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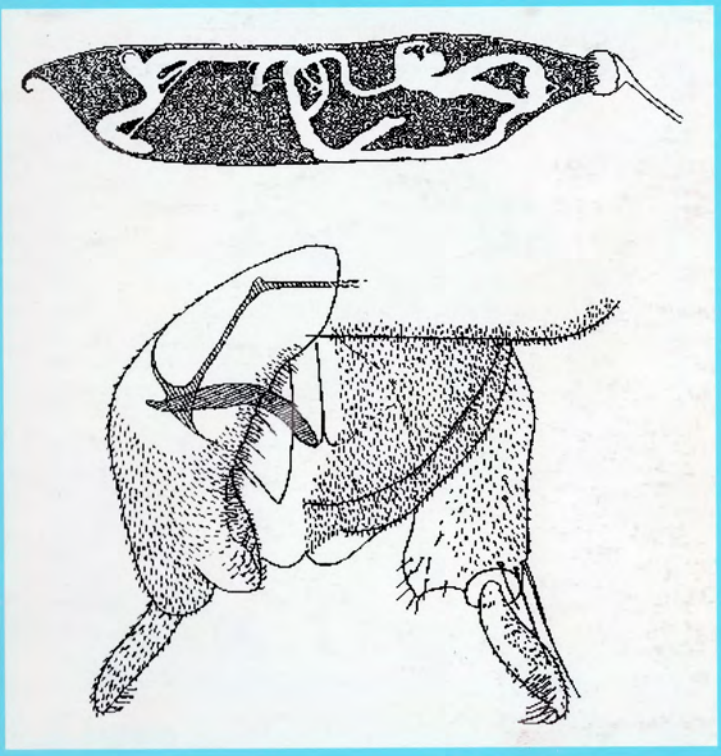

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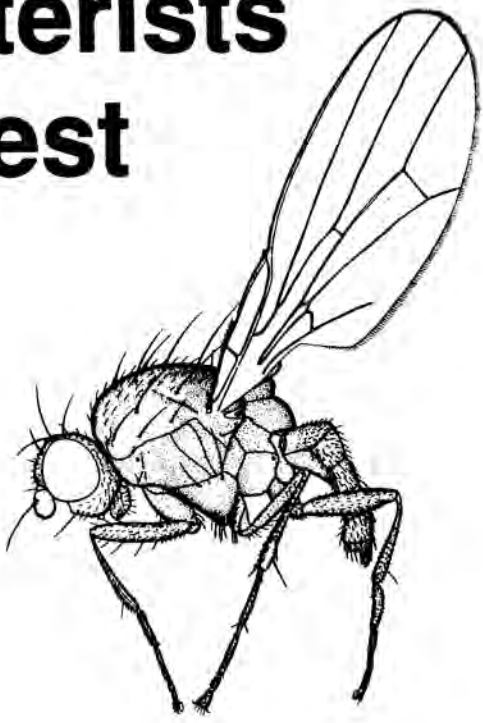

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Dipterists Digest is the journal of the **Dipterists Forum**. It is intended for amateur, semi-professional and professional field dipterists with interests in British and NW European flies. All notes and papers submitted to **Dipterists Digest** are refereed. The scope of **Dipterists Digest** is:

- the behaviour, ecology and natural history of flies;
- new and improved techniques (e.g. collecting, rearing etc);
- the conservation of flies;
- provisional and interim reports from the Diptera Recording Schemes, including maps;
- records and assessments of rare and scarce species including those new to regions, countries, districts etc;
- local faunal accounts and field meeting results specially if accompanied with good ecological/natural history interpretion;
- descriptions of species new to science, and
- notes on identification including deletions, ammendments to standard key works and checklists.

Articles may be of any length up to 3,000 words and must not have been accepted for publication elsewhere. Items exceeding this length may be serialised or printed in full, depending on competition for space. Articles should be written in clear and concise English, preferably typed double spaced on one side of A4 paper. Style and format should follow articles published in the most recent issue. References to journals should give the title in full. Only scientific names should be underlined. Tables should be on separate sheets. Figures should be drawn in clear black ink, about twice their printed size and lettered clearly. Descriptions of new species should include a note of which museum or institution type material is being deposited. Material submitted on 3.5" computer disc should be in ASCII, Word or Word Perfect formats and accompanied by hard copy. Authors will be provided with twenty reprints of papers of two or more pages in length.

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Dipterists Digest 1997 **4**, 1-3

A method of mass-rearing the hoverfly *Episyrphus balteatus* (Diptera, Syrphidae)

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Episyrphus balteatus (Degeer) is considered difficult to culture (Schneider 1948; Gilbert, pers. comm.) because adults require large amounts of space for mating on the wing. They also need a suitably strong light source for them to be sufficiently active. The following method is based on established culturing techniques for *E. balteatus* (Hickman, pers. comm.; Frazer, 1972), but with some changes made in order to increase the number of hoverflies reared and with a greater efficiency.

The culturing system was housed in a room maintained at a constant environment of 20°C and 18L:6D photoperiod. Shelves were constructed to hold the insect rearing cages and mounted within a metal frame. The shelves were made of 'chipboard' and painted with several coats of 'yacht varnish' to prevent water absorption. On the underside of each shelf six five-foot (1.54m) fluorescent tubes (58W) were affixed, together with fans to cool the lights. Cages were constructed to rear aphids (which were to be prey for the hoverfly larvae) and for housing the hoverflies. Two sizes of cage were used for aphid rearing: five cages measured approximately 60 cm wide, 60 cm long and 45 cm high and five cages measured 90 cm wide, 120 cm long and 30 cm high. The two side walls and back of each cage were of acrylic sheet, the floor of plywood, the top of muslin and the front of muslin attached by velcro for quick and easy access to the aphids. The cages for adult hoverflies were of a similar design, measuring 60 cm wide, 60 cm long and 95 cm high, with acrylic sheet for the top and front and muslin for the two side walls. A 15 x 15 cm hole was cut in the front and muslin fixed by velcro was used to cover this hole for access to the cage. The front acrylic panel was fixed by wing nuts for easy removal when the cage needed to be cleaned. Initially the adult cages had a 35 cm high strut fixed in the middle of the cage upon which food could be placed (Frazer, 1972). However, these were later removed as they were deemed unnecessary.

In the constant environment room Spring field beans (CPB Twyford, Scots Farm, Kings Sutton, Banbury, Oxon, OX17 3QW, cultivar *Scirocco*) were sown thickly (approximately forty beans per tray) in John Innes compost in plastic half trays (a rate of fifty half trays per week). Six to twenty half trays (depending on the size of the cage) of newly sprouted beans were placed in the aphid cages on plastic trays. Vetch aphids (*Megoura viciae*) were then introduced on to the bean plants. This species was chosen because it has a relatively fast rate of population increase, is large and feeds on all parts of the bean plant including the stem. The bean plants were replaced as and when necessary, i.e. when they started to wilt under the pressure of the aphids; usually once a week. Approximately three weeks after inoculation, the population of vetch aphids had increased to a level at which hoverflies could be introduced as eggs. Currently a mixed colony of pea and vetch aphids is being maintained. Other species of aphid have been used but were not as successful as the mixed colony of vetch and pea aphids. The black bean aphid *Aphis fabae* was unsuitable as it was difficult to rear the aphid in sufficient numbers to support the hoverfly colony. Pea aphid (*Acrythosiphum pisum*) alone was also used initially, but the

population was prone to sudden declines in density.

Adult hoverflies were kept in the large cages. High densities of adults were kept in each cage, sometimes up to 2,000. They were fed on pollen from bee hives (Sigma-Aldrich Company Ltd., Fancy Road, Poole, Dorset, BH12 4QH U.K., Cat. No. P-8753) placed on petri dish lids on the floor of the cage. Water was provided on cotton wool placed in cylindrical tubes. Both the pollen and the water were replaced every three days. Sugar cubes on petri dish lids were placed on the floor of the cage, and changed at bi-monthly intervals. Honey water was used initially, but was found to be troublesome and prone to mould infections. A cut section of bean plant infested with aphids was placed in the cage when eggs were required. The adults were stimulated to oviposit by the presence of the aphids and their honeydew. Newly emerged adult females take between ten to fourteen days before starting to lay eggs. Some adults survived for up to two months. Cut flowers (*Phacelia tanacetifolia*) were placed in the cage and changed at regular intervals as a source of nectar for the adult hoverflies. However, it was later found that the flowers were not necessary for maintaining the population.

Initially, the following method was used to rear *E. balteatus*, but was found to result in high levels of mortality. Eggs were removed from the adults' cage and placed in plastic containers (15x28x10 cm), with 3 cm ventilation holes covered in muslin in the lid and four sides of the container. Cut sections of bean plants with hoverfly eggs and infested with aphids were placed in the containers. First instar larvae emerged about two days later. Excess aphids were placed in the containers daily along with fresh bean plant sections. Third instar larvae were voracious feeders and consumed great quantities of aphids, making it very important for there to be an adequate supply of prey. Fifty to two hundred larvae were kept in each container through to pupation. There was some evidence of cannibalism, but it appeared to be minimal, as long as sufficient aphids were provided. A proportion of the second instar larvae were transferred singly to Blackman boxes (Blackman, 1971) containing cut sections of bean plants infested with aphids which eliminated cannibalism, and increased the chance of successful pupation. The third instar larvae discharged their abdominal contents when ready to pupate, which was seen as a brown semi-liquid deposit on the bean plant or walls of the container. The pupae were removed immediately with a paintbrush, and put on to cotton wool on petri dish lids which were placed on the floor of the adult cages. The adults emerged about a week later.

Over a period of time it became apparent that there was a high mortality of *E. balteatus* with this method, as well as a significant wastage of aphids. In a modification of the methodology, eggs were collected as before, but were placed directly on to bean plants infested with aphids in one of the smaller aphid cages. Absorbent cloth was attached to the floor of the cage by velcro to soak up excess water to prevent any mortality by drowning. The half trays of beans were placed on sections of wood to raise them off the floor of the cage by about 2 cm to stop water logging. The eggs were allowed to hatch and the larvae were allowed to feed on the aphids on growing plants. Aphids were added when necessary, and the bean plants were carefully watered up until pupation, when the soil was allowed to dry out in an attempt to limit *Sciarid* fly infestation and prevent pupae from rotting in the water. Pupation and adult emergence occurred in the cage. The larvae pupated almost anywhere in the cage, but mainly underneath the half trays and on the bean plants. Adults were collected when they appeared and placed in the adult rearing cages. By this method far fewer aphids were required (because of the lower mortality of the prey) to support the hoverfly population. Likewise there was lower mortality of *E. balteatus*, with well over two thousand adults being collected at one time.

For experimental purposes a batch of eggs could be collected from the stock colony of adults over a period of two or three hours and reared through to adulthood and placed into an empty adult cage. This provided a group of flies from the same generation with a synchronous adult emergence to within 48-72 hours.

Acknowledgements

Thanks to Janice Hickman and Francis Gilbert for help and advice on the rearing and biology of *E. balteatus*. This work was carried out as part of a studentship funded by the School of Biological Sciences at the University of Birmingham.

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Recent records of rare and notable *Ctenophora* & *Nephrotoma* (Tipulidae)

***Ctenophora flaveolata* (Fab.):** a gravid female was taken at the Sheepleas, Surrey (TQ089513) on 30.v.1996. She was showing interest in the base of a very large coppiced hazel, and in flight was a most convincing mimic of a queen *Vespula* wasp. the site has large amounts of wind blown beech, mostly in an advanced state of decay, as well as abundant hawthorn. Both features are known habitat elements for the species (Falk, S. 1991. A review of the scarce and threatened flies of Great Britain. Part 1. *Research & Survey in Nature Conservation*. **No.39.** NCC). This is possibly the first record of the species in Surrey.

***Ctenophora atra* (L.):** this attractive and nationally notable cranefly can be locally abundant in the area covered, with records from a variety of habitats. This cranefly readily utilises the piles of birch logs, which are often left in situ after heathland clearance work:-
Woolmer Forest, N. Hampshire (SU789324), several adults found prior to emergence under bark of rotten birch log. Somerset Bridge, Surrey (SU920444), deciduous woodland, female egg-laying in a long dead but hard oak stump. Thursley NNR, Surrey (SU908400), several adults around piles of birch logs, May 1996. Tugley wood, Surrey (SU9833), several in mixed woodland in May/June 1990-94.

***Nephrotoma crocata* L.:** this highly distinctive and handsome insect appears to have declined dramatically, and is currently listed as RDB3. Woolmer Forest, N. Hampshire (SU789325). A female landed in the bottom of a pond basin I was excavating by hand on 24.vii.1994. The substrate was loose slightly damp sand, into which the fly began to oviposit. Thursley Village, Surrey (SU902392), a female was observed ovipositing at the edge of a small garden pool on the 16.viii.1994. Folly Bog, Surrey (SU9261) 22.v.1997, a female in a sandy ditch.

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Further records of *Hilara setosa* (Diptera, Empididae) with some notes on its ecology

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Hilara setosa was described by Collin from specimens taken by J.J.F.X.King at Nethy Bridge in Strathspey on the 23rd and 29th August, 1906. There would appear to be no further records until one was taken by Ian McLean on the River Spey at Grantown on Spey on the 21st September 1979 and by Peter Chandler in Glen Affric on 1st September 1984. There is also a relatively recent record from northern England (JNCC unpublished data sheets). The few records for this species no doubt contributed to it being classified as RDB 2 - vulnerable in Falk (1991). On a European basis *H. setosa* is apparently only known at present from Great Britain (Chvála and Wagner, 1989) and thus as a possible endemic species an understanding of its distribution and ecology assume a greater importance.

I first took specimens of *H. setosa* on the River Nairn near Inverness during August 1991 where it occurred in good numbers. During 1996 however I made a more serious attempt to survey its occurrence on some of the main tributaries of the Tay and nearby rivers in Perthshire, Scotland. As a result I recorded it from a further eight sites in eight different 10km squares. On the Tay system it is present on the Rivers Almond, Braan and Blackwater, the Brerachan water and the Shee Water. It is also present on the River South Esk which reaches the North Sea at Montrose.

