

PROVISIONAL ATLAS OF THE CENTIPEDES OF THE BRITISH ISLES

A D BARBER and A N KEAY

(British Myriapod Group)



BIOLOGICAL RECORDS CENTRE

Natural Environment Research Council

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BY

A D BARBER and A N KEAY
(BRITISH MYRIAPOD GROUP)

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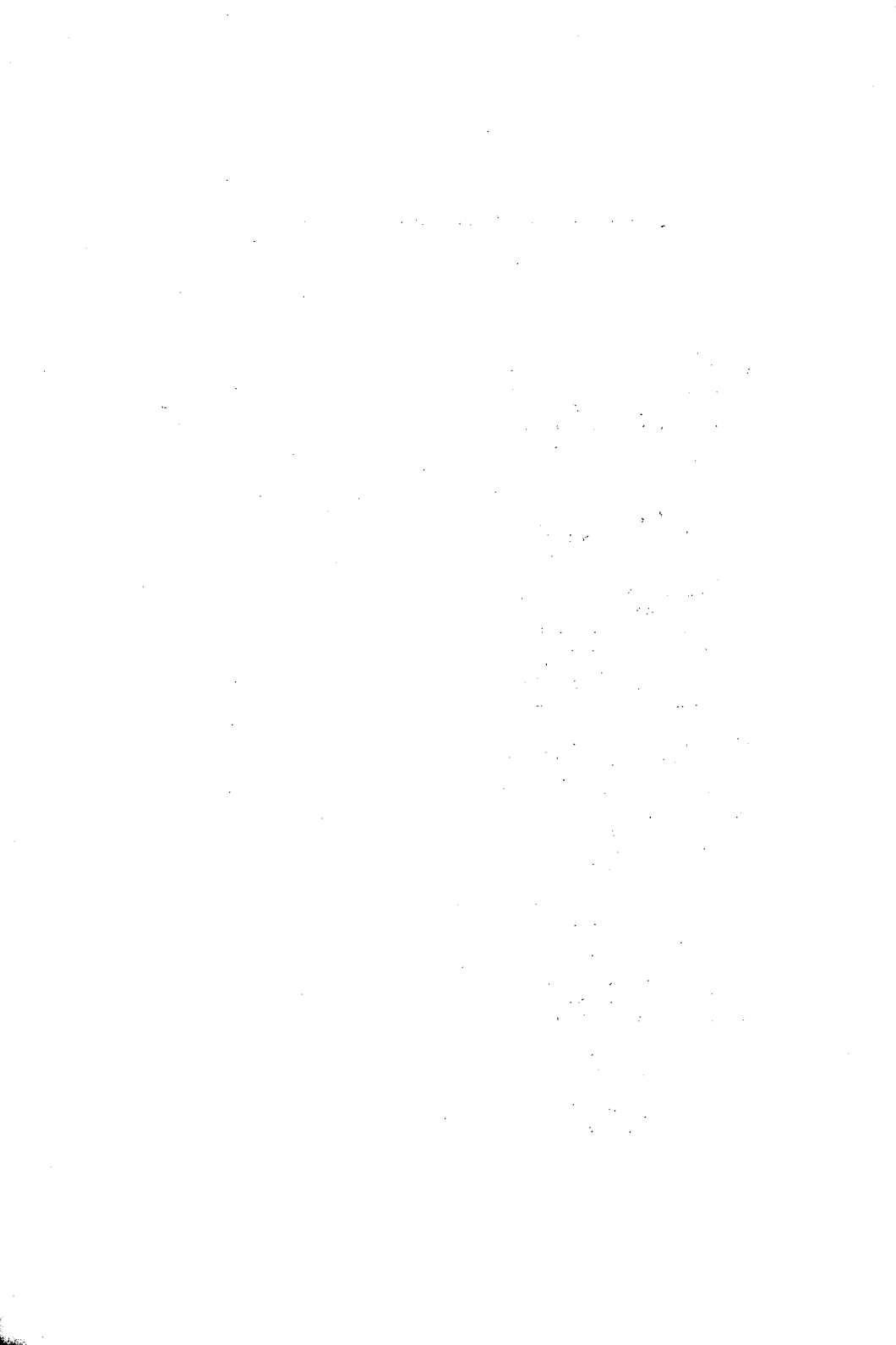
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FOREWORD

Centipedes, even if we include the larger, more colourful and venomous species found only in the tropics, have no obvious economic and only marginal medical importance, nor have they much aesthetic appeal. British species are even duller in these respects so it is hardly surprising that, in the past, they have suffered neglect at the hands of naturalists. Moreover, along with millipedes, they have always had a somewhat jocular image and have been the subject of a number of comic rhymes. However, all animal groups have much the same degree of interest to zoologists and ecologists and it is good to see centipedes taking their place among other hitherto more exhaustively studied invertebrates.

When I started studying myriapods just after the war it was difficult to know where to begin. The papers by S G Brade-Birks in Journal of the South-eastern Agricultural College, Wye, Kent and those of F A Turk in the North Western Naturalist were about the only works in English of much use to the beginner, and it was not until I met Gordon Blower in 1950, through the good offices of Dr Turk, that my studies began to take shape and I started to concentrate on centipedes. John Lewis's discovery, in 1960, of 3 new species of centipede at Cuckmere Haven gave a useful boost to the British list and publication of my book, Centipedes of the British Isles, in 1964 made identification of species easier. However, the first great landmark in the history of British myriapodology came with the formation of the British Myriapod Group in 1970 by, among others, Gordon Blower, Colin Fairhurst, Tony Barber and Des Kime. This gave tremendous impetus to our activities and Chalandea pinguis was added to the gradually expanding British list at our first field meeting near Lynton in Devonshire. But the emphasis was still on systematics and the identification of species and little was known of their natural history apart from a few rather vague generalizations, some of them misleading.

Now comes the second great landmark, as far as centipedes are concerned, with the appearance of Barber and Keay's Provisional atlas of the centipedes of the British Isles. This work gives details of the distribution, habitat preferences and general status of all known British species and, with statistical treatment, gives as true a picture as can be obtained from current records. The Atlas also points to gaps in our knowledge and will, I hope, act as a stimulus to further investigation, particularly of some of the smaller geophilomorphs. The authors, in collaboration with the Biological Records Centre, have done valuable work and it is a pleasure to write this foreword.

E H Eason
Bourton Far Hill
Moreton-in-Marsh

July 1987

INTRODUCTION

The centipede and millipede recording schemes date from the formation of the British Myriapod Group in 1970, with Dr C P Fairhurst, the prime instigator, being responsible for millipedes and one of the present authors (ADB) for centipedes. The schemes ran in parallel with the non-marine isopod recording scheme which had originally proposed habitat recording. The 3 schemes used identical record cards with relevant species lists for the 3 groups. An account of the centipede and millipede schemes is given by Barber and Fairhurst (1972), whilst the publication by Harding and Sutton (1985) represents the culmination of the recording of isopods.

Those involved in the schemes were convinced that simple mapping, as then used by other recording schemes, could be extended to include habitat data. Although, to new recorders, it seemed to present a somewhat daunting task to complete these more complicated record cards (Figure 1), they were, with experience, generally able to complete at least a proportion of the habitat categories. Instructions were available on how to fill in the cards, but some collectors preferred to give only verbal habitat descriptions which could then be transferred to cards by the scheme organizers; however, this was not an ideal arrangement. There were, unfortunately, some ambiguities in the system, such as the fact that the scheme did not differentiate under, on or in for microsites or how coastal was to be interpreted in the region of a major estuary such as the Severn. Nevertheless, an appreciable quantity of data has been accumulated and it seems an opportune time to present this.

From the start it was intended that data should be processed by computer, and the original RA14 card (Figure 1, p 2) was designed for transfer to 80-column punch cards. A straight transfer to these cards was possible with a punch card being generated for each species on a record card; the punch cards were then read into the computer. Preliminary results from the scheme for one or both myriapod groups was given by Barber and Fairhurst (1972), Fairhurst *et al.* (1978), Fairhurst and Armitage (1979) and Fairhurst (1983). A new record card (RA58) came into use in 1985, but data from these have, in general, not been included. Certain problems with organizing recording in Ireland have meant that there is only a small amount of Irish data.

A provisional analysis of the millipede data was made in 1983 with 50-km maps (Fairhurst 1983). The present analysis is based on print-out from the Biological Records Centre, at the NERC Institute of Terrestrial Ecology's Monks Wood Experimental Station, but a preliminary analysis had been made by Colin Fairhurst at the University of Salford.

VALIDATION

The records have been validated by the scheme organizers. Validation was based on the examination of initial specimens from most recorders, who then carried out their own identifications, referring on to the organizers any problematical or unusual material. For some collectors, and for certain surveys, we have examined most or all material on a regular or occasional basis. This identification work has not proved too onerous as it has been shared by several workers.

All collectors are referred to E H Eason's Centipedes of the British Isles (Eason 1964), which made the scheme viable in the first instance. This book is out of print and has become scarce, but some provisional keys have been prepared at various times to help recorders with identifications. Dr Eason has always been most willing to identify any particularly difficult specimens.

PROVISIONAL ATLAS OF THE CENTIPEDES OF THE BRITISH ISLES

A D D E N D U M

Keys to distribution maps

Coverage map

* 1-5 species

● 6-10 species

■ 11 or more species

Species maps

○ Up to and including 1939

● 1940 to 1963

■ 1964 to 1985

ARRANGEMENT OF SPECIES

Although species are listed in alphabetical order on the recording card, for ease of use it seems appropriate to arrange the species here in the same systematic order used by Eason (1964), with additional species inserted according to the sequence in Brolemann (1930). It should, therefore, be easy to use the current work in conjunction with those standard texts. A list of the species mapped is found on p 8 whilst unmapped species are described on p 9.

Nomenclature follows the above works except the following:

Mesoporogaster souletina brevior is now known as N. brevior

Chaetechelyne vesuviana is now known as Henia vesuviana

C. montana oblogocribellata is now known as Henia brevis

Necrophloeophagus longicornis is now known as N. flavus

Lithobius aulacopus is now known as L. macilentus

L. lapidicola (*sensu* Eason) is now known as L. borealis

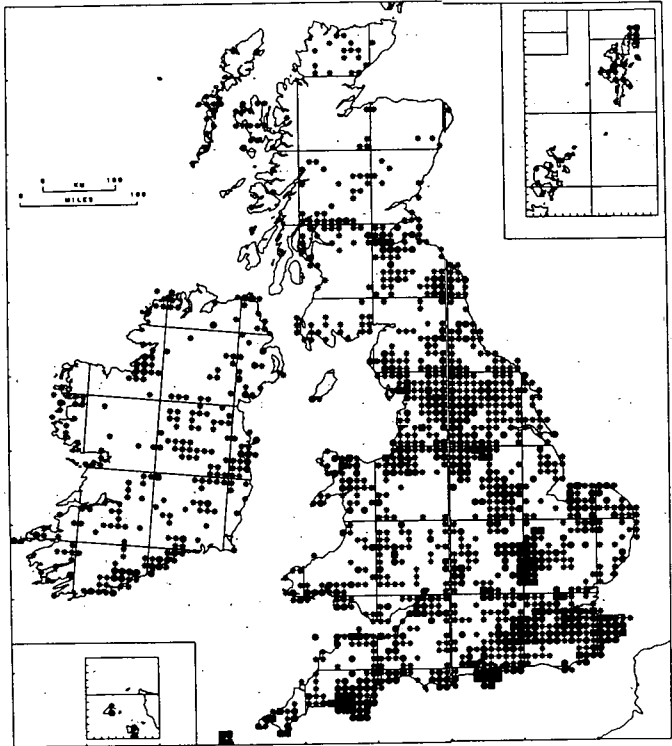
L. duboscqui is now known as L. microps

DATA SET

The data upon which the maps and analyses are based are derived from RA14 record cards, with other record cards (GEN7) being used where habitat data were not available (eg much of the literature). The records come from individual collectors and from records published since 1880, so far as they can be traced, and where records are considered reliable. The acceptability of old records is subjective; for instance, many of the older records of the 2 terrestrial Strigamia species should be treated with caution.

Inevitably the data set is biased in favour of the larger, surface-dwelling species, and undoubtedly there are serious underestimates of both frequency and distribution of small soil- and crevice-dwelling species. There is also substantial regional bias: some areas, such as much of Scotland and parts of Wales, are poorly recorded, whilst others, such as Yorkshire, South Devon, Isle of Wight, Kent and Surrey, are well worked. The paucity of Irish data is such that they are only included for mapping and regional analysis purposes (many of the records are more than 50 years old). Map 1 (p 4) shows the 10-km squares recorded by the scheme, whilst Table 1 (p 5-6) gives totals for individual species. Table 2 (p 7) shows the highest numbers of species recorded from individual 10-km squares.

A small number of recent records of unusual species or of species from areas with few records have been included for mapping only, but are not included elsewhere in the data. In addition, a few very recent records, or records not available at the time of data processing, are mentioned in the text; they have been included either because there are few records of that particular species, or because they significantly extend its known distribution.



Map 1. Coverage map - 10-km squares recorded

Table 1. Species recorded

Species	Total records (pre-1970 in brackets)		Records with 1st order habitat data (Great Britain)	10-km grid squares	
	Great Britain	Ireland		Great Britain	Ireland
Total records	15,156	776	11,712	1,178	249
<i>Haplophilus subterraneus</i>	721 (152)	45 (13)	575	250	33
<i>Nesopogaster breviar</i>	1 (1)	-	1	1	-
<i>Dicelophillus carniolensis</i>	3 (3)	-	0	3	-
<i>Hydroschendyla submarina</i>	18 (13)	1 (1)	13	11	1
<i>Schendyla nemorensis</i>	571 (118)	31 (9)	426	222	28
<i>Schendyla peyerimhoffi</i>	13 (5)	-	13	8	-
<i>Brachyschendyla dentata</i>	4 (3)	-	4	4	-
<i>Brachyschendyla monoeci</i>	1 (1)	-	1	1	-
<i>Henia vesuviana</i>	67 (5)	-	63	23	-
<i>Henia brevis</i>	20 (5)	-	18	14	-
<i>Strigamia crassipes</i>	191 (68)	7 (5)	134	106	7
<i>Strigamia acuminata</i>	255 (77)	-	170	136	-
<i>Strigamia maritima</i>	200 (64)	40 (22)	141	96	33
<i>Pachymerium ferrugineum</i>	2 (2)	-	2	1	-
<i>Clinopodes linearis</i>	18 (15)	-	13	10	-
<i>Geophilus carpophagus</i>	833 (245)	25 (22)	611	316	19
<i>Geophilus electricus</i>	78 (22)	9 (2)	67	61	9
<i>Geophilus osquidatum</i>	33 (10)	1 (0)	24	24	1
<i>Geophilus fucorum seurati</i>	21 (10)	1 (0)	16	16	1
<i>Geophilus pusillifrater</i>	5 (3)	-	4	3	-
<i>Geophilus insculptus</i>	322 (118)	29 (17)	223	173	25
<i>Geophilus proximus</i>	1 (0)	-	1	1	-
<i>Necrophloeophagus flavus</i>	862 (267)	61 (21)	593	346	54
<i>Brachygeophilus truncorum</i>	837 (290)	37 (10)	601	332	27
<i>Chalanda pinguis</i>	5 (0)	-	4	2	-
<i>Cryptops anomalans</i>	20 (7)	-	14	15	-

Table 1 continued. Species recorded.

Species	Total records (pre-1970 in brackets)		Records with 1st order habitat data (Great Britain)	10-km grid squares	
	Great Britain	Ireland		Great Britain	Ireland
<i>Cryptops hortensis</i>	605 (130)	20 (5)	475	230	16
<i>Cryptops parisi</i>	41 (4)	3 (0)	34	24	3
<i>Lithobius variegatus</i>	2153 (506)	149 (73)	1690	561	110
<i>Lithobius peregrinus</i>	4 (0)	-	4	1	-
<i>Lithobius forficatus</i>	3017 (667)	159 (59)	2407	764	120
<i>Lithobius piceus</i>	87 (73)	-	74	18	-
<i>Lithobius melanops</i>	701 (147)	60 (36)	521	299	54
<i>Lithobius macilentus</i>	55 (11)	-	45	40	-
<i>Lithobius tricuspis</i>	6 (1)	-	6	5	-
<i>Lithobius borealis</i>	216 (69)	14 (11)	181	112	13
<i>Lithobius pilicornis</i>	83 (13)	-	74	32	-
<i>Lithobius calcaratus</i>	179 (72)	-	113	111	-
<i>Lithobius muticus</i>	105 (39)	-	93	35	-
<i>Lithobius crassipes</i>	1041 (201)	6 (6)	806	411	5
<i>Lithobius curtipes</i>	58 (23)	-	41	28	-
<i>Lithobius microps</i>	1511 (252)	57 (13)	1962	359	54
<i>Lamyctes fulvicornis</i>	182 (36)	21 (13)	150	109	18
<i>Scutigera coleoptrata</i>	9 (9)	-	2	7	-

Table 2. 10-km square records

The highest numbers of species recorded from individual 10-km grid squares are:

<u>Grid reference</u>	<u>Vice-county</u>	<u>Number of species</u>
-----------------------	--------------------	--------------------------

Great Britain

40/48	10	21
40/49	10	21
41/93	17	20
41/94	17	20
20/45	3	19

Ireland

02/68	27	7
10/55	3	7
10/76	4	7
24/60	40	7
32/13	21	7
33/37	38	7

LIST OF SPECIES MAPPED

The following species have been mapped; certain others whose status is less clear have not been included, but notes on these are given on p 9-11.

Class CHILOPODA

Order Geophilomorpha

Family Himantariidae

Haplophilus subterraneus (Shaw 1789)
Nesoporogaster brevior Eason 1962

Family Schendylidae

Hydroschendyla submarina (Grube 1869)
Schendyla nemorensis (C L Koch 1837)
Schendyla peyerimhoffi Brolemann & Ribaut 1911
Brachyschendyla dentata (Brolemann & Ribaut 1913)*

Family Geophilidae

Henia vesuviana (Newport 1845) (= *Chaetechelyne vesuviana*)
Henia brevis Silvestri 1896 (= *Chaetechelyne montana oblongocribellata* Verhoeff 1898)
Strigamia crassipes (C L Koch 1835)
Strigamia acuminata (Leach 1814)
Strigamia maritima (Leach 1817)
Pachymerium ferrugineum (C L Koch 1835)
Clinopodes linearis (C L Koch 1835)
Geophilus carpophagus Leach 1814
Geophilus electricus (Linné 1758)
Geophilus osquidatum Brolemann 1909
Geophilus fucorum seurati Brolemann 1924
Geophilus pusillifrater Verhoeff 1898
Geophilus insculptus Attems 1895
Geophilus proximus C L Koch 1847*
Necrophloeophagus flavus (De Geer 1778) (= *N. longicornis* (Leach))
Brachygeophilus truncorum (Bergsoë & Meinert 1886)
Chalanda pinguis (Brolemann 1898)*

Order Scolopendromorpha

Family Cryptopsidae

Cryptops anomalans Newport 1844
Cryptops hortensis Leach 1814
Cryptops parisi Brolemann 1920

Order Lithobiomorpha

Family Lithobiidae

Lithobius variegatus Leach 1813
Lithobius peregrinus Latzel 1880*
Lithobius forficatus (Linné 1758)

Lithobius piceus L Koch 1862
Lithobius melanops Newport 1845
Lithobius macilentus L Koch 1862 (= *L. aulacopus* Latzel 1880)
Lithobius tricuspis Meinert 1872*
Lithobius borealis Meinert 1868 (= *L. lapidicola* Latzel 1880)
Lithobius pilicornis Newport 1844
Lithobius calcaratus C L Koch 1844
Lithobius muticus C L Koch 1847
Lithobius crassipes L Koch 1862
Lithobius curtipes C L Koch 1847
Lithobius microps Meinert 1868 (= *L. duboscqui* Brolemann 1896)

Family Henicopidae

Lamyctes fulvicornis Meinert 1868

* Species added to the British list since the publication of Centipedes of the British Isles (Eason 1964).

SPECIES NOT INCLUDED IN THE MAPS AND HABITAT ANALYSIS

The following species have not been included in the maps and analyses, for the reasons given.

Order Geophilomorpha

Family Mecistocephalidae

Dicellogophilus carniolensis (C Koch 1847)

This central European species was reported from the Glasgow Botanic Gardens by R S Bagnall (1913b) and from glasshouses in Edinburgh and Newcastle-upon-Tyne by the same author (1913a). There are no further records.

Tygarrup javanicus (Attems)

Species of this Asiatic species were collected from hothouses at the Royal Botanic Gardens, Kew, by A J Rundle in 1975-6 (Lewis, J G E & Rundle, A J, in litt.).

Family Schendylidae

Schendyla zonalis Brolemann & Ribaut 1911

This species was reported by R S Bagnall (1935) from the coasts of Devon and Dorset. It is a southern species, similar to the common S. nemorensis, but, despite careful checking of specimens of the latter sent in to the recording scheme, no further records of S. zonalis have been made. Its status must therefore remain doubtful for the present.

Brachyschendyla monosci (Brolemann 1904)

This species has been recorded once in Britain, from a glasshouse at Tuckingmill, Cornwall, in October 1943 (Turk 1944). It is known elsewhere from southern France, Czechoslovakia and Rumania. Although likely to be an introduced species, it is a small animal, only 14 mm long, and therefore easily overlooked. It may possibly be found elsewhere in southern England, but until an outdoor record is obtained it would be inappropriate to map it.

Family Geophilidae

Two species of geophilomorph were collected by F A Turk from the Scillies in the 1940s (examined by ADB) and were subsequently rediscovered by R E Jones nearly 40 years later. As yet, neither has been satisfactorily identified, although one has been provisionally named by Dr Minelli as belonging to the North American genus Arenophilus. The other species has been reported recently from the Isle of Wight.

Order Scolopendromorpha

Family Scolopendridae

Scolopendra spp

Examples of the large Scolopendra species, including S. subspinipes and S. dalmatica dalmatica, are reported at intervals from consignments of foreign fruits, etc. They are unable to establish themselves here and so cannot be regarded as British. Examples are deposited in collections at several museums.

Order Lithobiomorpha

Family Lithobiidae

Lithobius erythrocephalus C L Koch 1847

According to Eason (1964) this species has been reported from Northumberland, Cardigan and Midlothian. The northern records are by Bagnall (1930); a search of the Wooler area of Northumberland, from where he reported it, failed to rediscover the species and no authentic specimens from Britain have been examined by us. It has, however, a wide distribution in Scandinavia and its occurrence in Britain would not be unexpected.

Lithobius agilis C L Koch 1847

Reported from 2 Irish sites by Johnson (1913); no recent collections have been made in the same area and no further specimens of this widespread European species have been recorded from the British Isles. Eason (1965) suggests that the Irish records may, in fact, be based on L. tricuspis which Brolemann (1930) quoted as occurring in the British Isles; Brolemann does not list L. agilis from the British Isles.

Lithobius tenebrosus Meinert, 1872

Originally reported as L. nigrifons Latzel & Haase 1880, Bagnall (1913a) collected 2 mutilated specimens from a field between Hollinside and Gibside, Co Durham, which he said were apparently referable to this species.

Turk (1945) reported 2 females from a field at Reskadinnick, near Camborne, Cornwall. No further specimens have been collected. The species is known from Scandinavia, Germany, Austria and Switzerland.

Lithobius lapidicola Meinert 1872

The species previously recorded in Britain as L. lapidicola Latzel 1880 is now known as L. borealis. However, C P Rawcliffe has recently collected a male and female of L. lapidicola Meinert (det E H Eason) from a hothouse at the Royal

Botanic Garden, Edinburgh. They were taken from shingle on a shelf supporting plants in Tropical Rock House no. 23, on 20.5.86. It is a common Mediterranean species, but may be quite widespread in Europe.

Order Scutigeroforma

Family Scutigeridae

Scutigera coleoptrata (Linné 1789)

We have no recent records of this species, but it has been reported from a paper mill and from a wine cellar in the Edinburgh area (Evans 1907), from Colchester (Blower 1955) and from Jersey (Turk 1946). It is a house centipede in southern Europe and might be expected to turn up occasionally in Britain as an introduction. W A Ely of Rotherham has passed on a scutigeroform from a fruit importer's warehouse, but it has not, as yet, been identified.

PRESENTATION OF DATA

The information available in the analysis of data from BRC provided the total number of records under each of a variety of categories for every species: vice-counties, pre- and post-1970 (date of commencement of survey), months of the year, coastal/inland, urban/rural, altitude, first order habitats, second order habitats, microsites, habitat qualifiers, light level, soil/litter details and location, each category with appropriate sub-groups. In some cases, there were records without these data and also, in some, the field 'other' had been used, which would not be described on the computer listing and would require examination of the original card to get details. In addition, within each set there were certain categories for which the total number was extremely small. In consequence, it was necessary to group data in various ways, as described below.

Apart from the small size of some data categories, there was another problem of interpretation: the total records for all species in a particular category were often very different to the total in another category. This difference was due to a combination of the fact that some categories of habitat were much richer in either total number of animals or species than others and the different levels of collecting in the various categories. For instance, the total British records for the categories urban, suburban/village, rural were in the ratio 1:3.8:19.1, ie nearly 20 times as many records had been collected from rural sites than urban ones. For this reason, crude percentage figures would give a highly distorted picture. To make some allowance for this unevenness, a weighting or standardization procedure was carried out and the values thus calculated are referred to as 'standardized' throughout this account.

STANDARDIZATION PROCEDURE

Each species record total, for each category, was divided by the total number of records for that category to give a percentage of all species value. Such values for the categories within the data set were then summed, excluding those without data, to provide a divisor from which standardized percentages could be calculated. Clearly, with small all-species totals in any category, highly distorted values could occur, and for this reason, small categories, generally those with less than 50 records, were not included. There was also some grouping of categories in the calculation of standardized values. An example is given below.

Haplophilus subterraneus

Habitat B	Total	% for sp	Total all spp	% all spp
Urban	63	8.738	513	12.281
Sub/village	152	21.082	1929	7.880
Rural	368	51.040	9818	3.748
Not recorded	138	19.140	2909	4.744

The final column (% all spp) represented the percentage that H. subterraneus presents of all the records in the categories.

We then added the values in the final column, excluding 'not recorded' $12.281 + 7.880 + 3.748 = 23.909$ and used this total as a divisor:

For urban records, standardized percentage = $\frac{12.231}{23.909} \times 100 = 51.4\%$

Similarly, for suburban/village, 33.0%, and rural, 15.7%

Where categories were grouped, it was necessary to calculate % all spp for the combined values, as follows.

Soil type	No	Total	% for sp	Total all spp	% all spp
1	14	14	1.942	196	7.143
2	99	99	13.731	1125	8.800

To combine data for categories 1 and 2:

Total for species = $14 + 99 = 113$

Total all species = $196 + 1125 = 1321$

% all species (categories 1 + 2) = $\frac{113}{1321} \times 100 = 8.554$

This one value (for soil types 1 + 2) was then used instead of the 2 values 7.143 and 8.800.

For each species with a reasonable number of records (usually more than 50), a breakdown showing various categories of data is given. For species with small numbers of records, a partial analysis is given. Irish data are not included, except in the regional analysis.

The maps show all records with an indication of their date in the classes pre-1940, 1940-63, 1964 to the present. The date 1964 is that of the publication of Centipedes of the British Isles (Eason 1964) which provided a readily available and reliable means of identification. All records by Brade-Birks would fall into the earliest date class. In the numbers of records quoted, the date 1970 is used to divide records, this being the date of commencement of the survey scheme and introduction of the record card.

SPECIES DATA CATEGORIES

Figure 1 shows the layout of data as collected.

1. Total records

The totals are given separately for Great Britain and Ireland with pre-1970 records and the total number of 10-km squares of the British or Irish National Grid from which the species has been recorded. Distribution is shown on the map for each species.

