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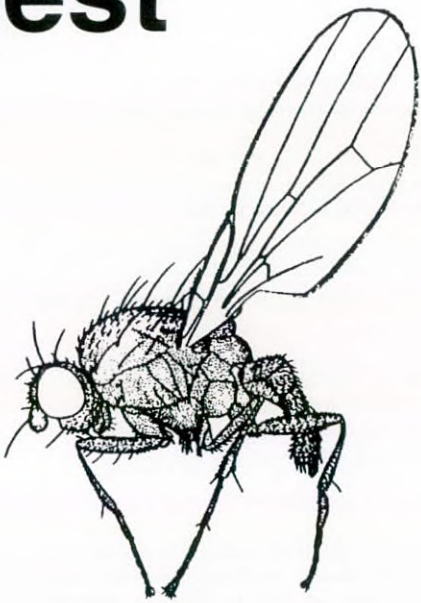
Cover illustration: ***Xylomya maculata*** **(Meigen, 1804) (Xylomyidae), female, Epping Forest, Essex, July 2014. Photo: Jeremy Richardson (see note on p. 195-196).**

Dipterists Digest



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

The scope of **Dipterists Digest** is:

- the behaviour, ecology and natural history of flies;
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- the conservation of flies;
- provisional and interim 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 good 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 must not have been accepted for publication elsewhere and should be written in clear and concise English. **Contributions should preferably be supplied either as E-mail attachments or on 3.5" computer disc or CD in Word or compatible formats and accompanied by hard copy.**

NEW INSTRUCTIONS: Articles should be supplied in A5 format with text in 9-point (preferably Times New Roman) font, title 12 point and author's name 10.5 point, with 0.55" side margins. Figures should be supplied separately as jpeg files to fit in the above page format, or as hard copy.

Style and format should follow articles published in the most recent issue. 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. Figures should be drawn in clear black ink, about 1.5 times their printed size and lettered clearly. **Colour photographs will also be considered.** 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.

Articles and notes for publication should be sent to the Editor at the address given above. Enquiries about subscriptions and information about the **Dipterists Forum** should be addressed to the Membership Secretary, John Showers, 103 Desborough Road, Rothwell, Kettering, Northamptonhire NN14 6JQ

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A review and checklist of the flesh-flies (Diptera, Sarcophagidae) of Malta

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Summary

An account and checklist of the sarcophagid fauna of the Maltese Islands are given following review of all previously recorded specimens and the identification of much new material. Several misidentifications were discovered, resulting in the exclusion of nine previously recorded species; nine species are added to the Maltese fauna, which now numbers 38 species. Reference is made to old literature records, and detailed collection data is given for each species, both for the first time. Rearing records are provided for 10 species, including the first rearing records for *Sarcophaga ferox* and *Sarcophaga sicilia*, whose biology was previously unknown. An abbreviated geographical distribution, a short note on the biology, where known and other comments where relevant are given for each species.

Introduction

The Sarcophagidae is a large family of calypterate Diptera of worldwide distribution. Three subfamilies are recognised: Miltogramminae, Paramacronychiinae and Sarcophaginae. More than 2500 species were listed in the world catalogue by Pape (1996). The larval biology is extremely diverse. Some are kleptoparasites of solitary aculeate Hymenoptera. Others are predators or parasitoids of invertebrates, including other insects and snails. Many species are necrophagous on small carrion like the dead bodies of insects, snails and small invertebrates. A few have been reared from faeces or decomposing vegetable matter. Those species that live on decaying corpses are of forensic importance. The family is also of medico-veterinary importance as some species are obligatory or facultative producers of myiasis.

The first mention of Sarcophagidae from Malta was by Macquart (1854), who described *Miltogramma melitensis* (= *M. murina* Meigen, 1824) from Malta. A few years later, Rondani recorded 8 species from the islands (Rondani 1859, 1862). In their currently used names, these are *Miltogramma ruficornis* Meigen, *Nyctia halterata* (Panzer), *Ravinia pernix* (Fabricius), *Sarcophaga africa* (Wiedemann), *S. albiceps* (Meigen), *S. lehmanni* Mueller, *Sarcophila latifrons* (Fallén) and *Taxigramma multipunctata* (Rondani). Cilia (1973) recorded *Sarcophaga carnaria* (Linnaeus) in a short list of common flies collected in Malta. The record of *Sarcophaga haemorrhoidalis* (Fallén) by Saliba *et al.* (1977) most likely refers to *S. africa* (T. Pape *pers. comm.*).

Publication of the catalogue of Palaearctic Diptera by Verves (1986) saw nine species listed as occurring in Malta. Whilst four of Rondani's records were overlooked, four were newly added – *Blaesoxipha campestris* Robineau-Desvoidy [=*Blaesoxipha lapidosa* Pape], *Sarcophaga* (*Helicophagella*) *melanura* Meigen, *S.* (*Liopygia*) *crassipalpis* Macquart and *S.* (*Liosarcophaga*) *tibialis* Macquart. Schembri *et al.* (1991) published a list of Diptera collected by themselves between 1975 and 1978 and included in it 29 named species of Sarcophagidae from Malta. The authors made no attempt to revise the older records and no reference was made to them. Moreover, detailed collecting data were not given and the publication was unfortunately beset by many typographical errors.

In the more than twenty years that have passed since that publication, much has been written on the taxonomy, nomenclature and faunistics of Sarcophagidae resulting in the discovery of new synonymies, description of new species and numerous important name changes of relevance to the Mediterranean fauna. A complete bibliography would be outside the scope of this work, but the following publications are considered to be of particular significance insofar as they contribute towards a better understanding of the still poorly known Mediterranean fauna.

A comprehensive treatment of the central European fauna with identification keys and a wealth of information on the known biologies, with references, but with limited relevance to the Mediterranean species, was published by Povolný and Verves (1997). The collections of Rondani (Pape 1988) and Pandellé (Pape 2004a), both of whom described several species from the Mediterranean region, were revised.

A catalogue of the Sarcophagidae of the world (Pape 1996) updated Verves' (1986) Catalogue of Palaearctic Diptera and corrected typographical errors in Schembri *et al.* (1991). In a few instances, species previously recorded from Malta were not mentioned. Others were erroneously included because of previous published misidentifications that were discovered during the preparation of this work. Whenever an omission or erroneous inclusion has occurred, a comment is made below under the name of that species.

A database of European species of Sarcophagidae (Fauna Europaea) was launched on the internet (Pape 2004b). At the time of submission of this manuscript, an updated (August 2013) version of this database was available and consulted, but this version contains no updates to the original entries relating to Sarcophagidae (T. Pape *pers. comm.*).

Faunal treatises or checklists were produced for Spain and Portugal (references in Pape *et al.* 2002), Italy (Pape *et al.* 1995), Turkey (Kara and Pape 2008), Sardinia (Whitmore 2009) and France (Richet 1987, Richet *et al.* 2011). Much needed revisions of the subgenera *Helicophagella* Enderlein (Blackith *et al.* 1997) and *Heteronychia* Brauer & Bergenstamm (Whitmore 2011) were produced.

The purpose of this article is to provide an up-to-date, nomenclaturally accurate account of the sarcophagid fauna of the Maltese Islands. All material previously treated by Schembri *et al.* (1991) was re-examined, as a result of which a number of previously unrecorded species and misidentifications were found. The sarcophagid collections in the Natural History Museum, London, the National Museum of Wales, Cardiff and the Oxford University Museum of Natural History were searched for material of Maltese provenance. New material collected and reared by the authors between 1992 and 2011 was identified.

The results are presented below, and a checklist of species from the islands is given in Table 1. Rearing records are summarised in Table 2. For two species, *Sarcophaga ferox* and *Sarcophaga sicilia*, whose biology was previously unknown, rearing records are provided for the first time.

Thirty-eight species in 12 genera, representing all three subfamilies of the Sarcophagidae, are here recorded, nine of them for the first time. Taxa are arranged in systematic order following Pape (1996). For species that had previously been recorded, literature references are given. Reference is made to misidentifications in previous publications. Species that are newly recorded from the Maltese archipelago are marked *. Detailed collection data, a short note on the biology, when known, and an abbreviated geographical distribution are given for each species. For a more detailed global and European distribution the reader is referred to Pape (1996) and Pape (2004b), respectively.

The names of collectors and institutions mentioned in the text are abbreviated as follows: AEB (Alfred E. Baldacchino), BM (Bernhard Merz), GZM (George Zammit Maempel), JCD

(John C. Deeming), JLS (James L. Schembri), JS (Joe Sultana), KAE (Karl A. Ebejer), MG (Mario Gauci), MJE (Martin J. Ebejer), NB (Nicholas Barbara), NHML (Natural History Museum, London), NMWC (National Museum of Wales Cardiff), PG (Paul Gatt), PS (Paul Sammut), SPS (Stephen P. Schembri).

All specimens are in the authors' private collections (UK) unless otherwise indicated in parentheses after the collector's name.

Results

Subfamily MILTOGRAMMINAE

Amobia signata (Meigen, 1824)

Literature records: Schembri *et al.* 1991: 272; Pape 1996: 74-75; Pape 2004b.

Material examined: MALTA: Fiddien: 1♂, 29.vii.1989, MJE; Fomm ir-Rih: 1♀, 20.v.1995, MJE; Ghar Lapsi: 5♂, 5♀, garigue, meadow, 2.xi.1997, MJE; Gnejna: 1♂, 9.iii.1996, MJE; Mgiebah: 1♀, 26.v.1993, MJE; Mtahleb: 1♂, 24.v.2000, MJE; Wied Babu: 1♂, 20.iv.1994, MJE; Wied il-Ghasel: 1♂, 9.iv.1977, SPS; 1♀, 28.iii.1997, MJE; Wied il-Mistra: 1♀, 17.iii.1996, MJE; Wied Incita: 1♂, 6.iii.1994, MJE; Wied is-Sewda: 1♀, 9.vi.1979, JLS; Zebbug: Wied il-Baqqija, 1♀, 21.ii.1999, MJE. GOZO: Dwejra: 1♂, 1♀, 2.iv.1994, MJE; Ramla: 1♀, 5.v.2001, PG.

Distribution: a widespread Palaearctic species, known also from northern India in the Oriental region.

Biology: larvae develop in nests of Eumenidae and Apidae (references in Povolný and Verves 1997).

Craticulina tabaniformis (Fabricius, 1805)

Literature records: Schembri *et al.* 1991: 269 (as *Crataculina tabaniformis* [*sic*]); Pape 1996: 83; Pape 2004b.

Material examined: GOZO: Ramla dunes: 1♂, 7♀, 22.vii.1979, near nests of *Bembix oculata* Panzer, SPS.

Distribution: a predominantly southern European and North African species, extending to south-east Asia.

Biology: species of *Craticulina* Bezzi are kleptoparasitic in the nests of sandwasps of the genus *Bembix* Fabricius (Krombein and Van Der Vecht 1987).

Macronychia polyodon (Meigen, 1824)

Literature records: Schembri *et al.* 1991: 271 (as *Macronychia polydon* [*sic*]); Pape 1996: 96; Pape 2004b.

Material examined: MALTA: Wied Qirda: 1♀, 22.ix.1978, SPS. COMINO: Santa Marija: 1♂, on *Foeniculum vulgare*, 20.viii.1978, PG.

Distribution: a widely distributed Palaearctic species, extending as far east as Japan.

Biology: larvae develop as inquilines in the nests of Sphecoidea and Apoidea (references in Povolný and Verves 1997).

Miltogramma murina Meigen, 1824

Literature records: Macquart 1854: 419 (as *M. melitensis* Macquart, 1854); Bezzi 1925; Verves 1986: 76 (as *M. murinum* Meigen); Pape 1996: 113; Pape 2004b.

Comments: no material of this species from the Maltese Islands has been seen by us.

Distribution: known from central and southern Europe and North Africa.

Biology: larvae of *Miltogramma* Meigen develop in the nests of bees and sphecid wasps (references in Povolný and Verves 1997). Séguy (1941) recorded *M. murina* as a parasitoid of *Osmia aurulenta* Panzer and *Hoplitis tridentata* (Dufour & Perris) although these records may refer to *M. ruficornis*. Grandi (1961) recorded it from *Osmia caerulescens* (Linnaeus).

Miltogramma ruficornis Meigen, 1824
Literature records: Rondani 1859: 217.
Material examined: GOZO: Ramla, dunes: 1♂, 1♀ (*in copula*), 3.v.2002, PG.
Comments: this species was not mentioned as occurring in Malta by Pape (1996, 2004b).
Distribution: a central and southern European species.
Biology: unknown.

Miltogramma rutilans Meigen, 1824
Literature records: Schembri *et al.* 1991: 269; Pape 1996: 116; Pape 2004b.
Material examined: MALTA: Balzan: 1♀, 3.iv.2002, MJE; Ghar Lapsi: 1♀, 12.x.1997, MJE; Marsaxlokk: 1♀, 15.vi.1980, JLS; Mgiebah: 1♂, 26.v.1993, MJE; Wied il-Ghasel: 1♀, on *Foeniculum vulgare*, 20.vi.1979, JLS; Wied il-Hesri: 1♂, 1♀, on *Foeniculum vulgare*, 2.ix.1978, JLS; Wied Qannotta: 1♂, 13.vii.1978, on *Foeniculum vulgare*, PG. COMINO: 1♀, 25.ix.1977, PG; Santa Marija: 1♀, on *Foeniculum vulgare*, 20.viii.1978, PG.
Distribution: widely distributed in southern and central Europe and extending east as far as China.
Biology: unknown.

Pterella grisea (Meigen, 1824)*
Literature records: Schembri *et al.* 1991: 271 (as *Setulia* sp.).
Material examined: MALTA: Buskett: 1♀, 21.vii.1978, PG; Wied il-Ghasel: 1♀, 20.vi.1979, JLS.
Distribution: a widely distributed Palaearctic species, extending from Europe east as far as China.
Biology: larvae develop as inquilines in the nests of the sphecid wasp *Cerceris arenaria* Linnaeus (Séguy 1941).

Pterella melanura (Meigen, 1824)*
Material examined: MALTA: Mgiebah: 1♂, 26.v.1993, MJE. GOZO: Marsalforn: Qbajjar: 1♀, 3.v.2002, PG.
Distribution: a Palaearctic species extending east as far as Mongolia.
Biology: larvae develop as inquilines in nests of sphecid wasps (references in Povolný and Verves 1997).

Senotainia tricuspis (Meigen, 1838)*
Material examined: MALTA: Gebel Ciantar: 1♂, 9.viii.1978, PG; Marfa Ridge: 1♂, 10.vii.1987, MJE; Wied Qannotta: 1♀, 31.viii.1978, PG. GOZO: Marsalforn: Qolla s-Safra, 1 ♀, 9.ix.1978, PG.
Distribution: a widely distributed Palaearctic species extending east as far as China.
Biology: larvae develop as endoparasites of *Apis mellifera* Linnaeus and other Apidae. The resulting 'senotainiasis' in honey bees may be of economic importance (references in Povolný and Verves 1997).

Taxigramma multipunctata (Rondani, 1859)
Literature records: Rondani 1859: 211-212 (as *Heteropterina multipunctata* Rondani); Verves 1986: 101 [as *Paragusia multipunctata* (Rondani, 1859]; Pape 1996: 154; Pape 2004b.
Material examined: MALTA: Marfa Ridge, 1♂, 11.vii.1993, MJE; Ghar Lapsi, 1♂, 28.v.2011, PG. COMINO: Santa Marija: 1♀, 20.viii.1998, SPS.
Distribution: a Palaearctic and Afrotropical species. In the Palaearctic, known from central and southern Europe extending east as far as China.
Biology: *T. multipunctata* is a kleptoparasite in the nests of Sphecidae and Crabronidae (Table 3 in Richet *et al.* 2013).

Subfamily PARAMACRONYCHIINAE
Nyctia lugubris (Macquart, 1843)
Literature records: Pape, 1996: 166; Pape, 2004b.
Material examined: MALTA: Fiddien: 1♀, 20.x.1991, MJE; Fomm ir-Rih: 1♂, 20.v.1995, MJE; Ghajn Tuffieha: 1♂, 9.v.1999, MJE; Manikata: 1♂, 9.iv.1993, PG; Marfa Ridge: 2♂, 1♀, 22.iii.1992, MJE; Wied il-Ghasel: 1♂, 1♀, 3.iii.1979, JLS; 1♂, 28.iii.1997, MJE; Wied Qannotta: 1♂, 28.x.1978, PG; 1♀, on *Inula viscosa*, 13.vi.1979, JLS; 1♂, 5.v.1988, MJE; Wied Qirda: 2♂, 22.ix.1978, JLS, PG. COMINO: 2♂, 22.iv.1979, JLS, PG.
Comment: Rondani (1862: 134) recorded *Nyctia halterata* (Panzer, 1798) [as *Megerlea caminaria* (Meigen, 1826)] from Malta, and this was repeated by Verves (1986: 115-116). Schembri *et al.* (1991: 269) likewise recorded as *N. halterata* specimens collected by themselves and, presumably on the basis of these records, Pape (1996: 166; 2004b) cited the species from the islands. Pape (1996) provided an identification key for the separation of *N. halterata* and the closely similar *N. lugubris*. Examination of all available specimens of *Nyctia*, including those previously recorded as *N. halterata* by Schembri *et al.* (1991), and others collected by the authors more recently, confirms that all are referable to *N. lugubris*. There is therefore no compelling evidence to support the occurrence of *N. halterata* in Malta, and this species is excluded from the Maltese list.
Distribution: a Mediterranean species known from southern Europe and North Africa.
Biology: larvae of *Nyctia* Robineau-Desvoidy develop in snails (Povolný and Verves 1997). Smith (1989) mentioned *N. halterata* as a parasitoid of weevils in the genus *Lixus* Fabricius (Coleoptera, Curculionidae), but this is likely a misidentification of a species of Tachinidae (T. Pape *pers. comm*).

Sarcophila sp. cf. *meridionalis* Verves, 1982*
Literature records: Rondani 1862: 130 (as *Sarcophaga latifrons* (Fallén), misidentification; Schembri *et al.* 1991: 271, misidentification).
Material examined: MALTA: Bahar ic-Caghaq: Qrejten Point, 1♀, from puparium in empty shell of the land snail *Sphincterochila candidissima* (Draparnaud), 28.ix.2000, adult 3.x.2000, KAE; Bahrija: 1♂, 21.vi.1992, MJE; Bidnija: 1♂, 16.v.1999, MJE; Birkirkara: 1♀, reared from *Hippotion celerio* (Linnaeus), vii.1979, SPS; Fiddien: 1♂, 26.ix.1978, JLS; Fomm ir-Rih: 1♂, 27.iv.1997, MJE; 3♂, on human faeces, 18.xi.2001, PG; Marfa Ridge: 2♂, 3♀, 27.v.2011, PG, MJE; Marsaxlokk: 2♂, 27.ix.1992, MJE, PG; Salina: 1♀, 31.v.1992, MJE; Mtahleb: 10♂, 6♀, 26.v.2011, PG, MJE; Wied Babu: 1♀, 7.vii.1979, JLS; 1♀, 4.viii.1979, JLS; Wied Ghajn Rihana: 2♀, 3.vii.1978, JLS; Wied Has-Sabtan: 1♂, 7.ix.1979, SPS; Wied il-Ghasel: 1♀, 14.x.1978, JLS; 2♂, 1♀, 20.vi.1979, JLS; 1♂, 13.ix.1979, JLS; Wied il-Hemsija: 1♂, 1.viii.1978, PG; Wied il-Mistra: 1♂, 31.iii.1985, MJE (NMWC); Wied is-Sewda: 1♀, 8.ix.1978, PG; Wied Qannotta: 2♂, 1♀, 13.vii.1978, JLS, PG; 1♀, 31.viii.1978, JLS; 1♂, 7.vii.1993, PG;

6♂, 4.xi.2001, PG; Wied Qirda: 1♂, 1♀, 22.ix.1978, SPS; 1♀, 20.vii.1978, JLS; 3♂, 1♀, 4.viii.1979, JLS; 1♂, 2.vii.1987, MJE. GOZO: Marsalforn: Qbajjar, 2♂, 3♀, reared from dead nestling 3.v.2002, puparia 10-14.v.2002, adults 28-29.v.2002, PG; Ramla dunes: 1♂, 21.ix.1992, MJE; 1♂, 1.iv.1994, MJE; 3♂, 1♀, 5.v.2001, PG; Ta' Cenc: 2♂, 1.iv.1994, MJE. COMINO: 1♀, 5.viii.1975, MJE; 6♂, 1♀, 28-30.iii.2002, MJE, PG. FILFLA: 1♂, 7.vii.1982, JS.

Comments: it has become clear that there is a rather intricate complex of species closely related to *Sarcophila latifrons* (Fallén, 1817) across the Palaearctic and the species that occurs very commonly all around the Mediterranean is not *S. latifrons* but close to *S. meridionalis* and may well be separate from it (T. Pape *pers. comm.*). Pape (1996; 2004b) did not list the genus as occurring in Malta.

Distribution: before the identity of this species is established, no comment can be made on its distribution.

Biology: unknown. Members of this species complex develop primarily in live and dead insects and less often in animal carcasses. They have also been reared from the land snail *Cepaea nemoralis* (Linnaeus) and may cause cutaneous myiasis (references in Povolný and Verves 1997).

Subfamily SARCOPHAGINAE

Blaesoxipha (*Blaesoxipha*) *lapidosa* Pape, 1994

Literature records: Verves 1986: 125 [as *campestris* (Robineau-Desvoidy, 1863), error]; Pape 1994: 59; Pape 1996: 192; Pape 2004b.

Comments: although *Blaesoxipha* Loew is well represented in the Mediterranean, no Maltese specimens have been seen by the authors. The source of Verves' (1986) record is not known, but *B. lapidosa* is a widely distributed species whose occurrence in Malta cannot be excluded.

Distribution: widely distributed in the Palaearctic and also known from the Afrotropical and Oriental regions.

Biology: the species is known from a large number of orthopteran hosts (Acridoidea and Tettigoniidae) (Pape 1994).

Ravinia pernix (Harris, 1780)

Literature records: Rondani 1862: 128 (as *Sarcophaga haematodes* Meigen, 1826); Verves 1986: 133 [as *Ravinia striata* (Fabricius, 1794)]; Schembri *et al.* 1991: 271 (as *Sarcophaga striata*); Pape 1996: 289; Pape 2004b.

Material examined: MALTA: Rabat: 1♂, garden, 9.x.2001, PG; Wied Ghajn Rihana: 1♂, 7.iii.1979, SPS; Wied Qirda: 1♂, 22.ix.1978, PG.

Distribution: a widely distributed Palaearctic and Oriental species.

Biology: old references (in Povolný and Verves 1997) record this species as developing in faeces and carrion and as facultative predators or parasitoids of other insects and snails, but misidentifications were common at the time. The only reliable rearing record is from sheep dung (Papp 1985) (T. Pape *pers. comm.*).

Sarcophaga (*Bercaea*) *africa* (Wiedemann, 1824)

Literature records: Rondani 1862: 124 (as *Sarcophaga nurus* Rondani); Verves 1986: 159 (as *Sarcophaga cruentata* Meigen, 1826); Schembri *et al.* 1991: 270 (as *Sarcophaga crientata* [*sic*]); Pape 1996: 304.

Material examined: MALTA: Balzan: 2♂, 1-2.ix.1991, MJE; 2♂, 15.ix.1991, MJE; 1♂, 15.x.1991, MJE; 1♂, 11.x.1997, MJE; Fiddien: 1♂, 5.v.2002, PG; 1♂, 26.v.2011, PG; Ghadira:

1♂, 4.v.2001, PG; 1♂, 27.v.2011, PG; Ghar Lapsi: 1♂, garigue, 26.x.1997, MJE; Rabat: 1♂, house, 27.ix.1999, PG; 5♂, 3♀, garden, 20.x.1999, PG; 1♂, 1♀ (*in copula*), 1.ix.2000, PG; 1♂, garden, 28.viii.2001, PG; 1♂, garden, 9.x.2001, PG; Wied Ghajn Rihana: 1♂, 1♀, 4.xi.2001, PG; Wied il-Ghasel: 1♂, 3.iii.1979, SPS; 1♂, 21.iv.2002, BM; Wied Qannotta: 2♂, 8.xi.1980, SPS; 1♂, 4.xi.2001, PG; Zebbug: from puparium on human corpse, 8.ix.1997, 1♀, 19.ix.1997, MJE. GOZO: Marsalforn: Qolla s-Safra: 1♂, 27.vii.1978, SPS; Mgarr ix-Xini: 1♂, 3.v.2002, PG; Ramla: 1♂, dunes, 3.v.2002, PG; Xaghra: reared from larva on dead bird, 2.xi.1991, puparium 5.xi.1991, 1♂, 10.xii.1991, MG (MJE). COMINO: 2♂, 29.iii.2002, PG.
Comments: not mentioned as occurring in Malta by Pape (2004b).
Distribution: cosmopolitan.
Biology: an anthropophilic species that has been reared from faeces, decaying animal carcasses, and bird nests. It is also involved in facultative myiasis in animals and man (references in Povolný and Verves 1997). Rearing records from acridoid grasshoppers and snails are not very likely (T. Pape *pers. comm.*). Bänziger and Pape (2004) have shown that the species larviposits exclusively on faeces and not on carrion when given a choice between the two.

Sarcophaga (*Helicophagella*) *hirticrus* Pandellé, 1896
Literature records: Schembri *et al.* 1991: 270; Pape 1996: 319; Pape 2004b.
Material examined: MALTA: Balzan: from puparium in soil, 21.v.1995, 1♂, emerged 4.vi.1995, MJE; Fiddien: 3♂, 5.v.2002, PG; Fomm ir-Rih: 1♂, grassy clay seepage, 27.iv.1997, MJE; Ghadira: 1♂, 27.v.2011, PG; Ghallis: 1♂, 7.vii.1987, MJE; Ghar Lapsi: 2♂, 28.v.2011, PG; Marfa Ridge: 1♂, 22.iii.1992, MJE; 1♂, 27.v.2011, PG; Marsaxlokk: 1♂, 15.vi.1980, JLS; Mistra: 2♂, 26.iii.1979, JLS; Mtahleb: 4♂, 26.v.2011, PG, MJE; Wied Babu: 1♂, 6.iii.1998, MJE; Wied Ghajn Rihana: 1♂, 3.vii.1978, JLS; 1♂, 7.iii.1979, JLS; 1♂, 4.xi.2001, PG; Wied Has-Sabtan: 1♂, 7.ix.1979, SPS; Wied il-Ghasel: 5♂, 3.iii.1979, SPS; 1♂, 20.vi.1979, JLS; Wied il-Mistra: 1♂, 5.vii.1978, SPS (NHML); Wied is-Sewda: 2♂, 8.iii.1979, SPS; 1♂, 9.vi.1979, JLS; Wied Qannotta: 1♂, 13.vii.1978, SPS (NHML); 3♂, 13.vi.1979, JLS; 2♂, 18.xi.1980, SPS; 1♂, 26.ii.1995, MJE; 6♂, 4.xi.2001, PG; Wied Qirda: 1♂, 2.vii.1987, MJE. GOZO: Marsalforn: Qolla s-Safra: 1♂, 27.vii.1978, SPS; 1♂, 9.ix.1978, PG; Mgarr ix-Xini: 2♂, 3.v.2002, PG. COMINO: 4♂, 29.iii. 2002, PG; Santa Marija Bay: 3♂, 1♀, 28-30.iii.2002, PG, MJE.
Distribution: a European species extending east as far as European Russia.
Biology: larvae have been reared from dead land snails and swallows (references in Povolný and Verves 1997).

Sarcophaga (*Helicophagella*) *melanura* Meigen, 1826
Literature records: Schembri *et al.* 1991: 270; Pape 1996: 320; Pape 2004b.
Material examined: MALTA: Ghadira: 1♂, 26.v.2011, PG; Ghar Lapsi: 1♂, garigue, meadow, 2.xi.1997, MJE; Wied Ghajn Rihana: 1♂, 3.vii.1978, SPS (NHML); Wied il-Ghasel: 1♂, on dung, 26.iii.1977, SPS; 1♂, 3.iii.1979, JLS. GOZO: Mgarr ix-Xini: 1♂, 16.vi.1999, PG.
Distribution: widely distributed in Holarctic, Afrotropical and Oriental regions.
Biology: larvae are mostly coprophagous, less frequently necrophagous. They have been found in a swallow's nest, and have been reared from grasshoppers and land snails. The species is known as a producer of myiasis (references in Povolný and Verves 1997).

Sarcophaga (*Helicophagella*) *noverca* Rondani, 1860
Literature records: Schembri *et al.* 1991: 271; Pape 1996: 320; Pape 2004b.
Material examined: MALTA: Wied il-Ghasel: 1♂, 20.vi.1979, SPS.

Distribution: a European species extending east as far as European Russia.
Biology: larvae develop in dead snails (references in Povolný and Verves 1997).

Sarcophaga (*Helicophagella*) *novercoides* Böttcher, 1913
Literature records: Schembri *et al.* 1991: 271; Pape 1996: 320; Pape 2004b.
Material examined: MALTA: 1♂, 6.vi.1994, GZM; Fomm ir-Rih: 1♂, 20.v.1995, JCD; Marfa Ridge: 1♂, 22.iii.1992, MJE; Wied Ghajn Rihana: 1♂, 7.iii.1979, SPS; Wied Has-Sabtan: 1♂, 7.ix.1979, JLS; Wied il-Ghasel: 3♂, 3.iii.1979, JLS and SPS; 1♂, 20.vi.1979, SPS. GOZO: Mgarr ix-Xini: 1♂, 4.v.2002, JCD. COMINO: 3♂, 23.iv.1978, PG, SPS (1♂ NHML); 5♂, 29.iii.2002, PG.
Distribution: a European species extending east as far as European Russia.
Biology: unknown; reared in the laboratory on freshly killed snails (Richet *et al.* 2011).

Sarcophaga (*Helicophagella*) *rosellei* Böttcher, 1912
Literature records: Pape 2004b.
Comments: a male specimen (Malta, Comino, 23.iv.1978, SPS) housed in the collections of the NHML under *S. rosellei* was dissected and found to be *S. novercoides.* The source of Pape's record (2004b) is not known, but could be based on this misidentified specimen. No Maltese specimens have been seen by the authors. Nevertheless, it does occur in Sicily and its occurrence in Malta, although doubtful, cannot be entirely excluded.
Distribution: a mostly northern and central European species extending east as far as western Siberia. In the Mediterranean region known from Spain, France, Italy including its islands and Croatia.
Biology: unknown; reared in the laboratory from freshly killed snails (Richet *et al.* 2011).

Sarcophaga (*Heteronychia*) *bulgarica* (Enderlein, 1936)
Literature records: Schembri *et al.* 1991: 271 (as *S. boettecheriana* Rondani [*sic*] [*recte boettcheriana* Rohdendorf, 1937)]); Pape 1996: 324 (as *S. boettcheriana* Rohdendorf, 1937).
Material examined: MALTA: Fomm ir-Rih: 1♂, on *Euphorbia dendroides*, 25.iv.1994, JCD; Gebel Ciantar: 2♂, on *Foeniculum vulgare*, 9.viii.1978, PG; Marfa Ridge: 1♂, 27.v.2011, PG. ST. PAUL'S ISLAND (Greater): 1♂, 30.viii.1975, MJE. GOZO: Mgarr ix-Xini: 1♂, 30.vii.2000, PG. COMINO: Santa Marija: 1♂, on *Foeniculum vulgare*, 20.viii.1978, PG.
Comments: Pape (1996) referred to Schembri *et al.* (1991) and listed this species as its synonym *S. boettcheriana*, but inadvertently omitted occurrence in Malta, again omitted in Pape (2004b).
Distribution: a widely distributed European species that extends to the Caucasus and European Russia.
Biology: a parasitoid of snails (Povolný and Verves 1990).

Sarcophaga (*Heteronychia*) *depressifrons* Zetterstedt, 1845
Literature records: Wyatt 1991; Pape 1996: 324 (as *S. compactilobata* (Wyatt, 1991)); Pape 2004b.
Material examined: MALTA: Buskett: 1♂, 11.ix.1978, PG; Ghadira: 1♂, dunes, 25.x.1998, MJE; Marfa Ridge: 1♂, 17.iv.1992, MJE; Wied Qannotta: 1♂, 27.v.2011, PG. GOZO: Mgarr ix-Xini: 2♂, 3.v.2002, PG.
Comments: *S. compactilobata* Wyatt, 1991, described from Malta and the United Kingdom, was tentatively synonymised by Pape (2004b) and formally by Whitmore (2011), followed by Richet *et al.* (2011).

Distribution: widely distributed in the Palaearctic, extending into the Oriental region.
Biology: unknown; reared in the laboratory on freshly killed snails (Richet *et al.* 2011).

Sarcophaga (*Heteronychia*) *ferox* Villeneuve, 1908
Literature records: Schembri *et al.* 1991: 270 (as *Sarcophaga bolivori* Collado [*sic*]; Schembri *et al.* 1991: 270 (as *Sarcophaga haemorrhoides* Böttcher, misidentification); Pape 1996: 324 (as *Sarcophaga bolivari* Gil Collado, 1932); Pape 2004b.
Material examined: MALTA: Fiddien: 4♂, 20.iv.1994, JCD; Fomm ir-Rih: 2♂, 25.iv.1994, JCD; 2♂, pebble beach and rocks, 18.xi.2001, MJE, PG; Ghadira: 2♂, 25.x.1998, MJE; Ghar Lapsi: 1♂, garigue, 2.xi.1997, MJE; Marfa Ridge: 1♂, 22.iii.1992, MJE; Rabat: garden, 1♂, 28.viii.2001, PG; 1 ♂, garden, 7.x.2001, PG; Wied Ghajn Rihana: 1♂, stone walls and grass verges, 4.xi.2001, MJE; Wied Has-Sabtan: 1♂, 7.ix.1979, JLS; Wied il-Ghasel: 1♂, 9.iv.1976, SPS; Wied Incita: reared from *Eobania vermiculata* (Müller), v.2006, NB, 1♂.vii.2006; Wied Qannotta: 6♂, 4.xi.2001, MJE, PG. COMINO: Santa Marija Bay: 1♂, 23.iv.1978, PG; 7♂, 28-30.iii.2002, PG, MJE.
Distribution: a Mediterranean species known from Spain, the Balearic Islands, France, Algeria, Italy, Sicily, Malta and the Canaries.
Biology: previously unknown. The present rearing record from the land snail *Eobania vermiculata* (Müller) is the first for the species.

