the Coreinae. *Annals of the Entomological Society of America* **55**(6), 675–678.

Schaefer, C.W. (1965) The morphology and higher systematics of the Idiostolinae (Hemiptera: Lygaeidae). *Annals of the Entomological Society of America* **59**, 602–613.

Schaefer, C.W., Pupedis, R.J. & Schaefer, C.W. (2015) A stridulatory device in certain Alydinae (Hemiptera : Heteroptera : Alydidae). *Journal of the Kansas entomological society* **54**(1), 143–152.

Schal, C., Fraser, J. & Bell, W.J. (1982) Disturbance stridulation and chemical defence in nymphs of the tropical cockroach *Megaloblatta blaberoides*. *Journal of Insect Physiology* **28,** 541–552.

Scharff, N. & Coddington, J.A. (1997) A phylogenetic analysis of the orb-weaving spider family Araneidae (Arachnida, Araneae). *Zoological Journal of the Linnean Society* **120**, 355–434.

Schmidt, J.M. (1994) Encounters between adult spined assassin bugs, *Sinea diadema* (F.) (Hemiptera: Reduviidae): the occurrence and consequences of stridulation. *Journal of Insect Behavior* **7**(6), 811–828.

Schmitz, B. (2002) *Sound production in Crustacea with special reference to the Alpheidae.* In: Wiese K. (ed.) The Crustacean Nervous System. Berlin, Springer, pp. 536–547.

Schofield, C.J. (1977) Sound production in some triatomine bugs. *Physiological Entomology* **2**(1), 43–52.

Schuh, R.T. & Weirauch, C. (2020) *True bugs of the world (Hemiptera: Heteroptera): classification and natural history (Second edition)*. Rochdale, Siri Scientific Press (Monograph Series Volume 8), 800 pp.

Schuh, R.T., Weirauch, C. & Grillo, H. (2015*a*) Revision of *Aphelonotus* Uhler (Hemiptera: Heteroptera: Pachynomidae), with description of six new Species and documentation of nymphal morphology for three species . *American Museum Novitates* **3829**(3829), 1–43.

Schuh, S. (1974) The Orthotylinae and Phylinae (Hemiptera: Miridae) of South Africa with a phylogenetic analysis of the ant-mimetic tribes of the two subfamilies for the world. *Entomologica Americana* **47**, 1–332.

Schuh, S. (1984) Revision of the Phylinae (Hemiptera, Miridae) of the Indo-Pacific. *Bulletin of the American Museum of Natural History* **177**, 1–462.

Schuh, T., Štys, P., Cassis, G., Lehnert, M., Swanson, D. & Bruce, T. (2015*b*) New genera and species of Plokiophilidae from Australia, Fiji, and Southeast Asia, with a revised classification of the family (Insecta: Heteroptera: Cimicoidea). *American Museum Novitates* **3825(**3825), 1–24.

Shelford, R. (1903) Bionomical notes on some Bornean Mantidae. *The zoologist* **7**, 293–304.

Shimojana, M. (1981) A new species of the genus *Trithyreus* (Schizomida, Schizomidae) from the Daito Islands, Okinawa Prefecture, Japan. *Acta Arachnologica* **30**, 33–40.

Šilhavý, V. (1978) *Minuides milleri* sp. n., an opilionid with an unusual manner of stridulation (Phalangodidae, Phalangodinae). *Acta Entomologica Bohemoslovaca* **75**, 58–63.

Slater, J.A. (1999) A revision of the genus *Lygofuscanellus* (Heteroptera; Lygaeoidea; Rhyparochromidae). *The Florida Entomologist* **82**(2), 284–290.

Smart, J. (1953) On the wing-venation of *Physemacris variolosa* (Linn.) (Insecta : Pneumoridae). *Proceedings of the Zoological Society of London,* **123** (1), 199–202.

Snazell, R. & Allison, R. (1989) The genus *Macrothele* Ausserer (Araneae, Hexathelidae) in Europe. *Bulletin of the British Arachnological Society* **8**, 65–72.

Song, H., Béthoux, O., Shin, S., Donath, A., Letsch, H., Liu, S., McKenna, D.D., Meng, G., Misof, B., Podsiadlowski, L., Zhou, X., Wipfler, B. & Simon, S. (2020) Phylogenomic analysis sheds light on the evolutionary pathways towards acoustic communication in Orthoptera. *Nature Communications* **11**(1), 4939.

Spooner, J.D. (1964) The texas bush katydid—its sounds and their significance. *Animal Behaviour* **12**, 235-244.

