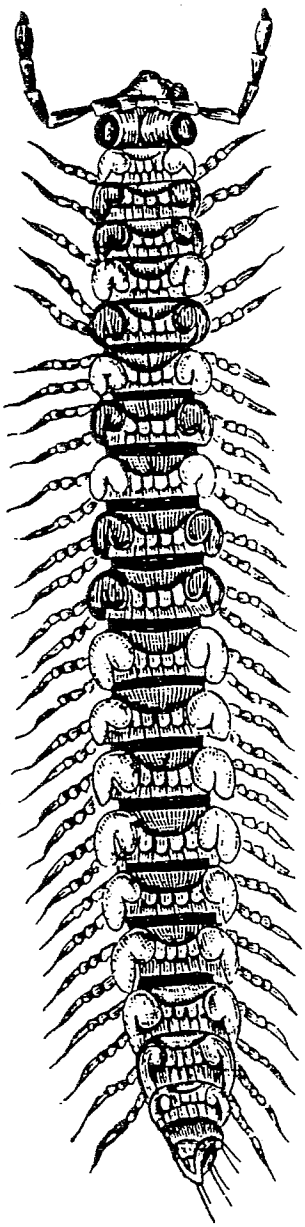
ISSN 0267 - 2154

BULLETIN of the BRITISH MYRIAPOD GROUP

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



Volume II

April 1995

BULLETIN OF THE BRITISH MYRIAPOD GROUP

Volume 11
April 1995

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Editors : A. D. Barber, Plymouth College of Further Education
H.J. Read, Towerwood, Park Lane, Burnham Beeches Bucks.

Published by The British Myriapod Group
C/o A. D. Barber, Rathgar, Ivybridge, Devon, P21 0BD. U.K.

ISSN 0267-2154

EDITORIAL

The first issue of the Bulletin was in April 1972 to coincide with the Second International Congress of Myriapodology at Manchester University.

The previous two years had seen the first meetings (in North Devon and in Herefordshire) of those with an interest in myriapods who were to form the British Myriapod Group. Gordon Blower was instrumental in getting these gatherings off the ground, ably assisted by John Lewis and Colin Fairhurst.

That first meeting saw the discovery of *Chalandea pinguis*, still only known elsewhere from the Pyrenees and Alps regions. The 1970 meeting also saw the formal setting up of the myriapod survey using 10km grid squares as the recording unit and, in a tradition that has continued down to the present, much discussion took place over quantities of liquid refreshment (largely Devon cider, so it is said, in this case). A link with an ealier generation of myriapodology was provided by Bill Rolfe, soon to retire, at that meeting.

Volume one included a photographic portrait of Canon Brade-Birks (BB), president of the Congress, a link with myriapodologists of an even earlier time such as Richard Bagnall and A. Randall Jackson and the Lancashire and Cheshire Fauna Committee as well as Henri Brölemann and H. Ribaut, names he recalled in his article in that volume. Also in the volume were reports on the two field meetings and a review of the then known vice-county distributions (including an invaluable list of references) by Gordon.

Volume two, as recounted in our last issue, was prepared but never issued until a revised version appeared in January 1985 following the revival of the field meetings. The latter largely thanks to the enthusiasm of Ron Daniel - who had caught an interest in millipedes from Gordon Blower! Bulletin and newsletters have appeared more or less regularly ever since.

Readers of this volume may have noticed that Gordon's name no longer appears in the list of editors. This is at his own request. We do not intent to let him drop out altogether but we do wish, at this time, to record our very sincere thanks for his efforts in helping to keep both going and for the encouragement he has always given to the present editors and to all other members of the group.

Bulletin of the British Myriapod Group 11 (1995)

COLIN PETER FAIRHURST 1942-1994.

Dr. Fairhust will always be remembered by his contribution to ecological studies of myriapods: *Life cycles and activity patterns in schizophylline millipedes*, an elegant, innovative and exciting account of their anamorphosis, life cycle and behaviour in the field and in the laboratory. The completion of his thesis coincided with the inception of CIM at the first International Congress in Paris, 1968. Small sections of this were published in the first Congress, and later at Hamburg and Gargano, but by far the greater part still remains unpublished. Already, Colin was putting his heart and soul into another venture, the British Myriapod Survey. He met the originators of the British Isopod Survey and with them developed a scheme for collecting more detailed habitat data along with the bare geographic records. Cards for woodlice and millipedes were printed and the Surveys were launched at the inaugural field meeting of the British Myriapod Group in Devon in April 1970. This was a major undertaking and involved Colin in checking identifications, organising workshops to facilitate reliable diagnoses, developing computer programmes for sorting data and publishing reports from time to time.

Colin's heart and soul also went into teaching; he had lectureships at Manchester College (1965), the University of Keele (1967), Stockport College (1970) and finally the University of Salford (1974). He left his mark on all these institutions, entering wholeheartedly into many activities within Biology and further afield. At Salford, which had been one of the first Colleges of Advanced Technology, he considered it his duty to persue research programmes in the applied field. Initially he had made a characteristically lively and helpful contribution to the MSc. course in Environmental Resources. Later he became involved in the study of river blindness (Onchocerciasis) and its vector in tropical Africa and used his experience of collecting and processing habitat data which he had gained with the myriapod survey. He also launched into a survey of Dutch Elm disease and its bark beetle vectors. Dr. Fairhurst's long list of publications in both these fields began in 1980. Not surprisingly he had to relinquish his overall commitment to the myriapod survey in 1982 after thirteen years; he was succeeded by Douglas Richardson.

Dr. Fairhurst had many research students working on myriapods, tropical diseases and the Elm bark beetle project along with an army of research fellows, scientific officers and technicians, all of whom testified to his personal ecncouragement, stimulus and help. Reacting quickly to the financial crisis in Universities he had successfully obtained funding for his various projcts from international agencies, commercial enterprises and local governments. Over a ten year period at Salford he had secured support totalling £400,000 and was the author or one of the co-authors of some 40 publications in addition to those on myriapods. One might think that no man could enter so many fields, cope with such an array of post-graduate students, undertake journeying to all quarters of the globe, serve on numerous committees (including the University Senate and Court) and yet maintain such an impetous in his lectures at the University and many places beyond, and still be held in high esteem by those he taught, advised or supervised, but Colin did; he was certainly a workaholic and latterly was gaining stimulus and comfort from alcohol in larger measure than many of us, his colleagues; but then he had more commitments to meet than most of us, just a few too many I urged on several occasions. A student who had enjoyed his personal support and encouragement commented that Colin was so busy fighting other peoples causes and sorting out their problems but was not so good in tackling his own. Fortunately we can remember him from

the not too distant past as a highly enthusiastic man of ideas and action and also as a devoted family man, devoted husband and father.

Colin burst into my life in 1964 having studied at the then Liverpool Polytechnic for an external London degree and worked with me on the field life cycles of *Tachypodoiulus niger* and *Ommatoiulus sabulosus*; he found, and studied populations of the former at Gibraltar Point in Lincolnshire and of the latter at Newburgh Warren, Anglesey. He was not a qualified rally driver for nothing, it was both hobby and necessity, as was his City of Guilds' Certificate in car mechanics. Many of his colleagues in Manchester valued his help and friendship; I valued his company and was buoyed-up by his presence, enthusiasm and verve. He it was who persuaded me to offer hospitality at Manchester to the first independent International Congress of Myriapodology; this was an excellent meeting which owed much to his organisational ability. Myriapodologists will remember his lively contributions to all aspects of the next six congresses.

Colin married Joan Margaret Lewis in 1968. Many will recall their hospitality at their home near Crewe and at 'Watling', at Kelsall in Cheshire; the fun, the music, the singing, Colin with guitar and Joan leading the singing. Also, their Christmas parties at Fox Howl (the field centre in Delamere Forest where Joan was warden). It was fitting to sing Sydney Carter's hymn 'The Lord of the Dance' at Colin's funeral service, to recall the good days and pay tribute to a remarkable and loveable man. Colin is survived by his wife Joan and his sons Peter and Ian; we share their sadness and offer to them our sympathy and good wishes.

J. Gordon Blower.

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OXFORDSHIRE MILLIPEDES

S.J.Gregory

Northmoor Trust, Little Wittenham Nature Reserve, Manor House, Little Wittenham, Abingdon, Oxfordshire, OX14 4RA

INTRODUCTION

Oxfordshire is fortunate to have had a long history of entomological research, mainly due to the presence of specialists associated with Oxford University (most notably at the Hope Department). Thus much is known about the insect fauna since the early 19th century. Unfortunately, as is the case with most other counties, little work was done on non-insect orders.

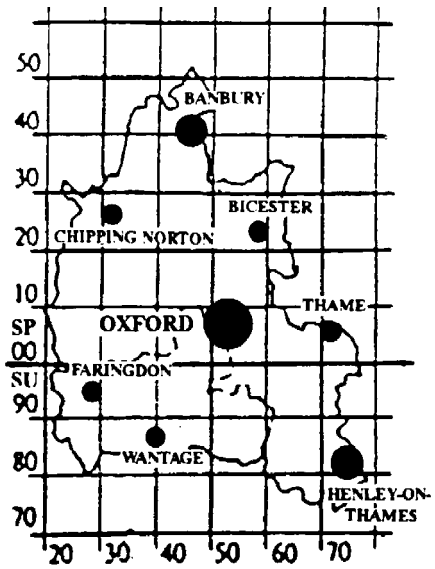
The situation was improved by Charles Elton and his workers at the Bureau of Animal Population Studies, who pioneered ecological research in the 1920's. This research, known locally as the 'Wytham Survey', continued until the 1970's. Species records were obtained for many under-recorded taxa including millipedes.

The current survey was started following the collection by the author of several species of Myriapoda considered to be rare in Britain, but which had been previously collected locally by the Wytham Survey. Were these species really rare or was it just that no-one had looked elsewhere before? Clearly some fieldwork was needed to put these, and other species, into their true county context. It is hoped that some objective statement can now be made about the distribution of millipedes in Oxfordshire and that species important in semi-natural habitats can be identified.

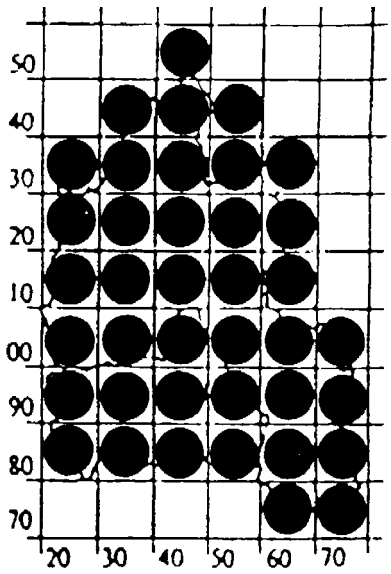
AREA OF SURVEY

The records presented in these maps cover the current administrative county of Oxfordshire (Map 1). This was created in 1974 by the amalgamation of Watsonian vice-county 23 (Oxfordshire) and the north west part of vice-county 22 (Berkshire). The old county boundary followed the course of the River Thames and is shown on the maps as a dashed line. This gives an area of 260,944 hectares which falls within the following 39 10km squares:

SU(41)28, SU29, SU38, SU39, SU48, SU49, SU58, SU59, SU67, SU68, SU69, SU77, SU78, SU79, SP(42)20, SP21, SP22, SP23, SP30, SP31, SP32, SP33, SP34, SP40, SP41, SP42, SP43, SP44, SP45, SP50, SP51, SP52, SP53, SP54, SP60, SP61, SP62, SP63 and SP70.



Map 1. Modern county of Oxfordshire



Map 2. Coverage map

PHYSICAL FEATURES OF THE COUNTY

Like most counties in the lowland south much of the countryside supports extensive agriculture. Considering the close proximity to London the county is surprisingly free of conurbations. Habitats considered to be of high conservation value occupy only 8% of the county. The underlying geology is a series of exposures from the Jurassic in the north west to the Cretaceous in the south east, forming three main north west facing calcareous escarpments, separated by two low lying clay vales. The county is dominated by the River Thames, which winds its way from the west to the south-east of the county against the slope of the prevailing escarpments. Extremes in elevation are seen in the south east of the county. The Thames valley lies at 35m above sea level and the highest point of the Chiltern escarpment at 255m.

The northern third of the county is a rolling plateau of Jurassic limestones (the North Oxfordshire Uplands). The extreme north is ironstone, once worked for iron ore, and dominated by agriculture. It is dissected by deep stream valleys which still contain a few remnants of semi-natural habitat. Further south on the oolitic limestones some large tracts of deciduous woodland occur, most notably Wychwood Forest NNR. Locally some glacial acidic clay drift occurs.

The Oxford Clay Vale lies between this and a well defined ridge of Corallian limestone and calcareous sands (the Oxford Heights) which crosses the centre of the county. In addition to woodlands this supports remnants of contrasting calcareous grassland and heath reminiscent of those of the East Anglian brecklands. At the base of the ridge, where these porous rocks meet the underlying impermeable clays a series of calcareous seepage fens has developed, typified by Cothill Fen NNR.

The Vale of White Horse, of Gault and Kimmeridge clays, lies across much of the south of the county. Along the southern edge Cretaceous chalk outcrops, forming the Chiltern escarpment, with much beech woodland and chalk grassland. In the extreme south east of the county this s overlain by acidic clay drift. This area covered by extensive woodlands

shows contrasting habitats where dry valleys have cut through this acid drift into the underlying chalk.

The Thames and its many tributaries, such as the Evenlode, Windrush, Cherwell, Ray and Thame, still have many associated unimproved damp meadows and marshes, including Otmoor.

HISTORICAL RECORDS

In general records have not been extracted from the literature or from the national database held at the BRC at Monks Wood. There is no reference to Myriapoda in the Victorian County History (Salzman, 1938). It is not clear whether this is due to the absence of recording or because no one was available to write the relevant text. It does record a visit by R.S.Bagnall to collect woodlice and it is possible that he may have collected Myriapoda as well. The following account is based on the computerised database held at the Oxfordshire BRC.

The earliest records that I am aware of are a result of the 'Wytham Survey'. This was started by Charles Elton, in the 1920's, with the formation of the Bureau of Animal Population Studies. Initially fieldwork was confined to Bagley Wood (SP50) near Oxford and covered a variety of taxa. Following the gift of the Wytham Estate to the University, research was concentrated there. In time the survey spread further afield to include other sites. The earliest millipede record is for *Glomeris marginata* from Bagley Wood in 1933. The remainder of the Wytham Survey millipede records date from 1950 to 1963.

The survey pioneered many new sampling techniques to enable ecological studies to be undertaken, such as Tullgren Funnel extraction of invertebrates from soil core samples. Specialists were often brought in to identify collected material. As a result many important species records were made. This is best illustrated by the collection of *Stygioglomeris crinata* from soil core samples taken at Wytham Woods in 1950, the first British record. In the following two decades the species was repeatedly extracted from soil cores at Wytham (Bocock et al.1973) and Howe Wood (SU69 & SU79) (Oxfordshire BRC database).

12 species of millipede were recorded during this period as follows: *Polyxenus lagurus, Glomeris marginata, Stygioglomeris crinata, Nemasoma varicorne, Proteroiulus fuscus, Tachypodoiulus niger, Cylindroiulus caeruleocinctus, C. punctatus, Julus scandinavius, Polydesmus gallicus, P. denticulatus* and *Brachydesmus superus.*

RECENT RECORDING

In the late 1980's collections were made in the county by S.P.Hopkin and D.T.Bilton. S.P.Hopkin made several excursions into the county to collect various invertebrate taxa from nature reserves. Millipedes he recorded include *Ommatoiulus sabulosus, Cylindroiulus britannicus* and *Ophiodesmus albonanus*. D.T.Bilton was based at Oxford University for a number of years and did much collecting from Oxford city centre where he found *Choneiulus palmatus, Nopoiulus kochii, Cylindroiulus vulnerarius, C. parisiorum, C. truncorum, Macrosternodesmus palicola* and *Oxidus gracilis* to add to the county list. Visits to Wychwood Forest NNR also added *Brachychaeteuma bradeae,*

Melogona scutellare, Boreoiulus tenuis and another record for *S. crinata*. Some collections were also undertaken from National Trust properties by K.N.Alexander. Other species recorded in this period were *Nanogona polydesmoides, Blaniulus guttulatus, Ophyiulus pilosus* and *Polydesmus angustus* adding 17 species to the county list.

THE PRESENT SURVEY

Since 1990 the author has put much effort into filling in the gaps for the common species and defining the ranges of the more local ones. Records are site based, within 10km national grid squares, and are made in accordance with guidelines given by the British Myriapod Group recording scheme. These are compatible with the tetrad (2km x 2km) recording unit used by the Oxfordshire BRC.

All 39 10km grid squares have been visited (Map 2). Within each 10km square several sites with contrasting habitats were sampled. These included not only natural sites such as ancient woodland, semi-natural grassland, old meadow and fen, such as those identified by the County Nature Conservation Forum, but also synanthropic sites such as old churchyards. Effort has been made to visit inaccessible and under recorded areas especially in the north. Most of the fieldwork was undertaken from October to May. Many species seemed much easier to find in the winter months, even in very cold conditions. Indeed the Chordeumatidans were conspicuously absent during the summer. Since this is primarily a tetrad survey many sites were visited only once. A few sites have been more extensively surveyed and should provide base-line species lists for other similar sites in the county.

As many microsites as possible were examined on each site. This mostly entailed searching the underside of large stones and fallen timber as well as the superficial soil layer beneath. Searches were also made in leaf-litter and under the bark of fallen and standing dead wood. Time permitting, soil or rubble in 'promising spots' was also hand sorted in the field. There has been a deliberate bias in looking for the more elusive species on the assumption that the common species will be found anyway. With practice it became possible to find many species simply by searching the appropriate microsite within suitable habitat. Much additional material has been collected by John Campbell at the Oxfordshire BRC and passed on for determination, including some pitfall trap specimens.

Seven further species have been added to the Oxfordshire list as follows: *Brachychaeteuma melanops, Chordeuma proximum, Archiboreoiulus pallidus, Allajulus nitidus, Brachyiulus pusillus, Polydesmus testaceus* and *P. inconstans*. *Cylindroiulus latestriatus* was also collected but, although no records were held at the Oxfordshire BRC, the Preliminary Atlas (BMG 1988) lists records for this species in Oxfordshire. The number of millipedes now recorded from Oxfordshire stands at 37.

RECORDS AND VOUCHER SPECIMENS

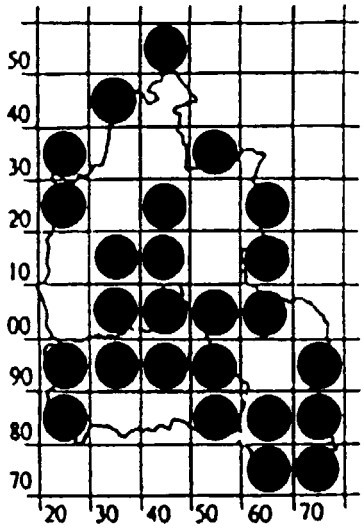
Biological recording for the county is co-ordinated by the Oxfordshire Biological Records Centre, part of the County Museum Service. Full details of all records are held there on a computerised database (using Recorder programme). To the end of October 1994 this amounts to 3109 millipede records. The majority of these records (96%) are post 1990 and mostly attributable to the author (2366 records) and J.M.Campbell (606 records).

The total number of records for each species is shown in Table 1. Species are ranked by the number of 10km squares within which they have been found in the county. The overall rank in Britain as given in the Preliminary Atlas (BMG 1988) is noted. The number of species recorded from each 10km square is shown in Map 40.

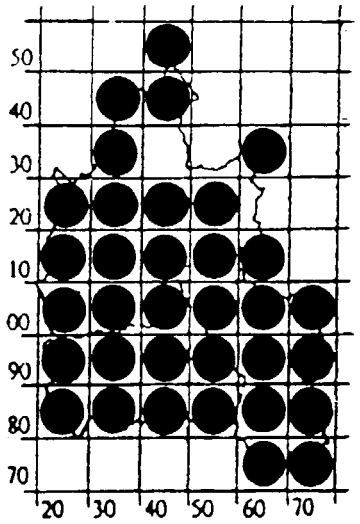
Of the post 1990 records at least one species record per 10km square has been submitted to the national recording scheme. A selection of Oxfordshire material has been lodged in the collections of the County Museum Service. A small working collection is held by the author.

Table 1: Species list for Oxfordshire showing relative abundance, rank in sthe county and rank in Britain (BMG 1988)

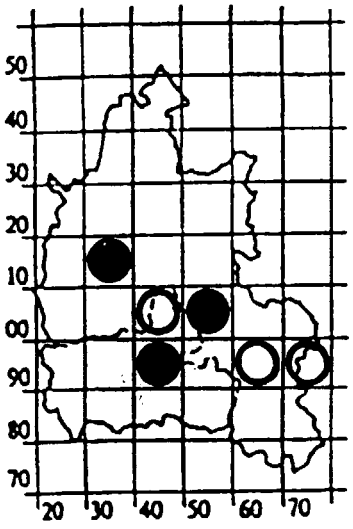
Species	Number of 10km sqs.	Total no. Records	Rank in county	Rank in Britain
Polyxenus lagurus	25	49	16	20
Glomeris marginata	34	176	11	4
Stygioglomeris crinata	6	9	27	31
Nanogona polydesmoides	39	127	7	5
Brachychaeteuma melanops	7	13	25	32
Brachychaeteuma bradeae	6	7	28	34
Chordeuma proximum	4	6	30	22
Melogona scutellare	13	25	20	23
Nemasoma varicorne	38	116	8	14
Proteroiulus fuscus	37	141	10	6
Choneiulus palmatus	7	8	26	29
Nopoiulus kochii	3	5	32	40
Blaniulus guttulatus	39	168	6	11
Archiboreoiulus pallidus	11	18	21	24
Boreoiulus tenuis	23	44	18	21
Ommatoiulus sabulosus	4	4	31	9
Tachypodoiulus niger	39	408	2	2
Allajulus nitidus	1	1	35	28
Cylindroiulus caeruleocinctus	39	114	8	19
Cylindroiulus vulnerarius	1	4	33	41
Cylindroiulus punctatus	39	424	1	1
Cylindroiulus latestriatus	5	11	29	12
Cylindroiulus britannicus	30	98	14	15
Cylindroiulus parisiorum	10	23	22	31
Cylindroiulus truncorum	1	1	36	-
Julus scandinavius	9	14	23	8
Ophyiulus pilosus	39	186	5	7
Brachyiulus pusillus	23	53	17	16
Polydesmus angustus	33	136	12	3
Polydesmus testaceus	1	1	37	37
Polydesmus inconstans	8	14	24	17
Polydesmus gallicus	39	310	3	13
Polydesmus denticulatus	13	29	19	18
Brachydesmus superus	39	222	4	10
Macrosternodesmus palicola	32	94	13	23
Ophiodesmus albonanus	26	49	15	25
Oxidus gracilis	1	4	34	-



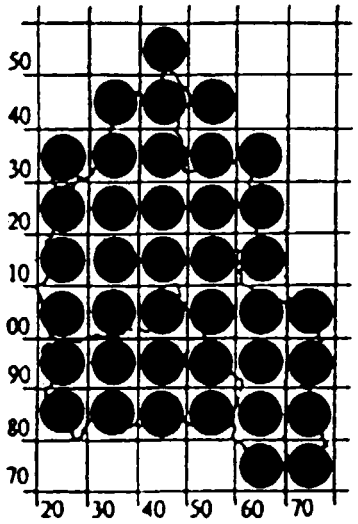
Map 3. *Polyxenus lagurus*



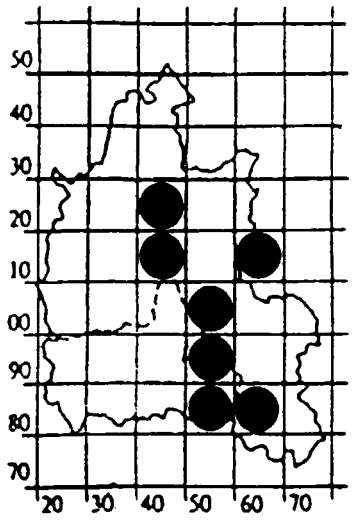
Map 4. *Glomeris marginata*



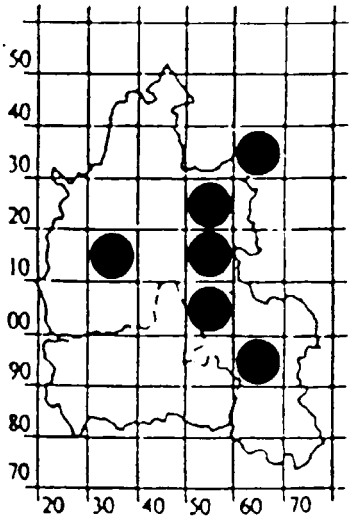
Map 5. *Stygioglomeris crinata*



Map 6. *Nanogona polydesmoides*



Map 7. *Brachychaeteuma melanops*



Map 8. *Brachychaeteuma bradeae*

INTRODUCTION TO THE MAPS

Records are shown in two time categories:

Post 1980 records (mostly post 1990) are shown as solid dots.

Pre-1980 records (mostly 1950 to 1963, Wytham Survey) are shown by an open circle.

Additional 10km records shown in the Preliminary Atlas (BMG 1988) but where details are not held on the O.B.R.C database are indicated by an 'A'. Only the most recent record for each square is shown on the maps.

NOTES ON SPECIES RECORDED

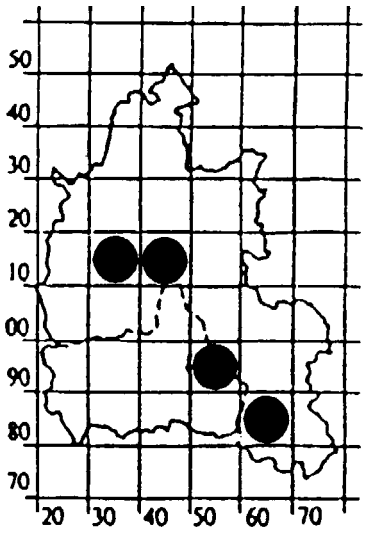
All of the 25 most common millipedes found in Britain (BMG 1988) have been collected from Oxfordshire. Despite many rare species having been recorded during this survey only one, *P. testaceus* was unexpected (Blower, 1985 & BMG, 1988). There are noticeable differences between the abundance of species found in the county and the abundance noted in the Preliminary Atlas (BMG 1988) (see Table 1). These are highlighted in the text below.

