

OXFORDSHIRE CENTIPEDES

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INTRODUCTION

This paper is the second on the distribution of Myriapoda within the modern county of Oxfordshire. As is the case with millipedes (Gregory, 1995), no work was under-taken on Oxfordshire centipedes until the formation of the Bureau of Animal Population Studies at Oxford University in the 1920's.

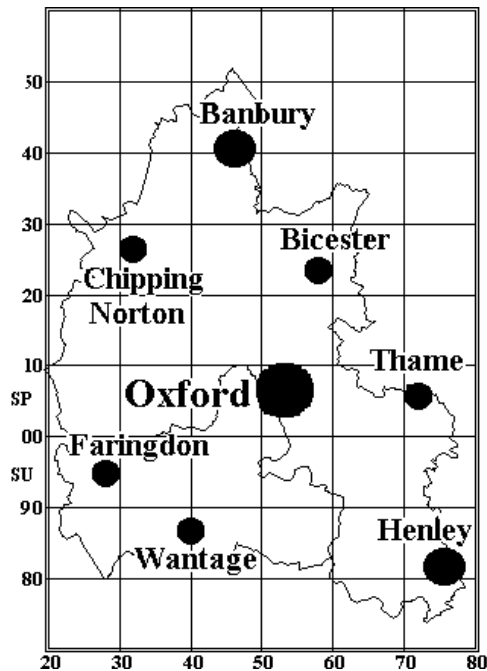
The current survey was started following the collection by the author of several species of Myriapoda considered to be rare in Britain, but which had been previously collected locally by the Bureau. In order to put these, and other species, into their true county context a more detailed survey was made across the county. It is hoped that some objective statement can now be made about the distribution of centipedes in Oxfordshire.

SURVEY AREA

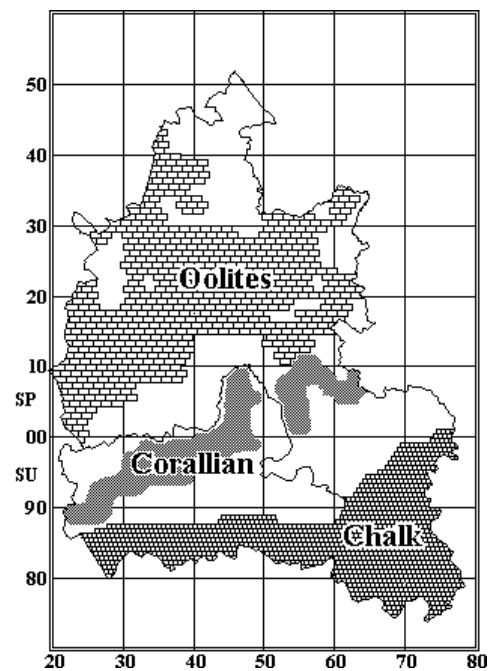
The records presented in these maps cover the current administrative county of Oxfordshire (Map 1). This was created in 1974 by the amalgamation of Watsonian vice-county 23 (Oxfordshire) and the north west part of vice-county 22 (Berkshire). The old county boundary followed the course of the River Thames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

The geology and principle habitats found in the county are described by Gregory (1995). In brief, Oxfordshire is a damp and limy county. The underlying geology is a series of exposures from the Jurassic in the north to the Cretaceous in the south east. There are three main outcrops of calcareous bedrock, Oolitic limestones, Corallian limestones and Chalk, as indicated in Map 2. Locally small areas may be masked by acidic clay drift of more recent origin. Between these three north-west facing escarpments are two low lying vales where neutral to calcareous clays are exposed. The county is dominated by the River Thames and its tributaries which flow against the slope of the prevailing escarpments. Like most counties in the lowland south much of the countryside supports extensive agriculture, with just 8% of land considered to be of high conservation value. This is mainly deciduous woodland but river-side meadows and calcareous fens are well represented in the county.



Map 1. Modern county of Oxfordshire



Map 2. Outcrops of calcareous rock

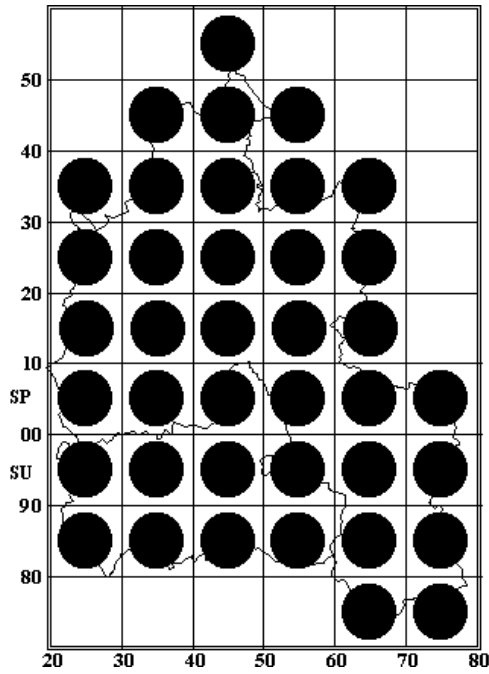
HISTORICAL RECORDS

There is no reference to Myriapoda in the Victorian County History (Salzman, 1938), which collated much of the biological recording in the county around the turn of the century. It is not clear whether this is due to the absence of recording or because no one was available to write the relevant text. No further attempt has been made to search the literature for old records. The following account is based on the computerised database held at the Oxfordshire BRC.

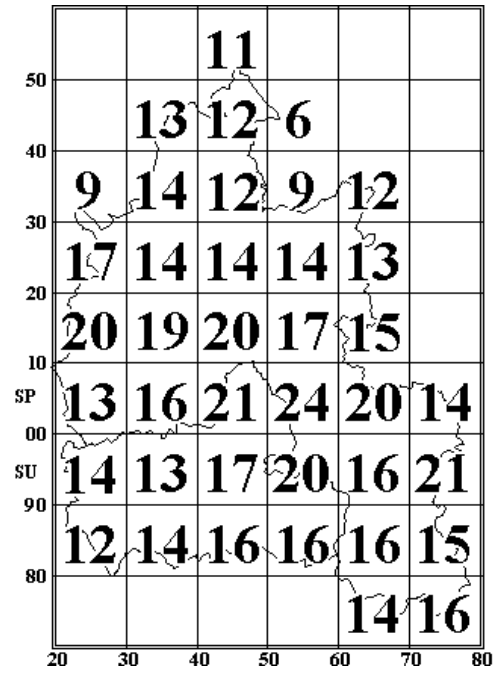
Nothing appears to be known of Oxfordshire centipedes until the creation of the Bureau of Animal Population Studies, by Charles Elton, at Oxford University in the 1920's. The earliest centipede records are for *Lithobius borealis* and *L. crassipes* from Bagley Wood near Oxford (SP50) in 1933. Most of the centipede records date from the 1940's and 1950's. Collections were made mainly from Wytham Woods near Oxford (SP40) and the survey records are known locally as the 'Wytham Survey'. However, other sites in the county were also visited and species records were obtained for many under-recorded taxa in addition to centipedes.

