WOODLICE IN SUFFOLK

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Woodlice are a common sight in the decaying leaf litter of just about any land based ecosystem. Despite this and their undoubted importance in the breakdown of detritus, few Suffolk naturalists have taken the time to note their observations of these animals let alone make a systematic survey of their distribution in the county. This paper summarises the results of recent attempts to remedy this neglect of a fascinating group of animals.

Ecology

The woodlice are members of the Crustacean order Isopoda, literally 'equal feet' i.e. all of their seven pairs of walking legs are very similar in structure. What makes the woodlice unique, not only among the Isopoda but among Crustaceans in general, is their adaptation to life on land. All other Crustaceans are aquatic or at least littoral in habit. The body structure and behaviour of woodlice reflect the adaptations necessary for the transition from an aquatic to a terrestrial life style. As an example, controlling water loss is perhaps the greatest problem any organism faces on moving from water to land; woodlice are most active at night when humidity is higher – a behavioural adaptation; the more highly evolved pill woodlice have also developed a tracheal system, far simpler than that of the insects, but nevertheless effective in reducing water loss in respiration – a structural adaptation. Other adaptations to life on land found in the woodlice are internal fertilisation, a hard exoskeleton to support the body and biting and chewing mouthparts as opposed to the filter feeding mechanisms found in many aquatic species.

The life cycle of a woodlouse also demonstrates its adaptation to life on land. It has overcome the problem of dehydration of the vulnerable egg stage by keeping it moist and at the same time protected inside brood pouches on the underside of the female. The young woodlice 'hatch' and develop in these brood pouches and are then 'born' able to move and fend for themselves. Like all animals with a hard exoskeleton growth is somewhat of a problem. Woodlice grow through a series of moults shedding the old cuticle and expanding to fill a new rapidly hardening cuticle. The process occurs in two stages, the rear half of the cuticle being shed first. The maturation of the animal is usually complete within a year, although moulting continues, albeit at a reduced rate, once the animal is adult. The adults can live for several years during which time they may produce several broods. Mating occurs in the dark and is typically over in 15 mins. (Sutton, 1972). Sperm transfer is achieved by means of specialised organs developed from the pleopods. These organs are of critical importance in the identification of a number of species.

Woodlice can be found in just about any habitat containing decaying vegetable matter. The decomposing material generally provides the humid microsite essential for the survival of the animals. Deciduous woodlands with their rich supply of leaf litter tend to be especially rich habitats. However, the

requirement for calcium in the production of the cuticle reduces the suitability of coniferous woodlands as woodlouse habitat. British species of woodlouse are usually totally vegetarian, preferring decomposing material, although they have been known to take young seedlings. By breaking up leaf litter into finer pieces they speed up the process of decomposition considerably. Woodlice are themselves eaten by a number of other organisms both invertebrate, e.g. spiders, centipedes and beetles, and vertebrate, e.g. small mammals, amphibians and birds. Spiders of the genus *Dysdera* are specialised predators of woodlice, but the most important predators in terms of impact on woodlice numbers are centipedes (Sutton, 1972).

Historical Records

The earliest record of a woodlouse in Suffolk appears to be of the common pill woodlouse, *Armadillidium vulgare*, from Foxhall crag pit in 1829. The next records date from the 1890s and only three species were recorded from Suffolk by the turn of the century. Further odd records were published in the next two decades, adding six more species to the county list (including the two freshwater species *Asellus aquaticus* and *A. meridianus*). A more intense period of recording then ensued in the 1920s and '30s led by Claude Morley. This culminated in a paper by E. Taylor in 1938 summarising the records of woodlice from Suffolk. Taylor lists 12 species from the county but does not include the freshwater taxa. However, only eleven of these species are now considered valid, as all British specimens of the twelfth, *Trachelipus ratzeburgi*, have been found to have been misidentified; it has been removed from the British list.

A further species was added to the county list in 1943, but it was not until the 1970s that any significant work was carried out again when P. T. Harding collected a large amount of data as part of the Isopod Survey Scheme organised by the Biological Record Centre (BRC), Monks Wood. This continued into the early '80s with A. G. Irwin of Norwich Museum collecting additional records. Recording through the rest of the decade was sporadic and, even after all this work, there were large areas of Suffolk which had not been visited at all. It was the attempt to remedy this lack of a systematic survey which marked the beginning of the current recording effort.

