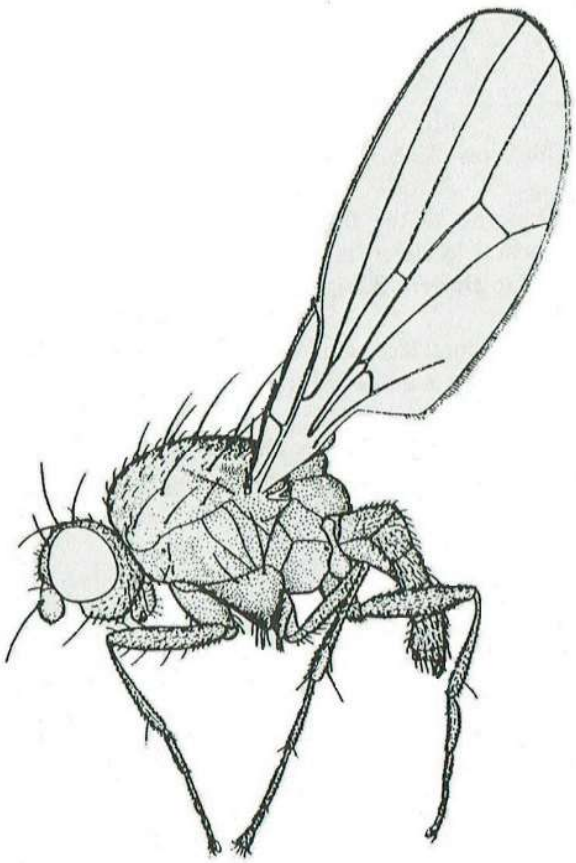
Dipterists Digest

2018 Vol. 25 No. 1

Cover illustration: a sequence of photographs showing *Episyrphus balteatus* (De Geer) landing on an *Echinops* flower head, at Castle Douglas (NX 757571), Dumfries & Galloway on 7 August 2018.

Dipterists Digest



Vol. 25 No. 1

Second Series

2018

Published 28th August 2018

Published by

Dipterists Forum

ISSN 0953-7260

Dipterists Digest

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 European flies. All notes and papers submitted to Dipterists Digest are refereed. Articles and notes for publication should be sent to the Editor at the above address, and should be submitted with a current postal and/or e-mail address, which the author agrees will be published with their paper. Articles must not have been accepted for publication elsewhere and should be written in clear and concise English. **Contributions should be supplied either as E-mail attachments or on CD in Word or compatible formats.**

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;
- reports from the Diptera Recording Schemes, including maps;
- records and assessments of rare or scarce species and those new to regions, countries etc.;
- local faunal accounts and field meeting results, especially if accompanied by ecological or natural history interpretation;
- descriptions of species new to science;
- notes on identification and deletions or amendments to standard key works and checklists.

Articles should be in A5 format with text in 9-point and Times New Roman font, title 12 point and author's name 10.5 point, with 1.27cm (narrow) side margins. Figures should be drawn in clear black ink, about 1.5 times their printed size and lettered clearly. Colour photographs will also be welcomed. Figures and photographs should be supplied separately as hard copy or as jpegs at 300dpi.

Style and format should follow articles published in recent issues. A short Summary (in the form of an Abstract) should be included at the beginning of each article. References to journals should give the title of the journal in full. **Scientific names should be italicised.** Authors of scientific names should be given in full and nomenclature should follow the most recent checklist, unless reflecting subsequent changes. 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 separates of papers of two or more pages in length, and a pdf of their contribution if requested.

Enquiries about subscriptions and information about the **Dipterists Forum** should be addressed to the Membership Secretary, John Showers, 103 Desborough Road, Rothwell, Kettering, Northamptonshire NN14 6JQ, showersjohn@gmail.com

Dipterists Digest 2018 **25,** 1-3

Phytomyza astrantiae Hendel (Diptera, Agromyzidae) new to Wales

BARRY P. WARRINGTON
36 Marlborough Avenue, Hessle, East Yorkshire, HU13 0PN; agromyzidaeRS@gmail.com

Summary
Phytomyza astrantiae Hendel, 1924 (Diptera, Agromyzidae), a monophagous leaf miner of *Astrantia*, is reported as a species new to Wales. A description of the larval mine is given.

Introduction
The distinctive leaf-mines of *Phytomyza astrantiae* (Hendel, 1924) were discovered on greater masterwort (*Astrantia major*) at the National Trust site, Bodnant Gardens, Tal-y-Cafn, North Wales on 24 August 2017.

Despite the gardens covering approximately 80 acres, only a handful of *Astrantia major* plants were recorded, all of which were heavily mined. Several tenanted mines were collected to rear through, with adults emerging during September and October 2017, confirming the causer to be *Phytomyza astrantiae*, a species which was not previously known from Wales.

Biology
The larvae form mines on greater masterwort (*Astrantia major)*, which can take the form of an irregular corridor or blotch. Initially, the mines are pale but quickly turn much darker, frequently with paler margins. Frass is irregular, scattered throughout the mine. The larvae, which can often be found feeding communally, vacate the mine to pupariate, via an exit slit which can be either lower or upper surface. The larva was described by de Meijere (1926).

Phenology
Larvae can be found in April-June and in August (Hering 1957), whilst Homan (2011) and Warrington (2017), have recorded tenanted mines during October and November, suggesting that the species is trivoltine in Britain.

Homan (2011) refers to the fact that in order for there to be a third generation, two conditions must be met: weather conditions during late summer and early autumn must allow the production of fresh foliage, and the weather must be favourable to allow emerging adults to lay eggs and the resulting larvae to feed and successfully pupariate.

Distribution
The larval mines of *Phytomyza astrantiae* were first recorded in Britain in 2005 but were not confirmed until adults were successfully reared by Homan four years later (2009).

Since then, the species has been recorded from 22 vice counties in Britain, with records ranging from East Kent (V.C. 15) to East Ross (V.C. 106).

Due to the popularity of the host plant in public and private gardens, it is highly likely that this species will continue to be recorded from areas in Britain where it was previously absent.

In Europe, *Phytomyza astrantiae* is known from the Czech Republic, Germany, Poland and Turkey.

1

2

Figs 1 and 2. ***Phytomyza astrantiae*** **Hendel leaf mines: 1, leaf with dark, older mine (left) and paler, young mine (right) with feeding larva; 2, young mine with several feeding larvae present.**

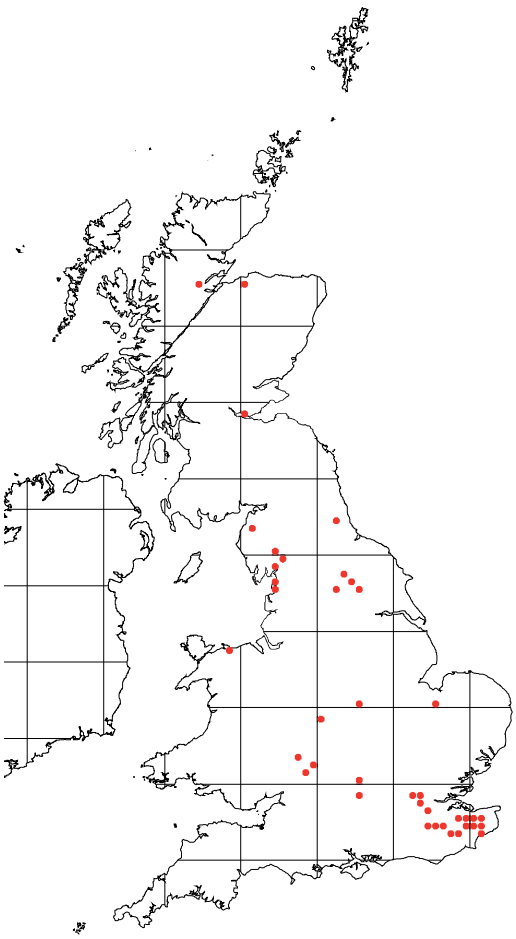


Fig. 3. Distribution map of *Phytomyza astrantiae* based on records held by the National Agromyzidae Recording Scheme.

References

De Meijere, J.C.H. 1926. Die Larven der Agromyzinen (Fortsetzung und Schluß). *Tijdschrift voor Entomologie* **69,** 227-317.

Hering, E.M. 1957. *Bestimmungstabellen der Blattminen von Europa einschliesslich des Mittelmeerbeckens und der Kanarischen Inseln*, vol. i-iii: 1-648, 649-1185, 1-221. Dr. W. Junk's-Gravenhage (Reprint 1996, Apollo Books, Stenstrup, Denmark).

Homan, R. 2009. *Phytomyza astrantiae* (Hendel, 1924) (Diptera, Agromyzidae) new to Britain. *Dipterists Digest* (*Second Series*) **16,** 183-184.

Homan, R. 2011. *Phytomyza astrantiae* (Hendel, 1924) (Diptera, Agromyzidae), an update. *Dipterists Digest* (*Second Series*) **18,** 4.

Martinez, M. 2011. *Diptera: Agromyzidae*. **In** Beuk, P. and Pape, T. (group coordinators): Fauna Europaea version 2017.06, https://fauna-eu.org; Museum für Naturkunde in Berlin - Leibniz Institute for Evolution and Biodiversity Science [Accessed February 26, 2018].

Spencer, K.A. 1990. *Host Specialization in the World Agromyzidae (Diptera)*, xii + 444 pp. [*P. astrantiae* pp 158-159, 162]. Kluwer Academic Publishers, continued as Springer Science + Business Media Netherlands.

Warrington, B. P. 2017. Agromyzidae new to Yorkshire. *The Naturalist*, August 2017, Vol. **142,** No.1095, 149-150.

Dipterists Digest 2018 **25,** 4-6

Agromyza abdita Papp (Diptera, Agromyzidae) new to Britain

BARRY P. WARRINGTON
36 Marlborough Avenue, Hessle, East Yorkshire, HU13 0PN; agromyzidaeRS@gmail.com

Summary
Agromyza abdita Papp, 2015 (Diptera, Agromyzidae), a member of the *A. ambigua* species group, is reported as a species new to Britain. A description of the adult and of the circumstances of the discovery are given.

Introduction

On 31 May 2018, a single male *Agromyza* Fallén was collected from a brownfield site in Hull (TA064265), East Yorkshire (V.C. 61). Using the key in Spencer (1976), the specimen ran to couplet 10, leading to *Agromyza ambigua* Fallén, 1823. However, the illustrations of the male genitalia differed greatly to those of the collected adult.

Using Papp and Černý (2015), the specimen ran readily to couplet 19, *Agromyza abdita* Papp 2015, not progressing further in the key owing to the concave distiphallus in profile (Fig 1). The illustrations here agreed strongly with the dissected adult.

As the colour of the squamal fringe in *Agromyza* species is often variable, the site was revisited on 5 June 2018 to obtain additional material and three males were collected. Upon examination of their external features and genitalia, these, too, agreed with *A. abdita*. Images of an adult and the genitalia were sent to László Papp, who agreed the specimen was *A. abdita*, a species previously not known from Britain.

Two further males were collected from a different location, Tickton (TA052424), East Yorkshire (V.C. 61), on 22 June 2018 from riverside vegetation (Fig 4). These were examined and proved to be identical to the specimens collected in Hull.

Agromyza abdita was described by Papp from material deposited in the Diptera Collection of the Hungarian Natural History Museum, Budapest: holotype male (HNHM, right wing wrinkled): Kiskunság National Park: Orgovány, ret, 24.v.1978, leg. Papp L; paratype male (HNHM): Hortobágy N. P., Etyek, Ohati halastó, 1.vi.1976, leg. Papp L.

Identification

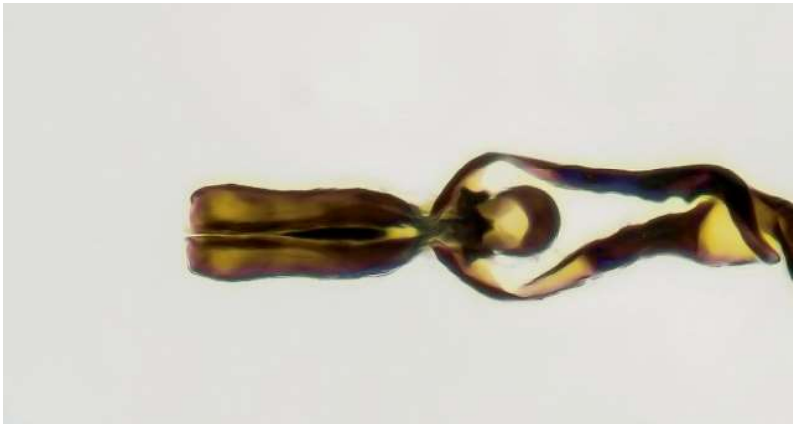
Agromyza abdita is a medium sized, all black member of the *Agromyza ambigua* species group. There are usually 2 *ori* and 2 *ors*. The third antennal segment is fractionally longer than broad. Frons matt black, with a slight brownish tinge.

The mesonotum is somewhat shiny, with dark and dense microtrichia. Costa extends to vein R_{4+5}, with the wing membrane and veins light yellow, similar to that of *A. ambigua*. The squamal fringe is white. Legs are black.

The apical part of the distiphallus is very long and strongly curved concavely (Fig. 1). When viewed from below, the distiphallus is almost parallel-sided (Fig. 3). There is a distinct dorsal membrane, whilst the ejaculatory apodeme is large, with the bulb shorter than the blade in profile (Fig. 2). Papp and Černý (2015) stated that its life habits are unknown but it is likely to be a grass (Poaceae) feeder, as are many of its congeners.

1

2



3

4

Figs 1-3. ***Agromyza abdita*** **Papp, male genitalia: 1, aedeagus in lateral view; 2, ejaculatory apodeme; 3, aedeagus viewed from below. Fig. 4. River Hull, Tickton, East Yorkshire.**

Additional information

The Latin 'abditus' means concealed, hidden or secret which refers to the difficulties in the identification of the species within the problematic *Agromyza ambigua* species group. Having reviewed this paper, David Gibbs recognised the genitalia and re-examined some of his material. This resulted in two further records of *A. abdita* from Whinfell Centre Parks (NY5726), Cumbria, 1 July 2006 and Avonmouth (ST5379), Bristol, 5 July 2001. Images of the genitalia were sent to BPW who agreed with the determination.

Acknowledgements

I would like to thank László Papp (Budapest, Hungary) for taking the time to confirm my determination, Africa Gomez (University of Hull, England) for kindly allowing me to include her photograph of the River Hull collecting site, David Gibbs (Weston-super-Mare, Somerset) for his correspondence and allowing his records to be published here and Michael von Tschirnhaus (University of Bielefeld, Germany) for discussing and clarifying relevant matters with me.

References

Martinez, M. 2011. *Diptera: Agromyzidae*. **In** Beuk, P. and Pape, T. (group coordinators): Fauna Europaea version 2017.06, https://fauna-eu.org; Museum für Naturkunde in Berlin - Leibniz Institute for Evolution and Biodiversity Science [Accessed June 26, 2018].

Papp, L. and Černý, M. 2015. *Agromyzidae (Diptera) of Hungary*. Volume 1, 416 pp. Agromyzinae. Pars Ltd, Nagykovácsi.

Spencer, K.A. 1966. Notes on European Agromyzidae (Diptera). 1. *Beiträge zur Entomologie* **16**(Nr. ¾)**,** 285-309.

Spencer, K.A. 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna entomologica scandinavica* **5**(in two parts)**,** 1-304, 305-606. Klampenborg: Scandinavian Science Press Ltd.

Spencer, K.A. 1990. *Host Specialization in the World Agromyzidae (Diptera).* xii + 444 pp. Kluwer Academic Publishers, continued as Springer Science + Business Media Netherlands.

Dipterists Digest 2018 **25,** 7-12

Phytomyza phillyreae Hering in Buhr (Diptera, Agromyzidae) new to Britain

BARRY P. WARRINGTON[1] and ANDY M. & MELISSA G. BANTHORPE[2]

[1] 36 Marlborough Avenue, Hessle, East Yorkshire HU13 0PN; agromyzidaeRS@gmail.com

[2] 32 Long Close, Lower Stondon, Bedfordshire, SG16 6JS; vc30moths@picus.co.uk

Summary

Phytomyza phillyreae Hering in Buhr, 1930 (Diptera, Agromyzidae), a monophagous leaf miner of *Phillyrea* (Oleaceae), is reported as a species new to Britain. Larval leaf mines were collected by AMB and MGB from a churchyard in Barton-le-Clay, Bedfordshire (V.C. 30), which resulted in adults been successfully reared by BPW. Details of the circumstances of the discovery and a description of the larval mine, larva, puparium and adult are given.

Introduction

On 21 April 2018, AMB and MGB were attending a daytime meeting in the church hall at St Nicholas Church in Barton-le-Clay (TL085304), Bedfordshire, and walked around the churchyard to look for any spring butterflies and maybe find a few bee-flies (*Bombylius major* Linnaeus). Leaf-mines, which resembled those of an agromyzid, were found on an evergreen tree that they did not recognise, so two mines were collected. Later research by MGB suggested a likely determination for the tree – *Phillyrea latifolia*, also known as mock privet. AMB used this putative determination to research possible leaf-mining species using a Dutch website. The dichotomous key for *Phillyrea* led to *Phytomyza phillyreae*, with the description agreeing with the mines collected.

Images of the mines and details of the host plant were emailed to BPW who agreed that the mines were likely to be those of *P. phillyreae*, but as this species was not known from Britain, adult males would have to be reared to confirm the causer. AMB returned to the site and collected many more mines to ensure that an adult male could hopefully be reared. These mines were sent to BPW and a single male emerged on 30 April 2018. Upon BPW's examination of the external features and the genitalia, the species was confirmed to be *P. phillyreae*.

Biology

The larvae of *P. phillyreae* form mines on *Phillyrea* (*P. angustifolia, P. latifolia* and *P. media*; Spencer 1990), which initially take the form of a corridor that is brown with pale margins and no more than 20mm in length. The corridor section then opens into a large, untidy blister-like blotch, which often completely overruns the initial corridor. The position of the mine is quite variable, albeit always upper surface, with some mines forming at the tip of the leaf, whilst others may form in the centre. There is usually only a single mine per leaf, although two or three is not unusual.

Frass appears to be irregular, in large grains or strips along the edges of the corridor section. The larva pupariates internally and the puparium is glued firmly within the mine by dried frass. This concentration of frass is indicated by the large black spot in the centre of the blotch.

The larvae are unusual in that they possess only five elongate pores on the posterior spiracles; there are normally more in *Phytomyza* species. The anterior spiracles are small, with 6 papillae (de Meijere 1937).

The spiracles of the puparium, anterior and posterior, do not penetrate the epidermis but a pale circular patch is present at the anterior end of the puparium, which is where the imago emerges (Fig. 3). Although Buhr (1930) and later authors state the puparium is black, BPW was able to extract larvae shortly before pupariating that showed the puparia to be much paler (Figs 4 and 5), which agrees with Ellis' (2017) observations from mines collected in Greece. As the puparium is covered with dried frass when pupariating naturally, this may account for the description by Buhr and others. The anterior end of the puparium is an unusual cone-shape (Figs 4 and 5).

Hering (1957) stated that larvae can be found in March and April, which agrees with the Barton-le-Clay discovery as BPW found active larvae within some of the mines. AMB and MGB plan to return to the site to ascertain if this species is indeed univoltine.

1

2

3

4 5

Figs 1-3. *Phytomyza phillyreae* Hering in Buhr leaf mines: 1 and 2, typical mines with initial corridor followed by a large blotch, with pale circular patch; 3, close up of position of puparium, showing exit slit. Figs 4-5. *Phytomyza phillyreae* puparia: 4, male (left) and female (right) viewed from above; 5, male (left) and female (right) viewed from below.

Identification

The adult fly (Fig. 6) is a small, taxonomically isolated, species, with a wing length of 1.5-2mm. Head, all antennal segments and legs are bright yellow. The mesonotum is orangey-brown, with two dark bands which almost reach the scutellum.

The scutellum is pale yellow centrally with darker edges. *Acr* are sparse, in two rows. Normally, there are two equal *ors* and two or three incurved *ori*. Orbital setulae are sparse but long, with the frons projecting strongly above the eye in profile.

Fig. 6. *Phytomyza phillyreae* Hering in Buhr, male.

The male genitalia (Fig. 7) are unusually elongate, presumed to be a parallel development with the female genitalia, which are modified for inserting the eggs deep within the leaf tissue (Spencer 1990).

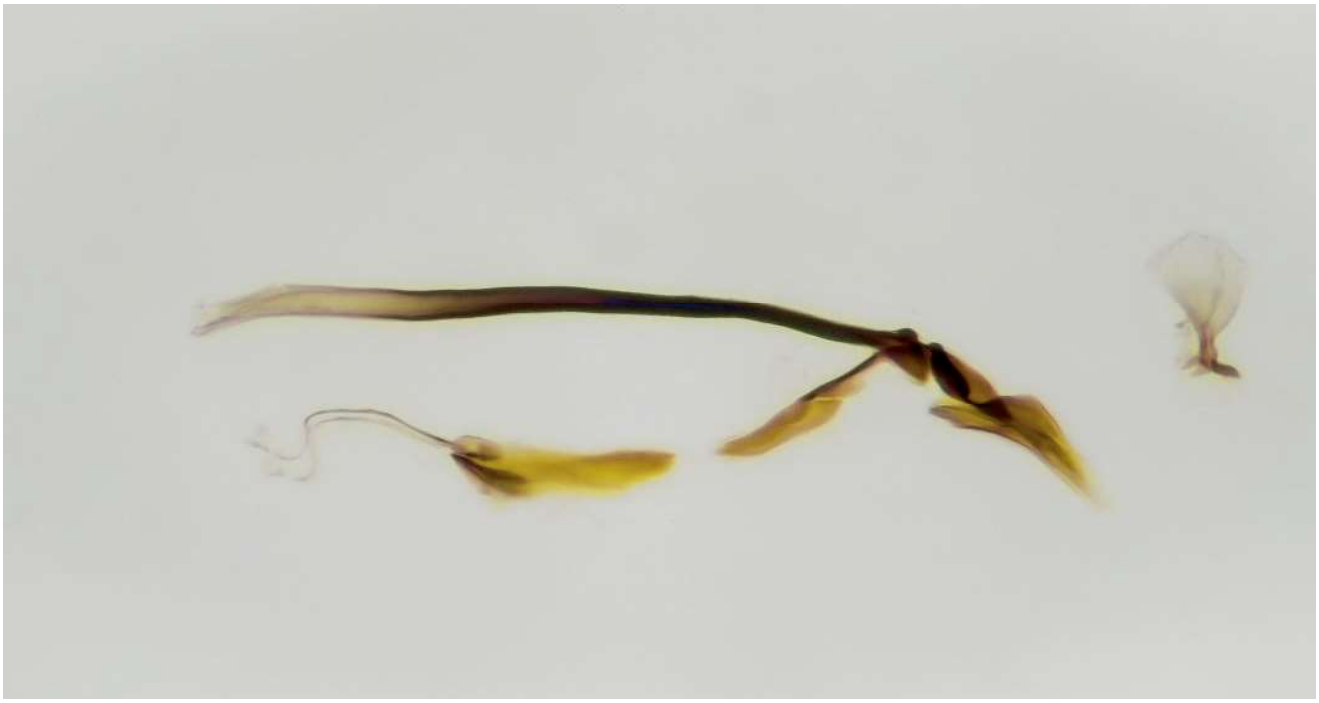


Fig. 7. *Phytomyza phillyreae* Hering in Buhr, phallus and ejaculatory apodeme.

Distribution

Phytomyza phillyreae is a West Palaearctic species, known in Europe from Corsica, Croatia, mainland France, mainland Italy, Sardinia, Sicily, Spain (Martinez 2011) and Russia (Michael von Tschirnhaus *pers. comm.*). There are also records from Morocco (Spencer 1967), Turkey (Černý and Merz 2006) and Tunisia (Černý 2009).

Additional information

Subsequent enquiries made by AMB and MGB with the local Parish Council highlighted that a recent survey of the trees in the churchyard had been undertaken, which explained the numbered metal tag present on the tree trunks.

Local tree expert David Alderman (who confirmed the identification as *P. latifolia*), has knowledge of the tree (Fig. 8), which is one of only a few in the county, and estimates that it is most likely a Victorian planting, therefore being c. 140 years old.

AMB and MGB possess photographs of the tree dating back to 21 May 2016, which upon closer examination, appear to have *P. phillyreae* mines present. They were informed of two more *P. latifolia*, at a property in Silsoe (TL081357), Bedfordshire, which upon visiting on 4 May 2018, were both found to also possess the mines of *P. phillyreae*.

On 5 May 2018, AMB and MGB visited two sites outside of Bedfordshire, Trumpington (TL445551), near Cambridge (V.C. 29), and Ickwell House (TL815613), near Bury St Edmunds (V.C. 26), as *P. latifolia* is known to be present there. Neither location yielded any *P. phillyreae* larval mines.

In total, 39 adults were successfully reared, with 15 donated to the Natural History Museum, London. The remaining 24 are in BPW's private collection. No parasitoids were reared. Figs 1-7 are by BPW, Fig. 8 by AMB and MGB.

Fig. 8. *Phillyrea latifolia*, St Nicholas Church, Barton-le-Clay.

Acknowledgements

BPW would like to give thanks to AMB and MGB for collecting and passing on the leaf mines, gathering location and host plant information and allowing him to keep several of the reared specimens, and to Michael von Tschirnhaus (University of Bielefeld, Germany) for confirming the determination based on images of the adult and genitalia and for checking his Agromyzidae database.

AMB and MGB would like to thank Revd Andrew Johnson, Rector of St Nicholas, for allowing them to collect mined leaves.

References

Buhr, H. 1930. Einige Blattminen und Gallen von der Insel Lesina (Hvar) in Dalmatien. *Sitzungsberichte und Abhandlungen der naturforschenden Gesellschaft zu Rostock (3. Folge)* **2**(1929), 125-148.

Černý, M. 2009. New faunistic data on the Agromyzidae (Diptera) from the West Palaearctic Region. *Klapalekiana* **45,** 9-21.

Černý, M. and Merz, B. 2006. New records of Agromyzidae (Diptera) from Palaearctic Region. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* **79,** 77-106.

de Meijere, J.C.H. 1937. Die Larven der Agromyzinen. Dritter Nachtrag. *Tijdschrift voor Entomologie* **80,** 167-243.

Ellis, W. Diptera : Agromyzidae version 27.vii.2017 http://bladmineerders.nl/parasites/animalia/arthropoda/insecta/diptera/brachycera/agromyzidae/phytomyzinae/phytomyza/phytomyza-phillyreae/ (accessed May 4, 2018)

Hering, E.M. 1957. *Bestimmungstabellen der Blattminen von Europa einschliesslich des Mittelmeerbeckens und der Kanarischen Inseln. Band III: Neubeschreibungen von Minen-Erzeugern. Systematische Übersicht der Wirtspflanzen und der Minen-Erzeuger. Abbildungen*. 121 pp. Dr. W. Junk's Gravenhage. (Reprint 1996, Apollo Books, Stenstrup, Denmark).

Martinez, M. 1987. *Phytomyza unedo* Séguy, 1953, nouveau synonyme de *Phytomyza phillyreae* Hering, 1930 (Dipt. Agromyzidae). *Bulletin de la Société entomologique de France* **91**(1986) (5-6)**,** 191-193.

Martinez, M. 2011. *Diptera: Agromyzidae*. **In** Beuk, P. and Pape, T. (group coordinators): Fauna Europaea version 2017.06, https://fauna-eu.org; Museum für Naturkunde in Berlin - Leibniz Institute for Evolution and Biodiversity Science [accessed May 4, 2018].

Spencer, K.A. 1967. Some Agromyzidae (Diptera) from Morocco. *Entomologist´s Monthly Magazine* **103,** 126-130.

Spencer, K.A. 1990. Host Specialization in the World Agromyzidae (Diptera). *Series entomologica* **45,** XII + 444 pp.

Gymnosoma nitens Meigen and _Litophasia hyalipennis_ (Fallén) (Diptera, Tachinidae) in East Anglia – On 10 May 2017, I swept a female of *Gymnosoma nitens* Meigen, 1824 at Fordham (TL645700), Cambridgeshire. A further visit to the site on 9 July 2017 revealed it to be numerous there, with both sexes being swept from the flowers of carrot *Daucus carota*. The location is a long-term set-aside field with sandy soil, on a gentle south-facing slope, adjacent to the northern boundary of Chippenham Fen NNR. The habitat is reminiscent of some of the Breckland grasslands, which would have extended into this part of Cambridgeshire in the past. Indeed many plants characteristic of that habitat have been recorded from this part of the county.

On 26 June 2017, I visited Walberswick (TM501747) on the Suffolk coast and found that my catch included two males of *Litophasia hyalipennis* (Fallén, 1815). I returned to the site on 5 July 2017 and swept seven more males. All of these were on or close to a low grassy north-facing embankment, which acts as a flood defence for the car park and adjacent beach huts. Sweeping rough grassland in the surrounding area failed to reveal any further examples.

In recent times several of the Phasiinae have expanded their ranges quite dramatically. Two such species – *Cistogaster globosa* (Fabricius, 1775) and *Subclytia rotundiventris* (Fallén, 1820) are now frequent visitors to my Cambridgeshire garden, something which would have been unthinkable twenty years ago. However, *G. nitens* and *L. hyalipennis* have until now remained confined to south-east England and have not been recorded north of the London area (Chris Raper *pers. comm.*), where both species can be quite numerous on brownfield sites in the capital. Their discovery in East Anglia, far away from any of their known sites, is quite a surprise. The population of *G. nitens* was especially strong and must have been present for some time. The possibility of further colonies nearby, particularly in similar habitats in the Breckland region, would seem quite likely. The colony of *L. hyalipennis* appears to be well established at Walberswick, albeit apparently confined to a very small area. The proximity to the car park and beach huts, suggests that humans may in some way have aided their dispersal.

I would like to thank Chris Raper for updating me on the distribution of *G. nitens* **– IVAN PERRY**, 27 Mill Road, Lode, Cambridge, CB25 9EN

Dipterists Digest 2018 **25,** 13-15

The leaf-mining fly *Cerodontha (Dizygomyza) palustris* Nowakowski (Diptera, Agromyzidae) new to Britain from Sutton Fen RSPB reserve in the Norfolk Broads

MARK G. TELFER[1] and DAVID J. GIBBS[2]

[1] 10 Northall Road, Eaton Bray, Dunstable, Bedfordshire, LU6 2DQ, UK;
mark.g.telfer@btinternet.com

[2] Orchard Cottage, Cecil Road, Weston-super-Mare, Somerset, BS23 2NF, UK;
DavidJGibbs6@Sky.com

Summary

Cerodontha (*Dizygomyza*) *palustris* Nowakowski, 1973 (Diptera, Agromyzidae) has been discovered new to Britain from open fen habitat at Sutton Fen RSPB reserve in the Norfolk Broads.

Telfer and Gibbs (2018) described the discovery of the leaf-mining fly *Metopomyza nigrohumeralis* (Hendel, 1931) as new to Britain, from an invertebrate survey of Sutton Fen RSPB reserve in the Norfolk Broads carried out between April and August 2016 (Telfer 2017). The same survey also yielded another leaf-mining fly with no previous British record: *Cerodontha* (*Dizygomyza*) *palustris* Nowakowski, 1973.

A male of *C.* (*D.*) *palustris* was netted by MGT at TG 37780 23503 (sampling point 6B) on 24 June 2016. This is an area of open sedge *Carex* and rush *Juncus* fen with sparse common reed *Phragmites australis* and a fairly rich herb-layer. It is managed by cutting on a short rotation.

Identification

Male specimens of *C.* (*D.*) *palustris* may be identified by examination of the aedeagus (Fig. 1), epandrium (Fig. 2) and first flagellomere (Fig. 3). Females cannot currently be identified with certainty.

Cerodontha (*Dizygomyza*) *palustris* is not included in Spencer's (1976) keys to the fauna of Fennoscandia and Denmark. Using Spencer (1976), the specimen runs to couplet 3(1) in the key to *Dizygomyza*, but at this point will not clearly key, the mid- and hind-knees being yellow but not 'clearly' so. If the first option is taken then it runs to *C.* (*D.*) *suturalis* (Hendel, 1931) but apart from the different leg colour, this species has a smaller first flagellomere, a pronounced caudal projection on the epandrium and subtle differences in the aedeagus. If the second option is taken it runs to couplet 8(6), where both *C.* (*D.*) *bimaculata* (Meigen, 1830) and *C.* (*D.*) *luctuosa* (Meigen, 1830) are readily ruled out by the form of the aedeagus. *Cerodontha* (*D.*) *fasciata* (Strobl, 1880) has closely similar distiphallus and mesophallus (compare fig. 383 in Spencer 1976), but according to Spencer's key this species has a black abdomen (yellow laterally in the Sutton Fen specimen) and yellow orbits (blackish in Sutton Fen specimen). The shape of the first flagellomere in male *C.* (*D.*) *fasciata* is depicted rather variably (see abb. 55B in Nowakowski (1973), fig. 381 in Spencer (1976) and fig. 42B in Papp and Černý (2016)) so its value in this context is uncertain. The key provided by Papp and Černý (2016) also does not include *C.* (*D.*) *palustris*, the specimen running readily to *C.* (*D.*) *suturalis*.

Using the monograph by Nowakowski (1973), which includes the original description of *C.* (*D.*) *palustris*, the Sutton Fen specimen clearly fits well on the form of the aedeagus and epandrium. However, with a wing length of 2.2mm, the Sutton Fen specimen is outside the range of 2.5-3mm given by Nowakowski (1973). For this reason, and the uncertainty regarding the

degree of variability in the shape of the first flagellomere, the specimen was sent to Miloš Černý for his opinion. He was able to confirm DJG's determination of the Sutton Fen specimen as *C.* (*D.*) *palustris*.

Cerodontha (*D.*) *palustris* is otherwise only known from Germany (http://www.fauna-eu.org) where it was collected from a lake with extensive *Phragmites* beds and *Juncus*, *Carex*, *'Scirpus'* and *Eleocharis* on 22nd July 1969 (Nowakowski 1973). The ecology of this species is unknown but larvae are probably miners of Cyperaceae.

Agromyzidae is a relatively under-worked family of flies within the British fauna and so there can be little doubt that *C.* (*D.*) *palustris* should be regarded as a hitherto overlooked native, as also should *M. nigrohumeralis*.

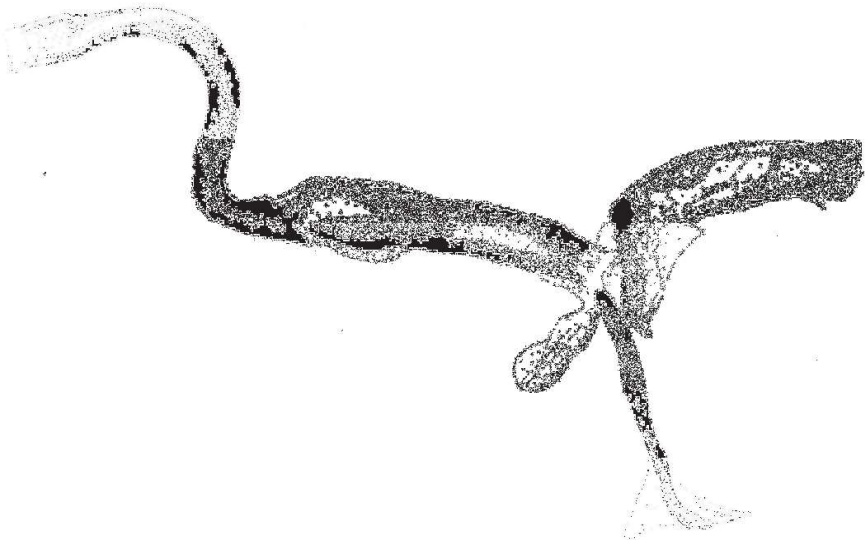


Fig. 1. Aedeagus of *Cerodontha* (*Dizygomyza*) *palustris* Nowakowski from Sutton Fen.

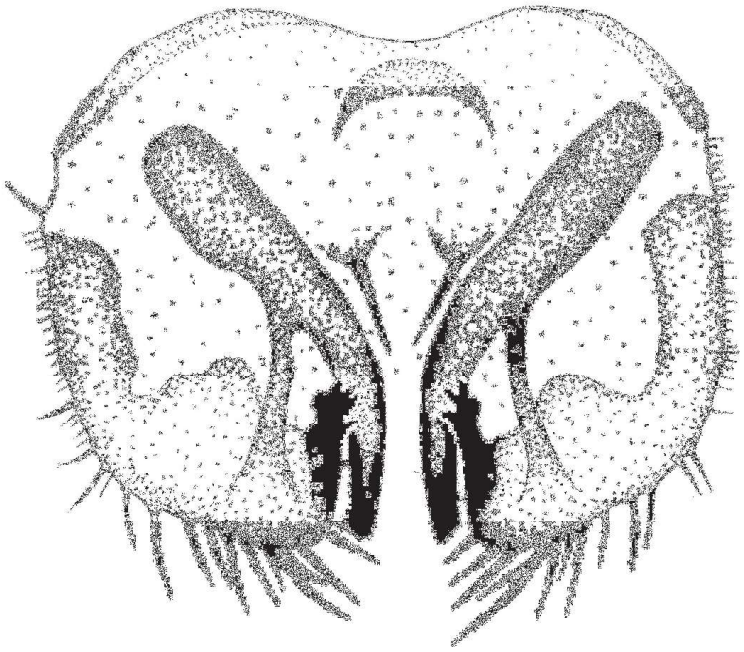


Fig. 2. Epandrium of *Cerodontha* (*Dizygomyza*) *palustris* Nowakowski in internal view.

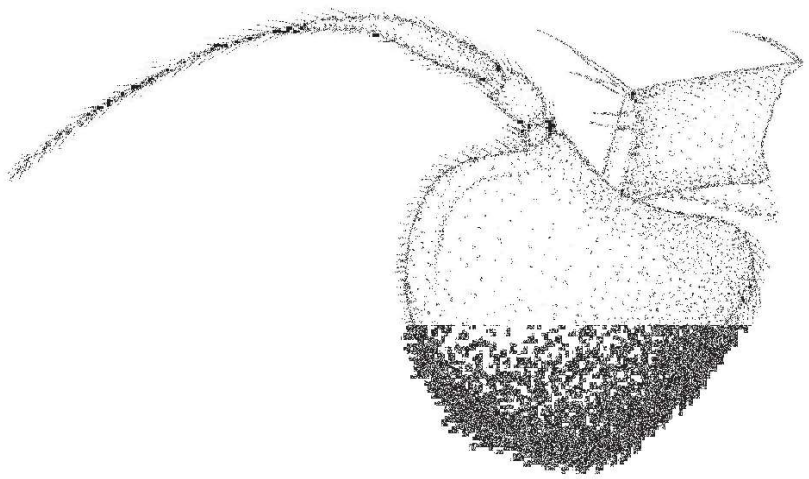


Fig. 3. Left antenna of *Cerodontha* (*Dizygomyza*) *palustris* Nowakowski in lateral external view.

Acknowledgements

MGT would like to thank those who arranged and assisted with the survey: Mark Gurney, Richard Mason, Martin Drake and Mick A'Court. DJG would like to thank Miloš Černý for providing confirmation of the identity of the *C.* (*D.*) *palustris* specimen.

References

Nowakowski, J.T. 1973. Monographie der europäischen Arten der Gattung *Cerodontha* Rond. (Diptera, Agromyzidae). *Annales zoologici, Warszawa* **31,** 1-327.

Papp, L. and Černý, M. 2016. *Agromyzidae (Diptera) of Hungary. Vol. 2: Phytomyzinae I.* 385 pp. Pars Ltd, Nagykovácsi.

Spencer, K.A. 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna entomologica scandinavica* **5**(in two parts)**,** 1-304, 305-606. Klampenborg: Scandinavian Science Press Ltd.

Telfer, M.G. 2017. *Invertebrate survey of Sutton Fen RSPB reserve: final report*. Report to RSPB.

Telfer, M.G. and Gibbs, D.J. 2018. The leaf-mining fly *Metopomyza nigrohumeralis* (Hendel) (Diptera, Agromyzidae) new to Britain from Sutton Fen RSPB reserve in the Norfolk Broads. *Dipterists Digest* (*Second Series*) **24(**2017)**,** 221-223.

***Helina deleta* (Stein) (Diptera, Muscidae) recorded in Devon, England –** This species was recorded as new to Britain by Tony Irwin and Adrian Pont in 2012 (Irwin, A.G and Pont, A.C. 2014. *Helina deleta* (Stein, 1914) (Diptera, Muscidae), new to Britain. *Dipterists Digest* (*Second Series*) **21,** 157-160). Three females were caught in water traps set in an area of grassland with veteran oaks and scrub in West Suffolk, the traps being emptied in September and October.

On 22 April 2017, I swept a male at Mill Bay, near Outer Froward Point (SX908499), Kingswear, on the south Devon coast. The habitat was a small stream bordered by hemlock water-dropwort *Oenanthe crocata* running down a shallow valley above sea cliffs. The stream was set within maritime grassland, flanked by blackthorn *Prunus spinosa* and common gorse *Ulex europaeus* scrub, and with a tiny wet willow (*Salix*) woodland at its head.

Another individual, a female, was caught on 12 August 2017 at Dawlish Warren National Nature Reserve, a sand spit at the mouth of the Exe estuary, again on the south Devon coast. Here the fly was caught in an area of wet grassland and willow scrub surrounding a pond known as Greenland Lake (SX984791).

Irwin and Pont (2014) noted that adults have been reared from the excrement of cattle and wild brown bears. Cattle are grazed at the former Devon site, but there are no large herbivores on the latter one, and certainly no bears! A female *Musca osiris* Wiedemann, 1830 was caught at Dawlish Warren on the same day, suggesting that there had been a recent fall of vagrant or migrant flies, of which the *H. deleta* was possibly one.

I am grateful to Howard Bentley for confirming the identification of the two specimens, and to James McGill for his draft Muscidae keys, without which I would doubtless have overlooked them. Both were found during Devon Fly Group field meetings. Thanks to the National Trust for giving us permission to record and collect flies at Froward Point, and to Teignbridge District Council for the same at Dawlish Warren NNR **– ROBERT WOLTON**, robertwolton@yahoo.co.uk

***Lispocephala fuscitibia* Ringdahl (Diptera, Muscidae) found on Dartmoor, Devon –** Steven Falk first recorded this species in Britain in 2004 and 2005, collecting individuals from three bogs in the New Forest (Falk, S. and Pont, A. 2006. *Lispocephala fuscitibia* Ringdahl, 1944 (Diptera, Muscidae) new to Britain from the New Forest. *Dipterists Digest* (*Second Series*) **13,** 39-41). Subsequently Martin Drake swept specimens at Stoborough Heath National Nature Reserve in June 2006 (Drake, M. 2010. *Lispocephala fuscitibia* Ringdahl, 1944 (Diptera, Muscidae) in a Dorset mire. *Dipterists Digest* (*Second Series*) **17,** 76). In 2016, I was able to extend the distribution westwards to Devon, where I caught single males at three well-separated mire sites on Dartmoor: Moortown Bottom (SX661888) near Gidleigh on 2 June, Upper Prewley Moor (SX542909) near Sourton on 4 June, and Emsworthy Devon Wildlife Trust Reserve (SX741778) near Haytor on 12 June. All three sites support acidic valley mire or soakaway communities, although the last has some base enrichment. Falk and Pont noted that the species appears to be very scarce across its known range in Central and Northern Europe. My thanks to James McGill for his draft Muscidae keys which enabled me tentatively to determine the species, to Martin Drake for confirming the identification, and to the Devon Wildlife Trust, Penelope Warren and Dartmoor National Park Authority for permission to record and collect flies on their land **– ROBERT WOLTON**, robertwolton@yahoo.co.uk

Dipterists Digest 2018 **25,** 17-19

Nanocladius (Nanocladius) distinctus (Malloch) (Diptera, Chironomidae) new to Britain and Ireland

PETER H. LANGTON and LES P. RUSE[1]
University Museum of Zoology, Cambridge, Downing Street, Cambridge
(address for correspondence: 16, Irish Society Court, Coleraine, Northern Ireland, BT52 1GX)
[1]Centre for Research in Ecology, Whitelands College, Roehampton University, Holybourne Avenue, London SW15 4JD

Summary
Pupal exuviae of *Nanocladius* (*Nanocladius*) *distinctus* (Malloch, 1915) were collected by LPR from the River Thames, Purley. An adult male has been detected in a series of *N.* (*N.*) *dichromus* (Kieffer) in coll. PHL, collected from the River Bann, Coleraine, Northern Ireland. This is the first record of the species for both Britain and Ireland. Information is provided for the identification of pupal exuviae and adult males.

Introduction
On 15 August 2017, amongst chironomid pupal exuviae LPR collected from the water surface of the River Thames at Purley (SU653774), Surrey were specimens of *Nanocladius distinctus* (Malloch, 1915) that he identified using Langton and Visser (2003). Since the pupal stage of this species is not easily separable from that of *N. dichromus* (Kieffer 1906), which is the valid replacement name for *N. bicolor* (Zetterstedt, 1838), LPR sent specimens to PHL for confirmation. The subsequent investigation revealed difficulties with separating the two species also for the adult males. The present paper aims to clarify the problem, and then provide a solution based on the material listed in the figure caption below, plus an adult male *N. distinctus* from the River Bann (C854304), drowned on the water surface, 25 July 2014, that was discovered in a series of *N. dichromus* in coll. PHL.

Separation of adult male *N. dichromus* and *N. distinctus*
Most species of adult male Chironomidae can be separated on the structure of the adult male hypopygium. However, the male genitalia of *N. dichromus* and *N. distinctus* are so alike that the figure for *N. dichromus* in Langton and Pinder (2007, Vol. 2, fig. 69A) will pass for both species (cf. Sæther 1977, fig. 9A for *N. distinctus*). Sæther (*op. cit.*) described different patterns and numbers of abdominal tergite setae for the various species he treated in detail. For males of *N. distinctus* he gave T1 with 8-18 (m=13) setae, TII-III each with 13-30 (m=19), and TIV-VIII each with 11-22 (m=16) setae, with the respective transverse row uniserial on most tergites, i.e. with the setae crowded laterally when the numbers are larger. For *N. dichromus* (syn. *bicolor*), Sæther apparently interpreted the adult male by combining features from the literature with others he had observed on a single female of *N.* 'cf. *bicolor* (Zett.)' from Canada. In his key to adult males, the only discrete difference between *N.* '*bicolor* (Zett.)' and *N. distinctus* was the arrangement of setae on abdominal tergites being 'irregularly double' on all tergites for the former species, but in a single row on at least two tergites in the latter (Sæther 1977, page 7, see also figs 1E versus 1D). The value of this distinction may be questioned, as the 'irregularly double' condition was extrapolated from a Nearctic female on which the author also remarked that 'it may represent a new species' (*op. cit.*, p. 30). On the other hand, Fittkau and Lehmann (1970) had described European specimens of *Microcricotopus bicolor* (*Microcricotopus* Thienemann and Harnisch was reduced to a junior synonym of *Nanocladius* by Freeman 1956 and confirmed by Sæther 1977) as also having the tergite setae irregularly arranged.

