

# Hymettus

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## **EAST ANGLIAN WETLAND BEES AND WASPS**



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**2008**

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*Macropis europaea* by Jeremy Early (reproduced with permission)

## Summary

- Further survey was undertaken for a suite of six aculeate species associated with East Anglian wetlands. Known *Odynerus simillimus* populations in the Brightlingsea area were monitored.
- Visits to seventeen different wetland areas in Essex, Norfolk and Suffolk were undertaken from June through to August 2008.
- A total of 25 trap nests were used on four of these sites. All the traps produced large numbers of the spider *Clubiona phragmitis* but no hymenoptera.
- Three of the target species, *Hylaeus pectoralis*, *Macropis europaea* and *Odynerus simillimus*, were recorded from a number of new locations as well as from established sites.
- No specimens of *Anoplius caviventris*, *Passaloecus clypealis* or *Rhopalum gracile* were found at any of the wetland sites visited in 2008 but records of all three species are reported from 2007.
- One site, Sutton Fen in Norfolk, was thought to have held populations of all six target species in 2007.

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# 1 Background

## 1.1 Study aims

Preliminary surveys at nineteen wetland areas in Cambridgeshire, Essex, Norfolk and Suffolk in 2007 aimed to identify sites that could be used in further studies of a suite of six species of aculeate hymenoptera (*Rhopalum gracile*, *Odynerus simillimus*, *Anoplius caviventris*, *Hylaeus pectoralis*, *Macropis europaea* and *Passaloecus clypealis*). In 2008 some of these sites were to be re-surveyed and further wetland sites in Norfolk were to be visited. The known nesting sites of *Odynerus simillimus* were to be monitored in Norfolk and Essex and *ad hoc* ecological data was to be collected for any of the species encountered. Monitoring of *Odynerus simillimus* in Norfolk in 2008 is reported separately by Strudwick (2008).

## 1.2 Previous work

The Aculeate Conservation Group / Hymettus Ltd has commissioned work previously on *Odynerus simillimus*. Nesting aggregations of the wasp have been studied at Hickling Broad, Norfolk and around Brightlingsea, Essex. Larvae of the weevil *Hypera pollux*, feeding on *Berula erecta* or *Apium nodiflorum*, have been identified as the obligatory prey for provisioning the nest (Booth & Foster, 2003). Observations on daily activity patterns, nest site substrate and nectaring on *Vicia cracca* have been noted (Harvey, 2001; Edwards & Harvey, 2002; Booth & Foster, 2003; Lee & Scott, 2007).

## 2. The target species

### 2.1 *Anoplius caviventris*

Although listed as Nationally Scarce (Nb) by Falk (1991), there are few modern records of this spider hunting wasp. East Anglian records are restricted to the Cambridgeshire fens. Adults are active from May to September building nests in dead plant stems. The nests are usually provisioned with Clubionid spiders but the crab spider *Tibellus maritimus* has also been recorded as prey (Edwards, 1997).

### 2.2 *Hylaeus pectoralis*

This small solitary bee appears to be restricted to reed beds in south east England, especially the southern coastal counties and East Anglia. Adults are active from June through to September and nest in old cigar galls of the fly *Lipara lucens*. Pollen sources used by *Hylaeus pectoralis* in Britain are unknown but the bee is polylectic in Germany (Edwards, 1997).

### 2.3 *Macropis europaea*

This solitary bee, listed as Rare (RDB3) by Shirt (1997) and as Nationally Scarce (Na) by Falk (1991), has been recorded from across southern England from Devon to Norfolk. The flight period is from July to September. Subterranean nests are provisioned with pollen and oils from Yellow Loosestrife *Lysimachia vulgaris*. Nectar is obtained from a variety of sources (Edwards, 1998).

### 2.4 *Odynerus simillimus*

This very rare potter wasp has been collected from a handful of coastal wetland sites in Essex, Suffolk and Norfolk. Falk (1991) listed the wasp as provisionally Endangered (pRDB1) and it has been added to the BAP Priority Species list in the latest review. The flight period of males is in June and July; females are also active in August. Subterranean nests are provisioned with larvae of the weevil *Hypera pollux* collected from Lesser Water Parsnip *Berula erecta* or Fool's Watercress *Apium nodiflorum*. Adults have been observed robbing nectar from Tufted Vetch *Vicia cracca*.