The Present Survey

The current bout of recording began in April 1990 when the British Isopod Study Group joined the British Myriapod Group at Thornham Magna Field Centre for an intensive weekend of collecting and recording. By coincidence, at the same time I moved into the county from Yorkshire to begin work in Lowestoft. This has enabled me to build on the work of that initial weekend during the last 30 months.

The initial aim of the survey was to map the distribution of the Suffolk woodlice on the basis of the Ordnance Survey 10km grid squares. All records of woodlice in Suffolk prior to 1990 were requested from the Suffolk Biological Records Centre (SBRC) at the outset. However the main source

of records has been field work. This was carried out in a variety of ways. Attendance at field meetings of the Lowestoft Field Club and the Suffolk Naturalists' Society provided access to a range of sites but most areas have had to be visited specifically for recording purposes. Ordnance Survey maps were used to identify possible sites for visits on collecting trips. Woodlands and fens with public access were mainly sought at the start. Up to half a dozen sites in three or four 10km squares could then be visited in a day. It soon became obvious that a major habitat being overlooked in this way was gardens. To remedy this an appeal was made through the Suffolk Naturalists' Society for access to private gardens. This met with limited success but added a further dimension to the records from a number of 10km squares across the county.

Almost all records were collected by direct observation and turning stones and bits of dead wood. A very few records were obtained from pitfall trapping carried out for educational purposes. During 1992 samples of leaf litter and moss were also collected from a number of the sites visited. Organisms were then removed by Tullgren extraction.

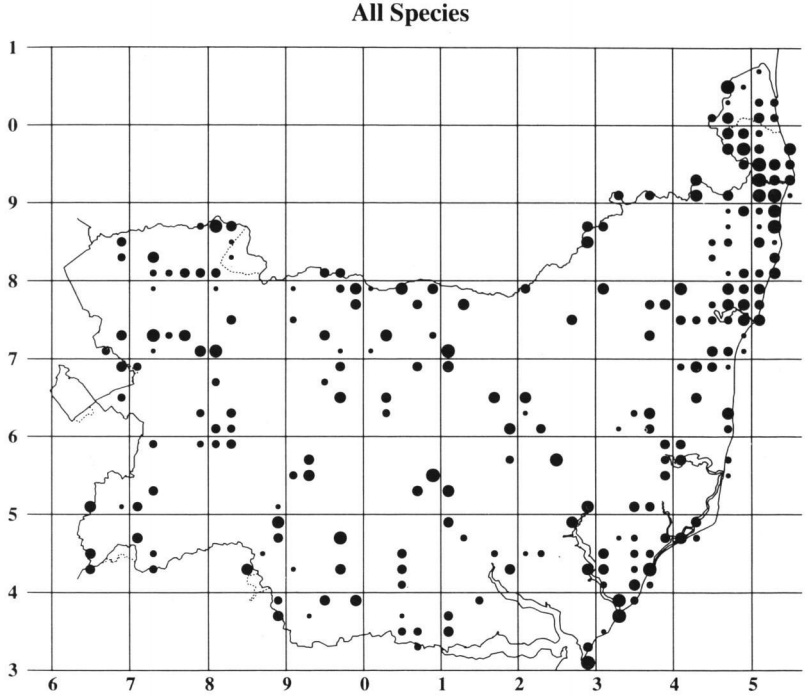
All records have been transferred to RA51 recording cards and submitted to the BRC. A full set of records is also held by the author on behalf of the SBRC. Where voucher specimens have been collected these are lodged in Ipswich Museum.

Results

The total number of records of woodlice from Suffolk stands at just over 1500 at the end of 1992. Of these 78% (1176) have been collected during the present survey, i.e. in the three years 1990, 1991 and 1992. The species list for the county (see Table) currently stands at 24 species out of a list of 37 species known to breed outdoors in Britain (Hopkin, 1991). These 24 species have all been recorded in the current survey hence no extinctions are known to have occurred among this group in Suffolk during this century. This is probably a true picture of the fauna but there is always a possibility that early workers missed species which have been lost in the meantime. Even now the list is probably incomplete, especially as in recent years several new species have been recognised as occurring in Britain. At least eight of the 'missing' species may yet turn up in Suffolk.

