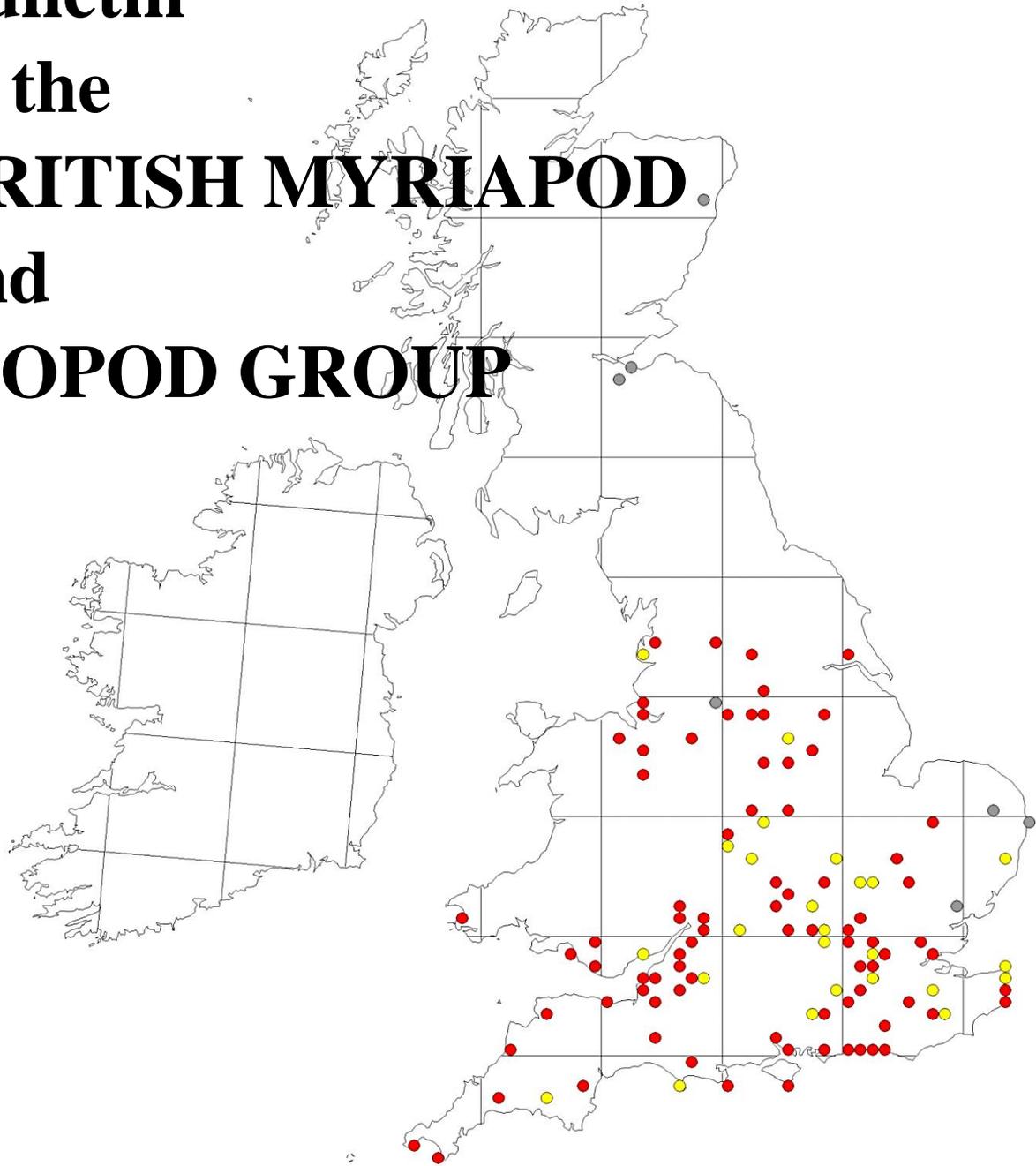


**Bulletin  
of the  
BRITISH MYRIAPOD  
and  
ISOPOD GROUP**



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**Bulletin of the British Myriapod & Isopod Group: Volume 37 (2025)**

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Cover illustration: Distribution map of the House Centipede *Scutigera coleoptrata*, Steve Gregory

Cover photograph: *Chaetophiloscia elongata* (Dollfus), a woodlouse new for Britain © Andy Musgrove

**Editors:** Steve J. Gregory, Helen J. Read & Anthony D. Barber

c/o Helen J. Read; email [helen@helen-read.co.uk](mailto:helen@helen-read.co.uk)

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## Editorial

The International congresses of Myriapodology provide opportunities for reflection as well as stimulation. A week to take time out from everyday activities and think solely (or almost solely!) about millipedes and centipedes in the company of like-minded people. The week in Serbia in July was no exception. We need these times of stimulation in order to give our work impetus, perhaps especially those of us for whom our work is carried out by ourselves rather than within an institution and for whom this is essentially a hobby. The BMIG annual field meetings provide similar stimulation and from a personal perspective I value them enormously, returning invigorated and refreshed (and often tired too!). At both meetings this year it was heartening to see so many new and younger faces. There are lively research groups working on aspects of Myriapodology from Serbia to Colombia and Georgia (USA). In the UK we have been fortunate in the last few years to have increased interest in the field meetings and the attendance has increased relative to pre 2020. It does seem that what we have in the UK is unique, an organisation that meets regularly, maintains an excellent website and social media feeds and involves a mix of professional and amateur myriapodologists/isopodologists. Perhaps seeing it from the outside is important in valuing the community that we have here.

The BMIG field meetings have benefitted in recent years from input from, and participation in, the Darwin Tree of Life Project with staff attending the meetings to give regular updates. Providing specimens for their genomes to be catalogued has added additional impetus for collecting and recording. In the current time in the UK however, there are very few people employed to work on Myriapods or Isopods and it is difficult to see how this situation might change. On a more positive note, in recent years we have been fortunately in recruiting a new Isopod recording scheme organiser in Thomas Hughes, a new Conservation Officer in Annie Northfield and we welcome Jessica Thomas-Thorpe as our new Project Officer (a post filled for the first time). Annie and Tom started our juices flowing with a presentation about a suggested conservation project concerning the subspecies of *Oniscus asellus* at the field meeting and we look forward to working on some conservation and other projects in due course. Do come and join us at the annual field meeting or get involved with BMIG in other ways.

As in previous years this Bulletin continues to document new species being found with an additional woodlouse to the list, *Chaetophiloscia elongata*. The slow march (or should it be a quick scurry) across the country of *Scutigera coleoptrata* is also documented and it seems this species has become established out of doors now – definitely a species to look out for. Tony has continued his review of the work of British Myriapodologists from earlier years, this time focussing on Reginald Pocock. We also include an article about synanthropy, a topic Tony has been interested in for many years and here he presents a method for using information from the recording schemes to categorise the degree of synanthropy in British species.

## ***Chaetophiloscia elongata* (Dollfus, 1884) (Isopoda: Oniscidea: Philosciidae): a woodlouse new to Britain**

Andy Musgrove<sup>1</sup> and Richard Wilson<sup>2</sup>

E-mail: <sup>1</sup>andymusbubo@gmail.com; <sup>2</sup>richard.wilson\_ecology@yahoo.co.uk

### **Introduction**

The genus *Chaetophiloscia* contains three species present in north-west Europe, although formerly apparently absent from the British Isles. *Chaetophiloscia sicula* Verhoeff was found at the Eden Project (Cornwall) from 2005 onwards, whilst *C. cellaria* (Dollfus) is known from a number of sites on Guernsey since its discovery there in 2018. The current paper discusses the discovery of the third of these species, *C. elongata* (Dollfus), in Kent in 2024.

### **Discovery**

Between March and September 2024, several visits were made to the southern edge of the Isle of Sheppey, East Kent, to undertake invertebrate surveys under contract. Whilst sorting through material collected prior to the final visit, multiple specimens of a distinctive small woodlouse were discovered. These were superficially similar to immature specimens of *Philoscia muscorum* (Scopoli, 1763), having a relatively dark head and dorsal stripe, as well as three flagella segments and a ‘stepped’ outline between pereion and pleon (Figure 1). However, the telson was notably rounded, which (in Hopkin, 1991) pointed to either *Halophiloscia couchii* (Kinahan, 1858) or *Stenophiloscia glarearum* Verhoeff, 1908, although it did not seem to fit for either of those species. The shape was notably more elongate than for an adult *P. muscorum*, although not so dissimilar in proportions to immatures of that species.



**Figure 1: Dorsal views of *Philoscia muscorum* (left) and *Chaetophiloscia elongata* (right) from Sheppey.**

## Identification

Investigating other options through the species accounts on the BMIG website, it was noted that *Chaetophiloscia cellaria* (Dollfus, 1884) was very similar in terms of the telson shape. The account of the first Channel Islands record of that species (Gregory & Marquis, 2019) suggested that *C. elongata* might be a more likely identification for the Sheppey specimens, given that the ommatidia in the eyes seemed to number about 25 (vs 15 for *C. cellaria*). Moreover, the last pereonite for *C. cellaria* has distinctly orange corners, not seen for the Sheppey animals. A further species, *C. sicula* Verhoeff, 1909, seemed to be ruled out by having much less pigmentation.

Images were posted on the BMIG Facebook group on 20<sup>th</sup> August 2024 and there was broad agreement with the suggested identification as *C. elongata*. Subsequent comparison with the key by Noël & Séchet (2021) also revealed a further identification feature; the dark pigmented lateral bars on the epimera are fringed by a much broader pale edge than for *C. cellaria* or *C. sicula* (Figure 2). Additionally, the male pleopods appear to match *C. elongata*, with endopodite 1 stout and tapered to a pointed tip and exopodite 1 with a clear indentation on the margin (Figure 3, c.f. Vandel (1962)).

## Distribution and habitat

Having established the identification of this new British species, further investigations were possible during the further visits during 10<sup>th</sup>-12<sup>th</sup> September and 1<sup>st</sup>-2<sup>nd</sup> October 2024. The initial specimens had all been taken from the same small area of tidal litter at the interface between the saltmarsh and seawall at the outlet of Bells Creek (TQ990673). We were keen to establish how widely the species was distributed and hence searched for it in similar habitat at the very top edge of saltmarsh at multiple locations around the Swale and Medway estuaries, with the following results:

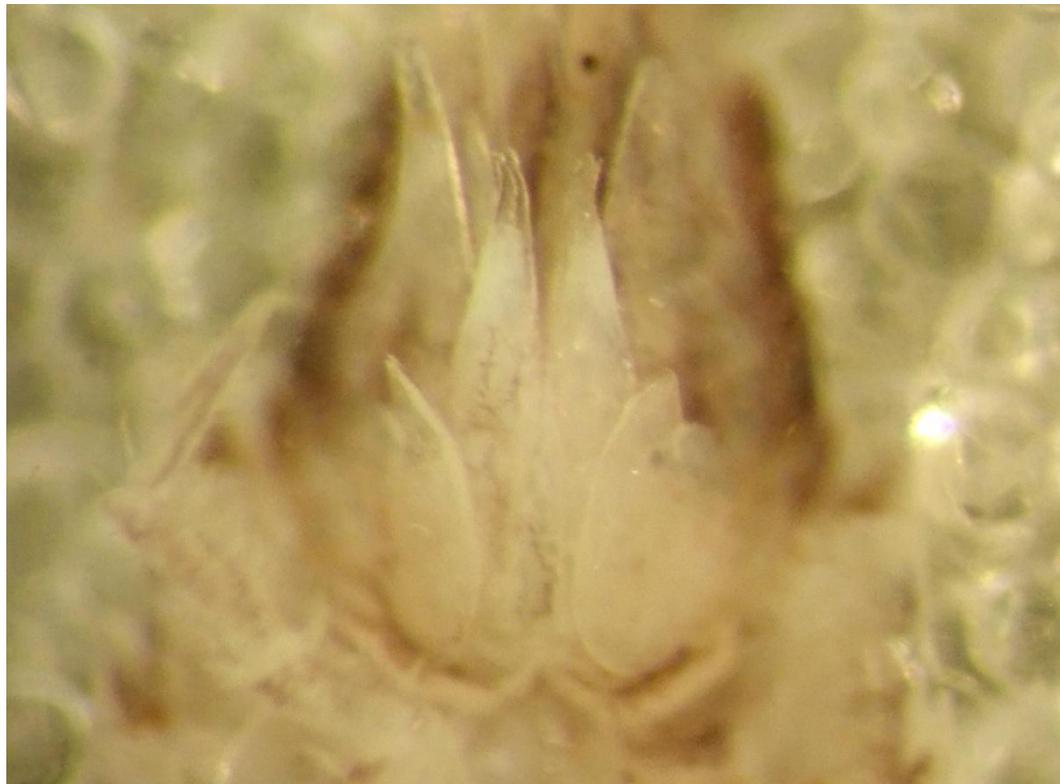
- It was present along the sea wall from Bells Creek to Mocketts Hill (TR008664), but ceased immediately after the eastern end of the sea wall where the saltmarsh was then backed by a more natural slope; the western edge of this part of the distribution was not clear, owing to lack of access, but searching around the next saltmarsh embayment to the west (Dutchman's Island / Windmill Creek) did not produce any specimens.
- Searching at Shellness at the easternmost point of Sheppey did not produce the species (although was similar in terms of seawall / saltmarsh structure).
- It was present at the saltmarsh / seawall on the east (Sheppey) side of Clay Reach, to the north of Elmley Hills (TQ928680).
- It was present on the mainland side of the Ferry Reach / Horse Reach channel, either side of the Kingsferry Bridge between at least TQ909696 and TQ915689. For any other observers wishing to encounter this species, this would be the most convenient area.
- An extensive, dedicated search of 29 different locations around the Medway Estuary in October 2024 failed to reveal it at any of these sites.

Figure 4 shows all detections and non-detections of *C. elongata* described in this paper. All detections of *C. elongata* were within the boundaries of The Swale SSSI, or (at Horse Reach) the Medway Estuary & Marshes SSSI.

Specimens were located both by sieving and through suction-sampling. Most of the records (and seemingly the highest abundance) were from the litter associated with the seawall / saltmarsh boundary (Figure 5), but specimens were also located on the top and landward edge of the seawall. However, none were found on saltmarsh more than a metre or so from the base of the seawall. The only other isopods occurring alongside *C. elongata* identified from these locations were *P. muscorum* and *Armadillidium vulgare* (Latreille, 1804).



**Figure 2: Lateral view of *Chaetophiloscia elongata* from Sheppey.**



**Figure 3: First pleopods of *Chaetophiloscia elongata* male from Sheppey (specimen from 14th May 2024)**



**Figure 4: Records of *Chaetophiloscia elongata* in 2024 around the Swale and Medway system, showing detections in blue and non-detections in orange.**



**Figure 5: Saltmarsh / seawall boundary at Bells Creek where *Chaetophiloscia elongata* was abundant.**

## Origins

Concerning the origin of *C. elongata* in this area, our initial suspicion was that it may have been introduced during repair works at the Bells Creek pumping station in 2018. However, our subsequent detections eastwards all the way to Mocketts Hill - which would imply a dispersal of 3.5 km in just six years - seemed to make this hypothesis less likely. Furthermore, the detections between Horse Reach and Clay Reach appear to suggest a second disconnected population. There does seem (so far) to be an association with man-made seawalls, which could potentially point to an association with materials used in their construction, which could arguably have been imported from the continent. Alternatively, there might simply be higher densities of the species in the micro-habitats created by the seawall. An alternative route of importation could be through unwitting delivery by boats – the area will have seen marine traffic to / from the continent for centuries. Indeed, Ridham Sea Terminals, on the edge of Clay Reach, continues to handle cargo including aggregates and timber. Finally, it is possible that *C. elongata* is a long-overlooked native species; it is probably impossible to prove or disprove this definitively, although the non-detections throughout similar habitat around the Medway Estuary would seem to count against this. Clearly, however, the species should also be sought in similar habitat elsewhere, especially along the southern shore of the Swale. Elsewhere, *C. elongata* is known from north-western France to Spain and then across to the eastern Mediterranean ([www.gbif.org](http://www.gbif.org)).

## Acknowledgements

Thanks go to Warren Maguire and Steve Gregory for helping confirm the identification, to Nick May (RSPB) for discussion regarding the Bells Creek location and the Environment Agency/ JBA Consulting for permitting/ arranging access.

## References

- Gregory, S. J. & Marquis, A. (2019) First record of *Chaetophiloscia cellaria* (Dollfus, 1884) from the Channel Islands (Isopoda: Oniscidea: Philosciidae). *Bulletin of the British Myriapod & Isopod Group*, **31**: 37-43.
- Hopkin, S. P. (1991) A key to the woodlice of Britain and Ireland. *Field Studies* **7**: 599-650.
- Noël, F. & Séchet, E. (2021) Crustacés Isopodes terrestres du Nord de la France (Crustacea, Isopoda, Oniscidea). Clé de détermination illustrée.
- Vandel, A. (1962). Isopodes terrestres (deuxième partie). *Faune de France*, **66**. Paris: Paul Lechevalier.

## 15 years on: An update to Woodlice and Waterlice in Britain and Ireland, part 2 ~ Non-native species, not yet naturalised

Steve J. Gregory

E-mail: [stevejgregory@btopenworld.com](mailto:stevejgregory@btopenworld.com)

### Abstract

In 2009 the ‘Woodlouse Atlas’, *Woodlice and Waterlice of Britain and Ireland*, was published. Although primarily covering the native or naturalised species then known from Britain and Ireland, WWIBI also provided cursory coverage of an additional twelve non-native species of woodlouse that are unable to survive ‘outdoors’ and are currently restricted to heated glasshouses, such as those of botanic gardens. In recent decades there has been renewed interest in sampling from heated glasshouses and more recently from garden centres. As a result nine additional non-native species have been discovered new to Britain and/or Ireland: *Styloniscus* (Dana) sp., *Anchiphiloscia pilosa* (Budde-Lund), *Chaetophiloscia sicula* Verhoeff, *Ctenoscia minima* (Dollfus), *Pseudotyphloscia* cf *alba* (Dollfus), *Lucasius pallidus* (Budde-Lund), *Porcellionides sexfasciatus* (Budde-Lund), *Armadillidium arcangelii* Strouhal and *Gabunillo* Schmalfuss & Ferrara sp. For each of these 21 species of woodlouse an individual species account is given, including information about known sites, colour images of specimens and references to recent identification works based on British specimens.

### Introduction

Fifteen years ago *Woodlice and Waterlice in Britain and Ireland* (Gregory, 2009) (hereafter referred to as WWIBI) was published. This was compiled from 85,950 records of terrestrial woodlice (Isopoda: Oniscidea) and 69,633 records of aquatic waterlice (Isopoda: Asellota) that had been submitted to the Non-marine Isopod Recording Scheme. WWIBI primarily covered the native or naturalised species then known from Britain and Ireland; providing up-to-date distribution maps and notes on habitat preference, species biology and conservation and collecting methods for four species of waterlouse and forty species of woodlouse. Gregory (2024) provides an update to WWIBI highlighting eleven species where our understanding of their distribution and habitat requirements has improved significantly since 2009, and three species of terrestrial woodlice that had recently been added to the British checklist. Twelve additional non-native species of woodlouse that are unable to survive ‘outdoors’ and are currently restricted to heated glasshouses, such as those of botanic gardens or butterfly houses (i.e. not yet naturalised), were only given cursory coverage in WWIBI. These species are not included within current available identification guides, i.e. the AIDGAP key (Hopkin, 1991) nor the Linnean Synopsis (Oliver & Meehan, 1993), which only include native and naturalised woodlice.

Heated glasshouses provide stable environmental conditions that allow introduced non-native species to exist well beyond their natural (outdoor) range. There has been a renewed interest in sampling from heated glasshouses, such as those of botanic gardens, in recent decades (e.g. Gregory, 2014; Gregory & Lugg, 2020). More recently collections have been made in garden centres (Maguire, 2023; Hughes, 2024; Hughes, Maguire & Northfield, 2024), which are known to harbour unusual invertebrate species that have stowed away in potted plants grown inside glasshouses. Therefore, this update also includes species that (so far) have only been found associated with plant displays at garden centres, for which there is currently no evidence that they have become naturalised, with an established breeding population that is able to survive outdoors though the relatively cold British and Irish winters.

Thus, our knowledge of these introduced species has improved substantially since the publication of WWIBI, which listed twelve species of non-native introduced woodlice. Since publication in 2009 more sites have been discovered for the known species and therefore there is a better understanding of their

habitat requirements. In addition, nine species have been discovered new to Britain and/or Ireland: *Styloniscus* sp. (Dana), *Anchiphiloscia pilosa* (Budde-Lund), *Chaetophiloscia sicula* Verhoeff, *Ctenoscia minima* (Dollfus), *Pseudotyphloscia* cf *alba* (Dollfus), *Lucasius pallidus* (Budde-Lund), *Porcellionides sexfasciatus* (Budde-Lund), *Armadillidium arcangelii* Strouhal and *Gabunillo* Schmalfuss & Ferrara sp. (see checklist in Table 1 below).

**Table 1: Updated checklist of British and Irish non-native terrestrial isopods (woodlice) that are not yet naturalised in outdoor habitats (i.e. currently restricted to artificially heated locations).**

\* Species added since the publication of WWIBI (Gregory, 2009)

Sub-order ONISCIDEA

Section Synocheta

Family Trichoniscidae

*Miktoniscus linearis* (Patience, 1908)

Family Styloniscidae

*Cordioniscus stebbingi* (Patience, 1907)

*Styloniscus mauritiensis* (Barnard 1936)

*Styloniscus spinosus* (Patience, 1907)

*Styloniscus* (Dana, 1853) sp.\*

Section Crinocheta

Family Philosciidae

*Anchiphiloscia pilosa* (Budde-Lund)\*

*Burmoniscus meeusei* (Holthuis, 1947)

*Chaetophiloscia sicula* Verhoeff, 1908\*

*Ctenoscia minima* (Dollfus, 1892)\*

*Pseudotyphloscia alba* (Dollfus, 1898)\*

*Setaphora patiencei* (Bagnall, 1908)

Family Platyarthridae

*Trichorhina tomentosa* (Budde-Lund, 1893)

Family Porcellionidae

*Agabiformius lentus* (Budde-Lund, 1885)

*Lucasius pallidus* (Budde-Lund, 1885)

*Porcellionides sexfasciatus* (Budde-Lund, 1885)\*

Family Trachelipodidae

*Nagurus cristatus* (Dollfus, 1889)

*Nagurus nanus* (Budde-Lund, 1908)

Family Armadillidiidae

*Armadillidium arcangelii* Strouhal, 1929\*

Family Armadillidae

*Gabunillo* Schmalfuss & Ferrara, 1983 n.sp. \*

*Reductoniscus costulatus* Kesselyák, 1930

*Venezillo parvus* (Budde-Lund, 1885)\*

Some of these species originate from the Mediterranean region and, of these, a few have now become naturalised (i.e. breeding outdoors) as far north as northern France (Noël & Séchet, 2021). In light of climate change it is perhaps just a matter of time before some of these are discovered naturalised outdoors in Britain or Ireland, for example in southern coastal habitats or synanthropic sites, such as gardens, alongside our more familiar native and naturalised species (which are covered by Gregory, 2024). However, other species including within this update originate from tropical areas and therefore are unlikely to survive outdoors through our relatively cold winters.

## The species accounts

All available records submitted to the BMIG Non-marine Isopod Recording Scheme up until the end of December 2024 (unless noted otherwise) are included in this updated account. These are derived from a number of sources, including those submitted and verified by the recording scheme via Biological Records Centre's *iRecord* website (<https://irecord.org.uk>) (which also includes verified records exported from *iNaturalist*; <https://www.inaturalist.org>) and records extracted from publications, such as the *Bulletin of the British Myriapod and Isopod Group* (<https://bmig.org.uk/view/resource/bmig-bulletin>).

The accounts summarise the known information of species distribution, species biology, field techniques, etc, which have been compiled from as many sources as possible. This includes published articles, including those in the *Bulletin of the British Myriapod & Isopod Group*, and more informal accounts, such as those found in the *BMIG Newsletter*. The original sources, which are cited, will provide much more detailed information. Where available colour images of live or preserved specimens are included. However, distribution maps have not been compiled since these are species associated with artificially heated habitats (glasshouses, etc) that may be found anywhere throughout Britain or Ireland. Their distribution is not restricted by climatic or geological factors as seen with our 'outdoor' native and naturalised woodlice.

## Non-native species of heated glasshouses and garden centres

All 21 species of non-native woodlice that are unable (currently) to establish outdoor breeding populations in Britain or Ireland (as listed in Table 1) are included in the species accounts below.

### Family: Trichoniscidae

#### *Miktoniscus linearis* (Patience, 1908)

This is a distinctive species, up to 3 mm in length, with the body entirely unpigmented and strongly tuberculate, with the eye comprising a single conspicuous black ommatidium.

*Miktoniscus linearis* was described new to science by Patience (1908) from a male and two females collected by R.S. Bagnall in December 1907 from Kew Gardens. These specimens were found under flower pots in a relatively cool greenhouse, associated with *Haplophthalmus danicus*. Subsequently Kesselyak (1930) found numerous specimens in a glasshouse in the botanic gardens at Dahlem (Berlin), Germany. At the time of the publication of WWIBI these were the only two known sites for this introduced species globally (Schmalfuss, 2003), which currently remains of unknown origin.

Recently there have been two sightings in Britain, both previously unpublished. The first from Treborth Botanic Gardens, Bangor (SH57) on 19.i.2019, when several specimens were encountered under a decaying log in the tropical house (Thomas Hughes *leg./det.*, pers. comm.). The second is from the Eden Project Rainforest Biome (SX05) on 21.iii.2020 when a single female (see image below) was collected from beneath a piece of dead wood (Steve Gregory *leg./det.*). Also of note is that Cifuentes *et al.* (2022) report several specimens of this species from heated greenhouses at two sites in Switzerland. It is likely that this species will be found at other heated glasshouses in Britain and Ireland.

There is an interesting possibility that this European species may prove conspecific with the American *M. medcofi* (Van Name, 1940) (Franck Noël, pers. comm.).



*Miktoniscus linearis* from Eden Project (preserved specimen) © Steve Gregory

**Family: Styloniscidae**

***Cordioniscus stebbingi* (Patience, 1907)**

There have been no confirmed post 2009 records for this species in Britain or Ireland.

