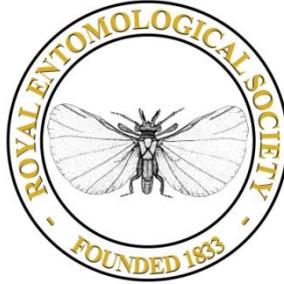


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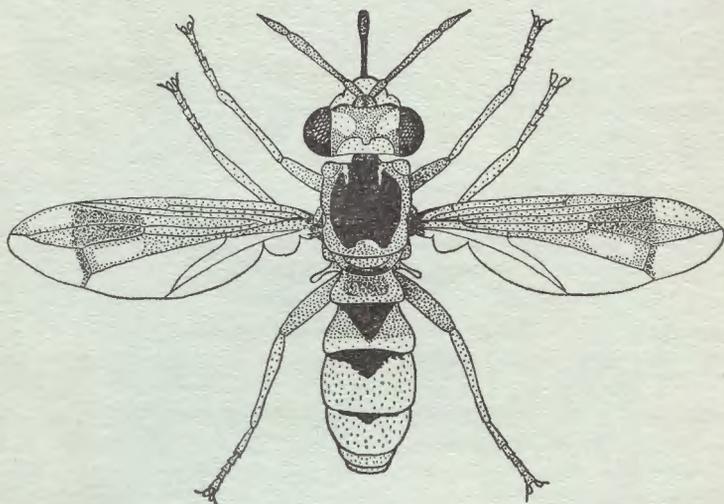
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DIPTERA CONOPIDAE

By
KENNETH G. V. SMITH

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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

The aim of this series of publications is to provide illustrated keys to the whole of the British Insects (in so far as this is possible), in ten volumes, as follows :

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Orthoptera. | " 13. Mecoptera. |
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DIPTERA

Family CONOPIDAE

By KENNETH G. V. SMITH

FLIES of the family Conopidae may be recognized by the narrowed or closed first posterior cell (R_5) and the long anal cell (Cu) of the wing (fig. 1), the usually elongate and often geniculate proboscis (figs. 16, 28, 29) and the more or less inflated head.

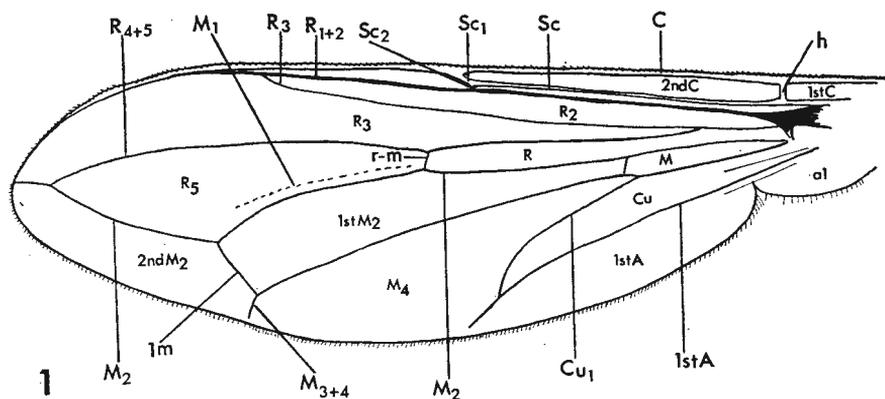


FIG. 1.—Wing of *Conops flavipes* showing notation of veins and cells.

The Conopidae have in the past been regarded as having close relationships with the Syrphidae, but there has been indecision in placing the family in the Aschiza or Schizophora series. It has been proposed that the family be placed in a separate series, the Archischiza, equal in status to the remaining Schizophora. Hennig (1958) and Steyskal (1957) regard the family as belonging to the Acalyptates, closely related to the Trypetidae. In the present work they are placed in the Division Aschiza of the Cyclorrhapha, superfamily Syrphoidea.

Four subfamilies are usually recognized, Conopinae, Myopinae, Dalmaniinae and Stylogasterinae, of which only the first two are represented in Britain.

