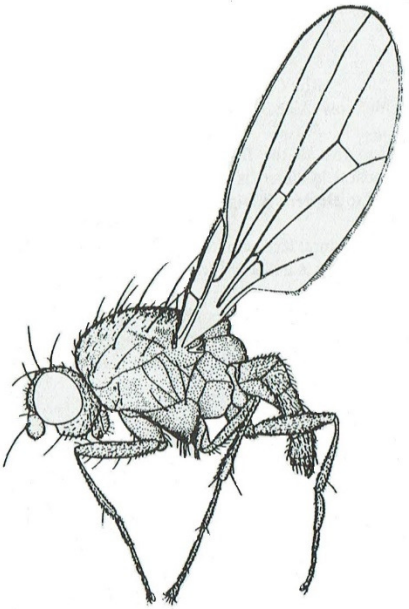
Dipterists Digest

2018 Vol. 25 No. 2

Cover illustration: *Palloptera usta* (Meigen, 1826) (Pallopteridae), male, on a rotten birch log at Glen Affric (NH 28012832), 4 November 2018.

In Britain, a predominantly Scottish species, having strong associations with Caledonian pine forest, but also developing in wood of broad-leaved trees. Rearing records from under bark of *Betula* (3), *Fraxinus* (1), *Picea* (18), *Pinus* (21), *Populus* (2) and *Quercus* (1) were cited by G.E. Rotheray and R.M. Lyszkowski (2012. Pallopteridae (Diptera) in Scotland. *Dipterists Digest* (*Second Series*) 19, 189-203). Apparently a late date, as the date range given by Rotheray and Lyszkowski (*op. cit.*) for both adult captures and emergence dates from puparia was 13 May to 29 September.

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

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

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

Style and format should follow articles published in recent issues. A short Summary (in the form of an Abstract) should be included at the beginning of each article. References to journals should give the title of the journal in full. **Scientific names should be italicised.** Authors of scientific names should be given in full and nomenclature should follow the most recent checklist, unless reflecting subsequent changes. Descriptions of new species should include a statement of the museum or institution in which type material is being deposited.

Authors will be provided with twenty separates of papers of two or more pages in length, and a pdf of their contribution if requested.

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Dipterists Digest 2018 **25,** 119-131

Melanagromyza galegae sp. n. (Diptera, Agromyzidae) from Hull, East Yorkshire, Great Britain

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Summary
A new species, *Melanagromyza galegae* sp. n. (Diptera, Agromyzidae) is described. A long series was reared from puparia obtained from the stems of *Galega officinalis* in Hull, Great Britain. A description of the larval stages and adult is given, along with comparisons with similar species.

Introduction

During November 2017, puparia were obtained from the stems of common goat's-rue (*Galega officinalis*) from a brownfield site in Hull (V.C. 61), TA059267, East Yorkshire, Great Britain. The puparia were found in the pith of the stems and possessed a strong central horn on each of the posterior spiracles, typical of the genus *Melanagromyza*; however, no species were known to utilise *G. officinalis*. Taking into account globally the host plant family, Fabaceae, *M. adsurgensis* Wenn, 1985, *M. azawii* Spencer, 1973, *M. dolichostigma* de Meijere, 1922, *M. erythrinae* (de Meijere, 1910), *M. fabae* Spencer, 1973, *M. floridensis* Spencer, 1963, *M. sojae* (Zehntner, 1900), *M. spenceriana* Zlobin, 2001 and *M. viciae* Wenn, 1985 were considered.

Having examined the puparia, the characteristics of the posterior spiracles did not agree with Spencer's (1973) description and illustrations of *M. azawii*, *M. dolichostigma, M. fabae* or *M. sojae*. The holotype and paratypes of *M. fabae*, a species known from Britain, were loaned from the Natural History Museum, London, with all puparia agreeing with Spencer's description. Although variation frequently occurs in regard to the shape and detail of the posterior spiracles, it was considered unlikely that the puparia from *G. officinalis* were *M. azawii*, *M. dolichostigma*, *M. fabae* or *M. sojae*.

Several of the collected puparia were retained indoors in the hope adult material might be forced into emerging, whilst the majority were placed in rearing jars and left in an unheated outbuilding to overwinter.

On 21 January 2018, an adult male emerged from the puparia retained indoors. Upon examination, the specimen runs to couplet 20 in the key by Papp and Černý (2015), which included *M. tschirnhausi* Pakalniškis, 1996 or *M. eupatorii* Spencer, 1957; however, certain morphological and genitalia features did not agree. Using Spencer's (1966) revision paper, it runs to couplets 19/20: *M. eupatorii*, *M. aenea* (Meigen, 1830) or *M. ferulae* Spencer, 1966. Again, based on some external features and details of the genitalia, none of these were considered conspecific.

When comparing the specimen with Spencer's (1973) descriptions of *M. azawii*, *M. dolichostigma, M. fabae* and *M. sojae,* several morphological features agreed; however, important characteristics such as size, wing and squamae detail did not. The male distiphallus was compared to those of the nine species listed above using Spencer (1990). When viewed laterally and from below, the distiphallus of the reared specimen is significantly different from all those species except *M. fabae*.

The genitalia of the specimen in lateral view agreed closely with *M. fabae* but when viewed from below, there were slight but obvious differences. To ensure Spencer's genitalia illustrations for *M. fabae* were a true representation, a male paratype of *M. fabae* was dissected and examined.

In lateral view, the aedeagus agreed with the illustration. From below, although slightly different, the general form of the distiphallus confirmed that the illustrations did represent *M. fabae* accurately and that the specimen was not the species described here.

Since the published *Melanagromyza* keys of Sasakawa (1961), Spencer (1966) and Spencer (1976), a further 17 valid new Palaearctic *Melanagromyza* spp have been described in nine publications (Černý 2007, Guglya 2016, Pakalniškis 1996, Sasakawa 1988, Sasakawa 1993, Sasakawa 2015, Spencer 1974, Wenn 1985 and Zlobin 2005). All descriptions and illustrations of these new species were checked and none were found to be the species described here.

Comprehensive notes and images, along with reared adults, were sent to Michael von Tschirnhaus, who confirmed that the specimen must be an undescribed species.

The overwintered puparia were brought indoors during March 2018 and over the following nine weeks, a total of 174 adults were successfully reared, with just a single parasitoid emerging.

Melanagromyza galegae Warrington **sp. n.**
urn:lsid:zoobank.org:act:403696E4-C825-4818-A9DB-15189991000B
Description

Head: Frons, 1.5x width of eye, slightly projecting above eye in profile, with 2 strong reclinate *ors*, the lower being slightly shorter and sometimes partially incurved, with 3 strong, incurved *ori*. Occasionally, there may be a fourth, much smaller, *ori* present [of 50 males and 50 females examined, two specimens possessed 2 *ori*, 77 specimens possessed 3 *ori* whilst 21 had 4 *ori*]. Orbital setulae long, numerous and entirely proclinate, in a single row at level of *ors*, which increases to two rows between lower *ors* and upper *ori*.

Eye in male with conspicuous patch of white pubescence at level of *ors*; in female, the pubescence is short and sparse or totally absent. Gena broad, slightly deeper below centre of eye, 1/3-1/4 height of eye (measured in 100 specimens). Cheeks forming a distinct ring below eye. Orbits wide with lunule broad, semi-circular, rarely with a slight central furrow (Fig. 1). Ocellar triangle reaching to level of lower *ors*. Third antennal segment small, rounded, with short pubescence, not longer than the basal section of the arista. Palpi and proboscis without peculiarities.

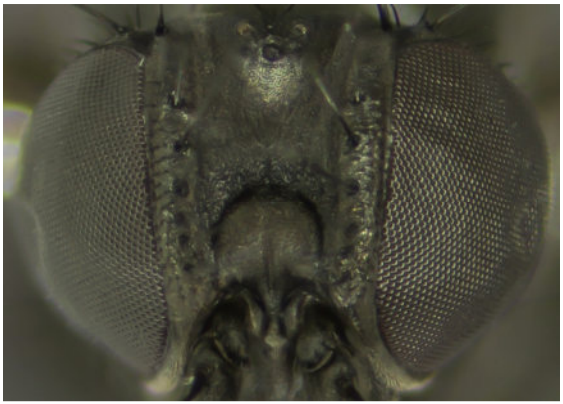

Fig. 1. Head detail of female *Melanagromyza galegae* sp. n.

Mesonotum: 2 strong dorsocentral (*dc*) bristles, with acrostichals in 10 rows at front, reducing to 4-5 rows at level of first *dc*. No setulae detected on or at the side of the scutellum.

Wing: hyaline, length 2.0mm-2.2mm in male, 2.3mm-2.6mm in female, with costa extending to vein M_{1+2}. All veins ochre-brown. Ultimate section of vein M_{3+4} 0.85 that of the penultimate; this feature was measured in 50 males and 50 females, with the results summarised in the table below:

Length of ultimate section of vein M_{3+4} to penultimate	No. of males	No. of females	Total
0.50 – 0.69	0	0	0
0.70 – 0.79	11	3	14
0.80 – 0.89	36	29	65
0.90 – 0.99	2	14	16
Both sections equal	1	4	5
TOTAL	**50**	**50**	**100**

[In *M. fabae*, the ultimate section of vein M_{3+4} is 0.66 that of the penultimate (Spencer 1973), which agreed with the specimens loaned from NHM, London. Also, the wing length of *M. fabae* is larger, from 2.6mm-2.7mm in the male and 3.2mm in the female].

Costal sections (2-4) of 100 *M. galegae* sp.n. specimens were measured, with an average ratio of 100:27:23 [The costal sections of *M. fabae* types were also measured, with the ratio being 100:21:23].

In some specimens (18 out of 100), cross-vein dM-M showed a distinct curvature (Fig. 2) [however, this is considered to be of no significance as such variation is frequently observed in the Agromyzidae].

Fig. 2. Wing of *Melanagromyza galegae* sp. n.

Colour: Frons matt black, with a slight grey tinge, rarely noticeably darker adjoining lunule. Orbits and ocellar triangle only moderately shining, paler than frons. Lunule lighter than frons, grey-black. Gena blackish-brown, palpi black. Third antennal segment and arista black. Mesonotum matt, greyish-black but with a distinct coppery-green shine. Abdomen weakly to moderately shining, greenish, more so in female. Squama (Fig. 3) grey, with margin dark brown (very rarely paler or extremely dark brown, almost black), fringe rather pale, ochreous, the hairs dark basally but becoming paler. Legs all black, with no posterolateral setae present. Halteres black, sometimes slightly brown.

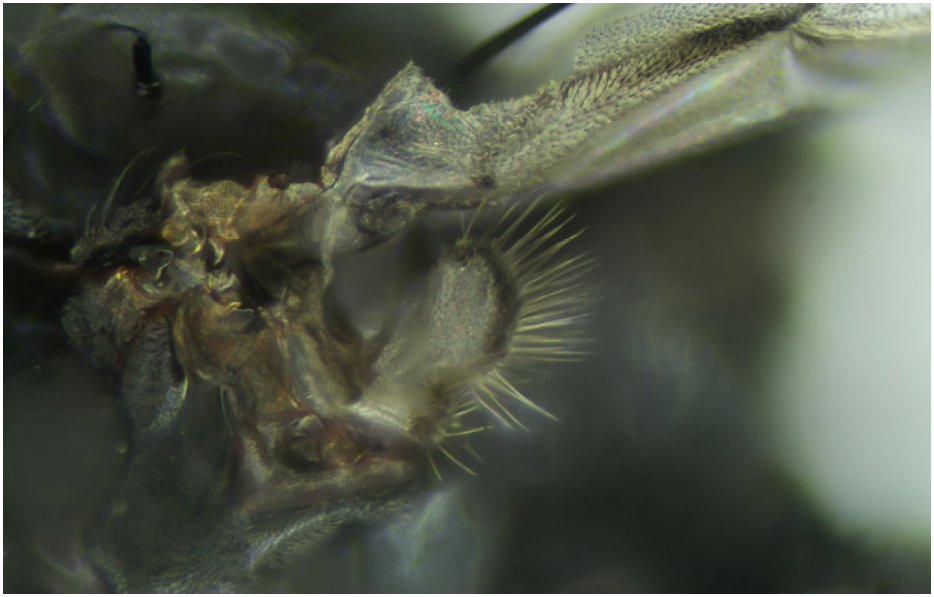

Fig. 3. Squama detail showing dark margin and pale fringe.

Male genitalia: Aedeagus as in Figs 4 and 5. In lateral view, basal bladder with an upwards curve, extending beyond rear of mesophallus (Fig. 4), the curvature being less than in *M. eupatorii* and *M. fabae*. [Spencer refers to *M. fabae* as possessing greater chitinization than *M. eupatorii*; however, this can be variable, depending on the time spent macerating].

Fig. 4. Aedeagus of male *Melanagromyza galegae* sp. n. in lateral view. Scale bar : 0.1mm

When viewed from above or below, distiphallus although superficially similar to *M. eupatorii* and *M. fabae*, possesses small but noticeable differences (Fig. 5). The positioning and quantity of spiculae on the distiphallus, although variable within individual specimens, is noticeably different between the three species.

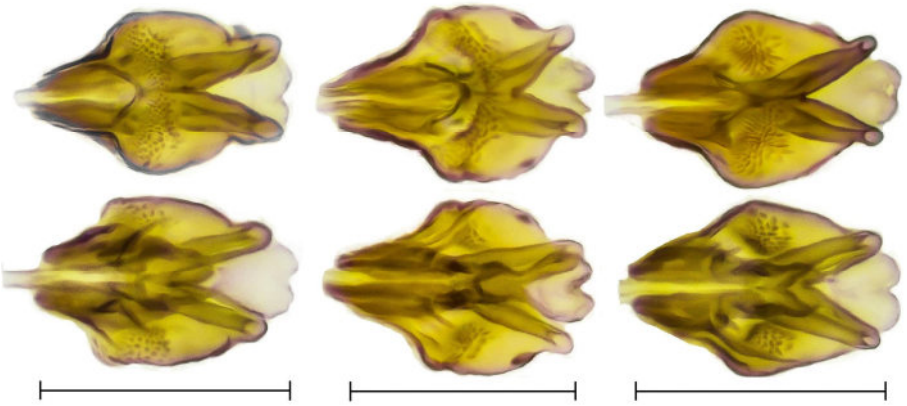

Fig. 5. Comparison of distiphallus viewed from above (top row) and below (bottom row). Scale bar: 0.1mm

Epandrium (Fig. 6) is hemispherical, covered with sparse setae; surstylus (Fig. 7) with a small group of long setae on the ventral margin, with numerous spines on the inner surface. Cerci (Fig. 8) club-shaped, with a few long thin setae ventrally and a group of five strong setae on the inner margin.

The ejaculatory apodeme showed great variation amongst the dissected males; therefore, it was considered appropriate that no single image was used to illustrate the species. In general, the blade is rather oval, asymmetrical, typical of the genus.

Figs. 6-8. ***Melanagromyza galegae*** **sp. n. outer genitalia (not to scale): 6, epandrium in caudal view; 7, surstylus; 8, cercus.**

Female genitalia: Egg guides (Fig. 9), relatively wide, 5.0-5.3x as long as maximum width (measured in ten females), acute apically, with the central and ventral part of medial membrane covered with numerous small, orange-brown, spinules, these sometimes reaching dorsal edge. Spermathecae (Fig. 11) unequal in size, dark brown, almost black, both possessing a collar of curved projections.

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10

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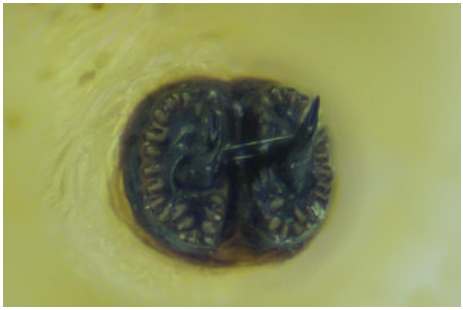
Figs 9-11. ***Melanagromyza galegae*** **sp. n. female genitalia (not to scale): 9, left egg guide viewed from outside, serrated dorsal edge top of image; 10, ovipositor and cerci viewed from below; 11, spermathecae.**

Early stages: Puparium (Fig. 15) orange-yellow; posterior spiracles (Fig. 14) virtually adjoining, each with an elipse of 15-20 elongate pores on bulbs around a strong central horn. The number of pores on the posterior spiracles is variable; the table below shows the number of pores present on the left and right spiracle of thirty specimens:

	Spiracle			Spiracle			Spiracle	
	Left	Right		Left	Right		Left	Right
Adult	No. of pores		Adult	No. of pores		Adult	No. of pores	
1 ♂	19	20	11 ♂	20	19	21 ♀	19	18
2 ♂	19	18	12 ♂	18	18	22 ♂	17	20
3 ♂	15	19	13 ♀	17	20	23 ♂	18	19
4 ♂	17	16	14 ♂	19	20	24 ♂	20	18
5 ♂	18	19	15 ♀	18	17	25 ♂	19	19
6 ♂	19	17	16 ♂	16	18	26 ♂	18	19
7 ♀	20	18	17 ♂	20	17	27 ♂	20	20
8 ♀	18	19	18 ♂	19	17	28 ♀	18	18
9 ♂	20	19	19 ♂	20	17	29 ♀	19	19
10 ♂	17	19	20 ♀	20	20	30 ♀	18	20

The puparium (Fig. 12, upper) of *M. fabae* (holotype and paratypes examined) differs from that of *M. galegae* sp. n. (Fig. 12, lower) by being larger, pale, yellowish-white, the posterior spiracles separated by their own diameter (Fig. 13) and each with an elipse of 12-15 elongate pores around a very short central horn (Fig. 13). Dr A.J. Biddle, who originally discovered *M. fabae*, kindly passed on several *Vicia faba* stems collected from Stamford, Lincolnshire, on 27 September 2018, which resulted in puparia being obtained from the roots. These puparia agreed with the *M. fabae* types.

Fig. 12. ***Melanagromyza fabae*** **(top) and** ***Melanagromyza galegae*** **sp. n. (bottom) puparia.**



13 **14**

Figs 13-14. Posterior spiracles: 13, *Melanagromyza fabae*; 14, *M. galegae* sp. n.

Fig. 15. *Melanagromyza galegae* sp. n. puparium.

Host plant: *Galega officinalis*.
A total of 175 stems were collected, with every tenth stem being gathered at random. All but two stems possessed puparia, which suggests a very high level of infestation. The plants did not show any signs of defoliation, wilting or root decay.

Biology: Although not known in detail, based on examination of the feeding channels, it is assumed that oviposition takes place in the stem on young plants, between ground level and the second node, during May/June.

The larva feeds within the stem in an upward or downward direction, with pupariation occurring consistently at level of first node (Figs 16-18). No puparia or feeding signs were detected above second node or below ground level. One larva per stem; very rarely were two puparia encountered in the same plant.

It appears there is only a single generation annually; the site was visited several times during 2018, with adults been collected from *G. officinalis* during the second half of May only, and puparia present in September/October.

16

17

18

Figs 16-18. ***Melanagromyza galegae*** **sp. n. puparia** ***in situ*** **at level of first node. Root of stem to the left in all images.**

Host-range and distribution: *Galega officinalis*, often referred to as common goat's-rue, French lilac, Italian fitch or Professor weed, is a hardy perennial lowland herb of grasslands, gravel pits, railway sidings, roadsides and brownfield sites, predominantly in the southern half of Britain .

It is a European Temperate species, which is absent as a native from Western Europe. The plant was introduced into cultivation by 1568 and the first English record in the wild was in 1640. The spread of this species is relatively recent; it was not mapped in the 1962 Atlas of the British and Irish Flora (Preston *et al.* 2002).

To date, *G. officinalis* has predominantly been an urban plant, but it is now spreading into more rural areas. In parts of London, it can be found in 75% of the tetrads and in each 10km square.

Type material: Holotype ♂ ENGLAND, East Yorkshire, V.C. 61, Hull TA059267 (53.726302 -0.39568894), emerged 21 January 2018, ex puparium collected November 2017. Pinned, with its puparium in a gelatin capsule and genitalia preparations in Euparal pinned below the specimen. Deposited at Natural History Museum, London.

Paratypes (same data, collected November 2017, emerged April 2018); 10 ♂ and 10 ♀ NHM London; 18 ♂ and 12 ♀ in the private collection of Michael von Tschirnhaus (Germany), 1 ♂ in the private collection of Miloš Černý (Czech Republic), with the remaining 122 specimens in the private collection of BPW.

Fig. 19. ***Melanagromyza galegae*** **sp. n. male (left) and female (right).**

Etymology: The name reflects the host plant genus.

Additional comments

Melanagromyza galegae sp. n. is a rather difficult species to identify, with *M. eupatorii* and *M. fabae* both being very similar, the latter particularly so. Size, wing venation and squama detail, although variable, can aid determination; however, any identification should be based on detailed examination of the male genitalia. The most obvious differences between the aforementioned species is in their biology and larval morphology.

Only one parasitoid was reared, the braconid *Chorebus cylindricus* (Telenga, 1934), a relatively common species, which is known to parasitise several *Melanagromyza* species. The low rate of parasitism is consistent with an introduced host (Charles Godfray *pers. comm.*). Spencer (1973) stated that *M. fabae* is 'heavily parasitised by a braconid', which Griffiths (1984) later confirmed as *C. cylindricus*. The larval mines of *Liriomyza congesta* (Becker, 1903) were also found on the host plant, which may represent the first record of this species utilising *Galega* in Great Britain. The collection site, a five acre brownfield, possesses much of the typical flora and fauna associated with these habitats. Unfortunately, the land is due to be developed over the coming next two years.

Acknowledgements

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Appendix: Summary of measurements (numbers refer to ocular micrometer reading) taken from 50♂ and 50♀.

Sex	ors	ori	Eye: jowl	Vein M_{3+4} ratio	M_{3+4} ult. to penult.	Costal sections 2 : 3 : 4	dc	acr at front	acr at 1st dc	Lunule with furrow	Pores on spiracles L	R
♂	2	3	13:04	13:11	0.85	26:07:05	2	10	5	y	19	20
♂	2	4	12:04	14:11	0.79	26:08:06	2	10	5	y	19	18
♂	2	3	12:04	16:12	0.75	31:08:06	2	10	5	n	15	19
♂	2	3	14:04	8:6	0.75	14:05:03	2	10	5	n	17	16
♂	2	4	14:04	17:13	0.76	31:08:07	2	10	5	n	18	19
♂	2	3	12:03	15:15	1.00	32:09:07	2	10	5	n	19	17
♂	2	3	12:04	13:10	0.77	21:06:05	2	10	5	n	20	19
♂	2	2	12:03	13:11	0.85	25:06:05	2	10	5	n	17	19
♂	2	3	10:03	12:10	0.83	22:06:05	2	8	5	n	20	19
♂	2	4	12:04	16:14	0.88	30:09:07	2	10	5	n	18	18
♂	2	3	12:04	13:10	0.77	24:06:05	2	10	5	y	19	20
♂	2	3	11:03	12:10	0.83	23:06:05	2	10	5	n	16	18
♂	2	3	11:03	13:10	0.77	23:06:05	2	10	5	y	20	17
♂	2	3	12:04	13:11	0.85	25:07:05	2	9	5	n	19	17
♂	2	3	11:03	12:10	0.83	22:06:05	2	10	5	n	20	17
♂	2	4	13:03	15:13	0.87	30:08:08	2	10	4	n	17	20
♂	2	4	13:04	13:10	0.77	26:06:05	2	10	5	n	18	19
♂	2	3	12:04	15:12	0.80	28:09:07	2	10	5	n	20	18
♂	2	3	11:03	11:10	0.91	24:07:06	2	10	4	n	19	19
♂	2	4	11:03	11:9	0.82	23:06:05	2	10	5	n	18	19
♂	2	3	13:04	15:13	0.87	28:09:07	2	10	5	n	20	20
♂	2	3	13:04	15:13	0.87	28:08:06	2	10	5	n	-	-
♂	2	3	14:03	16:13	0.81	30:09:06	2	10	5	n	-	-
♂	2	4	13:03	15:11	0.73	28:07:06	2	10	5	n	-	-
♂	2	3	12:03	15:13	0.87	29:08:07	2	10	5	n	-	-
♂	2	4	13:04	15:12	0.80	28:07:07	2	10	5	n	-	-
♂	2	4	14:04	13:10	0.77	25:07:06	2	10	5	n	-	-
♂	2	3	12:03	13:11	0.85	23:07:06	2	10	4	n	-	-
♂	2	4	14:04	16:14	0.88	30:09:07	2	10	4	n	-	-
♂	2	4	12:03	14:12	0.86	27:07:06	2	10	5	n	-	-
♂	2	3	11:03	15:12	0.80	27:08:06	2	8	4	n	-	-
♂	2	3	15:04	18:15	0.83	34:09:07	2	10	5	n	-	-
♂	2	3	12:03	15:13	0.87	30:08:06	2	10	4	n	-	-
♂	2	3	13:04	15:12	0.80	29:08:06	2	10	5	n	-	-
♂	2	3	11:03	10:9	0.90	22:06:05	2	10	5	n	-	-
♂	2	3	12:03	14:12	0.86	28:07:06	2	10	5	n	-	-
♂	2	4	13:03	18:14	0.78	35:09:07	2	10	5	n	-	-
♂	2	3	13:04	16:14	0.88	30:09:07	2	10	5	n	-	-
♂	2	4	14:04	11:9	0.82	22:06:05	2	10	5	n	-	-
♂	2	3	11:03	12:10	0.83	24:06:06	2	10	5	n	-	-
♂	2	3	10:03	14:12	0.86	27:07:06	2	10	5	n	-	-
♂	2	3	11:03	11:9	0.82	22:06:05	2	10	5	n	-	-
♂	2	4	12:03	14:12	0.86	28:07:06	2	10	5	n	-	-
♂	2	3	14:04	15:12	0.80	22:07:06	2	10	4	n	-	-
♂	2	3	15:05	17:14	0.82	31:09:07	2	10	5	n	-	-
♂	2	3	15:05	18:15	0.83	34:09:07	2	10	5	n	-	-
♂	2	3	12:03	15:12	0.80	27:07:06	2	10	4	n	-	-
♂	2	3	13:04	16:14	0.88	32:09:07	2	10	5	n	-	-
♂	2	3	12:03	13:11	0.85	25:07:05	2	8	5	y	-	-
♂	2	3	12:04	17:14	0.82	33:09:06	2	10	5	n	-	-

Sex	ors	ori	Eye: jowl	Vein M_{3+4} ratio	M_{3+4} ult. to penult.	Costal sections 2 : 3 : 4	dc	acr at front	acr at 1st dc	Lunule with furrow	Pores on spiracles L	R
♀	2	4	11:03	13:12	0.92	28:07:07	2	10	5	n	20	18
♀	2	4	18:03	13:11	0.85	25:07:06	2	10	4	n	18	19
♀	2	3	12:03	15:13	0.87	29:08:07	2	10	5	n	17	20
♀	2	3	11:03	13:13	1.00	28:09:07	2	10	5	y	18	17
♀	2	3	11:03	19:17	0.89	39:10:08	2	10	5	n	20	20
♀	2	3	11:03	10:9	0.90	20:05:04	2	10	5	n	19	18
♀	2	3	13:04	14:12	0.86	28:08:07	2	10	5	n	18	18
♀	2	3	11:03	16:13	0.81	31:09:07	2	10	4	n	19	19
♀	2	3	12:03	14:12	0.86	27:08:07	2	10	5	n	18	20
♀	2	2	11:03	10:9	0.90	20:07:05	2	10	5	n	-	-
♀	2	4	13:03	15:13	0.87	30:08:06	2	10	5	n	-	-
♀	2	3	12:04	11:8	0.73	22:05:05	2	10	5	n	-	-
♀	2	3	12:03	15:13	0.87	29:08:07	2	10	5	n	-	-
♀	2	3	12:03	19:17	0.89	38:09:08	2	10	5	n	-	-
♀	2	3	14:04	10:9	0.90	21:06:05	2	10	5	n	-	-
♀	2	3	12:03	14:12	0.86	27:07:06	2	8	5	n	-	-
♀	2	3	13:03	15:13	0.87	30:08:08	2	10	5	n	-	-
♀	2	4	13:03	15:14	0.93	31:09:07	2	10	4	n	-	-
♀	2	3	10:02	12:10	0.83	23:07:05	2	10	5	n	-	-
♀	2	3	11:03	10:9	0.90	20:06:05	2	10	5	n	-	-
♀	2	3	12:04	17:15	0.88	35:09:08	2	10	4	n	-	-
♀	2	3	11:03	13:11	0.85	24:07:06	2	10	5	n	-	-
♀	2	3	11:03	11:10	0.91	23:06:05	2	10	4	n	-	-
♀	2	3	12:03	9:7	0.78	18:04:04	2	10	5	n	-	-
♀	2	3	12:03	15:13	0.87	26:07:06	2	10	5	n	-	-
♀	2	3	13:04	15:13	0.87	31:08:07	2	10	5	n	-	-
♀	2	3	10:03	15:13	0.87	30:08:07	2	10	5	n	-	-
♀	2	3	11:03	14:13	0.93	30:08:07	2	10	5	n	-	-
♀	2	3	12:03	11:10	0.91	24:06:05	2	10	5	n	-	-
♀	2	3	13:03	16:14	0.88	33:09:07	2	10	5	n	-	-
♀	2	3	12:03	13:11	0.85	22:06:06	2	10	5	n	-	-
♀	2	3	11:03	12:10	0.83	22:06:05	2	10	5	n	-	-
♀	2	3	11:03	10:9	0.90	21:05:05	2	10	5	n	-	-
♀	2	3	11:03	12:12	1.00	26:06:06	2	10	5	n	-	-
♀	2	3	11:03	14:13	0.93	29:08:06	2	10	5	n	-	-
♀	2	3	12:04	15:13	0.87	30:07:07	2	10	5	n	-	-
♀	2	3	14:04	12:12	1.00	25:06:06	2	10	4	n	-	-
♀	2	3	11:03	11:10	0.91	24:07:06	2	10	5	n	-	-
♀	2	3	13:03	15:13	0.87	29:08:07	2	8	5	n	-	-
♀	2	3	14:04	15:14	0.93	30:09:07	2	10	5	n	-	-
♀	2	3	13:04	17:14	0.82	33:08:07	2	10	5	n	-	-
♀	2	3	13:04	16:13	0.81	30:09:07	2	10	5	n	-	-
♀	2	3	11:03	10:9	0.90	20:06:04	2	10	5	n	-	-
♀	2	4	10:03	10:10	1.00	21:06:05	2	10	5	y	-	-
♀	2	4	12:04	15:12	0.80	27:07:06	2	10	4	n	-	-
♀	2	3	11:03	12:10	0.83	25:06:05	2	10	4	n	-	-
♀	2	4	12:03	15:12	0.80	29:08:07	2	10	5	n	-	-
♀	2	3	14:04	18:15	0.83	34:10:08	2	10	5	n	-	-
♀	2	3	14:04	14:11	0.79	25:07:06	2	10	5	n	-	-
♀	2	3	12:03	14:12	0.86	27:07:06	2	10	5	n	-	-

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Additions to the Irish list of Agromyzidae (Diptera)

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Summary
Thirteen species of Agromyzidae are added to the list of Irish Diptera (Chandler *et al*. 2008). Details of each record are provided. All but one additions are based on larval leaf-mines, which the author considers acceptable, owing to host plant specificity and the characteristic mine of each species. All records are held within the National Agromyzidae Recording Scheme database and were obtained from verified supported records entered into iRecord.

Systematic list
AGROMYZINAE
Agromyza albitarsis Meigen, 1830
18 October 2016, Greenmount Campus, Antrim, NI; the distinctive mines (Fig. 1), which were tenanted, were discovered on white poplar *Populus alba* by Rodney Monteith. Greenmount Campus, now a land-based industries training centre, dates back to the 1760s and has a broad range of habitats including mixed woodland, constructed wetlands, agricultural land, ornamental gardens and wildflower meadows.

Agromyza alnivora Spencer, 1969
8 September 2014, King's Bridge, Antrim, Belfast, NI; leaf-mines were recorded on alder (*Alnus*) by John O'Boyle.

Agromyza demeijerei Hendel, 1920
15 June 2016, Greenmount Campus, Antrim, NI; Rodney Monteith discovered characteristic mines on *Laburnum* (Fig. 2).

Agromyza filipendulae Spencer, 1976
30 July 2015, Greenmount Campus, Antrim, NI; mines were noted by Rodney Monteith on meadowsweet (*Filipendula*) (Fig. 3).

