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Pardosa sp. with Brimstone Butterfly. © Christian Moss.

Why do Scientific Names Change?

by Alastair Lavery

Changes in the scientific names of arachnids are a perennial source of comment, and at times irritation, amongst all who use them. The changes can cause confusion and make older books and species lists all but unusable. The reasons for these changes should be good ones if they are to be justified.

When it was devised between 1735 and 1758, the aims of Linnaeus's *Systema Naturae* included ensuring that all living things had a globally uniform name, that these names were concise, and reflected the organism's place in his hierarchical classification. *Systema Naturae* is the basis of the names we use today, called either scientific, Latin or, more properly, binomial nomenclature.

Binomial names are made up of two words and describe a unique species. The first of these is the name of the genus – a group of close relations, and the second the species. The species is the most important unit in taxonomy and species description and diagnosis lies at the heart of all biology. Given this central importance, it seems undesirable that they are subject to change. But it is built into the system that they can, and on occasion should, change.

Why change names?
Basically, there are two reason for name change, taxonomy and nomenclature. In practice the categories interact.

Taxonomy – the science of classification. Name changes that are the easiest to justify are caused by advances in taxonomy. As more arachnids are described from all around the world, and as the techniques we can use to investigate them improve, it is inevitable that greater understanding will lead to change in taxonomic status. Often names will change as a result.

Nomenclature – the devising of names. The second reason is concerned with nomenclature and the rules that surround the naming of species and other taxonomic divisions above and below species level. These rules are set out by the International Commission of Zoological Nomenclature (ICZN) in its code, the ICZN Code. The Code covers all animals, with other organisations producing codes for plants, bacteria, and viruses. The Code has six principles, the most important to us being priority, the oldest available name should always be used. The ICZN maintains ZooBank, an as yet incomplete registry of names and references.

One of the surprising things about the binomial name system is its informal basis. The acceptance or rejection of arachnid names is, in almost all cases, not carried out by official bodies, but by arachnologists themselves. The ICZN can only rule on what these units are called, making sure that names are properly constructed, not confusing and basically follow the rules. One of the very few cases where ICZN have been involved in spider name change is in Box One; "A disaster avoided".

Box One; "A disaster avoided".
In 1970, Locket, Millidge and van Helsdingen reported that they had re-examined the Type material *Tenuiphantes tenebricola* (Wider, 1834) and found that it was all *Tenuiphantes mengei* (Kulczynski, 1887). If the ICZN rules were followed *Tenuiphantes mengei* should be called *Tenuiphantes tenebricola* and a new name found for *tenebricola.* The confusion this could cause can be imagined. To avoid this the three made an application to the ICZN in 1978 that the rules be relaxed to allow the two species to retain their established names. This is one of the very few cases where spider names have been submitted to the ICZN.

Box Two; "The Old Boys get it right".
In 2019 Cristoph Muster and Peter Michalik published a review of spiders related to the familiar UK species *Micaria pulicaria* Koch, 1839. They used modern microscopy and careful measurements along with mitochondrial DNA to revise the species boundaries in this complex group. Both morphological and molecular evidence led them to conclude that the UK species was in fact two, *Micaria pulicaria* and a "new" species, *Micaria micans* (Blackwall, 1858). The new species is in fact an old one rejected in the early 20th century when *M. micans* and *pulicaria* were judged to be the same species and synonymised. In this case the observations and intuition of the early arachnologists were right. The SRS now shows *M. micans* scattered across the southern half of the UK, with *M. pulicara sens. str.* with a wider distribution, likely to end up closer to the records of what is now *M. pulicara sens. lat.* or agg..

Why do species' names change?
A common reason for name change is when an accepted species is found to be more than one species. This can be because of better observations, as both microscopy and the understanding of spider anatomy has improved greatly, or the use of new techniques such as genetic barcoding. A recent UK example is the split of *Micaria* described in Box 2; "The Old Boys get it right".

Splitting species causes a real problem with recording and the literature. In most cases the original species name is kept for part of the new species group leading to potential confusion – which species does the name refer to in pre-split literature? Two terms are used to try to help with this – *sensu lato* (*sens. lat.* or *s.l.*) for the potentially mixed use of the species name and *sensu stricto* (*sens. str.* or *s.s.*) when the reference is to the post-split species. The term aggregate (agg.) is sometimes used to denote the pre-spit species combination, as in the Spider Recording Scheme.

Two other terms are used in discussing name changes and will be encountered in the literature and the World Spider Catalog (WSC). *Nomen dubium*, which translates as doubtful name, is used when the description is so poor that species or genus cannot be identified, and no type material can be found. *Nomen nudum* – as you guessed, naked name – is used when the name is not properly published or when the description has key information missing. Both lead to rejection of the name, though *Nomen dubium* can be reversed. Dealing fully with these categories brings us close to discussion of Type material and the technical terms use to describe it. Perhaps best left for another article.

Combining species is just as important, though now less common in the UK than in the past. An established species is found to be taxonomically the same as another, and their names are combined, with the oldest valid name taking priority. A good example of this is *Araneus diadematus* Clerck 1757. The WSC lists ten species synonyms, all before 1884, reflecting the same species described by different authors based on different colour forms or simply the species in a different place. Through all of that, the name given to the species is still the one given in 1757 by Carl Clerck, a contemporary and friend of Carl Linnaeus.

Figure 1. *Tenuiphantes tenuis* (Blackwall, 1852) adult female. Scale 1 mm. © Richard Gallon.

Why do genus names change?
Like species, genera can be split and merged. In addition, species can be re-allocated to a different genus as new information emerges or the definition of the genus is changed. Many recent name changes have been made as large traditional genera are divided into more manageable units. The splitting up of the genus *Lepthyphantes* is a good example here. By the 1990s, it had grown to more than 800 species worldwide. In the UK the 21 species were being split into more manageably sized groups by most authors for identification purposes. Locket and Millidge used five groups in *British Spiders Volume II* in 1953 and there were seven groups in Roberts' 1987 *The spiders of Great Britain and Ireland Volume 2*. These informal groups are similar to some of the new genera introduced by Tanasevitch and others from 1996.

Above genus level the same processes of splitting, merging and transfer take place, but don't change the binomial name. When a species is moved to a different family the order of species in lists and books is altered, a minor but persistent annoyance. A striking example is *Argyroneta aquatica* (Clerck, 1757), currently in Family Dictynidae, but has been in Cybaeidae, Argyronetidae and Agelenidae in recent times. Its true family position is "far from certain" (WCS, 2021).

Correcting mistakes
The major reasons for nomenclature-based change is the correction of mistakes. It is often difficult to ensure that, for example, a new species has not been described before or that the name chosen for it doesn't have some error. Box 3; "The tale of *Notolinga*" describes how this can happen and what the consequences are.

Authority
Formally, the full name of a species or higher taxonomic name includes an additional name and a date. *Tenuiphantes tenuis* (Blackwall, 1852) (Fig. 1) means that the species was described first by John Blackwall in 1852 but the bracket shows that this was not the name he used. In fact he called it *Linyphia tenuis*, before *Linyphia* and *Lepthyphantes* were shown to be different genera and were split in 1884 by Simon. The full name of the current genus is *Tenuiphantes* Saaristo & Tanasevitch, 1996. The genus *Tenuiphantes* is defined in the 1996 paper and has not been changed since then.

The authority is not always used, although if writing for a formal journal, like *Arachnology*, the authority is always given the first time the species is mentioned. It is useful when following and checking a sequence of name changes.

Box 3; "The tale of *Notolinga*"
In 2013 Rowley Snazell and I described a small linyphiid from the Falkland Islands as a new genus and species, *Linga orqueta* Lavery & Snazell, 2013. A few years later I was contacted by a mollusc expert and learned that a genus of bivalves had been called *Linga* since 1884. We had checked for other uses of the name but even as recently as 2013 global checks were difficult, although now easier thanks to improvements in internet biodiversity coverage. This meant we had to find a new, and unique, name for the genus, and publish this. A change very clearly in the nomenclature category.
While we were doing this, a contact in Argentina sent me a copy of a paper by Nadine Duperre and Danilo Harms from 2018, redescribing and illustrating material collected in Patagonia and Tiera del Fuego in 1890 and identified and stored by Eugene Simon in Hamburg. One female described as *Neriene fuegiana* Simon, 1902 is very clearly the same as our *L. orqueta.* The ICZN priority rules are clear, the oldest name must be used. But Simon's allocation to *Neriene* was clearly wrong. He followed practice at the time of placing the spider in the nearest known genus, in most cases a European one and at a time when genera had much wider limits than today.
This is the name-change nightmare, when both genus and species change, breaking the name links for anyone trying to keep up. To minimise confusion we kept part of the old genus name in the new one and of course adopted the species name from Simon's 1906 publication. The species is now *Notolinga fuegiana* (Simon, 1902).

How do names change?
In practice the process goes something like this. Research indicates that a species or genus should be named or re-named. This is written up in a standard format and published in a recognised journal. At this stage, the published changes are considered by the World Spider Catalog and, if accepted, are added to its online database and the name becomes the internationally recognised one. It is then up to the community to decide when, or indeed if, the new name goes into general use. At any point in this sequence a contentious naming could be referred to the IZCN for a ruling on the validity of the name, though this is extremely rare.

In the UK there is an unofficial convention that whenever possible the name used follows the latest UK Checklist revision, published about every 5 years by the B.A.S. This gives a degree of stability. This convention is followed most often for nomenclature-driven changes, while species splits are usually seized on and used, understandably, more quickly.

This is now a well-used process, but it was not always done in this orderly way. At the description stage, search through older literature shows most species descriptions lack the detail now considered essential for publication and in many cases the description is so poor that it is not possible to identify the species described. But as part of the species definition process Type individuals must be identified, and these specimens are placed in a major collection. In a reassuringly large number of cases the types can still be accessed and used to update species or genus descriptions.

