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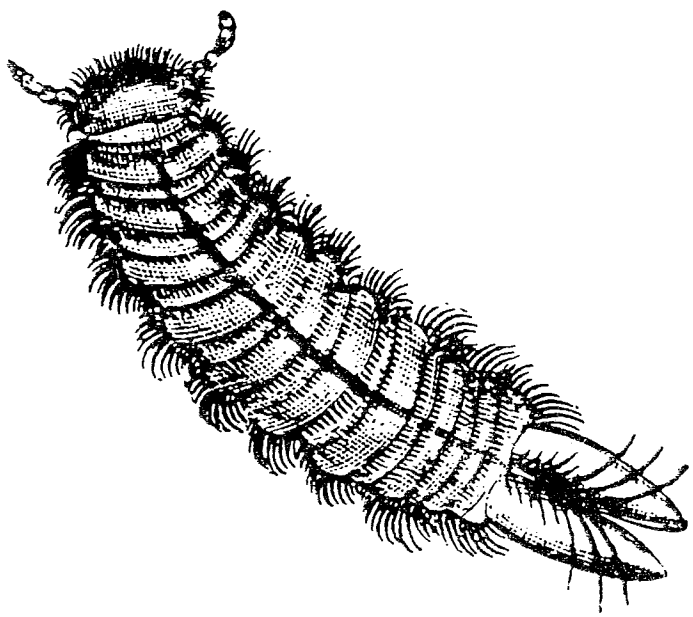
BULLETIN of the BRITISH MYRIAPOD GROUP

Edited for the Group by
A.D. Barber
and
H. Read



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EDITORIAL

It is now 25 years since the first issue of the Bulletin saw the light of day thanks to the efforts of Gordon Blower, Colin Fairhurst and others although there was a 13 year gap before Volume 2 appeared - by which time we thought that Vol.1 (to quote a bookseller's catalogue of the time) would be the first and only issue. We are now up to 13 which, at one stage, we thought would be the unlucky one simply because of lack of material. However, the desire to try to get it out before the 1997 field meeting has spurred our efforts and, though not up to the length of the last issue, is now here. May we appeal for contributions to Volume 14 (1998) whether faunistic studies, species accounts, aspects of biology or ecology, historical, etc. The policy that we use is that it should be of relevance or likely interest to British workers - and since other parts of Europe, etc. are relevant, the accounts are not confined to species in Britain - indeed some earlier volumes had a run of notes on species from Brittany and Normandy.

We have taken the opportunity to produce a cumulative index of the first 12 volumes. We also include an account of *Chalandea pinguis* with drawings by Dick Jones, the first of British specimens and the first since those of Brölemann in 1930, thus making its description more readily available - although - so far - no one has found it outside vice-county 3. The species has a special significance to the British Myriapod Group since it was first recorded as British at the first ever field meeting back in 1970 when such stalwarts as Ted Eason, Gordon Blower, Bill Rolfe, Colin Fairhurst, John Lewis, Des Kime and others were present. One of us has vague memories of a quantity of local cider being drunk - although whether it was in celebration he does not recall. Also included are reports on moorland millipedes in Scotland and a discussion on the possible factors affecting the distribution of *Lithobius forficatus* and *Lithobius variegatus.*

In volume 4 we introduced a section "Miscellanea" for short notes that were not appropriate for a larger article. This has subsequently lapsed as most of the short notes we have received have simply been records which have been more appropriate for the BMG newsletter. We think that it is probably useful to revive the Miscellanea section although obviously editorial decisions will need to be made as to whether the Newsletter is more appropriate for any individual note. On this basis we would more than welcome suitable material, particularly observations rather than just the recorded presence of a species.

Bulletin of the British Myriapod group 13 (1997)

MYRIAPODS OF MOORLAND HABITATS IN THE SIDLAW HILLS, ANGUS.

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INTRODUCTION

Between 9th May and 24th October 1995 pitfall traps were operated by Adam Garside of Dundee Museum at 24 moorland sites in the Sidlaw Hills, Angus. Millipedes, of eight species, were well represented in the catch, which provides a unique opportunity to make quantitative comparisons between habitats, and to record the altitudinal and habitat range of each species. No comparable quantitative data appear to be available from moorland elsewhere in the British Isles, although most of the species reported here have been recorded from moorland in the north of England (Richardson, 1990; Richards, 1995). Pitfalls are not generally effective in catching centipedes and only 17 of two species were caught, at four sites.

LOCATIONS AND HABITATS

Six areas were sampled, each with two to six sites varying in habitat, with one line of 9 pitfalls at each site (Figs 1, 2; Table 1). All the sites are remote from any buildings, walls, roads or other human artifacts or debris, except for the two highest, on Craigowl (sites 7 and 10) which produced nothing, and site 11 which was adjacent to farm buildings.

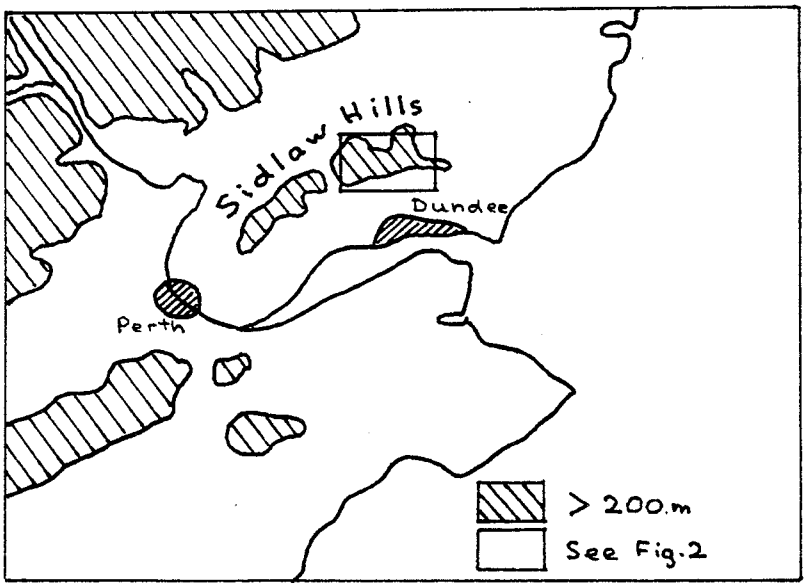

Figure 1. Location of the Sidlaw Hills.

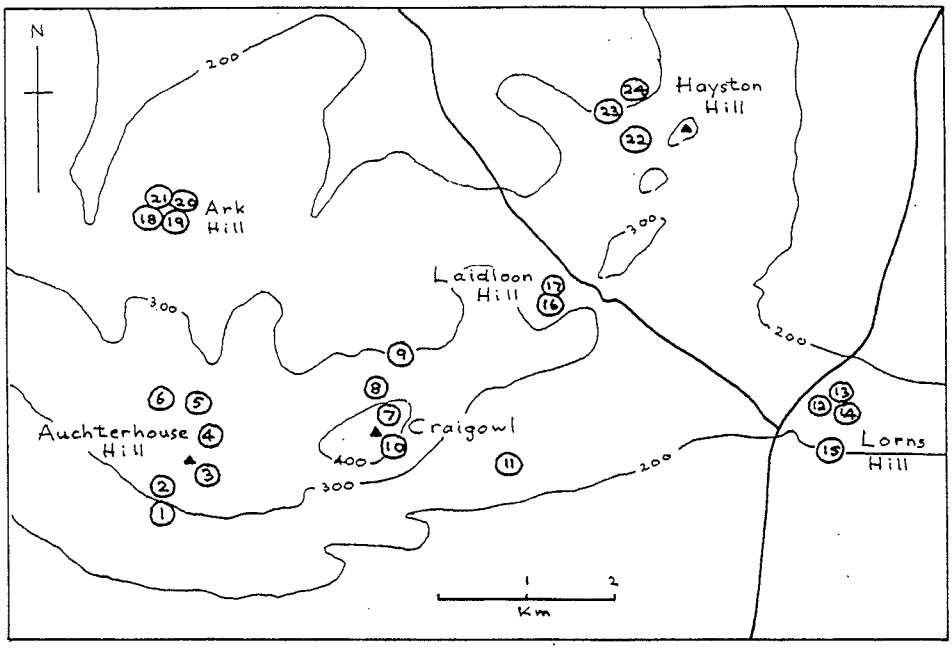

Figure 2. Location of the 24 trapping sites.

Table 1: Sites at which pitfall traps were set.

1	Auchterhouse Hill	NO 350393	Dry grassland	265 m
2	"	NO 351395	Dry heather	300 m
3	"	NO 355396	Dry heather	390 m
4	"	NO 3554400	Dry heather	360 m
5	"	NO 3553404	Wet grassland	330 m
6	"	NO 350405	Bog	350 m
7	Craigowl Hill	NO377401	Dry heather	445 m
8	"	NO 375405	Wet grassland	340 m
9	"	NO 378409	Dry heather	300 m
10	"	NO 377399	Dry grassland	450 m
11	"	NO 391402	Wet grassland	255 m
12	Lorns Hill	NO 429402	Wet grassland	205 m
13	"	NO 431403	Dry heather	205 m
14	"	NO 430402	Wet heather	205 m
15	"	NO 430398	Dry grassland	200 m
16	Laidloon Hill	NO 396416	Dry grassland	270 m
17	"	NO 397418	Dry heather	270 m
18	Ark Hill	NO 349426	Dry grassland	230 m
19	"	NO 352426	Dry heather	285 m
20	"	NO 353427	Dry heather	285 m
21	"	NO 352428	Dry grassland	275 m
22	Hayston Hill	NO 406453	Dry heather	265 m
23	"	NO 403438	Dry grassland	200 m
24	"	NO 406441	Wet grassland	195 m

In the following descriptions of habitats, generic names only are used for the following species of plants: *Calluna vulgaris* (heather), *Cytisus scoparius* (broom), *Empetrum nigrum* (crowberry), *Nardus stricta* (mat grass), *Pteridium aquilinum* (bracken), *Ulex europaeus* (gorse), *Vaccinium myrtillus* (bilberry).

Auchterhouse Hill (sites 1-6). All these sites were lightly grazed by sheep, with signs of cattle at site 1.
Site 1. Dry acid grass (*Nardus, Agrostis, Festuca*), abundant *Pteridium*; no dead wood; 10 m from *Ulex*.
Site 2. Dry *Calluna*, c.30 cm, with scattered *Pteridium* and *Vaccinium*; *Ulex* nearby.
Site 3. Dry *Calluna*, c.30 cm, occasional *Vaccinium* and *Empetrum*; one small branch of dead wood; 100 m from scattered larch and much dead wood.
Site 4. Dry *Calluna*, with frequent *Vaccinium* and *Empetrum*, some grass; scattered larch c.10 m either side.
Site 5. Damp acid grass dominated by *Pteridium* on gentle slope; 10 m from *Calluna*.
Site 6. Bog in slight depression; *Juncus, Sphagnum* and *Carex* dominant, but few tussocks; water level close to or at surface, but some islands and perimeter with drier *Calluna*.