Polyxenus lagurus (Linne, 1758)
Map 3. The bristly millipede is fairly common in the county and found in a variety of dry microsites. It is often numerous under loose bark on riverside willow pollards above winter flood levels. Also found under the bark of dead trees in ancient woodland and under moss or loose stones on walls.

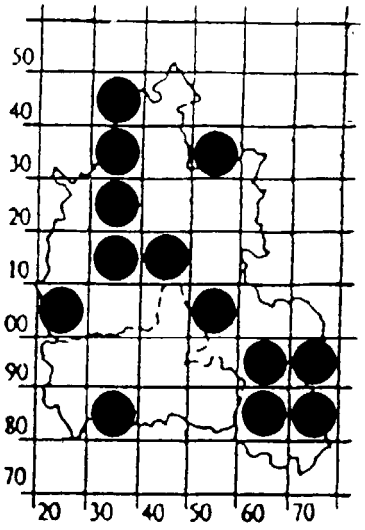
Glomeris marginata (Villers, 1789)
Map 4. Can be locally abundant, usually in shady habitats, where friable soils on both calcareous and acidic substrates occur. In the clay vales it is uncommon and confined to ancient woodlands. This patchy distribution is apparent from the tetrad maps held at the Oxfordshire BRC and reflected by it being ranked the 11th most common millipede in the county compared to 4th in Britain.

Stygioglomeris crinata Brolemann, 1913
Map 5. This small soil-dwelling pill millipede has proved very elusive in the county. It was recorded as new to Britain from Wytham Woods in 1950 and subsequently extracted from soil core samples on several occasions by the 'Wytham Survey'. There are three recent records where hand searching techniques have been used. All records are from primary woodlands (all SSSI) on friable calcareous soils. Probably very under-recorded in the county and, so far, no records from synanthropic sites.

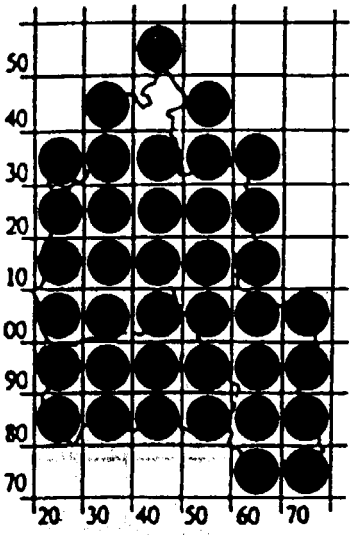
Nanogona polydesmoides (Leach, 1815)
Map 6. The only common Chordeumatidan in the county. It is found under stones and dead wood in a wide range of habitats from churchyards to ancient woodlands, usually on calcareous soils. In the summer months the distinctive 'hairy' immatures can be readily found.



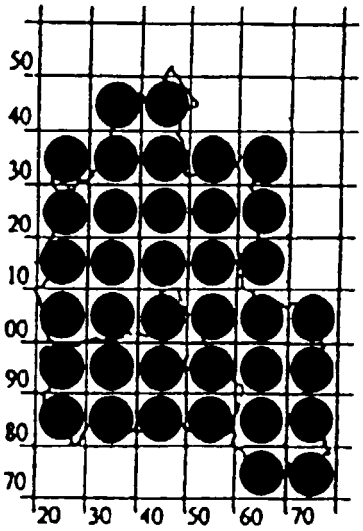
Map 9. *Chordeuma proximum*



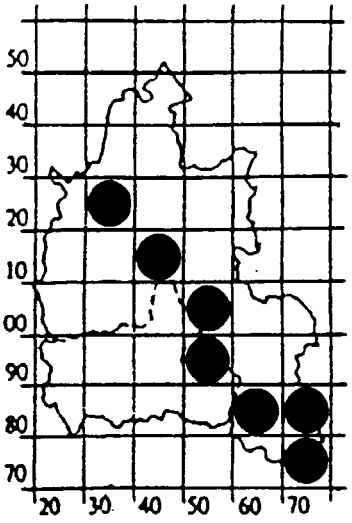
Map 10. *Melogona scutellare*



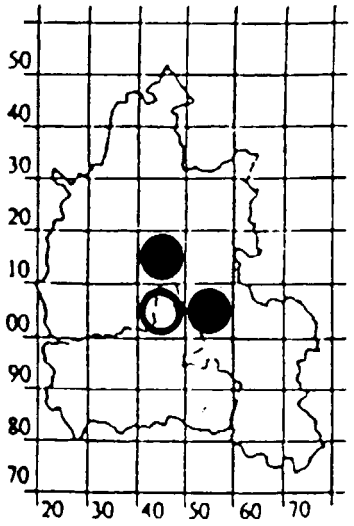
Map 11. *Nemasoma varicorne*



Map 12. *Proteroiulus fuscus*



Map 13. *Choneiulus palmatus*



Map 14. *Nopoiulus kochii*

Brachychaeteuma melanops Brade-Birks, 1918
Map 7. A scarce species in the county. Records are typically from rather disturbed sites such as riverside meadows prone to flooding or churchyards, usually on clay. Adults have been collected in the winter months, mostly November to April, under large stones or dead wood. This southern species is at the edge of its British range in Oxfordshire.

Brachychaeteuma bradeae (Brolemann & Brade-Birks, 1917)
Map 8. Another scarce winter active species. All records are from ancient woodland on clay, where small numbers can be found under dead wood, large stones, etc. Though synanthropic further north in England (where *B. melanops* does not occur) this is not the case in Oxfordshire (Gregory, 1993).

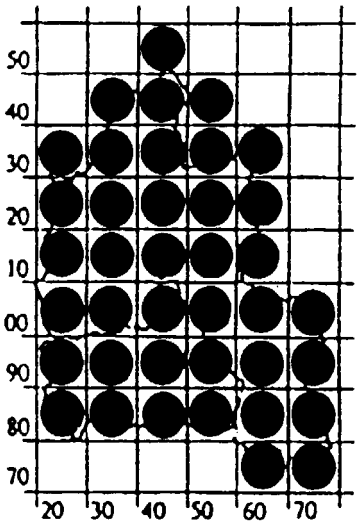
Chordeuma proximum Ribaut, 1913
Map 9. One of the more recent additions to the county list. A single specimen was collected from ancient woodland on acidic sands south of Oxford in October 1992. The following February it was collected from acidic woodland and *Salix* carr further north in the county. Recently another site has been found in deciduous woodland on acidic drift in the Chiltern Hills. Since acidic woodland is a scarce habitat in Oxfordshire it is probable that these records represent relic populations of this mainly western species, rather than a recent expansion in range as observed by Morgan (1986) in South Wales.

Melogona scutellare (Ribaut, 1913)
Map 10. A widespread but local species in Oxfordshire. All records are from the winter months (October to April), typically amongst litter or under dead wood in damp woodland. A few records are from churchyards where it is usually found near compost heaps.

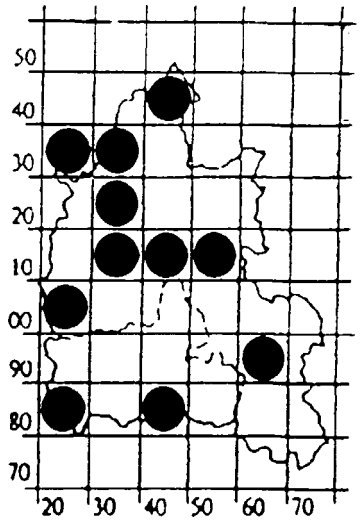
Nemasoma varicorne C.L.Koch, 1847
Map 11. A common millipede in the county found under the bark of fallen and standing dead wood, especially beech, or on live trees such as old willow pollards. Possibly more common in Oxfordshire (ranked 9th) than in Britain as a whole (14th in BMG 1988). Sometimes found with *P. fuscus* but typically found under closer fitting (less rotten) bark than that species. No males have been collected.

Proteroiulus fuscus (Am Stein, 1857)
Map 12. Another common species found under the bark of both living and dead trees (often with *N.varicorne*) in a wide range of natural and synanthropic habitats. Occasionally collected from deep leaf-litter in woodland or in compost heaps. In contrast to *N. varicorne* it appears to be less common in Oxfordshire (ranked 10th) than in Britain overall (ranked 6th). Males have been collected once; from a synanthropic site where *P. fuscus* was found in a pile of rotting wood chippings in association with *C. palmatus* and *B. guttulatus*.

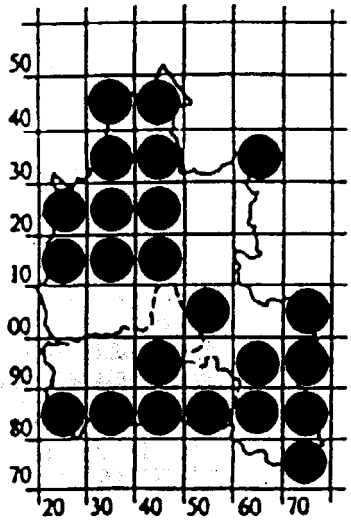
Choneiulus palmatus (Nemec, 1895)
Map 13. Uncommon in the county. The few records are mainly from compost heaps or amongst dead wood in disturbed sites such as churchyards or quarries. Many sites are adjacent to, or near, the River Thames. It is easily overlooked as the common *P.fuscus*. It is conspicuously hairy when viewed with a handlens and the presence of males is diagnostic.



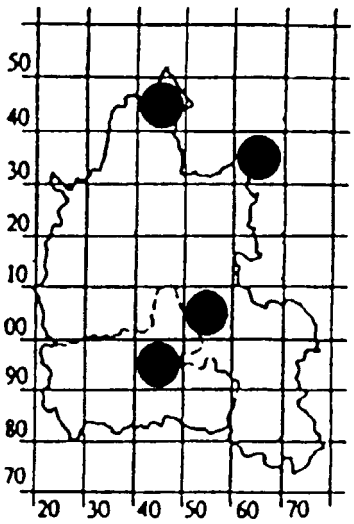
Map 15. *Blaniulus guttulatus*



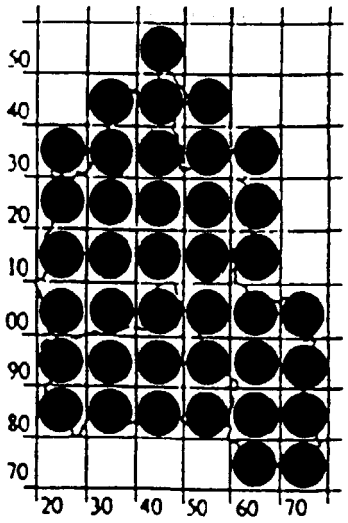
Map 16. *Archiboreoiulus pallidus*



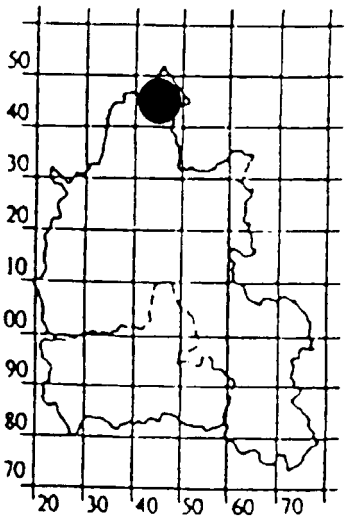
Map 17. *Boreoiulus tenuis*



Map 18. *Ommatoiulus sabulosus*



Map 19. *Tachypodoiulus niger*



Map 20. *Allajulus nitidus*

Nopoiulus kochii (Gervais, 1847)
Map 14. A rare species in the county with two recent records, both from synanthropic sites. First recorded from under a rotting mattress on the site of a disused landfill near Oxford (Bilton 1990). Subsequently found amongst dead wood and debris dumped in a small disused quarry near Woodstock. Over winter it was numerous and associated with *N. varicorne,* the Blaniulids *P. fuscus, B. guttulatus, C. palmatus* and an abundance of the Julids *Cylindroiulus britannicus* and *C.parisiorum*. A 1954 record (under the name *N. minutus*) from bark traps at the University Field Station at Wytham needs confirming.

Blaniulus guttulatus (Fabricius, 1798)
Map 15. This soil dwelling species may prove ubiquitous in the county (presently ranked 6th) and appears more abundant than in Britain as a whole (ranked 11th). Records are from a variety of habitats such as arable fields, gardens, meadows and ancient woodland. It is typically found under stones or dead wood and often numerous, especially during the winter.

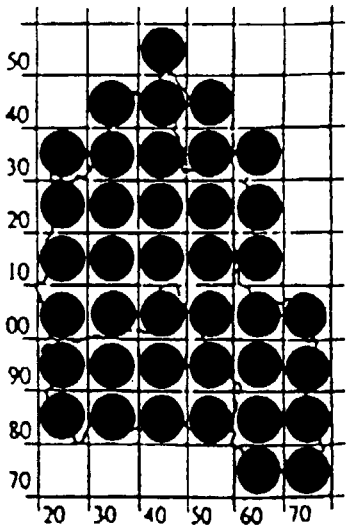
Archiboreoiulus pallidus (Brade-Birks, 1920)
Map 16. A local species in the county recorded from friable calcareous soils, in churchyards and natural sites including river banks. Perhaps more common on the Jurassic limestones in the north west of the county. It is similar in appearance to the common *Blaniulus guttulatus* with which it often occurs.

Boreoiulus tenuis (Bigler, 1913)
Map 17. This small Blaniulid is frequent on the Chiltern chalk in the south and on the Jurassic limestone and ironstone in the north of the county. It has been found in a wide range of habitats from churchyards to ancient woodland, but always on friable calcareous soils. During winter it seems to be much easier to find and can occasionally be numerous under large stones or dead wood.

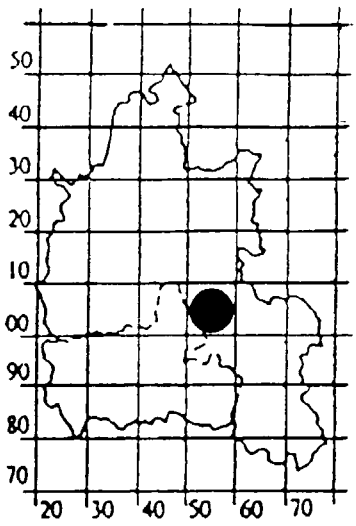
Ommatoiulus sabulosus (Linne, 1758)
Map 18. This large, unmistakable species is rare in the county (ranked 31th). Two records are from ironstone railway cuttings in the north where it was found under stones and beaten from scrub. Another two are from relic heathland and a disused sandpit on the Corallian sands near Oxford. The scarcity of this nationally common species (ranked 9th in BMG 1988) is perplexing. It is also rather scarce in adjacent Warwickshire (Copson 1991) and the Preliminary Atlas (BMG 1988) shows few records for central southern England.

Tachypodoiulus niger (Leach, 1815)
Map 19. A common and ubiquitous species in the county found under stones and dead wood, on walls and under loose bark on trees. It is ranked 2nd in the county and is the most frequently encountered species in gardens and houses.

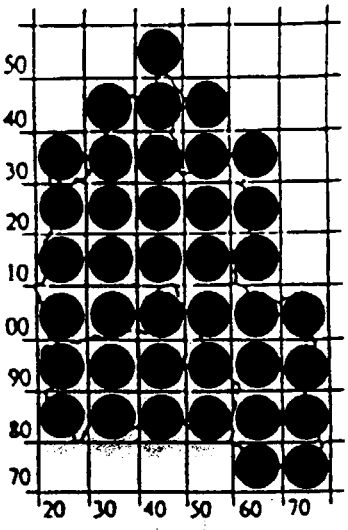
Allajulus nitidus (Verhoeff, 1891)
Map 20. A recent addition to the county list collected from the north of the county in August 1993. Several specimens were found under ironstone slabs at the bottom of a steep north facing slope within ancient deciduous woodland. Considering its large size it is probably genuinely scarce in the county despite its subterranean habits.



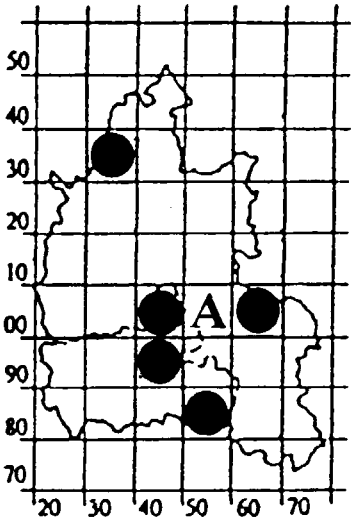
Map 21. *Cylindroiulus caeruleocinctus*



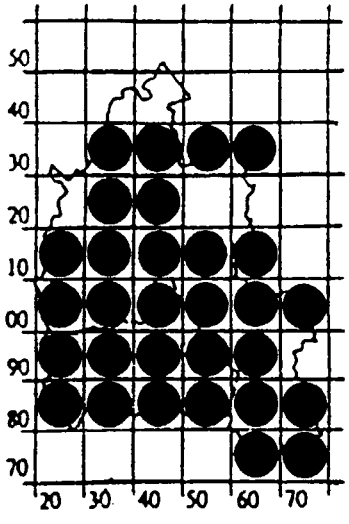
Map 22. *Cylindroiulus vulnerarius*



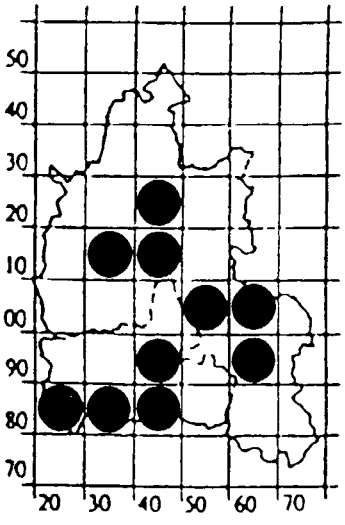
Map 23. *Cylindroiulus punctatus*



Map 24. *Cylindroiulus latestriatus*



Map 25. *Cylindroiulus britannicus*



Map 26. *Cylindroiulus parisiorum*

Cylindroiulus caeruleocinctus (Wood, 1864)
Map 21. This large and distinctive millipede is widespread and frequently encountered. Records are typically from churchyards or gardens but it can be numerous in natural calcareous grasslands. It is ranked 8th in the county (as opposed 19th nationally) which reflects its marked south eastern distribution in Britain. A 1959 record for *C. londinensis* from Wytham Woods (SP40) (of which *C. caeruleocinctus* was once considered a variety) has not been mapped.

Cylindroiulus vulnerarius (Berlese, 1888)
Map 22. A blind, pallid soil dwelling species widely recorded from the city of Oxford (Bilton 1990). Mainly collected from gardens it has been found under paving slabs and in compost heaps. At a garden centre it was numerous amongst 'chipped bark' covering soil in a shrub display. It will probably be found in other old towns in the county.

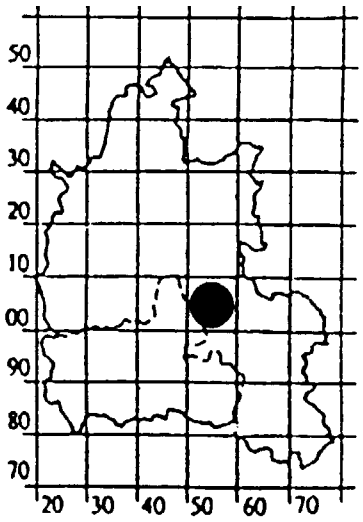
Cylindroiulus punctatus (Leach, 1815)
Map 23. The most commonly recorded millipede in the county readily found wherever rotting dead wood (including old planks) occurs. Also found under the bark of live trees, in compost heaps and amongst leaf-litter in woodlands.

Cylindroiulus latestriatus (Curtis, 1845)
Map 24. This soil dwelling species is scarce in the county (ranked 29th). Most records are from amongst plant roots on relic grassy heaths on the Corallian sands, but also from sandy soils in churchyards. In the north of the county it was collected among stones in a disused railway cutting. This mainly coastal species is ranked 12th in BMG (1988) which also gives an additional record for SP50 (A).

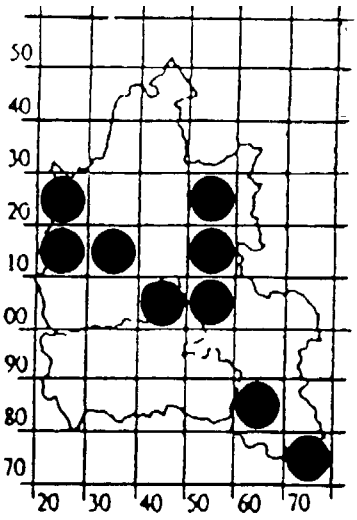
Cylindroiulus britannicus (Verhoeff, 1891)
Map 25. A fairly common dead wood species in the county. Typically found under the bark of old waterside willow pollards, or within and beneath fallen rotting timber in woodlands. It has also been found in compost heaps in gardens and churchyards.

Cylindroiulus parisiorum (Brolemann & Verhoeff, 1896)
Map 26. Uncommon in the county and usually found in well rotted dead wood in both semi-natural woodlands and synanthropic sites such as churchyards. It has also been found under the bark of large 'parkland' beech and oak trees. Single males have been taken in pitfall-traps: once in an old orchard and once in a sallow carr. At the latter site *C. parisiorum* had not been recorded before despite regular searches for Myriapods during the preceding year! It seems to be more common in the county (ranked 22nd) than in Britain as a whole (ranked 31st) but this could be recorder bias.

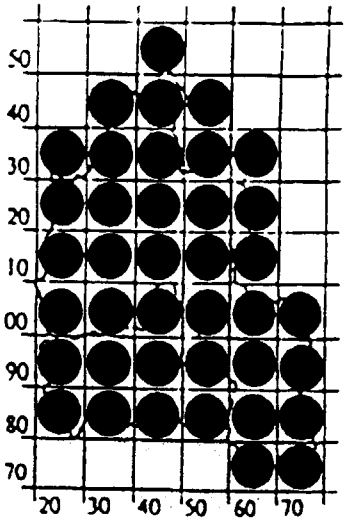
Cylindroiulus truncorum (Silvestri, 1896)
Map 27. D.T.Bilton collected this species from the Oxford Botanic Gardens in 1987. Further details are not known.



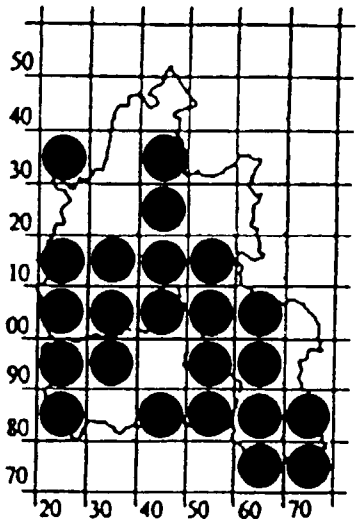
Map 27. ***Cylindroiulus truncorum***



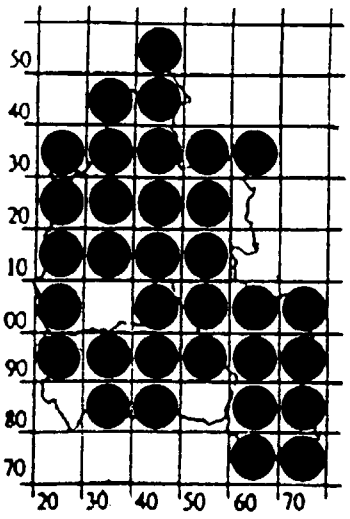
Map 28. ***Julus scandinavius***



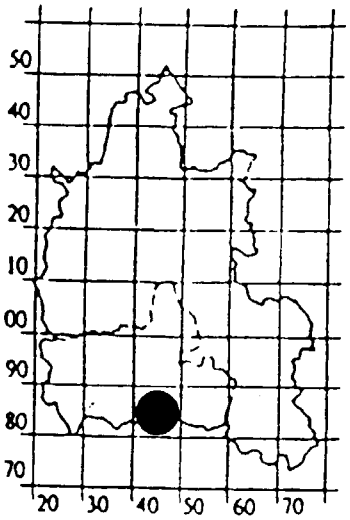
Map 29. ***Ophyiulus pilosus***



Map 30. ***Brachyiulus pusillus***



Map 31. ***Polydesmus angustus***



Map 32. ***Polydesmus testaceus***

Julus scandinavius Latzel, 1884
Map 28. An uncommon species in the county (ranked 23rd) recorded from damp areas in sandy or acidic deciduous woodland, usually under dead wood or amongst moss. Hand searching typically reveals few specimens, often mixed in with the superficially similar *O. pilosus* which does not aid detection! At one site it was abundant in pitfall traps. This is another nationally common species (ranked 8th in BMG 1988) which, like *O. sabulosus*, becomes inexplicably scarce in central southern England.

Ophyiulus pilosus (Newport, 1842)
Map 29. A common and ubiquitous species over much of the county often found under dead wood, amongst leaf-litter or in compost heaps in a variety of damp habitats.

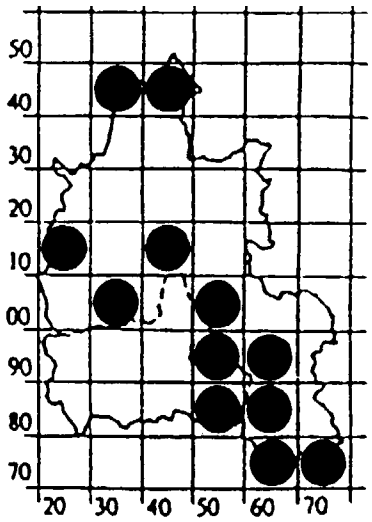
Brachyiulus pusillus (Leach, 1815)
Map 30. This small but distinctive species is typically associated with riverside meadows in the county, where it occurs in litter or under dead wood. It has also been found in drier sites such as gardens, railway sidings and arable fields often within soil.