### 2.5 *Passaloecus clypealis*

This solitary wasp, listed as Vulnerable (RDB2) by Shirt (1997) and as provisionally Rare (pRDB3) by Falk (1991), appears to be restricted to south east England. Adults are active from June to August but are rarely collected in the field. Adults have been reared from nests in old cigar galls *Lipara lucens* and in ungalled reed stems. The prey is unknown but may comprise aphids (Edwards and Telfer, 2002).

### 2.6 *Rhopalum gracile*

This rare solitary wasp, listed as Vulnerable (RDB2) by Falk (1991), is known from a small number of wetland sites in East Anglia with modern records restricted to Cambridgeshire and Norfolk. The flight period is from June to August. Nest sites are unknown in Britain but elsewhere nests have been found in stems of Common Reed *Phragmites australis*, Lyme-grass *Leymus arenarius* and Goldenrod *Solidago occidentalis*. These nests were provisioned with pscopterans and with small dipterans from a range of families (Lomholdt, 1984). Adults feed from Angelica *Angelica sylvestris* flowers.



## 3 Methods

### 3.1 Site selection

The selection of sites for monitoring *Odynerus simillimus* was based on the four locations known to support nesting aggregations in the Brightlingsea area in 2007 but potential new habitat was also visited. Previous records of *Odynerus simillimus* in Norfolk are restricted to Hickling Broad and Sutton Fen and Martin Drake's records of other target species in 2007 (see Appendix 1) also suggested that this area, particularly the wetlands along the River Ant, should be investigated in 2008. Other captures by Drake of some target species in 2007 suggested Woodbastwick Fen and the River Yare wetlands should be looked at. Finally, the poor weather conditions in 2007 may have been responsible for the lack of success in discovering the target species at a number of other sites visited in 2007 (Lee & Scott, 2007). Therefore it was the intention to revisit the most promising of these sites in 2008. As it was, further poor weather, combined with poor health, meant that only two sites along the Waveney Valley were revisited.

### 3.2 Survey methods

The Norfolk sites were all visited in mid-June and sampled by sweeping. This relatively early date was chosen as Drake had success in sampling by sweeping at the same time in 2007. Also during the June visits samples of cigar galls were collected and kept in suitable conditions to encourage emergence of target species. Finally, five trap nests were placed at each of five locations. Each trap consisted of 15cm lengths of reed bundled inside 5cm diameter plastic pipe and tied to vegetation approximately 1m above the ground.

All of the sites selected for survey were visited at least once during July or August 2008. On these visits survey methods were mainly based on locating resources required by the target species and concentrating observations and spot sampling on those resources. South facing banks with areas of bare soil were scanned for nesting burrows; known forage plants (especially *Angelica sylvestris*, *Apium nodiflorum*, *Berula erecta*, *Cirsium* sp., *Eupatorium cannabinum*, *Heracleum sphondylium*, *Lycopus europaeus*, *Lysimachia vulgaris* and *Vicia cracca*) were scanned and swept for foraging insects.

## 4 Survey sites

### 4.1 Tendring District, Essex

#### 4.1.1 Alresford TM0619

Survey date: 16/07/08

Nesting aggregations of *Odynerus simillimus* have been reported from this coastal location in each year from 2000. The wasp has nested in a roadside bank at the end of Ford Lane, in the corner of an arable field at the end of Ford Lane and along the sea wall footpath close to Ford Cottage. Between the visit in 2007 and July 2008, the original site close to Ford Cottage had been covered by spoil from a large pond dug behind the cottage. Some *Apium nodiflorum* remains in the adjacent borrow dyke but no wasps were seen. Further to the east (c.100m) along the sea wall three possible chimneys were found but no wasps were seen. As in 2007 no chimneys were found along Ford Lane but three possible *O. simillimus* nest holes were seen in the south east corner of the arable field. To the west along the sea wall no chimneys or wasps were seen on the path, in the adjacent field or on the low cliff alongside the Colne estuary.

