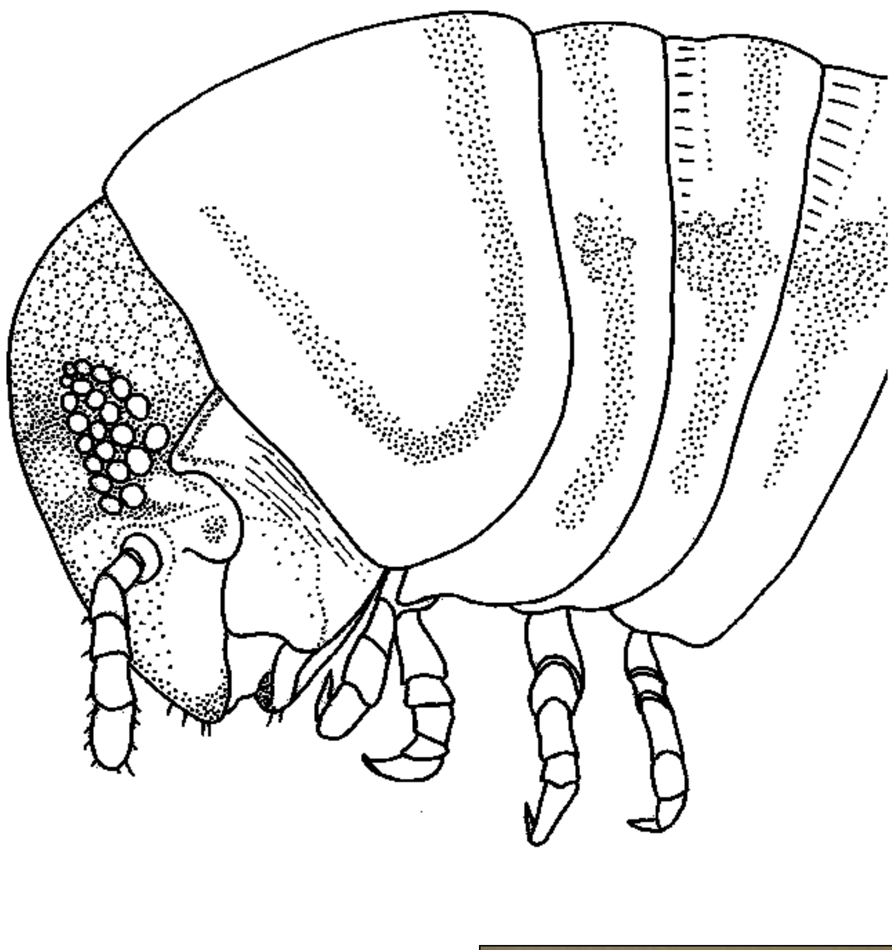
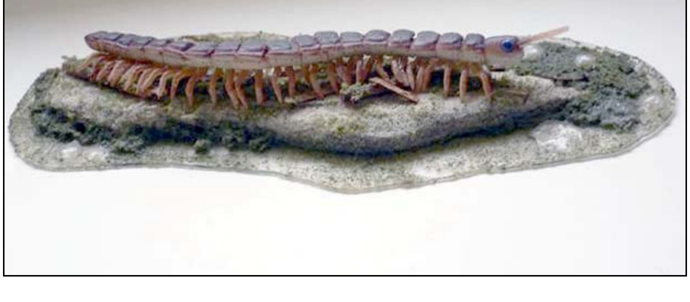
ISSN 1475 1739

Bulletin of the BRITISH MYRIAPOD and ISOPOD GROUP





Volume 23 (2008)

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Cover illustration: *Paraspirobolus lucifugus* © Helen Read
Cover photograph: reconstruction of *Pneumodesmus newmani* © Stonehaven Fossil Group

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ISSN 1475 1739

EDITORIAL

It would have been difficult to conceive that, in late 1984 when we started to put together material for a revived Bulletin of the British Myriapod Group (published in January 1985) and followed by Volume 3 in April 1986, that 23 years later we would still be "in business" and that Volume 23 of the renamed (and with a new ISSN) Bulletin of the British Myriapod and Isopod Group would be published in 2008. Our Bulletin has undergone changes since that when Volume 2, without a coloured or even card cover, was copied for us by a local printer and stapled together by hand.

In our early years we were joined for a while by a sister publication, *Isopoda*, edited by the late Steve Hopkin. When that ceased publication, there remained no comparable publication for material on British isopods until, in 2001, after the formal joining together of the BISG and the BMIG, the present title was first used and 5 articles on woodlice were included. Since then, varying proportions of myriapod and isopod topics have been covered and the present issue is no exception with the first five papers relating to isopods, two to centipedes and three to millipedes together with reports from field meetings. The diversity of interests is also reflected on the fact that there are articles by both Dutch and Danish colleagues, a review of two papers on French centipedes and the millipede papers include one on fossil types.

Other articles concern the often mis-identified species of pill woodlice, the presence of *Armadillidium pictum* in Herefordshire, *Platyarthrus* in arboreal ants' nests, a woodlouse new to Wales, a life-history study of *Lithobius variegatus* and a report on millipedes from the Eden Project in Cornwall. As well as the ubiquitous *Oxidus*, three exotic millipedes are recorded from the latter to join the four (so far) exotic centipedes reported.

2007 saw a field meeting at Ludlow, set up by Paul Harding and an additional autumn one in Scotland, organised by Dawn and Glyn Collis. Some of the reports from these are included in the present volume. The Oban meeting was notable for the millipedes in particular, which included *Chordeuma proximum*, *Thalassisobates littoralis* and *Leptoiulus belgicus*; the *Chordeuma* and the *Leptoiulus* no doubt reflecting the mild climate of western Scotland.

As always, articles, of whatever length on topics relating to British myriapods, woodlice and water-slaters or likely to be of interest to British workers with these groups are needed for our next volume.

DISTRIBUTION AND ECOLOGY OF TWO ENIGMATIC SPECIES, *TRICHONISCOIDES SARSI* PATIENCE, 1908 AND *T. HELVETICUS* (CARL, 1908) (CRUSTACEA, ISOPODA) IN THE NETHERLANDS

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INTRODUCTION

Specimens of *Trichoniscoides* are tiny and often live deeply hidden in the soil. Their small body size and concealed way of life makes them not easy to discover, especially during dry summer periods when most surveys are done. Once a specimen is discovered it is often difficult to determine the species directly in the field. The genus *Trichoniscoides* Sars, 1899 has three native species present in the Netherlands, i.e. *Trichoniscoides albidus* (Budde-Lund, 1880), *T. sarsi* Patience, 1908 and *T. helveticus* (Carl, 1908). Only specimens of *T. albidus* are easy to distinguish. The dull wine-red colour, in combination with the contrasting white under parts, and one brownish ocellus, sets this species apart from the other two species that both have an orange colour and a reddish ocellus. It is, however, not easy to distinguish *T. sarsi* from *T. helveticus* (photo 1). The males can only be separated after close microscopic examination of the pleopods, while determination of females to the species level is currently not possible.

Photo 1: Habitus of *T. sarsi* (left) and *T. helveticus* (right). Photos © Theodoor Heijerman.

The similar appearance of *T. sarsi* and *T. helveticus* might be one reason for the relatively late discovery of *T. sarsi* in many countries, such as Germany (Allspach, 1989), The Netherlands (Berg, 1997), and Belgium (Lock, 2001). Species of *Trichoniscoides* are poorly recorded, which makes the true extent of their distribution and habitat uncertain, especially at the borders of their geographical range. In Great-Britain *T. sarsi* and *T. helveticus* reach the western extreme of their range (Hopkin, 1991; Oliver & Meechan 1993). They are only known from a few locations in south east England (Gregory, 2002) and the Dublin area, Ireland (Cawley, 2001). From the distribution map published by Gregory (2002) it is apparent that *T. sarsi* and *T. helveticus* are mutually exclusive species, as their British ranges do not overlap. It was questioned why overlap in ranges did not occur. Both species occupy different habitats. *Trichoniscoides sarsi* is found in synanthropic sites, like gardens, while *T. helveticus* lives in calcareous grassland and open woodland on limestone. These habitat types are widely dispersed in south east England.

Therefore, difference in habitat occupancy does not seem to explain the observed exclusion (Gregory, 2002). What factors are at play? Can a comparison between British and Dutch records throw some light on this enigmatic range question? In the Netherlands the status of both species is relatively well known (Berg, Soesbergen, Tempelman & Wijnhoven, 2008). Both are scarce to common, can locally occur in high densities, and are close to the centre of their geographic range.

DISTRIBUTION IN THE NETHERLANDS

Over the last 15 years the members of the Isopod Survey Group of the European Invertebrate Survey, division the Netherlands, have made surveys all over the country. The database of the Isopod Survey Group contains 735 records of *T. helveticus,* and 1980 records of *T. sarsi*. The records of the two species are plotted on a single map in Figure 1. The distribution of Holocene and Pleistocene geological formations are added to the background of the map, and indicate the areas of the country that are below and above mean sea level, respectively. In the Holocene part, the soil consists mainly of sea clay, mixed with smaller areas of lowland peat. Sand dunes along the coast prevent flooding of the hinterland. The Pleistocene part consists mainly of tertiary sand, on which river clay has been deposited along the river areas. In the extreme south east of the Netherlands loess can be found. The coverage of isopod records over the country is mapped in Figure 2, using 10 km grid squares of the Universal Transverse Mercator (UTM) grid as mapping units. Circular

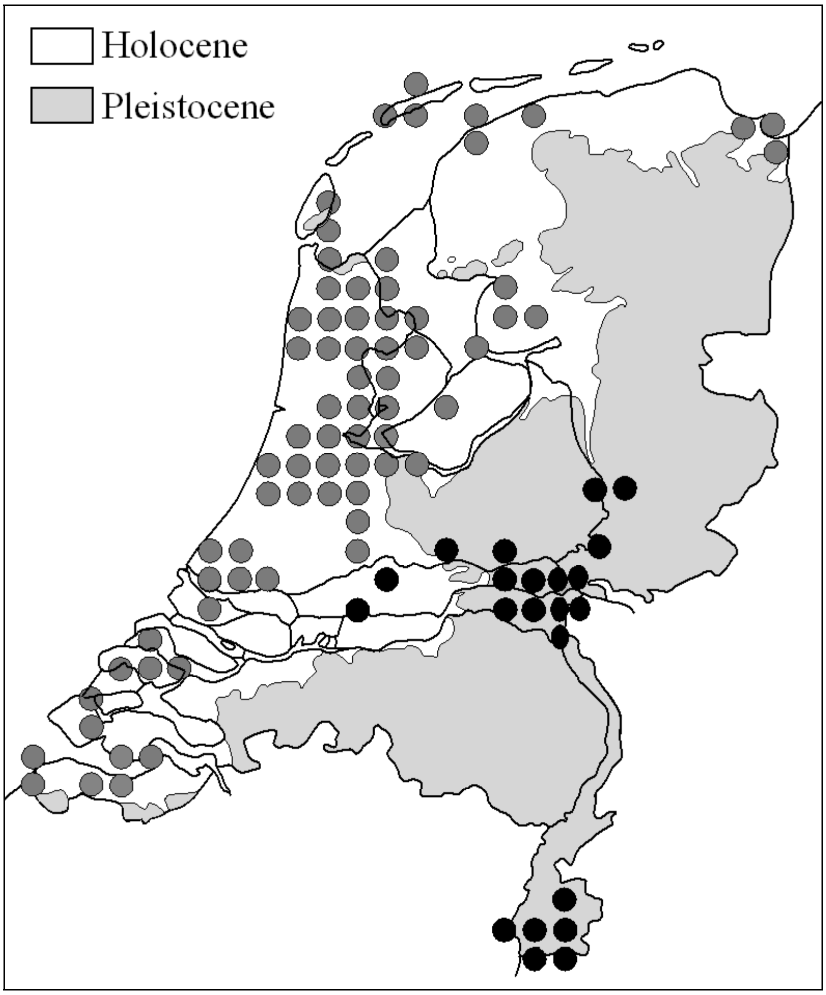

Figure 1: Distribution of *Trichoniscoides sarsi* (grey dots) and *T. helveticus* (black dots) in the Netherlands (grid cells are 10x10 km).

symbols increasing in diameter are used to differentiate the total number of species recorded per grid square. Blank squares indicate that there are no records of terrestrial isopods due to an absence of recording. Figure 2 might help to evaluate whether *T. sarsi* and *T. helveticus* are absent for a certain area due to absence of recordings or in all probability due to absence of the species.

Like in Great-Britain, *T. sarsi* and *T. helveticus* have never been recorded together. Their ranges are clearly divided (see Figure 1). *Trichoniscoides sarsi* is restricted to the western part of the country, and is recorded only from the Holocene region. Most records are from sea clay soils or from synanthropic sites with rich soil types, for instance sea clay mixed with (a little) sand. This species has been recorded from above the supralittoral zone, but never for the dunes nor for lowland peat. *Trichoniscoides helveticus* is more restricted to the eastern part of the Netherlands, but does not occur in the north east. Its distribution is not limited to the Pleistocene area, although most records are from this area. What the records do have in common is that *T. helveticus* only occurs on geologically young, river clay soil and loess soil. However, *T. helveticus* seems to be absent in river estuaries, near the sea, the trajectory of the tidal rivers or the former tidal rivers. It has never been found on sandy soils nor in lowland peat. In Europe, *T. sarsi* has a more 'atlantic' distribution, while *T. helveticus* has a more 'continental' distribution (Schmalfuss, 2003).

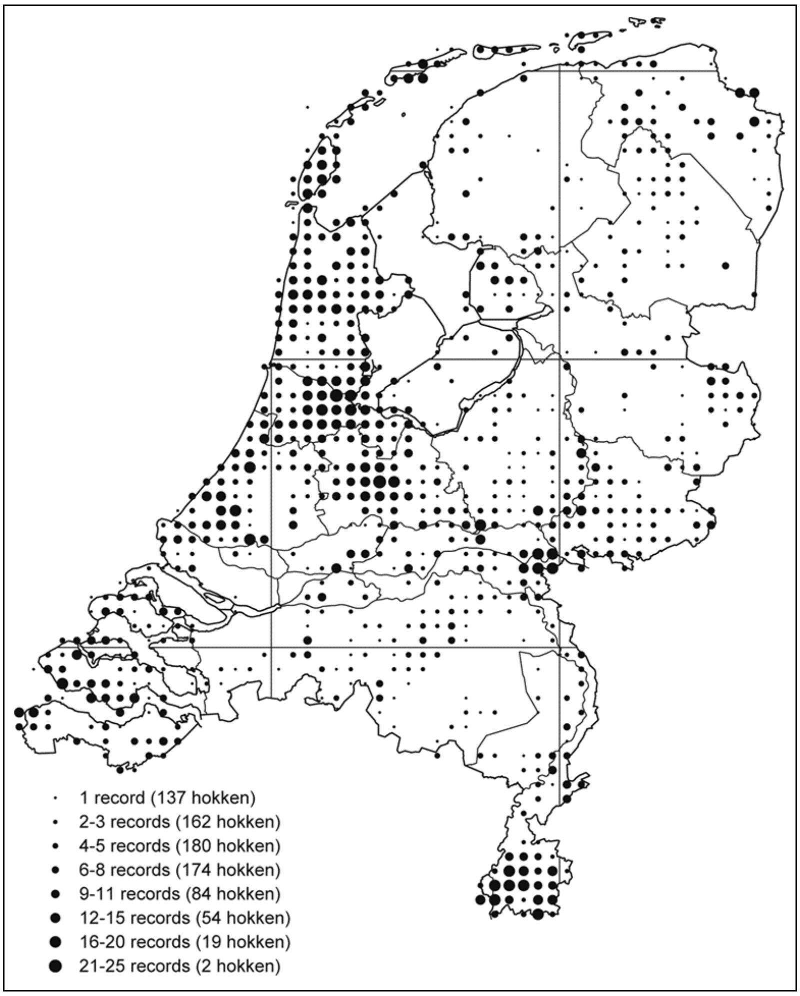

Figure 2: Number of species per grid cell (5x5 km). Between brackets the number of grid cells with a particular species richness is given. The number of species in a grid cell is significantly correlated with the number of records per grid cell. Absence of dots indicate areas that are not surveyed.