2. Records by month

Monthly records are given in detail only where there appears to be significant variation, as in the case of Lamyctes fulvicornis; otherwise a general comment is made.

3. Coastal/inland (A)

Based on a distance of 15 km from the sea, the significance of most results is not clear and may be a reflection of collector bias, or of a distinct regionality of a species.

4. Urban/suburban-village/rural (B)

This factor is probably highly significant in the occurrence of many species. What has not been analysed in detail is any regional difference in this field, which might prove interesting for species such as Cryptops hortensis and Lithobius microps.

5. Altitude

Altitude data are given in 100 ft steps up to 1000 ft, then 1000-1500, 1500-2000 and over 2000 ft. As the original data were recorded in feet (based on Ordnance Survey 1 inch:1 mile maps), they have not been converted to metres (100 ft = 30.5 m).

6. Regional analysis

Vice-counties (Watsonian/Praeger system) provide a validation procedure, when compared with grid references, during data processing. Vice-counties have been grouped together into regions for analysis (Map 2, p 12):

7. Region	Vice-counties
South-east (SE)	10-24, 30
South-west (SW)	1-9, 33-34
Wales	35, 41-52
East Anglia and east Midlands (East)	25-29, 31-32, 53-56
West and north Midlands (W & NM)	36-40, 57-58
Yorks, Lancs, Westmorland (Y,L,W)	59-65, 69
North England, south Scotland (N&SS)	66-68, 70, 72-84
Northern Scotland (NS)	85-112
Ireland	1-40 (Irish)
Isle of Man (IOM)	71
Channel Islands (CI)	113

There are few records for either the Isle of Man or the Channel Islands so these are not presented in the standardized form.

8. First order habitats (C)

These are grouped as:	Freshwater	(001-003)
	Maritime	(004-005, 014)
	Marsh	(011-013)
	Cave, etc	(021-022)
	Building	(031-032)
	Garden/allotment	(041, 065)
	Waste ground	(051-052)
	Arable	(061-064)
	Grassland	(071-074)
	Scrub	(081-082)
	Woodland	(091-093)
	Acid heath	(101-105)
	Sand dune	(201-205)

9. Second order habitats (D)

These are grouped, but only actual numbers of records are given.

Garden sites (01-04), compost/refuse (05), dung heap (11), haystack (12), hedge (21), roadside verge (22), embankment/cutting (23), woodland break (24), wood fence (25), drystone wall (26), wall with mortar (27), quarries and rockfaces (33-36, 41), road/path (51), ponds and ditches (61-72, 91-95), shore (81).

10. Microsites (E)

Categories 01 (stones) and 61 (rocks) are grouped together because of difficulties in interpretation. Because of the small size of certain categories, only the actual numbers of records are given, but an analysis of microsites is given in the habitat analysis section.

11. Qualifiers (F)

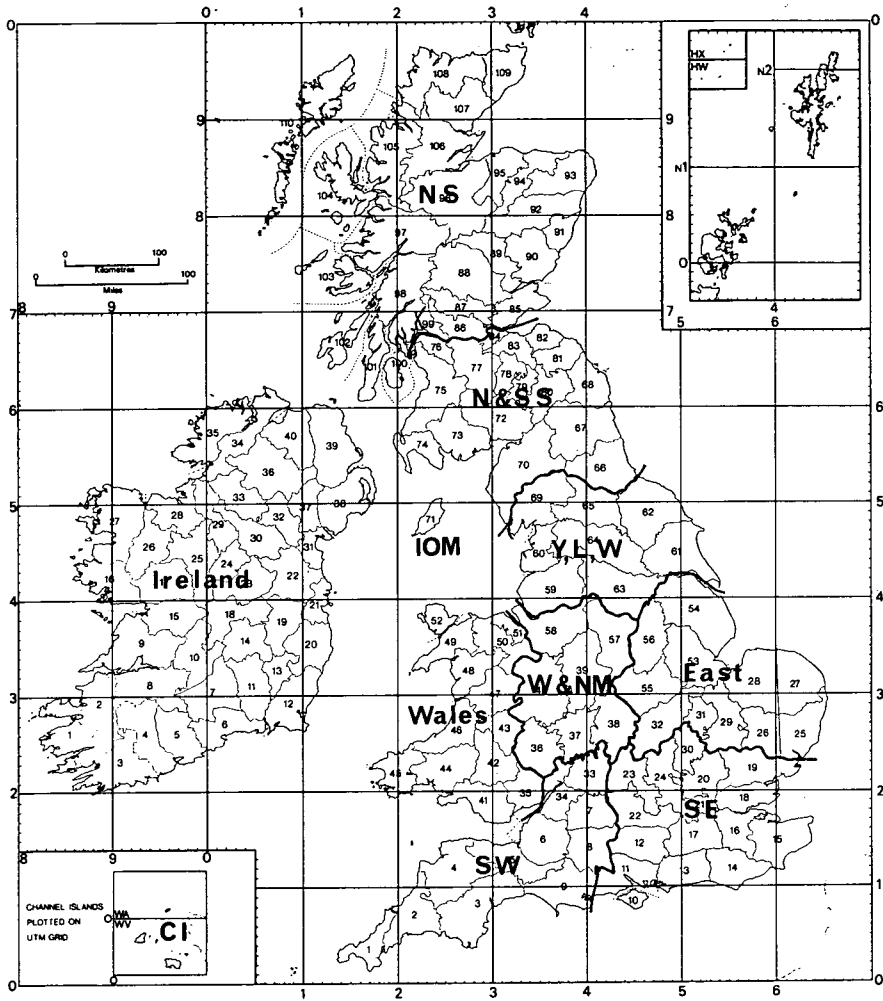
Data are quoted where there are records from buildings (a) or shore (b). For maritime species, more complete data are given under the latter. Data on encrustations (c) are too sparse to be meaningful and categories under (d) and (e) are not relevant.

12. Light level (G)

Most records (more than 11 000) are for daylight; the remainder constitute less than 400 and are mostly so coded from pitfall trap samples. No data are presented here.

13. Soil/litter details (H)

- (a) Litter: all sedge/grass data (41-47) are aggregated (largely "grass - species unknown"). Gorse, nettles, reeds and Juncus are not included in the standardized data because there were so few records.
- (b) Litter age: not included in the accounts.
- (c) Litter cover: not included in the accounts.
- (d) Soil/exposed rock: usually given, either in full or as standardized values. Its significance is not yet clear and many species have values close to equality for the 2 categories calcareous and non-calcareous.



Map 2. Vice-counties and regions (as used in this study)

(e) Soil: details are given for species with more than 50 records, in a standardized form. (Heavy clay and clayey are grouped, as are sandy and pure sand).

(f) Humus type: not included in the accounts.

14. Location (I)

(a) Horizon: given in full; all above surface (1, 2) are grouped, as are below surface (5, 6).

(b) Position: not included in the accounts.

SPECIES ACCOUNTS AND DISTRIBUTION MAPS

Haplophilus subterraneus (Shaw 1794)

This species is widespread and common in the south, especially the south-west where it is a common woodland animal: it is distinctly uncommon in much of Kent. It becomes less common towards the north and is apparently absent from northern Scotland. The regional analysis brings out its southern tendency. It occurs at similar frequencies throughout the year.

A Coastal sites represent 76.1% (standardized) and inland 24.9%.

B It has a marked synanthropic tendency over much of its range:

	Urban	Suburban/village	Rural
Total records	63	152	368
Standardized %	51.4	33.0	15.7

Altitude data show it to be largely a lowland species, probably a reflection of its urban preferences:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000	2000
Total records	186	126	109	45	24	26	4	13	6	1	3	-	-
Standardized %	20.1	14.4	14.3	10.2	6.7	8.1	3.3	11.0	8.1	1.5	2.4	-	-

C H. subterraneus is often found in shore sites, it also shows marked preferences for gardens, arable, grassland and woodland:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	1	40	1	0	9	91	125
Standardized %	3.1	13.3	1.7	-	7.7	20.8	8.7

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	8	59	14	194	12	0
Standardized %	14.4	8.3	10.7	7.9	3.5	-

Disturbed sites (arable, garden, waste) are clearly important to this species.

D Second order habitats: Garden sites (37), compost/refuse (16), hedge (11), roadside verges (28), embankment/cuttings (18), woodland breaks (6), walls (3), quarries/rock faces (42), road/path (38), ditch (10), shore (32), aquatic (6).

E Important microsites: rock/stones (220), shingle (11), soil/sand (54), litter (124), tussocks (5), dead wood (77), ant colony (1), stone/brickwork (18), human rubbish (26).

F There are 19 records from buildings: inside (2), ruin (3), greenhouse (14).

H Analysis of litter type shows a clear preference for grass, characteristic of the preferred first order habitats:

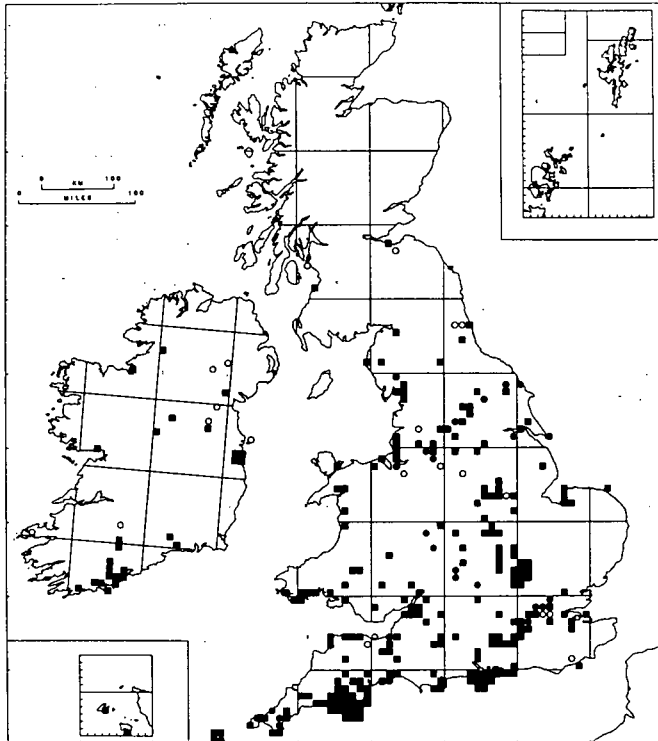
Litter/vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/deciduous
Total records	23	15	3	7	116	8	14
Standardized %	6.1	4.0	2.9	7.3	7.8	4.1	5.3

Litter/vegetation	Gorse	Hawthorn	Heathers	Grass/sedge	Grass/herbs	Nettles	Reeds	Bracken
Total records	0	9	1	81	29	3	1	0
Standardized %	-	11.3	1.4	42.5	7.5	-	-	-

59.0% (standardized) records are from calcareous sites and 41.0% non-calcareous (231 records). Clay soils (40.8% standardized) seem to be preferred; loam (32.6%), sandy and pure sand (16.9%), peat (9.8%) (382 records).

I Examination of the horizons at which it has been found shows the soil-dwelling habit suggested by its specific name:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	-	8	333	121	62	12
Standardized %		5.3	20.0	31.4	43.3	



Map 3 *Haplophilus subterraneus*

Britain	721 records	Ireland	45 records
	152 pre-1970 records		13 pre-1970 records
	250 10-km squares		33 10-km squares

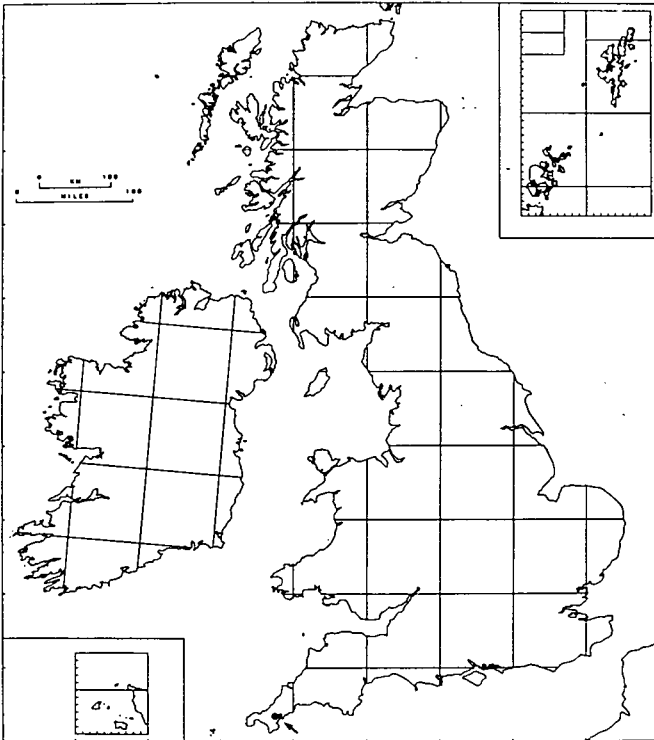
Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	255	299	24	43	30	58	10	0	45	0	1
% of regional records	3.6	12.4	4.7	3.0	6.3	3.2	1.2	-	6.1	-	-
Standardized %	8.9	30.6	11.6	7.4	15.5	7.9	3.0	-	15.0	-	-

Nesoporogaster brevior Eason 1962

This species was described by Eason (1962) from specimens collected at Carclew, Perranarworthal, Cornwall, in 1960, in association with Haplophilus subterraneus, which it resembles. A related species, of which N. brevior was believed to be a subspecies, N. souletina (Brolemann 1907), is recorded from Basses Pyrenees and Hautes Pyrennes.

The habitat was mixed woodland, with rhododendrons planted in the 19th century, on an estate with many other introduced plants. Possibly it had been brought in to the country with such plants.

No subsequent collections have been made in the area. Cornwall is not a well-recorded county and other introduced species may survive there.

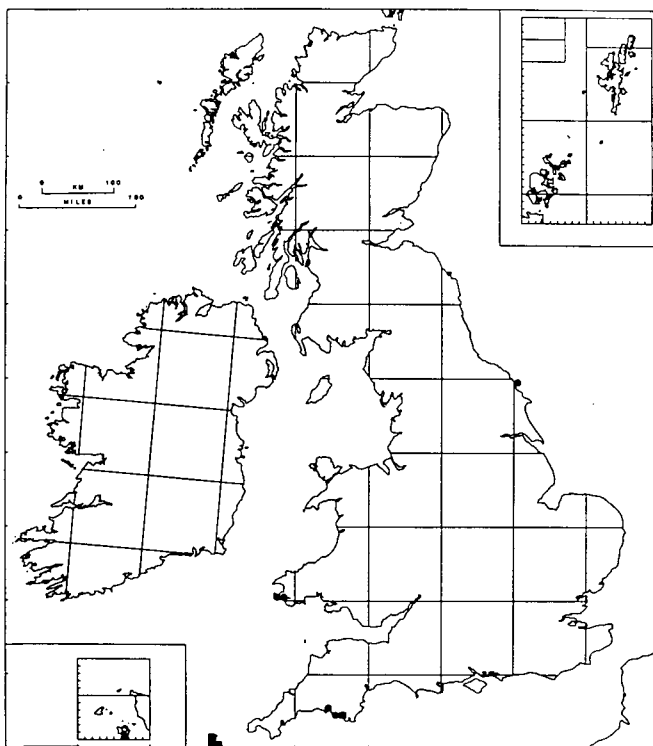


Map 4 *Nesoporogaster brevior*

Hydroschendyla submarina (Grube 1869)

This species tends to occur in rock crevices low on the shore and resembles Strigamia maritima in colour. It is probably far more common than records suggest. According to Lewis (1962), it has been reported from Jersey, Cornwall, Yorkshire, Pembrokeshire and from several sites in the Plymouth area. There is considerable doubt about the Yorkshire record (J G E Lewis pers. comm.) which, in consequence has been omitted from the data. It has also been recorded from Ireland (Clare Island) and occurs along the Atlantic seabord from Scandinavia to North Africa.

Only 18 records are on file; 2 from Jersey, 8 from the Plymouth area (Lewis 1962), 2 from Pembrokeshire (Bassindale & Barrett 1957) and Clare Island, all pre-1970. Subsequently there is a single record from south Devon, 7 from the Scilly Isles (Jones & Pratley 1987), and one recently from Carmarthenshire. Eight of the records are described as intertidal.



Map 5 *Hydroschendyla submarina*

Schendyla nemorensis (C L Koch 1837)

This small species is widespread, but has a tendency to be more abundant in the south of Britain although the regional analysis shows no clear pattern.

Seasons Standardized figures suggest it is most often found in the periods March-April and October-November, possibly in response to the lower temperatures of winter and the dryness of the summer months:

Month	J	F	M	A	M	J	J	A	S	O	N	D
Total records	7	13	58	162	65	51	17	13	38	70	21	13
Standardized %	4.2	6.1	12.7	12.2	8.5	7.6	2.9	1.9	6.9	18.6	12.4	6.1

A 55.5% (standardized) of records are from coastal areas, 44.5% inland.

B It shows no clear preference for urban or rural sites:

	Urban	Suburban/village	Rural
Total records	22	66	363
Standardized %	37.6	30.0	32.4

Altitude Altitudinal data show it to be generally a low-altitude species:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000	2000+
Total records	110	97	94	33	32	15	7	1	1	1	1	-	-
Standardized %	17.8	16.6	18.6	11.3	13.4	7.1	8.6	1.2	2.0	2.3	1.2		

C This is a species of arable, scrub and waste, but a surprisingly high percentage of records is from maritime sites:

Habitat type	Freshwater	Maritime	Marsh	Cave etc	Buildings	Garden/allotment	Waste ground
Total records	2	21	1	0	2	26	133
Standardized %	9.0	11.4	2.4	-	2.4	8.5	13.3

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	4	35	14	148	15	1
Standardized %	10.4	7.2	15.4	8.8	6.1	5.1

D Second order habitats: garden sites (7), hedges (11), compost/refuse heaps (5), roadside verges (71), embankments/cuttings (5), woodland breaks (4), walls (3), quarries/rockfaces (26), road/path (1), ditches (28), shore (3), aquatic (13).

E Microsites: rock/stones (97), shingle (4), soil/sand (46), litter (87),

tussocks (6), living bark (2), dead wood (119), ant colonies (3), nests (2), stone/brickwork (3), human rubbish (11), bracket fungi (9).

Note that the 9 records from bracket fungi represent 36% of all records from this microsite; personal experience has shown that mature bracket fungi can yield large numbers of S. nemorensis.

F Four records are associated with buildings, all ruins.

H Grass litter is preferred, but there is also a high percentage for oak:

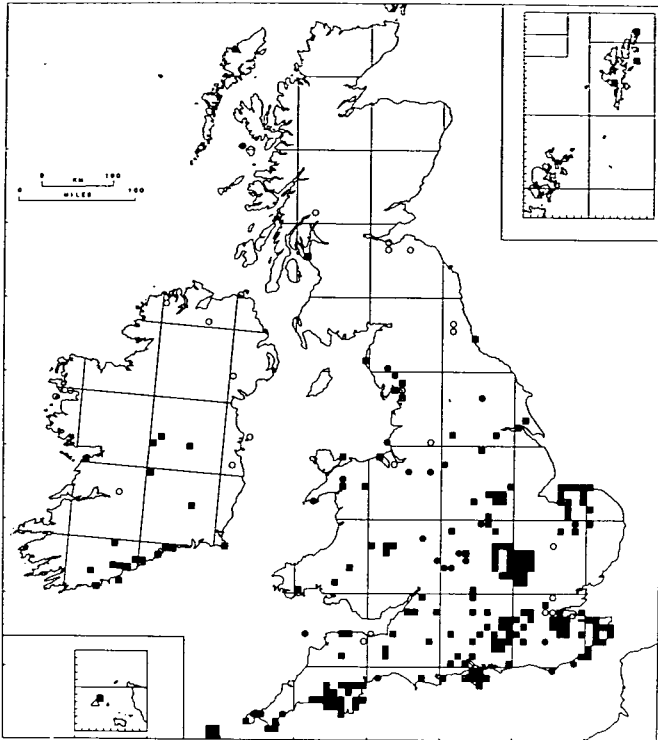
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	33	17	3	3	60	4	4
Standardized %	16.5	8.5	5.6	5.9	7.6	3.8	2.9

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	0	3	1	32	12	0	0	2
Standardized %	-	7.1	2.6	26.2	5.9			7.4

Soil/rock type seems to have no significant effect (53% standardized from calcareous sites, 47% non-calcareous) (125 records). Soil types show low numbers for peat (7.9% standardized) but otherwise a wide variety (clay, 25.1%, loam 30.3%, sandy and pure sand 36.7%) (161 records).

I Horizon data show comparatively high numbers above ground, reflecting, amongst other things, the bracket fungi microsite:

Horizon	>3 m above ground	<3 m below ground	surface	litter	<10 cm deep in soil	>10 cm
Total records	2	32	217	79	50	6
Standardized %	25.4	14.6	22.9	36.7		



Map 6 *Schendyla nemorensis*

Britain 571 records
 118 pre-1970 records
 222 10-km squares

Ireland 31 records
 7 pre-1970 records
 28 10-km squares

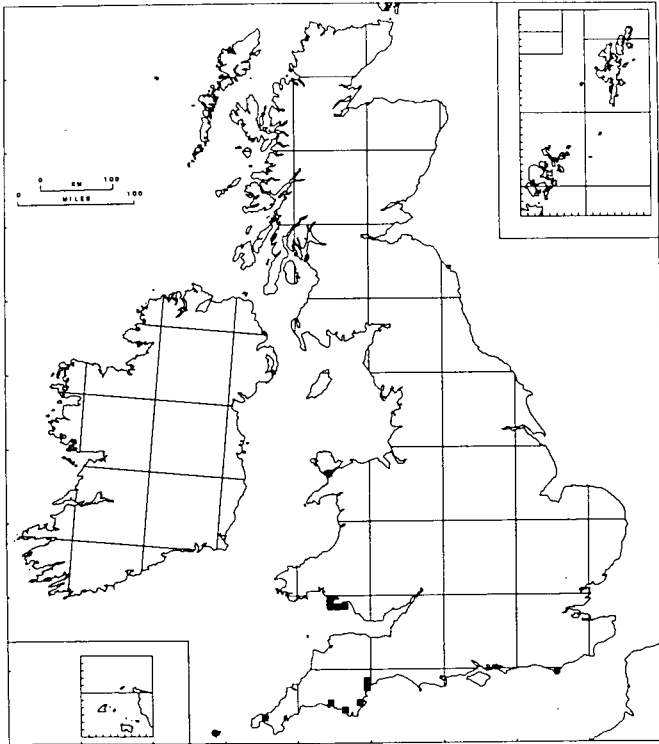
Region	SE	SW	Wales	East	W&NM	Y,L,W	H&SS	Scot.N	Ireland	IOM	CI
Total records	324	129	11	59	16	.18	8	6	31	-	-
% of regional records	4.6	5.5	2.1	4.1	3.4	1.0	0.9	1.8	4.2	-	-
Standardized %	16.9	19.9	7.6	14.9	12.3	3.6	3.3	6.5	15.2		

Schendyla peyerimhoffi Brolemann & Ribaut 1911

Originally described from Morocco and subsequently from Portugal, this species was found at Cuckmere Haven and Plymouth by J G E Lewis (1961a). It was later identified from a collection made in the Scillies by F A Turk in 1946. Later, it was shown to be widespread elsewhere in Devon and Cornwall, around high tide level, where Geophilus fucorum and Strigamia maritima occur, although not in the same microsites. It has also been found in rock crevices.

J G Blower has recorded it from several sites around the Gower coast in south Wales, from lichen-covered stones in the Psilvetia zone in sand and silt. R E Jones recorded it from rock crevices in the Scillies and S P Hopkin collected it on Anglesey.

Although only 13 records are currently held on file, it may in fact prove to be widespread in southern Britain. Failure, in the past, to collect from appropriate microsites has made it appear to be rare.



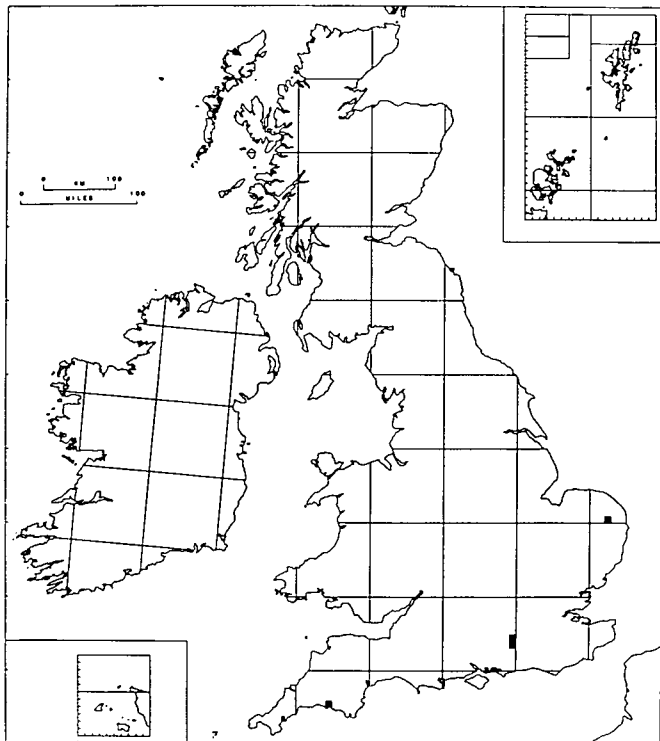
Map 7 **Schendyla peyerimhoffi**

Brachyschendyla dentata Brolemann & Ribaut 1911

Described by Brolemann (1930) from Haute Garonne and Tarn, this species was first collected by Tullgren extraction of soil from urban sites in Surrey, at Guildford and Haslemere (Barber & Eason 1970). It has subsequently been recorded at another site in Surrey, an urban site in Plymouth and from the Netherlands and Denmark. R E Jones (pers. comm.) has recently collected it in Norfolk and it has been found in Kensington Gardens, London (ADB), on the soil surface under a log.

This small animal, up to 12 mm long, and therefore easily overlooked as a juvenile of another species. It is nevertheless easily distinguished from the common Schendyla nemorensis by the tooth on the femoroid as well as at the base of the poison claw and the very small metatarsi of the last pair of legs.

All specimens found have been female; presumably parthenogenesis would favour its establishment from chance introductions. It would be surprising if it did not occur at other urban sites in southern England. In consequence, it would be useful to have further soil samples from urban and suburban sites extracted by heat. It appears to occur at low densities, so that a number of samples may be necessary to find the species, preferably taken at different times of the year.



Map 8 *Brachyschendyla dentata*

Henia vesuviana (Newport 1845)

Previously recorded in Britain as Chaetechelyne vesuviana, this is a Mediterranean species known from mainland Italy, Sicily, France, Austria, North Africa and the Iberian Peninsula. There is also a single record from Domburg in the Netherlands.

A All records are from southern England and almost all are from coastal sites (97.5% standardized), which may suggest that it needs climatic conditions modified by the sea.

B The species shows a marked bias towards urban sites, but is not confined to them:

	Urban	Suburban/village	Rural
Total records	6	17	40
Standardized %	47.6	35.8	16.6

Altitude All records are from lowland sites:

Altitude (ft)	0-100	100-200	200-300
Total records	40	21	3
Standardized %	61.9	33.6	5.5

C First order habitats show a bias towards arable sites; this finding fits in with the observation that throughout its range H. vesuviana is known as an animal of disturbed soils.

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	1	3	3	-	-	7	18
Standardized %	12.3	4.3	19.6			6.5	5.1

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	2	13	2	12	-	1
Standardized %	13.8	7.2	6.0	2.2		23.2

D Second order habitats: gardens (4), compost/refuse (3), hedge (2), embankment/cutting (7), woodland break (1), quarries/rockfaces (7), road/path (3), ditch (3), shore (6).

