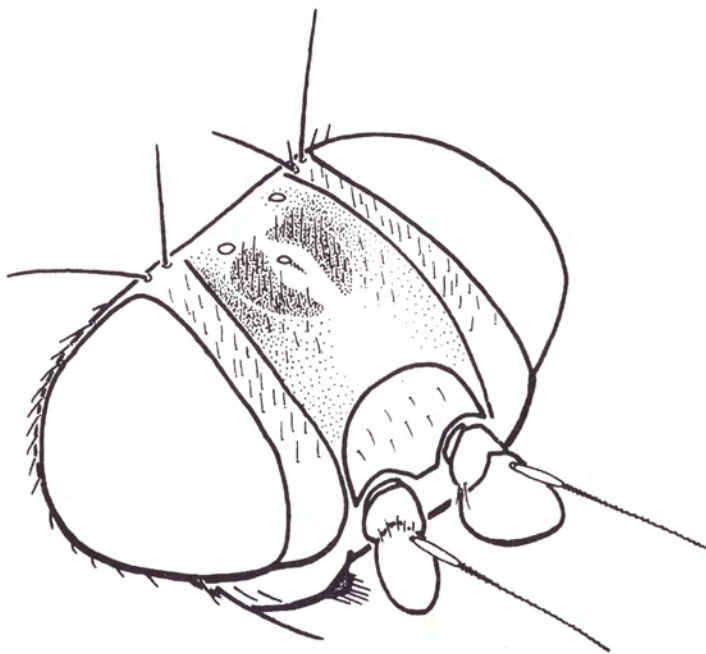
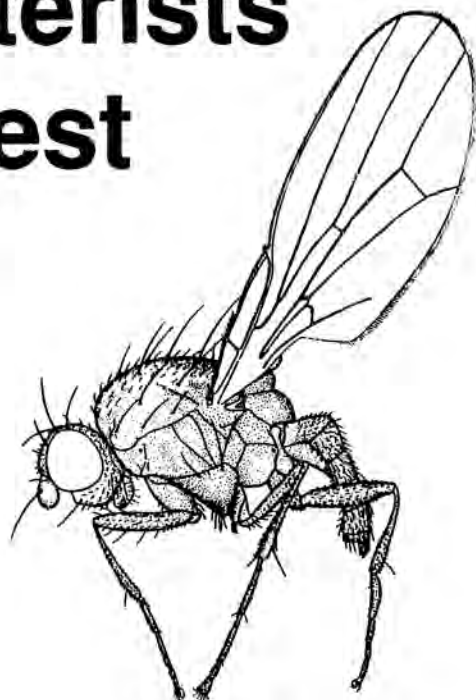


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Dipterists Digest is the journal of the **Dipterists Forum**. It is intended for amateur, semi-professional and professional field dipterists with interests in British and NW European flies. All notes and papers submitted to **Dipterists Digest** are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

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

Articles may be of any length up to 3,000 words and must not have been accepted for publication elsewhere. Items exceeding this length may be serialised or printed in full, depending on competition for space. Articles should be written in clear and concise English. They should preferably be typed double spaced on one side of A4 paper and **wherever possible also supplied on 3.5" computer disc**. Material submitted on disc should be in ASCII, Word or Word Perfect formats and accompanied by hard copy.

Style and format should follow articles published in the most recent issue. References to journals should give the title of the journal in full. Scientific names should be underlined or preferably italicised. **If an article is supplied on disc, scientific names should always be italicised.** Authors of scientific names should be given in full (with parentheses if applicable) and nomenclature should follow the most recent check list, unless reflecting subsequent changes. Tables should be on separate sheets. Figures should be drawn in clear black ink, about twice their printed size and lettered clearly. Descriptions of new species should include a statement of the museum or institution in which type material is being deposited.

Authors will be provided with twenty reprints of papers of two or more pages in length.

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Rearing *Xylophagus ater* Meigen (Diptera, Xylophagidae) larvae under observable conditions

DAVID K. CLEMENTS

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The paper by Clements and Alexander (1987) described the then-known distribution and biology of the species referred to by British authors as *Xylophagus ater* Meigen. This species was called *X. compeditus* Wiedemann by recent European authors and in the contribution to the *Palaeartic Catalogue* by Krivosheina and Mamaev¹ (1988), who appear to have incorrectly restricted the name *ater* Meigen to a northern and western Palaeartic species not recorded in Britain. Our 1987 paper made reference to observations of captive larvae reared under artificial conditions and promised further details as to how these were obtained.

The larvae of *X. ater* are saproxylic, developing in the subcortical space - the narrow zone between the still-adhering bark and the sapwood of trees. Many invertebrates share this confined niche and exploit it in differing ways, including the larvae of a wide variety of Diptera and Coleoptera. The eggs of *X. ater* are probably inserted in small crevices in the bark of moribund or recently-dead trees (usually broadleaves) and the hatching larvae burrow down into the subcortical space where they develop to maturity (Downes 1953). Unlike the larvae of some other Diptera (including some non-British members of the genus *Xylophagus*, see Krivosheina and Mamayev 1972) and many species of Coleoptera, the larva of *X. ater* does not burrow into the sapwood except on rare occasions where this is very soft-rotted, nor does it excavate tunnels and chambers. Instead, it apparently roams the confines of the subcortical space where it has been variously described as leading a predatory, saproxylic or detritivore existence. The distinctive larva of *X. ater* is admirably suited to movement in the subcortical space, being dorsoventrally flattened with a heavily-sclerotized, tapering, probe-like head.

In order to elicit anything resembling normal behaviour in captivity it is necessary to attempt to recreate the conditions of the subcortical niche. I am not aware of any previously published accounts of how this might be achieved and could find none listed in texts such as Wong (1972). However, the solution in the case of late instar *X. ater* larvae was remarkable in its simplicity and success, so seemed worth relating more widely.

Rearing apparatus

Rearing equipment was constructed as follows: a piece of chipboard approximately 30 x 20cm in size was overlaid by a similarly-sized piece of cork sheet. Cork floor-tile is suitable, provided it is unvarnished and has not been treated with fungicides or insecticides. However, 'raw' sheet obtained from an entomological supplier (used for lining entomological drawers) is better. The upper surface should be fairly smooth and not too coarsely-grained and pitted. Onto this surface was scattered a thin covering of fine deadwood detritus of the kind found beneath the bark of dead trees; this can easily be gathered in the field and typically comprises small particles of

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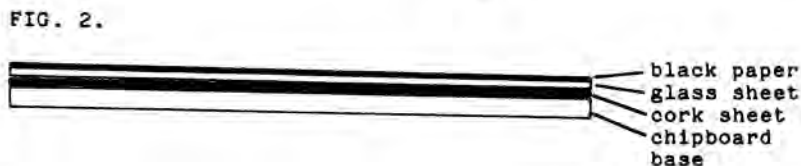
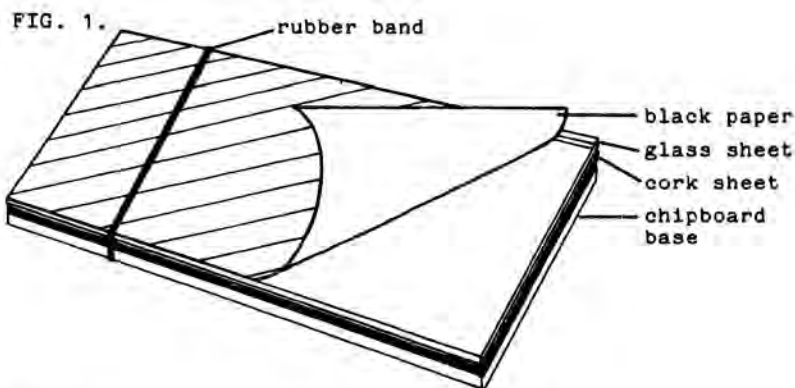
The published spellings of this name vary widely, as can be seen from the three papers cited in this article. They do, however, all refer to the same person.

decaying wood, insect remains and droppings, fragments of moss and fungi, etc. Large particles should be avoided, the ideal matrix having a consistency similar to sawdust and only a thin scattering is required.

A piece of thin window glass (about 2mm thick), cut to size, was laid over this and a sheet of black cartridge paper laid over the whole. Rubber bands were used to hold the resulting 'sandwich' together, as shown in Figs 1-2. The whole apparatus was then placed on a thick layer of old newspaper and moss in the bottom of a suitably-sized plant propagator, the interior of which was frequently and copiously humidified with water from a hand mist-sprayer obtained from a garden supplier.

X. ater larvae were introduced into the space between the cork and the glass. The edges were sometimes sealed with insulation tape, leaving a few gaps so that prey items could also be introduced periodically, although in practice the larvae were found rarely to attempt to leave the apparatus if the edges were left unsealed.

The technique is not far removed from that described by authors such as Beanlands (1966) and Mizuno (1963) for the observable rearing of bark beetles of the family Scolytidae, although these involve apparatus designed for larvae which actually burrow into the sapwood and are correspondingly more complex.



Figs 1-2. Construction of the apparatus for rearing *Xylophagus* larvae, 1, schematic view; 2, side view showing layers. Dimensions approximately 30 x 20cm.

Using the method described above, a number of late instar *X. ater* larvae were successfully observed during the period 1986-1987, reacting to prey items, feeding, undergoing moults, pupating and ultimately emerging as adults, simply by peeling back the cartridge paper periodically to watch. This was best done under low light conditions so as to minimise potential disturbance to the larvae by exposure to bright light, although in practice the larvae did not appear to react noticeably to such exposure.

Some observations of behaviour

Many authors have reported or suggested that the larva of *X. ater* is predatory on the larvae of other insects, notably those of cardinal beetles, *Pyrochroa* spp. (Coleoptera, Pyrochroidae), but much of the published evidence is more suggestive of saprophagy. Verrall (1909) summarised previous observations which ranged from active predation to the scavenging of dead beetle and fly larvae and even to subsistence on detritus (Damianitsch 1868); on balance they seemed to favour saprophagy as the most likely habit. Subsequent authors have tended to favour one or other of these options whilst generally failing to provide concrete evidence one way or the other.

Larvae are certainly found in the field feeding on the dead bodies of other larvae such as those of *Pyrochroa*, a situation which Keith Alexander and myself have seen on several occasions. Often the prey larva is in an advanced state of decay. One *ater* larva was found entirely enclosed within the body of a long-dead *Pyrochroa* larva, apparently feeding, recalling Downes (1953) reported finding of an *ater* larva feeding on a small staphylinid larva, which had been 'attacked' and pierced in the middle of the abdomen. In this case also, the *ater* larva eventually entered the body of its prey entirely in order to consume the body contents, but it is not clear whether or not the prey had actually been killed by the *ater* larva.

On the other hand, Lundbeck (1907) reported the larva as being "carnivorous and rapacious", preying on the larvae of various Coleoptera, as well as on those of Diptera such as tipulids and upon each other. Krivosheina and Mamajev (1966) stated that the larvae of "*ater*" (in their sense), *compeditus* (the *ater* of British authors) and *cinctus* De Geer are all predaceous on a range of beetle and fly larvae and are often cannibalistic. Graham Rotheray (*in litt.*, 1988) reported observing starved larvae of *ater* readily killing and eating the larvae of *Sphegina chumipes* (Fallén) (Diptera: Syrphidae) whilst in captivity, as well as the subsequent cannibalism of one of the smaller *ater* larvae. The method of attack appeared to be one of coming alongside the prey and scraping a hole in an approximately anteroventral position.

From observations gained using the rearing device, the predation of *Pyrochroa* larvae by a medium-sized *ater* larva can be confirmed. One *ater* larva was seen to approach a much larger *Pyrochroa* larva from one side and appeared to administer one or more bites to the soft lateral cuticle of the middle-body, to which the *Pyrochroa* reacted with understandable lateral writhing and gnashing of the large mandibles. The *Pyrochroa* subsequently expired over a period of about 24-36 hours, possibly as a result of fluid loss, moving a distance of some centimetres during this period. The *ater* larva remained nearby and moved in to commence feeding as the *Pyrochroa* finally succumbed.

Predation by *X. ater* does therefore clearly occur, but whether this or saprophagy is the normal and favoured habit is not presently known. Probably the species utilises both habits, depending on the individual circumstances encountered during the lifespan of the larva.

The larvae of *X. ater* mature over a period of one or more years (the exact period is not known, but the latter seems more likely), overwintering one or more times. Observations of one final instar larva revealed no indications of feeding of any kind over a period of nearly five months prior to pupation, despite the provision of a range of living and dead prey items. Ingestion of

deadwood detritus could not be ruled out during this period, although the larva was largely dormant during the winter months. The larva went on to successfully pupate and hatched as a female in May 1986.

By placing the propagator containing the apparatus in an unheated conservatory which offered protection from frost, several mature *ater* larvae were successfully overwintered in a dormant state. These went on to pupate, typically in April, near the edge of the apparatus. The last larval skin was cast off entirely. In some cases the pupae were removed to gelatin capsules, where they hatched after a period of about 10-11 days. However, one pupa (the one described above) was left *in situ* in the rearing apparatus and hatched successfully, the pupal exuvium being left projecting from the edge of the glass and cork "sandwich" in much the same way as they are sometimes found projecting from bark crevices in the field during the spring emergence period.

Many aspects of *Xylophagus* biology remain to be elucidated both for *ater* and for *cinctus*, which in Britain is a northern pinewood species, as well as for the enigmatic *X. junki* Szilady (still known only from a single female taken in Scotland in 1913 – see Collin 1962) and a possible fourth species found in the larval stage in Gloucestershire in 1989 (Clements unpublished). The number of larval instars is unknown, as is the length of the larval development period; the precise nature of the normal feeding habits of the larvae remains unclear. Observations are steadily accumulating, but there remains much scope for novel observation both in the field and using artificial methods such as that described in this paper.

Acknowledgements

My thanks go to Keith Alexander of the National Trust, Cirencester and Graham Rotheray of the National Museums of Scotland, Edinburgh, for past observations and comments.

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Two new localities for *Dorycera graminum* (Fabricius) (Diptera, Ulidiidae)

- The poor conservation status of this species has recently been highlighted by Stubbs (1997. *British Wildlife* **8**, 191-192). It was given Red Data Book Category 3 (Rare) status by Falk (1991. A review of the scarce and threatened flies of Great Britain, *Research and survey in nature conservation* No. **39**, JNCC) but Stubbs (*loc. cit.*) believed that it has declined to the point of surviving in very few localities. It has accordingly been placed on the Biodiversity "Long List" (1996. *Biodiversity: The UK Steering Group Report*, Vol. **2**, Action Plans. HMSO) on the basis of a 50-100% decline in numbers/range in Britain in the last 25 years.

I have found this species on two occasions in recent years and both sites were of rank vegetation with concentrations of umbellifers. The first site is Croome Park in Worcestershire, where one was swept along the sheltered laneside by the lakeside garden, SO 879445, 12 vi 1995. The lane was lined by flowering hogweed *Heracleum sphondylium* and other rare and interesting insects were also congregating there. The other site is Watermeads at Morden Hall Park in the London Borough of Merton (V C 17, Surrey), TQ 274677, where one was swept in a sheltered area of tall herb marsh along the river Wandle, specifically the *Epilobium hirsutum* sub-community of *Phragmites australis*-*Urtica dioica* fen (Rodwell *et. al.* 1995. *British Plant Communities* **4**, *Aquatic communities, swamps and tall-herb fens*. Cambridge University Press), a community characteristic of poorly-drained eutrophic places. The umbellifer where the *Dorycera* was swept was, in this case, hemlock water-dropwort *Oenanthe crocata*. Interestingly, the Croome Park locality is close to areas of eutrophic fen type habitats which may suggest an association with such conditions.

Laurence Clemons (1994. *Entomologist's Record and Journal of Variation* **106**, 138) commented that at one Kent site "the fly seemed particularly concentrated where hogweed was growing" and at another "mainly from or around alexanders *Smyrniolum olusatrum* L." Clemons (*loc. cit.*) raised a warning, however, that the association with umbellifers may only be a chemotactic attraction rather than evidence of phytophagous larvae.

Both of the above sites are owned and managed by the National Trust. A restoration plan is currently being developed at Croome, to return the current arable farmland to parkland with permanent pasture. The Morden Hall site is being restored to marshy grassland after a period as poplar plantation - blown down in the great storm of 1987. Unfortunately, the habitat requirements of the fly are too poorly understood to know whether the restoration plans will favour or disfavour the species.

I am grateful to Alan Stubbs for drawing my attention to the Croome Park specimen, which had been languishing amongst unidentified Diptera specimens in my collection - **KEITH ALEXANDER**, National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1RQ

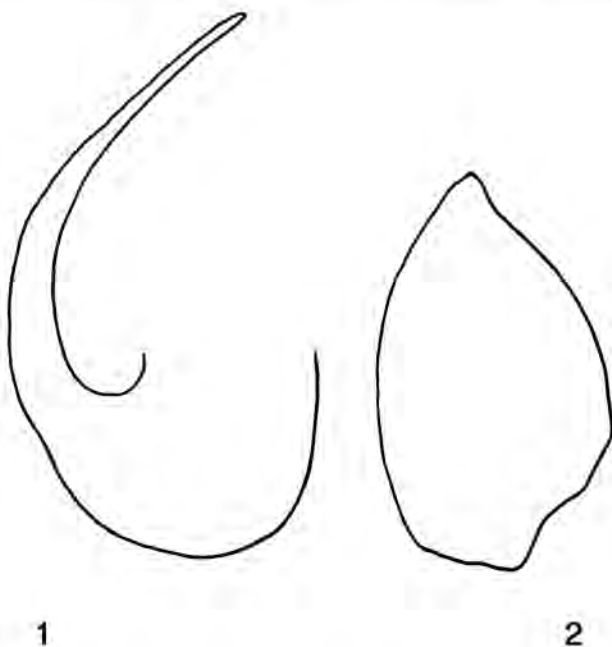
***Hilara pseudosartrix* Strobl, 1892 (Diptera, Empididae)
new to Britain**

ADRIAN R. PLANT

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On 14 June 1996, I collected four males and five females of an unfamiliar *Hilara* species from a boggy birch (*Betula*) clump bordering a stream and coniferous plantation overlooking the Kyle of Tongue at Woodend, Tongue, Sutherland (NC 5959, V.C. 108). Their identity could not be determined by reference to literature on the British fauna so a male and female were sent to Milan Chvála who kindly identified them as *Hilara pseudosartrix* Strobl, a species hitherto unknown from Britain.

Hilara pseudosartrix was an obscure species until Chvála (1997) examined the Strobl collection at Admont and established *H. subcalinota* Straka, 1976 as a synonym. It is about 3 mm long with bi- to quadriserial acrostichal bristles, a rather uniform light grey dusting on the mesonotum with somewhat darker lines between the rows of acrostichals and dorsocentrals.



Figs 1-2. *Hilara pseudosartrix* Strobl, male genitalia. 1, ventral lamella; 2, lateral lamella.