Sarcophaga (*Heteronychia*) *minima* Rondani, 1862
Literature records: Schembri *et al.* 1991: 269-270 (as *S.* sp. near *bezziana* Böttcher, 1913 and sp. nr. *penicillata* Villeneuve, 1907 and *maroccana* Rondani [*sic*] [*recte maroccana* Rohdendorf, 1937]), in part; as its synonyms *S. fertoni* Villeneuve, 1911 and *S. gracea* Rondani [*sic*] [*recte graeca* (Rohdendorf, 1937)]; Pape 1996: 327-328 (as *S. fertoni* and *S. graeca*); Pape 2004b; Whitmore 2011: 42.
Material examined: MALTA: Bahar ic-Caghaq: 1♂, 8.viii.1976, SPS; Qrejten Point, 1♂, 4.x.1997, MJE; Buskett: 1♂, 16.viii.2000, PG; Fiddien: 1♂, 6.vii.1987, MJE; 1♂, 5.v.2002, PG; Ghadira: 1♂, 10.viii.1979, JLS; Ghar Lapsi: 1♂, garigue, 2.xi.1997, MJE; 1♂, 28.v.2011, PG; Gnejna: 4♂, iii.2004, PG; Hal-Far: 17♂, 3♀, 27.vi.1979, SS; (4♂ in NHML); Manikata: 1♂, 9.iv.1993, PG; Marfa Ridge: 12♂, 27.v.2011, PG, MJE; Marsaxlokk: 1♂, 27.ix.1992, PG; 1♂, 9.vii.1993, PG; Mtahleb: 2♂, 26.v.2011, PG, MJE; Wied Babu: 1♂, 7.vii.1979, JLS; Wied Ghajn Rihana: 2♂, 3.vii.1978, SPS and JLS; Wied il-Ghasel: 2♂, 14.x.1978, JLS; 3♂, 20.vi.1979, SPS, JLS; 1♂, 3.iii.1979, JLS; 1♂, 28.iii.1997, MJE; 1♂, 21.iv.2002, BM; Wied il-Mistra: 3♂, 5.vii.1978, SS (NHML); 1♂, 19.iii.1993, MJE; Wied is-Sewda: 1♂, 8.ix.1978, PG; 1♂, 26.x.1978, PG; Wied Qannotta: 1♂, 13.vii.1978, PG; 5♂, 13.vi.1979, SPS and JLS; Wied Qirda: 3♂, 4.viii.1979, JLS. GOZO: Mgarr ix-Xini: 1♂, 30.vii.2000, PG; 2♂, 5.v.2001, PG; Dwejra: 1♂, 28.xi.1993, MJE; Ramla dunes: 2♂, 1♀, 1.iv.1994, MJE; 1♂, 5.iv.1999, MJE; 3♂, 16.vi.1999, JCD (NMWC); 3♂, 5.v.2001, PG; 2♂, 3.v.2002, PG; Wied il-Lunzjata: 1♂, 21.vii.1979, JL. COMINO: 1 ♂, 23.iv.1978, PG.
Distribution: a predominantly Mediterranean species.
Biology: a suspected parasitoid of the snails *Cernuella virgata* (Da Costa), *Cochlicella acuta* (Müller), *Theba pisana* (Müller), *Trochoidea elegans* (Gmelin), *T. simulata* (Ehrenberg) (Coupland and Barker 2004).

Sarcophaga (*Heteronychia*) *monspellensia* Böttcher, 1913

Literature records: Schembri *et al.* 1991: 270 (as *S.* sp. nr. *penicillata* Villeneuve, 1907 and *maroccana* Rondani [*sic*] [*recte maroccana* Rohdendorf, 1937], in part; Schembri *et al.* 1991: 271; Pape 1996: 331; Pape 2004b; Whitmore 2011: 43.

Material examined: MALTA: Buskett: 1♂, 25.viii.1991, MJE; 1♂, maquis and pine wood, 22.iv.1992, MJE; Marfa Ridge: 1♂, 22.iii.1992, MJE; 2♂, 27.v.2011, PG; Marsaxlokk: 1♂, 27.ix.1992, MJE; Mtahleb: 1♂, 1 ♀ (*in copula*), 25.vii.1989, MJE; 1♂, 26.v.2011, PG; Mtarfa: 1♂, 6.viii.1989, PS (MJE); Wied Has-Sabtan: 1♂, 7.ix.1979, JLS; Wied Qirda: 1♂, on *Foeniculum vulgare*, 4.viii.1979, JLS; 1♂, 2.vii.1987, MJE. FILFLA: 1♂, 7.vii.1982, JS, AEB (PG). GOZO: Wied l-Infern, 1♂, 9.ix.1978, SPS.

Distribution: a Mediterranean species known from Spain, France, Italy, Sicily, Tunisia, Malta, Greece and Turkey.

Biology: unknown.

Sarcophaga (*Heteronychia*) *sicilia* Pape, 1996

Literature records: Schembri *et al.* 1991: 270 (as *S. filia* Rondani, 1860, misidentification); Pape 1996: 327 (as *S. filia*, misidentification); Pape 2004b; Whitmore 2011: 49.

Material examined: MALTA: Bahrija: 1♂, 21.vi.1992, MJE; Ghar Lapsi: 3♂, garigue, 2.xi.1997, MJE; 3♂, 28.v.2011, PG; Mtahleb: 1♂, 26.v.2011, PG; Wied il-Ghasel: 2♂, 20.vi.1979, JLS; Wied il-Qlejgha: 1♂, 20.iv.1994, JCD (NMWC); Wied is-Sewda: 1♂, 9.vi.1979, JLS; Wied Qannotta: 5♂, 13.vi.1979, JLS; Wied Qirda: 1♂, 2.vii.1987, MJE (NMWC). COMINO: 1♂, reared from *Tudorella melitense* (Sowerby), 13.vii.1976, MJE.

Comment: examination of specimens previously recorded as *S. filia* and of all subsequent material has shown that all specimens are referable to the closely related *S. sicilia*. Pape (1996, 2004b) listed *S. filia* from Malta, presumably because of misidentified records; there is no evidence to support its occurrence, and it is excluded from the Maltese list.

Distribution: a little known Mediterranean species, hitherto recorded only from Sicily and Malta.

Biology: previously unknown. The present rearing record from the endemic land snail *Tudorella melitense* (Sowerby) is the first for the species.

Sarcophaga (*Heteronychia*) *uncicurva* Pandellé, 1896

Literature records: Schembri *et al.* 1991: 271 (as *Sarcophaga unicurva* [*sic*]); Pape 1996: 335; Pape 2004b.

Material examined: MALTA: Bahar ic-Caghaq: Qrejten Point, 1♂, 4.x.1997, MJE; Buskett: 2♂, 25.viii.1991, MJE (1♂ NMWC); 1♂, 1.v.1992, MJE; Fiddien: 1♂, 5.v.2002, PG; Ghadira: 2♂, 21.vi.1979, JLS; Ghar Lapsi: 2♂, 28.v.2011, PG; Marfa Ridge: 1♂, 1♀ (*in copula*), 27.v.2011, PG; Mosta: 4♂, vi-vii.2006, reared from the land snail *Otala punctata* Müller, NB (PG); Mtahleb: 4♂, 26.v.2011, PG, MJE; Wied Has-Sabtan: 2♂, 7.ix.1979, SPS; Wied Ghajn Rihana: 2♂, 3.vii.1978, PG; Wied il-Ghasel: 1♂, 21.iv.2002, BM; Wied il-Hesri: 1♂, 2.ix.1978, JLS; Wied is-Sewda: 1♂, 8.ix.1978, PG; Wied Qannotta: 1♂, 13.vii.1978, SPS; 2♂, 13.vi.1979, JLS; 1♂, 8.xi.1980, SPS; Wied Qirda: 1♂, 20.vii.1978, SPS. GOZO: Marsalforn: Qolla s-Safra, 1♂, 9.ix.1978, PG; Mgarr ix-Xini: 1♂, 3.v.2002, PG; Ramla: 1♂, 21.iv.1994, MJE (NMWC); 3♂, dunes, 16.vi.1999, PG; 1♂, 5.v.2001, PG; 8♂, 3.v.2002, PG.

Distribution: a West Mediterranean species known from Portugal, Spain, France, Italy, Sicily, Tunisia and Malta.

Biology: a parasitoid of the land snails *Cernuella virgata*, *Eobania vermiculata* and *Theba pisana* (Coupland and Barker 2004). In Malta, it has been reared once from the recently introduced land snail *Otala punctata* Müller.

Sarcophaga (*Heteronychia*) *villeneuveana* (Enderlein, 1928)*

Literature records: Schembri *et al.* 1991: 271 (as *penicillata* Villeneuve, 1907 misidentification); Pape 1996: 332 and Pape 2004b (as *penicillata*, misidentification).

Material examined: MALTA: "Malta", 1♂, 15.iv.1961, M. Dahl (NHML); Hal-Far: 1♂, light trap, 27.vi.1979, SPS; Mtahleb: 2♂, 26.v.2011, PG. GOZO: Qolla s-Safra, 1♂, 27.vii.1978, SPS (NHML).

Comments: examination of the specimen from Hal-Far, on which the record of *penicillata* from Malta is based (Schembri *et al.* 1991) shows it to be *S. villeneuveana*. Both specimens housed in the collections of the NHML under the name *penicillata* also belong to *villeneuveana*. The two species have frequently been confused by authors. Pape (1996, 2004b) presumably based his citations of *penicillata* from Malta on misidentified specimens of *villeneuveana*. The occurrence in Malta of *penicillata* is considered doubtful, and the species is excluded from the Maltese list.

Distribution: a Mediterranean species known from Spain, Portugal, France, Algeria, Morocco, Tunisia and Malta.

Biology: a parasitoid of the land snails *Cochlicella acuta* (Müller) and *C. barbata* (Linnaeus) (Coupland and Barker 2004).

Sarcophaga (*Liopygia*) *argyrostoma* (Robineau-Desvoidy, 1830)*

Material examined: MALTA: Balzan: garden, larvae in dead land snails *Cantareus aspersus* (Müller) 25.ix.1999, puparia 27-28.ix.1999, 10♂, 10♀, 8-9.x.1999, MJE, PG; Buskett: 1 ♂, 25.xi.2001, PG; Ghemmieri: larvae in dead rat 11.xii.1999, puparia 13.xii.1999, 2♂, 2♀ 19.iv.2000, PG; Rabat: 1♂, in house, 9.x.1999, PG; 1♂, garden, 9.x.2001, PG. GOZO: Ramla: 1♂, 16.vi.1999, JCD. COMINO: 1♂, 29.iii.2002, PG.

Distribution: a cosmopolitan species.

Biology: larvae develop in faeces (where they are predatory on other insect larvae), decaying vertebrate and invertebrate carcasses, bird nests and snails. The species is a cause of myiasis in sheep and man (references in Povolný and Verves 1997). Old records of the species developing as a parasitoid in other insects are unlikely (T. Pape *pers. comm.*).

Sarcophaga (*Liopygia*) *crassipalpis* Macquart, 1839

Literature records: Schembri *et al.* 1991: 270; Pape 1996: 347; Pape 2004b.

Material examined: MALTA: Bahar ic-Caghaq: Qrejten Point, 1♂, 4.x.1997, MJE; Balzan: 1♂, 13.viii.1975, MJE; 1♂, 26.ix.1991, MJE; 1♂, 16.ix.1997, MJE; Buskett: 1♂, 9.viii.1978, JLS; Fiddien: 1♂, 26.v.2011, PG; Fomm ir-Rih: 2♂, 18.xi.2001, PG; Ghadira: 1♂, 21.vi.1979, JLS; 1♂, 10.viii.1979, JLS; Rabat: garden: 3♂, 28.viii.2001, PG; 5♂, 9.x.2001, PG; Salina: 1♂, 28.x.2001, PG; Wied Ghajn Rihana: 2♂, 3.vii.1978, JLS, PG; Wied il-Ghasel: 1♂, 21.iv.2002, BM. GOZO: Ramla: 1♂, dunes, 3.v.2002, PG; Wied il-Lunzjata: 1♂, 21.vii.1979, SPS; Xaghra: reared from larva in dead bird, 2.xi.1991, puparium 5.xi.1991, 1♂ 19.iv.1992, MG (MJE).

Distribution: a cosmopolitan species.

Biology: larvae develop in invertebrate and vertebrate carcasses and in oothecae of locusts. It is also a cause of facultative myiasis in sheep and man (references in Povolný and Verves 1997).

Sarcophaga (*Liosarcophaga*) *jacobsoni* (Rohdendorf, 1937)*

Literature records: Schembri *et al.* 1991 (as *Sarcophaga exuberans* Pandellé, 1896, in part, misidentification).

Material examined: MALTA: Chadwick Lakes: 1♂, 30.vi.1978, SPS; Fomm ir-Rih: reared from mature larvae crawling in dust, 21.viii.1996, 3♂, 2♀ emerged 1.ix.1996, PG.

Comments: Pape (2004a) synonymised *S. exuberans* Pandellé, 1896 with *S. jacobsoni* (Rohdendorf, 1937) but argued a case for reversed priority. When Schembri *et al.* (1991) was published, the status of the nominal taxon *exuberans* Pandellé, 1896 and *exuberans* of authors had not yet been clarified, so their citation of *exuberans* is technically a misidentification. The species is formally recorded here under its currently valid name.

Distribution: a Palaearctic species extending east as far as China.

Biology: larvae are predatory on fly maggots in faeces, develop in carcasses and have been reared from snails (references in Povolný and Verves 1997). Richet (1990) reared it from the land snail *Cepaea nemoralis* (Linnaeus).

Sarcophaga (*Liosarcophaga*) *marshalli* Parker, 1923

Literature records: Schembri *et al.* 1991: 270: as *exuberans* Pandellé (in part), misidentification; Schembri *et al.* 1991: 271: as *misera* Walker (in part), misidentification; Schembri *et al.* 1991:271: as *portschinskyi* Rondani *sic!* [*recte* (Rohdendorf, 1937)], misidentification; Pape 2004b.

Material examined: MALTA: Bahrija: 1♂, 2.xi.1998, MJE; Bahar ic-Caghaq: Qrejten point, 1♂, 4.x.1997, MJE; Chadwick Lakes: 1♂, 24.viii.1979, JLS; Fiddien: 1♂, 21.xi.1999, MJE; 3♂, 5.v.2002, PG; Ghar Lapsi: 10♂, garigue, 19.x.1999, MJE; Hal-Far: 1♂, 27.vi.1979, SPS; Mgiebah: 1♂, 26.iii.1995, MJE; Mtahleb: 2♂, 26.v.2011, PG, MJE; Salina: 1♂, 25.vii.1978, SPS; 1♂, 28.x.2001, PG; Sliema: 1♂, on *Chrysanthemum coronarium*, 28.iii.1978, PG; Wied Babu: 1♂, 17.xi.1991, MJE; Wied Ghajn Rihana: 1♂, 7.iii.1979, JLS; 4♂, 4.xi.2001, PG; Wied Has-Sabtan: 3♂, 7.ix.1979, SPS, JLS; Wied il-Ghasel: 1♂, 20.vi.1979, SPS; Wied il-Mistra: 1♂, 31.iii.1985, MJE; Wied is-Sewda: 1♂, 21.viii.1974, MJE; 1♂, 8.iii.1979, SPS; Wied Qannotta: 3♂, 8.xi.1980, SPS; 2♂, 1.iv.1985, MJE (NMWC); 1♂, 4.xi.2001, MJE; 1♂, 27.v.2011, PG. GOZO: Mgarr ix-Xini: 2♂, 16.vi.1999, PG; 2♂, 30.vii.2000, PG; Ramla dunes: 1♂, 21.vii.1979, SPS. COMINO: near tower, 1♂, 17.iv.1977 SPS (MJE); Santa Marija Bay: 1♂, 28-30.iii.2002, MJE; 2♂, 29.iii.2002, PG.

Comments: review of material previously reported as *S. portschinskyi* by Schembri *et al.* (1991), as well as other material collected more recently by the authors shows that it is actually referable to *S. marshalli.* Pape's (1996: 357) mention of *portschinskyi* from Malta is presumably based on the misidentifications published by Schembri *et al.* (1991). Both species were recorded from Malta by Pape (2004b). There is no compelling evidence to support the occurrence of *portschinskyi* in Malta, and this species is excluded from the Maltese list.

Distribution: a poorly known Mediterranean species, recorded from Spain, France, Italy, Sicily and Malta.

Biology: unknown; reared in the laboratory on freshly killed snails (Richet *et al.* 2011).

Sarcophaga (*Liosarcophaga*) *teretirostris* Pandellé, 1896

Literature records: Schembri *et al.* 1991: 270: (as *S. misera* Walker, in part, misidentification); Schembri *et al.* 1991: 271; Pape 1996: 359; Pape 2004b.

Material examined: MALTA: Bahrija: 2♂, 2.xi.1998, MJE; Chadwick Lakes: 1♂, 30.vi.1978, PG; 3♂, 24.viii.1979, SPS; Fiddien: 2♂, 14.iv.1996, MJE; 1♂, waterside stones, 21.xi.1999, MJE; 1♂, 5.v.2002, PG; Fomm ir-Rih: 1♂, 20.v.1995, JCD; 2♂, 18.xi.2001, PG; Ghadira: 1♂,

23.v.1995, JCD; Ghar Lapsi: 6♂, garigue, 19.x.1999, MJE; Gnejna: 2♂, 14.xi.1999, MJE; Hagar Qim: 2♂, 15.xi.1992, MJE; Mistra: 1♂, 17.iii.1996, MJE; 1♂, JCD; Mtahleb: 3♂, 26.v.2011, PG, MJE; Rabat: 1♂, garden, 9.x.2001, PG; Wied Babu: 1♂, 20.iv.1994, JCD; Wied Ghajn Rihana: 3♂, 16.xi.1980, SPS; 1♂, stone walls and grass verges, 4.xi.2001, PG; Wied Has-Sabtan: 1♂, 7.ix.1979, JLS; Wied il-Ghasel: 1♂, 26.iii.1977, SPS; 2♂, 3.iii.1979, SPS; 1♂, 20.vi.1979, JLS; Wied is-Sewda: 5♂, 8.iii.1979, SPS; Wied Qannotta: 2♂, 31.viii.1978, PG; 3♂, 8.xi.1980, SPS; 3♂, 4.xi.2001, MJE, PG; 1♂, 27.v.2011, PG. GOZO: Mgarr ix-Xini: 1♂, 16.vi.1999, PG; 1♂, 30.vii.2000, PG. COMINO: 1♂, 23.iv.1978, PG; Santa Marija Bay: 2♂, 28-30.iii.2002, MJE, PG.

Distribution: a Palaearctic species, recorded from Europe and North Africa.

Biology: larvae develop in animal carcasses and are parasitoids of snails (references in Povolný and Verves 1997).

Sarcophaga (*Liosarcophaga*) *tibialis* Macquart, 1851

Literature records: Schembri *et al.* 1991: 271; Pape 1996: 359; Pape 2004b.

Material examined: MALTA: Bahrija: 1♂, 16.iv.1994, MJE; Fiddien: 1♂, 26.ix.1978, JLS; 2♂, 6.vii.1987, MJE (1♂ NMWC); 1♂, 26.v.2011, PG; Fomm ir-Rih: 2♂, 18.xi.2001, PG; Ghadira: 3♂, 4.v.2001, PG; 1♂, 27.v.2011, PG; Marfa Ridge: 1♂, 17.iv.1992, MJE; Mtahleb: 1♂, 26.v.2011, PG; Rabat: 1♂, 20.x.1999, PG; 1♂, garden, on dead snail, 25.x.2001, PG; Wied Ghajn Rihana: 8♂, stone walls and grass verges, 4.xi.2001, PG, MJE; Wied Has-Sabtan: 1♂, 7.ix.1979, SPS (PG); Wied Qannotta: 3♂, 4.xi.2001, PG; Wied Qirda: 2♂, 22.ix.1978, JLS. GOZO: Dwejra: 1♂, 2.iv.1994, MJE; Marsalforn: Qbajjar: reared from larvae in dead nestling, 3.v.2002, puparia 10-14.v.2002, 3♂, 3♀, emerged 27-28.v.2002, PG; Mgarr ix-Xini: 1♂, 30.vii.2000, PG; Ramla: 1♂, 21.ix.1992, MJE. COMINO: 4♂, 29.iii.2002, PG; Santa Marija Bay: 2♂, 28-30.iii.2002, MJE.

Distribution: an Old World species, also recorded from Oceania.

Biology: larvae develop in vertebrate and invertebrate carcasses or as parasitoids of locusts and have been implicated in cutaneous myiasis (references in Povolný and Verves 1997).

Sarcophaga (*Myorhina*) *nigriventris* Meigen, 1826.

Literature records: Schembri *et al.* 1991: 271; Pape 1996: 365; Pape 2004b.

Comment: no data are available, as the specimens reported by Schembri *et al.* (1991) from Mistra (Malta) and Santa Marija (Comino) in April and July, respectively, could not be traced, and no other material has been collected since then. This is, however, a common and widespread species, and there is no reason to doubt the veracity of this record. Nonetheless, it could also refer to *S. socrus* Rondani, 1860 or *S. soror* Rondani, 1860 which are closely related and occur (albeit less abundantly) in the Mediterranean (D. Whitmore *pers. comm.*).

Distribution: widely distributed in Europe, extending to the Far East of Russia.

Biology: larvae are parasitoids of acridoid locusts and beetles (references in Povolný and Verves 1997), and have also been reared from carcasses of mice, birds and snails (Blackith and Blackith 1990).

Sarcophaga (*Parasarcophaga*) *albiceps* Meigen, 1826

Literature records: Rondani 1862: 109 (as *Sarcophaga privigna* Rondani, 1860).

Comment: although this species has never been recorded from Malta since Rondani (1860) it is widely distributed and occurs in the Mediterranean region. For this reason, it is retained in the Maltese list.

Distribution: widely distributed in the Palaearctic, Oriental and Australasian/Oceanian regions.

Biology: a synanthropic species whose larvae develop in decaying carcasses and as parasitoids in Lepidoptera and Coleoptera. The species causes myiasis in cattle and man (references in Povolný and Verves 1997).

Sarcophaga (*Phytosarcophaga*) *destructor* Malloch, 1929*
Material examined: MALTA: Buskett: 1♂, 3.xi.1978, PG; Wied Ghajn Rihana: 1♂, 27.x.1998, PG; Fiddien: 1♂, 26.v.2011, PG. GOZO: Ramla: 1♂, 21.ix.1992, MJE.
Comments: this species has only recently (2009) been discovered in France, and it is speculated that it may be moving northwards as the climate warms (Richet *et al.* 2011).
Distribution: an Afrotropical species that in the Palaearctic is known from France, Italy, Malta, the eastern Mediterranean and the Middle East.
Biology: this species is unusual among the Sarcophagidae in that the larvae can develop entirely in decomposing vegetable matter (Verves 1993). Séguy (1951) recorded it from moribund grasshoppers.

Sarcophaga (*Sarcophaga*) *lehmanni* Mueller, 1922*
Literature records: Rondani 1862: 104-105 (as *Sarcophaga cognata* Rondani, 1860); Cilia 1973: (as *S. carnaria* (Linnaeus, 1758), misidentification); Schembri *et al.* 1991: 270 (as *S. carnaria*, misidentification).
Material examined: MALTA: Buskett: 1♂, 25.xi.2001, MJE; Chadwick Lakes: 2♂, 24.viii.1979, SPS; Fiddien: 1♂, 14.iv.1996, MJE; 1♂, 5.v.2002, PG; Fomm ir-Rih: 1♂, 25.iv.1994, JCD (MJE); Ghadira: 2♂, 27.v.2011, PG; Ghar Lapsi: 1♂, garigue, 26.x.1997, MJE; 2♂, 19.x.1999, MJE; Gnejna: 1♂, iii.2004, PG; Marfa Ridge: 1♂, 22.iii.1992, MJE; 1♂, 17.iv.1992, MJE; Marsaxlokk: 1♂, 27.ix.1992, MJE; Mgiebah: 1♂, 24.iv.1994, PG; Mtahleb: 1♂, 26.v.2011, PG; Wied Babu: 2♂, 17.xi.1991, MJE; 1♂, 20.iv.1994, JCD; Wied Ghajn Rihana: 3♂, 4.xi.2001, PG; Wied il-Ghasel: 1♂, 3.iii.1979, SPS; 1♂, 9.iv.1985 MJE (NMWC); 2♂, 28.iii.1997, MJE; Wied il-Hemsija: 1♂, 1.viii.1978, PG; Wied il-Mistra: 1♂, 3.iii.1985, MJE (NMWC); 2♂, 17.iii.1996, MJE; 2♂, same data, JCD (NMWC); Wied is-Sewda: 1♂, 8.iii.1979, SPS; Wied Qannotta: 1♂, 4.xi.2001, PG; 4♂, 5.iii.2003, PG, JCD (1♂ NMWC); Wied Qirda: 1♂, 22.ix.1978, PG. GOZO: Marsalforn: Ghajn Damma, 2♂, hilltopping, 22.iv.2000, PG; Mgarr ix-Xini: 1♂, 16.vi.1999, PG; Ramla: 2♂, 3.v.2002, PG; Ramla dunes: 1♂, 23.iv.1992, MJE; 1♂, 21.iv.1994, JCD; Wied il-Lunzjata: 1♂, 11.xii.1993, PG. COMINO: 1♂, 29.iii.2001, PG.
Notes: described by Rondani (as *S. cognata*) from Maltese material. This species was synonymised (in error) with *S. lasiostyla* Macquart, 1843 (Pape 1987, 1988). The error was later rectified by Pape (1996). The status of *S. carnaria* (Linnaeus, 1758) was established by Richet (1987) and records of *S. carnaria* in Schembri *et al.* (1991), as well as all material of *Sarcophaga sensu stricto* collected in the Maltese Islands after that time, refer to *S. lehmanni*.
Distribution: a widely distributed Palaearctic species extending east as far as Tajikistan.
Biology: it develops in nature as an internal parasite of earthworms (references in Povolný and Verves 1997); in the laboratory reared on freshly killed snails (Richet *et al.* 2011).

Discussion
Thirty-eight species of Sarcophagidae in 12 genera, representing all three subfamilies of the Sarcophagidae, are here recorded from the islands of Malta, nine of them for the first time (Table 1).

Nine species previously cited in the literature as occurring on the islands are excluded from the Maltese fauna because re-examination of the material on which these records were based shows that they were misidentified. For eight of these species – *Nyctia halterata*,

Sarcophaga carnaria, *S. filia*, *S. haemorrhoides*, *S. misera*, *S. penicillata*, *S. portschinskyi* and *Sarcophila latifrons* – details are given in the comments in the preceding section. The ninth species – *Sarcophaga* (*Liosarcophaga*) *dux* Thomson, 1869 – was cited by Pape (1996: 350; 2004b) as occurring in Malta, presumably because Schembri *et al.* (1991: 270) recorded two specimens of *Sarcophaga exuberans* Pandellé, 1896 from the island. The historical use of the nominal taxon *exuberans* is shrouded in confusion and was clarified by Pape (2004a), partly by synonymising the *exuberans* of authors (not Pandellé) with *S. dux* Thomson – a synonymy that was not accepted by Lehrer (1995). Examination of the two specimens cited by Schembri *et al.* (1991) and referred to above reveals that they belong to *S. marshalli* and *S. jacobsoni*. There is therefore no compelling evidence to suggest that *S. dux* actually occurs in Malta.

Five species whose occurrence is considered doubtful are nonetheless retained because their absence cannot be entirely confirmed: *Miltogramma murina* has not been collected since Macquart described it from Malta in 1854 (as *M. melitensis*); *Sarcophaga albiceps* has not been recorded since Rondani (1860) and is not cited from Malta in Pape (1996; 2004b); and no material of Maltese provenance has been seen of *Blaesoxipha lapidosa*, *Sarcophaga nigriventris* and *S. rosellei*.

Nine species are added: *Pterella grisea*, *P. melanura*, *Sarcophaga argyrostoma*, *S. destructor*, *S. jacobsoni*, *S. lehmanni*, *S. villeneuveana*, *Sarcophila* sp. cf. *meridionalis* and *Senotainia tricuspis*.

While at first sight the sarcophagid fauna of the islands might be considered small, it compares very favourably with that of the much larger and ecologically diverse neighbouring island of Sicily, with some 49 recorded species (Pape 2004b, Raffone 2009) and with the 32 species known from Sardinia (Pape 2004b, Whitmore 2009). Island faunas are expected to be restricted. In contrast, 185 species are known to occur in mainland Italy (Raffone 2009), where the large central European fauna is well represented in the north.

Twenty-six of the recorded species are known to be of wide to very wide distribution in the Palaearctic, or beyond. Three species – *Craticulina tabaniformis*, *Miltogramma murina* and *M. ruficornis*, are predominantly Mediterranean with extension to the Far East or Central Europe. Eight species are exclusively Mediterranean with a restricted distribution: these are *Nyctia lugubris*, *Sarcophaga* (*Heteronychia*) *ferox*, *S.* (*H*). *minima*, *S.* (*H*). *monspellensia*, *S.* (*H*). *sicilia*, *S.* (*H*). *uncicurva*, *S.* (*H*). *villeneuveana*, and *S.* (*Liosarcophaga*) *marshalli*. It comes as no surprise that six of these eight species belong to the subgenus *Heteronychia* Brauer & Bergenstamm, 1889 of *Sarcophaga* Meigen, 1826 – 50% of the known biodiversity of this subgenus (some 90 valid species) is from the Mediterranean region (Whitmore 2009, 2011).

Snail feeding species in the subgenera *Heteronychia* and *Helicophagella* Enderlein, 1928 occur preferentially in calcareous habitats and are relatively well represented in the Maltese Islands, which geologically are almost entirely composed of limestone. Around 60 species of land snails have been recorded from the Maltese Islands (Giusti *et al.* 1995) and some can be seasonally very abundant.

The identity of one species (*Sarcophila* sp. cf. *meridionalis*) cannot be established at present and therefore no comment can be made on its distribution.

Ten of the 38 species have been reared, mostly by the authors (Table 2), and some of these rearings are notable. First rearing records are provided for two poorly known Mediterranean species whose biology was previously unknown: *Sarcophaga ferox* from the land snail *Eobania vermiculata* and *Sarcophaga sicilia* from the endemic land snail *Tudorella melitense*, until recently (Pfenninger *et al.* 2010) considered (by Giusti *et al.* 1995) to be a local population of *Pomatias sulcatus* (Draparnaud, 1801).

Sarcophaga uncicurva is a western Mediterranean species that has been reared from the land snails *Eobania vermiculata*, *Theba pisana* and *Cernuella virgata* (Coupland and Barker

2004). In Malta, it has been reared from *Otala punctata*, a land snail that has only very recently been introduced to the island (Barbara and Schembri 2008).

The finding of *Sarcophaga destructor* is of particular interest. This is an Afrotropical and Middle Eastern species, which in the Mediterranean is known from Spain, France, mainland Italy (but not its islands), Greece and Cyprus. Its recent finding in France (2009) has led Richet *et al.* (2011) to speculate that its distribution may be shifting northwards as the climate warms.

The sarcophagid fauna of the Maltese Islands is considered well known, and although more intensive or specialised collecting (mass trapping, searching in and around the nests of bees and wasps, rearing from Orthoptera or land snails and collecting on hilltops) may unearth new records, these numbers are not expected to be large.

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Table 1. A Checklist of the Sarcophagidae of Malta - *new record for Malta.

Subfamily MILTOGRAMMINAE

Amobia signata (Meigen, 1824)
Craticulina tabaniformis (Fabricius, 1805)
Macronychia polyodon (Meigen, 1824)
Miltogramma murina Meigen, 1824
Miltogramma ruficornis Meigen, 1824
Miltogramma rutilans Meigen, 1824
Pterella grisea (Meigen, 1824)*
Pterella melanura (Meigen, 1824)*
Senotainia tricuspis (Meigen, 1838)*
Taxigramma multipunctata (Rondani, 1859)

Subfamily PARAMACRONYCHIINAE

Nyctia lugubris (Macquart, 1843)
Sarcophila sp. cf. *meridionalis* Verves, 1982*

Subfamily SARCOPHAGINAE

Blaesoxipha (*Blaesoxipha*) *lapidosa* Pape, 1994
Ravinia pernix (Harris, 1780)
Sarcophaga (*Bercaea*) *africa* (Wiedemann, 1824)
Sarcophaga (*Helicophagella*) *hirticrus* Pandellé, 1896
Sarcophaga (*Helicophagella*) *melanura* Meigen, 1826
Sarcophaga (*Helicophagella*) *noverca* Rondani, 1860
Sarcophaga (*Helicophagella*) *novercoides* Böttcher, 1913
Sarcophaga (*Helicophagella*) *rosellei* Böttcher, 1912
Sarcophaga (*Heteronychia*) *bulgarica* (Enderlein, 1936)
Sarcophaga (*Heteronychia*) *depressifrons* Zetterstedt, 1845
Sarcophaga (*Heteronychia*) *ferox* Villeneuve, 1908
Sarcophaga (*Heteronychia*) *minima* Rondani, 1862
Sarcophaga (*Heteronychia*) *monspellensia* Böttcher, 1913
Sarcophaga (*Heteronychia*) *sicilia* Pape, 1996
Sarcophaga (*Heteronychia*) *uncicurva* Pandellé, 1896
Sarcophaga (*Heteronychia*) *villeneuveana* (Enderlein, 1928)*
Sarcophaga (*Liopygia*) *argyrostoma* (Robineau-Desvoidy, 1830)*
Sarcophaga (*Liopygia*) *crassipalpis* Macquart, 1839
Sarcophaga (*Liosarcophaga*) *jacobsoni* (Rohdendorf, 1937)*
Sarcophaga (*Liosarcophaga*) *marshalli* Parker, 1923
Sarcophaga (*Liosarcophaga*) *teretirostris* Pandellé, 1896
Sarcophaga (*Liosarcophaga*) *tibialis* Macquart, 1851
Sarcophaga (*Myorhina*) *nigriventris* Meigen, 1826
Sarcophaga (*Parasarcophaga*) *albiceps* Meigen, 1826
Sarcophaga (*Phytosarcophaga*) *destructor* Malloch, 1929*
Sarcophaga (*Sarcophaga*) *lehmanni* Mueller, 1922*

Table 2. Species of Sarcophagidae reared from Malta.

Species name	Reared from
Sarcophaga africa	human corpse dead bird
Sarcophaga argyrostoma	land snail *Cantareus aspersus* (Müller) dead rat
Sarcophaga crassipalpis	dead bird
*Sarcophaga ferox**	land snail *Eobania vermiculata* (Müller)
Sarcophaga hirticrus	puparium in garden soil
Sarcophaga jacobsoni	mature larvae crawling in dust
*Sarcophaga sicilia**	land snail *Tudorella melitense* (Sowerby)
Sarcophaga tibialis	dead nestling
Sarcophaga uncicurva	land snail *Otala punctata* Müller**
Sarcophila sp. cf. *meridionalis*	land snail *Sphincterochila candidissima* (Draparnaud) hawk moth *Hippotion celerio* (Linnaeus) dead nestling

*first rearing record for this species
**first rearing record from this species

Notes and observations concerning *Physocephala rufipes* (Fabricius) (Diptera, Conopidae) and its relationship with an apparently newly discovered host species – During the Spring of 2013, I was surprised to notice a species of bee (*Bombus* species, Hymenoptera), flying in numbers to and from a bird nest box that was fastened in an elevated position, just under the eaves of the roof of my home. This nest box had in previous years been occupied by house sparrows *Passer domesticus*. In time, the bee proved to be *Bombus hypnorum* (Linnaeus, 1758) and the colony flourished into the autumn of 2013. During the subsequent winter, the nest box was cleaned, and during this process, as much as possible of the *Bombus hypnorum* nest material was retained and placed into a transparent plastic container; this was done with the hope that some species of interest would emerge in due course.