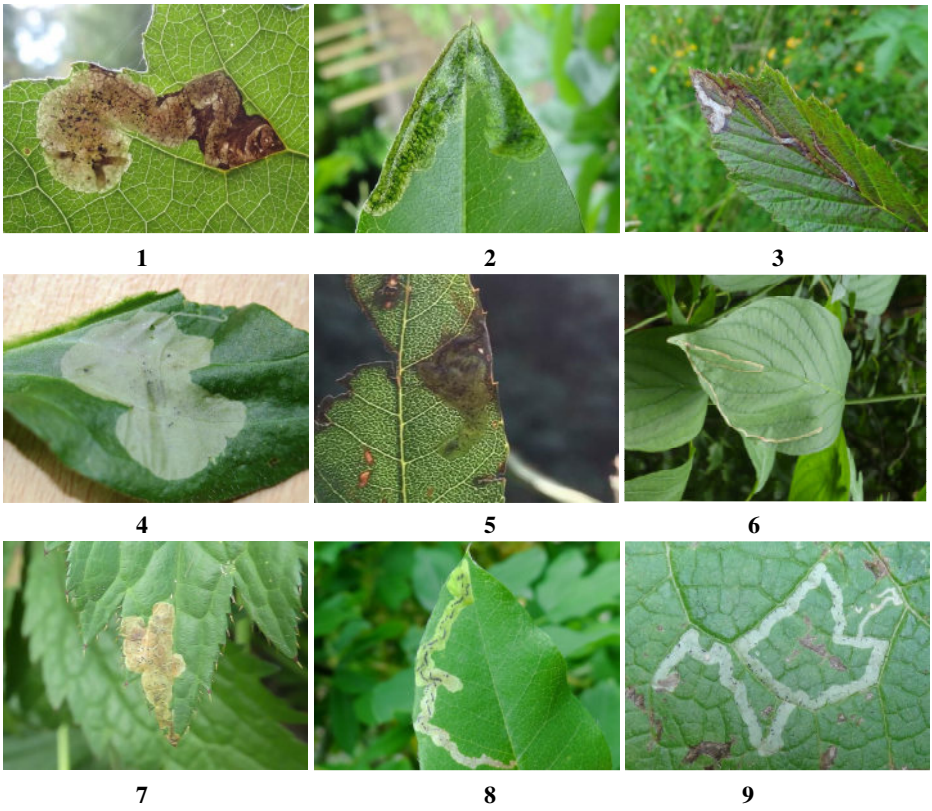
Agromyza vicifoliae Hering, 1932b
25 July 2017, Murlough NNR, Dundrum, County Down, NI; Ryan Mitchell discovered mines on a vetch *Vicia* sp.

PHYTOMYZINAE
Amauromyza flavifrons (Meigen, 1830)
2 November 2017, Greenmount Campus, Antrim, NI; mines were found on red campion (*Silene dioica*) (Fig. 4) by Rodney Monteith.

Aulagromyza heringii (Hendel, 1920)
17 October 2017, Ardilead Road, County Down, NI; Ryan Mitchell discovered the characteristic mines on ash (*Fraxinus excelsior*) (Fig. 5).

Phytomyza agromyzina Meigen, 1830

17 July 2018, Stormont Estate, County Down, Belfast, NI; larval mines (Fig. 6) were found by Aideen O'Doherty on the leaves of a larger *Cornus* species in the wetland part of the Stormont Estate, J40865760. The Stormont Estate contains various habitats including woodland, wetland and acid grassland with abundant club, earth-tongue and waxcap fungi.



Figs 1-9, leaf mines: 1, *Agromyza albitarsis* (R. Monteith); 2, *Agromyza demeijerei* (R. Monteith); 3, *Agromyza filipendulae* (R. Monteith); 4, *Amauromyza flavifrons* (R. Monteith); 5, *Aulagromyza heringii* (R. Mitchell); 6, *Phytomyza agromyzina* (A. O'Doherty); 7, *Phytomyza astrantiae* (A. O'Doherty); 8, *Phytomyza cytisi* (R. Monteith); 9, *Phytomyza lappae* (R. Monteith).

Phytomyza astrantiae Hendel, 1924

14 July 2018, Rowallane, Saintfield, County Down, NI; the leaf mines (Fig. 7) were discovered by Aideen O'Doherty in the walled garden at Rowallane, J40865760, on the lower leaves of several different *Astrantia* cultivars. Rowallane is a National Trust garden dating from the 1860s, specialising in rhododendrons. The site is a mixture of habitats including woodland and acid grassland with orchids, club and waxcap fungi but planting in the walled garden is ornamental.

16 June 2018, St Stephen's Green, Dublin, RoI; Aideen O'Doherty found leaf-mines on *Astrantia* in a long bed of ornamental planting in St Stephen's Green, Dublin, O160332, County Dublin, Republic of Ireland. St Stephen's Green is a formal park in central Dublin.

This species continues to be recorded from areas of the British Isles where it was previously absent and is now known from England, Ireland, Scotland and Wales. The increase in records and distribution may be two-fold; natural dispersal of the species, which may be partly contributed to by the horticultural trade, and an increase in awareness of this species and the Agromyzidae in general.

Phytomyza cytisi Brischke, 1881
15 June 2016, Greenmount Campus, Antrim, NI; distinctive mines on *Laburnum* (Fig. 8) were found by Rodney Monteith.

Phytomyza lappae Goureau, 1851
9 July 2015, Greenmount Campus, Antrim, NI; Rodney Monteith found leaf-mines on lesser burdock (*Arctium minus*) (Fig. 9).

Phytomyza pastinacae Hendel, 1923
6 June 2018, Chapeltown, County Down, NI; mines on hogweed (*Heracleum sphondylium*) were collected by Aideen O'Doherty and sent to the author for the Hogweed miner project that the National Agromyzidae Recording Scheme was undertaking. On 2 September 2018, a single male emerged, which was dissected and proved to be *P. pastinacae*.

Phytomyza ranunculivora Hering, 1932
21 September 2016, Greenmount Campus, Antrim, NI; leaf-mines were found on creeping buttercup (*Ranunculus repens*) by Rodney Monteith.

Additional information
There are several other species, which have been recorded, per the iRecord database, which would also be new to Ireland. However, due to the possibility of other causers and/or lack of supporting evidence, these must be considered dubious until proven otherwise. These species are:

Agromyza ferruginosa Wulp, 1871
Agromyza hendeli Griffiths, 1963
Agromyza lithospermi Spencer, 1963
Agromyza myosotidis Kaltenbach, 1864
Agromyza sulfuriceps Strobl, 1898
Aulagromyza cornigera (Griffiths, 1973)
Cerodontha silvatica (Groschke, 1957)
Liriomyza bryoniae (Kaltenbach, 1858)
Phytomyza aconiti Hendel, 1920
Phytomyza calthivora Hendel, 1934

Acknowledgements
I would like to thank John O'Boyle, Aideen O'Doherty, Ryan Mitchell and Rodney Monteith for allowing their records and images to be included in this paper.

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Liriomyza obliqua Hendel (Diptera, Agromyzidae) new to Britain with European data and morphological notes

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Summary
Liriomyza obliqua Hendel, 1931 (Diptera, Agromyzidae) is reported as a species new to Britain. A description of the adult and circumstances of the discovery are given. Literature discussing the species and host plant is provided and previous erroneous European records are corrected.

Introduction

A single male *Liriomyza* species was swept from vegetation at Wharram Quarry (SE859653), North Yorkshire (V.C. 62) on 9 July 2018 by BPW. The species runs to the final couplet (57) in Spencer (1976), *L. canescens* Spencer, 1976 or *L. congesta* (Becker, 1903); however, the genitalia are greatly different from those two species. Using Papp and Černý (2017), the adult can be included in couplet 71, with *L. obliqua* Hendel 1931 being the first option. However, the second cross-vein (*tp* or M-M or *dm-cu*) of the adult is not conspicuously oblique, therefore leading to couplet 72, *L. flavopicta* Hendel, 1931 or *L. hampsteadensis* Spencer, 1971. Again, the male genitalia differ greatly from these species. After studying the lectotype and his own material, the second author confirmed that the species is *Liriomyza obliqua*, a species previously not known from Britain.

Male lectotype

In the Natural History Museum in Vienna, two specimens are stored which were identified by F. Hendel before his description of *L. obliqua* (Hendel 1931-1936: 235), the first with the labels "St. Zagora, 1929, 9.17. / Bulgaria, leg. Szilády / Liriomyza obliqua H. F. Hendel det." was identified by MVT as *L. hampsteadensis* Spencer and labelled accordingly. The other one is equipped with a round white label with a violet edge "♂ Lectotype" and the labels / Mt. Meszes Biró. 04.V. / 11.v.901 / Coll. Hendel / Liriomyza F. Hendel det obliqua Hend. / 2657 8.8.70 L. obliqua K.A.S.", the latter carrying the genitalia preparation in euparal prepared by K.A. Spencer. The genitalia figure based on this specimen was published by Spencer (1972: 259). This preparation had to be dissolved from the medium and was re-embedded by MVT on 8.viii.1970.

Hendel's description applies well, except that the ocelli are not arranged in an exact equilateral triangle, and the third antennal segment not bearing an extremely short ("äußerst kurz") but a normal pubescence (shorter than the basal diameter of the arista). Thirdly, the hind cross-vein is peculiarly oblique only on the right wing. Therefore, the species name is misleading for non-teratological specimens. The following features are not mentioned by Hendel: a sensory pit on the 3rd antennal segment is not detectable, 1st antennal segments in contact, palpi normal and cylindrical, only 3+4 peristomal setae, width of cheeks equal to the diameter of the first two aristal segments, the deepest point of the jowl is in the hind part of the gena, depth of eye and depth of jowl (cheek plus gena below eye) as 28:12, 1+1 *ors*, 2+2 *ori*, 9+9 short recurved orbital setulae, length to width of frons as exactly 1:1, eye margins only slightly convergent anteriorly, ocellars extending until the level of the single *ors*, distances between 1st, 2nd and 3rd dorsocentrals as 10:7:4, the 3rd small dorsocentral (*dc*) [counted from behind] positioned in the scutal suture,

two or three rows of damaged acrostichals, before and behind the suture 4 *ia*-setulae, at least on the left side an inner postalar seta present at the border of a yellow postalar area, costa ends at wing tip, wing length 1.77mm, costal sections 2:3:4 as 57:24:16, basal : distal section of vein M_{3+4} as 15:46, both veins R_{2+3} and R_{4+5} straight, M_{1+2} only slightly weaker than R_{4+5}, eyes without pubescence, scutum moderately matt with slight sheen, right surstylus with one, left with two prominent pegs at the tip. Colour: head with antennae and palpi yellow, the hind upper eye margin yellow and only interrupted by some dark colour combined with the occiput, *vti* and *vte* setae on yellow ground, lateral scutellar seta on dark, apical scutellar on yellow ground, the dark centre of the humeral callus (postpronotum) is surrounded by yellow, notopleuron and upper 3/5 parts of anepisternum yellow.

British biotope

Wharram Quarry is a seven hectare, disused chalk quarry, with species-rich chalk grassland. The site is managed by the Yorkshire Wildlife Trust. It possesses variable depths of soil, resulting in different floral communities. The western edge of the site, where the spoil was deposited, is now dominated by coarse grasses and hawthorn scrub. There are several species of grasses present, including cocksfoot (*Dactylis glomerata*), meadow (*Avenula pratensis*) and false oat-grasses (*Arrhenatherum elatius*), red and sheep's fescues (*Festuca*), and quaking grass (*Briza*). Glaucous sedge (*Carex flacca*) is also widely distributed.

The remainder of the site is dominated by wildflowers including bird's-foot trefoil (*Lotus corniculatus*), cowslip (*Primula veris*), mouse-ear hawkweed (*Hieracium pilosella*), rough hawkbit (*Leontodon hispidus*) and yellow-rattle (*Rhinanthus minor*). Wharram Quarry is one of the few sites in Yorkshire for thistle broomrape (*Orobanche reticulata*), a Red Data Book species which is a parasite of woolly thistle (*Cirsium eriophorum*). Red hemp-nettle (*Galeopsis angustifolia*) has been introduced from nearby populations, along with small-flowered buttercup (*Ranunculus parviflorus*). Areas of the quarry floor are periodically scraped back to bare chalk in order to maintain the succession of plants. During late summer, parts of the quarry are mowed, whilst in winter, the site is grazed by Hebridean sheep to prevent it becoming dominated by dense coarse grasses and hawthorn scrub.

Biology

Hendel (1931-1936: 235) speculated about the possible identity of a female which was reared by Kolobowa from *Pisum sativum* in Poltawa, Central Ukraine. Females of most *Liriomyza* species cannot be identified without males in the same sample. The male genitalia show *L. obliqua* to belong to the *Liriomyza hieracii* (Kaltenbach, 1862) group, a monophylum bound to host plants that are all included in the Asteraceae. The phallus (Fig. 1) is very similar to that of another member of this group, *L. scorzonerae* Rydén, 1951 (host genus *Scorzonera*) which allowed the prediction that its host plant belonged to Asteraceae.

Hendel's assumption was apparently the source of an alleged record of a fly reared from *Pisum* in Finland by Thuneberg (1959), an error repeated by Vappula (1965) and Franz (1989: 200) who believed *Pisum* to be a confirmed host plant genus. Finally, Tanasijchuk and Zlobin (1981: 151) repeated this mistake in their book chapter on Russian agricultural pests as during that time the Ukraine was still a part of the USSR. We reject all those host records and their related distribution records from the Ukraine and Finland. Ostrauskas *et al*. (2005) were the first who detected the true host plant, *Picris hieracioides*, in Lithuania, a trustable record as Pakalniškis successfully clarified the hosts of many known and new Lithuanian agromyzid species between 1962 and his early death in 2006.

Ostrauskas *et al*. (*op. cit*.) also described the leaf-mine and mode of pupariation. The male specimen from the Austrian Alps (data see below) was caught on a lawn densely covered by flowering common dandelion (*Taraxacum officinale*).

Identification

After the material of MVT, the species must be included in Hendel's key (1931-1936: 198) not only in couplet 47d but also in couplets 47e and 57a as partly two upper orbital setae (*ors*) are present and only two or three rows of acrostichals (*acr*) occur. Different from the lectotype, the *ipa* seta stands partly on dark ground and both surstyli partly carry only one tooth at their tip, a variation not uncommon in *Liriomyza* species.

For reliable determination dissection, maceration and embedding of the male genitalia is indispensable. Apart from Fig. 1, further figures were published by Spencer (1990) and Papp and Černý (2017). The closely related species *Liriomyza flavopicta* Hendel and *L. hampsteadensis* should be compared as both species also bear only one upper orbital seta (*ors*). The latter is not rare and its host plant is yarrow (*Achillea millefolium)*.

Fig. 1. *Liriomyza obliqua* Hendel, male phallus (rest position), viewed from below. Scale bar: 0.1mm.

Distribution

A first record from the Austrian Alps: 1♂, Hohe Tauern, mountain hotel "Almgasthaus Glocknerblick", 2.7 km E of river Mölln, 2050m a.s.l, 46°57'15"N, 12°55'57"E, 24.vi.2004, leg. M. von Tschirnhaus, swept from lawn densely intermixed with flowering *Taraxacum officinale*, *Achillea millefolium*, *Trifolium repens*, *Ranunculus* sp., *Myosotis* sp. and *Alchemilla* sp. Wing length of this male 1.97mm, both hind cross-veins not oblique, one side of head with two reclinate ors, height of ejaculator 0.225mm, length of phallus including phallophorus 0.237mm.

Liriomyza obliqua is a rare European species, known only from a few specimens. The records of Hendel (1931-1936) from Delnice (Croatia), Tátraháza (Slovakia) and Vienna (Austria) are based on females which cannot be identified with certainty. Confirmed countries are Austria (this article), the Czech Republic (Černý *et al*. 2005: 292), England (this article), Germany (von Tschirnhaus 1994: 516), Hungary (Papp 2009: 237), Lithuania (Pakalniškis 1999: 76; Ostrauskas *et al*. 2005: 74-76), Romania: Mt. Meszes (Hendel 1931-1936: 235, lectotype), and Switzerland at 2000m a.s.l. (Černý 2005: 791).

As mentioned above under Biology, Finland and Ukraine have to be deleted from the list of countries.

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Dipterists Digest 2018 **25,** 139-141

Emergence of *Lasiomma picipes* (Meigen) (Diptera, Anthomyiidae) from Golden Eagle pellets

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Summary
Two golden eagle *Aquila chrysaetos* pellets supported larval development to adulthood for around 80 flies identified as *Lasiomma picipes* (Meigen, 1826).

Introduction

Larvae of the anthomyiid genus *Lasiomma* (Stein, 1916) are known to be saprophagous and are found on organic material such as rotting meat, dead animals and excrement of humans, mammals and birds. Of the five British species, four, including *Lasiomma picipes* (Meigen, 1826), are associated with birds' nests.

On 15 June 2017, during a routine visit to a golden eagle *Aquila chrysaetos* eyrie at NC 55 (near Tongue, Sutherland) to ring the chick, AR came across a couple of pellets (Fig. 1) coughed up by an adult bird around 6m above the nest. These were taken and placed in a freezer bag (for later dissection to determine prey species), then stored on a shelf in an unheated building.

As birds are incapable of chewing their prey, many species regurgitate pellets which contain indigestible material such as bones, fur, feathers and vegetation. Food is torn up and swallowed where it enters the crop to further grind and break up the food item. In the case of eagles, it then passes to the gizzard where indigestible material forms a pellet, which is then coated in mucus and regurgitated or cast. Pellets are formed within 6 to 10 hours of a meal in the bird's gizzard.

At the end of January 2018, on opening the bag of pellets, AR noticed quite a number of flies that had hatched and then perished. They were anthomyiids but unfortunately the legs had deflated and twisted making identification difficult. They were referred to PB, who confirmed the species as *Lasiomma picipes* and recorded 27 males and 46 females.

One of the pellets contained the remains of red grouse *Lagopus lagopus scotica*; bones, skull and feathers were present. Both pellets contained a large volume of plant matter such as mosses, grasses and bracken and were 10 to 15cm long.

Discussion

As *L. picipes* is documented to use common birds' nests it is assumed that the adult flies are attracted to decaying material which will support larval development. In the case of golden eagles, once the egg or eggs have hatched, food is brought and fed to the chick, the remains of which are discarded on the nest. It is plausible that the nest detritus initially attracted *L. picipes* and stimulated oviposition; the pellets, which were in reasonable proximity to the nest, were then used. Given the nature of the visit, no flies were collected from the nest itself.

Lasiomma picipes may be regarded as moderately common, being ranked 59th in frequency of records on the database of the Anthomyiidae Recording Scheme, out of a total of 246 British species. The current total of 36 records is split between England and Wales south of the Mersey and Humber, and the Highlands and Islands where there are now 11 records (Fig.2). That there are no records in the areas between attests to a general lack of recording of Anthomyiidae. The

species was regarded as eurytopic by Skidmore (2006), so the present observation does not greatly extend knowledge of the species' distribution or habitats. However, rearing from regurgitated raptor pellets does appear to be little reported; it was not recorded for any Diptera by Hutson (2010), though van Erkelens (2012) cited a reference to the rearing of *Lasiomma anthomyinum* (Rondani, 1866) from owl pellets.

Fig. 1. Golden eagle *Aquila chrysaetos* pellets, showing bone fragments of red grouse *Lagopus lagopus scotica* and vegetation. Note one of the flies on the left-hand side of the photo.

Acknowledgements

We are grateful to Michael Ackland for making available his unpublished identification keys and ecological notes. We are also grateful to Murdo MacDonald for creating the map using DMAP. Records for the dots were taken from NBNA (and just one, the SK GR, from iRecord that was not on NBNA). Records used in this paper were taken from the NBN Atlas. Data providers and the NBN Trust bear no responsibility for any further analysis or interpretation of the information in the maps.

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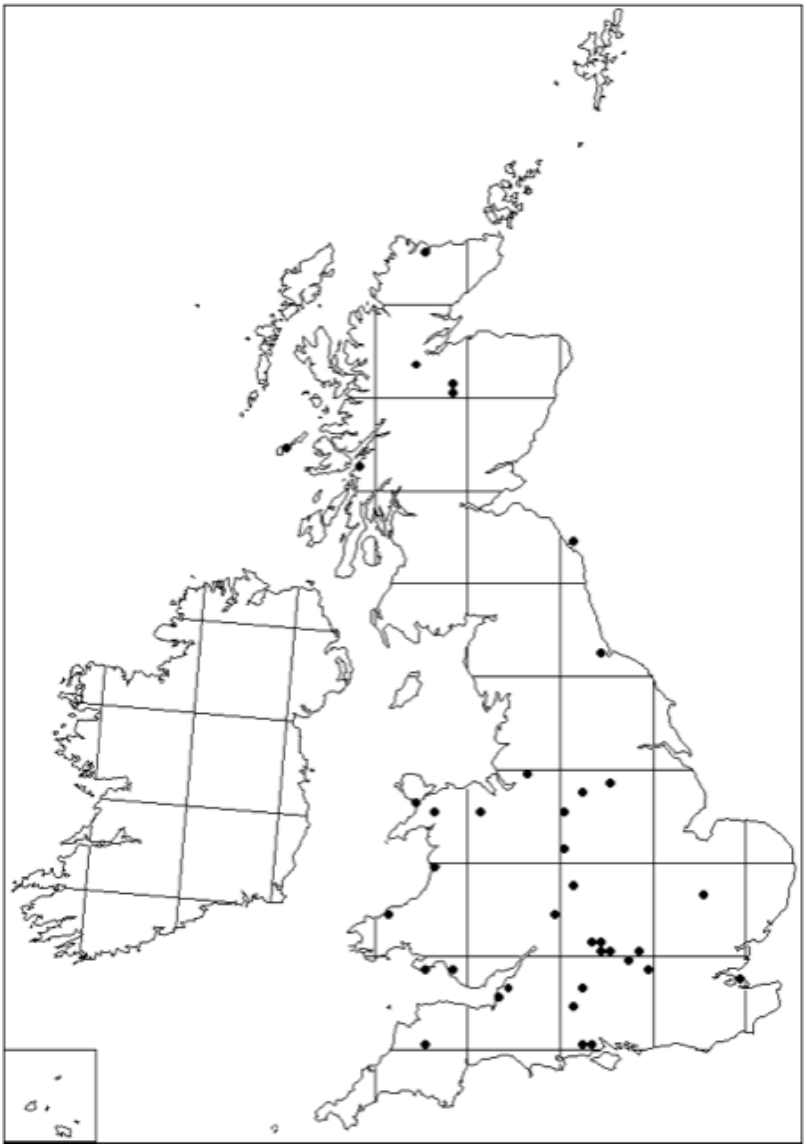

Fig. 2. Distribution of *Lasiomma picipes* records.

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***Liriomyza angulicornis* (Malloch) (Diptera, Agromyzidae) new to Ireland –** While conducting fieldwork for the Saltmarsh Monitoring Project 2017-18 with BEC Consultants on 25 July 2017 at the Blackwater Estuary (Irish Grid reference X09508440, V.C. H5) leaf mines were observed on sea arrowgrass (*Triglochin maritima*). A number of mines containing active larvae were collected and adults were successfully reared. The adults were identified as *Liriomyza angulicornis* (Malloch, 1918) based on their angulate third antennal segment and the pattern of yellow on the mesonotum (Spencer, K.A. 1972. Diptera Agromyzidae *Handbooks for the Identification of British Insects*. X, **5**(g), 1-136. Royal Entomological Society, London). This determination was confirmed from images by Barry Warrington, organiser of the Agromyzidae Recording Scheme, who also confirmed that the species had not previously been recorded from Ireland **– SAM J. THOMAS**, 20 Millstream, Benson, Oxfordshire, OX10 6RL; sjthomasbotany@gmail.com

***Campichoeta obscuripennis* (Meigen) (Diptera, Campichoetidae) from southern Scotland –** Peter Chandler (1986. The British species of *Diastata* Meigen and *Campichoeta* Macquart (Diptera: Drosophiloidea). *Proceedings and Transactions of the British Entomological and Natural History Society* **19,** 9-16) described *Campichoeta obscuripennis* (Meigen, 1830) as being common in southern England and extending north to Norfolk and Yorkshire. A search of the Scottish Insects Record Index at the National Museums Collection Centre (NMCC) did not reveal any published records of this species in Scotland and the main collection held no specimens of this species from Scotland. Consequently, we are not aware of any records extending its range into southern Scotland.

The following records, however, confirm its presence in Scotland:

A ♀ swept at Crichton Glen, Midlothian (NT3761; V.C. 83) on each of the following dates 8.vii.2006, 17.vii.2011, 29.v.2014 and 2.iv.2016.

1♂ swept at Danskine Loch, East Lothian (NT5668; V.C. 82) on 29.vii.2014 and 1♂ at the same place on 13.viii.2016.

1♂ swept at Cullaloe Reservoir, Fife (NT1887; V.C. 85) on 18.ii 2017 and 2♀ beaten from gorse bushes at the same site on 25.i.2018.

All three localities are basic or neutral marshes with tall herbs, while Cullaloe included stands of *Phragmites australis* around open water. Adults appear to fly throughout the year.

We have only met with the related species *Campichoeta punctum* (Meigen, 1830) in a single locality, Balnaguard Glen, Perthshire (NN9451; V.C. 88). David Pryce trapped several specimens in a Malaise trap during April and May 2011. We thank him for allowing us to examine the material **– KEITH P. BLAND,** 35 Charterhall Road, Edinburgh EH9 3HS and **DAVID HORSFIELD,** National Museums Collection Centre, 242 West Granton Road, Edinburgh EH5 1JA

***Pachygaster leachii* Stephens and *Beris morrisii* Dale (Diptera, Stratiomyidae) in southern Scotland –** *Pachygaster leachii* Stephens in Curtis, 1824 was reared from an active larva found in leaf litter under birch, *Betula pubescens*, at Maggie Bowies Glen, near Tynehead, Midlothian (NT3959; V.C. 83) on 16.v.2010. It transformed quickly to emerge on 10.vi.2010. A. Stubbs and M. Drake (2001. *British Soldierflies and their allies.* 512 pp. British Entomological and Natural History Society, Reading) mentioned varied

breeding sites for *P. leachii* including roots of umbels, stem bases of hogweed and in rotten wood, compost and decaying vegetation.

There are no records of this species in the Scottish Insects Record Index (SIRI) at the National Museums Collection Centre (NMCC) and no Scottish specimens in the main collection at the NMCC. The two most northerly NBN records (viewed March 2018) are NY53 in V.C. 70 (Cumberland) and NZ41 in V.C. 62 (North-east Yorkshire) just south of the Tees. Stubbs and Drake (2001 *loc. cit.*) noted that *P. leachii* is fairly common over much of the southern half of England, but is almost absent north of the Midlands. Therefore *P. leachii* does not appear to have been previously recorded from Scotland.

Another stratiomyid fly that appears to be poorly recorded in Scotland is *Beris morrisii* Dale, 1841. A male of this species was swept in the oak woods at Roslin Glen, Midlothian (NT2762; V.C. 83) on 17.vii.2016. SIRI provides several old published records from between 1884 and 1912 but there are no further published records until 1990 (Christie, I.C. 1990. Insect records from the west of Scotland. *Glasgow Naturalist* **21,** 577-580), who gave a record from Glasgow (V.C. 77) by E.G. Hancock, who reared the species from a giant hogweed (*Heracleum mantegazzianum*) stem. Stubbs and Drake (2001 *loc. cit.*) stated that it is widespread at least in lowland districts in England, Wales and Scotland, but is localised away from southern England. It is good to be able to confirm its continuing presence in Scotland **– KEITH P. BLAND,** 35 Charterhall Road, Edinburgh EH9 3HS and **DAVID HORSFIELD**, National Museums Collection Centre, West Granton, Edinburgh EH5 1JA

Calliphora uralensis Villeneuve (Diptera, Calliphoridae) on the Bass Rock

– Following my unexpected discovery of a female *Calliphora uralensis* Villeneuve (Diptera, Calliphoridae) near North Berwick (NT5685, V.C. 82) in July 2017 (Macdonald, M. 2017. *Calliphora uralensis* Villeneuve (Diptera, Calliphoridae) in East Lothian. *Dipterists Digest* (*Second Series*) **24**, 164), I contacted Maggie Sheddan, who carries out seabird counts on the Forth Islands, and asked her to collect any *Calliphora* she encountered there. In 2018, she collected two *C. vicina* Robineau-Desvoidy, 1830 from the Isle of May (NT6599, V.C. 85), and one female *C. uralensis* from the Bass Rock (NT6087, V.C. 82). The latter was in poor condition, having spent considerable time in a cobweb, but all essential features for recognition were intact. These two casual records in the area make it probable that *C. uralensis* is established in the seabird colonies on the Forth Islands, well to the south of its core range in the north and west of Scotland **– MURDO MACDONALD,** 'Tigh nam Beithe', Strathpeffer, Ross & Cromarty IV14 9ET

Braula coeca Nitzsch (Diptera, Braulidae) in the Orkney Islands (V.C 111)

– The bee louse *Braula coeca* Nitzsch, 1818 (Diptera, Braulidae) is a wingless kleptoparasite, living its entire life in honey bee *Apis mellifera* colonies. It has been virtually wiped out in mainland Britain (McAlister, E. 2017. *The Secret Life of Flies*. The Natural History Museum, London) due to the use of treatments for the varroa mite *Varroa destructor* Anderson & Trueman, 2000, which was first discovered in Britain in 1992.

Whilst attending a Diptera Identification Workshop, the subject of *Braula coeca* and its current status in the British Isles was discussed, and knowing that there was at yet no varroa recorded in the Orkney Islands where I live, it occurred to me that it might still be present. I asked the local beekeeping group members if they had seen it and all replied that it was present in Orkney bee colonies. I requested samples of the scrapings from hive floors to examine in order to back up their observations and one beekeeper, Helen Aiton (who has two hives on a hillside in Evie) obliged. The sample was frozen until it could be examined. Viewed under the microscope, I noted the presence of a few dead specimens (Fig. 1).

As there is more than one possible species of *Braula* in Britain (Dobson, J. 1999. A 'bee-louse' *Braula schmitzi* Òròsi Pál (Diptera: Braulidae) new to the British Isles, and the status of *Braula* spp in England and Wales. *British Journal of Entomology and Natural History* **11,** 139-148), the identification was confirmed by Erica McAlister (Natural History Museum, London) where a specimen was lodged.

Fig. 1. Orkney specimen of the bee louse *Braula coeca* Nitzsch.

It would appear that as long as Orkney (and possibly other isolated communities such as Colonsay) remain varroa free, the bee louse will have a foothold here in these parts of the British Isles **– LEE JOHNSON,** Scows, St Margaret's Hope, Orkney

A new first British record of *Anthomyia plurinotata* Brullé (Diptera, Anthomyiidae) – During verification for the Anthomyiidae Recording Scheme on IRECORD in 2018, I came across a record attributed to *Anthomyia pluvialis* (Linnaeus, 1758) which was immediately identifiable as a female of *A. plurinotata* Brullé, 1833 by the presence of only two post-sutural black marks on the thorax (Fig. 1). The record was made by Will George in Swavesey, Cambridgeshire at TL361680 on 25 April 2010, and was submitted to IRECORD on 19 February 2015 (Id 1691652). It was three years earlier than the first published British record from a photograph of a female in Whiteknights Park, Reading (SU735721) on 12 May 2013 by Tristram Brelstaff (2014. *Anthomyia plurinotata* Brullé (Diptera, Anthomyiidae) new to Britain. *Dipterists Digest* (*Second Series*) **21,** 201-202); a male was also reported there on 13 September 2014.

Fig. 1. Female of *Anthomyia plurinotata* Brullé, 1833: photo by Will George.

Will writes: "I found the fly whilst looking around my small garden on Whitton Close, Swavesey, Cambridgeshire. The garden backs onto grounds of Swavesey Village College, separated by an elm-dominated hedge. It was a sunny spring day, and I'd already recorded a handful of hoverflies including *Epistrophe eligans* (Harris, 1780), *Dasysyrphus albostriatus* (Fallén, 1817) and *Myathropa florea* (Linnaeus, 1758), when I noticed a small, striking black and white fly resting on the garden fence".

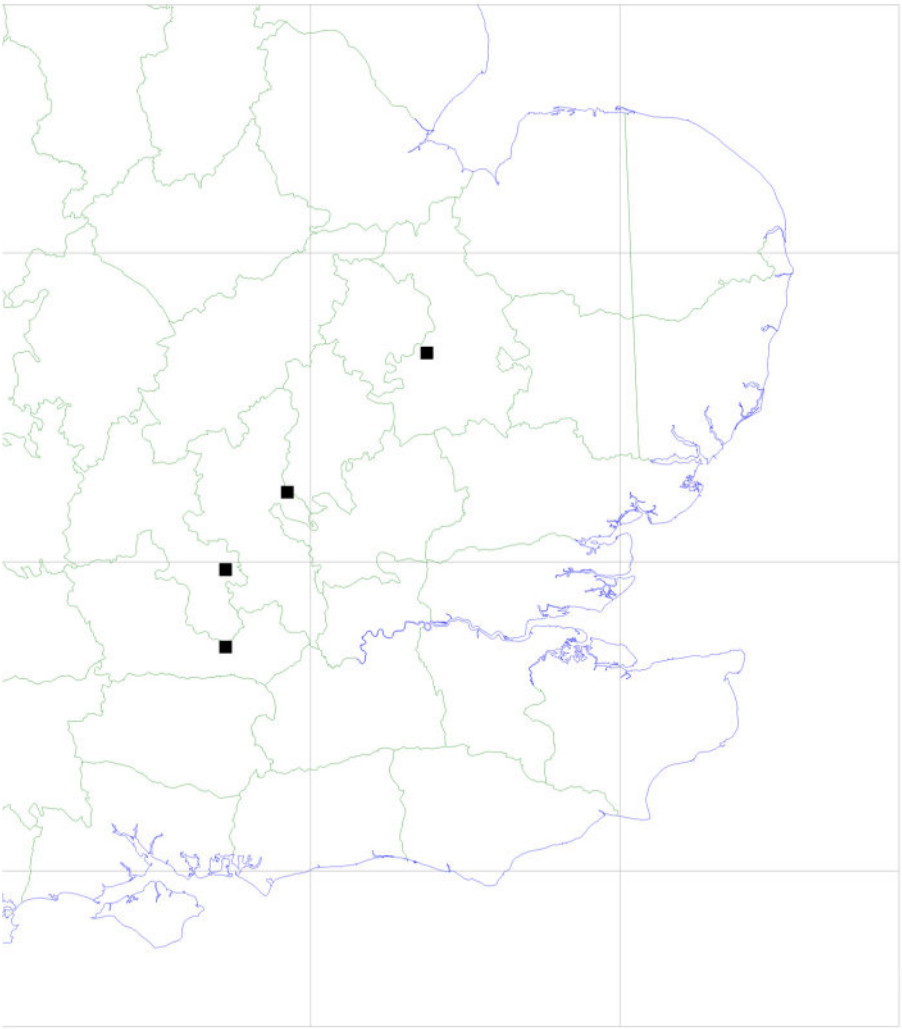

Fig. 2. Distribution of *Anthomyia plurinotata* Brullé, 1833.