HABITAT AND MICRO SITE

Records of the habitat of the mutually exclusive species *T. sarsi* and *T. helveticus* in the Netherlands provide no explanation why their geographical ranges in Great-Britain do not overlap. Their habitat preferences are not different from the habitats already given by Gregory (2002) for Great-Britain. Both species prefer calcareous sites. *Trichoniscoides sarsi* is found in sites of ditches next to grasslands, in drains of road sites, on dikes near fields and lakes, in flowerbeds of gardens, parks, greens and graveyards. This species is often found under synanthropic conditions, and is usually absent from forests. *Trichoniscoides sarsi* often co-occurs with other hygrophylic isopods, such as *Trichoniscus provisorius, T. albidus*, *Haplophthalmus mengii*, *Metatrichoniscoides leydigii* and *Trachelipus rathkii*.

Trichoniscoides helveticus is found in sites of ditches and drains next to fields and rivers, on the shores of lakes, in wooded banks and in moist deciduous forests (Wijnhoven, 2000). Occasionally this species is recorded from gardens, but in general *T. helveticus* avoids synanthropic conditions. Accompanying species are mostly *Haplophthalmus mengii*, *Trichoniscus pusillus*, *T. provisorius*, *Trachelipus rathkii* and *Hyloniscus riparius*.

The micro sites where *T. sarsi* and *T. helveticus* have been found are rather similar. Both species can easily be observed under buried stones and logs, under root mats on concrete culverts and abutments, on the interface between soil and stone walls, and under organic ditch marks. They prefer moist and rather light clay soils with an open texture, in which earthworms are frequently present. Here, they can be found in wormholes, former root channels, between roots, and in larger clay aggregates. They are often observed deeply hidden in the soil profile. Inundation by salt water, fresh water or seepage water is not tolerated. In conclusion, it seems that the non-overlapping ranges of *T. sarsi* and *T. helveticus* can not be explained by habitat or micro site preferences.

SOIL TYPE AND CLIMATE

Trichoniscoides sarsi and *T. helveticus* both prefer moist, base-rich clay soils. However, *T. sarsi* has a strong preference for sea clay, while *T. helveticus* is predominantly found in river clay. Chemically, sea clay and river clay are not very divergent (Locher & de Bakker, 1993). Sea clay has a slightly higher soil pH (5.2 to 7.6) than river clay soil (4.8 to 7.0). The large overlap in soil pH between the two clay types and the small differences in pH at the extremes of the pH range suggest that soil pH does not explain the distribution of *T. sarsi* and *T. helveticus*. Recent deposited or newly reclaimed sea clay soil contains a high sodium content. Although *T. sarsi* does occur in young sea clay soil it is also found in relatively old sea clay soil, with a sodium content not very different from river clay, while *T. helveticus* is absent in old sea clay. Therefore, chemical differences between the two clay soil types does not seem to explain the different ranges of *T. sarsi* and *T. helveticus*.

Soil moisture content affects the suitability of soils as a habitat for soil fauna, especially for isopods with a low drought tolerance. Sea clay has, on average, a significantly higher groundwater level (GWL) and a higher fraction of fine sand than river clay (de Bakker & Locher, 1992; Locher & de Bakker, 1993). As GWL is positively related to soil moisture content, differences in GWL may explain the observed distribution of the two *Trichoniscoides* species. In summer, the GWL for sea clay is 80-120cm below the soil surface, while river clay has a GLW of 120cm. In late summer, the driest period of the year, the low average GWL of river clay might result in soil moisture contents that are too low for *T. sarsi*, but not for *T. helveticus*. However, desiccation measurements under standardized laboratory conditions (measuring mass loss of field collected animals at 15º C and 40% relative humidity, after acclimatization for two days without food) revealed a higher water loss rate for *T. helveticus* (24.3 ml water g^{-1} dry weight h^{-1}) than for *T. sarsi* (20.8 ml water g^{-1} dry weight h^{-1}). If we assume an equal minimum threshold level for the amount of water that can be lost before mortality occurs than *T. helveticus* is reaching this threshold faster under dry conditions than *T. sarsi*, just the opposite of what you would expect. An alternative explanation might be that the minimum threshold level differs for the species.

In winter, the average GWL for sea clay is less than 40cm below ground level, while river clay has a GWL of 40-80cm. A high GWL forces isopods to the soil surface, and this is the reason why tiny, deeply living isopods are easier to collect during winter than in summer. In mid winter, when the GWL is at its highest, river clay soil has more pore space to offer to soil fauna than sea clay. The geographic location of river clay and sea clay in the Netherlands coincide with differences in the long-term yearly minimum temperature and with the long-term monthly minimum temperature from October till January (KNMI, 2007). The minimum temperature in the Pleistocene part of the country, with river clay, is 1.0-1.5 ºC lower than in the Holocene part, with sea clay. This means that sub-zero temperatures occur more often in river clay areas than in sea-clay areas. When the temperature drops below zero for a prolonged period of time, river clay offers better protection than sea clay because animals can crawl deeper into the ground due to a lower GWL. Moreover, isopods probably crawl more easily through river clay than sea clay due to a higher fraction of course sand (De Bakker & Locher, 1992), resulting in a lighter soil type. If extremes at the low temperature range explains the exclusive distribution patterns of the two *Trichoniscoides*-species one would expect the more ‘continental’ *T. helveticus* to be more tolerant to sub-zero temperatures than the more ‘Atlantic’ *T. sarsi*. Unfortunately, information on cold tolerance is not available for both species.

DISCUSSION AND CONCLUSION

Trichoniscoides sarsi and *T. helveticus* are rather similar in choice of habitat and micro sites, but they prefer different soil types, predominantly sea clay and river clay, respectively. Geographic separation of these clay types may result in the mutually exclusive range, with *T. sarsi* occurring in the western part of the Netherlands, and *T. helveticus* in the eastern part. The exclusive presence of *T. sarsi* in sea clay and *T. helveticus* in river clay suggests that explanatory factors for their distribution are related to clay type dissimilarities. On the one hand, sea clay and river clay vary in chemical, physical, and morphological characteristics. Acidity and mineral content are not that different between both clay types, but river clay has a more open texture and has a lower GWL. On the other hand, sea clay is located in the western part of the country, while river clay is found predominantly in the eastern part. Their geographic location coincides with a climatic gradient; more ‘maritime’ or ‘Atlantic’ in the west and more ‘continental’ in the east. In winter, the average minimum temperature significantly declines from the west coast to the eastern border, while the amount of precipitation is about 20mm higher in the west than in the east. Proximity of the North Sea causes relatively cool summers and mild, wet winters in the western part compared to the eastern part. Moreover, the amplitude of the daily temperature fluctuation is smaller in the west than in the east. The correlation between geographic location of clay types and climatic conditions during winter makes it difficult to unravel the observed separation in *T. helveticus* and *T. sarsi*. *Trichoniscoides helveticus* can overcome warm and dry summer conditions by crawling to deeper soil layers that are cool and moist. River clay with its lighter soil, and a lower GWL gives better opportunities to crawl deep into the soil and escape detrimental environmental conditions than sea clay. River clay might give better protection against water loss under dry conditions because animals can crawl deeper into the soil. This could also explain the lower water loss rate of *T. sarsi* compared *T. helveticus*, because *T. sarsi* is more exposed to dry conditions. Similarly, river clay can protect species better to exposure to sub-zero temperatures in winter, which are often accompanied by a low relative humidity. On the other hand, observations in Britain suggests that both species can be found close to the surface in heavy frost (S.J. Gregory, personal communication). It could also be that *T. helveticus* is simply adapted to the colder continental winters, while *T. sarsi* prefer warmer, damper winters. If this argument holds, then *T. helveticus* should have a higher cold tolerance than *T. sarsi*.

Although these factors can explain why *T. helveticus* is not found in the west, it does not give a proper explanation for the absence of *T. sarsi* in the east. For a true understanding why the range of both *Trichonisocides*-species do not overlap, and to be able to differentiate between effects of soil type and climatic factors, we need more physiological information. For instance, how dissimilar are *T. sarsi* and *T. helveticus* in pH-preference, cold-tolerance, drought-tolerance, and vertical stratification along the soil profile? The boundary between sea and river clay areas are particularly attractive to survey in this respect. Here, climatic conditions are equal and it would be interesting to find out if the two species are mutually exclusive too. Quantifying physiological traits of specimens collected in this boundary region, in combination with competition experiments might give an answer to the enigmatic ranges of *T. sarsi* and *T. helveticus*. Nevertheless, the observed differences in the distribution of the two species and their niche in the Netherlands might give some clues why the species have non-overlapping ranges in Great-Britain.

ACKNOWLEDGEMENTS

I am grateful to all the members of the Isopod Survey Group of the European Invertebrate Survey, division The Netherlands for the many records they have gathered over the last 17 years and to Steve Gregory for his constructive comments on an earlier version of the manuscript.

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COMPARISON OF THREE OFTEN MIS-IDENTIFIED SPECIES OF PILL-WOODLOUSE *ARMADILLIDIUM* (ISOPODA: ONISCIDEA)

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The genus *Armadillidium* Brandt, the pill-woodlice, comprises six species in Britain. The eurytopic *Armadillidium vulgare* (Latreille, 1804) is the only widespread member of the genus and may be locally abundant in south-eastern England. The remaining species have more localised distributions and are more restricted in their habitat preferences (Gregory, in prep). There has been some confusion in recent years regarding the correct identification of the two very attractively marked pill-woodlice *A. pictum* Brandt, 1833 and *A. pulchellum* (Zencker, 1798). As both are of some significance it is important to have reliable determination. When faced with juvenile *A. pictum* in particular, it can be easily dismissed as an adult *A. pulchellum*. *A. vulgare* is also found occasionally in brightly coloured forms, with ornate mottling, which have been mistaken for its two scarcer relatives. This latter species may occur with either of the former two and is also considered in this paper.

The rare *A. pictum* is listed in the British Red Data Book (Bratton, 1991). The thin scatter of records extends from the English Lake District south to the Welsh/English border counties of Monmouthshire and Gloucestershire. It typically occurs in hilly areas with rocky terrain where accumulations of scree, rocks or boulders are present. Many known sites are ancient deciduous woodland, but it also inhabits rough and/or shady grassland, including grikes in limestone pavement. It readily climbs vegetation and may be beaten from shrubs or found inhabiting dead wood niches several metres above ground level (Chater, 1988; Richards & Thomas, 1998).

A. pulchellum is more widely distributed and occurs across southern Scotland, northern England, Wales and south-western England. It is mainly associated with the coastal and upland grasslands and can be locally common on the short turf grasslands of the Carboniferous limestones of northern England, such as Derbyshire (Richards, 1995), beyond the northern inland range of *A. vulgare*. However, a few isolated populations are known from heathland in south-eastern England (Hopkin, 1986; Alexander, 2000; Telfer, 2007). In Wales *A. pulchellum* has been collected from Oak *Quercus* sp. woodland (Chater, 1989) and has been beaten from Ivy *Hedera helix* on a tree trunk (J.F. Harper, personal communication). These are habitats akin to those favoured by the rare *A. pictum*.

It is apparent that *A. pictum* and *A. pulchellum* are characteristically associated with rural semi-natural habitats. Although tolerant of acidic substrates, both seem to favour calcareous soils. There would appear to be considerable overlap in their respective distributions and habitat preferences. Indeed, the two may occur at the same site, but they normally occupy different niches. Generally *A. pulchellum* is tolerant of, and possibly favours, higher levels of insolation than *A. pictum* (and possibly also *A. vulgare*). For example on limestone pavement *A. pictum* is typically found within sheltered grikes that dissect the exposed clints favoured by *A. pulchellum*. In light of the Welsh observations cited above, it is clear that associated habitat is not a reliable distinction between the two species and it is essential that care is taken with the identification of these two species.

The marked north-western distribution of *A. pictum* and *A. pulchellum* means that there is a limited overlap of their respective ranges with that of their south-eastern congener *A. vulgare*. Often where their distributions do overlap they do not usually occur at the same locality. Unlike the former two species, *A. vulgare* cannot tolerate high altitude or non-calcareous localities. However, north of a line from the Severn Estuary to the Humber the latter is able to thrive within an increasingly narrow coastal fringe where the effects of latitude are ameliorated by maritime and/or synanthropic influences. Thus, in coastal localities in northern England it is possible to find *A. vulgare* co-existing with *A. pulchellum*. It is also possible that *A. pulchellum* may be under-recorded from relict heathland in south-eastern England, an area where the eurytopic *A. vulgare* is characteristically ubiquitous. *A. vulgare* and *A. pictum* may also occur together, such as seen on the limestones of the Welsh borders (Gregory, 2008). Again, the message is that care is needed with the identification of these superficially similar *Armadillidium* species.

While the FSC synopsis by Oliver and Meechan (1993) is an excellent guide to British and Irish species, there is unfortunately a mix up between the descriptions of the two scarce species, *A. pictum* and *A. pulchellum*. The following is a brief summary of the errors in the key and species descriptions for these two woodlice.

ADDENDUM TO OLIVER AND MEECHAN (1993)

Page 86, Identification key, Couplet 6

First option should read; *Rear angle of first pereonite* ***chamfered*** *(Fig. 36B) ………. Armadillidium pulchellum*

Second option should read; *Rear angle of first pereonite* ***pointed*** *(Fig. 35B) ………. Armadillidium pictum*

Page 92, *A. pictum*, species description

Size incorrect. Should read; *Small to* ***9 mm****, can roll into a tight ball.*

First pereonite should read; *Rear angle of epimera* ***acute**** *(Fig. 35B)*

* it is perhaps better to use ‘smoothly pointed’ or ‘not chamfered’

Description of male sexual characters correct.

Page 93, *A. pictum*, Fig 35 caption

Size incorrect. Should read; *Dorsal view of whole animal, length* ***9mm****.*

Page 94, *A. pulchellum*, species description

Size incorrect. Should read; *Small to* ***5mm,*** *can roll into a tight ball but leaves a gap.*

First pereonite should read; *Rear angle of epimera* ***chamfered*** *(Fig.36B).*

Description of male sexual characters correct.

Page 95, *A. pulchellum*, Fig 36 caption

Size incorrect. Should read; *Dorsal view of whole animal, length* ***5mm.***

The descriptions and figures in Steve Hopkin’s AIDGAP key are correct (Hopkin, 1991), as are those in Vandel (1962) and Gruner (1966). Table 1 summaries the distinctions between the three species of pill-woodlouse considered here.

Table 1: Summary of features distinguishing *Armadillidium pulchellum, A. pictum* and *A. vulgare*

	Armadillidium pulchellum **(Zencker, 1798)**	***Armadillidium pictum*** **Brandt, 1833**	***Armadillidium vulgare*** **(Latreille, 1804)**
Maximum length	Small species to **5 mm**.	Medium species to **9 mm**.	Large species to **18 mm**.
Rolls up	Into a tight ball, with a **slight gap**.	Into a **perfect sphere**.	Into a **perfect sphere**.
Posterior edge of first pereonite	**Chamfered** (i.e 'cut off' to form a blunt angle of two 'corners'). See Figure 1.	**Smoothly pointed**, not chamfered. See Figure 2.	**Smoothly pointed**, not chamfered. Similar to *A. pictum*.
When preserved in alcohol	Solid **dark patch** remains at edge of 7th pereonite.	Solid **dark patch** remains at edge of 7th pereonite.	Edge of 7th pereonite has the **same pigmentation** as central portion.
Male endopod 1	Robust and **slightly curved throughout length.**	**Broadly hooked** through approx. 90°.	Bent through 90° at **extreme tip** only.
Male 7th leg (Pereopod)	Anterior face of the ischium with a **fringe of 'hairs'**.	Sternal faces with a **dense array of jagged ended spines** on carpus and merus. Ischium with no fringe of hairs.	**Sternal face of ischium concave**. Ischium with no fringe of hairs. No dense patch of spines on carpus and merus.
Ridge of scutellum	Extends **all the way around the 'face'.**	Is **raised in the centre only**, not extending around the 'face'.	Is **raised in the centre only**. Similar to *A. pictum.*
Tip of telson	**Wide in comparison to height**. Tip roundly **truncate**, not at all pointed.	Narrower in comparison to height; virtually an **equilateral triangle**. Tip almost **pointed**.	Intermediate between *A. pulchellum* and *A. pictum* but **broadly truncate**.
Colour	Dark brown, mottled with yellow, chestnut and orange patches. Often with red-brown at rear edges of pereonites (as *A. pictum*).	Dark brown or black, with yellow or greenish mottling. Red-brown at rear edges of pereonites. Often slightly darker than *A. pulchellum*.	Typically slate-grey, but variable. Mottled varieties **rarely as ornately patterned** as *A. pulchellum* or *A. pictum*.