H. setosa was characteristically associated with medium sized, relatively fast flowing rivers in upland glens. These are often subject to winter spates and as a result there are often many stones, boulders and fine shingles exposed in the late summer months. As with the other *Hilara* species present *H. setosa* was most often associated with areas where trees, mainly alder in this case, provided some shelter by being present on at least one bank of the river. Sweeping over shingles and exposed stones under and around trees and on sheltered shingles and stones proved to be the most profitable area of capturing *H. setosa*. Although loch margins and other water courses were sampled it was not found associated with still water habitats or in association with small streams.

The altitudinal range of captures was between 140 and 330m. It was not found at four apparently suitable river sites in the Tay system at an altitude of 80m or less or in a more exposed site at 370m. *H. setosa* is commonly found in association with other *Hilara* species such as *H. chorica*, *H. nigrina*, *H. beckeri* and *H. canescens*. Dates of capture ranged from 26th August to 21st September.

In conclusion it seems that *H. setosa* is a relatively common species in the middle reaches of the Tay system. Records from other parts of the Highlands would also indicate that it is well distributed. Lack of records in the past is probably mainly due to its flight period in September being outwith the season which entomologists are active in the Highlands and indeed elsewhere.

Collin (1961) did not illustrate the male genitalia of *H. setosa* which appears diagnostic for the species. To assist recognition and recording of this species the male genitalia from a Perthshire specimen is provided (Fig. 1).

Fig. 1 ***Hilara setosa*****, a, aedeagus, lateral view; b, side lamella**

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Dipterists Digest 1997 4, 6-8

Recent records of notable and rare larger Brachycera from the Western Weald

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In this paper we give new records of Tabanoidae and Asiloidae categorised as notable or rare by Falk (1991), and others which are of regional significance from the western part of the Weald. This area covers parts of three vice counties viz. North Hampshire, VC12; West Sussex, VC13, and Surrey, VC17. We include several new vice county records, based on the lists produced by Martin Drake (1991).

STRATIOMYIDAE

Beris clavipes (L.) VC13: Burton Mill pond, (SZ9717) on 27.vi.95. VC17: Thursley NNR 18.vii.93.

Chorisops nagatomii Roskowsky. VC12: Alton, Chawton, (SU7138) roadside verge. 15.viii.95., VC17: Cranleigh (TQ0737), swept from beside a marshy ditch, vi.94; Whitedowns (TQ1249) edge of beech woodland, 9.viii.92.

Odontomyia ornata (Meigen). Several adults were found by RF on flowerheads of *Oenanthe crocata* beside the River Arun at Wisborough Green (TQ0726) on 24.vi.92. This was adjacent to the river and a disused canal with abundant submerged vegetation. This appears to be the first record for VC13 of this RDB2 species.

O. tigrina (F.). VC13: Burton Mill pond (SZ9717) 26.vi.95; River Arun at Stopham Bridge (TQ0318) 21.v.92; VC17: Shalford (TQ0047), 14.vi.94; Thundry Meadows (SU8944) several around a small *Typha* dominated pond on 17.v.93, along with a single specimen of the uncommon ephydrid *Ochthera mantis* Degeer; Farnham Park (SU8348) VC97.

Stratiomys potamida (Meigen) VC13: Burton Mill Pond (SZ9717) 31.vii.91; VC17: Hammer and Forked ponds, Thursley NNR (SU9140) vi-vii.92-96.

Vanomyia tenuicornis (Macquart). A single male was swept from streamside vegetation, dominated by *Phalaris arundinacea* next to Alton Station, North Hampshire on the 23.vi.96. First record for VC12.

RHAGIONIDAE

Atherix ibis (F.). VC17: Swept from riverside vegetation at Thundry Meadows (SU8943), 26.v.94, and at Somerset Bridge, Elstead (SU9243), vi.92-96.

A. marginata (F.). A single specimen swept by RMF from *Sparganium* beside the River Wey, at Eashing, Surrey (SU9443) on 18.vii.95. This constitutes the first record for VC17, and the first modern record for South-east England. Old records from the 19th century

mentioned by Verrall (1909) from Kent, and London, seem less dubious in the light of this record.

ASILIDAE

Asilus crabroniformis L. This RDB3 robberfly is still frequently seen on some Surrey heaths. However stable colonies are very localised, on Thursley NNR (SU89-90,40), Hankley common, (SU8841) and Witley Common (SU9340) late vi-x.92-96. At Thursley small aggregations of adults were found around horse dung on the bridleways, including pairs *in copula*. A female was also seen ovipositing under rabbit droppings.

Dioctria oelandica (L.). VC12: Old pasture woodland on Odiham common (SU7552) on 21.v.95. VC17: Thundry Meadows (SU8943) in rough grassland glade amongst mature oak woodland, 18.vi.94; Thursley NNR, in mixed woodland (SU9140) v-vi.94.

Eutolmus rufibarbis (Meigen). A RDB3 species, recently recorded at the following heathland sites: VC12: Frensham common (SU84-5,40), several on open heathland with gorse and *Deschampsia*, 10.vi.93; Hankley common (SU8942), swept from *Molinia* 16.vii.93; Thursley NNR (SU89-91, 40) vi-viii.92-6; VC17: Woolmer Forest (SU 7832) most frequent in open areas with some grass tussocks, vi-vii.92-6. The presence of some grassy vegetation seems important for this species. Also found on sandy floodplains of Thundry Meadows (SU8943) hunting from molehills in tall grassland, vii.1997.

Laphria marginata (L.) A notable woodland species which appears to have become more abundant over recent years. VC12: Alice Holt Forest (SU8142), 16.vi.93; VC17: Bookham Common (TQ1356), 26.vii.92; Elstead (SU9142) vi-vii. 92-6; Frillinghurst wood (SU9334) viii.92; Thundry Meadows (SU8944) vi.92-4; Thursley NNR (SU9140) vi.94.

Machimus rusticus (Meigen). Several found on scrubby chalk grassland at Whitedowns, Surrey (TQ1249) vi-vii.92/3. Adults disturbed from the short turf, regularly flew up to low branches of Dogwood etc. These appear to be the first records for VC17.

SCENOPINIDAE

Scenopinus fenestralis (L.). A single specimen of this declining species was taken indoors in Thursley Village, Surrey (SU9039) on 16.ii.92.

THERIVIDAE

Thereva plebeja (L.) VC17: Blackheath (TQ0346), 1 male on sandy firebreak, 12.vii.96; Thundry meadows (SU8943), a male found on sandy foodplain grassland, 9.viii.95.

BOMBYILIIDAE

Thyridanthrax fenestratus (Fallén). Frequent on several heaths in the study area, where recorded every year between 1992-6, vi-ix. VC12: Woolmer forest (SU73); VC13: Weaver's Down (SU8130); VC17: Frensham Common (SU8540); Hankley Common (SU84); Thursley NNR (SU94). Little is known of the dispersive powers of this species, but a single specimen was found in a garden in Thursley village, c.1km from the heathland on the NNR.

Mike Edwards and I have closely observed the oviposition method of the females. First they alight and 'wiggle' their abdomens into loose sand, then whilst hovering c.10cm

above the ground make a deep lunge flicking an egg into the base of a heather clump. It seems likely that sand is collected during the 'wiggle' which is then used to ballast the egg before deposition.

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Some Additional Mosquito Records from North Wales - The recent article on the distribution of *Aedes* by Rees and Snow (1996. The distribution of *Aedes*: subgenus *Ochlerotatus* in Britain. *Dipterists Digest*. **3(1):** 5-23) includes no records for Wales of *Aedes annulipes*, the distribution map indicates occurrence only in south and eastern areas of England. However, there are three North Wales localities for this species, the most recent probably being discovered since the map was produced. This was at a nature reserve of the North Wales Wildlife Trust, Big Pool Wood, near Gronant, Flints. V.C., SJ 102 838. During a visit by the North Wales Invertebrate Group on 21 May, 1995, both male and female mosquitoes were swept from the vegetation in great numbers, being more abundant than any other insect in the area. Fortunately few bites were sustained on this occasion! Keith Snow confirmed my identification.

At Llyn Bedydd, near Bronington, Denbs. V.C. SJ 471393, 18 August 1979, females were plentiful and biting, (M.J.M.). W. A. Ely recorded *annulipes* at Cors Goch N.R., Anglesey, SH 50.81. on 12 August 1982.

Aedes caspius is shown on the map as being recorded in Merioneth, prior to 1940 only. I found males of this species quite common in reed beds on the tidal stretch of the Afon Mawddach near the old railway track at Penmaenpool, near Dolgellau, SH 697188, on 15 July 1978.

Aedes cantans, *punctor* and *rusticans* were all recorded at Llay Hall Farm, near Cefn-y-bedd, Wrexham, Denbs., SJ 323553, in pools at Llay bog, between 1974-77 by Frederick Burke. **JOAN MORGAN**, School of Biological Sciences, University of Wales, Bangor, Gwynedd.

Dipterists Digest 1997 **4**, 9-17

Observations of aerial swarming in thirteen species of Diptera, and a discussion of 'occasional' swarmers

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Through whatever circumstance of climate and good fortune, 1996 was notable for the number of instances of aerial swarming in Diptera I witnessed, and nine of these thirteen accounts are from that year. In addition, eight of these records are from a single locality, Brent Reservoir (VC 21, Middlesex). The swarms described here include some that were distinctive in appearance, and others that seem unusual due to their size or the taxon represented.

Observations of swarming

Bibio leucopterus (Meigen) (Bibionidae). Brent Reservoir, East SSSI, TQ 2187 & 2287, 25 May 1996. 2 ♂ retained. Identified using Freeman and Lane (1985). This species was seen flying in many large amorphous swarms occupying entire clearings and spaces between trees from ground-level to 7m or more. Most sheltered clearings and woodland margins were occupied in mixed deciduous and carr woodland along a 500m stretch of the reservoir margin, and these swarms comprised in total many hundreds of thousands of individual flies.

Bibio pomonae (Fabricius) (Bibionidae). Haighton House, SD 560337, VC 60 West Lancaster, 28 June 1987. 1 ♂ retained. Identified using Freeman and Lane (1985). Adjacent to a bridle-path and poorly drained grassland (with standing water), and sheltered by a steep bank there was a row of tall, formally planted trees (species unrecorded). In each of the gaps between these trees there was an enormous vertical 'cylindrical' swarm of *B. pomonae*. These dense black clouds of flies extended to approximately the height of the trees, and the flies were also extremely numerous on nearby vegetation. As with the previous species many hundreds of thousands of individuals were involved.

Freeman and Lane (1985) suggest that *B. pomonae* is a species associated with heather in upland situations. The current observations however refer to a population several miles from the nearest extensive tracts of heather and at an altitude of only 40m. This also supplements the observation of R. P. Lane (Freeman and Lane, 1985) who reports seeing "loose swarms on two occasions".

Drapetis assimils (Fallén) (Hybotidae). Brent Reservoir, north arm, TQ 2187, 17 June 1997. 1 ♂ retained. Identified using Chvála (1975). An aerial swarm of this fly was observed flying in close proximity to the trunk of a mature oak. The swarm was mostly in shade and within 10cm of the trunk. It was almost invisible except from certain angles and extended partly around the circumference of the tree. It was thus difficult to estimate numbers but perhaps 30-60 individuals were involved.

It is possible that aerial swarming in *Drapetis* is previously unrecorded. Chvála (1976, 1983) states that epigamic behaviour is primarily substrate based in the Hybotidae, and this is associated with the loss of the holoptic condition and enlarged upper ommatidia

in males. Aerial swarming is therefore said to be a relict behaviour in this family and is no longer associated with attracting or selecting a mate. *Drapetis* may be somewhat unusual among the Tachydromiinae in that members of the genus are capable of substantial flight. Other members of the Hybotidae known to form aerial swarms occasionally include *Syneches muscarius* (Fabricius) (Hybotinae) and *Oedalea* spp. (Ocydromiinae).

D. assimilis is a very common species at Brent Reservoir. It may normally be found sitting or running (sometimes in numbers) on tree trunks where it displays no apparent preference between smooth- and rough-barked trees (I have also taken this species from the trunk of a small ornamental tree, so trunk diameter does not appear to be critical). It is also frequently seen at the reservoir on sunlit leaves of trees and shrubs, where its energetic and 'haphazard' running may lead it to be mistaken initially for a Phorid.

Beris chalybeata (Forster) (Stratiomyidae). Brent Reservoir, East SSSI, TQ 2287, 25 May 1996. 3 ♂ retained. Identified using Stubbs (1987). A swarm of this species was seen in a sheltered clearing flying closely adjacent to an oak tree. The swarm comprised *c.* 200 individuals and occupied a horizontal oblong space of *c.* 4×2×2m at between 2 and 4m above ground level. While the three specimens taken from the swarm were all males, nine specimens swept from low vegetation in the area were all females.

Swarming in *B. chalybeata* has been discussed by Verrall (1909) and by Stubbs (1988). Swarming in *B. morrisii* Dale is described by Parmenter (1937), Oldroyd (1937, 1964) and Edwards (1947). Oldroyd (1969) mentions that, "*[Beris]* males sometimes hover or dance in swarms". Colyer and Hammond (1968) summarise extant records of swarming in this genus.

Chloromyia formosa (Scopoli) (Stratiomyidae). Dinton Pastures Country Park, SU 7871, VC 22 Berkshire, 7 July 1996. Identified in the field. Six to eight individuals of this species were observed to form a short-lived (c. 30 seconds) swarm flying up and down at about 0.5m above a gravel path. Although individuals were plentiful on the low vegetation beside the path, further recruitment to this swarm nucleus did not occur and it quickly dispersed. It might be that the momentum of continuous recruitment to the small swarm nucleus is required in this species to maintain swarming behaviour.

Swarming in this species has been recorded by Stubbs and Drake (1995) but no estimate of the number of insects or height of the swarm is given.