The male has a very swollen fore basitarsus, brownish-yellow palpi, a striking (when viewed from above) and highly characteristic dull velvety brown patch, extending from the postalar calli to the scutellum on the posterolateral margin of the mesonotum. The structure of the male genitalia (Figs 1-2) is apparent without dissection, with narrow lateral lamellae and a slender ventral lamella recalling *H. galactoptera* Strobl.

In running fluid-preserved specimens of *H. pseudosaratrix* through the key to *Hilara* in Collin (1961) confusion first arises at couplet 82 as the darker mesonotal lines are indistinct and if missed, lead to *H. medeterifrons* Collin. If they are noticed, it will not be possible to progress beyond couplet 92 without "forcing" the characters and in any case, *H. pseudosaratrix* will be easily recognised by the combination of characters given above.

H. pseudosaratrix is widely distributed in temperate continental Europe, ranging from the Netherlands eastwards to central Russia and south to Switzerland, Austria and Hungary. It has an apparent preference for peat bogs, higher altitudes or colder biotopes and peak emergence is in May. Its occurrence somewhat later in the year in boggy woodland in the north of Scotland is perhaps not altogether surprising, even though it is unknown from Scandinavia and a logical demographic extrapolation would suggest a more southerly occurrence in Britain as likely.

The continental *Hilara* fauna is much richer than in Britain and has a rather different species composition (Chvála 1966). The revision of British *Hilara* by Collin (1961) was very thorough and although more species probably await discovery, it is interesting that few species have been added as British since then. *H. pseudosaratrix* is probably a genuinely rare species in Britain but further work is needed to establish its true status.

Acknowledgements

I would like to thank Milan Chvála for examining and commenting on the material.

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Chvála, M. 1997. Eleven new synonymies in European species of *Hilara* (Diptera, Empididae). *Acta Universitatis Carolinae Biologica* **41**, 293-322.

A Change of Vice-county - In my paper on Peter Crow's Merioneth Syrphid records (Morgan, M.J. 1994. *Dipterists Digest (Second Series)* **1**, 51-55), I included a record of *Xylota segnis* from Harlech, Merioneth, plus two specimens without data, labelled only "Gallt y Pandy, 1969", now in the Liverpool Museum collection. Despite pouring over one inch maps of North Wales I was unable to locate Gallt y Pandy, but thought that it might be in Merioneth, where the majority of his records were made.

However, I recently received a letter from Bob George who was able to give me a grid reference. His gazetteer was obviously better than my Ordnance Survey one! The locality at SH 8053 proves to be near Swallow Falls outside Betws-y-Coed in V.C. 49, Caernarvonshire, not Merioneth as I had previously suggested - **M. JOAN MORGAN**, School of Biological Sciences, University of Wales Bangor, Bangor, Gwynedd

***Sphegina sibirica* Stackelberg (Diptera, Syrphidae) in the Central Highlands of Scotland**

IVAN PERRY

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During the Dipterists Forum Field Meeting at Abergavenny in June 1997, along with others I took the opportunity to visit a site in the Mynydd Du Forest, Brecon, an area predominantly of conifer plantations, with some remnant deciduous woodland, to obtain specimens of *Sphegina sibirica* Stackelberg, believing that it would be some time before I had the chance to see it again. I was therefore somewhat surprised, whilst visiting Scotland shortly after, to find the species at four separate sites, all of which were somewhat different from the Welsh locality.

It first appeared at Camghouran Birch Wood, Perthshire on 22 June when I found a single male. The site was a small stream lined with ferns, in fairly open birch (*Betula*) woodland on the north facing slope by the southern shore of Loch Rannoch. A few days later on 26 June at Balnaguard Glen, Perthshire, I swept another male. The habitat was again a stream through birch woodland on a hillside, with no conifers in the vicinity.

On 29 June I moved up to the Spey Valley, Inverness-shire and on that first day found *S. sibirica* at two further sites. The first locality was one that is often visited by dipterists, being the damp deciduous woodland on the eastern bank of the River Spey, where it is joined by the River Druie. Here I swept a further male. Later in the day, whilst collecting in birch woodland at Glen More on the eastern shore of Loch Morlich, several individuals were seen in a small open area visiting white umbellifers (probably pignut *Conopodium majus* as at the Welsh locality) and three males and one female were collected. Unfortunately, the weather deteriorated rapidly on the next day and collecting became very difficult with no further *S. sibirica* seen during the rest of my stay.

All the indications point to *S. sibirica* being a recent addition to our fauna, with specimens now turning up in such well worked districts as the Spey Valley. An association with *Picea* is indicated (Speight 1988) but this is not borne out by the Scottish records so far. The first British record from north-west Scotland (Stubbs 1994) was from a small gully lined with ash (*Fraxinus*) trees and away from conifers. It seems likely that in Britain at least, *S. sibirica* is able to exploit a variety of damp woodland habitats, of both deciduous and coniferous trees and looks likely to become widespread in northern and western parts of the country. It will be interesting to observe its progress and see how far it can penetrate into the drier eastern counties where *Sphegina* species are generally much less in evidence.

A useful character for distinguishing *S. sibirica*, at least from the other British species, is that it has the last two tarsal segments of the fore and mid legs darkened and quite distinctly so, whereas they are pale in all the other species that I have examined.

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sub-genus of hoverfly (Diptera: Syrphidae) in Britain. *Dipterists Digest (Second Series)* 1, 23-25.

REVIEW

The Afrotropical Nemotelinae (Diptera, Stratiomyidae). 1997. Franco Mason. Monografie XXIV. Museo Regionale di Scienze Naturali, Torino. 309 pp. Lira 100,000 + postage. ISBN 88-86041-20-9.

It was with great delight that I received this book for review. Franco Mason has produced a magnificent piece of work, lucidly written in English and abundantly adorned with 76 clear plates (three in colour), 19 maps and 12 figures. His easy-to-read style breaks the barrier of tedium so frequently encountered in taxonomic works and, on the whole, the text knits together well.

The Afrotropical Nemotelinae (Diptera, Stratiomyidae) is a taxonomic account of the adults of the Sub-Saharan African members of this subfamily (larvae are wholly unknown). These species are distributed in southern and south-eastern Africa, with a single central African representative. There are 38 species arranged in six genera. Fifteen new species are described, whose names read like a directory of African Dipterists and Museum staff – justified gratitude to a great team of dedicated workers in Dipterology. One genus has two subgenera (described for the first time) and there is an additional anomalous species known from South America. Franco revises the classification to take account of the new information contained in this book.

In his Materials and Methods, Franco himself makes the point that much of the description of a species is included in the illustration. I think it is this healthy attitude towards both description and illustration, which makes his book easy to read and keeps the text sufficiently brief to make it readable. I came across no instance where his brevity has compromised the description, since the key characters, diagnoses and plates are well chosen.

Among the figures, the ecological dendrogram is particularly innovative. I have not seen this technique used in quite this manner before and find it explicit. For that matter, neither have I seen the “wind-rose” method (Figure 1) used for comparison of morphology before. Both are good ideas. Figure 11a is not easily compared with the companion figures (10a & b and 11b), but on the whole the other figures are useful and relate well to the text. The habitus figures (2-7) give a quick visual appreciation of the general form of each genus. The detailed tables may not be useful to all readers, but these relate to the figures and text and form an integral part of the work.

Another particularly strong point in Franco's work is his dedication to accumulating ecological data. It is justified that he acknowledges the sources of these data, since they must have taken quite some time to compile. Species are related to vegetation zones, with a summary of their phenology. He also briefly introduces some biogeographical ideas, but awaits further revisions of the South American fauna, before the ideas can be more firmly expressed.

First and foremost, this book is suitable for workers in Afrotropical Diptera, in Stratiomyidae, in Diptera in general and in African Natural History. Taxonomy being the grass-roots research that it is, the keys, maps and illustrations will have a wider appeal, catching the interest of ecologists and conservation biologists requiring to put names to their samples. All in all, this is a successful text, for which the hard labours of the author are to be commended –

A.E. WHITTINGTON, Assistant Curator: Entomology, National Museums of Scotland, Chambers Street, Edinburgh, EH1 1JF

Evidence for *Botanophila gentianae* (Pandellé, 1900) (Diptera, Anthomyiidae) being a British species

K.P. BLAND

National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF

A collection of some forty dehiscent seedheads of *Gentianella campestris* (Linnaeus) Börner (Gentianaceae) growing on a small exposed rocky outcrop (at an altitude of 670m) in the Carn an t-Sionnach area (O.S. Grid ref. NO 0075) of Fealar, Perthshire (V.C. 89), Scotland, was made on 27 September 1997.

A careful examination of this material revealed that in six cases there was incomplete dehiscence of the seed-capsule and signs that the capsule had been occupied and the seeds consumed by a phytophagous larva, that had since departed. In two of these worked seed-capsules, the cephalopharyngeal skeleton of a dipteran larva was found. These cephalopharyngeal skeletons were presumably the result of the penultimate larval moult, the fully-fed larva later leaving the seed-capsule to pupate elsewhere.

The anthomyiid *Botanophila gentianae* (Pandellé, 1900) feeds in the seedheads of various species of *Gentiana* in Europe and its larva has been described, initially by de Meijere (1947) and later, more fully, by Dušek (1969). It is the only species of this genus to have been reared from Gentianaceae. It was initially described from the low-lying district of the Landes, France where the foodplant was *Gentiana pneumonanthe* Linnaeus. It is also recorded from the montane parts of central Europe and Dušek recorded it from *G. asclepiadea* Linnaeus (in Austria) and *G. punctata* Linnaeus (in the Slovak Republic), both upland species.

Comparison of a cephalopharyngeal skeleton found in a seed-capsule of *Gentianella* from Fealar (Fig. 1a) with those illustrated by Dušek (1969) for second instar (Fig. 1b) and third instar (Fig. 1c) larvae of *Phorbia* [now *Botanophila*] *gentianae* show that they probably belong to the same species. *B. gentianae* has been recorded in addition to the countries mentioned above from Switzerland and Denmark (Dely-Draskovits, 1993). More recently, Čepelák & Rozkošný (1997) added records from the Czech Republic (reared from *G. asclepiadea*) and further records from the Slovak Republic. Until now, its presence in Britain has passed unnoticed.

It will be interesting to see if a search for the species in other parts of Britain is successful. *Gentianella campestris* is a widespread plant in well drained grassland, both in upland areas and in coastal dunes. Examination of *Gentiana* species as potential foodplants in Britain should also be considered.

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Meijere, J.C.H.de 1947. Over eenige Dipterenlarven, waaronder een galmug, die mijngangen maakt, en twee Dipteren, die gallen op paddenstoelen veroorzaken. *Tijdschrift voor Entomologie* 88, 49-62.

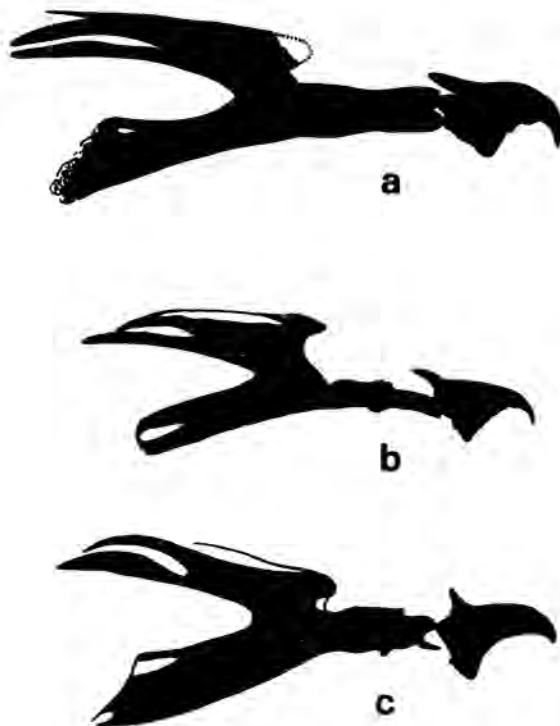


Fig. 1a, Cephalopharyngeal skeleton from *Gentianella* seed-capsule from Fealar. Fig. 1b, Cephalopharyngeal skeleton of 2nd instar larva of *Botanophila gentianae* after Dušek (1969). Fig. 1c, Cephalopharyngeal skeleton of 3rd instar larva of *B. gentianae* after Dušek (1969).

***Peplomyza litura* new to Scotland and description of the third stage larva (Diptera, Lauxaniidae)**

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During investigations of saproxylic Diptera occurring in Scotland, some slow-moving larvae similar to those of *Leucopis* (Chamaemyiidae) were found under bark of a fallen *Fagus* at Newbattle, Midlothian. Eventually, one of these larvae pupated and a female *Peplomyza litura* (Meigen) emerged. Subsequent searches under bark of fallen trees revealed more *P. litura* larvae and adults were seen on the bark of fallen wood.

According to Smith (1989) about 1500 species of Lauxaniidae are known worldwide, but the immature stages of only ten species have been described. No published records of *Peplomyza litura* apparently exist from Scotland, although captured adults are in the collections of the National Museums of Scotland.

In this paper the distribution of *P. litura* in Scotland is assessed, the third stage larva is described and larval morphology is discussed in relation to the way of life and other known lauxaniid larvae.

Distribution in Scotland

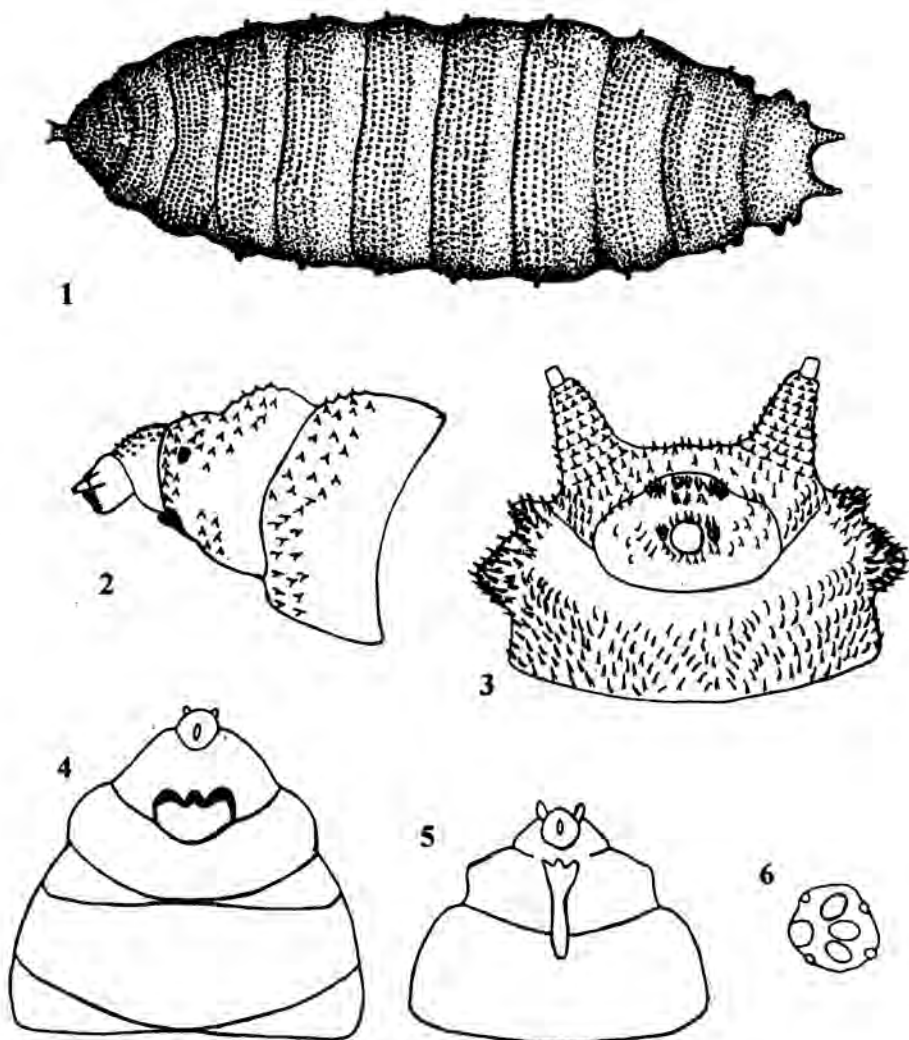
Adults

Specimens in the National Museums of Scotland: Dunbartonshire, Bonhill, 1 female 11.vii.1900, 1 male 13.vi.1905, 1 male 19.vi.1905, 1 female 23.vi.1905, 1 male 30.vi.1905, 1 male 1.vii.1905, 1 male 5.vii.1905, 1 male 4.vii.1908, J.R. Malloch; Morayshire, Logie, 1 female 21.ix.1904, F. Jenkinson; Argyll, Appin, Portnacroish, 1 female 1.x.1954, E.C. Pelham-Clinton.

Specimens collected during the saproxylic investigation: Midlothian, Newbattle Abbey, on bark of fallen *Fagus*, 1 female 2.viii.1993, G.E. Rotheray; Midlothian, Edinburgh, Hermitage of Braid, on *Quercus* logs, 1 female 5.vii.1994, 2 females 31.vii.1994, D. Horsfield; Clyde Valley, Avondale, on bark of live *Fraxinus*, 1 male 9.ix.1996, G.E. Rotheray.

Larvae

Specimens collected during the saproxylic investigation: Midlothian, Newbattle Abbey, under bark of fallen *Fagus*, 5 larvae 20.v.1994, 3 larvae 8.iv.1995, G.E. Rotheray; Midlothian, Arniston, under bark of fallen *Fraxinus*, 7 larvae 23.iv.1994, G.E. Rotheray and D.M. Robertson; Stirlingshire, Kippenrath, under bark of fallen *Fagus* branch, 3 larvae xi.1995-ii.1996, G.E. Rotheray; Clyde Valley, Upper Nethan under bark of fallen *Fagus* branch, 1 larva 9.ix.1996, G.E. Rotheray; Strathspey, Kincaig, Speybank, under bark of fallen branch of *Populus tremula* L., 1 larva 7.v.1997, G.E. Rotheray.



Figs 1-6. *Peplomyza litura*, larval stages: 1, whole larva, 3rd stage, dorsal view, length 5mm; 2, 3rd stage larva, head, prothorax and mesothorax, lateral view; 3, 3rd stage larva, anal segment, ventral view; 4, 3rd stage larva, head, prothorax and mesothorax, ventral view; 5, 2nd stage larva, head, prothorax and mesothorax, ventral view; 6, 3rd stage larva, posterior breathing tube, apical view.

Description of the third stage larva of *P. litura*

Length up to 5mm, width up to 1.5mm; dorsoventrally flattened in cross-section; tapering anteriorly, posterior end also tapered with a pair of fleshy projections each bearing at the tip a pale brown, lightly-sclerotised breathing tube; lateral margins of the anal segment bearing two pairs of rounded fleshy projections; posterolateral margin of abdominal segment 7 with a pair of similar fleshy projections (Fig. 1); each segment with complete bands of spicules; bands on the mesothorax, metathorax and abdominal segments 1-6 and anal segment occupying anterior half of segment; dorsum of prothorax with an almost complete coating of spicules; segment 7 with two spicule bands; abdominal segments 1-7 with lateral spiracles lightly-sclerotised and projecting from the integument about the same distance as the anterior spiracles; head bearing a pair of finger-like antennae, mouth opening narrow and small (Fig. 2); head skeleton apparently pale with little sclerotisation; ventral surface behind mouth with a tridentate, black, sclerotised projection (Fig. 4) (similar, sclerotised projection with an elongate posterior section in the 2nd stage larva, Fig. 5); locomotory organs apparently little developed; anus surrounded by setae with a pair of lateral projections; behind anus a pair of rounded fleshy projections with between them, spicules longer than elsewhere on the segment (Fig. 3); apex of breathing tube small (diameter of spiracular plate 0.015mm) bearing three oval-shaped spiracular openings (Fig. 6).