There are records of at least five woodlice species from all 10km squares with three or more tetrads inside the borders of Watsonian Suffolk. The maximum number of species recorded from a single 10km square is sixteen from TM59 (Lowestoft). The coverage of the county by tetrads is far less complete, standing at just over 20% (see Map 1).

A number of habitats are known to have certain groups of species associated with them (Harding & Sutton, 1985) whereas other species are more catholic in their requirements and can be found in a wide range of habitats. This last description applies to the commonest five species, *Armadillidium vulgare*, *Oniscus asellus*, *Philoscia muscorum*, *Porcello scaber* (see Map 2) and *Trichoniscus pusillus*. They all have a widespread distribution and all five are no doubt present in most if not all of the county's tetrads.

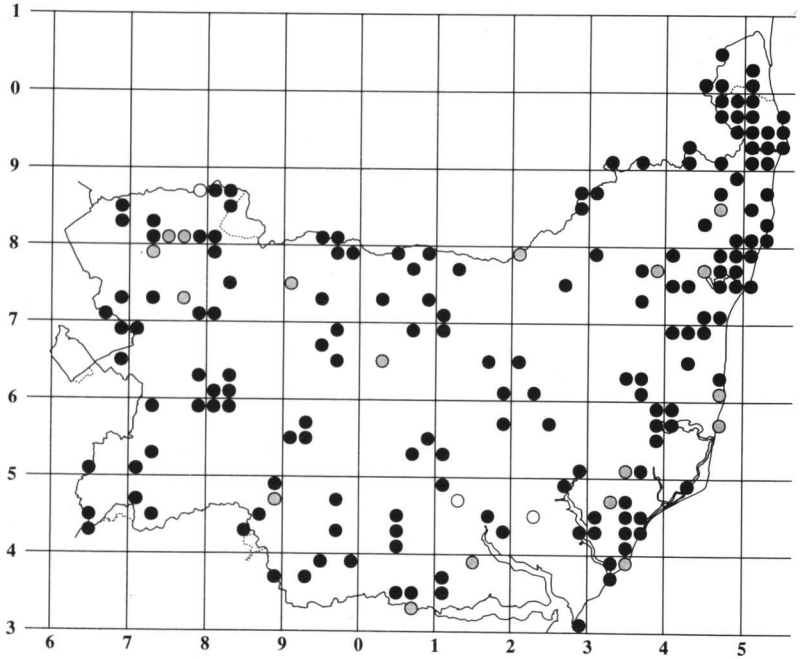


Map 1: Coverage map showing tetrads from which records of woodlice have been collected.

Table: A list of woodlice species recorded in Suffolk.

Ligia oceanica (Linnaeus, 1767)
Ligidium hypnorum (Cuvier, 1792)
Androniscus dentiger Verhoeff, 1930
Haplophthalmus danicus Budde-Lund, 1880
Haplophthalmus mengei (Zaddach, 1844)
Miktoniscus patiencei Vandel, 1946
Trichoniscoides albidus (Budde-Lund, 1880)
Trichoniscoides saeroeensis Lohmander, 1923
Trichoniscus pusillus Brandt, 1833
Trichoniscus pygmaeus Sars, 1899
Oniscus asellus Linnaeus, 1758
Philoscia muscorum (Scopoli, 1763)
Platyarthrus hoffmannseggi Brandt, 1833
Porcellio dilatatus Brandt, 1833
Porcellio laevis Latreille, 1804
Porcellio scaber Latreille, 1804

