

THE LARVAE AND PUPARIA OF FIVE SPECIES OF
APHIDOPHAGOUS SYRPHIDAE (DIPTERA)

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Despite the work of Dušek & Láska (1959, 1960a, b, 1961, 1962), Dixon (1960) and Goeldlin de Tiefenau (1974) the larvae of many syrphid species remain poorly described or unknown. Recent searches of aphid colonies have yielded four of these species and they are described in this paper. In all cases larvae were photographed and described in the third stage after the hind gut was emptied. Subsequently they were reared until emergence and identification was checked using Stubbs & Falk (1983) and by comparison with named material in the collections of the Royal Museum of Scotland.

Larvae of a fifth species, *Dasysyrphus venustus* (Meigen), were reared from eggs laid by a female caught in the field and then placed with *Sitobion fragariae* (Walker) aphids in a closed container. Dušek & Láska's (1962) description of the larva of this species was based on a single, dwarf and possibly aberrant specimen (P. Láska, pers. comm.) and, since it differs in several points from the series reared by me, the larva is redescribed here.

Dasysyrphus lunulatus (Meigen)

Larva: strongly resembling *Dasysyrphus albostrigatus* (Fallén) and *Dasysyrphus tricinctus* (Fallén) in form and colour (see Dixon 1960); length 11–13 mm, width 3 mm, height 1.5–2.5 mm; dorso-ventrally flattened; tapering anteriorly, truncate posteriorly; outline serrate from above owing to fleshy lateral projections; mottled dark-grey and black with short (less than half height of the larva) mid-dorsal fleshy projections on segments 5–11; the projection on segment 11 as wide as that on segment 10 and divided medially from about half way up (fig. 1); a pair of long, tapering backwardly directed projections on the anal lobe; integumental vestiture of black spicules which partially obscure the underlying, cream coloured adipose tissue; posterior respiratory process (figs 2 and 3) longer by about a third than basally broad; reticulated surface sculpture present to the tips of the spiracles; nodular at base; mid-point constriction lacking; divided apically by a V-shaped groove such that, in anterior view, the tips of the dorsal spurs are as wide apart as the diameter of a spiracular plate; dorsal spurs as high as half the diameter of a spiracular plate; spiracles mounted on carinae and equidistant from each other.

Puparium: inflated dorsally; mottled dark grey and black; mid-dorsal projections small and inconspicuous owing to the swollen anterior.

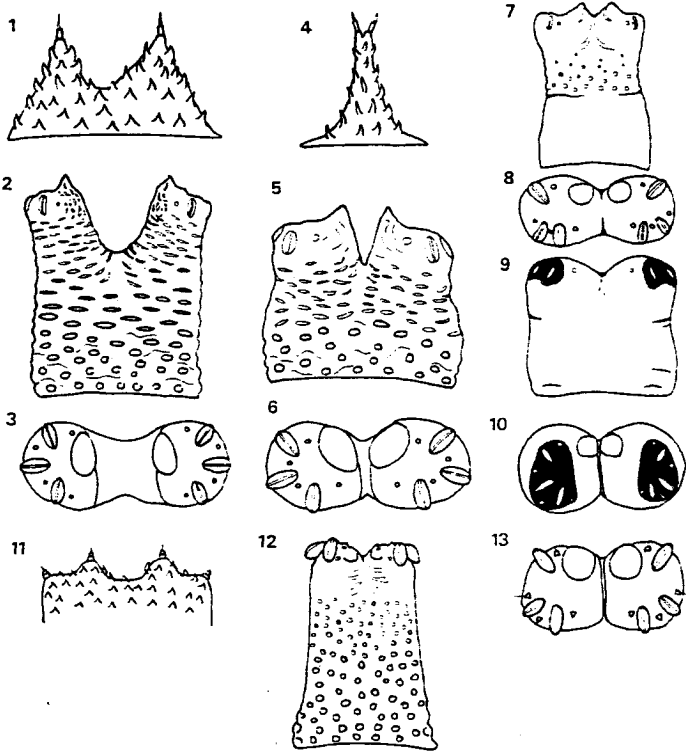
Description based on three larvae beaten from *Acer pseudoplatanus* (L.) foliage infested with *Drepanosiphum platanoidis* (Schrank) aphids near Ballater, Deeside, Scotland on 24.ix.1984. Adults emerged on 25.v.1985, 3.vi.1985 (males) and 29.v.1985 (female) after overwintering in an outdoor insectary.

Dasysyrphus venustus (Meigen)

Larva: resembling known *Dasysyrphus* species in form and colour; length 8–13 mm, width 2–3 mm, height 1.5–2 mm; dorso-ventrally flattened; tapering anteriorly, truncate

posteriorly; outline serrate; mottled grey, pink and black with long (more than half height of the larva) mid-dorsal bulbous projections on segments 5–11; the projection on segment 11 much narrower than that on segment 10 and divided from a point at or just below the base of the terminal spine (fig. 4); a pair of long, tapering, backwardly directed projections on the anal lobe; integumental vestiture of black spicules which partially obscure the underlying pink adipose tissue; posterior respiratory process (figs 5 and 6) as long as basally broad; nodular to mid-point, reticulated thereafter to just below spiracles; midway constriction lacking; divided apically by a narrow V-shaped groove such that the tips of the dorsal spurs are close together, in anterior view about as wide apart as half the diameter of a spiracular plate; spiracles mounted on carinae and equidistant from each other.