The next stage, of cataloguing, has changed greatly over the years. Before the published catalogues, arachnologists learned of changes in taxonomy and nomenclature through finding papers scattered through many journals or more importantly by informal networks exchanging letters and specimens. This was replaced by catalogues published in book form, first by Roewer from 1942 to 1955 and by Bonnet between 1945 and 1961, followed by Brignolli in 1983. Norman Platnick took over and published three volumes between 1989 and 1997. Under his guidance the catalogue moved online as the World Spider Catalog, changing to its current format and home in 2014 when Norm Platnick retired. Full details of WSC history and how it works can be found on its website.

Conclusions

Binomial names have always changed and at present the rate is probably close to its historical average. The reasons for change vary in time. In the great days of early arachnology, the major reason was synonymy, as arachnologists all over Europe began the painful process of working out which species described in Sweden, Germany and Wales were in fact the same and which name should be used following the rule of precedence. Next came many changes in genus names as the traditional genera were found to be inadequate. In 1864 Blackwall was able to place all the UK Linyphiidae in three large genera. We currently recognise over 120 linyphiid genera in the UK.

The literature has many examples of arachnologist's complaints about changes, but it's always worth quoting the great Bill Bristowe, a moderniser ahead of his day in most things, who wrote resignedly "The nomenclature has undergone many changes, and it is feared that we have by no means reached finality yet" in *The comity of spiders, Vol. 1* (Bristowe, 1939). Not all arachnologists face nomenclature revision with such acceptance.

Can we predict what is likely to happen over the next few years? There will be the normal changes due to species and genus splits and nomenclature corrections. The major areas of change are likely to be in large families with worldwide distributions, like Theridiidae and Salticidae, as regional and global reviews lead to shifts in genus definitions, species splits and synonymies. In addition we can expect major changes led by increasingly precise molecular techniques. These techniques may have had a shaky start in arachnology, but we can expect major DNA-led changes over the next few years, especially at genus and family levels.

The bright point in all this is that we have a way of keeping on top of name changes. The World Spider Catalogue https://wsc.nmbe.ch, online and free, allows us to check names, both current and old. The search facility allows almost any former name to be tracked down and its current name found. The genus and species pages give comprehensive lists of synonyms in date order and, miraculously, links directly to copies of the papers that made the changes. This makes sorting out names, which was extremely difficult 20 years ago, a matter of a few clicks.

If you need final words of encouragement, remember that the UK arachnids are taxonomically stable. Elsewhere taxonomic and nomenclature changes can be bewildering. There have been enormous improvements in the understanding of the taxonomy of arachnids in South America over the last two decades. With this has come changes in nomenclature. When I first became interested in arachnids on the Falkland Islands in 2000, there were 27 known, fully described, native species. Only 12 of these have the same name today, and 10 have changed both species and genus names. That is the equivalent of 66% of the UK list changing in the last 21 years, about 430 species. We live in stable times in a stable region!

Helen Smith and Geoff Oxford helped me with this article, suggesting I write it and providing useful discussion and comments.

References

This account should be accompanied by a lengthy list of references supporting each of the name changes described. However, since all of these can be traced, in greater detail than given here, through the World Spider Catalogue, the reference list is restricted to only two online sources.

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On a Theraphosid Spider Discovered as a Stowaway in Fruit from the Dominican Republic (Araneae: Theraphosidae)

by Danniella Sherwood

In early April 2020, the author was made aware, through an enquiry to the British Arachnological Society Google group, of an instance of a spider of the family Theraphosidae Thorell, 1869 being imported with a recent fruit shipment from the Dominican Republic. Photographs provided by a member of staff at a fruit importation facility (both remain unnamed here by request) confirmed the specimen to be a species of the genus *Phormictopus* Pocock, 1901 which is a widespread in the Dominican Republic and neighbouring Haiti (Rudloff, 2008). The specimen was promptly sent to the author within a few days, and prior to this was fed, watered and securely housed by the staff member with advice and instructions from the author. Upon arrival, the specimen, which is immature, was photographed (Fig. 1) and will now be housed for the duration of its lifetime, with the aim to raise it to maturity to enable species-level identification.

The taxonomy of the genus *Phormictopus* is currently unstable, with many species unable to be securely defined based on their original descriptions. It is clear that a comprehensive revision of this genus is needed and at present there is no way to definitely identify juveniles at the species-level and indeed this may not even be possible following any such revisions. At present this genus houses species occurring on the islands of Hispaniola and Cuba, with two securely known to occur within the Dominican Republic: *Phormictopus atrichomatus* Schmidt, 1991 (which has the erroneous type locality of Honduras) and *Phormictopus cancerides* (Latreille, 1806) (*sensu stricto*). Undescribed taxa are present in the county (Antonio Totso pers. comm.) and it is possible that the enigmatic *Phormictopus melodermus* Chamberlin, 1917 may also occur on Hispaniola (World Spider Catalog, 2020) but this remains unconfirmed with Chamberlin (1917: 62) giving the type locality as merely "West Indies?". Given the long -standing taxonomic chaos of this group of charismatic spiders, any identifications based on immature specimens or habitus photographs would be purely speculative at present, considering the lack of reliable lines of evidence to identify such specimens.

Spiders are occasional stowaways in fruit shipments (e.g. LeClercq, 1953; Schmidt, 1956a, 1956b, 1956c, 1956d, 1957, 1971; Baert, 1987; Van Keer, 2007; Jäger &

Figure 1. Immature specimen of *Phormictopus* sp. imported with fruit from the Dominican Republic. © D. Sherwood.

Blick, 2009; Bosselaers, 2013; Noordijk & de Winkel, 2017; Cathrine & Longhorn, 2017; Allen & Taylor, 2017; Lemke, 2019), but these nearly always concern araneomorph taxa. The occurrence of theraphosid spiders in such circumstances is rare, the author knowing of only a handful other live specimens being imported into the United Kingdom in the last two decades and an equal handful of specimens which died in transit. A comprehensive review of theraphosid importations with fruit from the 1800s through to the 2000s will be discussed in a future work (Sherwood *et al*. in prep). The author is unaware of any records at present of any other family of mygalomorph spider being imported with fruit except for the Theraphosidae.

Acknowledgements
I would like to thank the staff member at the fruit importation facility for making a special effort to ensure the safe transfer of the spider to me, and their encouragement for me to publish this record.

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Counting Pseudoscorpions in my Backyard

by Walter Schuit

Some years ago I placed a wooden board under a window sill in order to monitor a theridiid that was guarding two egg-sacs under that sill. In this way I hoped to see from the prey remains and excrement whether the spider was still catching prey. This set-up did indeed work, the spider showed activity.

The board was painted dark brown and measured 80 x 14 cm. The board was left over from my backyard fence. One side had little grooves machined into it for embellishment, so when this side was on the ground, there was room for small invertebrates to gain access beneath. The substrate this board covered was uneven flat bricks and boulders. These conditions may have been instrumental for my later observations. A perfectly flat board on a sandy surface might have given very different results.

Periodically I looked on the underside of this board for spiders and also noticed pseudoscorpions, springtails and woodlice there. I had never seen a pseudoscorpion in the Netherlands. By a coincidence, two months after this discovery I received an invitation from the B.A.S. for a Pseudoscorpion ID workshop in Liverpool in October 2017, led by Liam Andrews and Francis Farr-Cox, which I attended. Following the course, I looked beneath this board more frequently and almost every visit resulted in seeing pseudoscorpions. I am based in the Eastern Netherlands.

The year 2020 kept me at home after February because of Covid-19. Usually I spend a considerable part of my time in Spain (and sometime in England). This gave me a chance to do a more systematic observation of these pseudoscorpions. Almost every day between 9:00 and

Table 1. Numbers of pseudoscorpions seen under wooden board

	April	May	June	July	Aug	Sept	Oct	Nov
Number of visits	13	28	25	17	18	22	23	14
Average	1.9	4.5	2.9	5.2	4.4	4.8	1.6	0.1
Maximum	6	11	13	17	13	9	6	1

