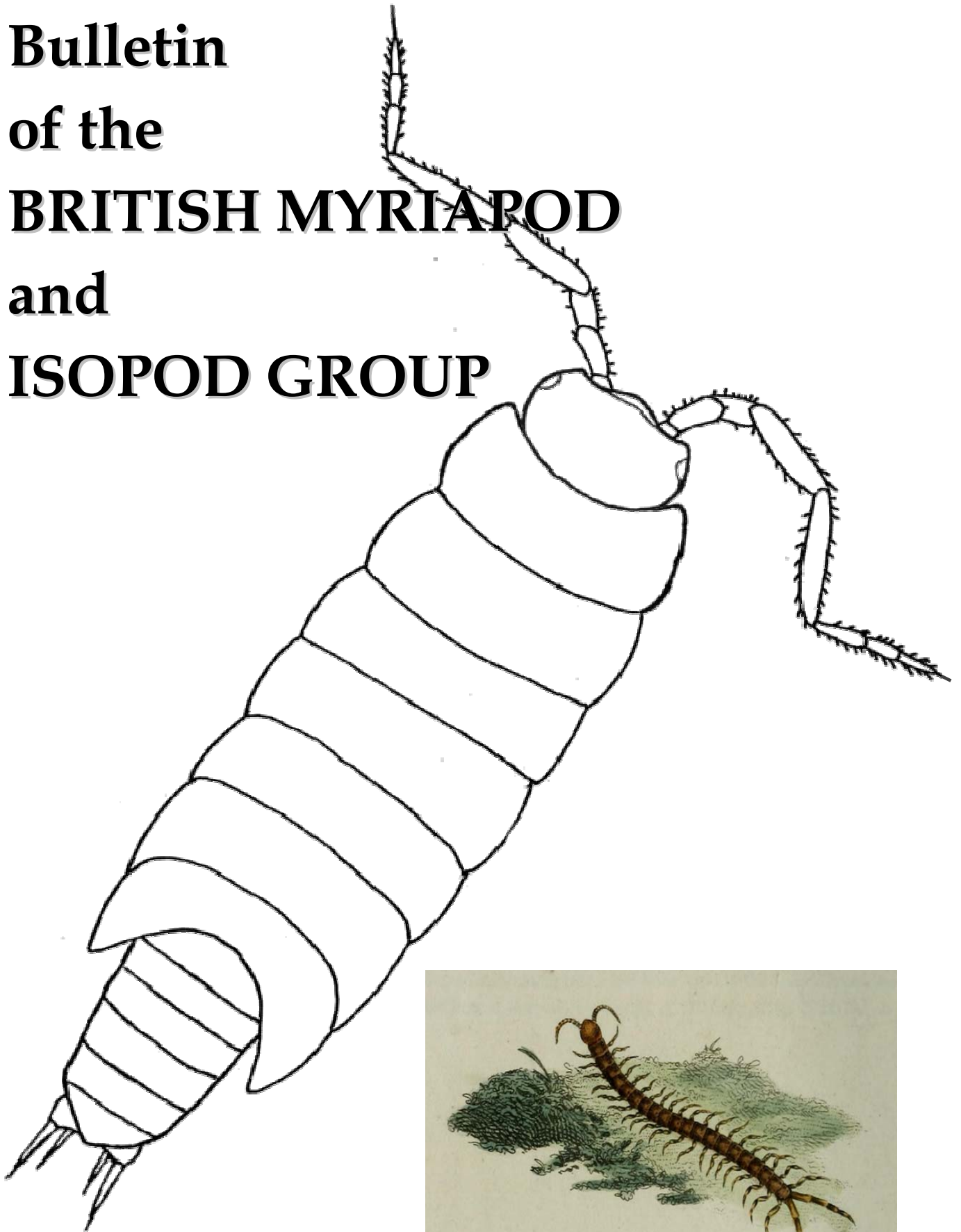


ISSN 1475 1739

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



Volume 27 (2014)

CONTENTS

Editorial	1
Woodlice (Isopoda: Oniscidea) from the Eden Project, Cornwall, with descriptions of species new to Britain and poorly known British species – Steve Gregory	3
Some observations on the ecology of <i>Leptoiulus belgicus</i> (Latzel) (Diplopoda, Julidae) – Keith N. A. Alexander & Paul Lee	27
On the status of <i>Cryptops savignyi</i> Leach, 1817, and <i>Cryptops anomalans</i> Newport, 1844, (Chilopoda: Scolopendromorpha: Cryptopidae) – John G. E. Lewis	30
Abnormal coxal pores in a specimen of <i>Strigamia crassipes</i> – Christian Owen & A. D. Barber	36
Abnormalities in a British population of <i>Haplophilus souletinus</i> (Brölemann, 1907) – Małgorzata Leśniewska & A.D.Barber	38
Three female gonopod spurs in a specimen of <i>Lithobius melanops</i> – Mark F. Robinson & A. D. Barber	41
Early records and names of centipedes – A. D. Barber	43
The Myriapod & terrestrial Isopod papers of A. Randell Jackson – A. D. Barber	53
Obituaries	
Eric Philp – by Paul Harding	55
J. Cloudsley-Thompson – Recollections by J. G. E. Lewis	57
D. T. Richardson – by Paul Lee	59
Richard L. Hoffman, Michael R. Warburg, Carol C. Prunescu and Chong-zhou Zhang	61
Miscellanea	
Geophilomorpha of Europe: some synonymies and name changes – A. D. Barber	62

Cover illustration: *Pseudotyphloscia alba*, Eden Project, a woodlouse new to Europe © Steve Gregory

Cover photograph: *Scolopendra hortensis* (now *Cryptops*) from Donovan's *British Insects* (1810) (detail)

Editors: H. J. Read, A. D. Barber & S. J. Gregory
c/o Helen J. Read, 2 Egypt Wood Cottages, Egypt Lane, Farnham Common, Bucks, SL2 3LE, UK.

© Published by the British Myriapod and Isopod Group 2014.

ISSN 1475 1739

EDITORIAL

The year 2014 represents fifty years since Ted Eason published his *Centipedes of the British Isles* (Eason, 1964). Produced by Warne, it was not one of their popular Wayside and Woodland series with its origin in Victorian times and which had been running since 1895 with illustrated covers, well written texts and rather variable illustrations. *Centipedes* had a drab un-illustrated green dust-jacket, a plain green binding, only one coloured and six black and white illustrations - and a rather high price of £3.3s (£3.15). Peter Marren in his *Observers Book of Wayside and Woodland* (Marren, 2003) commented that, “all the same, it matches the series layout and could have been a member of it”.

Whatever the reasons for it being published in the way it was, certainly copies were bought by libraries and by naturalists and it seemed to have received favourable reviews. What it did represent was the first ever book in English covering the species thought to occur in Britain & Ireland at the time and became a classic work. Its meticulous species descriptions and careful illustrations were more than good enough to be used (with Ted’s blessing and with appropriate editing and additions) in the *Linnean Society Synopsis* some 45 years later (Barber, 2009). Up to the time of *Centipedes*, British workers had been having to use Brölemann’s *Faune de France* (Brölemann, 1935) volume as their main reference alongside older published descriptions and the various papers by Brade-Birks, Gordon Blower and others relating to aspects of myriapod studies including nomenclature and occurrence in these islands.

Gordon Blower had also been interested in centipedes and millipedes around the same time and had produced various publications on them including the first edition of his millipede *Synopsis* (Blower, 1958) so there were now high quality identification guides to both groups. In the following years a variety of people looked at one or both groups, publishing various accounts and in 1970, Gordon, assisted by John Lewis (back from Africa) & Colin Fairhurst convened what was to be the first meeting of the then British Myriapod Group at Brendon in North Devon where the two myriapod recording schemes were initiated.

Woodlice had had a *Linn.Soc.* synopsis since 1953 (Edney, 1953). Although a major breakthrough for recording British woodlice, the keys proved difficult for beginners to use since many of the characters could not be seen in preserved specimens, or required dissection and slide preparation. The launch of the Woodlice Recording Scheme (in 1968) and the publication of Steve Sutton’s *Woodlice* (Sutton, 1972) spurred greater studies on these animals. The keys in *Woodlice*, based on characters that could be seen with naked eye or a hand lens, proved a success. The recording scheme ran parallel to the myriapod ones, in due course joint field meetings were being held and by the end of the century the British Isopod Study Group and the British Myriapod Group had joined together to become BMIG.

This Bulletin traces itself back to the first *Bulletin of the British Myriapod Group* in 1972 edited by Gordon Blower and to its one-time sister publication from Steve Hopkin, *Isopoda* (1987-1990). After a rather unsteady start, thanks to a more or less regular supply of papers from our contributors, we are published nearly every year and now include reports on both terrestrial and freshwater isopods and myriapods, covering a wide diversity of topics as reference to our current contents list will show. We have now reached Volume 27 and are looking to go “electronic” in the future starting maybe with Volume 28 and to continue publishing items relating to British & Irish myriapods, woodlice, water-slaters and the “honorary woodlouse” *Arcitalitrus dorrieni* and also of articles likely to be of interest to British and Irish workers in these fields – so long as we continue to receive contributions.

REFERENCES

- Barber, A.D. (2009) *Centipedes* Linnean Society Synopses Br. Fauna (N.S.) **58** Shrewsbury, Field Studies Council.
- Blower, J.G. (1958) *British millipedes*. Linnean Society Synopses Br. Fauna **11**. London, Linnean Society.
- Brölemann, H.W. (1930) *Eléments d'une Faune des Myriapodes de France: Chilopodes*. Toulouse: Imprimerie Toulousaine.
- Eason, E.H. (1964) *Centipedes of the British Isles*. London, Warne.
- Edney, E.B. (1953) The woodlice of Great Britain and Ireland – a concise systematic monograph. *Proc.Linn.Soc.Lond.* **164**:49-98. (reprinted in shortened form as *Woodlice*, Linnean Society Synopses Br. Fauna 9. London, Linnean Society.)
- Marren, P.(2003) *The Observer`s Book of Wayside and Woodland*. Leeds, Peregrine Books.
- Sutton, S. (1972) *Invertebrate Types, Woodlice*. London, Ginn & Company.

WOODLICE (ISOPODA: ONISCIDEA) FROM THE EDEN PROJECT, CORNWALL, WITH DESCRIPTIONS OF SPECIES NEW TO BRITAIN AND POORLY KNOWN BRITISH SPECIES

Steve Gregory

Earth Trust, Hill Farm, Abingdon, Oxfordshire, England, OX14 4QZ, UK.

E-mail: stevejgregory@btopenworld.com

ABSTRACT

The Eden Project, an extensive glasshouse complex covering 2.2 ha, has been stocked with thousands of introduced plant species and was opened in 2001. Woodlice samples collected from the Eden Project by various researchers between 2003 until 2010 have been identified and records collated. Fourteen species are recorded from the Rainforest Biome, four from the Mediterranean Biome and seven from the Outdoor Biome. Five species are recorded new to Britain: *Pseudotyphloscia alba* (Philosciidae), *Nagurus nanus* (Trachelipodidae) and *Gabunillo* n. sp. (Armadillidae) from the Rainforest Biome; and *Chaetophiloscia sicula* (Philosciidae) and *Lucasius pallidus* (Porcellionidae) from the Mediterranean Biome. Descriptions and figures based on specimens collected from the Eden Project are given for eleven species that are either new to Britain or have not been adequately described in the modern British literature.

INTRODUCTION

The woodlice (Isopoda: Oniscidea) of heated glasshouses have been relatively well studied in Britain, but much of the available information dates from the early to mid 20th Century (e.g. Edney, 1953). In later decades collecting from glasshouses, such as those of botanical gardens, has not been popular. Gregory (2009) reported twelve species of woodlice that can only survive in artificial climates in Britain, such as those maintained inside heated glasshouses.

In 2001 a new extensive glasshouse complex, the Eden Project, near the town of St Austell, Cornwall (SX 04-55-), was opened to the public. The site, constructed within a disused china-clay quarry, includes the world's largest 'greenhouse' (Smit, 2001) which comprises two artificial biomes which have been stocked with thousands of introduced plant species. The Rainforest Biome (formerly known as the Humid Tropical Biome) covers 1.5 ha (3.9 acres) and the Mediterranean Biome (formerly known as the Warm Temperate Biome) about 0.66 ha (1.6 acres). Invertebrate sampling within the Rainforest Biome was undertaken by the Entomology Department of the Natural History Museum, London, between 2003 and 2007. This resulted in the discovery of the armadillid woodlouse *Venezillo parvus* new to Britain (Gregory, 2009). In addition several millipedes new to Britain were collected (Read, 2008). However, other species, including a small pallid philosciid and a small trachelipodid remained unidentified. Surveys were also undertaken in the Mediterranean Biome by Tony Barber in 2005, which produced female specimens of an *Armadillidium* species and a *Chaetophiloscia* species, neither referable to known British species.

Further recording within the Eden project biomes was undertaken in April 2009 during the BMIG field meeting to Cornwall. Provisional results reported by Barber, Gregory & Lee (2010), only included millipedes collected from the outdoor gardens (the Outdoor Biome). No woodlice (or centipede) records were presented. However, Mark Telfer, who undertook extensive surveys within the Rainforest Biome on that date, found many species of woodlice that could not be readily identified using standard British identification keys (Hopkin, 1991 or Oliver & Meehan, 1993).

There remained many unanswered questions about the identity of the woodlice fauna occurring at the Eden Project. In April 2010 Mark Telfer, Darren Mann, and the author returned to the Eden Project to undertake two days of intensive field work within all three biomes: Rainforest Biome, Mediterranean Biome and Outdoor Biome (gardens). In addition, all available material collected from surveys undertaken between 2003 and 2010 (as described above) has been examined by the author. This report collates, and lists, records for all woodlice (Isopoda: Oniscidea) found at the Eden Project. Descriptions and figures are given, based on specimens collected from the Eden Project, of five species that are new to Britain. A further six species, that have not been adequately described in British literature (i.e. by Hopkin, 1991 or Oliver & Meechan, 1993), are also described.

WOODLICE RECORDED FROM THE EDEN PROJECT

To date 22 species of woodlice (Isopoda: Oniscidea) and one waterlouse (Isopoda: Asellota) have been recorded from the Eden Project Biomes. The species records are summarised in Tables 1, 2 & 3, which list the collector, year of collection and the number of specimens within the samples. Additional details of species records are given in the taxonomic listing presented below.

Outdoor biome

Despite the BMIG field trip to the Eden Project in 2009, no woodlice or waterlice records are reported by Barber, Gregory & Lee, (2010) from the Outdoor Biome (gardens). In 2010 a brief survey by the author recorded seven familiar British species from the gardens (Table 1).

TABLE 1: Woodlice and Waterlice recorded from the Outdoor Biome, Eden Project.
Collected by Steve Gregory (SG) in 2010. m = male, f = female

Family	Species Name	Status in UK	SG 2010
Asellidae	<i>Asellus aquaticus</i>	Native	mf
Trichoniscidae	<i>Androniscus dentiger</i>	Native	mf
Trichoniscidae	<i>Trichoniscus pusillus</i> agg.	Native	ff
Philosciidae	<i>Philoscia muscorum</i>	Native	mf
Oniscidae	<i>Oniscus asellus</i> ssp. <i>occidentalis</i>	Native	mf
Porcellionidae	<i>Porcellio scaber</i>	Native	mf
Armadillidiidae	<i>Armadillidium vulgare</i>	Native	mf

Mediterranean biome

Four species of woodlice have been identified from the Mediterranean Biome (Table 2). Despite the survey effort it is surprising (even disappointing) that more species were not found. However, this biome is rather dry and additional species, if present, may prove elusive. The most frequently encountered woodlouse in this biome was the ubiquitous *Porcellio scaber*. Surprisingly, considering the relatively favourable climate in this biome, no other known British species were found. However, two widespread 'Mediterranean' species have been discovered: *Chaetophiloscia sicula* (Philosciidae) and *Lucasius pallidus* (Porcellionidae). An as yet unidentified species of *Armadillidium* (Armadillidiidae) was also collected. *L. pallidus* was not discovered until 2010 and may have been overlooked during the 2005 survey. These three are new species records for Britain and Ireland.

TABLE 2: Woodlice recorded from the Mediterranean Biome, Eden Project, 2005 & 2010

Recorders: TB – Tony Barber; T-M-G -, Mark Telfer, Darren Mann & Steve Gregory.

m = male, f = female

Family	Species Name	Status in UK	TB 2005	T-M-G 2010
Philosciidae	<i>Chaetophiloscia sicula</i>	Non-native New to UK	1f	1m 5f
Porcellionidae	<i>Lucasius pallidus</i>	Non-native New to UK		1m 4f
Porcellionidae	<i>Porcellio scaber</i>	Native	4mf	40mf
Armadillidiidae	<i>Armadillidium</i> sp.	Non-native New to UK	5f	1m 4f

TABLE 3: Woodlice recorded from the Rainforest Biome, Eden Project, 2003 to 2010

Recorders: NHM – Natural History Museum, London; MT – Mark Telfer;

T-M-G -, Mark Telfer, Darren Mann & Steve Gregory. (HR) – collected Helen Read.

m = male, f = female, j - juvenile

Family	Species Name	Status in UK	NHM 2003	NHM 2004	NHM 2005	NHM 2007	MT 2009	T-M-G 2010
Styloniscidae	Styloniscidae sp.1	Non-native		1f				
Styloniscidae	Styloniscidae sp.2	Non-native					1f (HR)	
Trichoniscidae	<i>Haplophthalmus danicus</i>	Native					20mf	
Platyarthridae	<i>Trichorhina tomentosa</i>	Non-native		19f	~250f	8f	~50f	~100f
Philosciidae	Philosciidae sp.	Non-native	1f					
Philosciidae	<i>Pseudotyphloscia alba</i>	Non-native New to UK		1m	2m 2j			50mf
Porcellionidae	<i>Agabiformius lentus</i>	Non-native					3mf	
Porcellionidae	<i>Porcellio scaber</i>	Native						1f
Trachelipodidae	<i>Nagurus cristatus</i>	Non-native		1j	1j		3f	9f
Trachelipodidae	<i>Nagurus nanus</i>	Non-native New to GB		~50mf	1m			
Armadillidiidae	<i>Armadillidium nasatum</i>	Native	12mf	18mf				
Armadillidae	<i>Gabunillo</i> n. sp.	Non-native New to UK	5f	1f	11f	1f	13f	22f
Armadillidae	<i>Reductoniscus costulatus</i>	Non-native	1f		5f	12mf	4mf	54mf
Armadillidae	<i>Venezillo parvus</i>	Non-native New to UK		12mf	250mf	24mf	~20mf	30mf

Rainforest biome

Of the 14 species of woodlice collected from the Rainforest Biome only 11 can be reliably identified (Table 3). Two female styloniscids (collected in 2004 & 2009) and a single female philosciid (collected in 2003) cannot be identified and have only been allocated to family. Three species collected are familiar British woodlice able to thrive outdoors in our climate: *Haplophthalmus*

danicus, *Porcellio scaber* and *Armadillidium nasatum*. The remainder include several cosmopolitan inhabitants of heated glass-houses, such as *Trichorhina tomentosa* (Platyarthridae), *Nagurus cristatus* (Trachelipodidae) and *Reductoniscus costulatus* (Armadillidae). In 2010 *T. tomentosa* and *Venezillo parvus* (Armadillidae) were locally common throughout this biome, while other species were patchily distributed and were typically only encountered in small numbers. *Pseudotyphloscia alba* (Philosciidae), first collected in 2004, and *Gabunillo* n. sp. (Armadillidae), first collected in 2003, both represent new species records for Britain and Ireland.

DESCRIPTIONS OF NEW AND POORLY KNOWN BRITISH WOODLICE

Family PHILOSCIIDAE

Chaetophiloscia sicula Verhoeff, 1908

Chaetophiloscia massoncellensis Verhoeff, 1931

Material examined

A single female was collected from the Mediterranean Biome in 2005 by Tony Barber. It was not possible to confirm the species until 2010 when a male and five additional females were collected by Mark Telfer and the author.

Appearance

Figures 1a-c. This is a relatively slender species. The four gravid females ranged in size from 5.5 mm to 7.0 mm in length by 2.0 mm to 2.6 mm wide. The male specimen was 4.5 mm x 1.5mm. The cephalon, pereionites and pleon are pale brown, with a smooth dorsal surface. The pigmentation pattern of the epimera of the pereionites is distinct (see Noël, Séchet, Mouquet & Bécheau, 2014), allowing separation of females from its European congeners *C. elongata* and *C. cellaria*.

Cephalon with small median lobe and very feeble lateral lobes. Eyes are composed of numerous ommatidia and antennal flagellum is composed of three segments. Posterior margins of the anterior pereionites are rounded, without backward projections. Pleon much narrower than pereion, producing a strongly stepped body outline. Each pleonite bears a feeble, barely discernible, backward projecting 'tooth' at its lateral-posterior corner. Telson triangular, with straight edges. Uropods relatively long and slender.

Male sexual characters

Figures 1d-e. First pleopod with distinctive endopod, very broad at base and tapering towards the tip, which bears a distinctive notch. First exopod simple, triangular, with rounded corners. Second pleopod with its endopod narrow and parallel sided for two thirds of its length, before tapering to a fine point. Its exopod simple; an elongated triangle with a rounded posterior margin.

Distribution

This is the first British record for this species. The Eden Project specimens were found clinging to the damp underside of large embedded rocks in the 'Mediterranean Cyprus' area. Specimens of the porcellionid *Lucasius pallidus* were also present (pg.12).

Chaetophiloscia sicula is common in Mediterranean regions of southern France and Italy, including off-shore islands of Corsica and Sicily, central Greece and the Canary Islands (Vandel, 1962, Schmalfuss, 2003). It has been introduced into the USA, where an apparently isolated population has

been discovered in Baltimore, Maryland (Hornung & Szlavecz, 2003). Noël, Séchet, Mouquet & Bécheau (2014) report its occurrence in north-west France and suggest that *C. sicula* may be expanding its range into north-western Europe. In France, Vandel (1962) considered *C. sicula* to be frequently found with its more widespread congener *C. elongata*, which favours damp open habitats (and avoids woodlands).

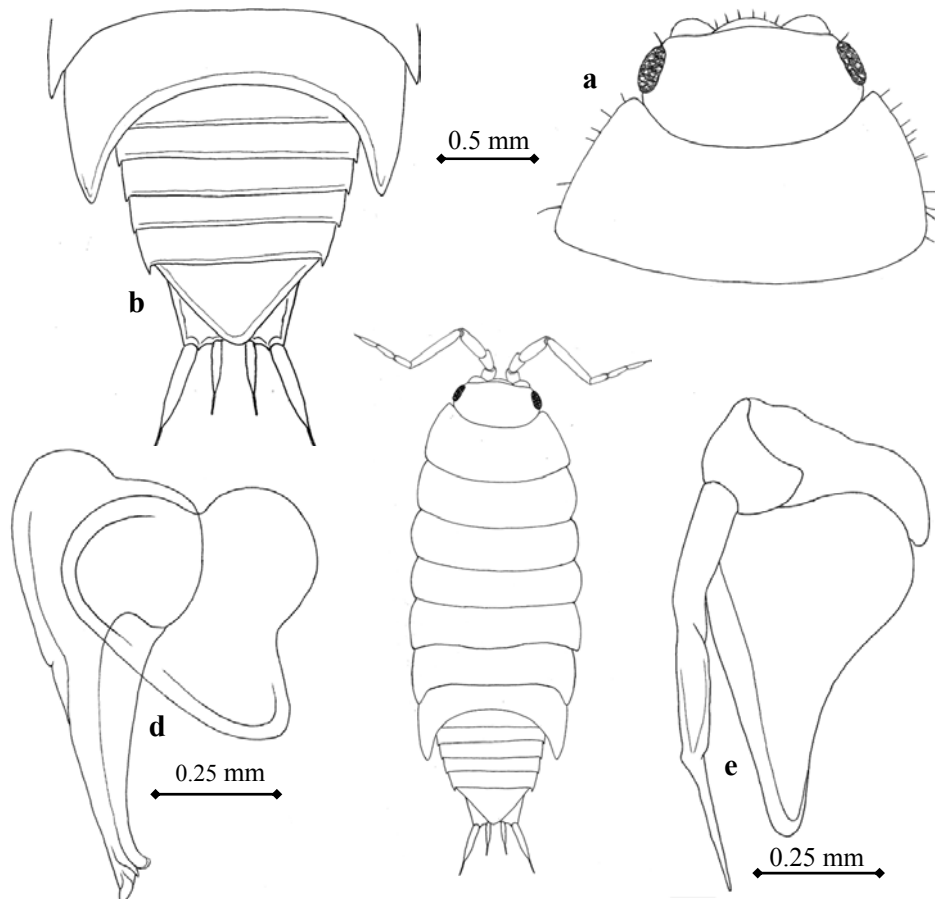


FIGURE 1: *Chaetophiloscia sicula* Verhoeff, male, from Mediterranean Biome
 a) head and first pereonite, dorsal view; b) seventh pereonite, pleon, telson and uropods, dorsal view; c) entire animal, dorsal view; d) first pleopod; e) second pleopod.