Polydesmus angustus Latzel, 1884
Map 31. A frequent species typically found in the more acidic or drier parts of the county (most notably the Chiltern Hills) and is rare in the clay vales. This is more apparent from the tetrad distribution maps held at the Oxfordshire BRC. Most records are from semi-natural sites such as ancient woodland, relic heathland or non-calcareous marsh. There are few records from synanthropic sites and it is ranked only 12th in the county compared to 3rd in Britain. It is usually found with the locally ubiquitous *P.gallicus*, but can be separated in the field with a hand lens.

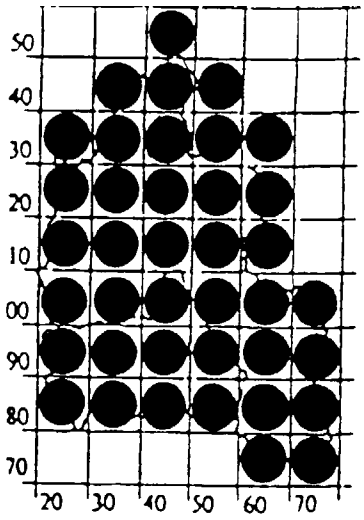
Polydesmus testaceus C.L.Koch, 1847
Map 32. The latest addition to the county list. Many specimens were collected in October 1994 from a remote area of herb rich short turf chalk grassland in the Lambourn Downs. These were on the underside of rotten logs towards the top of a south facing slope, which must become very hot and dry in summer. The only other recent records for this species are from Kent (pers comm R.E.Jones). The calcareous substrate and dry exposed habitat is in keeping with localities listed in Blower (1985). There is no reason to believe this species has been introduced to this site and it may represent a relic population.

Polydesmus inconstans Latzel, 1884
Map 33. A local species collected from damp grassland, under dead wood or in litter, mainly beside the River Thames. It appears to be highly seasonal with adults recorded from 25th May to 5th July. Possible (but not reliably identifiable) sub-adult stadia have been taken as early as February. The species may be under-recorded in the county.

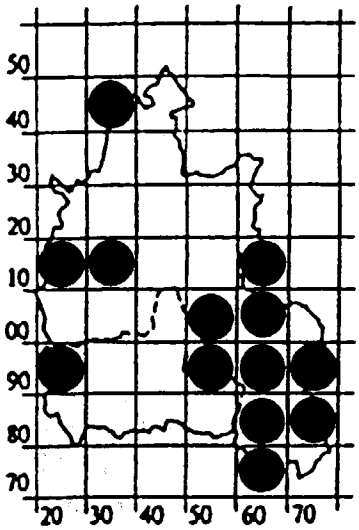
Polydesmus gallicus Latzel, 1884
Map 34. By far the commonest of the flatback millipedes in the county (ranked 3rd after the Julids *C. punctatus* and *T. niger*). Often abundant in a wide range of natural and synanthropic sites. On the Chiltern Hills in the south-east (where *P.angustus* abounds) it is much more local and mainly confined to the course of the River Thames. The Preliminary Atlas (BMG 1988) ranks this species 13th in Britain overall.



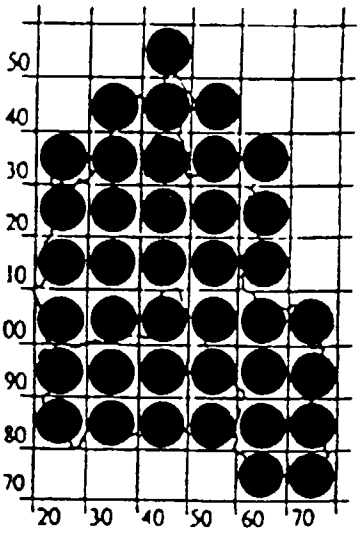
Map 33. *Polydesmus inconstans*



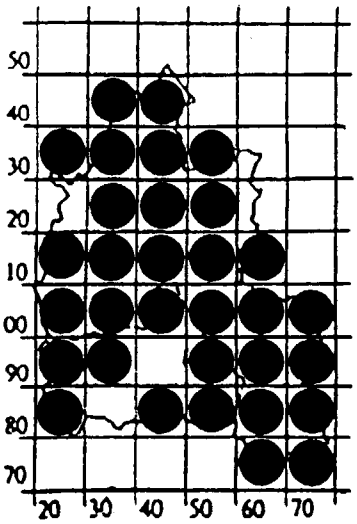
Map 34. *Polydesmus gallicus*



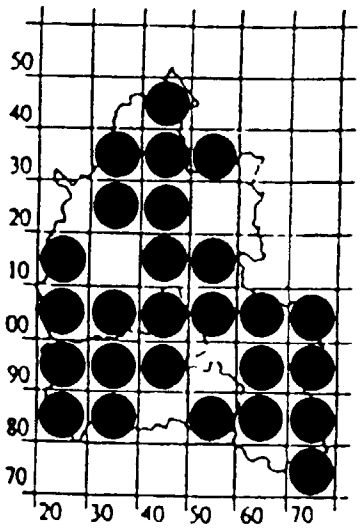
Map 35. *Polydesmus denticulatus*



Map 36. *Brachydesmus superus*



Map 37. *Macrosternodesmus palicola*



Map 38. *Ophiodesmus albonanus*

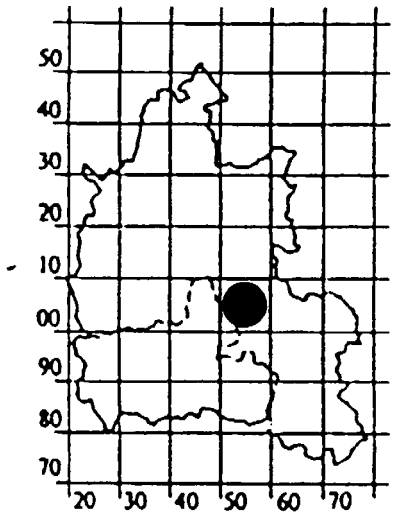
Polydesmus denticulatus C.L.Koch, 1847
Map 35. Apparently local in the county and usually collected from deciduous woodland. Perhaps more common in the well wooded south east. Hand-searching under dead wood or in leaf-litter rarely reveals more than single specimens. However it is readily taken in pitfall traps, including an arable field margin, suggesting it is elusive and possibly under recorded.

Brachydesmus superus Latzel, 1884
Map 36. Another common flatback ranked 4th in the county. Found amongst litter, under dead wood, etc in damp woodlands and meadows and within compost heaps, sometimes in abundance. Though common nationally it is only ranked 10th in BMG (1988).

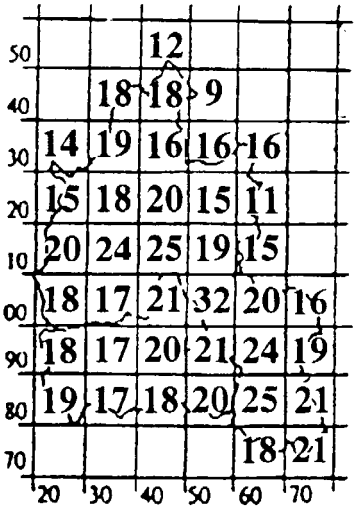
Macrosternodesmus palicola Brolemann, 1908
Map 37. This small white flatback is probably common throughout the county (currently ranked 13th). It inhabits friable calcareous soils and is usually found in small numbers under large stones, mainly in the winter months. Records are mostly from churchyards or gardens but it is also characteristic of ancient deciduous woodlands on the Chiltern chalk. Apparently much scarcer in the rest of Britain (ranked 23rd in BMG 1988).

Ophiodesmus albonanus (Latzel, 1895)
Map 38. Another small white species inhabiting friable calcareous soils. It is often found with *M. palicola* in churchyards and Chiltern woodlands. It appears less widespread than that species and easier to find rather later in spring. Ranked 15th in the county but only 25th in Britain overall.

Oxidus gracilis (C.L.Koch, 1847)
Map 39. This greenhouse species cannot be considered a true component of the county fauna. It is present at the Oxford Botanic Gardens and will almost certainly occur in other old heated greenhouses where pesticide usage is minimal. Single vagrant specimens have been taken amongst house plant displays at an Oxford garden centre (assumed to be introduced via a nursery) but there is little chance of a population becoming established.



Map 39. *Oxidus gracilis*



Map 40. Number of species recorded per 10km square

DISCUSSIONS

It is believed that a reasonable amount of fieldwork has been done for useful (albeit still subjective) conclusions to be made. Millipedes which are conspicuously uncommon in the county, considering their national abundance, are *O. sabulosus, J. scandinavius,* and *P. angustus*. The first two are scarce over much of central southern England (Kime, 1978 & BMG, 1988). The latter seems to be replaced in the county, especially in synanthropic sites, by *P. gallicus* (and perhaps *B. superus*).

Other species appear to be unexpectedly more common in Oxfordshire than elsewhere in Britain. *P. gallicus* is conspicuously abundant, perhaps due to the predominant 'wetness' of the county. The small white Polydesmidans, *M. palicola* and *O. albonanus* are perhaps favoured by the friable calcareous soils which have developed over much of the county.

It is clear from this survey that synanthropic sites are important for many species. Some synanthropic species are probably recent introductions into Britain. The most likely candidates are *N. kochii, C. vulnerarius, C. truncorum* and the greenhouse species *Oxidus gracilis*. All are only known from synanthropic locations in the city of Oxford or the equally historic town of Woodstock (Blenheim Park).

Other species thrive in apparently contrasting synanthropic and semi-natural habitats, which share common microsites. *B. tenuis, M. palicola* and *O. albonanus* thrive in friable calcareous soils whether these are in primary deciduous woodland on the shallow rendzinas of the Chiltern escarpment or in ancient churchyards with infrequently dug deep brown earths. A similar situation is seen with *P. lagurus* (under bark in woodland or under stones on walls), *M. scutellare,* (deep leaf litter in woodland or churchyard compost heaps) and *C. latestriatus* (grassy heath or churchyards on sand).

Some species show strong preferences for rural sites or semi-natural habitats in the county, although many are synanthropic elsewhere in Britain. These are *G. marginata, S. crinata, B. bradeae, C. proximum, O. sabulosus, J. scandinavius, P. angustus, P. denticulatus* and *P. inconstans*. Ubiquitous species such as *N. polydesmoides, B. guttulatus, T. niger, C. punctatus, O. pilosus, P. gallicus* and *B. superus* will obviously occur anywhere.

Reference to Map 40 shows the number of species recorded per 10km square to be rather uniform. The richest millipede fauna seems to be in the south east where there is a good diversity of habitats associated with the Chiltern Hills and the Thames valley. The southern edge of the Jurassic oolite is also apparently rich but this is possibly recorder bias. For example squares SP21 (20 species), SP31 (24 spp.) and SP41 (25 spp.) are well worked.

The species total for SP50 (32 spp.) is not just recorder bias. This square contains the most diverse assemblage of habitats in the county. The ancient city of Oxford is sited beside the rivers Thames and Cherwell, with associated grazing and hay meadows. A complex geology of limestones, sands and clays supports a mosaic of primary calcareous and acidic woodlands, seepage fens, carr, calcareous grassland, relic heathland and some non-calcareous marsh. It shows what can be achieved from even a small area!

The least diverse areas are the calcareous clays and chalky drift in the south-west and the ironstones and clay drift in the north. It is not clear why this should be so but perhaps the predominance of clayey soils in these areas is the reason.

THE FUTURE

Though initially undertaken as a 10km survey, a tetrad (2km X 2km) atlas is in preparation through the County Museum Service using records held on the Oxfordshire BRC database. Fieldwork continues to add further species records. Additional species may still be found in Oxfordshire. *Craspedosoma rawlinsii, Melogona gallica, Cylindroiulus londinensis* and perhaps *Stosatea italica* are the most likely candidates.

Continued fieldwork will also enable changes in species abundance and distribution to be observed. *C. vulnerarius* and *N. kochii* may be found in other old towns. Further sites may be found for *P. testaceus*. The use of specialist techniques may improve our knowledge of elusive species such as *S. crinata*. A number of questions may also be answered. For example: Are *B. bradeae* and *B. melanops* really mutually exclusive?; Will *C. proximum* show an expansion of range as seen in Wales?; Is *P. angustus* decreasing it's range at the expense of *P. gallicus*?

For the sake of completeness it worth collating old records for the county, both from the literature and from the national database held at the Biological Records Centre (Monks Wood).

ACKNOWLEDGEMENTS

I am indebted to John Campbell of the Oxfordshire Biological Records Centre for his encouragement, contribution of specimens, access to otherwise inaccessible sites and transport to the far corners of the county without which this survey would have been substantially less comprehensive.

I would also like to thank Fiona Woolmer and Yvonne Simms for their patience with my computer illiteracy, Robin Buxton for the use of his microscope and Wendy Millatt for checking the text.

Dick Jones unwittingly snared my interest in millipedes by his prompt checking of specimens in the early days.

REFERENCES

Bilton, D.T., (1990) Recent records of *Cylindroiulus vulnerarius* in the British Isles. *Bull. Brit. Myriapod Group* **7**:50-51.

Bilton, D.T., (1990) *Nopoiulus kochii* in two suburban localities. *Bull. Brit. Myriapod Group* **7**:51.

Blower,J.G., (1985) *Millipedes.* Synopses of the British Fauna (New Series) no.35, Linnean Society, London.

Bocock, K.L., Heath, J. & Blower, J.G., (1973) Some observations on the biology of the millipede *Geoglomeris jurassica* Verheoff, 1915. *J. Nat. Hist* **7**:691-697.

British Myriapod Group, (1988) *Preliminary Atlas of the Millipedes of the British Isles.* BRC, Huntingdon. Unpublished.

Copson, P.J., (1991) *Provisional Atlas of the Millipedes of Warwickshire*. Warwickshire Museum Service.

Gregory, S.J., (1993) More on *Brachychaeteuma. British Myriapod Group Newsletter No.19.* Unpublished.

Kime, R.D., (1978) The distribution of millipedes in the south of England. *Abh. Verh. naturwiss. Ver. Hamburg* (NF)**21**/**22**:135-147.

Morgan, I.K., (1986) *Chordeuma proximum* in Dyfed, S.Wales. *British Myriapod Group Newsletter* No.6. Unpublished.

Salzman, L.F.(Ed), (1938) *Victorian County History of Oxfordshire.* Oxford University Press.

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A DICHOTOMOUS KEY TO THE GEOPHILOMORPH CENTIPEDES OF BRITAIN.

A. N. Keay

37 Merrymeet, Woodmansterne, Surrey, SM7 3HX

This key includes all the geophilomorphs currently known from the British Isles. Immature specimens may be difficult in some cases. Some species of *Geophilus* have 0, 1 or 2 coxal pores in the early stages thus an additional option has been inserted at 12 to cover this. In the case of *Brachygeophilus* and the Schendylidae there may be only one such pore on each side.

1a Coxal pores distributed over the entire surface or at least the ventral surface of the coxae of the last pair of legs.....2
1b Coxal pores concentrated along the edge of the adjacent metasternite or opening into pits adjacent to the metasternite.....8

2a Coxal pores very numerous and sistributed over both the dorsal and ventral surfaces of the coxae.....3
2b Coxal pores less numerous and distributed over the ventral surface of the coxae only.....6

3a Head broader than long. With more than 73 pairs of legs.....4
3b Head longer than broad. with fewer than 51 pairs of legs.....5

4a With 91 or more pairs of legs. Large transverse, oval fossae between sternites 40 and 49. Rare species from a single site in Cornwall.....***Nesoporogaster brevior***
4b With 73 to 85 pairs of legs. Lacking fossae between sternites 40 and 49. Common in south and south-west, less so in north.....***Haplophilus subterraneus***

5a With terminal claws on last pair of legs. Forcipules with smooth concavity and with a prominent basal node. Rare, usually coastal.....***Pachymerium ferrugineum***
5b Lacking terminal claws on last pair of legs. Forcipules with a crenulate concavity and lacking a basal node. Rare, a hot house species.....***Dicellophilus carniolensis***

6a The pleurites of the last trunk segment distinct from the adjacent pretergite. Littoral species.....***Strigamia maritima***
6b The pleurites of the last trunk segment fused together with the adjacent pretergite.....7

7a With 49 to 53 pairs of legs. Sternites with a distinct median, longitudinal cleft.....***Strigamia crassipes***
7b With 37 to 41 pairs of legs. Sternites lacking a media cleft.....***Strigamia acuminata***

8a Head broader than long. The forcipular tergite much the same breadth anteriorly as posteriorly, with strongly convex lateral borders.....9
8b Head longer than broad. The forcipular tergite broader posteriorly than anteriorly, with almost straight lateral borders.....10

9a With 61 to 75 pairs of legs. Large stout species with eliptical pore groups on the sternites. Dorsal surface of trunk usually greenish-grey. Southern species, coastal or synanthropic inland.....*Henia vesuviana*
9b With 53 to 57 pairs of legs. Small, slender species with lanceolate pore groups on the sternites. Southern species usually synanthropic.....*Henia brevis*

10a With 63 to 79 pairs of legs. Sternal pore groups distinct on anterior segments. Coxal pores in rosettes and opening into pits adjacent to the meta-sternite (requires clearing to see this detail).....*Clinopodes linearis*
10b Sternal pores either absent or indistinct when seen by direct illumination. Coxal pores opening individually onto the coxal surface.....11

11a Two pores on each of the coxae of the terminal legs.....12
11b More than two pores on each of the coxae of the terminal legs.....17

12a Three strongly defined longitudinal sternal gutters anteriorly. Terminal pair of legs with distinct claws. 37-41 pairs of legs. Small, creamy white species.....*Brachygeophilus truncorum*
12b Lacking strongly marked sternal gutters. Either lacking or with rudimentary claws on last legs.....13
12c Terminal legs with distict claws, 45 or more pairs of legs.....Immature geophilids

13a Basal node of forcipules distinct.....14
13b Basal node of forcipules absent or rudimentary. Littoral species.....*Hydroschendyla submarina*

14a Lacking sternal pore groups on anterior segments.....15
14b Distinct pore groups on anterior segments.....16

15a Forcipules with crenulate concavity. With 51 to 57 pairs of legs. Single record from a glasshouse in Cornwall.....*Brachyschendyla monoeci*
15b Forcipules with a smooth concavity. Known specimens with 39 pairs of legs. Rare.....*Brachyschendyla dentata*

16a Forcipules with crenulate concavity. Telopodite of last pair of legs less than 1.5 times as long as that of penultimate pair of legs.....*Schendyla peyerimhoffi*
16b Forcipules with smooth concavity. Telopodite of last pair of legs greater than 1.5 times as long as the penultimate pair of legs.....*Schendyla nemorensis*

17a With fewer than 41 pairs of legs.....18
17b With more than 41 pairs of legs.....19

18a With distinct basal node on forcipules. 6 to 10 coxal pores adjacent to the metasternite and a single isolated pore on the main body of the coxae of the last pair of legs. North Devon..... *Chalandea pinguis*

18b With rudimentary basal node on forcipules. 3 to 5 coxal pores adjacent to the metasternite. Rare, south and southwest coastal species..... *Nothogeophilus turki*

19a With 65 to 75 pairs of legs. Coxal pores open on both dorsal and ventral surfaces of coxae, adjacent to the metasternite/metatergite..... *Geophilus electricus*

19b With fewer than 65 pairs of legs. Coxal pores open on the ventral surface of the coxae only..... 20

20a Last pair of legs with a tuberculate pretarsus. Rare species from the Scilly Isles..... *Arenophilus peregrinus*

20b Last pair of legs without a tuberculate pretarsus..... 21

21a Lacking carpophagus structure on anterior sternites..... 22

21b With carpophagus structure on anterior sternites..... 23

22a Forcipules with smooth concavity. With 3 coxal pores on each coxae of terminal legs..... *Geophilus pusillifrater*

22b Forcipules with crenulate concavity. With 6 to 10 pores on each coxae of terminal legs..... *Necrophloeophagus flavus*

23a Carpophagus structure occupying almost the entire breadthof sternite..... 24

23b Carpophagus structure occupying 3/4 of the breadth of the sternite..... 25

24a With a distinct claw on the second maxillary telopodite. Shetland Isles..... *Geophilus proximus*

24b With a small peg-like structure on the second maxillary telopodite. Widespread species..... *Geophilus oligopus*

25a Forcipules with a smooth concavity. Robust, red to brownish grey species..... *Geophilus carpophagus*

25b Forcipules with a crenulate concavity. Slender, pale species..... 26

26a Forcipules with about 14 crenulations. Estuarine and coastal species..... *Geophilus fucorum*

26b Forcipules with about 30 crenulations..... *Geophilus osquidatum*

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A TABULAR PARTIAL KEY TO BRITISH GEOPHILIOMORPHS

A.D.Barber

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

A.N. Keay,

37 Merrymeet, Woodmansterne, Surrey, GM7 3HX

INTRODUCTION

This table is intended to complement the proceeding key and allow checks to be made. It can be used on its own to partially identify species i.e. to narrow the range of possibilities.

A count of leg pairs is always a good start with geophilomorphs, narrowing down the options. The last legs are then useful, noting the distribution and number of coxal pores. Other characters can then be examined to refine the search. Sternal coxal pores are not always easy to see and may require oblique illumination.

SPECIES	TRUNK SEGMENT (leg pairs)	COXAL PORES ON LAST LEGS		CLAW ON LAST LEGS	BASAL NODE ON POISON CLAW	CARPOPHAGUS STRUCTURE	STERNAL PORE GROUPS	
Nesoporogaster brevior	93-101	Numerous	Dorsal/Ventral				+	One site, Cornwall
Haplophilus subterraneus	77-85	Numerous	Dorsal/Ventral				+	
Geophilus electricus	65-73	10-18	Dorsal/Ventral	+	+	+	+	
Clinopodes linearis	63-79	In pits	Ventral	+			+	
Henia vesuviana	61-75	1 + number	Ventral	+ usually			+	
Geophilus osquidatum	53-63	3-4	Ventral	+	+	+	+	
Henia brevis	53-57	1 + number	Ventral	+			+	
Geophilus fucorum	51-57	4	Ventral	+	+	+	+	Littoral
Brachyschendyla monoeci	51-57	2	Ventral					Greenhouse, once
Necrophloeophagus flavus	49-57	6-10	Ventral	+	+		+	
Strigamia crassipes	49-53	15-30	Ventral	+	+		+	
Strigamia maritima	47-51	10-15	Ventral	+	+		+	Littoral
Geophilus carpophagus	45-57	6-12	Ventral	+	+	+	+	
Geophilus proximus	45-55	8-10	Ventral	+	+	+	+	Once,Shetland
Geophilus oligopus (insculptus)	45-53	4-7 + 1	Ventral	+	+	+	+	
Hydroschendyla submarina	45-53	2	Ventral					Littoral
Tygarrup javanicus	45	Numerous	Ventral					Greenhouse, Kew
Arenophilus peregrinus	45	1 + 2	Ventral		+			Scilly
Pachymerium ferrugineum	43-45	Numerous	Dorsal/Ventral	+	+		+	Coastal, rare
Dicellophilus carniolensis	43	Numerous	Dorsal/Ventral					Greenhouse, rare
Geophilus pusillifrater	41-43	1 + 2	Ventral	+	+		+	S.W. Coasts
Schendyla peyerimhoffi	39-49	2	Ventral		+		+	Littoral
Brachyschendyla dentata	39	2	Ventral		+			
Schendyla nemorensis	37-43	2	Ventral		+		+	
Brachygeophilus truncorum	37-41	2	Ventral	+	+	+		
Strigamia acuminata	37-41	10-15	Ventral	+	+		+	
Nothogeophilus turki	37-39	3-5	Ventral	+	+		+	S.Coast, rare
Chalandea pinguis	35-37	1 + 6-10	Ventral	+			+	North Devon
		Note number is reduced in juveniles						

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ON SOME CASES OF STRUCTURAL ABNORMALITY IN *SCOLOPENDRA* (CHILOPODA, SCOLOPENDROMORPHA).

A. Garcia Ruiz

Departamento de Biología Animal I (Entomología), Facultad de Biología, Universidad Complutense 28040- Madrid, Spain.

INTRODUCTION

Among the large quantities of centipedes studied during the last years we have found several specimens with malformed structures. Minelli and Pasqual (1986) described eight structurally abnormal centipedes and listed the previously recorded cases; they distinguished three principal types of abnormality: spiral segmentation, homeotic mutations and schistomely.

Lewis (1987) states that each anomalous structure on centipedes cannot fit into Minelli and Pascual's (1986) classification because in most cases the anomalous structures are due to problems in the animal's development or to regeneration of structures after damage.

DESCRIPTION OF STUDIED CASES

A: Abnormal size of left antenna in *Scolopendra cingulata* Latreille, 1829.

A female *Scolopendra cingulata* collected on 5.iii.1993 from a pine tree at El Pardo (province of Madrid); we can see that the antennae are of different dimensions (Fig. 1). The two antennae have a complete number of articles, but the left is smaller than the right; both show all the antennal articles but the left antennal is smaller than the right because from the eleventh article down to the last they are smaller than their equivalent on a normal antenna. We think that it is due to a developmental abnormality.

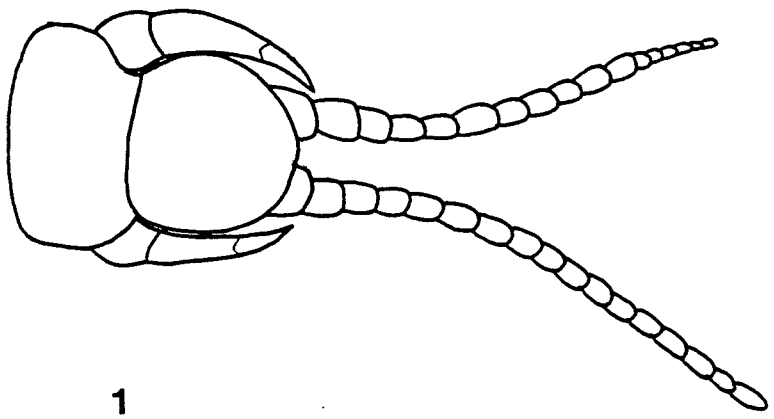

Figure 1. Dorsal view of head and antennae of a *Scolopendra cingulata* from El Pardo.