Figure 2

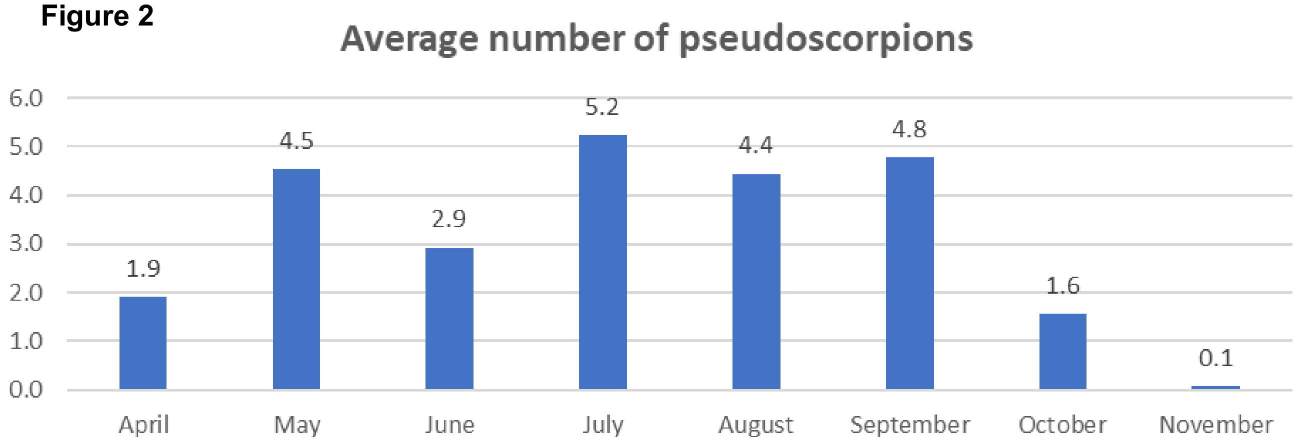

Figure 3

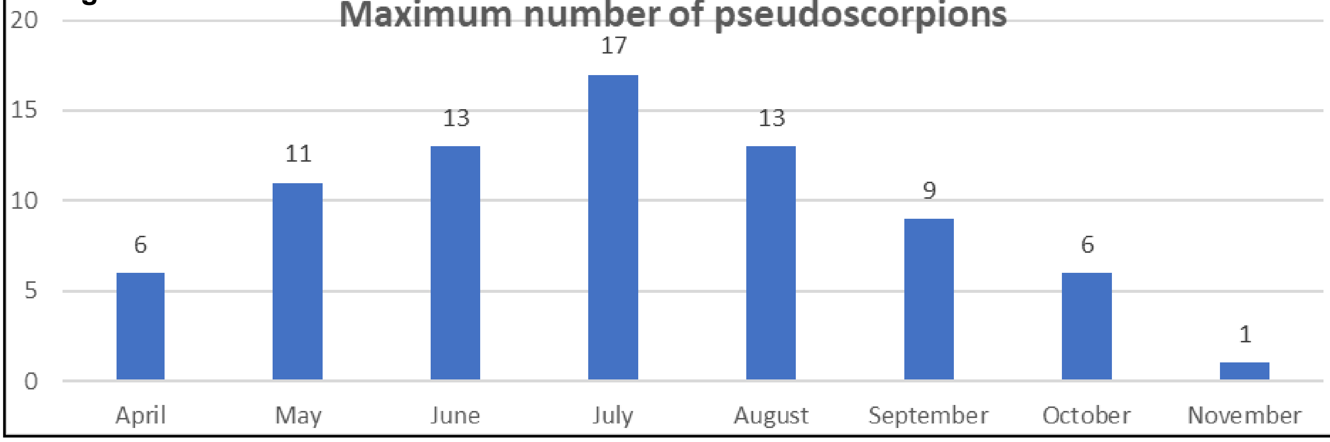

Figure 1. The corrugated wooden board, the corrugations were 3 mm apart. © Walter Schuit.

12:00 in the morning I turned over the board, laid it on a rubbish bin so I could look at it from approximately 25 cm, and then scanned it for pseudoscorpions. I did not identify any of them, that would have taken too much time, I just focused on their number.

Sometimes, because of rain or condensation of moisture from the ground below, the board was entirely or partially wet on the underside. I cannot remember having seen a pseudoscorpion on a wet part of the board. One reason may be that they stay away from moisture because it is sticky (one technique for picking them up is with a moistened finger tip). Another reason might be that they cannot hang upside down from a wet surface, but they might still be present on the ground under the board.

I summarised the pseudoscorpion occurrence data by month (Table 1). I started on the 15th April and my last observation was on the 24th November, with the last specimen seen on the 1st November. For each month I give the number of days I looked under the board (number of visits), the average number of pseudoscorpion over these days (Fig. 2), and the maximum number (Fig. 3) for that month. The maximum number of 17 pseudoscorpions was a great surprise to me.

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Micaria micans **(Blackwall, 1858) and** ***Micaria pulicaria*** **(Sundevall, 1831)** ***sensu stricto*** **in North Wales with Notes on Their Identification**

by Richard C. Gallon

Recently the common and widespread antmimic spider *Micaria pulicaria* (Sundevall, 1831) was found to represent two distinct species in Britain (Muster & Michalik, 2019): *Micaria micans* (Blackwall, 1858) and *Micaria pulicaria sensu stricto*. This publication reversed a 19th Century synonymy of the two species, but this meant that all British records need to be redetermined to ascertain which species they now represent.

Tony Russell-Smith and I were fortunate in that we had both supplied Muster & Michalik with fresh British material for their DNA and morphological research, so we already knew the identities of some of our regional *Micaria* populations. Tony subsequently redetermined his *M. pulicaria sensu lato* specimens and was able to define the habitat preference of *M. micans* and *M. pulicaria sensu stricto* in southeast England (Russell-Smith, 2020). In Kent he found *M. pulicaria sensu stricto* to be almost entirely a woodland species, while *M. micans* occurs in a range of open habitats including grasslands, coastal shingle, sand dunes and post-industrial sites. He also noted occasional exceptions to these rules.

Reviewing my own records, predominantly from North Wales, also showed that *Micaria micans* was associated with open, lowland, thermophilic habitats (e.g. short calcareous grassland, sand dunes, vegetated coastal shingle, built-up areas) with an altitudinal range of 1–135 m.

In North Wales *Micaria pulicaria sensu stricto* was also found to inhabit coastal sites, but here in thicker vegetation like coastal grassland, heath, upper strandline litter and dense marram on sand dunes. It was also found to occur on lowland raised bogs, heather moorland and in mountain scree, with an altitudinal range of 1–800 m. So far, my *M. pulicaria sensu stricto* records are all from open habitats rather than woodland, although one atypical record was from short calcareous grassland near to woodland. There is certainly the potential for both species to occur together in North Wales, particularly in coastal situations or where grasslands grade into woodland edge (as at Nant-y-Gamar).

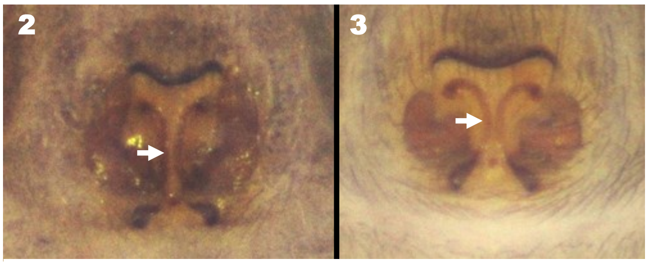
Identification notes

I have recently had the opportunity to redetermine the *Micaria* specimens held at the World Museum, Liverpool. This has given me the opportunity to examine a large series of specimens and to appreciate the variability and practicalities of identifying these spiders using the main characters given by Muster & Michalik (2019).

I found both sexes of *M. micans* readily identifiable by looking for the longitudinal dark dorsal stripe on femurs III and IV (even fifty-year-old specimens could be recognised) (Fig. 1). Large sub-adults (three-quarters grown) could also be confidently assigned to *M. micans* based on the presence of these distinctive markings. However, some smaller immatures collected together with larger *M. micans* did not always exhibit femoral striping, so could not be identified with confidence without the presence of their larger conspecifics.

Adult *M. pulicaria sensu stricto* were also relatively

Figure 1. *Micaria* adult females. Top *M. micans* (Nant-y-Gamar) with longitudinal dark dorsal stripe markings on femurs III and IV (arrowed). Lower *M. pulicaria sensu stricto* (Conwy Mountain) with uniformly coloured femurs III and IV. Scale 1 mm. © Richard Gallon.



Figures 2–3. *Micaria* epigynes. 2. *M. micans* (Nant-y-Gamar) showing elongated, parallel][copulatory ducts (arrowed). 3. *M. pulicaria sensu stricto* (Conwy Mountain) showing squat, divergent)(copulatory ducts (arrowed). © Richard Gallon.

easy to identify with their uniformly coloured femurs III and IV (Fig. 1). However, I was less confident identifying small immatures as this species given the observations above for small immature *M. micans*.

I found epigynal structure usually corroborated femoral marking identification of female *Micaria* specimens (Figs. 2–3). In *M. micans* the copulatory ducts are typically elongated and run in parallel][, whereas in *M. pulicaria* these ducts are more divergent)(. However, I found a few examples where the epigynal structure was contrary to the femoral markings – in these cases I used leg-markings as the primary identification feature (as Muster & Michalik found this somatic characteristic agreed most closely with DNA identification). The anterior epigynal margin condition was not found to be that reliable in the specimens I examined.

In mature males I found the notch on the retrolateral margin of the tegulum to be a useful corroboration of femoral markings (refer to Fig. 4 in Muster & Michalik, 2019). In *M. micans* this notch is obvious and distinct, but is much more shallowly incurved in *M. pulicaria*. The angle of view is critical in appreciating this subtle characteristic and fortunately I found all mature males readily assignable to species by means of femoral markings alone.

Acknowledgment
Thanks are due to Tony Hunter and Gary Hedges at the World Museum, Liverpool for access to their extensive *Micaria* collection.