Peter Chandler (2015. More British localities for *Anthomyia plurinotata* Brullé (Diptera, Anthomyiidae). *Dipterists Digest* (*Second Series*) **22,** 68) reported two further records: Aston Rowant NNR (SU7297) in Oxfordshire in July 2014; and Leighton Buzzard (SP918248) in August 2015. Tristram Brelstaff (*pers. comm.*) has reported catching two further specimens from his original location: a male on 22 April 2017 and a female on 22 September 2018.

The above map (Fig. 2) shows that the overall distribution is now extended considerably to the north-east. I thank Will George and Tristram Brelstaff for these further reports, and Michael Ackland for confirming the identification from the photograph **– PHIL BRIGHTON**, 32 Wadeson Way, Croft, Warrington WA3 7JS

Dipterists Digest 2018 **25,** 147-149

A remarkable assemblage of *Egle* (Robineau-Desvoidy) species (Diptera, Anthomyiidae)

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Summary
Adults of eight species of *Egle* Robineau-Desvoidy were collected from willow (*Salix* spp) blossom on a single day at the Venus Pool nature reserve and Venusbank in Shropshire. This observation is compared with other recorded assemblages of *Egle* species and its implications for the national distribution are discussed.

Introduction

There are currently 12 species in the anthomyiid genus *Egle* Robineau-Desvoidy 1830 in the British checklist. All except one are associated with willow, both as the larval food-plant and as a feeding resource for adults, like most of the European species (Michelsen 2009). This paper relates the circumstances in which eight of these species were found in a single location on a single day, and discusses the implications of this and two other comparable clusters of records in Britain.

Observations

On 9 April 2018, I set out on one of my annual *Egle* hunts, whereby I seek out *Salix* trees in flower and watch, then sweep trees for *Egle*. For me, a good day *Egle* hunting heralds the beginning of a new season for Diptera and is something looked forward to with great anticipation.

Normally, I capture a few specimens of one or two species, but 9 April 2018 was very different. March and April had been unremittingly cold and overcast, so that good days for *Egle* hunting had been extremely limited. At last, on 9 April, decent sunny intervals were predicted, so I ventured out to Venus Pool Nature Reserve, Shropshire (SJ5406), where I knew I should find *Salix* in flower. The reserve is on sandy ground with pools, damp and dry grassland, hedgerows and scattered trees. Venusbank, a disused sand quarry, borders the reserve and I visited this too.

It was a cool morning and the sun broke through only for short spells, so a sense of urgency was felt each time the sun appeared, as I attempted to spot and sweep *Egle* as they appeared on *Salix* flowers. Success was limited, with my taking of just one or two specimens from each of a series of promising looking *S. caprea*. My enthusiasm began to wane, and I was thinking of heading home as the temperature started to drop, but then I spotted a sizeable male *S. alba* (white willow) emblazoned with flowers. As I approached the tree, the clouds parted and remained so for a good 50 minutes or so, interjected by very brief spells of cloud cover. During this period I swept the *S. alba* flowers all around the tree, low down and as high as I could reach with a long-handled net. Conditions then became cool again, so I returned home, well pleased with what turned out to be a haul of 60 *Egle* and a single conopid fly: *Myopa pellucida* Robineau-Desvoidy, 1830. Subsequently, I have learned from Michael Ackland that at times of peak emergence it is often possible to find "masses of adults crawling up the trunks" of *Salix*, which are easily pooted up.

Over the next few days I worked my way through the sample, quickly separating out seven of the relatively large and distinctively hairy *E. ciliata* (Walker, 1849). Most of the remaining specimens were dissected, following maceration in lactic acid. Almost 62% of the catch was made up from two common species *E. minuta* (Meigen, 1826) and *E. rhinotmeta* (Pandellé, 1900). An advantage of working through this large number of specimens was that I got my "eye in" for

the shape of the genitalia of these two common species, so that the rather subtly differently characterised cercal plate and sternite 5 of *E. lyneborgi* Ackland & Griffiths, 2003 and *E. parva* Robineau-Desvoidy, 1830 became somewhat easier to discern. I'm quite sure that if I'd seen these in isolation I might well have struggled to identify them, or I may even have overlooked them as the common *E. minuta*. The remaining species determined were the seldom recorded *E. inermis* Ackland, 1970, *E. subarctica* Huckett, 1965 and the recently described *E. suwai* Michelsen, 2009.

The occurrence of a sunny day, following a long spell of unfavourable weather probably gave rise to a localised mass emergence of *Egle* flies, so my experience was probably a classic case of being in the right place at the right time. My eventual taxon count was a very gratifying eight species from a single site on a single day. The quantities for each species are given in Table 1, which illustrates the benefits of collecting large samples of *Egle* in order to find the more elusive species. A few females were also collected, but I did not attempt to determine them.

Interestingly, just ten days later, on 19 April, I sampled numerous *Salix* flowers at Prees Heath Nature Reserve and took not a single *Egle*, indicating that the season for these flies can be very short indeed.

Species	Quantity collected
E. minuta (Meigen, 1826)	20
E. rhinotmeta (Pandellé, 1900)	17
E. ciliata (Walker, 1849)	7
E. lyneborgi Ackland & Griffiths, 2003	7
E. parva Robineau-Desvoidy, 1830	3
E. suwai Michelsen, 2009	3
E. inermis Ackland, 1970	2
E. subarctica Huckett, 1965	1

Table 1. *Egle* species collected at Venus Pool and Venusbank, Shropshire on 9 April 2018.

Discussion

Examination of the records in the database of the Anthomyiidae Recording Scheme shows that there are only two localities in Britain where a comparable species richness of *Egle* has been recorded. These are around Oxford (V.Cs 22 and 23) recorded by Michael Ackland and in South Yorkshire, V.C. 63 by John Coldwell. Even in these cases no single day has reached the number of species in the present observations.

Michael Ackland's records from V.Cs 22 and 23 comprise 10 species. In addition to the eight listed in the Table above, they include *E. parvaeformis* Schnabl in Schnabl & Dziedzicki, 1911 and *E. steini* Schnabl in Schnabl & Dziedzicki, 1911. The sites with the most species listed are the Lashford Lane (SP4601) and Whitecross Green Wood (SP6014) nature reserves, each with 8, while Weston Green Fen (SP5219) has 7 species recorded. At each site the records were obtained by sweep-netting on a number of different occasions or from a Malaise trap.

The V.C. 63 records cover 7 species, those listed in Table 1 with the exception of *E. inermis.* The site with most species recorded is at Haigh (SE3011) with 6 species, again from a number of separate visits.

There seems no reason to suppose that these three widely separated locations have any special feature to distinguish them from other lowland areas of England with willow populations. A similar variety of species could be expected anywhere, but detection of all those present would evidently require much perseverance and luck, and several of the species have only recently been

recognised as separate. These findings are consistent with Michelsen's (2009, p. 13) observation that "that a single wetland locality with a shrubbery of grey willow (*Salix cinerea*), supplemented by some goat willow (*S. caprea*) may support up to 10 species of *Egle* apparently coexisting on the same willow hosts". Michelsen finds this "truly amazing". One wonders what could explain the evolution of so many species without apparent difference in host, location, or flight period.

The British species missing from all these locations are *E. brevicornis* (Zetterstedt 1838) and *E. concomitans* (Pandellé, 1900). The first of these is associated with creeping willow, *Salix repens* and has been found mainly in coastal locations (Bratton and Ackland 2015). There is only one British record of *E. concomitans*, which is associated with aspen and poplar (Perry and Ackland 2013).

Acknowledgement
All the records referred to are stored on the IRECORD database maintained by the Biological Records Centre and published on the NBN Atlas. Philip Brighton kindly provided much helpful comment on *Egle* assemblages in Britain.

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Perry, I. and Ackland, D.M. 2013. *Egle concomitans* (Pandellé) (Diptera, Anthomyiidae) new to Britain. *Dipterists Digest* (*Second Series*) **20,** 69-72.

Behaviour of *Xylota segnis* (Diptera, Syrphidae) on *Ranunculus* flowers – On sunny days from 15 May to 17 June 2017, I monitored hoverflies (Syrphidae) on flowers of creeping buttercup, *Ranunculus repens* (Ranunculaceae), in my garden near Gatehouse of Fleet, Dumfriesshire, Scotland. I observed behaviour using Pentax Papilio, 8.5x21, close focus binoculars that enable hoverfly movements on flowers to be followed from a convenient standing position (Rotheray, G.E. and Britton, N. 2015. *Scathophaga stercoraria* (Linnaeus) (Diptera, Scathophagidae) pollinator of Hebridean spotted heath orchid, *Dactylorhiza maculata* (Orchidaceae). *Dipterists Digest* (*Second Series*) **22**, 197-209). Throughout the monitoring period *Xylota segnis* (Linnaeus) was a frequent visitor to buttercups and I concentrated

on this species since flower visiting is enigmatic in this genus given a specialised leaf gleaning feeding habit (Ssymank, A. and Gilbert, F. 1993. Anemophilous pollen in the diet of Syrphid flies with special reference to the leaf feeding strategy in Xylotini (Diptera, Syrphidae). *Deutsche entomologische Zeitschrift* **2,** 245-258).

Over 80 *X. segnis* visits to buttercup flowers were monitored at a rate of about 2-3 per monitoring day, maximum 14. Behaviour at buttercup flowers was remarkably consistent. On arrival the mouthparts were usually lowered to a petal and the fly circled round the flower moving from petal to petal gleaning their relatively flat, upper sections with a zigzag pattern of movement typical to that described for this species feeding from leaf surfaces (Ssymank and Gilbert 1993 *ibid*). Large individuals straddled the flower during feeding, smaller ones stayed on the petals. During circling their legs sometimes crossed over and flies stopped feeding to separate their legs and adjust position. Feeding was also interrupted by grooming and resting (being motionless). In manoeuvring on a capitulum, their mouthparts touched occasionally the stamens, but such contacts were fleeting. No feeding was observed from the nectaries at the base of petals and flies had a tendency to visit buttercup flowers by either flitting from one to another successively or to nearby leaves of various plant species before flitting back to a buttercup flower.

These behaviours were in contrast to those of other hoverfly species that were also monitored visiting buttercup flowers, such as *Cheilosia fraterna* (Meigen), *Merodon equestris* (Fabricius), *Melanogaster hirtella* (Loew) and *Eristalis arbustorum* (Linnaeus). Adults of these species similarly straddled flowers and dipped their mouthparts, but they fed only from nectaries at the petal base. They circled round capitula, moving from nectary to nectary often completing a circuit and going further round up to five times before flitting to another flower. No petal-gleaning was observed, however, grooming was frequent in these species during which adhering *R. repens* pollen may have been gathered and imbibed (Holloway, B.A. 1976. Pollen feeding in hoverflies (Diptera, Syrphidae). *New Zealand Journal of Zoology* **3,** 339-350). The behaviour of *Episyrphus balteatus* (De Geer) was in marked contrast to both *X. segnis* and the nectary feeders. Adults perched on a petal and facing inwards to the stamens, manoeuvred their mouthparts over them. They also moved forward into the centre of the flower to access stamens, but they were not observed circling, feeding from the nectaries or gleaning petals.

Visiting *Ranunculus* flowers seems to be consistent behaviour in *X. segnis* (Harper, J.L. 1957. Biological Flora of the British Isles: *Ranunculus acris*, *R. repens*, *R. bulbosus*. *Journal of Ecology* **45,** 289-342; de Buck, N. 1985. Observations on the diet of two *Xylota* species. *Bulletin Société royale belge d'Entomologie* **121,** 385-390; Iliff, D. 1999. *Xylota segnis* on buttercups: not unusual at all (apparently). *Hoverfly Newsletter* **28,** 9). What does not seem to have been assessed is their behaviour at buttercup flowers and the observations presented here suggest that they visit them to glean pollen from the petals, in a similar way to which they glean pollen from leaf surfaces. The fleeting nature of contacts observed between the mouthparts and buttercup stamens suggests feeding was not elicited on pollen released but still attached to these structures. The source of petal pollen, whose presence was confirmed with a hand lens, is probably that loosened from the stamens by wind and insect visitors to the flower, particularly those that straddle and move round capitula.

The legs and thoraces of individual *C. fraterna*, *M. equestris*, *M. hirtella* and *E. arbustorum* captured after visiting a sequence of buttercup flowers were covered in pollen. This suggests that in straddling and moving round capitula these flies pick up and deposit pollen, perhaps leaving it attached to the carpels at the centre of the flower and increasing the likelihood *R. repens* is pollinated. Individual *X. segnis* that straddled capitula were also captured and they were similarly covered in pollen, making it probable that they too are capable of pollinating these flowers – **GRAHAM E. ROTHERAY**, 16 Bracken Wood, Gatehouse of Fleet, DG7 2FA, grahamrotheray@gmail.com

Dipterists Digest 2018 **25,** 151-154

Sex ratios of Hoverflies (Diptera, Syrphidae) caught by netting/sweeping

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Summary
In a recent paper (Wolton and Field 2018), reporting the sex ratio of hoverflies caught by Malaise trapping, it was shown that there were significantly more females than males (65% of the total catch). In this paper it is reported that by netting/sweeping the overall percentage of female hoverflies caught was 51%. Possible reasons for this discrepancy between collection methods is discussed.

Introduction

It is assumed that the sex ratio of adult hoverflies should be 1:1. However, for reasons discussed in Wolton and Field (2018), this may not be so for all species of hoverfly. Also, as discussed later, the various methods for collecting hoverflies may also have inbuilt biases which can alter the apparent sex ratio both overall, and for particular species.

Methods

The data is derived from records of hoverflies caught by netting/sweeping during the years 2009 – 2017, inclusive from March to October, generally between the hours of 10:00 to 16:00. The habitats (all lowland) included woodland paths/rides/edges, hedgerows, grassland, waterside, and fens. The locations were mainly around Oxford and in Northamptonshire (with the Northamptonshire Dipterists Group).

The hoverflies were identified using the keys in Stubbs and Falk (2002). Some species cannot be fully identified to species using these keys; in this paper *Cheilosia albitarsis* (Meigen, 1822) and *C. ranunculi* Doczkal, 2000 are treated as a species aggregate as the females cannot be separated.

The techniques of netting (also described as stalking) and sweeping are described by Stubbs (2010) and Stubbs and Falk (2002). Statistical significance was calculated using an online chi-square test calculator (*www.socscistatistics.com/tests/chisquare2/Default2.aspx*) testing for deviation from a sex ratio of 1:1.

Results

During the years 2009 – 2017, there were 2261 records of one or more hoverflies caught by netting/sweeping of 139 species, totalling 3420 individual hoverflies. Overall, 49% were males and 51% females (χ^2, p=0.37). However, when individual species were analysed there were significant differences in the sex ratio of some species.

It was decided that species where more than 50 individuals were collected would be further analysed; fourteen species fulfilled this condition and the results are shown in Table 1. In six species, the sex ratio differed significantly from a 1:1 ratio; in four species there was an excess of males, and in two species there was an excess of females.

Table 1. A comparison of the sex of the most numerous species captured in this study.

Species	No. Males	No. Females	p
Overall Total of individuals captured (3420)	1673	1747	0.37
Cheilosia albitarsis (Meigen)/*ranunculi* Doczkal	105	89	0.42
Cheilosia pagana (Meigen)	87	74	0.45
Epistrophe eligans (Harris)	58	7	<0.00001
Episyrphus balteatus (De Geer)	55	68	0.44
Eristalis pertinax (Scopoli)	94	64	0.05
Eristalis tenax (Linnaeus)	32	19	0.23
Eupeodes luniger (Meigen)	36	36	1.0
Helophilus pendulus (Linnaeus)	54	28	0.04
Melanostoma mellinum (Linnaeus)	37	117	<0.00001
Melanostoma scalare (Fabricius)	95	202	<0.00001
Platycheirus albimanus (Fabricius)	88	120	0.12
Rhingia campestris Meigen	33	30	0.86
Sphaerophoria scripta (Linnaeus)	60	24	0.0045
Syrphus ribesii (Linnaeus)	55	53	0.89

The most numerous species in this study are defined as those with a total number of more than 50 individuals. These 14 species account for 53% of the individuals collected.

Discussion

Overall, by netting/sweeping the sex ratio was very close to 1:1, which is the expected result. However, this is at variance from the results from Malaise trapping reported by Wolton and Field (2018).

There may be several factors which might be involved in this difference. Firstly, this study was conducted during the middle of the day and it may be that females remain active during a greater part of the day, whereas males when not displaying and seeking mates may not be active early and late in the day. Secondly, Malaise traps operate at a height from ground level to about 1.2 metres above ground level. Displaying males may be active at much higher levels and thus avoid being captured in Malaise traps. As the purpose of display is to be visible to females then males will also be more visible to the collector and susceptible to netting. In two species where there is a significantly greater proportion of males, *Epistrophe eligans* (Harris, 1780) and *Eristalis pertinax* (Scopoli, 1763), this is particularly true. However, whilst males may be more visible when displaying and thus easier to capture by netting, they are likely to be more susceptible to predation. It is possible that there may actually be fewer (but more visible) males than females at any location and the Malaise trap sex ratios are more representative of the true ratios.

Siting of a Malaise trap is important (McLean 2010), and differences in the orientation of the trap may result in differences in interception; for instance, at a woodland edge if the trap is at right angles to the edge then flies travelling along the edge will be intercepted, whereas if the trap is set parallel to the edge then flies entering/leaving the wood will be intercepted. Likewise for netting/sweeping it is not practical to survey the dense undergrowth of woodland habitats, or the

dense reeds at water margins/fens. In these circumstances, the potentially different behaviours of males and females may result in a biased catch.

There are clearly differences in the number of species caught by Malaise trapping and netting/sweeping; by Malaise trapping the most abundant 15 species comprised 86% of the total catch whereas in this study the top 14 species comprised 53% of the total catch. Comparing the most abundant species in each study shows that 7 of the most abundant species in this study are also found amongst the 15 most abundant species in the Malaise trap study. The other 7 abundant species collected in this study would also be considered to be common species. Thus each method of capture may be preferentially collecting different species, but also the Malaise trap study surveyed two locations/habitats whereas this study surveyed a wider range of locations and habitats in a different region of England. It is likely that other collection methods, including flight interception traps set at higher elevations, would result in a different subset of the hoverfly fauna and sex ratios. Only a meta-analysis of a wide range of studies of sex ratios conducted by different individuals in different regions using different collection methods can give an accurate representation of sex ratios, both overall and in different hoverfly species.

Nevertheless, there are some agreements in the findings of this study and the Malaise trap study for some species. In the case of the Boundary Trap captures (Wolton and Field 2018) of *Melanostoma* species, where 78% of *Melanostoma mellinum* (Linnaeus, 1758) were females this corresponds with this study's finding of 76%, and for *Melanostoma scalare* (Fabricius, 1794) where 69% were female compared with 68% in this study. But confirming the differences in relative abundance of hoverflies caught by Malaise trapping and netting/sweeping *Melanostoma mellinum* comprised 8.2% of the Malaise trap catch compared with 4.5% of the netting/sweeping catch. Similarly *Melanostoma scalare* comprised 19.3% of the Malaise trap catch, compared with 8.7% of the netting/sweeping catch.

It is known that some inheritable symbiotic bacteria (including *Wolbachia*, *Spiroplasma,* and *Rickettsia*) in insects distort host sex ratios by killing the male offspring of affected females (Martin *et al*. 2013). *Wolbachia* is a common parasite, infecting 66% of insect species worldwide (Hilgenboecker *et al.* 2008). However, the prevalence of *Wolbachia* in the population may be localised so that there is variation in the sex ratio effects across the whole species (Dyer *et al*. 2005). This does not explain the finding that some species of hoverfly in both the Wolton and Field study and this study show a distorted sex ratio with a predominance of males.

Conclusion

This study shows that collection of hoverflies by netting/sweeping results in an overall sex ratio very close to 1:1. However, in some species this ratio is significantly different. Possible reasons for this observation have been discussed, but it is likely that there are a variety of possible causes which differ from species to species, location, and collecting method.

Acknowledgements

I am grateful to the reviewers for the comments that they made and which I have incorporated into this paper.

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***Trixoscelis canescens* (Loew) (Diptera, Trixoscelididae) and other *Trixoscelis* in Shropshire –** Peter Chandler and Martin Drake announced *T. canescens* as a British species, from three localities in southern England, with specimens collected between 2010 and 2015 (Chandler, P. J. and Drake, C.M. 2016. *Trixoscelis canescens* (Loew) (Diptera, Trixoscelididae) in Britain. *Dipterists Digest* (*Second Series*) **22,** 147-152). I have processed Diptera collected in vane (flight interception) traps placed at Attingham Park, Shropshire (SJ5409/SJ5510) during 2016, amongst which I have found four specimens of *T. canescens* (1 ♂ and 3 ♀) in samples ranging across 21 July – 1 September. Attingham Park is a parkland site containing numerous mature oak and beech trees, as well as smaller numbers of sycamore and sweet chestnut. These records extend the known range of *T. canescens* into the north-west Midlands. Furthermore, during 2017, I placed a vane trap in an ash tree in my Shrewsbury garden (SJ4911) at about 6 metres height and this too captured *T. canescens* – a single ♂ during the sampling period 5 – 15 July. Interestingly, although I had swept this tree at height nearly every day for much of June and July, I did not capture any additional *T. canescens*, indicating that vane traps could be a favourable method for recording this species, which may reside at height in trees.

I have collected two other *Trixoscelis* species in Shropshire. These are *T. similis* (Hackman) and *T. obscurella* (Fallén). I have regularly swept *T. similis* ♂♀ from tree foliage in my Shrewsbury garden (SJ4911) in all of the years 2013 – 2017. Records range over the period 24 May – 2 July. I have also taken a single ♂ from Shrugg's Coppice, Nesscliffe (SJ3919) on 27 May 2015. *Trixoscelis obscurella* has been collected from two sand quarries: Venusbank, SJ5505 8 June 2013, and Gonsal (SJ4804) over a date range of 10 May – 8 August (2016 & 2017).

I would like to thank Caroline Uff and Emma Bonham for making samples of Diptera from Attingham Park available to me **– NIGEL P. JONES**, 22 Oak Street, Shrewsbury SY3 7RQ

Dipterists Digest 2018 **25,** 155-156

A clarification of the erroneous use of the name *Delia penicillaris* (Rondani) (Diptera, Anthomyiidae) in the British literature

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Summary
A justification is provided for including the name *Delia penicillaris*: authors, misident., not Rondani, 1866 as a misidentified name under the name *Delia penicillosa* Hennig, 1974 in the British checklist.

Introduction

Ackland (2010) provided a number of additions and nomenclatural changes to the British checklist for the Anthomyiidae. Amongst these was the addition of a new name *Delia penicilliventris* for a secondary homonym *Aricia criniventris* Zetterstedt, 1860, necessary because *Anthomyza criniventris* Zetterstedt, 1860 has page priority and both species now belong to the current genus *Delia.* This species had been misidentified by some European authors as *D. penicillaris* Rondani, 1866. However, further review of the use of the latter name has revealed that historically it has been applied in Britain to a different species, *D. penicillosa* Hennig, 1974. Only *Delia penicillivenris* and *D. penicillosa* have so far been found in Britain; *D. penicillaris* has only been found in southern Europe.

Review of records

British records under all three above-mentioned names have been published online in the NBN Atlas, as follows.

D. penicilliventris Ackland, 2010 has only one record on the Atlas: 6 males were swept by Ivan Perry at Kinrara on Speyside (NH8709) on 4 July 1997. Michael Ackland has one of these specimens and included the record in the original dataset for what is now the Anthomyiidae Recording Scheme. Ackland (2010) stated that this species which, as discussed above, was originally described from Sweden by Zetterstedt in 1860 as *Aricia criniventris*, occurs across the northern Palaearctic Region. In Britain it is apparently confined to the Scottish Highlands (Michael Ackland *pers. comm.*).

There are currently (November 2018) 18 NBN records for *D. penicillosa* Hennig, 1974, all from coastal locations with sand-dunes in North Devon, Wales and South Lancashire. Many of these records list D.M. Ackland as determiner. They also include records from the 2017 Dipterists Forum field meeting in Snowdonia, which have been identified using unpublished keys provided by Michael.

The NBN Atlas also holds 34 records under the name *D. penicillaris* Rondani, 1866, limited to the coasts of Wales and Cumbria. This name was added to the British list as *Hylemyia penicillaris* Rnd. by Verrall (1894), who recorded two males, one at St Bees, Cumbria (NX9711) on 18 July 1876 and the other at Barmouth, Merionethshire (SH6161) on 20 July 1888. These two records have been accepted by Michael as referring to *D. penicillosa* Hennig, 1974, and it can be safely concluded that all of these coastal records are of that species (Michael Ackland *pers. comm.*).

The true *D. penicillaris* Rondani, 1866 was described from Italy, and has not so far been recorded in Britain or Scandinavia (Ackland 2010).

Conclusion

It is evident from this collation of information that the misidentification of *D. penicilliventris* Ackland, 2010 as *D. penicillaris* Rondani, 1866 does not apply to any British records. In Britain, the name *D. penicillaris* has historically been applied to the species now known as *D. penicillosa* Hennig, 1974. For the purposes of the British Checklist and of the UK Species Index the citation should be as follows:

***Delia penicilliventris* Ackland, 2010**

Delia penicilliventris Ackland, 2010: 80. nom. n. for *Aricia criniventris* Zetterstedt, 1860.

Aricia criniventris Zetterstedt, 1860: 6244. Preoccupied in *Delia* by *Anthomyza criniventris* Zetterstedt, 1860: 6268, teste Michelsen, 1985: 44.

"*Delia penicillaris*": authors, not (Rondani, 1866: 177), misidentification (in part, European records).

***Delia penicillosa* Hennig, 1974**

Delia penicillosa Hennig, 1974: 869.

"*Delia penicillaris*": authors, not (Rondani, 1866: 177), misidentification (in part, British records).

Acknowledgement

I am grateful to Michael Ackland for helpful correspondence on this matter and for making available his unpublished identification keys and ecological notes.

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Verrall, G.H. 1894, "A second hundred new British species of Diptera". *Entomologist's Monthly Magazine* **5,** 140-144.

***Eurina lurida* Meigen (Diptera, Chloropidae) new to North-West England –** I swept this distinctive fly (Fig. 1) from vegetation around a small tidal creek (Fig. 2) on Birkdale Green Beach (SD307149) in South Lancashire (V.C. 59) on 31 May 2018. The specimen is a male and about 7mm long. The family could be readily determined as Chloropidae and reference to the Diptera.info gallery showed *Eurina* to be the likely genus: *E. lurida* Meigen, 1830 is the only species on the British checklist. The recent status review of the acalyptrates (Falk, S.J., Ismay, J.W. and Chandler, P.J. 2016. *A Provisional Assessment of the Status of Acalyptratae flies in the UK*. Natural England Commissioned Reports, Number 217) lists this species as provisionally Near Threatened.

Fig 1. Side view of the specimen of *Eurina lurida* Meigen.

The key to British plant galls (Redfern, M. and Shirley, P. 2011. British Plant Galls. AIDGAP. Second Edition) lists *E. lurida* as a gall-former on sea club-rush *Bolboschoenus maritimus*, though such galls have not been recorded in Britain. I did indeed observe stout rush-like plants which I subsequently concluded must be this species. No search for galls was carried out.

Falk *et al*. (*op. cit*.) described *E. lurida* as very localised with only a dozen post-1960 sites: the nearest previous records are from South Wales, Lincolnshire, Yorkshire and Dumfriesshire. Their description of the habitat fits this new location perfectly.

Fig 2. General view of the location of the record.

I am grateful to John and Barbara Ismay for confirming the identification; to Phil Smith for confirming the presence of *Bolboschoenus maritimus* at the site; and to the World Museum Liverpool for use of their new camera and image-stacking set-up **– PHIL BRIGHTON**, 32 Wadeson Way, Croft, Warrington WA3 7JS

Dipterists Digest 2018 **25,** 159-164

Liriomyza latigenis (Hendel) (Diptera, Agromyzidae) new to Britain, with morphological notes

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Summary
Liriomyza latigenis (Hendel, 1920) (Diptera, Agromyzidae) is reported as a species new to Britain. A description of the leaf mine, larva, puparium and adult is given, along with the circumstances of the discovery.

Introduction

On 17 August 2018, a male *Liriomyza* was collected from a brownfield site in Hull (TA064265), East Yorkshire (V.C. 61), which runs to couplet 96 in Papp and Černý (2017), with *Liriomyza ptarmicae* de Meijere being the only option owing to the specimen possessing long pubescence on the third antennal segment; however, the male genitalia were vastly different. Using Spencer (1976), the specimen runs to couplet 15, with again *L. ptarmicae* being the suggestion based on the long pubescence. A search through the genitalia illustrations in the afore-mentioned literature and Spencer (1990) suggested either *Liriomyza dracunculi* Hering, 1932 or *Liriomyza latigenis* (Hendel, 1920); however, both species are described as possessing normal pubescence on the third antennal segment. Additional single males, agreeing with the specimen, were collected from the same site on 5 and 13 September 2018 and another from a meadow at Willerby (TA048311), East Yorkshire (V.C. 61) on 29 August 2018.

On 25 September 2018, tenanted leaf mines on *Senecio jacobaea* were collected from Thorne Moor (SE717164), South Yorkshire (V.C. 63). The site covers an area of approximately 1900 hectares and consists of Thorne Moor, Northern Goole Moor, Goole Moor, Rawcliffe Moor and Snaith and Cowick Moor. Thorne Moor is now defined as a National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI), Special area of Conservation (SAC) and Specially Protected Area (SPA). Combined with the nearby Hatfield Moor, these wetlands form the largest lowland area of degraded raised mire in England (McDonald *et al*. 2014).

It was assumed that the leaf mines (Figs 1 and 2) were caused by *Liriomyza erucifolii* de Meijere, 1943, a relatively scarce species in Britain, owing to the host plant and the characteristics of the mine. The collected mines resulted in 27 puparia being obtained. Five of these were retained indoors, whilst the remainder were placed in an outbuilding to allow them to go through their normal diapause.

On 20 October 2018, a single male emerged from the puparia retained indoors, which upon detailed examination of the genitalia, proved to be identical to the specimens collected from Hull and Willerby. In Europe, four *Liriomyza* species are restricted to the Senecioneae: *L. latigenis*, *L. erucifolii*, *L. samogitica* Pakalniškis, 1996 and *L. kleiniae* Hering, 1927 (Gil-Ortiz *et al.* 2010, in which the last species is misspelt as *kleineae*), but the peculiar monophagous species *L. kleiniae,* restricted to the Canary Islands, has never been reported as reared from *Senecio* spp or any other herbaceous or shrubby host. Elsewhere, *L. seneciovora* Sehgal, 1971 and *L. seneciella* Spencer, 1963, known from North and South America respectively (Spencer 1990), are also confined to the Senecioneae. Taking into account the host plant and distinctive genitalia, the reared specimen was determined as *Liriomyza latigenis* (Hendel, 1920), rather than the very similar *L. dracunculi.*

These records represent the first known occurrence of this species in Britain.

Biology

The larva forms a widening, upper surface, linear mine (Fig. 1), on *Senecio jacobaea*, which frequently crosses itself, often creating a blotch-like appearance (Fig. 2). The mine may start in the middle of the leaf or near the margin and is not restricted to any part of the leaf. Frass is irregular, either in long strings alternating along the edges of the corridor or in untidy, scattered grains.

The majority of leaves contained more than one larva, with most being mined by 2-6 larvae. The larva vacates the mine to pupariate via an exit slit which is usually upper surface, although occasionally, may be lower surface. The puparium is orange with the posterior spiracles possessing three bulbs, the posterior bulb being noticeably longer than the other two (Fig. 3).

After the specimens were determined, the Hull and Willerby sites were revisited, with several empty mines, identical to the ones from Thorne, being found on *S. jacobaea*.