Chorisops tibialis (Meigen) (Stratiomyidae). Brent Reservoir, north bank of main arm, TQ 2187, 20/21 July 1996. 4 ♂ retained. Identified using Stubbs (1987). Weather: very hot and sunny. At about noon on 20 July three individuals were seen hovering in a group in a small shaded 'alcove' formed by a concavity in the leaf cover of a small oak. On returning to the spot ten minutes later about 12 individuals were present in the group. One hour later, in the same area, a large swarm was encountered hovering in the shade of a large ash tree. More than 100 individuals were involved occupying over 12 cubic metres and flying at between 0.5 and 4.0m above ground level. Between 11.0 and 12.00 am on the following day (21 July) at the same site a number of small swarms were encountered under hot and still conditions. Similarly, they occurred in partially shaded situations, for instance in the narrow gap between two closely apposed oaks. Within an hour the number of swarms increased until all suitable shaded locations around the edges of trees and hedges and in the shade of overhanging branches were occupied by swarms of this species. Many tens of thousands of

individuals were involved. Swarms were absent from the shaded interior of an oak copse suggesting that an 'edge' component to the situation was as important as the requirement for shade. In some swarms occupying concavities in the leaf cover of oaks, individuals were visible from a distance as bright points on a dark background. This was not a consistent observation however, and the importance of this particular visual component in attracting females to a swarm is uncertain.

Oldroyd (1937) and Colyer and Hammond (1968) refer briefly to a record of swarming in *C. tibialis* without citation.

Pachygaster leachii (Curtis) (Stratiomyidae). Brent Reservoir, TQ 2187, 14 June 1997. 1 ♂ retained. Identified using Stubbs (1987). A small swarm of 30-40 individuals swarming in the open between an apple (*Malus* sp.) and an elder (*Sambucus nigra*). It was noticeable that these insects were flying 'head-up' with their bodies inclined at about 30° from the vertical. Similar flight is described in *Chloromyia formosa* (Stratiomyidae) by Stubbs and Drake (1995).

Parmenter (1946) records hovering in this species.

Thereva nobilitata (Fabricius) (Therevidae). Brent Reservoir, TQ 2187, 21 July 1996. 1 ♂ retained. Identified using Stubbs (1995). Initially two small swarms of two to five individuals were noted. These seemed to be evanescent, dispersing and re-forming over periods of a few seconds and re-forming each time at the same place, although there were no obvious landmarks. These two temporary assemblages flew at *c.* 4m and above, and were 7-8m apart. After a few minutes a separate swarm began to form at about 5-8m from these original two, and rather higher in the air. All the swarming sites were sheltered but the latter was the more open of the three. Recruitment to the new swarm was rapid and many flies could be seen joining the swarm, apparently from perches on nearby oaks. In less than ten minutes it grew and coalesced into an extensive swarm of *c.* 50-70 flies flying mainly between 4-7m above the ground and dispersed laterally over an area of about 20×20m. The individual flies in the swarm flew rapidly back and forth in a series of short darts. Throughout the period of its existence the swarm was in a state of dynamic flux. That is to say that the size of the swarm at any moment depended on the balance between the rates of addition-to and depletion-from the swarm, and that there was considerable traffic in either direction throughout. This could be observed in some detail as the flies were clearly silhouetted against the sky. The swarm retained its maximum size for only 2-3 minutes after which, due to net efflux it shrank and dispersed, splitting into increasing numbers of smaller swarms over a period of 7-10 minutes until only a handful of groups of 2-3 flies remained.

Oldroyd (1969) mentions reports of 'small aerial swarms' [of Therevidae] without citation.

Opetia nigra Meigen (Opetiidae). Brent Reservoir, North SSSI, TQ 2188, 10 May 1996. 2 ♂ retained. Identified using Chandler (1973). While examining low vegetation in a sheltered but sunny situation for basking Diptera, I became aware that a swarm of *O. nigra* was in the process of forming immediately above my head. Recruitment to the swarm proceeded rapidly and the initial 40 cm. sphere of 20-30 flies grew over 1-2 minutes to a column of 80-100 individuals reaching *c* 4m above ground level. No distinctive pattern of flight could be detected in individual flies which appeared to be flying 'at random' within the bounds of the swarm. The landmark for this swarm was myself, and it stayed with me as

I walked around the immediate area. With the thought that the swarm would disperse, I sat down in the grass. This resulted in the immediate collapse of the swarm which settled on my head and shoulders. On standing up the swarm re-formed. I sat down and stood up again twice more and on each occasion the swarm behaved in an identical manner. When I sat down slowly, the top of the swarm descended faster than its base. If I paused half-way in my descent the swarm stabilised at around half its original height (and passers-by quickened their pace). The observed proportionality between the height of the swarm and the height above ground of the landmark object (my head) was marked and consistent. The swarm finally dispersed when I moved to a less sheltered area where there was a very light breeze. It may be that still air is a prerequisite for the formation of large aerial swarms in this species.

Aerial swarming in *O. nigra* has been observed rather infrequently. McLean (1977) describes a swarm of *c* 10 individuals adjacent to mixed deciduous woodland near Norwich (VC 27) on 28 April 1976. P. J. Chandler (*pers. comm.*) observed a small swarm, possibly landmarking on a dead beech trunk, in Savernake Forest (VC 7) on 29 September 1991.

***Chalarus* sp.** (Pipunculidae). Stanmore Country Park, TQ 1793, VC 21 Middlesex, 14 June 1996. 3 ♂ retained. Specific identification deferred. These specimens remain unresolved following examination of terminalia and external characters described and illustrated in the recent revision of the genus (Jervis, 1992). A compact swarm of 15-20 flies was observed flying adjacent to an oak branch at *c* 1.5m in a sheltered clearing on the edge of mixed woodland. The weather was sunny and hot with little wind and this observation was made at about 10.00 am. These small flies were fluttering weakly up and down in a manner that led me to believe initially that it was a swarm of nematocerous flies. On sampling the swarm and finding three *Chalarus* males in my net I watched the swarm carefully but concluded incorrectly that they were indeed nematocerans, and that I must have inadvertently brushed the pipunculids from adjacent vegetation. On carefully re-sampling the swarm however, it was confirmed that it was indeed *Chalarus*. The weak and slow fluttering of the wings, and the vertical 'bobbing' of the swarming flies, was entirely uncharacteristic of the flight behaviour normally associated with members of the Pipunculidae.

Males of *Chalarus* may occasionally be found flying together in considerable numbers but not swarming (described in *C. spurius* Fallén by Coe, 1966). I am not aware however of any records of swarming in *Chalarus* and it may be an uncommon occurrence. On the other hand it may have been overlooked in the past due to the resemblance of the swarming flies to small nematocerans. Swarming in another member of the Pipunculidae, *Nephrocerus scutellata* Macquart has been described from Greece by Stubbs (1980). In this very large member of the family, swarming behaviour appears to be quite different from that described here in *Chalarus*.

Cheilosia grossa (Fallén) (Syrphidae). Manwood Copse, Cranborne Chase, ST 978 202, VC 8 South Wilts., 7 April 1996. 1 ♂ retained. Identified using Stubbs and Falk (1983). A swarm of 6-8 males was observed flying at *c* 3m in the open over calcareous grassland. The site was sheltered from wind by a steep bank on one side and by woodland on the other. Subsequently a female was found basking on ground-layer vegetation within the woodland (ST 9818, VC 9) although this was far from the swarming site. Two days later (9 April) a solitary male was observed flying at 3-4m above short turf about 20m from a woodland edge (Sharpstone, ST 855 590, VC 6). From its behaviour and position it is suggested that this

comprised a swarm of one, in which the behaviour of a fly is similar to that of an individual in a more numerous swarm, and which may act as a nucleation point for the formation of a larger swarm in favourable circumstances.

Swarming in *C. grossa* has recently been described and discussed by Bridgen (1996). Swarming behaviour in solitary flies is discussed by McAlpine and Munroe (1968).

Protearomyia nigra (Meigen) (Lonchaeidae). Stanmore Country Park, TQ 1793, VC 21 Middlesex, 25 May 1997. 1 ♂ retained. Identified using Hackman (1956). A swarm of about 30 individuals was observed moving in and out of direct sunlight in a sheltered situation closely adjacent to oaks on the edge of mixed woodland. The swarm repeatedly shed small 'satellite' swarms, typically comprising 3 individuals which whirled rapidly around each other in a compact space for a few seconds before rejoining the main swarm and flying in a less frantic fashion.

Aerial swarming among the acalyptrate families is quite uncommon, but has been recorded in several species of Lonchaeidae by McAlpine and Munroe (1968). During very extensive sampling, these authors found no females within swarms. The significance of the formation of the short-lived 'satellite' swarms described here is unknown and is not recorded by McAlpine and Munroe (1968).

Fannia armata Meigen (Fanniidae). Brent Reservoir, TQ 2187, 24 June 1996. 1 ♂ retained. Identified using d'Assis Fonseca (1968). A group of about 10 individuals was observed occupying a compact and well-defined sphere of *c* 30cm diameter closely adjacent to the foliage of an oak tree at a height of 3-3.5m. The flies were describing a series of rapid loops around each other. This swarm was seen at mid-afternoon and the weather was warm but overcast. This was a visibly distinctive swarm, as the 'sphere' of rapidly moving flies silhouetted against the sky caught my attention when I was some distance away.

Males of *F. subpubescens* Collin and *F. corvina* (Verrall) are said by Fonseca (1968) to be, "in the habit of whirling erratically in the open and well removed from any trees, at a height of 15 to 20 feet from the ground". This pattern of flight seems to bear some points of similarity to that described here for *F. armata* although it is not known whether sexual display by individual flies was being described. Swarming in *F. monilis* (Haliday) and *F. manicata* (Meigen) is recorded by Stubbs (1988).

Discussion

It would appear that, while certain taxa of Diptera routinely form aerial swarms, there are a number of species (probably many) in which swarming takes place only occasionally. Questions arising include: why do some species swarm only occasionally and, what, if anything, does a record of an 'occasional' swarmer reveal about the status of a species at a site?

One contributory factor to the behaviour of 'occasional' swarmers may be the rarity of the circumstance in which large numbers of individuals occur in close proximity. This raises the question of what factors might lead to this unusual occurrence, particularly in species in which individuals are normally found widely dispersed, and not restricted to discrete areas of identifiable habitat.

It may be that an exceptional high local population of a species in combination with

still air conditions can trigger aerial swarming in species where this behaviour is otherwise rare. Swarming may occur as an unusual event resulting from a large and quasi-synchronous emergence in a restricted area. Alternatively, some sort of pre-swarming aggregation phase may occur, although no direct observational evidence for this is presented here. *Chalarus spurius* seems to form male aggregates without exhibiting swarming behaviour. It seems unlikely though that these activities are unrelated, and it may be that an aggregate can become a swarm (exhibiting characteristic flight behaviour) if certain other conditions are met.

The importance of sheltered areas to invertebrates, particularly in otherwise open habitats, is well known. In addition it is a commonplace observation that, all things being equal, aerial swarming is favoured by sheltered or relatively windless conditions. It may be that exceptionally still air is one factor required to induce aerial swarming in those species that do not routinely exhibit this behaviour. This cannot be substantiated in the absence of considerable additional observational evidence, but may indicate that pheromonal factors play a critical role in aggregation/swarming in such species.

The existence of 'occasional' swarmers (where swarming is shown to be epigamic) clearly implies that mate selection can occur by more than one means in these species. In such species mate selection *via* a swarm might only occur in certain years, in a certain proportion of the population, in certain portions of a species range, or a combination of the above. Downes (1969) highlights both the high mating efficiency achievable by a swarm, and the presence of alternative epigamic strategies among certain species where aerial swarming is the norm. Further examples of alternative epigamic strategies occurring in the same species are referred to by McAlpine and Munroe (1968). Downes (1991) provides a recent review of the role of aerial swarming in mate detection and choice in Diptera, with a discussion of the nature and function of 'landmarks'. McAlpine and Munroe (1968) discuss the relationship between swarming and mate selection in some detail. They concur with other authors that while the two activities are normally associated, they are essentially independent phenomena, the degree of association between them varying widely between taxa.

Records of aerial swarming in species which do not routinely exhibit this behaviour provide evidence that:

1. The population or local density of individuals is high enough to support the most favourable and efficient epigamic strategy. This means that: a) intra-sexual competition and inter-sexual choice are both optimised; b) the number of individual matings is maximised, and that multiple matings are enabled in those species that can use this strategy;
c) genetic mixing between sub-populations is facilitated.
2. Physical and other conditions (often independent of the larval pabulum or breeding site) are present that encourage or enable aerial swarm formation in that species. Compromise of those habitat features critical to aerial swarming is likely to adversely effect the viability of the local population.

If it is accepted that records of aerial swarming in species which do not routinely exhibit this behaviour indicate local population health and favourable habitat conditions, there may be implications for species and habitat monitoring and assessment. Observations of swarming in scarcer species may be of particular importance as they provide evidence of 1 and 2 (above), as well as observational evidence of the nature of the swarming site (including climatic factors) utilised by the species in question.

1. It is tentatively suggested that records of 'occasional' swarmers represent a subset of the population for which the conditions at the site in some way approach the optimum for

both the adults and larvae of the species, regardless of whether the swarming is true epigamic behaviour.

2. This significantly supplements distribution data in providing objective and readily recordable evidence of sites and regions within the overall range of a species in which the species occurs in strength. Although this data is intrinsically scarce, particularly for the less common species, it may be particularly informative in readily highlighting optimal sites and habitat for the species, and the distribution of strong breeding populations within the overall range of a species.

3. Sites where RDB and other scarce species are found to swarm could thus act as models, feeding in to the management of other sites where those species occur in lower numbers.

4. In certain species swarm monitoring may eventually provide a simple and specific measure of population health.

5. The opportunity to form epigamic swarms may have profound effects on the size and the genetic health of isolated or semi-isolated populations. Controllable physical factors which encourage swarm formation (e.g. sheltered areas in otherwise open situations) may therefore be particularly important considerations in habitat management, and ones that are not directly related to the conservation of larval habitats.

McAlpine and Munroe (1968) quote Stich, "It can be expected that a profound knowledge of the courtship pattern of various Diptera will contribute to an eventual biological control of a given population". The conservationist and the pest-controller may not always see eye-to-eye, but in this case an important underlying factor governing population health is equally applicable to maintaining and increasing the populations of species as it is to controlling them.