With the coming of Spring, the material was kept under regular observation, and in due course some Diptera did emerge and amongst them were two specimens of *Physocephala rufipes* (Fabricius, 1781) (Conopidae). This is a new host record for *P. rufipes*, which has otherwise been associated with a number of other *Bombus* species both in Britain and abroad. *Bombus hypnorum* has previously been recorded as a host for *Sicus ferrugineus* (Linnaeus, 1761) and another unidentified conopid species elsewhere in Europe (David Clements *pers. comm.*).

The first of the *P. rufipes* emerged on 6 May 2014 and the second on 10 May 2014. Sparrows have since reoccupied the nest boxes and subsequently there have been no new colonies of *B. hypnorum* and there have been no further sightings of *P. rufipes* – **MICK PARKER,** 9 East Wyld Road, Weymouth, Dorset DT4 0RP

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Pipizella siciliana Nielsen & Torp (Diptera, Syrphidae) recorded from France, with notes on its separation from related species

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Summary
Pipizella siciliana Nielsen & Torp, 1973 is recorded from France for the first time. Its separation from the closely related species *P. thapsiana* Kassebeer and *P. zloti* Vujić is reviewed. It is suggested that DNA barcoding of both these and other European *Pipizella* species is highly desirable, since the adequacy of the morphological basis for their separation remains open to question.

Introduction

There are now more than 30 *Pipizella* species known from Europe (Van Steenis and Lucas 2011). Only four of them were described prior to 1950 and recognition of many of them is still heavily dependent on features of the male terminalia. The females of most of them cannot be identified to species. *Pipizella siciliana* Nielsen & Torp, *P. thapsiana* Kassebeer and *P. zloti* Vujić make up one small group of closely similar species, separable from other European *Pipizella* only on genital features. For convenience, they are referred to here as the "*siciliana* group", after the first described of the three. They possess in common a large, transverse, more or less rectangular post-anal hood (sensu Van Steenis and Lucas 2011), an elongate (i.e. more than 4 x as long as wide) hypandrium carrying a pair of long, digitate processes extending toward the epandrium and lower gonocerci, each in the form of a serrated plate (Fig. 3).

Currently, *P. siciliana* is known only from Sicily and NW Spain, *P. thapsiana* from N Africa (Morocco) and Portugal and *P. zloti* is known from the Balkan Peninsula and further east (Speight 2013). In the present text *P. siciliana* is recorded from France for the first time, and the features used in separation of *P. siciliana* from *P. thapsiana* and *P. zloti* are reviewed.

Nine male *Pipizella* specimens, collected from two different localities in France, are here recognised as belonging to *P. siciliana*. The records are as follows:

Pipizella siciliana Nielsen and Torp, 1973
Alpes-de-Haute-Provence: 15 May 2013, 1 male, 10 May 2014, 7 males, St Martin-lès-Seyne, dry grassland and scrub, 910m, coll. T. Lebard
Lozère: 21 May 2000, 1 male, Nissoulogres, nr. Ste Enimie, Causse de Sauveterre, unimproved, calcareous, sheep-grazed grassland and thickets of *Juniperus/Prunus spinosa/Rosa* scrub, 960m, on flowers of umbellifer, coll. M.C.D. Speight

Recognition of *Pipizella siciliana*

Features for separation of *Pipizella siciliana* from other *siciliana*-group species were given by Kassebeer (1995), Vujić (1997) and Van Steenis and Lucas (2011). They relate only to the male. Although the females of both *P. thapsiana* and *P. zloti* were described, the descriptions do not include diagnostic features enabling separation of the females from one another or from the female of *P. siciliana*. The species keyed out as *P. siciliana* by Brădescu (1991) is *P. zloti*, according to Vujić (1997).

In his species diagnosis, Kassebeer (1995) separated *P. thapsiana* from *P. siciliana* on the basis of the darker tarsal segments, and the differently shaped surstyli and post-anal hood found in *P. thapsiana*. Vujić's (1997) species diagnosis separated *P. zloti* from *P. siciliana* entirely on genital characters, figuring the terminalia of *P. siciliana* from the left side and its epandrium in external view. In their key, Van Steenis and Lucas (2011) separated *P. siciliana* from both *P. thapsiana* and *P. zloti* using genital characters plus the extent of microtrichial coverage on the second basal wing cell, stated to be approximately 80% in *P. siciliana*, but more than 95% in the other two species. In addition they cited the length of the eye suture as distinguishing *P. siciliana*, in which it is half the length of the frons in the mid-line, from *P. thapsiana*, where it is less than half the median length of the frons. They also figured the left antenna, epandrium in external view and entire terminalia from the right side – and hence the right surstylus.

The features of the terminalia alluded to in the previous paragraph proved difficult to interpret, even with the figures supplied by the authors using them. In consequence, in order to arrive at secure determinations of the two French specimens, they were compared with type material of all three *siciliana*-group species. Most of the type material of *P. siciliana* originated from one locality, Taormina, but one male paratype was from a different location, Troina. Van Steenis and Lucas (2011) figured the terminalia of the latter specimen. Because of apparent differences between the terminalia of *P. siciliana* as figured by Nielsen and Torp (1973) and Van Steenis and Lucas (2011), and the fact that the holotype designated by Nielsen and Torp (1973) was one of the Taormina specimens, the paratype used here, for comparison with the French specimens, was one of those from Taormina. At some time in the past, the terminalia of the Taormina paratype examined had been severely cleared, rendering them transparent and frail. While it was possible to compare the terminalia of the French specimens with those of this paratype, and thus confirm their conspecificity, the terminalia of the paratype are not in a condition to use for illustration. The figures of features of the male terminalia of *P. siciliana* provided here are thus based on one of the French specimens. In the present text the terminalia figures have deliberately been drawn to show specimens "as they are", rather than tidied up, for instance, to show symmetry where it would be expected. Thus in Fig. 4a the apical rim of the epandrium is shown wider on the left of the figure than on the right. This is because the surstyli, the focus of the figure, were not, in this specimen, conveniently aligned so that they could be drawn to show their shape with the epandrium rotated so that the cerci would appear dead-centre and the epandrial margin would show an even curve. Similarly, in Fig. 4a, the post-anal hood is not shown as a symmetrical plate, but as an irregularly shaped feature with a far from flat surface – as it appeared in the specimen.

1. Features of the head

In the French specimens, the length of the eye suture corresponds with that of the Taormina paratype of *P. siciliana* (at least 2 x as long as the median length of the frons), as shown in Figs 1a and 1b. Eye suture length in *P. thapsiana* is proportionally shorter (less than 2 x the median length of the frons), as shown in Figs 1c and 1d. In Vujíc's (1997) description of *P. zloti* the eye suture is given as 'as long as distance between front and hind ocelli'. In the key by Van Steenis and Lucas (2011) it is said to be "long" in *P. zloti,* and contrasted with the "very short" eye suture of *P. thapsiana*. In the paratype of *P. zloti* examined here, the eye suture length appears intermediate between that of *P. siciliana* and *P. thapsiana* (see Fig. 1e). This feature is, then, potentially helpful in separating males of *P. siciliana* from males of *P. thapsiana*, but more difficult to use in separation of *P. zloti* from the other two species.

In all the French specimens, the third antennal segment is proportionally longer than in the Taormina paratype of *P. siciliana*, as shown in Figs 2a and 2b, but of the same proportions

as this segment in the Troina paratype figured by Van Steenis and Lucas (2011). In one of the French specimens this segment is longer still (Fig. 2c). This variability requires to be taken into consideration, but involves no overlap with the proportions found in *P. thapsiana,* where this segment is very short (Fig. 2d). The length of the third antennal segment can also be used to aid in separation of *P. thapsiana* from *P. zloti*, because in *P. zloti* it is long (Fig. 2e). But this also means that this feature does not help in separation of *P. zloti* from *P. siciliana*.

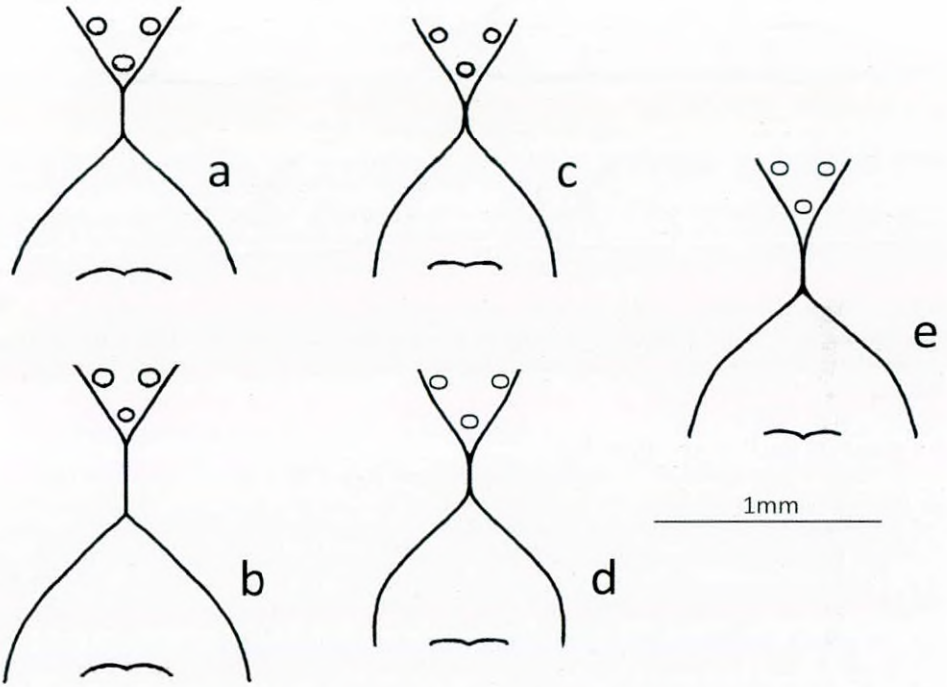

Fig. 1. Males of *Pipizella* species, frons and adjacent parts of the head (diagrammatic), to show eye sutures; a, b = *P. siciliana*; c, d = *P. thapsiana;* e = *P. zloti*. Origin of specimens: a = paratype (Taormina, Sicily); b = France (Lozère); c = paratype (Morocco); d = Portugal; e = paratype (Serbia).

In describing features of the species, Van Steenis and Lucas (2011) gave the arista as "light on basal 1/4 - 1/3" in *P. siciliana*, but all black in both *P. thapsiana* and *P. zloti.* In the original description of *P. siciliana* (Nielsen and Torp 1973) aristal colour is not explicitly stated. In the paratype of *P. siciliana* examined here the arista is all black when examined from above, but narrowly brown/pale brown at its base when examined from the side or from below. In all but one of the French specimens the arista is paler at the base from all angles, but only narrowly so i.e. for much less than a quarter of the length of the arista. In one of the males from St Martin-lès-Seyne it is yellow-brown for more than half of its length. Kassebeer (1995) described the arista of *P. thapsiana* as "oft bräunlich aufgehellt". In the two *P. thapsiana* specimens examined here the arista is entirely black. But in the *P. zloti* paratype examined the

arista is pale brown for approximately the basal half of its length, dorsally, ventrally and laterally. Aristal colour was not explicitly mentioned by Vujíc (1997), in his description of *P. zloti*. It can be concluded that aristal colour is too variable to help in distinguishing these three species.

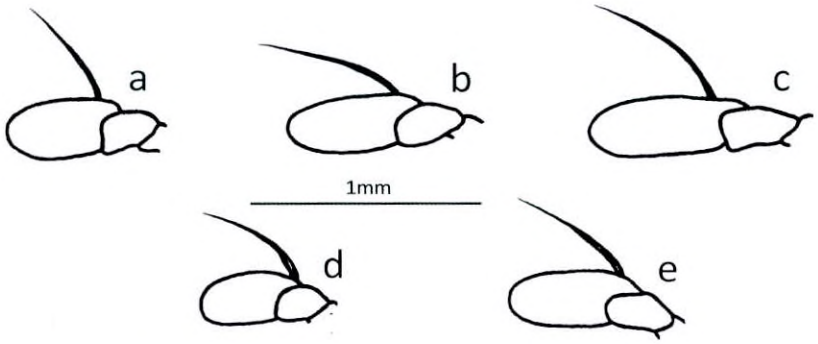

Fig. 2. ***Pipizella*** **males, right antenna, inner side: a, b, c =** ***Pipizella siciliana*****; d =** ***P. thapsiana*****; e =** ***P. zloti*****. Origin of specimens: a = paratype (Taormina, Sicily); b = France (Alpes-de-Haute-Provence); c = France (Lozère); d = paratype (Morocco); e = paratype (Serbia).**

2. Features of the thoracic appendages

In the original description of *P. siciliana* (Nielsen and Torp 1973), there is some ambiguity in the description of the colour of the tarsal segments of the fore and mid legs: "metatarsus on p1 and p2 yellow, tarsal joints otherwise mainly black". In the Taormina paratype of *P. siciliana* examined the first two tarsomeres of both fore and mid legs are yellow. This is also the case in two of the French specimens (one from each locality). The other six French specimens have only the fore and mid basitarsus yellow. Some variability in tarsal coloration in *P. siciliana* is referred to by Van Steenis and Lucas (2011), who say "basitarsus of front and mid tarsi and sometimes second tarsomere of mid tarsi yellow". In the Portuguese specimen of *P. thapsiana* and in the *P. thapsiana* paratype, all tarsomeres of both fore and mid legs are entirely dark brown/almost black. Kassebeer (1995) mentioned that the basitarsus of the mid leg may be somewhat paler, ventrally, in *P. thapsiana*. In *P. zloti* the basitarsus of the fore and mid legs is evidently consistently yellow (Vujíc 1997), but all other tarsal segments are dark brown/black, as was the case in the *P. zloti* paratype examined here. The yellow fore and mid basitarsi in *P. siciliana* and *P. zloti* could help to distinguish those species from *P. thapsiana*. But, varibility in the number of tarsomeres that are yellow in the fore and mid legs in *P. siciliana* means that tarsal coloration cannot be used to separate it from *P. zloti*.

The 80% microtrichial coverage of the 2nd basal wing cell given for *P. siciliana* by Van Steenis and Lucas (2011) was found in two of the French specimens. But, in the Taormina paratype of *P. siciliana* and four other French specimens, microtrichial coverage of the 2nd basal cell was complete. There was about 10% of the cell bare of microtrichia in the remaining French specimens. Complete microtrichial coverage of the cell was observed by Van Steenis and Lucas (2011) in both *P. thapsiana* and *P. zloti*. So this character, also, is subject to a degree of variability in *P. siciliana*, which renders it unhelpful in separating that species.

3. Features of the terminalia.

Genital characters which have been used in the separation of *P. siciliana* from *P. thapsiana* and/or *P. zloti* are the shape of the surstyli and the angle made between the face of the epandrium carrying the cerci and its shaft, on the opposite side to the surstyli. According to Van Steenis and Lucas (2011), this latter angle is 90° in *P. siciliana* and greater than 90° in the other two species. However, the figure of the epandrium in side view, provided by Nielsen and Torp (1973) shows that this angle can also be greater than 90° in *P. siciliana*. It is also greater than 90° in some of the French specimens (Fig. 3). So this feature is too variable to be relied upon.

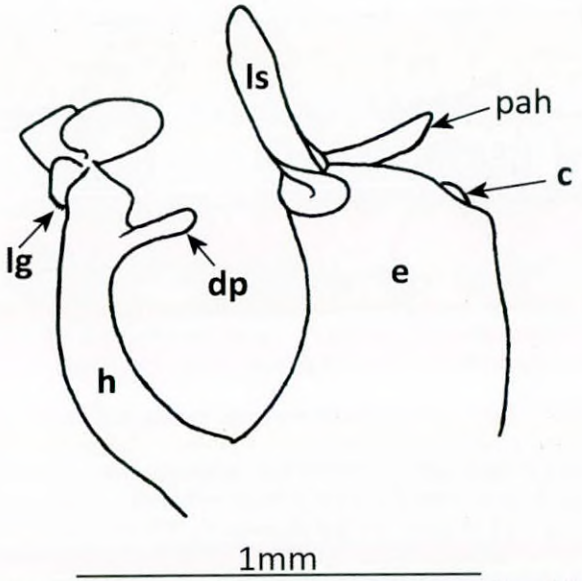

Fig. 3. *Pipizella siciliana*, genital capsule in side view: c = cercus; dp = left digitate process; e = epandrium; h = hypandrium; lg = left, lower gonocercus; ls = left surstylus; pah = post-anal hood. Origin of specimen: France (Alpes-de-Haute-Provence).

The shape of the surstyli has been used by all authors who have defined features for separation of the *siciliana*-group species from one another. To demonstrate differences in shape of the surstyli authors have depicted them from two different views. In one view the apex of the epandrium is shown from above, so that both surstyli can be seen (as in Fig. 4). In the other view, the epandrium is shown from the side (as in Fig. 3), which means only one of the surstyli is visible. To date, no author has figured both surstyli in side view for any of the *siciliana* group species, which introduces a source of confusion because, at least in the case of *P. siciliana*, the surstyli are to a significant extent asymmetrical, but the asymmetry is only clearly visible in side view. In consequence, the surstylus of *P. siciliana*, shown in the left side view of the epandrium by Vujić (1997), looks different in shape from the surstylus of the same species shown in the right side view of the epandrium by Van Steenis and Lucas (2011). Since the asymmetry of the surstyli is hardly detectable in figures in which the epandrium has been drawn from above, apparent differences in the appearance of the surstyli, as figured in side view by different

authors, become even more confusing. The figures of the epandrium viewed from above have also introduced another source of confusion, caused by differences in the actual angle from which the drawings have been made. The first figure of the epandrium of *P. siciliana* taken from this view is in Nielsen and Torp (1973), which shows the epandrium somewhat tilted away from the viewer, so that the upper ends of the cerci are in front of part of the post-anal hood (as in Fig. 4b).

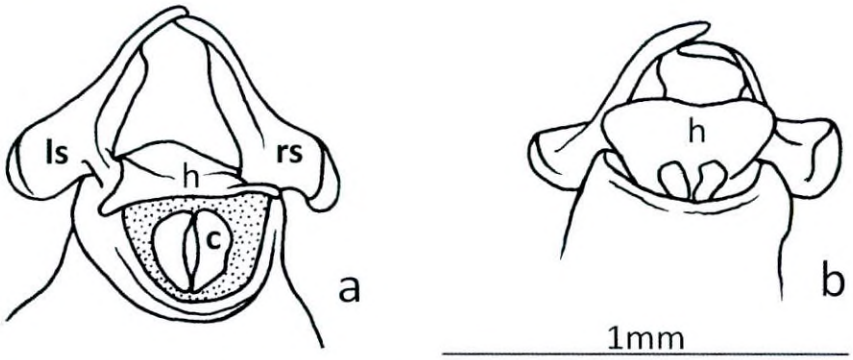

Fig. 4. ***Pipizella siciliana*****, epandrium and appendages, from above, shown in 4a and 4b from slightly different angles: c = cercus; h = post-anal hood; ls = left surstylus; rs = right surstylus. Origin of specimen: France (Alpes-de-Haute-Provence).**

The epandrium of *P. siciliana* is shown from almost exactly the same angle by Vujić (1997). However, in the same publication, the epandria of *P. thapsiana* and *P. zloti*, although drawn from the same general view, are shown rotated more towards the viewer, so that the cerci appear ventral to the post-anal hood in those figures, as in Fig. 4a. One consequence is that the surstyli of *P. siciliana* appear very different in shape from those of *P. thapsiana* and *P. zloti* in that set of figures. Van Steenis and Lucas (2011) showed the epandrium of *P. siciliana* rotated toward the viewer to the same degree as the epandria of *P. thapsiana* and *P. zloti* in Vujić's (1997) figures, resulting in an entirely different appearance to the surstyli in their figure, when it is compared with the figures of apparently the same species, drawn from the same view by Nielsen and Torp (1973) and Vujić (1997). From the angle at which the epandrium is figured by Van Steenis and Lucas (2011), there is little difference between the shapes of the surstyli in the three species, as is clear from their figures. The epandrium of one of the French specimens, drawn first from the angle depicted by Nielsen and Torp (1973) and then from the angle figured by Van Steenis and Lucas (2011), is shown in Figs 4a and 4b, to demonstrate how the appearance of the surstyli changes with the angle of viewing. A further source of confusion is introduced by the figures of the epandrium of *P. zloti* from above, in Vujić (1997) and Van Steenis and Lucas (2011). In these figures the inner edges of the surstyli differ significantly in appearance. In Van Steenis and Lucas (2011) the inner edge of each surstylus is depicted as possessing a short tooth on the inner side, toward the base of the surstylus. But that tooth is not shown in the figure of *P. zloti*, from the same view, by Vujić (1997). Neither has it been found in the paratype of *P. zloti* examined here (Fig. 5b). When observed from the angle shown in Figs 4a and 5b, in these specimens the inner edges of the surstyli show no features helpful in distinguishing the two species.

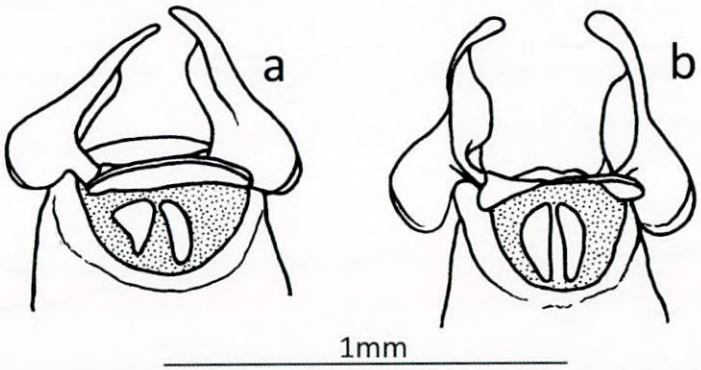

Fig. 5. ***Pipizella*** **males, epandrium plus appendages from above: a =** ***P. thapsiana*****; b =** ***P. zloti*****. Origin of specimens: a = paratype (Morocco); b = paratype (Serbia).**

The surstyli of *siciliana*-group species are prone to a greater degree of misinterpretation when drawn in side view than when drawn from above. Figs 6a, 6b and 6c show the left surstylus of one of the French specimens in side view, from slightly different angles, to illustrate this phenomenon. But, from most angles the upper margin of the left surstylus of *P. siciliana* is not sigmoid, as it is from all angles in *P. thapsiana* (Figs 6d, 6e). It instead remains more or less straight, as shown for *P. siciliana* in both Nielsen and Torp (1973) and Vujić (1997). The right surstylus of the same French specimen is shown in Fig. 7a, showing both that its shape differs from that of the left surstylus and that it corresponds in shape to the right surstylus of *P. siciliana* as figured by Van Steenis and Lucas (2011). The right surstylus of *P. thapsiana* was figured by Van Steenis and Lucas but, due to an inadvertent substitution of the terminalia figures for a different species, in their 2011 paper, the correct figures for *P. thapsiana* appeared later, as a correction (Anon. 2012). The shape of the right surstylus differs in the two *P. thapsiana* specimens examined here (Figs 7b, 7c). The right surstylus of the Moroccan paratype (Fig. 7c) is more similar in shape to the right surstylus of this species as figured by Van Steenis and Lucas (2011), than is the right surstylus of the Portuguese specimen (Fig. 7b).

Whether this is a demonstration of intra-specific variability in this feature in *P. thapsiana*, or a taxonomic difference between the Moroccan and Portuguese populations, remains to be established. In *P. zloti*, the upper margin of both surstyli, in side view, is as found in *P. siciliana*. The left surstylus of *P. zloti,* from three slightly different angles, is shown in side view in Figs 6f, 6g and 6h. Those figures show also that the lower margin of the left surstylus is almost straight or shallowly curved in *P. zloti*, dependent on the angle of viewing, contrasting with the left surstylus of *P. siciliana*, which narrows abruptly in the apical half of the length of the surstylus, when seen from some angles. This same difference can be seen in the right surstylus of these two species (Figs 7a, 7d). The lower margin of the surstyli thus provides the most obvious difference between the terminalia of *P. siciliana* and *P. zloti.* While there are other slight differences they are difficult to both describe and depict.

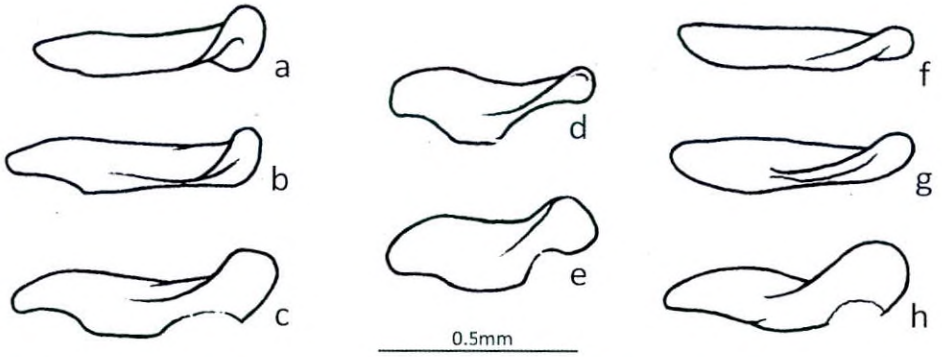

Fig. 6. ***Pipizella*** **males, left surstylus in side view; a, b, c =** ***P. siciliana*****, from slightly different angles; d, e =** ***P. thapsiana*****, from slightly different angles; f, g, h =** ***P. zloti*****, from slightly different angles. Origin of specimens: a, b, c = France (Alpes-de-Haute-Provence); d, e = paratype, Morocco; f, g, h = paratype, Serbia.**

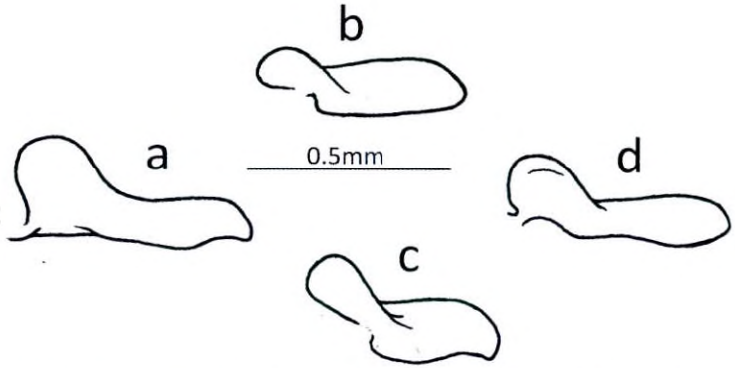

Fig. 7. ***Pipizella*** **males, right surstylus in side view; a =** ***P. siciliana*****; b, c =** ***P. thapsiana*****; d =** ***P. zloti*****. Origin of specimens: a = France (Alpes-de-Haute-Provence); b = Portugal; c = paratype, Morocco; d = paratype, Serbia.**

Viewing all of the various published figures of *P. siciliana* surstyli at the same time it would be easy to conclude that one or another of them was inaccurate, or that different species had been figured under the same name. In reality, the differences can largely be explained by variations in the angle from which specimens were drawn, accentuated by the previously unremarked difference in shape of its left and right surstyli. All 9 males of *P. siciliana* we have examined exhibit this phenomenon. Asymmetrical surstyli are not usual among European *Pipizella* species, so the left surstylus of *P. siciliana* figured by one author would be expected to resemble the right surstylus of the same species, as figured by a different author. When these factors are taken into consideration it becomes much easier to recognise that the various figures could, indeed, all refer to one species. But, just as they complicate recognition of *P. siciliana*, these factors also render difficult the separation of that species from both *P. thapsiana* and *P.*

zloti. Nonetheless, the shape of the left surstylus, in side view, is useful in separating *P. siciliana* from the other two species. It seems to vary very little within *P. siciliana* and is similarly of characteristic shape in both of the other species. The shape of the right surstylus seems to be less reliable. The hypandrium and its appendages are very similar in form in all three *siciliana*-group species, as can be seen from the figures provided by Vujić (1997), and help little in separating them.

To summarise, from the specimens examined in this study, most of the features used in the literature, to aid in separating males of *Pipizella siciliana*, *P. thapsiana* and *P. zloti* from each other, seem to be unreliable, while others, notably features of the terminalia, have proven difficult to both depict and describe in ways to assist interpretation. Even so, the shape of the surstyli remains the most diagnostic feature available so far to separate these three species, and construction of the following key has been attempted on that basis:

1. In side view, upper margin of left surstylus sinuous (Figs 6d, 6e) and surstylus no more than 3 x as long as its depth at the mid-point of its length; tarsal segments of all legs dark brown, with only the mid basitarsus of the fore and mid legs sometimes paler; third antennal segment less than 1.5 x as long as its maximum depth (Fig. 2d) (eye suture no longer than the distance between the anterior and posterior ocelli (Figs 1c, 1d) ..... ***thapsiana***
- In side view, upper margin of left surstylus almost straight from some angles (Figs 6a, 6b, 6f, 6g) and surstylus 4 x or more as long as its depth at the mid-point of its length; basitarsus of fore and mid legs yellow; third antennal segment 1.5 – 2.25 x as long as its maximum depth **2**

2. In side view, lower margin of both left and right surstylus (Figs 6a, 6b, 6c, 7a) abruptly angled (surstylus requires to be tilted backwards and forwards to gain a clear view of this angle); eye suture distinctly longer than the distance between the anterior and posterior ocelli ..... ***siciliana***
- In side view, lower margin of both left and right surstylus (Figs 6e, 6f, 6g, 7d) straight or gently curved, not abruptly angled however tilted; eye suture length variable, but may be no greater than the distance between the anterior and posterior ocelli ..... ***zloti***

Discussion

The objective of this text is to signal the presence of *Pipizella siciliana* in France and to show how the species can be separated from other European *Pipizella*. For purposes of their revision, Van Steenis and Lucas (2011) had available to them only four specimens of *P. siciliana*. Nine specimens have been available to the authors of the present text and this has made possible a re-assessment of some of the features employed in separation of *P. siciliana* from *P. thapsiana* and *P. zloti*, resulting in demonstration that they are too variable to be useful. The resulting key, above, shows that, while *P. thapsiana* can be separated from the other two species using a combination of genital and other morphological features, separation of *P. siciliana* from *P. zloti* can at present only be achieved by using small features of the surstyli, other characters proving too variable to be reliable. A complication encountered in using the surstyli in separation of the species is the discovery that, in this species group, and in *P. siciliana* in particular, the surstyli are asymmetrical, which had not been noted previously.

The morphological basis for separation of *Pipizella siciliana* from *P. thapsiana* appears reasonably secure, though it still could be interpreted as expressing regional differences between

populations of one variable species. But, the basis for separation of *P. siciliana* from *P. zloti* is less satisfactory. Unless further features can be found to consolidate the separate identity of *P. siciliana* and *P. zloti*, whether indeed they are separate, species-level taxa, would seem open to question. DNA barcoding (Hebert *et al.* 2003) of the *siciliana* group taxa would be highly desirable, to see if it might help in clarification of their status.

Fig. 8. *Pipizella siciliana* habitat, at 900m, in the vicinity of St Martin-lès-Seyne (Alpes-de-Haute-Provence, France). Photo: Roland Jamault.

Returning to the topic of *Pipizella siciliana* itself, is this species really as rare as current information would seem to suggest? At the time of writing it has been recorded only on three occasions in Sicily (Van Steenis *et al.* 2011), once in NW Spain (Ricarte *et al.* 2014) and at the two localities in southern France reported here. Difficulties in recognising the species may well have discouraged publication of records and, certainly the wide geographic spread of existing records, NW Spain, southern France and Sicily, suggests the species could be present in intervening areas. A second factor involved may be the lack of attention these small, black syrphids have received at the hands of those who might collect them, and the fact that, in sub-Mediterranean/Mediterranean Europe, those who might record them have been few in number. Available information on the habitats of *Pipizella siciliana* indicate that it is an inhabitant of ancient, lightly-grazed, unimproved grassland, with patches of scrub and taller vegetation, on the lower slopes of mountains within the Mediterranean zone (Fig. 8). For various reasons the grazing regimes which maintain that sort of habitat are disappearing over wide areas, so that it is replaced by scrub woodland or more intensively-used grassland. It would seem that, while *P. siciliana* may have been under-recorded in the past, today records of the species may be harder to come by due to habitat loss.

Acknowledgments

We are grateful to Claus Claussen, for making a paratype of *Pipizella thapsiana* available for study, and to Tore Nielsen and Ante Vujić, for similarly providing paratypes of *P. siciliana* and *P. zloti*. We are also grateful to Thomas Pape, for his strenuous efforts to locate paratypes of *P. siciliana*, at a point in time when it seemed all but one of them had disappeared. The comprehensive and detailed comments provided by Antonio Ricarte and Jeroen van Steenis, on an earlier version of the text, have helped to improve it enormously. We also record our thanks to Roland Jamault, for the opportunity to use his photograph of *Pipizella siciliana* habitat. Finally, a thank you to Marie Canut, whose keen eye led to collection of many of the *Pipizella siciliana* specimens from the St Martin-lès-Seyne locality.

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***Pipiza luteitarsis* Zetterstedt (Diptera, Syrphidae) on Canna** – Records of this distinctive pipizine species have declined in recent years (Ball, S.G., Morris, R.K.A. Rotheray, G.E. and Watt, K.R. 2011. *Atlas of the Hoverflies of Great Britain (Diptera, Syrphidae)*. Wallingford, Biological Records Centre). Although this may reflect reduced levels of recording, a genuine decline has probably occurred in association with the effects of Dutch elm disease. This is because the larva of *P. luteitarsis* appears to develop exclusively on the aphid *Schizoneura ulmi* (Linnaeus) (Pemphigidae) on its primary host, the foliage of elms, *Ulmus* species (Ulmaceae) (Rotheray, G.E. 1987. The larvae and puparia of five species of aphidophagous Syrphidae (Diptera). *Entomologist's monthly Magazine* **123,** 121-25.)

In Scotland, progress of Dutch elm disease is less complete than in many parts of Britain, due to restrictions apparently imposed by climate and that bark beetles do not favour the predominant elm species in Scotland, wych elm *Ulmus glabra* as much as other *Ulmus* species (*Dutch elm disease in Britain*, Forestry Commission, Forest Research, http://www.forestry.gov.uk/fr/HCOU-4U4JCL, 23.viii.2014). Even so, over much of mainland Scotland, elms have disappeared and apart from protected trees and isolated survivors, the main area of extant, mature trees is north of Inverness. It is therefore of interest to note the existence of elms on the Isle of Canna, about 26 miles from the mainland and 1,130h in size; between Rum and Skye, it is the westernmost of the Small Islands Archipelago of the Inner Hebrides.