Family PHILOSCIIDAE

Pseudotyphloscia alba (Dollfus, 1898)

Material examined

Three male specimens (and two juveniles) were collected by Tullgren funnel extraction from litter samples in the Rainforest Biome by the Natural History Museum, London in 2004 and 2005. Intensive searching in 2010 collected an addition 50 specimens, including mature males, females and immatures.

Appearance

Figures 2a-d. This is a very slender species. Gravid females were typically between 3.5 and 4 mm in length, and up to 1.8 mm in width. Male specimens were relatively more slender, reaching about 3.75 mm in length by 1.25 mm in width. In life specimens are a translucent off-white colour, infused with a pale orange pigment, especially along the lateral margins. This pigment rapidly disappears upon preservation in alcohol. Cephalon, pereionites and pleon with a smooth dorsal surface.

Cephalon bears a small median lobe and very feeble lateral lobes. Eyes are reddish in colour and composed of between four or five ommatidia (some specimens had up to ten ommatidia – see *Other remarks* below). Antennae are strikingly long, about half total body length. In the male fifth article of peduncle is distinctly swollen, first article of flagella slightly longer than second or third. Entire antennae, most noticeably the flagella segments, are clothed with conspicuous setae and spines on all sides. Posterior margins of anterior pereionites are rounded, without backward projections. Pleon much narrower than pereion, producing a strongly stepped body outline. Each pleonite without a backward projecting ‘tooth’ at its lateral-posterior corner. Telson triangular, with straight edges. Uropods relatively long and slender.

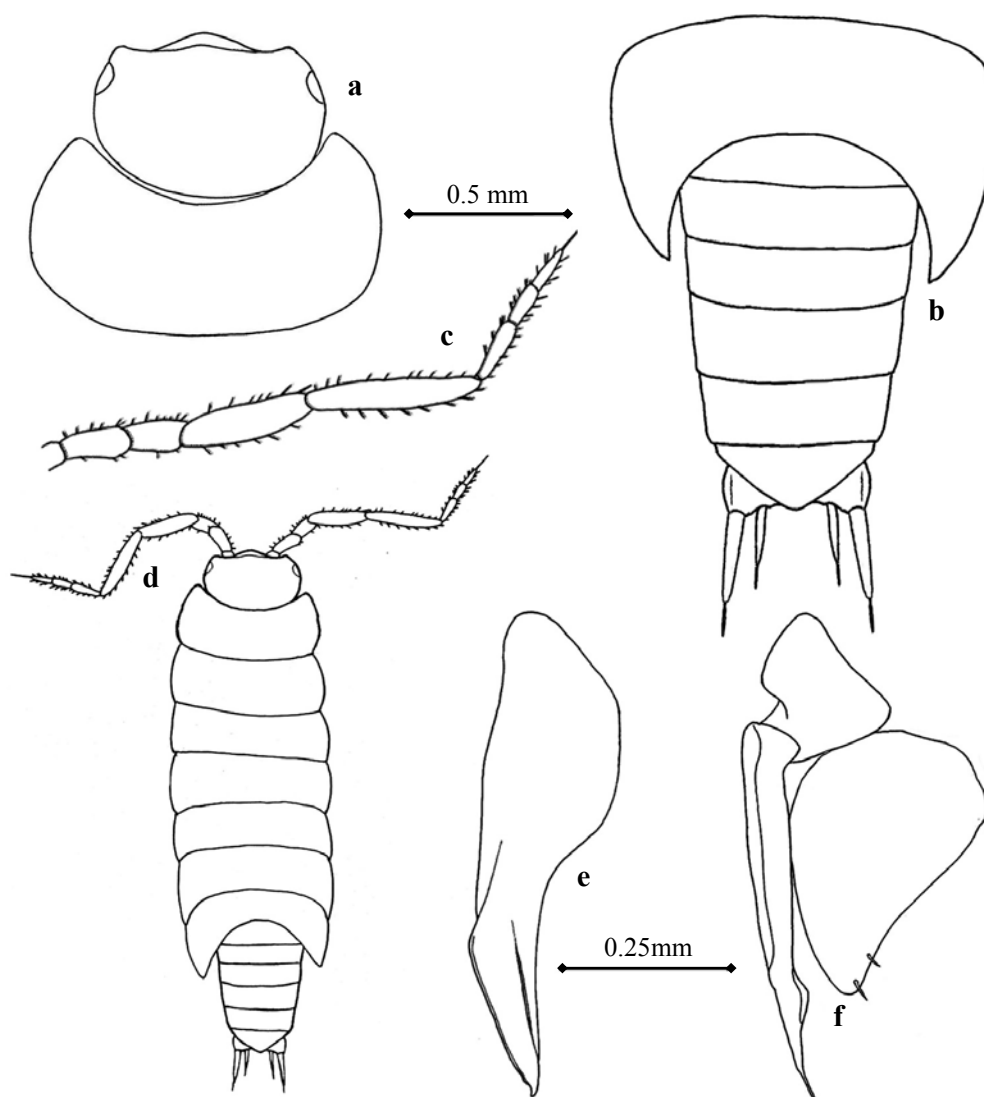


FIGURE 2: *Pseudotyphloscia alba* (Dollfus), male, from Rainforest Biome
 a) head and first pereonite, dorsal view; b) seventh pereonite, pleon and telson, dorsal view;
 c) antenna; d) entire animal, dorsal view; e) first endopod; f) second pleopod

Male sexual characters

Figures 2e-f. First pleopod with endopod with broad base tapering gradually to a pointed tip. There is distinct angular bend at about two-thirds along its length. Second pleopod with endopod narrow and parallel sided for two thirds of its length, before bulging slightly and then tapering to a fine point.

Distribution

This is the first British (and European) record for this species. The Eden Project specimens were found mainly in damp areas, such as under dead wood beside a small stream, and among accumulated leaf litter (where sieving proved productive). Specimens moved fast and were difficult to capture by hand.

Pseudotyphloscia alba has a wide Oriental distribution, being recorded from Southern China, Taiwan, Philippines and Indonesia (Schmalfuss, 2003).

Other Remarks

The genus *Pseudotyphloscia* was erected by Verhoeff (1928) to incorporate *P. pallida* (which has subsequently been synonymised by Green *et al* (1990) with *Philoscia alba*, Dollfus, 1898). This genus is close to *Burmoniscus* (Collinge, 1914) and differs only in the structure of the maxillular teeth. Currently, this is a monotypic genus.

Many specimens collected from the Eden Project conform to the 'typical' *P. pallida*, as described and figured by Verhoeff (1928) and Green *et al* (1990). However, some specimens have larger eyes comprising eight to ten ommatidia (instead of four to five), and there also appear to be subtle differences in the shape of the endopod of the first male pleopod. These 'large-eyed' specimens need to be carefully re-examined in case there is a second species present in the samples collected from Eden Project. This could be an un-described species or it may belong to "*Philoscia*" *pallida* (Dollfus, 1898) described from Java (S. Taiti, pers. comm.). Dollfus' (1898) description of this species is very brief and examination of the type-material may be required to clarify the situation.

Family PLATYARTHRIIDAE***Trichorhina tomentosa* (Budde-Lund, 1893)**

Alloniscus tomentosus Budde-Lund, 1893

Bathytropa thermophila Dollfus, 1896

Trichorhina monocellata Meinertz, 1934

Trichorhina thermophila (Dollfus, 1896)

Trichorhina vannamei Verhoeff, 1937

Material examined

Between 2004 and 2010 more than 400 specimens were collected in the Rainforest Biome.

Appearance

Figures 3a-d. This is a small woodlouse with a distinctive elongated oval outline. Gravid females collected from the Eden Project were between 3 to 3.5 mm in length by 1.5 mm to 2 mm wide. Those examined from elsewhere Britain reach 5mm (personal observation). It is off-white to pale buff in colour, with the entire body clothed in blunt tipped scale-spines giving a characteristic sheen to live and preserved specimens.

Lateral lobes of cephalon weakly developed, medial lobe very feeble. Eyes typically composed of a single black ommatidium, but some specimens with a single reddish ommatidium, sometimes apparently absent. Antennae rather stout, and entirely covered with setae. Flagellum comprising two distinct segments, first much shorter than second.

Posterior margins of anterior pereionites rounded, without backward projections. Posterior pereionites and pleon with well developed backward projections. The telson triangular, translucent, with rounded tip. Uropods are conical and terminated in conspicuous bristles.

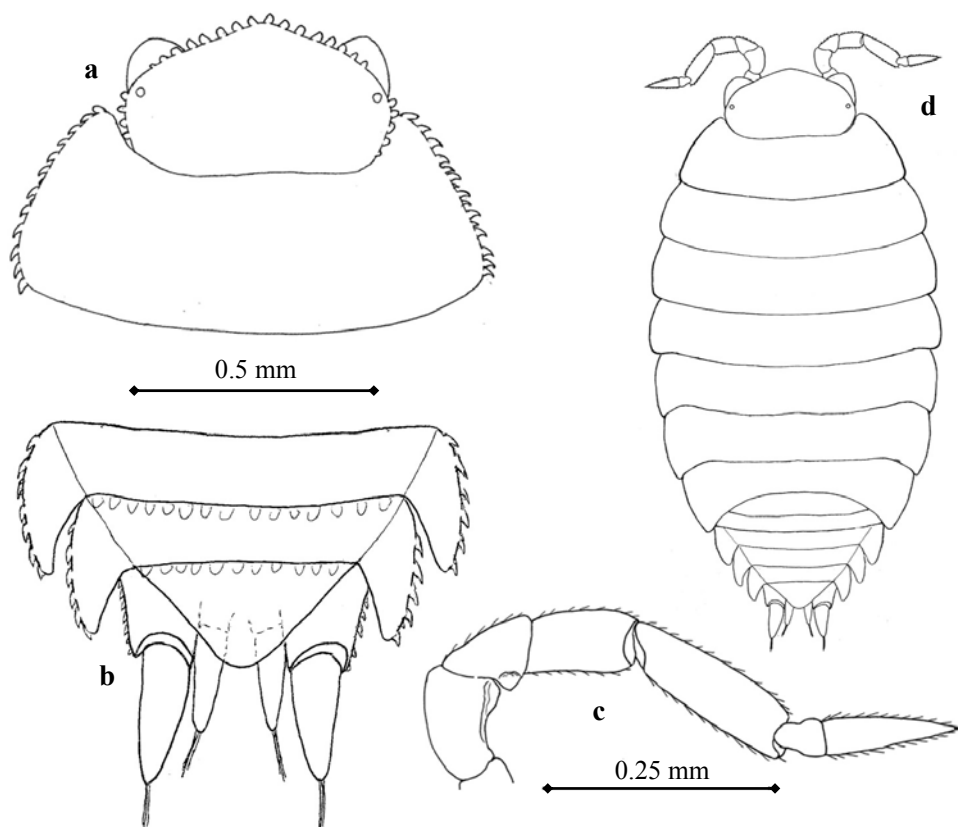


FIGURE 3: *Trichorhina tomentosa* (Budde-Lund), female, from Rainforest Biome

a) head and first pereonite, dorsal view; b) fourth & fifth pleonites, telson and uropods, dorsal view; c) antenna; d) entire animal, dorsal view.

Male sexual characters

This species reproduces parthenogenetically and males are unknown.

Distribution

Trichorhina tomentosa is probably the most frequently encountered woodlouse in the Rainforest Biome being readily collected from among damp litter, beneath dead wood, etc. In addition to the Eden Project, this species is widely distributed in heated glass-houses in Britain and Ireland. More recent records include Glasgow Botanic Gardens, Belfast Botanic Gardens, Oxford University Museum of Natural History (where it occurs in a heated Cockroach cage) and a heated reptile house in Somerset (Gregory, 2009).

In the wild it is known from tropical Central and South America, but has been introduced throughout the tropics (Schmalfuss, 2003) and into heated glasshouses across most of Europe (Cochard, Vilisics & Séchet, 2010). This species is sold commercially as ‘dwarf tropical woodlice’, primarily as food for pet spiders and amphibians.

Family PORCELLIONIDAE

Agabiformius lentus (Budde-Lund, 1885)

Numerous synonyms are listed in Schmalfuss (2003) within the genera *Angara*, *Leptotrichus*, *Lucasius*, *Lyprobius*, *Metoponorthus*, *Porcellio* and *Porcellionides*.

Material examined

A male and two females were collected in the Rainforest Biome by Mark Telfer in 2009.

Appearance

Figures 4a-c. The male specimen was 5.5 mm in length by 2.3 mm wide. Females were relatively broader, the largest being 5.25 mm long and 2.4 mm wide. Cephalon and pereionites have a yellowish background, with a broad brown stripe running the entire length of the pereion and thin lateral markings which become broader and more prominent on the posterior pereionites. Epimera are brown, separated from the main body by a thin pale line. Pleon darker brown, but telson and uropods much paler, providing a striking contrast.

Lateral lobes of cephalon well developed with rounded anterior margins. Medial lobe feebly developed, but looks larger since cephalon is extended forward between lateral lobes (Fig 4a). Eyes composed of many ommatidia and antennae relatively short, each with two flagellar segments. Cephalon, pereionites and pleon bear feeble tubercles. Posterior margins of anterior pereionites are rounded. Epimera lack backward projections and are poorly developed resulting in a rather arched body. Pereion/pleon outline is continuous. Posterior pleonites bear strongly curved backward projections. Telson triangular, with slightly concave lateral margins and broadly rounded tip. Uropods very short.

Male sexual characters

Figures 4d-e. First pleopod with endopod stout and tapering to rounded tip. First exopod of distinctive triangular shape, with posterior margin sharply truncated to leave a straight, but undulating, edge. Second pleopod with endopod narrow, curved along its entire length, with a constriction near the mid point and then tapered to a very fine point. The exopod triangular, bearing a few spines on the outer margin.

Distribution

First reported by Randell Jackson (1910) from a nursery at Chester, *A. lentus* was cited to be Britain’s most widespread heated glasshouse woodlouse (Sutton 1972). However, there appear to be no modern (post-1980) records until the 2009 records for the Eden Project.

This species originates from the eastern Mediterranean (Vandel 1962), 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 (Vandel, 1962).

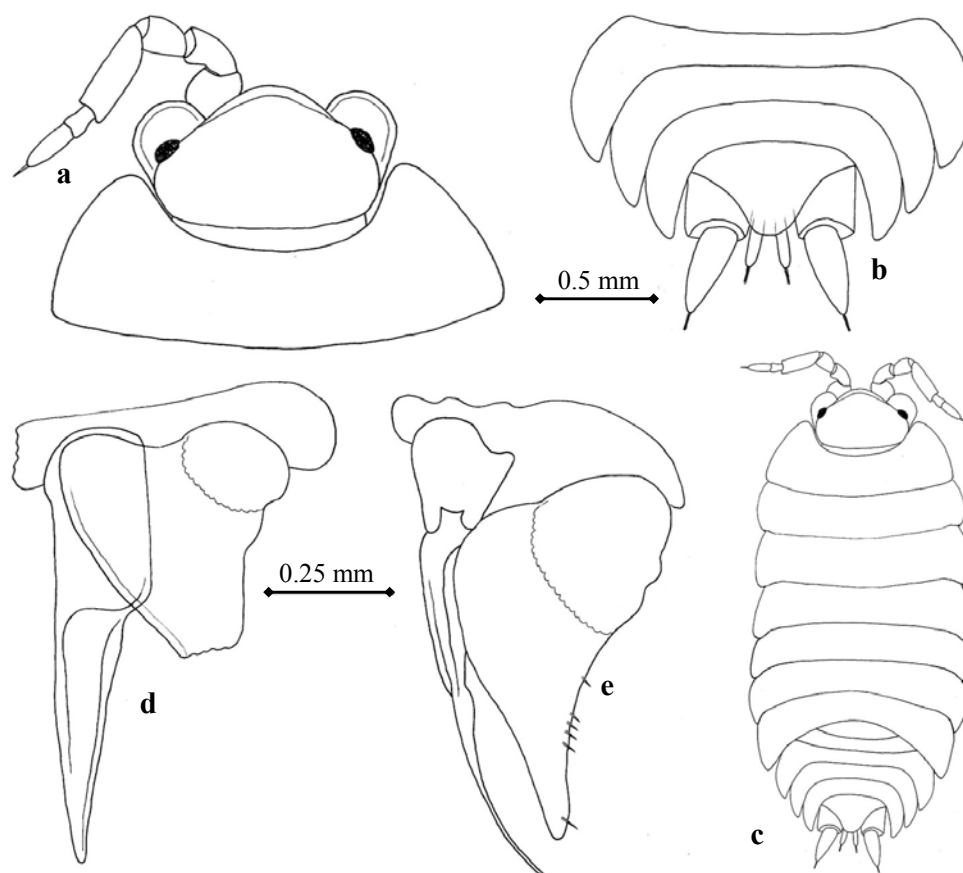


FIGURE 4: *Agabiformius lentus* (Budde-Lund), male, from Rainforest Biome
 a) head and first pereionite, dorsal view; b) pleon, telson and uropods, dorsal view;
 c) entire animal, dorsal view; d) first pleopod; e) second pleopod.

Other Remarks

This species is morphologically very variable, such as degree of body pigmentation, development of dorsal tubercles, form of head-lobes and form of exopodite of male first pleopod (Vandel, 1962). Consequently, it has been repeatedly re-described from various parts of the world using numerous specific names within a variety of genera.

Family PORCELLIONIDAE

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

Porcellio pallidus Budde-Lund, 1885

Lucasius occhialinii Arcangeli, 1924

Material examined

Two males, seven females and two juveniles were collected from the Mediterranean Biome in 2010 by Mark Telfer and the author.

Appearance

Figures 5a-c. Females vary in size from 5.25 mm long by 2.2 mm wide to 6.5 mm by 3.0 mm. The male specimen was 6.0 mm by 2.8 mm. Vandel (1962) gives up to 7 mm for specimens in France

and up to 8 mm in Spain. General appearance akin to a pale, poorly pigmented *Porcellio scaber*, but the body is relatively broader and shorter (as immature *Oniscus asellus*). It is light brown in colour, with noticeably pale antennae and pereopods. Each pereionite bears a pair of pale patches situated either side of a pale longitudinal central line.

Cephalon covered with prominent tubercles. Its lateral lobes well developed with rounded anterior margins and medial lobe triangular. Eyes composed of many ommatidia. Antennae with two flagella segments, first much shorter than the second. Anterior pereionites bear two rows of broad raised bumps, but these become less distinct on posterior ones and the pleon is more or less smooth. Epimera are slightly translucent, those of anterior pereionites with very prominent backward projections, but these become less developed towards the posterior. Pereion/pleon outline is continuous and each pleonite also bears prominent backward projections. Telson is approximately an equilateral triangular, with almost straight lateral margins, and an acute tip.

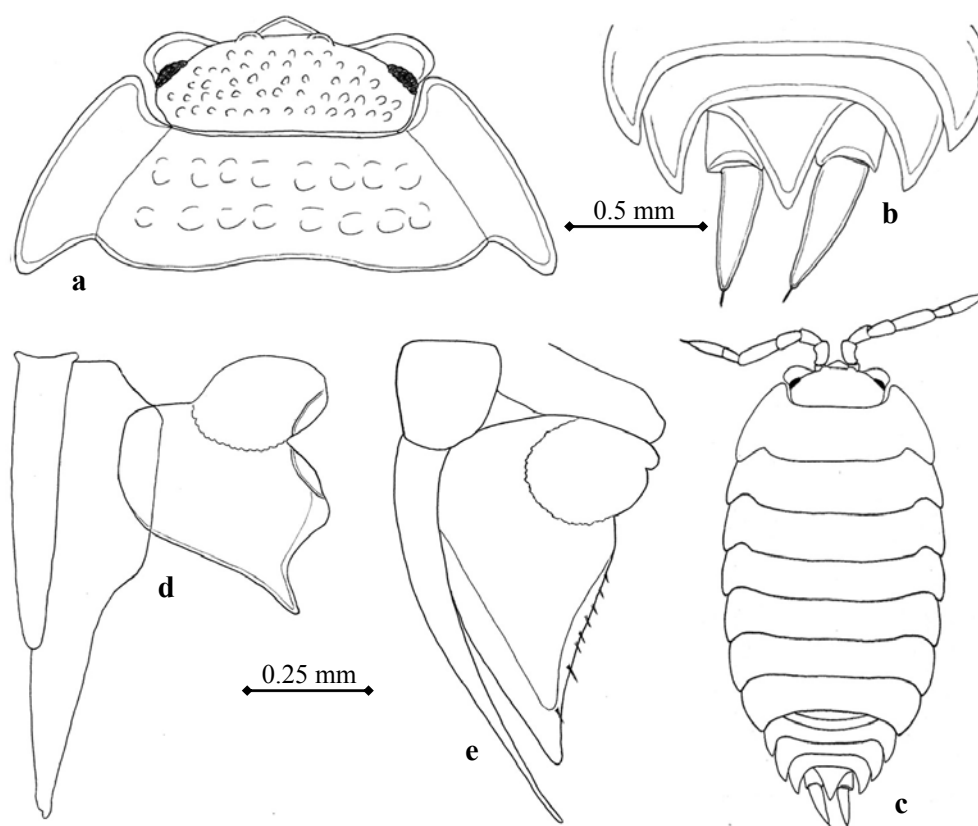


FIGURE 5: *Lucasius pallidus* (Budde-Lund), male, from Mediterranean Biome
 a) head and first pereionite, dorsal view; b) last pleonite, telson and uropods, dorsal view;
 c) entire animal, dorsal view; d) first pleopod; e) second pleopod.

Male sexual characters

Figures 5d-e. First pleopod with endopod stout and tapering to rounded tip, which bears a small bulge on its inner margin. First exopod very distinctive in shape, with posterior margin elongated into a narrowly triangular point and a prominent bulge on the anterior margin which bears the pseudotracheae. Second pleopod with endopod narrow, curved along its entire length, and tapered to fine point. Exopod triangular, bearing a few spines on the outer margin.

Distribution

This is the first record of this species in Britain. Eden Project specimens were found clinging to the underside of a large embedded stones in the 'Mediterranean Cyprus' area, in association with the philosciid *Chaetophiloscia sicula* (pg.6).

In southern France this species occurs at low altitudes, often in river valleys. Although typically found under stones in association with ants, such as *Lasius* sp., it is not strictly myrmecophilous (Vandel, 1962). It has been recorded from southern Spain, Portugal, Sardinia, Corsica and Tuscany (Vandel, 1946; Taiti & Ferrara, 1989; Taiti & Ferrara, 1996; Schmallfuss, 2003).

Family TRACHELIPODIDAE***Nagurus cristatus* (Dollfus, 1889)**

Porcellio cristatus Dollfus, 1889

Lyprobius cristatus (Dollfus, 1889)

Leptotrichus emarginatus Pearse, 1917

Nagurus incisus (Verhoeff, 1928)

Bifrontania femina Radu, 1960

Material examined

Single immature specimens were collected in the Rainforest Biome by the Natural History Museum, London, in 2004 and 2005. Adults were not found until 2009 (by Mark Telfer) and 2010 (by Darren Mann), when seven females and five juveniles were hand sorted and sieved from deep accumulations of leaf litter.