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2

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Figs 1 and 2, *Liriomyza latigenis* (Hendel), larval leaf mines: 1, linear leaf mines on *Senecio jacobaea*; 2, blotch-like leaf mines on *Senecio jacobaea*. Fig. 3, posterior spiracles of puparium of *L. latigenis* (upper surface of puparium top of image).

Identification

Hendel (1920) described this species, based upon a single female from Spain, as *Haplomyza latigenis*, characterising it by the lack of a second cross-vein (cross-vein dM-M) and the entirely shiny black mesonotum. Later, Hendel (1927) thought that *Haplomyza* was polyphyletic and assigned *latigenis* 'without constraint' to *Liriomyza.* Although Hendel and later authors state that *L. latigenis* does not possess cross-vein dM-M, the reared adult from Thorne and the collected males from Hull and Willerby do possess the cross-vein.

Spencer (1966) examined a series (4♂ and 3♀) reared from leaf mines on *Senecio jacobaea* by Dr K.E. Frick near Paris, which 'appears to represent this (*L. latigenis)* species' and he illustrated the 'distinctive' genitalia. Specimens (1♂ and 1♀) from Dr Frick's reared *L. latigenis* series were loaned from NHM London but, unfortunately, the male is very badly damaged and has no recognisable features; however, the genitalia preparation is in good order. The female, although card pointed in a less than ideal position, is of a reasonable condition.

Upon examination of the male genitalia, in lateral view, the aedeagus agreed with the collected (Fig. 4) and reared specimens; however, Spencer's "ventral view" illustration of the phallus in its rest position and repeated in his book (1990, p. 294) [throughout all his publications "ventral view" does not agree with the morphological term ventral] is in fact a view from above with the left side of the basiphallus longer than the right one, and his "dorsal" view is depicted in a suboptimal position. A more accurate representation of the distiphallus is that by Papp and Černý (2017) and in Fig. 5. When viewed from above or below, the distiphallus can vary considerably in appearance, depending on the time spent macerating and the viewing angle (as shown by Figs 5 and 6) – it is often extremely difficult to view and illustrate Agromyzidae genitalia in their optimal position.

The female possessed long pubescence on the third antennal segment (longer than the diameter of the basal section of the arista), agreeing with specimens from Hull, Thorne (Fig. 9) and Willerby. Whilst comparing the *L. latigenis* in his private collection with the specimen sent to him, Miloš Černý (*pers. comm.*) also noted that the pubescence may be long, a feature which, although rather significant, is not mentioned in the literature that discusses this species. The third antennal segment may be entirely yellow or infuscate (Fig. 9); the latter is particularly noticeable under high magnification.

Papp and Černý state that 'in spite of the easily recognisable differences in body characteristics, it (*L. latigenis*) is only slightly bigger and its male genitalia are similar to those of *L. dracunculi* (which they refer to as 'one of the species which is not easy to identify')'. One of the described defining morphological features which separates these two species is the absence (in *L. latigenis*) or presence (in *L. dracunculi*) of cross-vein dM-M. However, this must now be considered to be of no real significance, owing to the reared and collected specimens all possessing the cross-vein.

Reduction of the cross-vein is noticed in various genera and species within the Agromyzidae, absence or presence of the vein being a variable character in *Agromyza intermittens* Becker, 1907, for example. Nowakowski (1962: 121) mentioned several cases of this anomaly, an observation also made by Hering, Michael von Tschirnhaus (*pers. comm.*) and myself. The position of the cross-vein itself on the *L. latigenis* specimens was also variable, with no specimen possessing equal ratios:

Length of ultimate section of vein M_{3+4} compared to penultimate

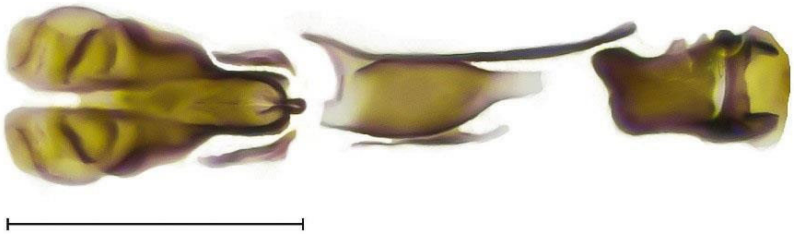
Specimen	Left wing	Right wing	Average
♂ Hull	x3.3	x4.5	x3.9
♂ Willerby	x2.7	x4.0	x3.4
♂ Hull	x4.3	x3.7	x4.0

♂ Hull	x4.3	x3.3	x3.8
♂ Reared from Senecio	x3.3	x3.0	x3.2

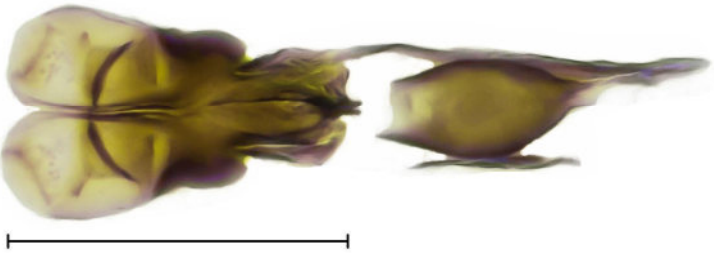
Having carefully examined types, von Tschirnhaus (1994) noted that the distiphallus illustration for *L. dracunculi* in Spencer (1976) is depicted in a suboptimal position, being too sharply shortened and the apical lobes being too large.

Four specimens of *L. dracunculi*, a species not known from Britain, reared from *Artemisia* by Hering, were loaned from the Natural History Museum, London for comparison. All four specimens, which were noticeably smaller than the *L. latigenis* adults, possessed distinct pubescence on the third antennal segment; however, the length of pubescence was less than half the diameter of the basal section of the arista. Cross-vein dM-M was present in all specimens, with the ultimate section of vein M_{3+4} being x3.3 that of the penultimate. As in the *L. latigenis* specimens, no two wings possessed equal ratios.

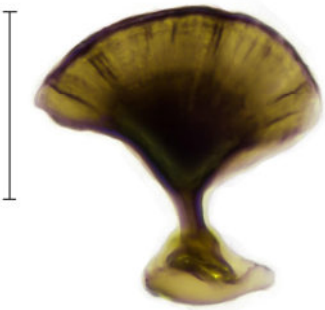
4



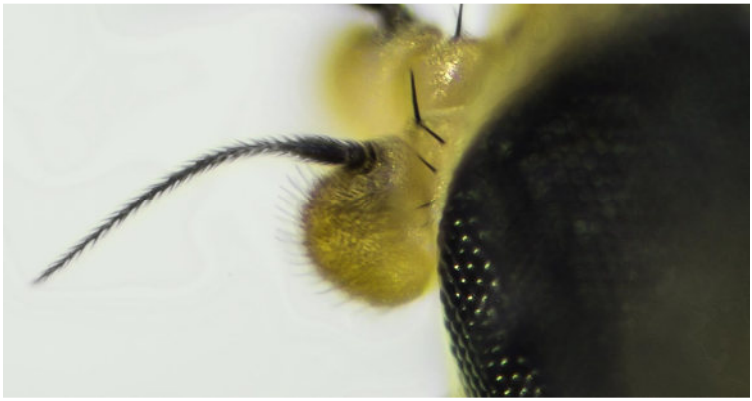
5



6



7



8

Figs 4-8, *Liriomyza latigenis* (Hendel) genitalia: 4, aedeagus in optimal lateral view of collected adult; 5, distiphallus in optimal view from below of collected adult; 6, distiphallus in suboptimal view from below of adult reared from *Senecio*; 7, ejaculatory apodeme of collected adult; 8, infuscated third antennal segment of specimen reared from *Senecio*, showing long pubescence. Scale bar: 0.1mm.

Distribution

This is a rare species, known only from Spain (Hendel 1920), France (Spencer 1966), Czech Republic (Černý *et al.* 2005), Uzbekistan (Černý and Merz 2006), Greece (Černý 2011), Romania (Papp and Černý 2017) and Portugal (Černý *et al.* 2018).

Acknowledgements

I would like to thank Miloš Černý (Halenkovice, Czech Republic) for taking the time to examine the adult and confirming the determination, Nigel Wyatt (NHM London) for arranging the loan of specimens and Michael von Tschirnhaus (University of Bielefeld, Germany) for his correspondence and helpful review of the manuscript.

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Dipterists Digest 2018 **25,** 165-167

Liriomyza yasumatsui Sasakawa (Diptera, Agromyzidae) new to Britain

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Summary
Liriomyza yasumatsui Sasakawa, 1972 (Diptera, Agromyzidae) is reported as a species new to Britain. A description of the adult, larval biology and circumstances of the discovery are given, along with European distribution details.

Introduction

A single male *Liriomyza* species was swept by the author from vegetation at a brownfield site in Hull (TA064265), East Yorkshire (V.C. 61) on 13 September 2018. Using Papp and Černý (2017), the specimen runs to couplet 55, with *L. yasumatsui* Sasakawa, 1972 being the resulting determination owing to the distiphallus possessing a pair of long apical tubes. An image of the male genitalia was sent to Miloš Černý, who confirmed that the specimen is *Liriomyza yasumatsui*, a species not previously known from Britain.

Identification

This is a relatively small species, with a wing length of 1.2-1.6mm. Frons, face, gena and antenna all yellow. Palpus also yellow, although can be tinged slightly brown (Sasakawa 1972). The third antennal segment is rounded, with distinct pubescence present. Both *vt* are on a yellow ground. Orbital setulae are small, sparse and erect or slightly proclinate.

The mesonotum is shining black, weakly greyish with a small yellow patch at hind corners, with 1+3 *dc*, which decrease in length anteriorly. There are 2-4 rows of *acr* before the second *dc*, with the central two rows extending just behind the level of the third *dc*.

Sasakawa, when describing this species based on the holotype collected from Taiwan in 1965, stated the ultimate section of M_{3+4} is approximately 3.5 times as long as the penultimate. Papp and Černý (*op. cit*.) stated the ultimate section of M_{3+4} is almost three times the length of the penultimate. In this specimen, the last section of vein M_{3+4} measured 3.2 times that of the first. Legs are yellow, with the tibiae and tarsi brownish.

The male genitalia consists of long and narrow cerci, each three-fifths as long as the depth of the epandrium, with the epandrium possessing a large, thick peg. Surstylus long, conical with a large peg and long setae. The phallus is distinctive, with the distiphallus (Fig. 1) consisting of three parts: basal part long subconical, medial part broad and comprising two lobes, which serve as a base of the apical part, and the apical part which consists of two up-curved membranous tubes.

The ejaculatory apodeme possesses an asymmetric bulb and a broad-based blade, with the basal half narrow and the apical part widened into an asymmetrical subquadrate plate. The female spermatheca, along with the male surstylus and phallus, is depicted by Ku *et al*. (1998).

Biology

The larva of *L. yasumatsui* forms a gallery-type leaf mine on *Artemisia princeps* and *Artemisia* sp. (Ku *et al*. 1998, Benavent-Corai *et al*. 2005), with *A. vulgaris* being abundant at the collection site. Malipatil *et al*. (2004) stated that it had also been reared from a *Chrysanthemum* sp.

Pupariation occurs externally, with the posterior spiracle possessing three bulbs. The last abdominal segment possesses a pair of tubercles, which distinctly project.

Fig. 1. ***Liriomyza yasumatsui*** **Sasakawa, male phallus (rest position), lateral view. Scale bar: 0.1mm.**

Distribution

In Europe, the species is known from the Czech Republic (Černý *et al*. 2005), France (Černý and Merz 2007), Greece (Černý 2011), Hungary (Papp and Černý 2017) and Switzerland (Černý and Merz 2005). Elsewhere, it is known from China and Japan (Sasakawa 1994), North Korea (Černý 2007), South Korea and Uzbekistan (Černý and Merz 2006), and Taiwan (Wang and Lin 1988; Shiao *et al.* 1991). It has also been recorded from Sulawesi (Malipatil *et al*. 2004) and other parts of Indonesia (Baliadi and Tengkano 2010; Herlinadewi *et al.* 2013; Pratama *et al.* 2013). Several further records from Japan, China and Korea exist (Michael von Tschirnhaus *pers. comm*.). It is not known if this species was introduced into Europe via the horticultural industry or is simply a very widespread species.

Acknowledgements

I would like to thank Miloš Černý (Halenkovice, Czech Republic) for confirming the determination and clarifying its distribution, and Michael von Tschirnhaus for supplying additional literature references.

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Dipterists Digest 2018 **25,** 168-169

Dipterists Day Exhibits 2018
– compiled by Editor from exhibitors' notes

Details are given here only of exhibits that did not also appear at the 2018 Exhibition of the British Entomological and Natural History Society.

BLOXHAM, M.G. A study of Diptera in Dingle Woodland: this continues the story told to the Forum at the 2013 AGM when the characteristics of the main component of Sot's Hole Local Nature Reserve in Sandwell were discussed and its cranefly fauna was compared with that of other Birmingham and Black Country sites. Since then, further work has added species to the lists because a Malaise trap survey of another important woodland component of the Sot's Hole LNR (Bluebell Wood SP01799271) has taken place during 2018.

This two hectare area of deciduous woodland lies on a steep slope, and springs from a relatively uncontaminated substrate arise within it, providing wet areas with the potential to host specialised invertebrates. A 1990 Nature Conservancy Council report highlighted the wood as being likely to host a reasonable representation of woodland fauna. The unique feature of the site is probably lack of any disturbance over many years for various reasons and therefore natural woodland succession has been allowed to take place

This review examined the two best recorded groups on the LNR in its entirety (the hoverflies and the craneflies) and also visited Bluebell Wood to review some newly discovered representatives of Drosophilidae, Anthomyiidae, Muscidae and Tachinidae.

A small display box containing specimens of Syrphidae plus Diplazontine parasitoids, theoretically associated with them and found in Sandwell, was also presented. The Malaise trap yields had suggested the numbers of these parasitoids had fallen fairly sharply in line with the general numerical decline of many syrphid species.

Analysis of the habitat patterns of the 74 cranefly species recorded from the main Sot's Hole LNR combined with the species found in the Bluebell Wood component suggested that 46 had a proven preference for woodland and of these, 26 had a known association with wet woodland seepages and trickles. *Lipsothrix nervosa* Edwards, 1938, a BAP marker for sites of this type, was present and a microphotograph of the aedeagus of a specimen found on site was provided. The following works were used in the cranefly habitat analysis: Boardman, P. 2007. *A provisional account and atlas of the Craneflies of Shropshire*. Published by the author (a later edition was published by FSC); Boyce, D.C. 2002. *A review of seepage invertebrates in England.* English Nature Research Reports. Number 452; Godfrey, A. 2003. *A review of the invertebrate interest of coarse woody debris in England*. English Nature Research Reports. Number 513.

A list of 78 syrphid species recorded from the combined sites as above was given. Thirteen of these held a status as ancient woodland marker species (sensu Stubbs in Whiteley, D. 1987. *Hoverflies of the Sheffield Area and North Derbyshire*. Sorby Record Special Series No.6. Published by Sorby Natural History Society, Sheffield, Sheffield City Museums and Derbyshire Wildlife Trust). The Valley in general has a substantial number of these markers, but it was considered that climatic factors, the addition of a great amount of additional syrphid data, coupled with the unexpected fluctuations in distribution of a number of species, meant that this evaluative tool was now in need of revision.

The latest date of appearance by year of each species in the Valley at large was also given so that readers might have some concept of the overall status of this group of species with regard to relative loss over time. Several species missing since the last century could have their absence

explained by obvious changes of vegetation by invasive ground flora and others that would not have been readily checked on a walk-through basis. More interesting in the context of dingle woodland and associated woodland continuity is the fact that almost all the LNR species associated with woodland sap runs, rot holes, wet or decaying timber continued to be recorded from 2012-2018. Drosophilids from the Malaise trap included *Amiota alboguttata* (Wahlberg, 1839) and the now almost ubiquitous *Drosophila suzukii* (Matsumura, 1931). Muscids included *Mydaea anicula* (Zetterstedt, 1860) and *Lispocephala brachialis* (Rondani, 1877) (genitalia microphotographs were shown). The infrequently-recorded *Pegomya testacea* (De Geer, 1776) (Anthomyiidae) was also included together with a microphotograph of genitalia dissection alongside a copy of Michael Ackland's reference figures for determination of the species. The tachinids included *Hemyda vittata* (Meigen, 1824), *Subclytia rotundiventris* (Fallén, 1820) and *Anthomyiopsis nigrisquamata* (Zetterstedt, 1838). Some members present thought these might be quite widely distributed and have their existing status reviewed in a forthcoming review.

DRAKE, C.M. Flies from inland saltmarshes in Cheshire and Staffordshire collected on the Dipterists Forum Summer Field Meeting in 2018. During the week, members of the Dipterists Forum visited Neumann's Flash and Anderton Nature Park (Cheshire) and Pasturefields (Staffordshire). These relict saltmarshes derive their salinity from subterranean salt deposits. Several species were displayed, some of which are genuine saltmarsh specialists and others are common species which occur at inland wetlands but reach their highest densities at the coast. The assemblage was remarkable in resembling that found on brackish coastal marshes, even if many of the species, if found in isolation, would be considered merely strays. The most exciting find was a rare western record of the dolichopodid *Campsicnemus magius* (Loew, 1845).

From Witton Brook at Anderton Nature Park, Cheshire (SJ662747, 27.vi.2018): *Symplecta stictica* (Meigen, 1818) (Limoniidae), *Nemotelus uliginosus* (Linnaeus, 1767), *N. notatus* Zetterstedt, 1842 (Stratiomyidae), *Argyra vestita* (Wiedemann, 1817), *Campsicnemus magius*, *Dolichopus sabinus* Haliday, 1838, *Hydrophorus praecox* (Lehmann, 1822) (all Dolichopodidae), *Paracoenia fumosa* (Stenhammar, 1844) and *Ephydra macellaria* Egger, 1862 (Ephydridae).

From Pasturefields, Staffordshire (SJ991245, 24.vi.2018): *Dolichopus nubilus* Meigen, 1824, *Platypalpus albocapillatus* (Fallén, 1815) (Hybotidae).

HALSTEAD, A.J. 2018 – A good year for platypezids? In most years the exhibitor found one or two species but this year he had managed to find eight, all taken in Surrey by sweeping unless stated otherwise. It was suggested that this may be due to warm weather in October 2018, which resulted in more collecting days than is usual at that time of year: *Callomyia amoena* Meigen, 1824 ♀, 10.x.2018, The Sheepleas (TQ084516), near West Horsley; *Microsania pallipes* (Meigen, 1830) ♂, one of the "smoke flies'', 7.x.2018, Snakes Field (TQ081577), Ockham Common, where the flies suddenly appeared in late afternoon near a conservation working party fire heap. The fire had mostly burnt down, with little smoke, but still giving out plenty of heat; *Paraplatypeza atra* (Meigen, 1804) ♀, 2.x.2018, Woking Palace (TQ028571), Old Woking; *Platypeza aterrima* Walker, 1836 ♀, 16.x.2018 White Rose Lane LNR (TQ016576), Woking; *Platypeza consobrina* Zetterstedt, 1844 ♀ 4.x.2018, Bolder Mere (TQ077583), Ockham Common; *Platypeza fasciata* Meigen, 1804 ♀, 18.ix.2018, North Meadow (SU982593), Goldsworth Park, Woking, on honey fungus *Armillaria*; *Protoclythia modesta* (Zetterstedt, 1844) ♀, 4.x.2018, Bolder Mere (TQ077583), Ockham Common; *Protoclythia rufa* (Meigen, 1830) ♂, 25.x.2018, Sheets Heath Wood (SU951573), Brookwood; ♀, 4.x.2018, Bolder Mere (TQ077583), Ockham Common.

Corrections and changes to the Diptera Checklist (40) – 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 8 species, resulting in a new total of **7178** species (of which 41 are recorded only from Ireland).

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

Chironomidae. The following genus and species are added in the present issue:
MOLLERIELLA Sæther & Ekrem, 1999
Molleriella ***calcarella*** Sæther & Ekrem, 1999

The following new synonymy results from J. MARTIN (2017. *Chironomus strenzkei* Fittkau 1968 is a junior synonym of *C. striatipennis* Kieffer 1910. *Chironomus Journal of Chironomidae Research* **30,** 19-25):
Chironomus ***striatipennis*** Kieffer 1910 = *C. strenzkei* Fittkau 1968

Conopidae. The following species is added in the present issue, as a probable adventive:
Leopoldius ***calceatus*** (Rondani, 1857 – *Brachiglossum*)

Lauxaniidae. The following changes result from M.J. EBEJER (2019. Taxonomic notes on West Palaearctic species of *Lauxania* Latreille, *Sapromyza* Fallén, *Calliopum* Strand and *Minettia* Robineau-Desvoidy, with a description of a new species of *Minettia* (Diptera, Acalyptrata: Lauxaniidae) from Morocco. *Zootaxa* **4543**(1)**,** 37-51):
Calliopum ***tuberculosum*** (Becker, 1895 – *Sapromyza*) = *Sapromyza halidayi* Shatalkin, 2000, new synonymy and new combination

Agromyzidae. The following species are added in the present issue:
Liriomyza ***latigenis*** (Hendel, 1920 – *Haplomyza*)
Liriomyza ***obliqua*** Hendel 1931
Liriomyza ***yasumatsui*** Sasakawa, 1972
Melanagromyza ***galegae*** Warrington, 2019

Sphaeroceridae. The following species are added in the present issue:
Rachispoda ***breviceps*** (Stenhammar, 1855 – *Limosina*)
Spelobia ***pappi*** Roháček, 1983

Dipterists Digest 2018 **25,** 171-172

Rachispoda breviceps (Stenhammar) (Diptera, Sphaeroceridae) reinstated as a British species

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Summary
Rachispoda breviceps (Stenhammar, 1855) has been confirmed from three different sites in East Anglia with a total of 11 specimens being found to date.

Introduction

The existence of *Rachispoda breviceps* (Stenhammar, 1855) in Britain was highlighted as being erroneous by Jindřich Roháček (1991) as the species keyed by Pitkin (1988), was in fact part of a species complex, and none of the specimens examined by Roháček from Great Britain was *R. breviceps.* However, it remained on the British Checklist until 2002 (Chandler 2002) when it was formally removed based on the information provided in Roháček *et al*. (2001).

Results

Two female specimens of *R. breviceps* were swept from a boggy stream edge in silver birch, *Betula pendula* woodland at Cavenham Heath NNR (TL750726), West Suffolk by IP on 31 March 2016. The habitat is consistent with the known information on the species' biology, based on verified records from Europe by Roháček (1991), who described the habitat as *"…various wetlands, including muddy banks of streams, lakes (also salty ones), sea shores, marshes, fens, wet forests, boggy meadows etc."*. All records originate from lowland areas (Roháček 1991).

One male and one female specimen of *R. breviceps* were swept from a small seepage across a water meadow at North Creake Abbey (TF856392), W. Norfolk on 13 July 2018 by DB, again the area was very muddy, although in this case more open. Both *R. longior* (Roháček, 1991) and *R. brevior* (Roháček, 1991) were subsequently swept from the same area on 2 and 13 September 2018, along with *R. limosa* (Fallén, 1820)*, R. lutosoidea* (Duda, 1938) and *R. lutosa* (Stenhammar, 1855).

Seven specimens (3 males and 4 females) were collected from a small patch of mud alongside a lake under white poplar, *Populus alba* at Buckenham Carrs, E. Norfolk (TG362058) on 5 August 2018 by DB. Collection was by use of a hand-held, rechargeable car vacuum, with the specimens collected inside, in fine muslin. Also collected at the time were specimens of *R. lutosa* and *R. limosa.*

Identification

Specimens of *R. breviceps* were identified using Roháček (1991), one female from IP being confirmed by Paul Gatt and a male and female from DB confirmed by Tony Irwin. When initially checking the identity of the specimens, it was noted that the key in Pitkin (1988) did produce the correct outcome. However, it should be noted that there are other species not mentioned in this key that could easily be confused with *R. breviceps,* these being *R. brevior, R. longior* and *R. gel* (Papp, 1978). Genitalia illustrations in Pitkin (1988) most closely resemble those of *R. longior* in Roháček (1991).

DB would be happy to examine any *Rachispoda* (or other Sphaeroceridae) specimens in collections or survey by-catch.

A male and female of *R. breviceps* from Buckenham Carrs have each been deposited in the Castle Museum Norwich, Natural History Museum, London and the Hope Collection, Oxford University Museum of Natural History.

Acknowledgements

We thank Paul Gatt (Hon. Research Fellow, Hope Museum, Oxford) for confirming the identity of one of the Cavenham females, and Tony Irwin for confirming the identity of a pair from Buckenham Carrs. For permission to collect at Cavenham Heath NNR, IP thanks Natural England, and for access to Buckenham Carrs, DB would like to thank Malcolm Savory and Alan Bates.

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Recent records of *Triphleba flexipalpis* Schmitz (Diptera, Phoridae)

– On 22 and 28 December 2018 I swept a single male *Triphleba flexipalpis* Schmitz, 1927 at Wandlebury (TL495533) Cambridgeshire; on both occasions they were accompanied by *T. autumnalis* (Becker, 1901) and *T. intermedia* (Malloch, 1908). The habitat was deciduous woodland, mainly beech *Fagus sylvatica* on chalk, with little ground vegetation apart from a carpet of ivy *Hedera helix* in places. There appear to be only two previous records from Britain: Stoke Wood, Herefordshire (1903) and Denge Wood, Kent (2003) (Falk, S.J. and Chandler, P.J. 2005. A review of the scarce and threatened flies of Great Britain. Part 2: Nematocera and Aschiza not dealt with by Falk (1991). Species Status No. 2. Joint Nature Conservation Committee). Although both records were for the month of October, it has been found during the winter months on the Continent and eggs and larvae have been reported from baits of rotten meat (Schmitz, H. 1949. Phoridae. *Die Fliegen der Palaearktischen Region* **4**(33)**,** 196-198) – **IVAN PERRY,** 27 Mill Road, Lode, Cambridge, CB25 9EN

Dipterists Digest 2018 **25,** 173-175

Spelobia pappi Roháček (Diptera, Sphaeroceridae) new to Britain from Catfield Fen, Norfolk

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Summary
A single male specimen of *Spelobia pappi* Roháček, 1983 was collected by AB in a water trap during the period 6-12 June 2018, from Catfield Fen, Norfolk. This represents the first record of this habitat specific species in Britain.

Introduction
Spelobia pappi Roháček, 1983 is a small (1.55-1.79mm) rarely recorded fly first described by Jindřich Roháček, which until now has been recorded from the Czech Republic, Germany, Sweden, Canada (Roháček *et al*. 2001) and Finland (Haarto and Kahanpää 2013).

Methods
Water traps were placed and monitored by AB as part of an ongoing survey of Catfield Fen by Tony Irwin; six yellow water-traps were aligned on the ground at regular intervals over a distance of about 12 metres, and were emptied on 8, 10 and 12 June 2018. The water traps were placed on an area of marsh (TG373212) that, as part of a rotational management programme, was machine-cut in late 2017. The marsh at Catfield Fen is classified as lowland acid mire, with a pH in some areas of between 4 and 5 (Dr J. Parmenter *pers. comm*.) and the sampling area was dominated by *Phragmites australis*, *Calamagrostis canescens*, *Sphagnum* spp and *Agrostis canina*.

Results
A single male specimen of *Spelobia pappi* was collected. Also collected at the time were less habitat specific flies of the genus: *Spelobia clunipes* (Meigen, 1830) and *S. parapusio* (Dahl, 1909).

Identification and discussion
Spelobia pappi is distinguishable from other *Spelobia* species in having a unique combination of yellow face, facial cavity, lunule and gena, a long pair of mid interfrontal bristles and a long proximal postero-dorsal (pd) bristle on the mid tibia (t2). Similar looking species within the genus *Spelobia* (*S. belanica* Roháček, 1983 and *S. parapusio*) may have some of these features but not in this combination (Roháček 1983). *Spelobia pappi* looks very similar to *Pteremis fenestralis* (Fallén, 1820), which can inhabit similar *Sphagnum* rich habitats, the main difference in this case being the lack of a ventropreapical bristle on t2 in *S. pappi* (Roháček 1983).

The Catfield specimen was identified by DB using the keys and description in Roháček (1983) and the illustrations of the 5th sternite (S5) and gonostylus (= telomere in Roháček 1985). In order to rule out any possible undescribed cryptic species, even though the S5 and gonostylus (Figs 1 and 2) are quite distinctive, images were sent to Dr Jindřich Roháček who confirmed the identification.

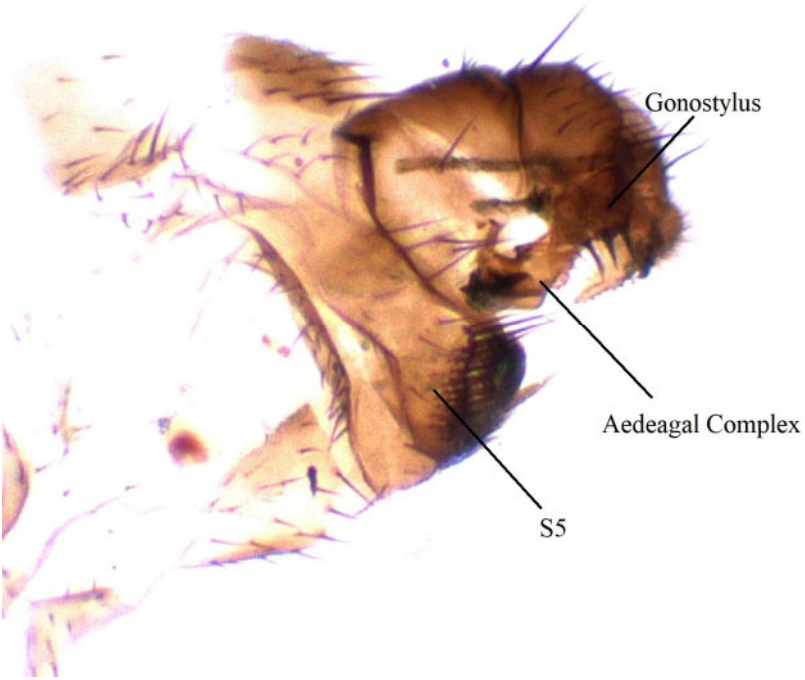

Fig 1. Lateral view showing S5, aedeagal complex, and gonostylus.

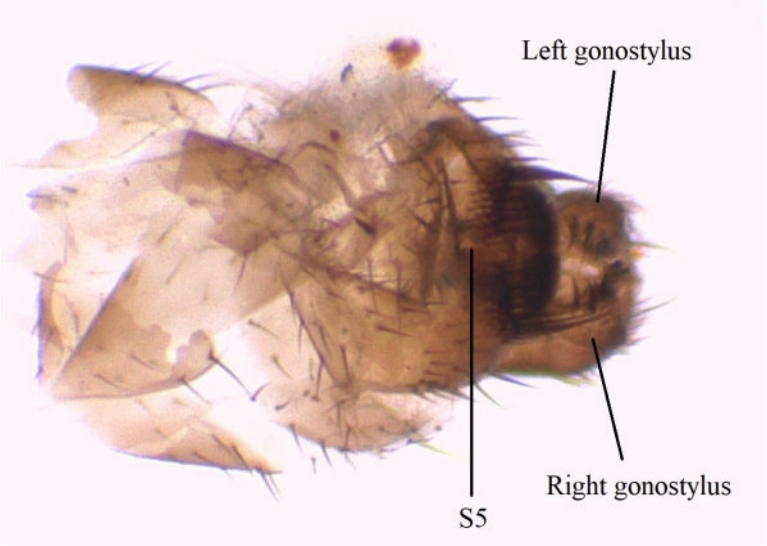

Fig 2. Ventral view showing S5 and left and right gonostyli.

Spelobia pappi is confined to *Sphagnum* peat-bogs and mires both in Europe (Roháček 1983) and Canada (Marshall 1985), the presence of *Sphagnum* and acid pH being the most important characteristics of the habitat preferred by this species (J. Roháček 2018 *pers. comm.*).

Acknowledgements
DB thanks Tony Irwin and Jindřich Roháček for their help in confirming the identity of the specimen. AB thanks Mr and Mrs T.C. Harris for granting permission to enter and survey on their property and Dr J. Parmenter for supplying the habitat description.

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A second record of *Angioneura acerba* (Meigen) (Diptera, Calliphoridae) from the East Lothian coast, Scotland – I reported the apparently first find of *Angioneura acerba* (Meigen, 1838) in Scotland from Longniddry Bents (NT4376) based on a single male specimen taken on 3 September 2015 (Horsfield, D. 2017. *Angioneura acerba* (Meigen) (Diptera, Calliphoridae) found in Scotland. *Dipterists Digest* (*Second Series*) **24,** 146). On 1 July 2017, a second specimen of *Angioneura acerba*, a female, was swept from marsh at Luffness near Aberlady (NT476806, V.C. 82). *Angioneura acerba* is a small (c. 4mm long) grey-dusted fly, which in the sweep net looks more like a muscid or an anthomyiid than a calliphorid. The localities of the two finds are about 6 km apart. The marsh flora at Luffness included common reed (*Phragmites australis*), bulrush (*Typha latifolia*), soft-rush (*Juncus effusus*), sea club-rush (*Bolboschoenus maritimus*) and horsetail (*Equisetum* sp).