#### 4.1.2 Alresford Creek TM0719

Survey date: 14/07/08

A nesting aggregation of *Odynerus simillimus* was discovered at this location in 2003. During the 2008 visit the nest aggregation found near a sluice in the bank above the borrow dyke (TM074191) comprised 8-10 chimneys but no wasps were seen. The new, nesting aggregation of *O. simillimus* found to the west of the sluice along the borrow dyke in 2007 was no longer present but possible nests were seen up to 250m further west along the bank. The amount of *Vicia cracca* on the banks has increased greatly. A small amount of *Apium nodiflorum* was found in an old pond in 2007 but this has now been cleared out.

#### 4.1.3 Brightlingsea TM0617

Survey date: 15/07/08

A nesting aggregation of *Odynerus simillimus* was discovered at this location in 2002. The original site on the west side of the ditch is now overgrown by *Phragmites* and deserted by the wasps. As on the visit in 2007, no wasps were seen in July 2008 but approximately twelve chimneys were found in a flat area of set-a-side in the south east corner (TM068173).

#### 4.1.4 Howlands Marsh, St Osyth TM1116

Survey date: 21/07/08

*Odynerus simillimus* was first recorded from this site in 2004. In July 2008 a single wasp was observed at 11.25 hunting weevils on *Apium nodiflorum* in a ditch (TM112163). A second wasp may have been present by 11.40. No chimneys of *O. simillimus* were found on the grazing marsh in 2008 but a single nest was found in the edge of an adjacent barley field.

#### **4.1.5 West of Hollybush Hill, St Osyth TM1118**

Survey date: 15/07/08

Searches found no wasps or chimneys. No *Apium nodiflorum* was found, most watercourses being dominated by *Phragmites*.

#### **4.2 Norfolk Broads: River Yare**

##### **4.2.1 Surlingham Marsh TG3206**

Survey dates: 16/06/08, 04/08/08

Surlingham Marsh is a RSPB reserve comprising cattle-grazed fen. Sweeping and spot sampling were used on the visits but none of the target species were recorded.

##### **4.2.2 Surlingham Broad TG3107**

Survey dates: 16/06/08, 04/08/08

Surlingham Broad is a RSPB reserve comprising unmanaged reed fen. Sweeping and spot sampling were used on the visits but none of the target species were recorded.

##### **4.2.3 Strumpshaw Fen TG3307**

Survey date: 20/06/07

Strumpshaw Fen is a RSPB reserve. One male *Hylaeus pectoralis* was swept from an area of dense reed fen.

#### **4.3 Norfolk Broads: River Bure**

##### **4.3.1 Woodbastwick Fen TG3316 / TG3416**

Survey dates: 18/07/07, 16/06/08

Woodbastwick Fen is part of the Bure Marshes NNR managed by Natural England. One *Passaloecus clypealis* was swept from reed fen on 18/07/07. Sweeping and spot sampling were used on 16/06/08 but none of the target species were recorded. Trap nests placed on 16/06/08 were collected on 19/11/08 but yielded no hymenoptera.

##### **4.3.2 Upton Fen TG3813**

Survey dates: 19/06/07, 18/07/07

Upton Fen is a Norfolk Wildlife Trust reserve comprising mixed fen managed by rotational cutting. Two male *Hylaeus pectoralis* and one *Rhopalum gracile* were swept on 19/06/07. A single *Passaloecus clypealis* was swept on 18/07/07.

#### **4.4 Norfolk Broads: River Thurne**

##### **4.4.1 Hickling Broad TG4021 / TG4022 / TG4120 / TG4121 / TG4221**

Survey dates: 19/06/07, 23/06/07, 22/07/07, 16/06/08, 18/06/08, 06/08/08

Hickling Broad is a large Norfolk Wildlife Trust reserve with a range of wetland habitats. *Odynerus simillimus* was rediscovered in Britain from this location in 1986 (Archer, 1989). Areas sampled mainly comprised mixed species fen and reed bed. Most of the areas were subject to some grazing by cattle or ponies. One *Passaloecus clypealis* was swept on 19/06/07. One male and one female *Hylaeus pectoralis* were swept on 23/06/07 and a further two males were swept on 22/07/07. Seven *Hylaeus pectoralis* emerged from 485 cigar galls collected on 18/06/08 along with a single *Trypoxylon attenuatum*. Trap nests placed at two locations on 18/06/08 were collected on 19/11/08 but yielded no hymenoptera.