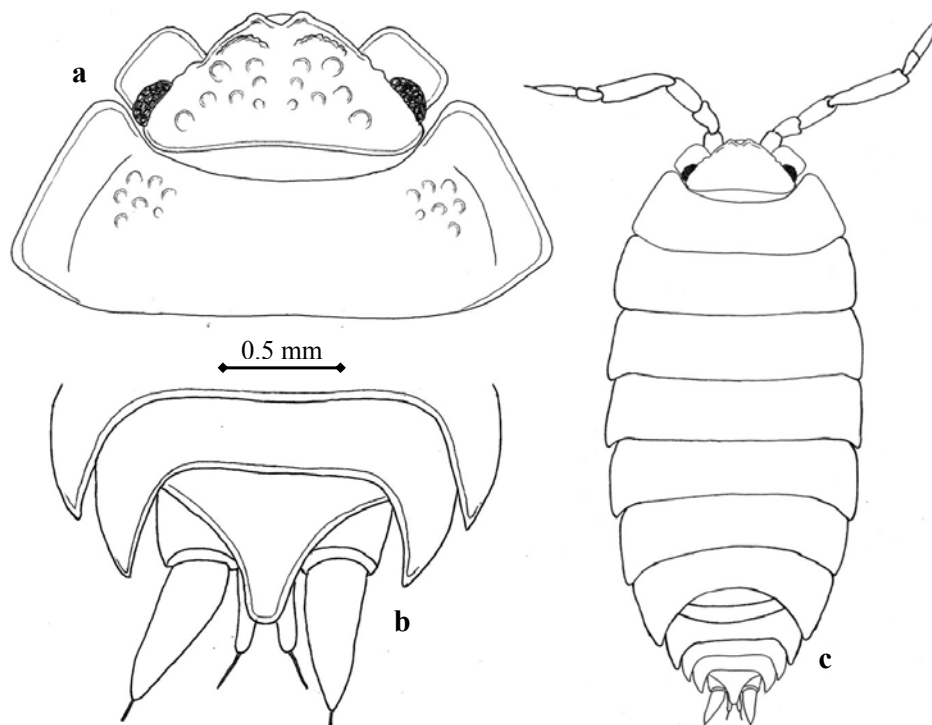


FIGURE 6: *Nagurus cristatus* (Dollfus), female, collected from Rainforest Biome
 a) head and first pereonite, dorsal view; b) last pleonite, telson and uropods, dorsal view;
 c) entire animal, dorsal view.

Appearance

Figures 6a-c. The general appearance is akin to a small, slender *Porcellio scaber*. Gravid females varied in size from 4.5mm long by 1.7 mm wide to 5.5 mm by 2.0 mm. The body has a yellowish background with four irregular brownish longitudinal stripes, of variable width, running the length of the pereion. Cephalon and pleon are darker brown, but the basal two antennal segments and uropods (except the tips) are contrastingly pale.

Cephalon bears broad raised bumps, which are more noticeable towards the lateral margins. Lateral lobes well developed and distinctly rectangular in shape. Medial lobe poorly developed and bears a prominent central cleft (distinct even in small immatures). Laterally the medial lobe extends backwards along the front of the cephalon in the form of a low ridge. Eyes are composed of many ommatidia and antennae have two flagella segments. Pereion and pleon are rather smooth, bearing a few weakly developed tubercles. Posterior margins of anterior pereionites are rounded and their epimera lack backward projections, giving a characteristic rectangular shape to the epimera of the first pereionite. Pereion/pleon outline is continuous and posterior pleonites bear prominent backward projections. Telson triangular, with concave lateral margins and rounded tip.

Male sexual characters

This species reproduces parthenogenetically and males are unknown.

Distribution

In Britain *N. cristatus* has been recorded from Northumberland in 1965 (Gregory, 2009). Until its re-discovery at the Eden Project there had been no additional British records. Elsewhere in Europe it is known from The Netherlands, Germany and Romania (Cochar, Vilisics & Séchet, 2010).

It has a pan-tropical distribution, having been widely dispersed by human activity. In temperate regions it occurs as a synanthrope inside glasshouses (Schmalfuss, 2003).

Family TRACHELIPODIDAE

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

Nagurus formosanus Verhoeff, 1928

Material examined

About 50 specimens, including males, were extracted from a litter sample in the Rainforest Biome by the Natural History Museum, London, in 2004. In 2005 a single male was collected. Subsequently, no further specimens have been collected.

Appearance

Figures 7a-c. This is a small, rather ovoid, species, with gravid females between 4.5 mm long by 2.3 mm wide to 5.0 mm by 3.0 mm. Males vary between 4.0 mm long by 2.0 mm wide to 4.5 mm by 2.2 mm. The body is dark brown with two patches of pale yellow mottling situated either side of a broad dark brown central stripe. There is a pale longitudinal line separating the epimera from the main body (rather akin to that seen in *Trachelipus rathkii*).

Cephalon covered in low tubercles (Fig. 7a), but these are indistinct on the pereion and pleon. Lateral lobes well developed, almost semi-circular in shape, and medial lobe rounded. Eyes

composed of many ommatidia and antennae have two flagella segments. Posterior margin of first pereonite straight and its epimera lack backward projections. Pereion/pleon outline continuous and posterior pleonites bear prominent backward projections (Fig. 7c). Telson triangular, longer than broad (Fig. 7b), with deeply concave lateral margins and rounded tip.

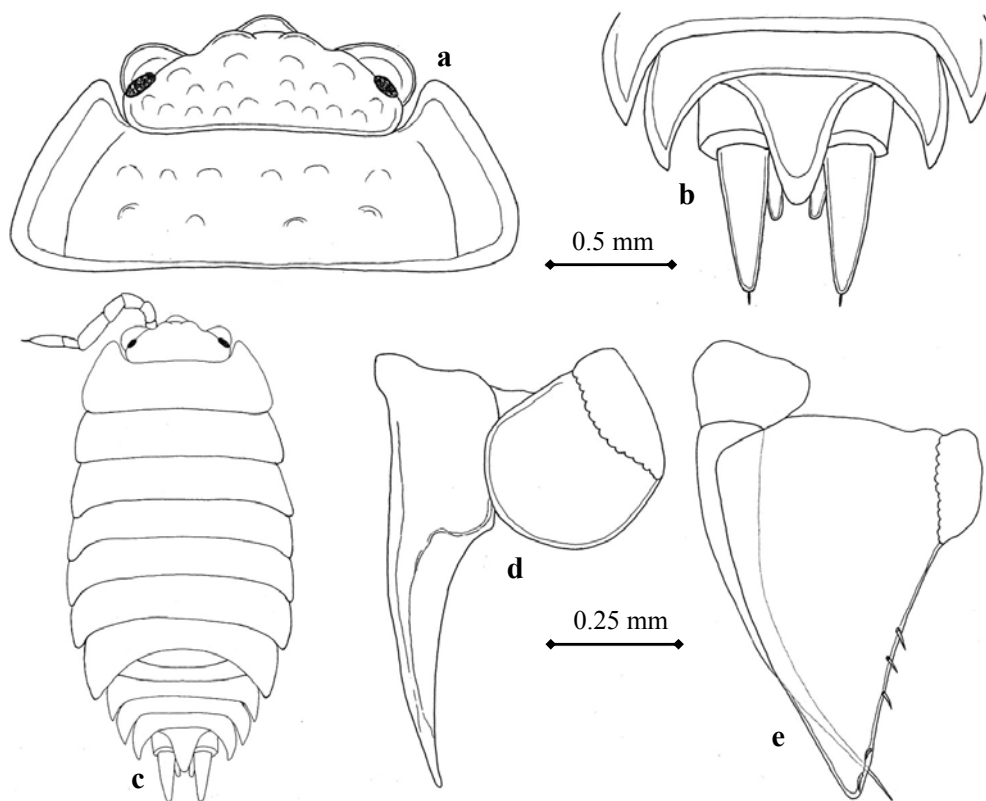


FIGURE 7: *Nagurus nanus* (Budde-Lund), male, from Rainforest Biome
 a) head and first pereonite, dorsal view; b) last pleonite, telson and uropods, dorsal view;
 c) entire animal, dorsal view; d) first pleopod; e) second pleopod.

Distribution

This is the first record for this species in Britain. Previously, a single specimen was collected from a heated glasshouse in Belfast Botanic Gardens (Ireland) in 1911 (Sutton, 1972), but there have been no subsequent records. In fact, no additional European records are given in Cochard, Vilisics & Séche, (2010).

Elsewhere, *N. nanus* has a pan-tropical distribution, where it has been widely introduced, and often inhabits synanthropic habitats (Schmalfuss, 2003).

Family ARMADILLIDIIDAE

***Armadillidium* Brandt in Brandt & Ratzeburg, 1831 sp.**

Material examined

Five female specimens were collected from the Mediterranean Biome in 2005 by Tony Barber. In 2010 a male specimen (collected Jo Clark) was found clinging to the underside of a large embedded

rock and four additional females (collected Darren Mann and Mark Telfer) were sieved from litter and debris nearby.

Although quite distinct from known British species of *Armadillidium*, it has not proved possible to satisfactorily name the species and it is cited here as *Armadillidium* sp. See 'Remarks' below.

General appearance

Figures 8a-b. Females are between 5.5 mm and 8.0 mm long by 2.0 to 3.0 mm wide, and up to 4.5 mm in diameter when enrolled. The male specimen is 6.5 mm in length by 2.6 mm wide. The general appearance is of a pale speckled *A. vulgare*. The background colour is uniform brown with cream-yellow mottling developed to a greater or lesser extent (the depth of colour varies from specimen to specimen). The epimera are slightly translucent.

In frontal view the head lobes are similar in shape to *A. vulgare*. Scutellum broad and rises slightly above the outline of the cephalon. Antennae bear two flagellar segments. Eyes are composed of numerous ommatidia. Dorsal surface of the pereionites and pleonites are smooth. Telson triangular with rounded tip.

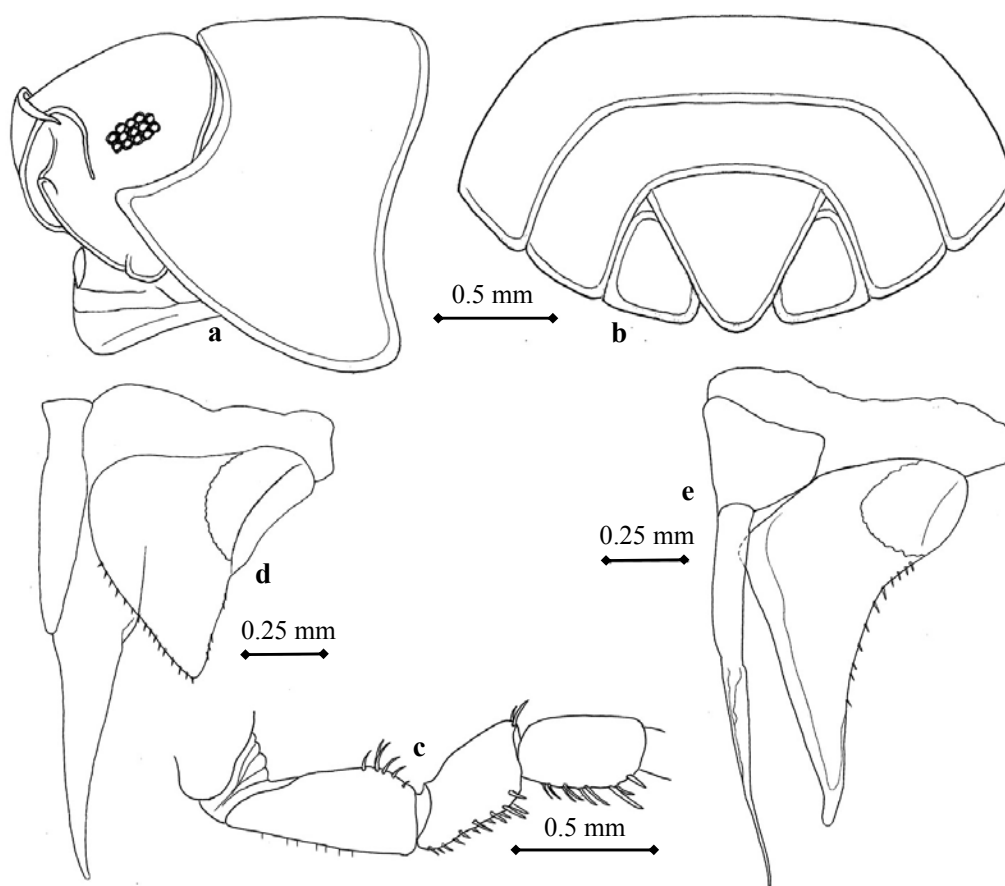


FIGURE 8: *Armadillidium* sp., male, from Mediterranean Biome

- a) head and first pereionite, lateral view; b) last two pleonites, telson and uropods, rear view;
 c) ischium, merus and carpus of seventh pereopod, posterior view;
 d) first pleopod; e) second pleopod.

Male sexual characters

Figures 8c-e. Seventh pereopod with ischium bearing row of stout spines on dorsal crest and with minute spines on ventral surface. Merus and carpus with stout spines ventrally. First pleopod with endopod straight and tapering to a slightly curved rounded point. Exopod triangular, bearing prominent spines around inner and outer margins. Second pleopod with endopod narrow, tapered to a fine point. Exopod narrowly triangular, with spatulate tip. Inner margin straight and outer margin concave, bearing spines.

Distribution

This is the first record of this species in Britain.

The distribution of species within the genus *Armadillidium* is centred on the Mediterranean region of Europe (Schmidt & Leistikow, 2004).

Remarks

Although provisionally named as *Armadillidium assimile* Budde-Lund, 1885 (Gregory, 2010), it differs from *A. assimile* in being much smaller in length (5.5-8 mm vs 10-14 mm) and in the shape of the exopod of the first pleopod (e.g. as figured in Taiti & Ferrara (1980) pg. 291) (S. Taiti, pers. comm.). Due to the high number of described species (about 180 listed in Schmalfuss (2003)) and the unknown origin of this introduction, it has not proved possible to satisfactorily name the species.

Family ARMADILLIDAE***Gabunillo* Schmalfuss & Ferrara, 1983 n. sp.***Material examined*

Specimens were first collected in the Rainforest Biome in 2003 by the Natural History Museum, London, using Tullgren Funnel extraction of leaf-litter. Small numbers were collected each year until 2007. In 2009 and 2010, Mark Telfer collected an additional 35 specimens by intensive hand sorting and sieving of deep accumulations of leaf litter and peaty soil.

Appearance

Figures 9a-d. A very small species capable of conglobating into a perfect sphere. Specimens reach up to 2.5 mm in length by 1.2 mm wide (about 1.3 mm diameter enrolled). The body lacks pigment, being an off-white colour in life, except for a single reddish ommatidium on each side of the cephalon. The entire body surface, including the short stout antennae, is covered in blunt-tipped scale-spines.

First pereonite bears a distinctive grooved margin along its ventral edge (giving the appearance of a double edge) which facilitates conglobation. Epimera are steep (almost vertical). Telson more or less triangular, translucent, with slightly concave sides and rounded tip. The adjacent uropod protopodite are roughly rectangular bearing a very small sub-terminal exopodite.

Male sexual characters

All specimens collected to date (53 in total) have been female and/or immature.

Distribution

This material represents a new species of *Gabunillo* (S. Taiti, pers. comm.) and consequently unknown in the wild.

The two other species described within the genus occur on opposite sides of the Atlantic Ocean: *G. coecus* Schmalzfuss & Ferrara, 1983 from caves in Gabon, West Africa and *G. aridicola* Souza, Senna & Kury, 2010 from karst formations in Brazil (Souza, Senna & Kury, 2010).

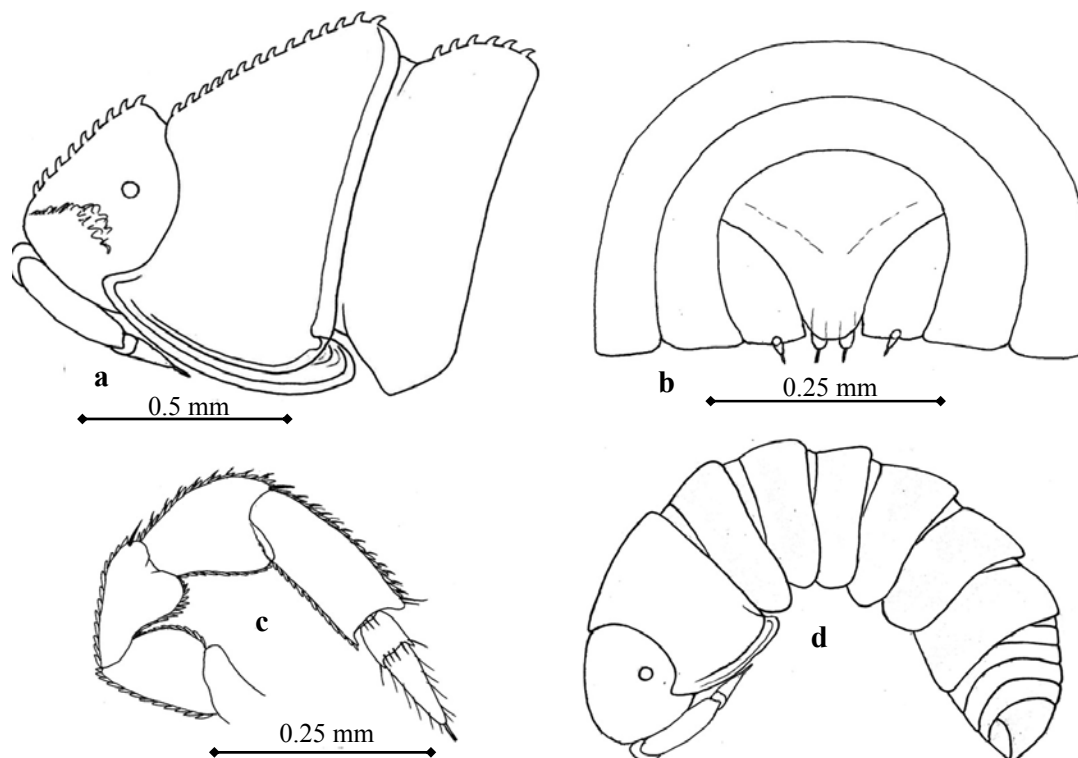


FIGURE 9: *Gabunillo* n. sp., female, from Rainforest Biome

a) head, first and second pereonite, lateral view; b) telson, uropods and last two pleonites, rear view; c) antenna; d) entire animal, legs omitted, lateral view.

Remarks

The genus *Gabunillo* Schmalzfuss & Ferrara, 1983, was erected to incorporate *Gabunillo coecus*. The genus is akin to *Synarmadillo* Dollfus, 1892, from which it differs in a number of features (Schmalzfuss & Ferrara, 1983).

The specimens collected from the Eden project are close to *G. coecus*, but differ principally by having a single reddish ommatidium on each side of the head (absent in *G. coecus*) and by the shape of the lobes of the schisma on the first pereonite (S. Taiti, pers. comm.). The second described species, *G. aridicola* differs from the Eden specimens principally in being much larger in size (to 6 mm), having better developed body pigmentation and having eyes composed of a cluster of well pigmented ommatidia. Thus, material collected from Eden Project appears to be a new species and it is hoped that a formal description will be published in due course.

All specimens collected have been female, and it may be that this is a genuinely parthenogenetic species. Although parthenogenesis is rare in woodlice, it is well known in species such as *Trichorhina tomentosa* and *Nagurus cristatus*, which are both recorded from the Eden Project.

Family ARMADILLIDAE

Reductoniscus costulatus Kesselyák, 1930

Reductoniscus fritschii Verhoeff, 1937

Material examined

This species was first collected in 2003 by the Natural History Museum, London, when a single female was collected by Tullgren Funnel extraction of leaf-litter in the Rainforest Biome. In 2009 and 2010 intensive searching resulted in the collection of numerous specimens throughout the Rainforest Biome.

Appearance

Figures 10a-c. This very small species is able to conglobate when disturbed. Females reach 2.5 mm in length, about 1.5mm in diameter when enrolled. Males are smaller. Smaller specimens are off-white in colour, but becoming progressively darker brown as they become larger.

Cephalon and pereionites covered in large prominent tubercles of characteristic shape. Epimera steep and telson of distinctive ‘hour-glass’ shape with broad ‘rectangular’ tip. Eye composed of cluster of well pigmented ommatidia.

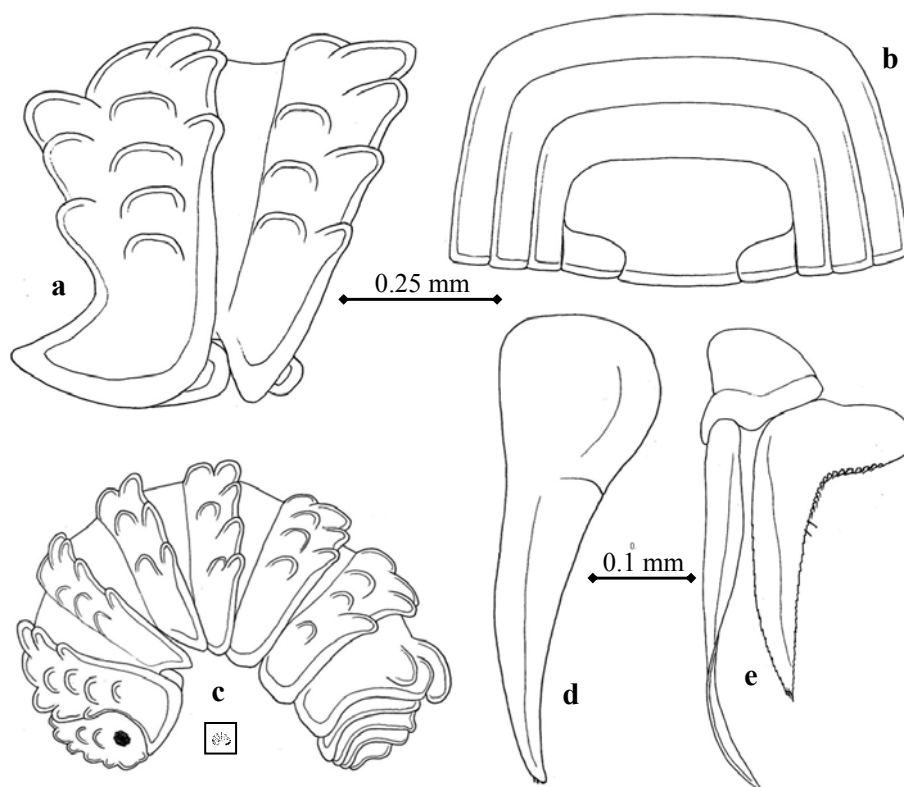


FIGURE 10: *Reductoniscus costulatus* Kesselyák, male, from Rainforest Biome
 a) first and second pereionite, lateral view; b) telson, uropods and last three pleonites, rear view;
 c) entire animal, lateral view (inset life-size); d) first endopod; e) second pleopod.

Male sexual characters

Figures 10d-e. First pleopod with endopod straight, with a broad base tapering to a rounded tip. Second pleopod with endopod narrow, strap-like, tapering gently along its length. Exopod narrowly triangular with dentate edges. These teeth most strongly developed along the deeply concave outer margin, each bearing a bent spine.

Distribution and habitat

This species was first recorded in Britain from Kew Gardens by Holthuis (1947) and it has been rediscovered there in recent years (Gregory, 2009). At Eden Project, intensive hand searching and sieving of leaf-litter in 2009 and 2010 has shown this small and elusive species to be widespread, and locally numerous, throughout the Rainforest Biome; its second British locality.

It has a broad Indo-Pacific distribution, being known outdoors in Seychelles, Mauritius, Malaysia and Hawaiian Islands (Schmalfuss, 2003). It is also well known, as an introduction, inside heated glasshouses across western Europe (Cochard, Vilisics & Séchet, 2010).

Additional Remarks

The genus *Reductoniscus*, as currently defined, includes three species (Ferrara & Taiti, 1990). *R. costulatus* is distinguished by its much smaller size, and characteristically shaped tubercles. The pan tropical genera *Myrmecodillo* and *Pseudodiploexochus* include species of superficially similar appearance and size and it is possible that these may be found at the Eden Project (or other sites in the UK).

