# EAST ANGLIAN WETLAND BEES AND WASPS

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**2007**

Cover photograph: *Odynerus simillimus* by Tim Strudwick

# Summary


- A suite of six aculeate species associated with East Anglian wetlands was identified, all potentially in need of further conservation action. An initial survey was required to identify populations for further ecological studies.
- Visits to nineteen different wetland areas in Cambridgeshire, Essex, Norfolk and Suffolk were undertaken from July through to September 2007.
- 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.
- Further work recommended would involve standardised monitoring of *Odynerus simillimus*; use of alternative survey methods to detect *Anoplius caviventris, Passaloecus clypealis* and *Rhopalum gracile*; further investigation of the forage habitat of *Odynerus simillimus*; and a study of the use of nest site resources by *Odynerus simillimus* and *Macropis europaea*.

# Contents

# 1 Background

## 1.1 Survey aims

The main aim was to identify a number of 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*) associated with wetland sites across Cambridgeshire, Essex, Norfolk and Suffolk. These studies will involve further autecological investigations to inform conservation actions and monitoring of populations at sites under different management regimes. Secondary aims were to monitor the known nesting sites of *Odynerus simillimus* and to gather *ad hoc* ecological data on any of the species encountered.

## 1.2 Previous work

The Aculeate Conservation Group / Hymettus Ltd has commissioned work in past years on just one of the six species targeted in this study. Although considered extinct by Shirt (1987), *Odynerus simillimus* was rediscovered at Hickling Broad in 1986 (Archer, 1989). Following discovery of nesting aggregations of the wasp at Alresford, Essex in 2000, further fieldwork by Peter Harvey, David Scott and Mike Edwards in 2001 added records of male specimens from Minsmere, Suffolk and Shoebury, Essex and provided some initial autecological observations from the Alresford populations. ACG commissioned further work in 2002 and 2003 building on these observations. Most importantly, larvae of the weevil *Hypera pollux*, feeding on *Berula erecta* or *Apium nodiflorum*, were identified as the obligatory prey for provisioning the nest. Observations on daily activity patterns, nest site substrate and nectaring on *Vicia cracca* were also recorded.

# 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 initial selection of sites for fieldwork was based on identifying known sites for the target species, especially those where *Odynerus simillimus* and *Rhopalum gracile* had been recorded previously. Further sites with similar characteristics, including botanical resources, were then identified through discussion with Nick Sibbett of Natural England and Dorothy Casey of the Suffolk Wildlife Trust. A chance meeting with Tim Strudwick, RSPB warden at Strumpshaw Fen, as part of work being undertaken for the Broads Authority, provided further assistance. During sabbatical leave, Tim was undertaking aculeate hymenoptera surveys on a number of RSPB reserves. As well as his valuable input into site selection, Tim was able to provide important records of our target species from his own work.

## 3.2 Survey methods

Each of the sites selected was to be visited at least once during July or August 2007. The poor weather conditions resulted in the final survey visits being extended into September. Many of the earlier visits were undertaken in far from ideal weather conditions and the paucity of records from most of the sites reflect this. Survey methods on site 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 cannabium*, *Heracleum sphondylium*, *Lycopus europaeus*, *Lysimachia vulgaris* and *Vicia cracca*) were scanned and swept for foraging insects; and reed beds were searched for old cigar galls that could be holding nests. Tim Strudwick's work also included some use of water traps.

# 4 Survey sites

## 4.1 Cambridgeshire Fens

### 4.1.1 Chippenham Fen TL6469 / TL6569

Survey date: 28/08/07
Chippenham Fen is a National Nature Reserve managed by Natural England. The habitats visited included saw-sedge and common reed fen, grazed wet meadows and the edges of carr woodland and scrub. There were good amounts of *Angelica sylvestris* in flower at the time of the visit but the conditions were generally cool and damp. The only target species collected were three female *Hylaeus pectoralis*.

### 4.1.2 Wicken Fen TL5570 / TL5670

Survey date: 24/08/07
Wicken Fen is a National Nature Reserve owned and managed by the National Trust. The survey visit was restricted to the areas of reed fen, carr and sedge north of Wicken Lode and accessible from the boardwalks. Survey effort was concentrated on flowering *Angelica sylvestris* and other Apiaceae. Very heavy overnight rain had left the vegetation very wet and fine drizzle persisted through most of morning making sweeping all but impossible. Brighter spells later in the day brought out more insects but did not dry the vegetation. One female *Hylaeus pectoralis* was the only target species collected.

## 4.2 Tendring District, Essex

### 4.2.1 Alresford TM0619

Survey dates: 24/07/07, 03/08/07
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. No wasps were around either of the Ford Lane sites during the July 2007 visit. A few possible *O. simillimus* nest holes were seen in the corner of the arable field but the area had been heavily washed over by rain. A few more holes were seen along the bank by Ford Cottage and a possible adult wasp was seen on *Apium nodiflorum* in the ditch but the identification could not be confirmed. When the site was visited again in August, a female *O. simillimus* was observed constructing a chimney in the middle of the sea wall footpath c.70m east of Ford Cottage.