E Microsite: stones/rock (24), shingle (2), soil/sand (1), litter (8), tussocks (6), dead wood (14), stone/brickwork (5), human rubbish (2).

F One record is given as between splash zone and 100 m.

H Litter/vegetation shows more than 52% (standardized) for grass/herbs which includes the vegetation of disturbed sites.

Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records				1	9		1
Standardized %				14.2	8.2		5.2

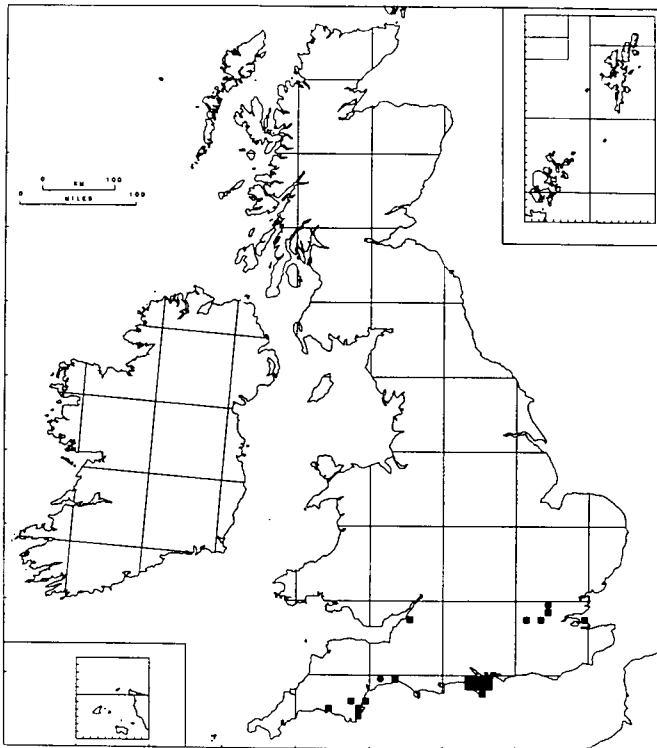
Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	-	-	-	16	15	-	2	-
Standardized %				19.5	52.9			

Soil types show some bias towards clay (48.1% standardized), peat (23.9%), loam (17.9%), sandy and pure sand (18.6%) (56 records).

With a small amount of data, there seems to be a bias towards this species occurring on calcareous soil/rock (10 records) rather than non-calcareous (5).

I Analysis of horizon data shows a bias towards soil occurrences.

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	-	3	38	12	8	1
Standardized %		15.8	18.0	24.6		41.6



Map 9 *Henia vesuviana*

Britain 67 records
 5 pre-1970
 23 10-km squares

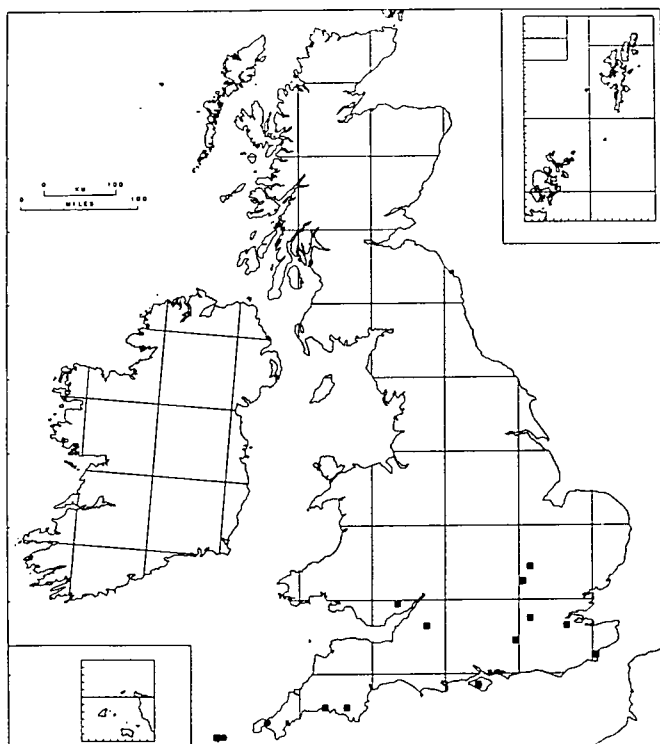
Region	SE	SW
Total records	51	16
% of regional records	0.7	0.8
Standardized %	46.0	54.0

Henia brevis (Silvestri 1896)

This species was formerly recorded in Britain as Chaetechelyne montana oblongocribellata Verhoeff 1898. It is regarded as a Mediterranean species with other records from Austria and France (Minelli 1982). In Britain it is at the northernmost edge of its range, with most records from synanthropic sites in southern and south-west Britain.

	Urban	Suburban/village	Rural
Total records	2	13	3
Standardized %	35.6	61.6	2.8

Records are from gardens (10), waste ground (3), marsh (1), grassland (1) and woodland (2). Most of the recent records are from the spring, summer and autumn months when ground temperatures are higher. It is worth looking for in gardens and similar sites where it is distinguished by its greater length compared with other small whitish geophilomorphs.



Map 10 *Henia brevis*

Britain 20 records
 5 pre-1970 records
 14 10-km squares

Strigamia crassipes (C L Koch 1835)

A widespread species, it is not common in any region. Regional analysis shows a confusing pattern; it seems to be well distributed in the south, particularly towards the south-east. Early records of this species are often unreliable because of confusion with S. acuminata and have therefore not been used.

Seasons Standardized data suggest a winter peak in numbers:

Month	J	F	M	A	M	J	J	A	S	O	N	D
Standardized %	3.2	11.1	7.0	5.4	4.4	5.1	5.5	6.4	11.1	12.6	17.1	11.1

A 50.2% (standardized) of records are coastal (47 records).

B Although very definitely a rural animal, it may have a greater urban tolerance than S. acuminata:

	Urban	Suburban/village	Rural
Total records	2	16	120
Standardized %	16.0	34.0	50.1

Altitude Well distributed up to altitudes of 900 ft:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900
Total records	20	35	21	8	22	10	4	4	1
Standardized %	7.7	14.3	9.8	6.5	21.9	11.2	11.6	12.1	4.8

C First order habitats:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	0	3	3	0	1	9	14
Standardized %	-	5.6	25.0	-	4.6	10.2	4.6

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	1	13	4	83	0	0
Standardized %	9.3	9.3	14.8	16.7	-	-

D Relatively few second order habitats are recorded: garden sites (3), dung heap (1), hedges (3), roadside verges (7), embankments/cuttings (4), woodland break (1), wall (1), quarries/rockfaces (4), roads/paths (4), shore (4).

E Microsite: rocks/stones (20), shingle (1), soil/sand (6), litter (43), living bark (2), dead wood (42), bracket fungus (1), stone/brickwork (2), human rubbish (5), dung (1).

F Two records are associated with buildings: outbuildings (1), ruin (1).

H Litter/vegetation preferences:

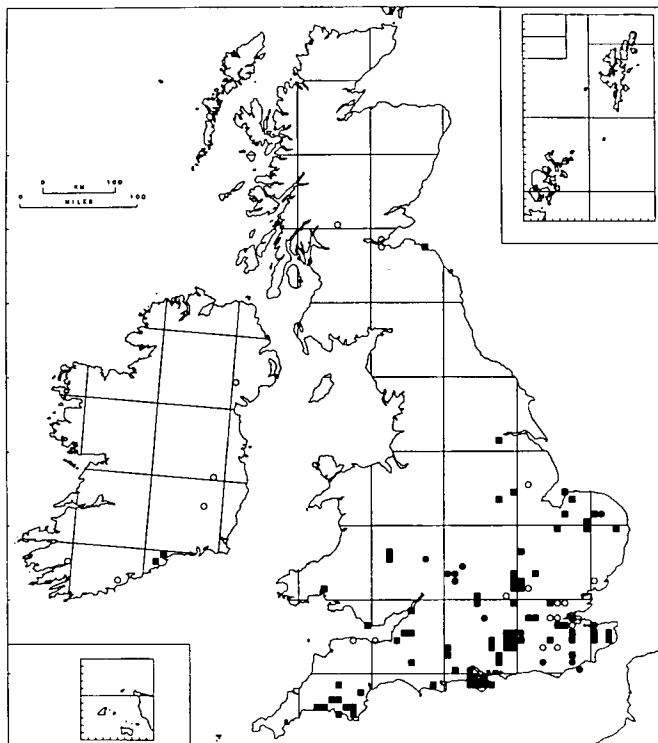
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	8	19	1	6	31	2	5
Standardized %	10.0	23.9	4.6	29.7	9.9	4.8	9.0

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	0	0	0	10	3	0	1	0
Standardized %	-	-	-	4.3	3.7	-	-	-

Soil types are: clay (48.6% standardized), peat (13.1%), loam (23.8%), sandy and pure sand (14.5%), based on 63 records; 17 records are from calcareous soils, 22 non-calcareous.

I Horizons reported indicate that a high proportion of records are from litter:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	0	10	60	43	3	2
Standardized %		27.4	14.8	45.8		12.0



Map 11 *Strigamia crassipes*

Britain 191 records
68 pre-1970 records
106 10-km squares

Ireland 7 records
5 pre-1970 records
7 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	136	27	3	15	5	1	2	2	7	0	0
% of regional records	1.9	1.2	0.6	1.1	1.1	0.05	0.2	0.6	1.0	-	-
Standardized %	24.5	15.5	7.7	14.2	14.2	0.6	2.6	7.7	12.9		

Strigamia acuminata (Leach 1814)

This species is widespread in England and Wales, but as yet there are no records for Scotland or Ireland. Regional analysis suggests a higher frequency in the east of Britain. It occurs at similar frequencies occur throughout the year.

A 76.8% (standardized) are inland with 23.3% coastal

B It shows a marked rural tendency, with only one urban record:

	Urban	Suburban/village	Rural
Total records	1	12	171
Standardized %	7.6	24.3	68.1

Altitude It occurs at altitudes up to more than 1500 ft:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000
Total records	20	29	47	12	33	18	2	2	4	2	1	1
Standardized %	4.8	7.4	13.8	6.1	20.5	12.6	3.7	3.8	12.0	6.8	1.7	6.7

C First order habitats show marsh and woodland as important:

Habitat	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	1	1	5	0	1	4	19
Standardized %	12.0	1.4	31.7	-	3.5	3.5	4.9

Habitat	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	8	4	123	1	0
Standardized %	4.2	11.3	19.0	1.4	

D Records from second order habitats, as with S. crassipes, are relatively sparse, perhaps due to a preference for natural habitats: compost/refuse (1), hedges (2), roadside verges (15), embankments/cuttings (2), woodland breaks (3), quarries/rockfaces (6), roads/paths (3), ditches (2).

E Microsite: litter (68), dead wood (50), stones/rocks (22), soil/sand (9), tussocks (2), human rubbish (3). This finding fits in with its woodland preferences.

F There is one record from a building, an uninhabited outbuilding.

H Litter/vegetation agrees with the woodland preference in C:

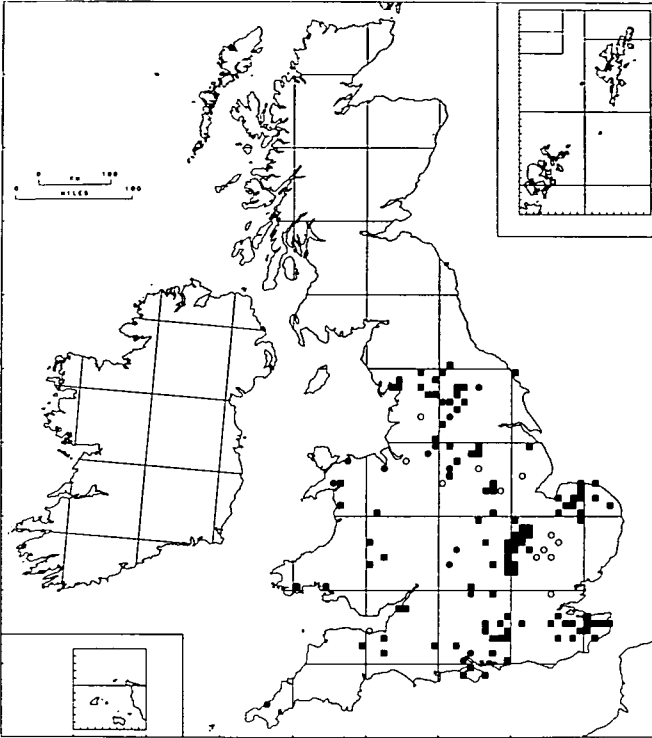
Litter/vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/deciduous
Total records	10	27	4	9	30	3	10
Standardized %	8.2	22.1	11.9	29.0	6.2	4.9	11.7

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	0	1	0	8	0	0	0	0
Standardized %	-	3.9	-	2.3	-	-	-	-

Soils are clays (31.6% standardized), peat (7.6%), loam (31.1%) and sandy/pure sand (29.6%) (58 records); 70.6% (standardized) are calcareous, 29.4% non-calcareous (54 records).

I As with S. crassipes, a high proportion of records are from litter:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	0	3	64	67	9	0
Standardized %		7.0	13.5	61.0		18.5



Map 12 *Strigamia acuminata*

Britain 255 records
 77 pre-1970 records
 136 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N.	Ireland	IOM	CI
Total records	129	10	10	53	13	40	0	0	0	0	0
% of regional records	1.8	0.4	1.9	3.7	2.7	2.2					
Standardized %	14.2	3.2	15.0	29.1	21.3	17.3					

Strigamia maritima (Leach 1817)

This seashore species may sometimes be found long distances up estuaries. Its ecology was extensively studied by Lewis (1961b). Where it occurs it is often in very large numbers. Apart from the records mapped, there are several records from Sutherland and a recent record from Co Antrim.

Season It has been recorded during all months of the year, but proportionately higher figures occur for the summer months April to October, possibly due to more collecting in maritime locations during that period.

B It has no clear rural or urban preference:

	Urban	Suburban/village	Rural
Total records	7	25	109
Standardized %	36.2	34.4	29.4

C First order habitats are limited; the records for waste ground and for grassland reflect ambiguity in the recording system:

Habitat type	River	Estuary	Sea	Waste ground	Grassland	Sand dune
Total records	1	32	97	2	2	1
% of habitat records	3.1	26.4	27.5	0.2	0.5	3.0

D, E Second order habitats reflect its restricted range: quarry floor (1), cliff face (2), shore (96), stream (1). Examination of microsites shows 85 from stone/rock, 39 from shingle (30% of records from this microsite), 1 litter, 2 dead wood, 2 stone/brickwork, 3 shoreline jetsam (15% of records).

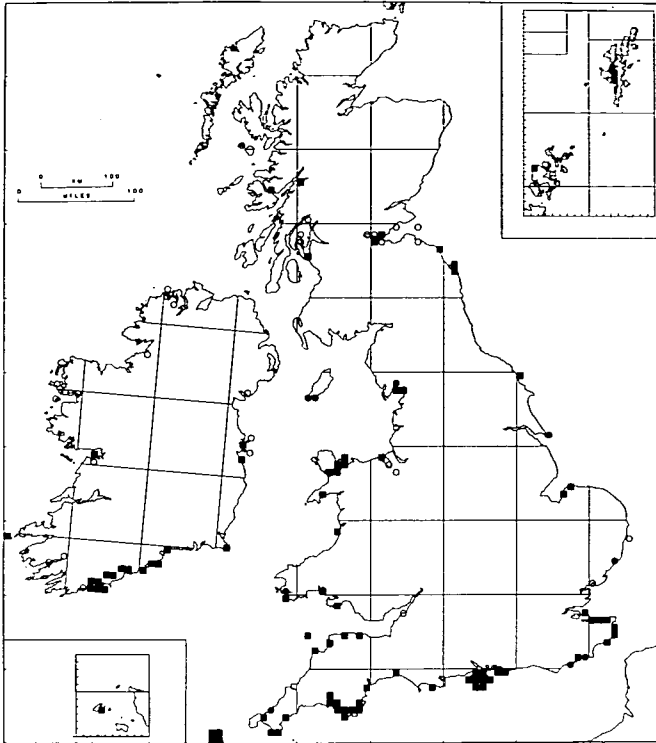
F Shore location shows a preference for intertidal:

	Intertidal	Splash zone	Splash zone - 100 m
Total records	45	64	4
Standardized %	70.6	28.0	1.4

H Only 7 records have details of litter: oak (1), sycamore (1), mixed deciduous (4), grass (1). For soil/rock type, there are 56.1% (standardized) calcareous, 43.9% non-calcareous.

I Examination of horizon shows a preponderance of records below surface level, as would be expected, although it should be noted that digging into shingle is a common way of searching for the species on the seashore:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total number	2	4	57	3	18	7
Standardized %		17.5	15.0	3.4	64.0	



Map 13 *Strigamia maritima*

Britain	200 records	Ireland	40 records
	64 pre-1970 records		18 pre-1970 records
	96 10-km squares		33 10-km squares

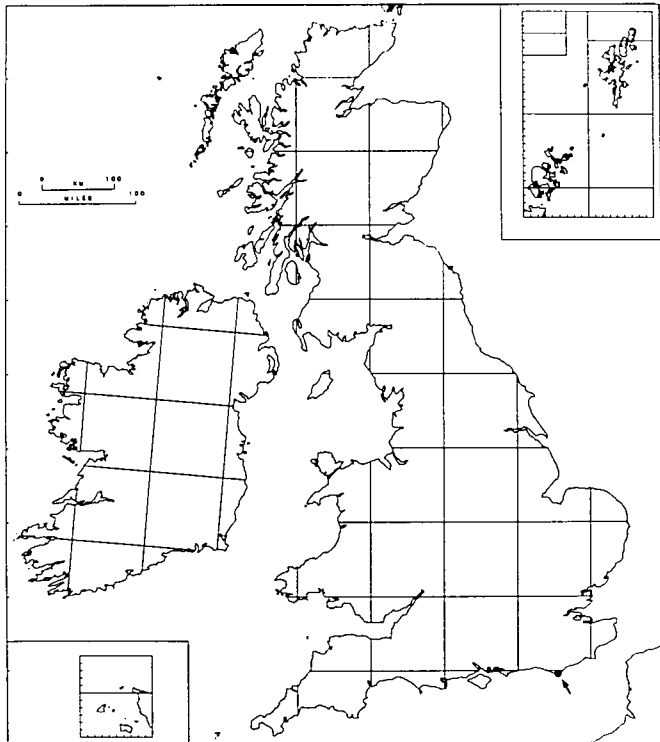
Region	SE	SW	Wales	East	W&NI	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	45	73	19	8	5	16	5	21	40	4	1
% of regional records	0.6	3.0	3.6	0.6	1.1	0.9	0.6	6.1	5.2		

Pachymerium ferrugineum (C L Koch 1835)

This conspicuous species was recorded as British on the basis of specimens, probably a chance introduction, found at Cuckmere Haven, Sussex (Lewis 1960). It is widespread in Europe, from Scandinavia to the Mediterranean, but has not been recorded from the French Atlantic coast or western Norway.

All specimens were from around MHWs in association with Strigamia maritima. Two juveniles were from a little behind the berm of a shingle bank at the top of the shore. Adults (8) were from shingle beneath decomposing drift of sea-purslane behind the main shingle bank and from a bank of consolidated shingle with sparse flora of bramble, sea wormwood and stonecrop.

It is a fairly bright yellow animal with a reddish head, unlike any other British centipede. All shore species are potentially of interest and searching for them may yield this species again.



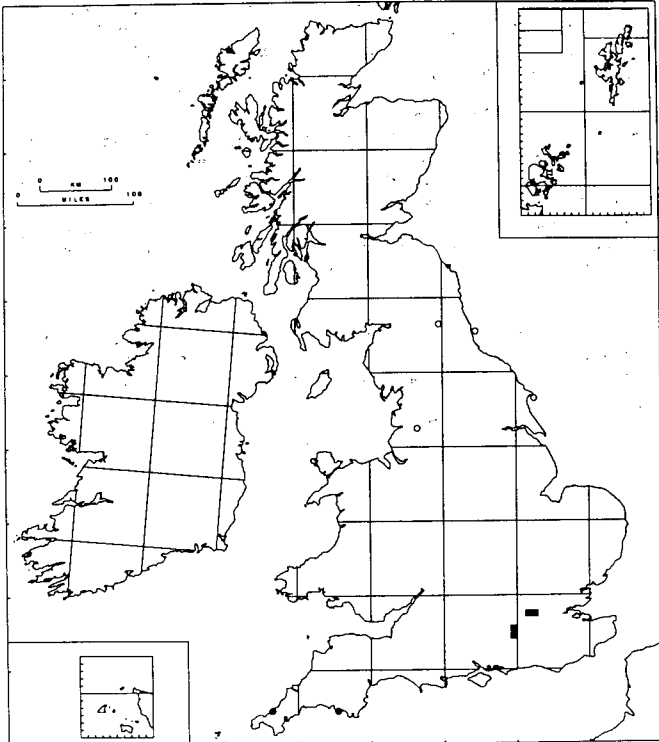
Map 14 *Pachymerium ferrugineum*

***Clinopodes linearis* (C L Koch 1835)**

R S Bagnall (1935) recorded this species from Northumberland, Durham and Yorkshire, specimens now being in the British Museum (Natural History) (E H Eason pers. comm.), but an earlier paper by Brade and Birks (1916) reported 'Geophilus linearis' from Darwen, Lancs.

The species was subsequently reported from Cornwall (Turk 1944), Devon (Lewis 1962) and Surrey (Barber 1969). In the latter case, several large specimens were collected from a garden near Guildford and from another site in the town itself. It has also been found at Teddington, and A J Rundle has it from Kew and Mortlake. Six of the records are from the Surrey garden at various times of the year; there is one other garden record, and records from seashore (1), waste ground (4) and woodland (1). Of the garden records, 5 are from depths of greater than 10 cm in the soil. It has recently been found (ADB) in Kensington Gardens, London.

C. linearis is a synanthrope in northern Europe, including Scandinavia, and further records might be expected from urban and suburban sites. It is a large, yellowish animal when fully grown and may at first be confused with G. electricus or H. subterraneus, both of which occur in gardens. Smaller specimens may be mistaken for several geophilomorphs. The distinctive arrangement of the coxal glands of the last pair of legs can only be seen after clearing in lactic acid.



Map 15 *Clinopodes linearis*

Britain 18 records
 10 10-km squares

Geophilus carpophagus Leach 1814

A species which is widespread in both Great Britain and Ireland, the regional analysis shows it to be least common in the south-east. It is recorded at similar frequencies throughout the year and the coastal (42.9% standardized) and inland (57.1%) records are not significantly different.

The species is often large, especially when recorded from well-established synanthropic sites. Eason (1979) details differences in trunk segment numbers in this species between natural, urban and domestic specimens; the urban and domestic animals had, in all cases, more trunk segments than those collected in natural sites. Lewis (1985) suggests that the 2 forms could be genetically distinct, possibly sibling species.

B The records show a higher proportion of rural than urban:

	Urban	Suburban/village	Rural
Total records	7	51	592
Standardized %	13.6	26.3	60.1

Altitude The species occurs at all altitudes, with highest values at higher altitudes. It is one of the characteristic centipedes of upland moor:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000	2000+
Total records	95	118	77	53	38	46	22	21	17	29	53	8	1
Standardized %	4.0	5.3	4.0	4.7	4.2	5.7	7.1	7.0	9.0	17.4	16.7	9.5	5.4

C Analysis of first order habitats shows clearly the characteristic habitats for this species: acid heath, marsh, sand dunes, buildings:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	3	13	19	0	21	25	36
Standardized %	6.6	3.3	11.4	-	12.3	3.9	1.8

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	2	63	11	284	109	7
Standardized %	2.4	6.1	5.7	8.0	21.6	16.8

D Second order habitats: garden sites (5), compost/refuse (3), dung heap (1), hedges (8), roadside verges (19), embankments/cuttings (5), woodland breaks (17), wood fences (2), walls (7), quarries/rockfaces (51), roads/paths (15), ditches (2), shore (11), aquatic (6).

E Microsites: rocks/stones (207), shingle (2), soil/sand (18), litter (115), tussocks (5), living bark (6), dead wood (142), dung (1), bracket fungus (2), stone/brickwork (19), human rubbish (12).

F There are 21 records from buildings, 13 from greenhouses where tolerance of high temperature is necessary, 3 inside buildings, 5 in ruins.

H Litter/vegetation reflects first order habitat preferences with high proportions of heathers, grasses and bracken:

Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	39	20	14	5	98	25	20
Standardized %	5.9	3.0	7.6	3.0	3.8	7.2	4.3

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	2	0	16	92	30	0	0	11
Standardized %	8.7	-	12.8	27.1	4.4	-	-	12.3

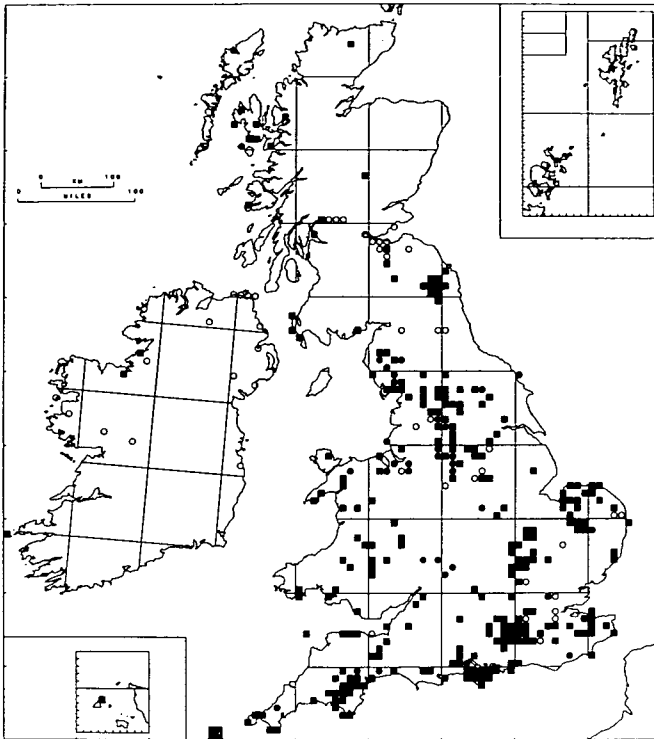
Soil types show high proportions from peat and sandy soils:

Soil type	Heavy clay	Clay	Peat	Loam	Sandy	Pure sand
Total records	11	56	67	161	59	4
Standardized %		14.2	47.9	13.0		24.9

Soil types are clays (14.2% standardized), peat (13.0%), loam (13.0%), sandy/pure sand (24.9%) (358 records); 23.8% (standardized) are calcareous, 76.2% non-calcareous (290 records).

I Horizon data show its frequency above ground level:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	5	44	347	119	31	2
Standardized %		31.6	20.1	29.7		18.6



Map 16 *Geophilus carpophagus*

Britain	833 records			Ireland			25 records				
	243 pre-1970 records						22 pre-1970 records				
	316 10-km squares						19 10-km squares				
Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	309	159	40	91	35	97	77	24	25	0	0
% of regional records	4.4	6.8	7.8	6.4	7.4	5.3	8.9	7.4	3.4	-	-
Standardized %	7.6	11.8	13.5	11.1	12.8	9.2	15.4	12.8	5.9		

Also recorded from St Kilda

Geophilus electricus (Linné 1758)

A very widespread, but uncommon, species, it has not yet been recorded from northern Scotland. Records are from all months of the year.

A There is no significant difference between inland (45.7% standardized) and coastal (54.3%) records.