Family ARMADILLIDAE***Venezillo parvus* (Budde-Lund, 1885)**

Armadillo parvus Budde-Lund, 1885

Sphaerillo parvus (Budde-Lund, 1885)

Venezillo evergladensis Schultz, 1963

Material examined

This is one of the most abundant species in the Rainforest Biome and several hundred individuals of all age classes have been collected most years since it was first discovered in 2004.

Appearance

Figures 11a-d. This species is able to conglobate. Males are between 4.0-5.0 mm in length; 2.5-3.0 mm in diameter when enrolled. Females reach 6 mm in length and up to 3.5 mm in diameter. The dorsal surface of the body is smooth.

The background colour is dark brown, with a characteristic pattern of pale yellow on each pereionite, comprising a pale central wedge and a pair of large pale patches with irregular margins (each with a dark centre) on either side. In most specimens a diffuse orange band, of varying intensity, occurs along the posterior margin of each pereionite. The pattern is less clear in juveniles, which are less strongly pigmented.

Cephalon with frontal margin forming a low ridge between the eyes. Eyes composed of cluster of numerous ommatidia. Antennal flagella bearing two segments. First pereionite bears a distinctive

double flange along its ventral edge, which facilitates conglobation. Telson has a distinctive ‘hour-glass’ shape, with a broad ‘rectangular’ tip. Adjacent uropod protopodites are roughly rectangular and bear small exopodite on their inner margin.

Male sexual characters

Figures 11e-f. First pleopod with endopod straight, with a broad base tapering to a rounded tip. Exopod tiny, about twice as wide as deep, with at least the outer half occupied by the pseudotracheae. Second pleopod with endopod narrow, parallel sided for much of its length, before curving strongly outwards to a rounded tip. Exopod very narrowly triangular due to deeply concave outer margin, with pseudotracheae occupying much of the anterior portion.

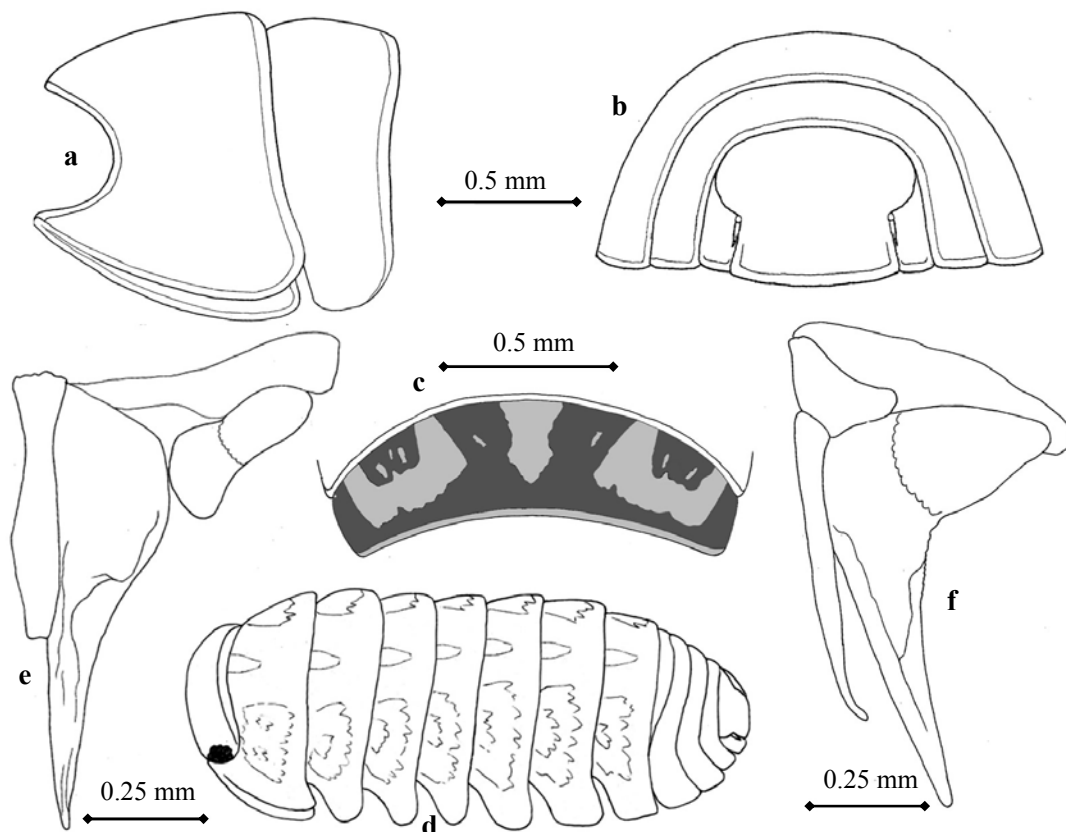


FIGURE 11: *Venezillo parvus* (Budde-Lund), male, from Rainforest Biome

- a) first and second pereonite, lateral view; b) telson, uropods and last two pleonites, rear view;
 c) first pereonite indicating typical pigmentation pattern, dorsal view;
 d) entire animal, dorso-lateral view; e) first pleopod; f) second pleopod.

Distribution

This species is first reported in Britain by Gregory (2009), based on specimens collected from Eden Project in 2005. Subsequently, it has proved to be one of the most abundant species in the Rainforest Biome.

It has a pan-tropical distribution, being widespread across tropical and sub-tropical regions of America and Africa (Schmalfuss, 2003). Within Europe, it has been introduced into heated glasshouses in the Netherlands (Soesbergen, 2003).

DISCUSSION

Six species of woodlouse (Oniscidea) and the waterlouse *Asellus aquaticus* (Asellota) are recorded from the Outdoor Biome (Eden Project gardens). All are all common eurytopic species in Britain. Considering the overall oniscid species diversity in Cornwall (Gregory, 2009), it is perhaps surprising that additional species have not been recorded. However, collecting effort has been targeted mainly to the indoor biomes. Further fieldwork is likely to yield additional species of woodlice from the outdoor biome, possibly even an introduced species previously unknown in Britain (as is the case with the millipede *Brachyiulus lusitanus* (Barber, Gregory & Lee, 2010). Unidentified female specimens of styloniscidae and philosciidae collected from the Rainforest Biome also hint that additional species may be awaiting discovery.

Examination of the global distributions of species recorded from the indoor biomes indicates that most are well known to be associated with human activity. Four species, *Haplophthalmus danicus*, *Porcellio scaber*, *Armadillidium nasatum* and *Agabiformius lentus*, are ‘Cosmopolitan’ species that have been widely introduced to many parts of the world. Although the first three are native, or at least ancient long-established introductions, to Britain, they can be characteristic inhabitants of synanthropic habitats elsewhere.

Lucasius pallidus and *Chaetophiloscia sicula* collected from the Mediterranean Biome, and *A. lentus* from the Rainforest Biome, have native distributions centred on Mediterranean Europe. These have been spread considerably further afield by human activity (Vandel, 1962; Hornung & Szlavecz, 2003; Schmalfuss, 2003; Noël, Séchet, Mouquet & Bécheau, 2014). It is probable that the unidentified *Armadillidium* species also falls into this category. These are European natives that have been introduced into a European region (in this case Britain) beyond their native range. Cochard, Vilisics & Séchet (2010) consider these species to be more likely to successfully disperse into adjacent habitats from their initial point of introduction, especially in light of climate change. It will be interesting to see if these species begin to colonise the Outdoor Biome (gardens) of the Eden Project.

Four ‘Pan Tropical’ species, *Trichorhina tomentosa*, *Nagurus cristatus*, *Nagurus nanus* and *Venezillo parvus*, that have been recorded from the Rainforest Biome have been widely spread throughout the tropics by human activity (Schmalfuss, 2003). They frequently turn up in heated ‘topical houses’ in Europe (Cochard, Vilisics & Séchet, 2010). A fifth species *Reductoniscus costulatus* has an Indo-Pacific distribution, but is also widely reported from heated glasshouses across Europe. Two remaining species are more localised in their known distributions; *Pseudotyphloscia alba* is Oriental Tropical, while the genus *Gabunillo* is Atlantic Tropical. Previously, neither has been reported as an introduction in Europe. Within Britain these tropical species are dependent upon the artificially heated conditions, such as those found inside the Rainforest Biome. It is unlikely that they will survive outdoors in Britain.

It is not possible to comment on changes in populations of each species over time (i.e. from 2003 to 2010) since different sampling methodologies and sampling efforts have been used. However, it appears that those species that were introduced in the early years were able to become successfully established. Within both the Mediterranean and Rainforest Biomes, almost all of the species recorded between 2003 and 2005 were still present in 2010, including *Pseudotyphloscia alba* and *Gabunillo* n. sp. Only two species recorded before 2005, *Nagurus nanus* and *Armadillidium nasatum*, were not refound in 2009 or 2010. It is also of note that the intensive surveys in 2009 and

2010 add just three species to the Eden Project list. These are *Agabiformius lentus* and *Haplophthalmus danicus* (a familiar British species) in the Rainforest Biome and *Lucasius pallidus* in the Mediterranean Biome. It is possible that these three had been overlooked by earlier field work. In the long term it is probable that a few highly competitive species, such as *T. tomentosa*, *V. parvus* and *R. costulatus*, will continue to dominate the fauna. Other less competitive species may persist, or may be entirely out-competed. It will be interesting to see if populations of species such as *Gabunillo* n. sp. and *Pseudotyphloscia alba* remain extant in future years.

ACKNOWLEDGEMENTS

Mark Telfer was instrumental in organizing the 2010 field trip to the Eden Project. Tim Petitt and Marc Mappley of the Eden Project allowed un-restricted access to the biomes. Kelly Inward and Angela Lidget (both Natural History Museum, London), Mark Telfer, Darren Mann (Oxford University Museum of Natural History), Tony Barber, Helen Read and Jo Clark freely offered their specimens for examination. Paul Harding and Stefano Taiti readily dealt with my requests for relevant literature. Stefano Taiti kindly identified specimens of *Pseudotyphloscia alba*, *Nagurus nanus*, *Gabunillo* n. sp. and *Venezillo parvus*, for which I am very grateful. Two referees provided useful comments and additional references.

REFERENCES

- Barber, T., Gregory, S. & Lee, P. (2010) Reports on the 2009 BMIG spring meeting in Cornwall. *Bulletin of the British Myriapod & Isopod Group* (2010) **24**: 65-74.
- Cochard, P-O., Vilisics, F. & Séchet, E. (2010) Alien terrestrial crustaceans (Isopods & Amphipods). Chapter 7.1. In Roques, A., *et al* (eds) Alien terrestrial arthropods in Europe. *BioRisk* **4**(1): 81-96.
- Edney, E.B. (1953) The woodlice of Great Britain and Ireland – a concise systematic monograph. *Proc.Linn.Soc.Lond.* **164**: 49-98 (reprinted in shortened form as *Woodlice*, Linnean Society Synopses of the British fauna, **No. 9**. London, Linnean Society)
- Ferrara, F. & Taiti, S. (1990) Two new species of *Reductoniscus* (Crustacea, Oniscidea, Armadillidae) from New Guinea. *Revue suisse de Zoologie* **97**: 489-497.
- Gregory, S.J. (2010) A weekend woodlousing in the Rainforest (and the Mediterranean). *British Myriapod & Isopod Group Newsletter* **21**: 3 (unpublished).
- Gregory, S.J. (2009) *Woodlice and Waterlice (Isopoda: Oniscidea & Asellota) in Britain and Ireland*. Centre for Ecology & Hydrology/Field Studies Council.
- Green, A.J.A, Ferrara, F. & Taiti, S. (1990) Terrestrial Isopoda from the Krakatua Islands, South Sumatra and West Java. *Memoirs of the Museum of Victoria* **50**(2): 417-436.
- Holthuis, L.B. (1947) On a small collection of Isopod Crustacea from the Greenhouses of the Royal Botanic Gardens, Kew. *Annals and Magazine of natural History* (Series 11), **13**: 122-137.
- Hopkin, S.P. (1991) *A key to the woodlice of Britain and Ireland*. AIDGAP, Field Studies Council. Preston Montford. (reprinted from *Field Studies* **7**: 599-650.)
- Hornung, E. & Szlavecz, K. (2003) Establishment of a Mediterranean Isopod (*Chaetophiloscia sicula* Verhoeff, 1908) in a North American Temperate Forest. *Crustaceana Monographs* **2**: 181-189.

- 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.
- Oliver, P.G. & Meehan, C.J. (1993) *Woodlice*. Synopses of the British Fauna (New Series). Field Studies Council. Preston Montford.
- Randell Jackson, A. (1910) On Some Arthropods observed in 1909. *Lancs.Nat.(NS)* **3**: 17 - 22, 46-51.
- Read, H.J. (2008) Records of millipedes from Kew Gardens and the Eden Project, including the descriptions of three species. *Bulletin of the British Myriapod & Isopod Group* **23**: 27-35.
- Schmalzfuss, H. (2003) World catalog of terrestrial isopods (Isopoda: Oniscidea). *Stuttgarter Beiträge zur Naturkunde, Serie A, Nr.* **654**: 341 pp.
- Schmalzfuss, H. & Ferrara, F. (1983) Terrestrial Isopods from West Africa, part 3: Family Armadillidae. *Monitore Zoologico Italiano* **3**: 111-157.
- Schmidt, C. & Leistikow, A. (2004) Catalogue of genera of the terrestrial Isopoda (Crustacea: Isopoda: Oniscidea). *Steenstrupia* **28**: 1-118.
- Smit, T. (2001) *Eden*. Bantam Press: London.
- Soesbergen, M. (2003) *Venezillo parvus* en *Synarmadillo* spec., twee nieuwe land-pissebedden in Nederland (Crustacea: Isopoda: Armadillidae). *Nederlandse faunistische Mededelingen* **18**: 97-101.
- Souza, L.A., Senna A.R., & Kury, A.B. (2010) A new species and first record of *Gabunillo* Schmalzfuss & Ferrara, 1983 (Isopoda, Oniscidea, Armadillidae) from the Neotropics. *Zootaxa* **2677**: 1-14.
- Sutton, S. (1972): *Woodlice*, 144 pp. Ginn; London.
- Taiti, S. & Ferrara, F. (1996) The terrestrial Isopoda of Corsica (Crustacea, Oniscidea). *Bulletin du Museum national d'Histoire naturelle (Paris)*, 4e Serie, **18**: 459-545.
- Taiti, S. & Ferrara, F. (1989) Biogeography and ecology of terrestrial isopods from Tuscany. *Monitore zoologico italiano, Nuova Serie, Monografia* **4**: 75-101.
- Taiti, S. & Ferrara, F. (1980) Nuovi studi sugli Isopodi terrestri dell'Arcipelago Toscano *Redia* **63**: 249-300.
- Vandel, A. (1962) *Faune de France*, **66**. *Isopodes terrestres (deuxieme partie)*, pp. 417-931; Paris.
- Vandel, A. (1946) Crustaces isopodes terrestres (Oniscoidea) epiges et cavernicoles du Portugal. *Anais da Faculdade de Ciencias do Porto* **30**: 135-427.
- Verhoeff, K. (1928) Isopoden aus Formosa. *Mitteilungen des zoologischen Museums Berlin* **14**: 200-226.

APPENDIX I: UPDATED CHECK LIST OF BRITISH AND IRISH NON-NATIVE TERRESTRIAL ISOPODS (WOODLICE) RESTRICTED TO HEATED GLASSHOUSES

Updated from Gregory (2009), Woodlice and Waterlice in Britain and Ireland.

* First species record for Britain

First reported by Gregory (2009)

Sub-order ONISCIDEA – Terrestrial Woodlice

Section Synocheta

Family TRICHONISCIDAE

Miktoniscus linearis (Patience, 1908)

Family STYLONISCIDAE

Cordioniscus stebbingi (Patience, 1907)

Styloniscus mauritiensis (Barnard 1936)

Styloniscus spinosus (Patience, 1907)

Section Crinocheta

Family PHILOSCIIDAE

Burmoniscus meeusei (Holthuis, 1947)

Chaetophiloscia sicula Verhoeff, 1908*

Pseudotyphloscia alba (Dollfus, 1898)*

Setaphora patiencei (Bagnall, 1908)

Family PLATYARTHRIIDAE

Trichorhina tomentosa (Budde-Lund, 1893)

Family PORCELLIONIDAE

Agabiformius lentus (Budde-Lund, 1885)

Lucasius pallidus (Budde-Lund, 1885)*

Family TRACHELIPODIDAE

Nagurus cristatus (Dollfus, 1889)

Nagurus nanus (Budde-Lund, 1908)*

Family ARMADILLIDIIDAE

Armadillidium Brandt *in* Brandt & Ratzeburg, 1831 **sp.**[#]

Family ARMADILLIDAE

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

Reductoniscus costulatus Kesselyák, 1930

Venezillo parvus (Budde-Lund, 1885)[#]

SOME OBSERVATIONS ON THE ECOLOGY OF *LEPTOIULUS BELGICUS* (LATZEL) (DIPLOPODA, JULIDAE)

Keith N. A. Alexander¹ & Paul Lee²

¹ 59 Sweetbrier lane, Heavitree, Exeter, EX1 3AQ, UK.
E-mail: keith.alexander@waitrose.com

² Little Orchard, Capel Road, Bentley, Ipswich, Suffolk, UK.
E-mail: arachne2222@aol.com

INTRODUCTION

When *Leptoiulus belgicus* was first collected in the British Isles it was found in bracken and conifer needle litter (Bagnall, 1922). Lee (2006) comments that habitat analysis of the Millipede Recording Scheme data for *L. belgicus* provides no evidence of a preference for particular soil types in Britain, other than a strong association with coastal sites. He suggests that this association may be due to the warmer microclimates in these areas. He adds that Kime (2004) associated it with warm positions on light, well-drained soils, whereas Morgan (1988) linked it with synanthropic habitats in south-west Wales. Berg *et al.* (2008), in their work on the Dutch fauna, also report *L. belgicus* to be associated with warm, dry conditions on free draining soils but do not consider it to be a synanthropic animal. They note a preference for relatively open habitats including scrub and young woodland on calcareous soils. Hopkin & Read (1992) present data from a pitfall trapping study of millipedes in Germany (Dunger & Steinmetzger, 1981) which shows an association between *L. belgicus* and areas of dry grassland and scrub, as opposed to a wide range of other situations such as water meadow, arable, pine forest and beech woodland – the associations were related to humidity and pH as well as vegetation type. The *L. belgicus* were found in the upper areas of an altitudinal succession from a stream and water meadows through grassland and scrub on the lower slopes, to pine and beech which dominated the highest levels. This is the only mention of *L. belgicus* anywhere in Hopkin & Read (*loc. cit.*) which provides further indication of the limited knowledge of this species in Britain. A project undertaken in September 2013 in West Cornwall (VC 1) provides an opportunity for further development of our knowledge of the habitat associations of this species. Fortunately the project timing coincided with the peak in activity when the millipedes are mature.

METHODS

Standardised sampling of the terrestrial invertebrates was carried out across 42 locations on 14 moorland sites covering the length of the West Penwith Moors, from west to east (hectads SW32 & 43). This area comprises old rough pasture land on Granite geology, with acid grassland, heath and scrub developed on mineral soils, and wet heath and mire on peat soils. It is effectively a small-scale version of the better known Bodmin Moor and Dartmoor. Active management largely ceased over 50 years previously but the moors are regularly burned to control coarse vegetation, and grazing has been restored to selected areas in recent years. Four sampling methods were used: pitfall trapping, suction sampling, sweep-netting and beating. The altitude of the sites was in the range of 150-225m. KA carried out the sampling while PL dealt with identification of the non-insect arthropods.

RESULTS & DISCUSSION

A total of fourteen specimens of *L. belgicus* were found on seven sampling locations across six sites – 3 males and 11 females. Although the sample size was small, the common factor in their

occurrence was very clear: the denser acid grassland, heath and scrub on mineral soils. There were just single occurrences from the other three main vegetation types (Table 1).

TABLE 1: Relationship between occurrence of *Leptoiulus belgicus* and vegetation density and soil type

	Mineral soils		Peat soils	
	Open vegetation	Dense vegetation	Open vegetation	Dense vegetation
Number of site studied	9	9	14	7
Number of sites with <i>L. belgicus</i>	1	5 (56%)	1	1
Number of individuals taken	1f	3m 8f (79%)	1m	1f

The millipedes were mainly taken by pitfall trapping, but a few females were also taken by sweep-netting and beating. One female was swept from tall dense acid grassland with clumps of heath and another from dense *Molinia* tussocks with bushy heath; the third was beaten from tall dense gorse heath. Clearly the females - at least - are active climbers amongst relatively tall coarse vegetation. The tussock site was the only site on peat soils to produce a female and this may be due to the ability here to remain high amongst the continuous tall tussock vegetation, above the potentially wet ground below.

The only other millipede species found in any numbers was *Ommatoiulus sabulosus* (L.), also with fourteen specimens taken. It was associated with the dwarf shrub heath vegetation on mineral soils. Single specimens were also taken of *Glomeris marginata* (Villers) and *Cylindroiulus latestriatus* (Curtis).

CONCLUSIONS

Although the data was limited in quantity, there does seem to be clear evidence that *L. belgicus* is associated with the taller and denser vegetation on mineral soils, in this area of moorland at least. The females - at least - are active high in the vegetation structure as well as at ground level.

ACKNOWLEDGEMENTS

The project was commissioned by Natural England, as part of a wider study of the invertebrates of the West Penwith Moors.

REFERENCES

- Bagnall, R.S. (1922) On some new and rare British diplopods. *Ann. Mag. nat. Hist.* **9**(9):176-177.
- Berg, M.P., Soesbergen, M, Templeman, D. & Wijnhoven, H. (2008) *Verspreidingsatlas Nederlandse landpissebedden, duizendpoten en miljoenpoten (Ispods, Chilopoda, Diplopoda)*. EIS Nederland, Leiden & Vrije Universiteit-Afdeling Dier-ecologie, Amsterdam.

- Dunger, W. & Steinmetzger, K.. (1981) Ecological investigations on Diplopoda of a grassland-wood-caterna in a limestone area in Thuringia (G.D.R.). *Zoologische Jahrbücher (Systematik)* **108**: 519-53.
- Hopkin, S.P. & Read, H.J., (1992) *The Biology of Millipedes*. Oxford University Press.
- Kime, R.D., (2004) The Belgian Millipede Fauna (Diplopoda). *Bulletin de l'Institut royal des Sciences Naturelles de Belgique, Entomologie* **74**: 35-68.
- Lee, P., (2006) *Atlas of the Millipedes (Diplopoda) of Britain and Ireland*. Sofia: Pensoft.
- Morgan, I.K. (1988) Recent records of Myriapods in South-West Wales. *Bulletin of the British Myriapod Group* **5**: 11-23.

ON THE STATUS OF *CRYPTOPS SAVIGNYI* LEACH, 1817, AND *CRYPTOPS ANOMALANS* NEWPORT, 1844, (CHILOPODA: SCOLOPENDROMORPHA: CRYPTOPIDAE)

John G. E. Lewis

Manor Mill Farm, Halse, Taunton, Somerset, TA4 3AQ, UK.

E-mail: johngelewis@realemail.co.uk

ABSTRACT

Previous opinions as to the relationship of *Cryptops savignyi* and *C. anomalans* are reviewed and the holotype of *C. savignyi* described. It is confirmed that the two are conspecific. Their relative status is discussed. It would appear that currently *C. anomalans* is to be regarded as the valid name.

Key words: *Cryptops savignyi*, *Cryptops anomalans*, synonymy

INTRODUCTION

There has long been confusion over the identity of *Cryptops savignyi* Leach, 1817 and its relationship to *Cryptops anomalans* Newport, 1844 which is a common and widely distributed species through Europe and North Africa and also occurs in the United States and Canada where it is presumably introduced. The literature on these species is here reviewed and the holotype of *C. savignyi* described.

The terminology for external anatomy follows Bonato *et al.* (2010).