The Wytham Survey pioneered many new sampling techniques, including Tullgren Funnel extraction and pitfall trapping of invertebrates. Specialists were often brought in to identify collected material. During this period all the rural species known in the county were first collected. In addition to *L. borealis* other species of note collected were *L. macilentus*, *L. calcaratus*, *L. muticus* and *L. curtipes*. When *Lithobius muticus* was first collected from Wytham Woods in 1950 it was the fourth British record. Barber & Keay (1988) note that 40 of the 105 British records for this species are from Wytham Woods.

Other species recorded were *Haplophilus subterraneus*, *Schendyla nemorensis*, *Strigamia crassipes*, *S. acuminata*, *Geophilus carpophagus*, *G. electricus*, *Necrophloeophagus flavus*, *Brachygeophilus truncorum*, *Cryptops hortensis*, *Lithobius variegatus*, *L. forficatus*, *L. melanops* and *L. microps*. By the end of the 1950's the county list stood at 19 species.



Map 3. Coverage map



Map 4. Number of species recorded per 10km grid square

RECENT RECORDING

Further recording in the county was limited until in the late 1980's when collections were made by S.P.Hopkin and D.T.Bilton. S.P.Hopkin made several excursions into the county to collect various invertebrate taxa. D.T.Bilton was based at Oxford University for a number of years and did much collecting from Oxford city centre where he found *Brachyschendyla dentata*, *Clinopodes linearis* and *Cryptops anomolans* to add to the county list. Collections were also undertaken from National Trust properties by K.N.A.Alexander. In this period *Geophilus oligopus (insculptus)* was also collected adding four species to the county list.

Since 1990 much effort has been put into filling in the gaps for the common species and defining the ranges of 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 in the county have been visited (Map 3). Within each 10km square several sites with contrasting habitats were sampled. These included not only semi-natural sites such as ancient woodlands, grasslands, meadows and fen, such as those identified by the

County Nature Conservation Forum, but also synanthropic sites. For example collections were made from about 200 churchyards throughout the county. Effort was made to visit sites in inaccessible and under-recorded areas. Most of the fieldwork was undertaken between October and May since many species seemed much more elusive in the summer months. Since this is primarily a tetrad survey most sites were visited just once. A few have been more extensively surveyed and should provide base-line species lists for 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 amongst leaf-litter and moss and also under the bark of fallen and standing dead wood. 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.

Five further species have been added to the Oxfordshire list as follows: *Henia brevis*, *Geophilus osquidatum*, *Cryptops parisi*, *Lithobius pilicornis* and *Lamyctes fulvicornis*. The number of centipedes now recorded from modern Oxfordshire stands at 28. All species have been collected from vice-county 23, but *B. dentata*, *C. linearis* and *L. pilicornis* are not yet known from that part of vice-county 22 which falls within the modern county boundary. The number of species recorded from each 10km square is shown in Map 4.

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 software). To the end of September 1995 this amounts to 2817 centipede records. The majority of these records are post 1990 and mostly attributable to the author and J.M.Campbell. The species maps have been generated from the O.B.R.C. data-base using DMAP mapping software via the R2DW linkage programme.

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 equivalent rank in Britain, calculated from the number of 10km square records given in Barber & Keay (1988), is also noted.

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 county and equivalent rank in Britain.

Species	Number of 10km sqs.	Number Records	Rank in County	Rank in Britain
<i>Haplophilus subterraneus</i>	37	154	7	9
<i>Schendyla nemorensis</i>	39	155	4	11
<i>Brachyschendyla dentata</i>	10	11	19	28
<i>Henia brevis</i>	15	16	16	26
<i>Strigamia crassipes</i>	26	59	13	17
<i>Strigamia acuminata</i>	30	70	10	13
<i>Clinopodes linearis</i>	7	9	23	27
<i>Geophilus carpophagus</i>	25	82	14	7
<i>Geophilus electricus</i>	13	22	18	18
<i>Geophilus osqidatum</i>	7	20	22	24
<i>Geophilus oligopus</i>	26	69	12	12
<i>Necrophloeophagus flavus</i>	38	227	5	5
<i>Brachygeophilus truncorum</i>	35	131	8	6
<i>Cryptops anomalans</i>	5	7	24	25
<i>Cryptops hortensis</i>	34	135	9	10
<i>Cryptops parisi</i>	5	6	25=	23
<i>Lithobius variegatus</i>	26	181	11	2
<i>Lithobius forficatus</i>	39	538	1	1
<i>Lithobius melanops</i>	39	257	3	8
<i>Lithobius macilentus</i>	16	25	15	19
<i>Lithobius borealis</i>	5	6	25=	14
<i>Lithobius pilicornis</i>	1	2	28	21
<i>Lithobius calcaratus</i>	8	13	21	15
<i>Lithobius muticus</i>	14	30	17	20
<i>Lithobius crassipes</i>	38	171	6	3
<i>Lithobius curtipes</i>	8	17	20	22
<i>Lithobius microps</i>	39	401	2	4
<i>Lamyctes fulvicornis</i>	4	7	26	16

INTRODUCTION TO THE SPECIES MAPS AND ACCOUNTS

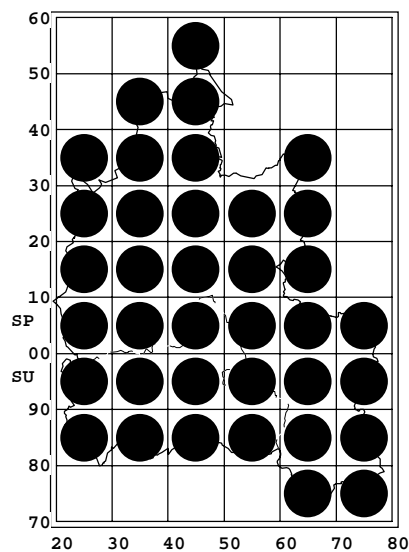
Records are shown in two time categories:

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

Pre-1980 records (mostly 1942-1959) are shown by open circles (○).