Discussion

No published records of *Peplomyza litura* apparently exist for Scotland. Collin (1948) recorded the species as, "not uncommon from June to October in at least the southern half of England and Ireland." However, from specimens in the collections of the National Museums of Scotland and obtained during the saproxylic survey, *P. litura* appears to be widespread in Scotland. It occurs from the Clyde Valley in the west to Midlothian in the east and up to Morayshire in the north. It occurs in Edinburgh. It is probably under-recorded and fairly common throughout Scotland. It is a species of moist, shaded woodlands. Adults are found on fallen wood and larvae under bark of well-decayed fallen timber, i.e. in timber where the bark is loose and the sapwood is soft. Larvae were usually located in the layer of decaying material between the bark and the sapwood and were always slow-moving and avoided the light.

In Scotland, *P. litura* appears to have a long flight period from mid-June to the end of September. The life cycle is uncertain but appears to involve larval development during winter. This is suggested by observations that small larvae were characteristically found in October and large larvae in the following February. Larval growth in winter does not appear to be confined to this species. Similar observations were made on other Diptera larvae under bark such as various species of *Lonchaea* (Lonchaeidae), *Palloptera* (Pallopteridae) and *Stegana* (Drosophilidae).

Most lauxaniids are saprophagous but a few are phytophagous (Smith 1989). The only previous rearing record for *P. litura* appears to be Smith (1989) who records it from a larva mining the withered leaf of a crab apple. However, there is specimen in the National Museums of Scotland reared by E.B. Basden from the nest of a rook at Temple, Berkshire. Larval mines in decaying leaves and development in bird's nests are previously known biologies for lauxaniids, involving several genera (Miller and Foote 1975), but these are apparently the first records for *P. litura*. The existence of these additional breeding sites suggests that *P. litura* is not entirely saproxylic.

The larva of *P. litura* is similar to other lauxaniid larvae in possessing bands of spicules round the body segments, anal segment with pairs of lateral fleshy projections and posterior breathing tubes borne on fleshy projections (Miller and Foote 1976). However a third pair of fleshy projections is present in the larva of *P. litura*, on the postero-lateral margin of the 7th abdominal segment. Another difference is the small and structurally simple anterior spiracles in

relation to those of other lauxaniid larvae (Miller and Foote 1976). The posterior spiracular plate is also small. However, pairs of well-developed spiracles are present on abdominal segments 1-7.

The mouth is small in relation to other larvae under bark such as species of *Lonchaea*, *Palloptera* and *Stegana*. Smith (1989) figured the head skeleton of *P. litura*. It is heavily pigmented but head skeletons removed from preserved larvae by soaking in 10% KOH for an hour and dissecting them out, lacked pigmentation in our material. Comparison with fresh material suggests that neither preservation nor treatment with KOH is likely to have affected pigmentation. A small mouth and lightly pigmented head skeleton are characteristic features of clusiid larvae (Diptera: Clusiidae). Clusiid larvae appear to suck fluids from decaying wood (G.E. Rotheray unpublished observations). This may also be the feeding mechanism of *P. litura*. A remarkable feature, apparently unknown in other lauxaniids, is the possession of a black, projecting, tridentate "ridge" just posterior to the mouth (Fig. 4). The shape of this structure differs between the second and third stage larva and can be used to distinguish them (Figs 4 and 5). Live specimens were observed in attempts to work out the function of this feature, but these observations were unsuccessful. However, the prothorax is very flexible in *P. litura* and can twist and turn in various directions. The sclerotised ridge behind the mouth may act as a scoop to gather material prior to feeding.

Acknowledgements

I am grateful to David Robertson for assistance in the field and to him and David Horsfield for additional Scottish records of *P. litura*. The work reported here was part of a wider project on saproxylic Diptera in Scotland, carried out by the Malloch Society. I gratefully acknowledge the contribution made by members of the Society to this work of which the present study is a part and for the financial assistance provided by the Worldwide Fund for Nature and Scottish Natural Heritage.

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An observed copulation of a *Campiglossa absinthii* (Fabricius, 1805) male and a *Campiglossa loewiana* (Hendel, 1927) female (Diptera, Tephritidae)

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The genus *Campiglossa* (Diptera: Tephritidae) is represented by several species in Fennoscandia and Denmark. *Campiglossa* species are fairly small tephritids with patterned wings, wing length from approximately 2mm to 5mm. Some of the species of *Campiglossa* are among the most common tephritid species in Norway.

No revision of the Norwegian material has hitherto been done and therefore it is still uncertain how many species there are present in the Norwegian fauna. Greve (1988) recorded *C. solidaginis* (White, 1986) as new to Norway, Merz (1994) recorded *C. guttella* (Rondani, 1870) and *C. punctella* (Fallén, 1814) specifically from Norway and Greve (1996) recorded *Campiglossa grandinata* (Rondani, 1870) as new to Norway. Older records probably need revision since earlier keys to species of *Campiglossa* (= *Paroxyna*) often used wing pattern alone in identification, while recent works (e.g. Merz 1994; White 1988) clearly noted the variation in wing pattern and used other characters, most often genitalia and the colour of some bristles.

For comparison, White (1988) recorded nine species (seven of them as genus *Paroxyna*) from Britain and Hedström (1995) recorded nine species from Sweden.

Four specimens of *Campiglossa* were sorted out from material collected in a Malaise trap in BØ, Drammen, Underlia in August 1995 by Lars Ove Hansen. The trap was situated in a garden, which was formerly a pine (*Pinus sylvestris* L.) forest. Today the area has open patches with deciduous herbage and grass with some flowers. Both *Artemisia vulgaris* L., host plant for the larvae of *C. absinthii* and *Solidago virgaurea* L., host plant for the larvae of *C. loewiana* (both Asteraceae) were present, growing close to each other and close to the Malaise trap. The locality is southfacing and warm.

Two out of the four specimens were *in copula*. They proved to be a male *C. absinthii* (Fabricius, 1805) and a female *C. loewiana* (Hendel, 1927). The couple unfortunately had to be separated for a safe identification. *C. absinthii* and *C. loewiana* are in the same group of *Campiglossa* species, the *loewiana*-group of Merz (1994) and are thus closely related. The other two specimens sorted separately from the material were a male and female of *C. loewiana*.

No copulating pair, where the specimens belong to two different species, had previously been observed in Norwegian material of Tephritidae. Neither have such pairs been observed in the much larger material from most parts of Europe examined by the second author. Thus the phenomenon is certainly rare indeed. It was shown, however, by Zwölfer (1969, 1974 a, 1974 b) that copulation between different species of *Urophora* could be induced under experimental conditions.

Similarly, it can be suggested that being caught in a Malaise trap is an exceptional situation for these flies and consequently two closely-related species with possibly similar mating-behaviour can accept each other. Many tephritid species are guided by visual stimuli to eventual mates. The

two species observed here might be guided by sight stimuli and in a very crowded area away from the host plants they might choose a mate from another, closely related species.

Acknowledgements

We give our thanks to Lars Ove Hansen, Oslo who collected the material and informed us of details of the locality.

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***Xanthandrus comtus* (Harris) (Diptera, Syrphidae) apparently resident in Scotland**

– Rotheray and Bland (1992. *Entomologist's monthly Magazine* 128, 57-58) reported finding *X. comtus* in Perthshire in 1990. This is apparently the northernmost record of this species in Britain and the only Scottish record since 1940. Stubbs and Falk (1983. *British Hoverflies*, London) pointed out that *X. comtus* had become more frequent in the British Isles following a period of relative scarcity. It was suggested that the unexpected appearance of *X. comtus* in Perthshire was due to the recent spread of this species following the succession of mild winters and warm summers in the 1980s (Rotheray and Bland 1992, *loc. cit.*).

At the Perthshire site (Falls of Fender, Glen Tilt NN 8766; V.C. 89) *X. comtus* larvae were feeding on caterpillars of *Caloptilia syringella* (Fabricius) (Lepidoptera, Gracillariidae) on young ash (*Fraxinus*) trees. The same stands of trees were revisited by one of us (KPB) on 13.ix.1997, some seven years later. The ash trees still supported a strong infestation of *C. syringella* and furthermore *X. comtus* was also present. Two vacated puparia were found in close proximity to *C. syringella* workings.

It seems unlikely that the 1997 records of *X. comtus* from this site are due to further migrations of this species into Perthshire. It is more likely that with the continued mild climate of the 1990s, a population has become established in the area. Continued monitoring of *X. comtus* at Glen Tilt is obviously called for in 1998 and beyond – **K.P. BLAND** and **G.E. ROTHERAY**, National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF

Fungus gnats and other flies (Diptera, Mycetophilidae, Sciaridae, Heleomyzidae and Sphaeroceridae) attracted to sapping sycamore

stems - On 21 November 1997, a remarkable concentration of flies was observed at the Coombe Valley RSPB Reserve, Staffordshire. While a Malaise trap was being resited alongside a brash pile comprising cut sycamore (*Acer pseudoplatanus*) logs in order to assist in the recording of emerging saproxylic insects, a cloud of gnats was noticed around a sycamore stump which had been cut in November 1996. This was surprising as the weather was poor with moderate drizzle and the temperature was only about 8° centigrade although there was not much wind. This observation was first made at 10.00 a.m. and the swarm was later noted to be still present at 4.00 p.m., although slightly decreased in number.

A closer examination revealed that the gnats were clustered on and around some thin coppice stems, less than 1cm in diameter, which were growing from the cut stump. These thin stems had been damaged at the tip by grazing cattle, which had been in the area for about two weeks and had been removed on the previous day. Sap was running down the stems and the gnats were gathered on and around it. A single sweep of the net produced a catch comprising 167 insects, but within half an hour the stems were again covered with insects. Most of the flies collected were fungus gnats (Mycetophilidae) but some Sciaridae, a few Heleomyzidae and Sphaeroceridae were also present. A list of the species identified is appended below. The stems were watched on subsequent days but the number of insects attracted decreased rapidly and after three days only a few gnats were present and a week later they had virtually disappeared.

An attempt will be made to replicate the conditions resulting in this concentration this year so that further observations may be made. Most of the species recorded are fungus feeders as larvae, in many cases associated with terrestrial or lignicolous agarics or (in the case of the *Mycomya*, *Phronia*, *Trichonta* and some *Mycetophila* species, probably also *Anatella* species) wood encrusting fungi. Although there is a record of *Boletina gripha* from the bolete *Suillus bovinus*, regular fungus feeding by this common species seems unlikely. The biology of the *Sceptonia* and *Zygomyia* species is unknown.

The following species were identified (the number of individuals of each species is stated):

Mycetophilidae: *Allodia lugens* (Wiedemann) 10, *A. ornatocollis* (Meigen) 24, *Anatella longisetosa* Dziedzicki 2, *A. setigera* Edwards 1, *Boletina gripha* Dziedzicki 2, *B. trispinosa* Edwards 1, *B. trivittata* (Meigen) 1, *Brevicornu auriculatum* (Edwards) 2, *B. sericoma* (Meigen) 9, *Cordyla fissa* Edwards 1, *C. murina* Winnertz 1, *Exechia fusca* (Meigen) 5, *E. spinuligera* Lundström 3, *Exechiopsis ligulata* (Lundström) 1, *E. subulata* (Winnertz) 1, *E. unguiculata* (Lundström) 11, *Mycetophila britannica* Laštovka & Kidd, 2, *M. curviseta* Lundström 8, *M. fraterna* Winnertz 3, *M. fungorum* (De Geer) 2, *M. ocellus* Walker 3, *M. ornata* Stephens 1, *M. perpallida* Chandler 8, *M. sepulta* Laffoon 2, *M. signatoides* Dziedzicki 5, *M. unipunctata* Meigen 4, *Mycomya annulata* (Meigen) 1, *Phronia braueri* Dziedzicki 2, *P. coritanica* Chandler 2, *Pseudobrachypeza helvetica* (Walker) 2, *Trichonta terminalis* (Walker) 1, *Sceptonia nigra* (Meigen) 1, *Zygomyia humeralis* (Wiedemann) 1, undetermined female Mycetophilidae 13; **Sciaridae:** *Corynoptera acanthostyla* Tuomikoski 1, *Pseudolycoriella bruckii* (Winnertz) 2, undetermined female Sciaridae 21; **Heleomyzidae:** *Suilla fuscicornis* (Zetterstedt) 1, *S. humilis* (Meigen) 1; **Sphaeroceridae:** *Gigalimosina flaviceps* (Zetterstedt) 1, *Lotophila atra* (Meigen) 2, *Spelobia palmata* (Richards) 2 - **MAURICE WATERHOUSE**, Six Oaks Farm, Bradnop, Leek, Staffs ST13 7EL

New records of Chloropidae (Diptera) from Scotland and the early stages of *Calamoncosis glyceriae*

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In working through unidentified Chloropidae in the National Museums of Scotland, several species were found that are apparently new to Scotland. These species and some others in the first author's collection are recorded here and the opportunity is also taken to describe more fully the early stages of *Calamoncosis glyceriae* Nartshuk of which a long series was obtained from East Lothian in Scotland by K. P. Bland.

Oscinellinae

Aphanotrigonum fasciella (Zetterstedt)

3 females, Dumfriesshire, Brow Wall, swept from saltings, 3.viii.1986, G.E. Rotheray.

This species is locally common in England and Wales on saltmarshes, but the only previous capture from the north is a female from Rockcliffe Marshes, Cumbria, 17.vi.1984, P. J. Chandler.

Calamoncosis glyceriae Nartshuk

11 males, 8 females, East Lothian, Aberlady Bay, Marl Loch ex grass stem, collected as larvae 4.i.1997, emerged ii.1997, K.P. Bland; 1 female, Midlothian, Crichton Glen, swept from marshy ground, 22.vi.1986, G.E. Rotheray.

Collin (1946) recorded this species as *Calamoncosis laminiformis* (Becker), stating "it is common in marshy situations and both Mr. Goodliffe and I have bred it from *Glyceria aquatica*, the larvae feeding gregariously on the ensheathed inflorescence of this grass." It is widespread and often very abundant in *Glyceria* marshes in England and Wales and has been recorded as far north as Yorkshire.

Dicraeus vallis Collin

1 male, Dumfriesshire, Ae Forest public area, 13.vi.1987, G.E. Rotheray.

This species was originally described from England and records indicate a preference for calcareous grassland. The larvae of *Dicraeus* live in the developing seeds of grasses and the adults may have a short flight period, leading to under-recording.

Eribolus gracilior (de Meijere)

2 males, 1 female, Dumfriesshire, Kirtlebridge, 30.vi.1993, J.W. Ismay; 3 males, same data except collected on 1.vii.1993; 1 male, Ross, Pitmaduthy Moss, 16.vi.1976, P.J. Chandler.

Although Collin (1946) recorded this species only from Suffolk, it has since proved to be much more widespread in England and Scotland. It is difficult to find by sweeping but has been taken by beating tussocks of *Carex* and marsh grasses.

***Oscinella trochanterata* Collin**

1 female, Argyll, Taynish NNR, 4.vii.1987, G.E. Rotheray; 1 male, Hebrides, Isle of Rum, Kinloch Castle, 28.vi.1990, G.E. Rotheray; 7 males, 1 female, Inverness-shire, Urquhart Bay, 14.vii.1991, J.W. Ismay; 1 male, Grampian Region, Dalnapot, 13.vi.1982, P.J. Chandler.

Collin (1946) described this species from England and the larva is known to feed in the stems of *Phalaris arundinacea*.

***Oscinisoma cognatum* (Meigen)**

1 female, Loch Lomond, Endrick Mouth, ex seedhead of *Typha*, collected 30.xii.1980, emerged 31.iii.1981, K.P. Bland.

Although frequent and often abundant in fens in England and Wales, this species is rarely recorded due to its retiring habit. The wings are shorter than in related species and the fly lives mainly in deep grass and marsh vegetation, rarely emerging high enough to be swept. It may be collected by beating tussocks or searching among the base of marsh vegetation.

Chloropinae

***Chlorops serenus* Loew**

1 female, Aberdeenshire, Strathdon, 11.vii.1977, M.J. Morgan; 2 males, 1 female, Perthshire, Loch Tummel, swept south-side, 27.vi.1986, G.E. Rotheray

A widely distributed species in England and Wales, most records being from meadows.

***Chlorops triangularis* Becker**

1 female, Midlothian, Crichton Glen, on *Phalaris arundinacea*, 12.vii.1986, G.E. Rotheray; 2 females, Inverness-shire, Strathspey, Insh Marshes, swept from grass, 17.vi.1988, G.E. Rotheray; 1 female, Inverness-shire, Strathspey, Craigellachie NNR, 12.vi.1982, P. J. Chandler, 1 male, Perthshire, Ballinluig Island, 28.vi.1986, G.E. Rotheray.

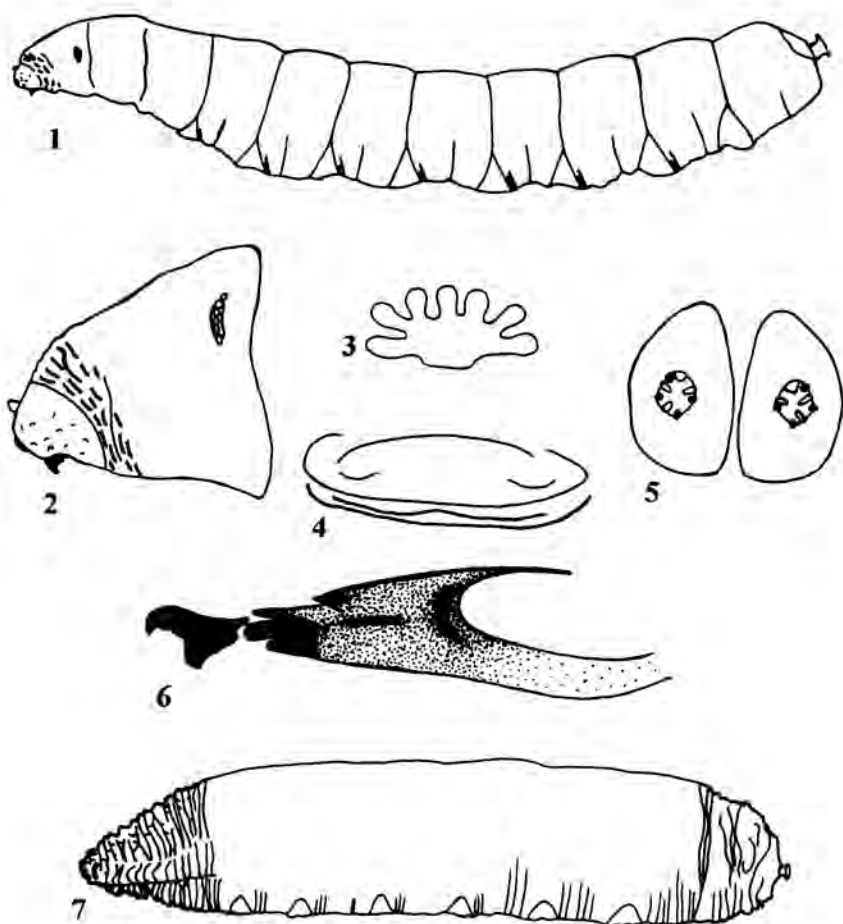
This is an infrequently recorded species associated with wetlands and wet grasslands.