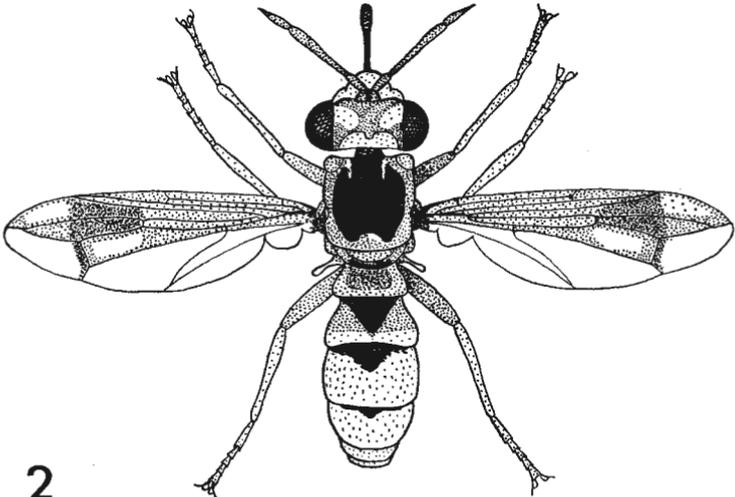
Members of the subfamily Conopinae (fig. 2) are usually of medium size, of black and yellow coloration, with waisted abdomens and elongate antennae and often bear a striking resemblance to certain wasps (Hymenoptera, Vespidae) and hover-flies (Diptera, Syrphidae). The subfamily Myopinae consists mostly of smaller flies of drabber coloration with short antennae.

The family contains 45 genera and some 800 species and is widely distributed throughout the world, except for the Arctic, Antarctic and many of the Pacific islands. Twenty-four species representing seven genera occur in the British Isles. The only known fossil species is from the Tertiary Baltic Amber (see Hennig, 1966).

LIFE-HISTORY AND IMMATURE STAGES

Few detailed studies on the biology of Conopidae have been made, but a summary of our knowledge to date has been published elsewhere (Smith, 1966). Papers dealing with the biology of Conopidae since that summary are included in the references to the present work.

A synopsis of early work on the biology of the family was given by Saunders (1858), but the classic writings of Meijere (1904, 1912) provided a sound basis for our present day knowledge of the subject. A good modern summary is given in Clausen (1940).



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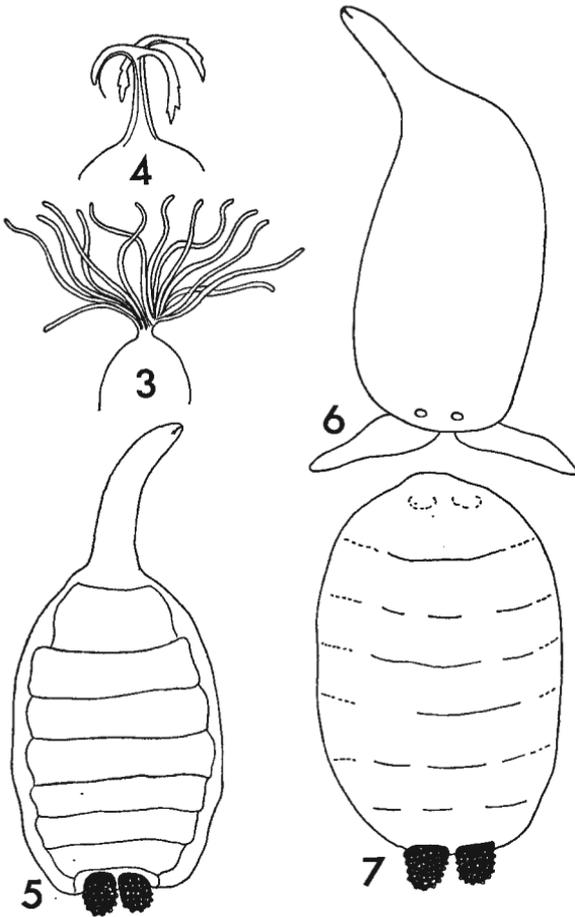
FIG. 2.—*Conops vesicularis* male.

The Conopidae are solitary internal parasites, mainly of Aculeate Hymenoptera with a few species parasitic on Orthoptera, while the non-British Stylogasterinae oviposit on Calyptrate Diptera and are regarded by some workers as a separate family. The hosts of the British species are given under each genus.

The eggs are laid directly into the host's abdomen while in flight. In structure the egg is elongate with a distinct micropyle, except in Stylogasterinae. The micropylar structure consists of a short hollow stalk capped with filamentous processes in *Physocephala* and *Zodion* (fig. 3) or with an inverted anchor-like process in *Myopa* and *Sicus* (fig. 4). Clausen (1940) has suggested that these structures may be adaptations for fixing the stalk

in the oviposition puncture in the intersegmental membrane or to an abdominal air sac of the host.