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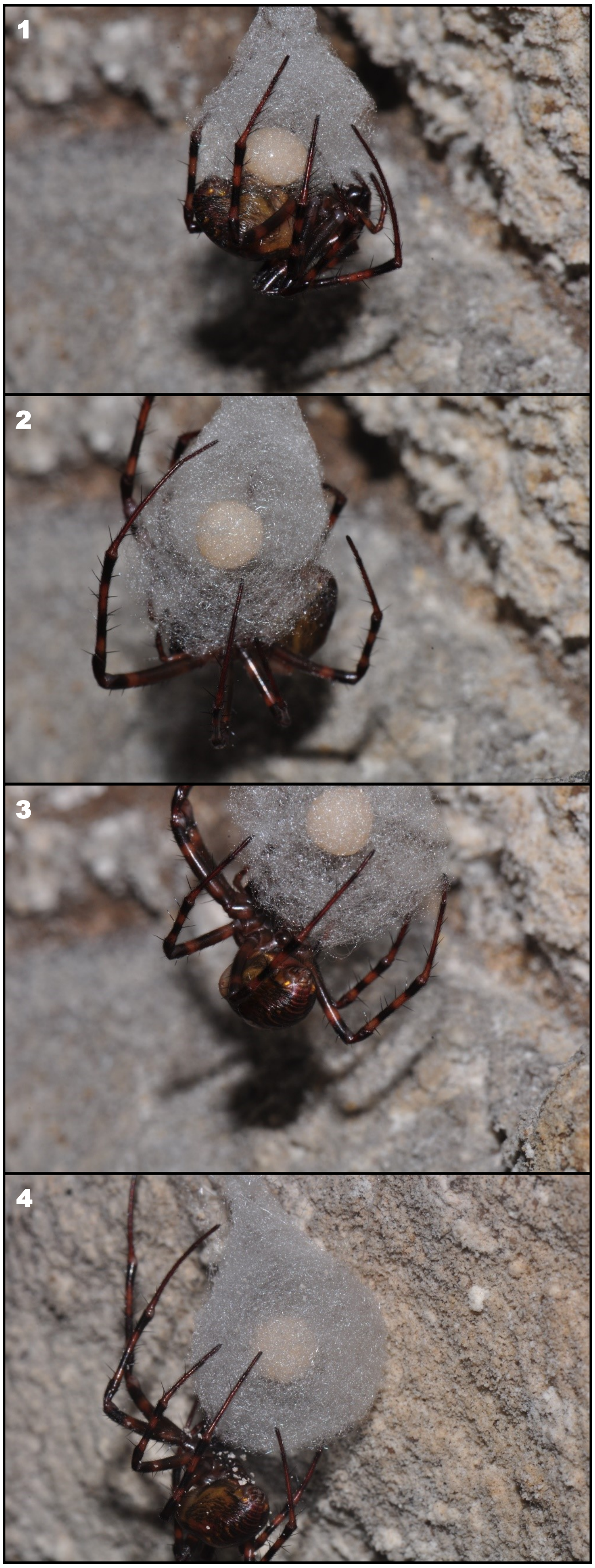
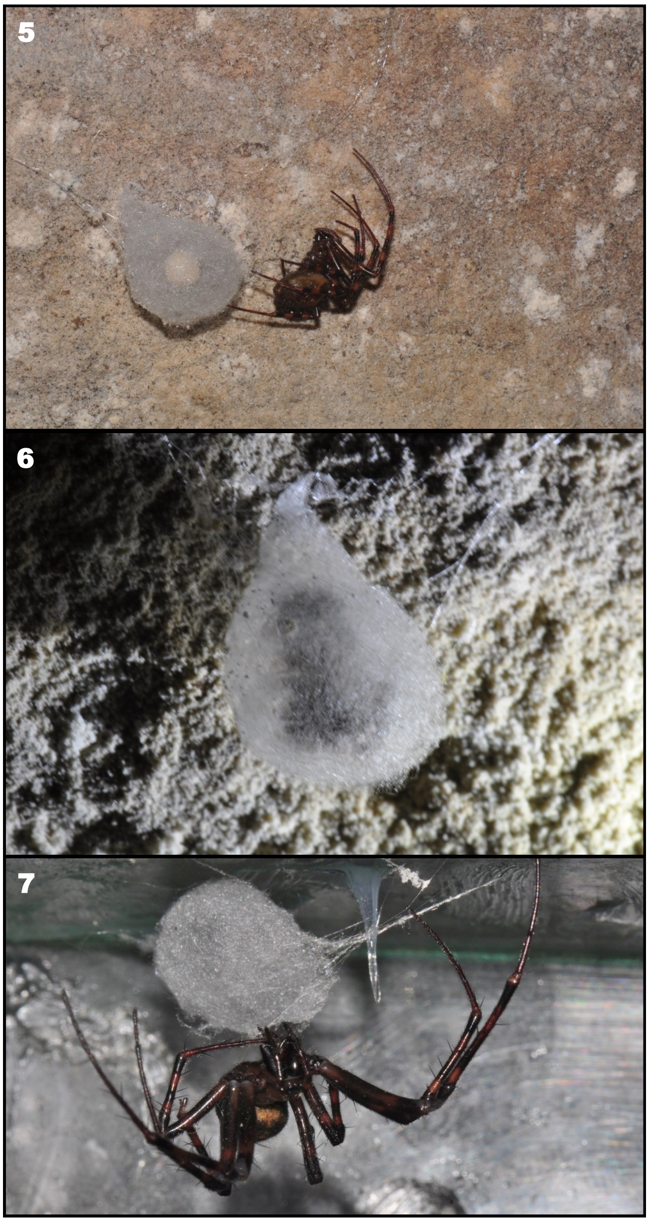
Egg-sac Construction in the Cave Spider *Meta menardi*

by Géza Szabó



Figures 1–4. *Meta menardi* egg-sac construction (minutes of observation): **1.** 0 mins.; **2.** 1 min.; **3.** 43 mins.; **4.** 46 mins. © Géza Szabó.

I have been studying the life cycle of *Meta menardi* for about ten years. However, despite this, there are still important behaviours that I have not been able to observe, such as egg-sac construction. I was most disappointed not to have observed a mating in this species. Initially I used to raise males and females separately in terrariums (in a cellar to imitate a natural cave). Unfortunately they did not feed very well under these conditions, and when I put the two sexes together, they showed no interest in each

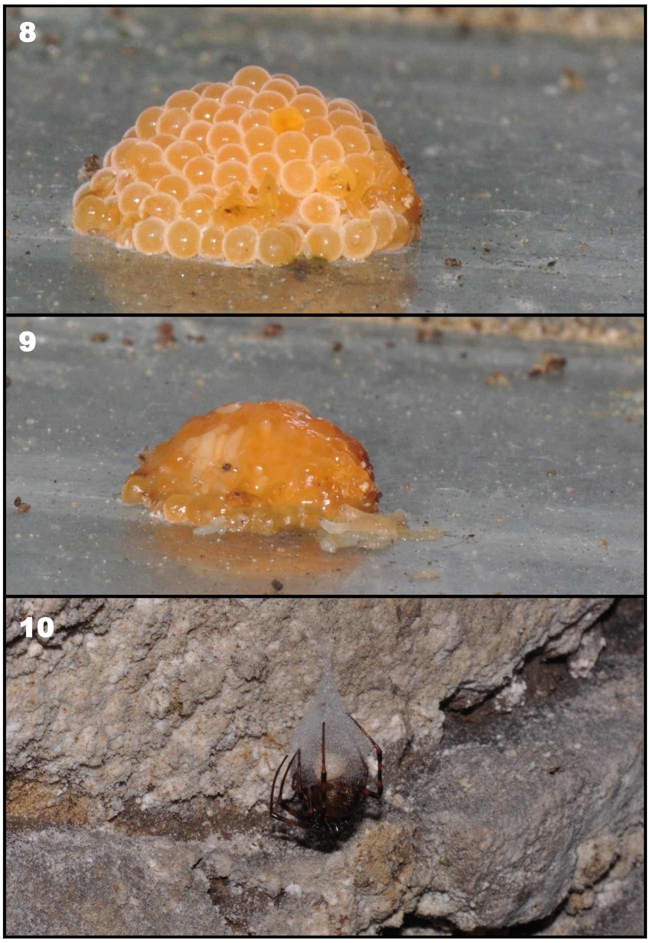


Figures 5–7. *Meta menardi* egg-sacs. © Géza Szabó.

other. This year, I have come up with a new method. I now liberate the females in the cellar allowing them to find their own prey, while keeping the males tightly locked up. As far as I know there was no opportunity for the different sexes to mate.

On the 30th July 2020, to my great surprise, I observed two freshly produced egg-sacs in the cellar. Later, I found another two. From that point onwards I watched the activity of my cave spiders even more enthusiastically than before. Although I was about to leave home on the 5th August (~2:00 pm), I still had a few minutes to spare, so I went down into the cellar. What I saw immediately made me forget my intended tasks, and instead I grabbed my camera.

One of my *M. menardi* females had just made an egg-sac (Figs. 1–2). The next two images show the further stage of egg-sac formation (Figs. 3–4). Six hours later, the egg-sac appeared to be finished (Fig. 5). The next day the female was no longer on the egg-sac. Less than a month later I could no longer find the female anywhere near. The inside of the egg-sac became fluffy (the spiderlings had



Figures 8–10. Failed *Meta menardi* eggs. **8**. on the ground; **9**. decomposing; 10. eggs three days latter. © Géza Szabó.

hatched) and a week later, the second, black instars appeared (Fig. 6).

The approximately 20 mm long, slightly oval egg-sac has a thin outer sheet layer, with a loose web within supporting the eggs. Based on the photos, I suppose the female constructs a cone-shaped sac first, which consists of the sheath and beneath that the loose structure. Then she pushes her eggs into the loose web, and at this point a bottom narrow skirt-shape has been formed. The loose web and the female's body holds the eggs until the egg-sac is finished.

These observations help explain an event I observed two years earlier. I brought home a heavily-gravid female *M. menardi* and placed her in a terrarium. She soon made a silk egg-sac, but it was empty, with the eggs sitting in a pile below on the terrarium floor (Fig. 8). These unwrapped eggs failed a few days later (Fig. 9). Based on my recent observations I suspect this unsuccessful egg-sac occurred because the eggs did not end up in the correct place during egg-sac construction, perhaps as a result of parasite disturbance or simple clumsiness. After laying the eggs, the mother finished this empty egg-sac and attended it (Fig. 10).

The possibility of parthenogenesis did not escape my attention during these observations and this will be investigated and reported on in a future article.

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European Acroceridae – New Host Records, Modified Epigynes and the British Isolation

by Aart Noordam

Introduction

The Acroceridae is a small family of flies completely specialised in parasitizing spiders. Because of their buckled appearance they are called Hunchback flies. Many species, at least all western European ones, have very small heads – so they are also known as Small-headed flies, or simply Spider flies.

Most insects that prey on spiders, as predators or parasites, are wasps – especially the Spider wasps (Pompilidae), that can be easily seen hunting on sunny summer days. It is also not too difficult to find spiders with an attached larva of an ichneumon wasp from the group Pimpliinae, of which the British spider parasitizing species have been studied extensively by Mark Shaw, with several papers also in this Newsletter and a guide to identification (Fitton *et al*., 1988). Of the small group of Diptera that parasitize spiders, only the Acroceridae are completely confined to spiders, but their link with spiders is far less easily observed. As in other primitive parasitizing Diptera families, the eggs are not laid on the host. Instead, the very small larva actively finds its host, in this case a spider, and develops within the spider's abdomen, invisible to the naked eye.