Description of the 3rd stage larva and puparium of *C. glyceriae*

Material examined: 4 larvae and 3 puparia, data as above.

Larva: length 3.5mm; width 0.5mm; subcylindrical in cross-section, tapering anteriorly, truncate posteriorly (Fig. 1); white with black protruding mouth-hooks and pale brown posterior breathing tubes; integument smooth and shining except for anterior margin of prothorax which bears rows of spicules (Fig. 2) and the locomotory organs which have two rows of spicules (Figs. 1 and 4); segment boundaries marked by grooves; anterior spiracles fan-shaped, consisting of up to seven lobes (Fig. 3); anal segment about as long or slightly longer than 7th abdominal segment; posterior breathing tubes mounted on a pair of short (about as long as apically broad) lightly sclerotised papillae with three pairs of spiracular openings and four groups of interspiracular setae, these setae often missing and indicated by nodular base (Fig. 5); cephalopharyngeal skeleton (Fig. 6); mouth-hooks large and black with a row of up to three small, accessory teeth; dental sclerite apparently absent; intermediate sclerite black and tapered posteriorly; parasomal bar about as long as intermediate sclerite; pharyngeal sclerite lacking windows and lightly sclerotised.

Puparium: length 2.3-2.6mm; width 0.8-1.0mm; pale brown, anterior end dorso-ventrally flattened and heavily wrinkled; apex of anal segment also wrinkled, rest of abdomen lightly wrinkled, more so on the ventral surface (Fig. 7); pupal respiratory horns absent.



Figs 1-7. *Calamoncosis glyceriae*, third stage larva and puparium: 1, whole larva, lateral view, length 3.5mm; 2, head and prothorax, lateral view; 3, anterior spiracles, lateral view; 4, 5th abdominal segment, locomotory organ, apical view; 5, anal segment, apical view; 6, cephalopharyngeal skeleton, lateral view; 7, whole puparium, lateral view.

Discussion

Collin (1946), when revising the Oscinellinae, included Scottish records but did not produce a comprehensive work on Chloropinae; Ismay (1981, 1985, 1991 and 1994) covered some genera. Certain species from the south of Scotland may be on the edge of their range in Britain e.g. *A. fasciella*. Others are simply under-recorded while others again are not yet searched for in Scotland, either because they have only recently been recognised as British or they are difficult to record by the usual collecting method of sweep-netting e.g. *D. vallis* and *E. gracilior*. Although workers such as J.R. Malloch and J.E. Collin have collected Chloropidae in Scotland they are, in general, poorly known and under-recorded in comparison with England and Wales.

Andersson (1977) illustrated the facial mask of *C. glyceriae* without further details. The larva of *Calamoncosis minima* Strobl has been described by d'Aguilar (1953) and that of *Calamoncosis aspistylina* Duda by Nartshuk (1981). At present too little is known to distinguish adequately *C. glyceriae* from other chloropid larvae. From the figures in Ferrar (1987) the larva appears to resemble those of *Comioscinella* Duda and *Oscinella* Becker, both in general form and structure of the cephalopharyngeal skeleton.

Acknowledgements

We are grateful to Keith Bland for specimens and to David Robertson for clarifying the Scottish status of some of the species in this paper. We also thank the Hope Entomological Collections, University of Oxford, for use of research facilities.

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REVIEW

CABIKEY to mosquito genera of the world. R.E. Harbach and G.R. Sandlant. Wallingford, CAB International, 1997. CD-ROM £195.00. ISBN 0 85199 170X.

This CD-ROM has been compiled for entomologists in human health and vector control, taxonomists and those particularly interested in the general taxonomy and biological diversity of mosquitoes. An explanation of how to use the multi-access keys to genera is given in the introductory TOUR with additional support provided by the HELP function. There is also a very informative GLOSSARY and a REFERENCE section with an extremely useful listing of key works.

The CABIKEY to identifying mosquito larvae and adults to generic level may be used in standard or advanced mode. The standard mode is ideal for most entomologists with a good grounding in dipteran terminology but who, like me, require to refresh their memories from time to time by dipping into the GLOSSARY. The on-screen questions appear in a logical sequence to assist the user in achieving the quickest and easiest route to identification. Contrasting morphological features are displayed as large (screen size) diagrams or as scanning electron micrographs with key features suitably highlighted, obviating the need for detailed descriptions so commonplace in conventional texts. If a main character is not distinguishable then an alternative key is set up to assist the user. One hardly realises that one is using a taxonomic key when clicking through the choices. **It really is a joy to use.** The advanced mode is more technical but allows the user more control over which questions are asked, such as the shape and number of metathoracic sensilla, a newly recognised taxonomic feature of the Culicidae (Harbach and Howard 1997). Confirmation of identification can be double-checked by searching numerous tables packed full of additional taxonomic data.

Is the CD-ROM of use to British dipterists? Certainly the keys provide an easy way of identifying the mosquito genera found in the British Isles, but at some expense. The main benefits are educational: British genera are placed in a world context and on one disc one can browse the world's fauna comparing and contrasting morphological features to gain a greater understanding of this medically important group of flies. For several years now, I have used ANI-CD (Arthropod Name Index) produced by the same publishers, with over 250,000 correctly named insect species and their synonyms for editing purposes and would not be without it. The same applies to the CABIKEY CD-ROMs. Throw away those old taxonomic keys and join the future generation. And if you have twin speakers, you can listen to the sound of approaching mosquitoes too! - **JOHN BADMIN**, "Coppice Place", Downwell, Perry Wood, Selling, Faversham, Kent ME13 9RP

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Dipterists Day Exhibits

It has been a concern for some years that no record is kept of exhibits displayed at the annual November meeting of Dipterists Forum, with the exception of those which have been exhibited at the preceding BENHS Exhibition. A detailed account of the latter is included in the Report on the Society's Annual Exhibition, thus providing a permanent record. With this in mind, notes were made on those exhibits shown in November 1997 which had not appeared previously and these are reproduced here. For future meetings it will be requested that exhibitors provide brief notes on their exhibits to enable them to be accurately reported in *Dipterists Digest*.

There was a strong showing of exhibits in 1997, perhaps encouraged by the award of a prize of a store box for the exhibit judged to provide the most effective display with a preference for those related to the Abergavenny summer field meeting. The prize was awarded to Jonathan Cole, who fulfilled these requirements and showed a most remarkable range of rarities found during that week.

BRACKENBURY, A. - *Eristalis similis* (Fallén) (= *pratorum* Meigen), the second British record: a male from Linacre Reservoir Woodlands, Chesterfield, Derbyshire, SK 330722, 5 July 1997.

CLEMENTS, D. - (1) Conopidae: manuscript of a world check list and an exhibit of foreign Conopidae, including several species from North Africa and *Myopa mixta* Frey an endemic species from the Canary Islands;

(2) *Asilus crabroniformis* Linnaeus (Asilidae), Brockwells Meadow, Gwent, SO 4689, ix. 1997 and a video showing its oviposition;

(3) *Herina lugubris* (Meigen) and *H. longistylata* Rivosecchi (Ulidiidae), demonstrating the recognition of the latter as the British species formerly known as *lugubris* (see Clements, D.K. and Merz, B. 1997. *Dipterists Digest* (Second Series), 4, 65-67).

(4) *Dicranomyia goritiensis* (Mik) (Limoniidae), an RDB3 species from cliff seepages at the Knap, Barry, Glamorgan, ST 094666, 31 ix. 1997

CLEMONS, L. - (1) Snail-killing flies (Sciomyzidae) from Kent, 38 species included;

(2) The genus *Volucella* (Syrphidae) in Kent since 1970 - specimens and maps for all species and flight histograms;

(3) 28 species of flies collected on *Angelica* flowers in a half hour visit to Lyminge Forest, Kent in September 1996;

(4) Local Kent Diptera recorded in 1996-1997; these included *Dorycera graminum* (Fabricius) (Ulidiidae), TQ 9165, Church Marshes; *Chetostoma curvinerve* Rondani (Tephritidae), Covert Wood, TR 182494, 1 May 1997; *Hemyda vittata* (Meigen) (Tachinidae), Covert Wood, reared from *Troilus luridus* (Fabricius) (Hemiptera: Pentatomidae).

COLE, J.H. - (1) Flies reared from under the bark of a dead branch of living grey poplar (*Populus canescens*), Bampton, Cambridgeshire; *Zygoneura sciarina* Meigen and *Lycoriella ingenua* (Dufour) (= *mali* (Fitch), *solani* (Winnertz)), both numerous; *Rhexozia subnitens* (Verrall) (which has also been reared from decaying poplar bark in Belgium); *Ptiolina obscura* (Fallén) (Rhagionidae); *Medetera impigra* Collin (Dolichopodidae); *Palloptera ustulata* Fallén

(Pallopteridae); *Lonchaea peregrina* Becker, *L. fugax* Becker and *L. palposa* Zetterstedt (Lonchaeidae); *Phaonia gobertii* (Mik) and *Helina abdominalis* (Zetterstedt) (Muscidae).

(2) Abergavenny Field Meeting. A map on which the sites were marked was the centre piece, with indication given at which sites each of the species exhibited had been found:

Blaen y Cwm: *Dedalea zetterstedti* Collin (Hybotidae); *Sphegina sibirica* Stackelberg (Syrphidae).

Nant Sere Wood: *Ptiolina obscura* (Fallén) (Rhagionidae); *Lonchoptera nigrociliata* Duda (Lonchopteridae); *Zophomyia temula* (Scopoli) (Tachinidae).

Craig y Cilau: *Dactylolabis sexmaculata* (Macquart) and *D. transversa* (Meigen) (Limoniidae); *Cnemacantha muscaria* (Fallén) (Lauxaniidae).

Cwm Siarpal: *Clinocera tenella* (Wahlberg) (Empididae).

River Usk, Llanwenarth: *Scleroprocta pentagonalis* (Loew) (Limoniidae); *Bombylius canescens* Mikán (Bombyliidae); *Sciapus basilicus* Meuffels & Grootaert (Dolichopodidae), first British record; *Homoneura limnea* (Becker) (Lauxaniidae).

River Usk, Bryn: *Platypalpus niger* (Meigen) (Hybotidae); *Hilara pseudochorica* Strobl (= *woodi* Collin) and *H. apta* Collin (Empididae).

River Monnow, Llangua: *Oxycera terminata* Meigen (Stratiomyidae); *Platypalpus melancholicus* (Collin) (Hybotidae).

River Monnow, Skenfrith: *Chalcosyrphus eunotus* (Loew) (Syrphidae); *Cosmetopus dentimanus* (Zetterstedt) (Scathophagidae).

River Monnow, Tregate: *Arctoconopa melampodia* (Loew) (Limoniidae); *Tachydromia costalis* (von Roser); *Clorismia rustica* (Panzer) (Therevidae); *Orthonevra* sp. nov. (Syrphidae).

CROSSLEY, R. - A selection of RDB and Notable craneflies from Yorkshire. Tipulidae: *Tipula cheethami* Edwards from Cray Falls, Wharfedale. Pediciidae: *Dicranota guerini* Zetterstedt, Hawnby. Limoniidae: *Idioptera linnei* Oosterbroek (= *fasciata* (Linnaeus), preocc.), Strensall Common; *Arctoconopa melampodia* (Loew), R. Derwent, Malton; *Dicranomyia goritiensis* (Mik), Sewerby Cliffs, Bridlington; *Gnophomyia viridipennis* (Gimmerthal), Lady Spring Wood, Malton.

DOBSON, J. - Tachinidae from Brent Reservoir, Middlesex, TQ 2187 (except *F. laeta*); the areas involved are abbreviated as POS = public open space including old hedges and grassland north of the main arm of the reservoir; ES = East SSSI. *Anthomyiopsis nigrisquamata* (Zetterstedt), POS, male 30.vii.1997; *Cyrtophleba ruficollis* (Meigen), POS, female 29.vi.1997, a species with very few British records, although inadvertently not assigned RDB status; *Thecocarcelia acutangulata* (Macquart), ES, female 29.vi.1994, second British record, det. confirmed by Nigel Wyatt; *Frontina laeta* (Meigen), TQ 2186, female 2.viii.1997 from *Cirsium* flower on short turf with light scrub adjacent to Neasden Recreation Ground, 3-4 individuals seen; *Carcelia atricosta* Herting, POS, male 8.vi.1997, det. confirmed by Nigel Wyatt; *Subclytia rotundiventris* (Fallén), ES, female 17.viii.1995, basking on a bramble (*Rubus*) leaf in a small sunny clearing; *Wagneria gagatea* Robineau-Desvoidy, ES, male 5.vi.1996, the second record from the site.

HARVEY, M. - Tipulidae and Asilidae from the BBONT area. Tipulidae: *Tipula livida* van der Wulp, both sexes at MV light, 5 August 1996, Hartslock N.R., near Goring, Oxfordshire, SU 616795; *T. selene* Meigen found as a larva under bark of a fallen beech (*Fagus*) log, in rather dry conditions at the top of the log, 21 April 1996, adult emerged 13 May 1996, Ashampstead Common, Berkshire. Asilidae: *Asilus crabroniformis* Linnaeus, maintaining a reasonably large population (up to 50 seen at one location) in various localities around Streatley and Goring in Berkshire and Oxfordshire. A female caught in copula was kept alive for about four days with a

substrate considered suitable for oviposition (i.e. a mixture of compost, grass and horse dung) but without success; *Choradex marginatus* (Linnaeus) found in several woodlands in Berkshire and Oxfordshire in the past two years. Acroceridae: *Ogcodes pallipes* Latreille in Olivier, Bucklebury Common, Berkshire, 6 July 1997 swept from lower branches of a small pine (*Pinus*) on heathland. Syrphidae: *Sphegina verecunda* Collin, Dry Sandford Pit, Berkshire, 16 May 1996; *Triglyphus primus* Loew, Moor Copse N.R., Berkshire, 24 August 1996 at *Angelica sylvestris* flowers.

LEFTWICH, A.P. and ELLIOTT, W. - Craneflies collected on a survey of twelve sites on Lewis, Outer Hebrides. This included 28 species, of which eight were new to the Outer Hebrides. The most significant records were of *Dicranomyia halterella* Edwards and *Pilaria meridiana* (Staeger).

SUMNER, D. - Conopidae including some from the A.E. Wright collection.

UNDERWOOD, R. - *Hilara monedula* Collin (Empididae), a gynandromorph with dilated front tarsi as in the male but with female genitalia, collected inside a hide at Martin Mere Wildfowl and Wetland Reserve, 11 June 1996.

***Oedalea hybotina* (Fallén) (Diptera, Hybotidae), a third British record** - This species was added to the British list in 1991 on a female from Morrone Birkwood, Aberdeenshire (Chandler, P.J. 1992. *Dipterists Digest* 12, 16-22). Since then, a male has been found in Kent by Laurence Clemons; this is indeed a more likely part of the country for *O. hybotina* to have turned up as it is widespread in Europe including records from the Netherlands. The Kentish specimen was from Stubbs Wood, part of Hanging Bank, near Sevenoaks, 1 May 1994. This site had been severely devastated in the 1987 storm and by 1994 was supporting many young birch (*Betula*) saplings so bore some resemblance to Morrone Birkwood (Clemons, *in litt.*, 8 June 1994).

A second British male was found rather unexpectedly on 22 July 1997 at Glen Coiltie, Inverness-shire. It was swept around piles of rotting logs in an area of wet woodland north of Drumnadrochit and about two miles from Loch Ness. This small area of woodland, which has proved very rich in Diptera, is predominantly alder (*Alnus*) and ash (*Fraxinus*), with some birch (*Betula*) and oak (*Quercus*) on the drier slopes. It is situated on the west bank of a small river opposite a conifer plantation and is sheltered to the north by steep slopes below the Divach Falls. Being ungrazed and continuously flooded in the lower lying parts, the site has a rich well structured ground flora.

Among other Diptera recorded with *O. hybotina* at Glen Coiltie was the frequent species *O. stigmatella*, which was also collected with it at Morrone Birkwood. It is thought that all *Oedalea* species develop in rotten wood, from which some other species of the genus have been reared. I understand from Graham Rotheray (*pers. comm.*) that *O. hybotina* has not been recorded during the survey of saproxylic Diptera being carried out by the Malloch Society. I am grateful to Laurence Clemons for the opportunity to examine his specimen and for the information about its habitat - **PETER J. CHANDLER**, 43 Eastfield Road, Burnham, Slough, Berkshire SL1 7EL.

***Drosophila trivittata* Strobl, 1893 (Diptera, Drosophilidae) new to France and notes on other French Drosophilidae**

- In 1997 I spent the weekend of 20-21 September collecting in the extensive Forêt de Fontainebleau 50 km south of Paris. I was concentrating mainly on areas of ancient beech woodland within the forest, which are characterised by an abundance of decaying trees and fungal growth. In one of these areas, Le Gros Fouteau, I was surprised to sweep a male and female of a *Drosophila* with a conspicuously striped thorax resembling a *Chlorops* pattern but with a black scutellum. The three dark brown stripes run the length of the dorsum along the quadriserial acrostichal and short pluriserial dorsocentral rows and become united in contact with the scutellum. The body is otherwise mainly brownish yellow with a transverse row of four dark triangles on abdominal tergites 2-4.

This species was clearly not included in the keys to Swiss Drosophilidae by G. Bächli and H. Burla (1985. *Insecta Helvetica Fauna* 7, 1-116). While I was visiting the National Museums of Scotland in November 1997, I scanned through the E.B. Basden world collection of Drosophilidae and was able to identify the Fontainebleau specimens as *D.* (subgenus *Hirtodrosophila*) *trivittata* Strobl. This is widespread in the Palaearctic and the collection included some from Korea and a series of a dozen specimens obtained by Ralph Coe at Plitvice in Croatia. These were found on unnamed bracket fungi on birch (*Betula*) trunks on 4-10 July 1960.

D. trivittata was described from Austria and has also been recorded from the Czech Republic, Hungary, Rumania, Sweden and Russia in Europe as well as the far east of Russia and Japan in Asia (Bächli, G. and Rocha Pité, M.T. 1984. *Catalogue of Palaearctic Diptera* 10, 186-220). Gerhard Bächli (*pers. comm.*) has confirmed that it has not yet been recorded in Switzerland. The *Drosophila* species recorded from France were listed by T. Rocha Pité and L. Tsacas (1979. *Revue française d'Entomologie (Nouvelle Série)* 1(3), 135-140) who recorded 30 species, noting that the country was, however, under recorded compared to Britain or Switzerland (both stated to have 31 species but both now with 34 species listed).

