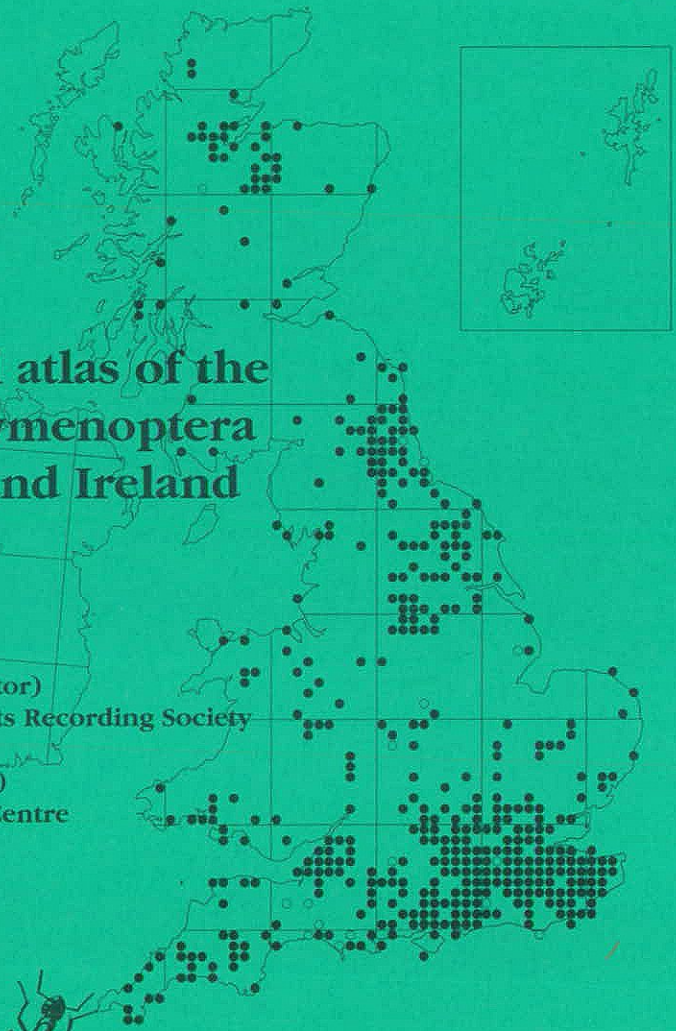
JOINT NATURE CONSERVATION COMMITTEE

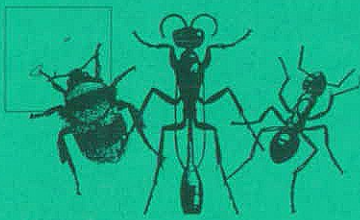
Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL



# Provisional atlas of the aculeate Hymenoptera of Britain and Ireland Part 6


Robin Edwards (Editor)
Bees, Wasps and Ants Recording Society

Gavin Broad (Editor)
Biological Records Centre


Centre for Ecology and Hydrology
Natural Environment Research Council

Printed in 2006 by RMG, St Ives
ISBN 1 870393 84 8

The Centre for Ecology and Hydrology (CEH) is the UK's Centre of Excellence for research in the land and freshwater environmental sciences. Our parent body is the Natural Environment Research Council (NERC).

CEH's staff have specialist skills in a wide range of environmental disciplines, ranging in scale from the gene to whole Earth systems. Our research is aimed at improving our understanding of both the environment and the processes that underlie the Earth's support systems. We are particularly interested in the impacts of human activity on natural environments. Our aim is to generate workable solutions to today's pressing environmental problems, so that a healthy, wealthy and sustainable environment can be enhanced and maintained in the UK and worldwide.

The results of CEH's research are available to all, being published in a wide range of scientific journals, general interest publications and websites. For further information and access to the CEH Annual Report please visit www.ceh.ac.uk.

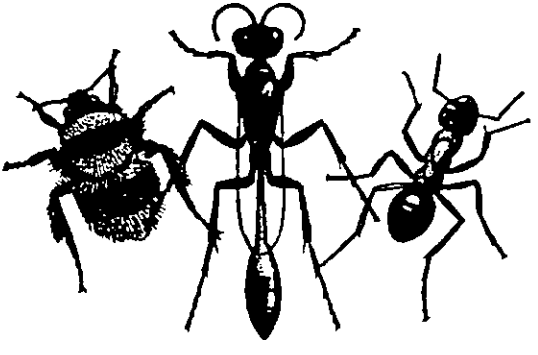
The Biological Records Centre (BRC) is managed by NERC's Centre for Ecology & Hydrology and is based at CEH Monks Wood in Cambridgeshire, UK. BRC was established in 1964 and is the national focus in the UK for terrestrial and freshwater species recording (other than birds). It works with the voluntary recording community throughout Britain and Ireland. The Centre conducts research to understand how environmental change results in changes to species distribution. The BRC database contains more than 14 million records of more than 12,000 species. Please visit www.brc.ac.uk for more information.

BRC is jointly funded by NERC and the UK's Joint Nature Conservation Committee, and is a key component of the National Biodiversity Network.

The Bees, Wasps and Ants Recording Society may be contacted initially via the address below:

Published by:
Centre for Ecology & Hydrology
Monks Wood
Abbots Ripton
Huntingdon
Cambs PE28 2LS
Tel: 01487 772400; Fax: 01487 773558; www.brc.ac.uk

# *Provisional atlas of the Aculeate Hymenoptera of Britain and Ireland Part 6*



**Robin Edwards (Editor)**
*Bees, Wasps and Ants Recording Society*
**Gavin Broad (Editor)**
*Biological Records Centre*

**Centre for Ecology and Hydrology**
Natural Environment Research Council

Citation information:

**Edwards, R. and Broad, G., eds.** 2006. *Provisional atlas of the aculeate Hymenoptera of Britain and Ireland.* Part 6. Huntingdon: Biological Records Centre.

# *CONTENTS*

# *ACKNOWLEDGEMENTS*

Again, this sixth part of the Bees, Wasps and Ants Provisional Atlas is the result of much hard work by many people. The species for this Atlas were carefully selected by Target Species Coordinator, Stuart Roberts, together with the following specialist group compilers:

Geoff Allen (Sphecidae and Crabronidae); Michael Archer (Chrysididae); Graham Collins (Pompilidae); Mike Edwards (Apidae); George Else (Apidae); Adrian Knowles (Sphecidae and Crabronidae); Glenda Orledge (Formicidae) and Matthew Smith (Sphecidae and Crabronidae).

The species profiles written by the compilers have been edited by Robin Edwards (BWARS) and Gavin Broad (BRC).

Next must be mentioned the large number of entomologists and naturalists who submitted records for the target species, and last, but by no means least, Mike Edwards and Stuart Roberts have also undertaken the huge task of checking all the data and producing the maps. These were drawn on computer using the DMAP mapping package developed by Alan J Morton.

Our thanks go to all these contributors.

We are specially indebted to The Trustees of the Natural History Museum, London, who have made their collections of aculeates available for study by our recorders.

The completed draft was read in its entirety by Mike Edwards, George Else and Stuart Roberts (BWARS). The Editors are grateful for their help in reducing errors to a minimum.

Finally, we are indebted to Henry Arnold at the Biological Records Centre, CEH Monks Wood and Julie Gaunt in CEH Knowledge Management for organising, computer setting, printing and distributing the Atlas.

# *INTRODUCTION*

Five parts of the Provisional Atlas have been published so far:

Part 1 with 55 species (Edwards 1997);
Part 2 with 55 species (Edwards 1998);
Part 3 with 60 species in 59 maps (Edwards & Telfer 2001);
Part 4 with 55 species (Edwards & Telfer 2002);
Part 5 with 60 species (Edwards & Broad 2005).

With this sixth part, another 59 species are added, taking the total number mapped to 344. The atlas coverage by family is shown in Table 1.

Table 1. Breakdown of the British and Irish aculeate fauna by family, showing the coverage of the first six parts of the atlas. Figures based on the BWARS checklist published in the Members' Handbook (BWARS 2005).

| Family | Total no. of spp | No. spp mapped | No. left to map |
|---|---|---|---|
| Dryinidae | 34 | 0 | 34 |
| Embolemidae | 1 | 1 | 0 |
| Bethylidae | 22 | 2 | 20 |
| Chrysididae | 33 | 24 | 9 |
| Tiphiidae | 3 | 3 | 0 |
| Mutillidae | 3 | 3 | 0 |
| Sapygidae | 2 | 2 | 0 |
| Scoliidae | 1 | 0 | 1 |
| Formicidae | 64 | 27 | 37 |
| Pompilidae | 46 | 30 | 16 |
| Vespidae | 34 | 31 | 3 |
| Sphecidae | 7 | 4 | 3 |
| Crabronidae | 123 | 85 | 38 |
| Apidae | 268 | 132 | 136 |
| **Total** | **641** | **344** | **297** |

# *SYSTEMATIC LIST OF SPECIES MAPPED*

**The classification here is as published in the BWARS Members' Handbook. (BWARS 2005). Map numbers are given for each species.**

**HYMENOPTERA ACULEATA**

**CHRYSIDOIDEA**

**CHRYSIDIDAE**

Cleptinae

286 Cleptes nitidulus
287 Cleptes semiauratus

Elampinae

288 Holopyga ovata

Chrysidinae

289 Chrysis bicolor
290 Chrysis gracillima
291 Chrysis illigeri
292 Trichrysis cyanea

**VESPOIDEA**

**FORMICIDAE**

Formicinae

293 Plagiolepis taurica

Myrmicinae

294 Temnothorax interruptus
295 Temnothorax nylanderi
296 Temnothorax unifasciatus
297 Myrmecina graminicola

**POMPILIDAE**

Pompilinae

298 Arachnospila anceps
299 Arachnospila consobrina
300 Arachnospila trivialis

**APOIDEA**

**CRABRONIDAE**

Crabroninae

301 Crossocerus annulipes
302 Crossocerus megacephalus
303 Crossocerus wesmaeli
304 Lindenius albilabris
305 Lindenius panzeri
306 Rhopalum clavipes

307 Rhopalum coarctatum
308 Rhopalum gracile
Pemphredoninae
309 Stigmus pendulus
310 Stigmus solskyi

**APIDAE**

Andreninae
311 Andrena bicolor
312 Andrena denticulata
313 Andrena fuscipes
314 Andrena labialis
315 Andrena nitida
316 Andrena simillima
317 Andrena thoracica
318 Andrena tridentata
Halictinae
319 Lasioglossum fratellum
320 Lasioglossum fulvicorne
321 Lasioglossum sexnotatum
322 Lasioglossum villosulum
323 Lasioglossum zonulus
324 Sphecodes reticulatus
325 Sphecodes rubicundus
326 Sphecodes scabricollis
Anthophorinae
327 Anthophora bimaculata
328 Anthophora furcata
329 Anthophora plumipes
330 Anthophora quadrimaculata
331 Anthophora retusa
332 Eucera longicornis
333 Eucera nigrescens
334 Melecta albifrons
335 Melecta luctuosa
336 Nomada fabriciana
337 Nomada rufipes
338 Nomada sexfasciata
Apinae
339 Bombus jonellus
340 Bombus pratorum
341 Bombus soroeensis
342 Bombus barbutellus
343 Bombus campestris
344 Bombus sylvestris

# *DISTRIBUTION MAPS AND SPECIES PROFILES*

Maps 286 to 344 show the recorded distribution of the individual species. Records are presented for three recording periods:

| | |
|---|---|
| + | before 1900 |
| o | 1900 - 1969 |
| ● | 1970 - May 2004. |

It should be mentioned here that plus signs and open circles do not necessarily mean that the species has declined since 1900 or 1969. They may indicate that the locality has not been visited, or that the species was not looked for.

## SPECIES PROFILES

Threat statuses (for Britain only) were identified for some species in the British Red Data Book (RDB) (Shirt 1987), in which the data sheets for aculeate Hymenoptera were compiled by G R Else and the late G M Spooner. Some of these RDB statuses were proposed for revision by Falk (1991) in a national review of scarce and threatened aculeates; such proposed changes being prefixed with a p - thus pRDB. Species with restricted distributions, that failed to meet the RDB threat criteria, were also listed by Falk (1991) as Notable (now referred to as Scarce). Two degrees of Notable status were recognised - Na (thought to occur in 30 or fewer 10km squares) and Nb (thought to occur in between 31 and 100 10km squares). For a full explanation of all the RDB and Notable statuses see Ball (1994).

In the text of this Atlas, county names are those of the Watsonian Vice-county system.

Plant names are given only in the vernacular form in the species profiles. Readers requiring scientific names should turn to page 135. All botanical names are as given in Stace (1997).

## Map 286 *Cleptes nitidulus* (Fabricius, 1793)

**[Chrysididae: Cleptinae]**

Identification keys and general biology are given in Morgan (1984) and Falk (1991).

**Distribution**

Devon to Kent, north to Cumberland and South-west Yorkshire. A widespread species which has probably declined recently.

Overseas, the wasp occurs in Europe (including Sweden, Finland, Denmark, The Netherlands, Belgium, France, Spain, Germany, Switzerland, Italy, Poland, Czech Republic, Slovakia, Austria, Hungary, Albania); also Turkey and Manchuria.

**Status (in Britain only)**

This species is regarded as a Red Data Book species (RDB3, Rare) by Shirt (1987), but provisionally downgraded to Nationally Scarce (Na) by Falk (1991).

**Habitat**

Associated with open habitats both inland, e.g. scrub, heathland, calcareous grassland; and coastal, e.g. sand dunes.

**Flight period**

From June to August but mainly during July; rare during May and September. Males are found slightly more frequently than females.

**Parasitic behaviour**

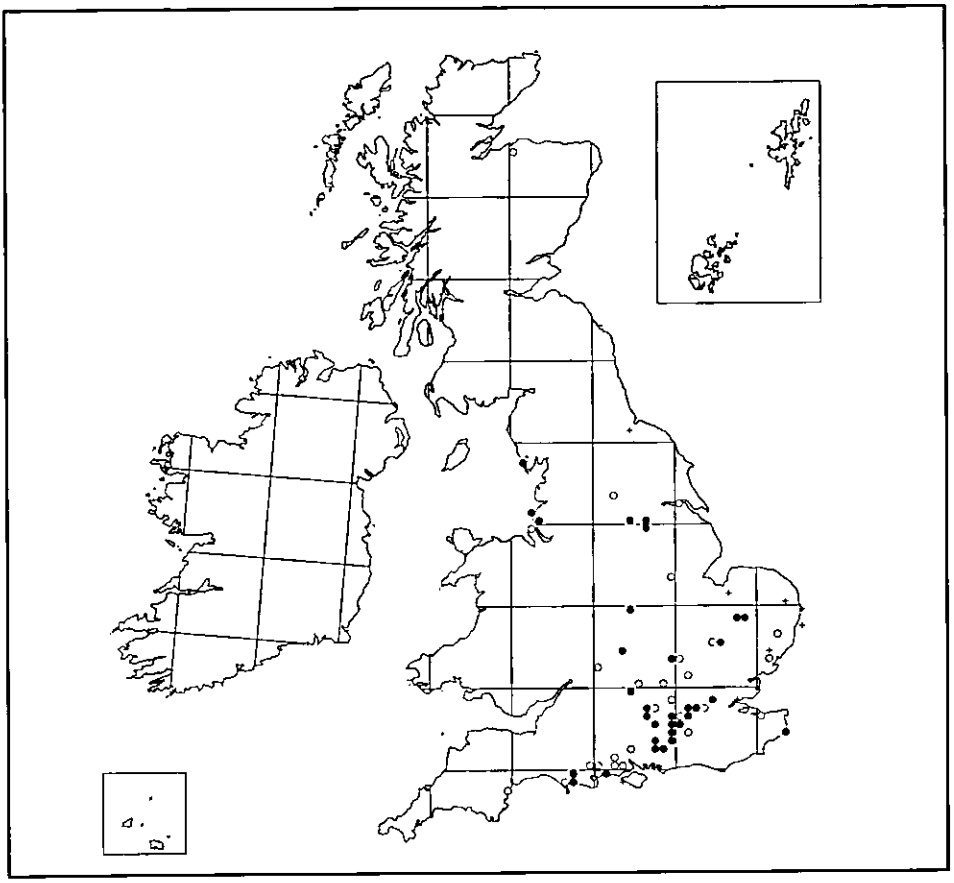
A parasitoid on the cocoons of tenthredinid sawflies. The wasp has been reared from cocoons of the sawfly *Caliroa cerasi* in France, whose caterpillars feed on the leaves of pears and cherries. See *Cleptes semiauratus* for details of life-history.

**Flowers visited**

Found on hogweed and wild carrot, and probably other umbellifers (Apiaceae).

**Parasites**

No specific information found.



***Map compiled by:*** M E Archer and S P M Roberts.
***Author of profile:*** M E Archer.

## Map 287 *Cleptes semiauratus* (Linnaeus, 1761)

**[Chrysididae: Cleptinae]**

Identification keys and general biology of this species, (also known as *C. pallipes* Lepeletier, 1805), are given in Morgan (1984) and Falk (1991).

### Distribution

Devon to Kent, north to North Wales (Anglesey), South Lancashire and West Yorkshire. A widespread species which has probably declined recently.

Overseas, the wasp occurs in Europe (including Sweden, Finland, Denmark, The Netherlands, Belgium, France, Spain, Germany, Italy, Poland, Hungary), much of Palaearctic Asia but not Japan, North Africa (Algeria) and has been introduced into the USA.

### Status (in Britain only)

This species is listed as Rare in Shirt and is regarded as Nationally Scarce (Nb) by Falk (1991).

### Habitat

Associated with gardens, cemeteries and post-industrial sites, and also open sandy habitats, e.g. heathland and sand dunes, and fenland.

### Flight period

From June to August but mainly during July, rarely during May. Males tend to be more frequently found than females.

### Parasitic biology

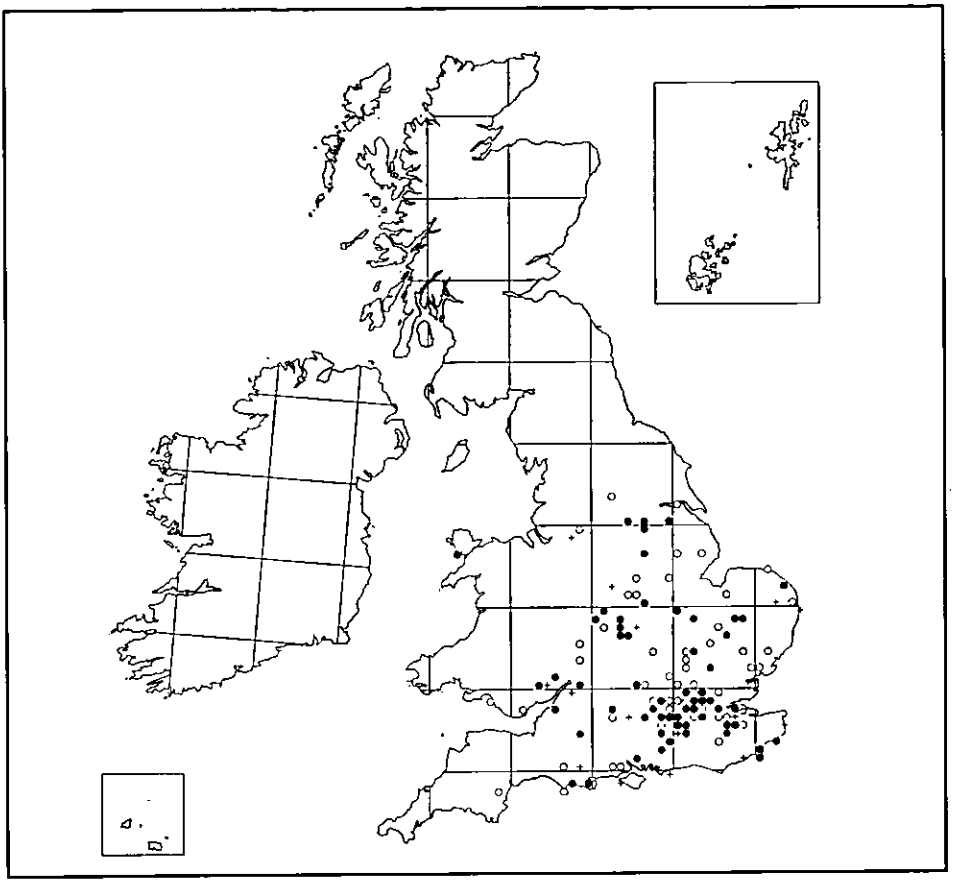
A parasitoid on the cocoons of tenthredinid sawflies, particularly the common currant sawfly (*Nematus ribesii*) which is found on red currant, gooseberry and similar shrubs. The sawfly can have several generations a year with the summer cocoon often spun between leaves and the over-wintering cocoons spun in the soil. The female wasp searches for a cocoon and bites a hole in it. An egg is then laid on the host and the hole sealed with glistening mucilage. On hatching the cleptine larva eats the host.

### Flowers visited

No British information found, but the wasp been collected by sweeping from birch and beating from white poplar. Also observed running about the leaves of red currant bushes and on the ground beneath them.

### Parasites

No specific information found.



***Map compiled by:*** M E Archer and S P M Roberts.
***Author of profile:*** M E Archer.

## Map 288 *Holopyga ovata* Dahlbom, 1845

**[Chrysididae: Elampinae]**

Identification key and general biology are given in Morgan (1984). Previously this species was misidentified as *H. amoenula* and is also known as *H. generosa* (Förster, 1853) in Kunz (1994).

**Distribution**
Only recorded from Sark and Jersey in the Channel Islands.

Overseas, the wasp occurs throughout much of Europe (including Norway, Sweden, Finland, Denmark, The Netherlands, Belgium, Luxembourg, France, Spain, Germany, Italy, Poland, Hungary, the former Yugoslavia and Greece); also from Turkey, Syria, Palestine and Iran.

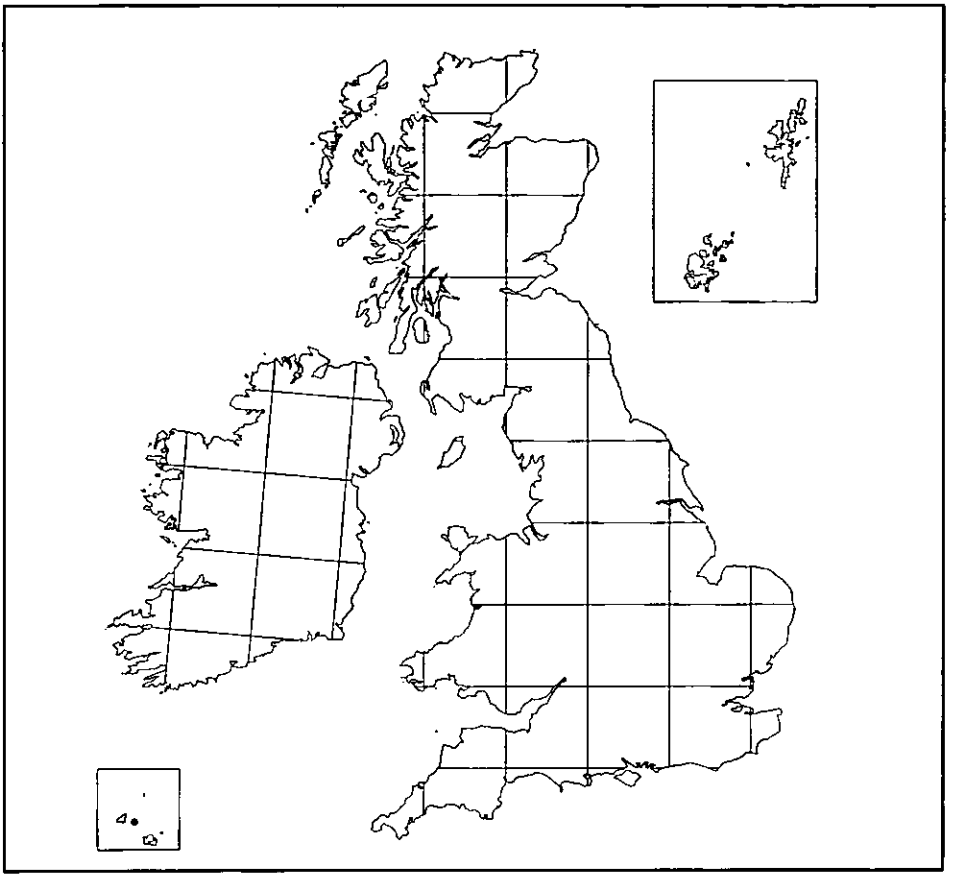
**Status (in Britain only)**
The Channel Islands were not included in assessments of conservation status either in Shirt (1987) or by Falk (1991).

**Habitat**
Associated with open sandy habitats with some bare soil.

**Flight period**
From the very few records available it has been recorded from April until June.

**Parasite biology**
The host for this wasp is unknown.

**Flowers visited**
Fennel, wild mignonette and wild parsnip.



**Map compiled by:** M E Archer and S P M Roberts.
**Author of profile:** M E Archer.

## Map 289 *Chrysis bicolor* Lepeletier, 1806

**[Chrysididae: Chrysidinae]**

Identification key and general biology are given in Morgan (1984). Kunz (1994) considers *C. bicolor* and *C. illigeri* (Wesmael 1839) to be the same species. Morgan (1984), however, separates these two names.

**Distribution**
Only recorded from Jersey in the Channel Islands.

Overseas, the wasp occurs throughout northern, middle and eastern Europe (including Sweden, Finland, The Netherlands, Belgium, Luxembourg, France, Spain, Germany, Switzerland, Italy, Poland and Hungary).

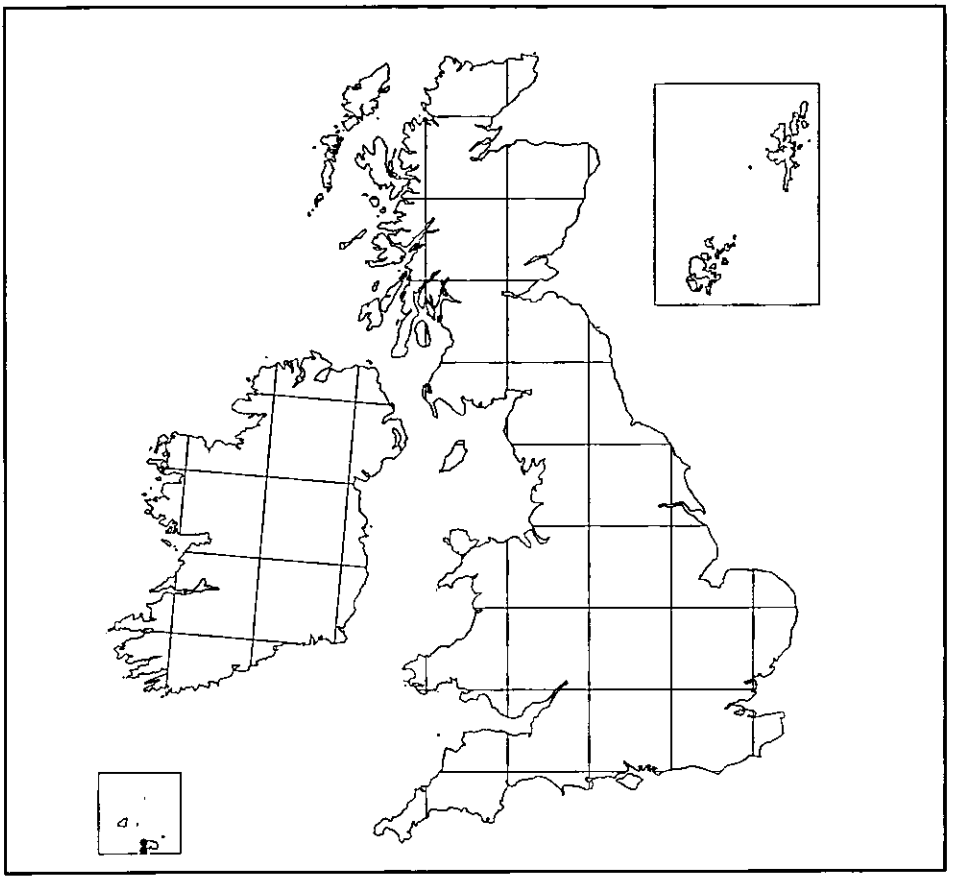
**Status (in Britain only)**
The Channel Islands were not included in assessments of conservation status either in Shirt (1987) or by Falk (1991).

**Habitat**
Associated with open sandy habitats such as coastal sand dunes and commons.

**Flight period**
From the very few available records, it has been recorded during July and August and once during October.

**Parasite biology**
The host is unknown.

**Flowers visited**
Wild carrot.



***Map compiled by:*** M E Archer and S P M Roberts.
***Author of profile:*** M E Archer.

## Map 290 *Chrysis gracillima* (Förster, 1853)

**[Chrysididae: Chrysidinae]**

Identification keys and general biology are given in Morgan (1984) and Falk (1991).

**Distribution**
South-eastern England from Dorset to West Suffolk.

Overseas, the wasp occurs in Europe (including The Netherlands, Belgium, France, Germany, Italy (Sicily), Poland, Austria, Hungary), North Africa (Morocco), Jordan.

**Status (in Britain only)**
Listed in Shirt (1987) and Falk (1991) as Vulnerable (RDB 2).

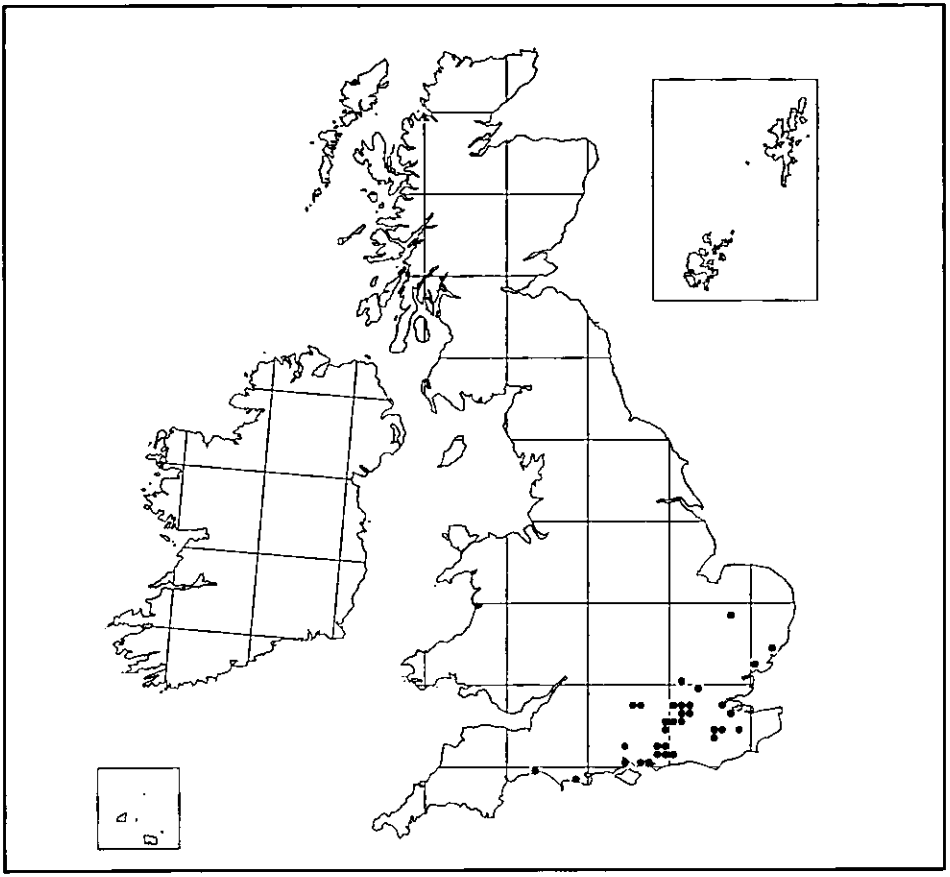
**Habitat**
Found in a range of habitats including lowland heath, hedgerows and chalk downland. Habitats probably need the presence of dead wood in which its host nests. Adults seen on trunks of dead trees.

**Flight period**
From the few records available, from June to August but mainly July and August.

**Parasite biology**
Seems to be associated with small aculeates that nest in holes in dead wood, possibly *Trypoxylon clavicerum*.

**Flowers visited**
Wild carrot.

**Parasites**
No specific information found.



***Map compiled by:*** M E Archer and S P M Roberts.
***Author of profile:*** M E Archer.

## Map 291 *Chrysis illigeri* (Wesmael, 1839)

**[Chrysididae: Chrysidinae]**

Identification keys and general biology are given in Morgan (1984) and Falk (1991). Previously known as *C. helleni* Linsenmaier, 1959. Kunz (1994) considers *C. bicolor* Lepeletier, 1805 and *C. illigeri* to be the same species. Morgan (1984) separates these two names, with *C. bicolor* only known from Jersey.

**Distribution**

Cornwall to Kent, and north to Leicestershire and West Norfolk. (Morgan (1984) also gives Nottinghamshire, but no data are available). Jersey.

Overseas, the wasp occurs in Europe (including Norway, Sweden, Finland, The Netherlands, Belgium, Luxembourg, France, Switzerland, Italy, Poland, Austria and Hungary).

**Status (in Britain only)**

This species was not listed in Shirt (1987), but was included by Falk (1991) (as *C. helleni*) in the category Notable B (now known as Nationally Scarce (Nb).

**Habitat**

Open sandy habitats such as lowland heathland, coastal sand dunes, gravel and sand pits.

**Flight period**

Females active from June to September but mainly during July and August. Males active from June to August but mainly during July.

**Parasite biology**

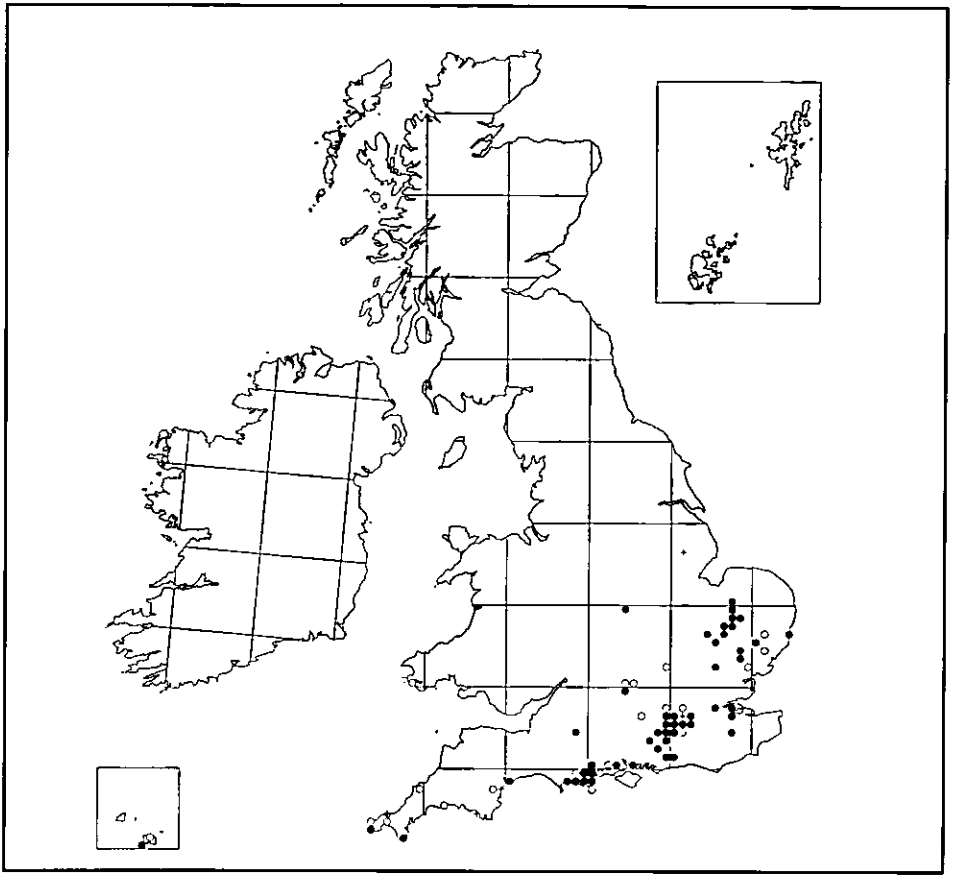
This wasp is a parasitoid on *Tachysphex pompiliformis* (see Atlas part 2).

**Flowers visited**

Apiaceae (Umbelliferae) and hemp-agrimony.

**Parasites**

No specific information found.



***Map compiled by:*** M E Archer and S P M Roberts.
***Author of profile:*** M E Archer.

## Map 292 *Trichrysis cyanea* (Linnaeus, 1758)

**[Chrysididae: Chrysidinae]**

Identification key and general biology are given in Morgan (1984). The only entirely metallic blue wasp in Britain.

**Distribution**

This species shows a widespread distribution from Cornwall to Kent and north to North Yorkshire with isolated records from Cumbria (Skirwith) and Scotland (Perth and Kinross).

Overseas, the wasp occurs throughout Europe (including Norway, Sweden, Finland, Denmark, The Netherlands, Belgium, Luxembourg, France, Spain, Germany, Austria (to 960m), Italy, Poland and Hungary) and the rest of the Palaearctic, but not Japan.

**Status (in Britain only)**

This species is not regarded as being scarce or threatened.

**Habitat**

Associated with open habitats with aerial nesting sites of its hosts such as wooden fence and gate posts, dead trees, logs and tree stumps, and holes in mud and cob walls.

**Flight period**

Recorded from May until September but mainly during June and July. There are a very few records from April and October. The males and females have the same flight period.