At present there are about 530 described species of Acroceridae worldwide (Gillung & Winterton, 2019); the real species number will undoubtedly be higher, as in other insect groups. In warmer climates there are more species. Europe has nearly 40 species, mainly Mediterranean; Germany 11, the Netherlands 7. Although the southern part of England has a similar climate to the Netherlands, only three species of Acroceridae are British. Erica McAlister, curator of Diptera at the Natural History Museum in London started a blog on Acroceridae in 2018 in this way: "*For the past two days I have started, and finished recurating the British Acroceridae Collection. Wow, you must be thinking, that young Erica is fast! Recurating an entire family in two days*". Later she explained in her blog that all the British Acroceridae are in just one drawer: "*The British Collection is just shy of 300 specimens that date back to the 1850's. In fact, most of the collection is pre-1960"*. The distribution of the three British species can be seen in the provisional atlas produced by Martin Harvey (2018).

The Acroceridae are an old family (Gillung & Winterton, 2017). The oldest known fossils are impressions from the Jura, about 160 million years old. Fossils in amber are much better preserved. The oldest amber fossil is from northern Myanmar, about 99 million years old. Their long coevolution with spiders resulted in a remarkable way of life. The female fly has a large number of minute eggs, that are dropped when flying over suitable habitat, or, as in the British genera *Acrocera* and *Ogcodes*, fastened to stalks or stems. From these eggs tiny larvae (usually less than 1 mm) emerge and then crawl in a leech-like manner to find a juvenile spider. There are hardly any observations of how the larva then proceeds. Schlinger (1987) wrote that the larva makes a journey on the outside of the spider to the cephalothorax or the abdomen and enters the spider skin there. Nielsen *et al*. (1999) observed what happens with the larva of *Acrocera orbiculus*, one of the three British species, and also the species of one of the new hosts recorded here. The larva attaches itself to a spider leg for some time, then makes a minute hole in the leg. On moulting, the second instar larva moves through the hole into the leg leaving its old skin covering the hole. Then follows an internal trip through the spider, to the anterior part of the abdomen where it remains for a long time between the book lungs from which it obtains oxygen. A long pause follows in which the larva lets the spider eat and grow. This pause lasts for months in the British species, but it can be many years in tropical Mygalomorphae. When the spider is nearly adult (or, as I discovered, even adult) a short period of greedy eating starts. In the British species the whole content of the spider is devoured in one or two days, in larger tropical species in a week or somewhat longer. Just before dying the spider spins a flimsy web. This also occurs in hunting spiders, which never make a real web. The full-grown larva emerges from the ventral side of the spider's abdomen in most acrocerid genera, but dorsally in *Acrocera*. The larva remains feeding for several hours with only its head still in the spider's abdomen, after

Figure 1. Last stages of *Acrocera orbiculus* emerging from *Amaurobius erberi*. © Frits Broekhuis

Figure 2. A "1000-year-old" olive tree – locality of the juvenile *Tegenaria*, 17th February 2019, Lluch, Mallorca, 39°49'N 2°53'E. © Aart Noordam.

Figure 3. Pupa and emerged fly *Ogcodes fumatus* from *Tegenaria* sp. – top, with dead spider; middle, with moulted skin. © Aart Noordam.

which it pupates within this flimsy web to become a fly in no more than two weeks judging by the six times I have reared an acrocerid (Schlinger mentions three to five weeks in his 1987 survey). Frits Broekhuis documented this emergence of a *Acrocera orbiculus* larva from a subadult *Amaurobius erberi* in a series of instructive photos (Fig. 1), accompanied by exact times: here the total development from emergence to fly was also somewhat less than two weeks. The interval between the first two photos, when feeding while emerged, is five hours, from 8 a.m. to 1 p.m. The last photo of the pupa with attached meconium (faeces after emergence) was taken six days later. The adult fly emerged a few days later. These photos were made at home from a spider collected in a garden in Dept. Var, France in October 2011. More photos of these same species can be found in Kehlmaier & Almeida (2014).

The first stage larvae are barely able to reach web spiders far above soil or vegetation. Most hosts are hunting spiders like Lycosidae, or sometimes web-spiders with webs in close contact with the substrate as with the *Amaurobius* above. Outside Europe there seem to be a few specialised acrocerid species with a very limited host range, but the rather limited knowledge of hosts suggests a remarkable broad host spectrum for most other acrocerid species. Since the minute larva's chance of finding a host is so small, it cannot be too choosy.

New host records

***Ogcodes fumatus* from *Tegenaria* sp. (Agelenidae)**
My wife and I visited Mallorca in February 2019, the season when the almonds are flowering there. We collected some juvenile spiders to raise them to adulthood. We were impressed by the thousand-year-old olive trees in the western mountain range (Fig. 2).

From between stones in such an orchard full of old giants, we collected a juvenile *Tegenaria* on the 17th February. At home it moulted twice, and was found dead on the 29th April with an acrocerid pupa next to it. On the 2nd May the acrocerid emerged (Fig. 3). Herman de Jong identified this as *Ogcodes fumatus*; the specimen is in his private collection.

In America Agelenidae are regularly recorded as hosts of Acroceridae, but not so in Europe (Schlinger, 1987, Gillung & Borkent, 2017). Koch (1872) published a *Textrix denticulata* from Austria as host of *Acrocera sanguinea*, and Brignoli (1976) published a paratype female of *Eritagena sicana* from Sicily as host of an *Ogcodes* sp., based only on finding a larva in the body. In America the acrocerid genus *Turbospebius* may specialise on Agelenidae based on limited records. Both *Acrocera* and *Ogcodes* species are mentioned with Agelenidae. One wonders how the minute larvae succeed in meeting these web-spiders.

This host record from Mallorca seems to be the third European example of an Agelenidae. *Ogcodes fumatus* seems to be the second Acroceridae record for the Balearic Islands; the other being *Ogcodes etruscus* from Mallorca (Ebejer *et al*., 2007), as kindly communicated by Miguel Carles-Tolrá to Herman de Jong.

***Acrocera orbiculus* from *Euophrys frontalis* (Salticidae)**
My wife, a friend and I visited the Dutch park De Hoge Veluwe, 52°06'N 5°48'E, on the 27th May 2020, during Covid time. We collected spiders from an area of open Pine and Oak forest with an underlayer of mainly grass and Bilberry (*Vaccinium myrtillus*). We took a number of live spiders home, in order to record their courtship. Among them were two male and three female *Euophrys*

Figure 4. Courtship of *Euophrys frontalis*, 21st June 2020. © Aart Noordam.

Figure 5. Female *Acrocera orbiculus* emerged from a female *Euophrys frontalis* 13th July 2020. © Aart Noordam.

frontalis. After one moult all seemed to be adults, and I recorded the courtship on the 21st June (Fig. 4). On the video the soft sound of the male's abdomen beating the dead oak leaves is clearly audible (see Noordam, 2002).

The three females were not very interested. No copulation occurred. On the 5th July all spiders were still alive and given new *Drosophila* and water via a small cotton pellet. I wanted to record the courtship once more on the 12th July, but by then both males were dead and one females as well. Next to the female was an acrocerid (Fig. 5). So, in this case too, the process from the death of the spider to emergence of the fly lasted no more than one week. The acrocerid was identified as *Acrocera orbiculus* by Herman de Jong and is now in his private collection.

Euophrys frontalis has not been recorded before as a host of any acrocerid according to Gillung and Borkent (2017), who give a long list of Salticidae host records; except for juvenile *Heliophanus* all salticids in this list are larger than *Euophrys frontalis*.

Modified epigynes

The total length of this *Euophrys frontalis* could not be measured anymore, but its carapace width was somewhat larger than that of the two other adult females: 1.38 versus 1.21 & 1.16 mm, so it was possibly an adult as well.

Figure 6. The spider remains with the exit hole. All the spider's tissue has been eaten! © Aart Noordam.

According to Schlinger (1987) the spider is usually killed as subadult, but in identifying large numbers of lycosids from German calcareous grassland, I found more than 100 parasitized adult lycosids; these had smaller, deformed epigynes (Fig. 7), and proved to have an acrocerid larva in their abdomens. This material was identified for the thesis by Toos van Noordwijk on calcareous grassland fauna (2014). These modifications of the genitalia seem to prevent fertilization (with the risk of loss of biomass if the spider would produce an egg-sac), while the larva can benefit from more food eaten by the larger adult spider. *Euophrys frontalis* is about the smallest host of *Acrocera*, which also parasitizes large Lycosidae and Gnaphosidae. A small subadult *Euophrys frontalis* might perhaps not have met the demands of the *Acrocera*.

The British isolation

Great Britain is usually very well investigated, often producing the first and most detailed atlases of species groups. Many people on the continent started their spider study with the excellent British works, first by Locket & Millidge, and later by Mike Roberts. So the contrast in acrocerid species numbers is rather surprising – 7 species in the Netherlands and 3 in the UK. It must be an island effect. The Channel formed about 6000 BC, and many southern species were too late to reach Britain. I used to be a fanatic birdwatcher. Now I am 71, but as a 12-year-old child I knew about the amazing case of the