There are several small areas of planted woodland on Canna (Campbell, J.L. 1970. Macro-Lepidoptera Cannae, the Butterflies and Moths of Canna. *Entomologist's Record and Journal of Variation* **82,** 211-214, 234-242, 292-298), of which the largest is about 4.5h and forms an S-shape, 50-60m wide by about 650m long, across the face of a steep slope behind and incorporating Canna and Tighard Houses at the east end of Canna (NG 2705). This woodland is a mix of deciduous and coniferous trees, with most elms concentrated at the west end, including the grounds of the two houses. It was first visited on 22.vi.2010, when numerous colonies of *S. ulmi* were found in its usual microhabitat, leaves growing from the mass of twigs at the base of *Ulmus* trunks, infested leaves being typically pale, bloated and crumpled up. On opening several crumpled leaves, *P. luteitarsis* larvae were encountered, 5 or 6 in total, one per leaf. They were left *in situ* as the status of the population is uncertain and the larva is readily distinguished by its pale colour, anal segment with a pair of rounded projections and the form of the vestiture, and the posterior breathing tube (Rotheray, G.E. 1987. *loc cit.*; 1993. Colour Guide to Hoverfly Larvae (Diptera, Syrphidae). *Dipterists Digest (First Series)* **9,** 1-155.).

One other hoverfly larva commonly occurs in colonies of this aphid, *Platycheirus splendidus* Rotheray, 1998, but that larva is mottled green, white and pink and not exclusive to *S. ulmi* (Rotheray, G.E. 1998. *Platycheirus splendidus* sp. n. from Britain formerly confused with *Platycheirus scutatus* (Diptera, Syrphidae). *Entomologist's Gazette* **49,** 271-276.). The larva of *P. splendidus* was also found in *S. ulmi* colonies on Canna and more frequently. On subsequent visits to Canna, in 2012, 2013 and 2014, colonies of *S. ulmi* were always present on *Ulmus* leaves in this woodland. Larval searching was not carried out on these subsequent visits and a more detailed assessment of this apparent, isolated *P. luteitarsis* population would be beneficial in determining its viability.

Pipiza luteitarsis has been recorded north east of Inverness (Ball *et al.*, *loc. cit.*) and the significance of these refugia on Canna and in northern Scotland for *P. luteitarsis* and perhaps, other elm associated insects, deserves better study, recognition and understanding – **GRAHAM E. ROTHERAY,** National Museums of Scotland, 242 West Granton Road, Edinburgh EH5 1JP

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New data on grass flies (Diptera, Chloropidae) from Iran

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Summary

As a result of studies on grass flies of the family Chloropidae in East Azerbaijan province, located in the north-west of Iran during 2009-2012, faunistic data including two subfamilies, 21 genera and 38 species were revealed. Among them, 11 genera and 15 species are recorded for the first time in Iran. Photographs of species are given.

Introduction

The family Chloropidae (Diptera: commonly called grass flies) with more than 2500 described species in 204 genera, belonging to four subfamilies is a moderately large family of acalyptrate flies (Nartshuk 2012). The larvae of this family have a very diverse biology. Most chloropid larvae develop in grasses; many species are pests of cereals, some of them cause galls on plants, a few are saprophagous, small numbers are predators of other insects and some are very annoying pests for humans by attracting and transmitting diseases to the eye (Doskočil and Chvála 1971, Sabrosky 1941, Deeming and Al-Dhafer 2012).

Species of the family Chloropidae are distinguished by the following combination of characters.

Adult: mainly small to medium sized (1 to 8 mm), rarely larger; yellow, yellowish green (subfamily Chloropinae) or black (subfamilies Oscinellinae, Rhodesiellinae and Siphonellopsinae), often with three or five dark longitudinal stripes on scutum. Frons broad in both sexes, usually with a large, strongly sclerotised, plate-like, sharply margined ocellar triangle, frons in profile usually only slightly projecting, face receding or slightly concave, and vibrissal angle obtusely rounded. Scutum usually longer than broad, convex; scutellum short and rounded to elongate-conical. A vertical proepisternal carina is characteristic.

Larva: peritreme of spiracle distinctly pigmented; spiracular setae prominent, arising as a continuous fringe along border of posterior spiracular plates; spiracular openings usually band or slit-like and distinctly bowed or abruptly bent (McAlpine 1981, Nartshuk *et al.* 1988, Nartshuk and Andersson 2013).

Before this study, Kubík and Barták (2008) described a new species (*Platycephala isinensis* sp. n.) from Iran. Modarres-Awal (2012) listed 13 species belonging to 6 genera (*Chlorops* Meigen, 1830; *Elachiptera* Macquart, 1835; *Lasiosina* Becker, 1910; *Meromyza* Meigen, 1830; *Oscinella* Becker, 1909; *Thaumatomyia* Zenker, 1833) of the family Chloropidae from Iran. This study adds 15 species and 11 genera of this family that are new for the fauna of Iran.

Material and methods

Adult specimens were collected by sweep-netting in forest and grassland habitats from East Azerbaijan province of Iran during 2009- 2012. The samples were killed in a killing jar containing potassium cyanide. The species were identified following Dely-Draskovits (1981, 1983), Deeming and Al-Dhafer (2012), Duda (1932-1933), Nartshuk (2009), Nartshuk *et al.* (1988) and Nartshuk and Andersson (2013). Nomenclature and distribution follow Nartshuk (2004) and Deeming and Al-Dhafer (2012). Male genitalia were cleared in 10% potassium hydroxide and images were obtained using a stereo microscope (Nikon SMZ 1000), connected to an image analyzing system (Figs 16-25).

The materials examined are deposited in collections of the following institutions:
IMTU: Insect Museum of Tabriz University.
CULS: Czech University of Life Sciences collections.

Survey of species

Subfamily Chloropinae

***Diplotoxa messoria* (Fallén, 1820)** (Figs 1, 16)
Material examined: 1♂, 2♀, Ajabshir, 37°31' N, 45°52' E, 1530 m a.s.l., 28 April 2009 (grassland habitat); 1♂, 3♀, Kandovan, 37°46' N, 46°16' E, 2500 m a.s.l., 15 May 2009 (grassland habitat); 4♂, 3♀, Chichakli, 38°40' N, 46°31' E, 2150 m a.s.l., 8 June 2011 (forest-grassland habitat); 1♂, Qaradagh, 38°57' N, 47°17' E, 1440 m a.s.l., 20 June 2012 (forest habitat), (6♂, 8♀, IMTU; 1♂ CULS). **New genus and species for Iran.**
Distribution: the species is widely distributed in the Holarctic Region, known from Central Asia, Siberia, Europe and North America.

***Eurina calva* Egger, 1862** (Figs 2, 17)
Material examined: 5♂, Chichakli, 38°40' N, 46°31' E, 2150 m a.s.l., 8 June 2011 (forest-grassland habitat), (4♂ IMTU; 1♂ CULS). **New genus and species for Iran.**
Distribution: a West Palaearctic species, known also from North Africa.

***Lagaroceras sequens* Becker, 1910** (Fig. 3)
Material examined: 3♀, Kandovan, 37°44' N, 46°19' E, 3000 m a.s.l., 12 May 2012 (grassland habitat), (2♀ IMTU; 1♀ CULS). **New genus and species for Iran.**
Distribution: this species is known only from Ethiopia, Kenya, Uganda, Zambia, Saudi Arabia and Yemen.

***Lasiosina subnigripes* Dely-Draskovits, 1977** (Figs 4, 18)
Material examined: 3♂, 2♀, Maragheh, 37°25' N, 46°25' E, 1790 m a.s.l., 5 June 2010 (grassland habitat); 3♂, 3♀, Chichakli, 38°40' N, 46°31' E, 2150 m a.s.l., 8 June 2011 (forest-grassland habitat); 4♂, 3♀, Qaradagh, 38°51' N, 46°52' E, 1770 m a.s.l., 7 May 2012 (forest habitat); 1♂, 1♀, Kandovan, 37°44' N, 46°19' E, 3000 m a.s.l., 12 May 2012 (grassland habitat), (10♂, 8♀ IMTU; 1♂, 1♀ CULS). **New species for Iran.**
Distribution: known from the Czech Republic, Estonia, Germany, Hungary, Italian mainland, Switzerland and Yugoslavia.

***Melanum laterale* (Haliday, 1833)** (Fig. 5)
Material examined: 2♂, Qaradagh, 38°51' N, 46°52' E, 1770 m a.s.l., 7 May 2012 (forest habitat), (1♂ IMTU; 1♂ CULS). **New genus and species for Iran.**

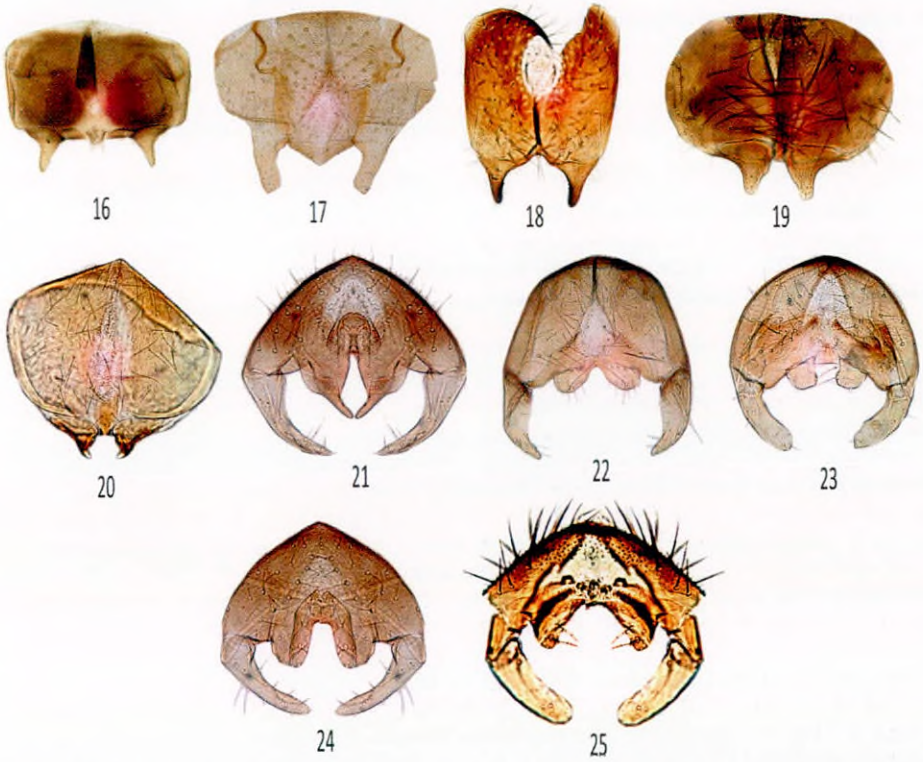
Distribution: the species is widely distributed in the Palaearctic Region.

Figs 1-9. Habitus. 1, *Diplotoxa messoria* (Fallén), dorsal view; *Eurina calva* Egger, lateral view; 3, *Lagaroceras sequens* Becker, lateral view; 4, *Lasiosina subnigripes* Dely-Draskovits, dorsal view; 5, *Melanum laterale* (Haliday), lateral view; 6, *Neohaplegis obscuripennis* (Loew), lateral view; 7, *Thaumatomyia glabra* (Meigen), dorsal view; 8, *Aphanotrigonum parahastatum* Dely-Draskovits, lateral view; 9, *Conioscinella sordidella* (Zetterstedt), lateral view.

Figs 10-15. Habitus. 10, *Elachiptera sarda* Nartshuk, dorsal view; 11, *Lipara similis* Schiner, lateral view; 12, *Oscinella trochanterata* Collin, lateral view; 13, *Oscinimorpha longirostris* (Loew), lateral view; 14, *Tricimba albiseta* Dely-Draskovits, lateral view; 15, *Trachysiphonella carinifacies* Nartshuk, lateral view.

Neohaplegis obscuripennis **(Loew, 1874)** (Figs 6, 19)
Material examined: 2♂, Chichakli, 38°40' N, 46°31' E, 2150 m a.s.l., 8 June 2011 (forest-grassland habitat); 5♂, 2♀, Qaradagh, 38°51' N, 46°52' E, 1770 m a.s.l., 7 May 2012 (forest habitat), (6♂, 1♀ IMTU; 1♂, 1♀ CULS). **New genus and species for Iran.**
Distribution: an East Palaearctic species, also known from Hungary, East and South Russia, and Ukraine.

Thaumatomyia glabra **(Meigen, 1830)** (Figs 7, 20)
Material examined: 2♂, 3♀, Ajabshir, 37°31' N, 45°52' E, 1530 m a.s.l., 28 April 2009 (grassland habitat); 3♂, 4♀, Maragheh, 37°25' N, 46°25' E, 1790 m a.s.l., 5 June 2010 (grassland habitat); 1♂, 2♀, Kandovan, 37°44' N, 46°19' E, 3000 m a.s.l., 12 May 2012 (grassland habitat), (5♂, 8♀ IMTU; 1♂, 1♀ CULS). **New species for Iran.**
Distribution: a widely distributed Holarctic species.



Figs 16-25. Male genitalia (dorsal view): epandrium in apical view. 16, ***Diplotoxa messoria*** **(Fallén); 17,** ***Eurina calva*** **Egger; 18,** ***Lasiosina subnigripes*** **Dely-Draskovits; 19,** ***Neohaplegis obscuripennis*** **(Loew); 20,** ***Thaumatomyia glabra*** **(Meigen); 21,** ***Aphanotrigonum parahastatum*** **Dely-Draskovits; 22,** ***Elachiptera sarda*** **Nartshuk; 23,** ***Oscinimorpha longirostris*** **(Loew); 24,** ***Tricimba albiseta*** **Dely-Draskovits; 25,** ***Trachysiphonella carinifacies*** **Nartshuk.**

Subfamily Oscinellinae

Aphanotrigonum parahastatum **Dely-Draskovits, 1981** (Figs 8, 21)

Material examined: 2♂, Qaradagh, 38°57' N, 47°17' E, 1440 m a.s.l., 20 June 2012 (forest habitat), (1♂ IMTU, 1♂ CULS). **New genus and species for Iran.**

Distribution: this species is known from Bulgaria, Crete, French mainland, Greek mainland, Hungary and North Africa.

Conioscinella sordidella **(Zetterstedt, 1848)** (Fig. 9)

Material examined: 2♂, Kandovan, 37°46' N, 46°16' E, 2500 m a.s.l., 15 June 2009 (grassland habitat), (1♂ IMTU, 1♂ CULS). **New genus and species for Iran.**

Distribution: a common West Palaearctic species.

Elachiptera sarda **Nartshuk, 2009** (Figs 10, 22)
Material examined: 2♂, 1♀, Ajabshir, 37°31' N, 45°52' E, 1530 m a.s.l., 28 April 2009 (grassland habitat); 2♂, 2♀, Kandovan, 37°44' N, 46°19' E, 3000 m a.s.l., 12 May 2012 (grassland habitat), (3♂, 2♀ IMTU; 1♂, 1♀ CULS). **New species for Iran.**
Distribution: this species is known hitherto only from Sardinia, so this is the second record for this species.

Lipara similis **Schiner, 1854** (Fig. 11)
Material examined: 2♂, Isperekhan, 37°46' N, 46°24' E, 2500 m a.s.l., 25 June 2010 (grassland habitat), (1♂ IMTU, 1♂ CULS). **New genus and species for Iran.**
Distribution: a widespread Palaearctic species.

Oscinella trochanterata **Collin, 1946** (Fig. 12)
Material examined: 1♀, Ajabshir, 37°32' N, 45°50' E, 1540 m a.s.l., 14 May 2011 (grassland habitat), (1♀ IMTU). **New species for Iran.**
Distribution: a West Palaearctic species.

Oscinimorpha longirostris **(Loew, 1858)** (Figs 13, 23)
Material examined: 1♂, Ajabshir, 37°31' N, 45°52' E, 1530 m a.s.l., 28 April 2009 (grassland habitat); 2♂, 3♀, Kandovan, 37°44' N, 46°19' E, 3000 m a.s.l., 28 May 2012 (grassland habitat), (2♂, 2♀ IMTU, 1♂, 1♀ CULS). **New genus and species for Iran.**
Distribution: this species is known from Belgium, Canary Is., Dodecanese Is, Hungary, Italian mainland, Sardinia, Sicily, The Netherlands, the Near East and North Africa.

Tricimba albiseta **Dely-Draskovits, 1983** (Figs 14, 24)
Material examined: 1♂, Kandovan, 37°46' N, 46°16' E, 2500 m a.s.l., 15 June 2009 (grassland habitat), (1♂ IMTU). **New genus and species for Iran.**
Distribution: a West Palaearctic species.

Trachysiphonella carinifacies **Nartshuk, 1964** (Figs 15, 25)
Material examined: 3♂, 3♀, Chichakli, 38°41' N, 46°31' E, 2160 m a.s.l., 2 June 2009 (forest-grassland habitat); 1♂, 2♀, Maragheh, 37°25' N, 46°25' E, 1790 m a.s.l., 5 June 2010 (grassland habitat); 1♂, 1♀, Qaradagh, 38°51' N, 46°52' E, 1770 m a.s.l., 26 May 2012 (forest habitat) (4♂, 5♀ IMTU, 1♂, 1♀ CULS). **New genus and species for Iran.**
Distribution: an East Palaearctic species, described from Mongolia and further recorded from Kazakhstan, Tajikistan, United Arab Emirates, Yemen and Greece.

Conclusions
The fauna of Chloropidae (Diptera) is relatively unknown in Iran; the above records increase the number of species known from this country. Presently, the family is represented only by 38 species (Table 1)

Acknowledgements
We would like to thank the University of Tabriz for supporting this work.

Table 1. Checklist of Chloropidae (Diptera) of Iran.

Species	Regions
Aphanotrigonum parahastatum Dely-Draskovits, 1981	East Azerbaijan province
Assuania thalhammeri (Strobl, 1893)	East Azerbaijan province
Camarota curvipennis (Latreille, 1805)	East Azerbaijan province
Cetema cereris (Fallén, 1820)	East Azerbaijan province
Chlorops adjunctus Becker, 1810	East Azerbaijan province
Chlorops calceatus Meigen, 1830	East Azerbaijan province
Chlorops figuratus (Zetterstedt, 1848)	East Azerbaijan province
Chlorops pumilionis (Bjerkander, 1778)	Tehran
Chlorops puncticornis Loew, 1866	East Azerbaijan province
Chlorops serenus Loew, 1866	East Azerbaijan province
Conioscinella sordidella (Zetterstedt, 1848)	East Azerbaijan province
Dicraeus raptus (Haliday, 1838)	East Azerbaijan province
Diplotoxa messoria (Fallén, 1820)	East Azerbaijan province
Elachiptera cornuta (Fallén, 1820)	East Azerbaijan province
Elachiptera sarda Nartshuk, 2009	East Azerbaijan province
Eurina calva Egger, 1862	East Azerbaijan province
Lagaroceras sequens Becker, 1910	East Azerbaijan province
Lasiosina cinctipes (Meigen, 1830)	Gilan, Khorasan
Lasiosina subnigripes Dely-Draskovits, 1977	East Azerbaijan province
Lipara similis Schiner, 1854	East Azerbaijan province
Melanum laterale (Haliday, 1833)	East Azerbaijan province
Meromyza facialis Fedoseeva, 1979	Tehran
Meromyza nigriventris Macquart, 1835	East Azerbaijan province
Meromyza saltatrix (Linnaeus, 1761)	East Azerbaijan province, north of Iran, Tehran
Neohaplegis obscuripennis (Loew, 1874)	East Azerbaijan province
Oscinella alopecuri Bałachovsky & Mesnil, 1935	Gilan, Khorasan, Kordestan
Oscinella frit (Linnaeus, 1758)	Golestan, Tehran
Oscinella maura (Fallén, 1820)	East Azerbaijan province
Oscinella nitidissima (Meigen)	Kordestan, Zanjan
Oscinella pusilla (Meigen, 1830)	East Azerbaijan province, Golestan, Kordestan, Markazi, Zanjan
Oscinella vindicata (Meigen, 1830)	East Azerbaijan province
Oscinimorpha longirostris (Loew, 1858)	East Azerbaijan province
Platycephala isinensis Kubík and Barták, 2008	east of Iran
Trachysiphonella carinifacies Nartshuk, 1964	East Azerbaijan province
Thaumatomyia elongatula (Becker, 1910)	Hamadan
Thaumatomyia glabra (Meigen, 1830)	East Azerbaijan province
Thaumatomyia notata (Meigen, 1830)	Khorasan, Semnan, Tehran
Thaumatomyia sulcifrons (Becker, 1907)	Tehran

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Dipterists Digest 2014 **21**, 143-149

New data on the subfamily Sympycninae Aldrich, 1905 (Diptera, Dolichopodidae) from Iran

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Summary

Seven species of the subfamily Sympycninae were collected during 2010-2011 by Malaise traps from the forestry areas in Northern Iran. Five species (*Syntormon aulicus* (Meigen, 1824), *Syntormon denticulatus* (Zetterstedt, 1843), *Syntormon macula mediterraneus* Grichanov, 2013, *Teuchophorus monacanthus* Loew, 1859, *Teuchophorus spinigerellus* (Zetterstedt, 1843)) are reported for the first time from Iran. The genus *Teuchophorus* Loew, 1857 is also recorded for the first time from the country. Diagnostic characters and distribution of the studied specimens, along with supplementary figures, are provided.

Introduction:

The subfamily Sympycninae comprises about 40 genera worldwide (Yang *et al.* 2006), of which 11 genera have been recorded so far in the Palaearctic Region, and 10 genera and 65 species have been recorded in the East Mediterranean (Grichanov 2007, Grichanov *et al.* 2011). Larvae of the subfamily Sympycninae are poorly studied, being sometimes found in mud or wet soil of swamps and bogs near springs under mosses and grasses (*Campsicnemus*), or on wet rocks (*Syntormon*), and probably both adults and larvae are predators on various groups of arthropods (Smith 1989).

Members of the subfamily Sympycninae are distinguished from other close subfamilies (i.e. Rhaphiinae and Diaphorinae) by the following morphological characters: mid and/or hind femora with distinct anterior preapical seta; antenna usually set high on head, about one-quarter distance from vertex; head usually ovate in anterior view, higher than wide; wing with anal lobe often reduced or lost; fore tibia often with anterodorsal row of short setae on distal half.

Some important studies have recently been done on this subfamily. Bickel (1992) has prepared an introduction to the subfamily Sympycninae in Australia. Grichanov (2000) has reviewed the Afrotropical Sympycninae and provided redescription of the Mediterranean *Peloropeodes acuticornis* (Oldenberg, 1916). Germann *et al.* (2011) have analysed the phylogeny of Dolichopodidae and suggested that the sympycnine genus *Lamprochromus* belongs within the Rhaphiinae clade. Pollet (2004) provided the Fauna Europaea database. Negrobov *et al.* (2013) and Grichanov (2013) reviewed the principal publications on the taxonomy of the genera *Sympycnus* and *Syntormon* in the Palaearctic Region.

The Iranian fauna of Sympycninae is poorly known. Before this study, three species of the genus *Syntormon* [*S. pallipes* (Fabricius, 1794); *S. giordanii* Negrobov, 1974; *S. iranicus* Negrobov, 1974] were reported from Iran (Becker and Stein 1913, Negrobov and Matile 1974). Grichanov *et al.* (2010) added two more species [*Sympycnus simplicipes* Becker, 1908; *Syntormon zelleri* (Loew, 1850)] of the subfamily to the country list, and Kazerani *et al.* (2014)

added four species to this fauna; therefore, nine species of this subfamily have been reported from Iran so far, mainly from central parts of Iran.

Considering the very rich insect fauna in the forests of Northern Iran, the objective of this study is to survey the sympycnine fauna in these forests.

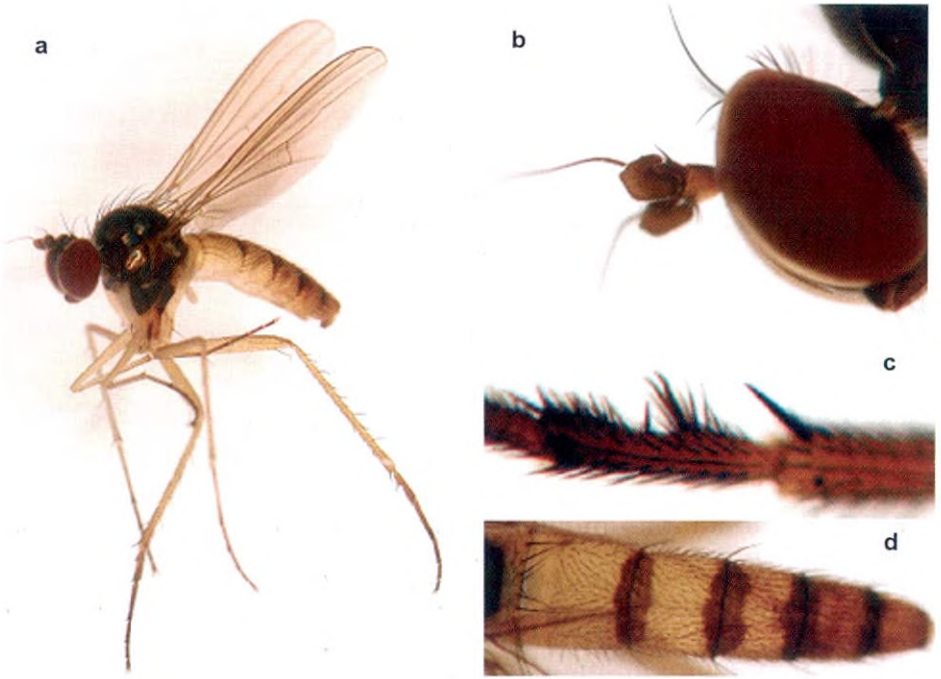

Fig. 1. ***Syntormon aulicus*****: a, male habitus, lateral view; b, antenna, lateral view; c, hind basitarsus, lateral view; d, abdomen, dorsal view.**

Material and methods

Materials for this study were collected from forests located in Northern Iran (Mazandran and Gilan provinces), using Malaise traps during the 2010-2012 seasons. The specimens were collected from March to November. The collected specimens were extracted from the traps weekly and transferred to the laboratory. The materials were preserved in 75% ethanol in glass vials. The specimens are deposited in the insect collection of the Department of Entomology, Tarbiat Modares University, Tehran, Iran and Insect Museum of Tabriz University (IMTU).

Morphological terminology follows Cumming and Wood (2009). The species are listed alphabetically within genera. The distribution accounts include adjacent countries and notes on the general distribution for each species after Grichanov (2007) and Grichanov's online database DoliBank (Grichanov 2003-2013).

Fig. 2. *Syntormon denticulatus*: **a, male habitus, lateral view; b, antenna, lateral view; c. hind tarsus, lateral view.** *Syntormon macula mediterraneus* **Grichanov, 2013: d, male habitus, lateral view; e, antenna, lateral view; f, hypopygium, lateral view.**

Results

Seven species belonging to three genera were identified, of which the following species are newly recorded from Iran: *Syntormon aulicus* (Meigen, 1824), *S. denticulatus* (Zetterstedt, 1843), *S. macula mediterraneus* Grichanov, 2013, *Teuchophorus monacanthus* Loew, 1859, *T.*

spinigerellus (Zetterstedt, 1843). We also give the first records of the genus *Teuchophorus* Loew, 1857 in Iran. Based on our results, the number of species of the subfamily Sympycninae in Iran has increased to 15.

***Sympycnus simplicipes* Becker, 1908**
Material examined: Iran, Mazandaran, Jurband 36°16′56.82″ N, 52°10′58.5″ E, 2032m, 5.ix.2011, 2♂, leg. A. Nadimi.
Distribution: widespread in Palaearctic (except the North); Afrotropical: DR Congo, South Africa, Kenya; Oriental: India (Kashmir), Taiwan.

***Syntormon aulicus* (Meigen, 1824)**
Material examined: Iran, Mazandaran province, Noor, Gaznasara, 36°16′58.08″ N, 52°10′55.62″ E, 2013m, 13.vii.2011, 1♂, leg. M. Khayrandish.
Distribution: widespread in western Palaearctic. **New to Iran.**
Diagnostic characters: postpedicel short, rounded, with dorsal stylus (Fig. 1b); acrostichals in two regular rows; legs yellow (Fig. 1a); male hind basitarsus with two ventral setae (Fig. 1c); abdomen brownish yellow, with dark posterior margins of tergites (Fig. 1d).

***Syntormon denticulatus* (Zetterstedt, 1843)**
Material examined: Iran, Mazandaran province, Noor, 36°16′58.44″ N, 52°10′58.5″ E, 2032m, 28.vi.2011, 2♂, leg. A. Nadimi.
Distribution: widespread in western Palaearctic (eastward to Afghanistan). **New to Iran.**
Diagnostic characters: postpedicel 1.5-2 times longer than high, shorter than stylus (Fig. 2b); legs yellow except fore femur and tarsus (Fig. 2a), mid femur with row of ventral setae (Fig. 2c); hind basitarsus with weak spiniform ventral setae; thorax and abdomen metallic green (Fig. 2a).

***Syntormon macula mediterraneus* Grichanov, 2013**
Material examined: Iran, Mazandaran province, Joorband, 36°26′17.28″ N, 52°07′13.62″ E, 272m, 29.iv.2011, 1♂, leg. M. Khayrandish.
Distribution: Greece (Rhodes); [as typical *S. macula* Parent, 1927] Bulgaria, Germany, Great Britain, Hungary, Italy, Romania, Switzerland. **New to Iran.**
Diagnostic characters: antenna dark, postpedicel elongate-triangular, rarely short, with apical stylus (Fig. 2e); acrostichals irregularly biseriate or uniseriate; wing with small brownish spot on M_{1+2} just before middle of its distal part (Fig. 2d); fore coxa yellow, fore tarsus having segments regularly decreasing in length towards apex, basitarsus much shorter than combined length of remaining segments; mid and hind coxae black, yellowish at apex; mid femur with fine ventral bristle at about middle, and a row of short black setulae from this bristle to base of femur; hind tarsus simple, uniformly dark (Fig. 2d); abdomen dark (Fig. 2d); male genitalia as Fig. 2f.

***Syntormon pallipes* (Fabricius, 1794)**
Material examined: Iran, Mazandaran province, Noor, 36°34′52.98″ N, 52°02′44.16″ E, 14 m, 29.iv.2011, 7♂, 6♀; Joorband, 36°26′17.28″ N, 52°07′13.62″ E, 272 m, 29.iv.2011, 7♂; Noor, Tangevaz, 36°21′55.2″ N 52°06′10.74″ E, 692m, 20.vi.2011, 3♂, 4♀; 10.vii.2011, 2♂, 3♀; Gilan province, Rudsar, Orkom, 36°45′44.34″ N, 50°18′11.88″ E, 1201 m, 11.x.2010, 4♂, 3♀, 7.vi.2010, 4♀; Rudsar, Ghazichak, 36°45′52.62″ N, 50°20′1.08″ E, 1787m, 27.ix.2010, 6♂, 5♀; 10.v.2010, 4♀, leg. A. Nadimi.

Distribution: widespread in Palaearctic, reaching Oriental and Afrotropical Regions.

Fig. 3. ***Teuchophorus monacanthus*****: a, male habitus, lateral view; b. antenna, lateral view; c, hind tibia, lateral view.** ***Teuchophorus spinigerellus*****: d, male habitus, lateral view; e, antenna, lateral view; f. hind tibia, lateral view.**

Teuchophorus monacanthus **Loew, 1859**

Material examined: Iran, Gilan province, Rudsar, Orkom, 36°45′44.34″ N, 50°18′11.88″ E, 1201m, 11.x.2010, 2♂, leg M. Khayrandish.

Distribution: widespread in western Palaearctic. **New to Iran**.

Diagnostic characters: antenna brown (Fig, 3b); legs yellow; hind femur slightly darkened at apex, hind tibia just beyond middle with strong and long curved black ventral spine and adjacent simple seta (Fig. 3c); hind femur with four strong black hairs ventrally at apex; abdomen dark green metallic (Fig. 3a).

Teuchophorus spinigerellus **(Zetterstedt, 1843)**

Material examined: Iran, Mazandaran province: Noor, Tangevaz, 36°21′55.2″ N 52°06′10.74″ E, 692m, 26.v.2011, 2♂, leg. M. Khayrandish.

Distribution: widespread in western Palaearctic. **New to Iran.**

Diagnostic characters: antenna brown (Fig. 3e); legs yellow (Fig. 3d), hind tibia at apex and hind basitarsus darkened, hind tibia extended at apex with ventral thickening covered with bunch of bristly hairs (Fig. 3f); mid and hind femora with one pair of black setae ventrally at the base; abdomen dark green (Fig. 3d).

Discussion

Regarding the larval habitat of predaceous sympycnines and also good conditions for the development of insects and their predators in the forests of Northern Iran, it can be concluded that the species of this subfamily are rather diverse there, and they can play a certain role in the natural regulation of various insect populations, especially soft-bodied Chironomidae and Culicidae, Homoptera, Collembola and Thysanoptera (Grichanov 2007).

Among the collected species, *S. pallipes* is much more abundant than other species, and we have collected it from Arasbaran forests in significant numbers. Apparently, *S. pallipes* is quite common in northern and north-western Iran.

With regard to the faunistic studies of the subfamily Sympycninae in adjacent countries like Turkey and Azerbaijan (Grichanov and Tomkovich 2009, Tonguç *et al.* 2013), it is worth noting that the Iranian fauna needs further study.

Acknowledgments

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Phortica variegata (Fallén) (Diptera, Drosophilidae) at Bushy Park, Middlesex and Windsor Forest, Berkshire –

Phortica variegata (Fallén, 1821) has long been known in the New Forest, Hampshire in association with sap flows from trees inhabited by larvae of the goat moth *Cossus cossus* (Linnaeus, 1758), and I had found it abundant on such trees (oak *Quercus*) by the Oberwater at Brockenhurst on 10 September 1977. This year it has been the subject of an investigation into its status by Steven Falk, Paul Brock and David Heaver, and they have confirmed it to be thriving at several sites in the New Forest (Webb, J. 2014. UK BAP & Adopt a species. *Bulletin of the Dipterists Forum* No. **78,** 10-12, including photograph by Steven Falk). Its larval biology appears to be unrecorded.

Although this species is widespread and not uncommon across much of Europe, it had not been confirmed to occur elsewhere in Britain until the present century, when it was reported from the Forest of Dean in Gloucestershire (Gibbs, D. 2004. *Amiota variegata* (Diptera,

Drosophilidae) new for Gloucestershire. *Dipterists Digest* (*Second Series*) **10,** 113), and the Blean Woods area of East Kent (Clemons, L. 2009. *Phortica variegata* (Fallén, 1821) (Diptera, Drosophilidae) in Kent. *Dipterists Digest* (*Second Series*) **16,** 25). All of the specimens found by David Gibbs and Laurence Clemons were swept, and the presence of trees with sap flows was not reported. In 2014, I found it at two sites that I have been regularly visiting during the year, again by general sweeping in woodland and without any sap flows having been observed.