There is a possibility that the ‘*C. stebbingi*’ found in glasshouses across Europe may not be the same species as the *C. stebbingi* that is native to, and occurs outdoors, in Spain (Franck Noël, pers. comm.).

***Styloniscus mauritiensis* (Barnard, 1936)**

*Styloniscus mauritiensis* is a small (up to 3.25 mm body length), reddish species, with a tuberculate body and an eye composed of three ommatidia. However, there are other similar Styloniscids occurring in heated glasshouses and identification should be based on a male specimen. A brief description with images to enable identification is given by Gregory & Lugg (2018).

At the time of publication of WWIBI *Styloniscus mauritiensis* was only known at Royal Botanic Gardens (RBG) Edinburgh where it was first collected from inside heated glasshouses in 1986 by Charles Rawcliffe (Rawcliffe, 1987; Collis & Harding, 2007).

A targeted survey for this species during BMIG’s 2015 annual field meeting successfully rediscovered *S. mauritiensis* at RBG Edinburgh, inside a non-public greenhouse and also in the Montane Tropics House (Gregory & Lugg, 2018). Subsequently, *S. mauritiensis* has been recorded from six additional sites in England and Wales. Its occurrence at Birmingham Botanic Garden, Living Rainforest (Berkshire) and National Botanic Garden of Wales is reported by Gregory & Lugg (2020). In addition there are three previously unpublished sightings: from Treborth Botanic Gardens Tropical House, Gwynedd (SH57) on 18.x.2019 (Thomas Hughes *leg./det.* and Steve Gregory *leg./det.*); Eden Project Mediterranean Biome, Cornwall (SX05) on 21.iii.2020 (Steve Gregory *leg./det.*); and Cannington Walled Garden Tropical House, Somerset (ST23) on 14.iv.2023 (Sue Harvey *leg.*; Steve Gregory *det.*).

Typically specimens are collected from within peaty soil or debris either on the ground, within decaying wood or beneath the leaf sheaths on plants. Given the relative ease with which this species has been found it is very likely to be present in many other tropical glasshouses throughout Britain and Ireland.



*Styloniscus mauritiensis* from RBG Edinburgh © Keith Lugg

***Styloniscus spinosus* (Patience, 1907)**

At the time of publication of WWIBI *Styloniscus spinosus* was only known from Kew Gardens in the 1970s and it had not been seen subsequently. However, in 2023 a male specimen was collected by Mike Davidson (pers. comm.) from a heated glasshouse at Dundee Botanic Gardens.



**Unidentified *Styloniscus* sp. male from Chester Zoo (preserved specimen) © Steve Gregory**  
(Species account on next page)

***Styloniscus* (Dana, 1853) sp.**

In May 2023 an unidentified male *Styloniscus* specimen, 1.9 mm in body length, was collected by Sean Hartnett from a tropical aviary at Chester Zoo (specimen examined by the author). Dissection indicated that it was not one of the known British or Irish species and it may be allied to the New Zealand species *S. otakensis* (Chilton) (Thomas Hughes, pers. comm.), but it would be useful to see more specimens.

**Family Philosciidae*****Anchiphiloscia pilosa* (Budde-Lund, 1913)**

This species has been recorded new to Britain since the publication of WWIBI.

*Anchiphiloscia pilosa* is a small dark philosciid, up to 6.5 mm in body length, with brightly orange-marked uropods and antennae. A brief description with figures is given by Telfer & Gregory (2018).

This strikingly coloured woodlouse was discovered by Mark Telfer from the Butterfly House at Whipsnade Zoo, Bedfordshire, in 2017 (Telfer & Gregory, 2018). Specimens were readily collected from among leaf-litter beneath planted exotic shrubs and the species seems to be well established. It may be present at other similar ‘heated glasshouse’ sites across Britain and Ireland, but this tropical species is unlikely to be able to survive outdoors in the British climate.

Although *A. pilosa* has been recorded from glasshouses in The Netherlands (Telfer & Gregory, 2018) its distribution there is uncertain due to confusion with the similar looking species *A. balssi* (Verhoeff), which has also been recorded (Berg, 2015). This latter species was described from glasshouses in Munich, Germany and is only known from inside European glasshouses. The two species may prove to be conspecific. *Anchiphiloscia pilosa* is widely distributed across the tropics, mainly on islands, across the Indian and Pacific oceans.



*Anchiphiloscia pilosa* from Whipsnade Butterfly House © Keith Lugg

***Burmoniscus meeusei* (Holthuis, 1947)**

There have been no confirmed sightings of this species in Britain or Ireland since it was last recorded at Kew Gardens in the 1970s.

***Chaetophiloscia sicula* Verhoeff, 1908**

This species has been recorded new to Britain since the publication of WWIBI.

*Chaetophiloscia sicula* is a relatively well pigmented woodlouse up to 8 mm in body length, with a markedly stepped pereion-pleon body outline and with the antennal flagellum composed of three articles. It is therefore reminiscent of *Philoscia* spp., but differs in the body pigmentation pattern. A brief description with figures to enable identification is given by Gregory (2014).

Although female specimens were first collected by Tony Barber from the Eden Project Mediterranean Biome, Cornwall in 2005 it remained un-identified until 2010 when additional specimens, including two males, were collected by Mark Telfer and the author (Gregory, 2014). These were found clinging to the damp underside of large embedded rocks in the Mediterranean Cyprus area, associated with *Lucasius pallidus* (Budde-Lund), another species new to Britain. It is quite possible that *Chaetophiloscia sicula* may be found at other heated warm temperate ‘Mediterranean’ glasshouses in Britain and Ireland.

*Chaetophiloscia sicula* originates from, and is widespread across, Mediterranean regions of southern France, Italy and central Greece (Schmalfuss, 2003). In recent decades it has expanded its range into north-west Europe and Noël *et al.* (2014) report its occurrence in north-west France. Given its occurrence on the Atlantic coast of Brittany it may be just a matter of time before it is discovered outdoors in southern England, either in coastal habitats or synanthropic sites, such as gardens.



***Chaetophiloscia sicula* from Eden Project (preserved specimens) © Mark Telfer**

***Ctenoscia minima* (Dollfus, 1892)**

This species has been recorded new to Britain since the publication of WWIBI.

*Ctenoscia minima* is small, to 5mm body length, well pigmented woodlouse with a discontinuous (stepped) body outline and the antenna with three flagella segments. It is readily distinguished from other known British and Irish Philosciids in having the eye comprising a single ommatidium (otherwise only seen in the Pygmy Woodlice, Trichoniscidae). A brief description with figures to enable identification is given by Hughes (2024).

In 2023 this species was discovered in a Garden Centre in Essex, initially beneath and subsequently within a large potted plant (Hughes, 2024). Several specimens, including gravid females, were discovered suggesting a viable and reproducing population. The plant is thought to have been imported via the horticultural trade from a Mediterranean grower.

Subsequently, specimens from under stones in the hothouse at Ventnor Botanic Gardens, Isle of Wight, which were first collected in 2016 by Mark Telfer, have also been confirmed by Thomas Hughes to be this species (Telfer, 2024). At this latter site the species was still present in 2022 and in 2024.



*Ctenoscia minima* from Essex © Thomas Hughes

***Pseudotyphloscia* cf *alba* (Dollfus, 1898)**

This species has been recorded new to Britain since the publication of WWIBI.



*Pseudotyphloscia* cf *alba* from Eden Project © Keith Lugg

Also known as *Pseudotyphloscia* sp. Eden A, this is a small, slender and poorly pigmented species reaching 4 mm in body length. It has a markedly stepped pereion/pleon outline and conspicuously long antennae bearing three flagella articles. A brief description with figures to enable identification is given in Gregory (2014).

It was first discovered at the Eden Project Rainforest Biome, Cornwall in 2004 and 2005 by Tullgren funnel extraction of leaf-litter samples undertaken by the Natural History Museum, London. Subsequently, in 2010 hand searching beneath stones and dead wood and sieving accumulations of damp leaf-litter revealed *P. cf alba* to be locally numerous. It was still present in 2020 (Gregory, 2020) and in 2024 (Finley Hutchinson *leg.*).

It may be present at other similar ‘heated glasshouse’ sites across Britain and Ireland, but currently the Eden Project remains the only known site for this species in Europe. It is very unlikely to be able to survive outdoors in the British climate. In the tropics *P. alba* has a wide Oriental distribution, including Southern China, Taiwan, Philippines and Indonesia (Schmalfuss, 2003).

### ***Setaphora patiencei* (Bagnall, 1908)**

There have been no confirmed records of this species in Britain or Ireland since its discovery early in the 20<sup>th</sup> Century. On the *World Marine, Freshwater & Terrestrial Isopod Crustaceans* database (Boyko *et al.*, 2025) this taxa is listed as ‘uncertain’ status so it may prove to be a synonym of another species.

### **Family: Platyarthridae**

### ***Trichorhina tomentosa* (Budde-Lund, 1893)**

This is a small off-white species, reaching 5 mm in length, with eyes composed of a single black, sometime indistinct, ommatidium. It has a distinctive oval body outline and the entire body is clothed in short club-shaped spines. A brief description, with figures, is given in Gregory (2014).



***Trichorhina tomentosa* from Stratford Butterfly Farm © Keith Lugg**

In WWIBI only a handful of post 1980 sites for *T. tomentosa* are listed and, of these known sites, it has been re-found at Glasgow Botanic Gardens in 2013, Tropiquaria, Somerset in 2023 and repeatedly at Eden Project, Cornwall (Gregory, 2014), as recently as 2024.

In addition there have been four post 2009 records from previously unknown sites. Living Rainforest, Berkshire; Cambridge Botanic Garden, Tropical Forest; and Stratford Butterfly Farm, Warwickshire are reported by Gregory & Lugg (2020) and in 2024 from Oxford Botanic Gardens (James Harding-Morris, *leg.*). This species is widely available through the hobby trade and, in addition to other tropical glasshouses, it may prove common in other heated facilities where livestock are kept (such as zoos and pet shops).

**Family: Porcellionidae**

***Agabiformius lentus* (Budde-Lund, 1885)**

*Agabiformius lentus* is a small brownish woodlouse reaching 6 mm body length. Although reminiscent of an immature *Porcellio scaber* it primarily differs in the pigment pattern, the shape of the head lobes and that the posterior lateral corner of pereonite 1 is not indented. A brief description of this species with figures to enable identification is given in Gregory (2014).

This species was first reported by Randell Jackson (1910) from a plant nursery at Chester and was formerly considered to be “the least rare of our [heated glasshouse] aliens” (Sutton, 1972). However, there appear to be no post-1970s records until specimens were collected in the Eden Project, Rainforest Biome by Mark Telfer in 2009 (Gregory, 2014). In March 2025 a single specimen was found under a small olive tree imported from Sicily in a garden centre in Essex by Thomas Hughes and Annie Northfield (*pers. comm.*). This species may be awaiting discovery at other heated glasshouses and garden centres throughout Britain and Ireland.



***Agabiformius lentus* from Eden Project (preserved specimen) © Steve Gregory**

This species originates from the eastern Mediterranean, but it is an expansive species that has been introduced to many other parts of the world by human activities, including northern Europe, Africa, China and South America (Schmalfuss, 2003). It is adapted to dry conditions and in France it readily colonises synanthropic habitats, such as gardens (Séchet & Noël, 2015), where it is only known from Mediterranean coastal regions and often found associated with ants.

***Lucasius pallidus* (Budde-Lund, 1885)**

This species has been recorded new to Britain since the publication of WWIBI.

Another small (to 6 mm in body length) brownish woodlouse with two pairs of pleopodal lungs and the antennal flagellum is composed of two articles, and thus reminiscent of a poorly pigmented immature *Porcellio scaber*. A brief description with figures to enable identification is given in Gregory (2014).

*Lucasius pallidus* was first recorded in 2010 inside the Eden Project Mediterranean Biome, Cornwall, where several specimens, including males, were found by Mark Telfer and the author clinging to the damp underside of large embedded rocks in the Mediterranean Cyprus area (Gregory, 2014). Here it was found with *Chaetophiloscia sicula* Verhoeff, another species new to Britain. *Lucasius pallidus* was found to be still present in the Mediterranean Biome in 2020 (pers. obsv.). It may be awaiting discovery at other ‘Mediterranean’ glasshouse throughout Britain and Ireland.



***Lucasius pallidus* from Eden Project (preserved specimen) © Steve Gregory**

Outdoors this species is found across Mediterranean Europe from southern Spain to northern Italy (Schmalfuss, 2003). In France it is mainly known from Mediterranean coastal regions, but seems to be increasing its range and recently it was found on the northern coast of Brittany (Franck Noël, pers. comm.). This raises the possibility that it could turn up outdoors in southern England.

***Porcellionides sexfasciatus* (Budde-Lund, 1885)**

This species has been recorded new to Britain since the publication of WWIBI.

*Porcellionides sexfasciatus* is similar in appearance to *P. pruinosus* with live animals bearing a similar grey ‘pruinose’ bloom, but the body also bears a series of indistinct dark longitudinal stripes. A brief description with figures to enable identification is given by Gregory, Lugg & Harding-Morris (2021).

Specimens were first encountered, and photographed, in 2018 by Keith Lugg during a visit to the Eden Project Mediterranean Biome, Cornwall. Two additional females were collected by James Harding-Morris and the author in 2020 in dry situations under loose stones on low walls with no other species of woodlouse present (Gregory *et al*, 2021). Subsequently a male specimen was found by Mark Telfer in the same year and the species was found to be still present in 2024 (Finley Hutchinson *leg.*).

*Porcellionides sexfasciatus* is widely distributed across the western Mediterranean region, including Spain, France, Italy and northern Africa and has been introduced to many other parts of the world (Schmalfuss, 2003). In France it is also widespread along the Atlantic coast as far north as Brittany (Séchet & Noël, 2015). Although predominantly a littoral species, *P. sexfasciatus* is not confined to the coast and has been widely spread by human activity into synanthropic habitats inland. It favours relatively dry stony or sandy soils, in stark contrast to the damp compost/manure habitats favoured by its superficially similar looking congener *P. puinosus*.



***Porcellionides sexfasciatus* male (with regenerated antenna) from Eden Project © Keith Lugg**

It is quite possible that *P. sexfasciatus* may be found at other heated warm temperate ‘Mediterranean’ glasshouses in Britain and Ireland. Given its occurrence on the Atlantic coast of Brittany it is perhaps just a matter of time before colonises the Channel Islands, the Isles of Scilly, or even the south coast of mainland UK.

### **Family: Trachelipodidae**

#### ***Nagurus cristatus* (Dollfus, 1889)**

*Nagurus cristatus* is a medium sized species (to 10 mm body length) with a distinct yellowish and brownish longitudinal pattern on the dorsal surface. Only females have been recorded in Britain. Although reminiscent of *Porcellio scaber* the medial lobe of the head bears a characteristic prominent central notch (visible in the image below) and there are five pairs of pleopodal lungs. A brief description with figures to enable identification is given in Gregory (2014).

In Britain *N. cristatus* was first recorded from Northumberland in 1965, but there were no additional records in Britain or Ireland until specimens were collected from the Eden Project Rainforest Biome by the Natural History Museum, London in 2004 and 2005. Subsequently additional specimens have been hand sorted and sieved from deep accumulations of leaf litter in 2009 (Mark Telfer *leg.*) and 2010 (Darren Mann *leg.*) (Gregory, 2014). The species was found to be still present in 2020 (Gregory, 2020) and in 2024 (Finley Hutchinson *leg.*). In 2017 a second modern site was discovered at Birmingham Botanical Gardens Tropical House where specimens were collected from among accumulated leaf-litter at the base of a shallow depression (Gregory & Lugg, 2020).



*Nagurus cristatus* from Birmingham Botanical Gardens © Keith Lugg

*Nagurus cristatus* has a pan-tropical distribution, having been widely dispersed by human activity. In temperate regions, such as Europe, it occurs as a synanthrope inside glasshouses (Schmalfuss, 2003). This species is very likely to be present in other tropical glasshouses throughout Britain and Ireland.

***Nagurus nanus* (Budde-Lund, 1908)**

*Nagurus nanus* is a small woodlouse (to 5 mm body length) with a rather oval outline. The body is dark brown with two patches of pale yellow mottling situated either side of a broad dark brown central stripe and it has five pairs of pleopodal lungs. It is readily identified from the male pleopods and a brief description with figures to enable identification is given in Gregory (2014).



*Nagurus nanus* from Eden Project (preserved specimen) © Steve Gregory

At the time of publication of WWIBI *N. nanus* was only known from a single site: a heated glasshouse in Belfast Botanic Gardens in 1911 (Foster, 1911). No additional observations were made until many specimens, including males, were extracted from a litter samples collected from Eden Project Rainforest Biome by the Natural History Museum, London in 2004 and 2005. Subsequent surveys undertaken at Eden Project have failed to re-find this species and it may no longer be present.

This species has been widely introduced throughout the tropics where it typically occupies disturbed habitats (Schmalfuss, 2003).

**Family: Armadillidiidae**

***Armadillidium arcangelii* Strouhal, 1929**

This species has been recorded new to Britain since the publication of WWIBI.

*Armadillidium arcangelii* resembles an immature poorly pigmented *A. vulgare*. Perhaps one of the most useful field characters is that the telson is triangular with a rounded tip in *A. arcangelii*, but is distinctly truncated and flat ended in *A. vulgare*. A brief description with figures is given in Gregory (2014) and a more detailed description in Noël, Gregory & Agapakis (2022).

Specimens were first collected from the Eden Project Mediterranean Biome, Cornwall in 2005 by Tony Barber, but remained unidentified, despite the collection of a male specimen in 2010 (Gregory, 2014). Specimens were found clinging to the underside of large embedded rocks and also sieved from leaf-litter and debris. A subsequent survey in 2020 failed to re-find the species. It took over a decade before the actual species was determined as *A. arcangelii* (Noël *et al.*, 2022).



***Armadillidium arcangelii* from Eden Project (preserved specimen) © Steve Gregory**

The first ‘outdoor’ record was made in August 2022 when a female specimen was found by Thomas Hughes beneath a potted palm tree imported from Spain in a garden centre in Suffolk (Hughes, Northfield & Maguire, 2024). Subsequently, in 2023 specimens were collected from garden centres in Edinburgh, Midlothian (the first Scottish record) and Enniskillen, Co. Fermanagh (the first Irish record) by Warren Maguire (2023). Further surveys of garden centres, including in Essex and Hertfordshire, found the species at three additional sites, typically singletons found beneath large potted plants of Spanish, Portuguese or Italian origin, suggesting unintentional introduction via the horticultural trade

(Hughes *et al.*, 2024). Then in April 2025 a specimen was found by Gino Brignoli on a balcony in central London (TQ3482), shortly followed by another about 4km to the east beside the River Lea (TQ3881). This latter specimen was found outdoors on a bed of soil covered with cardboard and bricks although there is a greenhouse on site nearby (Gino Brignoli, pers. comm.).

Considering its similar appearance to the common *A. vulgare*, then *A. arcangelii* is likely to be easily overlooked and it may prove to be more widespread across Britain and Ireland. Although these recent post 2022 observations are not from within heated glasshouses, there is currently no evidence that *A. arcangelii* is naturalised, with an established breeding population that is able to survive outdoors through the British and Irish winters (all current records are from April to August). However, it seems very likely that outdoor breeding populations may become established in the foreseeable future.

This species is native to Italy, but in the last decade *A. arcangelii* has been dispersed widely across Europe with records from the Iberian Peninsula north to the Netherlands and at least as far east as Turkey (Noël *et al.*, 2022). These wider continental records are typically from synanthropic sites such as gardens or city parks, providing evidence of anthropogenic dispersal via the horticultural trade.

### **Family: Armadillidae**

#### ***Gabunillo* Schmalzfuss & Ferrara, 1983 sp.**

This species has been recorded new to Britain since the publication of WWIBI.

*Gabunillo* sp., also known as *Gabunillo* Eden A, appears to be an undescribed species (Stefano Taiti, pers. comm.). It is a tiny ball-rolling species about 2mm in length which lacks body pigment, except for a single reddish ommatidium, and (atypically for an Armadillid) it has a triangular telson. A brief description, with figures to enable identification is given in Gregory (2014).



***Gabunillo* sp. from Eden Project (preserved specimen) © James Harding-Morris**

This species is only known from the Eden Project Rainforest Biome where it was first collected between 2003 and 2007 in small numbers using Tullgren Funnel extraction of leaf-litter samples undertaken by the Natural History Museum, London. In 2009 and 2010 numerous specimens were found by intensive hand searching and sieving of deep accumulations of leaf litter and peaty soil. It was found to be still present in 2020 (Gregory, 2020).

Currently there are three valid species of *Gabunillo*: *G. coecus* Schmalzfuss & Ferrara, 1983; *G. thomensis* Cifuentes & Da Silva, 2023 and *G. enfurnado* Campos-Filho, Sfenthourakis & Bichuette, 2023. All three described species lack body pigment and also lack ommatidia. All specimens collected from the Eden Project notably differ from the described species above in that they bear eyes comprising a single reddish ommatidium. It has recently become apparent that specimens of *Elumoides* sp. Taiti & Ferrara, 1983 (Eubelidae) look very similar to the Eden Project *Gabunillo* sp. (Thomas Hughes, pers. comm.). *Elumoides* spp. have a wide cosmopolitan distribution across tropical regions (e.g. see observations on iNaturalist - [www.inaturalist.org](http://www.inaturalist.org)) and consequently it seems sensible that specimens from Eden Project should be re-examined. [A fourth species *G. aridicola* Souza *et al.* 2010, which is well pigmented and has well developed pigmented eyes, is no longer considered to belong to this genus (Fernandes *et al.*, 2019).]

### ***Reductoniscus costulatus* Kesselyák, 1930**

This is a very small pill-woodlouse, to 2 mm body length, with the head and body covered in characteristic broad rounded tubercles. It is very similar in appearance to the naturalised *Buddelundiella cataractae* (Trichoniscidae), but the telson of *R. costulatus* has a characteristic ‘hour-glass’ shape and it has truncated ‘square’ uropods typical of its family. A brief description with figures to enable identification is given by Gregory (2014).



***Reductoniscus costulatus* from Living Rainforest, Berkshire © Keith Lugg**

At the time of publication of WWIBI *R. costulatus* was only known in Britain and Ireland from Kew Gardens, London, where it had been collected on several occasions since 1947. However, this species is proving to be widespread in tropical glasshouses and in recent decades has been found at five additional locations. In 2009 and 2010 intensive searching resulted in the collection of numerous specimens throughout the Eden Project Rainforest Biome (Gregory, 2014), where it was still present in 2020 (Gregory, 2020) and in 2024 (Finley Hutchinson *leg.*). Three additional sites are reported by Gregory & Lugg (2020): Living Rainforest (Berkshire), Cambridge Botanic Gardens (Cambridgeshire) and Whipsnade Zoo (Bedfordshire). There is an additional unpublished record from Glasgow Botanic Gardens, Palm House (NS56) on 05.vi.2013 by Andy Murray.

This species typically occurs among peaty soil, either on the ground beneath dead wood or in pockets that have accumulated under leaf sheaths (e.g. of banana plants). It is likely to be widely distributed in other tropical glasshouses throughout Britain and Ireland if looked for. Elsewhere it has been recorded outdoors in Seychelles, Mauritius, Malaysia and Hawaiian Islands (Schmalfuss, 2003).

### ***Venezillo parvus* (Budde-Lund, 1885)**

This species was briefly mentioned in WWIBI following the collection of specimens in 2004 by Tullgren Funnel extraction of ‘soil’ from Eden Project Rainforest Biome (Gregory, 2009a). Although superficially looking rather like a small *Armadillidium* species, *V. parvus* is a distinctive species with characteristic square-ended telson and body pigment pattern (see image below). A brief description with figures to enable identification is given by Gregory (2014).



***Venezillo parvus* from Eden Project © Keith Lugg**

Subsequent surveys in 2009 and 2010 showed this to be one of the most frequently recorded woodlice in the Rainforest Biome (Gregory, 2014) and it was found to be still present in 2020 (Gregory, 2020) and in 2024 (Finley Hutchinson *leg.*). Although known from several tropical glasshouses on continental Europe, no additional British or Irish sites have been discovered.

### **Looking Ahead...**

The species accounts presented in this work represent a snap shot of our current knowledge, which has substantially built upon the information available for the 2009 publication of WWIBI. Future survey work targeting heated glasshouses (botanic gardens, butterfly houses, aviaries, etc) and garden centres will undoubtedly show many of the species included herein to be much more widespread than currently known. It is also very likely that additional species of woodlouse await discovery.

As a result of ongoing climate change it is expected that some species currently confined to heated glasshouses, particularly those species of Mediterranean origin, could eventually become successfully established outdoors across at least southern England. For example the pill-woodlouse *Armadillidium arcangelii* has been repeatedly found in outdoor plant displays in garden centres (albeit only during the summer months) and there are known established outdoor populations in northern Europe (Noël *et al.*,

2022). However, it is very unlikely that those species originating from tropical regions will be able to survive outdoors through our relatively cold winters.

