

A review of the *Lonchaea fraxina* group of species (Diptera: Lonchaeidae) with the description of a new species

IAIN MACGOWAN

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The status of species within the *Lonchaea fraxina* group are reviewed and one new species *Lonchaea angelina* sp. nov. is described. A key with accompanying illustrations is provided for males of species within the group. The holotype specimen of *L. stigmatica* Czerny, 1934 is re-described.

Iain MacGowan, Scottish Natural Heritage, Battleby, Redgorton, Perth, PH1 3EW, Scotland. E-mail: iain.macgowan@snh.gov.uk.

Introduction

Within the genus *Lonchaea* Fallén four species, *Lonchaea fraxina* MacGowan & Rotheray, 2000, *L. iona* MacGowan, 2001, *L. spicata* MacGowan, 2008 and *L. stigmatica* Czerny, 1934, are uniquely distinguished by the presence of hairy eyes, multiple rows of anterior genal setae, dark fringes on the calypteres and entirely black legs. These species are referred to in this paper as belonging to the “*Lonchaea fraxina* group”. They can all show variation in the number of setae or setulae on the proepimeron, the presence and number of setulae on the orbital plates and scutellar disc and in the density and length of eye hairs; all features which can make species level identification difficult. The discovery of a new species belonging to this group has led to a re-examination of the male genitalia and, as a result, further distinguishing characters to separate the species have been identified.

Background

This small group of species has always proved taxonomically difficult. Previous keys to European Lonchaeidae have confused the identity of

L. stigmatica and *L. hirticeps* Zetterstedt, 1837. *L. stigmatica* was described, and is at present still only known, from a single female specimen collected in the Russian Far East, north west of Vladivostok. Although the type specimen originated from the extreme east of the Palearctic this name was used by subsequent authors for species occurring in the European fauna. Further confusion arose when Czerny (1934) included *L. stigmatica* in his key to *Lonchaea* under the section on species with bare eyes when in fact the eyes are pilose (see revised description below).

In his key to the British *Lonchaeidae* Collin (1953) identified only one species with characters of the *L. fraxina* group which he mistakenly called *L. hirticeps*. In the accompanying text description he refers to earlier descriptions by Zetterstedt and Czerny noting that “this species evidently requires further study based on more material”.

Hackman (1956) produced keys to the Lonchaeidae of eastern Fennoscandia. No doubt influenced by Collin’s earlier work he also listed *L. hirticeps* as the only species with characters of the *L. fraxina* group. However in the text de-

scription he also refers to the confusion with the name of this species and noted that the holotype needed to be re-examined.

The situation was clarified in part by McAlpine (1958) who examined the Zetterstedt types of *L. hirticeps* and re-described them as having a single row of anterior genal setulae. McAlpine also stated that the *L. hirticeps* specimens described by Collin (1953) belonged to a different species. However the implications of this paper were not fully translated into the European literature and the status of the species called *L. hirticeps* by Collin was unresolved. Indeed Kovalev and Morge (1984) still listed *L. hirticeps* as a British species whilst noting that “central European specimens require confirmation”.

Morge (1963) provided a key to the European *Lonchaea* species. Taking note of McAlpine (1958) he correctly placed *L. hirticeps* but, in the section of the key relating to species with characters of the *L. fraxina* group the only species listed is *L. stigmatica*. Morge had obviously examined the Holotype of *L. stigmatica* and noted the hairy eyes; he remarked that the intercostal space is “almost four times longer than the cross-vein”. This measurement probably related to the overall length of crossvein *rm* rather than the internal length, that is the length of *rm* from the lower margin of vein R4+5 to the upper margin of vein M1 which is used in this paper.

Shtakel'berg (1967) in his key to the *Lonchaeidae* of Russia and Europe followed Morge (1963) and the only species listed with characters of the *L. fraxina* group is *L. stigmatica*. This name was still being applied in the European fauna by Maca (1999) who included it in a checklist of the German fauna.

MacGowan & Rotheray (2000) examined specimens of *L. hirticeps* cited by both Collin (1953) and Hackman (1956), and compared them with the descriptions of previous authors and with their own extensive reared material. This led them to describe a new species, *L. fraxina* occurring in the British Isles and in central Europe. *L. iona* MacGowan, 2001 was later added to the group (MacGowan 2001) and in their Handbook to the British *Lonchaeidae* MacGowan & Rotheray (2008) provide a key which distinguishes both of these species.

