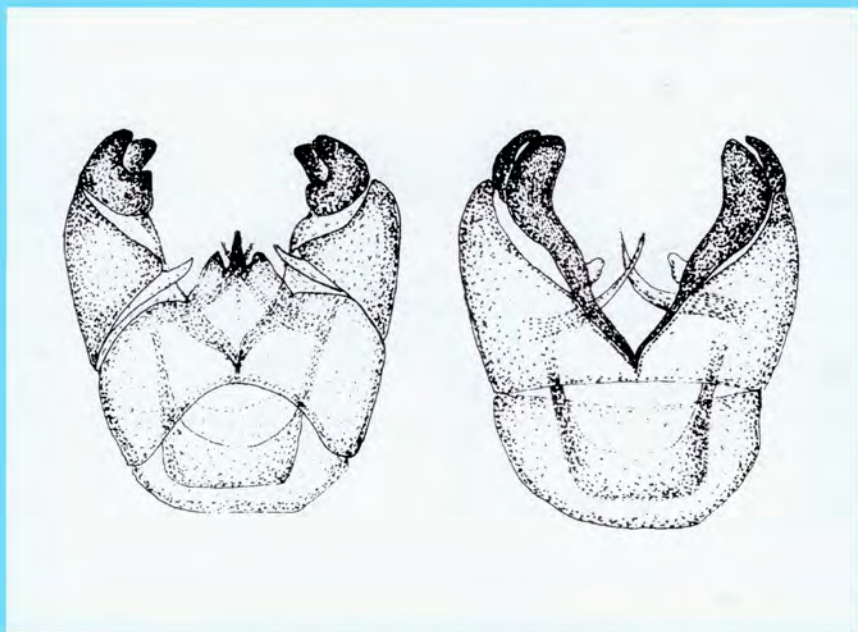
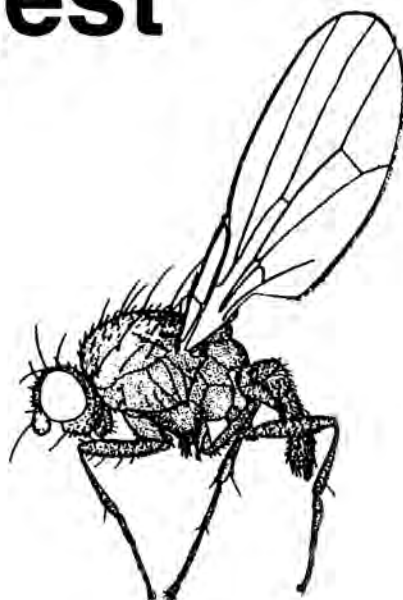


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***Dolichophorus kerteszi* Lichtwardt (Diptera, Dolichopodidae) new to Britain**

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Summary

Dolichophorus kerteszi Lichtwardt, 1902 is added to the British fauna, based on a male collected at the Ouse Washes, Cambridgeshire, in July 2004.

The genus *Dolichophorus* is a member of the subfamily Medeterinae, and shares with *Medetera* and *Thrypticus* conspicuously large genitalia that are not found in most other small British genera. The male differs from other British dolichopodids in having an almost black marginal cell along the leading edge of the wing and unique leg ornamentation. The front coxa has a conspicuous long stout downward-facing seta apically set on the inner margin, its length being 0.8 times the length to the coxa in the male and about 0.7 times in the female illustrated by Párvu (1999). The first tarsomere of the front leg has a frilled apico-ventral projection, and the underside of this tarsomere has four equally spaced short erect ventral hairs that are distinct from the finer setation. Parent (1938) illustrated these features in the male, and Párvu (1999) illustrated the female antenna, front coxa with its setae and wing. Both sexes will run to the couplets containing *Medetera* and *Thrypticus* in the generic keys of Assis-Fonseca (1978), but *Dolichophorus* lacks the stout proboscis and well developed anal vein of *Medetera* and the two external hind coxal bristles characteristic of *Thrypticus*. Superficially *D. kerteszi* also resembles a *Chrysotimus* in its brilliant, slightly pea-green body, and pale yellow setae and legs (except the tips of the tarsi).

A male was collected at the Ouse Washes Reserve of the Royal Society for the Protection of Birds (RSPB), Cambridgeshire (TL494882) on 22 July 2004, during a survey commissioned by the RSPB (Drake 2005). It was swept from the marginal vegetation of a ditch in the centre of the washes. These grazed fields flood each winter but were unusually under deep water well into May in 2004, so the fields around this ditch were exceptionally swampy and the ditch margin still saturated in July when the specimen was caught. The chance of the species developing outside the washes in the arable prairie of the fens is very unlikely. It would therefore seem to survive the extreme conditions of the washes.

Dolichophorus kerteszi appears to be widespread but scarce in Europe (Negrobov 1991). It appears to have been found in a range of habitats. In a study of the dolichopodids of a French valley that spanned floodplain wetlands and dry farmland on the adjacent plateau, Brunel *et al.* (1990) recorded *D. kerteszi* only from higher, drier areas. In contrast, Párvu (1999) recorded it from a river bank in the vegetation association '*Lathyro hallersteini* – *Carpinetum*', which is probably hornbeam *Carpinus* woodland, in northern Romania. These habitats do not match those of the Ouse Washes, which represent one of the most extreme (if artificial) wetlands in England.

Acknowledgements

I thank the Royal Society for the Protection of Birds for the opportunity to undertake the survey, Jon Webb (English Nature) for obtaining additional literature and Peter Dyte for useful corrections to the manuscript.

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***Molophilus ater* (Meigen) (Diptera, Limoniidae) in Cornwall** – Some years ago I discovered that I had collected a specimen of *Molophilus ater* from the West Penwith Moors area of Cornwall. It had remained overlooked in a box of unidentified insects until I eventually showed it to Alan Stubbs who immediately recognised it as this species and commented that he knew of no other records from south-west England. On examination of my field notes I also found that it was one of many specimens seen at the time. The site was Mayon and Trevescan Cliffs (SW3425), 23.v.1979, and the situation was *Molinia*-dominated mire which occurs in patches across the cliff top land here. The altitude is only about 70m.

Interestingly the species was not detected by D.A. Sheppard during his extensive surveys of the Lizard heaths of west Cornwall in 1980/81, and a recent review of mire invertebrates (Boyce, D.C. 2004. A review of the invertebrate assemblage of acid mires. *English Nature Research Report* No. 592) mentions that it is a northern insect in Britain, known from Scotland, northern England and Wales, and associated there with blanket mires. It was this latter publication that impelled me to finally publish the record. Since 1979 I have only encountered the species on the upland blanket mires of the Peak District (Derbyshire), the Lake District (Cumberland) and the Mourne Mountains in Northern Ireland (County Down) – **KEITH N.A. ALEXANDER**, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ, keith.alexander@waitrose.com

***Homoneura consobrina* (Zetterstedt, 1847) (Diptera, Lauxaniidae) restored to the British list**

DAVID GIBBS

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Summary

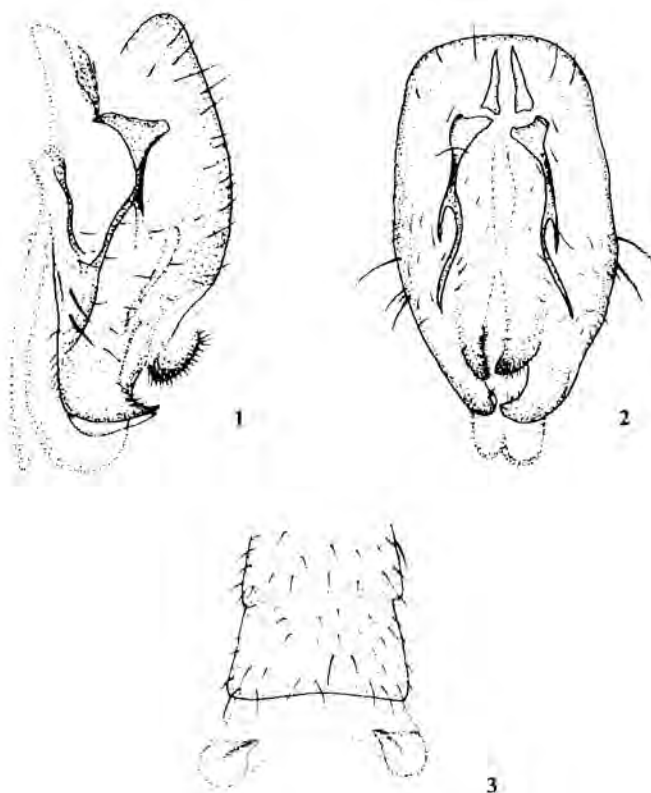
Homoneura consobrina (Zetterstedt, 1847) is restored to the British list based on a single male collected in the Avon Gorge, Somerset. Its identification is discussed and the male genitalia illustrated.

Introduction

In 2003 I surveyed some of the long abandoned quarries along the west wall of the Avon Gorge within the Leigh Woods National Trust property in Somerset (V.C. 6). Amongst the Diptera collected were two male *Homoneura*, one found on 5 August, was readily identified as *H. thalhammeri* Papp, 1978, but the other, collected on 9 June, although very similar, differed in the structure of the genitalia. I passed the specimen to Andy Godfrey who concluded that it was *H. consobrina*. The specimen was then sent to Bernhard Merz who confirmed this identification.

The name *consobrina* was used by Collin (1948) for his specimens with wings unspotted and cross-veins unclouded. Then it was discovered that two further species, *H. thalhammeri* and *H. patelliformis* (Becker, 1895) shared these characteristics (Falk 1994). In adding these two species to the British list Steven Falk recommended that the true *consobrina* should be removed. It seems that this conclusion was reached, quite reasonably, largely because Collin's concept of '*consobrina*' differed from that of continental workers. Collin described his '*consobrina*' as having three dorsocentral bristles, all postsutural, although with the foremost very close to the thoracic suture and stated that "Czerny in 1932 incorrectly indicated that the anterior dorsocentral bristle was in front of the thoracic suture". Subsequently Papp (1979) and Schacht *et al* (2004) repeated Czerny's description. However, my specimen from the Avon Gorge fits Collin's description in having the foremost dorsocentral just behind the thoracic suture in which it agrees with continental specimens (B. Merz *pers comm.*). I can see no difference in the disposition of the dorsocentrals between my specimens of *consobrina*, *thalhammeri* and *patelliformis*.

The Verrall-Collin collection at Oxford University Museum has five male specimens standing over the name '*consobrina*', one from Clifford's Castle, Herefordshire and four from Kirtling, Cambridgeshire. All have the epandrium tightly folded under the abdomen such that the details of the genitalia are invisible. I have dissected one from each location and they are both *H. thalhammeri*. Thus Collin was wrong to add *consobrina* to the British list; he had in front of him an undescribed species, and yet he still correctly divined Czerny's error!



Figs 1-2. *Homoneura consobrina* (Zetterstedt), male genitalia: 1, left lateral; 2, caudal; 3, sternites 3-5.

Identification

In Britain there are now four species with completely clear wings; although *H. hospes* Allen, 1989 has crossvein m-cu darker than the other veins, it is unclouded. *Homoneura hospes* is readily separated by its four dorsocentrals, the foremost clearly presutural, inner rows of acrostichals longer than lateral rows, no dark patch on the occiput and arisal rays longer than the basal thickness of the arista (Allen 1989). There appear to be very few non-genital characters which can be used to distinguish *consobrina* from *thalthammeri* and *patelliformis*. *Homoneura patelliformis* usually has two to four clearly differentiated anteroventral bristles at the tip of the hind femur, which are represented by fine hairs in *thalthammeri* and the Avon Gorge *consobrina*. From *thalthammeri* the Avon Gorge specimen does not seem to differ

externally in any way that is likely to be reliable for identification. Unfortunately, the head capsule has collapsed, so gauging the gena width is not possible but it appears to be relatively narrow as in *thalhammeri* (see Falk 1994).

Reliable identification requires examination of the male genitalia. *Homoneura consobrina* is readily distinguished from *patelliformis* as this species has genitalia of a quite different structure (see Falk 1994). Differences from *thalhammeri* are much more difficult to discern and in dry pinned material could easily be overlooked or misinterpreted. The most obvious difference is the shape of the distal end of the epandrium and its recurved and pointed tip in lateral view. In *thalhammeri* the epandrium narrows sharply beyond the cerci and the recurved tip is narrow and parallel sided just before coming to a point (see Falk 1994). In *consobrina* the epandrium is much broader distally, narrowing only gradually, the recurved tip with sides converging to a point (Fig. 1). Also the membranous, distal part of the hypandrium extends beyond the tip of the epandrium (Figs 1 and 2) significantly further than is the case in *thalhammeri* (see Falk 1994).

Biology

The life cycles and ecological requirements of the genus *Homoneura* seem to be very poorly known. However, the little information available strongly suggests an association with *Salix* and *Populus* (Falk and Ismay in preparation; Falk 1994; personal observations). The Avon Gorge *H. consobrina* was collected in an old limestone quarry with much *Salix* in the damper areas.

Distribution

H. consobrina is a European species recorded from Austria, Bosnia and Herzegovina, Croatia, Czech Republic, Hungary, Italian mainland, Liechtenstein, Poland, Romania, southern Sweden and Switzerland (Greve and Merz 2003; www.faunaeur.org). The Avon Gorge specimen is the only British example so far found: SOMERSET (V.C. 6), Avon Gorge (ST5473), quarry 5, 9 June 2003 1 ♂.

Acknowledgements

I am very grateful to Andy Godfrey for identifying the specimen and supplying me with several useful papers, also to Bernhard Merz for taking the time to examine my specimen and confirm its identity and to Steven Falk for his comments. Darren Mann of the Oxford University Museum kindly permitted me to borrow and dissect specimens from the Verrall-Collin collection. I would also like to thank Bill Morris, warden of the Leigh Woods National Trust property for commissioning the work.

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[sic], the actual species comprising the lauxaniid *laxa* hitherto known in Britain as *H. consobrina* (Zetterstedt, 1847). *British Journal of Entomology and Natural History* 7, 19-22.

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***Smittia scutellosetosa* Caspers, 1988, (Diptera, Chironomidae) new**

to France – On 26 March 2005 my wife (Sue McBean), while sweeping on an island in the river Têt at Olette, eastern Pyrenees, collected two small black midges from vegetation on the bank. Soon afterwards a small swarm was noted over an open white plastic bag and further specimens were pooted from the inside where they had settled. The unusual male hypopygia accord precisely with the figure given by N. Caspers (1988. Zwei neue *Smittia*-Arten aus dem süddeutschen Raum (Diptera, Chironomidae). *Spixiana*, supplement 14, 175-181) for *Smittia scutellosetosa*. The species is recorded previously only from Germany and Italy (Sæther, O.A. and Spies, M. 2004. Chironomidae. In *Fauna Europaea*, internet database at <http://www.faunaeur.org>) – **PETER H. LANGTON**, University Museum of Zoology, Downing Street, Cambridge (address for correspondence: 5, Kylebeg Avenue, Coleraine, Co. Derry, BT52 1JN)

Six species of Diptera new to Ireland – The following recently recorded species of Diptera are additions to the Irish list. **Tipulidae**. *Tipula (Odonatisca) nodicornis* Meigen, 1818: DERRY, Garvagh Wood, swept, 8.viii.2002 (J. McBean). **Cecidomyiidae**. *Giraudiella inclusa* (Frauenfeld, 1862): DERRY, Coleraine, bank of River Bann, galls in *Phragmites* stems, 18.vii.2004 (J. McBean), adult male reared. **Chironomidae**. *Bryophaenocladus simus* (Edwards, 1929): DERRY, Coleraine, Rosell's garden Garvagh Road, swept from nettles *Urtica dioica*, 16.v.2004 (S. McBean); *Pseudosmittia obtusa* Strenzke, 1960: ANTRIM, Rathlin Island, by East Light House, swept, 7.vii.2004 (S. McBean); *Tanytarsus anderseni* Fittkau & Reiss, 1971: ANTRIM, Lough Mourne near Carrickfergus, pupal exuviae, 4.v.1999 (P.H. Langton). **Sphaeroceridae**. *Norrbomia sordida* (Zetterstedt, 1847): DERRY, Umbra Nature Reserve, swept, 3.vii.2003 (P.H. Langton). I am grateful to K.M. Harris for confirming *G. inclusa* and to R. Nash for confirming *N. sordida* and *T. nodicornis*. These last two specimens have been deposited in the Ulster Museum, Belfast – **PETER H. LANGTON**, University Museum of Zoology, Downing Street, Cambridge (address for correspondence: 5, Kylebeg Avenue, Coleraine, Co. Derry, BT52 1JN)

The identification and status of *Dryomyza decrepita* Zetterstedt (Diptera, Dryomyzidae)

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Summary

An illustrated key is provided to the British species of Dryomyzinae and the characters by which *Dryomyza decrepita* Zetterstedt may be distinguished from *D. flaveola* (Fabricius) are discussed. The distribution and status of *D. decrepita* in Britain is described.

Introduction

The dryomyzids discussed here are typically large, conspicuous acalyptrates that can be readily encountered by sweeping woodland ground flora from May until October; *Neuroctena anilis* (Fallén, 1820), which can attain a wing length of 10mm, is especially so. However, confusion has resulted from the historical nomenclature for the family, now hopefully stabilised by the checklist (Chandler 1998), and particularly from the lack of British information for *D. decrepita* Zetterstedt, 1838, a relatively widespread species. This was particularly evident at the British acalyptrate workshop held at Preston Montford in March 2004.

Collin (1910) recorded *D. decrepita* as British, referring also to *D. senilis* Zetterstedt, 1838 and *D. flaveola* (Fabricius, 1794) as British species; he later realised that his *decrepita* and *senilis* represented the two sexes of *D. decrepita*. *Dryomyza senilis*, placed in the genus *Pseudoneuroctena* by Ozerov (1987), is a good species, known only from northern Europe (Sweden and Finland). Both names were included in the 1945 Kloet and Hincks checklist, but in the 1976 checklist were erroneously listed as synonyms of *D. flaveola*, following Steyskal (1962), who had recognised *senilis* as distinct but had treated *decrepita* as a synonym of *flaveola*, based on similar male genitalia.

The result has been that many British workers have been unclear precisely how many *Dryomyza* species are present in Britain, and how the two species listed by Chandler may be identified. This paper deals with the identification and status of *D. decrepita* with reference to the other two British species of the subfamily Dryomyzinae, *D. flaveola* and *N. anilis*. The three species included in the subfamily Helcomyzinae by Chandler (1998) are associated with coastal strand-lines and unlikely to be confused with any of the above species. Some other workers have excluded these three species from the Dryomyzidae and in the Fauna Europaea database the three genera are assigned to different families, Helcomyzidae (*Helcomyza* Curtis), Heterocheilidae (*Heterocheila* Rondani) and Coelopidae (*Malacomyia* Haliday) (Meier, R. *et al.* 2004, www.faunaeur.org).

A key to the British Dryomyzinae

Dryomyza decrepita is a relatively easily identified species. Superficially, it resembles *Neuroctena anilis* due to the shaded cross veins (*D. flaveola* has entirely unmarked wings), but close examination reveals an abundance of differences from *D. anilis*. The following key will separate the three British species.

1. Vein R_1 dorsally with distinct setulae along all its length (except base) in contrast to all other veins except costa. A strong propleural and subequal stigmatical bristle present above the front coxa. Frons protruding above antennal bases and lunule (Fig. 4), the lunule therefore obscured by the frons in dorsal view. Arista bare on apical two-thirds or more (Fig. 4). Male epandrium with surstyli narrow and lacking long setae, and with a pair of equally large inner lobes creating the impression of double claspers (Figs 2-3). Distinct clouds on cross veins r-m and dm-cu and apices of R_{2+3} , R_{4+5} and M (Fig. 1) but faint in teneral specimens. Vein R_{4+5} strongly curved beyond r-m. Sides of thorax mostly undusted. (Wing length 5-10mm)

Neuroctena anilis (Fallén)

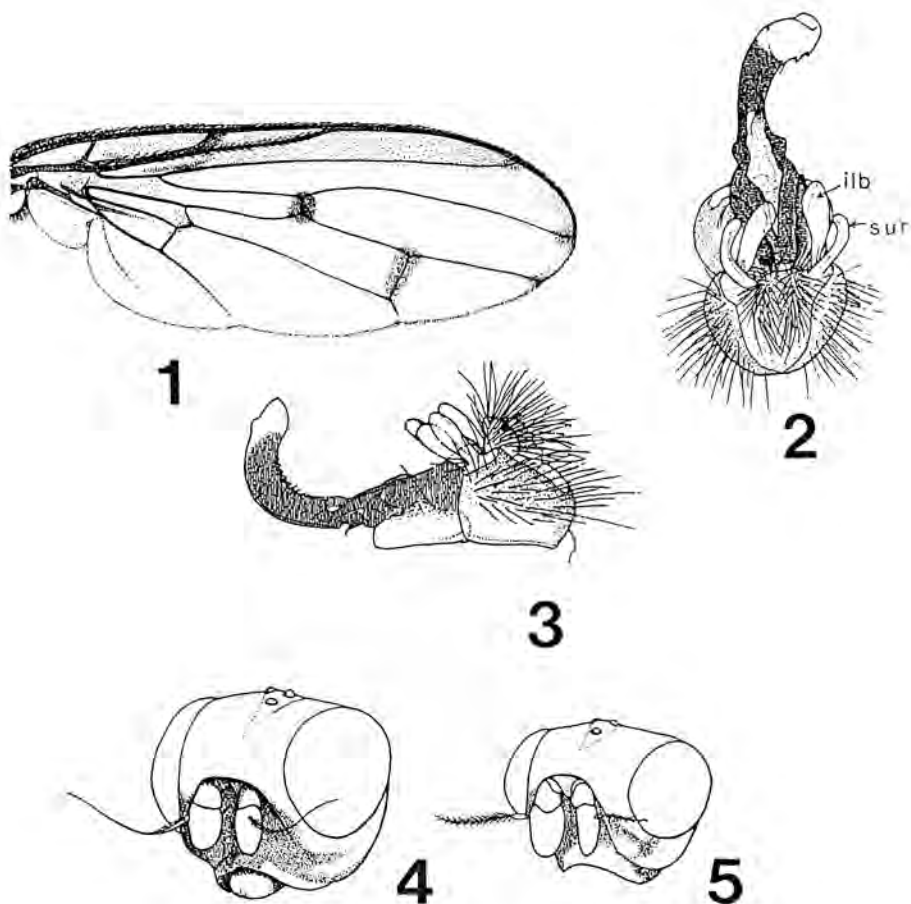
- Vein R_1 dorsally with only the microscopic setae found in the other non-costal veins. Vein R_{2+3} less strongly curved (Figs 6 and 10). Frons not protruding, the lunule semi-contiguous with the frons and usually protruding beyond the front of the frons in dorsal view (Fig. 5). No strong stigmatical. Arista pubescent on its entire length (Fig. 5). Epandrium with broader surstyli with numerous long setae (Figs 7-9, 11-12), plus short inner lobes attached to the inner surface of the epandrial capsule (Fig. 9) that are largely obscured by the surstyli in dorsal view. Sides of thorax at least slightly dusted

(Dryomyza) 2

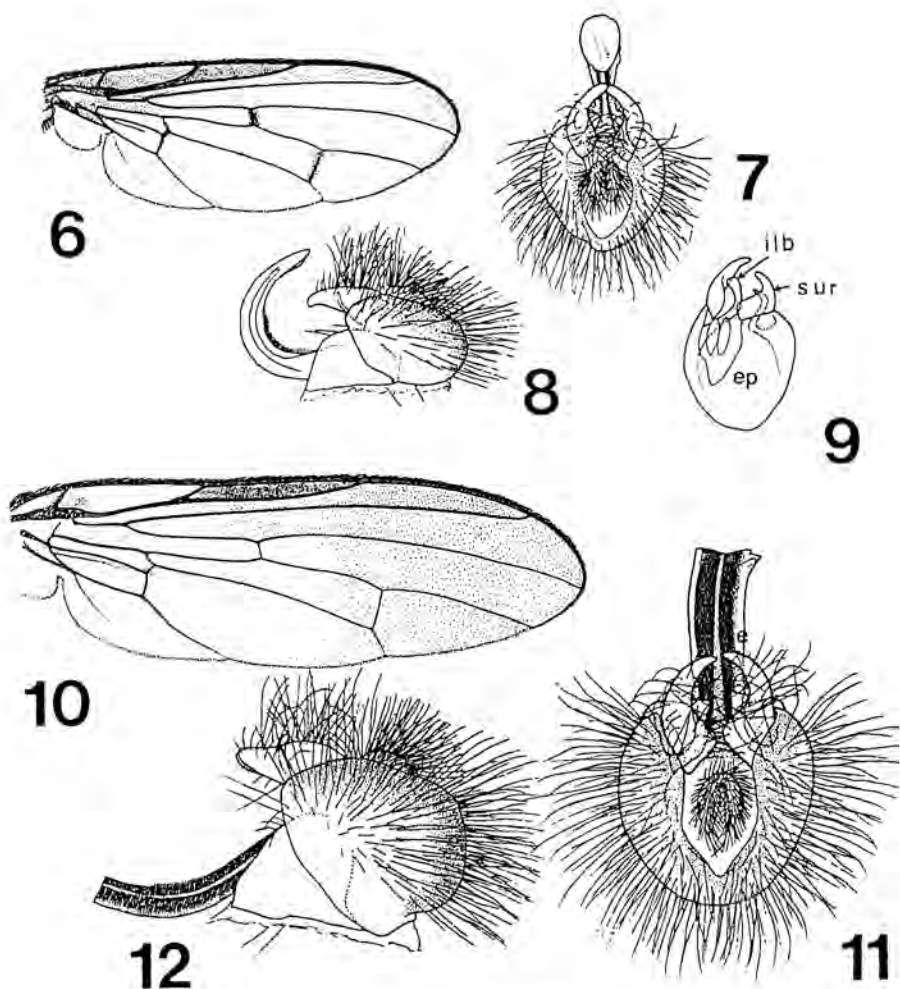
2. Cross-veins r-m and dm-cu with no hint of clouds; wings relatively long and narrow, with cells dm and r_{4+5} relatively long and narrow (Fig. 10). Arista with shorter pubescence, length of longest hairs about equal to basal width of arista. Palpi with darkened tips. Setae on upper margin of katepisternum (= sternopleuron) relatively strong. Body more heavily dusted, typically yellowish, but browner in autumn and winter (var. *zawalskii* Schummel, 1834), occasionally reddish like *decrepita*. Tarsi paler, the front basitarsus concolorous with the tibia. (Wing length 7-10mm)

flaveola (Fabricius)

- Cross-veins r-m and dm-cu with faint but obvious clouds (except in very teneral specimens); wings not noticeably long and narrow (Fig. 6). Arista with longer pubescence, length of longest hairs often twice the basal width of arista (Fig. 5). Palpi entirely yellow. Setae on upper margin of katepisternum relatively weak. Body lightly dusted and more shining, distinctly reddish (except in teneral specimens). Tarsi darker, the front basitarsus usually distinctly darker than the tibia. Male genitalia resembling *flaveola*, the differences in the surstylus shape in figures due to orientation and not consistent, but the inner lobe seems to be less twisted in the limited number of specimens checked. (Wing length 6-9mm) *decrepita* Zetterstedt



Figs 1-5. British Dryomyzinae: 1-4, *Neuroctena anilis* (Fallén). 1, wing; 2, male genitalia in dorsal view with inner lobe (i lb) and surstyli (sur) denoted; 3, same in lateral view; 4, head in oblique front view showing sunken lunule region of upper face; 5, *Dryomyza decrepita* Zetterstedt, head in same view showing unmodified lunule region and more pubescent arista.



Figs 6-12. British Dryomyzinae (cont'd): 6-9. *Dryomyza decrepita* Zetterstedt. 6, wing; 7, male genitalia in dorsal view; 8, same in lateral view; 9, simplified diagram of hypandrium with epandrium removed to show inner lobes (i lb) and their attachment to the epandrial inner wall (ep). 10-12. *Dryomyza flaveola* (Fabricius). 10, wing; 11, male genitalia in dorsal view (tip of aedeagus missing); 12, same in lateral view.

Problems can occur when dealing with teneral *decrepita* specimens, where the wing markings and body colour are poorly expressed, though the arisal hairing, pale palpi and wing proportions continue to provide a fairly reliable means of separation from *flaveola*.