#### **4.5 Norfolk Broads: River Ant**

##### **4.5.1 Reedham Marshes TG3618 / TG3619**

Survey dates: 17/06/08, 05/08/08

Reedham Marshes is a large area of wetland habitats managed by the Broads Authority. The areas sampled comprised reed and sedge fen managed by cutting and an area of unmanaged fen. Sweeping and spot sampling were used on 17/06/08 but none of the target species were recorded.

##### **4.5.2 Catfield Fens TG3621 / TG3720**

Survey dates: 23/06/07, 19/07/07, 17/06/08, 18/06/08, 05/08/08

Catfield Fens lie to the north of Reedham Marshes and are owned and managed by various individuals and organisations including the Broads Authority, Butterfly Conservation and the Norfolk Wildlife Trust. The areas sampled were reed and sedge fen managed by rotational cutting. One *Passaloecus clypealis* was swept on 23/06/07 along with two female *Hylaeus pectoralis*. A second *Passaloecus clypealis* was swept on 19/07/07 along with a male and three female *Hylaeus pectoralis* and a specimen of *Rhopalum gracile*. 53 cigar galls were collected from one area on 17/06/08 but no hymenoptera emerged from them. Five *Hylaeus pectoralis* emerged from galls collected the following day in a different area. Sweeping and spot sampling were used on 17/06/08 and 18/06/08 but none of the target species were recorded. Trap nests placed on 18/06/08 were collected on 19/11/08 but yielded no hymenoptera.

##### **4.5.3 Sharp Street TG3619**

Survey dates: 17/06/08, 05/08/08

A small area of privately owned reed fen cut on a commercial basis was sampled by sweeping and spot sampling on 17/06/08 but none of the target species were recorded.

#### **4.5.4 Common Fen TG3524**

Survey dates: 19/06/08, 04/08/08

Common Fen is an area of reed and sedge fen managed by the Broads Authority. Four *Hylaeus pectoralis* were swept on 19/06/08 and one *Hylaeus pectoralis* emerged from 72 cigar galls collected the same day.

#### **4.5.5 Barton Fen TG3523**

Survey dates: 19/06/08, 04/08/08

Barton Fen is a privately owned sedge fen cut on a commercial basis. Four *Hylaeus pectoralis* emerged from 39 cigar galls collected from the site on 19/06/08.

#### **4.5.6 Horning Marshes TG3617**

Survey dates: 19/06/08, 04/08/08

Horning Marshes is an area of reed and sedge fen managed by the Broads Authority. 70 cigar galls were collected here on 19/06/08 but no hymenoptera emerged. Trap nests placed on 19/06/08 were collected on 19/11/08 but yielded no hymenoptera.

#### **4.5.7 Sutton Fen TG3723**

Survey dates: 17/06/07, 20/06/07, 22/06/07, 21/07/07, 24/07/07

Sutton Fen is a recently acquired RSPB reserve comprising large areas of reed and sedge fen. Tim Strudwick's records of *Odynerus simillimus*, *Macropis europaea* and *Hylaeus pectoralis* from the reserve in 2007 are noted by Lee and Scott (2007). A female *Anoplius caviventris* and a male *Hylaeus pectoralis* were swept on 17/06/07. A second male *Hylaeus pectoralis* along with a *Passaloecus clypealis* was swept on 20/06/07. A female *Hylaeus pectoralis* was swept on 21/07/07. A second *Passaloecus clypealis* was swept on 24/07/07 along with a specimen of *Rhopalum gracile*.

### **4.6 Waveney Valley**

#### **4.6.1 Carlton Marshes, Lowestoft TM5091 / TM5092**

Survey date: 31/07/08

Carlton Marshes is a large Suffolk Wildlife Trust reserve in the lower Waveney Valley. Stands of *Lysimachia vulgaris*, *Apium nodiflorum* and *Angelica sylvestris* were scanned and swept. One female *Hylaeus pectoralis* was collected from *Sonchus* sp. on White Cast Marshes (TM501926) and a second from *Angelica sylvestris* around Sprat's Water (TM504917). Both male and female *Macropis europaea* were present in good numbers (10-50) around *Lysimachia vulgaris* on Woolners Carr (TM503916).