HISTORICAL REVIEW

Leach described *Cryptops Savignii* from a specimen 'Habitat in Musei Britannici horto.' Newport (1844) used Leach's original spelling namely *C. Savignii*, but since Lucas (1850), authors have, except in a few cases, used the spelling *savignyi* when referring to Leach's original description. According to article 33.3.1 of the International Code of Zoological Nomenclature this subsequent spelling is deemed to be the correct as it is in prevailing usage.

Many workers, namely Koch (1853), Latzel (1880), Meinert (1886), Kraepelin (1903), Attems (1930) and Brade-Birks, (1934, 1939) considered *C. savignyi* to be a junior synonym of *C. hortensis* (Donovan, 1810). However, Brolemann (1928, 1930) considered *C. savignyi* to be a senior synonym of *C. anomalans* and described a new subspecies *C. savignyi hirtitarsis* Brolemann, 1928. Most recently, Iorio and Geoffroy (2008) gave *C. savignyi hirtitarsis*, *C. savignyi sensu Brolemann, 1930* and *C. savignyi sensu Demange, 1981* as junior synonyms of *C. anomalans*.

Verhoeff, (1931) considered specimens assigned to *C. savignyi hirtitarsis* to be female *C. anomalans* and those assigned to *C. savignyi* to be males. Demange (1947) based on his personal collection and material so labelled in the Muséum national d'Histoire naturelle - Paris, rejected Verhoeff's conclusion stating that *C. anomalans* and *C. savignyi* are identical apart from the arrangement of setae on the antenna, namely a basal whorl of long setae on antennomere 10 in *C. anomalans*, two whorls in *C. savignyi* and *C. savignyi hirtitarsis*. As, however, these characters had been incompletely studied he did not proceed to formally separate the species, preferring to follow Brolemann (1928, 1930) in treating *C. anomalans* as a junior synonym of *C. savignyi*. The

difference may not be clear-cut and there seems little justification for separating them. Nevertheless, Schubart (1964) keyed out *C. savignyi* and *C. anomalans* using Demange's (1947) antennal characters.

Serra (1985), considered *C. anomalans* to be the junior synonym of *C. savignyi* and *C. savignyi hirtitarsis* to be valid.

In a paper that appears to have been largely overlooked, Crabill (1963) reported on his re-examination the holotype of *C. savignyi*. He wrote of *Cryptops savignii* Leach "the specimen is unquestionably referable to Newport's *anomalans* of 1844, but according to the stipulation of article 23 (b) of the International Code of Zoological Nomenclature it must be considered a *nomen oblitum*" Crabill was not happy with the then current limitations clause which stated that if a name had not been used as a senior synonym in the primary zoological literature for that more than fifty years it was to be considered a forgotten name (*nomen oblitum*). He was, in fact, incorrect in his conclusion that *savignii* was a forgotten name as several workers had used the name either as *savignii* or *savignyi* (see above).

Crabill gave no description of the type material of *C. savignyi* and it is here described and illustrated.

DESCRIPTION OF HOLOTYPE OF *C. SAVIGNYI*

The holotype is in the Natural History Museum, London.

Label 1. Holotype. *Cryptops Savignii* Leach. Discovered iv.16.60, dry on pin, condition very poor. Responded moderately well to 3-sod-phos. R. Crabill iv.18.60.

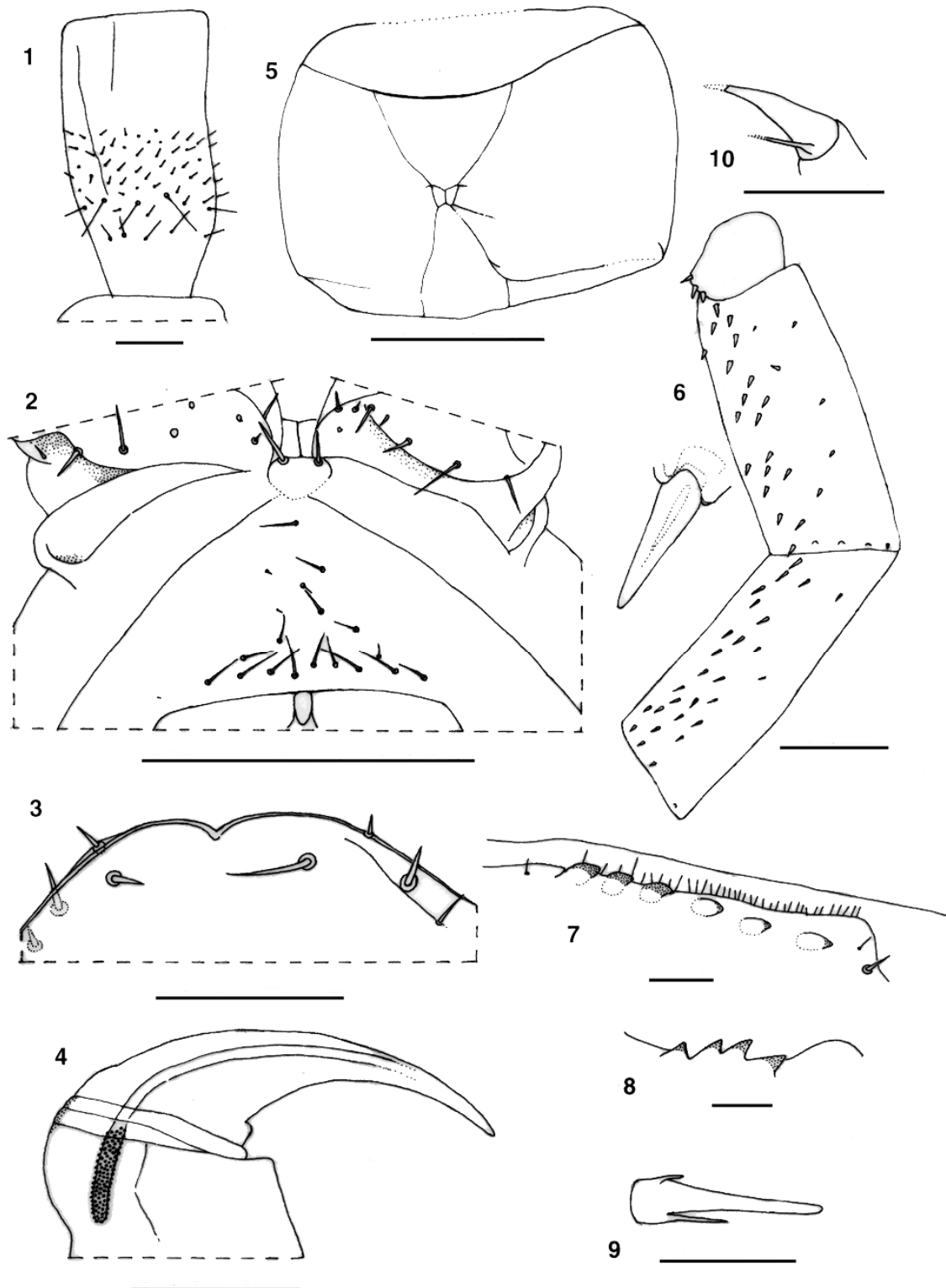
Label 2. This is *C. savignii* of Leach's Zool. Misc., 1817; the label appears to be in his handwriting rather than in Newport's. The species is clearly the senior synonym of *C. anomalans* Newport. Crabill iv.18.60. (NB The original label referred to by Crabill is missing.)

Label 3 (printed). *Cryptops savignii* Leach Holotype Italy: BMNH(E) #200018. (NB The correct locality is the garden of the British Museum.)

The specimen is in four microvials the first with head and maxillae, the second with the anterior half of the trunk, the third with the posterior half of the trunk and the fourth with the two ultimate legs.

Estimated length 31 mm. Antennal articles 15+7 (both damaged). Article 10 with a basal whorl of medium length setae and one of long setae (Fig 1). Cephalic plate paramedian sutures complete. Setose clypeal plate poorly defined with two setae followed by 1+2 + 1 + 2 + 2 + 2, some very small, in front of a row of nine prelabral setae (Fig 2). A groove on each side of the clypeus diverging from the clypeal plate clearly defining the clypeus. Anterior border of forcipular coxosternite bilobed apparently with a single marginal and three submarginal setae on each side (Fig 3), but these may have become displaced. The elongated poison gland calyx is situated in anterior part of forcipular trochanteroprefemur (Fig. 4).

Tergite 1 with anterior transverse suture, cruciform suture enclosing a small area at the point of intersection at the centre of the tergite and some short, insignificant lateral branches, also a faint incomplete posterior transverse suture (Fig 5). Details of other tergites, sternites, endosternites and spiracles not observable.



FIGURES 1 – 10: *Cryptops savignii* Leach, holotype

- 1) Antennal article 10 dorsal. Setae not shown in distal half of article. 2) Clypeus and antennal bases. N.B. There is some folding of the cuticle. 3) Anterior border of forcipular coxosternite. 4) Forcipule showing poison calyx and duct. 5) Tergite 1. 6) Prefemur and femur of ultimate leg medial with detail of spinous seta. 7) Tibial saw teeth of ultimate leg. 8) Tarsal saw teeth of ultimate leg. 9) Pretarsus of leg 2. 10) Pretarsus of leg 1.

Scale bars = 0.1 mm except figures 2, 4, 5 & 6 = 0.5 mm.

Pore field of ultimate leg coxopleuron virtually reaching posterior border as in Eason's (1964) figure 247. Ultimate legs with spinous setae on the ventrolateral and ventromedial but not the ventral face of the prefemur and only the one face of the femur, presumably the ventromedial, with the exception of a very few small spinous setae ventrolaterally (Fig 6). Tibia with very short fine setae, these denser on tarsus 1 and tarsus 2. Tibia (Fig 7) with seven, tarsus 1 (Fig. 8) with three or four saw teeth. As noted by Brolemann (1928), these are not visible from the lateral aspect. Dense brush of setae flanking the tibial saw teeth laterally.

Ambulatory legs with undivided tarsus (no data for leg 20). Pretarsi (tarsal claws) with one long and one short sensory spine (Fig. 9) but can appear that there is only a single long spine (Fig. 10). N.B. Most of legs 1 to 20 are missing.

Remarks: *Cryptops savignyi* has been well described and illustrated by Brolemann (1930) and as *C. anomalans* by Attems (1930) and Eason (1964). The holotype here redescribed, despite having been dried and pinned, shows a number of characters very clearly so that there can be little doubt that it is the same species as the specimens described by Brolemann, Attems and Eason.

CONCLUSION

Crabill (1963) stated that *Cryptops savignyi* Leach, 1817 was the senior synonym of *C. anomalans* Newport, 1844 and the redescription of the holotype reported here confirms that the two are conspecific. He noted, however, that according to article 23 of the ICZN then in force, *C. savignyi* was a *nomen oblitum* (forgotten name), not having been used since 1899. Crabill was, however, incorrect as *C. savignyi* had been used, albeit very occasionally, since 1899 and if strict priority is applied the valid name is *C. savignyi* and it was an erroneous reversal of precedence.

Currently the International Code of Zoological Nomenclature article 23.9.1 gives two conditions to be met if prevailing usage is to be maintained. The first that the senior synonym has not been used as a valid name after 1899. The second condition, that the junior synonym has been used as its presumed valid name in at least 25 works published by at least 10 authors in the immediately preceding 50 years. This has been met as the junior synonym has been used by at least 29 authors in at least 50 works in the last 50 years. The senior synonym has only been used three times during that period, namely by Schubart (1964) in a key, Demange (1981) and Serra (1985).

Article 23.12. states that a name rejected between 6 November 1961 and 1 January 1973 under Article 23b then in force on the grounds that it was a *nomen oblitum* is not to be given precedence over a junior synonym in prevailing usage unless the commission rules that the older but rejected name is to take precedence. So pending any such ruling the valid name is *C. anomalans*. Minelli *et al.* (2006 onwards) give *C. anomalans* as the valid name for *C. savignyi*.

C. anomalans is now used universally and to revert to *C. savignyi* now would only cause very considerable unnecessary confusion.

ACKNOWLEDGEMENTS

My thanks are due to Jan Beccaloni for arranging the loan of specimens, to Greg Edgecombe for helpful discussion of the problem, to Lucio Bonato for advice on matters taxonomic and to Dennis Parsons and staff of the former Somerset County Museum, now part of the Somerset Heritage Service, for providing excellent working conditions in that Museum. My thanks are also due to Michael Baker for processing the figures.

REFERENCES

- Attems, C. (1930) Scolopendromorpha, *Das Tierreich*, **54**, Berlin: Walter de Gruyter & Co., Berlin & Leipzig, 308 pp.
- Bonato, L., Edgecombe, G.D., Lewis, J.G.E., Minelli, A., Pereira, L.A., Shelley, R.M. & Zapparoli, M. (2010) A common terminology for the external anatomy of centipedes (Chilopoda). *ZooKeys*, **69**: 17-51.
- Brade-Birks, S. G. (1934) Notes on Myriapoda 35. Nomenclatural sources. *Journal of the South-Eastern Agricultural College, Wye, Kent*, No. **34**: 197-209.
- Brade-Birks, S. G. (1939) Notes on Myriapoda 36. Sources for the description and illustration of the British fauna. *Journal of the South-Eastern Agricultural College, Wye, Kent*. No. **44**: 156-179.
- Brolemann, H.-W. (1928) Notes sur quelques *Cryptops* (Myriapodes Chilopodes). *Bulletin de la Société d'histoire naturelle de Toulouse*, **57**: 249-260.
- Brolemann, H.-W. (1930) *Éléments d'une Faune des Myriapodes de France. Chilopodes*. Paris. xx + 405 pp.
- Crabill, R. E. Jr. (1963) Concerning the chilopod types in the British Museum (Natural History) Part 1. *Annals and Magazine of Natural History*, (13) (1962) **5**: 505-510.
- Demange, J.-M. (1947) Étude sur quelques *Cryptops* (Myriapodes-Chilopodes). *Bulletin du Muséum national d'histoire naturelle, Paris. 2^e série*, **19**: 173-176.
- Demange, J.-M. (1981) *Les Mille-Pattes Myriapodes*. Boubée, Paris. 284 pp.
- Donovan, E. (1810) *The Natural History of British Insects*, **14**: 23-24.
- Eason, E. H. (1964) *Centipedes of the British Isles*. Frederick Warne & Co Ltd, London & New York, x + 294 pp.
- International Code of Zoological Nomenclature*. (1999) 4th edition, xxvii + 306 pp.
- Iorio, E & Geoffroy, J.-J. (2008) Les Scolopendromorphes de France (Chilopoda, Scolopendromorpha): Identification et Distribution Géographique des espèces. *Rivière Scientifique*, 2007 (2008): 73-90.
- Koch, C. L. (1863) *Die Myriapoden getreu nach der natur*, Bd. 1. H. W. Schmidt, Halle, 134 pp.
- Kraepelin, K. (1903) Revision der Scolopendriden. *Mitteilungen aus dem Naturhistorischen Museum Hamburg*, **20**: 1-276.
- Latzel, R., 1880. *Die Myriopoden der Österreichisch-Ungarischen Monarchie. Erste Hälfte: Die Chilopoden*. Alfred Hölder, Wien, 223 pp. + pl. i-x.
- Leach, W. E., 1817. *Zoological Miscellany*, **3**: 31-45.
- Lucas, M., 1850. *Histoire naturelle des crustacés des arachnides et des myriapodes*. Société Bibliophile, Paris, 600 pp.
- Meinert, F., 1886. Myriapoda Musaei Hauniensis. III. Chilopoda. – Videnskabelige Meddelelser fra den naturhistoriske Forening i for Aarene København. 1884/1886: 100-150.
- Minelli, A., Bonato, L., Dioguardi, R. et al. (2006 onwards) Chilobase. A world catalogue of centipedes (Chilopoda) for the web. Available on-line at: <http://chilobase.bio.unip.it>.
- Newport, G. 1844. A list of the species of Myriapoda, Order Chilopoda, contained in the cabinets of the British Museum with synoptic descriptions of forty-seven new species. *Annals & Magazine of Natural History* **13**: 94-101.

- Schubart, O. (1964) Diplopoda, Symphyla, Pauropoda, Chilopoda (Ergänzung). In: Brohmer, P., Ehrmann, P. & Ulmer, (eds.) *Die Tierwelt Mitteleuropas (Ergänzung)*, **2** (3): 1-51, Taf. 1-6.
- Serra, A. (1985) Contribución al conocimiento de los Scolopendromorpha (Chilopoda) del sur de la Península Ibérica. *Publicaciones del Departamento de Zoología Universidad de Barcelona*, **11**: 37-43.
- Verhoeff, K. W. (1931) Über europäische Cryptops-Arten. *Zoologische Jahrbücher (Systematik)*, **62**: 263-288 + Taf. 3.

ABNORMAL COXAL PORES IN A SPECIMEN OF *STRIGAMIA CRASSIPES* (C.L. KOCH, 1835)Christian Owen¹ & A. D. Barber²¹ 53 Coed-y-moeth RD, Aberbargoed, Mid Glamorgan, CF81 9DR, UK.
E-mail: christian.owen49@yahoo.com² Rathgar, Exeter Road, Ivybridge, Devon, PL21 0BD, UK.
E-mail: abarber159@btinternet.com

One of us (CO) collected a specimen of what clearly appeared to be a 27 mm male *Strigamia crassipes* but with only 47 leg-pairs and an unusual arrangement in the coxal pores of the last legs. The number of leg-bearing segments given for this species in the Linnean Society Synopsis (Barber, 2009) is 49 to 51 in males. Apart from the low number of leg pairs and the unusual coxal pores it appeared to fit the description of *S. crassipes* in all other respects.

The animal was found on an old ash tip (bottle tip) at Aberbargoed, South Wales on 15.xi.2013. The surrounding area is mostly heathland with heather, bilberry and bracken which is gradually returning to woodland (oak, rowan, birch, etc.).



FIGURE 1: *Strigamia crassipes* from Aberbargoed, coxal pores of last legs

Photographs of the specimen was sent to Dr Lucio Bonato of Padova who agreed that it was indeed an example of *S. crassipes* with unusually developed coxal pores. He comments that this species is easily distinguished from other European *Strigamia* species in the adult stage by having a distinct darker longitudinal stripe on the metasternites just where there is a longitudinal shallow groove. The groove is common to other species but the darker stripe only occurs in this one. It also fitted the description of *S. crassipes* in the size and shape of the denticle, number of legs and colour in alcohol. The total range of numbers of leg-bearing segments, in the literature, he notes, is between 45 and 59.

The coxal pores of the last legs seemed at first unusually few (seemingly only 9 / 6) and one pore on the right side is actually moon shaped rather than rounded (Fig.1). The normal number of pairs in an adult is 15-30. According to John Lewis (pers. comm.), this is likely to be an adolescens III stage

and, by comparison with *Strigamia maritima*, at a similar stage, six coxal pores, as seen on the left side would seem to be about normal. The situation on the right hand side is of two additional small pores and the unusual shape of the large one that could possibly be due to coalescence of two pores.

Although this is not a major developmental abnormality it seems worth recording for its unusual appearance.

ACKNOWLEDGEMENTS

Many thanks to Lucio Bonato for examining the pictures and comments and to John Lewis for his most helpful comments on the first draft of this note.

REFERENCE

Barber, A.D. (2009) *Centipedes* Linnean Society Synopses of the British Fauna (N.S.) **58**. Shrewsbury, Field Studies Council.

ABNORMALITIES IN A BRITISH POPULATION OF *HAPLOPHILUS SOULETINUS* (BRÖLEMANN, 1907)

Małgorzata Leśniewska¹ & A. D. Barber²

¹ Department of General Zoology, Adam Mickiewicz University ul. Umultowska 89, 61-614 Poznań, Poland.

E-mail: remiz@amu.edu.pl

² Rathgar, Exeter Road, Ivybridge, Devon, PL21 0BD, UK.

E-mail: abarber159@btinternet.com

Conventionally, structural abnormalities in geophilomorphs whether of developmental origin or due to injury have tended to be regarded as relatively infrequent. However, in a study of European populations of *Haplophilus subterraneus* (Shaw, 1794) (*Stigmatogaster subterranea* (Shaw, 1794)), morphological abnormalities of various types were shown not to be rare occurrences but remarkably common (Leśniewska, 2012).

The same study included reference to a population of the related species *Haplophilus souletinus* (Brölemann, 1907) (*Stigmatogaster souletina* (Brölemann, 1907)) from near Jarret in the Pyrenées where 15 out of 37 individuals collected showed abnormalities of the trunk, of legs and of the of antennae with the highest number in any one individual being four. The highest number of leg-bearing segments found in the sample was 107.

H. souletinus was first described, as *Nesoporogaster souletina*, from the Basses- Pyrenées (Ahusquy) by Brölemann in 1907 and his monograph (Brölemann, 1930) cites Basses-Pyrenées and Hautes-Pyrenées as locations giving numbers of leg-bearing segments as 99 -101 (males) and 103 -107 (females). According to Bonato & Minelli (2014) *H. souletinus* var. *lusitanus* Verhoeff, 1925; *Nesoporogaster lusitanum* Verhoeff, 1951 from the Western part of the Iberian Peninsula, and *Nesoporogaster mediterranea* Matic & Dărăbanțu, 1969 from a locality in central Iberia are synonymous with *H. souletinus*.

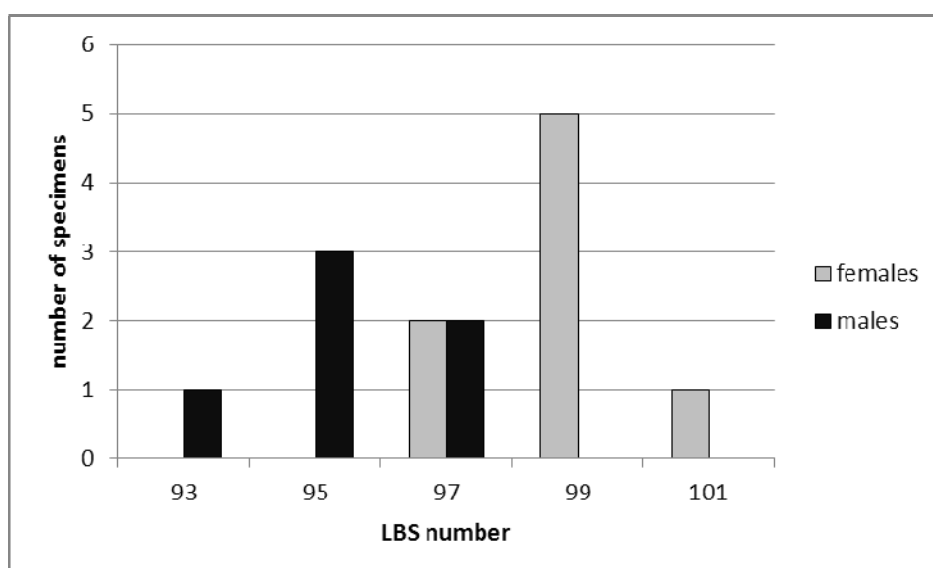


FIGURE 1: *Haplophilus souletinus* from Cornwall: numbers of leg-bearing segments (LBS) in 14 examples

In 1960 Dr E.H.Eason collected specimens of what he identified as *H. souletinus* from mixed woodland on the Carclew Estate in West Cornwall (Eason, 1962). Because of their lower number of leg-bearing segments (up to 101), he described these as belonging to a new subspecies *Nesoporogaster souletina brevior* which he thought was likely to have been introduced e.g. with plants. Subsequent studies in recent years have shown that *H. souletinus* occurs in a number of other localities in the Falmouth area ranging from a woodland nature reserve at Devichoys Wood, a National Trust ornamental garden at Glendurgan, another garden on the Universities' Campus at Tremough, woodland near Pendennis Point and The Dell, a site near the station in the centre of the town (see: Barber, 2013).