Craigowl (sites 7-11). All except site 11 were lightly grazed by sheep and devoid of any trees or dead wood.
Site 7. Dry *Calluna*, c.30 cm, with sparse *Empetrum* and *Vaccinium*; on north-facing slope near summit.
Site 8. Wet tussocky grassland with abundant *Deschampsia caespitosa* and *Juncus* on gentle slope.
Site 9. Dry, deep *Calluna*, 40-50 cm, with little else.
Site 10. Short dry grass on moderate south-facing slope, with occasional stunted *Vaccinium*.
Site 11. Tall grass and herb in fenced enclosure recently planted with broad-leaved trees; *Cytisus*, *Ulex* and disturbed ground nearby.

Lorns Hill (sites 12-15). Level moorland with scattered pines; no domestic stock.
Site 12. Wet grass, with tussocks and short grass, dominated by *Deschampsia caespitosa* and *Juncus*; *Cytisus* and *Ulex* within 5 m. No dead wood nor trees.
Site 13. Dry *Calluna*, c.30 cm, with occasional *Erica tetralix*; scattered dead trees and young pines.
Site 14. Wet *Calluna* with frequent *Empetrum, Erica tetralix* and *Polytrichum* moss; some dead wood and scattered young pines.
Site 15. Dry grass dominated by *Deschampsia flexuosa* and *Agrostis capillaris*, with deep thatch; scattered *Cytisus*; *Calluna* nearby.

Laidloon Hill (sites 16 and 17). Grazed by cattle and sheep; no trees nor dead wood; almost level ground.
Site 16. Dry grass, closely cropped, scattered short *Pteridium*.
Site 17. Short dry *Calluna*, 10 cm; little else.

Ark Hill (sites 18-21). All were lightly grazed by cattle.
Site 18. Dry grass on gentle slope, slightly tussocky; sparse *Pteridium, Calluna* and *Erica cinerea.*
Site 19. Dry tussocky *Calluna*, 30 cm, sparse *Pteridium* and grass.
Site 20. Dry *Calluna*, as 19 but more northerly aspect.
Site 21. Dry grass, as 18 but almost level.

Hayston Hill (sites 22-24).
Site 22. Dry *Calluna*, 30 cm, on gentle north-facing slope; a few small patches of grass.
Site 23. Dry grass, grazed by sheep, sparse tussocks.
Site 24. Wet grass and *Juncus*, with large tussocks and deep thatch.

METHODS

Pitfall traps containing antifreeze were placed 2 m apart in one line of 9 traps at each site. These were set from 9th May to 24th October 1995 and were emptied approximately monthly. Adult myriapods were identified by the author to species and sex (except for some *Ommatoiulus sabulosus* in July which were not sexed). No attempt was made to record the stadium of each, but very few early stadia were present (<1%) and these were disregarded in subsequent analyses. It is however possible that a few late, but immature stadia were included in the totals for adult female julids. All the specimens are preserved in the Dundee Museum.

RESULTS

Of the 24 sites, 21 produced millipedes, representing eight species (Tables 2-4). These are all large, surface-active species. It is possible that other species, living permanently within the topsoil or at the soil-litter interface could be present since these rarely fall into pitfall traps even in those lowland localities where they are common. However such species appear not to have been recorded in moorland or montane habitats in Scotland.

Dry grass (Table 2). Sites classed as 'dry grass' that produced millipedes were at altitudes of 200 - 275 m. Two higher sites, at 295 and 450 m, produced nothing. This was the only habitat in which all eight species were recorded and one of the five productive sites, site 1 at 265 m on Auchterhouse Hill, had seven, including *Ophyiulus pilosus* and *Polydesmus inconstans*. *Julus scandinavius* was the only species present at all the productive sites although in two of them *Ommatoiulus sabulosus* was dominant. Brief hand-searching on 25 Oct. 1996 produced a single specimen of *Nanogona polydesmoides*, a species not found in any of the pitfalls, under a stone on dry grass about 5 m from the unproductive site 10 at 450 m on Craigowl. However this was only about 100 m from a hill-top radio installation with disturbed ground and concrete. Total numbers of millipedes at productive sites ranged from three at site 16, closely grazed by cattle, to 321 at site 1.

Table 2. Numbers of millipedes at dry grassland sites.

Site:	1	10	15	16	18	21	23
Ommatoiulus sabulosus	96		3		40	46	
Tachypodoiulus niger			10				
Cylindroiulus punctatus	5		1		16	2	
Julus scandinavius	46		25	3	1	7	
Ophyiulus pilosus	50						
Polydesmus angustus	74				2		
Polydesmus denticulatus	24		1	2	2		
Polydesmus inconstans	26						
Total	321	0	40	5	61	55	0

Dry heather (Table 3). Of the ten dry heather sites, nine were productive (205 - 390 m), the only unproductive one being the highest at 445 m. Five species were recorded, and all five were present at two sites. *Ommatoiulus sabulosus* was dominant (and very abundant) at four sites, but *Julus scandinavius* was present at all and dominant at three. The only site with short heather (10cm), site 17, produced only one millipede (*Julus scandinavius*); all the others had deep heather and five of these produced over 200 millipedes each.

Table 3. Numbers of millipedes at dry heather sites. (Site 7 had nil.)

Site:	2	3	4	9	13	17	19	20	22
O. sabulosus	171	216	30	1	188		268	312	
C. punctatus	2	2	1		1		5	8	7
J. scandinavius	55	147	169	59	1	1	66	65	51
P. angustus	40		10	3	16				
P. denticulatus	1	1	8					2	
Total	269	366	218	63	206	1	339	387	58

Wet grass (Table 4). Wet grass sites ranged from 195 to 340 m and all were productive, with total catches ranging from 45 to 395, the highest recorded at any site. *Julus scandinavius* was again the only constant species, but seven species were recorded (all except *Polydesmus inconstans*) with a maximum of six at one (Craigowl, 255 m). *Ommatoiulus sabulosus* was dominant at two but absent from two others. *Polydesmus* spp. were well represented, and dominant at one - site 24, which was the wettest, with extensive *Juncus*.

Wet heather (Table 4). This site (14) produced an abundance of *Ommatoiulus sabulosus* (104) but only one other species, a single *Polydesmus angustus*, in spite of the presence of dead wood.

Bog (Table 4). The small numbers probably reflect the wetness of the ground, but the fact that five species were present could represent proximity to some drier ground with heather.

Table 4. Numbers of millipedes at wet grassland sites (5-24), bog (6) and wet heather (14).

Site:	5	8	11	12	24	6	14
Ommatoiulus sabulosus	208		11	82		21	104
Tachypodoiulus niger			4	6			
Cylindroiulus punctatus	2	2	1			5	
Julus scandinavius	144	8	16	1	1	13	
Ophyiulus pilosus					21		
Polydesmus angustus	9	20	4		33	2	1
Polydesmus denticulatus	32	17	9		27	4	
Total	395	47	45	89	82	45	105

ALTITUDE

No species of millipede in Britain is confined to higher altitudes, but the altitudinal limits of the lowland species vary considerably. *Ommatoiulus sabulosus, Julus scandinavius* and *Polydesmus angustus* are often the only species at higher altitudes in the Highlands, with a limit around 650 m in the case of *Julus scandinavius*. The apparent absence of any millipedes at the two highest sites in the Sidlaws, at 445 and 450 m, is probably determined by exposure. *O.sabulosus, J.scandinavius, P.angustus* and *Polydesmus dentatus* have been recorded at these and slightly higher altitudes in more sheltered localities in the Highlands (personal observation). Five species were recorded here at 390 m (*Ommatoiulus sabulosus, Cylindroiulus punctatus, Julus scandinavius* and *Polydesmus denticulatus*); *Ophyiulus pilosus* was recorded only at 255 m; *Tachypodoiulus niger* up to 255 m; and *Polydesmus inconstans* only at 265 m.

THE SPECIES OF MILLIPEDES

Ommatoiulus sabulosus (Fig.3a). This was the dominant species at most sites, up to 390 m, and was very abundant at some, especially in June, although inexplicably absent or scarce at others, e.g. Craigowl and Hayston Hill. It is a widespread lowland species but usually only abundant or dominant on coastal dunes, sandy soils and heathland, with records up to 550 m in Perthshire. It appears to be more tolerant of acidic conditions than other millipedes.

This species takes from two to four years to reach maturity. The virtual absence of immatures therefore suggests that these live entirely in the deeper layers of the litter and topsoil, as presumably do the adults prior to June since they too were virtually absent from the catches during the period 9 May to 5 June. They were also very scarce from August onwards. This could be due to post-breeding mortality, or to a return to lower levels in the