At Windsor Forest, Berkshire, one male was swept by the middle part of the stream in the Highstanding Hill woods (SU927745) on 9 July 2014, and a second male was swept by the lower part of the same stream, north of Darkhole Bridge (SU924753), on 18 September 2014, in both cases in the vicinity of ancient beeches and oaks. At Bushy Park, Middlesex a male was swept on 17 July 2014 in Waterhouse Plantation (TQ147696), an enclosure of mixed dry woodland with a number of decayed standing and fallen trees, adjacent to the Longford River.

Phortica variegata has the body and legs with a distinctive pattern of dark markings on a lighter ground, but is relatively small (wing length about 3.0mm) so could be overlooked. The above photograph, kindly provided by Steven Falk, was taken by him on 22 July 2013, at a fermenting sap run on an ornamental *Malus* containing *Cossus* larvae, at Furzey Gardens (SU272114), New Forest, Hampshire.

It is unclear whether these recent records indicate that it is extending its range, so it will be interesting if further records are reported – **PETER CHANDLER,** 606B Berryfield Lane, Melksham, Wilts SN12 6EL

Dipterists Digest 2014 **21**, 151-156

Some rare species of Diptera (Mycetophilidae, Scenopinidae, Hybotidae and Chloropidae) at Melbury Park, Dorset

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Summary
The invertebrate fauna of Melbury Park SSSI in Dorset was investigated during 2008-2009. A small flight interception trap was placed within one of the hollow parkland oak trees, while another was positioned over a large accumulation of deadwood – a deadwood 'graveyard' created by the Estate. A total of 202 Diptera species were detected from the whole site and these included six Diptera species with conservation status: Vulnerable – *Euthyneura albipennis* (Zetterstedt) (Hybotidae), Near Threatened – *Acnemia amoena* Winnertz (Mycetophilidae), and Nationally Scarce – *Exechiopsis membranacea* (Lundström) and *Mycetophila lastovkai* Caspers (Mycetophilidae), *Scenopinus niger* (De Geer) (Scenopinidae) and *Lasiambia brevibucca* (Duda) (Chloropidae). An additional mycetophilid found, *Sciophila baltica* Zaitzev, is being proposed for Nationally Scarce status.

Introduction

Melbury Park (ST576058) is a historic deer park, dating from the late 15th century. It is regarded as a surviving remnant of the medieval Forest of Blackmoor and contains individual trees of great antiquity. It is stated to be one of the richest localities for epiphytic lichens in Europe and was notified as a Site of Special Scientific Importance in 1977. This lichen interest is dependent on the outstanding historical and ecological continuity provided by the extensive concentration of veteran open-grown wood-pasture trees. Such a resource was highly probably of significant interest for wood decay mycota and invertebrates, as well as epiphyte associated invertebrates, although this was not acknowledged in the SSSI designation. The land within the SSSI also includes a series of seepage fens and other habitats of potential importance to invertebrate conservation.

A specialist invertebrate survey was commissioned by the owners, Ilchester Estates, in 2008 in order to inform a revision of the Park Restoration Plan, as part of a Higher Level Stewardship agreement with Natural England. Natural England wanted to take this opportunity to update the Plan and to include a more comprehensive consideration of the biodiversity interest and its relationship with the wider management of the designed and historic landscape, and to make this accessible within one document.

Methods

The timescales for the Plan meant that the survey had to necessarily straddle two field seasons, starting in autumn 2008 and completing in summer 2009. Standard field techniques such as beating, sweep-netting and hand search were employed during a series of visits and the opportunity was taken to operate small flight interception traps (see photograph in Alexander and Chandler 2011: 37) as these have proved to be very productive for saproxylic Diptera in particular. Two traps were accordingly set in place on 12.xi.2008, and emptied on 20.xi.2008, in order to investigate late autumn flight activity. The author had no experience with operating such traps through the winter and so it seemed sensible to empty and recharge the traps before the main onset of winter. In practice, both traps survived the winter very well and were next emptied on 17.iii.2009. The traps were emptied again on 22.v.2009 and 16.vii.2009. Both were left in place in the hope of completing an annual cycle of trapping but neither survived into autumn 2009.

The two traps were placed as follows:

1. inside an ancient hollow oak *Quercus* within an area of open parkland (ST5605)
2. over a 'deadwood graveyard' within a deep earthwork ditch (ST5705). Dead wood that has to be removed from other situations within the parkland is accumulated here as a conservation measure. The situation is relatively shady with a large growth of old hazel on the bank above.

Results

A total of 202 Diptera species were detected from the whole site and these included six Diptera species with current conservation status:

Vulnerable – *Euthyneura albipennis* (Zetterstedt) (Hybotidae)

Near Threatened – *Acnemia amoena* Winnertz (Mycetophilidae)

Nationally Scarce – *Exechiopsis membranacea* (Lundström) and *Mycetophila lastovkai* Caspers (Mycetophilidae), *Scenopinus niger* (De Geer) (Scenopinidae) and *Lasiambia brevibucca* (Duda) (Chloropidae). An additional mycetophilid found, *Sciophila baltica* Zaitzev, is being proposed for Nationally Scarce status (Peter Chandler *pers. comm.*).

These species were all additions to the known Diptera fauna of the county of Dorset.

Euthyneura albipennis

A single female *Euthyneura albipennis* was taken in the oak flight trap operated from 13 March until 27 May. This hybotid has been assessed as having 'Vulnerable' status in Britain based on its known occurrence at only three sites (Falk and Crossley 2005).

Members of the genus *Euthyneura*, unlike some other Hybotidae, are not predators as adults but feed on pollen of tree blossoms. The larvae develop in decaying wood and it is considered that they are predators like other hybotid larvae. There are relatively few rearing records for the genus but dead wood is known to be the larval habitat of the other four more widespread British species, although *E. albipennis* has not itself been reared. Collin (1961) referred to a rearing of *E. myrtilli* Macquart by Beling in 1882 from rotten beech *Fagus* wood, and of *E. halidayi* Collin by C.H.W. Pugh from rotten wood in Shropshire. Cole (1964) reported the rearing from under bark of a beech log what was then considered as possibly *E. albipennis* on Collin's authority, but he later corrected this to *E. inermis* (Becker) (Cole 1987). Hövemeyer (1998) obtained *E. myrtilli* and *E. gyllenhali* (Zetterstedt) in numbers using an emergence trap set over a moss-covered beech stump in Germany. Hövemeyer and Schauermann (2003) obtained the same two species from logs cut from branches of fallen beeches, especially when the logs had aged 7-10 years, referring to *E. myrtilli* as a zoophagous moss cushion species.

Euthyneura albipennis is best known in Britain from Windsor Forest, from where it was added to the British list (Chandler 1992) based on 7♂ and 10♀ found on nine dates ranging from 15 May to 13 June in the period from 1980 to 1991. These were swept from blossom of two hawthorns *Crataegus* that bordered a ride near the bridge over Badger's Brook, close to the ancient beeches lining this stream and where there was at the time a good quantity of moist fallen dead wood and some decaying beech stumps. During the same period *E. inermis* and *Anthalia beatricella* Chandler (Hybotidae) were also recorded at flowers of *Crataegus* and bird cherry *Prunus padus* that bordered the rides in this part of the Forest; *Anthalia* species are also pollen feeders. The *Prunus padus* had been planted by the Crown Estate specifically to provide additional blossom for insects.

Euthyneura albipennis has also since been found at Warren Pond (TQ398945), Epping Forest, Essex (18 May 1998), during the detailed survey of the Diptera of the Forest that took

place from 1998 to 2000. In the same year a male was caught in a Malaise trap at Melverley Farm, Whitchurch, Shropshire (1998) (SJ583407), a Shropshire Wildlife Trust Reserve since 1995, as part of a survey of this reserve by staff of the World Museum, Liverpool.

The first two sites – Windsor and Epping Forests – are former wood pastures with many veteran beech trees, whereas the Shropshire site comprises small fields managed as hay meadows, bordered by high hedges, including mature oaks, ash and horse chestnut, where both larval habitat and the blossoms required by the adults are likely to be present. The Melbury site is also a wood pasture with veteran trees, but also an actively grazed one, with the capture site an open-grown oak tree amongst grasses and bracken, with a few flowering hawthorns within 100m. 'Veteran' is a term describing a tree with habitat features such as wounds or decay (Woodland Trust, undated).

This all suggests that the species may be associated with mosaic sites containing i) veteran trees, as the sources of suitable decaying wood for larval habitat, and ii) flowering shrubs as a pollen source for the adults. The sites therefore are wood pastures and traditional pastoral farmland rather than conventional woodland situations. While the known larval associations of the genus have been with decaying wood, generally little additional information has been provided: the dimensions of the logs/stumps/etc, the stage of the decay where the larvae occurred, the situation of the decaying wood, the density of the trees in the immediate landscape, etc. While Cole (1964) reared it from under bark of a log, Hövemeyer and Schauermann (2003) associate it especially with 7-10 year old logs, by which time it would be expected that the bark would have long fallen away were it not held in place by bryophyte growth – moss cushions. It seems that the age and condition of the decaying wood may not be important. At Windsor and Epping the association was close to beech trees – Melbury Park does have veteran beech trees but the trap was actually placed in a hollow oak, and beech is not reported as present at Melverley Farm, so the tree species may also not be important.

Acnemia amoena

A single female *Acnemia amoena* was taken in the deadwood graveyard flight trap operated from 27 May to 16 July. This fungus gnat has been assessed as having 'Lower Risk (Near Threatened)' status in Britain based on its known occurrence at only ten sites (Falk and Chandler 2005). It has subsequently been found at additional sites and is currently known from 14 hectads, and Nationally Scarce may now be a more appropriate conservation status (P.J. Chandler *pers. comm.*). Its known sites form a scattered distribution from central southern and eastern England, extending north along the Welsh Borders and across to Carmarthenshire, with recent records by the present author from a Herefordshire cherry orchard (Alexander and Chandler 2010), and an area of wet birch and alder wood-pasture at Lyme Park (SJ98), Cheshire. Additional new records (P.J. Chandler *pers. comm.*) are from Windsor and Epping Forests, Chirk Castle Park, Moccas Park, Buckingham Thick Copse (Northamptonshire) and White Scar Hanging beechwood, Westbury (Wiltshire).

The larval biology is unknown but it has been found around dead wood and is likely to develop in this habitat or in saproxylic fungi. Hövemeyer and Schauermann (2003) (cited above under *Euthyneura*) also obtained *A. amoena* among about 40 species of fungus gnats emerging from their beech logs. The species appears to have a requirement for decaying wood, and probably broad-leaved in origin. The known sites range from ungrazed woodlands, through wood-pastures and parklands, to traditional orchards, and so tree density is presumably unimportant. Many of these sites are known to be rich in saproxylic species in general, although this association may reflect the level of recording that such sites tend to receive.

Historic sites tend to feature strongly, either as ancient woodlands or ancient wood-pastures and parklands.

Exechiopsis membranacea

Several males were taken by the deadwood graveyard trap between 20 November and 12 March, and single males by 27 May and again by 16 July. This fungus gnat was given Nationally Scarce status by Falk and Chandler (2005), but this is now considered unjustified (Chandler in prep.) with 4 hectads known up to 1989, but 32 during the period 1990-2011 (only one dual hectad). The first British records were from Monks Wood NNR, Huntingdonshire (1972) and Leckford, Hampshire (1979) and no earlier records have come to notice but, from increasing records since 1980, it is now known to be widespread in England north to Yorkshire, with a few records in the Scottish Highlands. Of 35 hectads with records to end of 2011, 32 were post 1990.

The lack of old records and the recent expansion in records might suggest a recent arrival in Britain that is now colonising suitable habitat throughout the country, but it is virtually impossible to know for sure if this is really the case. Its known sites include ancient wood pastures – both active ones and those no longer grazed, as well as carr woodland and wetlands. The larval biology remains unknown but the targeted use of small flight traps has found it associated with both rot-holes and decaying trunk sapwood on standing living trees, as well as lying deadwood generally, and in both shaded and open sunny situations. The author has also recently taken it in a flight trap placed inside a hollow apple tree in a traditional orchard (Alexander *et al.* in press).

Mycetophila lastovkai

This species was found in numbers in the trap inside the hollow oak tree: 14 males and 3 females in the first catch and a single male in the second catch. A single male was also taken in the second flight trap, which had been placed amongst the deadwood graveyard, on 13 March. This fungus gnat has Nationally Scarce status (Falk and Chandler 2005). The distribution in Britain then known was south-western – from Cornwall to Hampshire, Wiltshire and Herefordshire and across south Wales; Dorset had been the only county in SW England without a record. However, there are now known to be an earlier and a more recent record from Suffolk (Butley Thicks 1910, Verrall/Collin collection; Brandon Country Park 2011, I. Perry) and recent records from Surrey (Shoelands, a strip of very wet woodland with a stream on the Hampton estate, 2012, M. Mitchell), Middlesex (Bushy Park, Waterhouse Plantation, an enclosure of mixed dry woodland adjacent to the Longford River, 2012, 2013, P.J. Chandler) and Berkshire (Windsor Forest, 34 males swept along woodland stream with old beeches and many fallen trees, over 8 visits from June to October 2014, P.J. Chandler), as well as other recent records from within its previously known range, including eight provided by Martin Drake from Devon and Somerset. The latter are mostly sites previously unworked for Diptera but include Yarner Wood, which was well recorded in 1975-1980. Although a recent increase is apparent, the restricted range supports NS status.

The biology of *M. lastovkai* is not known but it is possible that the larvae develop in wood-decay fungi. The majority of sites known to Falk and Chandler (2005) are active or former wood pastures with veteran trees, or wooded river valleys, but a wider range of sites including several small woodlands is now known. The large catch in the trap placed inside a hollow open-grown oak tree may reflect development in this situation but it may equally suggest that the species might have been assembling here for some other purpose, such as sheltering or for mating. There are now 41 records from 27 hectads, of which 23 have post

1990 records, suggesting a recent increase that is supported by the spread into new areas. This is a pattern shown by some other mycetophilids that are known to have saproxylic associations, which may indicate this to be the case in *M. lastovkai*.

Sciophila baltica

Two males were taken in the flight trap inside the hollow oak and found on the final collection on 16 July. This fungus gnat was first recognised in Britain subsequent to the publication of Falk (1991) and there was insufficient information for it to be fully assessed by Falk and Chandler (2005). It was first recognised as British from a single male found at part of the Ashridge Estate which lies in Buckinghamshire. Earlier specimens from the New Forest, Hampshire (1986) and Savernake Forest, Wiltshire (1974) were found to have been confused with *S. hirta* Meigen in collections. Ivan Perry has since found it again at both localities and Peter Chandler found it at Newark Park, Gloucestershire in 2004. A rearing record from Holne Wood NNR, Devon, attributed in error to *S. plurisetosa* Edwards (Chandler 1987, Falk and Chandler 2005), has been found to correctly refer to *S. baltica* (Peter Chandler *pers. comm.*). The increasing knowledge of the species has led to it being proposed for Nationally Scarce status at the next review.

The species has been reared on the Continent on two occasions. Zaitzev (1994) reared it from fungal mycelium on the surface of rotten wood, but Ševčík (2010) reared it from the terrestrial tooth fungus *Hydnum repandum*, noting that the larvae burrowed within the fruit body. The Devon record was of two males reared from a fruit body of *H. repandum*, together with several of both sexes of *S. varia* (Winnertz); again, larvae were developing internally within the fungus. This fungus is a widespread species, which has a mycorrhizal association with the roots of broad-leaved trees such as beech and oak in woodlands. These reports suggest that the larvae are fungus feeders but not specific to any particular species or ecological types. The known sites include ancient woodlands, current and former wood-pastures, and historic parkland.

Scenopinus niger

A male and a female *Scenopinus niger* were found in the flight trap within the hollow oak on 16 July. This species is a regular feature of flight traps placed inside hollow parkland trees. The author also has new records from Cornwall, Sussex, Kent, Derbyshire and Cheshire. It seems likely that it will lose Nationally Scarce status at the next review (Drake in prep.).

Lasiambia brevibucca

Records of *Lasiambia brevibucca* from Melbury Park are detailed elsewhere (Alexander 2014).

Acknowledgments

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Dipterists Digest 2014 **21**, 157-160

Helina deleta (Stein) (Diptera, Muscidae), new to Britain

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Summary
Helina deleta (Stein, 1914) is recorded as new to Britain, based on three females collected in water traps in West Suffolk.

Introduction

Among Diptera collected from water traps set in an area of grassland with veteran oaks and scrub in Beck Row, West Suffolk, AGI found three females of a species of *Helina* Robineau-Desvoidy that could not immediately be identified using the Handbook to British Muscidae (d'Assis-Fonseca 1968). Using the key to Central European Muscidae (Gregor *et al.* 2002), these females ran to *Helina deleta* (Stein, 1914), a species not previously known to occur in Britain. They were sent to ACP who confirmed the identification.

The water traps were set in Aspal Close, Beck Row, at TL699775 and TL698774, and the flies were removed from the traps on 28 September and 11 October 2012. The three females have been dried and pinned, and are deposited in the Castle Museum, Norwich, the Natural History Museum, London, and the Oxford University Museum of Natural History, Oxford.

The specimens were found during a Diptera survey that was commissioned by Forest Heath District Council who own and manage the site, which is a Local Nature Reserve. The survey formed part of the Council's ongoing management and monitoring of the site and, unusually, used local volunteers to carry out much of the field work, including environmental education sessions with young people. The water traps were set and serviced by M. Vernon and the local volunteers in conjunction with AGI. AGI was commissioned to undertake identification work and additional field surveying as part of the project.

Aspal Close LNR is notable for its population of 200 + veteran oak trees and the predominately calcareous Brecks grassland. Notable species known to occur on the site include saproxylic Coleoptera and aculeate Hymenoptera associated with these habitats. Diptera have not been previously surveyed on the site. Oliver Rackham has described the site as "one of the best examples of fields with trees once abundant in the Breckland", and "remarkable, even on a world scale, in still having well developed semi-natural grassland as well as trees" (Rackham 1997).

Recognition

Helina deleta is an unusual species of *Helina* as the female lacks the fixed black abdominal spots of most species of the genus and in general appearance most closely resembles a black-legged species of *Mydaea* Robineau-Desvoidy (Figs 1 and 2). The species is widely distributed in the Palaearctic region from Central and Southern Europe east through Siberia and China to Japan, and reaches the northern part of the Oriental region in Pakistan (Pont 1986, 2005).

Figs 1-2. *Helina deleta*, ♀ from Aspal Close, Beck Row, Suffolk: 1, lateral view; 2, dorsal view.

Helina deleta can be incorporated into the key to British *Helina* (d'Assis-Fonseca 1968) by the following couplets. Note that the setation of fore tibia varies, with 0, 1 or sometimes even 2 posterior setae present, and that *H. subvittata* (Séguy) is an older name for *H. rothi* Ringdahl of d'Assis-Fonseca.

Males

67 (66) Legs entirely black. Hind tibia without especially long anterodorsal setae. Prealar at least as long as 2nd notopleural.

67a (67b) Prosternum and katepimeron with setulae. Hind tibia with 6-8 anteroventral setae. Wing dark smoky, especially in basal part ..... *subvittata* (Séguy)

67b (67a) Prosternum and katepimeron bare. Hind tibia with 3-5 anteroventral setae. Wing intensively yellow, especially at base ..... *deleta* (Stein)

Females

55 (50) Katepisternal setae 1+2, sometimes with a second weak seta below the anterior seta, but then arista long-plumose and legs black.

55a (55b) Arista long-plumose. Legs black. Wing, especially at base, conspicuously yellow tinged. Prealar as long as 2nd notopleural. Palpus black. Abdomen without paired black spots ..... *deleta* (Stein)

55b (55a) Combined aristal plumosity at most little more than half as long as width of postpedicel. Legs mainly reddish-yellow. Other characters not present in combination.

Ecology and biology

ACP has collected *H. deleta* in Austria at around 1100 m, resting on bracken and foliage in glades in coniferous forest. In Poland, two females were collected on 28 July 2009 and 11

October 2008, netted whilst resting on shrubs in dense, hornbeam-dominated woodland next to an airfield (Grzywacz 2012 and *pers. comm.*). The larva has not been described but adults have been reared from the excrement of cattle and that of wild brown bears (Iwasa 2007).

An earlier record of *Helina deleta* in Britain?

In the report of a field meeting of the South London Entomological and Natural History Society at St Martha's, Chilworth, Surrey, on 12 May 1934 (Anon 1935), H.W. Andrews gave a list of Diptera captures. The report, probably written by the meeting leader Baron Charles de Worms, stated that: "Some 40 species of Diptera were either taken, or observed, and this number would probably have been well exceeded if members other than the writer had turned their attention to this Order ... Of the Anthomyiids, *Phaonia confluens*, Stein, and (?) *Helina deleta*, Stein, deserve special mention." The Andrews collection of Diptera is now the property of the British Entomological and Natural History Society and is in the Society's headquarters at Dinton Pastures Country Park, Reading. In order to check on this intriguing statement, ACP inspected the collection but could find no trace of *Helina deleta*, nor indeed of any species of *Helina* or *Mydaea* collected at Chilworth. Nor were any Chilworth specimens found among the other species mentioned in Andrews' report. Furthermore, according to Andrews' notebooks, he was collecting at Joyden's Wood, Bexley, Kent, on 12 May 1934. Chilworth is not known as an Andrews locality, and Peter Chandler (*pers. comm.*) is not aware of any specimens from there in Andrews' collection. So, despite the implication in the first sentence of his report, it seems that he must have been given these specimens to identify and that he then returned them to the collectors(s).

A search was also made for this specimen in the Verrall-Collin Diptera collection in the Oxford University Museum of Natural History, without success. It seems that this specimen, whatever it may have been, has been definitively lost. Finally, it should be noted that *Helina deleta* was not included in the 1945 *Check List of British Insects* (Kloet and Hincks 1945) and has never been formally recorded as a British species.

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We thank Matt Vernon, Countryside Officer at Forest Heath District Council for organising the survey. In addition, we would like to thank the local volunteers Penny Springham, Therese Hayes, Peter Hayes, Jennifer Hall, Rodi Mckenzie and Nick Turner for operating the traps, and Forest Heath District Council for funding the survey. We also thank Peter Chandler for his assistance during a visit by ACP to view the Andrews collection, and Nigel Wyatt for checking *Helina deleta* in the Natural History Museum, London.

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***Homalocephala biumbrata* (Wahlberg) (Diptera, Ulidiidae), a southern Scottish record and an additional host tree –** This attractively-patterned fly is confined in Britain to northern Scotland and was designated as RDB1 (Endangered) by S.J. Falk (1991. *A review of the scarce and threatened flies of Great Britain, Part 1.* Research and Survey in Nature Conservation, No. 39, NCC, Peterborough). As a larva, *H. biumbrata* develops under the bark of fallen aspen, *Populus tremula* (Salicaceae), and adults are most often seen on the bark of fallen tree trunks and branches (Rotheray, G.E. and MacGowan, I. 1998. The biology and early stages of *Homalocephala* (Diptera: Ulidiidae) in Britain. *British Journal of Entomology and Natural History* **10,** 139-144). Known from just 11 sites in Sutherland, Ross-shire, Nairn and Inverness-shire, a major centre for *H. biumbrata* is Strathspey, Inverness-shire (MacGowan, I. 1993. The Entomological value of Aspen in the Scottish Highlands. *Malloch Society Research Report* **1,** 1-43).

On 19.v.2014 we investigated a large, fallen, non-native *Populus* species, not *tremula*, in the grounds of SNH's Office and Conference Centre at Battleby (NO0829), just north of Perth, Perthshire. We found a large aggregation of red-brown acalyptrate puparia under the bark, from a sample of which, a few weeks later, 11 males and 4 females of *H. biumbrata* emerged. Identity was confirmed by using the key by H. Andersson (1991. Revision of Swedish *Homalocephala* Zetterstedt (Diptera, Otitidae) *Entomologisk Tidschrift* **112,** 27-32) and by comparison with named specimens in the collections of the National Museums of Scotland. This unexpected rearing result extends the southern limit of *H. biumbrata* and is also from a different, albeit related, host tree. These results raise the possibility of additional, ecologically less demanding members of the highland aspen saproxylic community not being so restricted and occurring further south in Scotland and using large diameter specimens of *Populus* species other than aspen for larval development – **GRAHAM E. ROTHERAY,** National Museums of Scotland, 242 West Granton Road, Edinburgh EH5 1JA and **IAIN MACGOWAN,** SNH, Battleby, Redgorton, Perth PH1 3EW

Dipterists Digest 2014 **21**, 161-164

Records of *Lasiambia brevibucca* (Duda) (Diptera, Chloropidae) from ten sites across England, with comments on habitat associations and conservation status

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Summary
Records are provided for the saproxylic fly *Lasiambia brevibucca* (Duda, 1933) (Diptera, Chloropidae) taken by flight trapping at ten new sites across what appear to be seven new vice counties. Knowledge of the British distribution and habitat associations are collated and discussed. The evidence confirms its current status as Nationally Scarce but the trend in record generation suggests significant under-recording in the past and it is predicted that the species may no longer warrant conservation status in the very near future.

The chloropid fly *Lasiambia brevibucca* was assessed as being of 'Notable' conservation status by Falk (1991), i.e. Nationally Scarce using modern terminology. It is unusual amongst Chloropidae in being saproxylic. Ismay (2000) recorded adults flying from June to August and associated it with veteran trees among other saproxylic habitats – it had been reared from both rot-hole debris of oak (*Quercus*) (A. Godfrey) and sappy bark of horse chestnut (*Aesculus*) (Godfrey 1998), and had been found on exposed heartwood of a sycamore (*Acer pseudoplatanus*) (Robertson 1999) and at sap flows on oak (also later published by Godfrey and Whitehead 2001). Allen (1981) had reported it together with the scarcer species *L. baliola* (Collin) from a large excrescence exuding sap on the trunk of a wych elm (*Ulmus glabra*) in a suburban avenue at Blackheath, SE London. The draft acalyptrate review (Falk, Ismay and Chandler, in preparation) reports adults flying about exposed heartwood of a beech (*Fagus*), from which the ant *Lasius brunneus* was emerging; the latter observation was in the Badger's Brook area of Windsor Forest, 3.vi.1980 (Peter Chandler *pers. comm.*). It has also been recorded at a sap flow on beech (David Gibbs *pers. comm.*) and Ivan Perry reports that it was frequent in S Cambridgeshire in the early 1980s, when it could be found on the trunks of elm affected by Dutch elm disease, which often had small lesions of sap on the bark.

Ismay (2000) provided details of a large number of records of material which he has examined personally, from 20 hectads in the following vice counties (V.C.s): 11 (South Hampshire), 15 and 16 (East and West Kent), 20 (Hertfordshire), 22 (Berkshire), 25 and 26 (East and West Suffolk), 29 (Cambridgeshire), 31 (Huntingdonshire), 34 (West Gloucestershire), 36 (Herefordshire), 54 (North Lincolnshire) and 64 (Mid-west Yorkshire). He also referred to a V.C. 83 (Midlothian) record (Robertson 1999). Clemons (2003, 2014) published two further records from woods in Kent. Gibbs (2006) added a Welsh record from Pant-lasau Farm, Morriston, Glamorgan (V.C. 41), swept from oak in an old field boundary, 15.viii.2005. The National Biodiversity Network Gateway contains another record from Glamorgan, which requires confirmation, and one from Leicestershire (V.C. 55). Barclay (2005) and Schulten *et al.* (2005) add two further localities from two additional V.C.s: 21 (Middlesex) and 18 (South Essex) respectively. Barclay (*loc. cit.*) also reported a new habitat association with old bracket fungi, although the tenerals that emerged only indicate pupariation in the fungus and provide no evidence of larval development there – the larvae may have left a wet rot-hole to seek a drier situation for pupariation.

Information on additional unpublished records has been provided by John and Barbara Ismay, Peter Chandler, David Gibbs, Andrew Godfrey and Ivan Perry. These include records

for 20 additional hectads and from the following additional vice-counties, all within the known range: 12 (North Hampshire), 14 (East Sussex), 17 (Surrey), 23 (Oxfordshire), 24 (Buckinghamshire), 30 (Bedfordshire) and 33 (East Gloucestershire).

The present author has increasingly been using small flight interception traps in site surveys (see Alexander and Chandler 2011, for example) and has been finding this fly on a regular basis across the North Midlands and the South West of England, in counties that may not have had any previous records. It has been found in ten sites out of the 21 that have been sampled using such traps, i.e. nearly half of sampled sites. The new sites bring the number of hectads known to the author to 56.

South Devon (V.C. 3): Cadhay Wood (SY0795) from traps under closed canopy woodland in two sites: 2♀ in trap within perched alder *Alnus* stand, and 1♀ from a trap under ash *Fraxinus* and birch *Betula* woodland, trap operated 18.vi-24.ix.2013, neither area with veteran trees but with a series of veteran oaks along the valley bottom close by.

Dorset (V.C. 9): Melbury Park SSSI (ST5606) 2♂ and 11♀ in a trap placed inside a hollow veteran parkland oak, operated 27.v-16.vii.2009.

Isle of Wight (V.C. 10): Briddlesford Copses SSSI in three separate traps: 1♀ in trap attached to standard oak within recently cutover coppice (SZ5491), 21.vi-20.viii.2012; several ♂ and ♀ in trap placed against white-rotten heartwood of a large veteran beech within closed canopy woodland (SZ5490), 21.vi-20.viii.2012; 1♀ in trap hung close to the trunk of a veteran oak standing within open woodland (SZ5490), 21.vi-20.viii.2012 and again 20.viii-29.x.2012.

Worcestershire (V.C. 37): Rough Hill Orchard, Birlingham (SO9244), 1♀ taken in a trap placed by a rot-hole on a veteran apple *Malus* tree in a traditional orchard, 20.viii-30.x.2013. The bracket fungus *Polyporus squamosus* fruited from the same rot-hole during the summer.

South Lincolnshire (V.C. 53): Belton Park (SK929395), 20.v-30.vii.2008, 1♀ at veteran oak, 1♀ at veteran sycamore.

Derbyshire (V.C. 57): Calke Park SSSI (SK3622), 1♂ and 4♀ in trap placed inside hollow horse chestnut with wet white-rotten heartwood below, operated 14.v-11.vii.2012; 2♀ in trap at entrance to wet rot-hole in another horse chestnut, 14.v-11.vii and again 11.vii-18.x.2012.

Hardwick Park (SK4663), several ♂ and ♀ in trap placed against trunk of ancient parkland oak, 11.vii-13.viii.2012 and 1♀ 13.viii-16.x.2012; numerous in trap placed against trunk of veteran parkland horse chestnut being rotted by oyster fungus *Pleurotus ostreatus*, 11.vii-13.viii.2012, and 2♀ 13.viii-16.x.2012.

Kedleston Park: 2♀ in trap placed by rot-hole in trunk of ancient parkland ash tree (SK3040), and another in trap placed inside hollow parkland oak (SK3049), 5.vi-3.vii.2013.

Cheshire (V.C. 58): Dunham Park (SJ736874), 1♂ at hollow veteran beech; 1♀ at veteran beech with brackets of *Ganoderma australe*, 22.v-23.vi.2008.

Hampers Wood, Lyme Park (SJ9682), 2♀ from trap placed against standing dead birch in 25.vii-15.x.2013.

Discussion

It should first be mentioned that Michael von Tschirnhaus (*pers. comm.*) has pointed out that *Lasiambia brevibucca* as presently interpreted consists of a pair of sibling species, difficult to distinguish, but of which one has three slightly impressed lines on the scutum including a median one along an acrostichal row as well as dorsocentral lines, the other only two such lines. It has yet to be clarified to which of these the name will apply but as both species are present in Britain (John Ismay *pers. comm.*) any potential conservation status of either of them is as yet unclear. However, all specimens reported here that it has been possible to check have three such lines, suggesting that it is the commoner species in Britain.

It is clearly widespread and not infrequent in suitable habitat across much of lowland England, from Devon in SW England across to Yorkshire in the north, and counties south-east across to Kent. It is currently only known from two sites in SE Wales and one in SE Scotland. There are no records from the hill country of the far west of Britain. Tree species associations appear unimportant other than through a requirement for broad-leaved trees with either i) some white-rot development, as rot-holes or heart-wood or sap-wood decay, or ii) flows and/or accumulations of sap. It has been found by the present author in association with horse chestnut, apple, ash, sycamore, beech, birch, alder and oak. Associations with elm and rearings from oak and horse chestnut have been reported above. The type of fungus causing the white rot may also be unimportant, with records from a sapwood rotter *Pleurotus ostreatus* and a rot-hole former *Polyporus squamosus* (both current author) and a heartwood rotter *Inonotus hispidus* (Barclay 2005) – for more information on types of fungal decay see Rayner and Boddy (1988). The majority of records appear to come from healthy trees, albeit many old and with advanced natural fungal decay of dead woody tissues. Sap flows are also not necessarily a sign of disease (D. Lonsdale *pers. comm.*). Only one record states a clear association with diseased trees and it is therefore incorrect to suggest that tree disease is an important aspect of its ecology. As mentioned earlier, it is reported as having become frequent in S Cambridgeshire in the early 1980s when it could be found on the trunks of elm affected by Dutch elm disease; since then it seems to have disappeared from this area (Ivan Perry *pers. comm.*). This may suggest that the species has the capacity to quickly respond to increased habitat availability and implies significant mobility within the landscape at that time. The complete loss of elm trees locally, however, eventually resulted in a severe crash as no other suitable trees appear to have been available. This appears to demonstrate that tree disease is not favourable to the species in the longer term.

It has been found in open parkland and a traditional orchard situation, associated with trees in hedges and suburban situations, as well as in closed canopy woodland conditions. While the new data mostly derives from open-grown veteran trees, other recorders have associated it with sap-runs, and some records are from shady woodland situations. The expression 'veteran tree' describes a tree with habitat features such as wounds and decay (Woodland Trust, undated). The probability of a tree providing suitable habitat clearly increases with the age of the individual tree concerned, with increasing physical damage as well as fungal decay of the increasing accumulations of dead heartwood. There is clearly no particular association with woodlands or parklands, only trees. Tree density and shading appear unimportant – while small shallow rot-holes may dry out when in an exposed situation, deeper rot-holes in older trees are normally well-buffered from the effects of drought. Overall, the species does appear to be more of a specialist of suitable standing live trees – no records report rearing from lying dead wood. There appears to be no strong association with long-established sites. The patchy knowledge of its distribution appears to reflect under-recording more than true rarity. The discovery of ten new sites, representing nearly half of 21 sites sampled using

flight interception traps does provide strong evidence for under-recording. Nationally Scarce is clearly still a valid British conservation status assessment based on the evidence collated here – it is known from 56 hectads – although the trend in records is clearly upwards and the species may no longer qualify for conservation status in the very near future. The key threats are i) loss of the existing older generation trees, with their wood-decay and sap flows, and ii) land management practices which do not result in sufficiently diverse age structures of trees that will sustain populations into the future. These apply to trees across the landscape and not just in particular situations.