It has been beyond the scope of the present work to review original type material of *N. dichromus* and its junior synonyms, and to establish a new name-bearing type, if necessary. Consequently, it should be understood that we are using the name in the sense of its interpretation by Sæther (1977).

The following couplets are designed to be inserted in the key to adult male *Nanocladius* in Langton and Pinder (2007, Vol. 1).

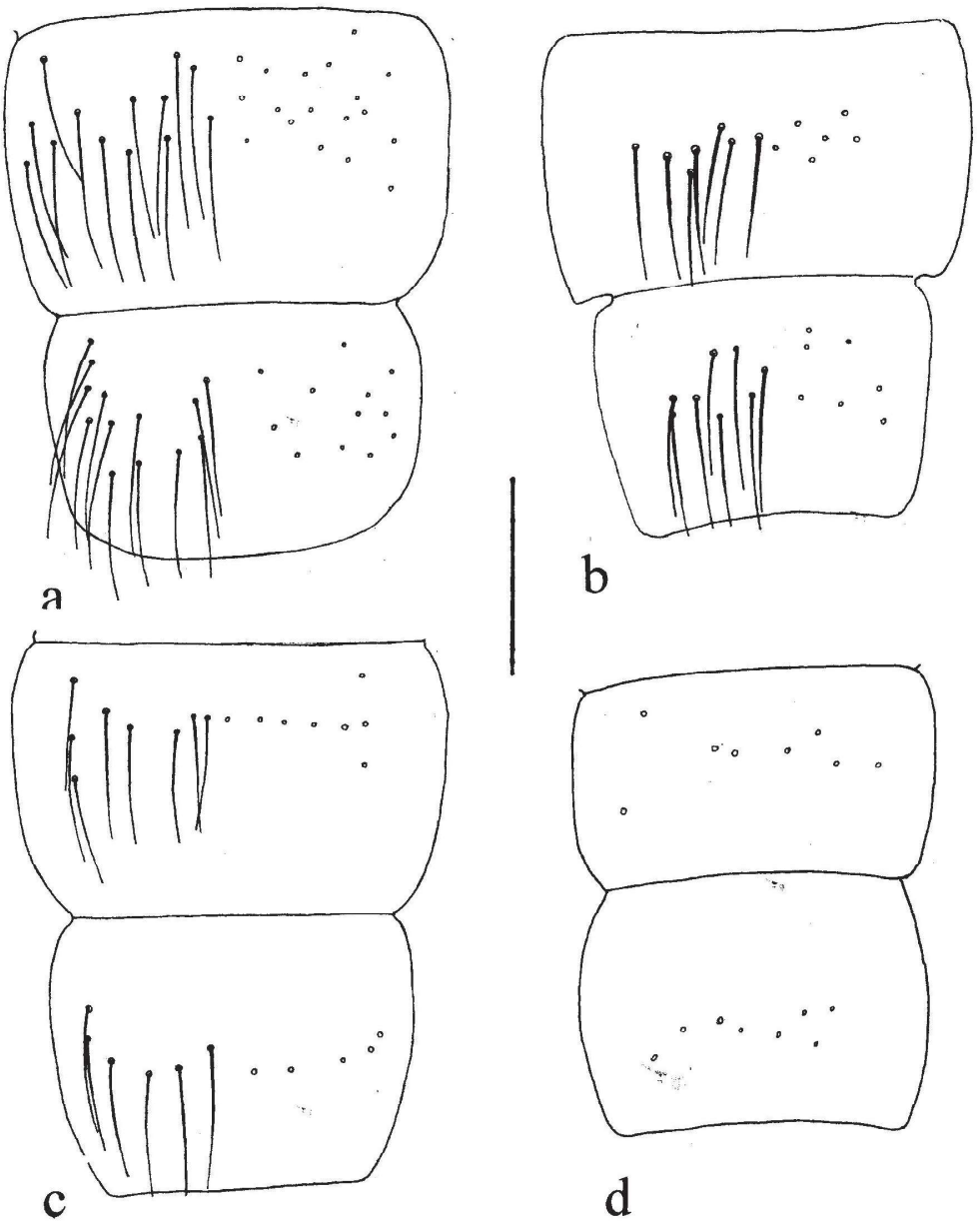


Fig. 1. Abdominal tergites VII and VIII: (a), *Nanocladius dichromus* pharate adult male, small pool by Loch Spynie (NJ237665), Scotland, 23 April 2000; (b), *N. dichromus* pharate adult male R. Bann (C854305), Coleraine, Northern Ireland, 14 June 2013; (c), *N. distinctus* pharate adult male, R. Rhine, Wageningen, The Netherlands, 16 August 1982, leg. A. Klink; (d), *N. distinctus* adult male, R. Bann (C854305), Coleraine, Northern Ireland, 26 July 2014, drowned on water surface. Scale line = 0.1mm.

1. Inner lobe of gonocoxite roughly rectangular 1a
- Inner lobe of gonocoxite conical in shape 2

1a. Abdominal tergites VII and VIII with a transverse row of setae (Figs 1c, d). Hypopygium as in *N. dichromus* fig. 169A ..... **Nanocladius distinctus** (Malloch)
- Abdominal tergites VII and VIII with many irregularly arranged setae (Figs 1a, b). Hypopygium fig. 169A .....**Nanocladius dichromus** (Kieffer) sensu Sæther

Nanocladius dichromus is a common, widespread species in the British Isles and occurs in a wide variety of stagnant and flowing waters. *Nanocladius distinctus* may have previously been overlooked, but its presence in the lower reaches of the R. Rhine in The Netherlands, the R. Thames in England and the R. Bann in Northern Ireland suggest that it might be associated with the potamon (slow-flowing lower course) of large rivers.

Acknowledgement
The authors are grateful to Martin Spies for his helpful review of this paper.

References
Fittkau, E.J and Lehmann J. 1970. Revision der Gattung *Microcricotopus* Thien. et Harn. (Dipt. Chironomidae). *Internationale Revue der Gesamten Hydrobiologie und Hydrographie* **55,** 391-402.

Freeman, P. 1956. A study of the Chironomidae (Diptera) of Africa south the Sahara II. *Bulletin of the British Museum (Natural History), Entomology* **4,** 1-7.

Langton, P.H. and Pinder, L.C.V. 2007. Keys to the adult male Chironomidae of Britain and Ireland. Volumes 1 and 2. *Freshwater Biological Association Scientific Publications* No. **64**.

Langton, P.H. and Visser, H. 2003. Chironomidae exuviae. A key to pupal exuviae of the West Palaearctic Region. Amsterdam: Biodiversity Center of ETI. CD ROM.

Sæther, O.A. 1977. Taxonomic studies on Chironomidae: *Nanocladius*, *Pseudochironomus*, and the *Harnischia* complex. *Bulletin of the Fisheries Research Board of Canada* **196,** 1-143.

Spies, M. and Sæther, O.A. 2004. Notes and recommendations on taxonomy and nomenclature of Chironomidae (Diptera). *Zootaxa* **752,** 1-90.

Metriocnemus (*Inermipupa*) *carmencitabertarum* Langton and Cobo (Diptera, Chironomidae) now well established in Northern Ireland –

The recent spread of *Metriocnemus* (*Inermipupa*) *carmencitabertarum* northwards from northwest Spain has been summarized in Langton, P.H. 2015. *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo (Diptera, Chironomidae) now in Northern Ireland. *Dipterists Digest* (*Second Series*) **22,** 10. Three years ago in response to the reports of its establishment in Co. Meath (Declan Murray *pers. comm.*), I set up an *M. carmencitabertarum* trap outside the back door of my apartment here in Coleraine. The species is characteristic of small, often temporary bodies of water. The trap is a plastic plant trough, 57cm long x 22cm wide by 15 cm deep. A layer of gravel reduces the water depth to 10cm. The trap was initially filled with tap water, and only once since has it been necessary to top up with tap water, rain water keeping the trap full. The water soon turned green and has remained so. My apartment is in a complex of contiguous apartments two and three storeys high surrounding a car park accessed by an archway through the buildings. Two narrow alleys also allow access to the court. All three

accesses are at the far end of the court to where the trap is sited. On 15 April of this year I discovered a thriving population of *M. carmencitabertarum* in the trap – **PETER H. LANGTON,** University Museum of Zoology, Downing Street, Cambridge (address for correspondence: 16 Irish Society Court, Coleraine, Co. Derry, BT52 1GX)

REVIEW

Chironomidae (Diptera) of Ireland – a review, checklist and their distribution in Europe by Declan A. Murray, James P. O'Connor and Patrick J. Ashe. 404 pp. Occasional Publication of the Irish Biogeographical Society Number 12, 2018.

This work is the result of many years' study of non-biting midges in Ireland, and is a significant contribution to knowledge of this family in a British Isles and European context. It is dedicated to Carmel Humphries (1909-1986), Professor of Zoology at University College, Dublin from 1957 to 1979, who fostered the interest of the authors in these insects during their time as students there, and it benefits from a foreword by her present successor, Thomas Bolger. Thanks to the diligence of the authors, the Chironomidae are now one of the better known Diptera families in Ireland, with 520 named species and some others awaiting identification recognised to occur, leaving only a little over 100 species recorded in the British Isles that have yet to be found in Ireland. Indeed, 18 species recorded in Ireland have yet to be found in Britain, nearly half of the Diptera species for which that is presently true. The extent and diversity of aquatic habitats in Ireland are reflected in the richness of its midge fauna.

The introduction includes a history of chironomid studies in Ireland, and of the progressive development of international collaboration that has enhanced them and placed them in a European context. The contribution of the senior author's many students in building knowledge of the Irish fauna is acknowledged, and more recently that of Peter Langton on that of Northern Ireland. This account is well illustrated with photographs of the authors and their collaborators over the years.

The main part of the work comprises a list of all species of the family that have been confirmed to occur in Ireland. An account of the biology is given under each generic heading. For each species, data are assigned to counties and to 40 hydrometric areas defined by river catchments, into which Ireland has been divided for recording purposes, with records for five offshore islands treated separately; maps show the distribution within Ireland by hectads, and the wider distribution is indicated and illustrated by maps showing the distribution in Europe by country.

Taxonomic issues are discussed under genera and species where relevant. In the checklist provided, it is indicated whether species have been recorded respectively in Northern Ireland and the Republic of Ireland and, if there is any uncertainty about occurrence in either geographic region, this is queried. Twenty presently un-named species, 14 known only from pupal exuviae and six other undescribed species, are included in the list and discussed in the text under their present designations; only two of these are currently in the British Isles checklist. However, for those known only from morphotypes of pupal exuviae, it is in some cases noted that they may represent known species of the respective genus for which exuviae have yet to be recognised.

This comprehensive account of the Irish chironomid fauna will be a firm basis for future studies of this family in the British Isles. It will undoubtedly continue to be built on, given that the authors and others are still actively adding to knowledge of the taxonomy, distribution and biology. **EDITOR**

Dipterists Digest 2018 **25,** 21-24

Diaphorus winthemi Meigen (Diptera, Dolichopodidae) is almost certainly not British

C. MARTIN DRAKE
Orchid House, Burridge, Axminster, Devon EX13 7DF; martindrake2@gmail.com

Summary
The only extant British specimens attributed to *Diaphorus winthemi* Meigen, 1824 are female *D. oculatus* (Fallén, 1823). Another female specimen referred to in a published account appears to be lost, but it is suggested that it may also have been *D. oculatus*. It is proposed that *D. winthemi* should be removed from the British list of dolichopodids.

Introduction
The number of species of dolichopodids recorded in Britain continues to grow. Since d'Assis-Fonseca (1978) published his Handbook, the number has risen from 267 to about 310, of which several have yet to be formally added to the British list (Drake 2011, Chandler 2018). A few species have been removed owing to corrected identification and synonymy, but three species that have not been recorded for a considerable time, or whose more recent records have not been confirmed, need closer investigation. *Poecilobothrus majesticus* d'Assis-Fonseca has not been seen since the only specimen ever found in 1909 was described as a new species, and may be just an odd specimen of another species; the identity of *Dolichopus mediicornis* Verrall has been questioned (Kahanpää 2008, Marc Pollet *in litt.*); and *Diaphorus winthemi* Meigen, 1824, has only a few old records based on females. This paper examines the last species.

The British list of dolichopodids includes the first four species of *Diaphorus* to be described by Fallén and Meigen between 1823 and 1830; the other 17 Palaearctic species have not been found here (Pollet 2011). Records for *Diaphorus winthemi* can be quickly summarised: two by Verrall and one by Blair. However, it is worth examining how these two recorders published their findings since they are based on females, which may have been misidentified.

Results
Verrall (1888, 1905) introduced *Diaphorus winthemi* to the British list on the basis of a female that the German dipterist Loew had identified for him, from Plashett Wood, East Sussex, 3 July 1868, and possibly several females that he included as *D. nigricans* Meigen but whose identity he was uncertain of, from Three Bridges, West Sussex (but in V.C. East Sussex), 31 July 1882. Verrall's (1905) ambivalence is worth repeating verbatim: "Two doubts arise; one as to whether Loew knew the females of these species correctly, and the other as to whether the specimens caught at Three Bridges ... belong to this. The species must remain doubtful as British at present, though it is most likely to occur." Blair (1946) briefly reported the prey of the crabronid wasp *Crossocerus megacephalus* (Rossi) (as *Coelocrabro leucostomoides* (Richards)) at Freshwater on the Isle of Wight where he lived. On 2 July 1946, he found three wasp cells close together in a fallen elm tree (*Ulmus*), one of which "contained the following flies, all fresh and in good condition, some indeed still capable of movement:- *Beris vallata* Forst. (7♂, 1♀), *Empis chioptera* Mg. (1♀), *Platypalpus flavicornis* Mg. (1♂), *Diaphorus winthemi* Mg. (1♀), *Chrysotus neglectus* Wied. (1♂), *Azelia zetterstedti* Rond. (1♂ with the egg of the wasp attached beneath the neck), *Sepsis fulgens* Mg. (1♀)." And that is it – the second British record after nearly 80 years without further comment.

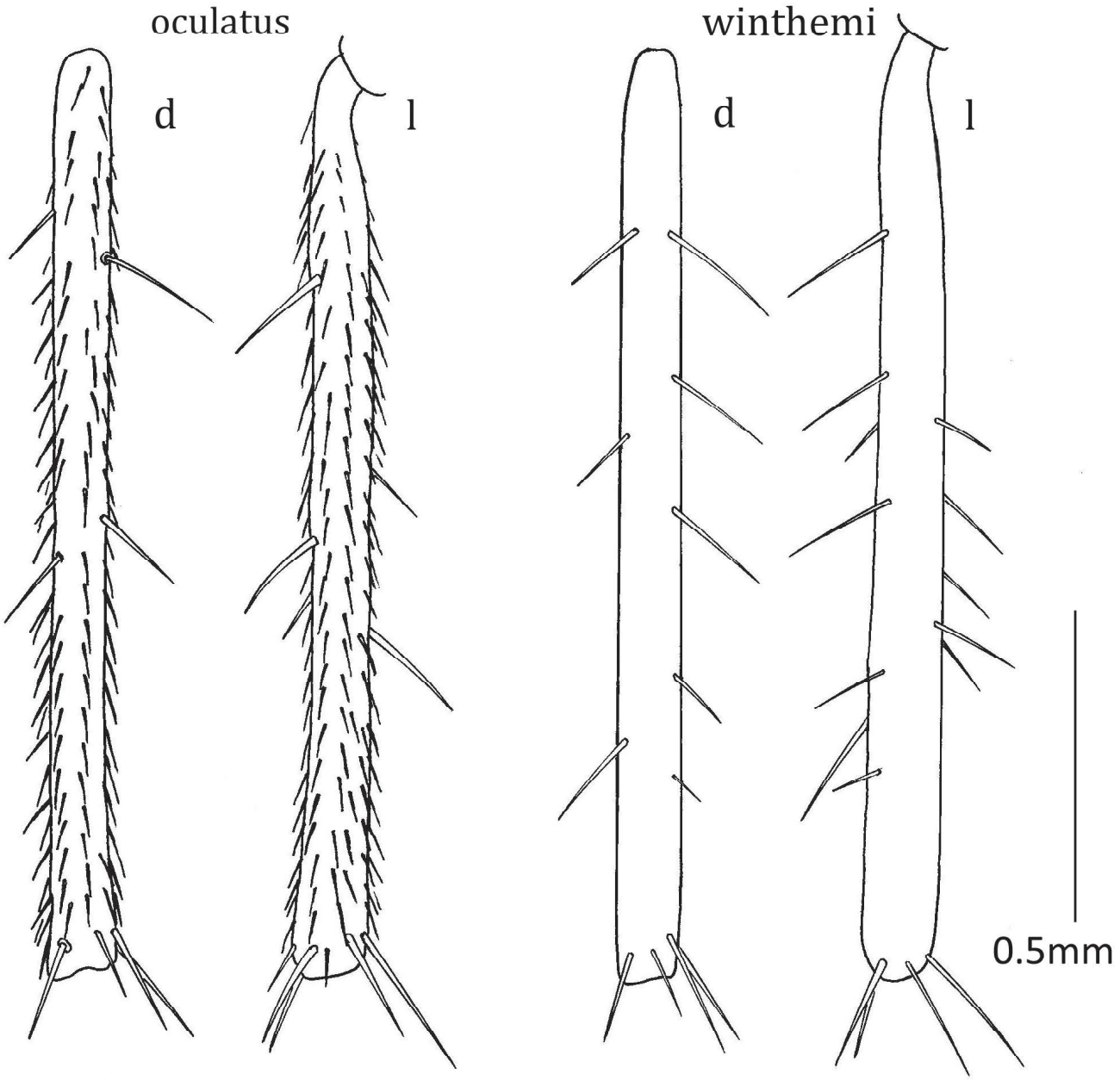


Fig. 1. Mid tibia of female *Diaphorus oculatus* and *D. winthemi*, dorsal (d) and lateral (l) views. The figures of *D. winthemi* are schematic.

Verrall's five female specimens from Plashett and Three Bridges are in the Oxford University Museum. They agree with the rather brief description of *D. oculatus* (Fallén) by Parent (1938) and with my own specimens of *oculatus* collected at several localities in the company of males, and run immediately to *oculatus* using Parent's key. In the Verrall-Collin Palaearctic collection, standing under *D. winthemi*, is a female collected by Kowarz at Wien (Vienna), along with several males at the same vague locality data and which are correctly identified as *winthemi*. This female agrees closely with Parent's description, in which he particularly calls attention to the remarkably rich and robust ("remarquablement riche et robuste") chaetotaxy of the tibia, and in his usual careful manner gives the numbers of setae in each position. The schematic drawing here of the Wien *winthemi* specimen, compared to an English *oculatus* in my collection, shows the mid tibia which is used in both Parent's and d'Assis-Fonseca's keys (Fig. 1). The one or two ventral setae of *oculatus* are true ventrals, whereas the several found in *winthemi* are both anteroventral and posteroventral. It is surprising that d'Assis-Fonseca (1978) did not realise, or

perhaps wish to admit, that Verrall's specimens, for which he gives the records, are *oculatus* as his key is based on Parent's, as is most of his Handbook. Verrall's specimens do not run clearly to any species in d'Assis-Fonseca's key because he added a variable colour character of the palps that muddies the distinction, whereas there is no such issue using Parent's key where the separation of *oculatus* and *winthemi* is based purely on unambiguous chaetotaxy. Although Loew had certainly studied the genus well, as he described six species between 1857 and 1871, it appears that Verrall was right to question his knowledge of female *Diaphorus*, even though dolichopodids were among Loew's favourite families (Osten-Sacken 1903-04).

Blair's specimen appears to be lost. I visited Winchester Museum (Hampshire) where his collection is housed (Chandler 2014). With much help from Christine Taylor, Keeper of Natural Sciences, I found the two crabronid wasps that Blair had reared (the data labels differ by one day from his published account) and, in the Diptera drawers, three of the species mentioned in his publication: *Azelia zetterstedtii*, *Empis chioptera* and two specimens of *Beris vallata*. Having established that Blair had kept and properly labelled the reared specimens, I did not continue looking for the hybotid and sepsid. However, there is only one dolichopodid specimen of Blair's in the entire Winchester collection, which Christine Taylor said is most unusual and suggests that his box of dolichopodids was lost, destroyed or not sent to the museum. Richard Dickson (*pers. comm.*) adds that some of the collection had been badly damaged by pests while in storage several decades ago.

Blair kept diaries and more detailed notebooks for Coleoptera and Lepidoptera, but no pertinent information can be found in the museum for the relevant year of 1946 when Blair would almost certainly have documented his finding. It is unlikely that this *Diaphorus* specimen or details about Blair's rearing can now be checked. The correctness of the determination may be guessed from the key that Blair may have used. Verrall's (1905) key applies only to males although he did not make this explicit; in that key female *oculatus* will run to *winthemi*. Becker (1918) would have been of no help as he did not separate these two species in his key to females. Blair may have used Parent (1938) and arrived at the right identification, but would have been unaware that his specimen represented the first for Britain as it was already on Verrall's list. Clearly we cannot know which key he used but I offer the following speculation to reach a conclusion.

Kenneth Gloyne Blair was regarded as an excellent all-round naturalist with a broad understanding of many insect orders, but he was primarily a coleopterist and employed in the Coleoptera section at the British Museum (Natural History), where he eventually became Deputy Keeper in the Department of Entomology (Hawkins 1953). Shortly after his retirement and in the year before he made his wasp-cell observations, he moved to Freshwater, leaving behind, one imagines, access to reference books and journals that would have been conveniently to hand for most of his working life, and I surmise that he would not have had need of his own copy of a moderately expensive tome such as Parent's monograph. I am therefore inclined to the view that Verrall's would have been the publication most readily available to Blair, and that, not being primarily a dipterist, he did not notice that this key does not work for females.

I suggest that *Diaphorus winthemi* is deleted from the British Dolichopodidae, and that the few records are re-assigned to *oculatus*. The key to female *Diaphorus* by d'Assis-Fonseca (1978) can be simplified: at the first couplet, specimens with white whiskers (occipital setae) are *oculatus*. *Diaphorus winthemi* is present in France, Belgium, the Netherlands and Germany among the continental countries closest to Britain, so Verrall may yet prove correct and the species may perhaps be found in Britain.

Acknowledgements
I am most grateful to Christine Taylor for access to the entomology collection at Chilcomb House (Hampshire Cultural Trust), and for her help in interpreting Blair's collection. Richard Dickson kindly continued searching the museum for documentation in the hope of unearthing relevant information. I also thank Zoë Simmons of Oxford University Museum for access to and help navigating the Verrall-Collin collection, and Peter Chandler for help with literature.

References

d'Assis-Fonseca, E.C.M. 1978. Diptera Orthorrhapha Brachycera Dolichopodidae. *Handbooks for the Identification of British Insects* **9**(5). Royal Entomological Society, London.

Becker, T. 1918. Dipterologische Studien, Dolichopodidae, Nova Acta. Part 3 *Abhandlungen der Kaiserlich Leopoldinisch-Carolinischen Deutschen Akademie der Naturforscher* **54,** 35-214.

Blair, K.G. 1946. *Coelocrabro leucostomoides* Rich. (Hym., Crabronidae) and its prey. *Entomologist's Monthly Magazine* **82**, 236.

Chandler, P. 2014. Museum collections - your local museum needs you. *Bulletin of the Dipterists Forum* **77,** 9-11.

Chandler, P.J. 2018. *Checklists of Insects of the British Isles (New Series) Part 1: Diptera.* Dipterists Forum website http://www.dipteristsforum.org.uk/sgb_check_intro.php

Drake, M. 2011. Changes in the dolichopodid fauna. *Empidid and Dolichopodid Recording Scheme Newsletter* No. **16,** 5-6.

Hawkins, C.N. 1953. Kenneth Gloyne Blair, 1882-1952. *Entomologists Monthly Magazine* **89,** 25-27, 1 plate.

Kahanpää, J. 2008. Nematode-induced demasculinisation of *Dolichopus* males (Diptera: Dolichopodidae). *Zootaxa* **1689,** 51-62.

Osten-Sacken, C.R. 1903-1904. *Record of my life-work in entomology*. Facsimile reprint by E.W. Classey Ltd, Faringdon, 1978.

Parent, O. 1938. Diptères Dolichopodidae. *Faune de France* **35**. Lechevalier, Paris.

Pollet, M. 2011. *Fauna Europaea: Dolichopodidae.* **In** Pape, T. and Beuk, P. (Eds) (2011) Fauna Europaea: Diptera, Brachycera. Fauna Europaea version 2.4, http://www.faunaeur.org.

Verrall, G.H. 1888. *A list of British Diptera*. 49 pp. Pratt, London.

Verrall, G.H. 1905. List of British Dolichopodidae, with tables and notes. *Entomologist's Monthly Magazine* **41,** 81-83.

Dipterists Digest 2018 **25,** 25-29

The larval habits and rearing of *Melanagromyza lappae* Loew (Diptera, Agromyzidae)

BARRY P. WARRINGTON
36 Marlborough Avenue, Hessle, East Yorkshire, HU13 0PN; agromyzidaeRS@gmail.com

Summary
The rearing methods and larval feeding habits of *Melanagromyza lappae* (Loew, 1850) (Diptera, Agromyzidae), a monophagous stem-borer of *Arctium*, are described and illustrated. A description of the puparium and of the adult are also given.

Introduction

There is very little information on the stem-boring habits of the agromyzid *Melanagromyza lappae* (Loew, 1850). The author therefore decided to describe and illustrate these larval feeding habits, along with the methods of locating and rearing puparia. Adults were successfully reared from collected puparia obtained in 2017/18, which also represent the first known record for Yorkshire; they may be identified using Spencer's keys (1972, 1976).

The genus *Melanagromyza* is one of the largest genera in the family Agromyzidae, present in all zoogeographical regions. At the time of writing, 38 species are known from Europe, with only 18 being present in Britain. Many adults of *Melanagromyza* are difficult to determine, with the most reliable method being that of examining the male genitalia.

The larvae of *Melanagromyza* species are known to be internal stem-borers, predominantly in the main stem but also in flower-heads or the root of the host plant. In general, females of *Melanagromyza* species lay eggs in young stems during early summer, with the larvae pupariating before the autumn and the puparium remaining in the centre of the stem until the adults emerge during the following spring or summer.

Methods

During the autumn/winter of 2017 and the early months of 2018, the author obtained dozens of puparia from the stems of *Arctium lappa*, from various sites across East Yorkshire (V.C. 61). Hundreds of stems had to be collected and examined to ascertain if they had any puparia present. Due to the feeding habits of the larvae, *Arctium* stems had to be cut at ground level, to see if any possessed the typical feeding channels of *Melanagromyza* species.

It was no surprise that stems of greater thickness (>20mm in diameter) possessed more larval feeding signs than narrow ones. Plants below c2ft in height very rarely contained any *M. lappae* feeding channels or puparia:

Height of main stem (mm)	Average number of puparia present
300 – 600	1
600 – 900	4
900 +	6

Once a stem had been identified as having feeding channels, they were collected and taken home to be examined more closely. Each stem was cut into sections of approximately 150-250mm and then carefully split open to locate any puparia present. The number of puparia present

in each stem ranged from one to 12, with the majority having three or four. The puparia were to be found at various points within the stem, with seemingly no preference for where pupariation takes place. Some were located close to the cortex of the stem, whilst others remained deep in the central pith.

Preventing the puparia succumbing to mould during the winter months is very important; therefore, any puparia found were carefully removed from the stem and placed into appropriate rearing jars. To allow the puparia to go through their normal diapause, the majority were kept outdoors in an out-building. Regular checks and maintenance were carried out through the winter to increase the chances of successfully rearing adult material. A small number of puparia were kept indoors to see if any adults could be forced into emerging during the winter/early spring. This method resulted in the first adult male emerging on 18 February 2018 (collected 16 November 2017).

Biology

Initially, the larva makes a short leaf-mine which quickly joins the midrib, feeding down into the main stem, where it forms a long channel in the pith (Fig. 3) of the host plant burdock (*Arctium* species). Both greater (*A. lappa*) and lesser (*A. minus*) burdock are utilised by this species; however, the author collected puparia only from *A. lappa*.

The larvae feed throughout the summer, with pupariation taking place in the autumn. The puparia remain in the stem throughout the winter, with emergence occurring the following spring/summer.

1

2

3

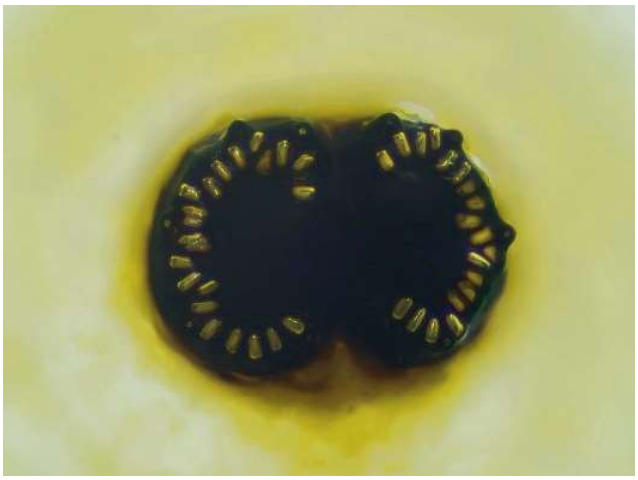
Figs 1-3. 1-2, signs of *Melanagromyza lappae* feeding tunnels in the stem of *A. lappa*; 3, puparium *in situ*, showing feeding channels within the pith of the stem.

Identification

Melanagromyza lappae is a large, robust, species with a wing length of 2.6mm to 3.5mm. The frons and orbits project strongly above the eye, with the orbital setulae in several rows, those which are nearest the eye margin largely reclinate, with those on inner orbits more proclinate.

There are usually two *ors* and three to six *ori*. The mesonotum is slightly greenish/coppery with the abdomen often brilliantly green or bluish. The squamae are white with pale brown margins and white fringe. This species agrees closely with *M. angeliciphaga* Spencer, 1969 on external features; however, the males are quite distinct, as well as *angeliciphaga* having differing host plants.

Whilst developing, the puparium is pale orange-yellow in coloration but becomes whitish-grey once the adult has emerged. The posterior spiracles are adjoining, each process with 16-22 bulbs (Fig. 4). Each spiracle possesses a very strong central horn (Fig. 5), typical for the genus *Melanagromyza* Hendel. The larva was described by Hering (1957: 81) and discussed by Spencer (1957: 186).



4

5

Figs 4-5. *Melanagromyza lappae* puparium: 4, posterior spiracles showing 19-20 bulbs; 5, puparium with the strong central horns clearly visible.

Distribution

Spencer (1972), states that the species is recorded from Middlesex, Buckinghamshire, Hertfordshire and Dunbartonshire. Unfortunately, data from Spencer's collection, at present, is not included within the NRS database. Several more British records are known, from other authors (Allen 1956, Allen 1958, Griffiths 1963, Hamm 1939, Robbins 1990); however, again, due to the huge task of collating historical data, these too are not yet included within the NRS database. The distribution map (Fig. 6) therefore indicates the records of *M. lappae* (the Yorkshire record is based on the author's initial find of the species) within the NRS database. Skidmore (1970) recorded *M. lappae* in Yorkshire; however, this determination is incorrect (Grayson 2018). Of course, this species may prove to be much more widespread and abundant than the known records suggest.

Additional notes

The majority of people who record the larval stages of the Agromyzidae do not investigate the stem-borers, with their attention usually focussed on larval leaf-mines. This may be due to there being very little information on the internet or in the most frequently used literature discussing and illustrating their larval habits in detail. Therefore, it is hoped that this paper will provide

recorders with sufficient information to record the discussed species. Although the host-plant and larval details cited within this paper should allow a positive determination, rearing adult material is advised. Parasitoids should be preserved, too, Braconidae, Figitidae (Cynipoidea) and Pteromalidae (Chalcidoidea) emerging.

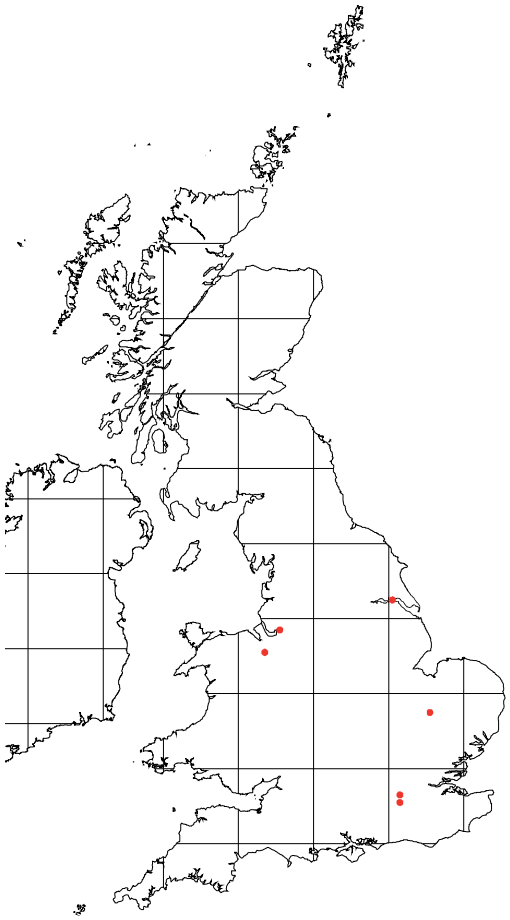


Fig. 6. Distribution of *Melanagromyza lappae*.

References

Allen, P. 1956. Observations on the biology of some Agromyzidae (Diptera). *Proceedings of the Royal Entomological Society of London* (*Series A*) **31**(7-9)**,** 117-131.

Allen, P. 1958. Larval morphology of different genera of Agromyzidae (Diptera). *Proceedings of the Royal Entomological Society of London* (*Series A*) **33**(7-9)**,** 123-135.

Grayson, A. 2018. Additions and corrections to the Yorkshire Diptera list (part 7): including two species of *Trichocera* [Diptera: Trichoceridae] new to the British list. *The Naturalist* Vol. 143, No **1097,** 23-31; April 2018.

Griffiths, G.C.D. 1963. The Agromyzidae (Diptera) of Woodwalton Fen. *Entomologist's Monthly Magazine* **98**(1962)**,** 125-155.

Hamm, A.H. 1939. A history of Oxfordshire Insecta. pp. 156-177/178. **In** Hobby M.A. and Salzmann, L.F. (Eds). Zoology of Oxfordshire I (Victoria History of Counties of England).

Hering, E.M. 1957. Die Larven der Agromyziden (Diptera) III. *Tijdschrift voor Entomologie* **100,** 73-94.

Robbins, J. 1990 *A Provisional Atlas of Leaf Miners of Warwickshire, with notes on others occurring in the Midlands (Insecta: Coleoptera 6441; Lepidoptera 6446; Diptera 6447;*

Hymenoptera 6450). Warwickshire Biological Records Centre (Ed.): Benchmark Atlas Series **38,** II + 181 pp.; Warwickshire Country Council, Coventry.
Skidmore, P. 1970. Diptera. **In** Yorkshire Naturalist's Union One Hundred and Eighth Annual Report for 1969: Entomology. **95,** 24-25.
Spencer, K.A. 1957. Notes on the British species of *Melanagromyza* Hendel (Diptera: Agromyzidae), with the description of four new species, and also of three new species from Germany. *Proceedings of the Royal Entomological Society of London* (B) **26,** 179-188.
Spencer, K.A. 1972. Diptera, Agromyzidae. *Handbooks for the Identification of British Insects.* **X**(5g)**,** 1-136. Royal Entomological Society, London.
Spencer, K.A. 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna entomologica scandinavica* **5**(in two parts)**,** 1-304, 305-606. Klampenborg: Scandinavian Science Press Ltd.

New records of *Leucophenga hungarica* Papp and *Phortica variegata* (Fallén) (Diptera, Drosophilidae) –

Leucophenga hungarica Papp, 1991 is a recent addition to the British list; after first being recorded at Windsor Great Park, Berkshire in 2015, it was found there again and at three other sites in Kent, Surrey and Hampshire in 2016 (Chandler, P.J. 2016. *Leucophenga hungarica* Papp (Diptera, Drosophilidae) new to Britain. *Dipterists Digest* (*Second Series*) **23,** 107-110). No other records have since been published, but it was later learned that Martin Drake, in addition to the specimen from Ham Street Woods cited in the above mentioned paper, had caught a second male in Kent during the 2016 Dipterists Forum summer field meeting based at Canterbury. This was at East Blean Woods (TR192644) on 3 July, along a wet track through coppiced woodland. In 2017, Martin also found it in Devon, a female on 19 June, at Side Downs (ST006004), swept from damp deciduous woodland near a conifer plantation (Martin Drake *pers. comm.*), and I caught a male on 7 June at the same spot in Windsor Great Park, near the stream south of Bishopsgate (SU976718), as the previous two years' records.

I can report three finds in 2018 in the same general region as the Windsor records, suggesting that this species is now well-established in the area. Firstly, on 15 June a female was found at Swinley Park, Berkshire, part of the Crown Estate near Bracknell; it was around a decayed oak stump within an area of open beech plantation (SU896677). Then at Burnham Beeches on 23 June a male and female were swept over moist fallen dead wood on a shaded north facing slope south of Halse Drive (SU952850). On 19 July two females were present among a large diverse assemblage of flies along the dry but humid bed of Badger's Brook (SU930739) in mixed beech and oak woodland within the Highstanding Hill area of Windsor Forest.

Leucophenga hungarica is pale yellow with the abdomen bearing a narrow black median stripe and black apical borders to the tergites, so is easily recognised on microscopic examination but in the field it could be mistaken for a yellow lauxaniid. Observations in Hungary, the Czech Republic and Slovakia (cited by Chandler *op. cit.*) indicate an association with saproxylic fungi including oyster mushrooms (*Pleurotus*), and it is considered likely that the larvae develop in fungi as does the other British species of the genus *L. maculata* (Dufour, 1839). As all British specimens so far recorded have been swept, this association has yet to be confirmed here.

I have previously reported the occurrence of *Phortica variegata* (Fallén, 1821) at sites outside the New Forest, Hampshire, where its association with trees attacked by the goat moth *Cossus cossus* (Linnaeus, 1758) has long been known (Chandler, P.J. 2014. *Phortica variegata* (Fallén) (Diptera, Drosophilidae) at Bushy Park, Middlesex and Windsor Forest, Berkshire. *Dipterists Digest* (*Second Series*) **21,** 149-150). It was later realised that *P. variegata* was

observed at these other sites when flying around my head and attempting to reach my eyes, a behaviour exhibited only by males. This was highlighted in an exhibit shown at both the 2016 Exhibition of the British Entomological & Natural History Society and at the Dipterists Forum annual meeting in the same year (Chandler, P.J. 2017. pp 90, 92-94. **In** 2016 Annual Exhibition. *British Journal of Entomology and Natural History* **30,** 79-107). It was noted there that this and allied species worldwide are attracted to lachrymal secretions and have been implicated in the transmission of a parasitic nematode *Thelazia callipaeda* Railliet & Henry, 1910 to the eyes of mammals, especially dogs and cats but including man (Otranto, D., Brianti, E., Cantacessi, C., Lia, R.P. and Máca, J. 2006. The zoophilic fruitfly *Phortica variegata*: morphology, ecology and biological niche. *Medical and Veterinary Entomology* **20,** 358–364; Roggero, C., Schaffner, F., Bächli, G., Mathis, A. and Schnyder, M. 2010. Survey of *Phortica* drosophilid flies within and outside of a recently identified transmission area of the eye worm *Thelazia callipaeda* in Switzerland. *Veterinary Parasitology* **171**(1-2)**,** 58-67). As this behaviour had not been observed in the New Forest (Ivan Perry *pers. comm.*), it was speculated that if the New Forest population behaves differently, the population at Windsor and other recent sites is due to a recent colonisation from the Continent and, if so, transmission of the nematode may become a problem here.

At Windsor Forest and Great Park, in all years since 2014, mainly while walking along rides I have noticed the attention of *P. variegata*, and have recorded it in five areas within the hectad SU97, on dates ranging from 26 April to 14 October; it usually appears soon after I have entered these sites, often becoming persistent. I have not come across sap runs during this time so have not been able to confirm if its biological associations are the same as in the New Forest, and only males have been recorded. On the above-mentioned field meeting at Burnham Beeches, it was towards the end of the day that this species appeared flying around my head while I was standing by the Druid's Oak (SU948845) on Lord Mayor's Drive. I have since heard from Helen Read that she has recently observed what must be *P. variegata* at this location and in Egypt Woods north of Burnham Beeches, but only for the first time in 2018.

Steven Falk had also observed similar behaviour of *P. variegata* at Windsor, most recently on 1 July 2015. In the previous year he surveyed known sites on behalf of Natural England and summarised knowledge of the biology and distribution of this species in Britain (2015. Surveys of *Phortica variegata* (Diptera: Drosophilidae) in 2014 with a compilation of other recent records. 8 pp. Buglife - The Invertebrate Conservation Trust) – this cited ten sites in the New Forest, all in association with *Cossus* trees and the five then known sites outside that area in Gloucestershire, Berkshire, Middlesex and Kent, where no such association had been confirmed. It can also now be recorded from Oxfordshire as on 21 May 2018, Steven was in Wytham Great Wood (SP457086), when he again experienced swarms of these flies around his head.

This species is known to develop in sap runs; oviposition on sap runs on beech, birch and oak was observed by J. Máca (1977. Revision of Palaearctic species of *Amiota* subg. *Phortica* (Diptera, Drosophilidae). *Acta entomologica bohemoslovaca* **74,** 115-130) and larvae had been found in a sap run on willow (Séguy, E. 1934. Muscidae acalypterae et Scatophagidae. *Faune de France* **28,** 1-832. Lechevalier, Paris). Falk (*op. cit.*) refers to it having been reared on decaying fruit in the laboratory and suggests that fallen fruit from trees such as crab apple *Malus sylvestris* (it had been found on sap runs on this tree in the New Forest), could be important to it. It is hoped that further observations may lead to establishing its larval biology at the several new sites.

I thank Martin Drake for inclusion of his records of *L. hungarica*, Helen Read (City of London Corporation) and Steven Falk for their sightings of *P. variegata*, and Steven for providing a copy of his survey report. I am also grateful to Helen, and to Keith Alexander and Jon Cole, for organising the field meeting at Burnham Beeches and to the Crown Estate and Natural England for enabling me to continue surveying in Windsor Forest and Great Park – **PETER J. CHANDLER**, 606B Berryfield Lane, Melksham, Wilts SN12 6EL

Dipterists Digest 2018 **25,** 31-34

Dasysyrphus neovenustus Soszyński, Mielczarek & Tofilski, (Diptera, Syrphidae): presence in Britain, France and Ireland

MARTIN C.D. SPEIGHT[1] and CÉDRIC VANAPPELGHEM[2]

[1]Dept of Zoology, Trinity College, Dublin 2, Ireland; speightm@gmail.com

[2]Conservatoire d'espaces naturels Nord et du Pas-de-Calais,
160 rue Achille Fanien, ZA de la Haye, 62190 Lillers, France

Summary

Dasysyrphus neovenustus Soszyński, Mielczarek & Tofilski, 2013 (Diptera, Syrphidae) is recorded from Great Britain, Ireland and France. Information is provided on its separation from *D. venustus* (Meigen, 1822) and *D. hilaris* (Zetterstedt, 1843).

Introduction

Láska and Bičik (1996) and Stubbs *et al.* (2002) made it clear that taxa within the *Dasysyrphus venustus* (Meigen, 1822) complex are difficult to separate and to define. So segregation of another European species within this complex is perhaps not so surprising. *Dasysyrphus neovenustus* Soszyński, Mielczarek & Tofilski was recently described (Soszyński *et al.* 2013) from Poland and European Russia and there are records in press for other countries (Jan van der Ent *pers. comm.*). The present article signals the presence of *D. neovenustus* in Britain, France and Ireland and provides information on its separation from related Atlantic-zone *Dasysyrphus* species.

Using the information provided by Soszyński *et al.* (2013), other European literature on *Dasysyrphus* species (e.g. Bartsch *et al.* 2009) and reference material of related species, specimens of *D. neovenustus* from Britain, France and Ireland were separated, providing the following records (MS and CV = collected and identified by the respective authors):

Dasysyrphus neovenustus Soszyński, Mielczarek & Tofilski, 2013
England: Dorset – 17.VI.1964, SZ0993, Bournemouth, ♀, MS; 22.v.1980, SU1300, ♀, MS; 12.vi.1980, SY 9291, Sherford Bridge, ♀, MS.
France: Lozère – 21.v.2000, env. Caussignac, Mas-St.-Chely, ♀s, MS; Nord – 16.v.2009, 50,163415 N; 3,194383 E, Réserve naturelle régionale de l'Escaut rivière, Proville, ♀, CV.
Ireland: Dublin – 22.v.1972, O2738, ♂, MS; Laois – 22.v.1976, S3380, ♀, MS.
Scotland: Inverness-shire – 18.vi. 1984, NH8907, ♀, MS; Kincardine – 13.vi.1974, NO4697, ♂, MS; Perthshire – Camghouran, Black Wood of Rannoch, 7.vi.1962, ♀, MS.