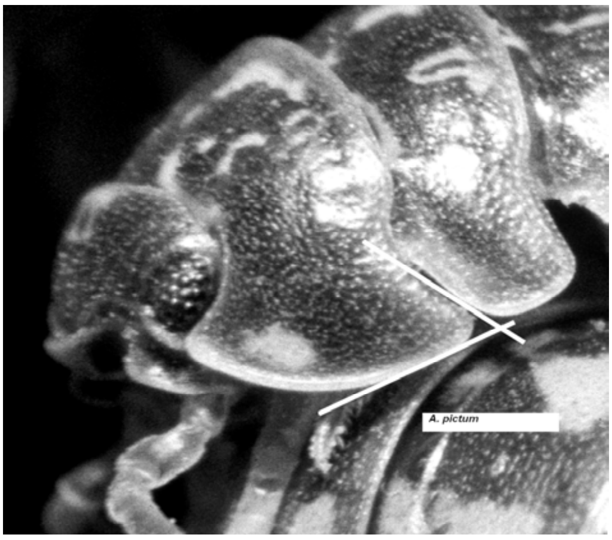

Figure 1: Posterior edge of first pereonite of *Armadillidium pictum* (smoothly pointed)

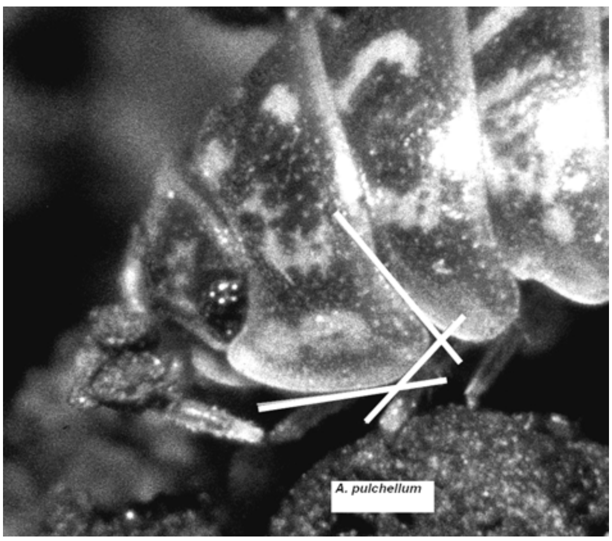

Figure 2: Posterior edge of first pereonite of *Armadillidium pulchellum* (chamfered)

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ARMADILLIDIUM PICTUM BRANDT (ISOPODA: ONISCIDEA) AT DOWNTON GORGE NNR, HEREFORDSHIRE

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Armadillidium pictum Brandt, 1833 is one of Britain's rarest woodlice. Unlike many other woodlouse 'rarities', it is exclusively associated with semi-natural habitats and is listed in the British Red Data Book (Bratton, 1991). It has a marked north-western distribution with the majority of known sites occurring in northern England south to Leicestershire (Daws, 1996). However, a small cluster of records is also known from the Welsh/English border counties of Breconshire (Harding, 2006), Radnorshire (Chater, 1988) and Gloucestershire (Alexander, 1995). *A. pictum* often occurs in hilly areas with rocky terrain, typically where talus slopes with accumulations of scree, rocks or boulders are present. Many known sites are ancient deciduous woodland often on limestone or other base-rich substrates.

Downton Gorge National Nature Reserve is bisected by the river Teme, which has cut through the underlying Silurian limestones to produce a steep sided wooded valley with rocky outcrops and cliffs. The gorge comprises a small fragment of the former Royal Chase of Bringewood, which once covered a large part of the Welsh Borders, but which has now been largely destroyed by clearance for agriculture or replanted with conifers (www.english-nature.org.uk). Historical records indicate that there has been a long-term continuity of ash *Fraxinus excelsior*, lime *Tilia* spp. and elm *Ulmus* spp. woodland present on the site. This is a rare woodland type and for this reason Downton Gorge is designated under European law as a Special Area of Conservation (SAC) (www.jncc.gov.uk). The gorge supports a diverse assemblage of ferns, bryophytes and lichens, reflecting the high humidity of the site, but the invertebrate fauna is less well known.

During the 2007 BMIG field meeting to Ludlow a visit was made by members of BMIG, under permit from Natural England, to the southern part of Downton Gorge NNR (SO 44-74-, vc 36). In light of the apparently suitable nature of the rocky woodland habitat for *A. pictum*, one of the objectives of the author was to look for this rare species. Hand searches were made in a wide variety of microsites known to be frequented by the species (Gregory, in prep.). This included searching amongst moss carpets, within red-rotted timber, beneath stones and dead wood. Tree boles, with loose bark and rot holes were also searched. Considerable effort was also put into hand sorting accumulations of scree.

Eventually, a few specimens of *A. pictum* were found with difficulty by laboriously hand-sorting limestone debris that had accumulated just above a track at the base of a wooded limestone slope. Specimens were not found amongst the loose upper-most pieces of scree, but at a depth of a few centimetres where small quantities of dark organic-rich material had accumulated. The associated species give no indication of anything special about this particular micro-site. The most frequently recorded species were the woodlice *Armadillidium vulgare, Oniscus asellus, Philoscia muscorum, Porcellio scaber* and *Trichoniscus pusillus* agg. and the millipedes *Glomeris marginata, Tachypodoiulus niger* and *Ophyiulus pilosus*. Following its initial discovery the species was repeatedly found by several other members of group within the same general location; a narrow accumulation of scree several tens of metres in length. The species was apparently absent from suitable habitat nearby and despite considerable searches elsewhere across the site a second population was not discovered.

It is of note that the species was found associated with its congener *A. vulgare*. Considering the marked north-western range of *A. pictum* and the south-eastern range of *A. vulgare* it is not surprising that there is normally little overlap in their respective distributions. A few ornately mottled females of this latter species were initially thought to be poorly pigmented *A. pictum*, but upon close examination with a microscope the characteristic dark patch on the edge of the 7th pereonite, characteristic of *A. pictum*, was found to be absent. This suggests that at some sites, such as the welsh borders, *A. pictum* may be overlooked as the common *A. vulgare* and confusion between the two species may be possible.

There have been a number of additional records since the publication of Harding and Sutton (1985). It has become apparent that the species is frequently associated with talus slopes associated with ravines or escarpments. Screes provide a number of features that may favour this species. Firstly, in response to current weather conditions (levels of humidity), screes allow easy vertical movement within the underlying substrate. Secondally, some acidic strata, such as those of the Borrowdale volcanic series, produce base-rich screes as a result of constant land-slippage and rock-fall (K.N.A. Alexander, personal communication). *A. pictum* seems to be able to locate and exploit such base-rich features within an otherwise acidic landscape (P.T. Harding, personal communication). This suggests that *A. pictum* could be adapted to, perhaps even a specialist of, talus slope situations.

As to the perennial question; is *A. pictum* rare or extremely elusive? It does seem to be a genuinely rare species. However, it was discovered in the relatively well-worked county of Derbyshire as recently as 1998, where it has subsequently proved to be widespread, but uncommon (Richards, 2004). It undoubtedly awaits discovery in other localities within its know range. The species is usually found in small numbers, but it may occasionally appear in large numbers in superficial habitats, only to become very elusive on subsequent visits (e.g. Chater, 1988). This is presumably as a result of retreating deep into crevices as a response to changes in humidity and would explain why the species is typically hard to find, even at know sites. It is also likely to be overlooked. Confusion with *A. vulgare* and *A. pulchellum* has also occurred both historically (Harding & Sutton, 1985) and in recent years (Gregory & Richards, 2008).

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PLATYARTHRUS HOFFMANNSEGGII BRANDT IN ARBOREAL ANT NESTS (ISOPODA, ONISCIDEA, PLATYARTHRIDAE)

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Platyarthrus hoffmannseggii is conventionally regarded as a soil-living woodlouse which is primarily associated with ants and most commonly found in ants' nests. Harding & Sutton (1985) provide habitat data accumulated from the records of the British Isopod Study Group – 54% of the 317 records received were from the ground surface while 34% were from the upper 10cm of the soil (horizon data was not provided for the residue). Some detail of the associated ants is provided but all of these construct soil nests, in many cases beneath surface-lying rock fragments. Until recently this fitted my own experience with *Platyarthrus* precisely.

On 13.ix.2007, while surveying old orchards for the rare beetle *Gnorimus nobilis* (Coleoptera: Scarabaeidae), this woodlouse was found with workers of the yellow meadow ant *Lasius flavus* within wood mould in the base of an old hollow plum tree, *Prunus domesticus*. The woodlouse and ants were at about 1m above the ground surface. The orchard is at Highcross, Minsterworth, West Gloucestershire (SO789172). The occurrence of this typical soil-nesting ant above the ground inside an old tree is very unusual but appears to be a feature of this orchard-growing area, with at least two encounters with this ant during 2006, in Minsterworth and Littledean. However, this is the first time that *Platyarthrus* had been found with the ants. The orchards in this area are also full of brown tree ant *Lasius brunneus* and *Platyarthrus* has been found in their nests by David Scott-Langley (personal communication) in this area during a field meeting of Gloucestershire Invertebrate Group in April 2002, at The Plackets (SO764167) and Denny Hill (SO757167), both in Minsterworth.

These observations appeared enigmatic until Steve Gregory drew my attention to an article on the associations between this woodlouse and the various British ants (Hames, 1987). Amongst his long list of ants which have been found to have *Platyarthrus* associated are *Lasius brunneus* and *Lasius fuliginosus* which both construct their nests within the decayed heartwood in the bases of hollow trees. However, the distribution map of *Platyarthrus* sites associated with *L. brunneus* is problematic as all three records lie beyond the known range of that ant (Alexander & Taylor, 1997), coming from West Cornwall and the East Midlands and so the ants have presumably been misidentified. Only a single occurrence with *L. fuliginosus* is shown, on the Lancashire coast. While this ant is best known nesting in the base of old trees it is occasionally found nesting in other situations, especially in coastal sand dunes - Donisthorpe (1915) comments on finding a colony nesting in a hollow in the sand-dunes at Southport on the Lancashire coast. Thus the Lancashire record is likely to be a coastal sand site rather than a tree nest. It may therefore be that the West Gloucestershire observations are the first for the woodlouse in ant nests within the trunks of living trees.

In conclusion, it seems that the presence of appropriate host ants within its range is more important than the actual habitat that the ants occupy.

ACKNOWLEDGEMENTS

Thanks to Steve Gregory for drawing my attention to the Hames paper. The orchard surveys are part of work being organised by the People's Trust for Endangered Species.

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TRACHELIPUS RATHKII (BRANDT 1833); AN ISOPOD NEW TO WALES

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On 2nd November 2007 I visited a site on the Bridgend Industrial Estate at SS927791, vc 41 (Glamorgan), accompanied by Simon Warmingham, ostensibly to search for spiders. The site is a patch of waste ground c 90m x 50m at an altitude of 18m asl bounded on its northern and western sides by light industrial units and on its southern and eastern sides by access roads. It is covered in rough grassland with a scattering of shrubs and large amounts of industrial and domestic refuse, which provides an abundance of habitats for invertebrates.

Only four spider species were collected: *Phrurolithus festivus, Trochosa ruricola, Agalenatea redii* and *Stemonyphantes lineatus,* but the site was rich in isopods with *Androniscus dentiger, Haplophthalmus mengii, Trichoniscus pusillus* agg*, T. pygmaeus, Oniscus asellus, Armadillidium nasatum, Platyarthrus hoffmannseggii, Philoscia muscorum* and *Porcellio scaber* found. Also present was a woodlouse that, to the naked eye, resembled a small, narrow *Oniscus.*

Microscopic examination of the specimen revealed antennal flagellae composed of two articles and five pleopodal lungs: these and other characteristics led me to determine it as *Trachelipus rathkii.* However, Harding & Sutton (1985), give its distribution in Britain as largely the Northamptonshire/Huntingdonshire block with a scattering of records south-east to Kent and south-west to Berkshire.

During the past two decades, its range has been shown to extend as far west as Gloucestershire (Gregory 2004), but until now it has never been collected west of the River Severn. Its discovery in Glamorgan raises the question whether it was accidentally introduced to the industrial estate or does it occur naturally in the area but has been overlooked due a lack of recording in south Wales.

The industrial estate was built during WWII on an area of marshland on the bank of the River Ewenny. As *T. rathkii* inhabits natural damp sites, as well as synanthropic situations, then it may well be found along the Ewenny and other riparian sites in south Wales. I have collected the species along the banks of the Mill Avon and Severn at Tewkesbury, where it exists in large numbers under flood debris.

The specimen was seen and examined by Simon Warmingham and Mark Winder, who agreed with my determination, and was then forwarded to Steve Gregory.. I have since collected at the site but have failed to find another specimen. Simon and I will now carry out searches for colonies on the banks of the Ewenny and other local rivers and Mark intends searching the banks of the Tawe in Swansea.

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THE SUCCESSION OF POST-LARVAL STADIA OF *LITHOBIUS VARIEGATUS* LEACH, 1817 IN A SOMERSET BEECH WOOD

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INTRODUCTION

There have been relatively few field studies on the life history of British lithobiomorph centipedes. They are Roberts (1957) on *Lithobius variegatus* Leach in Hampshire, Vaitilingham (1960) on *L. curtipes* L. Koch also in Hampshire, Wignarajah (1968) on *L. crassipes* C. L. Koch and *L. forficatus* Linn. in Durham and Lewis (1985) on *L. variegatus* in Yorkshire. The results of a further study of *L. variegatus* in Somerset carried out from January 1987 to July 1994 and April 2002 to April 2003 are reported here and compared with data for other *L. variegatus* populations.

There are two phases in the life history of lithobiomorphs. During the anamorphic phase the so-called larvae add extra pairs of legs at successive moults. In the epimorphic phase the post-larval stadia show a progressive development of the genital region and an increase in the number of antennomeres, ocelli and of coxal pores.

Eason (1964) assigned specimens of *L. variegatus* to a post-larval stadium on the basis of the number of coxal pores on leg pairs 12, 13, 14 and 15. In the first post-larval stadium there are two pores on each coxa of the twelfth pair of legs and one on each of the coxae of legs 13, 14 and 15. This is denoted 2,1,1,1. In the second post-larval stadium there are 3,2,2,2, and so on. In the two mature stadia (the fifth and sixth) there are almost invariably 6,5,5,5 and 7,6,6,6 respectively. The post-larval stadia 1-4 are also known as the agenitalis, immaturus, praematurus, and pseudomaturus, the mature stadia as the maturus or maturus junior and the maturus senior. The regular increment of pores means that the stadia are easy to distinguish rendering *L. variegatus* very suitable for life history studies. Eason & Serra (1986) stated that there are never more than 7,6,6,6 pores in *British L. variegatus* but a further seventh post-larval stadium occurs very rarely in some populations (see below).

MATERIALS AND METHODS

The population at Muchcare Wood was studied. This is a mature stand of beech (*Fagus sylvatica* L.) on a SE facing slope of Lydeard Hill near Bishops Lydeard, Somerset at an altitude of 320 to 330 m (grid reference: ST 183339). Samples were taken at approximately monthly intervals, hand-collected from beneath stones and the bark of rotten logs by successive groups of sixth form pupils from Taunton School, Somerset. Where possible, samples of 40-45 specimens were collected and on return to the laboratory, were sexed, weighed, the body length measured and the coxal pore formula recorded. Larval stadia were rarely collected and the investigation was restricted to post-larval stadia.