I am grateful to Olga Sivell for confirmation of the identification of both the female from Luffness and the male from Longniddry. Both specimens are kept at the National Museums Collection Centre **– DAVID HORSFIELD,** National Museums Collection Centre, 242 West Granton Road, Edinburgh EH5 1JA

Changes to the Irish Diptera List (27) – Editor

This section appears as necessary to keep up to date the initial update of the Irish list in Vol. **10,** 135-146 and the latest checklist of Irish Diptera (Chandler *et al*. 2008). Species are listed under families, but with references listed separately (unless within the present issue). The gain of 15 species cited here brings the total Irish list to 3444.

Chironomidae

Micropsectra recurvata Goetghebuer, 1928 (restored to Irish list by Murray and Langton 2018)

Agromyzidae

Agromyza albitarsis Meigen, 1830 (added by Warrington in the present issue)
Agromyza alnivora Spencer, 1969 (added by Warrington in the present issue)
Agromyza demeijerei Hendel, 1920 (added by Warrington in the present issue)
Agromyza filipendulae Spencer, 1976 (added by Warrington in the present issue)
Agromyza vicifoliae Hering, 1932b (added by Warrington in the present issue)
Amauromyza flavifrons (Meigen, 1830) (added by Warrington in the present issue)
Aulagromyza heringii (Hendel, 1920) (added by Warrington in the present issue)
Liriomyza angulicornis (Malloch, 1918) (added by Thomas in the present issue)
Phytomyza agromyzina Meigen, 1830 (added by Warrington in the present issue)
Phytomyza astrantiae Hendel, 1924 (added by Warrington in the present issue)
Phytomyza cytisi Brischke, 1881 (added by Warrington in the present issue)
Phytomyza lappae Goureau, 1851 (added by Warrington in the present issue)
Phytomyza pastinacae Hendel, 1923 (added by Warrington in the present issue)
Phytomyza ranunculivora Hering, 1932 (added by Warrington in the present issue)

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Dipterists Digest 2018 **25,** 177-178

A fifth site for *Chrysops sepulcralis* (Fabricius) (Diptera, Tabanidae) in Dumfries and Galloway

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Summary
The discovery of a fifth site for *Chrysops sepulcralis* (Fabricius, 1794) in Dumfries and Galloway is described and discussed within the context of other records from the region.

On a fine dry evening of 4 July 2018, I visited Carrick Ponds SSSI (NX581503) for the monthly setting of an actinic light trap adjacent to the largest pool on the site, as part of a survey for caddis flies. Noticing an unfamiliar small horsefly resting on rushes, I swept it and later identified it as a female *Chrysops sepulcralis* (Fabricius, 1794). No other specimens were observed at the time or on the previous June or subsequent August site visits. Despite exceptionally dry and warm conditions, some open water remained in the pool beyond the fringing rushes and extensive mat of *Menyanthes* swamp.

Carrick Ponds SSSI (Kirkcudbrightshire, V.C. 73), containing a series of ponds and mires, is on the Solway coast, approximately 6km south of Gatehouse of Fleet. It is designated for its rich basin fen plant community, combined with a diverse water beetle species assemblage. At over 81 species, it is the most diverse site in Scotland (Scottish Natural Heritage 2010). The series of eight ponds or damp hollows are not directly interconnected and lie between low rocky ridges with semi-improved neutral grassland. The ponds are predominantly rain-fed, with some surface run-off, though raised calcium levels in some of them may indicate a groundwater influence. There is a wide range of conditions from acidic to quite strongly basic, including open water at pH 9.5. Open water grades into swamp and fen, to wet willow woodland and grassland (Scottish Natural Heritage 2015). The site is currently used for grazing of cattle and sheep with some trampling around the ponds where absence of gorse scrub or willow permits. The thin soils are underlain by Silurian greywacke, some basic in character and there are extensive rock outcrops.

Chrysops sepulcralis was first confirmed in Scotland by Stubbs (1993), now known to be from Kirkchrist Mire, Kirkcudbrightshire (Telfer and Lyszkowski 2006), on 18 July 1979, one specimen. The second site record was made by Drake (2005) from Lochmaben Lochs SSSI, west Dumfriesshire, V.C. 72, on 11 July 2003, with three specimens. The third record from Lyszkowski (Telfer and Lyszkowski *op. cit*.) was from Dow Lochs, Wood of Cree, Kirkcudbrightshire, on 25 June 2005, one specimen. A fourth, unpublished, record was made from Perchhall Loch SSSI, Dumfriesshire, by G.N. Foster on 8 July 2010 with three specimens in the Hunterian (Zoology) Museum collection, identification confirmed by G. Hancock. The low *sepulcralis* numbers encountered at each of the five Dumfries and Galloway sites are in contrast to those seen on the Dorset heaths, where the species seems most abundant. Here, up to six males resting on short grasses near to a bog pool were captured by bringing one net down over them (Grayson 1997). Drake (2005) described the Lochmaben Lochs site for *sepulcralis* as being more fen-like and less acidic than the typical Dorset heath and New Forest sites. This also seems to be the case with Dow Lochs, Perchhall Loch and Carrick Ponds.

All the Dumfries and Galloway *sepulcralis* sites are within a distance of 78km, east to west; the three Kirkcudbrightshire sites being 12km (Dow Lochs) to 0.4km (Carrick Ponds) from

the Solway coast. The Dumfriesshire Lochmaben Lochs site is furthest from the coast, at approximately 13km inland. All five sites are likely to benefit from the mild winters and warmer summer temperatures of the Solway coastal climate and currently form the only known area for this former RDB1 (Falk 1991) species in Scotland. In the recent review of the status of Larger Brachycera (Drake, 2017), its threat status has been downgraded to ''Least Concern'' with a rarity status of ''Nationally Scarce''. An earlier Scottish record for *sepulcralis* from Aberfoyle, West Perthshire (Evans, 1907) would appear to be unsupported by specimens in either the National Museum of Scotland or the Hunterian (Zoology) Museum, Glasgow University, collections. Some doubt has been expressed about the Perthshire record which may be a misidentification of a dark variety of *Chrysops caecutiens* (Linnaeus, 1758) (Stubbs 2001). The female *sepulcralis* from the Carrick Ponds site has now been deposited in the National Museums of Scotland collection.

Acknowledgements
I would like to thank the landowner for permission to access the site, Scottish Natural Heritage for arranging consent to survey, Ashleigh Whiffin at the National Museums of Scotland for helpful information received via SIRI (Scottish Insect Records Index) and for arranging deposit of the Carrick Ponds specimen into the collection, Jeanne Robinson for checking the Hunterian (Zoology) Museum collections, Garth Foster for allowing his record to be published here and Graham Rotheray for confirming the identification of *Chrysops sepulcralis*. I am grateful to the reviewers for bringing my attention to the Review of the status of Larger Brachycera.

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Dipterists Digest 2018 **25,** 179-184

In search of *Wiedemannia simplex* (Loew) (Diptera, Empididae, Clinocerinae)

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Summary
As the result of further survey work in the Cairngorm National Park, the status of *W. simplex* is reviewed. The species was found in only one of six potentially suitable sites. The only site where *W. simplex* was found is the highest large water body in Britain. The low water temperatures at this altitude and the position of this loch in the central Cairngorms are suggested as being the main reasons for the highly restricted distribution of this boreal species.

Background

Wiedemannia simplex (Loew, 1862) (Plate 1), listed by Collin (1961) as *Wiedemannia impudica* (Mik, 1880), is one of the most enigmatic of the British Diptera. It is the final species documented in Collin's 1961 monograph on the Empididae (sensu lato) on the basis of specimens caught at a remote Cairngorm loch in the 1930s.

Wiedemannia simplex is one of only nine species of Empidoidea considered to be "Endangered" in the British Isles by Falk and Crossley (2005). At that time it was only known from a few specimens taken at a single site, the last record being in 1984 (see data below). This presence at just one site indicated a species at significant risk of extinction, which in turn led to its categorisation as Endangered. But apart from these isolated records nothing further was known of the species in Britain.

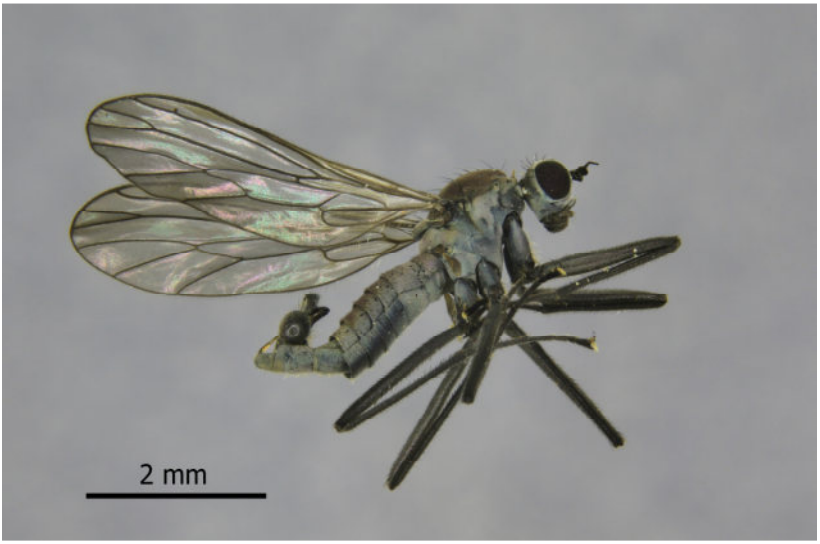


Plate 1. Adult male of *Wiedemannia simplex*.

Previous British records

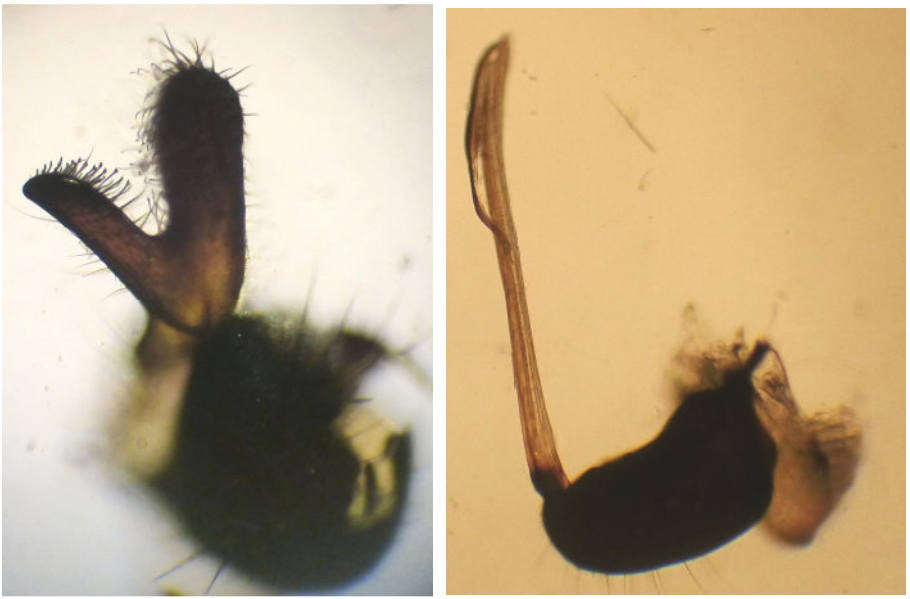
This species was previously only known in Britain from 11 specimens:

Scotland: Loch Avon: 13.vii.1936, 1♀, R.L. Coe (B.M. 1936-464); 6-7.viii.1937, 3♂, 3♀, R.L. & B.M. Coe (B.M. 1937-540); 18.viii.84, 1♂, J.M. Nelson (BMNH 1988-212); 17.viii.84, 2♂, J.M. Nelson; 18.viii.84, 1♂, J.M. Nelson (these last 3 specimens in National Museums of Scotland).

Taxonomy

Within the genus *Wiedemannia*, the *W. simplex* species-group as defined by Sinclair (1997) is characterised by acrostichals extending to the scutellum, a narrow stigma, femora usually lacking preapical setae, distiphallus with median swelling and clasping cercus with thumb-like projection clothed with clubbed setae (Plate 2) which serves to distinguish it from other British species. This group includes the Palearctic species *W. fallaciosa* (Loew, 1873), *W. hygrobia* (Loew, 1858) and possibly *W. bifida* Vaillant, 1965 (Sinclair 1997). This study was, however, done before the widespread use of DNA sequencing and modern analytical techniques may reveal a more complex picture.

Collin (1961) considered this species to be *W. impudica* Mik, 1880 but Sinclair (1997) could not locate the type specimens. However, on the basis of Collin's (1961) description of *W. impudica* and on the basis of the shape of the clasping cercus, the distinctive phallus (Plate 3) and coloration of the scutum, Sinclair (1997) considered *W. impudica* to be conspecific with *W. simplex*.



Plates 2-3. 2, clasping cercus of *W. simplex*; 3, phallus of *W. simplex*.

Geographical distribution

Wiedemannia simplex is a Holarctic boreal species. In North America, it is widely distributed in the far north and ranges from Quebec in the east, west to Alaska and southwards down the Rockies to Jasper. It is also known from Michigan and from localities in south western New Mexico and

Arizona. At northern localities, adults are present from mid-June to mid-August and from early-May to June or July in southern localities. In Europe, this species is recorded from Scotland, Norway, Finland, and western Russia. This species is also known from Hokkaido and Honshu in Japan (Sinclair 1997).

Survey work in 2018

During the summer of 2018, I carried out survey work to confirm the current status of the species. The first step was to make the rather long walk into Loch Avon in the Cairngorms, the only known site in Britain. After successfully re-finding the species on the loch shore, I then undertook further survey work of other potential sites in the Cairngorms in order to ascertain the current distribution of *W. simplex* and to obtain a better understanding of its ecological requirements.

The Cairngorms consist of a high plateau between 1000-1200m, dissected by deep glacial valleys often containing sizeable lochs. Situated in north-east Scotland, they are the coldest part of the British Isles and snow lies on the plateau well into the summer. No other part of the country has this combination of cold climate, late snow lie and a cluster of large high altitude lochs. For these reasons the survey was confined to the Cairngorm area.

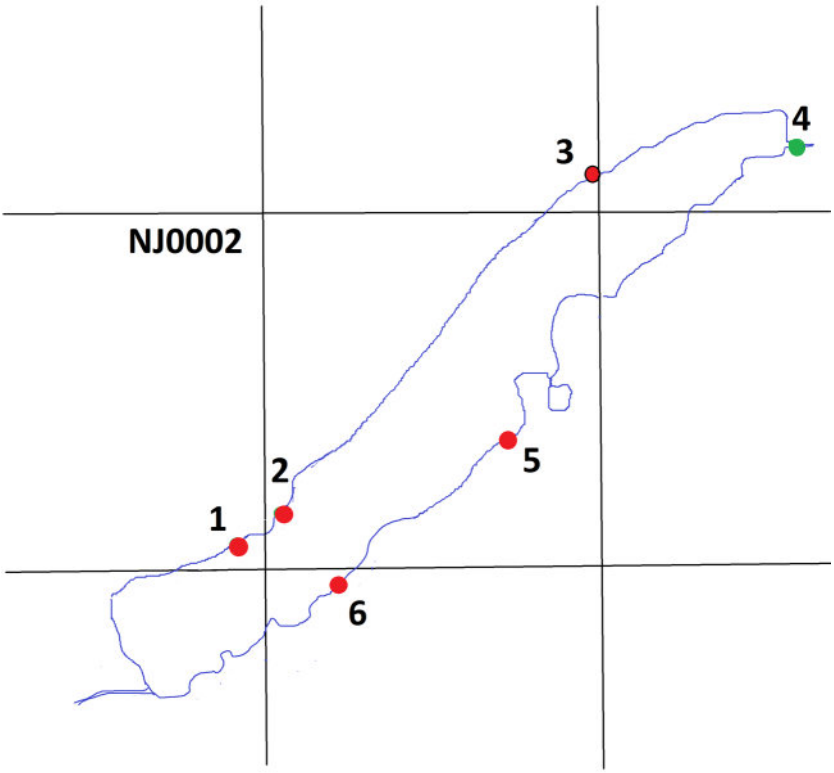
Plate 4. The habitat of *W. simplex* on the shores of Loch Avon.

Loch Avon

On 26 June 2018, I climbed over the shoulder of Cairngorm and descended Corrie Raibeirt to the shore of the loch, which at this point has many large granite boulders partly submerged in the water (Plate 4). Initial attempts to collect specimens by sweeping with a net proved difficult due to the large rocks and the net constantly getting wet. I could, however, see *Wiedemannia* adults flying low over the water surface and alighting just above the water level on the large boulders.

The best approach to capturing these was by using a pooter to try and aspirate specimens which landed on the boulders. This, however, proved to be rather challenging, requiring much patience and a steady hand but I was able to collect 11 specimens from two nearby sites on the north shore of the loch (Sites 1 and 2 on Map 1). After later examination these were all confirmed as *W. simplex*.

After this initial success, I visited Loch Avon again on 3 August 2018 with the intention of carrying out a more complete survey to ascertain the distribution of *W. simplex*. A further four sites were sampled around the shore of the loch and at the outflow of the River Avon. *Wiedemannia* specimens were seen at all sites and 17 individuals were taken for confirmation of identity. At sites 3, 5 and 6 (see Map 1) all the specimens were *W. simplex*. In addition to the individuals captured, many more specimens were present at each sampling site and on this occasion mating was observed on the wet rocks just above the water line. At the outflow of the loch (site 4) and for a distance of some 50m downstream, *W. bistigma* (Curtis, 1834) was recorded.



Map 1. Loch Avon showing capture sites referred to in the text

Wiedemannia records
W. simplex: 26.vi.2018, 8♂, 3♀, sites 1 and 2 on Map 1; 3.viii.2018, 6♂, 9♀ sites 3, 5 and 6 on Map 1, on boulders along the loch margin (specimens in NMS).
W. bistigma: 3.viii.2018, 3♀ at site 4 – the outflow of the River Avon.

Dubh Loch
This is perhaps the loch which showed the most similarity to Loch Avon; it is located 30km distant at an altitude of 637m in a deep glacial trough, surrounded by cliffs and screes. Along the loch shore are numerous large granite boulders partially submerged in the water providing potential habitat for *W. simplex*. The presence of *W. bistigma* at the outflow was an initial hopeful sign but, despite a search on two separate days in July and August, no specimens of *W. simplex* were seen or collected at this site.

Loch Etchachan
After visiting Loch Avon on 26 June 2018, I climbed up to this corrie lochan, well known as one of the highest water bodies in Britain. It lies 1.4km from Loch Avon and, at an altitude of 927m, is 200m higher. The character of this loch is, however, quite different from Loch Avon; it is a relatively shallow corrie lochan with no deep water near the shore and a littoral area which increases in extent in dry weather. There were numerous large boulders partly submerged near the shore, but there was no sign of any *Wiedemannia* specimens.

Lochs Eanaich, Callater and Muick
Loch Eanaich is the nearest large loch in a glacial trough to Loch Avon, situated approximately 9.5km distant. It is, however, some 225m lower in altitude and, although surrounded by high mountains, the slopes immediately above the loch are not as steep and rocky as at Loch Avon. There are areas with rocks and boulders partly submerged on the shoreline, but these do not occur as extensively as at Loch Avon. A short length of loch shore with apparently suitable boulders was surveyed at the NW of the loch, but no *Wiedemannia* specimens were seen. The same general situation prevailed at Loch Callater, 25km distant and at Loch Muick, 33km distant. Again a short area of apparently suitable shoreline was sampled but no *Wiedemannia* were seen.

Discussion
This survey work confirms the presence of *W. simplex* at Loch Avon, the historical site where it had not been recorded since 1984. The species is distributed around the loch shore where boulders or large rocks are partly submerged in the water. The loch has a shoreline of approximately 5.8km and it is estimated that approximately 4.5km of this is suitable for *W. simplex*. The species was present in good numbers at all loch shore sites sampled with many more specimens being seen than were collected. This survey work increases the known flight season for adults which now extends from at least 26 June to 18 August. Surveys carried out at other potentially suitable lochs in the Cairngorms found no further sites for *W. simplex*.

What makes Loch Avon so special? It is the largest loch above 600m in the British Isles, situated in the heart of the Cairngorms and surrounded by some of Britain's highest mountains. The average air temperature is low and an additional cooling effect is produced by inflow from melting snows on the Cairngorm plateau, which continues well into the summer months. The large volume and 90m+ depth of the loch also serves to maintain low water temperatures.

The character of the loch shore with extensive areas of large partly submerged granite boulders apparently provides an ideal habitat for *W. simplex* which spends most of its adult life just above the water line. Even on relatively windy days, when there is considerable wave action on the loch, the jumbled boulders continue to provide sheltered micro-habitats in which *W. simplex* is found. Constant deep water near the shore also seems to be an important factor as *W. simplex* was not found in the nearby higher, and presumably colder, Loch Etchachan.

Of all the lochs visited, the Dubh Loch is the most similar site to Loch Avon. With an area of approximately 20ha it is much smaller than the 56ha Loch Avon; it is also 85m lower in altitude. The absence of *W. simplex* at this apparently suitable but slightly lower and smaller loch

may indicate that, by being confined only to Loch Avon, this species is really at the edge of its climatic range in the British Isles.

Future prospects

Fortunately, Loch Avon now enjoys several layers of statutory protection, lying as it does within the Cairngorm Mountains National Scenic Area, Cairngorm Lochs Ramsar Site, Cairngorms SAC and SPA as well as being part of the Cairngorms National Park. The loch and surrounding land is owned by RSPB. However, the most obvious threat is from climatic change. Although populations appear to be healthy at present they may well be very susceptible to a rise in water temperatures, caused either directly by higher air temperatures or a reduction in cold water inflow from snow melt. In a recent publication Pohle *et. al*. (in press) report that water temperatures in the nearby River Spey have risen on average by 3 degrees C. over the past century. Whilst Loch Avon may be buffered from such rises by its location and volume, there is no doubt that increasing water temperature is the main threat to *W. simplex* populations. It may be one of the first species in the British Isles driven to extinction by climatic change. Future monitoring is considered essential to detect any changes in the population of this iconic Cairngorm species.

Table 1 – Lochs Surveyed

Site	Grid ref.	Altitude (m)	Date	*Wiedemannia* records
Loch Etchachan	NJ0000	927	26.6.2018	None detected
Loch Avon (Loch Abhainn, Loch A'an)	NJ0102	725	26.6.2018 3.8.2018	*W. simplex* *W. bistigma*
Dubh Loch	NO2084	637	14.7.2018 8.8.2018	W. *bistigma*
Loch Callater	NO1883	501	2.7.2018	None detected
Loch Eanaich (Loch Einich)	NN9198	498	9.7.2018	None detected
Loch Muick	NO2883	398	14.7.2018	None detected

Acknowledgements

I thank Duncan Sivell (NHM, London) for data on the Coe and Nelson specimens and Ashleigh Whiffin (NMS) for the photograph of the adult specimen. Video footage of the adults can be found at *https://youtu.be/WvejBpv1Gv4*.

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Dipterists Digest 2018 **25,** 185-187

So it has to be *Brillia longifurca* Kieffer (Diptera, Chironomidae)…at least for the time being…

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Summary
Identification of the three possible species of the *Brillia flavifrons* group is discussed and characters for separation of the females are presented.

***Brillia longifurca* Kieffer vs *B. flavifrons* (Johannsen)**

In A World Catalogue of Chironomidae by Ashe and O'Connor, Part 2B (2012), on page 748, the authors stated: '**flavifrons** (JOHANNSEN, 1905), **BRILLIA:** For several years the species *Brillia flavifrons* (Johannsen, 1905) was believed to be a senior synonym *of B. longifurca* Kieffer, 1921, but both are now regarded as distinct species. *Brillia flavifrons* is known to occur in the Nearctic and the Eastern Palaearctic (Japan and Russia (Far East, West Siberia)) but all published records from the Western Palaearctic (Europe, Near East and North Africa) are highly doubtful and probably misidentified specimens of *B. longifurca.*'

In consequence, all the Irish records of *B. flavifrons* were transferred to *B. longifurca* in Murray *et al*. (2018). Cobo *et al*. (1995) made a good case for the separate identity of the two species. Using Iberian material and comparing it with North American specimens, they confirmed that the respective males and pupal exuviae are indistinguishable morphologically, but proposed that the females can be recognised from their genitalia.

They provided excellent figures of the female genitalia in *B. longifurca* and a new species, *B. pudorosa* Cobo, Gonzalez & Vieira-Lanero, 1995. However, the structure of the female genitalia in *B. flavifrons* could be deduced only from the comparative account on *B. longifurca*, as no figure was given for the former species. On the other hand, such a figure is to be found in Oliver and Roussel (1983).

The differences are small, but appear to be fixed, for the only pharate female '*flavifrons*' in my collection, collected in the R. Chew at Stanton Drew Bridge (ST 597634) by R.S. Wilson on 20 March 1973, fits the figure of *B. longifurca* in Cobo et al (1995) very closely. Thus the only specimen of the *B. flavifrons* group from the British Isles that can be identified from its female genitalia belongs to *B. longifurca*.

The comment by Ashe and O'Connor (2012) and the decision by Murray *et al*. (2018) would appear therefore to be justified. However, there remains the implied possibility that *B. flavifrons* may occur in the Western Palaearctic, so I append diagrams of the female genitalia of *B. longifurca* and *B. flavifrons,* and include one for *B. pudorosa*, for the latter has been found in continental France (Moubayed-Breil 2007) as well as Iberia.

Note that if *B. flavifrons* were identified from an associated female from the British Isles, this would place all the records for *B. longifurca* based on adult male and pupal exuviae in doubt.

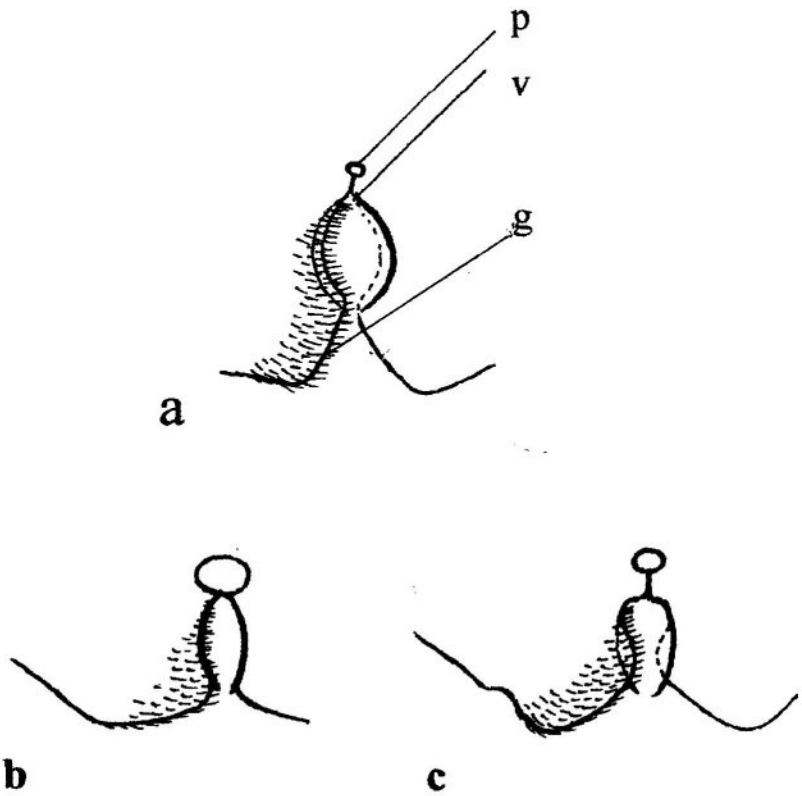

Fig. 1. Vaginal area of female genitalia (ventral views): a, *Brillia flavifrons* (after Oliver and Roussel 1983); b, *B. pudorosa* (after Cobo *et al.* 1995); c, *B. longifurca* (after Cobo *et al.* 1995).

With reference to Fig. 1, the differences between the female genitalia of the three species considered here are:

	p. the prevaginal indentation	v. anterior end of vaginal opening	g. posterior margins of ventrolateral lobes of gonapophysis VIII
B. flavifrons	small	narrowed to a point	at acute angle (<90°)
B. longifurca	intermediate	'shouldered' and truncate	at approx. right angle
B. pudorosa	large	narrowed to a point	at obtuse angle (>>90°)

Postscript

A comment by Edwards (1929, p. 310) calling *B. longifurca* 'A rather large species' raises the possibility that an indication of the species in hand might be gained from the wing length. Edwards did not give wing lengths for *B. longifurca* but a range of 3.4-4.4mm results from pupal exuviae in my collection using the conversion factor for pupal wing sheath length to adult wing length given in Langton (2002). Oliver and Roussel gave 2.22-3.25mm for *B. flavifrons*, i.e. generally lower values. *Brillia pudorosa* adults are brachypterous with wing lengths 0.9-1.23mm (Cobo *et al*. 1995). Two pupal exuviae in my collection from 100km west of the type locality of *B. pudorosa* in Galicia, Spain, convert to macropterous adult wing lengths of 2.9 and 3.1mm and one exuviae from the Sierra Nevada to 3.0mm. Thus, wing lengths of 3.4mm or above would indicate *B. longifurca* whereas smaller wing lengths would raise the possibility of the presence of *B. flavifrons* or *B. pudorosa.* It is the present author's hope that this contribution may stimulate a search for sympatric females of the *Brillia flavifrons* group!

Langton and Murray (2019) suggest a relationship between brachyptery in chironomids and a reduction in the length of leg setae based on brachypterous *Metriocnemus* species. The similarly reduced chaetotaxy of *B. pudorosa* (Cobo *et al*. 1995) gives support to that hypothesis.

Acknowledgements

I thank M. Spies and F. Cobo for their valued input to this paper.

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Dipterists Digest 2018 **25,** 188-192

The pupa of *Metriocnemus* (*Metriocnemus*) *ephemerus* Langton (Diptera, Chironomidae)

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Summary
The pupa of *Metriocnemus* (*M.*) *ephemerus* Langton, 2015, recently discovered, is described and comments are given on the distribution and habitat of this species. The pupa poses an interesting problem regarding eclosion. This is discussed and a novel adult structure is described.

Introduction

Metriocnemus (Metriocnemus) ephemerus was first described from Northern Ireland (Langton 2015), based on drowned adult male specimens, collected in February 2014 on the surface waters of a small tidal bay at the estuarine outflow of the R. Bann, Coleraine. The second record of this brachypterous species was reported by Murray (2017a, b) from specimens obtained on 28 August 2017 from a shallow pool inland of the sand dunes at Barrynagappul Beach at Dougort, Achill Island on the western Atlantic coast of the Republic of Ireland (latitude N54.01, longitude W9.99; Irish Grid reference F694088).

The collections at Achill included pharate adult males and females as well as pupal exuviae allowing description of the pupa, provided here, and of the adult female (in prep.).

Description of the pupa of *Metriocnemus* (*M.*) *ephemerus*

(Terminology is that of Langton 1991)

Total length 3.4-3.9mm (m=3.7mm, n=4). Colour: cephalothorax light brown, abdominal segments I-VIII colourless, except posterior transverse tooth rows set on a narrow pale brown stripe, anal segment pale brown.

Frontal apotome with hemispherical cephalic tubercles, frontal setae absent (Fig. 1a).

Thorax with a patch of weak granules anteriorly by suture and another small patch mid-laterally. Thoracic horn and thoracic setae absent. Posterior thoracic mound bulbous. Wing sheath length 0.68-0.92mm (0.83mm, n=5). Wing sheath length/total length = 0.20-0.24 (m=0.22, n=4). Wing sheath length/scutal length = 0.89-1.12 (m=1.02, n=4).

Abdomen. Tergites II-VIII with a posterior transverse row of flattened, apically pointed teeth (Fig 1b). Tergite II with 17-30 (m=23.6) well-developed teeth, III with 24-37 (m=31), IV, 18-35 (m=28.8), V, 24-34 (m=29.8), VI, 23-31 (m=28), VII, 22-30 (m=26), VIII, 18-20 (m=19.2) (n=5). Each tergite II-VII also with an anterior transverse band of small spinous points partly arranged in transverse rows. Paratergites and parasternites VII and VIII laterally with very small points, present to a variable degree and progressively reducing in extent on preceding segments. Between the anterior and posterior transverse bands, tergites covered with minuscule points that become slightly larger from segment II to VIII. Sternites unarmed. Dorsal and lateral setae absent or so small as to be undetected. Anal segment dorsally (Fig. 1c) with three narrowly separated patches of dense, strong points; patches occupying the anterior half of segment. Anal lobe length

240-272µm (m=256.8µm, n=5), macrosetae length 48-92µm (m=71µm, n=12), macrosetae length/anal lobe length 0.23-0.38 (m=0.3, n=5).