#### **4.6.2 Redgrave & Lopham Fens TM0479 / TM0579 / TM0580**

Survey date: 28/07/08

Another large wetland reserve owned by Suffolk Wildlife Trust, Redgrave and Lopham Fens lie at the source of the Waveney. One female *Hylaeus pectoralis* was collected from *Angelica sylvestris* and female *Macropis europaea* were seen around stands of *Lysimachia vulgaris* on Middle Fen (TM053800).

## 5 Discussion

### 5.1 General comments

The main aim of the survey work of locating sites for further autecological research has only been partially achieved. Monitoring of *Odynerus simillimus* in the Tendring district of north Essex is probably all that is required at this stage. Potential sites for further study of the smaller species (*Hylaeus pectoralis*, *Passaloecus clypealis*, *Anoplius caviventris* and *Rhopalum gracile*) which may utilise reed and similar plant stems as nesting habitat were identified as a result of Drake's 2007 captures. Sutton Fen is the only site that has as yet been shown to support all four species but a reliable method of detecting any of the species apart from *Hylaeus pectoralis* has yet to be achieved. At this stage, further work on *Macropis europaea* is probably not necessary.

The results from the trap nests were disappointing. Most of the traps contained large numbers of the common wetland spider *Clubiona phragmitis* along with an occasional ground beetle. Small numbers of other invertebrates were found including the uncommon tachinid fly *Siphona pauciseta*, a known parasite of the larvae of the cigar gall fly *Lipara lucens* but no hymenoptera were collected.

### 5.2 *Anoplius caviventris*

The collection of a specimen of *Anoplius caviventris* by sweeping at Sutton Fen in 2007 suggests that observations on nest provisioning and resource use in a wetland habitat may be possible. This site was not visited in 2008 due to problems of gaining access permission but using trap nests on the site may be helpful in yielding more information on the species.

### 5.3 *Hylaeus pectoralis*

Again *Hylaeus pectoralis* was the most widespread of the target species in East Anglian wetlands having been swept or emerged from *Lipara lucens* galls collected at five of the Norfolk sites visited. It was also collected from the two SWT reserves. Collection of galls earlier in the year would probably show a greater rate of success in producing emergent bees. No information was gained on the pollen used by the bee.

### 5.4 *Macropis europaea*

Good populations of *Macropis europaea* were identified on both of the SWT reserves visited. The bee was not seen at these sites in 2007 despite the presence of apparently suitable habitat and resources and it is assumed that poor weather conditions during the visits was the reason for the apparent absences. Based on the records from both years of the survey it would seem that *M. europaea* is widespread in East Anglian wetlands wherever there are strong populations of Yellow Loosestrife *Lysimachia vulgaris*.

## **5.5 Odynerus simillimus**

Monitoring of *Odynerus simillimus* populations in the Tendring District of north Essex suggests the wasp is maintaining its population overall despite variations in individual nesting aggregations from year to year. The lack of sightings of wasps as opposed to nests can be attributed to the weather and it is hoped that warmer, sunnier conditions in 2009 may be more conducive to wasp activity. The incidental provision of new nesting habitat at Ford Cottage, Alresford potentially provides the opportunity to monitor a complete population cycle from colonisation of the fresh substrate through to decline as the site becomes unsuitable through succession.

## **5.6 Passaloecus clypealis**

The collection of *Passaloecus clypealis* by sweeping at five sites in 2007 suggests the species is still relatively widespread in the Norfolk Broads. However, although three of these sites were revisited in 2008 the wasp was not collected at any of them. Trap nests were also used on two of the sites and failed to detect the wasp. Despite this failure, further, more intensive use of trap nests, will probably be the most efficient method of determining details of prey species and nest construction for *P. clypealis*.

## **5.7 Rhopalum gracile**

The collection of *Rhopalum gracile* by sweeping at three sites in 2007 confirms the species is still present in the Norfolk Broads but the one site revisited in 2008 produced no further specimens. As with *Anoplius caviventris* and *Passaloecus clypealis*, the failure to find a population of *R. gracile* at any of the sites visited may have been, in part at least, due to the poor weather conditions and again trap nests may be helpful in yielding more information on prey species and nest sites.