RESULTS

Figure 1 shows the number of each post-larval stadium collected from January 1987 to December 1990. Figure 2 gives the data for January 1991 to July 1994 and Figure 3 those for April 2002 to April/May 2003. Figure 4 shows the total numbers of stadia 1 to 4 collected from1987 to 1994. A clear succession of stadia is seen from stadium 1 in autumn, winter and spring with peak numbers in December and January, through stadium 2 with peaks in December and February. Stadium 3 was present in spring and summer with peak numbers in June and stadium 4 peaked in June and July.

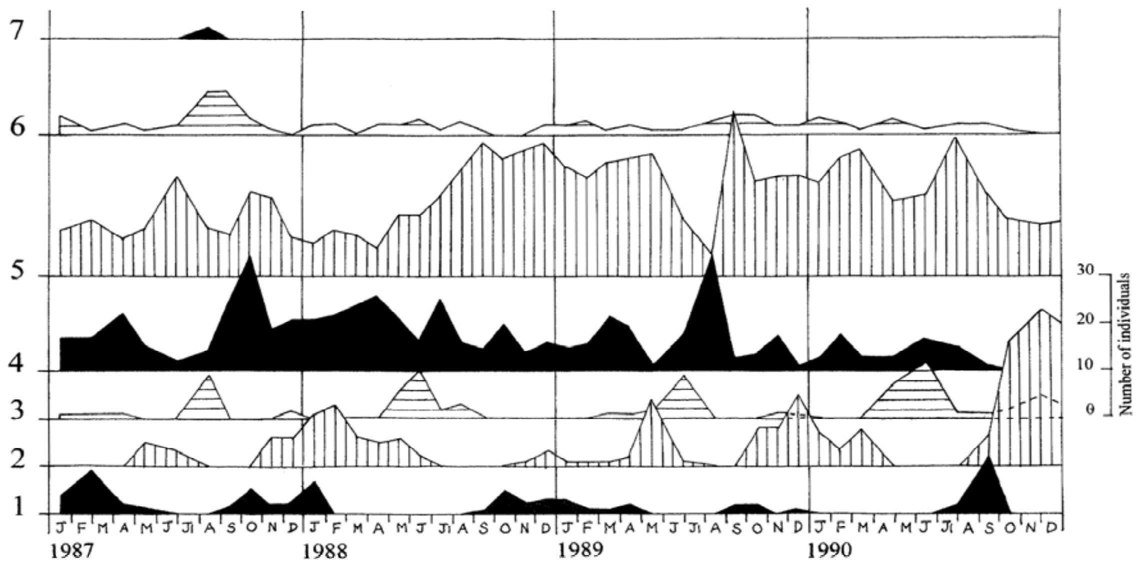

Figure 1: The occurrence of the post-larval stadia of *Lithobius variegatus* in Muchcare Wood, Somerset between January 1987 and December 1990

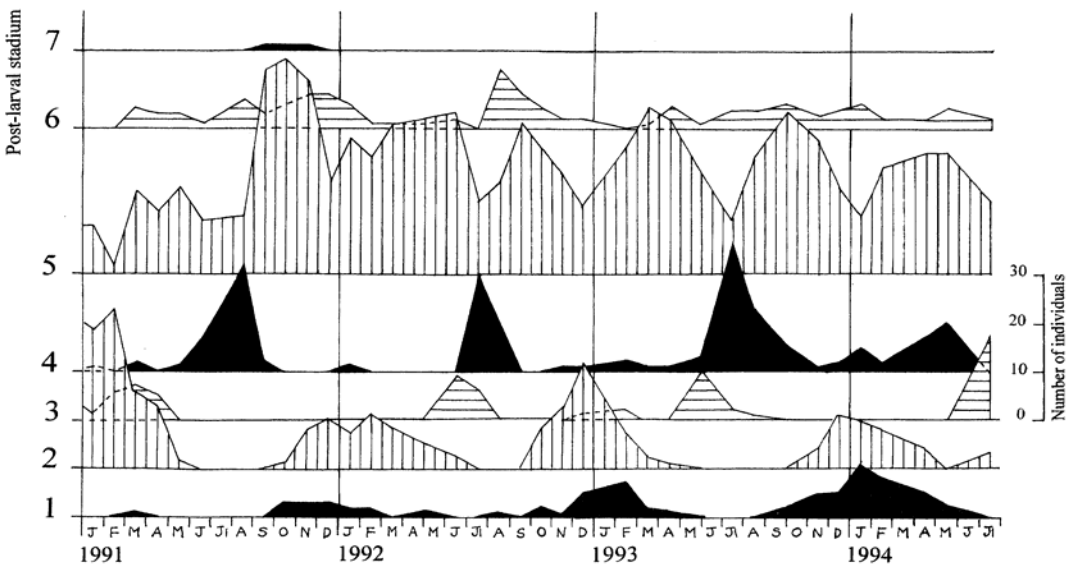

Figure 2: The occurrence of the post-larval stadia of *Lithobius variegatus* in Muchcare Wood, Somerset between January 1991 and July 1994

Maturus juniors were present throughout the year and maturus seniors were present in low numbers in almost all months. One stadium 7 specimen was collected in August 1987 and three in 1991, one in each of the months September, October and November. The general pattern of succession remained much the same throughout the sampling period of 16 years. There were, however, differences in some years most notably in 1990 (Figure 1) when stadium 1 was only present from July to September rather than in autumn, winter and spring. Stadium 4 individuals were present throughout the year from 1987 to September 1990, but were found almost exclusively in June, July and August in 1991 and 1992 (Figures 1 & 2). Numbers were also very low in 2002-2003 except in June/July and August (Figure 3). Maturus senior individuals formed 15 per cent of the population of mature individuals in 1987-1994, 28 per cent in 2002-2003.

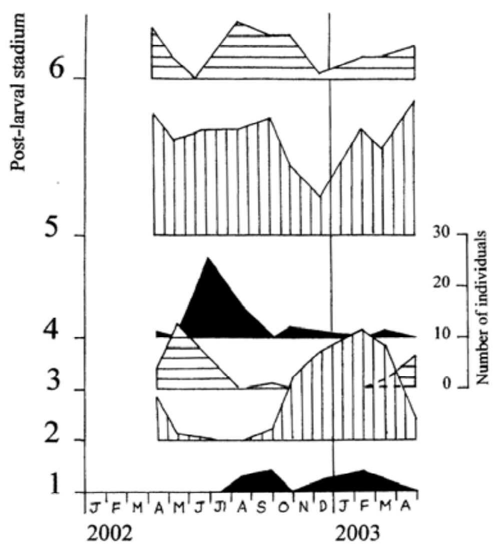

Figure 3: The occurrence of the post-larval stadia of *Lithobius variegatus* in Muchcare Wood, Somerset between April 2002 and April/May 2003

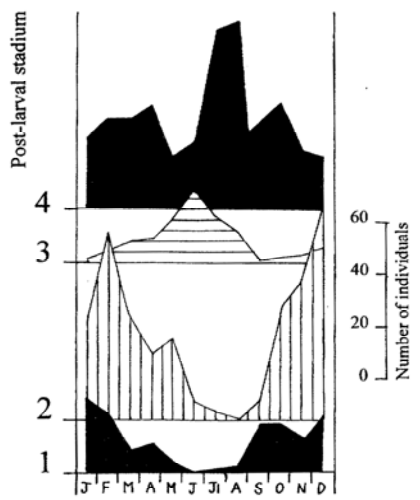

Figure 4: The total monthly numbers of post-larval stadia 1-4 of *Lithobius variegatus* collected in Muchcare Wood, Somerset from 1987 to 1994

DISCUSSION

Roberts (1957) postulated that the main period of oviposition for *L. variegatus* in Burley Wood, Hampshire was early summer (May), the first larval stadia occurring in mid-summer. The later larval stadia follow and the anamorphic stage of development is completed by September. The early epimorphic stadia then, ‘hibernate’ through the first winter emerging in the following spring. During the succeeding (second summer) the immature stadia pass through a number of moults to grow to maturity in approximately 15 months. In this, the second autumn, mating occurs. Oviposition takes place the following spring and the majority of the adult population dies. The length of life is therefore approximately two years in most cases. Roberts suggested that maturus senior (most of which were taken in the winter) results from a moult which occurs in the late summer – probably August.

In Shipley Glen, Yorkshire (Lewis, 1965) no post-larval stadium 1 were collected but stadium 2 was found from September to May peaking in November, December and January. Stadium 3 was found from October to June peaking in January and February and stadium 4 from June to September peaking in June and July (Figure 5). It was concluded that stadium 4 moulted to the maturus junior stadium in August and September and that eggs were laid through much of the year with a peak in spring. This suggests a two-year life cycle similar to that of the Hampshire population.

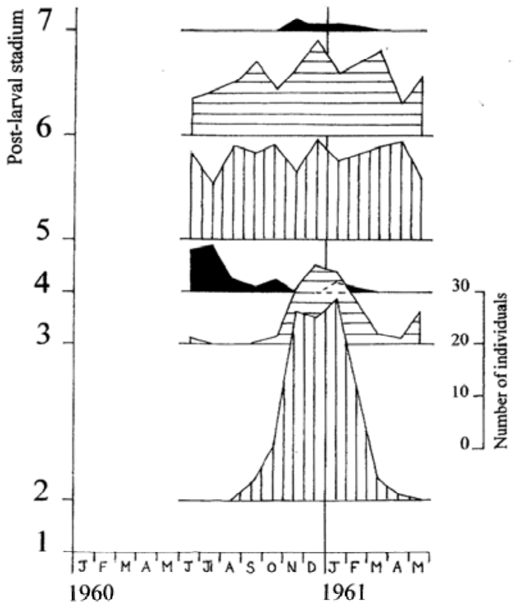

Figure 5: The occurrence of the post larval stadia of *Lithobius variegatus* in Shipley Glen Yorkshire between June 1960 and May 1961.

The succession of epimorphic stadia 2, 3 and 4 in Somerset is similar to that seen in Robert's Hampshire population, but post-larval stadium 1 was most common in August and September in Hampshire whereas in Somerset they were most common between September and February. This suggests that stadium 1 moulted to stadium 2 earlier in Hampshire than in Somerset.

In the Yorkshire population stadium 3 peaked in winter as opposed to late spring and summer in Hampshire and Somerset. Maturus senior individuals formed a much larger proportion (40 per cent) of the population of mature animals than in Somerset (15 or 28 percent) or Hampshire ("never numerous, small numbers taken in autumn, winter and spring"). Such differences could be ascribed to climatic differences, however, there can be differences between geographically close populations thus Lewis (1994) showed that there were marked differences between three populations in a small area of the Quantock Hills in Somerset within an overall distance of 5.2 km and all at an altitude of about 300m. Sampled in late February and early March 1991, in two localities the majority of post-larval stadia were at stadium 2 in the third they were at stadium 3. There were also differences in the occurrence of maturus junior and maturus senior stadia.

With a peak of egg-laying in spring, post-larval stadium 1 appearing in the autumn, stadium 4 the following summer or early autumn and the maturus juniors in the autumn to lay eggs the following year, then there will be a two year life cycle in the Somerset population. There are no data on the time of moult to the maturus senior but if it is after a year then matures juniors must survive into a third year and maturus seniors into a fourth.

SUMMARY

Populations of *Lithobius variegatus* in Yorkshire, Hampshire and Somerset appear to have a two-year life cycle but some individuals may survive into a fourth year.

ACKNOWLEDGEMENTS

This work was largely carried out at Taunton School supported by the Royal Society and Association for Science Education Research in Schools Committee. Successive groups of Sixth Form pupils collected and recorded data on the population of *L. variegatus*. My thanks are due to them and to Mr W. H. G. Warmington who kindly gave his permission for members of the Sixth Form to collect in Muchcare Wood.

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TOWARDS A BETTER KNOWLEDGE OF THE FRENCH CENTIPEDE FAUNA: REVIEW

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One of the aspects of the study of myriapods by British workers has been an interest in the fauna of neighbouring areas of mainland Europe especially that of northern France. There have been a variety of studies of the centipedes of that country and Brolemann's Faune de France *Chilopodes* (1930) was a standard work for UK use until Ted Eason's book (Eason, 1964) set the tone for a whole new outlook on the British fauna. However, Brolemann's data on the northern departements was very sketchy, going back to some of his own earlier studies and those of Gadeau de Kerville on Normandy, Chausey, etc. from the end of the 19th century. Demange's *Les Millepattes* (1981) added very little to the centipede data, that part of the book being largely based on Brolemann.

In the 1930s, 1940s and 1950s there were a small number of short papers by Legendre, Delamare-Deboutteville and Razet & Barbotin relating to Brittany, not necessarily well known or easily accessible to British workers.

In a BMG Newsletter Andy Keay reported *Lithobius variegatus* from France (Brittany) for the first time (Keay, 1983 *unpub*.; Barber, 1986) and in early issues of the Bulletin of the British Myriapod Group (Volumes 3-5) were notes by various British workers including a report of *L.variegatus* from Normandy by John & Sheila Lewis (Kime *et.al.*1987), *Schendyla peyerimhoffi* from Brittany (Blower, 1987) and *Geophilus gracilis* (*Geophilus fucorum seurati* of Eason, 1964) also from Brittany (Lewis & Kime, 1988). In the Memorial Volume of this *Bulletin*, Des Kime (Kime, 2003) reported on various centipedes identified by Ted Eason from France and elsewhere although none appear to be from the present area.

In 2000, Alain Livory, a naturalist whose interests included myriapods, published an account of records of *Scutigera coleoptrata* on the French coast and Isles of Chausey. Meanwhile, in France, Jean-Jacques Geoffroy has been collating aspects of the many species of French myriapods and their distribution.

It was in about 2002 that another French worker, Etienne Iorio started to publish a series of papers on chilopods, including, in 2005 a *Contribution à la connaissance des chilopodes de Bretagne* and in 2006 *La faune des Chilopodes du Massif Armoricain, Biologie, liste préliminaire et determination des espèces (Chilopoda)* and the following year *Nouvelles données sur la morphologie et la distribution géographique des Chilopodes du Massif Armoricain (Chilopoda)*. Now British workers have a good starting point for comparing the centipede fauna of Southern Britain with that of Northern France.

Parallel to the various other studies on centipedes, Etienne was also developing an interest in the French species of *Cryptops*. In BMG Bulletin 16 (Barber, 2000) the three British species of that genus were described and names of a few other European ones mentioned. France has a few more species than Britain overall and also two species of *Scolopendra*. In January 2008 Etienne Iorio & Jean-Jacques Geoffroy published *Les Scolopendromorphes de France (Chilopoda Scolopendromorpha): Identification et Distribution Géographique des Espèces* .

It would seem useful to look at both the Massif Armoricain and the Scolopendromorpha papers in more detail.

CENTIPEDES OF THE MASSIF ARMORICAIN

The first part of the 2006 booklet is an Introduction, describing the nature of the Massif Armoricain (Brittany, Pays de la Loire, Western Normandy). There is then an introduction to the biology of centipedes.

A table of species occurring in the three areas mentioned then follows and a complete preliminary listing. Most of these names will be familiar to British workers even if some are restricted in their distribution in this country. However there are some whose status in Britain is doubtful (*L.agilis*), is based on a really small number of records (*Pachymerium ferrugineum*) or are not on the UK list (e.g. *Lithobius aeruginosus*,) (Table 1). *Geophilus pusillifrater* is added here to the French list. There are also comments on *Lithobius dentatus*, *L. lucifugus*, *L. nicoeensis*, *L. mutabilis*, *Geophilus proximus*, *Himantarium gabrielis*, *Stigmatogaster arcis-herculis*, *Geophilus carpophagus* / *G. easoni*, *G. fucorum*, *G. osquidatum* / *G. joyeuxi*, *G. truncorum ribauti* / *G. pusillus*.