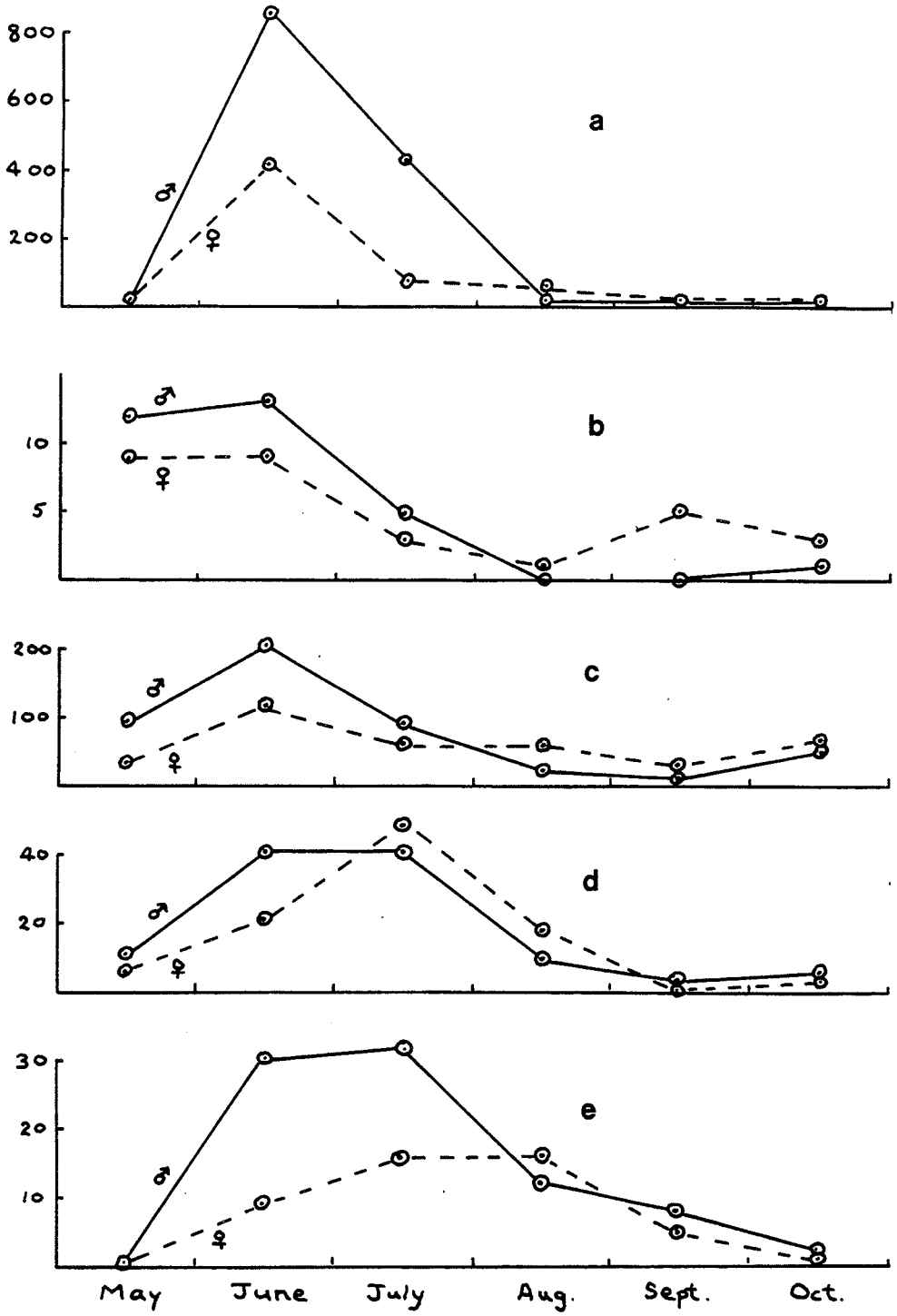

Figure 3. Seasonal pattern of the more abundant species. In *O.sabulosus* the July figures are extrapolated from a sample of 255 that were sexed.

(a) *Ommatoiulus sabulosus.*

(b) *Cylindroiulus punctatus.*

(c) *Julus scandinavius.*

(d) *Polydesmus angustus.*

(e) *Polydesmus denticulatus.*

soil. The latter seems more probable since both sexes are known to be capable of living for several years after reaching sexual maturity (Blower, 1985).

Tachypodoiulus niger. This species was found in small numbers and only at three grassland sites, up to 255 m. It may be significant that all these had broom and/or gorse nearby. It is a common lowland species, often abundant in woodland, but is generally scarce or absent in moorland habitats. These records may well be close to the altitudinal limit in Scotland. However in a study in the Pyrenees it was found at 2800 m, higher than any other species but nevertheless close to the tree-line (Mauriès, *fide* Hopkin & Read, 1992).

Cylindroiulus punctatus (Fig.3b). This was found only in small numbers but in all habitats, up to 390 m. It is an abundant and ubiquitous species in woodland, but often survives on moorland, for example in the dead wood of tree stumps. However at several of these sites, both in heather and grass, no dead wood was visible, other than that derived from heather and other dwarf shrubs. At site 8, one was found by hand searching in *Juncus* litter remote even from any dwarf shrubs.

Julus scandinavius (Fig.3c). In line with previous records, this species was the most widespread, being found at all productive sites, up to 390 m. It was the dominant species at two dry grass sites, three dry heather sites and two wet grass sites.

Ophyiulus pilosus. Found only at two grassland sites, up to 265 m. This is consistent with the situation in the Sheffield area where it 'occurs sporadically in acid heathland . . . but is very much replaced by *J.scandinavius* in these locations' (Richards, 1995).

Polydesmus angustus (Fig.3d). This species was found in all habitats, at frequencies ranging from an average of 16% of the millipede catch in dry grass to 2-4% in heather and bog. Where numbers were adequate for comparisons it was the dominant polydesmid at six sites, but was closely followed by *P.denticulatus* at two of these and exceeded by *P.denticulatus* at one other. It was present in all six months with a peak in July and August. In woodland in Surrey, pitfall trapping showed a similar seasonal pattern but with the peak earlier, in June (Banerjee, 1967). This is a very widespread species and is usually the most abundant (often the only) flat-backed millipede in a variety of habitats. It has been recorded throughout the Highlands but mostly in woodland.

Polydesmus denticulatus (Fig.3e). Considering the apparent scarcity of this species when hand-searching, it was rather surprising to find it in all habitats and at 12 of the productive sites, although this is consistent with experience elsewhere indicating that it is a difficult species to find except by pitfall trapping (e.g. Richards, 1995). It was scarce in heather, but represented 13% of the total catch in wet grass (exceeding *P.angustus*) and 6% in dry grass. This species has been recorded sparsely in the Scottish lowlands, in a variety of woodland and open habitats, without any clear pattern. However its predominance in wet grassland is concordant with studies in continental Europe showing it to be unusually tolerant of winter flooding (Hopkin & Read, 1992). Although there are records from coastal Caithness, the published atlas (British Myriapod Group, 1988) does not show any in the Highlands. However it was found in 1995 on Ben Lui (NN 2627), on herb-rich and

base-rich ledges at about 600 m, remote from woodland (personal observation) and in 1991 in Glen Shiel (NH 01) (Jones, 1992).

Polydesmus inconstans. Found only at one site, on dry grassland at Auchterhouse Hill at 265 m, where however it was slightly more numerous than *P.denticulatus*. This is a generally scarce species throughout the lowlands, but without any clear indication of habitat restriction in the available records, although most are from woodland.

CENTIPEDES

The general scarcity of centipedes in pitfall traps means that negative records should not be considered significant.
Geophilus carpophagus. One at site 1; one at site 18 (both dry grassland). This is normally the commonest geophilomorph centipede in moorland habitats.
Lamyctes fulvicornis. Site 16 (short dry grass): July - 1, Sept. - 6, Oct. - 2; site 24 (wet grass): August - 2. Not hitherto recorded in Angus, but
the habitats and season are typical.
Lithobius forficatus. Found in nearby disturbed sites, including the summit of Craigowl at 450 m.
Lithobius melanops. Site 3 (dry heather): one found by hand in dead wood.

CONCLUSIONS

Millipedes are generally difficult to find in moorland by direct searching, especially if logs and stones are scarce or absent. Pitfall trapping reveals their nocturnal activity, while they presumably spend the day (and the winter months) within the leaf-litter and topsoil. Although some species of the larger julids and polydesmids are well known to move seasonally between upper layers and vegetation in summer and lower layers including the soil in winter, little information appears to be available on the extent to which they are active and feeding in the lower layers. All species were very scarce in May but reached peaks of abundance in June and July. Although this indicates the start of surface activity in June, it is not clear to what extent this represents the beginning of the year's activity or simply a change from subterranean to surface activity. The summer of 1995 was exceptionally dry: at Invergowrie, 10 km south of the Sidlaws and close to sea-level, rainfall in August 1995 was only 16% of the 30-year average (Table 5). It is therefore possible that the decline in numbers after July (and the virtual disappearance of *Ommatoiulus sabulosus*,

Table 5. Monthly rainfall (mm) at Invergowrie, 10 km south of the Sidlaw Hills, for May to October 1995, compared with the 30-year averages for these months. (Courtesy of Scottish Crop Research Institute)

	M	J	J	A	S	O
1995	59	34	27	11	123	91
30-year average	53	52	56	67	67	63

a long-lived species) might be due to a premature move to lower levels to escape drought. However the above-average rainfall in September and October does not appear to have led to any significant reappearance. The preponderence of males, especially in the early months, is consistent with previous experience of pitfall trapping, reflecting greater activity of males (e.g. Blower, 1970).

The general abundance of millipedes at most of these sites suggests that at all except the highest they probably play a major role in the consumption of dead plant material. Conversely their absence at higher altitudes could substantially enhance the rate of peat formation.

ACKNOWLEDGEMENTS

Thanks are due to Adam Garside and the authorities of Dundee Museum for making the collection available; to Brian Boag and the Scottish Crop Research Institute, Invergowrie, for supplying meteorological data; and to Helen Read for useful comments on the first draft.

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Bulletin of the British Myriapod Group 13 (1997)

THE POSSIBLE FACTORS AFFECTING THE DISTRIBUTION AND ABUNDANCE OF THE CENTIPEDES *LITHOBIUS VARIEGATUS* LEACH AND *LITHOBIUS FORFICATUS* (LINN.) IN THE BRITISH ISLES.

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In two recent publications both on the distribution of centipedes in Yorkshire (Richardson, 1993 and Richards, 1995) attention has been drawn to the fact that the distribution of *Lithobius variegatus* Leach in the British Isles has not yet been fully explained. It seems appropriate, therefore, to review the current state of knowledge on this topic and the possible relationship between *L. variegatus* and L. *forficatus* (Linn.).

Eason (1964) noted that *Lithobius forficatus* "is the most familiar and widely distributed British centipede, being frequently found in gardens and suburban areas and, owing to its habit of wandering in the open at night, often finding its way into outbuildings and houses. It cannot, however, be regarded as synanthropic as it occurs commonly in woodland, grassland and moorland, well away from houses and villages: it has been found on the sea-shore above high-tidemark and also as high as 1,500 feet in the mountains of Scotland." It occurs in Europe generally, the Mediterranean region, the Caucasus and North Africa and has been frequently introduced elsewhere. In the British Isles *Lithobius variegatus* is a woodland species, also common in grassland and moorland, mountainous country and coastal areas but relatively uncommon in gardens, buildings and suburban areas (Eason, 1964). It was thought to be endemic to the British Isles but is now known to occur on the continent . Eason and Serra (1986) distinguished two subspecies: *L. variegatus* from the British Isles, northern France, north-west Spain and northern Portugal and *L. variegatus rubriceps* Newport from the rest of the Iberian Peninsula, southern Italy and Sicily and North Africa. The authors suggested that climate is an important factor affecting the distribution of this species but is unlikely to be the sole factor, pointing out that it is difficult to explain the absence of the species from south-west France on grounds of climate alone They observed that a competing species from the east which had failed to penetrate Brittany and failed to cross the Pyrenees into the Iberian Peninsula might possibly have played some part as well. Kime, Lewis and Lewis (1987) suggested *Lithobius piceus* L. Koch as a possible competing species in Normandy.

Eason (1964) observed that in the British Isles the two species are frequently found together but there are few records of *L. variegatus* east of the 38°F (3.0°C) winter isotherm in England and none from a similar area in eastern Scotland. This suggests that temperature may be an important factor. Blower (personal communication) has pointed out that these are also areas of low rainfall. Eason (personal communication) writes "Judging from the climate maps in Tansley The British Isles and their vegetation Vol. 1 (1949) figs. 11 & 27, the 38° F winter isotherm fits the distribution of *L. variegatus* better than mean annual rainfall, specially in Scotland. Barber and Keay's (1988) map also supports my theory."