A further species, *L. spicata* originally de-

scribed from a specimen collected in Greece has now been found more widely in Europe. The holotype of this species has scattered pale hairs on the eyes but other specimens examined have bare eyes. It does however consistently exhibit the other characters of the group including having a phallus with a short, sinuous apical section

This paper adds a new species to this group seeks to provide clear distinguishing characters based on the male genitalia.

The figures of male genitalia included within this paper follow the standard orientation adopted in the Manuals of Palearctic and Nearctic Diptera, not those of MacGowan & Rotheray (2008).

Systematics

Lonchaea Fallén, 1820

Lonchaea angelina sp. nov

Male.

Head: Compound eyes hairy, hairs pale, moderately dense, as long as combined diameters of three omatidia. Frontal and interfrontal setulae numerous, as long as orbital seta, orbital plates with setulae in addition to single seta. Antennae entirely black, first flagellomere 1.5x longer than broad; arista black, microscopically pubescent. Genal setulae forming multiserial rows anteriorly.

Thorax: Thoracic disc subshining black with dense setulae as long as orbital seta. Anepimeron covered with numerous setulae as long as orbital seta, no obvious differentiated row of strong anterior or posterior setae. Katepisternum with one weak seta near dorsal margin not greatly differentiated from the other setulae on sclerite, scattered setulae present anterior to this seta, none posterior. Proepimeron with two setae, one propleural. Scutellar disc slightly brownish when compared to thorax, bare, margin with two setulae between apical and lateral setae, two between apical setae, these slightly creeping on to disc. Legs entirely black.

Wings: Calyptrae greyish with a long, dark fringe. Wings clear with whitish veins. Intercostal space, (area of costa between insertion of veins Sc and R1) with length to depth ratio 3 : 1 (measurement as in Fig. 4d). Ratio of length of intercostal space to internal length of *rm* (mea-

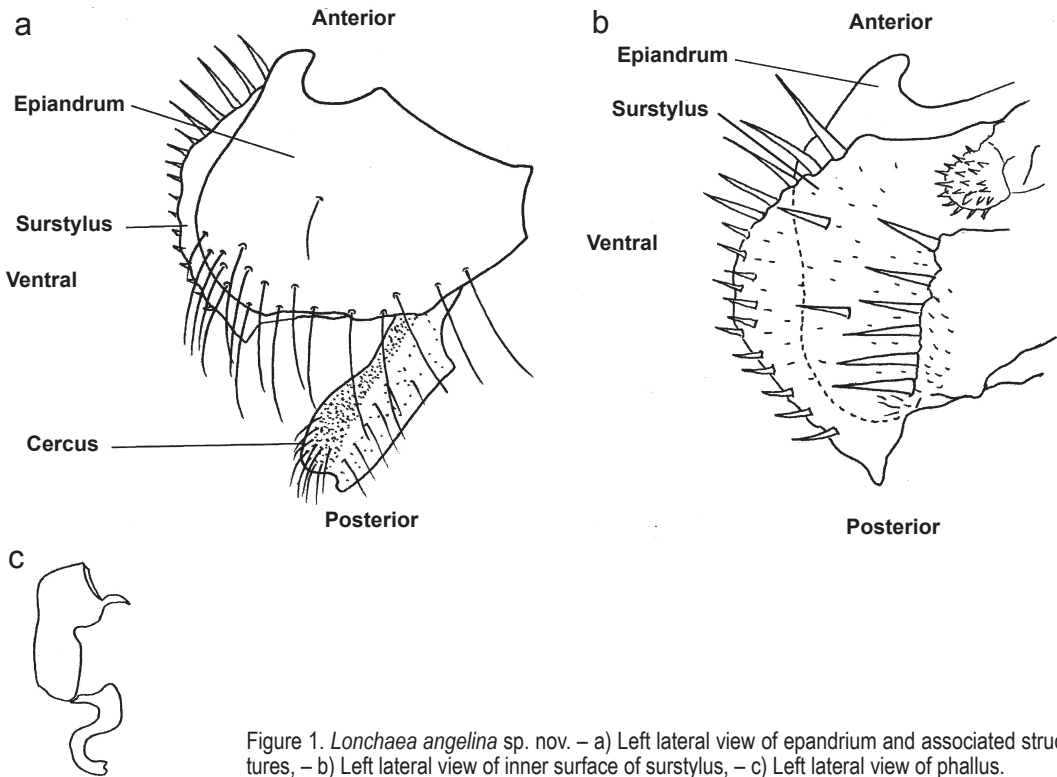


Figure 1. *Lonchaea angelina* sp. nov. – a) Left lateral view of epandrium and associated structures, – b) Left lateral view of inner surface of surstylus, – c) Left lateral view of phallus.