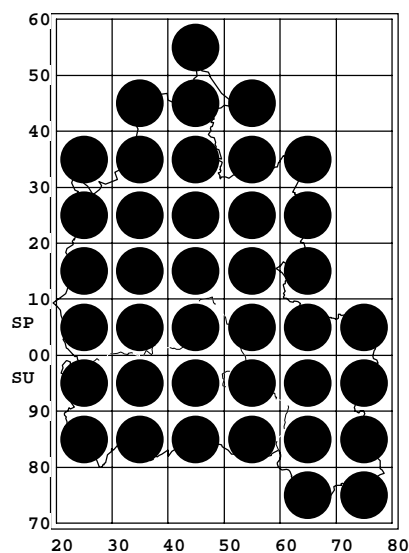
When there is more than one record per 10km square only the most recent is shown on the maps. All species have been collected from both vice-county 22 and 23 unless noted.

SPECIES MAPS AND ACCOUNTS



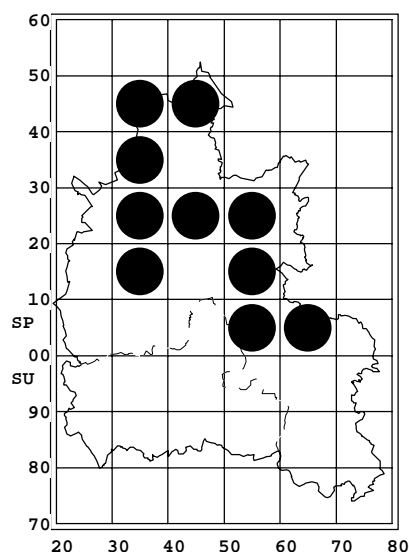
Haplophilus subterraneus (Shaw, 1789)

A large and conspicuous species commonly encountered under stones and dead wood in synanthropic sites such as disused quarries and churchyards. In keeping with this synanthropic preference the first county record is from Blenheim Park (SP41) in 1958. It is occasionally found in semi-natural sites such as woodlands but typically close to the edges and often associated with dumped garden rubbish at such sites. In the south-west of the county it seems rather more numerous, though this is not obvious from the 10km maps presented here.



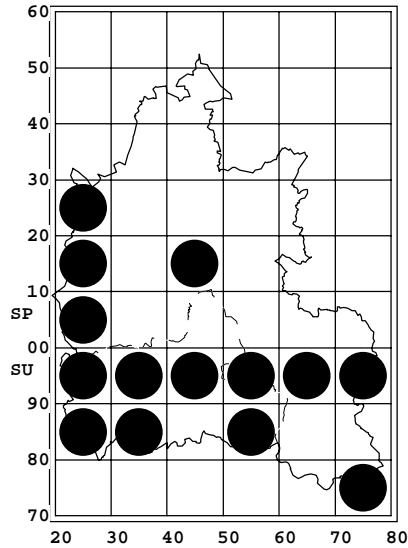
Schendyla nemorensis (C.L.Koch, 1837)

This common, but rather elusive, species occurs in a wide variety of habitats from ancient woodland and calcareous grassland to churchyards and gardens. It is usually found under stones and within soil. Occasionally it is found under moss and bark on dead wood where it can be over-looked as *B. truncorum*. First collected from Wytham Woods (SP40) in 1951, it is apparently more common in Oxfordshire (ranked 4th) than in Britain as a whole (ranked 11th).



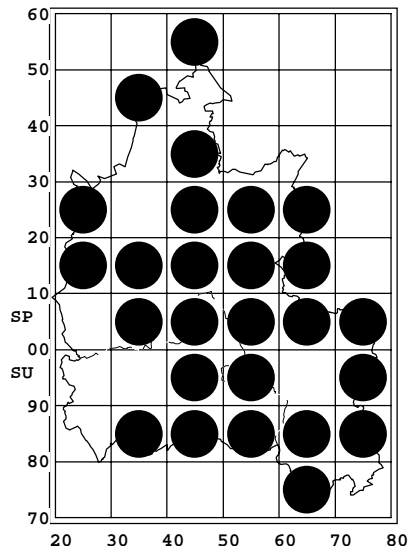
Brachyschendyla dentata Brolemann & Ribaut, 1911

vc.23 only: This small and elusive species was first recorded by D.T.Bilton from Oxford city (SP50) in the late 1980's. Subsequently it has been collected from several churchyards with sandy or friable soils and is currently ranked 19th. Careful searching of the underside of large stones (e.g. stacked gravestones), or by hand-sorting the superficial soil layer beneath, has revealed single specimens, usually in the winter months. It may prove widespread in urban areas but is apparently absent from the south of the county, where the equally scarce *H.brevis* occurs. Nationally it is ranked 28th, the lowest of the Oxfordshire species.



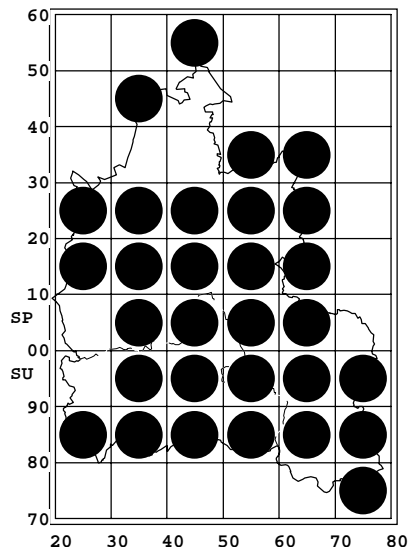
Henia brevis Silvestri, 1896

Another small elusive soil dwelling centipede which, like *B. dentata*, is found under large stones in gardens and churchyards, especially in winter. First collected, in association with *C. linearis*, from a North Oxford garden (SP41) in 1991, it is widespread in at least the south of the county. The apparently mutually exclusive distribution with *B. dentata* would repay further study. Though currently ranked 16th in the county (compared to 26th in Britain) it is probably under-recorded and may prove widespread in urban sites.



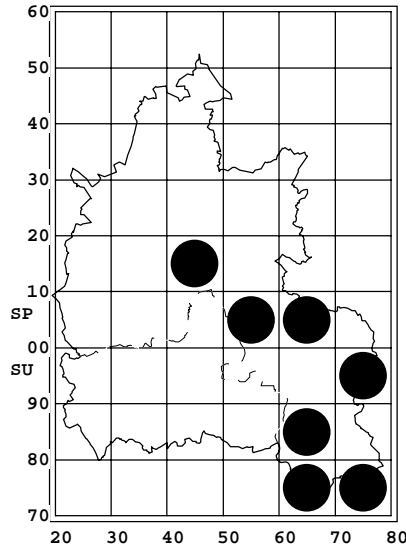
Strigamia crassipes (C.L.Koch, 1835)

First recorded from Wytham Woods (SP40) in 1949 this characteristically rural centipede is widely found in woodland, scrub and river-side meadows throughout the county. It is often found beneath or within dead wood, more rarely in litter and moss. However it is never numerous and usually only single specimens are found.