B: Abnormal prefemur in the last pair of legs in *Scolopendra cingulata.*

In a male of *Scolopendra cingulata* collected on 19.iv.1991 from a field at Moral de Calatrava (province of Ciudad Real), we see the prefemurs of the last pairs of legs are of different sizes although they are the same length (Fig. 2). The prefemur on the left is much larger overall than that on the right. We have not found any previous reference to centipedes with a malformed structure of this type and think that it is due to developmental abnormality.

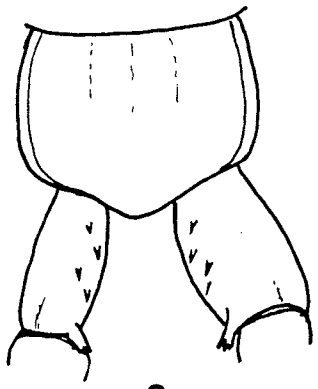

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Figure 2. Dorsal view of last pair of legs of a *Scolopendra cingulata* from Moral de Calatrava.

C: Abnormal forcipular coxosternite in *Scolopendra canidens oraniensis* (Lucas, 1846).

A female *Scolopendra canidens oraniensis* collected on 15.v.1992 from a field at Valdemoro (province of Madrid) shows the anterior border of the left forcipular coxosternite almost straight, without teeth (Fig. 3).

Lewis (1987) reported a similar case in a female *Lithobius borealis* and Garcia Ruis (1994) in a female *Lithobius guadarramus*. Again, we think that it is due to a developmental abnormality.

3

Figure 3. Forcipular coxosternite of a *Scolopendra canidens oraniensis* from Valdemoro.

REFERENCES

Garcia Ruiz, A., (1994): On some cases of structural abnormality in *Lithobius* (Chilopoda, Lithobiomorpha). *Bull. Br. Myriapod Grp.*, **10**: 31-33.

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

Minelli, A. & Pasqual, C., (1986): On some abnormal specimens of centipedes. *Lavori-Soc. Ven. SC. Nat.*, **11**: 135-141.

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RECORDS OF MILLIPEDES IN CENTRAL SOUTHERN ENGLAND

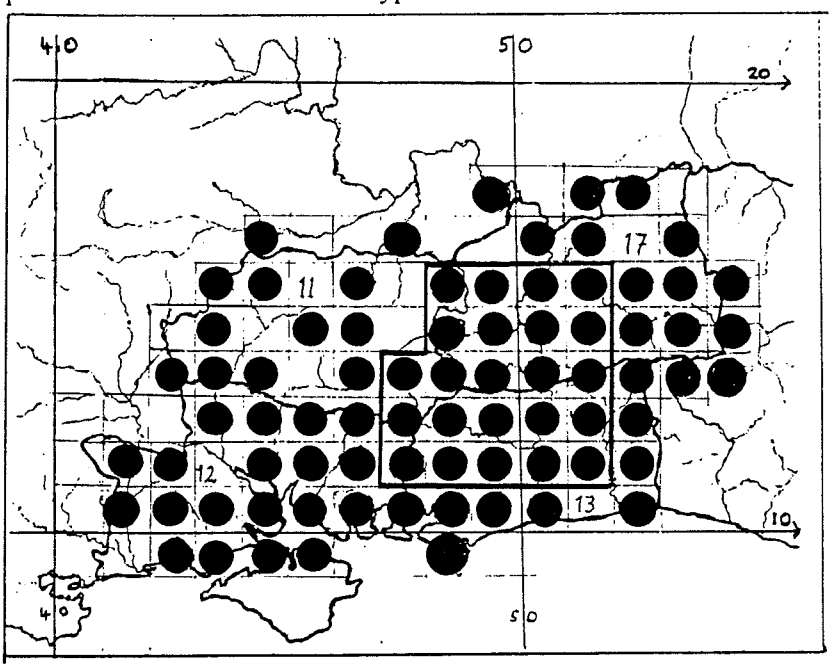
R.D. Kime

Institut Royal des Sciences Naturelles de Belgique, 29 rue Vautier, 1040 Brussels

INTRODUCTION

This report is based on the results of collecting millipedes in the South of England mainly between 1967 and 1975 (summarized in Kime, 1978) and also takes into account all other records for Watsonian vice-counties 11, 12, 13 and 17 kindly supplied by Paul Harding from the British Records Centre a couple of years ago. Also included are the new data published by the British Myriapod Group (1993) following the BMG field trip to Sussex, in order that the following maps should be as up to date as possible. There are omissions, mostly concerning data from the last two years, some of which are however mentioned in the text. Before 1967 there were very few published records indeed from this area.

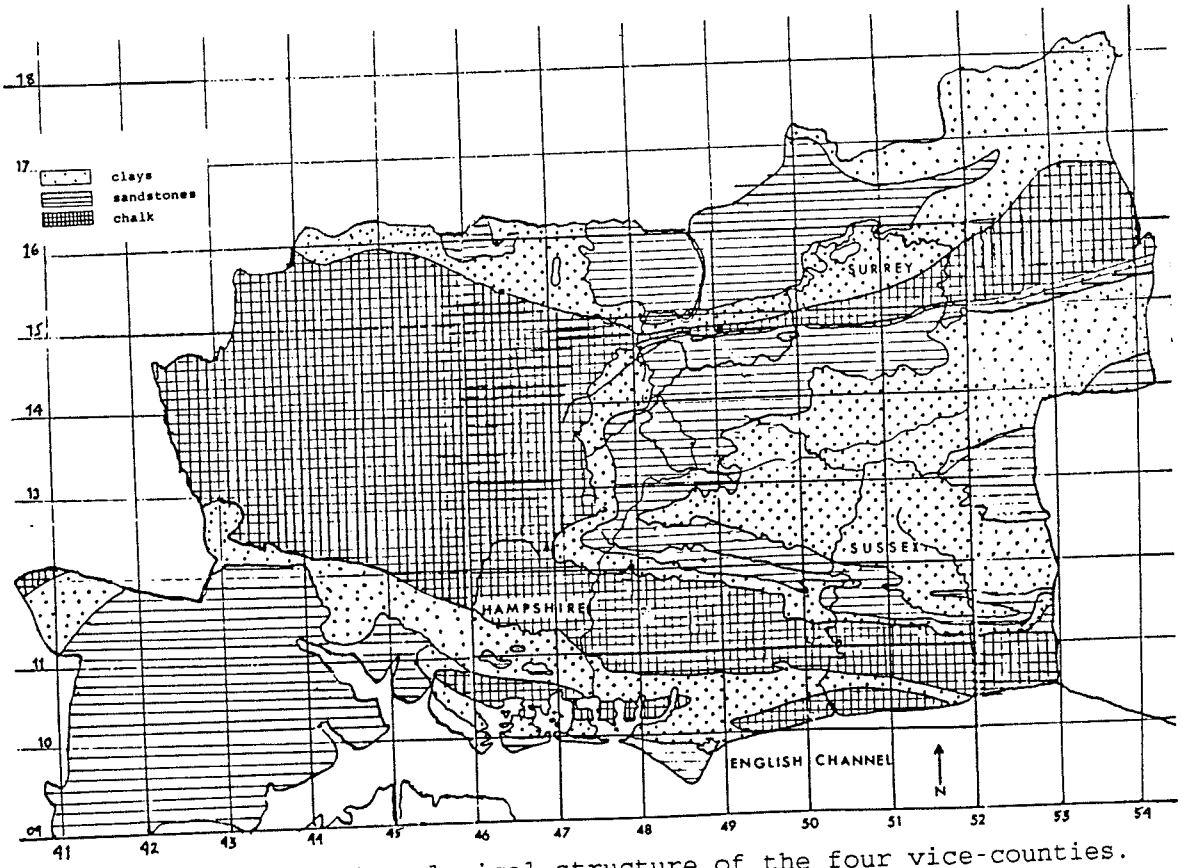
Map 1 shows all the 10 km squares from which I have noted records. The vast majority, which were recorded on a 1 km square basis, come from the area outlined by a bold line on the map: south west Surrey was intensively worked, together with some bordering parts of Hampshire and West Sussex, in such a way as to include detailed results from a full range of soil types present in Central Southern England. Whilst the Western Weald and the neighbouring chalk hills were the principal targets, the south west edge of the London basin, parts of the coast and the New Forest recieved a fair ammount of attention. The intensively farmed parts of North Hampshire were the least prospected: there was no collecting at all in some squares. In the main survey area hundreds of sites were visited and ecological data noted. The distribution of many millipede species was strongly linked to particular rock strata and soil types.



MAP 1. Cover map showing all 10km squares from which there are records.

Map 2 is a simplified representation of the geological nature of the four vice-counties included in the survey. Maps 3-37 show the distribution of 35 of the 37 species that were found out of doors. Hot house species obtained mainly from Kew Gardens are not considered here.

The following text reviews the distribution of the millipedes found, in the light of more recent knowledge of their distribution in the rest of Britain, Ireland and Continental Europe, particularly bearing in mind recent ecological work accomplished in Belgium, France and the Grand Duchy of Luxembourg across the Channel.



MAP 2. Simplified geological structure of the four vice-counties.

OCCURRENCE OF INDIVIDUAL SPECIES

Polxenus lagurus (Linné, 1758) (Map 3)

There are nine scattered records; it has not yet been located in West Sussex. The species has a large geographical range, and occurs in diverse habitats, as reported in Blower (1985). In addition to these habitats fairly recent work from Belgium suggests that it is often found under foliose lichens on tree trunks, as well as under loose bark.

Glomeris marginata (Villers, 1789) (Map 4)

A very abundant animal in these vice-counties, occurring in a wide range of habitats and attaining high population densities in deciduous woodland on chalk. It is a species with a strong Atlantic

orientation in Europe, although it reaches as far east as Poland on the coastal plain. Collecting in woods in Aquitaine, Brittany and Normandy indicates that it abounds in the west of France, but in Belgium it is less common in woodland than in southern England and has seldom been recorded at an altitude of over 300m, though it is found much higher in the South of France. It fades out eastwards in Germany and is not found in East Switzerland. Its distribution in Northern Europe certainly suggests that it is not tolerant of prolonged cold temperatures, and when the weather is cold in winter it does not occur on the surface of the ground or in the leaf litter in Belgium. Over most of continental Europe there are other species of the genus to take into account, some of which occur in the same biocenoses as *G. marginata* especially *G. hexasticha intermedia* which may compete with it and is certainly commoner than *G. marginata* in a number of forests on basic soil where population have been calculated.

Stygioglomeris crinata Brolemann, 1913

It is virtually certain that this small glomerid must occur here and there on the extensive chalk formations found in these counties. The amount of soil sampling in the survey was limited, and I did not find it, but I note a record for West Sussex in the list in the 1993 BMG Bulletin. We have done a fairly considerable amount of soil sampling on chalk in France and Belgium; Berlese extractions have yielded this species from a minority of sites in woodland. We think that soil depth and vegetation cover are perhaps important in determining in which sites it is likely to be found, as well as disturbance in the past. It is not a rare animal, but has a patchy distribution.

Polyzonium germanicum Brandt, 1831

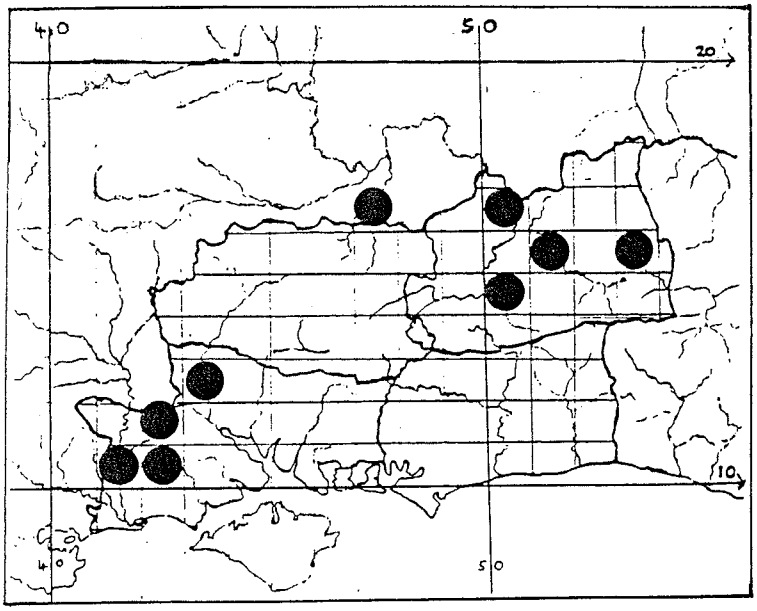
Blower (1958) states that there is a record from Surrey and he subsequently (1985) says that this record requires confirmation. We corresponded about this. I did not find it at all in these vice-counties and it does not appear in the BMG lists.

Craspedosoma rawlinsi Leach, 1815 (Map 5)

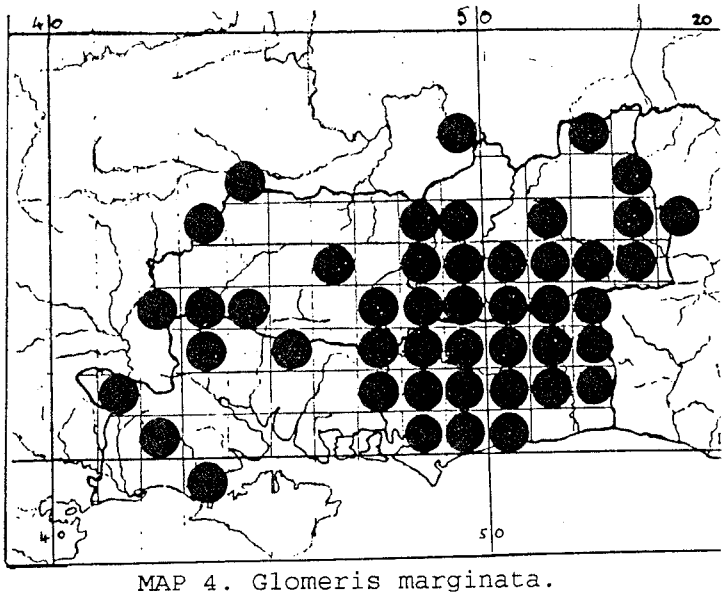
Apparently uncommon, at least during the time of the survey. There are only two records, both from sandstone hills in south west Surrey. In Belgium it is a common animal, particularly in relatively cold situations at an altitude of above 250m and on soils with an acid reaction, features true of hills in the Hindhead area where it was found by Tony Barber. It also appears to be commoner in areas of Britain which are colder in winter, like the Eastern Counties, and, concordantly, it is very common in southern Scandinavia and parts of Germany and Switzerland. Records from France are very scarce indeed, except from the east; this correlates with its absence from south west England (I believe that the 19th Century record from Cornwall has been disowned). But there are several records from South Wales!

Nanogona polydesmoides (Leach, 1815) (Map 6)

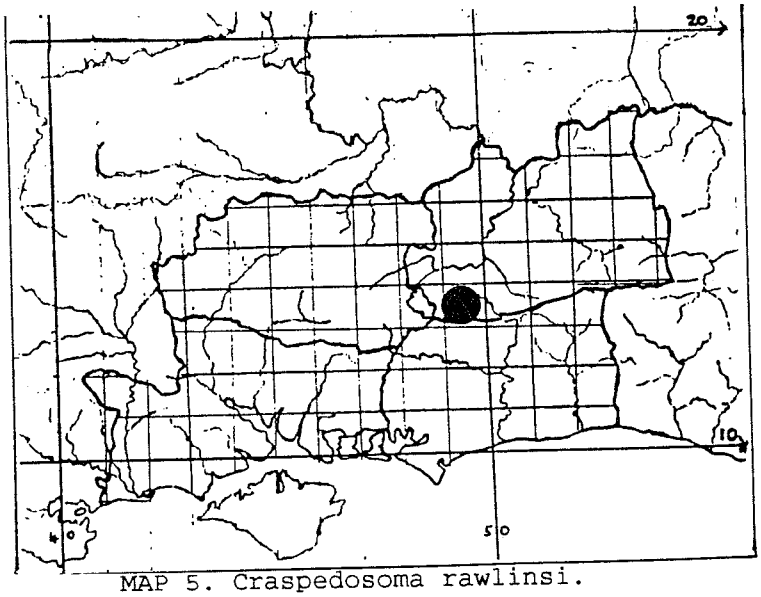
Quite widespread in these counties: it is more common to the west than to the east, and has a very marked Atlantic orientation on the Continent, being almost entirely confined to France, and even there not recorded from Alsace-Lorraine. There are two records from the south of Belgium, and an isolated race occurs in the North of Italy. On the continent most of the southern records are from caves, and, if only for this reason, it is strongly associated with limestone areas. In southern



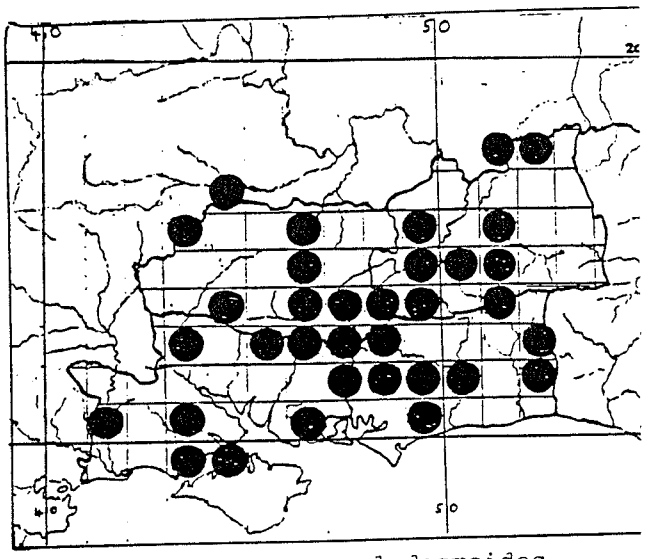
MAP 3. Polyxenus lagurus.



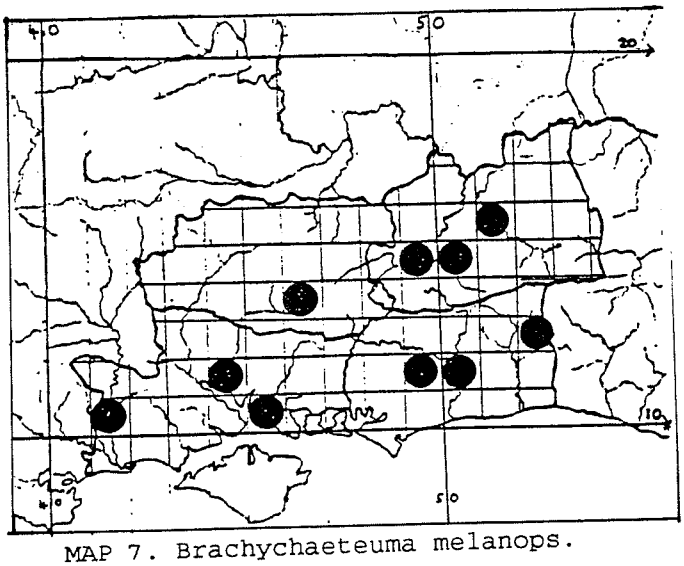
MAP 4. Glomeris marginata.



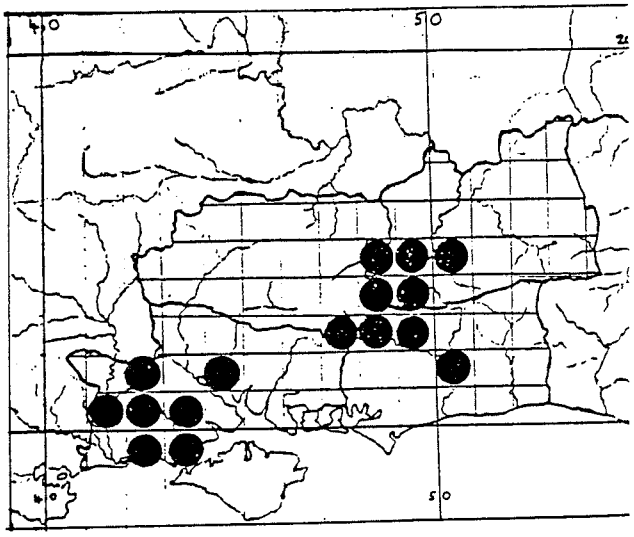
MAP 5. Craspedosoma rawlinsi.



MAP 6. Nanogona polydesmoides.



MAP 7. Brachychaeteuma melanops.



MAP 8. Chordeuma proximum.

England I formed the impression that it was most common on chalk formations. Blower (1985) has already noted that it is more common in limestone districts.

Brachychaeteuma melanops Brade-Birks, 1918 (Map 7)

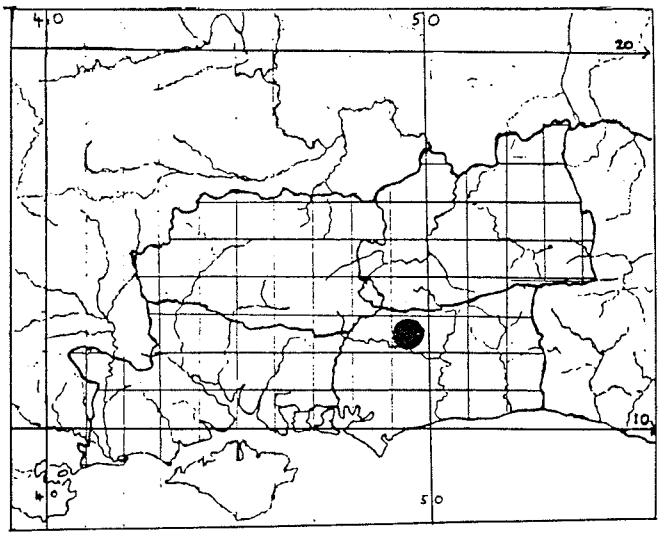
This fairly small species has turned up quite regularly in the Southern Counties in recent years and there are records from all four vice-counties under review, from ten different 10km squares. The records are generally from base-rich areas; most of mine were from chalk formations. Urban, suburban and rural habitats were listed. Thus the synanthropic tendency remarked upon by Steve Gregory (1993) is further supported here. One record was from a garden, confirming his suspicions that it would occur in them. On the other hand some were completely "wild" in rural woodland away from villages. On the continent the species is known only from France, where it is apparently confined to the milder parts of the Atlantic zone: these areas have not yet been thoroughly investigated. In Belgium the only member of the genus so far found is *B. bagnalli* which occurs in several widely dispersed caves and in suburban woodlands round Brussels, very close to habitation. There appears to be very little overlap in the ranges of *B. melanops* and other members of the genus: this could be due to a shortage of records of course.

Chordeuma proximum, Ribaut, 1913 (Map 8)

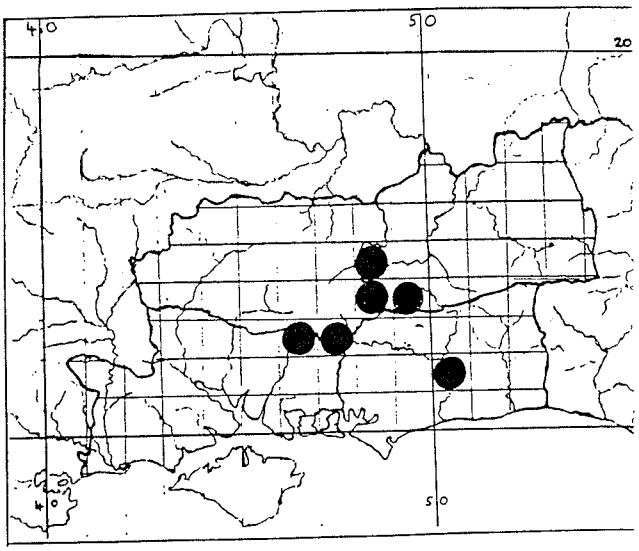
This is another markedly Atlantic species confined to the western half of France on the Continent, where it extends southwards from Normandy to the Pyrenees. It is locally common on sandstone in the Western Weald and in the New Forest area. During the survey it was almost always found in thick acidic litter in pinewoods, pine/oak/birch woodlands or heaths with bracken and heather: in this region it is strongly correlated with podsols. It similarly occurs in markedly acidic woodlands in Normandy. Further south in the Périgord it has been found in damp litter at the bottom of limestone cliffs, and, back in England, it was found in an oak wood on clay south of Bently in East Hampshire, in VC12. This appears to be a previously unpublished record, an omission on my part!