B There is a significant bias towards synanthropic sites as indicated in the analysis:

	Urban	Suburban/village	Rural
Total records	4	22	27
Standardized %	35.5	51.9	12.5

Altitude It is largely a lowland species (43 records):

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700
Total records	8	9	13	4	1	1	3

C First order habitats give highest values for garden and arable (51 records):

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	0	0	0	0	1	19	9
Standardized %	-	-	-	-	8.6	41.4	5.2

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	1	7	2	12	0	0
Standardized %	17.2	8.6	13.8	5.2		

D Second order habitats: garden sites (3), hedge (1), roadside verge (1), embankment/cutting (1), quarries/rockfaces (4), roads/paths (3), ditch (1), shore (1).

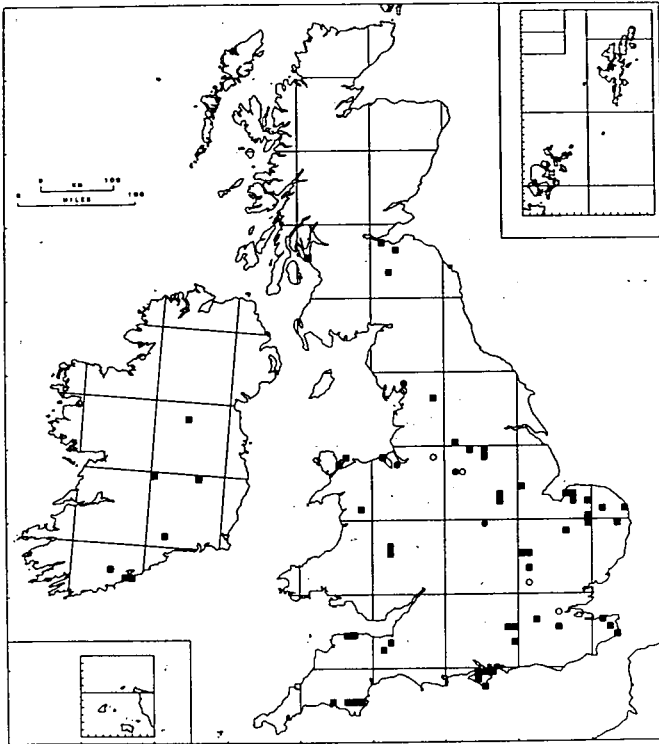
E Microsites: stones/rocks (16), soil/sand (9), litter (5), dead wood (3), human rubbish (6).

F Three records are associated with buildings; uninhabited/outbuilding (1), unheated greenhouse (2).

H Soil types are clay (86), loam (21), sandy (2); 7 are calcareous, 14 non-calcareous.

I The 39 horizon records suggest that it is a soil-dwelling species, which may partly account for its apparent scarcity:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	0	0	27	4	6	2
Standardized %		0	22.1	14.1	63.7	



Map 17 *Geophilus electricus*

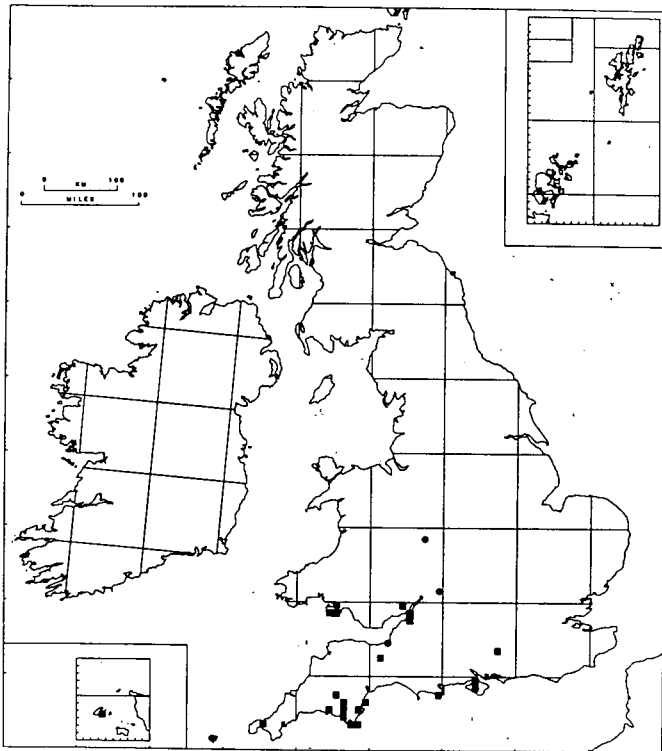
Britain	78 records		Ireland		9 records							
	22 pre-1970 records				2 pre-1970 records							
	61 10-km squares				9 10-km squares							
Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI	
Total records	25	15	4	15	7	9	3	0	9	0	0	
% of regional records	0.4	0.6	0.8	1.1	1.5	0.5	0.3	-	1.2	-	-	
Standardized %	6.3	9.4	12.5	17.18	23.4	7.8	4.7		18.8			

***Geophilus osquidatum* Brolemann 1909**

This species appears to show a largely south-western distribution (24 records from the south-west region) with a few records from adjacent areas and a single recent record from Ireland.

Sixteen records are coastal, 8 inland; 1 record is urban, 11 suburban/village, 12 rural. First order habitats are maritime (3), gardens (5), waste ground (3), arable (1), grassland (4), scrub (2), woodland (5), acid heath (1). Microsites reported are stone/rock (15), shingle (1), soil/sand (2), litter (5), dead wood (1). Records for calcareous and non-calcareous sites are similar and it has been found up to 900 ft.

It is probably fairly common in its area of occurrence, but somewhat unpredictable. It would be worth looking for in gardens and similar sites anywhere south-west of Bristol.



Map 18 *Geophilus osquidatum*

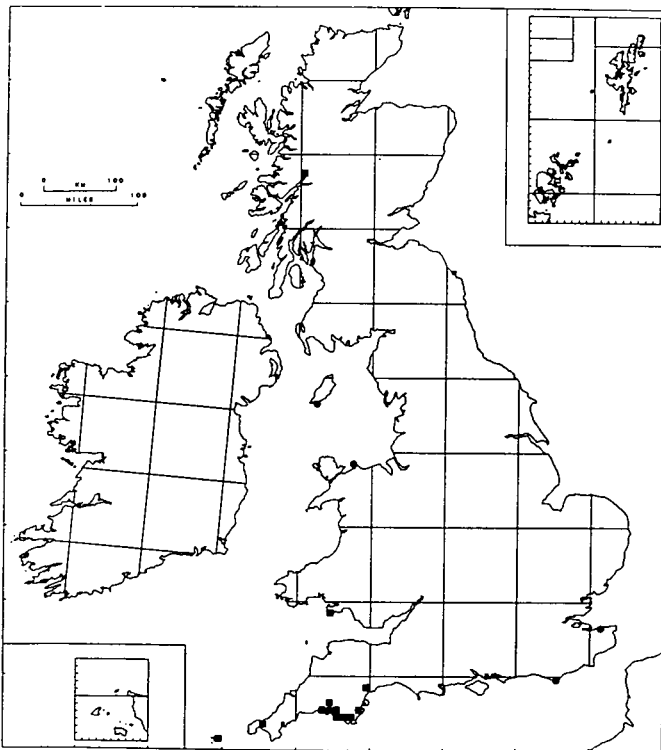
Britain	33 records	Ireland	1 record
	10 pre-1970 records		1 10-km square
	24 10-km squares		

Geophilus fucorum seurati Brolemann 1924

First recorded in Britain by J G Blower (1961) from the Isle of Man and Llandudno, J E G Lewis collected it in Kent, Sussex and Devon and showed it to be probably conspecific with *G. algarum* Brolemann (Lewis 1962).

Eason (1961) examined specimens of '*G. algarum*' of R S Bagnall (Bagnall 1917) and showed that they were not referable to that species. Bagnall (1935) also described 2 immature geophilids from south Devon as *G. fucorum*; he may have found this species, which is widespread in the south-west, but these records have not been included. From a total of 22 records from Britain, 16 records are from the south-west, 2 south-east, 1 Wales, 2 Isle of Man; R D Kime (pers. comm.) has recently found it in Scotland. Searching in appropriate sites will probably show it to be fairly widespread around the coast. *Geophilus gracilis* Meinert was recorded from Galway (Johnson 1912); Eason (1964) gives this as a synonym of *G. fucorum seurati*.

Of the 16 records with data, none are from urban, 3 suburban/village and 14 rural. All with data are estuarine (9) or sea (7); microsites are stones/rocks (11), shingle (2), soil/sand (2). Four are given as intertidal, 11 splash zone or above; 9 surface and 5 between surface and 10 cm deep.

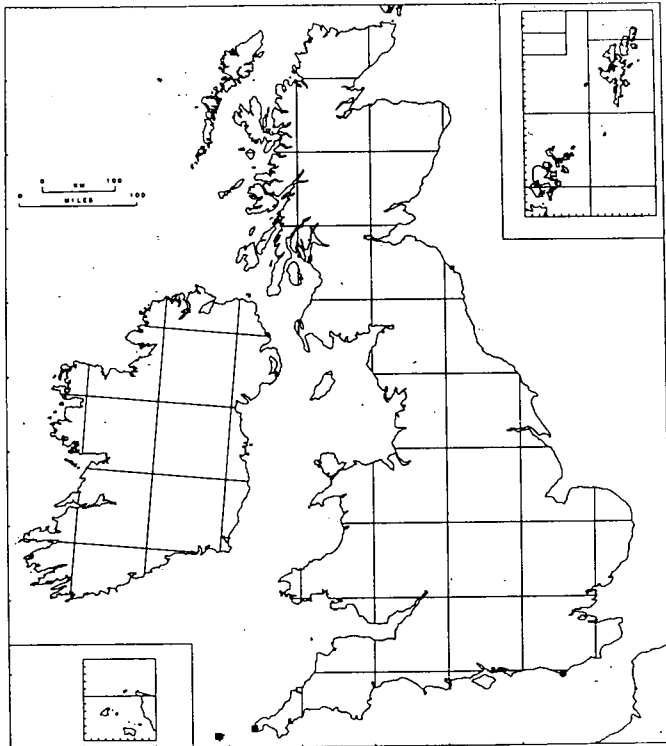


Map 19 *Geophilus fucorum seurati*

Geophilus pusillifrater Verhoeff 1898

Described originally from Yugoslavia, this species was recorded by J G E Lewis from Cuckmere Haven, Sussex (Lewis 1961a), where it occurred beneath decomposing Obione drift and shingle. More recently it has been collected from rock crevices at Lands End and the Scilly Isles by R E Jones. Rock crevices are notoriously difficult to sample and require the use of hammer and cold chisel, behaviour which is unlikely to endear the collector to those concerned with coastal conservation!

A small and inconspicuous species, it could well be found elsewhere on the coast of southern England in suitable microsites. Its distribution is puzzling and it is possible that it may prove conspecific with another European species.



Map 20 *Geophilus pusillifrater*

Britain 5 records
 1 pre-1970 record
 3 10-km squares

***Geophilus insculptus* Attems, 1895**

A widespread species, it occurs at similar frequencies throughout the year; 42.9% (standardized) are coastal and 57.1% inland. Regional analysis suggests a northerly and easterly tendency.

B It shows a preference for urban and suburban sites:

	Urban	Suburban/village	Rural
Total records	15	59	153
Standardized %	38.8	40.6	20.7

Altitude It occurs at altitudes up to more than 1000 ft:

Altitude (ft).	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500
Total records	42	35	39	25	27	18	7	9	5	2	3
Standardized %	7.8	6.9	8.8	9.8	12.9	9.7	9.9	13.2	11.6	5.2	4.0

C First order habitat data show it to favour gardens, grassland and arable:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	0	4	0	0	2	21	38
Standardized %	-	-	-	6.7	19.4	10.4	

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	2	31	5	107	4	1
Standardized %	14.2	16.4	1.5	8.2	4.5	14.2

D Second order habitats: garden sites (10), compost/refuse (2), hedges (3), roadside verges (18), embankments/cuttings (11), woodland breaks (2), walls (2), quarries/rockfaces (12), roads/paths (6), ditches (1), shore (5).

E Microsites: stone/rocks (104), shingle (1), soil/sand (16), litter (31), tussocks (1), dead wood (40), stone/brickwork (3), human rubbish (7).

F Six records are associated with buildings: outbuildings (2), ruins (3), greenhouse (1).

H Litter/vegetation:

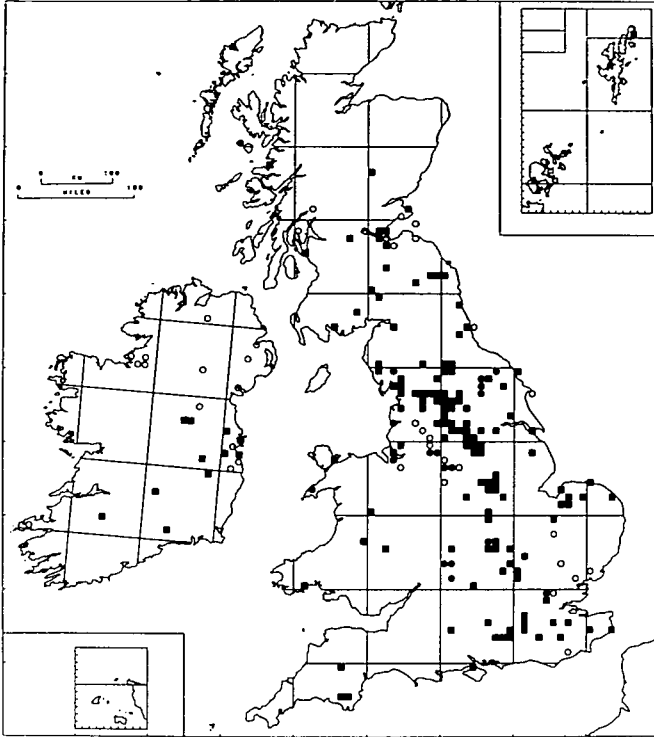
Litter/vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/deciduous
Total records	3	8	0	3	48	7	15
Standardized %	2.8	7.6		11.2	11.6	12.7	20.4

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	0	5	0	23	4	0	0	0
Standardized %	-	22.5	-	7.4	3.7	-	-	-

Records from soils are clay (31.7% standardized), peat (4.1%), loam (50.4%) and sandy (13.7%). A slightly higher proportion of records are from calcareous than non-calcareous: 58.9% to 41.1% (115 records).

I Horizon data show it to be almost equally common in surface, litter and subsurface sites:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	0	3	153	30	15	1
Standardized %		7.1	32.4	27.5		33.0



Map 21 *Geophilus insculptus*

Britain	322 records	Ireland	29 records
	118 pre-1970 records		17 pre-1970 records
	175 10-km squares		25 10-km squares

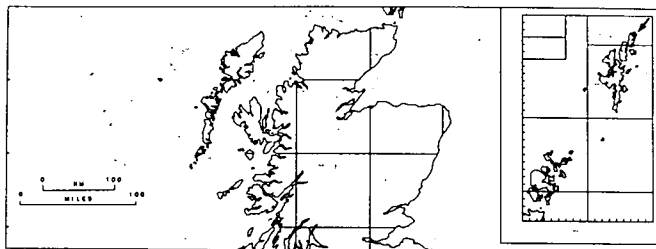
Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	52	11	10	48	17	130	32	21	29	0	0
% of regional records	0.7	0.5	1.9	3.4	3.6	7.1	3.7	6.4	4.0	-	-
Standardized %	2.2	1.6	6.1	10.9	11.5	22.7	11.8	20.4	12.8		

Geophilus proximus C L Koch, 1847

A single female of this species has been identified in material from Unst, Shetland Islands (Barber 1986). All previous published records of this as a British species probably refer to G. insculptus, which is superficially similar. G. proximus has a normal claw on the second maxillae and lacks the isolated coxal pore on the last legs found in G. insculptus.

The specimen was collected under boulders in the bottom of a nettle-grown hollow in a limestone hillock, close to a freshwater loch, by a team from ITE Merlewood Research Station in August 1974.

G. proximus is a widespread Scandinavian and north European species and clearly represents a northern element in our myriapod fauna. It would be valuable to have more collections from Caithness, Sutherland, Orkney and Shetland, which could yield further specimens.



Map 22 **Geophilus proximus**

Necrophloeophagus flavus (De Geer 1778)

This name should be used instead of *N. longicornis*, by which it had previously been recorded in Britain (H Enghoff pers. comm.).

This widespread and generally common species occurs at similar frequencies throughout the year.

A 47.9% (standardized) of records are "coastal" and 52.1 inland. Regional analysis brings out an eastern tendency.

B It seems to occur in urban and rural sites with similar frequencies:

	Urban	Suburban/village	Rural
Total records	26	125	481
Standardized %	30.8	39.4	29.8

Altitude It seems to be largely a lowland species although with records up to high altitude. The pattern may to some extent reflect the high proportion of records from the south-east and east (ie "lowland Britain").

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000
Total records	142	147	106	70	38	36	13	16	7	3	4	1
Standardized %	5.9	6.5	5.4	6.1	4.1	4.4	4.1	5.2	3.6	1.8	1.2	1.2

C Preferred habitats of the species include arable, gardens, waste ground and grassland, whilst aquatic, maritime and marsh sites are surprisingly quite high.

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	3	20	4	0	5	73	184
Standardized %	8.5	6.7	5.9	-	3.7	14.6	11.2

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	11	93	7	161	15	2
Standardized %	17.4	11.5	4.7	5.9	3.7	6.2

D Second order habitats: garden sites (35), compost/refuse (7), dung heap (2), hedges (10), roadside verges (95), embankments/cuttings (11), woodland breaks (9), walls (3), quarries/rockfaces (21), roads/paths (36), ditches (17), shore (19), aquatic (8).

E Microsite: stones/rocks (201), shingle (8), soil/sand (81), litter (56), tussocks (8), living bark (1), dead wood (153), dung (5), carrion (1), ant colonies (2), stone/brickwork (9), jetsam (3), human rubbish (20).

F Six records are associated with buildings: inhabited (1), uninhabited (1), ruin (4). Two records are intertidal, 7 splash zone, 12 splash zone to 100 m.

H Analysis of litter type shows highest levels for grassland and grass/herbs:

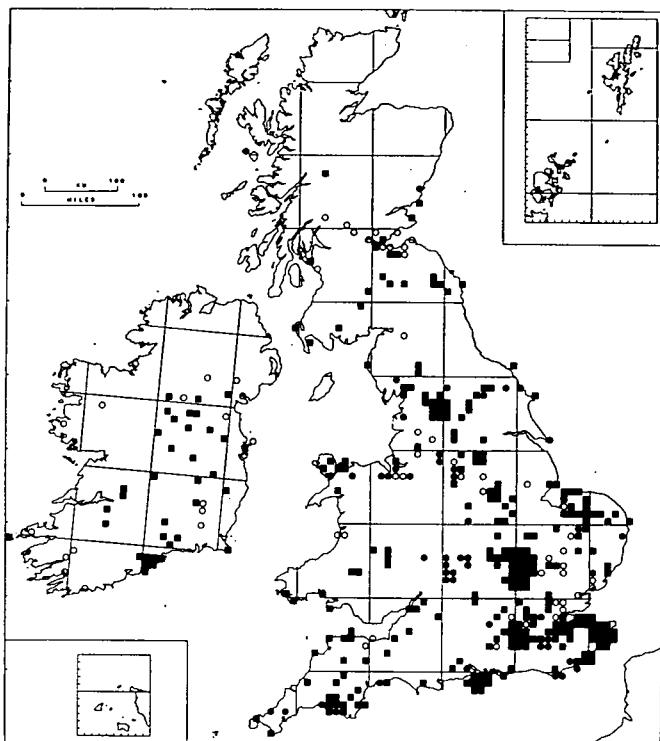
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	8	11	3	2	70	1	9
Standardized %	3.2	4.5	4.4	3.2	7.2	0.8	5.2

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	0	2	1	74	25	0	1	0
Standardized %	-	3.8	2.1	47.2	9.9	-	8.5	-

There would seem to be some preference for calcareous soils (64.5% standardized) but this, again, may be a regional effect, non-calcareous 35.5% (180 records); soils recorded are clays (32.5% standardized), peat (18.3%), loam (28.8%), sandy/pure sand (20.3%) (275 records).

I Horizon data show it to be a soil-dwelling species:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	1	15	375	60	80	14
Standardized %		10.3	21.7	15.0		53.0



Map 23 *Necrophloeophagus flavus*

Britain	862 records	Ireland	61 records
	267 pre-1970 records		21 pre-1970 records
	346 10-km squares		54 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	525	72	20	102	28	66	31	17	61	-	-
% of regional records	7.4	3.1	3.9	7.9	5.9	3.6	3.6	5.2	8.2	-	-
Standardized %	15.4	6.4	8.1	14.8	12.3	7.5	7.5	10.8	17.3		

Brachygeophilus truncorum (Bergsoë & Meinert 1866)

This small species is most often found in woodland, where it is commonly seen in large numbers between the bark and wood of decaying timber. It is, however, also relatively common on moorland and is associated with bracken. Widespread over the British Isles, it seems proportionately less common in south-west England.

B. truncorum has been recorded at similar frequencies throughout the year and there is no significant bias towards coastal (48.6%) or inland (51.4%).

B Although most records are from rural sites, it can be also be found in suburban/village and urban sites:

	Urban	Suburban/village	Rural
Total records	5	59	593
Standardized %	9.8	30.9	59.3

Altitude data show that this species is recorded at similar frequencies at heights up to 2000 ft:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000
Total records	100	148	103	58	55	54	19	11	11	9	22	5
Standardized %	4.2	10.2	8.2	7.9	9.2	10.2	9.4	5.6	8.9	8.3	10.6	7.3

C Analysis of first order habitats shows the marked tendency towards woodland and heath and also to marshland:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	1	3	9	-	8	15	50
Standardized %	3.7	1.3	17.5		8.1	4.1	4.1

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	3	38	6	401	45	2
Standardized %	6.3	6.3	5.5	19.4	15.3	8.3

D Second order habitats: garden (2), compost/refuse (1), dung/hay (1), hedge (11), roadside verge (25), embankment/cutting (8), woodland break (17), quarries/rockfaces (18), road/path (13), ditch (8), shore (10), wood fence (1).

E Important microsites are dead wood and litter: stone/rock (96), soil/sand (27), litter (123), tussocks (7), living bark (4), dead wood (279), bracket fungi (5), stone/brickwork (3), human rubbish (6).

F There are only 10 records associated with buildings: inside (2), ruins (7), greenhouse (1).

H There seems to be no preference for particular woodland types, but a strong preference for grass litter and, to a lesser extent, bracken:

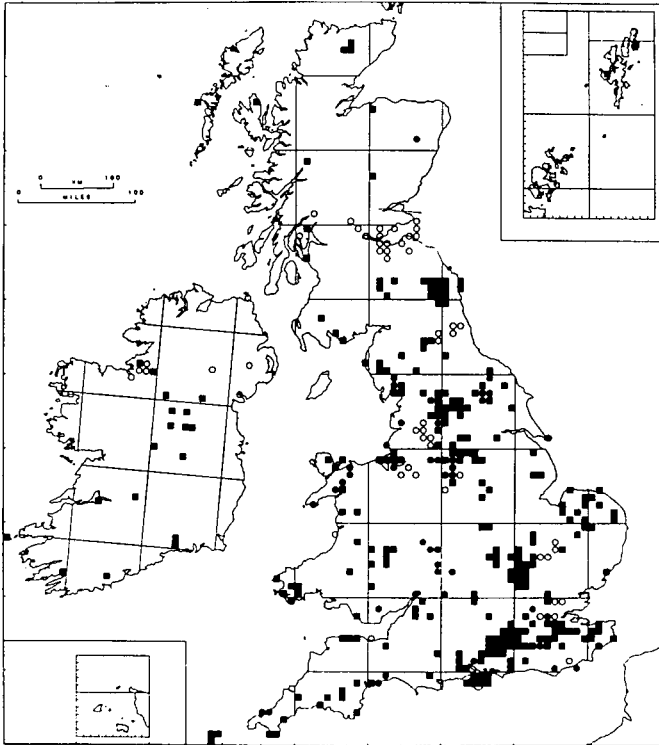
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	42	38	14	9	150	23	21
Standardized %	7.5	6.8	9.1	6.3	6.7	7.9	5.4

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedges	Grass/ herbs	Nettles	Reeds	Bracken
Total records	-	2	10	36	12	3	1	7
Standardized %	-	1.7	8.6	28.7	1.9	-	-	9.3

Soil types are clays (28.5% standardized), peat (23.9%), loam (17.9%), sandy/pure sand (29.9%) (296 records); 33.8% are calcareous, 66.2% non-calcareous (243 records).

I Horizons: this species shows a marked tendency to occur above ground:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	2	45	339	127	28	1
Standardized %		30.9	20.0	32.4		16.7



Map 24 *Brachygeophilus truncorum*

Britain	837 records	Ireland	37 records
	290 pre-1970 records		10 pre-1970 records
	332 10-km squares		27 10-km squares

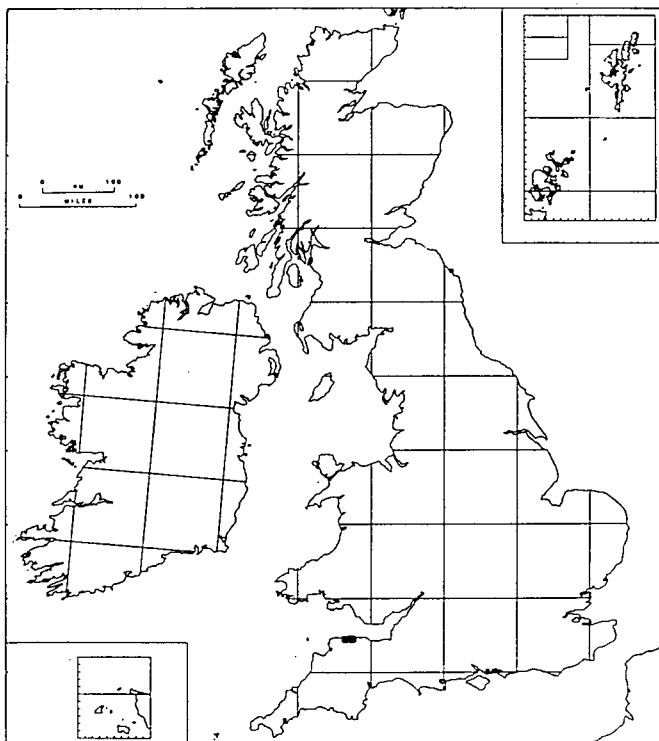
Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	N.Scot	Ireland	IOM	CI
Total records	418	53	38	73	41	115	69	29	37	-	-
% of regional records	5.9	2.3	7.4	5.1	8.6	6.2	7.9	8.9	5.0	-	-
Standardized%	10.3	4.0	12.9	8.9	15.0	10.8	13.8	15.5	8.7	-	-

Also recorded from St Kilda

Chalandea pinguis (Brolemann 1898)

This species has been reported by Brolemann (1930) from the Pyrenees, Alpes Maritimes and Corsica and by Minelli & Zapparoli (1985) from Liguria. It was found at 3 sites, in a limited area of north Devon around Lynton, by the British Myriapod Group meeting in 1970, collected from a nearby area by M J Bishop in 1973, and found to be still present at Woody Bay in 1976.

Characteristic sites are deciduous woodland close to the sea, where it may be found amongst Luzula rhizomes and litter. No other British locations are known, but the north coast of Cornwall, Devon and Somerset is a relatively poorly recorded area and would repay further investigation.