## **6 Conclusions**

### **6.1 General comments**

As in 2007, fieldwork was badly disrupted by the poor weather conditions but recording visits to seventeen East Anglian sites were still undertaken. These visits again failed to detect the presence of three of the target species although, as a result of specimens collected in 2007 being made available, it is now confirmed that populations of all six species are still present in East Anglia, at least in the Norfolk Broads. A single site, Sutton Fen, appears to support populations of all six species. A number of the sites are likely to support species other than those recorded and surveys undertaken in better weather conditions, at the optimum time of year and using alternative search methods would improve the chances of detecting these species.

### **6.2 Recommendations for future studies**

Further survey by sweeping and spot sampling when better weather conditions allow for field work during optimum flight periods would probably increase the number of sites from which all of the target species are recorded.

The collection of cigar galls and plant stems potentially used as nests by *Anoplius caviventris*, *Passaloecus clypealis* and *Rhopalum gracile* would increase the chances of detecting populations of these species suitable for further study and possibly provide information on prey species and nest construction.

The use of trap nests should be extended to include all those sites from which target species have been collected by sweeping. A much larger number of traps are required at each site and the optimum time for removal of traps from the field needs to be determined.



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# Appendix 1

## Aculeate hymenoptera records from East Anglian wetlands 2008

SPECIES	LOCATION	GRID REF.	DATE	COLL.	DET.	No.
<i>Anoplius caviventris</i>	Sutton Fen	TG371237	17/06/07	M.Drake	P.Lee	1f
<i>Odynerus simillimus</i>	Brightlingsea	TM068173	15/07/08	D.Scott	D.Scott	12 nests
<i>Odynerus simillimus</i>	Alresford Creek	TM074191	14/07/08	D.Scott	D.Scott	8-10 nests
<i>Odynerus simillimus</i>	Howlands Marsh	TM112163	21/07/07	D.Scott	D.Scott	1+1? + nest
<i>Symmorphus bifasciatus</i>	Redgrave & Lopham Fens	TM053798	28/07/08	P.Lee	P.Lee	1f
<i>Symmorphus bifasciatus</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	1m
<i>Vespula germanica</i>	Redgrave & Lopham Fens	TM054795	28/07/08	P.Lee	P.Lee	1w
<i>Trypoxylon attenuatum</i>	Common Fen	TG350245	19/06/08	P. Saunders	P. Saunders	1
<i>Trypoxylon attenuatum</i>	Hickling Broad	TG407221	26/06/08	P. Saunders	P. Saunders	1
<i>Crabro cribrarius</i>	Redgrave & Lopham Fens	TM053800	28/07/08	P.Lee	P.Lee	1f
<i>Crabro cribrarius</i>	Redgrave & Lopham Fens	TM053798	28/07/08	P.Lee	P.Lee	
<i>Crabro cribrarius</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	1m
<i>Crossocerus podagricus</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	1m
<i>Crossocerus quadrimaculatus</i>	Sutton Fen	TG369233	24/07/07	M.Drake	P.Lee	1m
<i>Ectemnius continuus</i>	Redgrave & Lopham Fens	TM053800	28/07/08	P.Lee	P.Lee	1m
<i>Ectemnius continuus</i>	Redgrave & Lopham Fens	TM053798	28/07/08	P.Lee	P.Lee	1f
<i>Ectemnius continuus</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	2m
<i>Ectemnius continuus</i>	Carlton Marshes	TM505922	31/07/08	P.Lee	P.Lee	1m