Description based on nine larvae reared on *Sitobion fragariae* aphids. Larvae obtained from eggs laid by a female caught at Croxteth Country Park, Liverpool, Merseyside on 2.vii.1981.



Figs 1–13. — Third stage syrphid larvae. 1–3. *Dasyrphus lunulatus* (Meigen): 1, dorsal projection on segment 11; 2, posterior respiratory process (prp), anterior view; 3, prp, dorsal view. 4–6. *Dasyrphus venustus* (Meigen): 4, dorsal projection on segment 11; 5, prp, anterior view; 6, prp, dorsal view. 7, 8 *Parasyrphus punctulatus* (Verrall): 7, prp, anterior view; 8, prp, dorsal view. 9, 10 *Sphaerophoria menthastri* (L.): 9, prp, anterior view; 10, prp, dorsal view. 11–13, *Pipiza luteitarsis* (Zetterstedt): 11, anal lobe, ventral view; 12, prp, anterior view; 13, prp, dorsal view.

Dasysyrphus larvae can be distinguished from other syrphid larvae by their flattened appearance, serrate outline, dark colour due to integumental vestiture and the possession of a pair of backwardly directed projections on the anal lobe. *D. lunulatus* may be known from other described *Dasysyrphus* larvae by characters on the posterior respiratory process. The dorsal spurs are short, about as long as half the diameter of a spiracular plate, with their tips separated by about the diameter of a spiracular plate. *D. venustus* may be recognised from other known *Dasysyrphus* larvae on the following characters: projections on segments 5–11 about half the height of the larva, projection on segment 11 narrower than that on segment 10; posterior respiratory process as long as basally broad with the tips of the dorsal spurs close together, separated by less than half the diameter of a spiracular plate.

Parasyrphus punctulatus (Verrall)

Larva: resembling *Parasyrphus lineolus* (Zetterstedt) and *Parasyrphus vittigera* (Zetterstedt) in form (see Goeldlin de Tiefenau 1974); length 10 mm long, 2 mm wide, 1.5 mm high; hemispherical in cross section; long and narrow, not tapering anteriorly; integument translucent and covered with papillae; wide dorsal stripes of pale brown adipose tissue either side of the heart line, tapering on the thorax and head; this adipose tissue surrounding the mid and hind gut laterally; ventro-lateral line of pale adipose tissue segmentally arranged in a chain-link pattern; occasional flecking of pale brown adipose tissue dorsally and laterally; anal lobe rounded and excised medially; posterior respiratory process (figs 7 and 8) about 1½ times as long as basally broad; nodular above mid-point constriction; basal half pale, brown thereafter; dorsal spurs prominent; spiracles mounted on brown carinae, II much closer to III than to I; interspiracular setae mounted on carinae.

Puparium: inflated dorsally; pale with a line of mid-dorsal, triangular, diffuse-edged, black markings on the anterior half; undulating black line on ventro-lateral edge.

Description based on two larvae collected 7.xii.1984 from leaf litter beneath *A. pseudoplatanus* trees previously infested with *D. platanoidis* aphids, St Patrick's Wood, Wirral, Merseyside. Two female flies emerged on 25.iv.1985 after overwintering in an outdoor insectary. At Corstorphine Hill, Edinburgh on 22.vi.1984 a further *P. punctulatus* larva was obtained feeding on this aphid and two more individuals were collected among *Macrosiphum rosae* (L.) aphids on *Rosa sp.*

Parasyrphus larvae may be distinguished from other syrphid larvae by their narrow hemispheroidal shape, lack of integumental vestiture, dorsal stripes of adipose tissue, and spiracles mounted on carinae. *P. punctulatus* can be separated from other known *Parasyrphus* larvae by its longer than broad posterior respiratory process.

Sphaerophoria menthastri (L.)

Larva: strongly resembling *Sphaerophoria scripta* (L.) (see Dixon 1960); length 8 mm, width 1.5 mm, height 1.5 mm; narrow, subcylindrical bright green larva tapering anteriorly; integument translucent and coated with papillae; green coloration due to material in the haemolymph; white dorsal stripes of adipose tissue either side of the heart line; anal lobe rounded apically; posterior respiratory process (figs 9 and 10) as long as basally

broad; pale brown; dorsal spurs absent; spiracular plates separated by shallow medial groove; spiracles mounted on black carinae, II nearer to III than to I.

Puparium: inflated dorsally; uniformly pale brown and without markings.

Description based on two males, one collected 28.v.1979 from *Brachycaudus* sp. aphids on *Silene dioica* (L.), Cardiff, Wales and the other from unidentified aphids on *Hieracium pilosella* L., 24.vi.1984, Dinnet Bridge, near Ballater, Deeside, Scotland.