Porcellio scaber



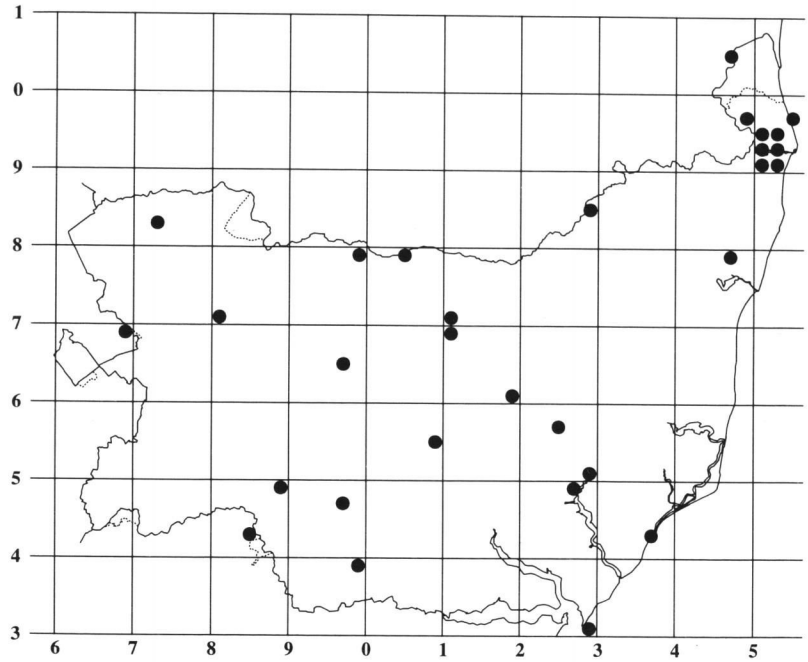
Map 2: Distribution map for *Porcellio scaber*.

Porcellio spinicornis Say, 1818
Porcellionides pruinosus (Brandt, 1833)
Armadillidium album Dolfus, 1877
Armadillidium nasatum Budde-Lund, 1885
Armadillidium vulgare (Latreille, 1804)
Cylisticus convexus (De Geer, 1778)
Asellus aquaticus Linnaeus, 1758
Asellus meridianus Racovitza, 1919

Other relatively common species which are likely to be widespread in Suffolk, probably to be found in every 10km square, are *Platyarthrus hoffmannseggi, Trichoniscus pygmaeus* and *Haplophthalmus danicus*. All three have been widely recorded from across the county although it is surprising that such a common species as *T. pygmaeus* was not recorded until 1990. This can probably be attributed to its small size. *Platyarthrus hoffmannseggi* is interesting in that it is found exclusively with ants, apparently as a commensal in their nests. All three species are commonly found in gardens but are by no means restricted to synanthropic sites.

Haplophthalmus danicus is the commonest of the genus in Suffolk and will

Haplophthalmus danicus



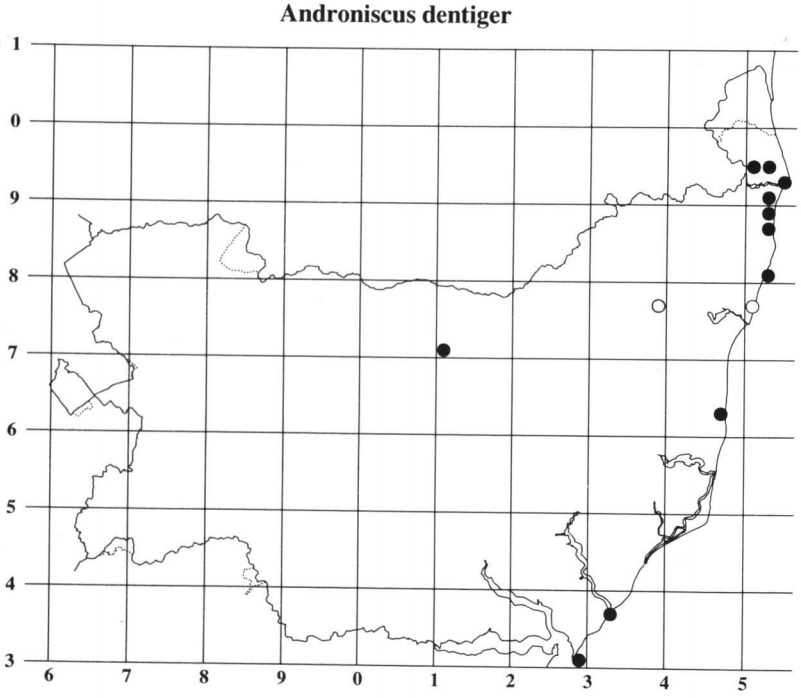
Map 3: Distribution map for *Haplophthalmus danicus*.

probably prove to occur in every 10km square, although not every tetrad by any means (see Map 3). *Haplophthalmus mengei* also appears widespread but less common. This fits the national distribution pattern where *H. danicus* is a southern species. *Haplophthalmus montivagus* is a recently described species which has not been recorded from Suffolk as yet, but may well occur here.