The key provided by Stubbs and Falk (2002) can be adapted to include *D. neovenustus* as shown below. The modified couplets are given here in both English and French versions:

6. Middle coxa with a group of ventrally directed hairs posteriorly; face usually without median, dorso-ventral black stripe (narrow when present) (mesoscutum vaguely dusted grey-brown, not shining when viewed from some angles; hind tibia usually broadly black round the middle-part of its length; sternite 2 with black marking ill-defined or absent, not rectangular and not reaching lateral margins of sternite) ..... ***hilaris* (Zetterstedt)**

- Middle coxa without hairs posteriorly; face with median, dorso-ventral black stripe (mesoscutum brightly shining from all angles) 7

7. Sternite 2 mostly to almost entirely pale yellow, usually black close to the posterior margin, the black area broadening toward the mid-line of the sternite to make a roughly oval or triangular shape, but rarely reaching the lateral margins of the sternite and not reaching its posterior margin (wing with stigma grey-brown; hind tibia nearly always distinctly darkened at about the middle of its length, but occasionally all yellow; anterior margin of pale marks on tergites 3 and 4 weakly concave; female: at the level of their maximum extent, the dust spots on the frons are separated by less than one third of the width of the frons: Fig. 1b) ..... ***venustus* (Meigen)**

- Sternite 2 with a rectangular black band across entire width of sternite, occupying most of the length of the sternite and reaching both its lateral margins and its posterior margin, or sternites almost entirely black (wing with stigma pale, yellow-brown; hind tibia yellow throughout, not darkened medially; anterior margin of pale marks on tergites 3 and 4 almost straight; female: at the level of their maximum extent, the dust spots on the frons are separated by a distance greater than one third of the width of the frons (Fig.1a), and often greatly reduced or even absent ..... ***neovenustus* Soszyński *et al*.**

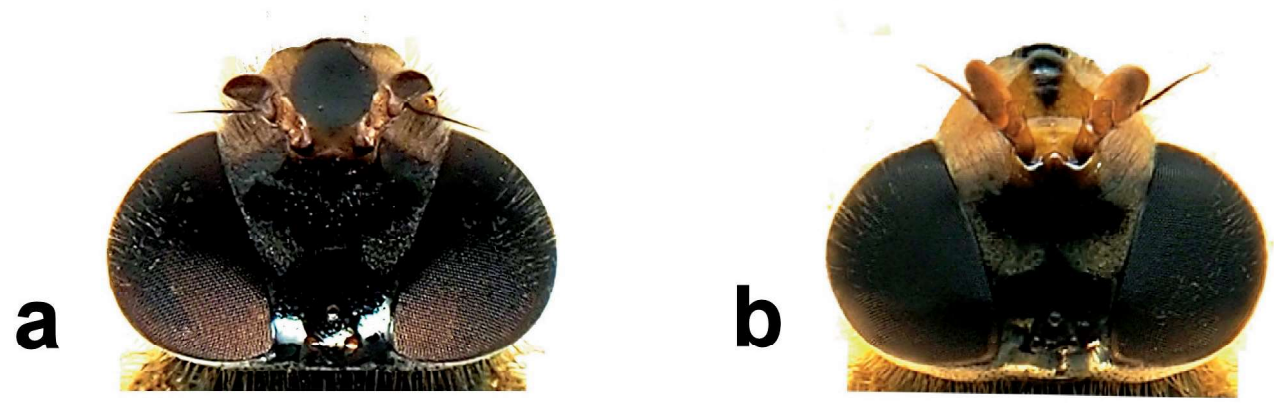


Fig. 1. *Dasysyrphus* females, head, dorsal view, to show frontal dust spots; a = *D. neovenustus*; b = *D. venustus*.

6. Coxa médiane avec, postérieurement, une touffe de poils dirigés ventralement ; la face sans bande noire dorso-ventrale (étroite si présente) (le mesonotum est vaguement pruineux gris-brun, pas brillant sous certains angles; le tibia arrière habituellement largement noir aux environs de la moitié de sa longueur; le sternite 2 avec une marque noire mal définie ou absente, elle n'est pas rectangulaire et ne touche pas les bordures latérales du sternite) ..... ***hilaris***

- Coxa médiane sans poils postérieurement; la face avec une bande noire dorso-ventrale (mesonotum fortement brillant sous tous les angles) 7

7. Sternite 2 principalement à entièrement jaune pâle, habituellement noir proche de la bordure postérieure, la zone noire s'élargit vers la partie centrale du sternite pour former grossièrement un ovale ou un triangle, cette zone touche rarement les bordures latérales et jamais la bordure postérieure (aile avec un stigma gris-brun; le tibia postérieur pratiquement toujours distinctement noirci à peu près à la moitié de sa longueur, mais

occasionnellement toujours jaune; la marge antérieure des marques pâles des tergites 3 et 4 faiblement concave; femelle : au maximum de leur largeur, les zones de pruinosité sont séparées par moins d'un tiers de la largeur du front : Fig.1b) ..... ***venustus***

- Sternite 2 avec une bande rectangulaire noire sur toute la largeur du sternite, elle occupe la majeure partie de la longueur du sternite et touche à la fois les bordures latérales et postérieures, ou sternite quasiment entièrement noir (aile avec un stigma jaune à jaune-brun; le tibia postérieur entièrement jaune, pas noir au milieu; la marge antérieure des marques pâles des tergites 3 et 4 presque droite; femelle : au maximum de leur largeur, les zones de pruinosité sont séparées par plus d'un tiers de la largeur du front (Fig.1a), ces marques sont souvent absentes ou très réduites ..... ***neovenustus***

Notes on *D. neovenustus*

In their diagnosis of *D. neovenustus*, Soszyński *et al.* (2013) alluded to differences between the male terminalia of *D. neovenustus* and *D. venustus*, but their associated figures are difficult to interpret. To judge from the specimens which form the substance of the present note, with an average body length of 7 – 8 mm, *D. neovenustus* is slightly smaller than most specimens of *D. venustus*. Differences in the shape and extent of the black marking on sternite 2 (illustrated in colour by Soszyński *et al.* (2013), which is available on-line) provide perhaps the most useful feature for distinguishing *D. neovenustus* from *D. venustus*. But females can occur in which sternite 2 appears to be extensively black, though with other features in the condition expected for *D. venustus*. Careful examination of these specimens suggests this is due to post-mortem darkening of body contents which show through the rather weakly sclerotised sternite. The possible occurrence of additional, undescribed taxa in the *D. venustus* complex also requires to be recognised. At present, separation of European *Dasysyrphus* species is based on morphology alone. The recent revision of Nearctic *Dasysyrphus* (Locke and Skevington 2013) incorporated a substantial molecular taxonomic component, which resulted in re-instatement of two species previously placed in synonymy and discovery of a third that had remained undetected by previous morphological studies. If a comprehensive bar-coding study of European *Dasysyrphus* were carried out it might be expected to produce similar results, given the existing uncertainty surrounding the taxonomic status and identity of some of the taxa. Locke and Skevington (2013) highlighted the need for genetic characterisation of European *Dasysyrphus*, in discussion of supposedly Holarctic *Dasysyrphus* taxa.

According to Soszyński *et al.* (2013) *D. neovenustus* is a univoltine species, on the wing slightly earlier in the year than *D. venustus*. But they do not provide further ecological information. Existing data suggest that, in Britain and Ireland, the flight periods of *D. neovenustus* and *D. venustus* overlap substantially. The sites for *D. neovenustus* mentioned above all show one element in common – the presence of *Pinus sylvestris*. Forest types involved include Caledonian pine forest; forestry plantations of *P. sylvestris*; heathland invaded by *P. sylvestris* scrub; permanent, montane, calcareous pasture invaded by *Juniperus/P. sylvestris* scrub (Causse grassland at 900m). These records also show that this species visits the flowers of yellow-flowered composites, white-flowered umbellifers and *Sorbus aucuparia*.

This note seeks only to draw attention to the presence of *Dasysyrphus neovenustus* in Britain, France and Ireland and provide information on its separation from closely similar species. The few records presented here indicate that, in Britain, *D. neovenustus* may be distributed from the Scottish highlands to the south coast of England, at locations where *Pinus sylvestris* occurs in woodland or as forestry plantations. It could similarly be expected anywhere in Ireland where plantations of *Pinus sylvestris* are present. In France, the Vosges/Jura, the Alps, the Massif Central and the Pyrenees would seem likely to support this syrphid. Further records of *D.*

neovenustus are to be anticipated, from among specimens at the moment standing in collections under the name *Dasysyrphus venustus*.

Acknowledgments
MS is most grateful to Jan van der Ent, for information about *D. neovenustus*. We also thank Peter Chandler and the reviewers of this article, for their helpful comments.

References

Bartsch, H., Binkiewicz, E., Rådén, A. and Nasibov, E. 2009. Blomflugor: Syrphinae. *Nationalnyckeln till Sveriges flora och flora,* DH53a. 406 pp. Artdatabanken, SLU, Uppsala.

Láska, P. and Bičik, V. 1996. On the problems of the species *Dasysyrphus venustus* (Meigen) and *D. hilaris* (Zetterstedt) (Dipt., Syrphidae). *Entomologist's Monthly Magazine* **132,** 305-310.

Locke, M.M. and Skevington, J.H. 2013. Revision of Nearctic *Dasysyrphus* Enderlein (Diptera: Syrphidae). *Zootaxa* **3660,** 1-80.

Soszyński, B., Mielczarek, E. and Tofilski, A. 2013. *Dasysyrphus neovenustus* sp. n. (Diptera: Syrphidae) a new species in the *venustus* group. *Polish Journal of Entomology* **82,** 353-363.

Stubbs, A.E and Falk, S.J. 2002. *British Hoverflies: an illustrated identification guide, 2nd edition.* 469 pp. British Entomological and Natural History Society, Reading.

Ctenophora flaveolata (Fabricius) (Diptera, Tipulidae), unexpected occurrence in Scotland –

A large cranefly which I observed at Glen Affric in the Highland Region of Scotland, on 26 May 2018, was identified as a male of *Ctenophora flaveolata* (Fabricius, 1794); the specimen was forwarded to Peter Chandler, who confirmed this identification. This was a surprising find as *C. flaveolata* is an uncommon saproxylic species, which develops principally in rotten beech wood, possibly also in oak, and has not previously been recorded in Scotland. Although mainly a southern species in Britain, it has been recorded more widely in recent years, but the most northerly records hitherto were from Cumbria.

When first observed, it was crawling across the road in the part of Glen Affric near Dog Falls (NH 28792 28374), just before being hit by a car, from which it was unscathed apart from the loss of one leg. The habitat in the immediate area is a mixture of broad-leaved trees, including hazel, aspen, eared willow and birch, with a plantation of Scots pines about 5 metres to the north of the road. The understorey vegetation includes *Calluna vulgaris*, *Vaccinium myrtillus*, and various flowering plants, such as *Primula vulgaris* and *Pyrola minor*. There are no beech trees anywhere in the vicinity, and the locality apparently lacks suitable habitat for the larval development of this species. As the area is popular with tourists and was especially busy at the time of this observation, the possibility that it had arrived by human agency cannot be excluded and unless further Scottish records follow, this seems the most likely explanation for its presence. As the species is nowhere common in Britain, its arrival in the north of Scotland by any means of transport is, nevertheless, an improbable occurrence.

I wish to thank Roy Leverton and Peter Chandler for their help with identification –
ALAN WATSON FEATHERSTONE, 433 Field of Dreams, The Park, Findhorn Bay, Forres IV36 3TA

Dipterists Digest 2018 **25,** 35-52

Habitat associations of the rare flies *Dolichopus laticola* and *D. nigripes* (Diptera, Dolichopodidae) in the fens of Norfolk, England

C. MARTIN DRAKE

Orchid House, Burridge, Axminster, Devon EX13 7DF; martindrake2@gmail.com

Summary

Adults of the two rare flies *Dolichopus laticola* Verrall, 1904 and *D. nigripes* Fallén, 1823 were surveyed intensively in six fens in Norfolk in 2010 and more widely in 15 more fens in 2011. *Dolichopus laticola* was more widespread than *D. nigripes* and was weakly associated with fens of high botanical interest and those rich in other species of dolichopodids, and absent from those with low botanical value and lower dolichopodid species richness. Within fens it occurred in all five habitat types but was significantly more abundant in tall-herb fen and rushy (*Juncus*) or grassy fen than in remaining habitat types, and was particularly scarce in carr woodland or scrub. There was no difference in abundance between different management classes of cutting or neglect, but it was scarce in grazed fen. At the microhabitat scale, it occurred significantly more frequently on wetter peat and where tall-herb fen vegetation was frequent to abundant, and was non-significantly scarcer where tall monocotyledons (*Phragmites*, *Cladium*) were frequent to abundant. *Dolichopus nigripes* showed a strong preference for grassy fen and was relatively scarce in typical tall-herb fen vegetation, carr and tall stands of *Phragmites* or *Cladium*. Each *Dolichopus* species was associated with a different suite of fenland specialist dolichopodids but ecologically distant from the suite of ubiquitous generalist species.

Introduction

Little is known about the ecology of many of Britain's 7000 flies. Indeed, it would make tedious reading if it existed for all species. Occasionally, a spotlight is focussed on a species to reveal more than can be gleaned beyond an obvious habitat affinity and membership of an assemblage of species with similar requirements. Two dolichopodids that are rare in a global and British context have been selected for closer examination and form the subject of this paper.

The UK Biodiversity Action Plan (BAP) was the government's response to the Earth Summit held in Rio de Janeiro in 1992. The UK plans were revised in 2007 when two dolichopodids, *D. laticola* Verrall, 1904 and *D. nigripes* Fallén, 1823 were included along with another 33 species of Diptera (Biodiversity Reporting and Information Group 2007). They are among the few dolichopodids with Endangered status (Falk and Crossley 2005) and share the same habitat of high quality fenland in Norfolk. They are moderately large dolichopodids and are easy to identify so are unlikely to have been overlooked in recent decades when Diptera recording has been intense in Britain (Ball and Morris 2012). They therefore made good candidates for inclusion in the BAP, in which they were listed under the criterion that allows for likely strong decline in the UK. There is a considerable body of work on the factors influencing dolichopodid communities, including those of fens (e.g. Laurence 1995; Meyer 2009; Meyer and Filipinski 1998; Pollet 1992, 2001; Rampazzi 2002; Van der Velde *et al.* 1985) but little has been published on the ecology of a single species of dolichopodid. Among the few examples are two species of *Medetera* (Beaver 1966), *Orthoceratium lacustre* (Scopoli, 1963) (Pollet *et al.* 2017) and, coincidentally, *Dolichopus laticola* (Vincent 2011).

The present work was part of a project commissioned by Defra (Department for Environment, Food and Rural Affairs) to investigate several BAP species. The aims were to establish the relationship between the occurrence of adults of *D. laticola* and *D. nigripes* with environmental features, and to record their distribution in the fens of Norfolk. The first aim was undertaken in the first of two years of work, in order to gain a better understanding of what aspect

of the fenland habitat needed to be searched in the following year for a distribution survey. Drake (2013) described the distribution of the two species within Norfolk.

Methods

Site

Broadland in Norfolk is a very large diverse wetland drained by several lowland rivers, with many small shallow lakes, known as broads (derived from medieval peat-digging), drained marshes that are now wet pasture dissected by numerous ditches, swamp bordering the rivers and broads, fen and secondary wet woodland. Fen is a subset of swamp found on soils that are usually base-rich and with neutral to higher pH. Broadland's fen has exceptional value in Britain and was the main focus of the present study. Fen and wet woodland occupy about 55km^2 of Broadland in Norfolk, representing the largest single block of these habitat types in Britain (George 1992). Most of the fen is base-rich flood-plain mire but there are two valley mires, both sampled in this survey, in the north of the area. The fen communities are exceptionally varied but three are widespread and together comprise most of the unwooded area. Of most interest is *Phragmites australis-Peucedanum palustre* tall-herb fen (S24), which is the most characteristic and species-rich plant community of the Ant and Bure floodplains. Harding *et al.* (2010) described it as having an eclectic mix of abundant species, often with no single dominant, although Rodwell (1995) gave *Phragmites australis* (reed), *Calamagrostis canescens* and *Cladium mariscus* as the dominant tall monocotyledons, with *Lythrum salicaria*, *Eupatorium cannabinum* and *Filipendula ulmaria* (among others) as the most frequent tall herbs; the lowest layer of herbs includes *Mentha aquatica* and *Galium palustre*. With increasing nutrient enrichment or reduced management, this first community grades into the second extensive community which is a less species-rich variant, *Phragmites australis-Eupatorium cannabinum* tall-herb fen (S25). Finally, *Phragmites australis* reed-beds (S4) is the most extensive of these dominating communities but is often floristically dull, particularly next to rivers that provide nutrient-enrichment. Fewer Diptera samples were taken from reedbeds and other communities which included *Juncus subnodulosus-Cirsium palustre* fen-meadow (M22), *Glyceria maxima* swamps (S5) in the fens of the Yare valley, and carr woodland or scrub, often dominated by *Salix cinerea* or *Alnus glutinosa*.

Habitat relationship survey

In the first year, sampling was concentrated on six fens where one or both *Dolichopus* species had been recorded in a previous survey undertaken for the Broads Authority (Lott *et al.* 2009, 2010). Samples were collected using a 10 minute sweep-net sample which consisted of repeatedly sweeping vegetation for about 25 sweeps and inspecting the catch. All larger dolichopodids were removed using an aspirator but tiny species such as those in the genera *Achalcus*, *Micromorphus*, *Telmaturgus* and *Teuchophorus* were probably often overlooked. The routine was continued for 10 minutes. This 10-minute sampling method had been long-used by the author in rapid surveys as it usually collected a large sample of flies in many families, standardised the effort per sample so preventing too much time being spent in favourable habitats, collected from only a small and moderately uniform patch of vegetation, and allowed many samples to be collected for meaningful statistical analysis. It was adopted by Natural England in their sampling protocol for site evaluation (Drake *et al.* 2007). Use of a suction sampler was rejected after comparing the number of samples taken by each method that contained any of the 25 species of *Dolichopus* recorded in a previous survey (Lott *et al.* 2009); nearly every species was found more often in sweep samples than in suction samples. In trials at the start of the present project, almost no large dolichopodids were found in suction samples. As the purpose of the present work was to study just two large *Dolichopus* species, the collection of other species of dolichopodids and their use in analysis was incidental to the contract.

A stratified-random sampling procedure was used. Several important strata were chosen before the sampling began: a general 'fen' category of tall-herb fen and reed, sedge-beds (*Cladium mariscus*), scrub and carr woodland, short vegetation usually dominated by fine *Carex* or *Juncus*, and ditches (Table 1). Once sampling had begun, tracks were identified as a distinct 'habitat' and a few pools were discovered. Data for tracks and pools were later distributed into the most appropriate of the five other habitat categories on the basis of the vegetation data collected and short description made at each sampling point, as there were too few pools to provide useful data for analysis and tracks were not an equivalent vegetation habitat. Separation between the broad categories of habitat sometimes became subjective, although an effort was made to sample fairly uniform stands of each type. Within each stratum, a sampling point was selected by walking a randomly selected number of paces in the direction of a conspicuous object, such as a tree on the horizon, to mark the starting point. The patch of sampled vegetation that was swept was usually about 30-40m in diameter, or a 50-80m length of ditch margin. Sometimes this approach failed such as when the only passage through dense vegetation was tracks made by red deer (*Cervus elephas* Linnaeus) or vehicles. Some features, such as ponds, were sampled when they were found and clearly these were not selected randomly. Repeatedly sweeping the same patch of vegetation caught considerably fewer larger dolichopodids after the initial sweeps and sweeping for 10 minutes in a small area caused much disturbance, so there was no point in reducing the patch size or sweeping for much longer than 10 minutes. More time was sometimes spent taking samples within *Alnus* and *Salix* carr woodland and stands dominated by *Cladium mariscus* or tall *Myrica gale* which were difficult and sometimes hazardous to walk through.

Each sampling point was described at two levels of complexity. The simplest was the habitat type and management which were recorded as nominal variables, and a second level included more detailed measures of vegetation structure and soil wetness (Table 1). Vegetation structure was scored using the DAFOR scale for each 'surface' in the sense used in Natural England's Common Standards Monitoring for invertebrates (Heaver *et al.* 2008). This methodology captures structural complexity by identifying obviously different 'surfaces', or layers, within the vegetation; in fens there are seven surfaces (Table 1).

Sampling took place on ten consecutive days from 20 to 29 June 2010. The period was chosen as both *Dolichopus* species had been recorded between these dates in 2007-2009; Vincent (2011) later showed this period to be the peak flight period of *D. laticola*.

Distribution survey

Sampling in the second year used similar methods but, as the aim was to record distribution, there was no need to restrict sampling to a small randomly selected patch, and instead the patches were often up to 100m across. Fewer environmental variables were collected: soil wetness, management and habitat type. The distribution of fen within the Broads is given in George (1992) from which 16 sites were selected for survey; these had not been surveyed in 2010 with the exception of Sutton Fen. They were widely spaced in six river catchments so encompassed much of the range of fen habitat in the river valleys of Broadland. Visits were between 16 and 23 June 2011. Along with the six fens sampled in 2010, a total of 21 fens were visited over both years, with one site duplicated in both years, and a total of 307 samples taken. The distribution of fen and sampled sites are shown for the northern part of Broadland (Fig. 1) but fens further south on the River Yare (Strumpshaw, Surlingham, Surlingham Church) and the River Waveney (Stanley Carr), where neither *Dolichopus* species was found, are not shown on this map.

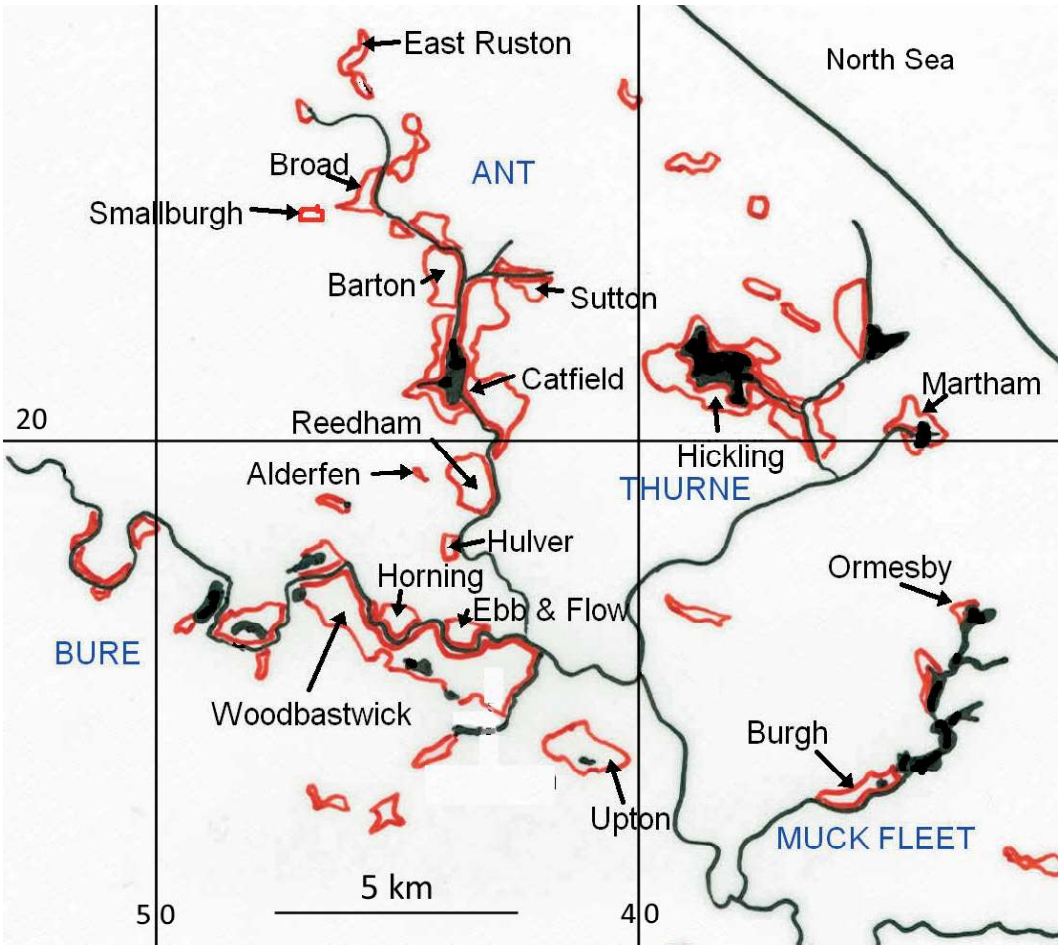


Fig. 1. Rivers and broads (black) and fens (red outline) in northern Broadland, Norfolk. Surveyed fens are labelled. Grid coordinates are in 100km square TG.

Analysis

Site quality relationships

As the two BAP *Dolichopus* species are almost confined to the best fenland in Britain, it was expected that they would show marked response to fens of different quality. Two entomological measures and one vegetation measure were used to test whether the occurrence of either *Dolichopus* species was associated with fens of better quality.

Entomological quality was measured quantitatively as species-richness of the family Dolichopodidae and qualitatively as the composition of the assemblage of other dolichopodids with which the two BAP species were associated. Two comparisons were made using species-richness. In the first, using data from intensive sampling of six fens in 2010, the median number of dolichopodid species in samples with or without either of the two BAP *Dolichopus* species were compared and tested using the Mann-Whitney U test; medians were calculated to avoid any issues with the underlying statistical distribution. This analysis was not done using the extensive data from the remaining sites sampled in the second year as sample size was too small for meaningful results, so instead the correlation was calculated between the occurrence of samples including either of the *Dolichopus* species and the median number of all other dolichopodids, using both years' data. Percentage occurrence of each *Dolichopus* was used rather than absolute numbers to correct for different sampling intensities. The presence of either *Dolichopus* was first removed from calculation of the median species-richness since including it in a comparison of with versus without the species would have introduced a strong bias in the relatively small catches.

Agglomerative clustering was used to establish the species most closely associated with *Dolichopus laticola* and *D. nigripes*. Ward's method using Chord distance as the index of similarity was selected as it has been recommended as performing well (Zuur *et al.* 2007). Presence-absence data were used rather than abundance data because abundance may have changed between the two years of sampling, between fens of varying quality and with the flight periods of each species. Several permutations of the assemblage data were analysed for clustering by removing different numbers of species to reduce the effects of rarely recorded species (those present in at least 5, 10 or 20 samples; those representing the most abundant 95% of all individuals identified), and comparing with graphical presentation using an ordination method (non-metric multidimensional scaling). Each permutation produced different results but several features were consistent, and Fig. 3 shows a typical result using species contributing 95% of the abundance of the 8,848 individuals identified. These 28 taxa (which included unseparable *Dolichopus nubilus / latilimbatus* females) were each represented by at least 42 individuals and together accounted for 46% of the 61 species identified in 2010 samples. The ordination results are not presented here. Using the habitat preferences of dolichopodids given by Meyer (2009), Meyer and Schleppegrell (2008), Pollet (2001) and Rampazzi (2002), species regarded by these authors as ripicole, paludicole or reedmarsh species were here designated as fenland specialists. Some species described by these authors as 'ripicole' have not been included in the 'fenland' group as they are frequently found in several other habitats in Britain, and indeed several species in this 'fenland' group have a broader habitat range in Britain than suggested by these authors. There are also differences in the classification of some species between these authors, which may be partly due to different interpretations of the nomenclature used in different countries, regional differences in habitat used by some species, or to incomplete knowledge.

The conservation value of the vegetation provided a measure independent of entomological value and which was likely to integrate management history and physiographic features that are not easily measured. An index of botanical value of fens is Wheeler's (1988) Rarity Weighted Principal Fen Species Score (abbreviated here to 'Fen Score') of Principal Fen Species that are those closely associated with fen vegetation and largely dependent on fens for their conservation. A score for a sample is based on the number of principal fen species present, and a weighting is applied to rare species, derived from the frequency of occurrence of each species recorded in Wheeler's fen dataset.

Harding *et al.* (2010) undertook an extensive botanical survey of Broadland fens between 2005 and 2009. They divided the range of the fen score into five classes, represented by differently coloured points on maps. Within each of 30 areas where the author had surveyed Diptera between 2007 and 2011 (additional to the current project), the numbers of each fen score class were counted from the maps, and from which a mean value was estimated for each class. As each of the five classes of fen score was a range of values, the means were obtained using the raw data from the botanical survey as [(number of samples in each class) x (class value) / total samples]. The classes and the average score (in brackets) in the entire botanical dataset of 7,038 samples were 0-2 (0.98), 2.01-4 (2.90), 4.01-6 (4.79), 6.01-8 (6.72), >8 (9.23). The botanical value was also expressed as the percentage of samples in different fen score classes in each fen, concentrating on the extremes of the poorest fens with a fen score less than 2 and the best fens with a fen score of 6 or more. Most fens had few botanical samples with scores greater than 6, so the group with more of these high-scoring samples highlighted areas of exceptional botanical value. For this analysis, a larger dataset was used, derived from other surveys undertaken by the author in 2007-2009 involving 496 samples (10-minute sweep and 3-minute suction samples) taken from 30 fens, with about 40% from just one site, Sutton Fen (Drake, unpublished; Lott *et al.* 2009, 2010).

Abundance in habitat and management types

Data collected from the small patches of habitat sampled in six sites in 2010 were used to estimate abundances in relation to habitat and management. Initial data exploration showed that the abundance data for both species were not normally distributed. A log+1 transformation made a small improvement and confidence limits of mean values were calculated using this transformation, but applied to the arithmetic mean in the compromise recommended by Elliott (1977). As *D. nigripes* was found only in the Bure fens, estimates of abundance were restricted to these sites. When comparing fly abundance in different management classes, an adjustment was made where limited grazing had made little obvious impact on the vegetation structure in very recently cut or old neglected fen; these few counts were duplicated in the relevant management classes, and this results in the total counts exceeding the number of samples.

Microhabitats

The relationship of each *Dolichopus* species with the microhabitat variables (vegetation structure and soil wetness) was examined using tree models which are unaffected by lack of normality or linearity in the data (Zuur *et al*. 2007). These models show the relationship of the response variable (*Dolichopus*) with the explanatory variables and their relative importance. The tree may be thought of as a dichotomous classification of the samples, with each split of a branch being explained by a particular value of one of the explanatory variables. Successive splits explain less of the variation in the samples. The point at which to stop the branching is given by a pruning diagram, which is the right-hand graph in Fig. 9. This gives an estimate, the complexity parameter, cp, of how well the data fit for each size of the tree, and the relative error associated with each successive branch (vertical axis). The optimum number of branches that fit the data well is indicated when the mean error for branch just drops below the average error for the whole tree (dotted horizontal line). Zuur *et al*. (2007) gave a full explanation.

The notation on the tree itself (Fig. 9, left-hand) defines the rule for each division and the condition is 'true' for the left-hand branch (labelled 0); the values at each node are the average condition for the explanatory variable. The pairs of figures at the bottom of each branch are the number of samples with (right) or without (left) the response variable. The vegetation 'layers' measured on the DAFOR scale were converted to numbers (5 for Dominant, 4 for Abundant, and so on) which approximates to a log transformation. The analysis used 181 samples for *D. laticola* and 80 samples from the Bure fens for *D. nigripes*. The analysis was undertaken using the R-based package Brodgar (Highland Statistics). Generalised Linear Modelling was tried but gave no significant results and is not discussed further.

Results

Site quality relationships

For five of the six fens sampled intensively in 2010, median species-richness of dolichopodids in each fen was marginally greater where *D. laticola* was present although significantly so only for Barton Fen (Table 2). When all 21 fens sampled in both years were considered, there was no significant correlation with median species richness ($r = 0.31$, n.s.; Fig. 2). Therefore, *D. laticola* was no more likely to be found in sites that were richer for dolichopodids than in those that were poorer, although sites that were particularly rich in dolichopodids would give an indication that *D. laticola* may be found. There was no difference in the median richness of the fauna of the two fens where *D. nigripes* was found, and its distribution was too restricted to give meaningful results using data from all fens.

Table 1. Environmental variables used in the analysis.

Feature	Measure
Habitat types	fen vegetation, sedge (*Cladium mariscus*), carr/scrub, grass/rush, ditch, pond, track/path
Management	new cut (cut within 1-2 years), old cut (cut about 3-5 years ago), neglected, grazed
Vegetation structure (DAFOR scale)	open water (ditch, pond, flooded area) leaf litter, peat (scored separately) short sward tall herb (rarely including tall grass) reed (*Phragmites*), sedge (*Cladium mariscus*) or mixed bushes (*Salix* and larger *Myrica gale* bushes) old scrub, carr
Wetness (subjective scale, at the moment of sampling)	1 – dry, 2 – damp, 3 – saturated, 4 – water above soil

Table 2. Median number of species of dolichopodids in samples with and without either *Dolichopus laticola* or *D. nigripes* in six fens sampled in 2010, with the Mann-Whitney U test and its significance.

Species	Fen	Median where present	Median where absent	Mann-Whitney U	p	Number of samples with, without each rare species
D. laticola	Barton	7	4	149.5	0.008**	17, 11
	Catfield	6	5	67.5	0.201	11, 9
	Ebb and Flow	7	7.5	12.5	0.362	3, 14
	Horning	6	4	128.0	0.071	9, 20
	Sutton	5	4.5	159.0	0.650	29, 10
	Woodbastwick	9	7	269.5	0.196	15, 29
D. nigripes	Horning	6	5	53.5	0.296	3, 26
	Woodbastwick	7	7	235.0	0.894	27, 17

The relationship of each of the two *Dolichopus* species with the whole dolichopodid assemblage varied depending on the subset of data and settings of the agglomerative clustering method, but Fig. 3 shows a representative result. *Dolichopus laticola* and *D. nigripes* were not closely positioned, although usually closer together in several runs of the data than to several common species with wide habitat preferences (in the lowermost branch of Fig. 3). *Dolichopus laticola* was always strongly associated with *Gymnopternus assimilis* (Staeger) and *G. blankaartensis* (Pollet), which are uncommon species usually found in fenlands of high quality in Britain, but was usually far removed in ecological space from other fenland species including *Argyra elongata* (Zetterstedt), *Poecilobothrus chrysozygos* (Wiedemann) and *Thrypticus smaragdinus* (Gerstäcker). *Dolichopus nigripes* was always closely associated with *Argyra vestita* (Wiedemann), from which little can be inferred as this species may be found commonly

in either fens or saltmarshes in Britain. It was sometimes associated with the less specifically fenland species *D. campestris* Meigen, *Hercostomus plagiatus* (Loew), *Sympycnus aeneicoxa* (Meigen) and *Syntormon pumilus* (Meigen). Of these, *H. plagiatus* is most relevant as it is an uncommon species found in rich fens.

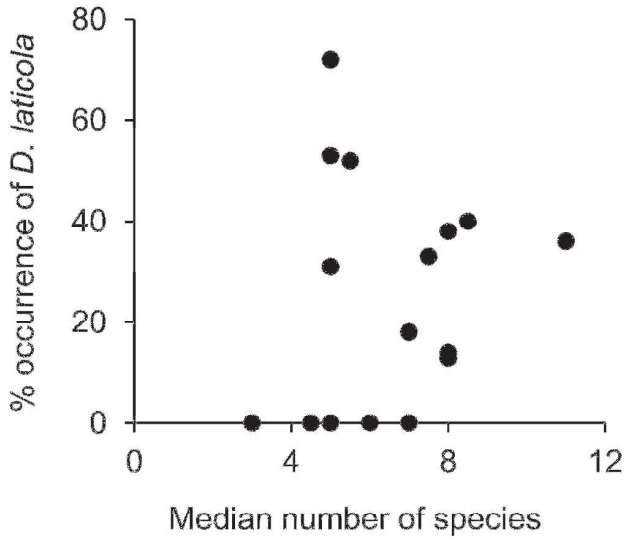


Fig. 2. Percentage occurrence of *Dolichopus laticola* in each of the 21 fens plotted against the median species richness of all dolichopodids (excluding *D. laticola* from these values).

Correlations between the measure of botanical 'richness' (fen score) and dolichopodid 'richness' was complicated by uneven sampling effort over the 30 sites used in the analysis, so dolichopodid 'richness' was expressed as percentage occurrence in preference to numbers of samples. There was no correlation with the average botanical fen score and the percentage of samples from each of the 30 sites containing either *D. laticola* (r=0.334, n.s.) or *D. nigripes* (r=0.096, n.s.) (Fig. 4). A lack of correlation was expected for *D. nigripes* since it was almost absent from the Ant valley, where most fens of highest botanical value are located.

When records of *D. laticola* were plotted against the botanical fen score for fens at either extreme of the spectrum, poor fens with a high proportion of the poorest botanical class rarely supported *D. laticola* (Fig. 5, left-hand graph). For example, there is only one sample containing *D. laticola* in the area of the graph representing the botanically least interesting samples. Coincidentally this exception (Reedham Marsh) was notable since this was the only site where *D. nigripes* was also found in moderate numbers in the Ant valley. Conversely, fens that included a high proportion of the best two botanical classes were more likely to support *D. laticola* (right-hand graph). These extremes of botanically poor or excellent quality therefore provided an approximate indication of whether *D. laticola* would be present.

Habitat preferences

Mean numbers of individuals differed markedly between habitat types in the six fens surveyed in 2010. *Dolichopus laticola* was significantly more abundant in tall-herb fen vegetation and shorter grass and rush swards than in any other habitat type, and was particularly scarce in carr or scrub (Fig. 6, Table 3). Although there were large differences in mean abundance, *D. laticola* was nevertheless present in all five habitat types and showed no significant difference in occurrence (presence) between them (χ^2=4.43, 4 d.f, n.s.).

As *D. nigripes* was found almost exclusively in fens of the Bure valley, analysis was restricted to these alone. It was most abundant on the shorter vegetation of tracks and paths and

on the grassy fens that were currently grazed or probably grazed in the recent past, or were cut for marsh hay (herbaceous species with various grasses, notably *Calamagrostis canescens* and *Juncus subnodulosus*; George 1992), and was just significantly more abundant in this vegetation than along ditches (t=2.56, p=0.05). It was far less abundant in taller fen vegetation and in carr or scrub. Its absence from sedge-beds may have been an artefact of the few samples from these habitats. There were two low expected values, which invalidated a χ^2 test of the frequency of occurrence in each habitat type.

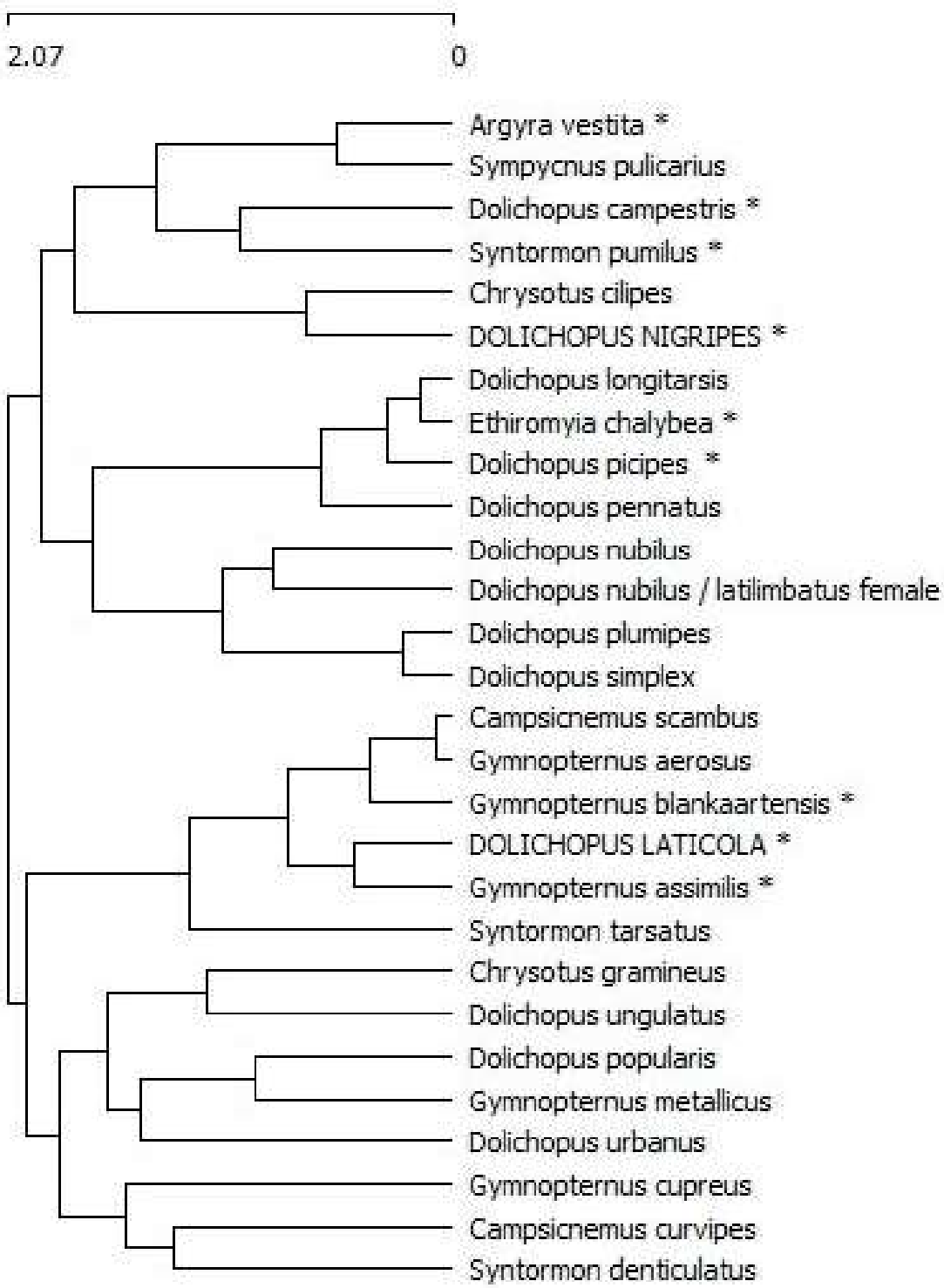


Fig. 3. Similarity dendrogram of dolichopodids in 2010 and 2011. + = fenland species as defined in Methods. These species represented 95% of all individuals identified.

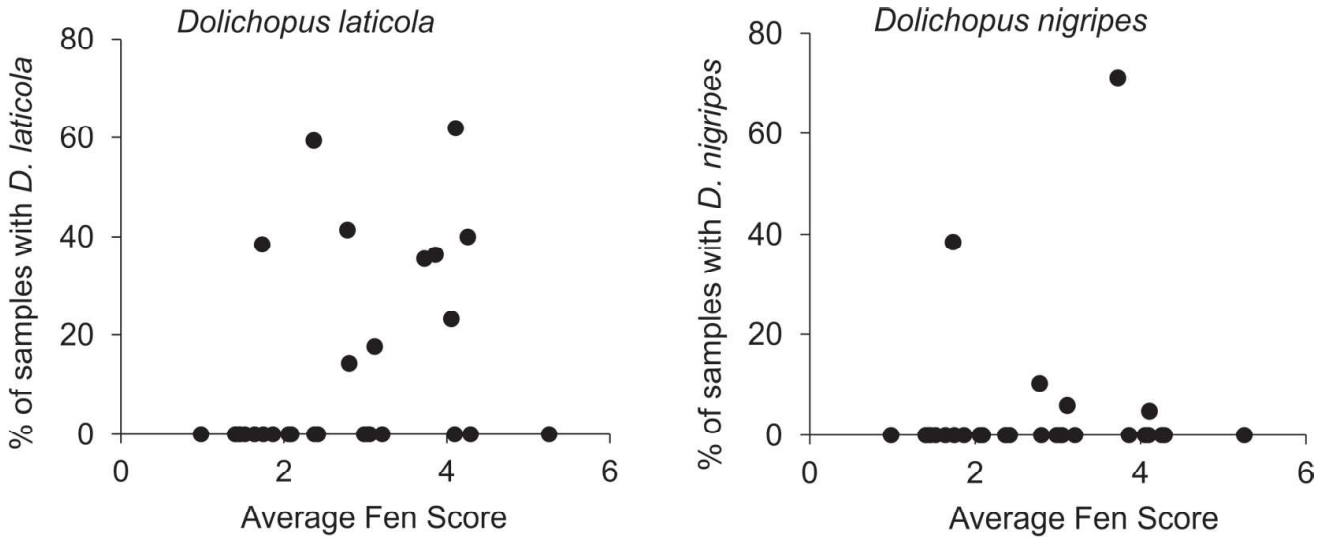


Fig. 4. Percentage of samples with *Dolichopus laticola* or *D. nigripes* plotted against the average Rarity Weighted Principal Fen Species Score (Fen Score) for 30 fens sampled in 2007-2011.

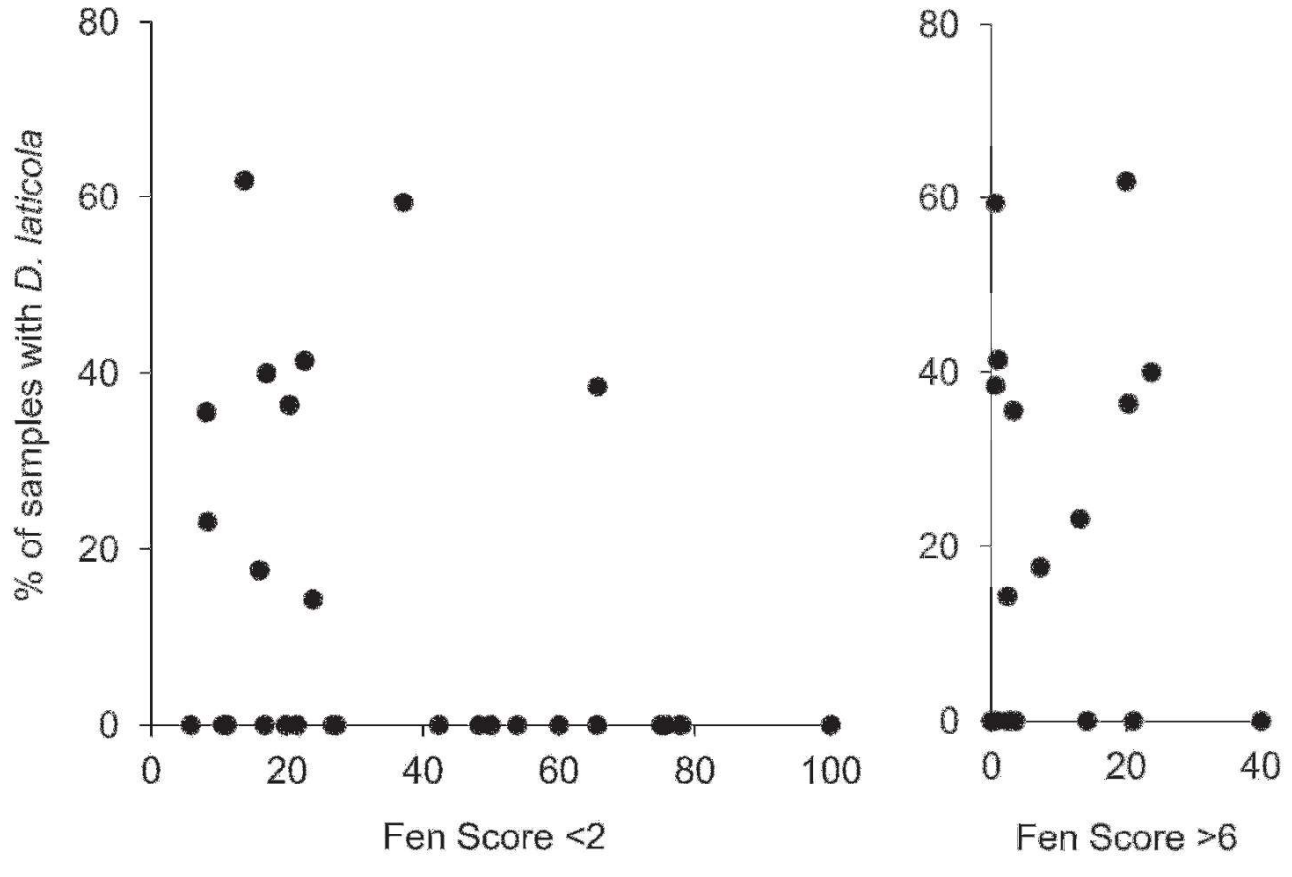


Fig. 5. Percentage of samples with *Dolichopus laticola* plotted against the percentage of botanical samples from the poorest (left-hand) and richest (right-hand) classes of Rarity Weighted Principal Fen Species Score (Fen Score) for 30 fens sampled in 2007-2011.