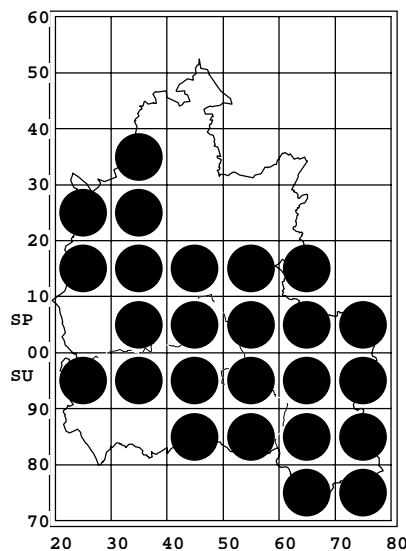
Strigamia acuminata (Leach, 1814)

Another widespread and distinctly rural species found in similar microsites to *S. crassipes*, though it is often found at wetter sites, such as wet woodland, fen and marsh. However the two species often occur together, especially in ancient deciduous woodland. It was first collected in the county in 1947 from Wytham Woods (SP40).



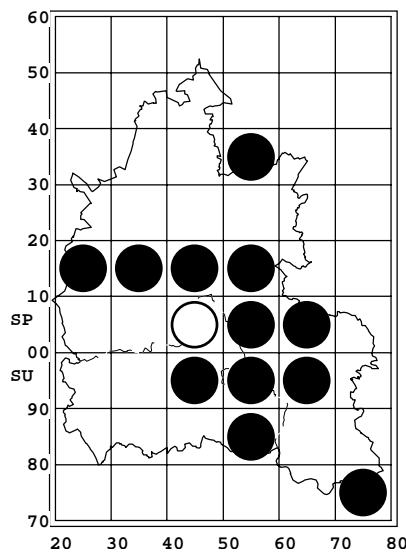
Clinopodes linearis (C.L.Koch, 1835)

vc.23 only: An uncommon species with a distinct south-easterly bias in the county. It was first recorded at University Parks, Oxford (SP50) in 1989 (Bilton, 1990). All other reliable records are from gardens or churchyards, where it is often found under large stones, or amongst soil and debris in neglected corners. Being of similar appearance to the common *H. subterraneus* it may have been overlooked at some sites. An old record from chalk grassland (OBRC records) needs confirming and has not been mapped.



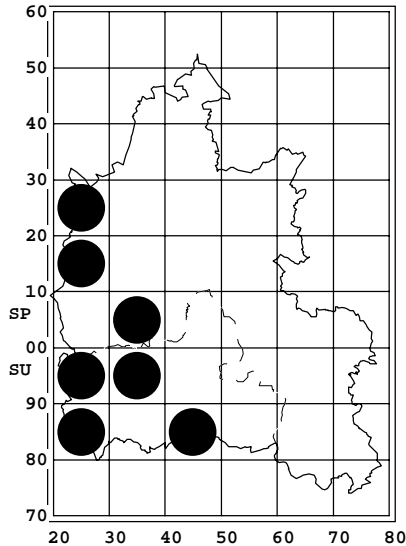
Geophilus carpophagus Leach, 1814

Both the rural and urban forms (Eason, 1979) are frequent in Oxfordshire (ranked 14th together) though apparently less so than in the rest of Britain (7th). As noted by Lewis (1989) there appears to be no overlap in either the number of leg bearing segments or the habitat preference of these two forms. The 'small red' rural form is found under stones and dead wood in woodlands on more acidic soils. The 'large grey' urban form is usually found above ground in synanthropic sites such as churchyards, gardens and farmyards. Typical micro-sites are under the bark of trees, especially yew (*Taxus baccata*) and pine (*Pinus* spp.) or under stones on walls.



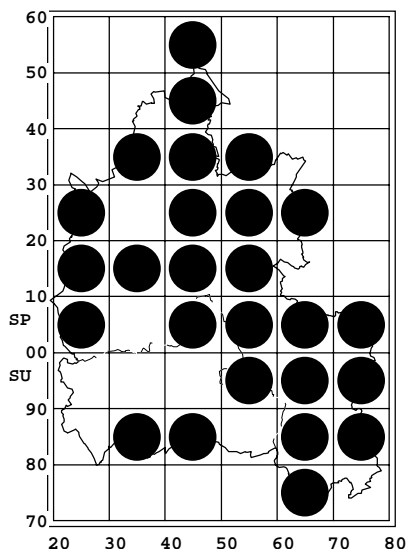
Geophilus electricus (Linné, 1758)

An uncommon but widespread species over much of the county. Most records are from churchyards where it inhabits friable soils. It has also been found in ancient woodlands and calcareous grasslands, such as at Wytham Woods (SP40) where it was first collected in 1951. It is similar in appearance to the common *H. subterraneus* and may possibly have been overlooked at some synanthropic sites.



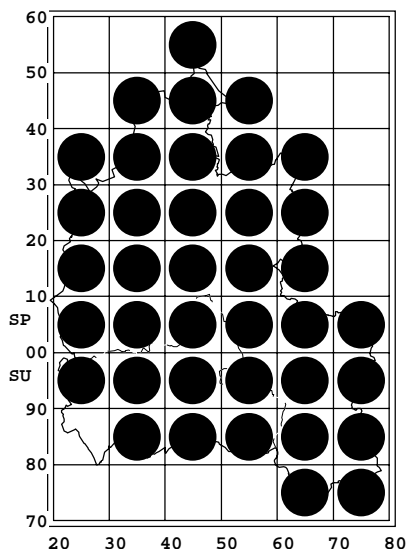
Geophilus osquidatum Brolemann, 1909

In Oxfordshire this species is at the edge of its British range with records concentrated in the south-west of the county, mainly in vc.22. First collected from a garden in Burford (SP21) in 1991, where it has been repeatedly taken from a vegetable plot in association with *H. subterraneus*. Most records are from churchyards or gardens where it occurs under stones and amongst soil. It has been collected with *N. flavus* and small specimens have proved difficult to separate from this common species.



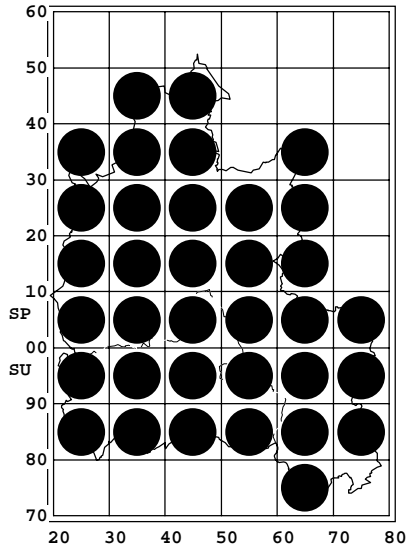
Geophilus oligopus (Attems 1885)

This soil dwelling species is widely recorded from the county, though only added to the county list comparatively recently in 1982 (Wytham Woods, SP40). It is typically found under stones in synanthropic sites such as churchyards, but less commonly, also in a variety of semi-natural sites. In the south-west of the county it has been much less widely collected and apparently absent from the Corallian sands.