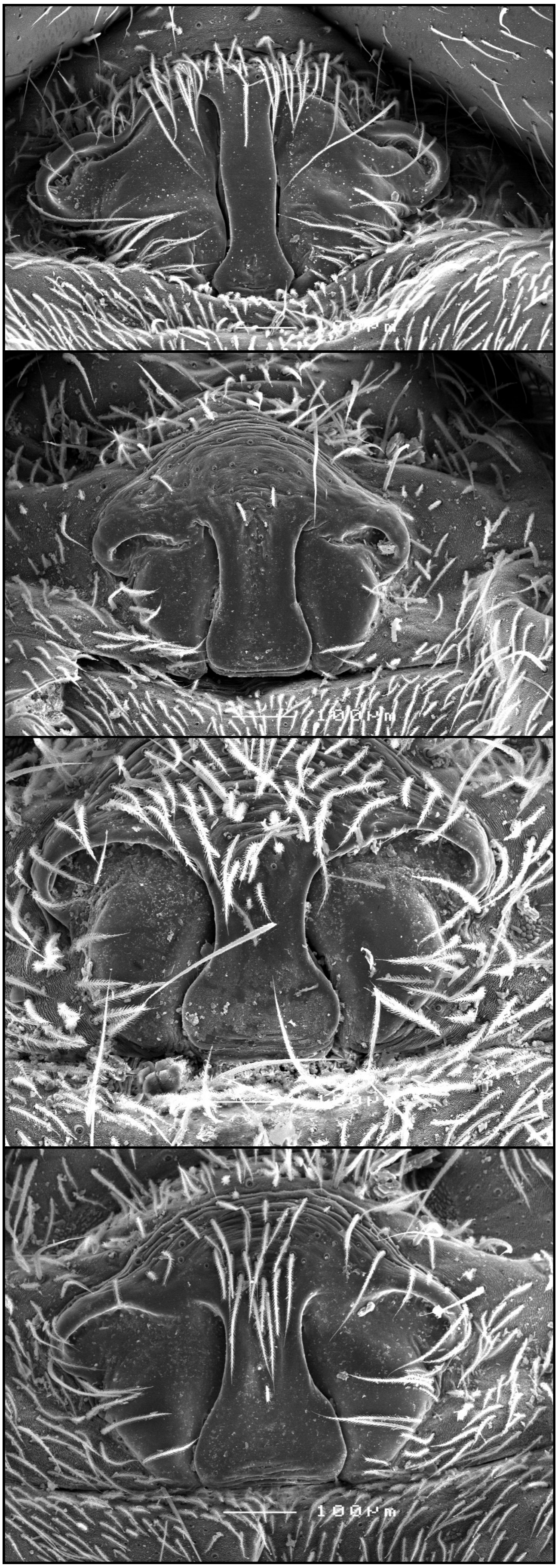

Figure 7. *Pardosa pullata* epigynes: top = normal; lower three modified. The modified ones were parasitized by *Ogcodes* cf. *pallipes*. Calcareous grassland Halsberg in the Eifel, Germany, 2006. © Dirk Platvoet.

treecreepers even then. Our common Treecreeper in the Netherlands is the Short-toed Treecreeper, present everywhere, but absent from Britain, nearly endemic to Europe, and as a southern species too late to arrive in Britain in moving north after the last Ice Age. Whereas in Great Britain the Eurasian Treecreeper, formerly simply called Treecreeper, is present everywhere, with a distribution to Japan, and even North America.

The same seems to be the case in several Acroceridae species; they are apparently too poor long-distance fliers to reach Britain. One fertilized female would be enough to colonise Britain after crossing the sea with her thousands of eggs, but this seems to be difficult.

I compared the spider fauna's of the UK, Belgium, the Netherlands and Germany years ago (Noordam, 1996). At that time the species numbers were: Belgium 659; the Netherlands 601; Great Britain 634; Germany 957. As would be expected Germany had far more species than Great Britain. Among the larger families, the largest difference was in the Gnaphosidae with Germany having more than twice the British number of species. The title of the paper (Belgium 1, England 2, Holland 3) hinted at the, for me, rather surprising order, with Belgium as number one in spider species, even beating England. The text of this paper ended with the advice: "*Belgian birders can better become arachnologists, and we – the Dutch – can perhaps better become footballers*". And look – Belgium is already number one in football on the FIFA ranking for several years, beating even England, Brazil, Argentina, etc. But seriously: the only big family with more species in England than Belgium was the Linyphiidae with its northern distribution, having eleven more British species than the Benelux in 1996. This family abounds in species with the ability to start new populations on islands by only one ballooning fertilized adult female. For this ability the crucial thing is the minimum weight or length of an adult female spider. I plotted this length for all the Belgian and Dutch species that were absent from Great Britain, and above 4 or 5 mm there was clearly a rise in absent species, more so if only southern species were considered. It seems clear – large southern species arriving at our latitudes after the forming of the Channel around 6000BC, were not able to colonise Britain by ballooning as an adult female. The chance that small spiderlings of those species could meet each other after ballooning over the Channel, reach adulthood there and found a new population, seems nearly impossible. Fertilized adult females don't have this problem – only the ballooning of one fertilized adult female seems enough to colonize an island. To give an example – the adult *Alopecosa* spiders are clearly too large for ballooning, as are adult female *Xysticus* too. There are eight Belgian and Dutch *Alopecosa* species and only four in Britain, with one very rare species (*A. fabrilis*) that is widespread in Belgium and the Netherlands. Flies can fly, but in case of the Acroceridae obviously not well enough.

The American Evert Schlinger (1928–2014) was the main expert in Acroceridae for many years. See his article with a complete survey of host records till 1987. He raised more than 5000 hunchback flies during his lifetime, often with the help of students. The remnant of the spiders were often identified for him by arachnologists. The Americans Jessica Gillung and Christopher Borkent give a more recent worldwide survey (2017) of all spider victims of Diptera, mainly Acroceridae.

Acknowledgements

Many thanks go to Herman de Jong for his identifications of Acroceridae, for mailing me useful references and for comments on this text. Thanks to Frits Broekhuis for his instructive photos of the emergence of *Acrocera orbiculus*, Dirk Platvoet for spending hours in making the SEM photos of modified epigynes, to Toos van Noordwijk for spending a whole day accompanying me to collect live lycosids in the Eifel for rearing acrocerids out of them, to Paul Beuk for the identification of *Ogcodes pallipes* reared from those German *Pardosa* spiders and to Miguel Carles-Tolrá Hjorth-Andersen for information on Spanish Acroceridae. Thanks to David Scarse for correcting the English. My wife Heleen helped with many things.

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A Gynandromorph *Gonatium rubens*

by Jim Pewtress

While examining the male palp of a *Gonatium rubens* specimen I assumed that the other palp was missing. However, on closer examination, the other palp was of the female type and the epigyne appeared to be half the normal size and situated on the same side as the female palp (Fig. 1). Individuals in which both sexes are discretely combined are termed gynandromorphs, whereas intersexuality is a condition in which portions of a body are intermediate between the sexes and are not clearly one sex or the other (White 1973, Roberts & Parker 1973). The earliest spider reference is given by Blackwall 1867 (cited in Bonnet 1945). Bonnet also lists numerous other early citations of gynandromorphs. It is more commonly found in insects than spiders.

In this case the spider is of different sex on either side of the median line from the head to the spinnerets – a bilateral gynandromorph. One side carries the male features and the other side female features, which includes half an epigyne on the ventral side of the female half. The male side has a curved front tibia and inflated patella, which are different to the unmodified segments on the female side. However there appears to be no difference in eye, carapace, or abdominal features. Hull (1918) noted that all records, at that time, are of species in which the total length of the female does not exceed that of the male by more than 15%.

Palmgren (1979) who had collected 69,970 adult spiders calculated that the occurrence of gynandromorphy to be one per 17,000 normal spiders. Whilst this, together with other samples, does not allow for an exact estimate of frequency, Palmgren suggested that 1/10,000 – 1/20,000 would not be unreasonable. It is noteworthy that a disproportionately high number of gynandromorphs has been described from the genus *Oedothorax*.

Kaston (1961) used the basic scheme, with additions, of Bonnet (1934):

- Typical lateral gynandry
- Lateral crossed gynandry
- Transverse gynandry
- Partial or mosaic gynandry
- Mixed gynandry & intersexuality
- Intersexuality

By comparison, in a detailed paper Roberts and Parker (1973) suggest that of the regular gynandromorphs 14 types are possible, although they admitted that several of these could never be externally recognised.

- Regular gynandry
    - Lateral
    - Transverse
    - Crossed
- Irregular gynandry
- Mixed gynandry and intersexuality
- Intersexuality

Due to the lack of specimens, it is difficult to say how common this condition is but Stratton (1995) suggested that only slightly more than 50 cases of gynandromorphy and intersexuality have been reported for spiders, but there are probably other discoveries that have not been published. Whilst he describes a case in *Schizocosa ocseata* found by someone else, in his various studies of 3000 Lycosidae (mostly *Schizocosa*) no other gynandromorphs were encountered.

Figure 1. Gynandromorph *Gonatium rubens*, showing male palp on one side and half an epigyne. © Jim Pewtress.

Acknowledgment
Many thanks to Geoff Oxford for information he provided on articles and papers relating to spider gynandromorphs.

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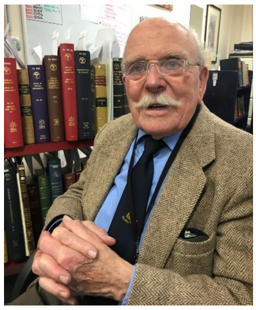
Obituary: Keith H. Hyatt, F.L.S., 1932–2021



© Hellen Pethers.

It was with great sadness that I learned of the death of my lifelong friend and fellow naturalist Keith Hotson Hyatt. He died in hospital from Covid-19 and pneumonia following a fall at his home in Rhandirmwyn, Carmarthenshire, on 23rd February 2021, a month before his 89th birthday. He was born at Woolwich in south-east London on 23rd March 1932.

I first met Keith when I joined the Roan (Grammar) School for Boys at Greenwich in the spring of 1946. Besides him and myself, Denis (D. F.) Owen shared our particular enthusiasm for entomology and ornithology. Together, on our bicycles, we roamed the wildlife habitats of south-east London and north-west Kent. Those were Halcyon days, the recent horrors of the Second World War then simply a memory. All three of us joined the RSPB and its junior branch, the Junior Bird Recorders' Club, and eventually became members of the club's committee. In 1947 we all joined the London Natural History Society (LNHS) and soon found ourselves serving on one or more of its various committees. Keith continued to serve the LNHS devotedly and loyally in various capacities, including those of President and editor of its journal, *The London Naturalist*, throughout his long life, even in retirement in central Wales. He only relinquished his distinguished editorship in 2014 after 35 years.