### 4.2.2 Alresford Creek TM0719

Survey date: 24/07/07
A nesting aggregation of *Odynerus simillimus* was discovered at this location in 2003. During the 2007 visit the nest aggregation found near a sluice in the bank above the borrow dyke (TM074191) was found to be active still. Four to six wasps were observed entering and leaving nest holes. Around 100m south of the nest burrows (TM074190), three wasps were seen nectaring on *Vicia cracca*. A male specimen was retained. A small

amount of *Apium nodiflorum* was found in an old pond but no wasps were seen there and there was very little weevil damage on the leaves. A second, new, nesting aggregation of *O. simillimus* was found 200m west along the borrow dyke (TM072191). This aggregation included an old *O spinipes* chimney. Nearby, patches of *Apium nodiflorum* in the ditch and of *Vicia cracca* on the banks have become established in the last year but no wasps were observed visiting the plants and no weevils were seen on the *A. nodiflorum*.

#### 4.2.3 Brightlingsea TM0617

Survey date: 24/07/07

A nesting aggregation of *Odynerus simillimus* was discovered at this location in 2002. When the site was visited in July 2007 some completed / abandoned nests were found but no wasp activity was observed. *Vicia cracca* was present along the field edge but no *Apium nodiflorum* was seen in the borrow dyke.

#### 4.2.4 Howlands Marsh, St Osyth TM1116

Survey date: 24/07/07

*Odynerus simillimus* was first recorded from this site in 2004 when a single wasp was observed hunting weevils on *Apium nodiflorum*. In July 2007, 2-3 wasps were seen hunting on a patch of *A. nodiflorum* in a freshwater ditch running through cattle grazed marsh (TM111161). Nesting of *O. simillimus* at the site was also confirmed for the first time when four chimneys were found on the south facing bank of a ditch c.100m north west of the *A. nodiflorum* patch (TM110162). Later, a single isolated nest was found on a slight raised bank several hundred metres to the north east (TM112165).

### 4.3 Norfolk Broads

#### 4.3.1 Buckenham Marshes TG3505

Survey date: 28/07/07

Buckenham Marshes is a RSPB reserve managed as grazing marsh. One male *Macropis europaea* was taken in a water trap set by Tim Strudwick. The trap was located close to Buckenham Station at the reserve entrance. No nest burrows were located.

#### 4.3.2 Hickling Broad TG4221

Survey dates: 08/08/07, 21/09/07

Hickling Broad is a Norfolk Wildlife Trust reserve. *Odynerus simillimus* was rediscovered in Britain from this location in 1986. Nesting aggregations were found in two parts of the reserve in 2002 in ditch dredgings and bare soil exposed by grazing. No wasps were observed when these sites were visited in 2007 and the area of suitably exposed substrate appeared low compared to the sites in North Essex. Discussion with John Blackburn, the NWT warden, confirmed the decline of the original colonies although small numbers of wasps had been observed earlier in the season. John also reported the discovery of a strong new colony on private land outside the reserve boundary (TG415220). The nesting aggregation is in wheel ruts along a bank used for access in a 4x4 vehicle. We were unable to gain access permission in time to observe the aggregation firsthand.

#### 4.3.3 Strumpshaw Fen TG3306 / TG3406

Survey dates: 03/07/07, 28/07/07

Strumpshaw Fen is a RSPB reserve including reed beds, sedge fen, carr and grazed wet grassland. One female *Macropis europaea* was taken in a water trap set by Tim Strudwick. A total of eight *M. europaea* of both sexes were recorded on flowers of *Cirsium arvense* and *Eupatorium cannabium*. No nest burrows were located this year although a few were seen in both 2005 and 2006. These were all in dry sandy, sparsely vegetated ground in open woodland adjacent to fen.

#### 4.3.4 Sutton Fen TG3723

Survey dates: 07/08/07, 08/08/07, 09/08/07

Sutton Fen is a recently acquired RSPB reserve comprising large areas of reed and sedge fen. Tim Strudwick visited the northern edge of the reserve, accessible by public footpath, on 7 August. A belt of woodland marks the boundary here where the wet fen interfaces with drier conditions on marginally higher ground. A female *Odynerus simillimus* was observed patrolling a bank of sandy silt adjacent to the wet fen. Eight female *Macropis europaea* were seen visiting nest holes in the same bank and *Hylaeus pectoralis* was also recorded from the same location. Returning to the site on 9 August Tim found three *O. simillimus* chimneys at the top of a short section of bank, c.1.5m high and facing due south (TG372238). The bank was of a slightly sandy silt material and was kept free of tall vegetation by cattle grazing. It was in a very sheltered situation, in a small clearing in the almost continuous woodland belt. *Berula erecta* was abundant in the vicinity. On 8 August five *M. europaea* were recorded on *Cirsium arvense* and four were taken in water traps at locations between 500m and 800m further south in the fen.

### 4.4 Suffolk Coast

#### 4.4.1 Minsmere TM4467 / TM4566 / TM4666

Survey date: 30/07/07

Minsmere is a RSPB reserve with a variety of wetland habitats. A single male *Odynerus simillimus* was captured here by Mike Edwards in 2001.With the help of Tim Strudwick, areas of fen with recently dredged ditches likely to support *Apium nodiflorum* were identified. Three locations were surveyed on 30 July but, although *Apium nodiflorum*, *Berula erecta* and *Vicia cracca* were present in varying amounts at each site, no *Odynerus simillimus* or evidence of nesting were seen. *Hylaeus pectoralis* was collected.