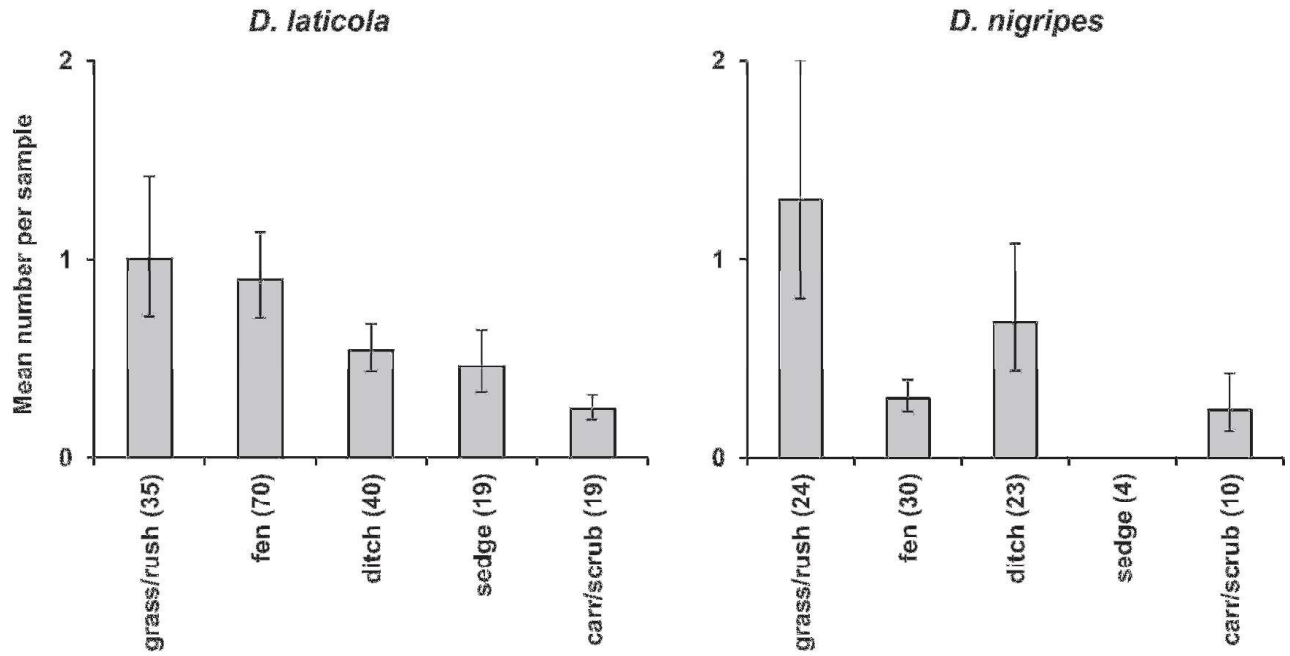


Fig. 6. Mean number of individuals per sample (with x÷ confidence limits applied to the arithmetic mean) of *Dolichopus laticola* or *D. nigripes* in the habitat types in 2010. The number of samples is given in brackets after each habitat type. The upper confidence limit for *D. nigripes* in grass/rush has been truncated (UCL = 2.11).

As a check on whether either *Dolichopus* behaved differently from the majority of dolichopodids, the median number of all dolichopodid species (excluding possibly overlooked genera comprising tiny species) was calculated for each habitat. More species were recorded in short grass or rush vegetation than in other vegetation types, but there was little difference in median species richness between tall-herb fen, ditch margins, carr or scrub; sedge-beds were clearly least productive (Fig. 7). The preferences of neither species of *Dolichopus* closely mirrored that of the whole dolichopodid assemblage although *D. laticola* more closely followed the general trend, but with a marked difference in its avoidance of carr or scrub. *Dolichopus nigripes* differed markedly from the whole assemblage in its scarcity in tall-herb fen vegetation and as well as carr or scrub.

Management preferences

Dolichopus laticola was similarly abundant in all three categories of managed fen (recent cut, old cut, neglected) but significantly less numerous in grazed fen (Fig. 8, Table 3). In 2011 many fewer individuals were recorded so the differences between classes in that year may not be real, although grazed plots still supported the smallest proportion of *D. laticola* (data not presented). In both years neglected fen was slightly less attractive than the two categories of managed fen (recent and old cut). In contrast, *D. nigripes* was equally abundant in grazed and cut areas but significantly less abundant in neglected fen (Fig. 8). Although both species showed pronounced differences in abundances, there were no significant differences in their occurrences between management classes when tested using a χ^2 test.

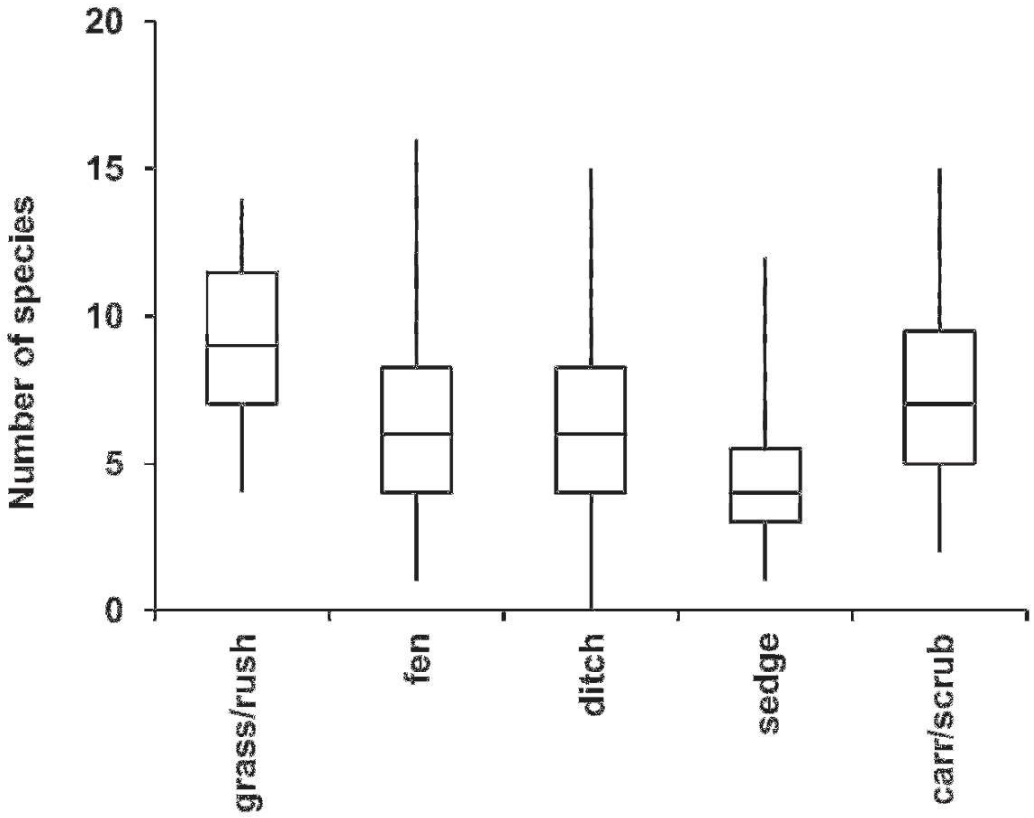


Fig. 7. Whisker plot of number of dolichopodid species in seven habitat types in 2010. The line in the middle of each box is the median, the upper and lower limits of the box are upper and lower quartiles, and the vertical lines are the extreme values.

Microhabitat relationships

A meaningful classification tree of the association with micro-habitat variables was obtained for *D. laticola* presence-absence data by setting the complexity parameter to 0.03 and the minimum branch size to the default of 5 samples. Setting the complexity parameter to a smaller value resulted in more divisions of large left-hand branch but this tree was rejected as the additional branches separated only small groups of samples, still leaving a large cluster unexplained. The pruning diagram indicated that a tree with three branches resulting from two splits was significant (Fig. 9). Wetness explained the first split and the abundance of tall herbs explained the second. *Dolichopus laticola* was more likely to be present in samples with an average wetness of more than 2.25 on the arbitrary scale of 1 to 4 (the right-hand branch), that is, in soil that was more likely to have been rated as saturated or covered in water. In wetter samples, *D. laticola* was more likely to be present when tall herbs were more than frequent on the DAFOR scale, remembering that the letters had been converted to numbers so that Frequent = 3. The final split shown was not significant as this branch fell below the horizontal line on the pruning diagram, but indicated that, in samples where tall herbs were sparse, *D. laticola* was scarcer in samples where tall reed or *Cladium* ('monocot') was frequent to dominant. It is possible that these samples included many where reed or *Cladium* formed dense stands. No significant tree could be obtained for *D. nigripes*.

Discussion

Following the earlier study of the wide-scale distribution of two rare dolichopodids, *Dolichopus laticola* and *D. nigripes* (Drake 2013), the present study sets out to understand the factors influencing their distribution at three finer scales: site, habitat and sample. From this, it was hoped that management recommendations could be made. Both were confined to fens of a very

small area of Norfolk where *D. laticola* appeared to avoid two river catchments, one slightly brackish (Thurne) and the other more nutrient-enriched (Yare) (Drake 2013). *Dolichopus nigripes* was unaccountably restricted to the Bure but almost absent from the adjacent Ant catchment which includes fens of high quality. Other than these broad generalisations, nothing more was known about what influenced the species. They are too rare in continental Europe to have been allocated to an assemblage, despite considerable work on wetland dolichopodids. In the present study, more useful information was collected for *D. laticola* than for the far more restricted *D. nigripes*.

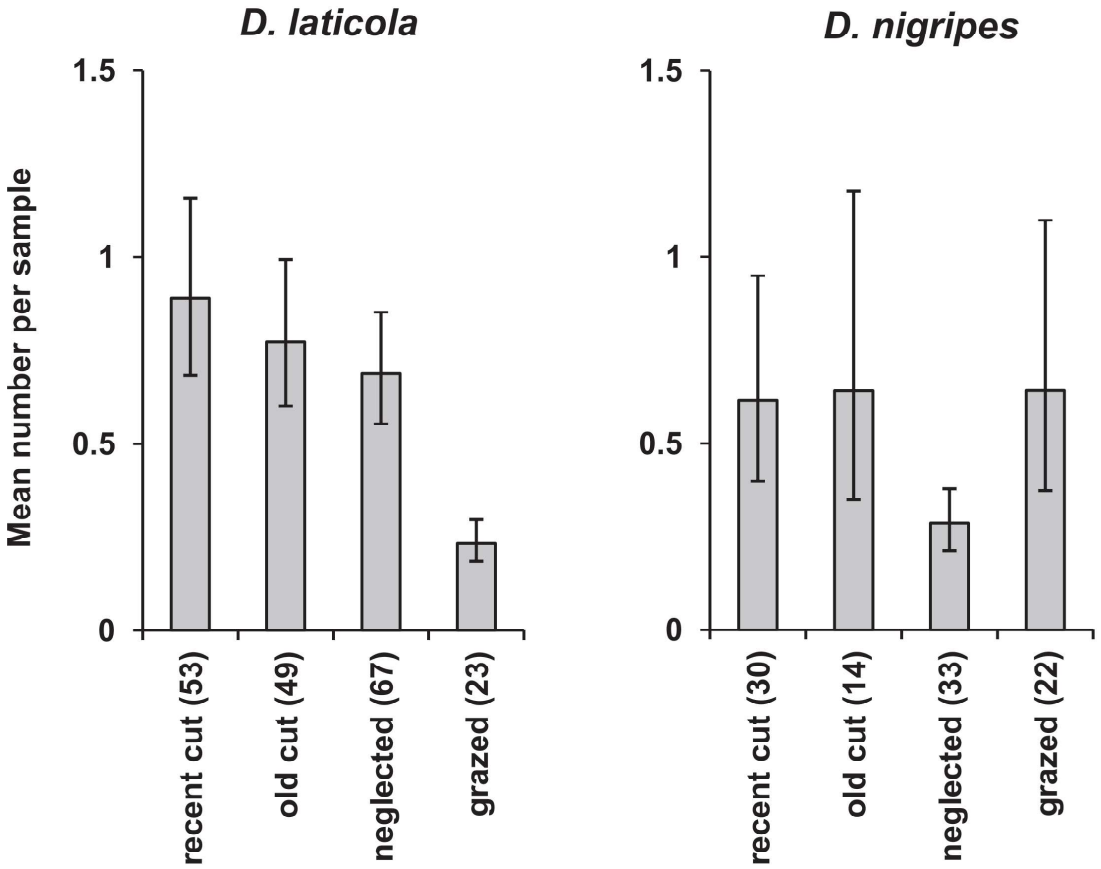


Fig. 8. Mean number of individuals per sample (with x÷ confidence limits applied to the arithmetic mean) of *Dolichopus laticola* and *D. nigripes* in each management regime in 2010. The number of samples is given in brackets after each habitat type.

At the site level, *D. laticola* showed a weak association with fens of high botanical value and was rarely found in fens of particularly poor value. The association was not well substantiated; thus, although good populations of *D. laticola* were present at some fens that are widely recognised as having exceptional value, for example Sutton Fen and Catfield Great Fen, they were apparently absent from other fens with outstanding vegetation, for example Smallburgh and Upton fens. This relationship may be useful for targeting further areas for survey to fill in the gaps in the local distribution of *D. laticola* in Norfolk where maps of botanical interest are now available for almost the entire fen resource in Broadland (Harding *et al*. 2010).

At the habitat scale, *D. laticola* was found in a large proportion of samples from unshaded habitats where it showed a weak preference for tall-herb fen vegetation and shorter rush and grass swards but no clear association with ditch margins. It might seem likely, therefore, that its larvae develop in the peat soil of fen compartments rather than at water margins. This would assume

that adult distribution reflects larval habitat, which may be a simplification as several studies show that there is often a mismatch between the abundance of adults caught in emergence traps and those caught in water traps, the former indicating larval habitat and the latter where adults may congregate for courtship, feeding or shelter (Delettre *et al*. 1998; Frouz and Paoletti 2000; Vilks 2007). However, these studies investigated marked ecotones, for example hedges and the adjacent field, or reedbed, wet grassland and dry grassland, where different behaviours would be marked, whereas the fens in the present study were extensive and often superficially monotonous vegetation. A larval habitat matching that used by the adults within the fen compartments therefore seems probable.

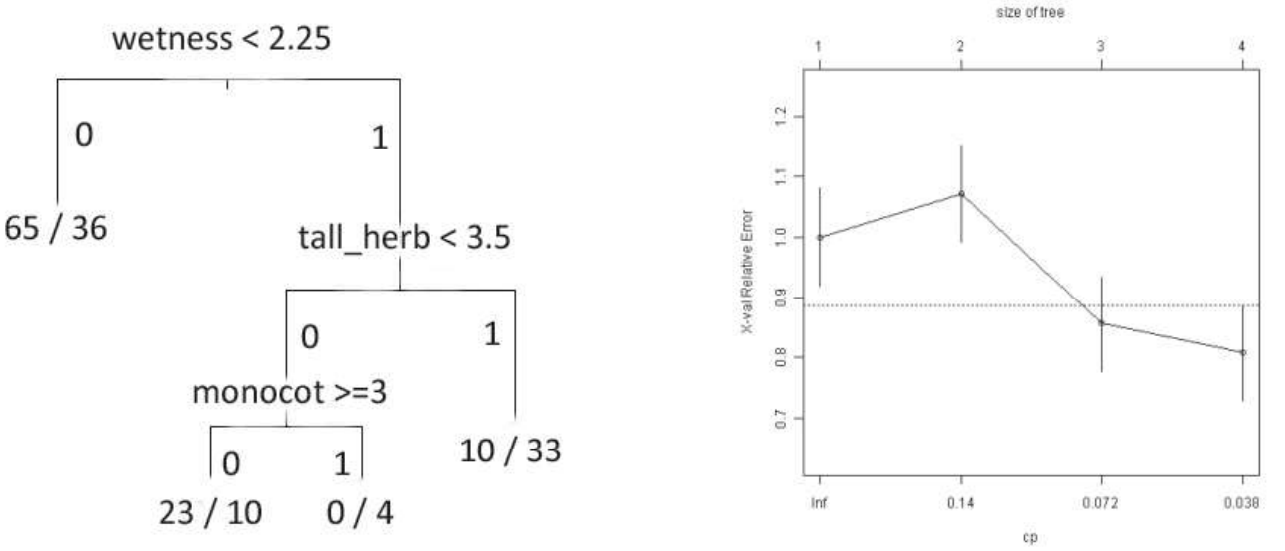


Fig. 9. Classification tree for *Dolichopus laticola* using presence-absence data (left-hand dendrogram), and the pruning diagram of relative error against the complexity parameter (right-hand graph).

Table 3. Occurrence and number of individuals of *Dolichopus laticola* and *D. nigripes* in each habitat and management type, with the percentage that occupied samples represent of the total number of samples taken. The total number of samples is smaller for *D. nigripes* as this analysis is restricted to the Bure valley only.

	D. laticola			*D. nigripes*		
	Total samples	Samples (%) with *laticola*	Number of individuals	Total samples	Samples (%) with *nigripes*	Number of individuals
Habitat						
grass/rush	35	20 (57)	50	24	16 (67)	53
fen	70	36 (51)	93	30	6 (20)	13
ditch	40	17 (43)	25	23	8 (35)	24
sedge	19	7 (37)	10	4	0	0
carr/scrub	19	4 (21)	5	10	1 (10)	4
Management						
new cut	53	28 (53)	68	30	9 (30)	68
old cut	49	25 (51)	50	14	4 (29)	50
neglected	67	27 (40)	59	33	6 (18)	59
grazed	23	1 (4)	2	22	8 (36)	2

In contrast to its clear preference for unshaded habitat, *D. laticola* was relatively scarce in shaded places, including sedge-beds of commercially harvested *Cladium mariscus*, old scrub and carr which it strongly avoided. Other surveys produced similar results. In two surveys using water traps, one of the eight records from an extensive survey of the Norfolk fens was from carr (Laurence 1995), and Vincent (2011) found about a quarter of his 134 specimens in carr at Walberswick NNR, and the rest in fen. Using sweep-netting, four of 14 records at Sutton Fen were from carr or wet scrub (Drake, unpublished). In the present study, representation of the different habitats was uneven so the total of records from each gives no indication of preference, but the proportion of samples containing *D. laticola* within each of these habitats was lower than in any open habitat, and about one fifth for carr and a little over one third for sedge-beds. Using different sampling methods, all these studies concur that *D. laticola* may be found in shaded places but much less often than in open sites.

At the microhabitat scale, the main influence on *D. laticola* was its preference for peat that was at least damp and presumably often wet or saturated. Combined with the weak association with sites of high botanical interest, it is likely that the peat has to be permanently damp since uncommon fen plants have this requirement. Weaker but still significant preferences were for vegetation characterised by a larger proportion of tall herb and an avoidance of places dominated by tall dense *Phragmites* or *Cladium* to the exclusion of tall-herb species, and which tend to characterise commercial reedbeds, sedge-beds and the nutrient-enriched swathe of tall reed bordering rivers and broads (lakes).

Even fewer conclusions could be drawn about the habitat needs of *Dolichopus nigripes*. Like *D. laticola*, it was also found more frequently in open habitat but appeared to prefer more grass-dominated areas to those in which reed or tall-herb fen was prevalent. This may hint at the reason for its more restricted distribution compared to that of *D. laticola* since such grassy vegetation was frequent at its stronghold at Woodbastwick Fen, but is relatively uncommon in many Norfolk fens. Grass areas here included many mown paths along ditches, and some compartments that resembled fen meadow. These features have been managed in a similar fashion for several decades since the site was purchased by the Nature Conservancy Council as a National Nature Reserve, although such intensive path maintenance was unlikely to have occurred when *D. nigripes* was first recorded here in 1952 (Collin 1952). It is unlikely that current management accounted for the fly's presence here, especially as a good colony was found at a more traditionally managed fen at another site, Reedham Marsh, but it may be a contributing factor in maintaining its abundance. No conclusions could be drawn for the microhabitat preferences of *D. nigripes*.

The relationship between *D. laticola* and sites of high botanical value had a counterpart in entomological value. Although there was no correlation between its occurrence and the mean species richness of dolichopodids, there was an indication that it was more likely to be found in sites that were particularly rich in dolichopodids and absent from those that were particularly poor. Lott *et al.* (2002) also showed that *D. laticola* was part of a group comprising species confined to fens or most abundant in fens, and which responded to the same set of measured environmental and management variables. These were *Argyra vestita*, *Gymnopternus assimilis*, *Hercostomus plagiatus*, *Ethiromyia chalybea* (Wiedemann), *Telmaturgus tumidulus* Raddatz and *Thrypticus smaragdinus*. The list is similar to that found in the present study using a different method of analysis. The assemblage described by Lott *et al.* (2002) was associated with more frequent management by cutting or burning, and so presumably at sites with open, unshaded and perhaps not particularly dense or tall vegetation. This impression differs from the characterisation by Pollet (1992), who described this suite of species as 'the most characteristic reedmarsh species' which, based on studies in Belgium, occurred in 'dark and moderately humid reedmarshes, in contrast to eurytopic species that predominated in more open reedmarshes'.

Fens range from highly managed, for example, cut annually, to neglected. The preference of *D. laticola* for tall-herb fen vegetation was corroborated by its marginally greater abundance in new or old cut fen compared to neglected fen. This result agreed with the conclusion by Lott *et al.* (2002) that *D. laticola*, along with some other uncommon fenland dolichopodids, appeared to benefit from regular cutting. *Cladium* sedge-beds, which are cut commercially on a three-year cycle, were very poor for both *D. laticola* and *D. nigripes*, and this was unsurprising given the botanical paucity of such beds and the dense thatch of leaf litter that appeared to decay far more slowly than that of reed.

Grazed areas were apparently avoided by *D. laticola* but no explanation can be offered since cattle or ponies were present in vegetation that varied hugely in its structure. However, Lott *et al.* (2010) found that grazing was associated with greater invertebrate species-richness but at the expense of fen specialists in Norfolk fens, although there was uncertainty whether there was a causal relationship or that ponies and cattle avoided the wetter fen which is characterised by more fen specialists but fewer species overall. It is possible that grazing converts fen to fen-meadow or wet grassland, by altering species composition, vegetation structure and, perhaps most importantly for the soil-dwelling larvae of dolichopodids, by breaking down the thatch of leaf litter and compacting the soil, which in turn may alter the hydrological properties of the peat. In Belgian sites, Pollet (2001) found that wet grasslands supported a less interesting dolichopodid fauna than reed marsh, both in terms of numbers of species and rarity indices. Pollet (1992) also showed that leaf litter and soil humidity were important factors influencing the dolichopodid assemblages of marshlands, and that fenland specialists were more frequent in the species group that was associated with a better developed litter layer. Clearly the negative impact of grazing on *D. laticola* needs to be confirmed since grazing is becoming an increasingly important conservation management tool in fens (Hodder *et al.* 2005; Vera 2009).

Management recommendations for individual species are often in conflict with one another. Foster and Procter (1995) compared the occurrence of invertebrates (Coleoptera, Hemiptera, Araneae, Opiliones) in an old, uncut block of reed-dominated Norfolk fen with an adjacent block that was cut two winters previous to sampling. They concluded that older vegetation was more attractive than frequently cut fen. Eight of ten nationally rare or scarce species were significantly more frequent in the uncut plot, and seven of these showed a preference for areas not cut for at least five years in a wider study of a large number of Norfolk fens. However, it is difficult for a casual visitor to the fens (the author, for instance) to accurately guess how many years have elapsed since cutting, and vegetation that has been described as 'old cut' in the present study may be the same as the *c.* 8 year-old vegetation in Foster and Procter's study, as distinct from the dense, tall and nearly impenetrable thicket of reed, saw-sedge and *Myrica* that has been described here as 'neglected'. If this is the case, then there is no conflict between the preference of *D. laticola* for 'new' or 'old' cut, as distinct from its avoidance of 'neglected' fen, and the results showing that the rarer fenland specialists prefer less recently cut fen.

In conclusion, the following management recommendations can be drawn from this study. Both species were favoured by more open tall-herb fen vegetation rather than tall vegetation types that cast shade, including tall reed, scrub or carr. Tall-herb fen vegetation that was cut frequently or infrequently is therefore the preferred management. No more precise recommendations for the structure or composition of tall-herb fen vegetation can be suggested since this vegetation community was the dominant one sampled and is botanically diverse. Managed sedge-beds and tall reed in monocultures were likely to be of little use to either species. Soil moisture needs to be kept at least damp and probably preferable wet all year. In the long term, the restoration of a wet peat surface may be achieved on a small scale by the creation of shallow pools over which new fen vegetation (hover) develops.

Acknowledgements
The study was funded mainly by Defra through Hymettus, an invertebrate charity that sponsors practical conservation work. For allowing or arranging access to the fens, I thank the staff of Natural England, the Broads Authority, Royal Society for the Protection of Birds and the Norfolk Wildlife Trust. Mike Harding (ELPP) kindly provided the data for the Broadland vegetation survey. I thank Marc Pollet for valuable constructive comments on a draft.

References

Ball, S.G. and Morris, R.K.A. 2012. The hoverfly recording scheme - putting Diptera on the map. *Antenna* **36,** 177-185.

Beaver, R.A. 1966. The biology and immature stages of two species of *Medetera* (Diptera: Dolichopodidae) associated with the bark beetle *Scolytus scolytus* (F.). *Proceedings of the Royal Entomological Society of London* (*A*) **41,** 145-154.

Biodiversity Reporting and Information Group. 2007. *Report on the Species and Habitat Review.* Joint Nature Conservation Committee, Peterborough.

Collin, J.E. 1952. Some rare Diptera found in Norfolk, including *Nemotelus fraternus* Loew, an addition to the British list. *Journal of the Society for British Entomology* **4,** 112-113.

Delettre, Y.R., Morvan, N., Tréhen, P. and Grootaert, P. 1998. Local biodiversity and multi-habitat use in empidoid flies (Insecta: Diptera, Empidoidea). *Biodiversity and Conservation* **7,** 9-25.

Drake, C.M. 2013. The distribution and abundance of the rare flies *Dolichopus laticola* Verrall and *D. nigripes* Fallén in Norfolk fens (Diptera, Dolichopodidae). *Dipterists Digest* (*Second Series*) **20,** 191-199.

Elliott, J.M. 1977. Some methods for the statistical analysis of samples of benthic invertebrates. *Freshwater Biological Association Scientific Publication* No. **25**.

Falk, S. and Crossley, R. 2005. A review of the scarce and threatened flies of Great Britain. Part 3. Empidoidea. *Species Status* No 3. Joint Nature Conservation Committee, Peterborough.

Foster, A.P. and Procter, D.A. 1995. The occurrence of some scarce East Anglian fen invertebrates in relation to vegetation management. pp 223-240. **In** Wheeler, B.D., Shaw, S.C., Fojt, W.J. and Robertson, R.A. *Restoration of temperate wetlands*. Wiley and Sons.

Frouz, J. and Paoletti, M.G. 2000. Spatial distribution of different life stages of one Dipteran community along hedgerow and field margin. *Landscape and Urban Planning* **48,** 19-29.

George, M. 1992. *The land use, ecology and conservation of Broadland*. Packard, Chichester.

Harding, M., Spencer, K., Stone, J. and Williams, B. 2010. *Fen plant communities of Broadland. Results of a comprehensive survey 2005-2009*. Report to Broads Authority and Natural England. http://www.broadsauthority.gov.uk/broads/live/authority/publications/conservationpublications/Broads_Fen_Veg_Survey_Rpt_final.pdf

Heaver, D., Key, R. and Webb, J. 2008. UK Common Standards Monitoring guidelines for invertebrates. Revised provisional guidance for England. Natural England. Unpublished.

Hodder, K.H., Bullock, J.M., Buckland, P.C. and Kirby, K.J. 2005. Large herbivores in the wildwood and modern naturalistic grazing systems. *English Nature Research Reports* No. **648**. Peterborough.

Laurence, B.R. 1995. Abundance and rarity of Dolichopodidae (Diptera) in East Anglian wetlands, with an addition to the British list. *Entomologist's Monthly Magazine* **131,** 95-105.

Lott, D.A., Drake, C.M. and Lee, P. 2009. *Broads fen invertebrate survey. Project 2: Assemblage response to salinity.* Unpublished report to the Broads Authority, Norfolk.

http://www.broadsauthority.gov.uk/broads/live/authority/publications/conservationpublications/Broads_Invert_Salinity_Report_Final.doc

Lott, D.A., Drake, C.M. and Lee, P. 2010. *Broads Fen Invertebrate Survey. Project 1: Assemblage responses to local factors. Project 4: Evaluation of invertebrate assemblages. Final Report.* Unpublished report to the Broads Authority, Norfolk. http://www.broadsauthority.gov.uk/broads/live/authority/publications/conservationpublications/Broads_Fen_Invertebrate_Report_Final.doc

Lott, D.A., Procter, D.A. and Foster, A.P. 2002. East Anglian fen invertebrate survey. *English Nature Research Report* No. 477. Peterborough.

Meyer, H. 2009. Langbein-, Tanz- und Rennraubfliegen der Ufersäume an Fließgewässern in Schleswig-Holstein (Diptera: Empidoidea: Dolichopodidae, Empididae, Hybotidae). *Mitteilungen der deutschen Gesellschaft für allgemeine und angewandte Entomologie* **17,** 45-48.

Meyer, H. and Filipinski, B. 1998. Empidoidea (Diptera: Dolichopodidae, Empididae, Hybotidae, Microphoridae) aus Emergenzfängen von zwei Seeausflüssen (Oberer und Unterer Schierenseebach) in Norddeutschland (Holsteinische Jungmoräne). *Studia dipterologica* **5,** 123-144.

Meyer, H. and Schleppegrell, M. 2008. Langbein-, Tanz- und Rennraubfliegen der ostfriesischen Düneninseln (Diptera: Brachycera: Orthorrhapha: Empidoidea: Dolichopodidae, Microphoridae, Empididae, Hybotidae) Artenverzeichnisse und Analysen zum Besiedlungsstand im Vergleich zur nordfriesischen Geestkerninsel Amrum Schriftenreihe Nationalpark Niedersächsisches. *Wattenmeer* **11,** 355-364.

Pollet, M. 1992. Impact of environmental variables on the occurrence of dolichopodid flies in marshland habitats in Belgium (Diptera: Dolichopodidae). *Journal of Natural History* **26,** 621-636.

Pollet, M. 2001. Dolichopodid biodiversity and site quality assessment of reed marshes and grasslands in Belgium (Diptera: Dolichopodidae). *Journal of Insect Conservation* **5,** 99-116.

Rampazzi, F. 2002. I ditteri dolicopodidi (Diptera: Dolichopodidae) delle torbiere a sfagni del Cantone Ticino e del Moesano (Val Calanca e Val Mesolcina, GR), Svizzera. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* **75,** 87-111.

Rodwell, J.S. (Ed.) 1995. *British plant communities. Volume 4. Aquatic communities, swamps and tall-herb fens*. Cambridge University Press, Cambridge.

Van der Velde, H.J.G., Meuffels, M.H. and Peeters, P.M.P.M. 1985. Dolichopodidae (Diptera) of a nymphaeid-dominated system in The Netherlands: Species composition, diversity, spatial and temporal distribution. *Aquatic Insects* **7,** 189-207.

Vera, F.W.M. 2009. Large-scale nature development - the Oostvaardersplassen. *British Wildlife* **20,** 28-36.

Vilks, K. 2007. Correspondence between larval development and adult residence habitats of dolichopodid flies (Diptera, Empidoidea: Dolichopodidae) in a heterogenous mosaic of seacoast grassland habitats. *Latvijas Entomologs* **44,** 115-124.

Vincent, P.J. 2011. Some notes on *Dolichopus laticola* (Verrall, 1904) (Diptera, Dolichopodidae) a UK BAP Priority Fly; the first recent record of this species outside Norfolk. *Dipterists Digest* (*Second Series*) **18,** 199-203.

Wheeler, B.D. 1988. Species-richness, species rarity and conservation evaluation of rich fen vegetation in lowland England and Wales. *Journal of Applied Ecology* **25,** 331-353.

Zuur, A.F., Ieno, E.N. and Smith, G.M. 2007. *Analysing ecological data*. 672 pp. Springer Science and Business Media, LLC.

Dipterists Digest 2018 **25,** 53-57

Some flies (Diptera, Mycetophilidae and Lonchaeidae) new to Ireland from Breen Wood in Northern Ireland

PETER J. CHANDLER
606B Berryfield Lane, Melksham, Wilts SN12 6EL

Summary
The first records from Ireland are presented for ten species of Mycetophilidae and two of Lonchaeidae.

Introduction
Diptera caught or trapped at two sites in Northern Ireland during 2017 were received for identification from Adam Mantell of Buglife. The sites concerned were Breen Wood (D1233), County Antrim and Rostrevor Wood (J1817), County Down, which are both predominantly sessile oak (*Quercus petraea*) woodland.

Breen Wood is situated inland from Ballycastle in north Antrim. It is a cold upland low nutrient site on gravelly acidic moraine deposits, with a relatively open canopy and an understorey of rowan, holly, hawthorn and hazel. Alder and birch are also present in wet stream-fed valleys between the moraine ridges, where wood-rush *Luzula* is the dominant ground cover.

Rostrevor Wood is on a steep slope close to the shores of Carlingford Lough on the lower slopes of the Mountains of Mourne, with commercial conifer plantations situated close to its margins. It has a more closed canopy with less diversity of structure than at Breen and has a drier climate, although it has mature high forest oaks with larger girth trees, potentially offering more saproxylic habitats. *Luzula* is also the dominant ground cover here.

Both sites had a single Malaise trap and two flight interception traps in place from April to October 2017, and most of the material examined including that of species that are new to Ireland came from these traps. Of 237 species of Diptera identified from these two sites (203 from Breen and 76 from Rostrevor), twelve were new records for Ireland and 24 others were considered likely to be new for Northern Ireland. Specimens of species new either to Ireland or Northern Ireland have been deposited in the National Museum of Ireland, Dublin (NMI).

Species new to Ireland
These comprised ten species of Mycetophilidae and two of Lonchaeidae. Mycetophilidae were relatively sparse in the catches and most of the 65 species identified were represented by rather few individuals, with 57 species from Breen and only 16 species from Rostrevor. The British Lonchaeidae, most of which develop under bark or in rotten wood, were revised by MacGowan and Rotheray (2007), but of 47 British species only 15 were known from Ireland, where they are clearly under-recorded; five species were recorded at Breen Wood, none at Rostrevor.

The Irish Mycetophilidae were the subject of several papers by the author (Chandler 1976, 1977, 1978, 1982, 1987; Chandler *et al.* 2000). More recent papers adding mycetophilids to the Irish list are Alexander & Chandler (2010, 2011), Deady (2013) and Chandler *et al.* (2016), which together added 15 species. Thus Irish records have previously been published of 254 of the 493 species of Mycetophilidae on the British list. However, this is probably far short of the actual total of Irish species, even considering the reduced state of native woodlands in which most species are to be found.

Alexander and Chandler (2010) recorded 12 species of Diptera, including five species of fungus gnats, as new to Ireland from demesne woodlands and parklands in Northern Ireland. On that survey of six sites by Keith Alexander in 2006, 111 species of fungus gnats (106 of

Mycetophilidae) were recorded, and in that case 33 species were in common with the present survey (28 at Breen Wood, 9 at Rostrevor). Of the six sites then studied the most productive for this family was The Misk, Drenagh, County Derry with 62 species of Mycetophilidae. A subsequent survey of seven sites in Northern Ireland by Keith Alexander in 2007 included Breen and Rostrevor Woods. This was less productive, with only 37 species of fungus gnats recorded and none new to Ireland; of nine species at Breen only three were in common and of five at Rostrevor none were in common with the 2017 survey.

Alexander and Chandler (2011) recorded 66 species of fungus gnats from St John's Wood, County Roscommon, of which 56 were Mycetophilidae, including four species new to Ireland. The species total was comparable to Breen Wood for that family, but remarkably only 17 species were in common between the two woods although common and widespread species predominated at both sites; five additional species found at Rostrevor were also in common with St John's Wood.

While all the species new to Ireland for which details are given below were from Breen Wood, Rostrevor Wood was not without interest and two species of Mycetophilidae new to Northern Ireland were recorded there: *Rymosia virens* Dziedzicki, 1910, a common species in Britain and previously known from Counties Wicklow, Cork and Mayo in Ireland, and *Sciophila geniculata* Zetterstedt, 1838, a Nationally Scarce species in Great Britain (Falk and Chandler 2005). 1♂ [NMI accession NH: 2018.5.17] of *S. geniculata* was found in an August to October sample from Rostrevor. Previous Irish records were from three sites near the west coast (Galway, County Galway 1979 and Kenmare/Glengarriff road, County Cork 1985 (Chandler 1987); Letterfrack, Connemara National Park, L7157, County Galway, July 1994, leg. M.C.D Speight), so occurrence at Rostrevor was surprising. In Great Britain there are now records from 17 hectads, most from S England and Wales, but also six hectads in Scotland. The biology is unknown and there are records from bogs as well as woodland.

As these recent studies have shown, it is not difficult to find species of fungus gnats additional to the Irish fauna when detailed surveys of sites are carried out, so it is not too surprising that 10 species new to Ireland were found in the present surveys. That they included several species that are scarce in Britain and would not have been considered those most likely to be found in Ireland was, however, of interest and draws attention to this family having been even more neglected in Northern Ireland than in the Irish Republic.

Leia bilineata (Winnertz, 1863) (Mycetophilidae)
1♂, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.1.
This distinctively marked gnat has a scattered distribution throughout Great Britain, with more western records in England, but only one Welsh record; all records are from Hampshire westwards apart from one on the Suffolk coast (Walberswick 1958). As records are infrequent within this wide range, it was designated as Nationally Scarce by Falk and Chandler (2005). It has been reared from under oak bark (possibly a pupation site) and from the drey of a red squirrel. Kurina (1994) reared it from the polypore fungi *Piptoporus betulinus* and *Phellinus igniarius*.

Mycomya affinis (Staeger, 1840) (Mycetophilidae)
1♂, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.2.
This species is widespread in Great Britain and commonest in wetlands, with most records in East Anglia, N England, Wales and Scotland. The East Anglian and Welsh records are mostly from wetland surveys in the period 1988 to 1993. In view of this distribution it is surprising that it has not been recorded previously in Ireland. The biology is unknown.

Mycomya insignis (Winnertz, 1863) (Mycetophilidae)
1♀, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.3.
There are scattered records across Great Britain, including a few in N Wales and only two Scottish records (Glen Sannox, Arran 1919; Loch Loy 1999) but it is apparently scarce throughout its range, justifying its designation as Nationally Scarce by Falk and Chandler (2005). The larvae have been recorded in webs on encrusting fungi, interpreted as *Schizopora paradoxa*.

Brachypeza bisignata Winnertz, 1863 (Mycetophilidae)
1♀, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.4.
This species is local, but widely distributed throughout Great Britain. It develops in oyster mushrooms (*Pleurotus* species) and some other larger fungi, terrestrial as well as saproxylic.

Mycetophila confluens Dzedzicki, 1884 (Mycetophilidae)
1♂, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.5.
It is found in woodland and heathland, and is common in Scotland (50+ hectads), with more scattered records in England (11 hectads) and a record from Wales. It develops in terrestrial fungi; there are rearing records from boletes (*Suillus granulatus*, *S. variegatus*, *Boletus subtomentosus*) and from *Lactarius rufus* (Kurina 1991, Jakovlev 1994).

Mycetophila eppingensis Chandler, 2001 (Mycetophilidae)
1♀, Breen Wood, flight interception trap, 17.vi-30.viii.2017, NMI accession NH: 2018.5.6.
This species was also found in 2015 during a survey by Mark Telfer of Glengarriff Woods Nature Reserve (V919569), County Cork, carried out for the Irish National Parks and Wildlife Service, for which the Diptera were determined by David Gibbs; it was recorded from an aerial interception trap (a 2 litre bottle trap) in the period 23 May to 5 June 2015 (Mark Telfer *pers. comm.*). It would therefore appear to be widespread in Ireland. It was new to science when it was discovered at Epping Forest, Essex in 1998, but it was quickly found at sites in Hampshire and Oxfordshire in 1999 (Chandler 2001), and then at further localities scattered across S England and East Anglia. It was thought to be a southern species until 2012 when it was found by Keith Alexander at a site in Scotland (Cleghorn Glen, Lanarkshire) (Chandler 2013) and it was numerous in 2017 samples trapped by him at a site in Cumbria. This apparent recent spread in Great Britain is indicative of a new arrival, but the Irish records may cast some doubt on that conclusion. As the biology is unrecorded, its precise ecological requirements are unclear.

Mycetophila immaculata (Dziedzicki, 1884) (Mycetophilidae)
1♂, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.7.
This is a very local species in Britain, with most records near the south and west coasts of England and Wales, but with three records in Scotland (River Tay at Caputh and Methven Wood, both 1992; Bognacruie 1999). This restricted but widespread occurrence resulted in its designation as Nationally Scarce by Falk and Chandler (2005). There are recent records from Somerset in 2015 (Chandler 2016), North Hampshire and Cumbria in 2017 (Chandler 2018) and Berkshire in 2018. The biology is unknown.

Mycetophila sumavica (Laštovka, 1963) (Mycetophilidae)
1♂, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.8
This is widespread in Great Britain but commonest in the north and Scotland. It belongs to the *M. vittipes* Zetterstedt, 1852 group, which includes several very similar species; *M. sumavica* is difficult to separate from *M. abiecta* and is probably under-recorded. The biology is unknown; *M. abiecta* develops on wood encrusting fungi, while *M. vittipes* is in myxomycetes.

Phronia sudetica Dziedzicki, 1889 (Mycetophilidae)
1♂, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.9.
A widespread and mainly western species, it was first found in Great Britain in Cumbria (Brigsteer Wood 1978), though first recognised in N Wales in 1987; there are four known Welsh sites, two in Scotland and six other English sites. Its scarcity within a wide extent of occurrence resulted in its designation as Nationally Scarce by Falk and Chandler (2005). The biology is unknown; other species of the genus are mainly on wood encrusting fungi.

Trichonta nigritula Edwards, 1925 (Mycetophilidae)
1♂, Breen Wood, flight interception trap, 30.viii-23.x.2017, NMI accession NH: 2018.5.10.
This species occurs in wet woodland, carr and fen. It was described from Shefford, Bedfordshire (1917) and not recorded again until found on the 1980s wetland survey in East Anglia (four sites) and contemporary surveys in Wales (Oxwich) and Oxfordshire (Wychwood). Otherwise it was recorded from the Black Wood of Rannoch, Perthshire in 1992. It was designated as Nationally Scarce by Falk and Chandler (2005). It has been recorded more recently from two sites in Devon (Wolton *et al*. 2014, Chandler 2016), from one site each in Cambridgeshire and Berkshire (Chandler 2018) and from a site in Cumbria in 2017. The biology is unknown; other species of the genus are mainly on wood encrusting fungi.

Lonchaea fugax Becker, 1895 (Lonchaeidae)
1♀, Breen Wood, flight interception trap, 17.vi-30.viii.2017, NMI accession NH: 2018.5.11.
This is a widespread and common species throughout Great Britain (MacGowan and Rotheray 2007). Its larvae develop under bark of various trees, especially aspen and poplar, but also birch, willow, beech and sycamore.

Lonchaea ultima Collin, 1953 (Lonchaeidae)
1♀, Breen Wood, Malaise trap, 24.v-17.vi.2017, NMI accession NH: 2018.5.12.
This species is widespread in southern England (MacGowan and Rotheray 2007). Its biology is unknown, but the larvae probably develop under bark like many other *Lonchaea* species.

Acknowledgements
I thank Adam Mantell (Buglife, Northern Ireland) for the opportunity to examine the material from these interesting sites. I also thank him and Keith Alexander for information concerning the habitats. This work was carried out by Buglife for Common Standards Monitoring and was paid for by the Northern Ireland Environment Agency. Mark Telfer and David Gibbs kindly enabled inclusion of the earlier Irish record of *M. eppingensis*; the survey involved was commissioned by Brian Nelson of the Irish National Parks and Wildlife Service. Paolo Viscardi (National Museum of Ireland, Dublin) received all the specimens cited above and assigned the museum accession numbers.

References

Alexander, K.N.A. and Chandler, P.J. 2010. Twelve flies new to Ireland and one further species confirmed as Irish from six historic demesnes (Diptera: Mycetophilidae, Sciaridae, Psychodidae, Scatopsidae, Ceratopogonidae, Dolichopodidae). *Irish Naturalist's Journal* **30**(2009)**,** 112-114.

Alexander, K.N.A. and Chandler, P.J. 2011. A notable assemblage of fungus gnats (Diptera, Sciaroidea) from St John's Wood, County Roscommon, Ireland. *Dipterists Digest* (*Second Series*) **18,** 27-42.