This visit to Fontainebleau was during a dry spell but was quite productive of dead wood and fungus associated Diptera. Drosophilidae, some of which were exhibited at the 1997 BENHS Exhibition, were well represented in the catch. These included *Drosophila confusa* Staeger (visiting *Grifola gigantea* brackets), *D. histrio* Meigen (a female under a bracket of *Fomes fomentarius*), *D. kuntzei* Duda, *D. phalerata* Meigen, *D. subobscura* Collin and the non-British *D. testacea* von Roser, as well as *Leucophenga maculata* (Dufour), *Amiota subtusradiata* Duda and *A. variegata* (Fallén). The last species, which was also found at Forêt de la Réna near Bourg-en-Bresse on 16 September, was recorded as new to France together with *A. semivirgo* Máca by P. Withers (1994. *Bulletin mensuelle de la Société linnéenne de Lyon* 63(6), 224).

Perhaps the most interesting observation made at Fontainebleau was a result of the dry weather conditions. A large concentration of flies was found gathering around wheel ruts of vehicles, where some moisture was present, on a partly shaded forest track at La Grande Vallée. Most of these flies were Lauxaniidae, especially *Peplomyza* and *Lyciella* species, but among them were a few drosophilids of the genus *Stegana*; these were mainly the smaller species (up to 3.5 mm long) *S. similis* Laštovka and Máca (3 males, 3 females collected) but one distinctly larger female (length 4.5 mm), with a conspicuously reddish thorax, proved to be *S. hypoleuca* Meigen.

At Forêt de la Réna 2 females of *Chymomyza amoena* (Loew) were swept from low vegetation in dry woodland. This American species is now widespread in central Europe and has recently been recorded from France (Jura, Ain, Rhône, Isère and Drôme) by P. Withers (1998. *Bulletin mensuelle de la Société linnéenne de Lyon* 67(5), 159-160). *C. amoena*, which is associated with fallen fruit especially apples and chestnuts, may turn up in Britain eventually. It is very distinctive, having a broad brown band over the posterior crossvein and a narrower preapical wing band - **PETER J. CHANDLER**, 43 Eastfield Road, Burnham, Slough, Berks SL1 7EL.

Ceromya flaviseta (Villeneuve) (Diptera, Tachinidae) new to Britain

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Introduction

In 1995 and 1996 Malaise traps were set in Burnham Beeches NNR, Buckinghamshire. The Tachinidae were identified by the author using the recent Handbook (Belshaw 1993). Two specimens of Siphonini could not be determined from the Handbook but were identified using Andersen (1996) as *Ceromya flaviseta* (Villeneuve).

In Belshaw's Handbook the species ran in the key to genera to the genus *Actia*. In the key to species of *Actia* and related genera (p.38) the species runs to couplet 5, having setae on veins R_1 and R_{2+3} but will not key to species since it has a combination of vein Cu without setae, anal vein not reaching the wing margin, yellow legs and no katapisternal hairs ventral to the main setae. In Andersen (1996) the specimens ran to *Ceromya flaviseta*, except for some minor differences. The first flagellomere of the antenna is paler than in Andersen's description: orange on the inner surface and orange-brown on the outer surface, paler basally, not "Antennal segment 3 mainly blackish-brown" as described by Andersen. The abdomen of the female lacks the central dark line described by Andersen and the male has a weakly formed dark line on the base of the abdomen. These differences are probably not of specific importance and the specimens have been examined by Dr Andersen and confirmed as *C. flaviseta*.

Key to species

The following couplets should be inserted in the key to *Actia* and related genera in place of couplet 5 of Belshaw's Handbook. The figure and page numbers refer to the Handbook.

- 5 Legs uniformly darkened, very dark red to black, katapisternum (fig. 332) with a line of hairs below the bristles [Abdomen black, vein R_1 with hairs confined to the apical part, anal vein disappearing well before the wing margin, thorax with 4 postsutural dorsocentral bristles] *Actia infantula* (Zetterstedt) (p. 100)
- Legs yellow, katapisternum without a line of hairs 5a
- 5a Abdomen black, vein R_1 with hairs confined to the apical part, anal vein reaching the wing margin although becoming very thin (fig. 157), thorax with 4 postsutural dorsocentral bristles *Aphantorhaphopsis verralli* (Wainwright) (p. 102)
- Abdomen black with an extremely narrow yellow posterior margin to tergites 1+2 - 4, vein R_1 with hairs on entire length, anal vein disappearing well before the wing margin, thorax with 3 postsutural dorsocentral bristles *Ceromya flaviseta* (Villeneuve)

Material examined

1 male, Buckinghamshire, Burnham Beeches National Nature Reserve, 21.vi.-5.vii.1995, Malaise trap, heath, J.W. Ismay; 1 female, same data but pasture woodland.

Habitat

The Malaise trap on the heath at Burnham Beeches was placed at grid reference SU 9540 8460 in an open position close to a large juniper bush and near to birch and oak trees. The open position

meant that the trap could have collected insects from a wider area than the cleared heath. The Malaise trap in the pasture woodland was at SU 9460 8475 in beech woodland with old pollards and birch and holly understorey. It was in a shaded position on the edge of a small clearing and any insects caught would have most likely come from the immediate vicinity.

Conservation status

The species was described by Andersen as "A very rare European species" known from Denmark, Switzerland, Hungary, Poland and Ukraine. It should probably have Red Data Book status in Britain, although Tachinidae are under-recorded and it may prove to be more widespread.

Acknowledgements

This work formed part of a survey funded by the Corporation of London. Dr S. Andersen (Zoological Museum, Copenhagen) kindly confirmed the identity of the specimens. I thank Dr H. Read, Ecologist and Mr M. Frater, formerly Head Keeper for facilities at Burnham Beeches and Dr S.J. Simpson, Curator of Entomology and Ms S. Brecknell, Librarian, Hope Entomological Collections for research facilities.

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Acartophthalmus bicolor Oldenberg and *Meoneura neottiophila* Collin (Diptera, Acartophthalmidae and Carnidae) on *Pleurotus*

caps - As part of a survey of the Ashridge Estate for the National Trust carried out in 1997, I visited Aldbury Common, Hertfordshire on 14 July. A number of fallen branches from one of the pollard beeches (*Fagus*) were found to bear fresh growth of fruiting bodies of the fungus genus *Pleurotus*. On close inspection a large number of small dark coloured flies were observed to be running about on the caps of these fruiting bodies. These flies were evidently of two species.

Several individuals of *Acartophthalmus bicolor* Oldenberg (Acartophthalmidae) taken from the caps comprised about equal numbers of both sexes. They were observed to be wing waving, presumably as part of a courtship display. Although accorded RDB3 status (Falk and Ismay in preparation), *A. bicolor* is in my experience quite widespread and may be found in numbers about colonies of lignicolous fungi. At Gwendraeth Wood, Cornwall on 7 July 1983 I found it around *Polyporus squamosus* and at Ebbor Gorge NNR, Somerset on 3 July 1985 it was around a *Mycena* species on a stump. It is also recorded as a visitor to carrion and the larval biology is unknown.

The smaller species present was found to be *Meoneura neottiophila* Collin (Carnidae), which has been reared from bird's nests and belongs to a family not usually associated with fungi. The nine individuals taken for examination were all males, but it cannot be certain that no females were present. It was concluded to be most likely that these flies, like *A. bicolor*, were using the fresh fungus caps as a site for courtship although this cannot be confirmed - **PETER J. CHANDLER**, 43 Eastfield Road, Burnham, Slough, Berks SL1 7EL

***Bellardia bayeri* (Diptera, Calliphoridae) new to Britain and a description of the puparium**

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On 20 May 1994 while searching under loose bark of a fallen *Fagus* tree at Newbattle Abbey, Midlothian, one of us (GER) encountered a calliphorid puparium. A few days later a male emerged from this puparium which was subsequently identified by DH as *Bellardia bayeri* (Jacentkovský), using keys in Rognes (1991) and confirmed on examination of the male genitalia.

Six other specimens from three further localities are also known from Britain. A female was taken by PJC on 2 June 1984 at Mark Ash Wood, an area of ancient beech (*Fagus*) woodland in the New Forest, Hampshire. Its identity was not appreciated at the time, but it is likely that it was found around one of the decayed trees which are frequent at this site. *B. bayeri* has also been identified by Del Smith from material caught in a Malaise Trap operated as part of the Survey of Buckingham Palace Garden, London. A male, which has been examined by PJC, was found in the sample from the catch up to 30 June 1995. Two other males were found in the samples from this trap for the periods 27 July to 3 August 1995 and 25 April to 9 May 1996. The Malaise trap was sited at one end of the wooded mound, which is a prominent feature in a corner of the garden.

A male was taken in a Malaise trap operated by JWI at Burnham Beeches NNR, in a sample from the period 7 June to 21 June 1995. This trap was sited at SU 9530 8490 on the bog above the lakes and was oriented at right angles to a slight slope in a large, recently cleared area with *Sphagnum*, birch (*Betula*) and long grasses. The trap was in an open position and was placed to collect insects from a wide area. The water table in this area was high and remained so during the drought of 1995. It was then of particular interest that another male was reared from a puparium collected from under bark of a fallen beech log, in which earthworms were present, in the Pumpkin Hill area of Burnham Beeches this year; this was collected by GER (during a visit accompanied by JWI and PJC) on 21 April and the adult emerged on 25 April.

This species has apparently not been recorded from Britain previously and is poorly known biologically.

Description of the puparium of *B. bayeri*: one puparium examined.

Length: 7mm; width 3mm; subcylindrical in cross-section, tapering anteriorly; red-brown with a darker, more wrinkled posterior end; interrupted rows of backwardly directed spicules round the complete circumference of the beginning and end of each thoracic and abdominal segment (Fig. 1); anterior spiracles consisting of two sclerotised, pale brown lobes each bearing spiracular openings at their tips (Fig. 4); first abdominal segment bearing a pair of pupal respiratory horns, length 0.2mm (Figs 1 and 3); locomotory organs consisting of complex arrangements of rows of spicules mostly on the anterior margin of each of the first seven abdominal segments (Fig. 5); posterior end inclined with six pairs of posterior papillae (Fig. 2); posterior spiracles each with three straight slits approximately parallel to each other with a complete peritreme and button (Fig. 2); anus parallel to the length of the body and with a pair of lateral anal lobes; cephalopharyngeal skeleton (Fig. 6); mouth-hooks large, without oral sclerite; dental sclerite present; intermediate

sclerite short and broadening posteriorly; parastomal bar shorter than intermediate sclerite; dorsal bridge lightly sclerotised; dorsal cornu heavily pigmented except for two apical windows and dorsal margin; ventral cornu lacking windows and heavily pigmented; ventral pharyngeal ridges apparently absent.

Discussion

The adult of *B. bayeri* is readily separated from other *Bellardia* species occurring in Britain by the presence of a dark brown spot on the upper part of the parafacials which does not disappear when viewed tangentially from above and the lower calypter which is heavily and evenly infuscated black (Rognes 1991). The puparium appears to differ from other calliphorids by the form of the twin-lobed anterior spiracles (Fig. 4).

The biology of the genus *Bellardia* is poorly known but some species are reported to be parasites or predators of earthworms (Smith 1989, Rognes 1991). For *B. bayeri*, biological data is summarised by Rognes (1991) which includes a male reared by Lundbeck in Denmark on 31.iii.1911 from a puparium found under *Ulmus* bark on 25.xii.1910. Rognes (1991) also referred to three females reared from the lumbricid, *Eisenia foetida* (Savigny) in Russia. *Bellardia* species are viviparous and the Mark Ash female was found on dissection to contain 32 first stage larvae, each approximately 0.7mm in length.

The present rearing records from fallen *Fagus* at Newbattle and Burnham Beeches fits in with these records as unidentified earthworms were relatively common among moist to wet debris under loose portions of bark. The New Forest record could also indicate association with earthworms in rotten wood, although this is less obvious in Buckingham Palace Garden where management of the Garden has precluded any continuity of dead wood. The Garden was visited by PJC on 15 August 1997, when the opportunity was taken to inspect the Malaise trap site in the company of the Head Gardener, Mark Lane and Andrew Halstead. It was understood from Mr Lane that there had previously been a stack of elm (*Ulmus*) logs in the vicinity. The logs had since been removed and there was nothing remaining of the elm stumps above ground level but the possibility of subterranean dead wood exists.

Evidence of a parasitic way of life is also obtained from the cephalopharyngeal skeleton. According to Ferrar (1987) parasitic calliphorid larvae differ from saprophages by the absence of ventral pharyngeal ridges and the development of large (about half as long as the dorsal cornu) mouth-hooks. *B. bayeri* both lacks these ridges and has large mouth-hooks.

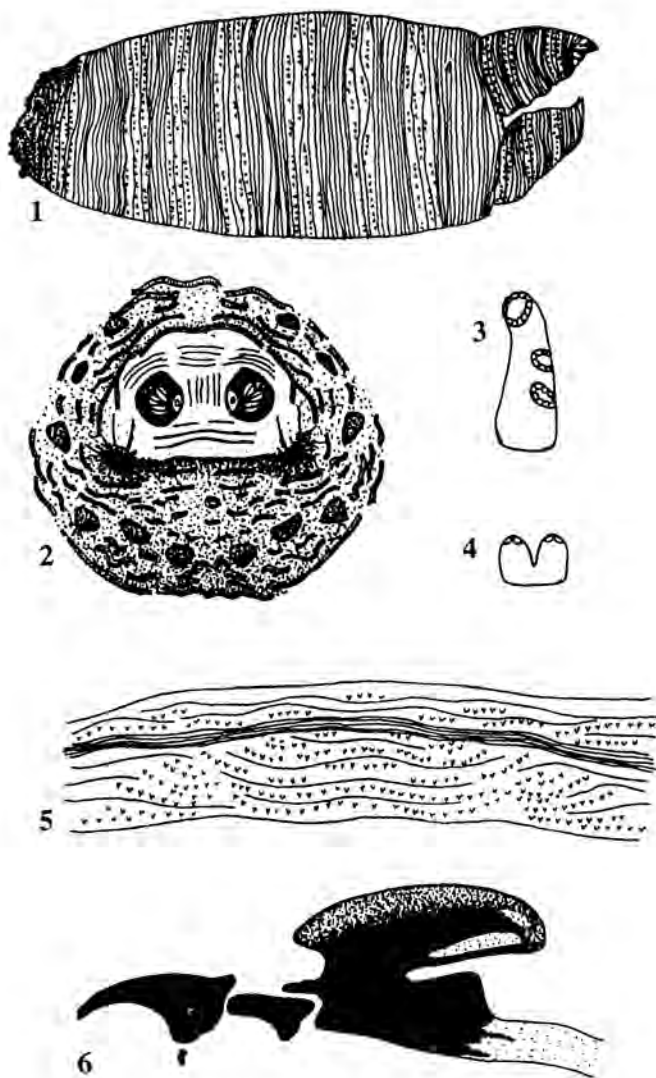
B. bayeri appears to be widely distributed in Britain according to our records. It looks as if collecting *Bellardia* round fallen wood might extend the distribution of this species in Britain.

Acknowledgements

We are grateful to Colin Plant, who has been responsible for sorting Malaise trap material from Buckingham Palace Garden and distributing it to specialists, for informing us of the *B. bayeri* material from this survey and to Del Smith for kindly forwarding a specimen identified by him from this survey to PJC.

Material from the garden at Buckingham Palace was collected as part of an in-depth survey into the flora and fauna there, with gracious permission of Her Majesty The Queen, by the London Natural History Society and the Natural History Museum.

The Scottish record reported here was part of a wider project on saproxylic Diptera in Scotland carried out by the Malloch Society. We gratefully acknowledge the contribution made by members of the Society to this work of which the present study is a part and for the financial assistance provided by the Worldwide Fund for Nature and Scottish Natural Heritage.



Figs 1-6 *Bellardia bayeri*, puparium, 1, whole puparium with cap split open, lateral view, length 7mm; 2, posterior end, apical view; 3, pupal respiratory horn, lateral view; 4, anterior spiracle, lateral view; 5, locomotory organ, upper part, 3rd abdominal segment, lower part, 4th abdominal segment; 6, cephalopharyngeal skeleton, lateral view.

The discovery at Burnham Beeches was part of a survey carried out by JWI, which was funded by the Corporation of London. We are grateful to Dr H. Read, Ecologist and Mr M. Frater, Keeper for the facilities provided at Burnham Beeches and Dr S.J. Simpson, Curator of Entomology, Hope Entomological Collections for research facilities.

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Species of *Medetera* (Diptera, Dolichopodidae) active in late

autumn - Records of adult *Medetera excellens* Frey, *M. saxatilis* Collin and *M. truncorum* Meigen occurring in September were given by Assis-Fonseca (1978. *Handbooks for the Identification of British Insects* 9 (5), iv+1-90), but apart from this he mentioned no species of this genus being taken in the British Isles later than August. However, in mild weather some species may occur as late as November. On poplar trunks in Home Park, Windsor, Berkshire (SU 9777), I found a male of *M. impigra* Collin on 3.xi.1997, and both sexes of *M. jacula* (Fallén) on 25.ix and 4.xi.1997. Three males of *M. dendrobaena* Kowarz were taken at Black Park, Wexham, Buckinghamshire (TQ 0083) on 1.ix.1981, two males of *M. truncorum* Meigen at Datchet, Berkshire (SU 9976) on 2.x.1987 and a pair of *M. petrophila* Kowarz at Minsmere N.R., Suffolk (TM 4767) on 13.x.1995.

Peter Chandler has informed me that he has found *M. jacula* in numbers on trunks in the beech avenue on the golf course at Leckford, Hampshire on 3.x.1970 and on beech trunks at Denny Wood, Hampshire on 8.x.1972. He has also recorded *M. dendrobaena* on 1.x.1967 at Knole Park, Kent and on 13.x.1983 at Swanton Novers Great Wood, Norfolk, as well as *M. jugalis* Collin on 15.x.1983 at Bure Marshes, Norfolk.

Although a female of *M. impigra* taken on 4.xi.1997 was lethargic and failed to fly into the tube placed over her, individuals of both sexes of *M. jacula* taken on the same day were normally active, as were the other flies mentioned above. A female of *M. jacula* was seen to take a small mite as prey on 10.x.1997; a male and a female of the same species each took small Collembola as prey two days later.