#### 4.4.2 Stour Estuary, Brantham TM1133 / TM1233

Survey date: 03/09/07

This location is an area of foreshore with a sea wall and a borrow dyke supporting *Phragmites australis*. The footpath atop the sea wall had potential sites for subterranean nesters were erosion had produced bare soil. *Apium nodiflorum* was present in a ditch and watercourse at TM119 334 and *Heracleum sphondylium* was growing throughout the site. Few insects were active at the time of the visit and none of the target species were seen.

#### 4.4.3 Stour Estuary, Lower Holbrook TM1734 / TM1735

Survey date: 03/09/07

At this site reed beds flank a cinder track running approximately 200m south from a public car park to the shore. *Heracleum sphondylium* was present and attracting insects but no *Apium nodiflorum* was seen. The footpath behind the foreshore to the west of Alton Wharf appeared to be a good location for aculeates and many holes were seen in the two parallel paths and the low foreshore cliffs. A variety of aculeates were seen visiting *Daucus carota*, *Leontodon* sp. and *Hedera helix* but the only target species collected was a female *Hylaeus pectoralis*.

#### 4.4.4 Stour Estuary, Harkstead TM1933 / TM2033

Survey date: 03/09/07

A public footpath allows access to the foreshore. *Phragmites australis* was growing an on inland sluice pond and on the foreshore. A few aculeates were seen on Compositae atop the 6-7m foreshore cliff but none of the target species were collected.

### 4.5 NW Suffolk

#### 4.5.1 Botany Bay, Lakenheath TL6785

Survey dates: 10/07/07, 08/08/07

This RSPB reserve comprises reed fen and grazing marsh regenerated on land that was arable fields. Two male *Macropis europaea* were seen on *Cirsium arvense* in July. In August two females were seen foraging on the *C. arvense* and a further four on *Lysimachia vulgaris*. A total of eight bees were observed patrolling a bank close to the *L. vulgaris*. Where a leaning tree had created a low bank, three females were nesting in the bare soil. The bank was shaded and was subjected to prolonged flooding through the winter.

#### 4.5.2 Lackford Lakes TL7970 / TL8070

Survey date: 21/08/07

This is a Suffolk Wildlife Trust wetland reserve created on the site of old gravel workings. *Angelica sylvestris*, *Lysimachia vulgaris* and *Phragmites australis* were present but *Apium nodiflorum* and *Berula erecta* were not seen. Bare ground suitable for subterranean nesters was present. Persistent drizzle throughout the visit restricted insect activity and none of the target species were recorded.

#### 4.5.3 Tuddenham Heath & Turf Fen TL7473

Survey date: 21/08/07

These locations form part of the Cavenham Heath National Nature Reserve managed by Natural England. Only the wetter areas of the site were visited where sedge fen with a strong *Lysimachia vulgaris* population and reed fen grading into wet grassland were present. Persistent drizzle again restricted insect activity and, although some brighter spells developed later in the day, none of the target species were recorded.

## 4.6 Waveney Valley

### 4.6.1 Carlton Marshes, Lowestoft TM5091 / TM5092

Survey date: 17/08/07

Carlton Marshes is a large Suffolk Wildlife Trust reserve in the lower Waveney Valley. A good range of wetland habitats are present including grazing marsh, reed bed and sedge fen. Stands of *Lysimachia vulgaris*, *Apium nodiflorum* and *Angelica sylvestris* were scanned and swept but the only target species collected were two female *Hylaeus pectoralis*.

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

Survey date: 30/08/07

Another large wetland reserve owned by Suffolk Wildlife Trust, Redgrave and Lopham Fens lie at the source of the Waveney. Reed, rush and sedge fens were visited in 2007. *Angelica sylvestris* was abundant but although the warden reported good stands of *Lysimachia vulgaris* none were seen on this visit. The only target species collected were two female *Hylaeus pectoralis*.

# 5 Discussion

## 5.1 General comments

The main aim of the survey work of locating sites for further autecological research was only partially achieved. The Tendring district of north Essex and Hickling Broad in Norfolk were confirmed as prime locations for further work on *Odynerus simillimus*. However, Sutton Fen may prove a good choice of study site as a strong population of *Macropis europaea* exists alongside *O. simillimus* here. *Hylaeus pectoralis* could be studied at Sutton Fen also. However, if further work on this bee is required, it is probably best undertaken alongside work on *Passaloecus clypealis,* and possibly *Anoplius caviventris* and *Rhopalum gracile* also, species which will also utilise reed as nesting habitat. Sites for further study of these last three species were not identified and further work, probably using alternative survey methods, is required to achieve this end.

## 5.2 *Anoplius caviventris*

The failure to find a population of *Anoplius caviventris* at any of the sites visited may have been, in part at least, due to the poor weather conditions. The visits to Chippenham Fen and Wicken Fen, the two sites that, based on past records, might have been most likely to yield specimens of this pompilid wasp, occurred in damp conditions when few aculeate hymenoptera of any sort were active and were also relatively late in the flight period. A further visit will be made to these sites in January 2008 to search for nests in hollow reed and other plant stems.