Eleven specimens collected from sites around and in the Falmouth area by one of us in 2013 (ADB) together with a further three from 2009 (6♂♂, 8♀♀) were examined by ML. The number of leg-bearing segments (LBS) varied between 93 and 97 in males and between 97 and 101 in females (Fig. 1). The characteristic sternal fossae of the species were also examined and began on sternites 40 to 45, terminating on sternites 45 to 50. Of 14 adults and juveniles examined, seven specimens (50%)

TABLE 1: *Haplophilus souletinus* from Cornwall: characteristics, presence of scars and anomalies. m = male, f = female, juv. = juvenile

T/Ts = tergite(s) S/Ss = sternite(s) R.leg(s) = right leg(s) L.leg(s) = left leg(s)

No	Date	Sex	Stage	LBS	Body Length	Fossae: sternites	Scars	Abnormalities
1	June 2013	m	adult	95	62 mm	41 – 45	L.leg 16. Ts 17, 62	
2	June 2013	m	adult	97	65 mm	42 – 47		
3	June 2013	m	adult	95	59 mm	42 – 47		L.leg 64. R.legs 79, 95
4	June 2013	m	adult	97	57 mm	42 – 47		L.leg 69
5	June 2013	f	juv	97	43 mm	43 – 48	L.leg 25. Left antenna	
6	June 2013	f	adult	99	80 mm	43 – 50	Head, Ts:3,5,10,12,19,41, 43, 54,60. Ss:4,6,7,9,12, 13,18; coxae last legs	L.legs 22, 25, 49
7	June 2013	f	adult	99	65 mm	44 – 48	Sternite 35	
8	June 2013	m	adult	95	59 mm	41 – 46	Pleurites L. 60, 67	
9	June 2013	f	juv.	101		45 – 49	S 22. Coxa last R.leg	L legs 15, 73
10	June 2013	f	juv.	97	43 mm	43 – 48		L.leg 59
11	June 2013	f	adult	99	50 mm	44 – 48	Sternites 23, 24, 25	
12	April 2009	m	adult	93	72 mm	40 – 46	Ts 2,4,14,15,17,19-21,27-29, 33, 34. Ss 4,16,22,27,33	
13	April 2009	f	adult	99	62 mm	45 – 50	Sternites 13, 14, 17, 18	R.legs 28, 36, 37, 69. L.leg 32 Right antenna: 13
14	April 2009	f	adult	99	63 mm	44 – 49		

(3♂♂, 4♀♀) showed some sort of abnormality (seven of legs and one antennal) although trunk abnormalities were not seen in this small sample. In individual specimens there are one to six defective appendages. The leg abnormalities are located both on the left (nine) and on the right (six) side, in the anterior (eight) and in the posterior (seven) part of the body. Nine of the specimens showed various types of scars but there was no correlation between the occurrence of abnormalities and that of scars. These results are summarized in Table 1.

REFERENCES

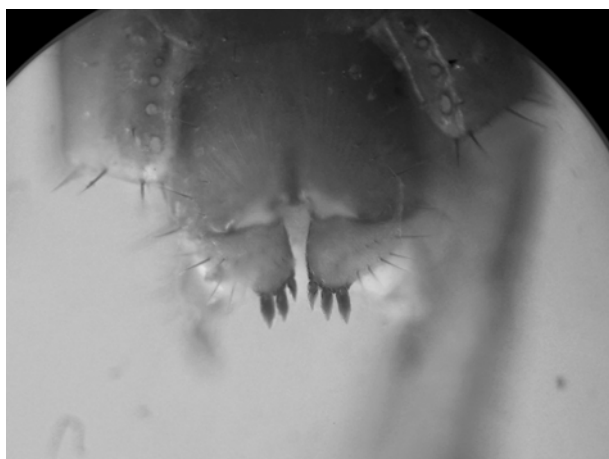
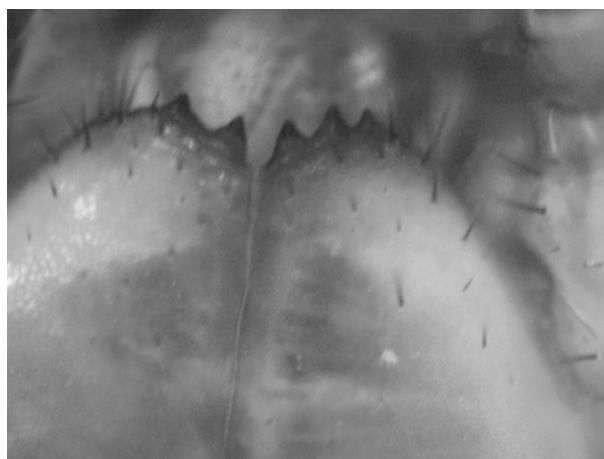
- Barber, T. (2013) Further records of the centipede *Stigmatogaster souletina* (*Haplophilus souletinus*). *British Myriapod & Isopod Newsletter* **27**: 4. (unpublished)
- Bonato, L., Minelli, A. (2014) Chilopoda Geophilomorpha of Europe: a revised list of species, with taxonomic and nomenclatorial notes. *Zootaxa* **3770** (1): 1-136.
- Brölemann, H.-W. (1930) *Éléments d'une Faune des Myriapodes de France. Chilopodes*. Imprimerie Toulosaine, Toulouse, 404 pp.
- Eason, E.H. (1962) The chilopod genus *Nesoporogaster* Verhoeff. *Proc.Zool.Soc.Lond.* **138**: 123-132.
- Leśniewska, M. (2012) *Morphological Anomalies in Haplophilus subterraneus* (Shaw, 1794) (Chilopoda: Geophilomorpha). Poznań, Wydawnictwo Kontekst.

NOTE ON NOMENCLATURE

Bonato & Minelli (*loc.cit.*) indicate that the correct generic name for the two species referred to here is *Haplophilus* rather than *Stigmatogaster* as currently listed in Chilobase (Accessible online: <http://chilobase.bio.unipd.it/search>).

THREE FEMALE GONOPOD SPURS IN A SPECIMEN OF *LITHOBIUS MELANOPS* NEWPORT, 1845Mark F. Robinson¹ & A. D. Barber²¹ 4 Layton Avenue, Malvern, Worcestershire WR14 2ND, UK.
E-mail: mark.robinson23@virgin.net² Rathgar, Exeter Road, Ivybridge, Devon PL21 0BD, UK.
E-mail: abarber159@btinternet.com

One of us (MR) had collected a number of specimens of *Lithobius* in the allotment garden area of a house at Slingsby, North Yorkshire in November 2013. Whilst some were obviously *Lithobius melanops* several seemed unusual and one in particular, a female (12 mm body length) was distinguished in having 3 + 3 gonopod spurs - immediately raising the question as to whether it was in fact, an example of *Lithobius tricuspis* (Fig. 1). It was also unusual in having 2 + 3 prosternal teeth on the forcipular coxosternite (Fig. 2). The latter condition is certainly not unknown in *L. melanops* nor is the presence of an extra gonopod spur on one or indeed both sides (see e.g. Barber, 1984). However, it was thought desirable to seek another opinion, especially so since another female had three spurs on one side and what appeared to have been a site where a third one had broken off on the other side.

**FIGURE 1: showing 3+3 gonopods spurs****FIGURE 2: showing 2+3 prosternal teeth**

It should be noted that none of the specimens had the spine 15VaC which is commonly seen in *Lithobius tricuspis*. Both Brölemann (1930) and Iorio (2010) indicate the presence of this spine in *L. tricuspis* but Eason (1965) reported specimens without it on one or both sides as well as those with it present. The latter also reviewed a range of forms of described from various localities in Europe, some with and some without 15VaC (as well as, to perhaps cause further confusion, forms with 2+2 genital spurs or with a simple apical claw on the 15th leg; Iorio refers to occasional forms with 2+2 spurs in populations in Alpes-Maritimes).

The collection site for our specimens was well out of the area where *L. tricuspis* has been recorded previously in Britain. Its main area of occurrence seems to be in mid South Devon but another population has been found in South Wales, and there is an isolated record from the Isle of Wight. There is also a report of it being found in a cave in the Mendips in 1965 (Lee Knight, pers.comm.). Its occurrence in North Yorkshire, although unlikely, could not be completely ruled out.

E.H.Eason (1965) first described the occurrence in Britain of *L. tricuspis* on the basis of specimens collected by the Entomological Section of the Devonshire Association at Fingle Bridge on Dartmoor

(Revell, 1965). Dr Eason compared it with *L. melanops*, noting that males were less easy to distinguish than females, especially if the spine 15VaC was absent and commented on its possible occurrence elsewhere in Britain or Ireland. Brölemann, interestingly, had described its distribution as “Très commun dans toute la France, notamment dans les forêts. Grande Bretagne; Europe Centrale”.

In the circumstances, we asked Dr Marzio Zapparoli to look at the female and two males and he positively identified them all as *L. melanops*, fitting the description given by Eason in his book (Eason, 1964) although with abnormalities in the female concerned which also showed teratology in the right 14th leg (Fig. 3).

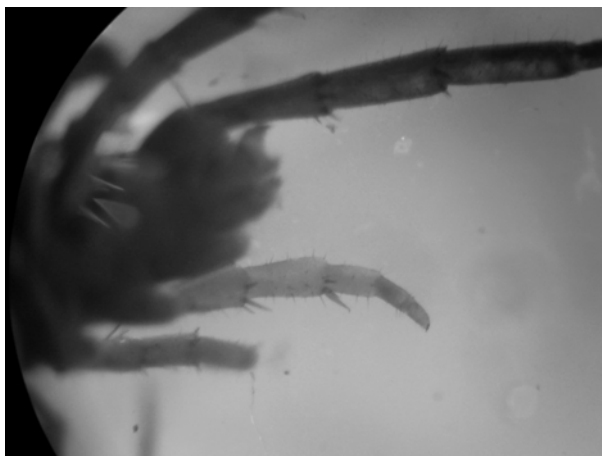


FIGURE 3: showing teratology in the right 14th leg

In South Devon and South Wales, *L. tricuspis* is generally an animal of woodlands and other more or less rural habitats whereas *L. melanops* occurs in a variety of sites in Britain, often quite disturbed ones such as gardens, urban waste ground, seashore, etc, as well as sometimes in woodland. In life, *L. melanops* is, for a *Lithobius*, relatively pale with a broad darker longitudinal stripe along its body whilst *L. tricuspis* tends to a more uniform chestnut brown (personal observations).

ACKNOWLEDGEMENT

Grateful thanks to Dr Zapparoli of Università degli Studi della Tuscia, Viterbo for examining and commenting on the specimens.

REFERENCES

- Barber, A.D. (1984) Chilopoda and Diplopoda from the Cheviot area. *Entomologist's Monthly Mag.* **120**: 87- 92.
- Brölemann, H.-W. (1930) *Éléments d'une Faune des Myriapodes de France. Chilopodes.* Paris. xx + 405 pp.
- Eason, E.H. (1964) *Centipedes of the British Isles.* London, Warne.
- Eason, E.H. (1965) On *Lithobius tricuspis* Meinert (Chilopoda, Lithobiomorpha) in Britain. *Ann.Mag.Nat.Hist* (13) **8**: 285-295.
- Iorio, E. (2010) Lithobies de France. *Revue de l'Association Rousillonnaise d'Entomologie* **19** (suppl): 1-104.
- Revell, R.J. (1965) Note on the discovery of *Lithobius tricuspis* Mein. in Devonshire. *Rept. Trans. Devonshire Assn.* **97**: 131.

EARLY RECORDS AND NAMES OF BRITISH & IRISH CENTIPEDES

A. D. Barber

Rathgar, Exeter Road, Ivybridge, Devon, PL21 0BD, UK.

E-mail: abarber159@btinternet.com

“SCOLOPENDRA”

The word scolopendra (Greek: *σκολόπενδρα*), which today we associate with certain large tropical or sub-tropical centipedes, was one known to the ancients. Aristotle (384-322BC) in his *Historia Animalium* (Thompson, 1910) referred to both land and sea *σκολόπενδραι* which were somewhat alike i.e. myriapods (notably centipedes) and polychaete worms - with a segmented worm-like body and many pointed legs on each side. Like centipedes with their poison claws, certain polychaetes are also “stinging” animals. Pliny (circa AD 78) referred to both *scolopendrae* and *centipedes* in his *Naturalis Historiæ* and commented on “the (marine) scolopendra which bears a strong resemblance to the land insect which we call a centipede” (Bostock & Riley, 1855). At some stage, the name Scolopendra also became associated with a fabulous sea fish as well as with centipedes and polychaetes. It has been suggested that *σκολόπενδρα* derives from *σκόλοψ* (“pointed”, “sharp”) and *έντερα* (“guts” and, by extension, “earthworm”) – literally “biting earthworms” (Guasparri, 2000).

The use of the word “scolopendra” or “scolopender” as relating to centipedes by British authors seems to date back to at least the early sixteenth century (Simpson & Weiner, 1989). Thomas Muffet (1634) included both *Scolopendra* and *Julus* in his *Insectorum sive Minemorum Animalium Theatrum* and refers to *Scolopendrae terrestres* but it is difficult to identify any particular species here. Indeed, for many years the word/genus *Scolopendra* continued to include both marine and terrestrial species; Thomas Molyneux (1753) describes a “not yet Described *Scolopendra marina*” which on examination of the drawing and description is clearly seen to refer to the polychaete *Aphrodite*.

The English naturalist John Ray in a posthumous publication (Ray, 1710) describes six types of animal under the heading “De Scolopendra”. These include what seem to be four marine worms together with two recognizably terrestrial centipedes:

Scolopendra valdè exiles longae is described as “In terra & fimo convolute jacent, coloris ex rufo vel flavor albicantis; capite pallidè castaneo, ex quo Antennae duae. Secunciam longa est; cauda bifurcate. Pedum numerus praeter forcipes caudae 96, nempe 48 paria”. With its 48 pairs of legs behind the forcipules which, with the “cauda bifurcata” (presumably the last pair of legs) gives 49 trunk segments this obviously describes some species of geophilomorph (or possibly, especially in view of the range of colours given, a combination of two or more) although clearly not the Linnean *Geophilus electricus*, having only 49 leg pairs. Excluding littoral types because of the habitat given, of the commoner British reddish brown geophilomorphs that could have this number we have *Strigamia crassipes* and *Geophilus easoni* whilst of the yellowish/whitish ones *Geophilus alpinus* (*Geophilus insculptus*) and *Geophilus flavus*.

Ad Scolopendra accedens trigina pedibus, instructa is “Corpore est depresso, unciam 1¼ longo. Antennae semunciales sere globulosae. Corpus latiusculum, rufescens, novem annulis praeter caput constans. Caput rorundiusculum, depressum; forcipes validate. Pedum 15 paria, quorum posteriora gradatim longiora, ultimam semunciam longum, ultra corpus extrenditur”. Its size of 1¼ inches (32 mm) and its description sounds much like *Lithobius forficatus* (or a similar species) and its habitat “Sub lignis & corticibus arborum latitat, estque satis frequens. Araneum devorantem vidit” also fits.

LINNAEUS'S SPECIES

Linnaeus (Carl von Linné) (1758) in his *Systema Naturae* (10th edition) listed nine species in his genus *Scolopendra* (Table 1). These included three centipedes currently on the British list; *Scolopendra forficata*, *Scolopendra coleoptrata* and *Scolopendra electrica*. All have been subsequently assigned to new genera as *Lithobius forficatus*, *Scutigera coleoptrata* and *Geophilus electricus*. The genus *Scolopendra* is now reserved for larger tropical and sub-tropical species such as *S. morsitans*. Linnaeus had also included one millipede, *Scolopendra lagura* (*Polyxenus lagurus*) in this list (other millipedes were in the genus *Julus*). *S. forficata* is described as from “Habitat in Europa, in America septentrionali” and *S. electrica* as “Habitat in Europa terra”.

Interestingly, as pointed out by Crabill (1955), *Scolopendra forficata* was the third species in the Linnean list and *Scolopendra morsitans*, the fifth, there being, of course, no type species being designated by him for the genus. In 1810 Latreille had selected *S. forficata* as the type species for the genus *Scolopendra*. In this situation, had the rule of priority been strictly applied, *Lithobius forficatus* would now be called *Scolopendra forficata* and the generic name *Lithobius* as applied by Leach would be a synonym of *Scolopendra*. Another name would have now been needed for the genus now known as *Scolopendra* in which current practice places *S. morsitans*!

TABLE 1: The species of *Scolopendra* listed by Linnaeus (1758)

† Foddai & Minelli (2002) * Chilobase

‡ *S. marina* Slabber 1781 is a nomen dubium (WoRMS: World Register of Marine Species)

Species	Occurrence	Modern name
<i>lagura</i>	In Svecia	<i>Polyxenus lagurus</i>
<i>coleoptrata</i>	In Hispania	<i>Scutigera coleoptrata</i>
<i>forficata</i>	In Europa, in America septentrionali	<i>Lithobius forficatus</i>
<i>gigantea</i>	In America	<i>Scolopendra gigantea</i>
<i>morsitans</i>	In Indiis	<i>Scolopendra morsitans</i>
<i>electrica</i>	In Europa terrae	<i>Geophilus electricus</i>
<i>phosphorea</i>	In Asia	<i>Orphnaeus brevilabiatus</i> †
<i>occidentalis</i>	In America	Identity uncertain *
<i>marina</i>	In Oceano Atlantico	Presume polychaete worm ‡

EARLY BRITISH RECORDS

It is difficult to find evidence of recording of centipedes in Britain or Ireland during the eighteenth century as notes about them are scattered in entomological and general natural history works but no doubt these animals were being seen by both naturalists and gardeners. In 1769, John Berkenhout M.D. published his *Outlines of the Natural History of Great Britain and Ireland* (Berkenhout, 1769) listing three species, *Scolopendra lagura*, *Scolopendra forficata* (Feet 30. Segments 9. Tawny, smooth. Antennae of 42 joints. Length 1 inch. Runs swift. Under stones) and *Scolopendra electrica* (Feet 140, Very flat. Tawny, with a black longitudinal line on the back. Segments 70. Joints of the Antennae 17. Shines in the dark). There is little likelihood of his *S. forficata* being anything much other than *Lithobius forficatus*, our common large lithobiid. The *S. electrica* certainly

has the right number of body segments for *Geophilus electricus* but whether the number given is from an actual specimen or a copy of a description from elsewhere is not clear and, as noted in relation to this species, one needs to be careful about older records of it since, although it does occur in gardens and other likely to be sampled synanthropic habitats, it is rarely the commonest of our geophilomorphs. His two species of *Julus* might need a similar caveat attached to them. *J. terrestris* does not occur in Britain so presumably this relates to something like *Tachypodoiulus niger* and to describe *J. sabulosus* as ash coloured (without any mention of its characteristic orange-red stripes) is odd.

In 1778 in his posthumous *Memoires pour server à l'histoire des insectes*, Charles De Geer published a description of a new species, *Scolopendra flava* (*Geophilus flavus* – known for a long time as *Necrophleophagus longicornis*) (Fig.1). No location was given but presumably it was from Sweden or elsewhere in Scandinavia.

A further geophilomorph, presumably from Britain in this case, was described by George Shaw a co-founder of the Linnean Society in a paper read to the Society in 1789 and published in 1794 (Shaw, 1794). He distinguished *Scolopendra subterranea* (*Haplophilus subterraneus*) from what he referred to as *Scolopendra electrica*. No locality was given although it was described as “a considerable depth below the surface of the ground, and principally in garden ground”.

Shaw described “*Scolopendra electrica*” as of a full brown or approaching to a chestnut colour and being found in houses and amongst wood, linen and other substances – which sounds much more like the species we know as *Geophilus carpophagus* ss (at the time not yet described) rather than the pale yellow of the *G. electricus* we recognize today. His drawing of “*electrica*” in a subsequent publication (Shaw, 1806) (Fig.2) does have about 70 leg pairs (too high for *G. carpophagus*) and the text refers to “about 70” which is well within the range for *G. electricus*. Similarly to his earlier comments he writes that it “not unfrequently makes its appearance in houses” and of its colour being “a dusky brown with legs yellowish” contrasted with his *S. subterranea*, being “of a much paler colour, viz a light yellow brown”.

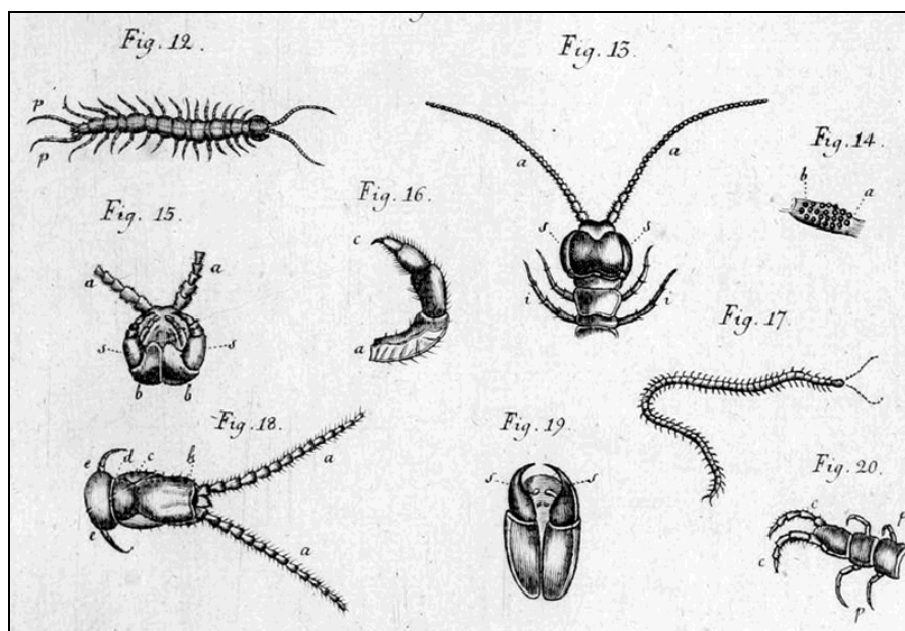


FIGURE 1. De Geer *Memoires pour server a l'Histoire des Insectes* (1778) - Plate 35 (detail)

Figs 12 – 16 Scolopendre brune rouffatre, à quinze paires des pattes (*S. forcicata*)

Figs 17 – 20 Scolopendre jaune, à tête & a antennes rouffes, a cinquante-quatre paires des pattes (*S. flava*)

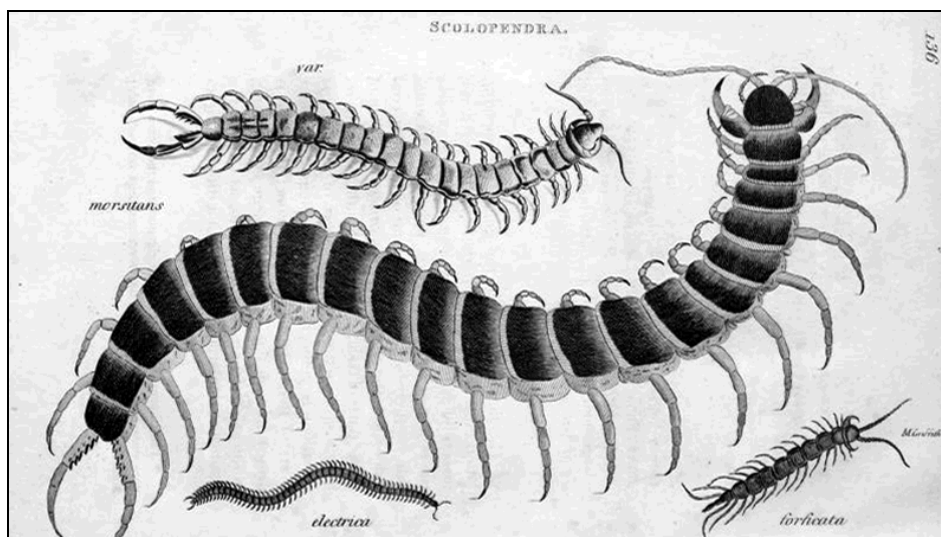


FIGURE 2: *Scolopendra* from Shaw's *General Zoology* (1806)
Showing *S. morsitans*, *S. electrica* and *S. forficata*

It seems possible that some early records of *Scolopendra electrica* might actually refer to a variety of species - possibly any geophilomorph might sometimes be identified in this way so caution is needed with interpreting these older records.

Just prior to the series of publications on myriapods by W.E. Leach which commenced in 1814 (q.v.), Edward Donovan (1810) had described, with an illustration, *Scolopendra hortensis* (*Cryptops hortensis*) found, in some abundance, in gardens (hence its name) at Exeter where it had been discovered by Mr. Leach (Fig.3). This seems to be the first occasion where we have both a location and a habitat for a British centipede. In an earlier volume of his work (Donovan, 1797) he had included *Scolopendra forficata* saying that it was not uncommon in many parts of Europe and in England "it is found under loose stones in damp places, and runs swiftly".