## References

- Berg, M. (2015). *Anchiphiloscia balssi*. De landpissebedden (Isopoda) van Nederland. Available online at [www.pissebeddenproject.nl/soort/soort\\_Anchiphiloscia\\_balssi.html](http://www.pissebeddenproject.nl/soort/soort_Anchiphiloscia_balssi.html)
- Boyko, C.B.; Campos-Filho, I.S.; Hadfield, K.A.; Hughes, T.; Merrin, K.L.; Ota, Y.; Poore, G.C.B. (Eds) (2025). World Marine, Freshwater and Terrestrial Isopod Crustaceans database. Accessed at: [www.marinespecies.org/isopoda/aphia.php?p=taxdetails&id=263018](http://www.marinespecies.org/isopoda/aphia.php?p=taxdetails&id=263018) on 2025-09-23
- Campos-Filho, I.S., Sfenthourakis, S., Gallo, J.S., Gallão, J.E., Torres, D.F., Chagas-Jr, A., Horta, L., Carpio-Díaz, Y.M., López-Orozco, C.M., Borja-Arrieta, R., Araujo, P.B., Taiti, S. & Bichuette, M.E. (2023). Shedding light into Brazilian subterranean isopods (Isopoda, Oniscidea): expanding distribution data and describing new taxa. *Zoosystema*, **45**(19): 531-599. doi.org/10.5252/zoosystema2023v45a19
- Cifuentes J. & Da Silva L.P. (2023). Terrestrial isopods (Isopoda, Oniscidea) of São Tomé Island, with the description of two new Armadillidae Brandt, 1831 species. *Zoosystema*, **45**(21): 635-652. doi.org/10.5252/zoosystema2023v45a21
- Cifuentes, J. Gilgado, J.D. & Bobbitt, I. (2022). The woodlice of Switzerland (Crustacea, Isopoda, Oniscidea), with 6 new records from heated greenhouses. *Revue suisse de Zoologie*, **129**(2):343-367 (2022). doi.org/10.35929/RSZ.0081
- Collis, G.M. & Harding, P.T. (2007). Charles Rawcliffe s discovery of the alien woodlouse *Styloniscus mauritiensis* (Barnard 1936). *Bulletin of the British Myriapod & Isopod Group*, **22**: 20-21. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Fernandes, C.S., Campos-Filho, I.S, Araujo, P.B & Bichuette, M.E. (2019). Synopsis of terrestrial isopods (Crustacea: Isopoda: Oniscidea) from Brazilian caves, with emphasis on new records from north, midwest, northeast and southeast regions. *Journal of Natural History*, **53**(17-18): 1095-1129.
- Foster, N.H. (1911). Two exotic species of woodlice found in Ireland. *Irish Naturalist*, **20**:154-156.
- Gregory, S.J. (2024) 15 years on: An update to Woodlice and Waterlice in Britain and Ireland, part 1 ~ Native and Naturalised Species. *Bulletin of the British Myriapod & Isopod Group*, **36**: 20-58. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Gregory, S. (2020). *Porcellionides sexfasciatus* new to Britain and some rainforest goodies. *British Myriapod and Isopod Group Newsletter*, **41**: 6 (unpublished). Available online at: [www.bmig.org.uk/view/resource/bmig-newsletter](http://www.bmig.org.uk/view/resource/bmig-newsletter)
- Gregory, S.J. (2014). Woodlice (Isopoda: Oniscidea) from the Eden Project, Cornwall, with descriptions of species new to Britain and poorly known British species. *Bulletin of the British Myriapod and Isopod Group*, **27**: 3-26. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Gregory, S. (2009a). A tropical woodlouse new to Britain. *British Myriapod & Isopod Group Newsletter* **18**: 1-2 (unpublished). Available online at: [www.bmig.org.uk/view/resource/bmig-newsletter](http://www.bmig.org.uk/view/resource/bmig-newsletter)
- Gregory, S.J. (2009b). *Woodlice and Waterlice (Isopoda: Oniscidea & Asellota) in Britain and Ireland*. Centre for Ecology & Hydrology/Field Studies Council. 175pp.
- Gregory, S.J. & Lugg, K. (2018). *Styloniscus mauritiensis* (Barnard) – an overlooked woodlouse of tropical glasshouses new for England and Wales (Isopoda, Oniscidea: Styloniscidae). *Bulletin of the British Myriapod & Isopod Group*, **30**: 26-32. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Gregory, S.J. & Lugg, K. (2020). Some recent observations of woodlice (Isopoda: Oniscidea), millipedes (Diplopoda) and centipedes (Chilopoda) from artificially heated glasshouses. *Bulletin*

- of the British Myriapod & Isopod Group, **32**: 35-43. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Gregory, S.J., Lugg, K. & Harding-Morris, J. (2021). *Porcellionides sexfasciatus* (Budde-Lund, 1885) new for the UK from Eden Project, Cornwall (Isopoda: Oniscidea: Porcellionidae). *Bulletin of the British Myriapod & Isopod Group*, **33**: 27-34. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Hughes, T.D. (2024). *Ctenoscia minima* (Dollfus, 1892): A woodlouse new for the British Isles from a Garden Centre in Essex (Isopoda: Oniscidea: Philosciidae). *Bulletin of the British Myriapod & Isopod Group*, **36**: 2-8. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Hughes, T.D., Northfield, A. & Maguire, W. (2024). The Conquest Continues: First Outdoor Records of *Armadillidium arcangelii* Strouhal, 1929 in the British Isles (Isopoda: Oniscidea: Armadilliidae). *Bulletin of the British Myriapod & Isopod Group* **36**: 14-19. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Kesselyak, A. (1930). Über Isopoden. *Zoologischer Anzeiger*, **91**: 50-66.
- Maguire, W. (2023). Garden Centre Woodlice. *British Myriapod & Isopod Newsletter*, **47**: 10-11 (unpublished). Available online at: [www.bmig.org.uk/view/resource/bmig-newsletter](http://www.bmig.org.uk/view/resource/bmig-newsletter)
- Noël, F., Gregory, S.J. & Agapakis, G. (2022). *Armadillidium arcangelii* Strouhal, 1929 (Isopoda: Oniscidea): a step towards the conquest of Europe? *Bulletin of the British Myriapod and Isopod Group*, **34**: 72-82. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Noël, F. & Séchet, E. (2021) Crustacés Isopodes terrestres du Nord de la France (Crustacea, Isopoda, Oniscidea): Clé de détermination illustrée. Publication en ligne, version 1. Available online at: [https://www.researchgate.net/publication/355145019\\_Cle\\_des\\_Isopodes\\_terrestres\\_du\\_Nord\\_de\\_la\\_France\\_2021](https://www.researchgate.net/publication/355145019_Cle_des_Isopodes_terrestres_du_Nord_de_la_France_2021)
- Noël, F., Séchet, E, Mouquet, C. & Bécheau, F. (2014). Découverte de *Chaetophiloscia sicula* Verhoeff, 1908 (Philosciidae) et de *Stenophiloscia glarearum* Verhoeff, 1908 (Halophilosciidae) dans l'Ouest de la France. *Invertébrés Américains*, **10**: 47-53.
- Patience, A. (1908). On a new British terrestrial isopod (*Trichoniscus linearis* sp. n.). *Annals and Magazine of natural History*, (**8**)**1**: 280-282 and plate 11.
- Randell Jackson, A. (1910). On Some Arthropods observed in 1909. *Lancs. Nat.* (NS) **3**: 17-22, 46-51.
- Rawcliffe, C. (1987). Collecting in hothouses. *British Isopod Study Group Newsletter*, **22**: 6 (unpublished). Available online at: [www.bmig.org.uk/view/resource/bisg-newsletter](http://www.bmig.org.uk/view/resource/bisg-newsletter)
- Schmalfuss, H. (2003). World catalog of terrestrial isopods (Isopoda: Oniscidea). *Stuttgarter Beiträge zur Naturkunde, Serie A, Nr. 654*: 341 pp.
- Schmalfuss, H.; Ferrara, F. (1983). Terrestrial isopods from West Africa, Part 3: Family Armadillidae Verhoeff, 1917. *Monitore Zoologico Italiano (Nuovo Serie). Supplemento* **18**(3): 111-157.
- Séchet, E. & Noël, F. (2015). Catalogue commenté des Crustacés Isopodes terrestres de France métropolitaine (Crustacea, Isopoda, Oniscidea). *Mémoires de la Société Linnéenne de Bordeaux*, **16**: pp156.
- Sutton, S. (1972). *Woodlice*. Ginn; London. 144 pp.
- Telfer, M.G. (2024). *Ctenoscia minima* (Dollfus, 1892) (Isopoda: Oniscidea: Philosciidae): the earliest British record from Ventnor Botanic Gardens, Isle of Wight. *Bulletin of the British Myriapod & Isopod Group*, **36**: 9. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Telfer, M.G. & Gregory, S.J. (2018). A woodlouse new to Britain: *Anchiphiloscia pilosa* (Budde-Lund, 1913) (Oniscidea: Philosciidae) in a heated butterfly house in Bedfordshire. *Bulletin of the British Myriapod & Isopod Group*, **30**: 12-20. Online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)

## **The House Centipede *Scutigera coleoptrata* (Linnaeus, 1758) (Chilopoda: Scutigeraomorpha) in mainland Britain: it's here to stay**

Steve J. Gregory

E-mail: [stevejgregory@btopenworld.com](mailto:stevejgregory@btopenworld.com)

### **Abstract**

The House Centipede *Scutigera coleoptrata* is a large and distinctive centipede typically found inside buildings including domestic houses. It was once considered very rare in Britain with just a handful of records made from 1883 until the 1990s. Subsequent decades, however, have seen a steady increase in sightings culminating in a sharp rise in 2024. The species is currently recorded from widely scattered locations across England and Wales north to Lancashire and Yorkshire. There are a few outdoor observations, including a vegetated sea cliff in Cornwall. The available data suggest peaks in abundance in early summer and later in the autumn. It is suggested that the major contributing factor to the recent increase in observations is climate change which has facilitated the establishment of this southern Europe species in the UK.

### **Introduction**

The House Centipede *Scutigera coleoptrata* (Linnaeus, 1758) (Chilopoda: Scutigeraomorpha) is a large (to 30 mm body length) and distinctive species, with ridiculously elongated legs, large compound eyes and three 'go faster stripes' running the full length of its body. Although considered to be native to the Mediterranean region, it has been widely spread by human activity throughout much of Europe, Asia and North America (Barber, 2009; 2022). In France *S. coleoptrata* is widely distributed, albeit favouring rather thermophilic locations (Iorio, 2014). Even in northern France it is relatively common, where it favours synanthropic habitats (Iorio & Labroche, 2015) including gardens and ornamental parks. It has been well established on the Channel Islands (about 30 km off the French coast) since at least the late-1800s (Barber 1990; 2022) and there it is widely observed outdoors in the summer months.

In stark contrast, in mainland Britain *S. coleoptrata* has always been considered to be a rarity and is typically found indoors. Currently there are no verified records from Ireland (Barber, 2022). In the review of species conservation status Lee (2015) lists *S. coleoptrata* as a non-native vagrant species: i.e. long term breeding populations are not established.

This paper highlights the substantial increase in reported sightings of this species across mainland Britain in recent years.

### **Sources of records**

Records of *Scutigera coleoptrata* up to the end of 2024 are included in this update. This includes all records submitted and accepted by the Centipede Recording Scheme up to the end of 2020, which are plotted in the updated Centipede Atlas (Barber, 2022). Additional records from 2021 to 2024 have been verified on *iRecord* (<https://irecord.org.uk/>) which includes additional verified records derived from *iNaturalist* (<https://www.inaturalist.org/>). These comprise the vast majority, if not all, of the British and Irish records for this species submitted to the centipede recording scheme for those years. Also included are three additional records from 2020 that are not plotted in Barber (2022).

### **Historic sightings**

The earliest records of *S. coleoptrata* from mainland Britain are detailed by Barber (2022). It was first noted from a paper mill near Aberdeen in 1883 where it was thought to have been introduced in bundles

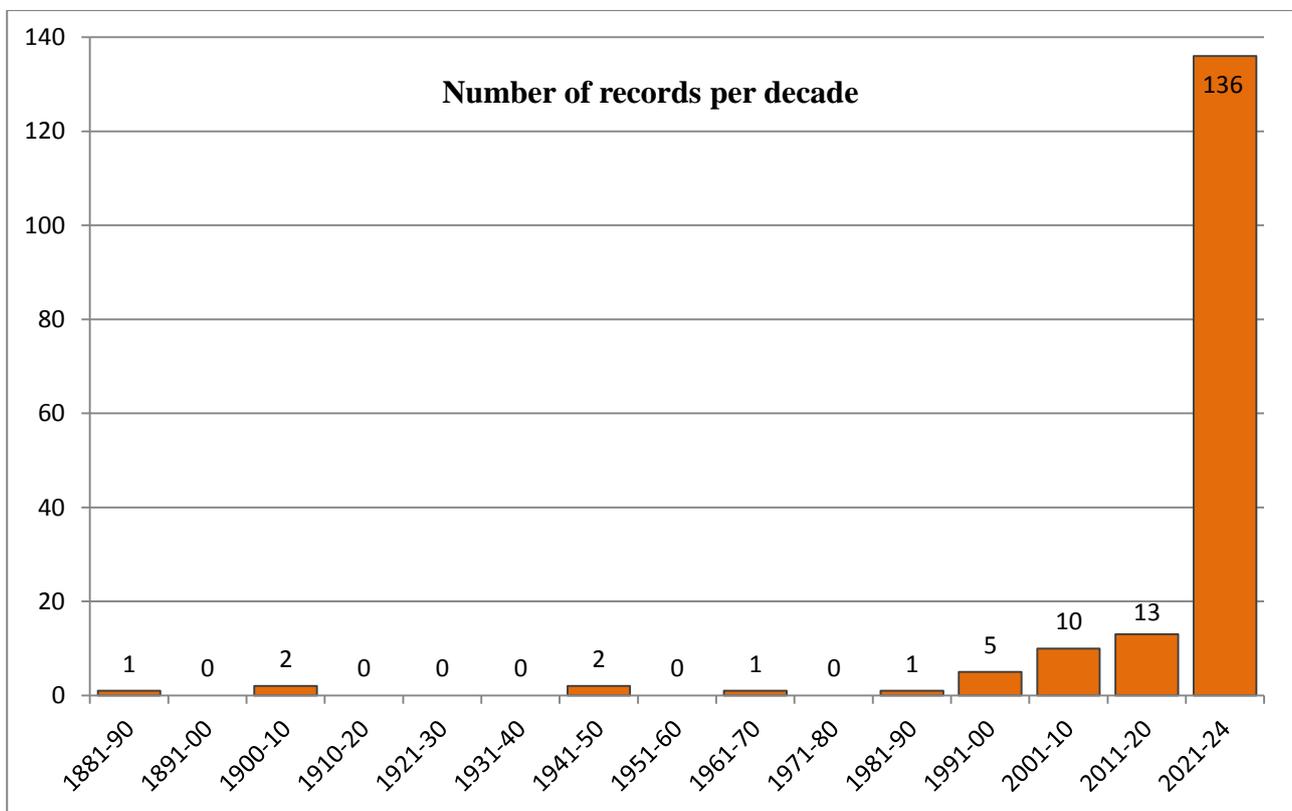
of rags from Southern Europe. Here it was present and successfully breeding for about 25 years. Early in the 20<sup>th</sup> Century it was recorded from a wine cellar (where it was also thought to be breeding) and a paper mill near Edinburgh. These three locations all suggest initial introductions of this species via accidental importation of goods from abroad.

The first English records were not made until the mid-20<sup>th</sup> Century: Norwich, Norfolk in 1949 and Colchester, Essex in 1955. Single additional sightings made in the in 1960s and 1980s meant that by the time of publication of the Provisional Centipede Atlas (Barber & Keay, 1988) there were seven known locations from mainland Britain over the 100 years spanning the 1880s to the 1980s (Fig. 1). Barber & Keay (1988) go on to comment that *S. coleoptrata* “might be expected to turn up occasionally in Britain as an introduction”. If only they were to know...

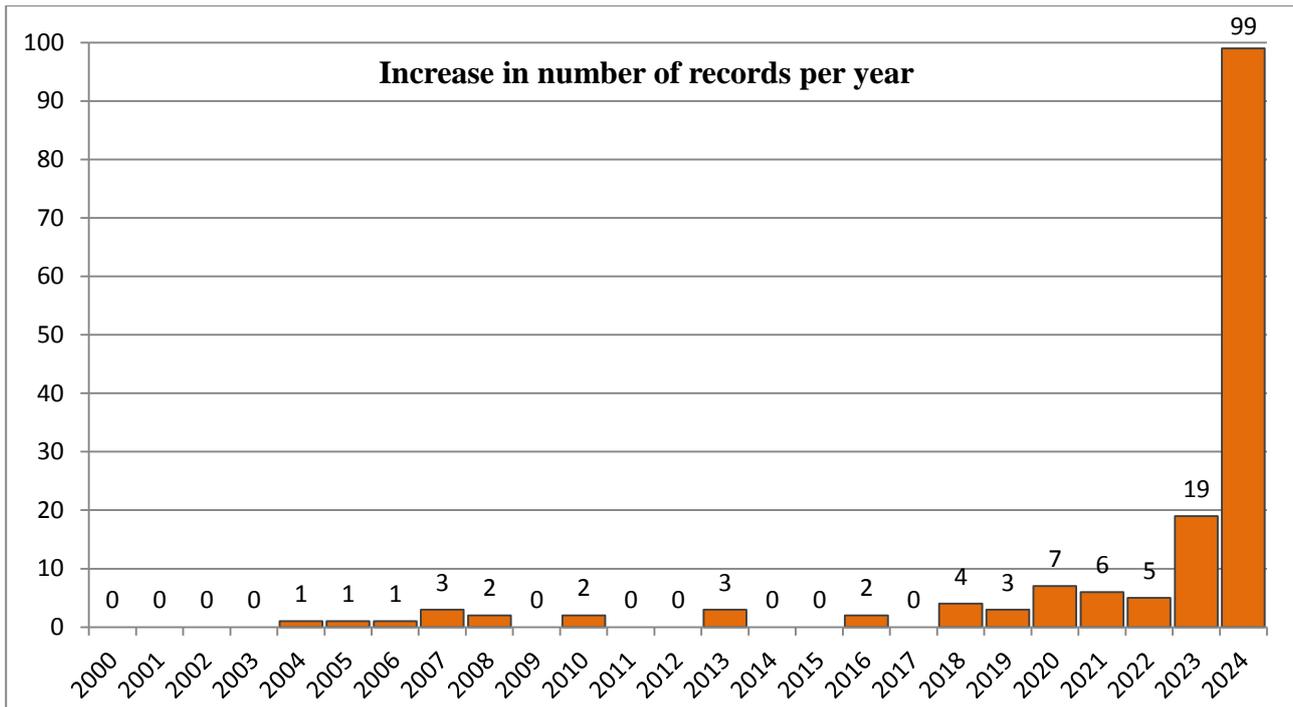
### Post 2000 records: the colonisation begins

Some two decades later Barber (2009) notes the occurrence of *S. coleoptrata* in eight additional counties across mainland Britain which equates to about 15 records (Figs. 1 & 2); mainly across southern England, but as far north as Lancashire. However, up to the mid-2010s the number of records barely averaged one per year.

Since 2018 (when four records were made in a single year) there has been a steady increase in the number of sightings of this species submitted to the centipede recording scheme (Barber, 2022; Gregory 2023). In 2020 there were seven records, six in 2021 and five in 2022, but then in 2023 an unprecedented 19 records in a single year! However, this was easily surpassed in 2024 when 99 records were verified by the recording scheme (Fig. 2). This single annual total is considerably more than all of the previous sightings of *S. coleoptrata* from 1883 to 2023 (141 years) added together!



**Figure 1: Number of records of *Scutigera coleoptrata* per decade from 1881 to 2024**  
Data from Barber (2022) and subsequent records (mainly 2020 to 2024) verified via *iRecord*.



**Figure 2: Increase in number of *Scutigera coleoptrata* records per year from 2000 to 2024.**

Data from Barber (2022) and subsequent records (mainly 2020 to 2024) verified via *iRecord*.

## Habitat and microsites

The earliest known records for *S. coleoptrata* are from inside paper mills and wine cellars, and thus linked with the importation of goods from abroad. The vast majority of modern (post 1990) records have also been from inside buildings. Although these are primarily domestic dwellings (so the vernacular name “House Centipede” would seem appropriate), they also include hospitals, warehouses and a golf course clubhouse. Of those sightings from inside houses the majority are reported from bathrooms and kitchens (perhaps the warmer and more humid rooms?), but bedrooms, living rooms, utility room and inside a garage are also noted. Interestingly, there have been no reported sightings from large Mediterranean glasshouses (such as those found at RBG Kew or Eden Project, for example).

Typically *S. coleoptrata* is observed running up a wall or along a ceiling or floor, usually at night. Several have been found in the kitchen sink, presumably having become trapped after falling in and unable to climb out. However a wide array of additional indoor ‘microsites’ have been given, including “found when taking off skirting board in house”, “found in my son’s toy box“, “found dead on daughter’s bed”, “found under the stairs” and “found in the shower”.

## Outdoor occurrences

Although *S. coleoptrata* is widely recorded outdoors in the summer months on the Channel Islands (Barber, 2009; 2022), there were no known outdoor sightings from mainland Britain known to Barber (2018) who speculates “If, maybe because of climate change, it [*S. coleoptrata*] is increasing, one wonders when the first “outdoor” specimens will be reported”. The wait was not long!

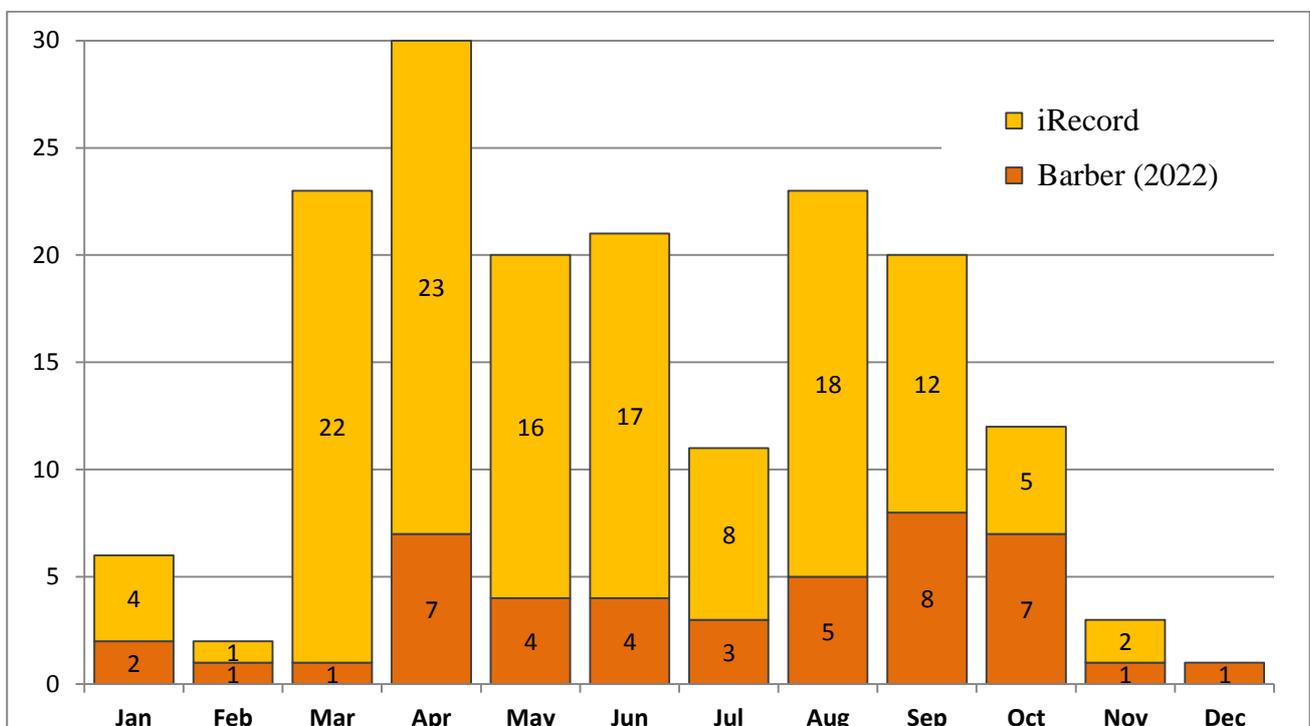
Later that same year the first outdoor occurrence was made in October 2018 when a specimen was observed at night in a garden on a wall close to a compost heap at Loosley Row, Buckinghamshire (SP8100) (Partridge, 2019). In 2020 there was a second outdoor garden sighting in Liverpool (SJ3587) “in the back yard at around 10:30pm crawling on the wall”. Then in 2021 a third outdoor sighting “in

my compost bin” was reported at Hedge End, Hampshire (SU4812). (These latter two records verified via *iRecord*). However, these three observations remain closely tied to domestic dwellings. In the USA it has been reported that *S. coleoptrata* may be found outdoors in summer, but needs to retreat indoors to survive the winter (e.g. Kaestner, 1968). It is likely that such a pattern may also be seen in the UK, at least in in southern England, perhaps with increasing numbers of outdoor observations in summer.

In August 2023 an entirely unexpected ‘outdoor’ discovery was made. Whilst surveying maritime grassland slopes for specialist clifftop assemblage of spiders at the Lizard Peninsula, Cornwall (SW6813) two specimens of *S. coleoptrata* were found under a rock by Tylan Berry & Cerin Poland (2023). Two additional specimens were found during a targeted survey by Paul Gainey at the same location later that same month. One was found under a stone and another under heather abutting a large boulder. Subsequently, an additional specimen was observed under large rocks in a pile of scree on vegetated cliffs nearby (SW6913) by Finley Hutchinson in June 2024. Thus the population here does seem to be well established and therefore can be considered the first naturalised outdoor population of *S. coleoptrata* in mainland Britain. The Lizard Peninsula constitutes the southern-most point in mainland Britain and the south facing vegetated cliffs here provide a distinct thermophilic environment. However, there may be additional coastal grassland sites for *S. coleoptrata* awaiting discovery along the English southern coastline?

## Phenology

Plotting the number of British records against month of observation shows that *S. coleoptrata* may be found throughout the year. However, the data from both Barber (2022) and from verified records imported via *iRecord* suggest two peaks of observations; the first in spring to early summer (March to June) and the second in autumn (August and September) (Fig. 3). There seems to be a pronounced dip in observations in July and records are sparse throughout the winter months (November to February).



**Figure 3. Number of records of *Scutigera coleoptrata* per month.**

Records from Barber (2022) from 1881 to 2020 (below) with additional verified records submitted to the recording scheme via *iRecord* (mainly 2020 to 2024) (above).

## Distribution

Records for *S. coleoptrata* are now widely scattered across England from Cornwall in the south-west to Kent in the south-east and northwards to a line from Blackpool, South Lancashire to Hull, South East Yorkshire (Fig. 4). There are an additional handful of records from Wales, where the species was first recorded in Glamorganshire, south Wales in 2020 (with several additional sightings) and subsequently in Pembrokeshire and in north Wales (Flintshire and Denbighshire). However, there are no modern sightings for Scotland where this species was last seen inside a paper mill in 1907 (Barber, 2022) and there remain no confirmed records from Ireland.