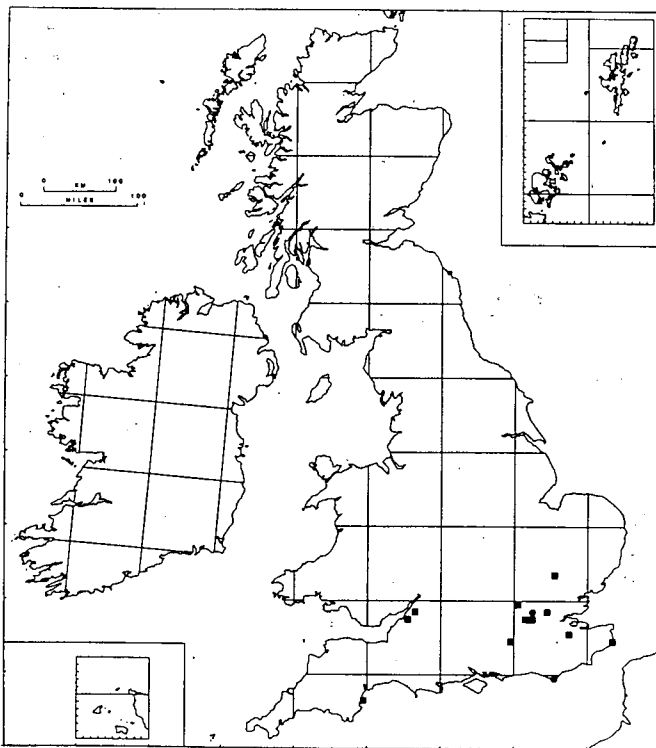
Map 25 Chalandea pinguis

Britain 5 records
2 10 km squares

Cryptops anomalans Newport 1844

A large and impressive animal, up to 5 cm long and capable of penetrating human skin with its poison claws, it occurs in scattered, more-or-less urban localities in south-east England, with a few records from the south-west. It has also been reported recently from an allotment in Cardiff. It has not yet been recorded in Ireland. Two records are from a garden at Winterbourne, Bristol, on different dates and 3 from a garden in Maidstone; 80.7% (standardized) are urban, 18.8% suburban/village and 0.5% rural.

Habitats include outside a building (1), gardens (10), waste ground (4), scrub (1). Records are from all months from March to September. It is worth searching for in urban sites anywhere in southern England and South Wales; C. parisi may be found instead, but there is also a need for more records of that species. C. anomalans may be an introduced species, but is clearly well established here.



Map 26 *Cryptops anomalans*

Britain 20 records
 7 pre-1970 records
 15 10-km squares

Cryptops hortensis Leach 1814

This is the smallest and by far the commonest member of the genus in Britain. It is a common animal of synanthropic sites, especially in the south. It has been recorded in all months of the year with no obvious peaks.

A 73.2% (standardized) of records are coastal and 26.8% inland:

B It shows a marked preference for urban sites, but is also present in rural ones, notably in the southern part of its range:

	Urban	Suburban/village	Rural
Total records	50	145	293
Standardized %	48.1	37.1	14.7

Altitude Its occurrence is predominantly lowland.

	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Total records	186	110	76	30	16	16	0	3	2	0
Standardized %	36.9	21.5	17.1	11.7	7.6	1.9		5.1	0.1	

C First order habitat preferences are varied, with highest incidences in marsh and buildings, and lowest in arable, woodland and acid heath:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	4	18	15	0	27	64	155
Standardized %	10.2	5.4	20.0	-	18.5	11.8	8.6

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	1	42	7	106	13	3
Standardized %	1.4	4.8	4.3	3.5	3.0	8.4

D Second order habitats: garden sites (40), compost/refuse (10), haystack (1), hedge (13), roadside verge (51), embankment/cutting (19), woodland break (1), drystone wall (3), wall with mortar (5), quarries/rockfaces (17), scree (2), road/path (19), ponds/ditches (14), shore (14).

E Microsites: stones/rocks (144), shingle (7), soil/sand (39), litter (57), tussocks (10), living bark (1), dead wood (136), stone/brickwork (25), human rubbish (24).

F Twenty-nine records are associated with buildings; inhabited (3), outbuildings (8), ruins (11), greenhouse, heated (7).

H Litter/vegetation types show highest values for hawthorn, grass/herbs, heathers, grass/sedge, mixed deciduous and sycamore.

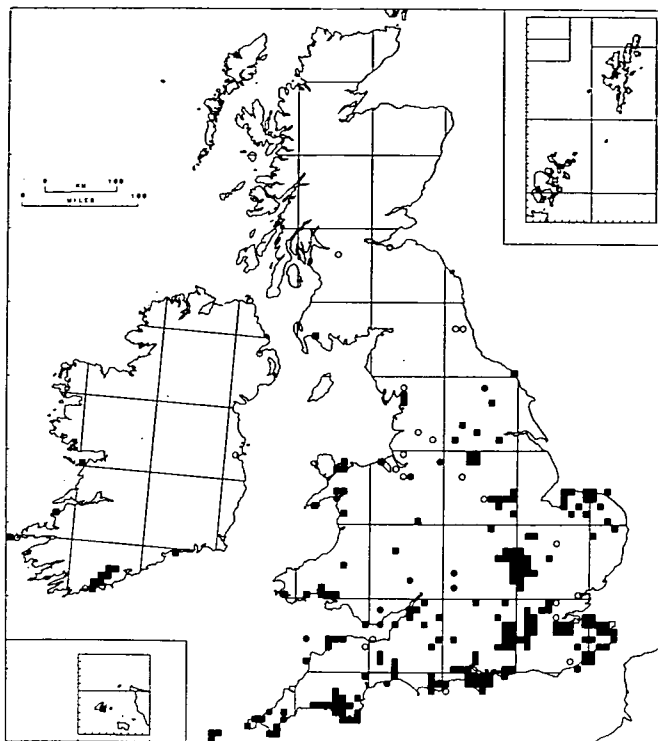
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	11	6	-	4	63	6	5
Standardized %	6.4	3.5		9.2	9.4	6.8	4.2

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Juncus
Total records	-	6	4	51	37	1	8	1
Standardized %		16.7	12.4	10.0	12.9	-	-	-

Soil types are clays (31.4% standardized), peat (28.3%), loam (19.9%), sandy/pure sand (20.4%) (234 records); 49.8% are calcareous, 50.2% non-calcareous (standardized values, 133 records).

I Horizon data show an unexpectedly high value for sub-surface but otherwise the animals seem uniformly distributed between above surface and litter sites:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	0	22	293	62	56	2
Standardized %		18.4	22.1	20.2		39.3



Map 27 *Cryptops hortensis*

Britain	605 records	Ireland	20 records
	130 pre-1970 records		15 pre-1970 records
	230 10-km squares		16 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	348	127	25	60	15	24	6	0	20	0	0
% of regional records	4.9	5.4	4.8	4.2	3.2	1.3	0.7	-	2.7	-	-
Standardized %	18.0	20.0	17.8	15.4	11.6	4.8	2.5	-	10.0	-	-

Cryptops parisi Brolemann 1920

Cryptops parisi often reaches a comparatively large size and, although not as large as the biggest C. anomalans, it is nevertheless strikingly larger than C. hortensis when fully grown. It is most likely to be confused with the latter and careful examination of the tibial and tarsal combs of the last legs is necessary. The so-called var. cristata of Ribaut probably only represents large specimens with more developed combs.

The regional analysis shows a marked south-west bias in distribution. It has been recorded from all seasons of the year. Larger numbers of records (68% standardized) are "coastal".

B Recorded widely, it is a fairly significant component of the urban fauna.

	Urban	Suburban/village	Rural
Total records	8	16	10
Standardized %	62.6	33.3	4.1

Altitude It has been recorded at altitudes only up to 400 ft.

C First order habitats: marsh (1), garden (11), waste ground (8), mown grassland (1), woodland (13).

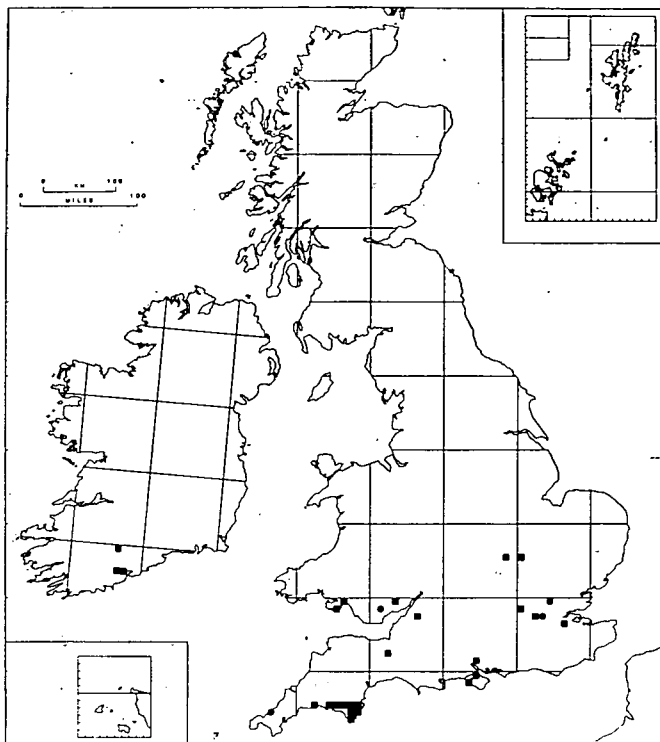
D Second order habitats: garden sites (2), compost (1), roadside verges (2), woodland break (1), quarry floor (3), road/path (2).

E Fourteen records are from stones/rocks, 3 from soil/sand, 6 from litter, 4 dead wood, 1 stone/brickwork and 4 from human rubbish.

F Of the 6 records associated with buildings, 1 is outbuilding, 3 ruins, 2 unheated greenhouse.

H Litter/vegetation types are oak (2), beech (3), mixed deciduous (11), grass/sedge (4), grass/herbs (1).

I Twenty-four records are surface, 4 litter, 3 less than 10 cm deep in soil.



Map 28 *Cryptops parisi*

Britain	41 records	Ireland	3 records
	4 pre-1970 records		3 10-km squares
	24 10-km squares		

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	10	28	2	1	-	-	-	-	3	-	-
% of regional records	0.1	1.4	0.4	0.07					0.4		
Standardized %	6.4	54.3	17.7	3.2					18.5		

Lithobius variegatus Leach 1817

Once considered to be endemic to the British Isles, this species has now been found in north-west France and the Channel Islands and has recently been shown to be conspecific with L. rubriceps Newport 1845 from Iberia and elsewhere (Eason & Serra 1986). It is a very common animal in rural situations over much of Britain, but is apparently absent from eastern areas, a situation discussed elsewhere (Barber 1985). There are also occasional sites elsewhere in Britain where it would be expected to be present, but has not been found.

Regional analysis clearly demonstrates a western tendency; the low proportion for northern Scotland may, in part, reflect the small number of records in total for that region. It occurs throughout the year and represents about 10-18% of centipede records for any given month.

A 47% (standardized) are coastal.

B It shows a marked rural preference:

	Urban	Suburban/village	Rural
Total records	5	173	1586
Standardized %	3.7	34.4	61.4

Altitude It is a characteristic animal of upland sites and occurs up to 2500 ft, forming 10% or more of centipede records from above 700 ft:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000	2000+
Total records	168	229	235	196	156	182	77	84	49	44	86	32	9
Standardized %	3.0	4.0	4.7	6.8	6.6	8.7	9.5	10.8	10.0	10.2	10.5	15.4	

C First order habitats: commonest in scrub, woodland and acid heath/moorland, and less frequent in buildings, gardens and sand dunes:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	5	31	14	0	5	22	172
Standardized %	5.3	5.0	9.7	-	1.8	2.1	5.0

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	14	178	47	957	139	1
Standardized %	10.5	10.6	14.9	16.9	16.7	1.5

D Second order habitats: garden sites (6), compost heaps (4), hedges (24), roadside verges (103), embankments/cuttings (38), woodland breaks (54), drystone walls (13), wall with mortar (1), quarries/rockfaces (67), scree (31), road/path (55), ditches and ponds (25), shoreline (29).

E Microsites: stones/rocks (567), soil/sand (13), litter (265), tussocks (17), living bark (11), dead wood (607), bracket fungi (3), ant colony (1), nests (2), stone/brickwork (21), human rubbish (32).

F Twenty records are from buildings: inhabited (1), ruins (19); 18 records are from the splash zone of the shore.

H Litter/vegetation: a wide range of locations, with highest proportions in oak, beech, mixed deciduous, coniferous and mixed woodland:

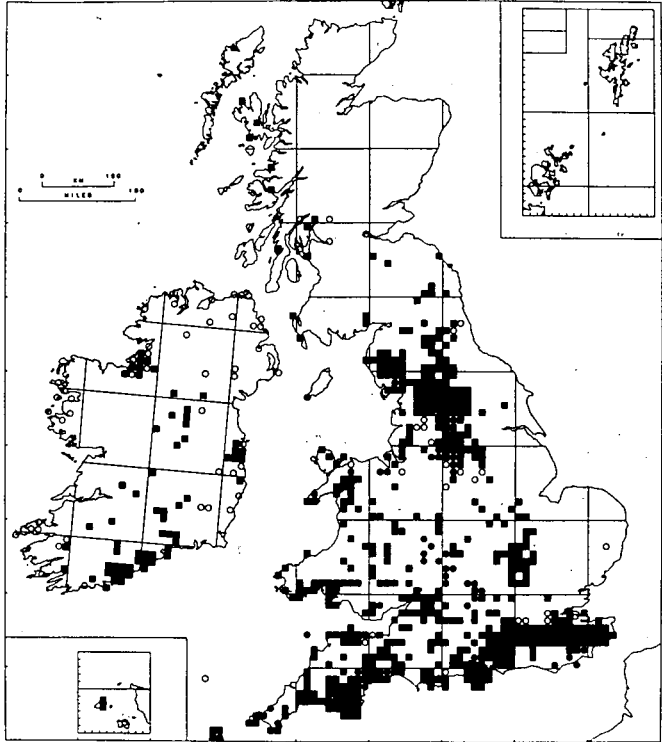
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	119	103	13	15	392	48	81
Standardized %	13.1	11.4	5.2	6.5	11.0	10.2	12.8

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	5	7	11	203	46	2	1	9
Standardized %	-	3.7	6.4	7.4	5.0	-	-	7.4

Soil types are clays (23.7%, standardized), peat (32.6%), loam (25.9%), sandy/pure sand (17.8%).

I Horizon: highest proportions in litter, surface, and above surface levels:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	1	130	1098	283	19	1
Standardized %		36.7	27.7	30.8	4.9	



Map 29 *Lithobius variegatus*

Britain 2153 records
 506 pre-1970 records
 516 10-km squares

Ireland 149 records
 73 pre-1970 records
 110 10-km squares

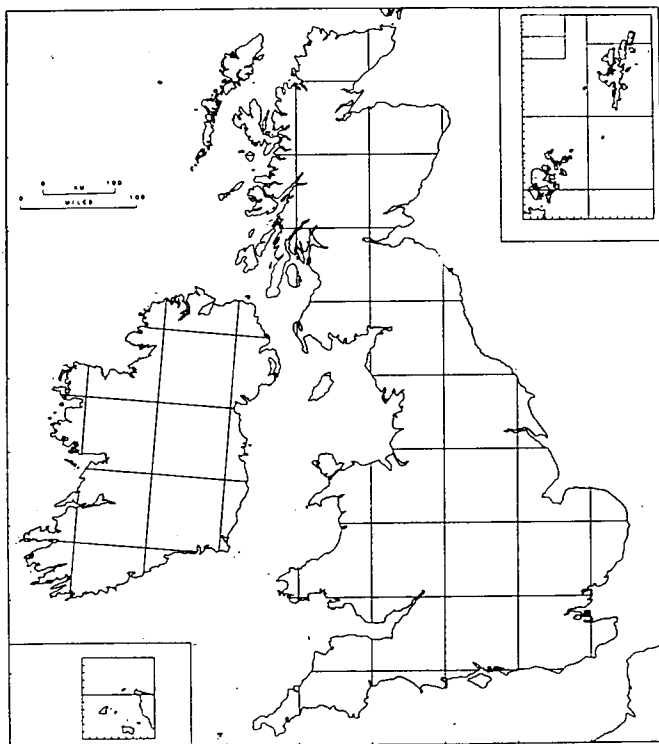
Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	882	576	113	31	62	355	113	17	149	1	3
% of regional records	12.5	24.7	22.0	2.2	13.1	11.4	13.0	5.2	20.3	-	-
Standardized %	9.5	18.8	16.1	1.7	9.9	14.7	9.9	4.0	15.4		

Lithobius peregrinus Latzel 1880

Lithobius peregrinus has recently been recorded as new to Britain from Sheerness, Kent (Barber & Eason 1986). It is well established there in the centre of the town, apparently occupying a niche that would normally be occupied by L. forficatus, which it resembles in size and general appearance.

L. peregrinus is distinguished from L. forficatus by the presence of the spine VaC on the 14th and 15th (and often 13th) legs and by the double claw of the last leg among other features.

Because of its similarity to L. forficatus, specimens of the latter from urban areas should always be collected. It can no longer be assumed that all large lithobiids in urban areas are L. forficatus. Two or 3 specimens from previously unsurveyed areas should indicate whether there is a different large lithobiid, such as L. peregrinus or L. pilicornis, present.



Map 30 *Lithobius peregrinus*

Lithobius forficatus (Linné 1768)

A large and conspicuous species which is widespread over the British Isles and which has been more frequently recorded than any other species. Regional analysis suggests that it is proportionately less common in the west, where L. variegatus is extremely common. It has been recorded at similar frequencies throughout the year. However, it tends to be over-represented from areas with few records because it is large and easy to find. It is one of the few species recorded on St Kilda.

A Of the 2533 for which there are data, 43.3% of records (standardized) are coastal and 57.6% are inland.

B It occurs in both urban and rural sites and is a common urban centipede:

	Urban	Suburban/village	Rural												
Total records	139	473	1910												
Standardized %	38.1	34.5	27.4												
Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000	2000+		
Total records	515	503	433	256	180	148	61	60	31	26	46	9	5		
Standardized %	10.2	9.9	9.8	10.0	8.6	8.0	8.5	8.8	7.2	6.8	6.3		5.9		

C It occurs in a wide variety of first order habitats:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	14	77	20	1	60	199	754
Standardized %	9.2	6.0	6.9	-	10.6	9.4	10.8

Habitat type Arable Grassland Scrub Woodland Acid heath/ Sand dune
moorland

Total records	20	318	45	673	110	15
Standardized %	7.4	9.4	7.1	5.7	6.6	10.8

D Second order habitats show a wide variety of sites, often associated with human activity: gardens (61), compost/refuse (41), dung (11), haystacks (3), hedges (54), roadside verges (362), embankment/cutting (67), woodland break (30), wood fence (1), walls (18), quarries/rockfaces (124), scree (27), road/path (51), ditches/ponds (61), shore (74).

E Microsites: stone/rock (883), shingle (16), soil/sand (67), litter (187), tussocks (18), bark (7), dead wood (711), dung (6), ant colony (2), nest (6), stone/brickwork (66), jetsam (9), human rubbish (139).

F Ninety-two records relate to buildings: cellars (3), inhabited (10), outbuildings (15), ruins (56), greenhouses (8).

H Litter/vegetation:

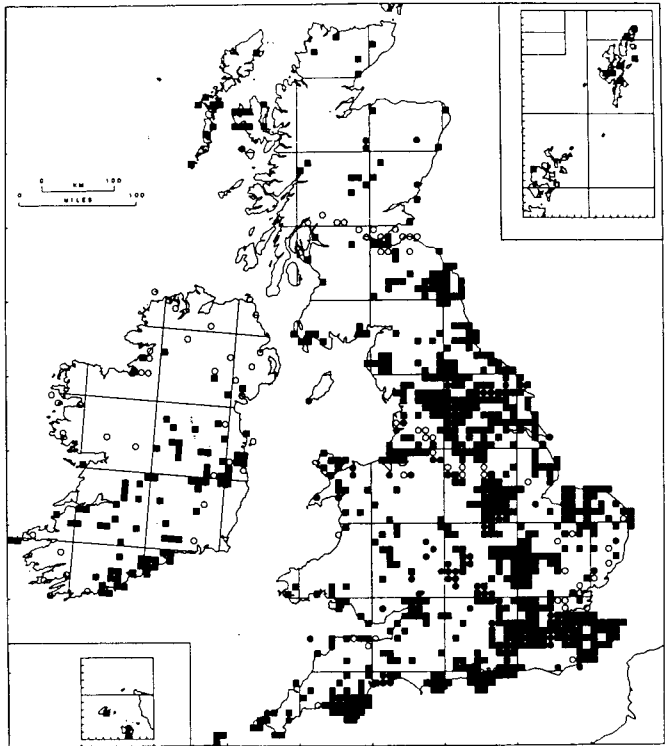
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	37	39	28	12	270	46	54
Standardized %	4.3	4.5	11.7	5.5	7.9	10.2	8.9

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	3	24	19	334	113	7	2	11
Standardized %	-	13.2	11.6	12.8	12.8	-	-	9.4

Soil types: clays (25.7% standardized), peat (20.7%), loam (26.0%), sandy/pure sand (27.6%). There are slightly more records from calcareous soils (55.2% standardized) than non-calcareous (44.5%) (940 records).

I About half the records with data are from the surface or litter:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	7	12.4	1778	183	99	5
Standardized %		28.9	35.3	15.7		20.1



Map 31 *Lithobius forficatus*

Britain	3017 records	Ireland	159 records
	667 pre-1970 records		50 pre-1970 records
	764 10-km squares		120 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	1466	282	73	380	87	462	180	84	159	1	2
% of regional records	20.7	12.1	14.2	26.6	18.3	25.2	20.1	25.8	21.7	-	-
Standardized %	11.2	6.5	7.7	14.4	9.9	13.6	11.3	13.9	11.5		

Lithobius picens L Koch 1862

Although a widespread European species, it is confined in Britain to a small area in Surrey, Sussex and Hampshire. There are also 3 records of a subspecies 'britannicus' by R S Bagnall (1913a) from Northumberland and Durham, but the species has not been re-found there.

Season It has been found throughout the year, but with proportionately highest numbers between December and April:

Month	J	F	M	A	M	J	J	A	S	O	N	D
Total records	3	5	18	26	5	4	2	5	4	2	1	7
Standardized %	10.4	15.4	22.6	11.2	3.7	3.4	2.0	4.1	4.2	3.0	3.4	18.7

Altitude All records are from below 600 ft, with the largest number between 400 and 600 feet, corresponding to the higher parts of the areas in which it occurs:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600+
Total records	0	3	8	8	15	22	0
Standardized %	-	2.4	7.4	12.7	29.2	48.3	-

C First order habitats show a marked woodland bias:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	0	0	0	0	0	0	8
Standardized %							12.6

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	0	1	1	58	2	0
Standardized %		3.2	17.3	53.8	13.1	

D, E Only 8 second order habitats are recorded: compost/refuse heap (1), hedge (1), roadside verge (2), woodland break (2), road/path (1), dry ditch (1). Microsites are: stones/rocks (10), soil/sand (1), litter (13), dead wood (29), human rubbish (1).

H Vegetation/litter types indicate deciduous woodland, but there are only 38 specified records, partly due to the fact that the RA14 card did not list hazel or chestnut:

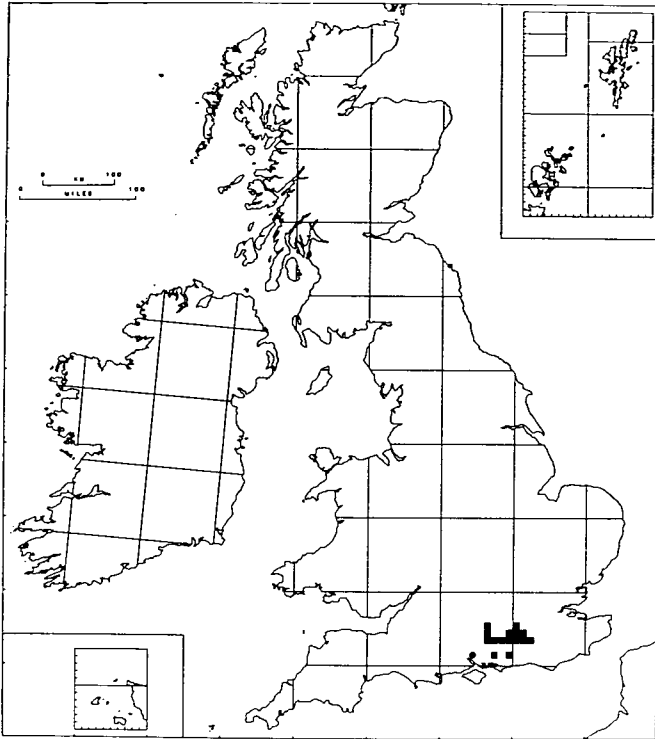
Litter/vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/deciduous
Total records	1	4	3	0	23	1	3
Standardized %	3.4	13.8	37.6		20.2	6.6	14.9

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	0	0	0	3	0	0	0	0
Standardized %				3.4				

There are 54 records giving soil type: clayey (3.3% standardized), loam (59.5%), sandy/pure sand (37.2 %). For the 57 soil/rock records, there are 19.6% (standardized) calcareous and 80.4% non-calcareous. Most records are from soil surface or litter:

I Horizon

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	0	1	51	12	1	0
Standardized %		9.0	41.3	41.9	7.9	



Map 32 *Lithobius piceus*

Britain 84 records
 70 pre-1970 records
 18 10-km squares

Lithobius melanops Newport 1845

A medium-sized lithobiid which is often reported from houses and urban sites. Analysis of distribution by regions shows considerable uniformity apart from northern Scotland where there are relatively small numbers of records in total. This species is recorded from all months of the year, but records for February and November are proportionately highest. There is no preference for coastal (52.9%) rather than inland (47.1%) sites; however, it is markedly an animal of seashores and sand dunes leading us to suggest that this would be its original habitat from which it has colonized its present urban strongholds. It is one of the few species recorded on St Kilda.

B Standardized data show a distinct preference for urban rather than rural sites.

	Urban	Suburban/ village	Rural
Total records	35	108	412
Standardized %	41.4	33.7	25.2

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500+
Total records	146	97	90	49	30	23	15	8	5	6	12	3
Standardized %	14.3	9.4	10.0	9.4	7.0	6.1	10.3	5.7	5.7	7.7	8.1	6.3

C First order habitats:

Habitat	Fresh-water	Estuary/sea/salt marsh	Marsh	Cave, etc	Building	Garden/allotment	Waste ground	Arable
Total records	5	35	3	0	33	61	133	2
Standardized %	10.7	8.9	3.4	0	19.1	9.4	6.4	2.4

Habitat	Grass	Scrub	Woodland	Acid heath	Sand dune
Total records	47	11	134	12	10
Standardized %	4.5	5.7	3.7	2.3	23.6

D Second order habitats: garden sites (22), compost/refuse (10), dung (5), hedges (11), roadside verges (54), embankment/cutting (9), woodland ride (4), walls (15), quarries/rockfaces (34), scree (3), road/path (21), ditches, ponds (15), shore (31).

E Microsites: stone/rock (136), shingle (10), soil/sand (20), litter (35), tussocks (11), bark (3), dead wood (208), dung (2), bracket fungi (3), nest (1), stone/brickwork (25), human rubbish (24).

F There are a total of 39 records from buildings: inhabited (10), outbuildings (7), ruins (14), greenhouses (8).