**Parasite biology**

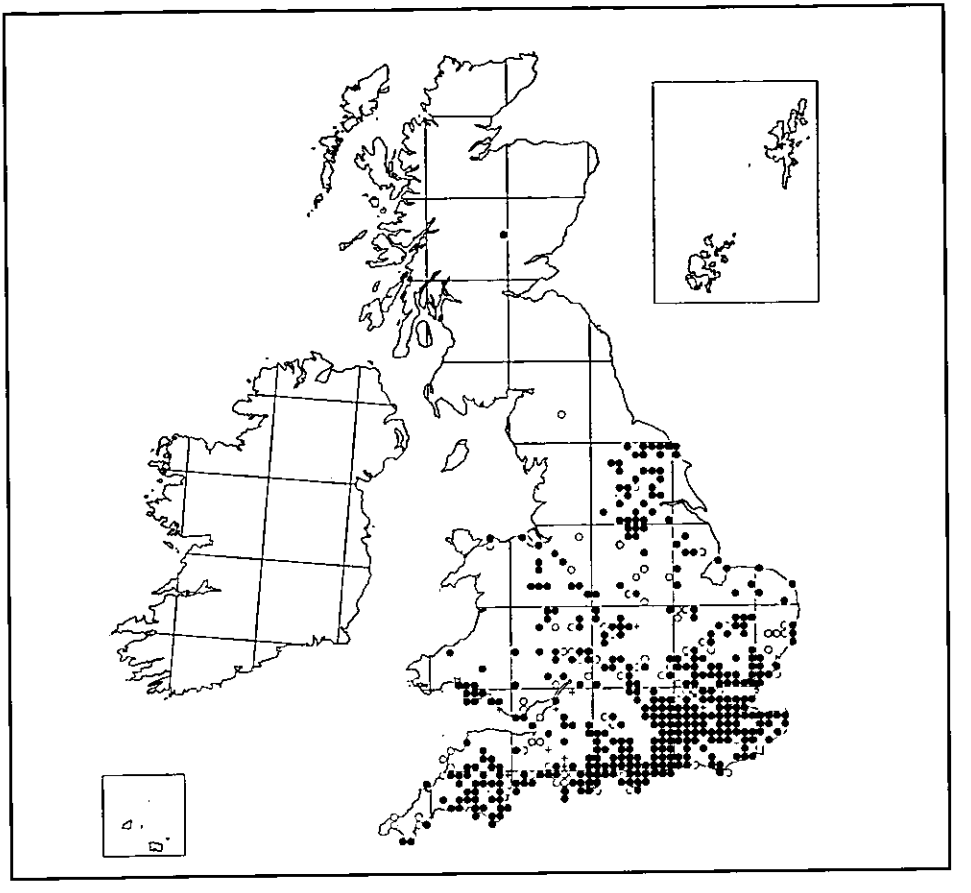
It has been reared from its hosts *Trypoxylon figulus* and *T. attenuatum*. Other hosts seem to be *Pemphredon lethifera, Stigmus pendulus, Hylaeus pectoralis, Heriades truncorum*, and *Chelostoma florisomne*.

**Flowers visited**

Wild carrot and wild parsnip. It has also been recorded on laurel leaves.

**Parasites**

Sometimes parasitised by *Perithous divinator* (Hym., Ichneumonidae), which is a regular parasitoid of stem-nesting crabronids (Danks 1971).



***Map compiled by:*** M E Archer and S P M Roberts.
***Author of profile:*** M E Archer.

## Map 293 *Plagiolepis taurica* (Santschi, 1920)

**[Formicidae: Formicinae]**

*Plagiolepis taurica* is a senior synonym of *P. vindobonensis* Lomnicki (Radchenko 1989 & 1996). The pale to dark brown workers and brownish black males are very small (1-2mm and 1.5mm-2mm long, respectively). Queens are 3-4mm long (Collingwood 1979).

### Distribution

*Plagiolepis taurica* occurs in the Channel Islands, but is absent from England, Wales, Scotland and Ireland.

Elsewhere it occurs in northern, central and eastern Europe, its range extending south into Italy and Greece. It is locally abundant in southern Belgium (Baugnée 2002).

### Status (in Britain only)

The Channel Islands were not included in assessments of conservation status either in Shirt (1987) or by Falk (1991).

### Habitat

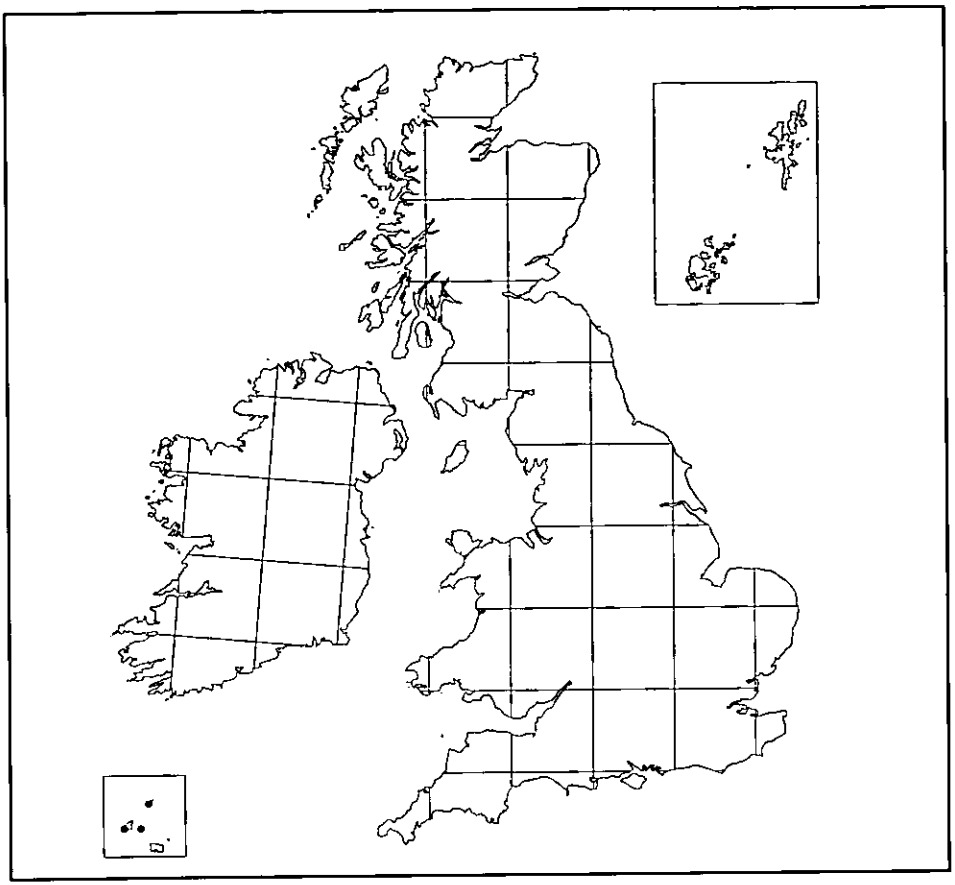
*Plagiolepis taurica* may be found in warm, dry, open areas where it nests under stones and in rock crevices. In the Channel Islands it colonises coastal cliffs.

### Flight period

Nests contain winged sexuals between June and August (Seifert 1996).

### Nesting biology and foraging behaviour

Colonies usually have several queens. Workers tend homopterans for honeydew and forage for nectar. They follow trails to permanent food sources (Seifert 1996).



***Map compiled by:*** G M Orledge and S P M Roberts.
***Author of profile:*** G M Orledge.

## Map 294 *Temnothorax interruptus* (Schenck, 1852)

**[Formicidae: Myrmicinae]**

Together with all but one of the ants included in *Leptothorax* (Myrafant), this species is now placed in *Temnothorax* (Bolton 2003). This leaves *Leptothorax acervorum* as the sole representative of its genus in Britain. Although widely distributed in Europe, *T. interruptus* is nowhere common. Its small, brownish-yellow workers may be distinguished from those of the three similar British and Channel Islands species - *T. albipennis, T. nylanderi and T. unifasciatus* - by their combination of relatively long and typically incurved pronotal spines, darkened antennal clubs, and the possession of a darkened band, interrupted in the middle, on the first gastral tergite.

### Distribution

The small number of British records for *T. interruptus* come only from the extreme south of England, where the species is currently known from heathland in Dorset and the New Forest, and from Hayling Island and Dungeness. It has also been recorded from Lydd-on-Sea (Felton 1965) and Rye Harbour (Grace & Yates 1989).

Elsewhere, *T. interruptus* occurs sparsely in Denmark and southern parts of Sweden and Finland, and in southern and central Europe (Collingwood 1979; Børgesen 2000; Czechowski, Radchenko & Czechowska 2002).

### Status (in Britain only)

Listed as rare (RDB3) in Shirt (1987) and by Falk (1991).

### Habitat

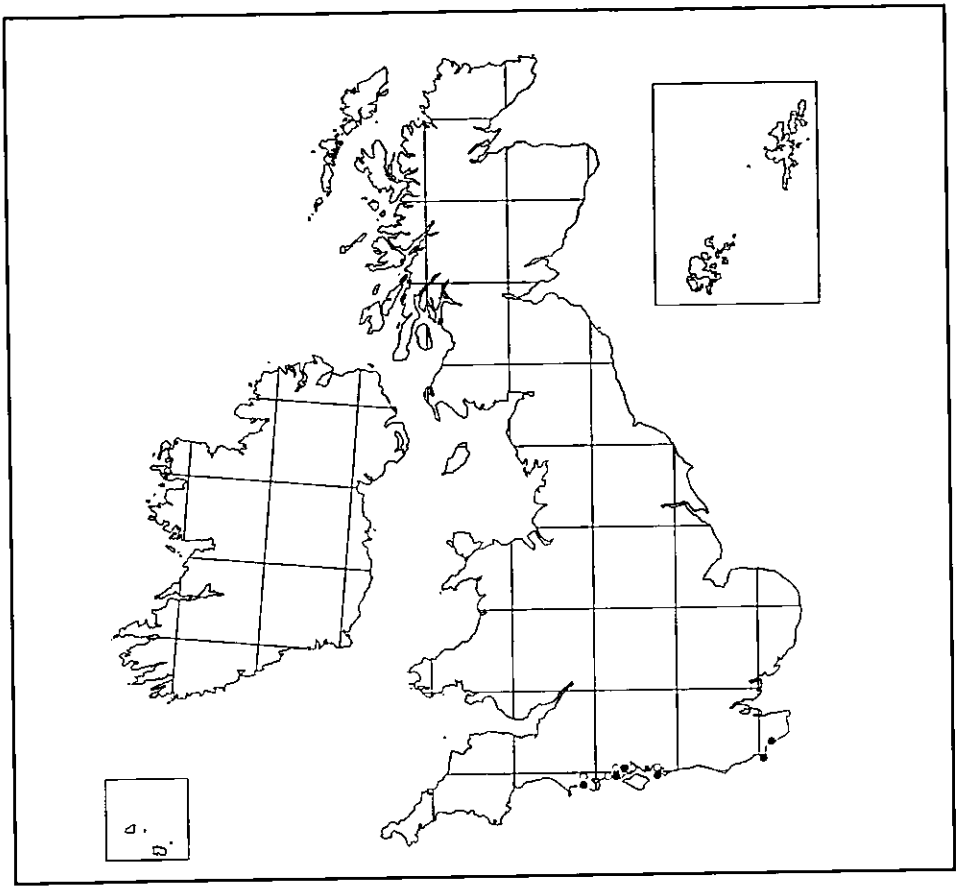
*Temnothorax interruptus* colonises warm, dry, open areas with a sparse cover of low-growing vegetation. Here, it nests under moss, lichen or small flat stones, in or among old heather roots, in peat, or among the roots of fine grass (Collingwood 1979; Børgesen 2000).

### Flight period

Nests contain winged sexuals in July and August.

### Nesting biology

Nests are small, containing up to a few hundred workers. When constructed in the ground, a single small entrance hole leads down several centimetres to a nest chamber. During warm weather, brood is moved up from this chamber to the surface, where it is covered with small fragments of vegetation (Børgesen 2000). Typically, each nest has a single (macrogyne) queen, but nests with several smaller, mated, worker-like egg layers (microgynes) are reported from Europe (Seifert 1996).



**Foraging behaviour**

Workers forage singly, scavenging and hunting small arthropods. However, nestmates may be recruited individually to a large food source (Børgesen 2000). Børgesen (2000) describes how a worker will stalk, cat-like, a live springtail, before making a successful capture by jumping onto it. She also suggests that *T. interruptus* workers use a chemical repellent to protect themselves from attack by other ants.

***Map compiled by:*** G M Orledge and S P M Roberts.
***Author of profile:*** G M Orledge.

## Map 295 *Temnothorax nylanderi* (Förster, 1850)

**[Formicidae: Myrmicinae]**

Together with all but one of the ants previously included in *Leptothorax* (Myrafant), this species is now placed in *Temnothorax* (Bolton 2003). Queens and the small pale yellow to yellowish-brown workers are immediately distinguishable from other British and Channel Islands *Temnothorax* species by having antennal clubs the same colour as the rest of the antennae. The workers are also distinguishable by their possession of a mesopropodeal furrow - seen in profile as a depression on the dorsal surface of the alitrunk separating the mesonotum and propodeum. Individuals morphologically intermediate between workers and queens are not uncommon (Plateaux 1970).

### Distribution

*Temnothorax nylanderi* occurs locally throughout southern England and in Wales, and is present in Jersey and Sark.

Elsewhere, it occurs in western Europe and the western part of central Europe, reaching as far north as Denmark and southern Sweden (Czechowski, Radchenko & Czechowska 2002).

### Status (in Britain only)

Neither Shirt (1987) nor Falk (1991) list *T. nylanderi* as scarce or threatened in Britain.

### Habitat

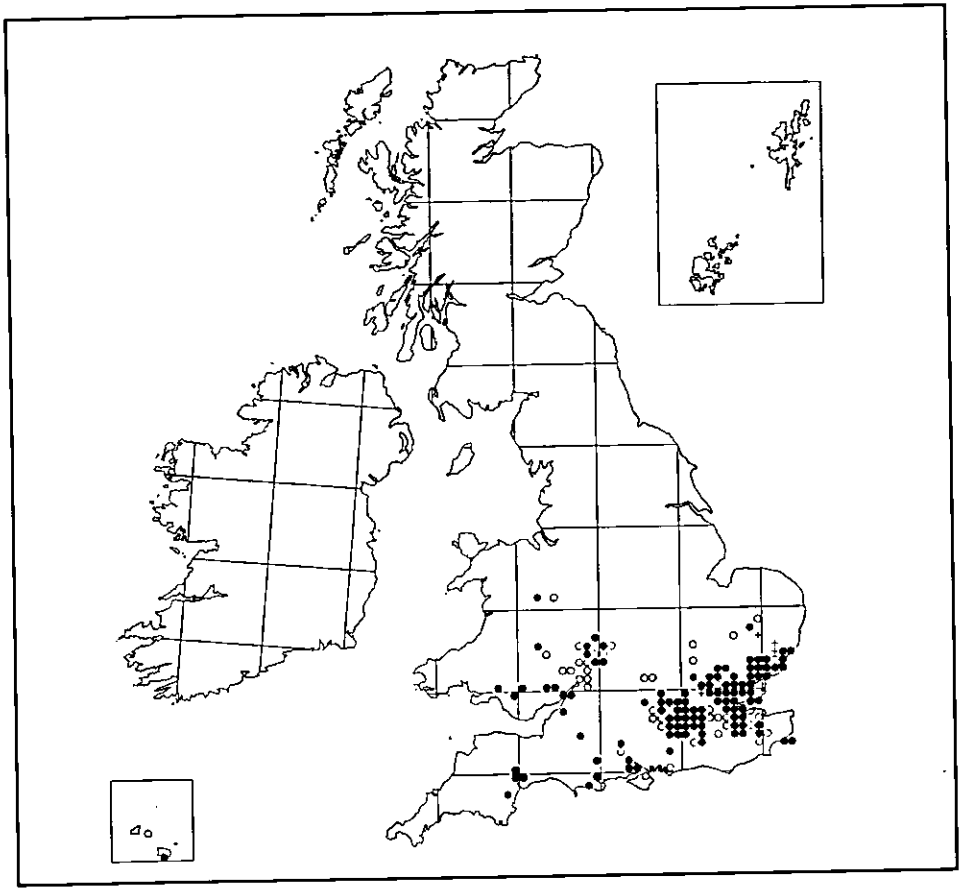
*Temnothorax nylanderi* inhabits parks and woodland where it generally nests in cavities in sticks and rotting branches, in tree stumps, at the base of tree trunks and under bark. The abandoned galleries of wood-boring insects are sometimes used. Foitzik & Heinze (1998) report nests in hollow acorns and grass stems from Germany. Unlike other British *Temnothorax* species, *T. nylanderi* shuns intense sunlight and high temperatures and favours shaded, sheltered positions (Pontin 1996; Blacker & Collingwood 2002).

### Flight period

Alate males and females are produced during July. Mating flights occur on warm evenings in August during the 2-3 hours before sunset (Plateaux 1978, 1984).

### Nesting biology

Colonies are small, with 100-200 workers and a single, singly-mated queen (Foitzik, Haberl, Gadau & Heinze 1997). If sufficient nest sites are available, a colony may fragment during spring and summer. Conversely, a shortage of nest sites can lead to the merging of unrelated colonies, generally with only one queen surviving the amalgamation (Foitzik & Heinze 1998). Although a newly-mated queen is capable of founding a colony on her own (Plateaux 1970), young mated queens may seek adoption by an established nest. In the latter case, the alien queen remains passive in the face of



initial attack. Later she attacks the resident queen, workers and brood, and queen-queen aggression leads to the elimination of one of the queens (Stratz, Strehl & Heinze 2002). Workers can lay eggs which develop into males, but only start to do so if their colony loses its queen (Heinze, Puchinger & Hölldobler 1997).

**Foraging behaviour**

Workers forage singly but will recruit individual nestmates to a food source using a combination of transient chemical and contact signals (Hölldobler & Wilson 1990).

***Map compiled by:*** G M Orledge and S P M Roberts.
***Author of profile:*** G M Orledge.

## Map 296 *Temnothorax unifasciatus* (Latreille, 1798)

**[Formicidae: Myrmicinae]**

This species, previously included in the genus *Leptothorax* (Myrafant) is also now placed in the genus *Temnothorax* (Bolton 2003). The small brownish-yellow workers of *T. unifasciatus* may be distinguished from those of the three similar British and Channel Islands species - *T. albipennis*, *T. interruptus* and *T. nylanderi* - by their possession of a clearly-defined, continuous dark band across the first gastral tergite.

### Distribution

*Temnothorax unifasciatus* occurs in the Channel Islands, but is absent from England, Wales, Scotland and Ireland.

Elsewhere, *T. unifasciatus* is found throughout southern, western and central Europe, and in parts of Eastern Europe. It has also been recorded from Morocco and southern Sweden (Collingwood 1979; Czechowski, Radchenko & Czechowska 2002).

### Status (in Britain only)

The Channel Islands are not included in assessments of conservation status by either Shirt (1987) or Falk (1991).

### Habitat

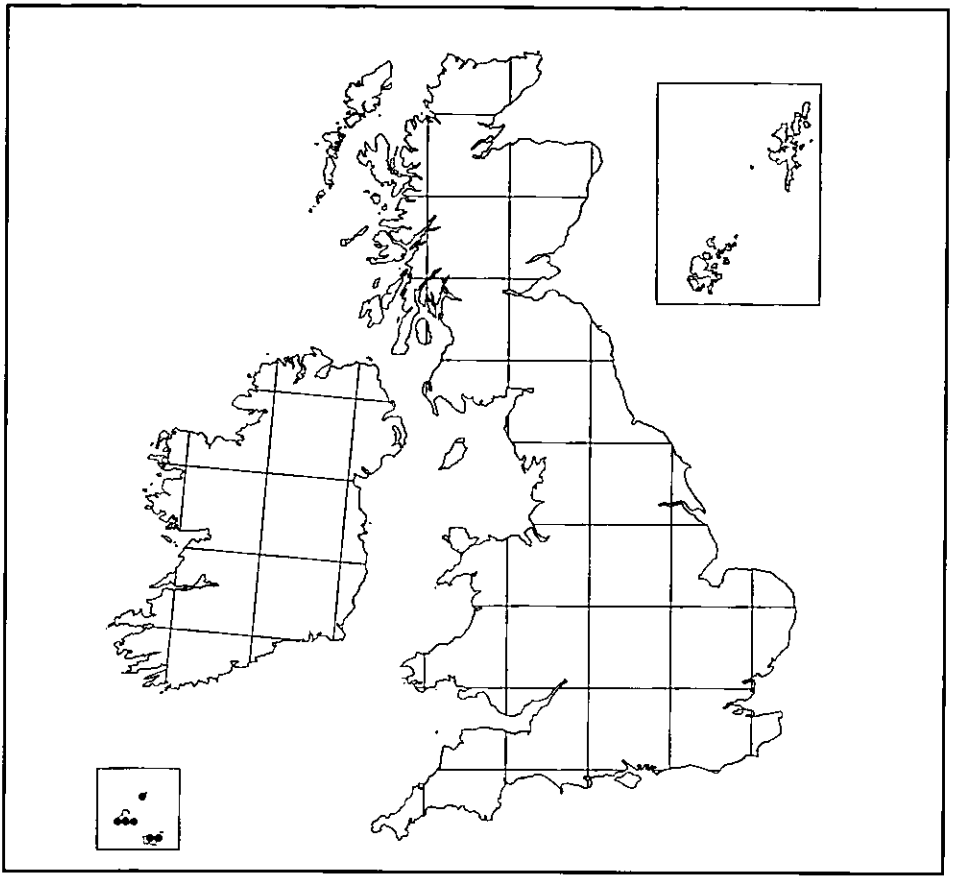
In the Channel Islands, *T. unifasciatus* colonises both coastal and inland sites (Orledge, Smith & David 2000) which are warm, dry and open, and where it has been found among rocks and under stones. Elsewhere, nests are found not only in rock crevices and under stones, but also in dead tree branches, under bark and in hollow plant stems (Collingwood 1979; Czechowski, Radchenko & Czechowska 2002).

### Flight period

Nests contain winged sexuals in July and August. Mating flights occur during the hour before, and the hour after, sunrise (Plateaux 1984).

### Nesting biology

Each nest has a single queen, and typically contains 200 or more workers. While the queen is present the production of males by workers is minimal (Heinze, Puchinger & Hölldobler 1997). Where *T. unifasciatus* and *T. albipennis* occur together in Europe they interbreed, and there is some evidence that the resulting hybrid colonies are able to reproduce (Douwes & Stille 1991). However, laboratory crosses between these species have produced only a few small, short-lived workers, and no sexuals (Plateaux 1984). As yet, there are no records of *T. unifasciatus* and *T. albipennis* occurring together in the Channel Islands (Orledge, Smith & David 2000).



***Map compiled by:*** G M Orledge and S P M Roberts.
***Author of profile:*** G M Orledge.

## Map 297 *Myrmecina graminicola* (Latreille, 1802)

**[Formicidae: Myrmecinae]**

Workers of this dark coloured, slow moving species are seldom seen in the open. When disturbed, the female castes curl into balls and appear dead. Blacker & Collingwood (2002) provide a useful commentary on this ant based on their Wiltshire records.

### Distribution

In Britain, *Myrmecina graminicola* occurs throughout southern England, and in the Midlands. There are a few records from East Anglia, and from south and west Wales. It occurs on the Scilly Isles and on the Channel Islands, but is not known from Ireland. Elsewhere, *M. graminicola* is present throughout Europe as far north as southern Sweden and east at least to the Caucasus. It also occurs in north-west Africa (Collingwood 1979; Czechowski *et al.* 2002). The possibility that records from southern parts of the Russian Far East and Korea refer to a closely related species cannot be ruled out (Czechowski *et al.* 2002).

### Status (in Britain only)

Neither Shirt (1987) nor Falk (1991) list *M. graminicola* as scarce or threatened in Britain.

### Habitat

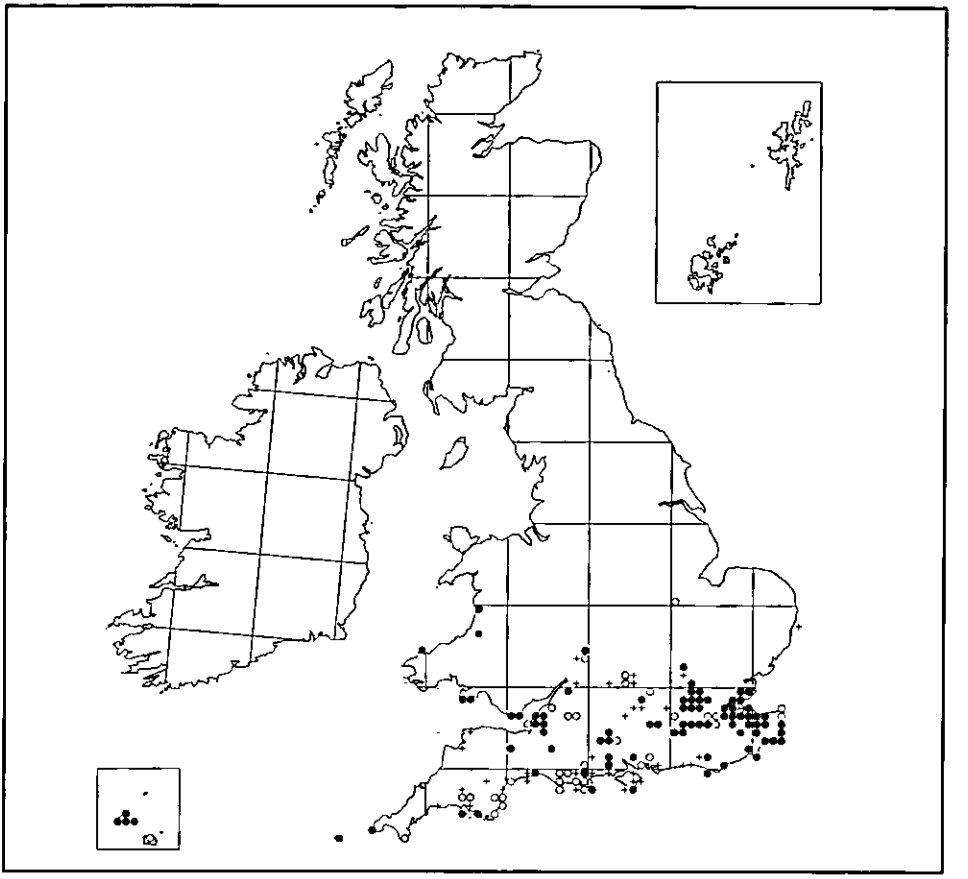
*Myrmecina graminicola* nests in cliffs, in pasture, and in dry open woodland. There are recent records of workers taken from grassland in a London park (Jones 2004) and from private gardens. Nests may be found under stones or pieces of fallen wood, in dead tree stumps, in soil, or under moss. Workers and small colonies have also been found in the nests of other ant species (Donisthorpe 1927; Bolton & Collingwood 1971).

### Flight period

Sexuals develop during late summer. The mating period extends from August to October, with mating taking place on the ground (Bolton & Collingwood 1975; Collingwood 1979; Blacker & Collingwood 2002; Buschinger 2003). The winged females exhibit sexual calling behaviour by depositing a sex pheromone, produced in the poison gland, on the ground (Buschinger 2003).

### Nesting biology

Nests typically have fewer than 100 workers (Seifert 1996; Buschinger & Schreiber 2002; Czechowski *et al.* 2002). Each has either a single egg-laying queen, a single, mated egg-laying intercaste (a female intermediate in form between a worker and a queen), or several mated egg-laying intercastes (Buschinger & Schreiber 2002).



**Foraging behaviour**
Workers forage on the ground and in litter, scavenging and preying on small invertebrates. They do not tend aphids (Czechowski *et al.* 2002).

***Map compiled by:*** G M Orledge and S P M Roberts.
***Author of profile:*** G M Orledge.

## Map 298 *Arachnospila anceps* (Wesmael, 1851)

**[Pompilidae: Pompilinae]**

A medium-sized, black and red species. It may be identified using Day (1988) and is characterised in the female by having comb-spines on the fore tarsus, a coarse, granular surface to the propodeum and rather long postnotum, and in the male by the subgenital plate which has a short tuft of hairs near the apex. Females of the subgenus *Ammosphex* Wilcke, to which this species belongs, are amongst the taxonomically most difficult of the family in Europe. Spooner (1941) was the first to correctly associate the females with the males, and earlier published records need to be treated with caution, as recognised by Richards & Hamm (1939).

### Distribution

Widely distributed, occurring in England, Wales, Scotland and Ireland as well as the Channel Islands. Apparently restricted to coastal sites in more northern and western areas.

Overseas, the species occurs in northern and central Europe and in Asia east to Mongolia.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

It occurs in a range of habitat types and on most soils except perhaps heavy clays.

### Flight period

Probably univoltine; May to September.

### Prey collected

A wide range of spiders is collected as prey; Lycosidae (wolf spiders), Clubionidae (foliage spiders) and Thomisidae (crab spiders) have been reliably recorded and perhaps Gnaphosidae (ground spiders) and Agelenidae (cobweb spiders) too (Day 1988).

### Nesting biology

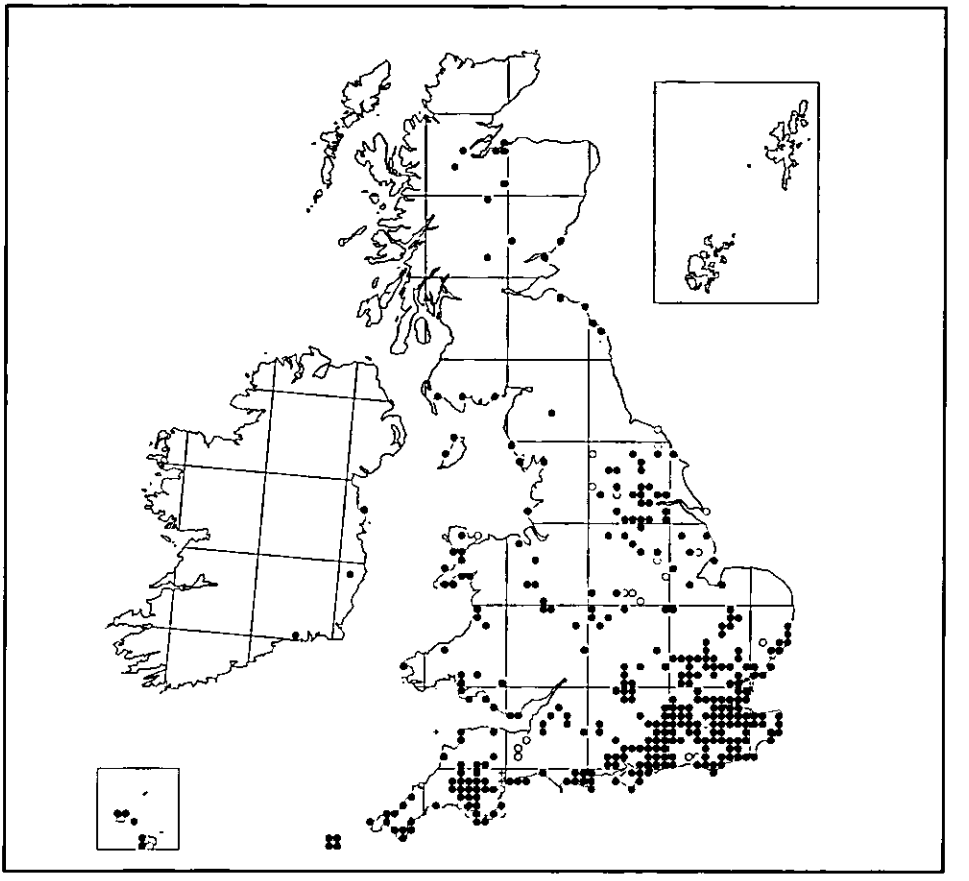
The prey is captured first and transported to the nesting location where it is hidden on a plant while the burrow is constructed.

### Flowers visited

No information is available.

### Parasites

No records have been found.



***Map compiled by:*** G A Collins and S P M Roberts.
***Author of profile:*** G A Collins.

## Map 299 *Arachnospila consobrina* (Dahlbom, 1843)

**[Pompilidae: Pompilinae]**

A medium-sized, red and black species. It may be identified using Day (1988) and is characterised in the female by having comb-spines on the fore tarsus, those on the second segment being longer than in related species; and by the head being particularly hairy, a character best appreciated in comparative material. The genital plate of the male is relatively distinct.

### Distribution

A very local species in Britain, restricted to coastal dunes in England and Wales. Its distribution indicates that it is probably on the edge of its range.

Overseas it occurs in northern and central Europe (Wolf 1972), also Africa and Asia (Day 1988).

### Status (in Britain only)

Listed as RDB3 (Rare) in Shirt (1987) and by Falk (1991).

### Habitat

A species of sandy areas, it belongs to a subgenus (*Ammosphex* Wilcke) which has the fore tarsus modified for digging in loose sand.

### Flight period

Single brooded, occurring in July and August.

### Prey collected

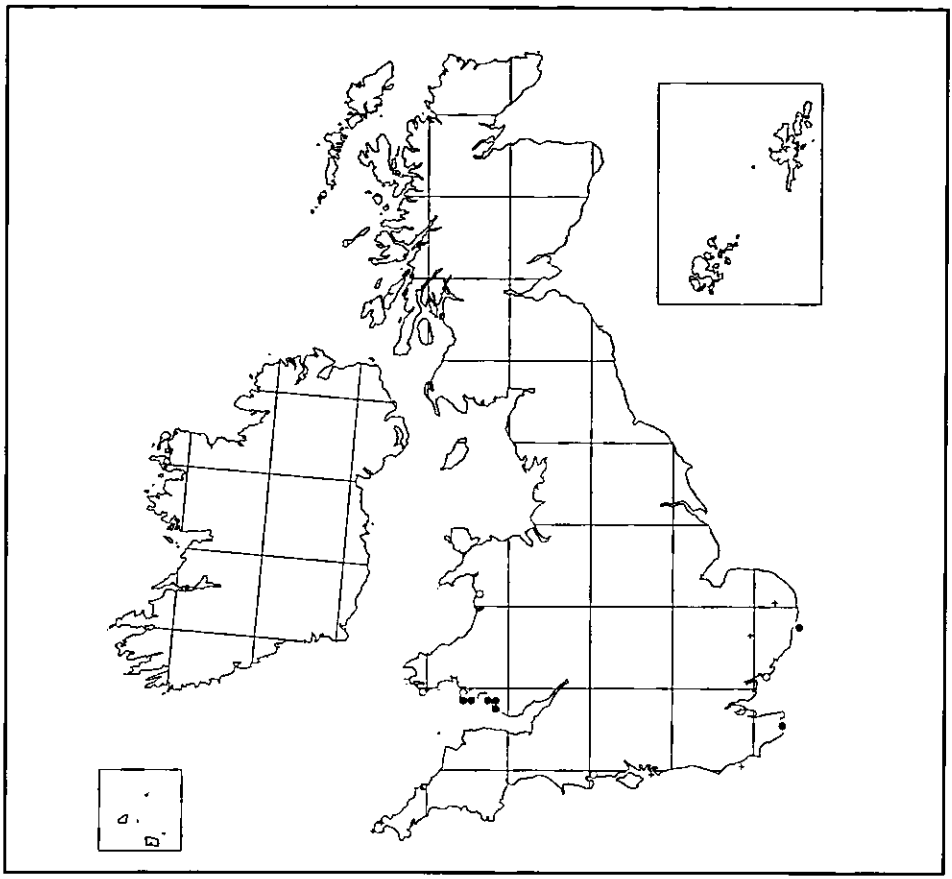
Virtually nothing is known about the biology of this species. Fahringer (1922) reported a female with a *Segestria florentina* (Rossi) (Segestriidae) under a stone near Constantinople.

### Nesting biology

Not known.

### Flowers visited

None recorded.



***Map compiled by:*** G A Collins and S P M Roberts.
***Author of profile:*** G A Collins.

## Map 300 *Arachnospila trivialis* (Dahlbom, 1843)

**[Pompilidae: Pompilinae]**

A medium-sized red and black spider wasp. Identification may be made from Day (1988). The male has a relatively distinct genital plate, but females are very similar to others in the subgenus *Ammosphex* Wilcke, and considerable care is necessary in identification.

**Distribution**

Locally common in suitable habitat in southern England, extending northwards to the East Riding of Yorkshire, and Lancashire. Also occurring in Wales, mainly on the coast. Limited to Jersey in the Channel Islands

Overseas it is known from northern and central Europe and across Asia to the Pacific coast (Wolf 1972).

**Status (in Britain only)**

This species is not regarded as being scarce or threatened.

**Habitat**

A species of loose, sandy soils, it is most frequent in coastal sites but also occurs on southern heathland.

**Flight period**

Single brooded, flying from May to August.

**Prey collected**

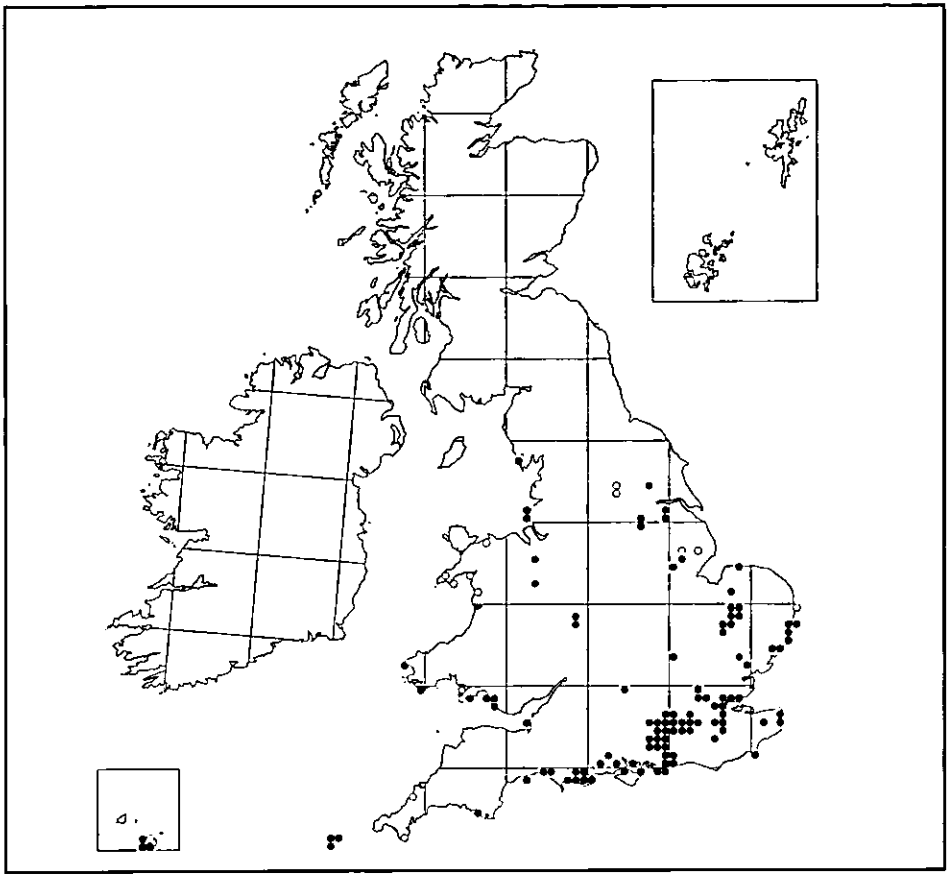
There are confirmed prey records of *Xysticus* (Thomisidae) and it may use spiders of the family Lycosidae too (Day 1988).

**Nesting biology**

Little appears to be known, but like other related species it is likely to construct a nest in loose sand having already captured a spider and hidden it in nearby vegetation.

**Flowers visited**

Wild parsnip (pers. obs.).



***Map compiled by:*** G A Collins and S P M Roberts.
***Author of profile:*** G A Collins.

## Map 301 *Crossocerus annulipes* (Lepeletier and Brullé, 1834)

**[Crabronidae: Crabroninae]**

### Distribution

Richards (1980) considered this species to be local but widespread throughout the British Isles northwards to Inverness, although much more common in the south. Currently available data suggests it is still generally spread across England and Wales, with one record for the Channel Islands.