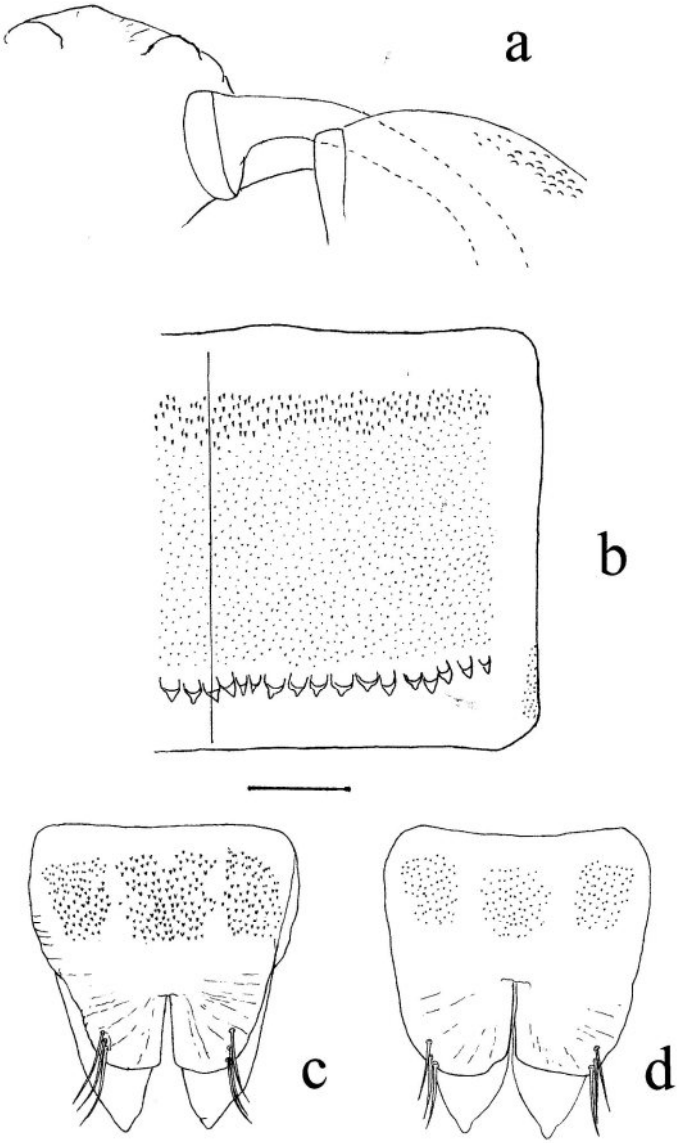

Fig. 1: a-c, *Metriocnemus ephemerus* pupal exuviae: a, frontal apotome and anterior thorax; b, abdominal segment V dorsal; c, anal segment dorsal; d, *M. tristellus,* anal segment dorsal. Scale line = 0.1mm for a, c and d, 0.07mm for b.

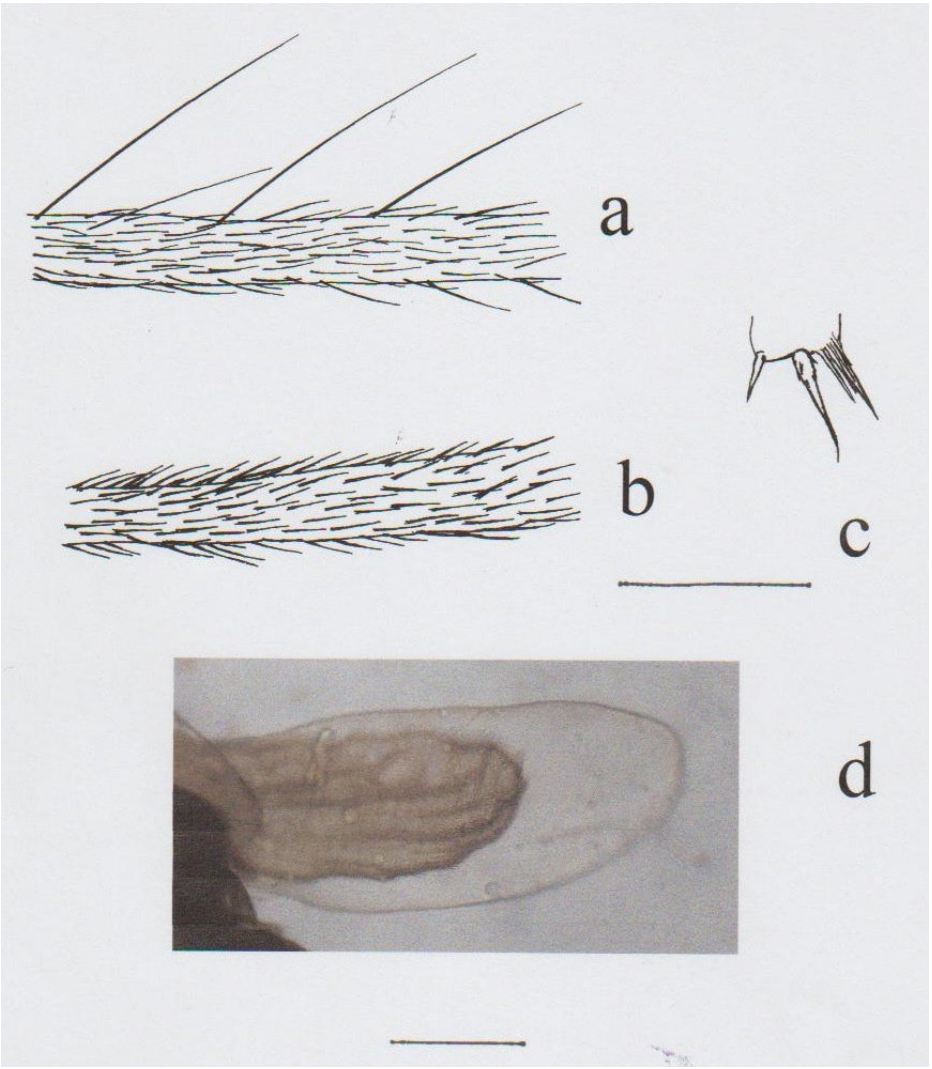

Fig. 2: a, *Metriocnemus tristellus*, chaetotaxy of mid hind tibia; b-d, *M. ephemerus*: b, chaetotaxy of mid and hind tibia; c, spurs of hind tibia; d, pharate wing in pupal wing sheath. Scale line = 0.1mm for a-c, 0.5mm for d.

Ecology and distribution

The shallow pool (20-30 cm deep at time of sampling), in which the immatures of *M.* (*M.*) *ephemerus* develop, and from which the specimens were collected at Achill, is situated on an undulating sandy plain, immediately inland of sand dunes at Ballynagoppul beach. The term *machair* (derived from a Gaelic word meaning "fertile plain") is applied to such coastal low-

lying, sandy, fertile grassland plains that form on calcareous sand (mostly fragmented calcareous shells) blown inland by prevailing winds from sandy beaches and dunes. They typically occur in geographic regions characterised by moist oceanic climates and persistent strong onshore winds. Machair plains are unique to parts of the Atlantic west and north coasts of Ireland and Scotland. They frequently contain pools and wet marshy areas sustained by freshwater percolating through the calcareous sand (Anon 2018) and they provide habitats for a mosaic of wet and dry grassland vegetation, birds and insects. These plains, of special scientific interest, are designated as priority habitats under the EU Habitats Directive (92/434/ENG).

Metriocnemus (*M.*) *ephemerus* is thus far known from Ireland only (Murray *et al*. 2018) but, given the distribution of machair plains along coastal regions of north and west Scotland, it would be reasonable to expect records of this species from similar habitats in Scotland.

Separation of pupal exuviae of *Metriocnemus ephemerus* from its congeners

Most details in the foregoing description also apply to the pupal exuviae of *Metriocnemus (M.) tristellus* Edwards, to which species the new one runs in the keys of Langton (1991) and Langton and Visser (2003). However, the strongly armed anal segment of *M. ephemerus* contrasts with the much more weakly armed anal segment of *M. tristellus* (Fig. 1d). The following couplets will serve to extend the key of Langton (1991) to include *M. ephemerus*:

170. Anal macrosetae about one third the length of the anal lobes. Tergites II-VIII with the flattened teeth of the posterior transverse rows conical in form …….. 170a
\- Anal macrosetae one seventh to one twelfth anal lobe length. Flattened teeth of the posterior transverse rows semicircularly rounded off at apex ……. 171

170a. Anal segment dorsally heavily armed with dense strong points medially and laterally. Wing sheath length/total length less than 0.25
…….…….. **Metriocnemus (Metriocnemus) ephemerus** Langton
\- Anal segment weakly armed. Wing sheath length/total length 0.25 or higher
…….…….. **Metriocnemus (Metriocnemus) tristellus** Edwards

Likewise the couplets at page 786a in Langton and Visser (2003) may be similarly extended.

Wing sheath length/wing length does not always = 1.9

Despite the adults of *M. ephemerus* being brachypterous, the ratios of wing sheath length to total length for the two above species is similar (0.20-0.24 for *M. ephemerus* and 0.25-0.31 (m=0.27, n=4) for *M. tristellus*. The wing of the pharate adult *M. ephemerus* does not fully occupy the wing sheath (Fig. 2d). Langton (1995) described how macropterous chironomids eclose, after the scutum splits along the mid dorsal longitudinal suture and flattens out on the water surface, by extending their wings, thus pushing the thorax away from the exuviae, and in turn drawing the legs out of the S-shaped leg sheaths. During the process the wings expand by a factor of about 1.9 (Langton 2002); the unexpanded wings are compacted within the wing sheath by means of fine transverse corrugations. Clearly the adults of *M. ephemerus* are unable to eclose using the expansion of their wings; thus their legs should remain entrapped within the S-shaped leg sheaths. However, two characters overlooked in the original description of *M. ephemerus* suggest an alternative form of eclosion in this species. In most species of *Metriocnemus* the adult legs are generally fine haired with some longer, more vertical 'beard hairs' interspersed (Fig. 2a). However, in *M. ephemerus* beard hairs are absent and the legs are densely covered with hairs relatively shorter and stronger than those of e.g. *M. tristellus* (Fig. 2b). Moreover, the uppermost seta of the hind tibial comb is larger than the others in other species of the genus, but in *M.*

ephemerus it is much enlarged and combines with the two spurs to form a three-pronged apex to the tibia (Fig. 2c). It seems likely that the *M. ephemerus* adult uses its legs, primarily the posterior ones, to push the body out of the exuviae on eclosion, ratcheting the legs up the leg sheaths using the dense covering of stiff setae to grip the sheath, perhaps by rocking from side to side, the three-pronged apex on the hind tibiae preventing the sheaths from slipping back. Once the hind legs are free the thorax can be pushed upwards and forwards away from the exuviae to free the anterior legs and wings (the leg sheaths once freed spring back to their previous S-shape). This would seem a plausible explanation, compatible with the modified chaetotaxy of the legs, but observation of enclosing specimens is needed to test the hypothesis.

According to Sæther (1989, 1995) there are two further *Metriocnemus* species with brachypterous adults, *M. longipennis* (Holmgren) and *M. sibiricus* (Lundström). The legs are short-spined in both these species, too, which would appear to endorse the hypothesis that the constraints on eclosion imposed by the short wings necessitate this adaptation of chaetotaxy.

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Dipterists Digest 2018 **25,** 193-197

Leopoldius calceatus (Rondani) (Diptera, Conopidae) new to Britain

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Summary
The rarely seen European conopid fly *Leopoldius calceatus* (Rondani, 1857) is recorded as new to the British Isles from a photograph of a specimen taken in a moth-trap at a site near Ipswich, in Suffolk, SE England. The specimen is considered most likely to be adventitious, having probably arrived by artificial means, although the species could possibly be a recent colonist. It is not considered likely to be an overlooked native, although that is also a possibility. Identification features are given, and the known biology and distribution is summarised.

Introduction

The genus *Leopoldius* is confined to the Palaearctic region (including the Sino-Japanese sub-region) and currently comprises nine valid species (Stuke 2017). Two species are currently recorded from Britain, *L. signatus* (Wiedemann, 1824) and *L. brevirostris* (Germar, 1827). The near continent supports a further four widely distributed species. Very little is known about the biology of the genus and host data is available for only three of the species, namely *L. signatus*, and the non-British *L. diadematus* Rondani, 1845 and *L. coronatus* (Rondani, 1857), all of which have been associated with species of *Vespula* and, in the latter case, somewhat doubtfully also *Polistes gallicus* Linnaeus, 1761 (Hymenoptera: Vespidae). Both of the British species are recorded with some frequency in moth-traps operated at night (CRS, unpublished data), possibly indicating some crepuscular or nocturnal activity.

Leopoldius coronatus is a very widespread and relatively common species in Europe, occurring throughout France, Germany and the Netherlands (Stuke 2017), and has been anticipated as a possible addition to the British fauna for some time, although without any evidence to date. *Leopoldius calceatus* (Rondani, 1857), by contrast, is a rather rare species confined mainly to central, eastern and southern Europe. Nevertheless, on 5 October 2018 it was a specimen of this latter species that was caught by DB and colleagues at a moth-trap on Purdis Heath, near Ipswich, in Suffolk (TM210427). The specimen, apparently a female, was photographed but unfortunately not retained, and the photographs posted on the Facebook 'Conopids' page. These were, however, sufficient to allow a positive identification, initially by John Smit of EIS Kenniscentrum Insecten, Leiden, and subsequently by DKC through comparison with unpublished reference photographs. Photographs of the Ipswich specimen are reproduced at Plate 1. Subsequent surveys in the days immediately following the identification of the *calceatus* specimen did not yield any further examples, although a male believed to be of *signatus* was also obtained in a moth-trap at the same location on 12 October 2018.

Capture details

The moth-trap, comprising a choke-regulated 125W mercury vapour bulb suspended from a tripod over a sheet, was operated in an area of secondary oak/sycamore/birch woodland at the perimeter of Purdis Heath between about 19.15 to 23.00hrs. Purdis Heath lies at the semi-rural edge of the town of Ipswich, about 4.5km south-east from the town centre. The woodland surrounds the main area of the heath, which is a Site of Special Scientific Interest (part of the Ipswich Heaths SSSI). The Martlesham and Purdis Heaths form the most southerly reach of the

once-extensive Suffolk 'sandlings' heaths (Natural England 1988), lying on an arm of light, sandy, acidic soils which extend south-west from Southwold to the north, and which here comprises a mosaic of heathland, acid grassland, deciduous woodland, scrub and some wetland habitats, together with domestic housing and gardens. Immediately to the north lies Ipswich Golf Club, with its large areas of semi-improved acid-neutral grassland together with some wetland areas and lakes associated with the nearby Mill River. There was some substantial flowering ivy (*Hedera helix*) near to the trapping location (q.v. below).

The night of 5 October 2018 was dry, somewhat cloudy and reasonably mild (10-12ºC), with light SSW-SW winds of about 6mph, following what had been a fairly hot, calm day for the time of year (15-20ºC; wind 6mph, SSW). Sunset was at 18.23 (Timeanddate.com 2018). There was a steady influx of moths in the early part of the evening, which slowed as it turned colder at around 22.00. The *calceatus* specimen appeared at 19.53 and spent some time walking over the trapping sheet. It was photographed, and then later departed of its own accord.

Weather conditions in September and October in eastern England (Ipswich area) were marked by relatively warm, dry and calm conditions (Timeanddate.com 2018). Storms affecting Britain in the early part of September were south-westerly or westerly in origin, whilst conditions in the 2-3 weeks before 5 October were dominated by mainly southerly to westerly winds which seldom exceeded about 20mph and were typically below 15mph – i.e. not conditions likely to cause insects to be blown in from the continent. Data from the 'Flight Arrivals' moth-migration database (Atropos 2018) do not indicate any marked influxes of migrants in eastern England in the preceding 4-5 weeks, and the regular Suffolk moth-trapping community reported immigrant moth activity rising and peaking locally around 10 to 14 October 2018, i.e. after the date when the *calceatus* appeared (Suffolk Moths Blog 2018; Sherman *pers. comm.*).

Identification

The genus *Leopoldius* lies in the Conopinae and is superficially very similar to *Conops*. It is, however, readily recognised by the complete absence of an elongated and sclerotised proboscis, having only a very short, soft proboscis which is often concealed within the oral cavity. Adults of the European species can be identified using the online key provided by van Veen (2004), although Stuke *et al*. (2014) warn that males of the central European 'black and yellow' species cannot be reliably identified at present and that females should be identified by reference to the shape of the ventral theca on sternite 5. The thecae of all of the western European species are illustrated in the key of Bree *et al*. (2014).

At least five rather similar-looking species occur in Europe, all of which are essentially 'black and yellow' in appearance, with areas of bright yellow integument on the abdomen and thorax, and wings which are hyaline or at most only slightly infuscated yellowish. *L. calceatus*, by contrast, is a rather darker, primarily blackish species with less extensive dusky yellow markings, at least on the abdomen, which are typically concealed under yellowish dust (see Plate 1). More significantly, the wing has a strong blackish or dark brownish band along the anterior edge which extends over about ⅓ to ½ of the anterior-posterior width of the wing. Other diagnostic features include black front coxae (usually all of the coxae are black) and a black theca. These features are typically all yellow in the other species. The frons is mainly yellow with a triangular black spot above the antenna bases, in contrast to the all or mainly black frons which typically occurs in the two previously known British species.

In photographs, *L. calceatus* can appear superficially similar to *Conops strigatus* Wiedemann, 1824, especially when the long blackish, sclerotised proboscis of the latter is not visible. It is, however, usually possible to see at least the characteristic small blackish spots on the upper frontal orbits, adjacent to the eye, in photographs of the latter.

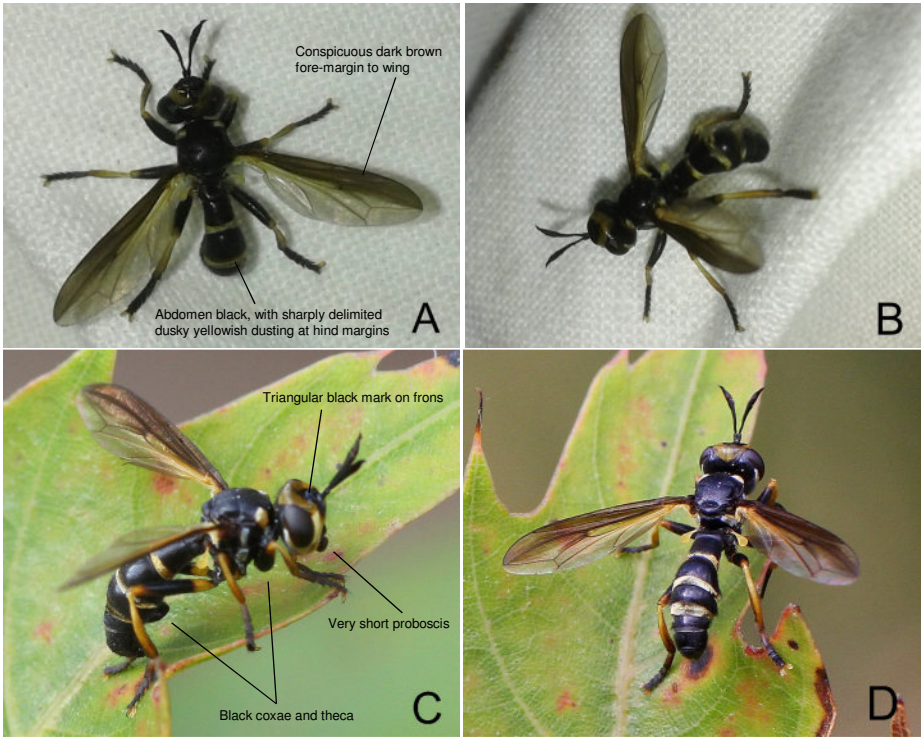

Plate 1. ***Leopoldius calceatus*****, Ipswich specimen: A, dorsal view; B, oblique view. C-D, reference images of a female specimen from Eindhoven, Netherlands: C, side view; D, oblique view.**

Distribution and biology

Leopoldius calceatus is currently recorded from Austria, Belgium, the Czech Republic, France, Germany, Hungary, Italy, the Netherlands, Poland and Tunisia (Stuke 2017; Smit *et al*. 2016). There is limited information available concerning its habitat preferences or biology, and the host is unknown. The flight period appears to be autumnal, i.e. September to October (Chvála 1961; Mei 2000), although an uncharacteristically early (and possibly erroneous) date of June was given by Duda (1940). Mei (2000) reported catching males on flowering ivy in October in an urban park, and Bree *et al.* (2014) referred to its occurrence in gardens and at forest edges in Germany, whilst citing a record of a mating pair in Belgium during October. Stuke (2008) reported a specimen from a submontane region of the Italian Alps, also in October, whilst Mielczarek (2014) recorded specimens in September and October in a cemetery near Krakow, in Poland. Lair and Livory (2009) recorded a single female in '*bocage*' countryside (i.e. a mosaic of hedged pastures and woodland) in France in September, whilst Rondani (1857) originally described the species from a female taken at the beginning of September in Parma, Italy, on the flowers of a wild mint (*Mentha* sp.). Smit *et al*. (2016) recently reported two specimens from forest edge and heathland habitats in the Netherlands, both in October, and speculated that the late flight period might indicate parasitism of late-season workers or possibly queens of *Vespula* species.

Likely origin

It seems unlikely that such a conspicuous insect could remain undetected in Britain until now, although perhaps not impossible: it does fly very late in the season and is evidently a rare species which tends to occur at very low densities, with records from elsewhere in Europe mostly comprising singletons or very low numbers only (Stuke *pers. comm.*). On the other hand, the international ports of Harwich and Felixstowe lie only 10km or so to the south-east, much of the traffic from which uses transport routes which pass within just a couple of kilometres of the site. It is therefore tempting to imagine the specimen arriving as a stowaway on a vehicle or in freight from these sources. The closest point on the nearby continent itself is at Calais (130km) whilst the nearest parts of Belgium and the Netherlands lie at about 150km and 165km respectively. Colonisation by natural means is not impossible at these distances – c.f. the similar-sized hoverfly *Episyrphus balteatus* (De Geer, 1776) which migrates annually to Britain from the continent – and the colonisation of Britain by European species in recent decades as a result of climate change is now a well-established phenomenon (see e.g. Hulme 2016). It is worth noting that the specimen was recorded in habitat circumstances not unlike those reported elsewhere in Europe, suggesting that local establishment is a possibility, assuming that a suitable host is present.

Acknowledgments

We thank Jens-Hermann Stuke (Leer, Germany) and John Smit (Leiden, Netherlands) for reading and commenting on the manuscript, and the latter for making the initial identification. Ruut Aussems (Netherlands) very kindly supplied the reference images, and Mark Tunmore (Helston, U.K.) and Neil Sherman (Ipswich, U.K.) provided helpful comments on the moth migration pattern at the site.

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Sciara militaris Nowicki (Diptera, Sciaridae), another Scottish record

– Following the first report for the British Isles of *Sciara militaris* Nowicki (Craik, J.C.A., Wormell, P., Smith, J.E. and Menzel, F. 2005. Long columns of "army worms" in west Scotland – the first record of *Sciara militaris* Nowicki (Diptera, Sciaridae) in the British Isles. *Dipterists Digest* (*Second Series*) **12,** 21-27), and a second Scottish population recorded (Maddison, L.M. and Hancock, E.G. 2011. Another record of *Sciara militaris* Nowicki (Diptera, Sciaridae) from Scotland. *Dipterists Digest* (*Second Series*) **18,** 53-54), a further observation has been made of this interesting insect in the west of Scotland.

Figs 1-2. Army worms in a garden near Strathaven, South Lanarkshire, 2 July 2018.

A friend and neighbour sent a photograph (Figs 1-2) taken on 2 July 2018 of the unmistakeable trail of the army worm larvae, on their land about 3km west of Strathaven (NS6745), South Lanarkshire.

The larval mass was about 2m in length and disappeared into loose soil, from which a sample was taken but no adults emerged. The land is little more than 1km from extensive alien conifer plantations over moorland in which some clear felling to make spaces for the large Whitelee windfarm occurred recently. Public access has been widened to the area along the forest roads from a visitor centre and other access points. The association with commercial forestry has been a common factor for *S. militaris* in Britain. The low number of reports of the army worm by the general public may be due to the brief time during which they undergo their mass movement, which for any one particular congregation may be just a matter of a few hours at the most. If these occur amongst dense tree cover with fallen branches or the trimmings of brash the larval gatherings would not be visible to dog walkers, joggers and passing cyclists. Any ambition to locate and monitor army worm movements would need a considerable amount of luck to be in the right place at the right time. Alison and Mike Woodcock are thanked for sending photographs and allowing any reproduction **– E. GEOFFREY HANCOCK**, Hunterian Museum, University of Glasgow, Glasgow, G12 8QQ, Scotland

Dipterists Digest 2018 **25,** 199-200

A handful of Andorran syrphid records, including *Chrysotoxum tomentosum* Giglio-Tos (Diptera, Syrphidae)

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Summary
Five syrphid species are recorded from Andorra for the first time, including *Chrysotoxum tomentosum* Giglio-Tos, 1890, which has not previously been reported west of the Alps.

Introduction

Whilst searching through the syrphid collections of the Geneva Museum (Museum d'Histoire Naturelle de Genève: MHNG), I came across specimens of a few species collected in Andorra by Henri Dirickx, who worked in the museum until recently. The species involved include five not previously recorded from Andorra (Carles-Tolrá 2006; Marcos-García *et al.* 2002; van Steenis *et al.* 2016), one of which has not been found in the Pyrenees until now. This note details the records of these six species. All were identified by the author and collected by Henri Dirickx.

Chrysotoxum festivum (Linnaeus, 1758)
Encamp, 21 July 1990, female, 1840m.

Chrysotoxum gracile Becker, 1921
Cortals d'Encamp, 21 July 1972, female, 1920m; La Massana, 26 June 1981, male, 1320m.

Chrysotoxum tomentosum Giglio-Tos, 1890
Cortals d'Encamp, 21 July 1972, 2 males, 1 female, 1920m.

Eristalis jugorum Egger, 1858
Ransol, 22 July 1990, male, 1800m.

Orthonevra nobilis (Fallén, 1817)
Canolic, 20 July 1982, male, 1600m.

Comment

The three *Chrysotoxum* species were all standing in the MHNG collections under the name *C. festivum*. They can be separated using the keys in Speight and Sarthou (2017). *Chrysotoxum festivum* is widely distributed from Scandinavia to the Mediterranean; *C. gracile* is more restricted to the Mediterranean zone, but has also been found at high altitudes, including in the Pyrenees (Speight *et al.* 2018). *Chrysotoxum tomentosum* was reinstated as a species distinct from *C. festivum* only recently (Nedeljković *et al.* 2013) and, until now, has been known only from the Alps and the Balkans. It is a species of subalpine grassland, not much recorded below 2000m.

The other species, *Eristalis jugorum* and *Orthonevra nobilis,* have been known from various parts of the Pyrenees previously. *Eristalis jugorum* occurs in montane forest in the Alps and the Pyrenees. The northern limits of its range are the Ardennes (Belgium) and Poland. *Orthonevra nobilis* is known from Scandinavia to the Mediterranean and from Portugal to China.

The previous paragraph indicates that the syrphids recorded here from Andorra include both well-known and widespread European species and others that are more localised, one of them not previously known further west in Europe than the Alps. With them included, the Andorran syrphid fauna totals 93 species. Of the two French departments which share the frontier between France and Andorra, Ariège has 73 recorded syrphid species and the Pyrenées-Orientales has 314 – the syrphids of different parts of the Pyrenees remain quite unevenly known. This handful of records also illustrates advances made in syrphid identification: in the period 1980/90, when the insects were collected, two of the species would not have been identifiable as distinct using the literature then available.

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Dipterists Digest 2018 **25,** 201-218

James Edward Collin (1876–1968) – his life, his achievements, his legacy To commemorate the 50th anniversary of his death

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Summary
A brief account of the life and dipterological work of J.E. Collin is given.

Fig. 1. James Edward Collin, as President of the Royal Entomological Society of London, 1927.

Introduction

Collin (Fig. 1) was a towering figure in British dipterology, and probably the most significant British dipterist of the 20th century. Even today, fifty years after his death, we are still in the shadow of his work and his legacy lives on.

Every British dipterist must be familiar with his work, whether it be his monumental book on British Empididae or his many other publications on the British Brachycera and Cyclorrhapha. But who was Collin and what sort of man was he? In this brief account, which is a slightly modified version of a talk given at the annual meeting of the Dipterists Forum on 10 November 2018, I shall give some information on these aspects as well as discuss briefly his dipterological work and his legacy.

The biography

James Edward Collin was born on 16 March 1876 and was the third of four sons and six daughters of Philip James Danby Collin (1846–1926) and Alice Bertha Collin (née Clark) (Fig. 2). Philip Collin was a farmer and the family lived at Prospect Villa (Fig. 3) in the small Cambridgeshire village of Kirtling, some five miles south-east of Newmarket. In the 1881 census, the occupants of Prospect Villa are listed as Philip (aged 35, a Malster employing two men), Alice (aged 29), George and John (aged 8 and 6, both scholars), James (aged 5), three daughters (Alice, Edith, Grace), a domestic servant, a domestic housemaid and a domestic cook.

Fig. 2. Philip Danby Collin with his family, around 1890; James Collin is at the back on the left, with his hand on his father's shoulder; Philip's mother Mary (née Danby) is seated.

Malster was a variant spelling of maltster, a manufacturer of malt from barley, so was often an additional occupation of cereal farmers. In 1871 Philip was listed as a farmer and malster employing 25 men. In 1851, his father George Pettett Collin (1810–1874) was at Parsonage Farm, Kirtling, a farmer of 650 acres, employing 30 men and 14 boys, 2 woodmen and 1 man occupied as a malster.

On his mother's side, Collin came from a horse racing fraternity. His grandmother was Sophie Clark, wife of John Francis Clark who was a successful architect and race-course judge. Of Clark's three daughters, one was the wife of Philip Collin, one married a Robinson (another family with racing connections which included one of the owners of Gatwick race-course), whilst the third sister Agnes married George Henry Verrall (1848–1911), who was thus Collin's uncle through marriage.

Much of the family's money came from John Francis Clark who left over £60,000 when he died in 1898. This would be approximately £5 million today. George Verrall left a similar amount in 1911. This had enabled the Collin sons to receive a private education and also allowed the daughters a degree of independence in their lives. Of James Collin's brothers, one became a local builder; one was a chemist and founded a pharmacy in Norwich, still known as Collin's though no longer in the family; one was killed in the First World War. His six sisters remained unmarried: one was a nurse and died tragically in a fire; one was a matron at Radley College, a well-known Oxfordshire school; another was an artist and a teacher of art; whilst the others in the middle of the twentieth century still lived and farmed at Prospect Villa. The artistic gene is clearly seen in Collin's own scientific illustrations, which are beautifully executed. His daughter Freda went to the Slade and became a recognised artist. One granddaughter is Marcia Pointon, Professor Emerita in the History of Art, University of Manchester, and Research Fellow of the Courtauld Institute of Art, and a great-grand-niece is Alison Plumridge, Director of the Smiths Row Gallery at Bury St Edmunds.

Fig. 3. Prospect Villa, as it is now.

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Figs 4–6. 4, Collin in his World War 1 uniform; 5, Collin, probably in the 1920s; 6, "Raylands", Newmarket.

The Verralls were also an eminent racing family, based for many generations at Lewes in Sussex. When in 1879 Verrall married Sophia Agnes Clark he was also furthering his business interests, and he then moved to Newmarket where he built himself the house known as Sussex Lodge. By all accounts his marriage was not a happy one and there were no children. In 1893 or 1894, at the age of 17 or 18, his nephew James became Verrall's private secretary and assistant and then followed a seamless progression from assistant to co-worker to heir to successor. When Gatwick Racecourse was founded, Verrall was one of the five principal shareholders, and Collin inherited his shares. Although not personally interested in horse racing (apparently he never attended a race) he maintained his business interest until 1956 when the Gatwick estate was sold to the Ministry of Aviation

In 1900, whilst Collin was working for Verrall but still living with his family at Kirtling, he received the following letter from his aunt Agnes Verrall, dated 8 December:

"Dear Jim
We are sorry to hear you have a bad cold, and hope that by keeping in bed today you will be well enough to dine with us tomorrow at one o'clock. Is there anything I can get for your eating, drinking or what I believe are called 'medical comforts', or any books you would like to read. I have some good chicken broth if you can fancy it. Hoping you will soon be on your feet again, I remain dear Jim your affectionate Aunt Agnes Verrall."

In 1905 Collin married Edith Rogers, the daughter of a local pharmacist. She was a direct descendant of John Rogers, an English clergyman, Bible translator and commentator who guided the development of the Matthew Bible in vernacular English during the reign of Henry VIII. He was the first Protestant martyr to be burned at the stake in the reign of Queen Mary, on 4 February 1555, at Smithfield in London. They lived at Sussex Lodge until 1908, when they moved to "Raylands" in Rays Lane, Newmarket (Fig. 6), which Verrall had built for them. The Collins had a daughter, Freda, and two sons, James (always known as David) and Peter, all born before the outbreak of World War 1.

During the First World War, Collin served in the army and rose to the rank of Captain (Fig. 4). But it is thought that he was in the Medical Corps, carrying out research on insect-borne diseases, and was therefore spared the horrors of front-line service. After the war he was able to devote himself to the collection and study of flies, but during his long life in Newmarket (Fig. 5), he also took an active interest in local affairs. He was a member of the Urban District Council, Chairman of the Newmarket Bench of Magistrates for about ten years, and served on the Board of Guardians and as a Commissioner of Income Tax. He was a lifelong supporter of the Conservative Party and served the Newmarket Conservative Club for over 60 years

Edith Collin died in 1958 and, now aged 82, Collin (Fig. 7) continued to live in "Raylands" alone, although a housekeeper came in every day to help him. His work and his collection, housed on the top floor of his house, must have been a great consolation for him. In 1967, he became ill and following an operation went to live with his daughter in Richmond. He died in Richmond Hospital on 16 June 1968.