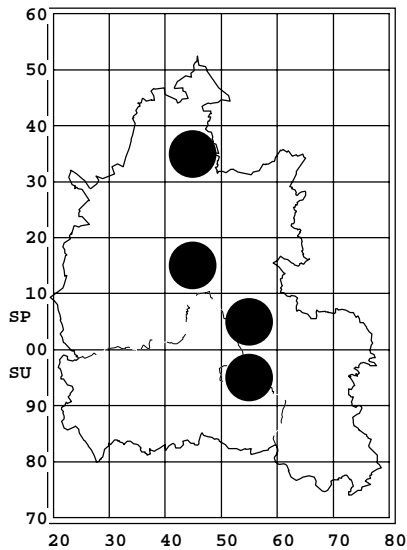
Necrophloeophagus flavus (De Geer, 1778)

First recorded from Bagley Wood (SP50) near Oxford in 1944, this is the commonest Geophilomorph in the county. Found under stones and dead wood in a variety of semi-natural and synanthropic habitats, though apparently less common in the south-west. This is in keeping with the eastern bias of this species in Britain (Barber & Keay, 1988), but it may also be partially replaced by *G. osquidatum* in synanthropic sites since the two tend to occupy similar microsites.



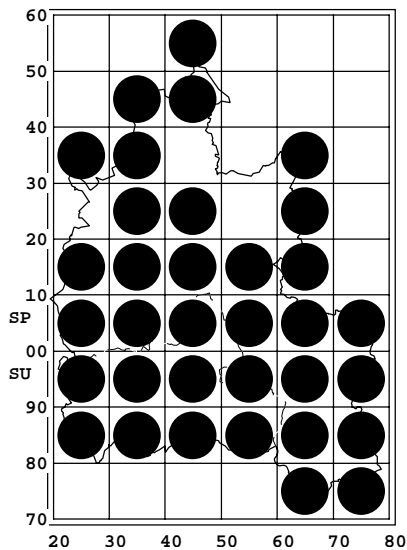
Brachygeophilus truncorum (Bergsoë & Meinert, 1866)

A small species commonly encountered under the bark of fallen timber or within rotten wood. It is typically found in rural sites and can be numerous at some, such as in damp areas within woodlands or in hedgerow ditches. It was first recorded by the Wytham Survey from Cothill Fen NNR (SU49) in 1959.



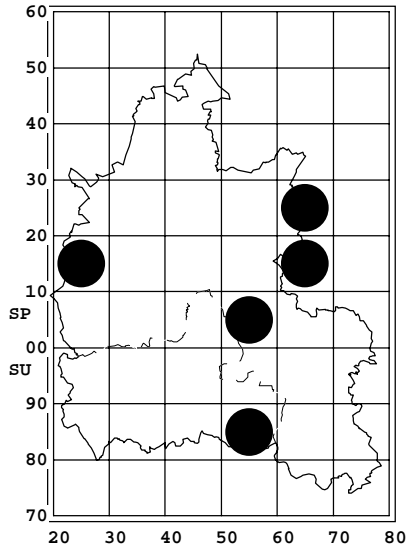
Cryptops anomalans Newport, 1844

This large conspicuous species is scarce in the county. It was first recorded from Queen's College gardens at Oxford (SP50) by D.T.Bilton in 1987. The few subsequent records are all from urban sites, including churchyards, where it has been found underneath large stones. It is probably genuinely scarce since it is too large to easily overlook.



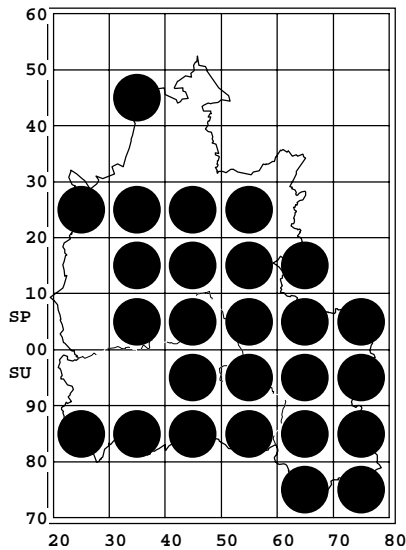
Cryptops hortensis Leach, 1814

The only common scolopendromorph in the county, first recorded from Wytham Woods in 1958. It seems to be more local towards the north which is even more apparent from the tetrad maps held at the OBRC. It is found in woodland and gardens, typically under the bark of tree stumps or within compost heaps. Less commonly it is discovered under stones and dead-wood lying on the ground.



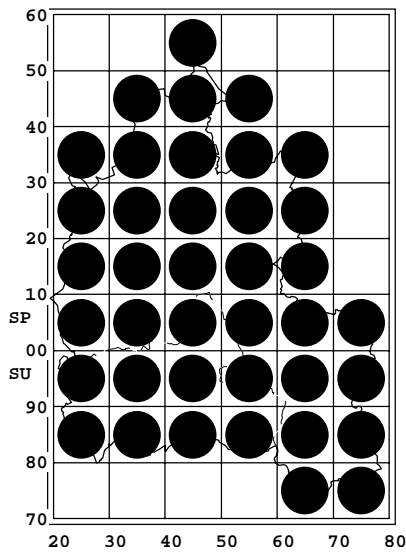
Cryptops parisi Brolemann, 1920

Another large but scarce species first recorded from an Oxford garden centre (SP50) in 1990. It is found beneath large stones or under bark on logs and tree-stumps, usually in urban locations. One record is from a rural woodland where it was found under the bark of fallen birches. It has also been collected from an ancient woodland site in adjacent Buckinghamshire (vc.24 SP71) again under birch bark (pers. obsv.). It may occur at other woodland sites in the county, but could be easily overlooked as the common *C. hortensis*



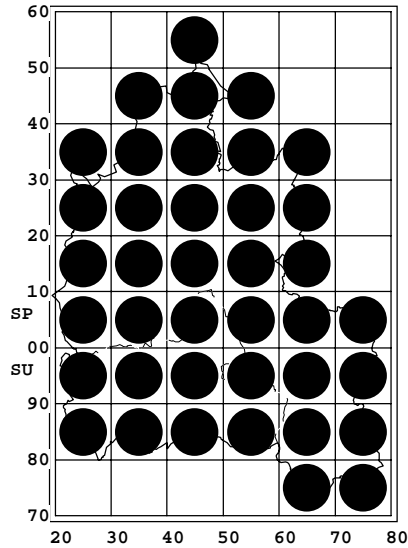
Lithobius variegatus Leach, 1813

This large easily identifiable centipede was first taken from Bagley Wood (SP50) in 1942. It can be locally abundant in woodlands and scrub on both acidic and calcareous soils associated with the Chiltern chalk, the Corallian beds and the Jurassic oolite. In the clay vales it has proved unexpectedly rare and confined to a few ancient woodlands. This patchy distribution is more apparent from the tetrad maps held at the OBRC and reflected by it being ranked 11th in the county compared to the 2nd most widely recorded species in Britain.