Lomholdt (1984) states that this is a wasp of only sporadic occurrence in Denmark and Fennoscandia, although widely spread across Europe, and with records from Kazakhstan, Mongolia, China and Japan. It is also found in north-eastern USA and adjacent parts of Canada.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

Found in a wide variety of habitats, where suitable nesting substrates occur.

### Flight period

Richards (1980) gives May to September, but the data set currently available indicates a bias towards the second half of this period, with only one record for May (27th, at Brandon in Norfolk).

### Prey collected

Hemipteran bugs, generally from the family Typhlocybidae (Lomholdt 1984), although reference is also made to the taking of small Psyllid and Mirid bugs as well.

### Nesting Biology

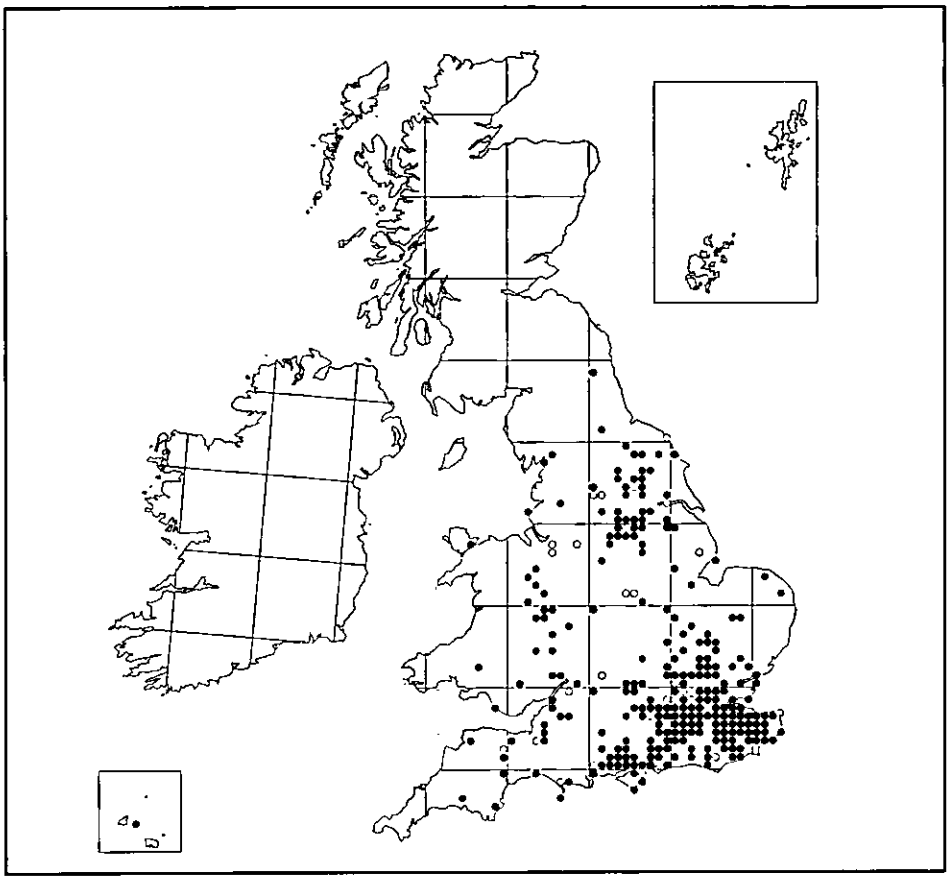
Nests are constructed in dead and occasionally rotting broadleaved or coniferous wood. Large nests may be provisioned with up to 500 bugs, spread throughout 20 cells (Lomholdt 1984).

### Flowers visited

No information is available.

### Parasites

No information is available.



***Map compiled by:*** A Knowles and S P M Roberts.
***Author of profile:*** A Knowles.

## Map 302 *Crossocerus megacephalus* (Rossi, 1790)

**[Crabronidae: Crabroninae]**

### Distribution

Richards (1980) states that it is common throughout the British Isles. However, current records show that, although it is widely distributed in England and Wales, it is represented by very few records from Scotland and a few coastal areas in Ireland. Also present on the Isles of Scilly, Guernsey and Sark.

Lomholdt (1984) considered the species to be widespread in Europe, although generally missing from the Iberian Peninsula, the Balkans and Asia minor. It has also been recorded from north Africa, Iran and northern Japan.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

May be recorded from a wide range of habitats where its nesting substrate can be found. Captures from Essex include a suburban garden, dead elms on an estuarine island and a dead, fallen tree trunk in an otherwise closely mown recreation ground.

### Flight period

Current data span from mid-May to mid-September, but most records come from June to August, inclusive.

### Prey collected

This wasp appears to have a very catholic taste from within the Diptera families.

### Nesting biology

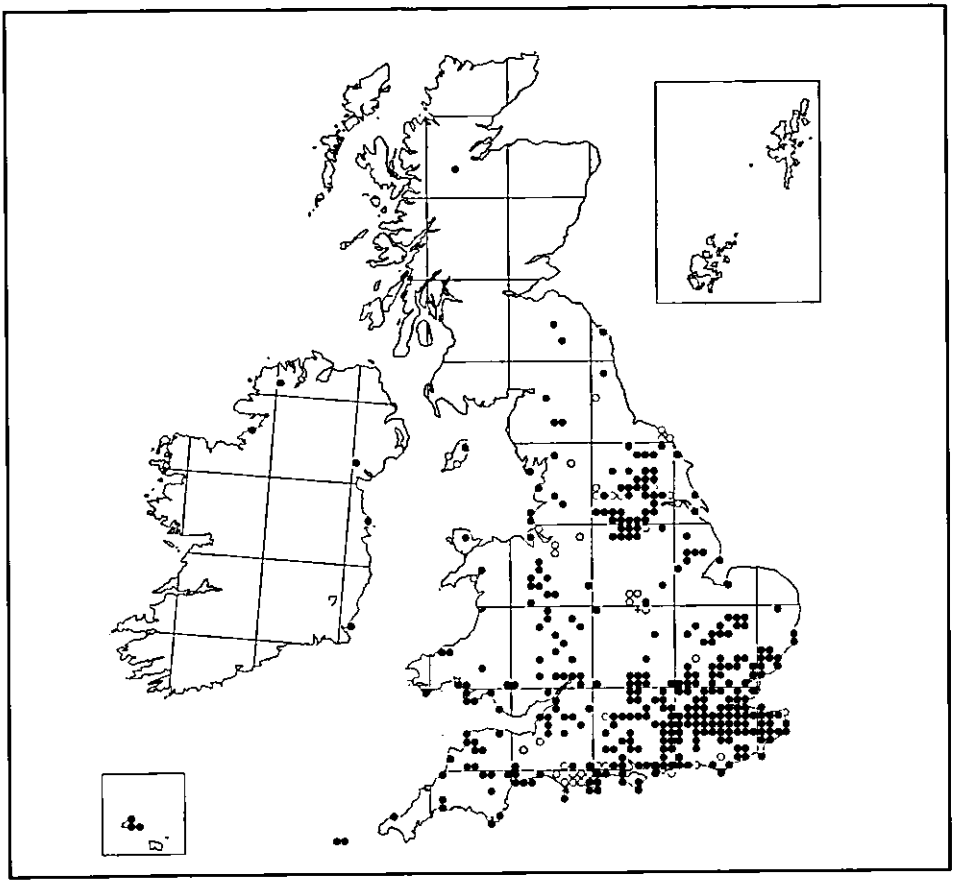
*C. megacephalus* nests gregariously, utilising mainly old beetle borings in dead and decomposing wood (Richards 1980). Lomholdt (1984) notes that both deciduous and coniferous wood may be utilised, as might the old larval galls of the Cerambycid beetle *Saperda populnea* L. It is apparently not uncommon for females to share the same entrance hole, but construct essentially independent systems that might inadvertently intersect each other.

### Flowers visited

No information is available.

### Parasites

Lomholdt (1984) lists the Ichneumonid wasp *Endasys analis* (Thomson)[a Continental species], the Pteromalid wasp *Habritys brevicornis* (Ratzeburg) and the Anthomyiid fly *Eustalomyia festiva* (Zett.).



***Map compiled by:*** A Knowles and S P M Roberts.
***Author of profile:*** A Knowles.

## Map 303 *Crossocerus wesmaeli* (Vander Linden, 1829)

**[Crabronidae: Crabroninae]**

### Distribution

Common throughout the British Isles (Richards 1980). Currently available data suggests this is probably still the case, but there is a shortage of records from Scotland and Ireland.

Lomholdt (1984) states that it is widely spread across Europe, with records also from Caucasus, Kazakhstan, Turkestan, Mongolia, Sakhalin and Japan.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

Found most often in sandy places, where suitable nesting substrates occur, including coastal dunes.

### Flight period

Richards (1980) gives May to September. The small data set currently available suggests that July and August are the peak periods, although this may be due to recorder activity on heathland during this period.

### Prey collected

Generally small flies (Diptera), although Lomholdt (1984) gives an unreferenced suggestion that small Homopteran or Heteropteran bugs might also be taken.

### Nesting biology

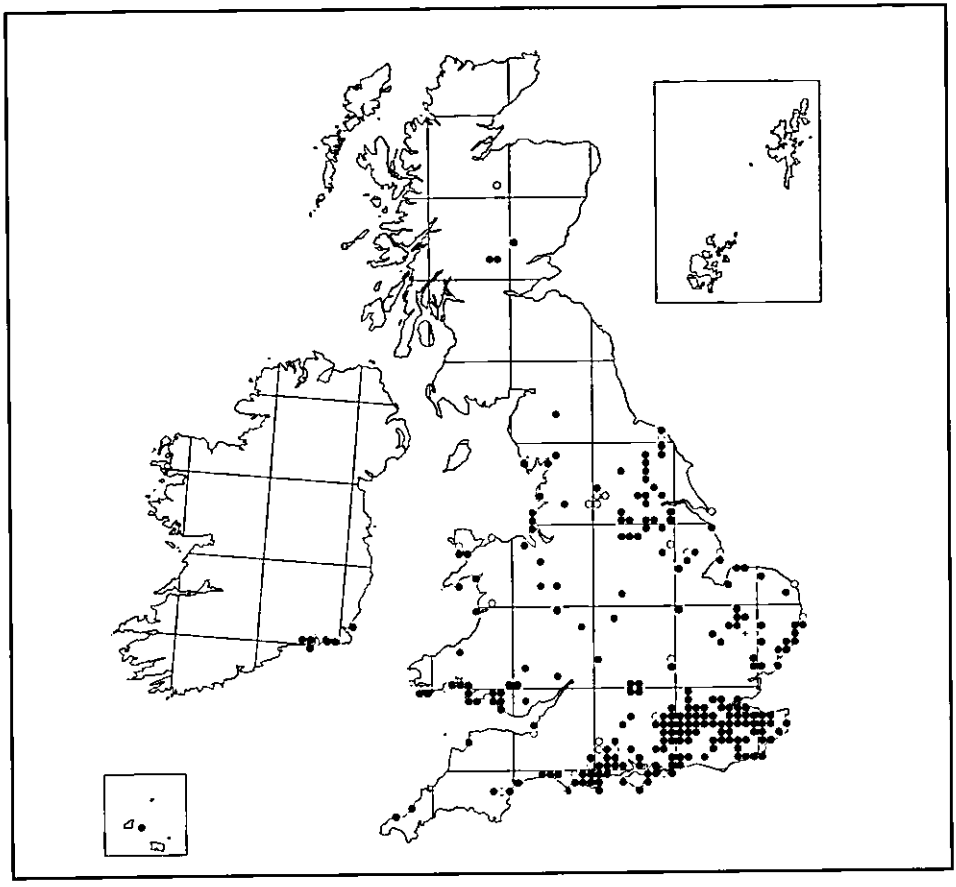
Tsuneki (1960) determined that, in Japan at least, the nest is simple, with perhaps only one or two, but up to nine cells. Nests are generally excavated in sandy substrates although more clayey banks exposed to the sun may also be utilised (Lomholdt 1984).

### Flowers visited

No information is available.

### Parasites

No information is available.



***Map compiled by:*** A Knowles and S P M Roberts.
***Author of profile:*** A Knowles.

## Map 304 *Lindenius albilabris* (Fabricus, 1793)

**[Sphecidae: Sphecinae]**

A small, black solitary wasp. Identification keys are given in Lomholdt (1984), Richards (1980) and Yeo & Corbet (1995).

**Distribution**
Widely recorded from localities throughout England, and reaching into northern Scotland (Moray).

Overseas, this species is found throughout Europe and north Africa, with the distribution extending eastwards to Mongolia and Manchuria.

**Status (in Britain only)**
This species is not regarded as being scarce or threatened.

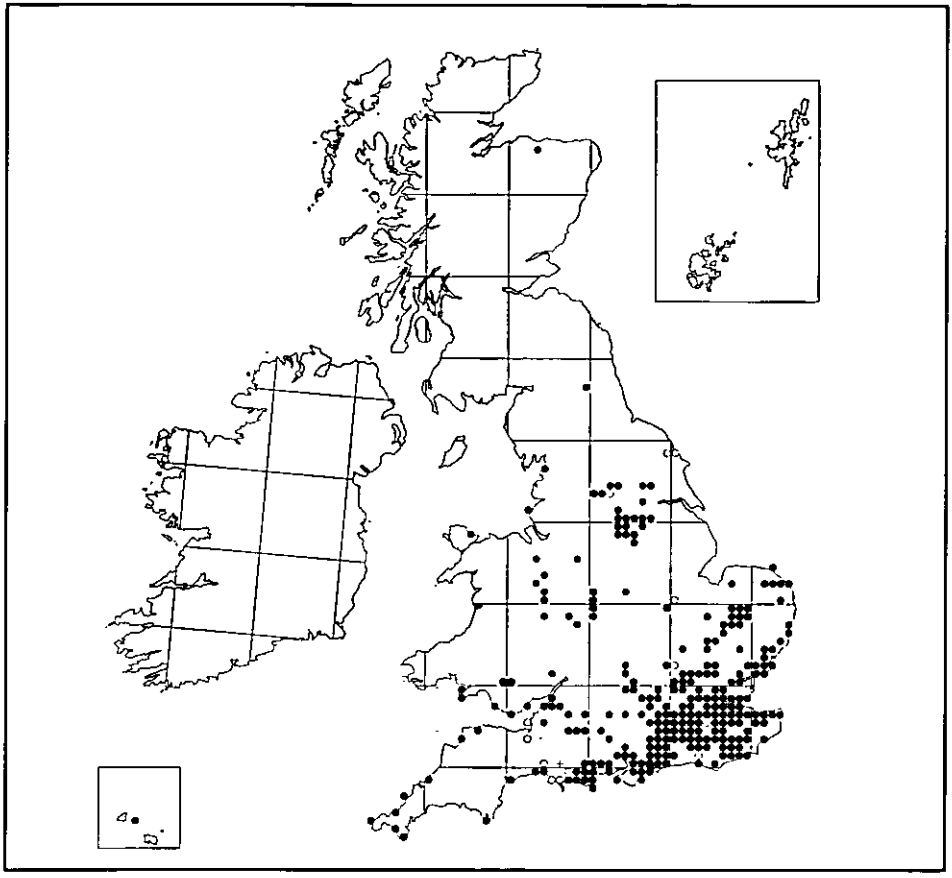
**Habitat**
Found in a wide variety of open, sunny habitats associated with its feeding and nesting sites and prey habitats.

**Flight period**
Univoltine; on the wing from late May to early August.

**Prey collected**
Nest cells are stocked with a mixture of small homopteran bugs, usually Miridae, and small flies (Chloropidae). Up to 20 bugs may be placed in a single cell. In Fennoscandia and Denmark this species usually only collects Miridae (Lomholdt 1984). When returning with prey, the female flies directly into the open nest entrance.

**Nesting biology**
The species nests in level ground in open, sunny situations, usually in small colonies. Richards (1980) notes that the species nests "in soil, usually in sand", suggesting that the species has a requirement for more friable ground. However, a good number of nests have been noted dug into the soil of heavily compacted, well trodden dirt paths (M N Smith, pers. obs.). The nest burrow descends vertically for approximately 10cm before turning horizontally. Individual cells are dug off the vertical portion of the burrow (Lomholdt 1984).

**Flowers visited**
Oxeye daisy.



**Parasites**

The RDB3 chrysid wasp *Hedychridium coriaceum* has been noted entering and leaving the burrows of *L. albilabris*. The distribution of *H. coriaceum* was mapped in Atlas 3, Map 112 (Edwards & Telfer 2001). In Fennoscandia Lomholdt (1984) cites the non-British wasp *Myrmosa melanocephala* as a parasite.

***Map compiled by:*** M N Smith & S P M Roberts.
***Author of profile:*** M N Smith.

## Map 305 *Lindenius panzeri* (vander Linden, 1829)

**[Sphecidae: Crabroninae]**

A small, black solitary wasp. Identification keys are given in Yeo & Corbet (1995), Lomholdt (1984) and Richards (1980).

**Distribution**
Recorded from England south of a line from the Severn Estuary to the Wash, with the majority of records coming from the south-east of England.

Overseas this species is found throughout Europe and north Africa, with the distribution extending eastwards to the Urals and into Kazakhstan.

**Status (in Britain only)**
This species is not regarded as being scarce or threatened.

**Habitat**
Found in a wide variety of open, sunny habitats associated with its feeding and nesting sites and prey habitats.

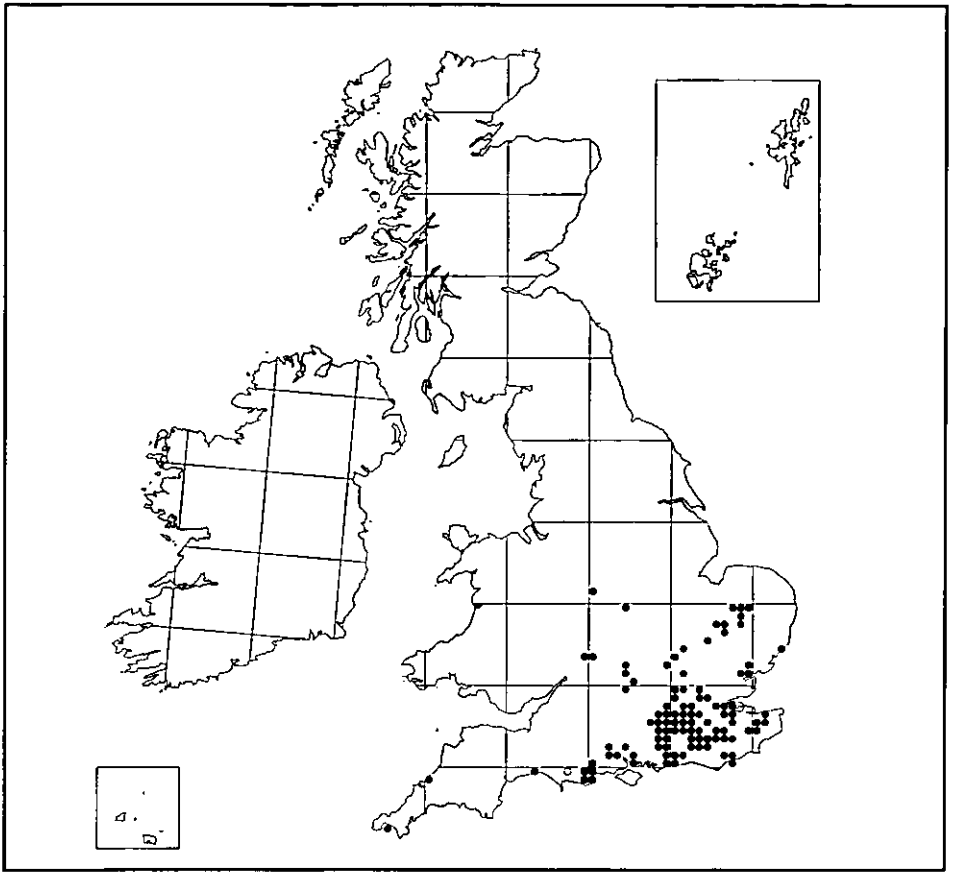
**Flight period**
Univoltine; on the wing from June to early September.

**Prey collected**
Nest cells are stocked with a mixture of small flies, usually Chloropidae, though Trypetidae and Simuliidae are also captured.

**Nesting biology**
The species nests in level ground in open, sunny situations. Richards (1980) notes that the species nests "in soil, usually in sand", suggesting that the species has a requirement for more friable ground. However, Abrahamsen (1950) indicates nests are constructed in "compact, clayey soil in the edge of woods". This accords well with nests in the UK that have been found dug into the soil of heavily compacted, well trodden dirt paths in unshaded, open areas (M N Smith, *pers. obs.*). Lomholdt (1984) states that the nests are very similar in contruction to those of *L. albilabris*, with the nest burrow descending vertically for approximately 10cm before turning horizontally. Individual cells are dug off the vertical portion of the burrow.

**Flowers visited**
None recorded.

**Parasites**
None recorded.



***Map compiled by:*** M N Smith and S P M Roberts.
***Author of profile:*** M N Smith.

## Map 306 *Rhopalum clavipes* (Linnaeus, 1758)

**[Sphecidae: Crabroninae]**

A small, black and red solitary wasp. Identification keys are given in Yeo & Corbet (1995), Lomholdt (1984) and Richards (1980).

**Distribution**
Widely recorded from England, Wales, Scotland and Ireland.

Overseas this species is found throughout Europe eastwards to Mongolia and Japan.

**Status (in Britain only)**
This species is not regarded as being scarce or threatened.

**Habitat**
Found in a wide variety of open, sunny habitats associated with its feeding and nesting sites and prey habitats.

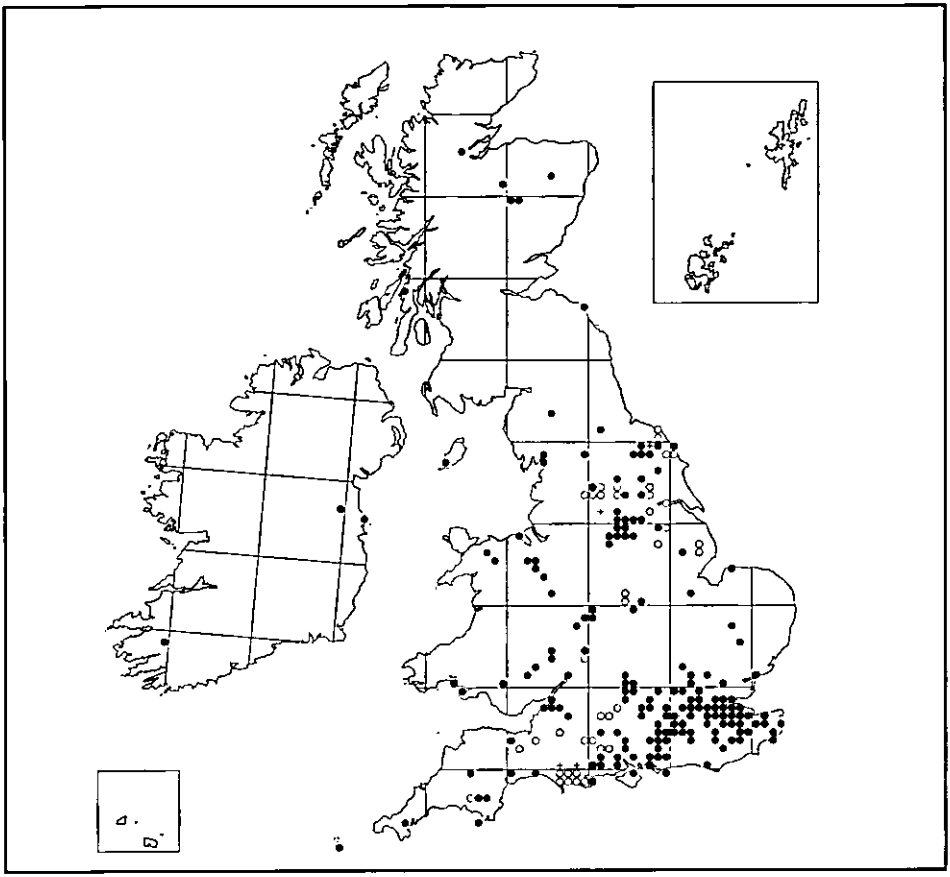
**Flight period**
Univoltine, May to August.

**Prey collected**
In Europe nest cells are reported as being stocked with a range of small Diptera such as Mycetophilidae, Chironomidae and Culicidae, together with Homoptera, Psocoptera and Psyllidae. In Britain, prey collected appears to be mostly Psocidae (Lomholdt 1984).

**Nesting biology**
This species is a stem nester and has been found nesting in the stems of a wide range of plants including ash, bramble, elder and reed. Females will either excavate their own nests or make use of existing cavities such as old beetle borings. If there is space, short side branches off the main tunnel may be constructed. Each nest may hold up to 13 cells.

**Flowers visited**
None recorded

**Parasites**
None recorded from Britain. In Europe, recorded parasites are *Omalus auratus* (Hymenoptera: Chrysididae), *Torymus armatus* (Hymenoptera: Torymidae), *Enclisis macilenta* and *Bathythrix fragilis* (Hymenoptera: Ichneumonidae) and *Oebalia minuta* (Diptera: Sarcophagidae)



***Map compiled by:*** M Smith and S P M Roberts.
***Author of profile:*** M Smith.

## Map 307 *Rhopalum coarctatum* (Scopoli, 1763)

**[Sphecidae: Crabroninae]**

A small, stem nesting solitary wasp. Identification keys are given in Yeo & Corbet (1995), Richards (1980) and Lomholdt (1984).

### Distribution

Widely recorded from England and Wales north to Cumbria, though Richards (1980) gives "north to Inverness" and indicates that the species has been recorded from Fermanagh in Ireland. The somewhat disjunct distribution of the mapped records suggests that the species may be under-recorded in the Midlands.

Overseas this species is found throughout Europe eastwards to Japan.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

Found in a range of habitats but more often recorded from areas close to water.

### Flight period

The species has a long flight period running from late April into September, though the majority of records come between June and August.

### Prey collected

*R. coarctatum* stocks its nest cells with a mixture of small flies (e.g. Chironomidae, Culicidae, Mycetophilidae and Tipulidae). Occasionally, Psocoptera and Neuroptera are utilised (Lomholdt 1984).

### Nesting biology

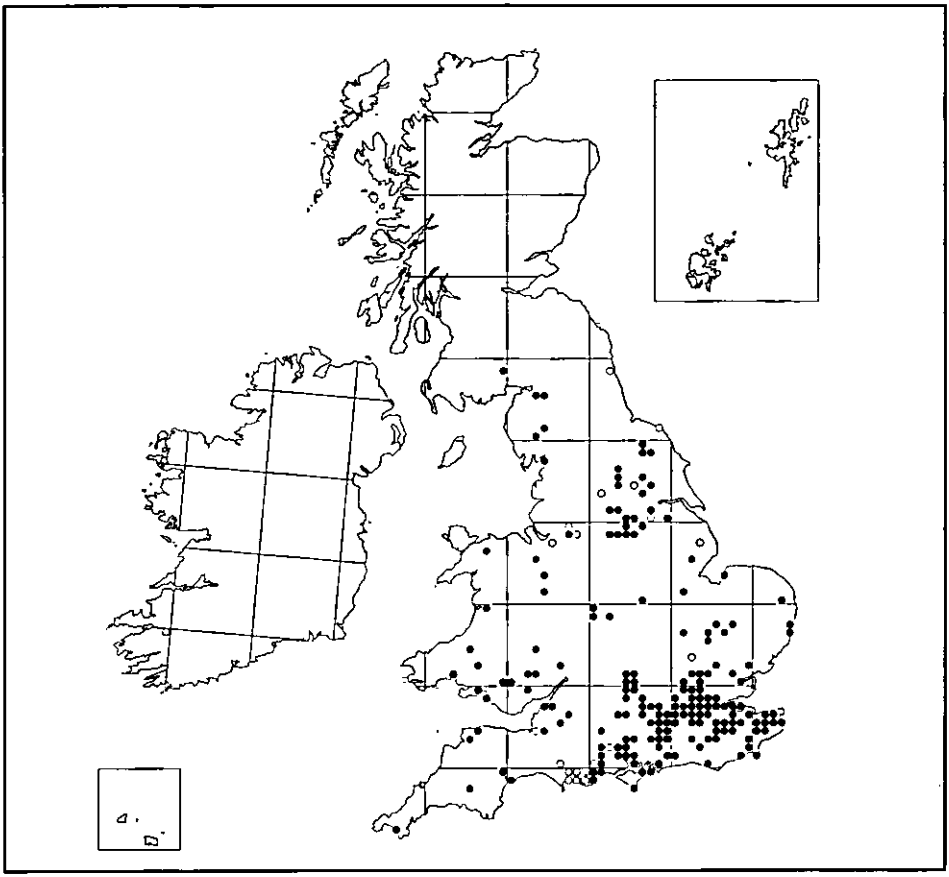
The species nests in hollow plant stems, though occasionally the species is recorded from old wood (Richards 1980). Nests are often very long, sometimes containing 29 cells (Danks 1971). Where space allows, the nest is branched, and old nest sites are often reused.

### Flowers visited

Angelica species.

### Parasites

Fitton et al. (1988) record *Perithous divinator* as a probable parasitoid, those known from Scandinavia (Lomholdt 1984) are *Bathythrix* sp. (Hym., Ichneumonidae), *Eurytoma* sp. (Hym., Eurytomidae), *Torymus armatus* (Hym., Torymidae) and the Sarcophagid fly, *Oebalia minuta* (as *Ptychoneura rufitarsis*). The Chrysid wasp *Omalus auratus* is also recorded as a parasite.



***Map compiled by:*** M N Smith and S P M Roberts.
***Author of profile:*** M N Smith.

## Map 308 *Rhopalum gracile* Wesmael, 1852

**[Sphecidae: Sphecinae ]**

A small, stem nesting solitary wasp. Identification keys are given in Lomholt (1984) (as *R. nigrinum*), Richards (1980) and Yeo & Corbet (1995).

### Distribution

Infrequently recorded from a few wetland localities in East Anglia, with very few modern records.

Overseas this species is found throughout Europe and eastwards to Japan.

### Status (in Britain only)

Listed as Vulnerable (RDB 2) in Shirt (1987) and by Falk (1991). Possibly under-recorded due to its habitat preferences.

### Habitat

Associated with lush marshes and reed beds, both in fresh and (in Scandinavia) brackish water sites.

### Flight period

Univoltine; on the wing from June to August.

### Prey collected

From studies of the species in Japan, *R. gracile* stocks its nest cells with a mixture of small flies (Chironomidae, Psychodidae, Dolichopodidae and Tephritidae) and Psocoptera (Lomholdt 1984).

### Nesting biology

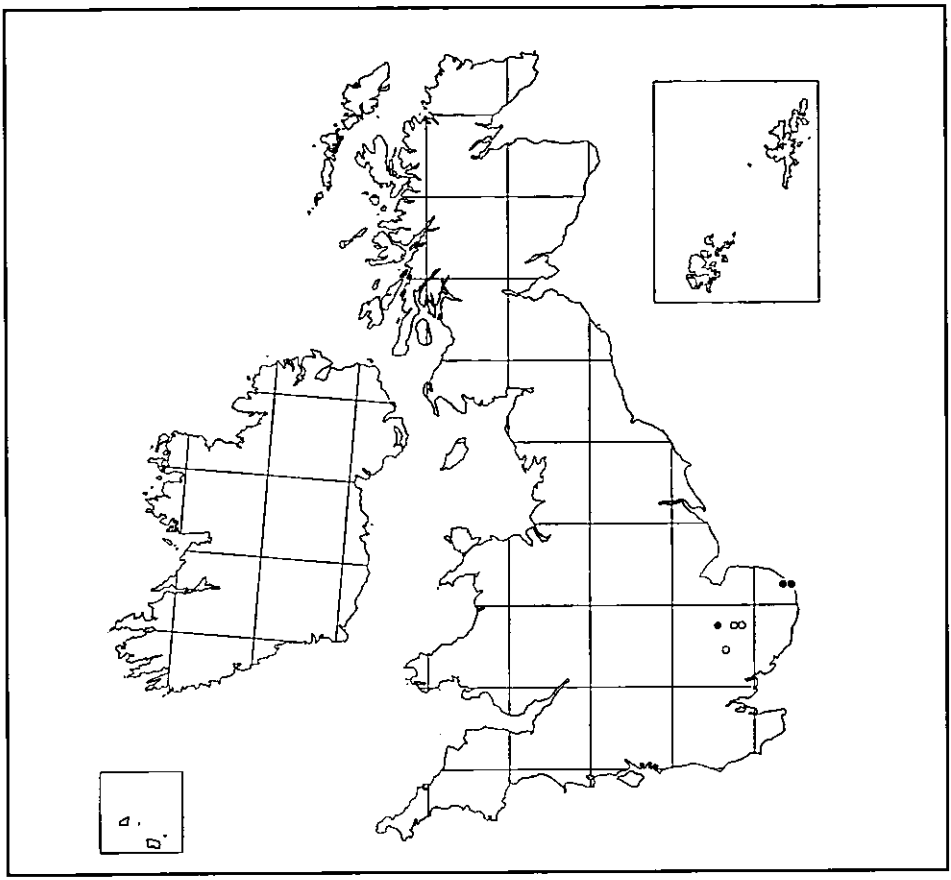
No nest sites have been recorded from Britain. In Scandinavia, the species nests in the stems of reeds; in Japan nests have also been found in lyme-grass (*Leymus arenarius*) and goldenrod (*Solidago occidentalis*) (Lomholdt 1984).

### Flowers visited

Angelica species.

### Parasites

None recorded, though Lomholdt (1984) suggests the generalist chrysid wasp *Chrysis cyanea* may be a parasite.



***Map compiled by:*** M Smith and S P M Roberts.
***Author of profile:*** M Smith.

## Map 309 *Stigmus pendulus* (Panzer, 1804)

**[Crabronidae: Pemphredoninae]**

This species had not been recorded in Britain at the time of Richards' (1980) RES handbook, but identification characters are given in Lomholdt (1984). It was first recorded in Britain in 1986 (Allen, 1987), although it may previously have been confused with *S. solskyi*.

### Distribution

Rare, but spreading in south-east England from West Sussex to Oxfordshire and Derbyshire.

Lomholdt (1984) describes a very limited distribution in Fennoscandia and Denmark, where it is rare and isolated, and very rare in other parts of central and northern Europe. It occurs eastwards to Kazakhstan.

### Status (in Britain only)

Listed by Falk (1991) as RDBK (insufficient information) on account of its recent discovery in the country and the lack of detailed records.

### Habitat

Generally found associated with twigs or dead timber, including fence posts where wood-boring beetles have left holes (Falk 1991). In Essex it has been found exploring north-facing dead wood within standing oak trees within a strip of woodland.

### Flight period

The very limited data set comes mainly from July and August, with a few records extending into September and occasional records from the second half of June.

### Prey collected

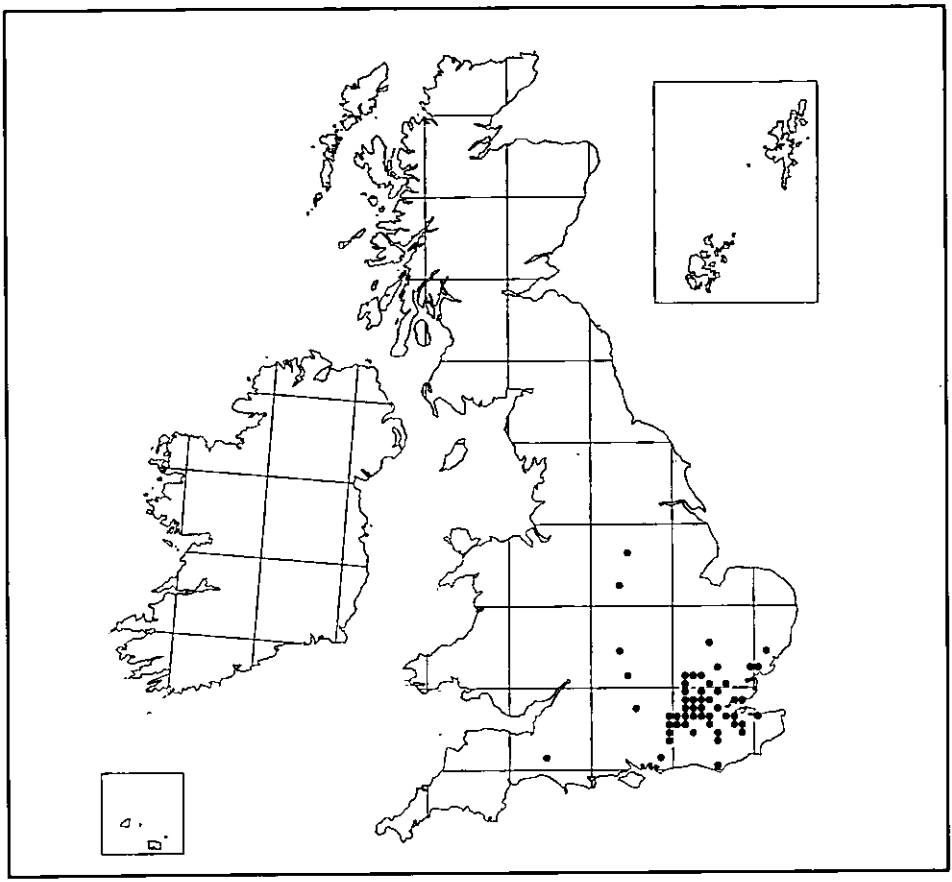
The cells are said by Lomholdt to be provisioned with aphids, such as *Myzus lythri* (Schrank).

### Nesting biology

Lomholdt (1984) states that the nests may be found in stems of plants such as bramble, but all of the author's observations from Essex and Suffolk have been of individuals inspecting small holes left by wood-boring beetles in standing dead wood or damaged trunk sections, all from pedunculate oak. The 1992 records from Buckingham Palace gardens refer to them being taken from old beetle holes in plane trees. Falk (1991) also mentions use of the stems of a variety of shrubs.

### Flowers visited

No information available.



**Parasites**
Lomholdt gives the ichneumonids *Perithous mediator* and *P. divinator* and the chalcid wasp *Torymus armatus*.

***Map compiled by:*** A Knowles and S P M Roberts.
***Author of profile:*** A Knowles.

## Map 310 *Stigmus solskyi* A. Morawitz, 1864

**[Crabronidae: Pemphredoninae]**

This is by far the more common species of *Stigmus* in Britain.

### Distribution

Current records come from South Devon to Kent and northwards to Yorkshire. Richards (1980) gives Cornwall in addition, with the range extending to Staffordshire and North Lincolnshire.

Lomholdt (1984) states that the species is uncommon but widespread in Fennoscandia and Denmark, spreading through central and northern Europe eastwards to Kazakhstan.

### Status (in Britain only)

This species is not considered to be threatened in Britain.

### Habitat

Nesting sites comprise beetle holes in dead wood or hollow plant stems, so the wasp may be present where such material is found including gardens, parks, open woodland and similar places.