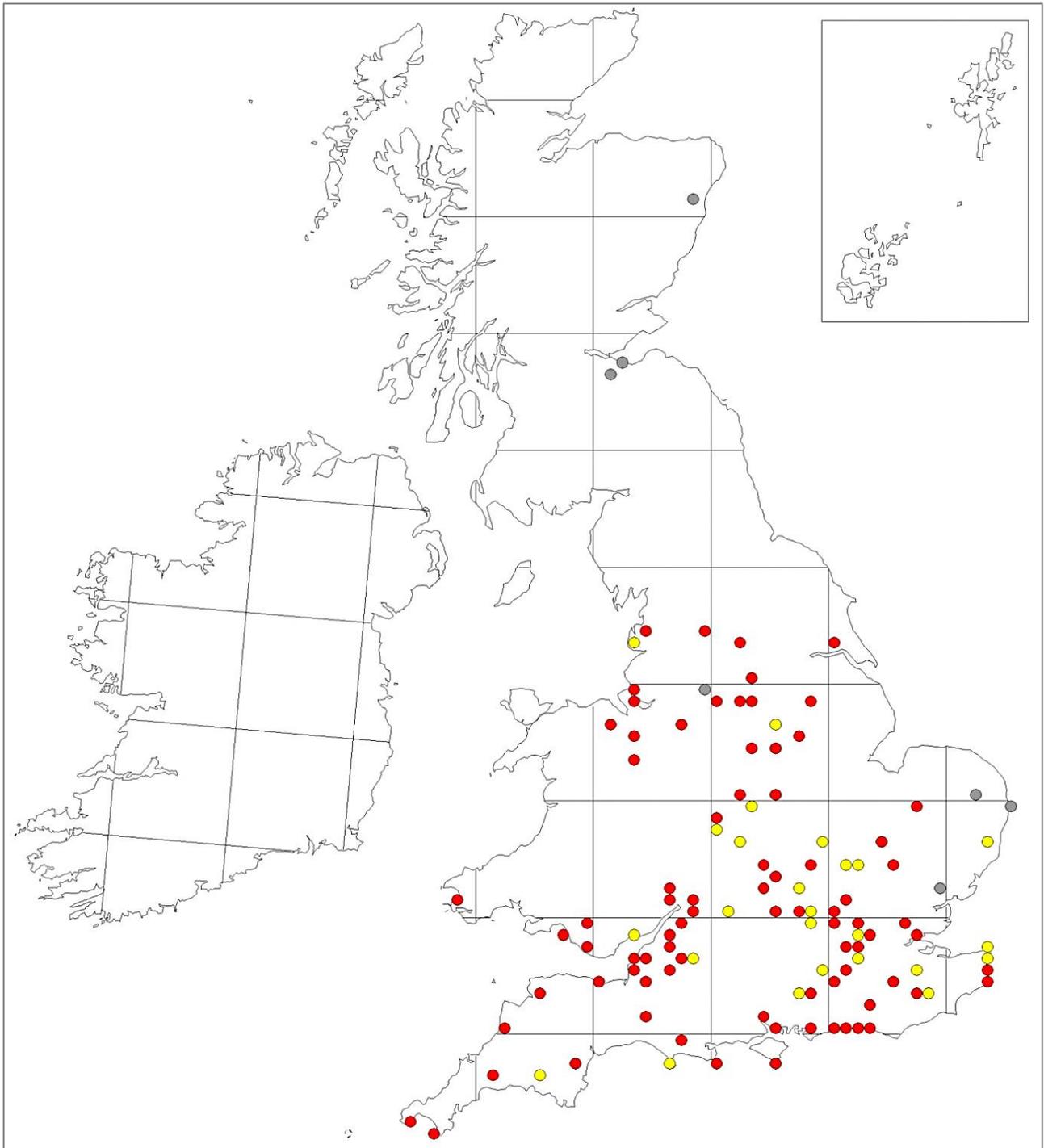
Most of these records are for isolated observations of a solitary specimen, perhaps representing ephemeral populations as a result of a chance accidental introduction. However, there is evidence that populations of *S. coleoptrata* may have become established in some areas. The most striking example is the town of Weston-super-Mare, located on the north Somerset coast (hectad ST36), where there have been 22 sightings from 10 locations since 2022, including several repeated observations at a few of these locations. On one occasion the recorder notes that there were “11 separate centipedes” and another recorder comments that the species has been “frequently sighted over a decade”. The species has also been repeatedly recorded from Liverpool, an historic port, with seven records from across the city since 2020 (hectads SJ38 & SJ39), which includes an outdoor record from a back yard.

## Discussion

There seem to be several factors that may have contributed to the apparent increase in sightings of *Scutigera coleoptrata* across Britain. There is little doubt that ready access to the internet and social media in recent decades has facilitated the recognition and identification of this distinctive species. In addition, the establishment of wildlife recording sites, such as *iRecord* and *iNaturalist*, has allowed observations to be readily filtered into, and verified by, the national recording schemes. In addition, the number of sightings of *S. coleoptrata* appears to have been slightly enhanced by the publication in January 2024 of a BBC news report regarding the discovery of the House Centipede in Nottinghamshire, which requested that sightings should be reported (BBC, 2024; Gregory, 2024). Several recorders upon submitting records for this species commented that they had seen this BBC article.

However, there is no doubt that this upward trend is real and the major contributing factor is most likely to be climate change resulting in an overall slight increase in average temperature across the UK. Across northern France *S. coleoptrata* is widely dispersed albeit typically associated with synanthropic and/or thermophilic locations (Iorio, 2014; Iorio & Labroche, 2015). Also it has been well established on the Channel Islands since at least the mid-1800s where it is regularly reported outdoors (Barber 1990; 2022). A slightly warmer climate across Britain should improve the chances of survival of this centipede following a chance introduction and may result in populations, at least across southern England and Wales, becoming permanently established (as has been long observed on the Channel Islands), rather than ephemeral. Indeed *S. coleoptrata* already seems to be well established and successfully breeding around Weston-super-Mare in Somerset and there does seem to be an established outdoor population on a south facing vegetated sea cliff in Cornwall.

The real puzzle is how does *S. coleoptrata* disperse into new areas where previously it has not been found? Many unintentionally introduced centipedes, millipedes and woodlice are soil or litter dwelling species, such as pill-woodlouse *Armadillidium arcangelii* Strouhal (Hughes *et al*, 2024), that are able to survive inside transported potted or bare rooted plants and thus easily (albeit accidentally) dispersed via the horticultural trade. Unfortunately, this is not a feasible route of introduction for *S. coleoptrata*; a species typically inhabiting walls and ceilings. Perhaps this is the main reason why this species has yet to be recorded from inside a large Mediterranean style glasshouses, such as those found at RBG Kew, Eden Project, etc.



**Figure 4: Current distribution map (to end of 2024) for *Scutigera coleoptrata* in Britain.**

Map plotted at 10km (hectad) resolution using records from Barber (2022) and verified records submitted to the centipede recording scheme via *iRecord*.

● records made 1883 to 1989: ● records 1990 to 2019: ● records 2020 to 2024

There are no modern records for Scotland and it is not yet recorded from Ireland.

Historically it seems that the species was unintentionally introduced with imported products into paper mills and wine cellars in Scotland. Perhaps this is also the case for Liverpool, an historic port which has been redeveloped in recent decades and where the species now seems to be well established (but perhaps previously persisting un-noticed in old warehouses). However, in recent decades almost all records are from inside domestic dwellings with no obvious link to the large scale importation of products from abroad. Perhaps in this modern era of online shopping specimens are being carried around in the back of delivery vans? Another potential means of introduction could be inside luggage following a holiday on the European continent? Whatever the mechanism of arrival, once an initial population has established under favourable conditions it is very likely that specimens are able to disperse into adjacent properties through small crevices in walls, around windows and pipes, etc, thus facilitating the spread of this species across a wider area. This may be the case at Weston-super-Mare (with 22 sightings from 10 locations since 2022), but it is not easy to explain how the species got there in the first place. Historically this was a small fishing village until its rapid development as a holiday resort in the 19<sup>th</sup> Century following the arrival of the railway in 1841 which encouraged mass tourism (*Wikipedia* website). But these Victorian tourists were from the UK, not southern Europe! Maybe *S. coleoptrata* arrived on Victorian trains, or maybe they are a more recent addition to the town's fauna? We may never know.

To conclude, it is expected that observations of *S. coleoptrata* will become more frequent in coming decades, particularly across southern England, with more populations becoming permanently established and therefore it is very likely that there will be an increase in the number of reported outdoor occurrences.

It seems that *S. coleoptrata* is no longer “a fabulous beast... on a par with the unicorn and the mermaid” (to quote Barber, 2018). It's real and it seems it's here to stay and it'll be interesting to see what happens in 2025.

## Acknowledgements

I am indebted to Tony (A.D.) Barber for his useful and thought provoking comments on an earlier draft.

I also thank the many recorders who have submitted their centipede observations to the BMIG Centipede Recording Scheme, without which we would have no way of tracking the colonisation of the House Centipede *S. coleoptrata* across Britain.

## References

- Barber, A.D. (1990) *Scutigera coleoptrata* (L.) (Chilopoda, Scutigermorpha) in Jersey, Channel Islands. *Bulletin of the British Myriapod Group*. **7**: 47-48. Available online at: [www.bmig.org.uk/view/resource/bmg-bulletin](http://www.bmig.org.uk/view/resource/bmg-bulletin)
- Barber, A.D. (2009) *Centipedes*. Linnean Society Synopses of the British Fauna (N.S.) **58** Shrewsbury, Field Studies Council.
- Barber, A.D. (2011) *Thereuonema tuberculata* (Wood, 1863), a scutigermorph centipede from China, found in a warehouse at Swindon. *Bulletin of the British Myriapod & Isopod Group*. **25**: 49-50. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Barber, A.D. (2018) House Centipedes found in Home. BMIG Newsletter. **37**: 6-7 (unpublished). Available online at: [www.bmig.org.uk/view/resource/bmig-newsletter](http://www.bmig.org.uk/view/resource/bmig-newsletter)
- Barber, A.D. (2022) *Atlas of the Centipedes of Britain and Ireland*. Shrewsbury, Field Studies Council. 389 pp.
- Barber, A.D. & Keay, A.N. (1988) *Provisional Atlas of the Centipedes of Britain and Ireland*. BRC, Huntingdon. Available online at: <http://nora.nerc.ac.uk/id/eprint/7275/>

- BBC (2024) *Rare and venomous centipede found in Nottinghamshire for first time*. Available online at: <https://www.bbc.co.uk/news/uk-england-nottinghamshire-68055122>
- Berry, T. & Poland, C. (2023) The House Centipede, *Scutigera coleoptrata*, found naturalised at the Lizard Peninsula, Cornwall. *BMIG Newsletter*. **47**: 8-10 (unpublished). Available online at: [www.bmig.org.uk/view/resource/bmig-newsletter](http://www.bmig.org.uk/view/resource/bmig-newsletter)
- Gregory, S.J. (2024) *Scutigera* makes BBC news! *BMIG Newsletter* **48**: 4 (unpublished). Available online at: [www.bmig.org.uk/view/resource/bmig-newsletter](http://www.bmig.org.uk/view/resource/bmig-newsletter)
- Gregory, S.J. (2023) The House Centipede *Scutigera coleoptrata*; the conquest of southern England. *Fritillary*. **11**: 16-21. Available online at: <https://anhso.org.uk/wp-content/uploads/frit11-centipede.pdf>
- Hughes, T.D. (2024). A new woodlouse for the British Isles: *Ctenoscia minima* (Dollfus, 1892) from a garden centre in Essex (Isopoda: Oniscidea: Philosciidae). *Bulletin of the British Myriapod and Isopod Group*. **36**: 2-8. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Hughes, T.D., Northfield, A. & Maguire, W. (2024). The Conquest Continues: First Outdoor Records of *Armadillidium arcangelii* Strouhal, 1929 in the British Isles (Isopoda: Oniscidea: Armadilliidae). *Bulletin of the British Myriapod & Isopod Group* **36**:14-19. Available online at: [www.bmig.org.uk/view/resource/bmig-bulletin](http://www.bmig.org.uk/view/resource/bmig-bulletin)
- Iorio, E. (2014) Catalogue biogéographique et taxonomique des chilopodes (Chilopoda) de la France métropolitaine. Biogeographic and taxonomic catalogue of the centipedes (Chilopoda) of metropolitan France. *Mem. Soc. Linn. Bordeaux*. **15**: 1-372.
- Iorio, E. & Labroche, A. (2015) Les chilopodes (Chilopoda) de la moitié nord de la France. *Invertébrés Armoricaïns, Les Cahiers de GRETIA*. **13**: 1-108.
- Kaestner, A. (1968) *Invertebrate Zoology Vol. 2: Arachnids & Myriapods*. Wiley, New York
- Lee, P. (2015) *A review of the millipedes (Diplopoda), centipedes (Chilopoda) and woodlice (Isopoda) of Great Britain*. Species Status No. 23. Natural England Commissioned Reports, Number 186. Available online at: <http://publications.naturalengland.org.uk/publication/4924476719366144>
- Partridge, N. (2019) *Scutigera coleoptrata*: Loosely Row, Buckinghamshire. *Bucks Invertebrate Group Bulletin*. **29**: 3-4. Available online at: <https://sites.google.com/site/bucksinvertebrategroup/big-downloads>

## Visualisation of a possible simple “Synanthropy Spectrum” for Centipedes, Millipedes and Woodlice

Anthony D. Barber

7 Greenfield Drive, Ivybridge, Devon PL21 0UG

E-mail: abarber159@btinternet.com

### Abstract

In addition to distribution maps for Britain and Ireland, considerable amounts of habitat data for centipedes, millipedes and woodlice was generated by the BMIG recording schemes for these three groups. Crude percentage data on its own can give a false impression because of the different total numbers of records in each recording category and the different total numbers for individual species. Weighting of the data can be used to produce figures that may be used to compare options in each recording category. One particular category was for “Urban”, “Suburban/Village” and “Rural” and by using these an attempt is made to explore the “Synanthropy Spectrum” of each of the three groups.

### Introduction: Synanthropy and a “Synanthropy Spectrum”

Synanthropy, with some animal species being described as synanthropic and inhabiting habitats associated with human activity is a familiar one. In the recent centipede atlas (Barber, 2022) there was some discussion of this. There are probably both potential benefits and disadvantages of living in synanthropic habitats for centipedes as generalist carnivores and millipedes and woodlice as scavengers/detritus feeders and examples of all three groups are widely found in significantly human influenced sites. One of the likely factors involved could well be local climate when urban/built environments act as “heat islands” in otherwise rural areas. This could act directly on the species or via other members of the food chain and one consequence could be the establishment of some species in warmer locations further north than they might otherwise occur (Barber, 1985). Blackburn *et al.* (2002) comment that northward moving propagules perhaps can only survive in or near urban heat islands. Another aspect of urban sites could possibly be the impact of calcium from construction materials, likely to be more important to millipedes and woodlice rather than centipedes.

The presence of synanthropic species in a site could well be excluding what we might term the “locally native” ones by out-competing them or it could be that the latter are unable to survive in synanthropic sites because of the conditions and synanthropes have taken their place. The account of centipede species in various parks and open spaces in London (actually Watsonian Vice-county 21, Middlesex) by Barber & Milner (2023) illustrates the range of species in a large urban area with some apparent survivals from pre-urban times.

The presence of synanthropic species in any particular location could be due either to accidental human importation (with plants, construction materials, etc.) or to natural geographical spread. *Cryptops anomalans*, a large and distinctive example of a strongly synanthropic species, was first described (as *Cryptops savignii*) by Leach (1817) from the garden of the British Museum at Bloomsbury. Pocock (1902, 1906) recording it from Kew, commented that “this species belongs typically to the fauna of the Mediterranean area”. The centipede atlas (Barber, 2022) recorded it from 79 hectads (10km grid squares) in Great Britain and one each from Ireland and from the Channel Islands. Wesener *et al.* (2016) described it as “most likely introduced from the Mediterranean to Northern Europe” – and, interestingly, a single bar-coding haplotype suggesting either human introduction from a homogenous source population or rapid spread of the species.

Whatever the factors involved in distribution, spread and survival, it is notable that certain species, which may be termed “avoiders” are rarely if ever found in synanthropic sites whilst others (“dwellers”) are regularly found there. In the context of bird species, Guetté *et al.* (2017) referred to a continuum between these two extremes and it is interesting to see if we can visualise some such sort of spectrum of species occurrence in our myriapods and woodlice.

In discussion of this with Dr Helen Read, she drew my attention to the work of Hauser & Voigtländer (2019) who, in their volume on German millipedes, reviewed by her in 2020 (Read, 2020), included an intersection ecogram (Abt. 34) showing species preferences in woodland (Waldarten), synanthropic sites (Synanthrope Arten) and open areas (Offenlandarten) and also, interestingly, a diagram (Abt. 33) showing relative synanthropy in common millipedes ranging from various *Glomeris* species to *Melosgona voigtii* and *Ophiodesmus albananus*.

For this latter they had used data derived from that in Schubart (1957) for Mark Brandenburg using catch numbers for each species and the various biotopes they were found in. In some cases, the numbers for particular species were small but the graphs show, in a diagrammatic way, a picture of a synanthropy spectrum and the relative positions along it of individual species. Clearly some species are apparently confined to “synanthropische biotopes”; those more centrally on the spectrum show different proportions from natural and synanthropic sites; and, at the other end, those seemingly confined to “natürliche biotopes”.

### **Possible Synanthropy Diagrams for British Species**

Abt.33 (in Hauser & Voigtländer, 2019) seemed to be the sort of idea that might possibly be applied to British centipedes, millipedes and woodlice but this would require some form of quantification of relative synanthropy for the various species so that they may be arranged in an appropriate way in a chart.

Data such as that of Schubart is not conveniently available for Britain and Ireland. However what we do have is the fact that, when launched, the national recording schemes for woodlice (British Isopod Study Group, commenced 1968) and centipedes and millipedes (British Myriapod Group, launched 1970) in association with the Biological Records Centre, included provision for the collection of habitat data as well as date and location on the record cards to be used. These cards for the three schemes had a common format apart from the species list and used a “tick-box” system. Examples are illustrated by Barber and Fairhurst (1974) and Harding and Sutton (1985).

One category of data asked for with each record was whether the site from which it derived could be classified as “Urban”, “Suburban / Village” or “Rural”. The woodlouse scheme ceased to collect habitat data in this way in 1982 but when the two myriapod schemes’ cards were revised, recording of these categories alongside other habitat data continued. Accepting that these categories are vague and somewhat subjective, a large amount of such data was accumulated, up to several thousand or more records in the case of some species. “Urban” and “Synanthropic” are not exactly identical categories and similarly “Rural” and “Non-synanthropic” but they approximate to these and are used for the purposes of this exercise since it would seem reasonable to assume that, essentially, records described as “Urban” would fit into the synanthropic category.

Data was presented in the centipede atlas (Barber, 2022) both as numbers of records and, for species with 31 or more records, percentage values, weighted (“standardised”) to take account of the variation in both the number of records with data for an individual species and the number of records for that particular habitat. It seemed interesting to see if this data as presented in the atlas (and similar data for millipedes and woodlice) could be used to produce some sort of visualisation of the relative synanthropy of British and Irish species in a similar way to the German one.

Species recorded only from heated greenhouses (and similar locations) and those considered to be marine littoral are excluded so as to concentrate on outdoor terrestrial ones. Species with less than 31 records were included in the calculation of total numbers of records in each category and used in the weighting exercise but are not shown in the final tables and charts.

### Calculation of a Species Synanthropy Spectrum Index

(Centipede data from Barber, 2022, see pages 18-20 for explanation)

#### 1. Crude percentages:

The total numbers of records for each of the three categories, Urban, Suburban/Village and Rural can be expressed as simple (crude) percentages.

e.g. for *Stigmatogaster subterranea*

	Urban	Suburban/Village	Rural
Records:	332	683	1,177
Crude %	15.1	31.2	53.7

This would suggest that we have a species with more than 50% rural records but through ‘personal experience’ we are aware that the species, outside the South and West, is typically found in synanthropic sites.

#### 2. Weighting of records data:

Data can be distorted by: (a) the different numbers of overall species records – 74% of these are from “Rural” sites. (b) The different numbers of records of the species as a percentage of total records in each habitat category. The need to weight (“standardise”) the data to take account of these was recognised in the provisional centipede atlas (Barber & Keay, 1988) and is described in Barber (2022, pp 19-20) where such weighted values are given for individual species.

Using *Stigmatogaster subterranea* as an example the process is outlined below.

	Urban	Suburban / Village	Rural
All centipede spp: total number of records	2596	6856	26957
All centipede spp: as percentage of those records	7	19	74
<i>Stigmatogaster subterranea</i> : number of records	332	683	1,177
As percentage of all centipede records	12.8	10	4.4
<i>S. subterranea</i> Crude %	15.1	31.2	53.7
<b><i>S. subterranea</i> Weighted %</b>	<b>47.1</b>	<b>36.8</b>	<b>16.1</b>

The **Crude %** is simply the percentage of records of a given species (in this case *S. subterranea*) in a given sub-category (in this case Urban, Suburban/Village and Rural).

To derive the **Weighted %** the total number of centipede records (all species) within each sub-category needs to be taken into account. Thus the **Weighted %** for Urban sub-category is calculated as follows:

$$\frac{\% \text{ of records of } S. \textit{subterraneus} \text{ in urban sub-category}}{\% \text{ of all } S. \textit{subterraneus} \text{ in urban+suburban/village+rural sub-categories}} \times 100$$

i.e.  $12.8 / (12.8+10+4.4) \times 100 = 47.1$  (Weighted %)

### 3. Converting three categories into two:

If the three categories can be converted into two, this would allow calculation of a single percentage figure. The boundaries between “Urban” and “Suburban/Village” and between the latter and “Rural” are not sharp and also suburban areas and villages frequently contain locations, often collected from, which are best described as synanthropic.

There are various possible ways to do this. One chosen here is to divide the “Suburban/Village” category evenly and combine each of these fractions with each of the other categories (i.e. Urban + 50% Suburban/Village and Rural + 50% of Suburban/Village). Different ways of doing this would produce different values for the “Spectrum Index” but if consistently applied to all the data a coherent set of values could be produced which might be used to give an alternative form of the index to the one used herein (see *Discussion* below).

Using the 50/50 division of “Suburban/Village” i.e. choosing to divide the Suburban/Village data evenly we obtain:

e.g. for *Stigmatogaster subterranea* (values as in section 2. above):

$$\begin{array}{ll} \text{Urban} + 50\% \text{ of Suburban/Village} & 47.1\% + (36.8\% / 2) = 65.5\% \\ \text{Rural} + 50\% \text{ of Suburban/Village} & 16.1\% + (36.8\% / 2) = 34.5\% \end{array}$$

### 4. Calculating a Synanthropy “Spectrum Index”:

For each species, a synanthropy “Spectrum Index” (Urban + 50% of Suburban/Village) may be derived so that comparisons between species can be made (Table 1):

$$\text{Number of Urban records} + \frac{\text{Number of Suburban / Village records}}{2} = \text{Spectrum Index}$$

e.g. for *Stigmatogaster subterranea* (as shown in section 3. above):

$$\begin{array}{l} \text{Weighted percentages are: Urban } 47.1\%; \text{ Suburban/Village } 36.8\%; \text{ Rural } 16.1\% \\ \text{Spectrum Index: } \quad 47.1\% + (36.8\% / 2) = \mathbf{65.5\%} \end{array}$$

This “Index” is, of course, simply a percentage for the “wider urban” records of the total records and if all records were in this category the index would be 100% whilst if none were it would be 0%. If the three original categories were one third / one third / one third, the index becomes 50%. A species with values close to this is the common brown centipede *Lithobius forficatus*:

	Urban	Suburban/Village	Rural
Records	37.4	683	1,177
Crude %	8.72	20.67	70.60
Weighted %	37.4	33.5	29.1

$$\text{Thus, Synanthropy “Spectrum Index”} = 37.4\% + (33.5\% / 2) = \mathbf{54.2\%}$$

Clearly the values obtained are only meaningful in terms of giving a very broad and generalised idea of relative synanthropy in the species listed rather than accurate figures with clear confidence limits but may be helpful in visualisation of an overall pattern.

## Centipedes

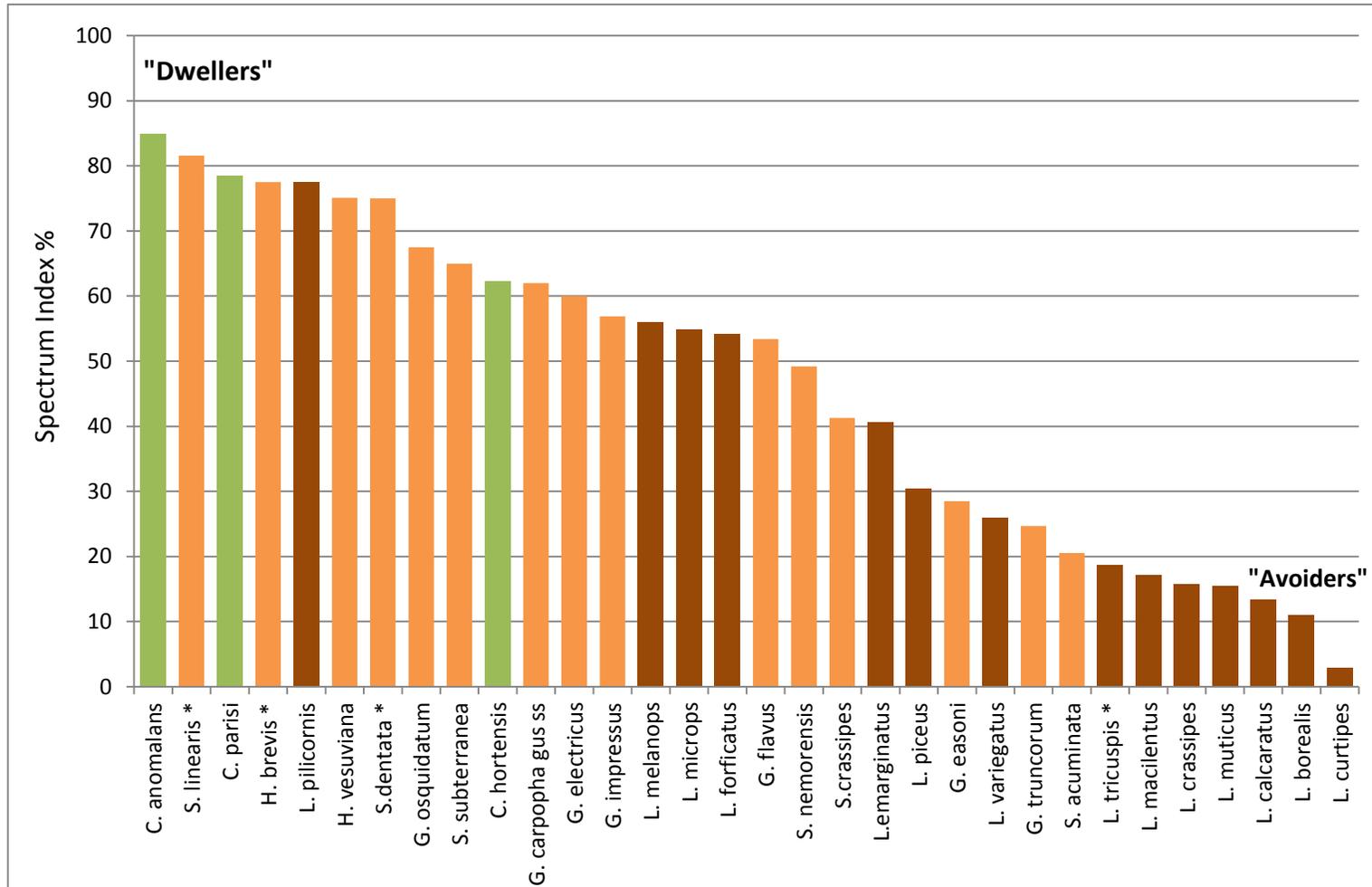
Total records available, including those subsequently excluded from the analysis (marine littoral, heated greenhouse, species with 30 or less records) were 36,409. Using the values in the 2022 atlas (Barber, 2022) and applying the index calculation with “Suburban / Village” being evenly divided, the species of centipede are tabulated with index value for the three orders Geophilomorpha, Scolopendromorpha and

Lithobiomorpha respectively as shown in Table 1. They are then set out as a chart in Figure 1. Species with less than 100 records (but >30) with appropriate data are shown in red.