Table 1: Armorican and British species comparison

Armorican species widespread in Britain	Armorican species rarely found or ± regional in Britain	Armorican species not yet found in Britain	British species not yet found in Massif Armoricain
Stigmatogaster subterranea	*Scutigera coleoptrata*	*Geophilus algarum*	*Stigmatogaster brevior*
Hydroschendyla submarina	*Henia vesuviana*	*Geophilus inopinatum*	*Schendyla dentata*
Schendyla peyerimhoffi	*Pachymerium ferrugineum*	*Geophilus gavoyi*	*Henia brevis*
Schendyla nemorensis	*Geophilus linearis*	*Schendyla monodi*	*Eurygeophilus pinguis*
Strigamia acuminata	*Geophilus osquidatum*	*Lithobius aeruginosus*	*Nothogeophilus turki*
Strigamia crassipes	*Geophilus pusillifrater*	*Lithobius agilis* (?in Britain)	*Geophilus proximus*
Strigamia maritima	*Lithobius muticus*	*Lithobius pelidnus*	*Arenophilus peregrinus*
Geophilus carpophagus sl	*Lithobius piceus*		*Lithobius lapidicola*
Geophilus electricus	*Lithobius pilicornis*		*Lithobius lucifugus (?armori)*
Geophilus flavus	*Lithobius tricuspis*		*Lithobius peregrinus*
Geophilus gracilis			*Lithobius tenebrosus*
Geophilus truncorum			
Cryptops anomalans			
Cryptops hortensis			
Cryptops parisi			
Lamyctes emarginatus			
Lithobius borealis			
Lithobius calcaratus			
Lithobius crassipes			
Lithobius curtipes			
Lithobius forficatus			
Lithobius macilentus			
Lithobius melanops			
Lithobius microps			
Lithobius variegatus			

There are hints on collection and keys for the determination of species. The geophilomorph key includes *Geophilus gavoyi* which has second maxillae with a peg rather than a claw as in *G. insculptus*, the latter not occurring in the area but with a note on how to distinguish it. There is a tabular geophilomorph key giving numbers of leg pairs for males and females followed by a series of figures. The key for scolopendromorphs covers the three *Cryptops* species found in Britain &

separates *C. hortensis* and *C. parisi* on the basis of labrum structure. The lithobiomorph key is followed by tables of body sizes and of spinulation and figures.

A section follows on determining sex in the three orders, a description of *Scutigera*, techniques for manipulation of specimens to examining mouthparts / labrum and a description of *Geophilus pusillifrater*. An extensive set of references is given.

Intended only as a preliminary work intended to prompt further studies, the 74 page booklet is likely to be of interest to British workers, especially those in the south and west both as a supplement to existing works and as a guide to what might be found when visiting the Brittany / Normandy area or to possible additional species that night occur in the Channel Islands or even SW England.

The 2007 paper provides lists of localities and additional notes for distinguishing some species. Interesting to note that *Lithobius variegatus* is now recorded from Pays-de-la-Loire as well as Brittany and Normandy but appears to be relatively infrequent and certainly not as common as it is in many parts of western Britain.

FRENCH SCOLOPENDROMORPHA

There are a total of eight, possibly nine species of this order reported from France, including Corsica, by the authors. The present key, based on existing works and recent papers by the two authors, aims to provide a solid base (une solide base de travail) for this group.

The species are clearly separated into the large (40-120mm) *Scolopendra* species and the relatively smaller (10-50mm) and more slender Cryptops. Of the former, *Scolopendra cingulata* (Southern France) is by far the larger and is distinguished from *S. oraniensis* (= *S. canidens oraniensis* of Brolemann, 1930) on the basis of the last tergite and projections and spines on the last legs. The latter occurs in Corsica. Further afield, *S. cingulata* is reported from much of Southern Europe, the Near East, Iran, Tadjikistan and North Africa with *S. oraniensis* from Italy, Malta, Portugal, Spain, Algeria, Morocco. There are coloured pictures of *S. cingulata* and *Cryptops parisi*.

The *Cryptops* key begins with the characteristics of the first tergite and its sutures (with appropriate illustrations), something familiar to us from our *C. anomalans*. A single arc-shaped transverse groove but without any other longitudinal or diagonal grooves leads to *C. sublittoralis*, a species of uncertain status described by Verhoeff from Alpes-Maritimes.

The first tergite with both transverse and longitudinal grooves leads to *C. umbricus*, *C. anomalans* and *C. trisulcatus*. *C. umbricus* is a distinctive cavernicolous species from Alpes-Maritimes, Alpes-de-Haute-Provence and Italy. *C. anomalans* has the characteristic X-shaped sutures whilst *C. trisulcatus* has the two longitudinal sutures but they do not cross, coming together only as they join the transverse one. *C .anomalans* is recorded widely both in France and in Southern Europe, *C. trisulcatus*, a Mediterranean species, from the South, from Spain, Greece, Italy, Portugal, Roumania, Turkey, Algeria & the Canaries.

The three remaining species, without grooves on the first tergite, are separated initially on the character of the labrum (not always easy for a beginner to see but in the final analysis, with “problem specimens”, the critical determination between *C. hortensis* and *C. parisi* in Britain). *C. parisi*, widespread in France and much of Europe has a tridentate labrum whilst *C. lobatus* and *C. hortensis* have a unidentate one (illustrated).

The final separation of these latter two species is based on the shape of the forcipular coxosternite, the presence of spines on this and the characteristics of the claw. *C. lobatus* is reported from Var and Alpes-Maritimes as well as the Italian Riviera, and the familiar *C. hortensis* from much of France and widely in Europe. On the basis of the distributions given here, it seems unlikely that new species of scolopendromorph will be found outdoors in Britain unless there is significant climatic change and that the only other types likely to therefore be found could be hothouse exotics such as *Cryptops doriae* (Lewis, 2007) or specimens brought in with fruit or other goods.

For each of the species a list of synonyms is given, including *Cryptops savignyi* (of Leach = *C.hortensis*: *sensu* Brolemann & Demange = *C.anomalans*). There is an extensive list of references.

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RECORDS OF MILLIPEDES FROM KEW GARDENS AND THE EDEN PROJECT, INCLUDING DESCRIPTIONS OF THREE SPECIES

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INTRODUCTION

The millipedes of glasshouses and formal gardens have been relatively well studied in Britain and new and interesting species regularly reported. Kew Gardens is perhaps the most well known botanic garden and glass house complex and many species have been reported here first and subsequently found elsewhere (for example *Poratia digitata* and *Haplopodoiulus spathifer*), Kew is also the type locality for *Prosopodesmus panporus*, the native country of which is still unknown. A new extensive glasshouse complex, the Eden Project, has also been established in Cornwall in recent years. This has already been the source of new species to Britain, for example the centipede *Cryptops doriae* (Lewis 2007).

In October 2002 the BMIG held a field meeting at Kew Gardens to establish the current status of some of the unusual species previously recorded following complete refurbishment of the Palm House. Several other visits have also been made in recent years. Collecting visits to the Eden Project were carried out by the Entomology Department of the Natural History Museum (London) in 2003 and University of Plymouth in 2005. This report lists the millipedes found and gives descriptions of three species not previously described in British literature. A notable find at the Eden Project is *Paraspirobolus lucifugus* (Gervais) the first example of a millipede of the order Spirobolida, in the British Isles, this order has no indigenous species in the Western Palaearctic.

KEW GARDENS

The millipedes recorded are shown in Table 1. Of the Kew 'specialists' *Haplopodoiulus spathifer* was found in both the palm house and outside close to a lake; this species is clearly well established. *Prosopodesmus panporus* still occurs in the Palm House and was found on two separate occasions. An apparent notable addition is *Cylindrodesmus hirsutus*, also from the Palm House and found on three separate times between 2002 and 2005. The very widespread hot house millipede *Oxidus gracilis* was still very common and *Cylindroiulus truncorum*, a species largely known from botanic gardens in the UK, was refound. Several British native species were also recorded from the outside areas as well as the glass houses.

THE EDEN PROJECT

The millipedes found are given in Table 2. The frequently found hot house millipede *Oxidus gracilis* appears to be common in the litter samples. The warm temperate biome seems to be inhabited by common British species but there are two species found that are apparently new to Britain, the spirobolidan *Paraspirobolus lucifugus* and the small relative of *Polyzonium*, *Rhinotus purpureus*. The tiny polydesmidan *Cylindrodesmus hirsutus* previously only known in the British Isles from Kew Gardens was also found.

Table 1: Millipedes collected from Kew Gardens

Key: P.O.W. - Princess of Wales Conservatory. Recorders: ADB - Tony Barber, SG - Steve Gregory, ZK - Zoltan Korsos, PL - Paul Lee, JPR - J. Paul Richards, HR - Helen Read.

Location	Species	Date	Recorders
Palm House	*Oxidus gracilis*	13/10/2002	JPR, SG, HR
Palm House	*Oxidus gracilis*	21/12/2002	Mann & Hogan
Palm House	*Oxidus gracilis*	06/2005	PL
Palm House	*Cylindrodesmus hirsutus*	13/10/2002	HR
Palm House	*Cylindrodesmus hirsutus*	26/09/04	PL
Palm House	*Cylindrodesmus hirsutus*	06/2005	PL
Palm House	*Prosopodesmus panporus*	06/2005	PL
Palm House	*Prosopodesmus panporus*	13/10/2002	HR
Palm House	*Choneiulus palmatus*	13/10/2002	SG, HR
Palm House	*Proteroiulus fuscus*	13/10/2002	SG, HR
Palm House	*Haplopodoiulus spathifer*	13/10/2002	JPR
Palm House	*Cylindroiulus parisiorum*	13/10/2002	SG, HR
Palm House	*Cylindroiulus truncorum*	13/10/2002	JPR
Palm House	*Cylindroiulus truncorum*	22/12/2002	Mann & Hogan
Evolution House. Under stones	*Nopoiulus kochii*	13/10/2002	JPR
P.O.W. 1: wet tropics	*Prosopodesmus panporus*	13/10/2002	SG
P.O.W. 1: wet tropics	*Choneiulus palmatus*	13/10/2002	SG, HR
P.O.W. 1: wet tropics	*Cylindroiulus parisiorum*	13/10/2002	JPR
P.O.W. 3: dry tropics	*Choneiulus palmatus*	13/10/2002	SG, HR
P.O.W. 3: dry tropics	*Cylindroiulus caeruleocinctus*	13/10/2002	SG
P.O.W. 3: dry tropics	*Cylindroiulus truncorum*	13/10/2002	HR
P.O.W. 4: tropical ferns	*Oxidus gracilis*	13/10/2002	SG, HR
P.O.W. 4: tropical ferns	*Choneiulus palmatus*	13/10/2002	SG, HR
P.O.W. 4: tropical ferns	*Cylindroiulus parisiorum*	13/10/2002	SG
P.O.W. 4: tropical ferns	*Cylindroiulus truncorum*	13/10/2002	HR
P.O.W.	*Choneiulus palmatus*	13/10/2002	ADB
P.O.W.	*Oxidus gracilis*	13/10/2002	ADB
Temperate House	*Choneiulus palmatus*	13/10/2002	ADB
Temperate House	*Choneiulus palmatus*	06/2005	PL
Temperate House	*Blaniulus guttulatus*	13/10/2002	ADB
Temperate House	*Blaniulus guttulatus*	06/2005	PL
Temperate House	*Cylindroiulus britannicus*	06/2005	PL
Temperate House	*Cylindroiulus truncorum*	13/10/2002	ADB
Temperate House	*Cylindroiulus vulnerarius*	13/10/2002	ADB
Temperate House	*Cylindroiulus vulnerarius*	06/2005	PL
Lakeside towards POW	*Blaniulus guttulatus*	13/10/2002	HR
Under conifers	*Haplopodoiulus spathifer*	13/10/2002	ADB
Lakeside towards POW	*Haplopodoiulus spathifer*	13/10/2002	SG, HR
Lakeside towards POW	*Cylindroiulus britannicus*	13/10/2002	SG, HR
Lakeside towards POW	*Cylindroiulus vulnerarius*	13/10/2002	SG
Palm House	*Cylindroiulus truncorum*	12/1991	ZK, HR
Palm House	*Proteroiulus fuscus*	12/1991	ZK, HR
Palm House	*Oxidus gracilis*	12/1991	ZK, HR
Palm House	*Prosopodesmus panporus*	12/1991	ZK, HR

Table 2: Millipedes collected from the Eden Project

Key: x – present and abundant

to recorders: ADB - Tony Barber, BM – British Museum (Natural History)

Location	Species	Male	Fe-male	Imma-ture	Date	Recorder
Litter 1	*Oxidus gracilis*	1			28/4-2/5/2003	BM
Litter 8	*Oxidus gracilis*	2	1		28/4-2/5/2003	BM
Litter 9	*Oxidus gracilis*			1	28/4-2/5/2003	BM
Litter 5	*Oxidus gracilis*		1		28/4-2/5/2003	BM
Litter 14	*Oxidus gracilis*	1			22/10/2003	BM
Litter 1	*Tachypodoiulus niger*	2	1		28/4-2/5/2003	BM
Warm Temperate biome	*Oxidus gracilis*	x	x		11/5/2005	ADB
Warm Temperate biome	*Cylindroiulus punctatus*	x			11/5/2005	ADB
Warm Temperate biome	*Polydesmus angustus*	1			11/5/2005	ADB
Warm Temperate biome	*Cylindroiulus britannicus*	1	1		11/5/2005	ADB
Warm Temperate biome	*Oxidus gracilis*	x			2005	ADB
Humid tropics biome	*Paraspirobolus dictyonotus*	x	x		2005	ADB
Humid tropics biome, site 8	*Cylindrodesmus hirsutus*				11/5/2005	ADB
Humid tropics biome, site 5	*Cylindrodesmus hirsutus*				11/5/2005	ADB
Litter 9	*Cylindrodesmus hirsutus*				22/10/2003	BM
Litter 15	*Cylindrodesmus hirsutus*				22/10/2003	BM
Litter 7	*Cylindrodesmus hirsutus*				28/4-2/5/2003	BM
Litter 9	*Cylindrodesmus hirsutus*				28/4-2/5/2003	BM
Litter 17	*Poratia digitata*				28/4-2/5/2003	BM
Litter 4	*Rhinotus purpureus*	1	2		28/4-2/5/2003	BM
Litter 8	*Rhinotus purpureus*		1	3	28/4-2/5/2003	BM
Litter 15	*Rhinotus purpureus*	1	2	(1jM)	28/4-2/5/2003	BM

DESCRIPTIONS OF NEW SPECIES

CYLINDRODESMUS HIRSUTUS POCOCK, 1889

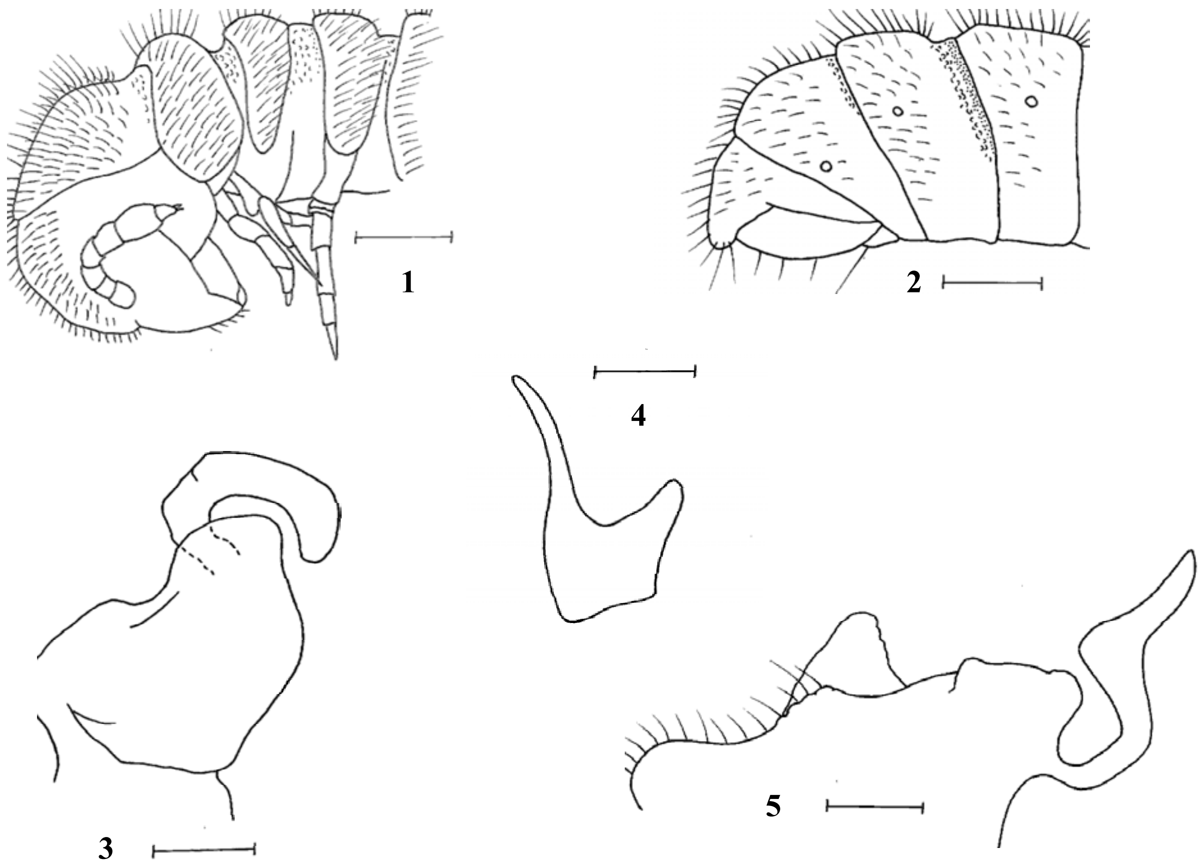
Appearance

A small white polydesmoid with most paranota totally reduced. British female specimens up to 6.5mm in length and 0.6mm wide. The only entire male 3.8mm long and 0.5mm wide.