sured from the lower margin of vein R4+5 to the upper margin of vein M1) 5 : 1. When the line of crossvein r-m is extended to costa it reaches it at the insertion of Sc. Wing length 2.8mm.

Male genitalia: Fig. 1. Epandrium in lateral view wider than high, bearing a row of setulae along posterior margin and a group of setulae at posteroventral angle. Cerci rather rectangular, not heavily chitinised, bearing setulae along the mid-line and at apex. Surstyli projecting ventrally beyond the shell of the epandrium with a row of strong setae on margin, a slight posteroventral projection evident. Inner surface of surstyli with a single row of 6 very strong setae, area between this row and the ventral margin with only a few shorter setae, a spherical process covered with small spicules present anterior to the single row of strong setae, this process arises from and forms part of the surstylus, it seems to be unique to *L. angelina* with no similar analogue in other members of the group or as far as I know in other

Lonchaea species. Phallus two segmented, basal part rectangular and rather broad, apical part S-shaped.

Holotype male: SWEDEN: Värmland, Munkfors kommun, Ransäter, Ransberg Herrgård, old mixed deciduous forest in stream ravine. N 59° 47' 25.59" E 13° 24' 54.61" 26.iv - 22.v.2005 (=coll. event ID 1383) Leg. Swedish Malaise Trap Project. Deposited in Swedish Natural History Museum.

Paratype: GREECE: Kerkini Site, Malaise trap, N 41°13'47", E 23°21' 71", 4-10.iv.2005, 1 male, leg. G. Ramel. Deposited in National Museums of Scotland.

Etymology: the species is named after my partner Angela.

Differential diagnosis: The single row of very strong setulae on the inner surface of the male surstyli and the spherical spiculate process are the main characters distinguishing this species from its close associates.