Stehlík, J.L. (2005) Largidae and Pyrrhocoridae collected by Alexander Riedel in Irian Jaya (New

Guinea) from 1990 up to 1996 (Heteroptera). *Linzer biologische Beiträge* **37**(2), 1719–1736.

Stehlík, J.L. & Brailovsky, H. (2016) Review of the genus *Arhaphe* (Hemiptera: Heteroptera: Largidae) with descriptions of nine new species from Central America. *Zootaxa* **4093**(4), 451–479.

Stehlík, J.L. & Jindra, Z. (2006) New species of Largidae and Pyrrhocoridae (Heteroptera) from the Oriental region. *Acta Entomologica Musei Nationalis Pragae* **46**(2), 31–41.

Stidham, T.A. (2020) Evaluating hypotheses for the function of the 'hissing' stridulation of sun spiders (Arachnida Solifugae). *Ethology Ecology and Evolution* **32**(3), 296–307.

Štys, P. (1961) The stridulatory mechanism in *Centrocoris spiniger* (F.) and some other Coreidae (Heteroptera). *Acta Entomologica Musei Nationalis Pragae* **34**, 427–431.

Štys, P. (1964) Thaumastellidae - a new family of pentatomoid Heteroptera. *Acta societatis entomologicae cechosloveniae* **61**, 238–253.

Štys, P. (2000) The enigmatic 'arrow-headed bug' from Australia (Heteroptera: Pentatomoidea) and its relationship. P. 918 in: *XXI. International Congress of Entomology*. Foz do Iguassu, Brazil.

Štys, P. & Baňař, P. (2006) Description of a new genus with larviform females from Mauritius (Heteroptera, Enicocephalidae), with discussion of thoracic and abdominal morphology. *Denisia* **19**, 681–695.

Štys, P. & Baňař, P. (2007) The first species of *Systelloderes* (Hemiptera: Heteroptera: Enicocephalidae) from New Caledonia. *Acta Entomologica Musei Nationalis Pragae* **47**, 3–15.

Štys, P. & Baňař, P. (2013) Eastern Arc Mountains in Tanzania: Hic sunt aenictopecheidae. The first genus and species of afrotropical aenictopecheidae (Hemiptera: Heteroptera: Enicocephalomorpha). *European Journal of Entomology* **110**, 677–688.

Sweet, M.H. (1964). The biology and ecology of the Rhyparochrominae of New England (Heteroptera: Lygaeidae). Part I. *Entomologica Americana* **43**, 1–124.

Sweet, M.H. (1996) *Comparative external morphology of the pregenital abdomen of the Hemiptera*. In: Schaefer, W.C. (ed.) Studies on Hemipteran Phylogeny. Lanham, Thomas Say Publications in Entomology, pp. 119–158.

Sweet, M.H. & Slater, J.A. (2004). An analysis of species-groups of the genus *Plinthisus* Stephen (Hemiptera: Rhyparochromidae) in the Ethiopian Region with the description of eight new species. *Zootaxa* **533**, 1–56.

Sweger, A.L. & Uetz, G.W. (2016) Characterizing the vibratory and acoustic signals of the "purring" wolf spider, *Gladicosa gulosa* (Araneae: Lycosidae) . *Bioacoustics* **25**(3), 293–303.

Tamada, Y., Hinami, H., Miyazaki, A., Yasunaga, T., Nagashima, T. & Serrano Leon, S. (2020) Elucidation of cryptic ecology of "Runner Plant Bugs" (Miridae: Phylinae: Hallodapini), with emphasis on the stridulatory mechanism. *Rostria* 65, 1–14.

Taylor, J.R.A., deVries, M.S. & Elias, D.O. (2019) Growling from the gut : co-option of the gastric mill for acoustic communication in ghost crabs. *Proceedings of the Royal Society B* **286**, 20191161.

Thorpe, K.W. & Harrington, B.J. (1981) Sound production and courtship behavior in the seed bug *Ligyrocoris diffusus*. *Annals of the Entomological Society of America* **74**(4), 369–373.

Tinerella, P.P. (2008) Taxonomic revision and systematics of New Guinea and Oceania pygmy water boatmen (Hemiptera: Heteroptera: Corixoidea: Micronectidae). *Zootaxa* **1797**, 1–66.

Tinerella, P.P. (2013) Taxonomic revision and systematics of continental Australian pygmy water boatmen (Hemiptera: Heteroptera: Corixoidea: Micronectidae). *Zootaxa* **3623**(1), 1–121.

Townsend, V.R., Classen-Rodriguez, L., Maloney, T.J. & Moore, M.K., Jr (2019) Stridulation by cosmetid harvestmen (Arachnida : Opiliones). *Journal of Arachnology* **47**(1), 132–141.