The larva (figs. 5, 6) is whitish and smooth and in the third instar is tapered anteriorly, which is an adaptation, at least in *Thecophora*, for feeding on the thoracic contents of the host *via* the petiole (Smith, 1966). In *Zodion* (fig. 6) all larval instars have two elongate, distally tapering retractile vesicles projecting caudo-ventrally into which the trachea extend. A smaller pair of these vesicles is present in *Sicus*. Anterior spiracles are present except in *Sicus*. In third instar larvae posterior spiracles are well developed and are usually rather large, hemispherical or kidney-shaped and with numerous protuberances each with numerous openings or (*Sicus*, *Thecophora*) with groups of openings not situated on protuberances. Usually

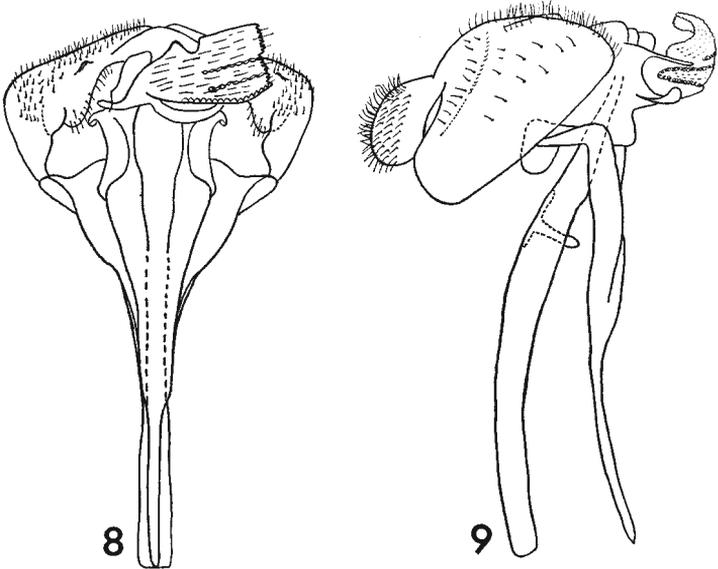


FIGS. 3-7.—Immature stages of Conopidae: 3, *Physocephala*, micropylar structure of egg; 4, *Sicus*, ditto; 5, *Physocephala*, third instar larva; 6, *Zodion*, third instar larva; 7, *Physocephala* puparium. (Figs. 3, 4 and 6, after Meijere, 1904).

there is a pair of small toothed processes behind the posterior spiracles which Clausen (1940) suggests may be used to rupture the host's air sacs. No larval Stylogasterinae or Dalmanniinae are known.

The puparium (fig. 7) is usually robust, brownish, cylindrical and slightly flattened dorsoventrally. The posterior spiracles are usually prominent.

Usually only one egg is laid per host and in cases where two or three eggs have been laid only one larva has been known to survive. Meijere (1904) found that in one area 30 per cent. of the bumble bees were parasitized by Conopidae. Cumber (1949) working near London found that up to 13 per cent. of some bumble bee species were parasitized. In the United States *Zodion fulvifrons* Say has caused considerable losses among hive bees (Severin, 1937) and Clausen (1940) discusses the problem of reduced pollination through bumble bee losses caused by Conopid parasitism. Recently detailed studies of the biology of individual Conopidae are given by Bohart & MacSwain (1939), Smith (1966), Howell (1967), and Smith & van Someren (in press).



FIGS. 8-9.—*Conops vesicularis*, male genitalia: 8, in ventral view; 9, in lateral view.

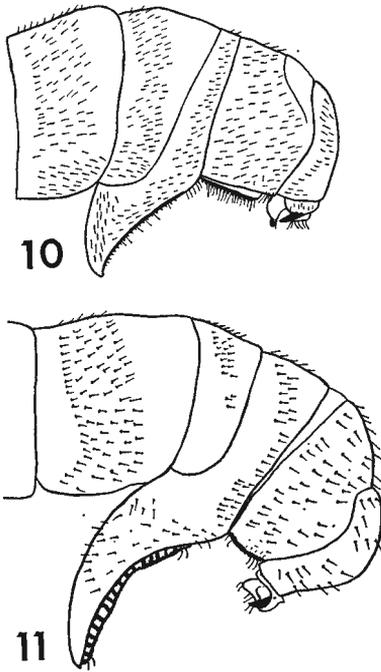
PARASITES

Habrocytus conopidarum (Bouček) (Hym., Pteromalidae) has been reared from *Physocephala vittata* (F.) and *Physocephala* sp. developing as endoparasites of *Bombus lapidarius* (L.) and *B. agrorum* (F.). The life-history of this species has been recorded by Meijere (1904), Postner (1951) and Bouček (1961), and Graham (1969) gives a brief summary. Postner states that often more than 40 Chalcids develop in one Conopid puparium and emerge by a single hole. The Conopids are probably attacked in the larval stage and the fully developed Chalcid larvae hibernate within the host puparium, emerging the following summer.