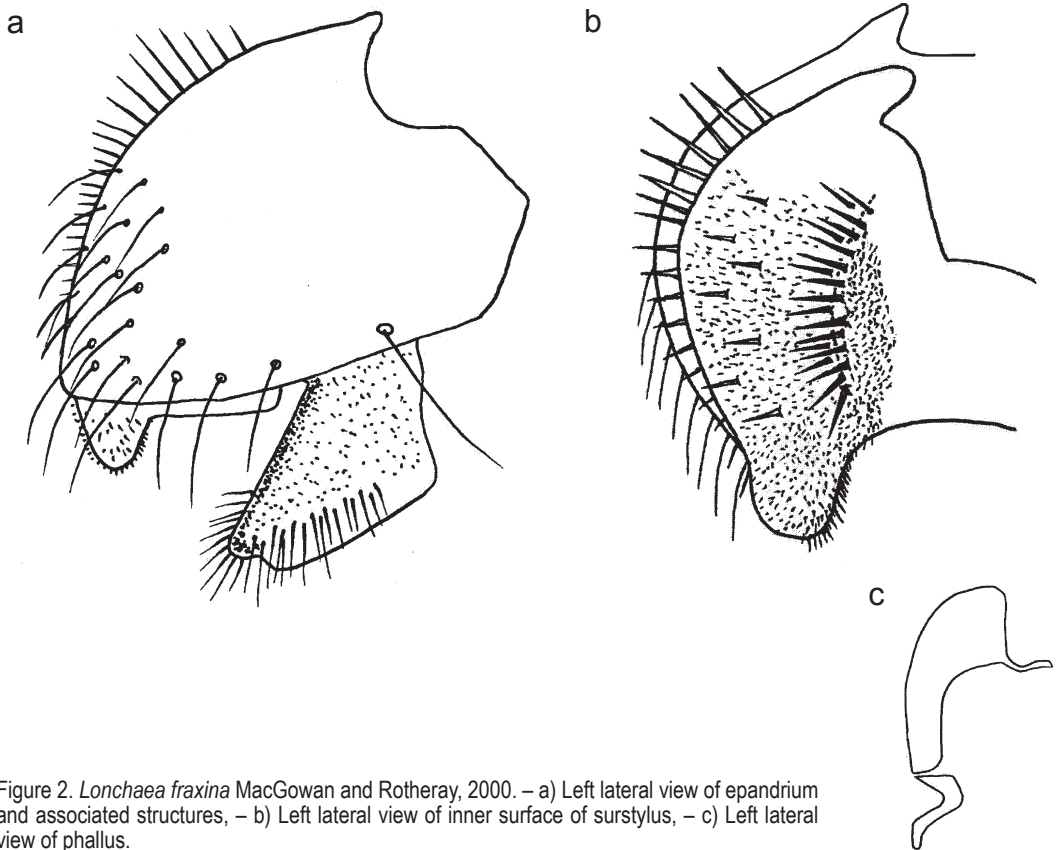


Figure 2. *Lonchaea fraxina* MacGowan and Rotheray, 2000. – a) Left lateral view of epandrium and associated structures, – b) Left lateral view of inner surface of surstylus, – c) Left lateral view of phallus.

Both specimens were collected in alcohol in a Malaise trap and are now mounted and micro-pinned with dissected genitalia cleared in KOH and retained in glycerin in a microvial attached to the mounting pin below the specimen. As a result of being collected in alcohol the specimens are slightly shrivelled.

Re-description of *Lonchaea stigmatica* Czerny, 1934

The original description of the Holotype female provided by Czerny (1934 p. 20) extends to just over 5 lines. As the species clearly belongs within the *L. fraxina* group the opportunity is taken here to provide a fuller description. The Holotype specimen from the Naturhistorisches Museum, Vienna, was examined. A stout pin passes through the sides of the thorax; the head

is positioned at 90° to the vertical, facing left. The right foreleg and left hind leg are missing.

Holotype female

Head: Eyes with dense covering of short hairs, each as long as width of an ocellus, light coloured (but this might just be an ageing effect). Genae wide anteriorly with multiserial black setulae. Frons wide, at level of ocellar triangle wider than width of an eye, frontal and inter-frontal setulae short and rather sparse, at most about half as long as orbital seta. Orbital plates bare. Right orbital seta missing as are the ocellar setae. Antennae entirely black, relatively large for such a small species, almost extending to mouth margin, postpedicellus 1.5x as long as deep, arista relatively short approximately 40% of its length extending beyond apex of flagel-