**Table 1: Centipede Records**

Weighted percentages for locations described as Urban, Suburban/Village or Rural and a calculated “Spectrum Index” for each species. (Pre-2019, excluding marine littoral, hothouse and species with 30 or less records; derived from Barber (2022)). Species with <100 records (but >30) are shown in red.

Species	Total Records	Urban %	Suburban / Village %	Rural %	“Spectrum Index” %
<b>Geophilomorpha</b>					
<i>Stigmatogaster subterranea</i>	2,849	47.1	36.8	16.1	<b>65.5</b>
<i>Schendyla dentata</i>	37	52.8	44.4	2.8	<b>75.0</b>
<i>Schendyla nemorensis</i>	1,789	31.1	36.1	32.8	<b>49.2</b>
<i>Henia brevis</i>	73	58	38.9	3.0	<b>77.5</b>
<i>Henia vesuviana</i>	238	59.2	31.7	9.1	<b>75.1</b>
<i>Strigamia acuminata</i>	672	5.1	30.8	64.1	<b>20.5</b>
<i>Strigamia crassipes</i>	481	24.7	33.1	42.2	<b>41.3</b>
<i>Geophilus carpophagus</i> s.s.	175	33.7	56.6	9.7	<b>62.0</b>
<i>Geophilus easoni</i>	727	19.0	19.0	61.9	<b>28.5</b>
<i>Geophilus electricus</i>	344	38.1	43.8	18.1	<b>60.0</b>
<i>Geophilus flavus</i>	2,440	34.9	36.9	28.2	<b>53.4</b>
<i>Geophilus impressus</i>	1,359	37.0	39.8	23.2	<b>56.9</b>
<i>Geophilus osquidatum</i>	147	46.4	42.2	11.4	<b>67.5</b>
<i>Geophilus truncorum</i>	2,713	10.9	27.5	61.7	<b>24.7</b>
<i>Stenotaenia linearis</i>	61	66.0	31.2	2.8	<b>81.6</b>
<b>Scolopendromorpha</b>					
<i>Cryptops anomalans</i>	176	72.7	24.3	3.1	<b>84.9</b>
<i>Cryptops hortensis</i>	2,211	43.3	37.8	18.9	<b>62.2</b>
<i>Cryptops parisi</i>	310	62.5	31.7	5.8	<b>78.4</b>
<b>Lithobiomorpha</b>					
<i>Lithobius borealis</i>	552	6.2	9.4	84.3	<b>10.9</b>
<i>Lithobius calcaratus</i>	553	4.3	18	77.6	<b>13.3</b>
<i>Lithobius forficatus</i>	9,456	37.4	33.5	29.1	<b>54.2</b>
<i>Lithobius macilentus</i>	203	5.2	23.8	71.0	<b>17.1</b>
<i>Lithobius melanops</i>	2,331	38.3	35.3	26.4	<b>56.0</b>
<i>Lithobius muticus</i>	287	4.4	21.9	73.6	<b>15.4</b>
<i>Lithobius piceus</i>	103	6.9	46.8	46.3	<b>30.3</b>
<i>Lithobius pilicornis</i>	226	64.5	25.7	9.8	<b>77.4</b>
<i>Lithobius tricuspis</i>	50	0	37.1	62.9	<b>18.6</b>
<i>Lithobius variegatus</i>	6,855	11.3	29.2	59.5	<b>25.9</b>
<i>Lithobius crassipes</i>	2,594	5.9	19.7	74.4	<b>15.8</b>
<i>Lithobius curtipes</i>	171	0	5.8	94.2	<b>2.9</b>
<i>Lithobius microps</i>	4,472	36.9	35.8	27.3	<b>54.8</b>
<i>Lamycetes emarginatus</i>	595	31.6	17.9	50.3	<b>40.6</b>



**Figure 1: Visualisation of a centipede “synanthropy spectrum” using data in Table 1.**

Geophilomorpha    Scolopendromorpha    Lithobiomorpha

\* species with <100 records (but >30)

## Comments

In a review of distribution and habitat patterns by the present author based on a somewhat smaller set of centipede records (Barber, 1992), ordination of species was carried out in terms of relative habitat preferences using “First Order Habitat” data as in the original version of the BMG Centipede Recording Scheme (Barber and Keay, 1988). The results were presented as scatter diagrams and those with ordinations of species in terms of habitat preferences and some similarities to the pattern seen in our synanthropy spectrum from dwellers to avoiders can be discerned.

Blackburn *et al.*, (2002) collected centipedes along with physical variables from 45 sampling sites across an area of about 4,000 km<sup>2</sup> in north-east England. They found a total of 14 species, seven geophilomorphs and the same number of lithobiomorphs. Three they described as “rare”, ( $\leq 3$  individuals; *Strigamia acuminata*, *Lithobius macilentus* & *L. borealis*), six “intermediate” (10-50: *Stigmatogaster subterranea*, *Schendyla nemorensis*, *Geophilus electricus*, *G. flavus*, *Lithobius melanops*, *L. muticus*) and five “common” (100+: *Geophilus impressus* (*G. insculptus*), *G. truncorum*, *Lithobius variegatus*, *L. forficatus*, *L. melanops*). Only the last group provided sufficient data for statistical analysis but the “intermediate” group showed that the geophilomorphs were markedly synanthropic whereas the lithobiomorphs were not. Overall, synanthropic sites had the highest centipede density but this was caused by the synanthropic tendencies of “intermediate” species. The overall picture of the five “common” species proved to be complex. Some of the findings matched the expectations of experienced fieldworkers, notably the negative association between *G. truncorum* and pH. Others were unexpected or counterintuitive.

Our “Synanthropy Spectrum” for a somewhat larger group of species than that used by Blackburn *et al.* seems to support the general idea of geophilomorphs being more likely to be synanthropic than lithobiomorphs but with several significant exceptions. *G. truncorum* is very clearly low down on the spectrum index score as are *Geophilus easoni* (not recorded by Blackburn *et al.*) and *Strigamia acuminata* (only three specimens found in their survey). The latter has been found in a diversity of habitats in Britain (although rare or absent in Ireland), occurs in sites up to 1,000m in Wales and seems markedly less synanthropic than the congeneric *Strigamia crassipes* which, itself, is only about halfway up the “spectrum”. The comment about the association of *G. truncorum* with low pH is borne out by atlas data and, although having only a relatively small number of records, data for *G. easoni* seems to indicate a likely similar preference for acid soils (Table 2). Other interesting points that arise are (a) the already recognised marked difference in habits between *Geophilus carpophagus* s.s. and *Geophilus easoni*; (b) the way *Geophilus electricus*, *Geophilus flavus* and *Geophilus impressus* seem to cluster together especially the latter two species even though their geographical distribution is not identical; (c) the marked similarity in synanthropy index in our two species of *Henia* even though their morphology and ecology may appear to be rather different. Our three (outdoor) species of *Cryptops*, well known for their tendency to occur in synanthropic sites, are all well up on the spectrum, especially *C. parisi* and even more so *C. anomalans*.

The one lithobiomorph on our chart which clearly does not fit the suggested generalised geophilomorph / lithobiomorph pattern is *Lithobius pilicornis* for which records are reported as less than 10% “rural” and has an “index” of nearly 80%, comparable with distinctly synanthropic geophilomorphs and the two larger *Cryptops* species. However, *L. pilicornis* has been found in some clearly rural woodlands in western Cornwall. Both *Lithobius melanops* (56) and *Lithobius microps* (55) are frequently found in gardens, both domestic and ornamental whilst *Lithobius forficatus* (54) has been noted already.

**Table 2: Extract from atlas records for Geophilomorpha.  
Weighted percentage of locations described as calcareous or non-calcareous.  
(From Barber, 2022)**

Species	Total Records with data	Calcareous %	Non-calcareous %
<i>Stigmatogaster subterranea</i>	876	57.9	42.1
<i>Schendyla nemorensis</i>	457	58.1	41.9
<i>Strigamia acuminata</i>	142	54.8	45.2
<i>Strigamia crassipes</i>	98	58.7	41.3
<i>Geophilus carpophagus</i> s.s.	23	82.9	17.1
<i>Geophilus easoni</i>	45	29.4	70.6
<i>Geophilus electricus</i>	106	51.5	48.5
<i>Geophilus flavus</i>	648	63.1	36.9
<i>Geophilus impressus</i>	522	62.4	37.6
<i>Geophilus truncorum</i>	790	38.0	62.0

## Millipedes

It seemed interesting to see if the procedure described above might be applied to other groups where such data was available. For instance millipedes where total records available, including those subsequently excluded (marine littoral, heated greenhouse, 30 or less records) were 31,764.

The preliminary atlas for millipedes (British Myriapod Group, 1988) did not include habitat data unlike Paul Lee's more recent one (Lee, 2006) which has a parallel set of figures to those for centipedes (his Appendix 3, Table 5). However, in his account the data is presented in terms of raw figures and in only two categories, "Rural" and "Suburban/Urban". Although these could be standardised and used for index calculations, it was considered important to use the same methodology as for centipedes. The Biological Records Centre (UKCEH), with Paul Lee's agreement, kindly provided raw millipede data with all three categories (Table 3).

The numbers recorded for British/Irish millipedes can therefore be as in the data preparation for the centipede atlas (Table 4).

Our one marine littoral species (*Thalassiosobates littoralis*) and millipedes recorded only from heated greenhouses and similar are excluded from the calculations and only species with more than 30 records are shown in the synanthropy table and diagram (Table 4 and Figure 2). Nomenclature is as in the millipede atlas (Lee, 2006). Species with less than 100 (>30) records with relevant data are shown in red.

## Comments

The millipede analysis exercise was carried out without direct reference to the text of the individual species accounts in the atlas (Lee, 2006) but subsequent attention to comments in the latter shows the author specifically remarking on synanthropic habits in species which emerge towards the higher end of our spectrum such as *Macrosterodesmus palicola*, *Ophiodesmus albonanus*, *Boreoiulus tenuis* and *Cylindroiulus caeruleocinctus*. At the other extreme, species tending to avoid synanthropic sites include *Glomeris marginata*, *Proteroiulus fuscus* and *Cylindroiulus punctatus*. However, the pattern is, in fact, more complex with some of our species (e.g. *Choneiulus palmatus*) tending to be more synanthropic in the more northern parts of their range.

Millipedes do present a more diverse variety than the centipedes and a less clear pattern in relation to synanthropy. In addition, undoubtedly a wide variety of environmental factors, including pH, types of soil, degree of habitat wetness and presence of woodland do seem to affect the occurrence of these animals. In Table 4 the species included are grouped by family and in the chart (Figure 2) they are grouped according to the four orders represented.

The data (250 records) for *Polyxenus lagurus* is somewhat puzzling with the species having something of an apparent preference for suburban/village sites. Whether this is due to some particular feature of such sites is unclear. One intriguing possibility is “recorder bias”, collectors deliberately going to such sites – including the walls of village churches and burial grounds so as to be able to find it - and skewing the record pattern accordingly.

Both of our included glomerids are strikingly non-synanthropic. In the Order Chordeumatida, *Craspedosoma raulinsii* and its fellow craspidosomatid, *Nanogona polydesmoides* are well apart on the spectrum and the three chordeumatids (*Chordeuma* and *Melogona*) are not close together. Our three species of *Brachychaeteuma* tend to be fairly well up the table towards “dwelling” although all have low numbers of records so their values need to be taken with caution. Amongst the Order Polydesmida, *Ophiodesmus albonanus* and *Macrosternodesmus palicola*, as already noted, are known for their synanthropic habits and this shows up in the chart, both having indices of >70%. Three of our species of *Polydesmus* are around the middle of the chart as is *Brachydesmus superus* and seem to have a wide habitat tolerance. However, *Polydesmus denticulatus* is very much lower down on the spectrum, with more than 60% of (weighted) records from rural locations. Although it has been found in a wide variety of habitats, notably woodland, the millipede atlas (Lee, 2006) suggests a strong association with wetland.

The so-called “snake millipedes” (Order Julida), which represent about half of our species, show a wide range of tolerances of synanthropic sites. The blaniulids are mostly in the range 60-80% although the relatively rare *Choneiulus palmatus* is more strongly synanthropic at 86%. In the north it is usually recorded from gardens and greenhouses, further south it has been collected from deciduous woodland (Lee, 2006). Towards the other end of the spectrum is the common litter and sub-cortical species, *Proteroiulus fuscus* (40%) while the nemasomatid *Nemasoma varicorne* is even more of an “avoider” at 31%

Top of the synanthropy list for the family Julidae is *Cylindroiulus vulnerarius* with 85% (weighted) of its records being recorded as “urban” although there are only 40 in total. Supposedly endemic to Italy, it was only recorded in Britain in 1975 for the first time and in the millipede atlas (Lee, 2006) is described as from about 20, mainly urban sites, and strongly synanthropic (glasshouses, gardens, parks, urban open spaces). Lowest on the list are *Cylindroiulus londinensis* and *Ommatoiulus sabulosus* although there are only a fairly small number of records (57) of the former and the latter is referred to below. Most of our most familiar julids are in the index range 40-70% with the typically woodland *Cylindroiulus punctatus* just below this.

*Cylindroiulus latestriatus* is a somewhat special case in relation to coastal sites. Although not an apparent obligate halophile in the way that *Thalassisobates littoralis* is, it is a common animal above the shoreline. However, it also occurs in inland locations (>15km from coast). Table 5, which uses millipede atlas data for coastal and inland habitats for some of our julids, shows how *C. latestriatus* reflects its maritime tendency strongly in both the raw and the weighted percentages. Since a good proportion of collected coastal locations are outside urban areas, this impacts on the synanthropy data for the species (Table 4 and Figure 2). *Ommatoiulus sabulosus* (27%) is often found in sand-dunes as well as elsewhere and this also seems to be reflected to a certain extent in its data in the same way in these tables.

**Table 3: Millipedes: Numbers of Records and Calculated (Crude) Percentages for Urban, Suburban/Village and Rural habitats (derived from BRC data)**

**Note:** The first number is the number of records for that species from that habitat sub-category. Second number, if given, is the unweighted percentage of records for that species from that habitat.

**Source:** Numbers of records courtesy of Biological Records Centre, UKCEH, October 2023.

Species	Total Records	Urban	Suburban / Village	Rural	Notes
<i>Adenomeris gibbosa</i>	2	0	1	1	<30 records
<i>Allajulus nitidus</i>	96	9 : 9.38%	33 : 34.38%	54 : 56.25%	<100 records
<i>Amphitomeus attemsi</i>	1	0	1	0	Hothouse sp.
<i>Anamastigona pulchella</i>	1	0	0	1	<30 records
<i>Anthogona britannica</i>	12	0	0	12	<30 records
<i>Archiboreoiulus pallidus</i>	214	22 : 10.28%	52 : 24.30%	140 : 65.42%	
<i>Blaniulus guttulatus</i>	1053	161 : 15.29%	305 : 28.96%	587 : 55.74%	
<i>Boreoiulus tenuis</i>	303	29 : 9.57%	131 : 43.23%	143 : 47.19%	
<i>Brachychaeteuma bagnalli</i>	39	3 : 7.69%	21 : 53.84%	15 : 38.46%	<100 records
<i>Brachychaeteuma bradeae</i>	32	6 : 18.75%	12 : 34.5%	14 : 43.75%	<100 records
<i>Brachychaeteuma melanops</i>	85	14 : 16.47%	36 : 42.35%	35 : 41.76%	<100 records
<i>Brachydesmus superus</i>	1593	62 : 3.89%	218 : 13.68%	1375 : 86.32%	
<i>Brachyiulus lusitanus</i>	2	0	2	0	<30 records
<i>Brachyiulus pusillus</i>	409	26 : 6.36%	81 : 19.80%	302 : 73.84%	
<i>Choneiulus palmatus</i>	81	27 : 33.3%	19 : 23.46%	35 : 43.21%	<100 records
<i>Chordeuma proximum</i>	224	7 : 3.13%	30 : 13.39%	187 : 83.48%	
<i>Chordeuma sylvestre</i>	5	0	0	5	<30 records
* <i>Craspedosoma raulinsii</i>	75	1 : 1.33%	4 : 5.33%	70 : 93.33%	
<i>Cylindrodesmus hirsutus</i>	2	0	2	0	Hothouse sp.
<i>Cylindroiulus britannicus</i>	657	65 : 9.89%	140 : 21.30%	452 : 68.80%	
<i>Cylindroiulus caeruleocinctus</i>	448	70 : 15.63%	164 : 36.61%	214 : 47.77%	
<i>Cylindroiulus latestriatus</i>	805	11 : 1.37%	90 : 11.18%	704 : 87.45%	
<i>Cylindroiulus londinensis</i>	57	0	11 : 19.30%	46 : 80.70%	<100 records
<i>Cylindroiulus parisorum</i>	54	7 : 12.96%	13 : 24.07%	34 : 62.96%	<100 records
<i>Cylindroiulus punctatus</i>	4883	122 : 2.50%	567 : 11.61%	4194 : 85.90%	
<i>Cylindroiulus salicivorus</i>	8	8	0	0	Hothouse sp.
<i>Cylindroiulus truncorum</i>	12	4	5	3	<30 records
<i>Cylindroiulus vulnerarius</i>	40	24 : 60%	13 : 32.5%	3 : 7.5%	<100 records
<i>Enantiulus armatus</i>	27	0	8	19	<30 records
<i>Eutrichodesmus</i> sp. Eden A	2	0	2	0	Hothouse sp.
<i>Geoglomeris subterranea</i>	54	0	2 : 3.70%	52 : 96.30%	<100 records
<i>Glomeris marginata</i>	2387	17 : 0.71%	188 : 7.88%	2182 : 91.41%	
<i>Haplopodoiulus spathifer</i>	1	0	1	0	<30 records
<i>Julus scandinavicus</i>	1141	42 : 3.68%	153 : 14.41%	946 : 82.91%	
<i>Leptoiulus belgicus</i>	104	7 : 6.73%	22 : 21.15%	75 : 72.11%	
<i>Leptoiulus kervillei</i>	53	1 : 1.89%	5 : 9.43%	47 : 88.68%	<100 records
<i>Macrosternodesmus palicola</i>	370	59 : 15.95%	141 : 38.11%	170 : 44.95%	

<i>Melogona gallica</i>	97	12 : 12.37%	18 : 18.56%	67 : 69.07%	<100 records
<i>Melogona scutellaris</i>	305	24 : 7.87%	79 : 25.90%	202 : 66.23	
<i>Melogona voigtii</i>	1	0	1	0	<30 records
<i>Metaiulus pratensis</i>	4	0	2	2	<30 records
<i>Nanogona polydesmoides</i>	1701	120	308	1273	
<i>Nemasoma varicorne</i>	492	9	36	447	
<i>Nopoiulus kochii</i>	25	14	7	4	<30 records
<i>Ommatoiulus sabulosus</i>	1050	13 : 1.24%	75 : 7.14%	962 : 91.62%	
<i>Ophiodesmus albonanus</i>	242	39 : 16.12%	106 : 43.80%	97 : 40.08%	
<i>Ophiulus pilosus</i>	2069	112 : 5.41%	347 : 16.77%	1610 : 77.82%	
<i>Oxidus gracilis</i>	29	21	6	2	Hothouse sp.
<i>Paraspirobolus lucifugus</i>	2	0	2	0	Hothouse sp.
<i>Polydesmus angustus</i>	2795	107 : 3.83%	364 : 3.02%	2234 : 77.92%	
<i>Polydesmus barberii</i>	8	3	1	4	<30 records
<i>Polydesmus coriaceus</i>	802	47 : 5.86%	172 : 1.45%	583 : 72.69%	
<i>Polydesmus denticulatus</i>	312	5 : 1.60%	18 : 5.77%	289 : 92.63%	
<i>Polydesmus inconstans</i>	289	13 : 4.50%	39 : 13.49%	237 : 82.01%	
<i>Polyxenus lagurus</i>	250	11 : 4.40%	56 : 22.40%	183 : 73.20%	
<i>Polyzonium germanicum</i>	29	0	1	28	<30 records
<i>Poratia digitata</i>	4	3	1	0	Hothouse sp.
<i>Propolydesmus testaceus</i>	8	1	0	7	<30 records
<i>Prosopodesmus panporus</i>	1	0	1	0	Hothouse sp.
<i>Proteroiulus fuscus</i>	2070	60 : 2.90%	225 : 10.87%	1785 : 86.23%	
<i>Pseudospirobolellus avernus</i>	1	0	1	0	Hothouse sp.
<i>Rhinotus purpureus</i>	1	0	1	0	Hothouse sp.
<i>Stosatea italica</i>	25	5	5	15	<30 records
<i>Tachypodoiulus niger</i>	4373	152 : 3.48%	596 : 13.63%	3625 : 82.90%	
<i>Thalassisobates littoralis</i>	21	0	3	18	Littoral
<i>Trachysphaera lobata</i>	6	0	1	5	<30 records
<i>Unciger foetidus</i>	3	0	3	0	<30 records

\* *Craspedosoma raulinsii* Leach, 1817 with a “u” is the correct spelling (Read & Enghoff, 2023)

**Table 4: “Synanthropy Spectrum” values for Millipedes**

Weighted (“Standardised”) numbers derived from BRC (UKCEH) data.  
Species with <100 records (but >30) shown in red.