It would appear that the many published accounts and analyses of aerial swarming in Diptera are scattered in the literature and deal mainly with a few well-studied taxa. In order to answer questions as to which species regularly form aerial swarms, which ones do so only in special circumstances, and in these cases, what factors enable swarm formation, further observations are required. In the light of this, it is hoped that field dipterists will be encouraged to record and publish further named examples of aerial and 'occasional' swarmers.

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Rare tachinids (Tachinidae) from north Hampshire - The RDB1 species *Cistogaster globosa* F. was locally abundant around Oakhanger (SU7736) North Hampshire. The first specimen was beaten from a broom bush at the edge of a sandy set-aside field on the 7.vii.1996. Several more were swept off flower heads of yarrow and ragwort growing nearby and in similar conditions on Shortheath Common LNR up to the 21.vii. Two were swept in sandy horse paddocks near to The Warren (SU7735). Whether the records presented here relate to recent immigration or a local population boom is unclear. However the principal host, the Bishop's Mitre Bug, *Aelia acuminata* L. (Pentatomidae), was exceedingly abundant in 1996. It seems likely that the recent run of warm summers has resulted in a dramatic increase in the fortunes of this and many other bugs. Indeed the area also supported breeding colonies of several rare hemiptera, not previously recorded in Hampshire.

Previous records of *C. globosa* were from downland near the coast on Portsdown Hill, S. Hampshire, and inland at Cothill Fen, Oxfordshire, now Berkshire in 1955, and more recently at Whitedowns, Surrey (Belshaw, R. 1993. Tachinid Flies, Diptera: Tachinidae. *Handbooks for the Identification of British Insects*. 10(4a)). A single specimen of the RDB2 species, *Freraea gagatea* Robineau-Desvoidy, was swept by JD from yarrow at Shortheath Common LNR on 20.viii.1997. This appears to be the first record of this species for Hampshire and VC 12. **JONTY DENTON** 26 Bow St., Alton, Hants, GU34 1NY & **PETER HODGE** 8 Harvard Rd., Ringmer, Lewes, E. Sussex, BN8 5HJ.

Dipterists Digest 1997 4, 18-19

Myolepta vara (Diptera, Syrphidae) reared in France (Dép. Sarthe)

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According to Peck (1988), ten *Myolepta* species are known from the palaearctic region. However, the immature stages and biology of only *Myolepta luteola* (Gmelin) (Becker, 1882; Dušek & Láska, 1960; Hartley, 1961) and of *M. potens* (Harris, 1776) (Rotheray, 1991) were known. In this paper I describe the biology of a third species: *Myolepta vara* (Panzer).

The only published data relating to the biology of *M. vara* is Sack (1930): "Die Larven wurden unter feuchtem Moos und Steinen gefunden" and Séguy (1961): "Autriche, pupe sous l'écorce d'un arbre, éclosion en Mars-Avril (Giraud)". I found one larva on 11.i.1995 in a *Quercus* sp. trunk recently cut down; the larva was in decaying organic matter located where a lateral branch had been recently cut. After sorting through decaying material, one larva was found at the bottom of a small cavity (Fig. 1). In similar situations in other tree trunks, I have previously found larvae of *Myathropa florea* (L.) and an empty puparium of a *Callicera spinolae* Rondani (det. GE Rotheray). Methods of searching for and rearing such larvae are given in Dussaix (1996).

The external morphology of the larva of *M. vara* closely resembles that of *M. luteola* described by Dušek & Láska (1960). Its colour was a strong white, due certainly to a transparent integument showing the internal fat bodies. The larva reacted negatively to light and moved quickly into shade whenever exposed.

Fig. 1 Habitat of *Myolepta vara*, cavity in cut *Quercus* trunk

The larva pupated on the 15.ii.1995 (Fig. 2) and appeared to have moved out of the organic matter used to feed it. It was entirely covered with a white substance which could help attach it to the substrate. Hartley (1961) describing *M. luteola*, suggested this material is the last excrement of the larva. An adult female emerged on 4.iii.1995, after a pupal period of 18 days.

Myolepta vara is considered as rare all over Europe and according to Speight (1989), could be valuable as a bioindicator of forests of international interest for nature conservation.

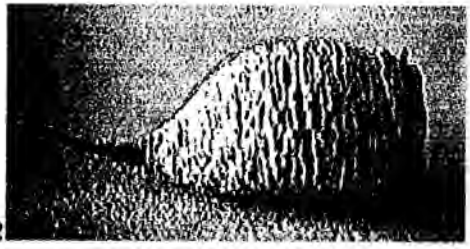

Fig. 2 ***Myolepta vara*****, puparium, lateral view**

Acknowledgements

I thank very much Dr M.C.D. Speight for identifying the adult specimen of *M. vara* as well as Dr A. Maibach for his help in translating my text into English.

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Dipterists Digest 1997 **4**, 20-21

Corynoneurella paludosa Brundin 1949: *Thienemanniella majuscula* Langton 1991 nec Edwards (1924) (Diptera, Chironomidae), new to Britain

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In the key to pupal exuviae of West Palaearctic Chironomidae (1991) I attributed a pupal form to *Thienemanniella majuscula* (Edwards) on the evidence of an immature pharate adult male collected in the River Nith, south-west Scotland. Recently, well-developed pharate adult males have been collected in the Spanish Pyrenees, showing that determination to be in error; the pupa belongs to *Corynoneurella paludosa* Brundin. The adult has the general facies of *Corynoneura*, but was placed in a separate genus by Brundin on the strength of the *Thienemanniella*-like hind tibiae (little expanded distally and horizontally cut off at apex), though he admitted that it might warrant no more than subgeneric status within *Corynoneura*. Schlee (1968) in his revision of the *Corynoneura* group, on the basis of Brundin's specimen, now nearly transparent, came to the conclusion that the species was a *Corynoneura*, sister species of *celeripes* Winn.

However, the pupa has the three anal macrosetae cylindrical as in *Thienemanniella*, not flattened as in *Corynoneura*, and the adult male has the transverse sternapodeme of the hypopygium long with a short anteriorly directed horn at each end characteristic of *Thienemanniella* (Cranston et al. 1989). The intermediate position of the species between *Thienemanniella* and *Corynoneura* is reinforced by the presence in the pupa of long spinules on sternite II and the frequent presence of pearl rows on the wing sheaths, both characters common among *Corynoneura* species.

Brundin's figure of the hypopygium omits the nearly transparent triangular superior volsella in the basal half of the gonocoxite and the short, weakly curved phallapodemes ending bluntly at the inner apex of the aedeagal lobes (Fig. 1).

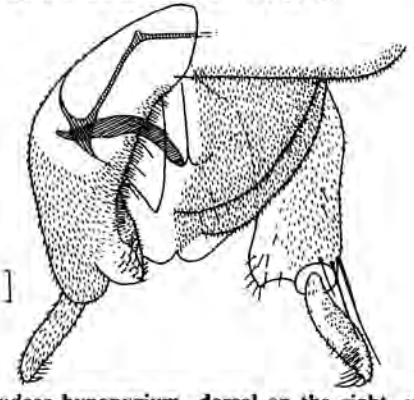

Fig. 1 ***Corynoneura paludosa*** **hypopygium, dorsal on the right, ventral on the left; apodemes cross-hatched. Scale = 0.01mm.**

The pupa of a male *Thienemanniella majuscula* (Edwards) reared by P. S. Cranston from a larva collected on Dartmoor runs to *Thienemanniella* Pe2a in Langton 1991.

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I am grateful to Dr Peter S. Cranston for the gift of a reared male *Thienemanniella majuscula* and to Drs Narcis Prat and Maria Rieradevall for their welcome and companionship at the Institut d'Alta Muntanya Vielha, high Pyrenees field station of Barcelona University, where the mature pharate adult males of *Corynoneurella paludosa* were collected.

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Dipterists Digest 1997 **4**, 22-23

Clytiomyia continua (Diptera, Tachinidae) confirmed as a British species

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The parasitic fly *Clytiomyia continua* Panzer, is included in van Emden (1954) as, "probably not British". More recently the species is not mentioned by Belshaw (1993) and it is assumed that Belshaw concurred with Van Emden's view that the species had not been reliably recorded in this country. It is therefore pleasing to place on record the capture of a single male at the disused Alsa Gravel Pit, Elsenham, North Essex (TL 5126) on 13 June 1996. The specimen was taken in a sweep net with other flies, over bare gravel ground in the vicinity of the nests of a variety of aculeate Hymenoptera, though Van Emden (1954) states that the fly is a parasite of *Eurydema* species (Heteroptera, Pentatomidae).

In Belshaw (1993) this specimen runs easily to couplet 118, which identifies it as either *Leskia aurea* Fallén or *Subclytia rotundiventris* Fallén. However, it is clearly neither of these species. On the basis of this single male example, we suggest that the key in Belshaw's work be modified by the insertion of an extra couplet (117a) between existing couplets 117 and 118, with couplet 117 modified to direct the user to this new couplet as follows:

117 abdomen almost entirely orange **117a**
\- abdomen with continuous grey or black stripe running down the middle (occasionally a narrow break at the junction of abdomen 1+2 with 3) **119**

117a antennae and legs, including coxae, at least partly, and usually entirely, yellow **118**
\- legs, including coxae, and antennae entirely black. [Wings orange at extreme base; frons, vertex and dorsal aspect of thorax covered with a distinctive gold dusting] . . . . . *Clytiomyia continua*

The history of *continua* has been convoluted. Walker (1853) includes it (on page 33) as a rare British species in the genus *Tachina*. Walker evidently saw it in the Stephens collection (A. Whittington, *pers. comm.*). Wingate (1906) lists the species under the disused name *Clytia* Robineau-Desvoidy. This name appears on the British list in Kloet and Hincks (1945), but is excluded from Kloet and Hincks (1975).

Day (1948) lists *Clytiomyia* as auctt. (pages 33, 39, 138 and 145). Unhelpfully, there is no indication of why this is so. It may be that he didn't know who was the authority as he does this with a number of genera (A. Whittington, *pers. comm.*). Day (1948) also lists the alternative spelling '*Clytiomya*' [no 'i' between the 'y' and last 'a'] in parentheses, indicating that he recognises this error. Zimin *et. al.* (1989) mention three species: *C. pellucens, C. continua and C. helluo,* and list the larvae as being parasitic on shield bugs. Herting and Dely-Draskovits (1993) place *C. helluo* and *C. pellucens* in the genus *Eliozeta* Rondani (they were formally described in *Musca* and *Tachina* respectively). In addition to

C. continua they list the species *C. dupuisi, C. mesnili, C. sola* for *Clytiomya* (p.401). *C. continua* is the type species for the genus. The distribution is given as, "Europe: northwards to Belgium, Sweden" but no mention of Britain. Čepelák (1986) also places *C. helluo* and *C. pellucens* in the genus *Eliozeta* and uses *Clytiomya* rather than *Clytiomyia* as the genus for *continua*.

Acknowledgements

We are extremely grateful to Dr Andy Whittington, Royal Museum of Scotland, Edinburgh for his considerable assistance in the researching of literature references which mention this species and to Dr Adrian Pont for reading the manuscript.

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Dipterists Digest 1997 4, 24-29

Systenus mallochi sp. n. from Britain (Diptera, Dolichopodidae)

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On 21 May 1995 I collected material from detritus-filled crevices in the trunk of an oak tree, *Quercus petrea* (Mattuschka) Lieblein, located within Quarry Wood SSSI near Elgin, Moray. On 14 June when I inspected the jar containing this material, I found that two male *Systenus* had emerged. The first was a typical *Systenus pallipes* von Roser but the other was distinctly different. The most obvious distinguishing features were the smaller size of the dark spot at the wing tip and the darker antennae. Reference to Fonseca (1978) showed that although the black apical wing spot was similar to *Systenus scholtzii* Loew, the all black antennae were not. Also, *S. scholtzii* is unknown in Scotland.

Peter Dyte kindly sent me a reared specimen of *S. scholtzii* for comparison. I also compared figures of the non-British but possible candidate species, *S. alpinus* and *S. apicalis* in Vaillant (1978) and figures of the wings, antennae and genitalia of *S. scholtzii* in Bequaert (1955) and Parvu (1991). However, the characters of my Elgin specimen did not conform to any of these figures or species.

Peter Dyte also informed me of an unusual male specimen of *S. scholtzii* which he had seen in the University Museum of Natural History, Oxford. On examining this specimen I found that it shared the same wing venation and genitalia as the specimen from Elgin. It was bred by J.E. Collin from a *Cossus* elm (*Ulmus*) at Barton Mills, Suffolk. The date of 7.vi.09 on the label is presumably the date of emergence.

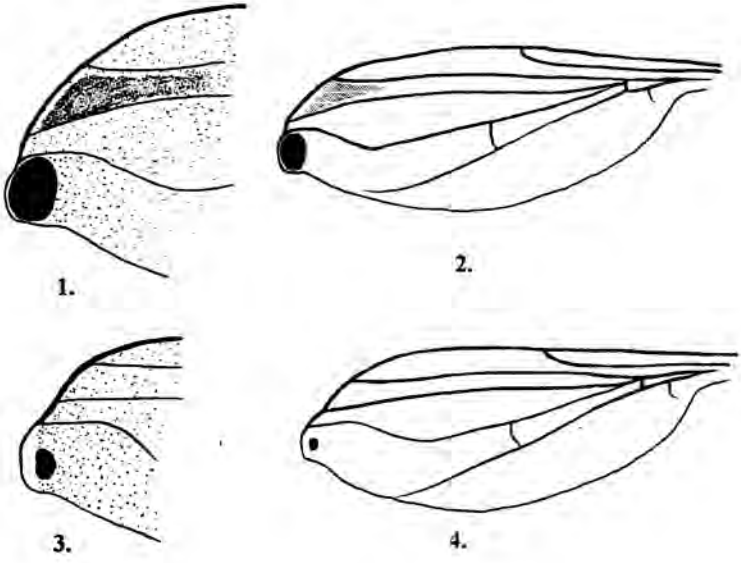
Later Ivan Perry also sent me an additional male and a female which also shared the same morphology of the specimens from Elgin and Barton Mills which he had bred from birch (*Betula* spp) rot holes at Tuddenham Heath in Suffolk, a site not far from Barton Mills. Examination of all this material has shown that an unrecognised species exists in *Systenus* which is described and distinguished from other *Systenus* species in this paper.