## 5.3 *Hylaeus pectoralis*

*Hylaeus pectoralis* appears to be the most widespread of the target species in East Anglian wetlands having been captured at seven of the sites visited. Winter collection of *Lipara lucens* galls and subsequent rearing of larvae from aculeate nests in the galls would probably show that the bee is present wherever the gall occurs. No information was gained on the pollen used by the bee although this may not be important in conservation terms if, as in Germany, it is polylectic.

## 5.4 *Macropis europaea*

Good populations of *Macropis europaea* were identified on RSPB reserves in the Norfolk Broads and at Lakenheath in north west Suffolk. However, the bee was not seen at any of the sites visited by the authors despite the presence of apparently suitable habitat and resources at several of the sites. Poor weather conditions may have been relevant but whether availability of nest sites is a limiting factor should be considered. Booth & Foster (2003) considered this may be the case with *Odynerus simillimus* and *M.europaea* has been found nesting alongside this wasp at Hickling Broad and at Sutton Fen.

## 5.5 *Odynerus simillimus*

As a result of *ad hoc* monitoring of *Odynerus simillimus* populations in the Tendring District of north Essex, David Scott is of the opinion that the wasp is at the least maintaining its population overall despite variations in individual nesting aggregations from year to year. The discovery of a new nesting aggregation at the Alresford Creek site

and confirmation of a breeding population at Howlands Marsh balancing apparent declines at the Brightlingsea and Alresford Ford Lane sites support this view. The same appears true of the Norfolk populations where declines at the original Hickling Broad sites are set against the discovery of new nesting aggregations there and at Sutton Fen. However, the establishment of a standardised monitoring programme for this BAP species is really required.

Although ditch slubbings can provide nesting sites for *O. simillimus,* they may not be so important as has been suggested in previous reports. Only the original Hickling Broad nest aggregations have been found in ditch slubbings and clearly the wasp is able to capitalise on a range of potential sites from temporary wheel ruts and ploughed furrows to the more permanent small cliffs along ditch banks. The substrate does appear to be important in choice of nest site; chimneys have been found in clay and silty soils. Although this includes sandy silt, no nests have so far been reported from sandy or peaty banks. If, as Booth & Foster (2003) suggested, nest sites are a limiting resource, more work to determine the exact requirements of the wasp would be beneficial. This could include investigations into the range of soil texture utilised, the amount of vegetation cover the wasp will tolerate and comparison of the success of methods for creating nest sites. A second aspect of the ecology that still needs elucidation is the extent and location of foraging habitat required by a nesting aggregation. Booth & Foster (2003) commented that there appeared to be insufficient forage habitat at the Brightlingsea site to support the nesting aggregation. This raises two questions, firstly what constitutes sufficient forage habitat and secondly how far will females fly to collect weevils? Some of the Tendring nest aggregations appear to be a long distance from the nearest known patches of *Apium nodiflorum*.

### 5.6 *Passaloecus clypealis*

The failure to find a population of *Passaloecus clypealis* at any of the sites visited may have been again, in part at least, due to the poor weather conditions. However, it should be noted that adults of *Passaloecus clypealis* are rarely collected in the field and searching old cigar galls and reed stems for nests may be a more efficient way of finding the wasp. Further site visits for this purpose are planned for January 2008.

### 5.7 *Rhopalum gracile*

As with *Anoplius caviventris* and *Passaloecus clypealis*, the failure to find a population of *Rhopalum gracile* at any of the sites visited may have been, in part at least, due to the poor weather conditions and key sites being visited relatively late in the flight period of this wasp. There is a chance that site visits planned for January 2008 to search for *A. caviventris* and *P. clypealis* nests may also produce nests of *R. gracile* in old reed stems.

# 6 Conclusions

Although fieldwork in 2007 was badly disrupted by the poor weather conditions, recording visits to nineteen East Anglian sites were still undertaken. These visits failed to detect the presence of three of the target species but the remaining three species were recorded from between four and seven of the sites. One site, Sutton Fen, supported all three species but none of the target species were detected at four sites. 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.

## 6.1 Recommendations for future studies

Repeating the survey in future years when better weather conditions allow for field work during optimum flight periods would probably increase the number of sites from which *Macropis europaea* and *Hylaeus pectoralis* were collected. It may also allow the confirmation of *Odynerus simillimus* at sites in Suffolk.

Further surveys based on the winter 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. Another technique that could be tried is the use of trap nests. However, if these species can only be found through such approaches it does suggest that further autecological work, e.g. observations on prey type, will be difficult.

A standardised system for monitoring the BAP priority species *Odynerus simillimus* should be established.

An investigation of the use of nest site resources by the subterranean nesters *Odynerus simillimus* and *Macropis europaea* is recommended. In the first place this could involve creation of areas of bare soil close to existing nesting aggregations. Discussion with land managers could identify a range of different methods to be tested, e.g. dumping of ditch slubbings, livestock grazing, scraping, ploughing, earth bank creation, and uptake by the aculeates would be monitored. An investigation of substrate texture preferences could be attempted alongside this study. A longer term aim may be the creation of new habitat away from known populations as a guard against threats from climate change and sea level rise in particular.