Species	Total Records	Urban %	Suburban / Village %	Rural %	Spectrum Index %
Polyxenidae					
<i>Polyxenus lagurus</i>	250	27.9	44.4	27.5	50.1
Glomeridae					
<i>Geoglomeris subterranea</i>	54	0	16.8	83.2	8.4
<i>Glomeris marginata</i>	2387	8.2	28.5	63.3	22.5

Craspedosomatidae					
<i>Craspedosoma raulinsii</i>	75	15.9	19.3	64.8	25.6
<i>Nanogona polydesmoides</i>	1701	41.6	32.6	25.8	57.9
Chordeumatidae					
<i>Chordeuma proximum</i>	224	25.9	33.8	0.3	42.8
<i>Melogona gallica</i>	97	56.1	25.7	18.3	68.9
<i>Melogona scutellaris</i>	305	40.1	40.2	19.7	60.2
Brachychaeteumatidae					
<i>Brachychaeteuma bagnalli</i>	39	29.3	62.2	8.5	60.4
<i>Brachychaeteuma bradeae</i>	32	57.2	35.0	7.7	74.7
<i>Brachychaeteuma melanops</i>	85	51.7	40.6	7.5	72.0
Polydesmidae					
<i>Brachydesmus superus</i>	1593	29.7	31.9	38.4	45.7
<i>Polydesmus angustus</i>	2705	30.7	31.9	37.4	46.7
<i>Polydesmus coriaceus</i>	802	35.2	39.3	25.6	54.8
<i>Polydesmus denticulatus</i>	312	18.3	20.1	61.6	28.3
<i>Polydesmus inconstans</i>	237	33.6	30.7	35.7	48.9
Macrosternodesmidae					
<i>Macrosternodesmus palicola</i>	370	52.0	38.9	9.0	71.4
<i>Ophiodesmus albonanus</i>	242	50.7	42.0	7.3	71.7
Bianiulidae					
<i>Archiboreoiulus pallidus</i>	214	47.8	34.5	17.7	65.1
<i>Bianiulus guttulatus</i>	1053	55.8	32.3	11.9	72.0
<i>Boreoiulus tenuis</i>	303	37.5	51.7	10.8	63.4
<i>Choneiulus palmatus</i>	81	77.5	16.7	5.9	85.8
<i>Proteroiulus fuscus</i>	1785	25.3	29.7	45.0	40.2
Nemasomatidae					
<i>Nemasoma varicorne</i>	492	19.6	23.9	56.6	31.5
Julidae					
<i>Allajulus nitidus</i>	96	40.5	45.3	14.1	63
<i>Brachyiulus pusillus</i>	409	38.1	36.2	25.8	56.1
<i>Cylindroiulus britannicus</i>	657	48.5	31.9	19.7	64.4
<i>Cylindroiulus caeruleocinctus</i>	448	52.8	37.8	9.4	71.7
<i>Cylindroiulus latestriatus</i>	805	13.8	34.5	51.6	31.1
<i>Cylindroiulus londinensis</i>	57	0	55.6	44.4	27.8
<i>Cylindroiulus parisiorum</i>	54	54.1	30.6	15.3	69.4
<i>Cylindroiulus punctatus</i>	4883	22.6	32.1	45.3	38.7
<i>Cylindroiulus vulnerarius</i>	40	85.0	14.4	0.7	92.2
<i>Julus scandinavus</i>	1141	29.2	32.4	38.4	45.4
<i>Leptoiulus belgicus</i>	104	38.7	34.5	24.2	56.0
<i>Leptoiulus kervillei</i>	53	19.0	28.9	24.2	33.5
<i>Ommatoiulus sabulosus</i>	1050	14.1	24.9	61	26.6
<i>Ophiulus pilosus</i>	2969	35.9	34.0	30.1	52.9
<i>Tachypodoiulus niger</i>	4373	27.4	33.6	39.0	44.2

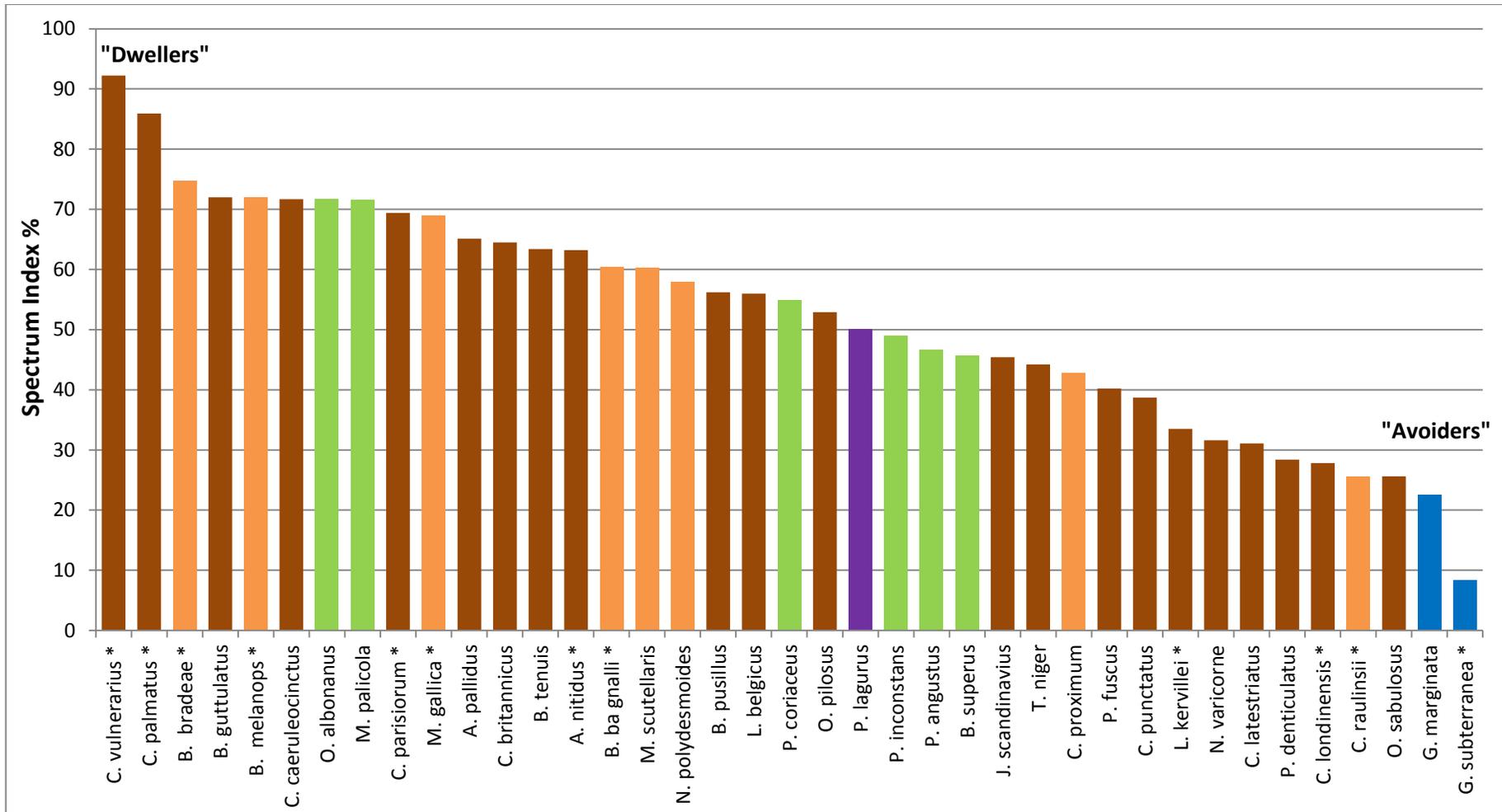


Figure 2: Visualisation of a millipede “synanthropy spectrum”

■ Polyxenida 
 ■ Glomerida 
 ■ Chordeumatida 
 ■ Polydesmida 
 ■ Julida

\* species with <100 records (but >30)

**Table 5: Millipede numbers and percentages (coastal and inland), in part.  
Less or more than 15km from the sea.**

Data derived from Millipede Atlas Appendix 3.3 (Lee, 2006, pg. 199).

Species with <100 records shown in red.

Species	Total number records	Coastal <15km (Total)	Inland >15km (Total)	Coastal <15km (Raw %)	Inland >15km (Raw %)	Coastal <15km (Weighted )	Inland >15km (Weighted )
<i>Cylindroiulus britannicus</i>	676	230	446	34.0%	66.0%	53.0%	47.0%
<i>C. caeruleocinctus</i>	465	78	387	16.8%	83.2%	30.7%	69.3%
<i>C. latestriatus</i>	817	700	117	85.7%	14.3%	92.9%	7.1%
<i>C. londinensis</i>	58	15	43	25.95%	74.1%	43.2%	56.8%
<i>C. parisiorum</i>	51	3	48	5.9%	94.1%	12.1%	87.9%
<i>C. punctatus</i>	5054	1415	3639	28.0%	72.0%	46.0%	54.0%
<i>C. salicivorus</i>	8	8	0				
<i>C. truncorum</i>	8	2	6				
<i>C. vulnerarius</i>	39	13	26	33.3	66.7%	9.9%	90.1%
<i>Julus scandinavicus</i>	1202	124	778	35.3%	64.7%	43.2%	56.8%
<i>Ophiulus pilosus</i>	2102	708	1394	33.7%	66.3%	52.6%	47.4%
<i>Ommatoiulus sabulosus</i>	1098	489	609	44.5%	55.5%	63.7%	36.3%
<i>Tachypodoiulus niger</i>	4605	1130	3475	24.5%	75.5%	41.6%	58.4%

### Comparison with the Mark Brandenburg data

It is of some interest to compare the picture presented in Figure 2 with that of Hauser & Voigtländer (2019) bearing in mind the differences between the millipede faunas of Britain and Ireland and that of Mark Brandenburg and also the different methodology used. A listing, in reverse order to those authors but derived from their Abt. 33, is shown in Table 6. This includes only species common to both the German list and that of Britain and Ireland. It also excludes such species with 30 records or less and gives a total of 26 names; the full German list contains 46.

Given the differing origins of the data, the varying numbers of records and the differences between the two faunas, it is not surprising that there are differences in the sequence of species names as between the two “spectra” but a number of names in common occur at both the “dweller” and “avoider” ends. Indeed, the same ten species are listed at the synanthropic end in both cases, although the order differs, *Glomeris marginata* is the most extreme “avoider” in both sequences. Only seven species have moved five or more positions up or down in one list in comparison with the other. *Brachychaeteuma bradeae*, at second highest in the Britain and Ireland list is seventh in the German one but the number of records for the species in the former case is low (32) so that confidence of its position in the British/Irish spectrum should be accordingly relatively low. On the other hand, *Polydesmus angustus*, five positions higher towards the dwellers in the German list could, one assumes, perhaps, be due to some difference in its relative abundance/occurrence or ecology. Similarly for the common *Cylindroiulus punctatus* which Kime & Enghoff (2017) describe as “more rural than synanthropic”, listing it from a variety of habitats as well as woodland, is found at five positions lower on the scale for Britain/Ireland compared with the German data. Both the schizophyllines *Tachypodoiulus niger* and *Ommatoiulus sabulosus*, though not close to each other on either list, are six places closer to the synanthropic end of the spectrum in the German list whilst *Cylindroiulus caeruleocinctus* is six places lower.

The most marked difference is seen in *Cylindroiulus latestriatus*, eleventh (i.e. “mid-range”) on the German list but twenty-first (distinctly “avoider”) on the British/Irish one. The reason for this, at least in part and as already noted, could be well be the inflation of the British/Irish “rural” data by its widespread occurrence (and recording) in rural, maritime influenced areas. The European millipede atlas (Kime & Enghoff, 2017) comments that it is found “among the roots of halophytes on fixed coastal dunes and in grassland on a sandy substrate; inland strongly associated with sandy soils, common on some heaths, has been found in the deciduous litter of woodland on light soils but more usually synanthropic. Abundant in some horticultural areas and found often in urban gardens”.

**Table 6: Millipedes from Mark Brandenburg**

Ranked in order from extreme synanthropes (“Dwellers”) to extreme non-synanthropes (“Avoiders”).  
(Derived from Hauser & Voigtländer, 2019)

Shown as from “Synanthrope Biotope” (“Dwellers”)	Shown as from “Synanthrope Biotope” and also from “Naturliche Biotope”	Shown as from “Naturliche Biotope” (“Avoiders”)
<i>Ophiodesmus albonanus</i>	<i>Blaniulus guttulatus</i>	<i>Polyxenus lagurus</i>
<i>Macrosternodesmus palicola</i>	<i>Cylindroiulus caeruleocinctus</i>	<i>Nemasoma varicorne</i>
<i>Cylindroiulus parisiorum</i>	<i>Cylindroiulus latestriatus</i>	<i>Glomeris marginata</i>
<i>Choneiulus palmatus</i>	<i>Tachypodoiulus niger</i>	
<i>Cylindroiulus britannicus</i>	<i>Brachyiulus pusillus</i>	
<i>Boreoiulus tenuis</i>	<i>Ophiulus pilosus</i>	
<i>Brachychaeteuma bradeae</i>	<i>Cylindroiulus punctatus</i>	
<i>Allajulus nitidus</i>	<i>Polydesmus inconstans</i>	
	<i>Brachydesmus superus</i>	
	<i>Julus scandinavus</i>	
	<i>Ommatoiulus sabulosus</i>	
	<i>Polydesmus angustus</i>	
	<i>Polydesmus denticulatus</i>	
	<i>Craspedosoma raulinsii</i>	
	<i>Proteroiulus fuscus</i>	

**Notes:**

- These species names are in reverse order to those in Hauser & Voigtländer’s diagram (Abt.33) with *O. albonanus* as the most synanthropic and *G. marginata* the least.
- Only the 26 species that have been recorded from Britain/Ireland with more than 29 records are listed here, Hauser & Voigtländer list a total of 46 altogether for Mark Brandenburg.
- Species recorded from Britain/Ireland with <31 records which are also in the German list are *Polyzonium germanicum*, *Unciger foetidus*, *Nopoiulus kochii*, *Cylindroiulus truncorum* and *Melogona voigti*. These are not included above.

**Woodlice**

As far as woodlouse data is concerned, record cards carrying habitat data were only used in the first phase (up to 1982) of the (then) BISG woodlouse recording scheme. The results were published, as percentage figures, in Harding and Sutton (1985). Millipede and centipede habitat data continued to be recorded up until the publication of the respective atlases.

Since the total number of records for each woodlouse species was included in the data set in Harding & Sutton (1985), it is possible to “back calculate” to get numbers of records (with a small margin of error due to “rounding up” effects) for the period of time between the launch of the recording scheme and the cessation of habitat recording in 1982 (Table 7). Such values can then be used to give us weighted values (Table 8) from which a synanthropy index may be calculated and displayed in a chart (Figure 3). Total records available, including those subsequently excluded (marine littoral, freshwater aquatic, heated greenhouses, etc., 30 or less records) were 23,444.

For species that might be considered as marine littoral and therefore best excluded from the exercise, the distinction is less clear than in, say, centipedes. Both *Buddelundiella cataractae* and *Metatriconiscooides celticus* are also known from inland sites and are described as terrestrial inland species that may stray on to the coast whilst *Miktoniscus patiencei* and *Stenophiloscia glarearum* (*S. zosterae*) favour habitats above highest tides but do not occur inland beyond saltwater influence. *Halophiloscia couchii* seems to occur lower down beaches, often co-existing with the intertidal and seawater tolerant *Ligia oceanica* (S.J.Gregory *pers. comm.*). *B. cataractae* and *M. celticus* could therefore be included in the present study but numbers of records for these are low and relevant data is not available; the others are excluded. *Armadillidium album* occurs typically above the highest tides, always on sandy substrates of the appropriate grain size (although not confined to dunes) and never inland (S.J.Gregory *pers. comm.*) so is also left out as is *Trichoniscooides saeroeensis*, described on the BMIG website (bmig.org.uk) as “mostly coastal” but with some upland limestone records (Gregory, 2009 and *pers. comm.*).

As with the other groups, only species with at least 31 records are shown in the synanthropy table (Table 8) although others with <31 records were used in the calculation of habitat totals where data was available. The synanthropy spectrum is visualised in Figure 3. Nomenclature follows the woodlice atlas (Gregory, 2009) and species are grouped by families in Table 8 and Figure 3. Those species with less than 100 records (>30) with relevant data are in red.

A feature of *Platyarthrus hoffmannseggii* is its well-known association with ants so that habitat information, including that relating to synanthropy, will reflect not only the ecology of the woodlice but also that of the ants. However, at the northern limit of its range in Cumbria and Lancashire it has a restricted occurrence (coastal limestone) despite the widespread presence of the relevant ant species (Gregory, 2009). *Trichoniscus pusillus* was regarded by Harding & Sutton (1985) as having two forms, *Trichoniscus pusillus* form *pusillus* and *Trichoniscus pusillus* form *provisorius*. Gregory (2009) refers to them as two distinct races, *provisorius* (sexual) and *pusillus* (parthenogenetic) and notes that they have been raised to the status of two full species by Schmalfuss (1984). They are mapped as an aggregate in the atlas and also separately (Gregory, 2009). We do not have data to treat them separately for the present purposes.

*Armadillidium depressum* comes out highest in our spectrum and along with *Cylisticus convexus* and the well-known, typically orange or pink coloured small synanthrope *Androniscus dentiger* which all lie within the 70-80% spectrum scores. Two other species of *Armadillidium*, *A. nasatum* and the common *A. vulgare* are much closer to the middle of the range whilst *A. pulchellum* with only 71 records, exclusively from rural sites actually comes out with a score of zero. Others around mid-range are *Haplophthalmus danicus*, *P. hoffmannseggii*, *Trichoniscus pygmaeus* and three of the very common, larger woodlice, *Oniscus asellus*, *Philoscia muscorum* and *Porcellio scaber*. Other species of *Porcellio* range between 35% and 68%. Other than *A. pulchellum*, the lowest species on the scale is *Ligidium hypnorum*.

**Table 7: Woodlice Calculated Numbers and Percentages for Urban, Suburban/Village and Rural habitats (excluding littoral and hothouse species)**

Totals and crude percentages for each species are from Harding & Sutton, 1985.

Record numbers for each category are established by calculation from these.

Species	Total Records	Urban	Suburban: Village	Rural
<i>Androniscus dentiger</i>	608	103.36 : 17%	206.72 : 34%	297.92 : 49%
<i>Armadillidium depressum</i>	100	24 : 24%	43 : 43%	33 : 33%
<i>Armadillidium nasatum</i>	113	9.04 : 8%	24.86 : 22%	79.1 : 70%
<i>Armadillidium pictum</i>	8	No detailed data		
<i>Armadillidium pulchellum</i>	71	0	0	71 : 0%
<i>Armadillidium vulgare</i>	1804	90.2 : 5%	378.84 : 21%	1334.96 : 74%
<i>Buddelundiella cataractae</i>	5	No detailed data		
<i>Cylisticus convexus</i>	119	26.18 : 22%	40.46 : 34%	52.36 : 44%
<i>Eluma caelata</i> ( <i>E. purpurascens</i> )	35	0	10.15 : 29%	24.85 : 71%
<i>Haplophthalmus danicus</i>	145	11.6 : 8%	43.5 : 30%	89.9 : 62%
<i>Haplophthalmus mengii</i> agg.	260	5.2 : 2%	23.4 : 9%	231.4 : 89%
<i>Ligidium hypnorum</i>	102	0	8.16 : 8%	93.84 : 92%
<i>Metatrachoniscoides celticus</i>	8	No detailed data		
<i>Oniscus asellus</i>	5611	280.55 : 5%	1009.98 : 18%	4320.47 : 77%
<i>Oritoniscus flavus</i>	44	0.88 : 2%	5.28 : 12%	37.84 : 86%
<i>Platyarthrus hoffmannseggii</i>	452	22.6 : 5%	103.96 : 23%	325.44 : 72%
<i>Philoscia muscorum</i>	3337	100.11 : 3%	600.66 : 18%	2636.23 : 79%
<i>Porcellionides cingendus</i>	320	6.4 : 2%	57.6 : 18%	256 : 80%
<i>Porcellionides pruinosus</i>	165	21.45 : 13%	61.05 : 37%	82.5 : 50%
<i>Porcellio dilatatus</i>	39	5.07 : 13%	10.92 : 28%	23.01 : 59%
<i>Porcellio laevis</i>	24	4.08 : 17%	13.92 : 58%	6.0 : 25%
<i>Porcellio scaber</i>	4662	326.64 : 7%	885.78 : 19%	3449.88 : 74%
<i>Porcellio spinicornis</i>	361	36.1 : 10%	104.69 : 29%	220.21 : 61%
<i>Trachelipus rathkii</i>	70	7 : 10%	13.3 : 19%	49.7 : 71%
<i>Trichoniscoides albidus</i>	22	No detailed data		
<i>Trichoniscoides sarsi</i> agg.	15	No detailed data		
<i>Trichoniscus pusillus</i> agg.	3569	107.07 : 3%	571.04 : 16%	2890.89 : 81%
<i>Trichoniscus pygmaeus</i>	485	24.25 : 5%	106.7 : 22%	354.24 : 73%

**Table 8: “Synanthropy Spectrum” Values for Woodlice  
Weighted (“Standardised”) numbers derived from Harding & Sutton (1985)**

Species with <100 records (but >30) shown in red.

Species	Total records	Urban %	Suburban / village %	Rural %	“Synanthropy Index” %
<b>Diplocheta Ligiidae</b>					
<i>Ligidium hypnorum</i>	<b>102</b>	0	25.4	74.6	<b>12.7</b>
<b>Synocheta Trichoniscidae</b>					
<i>Androniscus dentiger</i>	<b>608</b>	56.6	31.7	11.7	<b>72.5</b>
<i>Haplophthalmus danicus</i>	<b>145</b>	38.4	40.3	21.3	<b>58.4</b>
<i>Haplophthalmus mengii</i> agg.	<b>260</b>	17.7	22.4	59.9	<b>28.9</b>
<i>Oritoniscus flavus</i>	<b>44</b>	17.4	29.2	53.4	<b>32.0</b>
<i>Trichoniscus pusillus</i> agg.	<b>3569</b>	22.6	33.8	43.6	<b>39.5</b>
<i>Trichoniscus pygmaeus</i>	<b>485</b>	30.6	37.5	31.9	<b>49.3</b>
<b>Crinocheta Oniscidae</b>					
<i>Oniscus asellus</i>	<b>5611</b>	32.1	32.5	35.4	<b>48.4</b>
<b>Philosciidae</b>					
<i>Philoscia muscorum</i>	<b>3337</b>	21.9	36.9	41.2	<b>40.3</b>
<b>Platyarthridae</b>					
<i>Platyarthrus hoffmannseggii</i>	<b>452</b>	30.2	38.9	31.0	<b>49.6</b>
<b>Armadillidiidae</b>					
<i>Armadillidium depressum</i>	<b>100</b>	62.5	31.4	6.1	<b>78.3</b>
<i>Armadillidium nasatum</i>	<b>113</b>	41.9	32.2	26.1	<b>57.8</b>
<i>Armadillidium pulchellum</i>	<b>71</b>	0	0	71	<b>0.0</b>
<i>Armadillidium vulgare</i>	<b>1804</b>	31.0	36.3	32.7	<b>49.1</b>
<i>Eluma caelata</i>	<b>35</b>	0	61.6	38.4	<b>30.8</b>
<b>Cylisticidae</b>					
<i>Cylisticus convexus</i>	<b>119</b>	63.5	27.5	9.1	<b>77.2</b>
<b>Porcellionidae</b>					
<i>Porcellio dilatatus</i>	<b>39</b>	51.9	31.3	16.8	<b>67.5</b>
<i>Porcellio scaber</i>	<b>4662</b>	39.8	30.3	30.0	<b>54.9</b>
<i>Porcellio spinicornis</i>	<b>361</b>	44.5	36.1	19.4	<b>62.6</b>
<i>Porcellionides cingendus</i>	<b>320</b>	15.7	39.5	44.8	<b>35.4</b>
<i>Porcellionides pruinosus</i>	<b>165</b>	48.3	38.5	13.3	<b>67.5</b>
<b>Trachelipodidae</b>					
<i>Trachelipus rathkii</i>	<b>70</b>	51.8	27.6	20.6	<b>65.6</b>

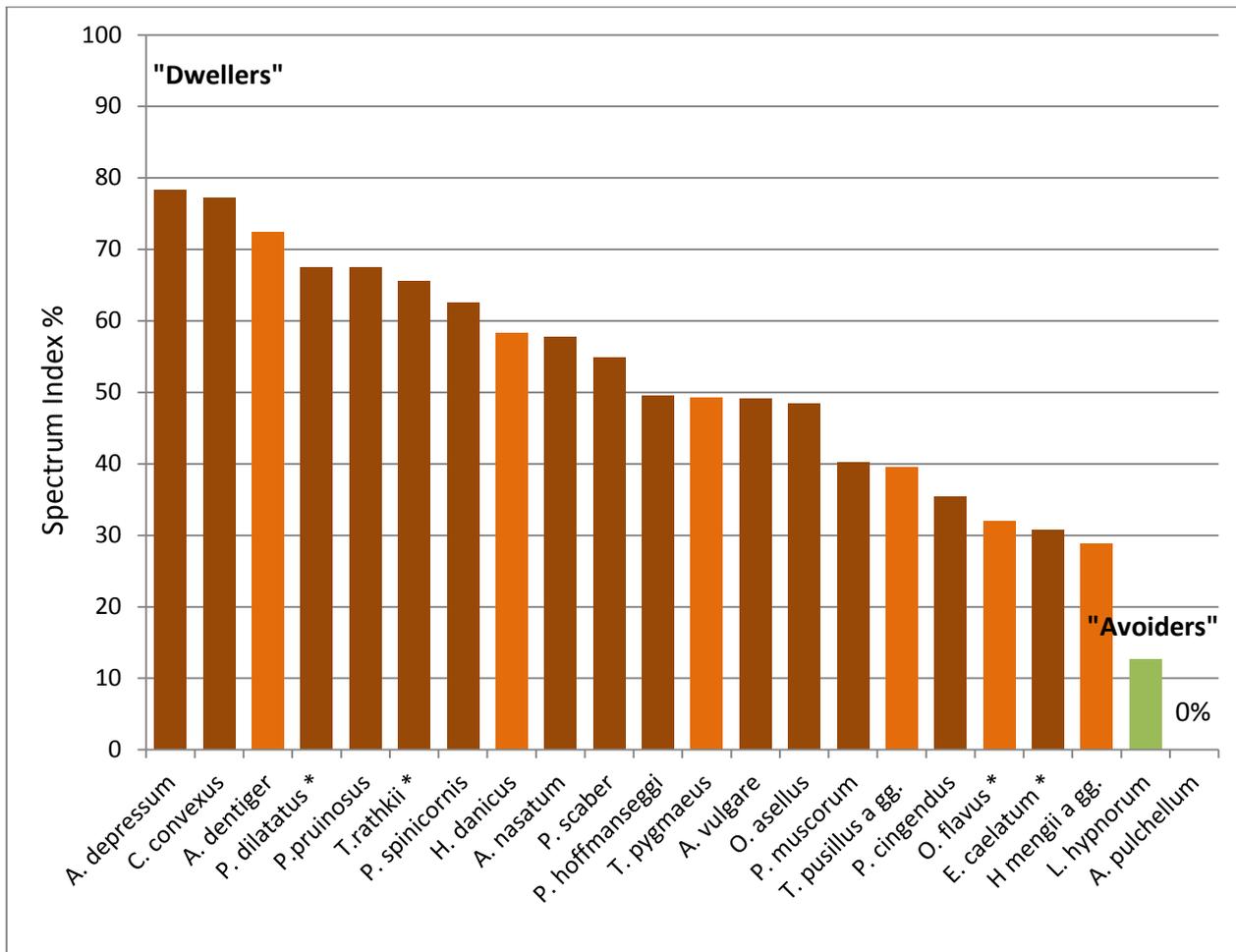


Figure 3: Visualisation of a woodlouse “synanthropy spectrum”

■ Diplocheta ■ Synocheta ■ Crinocheta \* species with <100 records (but >30)

### Discussion

In relation to the manipulation and use of the data, it needs to be recognised that collection of records overall was on an **unsystematic** “as and when” basis with many recorders submitting records over a long period of time. In addition, recording species absences was not part of the process. Although, in principle, a system such as that of Hauser & Voigtländer (2019) on the basis of records per habitat type might have been used this would have been cumbersome. There seemed to be no simple way to link habitat detail with synanthropy and detail (e.g. of woodland type) was often not recorded in BISG/BMIG data. The BMIG centipede, millipede and woodlouse data, on the other hand, was readily available.

1) The terms “urban” and “rural” are in this account are treated as synonymous with “synanthropic” and “non-synanthropic” (with an intermediate “suburban/village”) although this is not strictly correct. Our urban areas tend to have mostly synanthropic habitats but also some open spaces of various sizes whilst rural ones (at least in lowland Britain) tend to contain at least some synanthropic sites. However, on the basis that urban areas are likely to be mostly synanthropic and rural ones mostly non-synanthropic and with suburban/village somewhere in between we can use these categories to sort out species when we have sufficient data.

2) During the processing of the data it was recognised that the number of records in the three different categories was very heavily biased towards rural sites and that the number of records from these represented about 75% (centipedes and woodlice) or 80% (millipedes) of the total and would cause significant bias in the percentage data. For this reason, weighting (“standardisation”) was carried out as described in the centipede atlas (Barber, 2022). Table 12 shows the crude percentage figures, unweighted and the indices they would generate for a number of millipede species (all with >100 records) compared with those from the weighted data as already calculated (column B). These indices do seem tend to show a pattern but using them would be inappropriate because of the rural/urban biased figures.