Gregory and Campbell (1996) wrote of *L. variegatus* in Oxfordshire "can be locally abundant in woodlands and scrub on both acidic and calcareous soils... in the clay vales it has proved unexpectedly rare and confined to ancient woodlands." *L. forficatus* "despite a strong preference for urban sites,.... can also be found in most rural habitats except where *L. variegatus* is common".

Roberts (1956) showed that in Hampshire *L. variegatus* was less tolerant of low temperature than *L. forficatus*. In February 1956, of 23 immaturus and 96 maturus *L. variegatus* collected from dead logs, four immaturus and 52 maturus individuals were dead. The dead specimens were all under bark on the upper sides of logs where temperatures were as low as - 3°C. Living specimens were either in or beneath logs. Similarly, Lloyd (1963) found large numbers of dead *L. variegatus* in decayed logs after exceptionally cold weather in Oxfordshire. *L. variegatus* was uncommon in dry Chestnut wood in Hampshire but common in a damper Beech dominated wood. Roberts (1956) suggested that weather and predators were two of the more important factors controlling the number of *L. variegatus* in these Hampshire woodlands but the low numbers of *L. forficatus* (which can survive for long periods in a saturated atmosphere) in a damp wood were due to some additional factor not directly related to microclimate. Lewis (1967) in a rather tenuous argument suggested that the number of gregarine parasites could be Roberts' "additional factor" as parasite numbers were higher in the damper woods in the study area at Shipley Glen in Yorkshire where *L. forficatus* was less common but, if parasites were the cause, *L. forficatus* would have to be less resistant to the infection than *L. variegatus*. The similarity in the diet of these two species seemed to eliminate food as being important in their distribution (Lewis, 1965). It was also suggested that the prolonged period of oviposition in *L. variegatus* might be a safeguard against the loss of the brood during a dry season indicating that the species was less resistant to climatic extremes than *L. forficatus*.

Turk (1946) reported *L. forficatus* to be rare above 800 feet in southern England, being 'replaced' at higher altitudes by *L. variegatus* but at Bolistone in Scotland *L. forficatus* was the dominant species above 1000 feet. Barber (1985) in a discussion of *L. variegatus* wrote: "Any relationship between distribution and winter temperatures is clearly not a straightforward one. The tendency of the species apparently to favour upland areas may in fact be more due to the fact that it does not occur in urban and suburban sites in general, areas from which a higher proportion of lowland, compared with upland, records are made."

Richards, (1995) suggested that *L. variegatus* might compete with *Lithobius forficatus* at higher altitudes but the reason for the absence of *L. forficatus* from some upland and other localities may be that the species has not yet arrived. Pocock (1893) noted that "in the South of England *L. forficatus* is found most abundantly under bricks and planks, in or near yards, outhouses etc. *L. variegatus*, on the contrary, is found under stones and tree-trunks in woods or the open country. These facts in distribution suggest that *L. forficatus* has been introduced into the British Isles later than *L. variegatus*".

In West Somerset *L. variegatus* is by far the most common centipede in woodland: *L. forficatus* is rarely present (Lewis, unpublished data). The latter species is usually found in habitats associated with human activity past, such as long disused quarries and

ruins, and present. In some cases it is difficult to imagine what factors associated with human habitation remain. It would seem that once transported by man it persists after human activity has ceased.. The rarity of *L. forficatus* in the woodlands of west Somerset suggests that it is still spreading as Pocock (1893) had supposed. Indeed the paucity of centipede species in west Somerset despite the wide variety of habitats and mild climate suggests that it has yet to be colonised by species common elsewhere.

The absence of *L. variegatus* from areas of human habitation is difficult to account for. It may be due to predation, possibly by *L. forficatus*, although the two species are often found together in rural habitats. *L. forficatus* will certainly take small *L. variegatus* and Johnson (1952) reported that it takes small specimens of its own species. *L. variegatus* appears not to do so. This may be the reason why both immature and mature *L. variegatus* are frequently found together whereas immature and mature *L. forficatus* are not. Thus Lewis (1965) noted that very few immature *L. forficatus* were found during an investigation in some Yorkshire woodlands in contrast to *L. variegatus* where immature and mature individuals were common. It is odd that *L. variegatus* with its large head and powerful poison claws may be less aggressive than *L. forficatus*.

Fründ (1992) suggested that the frequency of scars in centipedes may indicate predator intensity or general ecological stress and his method might usefully be employed in further investigating the situation in *L. forficatus* and *L. variegatus*. Work on *L. forficatus* in Germany shows it to be common at woodland edges. Scar frequency is higher in the forest floor than in urban localities (Fründ, Balkenhol and Ruszkowski, 1996)

Other differences between the two species are that *L. forficatus* has stout legs and burrows whereas *L. variegatus* with a broad head and slender legs appears not to do so. The weighted data of Barber and Keay (1988) expressed as a "standardised percentage" gave 20.1% in soil for *L. forficatus* as compared with 4.9% for *L. variegatus*. There are behavioural differences between the species: *L. forficatus* runs away when exposed, as when a log or stone is turned but *L. variegatus*, as Eason (1964) pointed out, has colour-markings that "make it inconspicuous against its natural background of leaves and stones and, like so many protectively coloured animals it tends to remain motionless when disturbed." It is often found clinging ventral side uppermost to the underside of stones and bark whereas *L. forficatus* rests face-downwards. Similar behaviour when under leaves would be an effective defence against bird predation as blackbirds, for example, when hunting through dead leaves flick them aside to expose prey on the ground beneath. A specimen of *L. variegatus* clinging to the underside of the leaf would go unnoticed if it remained motionless.
The colour-markings of L. *variegatus* may be due to a reduction in the pigment lithobioviolin beneath the cuticle and it is possible that this may render it less resistant to low oxygen tensions in the soil.

CONCLUSIONS

The geographical range of *L. variegatus* may be limited by climatic factors: low temperature and, or, dry conditions and by competing species or predators of which *L. forficatus* may be one. Its absence from urban localities may be due to predators characteristic of such localities and possibility the shortage of litter and humus.

L. forficatus appears to have been a more recent arrival in the British Isles. Man appears to be important in distributing it and it is probably still spreading. Its penetration of woodland may be partially limited by woodland predators. The problem remains a complicated one. No doubt a number of factors operate at the same time and different factors may be of importance in different areas at different times.

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THE HISTORY OF FOUR-FOOTED BEASTS AND SERPENTS AND INSECTS

T. MUFFET

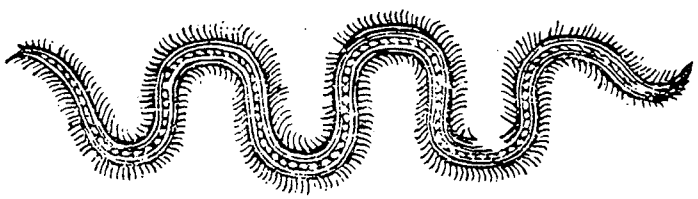
An extract from the above book was sent to us by Paul Richards of Sheffield Musuem. It was published in 1658 by E.C. of London. Unfortunately it is rather difficult to reproduce clearly but makes entertaining reading.

Concerning the Scolopendræ and Juli.

THE *Scolopendræ*, and *Juli*, and *Cheeſelips* march in the laſt rank. They far ſurpaſs in the number of their feet, Catterpillers, Staphylini, and Whurlworms, and all kindes of Inſects, whence they are called Many-feet by a peculiar name belonging to them. *Ariſtotle* cals this *Scolopendra*; *Theophraſtus*, *Scolopia*; *Dioſcorides* (from the deſtruction of Serpents) cals it *Ophioctone*: *Varinus* and *Heſychius* call it *Amphydes phaganon*; others, ϖϟ, and ſome call it *Thouſand-feet*, and *Many-feet*; the vulgar Greeks call it *Scolopetra*; the Latines alſo call this *Scolopendra* and *Sepa*, and *dirty-hog*, and *hundred-feet*, *thouſand-feet*, *many-feet*; which three laſt names alſo they give to *Juli*. In Hebrew they call it *Ghazam*; in Arabick, *Alcamptia*, and *Alamula*, as *Silvaticus* teſtifies; *Albertus* cals it *Almuga*, *Altapua*; in the Poliſh Tongue, *Stonogroback*, *Gaſlauka*; in the Hungarian Tongue, *Zones*, *Hiragopap*, *Matzkaia*; in High Dutch, *Ein naſſel*; in Italian, *Centopede Vermi*; in French, *Chenille*, *Millepied*; in Engliſh, *Scolopender* and *Manyfoot*. In my judgement it differs as far from *Julus*, as a ſea Lobſter from a *Crevis*. They are indeed like to one another, but theſe are alwaies leſs, nor are they ſo miſchievous when they bite, nor ſo venomous. The Name.

The great earth Scolopender is as long and thick as you have it pictured; the colour of the body is black from brown, and ſhining. To every inciſion a yellow little foot is joyned, that is, in the ſeveral ſides ſixty. It goeth forward and backward with equal eaſe. For it goes with the head forward, and with the tail forward; and therefore *Nicander* and *Rhodoginus* call it two heads. It hath the part between the head and belly not ſingle, but manifold; whence it comes to paſs that this kinde can live though it be cut in ſunder. This Scolopender being provoked bites ſo ſharply, that *Ludovicus Armarus* (who gave me one brought out of *Africa*) could ſcarce endure him to bite his hand, though he had a good glove on, and a double linnen cloth; for he ſtrook his forked mouth deep into the cloth, and hung a long time, and would hardly be ſhaken off.

Another was brought from new *Hiſpaniola*, which had on the midſt of the back a flame coloured line to adorn it; and a red ſide, and colour of the hair ſet it forth. It had feet like to hairs, and lifting it ſelf upon them all, it ran very ſwiftly: this is worthy of the greateſt admiration, that Nature having given to this creature a ſmall head, yet it hath given memory to it, and the rule of reaſon, not in pints and pitchers, but in the largeſt meaſure. For ſeeing it hath feet innumerable as Rowers, and many of them are from the Rudder the head at a great diſtance, yet every one knows his own office, and as the head directs, ſo they all frame their motion.



Another was brought to us from St. *Auguſtines* Promontory out of *India*, ſomething greater in body and feet: which had 70 black and blew inciſions, and twice as many light red feet.

I doubt not but more ſorts of Scolopenders may be found, of almoſt all colours except green; yet *Ardoynus* makes mention of one that was green. Each of them hath an inbred property, to go to the roots of ſword graſs (as *Theophraſtus* thinks). But *Robertus Conſtantinus* deſerves to be whipt, and ſo doth *Stephanus* that followes him, and *Ardoynus* himſelf, who invent that a Scolopender is firſt a Serpent, then hath eight feet, then a horn in its tail, and laſtly, it is a ſlow goer. *Albertus*, *Rhodoginus*, *Avicenna*, are to be blamed alſo, who affirm raſhly, that no Inſect hath above twenty feet, and they put the Scolopender in that number. Yet *Nicander* cals him two headed in theſe verſes:

The Scolopender hath each end a head;
And ſtings with both, untill that men be dead:
With feet like ores he wafts himſelf along, &c.