Melogona gallicum (Latzel, 1884) (Map 9)

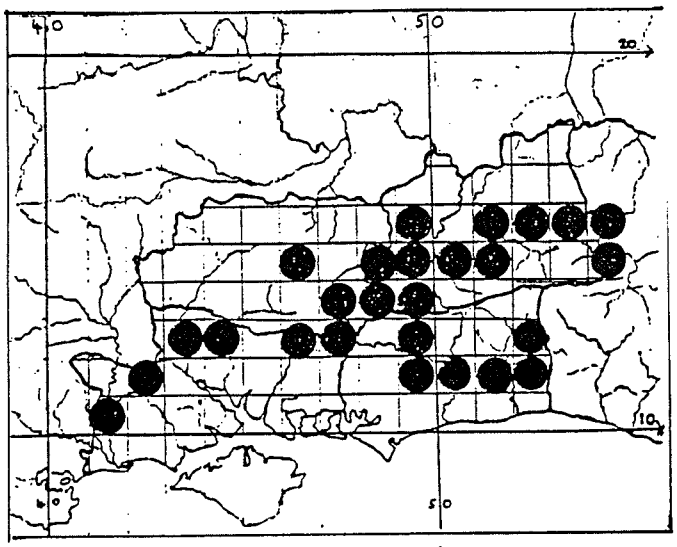
Rather remarkably found only once during the survey, on Telegraph Hill in west Sussex, in a beech/oak/holly wood on Hythe Beds sandstone. Records have accumulated for the West of Britain since it was first found in Wales by Dr. Eason (1957) in 1956, including VC12, Hampshire North. It is however, apparently scarce in south east England, as far west as Hampshire. This is interesting because it is the commonest millipede in Belgian forests and has been found on several occasions in Normandy across the channel; it extends eastwards to the Rhine and southwards to the Pyrenees. Because of its abundance in Belgium we have been able to analyse its ecological preferences statistically (Kime *et al.* 1992). It tends not to occur in soils with very few clay particles (below 8% clay), the highest populations were found in sites with between 8% and 20% clay (up to 385 specimens per square metre) and it occurred in stations with over 35% clay in the soil. 74% of the animals were found at an altitude of between 100 and 200m above sea level, where the mean average temperature was fairly mild, around 9°C and the climate not too continental. The effect of altitude is a rather particular one in Belgium because different rock strata occur in bands at different altitudes, resulting in a marked zonation (see Dufrene & Legrendre,1991). The coastal plain in Belgium has a high sand content and is warmer and drier than the hilly areas. Climatically the coastal plain is more comparable with the Weald than the rather humid Belgian forests that cover large areas of ground above 100m, and where the rainfall is



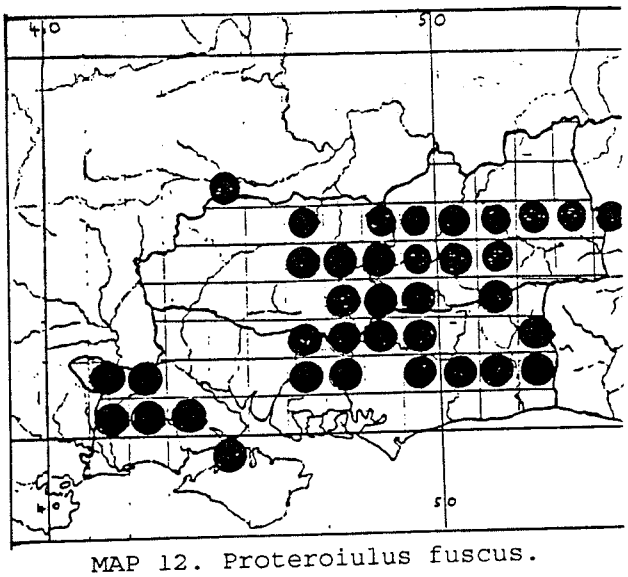
MAP 9. Melogona gallicum.



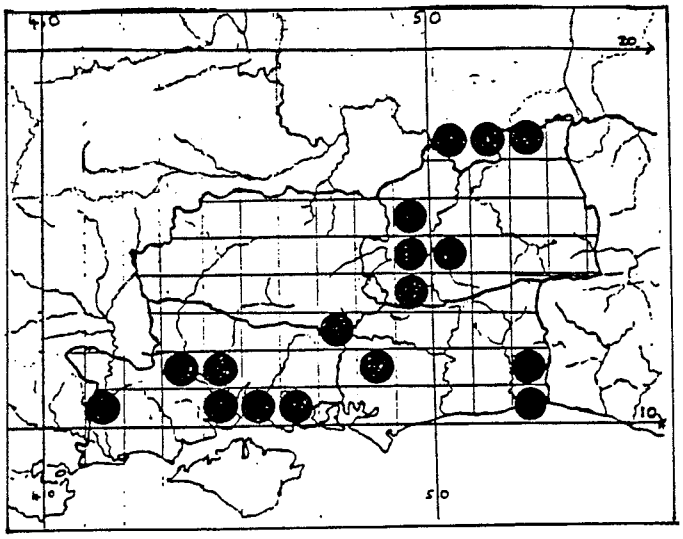
MAP 10. Melogona scutellare.



MAP 11. Nemasoma varicorne.



MAP 12. Proteroiulus fuscus.



MAP 13. Blaniulus guttulatus.

significantly higher. Above 300m *M. gallicum* is rare, and has not been found in forests above 500m: these regions are sub-Atlantic and Montane respectively (Ellenberg, 1988). The species reaches the limit of its geographical range in Belgium, and does not occur in the Netherlands, except in the extreme south east near Maastricht (Jeekel, 1978). It is another Atlantic species, although it occurs much further east than the previous two, and nearly all the French records are in the northern half of the country. The data in the British Myriapod Survey report (Fairhurst, 1984) indicate that most of the records are from litter in deciduous woodland on non-calcareous loams: in the moister west where *M. gallicum* is more common, most of the soils are non-calcareous. In Belgium it is found in litter on calcareous and non-calareous soils alike, it is present in almost every woodland (except in very sandy locations) up to 300m in altitude. Small numbers have fallen into pifall traps in a number of calcareous grasslands, perhaps during dispersal. As a general comment I would say that south east England is unusually dry for the Atlantic zone, and thus has very low numbers of chordeumatids which are associated with moist habitats. It has already been noted that *Chordeuma proximum* occurs in deep litter in the study area, and this litter is invariably moist at the bottom.

Melagona scutellare (Ribaut, 1913) (Map 10)

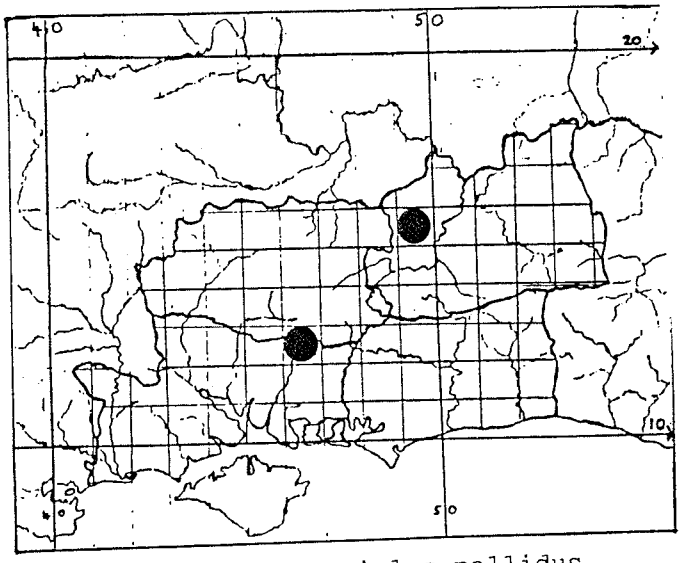
There are eight records from the Western Weald and the Hampshire and Sussex Downs, on a range of soils from greensand to chalk. A have a new vice-county record for West Sussex, where I found this species in an ashwood on May 1st 1994. Continental records are scarce, mainly from the Western Alps in France, Switzerland and Italy. There is also a single record from the Pyrenees. It has not been recorded in lowland France, and not at all in Belgium, Luxembourg, Holland or Germany. Its distribution is therefore markedly discontinuous, and most of the records are from Britain.

Nemasoma varicorne C.L. Koch, 1847 (Map 11)

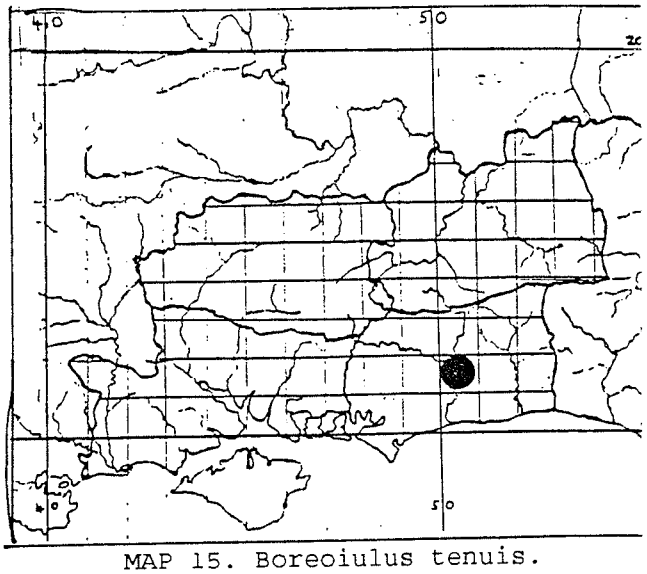
This animal was very abundant in some districts, particularly in old beechwoods, and often in isolated trees in pasture, almost always under the bark of dead branches. Two females were recently (December 1993 and January 1994) caught in pitfall traps set in open grassland in Belgium, indicating dispersal in winter. Although it has a wide distribution in Europe, I find it much less often in Belgium than in Britain, while data from France are scarce and inconclusive at present. Many of the forests that I have investigated on the Continent have been vigorously managed, involving the removal of dead wood and this can obviously account for a shortage of sub-cortical millipedes. On the other hand, there are large areas of semi-natural forest in Belgium, and searching some of these was in vain as well. It is true that in Surrey, Sussex and Hampshire I visited many old woods, for instance on scarp slopes, that are too steep ever to have been cultivated, where there was an abundance of dead timber, or on commons where old trees were similarly neglected, and these were the most fruitful areas.

Proteroiulus fuscus (Am Stein, 1857) (Map 12)

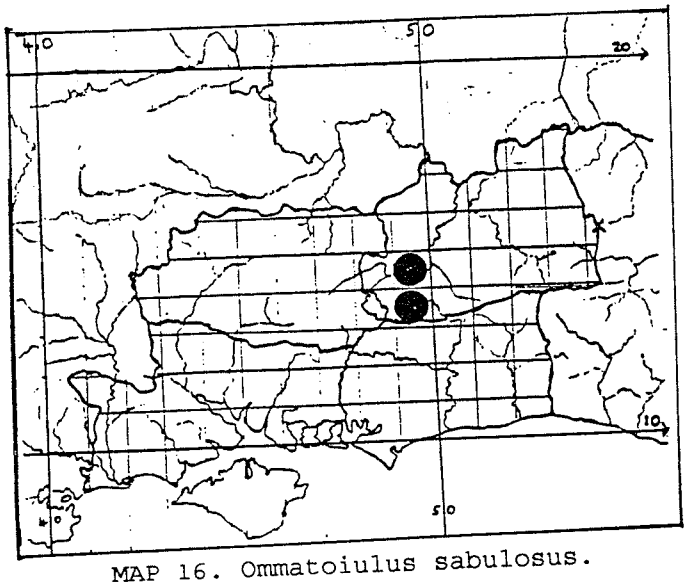
Even more common than the preceeding species, occuring throughout the wooded areas and extending into pine and silver birch woods on dry heath on the poorest soils, such as on Bagshot sands where it was sometimes the only millipede recorded. Again, data from the continent are more scattered, and it certainly becomes less common as you go south. In Southern France there are no records at all from low altitude. But this species extends northwards to Iceland and most of



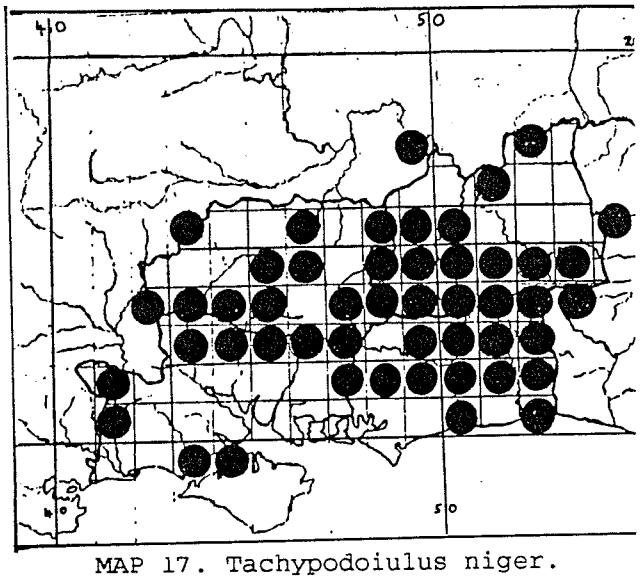
MAP 14. Archiboreoiulus pallidus.



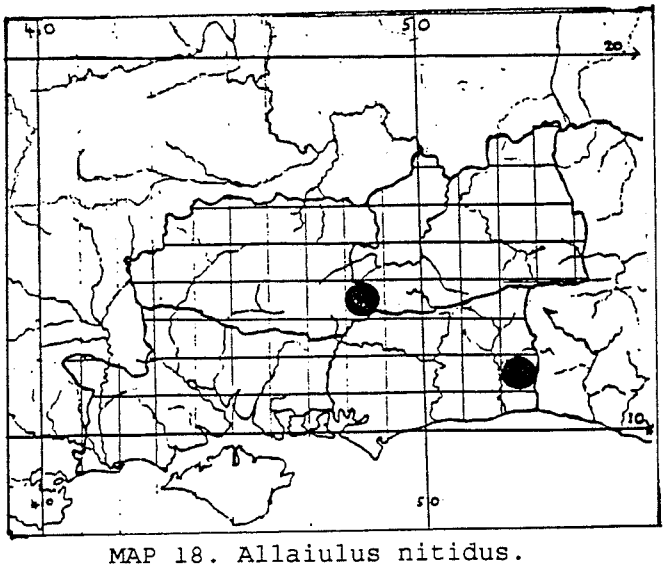
MAP 15. Boreoiulus tenuis.



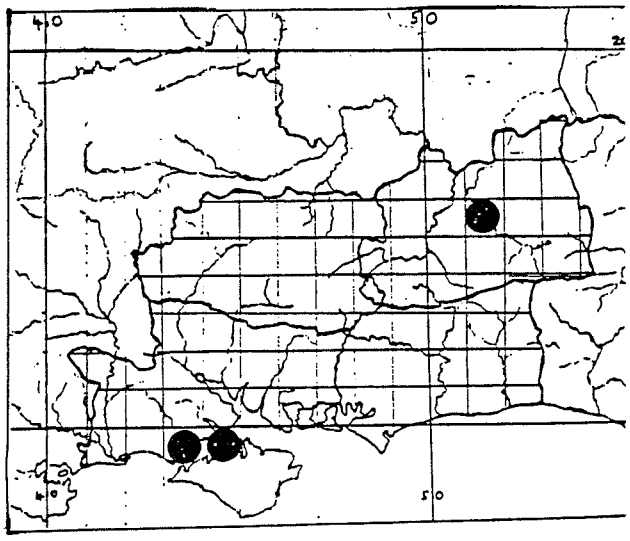
MAP 16. Ommatoiulus sabulosus.



MAP 17. Tachypodoiulus niger.



MAP 18. Allaiulus nitidus.



MAP 19 Cylindroiulus londinensis.

Scandinavia, being found as far north as the Arctic circle. Naturally, almost all of the records made during the survey indicate its presence below bark, but it was occasionally found in litter, and has fallen into pitfall traps on the Continent.

Choneiulus palmatus (Nemec, 1895)

There are records for this species for Surrey and West Sussex in the 1993 BMG list, but I do not have the data. I did not find it between 1967 and 1975, although I have found it regularly in Belgium since than.

Nopoiulus kochii (Gervais, 1847)

There are not yet any data for this area. I find it in Belgium. Despite past nomenclatural confusion there are plenty of established records all across Europe as far as Russia.

Blaniulus guttulatus (Fabricius, 1798) (Map 13)

Known to be very common in the South of England; its synanthropic tendencies are also beyond doubt. Because I scarcely employed soil sampling in my survey, and because the emphasis was placed on the examination of wild sites rather than urban sites and gardens (of which there are some), it is under recorded in the region. In semi-natural woods in Belgium which were investigated partly by means of soil extractions all the specimens obtained came from soils with mull humus, and almost all of them were situated on limestone. The dominant trees in these woods were beech, oak and hornbeam. Blower (1985) states that *B. guttulatus* favours base rich soils. We did not find this species at all in the part of Belgium with the lowest mean annual temperatures (below 8.3°C). Randomisation tests based on the Shannon-Weaver function (free test, Edgington, 1986) indicated that these results were not due to chance. In Britain, it is absent from the north of Scotland of course. In Eastern Europe *B. guttulatus* is entirely synanthropic, and, though human activity has spread this species to many lands, it is possible that it originated as part of the forest fauna of relatively mild West-European forest growing on good soils.

Archiboreoiulus pallidus (Brade-Birks, 1920) (Map 14)

Tony Barber found this animal on the municipal dump in Guildford in 1968, and I subsequently found it in two beechwoods on chalk in Hampshire. As in Britain, continental records are mainly from calcareous sites. East of the Atlantic zone it is synanthropic, and so there may be a scenario similar to that of *Blaniulus guttulatus*. In Belgium and Luxembourg we have obtained it by the use of both Barber traps and Berlese extraction in base rich areas.

Boreoiulus tenuis (Bigler, 1913) (Map 15)

I have just one record from another beechwood on chalk, this time on Rewell hill, near Arundel, in West Sussex. Fairhurst (1984) states that it appears to be rare in the south. In Europe, it has much the same distribution as *Archiboreoiulus pallidus*. There are recent records for Hampshire North and Surrey in the 1993 BMG list.

Ommatoiulus sabulosus (Linné, 1758) (Map 16)

There are only three records from these vice-counties, two of them from the survey. Both of these latter were from the sandstone outcrops in Surrey. Its possible scarcity is surprising in view of its known distribution, its ecological preferences, and its status as a common European species. It has about the largest range of any European millipede, having been found in almost every country, and there is no obvious reason why it should be less common in south east England than in other parts of Britain, as it is widespread in the warmer parts of the Continent.

In Belgium it is common in sandy areas (Biernaux, 1969) and we have found it in over half the calcareous grassland sites that have been extensively sampled by pitfall trapping. Sandy and chalky habitats do share a number of features, especially with respect to drainage and temerature, and particularly in open situations. In the Grand Duchy of Luxembourg, it has been recorded in almost all the investigated sites in the lower-lying southern half of the sountry, most of which are calcareous (Kime, in press). There are large numbers of records from France where it is very common, especially in the south, but its populations are known to fluctuate considerably over a period of time. It sometimes reaches plague proportions locally. It was reported from Brittany by Blower (1987) and Lewis & Kime (1988). However, we did not find it (Kime *et al.*, 1987) in Normandy, further east, in an admittedly not very extensive survey of 22 sites, most of which were visited in the autumn; while the animal is most active in the summertime. It wanders a lot and Barber traps provide a very efective means of catching it.

Tachypodoiulus niger (Leach, 1815) (Map 17)

One of the four most common species in the area, as in Britain generally (Blower, 1985). Quite eurytopic in the survey area, but especially abundant in woodland on chalk, again as reported elsewhere e.g. Pedroli-Christen (1993). It is abundant throughout most of north west Continental Europe (Kime, 1990).

In quantitative analyses of the Belgian woodland arthropod fauna over 75% of the individuals of *T. niger* were collected from calcic mulls, though it occurred in a great variety of woodland up to 550m in altitude. Stations higher than this were peaty and acidic, and it was not recorded. It was caught in the vast majority of calcareous grasslands sampled in both Belgium and Luxembourg, and not captured in bogs, marshes, moorland and heathland. Transects across 16 hedges in Luxembourg, in 14 of which it occurred, showed that it was much more abundant in the hedges than outside in the open fields (Kime, 1994), and, again it was virtually always recorded in woods on limestone in the Grand Duchy. It is absent from low ground in the south of France, which suggests that it may be limited by high summer temperatures. It occurs to heights of well over 2000m in the Alps (Pedroli-Christen, 1993).

Allaiulus nitidus (Verhoeff, 1891) (Map 18)

It was first collected in the region south of Haslemere in Surrey by Tony Barber in 1967, uncharacteristically from a sandstone area, since it is more often recorded on limestone. The second discovery in 1993 by the British Myriapod Group at Woodmanstone Church in West Sussex was not on limestone either. Geoffroy (1981) and David (1987) wrote about the ecology of *A. nitidus* in detail, having studied it in France, also on non-calcareous soils. David associated it with mull humus. In Belgium it is a common woodland species and, as with *Tachypodoiulus niger*, we have

found over 75% of our specimens in calcic mulls. In England, in the survey area, I searched many calcic mulls without finding it - it was sent to me from a few places on the North Downs in Kent by Tony Barber notwithstanding. In Belgium we established a connection between *A. nitidus* and high clay content of the soil, the species is infrequent on sandy ground. Its optimum habitat is apparently woodland with mull humus and a "good" base-rich soil. 90% of our Belgian specimens occurred in regions where the mean maximum summer temperatures were below 21.1°C, that is to say, in the cooler zones in summer. In France *A. nitidus* has a strong north east orientation, perhaps also connected with temperature.

Cylindroiulus londinensis (Verhoeff, 1891) (Map 19)

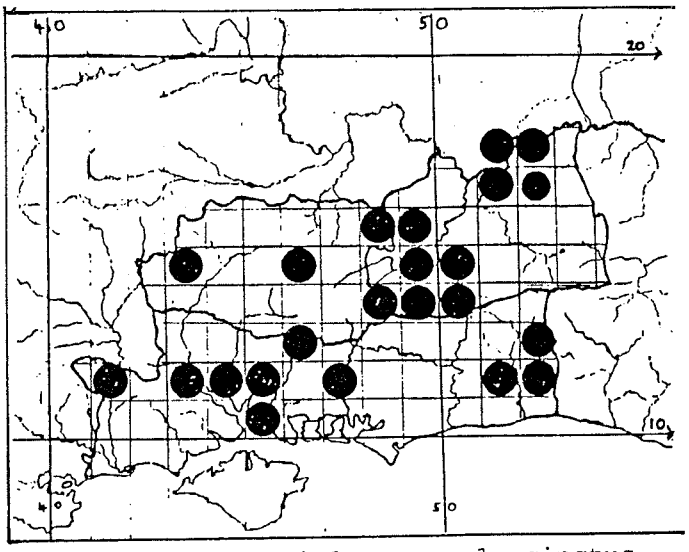
Although I have found this conspicuous animal many times I did not recorded it at all in the survey area; the records on the map are from John Sankey on Box Hill in Surrey (where I unsucessfully looked for it) and from Dick Jones in Hampshire South. The 1993 British Myriapod Group list gives Hampshire North as well. I expected to find it on the North and South Downs, since it often occurs on chalk, including the North Downs in Kent, but I did not. As it is so hard to overlook I concluded that it was rare in the area. It is a truly Atlantic species recorded on the Continent only from northern areas of Spain, and France west of the rivers Rhone, Saone and Seine. Other continental reports of the species are erroneous, resulting in nomenclatural confusion (see Blower, 1985), and refer to *C. caeruleocinctus* which occurs widely. In parts of the West of France *C. londinensis* is very common indeed, for example in oak woods on the extensive limestone formations. Only this much is certain at present. Much of Western France remains to be surveyed.

Cylindroiulus caeruleocinctus (Wood, 1864) (Map 20)

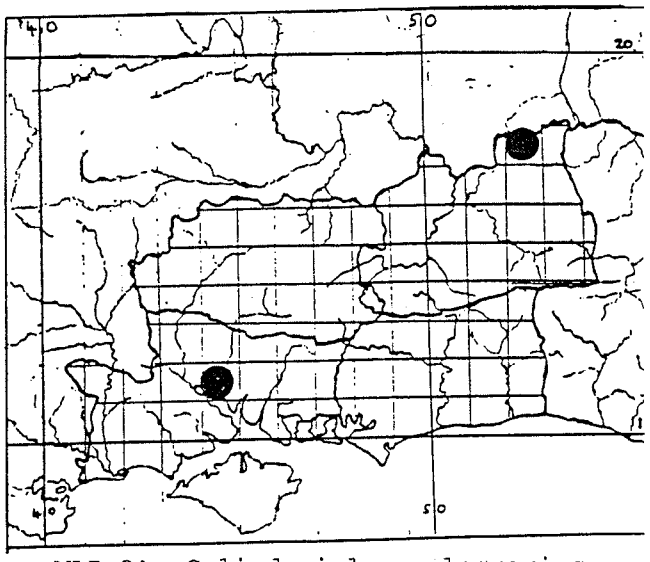
The survey in 1967-1974 revealed the relative abundance of this species in Surrey, where it was placed sixth in rank order, and it is widespread and frequently encountered in Hampshire and Sussex as well, although I did not find it in West Sussex until recently, when I looked at the sandstone ridges in the east of the county. Its association with calcareous soils, and also with cultivation and urban sites, is well known. I have found it in garden lawns in Belgium, where it is common, away from towns and cultivation I have found only one single specimen in a forest, on the other hand it was caught in pitfall traps in every calcareous grassland sampled, oftern in hundreds, and in one case thousands. This helps to explain its apparent south east orientation in Britain, as suggested by Blower (1985), who pointed out its association with Jurassic limestone and chalk. It is very common on these rocks, but in the south east it is also abundant on Lower Greensand where it occurs in the rather open and rather dry woods; I suspect that this reflects its ability to withstand the relativeiy dry conditions, and that it should not be regarded as a strict calcicole. Its presence in woodland in the south-east may be due to its adaptation to their periodic dryness, just as the rarity of chordeumatids may indicate their lack of tolerance of the same phenomenon. A recent survey of calcareous grasslands in the Grand Duchy of Luxembourg has shown that *C. caeruleocintus* is the most abundant species recorded there.