Chandler, P.J. 1976. A preliminary list of the fungus gnats (Diptera, Mycetophilidae) of Ireland. *Proceedings of the Royal Irish Academy* **76**(B)**,** 87-110.
Chandler, P.J. 1977. New records of Irish fungus gnats (Diptera: Mycetophilidae). *Irish Naturalists' Journal* **19,** 12-16.
Chandler, P.J. 1978. Irish fungus gnats (Diptera: Mycetophilidae) additions and corrections. *Irish Naturalists' Journal* **19,** 227-230.
Chandler, P.J. 1982. Some Diptera of the Killarney area May 1981, including five species new to Ireland. *Irish Naturalists' Journal* **20,** 555-558.
Chandler, P.J. 1987. New data on Irish fungus gnats (Diptera: Mycetophilidae) including 51 species new to the Irish List. *Bulletin of the Irish Biogeographical Society* **10,** 2-27.
Chandler, P.J. 2001. Fungus gnats (Diptera: Sciaroidea) new to Britain. *British Journal of Entomology and Natural History* **13,** 215-243.
Chandler, P.J. 2013. Fungus Gnats Recording Scheme Newsletter **6** Spring 2013. 6 pp. *Bulletin of the Dipterists Forum* No. **75**.
Chandler, P.J. 2016. Fungus Gnats Recording Scheme Newsletter **9** Autumn 2016. 6 pp. *Bulletin of the Dipterists Forum* No. **82**.
Chandler, P.J. 2018. Fungus Gnats Recording Scheme Newsletter **10** Spring 2018. 10 pp. *Bulletin of the Dipterists Forum* No. **85**.
Chandler, P.J., O'Connor, J.P. and Nash, R. 2000. Diptera (Mycetophilidae, Empididae, Micropezidae, Drosophilidae, Sarcophagidae, Muscidae, Calliphoridae and Tachinidae) new to Ireland. *Dipterists Digest* (*Second Series*) **7,** 15-18.
Chandler, P.J., Plant, C.W., Ashby, M. and Bantock, T. 2016. Nine species of Diptera new to Ireland from Lough Neagh, Northern Ireland. *Dipterists Digest* (*Second Series*) **23,** 211-214.
Deady, R.J. 2013. Four species of Mycetophilidae (Diptera) new to Ireland. *Irish Naturalists' Journal* **32,** 145-147.
Falk, S. and Chandler, P.J. 2005. A review of the scarce and threatened flies of Great Britain Part 2: Nematocera and Aschiza. *Species Status* **No. 2,** Joint Nature Conservation Committee
Jakovlev, J.B. 1994. *Palaearctic Diptera associated with fungi and myxomycetes*. 127 pp. Forest Research Institute, Petrozavodsk.
Kurina, O. 1991 Mycetophilidae (Diptera) reared from macrofungi in Estonia. *Proceedings of the Estonian Academy of Sciences, Biology* **40,** 84-90.
Kurina, O. 1994. New records of Mycetophilidae (Diptera) reared from macrofungi in Estonia. *Proceedings of the Estonian Academy of Sciences, Biology* **43,** 216-220.
MacGowan, I. and Rotheray, G.E. 2008. British Lonchaeidae. Diptera, Cyclorrhapha, Acalyptratae. *Handbooks for the Identification of British Insects* **10**(15)**,** 142 pp. Royal Entomological Society, London.
Wolton, R.J., Bentley, H., Chandler, P.J., Drake, C.M., Kramer, J., Plant, A.R. and Stubbs, A.E. 2014. The diversity of Diptera associated with a British hedge. *Dipterists Digest* (*Second Series*) **21,** 1-36.

A new record for *Trichomyia parvula* Szabó (Diptera, Psychodidae)

– Two minute species of the genus *Trichomyia* were added to the British list by Phil Withers (2004. The British *Trichomyia* Haliday in Curtis (Diptera, Psychodidae) with the description of a new species. *Dipterists Digest* (*Second Series*) **10**, 107-110). This saproxylic genus of primitive psychodids had previously been known in the British Isles only from the common and widespread species *T. urbica* Haliday in Curtis, 1839, although there are now 8 species known in Europe. The species added were *T. parvula* Szabó, 1960 and the newly described *T. minima* Withers, 2004. Each was recorded from a single site; *T. parvula* was trapped by Andy Godfrey in horse chestnut (*Aesculus*) rot holes at Moccas Park, Herefordshire in 2002 while *T. minima* was described from Burnham Beeches, Buckinghamshire, a male and female having been obtained by John Ismay in Malaise trap catches near beech (*Fagus*) trees with rot holes in August 1996.

Since then each species has been recorded from one further British locality; *T. minima* was trapped by Keith Alexander in a hollow ash tree at Tyntesfield, Somerset in the period July-September 2016 (Alexander, K.N.A. 2017. *Trichomyia minima* Withers (Diptera, Psychodidae) and other notable Diptera from the Tyntesfield Estate, North Somerset. *Dipterists Digest* (*Second Series*) **24,** 67-70). This species has yet to be recorded outside the British Isles.

Trichomyia parvula is also known from France, Germany and Hungary. French material was caught in an emergence trap during a survey run from 2008 to 2011 at the nature reserve of Le Marais de Lavours, Ain (Withers, P. 2014. Le marais de Lavours, une zone humide majeure pour la faune des diptères. *Bulletin de la Société linnéenne de Lyon*, *hors-série n°3* **2014,** 153 168). This was from a rot hole in ash (*Fraxinus*), where emergence traps were run over the same period in two consecutive years, and it was only in the second year that *T. parvula* was obtained, which may reflect on the development time of this species in nutrient-poor rot-holes (Phil Withers *pers. comm.*). One other French record provided by Phil was from the nature reserve of Forêt de la Massane, Pyrenées-Orientale, on 24 June 2009.

The second British record was a male swept by Julie Locke at Langley Park, Buckinghamshire on 26 May 2007; this was exhibited at the subsequent 2007 annual exhibition of the British Entomological & Natural History Society (Locke, J.A. p. 175 **In** 2007 Annual Exhibition. *British Journal of Entomology & Natural History* **21,** 155-186) and at the Dipterists Forum annual meeting in the same year.

A third British record of this species can now be reported, as I swept a male during the British Entomological & Natural History Society saproxylic group field meeting at Burnham Beeches NNR, Buckinghamshire on 23 June 2018. Due to the prevailing warm dry weather conditions, most Diptera were concentrated along the more sheltered stream beds and in this case it was the Nile stream (SU954852), so-called because of its proximity to Egypt Woods, that produced *T. parvula*. As *T. urbica* was numerous elsewhere on the site, it can be reported that Burnham Beeches harbours all three of the British species of *Trichomyia*.

I thank Phil Withers for information on the French records. I am also grateful to Helen Read (City of London Corporation), Keith Alexander and Jon Cole, for organising the field meeting at Burnham Beeches – **PETER J. CHANDLER**, 606B Berryfield Lane, Melksham, Wilts SN12 6EL

Dipterists Digest 2018 **25,** 58-61

Occurrence of *Stomorhina lunata* (Fabricius) (Diptera, Rhiniidae) in north Scotland

ABIGAIL RHODES[1] and MURDO MACDONALD[2]
[1]Strathtongue Old Manse, Strathtongue, Lairg, IV27 4XR
[2] 'Tigh nam Beithe', Strathpeffer, Ross & Cromarty, IV14 9ET

Summary
The discovery of two examples of the locust blowfly *Stomorhina lunata* (Fabricius, 1805) on the north coast of Scotland suggests that they may be established as migrants well north of the previously known British range. The observations are described, and possible explanations for their appearance are discussed.

Introduction
The locust blowfly *Stomorhina lunata* (Fabricius, 1805) (often included in Calliphoridae, but now considered to belong to the family Rhiniidae) is, as a larva, a predator on the eggs of several locusts of the family Acrididae (Greathead 1962). Formerly apparently rare in Britain and still officially regarded as an 'occasional vagrant'[1], it is now known to migrate northwards through SW Europe, and is frequently recorded in England between June and November (Falk 2016, Sivell 2017) in varying numbers. As far as is known, it does not overwinter in Britain, though there are suspicions that it may breed using our native grasshoppers as hosts (Sivell 2017). In 2015 and 2017, one of us (AR) photographed an unusual insect near Tongue, Sutherland, on the north coast of Scotland (NC65, V.C. 108). Both images were posted on the UK Diptera facebook page and on iRecord, and confirmed by Olga Sivell as *S. lunata*. The significance of the finds, the first in Scotland, was not fully appreciated until late in 2017 when the records were submitted to the Highland Biological Recording Group (HBRG) database. This led to a wider consideration of the status of the species in Scotland.

The records
The first *S. lunata*, a female, was photographed on *Rosa* at Dalcharn (NC621586), on 16 August 2015. The second, also a female, was seen on *Tanacetum parthenium* at Strathtongue (NC618596), a few km away, on 21 July 2017. They are shown in Plates 1 and 2. Both were recorded casually, in gardens. Various sources on the internet have mentioned 2015 and 2016 as especially good years for *Stomorhina* in Britain, with numerous sightings as far north as County Durham, though increased awareness may have played a part.

These two Scottish records are some 450km farther north than previously recorded in Britain (Fig. 1). The previous northern limit was near Durham (NZ34, NZ44; V.C. 66), where it was found four times between 2013 and 2017 by John Bridges (records detailed on iRecord).

Discussion
The casual finding of two individuals of *S. lunata* in Sutherland in two different years suggests strongly that there must have been many more in the north of Scotland, prompting the question of how they arrived there without others being detected farther south in Scotland. It is a distinctive species, which attracts the attention of even casual naturalists, as shown by submissions to iRecord.

[1] http://www.nhm.ac.uk/our-science/data/uk-species/species/stomorhina_lunata.html

A B

Plate 1. ***Stomorhina lunata*** **in Scotland. A - Dalcharn, 16 August 2015. B - Strathtongue, 21 July 2017. Photographs © Abigail Rhodes.**

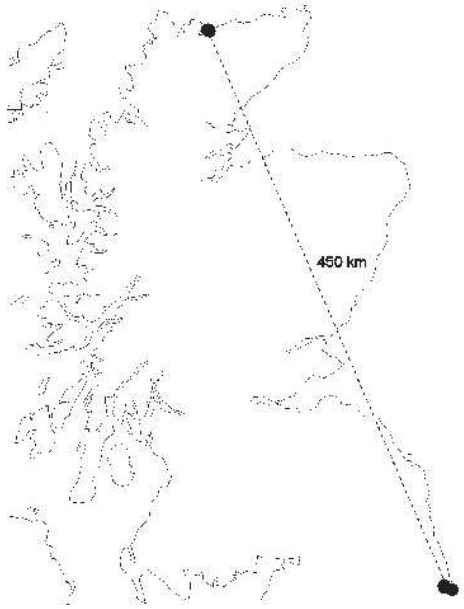


Fig. 1. Location of the Scottish ***Stomorhina lunata*** **in 2015 and 2017, and the nearest records in Britain. All other British records are south of here.**

Arrival in the north could be either by natural migration, or with human assistance, and migration on a northern route from Scandinavia must be considered. Live locusts are widely used as pet-food and are distributed commercially by companies in the UK. We have been assured by persons in the trade that locusts sold in Britain are bred here, and that there is no import of locusts (and more significantly their egg-pods) that could facilitate accidental introduction of *Stomorhina* to account for the Sutherland occurrences. The presence of the desert locust *Schistocerca gregaria* (Forskål, 1775) in Sutherland has been reported as an observation of a hopper in the wild at Achmelvich (NC02) in August 2017. That, while a strange coincidence and showing the potential for escape of captive locusts, is unlikely to be of any direct relevance to the Tongue events.

The north coast of Scotland is only a little farther from the Norwegian coast than from northern England (500km), and the 'stepping stones' of Shetland and Orkney provide another possible route. However, significant migration from Scandinavia would require a large source in Norway, and records of *Stomorhina* appear to be very scarce there. Rognes (1991) recorded it only in Finland, while a thread in the Diptera.info web forum claims the first Swedish record (and

only the third in Fenno-Scandinavia) in 2011[2]. This would appear to eliminate any possibility of a northern route to the north of Scotland.

The remaining puzzle is why it has not been recorded between Durham and the north coast. Lack of specialist dipterists in Scotland will be a factor, but cannot explain everything given that *Stomorhina* is distinctive enough to attract the attention of general naturalists. One of us (MM) has been actively recording several families of large Diptera in north Scotland for around 25 years, and in the last seven years has concentrated on Calliphoridae, but has never encountered *Stomorhina* or had reports from members of HBRG. Perhaps the possibility of assisted movements in air currents either at altitude or over the sea, thus prohibiting their easy detection, should be considered. This has been shown to take place with unidentified insects (Reynolds *et al.* 2008) and to account for the return autumn migration of *Vanessa cardui* (Linnaeus, 1758) in Britain, unsuspected from ground level (Stefanescu *et al*. 2012).

Given the lack of evidence of breeding by *Stomorhina* in Britain, it is improbable that it would succeed on the north coast, 800km north of London with relatively low temperatures and a short summer. In addition, the only Acrididae present in that area are *Omocestus viridulus* (Linnaeus, 1758), *Myrmeleotettix maculatus* (Thunberg, 1815), *Chorthippus brunneus* (Thunberg, 1815) and *C. parallelus* (Zetterstedt, 1821). All these are much smaller than the normal locust hosts. Data in Bijlmakers (1989) and Holst (1986) suggest that an egg-pod of these grasshoppers is only around 3% of the volume of the pod of *Schistocerca gregaria*, so unlikely to substitute as adequate larval food to support a local population.

The conclusion must be that the surprising appearance of *S. lunata* on the north coast arose from migration from the south in 2015 and 2017, though the reason for lack of observations elsewhere in Scotland remains obscure.

Acknowledgements

We are grateful to Olga Sivell and Steven Falk for helpful discussion and comments on the draft. The map was prepared with DMAP.

References

Bijlmakers, H. 1989. *Insect pests of cereals in Ethiopia - identification and control methods*. FAO/UNDP Project ETH/86/029 Crop Protection Phase II, Addis Ababa.

Falk, S. 2016. *British Blowflies (Calliphoridae) and Woodlouse flies (Rhinophoridae).* Unpublished draft key.

Greathead, D.J. 1962. The biology of *Stomorhina lunata* (Fabricius) (Diptera: Calliphoridae), a predator of the eggs of Acrididae. *Proceedings of the Zoological Society of London* **139**(1)**,** 139-180.

Holst, K.T. 1986. *The Saltatoria (Bush-crickets, Crickets and Grass-hoppers) of Northern Europe*. Fauna Entomologica Scandinavica **16**. Leiden-København: Brill.

Reynolds, D.R., Smith, A.D. and Chapman, J.W. 2008. A radar study of emigratory flight and layer formation by insects at dawn over southern Britain. *Bulletin of Entomological Research* **98**(1)**,** 35-52.

Rognes, K. 1991. *Blowflies (Diptera, Calliphoridae) of Fennoscandia and Denmark*. Fauna Entomologica Scandinavica **24,** 1-272. E.J. Brill, Leiden-New York-København-Köln.

Sivell, O. 2017. *Blowflies (Diptera: Calliphoridae) of Britain*. Unpublished draft key, second version.

Stefanescu, C. *et al*. 2012. Multi-generational long-distance migration of insects: studying the painted lady butterfly in the Western Palaearctic. *Ecography* **36**(4)**,** 474-486.

[2] https://diptera.info/forum/viewthread.php?thread_id=42861&pid=187832

Sciophila varia (Winnertz) (Diptera, Mycetophilidae) in Argyllshire: a sixth British locality – Following on from the success of rearing this supposedly rare fungus gnat from the fungus *Hydnum repandum* in Morayshire during 2016 (Alexander, K.N.A. 2017. *Sciophila varia* (Winnertz) (Diptera, Mycetophilidae) reared from *Hydnum repandum* at its old site at Logie in Morayshire. *Dipterists Digest* (*Second Series*) **23,** 168), rearing was again attempted after the host fungus was found on another site, elsewhere in Scotland. Cormonachan Community Woodlands (NS1997), on the steep slopes above Loch Goil on the Cowal peninsula of Argyllshire, were visited on 13.ix.2017. This is an extensive area of Atlantic oak and hazel woodland, and a patch of fresh fruiting *Hydnum repandum* was encountered during an exploration of the woods. A large example was broken open but no larvae could be seen within; nonetheless the mushroom was retained for rearing any insect eggs or young larvae which may have been present. Adult fungus gnats began to emerge during October and were later passed to Peter Chandler for identification; they were confirmed as examples of *Sciophila varia*. This therefore forms the sixth known locality and the sixth county. The ease with which it seems to be possible to find new sites merely by retaining portions of host fungus for rearing suggest that it may prove to be much more widespread in Britain than has been apparent.

My thanks to Peter Chandler for identifying the specimens **– KEITH N.A. ALEXANDER**, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ

Species of _Chalarus_ Walker (Diptera, Pipunculidae) recently discovered in Britain including _C. immanis_ Kehlmaier in Kehlmaier & Assmann new for Britain – At the 2017 BENHS exhibition, Ivan Perry exhibited two species of *Chalarus* Walker, new for Britain, 1♀ *C. elegantulus* Jervis from Lynford Lake, Norfolk and 2♀ *C. proprius* Jervis, from King's Forest, Suffolk. To these I can add one more record of each of these two species. A single ♀ *Chalarus elegantulus* was identified in Malaise trap material from Otmoor Range, Oxfordshire (SP573130) operated by Keith Porter from 27 June to 4 August 1991; the voucher specimen is retained in my reference collection. A single ♀ *Chalarus proprius* was swept from chalk grassland and scrub at Darland Banks, Gillingham, Kent (TQ793655) by Laurence Clemons on 22 June 1984; the voucher is retained in his collection. Both of these significantly pre-date the Perry specimens so it seems very likely that both are overlooked indigenous species and not recent colonists.

Additionally, and not yet exhibited or reported in the literature, are two ♂ specimens of *Chalarus immanis* Kehlmaier in Kehlmaier & Assmann, 2008 from south-east England. The first one was swept by Laurence Clemons in an old chalkpit at Berengrave Lane, Rainham, Kent (TQ8267) on 6 July 1994 and is retained in his collection. A second specimen was collected by John Dobson on Harrow Weald Common, London (TQ1492) 30 July 2000, the voucher now retained in my reference collection.

Chalarus immanis is currently only known from male specimens, but has a very wide distribution from Finland in the north-west to Japan in the east and south to Singapore, a fact that gives this species its name. It is readily identified once dissected by the form of the aedeagus, with the phallic processes absent and lower two ejaculatory ducts placed at the base of the membranous part of the distiphallus (Kehlmaier, C. and Assmann, T. 2008. The European species of *Chalarus* Walker, 1834 revisited (Diptera: Pipunculidae). *Zootaxa* **1936,** 1-39; fig. 4) **– DAVID GIBBS,** Orchard Cottage, Cecil Road, Weston-super-Mare, BS23 2NF; davidjgibbs6@sky.com

Dipterists Digest 2018 **25,** 63-64

The unexpected occurrence in Dorset of probable *Microdon mutabilis* (Linnaeus) (Diptera, Syrphidae)

MICK PARKER
9 East Wyld Road, Weymouth, Dorset, DT4 0RP

Summary
The discovery of specimens likely to belong to *Microdon mutabilis* (Linnaeus, 1758) at an entirely chalk habitat in Southern England is discussed.

On 12 May 2018, I visited the Cranbourne Chase area of Dorset and during this visit my attention was drawn to an area that, until fairly recently, consisted of an avenue of mature beech trees *Fagus sylvatica*. Between this avenue of trees there used to be an area of almost bare chalk, often in deep shade and with little vegetation. Subsequently a sizeable length of this avenue was clear-felled. This allowed light in and various plants to flourish, albeit on the margins; the centre of the ride remained mostly bare or with sparse vegetation. I started to sweep down the western side of the avenue, and before long I had caught a *Microdon*, and I could clearly see that it had a red scutellum. This suggested that it was either *M. mutabilis* (Linnaeus, 1758) or *M. myrmicae* Schönrogge *et al.*, 2002 with the habitat suggesting *M. mutabilis*. If this was right, then this was unexpected to say the least, as *M. mutabilis* is mostly known from limestone pavement areas such as occur in the Lake District area of northern England and the Burren area of Ireland (Stubbs and Falk 2002). Of course, there was always the possibility that this specimen could be a stray *M. myrmicae* from damp heathland or even a damp neutral grassland site, although I considered this possibility unlikely due to the distance from such sites. Therefore additional specimens from here or nearby were desirable. However, no further specimens were noted on that day.

I returned to this general area on 6 June 2018, and thought it worth checking an area of chalk grassland which had a good number of ant hills. This site is about 1 km to the west of my initial *Microdon* capture. Here, I thought it likely that if *M. mutabilis* was resident, then this is the place it would be. There then followed some three hours of sweeping, sadly all in vain, because despite all my effort there was no trace of any *Microdon*.

Despondent, I decided to go back towards the original locality, and in doing so I did not really expect to see this *Microdon* species again. However, on reaching this site I started to sweep down the eastern side of the avenue and within a few minutes I was delighted to find another *Microdon* specimen. I carried on sweeping and soon took another *Microdon*, which was checked and released; both had a red scutellum.

Unfortunately, this pair of *Microdon* species can only be identified from larvae and puparia, with adults currently indistinguishable from each other, so that finding the early stages at this site is desirable to confirm the specific identity of this population. Some further progress can, however, be made based on the type of habitat in which the adults were found. *Microdon myrmicae* is known to be associated with ants within the genus *Myrmica*, and mainly in *M. scabrinodis* Nylander, 1846 nests in tussocks on wet pasture and bogs (Schönrogge *et al.* 2002). Conversely, *M. mutabilis* is reported in Britain from *Formica lemani* Bondroit, 1917 nests under stones on exposed northern hillsides, especially on the Limestone (Schönrogge *et al.* 2002). More recent work in Belgium (Van de Meutter 2016) and Italy (Scarparo *et al.* 2017) has also found *M. mutabilis* on calcareous grassland in association with *Formica cunicularia* Latreille, 1798, a lowland, dry grassland ant species which nests deep underground with no surface exposure. This

more recent evidence suggests that all three specimens were very probably *M. mutabilis* and that they very much favoured this bare chalk and sparse grassland area. This is quite extraordinary as south of the Lake District the only other reported occurrence of *M. mutabilis* is from Porlock, West Somerset, dating from 1927.

As it is clearly resident in the general area, I strongly suspect that this species moved into this particular site after the beech avenue had been clear-felled. It is highly likely that the source of the original colony was a site with similar characteristics, and there is such an area about 1 km to the north of the site, where there are several km of almost identical habitat of long standing. It is highly likely that this species also occurs there, part of the Cranbourne Chase that is situated in Wiltshire – its discovery there could be an addition to the Wiltshire Syrphidae List.

References

Scarparo, G., Cerretti, P., Mei, M. and Di Giulio, A. 2017. Detailed morphological descriptions of the immature stages of the ant parasite *Microdon mutabilis* (Diptera: Syrphidae: Microdontinae) and a discussion of its functional morphology, behaviour and host specificity. *European Journal of Entomology* **114,** 565-586.

Schönrogge, K., Barr, B., Wardlaw, J.C., Napper, E., Gardner, M.G., Breen, J., Elmes, G.W. and Thomas, J.A. 2002. When rare species become endangered: cryptic speciation in myrmecophilous hoverflies. *Biological Journal of the Linnean Society* **75,** 291-300.

Stubbs, A.E and Falk, S.J. 2002. *British Hoverflies: an illustrated identification guide, 2nd edition.* 469 pp. British Entomological and Natural History Society, Reading.

Van de Meutter, F. 2016. *Microdon mutabilis* (Linnaeus) sensu Schönrogge *et al*. 2002 in Belgium: host use, distribution and status (Diptera: Syrphidae). *Bulletin de la Société royale belge d'Entomologie* **151,** 233-238.

Metriocnemus (*Metriocnemus*) *alisonae* Langton (Diptera, Chironomidae) new to Britain –

Metriocnemus (*M.*) *alisonae* Langton, 2013 was described from two males collected in the town of Coleraine, Co. Londonderry, Northern Ireland, one drowned on the surface of the R. Bann and the other at a lighted window (Langton, P.H. 2013. A new species of *Metriocnemus* van der Wulp (Diptera, Chironomidae) from Northern Ireland. *Dipterists Digest* (*Second Series*) **20,** 181-185). Since then a further seven specimens have been collected within a four kilometre radius of the type localities, four from the stream Ballysally Blagh that runs through the Ulster University, Coleraine Campus grounds (C849344), one each on 8 April and 16 April 2014 and two on 9 September 2015; two from Loughan Burn in the village of Loughan (C877291) and one from the Lodge Burn in Anderson Park, Coleraine (C849326), all drowned on the water surface. Amongst some Chironomidae Peter Chandler collected in Windsor Forest, at Badger's Brook (SU9373) on 15 April 2018, was a specimen of *M. alisonae*. This constitutes the first record for the species outside Northern Ireland – **PETER H. LANGTON,** University Museum of Zoology, Downing Street, Cambridge (address for correspondence: 16 Irish Society Court, Coleraine, Co. Derry, BT52 1GX)

Dipterists Digest 2018 **25,** 65-66

Podocera soniae (Merz & Roháček) (Diptera, Stenomicridae) new to Britain

ANDY GODFREY
90 Bence Lane, Darton, Barnsley, South Yorkshire S75 5DA

Summary
A single female *Podocera soniae* (Merz & Roháček, 2005) was swept from the edge of Buddon Wood SSSI, near Quorn, Leicestershire in 2012. This represents the first record of this minute species in Britain.

Introduction

Podocera soniae (Merz & Roháček, 2005) was described as *Stenomicra* (*Podocera*) *soniae* as new to science by Bernhard Merz and Jindřich Roháček, based on 74 specimens from central Europe (Bulgaria, Czech Republic, Germany, Romania, Slovakia and Switzerland). The subgenus was subsequently raised to generic status by Roháček (2009). It has since been recorded from Italy (von Tschirnhaus 2008), Sweden (Roháček 2011) and most recently from France (Withers 2018). Roháček (2017) recently recorded this species from Bohemia in the Czech Republic, where it was found in the foothills of the Jizerské hory Mountains; a colour photograph was included of a living female, caught in Opava city on the rear wall of his house, facing a small garden, possibly due to having been attracted to light as sometimes happens with this species (Jindřich Roháček *pers. comm.*).

Like other Stenomicridae, this species is minute with a body length of approximately 1.6 to 2mm. Merz and Roháček (*op. cit.*) provided a key which will enable identification of the species. *Podocera* can be separated from *Stenomicra* sensu stricto (in Britain represented by *S. cogani*) by the short costal section between the apices of veins R_{2+3} and R_{4+5}, whilst *P. soniae* can be separated from the other British species of the genus *P. delicata* (Collin, 1944) by the wings possessing a small alula, cell cup completely open and wings hyaline. I also noticed, when I was first examining the specimen, that the wings appeared shorter and broader compared with the other British Stenomicridae which might suggest a different ecology. It might be worth noting that *Stenomicra cogani* and *Podocera delicata* are rare to uncommon in Britain but almost certainly under-recorded because they inhabit sedge tussocks and other deep lying wetland vegetation and are rarely taken by sweep netting.

Merz and Roháček (*op. cit.*) noted that almost nothing was known about the ecology of this species and they summarised what was known about it at the time. Most of the specimens were taken with traps of various kinds, with only three by sweep netting and most of the males with Malaise traps. Whilst the other three species are largely associated with wetlands, this species can occur in drier biotopes and a wider range of habitats including dry to wet open grasslands, swamps, woodlands and even gardens. Females appear more frequent than males almost by a factor of 3:1.

Results

I swept a single female on the eastern edge of Buddon Wood SSSI, near Quorn, Leicestershire on 19 June 2012. Buddon Wood is one of the best examples of birch-oak woodland in the East Midlands. It lies on a granite pluton overlain by Keuper Marl which gives a relatively free-draining, acid soil. The specimen was swept from the wood/quarry interface at SK5586015276. The habitat here comprised natural woodland with young self-set trees on the slope below

growing amongst boulders, artificial scree and what appeared to be a small dry tailings lagoon. The site was dry with no noticeable wetland plants such as sedges as far as I recall (small woodland sedges may have been present but perhaps are unlikely to be associated with this fly). Most of the wood is dry with no streams or ponds present, but adjoining the wood to the south-west is Swithland Reservoir, which does support marginal vegetation in places. Chironomids, chaoborids and other wetland Diptera undoubtedly associated with the Reservoir are blown by the prevailing south-westerly winds into Buddon Wood, which rises up to the east. This individual was found on the far (north-eastern) side from the Reservoir and on the wood/quarry edge, in conditions which appear to resemble those where it has been found on the Continent, so I think it is unlikely that the specimen was swept up from the Reservoir. Merz and Roháček (*op. cit.*) have also suggested that this species could be associated with umbellifers, which are frequent in the wood. Drake (2013) provided a detailed overview of the ecology of *Stenomicra cogani* and *Podocera delicata*.

Acknowledgements

I would like to thank the landowner for permission to survey in the wood. My thanks also to Peter Chandler, Martin Drake and Jindřich Roháček for help and/or comments in the drafting of this paper. I would also like to thank John Mousley for first inviting me to look for Stenomicridae in Leicestershire back in 1991, when I found *P. delicata* at Holwell Mouth in *Carex paniculata* tussocks on 1 September 2001 at SK724245.

References

Drake, C.M. 2013. Some records and the habitat of Stenomicridae (Diptera). *Dipterists Digest* (*Second Series*) **20,** 1-4

Merz, B. and Roháček, J. 2005. The western Palaearctic species of *Stenomicra* Coquillett (Diptera, Periscelididae, Stenomicrinae), with description of new species of the subgenus *Podocera* Czerny. *Revue Suisse de Zoologie* **112**(2)**,** 519-539.

Roháček, J. 2009. New biological and biogeographical data about two European species of Stenomicidae (Diptera). *Časopis Slezského musea v Opavě* (A) **58,** 1-8.

Roháček, J. 2011.Taxonomy of *Stenomicra cogani*, with description of *S. gracilior* sp. nov. from Turkey and comparative morphology of terminalia in Stenomicridae (Diptera). *Acta Entomologica Musei Nationalis Pragae* **51**(2)**,** 697-722.

Roháček, J. 2017. Opomyzoid families – Clusiidae, Opomyzidae, Anthomyzidae, Aulacigastridae, Periscelididae, Stenomicridae and Asteiidae (Diptera: Acalyptrata) of the Jizerské hory Mts, Frýdlant region and Liberec environs (northern Bohemia, Czech Republic). *Sbornik Severočeského Muzea, Přírodní Vědy* **35,** 121-154.

Tschirnhaus, M. von 2008. Acartophthalmidae, Borboropsidae, Chyromyidae, Micropezidae, Odiniidae, Opetiidae, Periscelididae, Pseudopomyzidae and Tanypezidae. **In** Ziegler, J. (Ed.) Diptera Stelviana, A dipterological perspective on changing alpine landscape. Vol. 1. *Studia dipterologica*, *Supplement* **16,** 65-97.

Withers, P. 2018. Two species of acalypterate Diptera new to France. *Dipterists Digest* (*Second Series*) **24,** 164.

Dipterists Digest 2018 **25,** 67-70

Sex ratios of hoverflies (Diptera, Syrphidae) caught in Malaise traps within and on the edge of a wet woodland in Devon, England

ROBERT J. WOLTON[1] and BENJAMIN FIELD[2]

[1]Locks Park Farm, Hatherleigh, Okehampton, Devon, EX20 3LZ, UK;
robertwolton@yahoo.co.uk

[2] Aix Marseille University, CEA, CNRS, UMR7265 BVME, 13009 Marseille, France

Summary

In a study of the Diptera of a wet woodland and adjacent wet grassland, 65% of 1,775 individual hoverflies (Syrphidae) caught by Malaise traps were female, a percentage significantly different from an equal male to female ratio ($p<0.0001$). Among the 15 species caught most frequently, males were more numerous in only two species (*Helophilus pendulus* (Linnaeus, 1758) and *Rhingia campestris* Meigen, 1822). Traps were set either within a wet woodland or on the boundary between that woodland and adjacent wet grassland: the predominance of females over males was greater in the former (76%) than the latter (63%), a significant difference ($p<0.01$). Only one other published study has been found that reports on the sex ratio of hoverflies caught in Malaise traps (Owen 2010). This too found more females than males. Unpublished work provides further evidence that this is likely to hold true for most species in many habitats, and also using other sampling methods (e.g. hand netting or photography). The reasons are unknown and require further research, but are assumed to be related to differences between the sexes in behaviour or longevity rather than to differences in the numbers of each sex emerging from puparia (although little published information appears to be available on this).

Introduction

Very little published information is apparently available on the comparative numbers of adult male and female hoverflies (Syrphidae) captured by Malaise traps, or indeed by other sampling methods. Here, information is presented on the sex ratios of hoverflies caught in Malaise traps as part of a wider study to investigate the comparative importance of wet woodland and wet grassland for Diptera conservation (Wolton *et al.* 2017). Malaise traps are an efficient and frequently used method for collecting flying Diptera (McLean 2010).

Methods

The study site is Scadsbury Moor, part of Locks Park Farm, near Hatherleigh in Devon (SS518014, V.C. 4, North Devon). It comprises wet grassland (3.43 ha) surrounded by native broad-leaved woodland (3.80 ha), most of which is also wet. The poorly-draining mineral soils reflect deep underlying clay and are mostly acidic, although the occasional flush in the woodland is moderately base-rich. The wet grassland is characterised by *Molinia caerulea, Juncus effusus, J. acutiflorus*, short sedges (*Carex* species) and herbs like *Cirsium dissectum, C. palustre, Dactylorhiza maculata* and *Lotus pedunculatus.* The wet woodland is dominated by *Alnus glutinosa* or *Salix cinerea*, over a sparse cover of herbs among which *Carex remota*, *Galium palustre* and *Ranunculus repens* are the most frequent.

A Malaise trap was placed either on the boundary between wet woodland and wet grassland (in 2014 and 2015), or 25m into the wet woodland (in 2016). The traps were set almost continuously between late March/early April and late November/early December each year. An insecticide–impregnated card extracted from a commercially available clothes moth killer cassette was used in the collecting bottles. These bottles were emptied every one, two or three days. Hoverflies caught were identified, sexed and counted. For full information on the site, vegetation and sampling procedures, see Wolton *et al.* (2017).

Results

A total of 1,775 hoverflies were caught. Overall 65% of these individuals were female, significantly different from a 1:1 male to female ratio (χ^2, $p<0.0001$). The proportion of females was higher (76%) in the woodland trap than in the edge trap (63%), a statistically significant difference (χ^2, $p<0.01$) (Table 1).

Table 1. Numbers of hoverflies caught, by trap placement, species, individual numbers and sex.

Malaise trap placement	Number of trap years	Number of individuals caught in each trap year	% individuals which were female	Number of species caught	% of species where more females than males were caught
Well within wet woodland	1	280 in 2016	76	33	76
Boundary between wet grassland and wet woodland	2	748 in 2014 747 in 2015	63	64	72

Information on the sex ratios of the 15 most numerous hoverflies caught is presented in Fig. 1, with significance levels given in Table 2.

Discussion

Overall, female hoverflies were more numerous than males in both the trap site within the wet woodland and that on the boundary between the wet woodland and the wet grassland. This is consistent with the findings of other Malaise trap studies, for the majority of species and regardless of habitat (Owen 2012, Martin Speight *pers. comm.*, Roger Morris *pers. comm.*). Only two species were caught more often as males than females, *Helophilus pendulus* and *Rhingia campestris* (data for both trapping locations combined). The reasons why females predominate are not known but may be presumed to reflect behavioural or longevity differences (Martin Speight *pers. comm.*). The same pattern has been found for hoverfly records collected by netting: female records are markedly more numerous than male ones for the majority of species (Roger Morris *pers. comm.*). However, for photographic records of live individuals, the number of species where females outnumber males is roughly the same as where males outnumber females (Roger Morris *pers. comm.*).

It is assumed that equal numbers of male and female eggs are produced, and that will be reflected in equal numbers of adult hoverflies. Based on numerous rearings of syrphids, Francis Gilbert (*pers. comm.*) observes that overall there is a 1:1 sex ratio. However, relevant published studies are either few in number or hard to find: 1.3 male *Eupeodes (Syrphus) corollae* (Fabricius, 1794) emerged for every female (Barlow 1961); the sex ratio of *Heringia calcarata* (Loew, 1866) emerging from puparia was also skewed towards males (76 males : 53 females) (Gresham *et al.* 2013); while that 56% (24/43) of the *Microdon myrmicae* Schönrogge *et al.*, 2002 adults emerging from puparia were female (Wolton 2018). Karsten Schönrogge and colleagues (*pers. comm.*) recorded 52% (37/71) of emerging *M. myrmicae* adults to be female, and 50% (306/611) of *M. mutabilis* (Linnaeus, 1758). For some species it is possible that mortality rates may differ between sexes during immature stages, leading to uneven adult sex ratios.

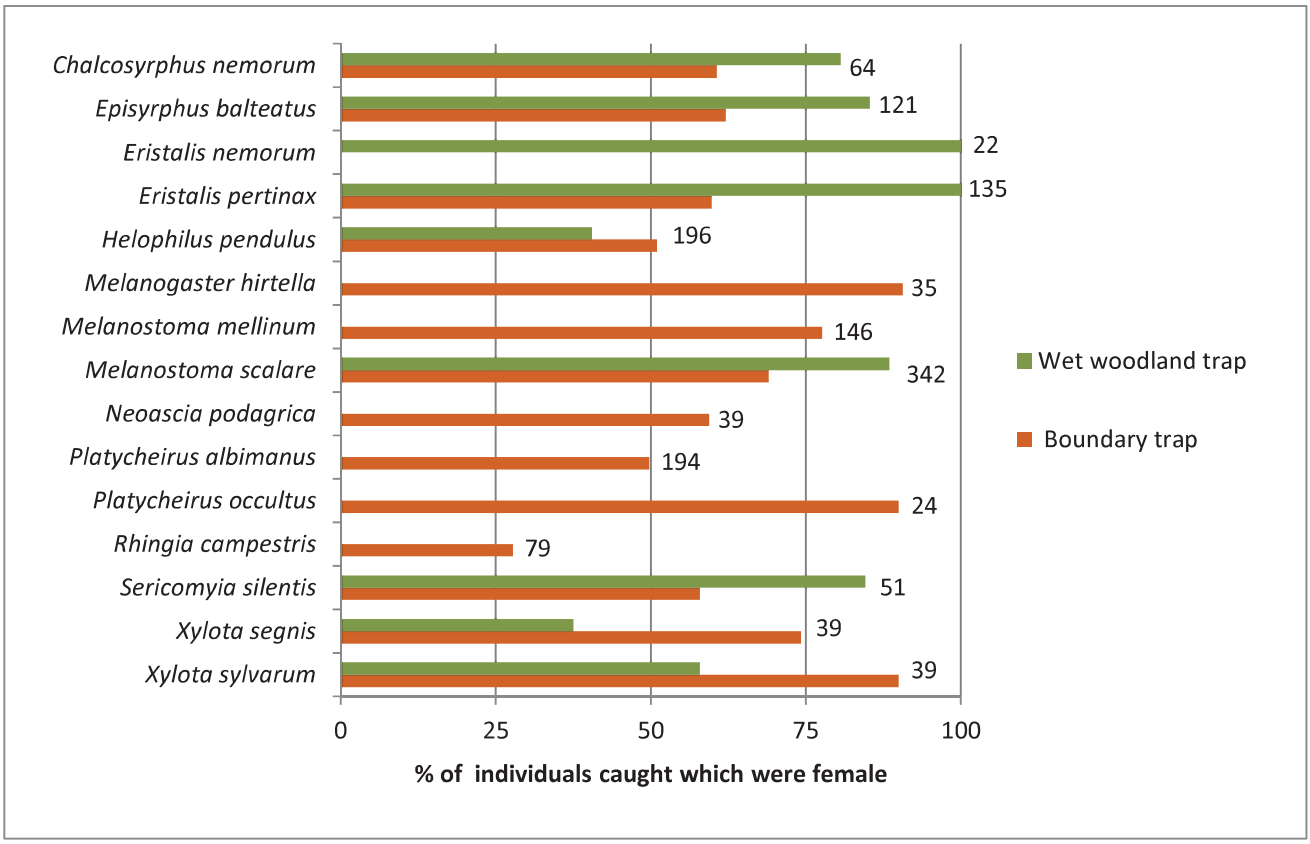


Fig. 1. The proportion of females caught in Malaise traps set either well within wet woodland or on the boundary between wet woodland and wet grassland, for the 15 most numerous hoverfly species. The numbers at the end of the bars are the combined totals of individuals caught of both sexes at both trap locations. Samples where the expected frequency (see Table 2) of either males or females is less than 5 have been excluded from this figure, Table 2 and statistical analysis.

Sex ratios of adults captured in Malaise traps were found to differ between species. Further research is required to understand why this should be so. Why, for example, were such high numbers of male *Helophilus pendulus, Platycheirus albimanus, Rhingia campestris* and *Xylota segnis* caught relative to females in comparison to other species?

The proportion of females was significantly higher in hoverflies caught well within the wet woodland than on the boundary between wet woodland and wet grassland. For some species, notably *Eristalis pertinax* and *E. nemorum*, only females were caught in the wet woodland. Presumably this is because the wet mud in the woodland provided suitable oviposition sites and so was attractive to females – the males on the other hand preferred to stay near flowers or sunny spots in the open grassland so they had better access to both food and mates.

Conclusions

This study and other, largely unpublished, results show that Malaise traps capture more females than males for most hoverfly species. The underlying causes, assumed to relate to behavioural or longevity differences between the sexes rather than to real differences in numbers upon emergence, are unknown and can only be guessed at. Research (or publication of data already held) is needed.

Table 2. Sex ratios of the 15 most numerous hoverfly species (across both Malaise trap positions). Significance levels are given where sex ratios are significantly different from expected based on sex ratios of all other species combined. Fisher's exact test: **P*<0.05, ***P*<0.01, ****P*<0.001, *****P*<0.0001. M - males over-represented or females under-represented compared to sex ratios for other species. F - females over-represented or males under-represented compared to sex ratios for other species.

Species	Numbers of individuals caught (M/F) Wet woodland trap	Boundary trap
Chalcosyrphus nemorum (Fabricius, 1805)	6/25	13/20
Episyrphus balteatus (De Geer, 1776)	5/29	33/54
Eristalis nemorum (Linnaeus, 1758)	0/18 F****	
Eristalis pertinax (Scopoli, 1763)	0/33 F****	41/61
Helophilus pendulus (Linnaeus, 1758)	22/15 M****	78/81 M**
Melanogaster hirtella (Loew, 1843)		3/29 F****
Melanostoma mellinum (Linnaeus, 1758)		32/111 F****
Melanostoma scalare (Fabricius, 1794)	3/23 F*	98/218 F**
Neoascia podagrica (Fabricius, 1775)		13/19
Platycheirus albimanus (Fabricius, 1781)		95/94 M***
Platycheirus occultus Goeldlin de Tiefenau, Maibach & Speight, 1990		2/18 F**
Rhingia campestris Meigen, 1822		52/20 M****
Sericomyia silentis (Harris, 1776)		16/22
Xylota segnis (Linnaeus, 1758)	5/3 M**	8/23
Xylota sylvarum (Linnaeus, 1758)	8/11	2/18 F**

Acknowledgements
We are most grateful to Roger Morris, Martin Speight and Karsten Schönrogge for making unpublished data available to us, and for suggesting reasons why more females than males may be caught. We also thank Francis Gilbert for advice on syrphid sex ratios within reared material.

References

Barlow, C.A. 1961. On the biology and reproductive capacity of *Syrphus corollae* Fab. (Syrphidae) in the laboratory. *Entomologia Experimentalis et Applicata* **4,** 91-100.

Gresham, S.D.M, Charles, J.G., Sandanayaka, M.W.R. and Bergh, J.C. 2013. Laboratory and field studies supporting the development of *Heringia calcarata* as a candidate biological control agent for *Eriosoma lanigerum* in New Zealand. *BioControl* **58,** 645-656.

McLean, I. 2010. Trapping Diptera. pp 95-102. **In** Chandler, P.J. (Ed). *A Dipterist's Handbook* (2nd edition). 525 pp. The Amateur Entomologists' Society, Orpington, Kent.

Owen, J. 2010. *Wildlife of a garden: A thirty year study.* 261 pp. Royal Horticultural Society.

Wolton, R.J. 2018. Colour dimorphism in the hoverfly *Microdon myrmicae* Schönrogge *et al.* 2002 (Diptera, Syrphidae). *Dipterists Digest* (*Second Series*) **24,** 169-173.

Wolton, R.J., Chandler, P.J., Drake, C.M. and Stubbs, A.E. 2017. The relative importance of wet woodland and wet grassland for Diptera conservation: a case study from Devon, England. *Dipterists Digest* (*Second Series*) **24,** 79-94.

Dipterists Digest 2018 **25,** 71-74

A review of the status of *Ula mixta* Starý (Diptera, Pediciidae) in Britain

JOHN KRAMER
31 Ash Tree Road, Oadby, Leicester LE2 5TE; john.kramer@btinternet.com

Summary
British records and the diagnostic characters of *Ula mixta* Starý 1983 are presented.

Introduction

Ula mixta was first designated by Jaroslav Starý from Czechoslovakia (Starý 1983). The specimens he worked with were from habitats ranging from 750m to 1,500m in altitude. It has since been found to be widespread in Europe ranging from Norway to Austria and from Russia to Romania (CCW July 2018).

The first British specimens of *Ula mixta* were hand-netted on 31 May 2002 by Ken and Rita Merrifield in the grounds of Cawdor Castle (NH8449), Inverness-shire, an event described in Erica McAlister's book, '*The Secret Life of Flies*' (p. 151). The site is by a stream in the wooded valley of the River Nairn (NH844494, altitude 100m) some 15km ENE of Inverness and specimens were subsequently identified by Alan Stubbs (AES) and exhibited by Ken Merrifield at a British Entomological & Natural History Society indoor meeting on 13 May 2003, and at the Society's Annual Exhibition in 2003. Since then there have been very few records and this may be due to the difficulties involved in identification. The only records known to me are as follows:

Table 1

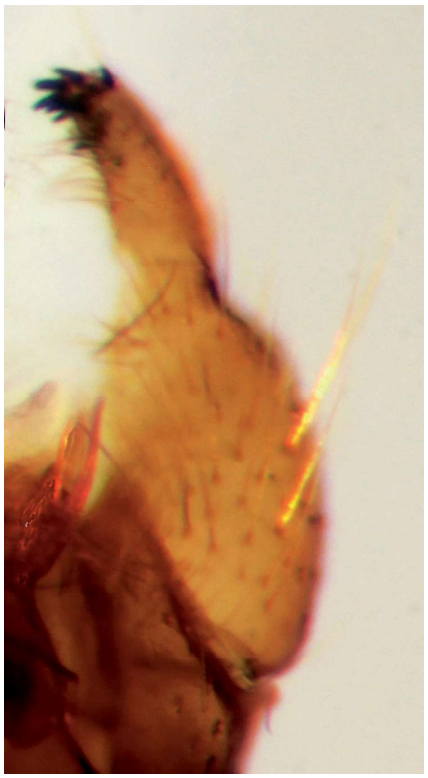
Site	Grid reference	VC	Date	Collector	Det.
Cawdor Woods	NH8449	96	31/5/02	K. and R. Merrifield	AES
Clumber Park	SK629748	56	1/12/05	A. Godfrey	AG
Loamhill Dingle	SJ662057	40	15/4/12	K.C. Fowler	PJB
Shifnal Cemetery	SJ747076	40	15/5/12	P.J. Boardman	PJB
New England Woods	SO7283	40	6/8/12	P.J. Boardman	PJB

The Clumber Park specimens were collected as larvae in a bracket fungus on 24 June 2005 by Andy Godfrey and numbers (more than 50) of *U. mixta* adults emerged on 1 December 2005 (Godfrey 2010). This was the first record from England.