Acknowledgements

I would like to thank Peter Chandler for identifying the Diptera from the flight interception traps samples and for stimulating and facilitating the compilation of this review. I am also grateful to him and to John and Barbara Ismay, Laurence Clemons, David Gibbs, Andrew Godfrey and Ivan Perry for information on their experience of this species.

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Dipterists Digest 2014 **21**, 165-169

Rhagio leg-waving is food-searching, but do *R. lineola* Fabricius females also signal (Diptera, Rhagionidae)?

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Summary
Rhagio lineola Fabricius and *R. tringarius* (Linnaeus) feed on material, probably pollen or aphid honey-dew, which they locate by sweeping their front legs across the surface of tree foliage. Their front tibiae have a few fine hairs that probably detect the material; these hairs are absent from other rhagionids. The front legs of female *R. lineola* are marginally more ornamented than those of the male and are more conspicuous during waving. This may be an uncommon example of reversal of normal sexual display in which males take the lead role, and it is interpreted as signalling to males using a pre-existing behaviour for locating food.

Introduction

Predatory and biting flies attract far more interest than do herbivores, resulting in a larger literature. Once it became clear that adults of most rhagionids were not predators, interest in their behaviour appears to have been minimal, although there are some publications on the morphology of rhagionid mouthparts (Chassagnard and Tsacas 1974, Panov 2001). Some early authors assumed, with no evidence beyond looking ferocious, that all rhagionids were predatory (Lundbeck 1907, Séguy 1926) but Bletchly and Varley (1955) showed conclusively that *Rhagio scolopaceus* (Linnaeus) was not a predator and inferred that it probably fed on nectar. Irwin (1984) saw *Rhagio notatus* (Meigen) feeding at aphid honey-dew. Majer (1997) repeated that some species of rhagionids other than *Symphoromyia* feed on nectar and pollen but does not quote sources for his statement.

Rhagio lineola Fabricius is a moderately common British species found in woodlands and at woodland edge, where the adults live on tree foliage. It is sometimes seen waving its front legs back and forth in a slow wide rowing-motion while it walks falteringly over leaves. I am not aware of any information on the purpose of this behaviour beyond the careful observations by Mik (1899, translated in full by Verrall 1909), who thought that the motion was either looking for food such as honey-dew, or testing the safety of their resting place. Oddly, he was inclined to the latter suggestion. Stubbs and Drake (2001) suggested that it was perhaps signalling by males. I watched several species of rhagionids and concluded that leg-waving of *R. lineola* and *R. tringarius* is a method of locating food on the leaves. They are not primarily signalling but, as I suggest below, this may be an example of courtship reversal, with the female taking the principal role.

Observations

Several of both sexes of *R. lineola* (many more females than males) and a few of each sex of *R. tringarius* were watched as they performed their leg-waving on a variety of tree leaves, including oak (*Quercus robur*), willows (*Salix* species) and English elm (*Ulmus procera* group) in my garden in Devon (ST313061, V.C. 9) over several days in mid July 2014. Sexes were easily distinguished by the tapered female abdomen compared to the nearly cylindrical and blunt-ended male. The basic motion in both sexes of both species was a slow back and forth sweep with an irregular frequency of about 2 to 3 per second, and superimposed on this was very fast, small amplitude vibration whose frequency was difficult to judge but likely to be in

the range of 20-40 beats per second. The slow motion swept horizontally across the surface of the leaf like that of an incompetent oarsman, with the right and left legs waving in unison or sometimes well out of synchrony, and between them swept an arc of about 90°. The vibration may have been up-and-down although this was almost impossible to see clearly. In *R. lineola*, almost the entire tarsus apparently hovered above the leaf surface whereas in *R. tringarius* the metatarsus was not so closely parallel to the leaf surface. In *R. tringarius*, the segments of the leg remained in a similar orientation to when the fly sat still, that is with each main segment moderately strongly angled to the next and not noticeably extended. In *R. lineola*, the leg often extended rather more, giving it a stiffer, straighter appearance.

After a few paces, something of interest was clearly found as the flies closed in with both legs before up-ending, rather like a duck, and fed on whatever it was – nothing was visible but presumably it was aphid honey-dew or clumps of pollen, which are well established as food for many Diptera (Rotheray and Gilbert 2011). Despite plentiful apparently suitable habitat in my garden, it took me a long time finding individuals of *Rhagio* which were clearly so scarce that their waving behaviour was not in obvious response to the presence of other individuals. *Rhagio* was clearly searching for food, rather than signalling to others. Other flies also fed from something on these leaves, particularly *Argyra*, *Dolichopus* and *Sybistroma obscurellum* (Fallén) (Dolichopodidae), *Beris*, *Chorisops* and *Sargus* (Stratiomyidae), Lauxaniidae and Muscidae.

In contrast to the nearly constantly active behaviour of *Rhagio*, which continued even in slightly drizzly conditions and towards sundown, several *Chrysopilus asiliformis* (Preyssler) sat still for long periods (sometimes for at least 30 minutes), standing on tip-toe with all but the last tarsal segment well away the leaf surface. They apparently did not feed on the leaves. On tall herbs in the garden, *C. cristatus* (Fabricius) also sat for long periods without apparently feeding. The morphology of the tarsi supports the assumption that *Rhagio* legs are adapted for detecting something on leaf surfaces whereas those of *Chrysopilus* are not. The ventral surface of the front tarsi, but not the mid or hind, of four *Rhagio* species in my collection (including *R. notatus* and *R. scolopaceus*) have a few fine, tapered and slightly curved hairs on each segment, resembling cats' whiskers, each marginally longer than the depth of the tarsus, whereas there are none in *Chrysopilus*, *Symphoromyia*, *Ptiolina* or *Spania* (Fig. 1). As Mik (1899) surmised, these hairs are assumed to be tactile organs; I assume that they perceive either sticky or lumpy objects on the leaf surface.

Nearly all observations of about 30 feeding flies were made on the foliage of two small oak trees (c. 10m high) whereas only three flies fed on grey willow (*Salix cinerea*), one on elm and none on hazel (*Corylus avellana*) or alder (*Alnus glutinosa*), the last two trees being abundant in the garden. This pronounced preference for oak leaves may be explained by their surface being smooth and hairless, compared to the finely pubescent and sometimes finely rugose upper surface of the other four tree species; such plant hairs may interfere with the flies' ability to detect objects on the leaf surface using whisker-like detectors on their tarsi.

A preference by *R. lineola* for oak was anecdotally confirmed by sweeping foliage of different tree species on Burridge Common, adjacent to my garden. Few individuals were found on foliage other than that of oak, whereas several individuals were swept from single small oak trees, using approximately the same amount of collecting effort.

The origin of material being eaten was not determined. When examined at x40 under a binocular microscope, the surface of oak leaves was thinly covered with dust-like detritus of indeterminate nature, although some was almost certainly grass pollen as it resembled pollen obtained from creeping soft-grass (*Holcus mollis*) growing in abundance under the oak trees. There were rare tiny sticky patches, assumed to be honey-dew, occasional dark dry smears, and

more frequent black deposits 0.25-0.75mm across that were presumed to be faecal droppings of a herbivore as, in alcohol, they turned green, suggesting that chlorophyll was present, and disaggregated quickly into tiny particles. Frequent invertebrates obtained by beating the terminal oak twigs and seen on the leaves under a microscope, and which may have contributed to the deposits in some way, were mites, immature spiders, sminthurid springtails, thrips, psocids, aphids, occasional mirids and the leaf-hopper *Alebra albostriella* (Fallén) (Hemiptera). Aphids were uncommon and their population size seemed too low to support the number of flies (of all families) feeding on the leaves.

Discussion

Leaf surfaces trap pollen and fungal spores (Bailey *et al.* 2006) which probably provide a food source for flies, and honey-dew from aphids has long been regarded as an important food resource. It seems probable that these potential food sources are eaten by *Rhagio*. Many flies detect food using chemical sensors in their tarsi, as is well established for culicids and calliphorids, and in this study stratiomyids were seen walking quickly over the surface and stopping to feed without first testing the surface using their mouthparts.

Rhagio uses a complex touch mechanism for locating food on the surface of leaves. Its origin may be in haematophagy, as the related Tabanidae also wave their legs in a similar manner, although without the vibration, as can be seen when *Haematopota* lands on us to feed. Nagatomi (1962) described leg-waving in search of food in both sexes of three Japanese species of Athericidae on leaf surfaces almost identical to that of *Rhagio*, although he did not mention vibration. As Mik (1899) observed, tabanids have hairs similar to those on the front tarsi of *Rhagio*, and within related genera in the British fauna the hairs are found in the rhagionid *Symphoromyia crassicornis* (Panzer) and in the athericids *Atrichops crassipes* (Meigen) and *Ibisia marginata* (Fabricius) (but not in *S. immaculata* (Meigen) or *Atherix ibis* (Fabricius)). The significance of tactile hairs in *Symphoromyia* and athericids is that there are blood-feeding representatives in non-British species of *Symphoromyia* and the Australian rhagionid genus *Spaniopsis* and in the athericid genera *Dasyomma* and *Suragina* as well as in *Atrichops crassipes* (Desportes 1942, Nagatomi 1962). However, the evolution of blood-feeding in these three related families remains unclear (Kerr, 2004), so the relationship between tarsal chaetotaxy and feeding behaviour of putative ancestors is purely speculative, particularly as both sexes have tactile hairs yet only females take blood meals.

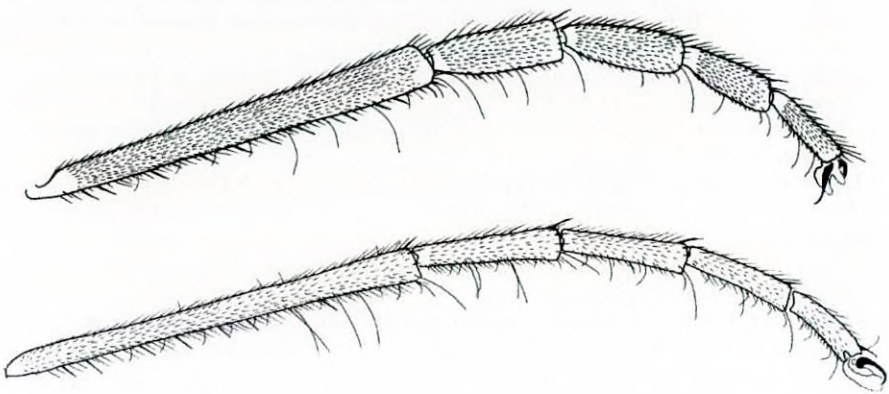

Fig. 1. Front tarsus of female (above) and male (below) of *Rhagio lineola* in lateral view.

Of greater interest is that the prosaic explanation of the behaviour as a means of detecting food does not explain the sexual dimorphic leg morphology of *R. lineola*. While there is no difference between sexes of other common British *Rhagio* species in the shape, colour and pubescence of the lower front leg, female *R. lineola* have a slightly swollen (deepened) front tarsus that is almost entirely dark to black, and the pubescence on the tibia's pale section is also pale, giving strong tonal contrast and additional reflectivity compared to the unmodified slender and cylindrical male tarsus and tibia, which are mainly pale with uniform black pubescence (Fig. 1). When waving, the front legs of female *R. lineola* are markedly more conspicuous compared to those of males by virtue of their greater contrast, and are strikingly obvious from at least 1 metre distance. Perhaps the rapid vibration helps to make the already pale but narrow tibia look fatter. In comparison, until one had looked closely, the waving and vibrating legs of males were barely noticeable against the leaf surface whose tonal colour was similar to that of the leg. It seems possible that the female may have adapted food-searching behaviour to also signal to males. This would make use of an existing feature – the ability to vibrate legs – to enhance the signal instead of developing a fringe of hairs or a thicker tibia, which no rhagionid appears to exhibit, although males of *Symphoromyia crassicornis* (Panzer) and *S. immaculata* (Meigen) do have long femoral fringes. If this suggestion is true, it may be an example of female leg ornamentation being better developed than that of males, which is uncommon in Diptera with the notable exception of the genera *Empis* and *Rhamphomyia* (Empididae), in which it has been taken to extremes in some species. It is an obvious mechanism for a large species present at low densities living in the canopy of deciduous woodland.

As always, more observations are needed to confirm or refute this idea, and notably whether any interaction can be seen between individuals of *R. lineola*.

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***Chrysopilus laetus* (Zetterstedt) (Diptera, Rhagionidae) in North London in 2014 –** On 31 May 2014, on Hackney's East Marsh (TQ370861), a female *Chrysopilus laetus* (Zetterstedt) was found sitting on *Buddleia* near a fallen poplar (*Populus*). Several tall mature poplars had lost their upper half in late winter storms, and most of the fallen timber had been cut and stacked in log piles. Five miles north-west of this location in Downhills Park Tottenham (TQ324896), three females were found on 27 June and 1 and 13 July. These were on or beside a single mature hollow poplar, which had fallen in January and had been allowed to remain where it fell. On 7 July, in Epping Forest (TQ402956), a further three females were found on fallen beech (*Fagus*), and two females emerged on 23 and 29 June from thick wet paste scooped from fallen beech in Windsor Great Park (SU933743) on 5 June. Traditionally *C. laetus* has been associated with this species of tree as well as poplar (*Populus*). A female of *C. laetus* is illustrated below.

Martin Drake (in preparation. A review of the status of the scarce and threatened "Larger Brachycera" flies of Great Britain, Asilidae, Bombyliidae, Xylophagidae, Athericidae, Rhagionidae, Tabanidae, Xylomyidae, Stratiomyidae, Acroceridae, Therevidae, Scenopinidae) writes that it is also found on birch (*Betula*) and where old hornbeam (*Carpinus*) was the most abundant tree and that, since the 1991 review of its status, the species has expanded its range from the Thames Basin to other parts of southern England. He also points out that "in view of the relatively uncommon habitat of heartwood-rotted old trees and the vulnerability of such trees to being felled for safety reasons, there is still a greater risk of the species reverting to its former very rare condition". Wildlife areas in urban parks, with the policy of leaving of logs and fallen timber on site, therefore appear as a positive contrast to such decline – **JEREMY RICHARDSON,** 12 Martlesham, Adams Road, London N17 6HT

Corrections and changes to the Diptera Checklist (32) – 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 4 species, resulting in a new total of **7092** species (of which 38 are recorded only from Ireland).

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

Limoniidae. The following species is added in the present issue:
Pilaria ***nigropunctata*** (Agrell, 1945 – *Limnophila*)

Dolichopodidae. The following species is added in the present issue:
Neurigona ***erichsoni*** (Zetterstedt, 1843 – *Dolichopus*)

Chloropidae. In the previous issue the finding of *Homalura tarsata* was erroneously attributed to C.W. Plant; this is corrected to D.A. Smith in the present issue.

Scathophagidae. The following changes result from V. MICHELSEN and J.E. O'HARA (2014. Review of genus-group names in Diptera (Insecta) that J.C. Fabricius "borrowed" from other Dipterists and proposed as new in his systematic works from 1775 to 1805. *Zootaxa* **3873**(1), 73-81):

Norellisoma spinimanum (Fallén, 1819) = *Scatophaga suilla* Fabricius, 1794, syn. nov.: although *suilla* has priority the name *Cordylura spinimana* Fallén, 1819 is conserved as a *nomen protectum* by reversal of precedence and *suilla* is treated as a *nomen oblitum*.

Scathophaga ***spurca*** Meigen, 1826 = *S. suilla* authors, not (Fabricius, 1794), misident.

Anthomyiidae. The following species is added in the present issue:
Anthomyia ***plurinotata*** Brullé, 1833

Muscidae. The following species is added in the present issue:
Helina ***deleta*** (Stein, 1914 – *Mydaea*)

***Villa cingulata* (Meigen) (Diptera, Bombyliidae) in Dorset –** During late July 2014, it was my good fortune to encounter *Villa cingulata* (Meigen, 1804) in an area of chalk grassland in the Cranborne Chase area of north-east Dorset. My first observation was on 23 July 2014 and the individual concerned was noted nectaring on wild carrot *Daucus carota*; it seemed unconcerned by my presence, and was easily caught. Then, a second *V. cingulata* was briefly noted in the same area. Later, a third was seen, although this was some distance from the previous sightings (a distance of about ½ mile). The last of these proved easy to approach, allowing me to take a large number of photographs, and after being observed for some time, it was then left alone, and there were no further *V. cingulata* observations on that day. All of those seen were females.

I returned to the same general area over the course of the next three weeks or so, checking nearby areas within a two mile radius for any additional *V. cingulata* populations, but, none were found. There was a clear dearth of most of the plant species that were present at the known *V. cingulata* site and generally all surrounding areas were lacking the floristic richness of the confirmed site. So it was the original site that was to provide my next *V. cingulata* observation and this took place on 29 July 2014; on this occasion additional notes and photographs were taken. The exact locality is little more then a herb-rich track, with typical chalk downland plants like wild carrot *Daucus carota*, bird's foot trefoil *Lotus corniculatus*, yarrow *Achillea millefolium*, and various species of clover *Trifolium* species etc, with both sides of the track bordered here and there with wild parsnip *Pastinaca sativa.*

The relevant part of this track extends for about a half mile, with the habitat contained within the track more diverse than the bordering fields, which are mostly cattle grazed. However, towards its northern end, the options for plants and insects alike are extended by an adjacent slope, which slightly steepens and this is increasingly apparent towards the north-western edge of the site. This slope is furnished with typical chalk downland flowers, thus supporting some additional chalk downland species of which the RDB2 asilid *Machimus rusticus* (Meigen, 1820) was the most noteworthy; other species included the Notable syrphid *Cheilosia soror* (Zetterstedt, 1843) and the RDB3 cerambycid *Paracorymbia fulva* (De Geer, 1775). It is hoped that more Dorset localities for *V. cingulata* will eventually be found. Also, there is the possibility that *V. cingulata* could occur at some similar looking sites over the county border in the Martin Down area of Wiltshire, and it would not surprise me in the least if it occurred there. The fact remains that its appearance in Dorset is quite a distance from its known sites, the nearest of which are in South Hampshire and North Wiltshire, and there are no records for South Wiltshire at the time of writing – **MICK PARKER,** 9 East Wyld Road, Weymouth, Dorset, DT4 0RP

***Villa cingulata* (Meigen) (Diptera, Bombyliidae) at Bushy Park, Middlesex –** On 20 July 2013 Martin Harvey was running a butterfly identification course for the Field Studies Council at Bushy Park, when he observed two adults of *Villa cingulata* (Meigen, 1804) in an area of herb-rich hay meadow (TQ14686942) and reported this on line (http://www.ispot.org.uk/node/351674), with photographs of the fly and its habitat. This was a surprising find, being some distance from known sites and not being the typical chalk downland habitat, so he caught a male and confirmed its identity by examination of the genitalia. This record from neutral grassland was also included in Martin's account of the distribution of the species (Harvey, M.C. 2013. Downland *Villa* on the move? *Soldierflies and Allies Recording*

Scheme Newsletter 1, autumn 2013, pp 1-2. Bulletin of the Dipterists Forum No 76 Autumn 2013). Steven Falk's photographs of the fly appear on the inside rear cover of that Bulletin.

I have been visiting Bushy Park regularly to survey for Diptera since 2011 but had not yet included the hay meadows, which are situated at the western end of the Park outside the public access areas, in these visits. I made a preliminary visit in August 2013 to the area where Martin had found *V. cingulata*, but it was very soon cut for hay, precluding much further investigation in that year. I included this area on each occasion when I resumed visits in 2014, from 23 May onwards and adults of *V. cingulata* were observed on two occasions. Firstly a male was swept on 20 June, but no others were seen during extensive sweeping of the area on that date. None were found on the next visit on 4 July, but several were observed on the subsequent visit on 17 July. On both occasions they were in the middle of the field near the diagonal mown path crossing it. Martin Harvey (*pers. comm.*) also visited the site on 21 June and 19 July 2014 and saw several individuals of *V. cingulata* on the second of these occasions.

On 17 July 2014 I first saw a pair hovering around each other in flight about a metre from the ground, and they were netted to confirm their identity. Then a few minutes later a male was seen hovering lower among the tall sward and it was soon apparent that a female that had settled on a stem about 15cm from the ground was the source of its attention. The male then landed about 2cm behind the female and slowly approached it. As contact was made the female instantly took off and hovered nearby, followed by the male which then hovered over it in flight for a short time before the female landed in a similar position to that previously occupied. After a few minutes hovering over the female, the male then landed at the same distance behind it and repeated the approach as before. Following the female taking off again, the process was repeated a third time. After the female had settled again, and while the male was still in flight, another beefly flew past, distracting the male which chased after it and it was not seen to return to find the female again. The whole period of observation lasted about 20 minutes.

The *Villa* site is a small very flowery field, bordered to the west by horse-grazed paddocks, to the south by the lime avenue and to the north and east by the wooded fringe bordering the Longford River opposite Waterhouse Plantation. It is linked by a strip of similar vegetation running north towards the much larger Brewhouse Fields, all three of these areas being similarly managed for hay. In May and June the dominant flowers were ox-eye daisy *Leucanthemum vulgare*, bird's foot trefoil *Lotus corniculatus* and yellow rattle *Rhinanthus minor*, with common knapweed *Centaurea nigra* and ragwort *Senecio jacobaea* becoming more prominent later in the season. On 30 July ragwort was being pulled preliminary to hay cutting; the cutting had not yet taken place on 15 August, but had been completed by 29 August. Some ragwort and knapweed remained in the field margins, and the abundance of tephritids that develop in flowerheads during visits from May to August suggested that the management had not adversely affected tephritid populations. The 13 species recorded included two on ragwort – *Campiglossa malaris* (Séguy, 1934) and *Sphenella marginata* (Fallén, 1814) – and all five of those developing in common knapweed – *Acinia corniculata* (Zetterstedt, 1819) was numerous on several visits from 20 June onwards, even found flying over the cuttings on 29 August.

Clearly *Villa cingulata* has also survived the management for hay at Bushy Park since 2013, though it is not known how long the population has been established at this site, and its precise biological requirements remain unknown.

Martin Harvey (*pers. comm.*) has reflected that although *V. cingulata* appears to be confined to flower-rich sites, its requirements for nectar do not seem to be especially demanding, so has suggested that its potential larval hosts are perhaps species that feed on some of the less widespread meadow plants – **PETER CHANDLER,** 606B Berryfield Lane, Melksham, Wilts SN12 6EL

Some observations on Agromyzidae (Diptera) in Suffolk – This note records two species of agromyzids reared from mined leaves found near my home in Ipswich, (TM166450), East Suffolk.

On 16 June 2014, I collected a mined nipplewort (*Lapsana communis*) leaf, which was growing at the base of a wall in the street near my house. The whitish blotch mine extended along the mid-rib with offshoots into the leaf blade.

Fig. 1. Nipplewort leaf with mine.

I kept the leaf in a plastic bag until, on 26 June, a fly emerged. A yellow/brown puparium was found in the bag afterwards. The small black fly was compared with the key by K.A. Spencer (1972. Diptera Agromyzidae. *Handbooks for the identification of British Insects* Vol. 10 Part 5g. Royal Entomological Society of London) and identified as *Ophiomyia cunctata* (Hendel, 1920). The identification was confirmed by Miloš Cerny.

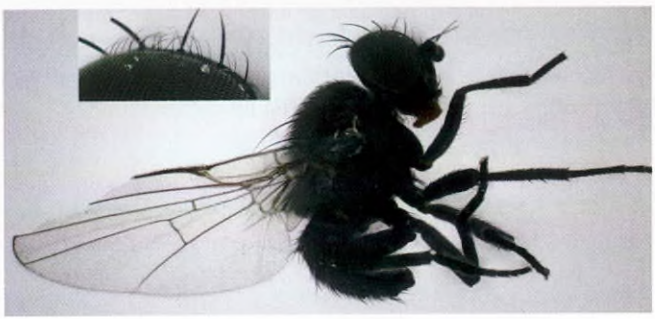

Fig. 2. *Ophiomyia cunctata* (Hendel, 1920).

The inset close-up in the photograph (Fig. 2) shows the orbital setulae of the specimen, which are a very good match to the figure given by K.A. Spencer (1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna entomologica scandinavica* Vol 5. Part 1. Scandinavian Science Press Ltd), which he described as "unique to *Ophiomyia cunctata*". Spencer (1972) reported a single previous Suffolk observation of this species from Newmarket (J.E. Collin). I suspect that this is a case of under-reporting. Nipplewort is a very common weed and, around here at least, many of the leaves have been mined.

The apple mint (*Mentha suaveolens*) in my back garden was also mined extensively this summer. I took a few leaves on 5 July and kept them to see what emerged. On 11 July, I found 8 small brown puparia on one of the leaves. These hatched into small black flies on 19 July, only 1 of which was obviously male. I photographed the leaf, the puparia and the male adult fly. To my great frustration I lost the abdomen when I was detaching it to get a better look at the genitalia! Using the keys in Spencer (1972, 1976) and information provided by www.ukflymines.co.uk/, www.leafmines.co.uk and www.bladmineerders.nl, I identified the fly as *Phytomyza petoei* Hering, 1924.

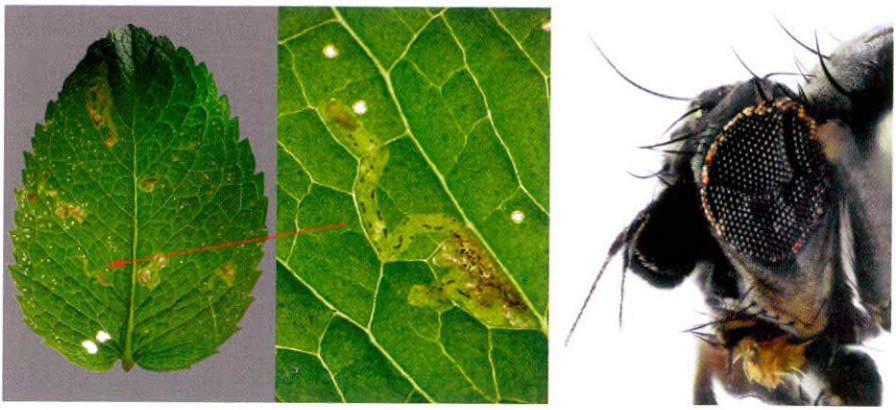

Fig. 3. Mine and lateral view of head of *Phytomyza petoei* Hering, 1924

This identification was confirmed by Miloš Cerny. Spencer (1972) gave the distribution of this species as "Probably not uncommon in south". There were so many mines on the leaves of my mint that it was quite hard to find enough unspoilt leaves to make the mint sauce.

I am grateful to Laurence Clemons, John Coldwell, Tony Irwin, David Henshaw and Miloš Cerny for assistance with identification and other information – **MARTIN COOPER,** 49 Bolton Lane, Ipswich, Suffolk IP4 2BX

Dipterists Digest 2014 **21**, 175-183

Neurigona erichsoni (Zetterstedt) (Diptera, Dolichopodidae) new to Britain, and a key to the British species

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Summary
Neurigona erichsoni (Zetterstedt, 1843) is reported for the first time in Britain from Dorset and Surrey in southern England. The sites are ancient deciduous woodlands. A key with illustrations is given to both sexes of the six known British species.

Introduction

Neurigona is one of the more distinct genera of dolichopodids as the adults are mainly or entirely yellow, quite large and often very long-legged. Four species were included by d'Assis-Fonseca (1978) in his key to *Neurigona*. Three of these, *N. pallida* (Fallén), *N. quadrifasciata* (Fabricius) and *N. suturalis* (Fallén) are moderately widespread in Britain but *N. abdominalis* (Fallén) is rare, being known from just a few sites in Eastern England (Bowden 1998; Falk and Crossley 2005; Laurence 1993, 1995). Cole (1991) added *N. biflexa* Strobl on the basis of a single female from Anglesey, and this remains the only record of the species in Britain. Here we report finding *N. erichsoni* in Britain. As six species of *Neurigona* are now known from Britain, an updated key with illustrations is appropriate.

Sites and records

In 2012 the opportunity arose for JH to set Malaise traps in two adjacent compartments of woodland on the Rushmore Estate close to the Dorset / Wiltshire border and part of Cranborne Chase in southern England. These woodlands cover 800 ha, of which 400 ha is semi-natural woodland, and form one of the largest woodland SSSIs in England. Different parts are managed as coppice or high forest. A study was initiated by Dorset County Council and Dorset Biological Records Centre to investigate the conservation benefits of the two types of management, since low-intensity management of high forest is a potentially economically sustainable approach to the management of broadleaved woodland as an alternative to grant-dependent coppicing or complete non-intervention or neglect. This study included comparing the dipteran biodiversity of the two management systems.

In the study area at Half Hide Coppice, a Malaise trap was set up in a small clearing made in the dense undergrowth that had grown up between the hazel stands (ST95591642) (site H), whilst another was positioned in a natural clearing between hazel stands and mature broadleaf trees (ST95511647) (site M). The traps were left in position from 10 July to 17 July 2012. In total 222 dipteran species were recorded, 142 species in (M) and 150 in (H). They included 16 species of Dolichopodidae, among which were two species of *Neurigona*, one of which keyed out to *N. suturalis* and the other, even though both males and females were present, did not conform in either case to the keys by d'Assis-Fonseca (1978). Six males and eight females of the unidentified dolichopodid were recorded altogether from both sites. Specimens of both male and female were sent to CMD for his assessment as JH had lost confidence in the key. They were identified unmistakeably as *N. erichsoni* using Parent (1938) and later compared with specimens in the Natural History Museum, London. *Neurigona*

erichsoni is one of the predominantly yellow species with a banded abdomen. Males have relatively short tarsi and the whole fly is rather short compared to the elongate form of most other *Neurigona* species. They also differ from all other British species in having eyes that touch on the face. The females differ from related species in the tergite bands bearing deep lunules that are about half the tergite's length and which are not indented on the mid-line. More details are given in the key below.

The other dolichopodids recorded at Half Hide Coppice did not form a noteworthy assemblage. They included species typical of woodland or shaded wetland – *Argyra leucocephala* (Meigen), *Chrysotimus flaviventris* (von Roser), *Dolichopus discifer* Stannius, *D. urbanus* Meigen, *Neurigona suturalis* (Fallén), *Rhaphium appendiculatum* Zetterstedt, *Sciapus platypterus* (Fabricius) and *Sybistroma obscurellum* (Fallén) – and the common species of open habitats *Chrysotus blepharosceles* Kowarz, *C. gramineus* (Fallén), *C. neglectus* (Wiedemann), *Dolichopus griseipennis* Stannius, *D. trivialis* Haliday, *D. ungulatus* (Linnaeus) and *Poecilobothrus nobilitatus* (Linnaeus).

Another record was made the following year by Andrew Godfrey, who trapped two males in a Malaise trap set in Cherkley Wood, which is ancient woodland near Leatherhead, Surrey, in southern England (TQ188544) on 10 August 2013. The dipteran fauna of the wood was outstanding and included a species of *Lonchaea* new to Britain, and the rare species *Chrysopilus laetus* Zetterstedt (Rhagionidae), *Rhamphomyia marginata* (Fabricius) (Empididae) and both species of *Nephrocerus* (Pipunculidae). *Neurigona suturalis* and *N. quadrifasciata* were also present in the same sample as *N. erichsoni*.

The discovery of *Neurigona erichsoni* in Britain may have been expected as it is one of the four species of *Neurigona* that are widespread in Europe, along with *N. pallida*, *N. quadrifasciata* and *N. suturalis*. Presumably because he knew of no specimens, Verrall (1904) dismissed Walker's (1851) inclusion of *N. erichsoni* which Walker appears to have assumed was in the Curtis and Clifton collections (he added '?' after these named collections). But if Verrall was too hasty in his assumption, then the species is a long-standing member of the British fauna rather than a recent immigrant. Lundbeck (1912) and Parent (1938) long ago included it in their countries' lists (Denmark and France, respectively). Pollet *et al.* (2012) gave a wide distribution from France to central Russia and northwards to Sweden. With a separation of about 125km, its occurrence at the two English sites suggests that it is likely to occur more widely in central-southern England. With only two records, it is unwise to speculate whether there is any significance in the flies being trapped rather than netted.

Identification

The six British species are covered in the key by Parent (1938), but not in his descriptions, and five (excluding *N. biflexa*) were included by Lundbeck (1912) and Grichanov (2006). These and many other species are covered by Negrobov and Fursov (1988) and Grichanov (2007, 2010), but their keys do not include figures of the British species. Other authors illustrate several of the British species, including the genitalia of *N. pallida* (Becker 1918, Weber 1989), *N. quadrifasciata* (Becker 1918, Buchmann 1961, Ulrich 1974, Weber 1989) and *N. suturalis* (Weber 1989). As there are many more species in the Palaearctic (for example, Negrobov 1987, 1988, Negrobov and Fursov 1985, Negrobov and Zuricov 1990, Pârvu 1997), it is useful to illustrate all the British species to help confirm identifications and prevent any further new species being overlooked.

The wing, genitalia and front tarsi of the males are illustrated, the abdomen of both sexes of the four species with dark markings, and the wing of female *N. suturalis* as this species shows sexual dimorphism in wing shape. Drawings of the two rare British species were made

from pinned specimens in the Natural History Museum, London: *N. abdominalis* – Letchworth, Hertfordshire, England (leg. F.W. Edwards); *N. biflexa* – Barranco do Velho, Algarve, Portugal and León, near Corullón, Spain (both leg. C.E. Dyte). The remaining specimens were in the first author's collection, collected from sites in England, and drawings were made from specimens that are either pinned or preserved in ethanol.

In the key below, features additional to those needed in the couplets are included in parentheses where they provide useful confirmatory characters. All the features except the eyes and face are shown in the figures. Wing lengths should not be taken too literally as they are mainly from the few specimens in CMD's collection, and of single specimens of *N. abdominalis* and *N. biflexa* in the NHM, London.