Throughout his long life, Collin kept up a voluminous correspondence and the Archive at the Oxford University Museum of Natural History (OUMNH) has letters from almost every dipterist of the 20th century, from Theodor Becker and the Abbé Parent through to Peter Dyte and Michael Ackland. When he received a letter, he would write notes or a draft reply in the margins of the letter, or on the back, and then type up the final version on his Yost typewriter (Fig. 8). In general, he was always helpful although he never shirked giving a scolding to anyone whom he thought was publishing careless or premature results. He was invariably hospitable to overseas visitors who wished to visit him and see his Collection. However, the American dipterist

Charles Townsend wrote how disappointed he was to have missed Collin and thanked his wife for showing him where the collection was kept. But knowing Townsend's combative and irascible temperament, it seems most likely that Collin had deliberately gone off for the day in order to avoid him. Milan Chvála in Prague still remembers the day in 1964 when, as a young postgraduate at the International Congress of Entomology in London, he and Gunter Morge from East Berlin were able to visit Newmarket, where Collin collected them in his car and entertained them at "Raylands" for the day.

Fig. 7. Collin in 1962, at Ringmere, Norfolk.

He could also be acerbic at times. He never got on with the dipterist Harold Oldroyd (1914–1978) at the British Museum of Natural History (BMNH), and they crossed swords several times in correspondence and in print. Collin had the nineteenth century attitude that the study of insects was a gentlemanly pursuit carried out as a hobby. In the early days, he had told Oldroyd that he did not think that studying insects was a reputable way to make a living, to which Oldroyd, a blunt Yorkshireman, replied that he did not think that horse racing was a reputable way to make a living. Right up to the end, in 1964, they were sparring over Tabanidae. Oldroyd wrote on 22 December 1964: "I was amused that in this correspondence you accuse both Lyneborg and myself of impatience and haste, but you know we can't all mull things over for fifty or sixty years and then say 'it must be left to someone else to complete this work'." Collin's reply at the age of 88 includes: "There is no further need to continue this correspondence. You asked for my comments on your draft "Note" and I have given them, if they are not to your liking you can ignore them. … If you cannot now see, you will never see, that my comments were intended to be helpful to you, and [deleted] there is no need for you to get 'nasty' about them". He also crossed swords on many occasions in print with E. Rivenhall Goffe (1887–1952) about the Syrphidae. For example, in 1933: "Mr Goffe, like so many other novices at systematic Entomology, appears to think that any 'change' must necessarily mean 'progress'; when he has had more experience he will find that there can be no greater stumbling-block to progress than such changes as he now supports." Yet for all that, the two had a very warm personal relationship.

Fig 8. Collin's Yost typewriter; note the separate keyboards for capitals and lowercase letters.

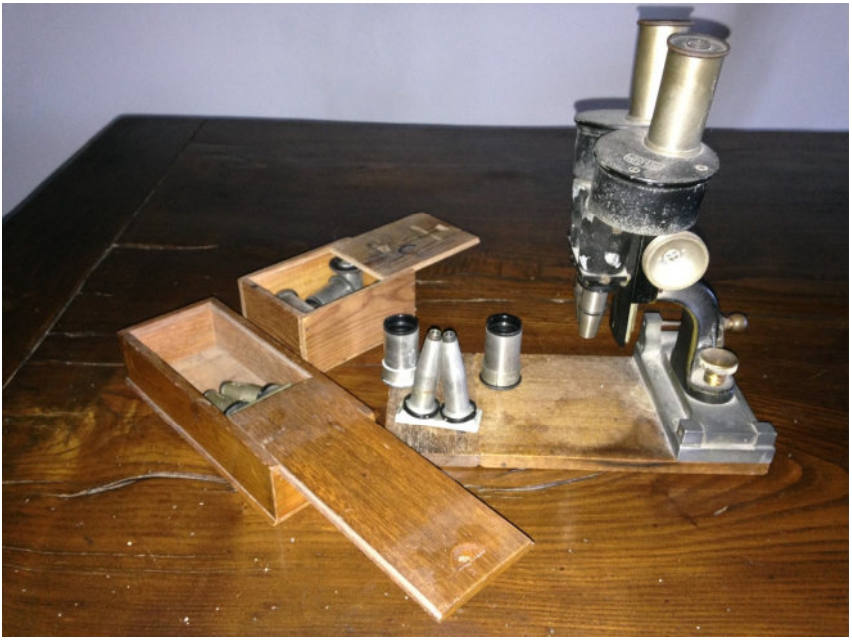

Fig. 9. Collin's Zeiss microscope.

Fig. 10. E.C.M. d'Assis-Fonseca, a self-portrait.

He had a particularly warm relationship with the French dolichopodid specialist the Abbé Octave Parent (1882–1942), who often wrote to him as "cher Monsieur et ami". Parent wrote in 1915 how he had lost his library, notes and collection during the month-long wartime bombardment of Arras. In 1919, he commiserated with Collin who was visiting the Arras war graves and regretted that he himself could not be there to meet the Collin family. And much later in life Collin had a close friendship with E.C.M. d'Assis-Fonseca (1899–1993) (Fig. 10), with whom he went on several collecting trips. It was Fonseca who typed out the manuscript of the British Empididae monograph and prepared the index. In the OUMNH there is a letter from Fonseca in August 1967, ten months before Collin's death, asking if it would be convenient to visit him at his daughter's house in Richmond, where in the margin Collin has written a quavering and poignant "yes".

Collin was devoted to his family, but as a characteristic product of his era and class he fell out quite radically with his son David, who was a conscientious objector in World War 2 and also married a girl who had strong left-wing opinions and who came from a working-class background. But this was eventually accepted. Life with him must have been difficult at times. Here is a rather sad letter from Edith Rogers to Collin, probably written during their courtship:

"Dear Jim,
I do not know if you are cross or not but I don't think you ought to be as if you will only put yourself in my place you must see that I am quite right. I am writing this as I find in speaking I am liable to say things more or less disagreeable which I did not intend to say. Everything has not gone quite right today so I am going to practise the violin. Edith."

Otherwise his family remember him as a somewhat austere, stern but kindly paterfamilias, spending every moment he could with "grandpa's flies" as they were called. His granddaughter Marcia Pointon remembers spending annual half-term holidays at "Raylands". Collin was always very kind to the grandchildren and let them run wild around the grounds of the house. He would willingly show them his collection, and she remembers particularly the carpet of dust around the cabinets as housemaids were never allowed into the attic where the collection was kept. Collin always had porridge for breakfast, and used to chant "steam, porridge" to speed up the cooking process. Meals were eaten in silence. "Every time you speak you miss a mouthful," he would say. Out in the field he told the grandchildren that there was a magic way to persuade flies to come out of crusted cow pats where they lived if you tapped on them, and with this priceless information they would entertain their friends on the route to school across the fields in Yorkshire. They rarely saw their grandmother Edith, who at that time never left her bedroom. She suffered from colitis, but the grandchildren could visit her one at a time, to eat toast and receive some pocket money.

Fig. 11. Collin driving, with Verrall as his passenger and Agnes Verrall in the back seat.

Collin liked his cars (Fig. 11). He travelled to London to buy his first car and drove it back to Newmarket without having had a lesson or a test. Perhaps it is the one in Fig. 11. In fact, he never took a driving test. Marcia Pointon remembers:

"When we stayed, if we were lucky, JEC would drive us over to Kirtling in the Jaguar. We sat in the back, my mother in the front. She was absolutely terrified but we thought it was great. He drove very fast along the long straight road that is still full of switchbacks, and his speed was such that we little ones in the back shrieked with excitement as we were thrown in the air – no seat belts then. The aunties made us tea and treated Jim (as they called him) as a little brother which amazed us who saw him as very old and a little frightening."

The Dipterology

The bases for Collin's expertise in the Diptera were of course his collection and his library, which he inherited from his uncle George Verrall, but all his life he continued to expand both assets. He was an outstanding and enthusiastic field worker and collected frequently throughout Great Britain (Fig. 12), often in the company of fellow enthusiasts such as J.W. Yerbury (1847–1927), C.J. Wainwright (1867–1949) and E.C.M. d'Assis-Fonseca, and being of independent means was able to collect when and where he wished. It is clear from collecting dates on specimens in his collection that if he found a particularly interesting species on one day he would return on the next day and the next to secure more specimens. As he was so frequently consulted over matters of identification, he was also able to improve and expand his collection by the retention of specimens or through exchanges.

Fig 12. Collin (second from left) with (from left to right), Charles N. Colyer, Len Parmenter and Cyril O. Hammond.

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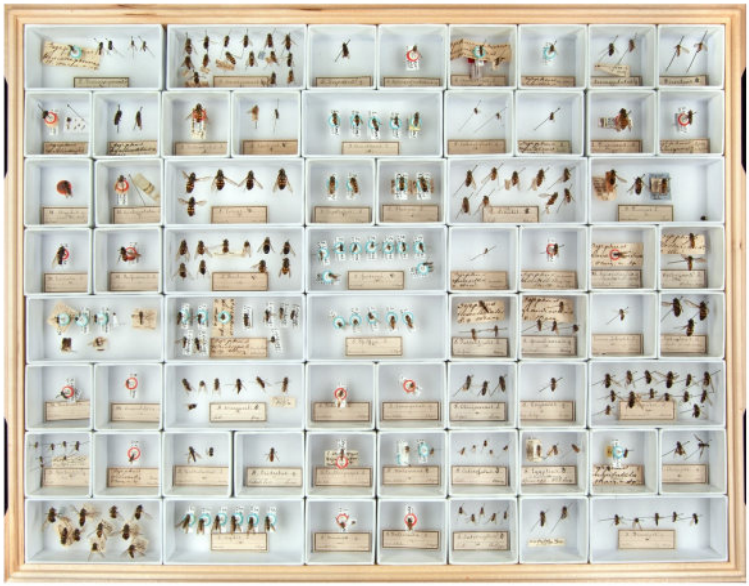

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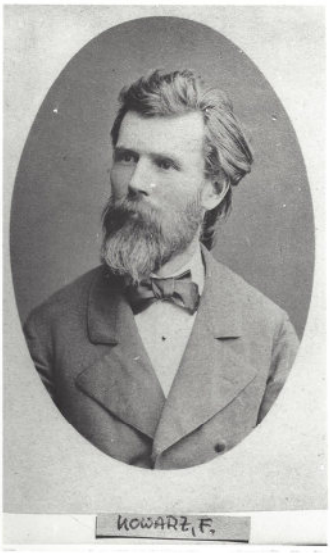
Figs 13–14. 13, Jean-Marie-Frangile Bigot; 14, A drawer from Bigot's Exotic Diptera collection.



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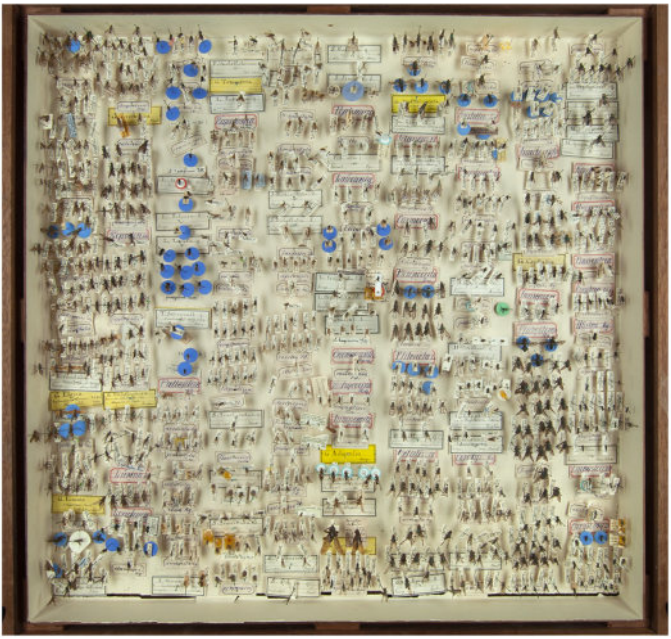

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Figs 15–16. 15, Ferdinand Kowarz; 16, a drawer from the Verrall-Collin Palaearctic Diptera collection, an amalgamation of the Kowarz Diptera collection and Bigot's European Diptera.

Apart from building up what is surely still the finest private collection of British Diptera, he was also the owner, or perhaps one should say custodian, of two important collections from Europe. One, formed by the French dipterist Jean-Marie-Frangile Bigot (1818–1893) (Fig. 13), contains an enormous number of types of species described by Bigot himself and also of species described by Pierre-Justin-Marie Macquart (1778–1855) from Bigot's collection. These are mostly "exotic" i.e. extra-European species and consequently the collection is of international importance. It came on the market after Bigot's death in 1893 and Verrall, tipped off by fellow dipterist Baron Osten Sacken, rushed over to Paris and bought the entire collection (Fig. 14).

The second collection is that of the Czech dipterist Ferdinand Kowarz (1838–1914) (Fig. 15). Verrall had purchased a number of specimens from Kowarz in 1882, but eventually visited him in the Bohemian spa town of Franzensbad and purchased his entire collection in 1888–1889. This again is a collection of international importance as it contains types of some of the European species described by Hermann Loew (1807–1878) and Camillo Rondani (1807–1879), in addition to the species described by Kowarz himself (Fig. 16).

When Verrall died in 1911, Collin presented a selection of specimens from his collection to the BMNH. But, despite his friendship with Frederick Edwards (1888–1940) and Fritz van Emden (1898–1958) at the BMNH, his antipathy towards the 9-to-5 post-1945 staff led to his eventual decision to leave his collection to the OUMNH. The British Collection consists of three parts. The Main Collection (Fig. 17) in 90 cabinet drawers is Collin's reference and working collection, and under each species are ideally six males and six females. The representation of British Diptera was, and probably still is, astonishingly complete, and it is the collection most frequently consulted. In addition, there are two Duplicate Collections in 115 cabinet drawers (Fig. 18), one being mostly Verrall's duplicates and the other Collin's. Whilst some are arranged discretely under families, many drawers are rather mixed. In all these collections, the congestion should be noted. All the specimens are on short pins and are impaled through card discs with locality data on the underside.

Between 1899, when his first note (on a cecidomyiid gall) was published, and a posthumous paper in 1969, on Empididae from the Alps, Collin authored almost 220 dipterological papers and books, ranging from short faunistic notes to major revisions (Smith, Cogan and Pont 1969). He described 38 new genus-group taxa and 791 species-group taxa of which 501 species or 63.3% were described in the Empididae *sensu lato*. The other taxa are spread right through the Aschiza, Acalyptrata and Calyptrata, except for the Tachinidae from which he described no new taxa. His major publications were on the Empididae, in particular "New Zealand Empididae", 110 pages (Collin 1928); his chapter on Empididae in the series "The Diptera of Patagonia and South Chile", 334 pages (Collin 1933); "British Flies: Empididae", 782 pages (Collin 1961). Collin worked with a Zeiss binocular microscope (Fig. 9). All the technical drawings of body parts and male terminalia were done by him, and it was only for whole insect drawings that professional artists such as A.J.E. Terzi and Arthur Smith were employed. The dissections that he made, and there are thousands, are mounted in Canada balsam on small celluloid strips.

In addition to building up his collection, Collin also kept his dipterological library up-to-date. He acquired every book and monograph published on Diptera, and also received an enormous number of reprints. Because of his Olympian status, everyone who was publishing on Diptera would send him reprints of their papers. In the late 1950s, he was in correspondence with the American entomologist Elwood C. Zimmerman (1912–2004), author of several volumes in the "Fauna of Hawaii" series. Zimmerman spent many months based at the BMNH, and indeed considered retiring to England, and after correspondence with and visits to Collin made an offer to purchase the entire library. In a letter dated 10 February 1959, he wrote to "My dear Mr Collin":

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Figs 17–18. 17, a drawer from the Verrall-Collin Main British collection; 18, a drawer from the Verrall-Collin Duplicate British collection.

"You may count on us to keep all details of the transaction completely confidential. We have not mentioned to anyone that we were even interested in your library or had viewed it. We have considered that to be your wish from the earliest part of our discussions, and we shall honour your desires in this regard."

Indeed, I can remember Zimmerman on his many visits to the BMNH in the 1960s, and there was never the slightest whisper that he had purchased Collin's library. The purchase was completed in 1959, and documents from Ennions, solicitors in Newmarket, record the receipt of a draft from Zimmerman for £2500 for the purchase of the library. Zimmerman subsequently sold the major part of the library, the books and serials, to the National Australian Library in Canberra. What he kept ended up in the Entomology Library of the Commonwealth Scientific and Industrial Research Organisation in Canberra. Dr F.C. Thompson, to whom I am indebted for this information, obtained what he calls "the dregs", namely 24 boxes of reprints – quite an acquisition – which are now in his personal library in Ponte Vedra, Florida, USA.

The legacy

This is not the place to offer a critical assessment of Collin's work, nor am I qualified to do so. But however "old fashioned" some of his papers may appear today, it must be remembered that he was of his time, that some of his work was indeed ahead of its time, and that he was respected, almost revered, by his contemporaries at home and abroad for his wide-ranging and profound expertise. Indeed, in commenting on his work on the Empididae, a European colleague wrote quite simply: "Collin was a genius." Another colleague wrote: "He did not do much with Syrphidae but the few things he did were small masterpieces, way ahead of their time."

His attitude towards systematics was essentially a practical and pragmatic one. He had strong views on nomenclature and believed firmly in continuity rather than priority. He had little sympathy for the fragmentation of large "natural" genera into smaller genera or subgenera. In the 1940s he was expressing the very modern view that primitive characters were of no value for defining groups since they were likely to have been retained in widely separated groups.

From my personal perspective, his 1921 series on the British species of the muscid genus *Limnophora* was ground-breaking, with its recognition of characters to break this large genus up into subgenera, now genera. Similarly, his 1930 paper on the Greenland species of *Limnophora* provided a series of outstanding illustrations of male terminalia that even now have not been surpassed by the advent of microphotography. Equally ground-breaking was his 1927 paper on "characters of possible generic importance" in Anthomyiidae of the old 19th century genera *Hylemya* and *Chortophila*.

If there is one criticism to be levelled at him, and at Verrall, it is their negligent attitude towards type specimens. They never felt any obligation to define their own new species by a single type specimen. Only rarely, and only towards the end of his publishing life, did Collin designate a single specimen as a type or holotype for new species that he was describing. For most of his new species he simply gave a list of localities, and sometimes not even that. Here are some examples:

"It was not uncommon about a garden compost heap at Kirtling (Cambs.) from May to July (and again in October), 1951. Specimens taken on 14.x.51 may be taken as typical."

"Not uncommon in wooded districts. Surrey, Sussex, Hereford, Cambs, Derby, Notts. May, June, July."

"At present only known from Scotland (Nethy Bridge and Aviemore) so far as the British Isles are concerned, but it occurs in Denmark (described by Lundbeck as *stigmatica* Schin.), and in Sweden (described by Zetterstedt as *monostigma* Mg. and *precatoria* var. b)."

This of course can cause considerable difficulties for dipterists wishing to study Collin's "types", and also for curators attempting to evaluate the contents of collections in their care and

assessing the possibility of type specimens being present. Syntypes of Collin's species can be scattered around the country, not just in his own collection in Oxford but also in Museums that house the collections of colleagues who sent him specimens to study and describe. Some may even be overseas in the collections of other empid workers with whom he exchanged specimens such as Richard Frey (1886–1965) in Finland, Lorenz Oldenberg (1863–1931) in Germany and Axel Leonard Melander (1878–1962) in the USA. The account by Pont (1995) enumerates all the type-material that could be recognised at that time and gives its current location.

Yet Collin was not unaware of the value of the types of other authors, and he travelled to Paris in April 1914 to study the Meigen types, and to Copenhagen, Lund and Stockholm in July to August 1920 to study the Fallén, Zetterstedt and other types.

So we come to his legacy, the books and papers which are still useful if not invaluable tools in the study of Diptera taxonomy, and to his collection. From the OUMNH point-of-view, the ultimate aim is of course to have all the various Diptera collections amalgamated to form a single World Collection, which will incorporate all elements from the Verrall-Collin Collection. However, most of the Verrall-Collin Diptera are still in the original cabinets that came from Collin's home in 1967 and require a major curatorial effort. For the present, all the type specimens that were recognised in Pont (1995) are kept as a separate Verrall-Collin type collection (Fig. 19).

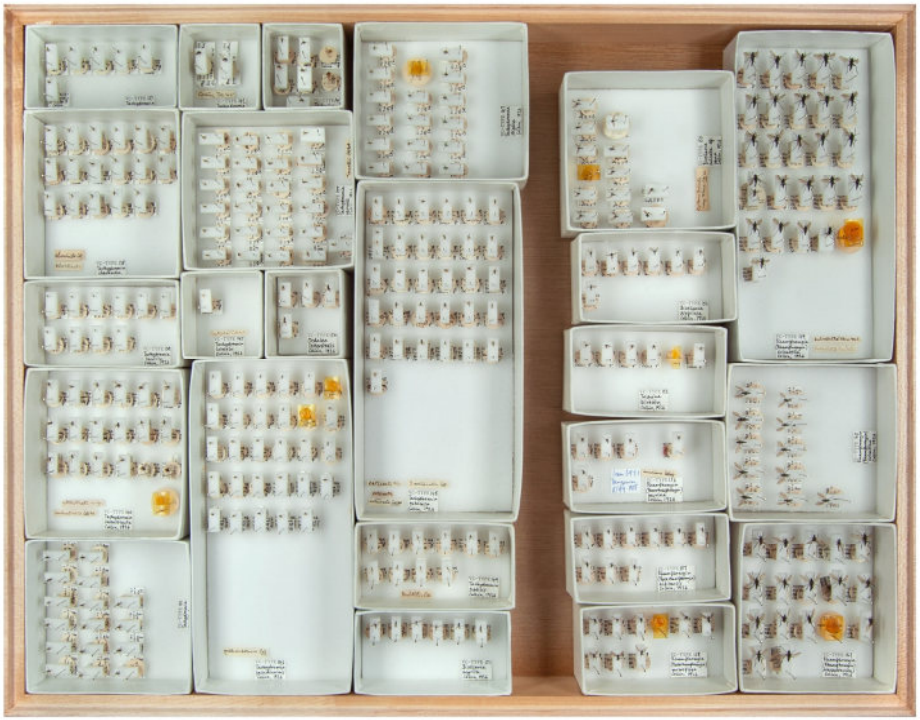

Fig. 19. A drawer from the Verrall-Collin Type collection.

As regards the families of Muscidae, Fanniidae and Sepsidae, I have set up World collections that amalgamate all the old OUMNH collections, and the British, Palaearctic and Exotic collections from the Verrall-Collin collection. British specimens are kept in their own trays, so that it is easy to extract their data and to recognise the Verrall-Collin specimens. All the identifications have been checked, and Collin made almost no errors in identifying Muscidae – an astonishing achievement.

As far as his special collections of Empidoidea are concerned, the OUMNH already has a vast European collection from Milan Chvála (Prague, Czech Republic), which for the time being is kept as a separate unit. The Verrall-Collin British Empidoidea and the Palaearctic Empidoidea have been processed and are also retained as separate units: specimens on short pins have been mounted, the data labels put the right side up, and an additional label has been added giving the name over which the specimens stood in the collection. Each species has its own tray, and species are arranged alphabetically within genera so that they can easily be located in the collection. Indices have been prepared for the Chvála and Verrall-Collin Empidoidea – especially important for the Chvála collection where males and females of the same species, and even series of the same species, may be in different drawers. This is all basic curation but will assist with collection management and will help towards the safe and secure storage of the specimens.

Other families of the Verrall-Collin British Diptera that have been transferred to the safety of unit trays are the Chloropidae, Agromyzidae, Anthomyiidae, Conopidae and Pipunculidae.

So how to summarise Collin's life and achievement? It was a life lived through two world wars, the Great Depression, the advent of the Welfare State, an era of change probably without parallel in human history. For us, living in the peace and comfort of post-1950s Britain, taking for granted our health, for the most part our jobs and housing, and perhaps even the idea of "progress", it is difficult to imagine how precarious even a century ago life must have seemed. And we have to admire a man who, with private means and without the need to seek a profession or a job, devoted himself to a scientific cause, however eccentric that might appear to many people, and spent his life expanding knowledge in this small but endlessly fascinating corner of the natural world on which he has left a permanent and indelible mark. It would be hard these days to find anyone with that kind of wealth who has the vision to raise his head above the parapet of hedonism and the pursuit of worthless goals. Collin's life is a classic life of service: he was born with great assets, intellectually and materially, and felt it his duty to put something back into society, through his scientific endeavours and his activities in local affairs. Such a man deserves our admiration and respect.

Acknowledgements

First and foremost I thank Professor Marcia Pointon, Collin's granddaughter, for sharing with me photographs and anecdotes about her grandfather. Previously, I learned much about Collin's life from his daughter-in-law, the late Margaret Collin, and from the obituary by Smith (1969). Finally, I thank Dr F.C. Thompson (Ponte Vedra, Florida, USA), for information about Collin's library, and Katherine Child (OUMNH), for assistance with the images accompanying this paper.

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Themira biloba Andersson (Diptera, Sepsidae) new to Scotland and confirmation of its larval substrate –

A pair of mute swans (*Cygnus olor*) and their well-grown cygnets used a causeway of land across Donolly Reservoir, East Lothian (NT5768; V.C. 82) as a safe overnight roost. A sample of accumulated uncontaminated swan faeces collected on 13.viii.2016 subsequently, in late autumn 2016, produced 12 flies (six males and six females, five of each sex collected with puparia) of *Themira biloba* Andersson, 1975. A further three flies (two males, one female) emerged in spring 2017.

Another sepsid species, *Themira superba* (Haliday, 1833), was reared from the same swan faeces, of which six males and two females emerged, while three females of *Microchrysa cyaneiventris* (Zetterstedt, 1842) (Diptera, Stratiomyidae) were also reared from these faeces.

In England, adults of *T. biloba* have been collected off guano on a nest of a coot (*Fulica atra*) while under laboratory conditions the flies oviposited in cattle dung, and the larvae developed in this substrate (Pont, A.C. and Meier, R. 2002. The Sepsidae (Diptera) of Europe. *Fauna Entomologica Scandinavica* **37.** Leiden, Boston, Köln: Brill). Pont and Meier (2002, *loc. cit.*) reported that both *T. biloba* and *T. superba* adults have been found near water where there were droppings of waterfowl and that *T. superba* has been reared from high-water flood debris, that larvae were found in a dirty pool and in the laboratory larvae of this species were readily reared on goose and duck droppings. Steve Crellin (2018. News from the Sepsidae Recording Scheme Update – Spring 2018. *Bulletin of the Dipterists Forum* **85,** 11) noted that *T. biloba* had been swept from swan and goose dung in Britain. However, neither *T. biloba* nor *T. superba* appears to have been reared before from water bird droppings collected in the wild.

The distribution map of *T. biloba* provided by Steve Crellin (2018, *loc. cit.*) has no records for Scotland, while the most northerly record of this species is for North Northumberland (V.C. 68). Therefore our record appears to be the first for Scotland.

We are grateful to Steve Crellin for confirming the identity of *T. biloba* **– KEITH P. BLAND,** 35 Charterhall Road, Edinburgh EH9 3HS and **DAVID HORSFIELD**, National Museums Collection Centre, 242 West Granton Road, Edinburgh EH5 1JA

Two wet-rock (hygropetric) species of Limoniidae (Diptera) from the Savoie, France – Notes are presented on two calcicolous species of craneflies. The genus *Elliptera* has not yet been recorded in Britain and the larval habitat of *E. hungarica* Madarassy, 1881 is described below. Two species of *Dactylolabis* are found in Britain, although *D. denticulata* (Bergroth, 1891), with its virtually unmarked wings, has not yet been found here. Suitable British limestone habitats could be located and searched.

Adults, larvae and pupae of *Dactylolabis denticulata* (Limoniidae, Dactylolabinae) and *Elliptera hungarica* (Limoniidae, Limoniinae) were photographed by MB on limestone rocks wet from seeping water (a hygropetric habitat) at a number of locations near Chambéry in the Departement of Savoie, France. The larvae of both species occupy a similar habitat and live on wet rock walls of limestone, where they feed on the small plants found there. Details of the locations for this species are: Commune St. Alban Leysse, altitude 658m (Lambert ref: 948001:6514387), in a forest on shaded vertical wet rocks with lichens; Commune St. Jean d'Arvey, altitude 1012m (Lambert ref: 931622:6505329), where the larvae were found on more exposed rock, partly covered with lichens. Adults were recorded on 24 May and 6 June 2018.

There are some 33 Palaearctic species and some 16 European species of the genus *Dactylolabis* Osten Sacken, of which there are two British and three French species (excluding Corsica). *Dactylolabis denticulata* was found by MB at several sites in the Savoie region. In contrast to the British species, the wings of *D. denticulata* are barely marked, with only a slight infuscation of the cross-veins (Figs 1-2).

1

2

Figs 1-2, *Dactylolabis denticulata*: 1, female; 2, wing. © M. Billard.

3

4

Figs 3-4, *Dactylolabis denticulata*: 3, larva; 4, pupal exuviae. © M. Billard.

C.P. Alexander (1919. The Crane-Flies of New York. Ithaca, The University, New York) quoted the work of J. Mik (1894. Ein Beitrag zur Biologie einiger Dipteren. *Wiener*

entomologische Zeitung **13,** 261-284), who described the larvae as being covered in particles (Fig. 3). These particles are those of the lichen on which the larvae feed and this sheath offers camouflage and protection from predators. When observed, during the day, the larvae are immobile and so they probably feed at night. The pupa is attached to the old larval cuticle, which is itself attached to the rock surface. A little before the emergence of the imago, the pupa begins to emerge from its larval skin like a foot sliding from a sock (Fig. 4).

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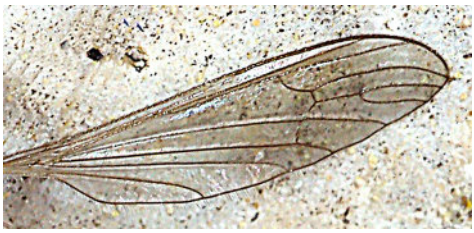

6

Figs 5-6, *Elliptera hungarica*: 5, male; 6, wing. © M. Billard.

Elliptera hungarica (determined by J. Starý) (Figs 5-6) is widely distributed in central Europe, although not yet found in the British Isles or Scandinavia. Four species in this genus occur in the Palaearctic region, and two of these are found in Europe. The life cycle of the closely related *Elliptera omissa* Schiner, 1863 was also described by Mik (1896. Über *Elliptera omissa* Egg. *Wiener entomologische Zeitung* **5,** 337-344), and quoted by Alexander (*op. cit.*). The larva (Fig. 7) and pupa (Fig. 8) of *Elliptera* species occur in cocoons on wet rock surfaces. The pupae have large ear-shaped yellowish-white breathing horns (Alexander *op. cit.*), but pupae of *E. hungarica* have not yet been found.

7

8

Figs 7-8: 7, larva of *Elliptera hungarica*, © M. Billard; 8, pupa of *Elliptera omissa* (from Alexander 1919).

We thank Jaroslav Starý for his identification of *E. hungarica* and helpful comments –
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Dipterists Digest 2018 **25,** 221-222

Molleriella calcarella Sæther & Ekrem (Diptera, Chironomidae) new to Britain

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Summary
Two adult male *Molleriella calcarella* Sæther & Ekrem were swept by Peter Chandler at Virginia Water, Berkshire. This is the first record of the genus and species for Britain. Details are provided for identifying the adult male.

Introduction

On 19 September 2018 Peter Chandler swept two very small black chironomids (wing length <1.5mm) at the Blacknest Gate end of Virginia Water (SU959688), Berkshire. Along with other chironomids he sent them to me for identification. These two specimens conform to the description by Sæther and Ekrem (1999) of *Molleriella calcarella* Sæther & Ekrem, 1999, which shows a unique combination of characters, each of which is known from various other orthocladiine genera as well: the strong seta on the antennal apex, hairy wings, and reduced spurs on the tibiae. The adult male can be incorporated in the key to orthocladiine genera in Langton and Pinder (2007) by the following modifications to couplets 2 (upper alternative only; *op. cit.*, p. 63) and 10 (*op. cit.*, p. 64):

2. Wing membrane with at least a few macrotrichia near the apex, usually more extensively 'hairy'. Apical flagellomere of antenna without a differentiated seta at the tip, except in *Molleriella* ….....……...…..... 3

10. Antenna with a short, strong seta at, or near, apex of the last flagellomere. Anal point long, robust, slightly spatulate at apex. (Fig. 1) ……. MOLLERIELLA Sæther & Ekrem
one species: **M. calcarella** Sæther & Ekrem
\- Antenna without apical seta. Anal point less robust ……..... 10a

10a. [see couplet 10 in Langton and Pinder (2007)]

This pecies was previously known only from the type material from the Netherlands. The pupal exuviae of *Molleriella calcarella* will be treated in a separate paper.