Like Denis Owen and myself, immediately on leaving school, Keith joined the staff of the Natural History Museum (NHM) in South Kensington; in his case, the Department of Zoology in 1949, where he specialised in mites and ticks, on which he became a leading authority. There he met his wife Eira Jenkins, whom he married in March 1964 with me as Best Man. After National Service Keith stayed on the staff of the Museum until he took voluntary retirement on 31st January 1989, having attained the rank of Senior Scientific Officer. While at the NHM he took part in several collecting expeditions to Nepal. In 1957 Keith and his Museum friend and colleague Rosemary Parslow, and her husband John, spent several weeks on St. Agnes in the Isles of Scilly establishing a bird observatory to monitor the migrants that appeared there, including the remarkable numbers of American migrants, especially in the autumn. Subsequently, Keith visited the observatory almost every year for the rest of his life and was on speaking terms with pretty well the entire population of the island.

Keith was a delightful, even-tempered person with a distinctive, rather dry sense of humour, whom I never remember seeing in bad humour or upset about anything. He was one of the nicest people I've ever met. This impression is borne out by others who have said that he was always a delight to talk to. Keith joined the British Arachnological Society in 1990. Francis Farr-Cox remembers that he was a regular attendee at the Society's AGMs and was always immaculately dressed, which now, on recollection, I believe he was even on our school-day excursions, when Denis and I certainly were not!

Keith is survived by his former wife Eira and his sons Lewis and Gavin, to whom we extend our condolences and deepest sympathy on their great loss.

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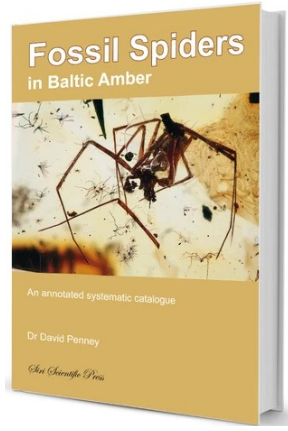
BOOK REVIEW: Fossil spiders in Baltic amber by David Penney. 2020. UK, Manchester: Siri Scientific Press. 150 pp.; cost £34.99; ISBN 978-1-8381528-1-9 (available directly from the publisher: www.siriscientificpress.co.uk)

Fossil spiders are an important source of information about the group's evolution. Some fossils belong to lineages which are now extinct. Others constrain the minimum age for when the living families must have first appeared, or else they provide information about historical biogeography by showing where particular groups lived at different times in Earth history. Underpinning this is the need for an accurate taxonomic database. We need to know what fossils are actually out there, and we need to have confidence that they have been assigned (as far as possible) to their respective families or genera correctly. Catalogues are an essential part of this, and a new book by David Penney offers a comprehensive annotated catalogue of more than 550 spider species preserved in Baltic amber. While the Cretaceous (ca. 100 million year old) Burmese amber of Myanmar has come to prominence in the last few years through the discovery of some unusual and sometimes spectacular spiders, the ca. 50 million year old (Eocene) Baltic amber remains the single largest source of data for fossil Araneae. Abundant plant and insect remains also allow the ecology of the Baltic amber forest to be reconstructed in some detail. Spiders have been formally described from Baltic amber for almost 200 years, the first being named by the Czech naturalist Jan Svatopluk Presl back in 1822. Subsequent work can be summarised into three main phases: the 1854 monograph of Carl Ludwig Koch and Georg Berendt, a series of monographs by Alexander Petrunkevitch in the mid 20th century, and more recent work since the 1980s (and especially from 2004 onwards) by Jörg Wunderlich. Several other workers (including the book's author) have described a smaller number of species, but a single volume compiling all this data into one place was so far lacking.

David Penney is an experienced worker on amber spiders, and the first twenty-five pages of his new book set the scene with an extensive introduction. This covers spider anatomy, the nature of amber and the original amber forest, an overview of previous work, and a summary of modern approaches to studying and imaging amber inclusions, including image stacking and the use of computed tomography to produce remarkable three-dimensional reconstructions. Several good black and white images illustrate these sections. The introduction ends with discussion of what the Baltic amber spiders can reveal: namely how various spider groups may have originated and evolved, how their distribution as fossils differs from that of their living relatives, and how spiders fitted into the wider ecosystem of the original amber forest. A key point here is that many of the more derived spiders in the so-called RTA-clade, for example common and diverse groups today like sac spiders, crab spiders and jumping spiders, make their first appearances in Baltic amber. This entire introductory section is very well written, and easy to follow by readers unfamiliar with the subject.

The bulk of the text (about 120 pages) is devoted to the catalogue itself, including a summary of the taxonomic changes proposed in the book and a full set of references. Two new genera are established, nine species are transferred to other genera, five species are recognised as junior synonyms and about 80 species are newly recognised as *nomina dubia*, usually because the original fossils were juveniles which makes it difficult to assign them reliably to their relevant taxonomic groups or compare them with adults of other established species. The fact that there seems to be rather too many spider species in Baltic amber – at least when spider numbers are compared to the diversity of other amber arthropods – is noted in the introductory chapters, and reiterates the need for careful reassessment of their systematics to eradicate synonyms and other spurious taxa. The catalogue itself documents 557 valid species in 202 genera and 58 families. The families are listed alphabetically, and for each species within the family there is a full synonymy list, an indication of where the type material is housed (if still available) and frequently additional notes on their identification and/or natural history. The book rounds off with an index of genera and a generous selection of more than 40 high quality colour plates illustrating a diverse range of Baltic amber spiders.



As with other books on arachnology from *Siri Scientific Press* the production quality is excellent and the price for a softback edition is quite reasonable. The coverage of the Baltic amber spider fossils is comprehensive and this book will clearly be of considerable value for anyone interested in the spider fossil record and the evolutionary history of the group. It should, however, be stressed that this is an annotated catalogue (rather than a monograph) and is thus of limited use for identifying new amber fossils, providing instead a summary of the known species and the relevant primary literature. As with any catalogue it is inevitably somewhat 'dry' in being predominantly a list of names, although the introductory chapters do offer a useful overview for readers new to the subject and, as noted above, the colour plates nicely illustrate how these fossils appear in amber.

As to critical remarks? The section on biogeography is rather brief, mentioning a couple of families present in Baltic amber, but now restricted to the southern hemisphere. Given the range of fossils now available it would be interesting to test hypotheses suggested by other arachnid groups, such as the idea that there were faunal elements originally spread across the whole northern hemisphere, but now restricted to (eastern) Asia and/or North America. Alternatively, were the spider lineages forced south by cooling climates into Mediterranean refuges? The section on evolutionary relationships could have been expanded to explore the role of fossils in time-calibrating phylogenies based on molecular data. The present (annotated) catalogue could offer an opportunity to engage with, for example, recent comments by Ivan Magalhaes and coauthors about how reliably fossil spiders can be assigned to their families, and thus their value as calibration points. However, these are minor quibbles about what remains a very solid piece of work and an important baseline for future investigation. As the author notes (p. 28) "…there are very few people currently working on fossil spiders…" and it can only be hoped that books like this encourage others to engage with this fascinating field of research.

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HARVESTMAN RECORDING SCHEME NEWS

Recording Scheme Organiser
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New Records of *Dicranopalpus larvatus* (Opiliones) in Mainland Britain

by Meg Skinner

In 2019 Paul Richards published a report detailing the status of *Dicranopalpus* species in the British Isles, introducing a potential new arrival *Dicranopalpus larvatus* (Richards, 2019) (Fig. 1). Since this article, *D. larvatus* has been recorded several times in the British Isles and mainland England as far north as Norfolk. This species is not known as a widely distributed European species, but instead has only been observed in Italy and Sicily (Delfosse, 2014) and recently in Guernsey and southern England (Wijnhoven & Martens, 2019).

Figure 1. Adult female *Dicranopalpus larvatus*. © Richie Howard via Twitter.

Unusually for harvestmen, British observations of adults have mostly taken place around February, indicating a winter maturity. Other records include juveniles recorded between April and September. This species is predominantly ground-dwelling, in contrast to the more arboreal *D. ramosus* (Wijnhoven, 2019). There is limited information about the habitat types this species occupies, but so far it has been recorded from grassland, gardens, broadleaved woodland and coastal areas. They have been found under logs and stones, in leaf litter, on walls and amongst low vegetation. One recorder collected two individuals in non-lethal pitfall traps in their garden, which further suggests a more ground-dwelling harvestman that can be found in low shrub and ground layers.

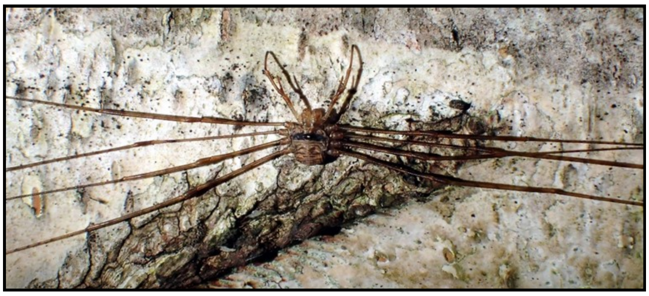

Figure 2. Resting posture of *Dicranopalpus ramosus* agg. © Chris Cathrine/Caledonian Conservation Ltd.

Figure 3. *D. larvatus* adult male. The colouration and small size of this species distinguishes it from other members of the genus. © Andy Marquis.

In contrast to the familiar and well-established *Dicranopalpus ramosus*, this species is smaller and has shorter legs in comparison to its body size. It also does not appear to adopt the stretched-out posture characteristic of *D. ramosus* (Fig. 2). *Dicranopalpus larvatus* has a distinctive appearance; pale brown in colour with dark markings across the eyes and on the abdomen. Males have darker markings in contrast to body colour (Fig. 3) compared to females (Fig. 1).