Cylindroiulus vulnerarius (Berlese, 1888) (Map 21)

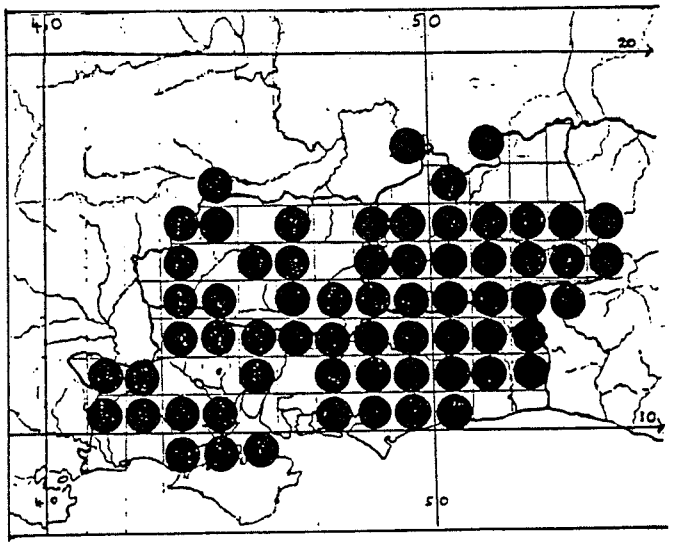
Found in south west London by Adrian Rundle and in Southampton (VC12 by Dick Jones. A native of Italy, it has been recorded frequently in Holland and Belgiun in sites associated with human activity, in particular horticulture, and suburban woodland. I often find it round and in



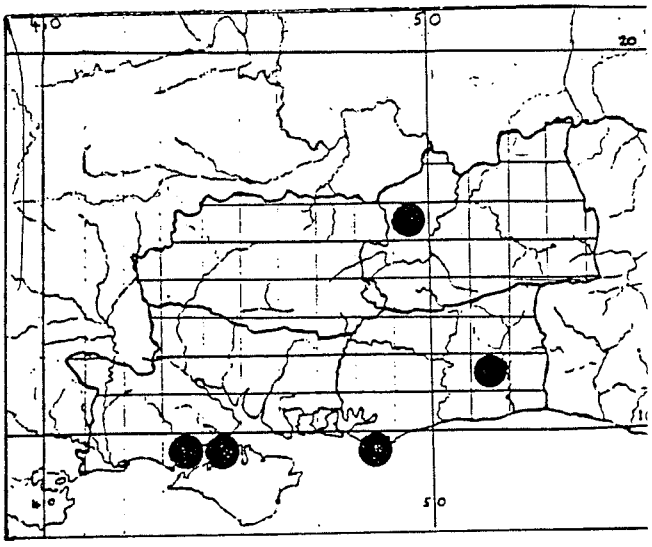
MAP 20. Cylindroiulus caeruleocinctus.



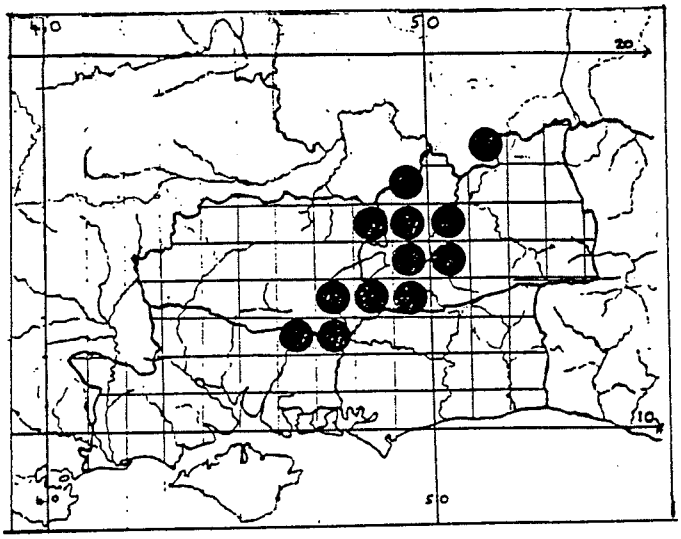
MAP 21. Cylindroiulus vulnerarius.



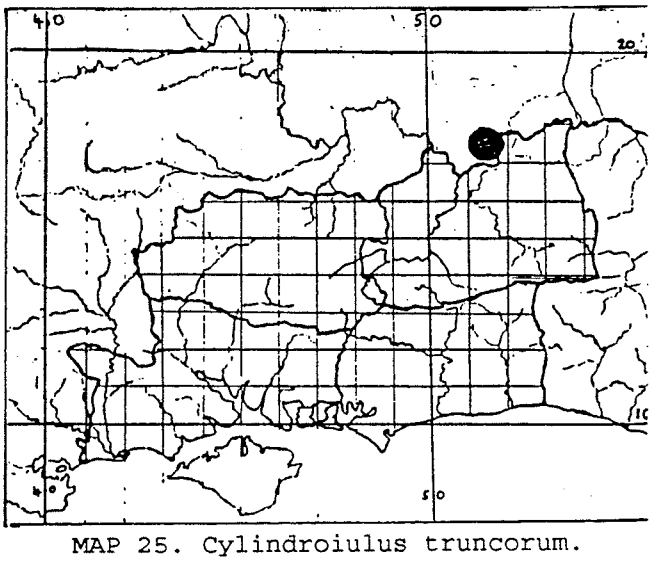
MAP 22. Cylindroiulus punctatus.



MAP 23. Cylindroiulus latestriatus.



MAP 24. Cylindroiulus britannicus.



MAP 25. Cylindroiulus truncorum.

Brussels. There seems to be a good chance of finding it in synanthropic sites. Yet, records from West European countries other than those mentioned are so far very few.

Cylindroiulus punctatus (Leach, 1815) (Map 22)

This animal is so common, first ranked in order, that its distribution map is nearly as complete as the cover map (Map 1), and it probably occurs in every square. Although it lives in dead wood for much of the year, we have not found *C. punctatus* in forests on the heaviest soils in Belgium; over 65% of the specimens occurred on soils with between 8% and 20% clay particles. In forests 61% of the animals occurred on mulls and 33% on mull-modders, and 87% were found on base-rich soils (Kime *et al.*, 1991). Looking back over British data I see that I did not find *C. punctatus* in some deciduous woods (mainly oak) on the heavy clay in the Weald where I recorded *Polydesmus coriaceus gallicus* or *P. denticulatus* both of which I associated with damp situations on heavy ground. *C. punctatus* occurred in a much higher proportion of well-drained sites. Finally, most of the *C. punctatus* in Belgium were found at an altitude lower than 200m above sea level. It has not yet been found in the highest parts of the Ardennes, and frequents the zones that are mildest in winter. This tallies with its frequency near the Atlantic Ocean and the North Sea, and its absence from Central European mountains and Eastern Europe.

Cylindroiulus latestriatus (Curtis, 1845) (Map 23)

Three coastal records and two inland, the latter from a garden on sandstone in Sussex and from logs on a sandy substrate in a Surrey pasture. This millipede is known from the Canary Islands, the Azores and European coasts from Portugal to the Faeroes, Norway, Sweden, Finland and Russia, as well as inland, where it is mainly synanthropic. It has been readily introduced into many countries (see Blower, 1985). In Belgium it occurs in sandy areas along the coast as well as inland as well. There are not many French records; these are almost all coastal.

Cylindroiulus britannicus (Verhoeff, 1891) (Map 24)

This turned up regularly during the survey, 13th rank order, though I cannot find a record from West Sussex, from where it is now listed. It was found mainly in or below dead wood, sawdust, or leaf litter. It has not yet been recorded from Spain, France or Belgium, and it mainly synanthropic from Holland eastwards to Russia. Blower (1985) lists Belgium from some source, but I have been quite unable to find any reference to it, and certainly no Belgian specimens. Verhoeff (1891) named *Julus britannicus* accurately; Britain and Ireland are definitely its headquarters. The fact that it is absent from the Atlantic zone of continental Europe leads to one speculation that it survived the ice age in a Hibernian refugium. It is unlikely to have been obliterated by competition in the whole Atlantic zone. The French millipede list now runs to 281 species, so it is unlikely to figure significantly on this, even if it is found one day from France. Coastal records from Portugal, Madeira and the Azores are possibly introductions, like those from America, South Africa and New Zealand. Or the former might just be relict populations which escaped the glaciations.

Cylindroiulus parisiorum (Brolemann & Verhoeff, 1896)

Not yet recorded from Surrey, Hampshire or Sussex. In Belgium it occurs "wild" in dead trees, other continental records are again generally synanthropic. Most of the records of this species are British too!

Cylindroiulus truncorum (Silvestri, 1896) (Map 25)

Another discovery of Dr. Adrian Rundle from the Royal Botanic Gardens at Kew. The species has been introduced into a number of North European countries from the Mediterranean region. In some places in Belgium it has become numerous and on one occasion swarmed and was reported to the authorities by the resident whose property it infested. It occurs in my own garden.

Haplopodoiulus spathifer (Brölemann, 1897)

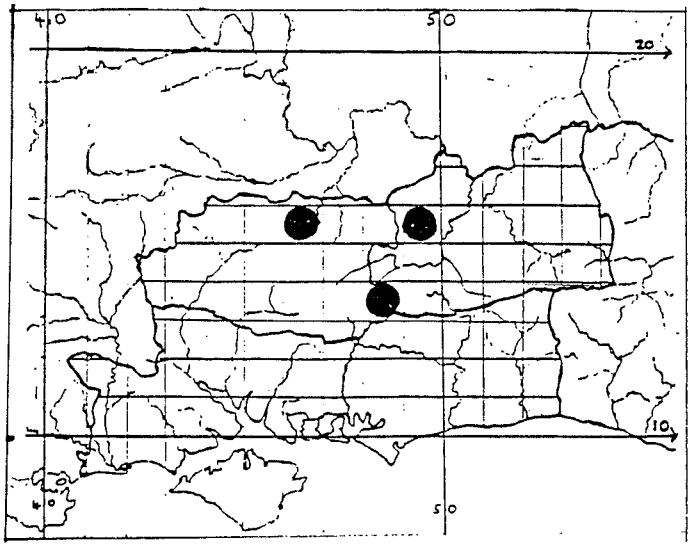
Listed from West Sussex in the BMG list. Supposedly an introduction from the Pyrenees, but it is not absolutely certain. I have found "pyrenean" and "alpine" species in ancient forests in Belgium. The intervening areas in France have been but poorly prospected so far, and some of these animals have bigger ranges than we presently suppose.

Julus scandinavius Latzel, 1884 (Map 26)

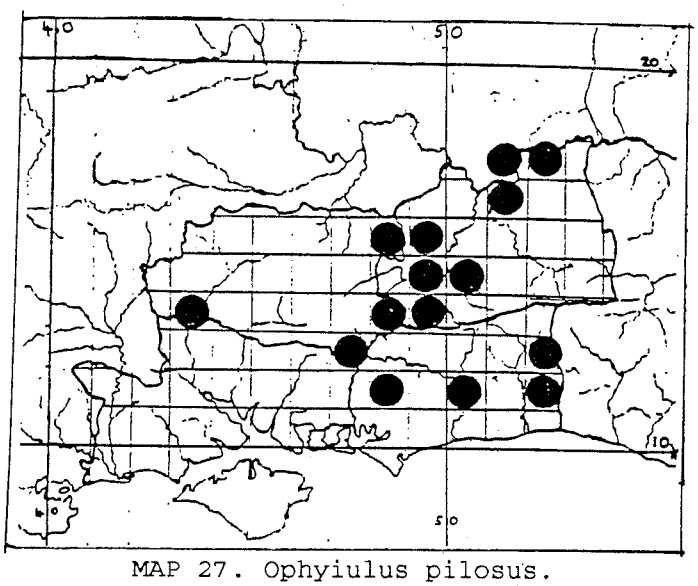
The relative scarcity of this species in south east England has been previously reported (Kime, 1978; Blower, 1985); it seems to be less common than in most parts of Britain. There are not many records from France either, other than the east: its main area of distribution on the Continent is northwards from the Alps to Norway and Sweden. With one exception continental records are from East of the longitude of Dover. It is a very common species in Belgium and Luxembourg, as well as further east, and has been discovered in a large number of different habitats. It is one of the most frequently encountered species in pitfall traps, and has been taken in heathland, meadows (from dry calcareous to marshy in nature), by rivers and ponds, in a raised bog, in hedges and several types of woodland, but never on woodland on limestone. Pedroli-Christen (1993) likewise signals its absence from calcareous woodland in Switzerland. The woodland sites in Belgium all had high levels of silt in the soil, some were also sandy and frequently acidic: open sites were often sandy, including dunes on the coast. While it falls readily into pitfall traps, extractions from soil samples have shown very low densities in most habitats, and it is possible to overlook it in places where it does occur. Only in a few woods have we found densities such as that described by Gordon Blower (1970) in Cheshire. Having said this, it is still very remarkable that I found *J. scandinavius* only twice in eight years in the survey area in Southern England, on both occasions on sandy heaths in Surrey, and that there is only one other record from the vice counties, from Great Sorrel Copse, Chineham, N. Hampshire. As far as I am aware there are still no records at all from either Hampshire south or West Sussex, and only one from East Sussex made during the British Myriapod Group visit in 1993. I see that it is at present ranked tenth in Suffolk (Lee, 1994) and has been recorded in about a third of the 10km squares in that county and not yet in the Brecklands. On the face of it this is a very different situation to that south of the Thames. There is scope for future study!

Ophyiulus pilosus (Newport, 1842) (Map 27)

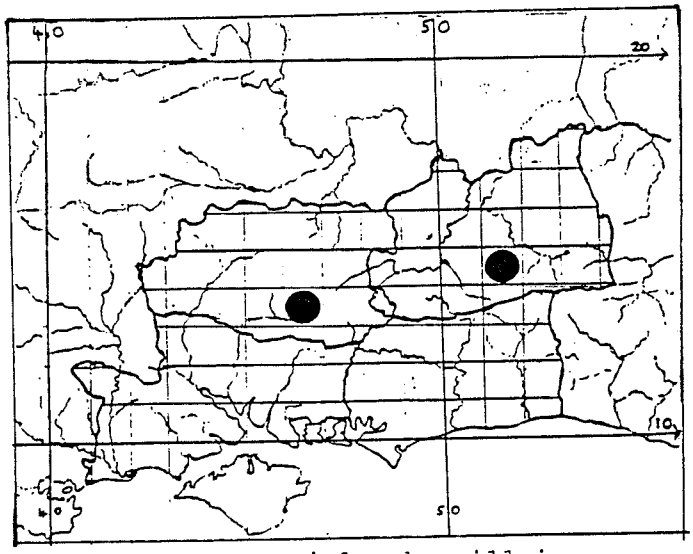
This is a millipede with a rather patchy distribution in the study area. It has a very interesting and unusual distribution in Europe. While it is very common in Britain and Ireland, countries which have supplied a significant proportion of the data for the species, there are no records from mainland France, Luxembourg, Belgium and almost the whole of the western half of Germany. Apart from a couple of isolated records from Holland, it occurs in the central and eastern countries from southern Scandinavia as far south as Italy and Croatia. It has been reported from Corsica as



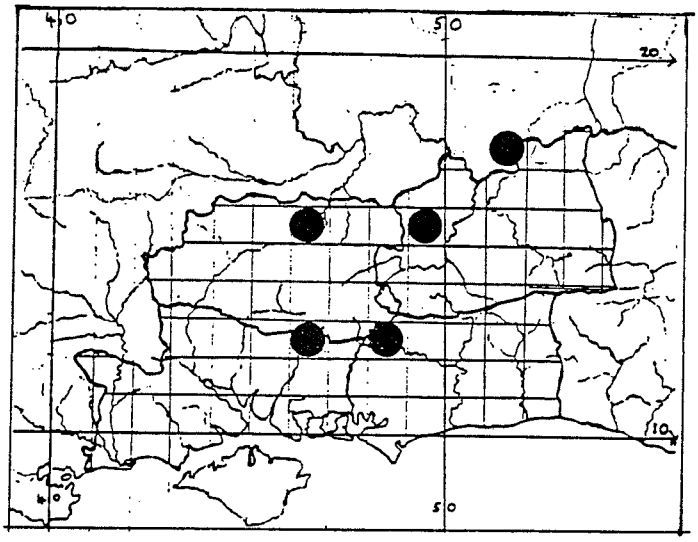
MAP 26. Julus scandinavius.



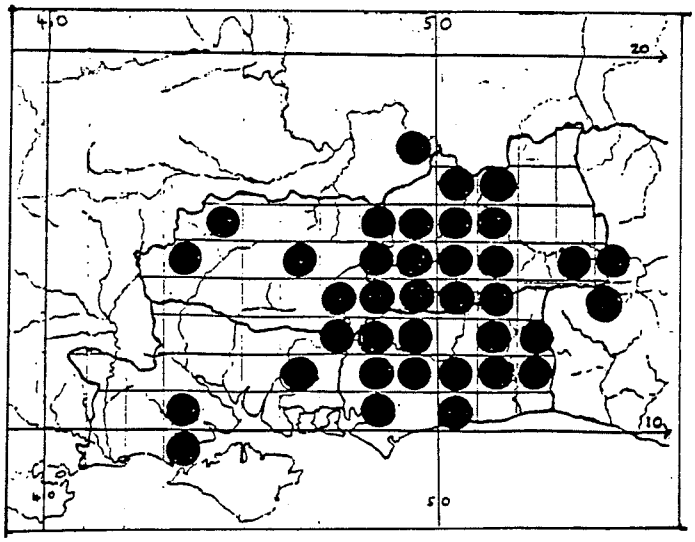
MAP 27. Ophyiulus pilosus.



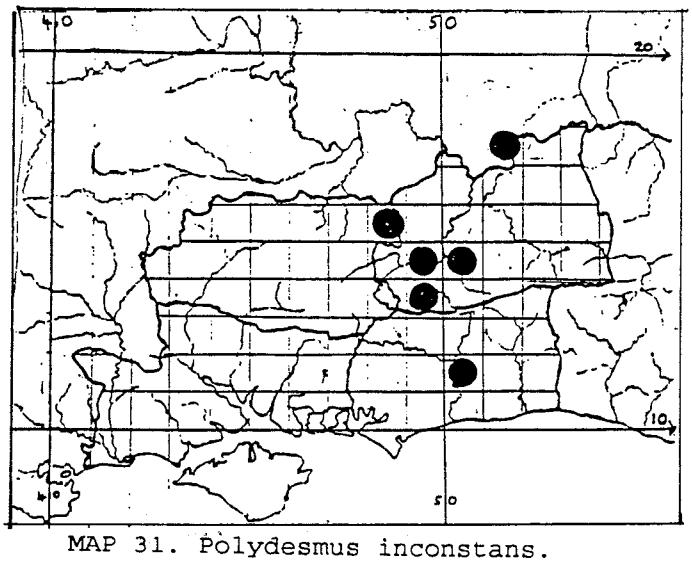
MAP 28. Leptoiulus kervillei.



MAP 29. Brachyiulus pusillus.



MAP 30. Polydesmus angustus.



MAP 31. Polydesmus inconstans.

well. There are several isolated populations, and a comparative study ought to prove worthwhile undertaking. Its virtual absence from Atlantic Continental Europe makes one compare it with *C. britannicus*. But in this case it must have also survived the glaciations in Italy at least.

Leptoiulus belgicus (Latzel, 1884)

Known from the south-west, west and the Channel Islands; it has not been found in this part of England. It has a western distribution on the Continent which nevertheless extends into eastern Germany.

Leptoiulus kervillei (Brolemann, 1896) (Map 28)

Only two records. On the Continent it is found in west and north France, Belgium and the southern tip of the Netherlands, a restricted Atlantic distribution. Its habitat is quite specialised; it is associated with high silt content of the soil and lives in mull litter, mainly calcic mulls, and below 300m in altitude except in the south of its range in the Pyrenees.

Brachyiulus pusillus (Leach, 1815) (Map 29)

Scattered records, mainly from grassland, and probably under recorded in my survey which concentrated on woodland. In Belgium and Luxembourg we have found it in pitfall traps set in grassland, especially low-lying pastures, and not in Berlese extractions from woodland.

Polydesmus angustus Latzel, 1884 (Map 30)

The second most abundant species in my survey, common throughout the west of Europe as far south as the Pyrenees and the Italian Alps. Undoubtedly eurytopic, yet ordination procedures indicate a preference for lighter (well drained) soils, and obviously litter or especially debris to shelter under.

Polydesmus testaceus C.L. Koch, 1847

Recorded from a cave in Surrey by Hazleton & Glennie (1962), presumably in the north Downs. It is a well known calcicole in Western Europe, common in grassland on chalk and limestone, and occasionally found in woods. In view of its presence in Cornwall, Kent and Essex, logically it should occur on the extensive chalk formations in all four vice-counties under consideration here, even if it is at the northern limit of its range. It is very easily obtained by pitfall trapping in spring and summer when it moves about on the surface of the ground at night.

Polydesmus inconstans Latzel, 1884 (Map 31)

Specimens were obtained from time to time in grassland, arable farmland and woodland, though not yet from Hampshire South. In Belgium and Luxembourg it is common in some of the calcareous grasslands sampled, but in a minority of them and was obtained during a survey of woodlands using Tüllgren funnels from two base rich sites in deciduous forest. It attains quite large populations on some sites on limestone.

Polydesmus coriaceus Porath, 1870 *gallicus* Latzel, 1884 (Map 32)

A western species confined to Ireland, Britain, west and north France, lowland Belgium, northern Spain and Portugal, with Madeira and the Azores. Sub-species are recognised in the south where it is very variable. Our form, *gallicus*, occurs everywhere to the north of the Pyrenees. It is common in parts of the survey territory, with an apparent preference for clay soils and usually found in damp oak woods, pastures (usually under logs) and shady escarpment woodlands. In these mild areas it is active all the year round.

Polydesmus denticulatus C.L. Koch, 1847 (Map 33)

I have met with this species sufficiently often to consider it locally common; it is usually found near the water table or in rather wet woodland in these counties. Most of my British records were from oak woods, especially on clay in the Weald.

In Belgium it has occurred in Tüllgren samples from near streams in four oak woods, in pitfall traps near ponds and in a raised bog. It has also been collected from flood plains and polders, often in agricultural land. It can withstand being submerged in water (Zulka, 1992). Remarkably, it has been caught in pitfall traps on dry calcareous grassland in Luxembourg, during the summer months, occurring in large numbers. It was also taken in upland pastures in the same country. *P. denticulatus* has a large geographicl range in Europe, where it is regarded as eurytopic, reaching 2382m in altitude, with a marked peak of activity in July (Pedroli-Christen, 1993).

Brachydesmus superus Latzel, 1884 (Map 34)

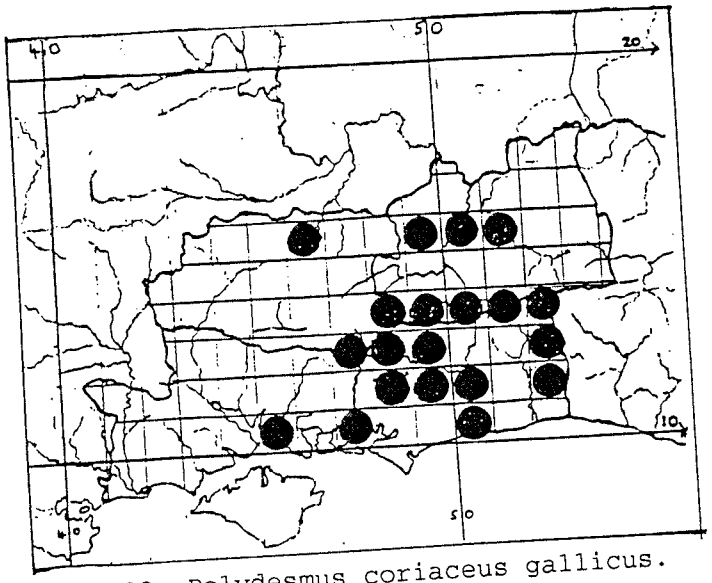
A common animal in most European Countries, *B. superus* occurs widely in cultivated land and wooded areas. It has appeared in almost exactly two thirds of the woodland sites sampled by Tullgren extractions in Belgium, from calcareous and non-calcareous soils alike, which is unusual, but reached high densities particularly on limestone (over 400 individuals per square metre). It has been caught in pitfall traps in calcareous grassland and is common on the Muschelkalk formation near the River Moselle in the east of Luxembourg. Although it is widespread, or because it is, there is still much to learn about its precise requirements. Statistical analyses suggest some temperature preferences, but these are not very obvious in the field.

Macrosternodesmus palicola Brolemann, 1908 (Map 35)

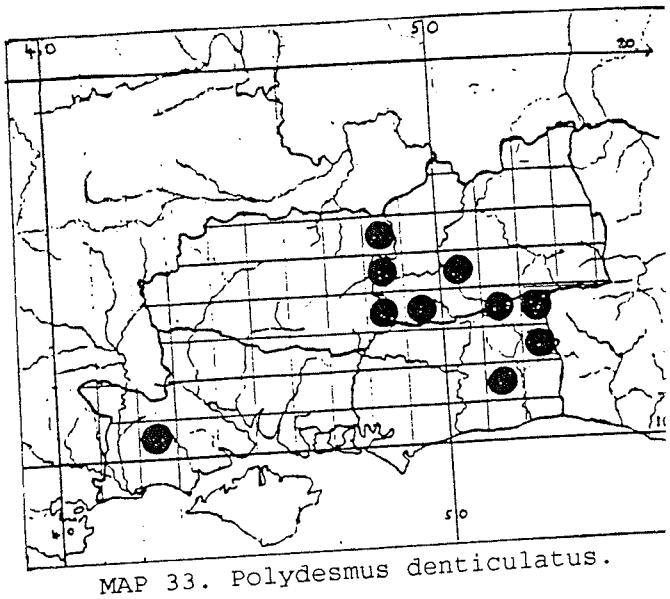
A calcicole located several times on chalk in Sussex, Surrey and Hampshire, generally in the beech woods which grow on the Downs. There used to be few continental records, but it is now turning up very regularly in samples from limestone, and is proving to be a common animal on such strata. It has obviously escaped attention because of its small size. There are also some synanthropic sites given in the literature.