ADULT HABITS AND BEHAVIOUR

The adults are diurnal. They are often found at flowers and appear to show no particular preference, being attracted to plants usually attractive to Diptera in general, such as Compositae, Umbelliferae, etc. Howell (1967) suggests that the blooms are located visually and that nectar is detected only when contacted with the proboscis. Conopidae are probably quite effective as pollinators of certain plants. In Paraguay *Conops asclepiadaicola* Janssens is an important pollinator of Asclepiadaceae (milkweeds).

Mating usually occurs while females are foraging for nectar. The male is positioned above the female and copulation varies from about 20 minutes up to 2 hours.



FIGS. 10-11.—*Conops*, female genitalia in lateral view: 10, *C. vesicularis*; 11, *C. flavipes*.

Ovipositing females wait on nearby vegetation and attack foraging bees with a very quick strike when both bee and fly may roll on the ground together in a violent struggle. Raw (1968) has noted that *Leopoldius*, in the final stages of the chase, actually mimics the zig-zag flight of its host.

ADULT MORPHOLOGY

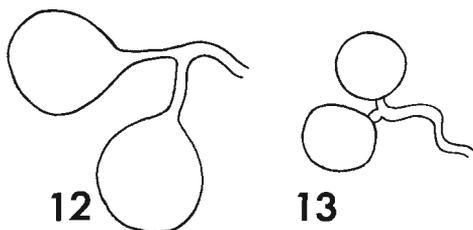
Conopidae are rather elongate flies and rather bare. The head is rather large, broader than the thorax, with the eyes bare and widely separated in both sexes. The ocelli are absent in Conopinæ, but present in other sub-

families. Vertical bristles are present or absent. The palpi vary in length and in shape; they are cylindrical or clavate. The antennae are three-segmented; in Conopinæ (figs. 14, 16) elongate with a short apical style on third segment; in other subfamilies (figs. 28, 29) shorter and with a dorsal arista on third segment. The proboscis is usually long and sclerotized (except for *Leopoldius*), and projects horizontally forward or downward and is jointed at the base only in Conopinæ and *Zodion* or at the base and middle in the Myopinæ (except *Zodion*) and other subfamilies.

The *thorax* is subquadrate and rather bare, though humeral, sternopleural, notopleural, supra-alar, postalar and scutellar bristles are often present. The thoracic squamæ are small.

The *abdomen* is cylindrical, more or less clavate and in *Physocephala* (fig. 23) considerably constricted at the base. The tergites are usually only sparsely short haired, but often heavily tomentose.

The male tends to have a shorter abdomen with six unmodified segments except for the (non-British) Dalmanniinae, which have five. The seventh and eighth segments in the male are modified into a double cushion-shaped process beneath the fifth and sixth segments. The male genitalia have been studied by Steyskal (1957); they are symmetrical and are relatively simple structures (figs. 8, 9) but become more complicated in *Zodion*.



FIGS. 12-13.—Female spermathecae (one of two pairs): 12, *Conops vesicularis*; 13, *Sicus ferrugineus*.

The female has seven visible abdominal segments, the eighth forming the tip of the abdomen. The fifth segment is often prominently produced ventrally to form the theca, but in *Myopa* and *Sicus* this structure may be replaced by a tuft of hairs or bristles. The seventh and eighth segments are prolonged and lined with papillate pads to form a clasping organ (figs. 10, 11). A well developed ovipositor is present in the non-British *Stylogaster* and *Dalmannia*. Sclerotized spermathecae (figs. 12, 13) are present, the Conopinæ and Myopinæ having two pairs while the Dalmanniinae and Stylogasterinae have only a single pair.

The *legs* are moderately long and usually nearly bare, though sometimes spinose in *Myopa*. In *Physocephala* (fig. 18) the hind femora are thickened, but otherwise the legs are of uniform shape. The tarsi have two distinct pulvilli.