Records and observations for *Dryomyza decrepita* Zetterstedt

Dryomyza decrepita is widespread in central and northern Europe, with records from Sweden, Finland, Germany, Poland, Belgium, Austria, Switzerland and Czech and Slovak Republics (Carles-Tolrá, M. *et. al.* 2004, www.faunaeur.org). In Britain it appears to have a more northerly bias to its distribution than *D. flaveola* or *N. anilis*, but is nevertheless widespread. Records for the following vice-counties have been obtained from Peter Chandler (PC), Jon Cole (JC), the author (SF), David Gibbs (DG), Andy Godfrey (AG), Ivan Perry (IP) and the Natural History Museum (BMNH). The species is newly recorded for Ireland:

ENGLAND: S. Wiltshire (BMNH), Berkshire (DG), Huntingdonshire (JC), Herefordshire (BMNH), Worcestershire/Salop (BMNH), Warwickshire (SF), S.W. Yorkshire (DG), N.E. Yorkshire (SF).

WALES: Brecon (BMNH), Merionethshire (JC).

SCOTLAND: West Perth (BMNH), Mid Perth (BMNH), East Perth (BMNH), Forfar (JC), S. Aberdeenshire (BMNH, SF, AG), Banff (BMNH, IP), Elgin (BMNH, IP), Easternness (BMNH, DG, PC), Main Argyllshire (BMNH), Clyde Isles (BMNH), E. Ross (PC), W. Ross (IP), E. Sutherland (BMNH, JC), W. Sutherland (BMNH, PC).

REPUBLIC OF IRELAND: Co. Laois: Slieve Bloom Mountains (N295045), 6.vi.1970, leg. R.I Vane-Wright (BMNH)

In Warwickshire it has been recorded at five sites since 1990, compared with over 100 sites for *N. anilis*, but only two sites for *D. flaveola*. Capture dates range from 25 May to 17 October, with most records coming from September and October. The general habitat requirements appear to be very similar to *D. flaveola* and *N. anilis*, and all three species were recorded together at one Warwickshire site on 17 October 1999. However, it appears to have a more boreal character than the others, and has been taken at a height of about 1000m on Cairngorm by Ivan Perry. Nothing appears to be recorded of its life history, though *D. flaveola* has been reared from dung whilst *N. anilis* typically develops in carrion (sources summarised by Smith 1989).

Other Palaearctic *Dryomyzinae*

Soós (1984) listed three further Palaearctic species (incorrectly citing *D. senilis* as British). The latter species was included in the key by Steyskal (1957) and its genitalia (which are quite distinct from the three British species) were figured by Steyskal (1962). Ozerov (1987) provided a key to all ten Russian species (including our three species) with simple sketches of key parts of the male genitalia. Five *Neuroctena* species were recognised in this work.

Acknowledgements

I am especially indebted to Peter Chandler for originally introducing me to the characters of *D. decrepita* and for providing key literature and information during the preparation of this paper. Jon Cole drew my attention to the problems associated with teneral *decrepita* specimens. Peter Chandler, Jon Cole, David Gibbs, Andy Godfrey, Ivan Perry and Nigel Wyatt (BMNH) kindly provided the records at their disposal.

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Syntormon macula Parent (Diptera, Dolichopodidae) in Shropshire

— The note by Jonty Denton and Peter Chandler (2004. *Syntormon macula* Parent (Diptera, Dolichopodidae) in Berkshire. *Dipterists Digest (Second Series)* **11**, 102) reminded me that I took this fly in Shropshire (V.C. 40) on 21.v.2003 at Ifton Wood, St. Martins (SJ315376). The site is a small piece of semi-natural ancient dingle woodland with a permanent stream flowing through it. The fly was very kindly identified by Roy Crossley in early 2004 — **PETER BOARDMAN**, 7 High Street, Weston Rhyn, Shropshire, SY10 7RP, peperouda@btinternet.com

Some lectotype designations in the family Dolichopodidae (Diptera) from the collections of Ferdinand Kowarz and Hermann Loew

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Summary

The type-material of ten species of European Dolichopodidae described by Kowarz and Loew is discussed, and lectotypes are designated in order to fix the identity of the names. These include six Kowarz types and four Loew types: *Diaphorus melancholicus* Loew, 1869, *Hypophyllus sciophilus* Loew, 1869, *Synarthrus subinermis* Loew, 1869 (now *Syntormon subinermis* (Loew)), *Chrysotus angulicornis* Kowarz, 1875, *Chrysotus blepharosceles* Kowarz, 1875, *Chrysotus microcerus* Kowarz, 1875 (= *Chrysotus gramineus* (Fallén, 1823)), *Chrysotus pulchellus* Kowarz, 1875, *Chrysotus varians* Kowarz, 1875 (= *Chrysotus gramineus* (Fallén, 1823)), *Psilopus bellus* Loew, 1873 (now *Sciapus bellus* (Loew)), *Sympycnus pullatus* Kowarz, 1889 (= *Sympycnus cirripes* (Haliday in Walker, 1851)), *Chrysotus pulchellus* Kowarz, 1875 and *Psilopus bellus* Loew, 1873 are redescribed from their types and the male genitalia are illustrated. The status of *Chrysotus angulicornis* Kowarz is discussed and its synonymy with *C. gramineus* (Fallén) is not accepted.

Introduction

The Dolichopodidae (Diptera) that Ferdinand Kowarz (1838-1914) collected in Central and Eastern Europe were described partly by Hermann Loew (1807-1878) and partly by Kowarz himself. As a result, the holotypes or syntypes may be in the Oxford University Museum of Natural History, Oxford, UK (UMO, Kowarz Collection), in the Zoological Institute of the Russian Academy of Sciences, St Petersburg, Russia (ASSP, Kowarz Collection) and/or in the Museum für Naturkunde, Humboldt-Universität zu Berlin, Berlin, Germany (ZMHU, Loew Collection). We have studied all three collections, and also relevant material in the Naturhistorisches Museum, Vienna, Austria (NMW) and Leeds City Museum, Leeds, England (LCM, Meade collection), and give here some of the results of these investigations. Lectotypes are here designated in order to restrict each name to a single specimen and thereby to ensure nomenclatural stability.

Note on the publication date of Kowarz' paper on *Chrysotus*

The five species of *Chrysotus* considered here were described in *Verhandlungen der zoologisch-botanischen Gesellschaft in Wien* 24, 453-478 (Kowarz 1875). Some explanation is necessary for treating this paper as published in 1875 as it has been widely cited as published in 1874. The manuscript was laid before the Society at the meeting of 7 October 1874 (see *Sitzungsberichte der zoologisch-botanischen Gesellschaft in Wien* 24, 32). The paper was published in fascicle 3 + 4 of volume 24; the exact date of publication is not known but this part of the journal was received by the Vienna Academy of Sciences on 11 March 1875 (N.L. Evenhuis *pers. comm.*). The new species described there are accordingly to be dated 1875, and

material collected by Kowarz in the summer of 1874 can be considered as syntypic.

Results

Diaphorus melancholicus Loew, 1869: 295 (now *Melanostolus melancholicus* (Loew)).

Described from the male sex, from "Ungarn", collected by Kowarz.

Lectotype (by present designation): ♂, labelled by Loew "Ungarn / Kowarz", in ZMHU.

No further syntypes in ZMHU, and none found in ASSP or UMO.

The specimen is in accord with the description in Parent's 1938 monograph.

Hypophyllus sciophilus Loew, 1869: 289.

Described from the male sex, from "Ungarn ... Losoncz" [= Lučenec, Slovakia], collected by Kowarz.

Lectotype (by present designation): ♂, with a small green label with the printed letter "L" [? = Losoncz], in ZMHU. It is labelled "Hypophyllus / sciophilus" in an unrecognised hand.

No further syntypes in ZMHU, and none found in ASSP or UMO.

The specimen is in accord with the description in Parent's 1938 monograph.

Synarthrus subinermis Loew, 1869: 290 (now *Syntormon subinermis* (Loew)).

Described from the male sex, from "Ungarn ... Losoncz" [= Lučenec, Slovakia], collected by Kowarz.

Lectotype (by present designation): ♂, labelled by Loew "Losoncz / Kowarz", in ZMHU.

Paralectotypes: 1 ♂, with a green tag but no further data, in ZMHU; 1 ♂, labelled by Kowarz "Losoncz / 1868", in ASSP.

No syntypes found in UMO.

The specimen is in accord with the description in Parent's 1938 monograph and with the key provided by Negrobov (1975).

Chrysotus angulicornis Kowarz, 1875: 474.

Described from the male sex, collected by Kowarz at Innsbruck and by Bergenstamm at Salzburg [both Austria].

Lectotype (by present designation): ♂, labelled by Kowarz "Insbrk / 27.6.73", in UMO. At some time this has become detached from its pin and is now glued to the staging pin; thorax damaged, and left fore leg and right mid leg missing.

No further syntypes in UMO, and none found in ASSP, ZMHU or NMW.

This species is different from *Chrysotus gramineus* (Fallén), with which synonymy has been suggested as reported in the British checklist (Chandler 1998). These species may be separated by the character given by Assis-Fonseca (1978), i.e. antennal first flagellomere triangular in *angulicornis* and oval in *gramineus*; Negrobov *et al.* (2000) also indicated differences in the genital structure but a further study of this aspect will be the subject of a subsequent article.

Chrysotus blepharosceles Kowarz, 1875: 462.

Described from the male sex, collected by Loew at Marktbreit, Germany, and also present in

Winthem's collection (NMW) from Lyon, France.

Lectotype (by present designation): ♂, labelled by Kowarz "Mkt Breit / Loew", in UMO. Head missing; genitalia mounted in Canada balsam on a small celluloid mount.

The ♂ collected by Winthem is in NMW and has been labelled as paralectotype.

No further syntypes in UMO, and none found in ASSP or ZMHU.

The specimen is in accord with the description in Parent's 1938 monograph and with the key provided by Negrobov *et al.* (2000).

Chrysotus microcerus Kowarz, 1875: 469 (now = *Chrysotus gramineus* (Fallén, 1823)).

Described from both sexes, collected by Kowarz at Asch [= Aš, Czech Republic], by Loew in various parts of Germany, and by Fedtschenko near Warsaw, Poland.

Lectotype (by present designation): ♂, labelled by Kowarz "Asch / 7. 1874", in ASSP.

Paralectotypes 14♂ 3♀: 3♂ from Asch, 1874, in ASSP; 1♂ in ZMHU (labelled by Kowarz "Asch 18 / 7.873"); 7♂ 1♀ in UMO (labelled by Kowarz: "Asch 7 / 1874", 1♂ 1♀ on one mount, 2♂ on one mount; "Asch 11 / 7.874", 2♂ on one mount; "Asch 15 / 7.874", 2♂ on one mount); 2♂ 1♀ in NMW, received via Mik ("Asch 8 / 873", 1♂ 1♀ on one mount; "Warschau", 1♂); 1♂ 1♀ in LCM ("Asch / 8.73").

This species is confirmed to be a synonym of *Chrysotus gramineus*. Characters previously used for separation of these species are considered to result from infraspecific variation in the general morphology; the structure of the hypopygium is identical.

Chrysotus pulchellus Kowarz, 1875: 461.

Described from both sexes, with no specific localities: widespread in Austria, Hungary and Germany.

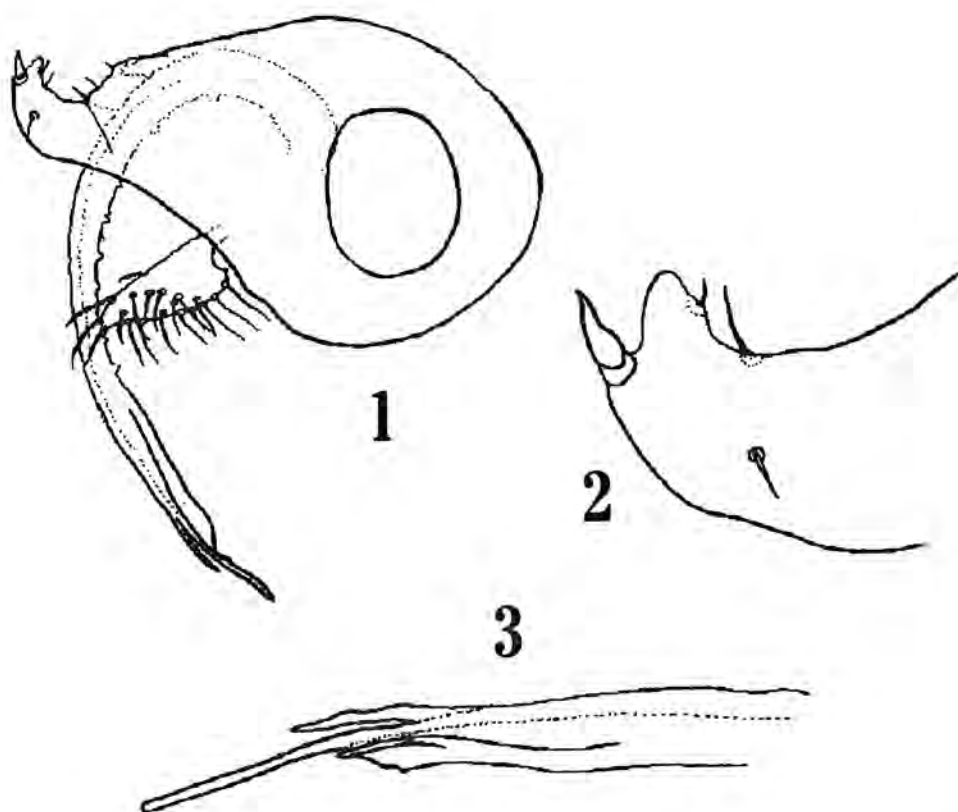
Lectotype (by present designation): ♂, "Asch / 7.74" (= Aš, Czech Republic), in ASSP.

Paralectotypes 11♂: 1♂, labelled "Asch / 7.74", in ASSP; 1♂, Innsbruck (Austria), 27.vi.1873, UMO; 2♂, Asch, 29.v.1872 and 12.viii.1872, UMO; 3♂, Asch, vii.1874, UMO; 2♂, Asch, vii.1874, LCM; 2♂ on one mount from Loew's collection (labelled by Kowarz "Asch 19 / 6.74" and "*Chrysotus / pulchellus*"). ZMHU. No syntypes in NMW.

Redescription of lectotype (Figs 1-3)

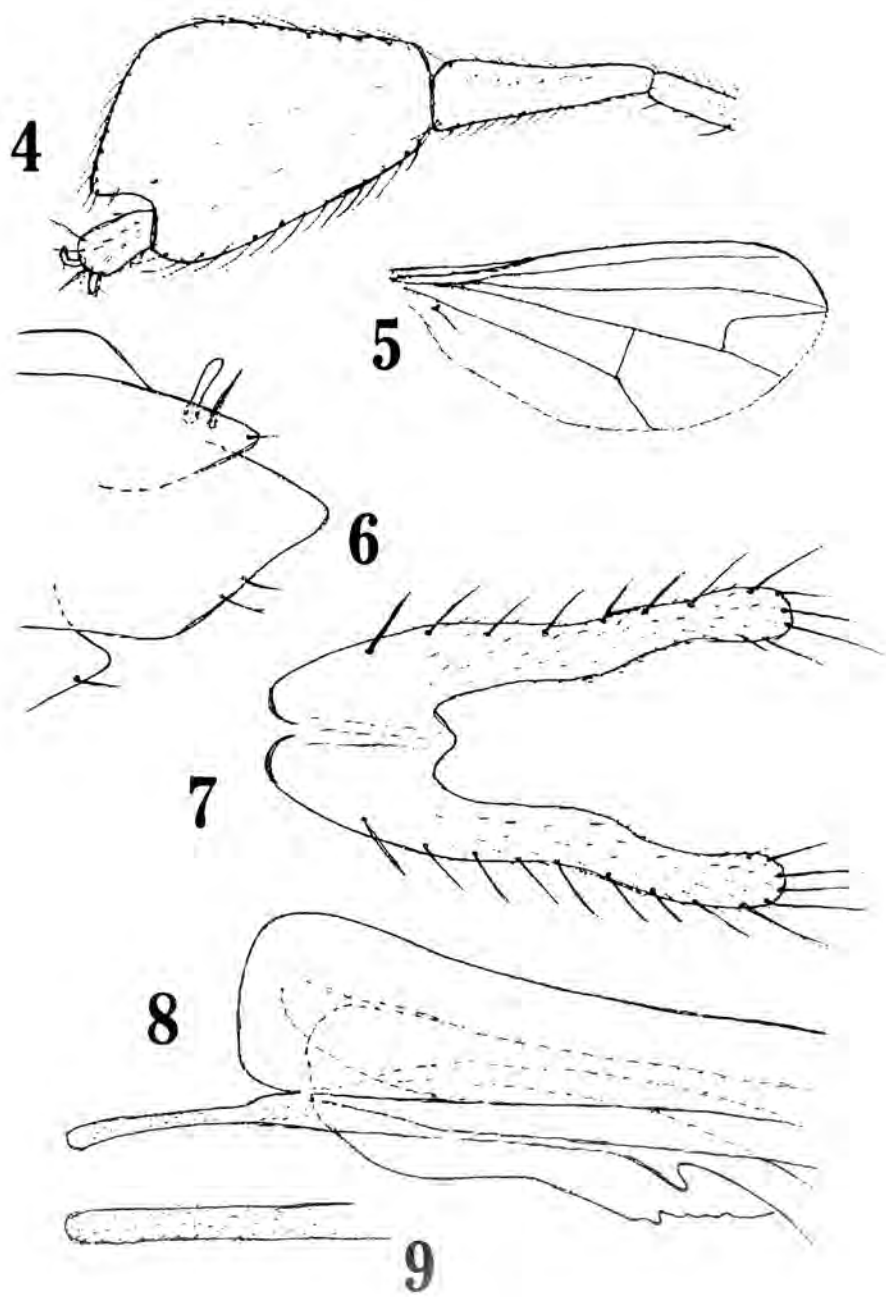
♂. Frons metallic-green, matt. Face metallic-green, shining. Eyes touching below. Palpi brown, with silvery-white pollen, with white hairs. Antennae black; first flagellomere large, bud-like, pointed at apex; ratio of length to height of flagellomere 6:5. Arista situated at apex of dorsal side of antennal flagellomere. Postocular bristles white from below. Thorax metallic-green, thinly covered with grey dust. Two rows of acrostichal bristles. Scutellum with 2 marginal bristles and 2 small hairs on the sides.

Legs mostly black, but yellow at apex of coxae, trochanters, apical part of femora, fore and middle tibiae, and first tarsomeres of fore and middle tarsi. Fore coxae with black hairs, at apex with some black bristles. Fore tibia with 1 anterodorsal bristle. Length ratio of fore tibia to fore tarsus (from tarsomeres 1 to 5): 4.0 to 2.1:1.0:0.7:0.5:0.7. Middle tibia with 2 anterodorsal bristles. Length ratio of middle tibia to middle tarsus (from tarsomeres 1 to 5): 5.0 to 2.5:1.0:0.8:0.7:0.5. Hind tibia with a row of long black bristles. Length ratio of hind tibia to hind tarsus (from tarsomeres 1 to 5): 5.8 to 1.9:1.4:0.8:0.6:0.6.



Figs 1-3. *Chrysotus pulchellus* Kowarz, ♂. 1, hypopygium, lateral view; 2, gonopod, lateral view; 3, tip of phallus, lateral view.

Figs 4-9. *Sciapus bellus* (Loew), ♂. 4, mid tarsal segments 4-5; 5, wing; 6, gonopods, lateral view; 7, cerci, ventral view; 8, tip of phallus and hypandrium, lateral view; 9, phallus, ventral view.



Wings hyaline with brown veins. Length ratio of costal vein between R_{2+3} and R_{4+5} and between R_{4+5} and M_{1+2} - 2.0:1.3. Veins R_{4+5} and M_{1+2} parallel in apical part. Apical section of M_{1+2} straight. Length ratio of basal and apical sections of M_{1+2} - 4.1:6.8. Crossvein tp straight. Ratio of basal and apical parts of m_{3+4} - 3.8:3.7. Cu present. Anal lobe of wing not developed. Anal angle obtuse. Calypters with white cilia, blackened at apex.

Abdomen metallic-green with brown dust.

Length of body 2.0mm, of wing 1.7mm.

Chrysotus varians Kowarz, 1875: 471 (now = *Chrysotus gramineus* (Fallén, 1823)).

Described from both sexes from the Tatra Mountains (Poland) collected by Loew, Asch (= Aš, Czech Republic) collected by Kowarz, and Munich (Germany) collected by Hiendlmayr.

Lectotype (by present designation): ♂, labelled by Kowarz "Tatra / Loew" and "Tatra / 7.69", in UMO; also studied by Parent and by Negrobov who dissected the genitalia and mounted them on a celluloid slip. It is in good condition.

Paralectotypes 1♂ 1♀ on one mount, labelled by Kowarz "Asch 29 / 7.874", in UMO; also studied by Parent and by Negrobov who dissected the ♂ genitalia and mounted them on a celluloid slip.

No syntypes found in ZMHU, ASSP or NMW.

This species is confirmed to be a synonym of *Chrysotus gramineus*. Characters previously used for separation of these species are considered to result from infraspecific variation in the general morphology; the structure of the hypopygium is identical

Sympycnus pullatus Kowarz, 1889: 178 (now = *Sympycnus cirripes* (Haliday in Walker, 1851) (as *Porphyrops*)).

Described from both sexes, "im Egerthale bei Eger im Juli" (= Cheb, Czech Republic), and also collected by Mik at Wildbad-Gastein, Austria.

Lectotype (by present designation): ♂, "Eger 24 / 8.872", consisting only of a pinned thorax and a genitalia mount, in UMO.

Paralectotypes 6♂ 6♀: 1♂, "Eger / 1867", without abdomen, in UMO; 5♂ 6♀ in NMW, received via Mik (labelled only with "E" (= Eger), Kowarz, 1♂; Gastein, 30.vii.1867, Mik, 1♂; the same, 8.viii.1867, 1♂4♀; the same, 24.vii.1879, 2♂ 2♀).

No syntypes found in ZMHU or ASSP.

The specimen is in accord with the description in Parent's 1938 monograph.

Psilopus bellus Loew, 1873: 44 (now *Sciapus bellus* (Loew)).

Described from both sexes, the localities given by Kowarz (1873: 458) as "im Mai und Juni [1871] bei Herculesbad" [now = Băile Herculane, Romania].

Lectotype (by present designation): ♂, Herculesbad, vi.1871, in ASSP.

No further syntypes in ASSP, and none found in UMO or ZMHU.

Redescription of lectotype (Figs 4-9).

♂. Frons and face satin-white. Width of face equal to 0.7 length of antennal first flagellomere. Antennae wholly yellow. Arista yellow-brown. Antennal first flagellomere conical, its width greater than its height. Palpi white. Postocular bristles white. Mesonotum

with bluish-grey dust. Acrostichal bristles well developed; 6 dorsocentrals. Humeral lobes with lilac-green dust, with 2 bristles. Pronotum with bristles. Scutellum wholly yellow with 2 large and 2 small bristles.

Legs light yellow. Fore coxa with 3 small bristles in front at apex. Mid coxa with black bristles in apical part. Hind coxa with 2 black bristles outside at base. All legs with small black bristles. Fore and hind tarsi simple. Third mid tarsomere whitish-yellow, weakly enlarged in apical part; fourth tarsomere black, wide and flat, brush-like, with black hairs; fifth tarsomere yellow with a white pulvillus. Length ratio of fore tibia to fore tarsus (from tarsomeres 1 to 5): 7.8 to 7.6:2.6:3.2:2.4:1.1. Length ratio of mid tibia to mid tarsus (from tarsomeres 1 to 5): 14.5 to 12.6:3.0:2.6:2.9:0.9. Length ratio of hind tibia to hind tarsus (from tarsomeres 1 to 5): 19.4 to 11.2:4.6:3.5:2.7:1.1.

Wings yellowish. Costal vein curved at wing base. Veins simple, yellowish-brown. Crossvein tp curved, 0.5 times as long as distance from tp to fork. Fork weakly visible. Calypters white with white cilia.

Abdomen yellow with a brown stripe on front margin of segments. First segment with black bristles in apical part. Last segment with pale bristles in apical part. Abdomen with black bristles below. Hypopygium black, gonopod and cerci yellow.

Length of body 4.5mm, of wing 4.3mm.

Acknowledgements

We thank a number of collection managers who have allowed us access to the collections in their charge: Adrian Norris (LCM), Peter Sehnal (NMW), Vadim Zaitzev (ASSP), and Joachim Ziegler (ZMHU). We also thank Neal Evenhuis (B.P. Bishop Museum, Honolulu) for information on the publication date of Kowarz' paper on *Chrysotus*. OPN has been supported by grant number RFBR 04-04-48802a from the Russian Fund for Basic Research. ACP has been supported by the Designation Challenge Project at the Oxford University Museum of Natural History.

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***Eristalinus taeniops* (Wiedemann, 1818) (Diptera, Syrphidae) new to Madeira Island, Portugal** – On 9.x.2004, AMFA captured a single female specimen of *Eristalinus taeniops* (Wiedemann), of which a photograph is shown on the adjacent plate, from the flowers of *Eugenia uniflora* Linnaeus (Myrtaceae) at Lombo da Boa Vista, Funchal, Madeira Island. *Eugenia uniflora* [local Portuguese name: Pitangueira] is a cultivated ornamental red-fruited tree or shrub that is native to tropical South America (see Press, J. R. and Short, M. J. 1994. *Flora of Madeira*. HMSO, London: 232). The *E. taeniops* specimen is deposited in AMFA's collection (no. 1307). It is the first recorded observation of this taxon from Madeira; bringing the total number of hoverfly species recorded from the Madeiran Archipelago to 26 (see Smit, J.T., Aguiar, A.M.F. and Wakeham-Dawson, A. 2004. The hoverflies (Diptera, Syrphidae) of the Madeiran Archipelago, Portugal. *Dipterists Digest* (Second Series) **11**, 47-82).

Eristalinus taeniops is widely distributed across the entire Mediterranean basin and the eastern part of Africa, including the Arabian Peninsula (Dirickx, H.G. 1994. Atlas des Diptères syrphides de la région méditerranéenne. *Studiedocumenten van het K.B.I.N.*, 75: 317 pp.; Dirickx, H.G. 1998. Catalogue synonymique et Géographique des Syrphidae (Diptera) de la Région Afrotropicale. *Instrumenta Biodiversitatis*, II: 187 pp.), and is present in the Canary Islands (Marcos-García, M.A., Rojo, S. and Pérez-Bañón, C. 2002. Syrphidae (Cyclorhapha: Aschiza) in Carles-Tolrá, M. (ed.) *Catálogo de los Diptera de España, Portugal y Andorra* (Insecta). Monografías S.E.A., vol. 8. Zaragoza, 323 pp.). It is possible that this specimen may have been wind blown from the Canary Islands. It is readily identifiable by its characteristic barred eye pattern – **ANTONIO M. FRANQUINHO AGUIAR**, Laboratório Agrícola da Madeira, Est. Eng. Abel Vieira, 9135-260, Camacha, Madeira, Portugal. **JOHN T. SMIT**, Wolvenstraat 62, 3512 CH Utrecht, The Netherlands and **ANDREW WAKEHAM-DAWSON**, Mill Lane Farm, Offham, Lewes, East Sussex, BN7 3QB, U.K.

Plate: (above: illustrating above note, Franquinho Aguiar *et al.*) *Eristalinus taeniops* (Wiedemann) in Madeira.
 (below: illustrating following paper, Craik *et al.*) Fig. 1. Adult female *Sciara militaris* Nowicki reared from Scottish larva.





Long columns of “army worms” in west Scotland – the first record of *Sciara militaris* Nowicki (Diptera, Sciaridae) in the British Isles?

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Summary

On 30 July 2004, dense moving columns of many thousands of larvae were found on a small area of footpath in coniferous woodland at Barcaldine, near Oban in west Scotland. They were photographed *in situ* and small numbers were collected and kept in captivity until adults emerged in mid-August. These were identified as *Sciara militaris* Nowicki, 1868 (Diptera: Sciaridae). These appear to be the first records in the British Isles, both of this species and of the spectacular columns that are sometimes formed by its larvae, popularly known as “army worms”.