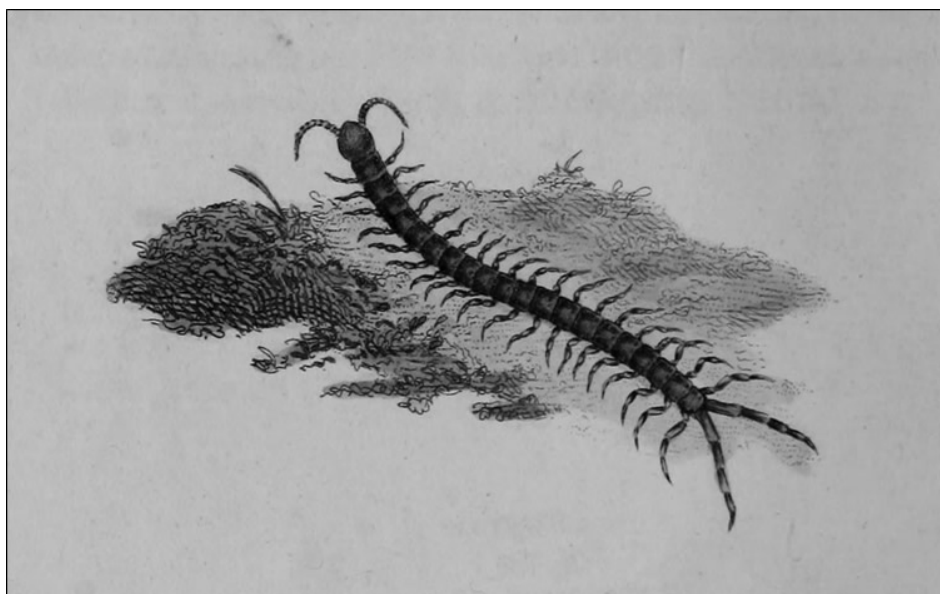


FIGURE 3: *Scolopendra hortensis* from Donovan's *British Insects* (1810) (detail)

In The *Encyclopaedia Londinensis*, published between about 1801 and 1828, volume 22 (Wilkes, 1827) there is an article on *Scolopendra* which adds a further 4 species of *Scolopendra* to the 1757 Linnean list although none of these are the three noted above as recognized by De Geer, Shaw or Donovan or include any new British species. The list of types is, in fact, identical with that given by Fabre (Fabricius, 1781) although in a slightly different order and included two species reported by Linnaeus subsequent to 1757, one of which (*S. ferruginea*) had been noted also by De Geer. What the *Encyclopaedia* article does note, however, is that of the 13 species in the list, three are “common to this country” although he only refers to *S. forficata* and *S. electrica* specifically with *S. coleoprata* as being found “in many parts of Europe”. Presumably the third species was *S. lagura*. Despite the date of publication, there is no reference to the work of Leach and the species that he had reported published a dozen years earlier.

W.E.LEACH

William Elford Leach, an early nineteenth century zoologist who worked with a great variety of animal groups published several papers on myriapods during the second decade of the nineteenth century. Born in Plymouth in 1790, attending school in Exeter later qualifying in medicine, Leach became assistant librarian in the Zoology Department of the British Museum in 1813 and subsequently assistant keeper in the Natural History Department where he had set himself to sort out the collections. He was elected FRS in 1815.

In 1814, Leach contributed to *Brewster's Edinburgh Encyclopedia* (Leach, 1814) and, under “Crustaceology”, gave an account of the Order Myriapoda in which, at the time (as Families Asellides and Oniscides), he had included what we now think of as Isopoda. Family Julides was the millipedes and Scolopendrides the centipedes. In the latter, introducing new genera, we recognize *Scutigera Coleoprata* (inside houses in southern Europe), several species of *Scolopendra*, *Cryptops hortensis* (gardens in and near Exeter), *Lithobius Forficatus* (not very uncommon in parts of England and Ireland, not yet occurred in Scotland or Wales), *L. Variegatus* (Devonshire), *L. Laevilabrum* (common in Scotland – now recognized as synonymous with *L. forficatus*) and *Geophilus Electricus* (Europe). As an “Observation” he adds “Besides the species of this family which have been here described, are many more inhabiting this country but their natural history is so imperfectly understood....”

A paper read to the Linnean Society in 1814 and published in their *Transactions* (Leach, 1815) is more detailed and woodlice are no longer included in the Myriapoda. The British species include *Lithobius forficatus* (Angliâ, Hiberniâ rarior), *Lithobius variegatus* (Danmoniâ australi sub lapidibus passim), *Cryptops hortensis* (in hortis in co.Devon, haud infrequens), *Geophilus carpophagus* (in fructibus Danmoniae passim –new species), *Geophilus subterraneus* (no location given), *Geophilus acuminatus* (Roborough Down nr Plymouth, Battersea Fields –new species), *Geophilus longicornis* (prope Edinburgum et Londinium sub lapidibus). Following his description of *G.acuminatus*, he comments that “To this division of the genus *Geophilus*, *Scolopendra electrica* of authors with two other indigenous and some exotic species belong; but as I have not had opportunities of examining the living animals, I shall at present forbear from giving any account of them”

Leach commenced his *Zoological Miscellany* in 1815 and in the third volume he included Class Myriapoda (Leach, 1817) with *Lithobius forficatus*, *L.variegatus* (Habitat in Anglia occidentali; praesertim in Danmonia), *L.vulgaris* (Magna Brittania – a synonym of *L.forficatus*), *Cryptops hortensis*, *Geophilus carpophagus*, *Geophilus subterraneus*, *Geophilus acuminatus* and *Geophilus longicornis*. To these he added *Geophilus maritimus* (*Strigamia maritima* – in Britannia inter scopulos ad littoral maris vulgatissime) and *Cryptops Savignii* (Habitat in Musei Britannici horto – now considered to be a synonym of the subsequently described *Cryptops anomalans*).

SAMOUELLE, STEWART & TEMPLETON

G.Samouelle who was in contact with, and helped by, Leach had dedicated his *Entomologist's Useful Companion* (1819) to him listing a number of species and referring the reader to the *Transactions of the Linnean Society* account. He added the information that *C. hortensis* had also been found near Plymouth, *G. subterraneus* was very common in England and that *G. acuminatus* was rare. He also referred to the fact that *G. carpophagus* “inhabits Devonshire, in garden fruit: it is not uncommon”. Interestingly, Leach, repeated in English by Samouelle, describes the latter species as “head, antennae and arms fulvescent: body violet, anteriorly yellowish: legs pale yellowish” but with a Var.β.”Body obscurely subviolet-testaceous, anteriorly subtetaceous”. One is tempted to think that these might have been the two species, *G. carpophagus* ss and *G. easoni* now recognized but there is insufficient evidence to support such an idea. The 1824 reprint of the *Useful Companion* (Samouelle, 1824) contains identical information regarding centipedes.

The ongoing linking of *G. carpophagus* with fruit (implicit in its specific name derived from the Greek, καρπος - fruit and φαγη - food; Slawson, 1998) is an interesting one although there seems to be no clear evidence that it does feed it this way. Perrier (1954), describing what is presumably *G. carpophagus* ss (“Corps violacé, fauve en avant...60 mm”) refers to it as “Souvent dans les fruits tombés”. Possibly this association with fruit is a result of it being found in fruit seeking prey or maybe even its tree-climbing habits, this then being copied by later authors.

Reports on species found in Scotland appear to commence with that of C.Stewart (1811) who listed *Scolopendra forficata* from the neighbourhood of Edinburgh and George Johnston (1835) on species of Insecta Myriapoda found in Berwickshire with *Lithobius vulgaris* (*L.forficatus*), *Geophilus subterraneus*, *Geophilus acuminatus* and *Geophilus longicornis*.

In Ireland, Robert Templeton (1836) reported *Lithobius vulgaris* (*L.forficatus*), *L.variegatus*, *L.laevilabrum* (*L.forficatus*), *Cryptops hortensis*, *Geophilus subterraneus* (neighbourhood of Cranmore), *G. maritimus* (Bangor), *G. longicornis* and *G. electricus*.

In 1842 Francis Walker had published his *Notes on Myriapoda* in *The Entomologist* including notes regarding five of our centipedes, *Lithobius laevilabrum* (*L.forficatus*), *Lithobius variegatus*, *Geophilus subterraneus*, *Geophilus longicornis* and *Cryptops hortensis*, with a mention of *Geophilus carpophagus* but with no distributional data for any of them.

GEORGE NEWPORT

In the year previous to Walker's *Notes* first evidence of the important myriapod studies of George Newport (1803-1854) appeared with a paper on the organs of reproduction and the development of the Myriapoda (Newport, 1841). The following year he presented a paper to the Zoological Society of London “On some new genera of the class Myriapoda” (Newport, 1842) where he introduced the generic names *Mecistocephalus*, *Necrophloeophagus* and *Gonibregmatulus*. *N. longicornis* was described as “Europe, very common”.

Two years later he produced two papers (Newport, 1844a, 1844b) (on specimens of centipedes and millipedes respectively) in the cabinets in the British Museum including the new species *Lithobius pilicornis*, *Cryptops anomalans* and *Lamyctes emarginatus* (from New Zealand). There were no habitat data for either *L.pilicornis* or *C. anomalans* although he did report *Lithobius variegatus* from Wimbledon Common. That same year (Newport, 1844c) there is a report of the presentation of his memoir “Monograph on the Myriapoda Chilopoda” to the Linnean Society which subsequently appeared in their *Transactions* (Newport, 1844/45). The first report is primarily about classification

and anatomy but the latter comprises a more detailed classification and descriptions of a large number of species and a little more about occurrence. British species categorized are: *L. pilicornis* described as “in Angliâ” and a new species, *Lithobius melanops*, described as the smallest of the British species from under moist stones in a garden “prope Sandwich in Com.Cantiano” in September 1842. *Cryptops Savignyii* (“In Angliâ”) and *C. anomalans* (no data) are both included. *Arthronomalus longicornis* (*Geophilus flavus*) is “Copiosissimè in Angliæ comitatibus Kent, Surrey, Middlesex, albique”, *A. similis* (*Geophilus carpophagus*) is “in Angliæ comitatu Kent, prope Sandwich), *A. flavus* (*G.electricus*) “in Angliâ, prope Gloucester”, *Geophilus acuminatus* (*Strigamia acuminata*) is “In Angliâ”, *G. Humuli* (*Stigmatogaster subterranea*) “in cultis Humuli lupuli in Angliæ comitatu Kent” and *G. subterraneus* “In Angliâ”.

In a posthumous *Catalogue of the myriapods in the collection of the British Museum* (Newport, 1856) included are *Geophilus maritimus* “in Angliâ (ad oras maritimas)”, *G. breviceps* (*Strigamia crassipes*) “in Angliâ”, *G. vesuvianus* (*Henia vesuviana*) “prope Napolin” and *Geophilus nemorensis* (*Schendyla nemorensis*) Koch “in Germania”. It is notable that with the exception of the last, described by C.L.Koch in 1837 and the newly described *Lithobius melanops*, all the species reported in Britain & Ireland are relatively large ones, presumably because, as with present day recorders first looking for myriapods, smaller animals are often likely to be seen as probably immatures and not examined separately. There are also a number of cases of what we now see as a single species being described as several, a notable case being that of *Lithobius forficatus*.

LATER STUDIES

Apart from scattered reports of species from certain localities, not necessarily with great detail, such as those of Cocks (1851) for Falmouth, Parfitt (1866a, 1866b, 1874) for Devon and Dale (1878) for Glanville's Wooton, (Dorset), I have been unable to locate few British or Irish records before the last two decades of the nineteenth century when, commencing with T.D.Gibson-Carmichael's (1882) *Preliminary list of Scottish myriapoda*, there has been a sequence of reports and descriptions listing species for Scotland, England & Wales and Ireland (from Pocock, 1893) and continuing in various forms until the present time.

Parfitt (1866b) is of interest as in that the *Arthronomalus crassicornis*, found near Exeter, is considered by Bonato & Minelli (2014) as synonymous with the species we now recognize as *Geophilus easoni*. His 1874 report includes a description of *Arthronomalus littoralis* discovered by Mr. W.S.M.D'Urban in crevices of the red sandstone rocks at the foot of the cliffs and within reach of the waves at high water at Hole Head between Dawlish and Teignmouth in 1873. It has not been possible to locate the specimens of this latter which Parfitt indicated that he deposited in the Royal Albert Museum at Exeter however Bonato & Minelli (*loc.cit.*) now show it to be synonymous with *Hydroschendyla submarina* Grube. The habitat is typical and this would seem to be the earliest British published record of the species, predating the Thompson (1889) record from Jersey.

THE CHANNEL ISLANDS

For the Channel Islands, Ansted & Latham (1862) listed four centipedes *Scutigera coleoptrata*, *Geophilus electricus*, *Geophilus longicornis* (*G.flavus*) and *Lithobius forficatus* amongst the Myriapoda recorded from Jersey. The possibility that, apart from the *Scutigera*, there could be confusion with other species should not be ruled out however. Recent studies do show *Lithobius forficatus* to be widespread on the island but the superficially similar *Lithobius pilicornis* has also been recorded there. There have been no subsequent records of *G.electricus* as far as I can ascertain and the roughly similar in appearance *Stigmatogaster subterranea* seems to be the widespread and

common large yellow geophilomorph on Jersey at the present time. *Geophilus flavus* has certainly been recorded from Jersey but there are somewhat similar species such as *Geophilus osquidatum* and *Geophilus fucorum seurati* (*Geophilus gracilis*) also known from the Channel Islands. The third edition of their book (Ansted & Latham, 1893), from which “lengthy lists of species” have been omitted, refers to “*Lithobius*, four species of *Geophilus* (two of which are marine, living low down in the littoral), a small species of *Scolopendra* (presumably *Scolopendrella*, a symphylan), two of *Julus*, and the remarkable long-legged *Scutigera coleoptrata*”. The littoral “*Geophilus*” species would presumably include *Strigamia maritima*. but *Hydroschendyla submarina* was not actually recorded from the Islands until 1889 having been collected by J. Sinel on Jersey when some specimens were collected close to the low water (Thompson, 1889). Our other exclusively littoral species (*Geophilus fucorum seurati* & *Schendyla peyerimhoffi*) were not recorded in Britain until the twentieth century.

ACKNOWLEDGEMENTS

Thanks are due to Devon County Library at Ivybridge for help with inter-library loans, to Plymouth Central Library (Reference & Local History) and to the National Marine Biological Library (Plymouth) for reference sources. Many sources have traced on line via the Biodiversity Heritage Library (www.biodiversitylibrary.org).

REFERENCES

- Ansted, D.T. & Latham, R.G. (1862) *The Channel Islands*. 1st Edition. London, W.H.Allen.
- Ansted, D.T. & Latham, R.G. (1893) *The Channel Islands*. 3rd Edition, revised & edited by E.T.Nicolle. London, W.H.Allen.
- Berkenhout, J. (1769) *Outlines of the Natural History of Great Britain and Ireland, Volume 1*. London, P.Elmsly.
- Bonato, L. & Minelli, A. (2014) Chilopoda Geophilomorpha of Europe: a revised list of species, with taxonomic and nomenclatorial notes. *Zootaxa* **3770**: 1-136.
- Bostock, J. & Riley, H.T. (1855) *The Natural History of Pliny 2*. Liber IX London, Henry G.Bohn.
- Chilobase. (<http://chilobase.bio.unipd.it/>)
- Cocks, W.P. (1851) Contributions to the Fauna of Falmouth. *Ann.Rept.Roy. Cornwall Polytechnic Soc.* **19**:12-22.
- Crabill, R.E. (1955) Proposed use of the plenary powers to designate for the genus “*Scolopendra*” Linnaeus, 1758 (Class Myriapoda) a type species in harmony with accustomed usage. *Bull.zool.Nomencl.* **11**(4): 134-136.
- Dale, C.W. (1878) *The History of Glanville’s Wootton in the County of Dorset including its Zoology and Botany*. London, Hatchards.
- De Geer, C. (1778) *Memoires pour server à l’histoire des insects, Tome septieme*. Stockholm, Pierre Hesselberg.
- Donovan, E. (1797) *The Natural History of British Insects* **6**:43-44. London, Author & F.C. & J.Rivington.
- Donovan, E. (1810) *The Natural History of British Insects* **14**:23-24. London, Author & F.C. & J.Rivington.
- Fabricus (Fabricii, Fabre), J.C. (1781) *Species Insectorum* Tom.1. Hamburg & Köln: Carol.Ernest, Bohni.

- Foddai, D., Minelli, A. & Pereira, L.A. (2002) *Geophilus brevilabiatus* Newport, 1845 (currently *Orphnaeus brevilabiatus*) and *Chromatobius brasilianus* Humbert & Saussure, 1870 (currently *O.brasilianus*) (Chilopoda): proposed conservation of the specific names. *Bull.zool.Nomencl.* **59** (2): 85-86.
- Gibson Carmichael, T.D. (1882) Preliminary list of Scottish myriapoda. *Proc.R.Phys.Soc.Edin.* **7**: 193-198.
- Guasparri, A. (2000) Gr. Σκολόπενδρα. *Glotta* **76**:199-201.
- Johnston, G. (1835) A descriptive Catalogue of the Insécta Myriápoda found in Berwickshire. *Loudon`s Magazine of Natural History.* **8**: 486-494.
- Leach, W.E. (1814) Crustaceology in *Brewster`s Edinburgh Encyclopedia* **7**: 383-437
- Leach, W.E. (1815) A tabular view of the external Characters of Four Classes of Animals, which Linné arranged under Insecta. *Trans.Linn.Soc.Lond.* **11**: 306-400.
- Leach, W.E. (1817) Class Myriapoda. *Zool. Misc.* **3**: 31-45.
- Linnaeus, C. (Linnæi), (1758) *Systema Naturae*, Editto Decima. Holmiæ, Laurentii Salvii
- Molyneaux, T. (1753) Account of a not yet Described Scolopendra Marina. *Phil.Trans.Roy.Soc.* **19**: 405-412; **21**:127-9.
- Muffet, T. (1634) *Insectorum sive Minemorum Animalium Theatrum*. London, Thom.Cotes.
- Newport, G. (1841) On the organs of reproduction and the development of the Myriapoda – First Series. *Phil.Trans.R.Soc.Lond.* **131** (2): 99- 130.
- Newport, G. (1842) On some New Genera of the Class Myriapoda. *Proc.zool.Soc.Lond.* **10**:177-181.
- Newport, G. (1844a) A list of the species of Myriapoda order Chilopoda contained in the cabinets of the British Museum with synoptic description of fort-seven new species. *Ann.mag.Nat.Hist* **13**: 94-101.
- Newport, G. (1844b) A List of the species of Myriapoda, Order Chilognatha contained in the Cabinets of the British Museum, with description of a new Genus and thirty-two new species. *Ann.mag.Nat.Hist* **13**:263-270.
- Newport, G. (1844c) Proceedings of Learned Societies. Linnean Society. *Ann.mag.Nat.Hist* **14**:48-53.
- Newport, G. (1844/45) Monograph on the Myriapoda Chilopoda; with Observations on the General Arrangement of the Articulata. *Trans.Linn.Soc.* **19**:265-302 (1844), 349-438 (1845).
- Newport, G. (1856) *Catalogue of the myriapods in the collection of the British Museum: I Chilopods*. London, Trustees of the British Museum.
- Parfitt, E. (1866a) Rediscovery of *Geophilus marinus* of Leach. *Zoologist* (2) **1**:7.
- Parfitt, E. (1866b) Description of *Arthronomalus crassicornis*. *Zoologist* (2) **1**:7-8.
- Parfitt, E. (1874a) Fauna of Devon Part XI. Myriopoda, etc. *Trans.Devonshire Assn.* **6**:716-727.
- Perrier, R. (1954) Myriapodes Insectes Inférieurs. Nouvelle edition. *Faune de France Illustrée* **3**: Paris, Libraire Delagrave.
- Pocock, R.I. (1893) Notes on some Irish Myriapoda. *Irish Nat.* **28**: 309-312.
- Ray, J. (1710) *Historia Insectorum*. London, A & J.Churchill.
- Samouelle, G. (1819) *The Entomologist`s Useful Compendium; or an Introduction to the Knowledge of British Insects*. London, Thomas Boys.

- Samouelle, G. (1824) *The Entomologist's Useful Compendium; or an Introduction to the Knowledge of British Insects*. London, Longman, Hurst, Rees, Orme, Brown & Green.
- Shaw, G. (1794) Remarks on *Scolopendra electrica*, and *Sc.subterraneus*. *Trans.Linn.Soc.Lond.* **2**: 7-9.
- Shaw, G. (1806) *General Zoology, Volume VI, Part II, Insects*. London, George Kearsley.
- Simpson, J.A. & Weiner, E.S.C. (1989) *The Oxford English Dictionary*. 2nd ed. Oxford: Clarendon Press ; Oxford ; New York : Oxford University Press, 1989.
- Slawson, G.C. (1998) The Latin names of British centipedes. *Bull.Br.Myriapod Isopod Gp.* **14**: 31-33.
- Stewart, C. (1811) List of Insects found in the Neighbourhood of Edinburgh. *Mem.Wernerian nat.Hist.Soc.* **1**: 566-577.
- Templeton, R. (1836) Catalogue of Irish Crustacea, Myriapoda, and Arachnoidea, selected from the Papers of the late John Templeton Esq. *Loudon's Magazine of Natural History.* **9**: 9-14.
- Thompson, D.W. (1889) A Marine Millipede. *Nature Lond.* **41**: 104.
- Thompson, D.W. (trans.) (1910) (*Aristotle*) *Historia Animalium*. Oxford, Clarendon Press.
- Walker, F. (1842) Notes on Myriapoda. *The Entomologist* **1**:237-243, 293-296.
- Wilkes, J (1827) *Encyclopaedia Londinensis* **22**: 818. London, J.Adlard.
- WoRMS (World Register of Marine Species). (www.marinespecies.org/)

THE MYRIAPOD & TERRESTRIAL ISOPOD PAPERS OF A. RANDELL JACKSON

A. D. Barber

Rathgar, Exeter Road, Ivybridge, Devon, PL21 0BD, UK.

E-mail: abarber159@btinternet.com



Born in 1877 in Southport, Lancashire, Arthur Randell Jackson pursued his scientific and medical studies at the University of Liverpool, qualifying in 1900 and practising medicine whilst continuing his studies in dentistry and medicine and was awarded doctorate in 1909 & 1911. He served as a medical officer in France and Belgium during the First World War and returned to civilian practice in 1919. He died at Chester in 1939.

His primary zoological interest was in spiders, publishing an account of the Araneida of Port Erin and District in 1899 and working on spiders of the British Isles, of arctic regions (Spitzbergen, Greenland, etc) and elsewhere. His last paper was a 1938 report on Arctic Spiders obtained in 1933-36.

In 1910 in his report *On Some Arthropods observed in 1909* he included records for one centipede (*Henicops fulvicornis*), one millipede (*Polydesmus gallicus*), a symphylan (*Scolopendrella notacantha*) and two exotic woodlice (*Philoscia patiencei* and *Angara lenta*) from a nursery at Chester. This was the first British record of *Angara lenta*, now known as *Agabiformius lentus*. The paper was the first of a short series of papers, published in the *Lancashire Naturalist* (later the *Lancashire and Cheshire Naturalist*) between 1909 and 1916 containing myriapod data. One of these, in 1914, was specifically a preliminary list of the Myriapoda of the Chester district in which he recorded 17 centipede, 20 millipede and 7 symphylan species. Three of these papers (1910, 1913 and 1916) also contained reports of terrestrial isopods. A list of these publications is given below.

In his 1916 paper he remarks that a number of myriapods had been sent to him for identification and goes on to comment that “Owing to affairs on the Continent it has been impossible to get most of these identified”. His spider papers were resumed in 1922.

Apart from the specific interest of Randell Jackson’s own papers, his great legacy to myriapod studies was the interest he stimulated in two other workers, H.K. and S.G.Brade-Birks. BB’s first appointment was as curate at Darwen and it was here that he and his then fiancée Dr Hilda Brade first took up the study of Myriapoda, helped and encouraged by Randell Jackson.