Ophiodesmus albonanus (Latzel, 1885) (Map 36)

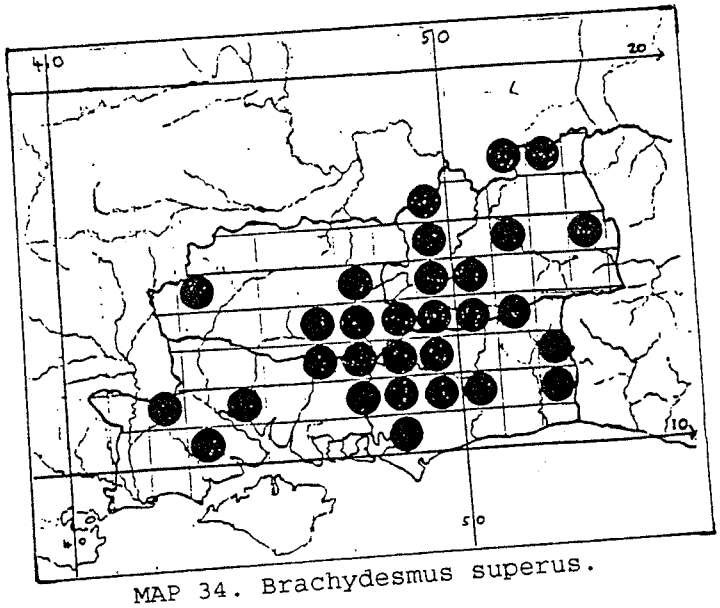
This is also turning up here and there in all vice-counties. On the continent it has been found much less often than *M. palicola*. In twenty years I have only found it twice, once in Belgium and once in France in association with a species new to science! There are over twice as many records from



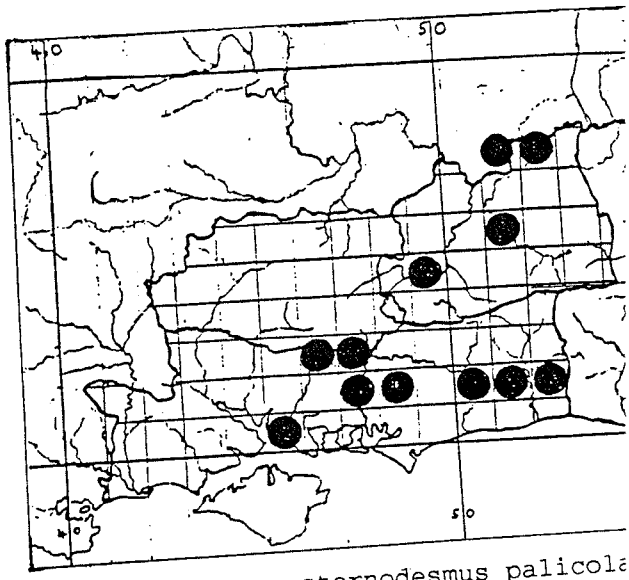
MAP 32. Polydesmus coriaceus gallicus.



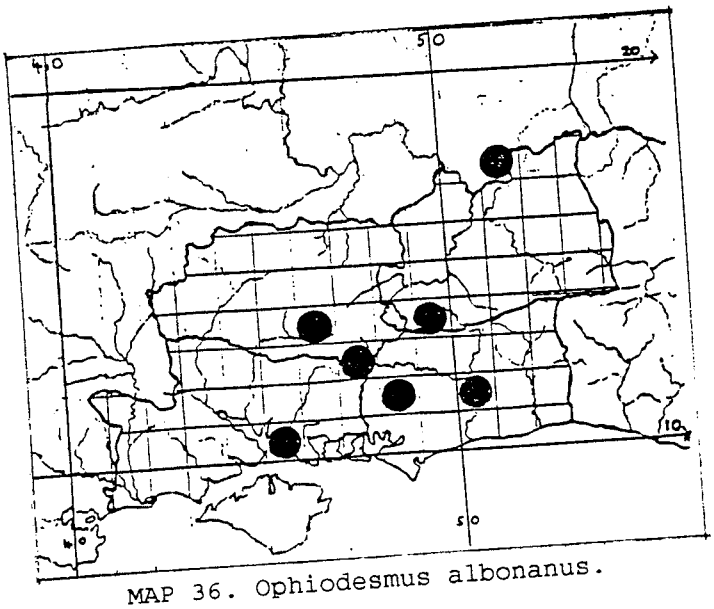
MAP 33. Polydesmus denticulatus.



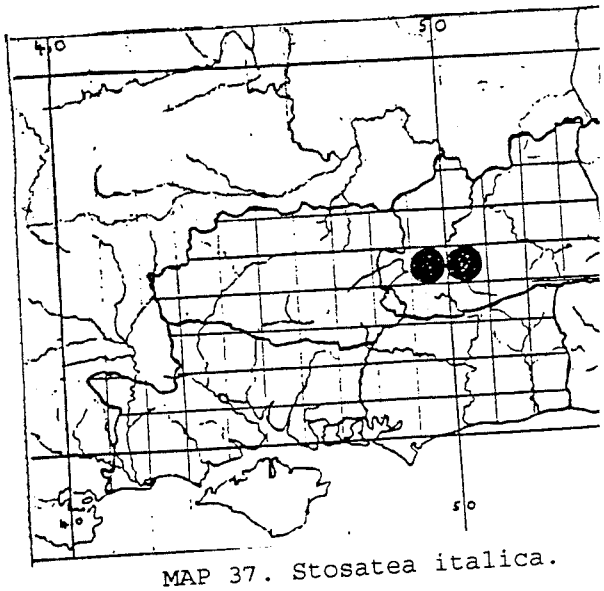
MAP 34. Brachydesmus superus.



MAP 35. Macrosternodesmus palicola



MAP 36. Ophiodesmus albonanus.



MAP 37. Stosatea italica.

Britain as there are from the continent where it has been found from France to Sweden. The Hampshire, Sussex and French specimens were found on chalk.

Stosatea italica (Latzel, 1886) (Map 37)

A native of the Mediterranean region, *S. italica* has been discovered in the Paris Basin in France, in the Netherlands, Luxembourg and Switzerland, as well as in Britain and Ireland. It was found at Valkenburg near Maarstricht in the Netherlands and was another species erroneously reported from Belgium, probably because Schubart did not doubt that it would occur there.

S. italica was collected on a number of occasions in Guildford in 1967: subsequent monitoring of these calcareous and synanthropic sites failed to reveal it again, just as Jeekel (1978) failed to find it again near Maarstricht.

CONCLUDING REMARKS

The distribution patterns of millipedes are interesting and of course relate to their evolutionary history. In Britain, they are just about entirely due to events since the last glaciation, the fauna being chiefly composed of pioneer species with a generally large distributional range. Because species spread northwards, there is a large Atlantic element in the British list. At the moment it is difficult to see how some species spread north because they have not been recorded in France, e.g. *Cylindroiulus britannicus*, *Ophyiulus pilosus*, *Anthogona britannicum*, whilst others e.g. *Chordeuma silvestre* are 'in the wrong place' and apparently introduced. On the continental scale there is a very strong inference that the geographical range of millipedes is greatly dependent on temperature, for example the Atlantic species do not occur in areas where it is cold in winter. At the regional and local level we can predict distribution patterns on the basis of factors that relate to the soil, in particular soil texture, type of humus, water and mineral content. It was the very fact that the soils are so varied in the Western Weald that led to this choice of study area.

It is encouraging that millipede distributions can be predicted in a given region on the basis of soil analysis. It promotes confidence in our science. Further, it may be possible to assess the amount of disturbance that a particular habitat has had. It is the case that the most species-rich habitats are often the least disturbed, for instance steep scarp slopes which have never been cultivated (these are often on calcareous soils because of the number of calcicolous millipedes). The presence of a complete set or guild of millipedes may indicate no or negligible disturbance and might indicate sites worthy of protection in Nature Conservation. This evaluation can be made at most times of the year. It has to be added that some suburban and urban areas contain many synanthropic species and may be rich in different niches, especially where vestiges of original vegetation persist. In this way the longest lists may come from the edges of cities. In Belgium this is true of Brussels: then Brussels has also received the most attention.

ACKNOWLEDGEMENTS

I am extremely grateful to Tony Barber, who collected vast numbers of millipedes for me during his survey of centipedes, and who provided ecological information to accompany them. I am also very grateful to Gordon Blower who encoraged me to work in this field and provided a great deal of help with early identifications as well as giving me much other advice. As far as this publication is concerned heartfelt thanks are given to Paul Harding for providing me with the records from the

Institute of Terrestrial Ecology. There were too many collectors involved in these records for me to mention them all individually, but I notice that a substantal number of records were his own, a lot more were from Dick Jones and Adrian Rundle provided a batch from south west London.

REFERENCES

Biernaux, J., (1969) Biotopes à *Schizophyllum sabulosum* L. (Myriapde-Diplopods). *Bulletin des Recherches agronomiques de Gembloux*, **4** (1):1-15.

Blower, J.G., (1958) *British Millipedes*. Linnean Society Synopses of the British Fauna. No. 11. London.

Blower, J.G., (1970) Millipedes of a Cheshire wood. *Journal of Zoology*, **160**: 455-96.

Blower, J.G., (1985) *Millipedes*. Linnean Society Synopses of the British Fauna (New Series). No. 35. E.J. Bill/Dr. W. Backhuys. London.

Blower, J.G., (1987) More millipedes from Britany. *Bull. Br. Myriapod Grp.* **4**:37-40.

British Myriapod Group (1993) *Newsletter of the British Myriapod Group*, **19**: 3-8.

David, J.F., (1987) Cosommation annuelle d'une litière de chêne par une population adulte du Diplopode *Cylindroiulus nitidus*, *Pedobiologia*, **30**: 299-310.

Dufrene, M. & Legendre, P., (1991) Geographic structure and potential ecological factors in Belgium. *J. Biogegr.*, **18**: 257-266.

Eason, E.H., (1957) Chilopoda and Diplopoda from Caernarvonshire, *Proc. zool. Soc. Lond.*, **129**(2):273-291.

Edgington, E.S., (1986) *Randomization Tests*, 2nd edition. M. Dekker, New York, Bâle, 341pp.

Ellenberg, H., (1988) *Vegetation Ecology of Central Europe*, 4th edition, Cambridge University Press, U.K. 731pp.

Fairhurst, C.P., (1984) *British Millipede Survey*. 10,000 records for Great Britain. 50 km square maps and habitat information. University of Salford.

Geoffroy, J.-J., (1981) Modalités de la coexistence de deux Diplopodes, *Cylindroiulus punctatus* (Leach) et *Cylindroiulus nitidus* (Verhoeff) dans un écosystème forestier du Bassin Parisien, *Acta Oecologia Generalis*, **2**:357-372.

Gregory, S., (1993) More about *Brachychaeteuma*. *British Myriapod Group Newsletter* No. 19.

Hazelton, M. & Glennie, E.A., (1962) Myriapoda, In: Cullongford, C.N.D. (Ed.) *British caving, an introduction to speleology*. 2nd edition, London, Cave Research Group.

Jeekel, C.A.W., (1978) Voorlopige atlas van de verspreiding der Nederlandse Miljoenpoten, *Verslagen en Technische gegevens.* Instituut voor Taxonomische Zöologie. Universiteit van Amsterdam. No. **15**.

Jones, R.E., (1993) The vice-county distribution of millipedes in the British Isles, *Bull. Brit. Myriapod Gp.* **9**:25-33.

Kime, R.D., (1978) The distribution of millipedes in the south of England. A preliminary survey. *Abh. Verh. naturwiss. Ver. Hamburg (NF)* **21/22**: 121-128.

Kime, R.D., (1990) A provisional atlas of European myriapods. Part 1, *Fauna Europaea Evertebrata,* EIS Luxembourg, 109pp.

Kime, R.D., (1994) Millipedes (Diplopoda) found in and around hedges in Luxembourg, *Bull. Soc. Nat. luxemb.* **95**:349-357.

Kime, R.D., (in press) Millipedes recorded in the Grand Duchy of Luxembourg, *Proc. 9th Int. Congr. Myriapod.* Paris.

Kime, R.D., Wauthy, G., Delecour, F., Dufrene, M. & Drugmand, D., (1992) Distribution spatiale et préférences écologiques chez les Diplopods du sol, *Mém. Soc. r. ent. Belg.* **35**: 661-670.

Kime, R.D., Lewis, J.G.E. & Lewis, S.J., (1987) Centipedes and millipedes collected in Normandy, France, *Bull. Brit. Myriapod. Grp.* **4**:30-36.

Lee, P., (1994) Suffolk millipedes, *Bull. Brit. Myriap. Grp.* **10**:5-18.

Lewis, J.G.E. & Kime, R.D. (1988) Centipedes and millipedes from Finstère, Brittany. *Bull. Brit. Myriap. Grp.* **5**:6-10.

Pedroli-Christen, A., (1993) *Faunistique des Mille-pattes de Suisse (Diplopoda).* Centre suisse de cartographie de la fauna., Neuchatel, 167p.

Verheoff, K.W., (1891) Ein Beitrag zur mitteleuropäischen Diplopoden Fauna. *Berlin ent. Z.* **36**:115-166.

Zulka, P., (1992) Myriapods from a central european rivers flood plain. *Proc. 8th Int. Congr. Myriapod. Ber. nat. med. Verein Innsbruck suppl.* **10**:189.

Bulletin of the British Myriapod Group 11 (1995)

THE APPEARANCE AND DISAPPEARANCE OF TELOPODAL GLANDS DURING THE DEVELOPMENT OF *LITHOBIUS MICROPS* (LITHOBIOMORPHA, LITHOBIIDAE).

J.G.E. Lewis* and P.C.S.Yeung

Taunton School, Taunton, Somerset TA2 6AD
*Address for correspondence: Manor Mill Farm, Halse, Taunton, Somerset, TA4 3AQ

INTRODUCTION

Blower (1952) examined several species of *Lithobius* and *Lamyctes* and reported the presence of telopodal glands opening on the inner, morphologically posterior face, of the four distal podomeres (femur, tibia, tarsus and metatarsus) of the last two pairs of legs. They produce a secretion which hardens on exposure, forming a material which is amber-coloured when seen in mass and is normally extruded as long sticky fibres resembling silk.

Eason (1964) stated that the telopodal glands are concentrated on the 14th and 15th legs in most British species but sometimes there are a few on the 12th and 13th and more rarely, on all other legs. The small pores of these glands are sometimes so numerous as to produce a cribiform appearance. In *Lithobius duboscqui* Brölemann (=*Lithobius microps* Meinert) the concentrations of pores are dense on 14th and 15th legs, less dense on 13th.

Changes in the distribution of teleopodal glands during development of *L. microps* are here described.

MATERIALS AND METHODS

Most of the specimens used in this study were collected on 17.xi.1987 in mixed deciduous woodland 1km north of Staple Fitzpaine, near Taunton, Somerset (Grid ref. ST 261 192). Litter and humus samples were collected and extracted using Tüllgren funnels. Both larval and post larval specimens were obtained. The specimens were mounted in Hoyer's mountant for examination. Additional larval material which had been collected in Champagne-de-Belair, France and Nismes and Crupet Belgium by Mr. R.D. Kime and identified by Dr. E.H. Eason was also examined. It was not always possible to count the pores accurately, due either to the orientation of the legs or to the longitudinal folding of the podomere cuticle which sometimes occurred. In some cases it was also difficult to distinguish between gland pores and the socket of a seta where the seta had been lost. Doubtful cases were not scored. Where scores differed between right and left sides, the higher figure was used.

Andersson's (1976) abbreviations for the stadia are adopted here: L for the larval stadia with numbers 0 (=foetus) and I-IV and PL for the post-larval stadia including adult stadia with the numbers 1 and up. The larval stadia are easy to distinguish using number of leg pairs (L1 with 7 pairs plus 1 pair of half developed legs and 2 very small

pairs of limb buds. Larva 2 with 8 pairs plus 2 pairs of limb buds. Larva 3 with 10 pairs plus 2 pairs of limb buds. Larva 4 with 12 pairs of legs and 3 pairs of limb buds). There is considerable overlap in the majority of characters of post-larval stadia in *L. microps* (Andersson, 1982) but it was assumed that specimens with 1, 1, 1, 1 coxal pores were post larval stadium 1 and that specimens with a head length greater than 0.70mm were adult as was the case in Andersson's Swedish material.

RESULTS

Fourteen specimens were examined in detail, 5 from France and Belgium and 9 from Somerset. No larva I were present in the collections. The results for one of each of larvae II, III and IV, post larval 1 and an adult male and female from the Somerset material are shown in Tables 1, 2 and 3. Table 1 shows the numbers of telopodal gland pores on the femora, Table 2 the tibia and Table 3 the tarsus. The data for the continental specimens are similar. No individuals of larva I were present in the collections. In LII the last pair of legs (the 8th) have telopodal gland pores on tibia and tarsus. In LIII pores are present on the last pair of legs (the 10th) and on the 8th but the latter are smaller and darker, presumably regressing. In LIV pores are present on the last pair of legs (the 12th) and on the 10th, where they are smaller and darker, but have disappeard on the 8th. In PL1 pores are present on the last 2 pairs of legs (14th and 15th) and regressing on the 12th. In mature specimens pores are present on the 13th, 14th and 15th pairs of legs, the condition described by Eason (1964). Pores could not be identified on the 12th with certainty. The femur, tibia and tarsus of the more anterior legs bear a few small pore-like structures, the exact nature of which is not clear.

Table 1. Number of telopodal gland pores on femur of legs 6-15 successive stadia of *L. microps*.

STADIUM	LII	LIII	LIV	PL1	ADULT	
					MALE	FEMALE
LEG 6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9		0	0	0	0	0
10		8	6	0	0	0
11			0	0	0	0
12			13	8	0	0
13				0	0	0
14				15	35	48
15				22	102	55

Table 2. Number of telopodal gland pores on tibia of legs 6-15 of successive stadia of *L. microps*.

STADIUM	LII	LIII	LIV	PL1	ADULT	
					MALE	FEMALE
LEG 6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	14	11	0	0	0	0
9		0	0	0	0	0
10		24	22	0	0	0
11			0	0	0	0
12			29	26	0	0
13				0	23	14
14				25	87	74
15				31	111	68

Table 3. Number of telopodal gland pores on tarsus of legs 6-15 of successive stadia of *L. microps*.

STADIUM	LII	LIII	LIV	PL1	ADULT	
					MALE	FEMALE
LEG 6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	15	11	0	0	0	0
9		0	0	0	0	0
10		31	16	0	0	0
11			0	0	0	0
12			30	16	0	0
13				0	22	20
14	TARSUS			24	71	79
	METATARSUS			11	20	29
15	TARSUS			25	115	75
	METATARSUS			16	46	27

DISCUSSION

During the anamorphic phase of development in *L. microps* each new pair of legs bears telopodal glands whilst those on more anterior, previously terminal legs gradually disappear. We have no knowledge of the condition in LI but since it is of very short duration and since there are no pores on the 7th pair in LII it seems likely that they are absent. The pattern differs in the post-larval, epimorphic stadia. In PL1 the last 2 pairs of legs bear glands, whilst in the adults the last 3 pairs do so. There is presumably an anterior/posterior gradient along the trunk which brings about the development of telopodal glands on more posterior legs and causes their regression on more anterior legs producing an apparent programmed death of gland cells.

ACKNOWLEDGMENTS

J.G.E.Lewis wishes to thank the Royal Society and the Association for Science Education Research in Schools Committee and Dr. D.J. Stradling for their support and encouragement. Dr. E.H. Eason kndly provided identified material which had been collected by Mr. R.D. Kime in France and Belgium.

REFERENCES

Andersson, G., (1976) Post-embryonic development of *Lithobius forficatus* (L.) , (Chilopoda: Lithobiidae), *Ent. scand.*, 7:161-168.

Andersson, G., (1982) Post-embryonic development of *Lithobius microps* Meinert (Chilopoda: Lithobiidae), *Ent. scand.*, **13**: 89-95.

Blower, J.G., (1952) Epidermal glands in centipedes, *Nature, Lond.*, **170**:166-167.

Eason, E.H., (1964) *Centipedes of the British Isles*, Frederick Warne & Co. Ltd. London and New York. x+294.

Bulletin of the British Myriapod Group 11 (1995)

LITHOBIUS LUCIFUGUS L. KOCH (CHILOPODA, LITHOBIOMORPHA), A CENTIPEDE NEW TO THE BRITISH ISLES FROM SCOTLAND.

A.D. Barber

Plymouth College of Further Education, Devonport, Plymouth,
PL1 5QD.

Towards the end of 1989 Gordon Corbet sent specimens of lithobiids which he was unable to determine from the the kirk yard at Cramond, Edinburgh. Dr. E.H. Eason, who subsequently examined these was unable to give a definite answer as no undamaged mature males were present. Subsequent searches did not find suitable specimens until November 1994 when a female and two males were found, identified by Dr. Eason as *Lithobius lucifugus* L. Koch, a species not previously found in Britain and likely to be introduced.

The original specimens were from accumulations of fallen leaves in the burial enclosure and the latest ones were also from leaf litter.

Although the species is well described in the literature (Brölemann, 1930, pp320-321, Matic, 1966, pp178-180) it is probably useful to give a brief description for the benefit of British workers based on these accounts. Drawings are from the Edinburgh material and kindly prepared by R.E. Jones.

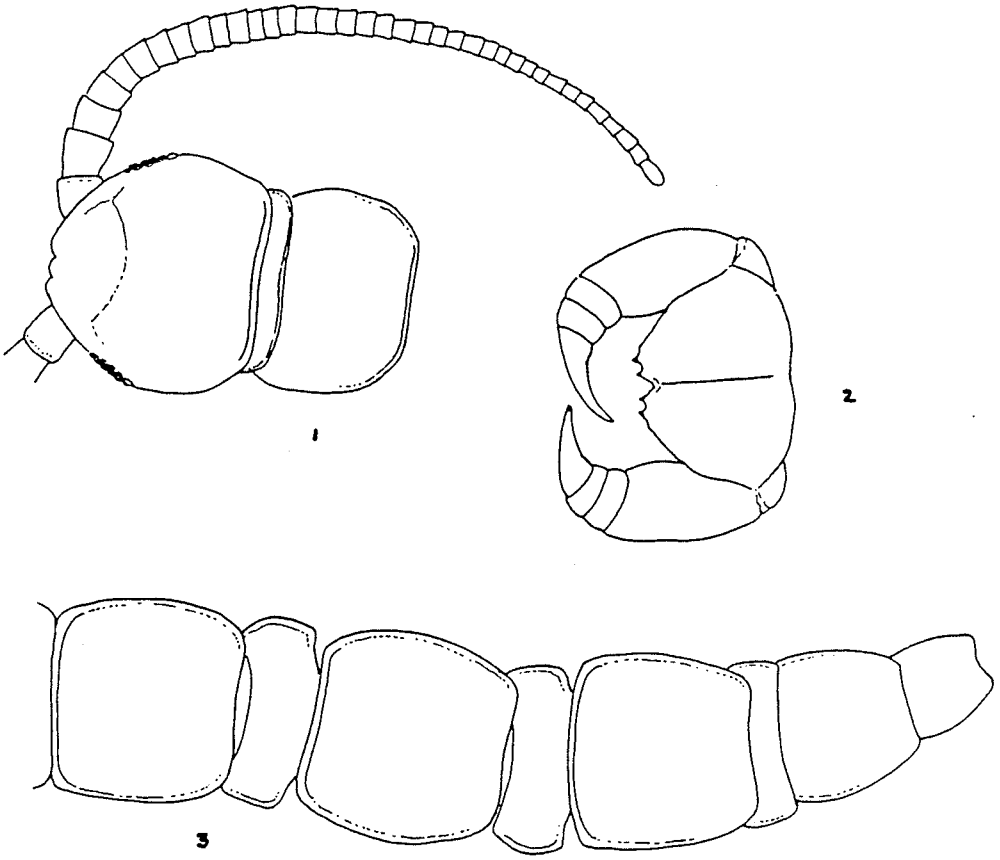
DESCRIPTION

Size:	12-17 mm long, 1.7-2.2 mm broad.
Colour:	Light brown, reddish brown in centre of head and in a wide dorsomedian stripe. Integument smooth and shiny, without punctuations.
Antennae:	Short, not more than 2/5 length of body, of 33-50 articles.
Ocelli:	Numerous, 13-23 in 4-6 curved rows (1+3, 3, 3, 3 to 1+5, 5, 4, 4, 3, 1 etc.)
Forcipular coxosternite:	2+2 conical teeth (very variable, may be as much as 4+4; Eason, 1981); a slender spine at each angle.
Tergites:	T9, T11 more or less rounded posterior angles; T13 straight, blunt.
Coxal Pores:	Generally rounded, 4-7 on each coxa, may be additional much smaller pores also (Eason, op. cit.).
Spinulation:	VaP from P7-10 to P15 VaT usually absent P15
Last legs:	Fairly long, short metatarsus, not longer than half the width of the head. All spines long and slender, notably the median ones. Claw simple. In males the last legs are slightly thickened but without any special structures.
Female genitalia:	2+2 cylindro-conical spurs usually. Apical claws rather large, tridentate.
Distribution:	Known from French Alps, Austria, S. Germany, Switzerland, Rumania, Central Europe. Often described as a species of high

altitudes (Eason, Brölemann, Matic).