***Systenus mallochi* sp. n.**

Most similar to *S. scholtzii* with veins R 4+5 and M strongly convergent at their tips where they are separated by a distance of less than one third the length of the outer crossvein and with an apical wing spot. It differs however in the following ways:

Wing venation and markings: in the male the apical wing spot is small occupying only half the area between vein M and the lower margin of the wing (Figs. 1&3). The area between the spot and the wing tip appears whitish and is clear of microtrichia. The postical vein is virtually straight to the wing edge, only curving up very slightly (Fig. 4). In *S. scholtzii* vein Cu 1 curves up almost mirroring the curvature of vein M and fades out before it reaches the wing tip (Fig. 2). There is no apical shading between veins R 4+5 and M as occurs in *S. scholtzii* (Figs. 2&4). In the female, as in others of this group there is no apical wing spot and the trailing edge of the wing is not indented. **Antennae:** in *S. mallochi* segment 3 is entirely sooty black. The specimen from Barton Mills has a trace of yellowing narrowly at the base of segment 3 but this may be fading due to age. In the more recent specimens from

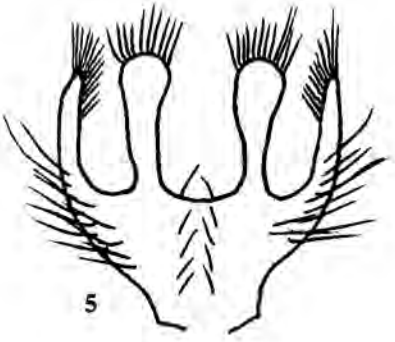
Tuddenham Heath segment 3 is all black. In *S. scholtzii* the third antennal segment is yellow for the basal half, at least on the ventral surface. **Genitalia:** the male hypogigium is in general similar in structure to that of *S. scholtzii* but differs in the shape of the external lamellae. In *S. mallochi* the external lamellae are smaller and more compact than in *S. scholtzii* being almost entirely confined within the genital capsule (Figs. 5&7). The inner processes are shorter and broader and lie close together. The outer processes are simple, reach only to half way along the internal processes from which they diverge like cow horns. The outer processes have only rather short, scattered black hairs spread along the surface from base to tip. This contrasts with *S. scholtzii* which has long pale hairs only on the basal part of the outer process and a fan of long hairs underneath at the tip (Figs. 6&8). **Legs:** the mid and hind coxae of *S. mallochi* are infuscated whereas in *S. scholtzii* they are mainly clear yellow. There is a dark dorso-apical marking on the hind femora in the male and suggestions of a dark ring in the female. The bristles of the mid tibiae have been used as diagnostic features in other *Systenus* species but this character is somewhat variable. In *S. mallochi* there are only two long bristles, one anterodorsal and one posterodorsal, near the base of the tibiae. In *S. scholtzii* there are often further anterio-dorsal bristles on the shaft of the tibiae.

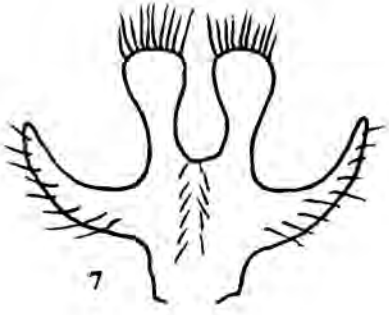


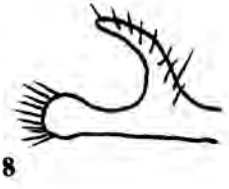
Figs. 1-4 ***Systenus*** **wings, 1,** ***S. scholtzii*****, wing tip; 2,** ***S. scholtzii*****, wing; 3,** ***S. mallochi*****, wing tip; 4,** ***S. mallochi*****, wing.**

Material examined

Holotype ♂: SCOTLAND: Moray, Quarry Woods SSSI, collected from detritus-filled crevices in the trunk of an oak tree, *Quercus petrea* on 25.v.96, emerged by 14.vi.96. Specimen deposited in the National Museums of Scotland, Edinburgh. Paratypes: ENGLAND: 1 ♂, Sussex, Barton Mills, bred from *Cossus* on *Ulmus* on 7.vi.1909, J.E.Collin, specimen in the University Museum of Natural History, Oxford; 1 ♂ and 1 ♀, Suffolk, Tuddenham Heath, bred from rot-holes in *Betula*, emerged 7.vi.96, I. Perry, specimens retained by I. Perry.







Figs. 5-8. ***Systenus*****, male genitalia, 5,** ***S. scholtzii*****, external lamellae, dorsal view; 6,** ***S. scholtzii*****, external lamellae, lateral view; 7,** ***S. mallochi*****, external lamellae, dorsal view; 8,** ***S. mallochi*****, external lamellae, lateral view.**

The key to *Systenus* in Fonseca (1978) can be modified to incorporate *S. mallochi* in the following way:

Males

1 Cubital and discal veins strongly convergent, their tips separated by not more than one third length of outer crossvein 2

- Cubital and discal veins much less convergent, tips separated by little less than length of outer crossvein 4

2 Hind margin of wing rather strongly concave near apex, where there is an apical black spot. Antennae with segments 1 and 2 reddish brown 3

- Wing not noticeably concave on hind margin, without apical black spot. Antenna largely black, 3rd segment more or less reddish brown, about 4 times as long as wide . . . . . ***pallipes* von Roser**

3 Antennae reddish yellow with 3rd segment only brownish apically. Wing with apical spot large, entirely filling the apical lobe. Mid tibiae with strong bristles on shaft in addition to thetwo basal ones . . . . . ***scholtzii* Loew**

- Antennae with 3rd segment almost entirely sooty black, occasionally with a trace of yellow at extreme base. Apical wing spot small, not filling all of apical lobe, separated from wing tip by whitish area free of microtrichia . . . ***mallochi* sp. n.**

4 Basal segments of the rather long antenna clear yellow . . . . . ***tener* Loew**

- Antenna entirely black 5

5 3rd antennal segment 2.5 times as long as wide. Hypopygium black, yellow at apex. . . . . ***bipartitus* Loew**

- 3rd antennal segment 3-3.5 times as long as wide. Hypopygium entirely pale . . . . . ***leucurus* Loew**

Females

1 Cubital and discal veins strongly convergent, tips separated by no more than one-third length of outer crossvein 2

- Cubital and discal veins almost parallel in apical half 4

2 Basal antennal segments brownish yellow 3

- Basal segments of antenna black . . . . . ***pallipes***

3 Antennal segment 3 broadly yellow basally. Mid tibiae with bristles on shank in addition to basal ones . . . . . ***scholtzii***

- Antennal segment 3 entirely black. Mid-tibiae with only a pair of strong basal bristles . . . . . ***mallochi* sp. n.**

4 Antenna yellow at base . . . . . ***tener***

- Antenna entirely black 5

5 Arista only slightly longer than 3rd antennal segment. Middle tibia dorsally with only two bristles at base. Hind femur broadly black at apex . . . . . ***bipartitus***

- Arista almost twice as long as 3rd antennal segment. Middle tibia dorsally with four bristles, two at base and two at middle. Hind femur with only a dark dorsal streak at apex . . . . . ***leucurus***

Biology

Systenus mallochi has been mostly bred from rot holes or detritus-filled cavities in deciduous trees such as *Quercus* and *Betula*. The earlier record of Collin suggests that the species may also be associated with *Cossus* infestations on *Ulmus*. *Cossus* caterpillars burrow through the wood of live trees and produce a great deal of sap-soaked debris within which many Coleoptera and Diptera are found. However precise details of where *S. mallochi* was obtained from *Cossus* are not recorded. Certainly during an extensive survey of sap-run Diptera by the Malloch Society, the only *Systenus* species taken was *S. pallipes*. There is therefore good reason to believe that this new species is associated more with rot-holes than sap-runs.

Acknowledgements

Particular thanks to Peter Dyte for all his assistance and to Ivan Perry and George MacGavin (University Museum, Oxford) for the loan of specimens. The work reported here was part of a wider project on saproxylic Diptera in Scotland carried out by the Malloch Society. I gratefully acknowledge the contribution made by members of the Society to this work of which the present study is a part, and to the Worldwide Fund for Nature and Scottish Natural Heritage who helped fund it.

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Thereva valida (Diptera, Therevidae) new to England

- *Thereva valida* Loew is a rare (RDB 3) and little-known species in Britain only known from four Scottish vice-counties in Tayside, Perthshire and the Spey Valley (Drake, C. M. 1991. *Provisional Atlas of the Larger Brachycera (Diptera) of Britain and Ireland.* B.R.C. Huntingdon; Falk, S. 1991. A review of the scarce and threatened flies of Great Britain. *Research and survey in nature conservation.* **No. 39.** NCC). The life-history is unknown and the presumed habitat is river margins including those with adjacent woodland and grassy areas (Falk, 1991 *loc. cit*).

Single females of *T. valida* have been taken at three very similar sites in the Helmsley area of North Yorkshire, extending the known range of this species: a female from tall grasses in a streamside meadow at Hawnby (44/5389) on 7.vii.1993 and another at Limperdale Gill (44/5286) on 10.vii.1994 (AG); a female swept 23.vii.1995 from Ashberry Pastures (44/5784) in similar habitat (JDC).

All three sites are characterised by calcareous flush conditions feeding small streams running through herb-rich meadows surrounded by woodland. All three sites are also exceptionally rich in insect life with Diptera, especially stratiomyids, being particularly well represented. We suspect that *T. valida* may prove to have an association with flushes though this must remain speculation for the moment.

Since we became aware of each other's discovery, one of us (JDC) came across a literature reference to *T. valida* from Hilbre Island (Craggs, J.D. 1982. Hilbre: The Cheshire Island. Liverpool University Press, Liverpool). On investigating this record, some doubt was expressed as to the reliability of this record (Rotheray, *pers. comm.*) and indeed three specimens held at Liverpool Museum from Hilbre Island standing under the name *T. valida* were the common *T. nobilitata* (Fabricius). Our thanks are due to Alan Stubbs for verifying AG's specimens and to Martin Drake and Alan Stubbs for JDC's. Thanks also to Chris Felton of Liverpool Museum and Graham Rotheray for information in connection with the Hilbre record and to Tom Mawdsley for checking the Hilbre specimens held at Liverpool Museum. **ANDREW GRAYSON**, 56 Piercy End, Kirkbymoorside, York YO6 6DF & **JOHN D. COLDWELL,** 16 Railway Cottages, Dodworth, Barnsley, S. Yorks S75 3JJ

Dipterists Digest 1997 **4**, 30-34

Rare and local Diptera from the Tay reed beds in Scotland

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The Tay estuary on the east coast of Scotland contains the largest single area of *Phragmites* reed beds in Britain extending to some 410 hectares. Despite the size and national importance of this reed bed little or nothing was known of its associated invertebrate fauna. To rectify this situation Scottish Natural Heritage commissioned the Initiative for Scottish Insects to carry out a survey of the reed beds during the summer of 1994. In this paper details of rare and significant species of Diptera taken during the survey are given.

Methods

Four sites on the north side of the estuary, Cairnie Pier (NO1919), Tay Lodge (NO2522), Powgavie (NO2925) and Kingoodie (NO3329), were chosen as locations for sampling. Sampling employed a number of techniques including the use of a Malaise trap, pitfall traps, water traps and hand collecting using sweep netting. Overall, by use of various collecting techniques, specimens were obtained between the months of May and October 1994. All species were taken among stands of *Phragmites*.

Results

Diptera made up a substantial proportion (70%) of the total number of 9773 identified invertebrates. The Great Britain status of the species (given in bold) are taken from Falk (1991) or Falk and Pont (*pers. comm.*). Comments on the Scottish status of the following species were confirmed using the Scottish Insects Records Index maintained by the National Museums of Scotland, Edinburgh.

Tipulidae

Dicranomyia complicata (de Meijere) **Notable**
A local species with scattered records from throughout the British Isles. Previous observations indicate an association with freshwater seepages at high tide levels in brackish water coastal marsh and upper salt marsh. In the Tay reed beds surrounding farmland may provide the run off for the appropriate habitat.

Cheilotrichia imbuta (Meigen) **Notable**
Usually associated with *Phalaris* or *Phragmites* stands beside rivers, streams and sheltered situations. This species has proved to be more common since Falk (1991) so its status as 'notable' may be queried in the future. Its larval life history remains unknown but it is a useful indicator species, similar to *Molophilus pleuralis* de Meijere which is also strongly associated with this habitat.

Rhagionidae

Chrysopilus aureus (Meigen) **New to Scotland**
A snipe fly with semi-aquatic larvae. Although not too uncommon in England and Wales there are no published records for Scotland. Only one female was taken in the Malaise trap.

Empididae

Empis scutellata **New to Scotland**
Larval history unknown. As with the previous species there are no published Scottish records, although it has been captured in southern Scotland during the last decade.

Hybotidae

Euthyneura halidayi Collin **Notable**

Larvae are probably associated with decaying vegetation or rotting wood. Less than 5 previous Scottish records from Highland and Strathclyde Regions.

Platypalpus rapidus (Meigen) **RDB3 and New to Scotland**
Larval history is unknown, though likely to be predatory, as are other species in this genus. This species seems to be little known in the British Isles as a whole and has not been previously recorded from Scotland (Collin 1961). The presence of 9 specimens from the Malaise trap would seem to point to this being a reed bed specialist species.

Dolichopodidae

Achalcus cinereus (Haliday) **New to Scotland**
Another reed bed specialist. Larvae are probably semi-aquatic in decaying vegetation. There are references to this species being associated with *Phragmites* stands in England and Wales, but to date there have been no published records in Scotland (Fonseca 1978), although one was taken in Morayshire in 1992.

Rhaphium patulum (Raddatz) **Notable**
Larvae are probably aquatic or semi-aquatic predators. There have been some 11 previous Scottish records, mostly from river banks and coastal marshes.

Teucophorus spinigerellus (Zetterstedt) **5th Scottish record**
Species in this genus are usually associated with riverside mud in which the predacious larvae live.