Sphaerophoria larvae can be distinguished from those of other syrphid genera by their subcylindrical shape, uniform green colour, lack of dorsal spurs on the posterior respiratory process and by the spiracles mounted on black carinae. *S. menthastri* can be distinguished from other known *Sphaerophoria* larvae by the posterior respiratory process being as long as basally broad.

Pipiza luteitarsis (Zetterstedt)

Larva: similar in form to *Pipiza bimaculata* (Meigen) (Dušek & Láska, 1959), *Pipiza austriaca* Meigen (Goeldlin de Tiefenau 1974) and *Pipiza noctiluca* (L.) (Dixon 1960); length 8 mm, width 3 mm, height 2 mm; subcylindrical in cross-section; tapering anteriorly; uniform pale yellow-brown owing to coloured haemolymph; adipose tissue not present; integument covered with translucent spicules except on ventral surface; a pair of rounded fleshy tubercles on the anal lobe (fig. 11); posterior respiratory process (figs 12 and 13) about twice as long as broad at tip, broadening sharply at base; nodular except for apical third; basal half pale, distally brown; dorsal spurs absent; spiracles prominently mounted on brown carinae, I higher than II and III; II closer to III than to I; interspiracular setae long and obvious, mounted on dark papillae.

Puparium: inflated dorsally, pale but often completely black anteriorly or with mid-dorsal and lateral black markings.

Description based on 26 larvae collected 11–21.vi.1984 from colonies of *Schizoneura ulmi* (L.) aphids in leaf curl galls on *Ulmus glabra* L., Corstorphine Hill, Edinburgh. Larvae entered diapause in July, puparia were formed in April and May and adults emerged during the period 16.v.–3.vi.1985 after overwintering in an outdoor insectary. Males emerged earlier than females.

Pipiza larvae can be distinguished from those of other syrphid genera by their lack of adipose tissue, translucent integumental spicules, and the fleshy tubercles on the anal lobe. *P. luteitarsis* can be recognised from other *Pipiza* larvae by the yellow-brown coloration and the extensively nodular posterior respiratory process.

ACKNOWLEDGEMENTS

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Royal Museum of Scotland, Chambers Street, Edinburgh EH1 1JF.
June 24th, 1985.

Badonnelia titei Pearman (Psocoptera, Sphaeropsocidae); a splendid addition to the library of the National Museum of Ireland! — J.P. O'Connor & C.N. Smithers (1982, *Entomologist's mon. Mag.*, 118: 226) recorded the first Irish specimen of *Badonnelia titei* Pearman from the library of University College, Dublin. These authors suggested that the species was possibly imported with books purchased abroad. In April 1985, the National Museum of Ireland received a shipment of secondhand entomological books from a bookseller in Great Britain. They arrived in a large cardboard box with some synthetic packing material. On 24th April, 1985, while Dr P. Ashe of Trinity College, Dublin, and myself were examining the consignment in the entomological section of the Museum on Upper Merrion Street, Dublin (O 164336), we noticed a psocid crawling about on one of the books. Appropriately, the relevant publication was the Insecta section of the 1942 *Zoological Record*. Upon examination, the specimen proved to be a female of *B. titei*. It may have originated amongst the books, some of which were stamped Ottawa, or in the cardboard box which may have been stored in an infested warehouse or room before dispatch. Whatever its precise source, the present record demonstrates that such book sales provide a ready means of dispersal for *B. titei*. It would be worthwhile therefore for purchasers of books to check consignments for the species. The specimen has been deposited in the National Museum. — J.P. O'CONNOR, National Museum of Ireland, Kildare Street, Dublin 2: May 7th, 1985.

Schizotus pectinicornis (L.) (Col., Pyrochroidae) in clearings under power lines. — Larvae of *Schizotus* live under the bark of dead birch wood taking several years to develop. At a site near Cannich, Inverness-shire in early June 1981, larvae of all sizes, pupae and newly emerged adults were numerous under the bark of small stumps (diameter 10–15 cm) which had resulted from the cutting down 5 years previously of birch saplings as routine clearance under power lines. In contrast, evidence of the beetle in birch woodland on either side of the power line was difficult to find, probably because of the lack of suitable dead wood or stumps. Moreover most of the evidence there occurred in the remains of trees that had been felled rather than died naturally.

On a return visit to the clearing on 9.v.85, neither larvae nor pupae could be found in the remains of the original stumps, which were probably by then too rotten, but some larvae and pupae were present under remains of bark on the stems of the original saplings which had been allowed to lie where they fell. There were, however, new stumps of saplings cut down the previous year which looked all ready for colonisation.

Human activities are rarely incidentally favourable to our rarer native insects but cyclical felling of birch saplings beneath power lines could prove to be an exception, as illustrated by this example.

I thank the Area Engineer, North of Scotland Hydro-Electric Board for supplying information about the clearance of saplings at the site. — J.A. OWEN, 8 Kingsdown Road, Epsom KT17 3PU: May 16th, 1985