Key to British species

Males

1 Abdomen with black bands (Fig. 2) 2
- Abdomen entirely yellow, without dark bands 5

2 Mesonotum almost entirely shining yellow, with only a small dark prescutellar mark (Fig. 2). Abdominal segments scarcely longer than wide; bands on tergites 2-4 at least half the tergite's length on the midline. Eyes touching on the face. [Front tarsus with the last four segments very short, altogether only ⅔ length of the metatarsus (Fig. 4). Wing length 3.5mm] ..... *erichsoni*
- Mesonotum mainly or entirely grey. Abdominal segments at least 1.5 times longer than wide, with tergite bands substantially less than half the tergite length on the midline. Eyes separated by about the width of the front metatarsus to give a parallel-sided silvery face 3

3 Front tarsus unmodified, slender and pale (Fig. 4). Wing vein M gently bowed, not sinuate; anal lobe absent (Fig. 1). [Hind tibia dark. Front part of wing slightly darkened (Fig. 1). Wing length 5.0–5.5mm] ..... *suturalis*
- Front tarsus black or bi-coloured; with modified setae. Wing vein M sinuate; anal lobe present 4

4 Front tarsus with conspicuous lateral feathering of flat black setae on the third and fourth segments, contrasting with the white tarsomeres 1, 2 and 5; tarsomeres 1 and 2 very long and slender (Fig. 4). [Last large (5th) tergite pale, the posterior margin bearing long curled pale setae. Wing length 4.7–5.4mm] ..... *quadrifasciata*
- Front tarsus black and uniformly thick, almost as wide as front tibia and clearly thicker than mid tarsus; tarsomeres 3-5 with dense ventral pile that contributes to the chunky appearance. [Last large (4th) tergite unremarkable, bearing only short marginal setae. Wing length 7.0mm] ..... *biflexa*

5 Mesonotum entirely yellow. Mid femur beneath at the base with 3-4 short flat bristles (Fig. 4). Front tarsi almost unmodified, the fourth segment slightly clubbed. [Large almost entirely yellow fly with 4th and 5th abdominal segments and genital capsule projecting ventrally (Fig. 3). Wing length 5.3–5.5mm] ..... *pallida*

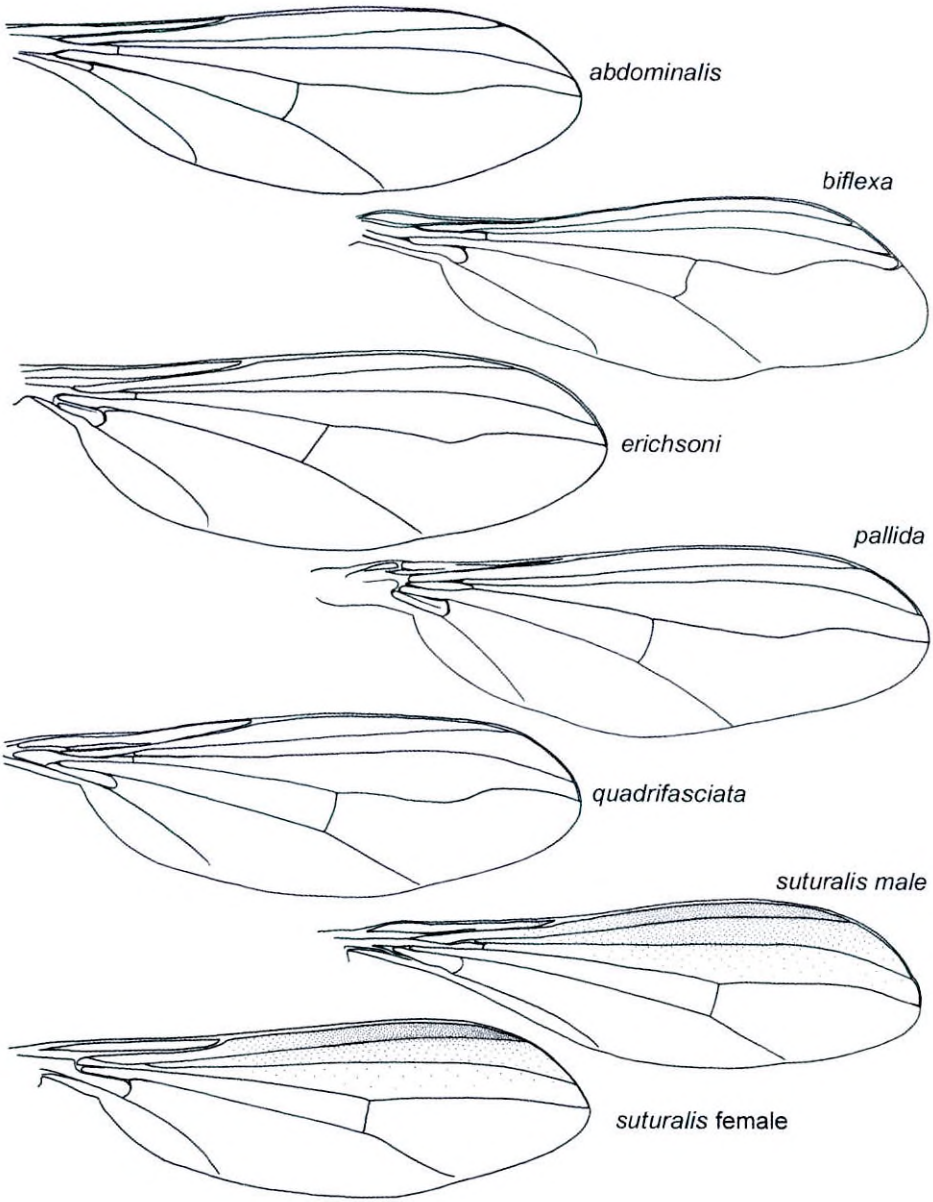

Fig. 1. Wings of *Neurigona*. Males of all species and female of *N. suturalis*.

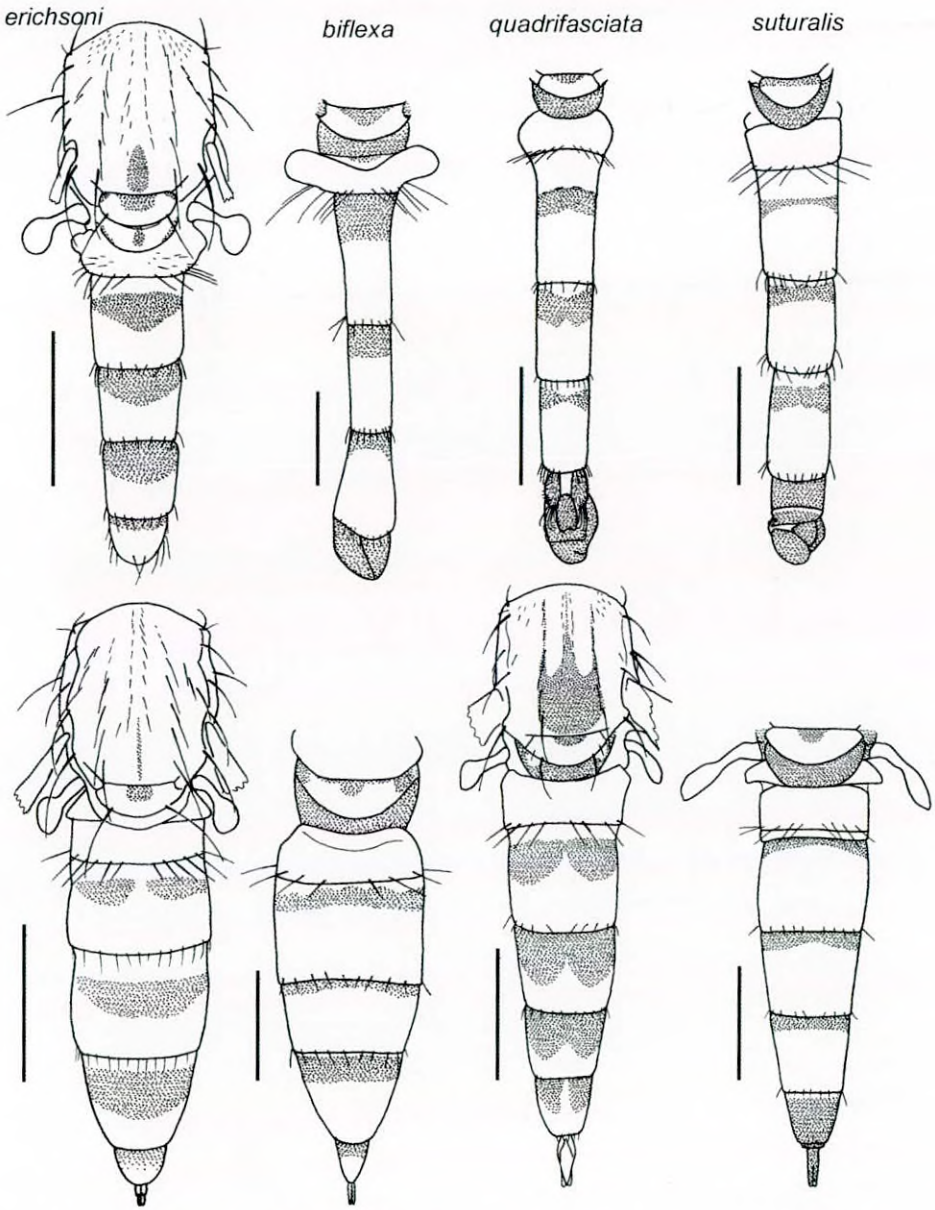

Fig. 2. Dorsal view of the four species of *Neurigona* with either a patterned abdomen or thoracic dorsum. Males above, females below. Scale lines – 1mm.

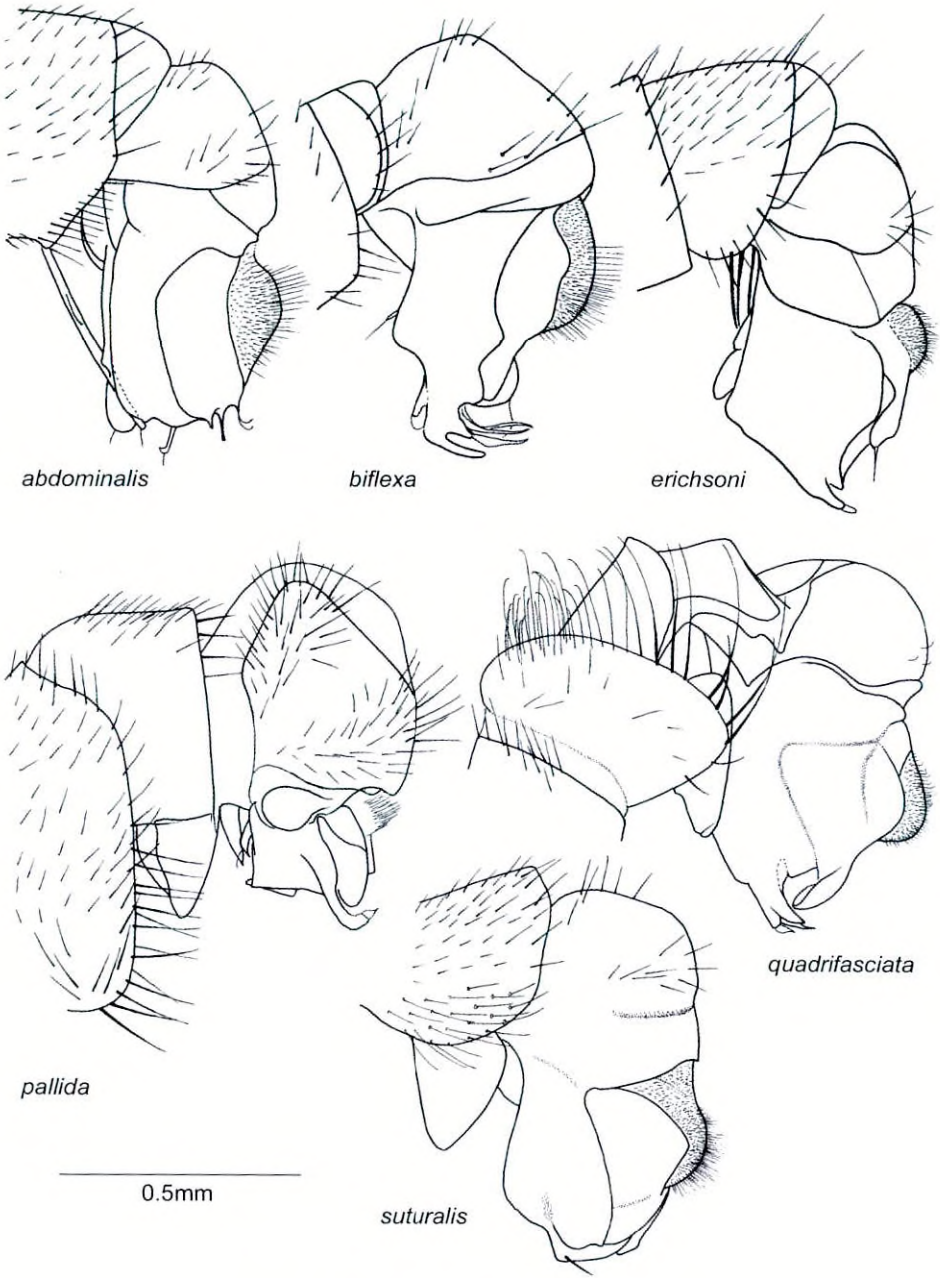

Fig. 3. Male genitalia of *Neurigona* species.

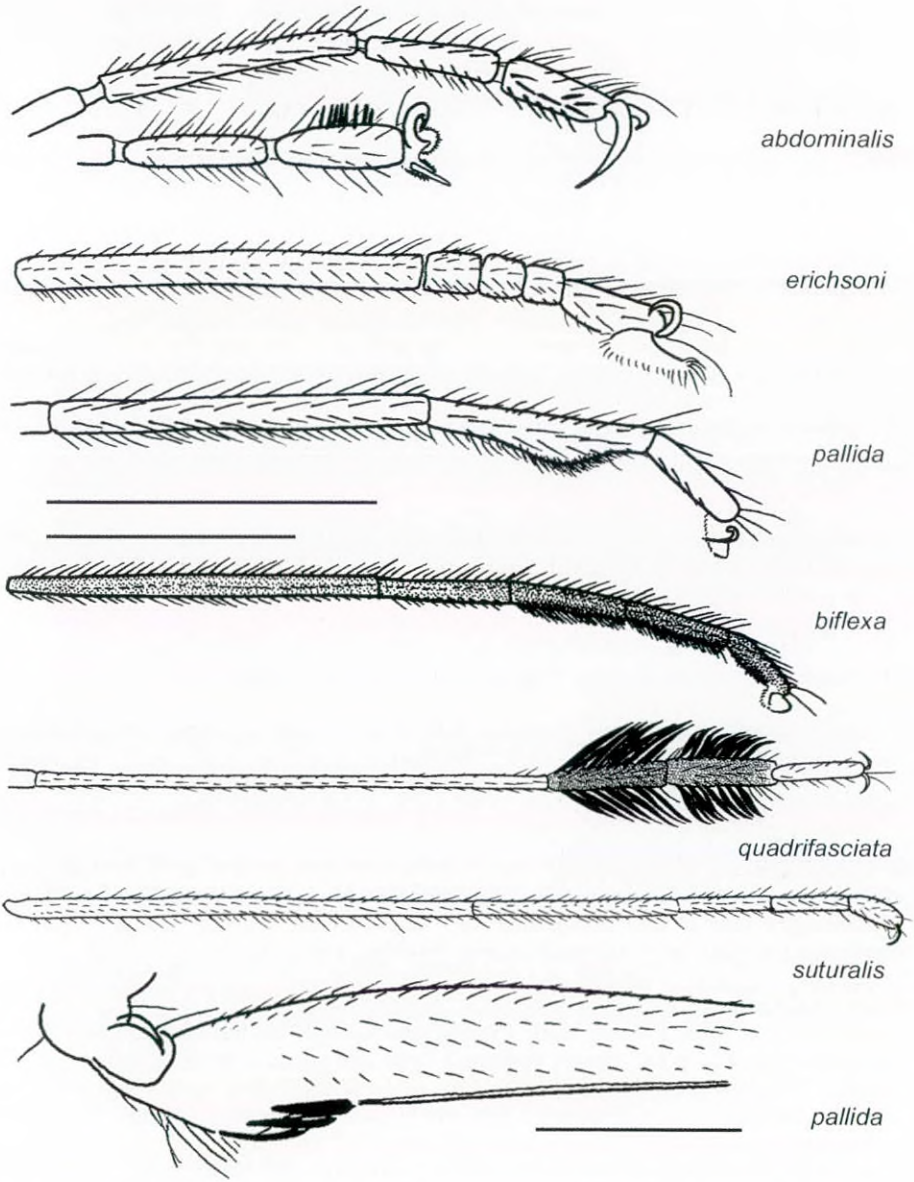

Fig. 4. Legs of male *Neurigona* species. Front tarsus of all species and base of mid femur of *N. pallida*. Lateral view for all species except *N. quadrifasciata* (dorsal view), and dorsal view of *N. abdominalis*. Scale lines = 0.5mm, the longer line for the tarsi of the three species above and shorter for the three species below.

- Mesonotum grey. Mid femur without flattened bristles at the base. Fifth segment of front tarsus with short coarse anterior spines and an enlarged anterior sinuous claw (Fig. 4). [Smaller fly with 4th and 5th abdominal segments and genital capsule no deeper than the 2nd segment. Wing length 4mm] ..... *abdominalis*

Females

1 Abdomen with black bands (Fig. 2) 2
- Abdomen entirely yellow, without dark bands 5

2 Mesonotum, at least in its front half, and pleura, predominantly yellow 3
- Mesonotum and pleura (except sclerite above hind coxa) entirely grey..... 4

3 Mesonotum dark in the posterior third between the dorsocentral setae and with three narrow dark lines extending forward along the dorsocentral and acrostichal rows; postnotum almost entirely dark (Fig. 2). Black bands on tergites 3 and 4 strongly indented on the mid-line (Fig. 2). [Wing length 4.1-5.0mm] ..... *quadrifasciata*
- Mesonotum and postnotum almost entirely yellow. Black bands on tergites 3 and 4 shaped as lunules. [Wing length 4.6mm] ..... *erichsoni*

4 Wing vein M very gently bowed, meeting the costa almost at the wing tip (Fig. 1). Front part of wing slightly darkened. Hind tibia darker than the yellow hind femur. [Wing length 4.5-5.0mm] ..... *suturalis*
- Wing vein M strongly sinuous, converging strongly with R_{4+5}, meeting the costa well before the wing-tip. Entire wing hyaline. Hind tibia and femur equally pale. [Wing length 5mm. See note below for separation from *abdominalis*] ..... *biflexa*

5 Mesonotum predominantly yellow or pale brown. Large fly, wing length 6.2-7.0mm ..... *pallida*
- Mesonotum and most of pleura dark grey. Smaller fly, wing length c. 5mm ..... *abdominalis*

Note. The females of *N. abdominalis* and *N. biflexa* are very similar, apart from the tergite bands, but they may also be distinguished by their venation. In *N. abdominalis*, veins R_{4+5} and M gradually converge at their tips whereas in *N. biflexa* these veins are parallel for the last 0.5mm (about one tenth the wing-length) before the wing tip (Fig. 1).

Acknowledgements

We thank Phil Sterling of Dorset County Council who arranged for the study to take place and produced the project proposal, and the Rushmoor Estate for giving permission and encouraging the survey. We also thank Duncan Sivell and Erica McAlister of the Natural History Museum, London, for arranging access to the collection and the loan of specimens, Andrew Godfrey for permission to publish his record and help with literature, and Chris Spilling for advice on graphics. Marc Pollet helpfully reviewed a draft version of the manuscript.

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Dipterists Digest 2014 **21,** 184-188

Pilaria nigropunctata (Agrell) (Diptera, Limoniidae) in Britain

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Summary
The limoniid cranefly *Pilaria nigropunctata* (Agrell, 1945) is added to the British list. It is known from Anglesey, Glamorganshire and east Norfolk. The habitat is mire on saturated peat in unshaded conditions, including floristically rich valley fen and tall-herb floodplain fen. Characters are given to separate both sexes from similar species.

Introduction

Pilaria is a genus of medium-sized craneflies. The five British species listed by Chandler (1998) are usually associated with wetlands, where the larvae of *P. discicollis* (Meigen) and *P. scutellata* (Staeger) live as predators in saturated soils or in the shallow margins of water-bodies (Brindle 1967). There is only one other species of *Pilaria* in the west Palaearctic, *P. nigropunctata* (Agrell, 1945), which is known from central and northern Europe (Czech Republic, Finland, Germany, Lithuania, Poland, Slovakia, Sweden and possibly Denmark) (Oosterbroek 2014). In the expectation that it may occur in Britain, this species was included a test key to the subfamily Limnophilinae (Stubbs 1997), along with another taxon called '*Pilaria* Species A', which was recognised as being different from the known British species.

For many years the British list had only one rusty-yellow species of *Pilaria*, determined as *P. fuscipennis* (Meigen); other members of the genus are mainly or entirely very dark brown or blackish above, and with a dusted appearance compared with the rather shining body of *P. fuscipennis*. This is an easily recognised species of wet woodland, especially where groundwater seepages are present; it avoids open sunny situations but exceptionally has been found where tall vegetation provides sufficient shade. It was the realisation by AES that he was sweeping '*fuscipennis*' from the wrong habitat in 1992 that led to a recognition of different characters and confirmation that a species pair was present in Britain, although the name for the additional species was not certain, hence Species A.

CMD undertook a brief survey of carr woodland in the Norfolk fens in June 2011. A single male identified as *P. nigropunctata* using Stubbs (1997) was collected at Woodbastwick Fen National Nature Reserve in the Bure valley. In previous years, '*Pilaria* Species A' had been collected from several other fens in Norfolk. When these were re-examined, they proved to be *P. nigropunctata* on the basis of the genitalia and antennal characters (Savchenko 1986). Thus prompted, we here formally add *P. nigropunctata* to the British list, recognising that Species A of the test key is *P. nigropunctata*, and present the records known to us.

Identification

Pilaria nigropunctata is one of the group of *Pilaria* species without the pleural markings found in *P. scutellata* (Staeger) and *P. meridiana* (Staeger). It resembles *P. fuscipennis* in having a pale thorax without the almost black dorsum of *P. discicollis* and *P. decolor*. Its overall appearance is drab yellow, although some specimens are reddish-orange. The colour grades from pale on the sternopleuron to darker on the dorsum, and is shining but slightly dulled by grey or brown dusting. Agrell (1945) described the thorax as dull greyish-brown with a thin

yellowish-red pubescence. In contrast, *P. fuscipennis* is a brighter, paler fly with a more orange thorax (Fig. 1). The stigma of *P nigropunctata* is not or hardly visible without magnification whereas that of *P. fuscipennis* is faint but apparent, and its presence in *P. fuscipennis* was used as a character by Coe (1950). *Pilaria nigropunctata* males are amply distinct from all three of these species by virtue of their antennal hairs and pubescence. Both the dorsal and ventral hairs of *P. nigropunctata* are short, approximately equal to each other and to the length of the segment from which they arise on all but the last few segments (Figs 1 and 2).

Fig. 1. Lateral view of thorax of *Pilaria nigropunctata* (left) and *Pilaria fuscipennis* (right). Photographs by John Kramer.

In contrast, the dorsal hairs of the other three species are far longer than the segment on which they arise, up to nearly three times as long in *P. decolor* and four times in *P. fuscipennis*, and these dorsal hairs are much longer than the ventral ones (Figs 1 and 2). This character is less obvious in females but, on the fourth flagellar segment, the hairs are still less than twice the segment's length (about 1.6 times), whereas in *P. fuscipennis* they are clearly more than twice the segment's length (about 2.5 times). The more basal segments of *P. nigropunctata* of both sexes differ from those of the other species in having short fine pubescence both above and below, whereas the dorsal pubescence is scarcely detectable in the other three species. *Pilaria nigropunctata* and *P. fuscipennis* are on average slightly smaller than *P. decolor* and *P. discicollis* (for males, wing length of *P. nigropunctata*: 7.6–8.5mm, N=7; *P. fuscipennis*: 8.1–9.1mm, N=8; *P. decolor*: 8.4–9.7mm, N= 5; *P. discicollis*: >10.0mm, N=3).

The genitalia of *Pilaria*, with the exception of *P. meridiana*, are moderately similar in appearance. Of the five species with similar genitalia, only *P. fuscipennis* lacks a large spherical vesica (Fig. 2). The degree of sinuosity of the aedeagus in lateral view is also constant between the species, even though the aedeagi may appear superficially similar. The most sinuously curved aedeagus is that of *P. decolor*, followed by *P. discicollis*, then *P. fuscipennis*, in which it is almost straight, then *P. nigropunctata*, in which it is a stout shaft with a straight ventral outline (Fig. 2). Without the need for dissection, *P. nigropunctata* and *P. fuscipennis* can be separated on the fineness of the terminal tooth of the outer style, which is more or less continuous with the main shaft in *P. nigropunctata*, but clearly narrower and differentiated in *P. fuscipennis* (Fig. 2).

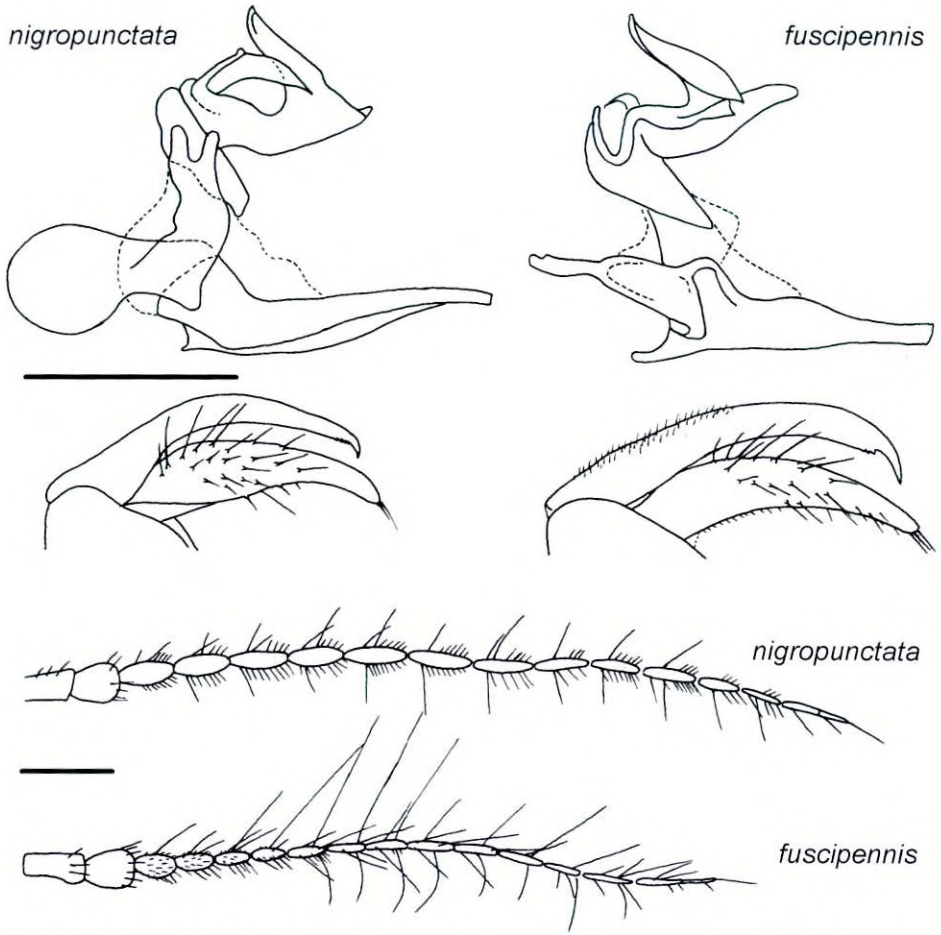

Fig. 2. Male genitalia, showing aedeagal complex in lateral view and styles in dorsal view, and antennae of *Pilaria nigropunctata* and *P. fuscipennis*. Scale bars = 0.25 mm. *Pilaria nigropunctata* from Norfolk and *P. fuscipennis* from different individuals (Cheshire, Herefordshire, Dorset), drawn by CMD.

Records of *Pilaria nigropunctata*

The earliest specimens date from July 1992, during a rapid survey by AES for The Countryside Council for Wales of Crymlyn Bog NNR. The presence of a distinct new species to the British list was recognised in the field because the top of the thorax was rather depressed (a character that has not proved constant), and named *Pilaria nigropunctata*, although it was uncertain that it corresponded with that European species. In the south of the NNR, this cranefly was found to be widespread on the western fringe of the valley mire where groundwater seepages were present, especially among swamp and very wet fen plant communities. These conditions were

met on sloping valley-side fen, including an area fed by a small stream, but the fly was also present on lower flat fen where flooding might occur.

CMD recorded *Pilaria nigropunctata* from samples collected in Norfolk's Broadland using either sweep-netting or vacuum sampling, in roughly equal proportions, between 2007 and 2011. Nearly all the specimens were from fens of high conservation value with an unsurprising concentration of records from the northern end of the River Ant at Sutton Fen and Catfield Fen, which have an exceptional dipteran fauna. Its occurrence on Hassingham Fen represented the only record in the Yare valley, and was unexpected as this site was managed commercially for reed, and had relatively low botanical diversity compared to fens in the Ant valley. With the exception of the specimen from Woodbastwick Fen, which was found in a small block of carr woodland surrounded by open fen, and that from the reedbed at Hassingham, it is likely that all samples were from unshaded tall-herb fen vegetation (*Phragmites australis – Peucedanum palustre*, S24) in the sense of Rodwell (1995). This is the dominant flood-plain mire vegetation of the Broadland fens and is variable both structurally and in species composition, and is found on base-rich peat with moderate to high summer water levels.

Other species of *Pilaria* recorded from the Norfolk fens were *P. decolor*, *P. discicollis*, *P. meridiana* (Sutton Fen only) and *P. scutellata*. Only *P. fuscipennis*, which is a western species, was not recorded, although specimens of *P. nigropunctata* were twice identified as this species from Sutton Fen in 2007 and 2009, and these uncorrected records may have been forwarded to the National Biodiversity Network Gateway by organisations that commissioned the surveys.

On Anglesey, AES swept a male at Cors Goch NNR on 6.vii.2014 during the Dipterists Forum field meeting based at Bangor. Notably this was in a small part of the valley-side sloping fen where groundwater seepages on the valley flank kept the peaty slope of the fen very wet. The cranefly was immediately recognised so details of its habitat were noted. It was found within a very localised patch of slender sedge *Carex lasiocarpa*, which had been cut fairly recently; some black bog-rush *Schoenus nigricans* was present within the sedge. Adjacent plant communities on the seepage fen included black bog-rush, bog myrtle *Myrica gale*, sparse reed *Phragmites australis*, bogbean *Menyanthes trifoliata* and marsh lousewort *Pedicularis palustris*. On the downhill side of the *C. lasiocarpa* lay a dense stand of saw sedge *Cladium mariscus* among reed.

There are two earlier large data sets in which *P. nigropunctata* may have been present but not then recognised. In the early 1980s, AES identified water-trap samples from two Nature Conservancy Council projects, the Welsh Wetlands Survey and the East Anglian Fens Survey, both involving many hundreds of samples preserved in alcohol. In retrospect AES may have been too hasty naming *P. fuscipennis* from these samples although, in the absence of a clear image of the habitat, its occurrence in reed-dominated habitats seemed plausible for a species requiring some shade that reed would provide. Certainly the records from East Anglia are likely to be *P. nigropunctata* since CMD's later records were from some of the same fens visited by the NCC survey.

In summary, *P. nigropunctata* has now been found at several widely spaced sites in England and Wales. Dates of capture ranged from mid June to mid September. While Salmela (2012) recorded *P. nigropunctata* in Finland, around shores of running waters with luxuriant riparian vegetation, this appears to be in contrast to the British records which were invariably from peat soils supporting valley mire with seepages or saturated peat, or floodplain mire with a high summer water table. The vegetation was unshaded, although it varied in height from low sedges to tall stands of reed, saw sedge and bog myrtle. Such habitat is moderately uncommon in Britain so *P. nigropunctata* is likely to be a scarce species.

Material examined

Norfolk (V.C. 27): Reedham Fen, TG366195, 26.vi.2008, 1♀. Hassingham Fen, TG364051, 27.vi.2008, 1♂, 1♀. Catfield Fen, TG367212, 18.vi.2007, 2♂; TG366211, 28.vi.2008, 1♂. Catfield Great Fen, TG365211, 19.vii.2007, 1♂; TG366212, 23.vi.2007, 1♂; 28.vi.2008, 2♂; TG365213, 23.vi.2007, 1♂, 28.vi.2008, 1♂. Sutton Fen, single males and females at several points between TG365230 and TG373235, and TG371238, 17, 22 and 29.vi.2007, 21.vii.2007, 12.ix.2007, 13.ix.2007. Woodbastwick Fen, TG336167, 15.vi.2011, 1♂. All coll. C.M. Drake and in his collection. **Glamorganshire** (V.C. 41): Crymlyn Bog NNR, SS6894, July 1992, several specimens, coll. A.E. Stubbs, specimens in his own collection and 1♂ in the Natural History Museum, London. **Anglesey** (V.C. 52): Cors Goch NNR, SH5081, 6.vii.2014, 1♂, A.E. Stubbs.

Acknowledgements

The Broadland surveys were undertaken for the Broads Authority and, at Sutton Fen, for the Royal Society for the Protection of Birds. We thank John Kramer for help with the literature and taking the photographs.

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Dipterists Digest 2014 **21**, 189-192

First record of *Drosophila suzukii* (Matsumura) (Diptera, Drosophilidae) in Great Britain

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Summary
Spotted wing drosophila *Drosophila suzukii* (Matsumura, 1931) was first recorded in Great Britain from monitoring traps deployed specifically to detect the presence of this invasive pest. Traps were baited with a yeast, sugar and water bait. First positive records were obtained on 29 August 2012, from traps deployed in wild blackberry (*Rubus fruticosus* agg.) and wind breaks at East Malling Research (EMR) in Kent. Subsequent monitoring also found *D. suzukii* in raspberry and strawberry crops at EMR.

Introduction

Spotted wing drosophila (SWD, *D. suzukii* (Matsumura, 1931)) is an invasive dipteran pest, originally described from Japan (Matsumura 1931). The first reports from Europe were in 2008 (Cini *et al.* 2012) and by 2011 it had reached the Sauternes vineyards of France (Rouzes *et al.* 2012). By 29 August 2012 its discovery in Britain was reported to the Kent Field Club (Clemons 2013), based on the records reported here.

Spotted wing drosophila has a wide range of host plants, both wild and cultivated, ranging from soft and bush fruit berries through grapes to cherries and peaches. The adult females are reported to lay their eggs in undamaged ripening fruit (Kanzawa 1939; Grassi *et al.* 2012; Lee *et al.* 2011b; Seljak 2011; Walsh *et al.* 2011).

Materials and methods

Based on Lee *et al.* (2012) traps were constructed from 2 litre plastic drinks bottles; the top was removed at the shoulder to create a removable lid. Five cm from the cut edge, a ring of 20 holes of 1cm in diameter were melted through the plastic with a hot cork borer. A wire mesh screen (2 mm mesh) was positioned in the bottom of the bottle to support a yellow sticky base (Agralan Ltd, Swindon, Wiltshire, UK) and to keep it out of the attractive bait. The attractive bait consisted of a yeast, sugar, water mix in a 1:4:16 ratio (Dreves *et al.* 2009). Traps were deployed across East Malling Research (EMR), Kent to cover all wild and cultivated berries (strawberries, raspberries, blackberries and cherries).

Results

On 29 August 2012, a single male *Drosophila* with spots on the wings was caught on the sticky card in the trap deployed in an area of wild blackberry. The specimen was isolated and microscopically examined, revealing the presence of distinctive sex combs on the front legs (Fig. 2). On 11 September 2012, a single male specimen was caught in a cultivated raspberry plantation. On 14 September the first female specimen was captured, also in the raspberry plantation. The female was readily identifiable by its heavily sclerotized and toothed ovipositor (Fig. 3), an adaptation to oviposition in undamaged fruit. On 21 September large numbers of males and females were being captured in a strawberry plantation at EMR.