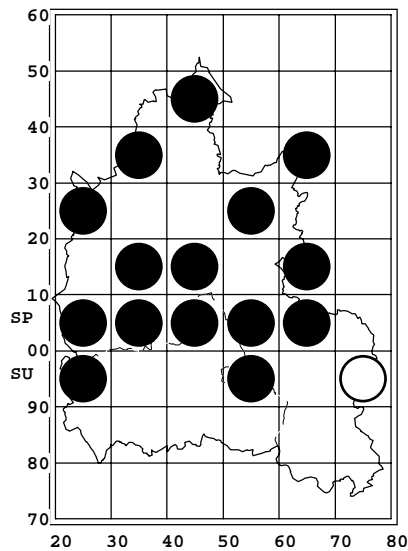
Lithobius forficatus (Linné, 1758)

By far the most commonly collected centipede in the county, no doubt due to its large size and surface activity. Despite a strong preference for urban sites, where it can be readily collected by turning stones and dead-wood, it can also be found in most rural habitats, except in areas where *L. variegatus* is common. The first county record is from Bagley Wood (SP50) in 1944.



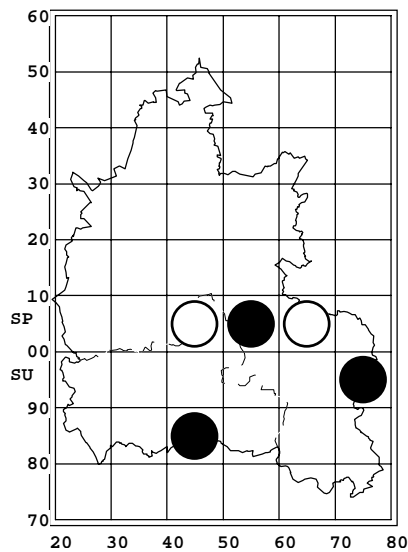
Lithobius melanops Newport, 1845

This is the 3rd most commonly recorded species in the county after the ubiquitous *L. forficatus* and *L. microps*. It is found in a variety of habitats from rural woodlands and meadows to urban churchyards, typically above ground level. Under loose bark on willow pollards and beneath moss or stones on walls it can be numerous. Nationally it seems to be less abundant being ranked 8th.



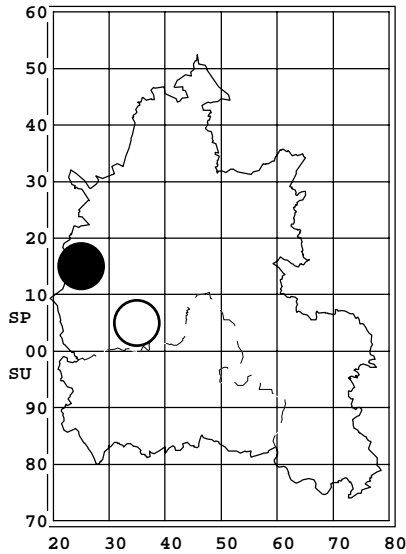
Lithobius macilentus L.Koch, 1862

The first county record for this small Lithobiid is from Wytham Woods (SP40) in 1945, where it has been widely collected on subsequent occasions. It has proved widespread throughout the county but is never numerous. Typically one or two specimens are hand-sorted from amongst deep accumulations of leaf and twig litter within deciduous woodland. It is possibly under-recorded.



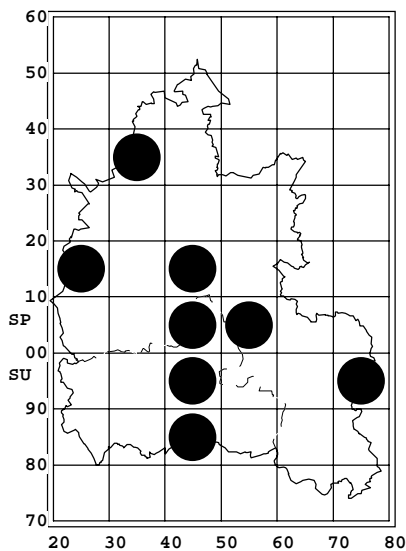
Lithobius borealis Meinert, 1868

A rare species recorded from a handful of deciduous woodlands on acidic soils in the county. It was first recorded from Bagley Wood near Oxford (SP50) in 1933 (Wytham survey), and thus the earliest centipede record for the County. It was refound there sixty years later in 1993. The Wytham survey also gives records for Wytham Woods (SP40) and Holton Wood (SP60) where this species may still occur. It would seem to be much scarcer in the county (ranked 25th) when compared to the rest of Britain (ranked 14th), perhaps reflecting the scarcity of acidic soils in Oxfordshire.



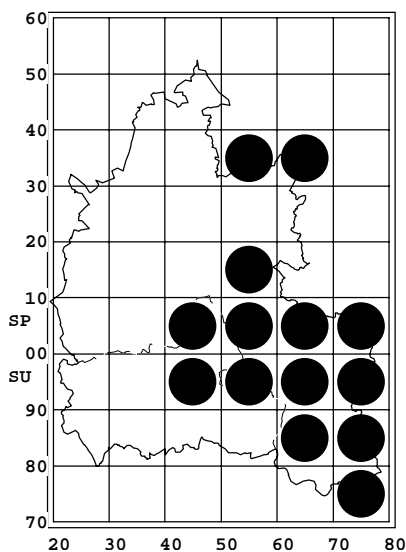
Lithobius pilicornis Newport, 1844

vc.23 only: Barber (1972) cites a record for this large Lithobiid from Bampton (SP30) but further details are not known. In 1993 it was collected by J.M.Campbell from a churchyard in the west of the county. Subsequent visits have revealed additional specimens (and another scarce synanthrope, *C. parisi*). It has probably been introduced and has apparently replaced *L. forficatus* at the site. It may occur at other urban sites, but is believed to be genuinely rare since large Lithobiids have been routinely collected from both urban and rural sites throughout the county.