Acknowledgement
I am grateful to Peter Chandler for sending me these specimens.

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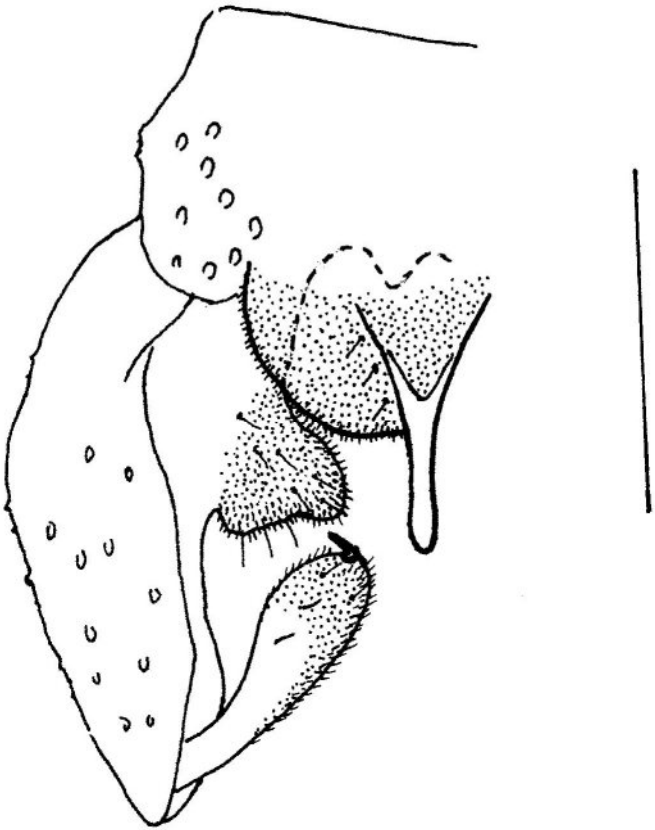

Fig. 1. ***Molleriella calcarella*** **hypopygium (scale line = 0.5mm).**

Sæther, O.A. and Ekrem, T. 1999. *Molleriella*, a new terrestrial orthoclad genus from the Netherlands (Diptera: Chironomidae). *Acta Zoologica Academiae Scientiarum Hungaricae* **45**(2)**,** 161-168.

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First record of *Scathophaga stercoraria* (Linnaeus) (Diptera, Scathophagidae) as a pollinator of a British mainland population of *Dactylorhiza maculata* (Asparagales, Orchidaceae), a review of the flowers visited by *S. stercoraria* and why flowers are visited by *S. stercoraria*

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Summary
During a survey of the heath spotted orchid *Dactylorhiza maculata* (Orchidaceae) at Cors Y Llyn NNR in Radnorshire, mid-Wales a male *Scathophaga stercoraria* (Linnaeus, 1758) was recorded as a pollinator of *D. maculata*. This is the first record of *S. stercoraria* as a pollinator of a British mainland population of *D. maculata*. The flowers visited by *S. stercoraria* and why flowers are visited by *S. stercoraria* are also reviewed.

Introduction and field observations

Flora Conservation UK is a project that records flowers and their insect pollinators in a wide range of habitats. This is particularly important due to declines in flora and fauna (e.g., Cheffings and Farrell 2005; Falk and Chandler 2005; Dines 2008; Fox *et al*. 2010; Hayhow *et al*. 2016; Drake 2017). Losses are mainly due to habitat degradation and loss. More recently it has also been speculated that pollination could be reduced, or fail completely if flowering time and the dates on which pollinators are active diverge in response to long-term climate warming (Hutchings *et al*. 2018).

As part of the 2018 Flora Conservation UK Orchid-Pollinators Survey a wet, unimproved meadow at Cors Y Llyn ('the bog of the lake') National Nature Reserve (NNR) was visited in Radnorshire, mid-Wales to record the insects visiting the flowers of a large population of the heath spotted orchid *Dactylorhiza maculata* (Orchidaceae); *D. maculata* is the only orchid species in the meadow of the NNR and there are no records of any other orchid species in the surrounding area in the available literature. The meadow was visited on 5, 12, 13 and 15 June. Field observations were carried out in the morning between c. 9.00a.m. and 12.30p.m. by eye and stealth! Photographs and short videos were taken using a Canon Powershot S3 IS digital camera.

On 5 June 2018, a single male *S. stercoraria* was recorded on a flower spike of *D. maculata* with six pollinaria of *D. maculata* attached to the front of its head (Fig. 1). All the pollinaria were below the antennae. The pollen massulae of the pollinia were in different stages of disintegration. A second single male *S. stercoraria* was found nearby on another *D. maculata* flower spike with only one *D. maculata* pollinarium attached to its head. Further searches for insects on *D. maculata* flowers in the meadow also resulted in the observation of a single male *Chloromyia formosa* (Scopoli, 1763).

Schemske and Horvitz (1984) suggested that floral visitors varied significantly in their ability to effect fruit-set. As a result, I have defined a pollinator of *D. maculata* as an insect that has removed three or more *D. maculata* pollinaria. This indicates that the insect has visited at least two different flowers and that visitation to the flowers was not a chance event. Consequently, this is the first record of *S. stercoraria* as a pollinator of a British mainland population of *D. maculata*.

Fig. 1. Male *Scathophaga stercoraria* on a flower spike of *D. maculata* with 6 pollinaria of *D. maculata* attached to the front of its head.

Review of the flowers visited by adult *S. stercoraria*

Adult *S. stercoraria*, especially the females (Menzel and Ziegler 2002) are known to visit flowers (e.g. Graham-Smith 1913; Menzel and Ziegler 2002; Weiner 2016) for nectar (N) and pollen (PO) (e.g. Müller 1873; Müller 1881; Willis and Burkill 1895; Knuth 1908). Both mature and immature adult *S. stercoraria* have been taken sucking nectar on flowers (Gibbons 1968). *Scathophaga stercoraria* is a short-tongued fly (Burkill 1897).

Flower families and species visited, excluding Orchidaceae.

Apiaceae: *Aegopodium podagraria* (Müller 1873); *Angelica sylvestris* (Müller 1873 as *Angelica silvestris*; N: Willis and Burkill 1895, September); *Anthriscus sylvestris* (Müller 1873, as *Anthriscus silvestris*, numerous; Willis and Burkill 1903, June; Verhoeff in Knuth 1908, female); *Astrantia major* (Knuth 1908, very numerous); *Carum carvi* (Verhoeff in Knuth 1908, female); *Conium maculatum* (Müller 1873); *Conopodium majus* (Willis and Burkill 1903 as *Conopodium denudatum*, June); *Daucus carota* (N: Willis and Burkill 1895; Knuth 1908); *Eupatorium cannabinum* (Willis and Burkill 1895); *Heracleum* (Poulton 1907); *H. sphondylium* (Willis and Burkill 1903, July, 7-800ft; Heinsius in Knuth 1908, ♂♀; Knuth 1908; Brodin 1994); *Meum athamanticum* (N: Willis and Burkill 1903, May, June); *Neogaya simplex* (Müller 1881 as *Gaya simplex*); *Oenanthe aquatica* (Knuth 1908); *Pimpinella saxifraga* (N: Willis and Burkill 1903, July, September); *Torilis arvensis* (Gibson *et al*. 2006). Araliaceae: *Hedera helix* (N: Willis and Burkill 1895; Kennison in Metcalfe 2005). **Asteraceae:** *Achillea millefolium* (Willis and Burkill

1895, August; PO: Willis and Burkill 1903, July, September, 7-900ft; PO: Buddeberg in Knuth 1908; Knuth 1908; Verhoeff in Knuth 1908; Lindner 1973 in Menzel and Ziegler 2002); *Anthemis arvensis* (PO: Müller 1873); *Aster tripolium* (N: Willis and Burkill 1895, August); *Bellis perennis* (PO: Müller 1873, common; N+PO: Burkill 1897; Willis and Burkill 1903, May, June, September, 8-1400ft); *Carduus crispus* (Heinsius in Knuth 1908, female); *Cirsium arvense* (N: Willis and Burkill 1903 as *Cnicus arvensis*, September, 8-900ft; Knuth 1908); *Cota tinctoria* (Knuth 1908 as *Anthemis tinctoria*); *Leucanthemum vulgare* (Müller 1873 as *Chrysanthemum leucanthemum*); *Pulicaria dysenterica* (Willis and Burkill 1895 as *Inula dysenterica*); *Scorzoneroides autumnalis* (Willis and Burkill 1903, September, 900ft; Knuth 1908; Totland 1993 both as *Leontodon autumnalis*); *Senecio aquaticus* (Heinsius in Knuth 1908, ♂♀); *S. jacobaea* (N: Willis and Burkill 1895, August, frequent; PO: Willis and Burkill 1903, September, 7-900ft); *Symphyotrichum novae-angliae* (Knuth 1908 as *Aster novae-angliae*, frequent, a few seen as late as October); *Taraxacum* (PO: Müller 1873, common; N+PO: Burkill 1897, mostly feeding on PO; PO: Müller 1881, July; N+PO: Willis and Burkill 1903, May, 800ft); *T. croceum* (Totland 1993); *Tripleurospermum inodorum* (Willis and Burkill 1903 as *Matricaria inodora*, September); *Tussilago farfara* (Müller 1881; N+PO: Burkill 1897; Harris, pers. obs., male in March). **Boraginaceae:** *Myosotis sylvatica* (Müller 1873 as *Myosotis silvatica*). **Brassicaceae:** *Cakile maritima* (PO: Knuth 1908); *Cochlearia officinalis* (N+PO: Burkill 1897); *Sinapis arvensis* (PO: Müller in Knuth 1908). **Butomaceae:** *Butomus umbellatus* (Heinsius in Knuth 1909, female). **Campanulaceae:** *Jasione montana* (N: Willis and Burkill 1895, September, 800ft; Knuth 1909). **Caprifoliaceae:** *Linnaea borealis* with a low pollen grain load (less than 20) on the thorax and legs (Scobie and Wilcock 2009); *Succisa pratensis* (N: Willis and Burkill 1895; N: Willis and Burkill, 1895, August, 1100ft both as *Scabiosa succisa*; Willis and Burkill 1903, September, 9-1100ft); *Valeriana montana* (Müller 1881, August); *Valerianella locusta* (Müller in Knuth 1908 as *Valerianella olitoria*, ♂♀ in large numbers). **Caryophyllaceae:** *Arenaria biflora* (Müller 1881); *Cerastium alpinum* (Totland 1993); *C. arvense* (Knuth 1908; Müller in Knuth 1908); *Honckenya peploides* (Verhoeff in Knuth 1908); *Stellaria holostea* (N: Burkill 1897); *S. media* (Burkill 1897). **Celastraceae:** *Euonymus europaeus* (Müller 1873; Knuth 1908); *Parnassia palustris* (Totland 1993). **Crassulaceae:** *Sedum acre* (Knuth 1908). **Ericaceae:** *Calluna vulgaris* (PO: Willis and Burkill 1895, frequent, September; PO: Knuth 1909); *Empetrum nigrum* (Müller 1881, June). **Euphorbiaceae:** *Euphorbia dendroides* (Knuth 1909). **Fabaceae:** *Medicago lupulina* (Burkill in Knuth 1908). **Geraniaceae:** *Geranium molle* (Müller 1873); *G. pyrenaicum* (Borgstette in Knuth 1908); *G. sylvaticum* (Totland 1993; Lindner 1973 in Menzel and Ziegler 2002). **Grossulariaceae:** *Ribes alpinum* (Müller 1873); *R. uva-crispa* (Müller 1873; N: Burkill 1897 both as *R. grossularia*). **Iridaceae:** *Iris pseudacorus* (Good 1986). Good 1986 states that they were never seen feeding on nectar and pollen. **Lamiaceae:** *Mentha aquatica* (Willis and Burkill 1895); *Origanum vulgare* (Willis and Burkill 1895). **Onagraceae:** *Circaea lutetiana* (PO: Knuth 1908). **Plantaginaceae:** *Veronica beccabunga* (PO: Müller 1873). **Polygonaceae:** *Reynoutria japonica* (Knuth 1909 as *Polygonum cuspidatum*). **Ranunculaceae:** *Anemone nemorosa* (PO: Müller 1873; PO: Burkill 1897; PO: Knuth 1908); *Caltha palustris* (Müller 1873; N: Burkill 1897); *Clematis vitalba* (PO: Knuth 1908); *Ficaria verna* (N+PO: Burkill 1897 as *Ranunculus ficaria*); *Ranunculus acris* (Totland 1993); *R. flammula* (PO: Knuth 1908); *R. lanuginosus* (Knuth 1908); *R. sceleratus* (Verhoeff in Knuth 1908). **Rosaceae:** *Geum montanum* (Müller 1881, common); *Malus* spp. (Sharma and Mitra 2012); *Potentilla anserina* (Verhoeff in Knuth 1908, female); *Prunus dulcis* (Sharma and Mitra 2012 as *Prunus amygdalus*); *P. persica* (Sharma and Mitra 2012); *P. spinosa* (Müller 1873; Knuth 1908); *Pyrus communis* (PO: Müller 1873); *Sorbus aucuparia* (Müller 1873; Knuth 1908). **Rubiaceae:** *Galium album* (Knuth 1908 as *Galium mollugo*); *G. verum* (Knuth 1908). **Rutaceae:** *Ruta graveolens* (PO: Knuth 1908). **Salicaceae:** *Salix. aurita* (N: Burkill 1897, ♂ and ♀ catkins;

Müller in Knuth 1909); *S. caprea* (Loew in Knuth 1909; Müller in Knuth 1909); *S. cinerea* (Müller in Knuth 1909); *S. purpurea* (N on ♂ catkins: Burkill 1897 on ♂ and ♀ catkins); *S. repens* (Leege in Knuth 1909, ♂♀, very common); *S. viminalis* (Burkill 1897, ♀ catkins). **Saxifragaceae:** *Saxifraga aizoides* (Müller 1881, August; Lindner 1973 in Menzel and Ziegler 2002); *S. paniculata* (PO: Müller 1881 as *Saxifraga aizoon*). **Sapindaceae:** *Aesculus hippocastanum* (Knuth 1908). **Staphyleaceae:** *Staphylea pinnata* (Knuth 1908). **Viburnaceae:** *Adoxa moschatellina* (Burkill 1897).

This review suggests: (1) *S. stercoraria* mainly forages from open flowers (Judy Webb *pers. comm.*); (2) *S. stercoraria* is polylectic i.e., pollen is collected from many unrelated flower species (e.g. *Anthemis arvensis*, *Cochlearia officinalis*, *Calluna vulgaris*, *Circaea lutetiana, Ficaria verna*) and (3) *S. stercoraria* visits flowers with different types of nectaries, for example nectaries freely exposed (*Angelica sylvestris*), flowers with nectaries concealed by scales (*Ranunculus acris*) and flowers with nectaries concealed within the corolla (*Senecio jacobaea*). Furthermore several foraging records for *S. stercoraria* on *Achillea millefolium* suggests that this is a core species for food.

Orchidaceae visited by adult *S. stercoraria*

A review of the available literature has found nine records of *S. stercoraria* visiting orchids. These are the nectariferous (Percival 1961) *Epipactis palustris* (Nilsson 1978; Brantjes 1981 with pollinium (sic); Verbeke and Verschueren 1984 in Jacquemyn *et al*. 2014) and the nectar-less orchids: *Orchis mascula* (Willis and Burkill 1903), *Orchis militaris* (Farrell 1985; Henneresse and Tyteca 2016), ***D. maculata*** (Proctor *et al*. 1996 with one pollinium attached to the front of the head (Wyatt *pers. comm.*), location unknown (Lack *pers. comm.*); Rotheray and Britton 2015) and *Cypripedium flavum* (Zheng *et al*. 2011). Rotheray and Britton (2015) carried out their study on the Scottish Islands of Canna and Sanday.

Plants that do not produce floral rewards are surprisingly common and include approximately one third of all orchids (Johnson *et al*. 2003). Deception of pollinators is achieved through olfactory and/or visual stimulation (Dafni 1987 in Neiland 1994). In the orchid genus *Dactylorhiza* nectar is absent (Claessens and Kleynen 2013). Pollinators of deceptive orchids are very seldomly observed visiting orchid flowers (Johnson *et al*. 2003). For example, Nilsson (1984, in Johnson *et al*. 2003) recorded sequences of bumblebee visits to flowers of *Anacamptis morio* on only eight occasions during 10 years of observations on Öland.

In contrast to the male *S. stercoraria* in this study, Nilsson (1978) noted a single pollinarium of *E. palustris* on the thorax of a female *S. stercoraria*. Studies on pollination in a primary forest in central Madagascar by the hawkmoth *Panogena lingens* revealed that the place and position of pollinaria deposition on the hawkmoth varied depending on the angraecoid orchid visited (Nilsson *et al*. 1987). Nilsson *et al*. (1987) suggested that this was a mechanism to restrict interspecific pollination.

Discussion and why flowers are visited by *S. stercoraria*

There is much debate on whether pollination success in non-rewarding plants that flower in association with nectar-producing plants will be diminished by competition for pollinator visits or, alternatively, enhanced through increased local abundance of pollinators (Johnson *et al*. 2003). Pollination success may be diminished by competition, either when neighbouring plants with superior rewards draw pollinators away, or when sharing of pollinators results in reproductive interference through the receipt of heterospecific pollen, or wasted export of pollen to heterospecific stigmas (Free 1968 and Waser 1983 in Johnson *et al*. 2003). Alternatively non-rewarding plant species may benefit most from close proximity to rewarding or magnet (Thomson

1978) species, although the phenomenon may extend to plants with floral rewards (Pellmyr 1986 and Laverty 1992 in Johnson *et al*. 2003). In a study at a site in Sweden, pollination success in the non-rewarding orchid *Anacamptis morio* was significantly greater for individuals translocated to patches of nectar-producing plants (*Geum rivale* and *Allium schoenoprasum*) than for individuals placed outside (c. 20 m away) such patches (Johnson *et al*. 2003). At Cors Y Llyn NNR there are at least 16 nectariferous species of co-flowering plants in the meadow. To date there are no records of *S. stercoraria* visiting the nectariferous flowers in the meadow. However, Totland (1993) reported *S. stercoraria* visiting the flowers of *R. acris* and there are patches of *R. acris* present in the meadow.

The role of the faint scent produced by *D. maculata* (Bowmer 2008) in the pollination of *D. maculata* flowers is not known. In the non-rewarding *Ophrys sphegodes* the floral scent from flowers attracts males of the solitary bee *Andrena nigroaenea* by mimicking the sex pheromone of receptive females. Common straight-chain saturated and unsaturated hydrocarbons are the key components in this chemical mimicry (Schiestl *et al*. 1999). In addition, there is considerable scent variation within *O. sphegodes* populations that minimises learned avoidance of the flowers and increases the likelihood that a given pollinator would visit several to many different plants within a population (Ayasse *et al*. 2000). More recently, it has been demonstrated that the rewardless orchid *Dendrobium sinense*, a species endemic to the Chinese island Hainan, produces a floral compound that mimics the alarm pheromone of honey bees in order to attract prey-hunting hornets for pollination (Brodmann *et al*. 2009).

Scathophaga stercoraria adults are also predators, mainly of other Diptera (Poulton 1907; Graham-Smith 1913; Cotterell 1920; Hobby 1934; Gibbons 1968; Parker 1971; Parmenter 1968; Sasaki and Nishijima 1985; Failes *et al*. 1992; Psarev 2001). In years of high abundance, *S. stercoraria* may be responsible for the impoverishment of the insect fauna in a particular locality (Chandler 1974; Harris *pers. obs*). Adults of *S. stercoraria* have been recorded searching for and capturing prey on floral spikes of *D. maculata* (Rotheray and Britton 2015). Large prey are energetically more profitable (Stephens and Krebs 1986 in Teuschl *et al*. 2010). In laboratory predation trials both sexes of *S. stercoraria* preferentially preyed on larger fly species (*Musca domestica* (Linnaeus, 1758) or *Delia antiqua* (Meigen, 1826)) rather than on smaller ones (*Drosophila* spp.) (Failes *et al*. 1992). In contrast, Teuschl *et al*. (2010) reported that female *S. stercoraria* preferred smaller *Sepsis cynipsea* (Linnaeus, 1758) in comparison to larger ones. Rotheray and Britton (2015) observed feeding on sciarids, *Dolichopus* species, small anthomyiids and muscids. However, they noted that large flies were often released without feeding because the predator could not reach the neck. The ability to capture prey may also depend on size and physiological condition of *S. stercoraria* (Jakob *et al*. 1996 in Blanckenhorn and Hosken 2003). For example, Hori (1967) found that larger individuals of *S. stercoraria* cannibalise smaller individuals in a captive population and suggested that the relative size of predator to prey was important in the capture of prey (in Sasaki 1984). In the Canadian High Arctic, *Scathophaga apicalis* Curtis uses flowers, especially *Saxifraga oppositifolia*, as sites for ambushing prey, mostly Syrphidae (Kevan 1970 in Larson *et al*. 2001).

Studies have also shown that a floral tube offers insects a place to rest or sleep, a hiding place during windy and rainy weather (Gumprecht 1977 in Jersáková *et al*. 2006) or for thermoregulation because the temperature in the flower tube may exceed the ambient temperature by up to 3˚C during the morning hours (Dafni *et al*. 1981; Felicioli *et al*. 1998 in Jersáková *et al*. 2006). In *D. maculata* small flies have been observed trapped in the mouth of the spur (Rotheray and Britton 2015, Harris 2017). Rotheray and Britton (2015) reported that in 58% of spikes examined at least one of the trapped sciarids had been reduced to fragments and suggested that they may constitute a food reward for predatory flies such as *S. stercoraria* and large empids (see Harris 2017).

Much work has been done on the life-history of *S. stercoraria* (e.g. Lewis and Bletchly 1943; Gibbons 1968; Parker 1970a; Parker 1970b; Parker 1970c; Borgia 1981; Simmons and Ward 1991; Reuter *et al*. 1998; Burkhard, 2000; Blanckenhorn *et al*. 2010). It is a dung breeding species (Cotterell 1920; Chandler 1974; Merritt and Anderson 1977; Sasaki 1980; Drake 1995; Smith 1989; Wormell 1982; Iwasa and Watanabe 2007). Copulation of *S. stercoraria* usually takes place on the dung pat or in the grass (Parker 1974) and lasts c. 35 min (Parker and Stuart 1976). After copulation the male remains paired to the female (Parker 1970d) and guards her from other males during oviposition (Parker 1970a; Parker and Stuart 1976). Females prefer to mate with large males (Borgia 1981). Oviposition lasts c. 10-20 minutes (Blanckenhorn *et al*. 2003) and the female leaves the dung pat following oviposition (Parker 1970b).

Pitnick *et al*. (2009) proposed that small males of *S. stercoraria* naturally inhabit substrates other than dung. In a study on composting pomace seven metres away from a nearby cow pasture they observed that single males on the pomace were significantly smaller than those resident on the dung in the pasture. Furthermore, smaller males of *S. stercoraria* had a mating 'advantage' on pomace, in contrast to the pattern observed on dung, providing support for the existence of an alternative male reproductive tactic in this species. It is noteworthy that "extra-dung matings" of *S. stercoraria* have occasionally been observed on trees (Wolton and Luff 2016), on large umbelliferous flowerheads and on thistles in the autumn (Parker 1971). Rotheray and Britton (2015) also recorded apparent copulation between male and female *S. stercoraria* on *D. maculata* spikes. Parker (1992, 1993) speculated that the reproductive payoff from such extra-dung matings would be limited because females will remate on dung prior to oviposition (in Gress *et al*. 2016) and the last male to mate with the female will fertilise 81.4 per cent of the eggs laid in the subsequent oviposition (Parker and Stuart 1976).

In this study an adult *S. stercoraria* male was recorded with six *D. maculata* pollinaria attached to the front of its head. When the viscidium is removed from the bursicle, the glue covering the viscidium instantly hardens on contact with the insect (Claessens and Kleynen 2013). Rotheray and Britton (2015) observed that grooming by *S. stercoraria* loosened pollinaria only when the viscidium was incompletely stuck down. Otherwise grooming was unsuccessful in removing pollinaria or individual pollinia.

The effects of pollinaria attachment to the head of *S. stercoraria* are unknown. For example, it is not known if their presence reduces the ability of the fly to capture and feed on prey. *Scathophaga stercoraria* is also prey for other Diptera (Séguy 1927; Parmenter 1960), Hymenoptera (Spooner 1934; Kurczewski 1993) and Chiroptera (Millais 1904 and Shiel 1991 in Swift 1998; Howes 1974 in Gloor *et al*. 1995; Zeale *et al*. 2011; Ransome 2002 in Hope *et al*. 2014; Rydell *et al*. 2016). Further research is also needed to find out if the presence of pollinaria on the head of *S. stercoraria* increases the ability of predators to capture them as prey.

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Dipterists Digest 2018 **25,** 234-235

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

by MARK G. TELFER and DAVID J. GIBBS (2018 25, 13-15)

The figures in this paper were corrupted in preparation of the pdf for that issue, so are reproduced here:

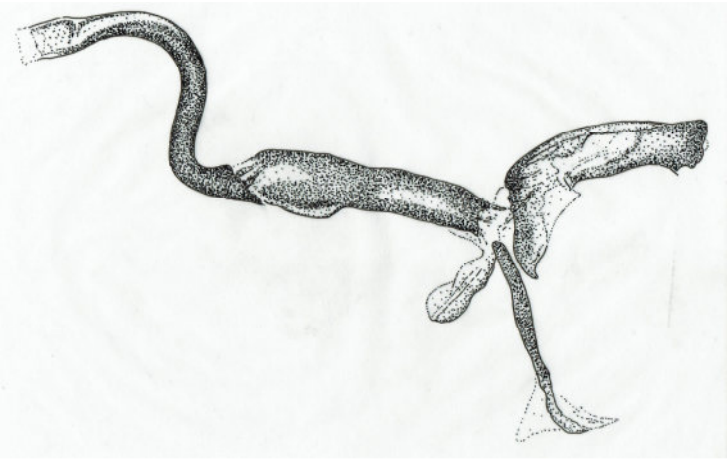

Fig. 1. Aedeagus of *Cerodontha* (*Dizygomyza*) *palustris* Nowakowski from Sutton Fen.

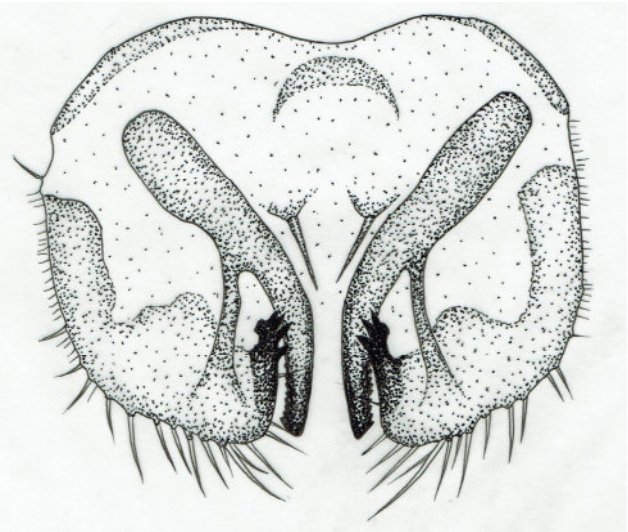

Fig. 2. Epandrium of *Cerodontha* (*Dizygomyza*) *palustris* Nowakowski in internal view.

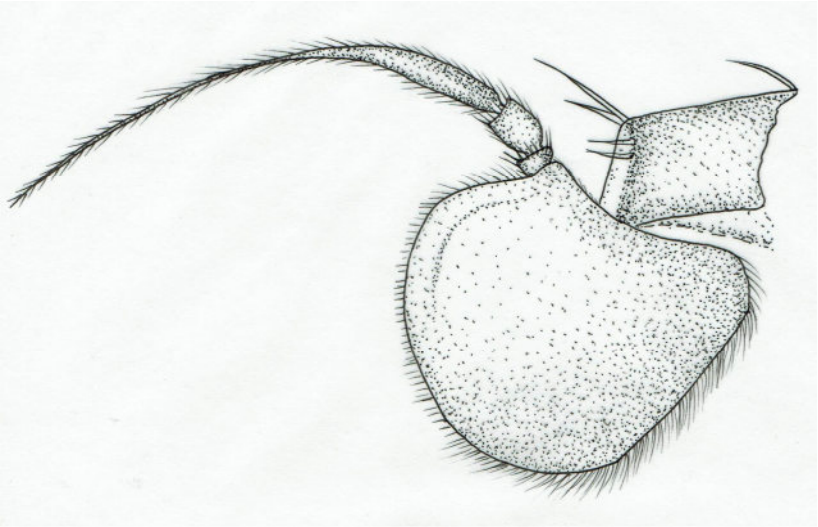

Fig. 3. Left antenna of *Cerodontha* (*Dizygomyza*) *palustris* Nowakowski in lateral external view.

CORRECTION: First record of *Empis* (*Euempis*) *tessellata* (Fabricius) as a pollinator of *Dactylorhiza maculata* (Asparagales, Orchidaceae) in Britain by ELISABETH A. HARRIS (2017 24, 185-194).

Page 188: "*Empis* pollinators and potential pollinators of *Dactylorhiza maculata* (L.) Soó" should be:
Empis pollinators, pollinators and potential pollinators of *Dactylorhiza maculata* (L.) Soó.

Page 189: Cerambycidae: *Paracorymbia maculicornis* (De Geer, 1775) should be:
Cerambycidae: *Stenurella melanura* (Linnaeus, 1758).

Page 193: Müller, H. 1883. should be Müller, H. 1873.

The page numbers for Knuth, P. 1908 and Knuth, P. 1909 are incorrect: for Knuth, P. (1908) it should be 703 pp and for Knuth, P. (1909) it should be 664 pp.

A second record of *Metriocnemus* (*Inermipupa*) *carmencitabertarum*, Langton & Cobo (Diptera, Chironomidae) from Lancashire – On a visit to Southport, Lancashire, in November 2017, chironomid larvae and pupal exuviae were observed and collected on 2 November from two outdoor rainwater-filled plastic containers in the garden of a house (SD3354176; latitude N53.645906, longitude W2.977963) in the Churchtown area of Southport. The characteristic pupal exuviae were readily identified as *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton & Cobo, 1997 from P.H. Langton and H. Visser (2003. Chironomidae exuviae - a key to pupal exuviae of the West Palaearctic Region, Interactive Identification System for the European Limnofauna. Biodiversity Centre of ETI. UNESCO Publishing, Paris).

This species was first collected in England, by R. Wilson, at Mudgley, Somerset in August 2010, from a wheelbarrow that periodically collected rainwater (Langton, P.H. and Wilson, R.S. 2012. *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo (Diptera: Chironomidae) in England. *Dipterists Digest* (*Second Series*) **19,** 141).

A second record from England was provided by the author (Murray, D.A. 2016. A new record of *Metriocnemus* (*Inermipupa*) *carmencitabertarum* (Orthocladiinae) from England. *CHIRONOMUS Journal of Chironomidae Research* No **29,** 43-44) from outdoor containers in a garden of a house at Rufford, some 6 miles south east of the location of the current record at Southport.

The species was first described from temporary pools in Galicia and a river in Portugal (Langton, P.H. and Cobo, F. 1997. *Metriocnemus* (*Inermipupa*) *carmencitabertarum* subgen.n., sp.n. from Spain and Portugal. *Entomologist's Gazette* **48,** 263-271). Since its original description, it has been documented from the Azores, the Netherlands, England and Ireland (including Northern Ireland) (Kuper, J. 2017. Life cycle of natural populations of *Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo, 1997 (Diptera: Chironomidae) in the Netherlands: indications for a southern origin? *CHIRONOMUS Journal of Chironomidae Research* **30,** 55-66).

The species appears to be an opportunistic inhabitant of ephemeral habitats; its larvae and pupae are characteristically found in small accumulations of rainwater - such as in wheelbarrows, water butts, buckets, basins and also in municipal water features. The second record from Lancashire, at Southport, is not surprising **– DECLAN A. MURRAY,** Freshwater Biodiversity, Ecology and Fisheries Research Group, School of Biology and Environmental Science, University College Dublin (address for correspondence: Meadesbrook, Ashbourne, Co. Meath, A84 K727, Ireland); declan.murray@ucd.ie

***Metriocnemus* (*Inermipupa*) *carmencitabertarum* Langton and Cobo (Diptera, Chironomidae) in Kent –** On 8 September 2018, I found adult males and females of *Metriocnemus* (*I.*) *carmencitabertarum* Langton & Cobo, 1997 resting on floating leaves and the sides of a plastic tub half-filled with rain water in my sister-in-law's garden in Charing, Kent (TQ948488). Previously recorded in England for Somerset and Lancashire (Murray, D. 2019. A second record of *Metriocnemus (Inermipupa) carmencitabertarum* Langton & Cobo (Diptera, Chironomidae) from Lancashire. *Dipterists Digest* (*Second Series*) **25,** 138), this is the furthest east in England that the species has been recorded. It would appear that this recently arrived species is already widespread across the southern half of England **– PETER H. LANGTON,** University Museum of Zoology, Cambridge, Downing Street, Cambridge (address for correspondence: 16 Irish Society Court, Coleraine, BT52 1GX)

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