Introduction

At certain stages of their development, larvae of some species of Sciaridae (Black Fungus Gnats) are known to form remarkable elongate columns that travel over the ground and the wide occurrence of this phenomenon in Europe was discussed by Imms (1964). These are popularly known as “army worms” in Europe and as “snake worms” in the United States (where the term “army worms” is usually applied to larvae of certain Noctuid moths). In continental Europe the species usually implicated is *Sciara militaris* Nowicki, 1868, while in the United States one such species has been identified as *Sciara fraterna* Say, 1824.

Menzel and Mohrig (2000: 17-21), in their revision of the Palearctic Sciaridae, dedicated a chapter to the army worm phenomenon including all the relevant literature and a table of all known records in Europe. This shows that most reports of “army worms” have come from Germany (59 sites, mainly in the mountainous areas of Thüringen [22] and Harz [20]), Finland (40), Sweden (18), Poland (17) and Norway (17) but there are also records from Denmark (5 sites), Slovakia (3), Ukraine (2) and from Lithuania, Romania, Russia, Switzerland and the Czech Republic (one site each).

Plate: Figs 2-3. *Sciara militaris* larval column in Barcaldine Forest, Argyllshire, on 31 July 2004 (£1 coin is 22mm diameter; lenscap is 67mm diameter). **Fig. 4.** Closer view of larvae in this column.

Menzel and Mohrig also provided evidence from the literature that, contrary to widespread belief, "army worm" larvae are not always from the species *Sciara militaris* Nowicki, 1868, or from the genus *Sciara* Meigen, or even from the family Sciaridae. Other sciarid species that have been implicated are *Sciara analis* Schiner, 1864, *S. hemerobioides* (Scopoli, 1763), *Bradysia bicolor* (Meigen, 1818), *Cratyna perplexa* (Winnertz, 1867) and *Ctenosciara hyalipennis* (Meigen, 1804), while similar phenomena have been described in other nematoceran families, namely the Bibionidae, Ceratopogonidae and Tipulidae [further information in Menzel and Mohrig 2000].

Here we report what appears to be the first record of "army worms" in the British Isles. It is also the first record in the British Isles of the species *Sciara militaris* Nowicki, 1868. Of the other sciarid species implicated all but *Sciara analis* are, however, recorded from the British Isles (Freeman 1983; Menzel in Chandler 1998; Menzel *et al.* in press), yet this behaviour is unrecorded in British populations.

Sciarid species cannot be easily identified from their larvae and pupae. There is no key to the immature stages, and the larvae of only about 50 of over 1,700 species known worldwide have been described. Therefore larvae from "army worms" can only be definitely identified after they have been reared to adulthood.

Field observations

On 30 July 2004, two local residents (Jane Eaton and Tom Webster) walking on a path through dense coniferous forest noticed what at first sight they described as resembling "masses of discarded light grey twisted plastic sheet or rope" or "large numbers of shed snake skins". On closer observation these were seen to comprise countless thousands of tightly appressed, constantly writhing, almost colourless larvae with small black heads. This was in Barcaldine Forest, 19km north of Oban in Argyllshire, west Scotland (NM951406; altitude 50m above sea level).

The finders alerted CC and PW, who visited the scene on 31 July. Regrettably, they did not then realise the importance of this event, or how soon the columns would disappear, otherwise fuller data would have been recorded. The weather was calm and sunny, with intermittent cloud, on both 30 and 31 July.

The larval columns were confined to a length of about 20m of the three to four metre wide path, and none was seen off either side of this path among the trunks of the densely planted, linear rows of Sitka spruce *Picea sitchensis*. These trees had been planted in 1981 and were about 20m high. Branches of trees growing on either side of the path overlapped, so that light intensity was reduced along the path and the humidity there was higher than outside the wood. While the forest interior was devoid of green plants because of the shading, shafts of light reached the ground intermittently along the path allowing the growth of fragmented hummocks of moss. On wetter ground these were *Sphagnum palustre* with patches of *Politrichum commune* and small tufts of grass including *Molinia coerulea* and the marsh violet *Viola palustris*. Drier sections, where most of the larval columns occurred, supported hypnoid mosses including *Thuidium tamarisinum*, *Rhitiadelphus loreus* and *Plagiothecium undulatum* along with small sparse patches of grass including *Holcus lanatus* with *Agrostis* and *Festuca* species, seedlings of foxglove *Digitalis purpurea* and young ferns

including *Anthrium* and *Dryopteris* species. The litter layer consisted largely of decomposing needles from the spruce trees.

No exact counts or measurements of the larval columns were made, but from memory there were about ten larval masses, mostly columnar. Their width was very variable, from about one to perhaps 20cm. The length of one of the longer columns was found by pacing to be about three metres; others were difficult to measure because they curved and, in a few places, bifurcated. The numbers of individual larvae were difficult to estimate. Our first reaction was that there must have been "literally millions", but no proper estimate was made; the very variable thickness of the columns, both horizontally and vertically, made this difficult.

All the larvae in any one column were pointing in much the same direction (i.e. no larvae were seen to be travelling in the opposite direction to the column itself) but different columns were moving in different directions – there was no common orientation. Forward movement of a column was achieved by the combined writhing movements of the larvae. By placing a twig at the front of one column, its forward movement was estimated at about one to two cm/min.

Close-up photography was difficult without a tripod and in the poor light, but Figs 2-4 give a reasonable impression of the appearance of a larval column.

On the evening of 1 August and the afternoon of 3 August, CC returned to the site to collect more data, but the columns had vanished. On 3 August, digging at the site revealed two small clumps of larvae about a metre apart, each with perhaps 200 larvae, at a depth of about 2cm, i.e., below the needle/leaf/moss litter-layer but above the compacted soil. Some of these buried larvae were in a small column like those that had earlier been seen above ground. None of the other countless thousands of larvae could be found. On 6 August, both these larval clumps had also disappeared.

Captive rearing

PW collected a small batch of larvae on 31 July and these were augmented by some collected by CC on 3 August. Some were preserved in ethanol. The remainder were reared by PW in a transparent plastic cake box (18 x 16cm and 12cm deep) with a layer of sand at the base covered by a thick layer of spruce needle mould. The larvae immediately buried themselves and stayed together in a tight band, moving within their column of slime between the spruce litter and the sand layer. The box was kept closed to retain humidity but the lid was removed briefly each day to admit fresh air and to spray the contents lightly with rainwater. A small crack in the base of the box allowed drainage and prevented water from collecting there.

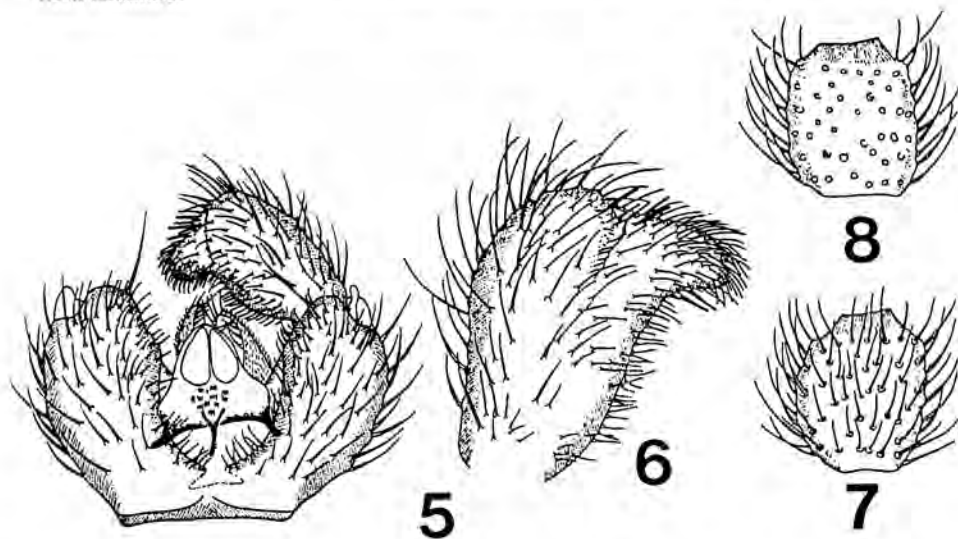
On 10 August the larvae had gathered at one corner of the box, in a cavity within the spruce needle mould, where they pupated between 10 and 12 August. The cavity was later found to have a firm crust that formed a communal cocoon. When the box was opened on 15 August, one adult was seen to fly out and escape. Adults continued to emerge until 18 August and several perfect specimens were collected. One of the adults with deformed wings was seen to lay eggs. Most of the adults, along with exuviae and remaining pupae, were preserved in ethanol.

About 100 larvae collected by CC on 3 August were reared in a slightly larger glass container with spruce needle mould but without sand. Water from the very damp mould collected at the base and many larvae were seen to drown. In both rearing methods, however, only a small proportion of larvae reached adulthood, perhaps 5-10%.

FM identified the adult flies as *Sciara militaris* by the criteria described in the next section. Most of the specimens (1 larva, 30 pupae, 1 pupal exuviae, 3 males, 22 females) are now in the collections at Warwick HRI (Wellesbourne, UK) and Deutsches Entomologisches Institut (DEI Müncheberg, Germany). Three females reared and set by PW (one is shown in Fig. 1) will be placed with the National Museums of Scotland, Edinburgh.

Synonyms and Identification

Sciara militaris was found by Prof. Dr. Maximilian Nowicki (1826-1890) in the mountainous spruce woods in Kopaliny near Bochnia (Poland). He published the original description, with detailed observations and results of rearings, almost simultaneously in German (Nowicki 1868a) and in Polish (Nowicki 1868b). Later the same species was described by Strobl (1898) from Austria and by Kjellander (1943) from Sweden. These authors used the names *Sciara frauenfeldi* var. *minor* Strobl, 1898 and *Semisciara agminis* Kjellander, 1943. By comparison with types, Menzel (1992) and Menzel and Mohrig (2000) confirmed their identity as *Sciara militaris* Nowicki. To supplement an earlier account of the species (Menzel 1992), we include a redescription of the males and further references from literature.



Figs 5-8. *Sciara militaris* Nowicki, 1868, male genitalia and antennae: 5, hypopygium in ventral view; 6, gonostylus in ventral view; 7, 4th flagellomere (male); 8, 4th flagellomere (female).

Sciara militaris (Figs 5-8) belongs to the genus *Sciara* Meigen, 1803 and to the *S. hemerobioides*-group, to which 11 Palaearctic species belong to date (Menzel and Mohrig 2000). This species group is characterised by very strong and relatively short gonocoxites with, at most, short setae on the inner side (Fig. 5), club shaped, oval to spherical gonostyles, bristles on the postpronotum and a uniformly dark body. *Sciara hemerobioides* (Scopoli, 1763) [= *thomae* (Linnaeus, 1767)], *Sciara analis* Schiner, 1864 and *Sciara militaris* Nowicki form a complex of species that are difficult to distinguish from each other.

All these species have dark bodies (also dark brown to black coxae, legs and halteres) and distinctly brown wings with similarly formed wing veins. Identification can be made by the length of the flagellomeres (the segments of the antennae) and by the construction of the male genitalia (especially the gonostyles and their spines). *S. militaris* can easily be distinguished from *S. hemerobioides* [redescription and figures in Menzel and Mohrig 2000, pp. 520-523] and *S. analis* by the longish-oval shape of the gonostyles (Fig. 6), the narrower bristled lobe on the apex of the gonostyles, the normally reduced number of apical spines and greater number of subapical spines (*S. militaris* with 4-8 weak, not closely grouped spines on the outer side of the apex of the gonostyles + 2 further spines on the base of the under side of the bristled lobe; all spines are hyaline and weaker than those of both the other species).

By contrast, there is little noteworthy difference between the male genitalia of *S. hemerobioides* and *S. analis*, because both species have similar shaped gonostyles and comparable spines on the apex (gonostyles distinctly swollen; all apical spines very strong, closely adjacent and in one or two well set-back groups). However, the length of the flagellomeres distinguishes the two species. While the 4th flagellomere of the male of *S. militaris* is only 1.2-1.5 times as long as wide (Fig. 7), that of *S. analis* is 2.0-2.3 and of *S. hemerobioides* even 2.7-3.2. Also, the flagellomeres of the females of *S. militaris* (Fig. 8) are distinctly shorter than those of both other species. Further differences from *S. analis* and *S. hemerobioides* are the always uniformly dark brown abdomen (lacking the lateral yellow membranes between tergites and sternites of the other species), the smaller and rather narrower wings and the shorter palpi composed of only two segments. These characteristics are the same in both sexes of *S. militaris*. The other difference between *S. militaris* and the other species is the shorter total body length (*S. militaris*: male = 2.5-3.1mm; female = 3.1-4.8mm / *S. analis*: male = 4.3-5.8mm; female = 4.3-6.8mm / *S. hemerobioides*: male = 4.5-6.8mm; female = 6.5-8.1mm).

Discussion

Sciara militaris is known to occur in Germany, France, Poland, Austria, Slovakia, Sweden and in the far eastern and European parts of Russia. Although widely distributed, the species is uncommon. The discovery of such huge numbers of larvae shows that it must be breeding in that part of the West Highlands of Scotland and raises the question of how it arrived there. Sciarids are small insects and weak fliers, so a crossing of the North Sea or the English Channel would almost certainly have had to be wind-assisted. However, any such explanation by natural spread north and west from its known continental range seems unlikely, as the species would then have been expected to appear first on the east or south coast of Britain rather than in the far west. A more likely explanation is transport by human

agency, most probably by the movement of soil or forest products containing the larvae, eggs or pupae. Young conifers with their roots embedded in forest soil or compost are sometimes imported from the continent for growing in commercial forestry plantations in Britain. Indeed, the local forestry records show that some Norway spruce *Picea abies* growing only 20 to 30 metres from the site of this discovery were imported as transplants from Sweden between October 1979 and April 1980 (R. Fraser *pers. comm.*).

Throughout the northern half of Britain, there are huge areas of conifer plantations with habitat similar to that at Barcaldine, and most of these areas are rarely visited by humans. Moreover, visiting entomologists and other wildlife enthusiasts tend to be more attracted by insects other than Diptera. Clearly it is possible that *S. militaris*, and even "army worm" columns, may have occurred undetected elsewhere in the British Isles. Most records from the continent have been made in deciduous woodland in July and August (Menzel and Mohrig 2000). We therefore urge readers in the British Isles to look out for this impressive phenomenon in both types of woodland at that time of year.

The cause and function of these spectacular larval aggregations remain unknown, but several hypotheses have been advanced. Menzel and Mohrig (2000, p. 20) rejected as inconsistent with the evidence two of these suggestions – namely, response to local food shortage or a means of avoiding desiccation. The fact that almost all the Scottish larvae had stomachs full of brown fluid (Figs 2-4) more than 24 hours after the columns were first discovered suggests that they were not seeking a new feeding ground after exhausting an earlier one.

Menzel and Mohrig considered that the most likely explanation was local population pressure. They suggested that columns form after a massive population increase causes a stress reaction and the need for new space. Another possibility is that aggregation serves as an aid to the uptake and digestion of food, perhaps by enhancing the local external concentration of any digestive enzymes that are secreted, or perhaps by raising the temperature above that of the environment (measurement of the temperature of the interior of a column would be worthwhile).

A very different explanation, albeit one that has not gained wide recognition, is that of epideictic display in the sense suggested by Wynne-Edwards (1967). This postulates that the participants are assessing their own abundance with a view to regulating their reproduction and hence their future population density, probably in relation to food availability. Indeed, Wynne-Edwards (*loc. cit.*, p.118) quotes the remarkable swarming habit of the larvae of *S. militaris* as one possible example of this process.

Acknowledgements

We are grateful to the Amateur Entomologists' Society and to Peter Chandler and Adrian Pont for help and advice.

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***Dactylolabis sexmaculata* (Macquart) (Diptera, Limoniidae) in Montgomeryshire** – The Nationally Scarce cranefly *Dactylolabis sexmaculata* (Macquart) was taken at Llanymynech Rocks Montgomeryshire Wildlife Trust reserve (SJ265217) (V.C. 47) on 18.iv.2003. The site is an old limestone quarry and is part of the wider Llanymynech and Llynclys Hill SSSI that straddles the Shropshire / Montgomeryshire border. This cranefly is typically one of limestone upland areas, especially with bare rock faces or of limestone pavement (Falk S.J. 1992. *A review of the scarce and threatened flies of Great Britain (part 1)*. Research & survey in nature conservation No.39. Peterborough, JNCC) and there a few recent records for Wales (Mike Howe *pers. comm*). I am grateful to Estelle Bailey of Montgomeryshire Wildlife Trust for permission to collect at the site – **PETER BOARDMAN**, 7 High Street, Weston Rhyn, Shropshire, SY10 7RP. peperouda@btinternet.com

***Chrysops sepulcralis* (Diptera, Tabanidae) at Lochmaben Lochs**

SSSI, Dumfries-shire – I undertook monitoring for Scottish Natural Heritage on several SSSIs in southern Scotland, with crane flies being the main target at most sites. Among other non-target groups, I recorded the rare horsefly *Chrysops sepulcralis* (Fabricius) on 11 July 2003 at Lochmaben Lochs SSSI. The site is a series of three small lowland lochs just to the north-west of Lochmaben. The two better examples, Blind Loch and Upper Loch, are set within poor fen that is forming as the lochs infill, and include transitions through swamp at the water margins. Much of the mire is neutral or perhaps has some basic influence, rather than bog; for example, *Filipendula ulmaria* (meadowsweet) and reed were frequent, but *Sphagnum* was rare (Drake, C.M. 2003. *Site Condition Monitoring of the Notified Invertebrate Features of Lochmaben Lochs SSSI, Dumfriesshire*. Unpublished report to Scottish Natural Heritage).

A male and a female of *C. sepulcralis* were swept from the margins of Blind Loch (NY062837) where *Menyanthes* swamp grades through *Oenanthe crocata* into *Carex* on peat, and from *Juncus*-dominated boggy ground on higher more mineral soils where a seepage arises. Cattle had lightly trampled and grazed the vegetation to provide a mixture of open seepage with some bare substrate and tussocks. Another female was swept from the margins of Upper Loch (NY073833) where the vegetation was extensive tall fen with abundant *Equisetum* and *Filipendula ulmaria* leading to floating rafts of shorter *Carex*, *Eriophorum* and *Menyanthes* within 10-15m of the open water. This habitat is more fen-like and less acidic than appears to be typical of *sepulcralis* sites on the heaths of Dorset and the New Forest.

The only other confirmed Scottish record for *C. sepulcralis* is from near Newton Stewart about 70km to the west although it was suggested (Stubbs, A.E. and Drake, C.M. 2001 *British soldierflies and their allies*. British Entomological and Natural History Society, Reading) that earlier Scottish records dismissed as misidentifications of *C. caecutiens* (Linnaeus) may have been correct. The finding of a small population at Lochmaben suggests that more sites may be found, at least in southern Scotland. A number of uncommon species in other families were widespread on the site and may be part of an assemblage of flies of poor-fen, and which may therefore provide indicators of the presence of *C. sepulcralis* at other sites. These were the *Renocera striata* (Meigen) and *Tetanocera freyi* Stackelberg (Sciomyzidae) and the crane flies *Pilaria meridiana* (Staeger) and *P. scutellata* (Staeger) (Limoniidae), although these species (except for *P. scutellata*) were also frequent at the more acidic Whitlaw Mosses, which was also investigated for Scottish Natural Heritage (SNH) in 2003 but where *Haematopota pluvialis* (Linnaeus) was the only tabanid seen – **C. MARTIN DRAKE**, Orchid House, Burrigle, Axminster, Devon EX13 7DF

A perspective on anthropophily in British blackflies (Diptera, Simuliidae), with keys for the identification of the culprit species

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Summary

Collation of data on anthropophilic behaviour by blackflies in Britain showed that fourteen species have been reported in association with humans. In some of these actual penetrative biting is rare and they molest largely by hovering around or landing on the skin without mouthparts penetration. Illustrated keys are provided to aid identification of females caught biting or molesting humans.

Introduction

By the yardstick of many countries, blackflies are not troublesome in Britain to humans - despite a certain notoriety as 'intolerable' pests acquired by the Blandford fly (*Simulium posticatum*) in Dorset and by the birch-flies (*Simulium reptans* and *Simulium tuberosum* s.l.) in the Spey Valley of Scotland. It is possible, in fact, to work for many years as a specialist on these insects and never experience a single bite. Interestingly, the early accounts of *Simulium* in Britain by Walker (1856) and Newman (1876) do not mention man-biting, though both these authors commented on the pestiferous nature of the flies in other continents. So far as I have able to find, the earliest reference to anthropophilic behaviour in Britain is by Austen (1906), secondhand from information provided by J.W. Yerbury - who himself (Yerbury 1912, 1913) later recorded being bitten by *Simulium reptans*. Since those times a dozen or more species or species-complexes have been recorded as anthropophilic at least to some degree (list below), and one or two more if credence is given to some rather dubious cases. The aim of this paper is to apply some perspective to the scattered information available both from literature and from specimens bearing labels showing that some form of anthropophilic response was operating at the time these specimens were caught. Discussion of the clinical effects of blackfly bites is outside my purpose, but useful information can be found in the following starting point references: Beaucournu *et al.* (1992), Beaucournu-Saguez *et al.* (1990), Cassella and Hay (1991), Gudge and Grauer (1954), Hamlet (1989), Hansford and Ladle (1979) and Ladle and Welton (1996); for a review of the topic see Crosskey (1990: 531-535). Data on the parts of the body affected by bites are given by Coupland (1990, birch-flies, Speyside) and Hansford and Ladle (1979, Blandford fly).

At the present time the propensity for simuliids in Britain to molest humans (i.e. irritate by landing on the skin in numbers) or to bite them seems to be on the increase, perhaps partly because cleaner rivers than in the recent past provide better developmental conditions for the aquatic stages. However, it is not always clear that complaints by the general public to their medical or environmental authorities, that they have been seriously bitten and suffered bad reactions, are justifiably laid at the simuliid door. In most recent

instances, for example in Wandsworth (South London) and at Kingsbury Water Park in Warwickshire on the river Tame, no simuliids have been captured in the act of biting to show beyond doubt that these insects were culpable.

The degree to which the anthropophilic species in Britain are actually attracted to humans varies considerably. As with simuliids generally, no species takes blood only from man; all have other mammalian hosts (often farm animals) and some include birds in their host repertoire. Broadly speaking, three categories can be recognized, but without really hard and fast lines between them and with some species being left unclassifiable, because their involvement in anthropophily is too tenuous or too little known: (1) major biting pest species, at least locally; (2) minor biting species; (3) irritant species. In the first category are the species so consistently troublesome over time in parts of their range that they have been the subject of special research reports and of control schemes that have been practised or at least considered; these are *S. reptans* and *S. tuberosum* s.l. in Speyside, particularly at Kincaid, and *S. posticum* in Dorset. In the second category are common riverine species of lowland regions that cause occasional biting annoyance at some place or time, usually without any similar problem having been evident at the same point previously; the species most concerned here are *S. ornatum* s.l., *S. erythrocephalum* and to a lesser extent *S. equinum*. In the third category are species that are attracted to humans and molest them by forming irritating clouds of flies which land on the skin but rarely take a bloodmeal; most typical in this category are the *Prosimulium* species and *S. argyreatum*. The geographical ranges and some other aspects of all the different species concerned are mentioned as appropriate in the species accounts that form the main text of this article. I have also included brief notes on animal hosts in Britain other than man, and on anthropophily in France.

Material and methods

Data on specimens in the Natural History Museum in London (BMNH) and published literature have been the main sources of information but my files and the record cards for the Lewis Davies British simuliid collection (which came to the BMNH in 1982) were dredged and yielded a few additional records. Specimens have been included in the 'Records and references' for each species where their label data, or any information about them, shows that they were captured whilst biting or whilst otherwise molesting humans. Where there is no previously published information about particular specimens I have shown this by adding 'NEW RECORD' to the entry. Published records that are uncertified, i.e. not backed by voucher specimens in any collection known to me, are assumed to be correct from the viewpoint of identification and the only changes made are those necessary to show names in their presently valid form. [Concerning voucher material it should be emphasised that there is none in any collection relating to the ecological work done over the years on the birch-fly problem in Speyside under the aegis either of the Zoology Department or the erstwhile School of Agriculture of Aberdeen University (Dr Mark R. Young *pers. comm.*)].

National grid references for specimens and literature records have been provided as accurately as practicable on the available evidence; in some cases they cannot be refined more precisely than to the 10-kilometre square. The nature of the evidence for

anthropophily is indicated by quotes from labels, for instance 'caught on man' or 'around humans'. July 2004 is the cut-off date for records.

List of British Simuliidae recorded as biting or molesting humans

Note. Names used in older British literature that are now synonyms are shown indented. Former misidentifications are in single square-brackets and, both here and in the text, cited within single quote marks. Species are alphabetical in the subgenera and listed this way in the text.

Prosimulium hirtipes (Fries)

Prosimulium latimucro (Enderlein)

inflatum Davies

Simulium (*Nevermannia*) *vernum* Macquart s.l.

['*latipes*': Edwards and other pre-1972 authors, not Meigen]

Simulium (*Wilhelmia*) *equinum* (Linnaeus)

Simulium (*Wilhelmia*) *lineatum* (Meigen)

salopiense Edwards

Simulium (*Boophthora*) *erythrocephalum* (De Geer)

sericatum Meigen

['*argyreum*': Edwards, not Meigen]

Simulium (*Simulium*) *argyreum* Meigen

['*monticola*': Edwards, also Davies, not Friederichs]

Simulium (*Simulium*) *morsitans* Edwards

Simulium (*Simulium*) *noelleri* Friederichs

subornatum Edwards

['*argyreum*': Davies, not Meigen]

Simulium (*Simulium*) *ornatum* Meigen s.l.

Simulium (*Simulium*) *posticatum* Meigen

austeni Edwards

['*venustum*': Edwards, not Say]

Simulium (*Simulium*) *reptans* (Linnaeus)

galeratum Edwards

Simulium (*Simulium*) *tuberosum* (Lundström) s.l.

Simulium (*Simulium*) *variegatum* Meigen

Identification

Two keys are given here as guides for the identification of species that have been reported to bite or otherwise molest humans in Britain. Key A is based on a mix of structure and coloration, Key B only on features of colour and colour patterning. The aim of Key B is to provide a quick idea of likely identity to act as a pre-check or cross-check against Key A. The main features used in the keys are shown in Figs 1-7.

The keys are mainly for pinned rather than alcohol-preserved specimens. Pinned flies usually shrivel considerably as they dry but show most characters better than specimens submerged in alcohol. Alcohol has the advantages of preserving shape and enabling the

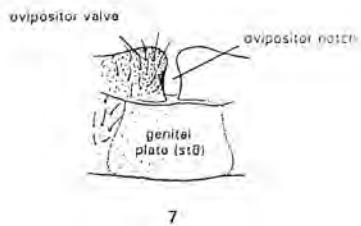
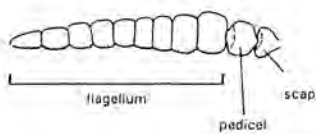
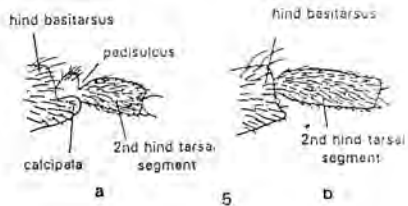
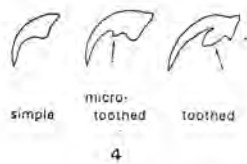
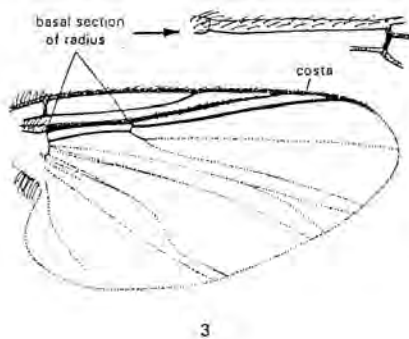
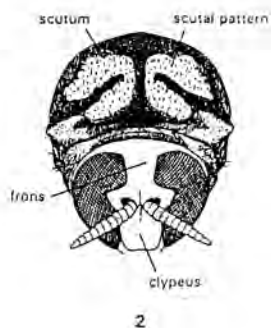
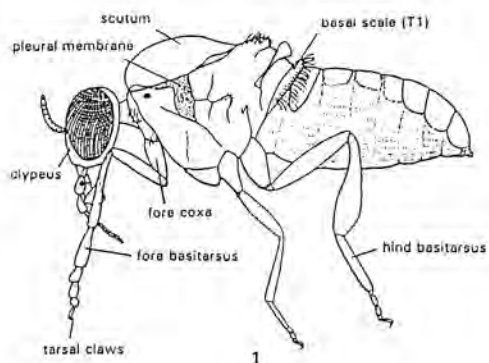
ovipositor notch or a microtoothed condition of the tarsal claws to be easily seen, but has serious disadvantages: it makes scutal patterns difficult to interpret, the frons appear shiny when it is matt, the pleural membrane hairing hard to see, and produces a general fading effect - especially when wet preservation has been long term.