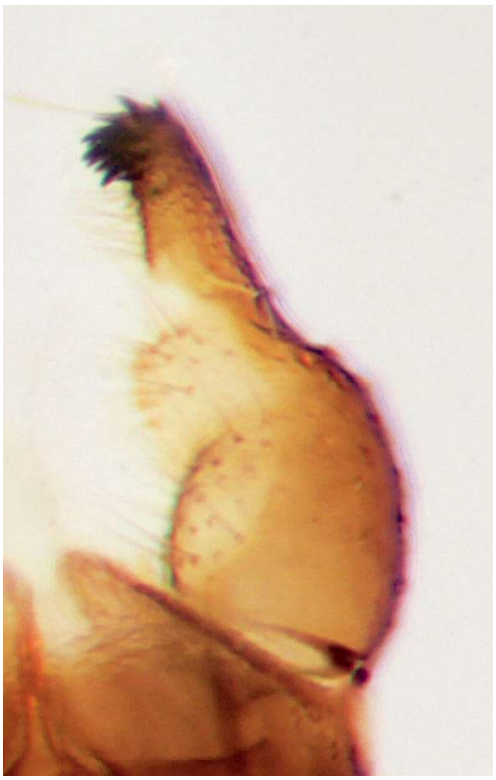
Materials and Methods

The specimens illustrated here were from the Cawdor Castle material cited above. All photographs were taken by the author in the Sackler laboratory at the NHM, London (JK © NHMUK).

To view the apodeme it is necessary to soak the end of the abdomen in a 10% solution of potassium hydroxide solution for several hours, and until the apodeme becomes visible through the cuticle of the ventral sternite. If the fan-shaped 'tail' is bent at 90° to the axis of the body it, and also the apodeme flange, may be difficult to see, and identification may be inconclusive. Where a diagnostic character is not clearly visible the terminal segment will need to be opened and the apodeme hooked out using a mounted micro-pin.

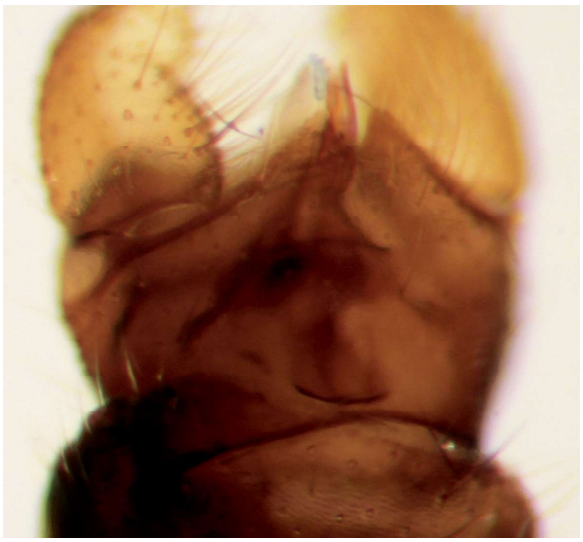


1



2

Figs 1-2. 1, *U. mixta,* clasper (Cawdor); 2, *U. mollissima*, clasper (Cawdor).



3

4

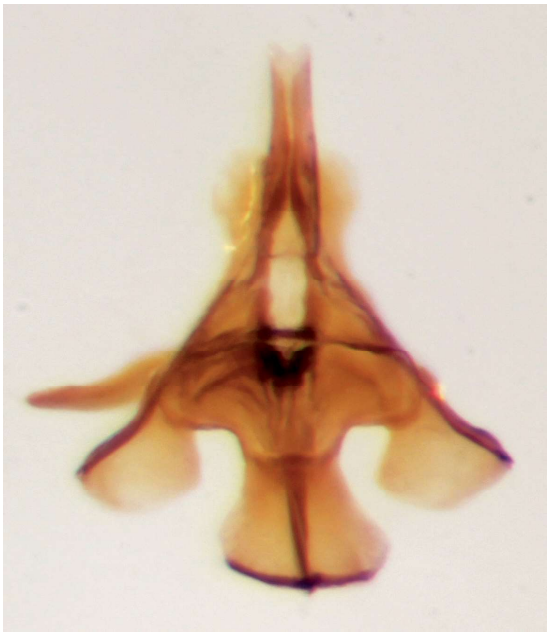
Figs 3-4. 3, sternite 9 and apodeme of *U. mixta* viewed through the cuticle (Cawdor); 4, sternite 9 and apodeme of *U. mollissima* viewed through the cuticle (Cawdor).

Identification

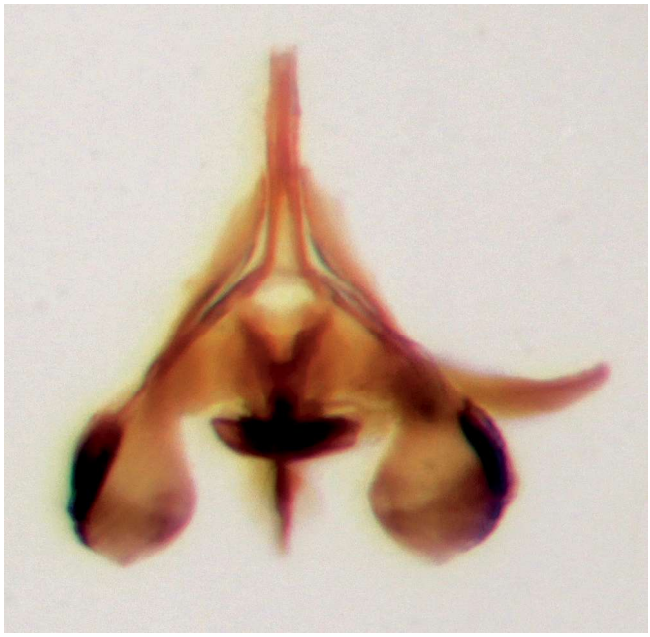
Craneflies in the genus *Ula* are relatively easy to identify to genus since they have trichia between the facets of their compound eyes (ommatrichia) and rather long macrotrichia on the wings giving them a brownish coloration (Kramer 2018).

The male and female adults of *U. mixta* and *U. mollissima* are very similar and the author has found that the females are extremely difficult to identify to species. It may be necessary to use a histological stain to stain the translucent membranous genital plate. The data presented here are based on the known male specimens.

Although the males have very similar claspers (styles) (Figs 1 and 2) they may be separated by differences in the genital apodemes. The male of *U. mixta* can be distinguished from *U. mollissima* by the presence in the former of a membranous flange to the aedeagus which is diagnostic, but this may be concealed by surrounding tissue if not dissected out (Figs 5-7).

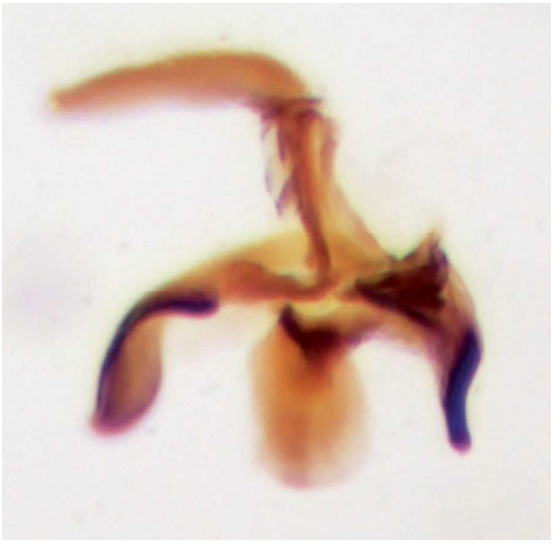


5



6

Figs 5-6. 5, *U. mixta,* genital apodeme, ventral view (damaged); 6, *U. mollissima,* genital apodeme, ventral view (damaged)



7

8

Figs 7-8. 7, *U. mollissima,* genital apodeme, posterior view (damaged); 8, *U. mollissima,* genital apodeme, ventral view (Buxton 49-53).

Ula mixta also has a larger 'fan-tail' central part of the apodeme. A central rib was found in the 'tail' of the *mixta* specimen, but the presence of this rib was variable in *U. mollissima* examined (Figs 7 and 8). The apodeme 'tail' of the *U. mollissima* specimen from Cawdor is bent downwards at 90° to the long axis and a ventral view reveals only a view of the edge of the 'tail'. When more specimens are examined the angle of bending is found to be variable (Fig. 8). This central fan-shaped structure is perhaps part of the sperm pump while the paired apodeme appendages are perhaps connected by muscles to the paired claspers.

Another difference lies in the shape of the 9th sternite. Starý (1983) described the sternite of *U. mixta* as follows: *'produced in the middle distally with a distinct median U-shaped notch between two small but well pronounced lobes'*. The ninth sternite of *U. mollissima* is described as *being 'shorter with posterior margin rather rounded, the median notch and especially the lobes, indistinct'* (Figs. 3 and 4). The males of both species are also figured in Starý (1997).

Table 2. Dimensions of terminalia.

	Dimensions (microns)	
	mixta	*mollissima*
Segment width	570	500
Apodeme width	358	264
'Tail' width	143	68
Aedeagus width	46	18

Discussion

The diagnostic character used to identify *U. mixta* in this study is the membranous flange on the aedeagus. There is some variation in the sizes of the apodemes of *U. mollissima* but they are smaller than that of the *U. mixta* specimen examined. The dimensions shown in Table 2 are representative. The larvae of members of the genus *Ula* are mycophagous, feeding inside the fruiting bodies of various kinds of fungi. Starý (1983) noted that *U. mixta* has been recorded at the same site as the very similar *U. mollissima*, which was also present at Cawdor Castle. This raises questions regarding the differences in niches and in resource partitioning for this pair of species. It will not be possible to answer these questions until more populations of *U. mixta* can be located. The purpose of this article is to encourage more people to look for *U. mixta*, and to record the details of its habitat so that we can fill the gaps in our current knowledge.

Acknowledgements

Especial thanks to Ken Merrifield for locating the *Ula* specimens in his collection and providing information thus making this study possible. They were captured during the Dipterists Forum summer meeting based at Tarradale House, Muir of Ord, in 2002. Thanks also to Duncan Sivell at the Natural History Museum, London, for practical assistance.

References

Catalogue of the Craneflies of the World (CCW). http://ccw.naturalis.nl

Boardman, P. 2016. Shropshire Craneflies. Field Studies Council.

Godfrey, A. 2010. Parkland. pp 256-264 **In** Chandler, P.J. (Ed). *A Dipterist's Handbook* (2nd edition). 525 pp. The Amateur Entomologists' Society, Orpington, Kent.

Kramer, J. 2017. Fungal hosts of *Ula* Haliday (Diptera, Pediciidae) in Britain, with reference to the collection of P.A. Buxton in the Natural History Museum, London. *Dipterists Digest* (*Second Series*) **24,** 195-205.

McAlister, E. 2017. *The Secret Life of Flies*. 248 pp. Natural History Museum, London.

Merrifield, K. 2003. [Communication at meeting of British Entomological and Natural History Society on 13 May 2003]. *British Journal of Entomology and Natural History* **16,** 199.

Starý, J. 1983. New Taxa of Limoniidae from Czechoslovakia (Diptera). *Annotationes Zoologicae et Botanicae, Bratislava* **154,** 1-22

Starý, J. 1997. A new *Ula* from eastern Slovakia. (Diptera, Pediciidae). *Časopis Slezského zemského muzea, série A* **45,** 235-237.

Dipterists Digest 2018 **25,** 75-78

Sea club-rush (*Bolboschoenus maritimus*) confirmed as a host-plant of *Cerodontha (Dizygomyza) suturalis* (Hendel) (Diptera, Agromyzidae)

BARRY P. WARRINGTON
36 Marlborough Avenue, Hessle, East Yorkshire HU13 0PN; agromyzidaeRS@gmail.com

Summary
The leaf-mining agromyzid, *Cerodontha (Dizygomyza) suturalis* (Hendel, 1931) is confirmed as utilising sea club-rush (*Bolboschoenus maritimus*) as a host. Leaf-mines were collected during July 2018, which resulted in adults being successfully reared, allowing the causer to be confirmed by way of examination of the male genitalia. Details of the circumstances of the discovery and a description of the larval mine and puparium are given.

Introduction
During July and August 2017, I swept several adult *Cerodontha (Dizygomyza) suturalis* (Hendel, 1931) from sea club-rush (*Bolboschoenus maritimus*) along Hessle foreshore (TA047260; Fig. 3), East Yorkshire (V.C. 61), which represented the first records of this species in Yorkshire (Warrington 2018). *Cerodontha suturalis* (Hendel, 1931) is known to use various species of *Carex* as a host plant and although Spencer (1976) mentions it had been reared from *Scirpus maritimus* (now *Bolboschoenus maritimus*) by Hering, he states that 'this is the only record of a species in this group to feed on both *Carex* and *Scirpus* and the possibility that the mines thought to be on *Scirpus* were in fact on *Carex* cannot be excluded'.

As the Hessle adults were collected from *B. maritimus* it seemed likely, even more so as no *Carex* species are present at the location, that *C. suturalis* was utilising *B. maritimus* as a host. Extensive searches during August resulted in several *Cerodontha*-type mines being discovered on *B. maritimus*; unfortunately, all were empty.

During October 2017, after much searching, multiple mines were collected, with some containing actively feeding larvae. However, 92% of the puparia obtained were parasitised with the remaining puparia not producing adults.

On 10 July 2018, several mines were collected from the same location which again contained *Cerodontha*-type puparia and six days later, a single female emerged. Using Spencer (1976), this agreed with the description of *C. suturalis* and also with the specimens collected during the previous year. Two days later, a single male emerged, which upon examination of the genitalia, proved to be *C. suturalis*, confirming that this species does utilise *B. maritimus* as a host.

Biology
Nowakowski (1973) stated that the larva of *C. suturalis* forms upper-surface, interparenchymatous, corridor mines which change direction at least twice. However, many of the mines present on *B. maritimus* were in fact lower surface (Fig. 1) and did not change direction at all or did so only once (Fig. 2). The mines are not detectable from the other side of the leaf. Nowakowski also stated that the larva is solitary, which agrees with the mines in Hessle, although several leaves frequently contained two separate mines, often running side by side (Fig. 1).

Fig. 1. Two mines of *Cerodontha (Dizygomyza) suturalis* (Hendel, 1931) present on the lower leaf surface of sea club-rush (*Bolboschoenus maritimus*).

Fig. 2. A single *C. suturalis* mine on the lower leaf surface of sea club-rush, showing only a single change in direction.

Frass is dispersed in one large lump and pupariation occurs within the mine; the puparium is firmly glued with dried frass. Spencer (1976) stated that the larva and mines are identical to those of *C. morosa* (Meigen, 1830).

Fig. 3. Hessle foreshore containing sea club-rush.

The puparium is yellow to reddish-brown, rather shining, sometimes with a darker central band dorsally and ventrally (although this can be absent in some specimens, BPW pers. obs.). The rear spiraculum possess three elongated papillae; two of them curve around the base of the spiraculum (Nowakowski 1973).

Nowakowski stated that larvae occur between June and August (which agrees with the mines discovered in Hessle), with there being two generations. The tenanted mines discovered in October 2017 are unusual and it may be that climatic conditions were suitable to allow a third generation to have materialised.

Distribution

The National Agromyzidae Recording Scheme holds 27 records of this species, from 18 locations in Britain. Interestingly, several of these are from habitats where *B. maritimus* is highly likely to occur. It is also known from Cambridge and Suffolk (Spencer), Warwickshire (Robbins 1990), Glamorgan, Monmouthshire and Westmorland (NBN Atlas).

Additional information

During his extensive ecological study of the Agromyzidae and Chloropidae of the border areas of the North and Baltic Seas, von Tschirnhaus (1981) collected *C. suturalis* from pure stands of *B. maritimus* but did not ever discover its larval mines.

Acknowledgements

I would like to thank Dr Michael von Tschirnhaus (University of Bielefeld, Germany) for his time and correspondence, Sam Thomas (Ecology by Design, Oxford) for confirming the host plant

based on images of the achenes and to Connor Warrington for kindly allowing me to use his photograph of the collecting site (Fig. 3).

References

Ellis, W. Diptera : Agromyzidae version 17.iii.2018 https://bladmineerders.nl/parasites/animalia/arthropoda/insecta/diptera/brachycera/agromyzidae/phytomyzinae/cerodontha/cerodontha-suturalis/ [accessed July 16, 2018]

Martinez, M. 2011. *Diptera: Agromyzidae*. **In** Beuk, P. and Pape, T. (group coordinators): Fauna Europaea version 2017.06, https://fauna-eu.org; Museum für Naturkunde in Berlin Leibniz Institute for Evolution and Biodiversity Science [accessed July 18, 2018].

National Biodiversity Network Atlas : https://species.nbnatlas.org/species/NBNSYS0000029690 [accessed July 18, 2018]

Nowakowski, J.T., 1973. Monographie der europäischen Arten der Gattung *Cerodontha* Rond. (Diptera, Agromyzidae). *Annales zoologici, Warszawa* **31,** 1-327.

Robbins, J. 1990 A Provisional Atlas of Leaf Miners of Warwickshire, with notes on others occurring in the Midlands (Insecta: Coleoptera 6441; Lepidoptera 6446; Diptera 6447; Hymenoptera 6450). Warwickshire Biological Records Centre (Ed.): Benchmark Atlas Series 38: II + 181 pp. Warwickshire Country Council, Coventry.

Spencer, K.A. 1972. Diptera, Agromyzidae. *Handbooks for the Identification of British Insects*. **X,** 5(g)**,** 1-136. Royal Entomological Society, London.

Spencer, K.A. 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna entomologica scandinavica* **5**(in two parts)**,** 1-304, 305-606. Klampenborg: Scandinavian Science Press Ltd.

Spencer, K.A. 1990. Host Specialization in the World Agromyzidae (Diptera). *Series entomologica* **45,** XII + 444 pp.

Tschirnhaus, M. von 1981. Die Halm- und Minierfliegen im Grenzbereich Land-Meer der Nordsee: ein ökologische Studie mit Beschreibung von zwei neuen Arten und neuen Fang- und Konservierungsmethoden (Diptera: Chloropidae et Agromyzidae). *Spixiana*, *Supplement* **6,** 1-405, 11 pl.

Warrington, B. P. 2018. Leaf-mining flies (Agromyzidae) new to the Yorkshire Diptera list. *The Naturalist*, April 2018. Vol. **143,** No.1097.

Themira gracilis (Zetterstedt) (Diptera, Sepsidae) new to Ireland –

Whilst undertaking invertebrate survey work on 17 May 2018 at the Ulster Wildlife site Glendun farm (Irish Grid reference: D204317), located in the Antrim Glens in County Antrim, Northern Ireland, a single male of *Themira gracilis* (Zetterstedt, 1847) was swept from well eroded soil, probably enriched by dung from grazing cattle and sheep, alongside the Glendun river. The specimen was retained and identified using an unpublished Sepsidae test key by Stuart Ball that was produced for a 2014 workshop. The identity of the specimen was later confirmed by Steve Crellin, organiser of the Sepsidae Recording Scheme, on the Dipterists Forum Facebook page. It was a rather pleasant surprise to find a species new to the Irish fauna; it is regarded as a pNationally Scarce species in Great Britain (Falk, S.J., Ismay, J.W. and Chandler, P.J. 2016. A Provisional Assessment of the Status of Acalyptratae flies in the UK. Natural England, Commissioned Reports, Number 217) **– RYAN MITCHELL,** Natural Sciences Curator, Department of Natural Sciences, National Museums Northern Ireland, Cultra, Holywood, Co. Down, BT18 0EU

Corrections and changes to the Diptera Checklist (39) – Editor

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

Changes are listed under families; names new to the British Isles list are in bold type. The notes below refer to addition of 18 species, two deletions, loss of one name as a nomen dubium and loss of two names due to synonymy, resulting in a new total of **7171** species (of which 41 are recorded only from Ireland).

An updated version of the checklist, incorporating all corrections and changes that have been reported in *Dipterists Digest*, is available for download from the Dipterists Forum website. It is intended to update this regularly following the appearance of each issue of *Dipterists Digest*.

Mycetophilidae. The following species were added by P. CHANDLER (2018. Fungus Gnats Recording Scheme Newsletter 10. Spring 2018. pp 1-10. *Bulletin of the Dipterists Forum* **85**):
Brevicornu arcticum (Lundström, 1913 – *Brachycampta*) + [new to Britain but previously recorded from Ireland]
Phronia ***longelamellata*** Strobl, 1898
Trichonta ***tristis*** (Strobl, 1898 – *Phronia*)

Sciaridae. K. HELLER, A. KÖHLER, F. MENZEL, K.M. OLSEN and Ø. GAMMELMO (2016. Two formerly unrecognized species of Sciaridae (Diptera) revealed by DNA barcoding. *Norwegian Journal of Entomology* **63,** 96-115) proposed the following changes:
Sciara hemerobioides Scopoli, 1763 = *Rhagio morio* Fabricius, 1794, syn. n.
Trichosia ***edwardsi*** (Lengersdorf, 1930) sp. restit., not *T. habilis* (Johannsen, 1912)
Trichosia ***caudata*** (Walker, 1848 – *Sciara*) sp. restit. = *morio*: authors, misident., not (Fabricius, 1794)

Cecidomyiidae. It was not previously reported that M. JASCHHOF and C. JASCHHOF (2009. The Wood Midges (Diptera: Cecidomyiidae: Lestremiinae) of Fennoscandia and Denmark. *Studia dipterologica, Supplement* **18,** viii + 333 pp) recognised a subfamily MICROMYINAE to include all tribes formerly in LESTREMIINAE except Lestremiini itself.

The following changes result from R.J. GAGNÉ and M. JASCHHOF (2017. A Catalog of the Cecidomyiidae (Diptera) of the World. Fourth Edition. 762 pp. Digital):
Ametrodiplosis phalaridis (Abbass, 1986 – *Sitodiplosis*) (ex *Sitodiplosis*)
Jaapiella gibsoni (Felt, 1911 – *Dasyneura*) (ex *Dasineura*: queried if a synonym of *J. cirsiicola*)
LESTODIPLOSIS Kieffer, 1894 = BLASTODIPLOSIS Kieffer, 1912, new synonymy
Lestodiplosis artemisiae (Kieffer, 1901 – *Clinodiplosis*)
STENOSPATHA *eriophori* Kieffer, 1913 [nomen dubium, genus and species ex Lestremiinae incertae sedis]

Numerous reassignments of genera to tribes were indicated by R.J. GAGNÉ (2010. Update for A Catalog of the Cecidomyiidae (Diptera) of the World. 545 pp. Digital Version 1.) and R.J. GAGNÉ and M. JASCHHOF (2014. A Catalog of the Cecidomyiidae (Diptera) of the World. 3rd Edition. 493 pp. Digital version 2; 2017. A Catalog of the Cecidomyiidae (Diptera) of the World. Fourth Edition. 762 pp. Digital.). The arrangement in the updated checklist follows them and these changes are not repeated here.

Trichoceridae. The following species were added by A. GRAYSON (2018. Additions and corrections to the Yorkshire Diptera list (part 7): including two species of *Trichocera* [Diptera: Trichoceridae] new to the British list. *The Naturalist* **143,** 23-31):
Trichocera (*Saltrichocera*) ***brevis*** Krzemińska, 2002
Trichocera (*Saltrichocera*) ***implicata*** Dahl, 1976

Psychodidae. It has been accepted in recent literature that a name synonymised with *Psychoda surcoufi* by P. WITHERS (1988. Revisionary notes on British species of *Psychoda* Latreille (Diptera, Psychodidae) including new synonyms and a species new to science. *British Journal of Entomology & Natural History* **1,** 69-76), has priority:
Psychoda ***sigma*** Kincaid, 1899 = *P. surcoufi* Tonnoir, 1922

The following changes are due to G.M. KVIFTE (2014. Nomenclature and taxonomy of *Telmatoscopus* Eaton and *Seoda* Enderlein; with a discussion of parameral evolution in Paramormiini and Pericomaini (Diptera: Psychodidae, Psychodinae). *Zootaxa* **3878**(4)**,** 390-400):
Telmatoscopus advena (Eaton, 1893), not *advenus* (as *advena* is considered a noun in apposition)
Telmatoscopus morulus (Eaton, 1893 - *Pericoma*) = *vaillanti* Withers, 1986, new synonym
[The latter species is in this work placed in SEODA Enderlein, 1935 also including of British species *labeculosa* (Eaton, 1893), *ambigua* (Eaton, 1893), *britteni* (Tonnoir, 1940), *morula* (Eaton, 1893) and *similis* (Tonnoir, 1922); only *laurencei* Freeman, 1953 remains in *Telmatoscopus* with *advena*, other species having earlier been assigned to other genera]

Chironomidae. The following species are added in the present issue:
Metriocnemus (*M.*) *alisonae* Langton, 2013 + [previously known only from Ireland]
Nanocladius (*Nanocladius*) ***distinctus*** (Malloch, 1915 – *Orthocladius*) +

The following changes result from E. STUR and T. EKREM (2006. A revision of West Palaearctic species of the *Micropsectra atrofasciata* species group (Diptera: Chironomidae). *Zoological Journal of the Linnean Society* **146,** 165-225):
Micropsectra atrofasciata (Kieffer, 1911) = *M. bidentata* (Goetghebuer, 1921), new synonym
Micropsectra ***logani*** (Johannsen, 1928 – *Tanytarsus*) = *M. groenlandica* Andersen, 1937
Micropsectra ***pallidula*** (Meigen, 1830 – *Chironomus*) = *M. bidentata* of authors, not Goetghebuer, 1921

The following synonymies follow O. SÆTHER and M. SPIES (2013. Fauna Europaea: Chironomidae. **In** P. BEUK and T. PAPE (Eds). Fauna Europaea: Diptera Nematocera. Fauna Europaea version 2.6. Internet database (http://www.faunaeur.org/)):
Micropsectra apposita (Walker, 1856) = *M. contracta* Reiss, 1965
Parachironomus ***gracilior*** (Kieffer, 1918 – *Chironomus*) = *P. arcuatus* (Goetghebuer, 1919), a junior primary homonym

The following species, recorded within the British Isles only in Ireland, was deleted from the list by D.A. MURRAY, J.P. O'CONNOR and P.J. ASHE (2016. A contribution to the Fauna Europea [sic] database – additions and amendments to the inventory of Irish Chironomidae (Diptera: Insecta) from the Republic of Ireland and Northern Ireland. *Bulletin of the Irish Biogeographical Society* **40,** 131-141):
Parachironomus swammerdami (Kruseman, 1933)

The following previously overlooked changes (the rest of those cited here for this family) were apparent from Murray *et al.* (2018: see Changes to Irish Diptera List (26) below) and Peter Langton was helpful in advising on these:

The following species was added by D.A. MURRAY and W.A. MURRAY (2003. A reassessment of Chironomidae (Diptera) of Clare Island, Co. Mayo, with first records of *Acamptocladius reissi* Cranston and Sæther and *Limnophyes angelicae* Sæther (Orthocladiinae) for the Irish faunal checklist. *Bulletin of the Irish Biogeographical Society* **27,** 255-269) (without indication that it was new to Ireland or the British Isles):
Eukiefferiella ***cyanea*** Thienemann, 1936 ++

The following species was added by D.A. MURRAY, P.H. LANGTON, J.P. O'CONNOR and P.J. ASHE (2014. Distribution records of Irish Chironomidae (Diptera): Part 2 Orthocladiinae. *Bulletin of the Irish Biogeographical Society* **38,** 61-246):
Cricotopus (*Cricotopus*) ***algarum*** (Kieffer, 1911 – *Trichocladius*) ++

The following species was added by D.A. MURRAY, P.H. LANGTON, J.P. O'CONNOR and P.J. ASHE (2015. Distribution records of Irish Chironomidae (Diptera): Part 3 Chironominae. *Bulletin of the Irish Biogeographical Society* **39,** 7-190):
Stempellinella ***reissi*** Casas & Vilchez-Quero, 1991 ++

According to P. ASHE and J.P. O'CONNOR (2012. A World Catalogue of Chironomidae (Diptera). Part 2. Orthocladiinae (Sections A and B). 968 pp; note on p. 748), *Brillia longifurca* Kieffer, 1921 is no longer regarded as a synonym of *B. flavifrons* (Johannsen, 1905), but western Palaearctic specimens named as *flavifrons* are likely to be *longifurca*. Murray *et al.* (2018) thus use the name *B. longifurca* for the British Isles species.

The following change results from P.S. CRANSTON and J.H. EPLER (2013. The larvae of Tanypodinae (Diptera: Chironomidae) of the Holarctic Region – keys and diagnoses. pp 39-136. **In** T. ANDERSEN, P.S. CRANSTON and J.H. EPLER (Eds) The larvae of Chironomidae of the Holarctic Region – keys and diagnoses. *Insect Systematics & Evolution Supplement* **66**:
HAYESOMYIA Murray & Fittkau, 1985 becomes a subgenus of THIENEMANNIMYIA Fittkau, 1957

The following change results from F.L. SILVA and T. EKREM (2016. Phylogenetic relationships of nonbiting midges in the subfamily Tanypodinae (Diptera: Chironomidae) inferred from morphology. *Systematic Entomology* **41,** 73-92):
PARAMERINA Fittkau, 1962 becomes a subgenus of ZAVRELIMYIA Fittkau, 1962

The following change results from P.S. CRANSTON and M.N. KROSCH (2015. DNA sequences and austral taxa indicate generic synonymy of *Paratrichocladius* Santos-Abreu with *Cricotopus* Wulp. *Systematic Entomology* **40,** 719-732):
PARATRICHOCLADIUS Santos Abreu, 1918 becomes a subgenus of CRICOTOPUS van der Wulp, 1874

The following change results from T. EKREM, E. WILLASSEN and E. STUR (2010. Phylogenetic utility of five genes for dipteran phylogeny: a test case in the Chironomidae leads to generic synonymies. *Molecular Phylogenetics and Evolution* **57,** 561-571):
PARAPSECTRA Reiss, 1969 = junior synonym of MICROPSECTRA Kieffer, 1909

Empidoidea. E. WAHLBERG and K.A. JOHANSON (2018. Molecular phylogenetics reveals novel relationships within Empidoidea (Diptera). *Systematic Entomology* DOI: 10.1111/syen. 12297**,** 1-18) propose a revised classification of Empidoidea, including sinking of Brachystomatidae within Empididae and recognition of a family Ragadidae, to include the genera *Ragas* and *Iteaphila* of the British fauna, as well as a number of changes to suprageneric taxa. These conclusions are yet to be tested by other workers on Empidoidea, so are not adopted here.

The subfamily RAGADINAE had previously been proposed by B.J. SINCLAIR (2016. Revision of the Australian species of *Hydropeza* Sinclair (Diptera: Empididae: Ragadinae subfam. nov.). *Records of the Australian Museum* **68**(1)**,** 1-22) for several genera, including *Hormopeza* Zetterstedt and *Ragas* Walker in the British Isles fauna.

Hybotidae. The current usage of *Ocydromia* Meigen, 1820 was conserved (ICZN. 2014. OPINION 2349 (Case 3595) *Ocydromia* Meigen, 1820 (Insecta, Diptera, HYBOTIDAE): usage conserved. *Bulletin of zoological nomenclature* **71**(4)**,** 65-266) by setting aside all type species fixations for *Ocydromia* Meigen, 1820 prior to that of *Empis glabricula* Fallén, 1816 by Westwood (1840).

Empididae. The current usage of *Hemerodromia* Meigen, 1822 was conserved (ICZN. 2014. Opinion 2347 (Case 3589): *Hemerodromia* Meigen, 1822 and HEMERODROMIINAE Schiner, 1862 (Insecta, Diptera, EMPIDIDAE): genus-group and family-group names conserved. *Bulletin of zoological nomenclature* **71**(4)**,** 265–266), by setting aside all type species fixations prior to that of *Tachydromia oratoria* Fallén, 1815 by Rondani (1856).

Dolichopodidae. The following species is deleted in the present issue:
Diaphorus winthemi Meigen, 1824

The following change results from M. POLLET and A. STARK (2018. The quest for the identity of *Orthoceratium lacustre* (Scopoli, 1763) reveals centuries of misidentifications (Diptera, Dolichopodidae). *ZooKeys* **782,** 49–79):
Orthoceratium ***sabulosum*** (Becker, 1907 – *Alloeoneurus*) = *O. lacustre*: authors, misident., not (Scopoli, 1763)

Note 1 in the 1998 list indicated that *Argyra* Macquart, 1834 was a junior synonym of *Porphyrops* Meigen, 1824 but *Argyra* was retained because of prevailing usage. This was resolved by ICZN (2014. Opinion 2348 (Case 3591): *Argyra* Macquart, 1834 (Insecta, Diptera, DOLICHOPODIDAE): the name conserved. *Bulletin of zoological nomenclature* **71**(4)**,** 267-268), which conserved *Argyra* by suppressing *Porphyrops*.

Phoridae. The following species was added by R.H.L. DISNEY and S. HÄGGQVIST (2018. Morphological recognition of the species of the *Megaselia lucifrons* (Schmitz) group (Diptera: Phoridae). *Entomologist's Monthly Magazine* **154,** 1-7), having previously been raised from synonymy with *M. lucifrons* by S. HÄGGQVIST, S.O. ULEFORS and F. RONQUIST (2015. A new species group in *Megaselia*, the *lucifrons* group, with description of a new species (Diptera, Phoridae). *Zookeys* **512,** 88-108):
Megaselia ***subnitida*** (Lundbeck, 1920 – *Aphiochaeta*)

Syrphidae. The following species is added in the present issue:
Dasysyrphus ***neovenustus*** Soszyński, Mielczarek & Tofilski, 2013 +

Attention was drawn by N.L. EVENHUIS (2018. Nomenclatural studies toward a World List of Diptera Genus-Group Names. Part VI: Daniel William Coquillett. *Zootaxa* **4381,** 95 pp) to *Xanthogramma* Schiner, 1860 being a junior synonym of *Philhelius* Stephens, 1841 (type species by monotypy, *Syrphus ornatus* Meigen, 1822 = *Xanthogramma pedissequum* (Harris, 1776)). This was on the grounds that *Philhelius* fulfilled the ICZN requirement of having been used as a valid name later than 1899, i.e. by D.W. COQUILLETT (1910. Corrections to my paper on type species of the North American genera of Diptera. *The Canadian Entomologist* **42,** 375-378). *Philhelius* was not described by Stephens and had been considered a nomen nudum, or merely a catalogue name as suggested by G.H. VERRALL (1901. *British Flies. 8. Platypezidae, Pipunculidae and Syrphidae.* 691 pp. Gurney & Jackson, London), but it is apparently valid because the identity of the only included species "*ornatus*" was clear. As *Philhelius* has never been adopted by subsequent workers on Syrphidae and *Xanthogramma* has been used in many hundreds of publications, acceptance of this change is not supported by syrphid workers consulted. Martin Speight (*pers. comm.*) will continue to use the name *Xanthogramma* in the StN database, explaining that replacing the well-established generic name *Xanthogramma* by *Philhelius* Stephens serves no useful scientific purpose and simply introduces confusion.

Pipunculidae. The following species are added in the present issue:
Chalarus ***immanis*** Kehlmaier in Kehlmaier & Assmann, 2008
Chalarus ***elegantulus*** Jervis, 1992
Chalarus ***proprius*** Jervis, 1992

Agromyzidae. The following species are added in the present issue:
Agromyza ***abdita*** Papp, 2015
Cerodontha (*Dizygomyza*) ***palustris*** Nowakowski, 1973
Phytomyza ***phillyreae*** Hering in Buhr, 1930

Stenomicridae. The following species is added in the present issue:
Podocera ***soniae*** (Merz & Roháček, 2005 – *Stenomicra*)

Chloropidae. The current usage of *Oscinella* Becker, 1909 was conserved (ICZN. 2014. Opinion 2336 (Case 3576): *Oscinella* Becker, 1909 (Insecta, Diptera, Chloropidae): precedence reversed with *Melanochaeta* Bezzi, 1906 and *Pachychaetina* Hendel, 1907. *Bulletin of zoological nomenclature* **71**(2)**,** 141-143) by giving it precedence over *Melanochaeta* Bezzi, 1906 and its objective synonym *Pachychaetina* Hendel, 1907 whenever these names are considered to be synonyms.

Heleomyzidae. A.Ö. KOÇAK and M. KEMAL (2013. A nomenclatural note in the family Heleomyzidae (Diptera). *Cesa News* **85,** 11) pointed out that *Chaetomus* Czerny, 1924 is preoccupied by *Chaetomus* McClelland, 1843 (Pisces) and proposed a replacement name:
LEANDERIA Koçak & Kemal, 2013 = CHAETOMUS Czerny, 1924, preocc.

The following change is proposed by J. ROHÁČEK (2018. European Chiropteromyzidae (Diptera): taxonomic revision, nomenclature, classification and preimaginal stages. *Annales Zoologici* **68**(2)**,** 281-316 [true *N. nidicola* (Frey, 1930) is known only from Finland], who also suggested that this family should be returned to Heleomyzidae as a subfamily CHIROPTEROMYZINAE):
Neossos ***broersii*** (de Meijere, 1946 – *Leptometopa*) +
= *N. nidicola*: Collin, 1939 and subsequent British authors, misident.

Drosophilidae. An application to conserve the current usage of *Drosophila* Fallén, 1823 by the designation of *Drosophila melanogaster* Meigen, 1830 (currently the type species of the subgenus *Sophophora* Sturtevant, 1939) as the type species of *Drosophila*, was rejected (ICZN 2010. OPINION 2245 (Case 3407) *Drosophila* Fallén, 1823 (Insecta, Diptera): *Drosophila funebris* Fabricius, 1787 is maintained as the type species. *Bulletin of zoological nomenclature* **67**(1)**,** 106-115).

Scathophagidae. A.L. OZEROV (2016. A review of the genus *Pogonota* Zetterstedt, 1860 (Diptera: Scathophagidae) in Russia. *Russian Entomological Journal* **25**(2)**,** 185-207) proposed the following generic synonymy:
POGONOTA Zetterstedt, 1860 = OKENIELLA Hendel, 1907
Pogonota caudata (Zetterstedt, 1838 – *Cordylura*)

A.L. OZEROV and M.G. KRIVOSHEINA (2016. To taxonomy of the genus *Cleigastra* Macquart, 1835 (Diptera: Scatophagidae) with description of two new species. *Russian Entomological Journal* **25**(1)**,** 97-102) proposed the synonymy of several genera with *Cleigastra* Macquart, 1835, of which two (*Gonatherus* and *Nanna*) are represented in the British Isles [new combinations of specific names were not indicated except for the type species of each name]:
GONATHERUS Rondani, 1856 becomes a subgenus of CLEIGASTRA Macquart, 1835
Cleigastra (*Gonatherus*) *planiceps* (Fallén, 1826 – *Cordilura*)
NANNA Strobl, 1894 is sunk within a subgenus CLEIGASTRA

Rhiniidae. *Stomorhina lunata*, which has been placed in the Calliphoridae in the checklist is now generally considered to belong to this separate family (Olga Sivell *pers. comm.*). This follows S.N. KUTTY, T. PAPE, B.M. WIEGMANN and R. MEIER (2010. Molecular phylogeny of the Calyptratae (Diptera: Cyclorrhapha) with an emphasis on the superfamily Oestroidea and the position of Mystacinobiidae and McAlpine's fly. *Systematic Entomology* **35,** 614-635).

Sarcophagidae. The following changes result in the present issue:
Macronychia ***dolini*** Verves and Khrokalo, 2006 = *striginervis*: authors, not (Zetterstedt, 1838)
Macronychia striginervis (Zetterstedt, 1838 – *Xysta*) new to list

Changes to the Irish Diptera List (26) – Editor

This section appears as necessary to keep up to date the initial update of the Irish list in Vol. **10,** 135-146 and the latest checklist of Irish Diptera (Chandler *et al*. 2008). Species are listed under families, but with references listed separately (unless within the present issue). The net gain of 20 species cited here brings the total Irish list to 3429.

Mycetophilidae
Leia bilineata (Winnertz, 1863) (added by Chandler in the present issue)
Mycomya affinis (Staeger, 1840) (added by Chandler in the present issue)
Mycomya insignis (Winnertz, 1863) (added by Chandler in the present issue)
Brachypeza bisignata Winnertz, 1863 (added by Chandler in the present issue)
Mycetophila confluens Dziedzicki, 1884 (added by Chandler in the present issue)
Mycetophila eppingensis Chandler, 2001 (added by Chandler in the present issue)
Mycetophila immaculata (Dziedzicki, 1884) (added by Chandler in the present issue)
Mycetophila sumavica (Laštovka, 1963) (added by Chandler in the present issue)
Phronia sudetica Dziedzicki, 1889 (added by Chandler in the present issue)

Trichonta nigritula Edwards, 1925 (added by Chandler in the present issue)

Cecidomyiidae
Dasineura harrisoni (Bagnall, 1922) (added by Henry 2017)

Chironomidae
Cricotopus (*Cricotopus*) *algarum* (Kieffer, 1911) (added by Murray *et al.* 2014, see checklist changes above)
Cricotopus (*Cricotopus*) *tibialis* (Meigen, 1804) (added by Murray 1972, assumed in the 1998 list to refer to misidentification of *C. reversus* Hirvenoja, 1973, when true *C. tibialis* was said to be new to the British list and was later confirmed from Scotland by Langton and Ruse 2005)
Eukiefferiella cyanea Thienemann, 1936 (added by Murray & Murray 2003, see checklist changes above)
Nanocladius (Nanocladius) distinctus (Malloch, 1915) (added by Langton and Ruse in the present issue)
Stempellinella reissi Casas & Vilchez-Quero, 1991 (added by Murray *et al.* 2015, see checklist changes above)
Tanytarsus lugens (Kieffer, 1916) (? as Irish in the checklist; accepted in Murray *et al.* 2018)
Cricotopus vierriensis Goetghebuer, 1935 (deleted by Murray *et al.* 2016)
Micropsectra recurvata Goetghebuer, 1928 (deleted by Murray *et al.* 2016)
Parachironomus swammerdami (Kruseman, 1933) (deleted by Murray *et al.* 2016)
Pseudodiamesa nivosa (Goetghebuer, 1928) (deleted by Murray *et al.* 2016)
[*Chironomus striatus* Strenzke, 1959 deleted by Murray *et al.* 2018, was already omitted from the checklist, where it is noted that it was a misidentification of species A sensu Pinder, 1978]

Syrphidae
Dasysyrphus neovenustus Soszyński, Mielczarek & Tofilski, 2013 (added in the present issue)

Pipunculidae
Dorylomorpha anderssoni Albrecht, 1979 (added by Carey and Gormally 2017)

Lonchaeidae
Lonchaea fugax Becker, 1895 (added by Chandler in the present issue)
Lonchaea ultima Collin, 1953 (added by Chandler in the present issue)

Sepsidae
Themira gracilis (Zetterstedt, 1847) (added by Mitchell in the present issue)

Chiropteromyzidae
Neossos broersii (de Meijere, 1946) (added by Roháček 2018, see checklist changes above)

Drosophilidae
Drosophila suzukii (Matsumura, 1931) (Gaffney 2017 indicates that this species has been established in Ireland since 2015 and is now present in six eastern counties)

References
Carey, J.G.J. and Gormally, M.J. 2017. A record of *Dorylomorpha anderssoni* Albrecht, a species of big-headed fly (Diptera: Pipunculidae) new to Ireland. *Irish Naturalists' Journal* **35,** 128-129.

Gaffney, M. 2017. Spotted wing Drosophila in Ireland: an increasing threat to the Irish soft fruit sector. Teagasc Agriculture & Food Development Authority [powerpoint presentation available on line at www.teagasc.ie/media/website/crops/horticulture/fruit]

Henry, C. 2017. First Irish record of the cecidomyid gall midge *Dasineura harrisoni* (Bagnall) (Diptera: Cecidomyiidae). *Irish Naturalists' Journal* **35,** 130-131.

Murray, D.A. 1972. A list of the Chironomidae (Diptera) known to occur in Ireland with notes on their distribution. *Proceedings of the Royal Irish Academy* **72B,** 275-293.

Murray, D.A., O'Connor, J.P. and Ashe, P.J. 2016 [see checklist changes above]

Murray, D.A., O'Connor, J.P. and Ashe, P.J. 2018. Chironomidae (Diptera) of Ireland – a review, checklist and their distribution in Europe. *Occasional Publication of the Irish Biogeographical Society* Number **12,** 404 pp.

Macrobrachius kowarzii Dziedzicki (Diptera, Mycetophilidae), second and third British records –

Macrobrachius kowarzii Dziedzicki, 1889 was recently newly recorded for the British Isles (Alexander, K.N.A. 2017. *Macrobrachius kowarzii* Dziedzicki (Diptera, Mycetophilidae) new to Britain, and other notable Diptera from Ashenbank Wood, West Kent. *Dipterists Digest* (*Second Series*) **24,** 71-77). Seven males had been trapped at this Kentish site. In a subsequent newsletter (Chandler, P.J. 2018. Fungus Gnats Recording Scheme Newsletter **10** Spring 2018. 10 pp. *Bulletin of the Dipterists Forum* No. **85**), Dziedzicki's original figures of the male genitalia and wing, and a habitus photograph of the male taken by Jostein Kjærandsen, were reproduced.

This was an unexpected addition to the British list, although the species has been increasingly recorded elsewhere in Europe in recent years. It may be another case of a recent arrival in this country, but as a small inconspicuous species could be overlooked and its biology remains unrecorded. We can now report its occurrence at two more sites in southern England.

On two visits by PC to the Highstanding Hill area of Windsor Forest in July 2018, numerous fungus gnats and other flies were in active flight along the dry but humid bed of Badger's Brook (SU930739), a result of the prevailing warm and dry conditions. On 5 July, two males of *M. kowarzii* were among 93 species of fungus gnats recorded and, on 19 July a further male of *M. kowarzii* was included in 71 species of fungus gnats identified (including only ten not found on the earlier date). On 5 July, two other fungus gnats not previously recorded at Windsor, *Sceptonia pilosa* Bukowski, 1934 and *Mycetophila immaculata* (Dziedzicki, 1884), were also found (one male of each). Both species are uncommon nationally and their discovery at Windsor now may be a result of the size of the catch as the area has been well recorded in recent years. The Crown Estate and Natural England are acknowledged for permission to record in this area.