### Flight period

June to August (Richards 1980) although the current data set includes records in mid-September from Tunbridge Wells.

### Prey collected

Nest cells are provisioned with aphids.

### Nesting biology

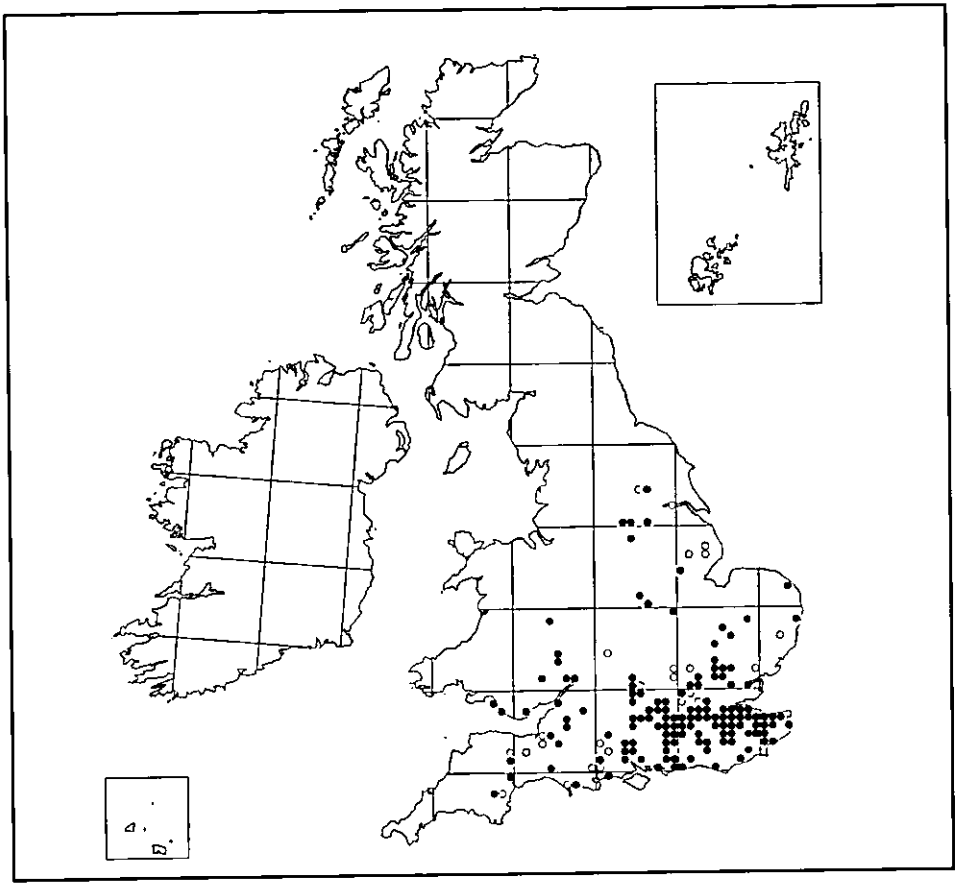
Nesting sites comprise beetle holes in dead wood and also hollow plant stems and branches.

### Flowers visited

No information available.

### Parasites

No information available.



***Map compiled by:*** A Knowles and S P M Roberts.
***Author of profile:*** A Knowles.

## Map 311 *Andrena bicolor* Fabricius 1775

**[Apidae: Andreninae]**

### Distribution

Throughout much of the British Isles, though mainly coastal in Scotland and Ireland. It is also known from the Isle of Man and the Channel Islands.

Very widely distributed in the western Palaearctic, from Fennoscandia south to Iberia and Corsica, and east to Siberia. It has also been reported from North Africa, Israel and Iran.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

Very catholic in its choice of habitats, occurring for example in open woodland and on calcareous grassland.

### Flight period

Bivoltine, the first brood flying from early March to May or June, the second brood from June to late August. Specimens of the first brood are usually locally abundant. However, second brood specimens are far less common and, indeed, males of this brood tend to be extremely elusive.

### Pollen collected

Polylectic. The first brood forages from barren strawberry, bluebell, butterbur, buttercup, daffodil, daisy, dandelion, germander speedwell, hawthorn, marsh-marigold, mustard, primrose and willow.

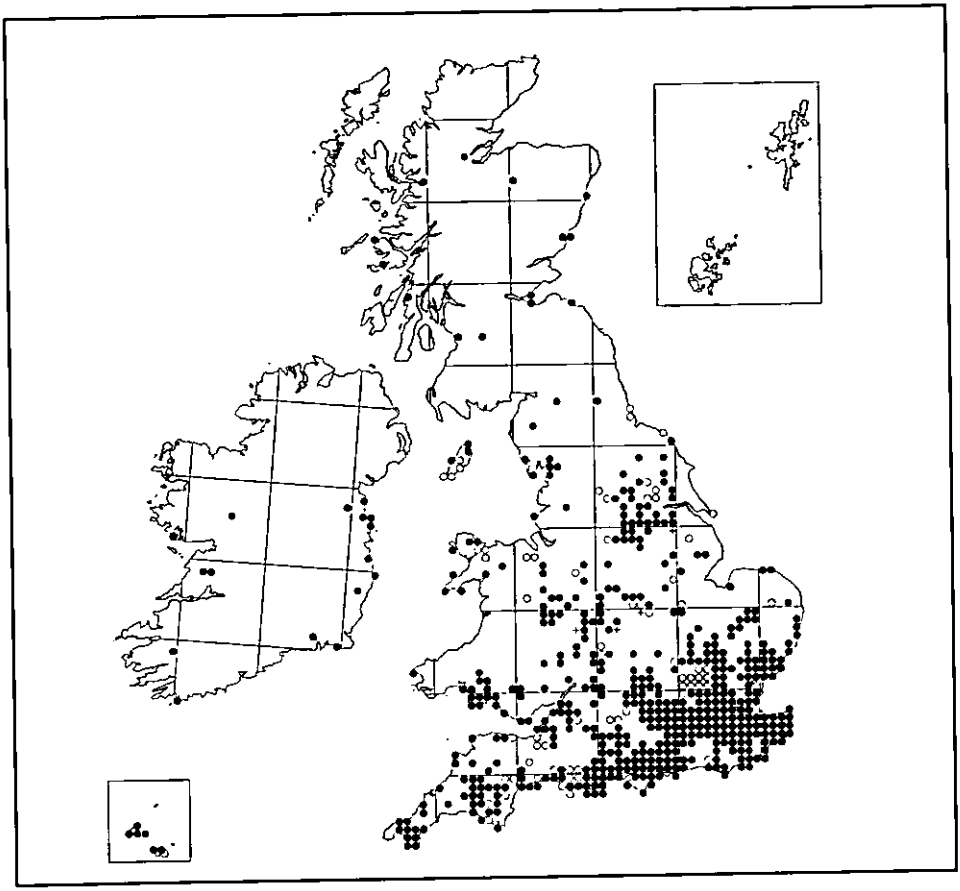
The summer brood has been confirmed as foraging from bramble, buttercup, cat's-ear, cinquefoil, crane's-bill, knapweed, lime, meadowsweet, mustard, rose, thistle and willowherb. These pollen sources were identified by pollen samples taken from female bees (Chambers 1968).

### Nesting biology

Nest burrows are rarely encountered and, in parts of Germany and eastern Europe, the species nests solitarily (Kocourek 1966; Westrich 1989). Brood cells have been located at the extreme depth of 101 cm (Malyshev 1936).

### Flowers visited

See above forage species. Females of the second brood are strongly associated with bellflowers, particularly harebell and clustered bellflower (pers. obs.).



**Parasites**

The species is a host of the cleptoparasite *Nomada fabriciana* (Perkins, 1919, 1924a, 1924b; Hallett, 1928, 1956; Spooner, 1931; Yarrow, 1941; Chambers, 1949; Westrich, 1989). Specimens are occasionally stylopized, possibly by *Stylops gwynanae*, as in eastern Europe and Spain (Noskiewicz & Poluszynski, 1928).

***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 312 *Andrena denticulata* (Kirby, 1802)

**[Apidae: Andreninae]**

This is a medium-sized *Andrena*, one of a small group of four species (*A. denticulata, A. fuscipes, A. simillima, A. tridentata*) where the females have distinctive, triangular hind tibiae which do not incurve distally and with a strongly banded appearance to the copiously-haired abdomen. Within the group, the species are all rather similar, especially the males.

### Distribution

Although widely dispersed throughout Great Britain and Ireland, this species is localised and rarely frequent at any one site. It is possible that the species is declining due to overall habitat loss.

*A. denticulata* is widespread in Europe. However, it has been categorized as Red List 3, Endangered, in Germany.

### Status (in Britain only)

This bee is not regarded as being threatened.

### Habitat

May be found in open, grassland habitats where there is a good representation of yellow Asteraceae flowers. It is most often associated with sandy areas.

### Flight period

Univoltine: July to September

### Pollen collected

There is disagreement about this species in the published literature. Chambers (1968) gives pollen sources from a wide range of plant species, but Westrich (1989) states that it is oligolectic on the flowers of the Asteraceae. My own observations support the latter view, but clearly more research is required.

### Nesting biology

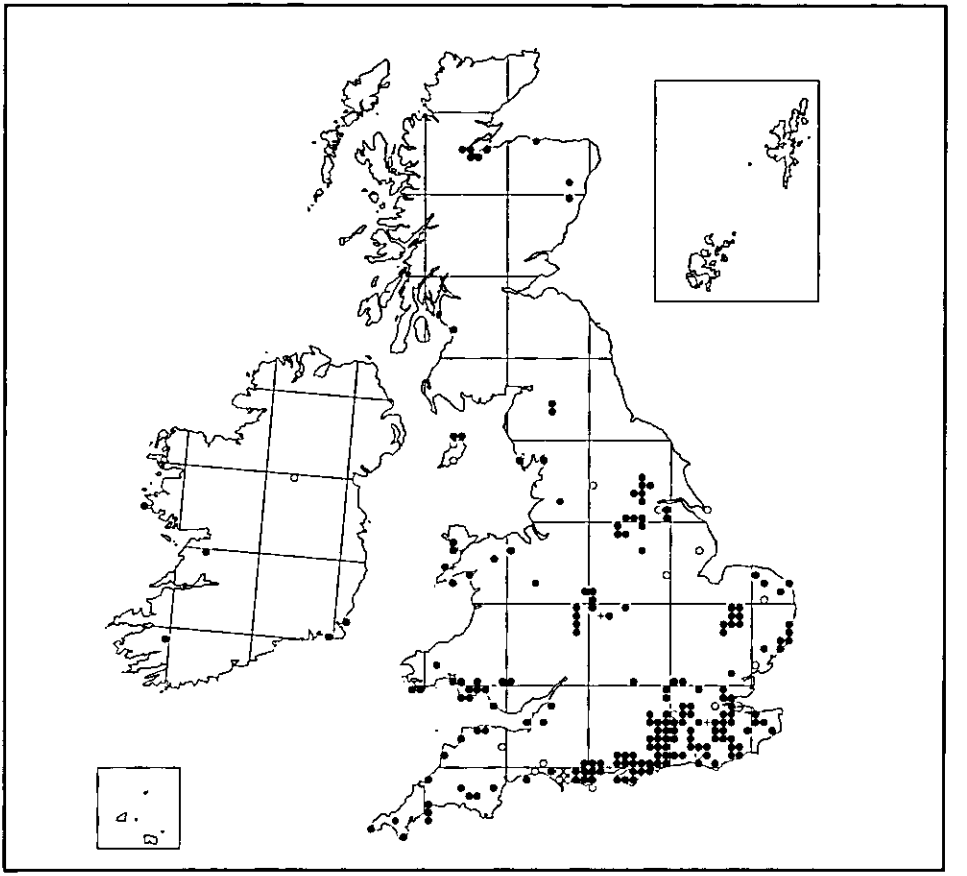
Nests singly in the ground.

### Flowers visited

A variety of species of the Asteraceae, especially yellow-flowered ones.

### Parasites

The cuckoo-bee *Nomada rufipes* is a parasite of this species (see p. 112).



***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 313 *Andrena fuscipes* (Kirby, 1802)

**[Apidae: Andreninae]**

*Andrena fuscipes* is a medium-sized *Andrena*, one of a small group of four species (*A. denticulata, A. fuscipes, A. simillima, A. tridentata*) where the females have distinctive, triangular hind tibiae which do not incurve distally and with a strongly banded appearance to the copiously-haired abdomen. Within the group the species are all rather similar, especially the males. The silver-grey males may be found in numbers dashing over the tops of flowering heather plants.

### Distribution

This species is locally common on heather-dominated heathlands; being found throughout Great Britain, although more localised than its heather pollen-source in the north of Scotland. It is probable that our populations are a significant proportion of the overall European population; especially in view of the very large proportion of remaining heathland and moorland in these islands

It is widespread, but rarely common, in Europe. It has been categorized as Red List 2, Severely Endangered, in Germany.

### Status (in Britain only)

This bee is not regarded as being scarce or threatened.

### Habitat

Very strongly linked to substantial areas of flowering heather

### Flight period

Univoltine: July to September.

### Pollen collected

Oligolectic on Ericaceae and rarely found with anything other than *Calluna vulgaris* pollen.

### Nesting biology

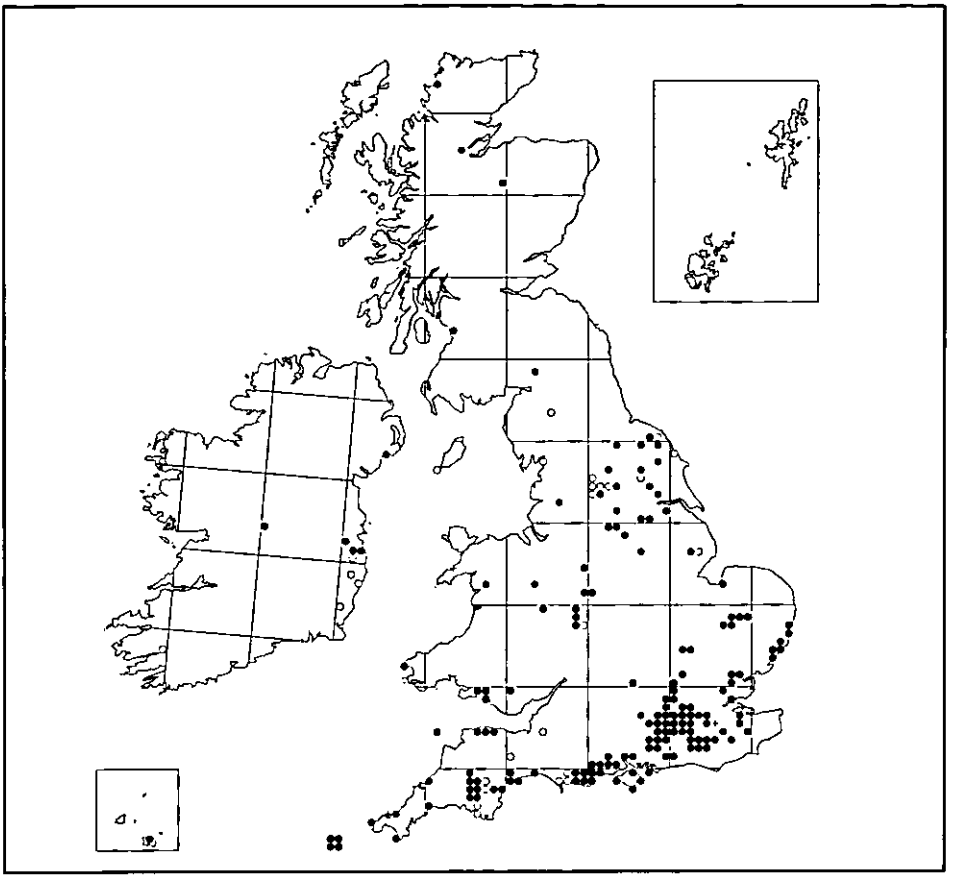
Nests singly in areas of bare ground amongst heathers.

### Flowers visited

Males and females are rarely seen at anything other than heather.

### Parasites

The cuckoo-bee *Nomada rufipes* Fabricius, 1793 parasitises this species (see p.112).



***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 314 *Andrena labialis* (Kirby, 1802)

**[Apidae: Andreninae]**

*A. labialis* is among the largest of our *Andrena* species and the male is very distinctive, having a large yellow area on the face between the mandibles. Males patrol along hedge-lines and over tall vegetation which contains early-flowering legumes, such as yellow vetchling.

### Distribution

This species is locally common in the midlands and southern Britain. It is widespread in northern and central Europe.

### Status (in Britain only)

This bee is not regarded as being scarce or threatened. It is possible that the status of this bee requires revision.

### Habitat

May be found in open, grassland habitats where there is a good representation of leguminous flowers.

### Flight period

Univoltine: May to July.

### Pollen collected

There is disagreement about this species in the published literature. Chambers (1968) gives pollen sources from a wide range of plant species, but Westrich (1989) states that it is oligolectic on the flowers of the Fabaceae. My own observations support the latter view, but clearly more research is required.

### Nesting biology

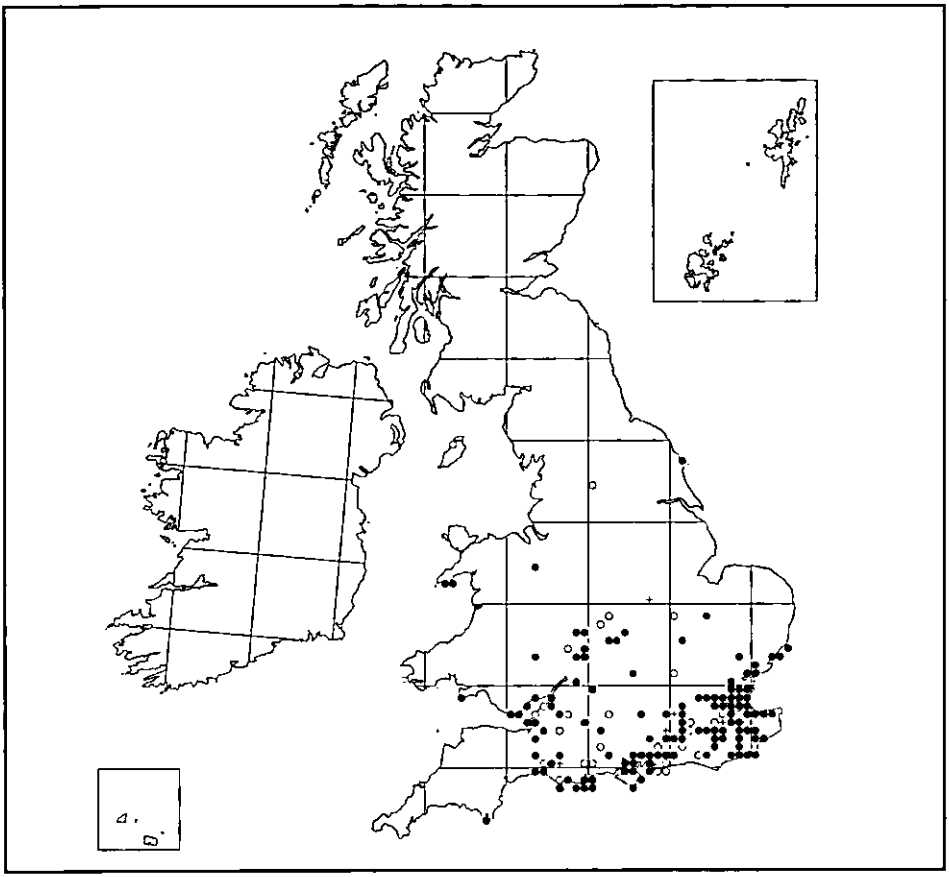
Nests singly in the ground, but it may have strong aggregations where conditions are particularly favourable.

### Flowers visited

A variety of early-flowering legumes, the males will also visit hawthorn flowers.

### Parasites

The cuckoo-bee, *Sphecodes rubicundus* is a parasite of this species (see p. 88). An unidentified *Stylops* (Strepsiptera) has also been known to attack this species (R C L Perkins 1919). Larvae and puparia of the bee-fly (*Bombylius major*) have also been found in the cells of *Andrena labialis* (Chapman 1878).



***Map compiled by:*** M Edwards and S Roberts.
***Author of profile:*** M Edwards.

## Map 315 *Andrena nitida* (Müller, 1776)

**[Apidae: Andreninae]**

There has been considerable confusion over the correct name to apply to this distinctive species, *A. nitida* or *A. pubescens*. It is a large *Andrena* with, when fresh, bright, foxy-brown hair on the thorax and a polished black abdomen. Females have thin apical side-bars of white pubescence on abdominal segments 1-3, and males have copious white facial hair, especially on the clypeus.

### Distribution

This species is commonly found throughout southern Britain, becoming scarcer towards southern Yorkshire and west Lancashire, its most northerly known counties. There is some doubt about the correctness of Irish records (Stelfox 1927) and those from Scotland.

It is widespread and common in Europe, also being known from Iran.

### Status (In Britain only)

This bee is not regarded as being scarce or threatened.

### Habitat

May be found in a variety of open grassland habitats.

### Flight period

Univoltine: April to June

### Pollen collected

Widely polylectic.

### Nesting biology

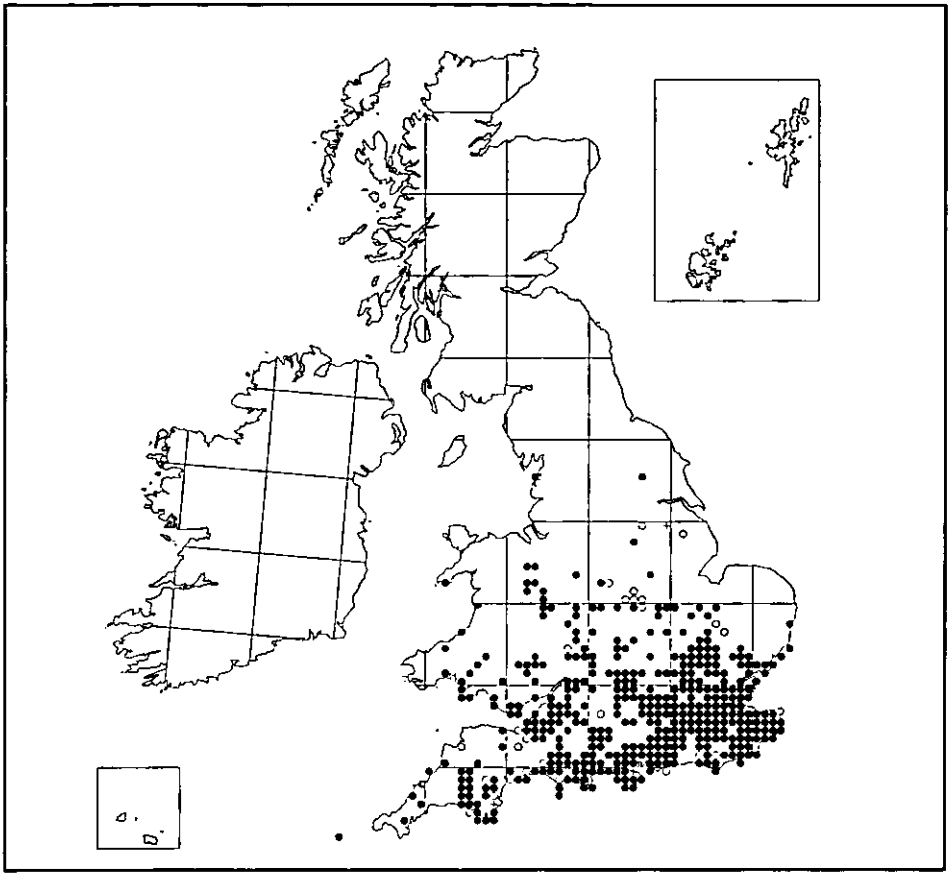
This species nests among short to medium-length grassland; there is no obvious preference for areas of bare ground. Nests are always well-dispersed.

### Flowers visited

There are no strong preferences in the flowers visited, both males and females can be found quite high up on blackthorn and down low on dandelions.

### Parasites

It is possible that the cuckoo-bee *Nomada goodeniana* parasitises this species. It is known to be parasitised by the Strepsipteran *Stylops melittae*, but this is not very frequent.



***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 316 *Andrena simillima* Smith, 1851

**[Apidae: Andreninae]**

One of a small group of generally distinctive summer-flying species, females of which all have the hind tibiae widest at the apex (i.e. triangular in outline), not before the apex, as in the vast majority of *Andrena*. The abdomens of these species have distinct, wide bands of long hairs on each dorsal segment, giving them a rather furry appearance overall. Separating the species within the group is rather more difficult. In fact there has been considerable discussion as to whether this species and *Andrena nigriceps* are the same species with different facial hair colour (black in female *A. nigriceps*, brown in female *A. simillima*). Males are very similar to each other. A specimen exists in the collection at Birmingham where half the face has black hairs, the other half being brown! Against this, it is unusual to find mixes of both 'species' in the same area.

### Distribution

This species is very patchily distributed and rarely frequent. Its modern records are coastal in Devon and Cornwall, being mostly found on the south coast. It is also known from the south-eastern coast of Kent. It is widespread, but not frequent, inland on Salisbury Plain and has been found fairly recently at a downland site north of Winchester.

It is local and scarce in Europe.

### Status (In Britain only)

Listed in Shirt (1987) as Rare (RDB3) and by Falk (1991) as Vulnerable (RDB2).

### Habitat

Flower-rich calcareous grasslands and coastal landslips with a mixture of grassland and scrub.

### Flight period

Univoltine: July and August

### Pollen collected

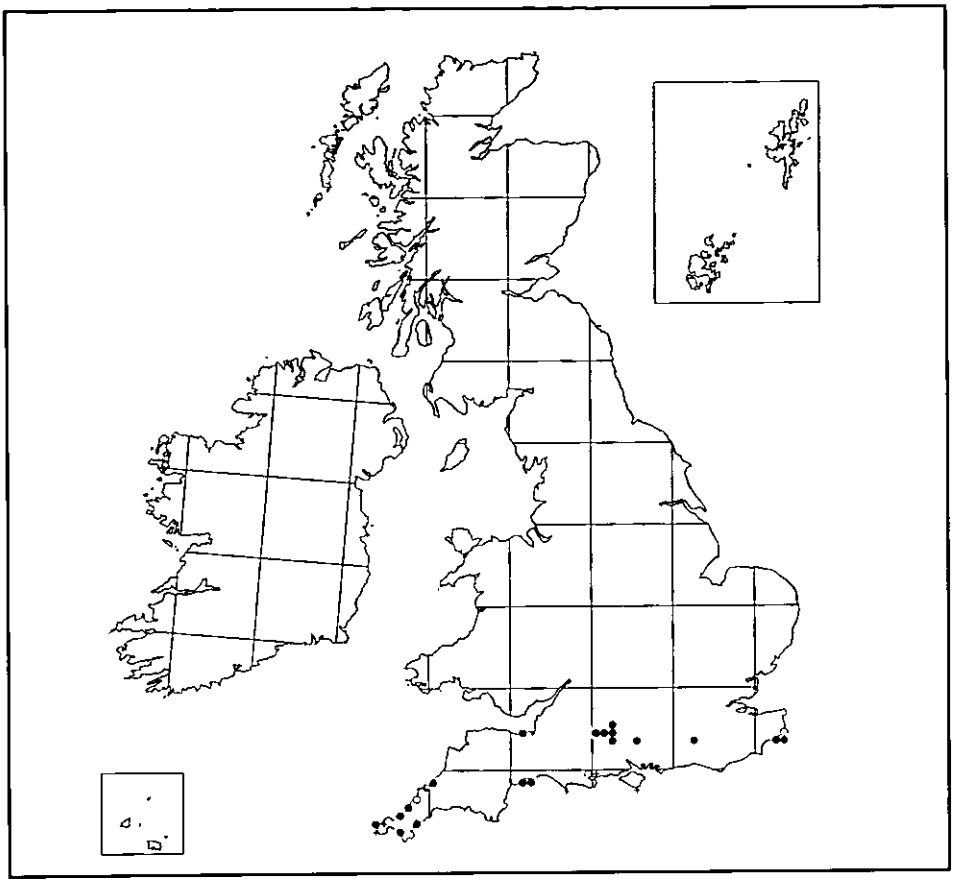
Polylectic. I have seen it collecting pollen at bramble, common fleabane and knapweeds.

### Nesting biology

Nests are made singly in fairly loose soil.

### Flowers visited

Brambles, common fleabane, hemp-agrimony, knapweeds, thistles and wild marjoram.



**Parasites**
The cuckoo-bee *Nomada rufipes* has been recorded as a parasite of this species in mainland Europe. (See p. 112.)

***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 317 *Andrena thoracica* (Fabricius, 1775)

**[Apidae: Andreninae]**

A large and distinctive species with bright foxy-red hairs on the thorax and a polished black abdomen.

### Distribution

This species is locally common in coastal localities in southern Britain, but is also known from a number of inland sites, often on heathy soils, where it rarely attains the abundance of some of its coastal locations. Males patrol nesting areas, flying extremely quickly along the edge of cliffs, just below the top edge.

It is widespread, but rarely common, in Europe. It is also found throughout the steppe regions of Asia.

### Status (in Britain only)

This bee is not regarded as being scarce or threatened.

### Habitat

May be found in open, sandy-grassland habitats, particularly where these are associated with exposed vertical cliffs, which provide the favoured nesting sites.

### Flight period

Bivoltine: March to May and July to August

### Pollen collected

Widely polylectic.

### Nesting biology

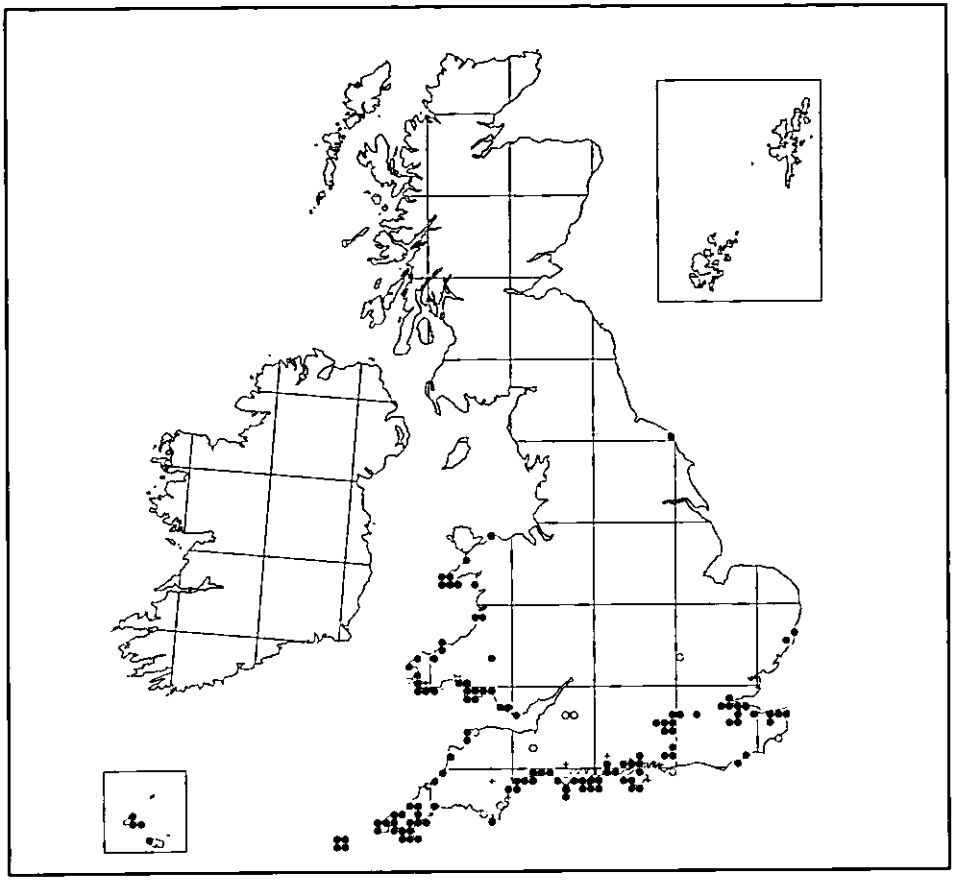
Strongly associated with vertical cliffs of sandy material, but may also use more level sandy areas.

### Flowers visited

There are no strong preferences in the flowers visited, these include members of the Brassicaceae, Asteraceae, Lamiaceae, Onagraceae and Salicaceae.

### Parasites

The cuckoo-bees *Nomada goodeniana* (Perkins 1919) and *Nomada fulvicornis* (Westrich 1989) cleptoparasitise this species.



***Map compiled by:*** M. Edwards and S P M Roberts.
***Author of profile:*** M. Edwards.

## Map 318 *Andrena tridentata* Kirby, 1802

**[Apidae: Andreninae]**

One of a small group of generally distinctive summer-flying species, females of which all have the hind tibiae widest at the apex (i.e. triangular in outline), not before the apex, as in the vast majority of *Andrena*. The abdomens of these species have distinct, wide bands of long hairs on each dorsal segment, giving them a rather furry appearance overall. Separating the species within the group is rather more difficult, especially for males.

### Distribution

A very rare bee in the UK, with confirmed records from Dorset and Suffolk only. Unconfirmed records are from South Hampshire, Essex and Norfolk. The last known sighting was in Dorset in 1944.

It is local and scarce in Europe, although records are well-dispersed in the central regions of the continent.

### Status (In Britain only)

Listed in Shirt (1987) as Endangered (RDB1) and by Falk (1991) as Vulnerable (RDB2). It is possible that the true situation may be that it is extinct.

### Habitat

No details known, but several other members of this group are closely associated with the flowers of Asteraceae. The known areas have sandy soils present (in Suffolk), or nearby (at Norden, near Corfe, Dorset).

### Flight period

Univoltine: July to August

### Pollen collected

Possibly associated with the flowers of Asteraceae.

### Nesting biology

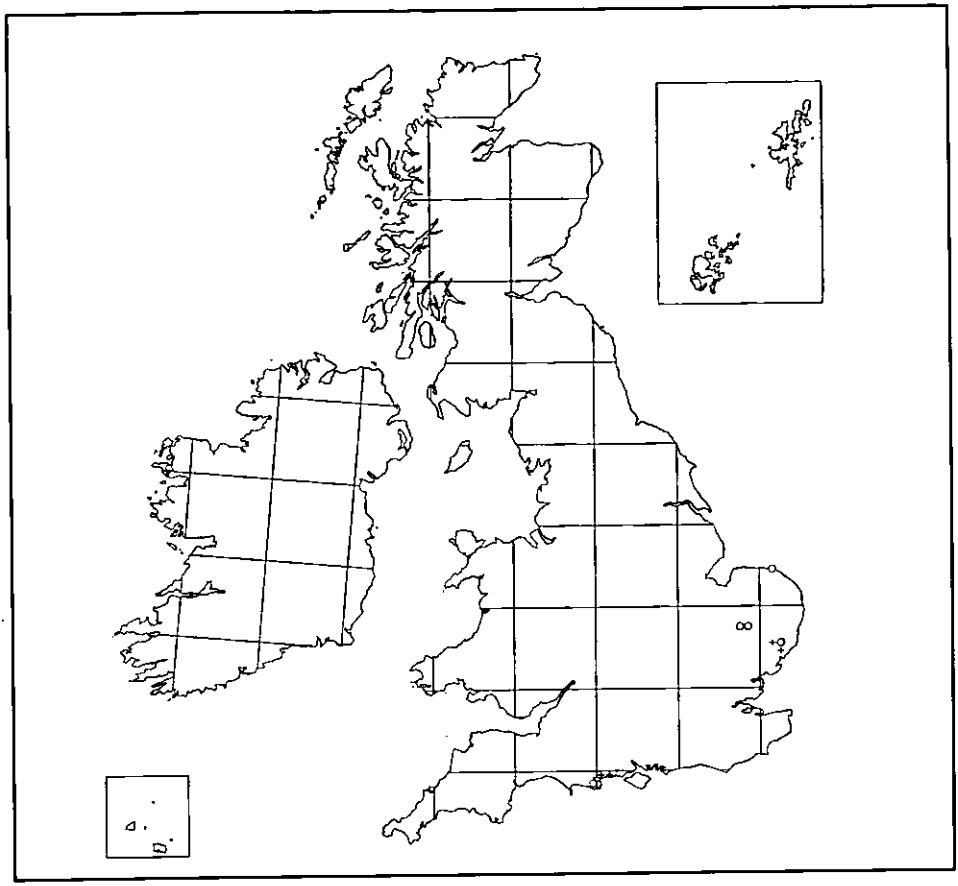
Unknown.

### Flowers visited

Purple loosestrife, ragwort, smooth hawk's-beard.

### Parasites

None known.



***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 319 *Lasioglossum fratellum* (Pérez, 1903)

**[Apidae: Halictinae]**

### Distribution

Widespread throughout the British Isles. Also known from the Channel Islands.

A Eurasian species, found to the far east of Russia. In southern Europe it mainly montane.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

Mainly a species of moor and sandy heath, possibly preferring wooded parts.

### Flight period

Univoltine. Females fly from early April to September, with males from late June to September.

### Pollen collected

Widely polylectic.

### Nesting biology

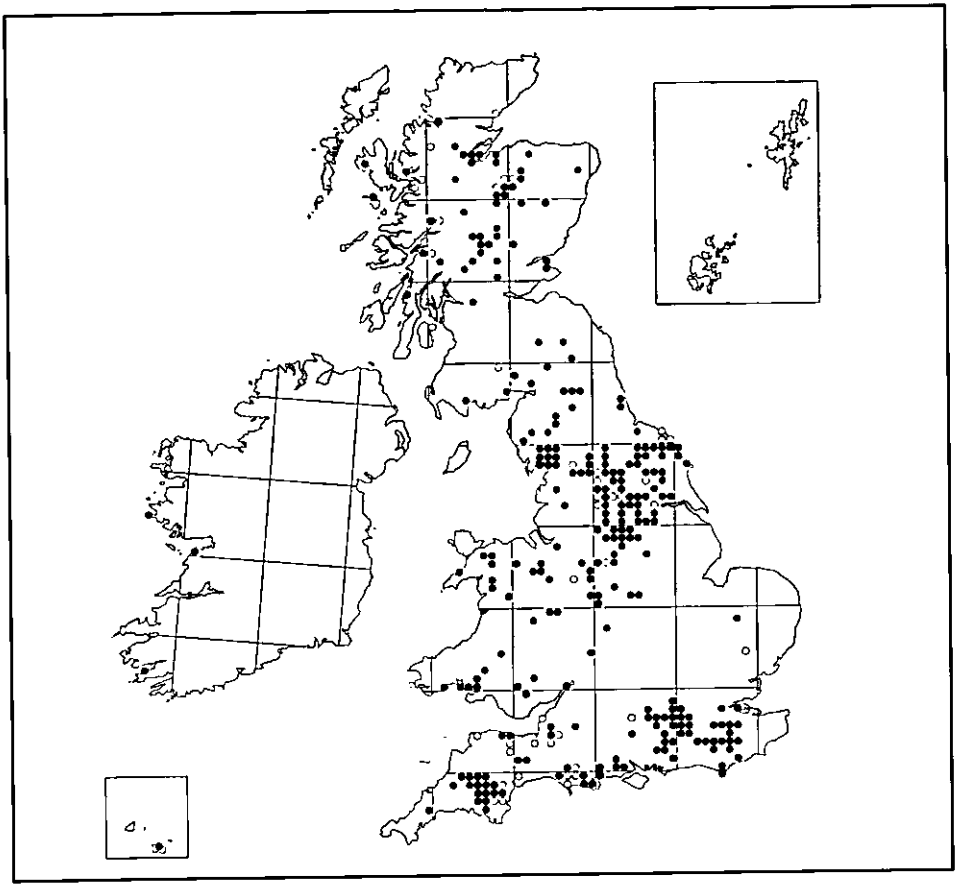
A mining bee with primitively eusocial colonies. The females have a long life span, up to a year, and a daughter will often remain with the foundress in the maternal nest. The latter then has more developed ovaries and usually guards the nest entrance, whilst the daughter carries out most of the foraging. The nest is illustrated by Heide (1992) and comprises an earth cell cluster held within a chamber by pillars. In a nest with only one female, there are up to nine cells, whilst a polygynous nest may have 17 (Pesenko *et al.*, 2000). To provision one cell the female may make 10-13 foraging trips, the final few being for nectar only. Provisioning a cell may take two days.