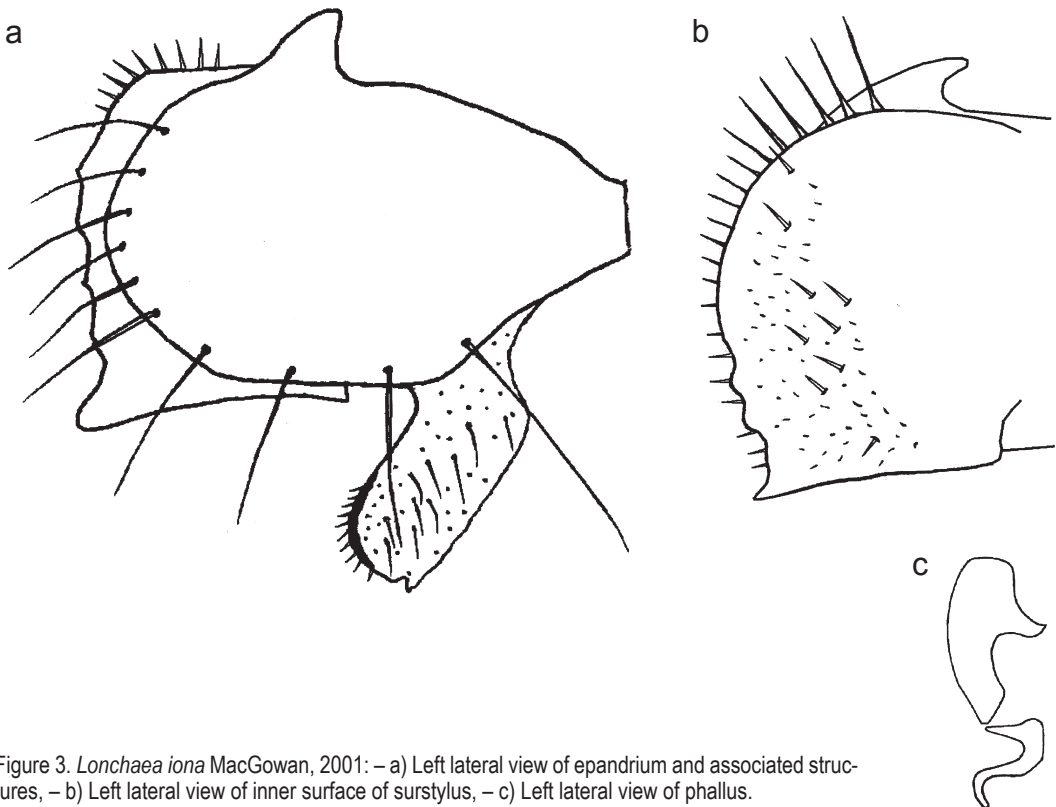


Figure 3. *Lonchaea iona* MacGowan, 2001: – a) Left lateral view of epandrium and associated structures, – b) Left lateral view of inner surface of surstylus, – c) Left lateral view of phallus.

lomere, bearing microscopic setulae.

Thorax: dorsum slightly dusted. Proepimeron and proepisternum with one seta. Anepisternum with most setae missing. Katepisternum with two dorsal setae very close together on right side (probably an aberration) the normal one seta on left, no setulae posterior to these but with 4-5 setulae anteriorly, one or two along anterior margin of the sclerite. One setulae in notopleural depression on right side, left side obscured by pin. Scutellum bare on dorsum, margin with three small setulae between apical setae in two horizontal rows, two between laterals on left side and one on right, these setulae short, apicals approx. 25% length of apical setae. Legs entirely black.

Wings: Calypteres dark with dark fringe. Wing with all veins rather yellowish. Intercostal space, (area of costa between insertion of veins Sc and R1) with length to depth ratio 4 : 1, (mea-

surement as in Fig. 4d). Ratio of length of intercostal space to internal length of crossvein rm (measured from the lower margin of vein R4+5 to the upper margin of vein M1) 8 : 1. When the line of r-m is extended to costa it reaches it at a point basal to the insertion of S1.

Type locality: Tigrovaja, UssuriGeb. Primorsky krai, Russian Far East.

Additional descriptive information on the characters of the male genitalia of species within the *L. fraxina* group

Although within the male genitalia figured in this paper the cerci are distinguishable between species they are not used here as a specific character due to the fact that this soft tissue can vary in shape according to the way in which the specimen has been dried, stored or prepared.