<i>Ectemnius cephalotes</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	2f
<i>Rhopalum gracile</i>	Upton Fen	TG385136	19/06/07	M.Drake	P.Lee	
<i>Rhopalum gracile</i>	Catfield Fen	TG366212	19/07/07	M.Drake	P.Lee	
<i>Rhopalum gracile</i>	Sutton Fen	TG368231	24/07/07	M.Drake	P.Lee	
<i>Psenulus pallipes</i>	Sutton Fen	TG370228	22/06/07	M.Drake	P.Lee	1f
<i>Stigmus solskyi</i>	Redgrave & Lopham Fens	TM054795	28/07/08	P.Lee	P.Lee	1f
<i>Pemphredon lethifera</i>	Turf Fen	TG368187	17/06/08	P. Saunders	P. Saunders	1
<i>Passaloecus clypealis</i>	Hickling Broad	TG425217	19/06/07	M.Drake	P.Lee	
<i>Passaloecus clypealis</i>	Sutton Fen	TG368231	20/06/07	M.Drake	P.Lee	
<i>Passaloecus clypealis</i>	Catfield Fen	TG366212	23/06/07	M.Drake	P.Lee	
<i>Passaloecus clypealis</i>	Upton Fen	TG385136	18/07/07	M.Drake	P.Lee	
<i>Passaloecus clypealis</i>	Woodbastwick Fen	TG338165	18/07/07	M.Drake	P.Lee	
<i>Passaloecus clypealis</i>	Catfield Fen	TG366212	19/07/07	M.Drake	P.Lee	
<i>Passaloecus clypealis</i>	Sutton Fen	TG368231	24/07/07	M.Drake	P.Lee	
<i>Passaloecus singularis</i>	Strumpshaw Fen	TG338070	20/06/07	M.Drake	P.Lee	
<i>Gorytes laticinctus</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	1f
<i>Argogorytes mystaceus</i>	Hickling Broad	TG41 20	16/06/08	P. Saunders	P. Saunders	1
<i>Hylaeus pectoralis</i>	Sutton Fen	TG370237	17/06/07	M.Drake	P.Lee	1m
<i>Hylaeus pectoralis</i>	Upton Fen	TG385138	19/06/07	M.Drake	P.Lee	2m
<i>Hylaeus pectoralis</i>	Strumpshaw Fen	TG338070	20/06/07	M.Drake	P.Lee	1m
<i>Hylaeus pectoralis</i>	Sutton Fen	TG368233	20/06/07	M.Drake	P.Lee	1m
<i>Hylaeus pectoralis</i>	Hickling Broad	TG413207	23/06/07	M.Drake	P.Lee	1f
<i>Hylaeus pectoralis</i>	Hickling Broad	TG413208	23/06/07	M.Drake	P.Lee	1m
<i>Hylaeus pectoralis</i>	Catfield Great Fen	TG365211	23/06/07	M.Drake	P.Lee	2f
<i>Hylaeus pectoralis</i>	Catfield Fen	TG366211	19/07/07	M.Drake	P.Lee	1m 1f
<i>Hylaeus pectoralis</i>	Catfield Great Fen	TG365211	19/07/07	M.Drake	P.Lee	2f
<i>Hylaeus pectoralis</i>	Sutton Fen	TG367231	21/07/07	M.Drake	P.Lee	1f
<i>Hylaeus pectoralis</i>	Hickling Broad	TG413207	22/07/07	M.Drake	P.Lee	2m
<i>Hylaeus pectoralis</i>	Hickling Broad	TG408215	18/06/08	P. Saunders	P. Saunders	2m 1f
<i>Hylaeus pectoralis</i>	Common Fen	TG350245	19/06/08	P. Saunders	P. Saunders	2m 1f 1?
<i>Hylaeus pectoralis</i>	Hickling Broad	TG407221	26/06/08	P. Saunders	P. Saunders	1m
<i>Hylaeus pectoralis</i>	Barton Fen	TG359236	27/06/08	P. Saunders	P. Saunders	2f
<i>Hylaeus pectoralis</i>	Catfield Great Fen	TG365212	27/06/08	P. Saunders	P. Saunders	1m 3f
<i>Hylaeus pectoralis</i>	Redgrave & Lopham Fens	TM053800	28/07/08	P.Lee	P.Lee	1f
<i>Hylaeus pectoralis</i>	Carlton Marshes	TM501926	31/07/08	P.Lee	P.Lee	1f
<i>Hylaeus pectoralis</i>	Carlton Marshes	TM504917	31/07/08	P.Lee	P.Lee	1f
<i>Hylaeus pectoralis</i>	Barton Fen	TG359236	11/08/08	P. Saunders	P. Saunders	2
<i>Hylaeus pectoralis</i>	Catfield Great Fen	TG365212	11/08/08	P. Saunders	P. Saunders	1f
<i>Hylaeus pectoralis</i>	Common Fen	TG350245	11/08/08	P. Saunders	P. Saunders	1
<i>Hylaeus pectoralis</i>	Hickling Broad	TG408215	11/08/08	P. Saunders	P. Saunders	1
<i>Hylaeus pectoralis</i>	Hickling Broad	TG407221	11/08/08	P. Saunders	P. Saunders	2
<i>Andrena denticulata</i>	Redgrave & Lopham Fens	TM053800	28/07/08	P.Lee	P.Lee	1f
<i>Andrena flavipes</i>	Redgrave & Lopham Fens	TM053798	28/07/08	P.Lee	P.Lee	1f