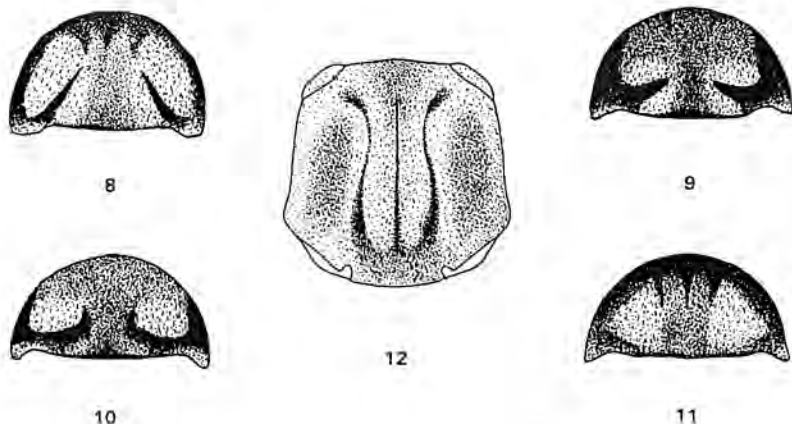
It is useful to note the following points when running the keys: (a) general appearance of colours can vary considerably with fly condition so a colour statement is not absolute, e.g. 'black' can be read as subsuming dark brownish or dark greyish black, 'pale' (of the leg parts) can indicate a colour range from creamy white to orange-yellow in contrast to 'dark', i.e. mid-brown to black (even with pinned flies the leg colour can fade badly over time); (b) scutal patterns are usually best seen from in front but lit from behind; (c) pleural membrane hairs can be easily abraded, but when rubbed some at least usually survive on the upper part of the membrane near the scutum; (d) the microtoothed condition of the tarsal claws (Fig. 4) is an important character but not easy to see and if there is doubt a slide-mount of any tarsal tip (the character applies to all legs) can be useful: examine at least at X100.

Key A

- | | | |
|---|---|---------------------------|
| 1 | Wing with basal section of radius bare dorsally..... | 2 |
| - | Wing with basal section of radius haired dorsally (Fig. 3)..... | 10 |
| 2 | Scutum almost uniformly shining black, little or no trace of pattern. Ovipositor valves very short and blunt, abutted closely together (Fig. 28). [Frons shiny black. Tarsal claws simple (Fig. 4), a toothless talon] | 3 |
| - | Scutum with a pattern which shifts in appearance from silver-white or grey to black according to light direction (best seen from in front, e.g. as Figs 8-11)..... | 4 |
| 3 | Legs almost entirely black, fore coxae black, only hind basitarsi and femoro-tibial joints noticeably paler than remainder of legs. Frons and clypeus both shiny black. Antennae black. Abdomen more or less evenly black (basal part not obviously paler than remainder). Pleural membranes bare | <i>S. tuberosum</i> s.l. |
| - | Legs not almost entirely black, fore coxae reddish yellow, hind basitarsi with long creamy yellow band, bases of tibiae and to some extent also femora conspicuously reddish yellow. Frons shiny black but clypeus dull grey pollinose (contrasting in colour to frons). Antennae with first two segments (scape and pedicel) reddish orange, only flagella black. Abdomen not uniformly black, basal scale and second segment more or less dingy yellow or yellowish brown. Pleural membranes with a few long fine hairs on upper parts [care: sometimes abraded]..... | <i>S. erythrocephalum</i> |

Figs 1-7. Drawings to illustrate main features used in the key: 1, features of the body and legs; 2, head and thorax in facial view, showing example of a scutal pattern (drawn from *S. ornatum* s.l.); 3, wing, showing a primary character of the radius; 4, three basic types of tarsal claws; 5, apex of hind basitarsus and second hind tarsal segment, 5a in *Simulium* s.l. (calcipala and pedisulcus present) and 5b in *Prosimulium* (calcipala and pedisulcus absent); 6, antenna; 7, main outward features of ovipositor.

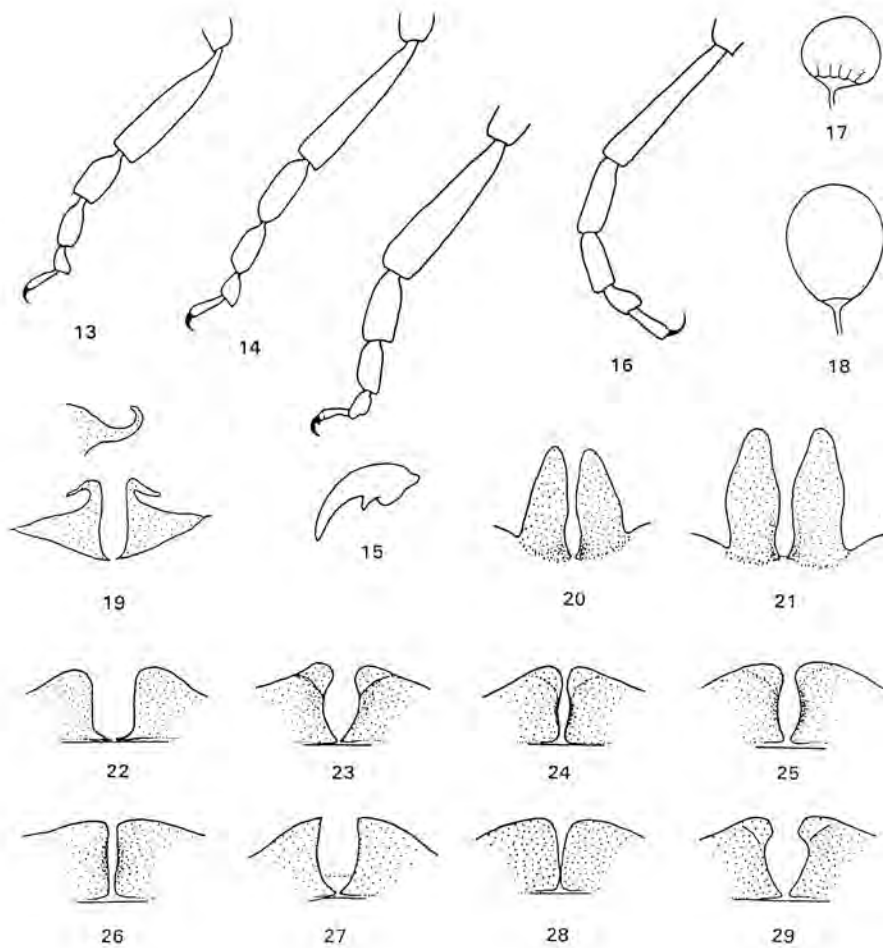




Figs 8-12. Patterns of the scutum: 8-11, seen at maximum when in front view and illuminated from behind in *S. variegatum* (8), *S. noelleri* (9), *S. posticum* (10) and *S. reptans* (11); 12, scutal pattern in subgenus *Wilhelmia* (dorsal view). Note that the pattern in *S. morsitans* and *S. argyreum* resembles that of *S. posticum* (10).

- 4 Pleural membranes hairy. Scutum with 'ornatum pattern', i.e. seen from in front showing a bright silvery white mark somewhat resembling an anchor or two horse-shoes nearly abutted back-to-back (Fig. 2); posterior margin of this mark sharply defined. Ovipositor notch amphora-shaped and valves widely separated apically (Fig. 29). [Lcgs variegated black and reddish yellow. Frons and clypeus both silvery grey pollinose. Antennae with scape and pedicel orange red. Fore tarsi conspicuously dilated, basitarsus in profile 4.1-5.0 times longer than maximum width, and tarsal claws microtoothed (Fig. 15)] *S. ornatum* s.l.
- Pleural membranes bare. Scutum with pattern otherwise formed, if slightly similar then not sharply defined posteriorly, or tarsal claws simple, or frons shiny black, or fore tarsi weakly dilated (about six times as long as maximum width). Ovipositor notch and ovipositor valves otherwise formed (slightly similar in *variegatum*)..... 5
- 5 Frons pale or dark grey, pollinose, not contrasting in appearance with pale grey clypeus. Abdomen with posterior tergites showing a uniform thin dark grey 'bloom' superimposed on black ground colour, appearance of this 'bloom' maximized when tip of abdomen directed towards light source (then dark grey distal half of abdomen seen to contrast with brownish black basal half) 6

- Frons shining black, more or less bare, contrasting in appearance with pale grey pollinose clypeus. Abdomen with posterior tergites brightly shining black without overlying grey 'bloom', when tip of abdomen directed towards light source both distal and basal halves of abdomen uniformly dark brown or black 7
- 6 Fore femora yellow, except sometimes for dark tips. Scutal pattern as Fig. 8. Tarsal claws microtoothed. Antennae with reddish colour extending onto bases of flagella. Fore tarsi slender, *second* segment about three times as long as wide (Fig. 14). Ovipositor notch amphora-shaped, valves wide apart at tips (Fig. 23) .. *S. variegatum*
- Fore femora pale brown to brownish black. Scutal pattern as Fig. 9. Tarsal claws simple. Antennae with reddish colour more or less confined to scape and pedicel. Fore tarsi more dilated, *second* segment about twice as long as wide (Fig. 13). Ovipositor notch in form of narrow subfusiform slit, valves nearly meeting at their tips (Fig. 24). [Pleural membranes normally bare but tiny hair or two sometimes present on or near upper anterior margin] *S. noelleri*
- 7 Scutum seen from in front with pattern area comprising two large silvery spots, these sharply outlined in black anteriorly and extending posteriorly into a wide brownish pollinose area, outer margins of whole pattern area close to and parallel with edges of scutum (Fig.10). Ovipositor notch narrowly oval or linear (Figs 25-27). ovipositor valves very narrowly separated apically 8
- Scutum with pattern as Fig. 11, silvery grey area seen from in front fairly well defined posteriorly (Fig. 11), its outer lateral edges oblique relative to scutal side margins. Ovipositor notch broadly U-shaped (Fig. 22), valves widely separated. [Legs with sharply contrasted dark and pale parts, hind tibiae with pale part creamy white and sharply contrasted with black femur. Small species, wing length nearly always less than 3.0mm] *S. reptans*
- 8 Tarsal claws microtoothed. Femora extensively reddish yellow basally. Trochanters dirty yellow. Mid basitarsi with clear yellow basal band. Frons dark grey-black, only slightly shiny *S. argyreatum*
- Tarsal claws simple, talon-like (no trace of basal tooth). Femora, especially mid femora, more or less all black (at most only very little pale colour basally. Trochanters blackish. Mid basitarsi appearing almost all black at first glance, bases only indistinctly paler reddish orange. Frons shiny black 9
- 9 Ovipositor valves closely abutted (Fig. 26), ovipositor notch narrow and slit-like [sometimes appearing a little V-like in preparations, preferably examine shape before mounting] *S. posticatum*
- Ovipositor valves widely separated and their tips rather sharply pointed, ovipositor notch somewhat U-like (Fig. 27) *S. morsitans*
- 10 Scutum with three narrow dark brown lines on greyish background, forming lyre-like pattern (Fig. 12). Pleural membranes hairy. Tarsal claws simple, unusually large. Hind basitarsi with long creamy-white or pale yellow band. Ovipositor valves drawn out apically into a pair of long and narrow curled processes (Fig. 19). [Subgenus *Wilhelmia*] 11



- Scutum uniformly dark, without definite pattern. Pleural membranes bare. Tarsal claws simple or toothed. Hind basitarsi unicolorous dark brown or blackish. Ovipositor valves without slender curly apical processes..... 12
- 11 Spermatheca very small (diameter 0.06-0.08mm), general shape like button-mushroom, edge of duct opening crimped (Fig. 17) *S. equinum*
- Spermatheca large (diameter at least 0.12mm), ovoid or slightly pear-shaped, edge of duct opening not crimped (Fig. 18) *S. lineatum*
- 12 Wing costa with all setulae fine and hair-like. Pedisulcus and calcipala absent (Fig. 5b). Ovipositor valves very large and tongue-like, projecting backwards conspicuously (Figs 20 and 21). [Genus *Prosimulium*] 13
- Wing costa with setulae consisting of intermixed stubby spinules and fine hairs. Pedisulcus and calcipala present (Fig. 5a). Ovipositor valves not produced tongue-like, bluntly truncate and separated by slit-like notch (similar to *erythrocephalum*, Fig. 28) *S. vernum* s.l.
- [Note: exiting here are specimens from the anthropophily record for the misidentified '*latipes*' (see text), but females of some other species currently not recorded as anthropophilic would also run out here]
- 13 Ovipositor valves proportionally larger, very long and widest near middle of their length (Fig. 21) *P. latimucro*
- Ovipositor valves proportionally smaller, widest near base or somewhere in their basal halves (Fig. 20) *P. hirtipes*

Key B

- 1 Legs uniformly pale brown to black. Antennae brownish black without paler bases. 10
- Legs not unicolorous, usually with extensive yellow parts and if mainly black then hind basitarsi with pale creamy white to orange-yellow band. Antennae with scape and pedicel mainly dirty orange or reddish, obviously paler than dark flagellum (except all dark in *tuberosum* s.l.) 2
- 2 Fore coxae black, remainder of legs (except hind basitarsal pale bands) blackish or pale only at femoro-tibial joints 3
- Fore coxae yellow (sometimes a little discoloured), remainder of legs variegated with pale and dark areas 4

Figs 13-29. Illustration for some characters in the key. 13-16, fore tarsus seen in profile in *Simulium noelleri* (13), *S. variegatum* (14), *S. ornatum* complex, with enlargement of tarsal claw microtooth (15), *S. equinum* (16); 17-18, spermatheca of *S. equinum* (17) and *S. lineatum* (18); 19-29, ovipositor notch and ovipositor valves (shape indicated semi-schematically) in *Simulium equinum* (19), *Prosimulium hirtipes* (20), *P. latimucro* (21), *Simulium reptans* (22), *S. variegatum* (23), *S. noelleri* (24), *S. argyreatum* (25), *S. posticatum* (26), *S. morsitans* (27), *S. erythrocephalum* (28) and *S. ornatum* complex (29).

- 3 Scutum shiny black, without pattern. Frons and clypeus shiny black. Antennae uniformly black *S. tuberosum* s.l.
- Scutum grey with three longitudinal brown lines meeting posteriorly to form a lyre-like pattern (Fig. 12). Frons and clypeus ashy grey. Antennae with basal two segments reddish *S. equinum*, *S. lineatum* (see Key A, couplet 11)
- 4 Frons pale ashy grey or mid-grey, more or less similar in colour to silvery or pale grey clypeus 5
- Frons shiny black (dark greyish black in *S. argyreatum*), dark colour sharply contrasting with paler silvery grey clypeus 7
- 5 Scutum seen from in front with silvery white 'ornatum' pattern like an anchor or pair of horse-shoes back to back (Fig. 4) *S. ornatum* s.l.
- Scutum seen from in front with pattern differently formed (Figs 8 and 9) 6
- 6 Fore femora yellow, at most only tips dark. Scutal pattern as Fig. 8. Antennae with reddish colour extending from scape and pedicel onto basal segments of flagellum *S. variegatum*
- Fore femora mainly pale brown to brownish black. Scutal pattern as Fig. 9. Antennae with reddish colour more or less confined to scape and pedicel *S. noelleri*
- 7 Scutum almost entirely shiny black, little trace of pattern from any light direction. Hind tibiae with dark brown or blackish colour usually clearly extending on ventral surface towards base, pale colour mainly confined to outer basal parts of these tibiae. Scutellum with erect dark hair only, no pale decumbent hair *S. erythrocephalum*
- Scutum anteriorly with silvery white pattern that shifts in appearance with light direction (Figs 10 and 11). Hind tibiae with dark colour not extending along ventral surface towards base, pale half or two thirds therefore more or less sharply distinguished from dark apex. Scutellum with silky decumbent pale yellow hair in addition to erect dark hair 8
- 8 Scutal pattern silvery area seen from in front more or less defined posteriorly, outer margins of patterned area oblique in relation to side margins of scutum (Fig. 11). Hind tibiae with basal pale part almost white, sharply contrasting with black of hind femora *S. reptans*
- Scutal pattern as Fig. 10, comprising two large silvery spots outlined in black anteriorly and merging posteriorly into wide median brownish area, outer margins of whole pattern area close to and parallel with side margins of scutum. Legs with pale and dark parts typically less strongly contrasted (pale parts yellow-orange and dark parts brown or brownish black) 9
- 9 Femora reddish yellow at base. Mid basitarsi with distinct yellow basal band. Trochanters clear or dirty yellow. Frons dark grey-black and only slightly shining *S. argyreatum*
- Femora, especially mid femora, more or less uniformly black. Mid basitarsi without clear yellow basal band, almost entirely dark or only a little dingy reddish orange at base. Trochanters blackish. Frons shining black *S. posticatum*, *S. morsitans*
- 10 Halteres more or less dark, dirty brown *P. hirtipes*, *P. latimucro* (see Key A, couplet 13)

Halteres pale, creamy or lemon yellow *S. vernum* s.l.
 [See note under *vernum* s.l. in Key A, couplet 12]

Prosimulium hirtipes* and *Prosimulium latimucro

Wild-caught females of these species are very difficult to separate and are best distinguished by the different size and shape of the ovipositor lobes. This character was illustrated by Davies (1957) in the original description of *P. inflatum* (now = *latimucro*), was verified by Zwick (1974) and is shown here semi-schematically in Figs 20 and 21.

The status of both species as man-biters in Britain is somewhat uncertain. Evidence for *P. hirtipes* as anthropophilic rests mainly upon the observations of J.W. Yerbury (quoted in Austen 1906) and Smart (1936), which appear to have been the reason for Smart's (1944: 50) statement "Bites man". According to Yerbury, this species is "the earliest of the [blackfly] biting pests in Scotland" and could be "found in numbers at Dunkeld so early as the 8th May". (No females exist in the BMNH relating to this general statement but there is a male from Dunkeld collected by Yerbury on 11.v.1904 vouching for the occurrence of *P. hirtipes* fitting the month and place.) Smart (1936) noted that a female was "observed on one occasion, in the laboratory, biting the human arm". Presumably this specimen was from Fortingal in Perthshire, the scene of Smart's fieldwork and a known source for *P. hirtipes*, as this blackfly does not appear to breed anywhere near Edinburgh, the site of the laboratory. Edwards' (1932) note on *hirtipes* is of interest: he found adults "abundant" by the forest edge at the northern end of Lairig Ghru in the Cairngorm Mountains (NH90) but, judging by absence of relevant comment, was presumably untroubled by them. Young and Purser (1984) observed that in Speyside and the Cairngorms females of a *Prosimulium* species (these would be *hirtipes*) "repeatedly hovered near humans and sometimes landed on them, but were not recorded actually biting" (see data below for sites).

Evidence that *P. latimucro* can be anthropophilic in Britain is provided by two females caught coming to man in the northwest Scottish Highlands (data below). Identification has been verified by size and shape of the ovipositor valves. The late month of capture (July) also suggests correct identification: *Prosimulium* species are univoltine, and *P. latimucro*, inhabiting higher and colder streams than *P. hirtipes*, emerges later, in July and August (Davies and Smith 1958; Davies 1966, as *inflatum*).

Animal hosts: horses. France: *P. hirtipes* can be irritating to humans because of its habit of landing persistently on the face and arms (Grenier 1953); *P. latimucro* is also present and is recorded by Brunhes and Philippon (1966, as *inflatum*), as persistently troublesome to humans, though without actually biting, in parts of the Alpes Maritimes.

Records and references

Prosimulium hirtipes;

SCOTLAND

Highland: Badenoch & Strathspey District, Speyside, Kincaig (NH836062), Allt Mor Coir na Cas (NH9905) and Cairngorms (NH852012), vi.1984, 'sometimes landed on [humans]' (Young & Purser) [Ref: Young and Purser 1984.]

Perth and Kinross: Dunkeld (NO04) (J.W. Yerbury) [Ref: Austen 1906, repeated Edwards 1915a]. (See also comment above re Smart 1936.)

Prosimulium latimucro;

SCOTLAND

Highland: Wester Ross, Beinn Eighe ['Eyle' on label, error] Nature Reserve, Foot of Sgùrr Bàn [Lewis Davies record card entry] (NG978603), 2250 feet, 'Attracted to man', 29.vii.1961 (L. Davies) (BMNH, 1♀) [Ref: none, NEW RECORD]; Beinn Eighe (NG96), 1800 feet, 'caught on man', 6.vii.1982 (R.A. Cheke) (BMNH, 1♀) [Ref: none, NEW RECORD].

Simulium (Nevermannia) vernum (complex)

This species, or complex of sibling species as it is now recognized to be, was known as *Simulium latipes* (Meigen) in British and general European literature until Crosskey and Davies (1972) found, by examination of the type specimen, that *latipes* of authors was a misidentification; the name *vernum* was thereafter applied to the blackfly that had till then been erroneously called '*latipes*'. *Simulium vernum* complex females have strongly toothed tarsal claws and, from a general perspective, this makes anthropophily in this taxon unlikely: possession of the large claw-tooth is a character typically indicative of an ornithophilic biting habit. Davies (1966), dealing with *vernum* (as '*latipes*'), commented that "records of biting are so few that it cannot be regarded as a [man-biting] pest". So far as I have been able to trace, there are only two reports: Edwards (1920, as '*latipes*') was bitten when collecting simuliids in the Isle of Arran in the spring of 1919 and Davies *et al.* (1962, as '*latipes*') obtained serological evidence of flies at Kincaig having taken human blood. Edwards (p. 215) noted that he "had abundant evidence that both *S. ornatum* and *S. latipes* will attack man" and (p. 240) "at the end of May 1919, females were very numerous in Sannox Wood [Arran] and by some of the wooded burns, flying round us in swarms, and so far as could be ascertained all the bites received were inflicted by this species".

The BMNH collection contains four females in excellent condition which are not labelled by Edwards as having been taken in the act of biting but which, by their data and apparent traces of ingested blood, appear almost certainly to be from the man-biting element in the Sannox population mentioned by Edwards. I accept them as such and have added a printed label to each that reads "From flies biting at Sannox Wood, see Edwards 1920 Bull.Ent.Res.11:240 (as *latipes*)".

Animal hosts: mainly birds, also cattle, horses, dogs, unidentified rodent. France: there is a single dubious record of anthropophily, Callot (1951, for '*latipes*') having stated that in part of the Vosges this simuliid "peuvent être très agressives pour l'homme à certains moments"; Grenier (1954), perhaps doubtful of this, did not repeat the comment. Beaucournu *et al.* (1992: 204) cited '*latipes*' of Callot as if it related to true *latipes* (subgenus *Hellichiella*) but it can only pertain to *latipes* in the old (pre-1972) sense.

Records and references

SCOTLAND

Highland: Badenoch and Strathspey District, Kincaig (NH80), 1958 (C.B. Williams) [Ref: Davies et al. 1962, as '*latipes*'].
North Ayrshire: Isle of Arran, Sannox (NS0145) [see above], 26-28.v.1919 (F.W. Edwards) [Ref: Edwards 1920].

Simulium (Wilhelmia) equinum* and *Simulium (Wilhelmia) lineatum

Edwards (1927), followed by Smart (1944) in his keys to British simuliids, indicated the existence of colour and size differences between the females of *S. equinum* and *S. lineatum* (syn. *salopiense*) but Davies (1966), who looked into the question thoroughly, concluded that "the alleged colour differences given by these authors ... are quite inconstant when large series reared from the readily identifiable pupae are examined" and that "size differences ... certainly do not apply, those of *S. equinum* overlapping completely with *S. salopiense*". He concluded that females "cannot be separated by any feature, since they are externally and internally identical as far as I can detect". More recent work has supported Davies' comments so far as external criteria are concerned, and it now seems that there are no differentiating characters of practical use other than the size and shape of the spermatheca (see key and Figs 17 and 18); in *S. lineatum* this internal anatomical capsule is massive in comparison to that of *S. equinum* and differently shaped.

The anthropophilic status of *S. equinum* is not fully clear. Occasional bites occur when flies are hovering around humans in some numbers, as Edwards (1915a, 1939) and Smart (1944) were aware though they cited no cases of proven man-biting. The few specimens I have seen that were caught in the act are listed below. The status of *S. lineatum* as a man-biter is even more uncertain. Smart (1944: 50, as *salopiense*) said that *S. lineatum* "bites man, as in *equinum*" but this was at a time when external differences were alleged to exist that distinguished the two species, so proof has been needed. By happenstance, this is now available from a specimen of *S. lineatum* that was caught while actually biting my BMNH colleague John Chainey in a garden in Buckinghamshire. My terminalia preparation from this specimen (data below) shows the massive spermatheca characteristic of *S. lineatum*.

The two species often breed sympatrically but their ranges are not fully coincident (cf. maps 20 and 22, pp. 112-113 in Davies 1968). A recent survey of simuliid breeding sites in South East England (Crosskey and Crosskey 2002) showed *Simulium equinum* alone to be present in Essex, Hertfordshire, Kent, London, Surrey and Sussex. Hence molestation of humans by *Wilhelmia* species in these counties is probably attributable to *S. equinum* rather than *S. lineatum*. The available records suggest that man-biting is associated with populations in lowland areas of central and southern England. There are no anthropophily records for Scotland.

A complication to the picture of anthropophily by species of *Wilhelmia* is provided by *S. (W.) pseudequinum* Séguy, the third member of the subgenus in our fauna. It is less common than the other species and, so far as I know, has still only been collected from the mid-lowland counties listed when I first reported its finding in Britain (Crosskey 1981). Females have the small type of spermatheca exactly like that of *S. equinum*, and outwardly there are no differences between the two species. Rivossecchi (1978), dealing with the Italian

fauna, uses the genital fork ('gonofurca') of the terminalia as a key character, that of *S. equinum* being stated to have a more slender stem and shorter lateral arms than those of *S. pseudequinum* (*Wilhelmia mediterranea* Puri in Rivosecchi). I have not been able to verify this from my own slides made from reared flies of known identity and therefore think that wild females of the two species are not distinguishable. Consequently we cannot be sure if *S. pseudequinum* is ever a man-biter in Britain, though as there appears to be no evidence of it being anthropophilic anywhere else in its wide range (mainly the Mediterranean subregion of the Palaearctic) it would seem unlikely to attack humans here. Consequently all the females listed below as *S. equinum* are presumed to be correctly identified as this species. (Detailed comparative study of the reared adults of *S. equinum* and *S. pseudequinum* would make a good student study.)

Simulium equinum and *S. lineatum* are multivoltine (probably also *S. pseudequinum*) and the long annual period over which these species can be on the wing is reflected in the early March and November capture dates recorded below.

Animal hosts: horses, cattle. France: species present but the anthropophily status uncertain; *S. equinum* bites man occasionally (Grenier 1953).

Records and references

Simulium equinum:

ENGLAND

Dorset: Brownsea Island, Poole Harbour (SZ018886), 'biting', 19.xi.1964 (M.W. Service) (BMNH, 1♀) [Ref: Service 1966].

Hampshire: New Forest (no precise locality), 'amongst heather biting', 20.iv.1926 (O.W. Richards) (BMNH, 3♀) [Ref: none, NEW RECORD].

London: Harrow Weald Common (TQ1492), 'hovering around head', 11.iv.1977 (R. Lane) (BMNH, 1♀) [Ref: none, NEW RECORD].

Oxfordshire: Oxford area (SP50) (A.H. Hamm) [Ref: Edwards 1920]. Enslow, R. Cherwell (SP4818), 'Caught trying to feed on girl's scalp', 7.iv.2004 (Doreen Werner) (BMNH, 1♀) [Ref: none, NEW RECORD].