Then one male of *M. kowarzii* was discovered in a sample of flies collected in a bottle trap between 29 April and 29 May 2018 at Forge Wood (TQ6520) in Dallington Forest, East Sussex. The trap had been placed on a veteran beech tree by a scar from a ripped out branch, and was operated by Jamie Simpson, who passed the samples to KA for sorting and dealing with determination. This sample contained only four other species of fungus gnats and overall the site had produced only 18 species of otherwise common fungus gnats by the end of June, probably a reflection of the prevailing weather conditions rather than the quality of the site.

Like those from Ashenbank Wood, these males have unmarked wings – females, known to have distinctive wing markings, have yet to be found in Britain. It will be interesting to see if it is soon noticed at other sites, to confirm whether it is currently spreading **– PETER J. CHANDLER**, 606B Berryfield Lane, Melksham, Wilts SN12 6EL, and **KEITH N.A. ALEXANDER**, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ

Dipterists Digest 2018 **25,** 87-90

Neoleria propinqua Collin (Diptera, Heleomyzidae) in South Kensington

DUNCAN SIVELL and MARTIN J.R. HALL
Natural History Museum, Cromwell Road, London, SW7 5BD

Summary
The heleomyzid *Neoleria propinqua* Collin, 1943 has been recorded in London as part of a forensic entomology research project. We highlight characters that can be used for its identification and discuss the ecology and status in Britain of this fly, which appears to be more abundant and widespread than previously thought.

Introduction

Three male specimens of *Neoleria propinqua* Collin, 1943 were collected by MH in the Wildlife Garden of the Natural History Museum, South Kensington (TQ265790), on 22 December 2014 and later identified by DS. These flies were collected from the outer surface of a suitcase, containing a pig's head, which had been placed in the garden 38 days previously, on 14 November 2014. Details of the Wildlife Garden and of other Diptera collected from the suitcase can be found in Ware *et al.* (2016).

The appearance of *Neoleria propinqua* in this forensic study is consistent with the expected biology of this species. Two of Collin's syntypes were collected from carrion, and *N. propinqua* was collected from a decaying fish head by Patrick Roper (*pers. comm.*) in Mayfield, Sussex (TQ622273, 8.ii.2000). The biology of closely related species would lead to the same expectation. *Neoleria inscripta* (Meigen, 1830), the commonest *Neoleria* species in Britain, is the most frequently recorded heleomyzid on carrion (Smith 1986); it has been recorded from sheep, cattle and fox carrion: in the latter case the fly appeared five days post-mortem and ultimately was the most abundant larva on the carcass (Smith 1975). Dear (1978) noted that *Neoleria* species are attracted to carrion at the stage when rancid fats are produced, after the early stages of decomposition, but Smith's (1975) observations suggest they can also arrive earlier. The state of rancidification of fats in the pig head was not noted here, but odours of decomposition were evident to the human nose at the time of fly collection. Over the 38-day period of exposure, the mean temperature within the suitcase (recorded by Tinytag temperature logger, Gemini Data Loggers, Chichester, UK) was 8.5°C (range 2.0-14.6°C) with the maximum being recorded on 18 December 2014, shortly before fly collection. As the suitcase had not been visited by us for a few days prior to *N. propinqua* being captured it is possible that these flies were attracted to it some days beforehand.

A further two males were captured in a modified Red Top ® Fly Catcher Trap (www.redtopflycatcher.co.uk) baited with 50 g chicken liver in 50 ml water and set in the Wildlife Garden between 21 December 2016 and 9 March 2017. One of these males was captured before late January, when the bait was refreshed, and the other male was captured between late January and early March. These additional records are important as they show that a population of *Neoleria propinqua* is present in the Wildlife Garden and persists.

Identification

The genus *Neoleria* can be distinguished from other Heleomyzidae by the following combination of characters: 2 ventral bristles on the apex of the mid tibia, 1 pair of vibrissae with no setae present just above the vibrissae, prosternum without bristles, length of arista shorter than the

height of the head, 2 pairs of frontorbital bristles, the anterior frontorbitals subequal to or longer than the posterior, 7-9 irregular rows of acrostichal setae.

Figs 1-2. ***Neoleria propinqua*** **male: 1, lateral view; 2, hind tarsus with peg on basitarsus arrowed.**

Neoleria propinqua might be confused with *N. ruficauda* (Zetterstedt, 1847), as both species have dark dorsal stripes on the thorax and lack an apical bristle on the hind femur. In his key to British Heleomyzidae, Collin (1943) used the thoracic stripes to separate these two species, but unfortunately his description is confusing and has almost certainly generated misidentifications. Collin (1943) stated that the dorsocentral bristles of *N. propinqua* lie on the dark central thoracic stripes (Fig. 3) whereas those of *N. ruficauda* lie outside these dark stripes (Fig. 4). A more precise description might be that the dorsocentral bristles lie outside the dark central stripes in both species, but that *N. propinqua* has dark spots around the bases of its dorsocentrals, and these spots may merge with the central stripes.

Fortunately, there is another character that can be used to separate these two species. In *N. propinqua* the frons is entirely orange, noticeably contrasting with the grey ocellar triangle at the top of the head (Fig. 5). In *N. ruficauda* the frons is orange from the lunule to about level with the posterior orbitals. Above this broad orange band the frons becomes dark brown and is similar in tone to the grey of the ocellar triangle, the outline of which is indistinct (Fig. 6). In addition, male *N. propinqua* have a blunt peg on the ventral apex of the hind basitarsus (Figs. 1 and 2) which is lacking in *N. ruficauda*. This character enables males of these two species to be separated but some care is required as the peg may not be obvious from certain angles of view.

Note that colour patterns may be obscured in specimens that are “greased”; this occurs when lipids leach through the exoskeleton after death and darken the appearance of a specimen. Greasing is quite common in Heleomyzidae but can be remedied by soaking specimens in ethyl acetate to dissolve the lipids. The specimen imaged in this article (Figs 1-3 and 5) was washed

in ethyl acetate before being identified and photographed. An ungreased *Neoleria ruficauda* was selected from the NHM collection for comparison (Figs 4 and 6).

Figs 3-4. Dorsal view of thorax: 3, *Neoleria propinqua*; 4, *Neoleria ruficauda*.

Figs 5-6. Dorsal view of head to show frons: 5, *Neoleria propinqua*; 6, *N. ruficauda*.

Distribution and flight period

We now know from available records that *Neoleria propinqua* is widespread across Britain with records from Aberdeenshire, Angus, Berkshire, Cambridgeshire, Hampshire, Herefordshire, Hertfordshire, Inverness-shire, Kincardine, Middlesex, Moray, Nottinghamshire, Perthshire, Roxburghshire and Sussex. Until recently it was thought to range from the midlands to the south coast (Collin 1943, Pont 1995, Chandler 2015) with an outlying record from Nethy Bridge in the highlands (Rotheray and Robertson 1993). The recent status review (Falk *et al.* 2016) mentions

only five post-1960 records, but did note that this is an under-recorded species. The expansion of the known range of *N. propinqua* is largely thanks to Peter Chandler (*pers. comm.*) who identified 16 new sites for the species when reviewing his personal collection. Adults have been recorded from September to February and appear to be most active in October and November. There are still too few records to build a clear picture of this species' phenology, but it is clearly a species of late autumn and winter and should be looked for outside the normal collecting season.

Conservation status

In the recent Acalyptratae review *N. propinqua* was given a provisional Near Threatened status (Falk *et al*. 2016), while it was allocated Notable status in the previous review under different criteria (Falk 1991). Based on the numbers of records that were known at the time, these statuses obviously took under-recording into consideration. We are now aware of 22 post-1960 sites for *N. propinqua*, which under the old system would keep it firmly in the Notable category. Modern conservation statuses rely more on population trends and can be difficult to apply when there are few records, which is why the Near Threatened status is provisional (Falk *et al.* 2016). In our opinion the current status is still appropriate for *N. propinqua*, as despite the increase in records the data are still scarce. We would encourage more winter recording to clarify the distribution and abundance of *N. propinqua*, and provide more data for the next species review.

Acknowledgements

Many thanks to the staff of the NHM Wildlife Garden for allowing us to carry out research work there. Thanks also to Peter Chandler and Patrick Roper for sharing their record details with us. All images are copyright of the Trustees of the Natural History Museum.

References

Chandler, P.J. 2015. Diptera recording at Bushy Park, Middlesex. *Dipterists Digest* (*Second Series*) **22,** 69-110

Collin, J. E. 1943. The British species of Heleomyzidae (Diptera). *Entomologists Monthly Magazine* **79,** 234-51.

Dear, J. P. 1978. Carrion. **In** Stubbs, A. and Chandler, P. (Eds). A Dipterist's Handbook. *The Amateur Entomologist* **15**. The Amateur Entomologists' Society.

Falk, S. 1991. *A review of the scarce and threatened flies of Great Britain (part 1)*. Research and Survey in Nature Conservation No. 39. Nature Conservancy Council.

Falk, S.J., Ismay, J.W. and Chandler, P.J. 2016. *A Provisional Assessment of the Status of Acalyptratae flies in the UK*. Natural England Commissioned Reports, Number 217.

Pont, A. 1995. *The Type-Material of Diptera (Insecta) described by G. H. Verrall and J. E. Collin*. Oxford University Museum Publication.

Rotheray, G.E. and Robertson, D. 1993. *Insects from Shingle Banks and Riverside Habitats in Strathspey.* Malloch Society Research Report no. 2. Glasgow, Malloch Society.

Smith, K.G.V. 1986. *A Manual of Forensic Entomology*. British Museum (Natural History).

Smith, K.G.V. 1975. The faunal succession of insects and other invertebrates on a dead fox. *Entomologist's Gazette* **26,** 277-287.

Ware, C., Lowe, M., Sivell, D., Baker, A., Bantock, T., Barclay, M., Carr, G., Cooper, L., Ellis, L., Hall, M.J.R., Hollowday, E., Honey, D.M., John, D., Martin, J., Notton, D., Osborne, D., Rundle, A., Sherlock, E., Tabor, B., Thomas, T.J., Thüs, H., Tovey, J. and Wolseley, P. 2016. Further developments of the flora and fauna of the Wildlife Garden at the Natural History Museum, London –Twenty years of species recording. *The London Naturalist* **95,** 45-159.

Dipterists Digest 2018 **25,** 91-97

Macronychia striginervis (Zetterstedt) new to Britain, and the misidentification of *M. dolini* Verves & Khrokalo (Diptera, Sarcophagidae)

DANIEL WHITMORE and IVAN PERRY*
Natural History Museum, London SW7 5BD; d.whitmore@nhm.ac.uk
*Mill Road, Lode, Cambridge CB25 9EN

Summary
Macronychia striginervis (Zetterstedt, 1838) is recorded from Britain for the first time, from Lode in Cambridgeshire, after comparison of recently-collected specimens with the holotype. Previous records of this species in Britain represent misidentifications of *Macronychia dolini* Verves & Khrokalo, 2006. An updated key to British species of *Macronychia* Rondani is presented.

Introduction
Macronychia Rondani is a genus of flesh flies belonging to the subfamily Miltogramminae (Diptera, Sarcophagidae). At the present state of knowledge it includes 21 species worldwide (Kurahashi and Pape 1996, Verves and Khrokalo 2006, Verves and Richet 2009, Mulieri and Mariluis 2011), nine of which occur in Europe (Verves and Richet 2009). Falk (2013) provided the first records of *M. agrestis* (Fallén, 1810) for Britain as well as an identification key and biological and distributional notes on the four British species of *Macronychia* known at that time. In this paper, we record *Macronychia striginervis* (Zetterstedt, 1838) from Britain for the first time and clarify the identity of the species treated as *striginervis* or *ungulans* in previous works (*e.g.* van Emden 1954, Falk 2013, Chandler 2018) as being *M. dolini* Verves & Khrokalo, 2006, based on comparison with the holotype of *M. striginervis*, other material of *M. striginervis* and *M. dolini* (see below), and information in Verves and Khrokalo (2006) and Verves and Richet (2009). We provide an updated key to the five species of *Macronychia* so far known to occur in the British Isles.

Methods
Specimens of *M. striginervis* were collected with a hand net off flowers of shrubby hare's ear (*Bupleurum fruticosum*), killed in ethyl acetate fumes and double-mounted on plastazote stages with micropins. The images in Figs 2–3 were obtained by stacking multiple photographs taken with an EOS 5D SR digital camera with MP-E 65mm macro lens (Canon, Tokyo), mounted on a Stackshot Micro Rail Package (Traverse City, Michigan). Imaging was done in Helicon Remote ver. 3.3.6, while photo stacking was carried out in Helicon Focus ver. 6.6.1 (Helicon Software Ltd.). A similar setup was used to photograph the holotype of *Macronychia striginervis* in MZLU (Fig. 1), except for use of a Canon EOS 760D camera body. The following abbreviations are used for collections: BENHS = British Entomological and Natural History Society, Reading, England [det. P.J. Chandler]; CUM = Cambridge University Museum, Cambridge, England; IPC = Ivan Perry private collection, Lode, England; MNHN = Muséum National d'Histoire Naturelle, Paris, France; MZLU = Biological Museum, Lund, Sweden; NHMUK = Natural History Museum, London, England; SFC = Steven Falk private collection, Kenilworth, England [det. S.J. Falk]. The BENHS and SFC material was not examined by the authors. Label information of the examined material is not cited verbatim except for some of the biological information, which is given in inverted commas. Geographic information is listed from the highest administrative

level to the lowest, followed by an OS grid reference where known. Any comments on label information are provided in square brackets.

Material examined

Macronychia striginervis: holotype ♀, Sweden, Lappland, Vojmsjön, [1838, J.W. Zetterstedt leg.] (MZLU; examined from photographs; see Fig. 1 for additional label information); lectotype ♂ of *Miltogramma ungulans* Pandellé, 1895, France, Hautes- Pyrénées (MNHN; examined from photographs); 1♀, France, Pyrénées-Orientales, Argelès-Gazost, 7.viii.1911, C.J. Wainwright leg. (NHMUK012809014; Fig. 3C); 1♀, England, Cambridgeshire, Lode, TL531626, 22.vii.2017, I. Perry leg. (NHMUK012809012; Figs 2, 3A); 1♀, same data as previous except 29.vii.2017 (IPC); 1♀, same data as previous except 6.viii.2018 (IPC).

Macronychia dolini: 1♀, New Forest, 27.vii.1894, F.C. Adams leg., "On *H. sphondylium*" (NHMUK010394850); 1♂, Blackheath, 9.vi.1897, A. Beaumont leg., "Bred from old apple-stump" (NHMUK010394834); 1♂, same data as previous except 11.vi.1897 (NHMUK010394835); 3♂, 1♀, Cambridgeshire, Cambridge, Sheep's Green, 1905, F. Jenkinson leg., "on rotten willow" (CUM); 1♂, Cambridgeshire, Cambridge, 19.vi.1909, F. Jenkinson leg., "willow" (NHMUK010394836); 1♂, France, Pyrénées-Orientales, Vernet-les-Bains, 20.vi.1920, C.J. Wainwright leg. (NHMUK012809015); 1♀, East Sussex, Hastings, Fairlight Glen, 3.viii.1938, C.J. Wainwright leg. (NHMUK010394849); 1♀, Hampshire, Breamore, 7.viii.1943, H.W. Andrews leg. (BENHS); 1♂, Bristol, 1–15.vi.1946, E.A. Fonseca leg. (NHMUK010394837); 1♀, London, Scout Park, TQ296914, 18.viii.1946, C.O. Hammond leg. (BENHS); 1♀, Somerset, Leigh Woods, 20.vii.1947, E.A. Fonseca leg. (NHMUK010394846); 1♀, Bristol, Blaise Woods, 3–8.vii.1948, E.A. Fonseca leg. (NHMUK010394847); 1♀, Surrey, Bookham, 1950, L. Parmenter leg., "Bred" (NHMUK010394838); 1♂, 1♀, Hampshire, Breamore, 26.vii.1950, H.W. Andrews leg. (BENHS); 2♀, same data as previous except 27.vii.1950 (BENHS); 1♀, same data as previous except 28.vii.1950 (BENHS); 1♀, same data as previous (NHMUK010394842); 3♀, same data as previous except 31.vii.1950 (BENHS); 1♀, Kent, St. Margaret, 1–7.viii.1953, E.A. Fonseca leg. (NHMUK010394844); 1♀, same data as previous (NHMUK010394848); 1♀, Dorset, nr Wareham, nr Morden Pond, 6.vi.1963, M. Speight leg., "in cell of crabronid in *Ilex* stump" (NHMUK010394847); 1♀, Bristol, 6.vii.1966, E.A. Fonseca leg. (NHMUK010394845); 1♀, Oxfordshire, Wychwood Forest, 4.viii.1973, A.C. Pont leg. (NHMUK010394839); 1♀, West Sussex, Bognor Regis, [bred] vi.1974, M. Edwards leg., "Ex *Ectemnius* sp. nest in rotten log" (NHMUK010394840); 1 specimen [sex not specified], Carmarthenshire, Pembrey Forest, 6.viii.1985, S.J. Falk leg. (SFC); 1♀, Surrey, Epsom, [collected] x.1986, [emerged] 1.vii.1987, G.R. Else leg., "Ex pupa in dead wood associated with cocoons of *Ectemnius cavifrons* (Thomson)" (NHMUK010394841); 1♀, Cambridgeshire, Wicken Fen, 3.vii.1992, I Perry leg. (IPC); several specimens [number and sexes not specified], Warwickshire, Harbury Village, vi.1995, S.J. Falk leg., *ex Ectemnius* nests (SFC); 1 specimen [sex not specified], Suffolk, Center Parcs Elveden, 6.viii.1995, S.J. Falk leg. (SFC); 1 specimen [sex not specified], Warwickshire, Bedworth, Judkins Quarry, 27.vii.1997, S.J. Falk leg. (SFC); 1♂, Suffolk, King's Forest, 2.viii.1997, I. Perry leg. (IPC); 1♀, same data as previous except 3.viii.1997 (IPC); 1 specimen [sex not specified], Warwickshire, Sutton Park, 4.viii.1997, S.J. Falk leg. (SFC); 1 specimen [sex not specified], Warwickshire, nr Stratford-upon-Avon, Bordon Hill, 11.vii.1999, S.J. Falk leg. (SFC); 1♀, Cambridgeshire, Cambridge, 8.vii.1999, I. Perry leg. (IPC); 1♂, Cambridgeshire, Newmarket, Devil's Ditch [= Dyke], 22.viii.1999, I. Perry leg. (IPC); 1♀, Cambridgeshire, Wicken Fen, 17.viii.2003, I. Perry leg. (CUM); 2♂, Cambridgeshire, Woodwalton Fen, 23.viii.2003, I. Perry leg. (CUM); 1♂, Dorset, Durlston Country Park, 3.viii.2005, I. Perry leg. (CUM); 1 specimen [sex not specified], Warwickshire, Coventry, Bell

Green, 14.vii.2007, S.J. Falk leg. (SFC); 1♀, Hampshire, Farley Mount, 10.viii.2007, I. Perry leg. (BENHS). 1♂, Oxfordshire, Aston Rowant NNR, 26.vii.2008, I. Perry leg. (BENHS).

Fig 1. Holotype female of *Macronychia striginervis* (Zetterstedt) (MZLU); photographs by Biological Museum, Lund University. A. Habitus in right lateral view. B. Labels.

Fig 2. *Macronychia striginervis* (Zetterstedt). Female from Lode, Cambridgeshire (NHMUK012809012), habitus in left lateral view.

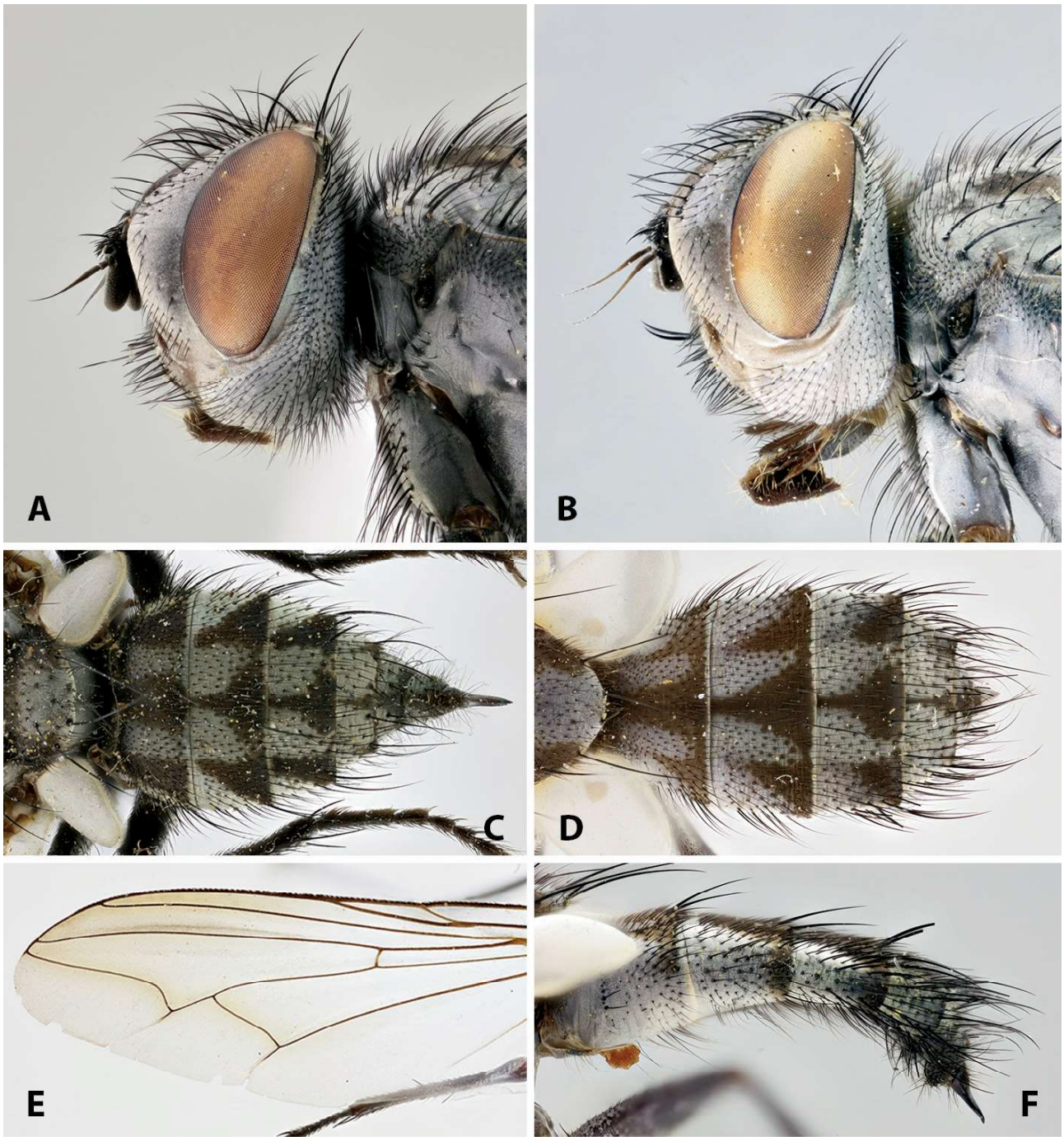


Fig 3. ***Macronychia*** **spp. A. Female** ***M. striginervis*** **(Zetterstedt) from Lode, Cambridgeshire (NHMUK012809012), head in left lateral view. B. Female** ***M. dolini*** **Verves & Khrokalo from nr. Wareham, Dorset (NHMUK010394843), head in left lateral view. C. Female** ***M. striginervis*** **from Pyrénées-Orientales, France (NHMUK012809014), abdomen in dorsal view. D. Female** ***M. dolini*** **from Breamore, Hampshire (NHMUK010394842), abdomen in dorsal view. E. Same as previous, left wing in dorsal view. F. Same as previous, abdomen in left lateral view.**

Key to British species of *Macronychia*

Species of *Macronychia* can be distinguished from all other British Sarcophagidae by the following combination of character states: arista bare; vibrissa well-developed and inserted well above clypeal margin; vibrissal angle poorly formed and face strongly receding in lateral view;

proepisternum swollen; notopleuron with just 2 strong primary setae (no subprimary setae); mid tibia with 2 anterodorsal setae; hind coxa bare on posterior surface.

The five species so far recorded from the British Isles can be identified using the following key (adapted from Pape 1987, Verves and Khrokalo 2006 and Falk 2013):

1 Basicosta yellow; thorax and abdomen with dense, olive-grey microtrichosity and inconspicuous dark markings; body length 5.5–7.0 mm ..... ***griseola*** (Fallén)
- Basicosta brown to black; thorax and abdomen with grey microtrichosity and conspicuous dark markings; body length 8.0–12.0 mm **2**

2 Posterior part of postgena and occiput with light-coloured setulae (Fig. 3B). Wing usually conspicuously infuscated in females, antero-distally between veins R_1 and R_{4+5} and along crossvein dm-cu and distal part of vein M (Fig. 3E); hyaline or at most slightly infuscated between veins R_{2+3} and R_{4+5} in males. Female: ovilarvipositor heavily sclerotised, spine-like (Fig. 3F) ..... ***dolini*** Verves & Khrokalo
- Postgena and occiput with black setulae only (Fig. 3A). Wing entirely hyaline in both sexes, sometimes slightly infuscated around the veins in females. Female: ovilarvipositor inconspicuous or heavily sclerotised, spine-like **3**

3 Abdominal syntergite 1+2 and tergite 3 without median marginal setae, at most tergite 3 with decumbent median marginals ..... ***polyodon*** (Meigen)
- Abdominal syntergite 1+2 and tergite 3 with median marginal setae **4**

4 Female: ovilarvipositor not heavily sclerotised and spine-like. Male: prongs of cerci broadly separated in posterior view ..... ***agrestis*** (Fallén)
- Female: ovilarvipositor heavily sclerotised, spine-like (Figs 2, 3C). Male: prongs of cerci contiguous almost to tip in posterior view ..... ***striginervis*** (Zetterstedt)

Discussion

Comparison of specimens of *Macronychia striginervis* from other European collections with specimens identified as such in the NHMUK collection showed that two closely-related but obviously different species had been confused in the literature. The British specimens in NHMUK key out as *M. dolini* using the keys in Verves and Khrokalo (2006) and Verves and Richet (2009). However, no type material was examined in either of these works. The holotype female of *M. striginervis* was studied by Pape (1986), but he did not provide sufficient information to assess whether it was conspecific with *M. dolini*, described two decades later. The recent finding in Cambridgeshire of three female specimens that are conspecific with European specimens identified as *M. striginervis* and key to that species in Verves and Khrokalo (2006) and Verves and Richet (2009) prompted us to clarify the identity of this species and the issue of its possible previous misidentification in Britain. We examined high-resolution digital photographs of the holotype female of *M. striginervis* from Lund (Fig. 1), and were able to confirm its conspecificity with the Cambridgeshire specimens and with *M. striginervis* as treated by Verves and Khrokalo (2006) and Verves and Richet (2009). This allowed us to confirm the identity of the species previously treated as "*M. striginervis*" (or "*M. ungulans*") in the British literature (Colyer and Hammond 1951, van Emden 1954, Kloet & Hincks 1976, Falk 1991, Chandler *et al.* 2008, Falk 2013, Falk *et al.* 2017, Chandler 2018) as being *M. dolini*. The identity of *Miltogramma ungulans* Pandellé, 1895 was also verified through high-resolution digital images of the lectotype male (in MNHN) and it is confirmed as a junior synonym of *M. striginervis*, as correctly treated by Pape (2004).

Macronychia dolini and *M. striginervis* are classified within the nominal subgenus *Macronychia* for their shared similarities in the male and female terminalia, most notably the sclerotised, spine-like ovilarvipositor. However, they can be readily distinguished by the following features: (1) overall size and appearance – *M. dolini* is generally of a larger size (specimens often reaching up to about 12 mm in body length) and more slender appearance, with particularly long wings and legs and a dorsoventrally compressed abdomen (Fig. 3E–F); *M. striginervis* is a smaller (up to 10 mm in body length) and stouter-looking species without unusually long wings (Fig. 2); (2) chaetotaxy of head – *M. dolini* has light-coloured setulae on the occiput and the posterior part of the postgena (Fig. 3B), whereas these are exclusively black in *M. striginervis* (Fig. 3A); (3) wing – in *M. dolini* the wing is usually hyaline in males but often conspicuously infuscated in females, antero-distally between veins R_1 and R_{4+5} and along crossvein dm-cu and the distal part of vein M (Fig. 3F); in *M. striginervis* the wing is usually entirely hyaline in both sexes, sometimes slightly infuscated around the veins in females; (4) shape of abdomen in dorsal view – in *M. dolini* the 3rd and 4th abdominal tergites are broader than syntergite 1+2, giving the abdomen a lozenge-shaped appearance, particularly in females (Fig. 3D); in *M. striginervis* syntergite 1+2 is broader than tergites 3 and 4 and the abdomen is gradually tapering to the tip (Fig. 3C); (5) tergites 6 and 7 and length of ovilarvipositor – in *M. dolini* tergites 6 and 7 are short and poorly visible in dorsal view (Fig. 3D) and the ovilarvipositor is visibly shorter than tergite 5; in *M. striginervis* tergites 6 and 7 are longer and well visible in dorsal view and the ovilarvipositor is about as long as tergite 5 (Figs 2, 3C); (6) median marginal setae on tergites 3 and 4 – stout and erect in *M. striginervis*, finer and more adpressed in *M. dolini*.

The three females listed above, from Lode in Cambridgeshire, are the only verified records of *M. striginervis* from Britain to date, although we cannot exclude that some past records of "*striginervis*" or "*ungulans*" do not belong to *M. striginervis*. *Macronychia dolini* has so far been recorded from Co. Wicklow and Co. Kildare in Ireland (Chandler *et al.* 2008) and from the following British counties: Anglesey, Bristol, Caernarvonshire, Cambridgeshire, Carmarthenshire, Dorset, East Norfolk, East Sussex, Gloucestershire, Greater London, Hampshire, Kent, Oxfordshire, Pembrokeshire, Shropshire, Somerset, Suffolk, Surrey, Warwickshire, West Sussex and Yorkshire (van Emden 1954, Perry 2013, Chandler 2015, Falk *et al.* 2017, NBN Atlas 2018 [verified records], and present records). It is listed as pNationally Scarce (i.e. a provisional status) by Falk *et al.* (2017).

Both species are recorded in the literature as kleptoparasites in nests of the crabronid wasp *Ectemnius cavifrons* (Thomson, 1870) (van Emden 1954, Pape 1987, Verves and Khrokalo 2006, Falk 2013). This is confirmed for *M. dolini* by the label data of some of the specimens in NHMUK. At the present state of knowledge, *M. striginervis* has a wide distribution throughout the Palaearctic as well as in the Afrotropical Region (Verves and Khrokalo 2006), though a revision of material would be necessary to verify that these records belong to a single species. *Macronychia dolini* would appear to be widespread in the West Palaearctic, from SW France to Turkmenistan and Western Siberia (Verves and Khrokalo 2006).

Acknowledgements

We are thankful to Rune Bygebjerg and Christoffer Fägerström (MZLU), and Emmanuel Delfosse (MNHN) for providing high-resolution photographs of the types of *Macronychia striginervis* and *Miltogramma ungulans*, respectively, to Thomas Pape (Natural History Museum of Denmark, Copenhagen) for very useful reviewer's comments, to Steven Falk (Kenilworth, England) for additional records of *M. dolini* from Carmarthenshire, Suffolk and Warwickshire, and Peter Chandler (Melksham, England) for information on the BENHS collection.

References

Chandler, P.J. 2015. Diptera recording at Bushy Park, Middlesex. *Dipterists Digest* (*Second Series*) **22,** 69-110.

Chandler, P.J. (Ed.) 2018. An Update of the 1998 Checklist of Diptera of the British Isles [updated 16 March 2018]. http://www.dipteristsforum.org.uk/sgb_check_intro.php

Chandler, P.J., O'Connor, J.P. and Ronayne, C. 2008. *Macronychia striginervis* (Zetterstedt, 1838) (Diptera, Sarcophagidae) new to Ireland. *Dipterists Digest* (*Second Series*) **14,** 169-170.

Colyer, C.N. and Hammond, C.O. 1951. *Flies of the British Isles*. Warne, London.

Emden, F.I. van 1954. Diptera Cyclorrhapha Calyptrata (1), section (a). Tachinidae and Calliphoridae. *Handbooks for the Identification of British Insects* **10**(4a)**,** 1-133.

Falk, S. 1991. A review of the scarce and threatened flies of Great Britain (Part 1). *Research and survey in nature conservation*, **39**. Nature Conservancy Council, Peterborough.

Falk, S. 2013. *Macronychia agrestis* (Fallén) (Diptera, Sarcophagidae) new to Britain, with notes on the other British *Macronychia* species. *Dipterists Digest* (*Second Series*) **20,** 57-61.

Falk, S.J. and Pont, A.C. 2017. A provisional assessment of the status of calypterate flies in the UK. *Natural England commissioned reports*, **234**.

Kloet, G.S. and Hincks, W.D. 1976. A check list of British Insects. Second edition (completely revised). Part 5: Diptera and Siphonaptera. *Handbooks for the Identification of British Insects* **11** (5)**,** 1-139.

Kurahashi, H. and Pape, T. 1996. The first endemic *Macronychia* from the Oriental Region (Diptera: Sarcophagidae). *Japanese Journal of Entomology* **64,** 267-274.

Mulieri, P.R. and Mariluis, J.C. 2011. Description of a new species of *Macronychia* Rondani (Diptera: Sarcophagidae: Miltogramminae), with a key to the New World species of the genus. *Zootaxa* **2832,** 51-55.

NBN Atlas. 2018. NBN Atlas website at http://www.nbnatlas.org [Accessed 3 August 2018]

Pape, T. 1986. A revision of the Sarcophagidae (Diptera) described by J.C. Fabricius, C.F. Fallén, and J.W. Zetterstedt. *Entomologica Scandinavica* **17,** 301-312.

Pape, T. 1987. The Sarcophagidae (Diptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* **19,** 1-203. E.J. Brill, Leiden – Copenhagen.

Pape, T. 2004. The Sarcophagidae (Insecta: Diptera) described by Louis Pandellé. *Zootaxa* **722,** 1-64.

Perry, I. 2013. Diptera of the Devil's Ditch, Cambridgeshire. *Nature in Cambridgeshire* **55,** 76-87.

Verves, Yu.G. and Khrokalo, L.A. 2006. Review of Macronychiinae (Diptera, Sarcophagidae) of the world. *Vestnik Zoologii* **40**(3)**,** 219–239.

Verves, Yu. and Richet, R. 2009. Description of a new species of *Macronychia* Rondani, 1859, from France (Diptera, Sarcophagidae). *Bulletin de la Société Entomologique de France* **114**(1)**,** 111-114.

***Stevenia deceptoria* (Loew) (Diptera, Rhinophoridae) and *Thelyconychia solivaga* (Rondani) (Diptera, Tachinidae) on the Suffolk coast –** On 1 August 2017, I visited Landguard (TM286321), Felixstowe, Suffolk and found that I had collected a male of *Stevenia deceptoria* (Loew, 1847). I returned to the site on 6 August 2017, and by sweeping the flowers of carrot *Daucus carota* found that a strong population of *S. deceptoria* was present, males being especially numerous. The habitat was a sparsely vegetated shingle beach, fringed with brambles and tall grassland. This species was first found in Britain in 2000 at Lydden NR, Dover, Kent by Laurence Clemons, with subsequent records from the Dover area (Clemons, L. 2006. *Stevenia deceptoria* (Loew, 1847) (Diptera, Rhinophoridae) new to Britain. *Dipterists Digest* (*Second Series*) **13,** 119-122).

In 2016 it was found at three sites along the north coast of Kent, having previously been found at Tide Mills, Sussex in 2010 (Laurence Clemons *pers. comm.*). The discovery of a strong colony at Felixstowe, without any other records between there and Kent, suggests a separate colonisation rather than a natural spread, especially as the records from north Kent weren't made until 2016. If this is the case, the proximity of Landguard to the port of Felixstowe may be significant as it is said to be capable of exploiting woodlice on boats or cargo, although the precise host is apparently unknown. Sweeping carrot flowers in similar habitat just to the north of Felixstowe (TM327366) on 1 August 2017 failed to find any further specimens, so it would appear to be confined to Landguard in this vicinity at present.

Thelyconychia solivaga (Rondani, 1861) was first found in Britain in Kent in 2006 and 2008, and on the Essex coast in 2010 (Clemons, L. and Perry, I. 2011. *Thelyconychia solivaga* (Rondani) (Diptera, Tachinidae) new to Britain. *Dipterists Digest* (*Second Series*) **18,** 77-79). Since then I have found it at four sites along the Suffolk coast, indicating a steady expansion northwards from its presumed arrival in Kent. My records are: Dingle Marshes (TM480714), 1.vii.2014, 1♀; Walberswick (TM501747), 26.vi.2017, 1♂; Landguard (TM286321), Felixstowe, 1.vii.2017, 1♂, 1♀; north of Felixstowe (TM327366), 1.vii.2017, 2♂, 4♀. All the sites were sparsely vegetated coastal shingle, except at Walberswick, where a male was swept from dry grassland.

The records from 2017 differed from all the previous ones in that they included males, all the previous occurrences having been of females only. The males can be identified using the characters given by Clemons and Perry (*op. cit.*), although there was one obvious difference between the sexes. Males have 12-13 pairs of strong upswept frontal bristles, whereas in females they are fewer in number (10 pairs), with two pairs distinctly proclinate. So far, *T. solivaga* has only been recorded at coastal localities in this country, which may reflect its need for xerothermic habitats, or perhaps its choice of host, which remains unknown.

I would like to thank Laurence Clemons for providing me with information on the current status of *S. deceptoria* **– IVAN PERRY**, 27 Mill Road, Lode, Cambridge, CB25 9EN

Dipterists Digest 2018 **25,** 99-103

Atylotus plebeius (Fallén) (Diptera, Tabanidae) in Britain, including discoveries made during 2018

ANDREW GRAYSON
'Scardale', High Lane, Beadlam, Nawton, York, North Yorkshire, YO62 7SX

Summary
Prior to the extremely fine summer of 2018, *Atylotus plebeius* (Fallén, 1817), which was rather appropriately given the vernacular name Cheshire Horsefly by Stubbs and Drake (2001, 2014), had not been recorded in Britain during the 21st Century; indeed, there were doubts as to whether it remained extant in Britain. It is therefore pleasing to report that in Cheshire (V.C. 58) during June 2018, it was re-discovered at one quaking bog in the Abbots Moss complex [Shemmy Moss, SJ 5949 6892], three quaking bogs on Little Budworth Common [Central Moss, SJ 5850 6574; East Moss, SJ 5859 6570; and Whitehall Moss, SJ 5878 6580] and at Wybunbury Moss [SJ 6965 5021], which also features areas of quaking bog. It is clear that *A. plebeius* maintains small, but viable, populations on quaking bog habitats at the aforementioned sites, none of which are imminently at risk of degradation or destruction.

History
Verrall (1909) stated that *Atylotus plebeius* (Fallén, 1817) would probably occur in Britain; albeit, his reasoning was merely that it had been found in France and Denmark. Nevertheless, *A. plebeius* was indeed found in Britain only two years later; the details were published by Goffe (1931), who wrote: 'Although Verrall stated that this species would probably occur with us (Brit. Flies, V. p. 381) I had not seen a published report of its capture; I was, therefore, agreeably surprised to find specimens in the British Museum [now The Natural History Museum, London] collection taken by Mr. H. Womersley in Cheshire and labelled "Delamere Forest, July 15th, 1911," and "Abbott's Moss, July 22nd, 1911," respectively. The species must surely occur elsewhere in the British Isles.' We cannot be exactly sure where Womersley took his specimens of *A. plebeius*, as both these localities refer to broad areas which would have contained several suitable quaking bog habitats at the time.

Goffe (1931) was soon superseded as the most recent standard British work on Tabanidae by Edwards *et al.* (1939), in which the Tabanidae section was written by Harold Oldroyd; this in turn was superseded by Oldroyd (1969), but neither of these works divulged any additional British localities for *A. plebeius*. In turn, Oldroyd (1969) was superseded as the standard British work on Tabanidae by Stubbs and Drake (2001), which listed the following localities and dates span: Delamere, 1911; Abbots Moss, between 1911 and 1941; Newchurch Common, between 1940 and 1945 (Goffe 1944; Collin 1945); Bettisfield, 1955; Wybunbury Moss, 1969; Whixall Moss, between 1969 and 1980; and 'a bog between Abbots Moss and Newchurch Common in the mid 1990s'. This last unnamed bog refers to the writer's discovery of a male and female *A. plebeius* at Shemmy Moss on 21.vii.1996. The record of the Shemmy Moss male was published in Grayson (1997) under the locality name 'a kettlehole bog near Nunsmere'. Stubbs and Drake (2014) added Budworth Common (Taylor 2000) as a further British site for *A. plebeius*. This refers to Little Budworth Common, which is situated southwards of the Abbots Moss/Newchurch Common areas, and not between those two localities as stated in Stubbs and Drake (2014) due to a text insertion error.

Much of the locality data in Stubbs and Drake (2001, 2014) relates to specimens in the World Museum, Liverpool, many of which were collected by H.L. Burrows, who was also responsible for finding *A. plebeius* on at least two occasions at Wybunbury Moss (21.vii.1956 and 30.vi.1969) according to records held by the Soldierflies and Allies Recording Scheme. Prior

to 2018, the last time *A. plebeius* was found in Britain was a solitary female at Shemmy Moss (Fig. 1) by the author on 24.vii.1999.

Fig. 1. Quaking peat bog habitat at Shemmy Moss, part of the Abbots Moss mire complex, 7 June 2018 (© Andrew Grayson).

Findings during 2018

The author was invited to carry out a survey of the horsefly fauna of the Cheshire Plain area during 2018 by Gary Hedges (World Museum, Liverpool), who obtained permissions to investigate more than 50 Cheshire Plain bogs, which are alternatively referred to as mires, or 'mosses'. The principal target of the survey was *Atylotus plebeius*, and it is pleasing to report that this nationally endangered fly not only persists as a British species, but is present on at least three well-separated Cheshire sites.

The precise habitat for *A. plebeius* is quaking bog [alternatively often referred to by the German term 'schwingmoor'], which is the type of bog characterised by a floating mat of *Sphagnum* and other bog plants, typically at least half a metre thick, and often covering quite deep water bodies underneath. The quaking bogs on which *A. plebeius* was found during 2018 are all very similar in characteristics, having a thick floating mat surface of *Sphagnum* and other plants, with *Vaccinium oxycoccos* [Bog Cranberry], *Drosera* [sundews] and *Calluna vulgaris* [Heather] as conspicuous elements, and the mat entirely covering the water held beneath.

The 2018 findings [those of the author unless stated otherwise] were as follows. *A. plebeius* was initially re-discovered at Shemmy Moss on 9.vi.2018 (both sexes) during a brief visit, accompanied by Gary Hedges; a male was also present on the following day. Brief visits to Little

Budworth Common on 10.vi.2018 and 27.vi.2018 produced *A. plebeius* from all three of its true quaking bogs [Central Moss, East Moss and Whitehall Moss] on both occasions. Females were found on both occasions, but the majority of individuals were males. *Atylotus plebeius* was also swept from Whitehall Moss by John Mousley during the Dipterists Forum Summer Field Meeting on 26.vi.2018. Also during the same Dipterists Forum meeting, the author observed, from a metre distance, a female *A. plebeius* at Wybunbury Moss on 24.vi.2018. This female was positioned slightly to the right of the centre of a cow's face, and was apparently trying to take a blood-meal, which is not a recorded activity for this fly. It had earlier been seen around the animal's hind legs. Rob Wolton visited Wybunbury Moss two days later and photographed a female *A. plebeius* (Fig. 2) near the centre of the bog.

Fig. 2. Female of *Atylotus plebeius* at Wybunbury Moss, 26 June 2018 (© Rob Wolton).

Discussion

Prior to 2018, there was some doubt as to whether *A. plebeius* remained extant in Britain. When it was first discovered in 1911, quaking bogs were a fairly common habitat in the Cheshire Plain area [which extends into neighbouring counties]; however, wholesale destruction and degradation of these habitats occurred during the mid-20th Century, when many were either drained and afforested [principally in Delamere Forest], hollowed out to create lakes [including in the Abbots Moss and Newchurch Common areas], or drained and subject to commercial peat-extraction [most notably on the conjoined bog complex comprising Whixall Moss, Fenn's Moss and Bettisfield Moss, which straddles the Welsh/English border]. Much drain-blocking and restoration work of Cheshire Plain mires has been carried out over recent years, principally in Delamere Forest. This work has been beneficial to many horseflies, but none of the 'restored mosses' investigated throughout the Cheshire Plain region during 2018 are currently suitable for *A. plebeius*.

Of the sites where *A. plebeius* was re-discovered during 2018: Wybunbury Moss suffered from 20th Century drainage, but does retain small areas of quaking bog; Little Budworth Common has four discrete bogs which escaped 20th Century destruction and degradation, three of which are pristine quaking bogs with populations of *A. plebeius*; and Shemmy Moss remains pristine, but can suffer from periodic flooding, including in summer, when it can become a shallow lake frequented by dragonflies etc., as occurred in at least one year in the early 2000s. *Atylotus plebeius* has survived such flooding at Shemmy Moss; therefore, it can be assumed that its larvae are capable of being fully aquatic.

The adults have a penchant for alighting upon the flower-heads of *Calluna vulgaris*, but the writer has yet to find either sex definitely feeding on the flowers, although they were often observed investigating last year's flowers, or those yet to open. Approaching dusk at Whitehall Moss on Little Budworth Common on 10.vi.2018, four males were apparently preparing to roost close together on a patch of *Calluna vulgaris* near the centre of the bog. One male remained motionless perched head-downwards near the top of a *Calluna vulgaris* stem. When perched on the general bog vegetation, males gain some inadvertent camouflage advantage in that their eyes are similar to unripe *Vaccinium oxycoccos*.

Other potential sites

It is very likely that *Atylotus plebeius* is restricted to true quaking bogs of the type mentioned above under the findings during 2018, and also likely that its British distribution is restricted to the Cheshire Plain area.