Yet by the favour of ſo great an Author, I might ſay that he hath but one head; though he can as eaſily move forward or backward with his tail conducting him, as with his head. And this I believe deceived *Nicander* and others. But he ſaith farther, that he bites at both ends; which is as falſe as the former; for he bites only with his forked mouth, and hurts not with his tail, otherwaies than by a venomous touch, and by putting forth poyſonous bloud.

Oppianus holds it to be more fierce than the ſea Scolopender, and ſo it is indeed: and I greatly wonder that *Grevinus Pariſienſis*, upon no authority, in his Book of Venomes ſhould oppoſe this.

All Hiſtories teſtifie that this creature is dangerous and venomous, and ſo much the more as it is more hairy. We read in *Ælian* that the *Rhytienſes* were driven out of their City by the multitudes of theſe creatures: and *Theophraſtus* affirms the like concerning the *Obterietes* in *Pliny*: therefore though we have ranked the Scolopenders in the laſt place, yet in executing divine vengeance, they may ſometimes challenge the firſt place. Countrey people do judge of fair weather by the frequent coming forth of the Scolopenders; and when they hide themſelves they foreſhew rain, as *Marcellus Virgilius* hath noted on *Dioſcorides*. *They have theſe uſes in Phyſick.* If they be boyled in Oyl, they take off hair with a little pricking, *Gal.* 11. *Simpl.* and *Aetius lib.* 7. They are enemies to Wiglice, that are moſt ſtinking creatures, and kill them with their breath, or eat them alive. Again, Wiglice being either taken inwardly, or anointed outwardly, are a remedy for their bitings, by a reciprocal, and as it were emulating antipathy, as is manifeſt from *Pliny*, and *Ardoynus lib.* 6. concerning poyſons. When the land Scolopender hath bitten, the place is all black and blew, putrefies and ſwels, and looks like to the dregs of red Wine, and is ulcerated with the firſt bite. *Ægineta*. *Aetius* adds that the pain is intolerable. *Dioſcorides* ſaith the whole body pricks. All hold that this bite is incurable, and will admit almoſt no remedy. It hath (ſaith *Anazarbeus*) ſymptomes, prevention, and cure, the ſame as for the ſtinging of a Viper, *lib.* 6. *c.* 23. Againſt this diſeaſe ſome things are taken inwardly, ſome things are applied outwardly.

Amongſt inward Remedies, *Ægineta* commends Trifoly that ſmels like Bitumen, drank with Wine. *Dioſcor.* approves much of wild Rue, the root of Dragons bruiſed, the root, ſeeds, and flowers of Aſphodill, the branches and leaves of Serpol, Calaminth, the roots of Fennel and Birthwort, given with pure Wine, or Wine and Oyl. *Actuarius* gives Nix with Wine. *Pliny* commends Salt with Vinegar, or rather the froth of Salt as being the better. Alſo he highly eſteems of Horſe-mints, or wilde Penniroyal taken in Wine. *Aetius* bids give Wormwood and Mints with Wine.

As for outward Remedies, firſt ſcarifie the place hurt, make deep inciſion, and draw out the venome by Cupping-glaſſes; then put in the juice of the leſſer Centory, boyle with a third part of ſweet Wine to the conſiſtence of Honey, and binde a leather over it for eight or fourteen daies. Then foment the place with a ſponge dipt in hot Wine, and this is a certain cure for the bite of a Scolopender. *Anonymus*. *Pliny* alſo preſcribed divers remedies for it, as the dregs of Vinegar, waſhing the place with Vinegar, the flower of Miller with liquid pitch, Butter with Honey, the green Figs of the wilde fig-tree with Vetches and Wine, the Urine of the patient hurt and of a Wether, burnt Salt anointed with Vinegar and Honey, wilde Penniroyal with Salt, Salt with Tar and Honey, wilde Cummin with Oyl; and all kindes of Maiden-hairs. *Dioſcorides* commends Garlick, with Fig-leaves and Cummin, and with Vetch Meal and Wine, alſo the leaves of Calamint, and burnt Barley with Vinegar; alſo he commends a Fomentation made of

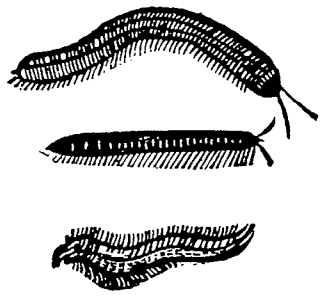
of ſowre Pickle: *Archigenes* bids foment the part with Allum-water: *Ægineta* ſaith, with much hot Oyl. *Nonius* preſcribes hot Oyl of Rue.

Some commend exceedingly both outwardly and inwardly ſuch things as are given againſt the biting of a Shrew. *Ariſtotle* writes that the Scolopenders are deluded and drawn forth with the fume of liquid Storax, and are eaſily taken whileſt they ſtick to the clammineſs of it.

Of the Juli.

THE kindes of the Juli follow next: which the Greeks call Ἰούλους; and that as I think not from their down, but from the tails of Walnuts and ſmal Nuts, whoſe hair being faſtned in a hard ſubſtance, repreſents theſe Cats-tails, whence they had the names of Juli. I know the Latines call them *Juli*, but I ſhould call them *Galleys*. For *Lycophron* called the Galleys of *Paris* that were ſwift with many ores, Ἰουλοπόδας. *Nicander* applies the ſame ſimilitude to Scolopenders; whence it may eaſily appear, that Juli and Scolopenders are like one to the other. The Spaniards call theſe *Centopeas*: the Italians, *Cento gambi*. It may be the Engliſh after me will call them Gally-worms: *Numenius* alſo called earth-worms black Juli, as *Athenæus* witneſſeth *lib.* 7. The Name.

Black Juli that feed on earth are called the earths bowels; yet unleſs they have many feet, they cannot be numbred or named amongſt the Juli. Juli are as I ſaid, ſhort Scolopenders, that for the number of their feet, exceed not only Hoglice, and all Catterpillers, but alſo all other Inſects. Some Juli are ſmooth, others hairy. I ſaw a ſmooth one in a Cabbage Lettice as thick as a ſmall river bulruſh, and of the ſame magnitude you ſee it here: it had a very black head, the back was of a golden colour, the belly was ſilver coloured from gray, the incitions and hairy feet were ſo many that they eaſily overcame both the eyes and memory. The ſecond was all black, except a white line, which was drawn down the back, ſtraight from head to the tail. The third was a decayed yellow, his head and feet were red, the ſailyards, and the hairs growing near the tail, were black and blew. If you paint the fourth with a body blackiſh red, and his feet and ſailyards lighter, you have rightly ſet him out: we caught ſome of theſe coming forth of moſs growing on the barks of trees, and others lurking under trees and rotten logs. I could meet but with two hairy ones. The firſt was white of this form and figure, it crept on a wall, the ſhort hairs that grew on t were black. The ſecond had a black and blewiſh belly, and a back ſpotted with an uncomly yellow. The mouth was red, a black eye, the hairs were hoary. It lies hid in old decayed trees between the bark and the wood; and alſo amongſt ſtones that are overgrown with moſſe and thick downy hair. All theſe Gally-worms, if they be touched roll themſelves up, and become round. I cannot tell whether they are venomous or not, but if they be, O happy *Pennius*, who divers times with his bare hand provoked and killed them, and yet was never bitten nor hurt by them. *George Agricola* tels us of a Gally-worm of a brazen colour (but he cals it a Scolopender) his words are theſe: A little Scolopender is bred and lives in the logs of trees, or in poſts driven into the earth, (whence it hath its name) remove theſe or ſtir them, and it will come forth; otherwiſe it alwaies lurks there. It hath no feathers, but hath many feet: when it creeps it lifts up the middle of a body like a vault: if you touch it with a little wand or any other thing, it rols it ſelf together. It is of a brazen colour, a ſlender body, not broad, but three fingers long, or at moſt four.



Alſo it is found in another form, almoſt in the very ſame places, with a ſlender round body, the thickneſs almoſt of a thread, of an allayed bright bay colour, the feet are ſo many and ſo ſmall, that it is impoſſible to number them. It is four fingers broad in length; it remains under rotten trees and plants. *Avicenna* makes the Scolopender (which is alſo a Gally-worm) to have 44 feet only, and to be the palm of ones hand long; ſo ſmall and ſlender, that it can creep into the ears. *Lib.* 4. *Fen.* 6. *tract.* 5. *cap.* 19. This creature, ſaith he, hath no venome, or but very weak, and cauſeth no great pain: which is preſently taken away with the flowers of Aſphodils, or with Salt mingled with Vinegar. Our Gally-worms (ſaith *Geſner*) if they be in the houſes, they will come together to St. Thomas Sugar, that is the moſt pure, (as Mice do to the beſt Cheeſe). Our Countreyman *Bruerus* (a skilful and laborious ſearcher of Nature) reports that he hath ſeen here in *England* Scolopenders, and kept them, that ſhined in the night, and in moſſy and broomy grounds ſhined with their whole body: who was no lier, and I willingly give credit to him; and ſo much the rather, becauſe *Oviedus* ſaith he obſerved the ſame in new *Hiſpaniola* in the fields, and *Cordus* did the like in *Germany* in moiſt cellars. It ſeems ſtrange that *Plutarch* relates, *Lib.* 8. *Sympoſ. problem.* 9. that a ſtripling at *Athens* caſt up a ſmall ragged creature, together with a great deal of ſeed: it had many feet, and walked exceeding faſt.

The Galley-worm found in cellers, burnt to powder, doth wonderfully provoke Urine. *Merula.* The bloud of Galley-worms, with the moiſture preſſed out of Hog-lice, is a divine and excellent remedy to take away the white ſpots of the eyes. *Arnold. Brev.* 1. *cap.* 18. The Uſe.

And thus much for Galley-worms, concerning whoſe Natures, I paſſe over the opinions of *Heſichius*, *Ariſtotle*, *Nicander*, *Lycophron*, *Ardoynus*, becauſe they are various, but not true.

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A DESCRIPTION OF *CHALANDEA PINGUIS* (BRÖLEMANN, 1898)

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INTRODUCTION

A description of *Chalandea pinguis* (Brölemann) based solely on the account in Brölemann (1930) was published in this Bulletin (Barber, 1985) as part of an update on British chilopod species and an account of its distribution in Britain and Europe subsequently (Barber, 1992) but the only figures of the species are those of Brölemann's 1930 account and of his original description (Brölemann, 1898a). The present paper is intended to make a description more widely available using figures based on British specimens by one of the present authors (REJ).