In both *M. jacula* and *M. truncorum* the male courtship behaviour involves him in turning to face the female, partially separating the wings in the same plane as when they are at rest and then rapidly quivering them before returning them to the resting position. He then jumps nearer to the female and repeats the process until the final jump brings him immediately behind her. I have observed this type of courtship behaviour as late as 26.ix.1988 in *M. truncorum* and 13.x.1997 in *M. jacula*. In both species males may sometimes court other males of their own species. With *M. truncorum*, two males were seen simultaneously courting a third male on 26.ix.1988. Both ultimately landed so close behind "her" that all three were captured in the same 3x1 in. tube. On 26.ix. and 12.x.1997 a male *M. jacula* was seen to court a male *M. truncorum* -

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The British species of *Dasiops* Rondani, 1856 (Diptera, Lonchaeidae)

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The British Lonchaeidae were monographed by Collin (1953) who recognised four species of the genus *Dasiops* Rondani. The subsequent European revision of this family by Morge (1959, 1963) resulted in nomenclatural changes to two of the species dealt with by Collin and the addition of a fifth species, *D. calvus* Morge, of which one of the types was a male collected by Collin in the New Forest subsequent to his paper. A second record of the latter species is reported here and checking of recently collected British material against Morge's keys has indicated the presence of three further species, which can presently be recorded as British only on the basis of females.

There are good specific characters in the structure of the ovipositor in this genus, both in the form of the long blade-like segment 8, which is contracted into the abdomen *in situ* and in that of the small apical part which comprises the fused cerci. The male genitalia are rather small and simple in structure compared to other Lonchaeidae with the most obvious specific characters in the form of the surstyli, which generally have a bilobed appearance with one or more strong cone-like teeth set in the internal apical margin. Closely related species, however, show less differences in the male than in the female genitalia. While only one sex has been examined of four of the eight species recognised here, it is hoped that the combination of chaetotactic and genital characters used in the key will enable recognition of the other sex when British material is found.

Dasiopinae are characterised by the presence of poststigmatal hairs or bristles, which are absent in other Lonchaeidae. They also have the lunule (area above antennae) bristled as in *Lonchaea* itself. Morge (1959) placed all species in *Dasiops* Rondani, but later (1963) proposed the genus *Silvestrodasiops* for species with a combination of characters not found simultaneously in other Dasiopinae. This group, which included the British species *occultus* Collin, has additional hairs or bristles to the usual two pairs of scutellar bristles and two or more poststigmatal hairs or bristles at the same time as having entirely dark tarsi. However, the male and female genitalia of species included in *Silvestrodasiops* overlap with the range of variation between other species groups of *Dasiops sensu lato*, which is a large group with many species in North America and in the tropics. Consequently, the view of Máca (1997) who followed McAlpine and Steyskal (1982) in treating *Dasiops* in the broad sense pending a revision of the entire group, is supported here.

Most *Dasiops* species appear to be relatively uncommon and less is known of the biology of the genus than of that of *Lonchaea*, although what is known suggests that there is a similarly wide range of larval habits. Some species do, like most *Lonchaea*, develop under bark or in rotten wood and at least *D. spatiosus* (Becker) and *D. perpropinquus* Morge among British species are in this category. Other species are associated with other parts of plants. The larva of the widespread southern European species *D. latifrons* (Meigen) forms galls in the stems of the grasses *Cynodon dactylum* and *Agropyron repens* (Morge 1959). A North American species, *D. alveofrons* McAlpine is a pest of apricots but was also recorded from dead sunflower stems, rotting cactus flowers and walnut husks (McAlpine 1961). Several Neotropical species, some of them reaching Florida, develop in the flowers or fruit of various passion fruits (*Passiflora* species) and are unique in the genus in having ovipositors with serrated tips (Steyskal 1980).

While some of the British species with unknown biology have been found mainly in woodland or around decaying wood, at least the commonest species *D. mucronatus* Morge, is often found in open habitats and development in herbaceous plants in that case seems likely. The remarkably broad ovipositor of the species group including *D. mucronatus* and *D. heinigi* Morge in Britain and also *D. latiterebra* Czerny in Europe may indicate a different or more specialised biology to the other species. *D. latifrons* mentioned above also has a fairly broad ovipositor.

The key provided here is based on that of Morge (1963). It makes much use of chaetotactic characters of the thorax which are indicated in Fig. 1.

Key to British species of *Dasiops* Rondani, 1856

- 1 Additional bristles on scutellar margin, at least 1 or 2 in front of the lateral scutellar. Several short poststigmatics. Strong anterior bristles not present on anepisternum. One strong stigmatical (a weaker hair on one side in female examined). Tarsi entirely black.
Male: single short tooth on margin of surstylus (Fig. 5).
Female: ovipositor narrow, with arrow-head shaped apical part (Fig. 12).
occultus Collin 2
- Only the 4 strong bristles on the scutellar margin (occasional examples with an additional short bristle in this position on one side) 2
- 2 Basitarsi of all legs contrasted yellowish. Eyes bare or with very short hairs. 3
- Legs entirely black. Eyes distinctly hairy. 5
- 3 More than one (2-5) stigmatical bristle. Anepisternum with 2-3 stronger anterior bristles in vertical row below anterior notopleural. Squamae with pale hairs on greyish margin.
Male (not examined): two closely apposed teeth on margin of surstylus.
Female: ovipositor slender with apical part downturned and almost pointed apically (Fig. 8).
solivagus Morge 4
- Only one stigmatical bristle. 4
- 4 Squamae yellowish with pale hairs on margin. Anepisternum with a distinct row of 3-4 anterior bristles below anterior notopleural.
Male: two slender narrowly separated teeth on margin of surstylus (Fig. 4).
Female (not examined): ovipositor resembling that of *solivagus*.
calvus Morge
- Squamae dull greyish with dark hairs on margin. Anepisternum without a row of anterior bristles, only 1-2 such setae near the upper front corner, although anterior part of surface has dense irregular bristling.
Male: three closely apposed teeth on margin of surstylus (Fig. 2).
Female: ovipositor straight in lateral view; segment 8 relatively short and broad, the apical part pointed (Fig. 9).
trichosternalis Morge
- 5 Only 1 stigmatical bristle. A series of 2-4 strong vibrissa-like bristles in a row on cheek.
Male: only 2 closely apposed teeth on margin of surstylus (Fig. 3).
Female: ovipositor relatively slender (Figs 9-10). 6
- Several stigmatical bristles. Only 1 strong vibrissa-like bristle on cheek.
Male: 8-9 teeth on margin of surstylus (Figs 6-7).
Female: ovipositor very broad (Figs 13-14). 7

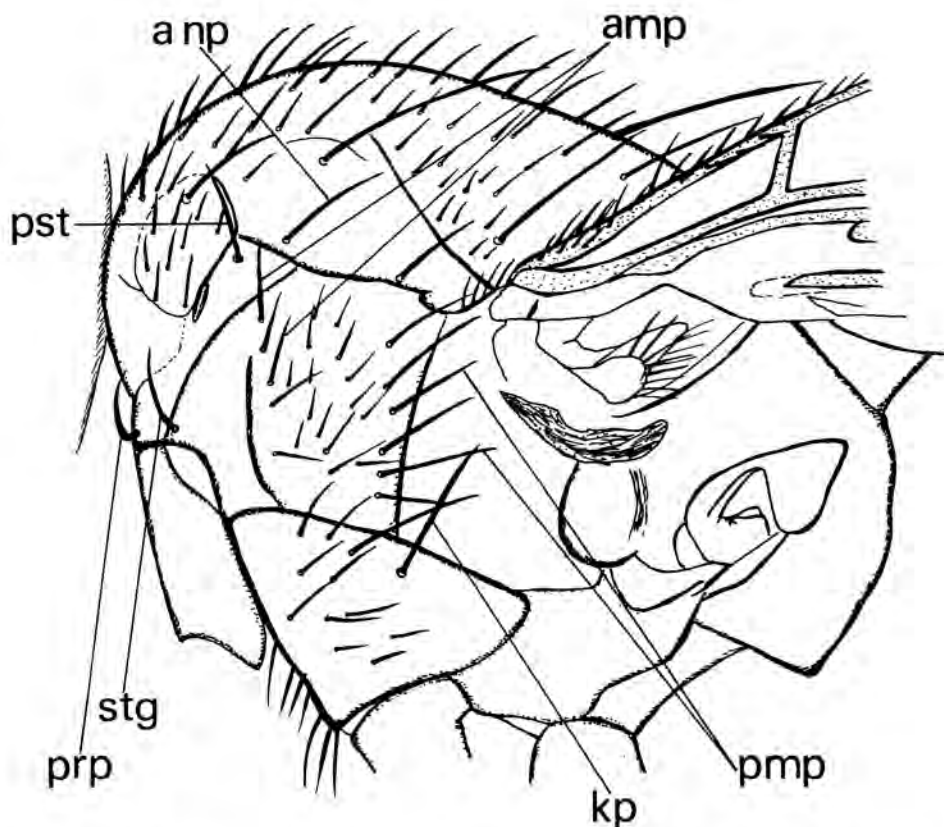
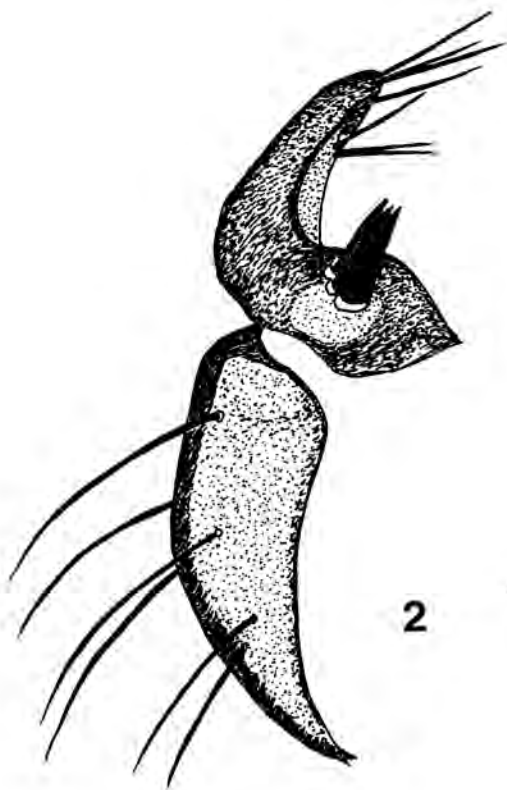
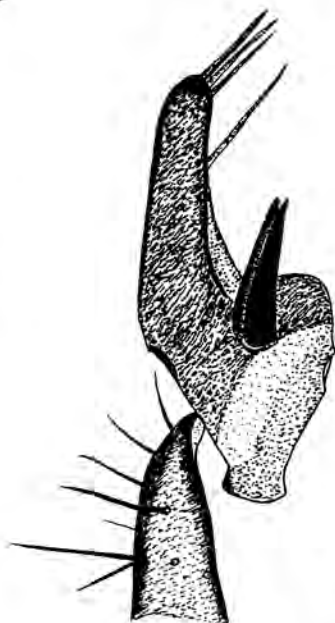


Fig. 1. Lateral view of thorax of *Dasiops perpropinquus* Morge female. Notation of bristles: a np anterior notopleural, amp anterior anepisternals, kp katepisternal, pmp posterior anepisternals, prp proepisternal, pst poststigmatal, stg stigmatal (= proepimeral).

- 6 Male: anterodorsal series of bristles on apical half of hind tibia up to 1.5 times the tibial width (not longer than tibial width in female). Surstylus as in Fig. 3.
Female: ovipositor with apical part more rounded apically, in lateral view set at an angle to segment 8 (Fig. 10). **spatiosus** (Becker)
- Male (not examined): anterodorsal bristles on hind tibia at most equal to tibial width.
Surstylus similar to *spatiosus* but basal part apparently less angular.
Female: ovipositor with apical part lance-shaped and more deeply set in segment 8 basally, in lateral view in line with it (Fig. 11). **perpropinquus** Morge
- 7 Male (not examined): teeth on base of surstylus very short relative to slender lateral lobe
Female: ovipositor with segment 8 very wide, apical part with broad base before being tapered to a point (Fig. 13). **hennigi** Morge



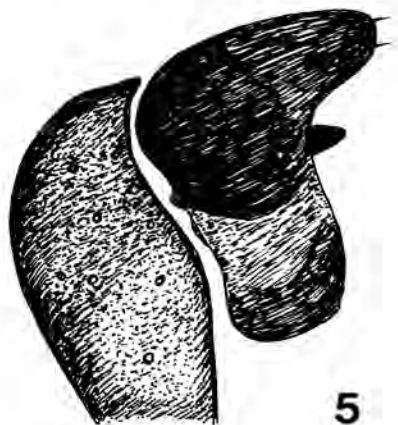
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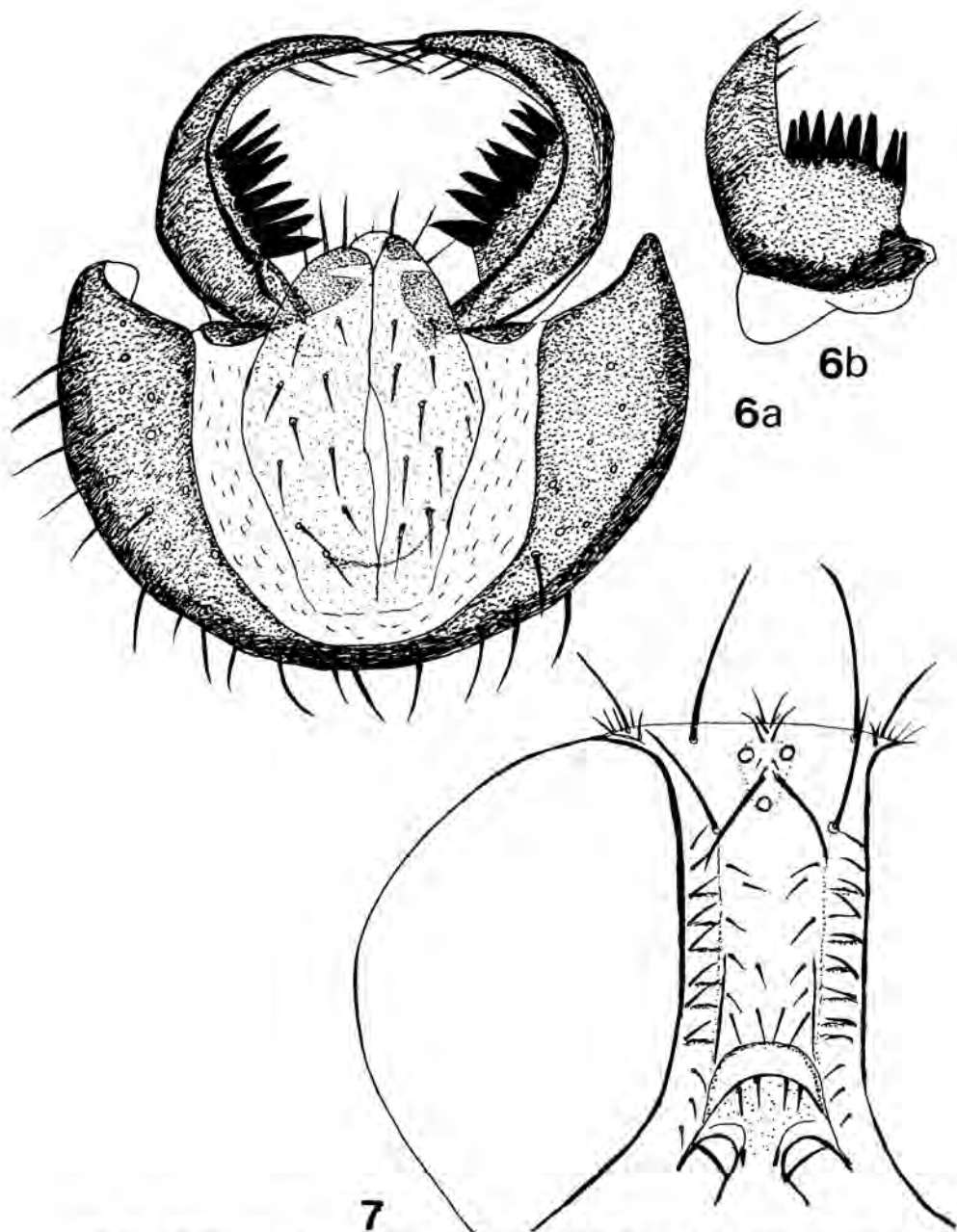


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Figs 2-5. Male genitalia of *Dasiops* species: posterior view of right surstylus. 2, *D. trichosternalis* Morge; 3, *D. spatiosus* (Becker); 4, *D. calvus* Morge; 5, *D. occultus* Collin.



Figs 6-7. *Dasiops* species. 6, *D. mucronatus* Morge male genitalia: 6a, posterior view of epandrium and surstyli; 6b, lateral view of surstylus. 7, *D. calvus* Morge, male frons.

- Male: teeth on base of surstylus relatively longer, more than a third length of lateral lobe (Figs 6a-b).
- Female: ovipositor narrower, segment 8 more angular on apical half; apical part more evenly tapered from the base (Fig. 14). **mucronatus** Morge

Notes on the species

The material examined is from the collections of the Natural History Museum, London (BMNH: principally E.C.M. d'Assis-Fonseca collection, EAF), the Hope Entomological collections at Oxford University Museum (OXUM: J.E. Collin collection only, JEC) and the private collections of Jonathan Cole, John Dobson, Ivan Perry and the author (PJC).

Chandler (1986) recorded *D. trichosternalis* from Ireland, the only published Irish record of the genus. A second species, *D. mucronatus* Morge, is recorded from Ireland here.

Dasiops occultus Collin, 1953

Collin (1953) described this species from three males, of which one from Aviemore was designated lectotype by Morge (1959). The Finnish females described and figured by Hackman (1965) correctly belonged to *D. perpropinquus* according to Morge (1959), who identified the type of *D. ingricus* (Stackelberg, 1955) as the female of *occultus*. The British female recorded here agrees with Morge's figure of the ovipositor and *D. occultus* has also been found on the recent survey of Burnham Beeches NNR by John Ismay (MacGowan, pers. comm.).

Material examined: Inverness-shire, Aviemore, 8.vi.1913 male (JEC); Suffolk, Barton Mills, 8.vi.1931 male paratype (JEC); Buckinghamshire, Burnham Beeches NNR, 26.vi.1983 female (PJC).

Dasiops solivagus Morge, 1959

This was described from a few examples of both sexes from Hungary and the Crimea. Five British females are considered conspecific.

Material examined: Oxfordshire, Wytham Wood, 31.viii.1962, 2 females (EAF); Berkshire, Windsor Forest, 3.viii.1974 female on fallen beech (*Fagus*) trunk (PJC); Hampshire, New Forest, Mark Ash Wood, 2.vi.1984 female (PJC); Somerset, Leigh Woods, 4.vii.1985 female (PJC).

Dasiops calvus Morge, 1959

One of the paratypes of this species was a male collected by J.E. Collin. This specimen is in OXUM and Fig. 4 is drawn from the genitalia slide of this specimen, prepared by Morge. The wrinkles near the side margin of the frons described and figured from a female by Morge (1959) are discernible with difficulty and this character has not therefore been used in the key. The position of these wrinkles is, however, indicated in Fig. 7. On other characters *calvus* closely resembles *solivagus*, but has only one stigmatal bristle, while the three females here determined as *solivagus* have up to five bristles in this position. Further material is necessary to confirm that the male of *calvus* is specifically distinct from the *solivagus* females.