The *wings* are of moderate length and width, with the third (r_{4+5}) and fourth (m_2) veins converging apically so that the first posterior cell (R_5) may be only narrowly open, closed, or closed and with a short stalk (figs. 1, 30). The anal cell (Cu) is normally elongate and always closed and petiolate.

KEY TO SUBFAMILIES

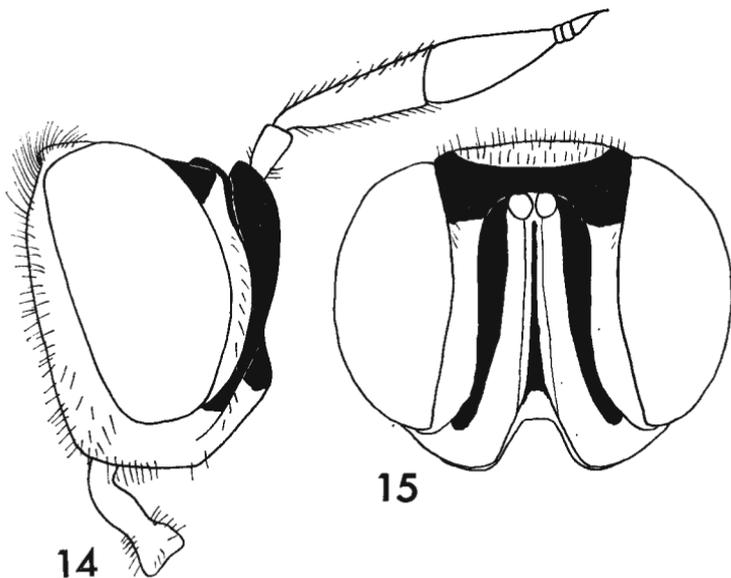
- 1 Ocelli absent; antennae longer, third segment with a short terminal style (figs. 14, 16)..... **Conopinæ** (p. 7)
- Ocelli present; antennae shorter, third segment with a dorsal arista (figs. 28, 29)..... **Myopinæ** (p. 12)

Subfamily CONOPINAE

Rather slender, wasp-like flies of medium size and rather conspicuous in flight.

KEY TO GENERA

- 1 Proboscis distinctly shorter than head and fleshy (fig. 14)
Leopoldius Rondani (p. 9).
- Proboscis as long as or longer than head and sclerotized (fig. 16)..... 2
- 2 Anterior cross-vein (*r-m*) beyond middle of discal cell (1st *M*₂) (fig. 17); second abdominal segment narrow and elongated (fig. 23); femora abnormally thickened about base (fig. 18)..... **Physocephala** Schiner (p. 11)
- Anterior cross-vein (*r-m*) beyond second third of discal cell (1st *M*₂); second abdominal segment not remarkably narrow (figs. 19, 20, 21, 22); femora not abnormally thickened at the base..... **Conops** Linnaeus (p. 7)



Figs. 14-15.—*Leopoldius brevisrostris* male head: 14, in lateral view; 15, in frontal view.

Genus **Conops** Linnaeus, 1758

(*Conopilla* Rondani, 1845)

The British species of *Conops* are mostly black and yellow or brown and yellow, of medium (8-14 mm.) size. The two species most frequently encountered are *Conops flavipes* L. and *C. quadrifasciatus* Degeer, while in the south-eastern coastal counties *C. ceriaeformis* Meigen is common. Species

of *Conops* are best sought where large masses of flowers occur such as in fields of ragwort (*Senecio*) or hogweed (*Angelica*). The members of this genus are parasitic on bees and wasps and the known hosts, continental and British, are indicated in the keys. In Britain Curtis (1856) recorded *Conops flavipes* L. "bred from the body of an *Osmia*, which had become nidified in bramble-stems". Arnold (1967) has reared *C. flavipes* from *Vespula rufa* (L.).