In the 1916 paper, Randell Jackson continues “Up to the present we have never had in Britain a worker who really specialized in this group, and we now feel the want of one very much. Miss H.K.Brade, of Manchester, and the Revd. S. Graham Birks, of Darwen, are taking up the group energetically, and I hope that eventually they will be able to fill this gap.”

The first of the Brade & Birks’ “Notes on Myriapoda” appeared in the *Lancashire & Cheshire Naturalist* for June 1916 describing a new variety of *Chordeumella scutellare*. In their seventh, in 1917, they named *Iackstoneuma bradae* (now *Brachychaeteuma bradae*) “in honour of our gallant friend, Captain A. Randell Jackson, M.C., M.D., D.Sc., R.A.M.C., of Chester, to whom we owe our introduction to this engrossing branch of zoological science.” The last of the series, No 36, appeared in 1939

A. Randell Jackson publications containing references to myriapods & terrestrial isopods:

- 1910 - On Some Arthropods observed in 1909. *Lancs.Nat.(NS)* **3**: 17 - 22, 46-51.
- 1913 - On some Arthropods observed in 1911 and 1912. *Lancs.Nat.* **5**: 440-444.
- 1914 - A preliminary list of the Myriapoda of the Chester district. *Lancs.Nat.* **6**: 450-458.
- 1915 - Notes on the collection and preservation of Myriapoda. *Lancs.Chesh.Nat.* **7**: 101-102.
- 1915 - On some Arachnids and Myriapods observed in 1914. *Lancs.Chesh.Nat.* **7**: 433-437.
- 1916 - On Some Arthropods observed in 1915. *Lancs.Chesh.Nat.* **8**: 355-364, 391-392.

ACKNOWLEDGEMENTS

Special thanks to Ian Wallace of National Museums Liverpool who obtained for me photocopies of several of the Randell Jackson papers not available on the internet and to Paul Harding for comments on the terrestrial isopods. Also to acknowledge the website of GIA - Grupo Iberico de Arachnologia for their page *Biografias Arthur Randell Jackson* (www.sea-entomologia.org/gia/biografia_jackson.html) from which the photograph, biographical details and information regarding his arachnid papers were obtained.

OTHER REFERENCES

- Brade,H.K & Birks, S.G. (1916) Notes on Myriapoda – 1 *Chordeumella scutellare* var *brölemanni* nov. *Lancs.Chesh.Nat.* **9**: 49-55.
- Brade-Birks,H.K & Brade-Birks, S.G. (1917) Notes on Myriapoda – VII. A new member of the AscospERMOMORPHA (*Jacksoneuma bradae*, gen. et sp. nov.). *J.Zool.Res.* **2**: 135-149.
- Brade-Birks, S.G. (1939). Notes on Myriapoda XXXVI, Sources for description and illustration of the British fauna. *J. S.E.Agric.Coll.Wye* **44**: 156-179.

OBITUARIES

In the last few years several eminent Myriapodologists have passed away. John Lewis and Paul Lee have provided their recollections of John Cloudsley-Thompson and Dougie Richardson, two people who made significant contributions to the British knowledge of our groups.

ERIC PHILP

24 June 1930 – 8 January 2013

Eric Philp, who was Chairman of BMIG from 2007 to 2010, has died aged 82. Born at Dartford in Kent, Eric spent most of his life in the county, devoting much time and energy to studying almost all aspects of its natural history. His enthusiasm was that of an amateur naturalist, which is how he had started, with interests in birds and moths whilst still working in the family grocery shop. He joined Maidstone Museum as assistant in the natural history section in 1954, progressing to Keeper of Natural History in 1958, where he continued until he retired in 1993. In 1956, with Tony Tynan the then Keeper at Maidstone, Eric and others formed the Kent Field Club to bring together like minded amateurs. Those 'others' included people who were or became key individuals in British natural history for decades, such as John Felton, Malcolm Chalmers-Hunt, A. M. Masee, David McClintock, Francis Rose, John Sankey and subsequently junior members Clive Stace and David Streeter. Eric took many roles with the Kent Field Club and was its President from 1990 to 1992. He was also President of the British Entomological and Natural History Society in 2001/2002.

Eric was a natural history polymath. Although he is reported to have said he regarded himself mainly as a coleopterist, he must have been the only entomologist in Britain to have published two county plant atlas and county atlases of amphibians, reptiles and mammals, as well as one of butterflies. Eric had 'the eye' – an uncanny ability to find unusual or overlooked species, which others had simply not seen, or had not searched for, and this skill applied across vascular plants and many invertebrate groups.

Tony Barber, who was brought up in Kent, and visited Maidstone Museum whilst at school, recalls first contacting Eric in the 1970s about myriapod records. Now living in Devon, on his periodic return visits to Kent, Tony got into the habit of calling on Eric and was always welcomed into Eric's office hidden away at the back of the museum, for a cup of coffee and gossip about natural history and myriapod recording. This office was also the home of the Kent Biological Records Centre, which was effectively run single-handedly by Eric. Although Tony was only occasionally able to go out in the field with Eric, one highlight together was finding *Cylindroiulus londinensis* in a wooded sandpit in West Kent, a species that Eric had not seen before. Eric made many records of myriapods in Kent, often in association with Adrian Rundle, and they had talked about a possible paper jointly between Eric and Adrian, Tony and Desmond Kime, to bring together records made over many years. Although Tony still has a preliminary draft, unfortunately the paper never happened because new records kept being made.

I first met Eric at a field weekend at Leckford in Hampshire in about 1970 when we were guests of the John Spedan Lewis Trust, carrying out surveys of the Leckford estates. A decade later, our paths began to intersect occasionally through Eric's role running the Kent BRC and my role at the national BRC. Eric was a contributor to all three BMIG recording schemes, almost from their beginnings, and he attended several annual field meetings, serving on the BMIG Committee for several years before becoming Chairman. Following major heart surgery soon after he had retired, it was inspirational to see Eric back in action again in 1996 when he joined BMIG for our field meeting at the Kingcombe Centre in Dorset. BMIG invaded Kent in 2011 for the spring meeting and our

fieldwork benefited greatly from Eric's unrivalled knowledge of the county, including finding *Polyzonium germanicum* at 17 sites and the elusive *Metaiulus pratensis* at one site.

Field recording, maintaining thorough and intelligible written records, mentoring less experienced naturalists, and working to preserve important natural history sites were all important to Eric throughout his life. He published his own findings sparingly, mainly in the *Transactions of the Kent Field Club* and the *Entomologist's Record*, but he was diligent in writing up reports of the field meetings of the Kent Field Club in its *Bulletin*, and was always in demand locally for natural history talks. Eric was a man of strong opinions on some topics, and not always entirely 'politically correct', but he never sought to offend or upset anyone. He had definite ideas with regard to successful gardening; he enjoyed the competition of local horticultural shows (especially when he won) and on being able to pass on his knowledge in talks and on gardening panels. Communicating his practical knowledge, to anyone that had the good sense to listen and being interested in what others had found or observed, were Eric's great strengths, for which he will be missed by many.

I am very grateful to Tony Barber for his personal reminiscences of Eric and to John Badmin for some biographical details.

Paul Harding

JOHN CLOUDSLEY-THOMPSON**23 May 1921 – 4 October 2013****Some personal recollections**

John Cloudsley-Thompson ‘the tank commander turned desert naturalist’ has died aged 92. Towards the end of the war he married Anne Cloudsley and they combined their surnames as Cloudsley-Thompson. “C.-T.” wrote some 50 books and numerous papers and articles on a wide variety of subjects zoological but his early work was on centipedes, millipedes and woodlice. The first was probably a note in *Nature* in 1945 on the behaviour of *Lithobius forficatus* written whilst completing his degree at Cambridge. Another early paper was on a record of *Hydroschendyla submarina* from Yorkshire (1948) with a valuable review of the marine myriapods. His Ph.D., also from Cambridge, was on ‘The ecology and physiology of myriapods’ There followed many scientific and more general papers on myriapods including the water relations and cuticle of *Paradesmus* (1950), and sensory physiology of millipedes (1951). References to these early works on myriapods and, indeed, on woodlice and arachnids may be found in his book *Spiders, scorpions centipedes and mites* published in 1959 and revised in 1969.

At his Ph.D. viva in May 1950, C.-T.’s external examiner Professor Ralph Dennel told him that one of his own research students, Gordon Blower, was completing an M.Sc. in Manchester on the cuticle of Myriapods. Nobody else was working on these animals in Britain so to prevent overlap in their efforts Gordon suggested John should concentrate on millipedes while he would stick to centipedes but by this time John’s interests were changing to humidity responses and diurnal rhythms in woodlice 1952, 1956).

After 10 years as a lecturer at King’s College London, C.-T. was appointed Professor of Zoology at the University of Khartoum and Keeper of the Sudan Natural History Museum in 1960. As an undergraduate I became interested in deserts as a result of reading *The Biology of Deserts* - the proceedings of an Institute of Biology Symposium on hot and cold deserts (1954) edited by Cloudsley-Thompson and when he advertised a lectureship in animal physiology in the Zoology Department in Khartoum I applied. The interview took place in London. C.-T., who was, I recall, wearing a Norfolk jacket, immediately put me at ease. I pointed out that I knew little physiology but was prepared to learn on the job and was appointed.

On the way to my lab. in Khartoum each morning I passed the open door of John’s lab which adjoined his office and was invariably greeted by “Hello John, how lovely to see you”, invited in for a smoke and offered a limoon (a long lime drink) or shai (tea). These drinks were constantly available from Khamis, one of the technical staff with this essential job, a key one, in the hot climate pre air conditioning. This was excellent man management ensuring that one started the day right.

In John’s little lab was a barograph clock set up as a kymograph for his work on diurnal rhythms and various animals both vertebrate and invertebrate. Extremely enthusiastic about his work John would show his latest results and animal of interest. I well recall an excited Prof. showing me a *Rhagodes*, an uncommon short-legged camel spider. He was always very supportive of my research and exhibited great interest, no matter how trivial the observations and could usually find a reprint of some relevant paper in one of his numerous box files. As witnessed by his numerous publications he had an extremely wide and detailed knowledge of matters zoological.

Every vacation John would take off ‘On Trek’ by Land Rover on rough tracks (there were then only 20 miles of metalled road in the Sudan.). He would always take a Sudanese member of staff. The strong Arab tradition of hospitality to travellers meant that whenever C.-T. stopped he was invited to take coffee. This could be a lengthy procedure, much reducing the time available for research, so the

Sudani's function was to make polite excuses to avoid any offence by respectfully declining the invitations.

I remember John Cloudsley-Thompson as a tremendously enthusiastic, energetic knowledgeable and affable zoologist. He will, without doubt, be sorely missed. I popped in to see him when he was Professor of Zoology at Birkbeck College and again when he had an emeritus Fellowship at University College London. As always a warm welcome and "how lovely to see you." I don't think that John ever stopped writing. Opening my copy of *The Linnean* for April 2013 behold an article by C-T 'Serendipity in Biological Research.'

John G. E. Lewis

DOUGLAS TURNBULL RICHARDSON CCHEM MRSC**29 March 1919 – 13 December 2013**

Doug Richardson was a leading field naturalist in Yorkshire during the last three decades of the twentieth century and over the same period played a key role in the establishment and development of the national recording schemes for centipedes, millipedes and woodlice. Most of his working life was spent in a chemistry lab in a variety of industries and he developed a lifelong interest in microscopy

His interest in myriapods was sparked by reading Blower's 1952 paper on British Millipedes in the *Naturalist* (pp.145-157) whilst between jobs in summer 1972. A new position as Senior Technical Officer in the Department of Geology at Leeds University and a meeting with Stephen Sutton, who was a lecturer in the Zoology Department at Leeds, on a Yorkshire Naturalists Union meeting led to his interest in woodlice. Stephen's enthusiasm rubbed off on Doug and soon the two were working together on the backlog of specimen identifications required since the launch of the Woodlouse Recording Scheme. Stephen remembers Doug as a very good friend and great companion in the field, a gifted, gregarious and generous man, popular at all levels in his Department for his cheerfulness and efficiency,

Doug's interest in myriapods developed into a 20 year survey summarized in a paper on Yorkshire millipedes in 1990 (*British Myriapod Group Bulletin* 7:5-28) and a paper on Yorkshire centipedes in 1993 (*BMG Bulletin* 9:5-20). At a national level he initiated a newsletter for the BMG in 1983 and gradually took over the role of national organizer for the Millipede Recording Scheme through 1984 handling the transition with the utmost tact. His time in this role culminated in the production of a preliminary atlas of millipede distributions in 1988.

Doug had a broad range of interests in natural history, something fostered by his father, including 'other invertebrates' e.g. harvestmen, pseudoscorpions, freshwater crustacea, leeches and flatworms. Also he was interested in subterranean flora and fauna and was involved in potholing and cave research.

His invertebrate interests resulted in him taking the role of Convenor of the Other Arthropods Committee of the YNU from 1984 to 1996. He built up a substantial collection of spirit preserved material that he donated to Leeds City Museum.

I first met Doug at a Yorkshire Naturalists' Union weekend residential event at Fountains Abbey in 1984. His enthusiasm and willingness to share his knowledge soon had me hooked on the study of myriapods and isopods. His day schools inspired many others in the same way. As another example of the encouragement he gave young naturalists I recall one of the indoor meetings of the YNU I attended with him when the library of a former member was going up for auction. The lots included a copy of Eason's *Centipedes*, a reference I did not possess at the time and one that I could not afford due to the inflated prices generated by book collectors. I had mentioned on the way to the meeting that I intended to put in a bid for the book but fully expected it to go for a price beyond my pocket. I was most surprised when the auction began and it was announced that Eason's book had been withdrawn as a lot. Instead I was sold the book for just £10 (much to the chagrin of a senior YNU member who had designs on the lot himself) after Doug had intervened behind the scenes to suggest the book should be sold so it could be used to study natural history rather than to adorn a library.

I attended many meetings of the YNU and BMG/BISG in Doug's company before I moved away from the county in 1990. Most notably I recall his relentless search for an *Armadillidium pictum* (then considered a rarity and potentially extinct in Yorkshire at least) site referred to as 'Catrick' in the literature. Doug was convinced this was actually Catrigg in the Yorkshire Dales rather than the

military town just off the A1 in North Yorkshire. After a number of visits over several years he was proved correct when he finally discovered the woodlouse on limestone pavement above Catrigg Force. Many members of BMG/BISG will recall with fondness the whisky drinking Yorkshireman always ready with an opinion but always willing to give advice and support to newcomers. His field attire on these occasions, including woolly hat, earned him the affectionate nickname of 'Compo' (after the Bill Owen character in the BBC series *Last of the Summer Wine*).

The BMIG membership sends our condolences to his widow, Marion, his two children, his four grandchildren and his great grandson.

Paul Lee

SHORT OBITUARIES**Richard L. Hoffman (25 September 1927– 10 June 2012) (USA)**

Richard L. Hoffman was well known to the myriapod community for his important taxonomic work *Classification of the Diplopoda* (1980). He was an extremely active millipede taxonomist describing approximately 400 new species or subspecies and established himself as the leading authority of the world's millipede fauna. He also devoted much of his life to the study and documentation of the natural history of his native state Virginia and the Appalachians.

Michael R. Warburg Professor emeritus (31 May 1931 Berlin, Germany – 9 February 2014 Haifa, Israel)

An honoured member of the terrestrial isopodology, myriapodology community, Prof. Michael Warburg passed away on the 9th of February, 2014.

He studied at the Hebrew University, Jerusalem (M.Sc. under Prof. S. Adler) followed by Yale University, USA (Ph.D., under Prof. G.E. Hutchinson). He retired from TECHNION, Haifa, where he spent his last 40 years. He was scientifically active in his whole life until the last months.

His broad research interests included neurosecretion, ultrastructure, ecophysiology (principally water relations of desert animals) and reproductive strategy of different animal groups including ticks, isopods, millipedes and amphibians. He was an appreciated and significant member of our research field.

Dr Erzébet Hornung

Carol C. Prunescu (- 23 September 2011) Romania

Carol Prunescu was Director of the Institute of Biology, Romanian Academy (1990-1995) and spent much of his life studying the anatomy and histology of centipedes, publishing on phylogeny and genital system of centipedes as well as describing several new species.

I met Carol Prunescu several times at international congresses and particularly remember spending an evening with him at the Polish congress, sitting outside 'discussing' various subjects over a beer in his very good and my very bad French!

Helen Read with information from Mihaela Ion

Professor Chong-zhou Zhang (1930-2 March 2013)

Professor Zhang wrote many taxonomic papers on the millipedes of China and he described some 40 new species of myriapod. Although mostly working on millipedes he did also publish on centipedes, symphylans and pauropods.

Information from Pavel Stoev

MISCELLANEA

GEOPHILOMORPHA OF EUROPE: SOME SYNONYMIES AND NAME CHANGES

A.D.Barber

Rathgar, Exeter Road, Ivybridge, Devon, PL21 0BD, UK.

E-mail: abarber159@btinternet.com

In a recent paper in *Zootaxa*, Lucio Bonato & Sandro Minelli (2014) have published a revised list of European species of geophilomorphs with taxonomic and nomenclatorial notes. As a consequence the identity of two species described from Britain in the genus *Arthronomalus* by Edward Parfitt (1866, 1874) has now been established and the names of four other British species it seems, should be changed or changed back to a previous form.

***Arthronomalus crassicornis* Parfitt, 1866** was found below the bark of an old elm near Exeter in April 1865 (Parfitt, 1866). Bonato & Minelli consider this to be a senior synonym of *Geophilus easoni* Arthur et al but in the circumstances, since it seems to have not been used since that date are asking the ICZN for a ruling in relation to the retention of *G. easoni*.

***Arthronomalus littoralis* Parfitt, 1874** was discovered by Mr. W.S.M.D'Urban in crevices of the red sandstone rocks at the foot of the cliffs and within reach of the waves at high water at Hole Head between Dawlish and Teignmouth in 1873 (Parfitt, 1874). Parfitt wrote that he had deposited specimens of this species in the Royal Albert Museum at Exeter but it appears that these cannot be located there however Bonato & Minelli show this species to be synonymous with *Hydroschendyla submarina* Grube, described (from the French coast) two years earlier. The habitat is typical for it and this would seem to be the earliest British published record of the species, predating the Thompson (1889) record from Jersey although, according to Pocock (1889) there were specimens of *H. submarina* in the Natural History Museum, which had been collected from Polperro by Laughrin and presented to it in 1868

Stigmatogaster souletina. *Nesoporogaster souletina brevior* was described by Eason (1962) based on British specimens. It seems to differ from *Nesoporogaster souletina* only on the basis of the lower average number of legs (93-95 in males, 97-101 in females as compared with 99-101 and 103-107). Bonato & Minelli regard *Nesoporogaster* as a junior synonym of *Haplophilus* and thus our species becomes *Haplophilus souletin* Brölemann, 1907. However Iorio (2014) does not accept this change and retains the name *Stigmatogaster* for both this and the following species.

Stigmatogaster subterranea. According to Bonato & Minelli, *S. subterranea* shares all major diagnostic features with *Haplophilus*. The species, therefore, reverts to its previously well-known name of *Haplophilus subterraneus* (Shaw, 1794). There has been some confusion over this date as the actual paper refers to it having being read to the Linnean Society in 1789 but the volume in which it was published (Volume II) dates from 1794.

Geophilus gracilis. The junior synonym, *Geophilus fucorum seurati* Brölemann, 1924 (as used by Eason, 1964) is now accepted on the basis that the senior synonym *Geophilus gracilis* Meinert, 1870 is a primary junior homonym of *Geophilus gracilis* Gervais, 1849 (another species, now under *Eurytion*) so unavailable. There were sufficient differences from *Geophilus fucorum* for Bonato & Minelli confirm, at least provisionally, that *G. fucorum seurati* is a distinct species, *G.seurati*.

Geophilus insculptus. Several authors in the past decade have used *Geophilus alpinus* Meinert, 1870 as the correct name for *Geophilus insculptus* Attems, 1895 and the Linnean Society Synopsis

(Barber, 2009) noted that it was the earlier and therefore, probably, the correct name. The identity of these two species is now confirmed by Bonato & Minelli so *Geophilus alpinus* should be the name used in future for this widespread species. The name *Geophilus oligopus* was used in Britain for several years as the name for this animal but this is a different species not found in the British Isles. Older British authors often used the name *Geophilus proximus* for *G.alpinus* incorrectly

REFERENCES

- Barber, A.D. (2009) *Centipedes* Linnean Society Synopses Br. Fauna (N.S.) **58** Shrewsbury, Field Studies Council.
- Bonato, L. & Minelli, A. (2014) Chilopoda Geophilomorpha of Europe: a revised list of species, with taxonomic and nomenclatorial notes. *Zootaxa* **3770**: 1-136.
- Eason, E.H. (1962) The chilopod genus *Nesoporogaster* Verhoeff. *Proc.Zool.Soc.Lond* **138**:123-132.
- Eason, E.H. (1964) *Centipedes of the British Isles*. London, Warne.
- Iorio, E. (2014) Catalogue biogéographique et taxonomique des chilopodes (Chilopoda) de France métropolitaine. *Mem.Soc.Linn.Bordeaux* **15**: 1-372.
- Parfitt, E. (1866) Description of *Arthronomalus crassicornis*. *Zoologist* (2) **1**:7-8.
- Parfitt, E. (1874) Fauna of Devon Part XI. Myriopoda, etc. *Trans.Devonshire Assn.* **6**:716-727.
- Pocock, R.I. (1889) A Marine Millipede. *Nature Lond.* **41**:176.
- Thompson, D.W. (1889) A Marine Millipede. *Nature Lond.* **41**:104.

NOTE FOR CONTRIBUTORS TO THE CENTIPEDE RECORDING SCHEME

Either the “old” names in the sense of having been used in either *Centipedes of the British Isles* or the Linnean Society Synopsis or the “new” ones suggested above can be used for submitting records to the recording scheme as species are allocated a number code for the scheme which does not change with nomenclatural changes. The only major exception to this is that of *Geophilus carpophagus* and *Geophilus easoni* which were not separated in *Centipedes of the British Isles* – they are, however separated in the Synopsis.

CONTENTS

Editorial	1
Woodlice (Isopoda: Oniscidea) from the Eden Project, Cornwall, with descriptions of new and poorly known British species – Steve Gregory	3
Some observations on the ecology of <i>Leptoiulus belgicus</i> (Latzel) (Diplopoda, Julidae) – Keith N. A. Alexander & Paul Lee	27
On the status of <i>Cryptops savignyi</i> Leach, 1817, and <i>Cryptops anomalans</i> Newport, 1844, (Chilopoda: Scolopendromorpha: Cryptopidae) – John G. E. Lewis	30
Abnormal coxal pores in a specimen of <i>Strigamia crassipes</i> – Christian Owen & A. D. Barber	36
Abnormalities in a British population of <i>Haplophilus souletinus</i> (Brölemann, 1907) – Małgorzata Leśniewska & A. D. Barber	38
Three female gonopod spurs in a specimen of <i>Lithobius melanops</i> – Mark F. Robinson & A. D. Barber	41
Early records and names of centipedes – A. D. Barber	43
The Myriapod & terrestrial Isopod papers of A. Randell Jackson – A. D. Barber	53

Obituaries

Eric Philp – by Paul Harding	55
J. Cloudsley-Thompson – Recollections by J. G. E. Lewis	57
D. T. Richardson – by Paul Lee	59
Richard L. Hoffman, Michael R. Warburg, Carol C. Prunescu and Chong-zhou Zhang	61

Miscellanea

Geophilomorpha of Europe: some synonymies and name changes – A. D. Barber	62
---	----

Cover photograph: *Scolopendra hortensis* (now *Cryptops*) from Donovan's *British Insects* (1810) (detail)

Cover illustration: *Pseudotyphloscia alba*, Eden Project, Cornwall, a woodlouse new to Europe © Steve Gregory

Editors:

Helen J. Read, A. D. Barber & S. J. Gregory

c/o Helen J. Read, 2 Egypt Wood Cottages, Egypt Lane, Farnham Common, Bucks. SL2 3LE. UK.