Material examined: Hampshire, New Forest, Aldridge Hills, 14.ix.1956 paratype male (JEC); Devon, Dawlish Warren, 20.viii.1960 male (EAF).

Dasiops trichosternalis Morge, 1959

Collin (1953) recorded this species as *D. facialis* Collin, which he proposed as a new name for *albiceps* Frey, 1930 because this name was preoccupied. When it was realised that the British material was not conspecific with *albiceps* Frey, Collin (1957) tried to limit the name *facialis* to the British species. However, Morge (1959) was correct in considering that the type of *facialis*

must be that of *albiceps* and proposed the name *trichosternalis* for the British species. One example from Nethy Bridge (BMNH) has two strong poststigmatal bristles.

The biology is unrecorded but Hackman (1956) recorded the related *D. facialis* mainly on dead or damaged trunks of aspen (*Populus tremula*). It has been collected from 21.iv to 5.vii.

Material examined (5 males, 8 females): Merioneth, Ganolwyd (cited as Garellwyd by Morge 1959), paratype male, 21.iv.1938 (JEC); Inverness-shire: Aviemore, 30.v.1913 male, 15.vi.1913 female (JEC); Glenmore, 13.vi.1960 female (JEC) and 5.vii.1965 female (EAF); Glen Urquhart, 5-12.vi.1962 female (EAF); Grantown, 10.vi.1960 female and 28.vi.1938 holotype female (JEC); Loch Vaa, 1.vi.1965 male (EAF); Nethy Bridge, 16.vi.1967 female (EAF); River Findhorn, Dulsie, 25.v.1991 male (I. Perry); Sutherland, Loch Loyal, 4.vii.1938 female (JEC); Down, Clandeboyne, 5.v.1970 male (PJC).

***Dasiops spatiosus* (Becker, 1895)**

Collin (1953) recorded *spatiosus* on a few specimens from southern England. It has since been found widely in Britain and has been reared on several occasions by the Malloch Society during their saproxylic Diptera project, from well decayed soft sapwood mainly of birch (*Betula*) but also of lime (*Tilia*). There are scattered records at woodland and wooded fen sites from Somerset to Ross. The separation of the male from that of *spatiosus* is, however, difficult and the characters used by Morge (1959) were comparative and variable. It is also unclear whether there are constant differences in structure of the male genitalia. It is possible that some of the males assigned to *spatiosus* here are indeed *perpropinquus*. A possible male *perpropinquus*, with the hind tibial bristles somewhat shorter than in males assigned to *spatiosus*, has been examined from Middlesex, Brent Reservoir, 19.vii.1996 (J.R. Dobson), but more material is necessary to come to confident conclusions on this. Collection dates of adults are from 5.vi to 20.vii.

Material examined (10 males, 4 females): Somerset, West Town, 22-28.vi.1947 male (EAF) and Vallis Vale, 2.vii.1985 male (PJC); Gloucestershire, Coombe Dingle, 13.vi.1948 male and Blaise Woods, 5.vii.1948 male, 8.vii.1948 male and 3-8.vii.1948 male and female (EAF); Herefordshire, Cusop Dingle, 5.vi.1900 male (J.H. Wood, BMNH); Worcestershire, Wyre Forest, 5.vi.1966 male (A.C. Pont, BMNH); Huntingdonshire, Holme Fen NNR, 20.vii.1973 female and 28.vi.1987 female (J.H. Cole); Glamorgan, Oxwich, 11-16.vi.1955 male (EAF); Ayrshire, Culzean Castle, 10.vii.1995 female on log pile (PJC); Ross, Beinn Eighe NNR, Glas Leitire, 10.vi.1984 male (J.H. Cole).

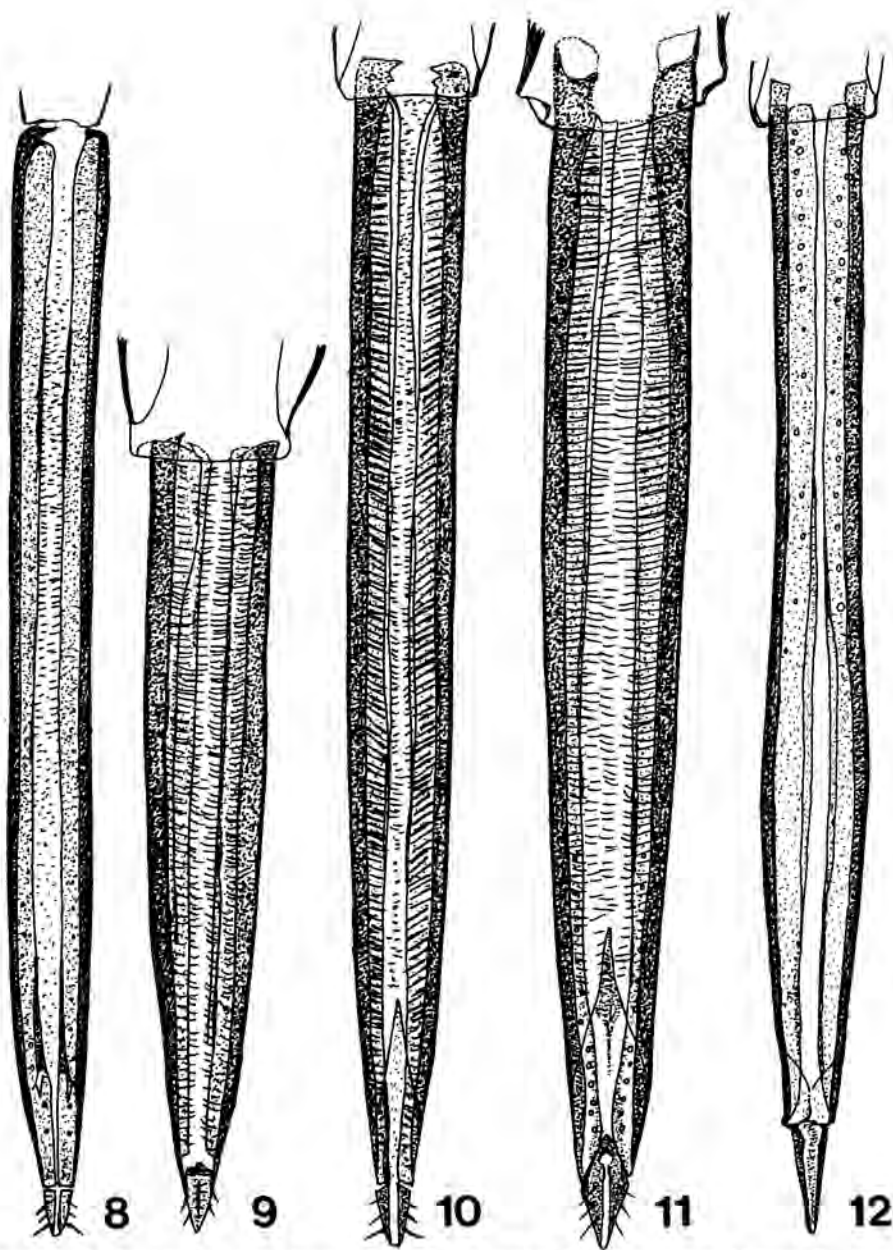
***Dasiops perpropinquus* Morge, 1959**

This species is very close to *D. spatiosus* but the females recorded here differ in the detailed structure of the ovipositor and agree with Morge's figures of this species. A possible male and the difficulties of separating males from *spatiosus* are mentioned under that species. Morge (1959) recorded this species more widely in Europe than *D. spatiosus* and reared it from a larva found under hornbeam (*Carpinus betulus*) bark in Germany; he also (1963) figured the puparium.

Material examined: Berkshire, Dinton Pastures Country Park, Mortimer's Meadows, wooded fen and grassland at south end, 31.vii.1993 female and 8.viii.1993 female (PJC); Hampshire, Ramsdell, 30.vi.1973 female (PJC).

***Dasiops mucronatus* Morge, 1959**

This was the species called *D. latiterebra* (Czerny, 1934) by Collin (1953). Morge (1959) found that *D. latiterebra* was a different eastern European species and proposed the name *mucronatus* for Collin's species, designating one of his specimens from Barton Mills as a paratype and otherwise described it only from Germany, the holotype coming from Berlin. Máca (1997) recorded it from the Czech Republic, one of his sites being a boggy meadow.



Figs 8-12. *Dasiops* species, dorsal view of ovipositor. 8, *D. solivagus* Morge; 9, *D. trichosternalis* Morge; 10, *D. spatiosus* (Becker); 11, *D. perpropinquus* Morge; 12, *D. occultus* Morge.



13



14

Figs 13-14. *Dasiops* species, dorsal view of ovipositor. 13, *D. hennigi* Morge; 14, *D. mucronatus* Morge.

This is the most frequently collected and widespread species in Britain (58 males, 64 females examined from 42 localities) with records from woodland, heathland, marsh, dunes and saltmarsh at sites from the south coast of Devon to Ross. Collection dates are 14.v to 10.vii.

New to Ireland. Dublin, Howth, 12.vi.1953 female (R.L. Coe, BMNH).

***Dasiops hennigi* Morge, 1959**

This was described from ten females from Finland, Poland and the north of European Russia. Máca (1997) added several records from the Czech Republic, including a record of a male of which he figured the surstylus; this had similar structure to that of *D. mucronatus*, except that the row of teeth were relatively short and the apical lobe was consequently five times as long as the teeth. The British females agree very well with Morge's figure of the ovipositor. The known sites have a mixture of wooded and open habitats. Collection dates are from 23.v to 10.vii.

Material examined (10 females): Huntingdonshire, Bevil's Wood, 29.vi.1963 female (EAF); Suffolk, Barton Mills, 23.v.1974 female, 19.vi.1974 two females, 21.vi.1974 three females, 7-10.vii.1974 female (EAF); Cambridgeshire, Wicken Fen, 6.vii.1991 female (I. Perry); North Yorkshire, Ashberry Pastures, 27.v.1992 female (PJC).

Acknowledgements

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The Diptera of Moccas Park National Nature Reserve

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Introduction

The Diptera fauna of Moccas Park National Nature Reserve (NNR) is described. Sources of records are given and important existing records are mentioned. New records are provided, based on the author's recording and significant unpublished records from other entomologists.

Moccas Park was the first NNR designated in Britain and represents one of the premier British sites for saproxylic Coleoptera (Welch and Cooter 1981, Steele 1985). It was listed by Harding and Alexander (1994) as the third most important for saproxylic Coleoptera in Britain, with only the much larger Windsor Great Park & Forest (710ha) and the New Forest (3800ha) ranked above it (Moccas Park is 140ha). Unfortunately, the importance of the site for Diptera is considerably less well-known, although there are several important records. Recent studies have attempted to improve our knowledge of the site and provide information for good management.

Location and site description

Moccas Park NNR is situated approximately 9 miles north-west of Hereford near the village of Bredwardine on the B4352. It is situated on the southern slope of the Wye Valley, which has a north-west/south-east alignment. The road wraps around the lowest part of the Park, the most obvious physical feature here being a large pond known as the Lawn Pool to the north-east. Increasingly steep slopes, most of which are wooded, occur to the south-west. The old park, which occupies the lower ground, comprises grassland grazed by deer and sheep, interspersed with large ancient or overmature and often stag-headed trees, of which both species of native oak *Quercus* are by far the dominant species. Other important tree species include beech *Fagus* (mostly dead or seriously decayed), sweet chestnut *Castanea sativa*, field maple *Acer campestre* and horse chestnut *Aesculus* (mostly on the lower hill slopes) (Harding 1977). Hollows in the low ground near the Lawn Pool support *Carex* and *Juncus* and the island in the centre of the Lawn Pool supports *Salix* over *Carex paniculata*. A number of small streams are present to the south; one of them in woodland is characterised in part by tufa terraces and has produced some interesting records. The NNR also includes part of the wooded slopes above the Park proper, but these have not been surveyed by the author and possibly not by others.

Previous records

The earliest records are those of Dr John Wood, a well known and highly regarded entomologist, who did most of his collecting in his native Herefordshire (he was a G.P. at Tarrington for nearly half a century). Unfortunately, it appears that Moccas Park was not one of his favourite localities, since there are only a few references to the Park in his publications. Examination of his collection (in BMNH) may reveal more specimens. Wood (1913) recorded the dolichopodids *Thrypticus laetus* Verrall, *T. nigricauda* Wood and *Rhaphium elegantulum* (Meigen) from Moccas Pool (= Lawn Pool) in 1912 and 1913. These *Thrypticus* records and records for *Rhaphium micans* (Meigen) and *Campsicneme pumilio* (Zetterstedt) (= *pectinulatus* (Loew)) (all undated) are mentioned by Assis-Fonseca (1978). *Hercostomus angustifrons* (Staeger) (Dolichopodidae) was also recorded by Dr Wood on 24.ix.1910 (Assis-Fonseca 1978, Steele 1985). Falk and Ismay (in preparation) cite a record of *Heteromeria nigrimana* (Loew) (Clusiidae) from Moccas in 1912

and *Periscelis winnertzi* Egger (Periscelidae) taken by James Collin in August 1934 and 1936, whilst a 1913 record for *Conops strigatus* Wiedemann (Conopidae) was given by Smith (1959).

James Collin visited the Park on a number of occasions. He described five species as new to science from Moccas, either on his or Wood's specimens. These are *Hilara griseifrons* Collin, *H. nigrohirta* Collin (Empididae), *Anthomyza dissors* Collin (Anthomyzidae), *Setacera trina* Collin (Ephydriidae) and *Fiebrigella baliola* (Collin) (Chloropidae) (Pont 1995). He also recorded *Lasiambia brevibucca* (Duda) (Chloropidae) from the Park (Collin 1947).

Harding (1977) mentioned only one species (*Neopachygaster meromelas* (Dufour) (= *meromelaena* emend.)) although he mentioned surveys carried out by Peter Skidmore, records from which are incorporated in the new list. Alan Stubbs visited the Park in 1977 and recorded the following hoverflies: *Brachypalpus laphriformis* (Fallén), *Criorhina floccosa* (Meigen), *Dasysyrphus albostrigatus* (Fallén), *Parasyrphus annulatus* (Zetterstedt) and *Pipiza noctiluca* (Linnaeus) (Steele 1985). Pont (1979) gave an undated record of *Themira germanica* Duda (Sepsidae), whilst Skidmore (1985) mentioned some muscids reared from dung. A list of records made by Jonathan Cooter from 1976 was provided by Paul Harding.

Recent Surveys

In 1994 the author carried out a three-day Diptera survey of the Park using direct searching methods, sweep netting and water traps (Ecosurveys 1994). Saproxylous taxa were given priority on this survey. The Diptera from an interception trap used by Jonathan Cooter to collect Coleoptera in 1992 have also been examined. In 1997 several members of the Dipterists Forum, including the author, visited the site on the weeklong meeting based at Abergavenny and added many significant records.

Results

The current Diptera list includes about 600 species (Godfrey in press). Only the more significant records are mentioned here. Several families have been poorly covered e.g. Chironomidae, Sphaeroceridae, Ephydriidae and Agromyzidae, but it is hoped that more work will rectify this.

TIPULIDAE: *Ctenophora pectinicornis* (Linnaeus) (Notable) was found emerging from the broken limb of a horse-chestnut in 1997.

LIMONIIDAE: *Molophilus lackschewitzianus* Alexander (RDB3) was found in the interception trap material. Also significant are *Molophilus corniger* de Meijere (Notable) and *Tasiocera robusta* (Bangerter) (Notable). *Tasiocera muscula* (Schmid), taken by Ivan Perry and identified by Alan Stubbs, is new to Britain.

MYCETOPHILIDAE: four species identified by Peter Chandler, *Sciophila nonnisilva* Hutson, *Docosia fuscipes* (von Roser), *Exechiopsis membranacea* (Lundström) and *Sceptonia costata* (van der Wulp) have been treated as Notable. All are widespread in England and Wales and this status is retained only for *E. membranacea* by Falk and Chandler (in preparation). *S. nonnisilva* is also known from Scotland and has been reared from the fungus *Hirneola auricula-judae*.

PSYCHODIDAE: *Pericoma calcilega* Feuerborn was swept around tuffaceous deposits by the stream mentioned above and identified by Phil Withers. This is regarded as a rarity but there are several records from calcareous streams (Elbourn 1965, Furse *et al.* 1991, McNish 1992). The author also has several records of larvae of *Pericoma calcilega* or *trifasciata* (Meigen) from tuff deposits throughout Britain. The larvae of these two species are very distinct in that they coat themselves with lime.

MYCETOBIDAE: *Mycetobia pallipes* Meigen (Notable) was taken on horse chestnut sap, which is the usual habitat of this species in the author's experience.

DIXIDAE: *Dixa maculata* Meigen (Notable) was identified from the interception trap material.

RHAGIONIDAE: *Ptiolina nigra* Staeger (Notable) was recorded in the interception trap.

STRATIOMYIDAE: *Oxycera pardalina* Meigen and *O. pygmaea* (Fallén) (both Notable) were swept from the same tufa deposits as *Pericoma calcilega*. There are old records for *O. pardalina* from nearby Tarrington, Woolhope and Cusop (Shirt 1987). *Odontomyia tigrina* (Fabricius) (Notable) was taken from the Lawn Pool by sweeping and by using water traps. *Neopachygaster meromelas* was recorded by Peter Skidmore and Jonathan Cooter but there are no recent records.

ASILIDAE: *Choerades marginatus* (Linnaeus) (Notable) found by Peter Skidmore in the 1960s.

HYBOTIDAE: *Platypalpus aurantiacus* (Collin) (Notable) in the interception trap in 1992.

EMPIDIDAE: *Rhamphomyia micropyga* Collin (Notable) was recorded in 1992.

DOLICHOPODIDAE: none of the species recorded by Wood, mentioned above, have been refound. One other Notable species, *Hercostomus nigrilamellatus* (Macquart) was recorded in 1997. The infrequently recorded *Systemus pallipes* (von Roser) was taken and reared from horse chestnut sap and from the interception trap.

SYRPHIDAE: *Platycheirus immarginatus* (Zetterstedt) (Notable) was recorded in 1976 by Jonathan Cooter and identified by Alan Brindle. *Brachyopa insensilis* Collin (Notable) larvae and adults were found associated with horse chestnut sap in 1994 and 1997. *Brachypalpus laphriformis* (Notable) was recorded by Alan Stubbs in 1977 and by the author from a recently fallen oak in 1997.

PIPUNCULIDAE: *Dorylomorpha anderssoni* Albrecht (proposed Notable in Falk and Chandler in preparation) was recorded by Ivan Perry and the author in 1997.

MEGAMERINIDAE: a singleton of *Megamerina dolium* (Fabricius) (Notable) was found in a water trap placed on the margins of the Lawn Pool in 1994.

CONOPIIDAE: *Conops strigatus* was collected by C.J. Wainwright in 1913 (Smith 1989).

SCIOMYZIDAE: several *Colobaea pectoralis* (Zetterstedt) (RDB2) were swept from *Carex* beds in hollows in low-lying parts of the Park in 1997. *Pteromicra glabricula* (Fallén) (Notable) was beaten from *Carex paniculata* tussocks in the Lawn Pool whilst *Pherbellia annulipes* (Zetterstedt) (Notable) was recorded throughout the Park by Ivan Perry and the author in 1997.