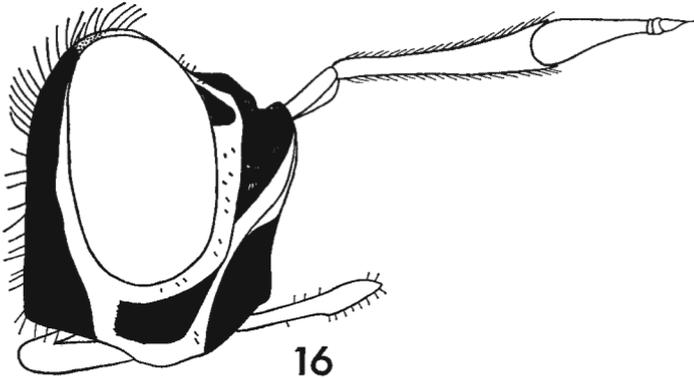
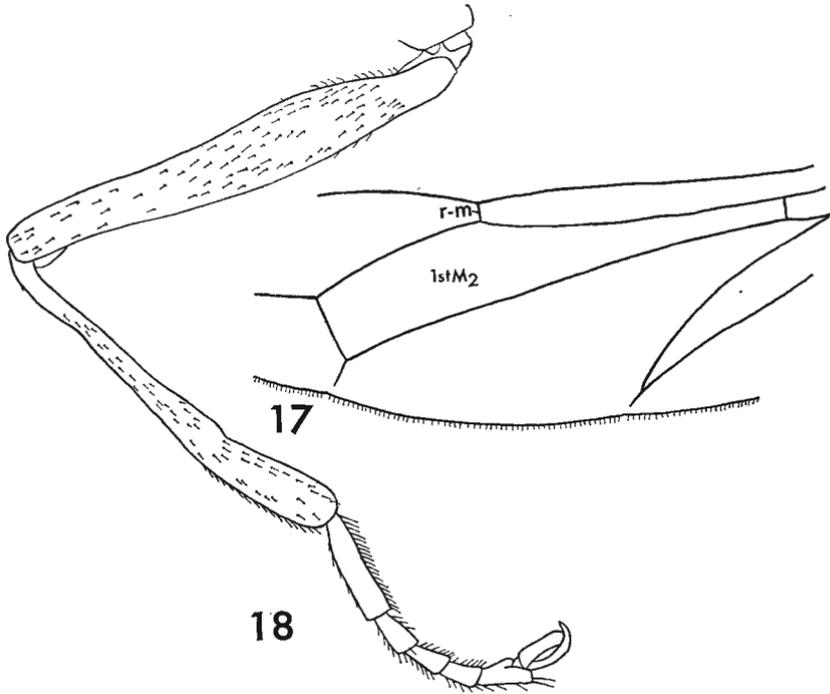


FIG. 16.—*Conops strigatus* male, head in lateral view.

KEY TO SPECIES

- 1 Frons partly yellow or brown..... 2
- Frons wholly black..... 4
- 2 Body brown with black markings; proboscis a little longer than head (fig. 2); 12-14 mm..... *vesicularis* Linnaeus
Parasitic on Bombus muscorum (L.). Rare. England: Berks., Cheshire, Devon, Dorset, Glos., Hants., Lincoln, Notts., Somerset, Suffolk, Surrey, Sussex, Worcester; Wales: Cardigan. iv-viii.
- Body yellow with black markings; proboscis much longer than head..... 3
- 3 Jowls yellow with black markings (fig. 16); a triangular black spot at front on upper eye-margin; ♀ with smaller theca; 9-10.5 mm.... *strigatus* Wiedemann
Hosts unknown. Rare. England: Berks., Devon, Dorset, Hants., Hereford, Lancs., Notts., Oxon., Somerset, Sussex, Worcs.; Ireland: Kerry. vii-ix.
- Jowls clear yellow; ♀ with a large theca (fig. 11); 9.5-11.5 mm... *flavipes* Linnaeus
Parasitic on Bombus lapidarius (L.), Osmia sp. and Vespula rufa (L.). Uncommon, though widely distributed, but strangely absent from Ireland. England: Cornwall to Cumberland to Norfolk to Kent; Scotland: Dumfries, Perth; Wales: Carnarvon, Glamorgan. vi-viii.
- 4 Pleurae without any silvery "shimmer stripes"; scutellum with apex yellowish; ♀ with large theca (fig. 11); 10-11 mm.
flavipes L. var. *melanocephala* Meigen
Hosts unknown. Rare. England: Devon, Hereford, Notts. viii.
- Pleurae with more or less evident silvery "shimmer stripes" when examined with shifting illumination; scutellum black; ♀ theca smaller..... 5
- 5 Middle and hind femora thickened with a blackish ring about middle, broader in ♀; ♂ tergites mainly yellow and obviously swollen (fig. 21); ♀ abdomen slender and more extensively blackish with a small black theca (fig. 20); 8-13 mm.
(Conopilla Rondani) ceriaeformis Meigen
Hosts unknown. Commonest in the southern counties Devon to Kent, but also recorded from Cambs., Cheshire, Hereford, Suffolk and Worcester and one surprising record from [Scotland] Kincardine (Invercannie). vii-x.

