

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

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### 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), *Pseudotiphloscia* 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* Schmalfuss & 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.

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