Syrphidae

Neoascia geniculata (Meigen) **Notable**
Records are widely distributed throughout Britain from marshes and water margins where there is lush emergent vegetation such as *Glyceria*. Larvae probably in wet mud and decaying vegetation.

Platycheirus immarginatus (Zetterstedt) **Notable**
Records are widely scattered in England, Wales & Scotland where is found in mainly brackish coastal marshes, including saline marsh along tidal rivers. Larvae are unknown but predators of aphids on water plants (G.E. Rotheray, *pers. comm.)*.

Platycheirus podagratus (Zetterstedt) **Notable**
Records are widely distributed throughout Scotland - especially the Highlands - as well as northern England. Bogs, poor fen and river margins, both in lowland and sub-montane acidic areas. Only taken at the Cairnie Pier site.

Eupeodes lundbecki (Soot-Ryen) **RDB K 4th Scottish record**
This species was only recently described as new to Britain (Watt and Robertson, 1990) from 3 specimens taken in widely differing parts of Scotland. A possible migrant, which could be resident, with very few records in Britain.

Sphaerophoria loewi Zetterstedt **RDB2**
Very few scattered records throughout England and Scotland. This is only the third known Scottish site. A species of wetlands, especially coastal marshes with stands of *Scirpus maritimus* or *Phragmites*. Also known from an inland site on *Phragmites* (Kinrara, Strathspey). Larva probably attacks *Hyalopterus* aphids on *Phragmites*. It was taken on four separate occasions during June.

Chloropidae

Platycephala planifrons (Fabricius) **New to Scotland**
A reed bed specialist species. The larvae are stem miners of the *Phragmites*. Although fairly commonly recorded from England and Wales, this giant Chloropid species has not been taken before in Scotland. Large numbers were taken, especially in the water traps.

Tachinidae

Rondonia fasciata (Macquart) **Notable**
A little known species of the Tachinidae, all of whose members have parasitic larvae. This species has only been recorded once before in Scotland, from Aviemore (Inverness-shire) (Belshaw, 1993).

Calliphoridae

Calliphora loewi Enderlein **Notable**
A northern species that is widespread in Scotland, though not on the islands, ranging from lowland to upland (Davies and Laurence, 1992).

Scathophagidae

Cleigastra apicalis (Meigen) **2nd Scottish record**
This is probably an overlooked species in Scotland. There is one previous published Scottish record from Whitlaw Moss, Roxburgh (Nelson 1982). In addition there is a number of other unpublished records by J.M. Nelson (*pers. comm.*) from southern Scotland for Aikengall (East Lothian), Duddingston Loch (Midlothian) and the Union Canal at Hermiston (Midlothian). The specimens caught by Nelson were either swept or caught in water traps among emergent vegetation, mostly *Phragmites*. Larvae are predatory, possibly on *Platycephala* larvae. This species is characteristic of reed beds.

Anthomyiidae

Botanophila appendiculata (Malloch) **RDBK**
There are only three other British records of this species which are Mitcham, Surrey (1964), Beddington, Surrey (1965) and Loch Awe, Dalmally, Argyll (1983) (D.M. Ackland, *pers. comm.*).

Delia linearis (Stein) **Notable**
According to Falk and Pont (*pers. comm.*) there are Scottish records from Aberdeen and Elgin of this species which is scarce in Britain. There are also unpublished records by Horsfield from the Isle of Bute and St John's town of Dalry (Kirkcudbridshire).

Fanniidae

Fannia nigra Malloch **Notable**
According to Falk and Pont (*pers. comm.*) there are only scattered known localities for this species in Britain, and in Scotland these range from Edinburgh to the Highlands. The earliest records are from Bonhill and Cardross, Dunbartonshire (Malloch 1910).

Fannia norvegica Ringdahl **Notable**
This species is widespread but uncommon in Britain (Falk and Pont, *pers. comm.*). The only previous published Scottish records of this species are from Grantown on Spey (Elgin) (Collin 1939) and in Strathspey (Collin 1958).

Muscidae

Phaonia atriceps (Loew) **Notable** (New to Scotland)
This species is widely scattered in England and Wales (Falk and Pont *pers. comm.*). There are no previous published Scottish records. It is restricted to reed beds with *Typha latifolia*, *Phragmites australis* and *Glyceria aquatica* where the larvae are predatory on phytophagous insects attacking the reeds (Falk and Pont, *pers. comm.*). *Platycephala* larvae are a likely prey species at this site.

Phaonia trimaculata (Bouche) **New to Scotland**
There are no previous published records of this species in Scotland though it appears to be widely distributed in England (Fonseca 1968). This species has been collected in Scotland

by E.C. Pelham-Clinton at Miltonbridge (Midlothian) in a suction trap where a number of specimens were taken from 1951 to 1953 (National Museums of Scotland).

Discussion

Although estuarine reed beds along the Tay are dominated by a relatively low number of higher plants they do contain and support a large number of insects, especially Diptera, many of which are rare, scarce or localised in their distribution. The Tay reed beds, due to their large size and northerly estuarine situation, contain a unique assemblage of insects which is probably not matched by any other British site. They therefore merit habitat conservation and protection and further survey work to find out the full range of their invertebrate interest.

Acknowledgements

We are grateful to Graham Rotheray for access to the collections and the Scottish Insects Record Index at the National Museums of Scotland, Edinburgh.

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Dipterists Digest 1997 **4**, 35-40

The hoverflies (Diptera, Syrphidae) of Rostherne Mere, Cheshire

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Rostherne Mere National Nature Reserve, situated near Knutsford in Cheshire, at 53°21'N, 2°23'W (SJ7484) has a total area of 150ha consisting of a large lowland mere (48.5ha). The site has a number of associated habitats including mature deciduous woodland (28ha) and *Phragmites* and *Typha* reed-beds. The mere is predominantly surrounded by 73.5ha of dairy pasture, which also comes under the protection of English Nature. The mere has a narrow fringe of reed *Phragmites communis* Trinius and lesser reedmace *Typha angustifolia* L. At the southern end of the mere is Shaw Green Willows, a former osier bed (although commercial extraction ceased after the Second World War), which now has a rich assortment of scrub willow *Salix* spp. and luxuriant growth of fen plants, particularly *P. communis*, *Filipendula ulmaria* (L.) Maximowicz, *Carex acutiformis* Ehrhart and *Phalaris arundinaceae* L.. The remaining perimeter is surrounded by woodland which is mostly mature *Quercus*. Rostherne Mere was a study site of the well-known entomologist, Harry Britten between 1920 and 1950. The aim of the present research is to investigate the syrphid faunas of two discrete but adjacent habitats, woodland and marshland, at this site.

Materials and Methods

Two Malaise traps were set up at sites at Rostherne Mere, chosen for their differences in habitat type. The first site (Shaw Green Willows) was a reed-bed site with *P. communis* and *T. angustifolia* being the commonest species, with a great deal of *Caltha palustris* L.. The second was a mature woodland ride (Mere Covert),with predominant tree species being *Quercus* and *Acer* with an understorey of *Rubus*. Traps were emptied weekly, (although some sampling periods were longer than seven days), from 29 March to 8 November 1996. Syrphids were preserved in 70% ethanol and all were identified by the author, using keys in Stubbs and Falk (1983) and revised keys especially for *Platycheirus* and *Parhelophilus* in Stubbs (1996).

The expectation was that the two sites would have very different syrphid assemblages despite being only 0.5km apart. Aphidophagous syrphids tend to be poorly represented in marshy habitats with only species such as *Platycheirus fulviventris* (Macquart), *Platycheirus scambus* (Staeger) being present (Chandler and Ismay, 1978). Other common marsh hoverflies include *Eristalinus sepulchralis* (L.) and species in *Anasimyia* and *Parhelophilus* (Chandler and Ismay, 1978). Coprophilous species such as *Rhingia campestris* Meigen, *Syritta pipiens* (L.) and *Eristalis tenax* (L.) (Skidmore, 1978) may be present in both habitats if good populations exist in the dairy pastures which surround the site.

Results

The traps caught a total of 1584 syrphids, 49.24% of which were aphidophagous syrphids. The commonest species caught were *R. campestris* (28.78%), *Episyrphus balteatus*

(Degeer) (15.15%), *Melanostoma scalare* (Fabricius) (10.73%), *Platycheirus albimanus* (Fabricius) (8.78%) and *Tropidia scita* (Harris) (7.20%) and 68 other species accounted for the remaining 29.36%. Cumulative totals for the commonest species caught by each of the traps are shown Tables 1&2.

Table 1. Syrphids caught by Malaise trap (29 March to 8 November 1996) at Shaw Green Willows reed-bed, Rostherne, Cheshire

Species	Number caught	Percentage	Cumulative %
Rhingia campestris	383	38.11	38.11
Tropidia scita	102	10.15	48.26
Melanostoma scalare	80	7.96	56.22
Platycheirus albimanus	75	7.46	63.68
Episyrphus balteatus	33	3.28	66.96
Syrphus ribesii	26	2.59	69.55
Platycheirus scutatus	26	2.59	72.14
Cheilosia fraterna	25	2.49	74.63
Eristalis tenax	20	1.99	76.62
Platycheirus clypeatus	20	1.99	78.61
Other (51 species)	215	21.39	100.00
Total	**1005**		

Table 2. Syrphids caught by Malaise trap (29 March to 8 November 1996) at Mere Covert, woodland, Rostherne, Cheshire

Species	Number caught	Percentage	Cumulative %
Episyrphus balteatus	207	35.75	35.75
Melanostoma scalare	90	15.54	51.29
Rhingia campestris	73	12.61	63.90
Platycheirus albimanus	64	11.05	74.95
Syrphus ribesii	19	3.28	78.23
Criorhina berberina	17	2.94	81.17
Tropidia scita	12	2.07	83.24
Chalcosyrphus nemorum	10	1.73	84.97
Platycheirus scutatus	8	1.38	86.35
Eupeodes corollae	7	1.21	87.56
Other (34 species)	72	12.44	100.00
Total	**579**		

Differences between the two sites were great. The trap situated in the reed-bed caught greater numbers of syrphids than that located in the woodland; 63.45% and 36.55% respectively. Most (65.77%) of the total for reed-bed were from the sub-family Milesiinae, whilst 76.30% of syrphids caught from the woodland ride were Syrphinae (Figs. 1&2). At the reed-bed there is an early peak in abundance from 3-9 May, which is due to early appearances of *R. campestris*, which was the dominant species at this time, then a second peak from 14-21 June consisting primarily of *T. scita*. Most syrphids were caught between 19 July and 6 September, and were predominantly *R. campestris*, *M. scalare* and *Platycheirus* spp. At the woodland ride again there is a peak at the start of June, represented by *R. campestris* and *Criorhina berberina* (Fabricius). A relatively small second peak occurred at the end of July, the majority of syrphids in the mid-summer peak being Syrphinae, notably *E. balteatus* and *M. scalare*. The commonest species caught, *R. campestris* has an early peak in abundance, then a second peak at the end of July, until September. Considerably more males (73.45%) were caught than females. *E. balteatus* has a unimodal distribution, with a sudden appearance towards the end of July. Most *E. balteatus* caught were females (60.42%). *M. scalare* has a bimodal distribution pattern, with early appearances in the beginning of May, then a second larger appearance of predominantly females in August. *T. scita* has a sudden appearance in June with males being initially more abundant than females.

Discussion

In a similar Malaise trap study in Hungarian apple orchards, Visnyovszky (1988) caught 3259 syrphids of 85 species, 92% were aphidophagous species. The three most common species were *Sphaerophoria scripta* (L.), *Eupeodes corollae* (Fabricius) and *E. balteatus* accounting for 2366 aphidophagous flies. The results presented here reveal differences in syrphid assemblages in adjacent woodland and reed-bed habitats. Using the formula of Bankowska (1980), which permits comparison of two sites; $S = w/a + b - w$, where S is the similarity coefficient, w is number of species common to the two communities (32), a is the number of species at the reed-bed (61) and b is the number of species at the woodland ride (44), a poor level of similarity exists between the two ($S = 0.44$). The low numbers of aphidophagous syrphids found in the reed-bed confirms the expectation that marshy habitats are poor for this group of syrphids, although in terms of species diversity both sites were similar: reed-bed 26 species, woodland ride 24 species. *Platycheirus* species were well represented with 8 species being recorded overall. Differences between the sites are largely due to the specialised breeding habits of the species within the two habitats. Thus aphidophagous Syrphinae find most aphids for oviposition and a mosaic of light and shade suitable for mate selection in and around the canopy of trees whereas reed-bed species find wet mud and decaying vegetation they need for oviposition within the marsh.

T. scita is a rare species in northern England, but was abundant at Rostherne, being the fifth most common species. It has a known trophic relationship with *Typha* (Decleer and Rotheray, 1990) and this goes some way to explaining its relative abundance at Rostherne. *T. scita* was also recorded at Rostherne by C.I. Rutherford on 3 July 1986 and 14 June 1989. Speight and Lucas (1992) state that *T. scita* is in decline over much of Europe, so it is apparent that Rostherne Mere may be an important site for this species. Another scarce species caught was *Parhelophilus frutetorum* (Fabricius), which also has larvae feeding in association with *Typha* (Hartley, 1961). Thirteen individuals were caught between 14 June and 17 August, a new species for Rostherne.

Fig. 1. Number of syrphids recorded by Malaise trapping at Shaw Green Willows reed-bed, Rostherne Mere NNR in 1996.