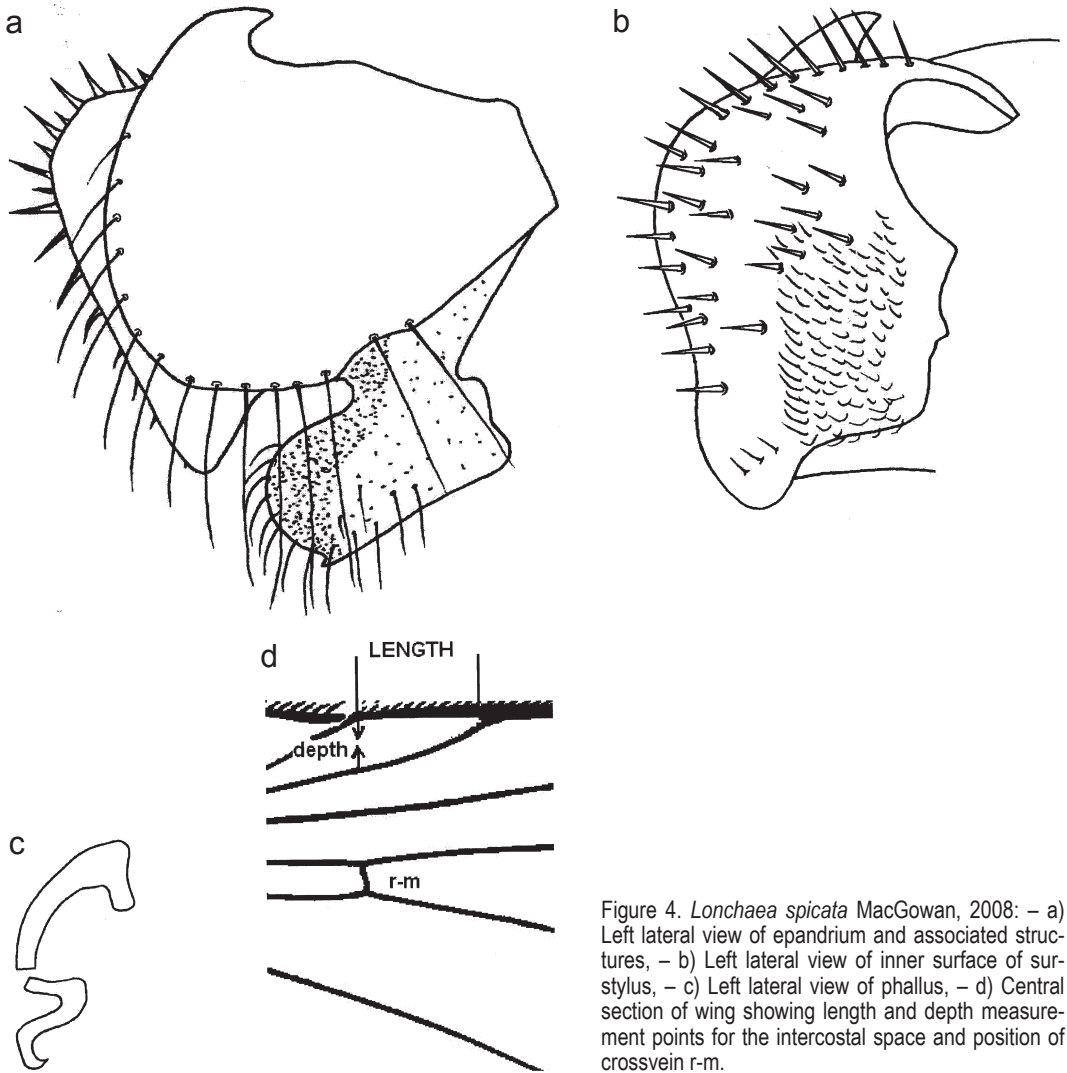


Figure 4. *Lonchaea spicata* MacGowan, 2008: – a) Left lateral view of epandrium and associated structures, – b) Left lateral view of inner surface of surstylus, – c) Left lateral view of phallus, – d) Central section of wing showing length and depth measurement points for the intercostal space and position of crossvein r-m.

***Lonchaea fraxina* MacGowan & Rotheray, 2000**

Male genitalia; Fig. 2. Surstylus; in lateral view with a rounded posterior projection extending beyond the shell of epandrium, inner surface with a double / triple posterior-anterior row of between 14 and 20 strong setae, between these and the ventral margin a scatter of approximately 6-8 setae, moderately dense fine setulae covering most of the inner surface of the surstyli

including the posterior projection and the area dorsal of the row of setae. Phallus with a broad basal section and small slightly sinuous apical section.

***Lonchaea iona* MacGowan, 2001**

Male genitalia; Fig. 3. Surstylus; in lateral view usually with posterior and ventral margins extending beyond shell of epandrium, posterior surface flat, extending ventrally to form a small

ventral projection, inner surface with approximately 8 well scattered, rather short setae, otherwise with scattered small setulae. Phallus with broad basal section and distinctly sinuous apical section.

Lonchaea spicata MacGowan, 2008

Male genitalia; Fig. 4. Surstylus; in lateral view usually with posterior and ventral margins extending beyond shell of epandrium, stout spine-like setae usually visible extending beyond ventral margin; inner surface with a scatter of approximately 20 strong setae concentrated on ventral portion, fine setulae almost entirely confined to a conspicuous raised area in the postero-dorsal quadrant of the surstylus. Phallus with basal section much narrower than in *L. fraxina* and *L. iona*, apical segment larger and more sinuous.

Discussion

It has been difficult to distinguish the males of *L. fraxina* group due similarity of external characters and the intra-specific variation in chaetotaxy. Taxonomic characters on the inner surface of the male surstylus, in particular the number, size and distribution of setae and setulae, have been found to provide a more satisfactory way of distinguishing between the males.