Body shape quite cylindrical in appearance. Collum and metaterga clothed with dense, in part 2-segmented setae (Figure 1). Antennae relatively short, in one specimen with chestnut coloured apical segments. Only body ring 2 with clear paranota, following segments only with small swellings laterally. 19 (male) or 20 (female) body rings (including collum and telson) in adults. Telson with short but clearly defined projection bearing four setae (Figure 2).

Of the five specimens collected at Kew Gardens there are no males. From the Eden Project 26 specimens were collected of which two were mature males. The majority of the others had 18-19 body rings and thus were immature but none showed any reduction in legs normally expected of polydesmid males in the moult before maturity.

Male gonopods (Figures 3-5) with clear anterior and posterior parts. Anteriorly with long (but rather sigmoid shaped) projection. Laterally with more gentle expansion. See Golovatch *et al*. 2000 for SEM micrographs of the gonopods which show the structure more clearly. Males from the Eden Project seem to have rather more bent gonopods than some of those described previously, a feature described by Golovatch *et al*. (2001) as something that might be expected in residual males in a population which is largely parthenogenetic.



Figures 1-5: *Cylindrodesmus hirsutus*
1. Head and first few segments. 2. Telson. Scale bars = 0.21mm
3. Male gonopods posterior view. 4. Male gonopods anterior view. Scale bars = 0.025mm
5. Male gonopods lateral view. Scale bar = 0.04mm

Distribution

This species is first mentioned for Britain by Lee (2006), based on specimens from Kew in 2002. As mentioned in Lee (2006) however, correspondence between Adrian Rundle and Henrik Enghoff in spring 1986 confirms the identification of some specimens Adrian had found at Kew as *Cylindrodesmus laniger* Schubart, 1944 (a junior synonym of *C. hirsutus* see below). Golovatch *et al.* 2000 also mentions 'strong evidence of its presence in the British Isles'. In 2005 it was also found in a tropical butterfly house in South Yorkshire (Lee 2005). This species has also been found in hothouses in Paris, Vienna and Berlin (Golovatch *et al.* 2000). It has also been found in a wide range of tropical countries and islands including the Galapagos, Ecuador, the Seychelles, Brazil, Indonesia etc.

Taxonomy

Until recently (Golovatch *et al.* 2001) two separate species of *Cylindrodesmus* were considered to inhabit European hothouses, *C. hirsutus* and *C. laniger*. These are now considered to be synonymous, with variations described by Golovatch *et al.* (2000). Populations of larger individuals (7-8mm), previously identified as *C. hirsutus,* are (nearly) always bisexual; those of smaller individuals (up to 5.5mm), previously identified as *C. laniger,* include some parthenogenetic populations.

It is interesting to note that males appear to be more abundant in the samples from the Eden Project than most other collections.

PARASPIROBOLUS LUCIFUGUS (GERVAIS, 1836)

The order Spirobolida can be distinguished from the Julida (i.e. the families Julidae and Blaniulidae of the British Isles) by the form of the gnathochilarium (seen by examining the underneath of the head capsule, Figure 6), the presence of a suture on the front of head (Figure 7) and details of the male gonopod structure.

Appearance

P. lucifugus resembles a shorter, fatter julid. Males from the Eden Project are 10-16mm in length, 1.2-1.45mm in body height with 25-33 podous rings and 2-4 apodous. Females are up to 19mm in length, up to 1.7mm in body height with up to 35 podous rings and usually 2 apodous rings.

The body shape is cylindrical with very blunt anterior and posterior ends. The background colour of the animals is yellow/green gold with darker red brown stripes at ozopore level and a thin dark dorsal stripe (Figure 8). The repugnatorial glands are dark brown and prominent (in preserved specimens at least).

The head (Figures 7 & 9) has the anterior suture, diagnostic of Spirobolida, clearly visible as a dark line on a paler background (in the Juliformia this is a more or less distinct vertigial furrow). There are 21-25 obvious black ocelli on mature specimens but the rows not easily readable. The antennae are very short and the legs also relatively short.

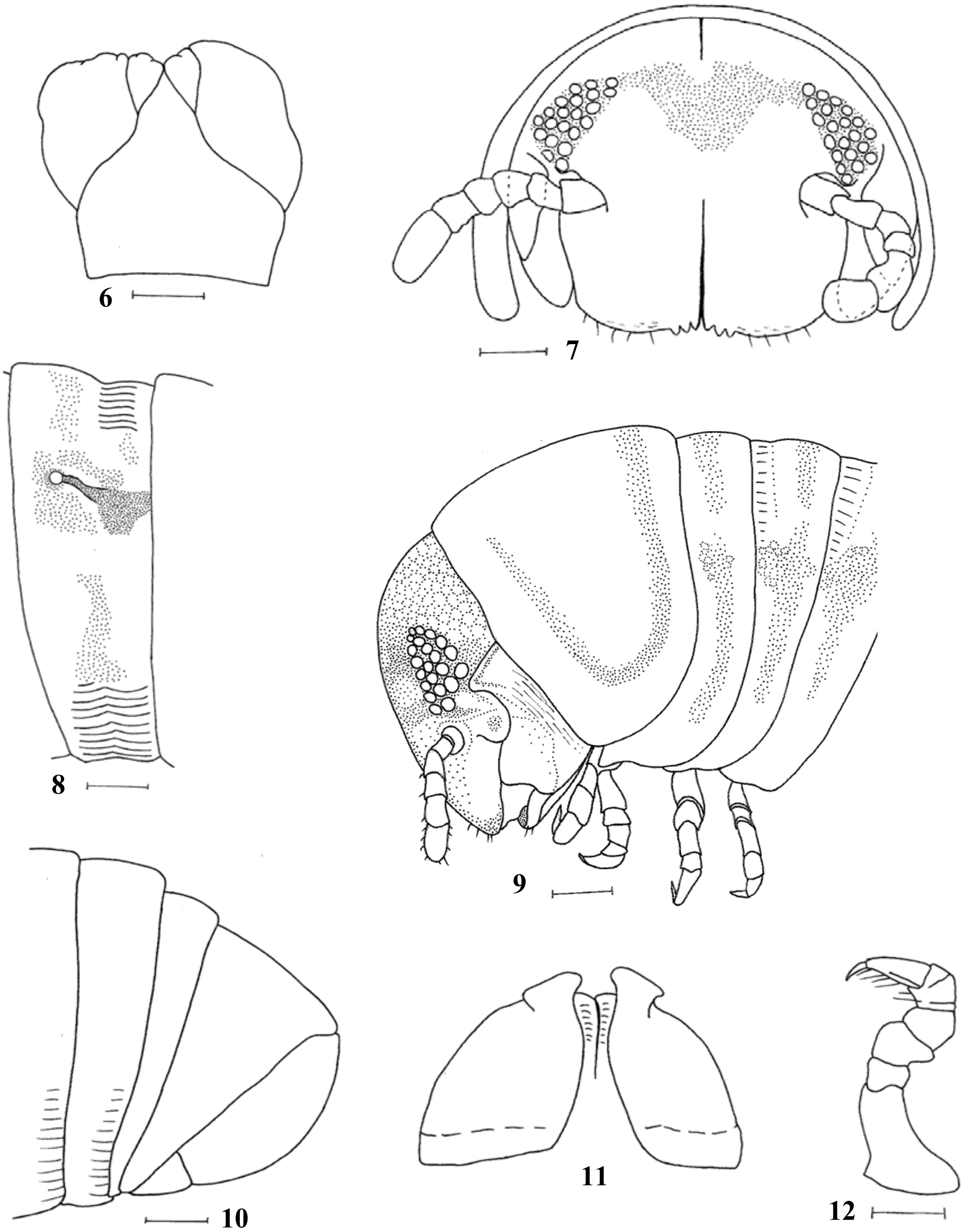
The telson lacks any anal projection (Figure 10) and is barely distinguishable from the trunk in outline. A notable difference from British Julida is the lack of any setae on the body, head or telson area. British *Cylindroiulus* species may lack setae on the body and head but always have a few on the telson and anal valves.

The mature males have gonopods enclosed in the trunk and not projecting at all but the body is slightly swollen where legs 8 & 9 should be. The gonopods are very simple in structure with two main structures closely pressed together (Figure 11). The first pair of legs of mature males looks like slightly shorter, thicker walking legs (Figure 12).

Distribution

No species of this order are represented 'naturally' in Europe and are more typical of tropical regions. The family Spirobolellidae, to which *P. lucifugus* belongs, is found in northern South America, Mexico, the Seychelles, Mauritius, Indonesia and eastern Australian region. *P. lucifugus* is the only species to have become established in Europe and has been recorded from hothouses in Hamburg (Latzel, 1895) and Denmark (Enghoff, 1975) but its native country and habitat are unknown.

The finding of this species in 2005 by Tony Barber was first reported in the BMIG Newletter 11. It has subsequently been referred to in Lee (2006) where it is listed as an alien species. It is reported to be well established in the tropical biome.



Figures 6-12 ***Paraspirobolus lucifugus***
6. Gnathochilarium. 7. Head anterior view. 8. Mid body segment. 9. Head and first few segments. 10. Telson. 11. Gonopods anterior view. 12. Male fist pair of legs.
Scale bars 0.21mm

Taxonomy

Until recently this species has been known as a variety of different names but a recent paper by Jeekel (2001) demonstrated various synonomies and clarified the name. In European literature referring to hot house finds it has largely been referred to as *P. dictyonotus* (Latzel).

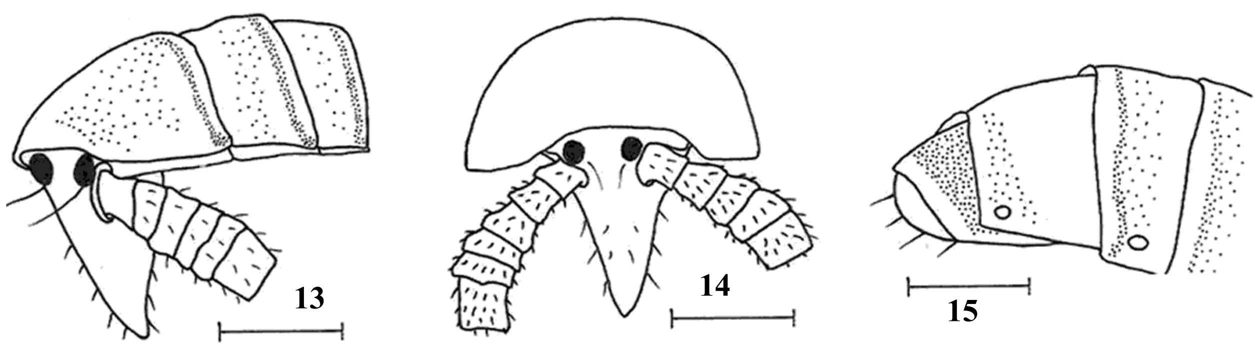
RHINOTUS PURPUREUS (POCOCK 1894)

This is the second genus and species of the order Polyzoniida to be found in Britain, the other being *Polyzonium germanicum* from Kent.

Appearance (based on specimens collected in the Eden Project)

Small in size, males 5-8mm in length, 0.6-0.7mm wide, females up to 6mm long and 0.7mm wide. Males with 31-44 body rings plus telson, females with up to 36.

Head tiny and triangular (Figures 13 & 14), with two large black ocelli and some setae, a very long seta associated with each ocellus. Antennae straight, more or less parallel-sided but slightly broader at the tip. Some of the antennal segments are hard to see and condensed into previous segments. Larger animals purple brown all over, with slightly darker bands on the metazonites, the anterior edge of which is pale. Ozopores clearly visible. Smaller animals paler but at least the anterior parts suffused with purple. Several individuals are darker anteriorly than posteriorly with a very definite demarcation of colour change. Ventrally pale. Tergites smooth, shiny and lacking setae. Legs pale. Telson much smaller than the pre anal ring, which has a slight point dorsally but barely projecting (Figure 15). Setae on telson and approximately three pairs on the anal valves.



Figures 13–15 *Rhinotus purpureus*
13. Head lateral view. 14. Head anterior view. 15. Telson. Scale bars 0.21mm

Leg pairs 9 and 10 are modified in the males into gonopods. These are external and appear from the side as thickened white appendages. The gonopods are illustrated in Golovatch & Korsós (1992)

These specimens agree with the original description (of *Siphonotus purpureus*) by Pocock except that he listed the maximum size as 7mm and considered the antennae to be considerably longer than the head (shown clearly in his diagram). Experience of other colobognathan millipedes suggests that the length of the antennae can be very variable depending on the state of preservation (Read in prep.). The colour was described as light purple in the field, dark purple in alcohol.

Distribution

This species was originally described from under bark in mountain forest 2500ft on St Vincent in the West Indies. J-P Mauriès reports it to be a very widespread species well known in neotropical sites (pers. comm.). It has been formally reported from central America and southern USA (Mauriès, 1980) and the Comoro Islands, Madagascar and Mauritius in the Indian Ocean VandenSpiegel & Golovatch (2007) however it is not clear if it has been recorded from glasshouses.

Finds of *Rhinotus purpureus* in Britain have not previously been referred to in any literature but correspondence between Adrian Rundle and Henrik Enghoff in spring 1986 mentions that specimens had been sent to J-P Mauriès who confirmed them as this species. The correspondence does not state that they were found at Kew Gardens but this is the most likely locality since Adrian Rundle was a frequent collector there and the rest of the correspondence is mostly about species found there, however there is a possibility it was from Edinburgh Botanic gardens (Enghoff pers comm.).

Taxonomy

Originally described as a species of *Siphonotus* Brandt, it was made type species of the genus *Rhinotus* by Cook (1895).

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THE OLDEST LAND ANIMALS: SILURIAN MILLIPEDES FROM SCOTLAND

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When the record for the oldest known terrestrial animals in the world gets broken you would expect an announcement to be splashed across the front pages of natural history magazines, or at least appear in one of the prestigious journals Nature or Science. Instead, when the record for the oldest land animals was pushed back by a few million years in 2004, it appeared buried in the pages of the Journal of Paleontology in a paper describing a collection of new fossil millipedes (Wilson & Anderson 2004).

For most of the last century, the oldest recorded land animals were arachnids and other arthropods from the celebrated locality at Rhynie, Aberdeenshire, in rocks dated to around 400 million years old (early Devonian). These had been discovered by palaeobotanists in the 1920s who were describing the then earliest known land plants beautifully preserved in the translucent flint-like chert rock which cropped out in a field close to this small village. Whilst some of the Rhynie arachnids are strikingly modern (e.g. mites), others belong to extinct groups (e.g. trigonotarbids). Their book-lungs are preserved in great detail, which proves their terrestrial lifestyle. No myriapods were known from Rhynie, however, until fairly recently (Anderson & Trewin 2003).