Although not yet noted for *A. plebeius*, the following Cheshire sites are worthy of future investigation for its potential occurrence: Barnsbridge Basin [SJ 5420 7190]; Black Lake [SJ 5373 7091], Brackenhurst Bog [SJ 5956 6983], Boggy Pool [SJ 5970 6910], Gull Moss [SJ 6011 6871], Lily Pool [SJ 5956 6925] and South Moss [SJ 5937 6863]. These sites were investigated by the writer during 2018; however, Boggy Pool and Lily Pool were regrettably out-of-bounds during the flight period of *A. plebeius*, so could not be satisfactorily investigated. It is quite possible that the ecology of *A. plebeius* demands a reasonable depth of water beneath the surface vegetation; in which case, mires which are more 'squidgy' underfoot than truly quaking, such as at Barnsbridge Basin, Brackenhurst Bog and Boggy Pool, would not be suitable sites. It is also possible that *A. plebeius* may require underlying water to be completely covered by quaking bog' with no open pools; in which case, Black Lake and Lily Pool would be unsuitable sites. Gull Moss is undeniably currently suitable for *A. plebeius*; and it must surely occur on South Moss, which is very similar to the adjacent Shemmy Moss.

Similar species

Atylotus sublunaticornis (Zetterstedt, 1842) is very similar to *A. plebeius*, occurs in similar habitats, and shares a similar European distribution, including all the Scandinavian countries, and our near neighbours Belgium, France and Holland (Chvála *et al.* 1972). It could very plausibly occur in Britain, as indicated by Stubbs and Drake (2001, 2014); therefore, it is important to examine British specimens identified as *A. plebeius* to check that *A. sublunaticornis* has not been overlooked. I have seen most British specimens of *A. plebeius*, and have not found *A. sublunaticornis* among those examined. The most reliable character for separating these species is that both sexes of *A. sublunaticornis* have a dense fringe of long black hairs on the vertex, the longest being about as long as the hairs on the thoracic dorsum, and more than twice as long as those on the frons. Both sexes of *A. plebeius* usually have only fine pale hairs on the vertex and, when thicker black hairs do occur, they are shorter, intermixed with finer pale hairs, and do not form such a dense fringe.

Acknowledgements

Foremost, I am grateful to Gary Hedges (World Museum, Liverpool) for arranging the survey and facilitating permissions to access a large number of Cheshire Plain area sites during 2018. Katie Piercy [ex Cheshire Wildlife Trust] provided a very useful reconnaissance tour. Adam Evans (Forestry Commission) provided an access key to Delamere Forest. Rob Wolton and John Mousley provided supplementary records, and Rob kindly permitted use of his photograph.

References

Chvála, M., Lyneborg, L. and Moucha, J. 1972. *The Horse Flies of Europe (Diptera, Tabanidae)*. Entomological Society of Copenhagen, Copenhagen.

Collin, J.E. 1945. Correction of a mistake of long standing concerning the identity of *Atylotus plebeius* Fallén (Diptera, Tabanidae). *The Proceedings of the Royal Entomological Society of London* Series B. Taxonomy **14,** 89-90.

Edwards, F.W., Oldroyd, H. and Smart, J. 1939. *British blood-sucking flies*. British Museum (Natural History), London.

Goffe, E.R. 1931. British Tabanidae (Diptera). With an account of the Principal Variation. With descriptions of a number of New Forms, and of some Additions to the British List. *Transactions of the Entomological Society of the South of England* **6,** 43-114.

Goffe, E.R. 1944. *Tabanus* (*Atylotus*, *Ochrops*) *plebejus* Fallén (Dipt., Tabanidae) in Cheshire. *Journal of the Society for British Entomology* **2,** 178-179.

Grayson, A. 1997. Further notes regarding finding male tabanids. *Larger Brachycera Recording Scheme Newsletter* **15,** 5-8. Bulletin of the Dipterists Forum No. **43**.

Oldroyd, H. 1969. Diptera Brachycera, Tabanoidea and Asiloidea. *Handbooks for the identification of British Insects* **IX**(4a). Royal Entomological Society of London, London.

Stubbs, A.E. and Drake, [C.] M. 2001. *British Soldierflies and their Allies*. British Entomological and Natural History Society, Reading.

Stubbs, A.E. & Drake, [C.] M. 2014. *British Soldierflies and their Allies*. Second edition. British Entomological and Natural History Society, Reading.

Taylor, M. 2000. A modern record of a Red Data Book 1 [Endangered] horsefly *Atylotus plebeius* (Fall.) (Diptera: Tabanidae) from Little Budworth Common, Cheshire (SJ585657). *Journal of the Lancashire & Cheshire Entomological Society* **124,** 121-123.

Verrall, G.H. 1909. *Stratiomyidae and succeeding families of the Diptera Brachycera of Great Britain*. British Flies. Volume V. Gurney & Jackson, London.

***Eupachygaster tarsalis* (Zetterstedt) (Diptera, Stratiomyidae) in Berkshire (V.C. 22) –** On 27 June 2018, I was running a course on Diptera at Dinton Pastures Country Park, Berkshire, for the Field Studies Council's "BioLinks" project. Among the species recorded were two female specimens of soldierfly from subfamily Pachygastrinae: *Pachygaster atra* (Panzer, 1798) and *Eupachygaster tarsalis* (Zetterstedt, 1842), of which *P. atra* is common but the rather similar *E. tarsalis* is more rarely recorded. Both soldierflies were caught in a single sweep of the foliage of small oak (*Quercus robur*) trees that line the path immediately south of the "Play Park", not far from the main car park at the south-east corner of Dinton Pastures. The grid reference is SU78267186.

Eupachygaster tarsalis is a saproxylic species with larvae that develop in rot-holes in a range of deciduous trees, often high in the trees (Stubbs, A. and Drake, M. 2014. *British soldierflies and their allies: an illustrated guide to their identification and ecology*. British Entomological and Natural History Society, Reading). The oak trees from which it was swept at Dinton Pastures were relatively young and no rot-holes were observed in the immediate vicinity. In the recent status review (Drake, C.M. 2017. *A review of the status of Larger Brachycera flies of Great Britain - Species Status No.29*. Natural England Commissioned Reports, Number **192**) *E. tarsalis* is considered to be Nationally Scarce, but not of conservation concern.

This is the first record for *E. tarsalis* at Dinton Pastures, despite the relatively high level of entomological recording at this site. It is also the third for vice-county Berkshire, with previous records from Windsor Forest of rearings from rot-holes in beech in 1977 and 1981, and from California Country Park in 1998. The latter record has not previously been published; it was of a male swept over a stack of birch logs, recorded by Peter Chandler on 19 June 1998, at grid reference SU7864.

Figs 1-2. *Eupachygaster tarsalis*, female from Dinton Pastures Country Park.

Eupachygaster tarsalis is a small, dark fly that no doubt suffers from under-recording, but does seem to be a genuinely elusive species. Its identification in samples trapped in the vicinity of decaying trees at a range of sites across southern England in recent years has shown that it is quite widespread in these habitats, and it has also been found in gardens in Kent and Surrey. Further records may result from sweeping tree foliage and carefully checking any small, dark pachygastrine soldierflies. Photographs of the specimen from Dinton Pastures (Figs 1 and 2) have been added to the recording website to show the identification features that separate *E. tarsalis* from the widespread *P. atra*, see www.brc.ac.uk/soldierflies-and-allies/pachygastrinae

Thanks to Peter Chandler for providing details of the previous Berkshire records –
MARTIN C. HARVEY, Evermor, Bridge Street, Great Kimble, Aylesbury, HP17 9TN; kitenetter@googlemail.com

Dipterists Digest 2018 **25,** 105-106

The first English record of *Cetema myopinum* (Loew) (Diptera, Chloropidae) since 1899

J.W. ISMAY[1], B. ISMAY[2] and S.M. CRELLIN[3]

[1]Life Collections, Oxford University Museum of Natural History, Parks Rd, Oxford OX1 3PW

[2]67 Giffard Way, Long Crendon, Aylesbury, Buckinghamshire HP18 9DN: schultmay@insectsrus.co.uk

[3]Shearwater, The Dhoor, Andreas Road, Lezayre, Ramsey, Isle of Man, IM7 4EB

Summary

The chloropid *Cetema myopinum* (Loew, 1866) is recorded from a site in Staffordshire in 2018, which is the second English record and the first for more than a century, other British records all being from Scotland.

The chloropid fly *Cetema myopinum* (Loew, 1866) is rarely recorded in the United Kingdom and almost all records are from Scotland. The Chloropidae Study Group has six records from sites in Scotland (Dumfries, Midlothian, East Inverness-shire and Moray), but only one record from England: 1 male, West Yorkshire, Burley in Wharfedale, vii.1899, P.H. Grimshaw, in National Museums of Scotland, Edinburgh. The last record was from 1975 in Dumfries. In Falk *et al.* (2016) it has a provisional status of Data Deficient. During the Dipterists Forum Field Meeting in Stoke-on-Trent in June 2018, one of us (SMC) caught a male specimen of *C. myopinum* at Rod Wood Nature Reserve, Staffordshire, a Staffordshire Wildlife Trust Reserve, on 28.vi.2018, at grid reference SJ 993532. It appears that this is the only record of this species from England since 1899. *Cetema* Hendel is a small genus of six recorded British species (Chandler 2018). It is in the subfamily Chloropinae, distinguished by the costa of the wing extending only to vein R_{4+5}. A key to the genera of Chloropinae is given in Ismay (1999). *Cetema* is distinguished by the strongly curved ventral apical spur to the middle tibia and the pair of corni (finger-like, not articulated projections) on the epandrium of the male genitalia, a unique feature of the genus.

Cetema myopinum is a distinctive species in the male because the terminalia are massively enlarged (Fig. 1), curled under the abdomen and resembling the conopid genus *Myopa* Fabricius, 1775, hence the specific name. Unfortunately *C. neglectum* Tonnoir also has the, smaller, male terminalia curled under the abdomen and is frequently misidentified as *C. myopinum* in older collections and literature. Both species have a black arista and long white posterior hairs on the anterior and middle tibiae, which distinguishes them from other British *Cetema* species. In *C. myopinum* the abdomen and terminalia are entirely black, the male epandrium has the corni bent inwards at right angles at about half their length and the legs are extensively darkened; the terminalia are distinctly larger than in *C. neglectum.* In *C. neglectum* the male epandrium and the pregenital sclerite are at least partly yellow and the male terminalia have corni which curve gently inwards towards the tip and the legs are yellow.

Collin (1966) revised the British species but the species concepts in this work have changed and there is further revisional work required, while Nartshuk and Andersson (2013) have not included all British species. According to Nartshuk and Andersson (2013) *C. myopinum* is phytophagous in the grass genus *Agrostis* in Russia, but nothing is known about its habitat or foodplant preferences in Britain and although *Agrostis* includes very common grasses, *Cetema myopinum* is a fly only known from fewer than ten records.

The first two authors visited the site on 30.vi.2018 but were unable to locate any further specimens. The site consists of an upper part of flower-rich hay meadows on limestone, cut

annually in mid-July, and a lower area of partly wet, lightly cattle-grazed diverse grassland with trees and shrubs. In normal years this would be too wet for access in parts but in the dry summer of 2018 the entire area was accessible. The flora included tussocks of *Deschampsia cespitosa*, *Juncus* spp and *Carex* spp.

Fig. 1. *Cetema myopinum* Hendel, habitus lateral view, taken with Leica Application Suite (= LAS) Version 4.12.0 and stacked with Helicon Focus 6.8.0 in the University of Oxford Museum of Natural History.

Acknowledgements

We thank Dipterists Forum for organising the Stoke-on-Trent Field Meeting and Malcolm Smart in particular for his help. The Staffordshire Wildlife Trust, in particular their monitoring officer Jonathan Groom, kindly gave Dipterists Forum permission to survey certain sites including Rod Wood Nature Reserve. David Rowe, Rod Wood Reserve Warden, kindly provided further information about the site. We thank the Life Collections, University of Oxford Museum of Natural History for the use of facilities including the Leica stacking microscope and camera.

References

Chandler, P.J. (Ed.) 2018. An Update of the 1998 Checklist of Diptera of the British Isles [updated 16 March 2018]. http://www.dipteristsforum.org.uk/sgb_check_intro.php [Accessed 24 April 2018]

Collin, J.E. 1966. A revision of the British species of *Cetema* Hendel (Diptera, Chloropidae), with two species new to Science. *Entomologist* **99,** 116-120.

Falk, S.J., Ismay, J.W. and Chandler, P.J. 2016. A Provisional Assessment of the Status of Acalyptratae flies in the UK. *Natural England Commissioned Reports*, Number **217**.

Ismay, J.W. 1999. The British and Irish genera of Chloropinae (Dipt., Chloropidae). *Entomologist's Monthly Magazine* **135,** 1-37.

Nartshuk, E.P. and Andersson, H. 2013. The frit flies (Chloropidae, Diptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* **43,** 1-282.

Dipterists Digest 2018 **25,** 107-112

Sphaerophoria bankowskae Goeldlin (Diptera, Syrphidae) new for the Belgian Fauna

ELIAS DE BREE[1], FRANK VAN DE MEUTTER[2] and JONAS MORTELMANS[3]

[1] Arnhem, The Netherlands; ectemnius@gmail.com

[2]Achterheide 16, 3980 Gerhagen, Achterheide, Belgium; frank.vandemeutter@bio.kuleuven.be

[3]Sint-Martensblindeken 37, 9000, Gent, Belgium; jonasmortelmans@gmail.com

Summary

Sphaerophoria bankowskae Goeldlin, 1989 is here reported as new for the Belgian fauna. We present photographs of the genitalia of Belgian specimens together with photographs of the genitalia of a Swiss specimen for comparison. The species has probably been overlooked because of the choice of habitat and difficult identification.

Introduction

Sphaerophoria Le Peletier & Serville, 1828 are small yellow-and-black coloured slender syrphids found usually in grasslands and meadows (Fig. 1). Ten species of *Sphaerophoria* are known to occur in Belgium (Van de Meutter 2012). Here we report a new species for the fauna of Belgium, *Sphaerophoria bankowskae* Goeldlin, 1989.

Fig. 1. Habitus of a male *Sphaerophoria bankowskae* (Specimen: Belgium, Rocherath, 20-5-2014 leg. et. coll. E. de Bree, with abdomen of a specimen from Switzerland 9-7-1979 leg. J.A.W. Lucas, col. RMNH) (photo: Sander Bot).

2

3

Figs 2-3. Genitalia ventral view: 2, Specimen: Belgium, Rocherath, 20-5-2014, leg. et coll. E. de Bree (photo: Sander Bot and Christophe Brochard); 3, Specimen: Switzerland, Allulatal, 9-7-1979, leg. J.A.W. Lucas (photo: Sander Bot and Christophe Brochard).

4

5

Figs 4-5. Genitalia: 4, Specimen: Belgium, Liège, Journal, 1971, coll. Gembloux, ventral view (photo: Sander Bot and Christophe Brochard); 5, Specimen: Sweden, Tjulan river, Ammarnäs, 19-7-1996, leg et. coll. J. Van Steenis, dorsal view (photo: Sander Bot and Christophe Brochard).

During the spring of 2013 a single male *Sphaerophoria* was caught by E. de Bree at Rocherath. After examining the specimen, it could not be assigned to any of the known Belgian species. Additional field trips were carried out the next year in order to find more specimens. The private collections of the authors, the national collections in Brussels and the collection in Gembloux were also examined. This resulted in the capture of an additional male and the discovery of a specimen in the collection of Gembloux. All three specimens were identified as *Sphaerophoria bankowskae* Goeldlin, 1989.

Identification

Only males can be reliably identified by examining the genitalia. All examined material was keyed using Bartsch *et al.* (2009), which includes a key for females; however, its reliability outside Scandinavia is unknown. Besides the Belgian material, we also examined all the available material in the Palaearctic collection of the former Zoological Museum, Amsterdam (ZMA) and in the collection of Naturalis, Leiden, The Netherlands (RMNH). There were several dozen specimens of *S. bankowskae* present from all over Europe, identified by Goeldlin de Tiefenau, which we used as reference besides the original description (Goeldlin de Tiefenau 1989).

The genitalia of *Sphaerophoria bankowskae* are characterised by a hairy lobe and a hypopygium that are, when viewed dorsally, about equally high as wide (Fig. 5). The inner process of the hairy lobe is asymmetrical. It has a rounded tip, is broad and the base is stalked. The surstyli have a broad shoulder; the right one (as seen in the photograph) usually more so than the left. The tooth of the surstylus is located at the upper edge. The inner process of the surstyli is a small and finger-like projection.

In van Veen (2006) the species keys out in two directions. Both mention that the surstyli should be whitish. That is not the case in the Belgian material nor in the other European material that we have seen in the collection of RMNH.

At first glance the species' genitalia are similar to *Sphaerophoria fatarum* Goeldlin de Tiefenau, 1974; however, the abdominal markings are different from this species. The latter usually has spots whilst *S. bankowskae* has bands. This is, however, not a reliable feature for identification. The surstylus is not as broadly shouldered in *S. fatarum* and the inner projection of the hairy lobe has a long and tapering apex whereas it is leaf-shaped in *S. bankowskae*.

As identification of *Sphaerophoria* males is difficult, and this species even more so, we present three photographs of the ventral side of the genital capsule. Two are from Belgian specimens (Figs 2 and 4) and one from a specimen from Switzerland (Fig. 3). In all photographs the broad shouldered surstyli and the typical form of the inner process of the surstyli are clearly visible. In Fig. 3 the finger-like inner process of the surstyli is clearly visible on the left surstylus. In Fig. 2 the process is narrowly visible on the right surstylus.

The genitalia of the specimen from Journal (Fig. 4) has unfortunately later been lost during transport; Fig. 4 has therefore to be taken as proof of its identification. The specimen has an extra label on the pin which reads: genitalia missing/ for photo see/De Bree *et al.* 2018/Figure 4.

Material examined

1 Male, Liège, Journal, 1971, coll. Gembloux
1 Male, Liège, Büllingen, Rocherath, 26-6-2013, leg. et. coll. E. de Bree
1 Male, Liège, Büllingen, Rocherath, 20-5-2014, leg. et. coll. E. de Bree

The first record is a male which was discovered in the collection of Gembloux. It demonstrates the difficult identification of the species. The specimen bears two different labels. The first label identifies the specimen as *S. interrupta*, the second as *S. abbreviata* det. Verlinden. *Sphaerophoria abbreviata* was then the name for the species currently known as *S. fatarum*.

Habitat
Forests and open habitats according to Bartsch *et al*. (2009). Speight (2013) mentioned that the preferred environment is "herb-rich, ephemeral open areas (small, clear-felled areas of c. 0.5 ha within forest, colonised by tall ruderal vegetation) within *Fagus*/*Picea* forests." Ball and Morris (2001) reported two specimens from the United Kingdom found in open areas in woods. In Belgium the recently collected specimens were found in a similar situation, a small grassy open space within a *Fagus*/*Picea* forest on a former clearcut area.

Biology
The records fall within the European flight period of this species: May to August (Speight 2013, Bartsch *et al*. 2009). Remarkable is the fact that searches in 2015, 2016 and 2017 in Rocherath did not produce new records.

Distribution
In Europe, *S. bankowskae* has been found in the northern and the elevated parts of central and southern Europe: Britain, Denmark, Finland, France, Germany, Italy, Norway, Sweden and Switzerland (Speight 2013). The distribution in Belgium is shown on the map in Fig. 6.

Fig. 6. Map of *S. bankowskae* in Belgium (Frank van de Meutter) (star = before 2000, dot = after 2000).

Discussion

The record from the seventies of the last century seems to indicate that the species is not a recent arrival in Belgium. It is most likely that the species has not been recorded before because identification is difficult, because the habitat is not often sampled by syrphidologists and because of the possibly ephemeral presence of adults. Also the fact that additional searches in the years after capture yielded no specimens can indicate that the species flies in low numbers or has a very short flight period. Both Reemer *et al.* (2009) and Van de Meutter (2012) noted that the species can be expected to occur in either the Netherlands or Belgium because *S. bankowskae* occurs in the bordering parts of Germany.

As it is common now to introduce a Dutch name when publishing a species new for Belgium or the Netherlands we propose the name 'Boslanglijf.' This name reflects its preference for forests.

Acknowledgments

Jeaninne Bortels for access to the collection of Gembloux, Patrick Grootaert for access to the collection of Brussels, and Sander Bot and Christophe Brochard for their excellent photographs.

References

Ball, S.G. and Morris, R.K.A. 2001. Provisional atlas of British hoverflies (Diptera: Syrphidae). Biological Records Centre, Huntington.

Bartsch, H., Binkiewicz, E., Rådén, A. and Nasibov, E. 2009. Nationalnyckeln till Sveriges flora och fauna. Tvåvingar: Blomflugor: Syrphinae. Diptera: Syrphidae: Syrphinae. Art Databanken, SLU, Uppsala.

Goeldlin de Tiefenau, P. 1989. Sur plusieurs espèces de *Sphaerophoria* (Dipt., Syrphidae) nouvelles ou méconnues des régions paléarctique et néarctique. *Bulletin de la Société Entomologique de Suisse* **62,** 41-66.

Meutter, F. van de 2012. An annotated catalogue of the hoverflies (Diptera, Syrphidae) of Belgium. *Studia dipterologica* **18**(1/2)**,** 55-75.

Reemer, M., Renema, W., van Steenis, W., Zeegers, Th., Barendregt, A., Smit, J.T., van Veen, M.P., van Steenis, J. and van der Leij, L.J.J.M. 2009. *De Nederlandse zweefvliegen (Diptera: Syrphidae).* Nationaal Natuurhistorisch Museum Naturalis, KNNV Uitgeverij, European Invertebrate Survey - Nederland, Leiden. [Nederlandse Fauna 8]

Speight, M.C.D. 2013. Species accounts of European Syrphidae (Diptera), 2013. Syrph the net: the database of European Syrphidae (Diptera) Volume 72.

Van Veen, M. 2006. Hoverflies of Northwest Europe. Identification keys to the Syrphidae. KNNV publishing Utrecht, The Netherlands.

Dipterists Digest 2018 **25,** 113-118

Phormia regina (Meigen) (Diptera, Calliphoridae) in Britain

OLGA SIVELL
Jill Dando Institute of Security and Crime Science, University College London, 35 Tavistock Square, London, WC1H 9EZ; aruma@wp.pl

Summary
Two specimens of *Phormia regina* (Meigen, 1826) were discovered in the collection of the National Museums of Scotland in Edinburgh. They had been previously identified as *Protocalliphora azurea* (Fallén, 1817). A specimen labelled as *Lucilia regina* and located in the National Museum of Wales, Cardiff was examined and identified as *Neomyia viridescens* (Robineau-Desvoidy, 1830) (Muscidae). The validity of other specimens listed in British collections is unclear. Information on biology and characters useful in identification are provided. The status of the species is discussed. Based on current knowledge, *Phormia regina* is likely to be extinct in Britain.

Introduction
Phormia regina (Meigen, 1826) (Diptera, Calliphoridae) is widely distributed across the Holarctic, also collected in Hawaii (Rognes 1991). It is very common in North America, where it is known as the black blow fly and is a primary species used in forensic entomology for determination of post-mortem interval (PMI) – "time since death", or more accurately the time since a body was colonised by the fly (Byrd and Allen 2001; Jordaens *et al.* 2013). The species is less common in Europe, considered rare in Fennoscandia and is absent from Denmark (Rognes 1991). Apart from its importance in forensic entomology, the fly has also been used in maggot therapy for cleaning wounds (Baer 1931; Sherman and Pechter 1988; Sherman *et al.* 2000). It causes myiasis, feeding on live animals, particularly sheep and cattle (Zumpt 1965; Hall *et al.* 1995), but also other vertebrates (Yavrularında, 2014) including humans (Hall 1948; Hall *et al.* 1986; Abdel-Hafeez *et al.* 2015). It is attracted to pre-existing myiasis infestations of sheep by *Wohlfahrtia magnifica* (Schiner, 1862) (Hall *et al.* 1995).

Phormia regina is oviparous (laying eggs) and its larvae are saprophagous – feeding on carrion and faeces (Draber-Mońko 2004). Immature stages have been described by Hall (1948) and first instar larvae have been scanned using MRI and described by Szpila *et al.* (2008). The development of this species has been studied in depth, mainly in North America (Kamal 1958; Greenberg 1991; Anderson 2000; Stoffolano *et al.* 2000; Byrd and Allen 2001; Tabor *et al.* 2005; Nabity *et al.* 2006; Monthei 2009). The species is synanthropic – it has been collected in rural habitats in Poland (Draber-Mońko 2004) and in urban habitats of Chicago, USA (Baumgartner 2017) and is known to enter buildings (Anderson 2011). In Poland single specimens have been collected from July to August (Draber-Mońko 2004).

Identification
Phormia regina belongs to the calliphorid subfamily Chrysomyinae, characterised by a stem vein with small black setulae in dorsal view. There are two other species in the subfamily currently recorded in Britain: *Protocalliphora azurea* (Fallén, 1817) and *Protophormia terraenovae* (Robineau-Desvoidy, 1830). *Phormia regina* can be distinguished by the following characters: pale basicosta: white/yellowish to pale brown as opposed to dark basicosta (brown to black) in *P. azurea* and *P. terraenovae* (can be infuscated in *P. azurea,* but not entirely pale); pale anterior thoracic spiracle: yellow, orange or brownish (it is dark brown to almost black in *P. azurea* and *P. terraenovae*); presutural acrostichal bristles short, approximately twice the length of surrounding hairs (in lateral view); upper calypter pale (white to yellow) and its lateral part with

pale hairs on dorsal surface (can be very inconspicuous). There is another species strongly resembling *P. regina*: *Trypocalliphora braueri* (Hendel, 1901), not currently recorded in Britain, but known from Fennoscandia and mainland Europe (Rognes 1991). They can be separated based on bristles on the postalar wall: conspicuous in *P. regina* and absent in *T. braueri* (a few short hairs may be present); also, the upper calypter is bare in the latter, and presutural acrostichal bristles are 3-4 times longer than surrounding hairs, while in *P. regina* they are no more than twice as long as the surrounding hairs.

The records

For a long time, the status of *Phormia regina* in Britain was based on records given by van Emden in his handbook for Tachinidae and Calliphoridae (van Emden 1954). His distribution note reads "Ireland: Dublin, South England: Oxon. vii". The two specimens from Dublin are in the Oxford University Museum of Natural History, where van Emden worked on the Diptera collection. They are a single male and a single female with labels reading "from A.W. Foot, Dublin, 2/71" and are part of the Verrall-Collin Collection. No other specimens of *P. regina*, including those from "South England: Oxon", have been located in the Oxford University Museum of Natural History. The South England specimens mentioned by van Emden could have been misplaced sometime in the past or sent on loan and never returned. For this reason, their identification could not be confirmed. However, based on the correct identification of Dublin specimens and van Emden's vast experience with Calliphoridae, I am inclined to assume the South England records are genuine.

Knut Rognes in *Blowflies (Diptera, Calliphoridae) of Fennoscandia and Denmark* (1991) provides distribution tables for different blow fly species including *P. regina*. The basis for its presence in Britain is the record published by van Emden (discussed above) and the checklist by Kloet and Hincks (1975) (K. Rognes *pers. comm.*). It is likely that both these sources are based on the same record.

Among other known specimens of *P. regina* are three located in the British Collection, in the Natural History Museum in London (ex J.F. Stephens Collection, BM 1948-171: BMNH(E) 908393, BMNH(E) 915929, BMNH(E) 915930). There are no data on location or collection date associated with them. They all come from J.F. Stephens' Collection, which is considered to contain insects of British origin. However, it also includes a number of species unknown in Britain, which were likely collected elsewhere in Europe (N. Wyatt *pers. comm.*). As there are no data, no assumptions on the origins of these specimens can be made.

A single specimen (no. 21448. 303), identified as *Lucilia regina,* was held in the National Museum of Wales, Cardiff. However, upon examination, it was discovered to be misidentified. It has been re-identified by Martin Ebejer and Olga Sivell as *Neomyia viridescens* (Robineau-Desvoidy, 1830) (Muscidae).

No new records were reported until the publication of an article by P.W. Green *et al.* (2003). Upon enquiry, specimens used in the experiment had been collected in Brentwood, Essex, in spring, between 1992 and 1998 (P.W. Green *pers. comm.*). However, the authors were unable to provide specimens for examination; hence their identification could not be confirmed.

Two previously unknown specimens of *Phormia regina* have been recently discovered in the National Museums of Scotland in Edinburgh (Figs 1-3). They had been identified as *Protocalliphora azurea*. One male (Royal Scottish Museum 1916.1.2; NMS.Z.2017.114.264) and one female (Royal Scottish Museum 1916.1.3; NMS.Z.2017.114.263), were collected in Cambridge by D.G.S. Graham-Smith on 27.viii.1915 (male) and on 17.ix.1915 (female). To date, these are the only two records of *Phormia regina* that can be reliably placed in Britain.

Fig. 1. ***Phormia regina,*** **male, from National Museums of Scotland (Royal Scottish Museum 1916.1.2; NMS.Z.2017.114.264): lateral view. Photograph by O. Sivell, courtesy of Angela Marmont Centre for UK Biodiversity at the Natural History Museum in London. © National Museums of Scotland, Edinburgh.**

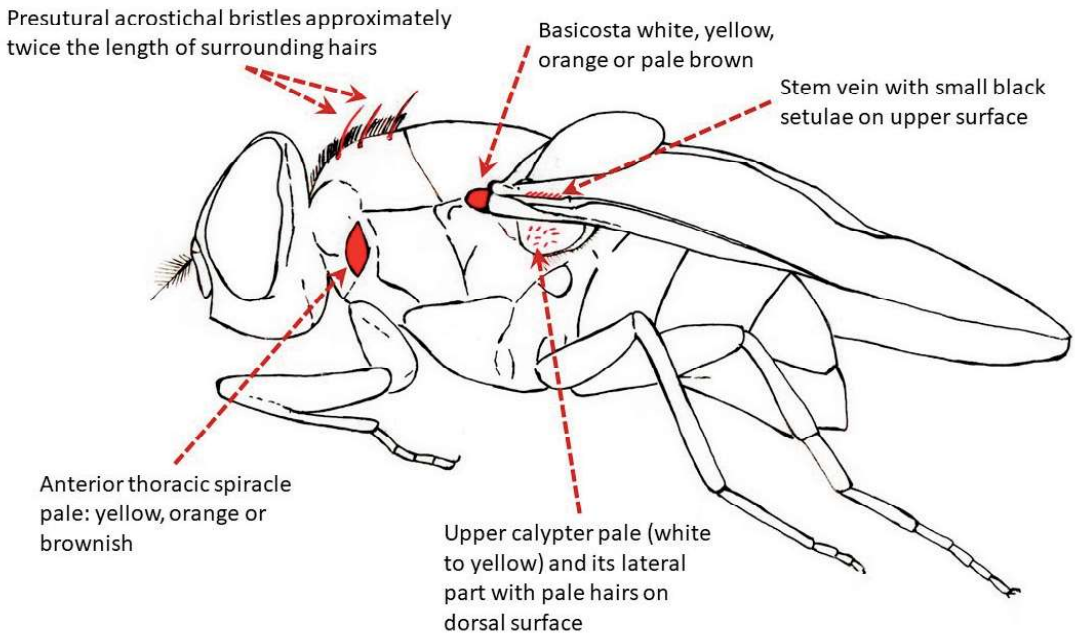


Fig. 2. ***Phormia regina,*** **male, from National Museums of Scotland (Royal Scottish Museum 1916.1.2; NMS.Z.2017.114.264), lateral view, line drawing showing characters important for identification of this species.**

Fig. 3. ***Phormia regina,*** **male, from National Museums of Scotland (Royal Scottish Museum 1916.1.2; NMS.Z.2017.114.264). Upper calypter. Please note pale hairs on lateral part. Photograph by O. Sivell, courtesy of Angela Marmont Centre for UK Biodiversity at the Natural History Museum in London. © National Museums of Scotland, Edinburgh.**

Discussion

The reliable records of *P. regina* are very scarce and over a hundred years old. The two valid specimens that are known were collected three weeks apart at the same location (Cambridge). The specimen from 'Oxon' (Oxfordshire), to which van Emden refers, had to be collected prior to the book being published – at least before 1954. Both locations (Cambridge and Oxfordshire) are in close proximity to large universities – Cambridge and Oxford. It is plausible that *P. regina* may have been used for research and specimens collected represent escapees from colonies kept at university laboratories (A. Pont *pers. comm.*). Alternatively, they could have been brought in from abroad with livestock, either infesting live animals (myiasis) or feeding on fallen stock. In the past this species was used in maggot therapy (Baer 1931; Sherman *et al*. 2000). It could have been brought to Britain for experiments in wound cleaning or for medical treatment, although this is much less likely than the livestock route. It is also possible that the species was endemic to Britain and for reasons currently unclear (climate change, competition, habitat destruction) it went extinct. A similar situation seems to have occurred in Sardinia where puparia of *P. regina* have been found in an archaeological context (pre-1806), proving the species was once present. However, no recent records exist and the species is considered to be locally extinct (Giordani *et al*. 2018). Whether *P. regina* was introduced briefly or was previously well-established in Britain is at present impossible to tell. Recent research shows there is a considerable difference in DNA between North American and Western European populations of *P. regina*, while intracontinental variation was found to be very small (Jordaens *et al*. 2013). Genetic analysis should be able to determine from which continent British specimens originally came.

The interest in flies, and blow flies in particular, is growing – as can be observed in social media platforms such as Facebook, Twitter and others. There is more access to information (e.g. online journals, websites and organisations such as Dipterists Forum) and recording and identification methods have improved vastly (iRecord, recording schemes, high resolution photography, new identification keys being developed). As forensic science is developing, with many experiments being conducted across Britain, one would expect that *Phormia regina* would have been recorded, if still present. There are, however, no recent, reliable records of this species in Britain.

It is possible that there is an identification issue, since a number of the specimens discussed above were previously misidentified. Hopefully, the characters and photographs provided here will solve this problem. Based on the present state of knowledge on *P. regina*, it is very likely that the species is currently extinct in Britain.

Acknowledgements

I am grateful to numerous people for their support, in particular to Adrian Pont, especially for his work on the Verrall-Collin Collection; Vladimir Blagoderov and Ashleigh Whiffin for access to the Edinburgh Collection and the loan of specimens; Nigel Wyatt for continuous help and information on the NHM collection; Adrian Plant, Martin Ebejer and John Deeming for access to the Cardiff Collection, especially at inconvenient times; Martin Hall and Duncan Sivell for comments on the draft; Paul W. Green and Knut Rognes for additional information on *P. regina*; Chris Raper, Florin Feneru and Christina Fisher, Angela Marmont Centre for UK Biodiversity at the Natural History Museum in London for providing the access to stacking equipment.

References

Abdel-Hafeez, E.H., Mohamed, R.M., Belal, U.S., Atiya, A.M., Takamoto, M. and Aosai, F. 2015. Human wound myiasis caused by *Phormia regina* and *Sarcophaga haemorrhoidalis* in Minia Governorate, Egypt. *Parasitology Research* **114**(10)**,** 3703-3709.

Anderson, G.S. 2000. Minimum and maximum development rates of some forensically important Calliphoridae (Diptera). *Journal of Forensic Science* **45**(4)**,** 824-832.

Anderson, G.S. 2011. Comparison of decomposition rates and faunal colonization of carrion in indoor and outdoor environments. *Journal of Forensic sciences* **56**(1)**,** 36-142.

Baer, W.S. 1931. The treatment of chronic osteomyelitis with the maggot (larva of the blow fly). *Journal of Bone and Joint Surgery* **13**(3)**,** 438-475.

Baumgartner, D.L. 2017. Spring season survey of the urban blowflies (Diptera: Calliphoridae) of Chicago, Illinois. *The Great Lakes Entomologist* **21**(3)**,** 5.

Byrd, J.H. and Allen, J.C., 2001. The development of the black blow fly *Phormia regina* (Meigen). *Forensic Science International* **120**(1-2)**,** 79-88.

Draber-Mońko, A., 2004. Calliphoridae-plujki (Insecta: Diptera). *Fauna Polski* **23,** 1-658.

Giordani, G., Tuccia, F., Floris, I. and Vanin, S. 2018. First record of *Phormia regina* (Meigen, 1826) (Diptera: Calliphoridae) from mummies at the Sant'Antonio Abate Cathedral of Castelsardo, Sardinia, Italy. *PeerJ* **6**, e4176. https://doi.org/10.7717/peerj.4176

Green, P.W., Simmonds, M.S. and Blaney, W.M. 2003. Diet nutriment and rearing density affect the growth of black blowfly larvae. *Phormia regina* (Diptera: Calliphoridae). *European Journal of Entomology* **100**(1)**,** 39-42.

Greenberg, B. 1991. Flies as forensic indicators. *Journal of Medical Entomology* **28**(5)**,** 565-577.

Hall, D.G. 1948. *The blowflies of North America*. Thomas Say Foundation, Baltimore, MD.

Hall, M.J.R., Farkas, R., Kelemen, F., Hosier, M.J. and El-Khoga, J.M. 1995. Orientation of agents of wound myiasis to hosts and artificial stimuli in Hungary. *Medical and Veterinary Entomology* **9**(1)**,** 77-84.

Hall, R.D., Anderson, P.C. and Clark, D.P. 1986. A case of human myiasis caused by *Phormia regina* (Diptera: Calliphoridae) in Missouri, USA. *Journal of Medical Entomology* **23**(5)**,** 578-579.

Jordaens, K., Sonet, G., Braet, Y., De Meyer, M., Backeljau, T., Goovaerts, F., Bourguignon, L. and Desmyter, S. 2013. DNA barcoding and the differentiation between North American and West European *Phormia regina* (Diptera, Calliphoridae, Chrysomyinae). *ZooKeys* **365,** 149.

Kamal, A.S. 1958. Comparative study of thirteen species of sarcosaprophagous Calliphoridae and Sarcophagidae (Diptera) I. Bionomics. *Annals of the Entomological Society of America*, **51**(3), 261-271.

Kloet, G.S. and Hincks, W.D. 1975. A check list of British insects, 2nd ed. Diptera and Siphonaptera. *Handbooks for the identification of British insects* **11**(5). Royal Entomological Society, London.

Monthei, D.R. 2009. *Entomotoxicological and thermal factors affecting the development of forensically important flies* (Doctoral dissertation, Virginia Tech).

Nabity, P.D., Higley, L.G. and Heng-Moss, T.M. 2006. Effects of temperature on development of *Phormia regina* (Diptera: Calliphoridae) and use of developmental data in determining time intervals in forensic entomology. *Journal of Medical Entomology* **43**(6)**,** 1276-1286.

Rognes, K. 1991. *Blowflies (Diptera, Calliphoridae) of Fennoscandia and Denmark*. Fauna Entomologica Scandinavica **24,** 1-272. E.J. Brill, Leiden-New York-København-Köln.

Sherman, R.A., Hall, M.J.R. and Thomas, S. 2000. Medicinal maggots: an ancient remedy for some contemporary afflictions. *Annual Review of Entomology* **45**(1)**,** 55-81.

Stoffolano, J.G., Gonzalez, E.Y., Sanchez, M., Kane, J., Velázquez, K., Oquendo, A.L., Sakolsky, G., Schafer, P. and Yin, C.M. 2000. Relationship between size and mating success in the blow fly *Phormia regina* (Diptera: Calliphoridae). *Annals of the Entomological Society of America* **93**(3)**,** 673-677.

Szpila, K., Pape, T. and Rusinek, A. 2008. Morphology of the first instar of *Calliphora vicina, Phormia regina* and *Lucilia illustris* (Diptera, Calliphoridae). *Medical and Veterinary Entomology* **22**(1)**,** 16-25.

Tabor, K.L., Fell, R.D., Brewster, C.C., Pelzer, K. and Behonick, G.S. 2005. Effects of antemortem ingestion of ethanol on insect successional patterns and development of *Phormia regina* (Diptera: Calliphoridae). *Journal of Medical Entomology* **42**(3)**,** 481-489.

van Emden, F.I. 1954. Diptera: Cyclorrhapha Calyptrata (I), Section (a). Tachinidae and Calliphoridae. *Handbooks for the identification of British insects* **10**(4). Royal Entomological Society, London.

Yavrularında, Y.D.K. 2014. A Case of Auricular, Anal and Umbilical Myiasis Caused by the Larvae of *Phormia regina* (Meigen) (Diptera: Calliphoridae) in Neonatal Kittens. *Turkiye Parazitol Derg* **38,** 71-75.

Zumpt, F. 1965. *Myiasis in man and animals in the Old World. A textbook for physicians, veterinarians and zoologists*. xv + 267pp. Butterworths, London.

Habitat associations of the rare flies *Dolichopus laticola* and *D. nigripes* (Diptera, Dolichopodidae) in the fens of Norfolk, England C. MARTIN DRAKE 35-52
Some flies (Diptera, Mycetophilidae and Lonchaeidae) new to Ireland from Breen Wood in Northern Ireland 53-57
A new record for *Trichomyia parvula* Szabó (Diptera, Psychodidae) P.J. CHANDLER 58
Occurrence of *Stomorhina lunata* (Fabricius) (Diptera, Rhiniidae) in north Scotland
ABIGAIL RHODES and MURDO MACDONALD 59-61
Sciophila varia (Winnertz) (Diptera, Mycetophilidae) in Argyllshire: a sixth British locality
KEITH N.A. ALEXANDER 62
Species of *Chalarus* Walker (Diptera, Pipunculidae) recently discovered in Britain including *C. immanis* Kehlmaier in Kehlmaier & Assmann new for Britain DAVID GIBBS 62
The unexpected occurrence in Dorset of probable *Microdon mutabilis* (Linnaeus) (Diptera, Syrphidae) MICK PARKER 63-64
Metriocnemus (*Metriocnemus*) *alisonae* Langton (Diptera, Chironomidae) new to Britain
PETER H. LANGTON 64
Podocera soniae (Merz & Roháček) (Diptera, Stenomicridae) new to Britain
ANDY GODFREY 65-66
Sex ratios of hoverflies (Diptera, Syrphidae) caught in Malaise traps within and on the edge of a wet woodland in Devon, England ROBERT J. WOLTON and BENJAMIN FIELD 67-70
A review of the status of *Ula mixta* Starý (Diptera, Pediciidae) in Britain JOHN KRAMER 71-74
Sea club-rush (*Bolboschoenus maritimus*) confirmed as a host-plant of *Cerodontha (Dizygomyza) suturalis* (Hendel) (Diptera, Agromyzidae) BARRY P. WARRINGTON 75-78
Themira gracilis (Zetterstedt) (Diptera, Sepsidae) new to Ireland
RYAN MITCHELL 78
Corrections and changes to the Diptera Checklist (39) EDITOR 79-84
Changes to the Irish Diptera List (26) EDITOR 84-86
Macrobrachius kowarzii Dziedzicki (Diptera, Mycetophilidae), second and third British records
PETER J. CHANDLER and KEITH N.A. ALEXANDER 86
Neoleria propinqua Collin (Diptera, Heleomyzidae) in South Kensington
DUNCAN SIVELL and MARTIN J.R. HALL 87-90
Macronychia striginervis (Zetterstedt) new to Britain, and the misidentification of *M. dolini* Verves & Khrokalo (Diptera, Sarcophagidae) DANIEL WHITMORE & IVAN PERRY 91-97
Stevenia deceptoria (Loew) (Diptera, Rhinophoridae) and *Thelyconychia solivaga* (Rondani) (Diptera, Tachinidae) on the Suffolk coast I. PERRY 98
Atylotus plebeius (Fallén) (Diptera, Tabanidae) in Britain, including discoveries made during 2018
ANDREW GRAYSON 99-103
Eupachygaster tarsalis (Zetterstedt) (Diptera, Stratiomyidae) in Berkshire (V.C. 22)
MARTIN C. HARVEY 104
The first English record of *Cetema myopinum* (Loew) (Diptera, Chloropidae) since 1899
J.W. ISMAY, B. ISMAY and S.M. CRELLIN 105-106
Sphaerophoria bankowskae Goeldlin (Diptera, Syrphidae) new for the Belgian Fauna
E. DE BREE, F. VAN DE MEUTTER and J. MORTELMANS 107-112
Phormia regina (Meigen) (Diptera, Calliphoridae) in Britain
OLGA SIVELL 113-118

Dipterists Digest Volume 25, No. 1 2018

Phytomyza astrantiae Hendel (Diptera, Agromyzidae) new to Wales 1-3
Agromyza abdita Papp (Diptera, Agromyzidae) new to Britain 4-6
BARRY P. WARRINGTON

Phytomyza phillyreae Hering in Buhr (Diptera, Agromyzidae) new to Britain
BARRY P. WARRINGTON and ANDY M. & MELISSA G. BANTHORPE 7-12

Gymnosoma nitens Meigen and *Litophasia hyalipennis* (Fallén) (Diptera, Tachinidae) in East Anglia
I. PERRY 12

The leaf-mining fly *Cerodontha (Dizygomyza) palustris* Nowakowski (Diptera, Agromyzidae) new to Britain from Sutton Fen RSPB reserve in the Norfolk Broads
MARK G. TELFER and DAVID J. GIBBS 13-15

Helina deleta (Stein) (Diptera, Muscidae) recorded in Devon, England
Lispocephala fuscitibia Ringdahl (Diptera, Muscidae) found on Dartmoor, Devon
ROBERT WOLTON 16

Nanocladius (Nanocladius) distinctus (Malloch) (Diptera, Chironomidae) new to Britain and Ireland
PETER H. LANGTON and LES P. RUSE 17-19

Metriocnemus (*Inermipupa*) *carmencitabertarum* Langton and Cobo (Diptera, Chironomidae) now well established in Northern Ireland PETER H. LANGTON 19-20

REVIEW: Chironomidae (Diptera) of Ireland – a review, checklist and their distribution in Europe by Declan A. Murray, James P. O'Connor and Patrick J. Ashe EDITOR 20

Diaphorus winthemi Meigen (Diptera, Dolichopodidae) is almost certainly not British
C. MARTIN DRAKE 21-24

The larval habits and rearing of *Melanagromyza lappae* Loew (Diptera, Agromyzidae)
BARRY P. WARRINGTON 25-29

New records of *Leucophenga hungarica* Papp and *Phortica variegata* (Fallén) (Diptera, Drosophilidae) PETER J. CHANDLER 29-30

Dasysyrphus neovenustus Soszyński, Mielczarek & Tofilski, (Diptera, Syrphidae): presence in Britain, France and Ireland
MARTIN C.D. SPEIGHT and CÉDRIC VANAPPELGHEM 31-34

Ctenophora flaveolata (Fabricius) (Diptera, Tipulidae), unexpected occurrence in Scotland
ALAN WATSON FEATHERSTONE 34

continued inside back cover

Published by

Dipterists Forum

ISSN 0953-7260