Surrey: Bookham (TQ15), 'around humans', 8.iv.1956 (L. Parmenter) (BMNH, 1&) [Ref: none, NEW RECORD]. Rushmoor, near Flashes Pond (SU8740), 26.vii.1970 (P.J. Chandler collection, 9♀) [Ref: none, NEW RECORD].

Simulium lineatum:

ENGLAND

Buckinghamshire: Chesham Bois, 2.5 km SE of Chesham, near R. Chess (SU973997), 'Biting man', 7.iii.1993 (J. Chainey and J. Spence) (BMNH, 1♀ with terminalia slide) [Ref: none, NEW RECORD].

Simulium (Boophthora) erythrocephalum

Leaving aside *Simulium posticum* and its notorious association with Dorset, *S. erythrocephalum* is by far the most troublesome and widely distributed blackfly that bites humans in England. Its strong anthropophilic tendency has been widely recognized and

remarked upon. Unfortunately, for many years following an initial misidentification by Lundström (1911), it was referred to (e.g. by Edwards 1915a, 1920) as *argyreatum*, an error later corrected by Edwards (1939) in his account of British *Simulium*. In the latter work, the *S. posticum* problem not then having arisen, Edwards wrote that "All records go to show that this is the most annoying species of the genus in the areas where it is common", a statement which remains correct for England in general. The species is not common in Scotland, where it occurs only sporadically in the lowlands and from where there are no biting records.

The earliest reference to anthropophily in Britain is that of Edwards (1915a, as '*argyreatum*'), who was personally "besieged by a large swarm of females on Sandy Heath, many attempting to bite and some actually doing so". One of these specimens is preserved at BMNH (data below). Later, Edwards (1920, as '*argyreatum*') recorded being bitten on the head and hands by a troublesome population encountered on the 25 April 1916 at Mildenhall; three of these females are preserved at BMNH but (unlike the specimen from Sandy Heath) are not labelled by Edwards as caught biting.

Simulium erythrocephalum is multivoltine, and Post (1983) reported five annual generations and a comparably long adult emergence period from April to September.

Animal hosts: horses, cattle. France: the species has been reported as very aggressive to humans on 6 June 1950 at Herrenwald, Bas-Rhin Department (10 km N of Strasbourg) (Callot 1951, as '*erythrocephalum* forme *sericatum*'); it is also recorded as aggressive in Vaucluse Department (Beaucournu-Saguez *et al.* 1993).

Records and references

ENGLAND

Bedfordshire: Sandy Heath (TL14), 'Biting', 10.v.1910 (F.W. Edwards) (BMNH, 1♀) [Ref: Edwards 1915a].

Berkshire: near Reading, Hurst, 2 km from R. Loddon (SU87), 'biting man', 16.iv.1980 (D.B. Eastwood) (BMNH, 1♀) [Ref: none, NEW RECORD].

Cambridgeshire: Wicken (TL28) and Wood Walton Fen (TL57), 'very troublesome in spring and again in August' (J.C.F. Fryer) [Ref: Edwards 1915a].

Dorset: Brownsea Island, Poole Harbour (SZ018886), in 'human bait catch', 1.vi.1965 (M.W. Service) [Ref: Service 1965].

Hertfordshire: Letchworth (TL23), 'bites on hand and ear', 18.iv.1919 (F.W. Edwards) [Ref: Edwards 1920].

Kent: Otford, Magpie Bottom (TQ56), 'Man-biting', 1.ix.1981 (A.P.A. Luna Dias) (BMNH, 1♀) [Ref: none, NEW RECORD].

London: Hampton Court (TQ1568), 'Man-biting', ix.1989 (M. Halpin) (BMNH, 1♀) [Ref: none, NEW RECORD]. Harefield (TQ050919) 'Man-biting', 17 and 20.viii.1980 (C. and M. Vardy) (BMNH, 22♀) [Ref: none, NEW RECORD]. River Colne, near Harefield (TQ050918) [Ref: Post 1982]. Wimbledon (TQ27), 'biting in garden', 28.iv.1993 (P. Smith) (BMNH, 1♀) [Ref: none, NEW RECORD]. North Finchley (TQ29), 'small midges which caused bites', 1.vi.1993 (BMNH, 1♀) (? collector: submitted to BMNH by Dr J.C. Taylor, Immunology Department, St Thomas'

Hospital) [Ref: none, NEW RECORD]. Kentish Town NW5 (TQ28), 'biting in garden'. 30.viii.1995 (BMNH, 1♀) [Ref: none, NEW RECORD].

Norfolk: Carleton Forehoe, River Tiffey (TG092053), [Man] 'bitten repeatedly'. 2.ix.1980 (G.M. Hewitt) [Ref: Post 1982].

Oxfordshire: Oxford district (SP50), 'biting', 23.ix.1916 and 6.vi.1917 (A.H. Hamm) [Ref: Edwards 1920].

Suffolk: Mildenhall (TL77), 25.iv.1916 (F.W. Edwards) (BMNH, 3♀) [Ref: Edwards 1920, quote above].

Surrey: Guildford (SU9949), vii.1984 (via P. Mellor) [Ref: none, NEW RECORD, RWC identification file]. Woking (TQ05), 'biting man in garden on hot afternoon', 18.viii.1975 (B.R. Laurence ['Lawrence' in error]) (BMNH, 2♀) [Ref: none, NEW RECORD]. Rushmoor, near Flashes Pond (SU8740), 26.vii.1970 (P.J. Chandler collection, 1♀) [Ref: none, NEW RECORD].

Simulium (Simulium) argyreatum

Like its close relative *S. variegatum* this is a species of the upland areas of western and northern Britain (map 30 in Davies 1968: 121, as '*monticola*'). Man-biting appears to have been reported only from the Kincaig area of the Scottish Highlands, whence anthropophily was first reported from precipitin test studies: Davies (1968, as '*monticola*') recorded it biting "occasionally man", an observation evidently based on three flies that had tested positive for human blood in 1958 during the serological study of blackflies at Kincaig described earlier by Davies *et al.* (1962). No actual biting was experienced at Kincaig by Young and Purser (1984) during their study of the simuliid pest problem there, though they encountered flies at Kincaig stream (NH836062), Balachroick (NH843010), Feshie landing strip (NH854025) and the Allt Ruadh stream in the Cairngorms (NH852012). Confirmation that biting sometimes occurs was, however, later obtained by Coupland (1990, 1994), who found *S. argyreatum* biting humans on deer-hunting upper moorland areas near Kincaig when flies were stimulated by scent of fresh blood from dismembered deer. (Gamekeepers recognize an association and use repellents in the 'stag' season: Coupland 1990.)

Animal hosts: cattle, horses, sheep, deer. France: the species is present but man-biting unrecorded.

Records and references

SCOTLAND

Highland: Badenoch and Strathspey District, Speyside, Kincaig (NH80), 1958 (C.B. Williams) [Ref: Davies *et al.* 1962, as '*monticola*']. Speyside, Kincaig (NH80) and nearby Alt Mor in Monadhliath Mountains, >500 m, 'biting humans', v. and ix.1988, v and vii.1989 (total both years 8 specimens) (J.B. Coupland) [Ref: Coupland 1990, 1994].

Simulium (Simulium) morsitans

This species was described from Britain (type locality Christchurch in Dorset) but its present status in the British fauna and its role in anthropophily remain very uncertain. Reliable breeding records are scanty (none since the 1980s and few that are dependable before then) and all reports of its biting man in Britain apparently derive from a single source. Each of two paratype females (BMNH) collected by J.W. Yerbury on 1.vi.1894 at Lyndhurst in the New Forest has a label with Yerbury's observation "'This fly bites and annoys one in the Forest'" (Collector's note)' written in the minute pencilled handwriting of E.E. Austen. Edwards (1915a: 33) quoted the note in his original description and it is clearly the basis for him baptizing his new species with the name *morsitans* (= biter, from Latin *morsus*, bite). The trouble with this biting record is that it is considerably suspect: it might apply to *S. posticatum* (Blandford fly) rather than *S. morsitans*, particularly as the Yerbury comment was not on original labels by him but on labels added later by Austen, and *S. posticatum* occurred sympatrically in the New Forest with *morsitans* at that time. The *morsitans* type series includes a misassociated female, also collected by Yerbury in the New Forest (Lyndhurst Road, 8.v.1897), but actually a specimen of *S. posticatum*. Evidence provided by the data on old specimens in the BMNH collection shows that in the late nineteenth and early twentieth centuries both *S. morsitans* and *S. posticatum* were present in the New Forest area. In modern times, however, only the latter species is known from the New Forest. No *S. morsitans* specimens have been found there since Edwards, over eighty years ago, obtained pupae at Brockenhurst (2-10 May 1920) and reared out some adults. (These specimens, adults and exuviae, are in BMNH.)

Unfortunately it is not possible to distinguish wild-caught females of *S. morsitans* and *S. posticatum* reliably on external characters, though a useful taxonomic difference between them exists in the terminalia (see key). Edwards did not study female terminalia and it seems clear that it is confusion of the virtually identical females of the two species that led him (Edwards, 1939) to write of *S. morsitans* that it is "a common and troublesome biting pest in the New Forest and adjoining parts of Hampshire" but to remark of *S. posticatum* (as '*venustum*') only that there are no definite records of bloodsucking in Britain. I believe that Edwards' remarks for *morsitans* apply largely or wholly to *S. posticatum*. Neither Smart nor Davies had other data for *S. morsitans*; the former simply wrote "bites man" (Smart 1944), the latter either referred to Edwards (1915a) or commented cautiously "reported to bite man" (Davies 1966, 1968).

Animal hosts: apparently none reported. France: recorded as '*aggressives pour l'homme*' on 6 June 1950 at Herrenwald, Bas-Rhin Department (10 km N of Strasbourg) (Callot 1951). (Grenier identified the specimens for Callot but later (1954) did not comment, probably because he was then aware of difficulty in separating *S. morsitans* and *S. posticatum* ('*venustum*') females.)

Records and references

ENGLAND

Hampshire: New Forest, Lyndhurst (SU2907), 1.vi.1894 (J.W. Yerbury) (BMNH, 2♀, *morsitans* paratypes) [Ref: Edwards 1915a].

Simulium (Simulium) noelleri

This species has a scattered distribution throughout Britain (map 28 in Davies 1968: 119, as '*argyreatum*'), reflecting the wide availability of its characteristic breeding habitat of falling water from lake outfalls, weirs and even pipe outlets. The early stages often occur in astronomical numbers, but the adults are rarely seen and seem not to molest humans at the breeding sites. Females are apparently autogenous for the first gonotrophic cycle, and only a small fraction of females takes a bloodmeal for the second cycle (Schütte 1990). Scarcity of bloodsucking records is remarkable considering the enormous numbers of larvae and pupae often to be found in the breeding habitats. Recently, as the records below show, females have been collected whilst in the act of biting humans, putting to rest the prevalent assumption obtaining until recently that *S. noelleri* is entirely non-anthropophilic in Britain. To my knowledge there are no previous reports. So far all recorded bites on humans have taken place between late May and September.

Animal hosts: apparently none recorded. France: the species is present but man-biting is unrecorded.

Records and references

ENGLAND

- Bedfordshire: Luton Unitary Authority, Luton, Hart Hill Road (TL098216), 'caught while biting man in garden', 4 and 6.vii.2004 (S.A. Hawkins) (BMNH, 3♀, one KOH-treated and in alcohol) [Ref: none, NEW RECORD].
- Berkshire: Wellington College, playing fields (SU8363), 'Caught while biting', 20.xi.2003 (Martin Brandom) (BMNH, 1♀) [Ref: none, NEW RECORD].
- Leicestershire: near Whitwick (SK4514), 'caught biting man', 28.viii.1995 (J. Mousley) (BMNH, 1♀) [Ref: none, NEW RECORD].
- London: Buckingham Palace Garden (TQ287797), 'Captured in garden while biting on collector's leg', 1.viii.2002 (M. Honey) (BMNH, 1♀) [Ref: none, NEW RECORD].
Dulwich, near junction Lordship Lane and South Circular Road (TQ3473), 'Biting human on garden allotment', 23.v.2004 (Richard Lloyd) (BMNH, 4♀) [Ref: none, NEW RECORD].
- Suffolk: Ipswich, close to Mill River (TM1943), 'biting her in garden', ix.1997 (Mrs Thompson) (BMNH, 2♀) [Ref: none, NEW RECORD].
- West Midlands: Birmingham, Hall Green, near R. Cole (SP1081), 'removed from arm whilst biting, when sitting in garden', 4.vii.2001 (Derek Jones) (BMNH, 1♀) [Ref: none, NEW RECORD].

***Simulium (Simulium) ornatum* (complex)**

This, the universal 'weed' species of the British simuliid fauna, bites humans quite frequently, mainly in the English lowlands. It is seldom seriously troublesome but biting can be experienced at any time over the year from February to late autumn; Edwards (1920) has recorded that, in his home town of Letchworth, he was bitten as late as mid-November, and the man-biting specimen recently identified from Berkshire (see below) was captured on 20 November. In Scotland, *S. ornatum* was not known to be anthropophilic until April 1944,

when it was found attacking man at various localities on the outskirts of Edinburgh (Cameron 1945). Another example of a biting problem in Scotland occurred in 1985 on the river White Cart near Glasgow, where schoolchildren were seriously bitten by *S. ornatum* (identity verified by RWC), some developing severe skin reactions that required hospital treatment.

Animal hosts: cattle, horses. France: anthropophily is recorded from the eastern side of the country in the Departments of Ardennes, Bas-Rhin, Vosges and Vaucluse (Beaucournu *et al.* 1992); according to Beaucournu-Saguez *et al.* (1993) it is nearly always the *S. ornatum* complex that is incriminated when simuliids bite humans in France.

Records and references

ENGLAND

Berkshire: Wellington College, playing fields (SU8363), 'caught while biting', 20.xi.2003 (Martin Brandom) (BMNH, 1♀) [Ref: none, NEW RECORD].

Dorset: East Stoke, near Wareham (SY8786), 19.v.1966 (BMNH, 1♀) [Ref: none, NEW RECORD].

Hampshire: Winchester area, Itchen River valley, Itchen Abbas (SU5332), '♀ caught biting man', 12.vii.1983 (Y.M. Chamberlain) (BMNH, 1♀) [Ref: none, NEW RECORD].

Hertfordshire: Letchworth (TL23), 25.iv.1916, 19.x.1917, 15.xi.1917, 5-18.iv.1919 (F.W. Edwards) [Ref: Edwards 1920: 226, no man-biting specimens in BMNH linking to these data, one fly from 'calf's belly'].

Kent: Otford, Magpie Bottom (TQ56), 'Man-biting', 1.ix.1981 (A.P.A. Luna Dias) (BMNH, 1♀) [Ref: none, NEW RECORD].

Surrey: Kingston (TQ17), 19.iv.1942, 'Caught in act of biting man' (F. Barnett) (BMNH, 1♀) [Ref: Crosskey, 1985: 69]. Bookham (TQ15), 'Around humans, not plentiful', 8.iv.1956 (L. Parmenter) (BMNH, 1♀) [Ref: none, NEW RECORD].

Wiltshire: Devizes, Roundway (SU0163), iv.1982 (J.F. Phillips) [Ref: RWC identifications file, two biting females seen].

SCOTLAND

Clydesdale: White Cart River area, near Glasgow (NS56), v.1985 (Clyde River Purification Board) [Ref: RWC identifications file, three biting females seen].

Edinburgh: 'various localities on the outskirts' (NT27), iv.1944 [Ref: Cameron 1945].

Simulium (Simulium) posticum

This species, known in Britain till the 1970s as *S. austeni* Edwards or, as the result of misidentification, as '*S. venustum*', is the notorious 'Blandford fly' man-biting pest in the area of Dorset after which it is vernacularly named. It is the only blackfly in Britain troublesome enough to humans to have been the subject of an insecticidal control scheme actually carried out to alleviate an anthropophily problem (Ladle and Welton 1996: review). Although widespread in central and southern England there are few dependable records of anthropophily outside the man-biting range indicated in the maps of Welton and Ladle (1993) for the East Dorset area except for those recently obtained by Dr Doreen Werner in Oxfordshire (below). Cassella and Hay (1991) reported adverse reactions in humans bitten

by *S. posticum* at a site (SK6000) three miles south of Leicester City Centre but the record is unverifiable in the absence of voucher specimens and might apply to some other species, particularly *S. noelleri* which is beginning to become troublesome occasionally in urban environments. The species has been recorded as breeding generally in the rivers around Oxford (Williams 1991) and this has now been confirmed by the studies of Dr Doreen Werner. Her investigations in the area of the Cherwell, Evenlode and Glyme rivers from April to June 2004 have left no doubt that the simuliid known locally in this part of Oxfordshire as the 'Stonesfield Stinger' and the 'Woodstock Fly' (McCrae and Hill 1994) - names derived from two of the most intensely affected villages - is truly *Simulium posticum* and that this species is highly anthropophilic in the north Oxfordshire area of central England.

Still, anthropophily in *S. posticum* remains most virulent in East Dorset (within the area shown in Fig. 30), where it began to trouble the human population in the 1960s and continues to do so today, with variable severity, from year to year. Even here, however (as McCrae and Hill 1994 have shown) only a minute proportion of female flies emerging from the Dorset Stour actually bites man - not that this fact is much comfort to the unlucky persons who are hypersensitive to the bites. Luckily the 'season' is short, since *S. posticum* is univoltine and adults emerge only in May and June.

The counties where the species is known to breed, or at least has bred, based on specimens in the BMNH collection are: Buckinghamshire, Cambridgeshire (all pre-1930 records), East Sussex, Essex (all pre-1930 records), Hampshire, Hertfordshire (all pre-1930 records), Kent, Oxfordshire, Surrey, Warwickshire (1893 only: types of *S. austeni*), West Sussex, Wiltshire.

Animal hosts: McCrae and Hill (1994) found by blood-meal identifications that cattle, horses and dogs are bitten. Werner's recent capture of flies while engorging on these hosts provides corroboration. France: in northern lowlands a man-biting focus developed in 1987/88 in the Iton river valley of Eure Department (Beaucournu-Saguez *et al.* 1990), another in the Department of Ille-et-Vilaine (Beaucournu *et al.* 1992); this suggests a spreading range, as does the fact that *S. posticum* is now known in Germany but was unknown there for the fifty years prior to 1984-85 (Timm and Piper 1985).

Records and references

ENGLAND

Dorset: River Stour valley biting area, ca 530 square kilometres (Bournemouth-Wimborne-Blandford Forum) (ST80/90/91, SU00, SY89/99, SZ09/19 [10 km squares determined on basis of map Fig. 1a in Welton and Ladle 1993 compared to O.S. grid maps]), 1971-1973 [Refs: Hansford 1978; Hansford and Ladle 1979; Ladle and Welton 1996; Welton and Ladle 1993]; Rivers Avon/Stour/Frome area, ca 3770 square kilometres (Bournemouth-Shafesbury-Dorchester) (ST60/70/71/72/80/81/82, SU00/01/10/11, SY69/78/79/88/89/97/98/99, SZ07/08/09/19/29 [10 km squares determined on basis of map Fig. 1b in Welton and Ladle 1993 compared to O.S. grid maps]), 1988 [Refs: Lawless 1988; Welton and Ladle 1993]. Pimperne near Blandford (ST907095), 'Caught biting man', 11.v.1968 (Judith L. Merryweather) [Ref: Lewis Davies record card, as *austeni*, 1♀ ex LSHTM but not now present in BMNH, NEW RECORD].

Poole, 'troublesome' on golf course (SZ09), v.1987 [Ref: RWC identifications file, NEW RECORD]. Holt, 5 km N of Wimborne Minster (SU0304), '♀ caught biting man', 29.v.1984 (R.C. Maxwell-Darling) (BMNH, 1♀) [Ref: RWC identifications file, NEW RECORD]. Iwerne Minster (ST8614), 'biting man', v.1970 (Grainger) (BMNH, 1♀) [Ref: none, NEW RECORD]. Tollard Royal area (ST9417), '♀ caught biting man', v.1970 (W.E. Grainger) (BMNH, 2♀) [Ref: none, NEW RECORD]. Brownsea Island, Poole Harbour (SZ018886), in 'human bait catch', 1.vi.1965 (M.W. Service) [Ref: Service 1966, as *austeni*].

Leicestershire: see comment (above) re Cassella and Hay (1991).

Oxfordshire: Charlbury (SP31), 'caught attempting to bite collector', 26.iv.2004 (D. Werner) (BMNH, 1♀) [Ref: none, NEW RECORD]. Stonesfield (SP31), ex 'man-baited trap', vi.1993 [Ref: McCrae and Hill 1994].

Surrey: Esher, 1 km from River Ember (= Mole) (TQ145659), 'bitten on arm', summer 1952, 14.viii and 5.ix.1954 (J.L. Cloudsley-Thompson) [Ref: Cloudsley-Thompson 1955, as '*venustum*']

Simulium (Simulium) reptans

Simulium reptans is widespread throughout upland Britain (Davies 1968: 115, map 24) but it is in the Spey Valley area of Scotland that this species is most strongly anthropophilic; even here, however, the proportion of the female fly population taking human blood appears to be quite small. The species became the first simuliid to be recorded as troublesome to man in Britain when Austen (1906) printed comments by J.W. Yerbury that in the Scottish Highlands this species "occurs in countless numbers in the Abernethy Forest in June and July, and causes great annoyance. A sweep or two with the butterfly net round one's head results in a perfect holocaust of victims". Later, Yerbury (1912) himself, listing the Diptera of Wester Ross, slipped in under *S. reptans* a note that on 30 June 1911 this species had been troublesome at Lochinver (Sutherland), where he had been bitten on the forehead (the fly concerned is not preserved in the BMNH but there is another female collected by Yerbury at Lochinver on 7 July 1911 while flying with *Hydrotaea irritans* (Fallén) (Muscidae; Yerbury 1913). Besides Scotland, *Simulium reptans* is on record as pestiferous in the English Lake District, where it was found by T. Hartley at Bassenthwaite to be "a terrible pest of man, dogs and cattle" (Edwards 1915a). (Two females that relate to this record are in BMNH: the labels do not precisely specify their capture on humans, but this is likely.) Smart's (1944) note for *reptans* that it bites man, oxen and dogs is from the same source.

This species, and to a lesser extent, *S. tuberosum* s.l. are the infamous 'birch-flies' which acquired notoriety in some years as pests troublesome to humans in the Badenoch and Strathspey District of the Highlands, especially at the 'hotspot' (Young and Purser 1984) of Kincaig and its immediate environs. Coupland's (1990, 1994) research at Kincaig carried out in 1987-89 indicated that *S. reptans* was the predominant anthropophilic species there, but other investigators have drawn slightly different conclusions. Davies *et al.* (1962), from their serological work found that most bloodmeals from man occurred in *S. tuberosum* s.l., and the sample site geographical data (intensity data at sites not given) by Young and Purser (1984) indicate less widespread biting by *S. reptans* than by *S. tuberosum* s.l.

Animal hosts: cattle, horses, dogs. France: man-biting is recorded only in the area of Lyon, Department of the Rhône (Grenier 1953; Beaucomroun *et al.* 1992).

Records and references

ENGLAND

Cumbria: Cumberland. Bassenthwaite ('Bassinthwaite' on label) (NY23), 'A terrible pest to man, dogs and cattle'. 24.v.1913 (T. Hartley, 'Per Prof. G.H.F. Nuttall, F.R.S.') (BMNH, 2♀) [Ref: Edwards 1915a].

SCOTLAND

Edinburgh district (NT27) [Ref: Zahar 1951].

Highland: Badenoch and Strathspey District, Speyside, Kincaig (NH80), 1957 and 1958, various dates (C.B. Williams) [Ref: Davies *et al.* 1962]. Speyside, Kincaig area (NH80), 'prolific biter', vi-viii.1988 and v-viii.1989 (J.B. Coupland) [Ref: Coupland, 1990, 1994]. Speyside, vi and viii.1984, Alvie School at Kincaig (NH835066), in Kincaig (NH836059/62), Mill Cottage near Feshie Bridge (NH847047), Cairngorm Mountains, Allt Ruadh (NH852012) [Ref: Young and Purser 1984]. Speyside, Abernethy Forest (NJ01) [Ref: Austen 1906]. Sutherland, Lochinver (NC12), 30.vi.1911 'biting forehead' (J.W. Yerbury) [Ref: Yerbury 1912].

Perth and Kinross: Rannoch (NN45), 'repeatedly flew at my face. They did not actually bite' [Ref: P.H. Grimshaw *in litt.*, Edwards 1920: 231].

Simulium (Simulium) tuberosum (complex)

The precise identity of the British member of the *Simulium tuberosum* species complex remains uncertain but it is not *tuberosum* sensu stricto, which appears to be absent from Britain. According to Adler and Kuusela (1994: 445) our species of the *tuberosum* group is probably one as yet unnamed. For the present, this species is simply referable to *tuberosum* sensu lato. As well shown by map 23 in Davies (1968: 114), *tuberosum* s.l. is strictly upland in distribution and unrepresented in lowland England.

Simulium tuberosum s.l. was first reported as a man-biter in Britain by Edwards (1915a: 34), based on comments by Hartley showing its pest status in the Lake District (Bassenthwaite). One of Hartley's specimens survives in BMNH and, in addition to the usual collection data (given below), bears a label reading "A terrible pest to man, dogs, and cattle": it is not certain, however, that this specimen was caught while man-biting. Other information sent to Edwards deserves repetition here for its suggestion that outbreaks occur in certain years and for the first use (apparently) of the term 'Black Fly' in Britain: "it is only within the last three years [prior to June 1913] that it has been troublesome, but now [it] is becoming a perfect plague" and "locally known as 'the Black Fly'. It is a pest, and from being almost unknown ... 30 or 40 years ago, has increased year by year in the district [Bassenthwaite]". Hartley's observations for the Lake District are the basis of Smart's (1944) statement "Bites man, oxen and dogs".

Females of *S. tuberosum* s.l. participate with those of *S. reptans* to create the well known but annually very variable 'birch-fly' pest problem at Kincaig in Speyside, Scottish Highlands (Young and Purser 1984). Breeding of the two species is almost everywhere

sympatric in the Kincaig area but they usually do not bite humans to the same intensity. Coupland (1990, 1994) found *S. tuberosum* s.l. to be less strongly anthropophilic than *S. reptans*, but this had not been the experience of Davies *et al.* (1962) at an earlier period when *S. tuberosum* s.l. was the more dominant. (Lewis Davies *in litt.* to me on 25.xi.2003 says that at Kincaig in the summer of 1956 his children suffered many bites, his daughter being badly bitten around the hairline of her long ringleted hair and his son being bitten particularly along the top edge of his swimming trunks. A female from these specimens ex the L.D. collection is in BMNH labelled 'Off Jennifer!').

Animal hosts: cattle, horses, dogs, birds. France: present but man-biting unrecorded.

Records and references

ENGLAND

Cumbria: 'Cumberland', Bassenthwaite ('Bassinthwaite' on label) (NY23), 24.v.1913 (T. Hartley, 'Per Prof. G.H.F. Nuttall, F.R.S.') (BMNH, 1♀) [Ref: Edwards 1915a].

SCOTLAND

Highland: Badenoch and Strathspey District, Speyside, Kincaig (NH80), 24.viii.1956 [labelled '9' for September in error] (Alice Davies) (BMNH, 1♀) [Ref: none, NEW RECORD]. Speyside, Kincaig (NH80), 1957 and 1958, various dates (C.B. Williams, [Ref: Davies *et al.* 1962]. Speyside, Kincaig area (NH80), 'landing/biting on humans', vi.1988 and v-vi.1989 (J.B. Coupland) [Ref: Coupland 1990, 1994]. Speyside, vi and viii.1984, Dunachton Burn (NH824046), Mid Leault Burn (NH829060), Leault Burn (NH834061), Alvie School (NH835066), Kincaig village (NH836059/62), Loch Insh (NH837043) (M.R. Young and J.G. Purser) [Ref: Young and Purser 1984]. Wester Ross, Beinn Eighe Reserve, small stream (NG996616), 'attracted to man', 29.vii.1961 (L. Davies) (BMNH 3♀) [Ref: none, NEW RECORD].