### Flowers visited

These include bellflowers, bilberries, daisies and rosebay willowherb.

### Parasites

*L. fratellum* is a host of the cleptoparasitic halictine *Sphecodes hyalinatus*.



***Map compiled by:*** G W Allen and S P M Roberts.
***Author of profile:*** G W Allen.

## Map 320 *Lasioglossum fulvicorne* (Kirby, 1802)

**[Apidae: Halictinae]**

### Distribution

England and Wales with a very few Scottish records.

Widely distributed in Europe to 64°N and found eastwards to the eastern Palaearctic, including Taiwan. There is a little geographical variation resulting in subspecies being recognised for parts of Asia.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

Frequent on calcareous soils such as chalk scarps but also found on other strata. Shows a preference for short grassland in dry areas.

### Flight period

Probably univoltine; the female with a long life span, appearing on the wing from mid-March to the end September and males from mid-June until early October.

### Pollen collected

Widely polylectic.

### Nesting biology

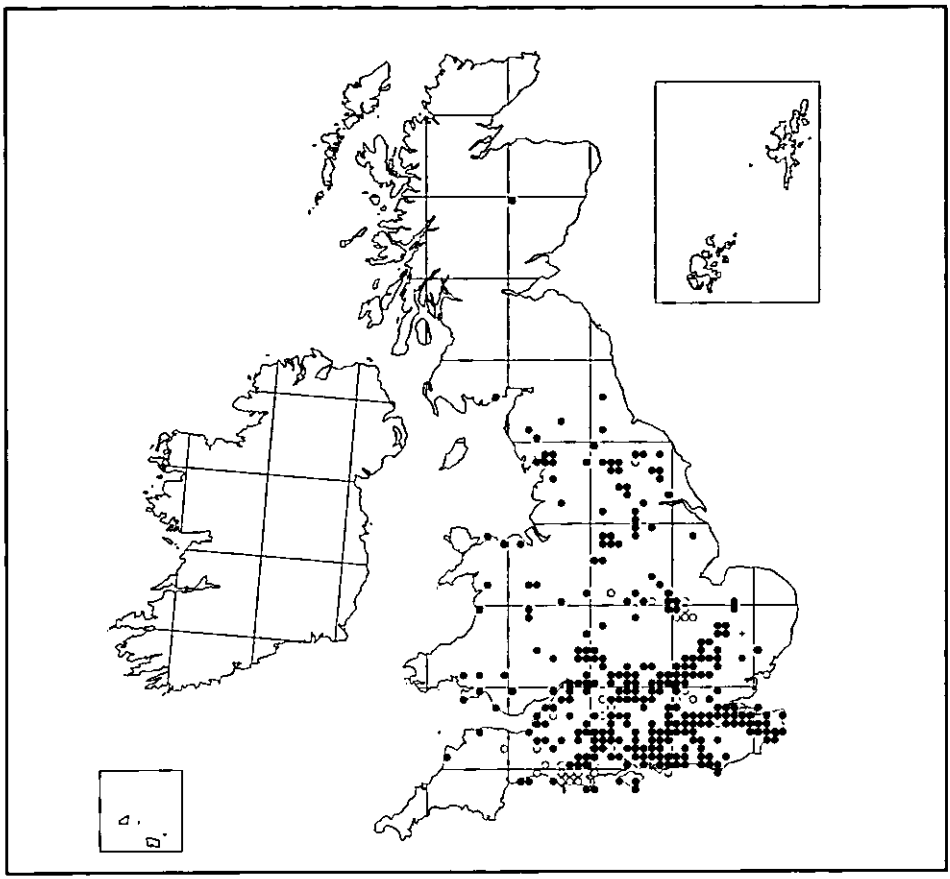
The nesting biology is not well known but the species is solitary, the female digging a nest in short turf in the spring.

### Flowers visited

The species probably visits a variety flowers for nectar only.

### Parasites

The halictine bees *Sphecodes hyalinatus* and *S. ferruginatus* are cleptoparasites.



***Map compiled by:*** G W Allen and S P M Roberts.
***Author of profile:*** G W Allen.

## Map 321 *Lasioglossum sexnotatum* (Kirby, 1802)

**[Apidae: Halictinae]**

### Distribution

A southern, restricted species, occurring mainly in East Anglia and Surrey. Recently found in East Sussex (S J Falk, pers. comm.) and known from the Channel Islands. Old information for Hampshire, Devon, Cornwall and Lancashire requires confirmation.

Abroad, this is a central and southern Palaearctic species, widely distributed and sometimes common in Europe. Found from Spain east to Mongolia.

### Status (in Britain only)

Listed in the Appendix of Shirt (1987), i.e. thought to be extinct, and as RDB1 by Falk (1991). There are only five known modern occurrences.

### Habitat

In Britain confirmed only from sandy heath, breckland heath and calcareous heath.

### Flight period

Univoltine. The British flight period is hard to determine, due to the paucity of data but the female appears in April and males have been found in August. In Poland, Pesenko *et al.* (2000) state that both sexes can be found for nearly the whole flight period, April to October.

### Pollen collected

Abroad, the species is widely polylectic. However, pollen sources have yet to be established in Britain.

### Nesting biology

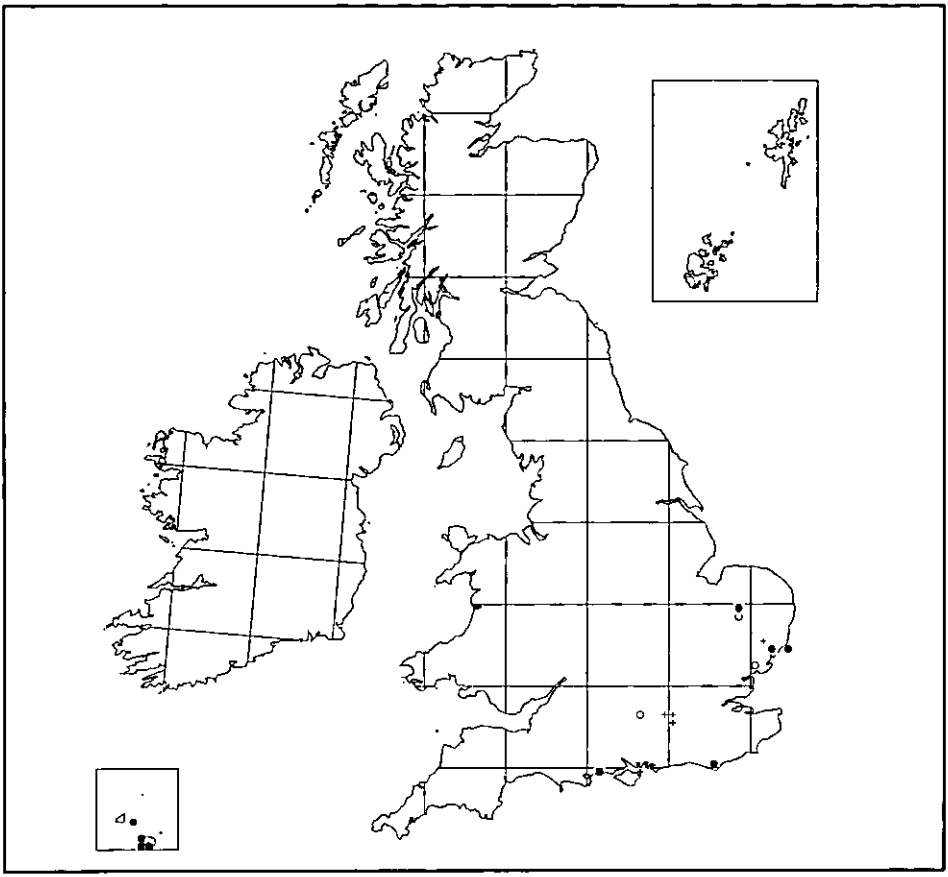
Apparently, the nesting biology has not been established, even where the species is common abroad.

### Flowers visited

Visits to bramble, bryony, dandelion, figwort and ragwort and have been observed in Britain; some of these plants may represent pollen sources.

### Parasites

No information available.



***Map compiled by:*** G W Allen and S P M Roberts.
***Author of profile:*** G W Allen.

## Map 322 *Lasioglossum villosulum* (Kirby, 1802)

**[Apidae: Halictinae]**

### Distribution

Widely distributed in England and Wales, north to Scotland. Also found in Ireland, the Isle of Man, the Isles of Scilly and the Channel Islands.

Abroad, the species is distributed across the Palaearctic region, from Europe to Mongolia and north to 64 degrees.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

Found in many habitats, including coastal soft rock cliffs. In Wales and north-west England it is largely coastal.

### Flight period

Bivoltine. The females are to be found in flight from mid-March, although more commonly from early April, until October. Males appear in late June and fly until mid-October. There is a peak of activity in July and August, and very limited data for early November. Information on the sex of these late specimens is not available.

### Pollen collected

The species is polylectic but yellow-flowered Asteraceae predominate in host plant records.

### Nesting biology

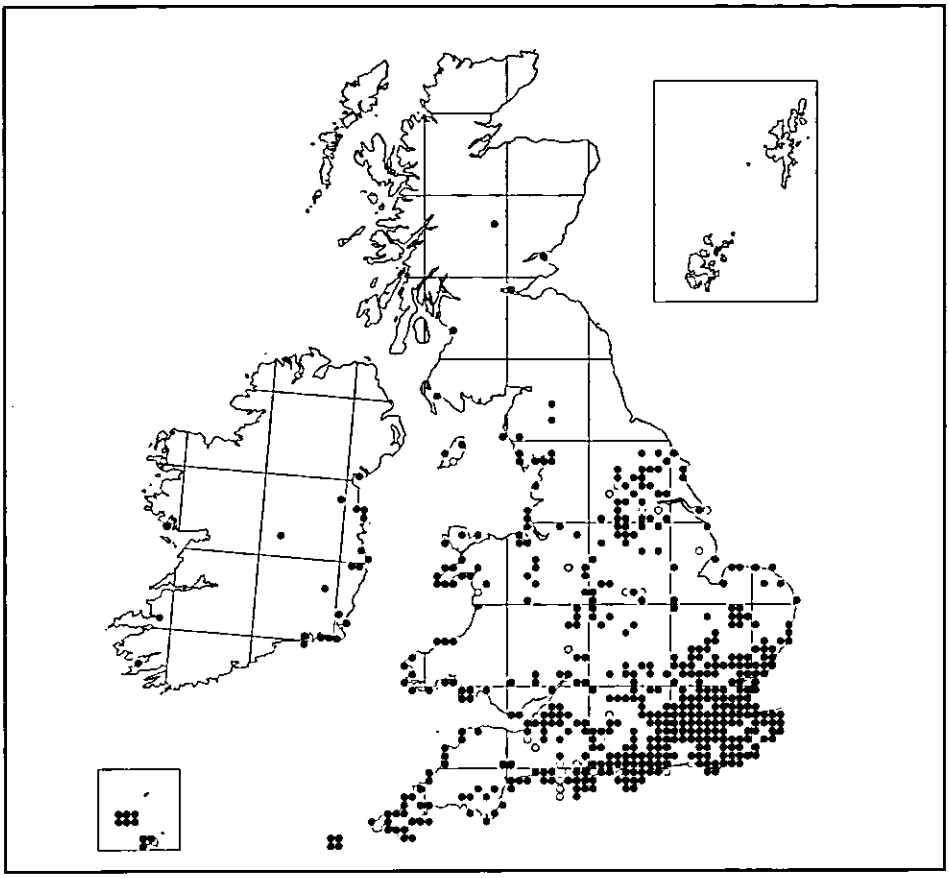
A solitary mining species, although nests may be found in aggregations. Occasionally, two females of the same generation share a nest entrance but these nests are thought to be communal rather than primitively eusocial. The main burrow is dug vertically, with lateral burrows off this leading to horizontal cells. A small tumulus accumulates at the nest entrance as digging is carried out. As soon as it is constructed, each cell is fully provisioned, an egg laid and the cell sealed off. This means the adult female bee has no contact with the larva.

### Flowers visited

Included are: alexanders, buttercups, creeping thistle, hawthorn, hogweed and plum, as well as yellow Asteraceae (G H L Dicker, unpublished).

### Parasites

There are no *Sphecodes* species which are host specific on *L. villosulum*, but some of the more general *Sphecodes* may parasitise this bee.



***Map compiled by:*** G W Allen and S P M Roberts.
***Author of profile:*** G W Allen.

## Map 323 *Lasioglossum zonulum* (Smith, F., 1848)

**[Apidae: Halictinae]**

### Distribution

Restricted to southern England and south Wales, with a few occurrences in the Welsh borders and an old specimen is known from north Wales (Criccieth). Known from the Channel Islands (Sark, I C Beavis, pers. comm.).

Abroad, an Holarctic species, probably introduced to North America. Widely distributed in the temperate and warm zones of the Palaearctic and north Oriental regions.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

The species shows a preference for woodland rides and sometimes is coastal. Not frequent on calcareous soils.

### Flight period

Univoltine. The females fly from early April to October, males from June to September.

### Pollen collected

This bee is widely polylectic.

### Nesting biology

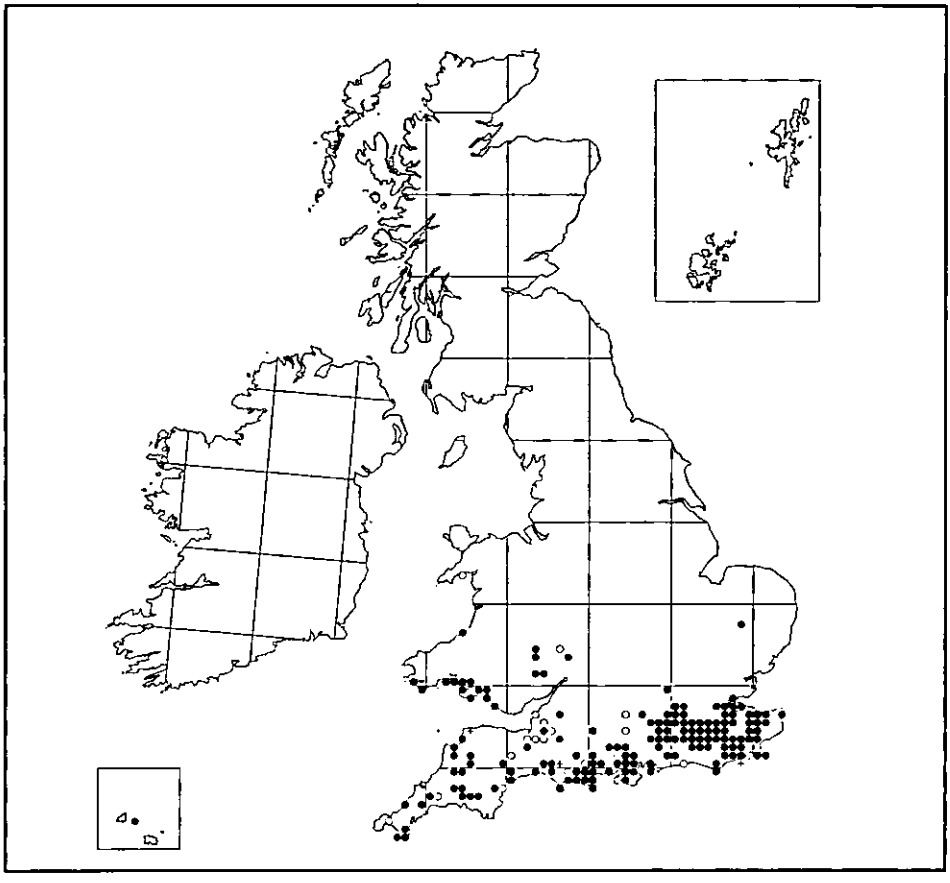
A solitary mining bee nesting in areas exposed to the sun. The main burrow is almost vertical down to a depth of some 20 cm, where it is widened into a blind ending. Cells are constructed, each at the end of a short lateral burrow, starting at a depth of 10 cm below the ground level. Cells are pyriform with polished walls, and are sealed after being provisioned and an egg laid. The pollen provisioned is frequently yellow. After copulation, the young females hibernate in the maternal nest, lengthening the burrow to 40-50 cm and constructing individual hibernaculae. It has been suggested that the foundress female may live up to two years (Pesenko *et al.* 2000).

### Flowers visited

The bees visit a range of botanical families.

### Parasites

The bee *Sphecodes scabricollis* is thought to be a cleptoparasite of *L. zonulum*, the two species having been dug out of the soil together (C R Vardy; specimens in the Natural History Museum, London). The species also have rather similar ranges in the UK, although *S. scabricollis* is much more scarce (see p. 90).



***Map compiled by:*** G W Allen and S P M Roberts.
***Author of profile:*** G W Allen.

## Map 324 *Sphecodes reticulatus* Thomson, 1870

**[Apidae: Halictinae]**

### Distribution
Widely distributed in England, from Dorset to Kent and north to Lincolnshire.

### Status (in Britain only)
Listed as Rare (RDB3) in Shirt (1987) and as Notable A, now Nationally Scarce (Na), by Falk (1991).

### Habitat
This *Sphecodes* has been found in a variety of habitats on light soils, including sandy heath, soft rock cliffs, sandpits and occasionally on calcareous grassland (Falk 1991).

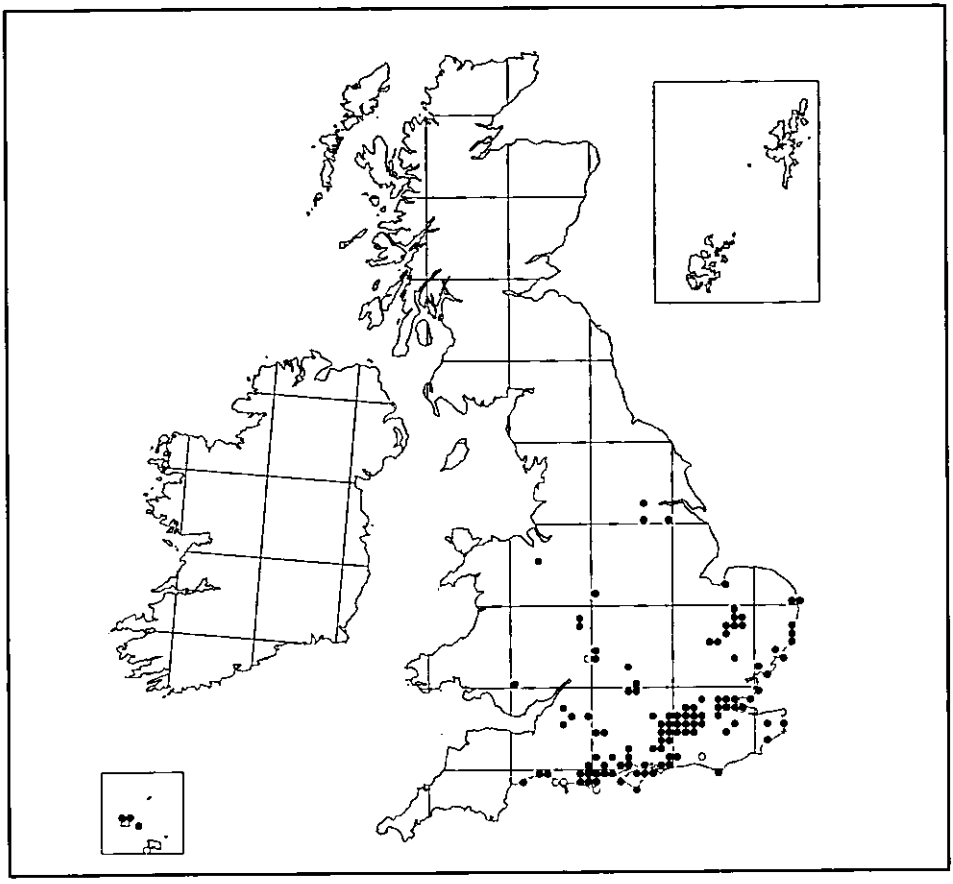
### Flight period
The species been found in flight from late May to mid September but there is no available information on the flight periods of the two sexes.

### Pollen collected
As this is a cleptoparasitic bee, no pollen is collected.

### Nesting biology
The parasitic behaviour has not been observed and the host has not been ascertained. The parasite has been captured near burrows of *Lasioglossum prasinum* on sandy heath but is found outside the range of this mining bee. Some *Andrena* species have been implicated as hosts, including *A. argentata, A. dorsata* (second brood) and *A. barbilabris*.

### Flowers visited
Apiaceae and Asteraceae are visited for nectar only in Britain, whilst abroad, heather has additionally been found to be used.

### Parasites
No information available.



***Map compiled by:*** G W Allen and S P M Roberts.
***Author of profile:*** G W Allen.

## Map 325 *Sphecodes rubicundus* von Hagens, 1875

**[Apidae: Halictinae]**

This species has also been known as *S. ruficrus* (Erichson) and *S. rufiventris* (Panzer), but both were misidentifications.

### Distribution

Essentially, a southern species, found from Devon to Kent and north to Suffolk. Also known from south Wales.

Abroad, found throughout much of central and southern Europe, and western Asia.

### Status (in Britain only)

Not mentioned in Shirt (1987), but listed by Falk (1991) as Notable A, (now known as Nationally Scarce Na).

### Habitat

Found in old, herb-rich meadowland, and soft-rock coastal cliffs and landslips.

### Flight period

Univoltine. Early May to mid-July. The males emerge in the spring rather than late summer or autumn; unusual for halictine bees including most *Sphecodes*. This flight period is in synchronization with that of the host: *Andrena*, rather than *Lasioglossum* or *Halictus*.

### Pollen collected

As this is a cleptoparasite, pollen is not collected by the female.

### Nesting biology

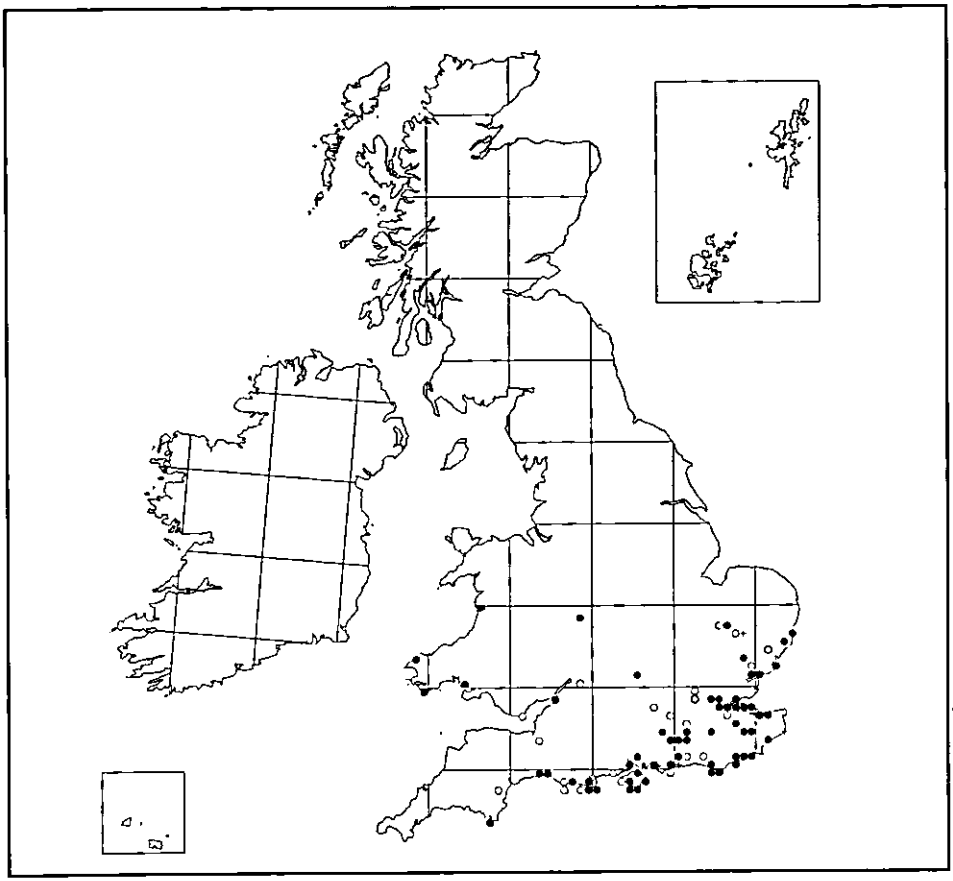
A cleptoparasite of *Andrena labialis*, with which it is usually recorded (see p. 66), and possibly, *A. flavipes* (see Atlas 4, p. 88). The parasitic behaviour has not been well documented.

### Flowers visited

The species has been reported visiting angelica, wild carrot and spurges for nectar only.

### Parasites

No information available.



***Map compiled by:*** G W Allen and S P M Roberts.
***Author of profile:*** G W Allen.

## Map 326 *Sphecodes scabricollis* Wesmael, 1935

**[Apidae: Halictinae]**

### Distribution

Found locally and sparingly in southern England and Wales.

Abroad, found throughout much of Europe, but apparently rare everywhere.

### Status (in Britain only)

Listed as Rare (RDB3) in both Shirt (1987) and Falk (1991).

### Habitat

Found in open, broadleaved woodland and heath margins, situations where the host may nest.

### Flight period

Univoltine. Very few females of this species are known but the flight period of this sex is probably from early April to mid September. Males are captured more frequently, from late July to late September.

### Pollen collected

This bee does not collect pollen as it is a cleptoparasite. The host is believed to be *Lasioglossum zonulum* (see p. 84), although R C L Perkins considered *Halictus eurygnathus* a possible host, without evidence.

### Parasitic behaviour

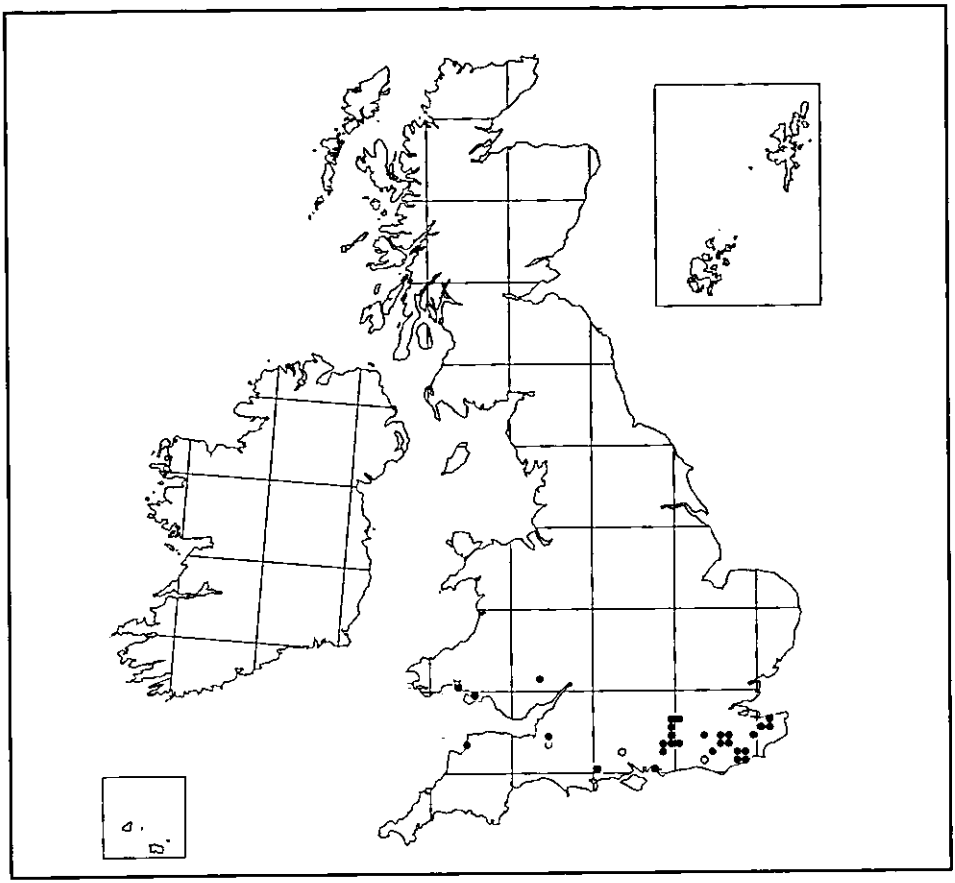
Details of the life history of *S. scabricollis* are not known, apart from a female being excavated with one of *Lasioglossum zonulum* by C R Vardy in 1972 (specimens in the Natural History Museum, London).

### Flowers visited

Flower visits are recorded from the daisy family plants (Asteraceae) and, in continental Europe, carrots.

### Parasites

No information available.



***Map compiled by:*** G W Allen and S P M Roberts.
***Author of profile:*** G W Allen.

## Map 327 *Anthophora bimaculata* (Panzer, 1798))

**[Apidae: Apinae]**

Both sexes can be identified by their yellow-marked faces and shrill hum. The male has pale green eyes in life, though this is a purely ephemeral character, the eyes becoming brownish-black after death.

### Distribution

Southern England and the Channel Islands.

The species is widely distributed throughout much of Europe, from southern Fennoscandia to Spain, eastwards to at least Italy. However, this bee belongs to a group of species (sometimes placed in the genus *Heliophila*) which, in the western Palaearctic, closely resemble one another and are sometimes difficult to identify. *A. bimaculata* is the only such representative of the group which occurs in Britain.

### Status (in Britain only)

The bee is not regarded as being scarce or threatened.

### Habitat

Associated particularly with light sandy soils and, as such, is generally to be encountered inland on lowland heaths and commons, and on coastal dunes and landslips. Sometimes abundant where found, particularly in the vicinity of its nesting sites.

### Flight period

Univoltine; late June to mid September.

### Pollen collected

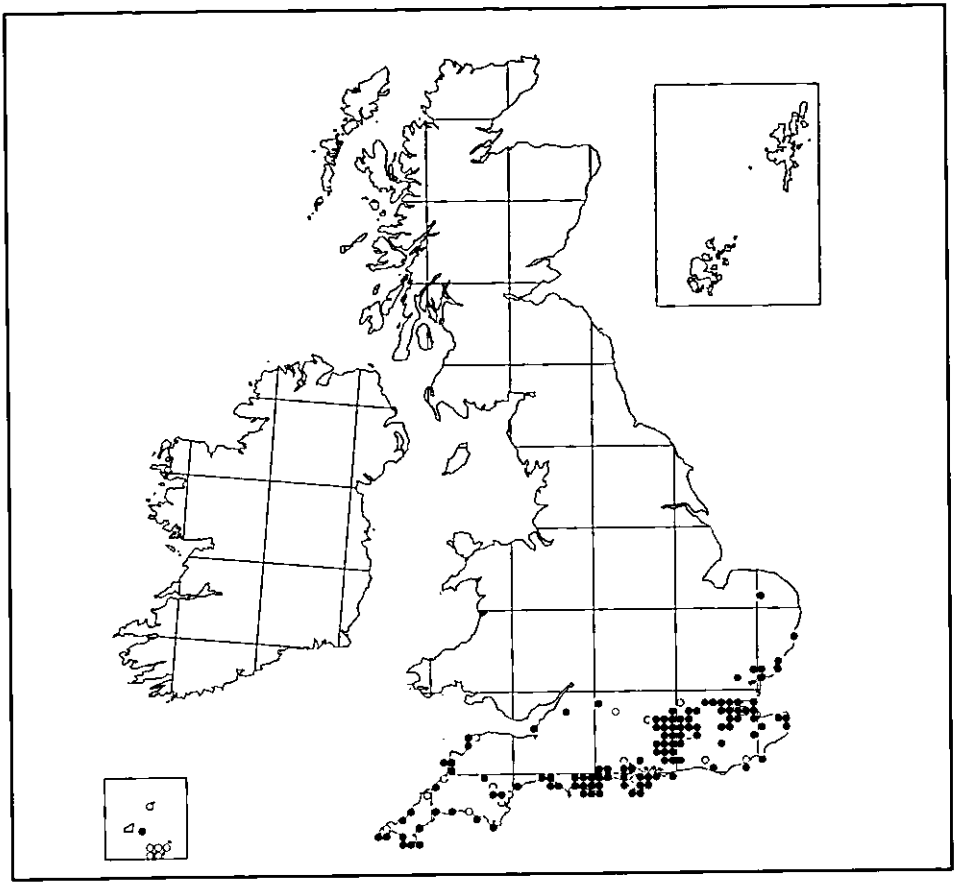
Polylectic (Westrich 1989).

### Nesting biology

Nests usually occur in dense aggregations, often in exposed soil in either level surfaces or, more especially, slopes and cliff faces.

### Flowers visited

Bramble, burdock, common fleabane, common knapweed, dead-nettle, gypsywort, hawk's-beard, hawkweed, heaths, privet, ragwort, sea bindweed, sea-lavender, spear thistle, thyme, viper's-bugloss, willowherb and wood sage.



**Parasites**

The cleptoparasitic bee *Coelioxys rufescens* has been reared from cells of *A. bimaculata* (F Smith 1845b) and is sometimes noted about nesting aggregations of the same species (pers. obs.). In Dorset, *C. elongata* has also been observed investigating nest burrows of the same host (G M Spooner, pers. comm.).

***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 328 *Anthophora furcata* (Panzer, 1798)

**[Apidae: Apinae]**

An unusual *Anthophora* species, which excavates its nest burrows in rotten wood, rather than in the soil. Unusually for *Anthophora* the mandible is tridentate, with both an inner and outer subapical tooth.

### Distribution

Widely distributed in England and Wales; it is the only *Anthophora* species recorded from Scotland (Kircudbrightshire). There are no records from Ireland or the Channel Islands.

A Eurasian species, the range extending from western Europe to Kashmir.

### Status (in Britain only)

The bee is not regarded as being scarce or threatened.

### Habitat

Virtually ubiquitous within its range in lowland Britain, being reported from gardens, woodland, grasslands, moors, heaths and fenlands.

### Flight period

Univoltine; late May to August or early September.

### Pollen collected

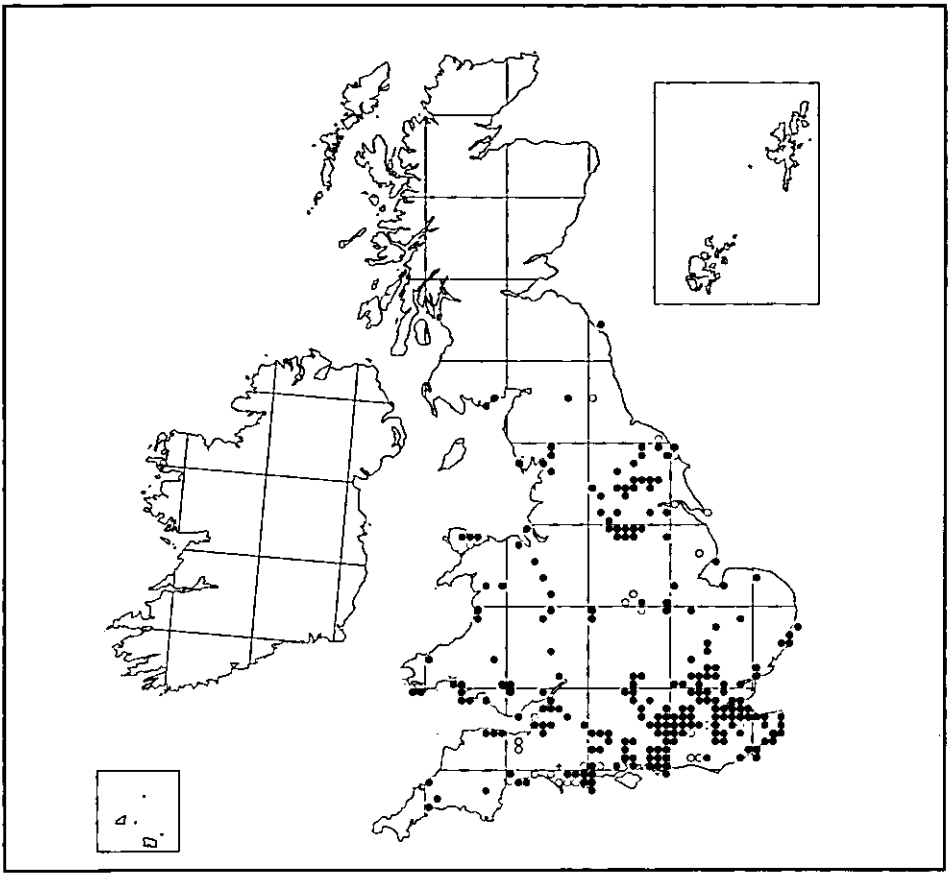
Oligolectic on Lamiaceae (Westrich 1989). In the Netherlands, plants of the family Boraginaceae are additionally listed as important foraging plants for this species (Peeters, Raemakers & Smith 1999).

### Nesting biology

Nest burrows and cells are excavated in rotten wood. A nest generally consists of two or more parallel burrows. Cells are oval in outline and are enlarged sections of the burrow; each cell is lined with compacted wood dust (pers. obs.). A nest is illustrated by Müller, Krebs & Amiet (1997). The winter is passed as a prepupa, not contained within a cocoon.

### Flowers visited

Bastard balm, black horehound, bramble, butterfly-bush, cat-mint, hawkweed, hedge woundwort, iris, knapweed, marsh thistle, marsh woundwort, nightshades, red dead-nettle, spear thistle, white dead-nettle, wood sage.



**Parasites**

Both *Coelioxys quadridentata* and *C. rufescens* have been cited as bee cleptoparasites of *A. furcata*, having been reared from nests of the species (M Edwards, pers. comm., and Richards (1949) respectively).