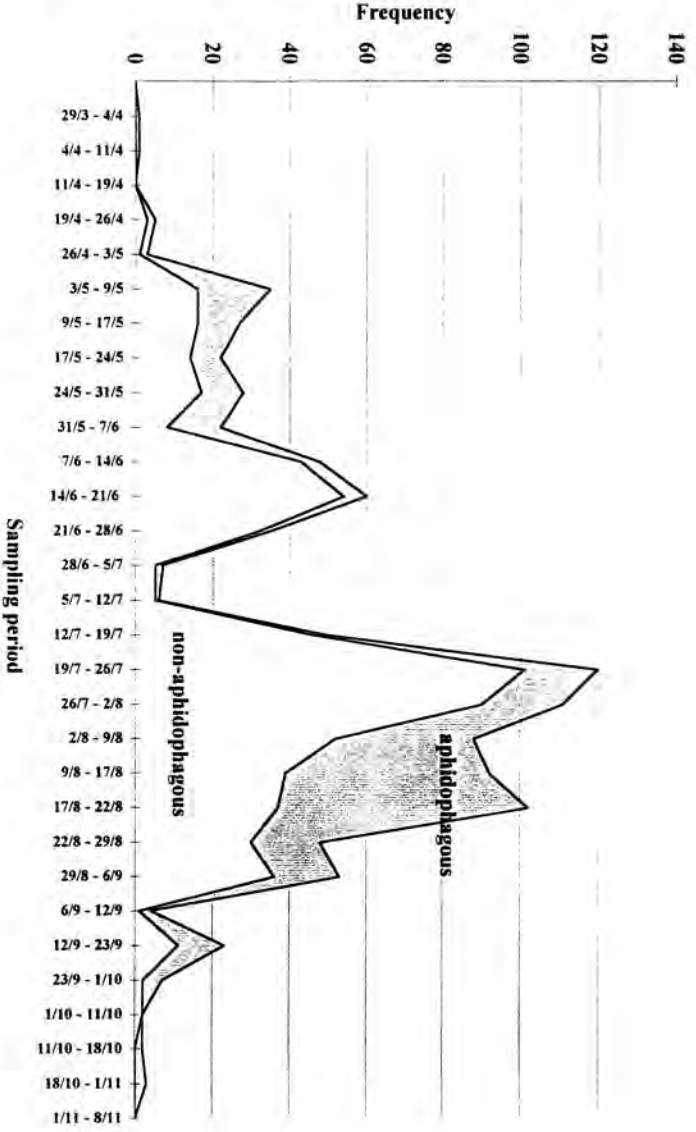
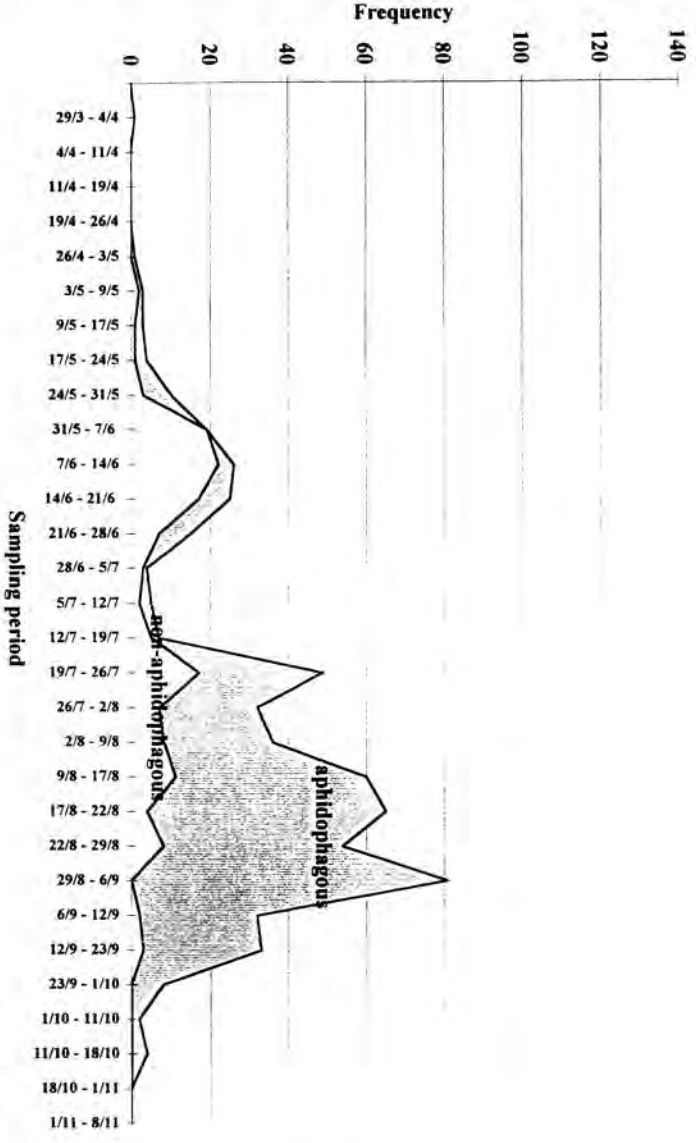


Fig. 2. Number of syrphids recorded by Malaise trapping at Mere Covert woodland ride, Rostherne Mere NNR in 1996.



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Dipterists Digest 1997 4, 41-44

Ectaetia christii sp. n., a Scottish species similar to *Ectaetia clavipes* (Diptera, Scatopsidae)

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While searching for saproxylic Diptera associated with aspen, *Populus tremula* L., in Strathspey, Inverness-shire in May 1990, we collected some decayed bark from which, among other Diptera, a shiny, black scatopsid was reared. Later, in July 1990, we collected some more decayed *P. tremula* bark from which many black scatopsids were obtained.

In Freeman and Lane (1985) the species keyed out close to *Ectaetia clavipes* (Loew). However, on close examination we were able to determine that an unrecognised species exists similar to *E. clavipes*. In this paper we describe both sexes and the puparium of this new species.

Ectaetia christii sp. n.

Material examined. Adults: holotype ♂, Scotland, Inverness-shire, Grantown, Dulicht Wood, NJ0228, bred from decaying bark taken from fallen *P. tremula*, collected 22.vii.1990, emerged May-June 1991. Paratypes 67 ♂, 72 ♀: Scotland, Inverness-shire, Grantown, Dulicht Wood, bred from decaying bark taken from fallen *P. tremula*, collected 22.vii.1990, emerged May-June 1991. One ♀: Scotland, Inverness-shire, nr Inshriach NH8808 25.v.1990, emerged 25.vi.1990. Six ♂ and 5 ♀ (including holotype) dry pinned, 62 ♂ and 68 ♀ maintained in spirit, as recommended by Freeman and Lane (1985). Puparia: Scotland, Inverness-shire, Grantown, Dulicht Wood, 6 from under decaying bark of a fallen *P. tremula*, collected 26.v.1990, adults emerged by 20.vi.1990. Holotype, all paratypes and puparia in the National Museums of Scotland, Edinburgh.

Etymology. *Ectaetia christii* is named after the late Iain Christie who, being interested in aspen and its insects, joined in the fieldwork that led to the discovery of this new species.

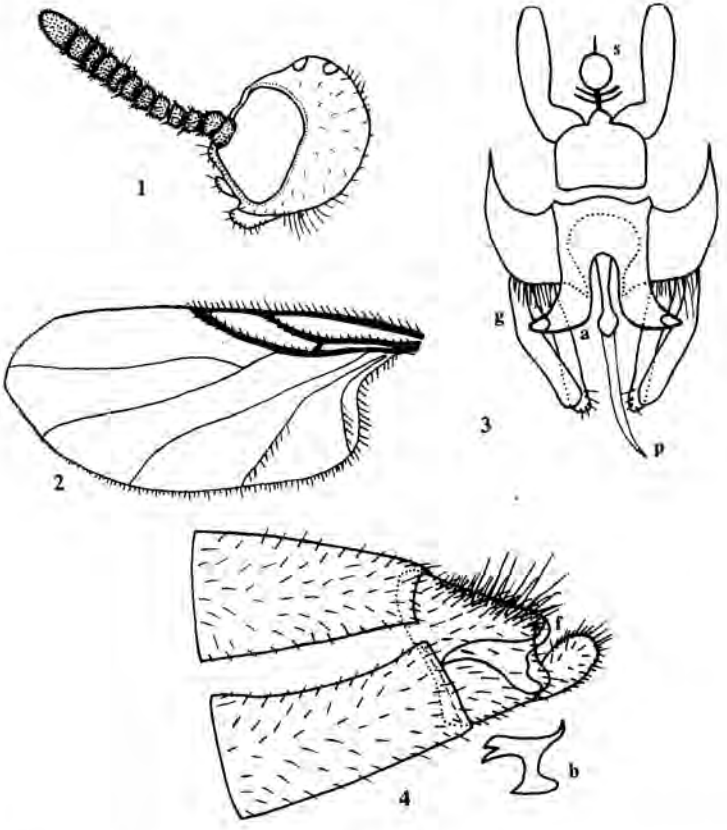
Description

Terms follow Freeman and Lane (1985) and McAlpine (1981).

Male. Wing length 2.0-2.5mm; head, thorax, abdomen and legs almost entirely shining black; halteres pale; body laterally compressed, eyes meeting above the antennae by about 6 facets; antennae 12 segmented (Fig. 1); front coxae about as long as femora, hind tibiae dilated at apex with a row of close-set setae; wing without false vein and macrotrichia except along 1st and 2nd sections of C, R1, 2nd section R 4+5, CuA2 and A (Fig. 2); male with sperm pump joined to external genitalia (Fig. 3); genitalia (Fig. 3) with elongate, round-tipped appendages and pointed apical processes, penis apparently tapering.

Female. Similar to male; 7th sternite U-shaped with little apical thickening; one kidney-shaped spermatotheca; ventral arm of genital fork rounded, anterior arm tapering ventrally (Fig. 4).

Puparium. Length 2.0-2.5mm; pale brown, anterior end with a blunt projection (Figs. 5&6), posterior end with a rounded projection; 6 pairs of abdominal spiracles along the lateral margins on rounded projections (Figs. 5&6); prothoracic spiracles large and conspicuous, consisting of two blunt-tipped branches, one longer than the other and each bearing respiratory openings (Fig. 7).

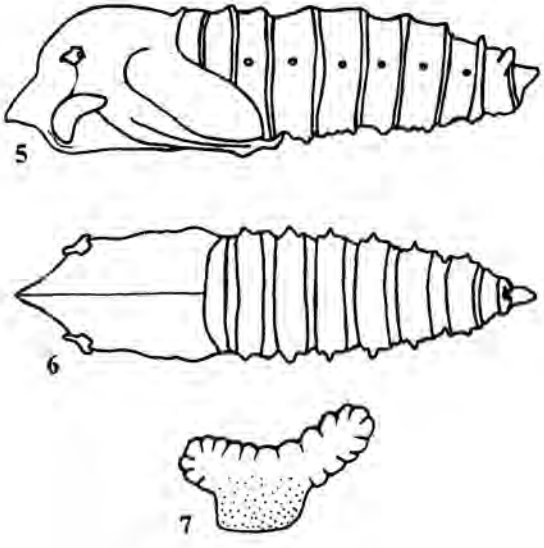


Figs. 1-4. ***Ectaetia christii*****, 1, male holotype, head, lateral view; 2, male holotype, wing, dorsal view; 3, male holotype, genitalia, s = sperm pump, g = genital appendage, a = apical process, p = penis; 4, female, tip of abdomen, lateral view, f = genital fork, b = genital fork of** ***E. clavipes*****.**

Discussion

Ectaetia is a small genus with only three species in the Palaearctic Region (Krivosheina and Haenni, 1986). All three species occur in Britain and are readily separated by differences in their genitalia (Freeman and Lane, 1985). *E. christii* is most similar to *E. clavipes* in having a shiny abdomen not densely clothed with microtrichia (these microtrichia present in *E. platyscelis* (Loew)), eyes meeting above the antennae by about 6 facets (about 20 facets in *E. lignicola* Edwards) and having, in the male, rounded genital appendages (tapering in *E. lignicola*) without basal hairy projections (present in *E. platyscelis*).

E. christii is readily separated from *E. clavipes* on characters of the genitalia. In males the genital appendages of *E. christii* are parallel-sided to the tip and do not broaden, as in *E. clavipes*. However the most conspicuous difference between males is the shape of the apical processes. In *E. christii* they taper (Fig. 3) whereas in *E. clavipes* they are rounded (Fig. 66 in Freeman and Lane (1985)). The apical processes often protrude from dried specimens and dissection is not usually required to identify the species. In females the shape of the genital forks differ, in particular the anterior arms in *E. clavipes* appear to bifurcate but form a single projection in *E. christii* (Fig. 4).



Figs. 5-7. *Ectaetia christii*, puparium, 5, lateral view, length 2.5mm; 6, dorsal view; 7 prothoracic spiracle, dorso-lateral view.

The early stages of scatopsids in general are very poorly known (Freeman and Lane, 1985; Smith, 1989). Apparently the only description of *Ectaetia* early stages is that of the supposed larva of *E. platyscelis* (Laurence, 1953) but identification was not confirmed by rearing and some doubt remains about the identity of these larvae (Freeman and Lane, 1985). Puparia are also poorly known (Freeman and Lane, 1985) and have not, apparently been described in *Ectaetia*. The puparium of *E. christii* is similar to other scatopsid puparia in bearing abdominal spiracles on projections and in having branched prothoracic spiracles. However, the form of these spiracles differs in *E. christii* in being much stouter and rounded (Fig. 7) rather than being narrow and thread-like (Freeman and Lane, 1985). In addition, the anterior end of the puparium of *E. christii* tapers and is, apparently, much more pointed than in other scatopsid puparia (Figs. 5&6). The significance of a pointed anterior end may be to facilitate movement through the decayed bark prior to emergence.

E. christii is currently known only from Inverness-shire where it was bred from under bark of fallen *P. tremula* lying in shaded conditions. To judge from the number reared from a small amount of bark from one fallen tree (n = 140), it can be abundant and may form a considerable fraction of the dipteran biomass associated with fallen *P. tremula*. The larva probably feeds saprophagously on materials associated with the decay of the cambial layers caused by micro-organisms. Another abundant group of primary feeders on this material are sciarids, such as *Xylosciara lignicola* (Winnertz) and *Lycoriella mali* (Fitch) (Diptera, Sciaridae). Together these larvae probably form important items of prey for the range of dipteran larval predators we also reared from the same sample of bark, such as the RDB 2 hybotid, *Tachypeza heeri* Zetterstedt (Hybotidae), the RDB 3 dolichopodid, *Medetera inspissata* Collin (Dolichopodidae). To judge from the emergence dates of our material, *E. christii* appears to have one generation per annum with an adult flight period in June.