Brölemann's original specimens (named as *Geophilus pinguis*) were from the Pyrenees but it was subsequently reported from Alpes Maritimes and Corsica whilst Minelli in recent years has records from various parts of Italy and (probably) Switzerland. It is known to be widespread in the North Devon area of South West England but has so far not been reported elsewhere from Britain. A summary of these records is given in Barber (1992).

DESCRIPTION

Chalandea pinguis is highly unlikely to be mistaken for any other British (and probably European) geophilomorph because of its extreme shortness compared with its breadth and the small number of trunk segments (35-37), resembling superficially one half of a geophilomorph such as *Haplophilus subterraneus*. Brölemann himself (1898b) wrote "très reconnaisable à son aspect ramassé, qui ne tient pas, comme on pourrait le croire au premier abord, à la contraction de l'animal".

Size: Up to about 20 mm long by 1.6mm broad.

Number of trunk segments: All British specimens seem to correspond to the 35 segments in males and 37 in females of the original description. None resembling the 45-47 segments of some of Brölemann's rare female specimens from Corsica and Alpes Maritimes have been found here.

Coloration: Pale yellowish-brown (pale ochre) but some preserved specimens may be darker or appear to have a pinkish tinge.

Shape: Very short in relation to breadth, strongly contracted anteriorly but trunk barely attenuated and truncated posteriorly. Very distinctive. In life it may be found coiled into a ball with the sternites facing outwards in the way of *Henia vesuviana*.

Head: Small in relation to body, slightly wider than long with rounded antero-lateral and slightly convex posterior borders.

Antennae: Relatively long, three or four times the length of the head and about one tenth of the length of the body. Articles a litttle longer than broad, of uniform diameter throughout ; terminal article about equal in length to the preceding three together.

Clypeus: Two areas of reduced reticulation just anterior of the labrum. Clypeal difficult to see on the two specimens examined. 4 large post antennal setae in both specimens with 2+3 and 1+0 alongside them.

Labrum: Tripartite with side pieces bearing about 15 (14-16) fimbriae (Brölemann, 1930, quotes "pièces latérales frangées de 8 à 10 lanières grêles") and the mid piece with 3- 4 tuberculous teeth.

Mandibles: Typical geophilid type but without clear ventral ridge or dorsal apophysis.

Maxillae: First maxillae with long palps and 8-9 setae with a small number of microsetae on each of the palpal projections. Tips ciliate. Syncoxae with palps.

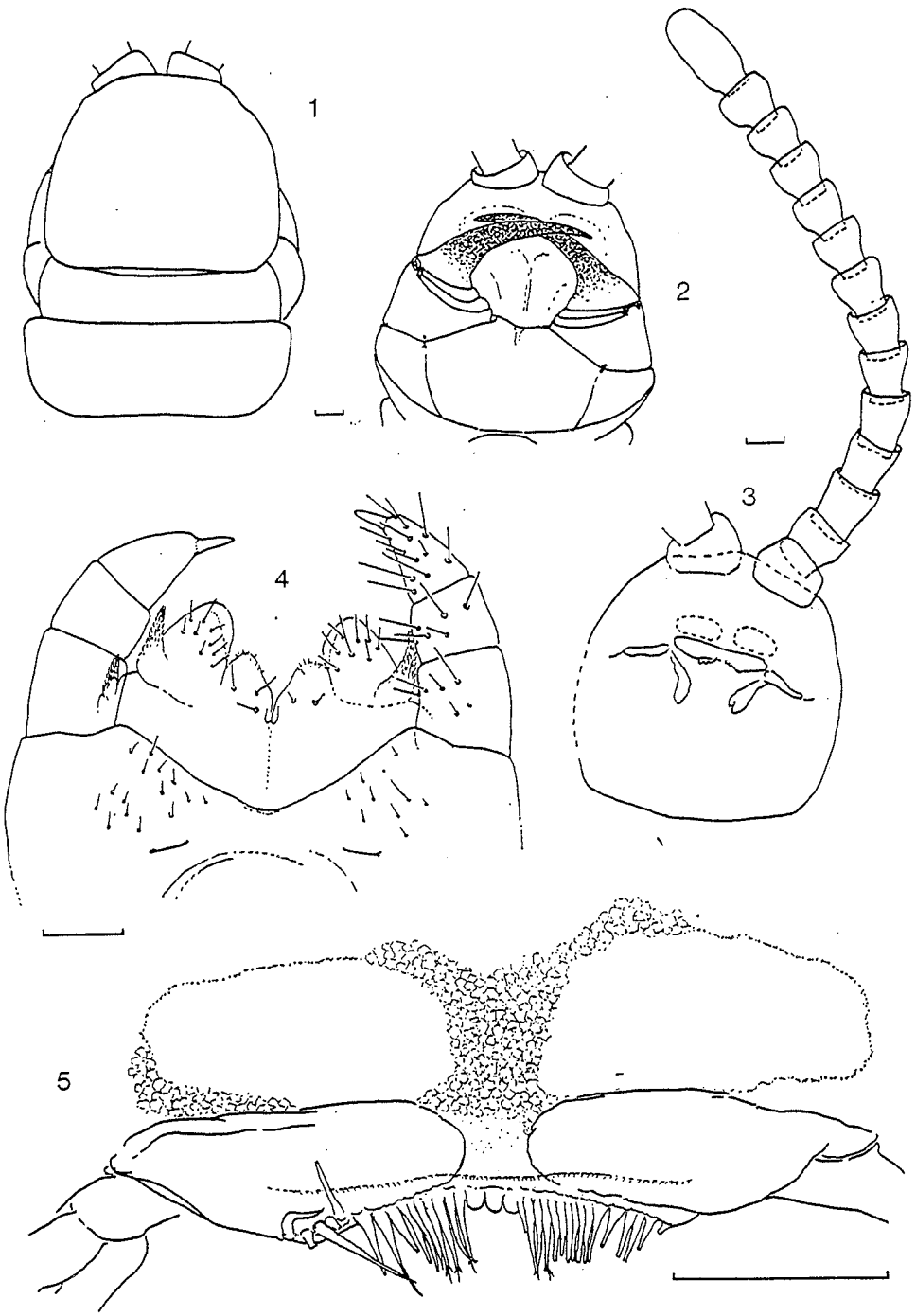
Forcipular segment: Tergite short, about 3-4 times as wide as long , lateral edges converging posteriorly. Coxosternite with complete chitin lines. Articles of poison claws very short; the length of the femoroid is less than three quarters of the width of its base. All articles are unarmed internally. The claw, contracted towards the base, is flattened, long and attenuated towards its point with a smooth concavity. Brölemann (1930) uses the phrase "comprimée en lame de sabre". The poison gland, which appears to be spindle shaped, is located in the femoroid.

Trunk: Pores on all segments except the last forming a narrow band across the posterior of each segment surrounded by a narrow (2 or 3 cells wide) band of areolation. The last two sternites narrowed posteriorly, trapezoidal. A weak carpohagus structure is present but is not recognisable on the posterior sternites.

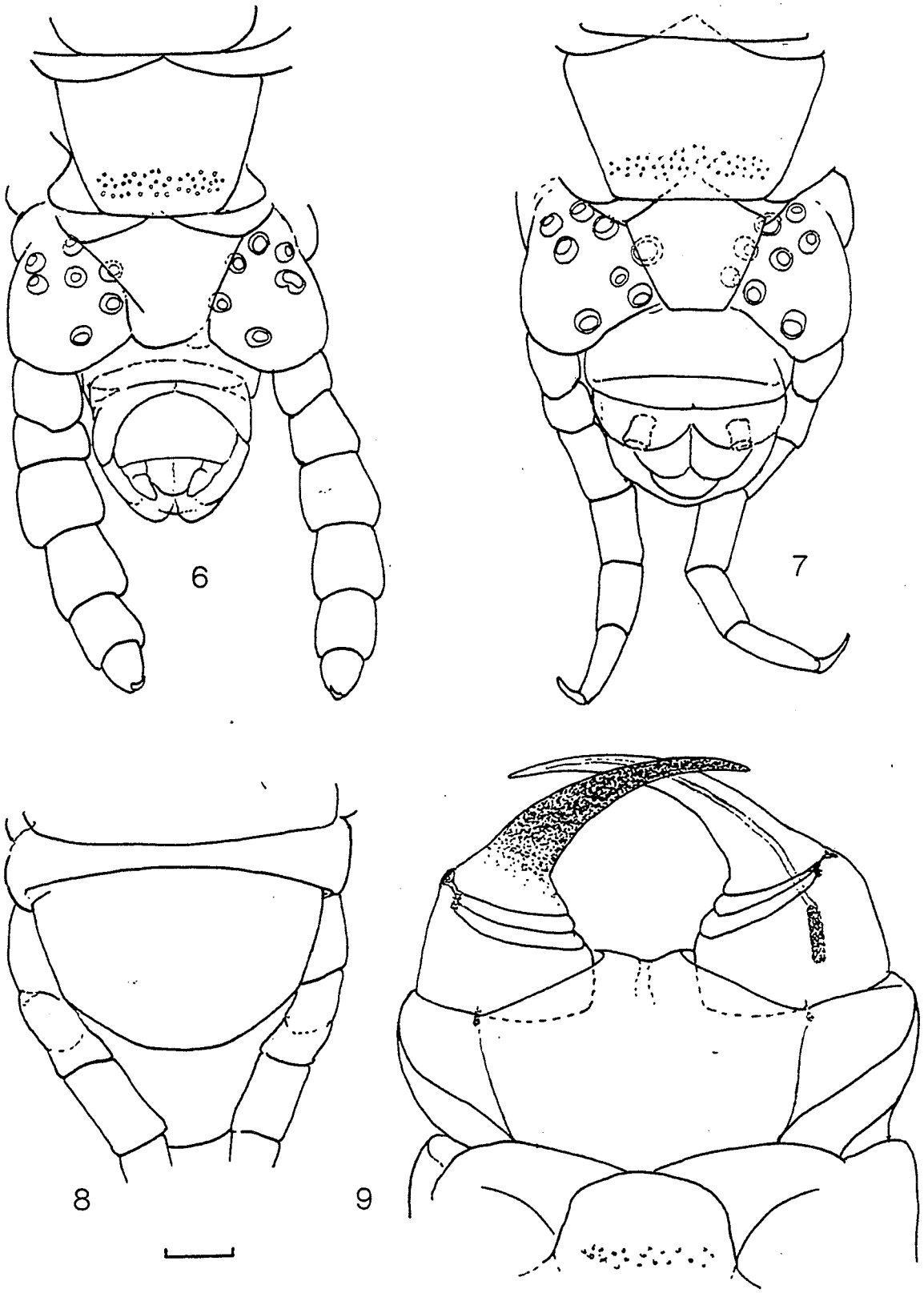
Last trunk segment: Presternite divided, metasternite trapezoidal. Coxae short and swollen, almost globular in the male. 6-10 coxal pores, mostly clearly visible; one more or less isolated pore distally. Telopodites much swollen in the male ; terminal claw clearly developed in female, less so in male. Anal pores present.