***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 329 *Anthophora plumipes* (Pallas 1772)

**[Apidae: Apinae]**

With its swift, darting flight and predilection for lungwort flowers, this attractive bee is commonly encountered in private gardens in southern England in the spring and early summer. Sexual dimorphism is strongly pronounced, the male being clothed mainly with bright reddish brown hairs, the female entirely black-haired, except for reddish orange scopal hairs on the hind tibia.

### Distribution

Throughout much of England and south Wales. It also occurs in the Channel Islands.

Widely distributed in Eurasia, from Britain east to China and Japan, and south to North Africa.

### Status (in Britain only)

This bee is not regarded as being scarce or threatened.

### Habitat

Almost ubiquitous, including gardens, open woodland, and coastal sites (especially in the vicinity of soft rock cliffs).

### Flight period

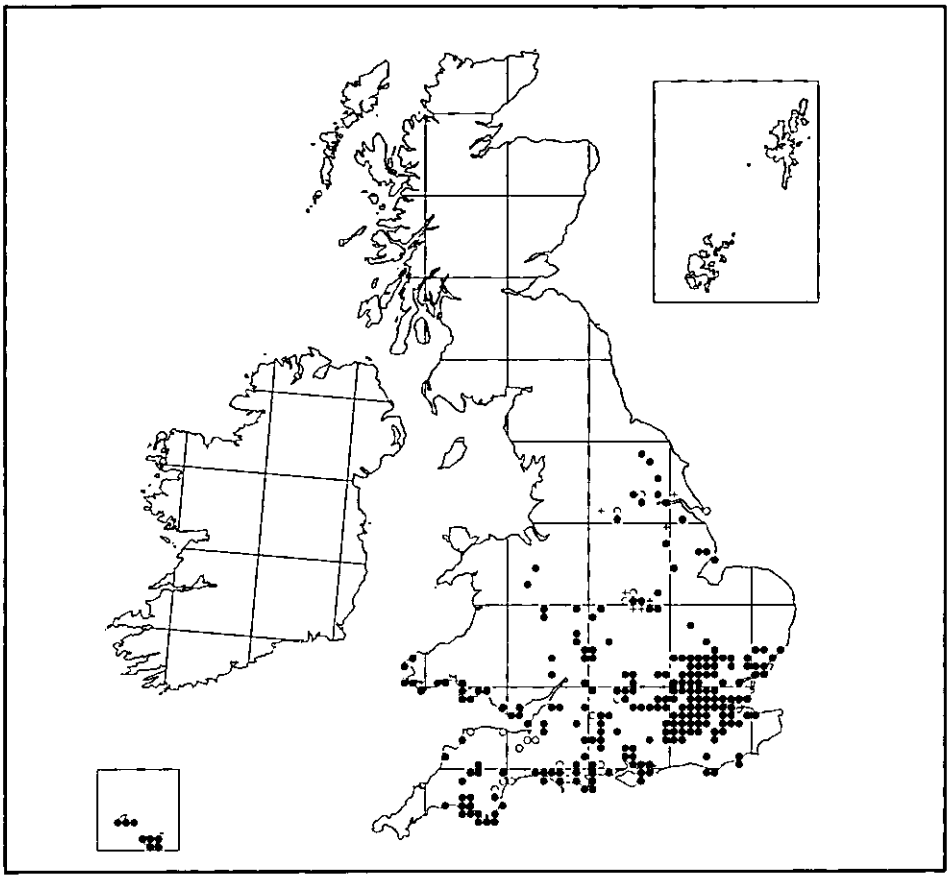
Univoltine, generally from March to late May, but there are a few records from February, June and early July.

### Pollen collected

Polylectic, foraging from species in the families Berberidaceae, Boraginaceae, Fabaceae, Iridaceae, Lamiaceae, Liliaceae, Papaveraceae, Primulaceae, Rosaceae and Scrophulariaceae (Westrich 1989). However, it has a strong preference for Lamiaceae.

### Nesting biology

Usually nests gregariously in vertical soil profiles, such as coastal cliffs and, inland, in sand pits, soft mortar joints and cob walls. Such sites are used annually, so that with time and erosion old cells are occasionally brought to the surface. Individual cells are pitcher-shaped, the walls and closing lid being fashioned from compacted soil which is almost certainly impregnated with a secretion from the Dufour's gland. When excavated the cells can be readily extracted from the surrounding substrate. Both sexes pass the winter newly emerged in their sealed cells. Nest construction and provisioning is described by Malyshev (1928) and Lith (1947). Müller, Krebs & Amiet (1997) illustrate both nests and their contents.



**Flowers visited**

Aubretia, azalea, borage, cabbage, daffodil, gorse, ground-ivy, herb-robert, ivy-leaved toadflax, lungwort, primrose, rosemary, violet and wallflower. In Cambridgeshire, *A. plumipes* is an important pollinator of cultivated, autumn sown varieties of *Vicia faba* (Bond & Kirby 1999).

**Parasites**

This is the common host of the cleptoparasitic bee *Melecta albifrons* (Hallett 1928; Lith 1947) (see also p. 106). Parasitoids of *A. plumipes* are the torymid chalcid *Monodontomerus obsoletus* and an unidentified eulophid chalcid in the genus *Melittobia* (a hyperparasitoid of the *M. obsoletus* larva). Females of the bee-fly *Bombylius discolor* have been seen about the nest burrows of the bee in Devon (Turner 1972), and thus this fly may prove to be a cleptoparasite of *A. plumipes*.

***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 330 *Anthophora quadrimaculata* (Panzer, 1798)

**[Apidae: Apinae]**

### Distribution

Widely distributed in southern England, particularly in the south-east. Not found in Ireland, but does occur in the Channel Islands. The majority of records are from private gardens, where the bees are often observed hovering about and visiting the flowers of various labiates, particularly cat-mint and lavender. Searching gardens within the known distribution of this bee, where one or more of these plants is being cultivated, is a recommended method for recording new sites for this bee.

Widely distributed in Europe, ranging from southern Finland to Spain, east to Hungary. Also known from China (Wu 2000).

### Status (in Britain only)

Not listed in Shirt (1987). Listed as a Notable B species by Falk (1991) (now known as Nationally Scarce (Nb)), though, in view of numerous recent records, this status should be reviewed.

### Habitat

Open sites, especially private gardens containing cultivated Lamiaceae.

### Flight period

Univoltine, early June to mid August.

### Pollen collected

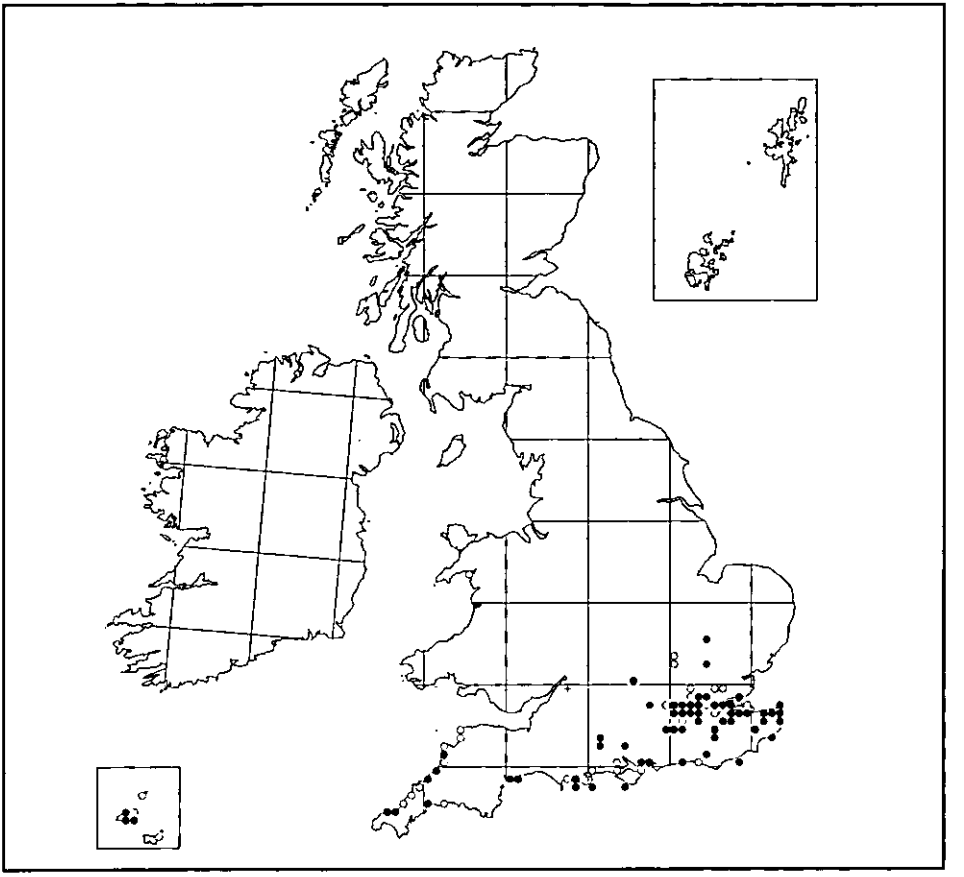
Polylectic (Westrich 1989; Peeters, Raemakers & Smit 1999), with a strong preference for Lamiaceae.

### Nesting biology

Small aggregations of nests have been observed in sandy banks and cliffs (Smith 1876), clay and stone walls, and mortar joints of walls. A nest is described and figured by Nielsen (1902), under the synonym *A. vulpina*.

### Pollen collected

Polylectic (Westrich 1989; Peeters, Raemakers & Smit 1999), with a strong preference for Lamiaceae.



***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 331 *Anthophora retusa* (Linnaeus, 1758)

**[Apidae: Apinae]**

### Distribution

Southern England from Dorset to Kent, north to Oxfordshire, and East Norfolk. Also recorded from the Channel Islands (Jersey (Saunders 1902), Herm (Richards 1979), Guernsey and Sark). There are several records from outside this distribution range, though these are unconfirmed and are likely to be based on misidentifications (these are omitted from the distribution map). This bee has undergone a rapid and largely unexplained decline in Britain. In the last two decades it has been reliably recorded from just seven sites in Dorset, Isle of Wight, North Hants, East Sussex and North Essex.

The species is widely distributed in western Europe.

### Status (in Britain only)

Listed as Rare (RDB3) by Else & Spooner (in Shirt, 1987) and as Endangered (RDB1) by Falk (1991).

### Habitat

The species has a preference for sandy soils, being generally found inland on commons and heathlands, as well as coastal dunes and cliffs. Other sites seem to have been on heavier, wooded soils.

### Flight period

Univoltine; early April to mid June (rarely late July). Generally the species emerges a little later than the other *Anthophora* species (*A. plumipes*) which is active in the Spring.

### Pollen collected

Polylectic, foraging from Brassicaceae and Lamiaceae (Westrich 1989), though there is no British record.

### Nesting biology

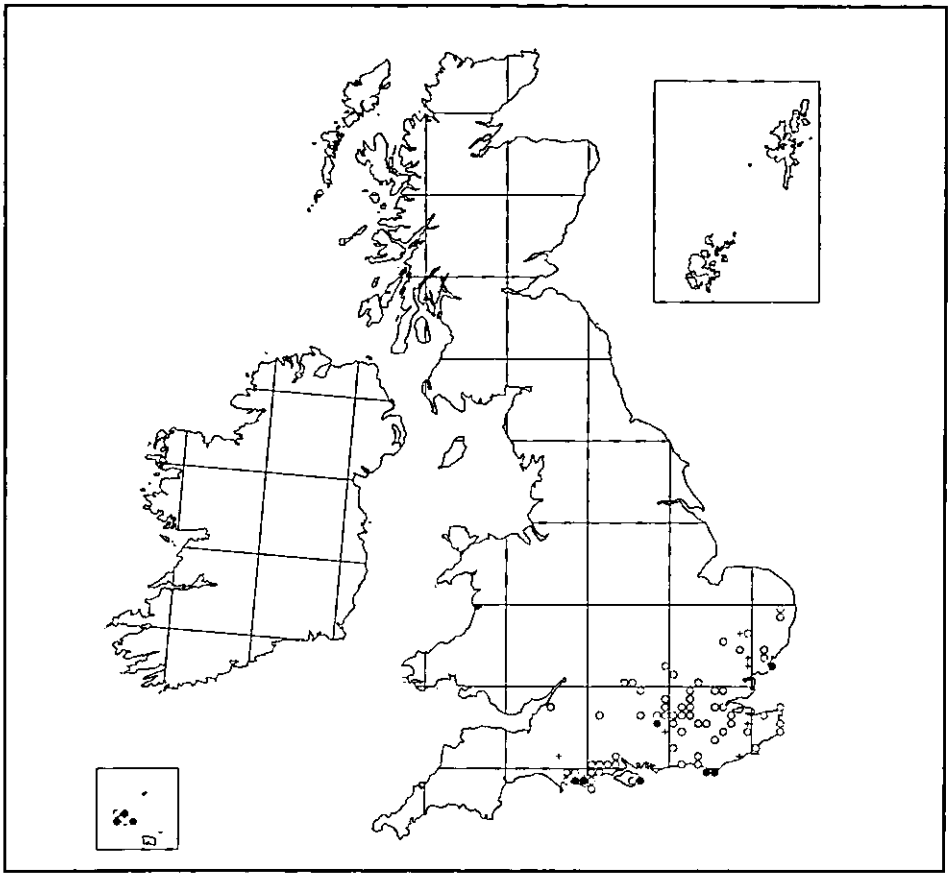
Nest burrows are excavated in the soil. However, there seems to be no published description of their internal arrangement or whether they occur in aggregations. The species probably over-winters as a newly eclosed adult in its sealed cell.

### Flowers visited

Common bird's-foot-trefoil, common vetch, dandelion, ground-ivy, kidney vetch, thrift, wallflower and wild radish.

### Parasites

The cleptoparasitic bee *Melecta luctuosa* (see p. 110) attacks the nests of *A. retusa* (e.g. Saunders 1896; Morice 1901; Giordani Soika 1936; Lieftinck 1980).



***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 332 *Eucera longicornis* (Linnaeus, 1758)

**[Apidae: Apinae]**

The extraordinarily long antennae of male *Eucera* species (when laid back these reaching the apex of the gaster) readily distinguish these bees from males of any other British bee genus. The male clypeus and labrum are bright yellow. In the female, the antennae are considerably shorter, when laid back their distal segments only reaching the scutellum; head entirely black.

### Distribution

Very local but sometimes numerous where found in southern England and south Wales. This species does not occur in Ireland. Widespread in Eurasia, the range extending east to Siberia and China (Wu 2000). A map illustrating its distribution within the western Palaearctic has been published (Kullenberg, Buel & Tkalcu 1984).

### Status (in Britain only)

In Shirt (1987) this species was considered to be RDB1, and believed to be extinct. Listed as a Notable A species by Falk (1991).

### Habitat

Coastal grasslands (including cliffs and landslips), open rides in deciduous woodland and, occasionally, heathlands.

### Flight period

Univoltine, mid May to mid July, exceptionally August.

### Pollen collected

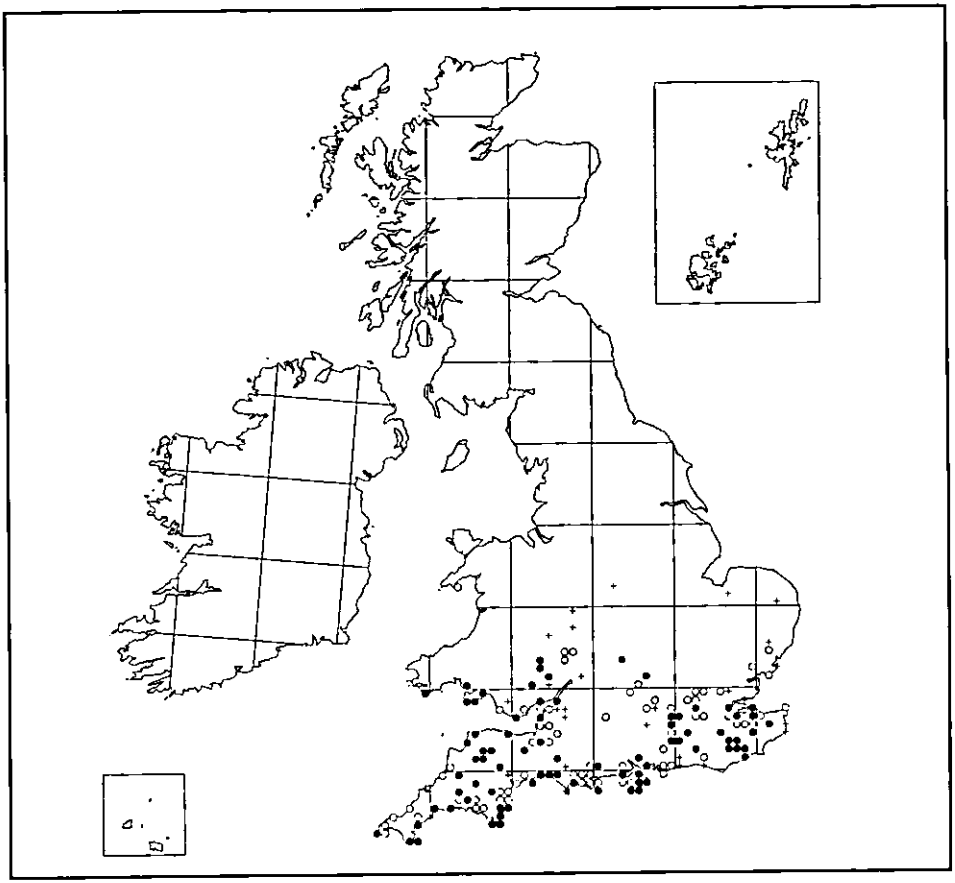
Oligolectic on Fabaceae, including bush vetch, common bird's-foot-trefoil, lucerne, narrow-leaved everlasting-pea, red clover, tuberous pea, tufted vetch and white clover (Westrich 1989).

### Nesting biology

Nest burrows are generally found in aggregations in sparsely vegetated or eroded soil. The nest architecture of this species has been described by Smith (1846, 1876), J C Nielsen (1902) and E T Nielsen (1941). The winter is spent as a diapausing prepupa (Smith 1846, 1876). However, in late August, F W L Sladen excavated a nesting aggregation of this species in east Kent and counted 180 cocoons (Sladen 1895). Of these, 54 contained fully developed bees, the remainder prepupae. It is thus possible that the species may pass the winter in both of these stages.

### Flowers visited

In western Europe, these include bloody crane's-bill, bramble, bugle, bush vetch, comfrey, common bird's-foot-trefoil, early-purple orchid, heather, heath milkwort,



kidney vetch, lucerne, narrow-leaved everlasting-pea, radish, red clover, tuberous pea, white clover. Bees also visit Boraginaceae, Lamiaceae and Liliaceae (Móczár, 1954).

On mainland Europe, the males of this bee are occasional pollinators of the bee orchid and late spider orchid (Kullenberg, Buel & Tklacu 1984). The bees mistake the flowers for their own species and attempt to couple, the labellum of the flower acting as a copulatory dummy.

**Parasites**

The very rare bee, *Nomada sexfasciata* is a cleptoparasite (see p. 144). This *Nomada* is currently known from only a single site on the south coast of Devon, where bees have been observed flying about the nest burrows of *E. longicornis* (pers. obs.).

***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 333 *Eucera nigrescens* Pérez 1879

**[Apidae: Apinae]**

This species was previously known as *E. tuberculata* (F.).

### Distribution

Mainly south-east England, particularly Kent and East Sussex. Very rare, with no British record since J C Felton collected the species at Maplesden, Kent, in 1970 (Booth Museum, Brighton) and K M Guichard took another at Pluckley, Kent, in 1966 (Natural History Museum, London). There are several records of this species and *E. longicornis* being found in the same locality. Not found in Ireland.

Widely distributed in Europe and North Africa (Baker 1964; Kullenberg, Buel & Tkalcu 1984, the latter providing a distribution map).

### Status (in Britain only)

Nationally Endangered (RDB1) and thought to be extinct in Britain (Else & Spooner in Shirt 1987).

### Habitat

Mainly open grassland (Baker 1964). Some sites, however, were probably open clearings and rides in deciduous woodland.

### Flight period

Univoltine, mid June to late July. This species often begins its flight period before that of its congener *E. longicornis*, though there is a considerable overlap. The species is also reported to be strongly protandric, males appearing three to four weeks before the females (Baker 1964).

### Pollen collected

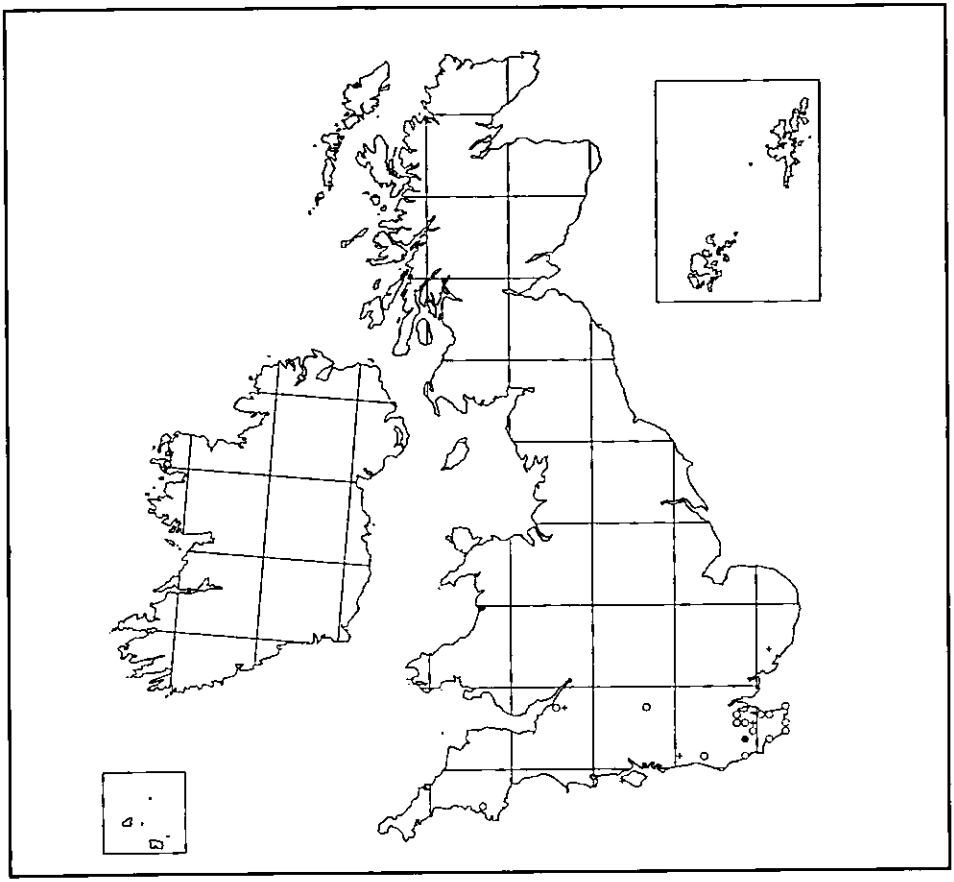
Oligolectic on Fabaceae, foraging from bush vetch, tufted vetch, meadow vetchling, lucerne, white clover and red clover (Westrich 1989). However, D B Baker (1964) states that the bee is polylectic, visiting a number of Fabaceae, Boraginaceae, Lamiaceae and Scrophulariaceae.

### Nesting biology

No information, other than that females excavate their nest burrows in the soil.

### Flowers visited

The only flower visits in Britain are tufted vetch (Baker 1964), bush vetch (J C Felton, pers. comm.) and "pink clover" (specimens in the Natural History Museum, London). In Europe, it has been recorded visiting members of Asteraceae, Boraginaceae, Caryophyllaceae, Cruciferae, Euphorbiaceae, Lamiaceae, Oleaceae, Ranunculaceae and Solanaceae (Móczár 1954). Males of *E. nigrescens* are known pollinators of the bee



orchid and late spider-orchid on mainland Europe (see notes for this behaviour in the *E. longicornis* profile (p.103)).

**Parasites**

On mainland Europe, the nests of this bee are attacked by the cleptoparasitic bee *Nomada sexfasciata* (Stöckhert 1933; Westrich 1989), though this association has not been confirmed for Britain.

***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 334 *Melecta albifrons* (Forster 1771)

**[Apidae: Apinae]**

An unmistakable spring bee, with the head and body entirely black except for a pair of lateral patches of white appressed hairs on most of the gastral tergites. However, in some individuals, these patches are also black, so that the bee is entirely melanic.

### Distribution

Throughout much of southern England, with an apparent bias towards the south-east, with a few records from Wales, particularly in the south. There is at least one old record for south Wales. It is also found in the Channel Islands (Guernsey and Jersey).

The species is widely distributed in Eurasia, from Britain south to Iberia and North Africa (Morocco to Egypt), and eastwards to the Middle East, Armenia and Iran.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

The bee can be expected to occur in the same sites as its two *Anthophora* host species, including coastal localities (especially soft rock cliffs) and private gardens (sometimes in large cities, including London). Usually it is rather scarce.

### Flight period

Univoltine; April to early June.

### Pollen collected

This species does not collect pollen.

### Nesting biology

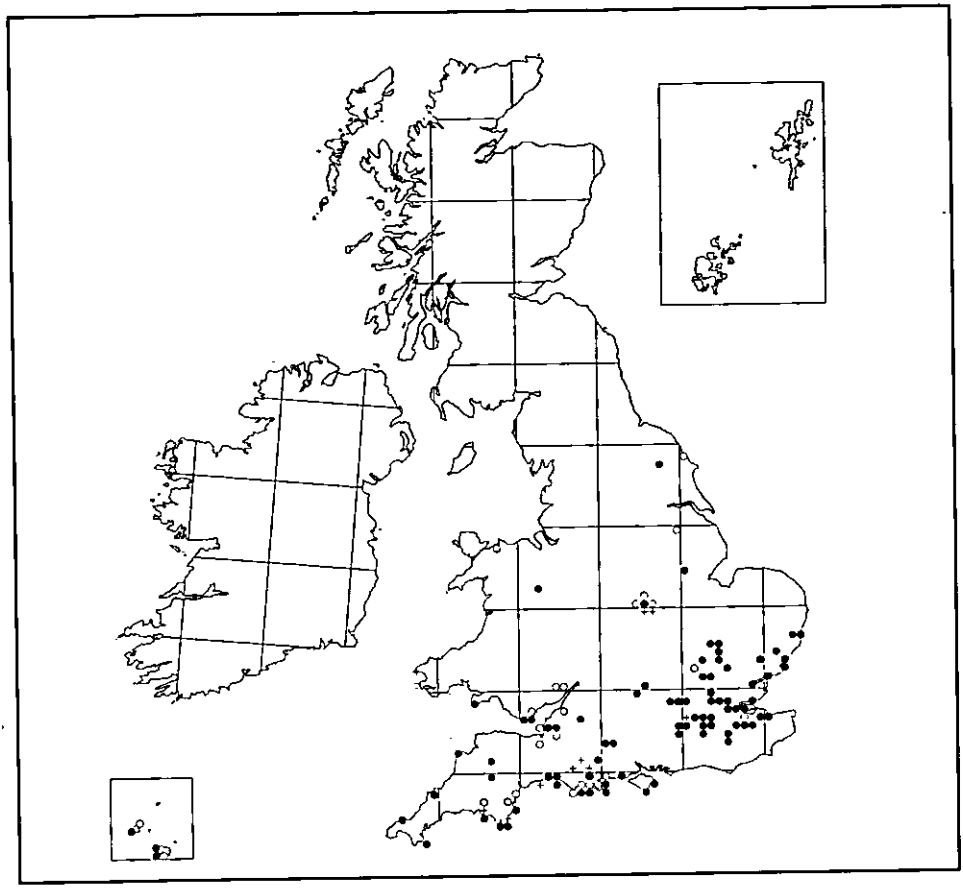
A cleptoparasite of *Anthophora plumipes* (see p.96) (e.g. Hallett 1928; Lith 1947). It has also been observed inspecting and entering the nest burrows of *A. retusa* (Smith 1845b; Morice 1901; G M Spooner, pers. comm.). The winter is spent as a newly eclosed adult in the sealed cell of the host (Hallett 1928).

### Flowers visited

Apple, cabbage, cherry, ground-ivy, kidney vetch, rosemary, wallflower (and some other crucifers).

### Parasites

None recorded.



***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 335 *Melecta luctuosa* (Scopoli, 1770)

**[Apidae: Apinae]**

### Distribution

Formerly widely distributed in south-east England. It has not been found in Ireland or the Channel Islands. However, there has been no confirmed British record of this species for at least ninety years (New Forest, South Hants, 1912) and it seems very likely that the bee is now extinct in this country. Its demise was possibly a result of the rapid decline in Britain of its sole known host species (*Anthophora retusa*; see p.100), though the last known record apparently pre-dated this event.

Widely distributed in Eurasia, from Scandinavia to Spain, eastwards to Iran; possibly present in North Africa (Lieftinck 1980).

### Status (in Britain only)

Listed as Endangered (RDB1) by Else & Spooner (in Shirt 1987) and by Falk (1991).

### Habitat

In the New Forest, South Hants, Nevinson (1902) found it flying along the banks of rides and remarked that it was curiously difficult to see. It would clearly have shared the same habitat of its host species.

### Flight period

Univoltine; late April to June or July.

### Pollen collected

This species does not collect pollen.

### Nesting biology

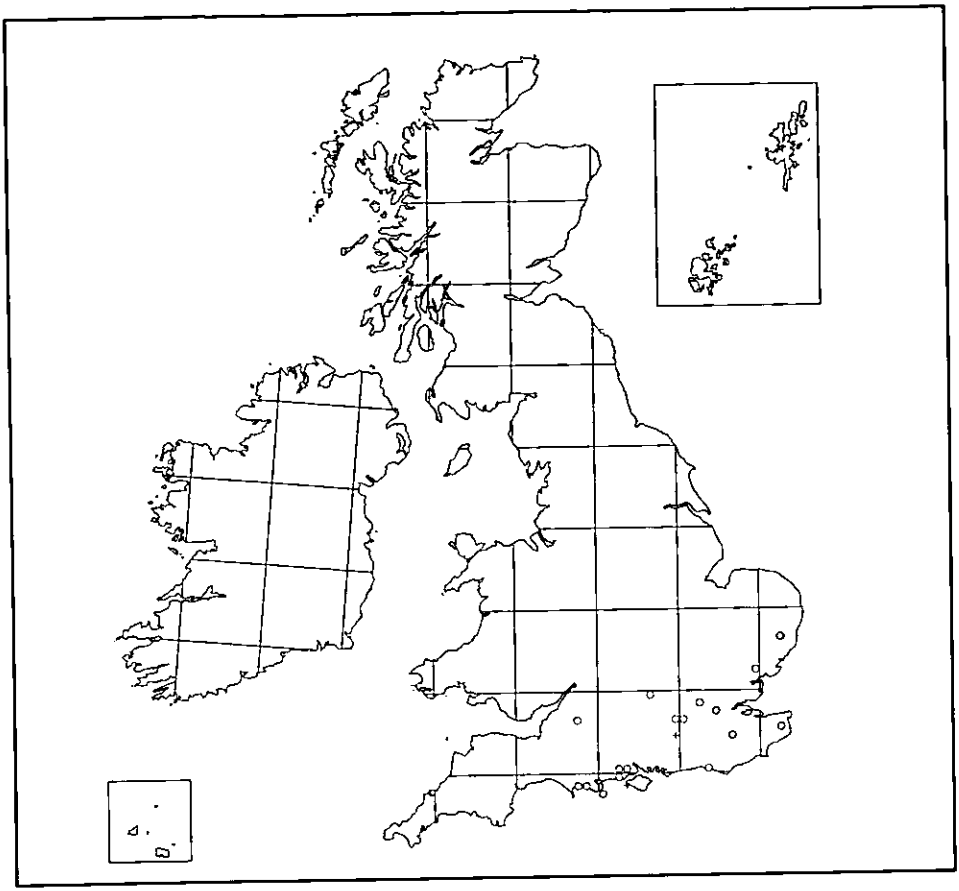
A cleptoparasite of *Anthophora retusa* (e.g. Saunders 1896; Giordani Soika 1936; Lieftinck 1980). In Venice, Italy, Giordani Soika (1936) observed a female *M. luctuosa* breaking into a sealed cell of *A. retusa*. The egg of the cleptoparasite was laid on the provision, close to the young larva of the host species.

### Flowers visited

Hound's-tongue is the only British record (Nevinson 1902). In the Netherlands it visits cat-mint, common gromwell and white dead-nettle (Lieftinck 1980).

### Parasites

None recorded.



***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 336 *Nomada fabriciana* (Linnaeus, 1767)

**[Apidae: Apinae]**

Females are easily identified by their reddish antennae with several of the intermediate segments being black. This banded appearance is visible in the field. It is also the only *Nomada* species which, in the British Isles, has (in both sexes) a combination of bidentate mandibles and a black labrum; the gaster is mainly reddish.

### Distribution

Widely distributed in England and Wales (especially so in the south), sporadic in Scotland and Ireland (possibly more widespread in Ireland than the few records suggest (Stelfox 1927)). It is known too from the Isle of Man and the Channel Islands. As might be expected, this range closely mirrors that of one of its common host species, *Andrena bicolor* (see map p. 61).

The species occurs throughout much of central and southern Europe, with records from as far south as Corsica and east to Turkey.

### Status (in Britain only)

This species is not regarded as being scarce or threatened.

### Habitat

To be expected wherever its *Andrena* host species are well established.

### Flight period

Bivoltine, from March to June, and June to August. In Ireland, Stelfox (1927) did not detect a second brood.

### Pollen collected

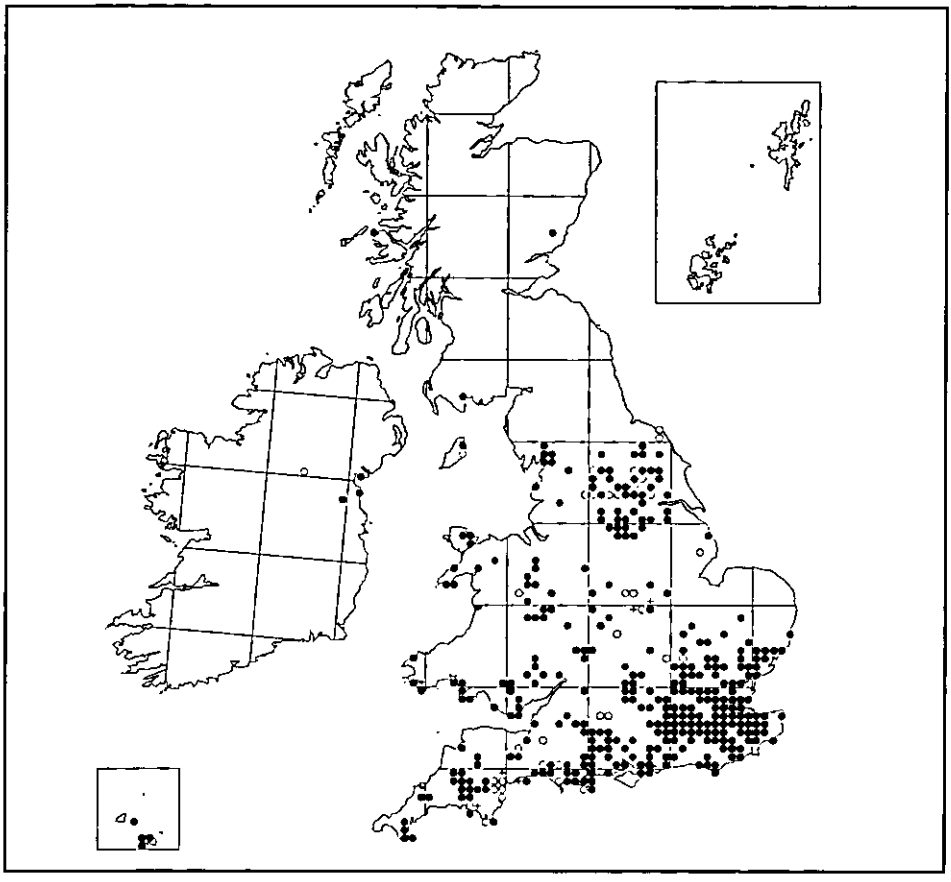
This cleptoparasitic bee does not collect pollen.

### Nesting biology

A cleptoparasite of, apparently, several *Andrena* species (confirmation of these species being hosts is required): *A. bicolor* (Perkins 1919, 1924a, 1924b; Hallett 1928, 1956; Spooner 1931; Yarrow 1941; Chambers 1949); *A. nigroaenea* (Perkins 1919, 1924a, Spooner 1931, Richards 1979); *A. angustior* (Perkins 1919, 1924a; Richards 1979); *A. flavipes* (Chambers 1949); *A. varians* (Chambers 1949) and *A. chrysosceles* (Yarrow 1941). Specimens of the *Nomada* vary greatly in size, no doubt a reflection of the different host species utilized. The largest individuals may develop in the nests of *A. nigroaenea*.

### Flowers visited

Species include; bogbean, dandelion, daisy, ragwort, scabious, speedwell, spurge, stitchwort, strawberry and willow.



**Parasites**
None known.

***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 337 *Nomada rufipes* Fabricius, 1793

**[Apidae: Apinae]**

This is a medium-sized cleptoparasitic bee which is yellow and black, although some females may be red, yellow and black. The bees can be very obvious on some heathland sites, being more readily found than its hosts (bees of the *Andrena denticulata* group).

**Distribution**
Widely distributed in England and Wales, although more common in the south.
It is local in Europe, where it is considered to be a northern species which becomes scare towards the south of Europe. As with two of its most frequent host species, *A. denticulata* and *A. fuscipes*, there is concern over the status of this bee in Germany, it being accorded Red List 3, Endangered, status.

**Status (in Britain only)**
This bee is not regarded as being scarce or threatened.

**Habitat**
As its hosts have a wide range of habitat types in which they may occur, so *N. rufipes* is found in a similarly wide range of habitats. However, it is most frequently found on heathlands.