In 1990, new terrestrial arthropods were described from Ludlow, Shropshire, in rocks of late Silurian age (approx. 419 million years old) by Jeram *et al*. (1990). These included trigonotarbid arachnids and myriapods. These became the oldest known terrestrial animals and pushed the record back, by about 20 million years, for the first time since the 1920s.

Myriapod fossils were known to occur in rocks exposed at Cowie Harbour, near Stonehaven, also in Aberdeenshire; however, the preservation of the fossils was poor and the age of the strata was considered to be younger than those in Shropshire. More recently, new and better preserved specimens have turned up and, coupled with this, the age of the Stonehaven beds has now been determined more precisely using fossil spores as middle Silurian (about 423 million years old).

The millipedes at Stonehaven consist of three genera, all belonging to the extinct superorder Archipolypoda within the subclass Chilognatha. Wilson & Anderson (2004) erected the genus *Cowiedesmus* (named after Cowie Harbour), which forms the type and only genus of a new family, Cowiedesmidae, belonging to the new order Cowiedesmida. Many millipede orders can be distinguished by which leg is modified in some way, e.g. as gonopods; in Cowiedesmida it appears to be the posterior leg of trunk segment 8. The monotypic species *Cowiedesmus eroticopodus* ("erotic leg") derives its name from the male gonopods which are preserved in the fossil. Only the anterior part of the animal is preserved, from the head to trunk segment 10.

The other two fossils from Cowie Harbour do not have modified appendages preserved so could not be placed in any order. *Albadesmus almondi* was named after the gaelic name for Scotland: Alba, and in honour of John Almond who did much unpublished description of these fossils for his PhD thesis. The nearly twenty preserved trunk segments of *Albadesmus* show a tuberculate ornament on the tergites and paranota; paramedian pores can also be seen on some segments.

Although only known from a trunk section of six segments with tuberculate tergites, *Pneumodesmus* is a most interesting fossil because spiracles can be seen on the lateral parts of the sternites. These spiracles are direct evidence of air breathing, and represent the oldest evidence of a terrestrial animal. The monotypic species *Pneumodesmus newmani* was named in honour of its collector, Michael Newman, a local amateur palaeontologist who found the specimen while hunting for fossil fish.

Figure 1: Reconstruction of *Pneumodesmus newmani* at the National Museum of Scotland, Edinburgh. Photo: Stonehaven Fossil Group

The holotype of *Pneumodesmus newmani* is kept in the National Museum of Scotland, Edinburgh, but a reconstruction of it (Figure 1) has become the highlight of an exhibition at the Tolbooth Museum in Stonehaven. The exhibition was prepared by the Stonehaven Fossil Group to raise awareness of the geology of the area, and the 30 cm model millipede, made by Stephen Caine of New Aberdour, takes pride of place. The model helps to give visitors a better idea of what the animal would have looked like and allows the details of it to be seen more clearly. As well as the main exhibit there is a smaller mobile exhibition which visits schools and local groups, and an information board has also been set up outside at Cowie. The Tolbooth Museum, Stonehaven, is open afternoons (except Tuesdays) between 1 May and 31 October.

ACKOWLEDGEMENTS

We thank the late Derek Stewart (Chairman, Stonehaven Fossil Group) for information on the exhibition at Stonehaven.

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A LARGE NEOTROPICAL MILLIPEDE IN EUROPEAN FLOWER POTS

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In March, 2000, a number of large millipedes were found in the telephone office of Umeå University, northern Sweden. A male from the sample was sent to HE by Dr. Göran Andersson, Natural History museum of Gothenburg, and was tentatively identified as a species of the Neotropical genus *Chondrodemus* (Chelodesmidae), which was confirmed by Dr. R.L. Hoffman, Martinsville, Virginia, undisputed World leader in the taxonomy of Chelodesmidae.

Some years later, in 2006, the same exotic millipede species again appeared in Sweden, again in a flowerpot with a palm, but this time in Söderköping in the south-central part of the country. In 2007 there were further finds in Sweden, including in plants purchased in an IKEA store.

In January, 2007, several specimens were found in the lobby of an office in Copenhagen. The millipedes lived in a big, heated flowerpot housing a palm (*Phoenix robbelini*) and caused some concern among the office personnel. Mr. Anders Thomsen from the company Indoordesign established a contact to the Natural History Museum of Denmark, and thus two males, two females, and two juveniles were collected. The larger juvenile, a subadult male, constructed a spherical moulting chamber ca. 2½ cm in diameter and after several weeks appeared as adult. Several plants linked to the finds in Denmark and Sweden were linked with Dutch suppliers (Andersson & Enghoff 2007).

Upon broadcasting the Scandinavian finds, a reply was received from Mr. Thomas Wesener in Bonn, Germany, who in January 2007 found four females of what must be the same species in a flowerpot in Bonn. He further reported three additional similar cases having been discussed in the German millipede forum (www.diplopoda.de), including reports of reproduction in a terrarium.

It would thus seem that *C.* cf. *riparius* is well established in the flowerpot habitat in Europe and is likely to be found in Britain in the future.

Chondrodesmus is a large genus, with ca. 40 species decribed from tropical America (Ecuador and Brazil north to Veracruz and Guerrero, Mexico (Hoffman 1980). The most recently described species is from Brazil (Golovatch *et al*. 1999). Hoffman (1999) lists the 23 Central American species but there is no recent checklist of the South American ones. The most recent key to species is that of Attems (1940) who recognised 24 species (plus 11 uncertain species which were not included in the key).

Using the key of Attems (1940) one comes without problems to *C. riparius* Carl, 1914, a species described from Bodega Central on the Magdalena river, Colombia, and apparently never recorded since then. The Scandinavian specimens largely match the very accurate description provided by Carl (1914) but there are some small differences, the significance of which cannot be assessed without a comprehensive review of the entire genus. The taxonomically important gonopods exactly match Carl's description and illustration of *riparius*. For the time being, the Scandinavian specimens may be identified as *Chondrodesmus* cf. *riparius* Carl, 1914.

For North Europeans, it is quite an impressive millipede (Figure 1). Females are ca. 6 cm long and 9-10 mm wide, males are slightly smaller, about 5 cm long and 8 mm wide. The colour is a warm, reddish brown, with strongly contrasting yellow markings on the lateral "wings" (paranota). If it must be compared with a familiar species, it looks vaguely like a gigantic version of the common hothouse millipede *Oxidus gracilis* (C.L. Koch, 1847).

Figure 1: *Chondrodesmus* cf. *riparius* Carl, 1914

ACKNOWLEDGEMENTS

Thanks to Göran Andersson for providing information on the Swedish finds, and the first specimen to come into my hands, to Thomas Wesener for information on the German situation, and to Richard L. Hoffman for taxonomic advice.

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REPORT ON THE SPRING FIELD MEETING AT LUDLOW, 2007: CHILOPODA

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During the period of the meeting, 30th March to 1st April, based at the Bishop Maskell Centre in Ludlow, some 19 species of centipede were recorded from more than 30 sites from a total of 13 10km National Grid squares in the Shropshire area with a variety of habitats varying from urban (Ludlow Castle) to very rural (Long Mynd) including some woodlands (Table 1). Records were submitted by G. Collis, S. Gregory, P. Lee, H. Read, J.P. Richards, D. Whiteley & J. Flannagan and the present author. A number of the records were from churchyards, especially those of Steve Gregory.

Table 1: List if sites surveyed

Code	Locality	Grid Ref.	Code	Locality	Grid Ref.
1	Titley	SO33-60-	**18**	Hughley	SO56-97-
2	Pembridge	SO39-58	**19**	Knowle Quarry	SO58-97-
3	Long Mynd	SO42-72-	**20**	Hanley Dingle	SO682660
4	Bromfield Church	SO418768	**21**	Hanley W Church	SO673660
5	Downton Gorge	SO443743	**22**	Stoke Bliss Church	SO651628
6	Monkland	SO46-57-	**23**	Stoke Bliss Wood	SO651628
7	Kingsland	SO44-61-	**24**	Stoke Bliss Pasture	SO651628
8	Berrington Church	SJ530068	**25**	Brown Clee	SO608871
9	Ludlow Car Park	SO509746	**26**	Cleobury N. Church	SO623870
10	Ludlow Castle	SO506747	**27**	Much Wenlock	SO612998
11	Ludlow BMC	SO515746	**28**	Much Wenlock Church	SJ624000
12	Whitcliffe Wood	SO504743	**29**	Wenlock Edge	SO604997
13	Milchope Park	SO52-88-	**30**	Wenlock Edge	SJ606001
14	Milchope Park	SO53-88-	**31**	Wenlock Edge Quarry	SO578970
15	Wild'hp Manor NT	SO54-92-	**32**	Harley Bank	SO61-99-
16	Tugford Church	SO557871	**33**	Ashford Bowdler C	SO519705
17	Easthope Wood	SO572967			

Most of the species were those to be expected in this area between the West Midlands and Mid Wales but there was a distinct lack of small lithobiids (other than *Lithobius microps* and *L. melanops*) and several geophilomorphs that might be expected were only recorded a relatively small number of times (e.g. *Geophilus easoni*, *G. insculptus*, *G. flavus*). A summary of the records is shown in the tables along with the 10km squares from which each species was recorded (Table 2).

Unexpectedly, *Stigmatogaster subterranea*, usually regarded as more or less a synanthrope, was found to be the most widely recorded species, occurring in Ludlow and in churchyards unsurprisingly but also at Downton Gorge and other sites. The fact that the next commonest members of that order were the two rather small species, *Schendyla nemorensis* and *Geophilus truncorum* would suggest that larger forms were not just being missed during collection. Of the remainder, one might have expected *Geophilus insculptus* or *G. flavus* to be much commoner and *G. easoni* to be found more often; the two *Strigamia* species are always intermittent in occurrence.

Table 2: Centipede species recorded during BMIG field trip to Ludlow

Site Code:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
Stigmatogaster subterranea	x	x		x	x	x	x	x	x	x		x			x	x					x
Schendyla nemorensis					x			x		x	x	x						x			x
Schendyla dentata					x																
Strigamia acuminata																				x	
Strigamia crassipes					x																
Henia brevis								x													
Geophilus carpophagus				x				x													
Geophilus easoni																				x	
Geophilus insculptus					x											x					
Geophilus flavus																					
Geophilus truncorum			x		x									x				x		x	
Cryptops hortensis					x			x			x					x					x
Cryptops parisi									x												
Lithobius variegatus				x	x					x		x	x		x	x	x	x	x	x	
Lithobius forficatus	x			x	x			x			x					x		x		x	x
Lithobius melanops				x				x			x									x	
Lithobius macilentus																					
Lithobius crassipes																				x	
Lithobius microps			x	x	x		x	x		x	x			x		x	x	x		x	x

Table 2: (continued). N = number of 10km squares in which species recorded

Site Code:	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**10 km squares with records**	**N**
Stigmatogaster subterranea	x				x		x		x			x	35,36,45,46,47,50,57,58,59,60, 66,68	12
Schendyla nemorensis						x							50,57,59,66,69	5
Schendyla dentata													47	1
Strigamia acuminata				x									66,68	2
Strigamia crassipes													47,50	2
Henia brevis							x					x	57	3
Geophilus carpophagus													47,50	2
Geophilus easoni				x									66,68	3
Geophilus insculptus													47,57,58	1
Geophilus flavus								x		x			59,69	2
Geophilus truncorum				x	x					x			47,58,59,66,68	5
Cryptops hortensis		x			x					x			47,50,57,58,59,68	6
Cryptops parisi													57	1
Lithobius variegatus				x	x	x	x	x	x	x		x	47,57,58,59,60,66,68,69	8
Lithobius forficatus	x	x	x							x			36,47,50,57,58,59,66,68	8
Lithobius melanops					x		x			x			47,50,57,59,66	5
Lithobius macilentus									x				60	1
Lithobius crassipes													66	1
Lithobius microps	x	x		x	x	x	x	x	x	x	x	x	46,47,50,57,58,59,60,66,68,69	10

Schendyla dentata (coll. Paul Richards), *Henia brevis* (coll. Steve Gregory & author) and *Geophilus carpophagus* (coll. Steve Gregory) are synanthropes; *S. dentata* has been recorded in Shropshire before (at Bishops Castle).

Of the scolopendromorphs, *Cryptops hortensis* is widespread and with a distinctly synanthropic bias in most areas whilst *C. parisi*, found in a car park at Ludlow is almost exclusively so. Similarly, in most areas *Lithobius microps* is a species commonly associated with human influenced habitats and this is the commonest lithobiomorph. However, lest this would suggest that most collecting was biased away from rural sites, it should be noted that *Lithobius variegatus* as well as *L. forficatus* is well recorded.

Of the remaining lithobiids, *L. melanops* is frequently associated with gardens and similar sites whilst *L. crassipes* is the common rural small lithobiomorph of much of central and eastern Britain yet the only site from which the latter was recorded was Hanley Dingle. *L. macilentus*, parthenogenetic in Britain, is patchily distributed across much of the country. The impression is gained that the common small *Lithiobius* of the area is *L. microps* as it sometimes appears to be in south east England. Possibly collecting at a different time of year or during different weather would give a different perspective on the local centipede fauna.

REPORT ON THE AUTUMN MEETING IN THE OBAN AREA, 2007: ISOPODA

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The Oban meeting, 29th September to 5th October, was based in self-catering accommodation at Bragleenbeg, at the head of Loch Scammadale, an inland loch about 10km south of Oban. The large majority of sites visited were coastal and included locations on the islands of Lismore, Mull and Seil, though the last named is joined to the mainland by the small but famous "Bridge over the Atlantic".

Isopod records were contributed by Steve Gregory, Gordon Corbet, Richard Price, Dawn Collis and Glyn Collis from 20 different sites (Table 1) across eleven different 10km squares. Fourteen taxa of woodlice were represented (Table 2), including *Trichoniscus provisorius* which has only recently received general recognition as a full species. Other particularly welcome Trichoniscid records were for *Trichoniscoides saeroeensis*, *Haplophthalmus mengii* seg., *Trichoniscus pygmaeus* and *Androniscus dentiger*, all under-recorded in Scotland.

Table 1: List of sites.

Code	Site name and grid reference
1	Lismore, north end, NM8845, NM8946
2	Loch Baile Ghobhain, Lismore, NM8542
3	Port Appin, NM9045
4	Tralee NM8938
5	Benderloch, NM9038
6	Ledaig, NM9037
7	Moss of Achnacree, NM9136
8	Torosay Castle gardens and nearby shore, Isle of Mull, NM7335
9	Dunstaffnage, NM8834
10	Oban Cathedral area, NM8530
11	Oban (South), NM8629
12	Scammadale Farm, Loch Scammadale, NM8820
13	Bragleenbeg House, Loch Scammadale, NM9020
14	Ellenbeich, Seil Island, NM7417
15	An Cala Garden, Seil Island, NM7417
16	Ardmaddy Garden, NM7816
17	Ballachuan & Cuan Ferry, Seil Island, NM7514 & NM7614
18	Fearnach Bay, Loch Melfort, NM8313
19	Airds Bay, Taynuilt, NN0032
20	Crianlarich, NN3825

Among the larger woodlice, *Cylisticus convexus* and *Porcellio spinicornis* were found only at one site each, which was a little surprising. In the case of *P. spinicornis*, this may reflect the difficulty of finding *P. spinicornis* in the north-west other than in buildings; it was found among roofing slates that had been removed from one farm building and stacked ready for re-use in another. Steve Gregory was able to distinguish the subspecies *Oniscus asellus asellus* among material from four sites.

The only asellid found was *Asellus aquaticus*, which is perhaps a little surprising given the presumed association of *A. meridianus* with near-coastal sites. *A. asellus* was recorded from three sites, including island locations on Mull and Lismore. On Mull it was found in a small pond in Torosay Gardens. On the limestone island of Lismore it was found in a kilometer-long natural loch. The third location was a system of small drainage ditches and pools in woodland not far from the shore at Tralee.