Tran, A.D. & Nguyen, X.Q. (2016) A study of the genus *Aphelocheirus* (Hemiptera: Nepomorpha: Aphelocheiridae) from northern Vietnam, with descriptions of three new species. *Zootaxa* **4083**(4), 587–600.

Truxal, F.S. (1952) The comparative morphology of the male genitalia of the Notonectidae (Hemiptera). *Journal of the Kansas Entomological Society* **25**, 30–38.

Tsang, L.M., Schubart, C.D., Ahyong, S.T., Lai, J.C.Y., Au, E.Y.C., Chan, T.-Y., Ng, P.K.L. & Chu, K.H. (2014) Evolutionary history of true crabs (Crustacea: Decapoda: Brachyura) and the origin of freshwater crabs. *Molecular Biology and Evolution* **31**(5), 1173–1187.

Uetz, G.W. & Stratton, G.E. (1982) *Acoustic communication and reproductive isolation in spiders*. In: Witt, P. N. & Rovner, J.S. eds. Spider communication: mechanisms and ecological significance. Princeton, Princeton University Press, pp. 123–159.

Uhl, G. & Schmitt, M. (1996) Stridulation in Palpimanus gibbulus Dufour (Araneae: Palpimanidae). *Revue Suisse de Zoologie* **2**, 649–660.

Usinger, R.L. & Matsuda, R. (1959) *Classification of the Aradidae (Hemiptera-Heteroptera)*. London, Printed by order of the trustees of the British Museum, 410 pp.

Uvarov, P.B. (1943) The tribe Thrinchini of the subfamily Pamphaginae, and the interrelations of the acridid subfamilies (Orthoptera). *Transactions of the Royal Entomological Society of London* **93**, 1–72.

Uvarov, P.B. (1966) *Grasshoppers and locusts. A handbook of general acridology. Volume 1. Anatomy, physiology, development, phase polymorphism, introduction to taxonomy*. London, Anti-Locust Research Centre, 481 pp.

Van Der Wal, C., Ahyong, S.T., Ho, S.Y.W. & Lo, N. (2017) The evolutionary history of Stomatopoda (Crustacea: Malacostraca) inferred from molecular data. *PeerJ* **5**, e3844.

Van Staaden, M.J. & Römer, H. (1997) Sexual signalling in bladder grasshoppers: Tactical design for maximizing calling range. *Journal of Experimental Biology* **200**(20), 2597–2608.

Varley, G.C. (1939) Frightening attitudes and floral simulation in praying mantids. *Proceedings of the Royal Entomological Society of London A* **14**, 91–96.

Weissman, D.B. (2001) *North and Central American Jerusalem crickets (Orthoptera: Stenopelmatidae): taxonomy, distribution, life cycle, ecology and related biology of the American species*. In: Field, L. (ed.) The biology of Wetas, King Crickets and their allies. New York, CAB International, pp. 57–72.

Wesener, T., Köhler, J., Fuchs, S. & Van Den Spiegel, D. (2011) How to uncoil your partner-"mating songs" in giant pill-millipedes (Diplopoda: Sphaerotheriida). *Naturwissenschaften* **98**, 967–975.

West, R.C., Marshall, S., Fukushima, C.S. & Bertani, R. (2008) Review and cladistic analysis of the neotropical tarantula genus *Ephebopus* Simon 1892 (Araneae: Theraphosidae) with notes on the Aviculariinae. *Zootaxa* **1849**, 35–58.

West, R.C., Nunn, S.C. & Hogg, S. (2012) A new tarantula genus, *Psednocnemis,* from West Malaysia (Araneae:Theraphosidae), with cladistic analyses and biogeography of Selenocosmiinae Simon 1889. *Zootaxa* **3299**, 1–43.

Wesolowska, W. (1999) A revision of the spider genus *Menemerus* in Africa (Araneae: Salticidae). *Genus* **10**(2), 251–353.

Weygoldt, P. (1996) Evolutionary morphology of whip spiders: towards a phylogenetic system (Chelicerata: Arachnida: Amblypygi). *Journal of Zoological Systematics and Evolutionary Research* **34**(4), 185–202.

Wheeler, W.C., Coddington, J.A., Crowley, L.M., Dimitrov, D., Goloboff, P.A., Griswold, C.E., Hormiga, G., Prendini, L., Ramírez, M.J., Sierwald, P., Almeida-Silva, L., Alvarez-Padilla, F., Arnedo, M.A., Benavides Silva, L.R., Benjamin, S.P., *et al*. (2017) The spider tree of life: phylogeny of Araneae based on target-gene analyses from an extensive taxon sampling. *Cladistics* **33**(6), 574–616.