Hopkin (1991) says that *Trichoniscoides albidus* can be found in the majority of 10km squares in S.E. England. However, in Suffolk this species was recorded for the first time during the current survey and is still only known from five 10km squares.

The remaining species tend to be associated with particular types of habitat and so would be expected to be less widespread than the previous species. There appear to be two major habitat groups of species in Suffolk with another two minor ones. The major groups are those species found only in association with man, especially in gardens and on buildings, and those species found only on the coast. The two minor groups are the freshwater *Asellus spp.* and a single species restricted to fenland.

A good number of our Suffolk woodlice are synanthropic and their restricted distributions may be the result of a dearth of records from such

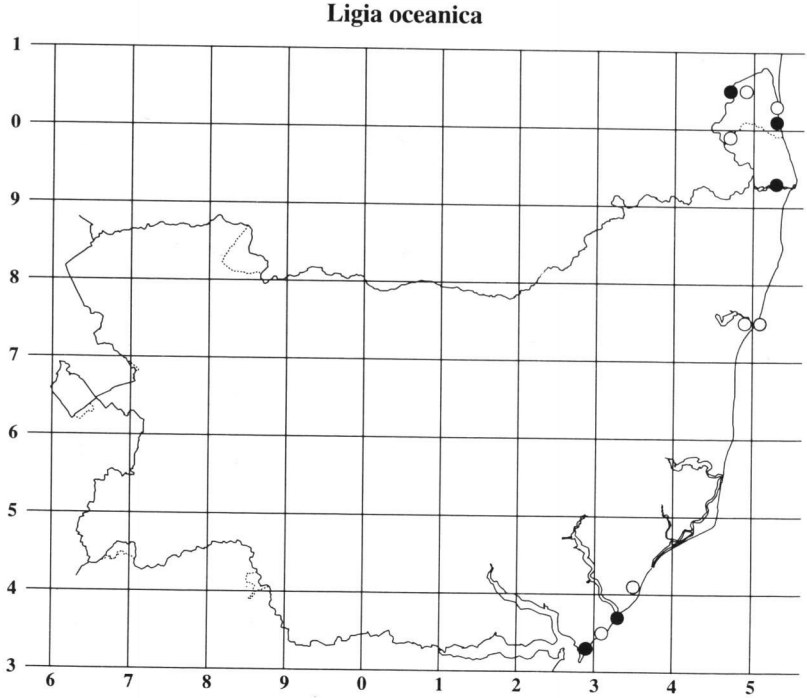


Map 4: Distribution map for *Androniscus dentiger*.

sites. Two good examples are *Cylisticus convexus* and *Androniscus dentiger* (see Map 4) which have only been recorded from East Suffolk to date. Another example may be *Armadillidium nasatum* which has only been seen once in Suffolk at Rodbridge Corner Picnic Site in 1991. This is a locally common species in southern England (Hopkin, 1991) and could be expected to turn up anywhere in the county, especially in gardens and garden centres.

Porcellionides pruinosus is typically found in dung heaps on farms or in compost heaps in gardens. The first type of site is rarely sampled! The garden survey conducted during 1992 produced a number of records of this species, suggesting that it is probably widespread in compost heaps across the country.

Three related species which are possibly truly scarce are *Porcellio dilatatus*, *P. laevis* and *P. spinicornis*. *P. dilatatus* is very similar in appearance to the common species *P. scaber*, which may account in part for its apparent scarcity. The large size of *P. laevis* makes it quite distinctive so it is unlikely to have been overlooked in the past. There are two old records of the species in Ipswich from the turn of the century. Since that time it has only been recorded from an old garden in Lowestoft where there is a well-established population. *P. spinicornis* is also a large and distinctive species and is



Map 5: Distribution map for *Ligia oceanica*.

restricted to the walls of buildings in Suffolk. Its national distribution tends to suggest it should be more common in Suffolk than it appears to be. It may well be present in many homes across the county but these are not the easiest sites to sample.

A particular problem with all of these synanthropic species is that their distributions are often more fluid than the species of natural habitats due to the rapidly changing nature of synanthropic sites.