The distribution of *D. larvatus* suggests it has a wide range across southern England. However, this is based on very recent records as this species has only been recorded in the British Isles since 2019. It seems likely that we will see its distribution quickly expanding into other parts of southern England and possibly further north in time. It will also be interesting to see whether this species will be observed in other areas of Europe outside of Italy. Based on habitat data collected so far, this species does not appear to inhabit a particular habitat type, but seems to be a generalist living in the ground layer. This information, along with its surprisingly fast spread around Britain, begs the question – why is it only found in Italy and Britain? Has it been missed in other parts of Europe or is this a new arrival with a rapidly expanding population?

Despite its distinctive appearance, it is possible that *D. larvatus* has been missed by recorders, due to its winter maturity and small size. This will be a good excuse to spend some time looking for adults in the winter months as well as for juveniles in spring and summer. Any records and further information about this harvestman will be much appreciated, so please get in touch at hrs@britishspiders.org.uk.

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Sending Harvestmen Specimens in the Post

by Meg Skinner

I recently came across an article in the Bulletin of the Dipterists' Forum giving advice about transporting specimens by post (Clemons *et al.*, 2021). The authors of this article gave details of precautions to follow when posting specimens, particularly overseas. I will highlight the main points for recorders who may want to send arachnid specimens.

Firstly, you will need to decide whether to send your specimens in preserving spirits (e.g., ethanol or isopropanol). When using these, make sure your container is secure and not able to leak. It is recommended that you tape up the container and place it within one or more sealed bags before packaging. Remember these spirits are often flammable and toxic.

Secondly, remember that it is possible for specimens to get lost or damaged in transit, so make every effort to package them well and consider that there is a chance they will not reach their destination!

Finally, some recorders prefer to receive specimens in a certain way, e.g. dry specimens, labels inside the container, etc. so please don't hesitate to ask if you're unsure how to package them.

Thanks to those that have sent me *Dicranopalpus* specimens for examination and please get in touch if you would like to send any.

Reference

Clemons, L., Cunningham, A., McAlister, E. & Merrifield, K. 2021. Techniques: Specimen transport. *Bull. Dipterists' Forum* **91**: 15–16.

Harvestmen Recording Scheme Organiser; e-mail: hrs@britishspiders.org.uk

Figure 1. Original image from Facebook. © D. Holland.

Figure 2. Juvenile *Histricostoma argenteolunulatum* © D. Holland.

Histricostoma argenteolunulatum Canestrini 1872, a Harvestman (Opiliones: Nemastomatidae) New to Britain

by David Holland & Paul Richards

On 7th March 2020, David Holland photographed a small (2.4 mm) black harvestman and a juvenile harvestman from under a piece of wood on his plot on Ravensbourne allotments in Bromley, Kent, England (TQ401687). The black individual looked very much like the common *Nemastoma bimaculatum*, but a little smaller. When posted on the UK Harvestmen Facebook group (www.facebook.com/groups/1460150090961032) on the 18th March, it was recognised as having some significantly different features to that species. (Fig. 1). Unfortunately David had not retained these specimens and about four hours after posting he went down with Covid 19 and was unable to return to the site to secure further specimens for three weeks due to health issues. However, after this period of isolation, one further juvenile (Fig. 2) was located at the beginning of April. This was a male and was reared to adulthood in captivity (Figs. 3 & 4).

This specimen displayed the two silvery-white spots at the front of the black opisthosoma, seen in *N. bimaculatum*, but there were also two further white spots towards the rear end. The latter are of an elongated crescent shape and help to identify the species as *Histricostoma argenteolunulatum* (roughly meaning: 'silver moon-like spots'). The entire dorsal surface was very roughly tuberculate and even more distinctively, there were two rows of five small spines running down the centre of the dorsal saddle area. In addition to these features, this species is also distinguished by a hooked spine on the inner face of the palpal patella of the male (Fig. 4). These pedipalps are very pale in comparison with the dark brown-black legs. The bases of the femora on leg pairs II, III and IV are ringed with pale annulations of five, two and five rings, respectively. The claws at the tip of the chelicerae are turned inwards and the inner faces of the basal segments display a series of over 70 very fine striae known as a 'lyre'. It shares this character with *Histricostoma dentipalpe*, but the latter has much fewer lines in the lyre and an abdomen with no white spots. Dissection of the penis clearly separates this species from *Nemastoma bimaculatum* as the glans is simply rounded and pale, rather than dark and sharply pointed with toothed edges as seen in *N. bimaculatum.*

Subsequent searches have not revealed any further specimens, but the driest spring on record has probably discouraged a small harvestman of this type from extended surface activity. Hopefully whatever population is present has found refuge somewhere suitable and may be found again later in the year. David had previously looked under the piece of wood every week and had not

Figure 3. *Histricostoma argenteolunulatum* male. © J. P. Richards.

Figure 4. *Histricostoma argenteolunulatum* male. © J. P. Richards.

seen this species before, so it is unlikely it had been there for many years prior to discovery. David had planted rosemary, thyme, apple trees and gooseberry bushes near to the piece of wood in recent months (the latter supplied by R. V. Roger, Pickering, North Yorkshire). Neighbouring plots had not had anything planted for at least a year prior to this discovery.

Histricostoma is a genus normally found in Italy and Mediterranean islands such as Sardinia, Sicily, Corsica and Menorca, plus small islands of the Tyrrhenian sea such as Elba and Capri. There are also records from the Greek island of Zakynthos, Alpes-Maritimes in S-E France and a small area in Switzerland (Martens, 1978, Rambla, 1979, Iorio & Delfosse, 2015, 2016). This discovery is somewhat reminiscent of the recently discovered *Dicranopalpus larvatus* (Richards, 2019, Wijnhoven & Martens, 2019), another species from Italian islands turning up in isolated locations in southern Britain. The nearest records would seem to be from a single French site in the Vendée (Iorio & Delfosse, 2015).

The assumption is that these individuals originated from introduced plant material from continental Europe. Their discovery highlights the ongoing need to examine all small black and white harvestmen carefully before assuming them to be *Nemastoma*. Indeed, any males should also be examined for the so far non-British *Nemastoma lugubre*, which is very similar, but has a distinct, strongly 'barbed' tip to the penis.

A sample of *Histricostoma argenteolunulatum* has been sent to the barcoding project for extraction of the DNA.

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Cheiracanthium mildei Predating Hemiptera Eggs in Sardinia

by Nick Nimbus

Early last year (2019), my wife and I moved from the UK to Santa Teresa Gallura in Sardinia. One of the main reasons that I wanted to live here is the abundance of wildlife. I have never witnessed such a heavy concentration of invertebrates. We live in a place called Ruoni, on the side of a mountain. I have counted nearly 100 different species of spiders in and around our garden, including the infamous Mediterranean Black Widow, known in Italy as La Malmignatta. One night in September this year, whilst looking in our olive trees for the sparassid *Olios argelasius*, I observed a female *Cheiracanthium mildei* approaching a group of Hemiptera eggs on the underside of an Olive leaf.

There was quite a breeze, so I needed to hold onto the leaf, to steady it and to turn it over. As I held the leaf, she threateningly waved her front pair of legs at my thumb, and then sat down on the eggs to guard them. She was not about to give up her bounty. She sat for a while with one foot on the eggs, and then relaxed to resume her raid. A few moments later, she began tapping at an egg with her pedipalps. I could see that she knew exactly what the eggs were. She then lifted the lid of an egg with her fangs and sucked out the unformed insect inside. She moved from egg to egg, repeating the process, until all of the eggs were empty. The eggs became blackened after she had fed from them. I took hundreds of photographs, as I wanted to make sure that I had captured the event. I had not seen this behaviour before, and I had a feeling that I was witnessing something unique.

My good friend, the very knowledgeable Luigi Lenzini, who visits Santa Teresa Gallura every summer, to record and photograph the native fauna, was very excited about my observation. He posted my photographs on the Forum Natura Meditteraneo and the Forum Aracnofilia. No one on the forums had observed this behaviour before, which is why I have reported it here. *Cheiracanthium*

Figures 1–3. *Cheiracanthium mildei* predating Hemiptera eggs. © Nick Nimbus.

mildei also has her predators in my garden. I have observed and photographed *C. mildei* being predated upon by *O. argelasius* and the thomisid *Thomisus onustus*. If you are interested in the fauna of Sardinia, you can follow me on Instagram for regular posts.

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www.instagram.com/macrosarda/

ARTICLE SUBMISSION

Please send B.A.S. Newsletter articles to the Editor: Richard Gallon, 23A Roumania Crescent, Llandudno, North Wales, LL30 1UP, United Kingdom; e-mail: newsletter@britishspiders.org.uk

Whenever possible, please submit articles by e-mail.

B.A.S. AGM Arrangements 2021

Because of the ongoing uncertainty caused by the coronavirus, the B.A.S. Council has decided to hold a virtual AGM *via* Zoom, as we did last year. The meeting will be held at **10:00 am on Saturday 5th June**. Please put this date in your diaries. A virtual meeting provides a wonderful opportunity for many more members to attend – you are all very welcome.

We are delighted to announce that immediately after the AGM, which will last for approximately half-an-hour, there will be three short presentations:

Jan Beccaloni (Senior Curator of Chelicerata, NHM) – *Exploring the world of spiders*

Liam Andrews (from the Pseudoscorpion Recording Scheme) – *Recording pseudoscorpions*

Meg Skinner (Harvestman Recording Scheme co-ordinator) – *Harvestmen Recording Scheme: updates and arrivals*

These talks, plus an opportunity to ask questions, will take about one and a half hours. The AGM agenda is included with this mailing. If you would like to attend, please send an e-mail to Richard Gallon, who is organising the Zoom meeting, at rgallon47@gmail.com. He will forward to you a link to the event in the first few days of June.

If you have any queries about the AGM, please contact me.

Geoff Oxford
secretary@britishspiders.org.uk

Opilio canestrinii male. © Richard Gallon.

B.A.S. Newsletter Article Deadlines

Spring:	1st February
Summer:	1st June
Autumn:	1st October

Please send articles/submissions to the Newsletter Editor by the dates indicated above. However, please note that the Editor reserves the right to hold material back for future issues, but where possible will always try to publish in the next available issue.

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