Other recent reports (see notes following this paper) indicate that this species is becoming an established member of the British fauna.

Fig. 1. ***Drosophila suzukii*****, male from Ipswich (photo Martin Cooper).**

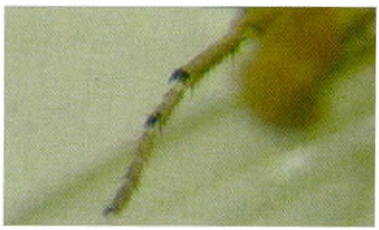

Fig. 2. ***Drosophila suzukii*****, male, combs on first and second tarsomeres of fore tarsus (photo Bethan Shaw).**

Identification

The size ranges of male and female *Drosophila suzukii* greatly vary, although as a general rule female *D. suzukii* are larger in body and wing size. Males have a wing length range of 2.46mm to 2.85mm (mean 2.67). Females have a greater range of variation with the smallest of wing length 2.27mm and the largest 3.20mm (mean length 2.69) (Adrian Harris, personal observation).

This species is not included in the key to European Drosophilidae by Bächli *et al.* (2004). In that key both sexes would run to couplet 12 in the key to European species of *Drosophila* and *Hirtodrosophila* (p. 122), where they would usually fit the first alternative on coloration, i.e. the *melanogaster* group comprising *D. melanogaster* Meigen, *D. ananassae* Doleschall and *D. simulans* Sturtevant; these species differ in the arrangement of the tarsal combs (several combs on the first two tarsomeres in *D. ananassae*, a comb present only on the first tarsomere in the other species) but winter populations may be darker, so might be interpreted as fitting the second alternative, including species with a similar arrangement of male tarsal combs.

Fig. 3. *Drosophila suzukii*, female from Ipswich, with (inset) lateral view of ovipositor (photos Martin Cooper).

It may be separated from both groups of species by the addition of a further couplet as follows:

12(11) Males: Wing usually with a dark, roundish spot around ending of vein R_{2+3} (Fig. 1); tarsomeres 1 and 2 of fore leg with combs as in Fig. 2. Females: Wing without dark spot. Oviscapt dark brown, triangular, upper and lower margins with strong teeth (Fig. 3); usually yellowish flies, but dark forms may occur ..... *D. suzukii* (Matsumura)

\- Males without such a spot. Females with predominantly yellowish, rather soft, roundish oviscapt, no upper marginal teeth, lower marginal teeth small..... 12A

12A(12) Generally yellowish flies (*melanogaster* group).....13

\- Generally blackish flies (*obscura* group).....15

Acknowledgments

We would like to thank Darren Obbard of the University of Edinburgh for confirming the identification of the specimens of *Drosophila suzukii*, and Michelle Fountain of East Malling Research for her continued support and motivation. Gerhard Bächli kindly provided the suggested addition to the key to European species to assist in recognition of this species. We are also indebted to Martin Cooper for the inclusion of his photographs (see his note below).

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Drosophila suzukii (Matsumura) (Diptera, Drosophilidae) in Tottenham, north London

– Two males of *Drosophila suzukii* (Matsumura, 1931) were found on mature and rotting honey fungus (*Armillaria* species) at the base of a dead ash tree (*Fraxinus*) in Downhills Park, Tottenham (TQ324896) on 24 September 2014 – **JEREMY RICHARDSON**, 12 Martlesham, Adams Road, London N17 6HT

Drosophila suzukii (Matsumura) (Diptera, Drosophilidae) in Suffolk

– A male and female of *Drosophila suzukii* (Matsumura, 1931) were found near rotting honey fungus (*Armillaria* species) at the base of a silver birch tree (*Betula pendula*) in Christchurch Park, Ipswich, East Suffolk (V.C. 25, TM166453) on 24 September 2014. Photographs that I

took of these specimens have been used to illustrate the above paper by Adrian Harris and Bethan Shaw). There do not appear to be any previous records of a fungus association for this species, but the similar observation by Jeremy Richardson (above) suggests that it may be a regular occurrence that merits further investigation – **MARTIN COOPER,** 49 Bolton Lane, Ipswich, Suffolk IP4 2BX

***Drosophila suzukii* (Matsumura) (Diptera, Drosophilidae) in Kent –** *Drosophila suzukii* was first recorded in Britain from specimens collected at East Malling Research Station, Kent (TQ7057) in 2012.

On 27 September 2014 large numbers of drosophilids were observed on autumn-fruiting raspberries in my garden at Sittingbourne (TQ919631), and males of *Drosophila suzukii* were instantly recognisable by eye. A sample of the flies also revealed males and females of *Drosophila immigrans* Sturtevant, 1921 and *D. melanogaster* Meigen, 1830, but no female *D. suzukii*. On 2 October 2014 a single male of *D. suzukii* was swept at Oare Gunpowder Works Country Park near Faversham (TR003624). This site is mainly densely shaded secondary woodland and no fruiting *Rubus* species were observed. Further records were obtained on 3 October 2014. At Lower Halstow Brickworks (TQ858676), one male and one female of *D. suzukii* were swept along a narrow track bordered by bracken *Pteridium aquilinum*, hawthorn *Crataegus monogyna* and privet *Ligustrum* species. In a small coppice adjacent to Bredhurst Church (TQ799621) a single female was swept and, nearby, in Bredhurst Hurst (TQ801618) a single male was swept over leaf litter. On 18 October 2014 many males and females were swept over leaf litter in Sharsted Wood, Newnham (TQ948575), and smaller numbers of both sexes swept over leaf litter at Brook Wood, Charing (TQ95674903) and Dering Wood, Pluckley (TQ896447). The East Malling site is in V.C. 16 and all subsequent sites are in V.C. 15 – **LAURENCE CLEMONS,** 14 St. John's Avenue, Sittingbourne, Kent ME10 4NE

***Drosophila suzukii* (Matsumura) (Diptera, Drosophilidae) in Grays, Essex** – Peter Harvey collected single females at Mill Wood, Grays, TQ5978, on 11 September 2014 and at a second site with grassland and scrub, TQ6078, on 22 September 2014. I recognised them from general samples of Diptera, and on 3 October I asked him to examine his garden compost heap at TQ62497933, about three kilometres away. He did so on the same day and captured 5 further males – **DEL SMITH**, Milltown of Dunnideer, Insch, Aberdeenshire AB52 6XQ

***Drosophila suzukii* (Matsumura) (Diptera, Drosophilidae) in Dorset** – On 3 October 2014, one male of *Drosophila suzukii* (Matsumura, 1931) was swept from rank vegetation at the drainage and settlement pond site associated with the Weymouth Bypass (SY674819). The trapping site is about 25m wide, lying between the drainage ponds to the south and ancient woodland, Two Mile Coppice, to the north. *Rubus fruticosus* agg is abundant, backed by oak and willow at the south edge of Two Mile Coppice – **DEREK HALLETT,** 16a St Helen's Road, Dorchester DT1 1SD

***Drosophila suzukii* (Matsumura) (Diptera, Drosophilidae) in Purbeck, Dorset** – On 4 November 2014, large numbers (>100) of male and female *Drosophila suzukii* (Matsumura, 1931) were collected from moth traps set at the back of

the Discovery Centre at Knoll Beach, Studland (SZ0321183588) and in a stand of aspen *Populus tremula* (SZ0316683630). The traps had been running all night and are run every week as part of the Cyril Diver Project on Studland. This was the first night that the drosophilids were noted. The site is damp woodland consisting of birch *Betula*, aspen and goat willow *Salix caprea* with bracken understorey near the Discovery Centre – **CHRIS SPILLING,** Culls, Garfield Lane, Langton Matravers, Dorset BH19 3HJ

***Drosophila suzukii* (Matsumura) (Diptera, Drosophilidae) in Northamptonshire** – On the night of 13/14 October 2014, one male of *Drosophila suzukii* (Matsumura, 1931) was taken in a MV moth trap at Pitsford Water Nature Reserve (SP787701) by Mischa Furfaro. I received the Diptera by-catch and determined the species. The trap is set in a mixed woodland clearing with many brambles and elder in the area – **JOHN SHOWERS,** 103 Desborough Road, Rothwell, Kettering, Northants NN14 6JQ

***Drosophila suzukii* (Matsumura) (Diptera, Drosophilidae) in Norfolk** – A male and female of *Drosophila suzukii* (Matsumura, 1931) were caught in a Malaise trap set in a depression among mature dunes at Winterton National Nature Reserve, East Norfolk (TG 49342015). The trapping period was 21 September to 5 October 2014. A further trapping session at a nearby site (TG48982023) from 5 to 19 October produced 35 male and 59 female *D. suzukii*, along with one male *D. subobscura* Collin and one male and two female *D. phalerata* Meigen.

What was striking about the *D. suzukii* was the size range they exhibited, with male wing lengths from 2.28 to 3.2mm and female from 2.44 to 3.4mm. This sort of size variation is not typical of *Drosophila*, judging from the wing lengths given by G. Bächli, C.R. Vilela, S.A. Escher and A. Saura (2004. The Drosophilidae (Diptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* **39,** 1-362. Brill, Leiden and New York). Usually such variation in size results from the opportunistic exploitation of both limited and extensive food sources, and may be one reason why this species is spreading so rapidly.

At both sites, there were nearby birch trees, and numerous fungal fruiting bodies, but no evidence of honey fungus, with which the species has been found elsewhere. There are plenty of blackberries available on the site, though not in the immediate vicinity of the traps. To my knowledge, this is the most northerly location for the species in Britain to date.

I thank Rick Southwood and John White (Natural England) for arranging permission to trap on the reserve – **TONY IRWIN**, 47 The Avenues, Norwich NR2 3PH

***Drosophila suzukii* (Matsumura) (Diptera, Drosophilidae) at Bushy Park, Middlesex, Windsor Forest, Berkshire and Fleet Pond, Hampshire** – On a visit to Bushy Park on 29 August 2014, I was surprised to find several adults of *Drosophila suzukii* (Matsumura, 1931). A male and three females were swept in the wooded fringe along the west side of the Longford River opposite Waterhouse Plantation (TQ1469). Then a male was caught in Round Plantation (TQ1470), an enclosed area of oak and sycamore woodland, surrounded by the open deer grazed parkland that separates it from the former location. During a visit to the Park on 3 October 2014, sweeping in several areas produced a few further *D. suzukii*, although it appeared from the targeted sweeping of areas with bramble that they may not have been present in large numbers. One male and one female

respectively were caught in the two areas mentioned above, and a male was also found in the strip of woodland fringing the Longford River at the north end of Brewhouse Fields (TQ1470). Then on 31 October 2014, a female and two males respectively were swept in the first two areas mentioned above, and three of each sex were obtained by sweeping sunlit ivy *Hedera helix* flowers on the bank of the Longford River within Waterhouse Plantation (TQ1469).

On 2 October 2014, a single male was swept near the northern edge of Windsor Forest (SU924753), near the meandering lower reaches of the stream north of Darkhole Bridge, just before it leaves the Forest. On a subsequent visit to this site on 23 October, a male was among a catch from ivy flowers near the same stream in a more central part of the Highstanding Hill woods (SU925745) and a female was swept from bracken further south (SU929739), suggesting that the species is now widespread in the Forest. On the previous day, 22 October, two females were swept from ivy flowers at Fleet Pond, Hampshire, in the Fugelmere Wood and Jacob's Wood areas to the south-west and south of the pond (SU8254).

The size range of the above specimens (11 males, 10 females) was more limited than found in the larger sample examined by Tony Irwin (see above): males wing length 2.6-2.9mm, females 3.0-3.3mm. The females mostly have a more extensively dark abdomen than illustrated by Harris and Shaw (above), with tergites 5-6 almost entirely shining black and shining black apical bands on preceding tergites.

As most of these flies were not recognised in the field it is not possible to be more precise about the habitats, but the only soft fruits available at these sites were those of bramble *Rubus fruticosus* agg. and elder *Sambucus nigra*, so the wild blackberries that abound at Bushy Park seem the most likely attraction for *D. suzukii* at that locality – **PETER CHANDLER,** 606B Berryfield Lane, Melksham, Wilts SN12 6EL

Xylomya maculata (Meigen) (Diptera, Xylomyidae) adults observed in Epping Forest –

At the 'Introduction to Soldierflies' BENHS workshop on 18 January 2014 specimens of the highly secretive *Xylomya maculata* (Meigen, 1804) were on display. A rare and striking species of ancient woodland, it is much larger than its widespread and less conspicuous cousin *Solva marginata* (Meigen), which is common on poplar *Populus*, especially in the London area. I decided to look for *Xylomya* within its known range - Epping, Windsor and the New Forest with some Middlesex sites (Chandler, P.J. 2013. A new Berkshire locality for *Xylomya maculata* (Meigen) (Diptera, Xylomyidae). *Dipterists Digest* (*Second Series*) **20,** 72). On paper, it appeared unlikely that I would get to see adults in the wild; available literature, as well as anecdotal accounts from expert dipterists, revealed that adults had been encountered mainly from reared material, which was usually collected from rot holes in old trees, mainly beech *Fagus*.

A.E. Stubbs and M. Drake (2014. *British Soldierflies and their Allies*. 527 pp. Second edition. British Entomological and Natural History Society, Reading) give (p. 423) the flight period as May and June. From the end of April 2014, I began looking closely at beech with saproxylic features, mainly in Epping Forest, concentrating on trees with accessible rot holes that could be viewed. I also visited Windsor Great Park and the New Forest. With no trace by mid-June I concluded that the species may spend most of its life hidden, and the scarcity of reported sightings was probably with good reason.

On 3 July 2014, in Epping Forest (TQ407973), a female *Xylomya maculata* (Meigen) was found freeing itself from a spider's web inside the base of a large hollow beech stump. The trunk had broken off above approximately 70cm above ground level, leaving a hollow circular area which could easily be viewed from above. The following day, 4 July, I observed two

females at the same location during a two hour period - the first coming and going while the second stayed for 25 minutes - at one point they were observed simultaneously about 1.5 metres apart. A photograph is shown on the front cover of this issue.

Notable was the flies' tendency to arrive abruptly in the hollow within the stump, apparently in a straight line from the direction of a large healthy beech some eight metres away. Both females would move about freely within the enclosed area, sometimes remaining still for several minutes and proving very approachable. Their departure was equally abrupt, apparently vanishing in the direction of a different large beech. The flies were not startled, rather they seemed efficient at moving between sites. This sudden coming and going seemed inconsistent with their relaxed manner once inside the tree, and was also in sharp contrast to the behaviour of several other Diptera species present. This appeared to support the notion that adults spend much of their life inside tree cavities. Visits on 7 and 9 July 2014 produced no more sightings, and further observations are hoped for in 2015.

Thanks to John Ismay, Martin Harvey and Peter Chandler for their accounts of finding and rearing larvae and for their encouragement of what seemed an improbable project. A video of a captured female can be seen here http://youtu.be/dFphLc34QqQ – **JEREMY RICHARDSON,** 12 Martlesham, Adams Road, London N17 6HT

***Carcelia atricosta* (Herting) (Diptera, Tachinidae) in Tottenham** – On 1 September 2014 a male *Carcelia atricosta* (Herting, 1961), figured below, was collected upside-down but still alive on a leaf of Dogwood (*Cornus*) in the small patch of deciduous woodland at Lordship Recreation Ground, Tottenham (TQ324898).

It is one of the rarest of our eight British *Carcelia* species, with some years producing no records. Robert Belshaw (1993. Tachinid Flies Diptera: Tachinidae. *Handbooks for the Identification of British Insects* 10, 4a(i), p. 78. Royal Entomological Society of London) reported a few records ranging from Southern England, including the London area, to Northern Scotland. Host species mentioned include the lackey moth *Malacosoma neustria* (Linnaeus, 1758), the vapourer moth *Orgyia antiqua* (Linnaeus, 1758) and the grey dagger *Acronicta psi* (Linnaeus, 1758) – **JEREMY RICHARDSON**, 12 Martlesham, Adams Road, London N17 6HT

Dipterists Digest 2014 **21**, 197-200

Observations of *Calliphora uralensis* Villeneuve (Diptera, Calliphoridae) in Scotland

MURDO MACDONALD
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Summary
Calliphora uralensis Villeneuve, 1922 is widely distributed in north and west Scotland, especially in Shetland and the Western Isles. Apparent rarity or absence elsewhere in the area may be a result of poor recording effort. In Shetland, it may be commoner than *C. vicina* Robineau-Desvoidy, 1830 in the north, becoming relatively rarer in the south. Both species are found commonly on or close to the shore, often together, flying from May to August at least. Identification in the field is described.

Introduction

The blowfly *Calliphora uralensis* Villeneuve, 1922 has a northern distribution in Europe, and is apparently virtually confined in the British Isles to the N and W of Scotland (there is one 1958 record from the Firth of Forth), and the west coast of Ireland (Irwin 1976, Davies 1987). It is currently listed as 'rare' on the IUCN Red Data List. This note describes my mainly casual observations on the species in Scotland since 2010, and in more detail results from a visit to Shetland in 2014.

Methods

Casual recording of *Calliphora* species was carried out on mainland Scotland, Skye, Raasay and nearby small islands from 2012. All contacts on Hirta (May-June 2010), Harris and Lewis (June 2013), North Uist and Benbecula (April 2014), and Shetland (June 2014) were recorded. Results also include records from literature and correspondence as referenced.

Results

Distribution in Scotland

Fig. 1 shows all the records I have located, showing that the fly is mainly to be found in the Western Isles, Orkney and Shetland, with smaller numbers on the north and west mainland. Recording effort will always influence such maps, but my own recording on the mainland and around Skye suggests that *C. uralensis* is scarce there. It was, however, found in slightly greater numbers than *C. vicina* Robineau-Desvoidy, 1830 in Coigeach, West Ross in July 2014 (20 *C. uralensis*, 17 *C. vicina*). Searches along the west coast and islands may well reveal its presence farther south than is apparent now.

There is a clear concentration of records around the coasts, though, as Macleod and Donnelly (1956) found it at inland sites in Caithness up to 14km from the sea, this impression may be a result of observer behaviour. My own records are almost all within 50m of the shoreline, and none is farther than 800m inland.

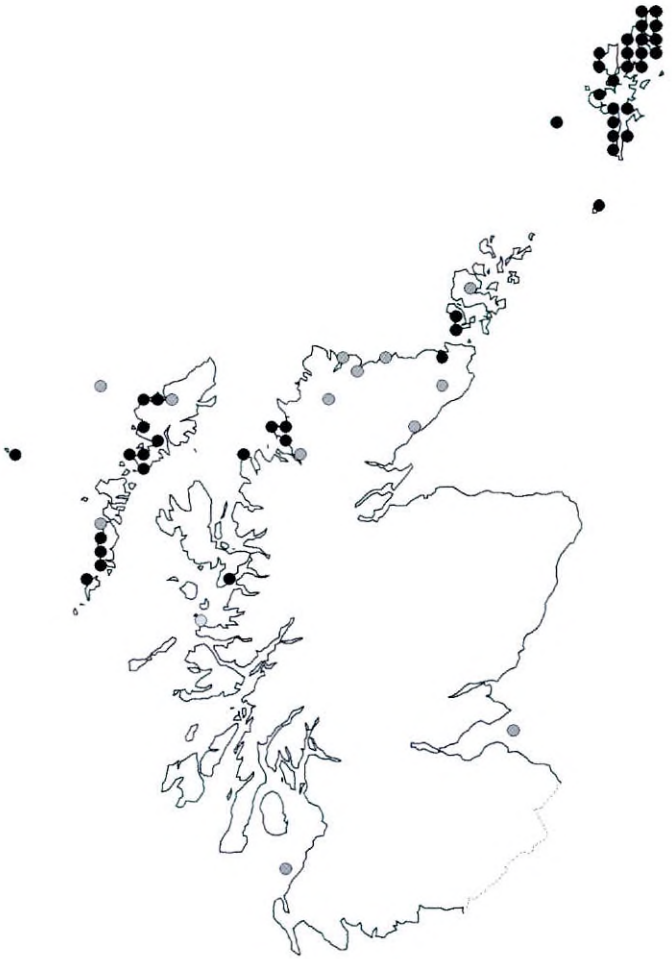

Fig. 1. Distribution of records of *Calliphora uralensis* in Scotland. The record for Muck NM47 (pale grey) may be one hectad out, and the date is unknown. Other grey dots are <1970. Data are from my own observations, Paul Harvey, Bill Neill, Nick Riddiford, Macleod and Donnelly (1956), Davies (1987), Skidmore (2008) and Bratton (2010).

Distribution in Shetland

From 20-30 June 2014, I was able to catch and identify a total of 46 *C. uralensis* and 50 *C. vicina* in Shetland, from Unst to Sumburgh. The distribution and relative numbers encountered of these is shown in Fig. 2. Both species were found along the full length of the archipelago from Unst in the north to Sumburgh in the south. The relative numbers of the two species caught varied, suggesting that *C. uralensis* was more numerous in the north, and *C. vicina* in the

south. Nick Riddiford (*in litt.*, July 2014) has found *C. uralensis* to be common on Fair Isle, but outnumbered greatly by *C. vicina*, perhaps confirming this trend.

Habitat

Most *C. uralensis* were taken within a short distance of the seashore, typically basking on rocks immediately above the shore or on short turf on clifftops. They were frequent at Hermaness in Unst on moorland up to 124m altitude, but my searches inland and on moorland in Shetland were limited. It proved productive to check ruined buildings, where it was found basking on walls, perhaps taking advantage of shelter and relative warmth.

All habitats were shared with *C. vicina*, the two species frequently occurring side by side, but *C. vicina* was more likely than *C. uralensis* to be found in built-up areas and at significant distances inland. *Calliphora uralensis* was seen taking nectar from hogweed *Heracleum sphondylium* in dunes, and thyme *Thymus polytrichus* on short coastal turf in Shetland, and from rowan *Sorbus aucuparia* in Harris. Bill Neill took an adult from a dead golden eagle chick on South Uist in June 2014.

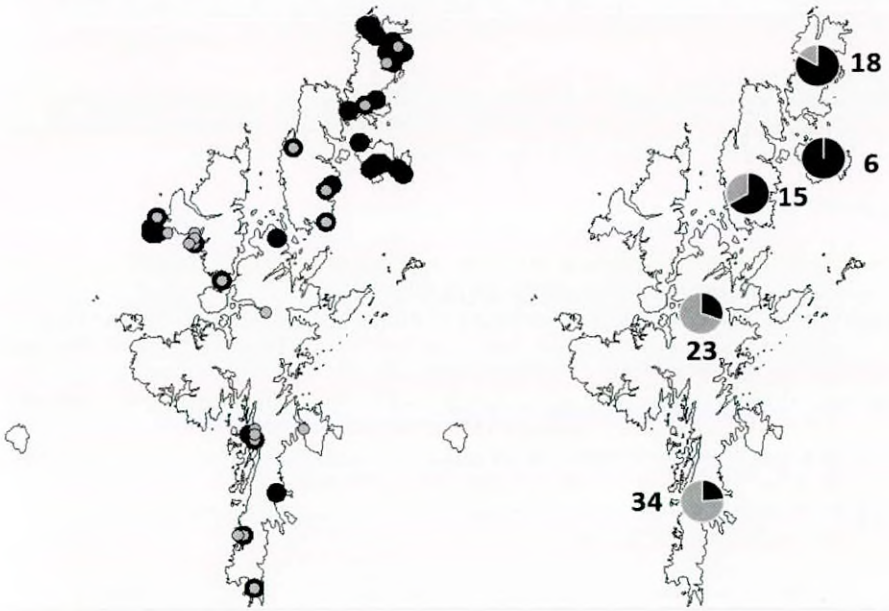

Fig. 2. *Calliphora uralensis* (black) and *C. vicina* (grey) in Shetland, 20-30 June 2014. Left - distribution, symbols plotted at 1km precision; right - relative numbers. Charts are, in order, from the top, Unst, Fetlar, Yell, N Mainland and S Mainland. Numbers are sample sizes.

Phenology

Records where the date can be established fall between early May and late-July, but this is certainly biased by observer activity. Bratton (2010) found it in early August in North Uist. No *C. uralensis* was seen in North Uist in mid-April 2014, though 4 *C. vicina* were found..

Identification

The identification of *C. uralensis* is easy in the field, especially as in most places the only other *Calliphora* species encountered was *C. vicina*. Once netted, the fly can be extracted, held in the fingers, and the colour of the anterior spiracle determined with a x 15 lens. The contrast between the black of *C. uralensis* and the yellow of *C. vicina* is obvious. Any doubt should be removed if a black basicosta is combined with infuscated calypters.

Discussion

Calliphora uralensis remains a relatively poorly-known species in Britain, though these observations help a little to clarify its status and ecology. We can be confident that it is well established and common in Shetland and the Western Isles. It seems certain that more recording on Orkney, the west coast mainland, and the Inner Hebrides, would reveal it to be widespread there, but on the mainland at least it seems to be generally scarce.

Although is it recognised as rare by IUCN criteria, there seems little need for special conservation measures, with no threat to its habitat or food sources. Given its northern distribution globally, and the concerns about climate change, environmental conditions may force a contraction in Scotland, at the southern limit of its range.

Acknowledgements

I thank Geoff Hancock for identifying my first *Calliphora uralensis* and setting me on this project. Paul Harvey, Nick Riddiford and Bill Neill kindly supplied records from Shetland and South Uist, and they and Jimmy McKellar read and commented on a draft.

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***Anthomyia plurinotata* Brullé (Diptera, Anthomyiidae) new to Britain** - On 12 May 2013, I photographed what appeared to be a female of *Anthomyia plurinotata* Brullé, 1833 (Fig. 1) at SU735721 in Whiteknights Park, Reading. It was resting on a leaf in an overgrown hedge overlooking a meadow. My tentative identification was confirmed by Johanna van Erkelens, but Michael Ackland (*pers. comm.*) warned me that I needed to catch a male to be sure. On 13 September 2014, I caught a male (Fig. 2) at SU742716, on a beech log in a clearing in the Wilderness, an area of old woodland that runs along the south-east boundary of Whiteknights Park. The absence of previous British records of such a distinctive species suggests that it may be a recent arrival in this country.

Fig. 1. *Anthomyia plurinotata* female.

Fig. 2. *Anthomyia plurinotata* male.

According to Michael Ackland (*pers. comm.*), there are no other *Anthomyia* species in Europe that have only two postsutural black spots or marks on the thorax; the other four black and white British species have three such spots including a central one. The male genitalia (Fig. 3, 1-8, drawn by Michael Ackland) have a characteristic profile to the fifth sternite, which has a small membranous area.

Anthomyia plurinotata Brullé was described from Greece (Peloponnese) (Brullé, A. 1832-1833. *Expédition scientifique de Morée, Insectes* **3,** 1(2), 1-400). It has been quoted in the literature by numerous authors since then, generally as just a record of its occurrence, and has been included in some keys. Hennig was the first to list all these citations; he commented that "the species is known from only a few localities, it is however widely distributed..." and recorded it from Sweden, Finland, Norway, Germany, France, Hungary and Greece. In Fauna Europaea (www.faunaeur.org) it is also recorded from the Czech Republic, Denmark, the Netherlands, Poland and Slovakia, though Greece is curiously listed there as doubtful. The genitalia figures presented here were drawn from a Dutch specimen (Netherlands: Het Zwin, 2km from Cadzand, 10.v.2011, Malaise trap, leg. L. Calle).

There is a record of its biology by D. Teschner (1958. Die Dipterenfauna an menschlichen Fäkalien. *Zeitschrift für angewandte Zoologie* **45,** 153-19), who found adults near Braunschweig, Germany on human faeces. This is in agreement with several other species of *Anthomyia* (in the species group of *Anthomyia pluvialis* (Linnaeus), which have also been recorded from bird nests, and similar habitats where the larvae are scavengers.

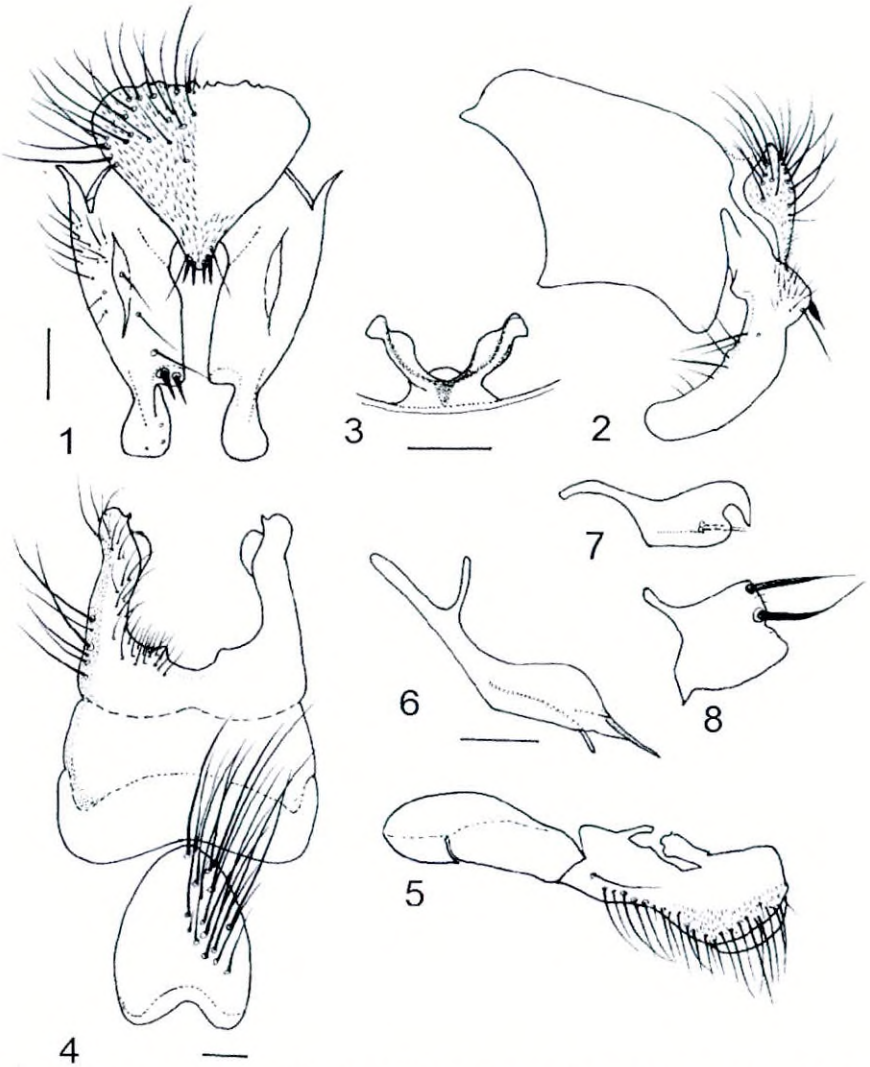

Fig. 3. *Anthomyia plurinotata* **Brullé, 1833, male genitalia and sternites IV and V. 1, cercal plate and surstyli, caudal view; 2, cercal plate and surstyli, lateral view; 3, central process of synsternite (6+7); 4, sternite IV and V, ventral view; 5, sternite V lateral view; 6, aedeagus, lateral view; 7, postgonite; 8, pregonite (scale lines 0.1mm) (drawn by Michael Ackland).**

I thank Michael Ackland for information and for kindly permitting the inclusion of his figures of the male genitalia - **TRISTRAM BRELSTAFF,** 3 Malvern Court, Addington Road, Reading, RG1 5PL

Dipterists Digest 2014 **21**, 203-204

Homalura tarsata Meigen (Diptera, Chloropidae) new to Britain

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Homalura Meigen, 1826 is a small genus, including three Palaearctic species (Nartshuk 1984). It belongs to the subfamily Chloropinae, in which the costa extends only to the end of vein R_{2+3}. One of us (DAS) caught a single male of *H. tarsata* in Essex on a brownfield site (West Thurrock PFA [pulverised fuel ash], South Lagoon, C2, *Phragmites*, TQ586763, 4.vii.2005, D.A. Smith) and sent it to JWI for confirmation of identity. The species has been reared from *Phragmites*, but the exact nature of the association is unclear. The genus and species were recorded as new to Britain by Harvey (2005) in the report of the invertebrate survey and it was included in a list of Essex Diptera (Smith 2009). The present paper formally adds the species to the British List. Chandler (2014) wrongly attributed the record to C.W. Plant due to a mistake by the first author; this is herewith corrected. *Homalura tarsata* is recorded from Austria, Bulgaria, Czech Republic, Germany, France, Hungary, Italy, Latvia, Lithuania, Poland, Romania, Slovakia, Switzerland, the Ukraine, European Russia and the East Palaearctic (Nartshuk 1984, Fauna Europaea and Michael von Tschirnhaus *pers. comm.*).

A key to the genera of British Chloropinae was given by Ismay (1999) and *H. tarsata* will run to couplet 9, since the scutum and postpronotal lobe are entirely black. In this key couplet 8 should be replaced by:

8 Postpronotal lobe black 8a
Postpronotal lobe yellow with a black mark; ocellar triangle long, black and shining... 11

8a Ocellar triangle bare on central 1/3, lateral 1/3 with setulae set in distinct punctures (Fig. 1); anepisternum with minute setulae in distinct punctures; almost entirely black species, all tarsi and tip of anterior femur yellow, parafacialia brown ..... *Homalura tarsata* Meigen, 1826

\- Ocellar triangle bare or with a single row of setulae inside the lateral margin; without the above combination of characters 9

Homalura is most easily distinguished from other Chloropinae by the setulae set in punctures on the ocellar triangle. Among European genera, these are also found in *Platycephala* Fallén but the species of that genus are almost entirely reddish brown in colour and have thickened posterior femora, while *Homalura* is almost entirely black and does not have thickened posterior femora.

There is an earlier record of *Homalura tarsata* from Britain. The genus and species were included in the catalogue of Stephens (1829: p. 319), but Walker (1856) considered this to be a misidentification and in the Addenda and Corrigenda (p. xiii) stated: 'The g. HOMALURA has been introduced into the British lists, on the authority of Stephens' Systematic Catalogue, but the specimens '*H. tarsata*' in his collection, are *Gymnopoda glabra*'. The latter is an ephydrid, correct original name *Gymnopa glabra*, valid as *Athyroglossa glabra* (Meigen, 1830).

The 41 photographs used to produce Fig. 1 were taken by the Leica Application Suite V3.7 using a Leica microscope M165.C; they were stacked with Helicon Focus 5.3 C64 and refined with Adobe Photoshop CS5(64Bit). The specimen is deposited in the Life Collections, Oxford University Museum of Natural History.

Fig. 1. Head of *Homalura tarsata* Meigen, dorsal view; copyright Oxford University Museum of Natural History.

Acknowledgements

We thank Barbara Ismay for taking the photographs and revising the manuscript, Peter Harvey for revising the manuscript as well as supplying the links to the original publication and the Life Collections, Oxford University Museum of Natural History for photographic facilities.

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Continued inside back cover

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