- Femora not thickened; legs usually yellowish or only obscurely banded; abdomen more normal in shape; ♀ theca yellow; 8.5-12 mm. . . . *quadrifasciatus* Degeer
Parasitic on *Bombus lapidarius* (L.). Uncommon though widely distributed in England, Ireland, Scotland and Wales. vi-ix.



FIGS. 17-18.—*Physocephala rustipes*: 17, discal area of wing; 18, hind leg.

Genus *Leopoldius* Rondani, 1843

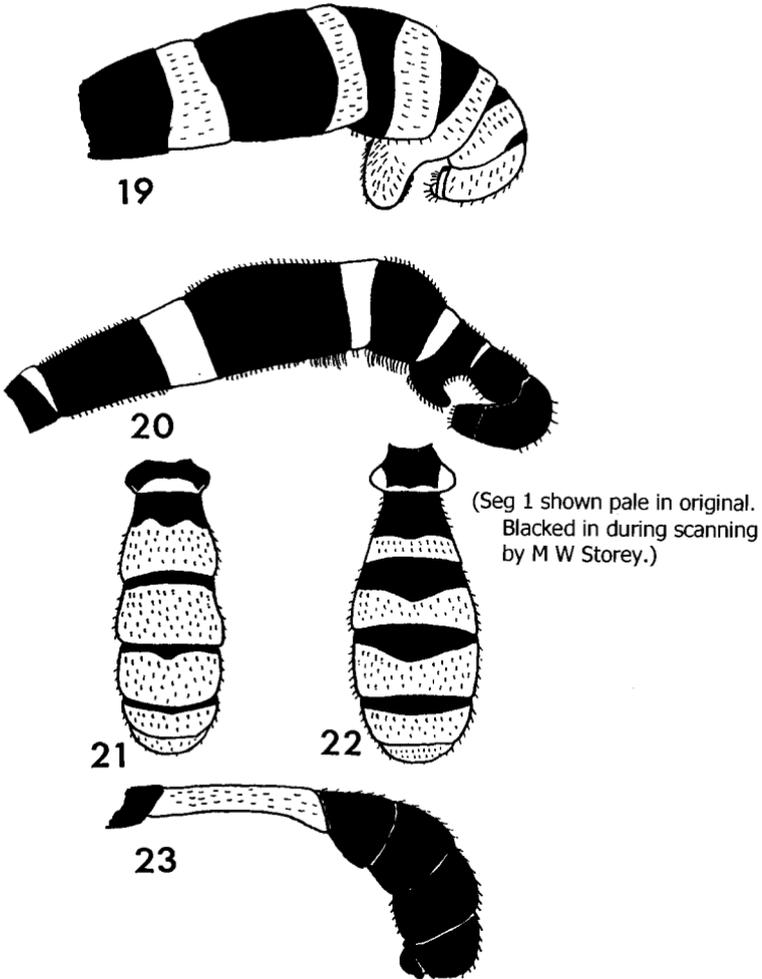
(*Brachiglossum* Rondani, 1856)

Medium sized yellow and black species resembling *Conops* in general facies, but distinguished at once by the short fleshy proboscis. Two species occur in Britain; both are rare, but in recent years *L. signatus* (Wiedemann) has been taken more frequently.

The life-histories of the British species are unknown, though *L. signatus* occurs at ivy blossom, with *Vespula*, upon which it is probably parasitic. On the continent *L. coronatus* Rondani and *L. diadematus* Rondani have been associated with *Vespula* (Meijere, 1912; Séguy, 1928) and the former reared from *V. germanica* (F.) (Meijere, 1912). Raw (1968) has observed *L. coronatus* ovipositing upon workers of *Vespula vulgaris* (L.), *V. germanica* and *Polistes gallicus* (L.).