Simulium (Simulium) variegatum

This is one of the species with a characteristically upland distribution in Britain, occurring only to the north and west of a line from the Humber to the Severn estuaries and in the English southwest (Davies 1968: 122, map 31). Prior to 1962 it had not been recorded biting man although there existed a report of it biting horses (Edwards 1920, repeated Edwards 1939). However, studies at Kincaig, based on precipitin test data (Davies *et al.* 1962) and capture of wild flies biting (Coupland 1990, 1994) show that this species very occasionally takes bloodmeals from man. Nevertheless it can be discounted as a contributor to the man-biting pest problem in Speyside. During Coupland's studies the biting of humans was found to occur on the upper Kincaig moorland only when deer had been freshly killed, exactly as was the case with the very closely related species *Simulium argyreatum*. Young and Purser (1984) found *S. variegatum* breeding plentifully in the Kincaig area but recorded no instance of biting or even of attraction to humans.

Animal hosts: cattle, horses, sheep, dogs, probably deer. France: man-biting has been recorded in the mountainous southern coastal Departments of Alpes Maritimes (Beaucournu-Saguez in Beaucournu *et al.* 1992) and Var (Brunhes and Philippon 1966).

Records and references

SCOTLAND

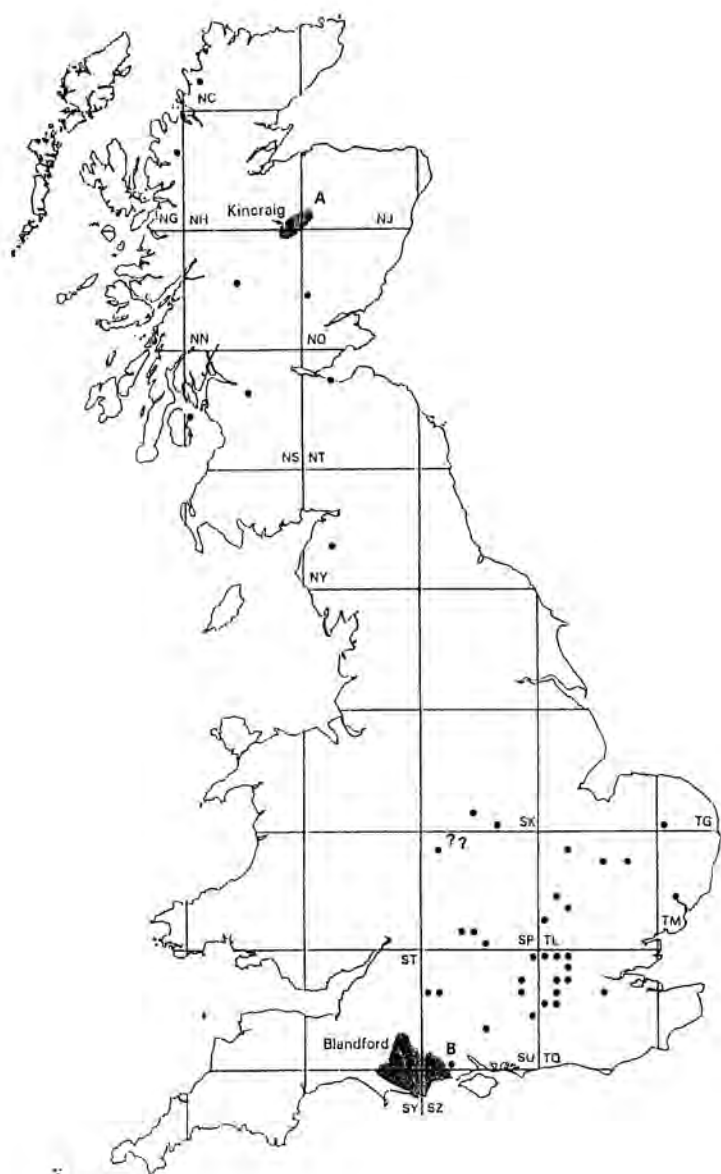
Highland: Badenoch and Strathspey District, Speyside, Kincaig (NH80), 1957 and 1958, various dates (C.B. Williams) [Ref: Davies *et al.* 1962]. Speyside, Kincaig area (NH80), 'caught biting', vi.1988, v. and viii.1989 (J.B. Coupland) [Ref: Coupland 1990, 1994].

Concluding remarks

The literature reports and the specimen-based records given in the foregoing pages indicate that some 14 out of the 33 British species are implicated in molesting humans, even if this is more as an occasional minor irritant rather than a regular biting menace. In all cases the distribution ranges of the species are much wider than the geographically restricted areas in which they have been proved, at least sometimes, to be anthropophilic. Outbreaks of anthropophilic behaviour are unpredictable as to where they might occur. They are also, even in *S. posticum* (Blandford fly) and in *S. reptans* and *S. tuberosum* s.l. (the birch-flies), very variable in intensity from year to year. In the case of the Speyside pest focus, and its 'hot-spot' Kincaig, for example, biting attacks on a moderately severe scale were happening in the early 1980s (leading to demands that something be done and to the studies of Young and Purser and of Coupland) yet in the years since then the situation has been relatively benign (M.R. Young *pers. comm.*). In fact, even in the years of Coupland's research at Kincaig (1987-1989) there was little actual biting in evidence although flies could be sweep-netted fairly readily around humans. Only 78 flies were observed biting people, of which 59 were *S. reptans*, 8 *S. tuberosum* s.l., 8 *S. argyreatum* and 3 *S. variegatum*. Presumably, various factors that promote high larval population densities and heighten adult fly activity help to determine the severity of each yearly biting season. So far, though, the biting problem has never induced any officially operated control scheme in the Spey valley. Still, practicalities for a control option have been considered by Young and Purser (1984) and by Coupland (1990). (For *Simulium* control in general in Britain the larvicidal operation against *S. posticum* in Dorset remains the only scheme actually to have been put in place: see Ladle and Welton 1996.)

Although the incidence of anthropophily in Britain shows no precise pattern it seems warranted to comment briefly on certain aspects that emerge when an attempt is made to map the findings to date, if only in a preliminary way (Fig. 30).

Fig. 30. Map to provide a visual aid illustrating the scattered distribution of anthropophily in British blackflies as reliably known up to July 2004. The map is based on voucher specimen data and literature records reported in this article. A = birch-fly pest problem area of Speyside; B = Blandford fly pest problem area of East Dorset (based on maximal extent map in Welton and Ladle, 1993). Dots indicate at least one anthropophily record in each 10 kilometre square marked. Question marks indicate an area of strongly suspected but unproven anthropophily recorded from Warwickshire and Greater Birmingham.



As can be seen, from large swathes of Britain (including Wales, northern England and the Devon and Cornwall peninsula) there are (apparently) no anthropophily records. These areas, 'uplands' as well shown by the uplands map in Miles (1981: 136), are largely moorlands inhabited by species that breed in small streams and do not bite man. On the other hand, anthropophily in England is most associated with *S. erythrocephalum*, *S. equinum*, *S. ornatum* s.l. and *S. posticum*, species that breed mainly or almost entirely in the lowland rivers of southern Britain. However, notably we must now add to this list *Simulium noelleri*, which although not truly riverine in its habitat has to a limited extent started to bite humans (see records given above under this species). In Scotland an association with rivers rather than small streams also mainly holds true, inasmuch as *S. reptans* and *S. tuberosum* s.l. are species of the larger river valleys (as is the case where these species are pests in Speyside) and not of the mountain streams, i.e. they inhabit what Smart (1936), with reference to Scotland, called the 'main draining rivers'. *Prosimulium* species are to some extent an exception insofar as although they occasionally annoy and bite humans they typically breed in the 'burns', the streams of the hills and mountains.

A difficulty in assessing the incidence of anthropophily lies in the fact that simuliids are often blamed for attacking humans at some particular time and place without tangible evidence that they are really doing so. Often they may be the culprits, but rarely are any specimens obtained to confirm this beyond doubt. The question-marks on the map in Fig. 30, positioned in the West Midlands of England, mark an area providing a recent example. Here, in the summer of 2001, some human cases of anaphylactic shock occurred that were regarded by the local medical authorities as due to mass blackfly attack. The worst affected area was the Kingsbury Water Park in Warwickshire on the Tame River, a north-flowing feeder of the Trent. No flies were collected here in the act of biting, so it is not verified (although likely) that simuliids were responsible. See Falk (2002) for a full account.

Acknowledgements

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The identification of *Palloptera anderssoni* Rotheray & MacGowan, 1999 (Diptera, Pallopteridae) – *Palloptera anderssoni*

Rotheray and MacGowan, 1999 was described from material collected in Scotland and Finland (*Palloptera anderssoni* sp. n. from Scotland and Finland (Diptera: Pallopteridae). *British Journal of Entomology and Natural History* 11, 175-179). The character which first alerted the authors to this taxon was the lack of shading on the wing tip. In describing it they stated that the "consistency of clear wings in all material was striking, and shading did not develop as specimens aged".

In spring 2004 I collected a sample of bark and underlying cambium from an oak log. On 9 May a single male *Palloptera* emerged and before the end of the day it had developed a dark shade on the wing tip, thus I presumed it to be *P. ustulata* Fallén, 1820. On 11 May a female emerged, but when this one died without my intervention its wings were still entirely clear. This prompted me to dissect the male and the long forked process at the tip of the aedeagus proved that it was *P. anderssoni*. A further three males and four females emerged up to 16 June, all of the males and one of the females with at least a small discernible dark shade on the wing tip. I then dissected my male specimens identified as *P. ustulata*. Of these three were *P. ustulata* but one proved to be another *P. anderssoni*. This netted specimen had an even darker, and slightly more extensive shade on the wing tip than the reared specimens. It was also by far the most southern specimen yet reported; it would be interesting to see if the wing shade has a greater tendency to disappear in more northerly populations. All the other characters used by Rotheray and MacGowan (1999) seem to fit well my specimens, of which the data is as follows:

DEVON (V.C. 3): Greenway (SX8754), 12.viii.2003, 1♂; SOMERSET (V.C. 6): Leigh Woods (ST5573), 9.v–16.vi.2004 ex *Quercus* bark 4♂, 5♀.

Having been alerted to the possibility that these two species could be confused due to some examples being indistinguishable on wing markings, Peter Chandler also recognised a recently collected male with a strong wing marking as *anderssoni*, which has the following data: BERKSHIRE (V.C. 22): Theale, Elephant Pit (SU6370), 23.x.2004 1♂.

The small amount of material previously in his collection, including some reared from *Ulmus* bark at Leckford, Hampshire, was confirmed to belong to *P. ustulata*.

Clearly all previous records of *P. ustulata* require checking and those not backed by specimens cannot be substantiated. The differences in male genitalia illustrated by Rotheray and MacGowan (*op. cit.*) are clearly visible in dry specimens if the genitalia are exerted when fresh – **DAVID GIBBS**, 6 Stephen Street, Redfield, Bristol BS5 9DY, davidgibbs@aol.com

Is the hoverfly *Epistrophe diaphana* (Zetterstedt) (Diptera, Syrphidae) responding to climate change? –

Epistrophe diaphana (Zetterstedt, 1843) is a relatively straightforward species to identify, although it may be confused with *E. grossulariae* (Meigen, 1822) and possibly with *Syrphus* species. It is somewhat deeper orange in colour than many *Syrphus* and should stand out as different even when amongst other yellow and black hoverflies on umbellifer or other flowers. Most experienced recorders could be expected to take note, making it likely that it has been a genuinely scarce species. The map of occurrence given by S.G. Ball and R.K.A. Morris (2000. *Provisional atlas of British hoverflies*, 167 pp. Centre for Ecology and Hydrology, Abbots Ripton) indicated that prior to 2000 recent records of *Epistrophe diaphana* were confined to southern England, with the northern-most recent records from East Gloucestershire, Oxfordshire, Buckinghamshire and the borders of Hertfordshire and North Essex. A scatter of older records from Huntingdonshire (now Cambridgeshire), southern Derbyshire and northern Worcestershire prior to 1960 suggest that it may have been more widely distributed in the past, but they are insufficient to make such a judgement.

It is therefore noteworthy that *Epistrophe diaphana* was recorded on four separate occasions in the English East Midlands in 2004, following its surprise discovery at a Shropshire site by Richard Bennett, a student on the 'introduction to Hoverflies' FSC course, during a visit to Loamhole Dingle (SJ6605) near Ironbridge, Shropshire, on 6 June 2004. This was quickly followed by a female taken at hogweed *Heracleum sphondylium* at Prior's Coppice, Leicestershire (SK8305) on 15 June (RKAM). On 27 June 2004, I took a further female at Southfield Farm Marsh, Northamptonshire (SP885759) and saw another (sex uncertain) at woodland near Barnwell, Northamptonshire (TL041839) on wild parsnip *Pastinaca sativa*. Two females at hogweed in Southey Wood, Cambridgeshire (TF1002) (RKAM) completed the records for 2004.

The occurrence of a single specimen might simply be dismissed as a vagrant, but the appearance of records over such a wide front paint a different picture. They suggest that *Epistrophe diaphana* has undergone recent northward movement, and confirms the observation by S. Falk (2004. Warwickshire hoverfly list reaches 201! *Hoverfly Newsletter* 37, 6-8) that *E. diaphana* has become more frequent in Warwickshire in the past twenty years. This expansion in range follows a string of warm years, including a particularly hot summer in 2003, and seems to be consistent with climate change impacts demonstrated for species such as *Volucella inanis* (Linnaeus) (Morris, R.K.A. and Ball, S.G. 2004. The Changing Distribution of *Volucella inanis* (L., 1758) (Diptera: Syrphidae). *British Journal of Entomology and Natural History* 16, 221-227) – **ROGER K.A. MORRIS**, 7 Vine Street, Stamford, Lincs PE9 1QE

Have there been changes in the frequency of *Leucozona glauca* (Linnaeus) and *L. laternaria* (Müller) (Diptera, Syrphidae) since 2000?

— A noticeable feature of the maps for both *Leucozona glauca* (Linnaeus, 1758) and *L. laternaria* (Müller, 1776) provided by S.G. Ball and R.K.A. Morris (2000. *Provisional atlas of British hoverflies*. 167pp. Centre for Ecology and Hydrology, Abbots Ripton.) is the virtual absence of both species from eastern England, including the Peterborough area which is home to a number of active hoverfly recorders. Both are readily identifiable and likely to be reported; thus it has been concluded that this absence is genuine and not an artifact of recorder effort. Numbers of both species noted in 2003 and 2004 seem to be at variance with previous data, however, and indicate that distribution changes may be underway.

In 2003, both species were noted on a number of occasions at Old Sulehay Forest (TL0698) (both on 28.vi.2003, 11.vii.2003, 18.vii.2003; *L. glauca* on 7.vii.2003; and *L. laternaria* on 17.vii.2003 and 26.vii.2003). *Leucozona glauca* was also noted at Wakerley Great Wood (SP9598, 2.viii.2003). In 2004, it was noticeable that *L. laternaria* occurred widely: Priors Coppice (SK8305), 15.vi.2004; Southey Wood (TF1002, TF1003), 3.vii.2004; Wakerley Great Wood (SP9698), 3.vii.2004; Barnack Hills & Holes NNR (TF0704), 10.vii.2004; Pickworth Great Wood (SK9814), 23.vii.2004; Bourne Woods (TF0720), 23.vii.2004; Wardley Wood (SK8400), 1.viii.2004. However, *L. glauca* was noted at just one additional site, Wardley Wood (SP8399, SK8400), 1.viii.2004.

Both species are most frequently noted in woodland rides at umbellifers (Apiaceae) such as hogweed *Heracleum sphondylium*. They also seem to adopt a more western distribution, but are also widespread in south-east England. Thus possible factors behind any genuine changes are difficult to discern. Recent hot summers have largely been accompanied by drought, which is unlikely to favour aphidophagous species whose prey are vulnerable to drought impacts on their host plants. An alternative hypothesis is that levels of recording were insufficient to reveal these species. Yet *L. laternaria* was recorded, apparently for the first time, from Barnack Hills and Holes NNR in 2004 and from Old Sulehay Forest in 2003, sites which have been regularly visited in the past. At the moment, there would seem to be a conundrum that cannot be readily explained, even though other hoverflies are showing very clear changes in distribution and behaviour that can be attributed to climate change (Morris, R.K.A. 2000. Shifts in the phenology of hoverflies in Surrey: do these reflect the effects of global warming? *Dipterists Digest* (second series), 7, 103-108; Morris, R.K.A. and Ball, S.G. 2004. The Changing Distribution of *Volucella inanis* (L., 1758) (Diptera: Syrphidae). *British Journal of Entomology and Natural History*, 16, 221-227) — **ROGER K.A. MORRIS**, 7 Vine Street, Stamford, Lincs PE9 1QE

Identification of the females of the smaller British species of *Machimus* sensu lato (Diptera, Asilidae) with a note on the morphology of the ventral abdominal and thoracic plates

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Summary

Characters that can be used to separate the three smaller species of *Machimus* sensu lato found in Britain are discussed and illustrated with photographs. Attention is drawn to an anomaly in the terminology currently in use for the ventral plates in the postmetacoxal region of Asilidae.

Introduction

The identification of British Asilinae, especially in the field, can prove rather daunting for those not familiar with the group. Judging from the number of requests for confirmation of identity that I receive, the separation of females of the smaller species of *Machimus* sensu lato, i.e. *M. atricapillus* (Fallén, 1814), *M. cingulatus* (Fabricius, 1781) and *M. cowini* (Hobby, 1946), appears to be particularly problematic. The features used in couplet 5 of the key by Stubbs and Drake (2001) have proved to be difficult to use and not completely reliable. Here I review and evaluate the characters used historically to separate the species in published keys including that of Stubbs and Drake, using photographs to illustrate and explain the differences described. An alternative version of couplets 4 and 5 (p. 121) of Stubbs and Drake is offered in the hope that it may prove easier to identify the species with confidence.

Characters historically used to separate the females of the species

Machimus cingulatus has historically been placed in the genus *Epitriptus* Loew, of which it is the type species, while *M. atricapillus* has been placed in either *Machimus* sensu stricto or *Tolmerus* Loew. Similarly, *Machimus cowini*, described in 1946 in the genus *Epitriptus*, has more recently been placed in *Tolmerus*. Consequently, despite their close physical similarities, they were generally separated at the generic level in early keys to the North European fauna. Since the generic key characters were primarily male sex-specific, this caused some confusion. Even Rikhter (English translation 1989) only separated *Machimus atricapillus* and *cingulatus* on the basis of male genitalia.

Prior to the recognition and description of *Machimus cowini*, keys separating *M. cingulatus* from *M. atricapillus* were published by Lundbeck (1907), Verrall (1909), Ségué (1927), Engel (1928) and Hobby (1932). Of these, it appears that only Engel had specimens of *Machimus cowini* before him but confused them with *M. cingulatus* (Speight 1987).

While describing *Machimus cowini*, Hobby (1946) amended his previous key to include it, and all subsequent keys covering the North European *Machimus* fauna except Trojan (1970) and Rikhter (1989) also considered it. These included the work of Oldroyd

(1969) as well as that of van der Goot (1985), who treated *cowini* as a colour form of *cingulatus*. Speight (1987) quickly responded to van der Goot with a re-affirmation of the specific status of *cowini*.

The work of Hull (1962) in his key to genera of the world is worthy of particular mention. His key, if properly applied, would place females of our subject species in two separate 'genera' (text) or 'subgenera' (key) as follows: *atricapillus* and *cowini* in *Tolmerus* and *cingulatus* in *Epitriptus*. Unfortunately, his list of species inexplicably placed *atricapillus* in *Machimus* sensu stricto and *cingulatus* plus *cowini* in *Epitriptus*. It is likely that he had never seen specimens of *cowini* and was simply following Hobby.

Drake (1995) specifically addressed the separation of females of *cingulatus* and *atricapillus*, proposing use of the bristle arrangement beneath the ovipositor to separate them. He also drew attention to a difference in relative length of the last segment of the ovipositor in the two species. Among later keys, those of Weinberg and Bächli (1995) and van Veen (1996) were almost identical to that of van der Goot. Stubbs and Drake (2001) used the characters proposed by Drake (1995) and earlier authors in their key to separate *cingulatus* from *atricapillus* but relegated the most definitive character to the text. The most recent key, built into a pictorial atlas of the German species by Geller-Grimm and Dikow (2003), unfortunately failed to recognise the significant differences between females of *cingulatus* and *cowini* and does not separate them, although both species were illustrated with several photographs.

The following list of characters historically used to separate the species can be extracted from the references cited above.

Character	First use	Date	Choice 1	Choice 2
Pile/bristles beneath abdomen	Lundbeck	1907	Bristly	Not bristly
General colour (abdomen)	Verrall	1909	Darker	Lighter
Size	Verrall	1909	Larger	Smaller
Colour of hairs on frons	Verrall	1909	All (except 1 or 2) black	Roughly half white
Acrostichal bristles	Séguy	1927	Shorter	Longer
Colour of femur	Hobby	1946	With orange apical ring	With posterodorsal stripe
Colour of tibia	Hobby	1946	With median black ring	Without median ring
Profile of facial tubercle	Oldroyd	1969	More angular (figure)	Less angular (figure)
Bristles under ovipositor	Drake	1995	Longer	Shorter
Ovipositor length	Drake	1995	Longer	Shorter
Ovipositor last segment	Drake	1995	Longer	Shorter
Relative length of antennal style	Stubbs	2001	Longer	Shorter
Hairs on axis of tergites	Stubbs	2001	Pale colour	Dark colour

The nomenclature of the ventral abdominal plates of *Machimus*

Because I refer below in detail to the underside of the abdomen, it is necessary to first discuss a problem relating to the nomenclature of the sclerotised plates to be found there.

If one examines the underside of the base of the abdomen of a *Machimus*, or indeed of most Asilidae, it is clear that there are more plates present than there are tergites on the top of the abdomen (see Fig. 7). Dissection shows that the extra plate is the hairy anterior one, which lies immediately in front of (bare) sternite 1, and is actually part of the thorax. It is directly associated with the post-metacoxal membrane and appears to be part of the metathorax (i.e. part of the metasternum). A search of the literature on Diptera morphology and terminology has failed to find any discussion of this particular plate. In particular, it is not mentioned in either of the classic works on this subject (Crampton 1946 or McAlpine 1981). Geller-Grimm and Dikow (2003), in a key to German Asilidae and also (undated) on a web-site, showed it on a diagram (Fig. 6: Thorax, ventral: item 17) with the label "metasternum, = postcoxal bridge?". A detailed anatomical study is necessary to determine the true nature and correct nomenclature of this plate. In the meantime, in the absence of a formal name and since it is necessary to refer to this plate in the following discussion, I have chosen for simplicity to call it "Anterior Sternite" and to label it "SA" in the photographs.

In the text of Stubbs and Drake (pp. 223-224) this hairy plate (which I am now calling the anterior sternite, SA) was referred to as sternite 1 and the true (bare) sternite 1 (my S1) was treated as the anterior part of sternite 2.

Evaluation of the usefulness of the differentiating characters identified

In this section I discuss the value of each of the characters for differentiating the three subject species (particularly the females) and the use as key characters.

Nature of the pile/bristles on the ventral abdominal plates (sternites)

This is by far the most important of all the available key characters because it is the only one so far recognised which definitively distinguishes *cowini* from *cingulatus* in both sexes by a factor other than coloration. It also very clearly separates both sexes of *atricapillus* from *cingulatus*. The situation in *cowini* is not quite identical to *atricapillus* but the difference is not really sufficient to quantitatively differentiate them.

Species	Figure	Sternite	State
<i>atricapillus</i>	10	S2	All hair similar to SA
		S3	~50% like SA, mixed with 50% short stiff bristles
		S4	~25% like SA, mixed with 75% short stiff bristles
<i>cowini</i>	11	S2	Hair similar to SA, with a few slightly stiffer long hairs
		S3	~50% like SA, mixed with 50% stiff bristles mostly of similar length
		S4	~50% like SA or shorter, mixed with 50% stiff bristles mostly of similar length
<i>cingulatus</i>	12	S2-5	No mixture, hair/bristle texture progressively stiffer and shorter towards the rear.

The differences are subtle but, once understood, this character is easy to use at a magnification of about 20X. It is illustrated in Figs 10-12. The character is described in detail in the text of Stubbs and Drake (p. 223) but is unfortunately not used in their keys. I repeat the description here with slight enhancements to add clarity.

The anterior sternite in all three species bears long soft white wispy hairs, which are so fine that the ends are slightly wavy and bend in random directions. The difference between the species lies in the presence or absence of similar fine (sometimes slightly longer) hairs on tergites 2, 3 and 4 in addition to any stronger (usually shorter) bristles which are also present on sternites 3 and 4. The above table describes in detail the nature of the bristles typically present on each sternite.

General size and colour

When I look at a drawer full of specimens, I can see some difference in average colour but not in size between *atricapillus* and *cingulatus*. I have not seen enough specimens of *cowini* to make a serious judgement other than to say that all three species look rather similar to me. There is a subtle difference in the abdominal colour pattern when viewed from certain angles but (as Drake 1995 noted) this cannot be easily described or illustrated. I do not believe that these characters are of any value in keys for determination of species.

Colour of hairs on frons

Although only a colour difference, this character seems to separate *atricapillus* reliably from *cingulatus*. Most *atricapillus* have all the bristles black and I have never seen one with more than 2 white out of a total of between 20 and 35 bristles. The least white bristles that I have seen in *cingulatus* is 4 out of 22 total, but the average seems to be around 13 white. *Machimus cowini* seems to be much more variable, the number of white bristles ranging from 1 to 6 out of a total of 18 to 21 in a batch of 5 specimens that I examined.

Nature of the acrostichal bristles

A character used by Séguy to separate *atricapillus* from *cingulatus*. His description is lengthy and I cannot recognise the difference he described when I compare specimens of these species. I do not believe it to be a useful key character.

Plate 1: Figs. 1, 3 and 5. *Machimus atricapillus*, *M. cingulatus* and *M. cowini* in front view. Red arrows indicate the absence (Fig. 1) or presence (Figs. 3 and 5) of apparent black rings near the middle the four front tibiae. Figs 2, 4 and 6. Posterodorsal aspect of front and mid femora of the same species. Arrows point to orange longitudinal stripes in *M. atricapillus* and *M. cingulatus* (Figs 2 and 4), and to the orange apical rings in *M. cowini* (Fig. 6). Fig. 7. Ventral view of the area at the base of the abdomen in *M. cingulatus*. Blue lines indicate the position of boundaries between the plates and membranes present. PMM = Postmetacoxal membrane (part of thorax), SA = Anterior sternite (part of thorax), S1 = Sternite 1, S2 = Sternite 2, S3 = Sternite 3. Figs. 8 and 9. Lateral views of the ovipositors of *M. atricapillus* and *M. cingulatus*. Red arrows point to long ventrally-placed bristles on sternite 8. Blue lines indicate the positions of boundaries between the tergites incorporated into the ovipositor. T8 = Tergite 8, T9 = Tergite 9, T10 = Tergite 10.