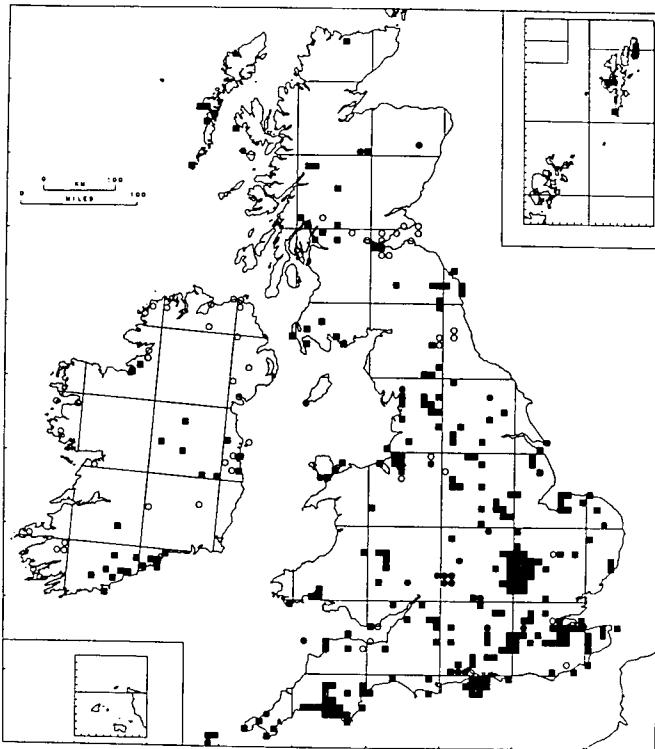
H Litter/vegetation types

Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifer	Coniferous/ deciduous
Total records	17	17	7	4	51	3	6
Standardized %	8.0	8.0	12.0	7.4	6.1	2.7	4.1

Litter/ vegetation	Gorse	Hawthorn	Heather	Grass/sedge	Grass/herbs	Bracken
Total records	1	6	2	48	25	4
Standardized %	-	13.4	5.0	7.5	11.6	14.0

Soil types show a bias towards sandy/pure sand (44.2% standardized), clays (24.7%), peat (10.9%), loam (20.1%); 58.7% (standardized) are from calcareous sites, 41.3% non-calcareous (165 records).

I Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep	>10 cm deep
Total records	3	88	317	37	21	2
Standardized %		59.1	18.5	9.3	13.1	



Map 33 *Lithobius melanops*

Britain	701 records								Ireland	60 records	
	147 pre-1970 records									36 pre-1970 records	
	299 10-km squares									54 10-km squares	
Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	N.Scot	Ireland		
Total records	346	113	24	55	20	61	41	41	60		
% of regional records	4.9	4.8	4.7	3.9	4.2	3.3	4.7	12.5	8.2		
Standardized %	9.6	9.4	9.2	7.6	8.2	6.4	9.2	24.4	16.0		

Lithobius macilentus L Koch 1862

Formerly known as L. sulacornis Latzel, only females of this species have been found in Britain and it shows a somewhat patchy distribution. It has been collected in most months of the year except January and February. Standardized data for 46 records show 19% coastal and 81% inland.

B There are no urban records, but standardized figures give suburban/village 26.3% and rural 73.7%.

Altitude All records are from below 1000 ft, mostly 100-600 ft (31 out of 36 records for altitude).

C Total records for first order habitats are: garden (2), waste ground (6), arable (1), grassland (4) and woodland (32).

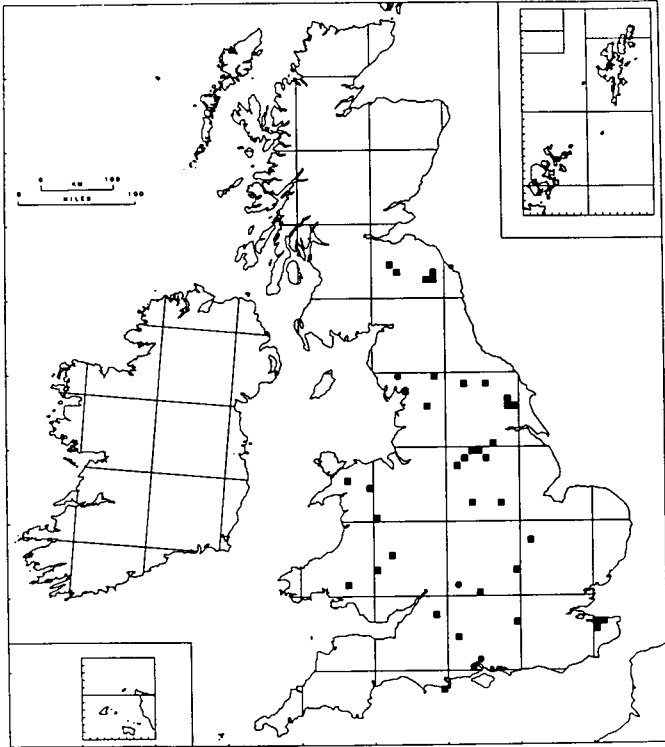
D Second order habitats: compost/refuse (1), haystack (1), hedge (1), roadside verge (2), embankment/cutting (2), woodland ride (1), quarry/rockface (1), scree (2).

E Microsites: stone/rock (13), soil/sand (3), litter (13), bark (1), dead wood (7), human rubbish/garbage (1).

One record is associated with a ruin. Litter/vegetation details are: oak (1), beech (6), birch (1), sycamore (2), mixed deciduous (6), coniferous (1), deciduous/coniferous (4), grasses (2).

One record is from >5 m above ground surface, one record from <3 m, 27 from ground surface, 10 from litter and 3 from soil (<10 cm depth). Nine records are from calcareous sites and 9 from non-calcareous sites.

Most records are of one or a few animals per site, but in a deciduous woodland near Pawston, north Northumberland, this species was abundant and was the only small lithobiid present; there are 5 other sites for this species in the same area, all on the north-west side of the Cheviot Hills. The most northerly record is from Kincardine, where it was found under stones on moorland (not mapped).



Map 34 *Lithobius macilentus*

Britain 55 records
40 10-km squares

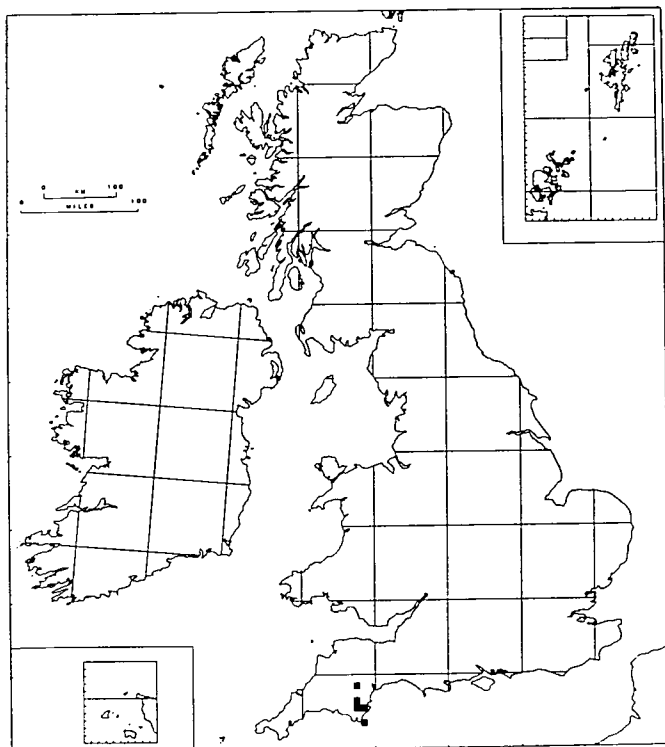
Regional analysis

Region	SE	SW	Wales	East	W&NM	Y,L,W	M&SS	N.Scot	Ireland
Total records	10	3	6	3	1	22	8	0	0
Standardized %	3.5	5.3	28.7	5.2	5.2	29.5	22.7	-	-

Lithobius tricuspis Meinert 1872

This common European species was first collected in Devon just over 20 years ago (Eason 1965). It has subsequently been found on several occasions in that area and recently on the Isle of Wight (ANK). Eason (1965) has suggested that the old Irish records of L. agilis may possibly be of this species.

All records are from suburban/village or rural sites (2 from waste ground, one each from grassland, scrub, woodland with scrub, woodland with herbs/grass). Three records were under stones, 3 from litter; 2 were associated with a ruin. One record was from oak litter, 2 from mixed deciduous litter and one from grass litter. In no cases was there an association with calcareous rock.



Map 35 *Lithobius tricuspis*

Britain
6 records
1 pre-1970 record
5 10-km squares

Lithobius borealis Meinert 1868

Formerly recorded under the name L. lapidicola Meinert, all records are included under L. borealis. It is a widespread species, most easily distinguished from L. melanops by the absence of posterior projections on tergite 9 and the presence of a supplementary spine on the prefemur of the 15th legs. Northern specimens tend to have distinct projections on tergite 9 which makes separation more difficult. Regional analysis shows this species to be most common in south-west England and in northern Scotland. It seems to occur at similar frequencies throughout the year.

A 63.1% (standardized) of records are coastal and 36.9% are inland.

B In contrast to L. melanops it has a marked rural bias.

	Urban	Suburban/village	Rural
Total records	0	6	177
Standardized %	-	14.7	85.3

Altitude It is frequent above 700 ft, which has some correlation with the first order habitats from which it has been recorded.

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000
Total records	23	18	17	22	6	12	5	16	8	11	16	3
Standardized %	2.1	2.5	2.7	6.1	2.0	4.6	5.0	16.6	13.1	20.5	15.6	9.1

C First order habitats

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Building	Garden/allotment	Waste ground
Total records	1	3	3	-	-	-	10
Standardized %	8.5	3.0	13.2	-	-	-	1.8

Habitat type	Arable	Grass	Scrub	Woodland	Acid heath/	Sand dune
Total records	3	14	5	94	32	1
Standardized %	14.3	5.3	10.1	10.2	24.4	9.2

The standardization brings out the acid heath habitat as characteristic for this species, whilst woodland, despite having a comparatively large number of records, is less so. The low value for waste ground sites reflects its mainly rural occurrence.

D Second order habitats: hedges (3), roadside verges (6), embankment/cutting (1), woodland break (5), wood fence (1), walls (3), quarries/rockfaces (7), scree (6), road/path (9), ditches/ponds (2), shore (3).

E Microsites: stones/rock (61), shingle (1), litter (25), tussocks (2), bark (2), dead wood (45), bracket fungi (1), nest (2), stone/brickwork (2).

F Only 5 records from buildings (ruins) and 9 from shore habitats.

H Litter/vegetation type

Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Coniferous	Deciduous/ coniferous
Total records	13	8	4	3	20	12	8
Standardized %	5.2	3.8	6.9	5.6	2.4	11.0	5.5

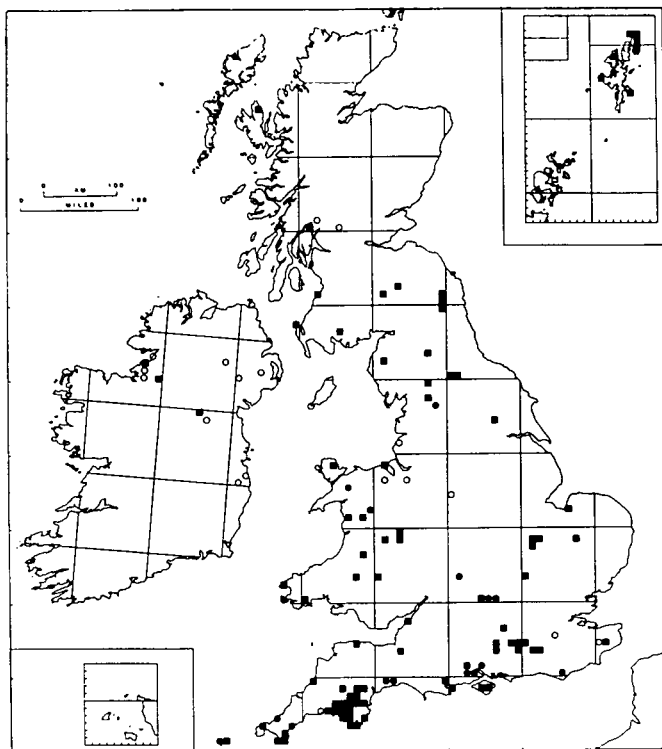
Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Reeds	Bracken
Total records	1	1	8	30	1	1	2
Standardized %	13.7	2.2	20.2	4.8	0.5	10.0	7.1

Soil/rock type

There is a marked bias to non-calcareous sites (84.7% standardized) (112 records). Soil types are biased towards peat (62.3% standardized), clays (3.7%), loam (18.9%), sandy/pure sand (15.2%).

I Horizon

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	2	23	99	24	1	-
Standardized %		56.6	20.2	21.1	2.2	-



Map 36 *Lithobius borealis*

Britain	216 records	Ireland	14 records
	69 pre-1970 records		11 pre-1970 records
	112 10-km squares		13 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	N.Scot	Ireland	IOM	CI
Total records	34	108	14	16	9	8	10	16	14	1	0
Standardized %	2.5	24.0	14.2	5.8	9.8	2.3	6.0	25.5	9.9	-	-

Also recorded from St Kilda

Lithobius pilicornis Newport 1844

Of similar size to, or larger than, L. forficatus, this is our largest lithobiid, reaching 35 mm or more in length. It is distinguished from the latter species by the absence of projections on tergite 9 and the presence of spines 15VaC and 15VmC, but in the field it is often recognizable by the large 15th legs which seem to be readily shed.

In Britain, this species is widespread in Devon and Cornwall, occurring in scattered urban, suburban and some rural sites. It also occurs on the Isle of Wight and there are scattered synanthropic records across southern England and south Wales. It has recently been collected by ANK from Wakefield and there is an older record from Oxfordshire (not mapped).

It is difficult to interpret a pattern of its distribution in the south-west, where one site will have L. forficatus and an adjacent one L. pilicornis. In continental Europe, the latter is essentially a species of the south-west: Alps, west coast of France, Iberian peninsula. L. pilicornis is reportedly the commonest centipede in Navarre in south-west France (R D Kime pers. comm.), whilst in Liguria (north-west Italy) it is a species of less disturbed habitats with L. forficatus having the synanthropic tendency (A Minelli, pers. comm.). Geoffroy (1983) reports on competition between the 2 species in alpine sites where L. forficatus occurs at high altitudes. Regional analysis shows a southern/south-western pattern of distribution; it has not been recorded from Ireland; 94.9% of records (standardized) are coastal.

B It shows a marked urban tendency:

	Urban	Suburban/ village	Rural
Total records	18	27	29
Standardized %	67.4	26.9	5.7

C First order habitats show a strong preference for buildings, gardens and waste ground etc:

Habitat type	Freshwater	Maritime Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	1	4	1	8	10	27
Standardized %	17.9	8.4	-	38.9	12.8	10.5

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/ moorland	Sand dune
Total records	0	3	1	15	1	0
Standardized %	-	2.1	4.2	3.2	2.1	-

D Second order habitats: garden sites (6), hedges (2), roadside verges (2), woodland breaks (4), walls (2), quarries/rockfaces (4), roads/paths (4), dry ditch (1), shore (4).

E Microsites recorded: stones/rocks (34), shingle (2), soil/sand (1), litter (5), tussocks (3), dead wood (6), stone/brickwork (10), human rubbish (5).

F Twelve records are from buildings: inhabited (3), outbuildings (3), ruins (6), and 4 records are from the splash zone of the shore.

H Litter types are recorded for only 30 occurrences:

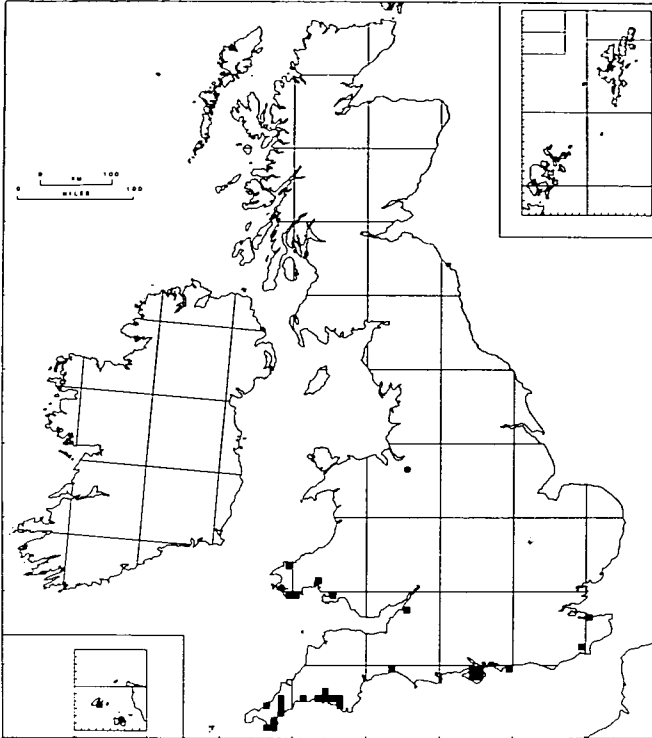
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	2	0	0	1	9	0	0
Uncorrected %	6.7	-	-	3.5	30	-	-

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	0	0.1	0	4	12	1	0	0
Uncorrected %	-	3.3	-	13.3	40	3.3	-	-

Of the 26 records, 21.3% (standardized) are calcareous and 78.7% non-calcareous. Soils: clays (20), peat (0), loam (18), sandy/pure sand (3).

I Horizons occupied most frequently are on the surface and above ground:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	<10 cm deep in soil
Total records	0	7	57	6	2	0
Standardized %		43.2	31.6	14.4		10.8



Map 37 *Lithobius pilicornis*

Britain 83 records
 13 pre-1970 records
 32 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	30	43	7	0	1	0	0	0	0	0	2
Standardized %	11.2	48.7	34.6	-	5.6	-	-	-	-	-	2.4

Lithobius calcaratus C L Koch 1844

The name calcaratus apparently derives from the Latin calcar, a spur, referring to a projection on the 15th legs of males; it does not, in any way, refer to calcareous habitats. The species is one of the characteristic animals of acid heathland.

Regional analysis seems to suggest an easterly and northerly tendency in this species, but the small number of records from northern Scotland gives an incomplete picture. It has not been recorded from Ireland. Records are from all months of the year with no obvious peak time.

A 35.8% (standardized) are coastal and 64.2% inland.

B It is essentially a rural animal with only 2 records from suburban/village and none from urban sites.

	Urban	Suburban/ village	Rural
Total records	0	2	113
Standardized %	-	8.3	91.7

Altitude The analysis shows high values above 800 ft, a reflection of the restricted number of species and range of habitat occurring at the higher altitudes.

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000	2000+
Total records	19	19	18	7	3	6	5	2	6	5	10	0	0
Standardized %	5.1	5.0	5.5	3.7	1.9	4.4	9.5	4.0	18.8	17.7	18.6	-	-

C First order habitats show highest proportions in marsh, grassland and acid heath, with woodland making up only 3% of standardized records:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/ allotment	Waste ground
Total records	1	2	4	0	0	0	16
Standardized %	10.7	2.5	22.3	-	-	-	3.7

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/ moorland	Sand dune
Total records	0	36	0	22	30	1
Standardized %	-	17.1	-	3.0	28.9	11.7

D Second order habitats: hedge (1), roadside verge (4), embankment/cutting (1), woodland break (2), quarries/rockfaces (11), scree (3), road/path (2), shore (2).

E Microsites: stones/rocks (40), soil/sand (1), litter (11), tussocks (3), dead wood (3), stone/brickwork (2).

Its low incidence in dead wood correlates well with its preference for open habitats.

F Four records are associated with buildings, all ruins.

H Litter/vegetation shows highest incidence associated with grasses, heathers and bracken, with birch and conifers as the main tree types:

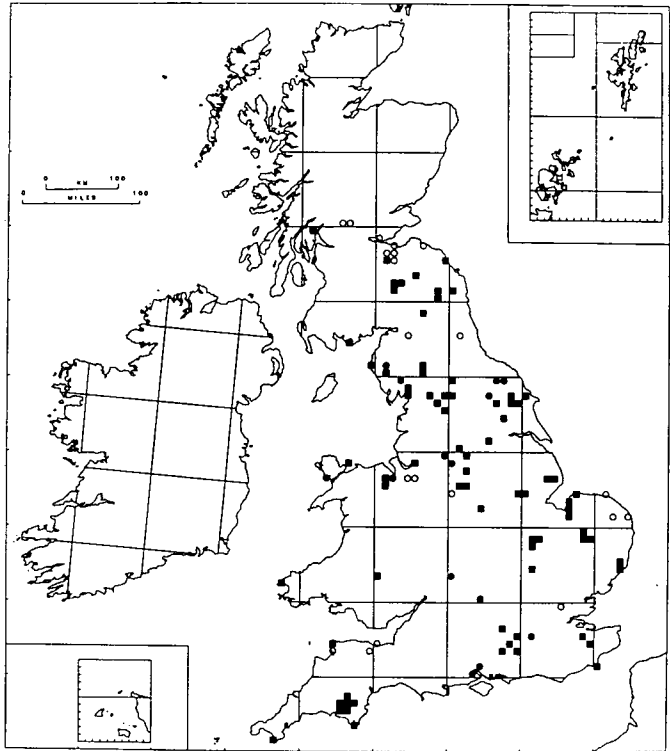
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	1	0	2	0	3	2	1
Standardized %	1.5	-	11.1	-	1.2	5.9	2.2

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	0	0	2	36	6	1	1	3
Standardized %	-	-	16.3	18.5	9.0	-	-	34.2

Soil types, based on 54 records, are clays (5.4% standardized), peat (57.4%), loam (7.9%), sandy/pure sand (28.3%), ie a marked bias towards peat and sand; 64.9% (standardized) are calcareous, 35.1% non-calcareous (70 records).

I It is mostly found on the surface and to a lesser extent in litter:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	1	1	76	10	3	0
Standardized %		13.0	44.6	25.3		17.1



Map 38 *Lithobius calcaratus*

Britain 179 records
 92 pre-1970 records
 111 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	21	29	11	46	9	44	25	4	0	0	0
Standardized %	2.0	5.3	14.1	21.9	12.9	16.3	19.6	7.9	-	-	-

Lithobius muticus C L Koch 1847

This animal is collected characteristically from woodland in south-east England, having been apparently first recorded in Kent by S G Brade-Birks (unpublished notes). A total of 105 records have been made, at all seasons of the year, but 40 of these represent collections made in Wytham Great Wood near Oxford.

It has recently (1986) been found during the BMG/BISG meeting in Delamere Forest, Cheshire (coll. E G Philp) and at Heaton Mersey, Lancs (coll. A H Keay). These records have not been included in the analysis.

A Standardized data show a marked preference for inland (92.0%) rather than coastal sites.

B Essentially a rural species.

	Urban	Suburban/village	Rural
Total records	0	10	85
Standardized %	-	37.4	62.6

Altitude All records are from sites below 700 ft but this is a reflection of the topography of south-east England as much as any altitudinal preferences of the species.

C First order habitat analysis shows it as a distinctly woodland animal:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	-	-	-	-	-	1	7
Standardized %						3.8	8.1

Habitat	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	-	5	2	74	-	-
Standardized %		11.9	25.5	50.7		

D Second order habitats are given for only 6 records: verges (2), woodland break (1), road/path (3).

E Microsites: stone/rocks (6), litter (57), dead wood (14), stone/brickwork (3), human rubbish (1). One record is associated with a ruin.

H A clear preference for deciduous woodland is shown by the litter/vegetation data:

Litter/vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/deciduous
Total records	11	26	-	12	18	-	2
Standardized %	11.7	27.9		50.6	4.9		3.1

Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
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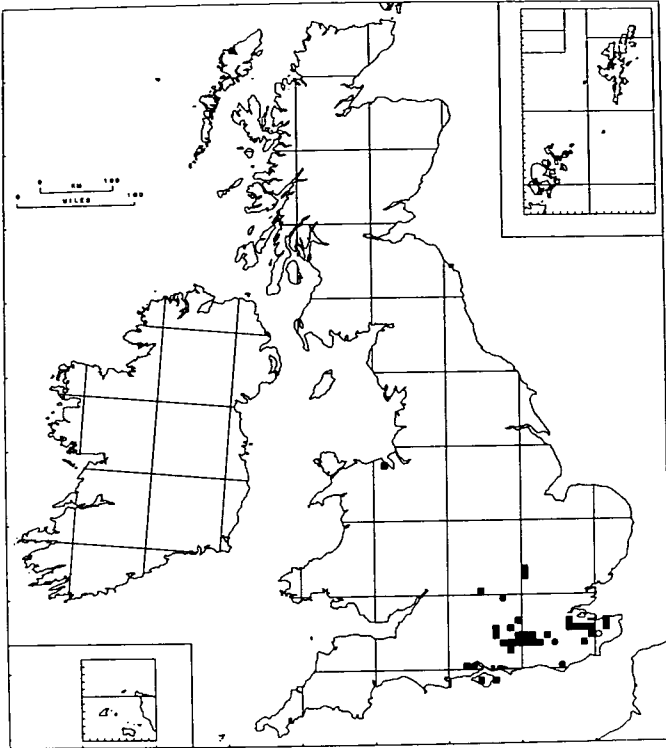
Total records	-	-	-	5	-	-	-	-
Standardized %				1.8				

Sweet chestnut, one of the characteristic woodlands for the species, was not coded separately and would have been noted under mixed deciduous or other.

Of the 36 records, 29.3% (standardized) are calcareous and 70.7% non-calcareous. Soils are loam (30) and sandy (5).

I Horizon data show only records from surface and litter, with the latter much favoured:

Horizon	Surface	Litter
Total records	34	54
Standardized %	12.7	87.3



Map 39 *Lithobius muticus*

Britain 105 records
 40 pre-1970 records
 35 10-km squares

Lithobius crassipes L Koch 1862

This is the commonest small lithobiid over large areas of rural Britain, where it occurs mainly in the east and north, but is rare in the south-west and in Ireland.

A 23.3% (standardized) of records are from coastal and 76.8% from inland, probably biased because of the substantial overall number of southern coastal records and the low proportion of L. crassipes in these records.

B It shows a marked preference for non-urban sites:

	Urban	Suburban/village	Rural
Total records	5	54	810
Standardized %	8.1	23.3	68.6

Altitude A higher proportion of the records are from high altitudes; this is probably due to limited habitat diversity at high altitudes - mainly grass and moorland and with few settlements:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000	2000+
Total records	72	117	147	103	83	65	37	36	33	22	48	17	4
Standardized %	2.5	4.0	5.7	6.9	6.8	6.1	9.0	9.1	13.2	10.0	11.4	5.4	

C It occurs in a wide variety of first order habitats, notably grassland and acid heath:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	4	6	6	0	9	12	142
Standardized %	10.0	1.8	7.8	-	6.0	2.1	7.7

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
Total records	8	138	9	385	66	2
Standardized %	11.2	15.3	5.4	12.3	14.9	5.4

D Second order habitats: garden sites (4), compost/refuse (1), dung (1), hedges (13), roadside verges (104), embankments/cuttings (24), woodland breaks (17), walls (6), quarries/rockfaces (28), scree (14), roads/paths (27), ditches/ponds (21), shore (8).

E Microsites recorded: stones/rocks (321), soil/sand (3), litter (101), tussocks (8), living bark (5), dead wood (265), dung (2), nest (1), stone/brickwork (6), jetsam (2), human rubbish (17).

F Thirteen records are from buildings: outbuildings (5) and ruins (8).