Habits: Found in a variety of sites but all British sites so far seem to be associated with deciduous trees. Leaf litter is a common location where it may often be found rolled into a ball with the sternites outside; has been found under bark. May be quite abundant in some sites.

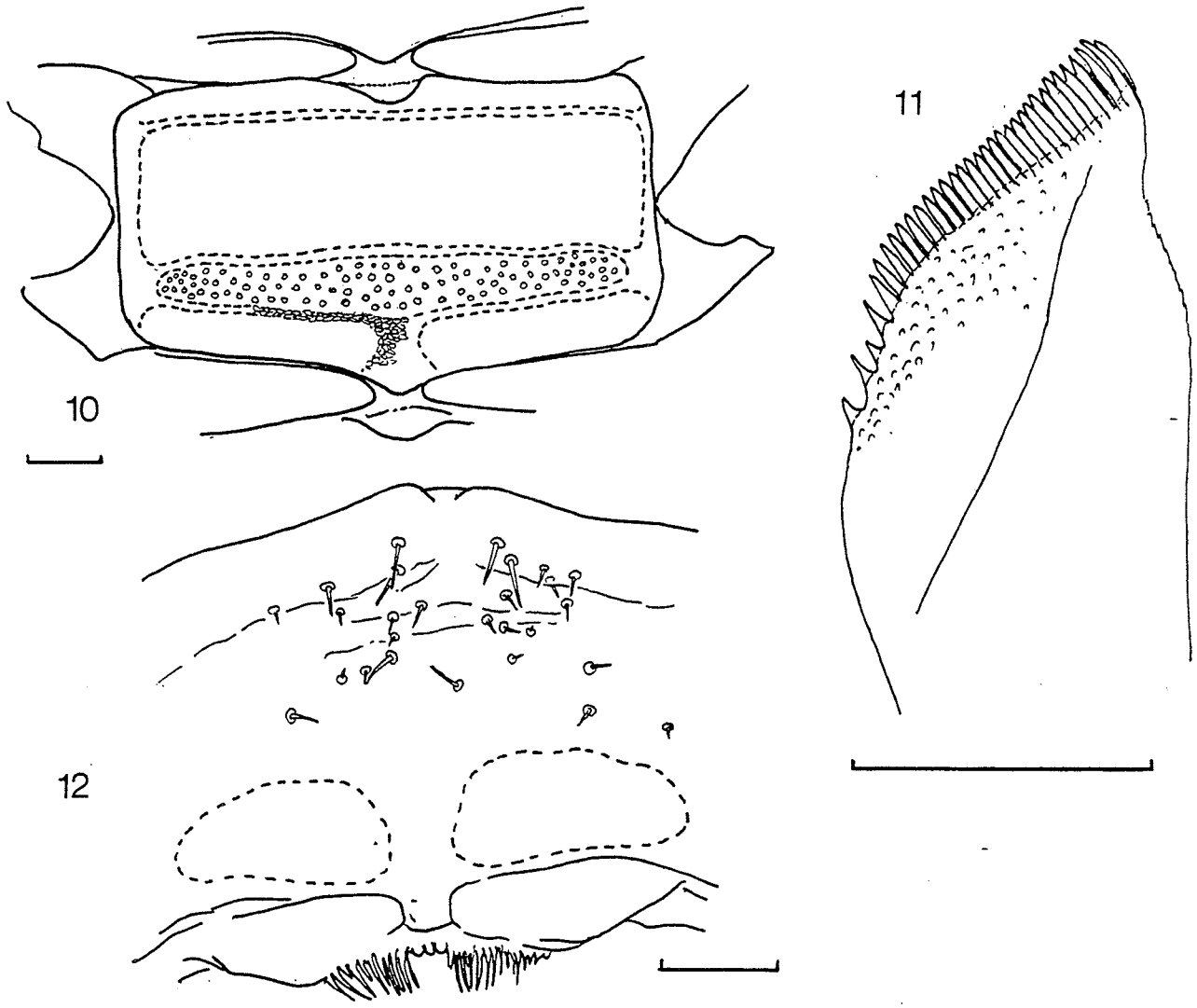
Distribution: Only known in Britain from North Devon (Vice-county 4) where it has been found in 13 locations in 9 10km grid squares between 1970 and 1989. Pyrenees, Alpes Maritimes, Liguria, Lombardy, Cottian Alps, ?Ticino and Corsica.



Figures 1-5. ***Chalandea pinguis* Brölemann 1898. Specimens from North Devon.** 1) Head and first two segments, dorsal 2) Head and forcipular segment, ventral. 3) Antennae and head capsule. 4) First and second maxillae, ventral. 5) Labrum, showing area of reduced reticulation of clypeus. Scale bars = 0.1mm.



Figures 6-9. ***Chalandea pinguis* Brölemann 1898. Specimens from North Devon.** 6) Last leg bearing segment, male, ventral. 7) Last leg bearing segment, female, ventral. 8) Last segment, female, dorsal. 9) Forcipules, ventral. Scale bar = 0.1mm



Figures 10-12. ***Chalandea pinguis* Brölemann 1898. Specimens from North Devon.** 10) 11th segment, ventral, showing posterior band of pores surrounded by ring of areolation and weak carpophagus structure. 11) Mandible. 12) Clypeus showing setae and the two areas of reduced reticulation. Scale bars = 0.1mm.

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Barber, A.D. (1992) *Chalandea pinguis* (Brölemann) in Britain & Southern Europe. Bull.Br.Myriapod Gp. **8** : 31-38

Brölemann, H.W. (1898a) Matérieux pour servir à une faune des Myriapodes de France (Suite). Feuille j. Natur. **28** : 46-47

Brölemann, H.W. (1898b) Matérieux pour servir à une faune des Myriapodes de France : Ahusquy (Basses-Pyrénées) - Myriapodes. Feuille j. Natur **28** : 187-192, 200-203

Bulletin of the British Myriapod Group 13 (1997)

A SIMPLE SHINGLE TRAP FOR MYRIAPODS

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Plymouth College of Further Education, Devonport, Plymouth, PL1 5QG

Sampling for Isopoda and Myriapods in beach shingle is complicated by the nature of the substrate and favoured techniques include hand searching or sieving. The fact that the animals can be 20 or more centimetres deep in loose substrate during the day, coupled by the coloration, particulate nature, and looseness of the substrate makes small, pale arthropods especially difficult to find. Pitfall trapping has been used with some success and led, for instance, to the discovery of the diplopod *Thalassisobates littoralis* at Slapton, South Devon and elsewhere (Harding, 1985).

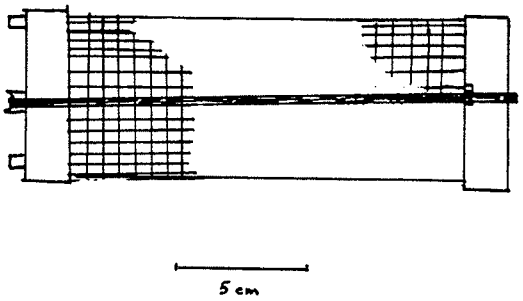
A trap as described below was devised in an attempt to see if an "in shingle" device might prove appropriate for the capture of isopods and myriapods. On testing this at Slapton, in a shingle area similar to that sampled by Harding, during May 1996, more than a dozen living specimens of *Thalassisobates* were collected suggesting that the idea is one that could be used with possible success elsewhere although no further tests have so far been carried out.

The device is a wire cage with plastic capped ends derived from a bird feeder purchased cheaply from a local shop. The particular type used was approximately 18cm long by 6.5cm diameter with a mesh size of approx. 7mm with 16mm long caps. It is held together by a simple rubber band. The handle and bird perch were discarded. No further modifications were made.

The trap was loaded with torn up kitchen tissue and some cut pieces of potato to provide moisture and assist in trapping the animals. It was buried horizontally approximately 0.5m deep in shingle ensuring that it was surrounded by generally larger pebbles that would not go through the mesh and attached to brightly coloured plastic twine which, being arranged so as to reach the surface made locating the trap for examination easier. To prevent human interference in the area concerned the twine was then hidden under a moderately conspicuous larger stone.

Traps were lifted after a week. They were found to contain a quantity of smaller stones and be apparently empty apart from one dead earwig (*Forficula* sp.) but were transferred to polythene bags for later examination. When emptied into a suitable white tray, one of the three samples was found to contain two specimens of *Thalassisobates* and another more than a dozen, all alive and very active.

Although this does not represent a new record for this particular site, it would obviously be worth trying the technique elsewhere.



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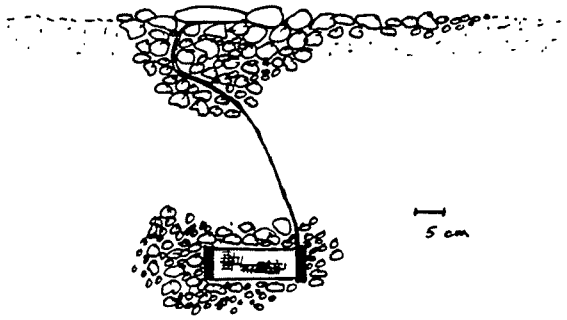

2

Figures 1-2 Shingle trap for diplopods and isopods 1) Design 2) In use.
Scale bars = 5cm.

REFERENCE

Harding, P.T.(1985) Recent records of *Thalassisobates littoralis* (Silvestri). Bull.British Myriapod Group. **2**, 6-7.

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MISCELLANEA

Lithobius piceus L. Koch : Conservation of name

A. D. Barber, Plymouth College of Further Education.

In its opinion 1816, the Bulletin of Zoological Nomenclature 52 (3), (1995) has given a ruling on the names *Lithobius piceus* L.Koch, 1862 and *Lithobius quadridentatus* Menge, 1851 following the application of Dr E.H.Eason.

1. *quadridentatus* is suppressed for the purposes of priority but not for homonymy.
2. *piceus* is placed on the Official List of Specific Names in Zoology.
3. *quadridentatus* is placed on the Official Index of Rejected and Invalid Specific Names in Zoology.

Ted Eason reported on the situation in Bulletin 10.49-50 (1994).

Lithobius lucifugus C. L. Koch - Ocelli

A. D. Barber & R. E. Jones, Plymouth College of Further Education and Dersingham, Norfolk.

In the account of this species published earlier (Barber, 1995) a drawing of the ocelli was omitted. The present drawing by R.E.Jones shows ocelli on the right side of the head for two individuals.

Lithobius lucifugus, right ocelli from two individuals from Cramond, Edinburgh (coll.G.B.Corbet)

REFERENCE

Barber, A.D., (1995) *Lithobius lucifugus* L.Koch (Chilopoda, Lithobiomorpha), a centipede new to the British Isles from Scotland. Bull. Br. Myriapod Gr. **11**: 63-65.