It is now clear that there are five species in the *L. fraxina* group. Two (*L. fraxina* and *L. iona*) are relatively well known in western and central Europe, one (*L. angelina*) is known from the material described here, and one (*L. stigmatica*) is known only from the female holotype captured in the Russian far east. *L. spicata* occurs sporadically across western Europe.

The status of *L. stigmatica* remains unsatisfactory and, until more material with an associated male is found, it is difficult to accurately determine its relationship to the western Palearctic species. For example the length of crossvein rm may have a variability that could be related to sex or other environmental causes and is based on only one specimen. If males are found they should be able to be distinguished by having the orbital plate bare apart from the orbital seta, one setulae on the proepimeron, disc of the scutellum bare with the margin bearing only a few short setulae. The wing also holds important features with the length of the intercostal space

being approximately eight times as long as the internal length of crossvein r-m which itself is in line with a point on the costa just before the insertion of vein Sc

The *L. fraxina* group seems to be exclusively Palearctic; there are no similar described North American species, the most closely related species, *Lonchaea nebulosa* McAlpine & Munroe 1968, has hairy eyes, dark calypteres and fringes and all black legs but the anterior genal setulae are uniserial.

Key to the *Lonchaea fraxina* group

1. Wing; ratio of length of intercostal space to internal length of crossvein rm 8 : 1, (measurement as in Fig. 4d), extended line from crossvein rm reaching costa basal to insertion of Sc,*stigmatica* Czerny, 1934.
 - . Ratio of length of intercostal space to internal length of crossvein rm at most 6 : 1, extended line from crossvein rm reaching costa at, or distal to, insertion of Sc. 2
2. Male genitalia; inner surface of surstylus with a distinct row of strong setulae parallel to the ventral margin (Figs. 1, 2) 3
 - . Inner surface of surstylus with only scattered setulae (Figs. 3, 4) 4
3. Strong setulae forming a single row of approximately 6, a small spiculate rounded process lying anterior to these (Fig. 1b). Proepimeron with two setae, scutellar disc bare. Intercostal space length to depth ratio approx. 3 : 1 *angelina* sp.nov.
 - . Strong setulae forming double or triple row of between 14 and 20, no rounded small spiculate anterior process (Fig. 2b). Proepimeron usually with more than three setae, scutellar disc usually with setulae. Intercostal space length to depth ratio in range of 4-6 : 1*fraxina* MacGowan & Rotheray, 2000.
4. Inner surface of surstylus with only a few scattered spinules, without an anterior setulose raised area (Fig. 3b). Basal section of phallus distinctly broader than apical section (Fig. 3c). Proepimeron with one or occasionally two/three setae. Intercostal space length to depth ratio in range of 2.8-3.3 : 1 *iona* MacGowan 2001
 - . Inner surface of surstylus with approximately 20-30 scattered spinules, a finely setulose raised area lying anterior to these (Fig. 4c). Phallus with basal section only slightly wider than apical section (Fig. 4b). Proepimeron with one or occasionally two setae. Eyes often bare. Intercostal space length to depth ratio 2 : 1*spicata* MacGowan, 2008.

Acknowledgements

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Svensk sammanfattning

Bland stjärflugorna (Lonchaeidae) finns ett artrikt släkte, *Lonchaea*, där de flesta arter lever i ved. I denna artikel går författaren igenom de fem arter i detta släkte som karaktäriseras av bl.a. håriga ögon och helsvarta ben och som han kallar *L. fraxina*-gruppen. Arterna är ganska svåra att särskilja och författaren går igenom den stora förvirring som har rått runt dem i litteraturen. Här publiceras nya artskiljande karaktärer på hanarnas genitalier. Undersökningarna visar också att det finns en hittills obeskriven art, som i artikeln ges namnet *Lonchaea angelina* n.sp. Namnet är givet efter författarens partner. Typexemplaren har fångats i Munkfors, Värmland i det svenska Malaisefälprojektet och i Grekland.

Säljes

Två insektsskåp i mycket gediget (snickartillverkade) utförande med täta låsbara dörrar med vardera 50 insektslådor i två rader. Lådorna har infalsade glaslock och är tättslutande. Innermått på lådorna är 37X47 cm.

Pris per skåp är 15 000 kr

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