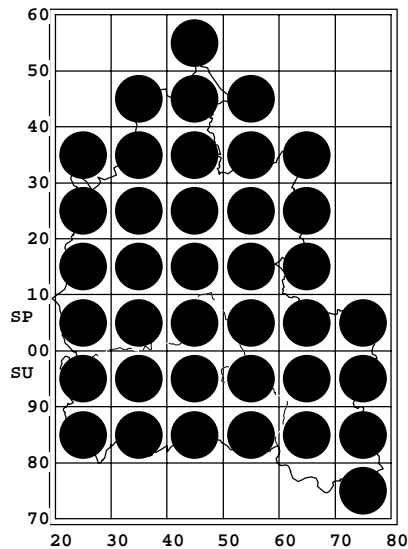
Lithobius calcaratus C.L.Koch, 1844

This uncommon species is found in dry open sites such as grassy heaths on the Corallian sands, dry calcareous grasslands on the Oolites and chalk and a disused gravel-pit in the Windrush valley. It seems to be rather elusive (ranked 21st in the county) and may prove to be under recorded. The first county record is from Wytham Woods (SP40) in 1950. It would seem to be much more widely collected in Britain as a whole (ranked 15th).



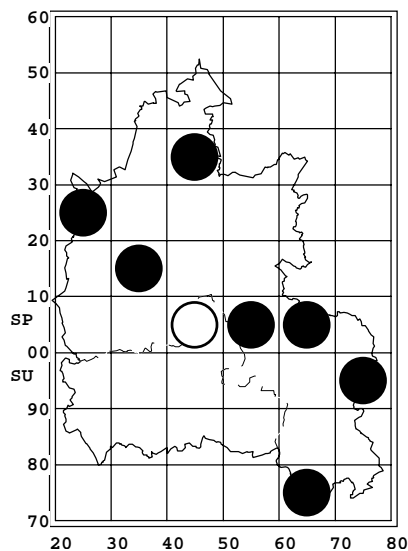
Lithobius muticus C.L.Koch, 1847

In Oxfordshire this distinctive species is at the edge of its British range with records concentrated in the south-east. On the Chiltern chalk and Corallian limestones it can be locally frequent in both wet and dry deciduous woodlands, wherever a well developed litter layer is present. It also has been collected from calcareous grasslands where these adjoin woodlands. Isolated records occur elsewhere in the county most notably near Cottisford (SP53 & 63) in the north. It was first recorded from Wytham Woods (SP40) in 1950 and on numerous subsequent occasions.



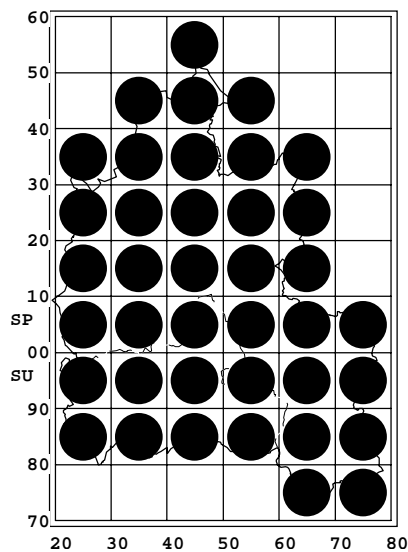
Lithobius crassipes L.Koch, 1862

A common species found mainly in rural sites such as deciduous woodland. It is readily found, and sometimes numerous, under stones, dead wood and carpets of moss. This species was first collected from Bagley Wood (SP40) in 1933, in association with *L.borealis*, representing the earliest centipede records for the county. It seems to be less common in the south despite much apparently suitable habitat. This is in keeping with the general scarcity of this species in the extreme south of Britain (Barber, 1969).



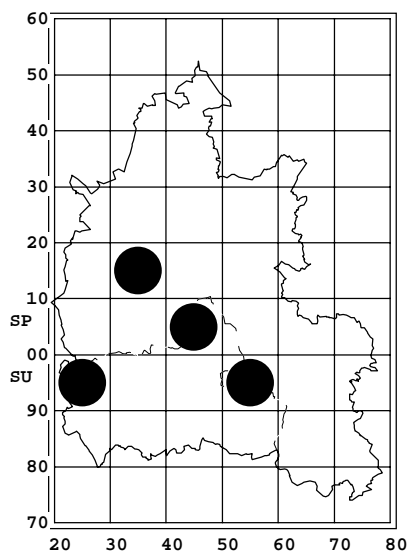
Lithobius curtipes C.L.Koch, 1847

A widespread but elusive species associated with ancient deciduous woodland throughout the county. The first county record is from Aston Rowant Woods (SU79) in 1959 (Wytham Survey) and subsequently widely recorded from Wytham Woods (SP40). The current survey has found the species difficult to locate even at known sites and it may prove more widespread in the county. It is typically collected from amongst leaf-litter or moss and has been hand-sorted from a grass tussock in mid-winter.



Lithobius microps Meinert, 1868

This is possibly the commonest centipede in the county, though currently ranked second after *L. forficatus*. Certainly its small size and subterranean habits do not assist collection. None the less it is often numerous at synanthropic sites where it can be readily found under stones or within soil. In semi-natural habitats, such as woodlands and river-side meadows, it is much less abundant but inevitably still present.



Lamycetes fulvicornis Meinert, 1868

An apparently rare species first recorded in 1992 and ranked 26th in the county. Most records are from riverside locations, such as meadows and disused gravel-pits. However recent pitfall trapping has shown it to be more widespread with records from arable fields and a dry sand-pit on the Corallian ridge. The common factor would seem to be the presence of bare, un-vegetated ground. The few records are from late-June until late-September, when collector activity is usually minimal, so it is almost certainly under-recorded. It is ranked 16th in Britain.

DISCUSSIONS

Considering the absence of coastline, the county species list would appear to be quite good. Reference to Keay (1993) shows that modern Oxfordshire (28 species) compares with other well worked counties in southern England, including land-locked Surrey (vc 17), which boasts 29 species. Reference to Map 4 shows the number of species recorded from each 10km square to be rather uniform. As was noted with the millipedes (Gregory, 1995) the richest centipede fauna seems to be in the south east of the county where there is a good diversity of habitats associated with the Chiltern Hills and the Thames valley. None the less many of the higher totals (i.e. 20+) tend to reflect well worked squares rather than hot spots. It is believed that a reasonable amount of fieldwork has been done for useful (albeit still subjective) conclusions to be made.

In general species abundance, distribution and habitat preference have been in keeping with that given in Barber & Keay (1988) and Barber (1992). Four species, *S. nemorensis*, *N. flavus*, *L. forficatus* and *L. microps*, can be said to be common and ubiquitous throughout the county. Other species such as *C. hortensis* and *L. melanops*, and the more local *G. carpophagus*, *G. electricus* and *G. oligopus*, are generally common in synanthropic sites but are much more limited in the semi-natural habitats that they occupy.