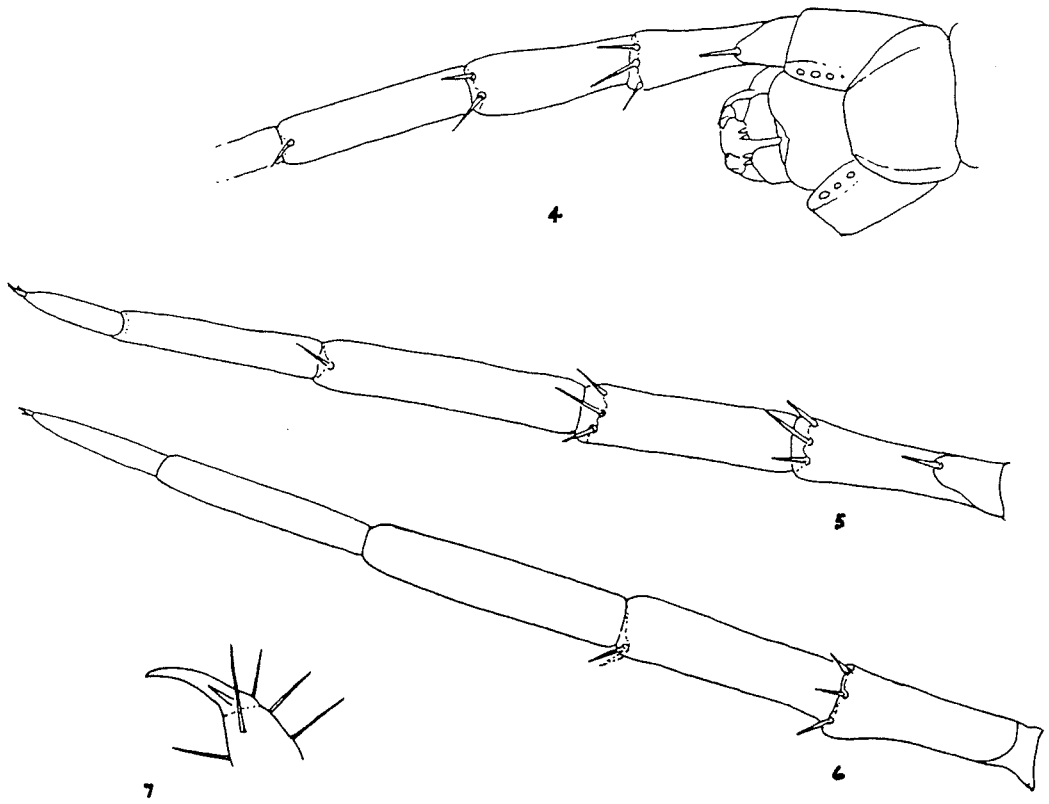
Distiguishing features: It would key out in Eason (1964) to *Lithobius muticus*. In Eason (1981) the absence of modifications on the legs of the males contrasts it with the small setose swelling on leg 14 of male *L. muticus*. The number of ocelli is much greater than in *L. muticus* whilst the very characteristic head shape of mature males of that species (1.25 times as broad as long) is lacking.

The fact that it has been found in an urban locality is interesting, presumably introduced as a result of human activity. Further collections from other sites in Edinburgh would be interesting although the Lothians are, in general a well studied area, certainly for the larger species.



Lithobius lucifugus L. Koch, Cramond, Edinburgh, 16.11.1994.

1. Head and first tergite, 2. Forcipules, 3. Tergites 8-15



Lithobius lucifugus L. Koch, Cramond, Edinburgh, 16.11.1994.

4. Posterior end, female, 5. 15th leg, male, ventral, 6. 15th leg, male, dorsal, 7. 15th leg, male, claw

ACKNOWLEDGEMENTS

Dr G. Corbet for collecting the specimens and for continuing to visit the site until an undamaged male was collected. Dr. E.H. Eason for his identification and helpful comments both on the specimens and this report. R.E. Jones for his excellent drawings from Scottish specimens.

REFERENCES

Brölemann, H.W. (1930): *Elements d'une Faune des Myriapodes de France, Chilopodes.* Faculte des Sciences, Paris.

Eason, E.H. (1964): *Centipedes of the British Isles.* Warne, London.

Eason, E.H. (1982): A review of the North-West European species of Lithobiomorpha with a revised key to their identification. *Zool. J. Linn. Soc.*, **74:** 9-33.

Matic, Z. (1966): *Fauna Republicii Socialiste Romania, clasa Chilopoda, subclasa Anamorpha.* Academia Republicii Socialiste România, Bucuresti.

SOME MYRIAPOD RECORDS FOR NORTH ESSEX (VC 19).

S.J.Gregory

Little Wittenham Nature Reserve, Manor House, Little Wittenham, Abingdon, Oxon, OX14 4RA.

INTRODUCTION

Reference to current national atlases (Barber & Keay, 1988 and BMG, 1988) show a rather conspicuous paucity of myriapod records from most of North Essex (Vice County 19). Since Christmas 1991 I have taken the opportunity to collect from the vice-county, albeit in a rather haphazard manner, during sporadic visits to the area. It is hoped that this preliminary survey will provide a base-line for further recording in the county.

SURVEY TECHNIQUES

Efforts were made to cover as many 10km squares as possible rather than concentrating on one small area. Due to time and transport limitations, collections were mostly made within 10 miles radius of the city of Colchester. I know little about the geology or the location of sites of potential interest. Thus sample sites (mainly deciduous woodland or churchyards) were chosen for their ease of access, using an Ordnance Survey map (1:50,000 series). A few coastal locations were also examined.

As many microsites as possible were examined at each site. This mostly entailed searching the underside of large stones and fallen timber as well as the superficial soil layer beneath. Searches were also made in leaflitter and under the bark of fallen and standing deadwood. Time permitting soil or rubble in 'promising spots' was also hand sorted in the field.

RECORDS

In four visits 15 10km grid squares have been visited as follows: TL(52)62, TL73, TL81, TL82, TL83, TL91, TL92, TL93, TM(62)01, TM02, TM03, TM11, TM12, TM21 and TM22. 16 species of centipede and 17 species of millipede were collected. A number of species have been added to the county list as given below:

Centipedes: *Schendlya nemorensis, Brachyscendyla dentata, Strigamia acuminata, Geophilus carpophagus, G. electricus, Brachygeophilus truncorum, Cryptops hortensis, C. parisi, Lithobius melanops, L. macilentus* and *L. calcaratus.*
Millipedes: *Melogona scutellare, Julus scandinavius, Brachyiulus pusillus, Polydesmus denticulatus, P. gallicus* and *Macrosternodesmus palicola.*

All records have been submitted to the Colchester Museum and to the respective national recording schemes. A summary of 10km distribution is given in Table 1. Full details of records (site name, OS grid reference, date of collection) are given below:

Table 1: Distribution of myriapods recorded by 10km square.

* indicates new vice-county record (VC 19)

	10km square:	62	73	81	82	83	91	92	93	01	02	03	11	12	21	22
	CENTIPEDES															
*	Schendyla nemorensis	+	+		+	+		+	+	+	+	+	+	+	+	
*	Brachyschendyla dentata							+								
*	Strigamia acuminata								+			+				
	Strigamia crassipes							+				+				
*	Geophilus carpophagus	+	+					+			+		+	+	+	
*	Geophilus electricus					+		+	+							
	Necrophloeophagus flavus	+	+		+	+		+	+	+			+	+		+
*	Brachygeophilus truncorum	+	+					+	+	+	+	+				
*	Cryptops hortensis				+	+	+	+						+	+	
*	Cryptops parisi										+					
	Lithobius forficatus	+	+		+	+		+	+	+	+	+	+	+	+	+
*	Lithobius melanops		+	+			+	+			+		+	+	+	+
*	Lithobius macilentus									+						
*	Lithobius calcaratus										+					
	Lithobius crassipes	+	+			+		+	+	+	+	+				+
	Lithobius microps		+	+	+	+	+	+	+	+	+	+	+	+	+	+
	MILLIPEDES															
	Glomeris marginata	+	+	+	+	+	+	+	+						+	
	Nanogona polydesmoides	+	+		+			+	+		+		+	+	+	+
*	Melogona scutellare							+								
	Nemasoma varicorne							+		+						
	Proteroiulus fuscus	+	+				+	+		+						
	Ommatiulus sabulosus														+	+
	Tachypooiulus niger	+	+			+								+	+	
	Cylindroiulus punctatus	+	+			+				+	+	+				
*	Julus scandinavius	+	+					+	+		+					
	Ophyiulus pilosus	+			+									+	+	
*	Brachyiulus pusillus							+								
	Polydesmus angustus	+	+	+	+	+	+	+	+	+	+	+		+	+	
*	Polydesmus gallicus	+	+	+	+			+					+		+	+
*	Polydesmus denticulatus										+					
	Brachydesmus superus	+	+	+	+	+	+	+	+	+	+	+			+	
*	Macrosternodesmus palicola					+		+								
	Stosatea italica										+					

DONYLAND WOODS: 62/015 206, 27/XII/1991

Deciduous woodland on acidic soils.

Centipedes	**Millipedes**
Geophilus carpophagus	*Nanogona polydesmoides*
Brachygeophilus truncorum	*Cylindroiulus punctatus*
Lithobius forficatus	*Julus scandinavius*
Lithobius crassipes	*Polydesmus angustus*
Lithobius microps	*Polydesmus denticulatus*
	Brachydesmus superus

DONYLAND 'SALTMARSH': 62/038 213, 27/XII/1991

Grassy area above saltmarsh strandline.

Centipedes	**Millipedes**
Schendyla nemorensis	*Brachydesmus superus*
Lithobius melanops	
Lithobius calcaratus	

FINGRINGHOE WICK RESERVE: 62/043 196, 27/XII/1991

Damp deciduous woodland.

Centipedes	Millipedes
Brachygeophilus truncorum	*Nemasoma varicorne*
Lithobius forficatus	*Proteroiulus fuscus*
Lithobius macilentus	*Cylindroiulus punctatus*
Lithobius crassipes	*Polydesmus angustus*
Lithobius microps	*Brachydesmus superus*

WEST MERSEA: 62/005 124, 27/XII/1991

Grassy ground above beach.

Centipedes

Schendyla nemorensis
Lithobius forficatus

WOODED STREAM-SIDE SWAMP: 52/958 217, 28/XII/1991

Adjacent to deciduous woodland.

Centipedes	Millipedes
Necrophloeophagus flavus	*Glomeris marginata*
Brachygeophilus truncorum	*Polydesmus angustus*
Lithobius forficatus	*Brachydesmus superus*
Lithobius crassipes	

CHEST WOOD: 52/964 212, 28/XII/1991

Ancient deciduous woodland.

Centipedes	Millipedes
Strigamia crassipes	*Glomeris marginata*
Brachygeophilus truncorum	*Nanogona polydesmoides*
Lithobius forficatus	*Melogona scutellare*
Lithobius crassipes	*Proteroiulus fuscus*
Lithobius microps	*Polydesmus angustus*
	Brachydesmus superus

LAYER WOOD: 52/913 185, 28/XII/1991

Roadside deciduous woodland.

Centipedes	Millipedes
Cryptops hortensis	*Glomeris marginata*
Lithobius melanops	*Proteroiulus fuscus*
Lithobius microps	*Polydesmus angustus*
	Brachydesmus superus

PODS WOOD: 52/897 177, 28/XII/1991

Roadside coniferous plantation.

Centipedes	Millipedes
Lithobius melanops	*Glomeris marginata*
Lithobius microps	*Polydesmus angustus*
	Polydesmus gallicus
	Brachydesmus superus

DOMSEY BROOK: 52/877 190, 28/XII/1991
Roadside ditch.
Centipedes
Lithobius microps

NEAR FEERING: 52/865 212, 28/XII/1991
Willow scrub beside River Blackwater.
Millipedes
Brachydesmus superus

HEATH ROAD, STANWAY: 52/959 235, 25/XII/1992
Domestic garden.

Centipedes	**Millipedes**
Schendyla nemorensis	*Brachydesmus superus*
Brachyschendyla dentata	*Macrosternodesmus palicola*
Geophilus electricus	
Cryptops hortensis	
Lithobius microps	

GRYMES DYKE, STANWAY GREEN: 52/961 233, 25/XII/1992
Oak woodland on ancient earthworks.

Centipedes	**Millipedes**
Geophilus carpophagus	*Nanogona polydesmoides*
Brachygeophilus truncorum	*Proteroiulus fuscus*
Lithobius forficatus	*Polydesmus angustus*
Lithobius melanops	*Brachydesmus superus*
Lithobius microps	

CUDMORE GROVE COUNTRY PARK: 62/070 148, 27/XII/1992
Under deadwood, etc near freshwater dyke.

Centipedes	**Millipedes**
Schendyla nemorensis	*Proteroiulus fuscus*
Necrophloeophagus flavus	*Brachydesmus superus*
Lithobius forficatus	
Lithobius crassipes	
Lithobius microps	

LITTLE TEY CHURCH: 52/892 238, 27/XII/1992
Under stones and in compost heap in churchyard.

Centipedes	**Millipedes**
Schendyla nemorensis	*Polydesmus angustus*
Lithobius forficatus	*Brachydesmus superus*
Lithobius microps	

LITTLE HORKESLEY CHURCH: 52/961 319, 28/XII/1992
Under stones in churchyard.
Centipedes
Lithobius crassipes
Lithobius microps

1KM NORTH OF LITTLE HORKESLEY: 52/961 329, 28/XII/1992

Damp deciduous woodland on north facing slope.

Centipedes	**Millipedes**
Schendyla nemorensis	*Glomeris marginata*
Strigamia acuminata	*Nanogona polydesmoides*
Necrophloeophagus flavus	*Julus scandinavius*
Brachygeophilus truncorum	*Polydesmus angustus*
Lithobius forficatus	*Brachydesmus superus*
Lithobius crassipes	

BOXTED CHURCH: 52/998 333, 28/XII/1992

Under stones in churchyard.

Centipedes

Geophilus electricus

'CHESHUNTS' WEST OF BOXTED: 52/009 335, 28/XII/1992

Lakeside deciduous woodland.

Centipedes	**Millipedes**
Schendyla nemorensis	*Cylindroiulus punctatus*
Strigamia acuminata	*Polydesmus angustus*
Strigamia crassipes	*Brachydesmus superus*
Brachygeophilus truncorum	
Lithobius forficatus	
Lithobius crassipes	
Lithobius microps	

COLNE ESTUARY, EAST MERSEA: 62/070 155, 02/I/1994

Small area of saltmarsh.

Centipedes

Schendyla nemorensis
Lithobius forficatus
Lithobius crassipes
Lithobius microps

HILLY FIELDS 'PARK': 52/984 257, 03/I/1994

Marshy areas around new pond beside main road.

Centipedes	**Millipedes**
Necrophloeophagus flavus	*Julus scandinavius*
Lithobius forficatus	*Polydesmus angustus*
Lithobius crassipes	*Brachydesmus superus*
Lithobius microps	

CYMBELINE MEADOWS: 52/985 261, 03/I/1994

Damp cattle grazed meadow with willow pollard lined ditches.

Centipedes	**Millipedes**
Strigamia crassipes	*Nemasoma varicorne*
Necrophloeophagus flavus	*Proteroiulus fuscus*
Lithobius forficatus	*Brachyiulus pusillus*
Lithobius melanops	*Polydesmus angustus*
Lithobius crassipes	*Polydesmus gallicus*
Lithobius microps	*Brachydesmus superus*

ST JAMES CHURCH, COLCHESTER: 62/002 253, 03/I/1994

Under stones in churchyard.

Centipedes	**Millipedes**
Schendyla nemorensis	*Stosatea italica*
Cryptops parisi	
Lithobius forficatus	
Lithobius microps	

GREAT BENTLEY CHURCHYARD: 62/109 217, 25/II/1994

Mostly under stones in churchyard.

Centipedes

Schendyla nemorensis
Geophilus carpophagus
Cryptops hortensis
Lithobius forficatus
Lithobius microps

THORPE-LE-SOKEN CHURCHYARD: 62/179 224, 26/II/1994

Mostly under stones in churchyard.

Centipedes	**Millipedes**
Schendyla nemorensis	*Nanogona polydesmoides*
Geophilus carpophagus	*Tachypodoiulus niger*
Necrophloeophagus flavus	*Ophyiulus pilosus*
Lithobius forficatus	*Polydesmus angustus*
Lithobius melanops	
Lithobius microps	

THE NAZE, WALTON: 62/26- 24-, 26/II/1994

Around 'storm drift line'and also landward side of seawalls.

Centipedes	**Millipedes**
Necrophloeophagus flavus	*Nanogona polydesmoides*
Lithobius forficatus	*Ommatiulus sabulosus*
Lithobius melanops	*Polydesmus gallicus*
Lithobius crassipes	
Lithobius microps	

ST. OSYTH BEACH: 62/127 127, 26/II/1994

Around and above 'storm drift line' at edge of saltmarsh.

Centipedes	Millipedes
Necrophloeophagus flavus	*Polydesmus gallicus*
Lithobius forficatus	
Lithobius melanops	
Lithobius microps	

ST.OSYTH CHURCHYARD: 62/123 155, 26/II/1994

Mostly under stones in churchyard.

Centipedes	Millipedes
Schendyla nemorensis	*Nanogona polydesmoides*
Geophilus carpophagus	
Lithobius forficatus	
Lithobius microps	

GREAT HOLLAND CHURCHYARD: 62/219 194, 26/II/1994

Mostly in rubbly compost heap in churchyard.

Centipedes	Millipedes
Schendyla nemorensis	*Glomeris marginata*
Geophilus carpophagus	*Nanogona polydesmoides*
Cryptops hortensis	*Ommatiulus sabulosus*
Lithobius forficatus	*Tachypodoiulus niger*
Lithobius melanops	*Ophyiulus pilosus*
Lithobius microps	*Polydesmus angustus*
	Polydesmus gallicus
	Brachydesmus superus

CHAPPEL: 52/894 285, 27/II/1994

Under large logs in grassy area beside River Colne.

Centipedes	Millipedes
Schendyla nemorensis	*Glomeris marginata*
Necrophloeophagus flavus	*Nanogona polydesmoides*
Cryptops hortensis	*Ophyiulus pilosus*
Lithobius forficatus	*Polydesmus gallicus*
Lithobius microps	

DISMANTLED RAILWAY CUTTING, Near HALSTEAD: 52/803 319, 27/II/1994

Under stones and deadwood (and in soil beneath).

Centipedes	Millipedes
Schendyla nemorensis	*Glomeris marginata*
Geophilus electricus	*Tachypodoiulus niger*
Necrophloeophagus flavus	*Cylindroiulus punctatus*
Cryptops hortensis	*Polydesmus angustus*
Lithobius forficatus	*Brachydesmus superus*
Lithobius crassipes	*Macrosternodesmus palicola*
Lithobius microps	

BROAKS WOOD: 52/785 317, 27/II/1994

Under deadwood and in rotten stumps near ditch in mixed woodland.

Centipedes	**Millipedes**
Schendyla nemorensis	*Glomeris marginata*
Geophilus carpophagus	*Nanogona polydesmoides*
Necrophloeophagus flavus	*Proteroiulus fuscus*
Brachygeophilus truncorum	*Tachypodoiulus niger*
Lithobius forficatus	*Cylindroiulus punctatus*
Lithobius melanops	*Julus scandinavius*
Lithobius crassipes	*Polydesmus angustus*
Lithobius microps	*Polydesmus gallicus*
	Brachydesmus superus

HIGH WOODS, Near GT.DUMNOW: 52/617 207, 27/II/1994

Under and in deadwood in swampy deciduous woodland

Centipedes	**Millipedes**
Schendyla nemorensis	*Glomeris marginata*
Geophilus carpophagus	*Nanogona polydesmoides*
Necrophloeophagus flavus	*Proteroiulus fuscus*
Brachygeophilus truncorum	*Tachypodoiulus niger*
Lithobius forficatus	*Cylindroiulus punctatus*
Lithobius crassipes	*Julus scandinavius*
	Ophyiulus pilosus
	Polydesmus angustus
	Polydesmus gallicus
	Brachydesmus superus

DISCUSSION

The centipede species were very much as expected for eastern Britain, most noticeably in the absence of *Lithobius variegatus* from the samples. Species such as *S. nemorensis, N. flavus, L. forficatus, L. melanops* and *L. microps* were equally common in both rural and urban locations.

Several species were mainly collected from rural habitats. The commonest of these *was L. crassipes*. Both *Strigamia* species were found in woodland or riverside meadows, typically in rotten wood. Several *L. macilentus* were found under logs in a deciduous woodland. A single male *L. calcaratus* was sorted from a grass clump above a salt marsh in a river estuary. The rural form of *G. carpophagus* was not widely recorded but it was always found in the superficial soil layers beneath deadwood (cf urban form, below).

Despite searching suitable urban habitats *Haplophilus subterraneus* was not collected. However the similarly sized *G. electricus* was encountered instead. A single *B. dentata* was found coiled between soil crumbs beneath a seedtray resting on recently cultivated soil in a domestic garden. *C. parisi* was found under a large stone in a churchyard. Both may prove widespread in gardens and churchyards in the

county. The urban form of *G. carpophagus* was readily collected from under loose bark on the trunks of every churchyard pine tree examined (cf rural form).

The most frequently encountered millipedes, *G. marginata, N. polydesmoides, P. angustus, P. gallicus* and *B. superus*, were found in a variety of habitats. The normally ubiquitous *T.niger* and *C. punctatus* seem to be unusually thin on the ground, but this could be a consequence of collecting in mid winter.

Single specimens of *M. scutellare* (in leaf-litter) and *P. denticulatus* (on underside of deadwood) were found in deciduous woodland. The former appears to be scarce in eastern England (BMG, 1988) and the latter typically elusive (unless pit-falled, pers obsv). *B. pusillus* was numerous under deadwood on a meadow beside the River Colne. It may prove common in such riverine locations.

Two typical urban species are worth noting. *M. palicola* was found at two sites, one a domestic garden the other a disused railway cutting. At both it was found under large stones partly embedded into a friable soil. *S. italica* was found to be numerous under large stones in one churchyard visited (Gregory 1994). Both species may be more widespread in the county.

Jones (1993) and Keay (1993) list several additional species which have previously been recorded from North Essex but were not collected during the current survey. These are the centipedes; *Strigamia maritima, Geophilus oligopus, Cryptops anomalans* and the millipedes; *Polyxenus lagurus, Blaniulus guttulatus, Cylindroiulus caeruleocinctus, C. latestriatus, Polydesmus inconstans, P. testaceus*. Many species such as the common *B. guttulatus* have probably been overlooked. In other cases, eg *C. latestriatus*, appropriate microsites were not examined.

FUTURE SURVEYS

Many areas of the county still remain untouched by myriapodologists. The actual distribution of many species recorded is still unknown even at a 10km survey level. Effort needs to be spent on updating old records from past collections for species which were not found during this current survey. The uncommon flatback *Polydesmus testaceus* was first recorded as British from North Essex in 1903 (Blower, 1985). It would be interesting to know if this species, recently only known from the extreme south east of Kent, is still present in the county.

Many additional species must still await discovery in the county. Rural sites could produce several further lithobiomorphs, including *Lithobius borealis* or *L. curtipes*, and millipedes such as *Leptoiulus* spp. The chordematidans could prove most interesting. *Craspedesoma rawlinsi* should be present somewhere. It is possible that *Cordeuma proximum* may also occur in acidic woodlands. Will both *Brachychaeteuma bradeae* and *B. melanops* be found and if so will they show distinct habitat preferences, as observed in Oxfordshire (Gregory, 1993)? Coastal sites could harbour species such as *Geophilus fucorum* or *Lithobius lapidicola*.

Synanthropic sites, such as old churchyards, would also repay further study. Geophilomorphs such as *Henia brevis* and *Clinopodes linearis* or the polydesmid *Ophiodesmus albonanus* may be found.

In conclusion it can be said that there is much still to do in North Essex. Gaps in species distributions need plugging and the county list is by no means exhaustive.

REFERENCES

Barber, A.D. & Eason, E.H., (1970) On *Brachyschendyla dentata* Brolemann & Ribaut, a centipede new to Britain. *J. Nat. Hist.*,**4**:79-84.

Barber, A.D. & Keay, A.N., (1988) *Provisional atlas of the centipedes of the British Isles*. BRC, Huntingdon.

Blower, J.G., (1985) *Millipedes*. Synopses of the British Fauna (New Series) no.35, Linnean Society, London.

British Myriapod Group, (1988) *Preliminary Atlas of the Millipedes of the British Isles*. BRC, Huntingdon. Unpublished.

Eason, E.H., (1964) *Centipedes of the British Isles*. Warne, London.

Gregory, S.J., (1993) More on *Brachychaeteuma*. *British Myriapod Group Newsletter No.19*. Unpublished.

Gregory, S.J., (1994) *Stosatea italica* Rediscovered in North Essex. *British Myripod Group Newsletter No.20*. Unpublished.

Jones, R.E., (1993) The Vice-County Distribution of Millipedes in the British Isles, *Bull. British Myriapod Grp*,**9**:25-33.

Keay, A.N., (1993) Vice-County Lists for Centipedes, *Bull. British Myriapod Grp*,**9**:35-41.

Bulletin of the British Myriapod Group 11 (1995)

9th INTERNATIONAL CONGRESS OF MYRIAPODOLOGY PARIS 26-31 JULY 1993

Helen Read

Towerwood, Park Lane, Burnham Beeches, Bucks.

The three yearly international congresses are enjoyable and valuable occassions to meet people from all over the world and talk about Myriapods. That in Paris in 1993 proved no exception and as we have come to expect, a wide range of countries were represented. It was good to meet colleagues from South Africa, Algeria and Japan for the first time and to renew aquaintances with those from other parts of the world. France was well represented with an enviable number of Myriapodologists. However, unfortunately the United States was poorly represented.

The presentations are too numerous to mention individually but topics ranged from the history of myriopodology, population biology and zoogeography to taxonomy and phylogenetics, physiology and functional morphology. Undoubtedly the best talk (for which was awarded the newly established prize for the best presentation!) was that by Mandy Barnett who presented evidence for sperm competition in Spirostreptids from South Africa. Her visual aids and subject matter were fascinating and opened up a whole new subject area in Myriapodology.

The formal sessions were interspersed with social events including a walking tuor of the Evolution Gallery of the Museum which was still under construction (and is now open) and the conference dinner.

The day excursion to Fontainbleau Forest provided a more informal atmosphere for getting to know other participants, and allowed us time to escape from the city while seeing some of the more natural areas around Paris.

As with all the Myriapod Congresses I have attended I look back upon Paris with fond memories (and indeed also this time some souvenirs in the form of a CIM tee shirt and some hand painted *Glomeris* earings!). The only disappointment is the so far lack of signs of any proceedings being published, but there is still time for this to be rectified.

Many thanks to the organising committee for all their hard work and we look forward to Copenhagen in 1996 with anticipation.