3) A decision on how much, if any of the suburban/village data should be included had to be made. Should we use only “urban” data to calculate our index or “Urban” + ”Suburban/Rural” (as in the table in Lee, 2006) or “Urban” + part of “Suburban/Village” (as in this present account). Table 12, columns D – E show the indices we would obtain if, instead of using  $SI = U + (SV / 2)$ , we choose to include only the urban data ( $SI = U$ ) or, alternatively, include the whole of the Suburban/Village records ( $SI = U + S/V$ ). This is to indicate the range of values we could obtain depending on what proportion of the suburban/village data that is included.

**Table 12: “Synanthropy Spectrum” Values for some Millipedes calculated using different methods**

**A** = Total records for the species in the three categories

**B** = Index ( $U + SV/2$ ) calculated using unweighted data

**C** = Index ( $U + SV/2$ ) calculated using weighted data

**D** = Index (U) calculated using urban only (weighted) data

**E** = Index ( $U + SV$ ) calculated using urban and all suburban/village (weighted) data

	<b>A</b>	<b>B</b>		<b>C</b>		<b>D</b>	<b>E</b>
<b>Species</b>	Total Records	SI Crude data only		SI (as used) Weighted		SI Urban only	SI Urban + All S/V
<i>Polyxenus lagurus</i>	250	15.6		50.65		27.9	72.3
<i>Glomeris marginata</i>	2387	4.61		22.5		8.2	36.7
<i>Nanogona polydesmoides</i>	1701	16.11		57.9		41.6	74.2
<i>Chordeuma proximum</i>	224	9.83		42.8		25.9	59.7
<i>Melogona scutellaris</i>	305	20.82		60.2		40.1	80.3
<i>Brachydesmus superus</i>	1593	10.73		45.7		29.7	61.6
<i>Polydesmus angustus</i>	2705	5.34		46.7		30.7	62.6
<i>Polydesmus coriaceus</i>	802	6.59		54.8		35.2	74.5
<i>Polydesmus denticulatus</i>	312	4.49		28.3		18.3	38.4
<i>Polydesmus inconstans</i>	237	11.25		48.9		33.6	64.3
<i>Macrosternodesmus palicola</i>	370	35.01		71.4		52	90.9
<i>Ophiodesmus albonanus</i>	242	38.02		71.7		50.7	92.0
<i>Archiboreoiulus pallidus</i>	214	22.43		65.1		47.8	82.3
<i>Blaniulus guttulatus</i>	1053	29.77		2.0		55.8	89.1
<i>Boreoiulus tenuis</i>	303	31.19		63.4		37.5	51.7
<i>Proteroiulus fuscus</i>	1785	8.34		40.2		25.3	55.0

4) As well as the vagueness and subjectivity of the three categories as seen by different recorders there was no overall systematic collection (temporally, spatially or by habitat) of data which was gathered by a large number of different, often non-specialist, recorders. In addition, the number of records varied widely between different individual species: those with large numbers of records would give a more reliable picture of that species habits than those with few. For this reason, species with less than 100 (>30) records are distinguished in red in the tables and those with 30 or less not included.

5) Different species occupy different geographical areas and some species are widespread in rural sites in one part of their range but seemingly solely or largely synanthropic in others whilst apparently entirely absent from other regions. Thus the proportion of synanthropic records for a species is likely to vary depending on the region looked at. The figures calculated here are for Britain and Ireland as a whole. If we were to calculate such figures for the various different regions, no doubt we should see clear differences between them especially as between north and south and possibly east and west. As an example, the centipede *Stigmatogaster subterranea* is a very common and typical geophilomorph of a variety of habitats in SW England but, as Blackburn *et al.* note, it is markedly synanthropic in NE England. Possibly a way might be found to include regional distribution data but this may not be necessarily easy especially in terms of having adequate numbers of regional records.

## Conclusions

The pictures that emerge for the three groups from our data as used in this account do seem to fit fairly well with our knowledge of the different species. However, there are several important methodological issues / assumptions including the need to weight data to take into account the different numbers of records both for individual species and individual habitat categories. In addition, there is the need to convert the data from three habitat categories into two to allow derivation of index figures.

The concept of a “Synanthropy Index” used here is not intended to be a precise measurement (with clear confidence limits) of synanthropy, or some aspect of it, but as a tool to be used in the production of a chart (or similar) to visualise degree of synanthropy towards “dwellers” or “avoiders” ends of the spectrum. Such charts allow us to visualise a spectrum of the various species and their relationships to each other and to the concepts of “dwellers” and “avoiders” using the type of data produced by the relevant recording schemes.

Different approaches may be needed for other groups. It might also, perhaps, be able to inform the possibility of the three groups being able to be used as biological indicators.

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## References

Barber, A.D. (1985) Distribution patterns in British Chilopoda. *Bidjdr.Dierk.* **35**(1): 16-24.

- Barber, A.D. (1992) Distribution and habitat in British Centipedes. *Ber.nat.-med.Verein.Innsbruck Suppl.* **10**: 339-352.
- Barber, A.D. (2022) *Atlas of the centipedes of Britain and Ireland*. Telford, FSC Publications.
- Barber, A.D. & Fairhurst, C.P. (1974) A habitat and distribution recording scheme for Myriapoda and other invertebrates. In Blower, J.G. (ed.) *Myriapoda. Symp.zool.Soc.Lond.* **32**: 611-619.
- Barber, A.D. & Keay, A.N. (1988) *Provisional Atlas of the Centipedes of the British Isles*. Huntingdon, NERC.
- Barber, A.D. & Milner, E. (2023) London centipedes. *London Naturalist* **102**: 113-33.
- Blackburn, J., Farrow, M. & Arthur, W. (2002) Factors influencing the distribution and diversity of geophilomorph and lithobiomorph centipedes. *J.Zool.Lond.* **256**: 221-232.
- British Myriapod Group (1988) Preliminary atlas of the millipedes of the British Isles. Huntingdon, Biological Records Centre.
- Gregory, S. (2009) *Woodlice and Waterlice in Britain and Ireland*. Shrewsbury, FSC Publications.
- Guetté, A., Gaüzère, P., Devictor, E. Jiguet, F. & Godet, L. (2017) Measuring the Synanthropy of species and communities to monitor the effects of urbanisation on biodiversity. *Ecological Indicators* **79**: 139-154.
- Harding, P.T. & Sutton, S.L. (1985) *Woodlice in Britain and Ireland: Distribution and Habitat*. Huntingdon, NERC.
- Hauser, H. & Voigtländer, K. (2019) *Doppelfüßer Deutschlands*. Deutscher Jugendbund für Naturbeobachtung
- Kime, R.D. & Enghoff, H. (2017) *Atlas of European millipedes 2 Order Julida*. European Journal of Taxonomy **346**: 1-299. <https://dti.org?10.5852/ejt.2017.346>
- Leach, W.E. (1817) The characters of the genera and class Myriapoda with descriptions of some species. *Zoological Miscellany* **4**: 31-45.
- Lee, P. (2006) *Atlas of the Millipedes (Diplopoda) of Britain and Ireland*. Sofia – Moscow, Pensoft.
- Pocock, R.I. (1902) Myriapoda in *The Victoria History of the Counties of England Surrey*. Westminster, Archibald Constable.
- Pocock, R.I. (1906) The wild fauna and flora of the Royal Botanic Gardens, Kew. *Royal Botanic Gardens, Kew. Bulletin of Miscellaneous information Additional Series* **5**.
- Read, H.J. (2020) Book Review: *Doppelfüßer (Diplopoda) Deutschlands*. *Bulletin of the British Myriapod and Isopod Group* **32**: 93-94.
- Read, H.J. & Enghoff, H. (2023) On the names of some British Millipedes. *Bulletin of the British Myriapod & Isopod Group* **35**:43-44.
- Schubart, O. (1957) Die Diplopoden der Mark Brandenburg. *Mitteilungen aus dem Zoologischen Museum, Berlin* **33** (1): 1-91.
- Schmalfuss, H. (1984) Ecophysiological strategies in terrestrial isopods. In Sutton, S.M. & Holdich, D.M. The biology of terrestrial isopods. *Symp.zool.Soc.Lond.* **53**: 49-63 (cited by Gregory, 2009).
- Wesener, T., Voigtländer, K., Decker, P., Oegen, J. P., Spelda, J. (2016) Barcoding of Central European *Cryptops* centipedes reveals large interspecific distances with ghost lineages and new species records from Germany and Austria (Chilopoda, Scolopendromorpha). *Zookeys* **564**: 21-46.

## Reginald Innes Pocock FRS, FZS (1863-1947): Some Notes and Papers on British & Irish Myriapods

Anthony D. Barber

7 Greenfield Drive, Ivybridge, Devon, PL21 0UG

E-mail: abarber159@btinternet.com

### Introduction

Reginald Innes Pocock was the fourth son of Rev. Nicholas Pocock and Edith, daughter of James Cowles Richards FRS, and was born at Clifton, Bristol. He attended a preparatory school there before being sent to St. Edward's School, Oxford for an education chiefly along "classical" lines. Having an early interest in natural history, he was given special tuition in zoology by Edward Poulton and allowed to study comparative anatomy at the Oxford Museum. When he left St. Edmunds, his parents decided to let him adopt a scientific career and he became a pupil at Frank Townsend's School at Clifton and attended biological and geological courses at University College, Bristol under Professors Lloyd Morgan and Solas.

In 1885 he obtained through competitive examination the post of Assistantship on the staff of the Zoological Department at the British Museum. After working for a year in the Entomology Section, he was placed in charge of the Arachnida and Myriapoda. His first task, however, was to rearranging the collection of British Birds in the public gallery which, along with work in the field, gave him a lasting interest in ornithology. He, apparently, showed great aptitude for the work he was doing during his eighteen years at the Museum and had an enormous output of scientific publications. In 1895, on the recommendation of Sir William Flower, Director of the Natural History Museum, he was promoted to First-Class Assistant.

Pocock had a long-standing interest in mammals and later published many papers on them including an account of the species and sub-species of zebras (Pocock, 1897). When the post of Superintendent at Regents Park Zoo became vacant in 1903, he was appointed to this role and in 1904 left the Museum. He retired from his post at the Zoo in 1923 and then worked as a voluntary researcher on mammals back at the museum. He died in his sleep of a coronary thrombosis in 1947. An account of his life & work with a list of publications was published in the *Biographical Memoirs of Fellows of the Royal Society* (Hindle, 1948)

### Collections and Contacts

During Pocock's tenure at the museum numerous collections from various parts of the world were received and material described. This material also certainly included British material. Amongst the latter we read in the history of the museum's collections (Pocock, 1906a) of large numbers of specimens of myriapods collected by Oldfield Thomas from various parts of England during the period 1889-1900. Also, in 1889, of a collection of 250 British centipedes containing many species new to the collection, by Oldfield Thomas and Pocock. In 1892 a collection of 319 millipedes from the south of England collected and presented by Oldfield Thomas is referred to.

Through his work at the Museum, Pocock would have been in contact with many people, both professional biologists and lay people. A scan through all relevant literature will, no doubt find reference to Pocock's work on identifying various British specimens such as that of *Linotaenia maritima* (*Strigamia maritima*) from Bexhill (Scherren, 1895). One interesting snippet was his contribution regarding myriapods to the book *Rugby past and Present* (Wait, 1893).

## Publications

Pocock published large numbers of papers and notes on arachnids, myriapods, mammals, etc. during his tenure at the museum and subsequently. Of these, a paper on a new genus and species of Polyzoniidae, *Pseudodesmus verrucosus* from Perak (Malay Peninsula) in the *Annals and Magazine of Natural History* would seem to be the first specifically myriapod one (Pocock, 1887) - he was described in this as “Assistant Naturalist, British Museum”.

The list of his published material in the Royal Society obituary (Hindle, 1948) includes about eighty publications partly or solely on myriapods. He seems to have been responsible for the description of three to four hundred species of millipede (Sierwald & Bond, 2007). For centipedes, based on the database *Chilobase*, it seems that Pocock named 101 valid species or subspecies plus 40 synonyms and 13 valid genera (L. Bonato *pers. comm.*). Eason (1973) examined some 20 of his named specimens of the genus *Lithobius* in the Natural History Museum and reviewed their status.

Notes and papers relating to Britain and Ireland form a small but interesting minority. In those referred to herein both species names used by Pocock as in his publications along with species names as in the two most recent British / Irish atlases for millipedes (Lee, 2006) and centipedes (Barber, 2022) are given. In Pocock’s work the spelling was sometimes “myriopod”, other times “myriapod”.

What seems to have been his last zoological paper was published posthumously in *Zoo Life* in 1948 (Pocock, 1948) and was on beavers.

### 1889 “A marine millipede”

Despite the title, this note (Pocock, 1889) is about marine centipedes and is a response to a note in the same volume of *Nature* by D.W.T. (1889, presumably Darcy Wentworth Thompson) where the latter had drawn attention to the finding of *Geophilus* (*Schendyla*) *marina* (= *Hydroschendyla submarina*) on Jersey by Mr Sinel. “Some examples were found close to the low-water mark of very low spring tides, where they could not be exposed on two days in a fortnight.”

Pocock, in turn, reports the fact that specimens had been found at Polperro (along with *Linotaenia maritima* (*Strigamia maritima*) “more than 20 years ago” and had been presented to the British Museum in 1886.

The species had been first described, by Grube, from St. Malo in 1872. It seems that Parfitt’s 1873 record of *Arthronomalus littoralis* from the South Devon Coast was also this species (Bonato & Minelli, 2014 cited by Barber, 2022).

It is a species of rock crevices down to mid-tide level (Sinel had apparently used a crow-bar in collecting it) and with an apparent southern distribution so perhaps may appear to be rather more rare than it really is.

### 1891 The history of a long-forgotten *Lithobius*

In this paper (Pocock, 1891) the author reports on a “magnificent specimen” of the genus *Lithobius* collected for him by Oldfield Thomas on St. Michael’s Mount during the autumn of 1890. Examination of material in the Museum showed that the animal was identical with the type of *Lithobius pilicornis*, of which *L. sloani* and *L. longipes* were synonyms, with records from the Azores, Madeira and Morocco. Pocock’s *Lithobius doriae* from Italy seems to be a subspecies of *L. pilicornis* (Eason, 1973).

The 1891 paper gave a full description of *Lithobius pilicornis* which was referred to by Eason (1971) in his review of Newport material in the Natural History Museum. The centipede atlas (Barber, 2022) records the species from 74 hectads across Britain and Ireland. Many of these records are from synanthropic sites but it can also be found in some rural woodlands in west Cornwall.

## 1893 Notes on some Irish myriopods (sic)

In this report in the *Irish Naturalist* (Pocock, 1893) the author reports on material made available to him by R.F. Scharff of Dublin and by G.H. Carpenter. It seems that Pocock had hoped to find something unusual in these collections but, in the event, he seems to have been disappointed, finding only species of the same sort as those in occurring southern England. It was only in a second collection from Carpenter that he did find a millipede not previously known from Britain or Ireland. This was *Polydesmus gallicus*, now known as *Polydesmus coriaceus*, originally described from Normandy and, at the time, unknown from Great Britain.

Nine centipede species and twelve millipede ones are listed with various comments on them in quotation marks.

### Chilopoda

*Lithobius forficatus*, *Lithobius variegatus*, *Lithobius melanops*, *Lithobius microps*, *Cryptops hortensis*, *Geophilus flavus*, *Geophilus carpophagus*, *Linotaenia crassipes* (*Strigamia crassipes*), *Linotaenia maritima* (*Strigamia maritima*), *Stigmatogaster subterraneus* (*Stigmatogaster subterranea*).

As well as listing localities for *L. variegatus*, the comment is made “Abundantly distributed throughout the British Isles and occurs also in Jersey. It has not yet, however, been recorded from any part of the continent of Europe”. As we now know, this is, indeed substantially still the case. There are, however quite large areas of eastern England and Scotland where it is apparently rare or absent (Barber, 2022). As well being found in the Channel Islands there are a few records from NW and SW France and Iberia.

In relation to *Geophilus carpophagus*, it is likely that the species concerned is most probably *Geophilus easoni* on Great Sugar-loaf Mountain and other upland areas.

### Diplopoda

*Polyxenus lagurus*, *Glomeris marginata*, *Polydesmus complanatus* (not *P. complanatus* but *P. angustus*), *Polydesmus gallicus* (*P. coriaceus*), *Brachydesmus superus*, *Atractosoma polydesmoides* (*Nanogona polydesmoides*), *Blaniulus fuscus* (*Proteroiulus fuscus*), *Iulus luscus* (*Cylindroiulus latestriatus*), *Iulus punctatus* (*Cylindroiulus punctatus*), *Iulus pilosus* (*Ophiulus pilosus*), *Iulus niger* (*Tachypodoiulus niger*), *Iulus sabulosus* (*Ommatoiulus sabulosus*).

*Polydesmus gallicus* was recorded from: Armagh: Mullingar, Lismore, Castletown Berehaven and Glengariff. *Polydesmus complanatus* is not known in Britain or Ireland.

### Comments on “Irish Myriapods”

Although the list was relatively short and, for Pocock, disappointing (apart from “*Polydesmus gallicus*”), it formed a valuable basis for further studies with more Irish records being added by Brölemann, Carpenter, Selbie, Kew, Johnson, Foster and others with a succession of reports on Irish myriapods up until the time of the First World War.

## 1895, 1896 Luminous centipedes

In November 1895 Rose Haig Thomas of Basildon wrote to *Nature* regarding observed luminescence in a centipede:

“Returning home on a very dark evening a few days ago, I saw on the ground a greenish phosphorescent light which, in the distance, I took to be a glow-worm (*Lampyrus noctiluca*), but a nearer approach showed a luminous thread-like worm of 1¼ inches in length, moving in curves along the gravel drive. I stooped and placed a finger and thumb on either side of the glowing thread without actually touching it, and in a few seconds observed that, aware of danger either from scent or vibration, the insect showed

a remarkable power of control over its luminosity, invaluable for protection. It began to extinguish its light, and in a most peculiar fashion, not dying slowly out all over, but with a rapid wave of darkness sweeping from the tail to the head, then in a second or so glowing brightly all over again, repeating the manoeuvre several times so long as my finger and thumb remained in its vicinity. A glass was brought, into which I transferred the insect, where it glowed with a lessened light for three or four hours. The next night the phosphorescence was very feeble, and on the morning following the insect was dead.” (Harris, 1895).

Pocock (1895) responded directly to Miss Haig’s communication:

“The above communication certainly refers to one of the luminous centipedes of the family *Geophilidae*; and since the species that most commonly draws attention to itself in England by the exhibition of phosphorescence is of a reddish-orange colour and is known as *Linotaenia crassipes*, there is no reason to doubt that the specimen under discussion was an example of this species. The property of luminosity lies in an adhesive fluid secreted by glands which open upon the lower surface of the body, and the power of discharging or retaining the fluid appears to be entirely under the centipede's control.”

In a subsequent note, in response to a question of Mr Lloyd Bozward (Pocock, 1896), he comments of *Geophilus electricus* that, despite its Linnean name, not one of the many specimens brought to the British Museum as showing luminosity had been that species. In the Victoria Histories (Pocock, 1900c, 1902, 1906a) he remarks that *Strigamia crassipes* and *S. acuminata* (*Linotaenia acuminata*) are the two common British luminous centipedes.

### Comments

Brade-Birks & Brade-Birks (1920), who carried out several experiments on luminescence, used *Geophilus carpophagus* s.l. (i.e. *Geophilus easoni* or *Geophilus carpophagus* s.s.). In recent years, most reports of geophilomorph bioluminescence in Britain where the species was precisely determined do seem to refer to *Geophilus easoni* but it has also been noted in *Geophilus carpophagus* s.s.

It is improbable that Pocock was confusing *G. easoni* with a *Strigamia* species but what is interesting is that all four of the species referred to here are (a) reddish or brownish compared with the paler colours of most British geophilomorphs and (b) on the limited data available (Barber & Keay, 1988: Table 6), seem to prefer more superficial litter/soil horizons (i.e. they are epigeic rather than hypogeic). Whether this is linked in any way with luminosity is open to speculation. For more information on luminescence in centipedes refer to Lewis (1981).

In the light of Pocock’s comments about “common” species it is interesting to note the numbers of records of species as reported in the centipede atlas (Barber 2022). By far the greatest majority of these would have been made in the last fifty years.

Species	Number of Records	Notes
<i>Strigamia acuminata</i>	678	
<i>Strigamia crassipes</i>	502	
<i>Geophilus carpophagus</i> s.l.	1,856	<i>G. carpophagus</i> + <i>G. easoni</i>
<i>Geophilus carpophagus</i> s.s.	180	
<i>Geophilus easoni</i>	785	
<i>Geophilus electricus</i>	400	

Overall total atlas records for all species of centipede (Britain, Ireland, Isle of Man, Channel Islands) is 53,097 (Barber, 2022).

## 1900 Marine centipede in Somerset

This is a short note in *Zoologist* (Pocock, 1900a) reporting his finding of large numbers of centipedes (*Strigamia maritima*) of all sizes swarming over seaweed at Portishead. Pocock writes, “I had hitherto looked at this centipede as a rarity to be picked up only by ones or twos. Great therefore was my astonishment, when turning over the line of seaweed marking the high spring tide to find specimens of all sizes swarming amongst the slimy decaying fronds and wriggling away into darkness in company with hosts of scuttling woodlice and hopping sand-shrimps whilst here and there was a cluster of them feeding upon the remains of one of these crustaceans”.

## 1900 *Iulus londinensis* and *Iulus teutonicus*

Kime & Enghoff (2017) comment that there had been “much confusion” in relation to the identity of *Cylindroiulus caeruleocinctus* (*C. teutonicus*). Leach had originally described *Iulus londinensis* from the vicinity of London but there had been subsequent confusion with another species which Pocock (1900b) describes here as *Iulus teutonicus*, a rather smaller species of similar appearance. He used this name in subsequent publications.

Pocock described how *I. londinensis* was a larger and fatter animal, length 38-48mm long, 4mm diameter compared with his *I. teutonicus* at 25-35mm. width 2.5 mm. Distinctive was the fact that *I. londinensis* has a short, subcylindrical, unpointed (club-shaped) caudal process whereas that of *I. teutonicus* is just obtusely angular and not even sub-mucronate. There are also differences in the pattern of the tergite striae.

Brade-Birks (1922), referred to a publication of Chamberlin (1921) and to correspondence with the latter concerning *C. teutonicus* which appeared to be called *londinensis* in North America and on the continent of Europe. He came to the conclusion that it was synonymous with *Iulus caeruleo-cinctus* of Wood (1864) and so refers to it as *C. londinensis* var *caeruleocinctus* (Wood). Reference to Wood’s original description does not give a location for the species but the paper, published by the Philadelphia Academy, was entitled “Descriptions of New Species of North American Iulidae”. Chamberlin refers to it as *Diploiulus londinensis* with *Julus londinensis* (Leach) and *Julus caeruleo-cinctus* Wood as synonyms. He described it as being “our most commonly observed member of the family it is abundant throughout New England and adjoining parts of Canada and New York State”. On Brade-Birks’ interpretation, this is the species we now refer to as *Cylindroiulus caeruleocinctus* (= *C. teutonicus*), but not the *C. londinensis* of Leach).

In Gordon Blower’s first millipede synopsis (Blower, 1958), *londinensis* and *caeruleocinctus* were treated as forms of *C. londinensis* with reference also to a form *finitimus*. In subsequent years with further collections of the “true” *londinensis*, including immatures, it became clear that *C. londinensis* and *C. caeruleocinctus* were distinct species and are treated as such in the second synopsis (Blower, 1985). Demange (1981) had referred to *caeruleocinctus* as “Differe de *londinensis* par son ecologie”.

Reference to the European millipede atlas (Kime & Enghoff, 2017) shows the distribution of the two species in Europe with relevant comments and Lee (2006) in more detail for Britain and Ireland.

## 1900-1906: The Victoria County Histories

In 1899 the Westminster publisher Archibald Constable launched *The Victoria History of the Counties of England* with volumes intended for each of the English counties. From 1900 to 1906, under the subject of Natural History, a list of Myriapoda (centipedes and millipedes) under Pocock’s authorship was included in six of these county histories: Hampshire & the Isle of Wight (Pocock, 1900c), Cumberland (Pocock, 1901a), Norfolk (Pocock, 1901b), Surrey (Pocock, 1902), Essex (Pocock, 1903), Somerset (Pocock, 1906b). By 1906, Pocock had left the Natural History Museum and there were, it

seems, no further such lists by him although Worthington (1938) included a list in the volume for Cambridgeshire & the Isle of Ely. However, Sinclair (1904) had already published a list of myriapods in the *Natural History of Cambridgeshire* and these records, along with others, were included in the Worthington list. Frank Morey's (1909) *Guide to the Natural History of the Isle of Wight* quotes the *Victoria History* list. Most *Victoria History* notes were referenced in relation to centipedes by Eason (1964).

The Pocock reports included names of species as in the then current use, localities and collectors. Tables 1A and 1B summarise the 1900-1906 reports with current names in the tables and names used by Pocock in the notes.

**Table 1A: Species recorded in the Victoria Histories 1900-1906 (Centipedes).**

Names given as in Barber, 2022 with notes of Pocock's names as used.