Further investigation of the extent and location of forage habitat required by a nesting aggregation of *Odynerus simillimus* could be undertaken.

# 7 Acknowledgements

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# Appendix 1

**Notes on *Odynerus simillimus* in the Tendring District 2004-6**

The last ACG commissioned work on *Odynerus simillimus* was in 2003. David Scott has been observing the wasp in its north Essex sites since that time and his observations are summarised here.

2004
Alresford
TM 064 197

| | |
|---|---|
| 7 July | Three chimneys on the bank in Ford Lane.<br>Fourteen chimneys in the field at the end of Ford Lane.<br>Four chimneys on the bank by Ford Cottage. |

Alresford Creek
TM 073 192

| | |
|---|---|
| 14 July | Several chimneys present near sluice on south side. Two wasps seen. |

Brightlingsea Sewage Works
TM 068 173

| | |
|---|---|
| 29 June | Several chimneys seen but *Odynerus spinipes* also present. |
| 11 August | Chimneys washed out by heavy rain, One wasp seen. |

Howlands Marsh, St. Osyth
TM112 163

| | |
|---|---|
| 21 July | One wasp seen. |

2005
Alresford
TM 064 197

| | |
|---|---|
| 30 June | Four chimneys on the bank by Ford Cottage.<br>One chimney on Ford Lane bank & field. One wasp seen. |

Alresford Creek
TM 073 192

| | |
|---|---|
| 14 July | Three possible chimneys present near sluice on south side. |
| 17 July | At least 12-15 chimneys present near sluice. |
| 24 July | At least 12-15 chimneys present near sluice plus one chimney 120m west of main colony. |

Brightlingsea Sewage Works
TM 068 173

| | |
|---|---|
| 14 July | Several chimneys washed out on bank, but 12-15 chimneys present at south end on ploughed furrows. |
| 24 July | 12-15 chimneys present at on ploughed furrows. |

2006
Alresford
TM 064 197
12 July At least two chimneys on the bank in Ford Lane.
At least two chimneys in the field at the end of Ford Lane.
At least two chimneys on the bank by Ford Cottage.

Alresford Creek
TM 073 192
14 July Good numbers present near sluice on south side.

Brightlingsea Sewage Works
TM 068 173
13 July Several chimneys present at north end of bank.

Howlands Marsh, St.Osyth
TM 112 163
3 July One possible wasp seen.