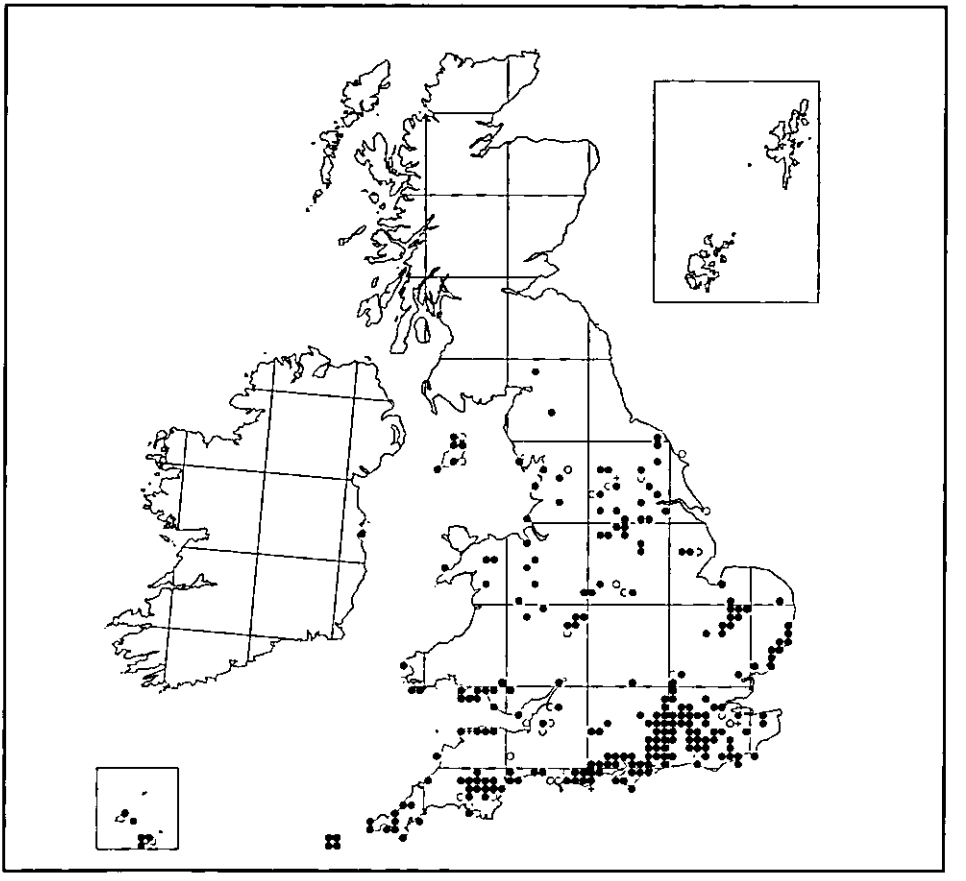
**Flight period**
Univoltine: July to September

**Pollen collected**
This is a cleptoparasitic bee and does not collect its own pollen.

**Nesting biology**
The female bee lays her eggs in provisioned cells inside the underground nests of its hosts, which are bees of the *Andrena denticulata* group, and probably *A. nitidiuscula* (S P M Roberts, pers. comm.).

**Flowers visited**
Ragwort and heathers are very frequently visited, although *N. rufipes* may be found at a much wider range of flowers than this.

**Parasites**
None known.



***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 338 *Nomada sexfasciata* Panzer, 1799

**[Apidae: Apinae]**

### Distribution

South Devon; formerly recorded from a number of counties in southern England. Not found in Ireland.

Widely distributed in southern and central Europe, becoming scarcer in the north.

### Status (in Britain only)

Endangered (RDB1) in Britain (Else & Spooner in Shirt 1987). Also given as an RDB1 species by Falk (1991).

The species is currently known from only a single coastal site in south Devon. There were no British records of this very large *Nomada* from about 1925 until 1975, in which year G M Spooner recorded the species from this site, flying within the nesting areas of *Eucera longicornis*. The population there of *N. sexfasciata* is small and apparently stable. It occurs along much of the cliffs in this locality (A Stubbs, pers. comm.).

### Habitat

Shares the same habitats of its hosts, *E. longicornis* (see p. 102) and, perhaps formerly, *E. nigrescens* (see p. 104) (this association is known on mainland Europe but has not been reported from Britain).

### Flight period

Univoltine, late May to mid July, rarely August.

### Pollen collected

This is a cleptoparasitic species, so no pollen is collected.

### Nesting biology

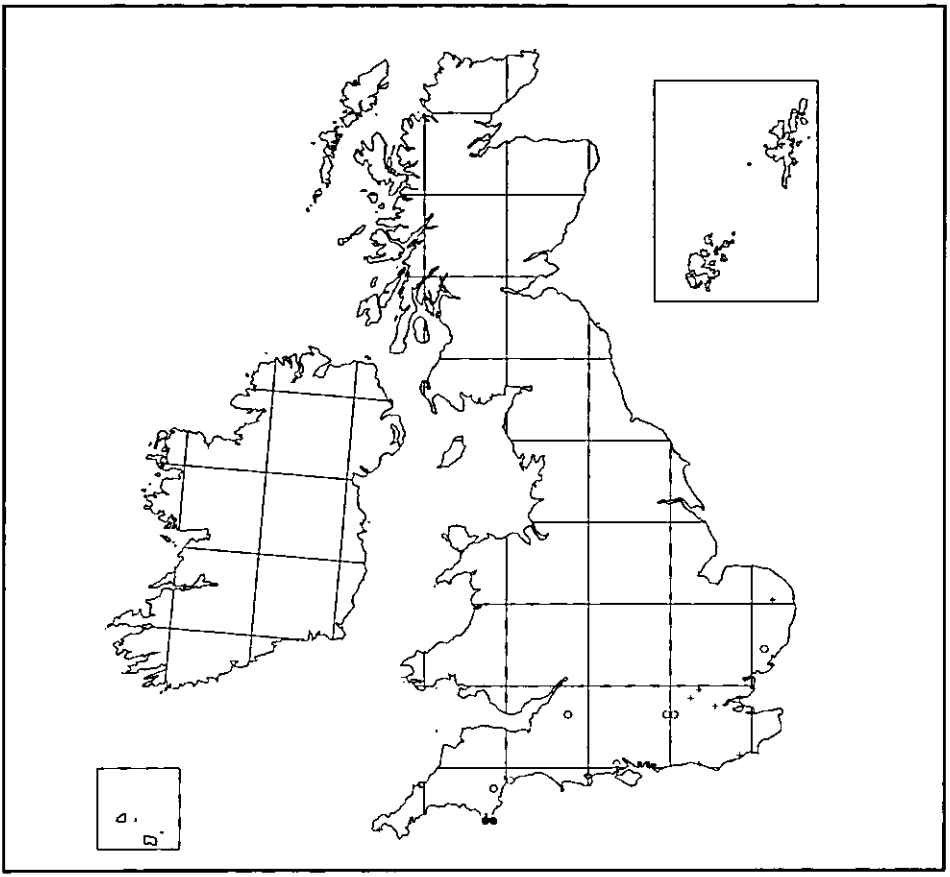
A cleptoparasite of *E. longicornis* and *E. nigrescens* (Stöckhert 1933; Westrich 1989), though only the former species is a known host bee in Britain, the *Nomada* having been found inside a cell of this *Eucera* (Smith 1843).

### Flowers visited

In Britain, the species has been observed visiting bloody crane's-bill and sow-thistle (G M Spooner, pers. comm.), and kidney vetch (S P M Roberts, pers. comm.).

### Parasites

None recorded.



***Map compiled by:*** G R Else and S P M Roberts.
***Author of profile:*** G R Else.

## Map 339 *Bombus jonellus* (Kirby, 1802)

**[Apidae: Apinae]**

Keys and general biology are found in Sladen (1912), Free & Butler (1959), Alford (1975) and Prŷs-Jones & Corbet (1991). A rather small yellow, black and white-banded bumblebee which is either expanding into habitats it was not previously found in, or has been overlooked in these areas in the past. Whilst it undoubtedly does very well on heathlands and moorlands and may be very frequent here, it is also found in calcareous grasslands, such as Salisbury Plain, coastal dunes and suburban gardens. There is a form known from the Outer Hebrides where the normally white tail is bright orange, making it look very much like *B. pratorum*.

### Distribution

This species is distributed widely throughout the entire area covered by this Atlas, although it is absent from the Channel Islands.

It is widespread and often common in Europe; middle and northern latitudes of Asia, eastwards to Kamchatka (Løken 1973).

### Status (In Britain only)

This bee is not regarded as being scarce or threatened.

### Habitat

Although it has always been considered strongly associated with heathland and moorland, it does occur in a wide variety of other habitats, although it is usually less frequent in these.

### Flight period

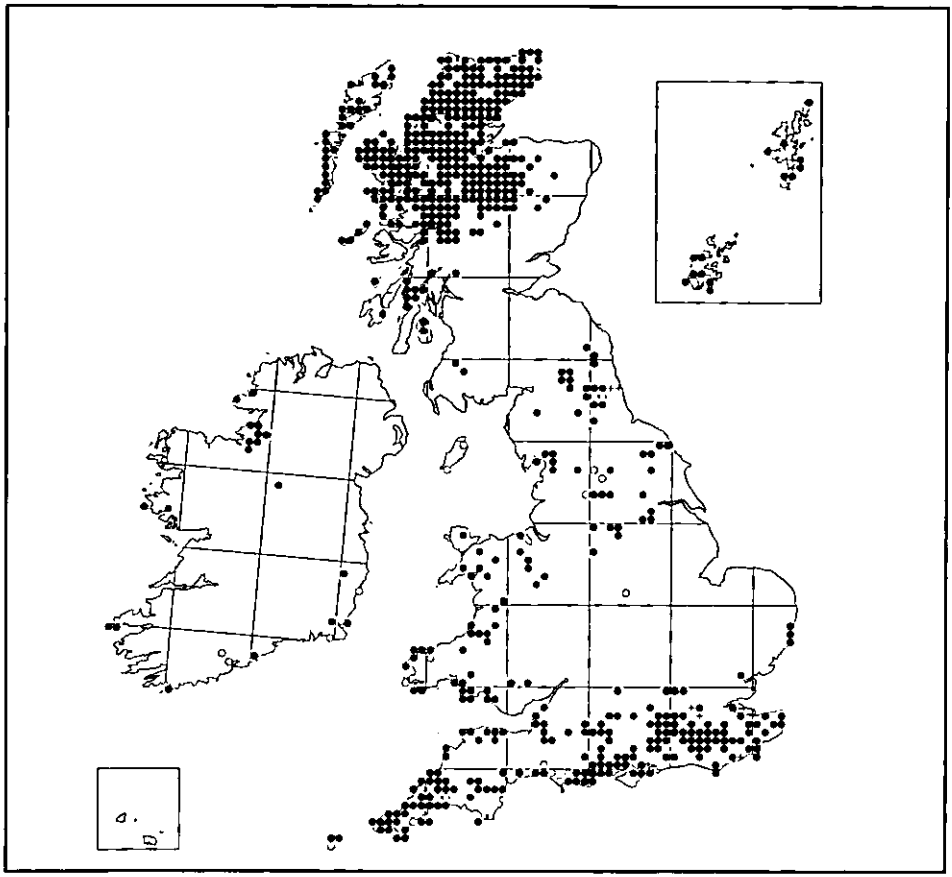
In southern lowland areas *B. jonellus* is often bivoltine, with first-generation queens searching for nest sites in March, and males and new females are produced in May. These queens may either enter hibernation or found new nests in June. These nests produce their sexuals in late August or September. In northern and upland areas nests are not founded until June, with males in late August and September. Workers may therefore be found between April and September in southern and lowland areas, but only between July and September in northern or upland areas.

### Pollen collected

Widely polylectic.

### Nesting biology

This species nests in a variety of situations, including roof-spaces; old birds' nests (usually in holes); moss and leaf-litter on the surface of the soil and underground in old mouse or vole nests. The nest is small, usually with fewer than 50 workers.



**Flowers visited**
Visits are made to a very wide variety of flowers, both for pollen and nectar.

**Parasites**
The cuckoo bumblebee *Bombus sylvestris* attacks nests of this species (see p. 126).

***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 340 *Bombus pratorum* (Linnaeus, 1761)

**[Apidae: Apinae]**

Keys and general biology are found in Sladen (1912), Free & Butler (1959), Alford (1975) and Prŷs-Jones & Corbet (1991). A rather small yellow and black-banded bumblebee with an orange tail. It is a frequent visitor to the flowers of soft fruit, making it an important pollinator of these.

### Distribution

It is found throughout Great Britain and in two widely separated areas in Ireland, although it is absent from the Western and Northern Isles of Scotland.

It is widespread in Europe; middle and northern latitudes of Asia, eastwards to northern Mongolia (Løken, 1973).

### Status (in Britain only)

This bee is not regarded as being scarce or threatened.

### Habitat

*B. pratorum* is strongly associated with gardens and woodland habitats. Although it may also occur on open grasslands, heath and moorland it is much less frequent there.

### Flight period

Bivoltine in the south, with a smaller late-summer generation; univoltine towards the north. Nest-searching queens are among the first species to emerge throughout its range, being present from March to May, according to latitude. The males are similarly early to emerge, often being seen by the end of May or June.

### Pollen collected

Polylectic. The flowers of rosaceous plants such as blackthorn, bramble and raspberry are especially popular. Queens are often seen at rhododendron flowers in gardens.

### Nesting biology

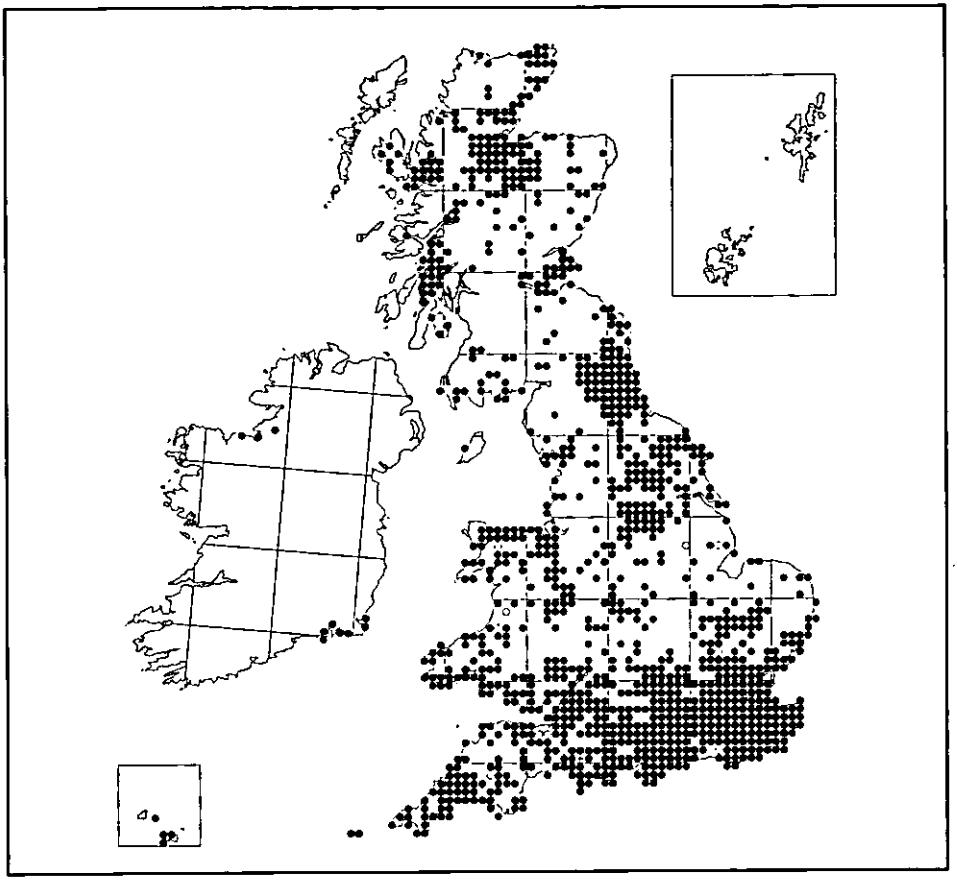
This species nests underground in old mouse or vole nests, or in old bird nests, especially if these are in holes in trees - or even bird-boxes. The nest is rather small, usually with fewer than 100 workers.

### Flowers visited

Visits are made to a variety of flowers, both for pollen and nectar.

### Parasites

The cuckoo-bee *Bombus sylvestris* is well-known as attacking this species (see p. 126). *Syntretus splendidus* (Hym., Braconidae) is an endoparasitoid of adults of this and various other *Bombus* species (Alford 1968).



***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 341 *Bombus soroeensis* (Fabricius, 1776)

**[Apidae: Apinae]**

Keys and general biology are found in Sladen (1912), Free & Butler (1959), Alford (1975) and Prŷs-Jones & Corbet (1991). A rather small yellow, black and white-banded bumblebee which can be rather difficult to distinguish from the very common *Bombus lucorum*. Although much is made in the literature of a centrally broken yellow band on the second segment of the abdomen, this is probably the worst field character to distinguish this species, being hard to discern with the naked eye. Even then one must be sure that the break is due to black hairs, not loss of yellow ones! Apart from its rather smaller size than *B. lucorum*, there are two characters which should alert one to the possibility of *B. soroeensis*. The yellow abdominal band on the second tergite often curves round onto the sides of the first and the tail is often suffused with a peachy colouring. However, neither of these characters is completely constant and then the only option is to look at the grooves on the mandible of females and the genitalia of males.

### Distribution

Much of England, Wales and Scotland. It is restricted to extensive areas of late-flowering grasslands and moorland. However, it appears to be absent from the dry heaths of south-eastern England and has disappeared from much of southern and eastern England. There are recent records from the Dungeness area, where it had been previously unrecorded.

It is widespread in Europe, and in middle and northern latitudes of Asia, eastwards to northern Mongolia (Løken 1973).

### Status (in Britain only)

This bee is not regarded as being scarce or threatened. However, modern research suggests that its status is in need of review.

### Habitat

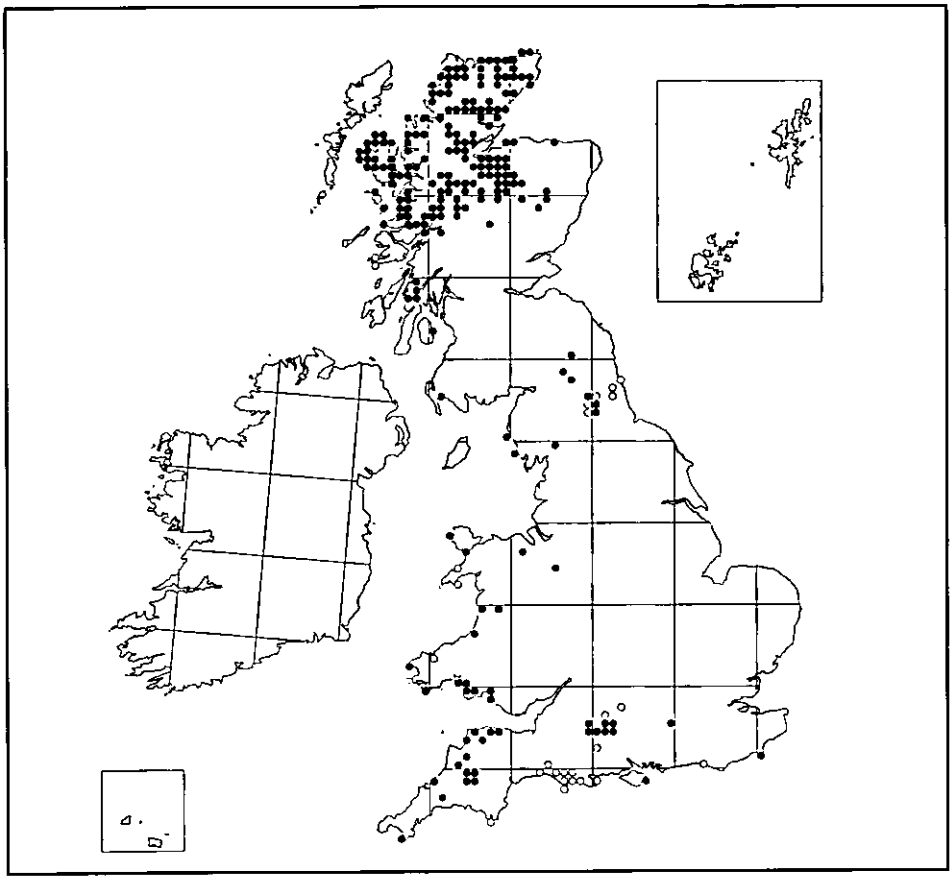
Although it has always been considered strongly associated with extensive moorland in the north and west of the Atlas area, it does occur in a variety of other habitats, including the extensive calcareous grasslands of Salisbury Plain.

### Flight period

Univoltine. Nest searching queens are among the last species to emerge throughout its range, being present in June to August, according to latitude. The males, are similarly late to emerge, often not being seen until September and October.

### Pollen collected

Polylectic. It is very fond of the smaller-flowered legumes, such as the melilots; but also visits bellflowers and devil's-bit scabious.



**Nesting biology**
This species nests underground in old mouse or vole nests. The nest is rather small, usually with fewer than 100 workers.

**Flowers visited**
Visits are made to a variety of flowers, both for pollen and nectar.

**Parasites**
No cuckoo-bee is known to attack this species in the Atlas area.

***Map compiled by:*** M Edwards & S P M Roberts.
***Author of profile:*** M Edwards.

## Map 342 *Bombus barbutellus* (Kirby, 1802)

**[Apidae: Apinae]**

Keys and general biology are found in Sladen (1912), Free & Butler (1959), Alford (1975) and Prŷs-Jones & Corbet (1991). Until recently this species was known as *Psithyrus barbutellus*, but *Psithyrus* has now been reduced to a sub-genus within *Bombus*. It bears a close resemblance to its host, *Bombus hortorum*, but has an almost circular face, most unlike the very elongated one of *B. hortorum*.

### Distribution

This species is distributed widely throughout England, but is absent from most of Scotland and Ireland. It is rarely common.

It is widespread in Europe; middle and northern latitudes of Asia, and eastwards to Mongolia (Løken 1973).

### Status (In Britain only)

This bee is not regarded as being scarce or threatened.

### Habitat

This cuckoo-bee occurs in a wide variety of habitats.

### Flight period

Over-wintered females can be found from late April onwards, males and new females in July to September.

### Pollen collected

As this bee is parasitic it does not collect pollen, although females eat pollen in order to develop their ovaries. Foraging for pollen for the nest is carried out by the host workers.

### Nesting biology

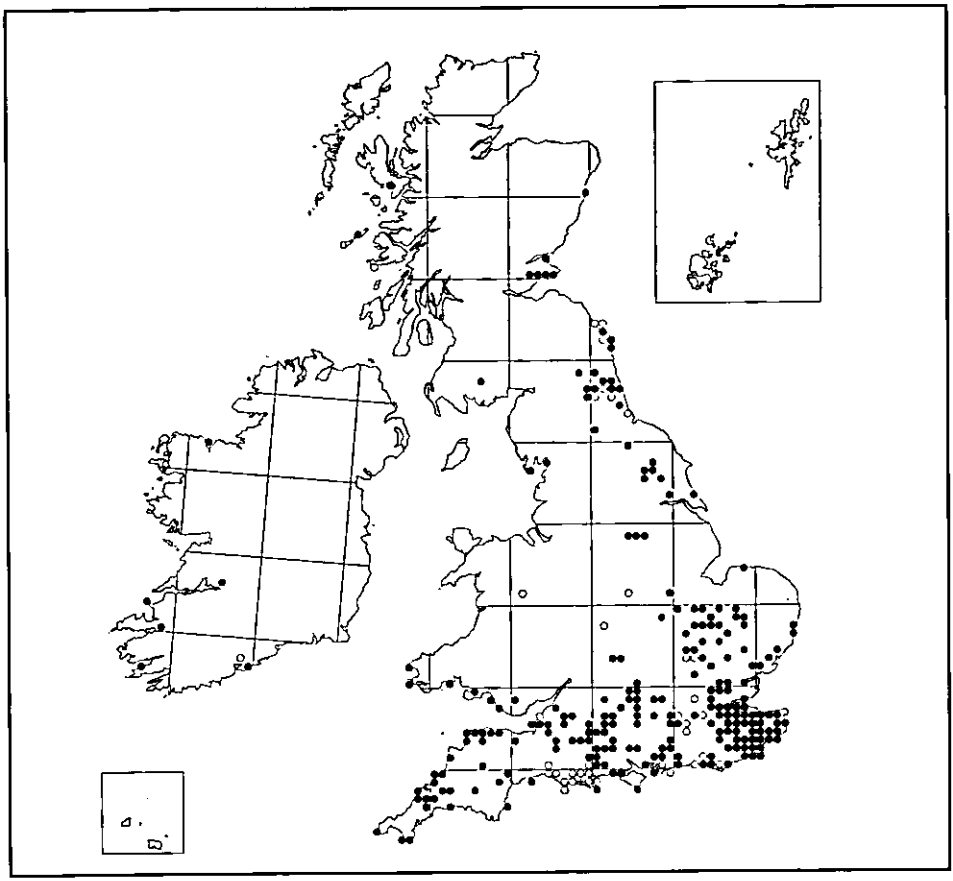
During spring the over wintered, fertilised female *B. barbutellus* searches for a small nest of the host bumblebee, *B. hortorum*. It enters the nest and eventually dominates, or kills the host queen. The parasite female then lays eggs which will develop into either males or females of *B. barbutellus*. All foraging and nest duties are carried out by the host workers. It is likely that this species will also attack *B. ruderatus*.

### Flowers visited

Visits are made to a wide variety of flowers.

### Parasites

None specifically recorded in Britain or Ireland.



***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 343 *Bombus campestris* (Panzer, 1800)

**[Apidae: Apinae]**

Keys and general biology are found in Sladen (1912), Free & Butler (1959), Alford (1975) and Prŷs-Jones & Corbet (1991). Until recently this species was known as *Psithyrus campestris*, but *Psithyrus* has now been reduced to a sub-genus within *Bombus*.

A very variable species, colours ranging from forms which are all-black to those where the black is broken by two yellow stripes on the thorax and a yellowish tail. This is a cuckoo-bumblebee which is well-known to usurp the nests of *Bombus pascuorum* and has been recorded in nests of *B. humilis* as well. It is likely that it will attack all the carder bumblebees (*B. humilis, B. muscorum, B. pascuorum, B. ruderarius* and *B. sylvarum*).

### Distribution

This species is distributed widely throughout almost the entire area covered by this Atlas. It is not currently recorded in the far north of the Highland Region of Scotland or the Channel Islands

It is widespread and often common in Europe; middle and northern latitudes of Asia, eastwards to Kamchatka (Løken 1973).

### Status (In Britain only)

The bee is not regarded as being scarce or threatened.

### Habitat

This cuckoo-bee occurs in a wide variety of habitats.

### Flight period

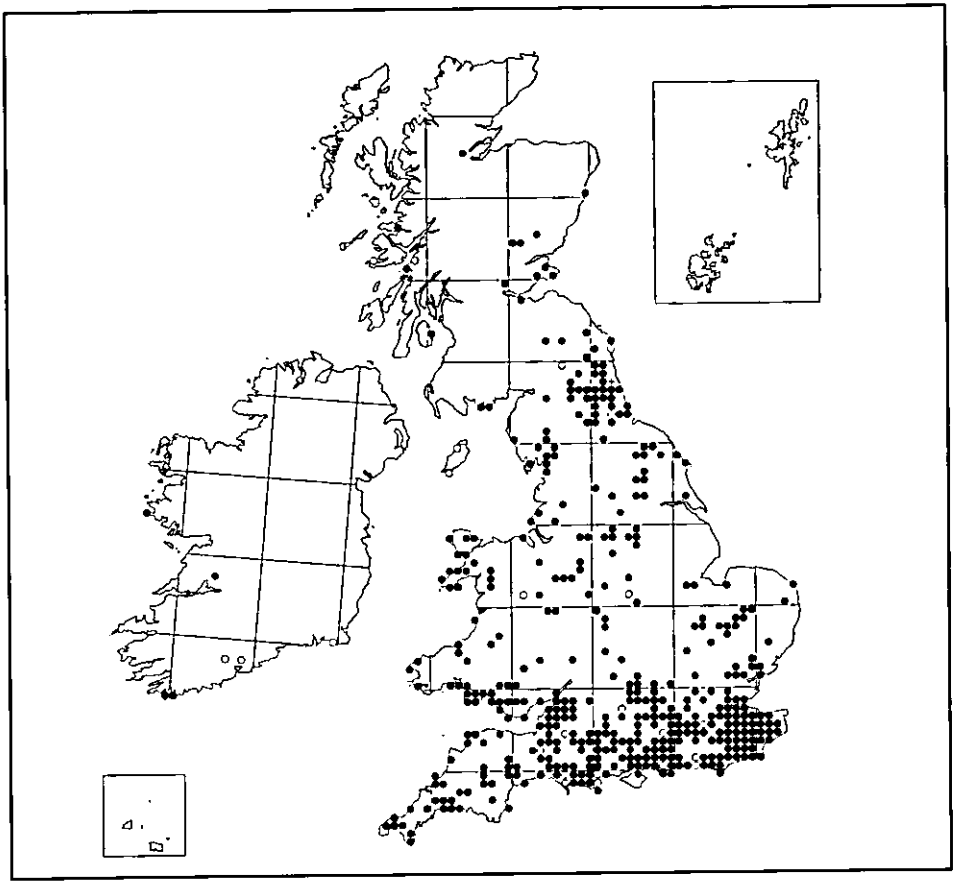
Over-wintered females can be found from late April onwards, males and new females in July to September.

### Pollen collected

As this bee is parasitic it does not collect pollen, although females eat pollen in order to develop their ovaries. Foraging for pollen for the nest is carried out by the host workers.

### Nesting biology

During spring the overwintered and fertilised female *B. campestris* searches for a small nest of a suitable host bumblebee, most commonly *B. pascuorum*. It enters the nest and eventually dominates, or kills the host queen. The parasite female then lays eggs which will develop into either males or females of *B. campestris*. All foraging and nest duties are carried out by the host workers.



**Flowers visited**
Visits are made to a very wide variety of flowers.

**Parasites**
None specifically recorded in Britain or Ireland.

***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

## Map 344 *Bombus sylvestris* (Lepeletier, 1833)

**[Apidae: Apinae]**

Keys and general biology are found in Sladen (1912), Free & Butler (1959), Alford (1975) and Prŷs-Jones & Corbet (1991). Until recently this species was known as *Psithyrus sylvestris*, but *Psithyrus* has now been reduced to a sub-genus within *Bombus*. The bee bears little clear resemblance to any of its probable host species in the *Bombus pratorum* group.

### Distribution

This species is distributed widely throughout most of the area covered by this Atlas, but is rarely common. Apparently now absent from Ireland.

It is widespread in Europe; middle and northern latitudes of Asia, eastwards to Kamchatka and Korea (Løken 1973).

### Status (In Britain only)

This bee is not regarded as being scarce or threatened.

### Habitat

This cuckoo-bee occurs in a wide variety of habitats.

### Flight period

Over-wintered females can be found from late March onwards, males and new females in July to September. It is probable that this species has two generations in areas where its major host, *Bombus pratorum*, is bivoltine.

### Pollen collected

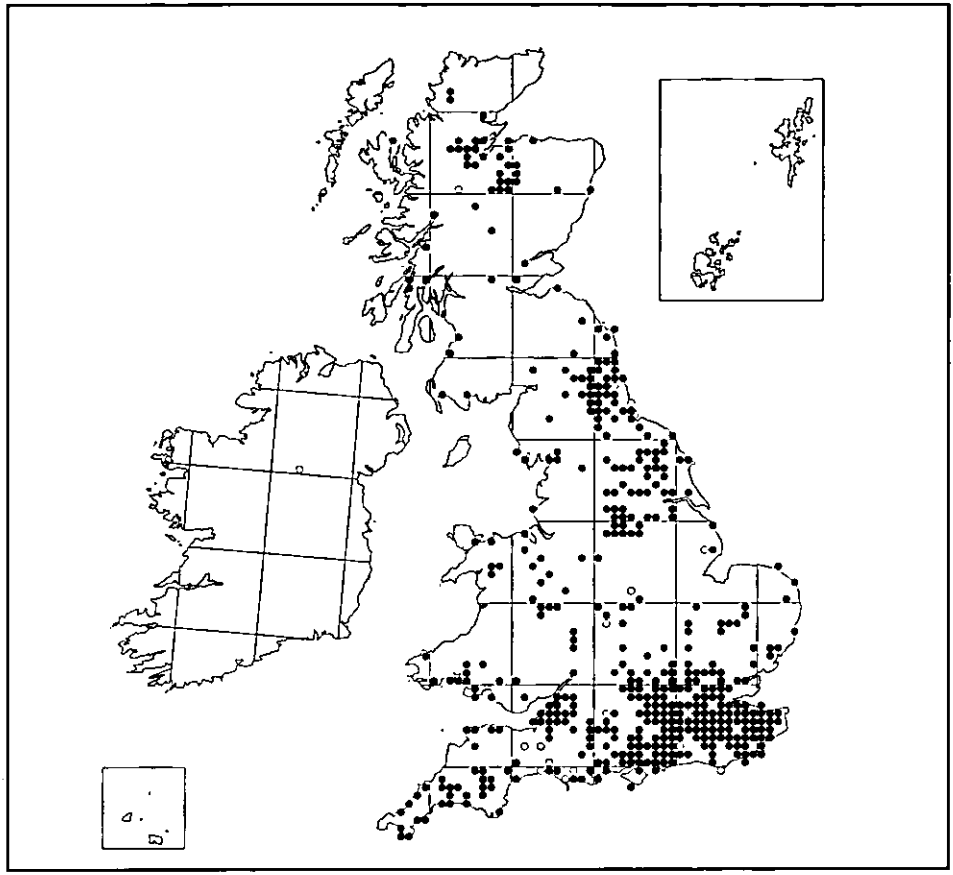
As this bee is parasitic it does not collect pollen, although females eat pollen in order to develop their ovaries. Foraging for pollen for the nest is carried out by the host workers.

### Nesting biology

During spring the over-wintered and fertilised female *B. sylvestris* searches for a small nest of the host bumblebee, *B. pratorum*. It enters the nest and eventually dominates or kills the host queen. The parasite female then lays eggs which will develop into either males or females of *B. sylvestris*. All foraging and nest duties are carried out by the host workers. It is likely that this species will also attack other species in the *B. pratorum* group, e.g. *B. jonellus* and *B. monticola*.

### Flowers visited

Visits are made to a wide variety of flowers.



**Parasites**
None specifically recorded in Britain or Ireland.

***Map compiled by:*** M Edwards and S P M Roberts.
***Author of profile:*** M Edwards.

# *BIBLIOGRAPHY*

**Abrahamsen, S.E.** 1950. Gravehvepsen Crabro Lindenius panzeri v.d.Lind. Redekolonier fundet I Danmark. *Flora og Fauna*, **56**, 125-130.

**Alford, D.V.** 1968. The biology and immature stages of *Syntretus splendidus* (Marshall) (Hymenoptera: Braconidae), a parasite of adult bumblebees. *Transactions of the Royal Entomological Society of London*, **120**, 375-393.

**Alford, D.V.** 1975. *Bumblebees*. London: Davis-Poynter.

**Allen, G.W.** 1987. *Stigmus pendulus* Panzer (Hymenoptera: Sphecidae) new to Britain. *Entomologist's Gazette*, **38**, 214.

**Baker, D.B.** 1964. Two bees new to Britain (Hym., Apoidea). *Entomologist's Monthly Magazine*, **100**, 279-286.

**Baugnée, J-Y.** 2002. Nouvelles observations de *Plagiolepis vindobonensis* Lomnicki, 1925, en Belgique (Hymenoptera Formicidae). *Bulletin Société Royale Belge d'Entomologie*, **138**, 133-134.

**Blacker, N.C. & Collingwood, C.A.** 2002. Some significant new records of ants (Hymenoptera: Formicidae) from the Salisbury area, South Wiltshire, England, with a key to the British species of Lasius. *British Journal of Entomology and Natural History*, **15**, 25-46.

**Bolton, B.** 2003. Synopsis and classification of Formicidae. *Memoirs of the American Entomological Institute*, **71**, 1-370.

**Bolton, B. & Collingwood, C.A.** 1975. *Hymenoptera: Formicidae*. Handbooks for the Identification of British Insects, 6, Part 3c. London: Royal Entomological Society.

**Bond, D.A. & Kirby, E.J.M.** 1999. *Anthophora plumipes* (Hymenoptera: Anthophoridae) as a pollinator of broad bean (*Vicia faba major*). *Journal of Apicultural Research*, **38**, 199-203.

**Buschinger, A.** 2003. Mating behaviour in the ant, *Myrmecina graminicola* (Myrmicinae). *Insectes Sociaux*, **50**, 295-296.

**Buschinger, A. & Schreiber, M.** 2002. Queen polymorphism and queen-morph related facultative polygyny in the ant, *Mymecina graminicola* (Hymenoptera, Formicidae). *Insectes Sociaux*, **49**, 344-353.

**BWARS.** 2005. *Bees, Wasps and Ants Recording Society. Members' Handbook*. Centre for Ecology & Hydrology. 158pp.

**Chambers, V.H.** 1949. The Hymenoptera Aculeata of Bedfordshire. *Transactions of the Society for British Entomology*, **9**, 197-252.

**Chambers, V.H.** 1968. Pollens collected by species of Andrena (Hymenoptera: Apidae). *Proceedings of the Royal Entomological Society of London*, (A), **43**, 155-160.

**Chapman, T.A.** 1878. On the economy etc., of *Bombylius*. *Entomologist's Monthly Magazine* **14**, 196-200.

**Collingwood, C.A.** 1979. The Formicidae (Hymenoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica*, **8**. Klampenborg, Denmark: Scandinavian Science Press Ltd.

**Czechowski, W., Radchenko, A. & Czechowska, W.** 2002. *The Ants (Hymenoptera, Formicidae) of Poland*. Warsaw: Museum and Institute of Zoology PAS.

**Danks, H.V.** 1971. Biology of some stem-nesting aculeate Hymenoptera. *Transactions of the Royal Entomological Society of London,* **122**, 323-399.
**Day, M.C.** 1988. *Spider Wasps (Hymenoptera: Pompilidae).* Handbooks for the Identification of British Insects, 6, Part 4. London: Royal Entomological Society.
**Donisthorpe, H.St.J.K.** 1927. *British Ants: Their Life-history and Classification.* 2nd edition. London: George Routledge and Sons Ltd.
**Edwards, R., ed.** 1997. *Provisional Atlas of the aculeate Hymenoptera of Britain and Ireland. Part 1.* Huntingdon: Biological Records Centre.
**Edwards, R., ed.** 1998. *Provisional Atlas of the aculeate Hymenoptera of Britain and Ireland. Part 2.* Huntingdon: Biological Records Centre.
**Edwards, R. & Telfer, M.G., eds.** 2001. *Provisional Atlas of the aculeate Hymenoptera of Britain and Ireland. Part 3.* Huntingdon: Biological Records Centre.
**Edwards, R. & Telfer, M.G., eds.** 2002. *Provisional Atlas of the aculeate Hymenoptera of Britain and Ireland. Part 4.* Huntingdon: Biological Records Centre.
**Edwards, R. & Broad, G., eds.** 2005. *Provisional Atlas of the aculeate Hymenoptera of Britain and Ireland. Part 5.* Huntingdon: Biological Records Centre.
**Fahringer, J.** 1922. Hymenopterologische Ergebnisse einer wissenschaftlichen Studienreise nach der Turkei und Kleinasien (mit Ausschluss des Amanusgebirges). *Archiv für Naturgeschichte,* **88** A, Heft 9, 149-222.
**Falk, S.J.** 1991. *A review of the scarce and threatened bees, wasps and ants of Great Britain.* Research and Survey in Nature Conservation, no. 35, Peterborough: Nature Conservancy Council.
**Felton, J.C.** 1965. Reports of recorders, Hymenoptera. *The Bulletin of the Kent Field Club,* **10**, 6.
**Fitton, M.G., Shaw, M.R. & Gauld, I.D.** 1988. *Pimpline ichneumon-flies.* Hymenoptera, Ichneumonidae (Pimplinae). Handbooks for the Identification of British Insects, 7, Part 1. London: Royal Entomological Society.
**Foitzik, S., Haberl, M., Gadau, J. & Heinze, J.** 1997. Mating frequency of *Leptothorax nylanderi* ant queens determined by microsatellite analysis. *Insectes Sociaux,* **44**, 219-227.
**Foitzik, S. & Heinze, J.** 1998. Nest site limitation and colony takover in the ant *Leptothorax nylanderi. Behavioural Ecology,* **9**, 367-375.
**Free, J.B. & Butler, C.G.** 1959. *Bumblebees.* London: Collins.
**Giordani Soika, A.G.** 1936. Etologia e larva primaria di *Melecta luctuosa* Scop. (Hym. Apidae). *Bollettino della Societá Entomologica Italiana,* **68**, 47-48.
**Grace, A. & Yates, B.J.** 1989. *The Aculeate Hymenoptera of Rye Bay.* East Sussex County Council.
**Hallett, H.M.** 1928. The Hymenoptera Aculeata of Glamorgan. *Transactions of the Cardiff Naturalists' Society,* **60**, 33-67.
**Hallett, H.M.** 1956. Hymenoptera Aculeata in Monmouthshire. *Transactions of the Cardiff Naturalists' Society,* **83**, 18-21.
**Heide, A. van der.** 1992. Zur Bionomie von *Lasioglossum (Evylaeus) fratellum* (Perez), einer Furchenbiene mit langlebigen Weibchen (Hymenoptera, Halictinae). *Drosera (Oldenburg),* 1992 (2), 171-188.