H/IOW = Hampshire & Isle of Wight, Cumb'ld = Cumberland, Som'set = Somerset

County (Volume)		H/IOW	H/IOW	Norfolk	Cumb'ld	Surrey	Essex	Som'set
		Hants	IOW					
Chilopoda	Notes	1900	1900	1901b	1901a	1902	1903	1906b
<i>Lithobius forficatus</i>		●		●		●	●	●
<i>Lithobius variegatus</i>			●		●	●		●
<i>Lithobius melanops</i>		●	●					●
<i>Lithobius calcaratus</i>		●		●	●		●	●
<i>Lithobius crassipes</i>							●	●
<i>Lithobius microps</i>								●
<i>Lamyctes emarginatus</i>	1							●
<i>Cryptops hortensis</i>		●	●			●	●	●
<i>Cryptops anomalans</i>						●		
<i>Geophilus flavus</i>		●	●		●	●	●	●
<i>Geophilus carpophagus</i>	a	●			●	●	●	●
<i>Geophilus impressus</i>	2, b						●	
<i>Geophilus truncorum</i>							●	●
<i>Strigamia acuminata</i>	3						●	●
<i>Strigamia crassipes</i>	4, c		●			●	●	●
<i>Strigamia maritima</i>	5						●	●
<i>Schendyla nemorensis</i>							●	●
<i>Stigmatogaster subterranea</i>	6	●	●			●		●

**Notes:** Pocock's names: 1. *Lamyctes fulvicornis* 2. *Geophilus proximus* (in more recent years known as *Geophilus insculptus*) 3. *Linotaenia acuminata* 4. *Linotaenia crassipes* 5. *Linotaenia maritima* 6. *Stigmatogaster subterraneus*

- "*Geophilus carpophagus*" as listed here is most likely or possibly entirely *Geophilus easoni* as currently named.
- Geophilus proximus* as now understood has only been recorded in Britain from the Shetland Islands.
- This and its congener *Linotaenia acuminata* (*Strigamia acuminata*) are the two common British luminous centipedes according to Pocock.

**Table 1B: Species recorded in the Victoria Histories 1900-1906 (Millipedes).**

Names given as in Lee 2006 with notes of Pocock's names as used.

H/IOW = Hampshire & Isle of Wight, Cumb'ld = Cumberland, Som'set = Somerset

County		H/IOW	H/IOW	Norfolk	Cumb'ld	Surrey	Essex	Som'set
		Hants	IOW					
Diplopoda	Notes	1900	1900	1901b	1901a	1902	1903	1906b
<i>Polyxenus lagurus</i>		●					●	
<i>Glomeris marginata</i>			●			●		
<i>Polydesmus angustus</i>	1, a			●	●	●	●	●
<i>Polydesmus denticulatus</i>					●			
<i>Polydesmus inconstans</i>								●
<i>Propolydesmus testaceus</i>	2						●	
<i>Brachydesmus superus</i>				●			●	●
<i>Oxidus gracilis</i>	c					(●)		
<i>Nanogona polydesmoides</i>	3		●	●	●		●	●
<i>Blaniulus guttulatus</i>		●				●	●	●
<i>Proteroiulus fuscus</i>	4							●
<i>Cylindroiulus britannicus</i>	5		●					●
<i>Cylindroiulus caeruleocinctus</i>	6	●				●		●
<i>Cylindroiulus londonensis</i>	b					?		
<i>Cylindroiulus punctatus</i>	7		●	●		●	●	●
<i>Iulus scandinavicus</i>	8						●	●
<i>Ophiulus pilosus</i>	9				●	●	●	
<i>Tachypodoiulus niger</i>	10		●	●	●	●	●	●
<i>Ommatoiulus sabulosus</i>	11			●	●		●	
<i>Brachyiulus pusillus</i>	12							●

**Notes:**

Pocock's names: 1. *Polydesmus complanatus* 2. *Polydesmus subintiger* 3. *Atractosoma polydesmoides*  
 4. *Blaniulus fuscus* 5. *Iulus britannicus* 6. *Iulus teutonicus*. 7. *Iulus punctatus* 8. *Iulus ligulifer*  
 9. *Iulus pilosus* 10. *Iulus niger* 11. *Iulus sabulosus* 12. *Iulus pusillus*

a. *Polydesmus complanatus* is not known from Britain (as noted earlier).

b. *Cylindroiulus londonensis* (*Iulus londonensis*) recorded from the environs of London – “may prove to belong to the Surrey fauna”.

c. *Oxidus gracilis* (here called *Orthomorpha gracilis*) is “of common occurrence in many of the conservatories in England and other countries of Europe where it breeds in profusion”. Here recorded from Kew Gardens

**Comments on the Victoria County History lists**

Although myriapod species records of various dates were collected across the British Isles, the county histories provide us with data that can be visualised in geographical terms and, possibly, begin to see what might ultimately become the hectad (and tetrad) maps of the middle of the twentieth century onwards.

There are, of course, many limitations. Only seven counties are included (counting Hampshire and the Isle of Wight separately), all of which, except one are from the south eastern region of England and each is represented by only a handful of sites. In addition, experience has taught us that different collectors working in different ways, at different times and in different sorts of habitat may produce records of different species.

Maybe there are some hints of wider patterns such as the non-recording of *Lithobius variegatus* from Essex and Norfolk which, today, fits into a pattern of its absence or scarcity in much of eastern England and Scotland (and most of Europe) whilst being common and widespread in rural areas in western Britain and in Ireland.

### 1901 Some questions of Myriapod nomenclature

This is a short paper (Pocock, 1901c) in two parts discussing (a) issues of nomenclature in Leach's species of the genus *Geophilus* and (b) the genera of blaniulid millipedes.

a. Leach's genus *Geophilus* had contained *G. carpophagus*, *G. subterraneus*, *G. acuminatus* and *G. longicornis*. Subsequent workers, including Newport, had created various separate genera, *Necrophloeophagus* (= *Arthronomalus*), *Scnipæus*, *Linotaenia* and *Stigmatogaster* and Pocock was here, it seems, endeavouring to identify type species for each genus.

Following his review of type species, his suggestion was:

Possible generic names	Type
<i>Necrophloeophagus</i> Newport ( <i>Arthronomalus</i> )	<i>longicornis</i>
<i>Scnipæus</i> Meinert	<i>carpophagus</i> (= <i>sodalis</i> )
<i>Linotaenia</i> Leach	<i>acuminata</i> (= <i>rosulans</i> )
<i>Geophilus</i> Leach	<i>subterraneus</i>

Pocock's proposals failed to gain wider currency in the long-term and at the present time *Geophilus flavus* and *Geophilus carpophagus* (as they are currently known) are placed in the Geophilidae, *Strigamia* (*Linotaenia*) in the Linotaeniidae and *Stigmatogaster subterranea* in the Himantariidae.

b. The genus *Blaniulus* was established by Gervais in 1836 for the reception of the blind *Iulus guttulatus*. Following his review, Pocock proposed:

Generic names	Type
<i>Blaniulus</i> Gervais (= <i>Typhloblaiulus</i> )	<i>guttulatus</i>
<i>Trichoblaniulus</i> Verhoeff	<i>Blaniulus hirsutus</i> Brol.
<i>Nopoiulus</i> Menge	<i>Nopoiulus Kochii</i> Gervais
<i>Proteroiulus</i> Silvestri	<i>Blaniulus fuscus</i> Stein

*Blaniulus hirsutus* is now known as *Trichoblaniulus hirsutus* and *Blaniulus fuscus* as *Proteroiulus fuscus*.

The reported occurrence of *Nopoiulus kochii* in the British Isles is of some interest. It has been reported here since at least the early part of the 20<sup>th</sup> century but there had been much nomenclatural confusion and with re-examination of specimens identified as the species all turned out to be those of others (Lee, 2006). This led Gordon Blower in the second edition of his millipede synopsis (Blower, 1985) to write that "There remains no evidence that *N. minutus* (= *venustus* in the sense of Schubart, 1934) has ever occurred in Britain, but there is a possibility that it may occur". In the spring of 1986, at a BMG/BISG meeting in Manchester, it was collected there by Steve Hopkin (Hopkin & Blower, 1987). The millipede atlas (Lee, 2006) shows a map of its, then current, hectad distribution.

## 1906 The Kew Bulletin

Published in the *Additional Series V* of the (Kew) *Bulletin of Miscellaneous information* and entitled “The Wild Fauna and Flora”, this contains lists of species of both centipedes and millipedes, both “native” and “exotic”, that had been found in the Royal Botanic Gardens (Pocock, 1906c)

Species already noted from “Surrey” in the Victoria History are marked with an asterisk (\*). Comments made by Pocock in the report are in inverted commas (“ ”) whilst comments from the present author are in square brackets [ ].

### Chilopoda

\**Lithobius forficatus*. “Common everywhere throughout Europe”

\**Cryptops hortensis*. “Common throughout temperate Europe”

\**Cryptops anomalans*. “This species belongs typically to the fauna of the Mediterranean area and has hitherto not been met with elsewhere in Great Britain, nor so far north as London in any country of Europe”. [*Cryptops savignii* which is a synonym of *C. anomalans* was in fact, first described by Leach in 1817 from the garden of the then British Museum in London.]

*Scolopendra morsicans*. (Presumably *S. morsitans*) “Introduced amongst living plants from India”.

*Scolopendra subspinipes*. “Introduced from the Tropics”

\**Geophilus flavus*. “Common throughout Europe”

*Geophilus electricus*. “European species but not common in England” [Not recorded in any of the 1900-1906 Victoria History lists]

*G.* sp. “In rotten wood. Apparently not identifiable with any British species”.

*Mecistocephalus punctifrons*. “Imported probably from India”. [The identity of the species referred to here is uncertain (Barber, 2022) but it does seem to be the first record from Britain of a mecistocephalid centipede. At the present time, the seemingly parthenogenetic *Tygarrup javanicus* has been recorded from a number of heated sites whilst *Mecistocephalus guildingii* is known from the Eden Project in Cornwall.].

\**Stigmatogaster subterraneus*. (*Stigmatogaster subterranea*)\*. “A common British species”.

### Diplopoda

An attempt to recognise current names for exotic species has been made using the on-line database MilliBase (2025) and these are given in parenthesis.

\**Polydesmus complanatus* (*Polydesmus angustus*). “Common in cool plant houses and elsewhere” [*Polydesmus angustus* was frequently identified as *Polydesmus complanatus*, a similar but not identical species and, as already noted, one not known from Britain].

*Brachydesmus superus* “Common in the south of England and in central Europe”.

*Orthomorpha coarctata* (Saussure). “Arboretum”. [*Orthomorpha coarctata*\*]

\**Orthomorpha gracilis*. [*Oxidus gracilis*] “This species and the preceding are world-wide in their distribution owing to artificial importation”.

*Orthomorpha Kelaati* “Imported amongst living plants from Ceylon” [*Chondromorpha kelaati* (Humbert)\*]

\**Iulus teutonicus* (*Cylindroiulus caeruleocinctus*). “Common in the south of England and western Europe”.

\**Iulus punctatus* (*Cylindroiulus punctatus*). “A common European species”.

\**Blaniulus guttulatus*. “A common European species”.

*Typhloiulus* sp.? “Amongst rotten stumps, south of Herbaceous ground”.

*Trigoniulus* Goësi. “Distributed all over the world by human agency”.

[*Trigoniulus corallinus* (Eydoux & Soulyet)\*]

*Rhinocricus monilicornis*. ”Imported from Barbados in living plants. Known also from Demerara, Hayti and Bermuda”. [*Anadanobolus monilicornis* (Porat)\*]

*Rhinocricus Vincenti*. “Introduced in October 1900 amongst living plants from St. Vincent, West Indies. First record of this species from Britain” [*Anadenobolus vincentii* (Pocock)\*]

*Spirobolellus* sp. “In stoves. Probably imported from the Oriental Region”.

### Comments on the Kew Bulletin list:

The list of species comprises:

- a. Species that can be described as “native” to Britain comprising those marked with an asterisk for occurrence in Surrey (as in the *Victoria History* but excluding *Oxidus gracilis* which is known here from heated sites) together with *Geophilus electricus* and *Brachydesmus superus*.
- b. “Exotic” species best described a “non-native” or “alien” which have been introduced to Britain from elsewhere in the world and would seem unlikely to survive here long-term outdoors although there is only limited data on whether they were restricted to sheltered sites at Kew.
- c. It is also possible that some introduced species might be able to survive outdoors in this country and become permanent or semi-permanent members of our fauna.

The comments made regarding the exotic millipedes introduced give some insight of how they may have spread more than a hundred years ago when standards of biosecurity could have been different. There have been a number of reviews of myriapods found in greenhouses and similar places in recent years such as that of Stoev *et al.* (2010).

### General Comments

Individual notes or papers by Pocock have been reviewed and commented on rather than trying to produce an overall assessment. These publications reflect a diversity of aspects of myriapod biology and, hopefully, may give some idea of the climate of myriapod studies around the turn of the nineteenth/twentieth century and to be of interest to present day students of these animals. Pocock’s work gave some bases for later myriapodologists. The Irish paper of 1893, as noted, formed much of the starting point for studies in that country up until about 1920 but the Great War and Partition led to such work more or less ceasing until the latter part of the twentieth century when Martin Cawley, Roy Anderson and others led to their revival.

In Britain, after what we might call the “Pocock period” in myriapod studies, A. Randall Jackson, H.K. and S.G. Brade-Birks and Richard Bagnall made massive contributions to the study of our animals in the first half of the twentieth century and we are still looking at our myriapods today.

One might regret that Pocock had not published more on British and Irish myriapods and that, for instance, further *Victoria History* type lists or observations about specific topics like those on marine myriapods or luminescence had not appeared. But we must be aware of the wide range of his responsibilities (including Arachnida as well as Myriapoda) and interests (including mammals) and the role of the museum in an international context and appreciate his work as referred to here.

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Dr Helen Read (Burnham Beeches) for information and comment especially with regard to millipedes and millipede nomenclature and to Dr Lucio Bonato (Padova) for data derived from the latest version of the on-line database *Chilobase* in relation to numbers of centipede taxa described by Pocock.

## References

- Barber, A.D. (2022) *Atlas of the Centipedes of Britain and Ireland*. Telford, FSC Publications.
- Barber, A.D. & Keay, A.N. 1988) *Provisional atlas of the centipedes of the British Isles*. Huntingdon, Biological Records Centre, Natural Environment Research Council.
- Blower, J.G. (1958) *British Millipedes (Diplopoda)*. Linnean Society Synopses of the British Fauna **35**. London, Linnean Society.
- Blower, J.G. (1985) *Millipedes*. Linnean Society Synopses of the British Fauna (New Series) **11**. London, Leiden, Köln. København, E.J. Brill, W, Backhuys.
- Bonato, L. & Minelli, A. (2014) Chilopoda Geophilomorpha of Europe: a revised list of species, with taxonomic and nomenclatorial notes. *Zootaxa* **3770**: 1-136.
- Brade-Birks, S.G. (1922) Notes on Myriapoda XXVI The names of some Iulidae and Blaniulidae. *Annals & Magazine of Natural History* (Ser. 6) **9**: 160-163.
- Brade-Birks, H.K. & Brade-Birks, S.G. (1920) Notes on Myriapoda XX: Luminous Chilopoda with special reference to *Geophilus carpophagus* Leach. *Annals & Magazine of Natural History* (Ser. 9) **25**: 1-30.
- Chamberlin, R.V. (1921) The Iulidae and Isobatidae of North America. *Proceedings of the Biological Society of Washington* **34**: 81-84.
- Demange, J-M. (1981) *Les Mille-pattes Myriapoda*. Paris Éditions Boubée.
- D.W.T. (1889, presumably Darcy Wentworth Thompson) A marine millipede *Nature* **41**: 104
- Eason, E.H. (1964) *Centipedes of the British Isles*. London, Warne
- Eason, E.H. (1971) The type specimens and identity of the species described in the genus *Lithobius* by George Newport in 1844, 1845 and 1849 (Chilopoda, Lithobiomorpha). *Bulletin of the British Museum (Natural History) (Zoology)* **21**: 297-311.
- Eason, E.H. (1973) The type specimens and identity of the species described in the genus *Lithobius* by R. I. Pocock from 1890 to 1801 (Chilopoda, Lithobiomorpha). *Bulletin of the British Museum (Natural History) (Zoology)* **25**: 41-83.
- Harris, R.H. (1895) A luminous centipede. *Nature* **53**: 131.
- Hindle, E. 1948 Reginald Innes Pocock 1863-1947 *Biographical Memoirs of Fellows of the Royal Society*. **6 (17)**: 189-211.
- Hopkin, S.P. & Blower, J.G. (1987) Displaced ocelli in blaniulid millipedes. *Bulletin of the British Myriapod Group* **4**: 27-28.
- Kime, R.D. & Enghoff, H. (2017) *Atlas of European millipedes 2 Order Julida*. European Journal of Taxonomy **346**: 1-299. <https://dti.org?10.5852/ejt.2017.346>.
- Lee, P. (2006) *Atlas of the Millipedes (Diplopoda) of Britain and Ireland*. Sofia, Moscow, Pensoft.
- Lewis, J.G.E. (1981) *The Biology of Centipedes*. London, New York, New Rochelle, Melbourne, Cambridge University Press.
- MilliBase: Sierwald, P.; Decker, P.; Spelda, J. (2025). MilliBase. Accessed at <https://www.millibase.org> on 2025-05-22. doi:10.14284/370.
- Morey, F. (1909) *A Guide to the Natural History of the Isle of Wight*. Newport, County Press.

- Pocock, R.I. (1887) description of a new genus and species of Polyzooniidae. *Annals & Magazine of Natural History* (Ser. 5) **20**: 222-226.
- Pocock, R.I. (1889) A marine millipede. *Nature* **41**: 176-177.
- Pocock, R.I. (1891) The history of a long-forgotten British *Lithobius*. *Annals & Magazine of Natural History* (Ser. 6) **7**: 367-374.
- Pocock, R.I. (1893) Notes upon some Irish myriopods. *Irish Naturalist* **28**: 309-312.
- Pocock, R.I. (1895) Untitled (A luminous centipede). *Nature* **53**: 131.
- Pocock, R.I. (1896) A luminous centipede. *Nature* **53**: 223.
- Pocock, R.I. (1897) The species and sub-species of zebras. *Annals & Magazine of Natural History* (Ser.6) **20**: 33-51.
- Pocock, R.I. (1900a) Marine centipede in Somerset. *Zoologist* (4) **4**: 484-5.
- Pocock, R.I. (1900b) Two English millipedes, *Iulus londinensis* Leach and *Iulus teutonicus* (sp.n.). *Annals & Magazine of Natural History* (Ser. 7) **6**: 206-207.
- Pocock, R.I. (1900c) Myriapoda. *The Victoria History of the Counties of England, Hampshire and the Isle of Wight* **1**: 163-165. Westminster, Archibald Constable.
- Pocock, R.I. (1901a) Myriapoda. *The Victoria History of the County of Cumberland* **1**: 143-144. Westminster, Archibald Constable.
- Pocock, R.I. (1901b) Myriapoda. *The Victoria History of the Counties of England, Norfolk* **1**: 171-172. Westminster, Archibald Constable.
- Pocock, R.I. (1901c) Some questions of Myriapod nomenclature. *Annals & Magazine of Natural History* (Ser. 7) **8**: 329--331
- Pocock, R.I. (1902) Myriapoda. *The Victoria History of the Counties of England, Surrey* **1**: 176-178. Westminster, Archibald Constable.
- Pocock, R.I. (1903) Myriapoda. *The Victoria History of the County of Essex* **1**: 153-155. Westminster, Archibald Constable.
- Pocock, R.I. (1906a) Myriopoda in *The history of the collections contained in the Natural History Departments of the British Museum* 2. London, Trustees of the British Museum.
- Pocock, R.I. (1906b) Myriapoda. *The Victoria History of the County of Somerset* **1**: 121-134. Westminster, Archibald Constable.
- Pocock, R.I. (1906c) Myriapoda in *The Wild Fauna and Flora of the Royal Botanic Gardens Kew. Royal Botanic Gardens, Kew. Bulletin of Miscellaneous Information. Additional Series* **5**: 21-22.
- Pocock, R.I. (1948) Beavers and their work. *Zoo Life* **3**: 53.
- Sierwald, P. & Bond, J. (2007) Current Status of the Myriapod Class Diplopoda (millipedes). Taxonomic Diversity and Phylogeny. *Annual Review of Entomology* **52**(1): 407-420.
- Sinclair, F.E. (1904) Myriapoda in Marr, J.E. & Shipley, A.E. (eds.) *Handbook to the Natural History of Cambridgeshire*. Cambridge, University Press.
- Scherren, H. (1895) "*Linotaenia maritima*" (Leach). *Nature* **53**:152.
- Stoev, P., Zapparoli, M., Golovatch, S., Enghoff, H., Akkari, N., Barber, A. (2010) Myriapods (Myriapoda) *Biorisk* **4**(1): 97-130.
- Wait, W.O. (1893) *Rugby past and present with an historical account of neighbouring parishes*. Rugby, Albert Frost.
- Wood, H.C. (1864) Description of new species of North American Iulidae. *Proceeding of the Academy of Natural Sciences of Philadelphia* **1864**: 10-16.
- Worthington, E.B. (1938) Myriapoda in Salzman, L.F. (ed.) *The Victoria History of Cambridgeshire and the Isle of Ely* **1**: 87-88. London, Oxford University Press.

## International Congress of Myriapodology in Serbia: 20-26 July 2025

### Helen J. Read

The 20<sup>th</sup> International Congress of Myriapodology was held in July 2025 at Srebrno Jezero (Silver Lake) in Serbia. Silver Lake is an oxbow lake of the Danube that has been dammed off with a small but growing holiday resort on the west side. The Congress took over a hotel where most delegates were staying, with more in neighbouring hotels and hostels. Some 85 delegates from a wide range of countries including Australia, Chile, South Korea, USA, Thailand and right across Europe from Bulgaria, Italy, Greece to Scandinavia attended the congress. Several friends of BMIG were there including Thomas Wesener, Stylianos Simaiakis, Maïke De Voogd and Henrik Enghoff, all of whom have attended meetings over the years. Plus Hans Reip, Norman Lindner and Per Djursvoll who went collecting with BMIG in northern Spain.



The format followed that of previous congresses with two days of talks, a full day excursion and a further two days of talks. Themes for the talks included physiology, taxonomy and ecology of both millipedes and centipedes.

Organised by Dragan Antić, supported by his students and colleagues, the congress was notable for having a young feel with a good number of new researchers and students. Some myriapod research groups were well represented such as that of Bruce Snider from Georgia, USA and Daniella Martinez-Torres from Colombia who both brought numerous students with them. There were perhaps fewer older people than previous congresses.

As usual we all learnt something new and surprising about our animals. Ruttapon Srisonchai (Tol) who works on the very special dragon millipedes spoke about a new genus of these species (*Alternaxytes*) that exhibit heteropody. This is where legs on the diplosegments are alternating in length, long and short, something that is very obvious to see. Although it is not known why this might be advantageous reasons discussed included that it might be a method of avoiding the legs bumping into one another or to help the animals cling on to a surface and climb as they are found on limestone rock walls.

Another highlight was a short film shown by John Seifert of *Scutigera coleoptrata* mating. The male circled the female before forming a T shape, positioning at right angles to the female. The male then bobs up and down before depositing a spermatophore and then actively pushing the female over it.

*Scutigera coleoptrata* was the subject of another fascinating revelation. Andy Sombke introduced us to 'explosive' leg regeneration where entire legs can grow back within one moult and within 7 days if it has been lost at the right moment in the moulting cycle. Andy revealed that you can remove 12 legs from an individual and they can all grow back at the next moult!

An interesting new technique was outlined by Sydney Irons who used fluorescent powder as a method for marking millipedes. After establishing that there was no impact on animals in captivity and learning where on the millipedes the powder was retained (on the sterna in a Parajulid and under the paranota in a Polydesmid) a field study in mesocosms demonstrated that after two weeks sufficient of the powder remained on the animals for them to be distinguished from unmarked animals.

We were treated to several talks about South American millipedes where we were able to admire photographs of Glomerodesmida (slug millipedes), Cryptodesmida and the fast running and jumping Stemmiulida. With the finding of a Siphonophorida at the Eden Project in Cornwall perhaps some of these engaging millipedes might yet turn up in the UK!

Each topic or session was started off with a longer keynote talk before shorter talks by other delegates. Nesrine Akkari had the unenviable first slot at the congress with her key note talk and spoke about the importance of natural history collections in museums and the taxonomy carried out there. Nesrine highlighted that there are too many taxa and too little time and stressed that taxonomic revisions are the 'gold standard' of taxonomy - work that is not usually high profile and attention grabbing but essential to take forward our knowledge. She also introduced me to the FAIR principles of data management and sharing and pointed out that these should be applied to taxonomy. I.e. the data should be Findable, Accessible, Interoperable and Reuseable.

Of interest to those in Britain concerned with conservation was a talk by Peter Decker, President of CIM who has been working with a team on the Red List of Myriapods for Germany. Several methods were used in an attempt to identify rare and threatened species including expert knowledge (a meeting where each taxa was discussed), an analysis of those species found in red listed biotope types and a statistical analysis using linear regression to highlight trends for those species with sufficient data (including about 34,000 observations of centipedes and 61,000 for millipedes, which is all on [www.edaphobase.org](http://www.edaphobase.org)). As a result, 6% of centipedes are considered endangered and 12% of millipedes. Peter's interesting conclusions included the point that expert knowledge was essential and that the opinions of the experts were always proved correct by the data.

The 40 posters were exhibited in the main conference room so we could browse during coffee breaks at our leisure. Topics expanded considerably on those of the papers with examples of educational work in Budapest Museum by Eszter Lazányi and two on pauropods in Serbia (Dragan Antić and Klaus Hasenhuütl) and Austria. The best poster award was won by Jéhan Le Cadre with his remarkable work on millipedes preserved in amber which included the option of wearing 3D glasses to view illustrations.

At the end of the congress was the general assembly of the Centre International de Myriapodologie, the International organisation that co-ordinates the congresses. At the meeting a new logo (in Olympic colours) was launched along with new website [www.myriapodology.org](http://www.myriapodology.org) which is well worth a look and includes an online literature database for myriapoda. At the assembly there was also an update on MilliBase ([www.millibase.org](http://www.millibase.org)) which gives details of the taxonomy, distribution, type localities and literature for each species of millipede and Myriatrix ([www.mriatrix.myspecies.info](http://www.mriatrix.myspecies.info)). ChiloBase ([www.chilobase.biologia.unipad.it](http://www.chilobase.biologia.unipad.it)) is also being updated.

The congress was a great opportunity to reconnect with old friends and to meet new researchers in a friendly atmosphere. As well as the formal scientific sessions social opportunities included a welcome reception and a party on the last evening. The excursion was an opportunity to visit some of the amazing archaeological sites in eastern Serbia followed by a boat trip back along the Danube in the evening. As we were all staying close together the whole congress was very convivial and much easier than being in a big city; the warm weather was matched by the warm atmosphere! The added bonus was the opportunity to swim each day in Silver Lake after the formal part of each day was over and explore some Serbian ‘street food’ at lunch times.



**Peter Decker, President of CIM giving his address at the General assembly**



**Conference poster**



**Delegates on a boat on the Danube during the excursion**