SEPSIDAE: *Themira germanica* Duda (Notable) was cited by Pont (1979).

CLUSIIDAE: one of the most significant records is that of *Heteromeria nigrimana* (RDB1) recorded in 1912 (Falk and Ismay in preparation). Most of the records for this species are old (1945 and earlier) with recent records only for the Isle of Wight and Burnham Beeches.

ANTHOMYZIDAE: *Anagnota bicolor* (Meigen) (Notable) was beaten from *Carex paniculata* tussocks in 1997. The author has several records of this species from this micro-habitat, which it shares with several other anthomyzids.

AULACIGASTRIDAE: *Aulacigaster leucopeza* (Meigen) (Notable) was recorded in 1994 from horse chestnut sap and in 1997 reared from the same.

PERISCCELIDAE: *Periscelis winnertzi* (RDB2) was recorded in 1905 and 1934 (Falk and Ismay in preparation). Apparently it was not uncommon in 1905. The only other British localities are Lyndhurst, Hampshire and the Wyre Forest.

CARNIDAE: *Meoneura triangularis* Collin (Notable) was recorded in 1992. Members of this family are very much under-recorded.

CHLOROPIDAE: Collin (1947) recorded both *Lasiambia baliola* and *L. brevivucca* from Moccas Park and the former was described as new to science by Collin from this site (Pont 1995). Both species have been re-recorded by the author and *L. brevivucca* was reared by the author from sappy horse chestnut bark in 1997. *Chlorops rufinus* (Zetterstedt) (Notable) was also recorded by Collin in 1934 (John Ismay pers. comm.). The remaining Notable species, all wetland specialists, were taken from the Lawn Pool: *Speccafrons halophila* (Duda), *Eriholus gracillior* (de Meijere), *Pseudopachychaeta* species (*heleocharis* (Nartshuk) or *approximatonervis* (Zetterstedt) of which males cannot presently be separated) and *Chlorops planifrons* (Loew).

HELEOMYZIDAE: *Eccoptomera microps* (Meigen) (Notable) was swept in 1994.

DROSOPHILIDAE: *Stegana nigrithorax* Strobl (Notable) was identified from the interception trap material. The local *Lencophenga maculata* (Dufour) has also been recorded.

SCATHOPHAGIDAE: the author and Ivan Perry found *Cordilura aemula* (proposed RDB2) in 1997. *Conisternum decipiens* (Haliday) (Notable) was found in the interception trap.

MUSCIDAE: *Phaonia atriceps* (Loew) (Notable) was taken from the Lawn Pool. This species has been reared from pupae found on *Typha*. The local *Phaonia cincta* (Zetterstedt) was reared from mouldy wood taken from a horse chestnut.

Discussion

The old oaks represent the prime interest for the rare Coleoptera in the Park. Clearly they must be the focus for the conservation and management of the Diptera also. Locating saproxylic Diptera on or around the oaks has proven difficult for a variety of reasons. Saproxylic Diptera are often difficult to find because they have a short flight period (typically May-June) and surveys for adults need to take place at this time. Even then many species are difficult to find: rot hole and sap run species, for example, rarely venture far from these micro-habitats and these may be inaccessible without recourse to ladders. Most of the tree cavities found at Moccas were very dry and Diptera were not found, the only exceptions being on horse chestnut. Rearing provides a very useful way of recording these rarely seen species. However, removal of the bark from the veteran trees to locate larvae such as *Xylophagus* or lonchaeids for rearing would have been inappropriate, but might be possible on the non-native species (see *Lasiambia*) or on the younger trees in the wooded upper slopes which have yet to be sampled.

Apart from rearing, passive traps such as Malaise traps, interception traps and water traps provide an excellent means of recording the rarer species. At Moccas there is a problem, in that there is nowhere that is deer-free and deer partially destroyed the interception trap in 1992.

Much of Moccas consists of old trees with red rot and dead decorticated and sun-baked wood. Because of the lack of a herb or shrub layer moisture levels are low. These situations may suit Coleoptera more than Diptera. Better survey results seem to be associated with old parklands interspersed with mature woodland blocks or with ancient woodlands incorporating veteran trees for example Windsor Forest, Epping Forest, Bredon Hill, Calke Park, Kedleston Park and Burnham Beeches. The presence of other habitats such as bogs and heath, as for example in the New Forest, increases the likelihood of rare species being found. At Moccas there is a lack of suitable nectar and pollen sources, favoured by some saproxylic species such as empids and hoverflies, although this has been partly rectified in the middle and long term by English Nature, who have planted young hawthorn.

The Lawn Pool provides an interesting habitat within the Park not only for Diptera but for other invertebrates (the medicinal leech and a rare pea-mussel have been recorded). The Pool may be a kettle hole (Paul Harding pers. comm.) and consequently a feature present since the end of the Pleistocene. If this is correct, the Pool, even more so than the veteran trees, has considerable ecological continuity and this may explain why several species of interest have been found there. Its current use as a flight-pond may result in eutrophication, particularly since in recent summers it occupies an increasingly smaller area, with the ducks crowded into this area.

A third habitat of interest is the woodland stream and flushes where tufa is present. The old record of *Oxyera pardalina*, at least, is on the same spring-line and the Tarrington and Woolhope records suggest similar calcareous seepages. Unfortunately, at Moccas afforestation has taken place above the stream and this may have a detrimental effect on the stream's ability to deposit calcium carbonate; this consequently may adversely affect the fauna associated with it.

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***Leucopis psyllidiphaga* sp. n., a new species of silverfly (Diptera, Chamaemyiidae) from Britain**

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Introduction

The Chamaemyiidae comprise a family of over 230 described species of acalyptrate Diptera, with about 150 species known from the Palaearctic Region (Tanasijschuk 1984 and 1985). The adults are small flies (about 1.5-4mm long for British species), typically with silver-grey dusting on the body surface, hence the common name for the family originally coined by Tanasijschuk (1970). The larvae resemble small hoverfly larvae, but are distinctive due to the presence of two widely separated posterior spiracles (hoverfly larvae have the posterior spiracles fused into a single tube). The larvae of Chamaemyiidae are known to be predators of Homoptera, including aphids, adelgids and scale insects (McLean 1992). They have attracted attention as potential biocontrol agents and some species which feed on woolly aphids have translocated outside their natural ranges as part of initiatives intended to reduce the abundance of their prey (see McAlpine 1971).

McAlpine (1963) published a key to world genera and subsequently prepared a very useful synopsis of the Nearctic fauna (McAlpine 1987). Tanasijschuk has published extensively on the taxonomy and biology of Palaearctic Chamaemyiidae, culminating in a detailed monograph of the family for the USSR (Tanasijschuk 1986). There remain many undescribed species in the family within the Palaearctic region and elsewhere, including a number which have been found in Britain by the author in recent years. Hitherto, 31 species have been reported from the British Isles (Chandler 1998); with the addition of *Leucopis psyllidiphaga* the total is now 32 species, with a number of additional species awaiting description or addition to the British List.

The paper describes a *Leucopis* with a distinctive life history, as it is the first member of the Chamaemyiidae reported as preying upon a member of the Psylloidea. The ecology and population dynamics of this *Leucopis* have been investigated in detail as part of a long-term population study of the gall-forming psyllid *Trichohermes walkeri* Förster (Psylloidea: Trioziidae) (McLean 1993, 1994a, 1994b and 1998). This psyllid is monophagous on *Rhamnus catharticus* Linnaeus (Rhamnaceae) in Britain (McLean 1993).

Description: the terminology used here follows McAlpine (1981).

***Leucopis psyllidiphaga* sp. n.**

Diagnostic features

General description: adults are typical members of the genus *Leucopis sensu stricto*, with characters of the male genitalia currently being the only reliable means for distinguishing this species from its congeners. The majority of the body surface of the adults is silver-grey in ground colour, with the dorsal surface of the thorax having brown sublateral stripes along the dorsocentral lines and a pair of darker grey stripes between them, set along the acrostichal rows. Abdominal syntergite 1+2 dark grey except for the silver-grey posterior margin, tergite 3 with a pair of dark grey basal spots, the remaining tergites unmarked. These characters are all typical for the subgenus.

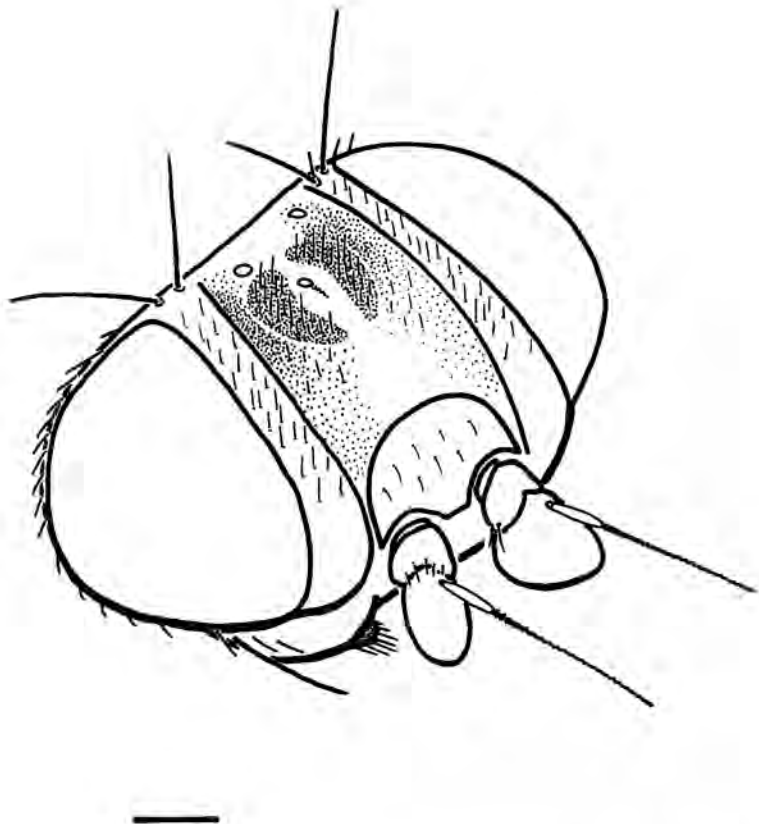


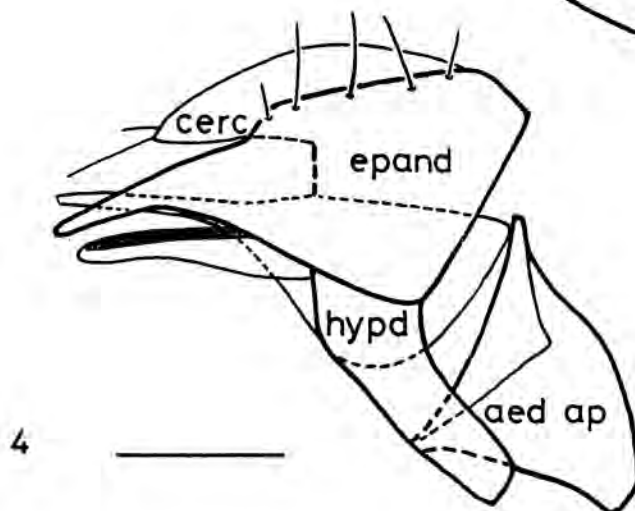
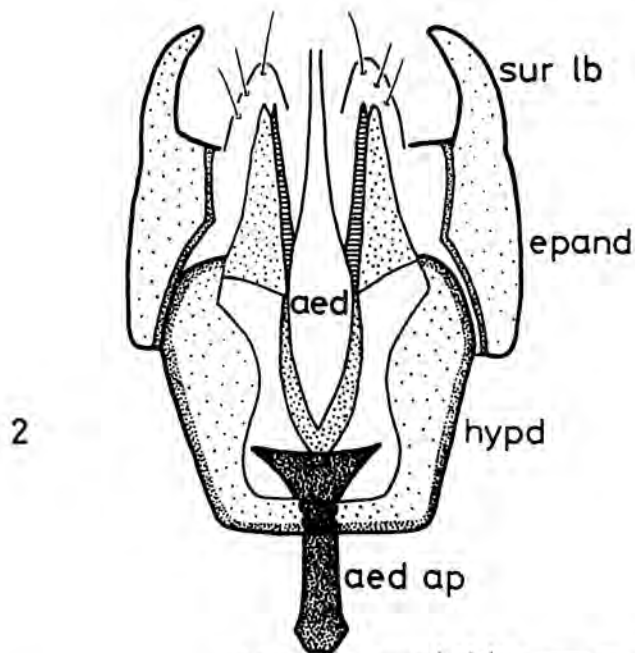
Fig. 1. *Leucopis psyllidiphaga* male: head in right dorso-anterolateral view. Scale line 0.1mm.

Adult male. Head: fronto-orbital plates with short, fine, pale, slightly reclinate setulae, irregularly triserial; frontal vitta with a few short, fine, pale, slightly reclinate setulae; lunule with a few (less than 10) fine, pale, proclinate setulae; sensory areas lateral of the anterior ocellus moderately well developed in the form of two darkened "felty" pads with erect, fine pale setulae (posterior setulae longer and darker), slightly raised as two incomplete, crescent shaped areas, separated by a gap anteriorly and posteriorly (see Fig. 1).

Thorax: chaetotaxy typical for the subgenus; prescutellum present.

Abdomen: male genitalia of typical structure for the subgenus; in ventral view (Fig. 2) the surstylar lobes are of moderate length and gently incurved, while the aedeagus is slender; the shape of the aedeagus in profile (Fig. 3) is characteristic and, combined with the shape of the epandrium + surstylar lobe in lateral view (Fig. 4), should enable this species to be separated from other *Leucopis*.

Figs 2-4. *Leucopis psyllidiphaga* male, 2, postabdomen in ventral view; 3, aedeagal complex in right lateral view; 4, postabdomen in right lateral view (aed = aedeagus; aed ap = aedeagal apodeme; cerc = cercus; epand = epandrium; gon = gonopod (left); hypd = hypandrium; pm = paramere (left); sur lb = surstylar lobe). Scale line 0.1mm.



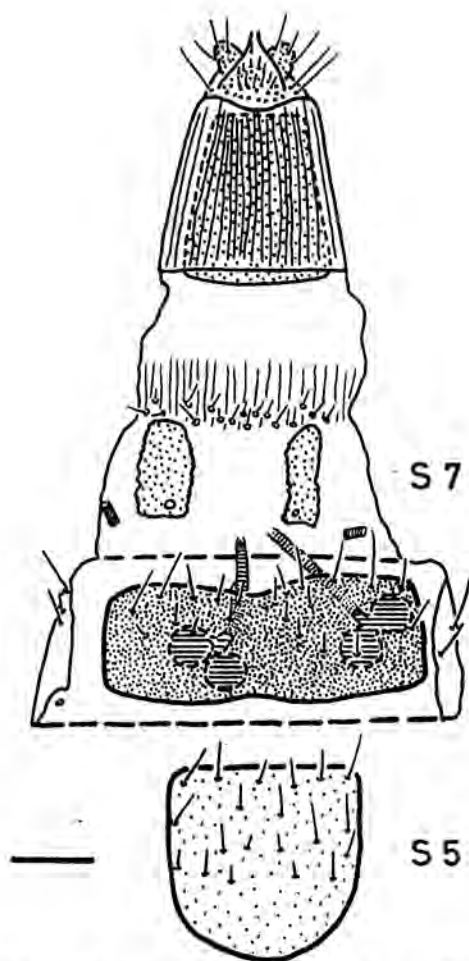


Fig. 5. *Leucopis psyllidiphaga* female: abdomen in ventral view (S5 = sternite 5; S7 = sclerites of sternite 7). Scale line 0.1mm.

Adult female. Head: as in male, but lacking the sensory areas lateral of the anterior ocellus.

Thorax: as in male.

Abdomen: female postabdomen (Fig. 5) with sternite 5 bearing about 20 setae, those in the central anterior area very short; sternite 6 heavily sclerotised, shallowly emarginate anteriorly and posteriorly, with setae along the posterior margin and scattered in two irregular curved lines laterally; four spermathecae (the ground plan condition for the Chamaemyiidae); sternite 7 divided into two rectangular sclerites (the narrower of the two in Fig. 5 is in oblique view).

Derivation of specific name: psyllid + phaga (Greek *phagein* to eat), i.e. psyllid-eater. The specific name refers to the unusual larval biology of the species.

Type material

Holotype male: deposited at the Natural History Museum, London. Norfolk, Foulden Common, (TF 7600), 18.vi.1978, swept from *Rhamnus catharticus*.

Paratypes: deposited at the Natural History Museum, London. Three males and three females, same data as holotype.

Other material seen: Cambridgeshire, Chippenham Fen (TL 647694), 1982-1997; Huntingdonshire, Brampton, Bromholme Lane (TL 225709), 1986-1987; Norfolk, Foulden Common (TF 7600), 1986-1997; Suffolk, Cavenham Heath (TL 757728), 1986-1997. At each location recorded as part of population study of *T. walkeri* and *L. psyllidiphaga*.

Geographical distribution

So far this species is known only from East Anglia in England, but it is likely to occur widely elsewhere in the Palaearctic Region in association with *R. catharticus* and *T. walkeri*.

Ecology

L. psyllidiphaga is a specialist predator of the psyllid *T. walkeri*. The eggs are laid on the outside of the newly-formed galls in May/June, typically on the upper surface of the leaf and usually near either end of the gall; they are tucked in near the edge of the leaf where the margin rolls up and inwards or at the inner edge of the gall. The first instar larva attempts to enter the gall soon after hatching and if successful at gaining access to the inside of the gall, it commences to feed on the enclosed *T. walkeri* nymph(s). Only one larva survives per gall, though several eggs can be laid on a gall; it is believed that larval cannibalism is responsible for a maximum of a single larva developing in a gall.

The most striking adaptation for feeding upon *T. walkeri* concerns the extended larval development period, which lasts 8-10 weeks in *L. psyllidiphaga* compared with 2-3 weeks in most British aphidophagous *Leucopis*. The *L. psyllidiphaga* larva continues to feed slowly on the enclosed *T. walkeri* nymphs until just before the gall opens, when the final instar nymphs have their body contents consumed and the *Leucopis* larva emerges, falls to the ground and pupariates. Overwintering puparia have not yet been discovered in the field, though emerging adults have been detected in May and June by deploying emergence traps under a *R. catharticus* bush at Chippenham Fen NNR. Adult *L. psyllidiphaga* may be swept from *R. catharticus* bushes when *T. walkeri* galls are first forming in May/June in East Anglia. Although substantial numbers of *T. walkeri* nymphs can be killed by *L. psyllidiphaga* larvae in some years, they do not reduce the number of eggs laid by *T. walkeri* adults the following Autumn because other density-dependent factors result in similar numbers of eggs being laid each year (McLean 1994b, 1998). Thus, *L. psyllidiphaga* does not reduce the abundance of its prey in the long term, though the numbers of the *Leucopis* predator larvae are determined largely by the density of galls formed by *T. walkeri*.

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