SPECIES	LOCATION	GRID REF.	DATE	COLL.	DET.	No.
<i>Macropis europaea</i>	Redgrave & Lopham Fens	TM053800	28/07/08	P.Lee	P.Lee	f
<i>Macropis europaea</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	m f
<i>Dasyroda hirtipes</i>	Carlton Marshes	TM504924	31/07/08	P.Lee	P.Lee	1m
<i>Megachile versicolor</i>	Surlingham Marsh	TG325066	16/06/08	P.Saunders	P.Saunders	1
<i>Bombus lucorum</i> agg.	Redgrave & Lopham Fens	TM054801	28/07/08	P.Lee	P.Lee	
<i>Bombus lucorum</i> agg.	Redgrave & Lopham Fens	TM046795	28/07/08	P.Lee	P.Lee	
<i>Bombus lucorum</i> agg.	Redgrave & Lopham Fens	TM053798	28/07/08	P.Lee	P.Lee	
<i>Bombus lucorum</i> agg.	Redgrave & Lopham Fens	TM054795	28/07/08	P.Lee	P.Lee	1m
<i>Bombus lucorum</i> agg.	Carlton Marshes	TM504924	31/07/08	P.Lee	P.Lee	1w
<i>Bombus lucorum</i> agg.	Carlton Marshes	TM501926	31/07/08	P.Lee	P.Lee	1w
<i>Bombus terrestris</i>	Redgrave & Lopham Fens	TM053798	28/07/08	P.Lee	P.Lee	
<i>Bombus terrestris</i>	Redgrave & Lopham Fens	TM054801	28/07/08	P.Lee	P.Lee	
<i>Bombus terrestris</i>	Carlton Marshes	TM504924	31/07/08	P.Lee	P.Lee	1w
<i>Bombus terrestris</i>	Carlton Marshes	TM501926	31/07/08	P.Lee	P.Lee	1w
<i>Bombus hortorum</i>	Redgrave & Lopham Fens	TM054801	28/07/08	P.Lee	P.Lee	1m
<i>Bombus lapidarius</i>	Redgrave & Lopham Fens	TM053798	28/07/08	P.Lee	P.Lee	1m
<i>Bombus lapidarius</i>	Redgrave & Lopham Fens	TM054801	28/07/08	P.Lee	P.Lee	
<i>Bombus lapidarius</i>	Redgrave & Lopham Fens	TM054795	28/07/08	P.Lee	P.Lee	1m
<i>Bombus lapidarius</i>	Carlton Marshes	TM504924	31/07/08	P.Lee	P.Lee	1m 1w
<i>Bombus lapidarius</i>	Carlton Marshes	TM501926	31/07/08	P.Lee	P.Lee	2m 1w
<i>Bombus lapidarius</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	
<i>Bombus jonellus</i>	Catfield Fen	TG371205	17/06/08	P.Saunders	P.Saunders	1m
<i>Bombus pascuorum</i>	Redgrave & Lopham Fens	TM046795	28/07/08	P.Lee	P.Lee	1w
<i>Bombus pascuorum</i>	Redgrave & Lopham Fens	TM053798	28/07/08	P.Lee	P.Lee	
<i>Bombus pascuorum</i>	Redgrave & Lopham Fens	TM054801	28/07/08	P.Lee	P.Lee	
<i>Bombus pascuorum</i>	Carlton Marshes	TM504924	31/07/08	P.Lee	P.Lee	1w
<i>Bombus pascuorum</i>	Carlton Marshes	TM501926	31/07/08	P.Lee	P.Lee	1w
<i>Bombus pascuorum</i>	Carlton Marshes	TM503916	31/07/08	P.Lee	P.Lee	1w