Cases of Structural Abnormality in Cryptops

[Diversos casos de estructuras anormales in Cryptops (Chilopoda, Scolopendromorpha)]

A.Garcia Ruiz, Universidad Complutense, Madrid

Our colleague, Andrés Garcia Ruiz, has sent us a report on various abnormalities in *Cryptops hortensis*, *C.trisulcatus* and *Cryptops hispanus* from the Iberian peninsula.

1. *Cryptops hortensis* female (1.iv.89, waste site, Segovia, Prov.Segovia) with an abnormal right tibial comb.
This specimen shows the normal five teeth on the tibial comb of the last left leg but that on the right has only one (Fig.1). No previous reference to a similar situation, which was presumably due to a developmental abnormality, has been found.

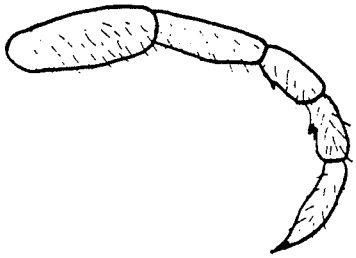

Figure1. Lateral exterior view of right last leg of a *Cryptops hortensis* from Segovia.

2. *Cryptops trisulcatus* male (28.iii.88, pine tree, La Granja, Prov.Segovia) with abnormal forcipular coxosternite.
The specimen shows two normal stout setae on the anterior border of the right coxosternum but only one on the left (Fig.2). There is no indication of damage or regeneration so presumably this is another case of developmental abnormality. Lewis (1987) reported a similar case in *C.parisi*.

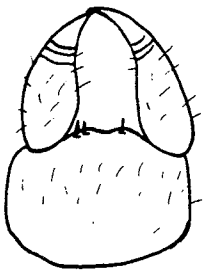

Figure 2 Ventral view of forcipules of a *Cryptops trisulcatus* from La Granja.

3. *Cryptops hispanus* male (11.ii.89, field at Almagro, Prov. Ciudad Real) with an abnormally sized right antenna.
The antennae of this specimen both have a complete number of articles but that on the left shows these to be much smaller from the twelvth onward than the corresponding ones on the right resulting in an overall smaller structure (Fig. 3). Garcia Ruiz (1995) reported on a similar case in Scolopendra cingulata, again, likely to be a developmental abnormality .

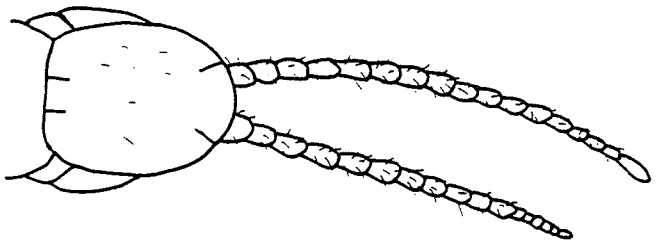

Figure 3 Dorsal view of head and antennae of a *Cryptops hispanus* from Almagro.

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Garcia Ruiz, A. (1995). On some cases of structural abnormality in *Scolopendra* (Chilopoda, Scolopendromorpha). Bull.Br. Myriapod Gr. **11**, 33-35.

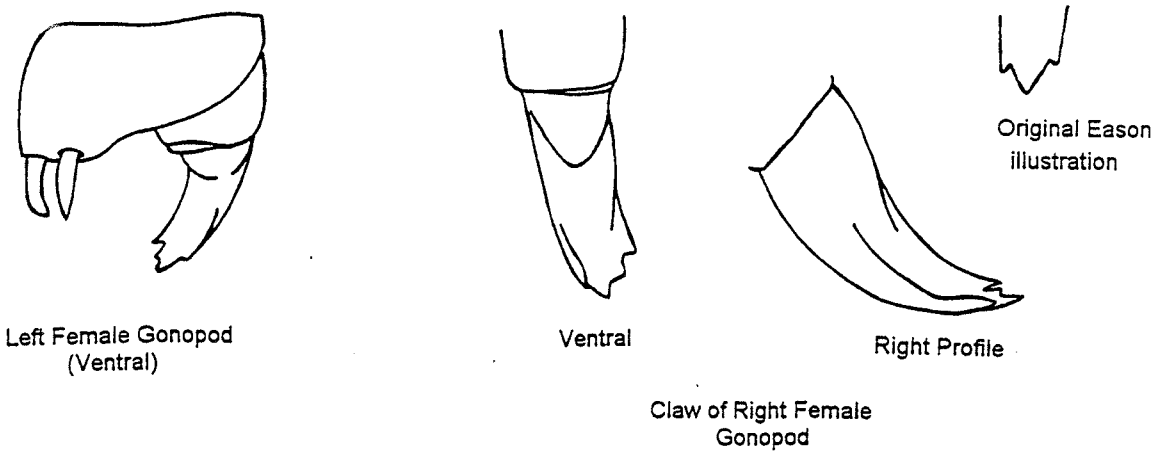
Lewis, J.G.E. (1987). On some structural abnormalities in *Lithobius* and *Cryptops* (Chilopoda) and their possible significance. Bull.Br. Myriapod Gr. **4**, 3-6

A Second Record for *Lithobius pilicornis* from Sheffield

Paul Richards, Sheffield Museum.

A single specimen of *Lithobius pilicornis* was found in a central Sheffield car park in April 1992 (Richards, 1995). This was assumed to be a one-off import as it was so far from its normal Devon & Cornwall stronhold. Recently, however, another specimen has been discovered a little further down the road from the first site. During November 1996 while clearing out a cellar, Paul Harding captured a large female specimen (38mm + antennae) and sent it to Sheffield Museum for confirmation.

It is a very typical specimen in all respects except for the gonopods. Eason (1964) states that the claw of the gonopod has a dorsal and ventral denticle as illustrated here. This Sheffield specimen has a rather more complex gonopodal claw with an additional dorsal denticle (see figures below).



Lithobius pilicornis

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Eason, E.H. (1964). *Centipedes of the British Isles*. London: Warne. x + 1-294.

Richards, J.P. (1995). Millipedes, Centipedes and Woodlice of the Sheffield Area. *Sorby Record Special Series* No. 10: 1-90.

Bulletin of the British Myriapod Group 13 (1997)

PRELIMINARY ATLAS OF THE CENTIPEDES OF THE NETHERLANDS

M.P.BERG Communication EIS-Nederland no.78 (December 1995)

PRELIMINARY ATLAS OF THE MILLIPEDES OF THE NETHERLANDS

M.P.BERG Communication EIS-Nederland no.79 (December 1995)

These two volumes and the companion one by the same author on the terrestrial isopods (Communication no.77) are a welcome and valuable addition to our knowledge of these animals in the Netherlands.

C.A.W. Jeekel published an invaluable series of papers describing myriapods, from various parts of that country during the 1970s which culminated in his Voorlopige atlas van de verspreiding der Nederlandse duizendpoten (Chilopoda) and the corresponding one for miljoenpoten (Diplopoda) (1978), two of the earliest national atlases to be prepared. The present works include his records and others and those of a new working group on Myriapoda within the European Invertebrate Survey (EIS), Nederland active since 1990.

To the British worker their interest lies in the similarities and differences between the Dutch and the British myriapod fauna and the reasons for these and perhaps the most interesting comparison can be made of species from eastern England, notably Lincolnshire and east Yorkshire and those on the other side of the North Sea where one may assume some similarities in climate, etc. - or is it just me seeing *Lithobius variegatus* absent in both areas ? To the east, the Dutch species merge into a more general European fauna with species which we lack whilst in the southernmost province, Limburg, we see species known as southern ones here.

Each atlas comprises a foreword, introduction, checklist, a note on the recording units (10km UTM grid), a brief introduction to the Netherlands, occurrence per province, distribution maps (46 centipedes, 46 millipedes), list of recorders, acknowledgements and references. There is also a set of transparent overlays provided covering distribution Holocene & Pleistocene (sea level), soils, phytogeographic regions, annual precipitation and mean daily temperature.

Species are mapped by dots but without records of different dates being distinguished. The total number of records, number of UTM squares and ranking in order of number of records are given.

Centipedes unfamiliar to British workers are *Lithobius dentatus*, *L. pelidnus*, *L. subtilis*, *L. agilis*, *L. erythrocephalus*, *L. lusitanus* and *L. aeruginosus* whilst missing are not only *Lithobius variegatus* but *L. borealis* and *Henia brevis.* Ranked number one, unsurprisingly, is *Lithobius forficatus* with 971 records from 241 UTM squares. *Henia vesuviana* has only one record as also *Lithobius lapidicola* *L.pilicornis* and

Scutigera. There are 26 for *Pachymerium ferrugineum*, not coastal, 8 for *Geophilus proximus* and 6 for *Brachyschendyla dentata*. Notable is the cluster of species mostly or almost entirely recorded from Limburg, *Cryptops parisi*, *Lithobius dentatus*, *L. muticus*, *L. tricuspis*, *L. agilis* and *L. aeruginosus*. There are only 10 records of *Lamyctes fulvicornis* but this could be due to its seasonality.

Millipedes include *Glomeris intermedia* (Limburg), *Seychellobolus dictynotus*, *Ommatoiulus rutilans* (Limburg), *Cylindroiulus appeninorum*, *Leptophyllum nanum*, *Microiulus laeticollis*, *Chromatoiulus projectus* (eastern) and *Detodesmus attemsi*. Not included are species such as *Chordeuma proximum*, *Melogona scutellare*, *Nanogona polydesmoides*, *Brachychaeteuma melanops*, *Cylindroiulus londinensis* and *Polydesmus gallicus*. *Ophyiulus pilosus* has only 16 records from 5 squares all in Utrecht & Noord-Holland whereas *Julus scandinavius* is ranked 1 with 483 records from 142 squares. *Stosatea italica* and *Unciger foetidus* are both deleted from the Netherlands list as there were no reference animals. Both were old records. The apparent absence of *Unciger* from Holland casts an interesting light on the *Unciger* colony in Norfolk as it was widely suggested that it came in with garden plants. The usual source of these is the Netherlands.

If there is one criticism, it is that the maps do not have any indication of the age of the record nor any habitat or other information. The 1978 maps did include comments on ecology and aspects of the species distribution - although for the non-Dutch speaker there was a language problem. Here it is difficult to know which are synanthropic or indoor records, information which would have been helpful for some of the species. For instance, there are 59 records of *Oxidus gracilis* from 17 squares when the usual habitat for this in northern Europe is glasshouses.

Despite this the atlas maps are a valuable indication of the distribution of species and make a most useful comparison with those for Britain and for other nearby parts of Europe and the quality of production is very high. Well worth looking at for anyone working in Britain or elsewhere in NW Europe.

The author and publisher are to be congratulated.

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