H Litter/vegetation:

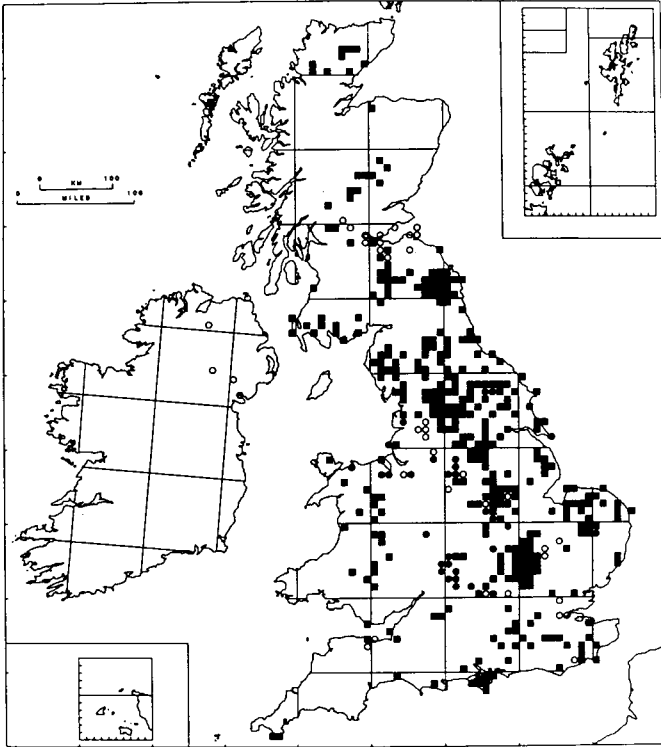
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous	Gorse
Total records	29	28	18	3	138	36	31	0
Standardized %	6.0	5.8	13.5	2.5	7.3	14.3	9.2	-

Litter/ vegetation	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	<u>Juncus</u>	Bracken
Total records	9	5	118	17	1	1	1	10
Standardized %	8.9	5.5	8.1	3.5	-	-	-	15.4

Soil types: clays (15.1% standardized), peat (28.6%), loam (31.3%), sandy/pure sand (24.9%); 51.2% are calcareous, 48.8% non-calcareous (325 records).

I Horizon shows fair uniformity with the lowest proportion from sub-surface:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	0	34	573	92	25	0
Standardized %		23.8	36.0	24.9	15.3	



Map 40 *Lithobius crassipes*

Britain	1041 records	Ireland	6 records
	201 pre-1970 records		6 pre-1970 records
	411 10-km squares		4 10-km squares

Region	SE	SW	Wales	East	W&M	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	299	19	34	163	32	233	220	41	6	0	0
Standardized %	5.2	1.0	8.1	14.0	8.3	15.6	31.3	15.5	1.0	-	-

Lithobius curtipes C L Koch 1847

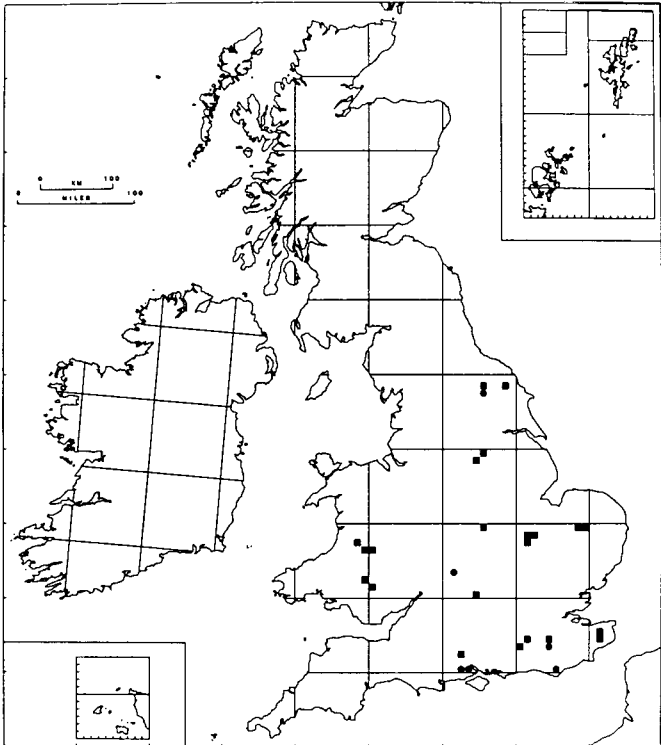
This species has a close resemblance to *L. crassipes* and the 2 species are difficult to separate. There are, however, indications that their respective habitats are different; in Kent and Surrey the 2 species are not found together and in Scandinavia their ecology seems distinctly different (Palmen 1948; Andersson 1983).

Records occur up to 700 ft and are from most months of the year. All but one record are inland and all are rural.

First order habitats include grassland (3), scrub (2), woodland (35); litter/vegetation given is oak (6), beech (10), sycamore (4), mixed deciduous (7), conifer (1), deciduous/coniferous (2), grass (3). Three records are calcareous and 12 non-calcareous; horizons given are surface (8), litter (27), less than 10 cm deep (1).

L. curtipes appears to be a predominantly woodland species with a puzzling distribution of scattered sites, but is often very common at those sites. An examination of the actual sites indicates that a high proportion of them, possibly all, are ancient woodland and it may be that we are here dealing with an ancient woodland species. From a total of 58 records, 29 are from important ancient woodlands: Denny nature reserve, New Forest (6), Wytham Wood near Oxford (16), Monks Wood National Nature Reserve, Huntingdon (4) and Wayland Wood nature reserve, Norfolk (3). It would be valuable to have more records from ancient woodlands.

There are several older records which were not included in the analysis, including some from Caernarvonshire and one from abandoned pit heaps in Co Durham (coll. Wignarajah in 1967).



Map 41 *Lithobius curtipes*

Britain 58 records
 23 pre-1970 records
 28 10-km squares

Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	31	2	5	11	0	9	0	0	0	0	0
Standardized %	7.9	4.3	49.0	14.1		24.7					

Lithobius microps Meinert 1868

This species was formerly known as L. duboscqui Brolemann. It is one of the smallest British lithobiomorphs and is frequently found in gardens and urban sites. It does, however, seem to have a wide range of habitat preferences, especially in south-east England. Regional analysis shows a decidedly southern and somewhat eastern bias. Records are from all seasons of the year, with no obvious seasonal bias.

A 41.7% (standardized) are coastal and 58.3% inland.

B Urban and suburban locations are slightly more frequent than rural.

	Urban	Suburban/village	Rural
Total records	69	220	1034
Standardized %	38.0	32.2	29.8

Altitude shows it to be a lowland animal (probably reflecting its habitat preferences) with few records above 1000 ft:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500
Total records	246	308	276	133	118	76	24	11	4	1	4
Standardized %	12.6	15.6	16.1	13.4	14.5	10.6	8.7	4.1	2.4	0.7	1.4

C It occurs in a variety of first order habitats, lowest frequency being on acid heath/moorland:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	10	25	8	1	22	96	550
Standardized %	14.1	4.2	5.9	-	8.3	9.7	16.9

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/moorland	Sand dune
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Total records	11	113	34	316	13	4
Standardized %	8.7	7.1	11.5	5.7	1.7	6.2

D Second order habitats also show a wide variety: garden sites (27), compost/refuse (11), dung (1), hedges (42), roadside verges (271: 21.6% of all records from such sites), embankments/cuttings (24), woodland breaks (88), drystone walls (4), walls with mortar (4), quarries/rockfaces (52), scree (12), roads/paths (64), ditches/ponds (84: 55 of these from dry ditches, 33.6% of records from this site), shore (18).

E Microsites: stones/rocks (389), shingle (10), soil/sand (118), litter (222), tussocks (13), living bark (3), dead wood (276), dung (1), bracket fungi (1), ant colonies (3), birds' nest (1), stone/brickwork (35), jetsam (3), human rubbish (73).

F Thirty-three records refer to buildings: inhabited (1), outbuildings (11), ruins (21).

H Litter/vegetation shows wide variety, with high values for hawthorn and low values for heather.

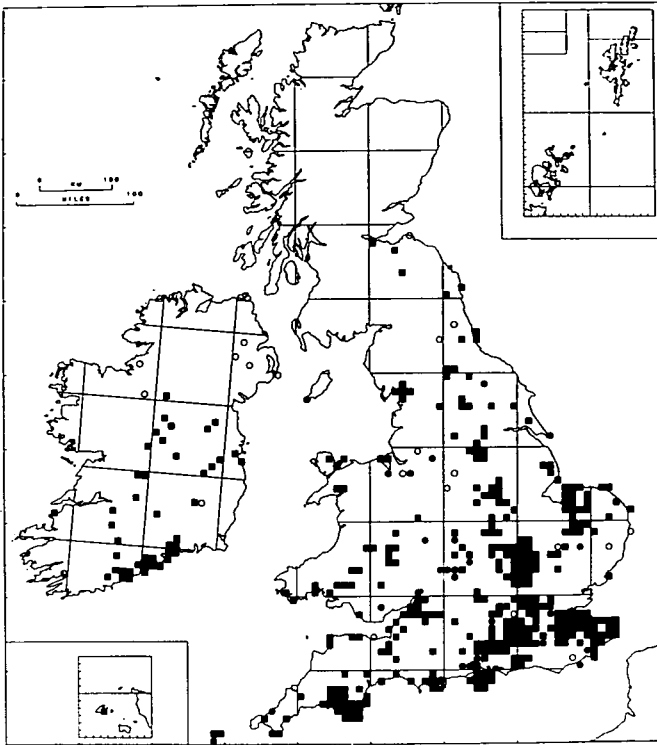
Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous	Orse
Total records	34	45	8	11	155	8	20	2
Standardized %	7.4	10.0	6.4	9.5	8.6	3.4	6.3	-

Litter/ vegetation	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	<u>Juncus</u>	Bracken
Total records	17	2	120	69	2	1	1	3
Standardized %	17.7	2.3	8.7	14.8	-	-	-	4.9

Soil types: clays (31.0% standardized), peat (6.9%), loam (34.7%), sandy/pure sand (27.4%); 64.7% (standardized) are calcareous, 35.3% non-calcareous (352 records).

I Most records are from surface, litter or sub-surface:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	0	35	810	216	119	3
Standardized %		7.1	25.7	29.6		37.7



Map 42 *Lithobius microps*

Britain	1511 records			Ireland			57 records		
	252 pre-1970 records						13 pre-1970 records		
	359 10-km squares						54 10-km squares		
Region	SE	SW	Wales	East	W&NM	Y,L,W	N&SS	Scot.N	Ireland
Total records	1050	177	31	151	35	53	13	0	57
% of regional records	14.7	4.9	6.0	10.6	7.4	2.9	1.5	-	7.8
Standardized %	26.3	8.8	10.7	19.0	13.3	5.2	2.7	-	14.0

Lamyctes fulvicornis Meinert 1868

This species is parthenogenetic over most of its extremely wide range and has recently been found as far north as Greenland (Böcher & Enghoff 1984).

Regional analysis suggests a northerly bias, but, as there has been a tendency to collect in the 2 northernmost regions in the summer, this should be treated with caution because of the seasonal effects described below.

Records are known from all months of the year except December, with a marked peak from July to October, and another in January.

Month	J	F	M	A	M	J	J	A	S	O	N	D
Total records	9	1	9	7	5	7	32	41	38	17	2	0
Standardized %	19.3	1.7	7.0	1.9	2.3	3.7	19.6	20.8	24.5	16.0	4.2	-

Eason (1970) comments that in Iceland, based on 60 specimens, larvae were found in June and adults in July and August and that in the Faeroes the species was only found from July to September. He remarked that in Britain he had only found the species from early August to September and suggested that these phenomena may be due to the species occupying superficial soil and litter layers for only part of its life cycle. In the absence of detailed information regarding stadia, we are unable to draw conclusions from the survey results. G Andersson (pers. comm.) reports on a similar seasonality in Swedish records and remarks that Lohmander called L. fulvicornis an autumn species.

A 65.8% (standardized) of the records were coastal and 34.4% inland.

B There is a preponderance of rural records but the species has been found in urban sites:

	Urban	Suburban/village	Rural
Total records	3	15	135
Standardized %	24.4	28.4	50.2

Altitude Occurs at all altitudes up to 1900 ft and is proportionately commoner at higher altitude:

Altitude (ft)	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000	1000-1500	1500-2000
Total records	37	26	17	10	6	2	4	6	1	6	14	5
Standardized %	7.0	6.0	4.0	4.0	3.0	1.1	5.8	9.1	2.4	16.3	20.0	22.0

C First order habitat: a wide variety, with arable, grassland and acid heath with highest percentages:

Habitat type	Freshwater	Maritime	Marsh	Cave, etc	Buildings	Garden/allotment	Waste ground
Total records	1	2	0	0	1	7	28
Standardized %	8.6	2.0	-	-	2.3	4.3	5.2

Habitat type	Arable	Grassland	Scrub	Woodland	Acid heath/ moorland	Sand dune
Total records	7	31	5	36	23	1
Standardized %	33.7	11.8	1.0	3.9	17.7	9.4

D Second order habitats: garden sites (1), compost/refuse heaps (5), hedges (4), roadside verges (10), embankments/cuttings (2), drystone wall (1), quarries and rockfaces (12), scree (2), roads/paths (4), ponds/ditches (3), shore (3).

E Microsites: rocks/stones (66), litter (14), tussocks (7), living bark (2), dead wood (30), stone/brickwork (1), human rubbish (9).

F Two records are associated with buildings: inhabited (1) and ruin (1).

H Litter/vegetation: highest frequencies for hawthorn scrub, heathers, grass and grass/herbs.

Litter/ vegetation	Oak	Beech	Birch	Sycamore	Mixed deciduous	Conifers	Coniferous/ deciduous
Total records	5	6	1	0	14	0	3
Standardized %	5.4	6.5	3.9	-	3.8	-	4.6

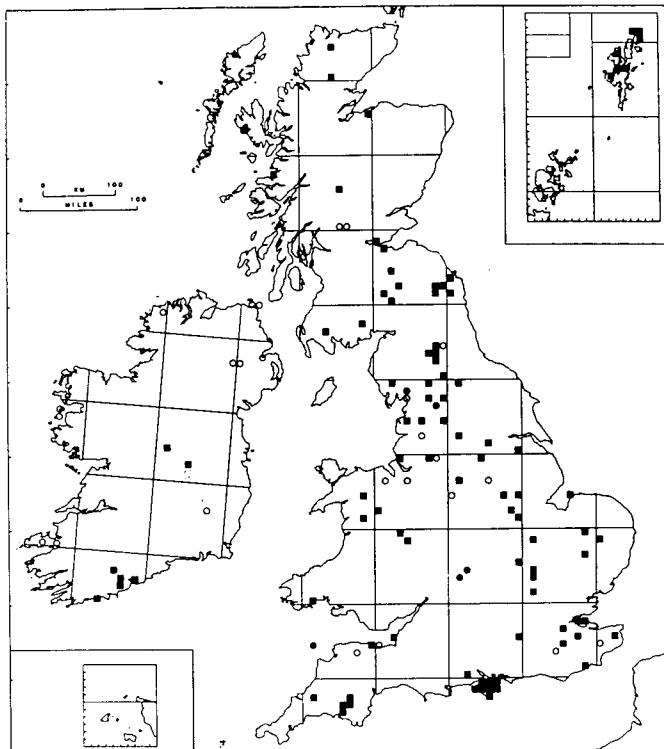
Litter/ vegetation	Gorse	Hawthorn	Heathers	Grass/ sedge	Grass/ herbs	Nettles	Reeds	Bracken
Total records	2	3	6	38	12	0	0	0
Standardized %	-	15.3	34.2	13.6	12.7	-	-	-

Soil types, based on 82 records, are clays (24.6% standardized), peat (38.4%), loam (10.5%), sandy/pure sand (26.6%).

No preference for rock type was shown; standardized values are 51.5% calcareous and 48.5% non-calcareous (59 records).

I Horizons:

Horizon	>3 m above ground	<3 m above ground	Surface	Litter	<10 cm deep in soil	>10 cm deep in soil
Total records	1	3	103	19	8	0
Standardized %		14.5	33.5	26.7		25.3



Map 43 *Lamyctes fulvicornis*

Britain 182 records
 36 pre-1970 records
 109 10-km squares

Ireland 21 records
 13 pre-1970 records
 18 10-km squares

Region	SE	SW	Wales	East	W&M	I,L,W	N&SS	Scot.N	Ireland	IOM	CI
Total records	82	13	5	12	7	26	15	22	21	0	0
% of regional records	1.2	0.6	1.0	0.8	1.5	1.4	1.7	6.7	2.9	-	-
Standardized %	6.5	3.1	5.5	4.7	8.3	8.0	9.8	38.0	16.1	-	-

HABITAT ANALYSIS - TERRESTRIAL SPECIES

Analyses are given for various habitat categories in 2 forms:

- a. Habitat species spectrum: the percentage figures for each species for the appropriate habitat indicate their relative frequency in the habitat type.
- b. Species habitat spectrum: standardized values indicate the relative habitat preferences of particular species. These data are also given under each species, but certain categories are brought together to allow comparison between species.

Species with small numbers of records are not included

1. First order habitats
 - a. Percentage of species occurrences in habitats
 - b. Standardized percentages of habitats for species
2. Vegetation types Percentages of species occurrences in habitats
3. Altitude Percentages of species occurrences in altitude ranges
4. Urban species Percentages of species occurrences in habitats
5. Coastal/inland Percentages of species occurrences in coastal and inland areas. Standardized percentages of habitats for species
6. Microsites Percentages of species occurrences in microsites
7. Soil type Standardized percentages of soil types for each species
8. Horizon Standardized percentages of horizons for each species

1 First order habitats

An analysis of first order habitats shows the species spectrum of each. The more important habitats are given for every species with more than a total of 60 records.

- a. Percentage of species occurrences in proportion to all species found in that habitat; this shows the spectrum for each habitat type.

	Building	Garden	Waste	Arable	Grass	Scrub	Wood	Acid
	ground	land	land	land	land	land	land	heath
<i>Haplophilus subterraneus</i>	4.2	11.3	4.7	7.8	4.5	5.8	4.3	1.9
<i>Schendyla nemorensis</i>	0.9	3.2	5.0	3.9	2.7	5.8	3.3	2.3
<i>Henia vesuviana</i>		0.9	0.7	1.9	1.0	0.8	0.3	
<i>Strigamia crassipes</i>	0.5	1.1	0.5	1.0	1.0	1.6	1.8	
<i>Strigamia acuminata</i>	0.5	0.5	0.7	1.0	0.6	1.6	2.7	0.2
<i>Geophilus carpophagus</i>	9.7	3.1	1.4	1.9	4.8	4.5	6.3	17.0
<i>Geophilus electricus</i>	0.5	2.4	0.3	1.0	0.5	0.8	0.3	
<i>Geophilus insculptus</i>	0.9	2.6	1.4	1.9	2.2	0.2	1.1	0.6
<i>Necrophloeophagus flavus</i>	2.3	9.0	6.9	10.7	7.1	2.9	3.6	2.3
<i>Brachygeophilus truncorum</i>	1.4	1.9	1.9	2.9	2.9	2.5	8.9	7.0
<i>Cryptops hortensis</i>	12.5	7.9	5.8	1.0	3.2	2.9	2.3	2.0
<i>Lithobius variegatus</i>	2.3	2.7	6.5	13.6	13.7	19.3	21.8	21.6
<i>Lithobius forficatus</i>	27.8	24.6	28.3	19.4	24.4	18.6	14.9	17.1
<i>Lithobius piceus</i>			0.3		0.08	0.4	1.3	0.3
<i>Lithobius melanops</i>	15.3	7.5	5.0	1.9	3.6	4.5	3.0	1.9
<i>Lithobius borealis</i>			0.4	2.9	1.1	2.1	2.1	5.0
<i>Lithobius pilicornis</i>	3.7	1.2	1.0		0.2	0.4	0.3	0.2
<i>Lithobius calcaratus</i>				2.8	7.8		0.5	4.7
<i>Lithobius muticus</i>		0.1	0.3		0.4	0.8	1.6	
<i>Lithobius crassipes</i>	4.2	1.5	5.3	7.8	10.6			
<i>Lithobius microps</i>	10.2	11.7	20.6	10.7	8.7	14.0	7.0	2.0
<i>Lamyctes fulvicornis</i>	0.5	0.9	1.1	6.8	2.4	0.2	0.5	3.6

b. Standardized percentage of species occurrences in a habitat in proportion to all habitats for that species. This shows the importance of each habitat in the ecology of an individual species.

	Building	Garden	Waste ground	Arable	Grass land	Scrub land	Wood land	Acid heath
<i>Haplophilus subterraneus</i>	7.7	20.8	8.7	14.4	8.3	10.7	7.9	3.5
<i>Schendyla nemorensis</i>	2.4	8.5	3.3	10.4	7.2	15.4	8.8	6.1
<i>Henia vesuviana</i>		6.5	5.1	13.8	7.2	6.0	2.2	
<i>Strigamia crassipes</i>	4.6	10.2	4.6	9.3	9.3	14.8	16.7	
<i>Strigamia acuminata</i>	3.5	3.5	4.9	7.0	4.2	11.3	19.0	1.4
<i>Geophilus carpophagus</i>	12.3	3.9	1.8	2.4	6.1	5.7	8.0	21.6
<i>Geophilus electricus</i>	8.6	41.4	5.2	17.2	8.6	13.8	5.2	
<i>Geophilus insculptus</i>	6.7	19.4	10.4	14.2	16.4	1.5	8.2	4.5
<i>Necrophloeophagus flavus</i>	3.7	14.6	11.2	17.4	11.5	4.7	5.9	3.7
<i>Brachygeophilus truncorum</i>	8.1	4.1	4.1	6.3	6.3	5.5	19.4	15.3
<i>Cryptops hortensis</i>	18.5	11.8	8.6	1.4	4.8	4.3	3.8	3.0
<i>Lithobius variegatus</i>	1.8	2.1	5.0	10.5	10.6	14.9	16.9	16.7
<i>Lithobius forficatus</i>	10.6	9.4	10.8	7.4	9.4	7.1	5.7	6.6
<i>Lithobius piceus</i>			12.6		3.2	17.3	53.8	13.1
<i>Lithobius melanops</i>	19.1	9.4	6.2	2.4	4.5	5.7	3.7	2.3
<i>Lithobius borealis</i>			1.8	14.3	5.3	10.1	10.2	24.4
<i>Lithobius pilicornis</i>	38.9	12.8	10.5		2.1	4.2	3.2	2.1
<i>Lithobius calcaratus</i>			3.7		17.1		3.0	28.9
<i>Lithobius muticus</i>		3.8	8.1		11.9	25.5	50.7	
<i>Lithobius crassipes</i>	6.0	2.1	7.7	11.2	15.3	5.4	12.3	14.9
<i>Lithobius microps</i>	8.3	9.7	16.9	8.7	7.1	11.5	5.7	1.7
<i>Lamyctes fulvicornis</i>	2.3	4.3	5.2	33.7	11.8	1.0	3.9	17.7

2 Vegetation types

Analysis of the main vegetation types shows the percentage of total records for each vegetation type. As with the first order habitats (a) (p 108), this shows the species spectrum associated with particular vegetation.

	Oak	Beech	Birch	Sycamore	Mixed deciduous	Coniferous
<i>Haplophilus subterraneus</i>	5.0	3.3	2.4	6.0	6.4	3.3
<i>Schendyla nemorensis</i>	7.1	3.7	2.4	2.6	3.3	1.7
<i>Henia vesuviana</i>				0.9	0.5	
<i>Strigamia crassipes</i>	1.7	4.1	0.8	5.1	1.7	0.8
<i>Strigamia acuminata</i>	2.2	5.9	3.2	7.7	1.7	1.3
<i>Geophilus carpophagus</i>	8.4	4.4	11.0	4.3	5.4	10.4
<i>Geophilus electricus</i>	0.2	0.7			0.2	0.8
<i>Geophilus insculptus</i>	0.6	1.7		2.6	2.7	2.9
<i>Necrophloeophagus flavus</i>	1.7	2.4	2.4	1.7	3.9	0.4
<i>Brachygeophilus truncorum</i>	9.1	8.3	11.0	7.7	8.2	9.6
<i>Cryptops hortensis</i>	2.4	1.3		3.4	3.5	2.5
<i>Lithobius variegatus</i>	25.8	22.4	10.3	12.8	21.6	20.0
<i>Lithobius forficatus</i>	8.0	8.5	22.0	10.3	15.0	19.2
<i>Lithobius piceus</i>	0.2	0.9	2.4		1.3	0.4
<i>Lithobius melanops</i>	3.7	3.7	5.5	3.4	2.8	1.3
<i>Lithobius borealis</i>	2.8	1.7	3.2	2.6	1.1	5.0
<i>Lithobius pilicornis</i>	0.4			0.9	0.5	
<i>Lithobius calcaratus</i>	0.2		1.6		0.2	0.8
<i>Lithobius muticus</i>	2.4	5.7		10.3	1.0	
<i>Lithobius crassipes</i>	6.3	6.1	14.2	2.6	7.6	15.0
<i>Lithobius microps</i>	7.4	9.8	6.3	9.4	8.6	3.3
<i>Lamyctes fulvicornis</i>	1.1	1.3	0.8		0.8	
Total records	462	460	127	117	1811	240

	Deciduous/ coniferous	Hawthorn	Heather	Grass/ sedge	Grass/ herbs	Bracken
<i>Haplophilus subterraneus</i>	4.4	9.3	1.1	5.9	6.2	
<i>Schendyla nemorensis</i>	1.2	3.1	1.1	2.3	2.6	3.2
<i>Henia vesuviana</i>	0.3			1.2	3.2	
<i>Strigamia crassipes</i>	1.6			0.7	0.6	
<i>Strigamia acuminata</i>	3.1			0.6		
<i>Geophilus carpophagus</i>	6.2		18.4	6.6	6.4	17.7
<i>Geophilus electricus</i>		1.0		0.4	0.2	
<i>Geophilus insculptus</i>	4.7	5.2		1.7	0.9	
<i>Necrophloeophagus flavus</i>	2.8	2.1	1.1	5.3	5.3	
<i>Brachygeophilus truncorum</i>	6.5	2.1	10.3	2.5	12.3	1.3
<i>Cryptops hortensis</i>	1.6	6.2	4.6	3.7	7.9	
<i>Lithobius variegatus</i>	25.2	7.2	12.6	14.7	19.8	4.5
<i>Lithobius forficatus</i>	16.8	24.7	21.8	24.1	24.0	17.7
<i>Lithobius piceus</i>	0.9			0.2		
<i>Lithobius melanops</i>	1.9	6.2	2.3	3.5	5.3	6.5
<i>Lithobius borealis</i>	2.5	1.0	9.2	2.2	0.2	3.2
<i>Lithobius pilicornis</i>		1.0		0.3	2.6	
<i>Lithobius calcaratus</i>	0.3		2.3	2.6	1.3	4.8
<i>Lithobius muticus</i>	0.6			0.4		
<i>Lithobius crassipes</i>	9.7	9.3	5.8	8.5	13.6	6.2
<i>Lithobius microps</i>	6.2	17.5	2.3	18.7	4.7	4.8
<i>Lamyctes fulvicornis</i>	0.9	3.1	6.9	2.7	2.6	
Total records	321	97	87	1384	470	62

3 Altitude

Altitude is closely linked to habitat because virtually all urban sites are in lowland areas and most upland sites are grassland, acid heath/moor, or in some cases marsh (ie bog).

Analysis is given for relative proportions of records, at particular altitude ranges, compared with total records for those altitudes. Only species with more than 60 altitude records are included. This table shows species spectra, in this case associated with particular altitude levels. NB This is the overall pattern; regions vary greatly.

	Feet				
	0-500	500- 1000	1000- 1500	1500- 2000	2000- 2500
<i>Haplophilus subterraneus</i>	5.7	2.8	0.9		
<i>Schendyla nemorensis</i>	4.3	1.4	0.3		
<i>Henia vesuviana</i>	0.7				
<i>Strigamia crassipes</i>	1.2	1.0			
<i>Strigamia acuminata</i>	1.6	1.5	0.3	1.2	
<i>Geophilus carpophagus</i>	4.5	7.4	16.4	9.3	5.3
<i>Geophilus insculptus</i>	2.0	2.3	0.9		
<i>Necrophloeophagus flavus</i>	5.9	4.1	1.2	1.2	
<i>Brachygeophilus truncorum</i>	5.0	5.7	6.8	7.0	
<i>Cryptops hortensis</i>	4.9	1.2			
<i>Lithobius variegatus</i>	11.5	24.0	26.5	37.2	47.4
<i>Lithobius forficatus</i>	22.0	18.0	14.2	10.5	26.3
<i>Lithobius melanops</i>	4.8	3.1	3.7	3.5	
<i>Lithobius borealis</i>	1.0	2.9	4.9	3.5	
<i>Lithobius pilicornis</i>	0.7	0.06			
<i>Lithobius calcaratus</i>	0.8	1.3	3.1	1.2	
<i>Lithobius muticus</i>	0.7	1.6			
<i>Lithobius crassipes</i>	6.1	10.6	14.8	19.8	21.5
<i>Lithobius microps</i>	12.6	6.4	1.2		
<i>Lamyctes fulvicornis</i>	1.1	1.0	4.3	5.8	
Total records	8558	1813	324	86	19

4 Urban species

Analysis for urban, suburban/village and rural sites shows the percentage of total records for each type of site. NB Some species are both urban and rural in parts of their range, but wholly or mostly urban in other parts.