Wieland, F. (2013) The phylogenetic system of Mantodea (Insecta: Dictyoptera). *Species, Phylogeny and Evolution* **3**, 3–222.

Wilcox, R.S. (1969) *Acoustical behavior, sound-producing structures and biology of Buenoa (Hemiptera, Notonectidae)*. PhD dissertation, University of Michigan, Ann Arbor, 271 pp.

Wilcox, R.S. (1979) Sex discrimination in *Gerris remigis*: role of a surface wave signal. *Science* **206**(4424), 1325–1327.

Woo, B. (2020) First natural history observations of the canyon pygmy mole cricket, *Ellipes monticolus* (Orthoptera: Tridactylidae). *Journal of Orthoptera Research* **29**(1), 1–7.

Wood, H.M. & Scharff, N. (2018) A review of the Madagascan pelican spiders of the genera *Eriauchenius* O. Pickard-Cambridge, 1881 and *Madagascarchaea* gen. n. (Araneae, Archaeidae). *ZooKeys* **2018**, 1–96.

Wood-Mason, J. (1878) Entomological notes 2: On the presence of a stridulating apparatus in certain Mantidae. *Transactions of the Entomological Society of London*, 263–267.

Woodrow, C., Judge, K.A., Pulver, C., Jonsson, T. & Montealegre-Z, F. (2021) The Ander’s organ: a mechanism for anti-predator ultrasound in a relict orthopteran. *The Journal of Experimental Biology* **224**(2), jeb237289.

Woodrow, C., Baker, E., Jonsson, T. & Montealegre-Z, F. (2022) Reviving the sound of a 150-year-old insect: The bioacoustics of *Prophalangopsis obscura* (Ensifera: Hagloidea). *PLoS ONE* **17**(8), e0270498.

Wu, Y.-Z., Rédei, D., Eger, J., Wang, Y.-H., Wu, H.-Y., Carapezza, A., Kment, P., Cai, B., Sun, X.-Y., Guo, P.-L., Luo, J.-Y. & Xie, Q. (2017) Phylogeny and the colourful history of jewel bugs (Insecta: Hemiptera: Scutelleridae). *Cladistics* **34**(5), 502–516.

Yasunaga, T., Tamada, Y., Hinami, H., Miyazaki, A. & Duwal, R.K. (2019) Taxonomic review for the Asian taxa of plant bug tribe Hallodapini, with emphasis on stridulatory mechanism (Hemiptera: Heteroptera: Miridae). *Acta Entomologica Musei Nationalis Pragae* **59**(1), 71–99.

Ye, Z., Damgaard, J., Yang, H., Hebsgaard, M.B., Weir, T. & Bu, W. (2019) Phylogeny and diversification of the true water bugs (Insecta: Hemiptera: Heteroptera: Nepomorpha). *Cladistics* **36**(1) 1–16.

Zettel, H. (1996) *Chenevelia stridulans* gen . n . et sp . n . from North Thailand. *Annalen des Naturhistorisches Museum Wien* **98**, 353–359.

Zettel, H. (2012) One new species and one new record of *Helotrephes* (Insecta : Hemiptera : Heteroptera : Helotrephidae) from Laos. Annalen des Naturhistorischen Museums in Wien. *Serie B für Botanik und Zoologie* **114**, 37–42.

Zettel, H., Papáček, M. & Kovac, D. (2011) Guide to the aquatic Heteroptera of Singapore and Peninsular Malaysia: VII. Family Helotrephidae. *The Raffles Bulletin of Zoology* **59**(2), 171–179.

Zettel, H. & Thirumalai, G. (2000) *Stridulobates anderseni*, a new genus and species of ptilomerine Gerridae (Hemiptera: Heteroptera) with “stridulatory devices” from South India. *Insect Systematics and Evolution* **31**(4), 432–439.

Zhang, W.T., Yao, Y.Z. & Ren, D. (2012) Phylogenetic analysis of a new fossil Notonectidae (Heteroptera: Nepomorpha) from the Late Jurassic of China. *Alcheringa: An Australasian Journal of Palaeontology* **36**(2), 239–250.

Zuk, M., Rotenberry, J.T. & Tinghitella, R.M. (2006) Silent night: adaptive disappearance of a sexual signal in a parasitized population of field crickets. *Biology letters* **2**(4), 521–524.

Zych, A.F., Mankin, R.W., Gillooly, J.F. & Foreman, E. (2012) Stridulation by *Jadera haematoloma* (Hemiptera: Rhopalidae): production mechanism and associated behaviors. *Annals of the Entomological Society of America* **105**(1), 118–127.