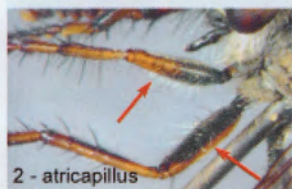
1 - atricapillus



3 - cingulatus



5 - cowini



2 - atricapillus



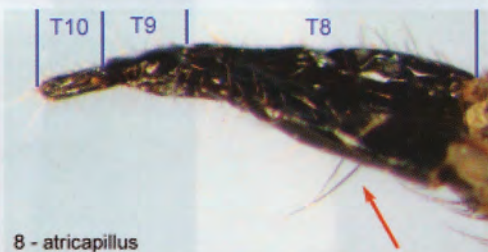
4 - cingulatus



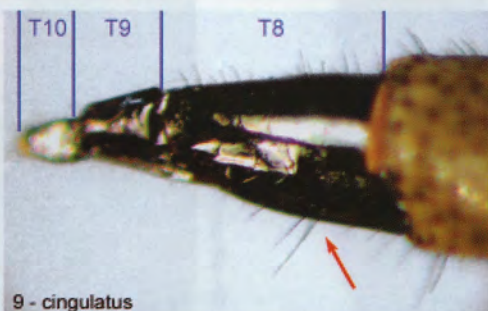
6 - cowini



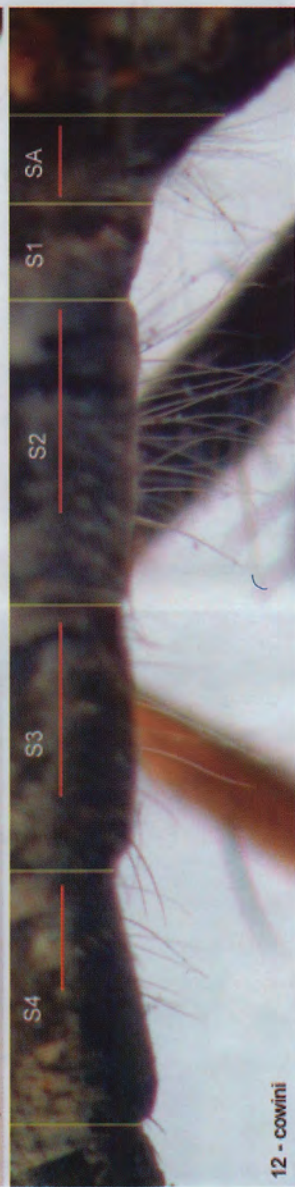
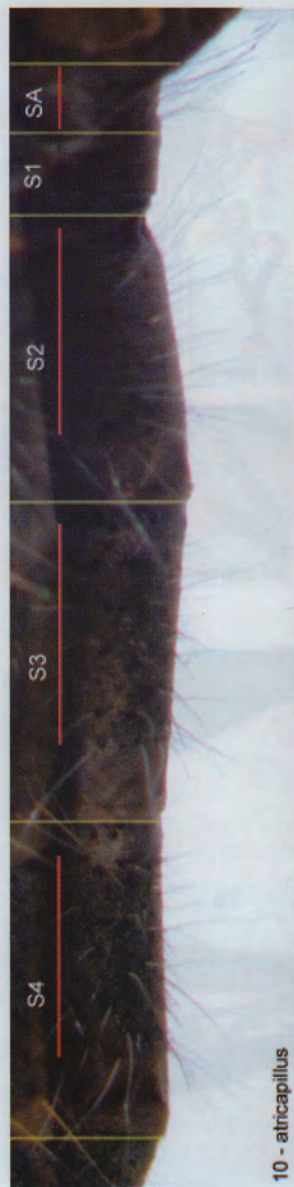
7 - cingulatus



8 - atricapillus



9 - cingulatus



Colour pattern on femur

In *cowini* the front and middle femora are completely black except for an orange ring at the apex (Fig. 6). The hind pair are similarly coloured but also have a small posterodorsal orange patch near their base (sometimes very inconspicuous). *Machimus cingulatus* and *atricapillus* also have orange-ringed tips but additionally have extensive orange longitudinal posterodorsal stripes on all femora. In *cingulatus* these stripes all reach from the apical ring to the base (Fig. 4), in *atricapillus* the stripes on the front femora may not reach to the base (Fig. 2).

Although based on colour, this appears to be a very good character for recognition of *cowini*. However, I must caution that I have seen one undoubted specimen of *atricapillus* that had almost totally black femora.

Colour pattern on anterior / anterodorsal face of front and middle tibiae

In *cingulatus* the front and middle tibiae, when viewed from the front (Fig. 3) have a very obvious dark patch creating an apparent black central ring. This is not obvious in *atricapillus* (Fig. 1). Although the specimen of *cowini* shown in my picture (Fig. 5) has the same ringed appearance as *cingulatus*, Hobby (1946) pointed out that some *cowini* have "...tibiae with more extended dark markings, so that the annulate appearance so characteristic of *E. cingulatus* is obscured...". John Ismay (*pers. comm.*) has confirmed that the holotype male of *cowini* in the collection of the Oxford University Museum does indeed have more extensively darkened tibiae than usual for this species.

Although based on colour, I have found this to be a very reliable character for separating *atricapillus* from *cingulatus* and have never come across a case in which it did not work. It is particularly useful in the field where it can be recognised instantly with a hand lens. It has been used as the main key character by recent continental authors (van der Goot 1985, Weinberg and Bächli 1995 and van Veen 1996). Because it may be unclear in darker specimens of *cowini* it is best avoided as a key character for distinguishing *cowini* from *atricapillus*.

Shape of facial tubercle

Oldroyd (1969) gave diagrams showing a quite strong difference between the profile of the face in *cingulatus* and *atricapillus*. In practice, the facial bristles make it very difficult to see any difference that may exist. I do not believe that this character is of value in separating the species.

Plate 2. Figs. 10-12. Sternites of *Machimus atricapillus*, *M. cingulatus* and *M. cowini* in side view. SA = Anterior sternite (part of thorax), S1 = Sternite 1, S2 = Sternite 2, S3 = Sternite 3. Yellow lines indicate position of boundaries between sternites. Red lines indicate zones where some long fine "wispy" hairs, similar in texture to those on SA, are present in the specimens illustrated (dense on S2, sparser towards posterior). Blue arrow indicates zone where hairs (if present) become progressively more bristly and shorter towards the posterior in *M. cingulatus*.

Structure of the ovipositor

Drake (1995) drew attention to three structural differences that might be used to separate *atricapillus* from *cingulatus*: its relative total length, the length of the last segment (abdominal segment 10 = cerci) and the length of the bristles beneath the first segment (abdominal sternite 8).

In dried specimens, the ovipositor always becomes to some extent twisted or otherwise distorted, making it difficult to make accurate comparative measurements. In particular, the joints between abdominal segments (especially segments 6-9) are telescopic so that measurements of relative visible segment lengths are unreliable.

There is no doubt that the ovipositor of *cingulatus*, especially (abdominal) segments 8 and 10, is shorter and more robust than that of *atricapillus* (compare Figs 8 and 9), but this is difficult to quantify for use as a key character.

Drake proposed that the two species can be distinguished on the basis of the presence or absence of a pair of differentiated long bristles beneath sternite 8 and use of this character was followed by Stubbs and Drake (2001). In my experience, the long bristles present in both species appear similar (Figs 8 and 9). I have never been able to understand Drake's distinction and believe that it is not valid. I conclude that the ovipositor does not provide any characters useful for distinguishing the species in a key.

Length of the antennal style (= "arista" of Stubbs & Drake)

I have measured the relative length of the style to the third antennal segment in a number of specimens and found them to be reasonably consistent within each species. The ratios I measured lie in the following ranges:

Machimus atricapillus: 0.8 - 1.0; *M. cingulatus*: 0.4 - 0.5; *M. cowini*: 0.7 - 0.8.

Those for *atricapillus* and *cingulatus* are in good agreement with the values used in the Stubbs and Drake key. It would appear that the character can be used with reasonable confidence to distinguish *cingulatus* from *atricapillus*, but *cowini* seems to be intermediate between the other two.

Colour of hair on axis of the tergites 3, 4 and 5

It is true that the hair on these tergites is almost completely black in typical *atricapillus* and *cowini* and can be almost totally white in some specimens of *cingulatus*. However, there is much variation and I have seen *cingulatus* specimens in which it was almost totally black. I do not believe that this character could reliably be used to differentiate the species in a key.

A revised key for separation of the smaller British species of *Machimus*

I offer the following two couplets as an alternative for couplets 4 and 5 on p. 121 in the Stubbs and Drake (2001) key to *Machimus*. I have based these on the premise that the most easily recognisable character should appear first, the most definitive character (where different) second.

If followed carefully, these should enable correct distinction of both male and female specimens of the three species involved. They would work on all specimens that I have seen

with the exception of a single specimen of *Machimus atricapillus* with almost totally black femora.

- 4 Front and middle femora completely black with a narrow orange ring around the apex (Fig. 6). Sternites 2 - 4 bear a quantity of very fine long hair similar to that on the anterior sternite in addition to any more robust bristles or hairs that are also present (Fig. 12). Male without a tab on the hind margin of sternite 8 *M. cowini* (Hobby)
- Front & middle femora with extensive longitudinal posterodorsal orange markings in addition to an apical ring (Figs 2 and 4). Sternite hair/bristles (Figs 10 and 11) and male sternite 8 variable, with or without a tab 5
- 5 Front tibiae without any obvious apparent central black ring when viewed from the front, a very weak one may be present on the middle tibiae (Fig 1). Sternites 2 - 4 bear a quantity of very fine long hair similar to that on the anterior sternite in addition to any more robust bristles that are also present (Fig. 10). Male with tab on sternite 8. Bristles on frons all black (occasionally 1 or 2 white) *M. atricapillus* (Fallén)
- Anterior and anterodorsal surfaces of front and middle tibiae with a central darkened patch so that there is an obvious apparent central black ring when viewed from the front (Fig. 3). Sternites 2-4 with progressively stiffer and shorter hairs/bristles in contrast to the very fine hairs on the anterior sternite (Fig. 11). Male without a tab on the hind margins of sternite 8. A substantial proportion (~ 50%) of bristles on the frons white *M. cingulatus* (Fabricius)

Acknowledgements

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Dipterists Day Exhibits 2004 **- compiled by Editor from exhibitors' notes**

Again only those exhibits, which did not also appear at the Exhibition of the British Entomological and Natural History Society, are included here; details of the exhibits by P.J. Chandler, A.J. Halstead, I. Perry, M. Parker and the trap exhibit by B. Schulten, J.W. Ismay and D.J. Mann will be included in the BENHS Exhibition Report.

BALL, S. and MORRIS, R.K.A. A model for predicting the distribution of species was displayed. The problem was recognised that the coverage achieved by recording schemes is patchy and incomplete; the question was posed whether this partial data about a species can be used to estimate its real distribution and if so if it can be predicted what will happen if the environment changes? (e.g. climate change, changes in land use). The model used was GARP (Genetic Algorithm for Rule-set Production) developed by David Stockwell (formerly of Environment Australia, now at San Diego Supercomputer Centre). This fitted rules of the form "If July temperature is between 17.5 and 21.3°C and altitude is less than 150m then species is present" and only considered locations at which the species is present

The assumption made is that the "niche" of a species is defined by a series of measurable variables which might include: physical environment, e.g. soil, topography; climate, e.g. temperature, rainfall; vegetation cover, e.g. woodland calcareous grassland; other species, e.g. larval food plants. There is a range of values for each of these variables within which a species can occur; if the relevant variables are within their optimum range, then the species occurs. The data used comprised the following: Ordnance Survey topography, e.g. mean altitude for 1km grid; UK Climate Impact Programme; weather for each month from 1961-2000 on 5km grid; predicted values for 2020, 2050 and 2080 from four climate change scenarios; Centre for Ecology and Hydrology. Land Cover maps for 1km grid; National Biodiversity Network Species distributions.

The conclusion was drawn that for at least some species of hoverfly, it is possible to fit models which produce a reasonably convincing prediction of the real distribution, but it does not work well for the following: (1) very scarce species – requires a minimum of 40 different observed locations; (2) very common species – if a species occurs in most grid squares then there is no basis for forming rules; (3) species whose distribution is controlled by factors poorly represented by the available variables – e.g. saproxylic species. If a model can be fitted which involves weather variables, then it is possible to investigate the effect of long term weather changes on the distribution.

The following examples were provided: (1) a worked example showing how the predicted distribution for *Tropidia scita* Harris, 1760 in England and Wales was derived, followed by further examples: *Chrysotoxum arcuatum* (Linnaeus) and *C. cautum* (Harris), showing that there is very little overlap in the predicted distributions of these two species; (2) a model fitted to show the distribution of *Volucella zonaria* (Poda) in the 1980s and this was then used to predict the distribution in five year periods: 1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986-90, 1991-95, 1996-2000. The same model was also applied to the

predicted weather for 2020 using the medium-high emissions scenario to show the potential distribution of this species in the future; (3) a model fitted to show the distribution of *Epistrophe diaphana* (Zetterstedt) and used to predict the distribution in 1996-2000.

COLE, J.H. Some noteworthy Diptera collected at three sites during 2004: (1) Results of the BENHS field meeting at Canvey Island, Essex, 19.vi: *Poecilobothrus ducalis* (Loew) (Dolichopodidae), a few post 1960 records from the Kent coast and one from Essex; *Myopites eximius* Ségué (Tephritidae), numerous on golden samphire *Inula crithmoides* along a sea wall; *Campiglossa malaris* Ségué (Tephritidae), which has spread through Kent and is now established in Essex (Laurence Clemons *pers. comm.*); *Tephritis matricariae* Loew (Tephritidae), which has spread rapidly in south-east England since its discovery at Sandwich Bay in 2000 (Laurence Clemons *pers. comm.*; also see Exhibit by R.A. Jones, 2004 BENHS Exhibition); *Blaesoxipha plumicornis* (Zetterstedt) (Sarcophagidae), a parasitoid of grasshoppers with few recent records; *Cyrtophleba ruricola* (Meigen) (Tachinidae), a rare parasitoid of noctuid larvae; *Gymnosoma niteus* Meigen (Tachinidae), until recently rarely found on chalk grassland with a few records from Kent and Surrey but has now been found in a number of brownfield sites east of London along the Thames Estuary (see Exhibit by R.A. Jones, 2004 BENHS Exhibition).

(2) Five Arches Pit Wildlife Trust Reserve, Woodwalton Church End, Cambridgeshire (V.C. 31, Huntingdonshire), 2.viii: *Chloropsina pulicaria* Ismay and *C. varleyi* Ismay (Chloropidae).

(3) Dogsthorpe Star Pit SSSI Wildlife Trust Reserve, Peterborough, Cambridgeshire (V.C. 31, Huntingdonshire): three species of Muscidae new to Britain, *Hydrotaea aenescens* (Wiedemann), known to be established at least at one other site (Adrian Pont *pers. comm.*), listed under imported species in the 1998 checklist, it is a North American species with larvae predatory on larvae of *Musca domestica* Linnaeus in animal houses and refuse tips, that has spread through most of Europe since the 1960s; two undetermined species of *Lispe*.

CROSSLEY, R. Noteworthy Diptera from Yorkshire in 2004: *Dicranota simulans* Lackschewitz (Pediidae), from a streamside at East Moor Wood, Helmsley, also found in 2004 at Hack Fall Woods, Masham; *Ellipteroides alboscuteellatus* (von Roser) (Limoniidae), Hack Fall Woods, Masham, 10.vii, abundant in calcareous seepages; *Chrysopilus erythrophthalmus* Loew (Rhagionidae), Seivedale Fen, Dalby Forest, found in an atypical habitat by a shallow drainage ditch within alder *Alnus* carr woodland; *Odontomyia hydroleon* (Linnaeus) (Stratiomyidae), Dalby Forest, monitoring of this site indicates a continuing small population confined to a very restricted area of seepage fen, with emergence range 28.vi-20.vii; *Cheilosia ranunculi* Doczkal (Syrphidae), Millington Springs, 10.v, from a chalk fen in the Wolds, the third Yorkshire locality; *Melangyna barbifrons* (Fallén) (Syrphidae), East Moor Wood, Helmsley, 24.iv, three females at willow *Salix* flowers, apparently rare in Yorkshire and the first observation of the species by the exhibitor.

DRAKE, M. (1) Uncommon flies from Black Venn mud cliffs, Dorset, collected in June and August 2003. Five species were particularly frequent on the mud-slide seepages: *Diaphorus nigricans* Meigen (Dolichopodidae), *Micropeza corrigiolata* (Linnaeus) (Micropezidae), *Herina lugubris* (Meigen) and *Meliera omissa* (Meigen) (Ulidiidae), *Minettia rivos*a (Meigen) (*fasciata* (Fallén) of Collin) and *M. plumicornis* (Fallén) (Lauxaniidae); the last species appeared to favour bare clay. Other less frequent species

were *Platypalpus articulatus* Macquart (Hybotidae), *Dolichocephala ocellata* (Costa) (Empididae), *Melanostolus melancholicus* (Loew) (Dolichopodidae), *Myopites inulaedysentericae* Blot (Tephritidae) swept from fleabane *Pulicaria*, *Micropeza lateralis* Meigen (Micropezidae), *Chamaemyia fasciata* (Loew) (Chamaemyiidae), *Colobaea bifasciella* (Fallén) (Sciomyzidae), *Gymnoclasiopa plumosa* (Fallén) (Ephydriidae), *Lipara rufitarsis* Loew and *Platycephala umbraculata* (Fabricius) (Chloropidae) which was widespread in reeds. The collection was made as a contribution to the Charmouth Heritage Coast Centre's ecological study of Black Venn.

(2) *Dolichophorus kerteszi* Lichtwardt (Dolichopodidae) new to Britain (formally added in the present issue). Collected from the Ouse Washes, Cambridgeshire, on 22 July 2004, from a ditch margin, during a survey for the RSPB.

GIBBS, D.J. Diptera collected in 2004: *Dicranomyia melleicauda complicata* de Meijere (Limoniidae), Minsmere RSPB Reserve (TM4766), Suffolk, 13.vii, brackish lagoon margins; *Erioptera bivittata* (Loew) (Limoniidae), Minsmere RSPB Reserve (TM4766), Suffolk, 18.v, brackish lagoon margins; *Rhipidia uniseriata* Schiner (Limoniidae), Higham Woods NR (SO7719), Gloucestershire, 18.v, reared from oak *Quercus* rot-hole material; *Mycetophila uliginosa* Chandler (Mycetophilidae), Arno's Vale Cemetery (ST6071), Bristol (V.C. 6), 26.vi; *Mycetobia pallipes* Meigen (Mycetobiidae), Walton Moor (ST4372), Somerset, 14.iv, reared from sample of poplar *Populus* bark; *Crossopalpus curvipes* (Meigen) (Hybotidae), Minsmere RSPB Reserve (TM4766), Suffolk, 18.v, brackish lagoon margins; *Chersodromia cursitans* (Zetterstedt), Minsmere RSPB Reserve (TM4766), Suffolk, 18.v, brackish lagoon margins; *Drapetis simulans* Collin (Hybotidae), Keynsham (ST6668), Somerset, 28.vi and 4.vii, on trunks of Lombardy poplars; *Stilpon lunatus* (Haliday in Walker) (Hybotidae), Havergate Island RSPB Reserve (TM4148), Suffolk, 17.v and Minsmere RSPB Reserve (TM4766), Suffolk, 18.v, brackish lagoon margins; *Tachypeza fuscipennis* (Fallén) (Hybotidae), Higham Woods NR (SO7719), Gloucestershire, 21.v and 1.vi, reared from oak *Quercus* rot-hole material; *Rhamphomyia caliginosa* Collin (Empididae), Minsmere RSPB Reserve (TM4766), Suffolk, 13.vii, dunes; *Stratiomys longicornis* (Scopoli) (Stratiomyidae), Minsmere RSPB Reserve (TM4766), Suffolk, 18.v, brackish lagoon margins; *Medetera inspissata* Collin (Dolichopodidae), Walton Moor (ST4372), Somerset, 23.iv-10.v, reared from sample of *Populus* bark; *Medetera parenti* Stackelberg (Dolichopodidae), Arno's Vale Cemetery (ST6071), Bristol (V.C. 6), 26.vi, from trunks of White poplar; *Syntormon mikii* Strobl (Dolichopodidae), Minsmere RSPB Reserve (TM4766), Suffolk, 13.vii, brackish pool in dunes; *Systemus bipartitus* (Loew) (Dolichopodidae), St Georges Park (ST6273), Bristol (V.C. 34), 1.vii.2004, from sap run on horse chestnut *Aesculus hippocastanum*; *Sciapus laetus* (Meigen) (Dolichopodidae), Minsmere RSPB Reserve (TM4766), Suffolk, 10.viii, brackish pool in dunes; *Xylota xanthocnema* Collin (Syrphidae), Keynsham (ST6668), Somerset, 28.vi, on brambles *Rubus fruticosus* agg., below a row of Lombardy poplars; *Cephalops perspicuus* (de Meijere) (Pipunculidae), Minsmere RSPB Reserve (TM4766), Suffolk, 10.viii, brackish pool in dunes; *Leopoldius signatus* (Wiedemann in Meigen) (Conopidae), Staple Hill (ST6575), Gloucestershire, 19.ix, on ivy *Hedera* in garden; *Dioxyna bidentis* (Robineau-Desvoidy) (Tephritidae), Minsmere RSPB Reserve (TM4766), Suffolk, 13.vii, dunes; *Lonchaea hackmani* Kovalev (Lonchaeidae) Arno's Vale Cemetery (ST6071), Bristol (V.C. 6), 31.v

and 8.vi, from under bark of White poplar; *Dasiops calvus* Morge (Lonchaeidae), Arno's Vale Cemetery (ST6071), Bristol (V.C. 6), 26.vi, from White poplar trunk; *Lonchaea caucasica* Kovalev (Lonchaeidae), St Georges Park (ST6273), Bristol (V.C. 34), 17.vii, from sap run on horse chestnut; *Cnemacantha muscaria* (Fallén) (Lauxaniidae), Keynsham (ST6668), Somerset, 13.v, Arno's Vale Cemetery (ST6071), Bristol (V.C. 6), 20.v; *Dietya umbrarum* (Linnaeus) (Sciomyzidae), Crymlyn Bog (SS6894), Glamorgan, 9.v; *Psacadina zernyi* (Mayer) (Sciomyzidae), Minsmere RSPB Reserve (TM4766), Suffolk, 10.viii, brackish pool in dunes; *Themira biloba* Andersson (Sepsidae), Minsmere RSPB Reserve (TM4766), Suffolk, 13.vii, brackish lagoon margins; *Aulacigaster leucopeza* (Meigen) (Aulacigastridae), St Georges Park (ST6273), Bristol (V.C. 34), 1.vii, from sap run on horse chestnut; *Tricimba humeralis* (Loew) (Chloropidae), Arno's Vale Cemetery (ST6071), Bristol (V.C. 6), 1.viii; *Parydroptera discomyzina* Collin (Ephydriidae), Minsmere RSPB Reserve (TM4766), Suffolk, 18.v, brackish lagoon margins; *Gimnomera tarsea* (Fallén) (Scathophagidae), Crymlyn Bog (SS6894), Glamorgan, 9.v; *Phaonia canescens* Stein (Muscidae), Walton Moor (ST4372), Somerset, 4.v, Arno's Vale Cemetery (ST6071), Bristol (V.C. 6), 12.vi, from under *Populus* bark; *Lispe loewi* Ringdahl (Muscidae), Havergate Island RSPB Reserve (TM4148), Suffolk, 12.vii, brackish lagoon margins; *Lispe caesia* Meigen (Muscidae), Minsmere RSPB Reserve (TM4766), Suffolk, 13-27.vii, brackish lagoon margins; *Phaonia atriceps* (Loew) (Muscidae), Crymlyn Bog (SS6894), Glamorgan, 9.v; *Phaonia fusca* (Meade) (Muscidae), Havergate Island RSPB Reserve (TM4148), Suffolk, 12.vii, brackish lagoon margins.

GODFREY, A. Rare Diptera taken in 2003 and 2004: *Ctenophora pectinicornis* (Linnaeus) (Tipulidae), Castle Howard, North Yorkshire, 30.vi.2003 and Clumber Park, Nottinghamshire, 30.v.2004; *Kowarzia madicola* (Vaillant) (Empididae), new to Britain, known from few European countries (among them France) (determination confirmed by Rüdiger Wagner), Wormhill Springs, Matlock, Derbyshire, x.2003; *Kowarzia tenella* (Wahlberg) (Empididae), Corrieshalloch Gorge, Braemore, 31.vii.2003, mainly associated with small rocky streams; *Wiedemannia simplex* (Loew) (Empididae), Loch Avon, Cairngorms NNR, 12.viii.2003, at the only known British locality for this species where adults were discovered in 1936 and 1937 and further examples in 1984; *Achalcs bimaculatus* Pollet (Dolichopodidae), Osbalwick, Yorkshire, 9.vi.2003, frequent in *Deschampsia* tussocks; *Poecilobothrus ducalis* (Loew) (Dolichopodidae), Wallasea Island, Essex, 11.vi.2004; *Campsicnemus compeditus* Loew (Dolichopodidae), Pitmaduthy Moss SSSI, Tain, 4.viii.2004; *Chamaesyphus caledonicus* Collin (Syrphidae), Culbin Forest, 7.viii.2004, swept in the woodland with several *C. scaevoides* (Fallén); *Chalcosyrphus eunotus* (Loew) (Syrphidae), Cotton Dell, Staffordshire, 27.v.2004, also at Shrawley Wood, Worcestershire, 23.v.2004 and the exhibitor has altogether recorded about six sites for this species while doing survey work on *Lipsothrix* species (Limoniidae), which develop in the same habitat of semi-submerged logs in watercourses; *Platycheirus melanopsis* Loew (Syrphidae), Ben Nevis, 28.viii.2003; *Dorycera graminum* (Fabricius) (Ulidiidae), Wallasea Island, Essex, 11.vi.2004; *Campiglossa argyrocephala* (Loew) (Tephritidae), Alvie (part of Cairngorms NNR), Inverness-shire, 11.viii.2003; *Meiosimyza mihalyii* Papp (Lauxaniidae), Pikenaze Moor, Woodhead, Derbyshire, 5.vi.2003, an upland wood; *Minettia filia* (Becker) (Lauxaniidae), Corrieshalloch Gorge, Braemore, 31.vii.2003, a poorly recorded species of

damp woodland; *Parochthiphila coronata* (Loew) (Chamaemyiidae), a rare coastal species also found on brownfield sites inland, female from Knottingley, West Yorkshire, 13.vi.2004 and male from Markham Economic Growth Zone (= Shuttleworth Colliery), Duckmanton, Nottinghamshire, 4.vii.2003; *Tricimba brachyptera* (Thalhammer) (Chloropidae), Sherwood Heath, Nottinghamshire, 24.viii.2003, a minute brachypterous fly; *Trixoscelis marginella* (Fallén) (Trixoscelidae), Batchelor Hill, Yorkshire, 2.vii.2004, on a sandy exposure; *Alliopsis conifrons* (Zetterstedt) and *A. sitiens* (Collin) (Anthomyiidae), two poorly recorded species, Coille Coire Chuile SSSI, Tyndrum, 22.vii.2003; *Phasia barbifrons* (Girschner) (Tachinidae), Kinver Edge, Staffordshire, 12.ix.2004 and also recorded from Sherwood Heath, Nottinghamshire (2003), Bilston (West Midlands) and Sharlston Colliery, South Yorkshire (2004).

MERRIFIELD, R.K and MERRIFIELD, R.M. An account illustrated by photographs of the succession of insects associated with a dead amphibian (frog or toad), of which the headless body was found on their lawn at Eastcote, Middlesex, 3.viii.2004. It was starting to become bloated and had already attracted a number of flies including *Lucilia* species (Calliphoridae) (not of the species that are parasitoid on toads), which were taking up fluid from the skin at around midday in hot dry weather but none was seen to be laying eggs. A few social wasps (*Vespula* species) were attracted and removed material from the severed neck region of the frog. To prevent disturbance by mammals the carcass was covered with a wire frame that had been a guard around a gas boiler vent, secured with a ridge tile placed on top. On the following day the carcass had become more bloated, with wasps and flies still present. By 7.viii the carcass was less bloated, the surface appeared to be harder and visibly desiccating at the ends of the limbs. Some adults of *Lucilia* were still on it but they did not appear to be feeding. On 8.viii the carcass was drying out and no longer bloated; no insects were seen on it. Following some rain on 9.viii, the carcass was turned over on 11.viii and it was found that although the top surface had become hard and rigid the lower surface had decayed away leaving black putrefying material attached to the interior and on the grass below and there were two fly larvae in this material (probably calliphorid from photographs and presumed to be of the *Lucilia* species). The carcass was replaced and again covered with the wire frame. On 1.ix (30 days after the first observation) the carcass was inspected again and Coleoptera larvae/pupae were observed in the material under it. An emergence trap made from a 2 litre plastic bottle (Irwin bottle) was placed over the amphibian on 1ix and a few small grey flies were observed in the trap on 13, 16 and 18.ix, but as no control traps had been placed nearby there is no evidence that they were associated with it. As larvae of *Lucilia* are known to migrate considerable distances before burrowing into the ground a trap directly over the carcass may have been unlikely to have given useful results. In this instance there was access to the interior of the frog at the neck region so these observations do not prove that in the case of an intact amphibian carcass fly larvae would be able to enter (or leave if the skin becomes desiccated before they complete development) but the observation that when in contact with a moist substrate the lower surface does not become hardened suggests that larvae should be able to enter. It is possible that the lining of the mouth and nostrils could remain soft enough for larval entry after death, these routes being used on living amphibians by the larvae of *Lucilia bufonivora* Monicz.