**Heinze, J., Puchinger, W. & Hölldobler, B.** 1997. Worker reproduction and social hierarchies in *Leptothorax* ants. *Animal Behaviour*, **54**, 849-864.
**Hölldobler, B. & Wilson, E. O.** 1990. *The Ants.* Berlin: Springer-Verlag.
**Jones, R.A.** 2004. Green deserts? The invertebrate fauna of mown grass playing fields. *British Journal of Entomology and Natural History*, **17**, 39-44.
**Kocourek, M.** 1966. Prodromus der Hymenopteren der Tschechoslowakei. Part 9: Apoidea, 1. *Acta Faunistica Entomologica Musei Nationalis Prague*, **12** (Supplement), 1-122.
**Kullenberg, B., Buel, H. & Tkalcu, B.** 1984. Übersicht von Beobachtungen über Besuche von *Eucera*- und *Tetralonia*- Männchen auf *Ophrys*-Blüten (Orchidaceae). *Nova Acta Regiae Societatis Scientiarum Upsaliensis*, Ser. V: c., **3**, 27-40.
**Kunz, P.X.** 1994. Die Goldwespen (Chrysididae) Baden-Württembergs. *Beihefte zu den Veröffentlichungen für Naturschutz und Landschaftspflege in Baden-Württemberg*, **77**, 1-188.
**Lieftinck, M.A.** 1980. Prodrome to a monograph of the Palaearctic species of the genus *Melecta* Latreille 1802 (Hymenoptera, Anthophoridae). *Tijdschrift voor Entomologie*, **123**, 129-349.
**Lith, J.P. van.** 1947. A note on the biology of *Anthophora acervorum* L. (Hym. Apid.). *Entomologische Berichten*, **12**, 197-200.
**Lomholdt, O.** 1984. The Sphecidae (Hymenoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica*, **4**. Second edition. 1-452.
**Løken, A.** 1973. Studies on Scandinavian bumble bees (Hymenoptera, Apidae). *Norsk Entomologisk Tidsskrift*, **20**, 1-218.
**Malyshev, S.J.** 1928. Lebensgeschichte der Anthophora acervorum L. *Zeitschrift für Morphologie und ökologie der Tiere*, **11**, 763-781.
**Malyshev, S.J.** 1936. The nesting habits of solitary bees. *Eos*, **11**, 201-309.
**Morgan, D.** 1984. *Cuckoo Wasps (Hymenoptera, Chrysididae)*. Handbooks for the Identification of British Insects, **6**, Part 1. London: Royal Entomological Society.
**Morice, F.D.** 1901. Hymenopterological notes. *Entomologist's Monthly Magazine*, **37**, 96-98.
**Móczár, M.** 1954. Systematik, Verbreitung und Ökologie der Gattungen Eucera Latr. und *Tetralonia* Spin. (Hym.). *Annales Historico-Naturales Musei Nationalis Hungarici* (New Series), **5**, 367-386.
**Müller, A., Krebs, A. & Amiet, F.** 1997. *Bienen Mitteleuropäische Gattungen, Lebensweise, Beobachtung.* Augsberg: Naturbuch Verlag.
**Nevinson, E.B.** 1902. Hymenoptera Aculeata at Criccieth, Lyndhurst and Newquay. *Entomologist's Monthly Magazine*, **38**, 11.
**Nielsen, E.T.** 1941. Nestbau von *Eucera longicornis* L. *Entomologiske Meddelelser*, **22**, 142-149.
**Nielsen, J.C.** 1902. Biologiske Studier over danske enlige Bier og dares Snyltere. *Videnskabelige Meddeleser fra Dansk Naturhistorisk Forening I Kjøbenhavn*, **1902**, 75-106.
**Noskiewicz, J. & Poluszyski, G.** 1928. Embryologische Untersuchungen an Strepsipteren. 1. Teil. Embryogenesis der Gattung Stylops Kirby. *Bulletin International de l'Académie Polonaise des Sciences et des Lettres. Classe des Sciences Mathétiques et Naturelles. Série B: Sciences Naturelles*, **1927**, 1093-1226.

**Orledge, G.M., Smith, P.A. & David, C.** 2000. *Leptothorax albipennis* (Curtis) and other *Leptothorax* ants in the Channel Islands. *Report and Transactions of La Societé Guernesiaise*, **24**, 862-866.
**Peeters, T.M.J., Raemakers, I.P. & Smit, J.** 1999. *Voorlopige atlas van de Nederlandse bijen (Apidae)*. EIS-Nederland, Leiden.
**Perkins, R.C.L.** 1919. The British species of *Andrena* and *Nomada*. *Transactions of the Entomological Society of London*, **1919**, 218-319.
**Perkins, R.C.L.** 1924a. The aculeate Hymenoptera of Devon. *Transactions of the Devonshire Association for the Advancement of Science, Literature and Art*, (1923), **55**, 188-241.
**Perkins, R.C.L.** 1924b. The aculeate Hymenoptera of Gloucestershire and Somerset. *Proceedings of the Bristol Naturalists' Society*, **6**, 133-160.
**Pesenko, Yu. A., Banaszak, J., Radchenko, V.G. & Cierzniak, T.** 2000. *Bees of the Family Halictidae (excluding Sphecodes) of Poland*. Bydgoszcz.
**Plateaux, L.** 1970. Sur le polymorphisme social de la fourmi *Leptothorax nylanderi* (Förster). I. Morphologie et biologie comparées des castes. *Annales des Sciences Naturelles, Zoologie, Paris, 12e* Série, **12**, 373-478.
**Plateaux, L.** 1978. L'essaimage de quelques fourmis *Leptothorax*: rôles de l'éclairement et de divers autres facteurs. Effet sur l'isolement reproductif et la répartition géographique. (Ire partie). *Annales des Sciences Naturelles, Zoologie, Paris, 12e* Série, **20**: 129-164.
**Plateaux, L.** 1984. L'isolement reproductif chez les Fourmis Leptothorax (Hyménoptères, Myrmicidae). *Revue de la Faculté des Sciences de Tunis*, **3**, 215-234.
**Pontin, J.** 1996. Ant nests, sun and shade - their measurement and significance for invertebrate conservation. *British Wildlife*, **8**, 1-27.
**Prŷs-Jones, O.E. & Corbet, S.A.** 1991. *Bumblebees*. (Naturalists' Handbooks, 6.) Second edition, revised. Slough: Richmond Publishing Co. Ltd.
**Radchenko, A.G.** 1989. Murav'i roda *Plagiolepis* europeiskii chasti SSR. *Zoologicheskii Zhurnal*, **68**, 153-156.
**Radchenko, A. G.** 1996. Murav'i roda *Plagiolepis* tsentral'noi i yuzhhnoi palearktiki. *Entomologicheskoe Obrozrenie*, **75**, 178-187.
**Richards, O.W.** 1949. The evolution of cuckoo bees and wasps. *Proceedings of the Linnean Society of London*, **161**, 40-41.
**Richards, O.W.** 1979. The Hymenoptera Aculeata of the Channel Islands. *Report and Transactions of the Société Guernésiaise*, **20** (1978), 389-424.
**Richards, O.W.** 1980. *Scolioidea, Vespoidea and Sphecoidea*. Hymenoptera, Aculeata. Handbooks for the Identification of British Insects, 6, Part 3(b). London: Royal Entomological Society.
**Richards, O.W. & Hamm, A.H.** 1939. The biology of the British Pompilidae (Hymenoptera). *Transactions of the Society for British Entomology*, **6**, 51-114.
**Saunders, E.** 1896. *The Hymenoptera Aculeata of the British Islands*. London: L. Reeve & Co. Ltd.
**Saunders, E.** 1902. Hymenoptera Aculeata of Jersey, Guernsey, Alderney and St. Briac (Brittany). *Entomologist's Monthly Magazine*, **38**, 140-146.

**Seifert, B.** 1996. *Ameisen: beobachten, bestimmen.* Augsburg: Weltbild Verlag GmbH.
**Shirt, D.B., ed.** 1987. *Insects.* British Red Data Books, 2. Peterborough: Nature Conservancy Council.
**Sladen, F.W.L.** 1895. *Sphecodes rubicundus* and other bees near Dover. *Entomologist's Monthly Magazine*, **31**, 256-258.
**Sladen, F.W.L.** 1912 [1989]. *The humble-bee: its life-history and how to domesticate it, with descriptions of all the British species of Bombus and Psithyrus.* London: Macmillan. [Reprinted by Logaston, Woonton, Herefordshire.]
**Smith, F.** 1843. Notes on the parasites of the genus *Nomada* and on other insects. *Transactions of the Entomological Society of London,* **3**, 293-294.
**Smith, F.** 1845a. Descriptions of the British species of bees belonging to the genera *Anthophora* and *Saropoda* of Latreille; with observations on their economy. *Zoologist*, **3**, 890-896.
**Smith, F.** 1845b. Descriptions of the British species of bees belonging to the genera *Melecta* (Latreille), *Coelioxys* (Latreille), and *Stelis* (Panzer). *Zoologist*, **3**, 1146-1155.
**Smith, F.** 1846. Descriptions of the British species of bees belonging to the genera *Chelostoma, Heriades, Ceratina, Eucera, Panurgus*, and *Anthidium*; with observations on their economy etc. *Zoologist*, 4, 1445-1454.
**Smith, F.** 1876. *Catalogue of British Hymenoptera in the British Museum.* Second edition. 1. Andrenidae and Apidae. London: British Museum.
**Spooner, G.M.** 1931. *The bees, wasps and ants (Hymenoptera, Aculeata) of Cambridgeshire*, Cambridge Natural History Society, Cambridge. 19 pp.
**Spooner, G.M.** 1941. The characters of the female and distribution in Britain of *Pompilus trivialis* Dahlb., *unguicularis* Thoms. and *wesmaeli* Thoms. (Hymenoptera: Pompilidae). *Transactions of the Society for British Entomology,* **7**, 85-122.
**Stace, C.A.** 1997. *New Flora of the British Isles, edn 2.* Cambridge: Cambridge University Press.
**Stelfox, A.W.** 1927. A list of the Hymenoptera Aculeata (*sensu lato*) of Ireland. *Proceedings of the Royal Irish Academy*, **37** (Section B, no. 22), 201-355.
**Stöckhert, F.K.** 1933. Die Bienen Frankens (Hym. Apid.). Eine ökologisch-tiergeographische Untersuchung. *Deutschen Entomologischen Zeitschrift (Beiheft)*, **132**, 1-294.
**Stratz, M., Strehl, C. P. & Heinze, J.** 2002. Behaviour of usurping queens in colonies of the ant species *Leptothorax nylanderi* (Hymenoptera: Formicidae). *Entomologia Generalis*, **26**, 73-84.
**Tsuneki, K.** (1960) Guide to the study of the Japanese Hymenoptera 10.3. Crabroninae 7. Biology of the Japanese species of *Crossocerus. Life Study*, **4** (1).
**Turner, M.A.** 1972. Diptera, recorder G.M. Spooner. In: 24th report of the Entomological Section. *The Devonshire Association for the Advancement of Science, Literature and Art. Report and Transactions*, **104**, 226-228.
**Westrich, P.** 1989. *Die Wildbienen Baden-Württemburgs.* 2. Stuttgart: Eugen Ulmer GmbH & Co.
**Wolf, H.** 1972. Hymenoptera, Pompilidae. *Insecta Helvetica*, **5**, 1-176.

**Wu, Y.R.** 2000. Hymenoptera. Melittidae, Apidae. *Fauna Sinica* (Insecta), **20**.
**Yarrow, I.H.H.** 1941. *Andrena* and *Nomada* (Hymenoptera, Apidae) on Hampstead Heath. *The London Naturalist*, 1940, 9-13.
**Yeo, P.F. & Corbet, S.A.** 1995. *Solitary Wasps* (2nd edn). Naturalists' Handbooks, 3. Slough: Richmond Publishing Co. Ltd.

# *LIST OF PLANT NAMES*

The names of plants have been standardised on the *New flora of the British Isles* (Stace 1997).

Note that in this list, vernacular names of individual species are treated as proper nouns. Collective nouns for genera or other groups of species start with a lower case letter. The old collective term 'umbellifers' is often still used for members of the family now known as the Apiaceae.

| | |
|---|---|
| Alexanders | *Smyrnium olusatrum* |
| angelica | *Angelica* species |
| Apple | *Malus domestica* |
| Aubretia | *Aubrieta deltoidea* |
| azalea | *Rhododendron* species |
| Bastard Balm | *Melittis melissophyllum* |
| bellflowers | *Campanula* species |
| Bellflower, Clustered | *Campanula glomerata* |
| bilberries | *Vaccinium* species |
| Bindweed, Sea | *Calystegia soldanella* |
| birch | *Betula* species |
| Bird's-foot-trefoil, Common | *Lotus corniculatus* |
| Blackthorn | *Prunus spinosa* |
| Bluebell | *Hyacinthoides non-scripta* |
| Bogbean | *Menyanthes trifoliata* |
| Borage | *Borago officinalis* |
| bramble | *Rubus fruticosus* agg. |
| Bryony, White | *Bryonia dioica* |
| Bugle | *Ajuga reptans* |
| burdock | *Arctium* species |
| Butterbur | *Petasites hybridus* |
| buttercup | *Ranunculus* species |
| Butterfly-bush | *Buddleja davidii* |
| cabbages | *Brassica* species |
| carrots | *Daucus* species |
| Carrot, Wild | *Daucus carota* |
| Cat-mint | *Nepeta cataria* |
| cherry | *Prunus* species |
| cinquefoil | *Potentilla* species |
| Clover, Red | *Trifolium pratense* |
| Clover, White | *Trifolium repens* |
| comfrey | *Symphytum* species |
| crane's-bill | *Geranium* species |

| | |
|---|---|
| Crane's-bill, Bloody | *Geranium sanguineum* |
| Currant, Red | *Ribes rubrum* |
| daffodil | *Narcissus* species |
| daisy | various genera and species |
| Daisy, Oxeye | *Chrysanthemum leucanthemum* |
| dandelion | *Taraxacum* species |
| dead-nettle | *Lamium* species |
| Dead-nettle, Red | *Lamium purpureum* |
| Dead-nettle, White | *Lamium album* |
| Everlasting-pea, narrow-leaved | *Lathyrus sylvestris* |
| Fennel | *Foeniculum vulgare* |
| figwort | *Scrophularia* species |
| Fleabane, Common | *Pulicaria dysenterica* |
| Gooseberry | *Ribes uva-crispa* |
| Gorse | *Ulex europaeus* |
| Gromwell, Common | *Lithospermum officinale* |
| Ground-ivy | *Glechoma hederacea* |
| Gypsywort | *Lycopus europaeus* |
| Harebell | *Campanula rotundifolia* |
| Hawk's-beard, Smooth | *Crepis capillaris* |
| hawk's-beard | *Crepis* species |
| hawkweed | *Hieraceum* species |
| Hawthorn | *Crataegus monogyna* |
| heaths | *Erica* species |
| Heather | *Calluna vulgaris* |
| Hemp-agrimony | *Eupatorium cannabinum* |
| Herb-Robert | *Geranium robertianum* |
| Hogweed | *Heracleum sphondylium* |
| Horehound, Black | *Ballota nigra* |
| Hound's-tongue | *Cynoglossum officinale* |
| iris | *Iris* species |
| Knapweed, Common | *Centaurea nigra* |
| knapweed | *Centaurea* species |
| lavender | *Lavendula* species |
| lime | *Tilia* species |
| Loosestrife, Purple | *Lythrum salicaria* |
| Lucerne | *Medicago lupulina sativa* |
| lungwort | *Pulmonaria* species |
| Lyme-grass | *Leymus arenarius* |
| Marjoram, Wild | *Origanum vulgare* |
| Marsh-marigold | *Caltha palustris* |
| Meadowsweet | *Filipendula ulmaria* |
| melilots | *Melilotus* species |
| Mignonette, Wild | *Reseda lutea* |

| | |
|---|---|
| Milkwort, Heath | *Polygala serpyllifolia* |
| Nightshades | *Solanum* species |
| oak | *Quercus* species |
| Orchid, Bee | *Ophrys apifera* |
| Orchid, Early-purple | *Orchis mascula* |
| Orchid, Late-spider | *Ophrys fuciflora* |
| Parsnip, Wild | *Pastinaca sativa* |
| Pea, Tuberous | *Lathyrus tuberosus* |
| Plum | *Prunus domestica* |
| Poplar, White | *Populus alba* |
| Primrose | *Primula vulgaris* |
| privet | *Ligustrum* species |
| Radish, Wild | *Raphanus raphanistrum* |
| Ragwort, Common | *Senecio jacobaea* |
| ragwort | *Senecio* species |
| Raspberry | *Rubus idaeus* |
| rhododendron | *Rhododendron* species |
| rose | *Rosa* species |
| Rosemary | *Rosmarinus officinalis* |
| Sage, Wood | *Teucrium scorodonia* |
| scabious | *Scabiosa* species |
| Scabious, Devil's-bit | *Succisa pratensis* |
| sea-lavender | *Limonium* species |
| sow-thistle | *Sonchus* species |
| speedwell | *Veronica* species |
| Speedwell, Germander | *Veronica chamaedrys* |
| Spider-orchid, Late | *Ophrys fuciflora* |
| spurge | *Euphorbia* species |
| stitchwort | *Stellaria* species |
| Strawberry, Barren | *Potentilla sterilis* |
| strawberry | *Fragaria* species |
| thistle | various genera and species |
| Thistle, Creeping | *Cirsium arvense* |
| Thistle, Marsh | *Cirsium palustre* |
| Thistle, Spear | *Cirsium vulgare* |
| Thrift | *Armeria maritima* |
| thyme | *Thymus* species |
| Toadflax, Ivy-leaved | *Cymbalaria muralis* |
| Vetch, Bush | *Vicia sepium* |
| Vetch, Common | *Vicia sativa* |
| Vetch, Kidney | *Anthyllis vulneraria* |
| Vetch, Tufted | *Vicia cracca* |
| Vetchling, Meadow | *Lathyrus pratensis* |
| Vetchling, Yellow | *Lathyrus aphaca* |

| | |
|---|---|
| violet | *Viola* species |
| Viper's-bugloss | *Echium vulgare* |
| wallflower | *Erysimum* species |
| willow | *Salix* species |
| willowherb | *Epilobium* species |
| Willowherb, Rosebay | *Chamerion angustifolium* |
| Woundwort, Hedge | *Stachys sylvatica* |
| Woundwort, Marsh | *Stachys palustris* |

# *CUMULATIVE INDEX TO SPECIES IN PARTS 1 to 6*

Synonyms and misidentifications referred to in the text are listed in italics. Valid names are listed in normal typeface. Species in this atlas are in bold. (Errors introduced by the printers in Atlas Part 5 have been corrected here.)

| | | |
|---|---|---|
| Andrena lathyri | 4 | 92 |
| Andrena marginata | 3 | 108 |
| **Andrena nitida** | **6** | 68 |
| Andrena nitidiuscula | 4 | 94 |
| Andrena praecox | 4 | 96 |
| **Andrena simillima** | **6** | 70 |
| Andrena tarsata | 5 | 80 |
| **Andrena thoracica** | **6** | 72 |
| **Andrena tridentata** | **6** | 74 |
| Anergates atratulus | 4 | 24 |
| Anoplius caviventris | 1 | 32 |
| Anoplius concinnus | 2 | 42 |
| Anoplius infuscatus | 3 | 40 |
| Anoplius nigerrimus | 2 | 44 |
| Anoplius viaticus | 3 | 42 |
| Anthidium manicatum | 1 | 110 |
| **Anthophora bimaculata** | **6** | 92 |
| **Anthophora furcata** | **6** | 94 |
| **Anthophora plumipes** | **6** | 96 |
| **Anthophora quadrimaculata** | **6** | 98 |
| **Anthophora retusa** | **6** | 100 |
| Aporus unicolor | 1 | 34 |
| **Arachnospila anceps** | **6** | 34 |
| **Arachnospila consobrina** | **6** | 36 |
| Arachnospila rufa | 3 | 38 |
| **Arachnospila trivialis** | **6** | 38 |
| Argogorytes fargei | 3 | 90 |
| Argogorytes mystaceus | 3 | 92 |
| Astata boops | 2 | 66 |
| Astata pinguis | 2 | 68 |
| Auplopus carbonarius | 1 | 24 |
| *Blepharipus dimidiatus* | 3 | 62 |
| **Bombus barbutellus** | **6** | 122 |
| Bombus bohemicus | 5 | 118 |
| **Bombus campestris** | **6** | 124 |
| Bombus distinguendus | 3 | 124 |
| Bombus humilis | 4 | 120 |
| **Bombus jonellus** | **6** | 116 |
| Bombus lapidarius | 5 | 120 |
| Bombus monticola | 5 | 122 |
| Bombus muscorum | 5 | 124 |
| Bombus pascuorum | 5 | 126 |
| **Bombus pratorum** | **6** | 118 |
| Bombus ruderarius | 3 | 126 |

| | | |
|---|---|---|
| Bombus rupestris | 3 | 128 |
| **Bombus soroeensis** | **6** | 120 |
| Bombus subterraneus | 4 | 122 |
| Bombus sylvarum | 3 | 130 |
| **Bombus sylvestris** | **6** | 126 |
| Bombus vestalis | 5 | 128 |
| Caliadurgus fasciatellus | 3 | 32 |
| Ceratina cyanea | 1 | 122 |
| Cerceris arenaria | 1 | 86 |
| Cerceris quadricincta | 1 | 88 |
| Cerceris quinquefasciata | 1 | 90 |
| Cerceris ruficornis | 1 | 92 |
| Cerceris rybyensis | 1 | 94 |
| Cerceris sabulosa | 1 | 96 |
| Ceropales maculata | 2 | 48 |
| Ceropales variegata | 1 | 38 |
| **Chrysis bicolor** | **6** | 16 |
| Chrysis fulgida | 4 | 18 |
| **Chrysis gracillima** | **6** | 18 |
| ***Chrysis helleni*** | **6** | 20 |
| **Chrysis illigeri** | **6** | 20 |
| *Chrysis osmiae* | 4 | 20 |
| *Chrysis pustulosa* | 4 | 22 |
| Chrysis viridula | 2 | 22 |
| Chrysura hirsuta | 4 | 20 |
| Chrysura radians | 4 | 22 |
| **Cleptes nitidulus** | **6** | 10 |
| ***Cleptes pallipes*** | **6** | 12 |
| **Cleptes semiauratus** | **6** | 12 |
| Coelioxys conoidea | 3 | 116 |
| Colletes cunicularius | 1 | 100 |
| Colletes daviesanus | 4 | 76 |
| Colletes floralis | 1 | 102 |
| Colletes fodiens | 4 | 78 |
| Colletes halophilus | 1 | 104 |
| *Colletes halophilus* | 3 | 94 |
| Colletes hederae | 3 | 94 |
| Colletes marginatus | 1 | 106 |
| Colletes similis | 4 | 80 |
| *Colletes succinctus* | 3 | 94 |
| Colletes succinctus | 3 | 96 |
| *Crabro binotatus* | 3 | 60 |
| Crabro cribrarius | 1 | 62 |
| *Crabro dimidiatus* | 3 | 62 |

| | | |
|---|---|---|
| Crabro peltarius | 1 | 64 |
| Crabro scutellatus | 1 | 66 |
| **Crossocerus annulipes** | **6** | 40 |
| Crossocerus binotatus | 3 | 60 |
| Crossocerus dimidiatus | 3 | 62 |
| Crossocerus distinguendus | 5 | 44 |
| Crossocerus elongatulus | 5 | 46 |
| **Crossocerus megacephalus** | **6** | 42 |
| Crossocerus quadrimaculatus | 3 | 64 |
| Crossocerus vagabundus | 3 | 66 |
| **Crossocerus wesmaeli** | **6** | 44 |
| Cryptocheilus notatus | 1 | 26 |
| *Cuphopterus binotatus* | 3 | 60 |
| *Cuphopterus dimidiatus* | 3 | 62 |
| Dasypoda altercator | 2 | 106 |
| Didineis lunicornis | 3 | 78 |
| Dienoplus tumidus | 3 | 86 |
| Diodontus insidiosus | 4 | 52 |
| Diodontus luperus | 4 | 54 |
| Diodontus minutus | 4 | 56 |
| Diodontus tristis | 4 | 58 |
| Dipogon bifasciatus | 5 | 34 |
| Dipogon subintermedius | 5 | 36 |
| Dipogon variegatus | 5 | 42 |
| Dolichovespula media | 1 | 58 |
| Dolichovespula norwegica | 4 | 44 |
| Dolichovespula saxonica | 1 | 60 |
| Dolichovespula sylvestris | 4 | 46 |
| Dryudella pinguis | 2 | 68 |
| Ectemnius borealis | 1 | 68 |
| Ectemnius cavifrons | 1 | 70 |
| Ectemnius cephalotes | 2 | 78 |
| *Ectemnius chrysostomus* | 2 | 84 |
| Ectemnius continuus | 2 | 80 |
| Ectemnius dives | 2 | 82 |
| Ectemnius lapidarius | 2 | 84 |
| Ectemnius lituratus | 2 | 86 |
| *Ectemnius nigrifrons* | 2 | 90 |
| *Ectemnius planifrons* | 2 | 90 |
| *Ectemnius quadricinctus* | 2 | 92 |
| Ectemnius rubicola | 2 | 88 |
| Ectemnius ruficornis | 2 | 90 |
| *Ectemnius saundersi* | 2 | 92 |
| Ectemnius sexcinctus | 2 | 92 |

| | | |
|---|---|---|
| *Ectemnius zonatus* | 2 | 92 |
| Elampus panzeri | 5 | 10 |
| Embolemus ruddii | 1 | 14 |
| Entomognathus brevis | 3 | 68 |
| Epeolus cruciger | 4 | 116 |
| Epeolus variegatus | 4 | 118 |
| Episyron rufipes | 2 | 46 |
| **Eucera longicornis** | **6** | 102 |
| **Eucera nigrescens** | **6** | 104 |
| ***Eucera tuberculata*** | **6** | 104 |
| Eumenes coarctatus | 3 | 44 |
| Euodynerus quadrifasciatus | 3 | 46 |
| Evagetes crassicornis | 4 | 40 |
| Evagetes dubius | 1 | 28 |
| Evagetes pectinipes | 1 | 30 |
| Evagetes siculus | 4 | 42 |
| Formica aquilonia | 3 | 30 |
| Formica candida | 2 | 38 |
| Formica cunicularia | 5 | 24 |
| Formica exsecta | 1 | 18 |
| Formica fusca | 5 | 26 |
| Formica lemani | 5 | 28 |
| Formica lugubris | 4 | 28 |
| *Formica picea* | 2 | 38 |
| Formica pratensis | 5 | 30 |
| Formica rufa | 1 | 20 |
| Formica rufibarbis | 4 | 30 |
| Formica sanguinea | 5 | 32 |
| *Formica transkaucasica* | 2 | 38 |
| Formicoxenus nitidulus | 4 | 26 |
| Goniozus claripennis | 2 | 16 |
| *Gorytes bicinctus* | 3 | 84 |
| *Gorytes campestris* | 3 | 90 |
| Gorytes laticinctus | 3 | 80 |
| *Gorytes punctatus* | 3 | 88 |
| Gorytes quadrifasciatus | 3 | 82 |
| Gymnomerus laevipes | 3 | 50 |
| Halictus eurygnathus | 5 | 82 |
| Halictus maculatus | 5 | 84 |
| Halictus rubicundus | 5 | 86 |
| Harpactus tumidus | 3 | 86 |
| Hedychridium ardens | 2 | 18 |
| Hedychridium coriaceum | 3 | 14 |
| Hedychridium cupreum | 3 | 16 |

| | | |
|---|---|---|
| *Hedychridium integrum* | 3 | 16 |
| Hedychridium roseum | 2 | 20 |
| *Hedychrum aureicolle* | 4 | 14 |
| *Hedychrum intermedium* | 4 | 16 |
| Hedychrum niemelai | 4 | 14 |
| *Hedychrum nobile* | 4 | 14 |
| Hedychrum rutilans | 4 | 16 |
| ***Holopyga amoenula*** | **6** | 14 |
| ***Holopyga generosa*** | **6** | 14 |
| **Holopyga ovata** | **6** | 14 |
| Homonotus sanguinolentus | 1 | 36 |
| Hoplisoides punctatus | 3 | 88 |
| Hoplitis claviventris | 2 | 122 |
| *Hoplitis leucomelana* | 2 | 122 |
| Hylaeus brevicornis | 3 | 98 |
| Hylaeus cornutus | 3 | 100 |
| Hylaeus pectoralis | 1 | 108 |
| Lasioglossum angusticeps | 4 | 98 |
| Lasioglossum brevicorne | 4 | 100 |
| Lasioglossum cupromicans | 5 | 88 |
| **Lasioglossum fratellum** | **6** | 76 |
| **Lasioglossum fulvicorne** | **6** | 78 |
| Lasioglossum laevigatum | 4 | 102 |
| Lasioglossum laticeps | 5 | 90 |
| Lasioglossum leucopus | 5 | 92 |
| Lasioglossum malachurum | 5 | 94 |
| Lasioglossum morio | 5 | 96 |
| Lasioglossum pauxillum | 5 | 98 |
| Lasioglossum prasinum | 4 | 104 |
| Lasioglossum rufitarse | 5 | 100 |
| **Lasioglossum sexnotatum** | **6** | 80 |
| Lasioglossum smeathmanellum | 5 | 102 |
| **Lasioglossum villosulum** | **6** | 82 |
| *Lasioglossum xanthopum* | 3 | 110 |
| *Lasioglossum xanthopus* | 3 | 110 |
| **Lasioglossum zonulum** | **6** | 84 |
| Lasius brunneus | 2 | 40 |
| Lasius fuliginosus | 1 | 22 |
| Leptothorax acervorum | 2 | 34 |
| Leptothorax albipennis | 2 | 36 |
| ***Leptothorax* species** | **6** | 26 |
| *Leptothorax tuberum* | 2 | 36 |
| Lestiphorus bicinctus | 3 | 84 |
| **Lindenius albilabris** | **6** | 46 |

| | | |
|---|---|---|
| **Lindenius panzeri** | **6** | 48 |
| Macropis europaea | 2 | 108 |
| Megachile maritima | 3 | 114 |
| **Melecta albifrons** | **6** | 106 |
| **Melecta luctuosa** | **6** | 108 |
| Melitta dimidiata | 2 | 98 |
| Melitta haemorrhoidalis | 2 | 100 |
| Melitta leporina | 2 | 102 |
| Melitta tricincta | 2 | 104 |
| Mellinus arvensis | 2 | 94 |
| Mellinus crabroneus | 2 | 96 |
| Methocha ichneumonides | 2 | 24 |
| Microdynerus exilis | 3 | 52 |
| Mimesa bicolor | 5 | 48 |
| Mimesa bruxellensis | 5 | 50 |
| Mimesa equestris | 5 | 52 |
| Mimesa lutaria | 5 | 54 |
| Mimumesa atratina | 5 | 56 |
| Mimumesa dahlbomi | 5 | 58 |
| Mimumesa littoralis | 5 | 60 |
| Mimumesa spooneri | 5 | 62 |
| Mimumesa unicolor | 5 | 64 |
| Monosapyga clavicornis | 2 | 30 |
| Mutilla europaea | 1 | 16 |
| **Myrmecina graminicola** | **6** | 32 |
| *Myrmica lobicornis* | 2 | 32 |
| Myrmica sulcinodis | 3 | 24 |
| *Myrmosa atra* | 2 | 26 |
| Nitela borealis | 5 | 40 |
| Nitela lucens | 5 | 42 |
| Nomada argentata | 3 | 118 |
| Nomada armata | 3 | 120 |
| Nomada errans | 4 | 108 |
| **Nomada fabriciana** | **6** | 110 |
| Nomada ferruginata | 4 | 110 |
| Nomada fucata | 4 | 112 |
| Nomada guttulata | 5 | 110 |
| Nomada lathburiana | 4 | 114 |
| Nomada leucophthalma | 3 | 122 |
| Nomada obtusifrons | 5 | 112 |
| Nomada roberjeotiana | 5 | 114 |
| **Nomada rufipes** | **6** | 112 |
| **Nomada sexfasciata** | **6** | 114 |
| Nomada signata | 5 | 116 |

| | | |
|---|---|---|
| *Nomada xanthosticta* | 4 | 110 |
| Nysson dimidiatus | 3 | 70 |
| Nysson interruptus | 3 | 72 |
| Nysson spinosus | 3 | 74 |
| Nysson trimaculatus | 3 | 76 |
| Odynerus melanocephalus | 1 | 40 |
| Odynerus reniformis | 1 | 42 |
| Odynerus simillimus | 1 | 44 |
| Odynerus spinipes | 1 | 46 |
| Omalus aeneus | 5 | 12 |
| Omalus puncticollis | 5 | 14 |
| Osmia aurulenta | 2 | 116 |
| Osmia bicolor | 2 | 118 |
| Osmia caerulescens | 5 | 106 |
| Osmia inermis | 1 | 114 |
| Osmia leaiana | 5 | 108 |
| Osmia parietina | 4 | 106 |
| Osmia pilicornis | 1 | 116 |
| Osmia rufa | 2 | 120 |
| Osmia uncinata | 1 | 118 |
| Osmia xanthomelana | 1 | 120 |
| Oxybelus argentatus | 1 | 72 |
| Oxybelus mandibularis | 1 | 74 |
| Oxybelus uniglumis | 1 | 76 |
| Passaloecus clypealis | 4 | 60 |
| Passaloecus corniger | 4 | 62 |
| Passaloecus eremita | 4 | 64 |
| Passaloecus gracilis | 4 | 66 |
| Passaloecus insignis | 4 | 68 |
| Passaloecus monilicornis | 4 | 70 |
| Passaloecus singularis | 4 | 72 |
| Passaloecus turionum | 4 | 74 |
| Philanthus triangulum | 1 | 98 |
| Philoctetes truncatus | 5 | 16 |
| **Plagiolepis taurica** | **6** | 24 |
| ***Plagiolepis vindobonensis*** | **6** | 24 |
| Podalonia affinis | 1 | 82 |
| Podalonia hirsuta | 1 | 84 |
| Pompilus cinereus | 3 | 34 |
| Priocnemis coriacea | 4 | 32 |
| Priocnemis perturbator | 4 | 34 |
| Priocnemis schioedtei | 4 | 36 |
| Priocnemis susterai | 4 | 38 |
| Psen ater | 5 | 66 |

| | | |
|---|---|---|
| Pseudepipona herrichii | 3 | 48 |
| *Pseudepipona tomentosus* | 3 | 46 |
| Pseudisobrachium subcyaneum | 2 | 14 |
| *Pseudocilissa dimidiata* | 2 | 98 |
| Pseudomalus auratus | 5 | 18 |
| Pseudomalus violaceus | 5 | 20 |
| *Psithyrus* species - see *Bombus* | | |
| Pseudomalus violaceus | 5 | 20 |
| Pseudospinolia neglecta | 5 | 22 |
| **Rhopalum clavipes** | **6** | 50 |
| **Rhopalum coarctatum** | **6** | 52 |
| **Rhopalum gracile** | **6** | 54 |
| ***Rhopalum nigrinum*** | **6** | 54 |
| *Sapyga clavicornis* | 2 | 30 |
| Sapyga quinquepunctata | 3 | 22 |
| Smicromyrme rufipes | 2 | 28 |
| Sphecodes gibbus | 5 | 104 |
| **Sphecodes reticulatus** | **6** | 86 |
| **Sphecodes rubicundus** | **6** | 88 |
| ***Sphecodes ruficrus*** | **6** | 88 |
| ***Sphecodes rufiventris*** | **6** | 88 |
| **Sphecodes scabricollis** | **6** | 90 |
| Sphecodes spinulosus | 3 | 112 |
| Stelis breviuscula | 2 | 110 |
| Stelis ornatula | 2 | 112 |
| Stelis phaeoptera | 2 | 114 |
| Stelis punctulatissima | 1 | 112 |
| **Stigmus pendulus** | **6** | 56 |
| **Stigmus solskyi** | **6** | 58 |
| Symmorphus bifasciatus | 1 | 48 |
| Symmorphus connexus | 1 | 50 |
| Symmorphus crassicornis | 1 | 52 |
| Symmorphus gracilis | 1 | 54 |
| Tachysphex nitidus | 2 | 70 |
| Tachysphex obscuripennis | 2 | 72 |
| Tachysphex pompiliformis | 2 | 74 |
| *Tachysphex unicolor* | 2 | 70 |
| Tachysphex unicolor | 2 | 76 |
| Tapinoma erraticum | 3 | 28 |
| **Temnothorax interruptus** | **6** | 26 |
| **Temnothorax nylanderi** | **6** | 28 |
| **Temnothorax unifasciatus** | **6** | 30 |
| Tetramorium caespitum | 3 | 26 |
| Tiphia femorata | 3 | 18 |

| | | |
|---|---|---|
| Tiphia minuta | 3 | 20 |
| **Trichrysis cyanea** | **6** | 22 |
| Vespa crabro | 1 | 56 |
| Vespula austriaca | 2 | 64 |
| Vespula germanica | 4 | 48 |
| Vespula rufa | 3 | 58 |
| Vespula vulgaris | 4 | 50 |