# Appendix 2

## Aculeate hymenoptera records from East Anglian wetlands

| SPECIES | LOCATION | GRID REF. | DATE | COLL. | DET. | No. |
|---|---|---|---|---|---|---|
| | | | | | | |
| *Chrysis angustula* | Minsmere | TM452664 | 30/07/07 | D.Scott | D.Scott | 1f |
| *Chrysis angustula* | Wicken Fen | TL555707 | 24/08/07 | D.Scott | D.Scott | 1f |
| *Tiphia femorata* | Redgrave & Lopham Fens | TM054799 | 30/08/07 | D.Scott | D.Scott | 2f |
| *Tiphia femorata* | Redgrave & Lopham Fens | TM049797 | 30/08/07 | P.Lee | P.Lee | 1f |
| *Myrmica rubra* | Turf Fen | TL743734 | 21/08/07 | D.Scott | D.Scott | 1w |
| *Myrmica scabrinodis* | Redgrave & Lopham Fens | TM051800 | 30/08/07 | P.Lee | P.Lee | 2m |
| *Formica fusca* | Lackford Lakes | TL800707 | 21/08/07 | P.Lee | P.Lee | w |
| *Priocnemis exaltata* | Minsmere | TM446675 | 30/07/07 | D.Scott | D.Scott | 1f |
| *Priocnemis pusilla* | Lower Holbrook | TM174347 | 03/09/07 | D.Scott | D.Scott | 2f |
| *Arachnospila anceps* | Redgrave & Lopham Fens | TM045797 | 30/08/07 | D.Scott | D.Scott | 1m |
| *Odynerus spinipes* | Alresford Creek | TM072191 | 24/07/07 | D.Scott | D.Scott | nest |
| *Odynerus simillimus* | Brightlingsea | TM067173 | 24/07/07 | D.Scott | D.Scott | nests |
| *Odynerus simillimus* | Alresford Creek | TM074191 | 24/07/07 | D.Scott | D.Scott | nests |
| *Odynerus simillimus* | Alresford Creek | TM072191 | 24/07/07 | D.Scott | D.Scott | nests |
| *Odynerus simillimus* | Alresford Creek | TM074191 | 24/07/07 | D.Scott | D.Scott | 4-6? |
| *Odynerus simillimus* | Alresford Creek | TM074190 | 24/07/07 | P.Lee | P.Lee | 1m +2? |
| *Odynerus simillimus* | Howlands Marsh | TM111161 | 24/07/07 | D.Scott | D.Scott | 2-3? |
| *Odynerus simillimus* | Howlands Marsh | TM110162 | 24/07/07 | D.Scott | D.Scott | 4 nests |
| *Odynerus simillimus* | Howlands Marsh | TM112165 | 24/07/07 | D.Scott | D.Scott | nest |
| *Odynerus simillimus* | Alresford | TM064197 | 03/08/07 | D.Scott | D.Scott | 1f + nest |
| *Odynerus simillimus* | Hickling Broad | TG415220 | --/08/07 | J.Blackburn | J.Blackburn | nests |
| *Odynerus simillimus* | Sutton Fen | TG372238 | 07/08/07 | T.Strudwick | P.Lee | 1f |
| *Odynerus simillimus* | Sutton Fen | TG372238 | 09/08/07 | T.Strudwick | T.Strudwick | 3 nests |
| *Ancistrocerus trifasciatus* | Turf Fen | TL744732 | 21/08/07 | P.Lee | P.Lee | 1f |
| *Symmorphus bifasciatus* | Carlton Marshes | TM507920 | 17/08/07 | D.Scott | D.Scott | 1f |
| *Symmorphus bifasciatus* | Redgrave & Lopham Fens | TM056797 | 30/08/07 | P.Lee | P.Lee | 1f |
| *Vespa crabro* | Chippenham Fen | TL644694 | 28/08/07 | D.Scott | D.Scott | 1w |
| *Vespa crabro* | Chippenham Fen | TL644692 | 28/08/07 | P.Lee | P.Lee | |
| *Vespa crabro* | Redgrave & Lopham Fens | TM045797 | 30/08/07 | D.Scott | D.Scott | 1w |
| *Vespa crabro* | Redgrave & Lopham Fens | TM052801 | 30/08/07 | P.Lee | P.Lee | |
| *Dolichovespula media* | Tuddenham Heath | TL744730 | 21/08/07 | P.Lee | P.Lee | 1m |
| *Vespula germanica* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | |
| *Vespula vulgaris* | Carlton Marshes | TM506919 | 17/08/07 | P.Lee | P.Lee | |
| *Vespula vulgaris* | Lackford Lakes | TL800707 | 21/08/07 | P.Lee | P.Lee | 1w |
| *Vespula vulgaris* | Tuddenham Heath | TL744730 | 21/08/07 | P.Lee | P.Lee | 1w |
| *Vespula vulgaris* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | |
| *Vespula vulgaris* | Chippenham Fen | TL644692 | 28/08/07 | P.Lee | P.Lee | |
| *Vespula vulgaris* | Chippenham Fen | TL650692 | 28/08/07 | P.Lee | P.Lee | |
| *Vespula vulgaris* | Redgrave & Lopham Fens | TM054801 | 30/08/07 | P.Lee | P.Lee | |
| *Vespula vulgaris* | Redgrave & Lopham Fens | TM052801 | 30/08/07 | P.Lee | P.Lee | |
| *Trypoxylon attenuatum* | Wicken Fen | TL555707 | 24/08/07 | D.Scott | D.Scott | 1m |
| *Crabro peltarius* | Redgrave & Lopham Fens | TM054799 | 30/08/07 | D.Scott | D.Scott | 1f |
| *Crossocerus podagricus* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | 1f |
| *Crossocerus podagricus* | Redgrave & Lopham Fens | TM052800 | 30/08/07 | D.Scott | D.Scott | 1f |
| *Crossocerus podagricus* | Lower Holbrook | TM176351 | 03/09/07 | D.Scott | D.Scott | 1m |
| *Ectemnius cavifrons* | Chippenham Fen | TL644694 | 28/08/07 | D.Scott | D.Scott | 1f |
| *Ectemnius cavifrons* | Chippenham Fen | TL650693 | 28/08/07 | P.Lee | P.Lee | 1f |
| *Ectemnius lapidarius* | Wicken Fen | TL561705 | 24/08/07 | D.Scott | D.Scott | 1f |
| *Ectemnius lapidarius* | Redgrave & Lopham Fens | TM056799 | 30/08/07 | P.Lee | P.Lee | 1f |
| *Ectemnius continuus* | Carlton Marshes | TM507920 | 17/08/07 | D.Scott | D.Scott | 1f |
| *Ectemnius continuus* | Turf Fen | TL744732 | 21/08/07 | P.Lee | P.Lee | 1f |
| *Ectemnius continuus* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | 1f |
| *Ectemnius continuus* | Chippenham Fen | TL644694 | 28/08/07 | D.Scott | D.Scott | 1f |
| *Ectemnius continuus* | Redgrave & Lopham Fens | TM052801 | 30/08/07 | P.Lee | P.Lee | 1f |
| *Ectemnius continuus* | Redgrave & Lopham Fens | TM051800 | 30/08/07 | P.Lee | P.Lee | 1f |
| *Ectemnius cephalotes* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | 1m |
| *Ectemnius cephalotes* | Wicken Fen | TL555707 | 24/08/07 | D.Scott | D.Scott | 1f |