	Urban	Suburban/village	Rural
<i>Haplophilus subterraneus</i>	12.3	7.9	3.7
<i>Schendyla nemorensis</i>	4.3	3.4	3.7
<i>Henia vesuviana</i>	1.2	0.9	0.4
<i>Strigamia crassipes</i>	0.4	0.5	1.2
<i>Strigamia acuminata</i>	0.2	0.6	1.7
<i>Geophilus carpophagus</i>	1.4	2.6	6.0
<i>Geophilus electricus</i>	0.8	1.1	0.3
<i>Geophilus insculptus</i>	2.9	3.1	1.6
<i>Necrophloeophagus flavus</i>	5.1	6.5	4.9
<i>Brachygeophilus truncorum</i>	0.1	3.0	5.9
<i>Cryptops hortensis</i>	9.8	7.5	3.0
<i>Lithobius variegatus</i>	1.0	9.0	16.2
<i>Lithobius forficatus</i>	27.1	24.5	19.5
<i>Lithobius piceus</i>		0.8	0.6
<i>Lithobius melanops</i>	6.8	5.6	4.2
<i>Lithobius borealis</i>		0.3	1.8
<i>Lithobius pilicornis</i>	3.5	1.4	0.3
<i>Lithobius calcaratus</i>		0.1	1.2
<i>Lithobius muticus</i>		0.5	0.9
<i>Lithobius crassipes</i>	1.0	2.8	8.3
<i>Lithobius microps</i>	13.5	11.4	10.5
<i>Lamyctes fulvicornis</i>	0.6	0.8	1.4
Total records	513	1929	9818

5 Coastal/inland

There is ambiguity in this classification related to differences in judging the distance of 15 km from the sea, eg in the case of estuaries, inlets and harbours.

Analysis is given for relative proportions of species records in the 2 categories (as a percentage of total records for each category). The significance, if any, of these values, in most cases, is not clear.

Standardized values are given in parenthesis.

	Coastal	Inland
<i>Haplophilus subterraneus</i>	8.7 (76.1)	2.7 (24.9)
<i>Schendyla nemorensis</i>	4.3 (55.5)	3.4 (44.5)
<i>Henia vesuviana</i>	1.4 (97.5)	0.04 (2.5)
<i>Strigamia crassipes</i>	1.1 (50.2)	1.1 (49.8)
<i>Strigamia acuminata</i>	0.6 (23.3)	2.0 (76.8)
<i>Geophilus carpophagus</i>	5.9 (42.9)	5.0 (57.1)
<i>Geophilus electricus</i>	0.5 (45.7)	0.4 (54.3)
<i>Geophilus insculptus</i>	1.5 (42.9)	2.0 (57.1)
<i>Necrophloeophagus flavus</i>	4.9 (47.9)	5.3 (52.1)
<i>Brachygeophilus truncorum</i>	5.0 (48.6)	5.3 (51.4)
<i>Cryptops hortensis</i>	6.8 (73.2)	2.5 (26.8)
<i>Lithobius variegatus</i>	13.4 (47.5)	14.8 (52.5)
<i>Lithobius forficatus</i>	17.1 (43.3)	22.4 (57.6)
<i>Lithobius piceus</i>		1.0 (100)
<i>Lithobius melanops</i>	4.9 (52.9)	4.4 (47.1)
<i>Lithobius borealis</i>	2.1 (63.1)	1.2 (36.9)
<i>Lithobius pilicornis</i>	1.6 (94.9)	0.09 (5.1)
<i>Lithobius calcaratus</i>	0.6 (35.8)	1.1 (64.2)
<i>Lithobius muticus</i>	0.1 (8.0)	1.1 (92.0)
<i>Lithobius crassipes</i>	2.8 (23.3)	9.3 (76.8)
<i>Lithobius microps</i>	8.6 (41.7)	11.9 (58.3)
<i>Lamyctes fulvicornis</i>	1.8 (65.8)	0.9 (34.4)
Total records	4200	8097

6 Microsite

Analysis of the main microsite types shows the percentage of total records for each microsite type. Standardization has not been carried out because of the small totals for some microsites.

	Rock/ stones	Shingle	Soil/ sand	Litter	Tussocks	Bark, living	Dead wood	Dung, carrion
Haplophilus subterraneus	6.0	13.7	9.8	7.5	3.8		2.3	
Schendyla nemorensis	2.6	5.0	8.4	5.2	4.5	4.1	3.6	
Henia vesuviana	0.7	2.5	0.2	0.5	4.5		0.4	
Strigamia crassipes	0.5	1.3	1.1	2.5		4.1	1.3	5.2
Strigamia acuminata	0.6		1.6	4.1	1.5		1.5	
Geophilus carpophagus	5.6	2.5	3.3	7.0	3.8	12.2	4.4	5.2
Geophilus electricus	0.4		1.6	0.3			0.1	
Geophilus insculptus	2.8	1.3	2.9	1.8	0.7		1.2	
Necrophloeophagus flavus	5.5	10.0	14.8	3.4	6.0	2.0	4.7	31.5
Brachygeophilus truncorum	2.5		4.5	7.3	4.5	8.1	8.5	
Cryptops hortensis	3.9	8.7	7.1	3.4	7.5	2.0	4.2	
Lithobius variegatus	15.5	6.3	2.4	16.1	12.9	22.4	18.7	
Lithobius forficatus	24.1	20.0	12.2	11.3	13.6	14.3	21.9	31.5
Lithobius piceus	0.3		0.2	0.8			0.9	
Lithobius melanops	3.7	12.5	3.6	2.1	8.3	6.1	6.4	10.5
Lithobius borealis	1.6	1.3		1.5	1.5	4.1	6.4	10.5
Lithobius pilicornis	0.9	2.5	0.2	0.3	2.3		0.2	
Lithobius calcaratus	1.1		0.2	0.6	2.3		0.2	
Lithobius muticus	0.1			3.5	0.7		0.4	
Lithobius crassipes	8.8	3.6	6.1	6.0	10.2	8.1	10.5	
Lithobius microps	10.6	12.5	21.5	13.4	9.8	6.1	8.5	5.2
Lamyctes fulvicornis	1.8		0.5	0.8	5.3	4.1	0.9	
Total records	3658	80	548	1649	132	49	3249	19

	Bracket fungi	Ant colony	Bird/ mammal nest	Stone/ brickwork	Shoreline jetsam	Human rubbish
Haplophilus subterraneus		8.3		6.9		6.1
Schendyla nemorensis	36.0	25.0	14.3	1.1		2.6
Henia vesuviana				1.9		9.5
Strigamia crassipes	4.0			0.7		1.2
Strigamia acuminata						0.7
Geophilus carpophagus	8.0			7.3		2.8
Geophilus electricus						1.4
Geophilus insculptus				1.1		1.6
Necrophloeophagus flavus		16.6		3.5	17.6	4.7
Brachygeophilus truncorum	20.0			1.1		1.4
Cryptops hortensis				9.6		5.6
Lithobius variegatus	12.0	8.3	14.3	8.1		7.5
Lithobius forficatus		16.6	42.8	25.4	52.9	32.8
Lithobius piceus						0.2
Lithobius melanops	12.0		7.1	9.6		5.6
Lithobius borealis	4.0		7.1	1.5		
Lithobius pilicornis				3.8		1.2
Lithobius calcaratus				0.7		
Lithobius muticus				1.1		0.5
Lithobius crassipes			7.1	2.3	11.7	4.0
Lithobius microps	4.0	25.0	7.1	13.4	17.6	17.2
Lamyctes fulvicornis				0.4	2.1	
Total records	25	12	14	260	17	424

7 Soil type

Standardized percentages are shown for species with more than 60 records of soil type. They probably reflect the vegetation type as much as the soil type.

	Clays (heavy clay + clayey)	Peat	Loam	Sandy/pure sand
<i>Haplophilus subterraneus</i>	40.8	9.8	32.6	16.9
<i>Schendyla nemorensis</i>	25.1	7.9	30.3	36.7
<i>Strigamia crassipes</i>	48.6	13.1	23.8	14.5
<i>Geophilus carpophagus</i>	14.2	47.9	13.0	24.9
<i>Geophilus insculptus</i>	31.7	4.1	50.4	13.7
<i>Necrophloeophagus flavus</i>	32.5	18.3	28.8	20.3
<i>Brachygeophilus truncorum</i>	28.3	23.9	17.9	29.9
<i>Cryptops hortensis</i>	31.4	28.3	19.9	20.4
<i>Lithobius variegatus</i>	23.7	32.6	25.9	17.8
<i>Lithobius forficatus</i>	25.7	20.7	26.0	27.6
<i>Lithobius melanops</i>	24.7	10.9	20.1	44.2
<i>Lithobius borealis</i>	3.7	62.3	18.9	15.2
<i>Lithobius crassipes</i>	15.1	28.6	31.3	24.9
<i>Lithobius microps</i>	31.0	6.9	34.7	27.4
<i>Lamyctes fulvicornis</i>	24.6	38.4	10.5	26.6

8 Horizon

Analysis for horizon (above ground, surface, litter and below ground) for which standardized percentages are given.

The different habitats of the lithobiomorphs compared with the geophilomorphs, are apparent in these figures. Of the lithobiomorphs, characteristically litter and surface species, only L. microps and L. fulvicornis have more than 25% of records below the surface. The 4 geophilomorphs with less than 25% here are the 3 reddish-brown species (2 Strigamia spp. and G. carpophagus) and the subcortical species, B. truncorum.

	Above ground	Surface	Litter	Below surface
Haplophilus subterraneus	5.3	20.0	31.4	43.3
Schendyla nemorensis	10.3	21.7	15.0	53.0
Henia vesuviana	15.8	18.0	24.6	41.6
Strigamia crassipes	27.4	14.8	45.8	12.0
Strigamia acuminata	7.0	13.5	61.0	18.5
Geophilus carpophagus	31.6	20.1	29.7	18.6
Geophilus electricus	0	22.1	14.1	63.7
Geophilus insculptus	7.1	32.4	27.5	33.0
Necrophloeophagus flavus	10.3	21.7	15.0	53.0
Brachygeophilus truncorum	30.9	20.0	32.4	16.7
Cryptops hortensis	18.4	22.1	20.2	39.3
Lithobius variegatus	36.7	27.7	30.8	4.9
Lithobius forficatus	28.9	35.3	15.7	20.1
Lithobius piceus	9.0	41.3	41.9	7.9
Lithobius melanops	59.1	18.5	9.3	13.1
Lithobius borealis	56.6	20.2	21.1	2.2
Lithobius pilicornis	43.2	31.6	14.4	10.8
Lithobius calcaratus	13.0	44.6	25.3	17.1
Lithobius muticus	0	12.7	87.3	0
Lithobius crassipes	23.8	36.0	24.9	15.3
Lithobius microps	7.1	25.7	29.6	37.7
Lamyctes fulvicornis	14.5	33.5	26.7	25.3

HABITAT ANALYSIS - SEASHORE SPECIES

Although certain geophilomorphs are known solely as seashore species, several other centipedes are found on the shore. The following analysis indicates those species which have been recorded in the category F(b) shore. Because group F(b) 4 is of limited use, it is not included in this analysis. Figures and uncorrected percentages are given; standardization would be misleading for the rarer species. Percentage of records for each category is given in brackets.

a. Total records from shore categories

	1. Intertidal	2. Splash zone	3. Splash zone - 100 m
<i>Haplophilus subterraneus</i>	2(2.8)	27(10.5)	28(8.9)
<i>Schendyla nemorensis</i>		12(4.7)	14(4.5)
<i>Schendyla peyerimhoffi</i>		11(4.3)	1(0.3)
<i>Hydroschendyla submarina</i>	8(11.1)		
<i>Henia vesuviana</i>	1(1.4)	4(1.6)	6(1.9)
<i>Henia brevis</i>			1(0.3)
<i>Strigamia crassipes</i>		3(1.2)	3(1.0)
<i>Strigamia maritima</i>	45(62.5)	64(24.8)	4(1.3)
<i>Pachymerium ferrugineum</i>		2(0.8)	
<i>Clinopodes linearis</i>	1(1.4)		
<i>Geophilus carpophagus</i>		6(2.3)	23(7.3)
<i>Geophilus osquidatum</i>		2(0.8)	2(0.6)
<i>Geophilus fucorum</i>	4(5.6)	11(4.3)	1(0.3)
<i>Geophilus pusillifrater</i>		1(0.4)	3(1.0)
<i>Geophilus insculptus</i>	1(1.4)	2(0.5)	3(1.0)
<i>Necrophloeophagus flavus</i>	2(2.8)	7(2.7)	12(3.8)
<i>Brachygeophilus truncorum</i>		3(1.2)	8(2.6)
<i>Cryptops hortensis</i>		11(4.3)	24(7.7)
<i>Lithobius variegatus</i>		18(7.0)	47(15.0)
<i>Lithobius forficatus</i>	3(4.2)	35(13.6)	64(20.4)
<i>Lithobius melanops</i>	2(2.8)	22(8.5)	20(6.4)
<i>Lithobius borealis</i>		1(0.4)	5(1.6)
<i>Lithobius pilicornis</i>		4(1.6)	2(0.6)
<i>Lithobius calcaratus</i>		1(0.4)	1(0.3)
<i>Lithobius muticus</i>			1(0.3)
<i>Lithobius crassipes</i>		1(0.4)	3(1.0)
<i>Lithobius microps</i>	3(4.2)	10(3.9)	29(9.3)
<i>Lamyctes fulvicornis</i>			8(2.6)
Total records	72	258	313

b. Shore records as a percentage of all habitat records for each species

This table shows the species whose major habitat is maritime (marked *) compared with those which also occur elsewhere. NB Remainder of records are in 100-1,000 m or not recorded categories.

	1. Intertidal	2. Splash zone	3. Splash zone - 100 m	Total % of records
Haplophilus subterraneus	0.3	3.7	3.9	7.9
Schendyla nemorensis		2.1	2.5	2.6
*Schendyla peyerimhoffi		84.6	7.7	92.3
*Hydroschendyla submarina	44.4			44.4
Henia vesuviana	1.5	6.0	9.0	16.5
Henia brevis			5.0	5.0
Strigamia crassipes		1.6	1.6	3.2
*Strigamia maritima	22.5	32.0	2.0	56.5
*Pachymerium ferrugineum		100.0		100.0
Clinopodes linearis			20.0	20.0
Geophilus carpophagus		0.7	2.8	3.5
Geophilus osquidatum		6.1	6.1	12.2
*Geophilus fucorum	18.2	50.0	4.5	72.7
*Geophilus pusillifrater		20.0	60.0	80.0
Geophilus insculptus	0.3	0.6	0.9	1.8
Necrophloeophagus flavus	0.2	0.8	1.4	2.4
Brachygeophilus truncorum		0.4	1.0	1.4
Cryptops hortensis		1.8	4.0	5.8
Lithobius variegatus		0.8	2.2	3.0
Lithobius forficatus	0.1	1.2	2.1	3.4
Lithobius melanops	0.3	3.1	2.9	6.3
Lithobius borealis		0.5	2.3	2.8
Lithobius pilicornis		4.8	2.4	7.2
Lithobius calcaratus		0.6	0.6	1.2
Lithobius muticus			0.9	0.9
Lithobius crassipes		0.1	0.3	0.4
Lithobius microps	0.2	0.7	2.0	2.9
Lamyctes fulvicornis			4.4	4.4

RARITY AND CONSERVATION

As can be appreciated from the individual species accounts, there are relatively few records for certain species. This lack may be due to either a genuine rarity of occurrence, to a failure to sample the appropriate microsites, or to limited collecting in the relevant areas.

Several species are restricted in their occurrence. Other species, as yet unknown to Britain, or which are thought of as scarce, may prove locally abundant as, for example, is the case with Lithobius peregrinus, which is well established in the only town from which it is recorded so far.

Over the years, various different habitats and microsites have been sampled and, as new techniques are used, unusual species are found. A good example was the finding of Brachyschendyla dentata by Tullgren extraction of soil from urban sites and of Hydroschendyla submarina and Geophilus pusillifrater in rock crevices, sites which are frequently ignored because of the difficulty of sampling.

1. Rarity index

An index of rarity, based on the available data, has been calculated. No particular significance is attached to these values, but they do give a score for relative rarity.

Two values are computed to give an index figure representing the rarity of each species. The first value relates to the distribution over an area (in this case Britain and Ireland) and is a measure of the number of 10-km squares in which each species has been found (eg Brachygeophilus truncorum is known from 332 10-km squares). This figure is then compared with index (a) below.

Index (a)

Recorded from less than 10 10-km squares	- Score 5
Recorded from between 11-50 10-km squares	- Score 4
Recorded from between 51-100 10-km squares	- Score 3
Recorded from between 101-400 10-km squares	- Score 2
Recorded from more than 400 10-km squares	- Score 1

(Thus, B. truncorum scores 2 on this index.)

A second value is then computed from the total number of records for each species compared with index (b) below.

Index (b)

1-25 records	- Score 5
26-250 records	- Score 4
251-500 records	- Score 3
501-1000 records	- Score 2
Over 1000 records	- Score 1

(B. truncorum with 837 records scores 2 on index (b).)

The 2 values arrived at for B. truncorum are then placed together in the form 2/2, which indicates a widespread and relatively common species. A very common species, eg Lithobius forficatus has a rarity index of 1/1, whereas a rare species with limited distribution, eg Chalandea pinguis has a rarity index of 5/5. There are 25 intermediate steps between very rare (5/5) and very common (1/1).

	10-km square index	Total record number index	Rarity index
Haplophilus subterraneus	2	2	2/2
Nesoporogaster brevior	5	2	5/5
Hydroschendyla submarina	4	5	4/5 M
Schendyla nemorensis	2	2	2/2
Schendyla peyerimhoffi	5	5	5/5 M
Brachyschendyla dentata	5	5	5/5
Henia vesuviana	4	4	4/4
Henia brevis	4	5	4/5
Strigamia crassipes	2	4	2/4
Strigamia acuminata	2	3	2/3
Strigamia maritima	3	3	3/3 M
Pachymerium ferrugineum	5	5	5/5 +
Clinopodes linearis	5	5	5/5
Geophilus carpophagus	2	2	2/2
Geophilus electricus	3	4	3/4
Geophilus osquidatum	4	4	4/4
Geophilus fucorum	4	5	4/5
Geophilus pusillifrater	5	5	5/5
Geophilus insculptus	2	3	2/3
Geophilus proximus	5	5	5/5
Necrophloeophagus flavus	2	2	2/2
Brachygeophilus truncorum	2	2	2/2
Chalandea pinguis	5	5	5/5
Cryptops anomalans	4	5	4/5
Cryptops hortensis	2	2	2/2
Cryptops parisi	4	4	4/4
Lithobius variegatus	1	1	1/1
Lithobius peregrinus	5	5	5/5 +
Lithobius forficatus	1	1	1/1
Lithobius piceus	4	4	4/4
Lithobius melanops	2	2	2/2
Lithobius macilentus	4	4	4/4
Lithobius tricuspis	5	5	5/5
Lithobius borealis	2	4	2/4
Lithobius pilicornis	4	4	4/4
Lithobius calcaratus	2	4	2/4
Lithobius muticus	4	4	4/4
Lithobius crassipes	1	1	1/1
Lithobius curtipes	4	4	4/4
Lithobius microps	2	1	2/1
Lamyctes fulvicornis	2	4	2/4

+ Denotes a species recorded from only one 10-km square.
M Denotes a maritime species.

On the above scores, species with 1/1-2/2 are clearly widespread and common, whilst those with 5/5 are the rare group. There are, of course, regional factors to be considered; for instance, Lithobius crassipes, which is the common small centipede of much of Britain, is almost unknown in much of the south-west.

2. Endangered species

It is extremely difficult to assess the vulnerability of many of our species, even those in category 5/5. Those from rural sites are likely to be protected by

conservation practices used for more conspicuous groups of organisms, eg through conservation of woodland and the countryside in general. Seashore species must be vulnerable to environmental damage and redevelopment. It is possible that Pachymerium ferrugineum, found at the one site and clearly outside its normal range, may have disappeared, but population numbers were so low that this could be difficult to confirm with certainty; other maritime types in 5/5 may be so because we have not surveyed in the right places thoroughly (eg Schendyla peverimhoffi could be very widespread on the coast of southern Britain in the appropriate microsites).

The most vulnerable species are probably those of the urban environment which, by its nature, is subject to change. At present, the survival of Lithobius peregrinus in Britain depends on the state of the single urban area in which it has been found. The 2 larger Cryptops species are largely or entirely synanthropic in most of Britain and are subject to similar pressures. The presence of waste sites with a certain amount of shelter provided by relatively undisturbed rubbish is also probably critical. Greenhouse species clearly represent a special high-risk category.

3. Conservation

With our present state of knowledge, it is almost impossible to suggest practical conservation measures for myriapods, except that habitat destruction is likely to be the reason for disappearance of species. Apart from recognizing the loss of obvious habitats, such as deciduous woodland, it is important to note the importance of both disturbed and urban sites for certain species which may be at risk from environmental improvement programmes - the value of old churchyards, cemeteries and waste ground must not be underestimated.

COLLECTING TECHNIQUES

Centipedes are one of several groups of invertebrates for which it is essential to collect, kill and preserve specimens to be sure of their identity. There is no single correct way to collect centipedes. Indeed, new workers, using their own versions of traditional procedures or previously untried techniques, tend to find new or unusual species. It is probably useful, however, to list some methods that have proved useful. There is no guarantee that any one method will yield results immediately; location, season, weather and the unpredictability of organisms can all conspire to bring disappointment. However, there is always the chance that new species for the locality, the vice-county or even the country, will turn up. It is important to collect small as well as larger specimens; they may be immatures, but are frequently adults of small species. Never neglect unnatural sites - towns and gardens are usually much richer in species than the open country.

1. Hand sorting

This is probably the way most recorders start (and go on) collecting. It requires a sharp eye and a quick hand to pick up the animals with forceps. One rarely gets a second chance with Lithobius or Cryptops, once they start to move, and geophilomorphs have an uncanny knack of disappearing down a crevice whilst attention is directed to another specimen. Some recorders take up a mass of leaf litter, etc, with the animal in it and put it on to a suitable surface (eg a plastic bag or a groundsheet) to sort out the specimens. Whichever way they are taken, any lost legs should be put in with the specimen to aid identification. Unless one is using one specimen tube per animal, use 70% alcohol to kill and preserve specimens (centipedes are carnivores and not above cannibalism). Typical microsites for hand-sorting are:

Dead wood (vertical or horizontal): some species may be found by careful removal of loose bark, others underneath logs and some in the rotten wood.

Rocks and stones: turning over rocks and stones is a convenient method. Obviously larger stones may have more specimens under them, but there is almost a law which says that the harder the rock is to turn over, the less likely it is that there will be anything of interest. Rocks and stones are often one of the few possible sites for searching in grassland. (Never forget to return rocks and stones to their original position.)

Tussocks: tussocks of grass or other plants need to be torn apart (a knife helps) and are sometimes the only relatively easy site to sample in grassland or moorland.

Moss/lichen: moss/lichen on the surface of rocks, wood, buildings, etc, is worth searching and often yields small lithobiids.

Soil/sand: hand-sorting of soil or sand can be very tedious but may yield results from hedgebanks, riverbanks, etc.

Shingle: at the seaside, shingle is a classic site for Strigamia maritima, especially near rocks or wooden groynes around high-tide level. It is often necessary to dig down for one foot or more. Flat stones in muddy estuaries sometimes yield unusual species such as Schendyla peverimhoffi and Geophilus fucorum. Riverside shingle is also worth investigating.

Rocks: splitting of rocks to open up crevices, using a hammer and cold chisel or a crowbar, is a highly destructive technique and sometimes attracts the attention of passers-by or coastguards, but it has been used to good effect on the coast by some workers.

Human rubbish/garbage: often very fruitful but can be rather unappealing.

Leaf litter: hand-sorting of leaf litter is often a valuable procedure in woodland. Animals may often be found at the interface between the old and fresh litter.

Nests: if carefully dismantled, old bird or mammal nests may yield species. Ants' nests sometimes contain centipedes, but sorting in them may be uncomfortable.

Bracket fungi: old bracket fungi may contain several species.

Walls: partial demolition of old mortar or drystone walls may produce specimens (and irrate landowners).

2. Tullgren funnels

Tullgren funnels are often easy to improvise with a large funnel, gauze and an electric light bulb, and are a very useful way of extracting centipedes (and much else) from soil, litter or old birds' nests. A catching bottle, containing preservative, is placed at the end of the funnel. Two main types can be used:

Soil funnels: these are often relatively small (up to 15 cm diameter); fine gauze is used and they are run for one or two days or possibly longer for large samples. Very useful for small geophilomorphs.

Litter funnels: these can be much larger, up to 40-50 cm diameter and a much coarser wire gauze, or even fine chicken wire, is used. They need to run for 7-14 days and it is important to keep the container of preservative (70% alcohol or ethylene glycol) topped up.

It is possible to keep litter and soil samples, brought back in polythene bags from the field and sealed, in the fridge for a week or more whilst other samples are being extracted.

3. Pitfall trapping

Small pitfalls, made from plastic cups with a preservative (eg ethylene glycol) in the bottom, are generally more productive of millipedes, harvestmen and beetles, but do trap some centipedes. They are a useful way of finding the larger and more active species which move about at night. They have been used in woodland, grassland, moorland and even on the seashore. Probably worth trying in urban sites.

4. Flotation

A crude form of flotation has been used which involves putting soil into water (eg an old tin bath) and stirring it well so that animals float to the surface. It is messy and somewhat tedious, but has produced interesting results. Orthodox flotation techniques involve the use of magnesium sulphate solution after initial washing of soil through a series of sieves.

5. Sieving

Sieving of soil using 2 different mesh sizes has been used to good effect for millipedes and woodlice, but is less appropriate for centipedes. Sieving of leaf litter samples over a light-coloured tray or sheet may prove productive.

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Our sincere thanks must be given to all those collectors who, since the commencement of the scheme, have contributed records. Well over 250 different names are on file as contributors. Special mention must be made of 4 individuals who have been of outstanding importance. **Ted Eason** wrote the standard work on this group that made identification of our species straightforward and has, throughout the scheme, provided support in identification of difficult or unexpected species. Identification is the key to any recording scheme and one doubts if, without his work, such a scheme as this would have been possible. **Gordon Blower** was the instigator of the British Myriapod Group which first met in 1970, near Lynton, and from which the myriapod joint recording scheme sprang. Despite his own initial doubts about the scheme, he has become and remained an inspiration to all British myriapodologists. **Colin Fairhurst** was the instigator of the recording scheme for the myriapods and over the years has given help, encouragement and inspiration to those of us working in it. **Paul Harding**, now head of the Biological Records Centre, was, with Stephen Sutton and John Metcalfe, instrumental in setting up the original isopod scheme and over the years has helped and encouraged us so that we have at last reached the point of this provisional atlas and are looking forward to the continuation of the scheme towards, hopefully, a final version.

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NB Only the main account for each species is given (synonyms quoted are included)

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