Table 2: Woodlice records, species by site
N = number of localities

Taxon	**Site code**																				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**N**
Ligia oceanica			x	x	x	x		x		x				x			x	x	x		10
Asellus aquaticus		x		x				x													3
Androniscus dentiger			x	x				x		x	x					x					6
Haplophthalmus mengii seg.														x							1
Trichoniscoides saeroeensis														x			x	x			3
Trichoniscus provisorius										x						x					2
Trichoniscus pusillus agg.		x	x	x	x		x	x			x	x	x	x		x	x	x	x		14
Trichoniscus pygmaeus	x									x	x										3
Philoscia muscorum	x	x	x	x	x		x		x			x		x			x				10
Oniscus asellus		x	x	x	x		x	x		x	x	x	x		x	x	x		x	x	15
Oniscus asellus asellus							x							x		x		x			4
Cylisticus convexus														x							1
Porcellio scaber	x	x	x	x	x	x	x	x		x	x	x	x	x		x	x	x	x	x	18
Porcellio spinicornis												x									1

REPORT ON THE AUMTUMN MEETING IN THE OBAN AREA, 2007: CHILOPODA

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Organised by Glyn and Dawn Collis, the Group met at Bragleenbeg House, Bragleenmore near Oban, Scotland during the period 29th September to 5th October. A total of 13 species of centipede were recorded (Table 2) from 20 sites from a total of 9 10km National Grid squares in the 100km square NM (Table 1). These included collections from both the mainland and from Seil Island, Isle of Mull and Lismore Island. Many of the collections involved areas either close to or actually on the shore line and in addition ornamental gardens were visited as well as various rural and urban locations but despite the diversity of habitats sampled the total number of species recorded was, in some ways, disappointingly low compared with the records for millipedes.

Specimens were collected locally at Bragleenmore and Scammadale, at Ballahuan NR and adjacent areas, Cuan Ferry and Ellenbeich on Seil Island, Craignure, Torosay (Including Torosay Gardens) on Mull, woodland at Moss of Achnacree, Ledaig, Banderloch, Tralee, Ardmaddy Gardens, Appin Port, Lismore Island, the Dunollie/Dunstaffnage/Connel area north of Oban, Fearnach Bay and various sites in the town of Oban (Table 1). Those involved were Glyn Collis, Steve Gregory, Richard Price, Peter Nicholson, and the present author also Gordon Corbet for part of the week.

Table 1: List of sites surveyed

Code	Locality	10km Grid	Code	Locality	10km Grid
1	Bragleenbeg	NM92	11	Ardmaddy Gardens	NM71
2	Ballahuan (Seil Is.)	NM71	12	Appin	NM94
3	Cuan Ferry	NM71	12	Lismore Island	NM84
4	Ellenbeich (Seil Is.)	NM71	14	Dunollie Castle	NM83
5	Craignure (Mull)	NM73	15	Dunstaff'g Castle	NM83
6	Torosay (Mull)	NM73	16	Connel L.Linnhe	NM93
7	Moss of Achnacree	NM93	17	Fearnach Bay	NM81
8	Ledaig	NM93	18	Oban Town	NM83
9	Banderloch	NM93	19	Oban Town	NM82
10	Tralee	NM83	20	Scammadale	NM82

The visit to Seil Island was rather disappointing in terms of the Ballahuan nature reserve which yielded only four species. However sampling in the shingle at Cuan Ferry created more interest, yielding not only numbers of *Strigamia maritima* but also the millipede *Thalassisobates littoralis* and some paler geophilomorphs that proved, on later inspection to include the species we have known as *Geophilus fucorum seurati* but is probably more correctly called *Geophilus gracilis* (Iorio, 2006) and *Stigmatogaster subterranea*. The only other record of the latter was from Ardmaddy Gardens; it tends to be a synanthrope in northern Britain.

The visit to Mull included Torosay Gardens where we were able to collect in the greenhouses. The result of this included a small lithobiid from a glasshouse which was identifiable as a female *Lithobius lucifugus*, a species that had been previously recorded from a kirkyard at Cramond, Edinburgh (Barber, 1995). It is generally regarded as an alpine species and a record from Côtes d'Armor in northern France has been considered by Etienne Iorio (loc.cit.) to be perhaps an error of identification.

A visit was also made to Lismore Island where eight species had previously been recorded by Gordon Corbet in 2001 (unpublished). All but one of these (*Strigamia maritima*) were found on this visit and in addition *Lithobius macilentus*.

A number of different shoreline sites were examined, indicated both in the records of *Strigamia maritima* which sometimes occurred in very large numbers and the relatively large number of records of *Lithobius melanops* which reflect both maritime, garden and urban collecting.

Of non-maritime geophilomorphs, *Geophilus insculptus*, *G. easoni* and *G. flavus* were widespread as were the two smaller forms *G. truncorum* and *Schendyla nemorensis*. Of the lithobiomorphs, *Lithobius variegatus* seems to be patchily distributed along the coast of western Scotland, *L. forficatus* is the common large brown lithobiid of most of Britain although only 6 out of 10 10km grid squares yielded it compared with 8/10 for *L. melanops* and the parthenogenetic *L. macilentus* was only found on Lismore Island.

Removing from the list the littoral types and *Lithobius lucifugus* leaves us with only 10 species, a relatively poor number. A 2004 report on the myriapods of the Outer Hebrides produced a comparable number (11 non-maritime species including *Lithobius borealis*, *L. crassipes* and the summer/autumn *Lamyctes emarginatus*) whilst a collection in Wester Ross and Skye in 2003 was similar (12 with the same additions) (Corbet, 2004, Barber, 2004). The likelihood of other species from the present study area is high if a further range of sites were sampled, possibly at a different time of year and the three lithobiomorphs just mentioned are possibilities but the total number will clearly never be comparable with southern England, for instance.

Table 2: Centipede species recorded from the Oban area. N = number of 10km squares

Species	**Site Code**																				**N**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	
Stigmatogaster subterranea			x								x										1
Schendyla nemorensis				x									x								2
Strigamia maritima		x	x	x	x	x			x			x		x	x	x					5
Geophilus easoni		x				x				x		x	x								5
Geophilus insculptus	x	x				x		x			x		x	x	x				x		7
Geophilus gracilis			x																		1
Geophilus flavus	x			x		x			x	x					x			x	x	x	6
Geophilus truncorum									x	x			x		x						4
Lithobius variegatus				x									x						x		3
Lithobius forficatus				x					x			x	x					x	x	x	6
Lithobius melanops	x	x		x		x	x		x	x	x		x	x	x		x	x	x	x	8
Lithobius macilentus													x								1
Lithobius lucifugus						x															[1]

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Barber, A.D. (2004) Myriapoda from Wester Ross and Skye. *Bull.British Myr.Isopod Gp.* **20**: 25-33

Corbet, G.B. (2004) Myriapoda on the Outer Hebrides. *Bull.British Myr.Isopod Gp.* **20**: 34-37

Iorio, I. (2006) La faune des Chilopodes du Massif Armoricain. Biologie, liste préliminaire et detétermination des espèces (Chilopoda) *Mém.Soc.linn. Bordeaux* **7**: 1- 7

REPORT ON THE AUTUMN MEETING IN THE OBAN AREA, 2007: DIPLOPODA

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During the BMIG field meeting in the Oban area (29th September to 5th October, 2007) a total of 24 species of millipede were recorded (Table 2) from more than 20 sites from a total of 10 10km National Grid squares predominantly within the 100km square NM but also NN (Table 1). Collections were made both from the mainland and from Seil Island, Isle of Mull and Lismore Island, including a large proportion from coastal habitats and ornamental gardens in various rural and urban locations. Those involved were Glyn Collis, Richard Price, Peter Nicholson, the present authors, and also Gordon Corbet for part of the week. Some of the identifications, including that of *Alajulus nitidus*, were made by Paul Lee to whom thanks are due.

Collections were made at Bragleenmore and Scammadale in the immediate area. Also at Ballahuan NR and adjacent areas, Cuan Ferry and Ellenbeich on Seil Island, Craignure, Torosay (including Torosay Gardens) on Mull, woodland at Moss of Achnacree, Ledaig, Banderloch, Tralee, Ardmaddy Gardens, Appin Port, Lismore Island, the Dunollie/Dunstaffnage/Connel area north of Oban, Fearnach Bay, Airds Bay and various sites in the town of Oban (including in the vicinity of the cathedral) (Table 1). The soils were mainly non-calcareous but Lismore Island is entirely composed of limestone, which also outcrops at Tralee.

Table 1: List of sites surveyed

Code	Locality	10km Grid	Code	Locality	10km Grid
1	Bragleenbeg	NM92	**12**	Appin	NM94
2	Ballahuan (Seil Is.)	NM71	**12**	Lismore Island	NM84
3	Cuan Ferry	NM71	**14**	Dunollie Castle	NM83
4	Ellenbeich (Seil Is.)	NM71	**15**	Dunstaff'g Castle	NM83
5	Craignure (Mull)	NM73	**16**	Connel L.Linnhe	NM93
6	Torosay (Mull)	NM73	**17**	Fearnach Bay	NM81
7	Moss of Achnacree	NM93	**18**	Oban Town	NM83
8	Ledaig	NM93	**19**	Oban Town	NM82
9	Banderloch	NM93	**20**	Scammadale	NM82
10	Tralee	NM83	**21**	Airds Bay, Tainuilt	NN03
11	Ardmaddy Gardens	NM71			

By comparison with the centipedes recorded at the same time, there was a larger number of specimens collected and a much greater species diversity for millipedes. One species, a *Brachychaeteuma* sp. could only be determined to generic level since a male specimen was not collected. As far as the millipedes were concerned, not only was a good range of species found, but there were a number of highlights.

On Seil Island sampling in the 'slatey' shingle at Cuan Ferry (primarily for centipedes) yielded numbers of *Thalassisobates littoralis* allowing participants to see this elusive animal in the living state. It was subsequently found at another site on Seil, Ellenbeich. The new Millipede Atlas (Lee,

2006) shows only 17 "dots" in total for Britain and Ireland for this interesting species that occurs both in the Mediterranean and on the Atlantic coast of the United States. These are the most northerly British records.

The visit to Mull included Torosay Gardens where collections were made in the garden work area and greenhouses. Here 16 species of millipede were collected including specimens of a blackish Juline millipede. Despite lacking the supposedly diagnostic white stripe (Blower, 1985) these were subsequently identified by SG as *Leptoiulus belgicus* (male gonopods examined). Subsequently, this same species was identified from another 4 sites. Often the pale dorsal stripe was indistinct or entirely absent. Some females had a distinctive marbled brown colouration, but in these examples the pale dorsal stripe was always distinct. This variation in pigmentation is much wider than suggested by Blower (1985), but has been noted before (Des Kime, pers. comm). In Britain *L. belgicus* is known mostly from the Channel Islands, south west England, south Wales and north-west Ireland. Lee (2006) includes a record from the Inner Hebrides and in light of the additional records detailed herein it is probable that this species has a widespread distribution along the entire Atlantic fringe of Britain.

Table 2: Species recorded from the Oban area, by site.
N = number of 10km squares

Species	**Site Code**																					**N**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	
Chordeuma proximum						x	x	x	x		x			x								4
Chordeuma sp.						x		x			x	x			x							-
Nanogona polydesmoides						x			x	x	x	x	x				x	x	x			9
Melogona scutellaris						x																1
Melogona sp.															x							-
Brachychaeteuma sp.				x														x				2
Thalassisobates littoralis			x	x																		1
Blaniulus guttulatus	x					x							x	x	x			x	x	x		4
Archiboreoiulus pallidus																		x				1
Proteroiulus fuscus	x	x				x	x	x	x	x	x		x		x							6
Choneiulus palmatus						x																1
Boreoiulus tenuis																	x	x	x			3
Tachypodoiulus niger	x	x	x		x	x	x	x	x	x	x	x	x	x	x			x	x	x	x	9
Ommatoiulus sabulosus	x	x		x		x	x			x	x					x						5
Brachyiulus pusillus						x											x					2
Julus scandinavius		x				x			x								x					5
Ophyiulus pilosus	x	x		x		x	x	x	x	x	x	x	x	x			x		x	x		9
Leptoiulus belgicus				x	x	x					x	x										3
Cylindroiulus punctatus	x	x			x	x	x	x	x	x	x	x	x		x	x		x	x	x	x	9
Cylindroiulus britannicus	x				x	x	x	x	x		x		x		x		x	x	x	x		8
Cylindroiulus latestriatus		x		x		x	x		x	x		x										5
Allajulus nitidus									x													1
Polydesmus angustus	x	x		x		x				x		x	x				x		x	x		8
Polydesmus inconstans									x													1
Polydesmus sp.							x		x													-
Brachydesmus superus	x	x		x		x			x		x		x				x	x	x	x		8
Macrosternodesmus palicola																		x				1

Gordon Corbet had already collected in the area and had found a *Chordeuma* species, unidentifiable to species level at the time due to lack of adult males. Visiting his site at Moss of Achnacree at a later time of year yielded several adult males, clearly identifiable as *C. proximum*, a species already known from the Inner Hebrides (Lee, 2006). Again, further specimens were obtained from other localities, a total of 4 10km NG squares, suggesting a much wider distribution in western Scotland than previously noted.

Two other chordeumatidans, five blaniulids/nemasomatids, four polydesmoids and another nine julids added up to an interesting collection. The most widely recorded species, not completely unexpectedly, were *Nanogona polydesmoides*, *Tachypodoiulus niger*, *Ophyiulus pilosus*, *Cylindroiulus punctatus*, *C. brittanicus*, *Polydesmus angustus* and *Brachydesmus superus*. There were, not surprisingly, no glomerids collected although *Glomeris marginata* and *Geoglomeris subterranea* could possibly be here, just at the apparent edge of their range (Jura, Arran).

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CORRECTION: Bulletin of the British Myriapod and Isopod Group, Volume 21 (2006), page 75

Table 1: Records of Millipedes from the 1999 BMG Field Meeting in Northumberland

Compiled from records submitted by: Wallace Arthur, Tony Barber, Gordon Corbet, Steve Gregory, John Harper and Paul Lee

Site number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Allajulus nitidus												x										x					x				
Archiboreoiulus pallidus	x												x	x												x	x				
Blaniulus guttulatus	x	x	x	x	x	x	x	x				x	x	x	x				x					x		x	x		x		
Boreoiulus tenuis			x		x		x	x				x	x	x	x																
Brachychaeteuma sp.												x																			
Brachydesmus superus				x					x		x		x	x		x		x	x					x					x		
Brachyiulus pusillus				x			x	x				x		x		x								x					x		
Choneiulus palmatus													x																		
Cylindroiulus britannicus			x	x	x		x	x					x	x	x	x	x		x										x		
Cylindroiulus caeruleocinctus			x					x																			x				
Cylindroiulus latestriatus												x												x						x	x
Cylindroiulus punctatus	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		x		x		x		x
Glomeris marginata	x	x							x		x	x				x	x		x	x	x				x				x		
Julus scandinavius	x	x					x		x	x						x	x				x	x			x		x	x	x	x	
Macrosternodesmus palicola				x									x	x	x												x				
Melogona scutellaris							x																			x					
Nanogona polydesmoides			x		x		x					x			x														x		
Nemasoma varicorne																x													x		
Nopoiulus kochii			x																												
Ommatoiulus sabulosus					x	x																									
Ophiodesmus albonanus				x				x				x	x		x												x				
Ophyiulus pilosus	x	x	x		x	x	x		x		x	x	x	x	x	x			x		x	x		x		x	x		x		x
Polydesmus angustus	x	x	x	x	x		x	x			x	x	x	x	x	x					x	x		x	x		x	x	x		
Polydesmus denticulatus							x							x																	
Polydesmus inconstans	x			x		x		x				x	x		x							x									
Proteroiulus fuscus	x		x	x		x	x		x		x		x	x		x													x		
Tachypodoiulus niger	x	x		x	x	x	x	x		x		x	x	x	x	x	x	x	x		x		x				x	x	x	x	
No. spp. (Total = 27)	10	7	10	11	9	7	13	10	6	3	6	14	14	13	11	11	5	3	7	1	5	6	2	6	4	4	11	3	13	3	3

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