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|---|---|---|---|---|---|---|
| | | | | | | |
| *Ectemnius lituratus* | Carlton Marshes | TM505917 | 17/08/07 | P.Lee | P.Lee | 1f |
| *Ectemnius lituratus* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | 1f |
| *Ectemnius lituratus* | Redgrave & Lopham Fens | TM045797 | 30/08/07 | D.Scott | D.Scott | 2f |
| *Lindenius albilabris* | Alresford Creek | TM073192 | 24/07/07 | D.Scott | D.Scott | 1f |
| *Stigmus solskyi* | Redgrave & Lopham Fens | TM052800 | 30/08/07 | D.Scott | D.Scott | 1f |
| *Mellinus arvensis* | Lackford Lakes | TL798706 | 21/08/07 | D.Scott | D.Scott | 1f |
| *Gorytes quadrifasciatus* | Carlton Marshes | TM507920 | 17/08/07 | D.Scott | D.Scott | 1f |
| *Gorytes quadrifasciatus* | Redgrave & Lopham Fens | TM052800 | 30/08/07 | D.Scott | D.Scott | 1f |
| *Cerceris quinquefasciata* | Redgrave & Lopham Fens | TM045797 | 30/08/07 | D.Scott | D.Scott | 1f |
| *Cerceris rybyensis* | Minsmere | TM445674 | 30/07/07 | P.Lee | P.Lee | |
| *Cerceris rybyensis* | Lower Holbrook | TM174347 | 03/09/07 | D.Scott | D.Scott | 1f |
| *Cerceris rybyensis* | Lackford Lakes | TL804709 | 21/08/07 | P.Lee | P.Lee | 1f |
| *Philanthus triangulum* | Howlands Marsh | TM110162 | 24/07/07 | P.Lee | P.Lee | 1m |
| *Hylaeus communis* | Chippenham Fen | TL644694 | 28/08/07 | D.Scott | D.Scott | 2f |
| *Hylaeus communis* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | 1f |
| *Hylaeus pectoralis* | Minsmere | TM4467 | 30/07/07 | T.Strudwick | T.Strudwick | |
| *Hylaeus pectoralis* | Sutton Fen | TG372238 | 07/08/07 | T.Strudwick | T.Strudwick | |
| *Hylaeus pectoralis* | Carlton Marshes | TM507920 | 17/08/07 | D.Scott | D.Scott | 2f |
| *Hylaeus pectoralis* | Wicken Fen | TL561705 | 24/08/07 | D.Scott | D.Scott | 1f |
| *Hylaeus pectoralis* | Chippenham Fen | TL647696 | 28/08/07 | D.Scott | D.Scott | 3f |
| *Hylaeus pectoralis* | Redgrave & Lopham Fens | TM045797 | 30/08/07 | D.Scott | D.Scott | 2f |
| *Hylaeus pectoralis* | Lower Holbrook | TM176351 | 03/09/07 | D.Scott | D.Scott | 1f |
| *Andrena minutula* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | 1f |
| *Lasioglossum calceatum* | Carlton Marshes | TM507910 | 17/08/07 | D.Scott | D.Scott | 1f |
| *Lasioglossum calceatum* | Redgrave & Lopham Fens | TM054799 | 30/08/07 | D.Scott | D.Scott | 1m |
| *Lasioglossum leucozonium* | Carlton Marshes | TM508920 | 17/08/07 | P.Lee | P.Lee | 1f |
| *Lasioglossum malachurum* | Harkstead | TM206334 | 03/09/07 | D.Scott | D.Scott | 1m |
| *Lasioglossum ?quadrinotatum* | Wicken Fen | TL561705 | 24/08/07 | D.Scott | D.Scott | |
| *Lasioglossum villosulum* | Brantham | TM119334 | 03/09/07 | D.Scott | D.Scott | 1f |
| *Sphecodes ephippius* | Carlton Marshes | TM505917 | 17/08/07 | P.Lee | P.Lee | 1f |
| *Sphecodes ephippius* | Redgrave & Lopham Fens | TM057800 | 30/08/07 | P.Lee | P.Lee | 1f |
| *Sphecodes rubicundus* | Carlton Marshes | TM507920 | 17/08/07 | D.Scott | D.Scott | 1f |
| *Macropis europaea* | Strumpshaw Fen | TG339063 | 03/07/07 | T.Strudwick | T.Strudwick | 3 |
| *Macropis europaea* | Lakenheath Fen | TL674853 | 10/07/07 | T.Strudwick | T.Strudwick | 1m |
| *Macropis europaea* | Lakenheath Fen | TL678854 | 10/07/07 | T.Strudwick | T.Strudwick | 1m |
| *Macropis europaea* | Strumpshaw Fen | TG339063 | 28/07/07 | T.Strudwick | T.Strudwick | 5 |
| *Macropis europaea* | Strumpshaw Fen | TG341064 | 28/07/07 | T.Strudwick | T.Strudwick | 1f |
| *Macropis europaea* | Buckenham Marshes | TG350056 | 28/07/07 | T.Strudwick | T.Strudwick | 1m |
| *Macropis europaea* | Sutton Fen | TG372238 | 07/08/07 | T.Strudwick | T.Strudwick | 8f |
| *Macropis europaea* | Sutton Fen | TG370232 | 07/08/07 | T.Strudwick | T.Strudwick | 5 |
| *Macropis europaea* | Sutton Fen | TG370230 | 08/08/07 | T.Strudwick | T.Strudwick | 4 |
| *Macropis europaea* | Lakenheath Fen | TL673853 | 08/08/07 | T.Strudwick | T.Strudwick | 2f |
| *Macropis europaea* | Lakenheath Fen | TL673852 | 08/08/07 | T.Strudwick | T.Strudwick | 2f |
| *Macropis europaea* | Lakenheath Fen | TL676853 | 08/08/07 | T.Strudwick | T.Strudwick | 8 |
| *Macropis europaea* | Lakenheath Fen | TL675853 | 08/08/07 | T.Strudwick | T.Strudwick | 1f |
| *Macropis europaea* | Lakenheath Fen | TL676855 | 08/08/07 | T.Strudwick | T.Strudwick | 1f |
| *Macropis europaea* | Lakenheath Fen | TL674853 | 08/08/07 | T.Strudwick | T.Strudwick | 3f |
| *Megachile ligniseca* | Minsmere | TM445674 | 30/07/07 | P.Lee | P.Lee | 1f |
| *Epeolus variegatus* | Lower Holbrook | TM174347 | 03/09/07 | D.Scott | D.Scott | 2m |
| *Apis mellifera* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | |
| *Apis mellifera* | Redgrave & Lopham Fens | TM054801 | 30/08/07 | P.Lee | P.Lee | |
| *Apis mellifera* | Redgrave & Lopham Fens | TM057800 | 30/08/07 | P.Lee | P.Lee | |
| *Apis mellifera* | Redgrave & Lopham Fens | TM056799 | 30/08/07 | P.Lee | P.Lee | |
| *Bombus hortorum* | Turf Fen | TL744732 | 21/08/07 | P.Lee | P.Lee | 1w |
| *Bombus lapidarius* | Minsmere | TM445674 | 30/07/07 | P.Lee | P.Lee | 1m |
| *Bombus lapidarius* | Carlton Marshes | TM506919 | 17/08/07 | P.Lee | P.Lee | 1m |
| *Bombus lapidarius* | Carlton Marshes | TM505917 | 17/08/07 | P.Lee | P.Lee | 1m |
| *Bombus lapidarius* | Lackford Lakes | TL804709 | 21/08/07 | P.Lee | P.Lee | 1m |
| *Bombus lapidarius* | Chippenham Fen | TL646697 | 28/08/07 | P.Lee | P.Lee | 1m |
| *Bombus lapidarius* | Redgrave & Lopham Fens | TM057800 | 30/08/07 | P.Lee | P.Lee | 1m |
| *Bombus lucorum* agg. | Carlton Marshes | TM506919 | 17/08/07 | P.Lee | P.Lee | |
| *Bombus lucorum* agg. | Lackford Lakes | TL804709 | 21/08/07 | P.Lee | P.Lee | 1w |
| *Bombus lucorum* agg. | Tuddenham Heath | TL744730 | 21/08/07 | P.Lee | P.Lee | |