There are four species found only in coastal sites in Suffolk. The sea slater, *Ligia ocenica*, is a truly littoral species (see Map 5). Its absence from the central parts of our coastline may be real due to the lack of suitable substrates but further work is needed along this stretch of coast. It probably also occurs further upstream in the Deben, Orwell and Stour estuaries than has hitherto been found.

Miktoniscus patiencei has been recorded new to the county during the current survey. It is typically a salt marsh animal and so far the most northerly Suffolk record is from Havergate Island. However, there seems no reason why it should not occur in most of the coastal 10km squares as most contain habitat which is eminently suitable.

Another coastal species is *Trichoniscoides saeroeensis* which Hopkin

(1991) believes is under recorded and probably quite common. As for *M. patiencei*, the coastline of Suffolk is suitable habitat for this species and further searching may similarly turn up this species in all 10km squares along the coast.

Armadillidium album is a nationally rare species. The only record in Suffolk is from Southwold in 1990 where it had been searched for on several occasions in the past (Harding, *pers. comm.*). This shows how difficult it can be to locate this animal. It is intolerant of disturbance by man and its continued survival at Southwold must be in doubt.

Very little work has been done in freshwater habitats but the common water louse, *Asellus aquaticus* will probably prove to be widespread in Suffolk when suitable sites have been sampled. *A. meridianus* is a far less common species. There are a handful of old records but the only record from the current survey is from Beccles Marshes in 1992.

The damp, litter-rich fens are ideal habitat for many species of woodlouse. However, *Ligidium hypnorum* is the only species restricted to this habitat in Suffolk. Interestingly, elsewhere it is also an inhabitant of old woodlands but has not been recorded from such sites in this county. Being a fenland animal, it occurs most commonly along the valleys of the Waveney and Little Ouse.

The Future

The initial aim of the current survey of gaining a picture of the distribution of woodlice in Suffolk on a 10km square basis is now completed. There are still areas of the county, particular habitats and particular species which are under recorded and examples have been referred to above. The 10km square grid is also too coarse a system for gaining a true understanding of the distribution of an organism within an area the size of Suffolk. It is therefore intended to move into a second phase of the survey aimed at increasing the tetrad coverage of the county and concentrating on filling in the gaps in the distributions of particular species. As with any survey work this is a time-consuming task and any help from other naturalists both new and established would be most appreciated. In particular specimens collected from named sites, especially in the centre and west of the county would be most appreciated. Failing that, information on sites worth visiting and access to private land, including gardens, would be helpful.

Acknowledgements

The completion of this survey in a relatively short time would not have been possible without help from a large number of people. I would particularly like to thank Paul Harding at the BRC and Martin Sanford at the SBRC for the majority of the pre-1990 records and members of the British Isopod Study Group for records from their 1990 meeting at Thornham Magna. Eric Parsons has been a great source of ideas and information and has supplied specimens from his own garden as well as encouraging others to give access to their properties. I would also like to thank the following for allowing me to grub around in the forgotten corners of their gardens; Richard Addington,

Nora Chapman, Jenny Crisp, Mr & Mrs I. Dyson, Malcolm Farrow, Sheila Hannant, Mr & Mrs Smart and Arthur & Janet Watchman. Finally I would thank the SNS for the bursary which enabled me to collect records from many of the most westerly areas of Suffolk, a long and expensive journey from Lowestoft.

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The Firethorn leaf-miner in Suffolk

An article by Dr David Nash in *White Admiral* No. 19, 5–7 describes the mines caused by the Firethorn leaf-miner (*Phyllonorycter leucographella*) on the leaves of the common garden shrub Firethorn (*Pyrocanthus* sp.). This minute golden-brown moth was first discovered in Britain in 1989, and had been found in southern Essex, but by the summer of 1991 had not spread into Suffolk.

In a letter to Howard Mendel dated 25th February, 1993, David Agassiz wrote:

'I have recently been carrying out our annual survey and to date have found the mines (of the Firethorn leaf-miner) in four places in the county: Woodbridge, common in Nottcutts Garden Centre! Ipswich, against B & Q store in the town centre, Nayland and Old Felixstowe. I see this covers both vice-counties.'

Firethorn Leaf-Miner Project,
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