PALMER, C.J. (1) A small selection of European (non-British) Syrphidae from various localities: Chalets de Charamillon, le Tour, Haute-Savoie, France, altitude 1900m, 7.vii.2003: ♀ *Cheilosia marginata* Becker, ♂ *Epistrophe leiophthalma* (Schiner & Egger), ♂ *Orthonevra onytes* (Séguy) and ♀ *Xylota ignava* (Panzer), Col de Balme, Switzerland, altitude 2100m, 7.vii.2003: ♀ *Cheilosia impudens* Becker and ♂ *Cheilosia melanura* Becker, Les Bossons, Chamonix, Haute-Savoie, France, altitude 1100m, 5-6.vii.2003: ♀ *Cheilosia pedemontana* Rondani, ♂ *Eristalis jugorum* Egger and ♀ *Temnostoma vespiforme* (Linnaeus), Forêt Dom. Bois Huet, Neuve-Forge, Ardennes, France, 26.vi.2002: ♂ *Xylota meigeniana* Stackelberg, St Nizier-du-Moucherotte, Isère, France, altitude 850m, 8.ix.2004: ♀ *Eumerus grandis* Meigen and ♀ *Merodon cinereus* Fabricius.

(2) Copies of *Provisional checklist of the Hoverflies (Diptera: Syrphidae) of Hampshire, UK* (Palmer, C. J. 2003. *Hampshire Museum Papers* 28. Winchester: Hampshire County Council Museums & Archives Service).

UFFEN, R.W.J. *Rhagoletis meigenii* (Loew) (Tephritidae), found beneath foliage of *Berberis thunbergii* in a garden at Welwyn, Hertfordshire, 17.vii.2004; on return to the location on 13.ix.2004 final instar larvae were found within a seed in several of the berries (a more detailed account will be published elsewhere by the exhibitor).

WEBB, J. Diptera reared from fungi, the subject of the note by the exhibitor in the previous issue (2004. 11, 143). This demonstrated the successful rearing of fungus associated Diptera using Coir compost, which absorbs excess moisture that is sometimes detrimental to completion of larval development or pupation using other substrates. Coir blocks can be obtained in small quantities for this purpose from Curt Lamberth (curt@oxfordenvironment.co.uk) at a cost of about £1 each plus postage.

***Cryptochironomus defectus* (Kieffer, 1913) and *Paratanytarsus dimorphus* Reiss, 1965 (Diptera, Chironomidae) new to Britain –**

Pupal exuviae of *Cryptochironomus defectus* (Kieffer) have been collected at Loch Ardnave, Islay, Argyll & Bute, SCOTLAND, on 26 May and 13 July 2004 and Betton Pool, Shropshire, ENGLAND on 11 June 2002. Previously recorded for the British Isles from a number of sites in Northern Ireland (Langton, P.H. 2002. A preliminary survey of the non-biting midges (Diptera: Chironomidae) of Northern Ireland. *Bulletin of the Irish Biogeographical Society* 26, 14-28), these are the first specimens for Britain. *Paratanytarsus dimorphus* Reiss has also been recorded previously for Ireland (Murray, D. and Ashe P. 1983. An inventory of Irish Chironomidae (Diptera). *Memoirs of the American entomological Society* 34, 223-233) and now can be added for Britain: ENGLAND, North Yorkshire, Malham Tarn, 11 May 1998 and Semer Water, 13 August 1998 – **PETER H. LANGTON**, University Museum of Zoology, Downing Street, Cambridge (address for correspondence: 5, Kylebeg Avenue, Coleraine, Co. Derry, BT52 1JN) and **LES P. RUSE**, Environment Agency, Fobney Mead, Rose Kiln Lane, Reading, RG2 0SF

Corrections and changes to the Diptera Checklist (13) – Editor

It is intended to publish here any corrections to the text of the latest Diptera checklist (publication date was 13 November 1998; the final 'cut-off' date for included information was 17 June 1998) and to draw attention to any subsequent changes. All readers are therefore asked to inform me of any errors or changes and I would like to thank all those who have already brought these to my attention. Zoological Record for 2004 has been consulted and taken into account.

In the notes below where names of genera and species are given as in the Checklist, authorship is not stated here. Changes are listed under families; names new to the British Isles list are given in bold type. The notes below refer to 3 deletions or losses due to synonymy and addition of 10 species, resulting in a new total of **6810** species.

Corrections

- p. 55 In the checklist *Dasyhelea acuminata* was placed in error under subgenus *Dicryptoscena*. It should be assigned to the following subgenus additional to the list:
Subgenus **SEBESSIA** Remm, 1979

Changes

Limoniidae. The following changes to *Rhabdomastix* result from J. STARY (2003). Revision of European species of the genus *Rhabdomastix* (Diptera: Limoniidae). Part I: Introduction and subgenus *Lardia* subgen. n. *European Journal of Entomology* **100**, 587-608):

Sacandaga is synonymised with typical subgenus *Rhabdomastix*

R. inclinata is referred to subgenus **LARDIA** Stary, 2003

Mycetophilidae. Some changes in *Brevicornu* result from J. KJAERANDSEN (2005. A review of fungus gnats in the tribe Exechiini (Diptera, Mycetophilidae) from the J.W. Zetterstedt collection at the Museum of Zoology in Lund, Sweden. *Zootaxa* **856**, 1-35):

Brevicornu canescens (Zetterstedt, 1852 – *Mycetophila*) = *B. griseolum* of authors

Brevicornu griseolum (Zetterstedt, 1852) = *B. boreale*, a new synonymy

Sciaridae. The following species is added in the present issue:

Sciara militaris Nowicki, 1868

Ceratopogonidae. The following addition by J. BOORMAN and J. ISMAY (2003. A species of *Dasyhelea* (Dipt., Ceratopogonidae) new to Britain. *Entomologist's monthly Magazine* **139**, 161-162) was previously omitted:

Dasyhelea (Prokempia) biunguis Kieffer, 1925

Chironomidae. When citing addition of *Conchapelopia hittmairorum* to the British list in supplement (11) (11, 46) it was overlooked that the following species was also recorded as new to Britain in the same paper by B. MICHIELS and M. SPIES (2002. *Spixiana* 25, 251-272):

Conchapelopia triannulata (Goetghebuer, 1921 – *Tanypus*)

The following genus and species of tribe Chironomini are added in the present issue:

FLEURIA Kieffer, 1924

Fleuria lacustris Kieffer, 1924

A revision of types by O.A. SAETHER and L.C. FERRINGTON (2003. Nomenclature notes on some orthoclads (Diptera: Chironomidae). *Zootaxa* 322, 1-7) has resulted in the following changes, reducing by three the species of *Pseudosmittia* and *Smittia*:

Camptocladius stercorarius = *Pseudosmittia scotica*, a junior synonym

Pseudosmittia albipennis (transferred from *Smittia*) = *P. curtica*, a junior synonym

Pseudosmittia oxoniana = *P. recta*, a junior synonym

The following changes result from M. SPIES and O.A. SAETHER (2004. Notes and recommendations on taxonomy and nomenclature of Chironomidae (Diptera). *Zootaxa* 752, 1-90); contrary to this paper *Chironomus prasinus* Meigen, 1804 is the valid name for the species usually known by this name (Peter Langton *pers. comm.*):

Chironomus (*Chironomus*) *dorsalis*: authors, misident. remains nameless but becomes further problematic because the name *dorsalis* has now been applied to another species, as indicated below. Until this is clarified it is recommended that citation of both this name and of *Chironomus venustus*: authors, not Staeger (itself a junior primary homonym of *venustus* Wiedemann, 1818) should state the reference after which they are interpreted.

Chironomus (*Lobochironomus*) *dorsalis* Meigen 1818 = *Chironomus* (C.) *longipes* Staeger, 1839, new syn. and transferred to subgenus *Lobochironomus*

Cladopelma goetghebueri Spies & Sæther 2004 = *laterale* (Goetghebuer, 1934), preocc.

Dicrotendipes pulsus (Walker, 1856) = *objectans*, reversion due to usage by first reviser

The subgeneric nomenclature of *Glyptotendipes* sensu stricto (= *Phytotendipes* Goetghebuer, 1937) and of *Caulochironomus* Heyn, 1993 is restored to that of the checklist, while *Trichotendipes* Heyn, 1993 becomes **HEYNOTENDIPES** Spies & Sæther, 2004

Glyptotendipes (*Caulochironomus*) *foliicola* sensu Pinder 1978 (? = Kieffer, 1918)

Glyptotendipes (*Caulochironomus*) *imbecilis* [not *imbecillis*, spelling corrected] is restored to a valid species, as in the checklist, not a synonym of *viridis* but the identity of *viridis* is queried and requires clarification.

Glyptotendipes (*Glyptotendipes*) *cauliginellus* (Kieffer, 1913 – *Tendipes*) = *gripekoveni*, new syn.

Stempellinella edwardsi Spies & Sæther, 2004 = *minor* (Edwards, 1929), preocc.

Tanytarsus volgensis Miseiko, 1967 = *fimbriatus* Reiss & Fittkau, 1971, new syn.

Potthastia longimanus [not *longimana*, spelling corrected]

Eurycnemus crassipes (Meigen, 1810) [not Panzer, authorship corrected]

Metriocnemus cavicola Kieffer, 1921 = *martinii* Thienemann, 1921, nomen nudum

Nanocladius dichromus (Kieffer, 1906 – *Chironomus*) = *bicolor* (Zetterstedt, 1838), nomen nudum

Paralimnophyes longiseta (Thienemann, 1919 – *Camptocladius*) = *hydrophilus* (Goetghebuer, 1921), new syn.

Parametriocnemus stylatus (Spärck 1923) [not Kieffer, authorship corrected]

Thienemannimyia geijkesi (Goetghebuer 1934) [not *geijkesi*, spelling corrected]

The following species, previously known within the British Isles only from Ireland, are recorded as new to Britain in the present issue (change ++ to +):

Cryptochironomus defectus (Kieffer, 1913)

Paratanytarsus dimorphis Reiss, 1965

Empididae. The following species is added in the present issue:

Kowarzia madicola (Vaillant, 1964 – *Atalanta*)

Dolichopodidae. The following genus and species are added in the present issue:

DOLICHOPHORUS Lichtwardt, 1902

Dolichophorus kerteszi Lichtwardt, 1902

The following species is recognised as valid and not a synonym of *Chrysotus gramineus* (Fallén, 1823) in the present issue:

Chrysotus angulicornis Kowarz, 1875

Lauxaniidae. The following species is restored to the British list in the present issue:

Homoneura consobrina (Zetterstedt, 1847 – *Sapromyza*)

Muscidae. *Hydrotaea aenescens*, listed as an imported species in the checklist, is confirmed to be established in Britain in the present issue.

Changes to the Irish Diptera List (3) – Editor

This section will appear as necessary to keep up to date the initial update of the Irish list in Vol. 10, 135-146. Species will be listed under families as in the overall checklist update, but with references listed separately. The additions reported here bring the confirmed Irish list to 3151 species.

Tipulidae

Tipula (*Odonatisca*) *nodicornis* Meigen, 1818 (added in the present issue)

Cecidomyiidae

Giraudiella inclusa (Frauenfeld, 1862) (added in the present issue)

Simuliidae

Simulium tuberosum Lundström, 1911 (Tierney and Kelly-Quinn 2005)

Chironomidae

Bryophaenocladus simus (Edwards, 1929) (added in the present issue)

Pseudosmittia obtusa Strenzke, 1960 (added in the present issue)

Tanytarsus anderseni Fittkau & Reiss, 1971 (added in the present issue)

Dryomyzidae

Dryomyza decrepita Zetterstedt, 1838 (added in the present issue)

Sphaeroceridae

Norrbomia sordida (Zetterstedt, 1847) (added in the present issue)

References

- Tierney, Deirdre and Kelly-Quinn, Mary 2005. *Simulium tuberosum* Lundström, 1911 (Diptera: Simuliidae) - a blackfly species new to Ireland, with a note on its identification. *Entomologist's Gazette* **56**, 51-52.

***Melanostoma wollastoni* Wakeham-Dawson, Aguiar, Smit, McCullough & Wyatt, 2004 (Diptera, Syrphidae): further description of arista** – In the original description of *Melanostoma wollastoni* (Wakeham-Dawson, A., Aguiar, A.M.F., Smit, J.T., McCullough, A. and Wyatt, N. 2004, *Melanostoma wollastoni* sp. n. (Diptera, Syrphidae) from Madeira, Portugal. *Dipterists Digest (Second Series)* **10**, 89-94), the arista is described as 'black, thickened in basal third, with microscopic hairs much shorter than width of arista'. It is worth noting that in both male and female *M. wollastoni* specimens these microscopic hairs occur along the whole length of the arista, making the arista more similar in appearance to that of *M. scalare* (Fabricius, 1794) than to that of *M. mellinum* (Linnaeus, 1758) (see figure 464, p. 136 in van Veen, M.P. 2004. *Hoverflies of Northwest Europe*. KNNV Publishing, Utrecht). The microscopic hairs extend further along the arista of Madeiran *M. mellinum* than is illustrated for mainland European *M. mellinum* in van Veen (Fig. 465, *op. cit.*), but the arista is clearly more bare than in *M. wollastoni*. It is also worth noting that although the general habitus of *M. incompletum* Becker, 1908 (from the Canary Islands) may appear more similar to *M. scalare* than to *M. mellinum*, the arista of *M. incompletum* is significantly bare of microscopic hairs like that of *M. mellinum*. Examination of arista and hypandrium structure (see Wakeham-Dawson *et al. op. cit.*) indicates that *Melanostoma* taxa from north-west Europe and the North Atlantic Islands cannot simply be separated into *M. scalare*-like or *M. mellinum*-like groups – **ANDREW WAKEHAM-DAWSON**, Mill Laine Farm, Offham, Lewes, East Sussex, BN7 3QB, **ANTONIO M. FRANQUINHO AGUIAR**, Laboratório Agrícola da Madeira, Est. Eng. Abel Vieira, 9135-260, Camacha, Madeira, Portugal and **JOHN T. SMIT**, Wolvenstraat 62, 3512 CH Utrecht, The Netherlands

***Fleuria lacustris* Kieffer, 1924 (Diptera, Chironomidae): a genus of non-biting midge new to Britain**

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Summary

The discovery of the highly distinctive non-biting midge *Fleuria lacustris* Kieffer, 1924 is reported. Its identification, biology and European distribution are discussed and the male genitalia illustrated.

Introduction

Between May and August 2004 I ran several water traps and pitfall traps on the scrape at the Royal Society for the Protection of Birds Minsmere Reserve, Suffolk. These trapped very large samples of Diptera including many Chironomidae. No attempt was made to identify most of these but one caught my eye as being particularly strange. It lacked the conspicuous antennal plumes so characteristic of male Chironomidae and so, at first sight, looked more like a female. The genitalia were quite atypical so, I thought, it would be quite easy to identify.

From Colyer and Hammond (1968) I learned that, at the time of publication of that book, the male of only one British species was known to lack antennal plumes, *Clunio marinus* Haliday, 1855. However, this is a tiny marine species only about 1.5mm long, lacks a median groove or keel on the postnotum and has quite different genitalia. Pinder (1978) got me no further because my specimen failed at the first couplet having 9 antennal segments. A careful search through the illustrations provided by Pinder (1978) confirmed that my specimen was not included in these keys. I then sent the specimen to Patrick Roper who was readily able to identify it as *Fleuria lacustris* Kieffer, 1924, a species hitherto not recorded in Britain.

Identification

Fleuria lacustris is currently placed in the subfamily Chironominae, although as a monotypic genus, its systematic position is not entirely clear. Within this family there are two other Holarctic genera that have 9-segmented antennae, *Acalcarella* and *Thienemanniola* (Cranston *et al.* 1989).

Males of *Fleuria lacustris* are easily distinguished from all other British species by the combination of fairly large size, wing length 3.5mm, body length (excluding antennae) 6mm; entirely black coloration; 9-segmented antennae lacking long plumes, hairs conspicuously shorter than apical segment (Fig. 1). The male genitalia are diagnostic, with a trifid anal point and bilobed gonostylus (Figs 2 and 3). It can also be identified using keys to the Holarctic genera (Cranston *et al.* 1989) and it will be included in the generic key in a forthcoming Freshwater Biological Association publication providing updated keys to the pupal exuviae of Chironomidae (Ruse and Wilson in preparation).



Figs 1-3. *Fleuria lacustris* (Kieffer), male: 1, antenna; 2, genitalia, dorsal view; 3, genitalia, ventral view.

Biology

In mainland Europe the immature stages of *Fleuria lacustris* are found in soft sediments of shallow, eutrophic ponds, including fish ponds and pools of slight salinity. Adults do not form typical aerial swarms but copulation, accompanied by male hypopygial rotation, takes place on the substrate (Cranston *et al.* 1989). It seems to be tolerant of heavily polluted sites, for example near Kassel (North-Hesse, Germany) it has been found in a storage pond for runoff from a motorway. The pond had a pH of 8.6, a conductivity of 171 mS/cm and was polluted with NH_4 (0.2 mg/l), NO_3 (<2mg/l), PO_4 (<0.01), Cl (pro mille 0.056), hydrocarbons (water 0.7 mg/l; mud 397 mg/kg), Pb (mud 17 mg/kg), Cd (mud 3 mg/kg), Cu (mud 60 mg/kg), Ni (mud 80 mg/kg) and Zn (1480 mg/kg) (A. Dettinger-Klemm *pers comm.*).

European Distribution

At some localities in central and eastern Europe *Fleuria lacustris* has been reported to occur in numbers (Cranston *et al.* 1989) and it seems to be most frequent in central and eastern Europe. In the west it extends to the Netherlands but is, however, quite rare there and restricted to lakes and rivers in the western part of the country (D. Templeman *pers comm.*); it is also recorded from the river Dommel on the Netherlands/Belgium border. So far it is known from the Czech Republic, Denmark, Germany, Hungary, Italy, Poland, Russia, Slovakia and the Netherlands and outside Europe from the east Palaearctic and the Near East (Sæther and Spies 2004, www.faunaeur.org/).

Since its discovery in Britain no further specimens have come to light. However, it has long been expected to occur here and may prove to be more widespread. It is, however, rather surprising that it has been hitherto overlooked and, given the location of this record close to the east coast, it may well be a recent arrival. The single male specimen, retained in my private collection, has the following data:

BRITAIN, Suffolk, Minsmere (The Scrape) TM 4766 13-27 July 2004 pitfall 1♂.

Acknowledgements

I am particularly grateful to Patrick Roper for naming the specimen, commenting on this paper and passing much of the above information on to me. I am also indebted to all of those who kindly responded to requests for information including Andreas Dettinger-Klemm, Les Ruse, Martin Spies and David Templeman. I would also like to thank the Royal Society for the Protection of Birds and Mark Telfer for commissioning the work at Minsmere.

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Two records of *Berkshiria hungarica* (Kertész, 1921) (Diptera, Stratiomyidae) from western Norway

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Summary

The second and third records for Norway of *Berkshiria hungarica* (Kertész, 1921) are presented. The wider distribution of this rare species is discussed.

A female of *Berkshiria hungarica* (Kertész, 1921) was collected in a collision trap between 26 June and 5 July 2003 at Yttri, Djupedalane, the Fortun valley in Luster community, Sogn and Fjordane province, EIS 60, UTM 32 VMP 296212. This area is in the inner part of the Sognefjord, Western Norway. The trap was placed in a large aspen, *Populus tremula*, situated in an old forest of Scots pine, *Pinus silvestris*, at 600 metres above sea level.

Another female was collected between 21 May and 26 June 2004 in a Malaise trap situated at Ruskesethaugen near Drægne in Luster, Sogn and Fjordane Province. The trap was placed in an old forest of Scots pine with several large aspens at 480 metres above sea level on a south east facing hillside. The Malaise trap was opened on 24 April and closed on 6 October 2004, but no more specimens were collected. Larvae of *B. hungarica* have, according to Rozkošný (1983), been found under the bark of *Populus tremula* logs.

Berkshiria hungarica has earlier only once been recorded from Norway. A female was netted by Thor Jan Olsen at Rådal, Sarpsborg, in the province of Østfold, situated in SE Norway (Greve and Jonassen 1993). According to the map provided by Rozkošný (1983), this species has been recorded in Fennoscandia from a few localities in Sweden and Finland in addition to the record from Østfold, and *B. hungarica* must still be considered a rare species in Europe. It is also known from Siberia. The two new records from Sogn and Fjordane province are the westernmost in Europe.

Acknowledgements

I am indebted to Johannes Anonby, Leikanger, who initiated the collections, and to Tore Yttri, Luster, who ran the traps.

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A review of the known records of *Phylidorea heterogyna* (Bergroth, 1913) (Diptera, Limoniidae) from Great Britain

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Summary

The RDB1 crane fly *Phylidorea heterogyna* (Bergroth, 1913) is known to have only a very few records from the United Kingdom. All known records are compiled, and photographs of the insect are displayed. A summary of site descriptions allow the conclusion that NVC M18 habitat on lowland raised mire or blanket bog is the preferred habitat for the species and that a widespread distribution within England and Scotland suggest that it may occur on more sites within the UK in similar habitats during late summer and early autumn.

Introduction

In Europe the crane fly *Phylidorea heterogyna* (Bergroth), (formerly *Limnophila heterogyna*) is known to occur in Belgium, Great Britain, the Czech Republic, France, Germany, Scandinavia, Switzerland, Latvia, Lithuania, and north west Russia (www.faunaeur.org). In Britain the crane fly was listed as RDB1 by Shirt (1987) and it appears that little is known about the autecology of the fly in Britain (Falk 1991) or Europe (Herbert Reusch *pers. comm.*). Within Britain the taxonomy was first described by Edwards (1938). This review seeks to compile all known records from archive and published material in Britain, as well as include more recent information.

Known British records

Phylidorea heterogyna was first discovered in Great Britain by the Shropshire dipterist Cyril Henry Wallace Pugh (1890-1973) on 22 August 1936, upon what is now Fenn's, Whixall & Bettisfield Mosses NNR, a peat bog that straddles the England / Wales border. Pugh was a solicitor in the border town of Oswestry in Shropshire and collected Diptera widely within the Marches during this period but published little. Due to the passage of time there is some doubt as to exactly where on the site the specimens were collected (Falk 1992), but the canal lagg has been suggested. Further to this, one of the obituaries of Pugh (Brindle 1974) stated that Pugh had shown Alan Brindle the exact spot where the crane fly was discovered. Unfortunately a recent examination by the author of Brindle's field note books in the Manchester Museum archive failed to locate this information. Pugh's specimens of *P. heterogyna* are to be found in the collections of the Natural History Museum, London and the Manchester Museum (Fig.1), where the author came across them whilst examining specimens of other crane fly species.

No further records of this species were forthcoming until 1994 and 1995 when surveys were carried out on blanket bog habitat on Scottish Flows in Caithness. Pitfall traps located at Loch Nan Clar (NC774375) and Badenoch (NC793329) caught several specimens

between 11 August and 5 October over the two late summer to autumn periods. The habitat was described as "typical NVC M18" (Rodwell 1998), "but with a greater frequency of pools than the other sites surveyed" (Coulson and Downie 2000).

The next record of *P. heterogyna* came from a Liverpool Museum survey of Drumburgh Moss NNR (NY255583) in Cumbria (V.C. 70) carried out for the Cumbria Wildlife Trust. Individuals were collected in a water trap placed on raised bog habitat between 23 August and 4 September 2001 and identified by Tom Mawdsley (checked by Alan Stubbs). A specimen collected from Drumburgh Moss was photographed by the author next to a 1p coin to show the size of the crane fly (Fig.2).

The fourth and most recent record of *P. heterogyna* (Fig.3) was collected by the author on 3 September 2004 at Wybunbury Moss NNR (SJ698502) in Cheshire (V.C. 58). Several individuals of both sexes were swept from an area of the bog where vegetation was low-growing due to the remnants of an old, in-filled ditch, and a path, presumably kept low by occasional usage associated with nearby hydrological monitoring equipment. There was very little open water but plenty of waterlogged *Sphagnum* mosses and bare peat. Other aspects of M18 habitat were present including cotton sedges (*Eriophorum* species).

Also during 2004 the author spent several hours over three visits in late August – early September searching for the crane fly without success on Fenn's, Whixall & Bettisfield Mosses NNR. The site is large (approximately 1000ha) and has changed considerably since Pugh's day due to commercial peat-cutting but is now being restored by English Nature and the Countryside Council for Wales. Several areas, particularly old hand-cuttings are known to offer habitat for other bog crane flies (Boardman 2004) and are likely to have acted as "reservoirs" for some bog species during the period of the most damaging commercial exploitation. It is therefore possible that further targeted searches may be rewarding.

Discussion

A comparison of the four sites where records of *P. heterogyna* have been made appear to show a preference for NVC M18 habitat upon lowland raised bog or blanket bog. All of the English sites have had some form of human disturbance: however all are now protected as National Nature Reserves and are in the process of restoration by English Nature.

Conclusion

Further searches for this small crane fly through the period from the end of August to early September around the southern range, and through to October around the northern range of the fly, on other bog sites exhibiting NVC M18 habitat is likely to increase the records of this species.

Acknowledgements

I would like to thank Dmitri Logunov for access to the Manchester Museum collections and library, David Notton for access to the Natural History Museum collections, Alan Stubbs for supplying references to crane fly literature, Berit Pedersen of the Royal Entomological Society library for access to the obituaries of C.H.W. Pugh. I would also like to thank Joan Daniels and Tim Coleshaw (both of English Nature) for site access permissions and Tom Mawdsley for introducing me to the Liverpool Museum specimens of *P. heterogyna*.

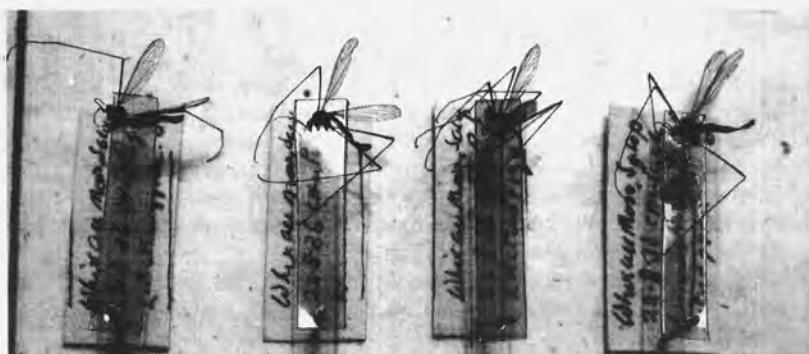


Fig. 1 - C.H.W. Pugh's 1936 specimens from Fenn's, Whixall & Bettisfield Mosses NNR housed in the Manchester Museum.



Fig. 2 – Drumburgh Moss specimen of *P. heterogyna* compared to a penny piece.



Fig. 3 – Wybunbury Moss NNR specimen of *P. heterogyna* (2004) stored in alcohol.

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Scenopinus niger (De Geer) (Diptera, Scenopinidae) reared from a bracket fungus

— While surveying the saproxylic invertebrates of Parham Park in West Sussex for English Nature on 22.vii.2003, a piece of bracket fungus of *Ganoderma adspersum* was retained, in order to rear the larvae within to the adult stage to facilitate their identification. A single adult of *Scenopinus niger* (De Geer) later emerged.

The bracket fungus was growing from an ancient open-grown oak tree (*Quercus robur*) immediately to the south of the deer park (TQ0613), and also produced a number of adults of *Dorcatoma dresdensis* (Anobiidae) beetles. Little is known of this rare fly (Stubbs, A.E. and Drake, M. 2001 *British Soldierflies and their allies*. British Entomological & Natural History Society, Reading) and most previous records have been from decaying wood rather than the fruiting body of the fungus carrying out the decay. Nonetheless, an association with anobiid beetles has been suggested and the new record is no exception in this respect.

This record appears to represent the second for West Sussex. Peter Hodge (*pers. comm.*) has a specimen that Roger D. Dumbrell collected in Arundel Park, 18.vi.1976, and reports that the species is not listed in the Sussex Victoria County History list – **KEITH N.A. ALEXANDER**, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ, keith.alexander@waitose.com

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