Several species, most notably the soil dwelling urban geophilomorphs, have been more widely collected from Oxfordshire than expected. Their relative abundance in the county may be mainly due to the friable calcareous soils which have developed over much of the county. It could also be due to recorder bias reflecting the effort put into surveying churchyards throughout the county.

Whatever the reason it is clear from this survey that synanthropic sites, especially old churchyards, are important for many species. Three apparently very rare geophilomorphs, *B. dentata*, *H. brevis* and *C. linearis*, were collected mainly from old churchyards and gardens throughout the county. Other scarce but typical 'churchyard' species are the Geophilomorph

G. osquidatum, the large Scolopendromorphs *C. anomolans* and *C. parisi* and the large Lithobiid *L. pilicornis*. The common *H. subterraneus* is also essentially synanthropic in Oxfordshire. Even in semi-natural sites it is typically collected from disturbed road-verges or boundary ditches.

The faunal interest of urban and suburban sites in Surrey was noted by Barber & Eason (1970) following the addition of *B. dentata* to the British list. There have been repeated requests for more records from urban areas (e.g. Barber & Keay 1988, Barber 1992, Keay 1993). With the exception of a few recorders (e.g. Lee 1993) the response has been slow. How can we claim to know the true status of a species unless all available habitats have been sampled? For example in Oxfordshire *G. osquidatum* is now known to be widespread in churchyards in the south-west of the county. It has also been recorded from a single SSSI meadow and, in the absence of these churchyard records, could be seen as a rare species occupying a vulnerable semi-natural habitat within the county. This interest is not confined to centipedes. In Oxfordshire a characteristic synanthropic fauna includes, for example, the millipedes *Nopoiulus kochii* and *Cylindroiulus vulnerarius* (Gregory 1995), the Molluscs *Boettgerilla pallens* and *Testacella haliotide* (OBRC records) and many other under-recorded taxa.

In contrast many of the Lithobiids show strong preferences for semi-natural habitats in the county. Deciduous woodland is an important habitat for several species: *L. variegatus*, *L. maciletus*, *L. borealis* and in particular *L. muticus* and *L. curtipes*. In keeping with a preference for open sites noted in Barber & Keay (1988) *L. calcaratus* inhabits heathland and calcareous grassland. The Geophilomorphs *S. crassipes*, *S. acuminata* and *B. truncorum* tend to be found in semi-natural habitats but are tolerant of a wide range of types. The most diverse centipede faunas were typically found at sites where non-calcareous soils occur. At such sites other soil invertebrates such as millipedes and snails are often poorly represented.

Even considering the limited amount of semi-natural habitat in the county, many rural species seem to be much less common than would be expected from their national distributions. The best example is *L. variegatus* which is absent from much of the clay vales in the county. Barber & Keay (1988) comments that this species is occasionally absent from areas where it would be expected to occur. This is certainly true there. *L. borealis* is also conspicuously uncommon in Oxfordshire. This is considered to be a species typical of acid soils (Barber & Keay 1988) so it is perhaps not surprising that it is scarce in this lime rich county. This may also explain the relative paucity for the rural form of *G. carpophagus* and *L. calcaratus*. However, in Oxfordshire the latter species has also been collected from short turf calcareous grasslands. This is a fairly widespread habitat in the county so the reason for its scarcity is unclear, though possibly in keeping with a north-eastern bias in Britain. Considering the relatively large number of pre-1960 records for species such as *L. borealis* and *L. curtipes* it is possible that they have decreased in abundance in recent years.

THE FUTURE

Being a land locked county there would appear to be few species left to add to the county list. *Henia vesuviana* is perhaps the most likely candidate and may be found lurking in a synanthropic site somewhere. Outlying populations of *Lithobius piceus* or *L. tricuspis* may be

found at woodland sites. There may be some introduced species hiding in the hot houses at the Oxford Botanic Gardens, such as those known from Kew or Edinburgh.

The collection of data is on-going, though recording effort is more limited. Continued fieldwork will enable long-term changes in species abundance and distribution to be observed. For example *L. microps* has been shown to be replacing *L. curtipes* in Sweden (Barber 1992). Similar changes may be occurring in Oxfordshire. Species which are scarce or have outlying populations in the county may show expansion or contraction of their respective ranges. The use of specialist techniques may improve our knowledge of elusive species such as *B.dentata* and *H.brevis*. It would be interesting to know if the ranges of these two species are really mutually exclusive as current records indicate. On present evidence *L. fulvicornis* would appear comparatively scarce in the county. However, this is almost certainly a result of collecting at inappropriate times of year for this autumnal species, so a specific search at this time of year may prove the species to be much more widespread.

Though initially undertaken as a 10km survey, many of the species distribution patterns seen across the county are too subtle to be adequately seen with the relatively coarse 10km recording unit used by the national recording scheme. These patterns are much more apparent from the tetrad (2km X 2km) maps held at the Oxfordshire BRC. A tetrad atlas is in preparation through the County Museum Service using the records held on the OBRC database.

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REFERENCES

- Barber, A.D. (1969) Notes on the Chilopoda of Surrey, *Entomologists Monthly Magazine*, **105**: 85-92
- Barber, A.D. (1972) Some notes on the Chilopoda of South East England. *Bull. Brit. Myriapod Group*, **1**: 39-48.
- Barber, A.D. (1992) Distribution and Habitat in British Centipedes. *Ber. nat.-med. Verein Innsbruck*, Suppl. **10**: 339-352.

- 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.
- Bilton, D.T. (1990) *Clinopodes linearis* (Koch) in Oxfordshire and Surrey. *Bull. Brit. Myriapod Group*, **7**: 50.
- Eason, E.H. (1964) *Centipedes of the British Isles*. Warne, London.
- Eason, E.H. (1979) The effect of the environment on the number of trunk-segments in the Geophilomorpha with special reference to *Geophilus carpophagus* Leach. In Camatini, M (Ed.) *Myriapod Biology*. 233-240. Academic Press.
- Gregory, S.J. (1995) Oxfordshire Millipedes. *Bull. Brit. Myriapod Group*, **11**: 7-26.
- Keay, A.N. (1993) Vice County lists for Centipedes. *Bull. Brit. Myriapod Group*, **9**: 35-41.
- Lee, P. (1993) Some garden goodies in Suffolk. *Brit. Myriapod Group Newsletter* No. 18. (Unpublished).
- Lewis, J.G.E. (1989) On the two forms of *Geophilus carpophagus* in Somerset. *Bull. Brit. Myriapod Group*, **6**: 6-7