Acknowledgements

The work reported here was part of a wider project on saproxylic Diptera in Scotland carried out by the Malloch Society. We gratefully acknowledge the contribution made by members of the Society to this work of which the present study is a part, and to the Worldwide Fund for Nature and Scottish Natural Heritage who helped fund it. We particularly acknowledge the interest, support and encouragement of our sadly missed colleague, Iain Christie, who, although not a full member of the Malloch Society, joined us on the occasion we discovered *E. christii*. We are also grateful to Nigel Wyatt for arranging a loan of scatopsid material from the Natural History Museum, London.

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Dipterists Digest 1997 4, 45-47

Notes on *Xylophagus cinctus* (Diptera, Xylophagidae) with a description of the puparium

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Xylophagus cinctus Degeer is one of three British species of Xylophagidae, all of which are known from Scotland. *Xylophagus ater* Meigen is the most common species in the group and occurs as a larvae under the bark of a wide range of deciduous trees. *Xylophagus junki* Szilády is known only from one adult specimen taken near Aviemore in 1913 and Falk (1991) considers that it may now be extinct as a British species.

Xylophagus cinctus is considered to be rare and is given a RDB 3 status in Falk (1991). According to Falk (1991) it is only known from six post-1960 native pinewood sites across Scotland from Beinn Eighe NNR in the north west highlands, through Strathspey and Deeside to the Black Wood of Rannoch in Perthshire (Falk 1991). The larva occurs under bark of dead Scots Pine, *Pinus sylvestris* L., where it is a predator of Dipteran and Coleopteran larvae which are present during the first stage of decay, when the cortical layers die and ferment.

During recent survey work on saproxylic Diptera in Scotland the presence of *X. cinctus* was confirmed in the native pinewoods of Deeside, the Black Wood of Rannoch and in Strathspey. Additionally, it was recorded from Culbin Forest near Nairn on the Moray coast. This is not surprising because although much of the area consists of relatively recent conifer plantations, it does contain areas of old pinewood and is well known for containing other native pinewood Diptera such as *Laphria flava* L. (Asilidae) and *Callicera rufa* Schummel (Syrphidae).

It does, however, also occur in commercial plantations of Scots Pine, such as those at Fochabers in Morayshire, Huntly in Aberdeenshire and on the outskirts of Inverness. The Inverness site is at least 35Km from the nearest native pinewood the other two being at least 45Km distant. At Fochabers an empty but recent puparium was found under the bark of a fallen pine within the plantation. At the Huntly site a large larva was collected from a pile of extracted timber lying by the roadside within the forest. This soon pupated and an adult emerged a few weeks later. Several larvae were found under the bark of a fallen Scots Pine at the Inverness site.

Another discovery was that the larval stages of *X.cinctus* are not confined to Scots Pine but will also utilise other non native conifers such as spruce (*Picea* sp.). Larvae and a puparium were found under bark of a fallen spruce trunk and in the stump of a spruce in the Rothiemurchus Forest, Strathspey and a larvae in a similar situation was found in Glen Cannich (D. Robertson *pers. comm.*).

These records constitute a considerable extension of the known range of *X.cinctus* both in geographic and habitat terms. The general body form of adult *X. cinctus* does not suggest that it is a strong flying insect and that it has a low dispersive ability. However the records from relatively recent plantations, often well apart from ancient pinewoods, indicate that *X. cinctus* may have a dispersive ability greater than previously considered. Even if it is unlikely to cover distances as great as 35km, it may have used other Scots Pine or indeed

mixed conifer plantations as "stepping stones" over several generations of progressive dispersal from native pinewoods.

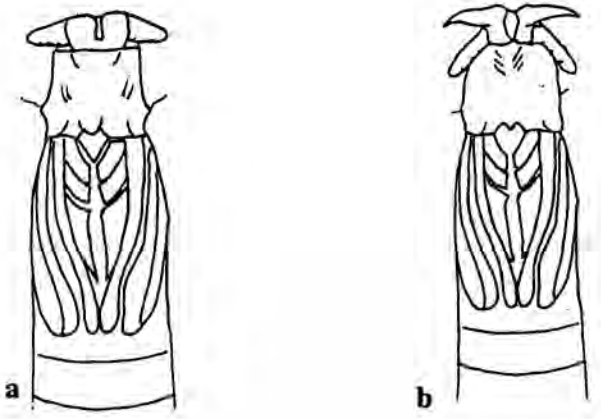

Fig. 1. *Xylophagus* puparia, anterio-ventral view, a, *X. cinctus*; b, *X. ater*

The ability of *X. cinctus* to colonise commercial plantations appears to be related to the age of the trees that are present. In native pinewoods larvae are usually found under the bark of large trees, about 50 years old. There is now over ten times as much Scots Pine in Scotland present in plantations when compared with the amount in native woodlands. A considerable amount, especially in north east Scotland, consists of trees 50+ years old. Increasingly felling within these large plantations is staggered over a long period and there is a continuity of old trees. Apart from stumps and occasional logs left over from forestry operations, these plantations also contain a proportion of wind-blown trees which increase the number of breeding sites even further.

Plantations with old trees like these are becoming important for saproxylic pinewood Diptera. We found other pinewood saproxylic species from a range of groups such as *Medetera* (Dolichopodidae), *Zabrachia* (Stratiomyidae), *Xylota* and *Callicera* (Syrphidae), *Lonchaea* (Lonchaeidae) and *Chymomyza* (Drosophilidae) within these plantations. The value of these sites has yet to be fully recognised.

The finding of empty *Xylophagus* puparia is not uncommon when searching under

bark in the late spring or early summer. Brindle (1961) keys out the larval stages of *X. ater* and *X. cinctus*, and the puparia are considered by Buchanan White (1876) but without illustration.

The main difference between the puparia of *X. ater* and *X. cinctus* is that in *X. ater* there are a pair of chitinised hooks or horns at the anterior end of the puparium above the folds which enclose the antennae. These are absent in *X. cinctus* (Fig. 1). This feature only seems to appear in the pupal stage, the larvae of the two species are otherwize very similar. Hooks on the puparium of *X. ater* may either assist in wedging the puparium in place under the bark so preventing accidental dislodgement during development or, they anchor it allowing the adult to separate itself from the puparium during emergence. The absence of hooks in *X. cinctus* is perhaps related to the different conditions which are found under the bark of pine where an ability of the puparium to move to a certain extent may be an advantage.

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Oviposition in *Epistrophe diaphana* (Syrphidae) - A female of *Epistrophe diaphana* (Zetterstedt) was observed ovipositing on a flower-head of Hogweed (*Heracleum sphondylium*) at Brent Reservoir, Middx. (TQ2187, VC 21) on 2 July 1996. The plant was situated adjacent to old hedgerows from which a number of 'primary woodland indicator' and 'woodland edge' species of Diptera have been recorded by the author in the past. The fly perched successively at three locations on the rim of the flower-head, curving its abdomen beneath to oviposit at the very top of the flower-stalks. It appeared that single ova were deposited. The underside of the flower-head and the flower-stalks were lightly infested with *Cavariella* aphids (det. G.E. Rotheray). The aphids were widely but sparsely dispersed over the underside of the flower-head and it was therefore not possible to make a meaningful estimate of the distance of the oviposition sites from the aphid colony. The plant in question was re-inspected on 18 July 1996. By that time the plant had become woody and formed seeds. No syrphid larvae were found although one lacewing larva was observed feeding on the very few aphids that were still present about the seed head. There appear to be no published observations of oviposition in this species. *E. diaphana* was initially recorded at the site from a female feeding at Bramble (*Rubus fruiticosus* agg.) flowers on 24 June 1996. **JOHN DOBSON,** 46 Elmwood Avenue, Kenton, Harrow, Middx. HA3 8AH

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Further records of *Haematopota subcylindrica* Pandellé in Essex and notes on identification of British *Haematopota* females (Tabanidae)

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During 1996, I spent from 30 June to 6 July, and from 23 to 27 July in Essex. A male *Haematopota subcylindrica* Pandellé was collected on 4 July 1996, during a half an hour spell of sunshine, in what was a week of inclement weather. Two females of the same species were collected on 26 July 1996, a day of hot, still, dry weather; ideal of encountering female tabanids in search of a blood-meal.

The male was captured around 3.00pm at rest/basking in sunshine, on the top rail of a fence, surrounding a small pond, on the open gravelly area of East Heath (62/0420), part of Fingringhoe Wick LNR, North Essex. The small pond is only approximately twenty metres away from a larger, dried-up pond, from where I swept a female *H. subcylindrica* from tall vegetation on 17 July 1995 (Hodge & Grayson 1996).

The two females captured during 1996, were taken in the vicinity of Copt Hall (52/9714), North Essex, on 25 July. One was captured beside a brackish ditch, close to Copthall Saltings, as it took a blood-meal from my left wrist, whilst initially, I carried too much equipment to be able to remove it. The piercing of the skin was felt, and the fly was allowed to commence feeding, and to continue doing so for approximately thirty seconds, before being captured by placing a 6 inch x 1 inch tube over it. A small trickle of blood oozed from the point of the 'bite' for several minutes after the fly had been removed; however, no irritation was noticed after the fly had been removed, nor was any irritation noticed during the following days, nor did any swelling or inflammation appear. The second female caught on 25 July 1996, found its way into the collecting container at the top of a 6 foot high Manitoba trap, placed in full sunshine in the middle of the small lawn in front of Copt Hall.

Notes on identification of British *Haematopota* females

Haematopota taxonomy is somewhat difficult, and identification of even the few British species is best achieved by the use of a number of characters. Chvála *et. al.* (1972) correctly recognises that the shape and dusting of the antennal scape is of paramount importance for the identification of *Haematopota*; although, it is worth noting that within each species, the antennal scape will show variation of both shape and dusting, but such variations are within definable limits, and the scape remains a useful character for identification. As I have to hand a number of females of four of the British *Haematopota* species, several comparisons have been made, and these have been listed below.

Chvála *et. al.* (1972) divides female European *Haematopota* into a 'pluvialis group' consisting of those species which have the antennal scape at most three times as long as deep; distinctly shorter than frons is high when viewed from above; usually conical to oval; only seldom entirely dusted: and an '*italica* group' consisting of those species which have the antennal scape at least four times as long as deep; about as long as frons is high when viewed

from above; long, cylindrical and rather slender; always entirely greyish dusted. One of the known British species, *H. grandis* Meigen, is in the '*italica* group', the other four are in the '*pluvialis* group', and a number of characters are listed below as an aid to identification.

***Haematopota bigoti* Gobert**
General coloration of dorsal dusting (i.e. any dusting present on the upper half of the insect-tergites etc) yellowish-grey. General coloration of ventral dusting pale grey. Sublateral spots on tergites large; present on all tergites; indistinct, but present on tergite 1; spots on tergite 2 about ⅓ length of tergite; spots on following tergites ¾ length of tergite or more. All femora broadly yellowish in the middle (but partly obscured by grey dusting). Eye hairs pale, fairly dense, moderately long. Width of frons at least equal to width of an eye when viewed from above.

***Haematopota crassicornis* Wahlberg**
General coloration of dorsal dusting yellowish-grey. General coloration of ventral dusting pale grey. Sublateral spots absent from tergites 1 and 2; spots on tergite 3 less than ¼ length of tergite; spots on following tergites ½ length or longer than ½ length of tergite. All femora black (but obscured by grey dusting). Eye hairs pale, fairly dense, moderately long (N.B. best viewed from above). Width of frons at least equal to width of an eye when viewed from above.

***Haematopota pluvialis* (L.)**
General coloration of dorsal dusting yellowish-grey. General coloration of ventral dusting yellowish-grey. Sublateral spots absent from tergite 1; spots present on following tergites, but poorly defined; spots on tergite 2 about ⅓ length of tergite; spots on following tergites ½ to ¾ length of tergite. All femora black (but obscured by yellowish-grey dusting. Eye hairs whitish, not particularly dense, moderately long. Width of frons slightly less than width of an eye when viewed from above.

***Haematopota subcylindrica* Pandellé**
General coloration of dorsal dusting light grey. General coloration of ventral dusting pale grey. Sublateral spots absent from tergite 1; spots on tergite 2 less than ¼ length of tergite; spots on following tergites not longer than ½ tergite length. All femora black (but obscured by light grey dusting). Eye hairs pale, short, sparse; eyes appear almost bare. Width of frons less than the width of an eye when viewed from above.

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Mangetout, an unusual host for *Liriomyza bryoniae* (Diptera, Agromyzidae) - The polyphagous agromyzid *Liriomyza bryoniae* (Kaltenbach) makes irregular linear mines in the leaves of at least 45 plant genera in some 10 different orders (Spencer, K.A. 1990. Host Specialization in the World Agromyzidae (Diptera). *Series Entomologica*. **45**, 1-444). It can sometimes be a serious pest in several European countries. In France tomatoes, melon, cucumber and lettuce have been attacked (Spencer, K.A. 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica*. **5**, 1-304). Leguminous plants are usually avoided by *L. bryoniae*; it having been recorded from only two genera, *Phaseolus* and *Lupinus*. It was thus rather surprising to find that some very early mines in the young pods of *Pisum sativum*, purchased as mangetout on 2.vi.1993 at a supermarket in Edinburgh, produced several imagines of *L. bryoniae* on 28.vi.1993. The flies were identified by Dr K. A. Spencer. Enquiries suggested that the mangetout originated in southern France. As shown in Fig. 1 the mines, which were just under the epidermis of the fleshy pods, had a similar form to the uppersurface leafmines characteristic of this species. The larvae left the pods to pupate. **K.P. BLAND** National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF.

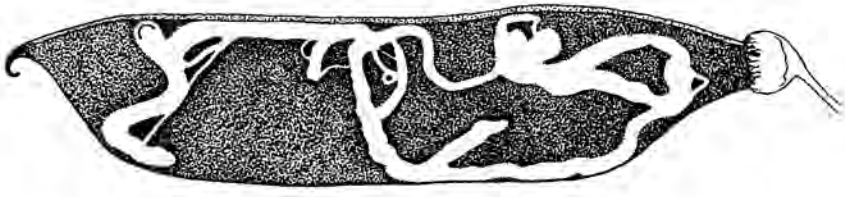

Fig. 1. The mines of *Liriomyza bryoniae* in a young pod of *Pisum sativum*.

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