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|---|---|---|---|---|---|---|
| | | | | | | |
| *Bombus pascuorum* | Minsmere | TM445674 | 30/07/07 | P.Lee | P.Lee | 1w |
| *Bombus pascuorum* | Carlton Marshes | TM508920 | 17/08/07 | P.Lee | P.Lee | 1w |
| *Bombus pascuorum* | Carlton Marshes | TM506919 | 17/08/07 | P.Lee | P.Lee | 1w |
| *Bombus pascuorum* | Lackford Lakes | TL800707 | 21/08/07 | P.Lee | P.Lee | 1w |
| *Bombus pascuorum* | Lackford Lakes | TL804709 | 21/08/07 | P.Lee | P.Lee | 1m1w |
| *Bombus pascuorum* | Tuddenham Heath | TL744730 | 21/08/07 | P.Lee | P.Lee | |
| *Bombus pascuorum* | Turf Fen | TL744732 | 21/08/07 | P.Lee | P.Lee | 1m |
| *Bombus pascuorum* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | |
| *Bombus pascuorum* | Chippenham Fen | TL646697 | 28/08/07 | P.Lee | P.Lee | w |
| *Bombus pascuorum* | Chippenham Fen | TL650692 | 28/08/07 | P.Lee | P.Lee | |
| *Bombus pascuorum* | Redgrave & Lopham Fens | TM054801 | 30/08/07 | P.Lee | P.Lee | |
| *Bombus pascuorum* | Redgrave & Lopham Fens | TM052801 | 30/08/07 | P.Lee | P.Lee | |
| *Bombus pascuorum* | Redgrave & Lopham Fens | TM049797 | 30/08/07 | P.Lee | P.Lee | 1w |
| *Bombus pascuorum* | Redgrave & Lopham Fens | TM057800 | 30/08/07 | P.Lee | P.Lee | |
| *Bombus terrestris* | Minsmere | TM445674 | 30/07/07 | P.Lee | P.Lee | 1w |
| *Bombus terrestris* | Lackford Lakes | TL804709 | 21/08/07 | P.Lee | P.Lee | 1w |
| *Bombus terrestris* | Turf Fen | TL744732 | 21/08/07 | P.Lee | P.Lee | 1q |
| *Bombus terrestris* | Wicken Fen | TL560707 | 24/08/07 | P.Lee | P.Lee | |
| *Bombus terrestris* | Chippenham Fen | TL644692 | 28/08/07 | P.Lee | P.Lee | |