KEY TO SPECIES

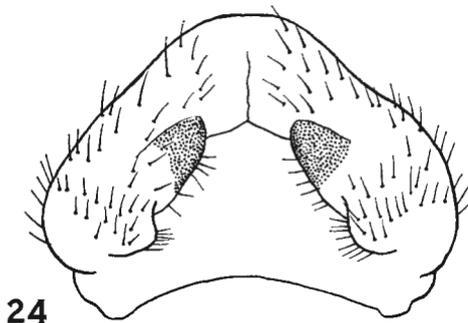
- 1 ♂ with a broad black streak down the facial ridges (figs. 14, 15), broad at junction with frons, tapering nearly to a point at level of mouth-edge and broadening again on to cheeks; femora usually completely yellow; genitalia with epandrium as illustrated (fig. 25); ♀ with theca large and prominent and black abdominal markings reduced (fig. 27); 10 mm.....*brevirostris* (Germar)
Hosts unknown, probably Vesputa spp. Very rare. England: Berks., Hants., Ozon. vii-viii.



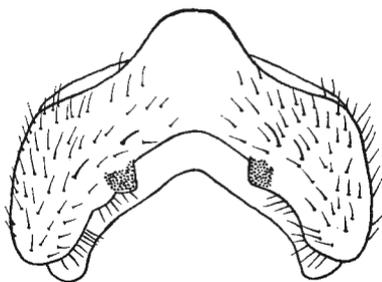
Figs. 19-23.—Conopid abdomens: 19, *Conops quadrifasciatus* female, in lateral view; 20, *C. ceriaeformis*, ditto; 21, *C. ceriaeformis* male, in dorsal view; 22, *C. quadrifasciatus* male; 23, *Physocephala rufipes* male, in lateral view.

- ♂ with facial ridges yellow though the facial keel is more or less darkened; hind femora nearly always, other femora often, with a blackish patch above about middle; genitalia with epandrium as illustrated (fig. 24); ♀ theca rather flat and not prominent, and black abdominal markings more pronounced (fig. 26); 10-11 mm.....*signatus* (Wiedemann)

Hosts unknown. Rare. Occurs at ivy blossom (Hedra helix L.) among Vespula upon which it is probably parasitic. England: Berks., Cambs., Cornwall, Glos., Hereford, Shropshire, Somerset, Suffolk, Worcester. vii-a.



24



25

FIGS. 24-25.—*Leopoldius*, epandria of male genitalia: 24, *L. signatus*;
25, *L. brevisrostris*.

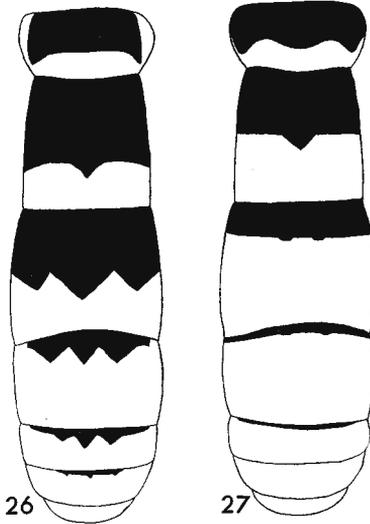
Genus *Physocephala* Schiner, 1861

Only two British species occur, of which *P. rufipes* is probably the most frequently encountered member of the family in the British Isles. Like members of the genus *Conops*, *P. rufipes* is attracted to thistles (*Carduus*) and ragwort (*Senecio*); it is best sought where large areas of flowers occur. *P. nigra* has been mostly frequently taken at flowers of rhododendron in the New Forest, but is also attracted to heather (*Erica*).

P. rufipes has been reared from a number of *Bombus* species by Meijere (1904) and Cumber (1949) and from a nest of *Vespula rufa* (L.) by Tuck (1896). A good description of a *Physocephala* larva is given by Townsend (1935) and photographs of living larvae are given by Smith and van Someren (in press). The known British and continental hosts of both species are given in the key.

KEY TO SPECIES

- 1 Large black species; black mid-stripe of face distinctly forked; antennae reddish; 14–18 mm..... **nigra** (Degeer)
Parasitic on Bombus muscorum (L.). A rare species with a discontinuous distribution. England: Dorset, Hants., Kent, Yorks.; Scotland: Argyll, Inverness, Perth (Black Wood, Rannock, 7.vii.1962, M. Speight), Ross, Sutherland. v-vii.
- Smaller, more reddish-brown species; black mid-stripe of face scarcely forked; antennae blackish; 7–15 mm..... **rufipes** (Fabricius)
Parasitic on Bombus terrestris (L.), B. agrorum (F.), B. lapidarius (L.), B. lucorum (L.), B. hortorum (L.), B. humilis (Illig.), B. pratorum (L.), B. ruderarius (Mueller), B. sylvarum (L.) and Vespula rufa (L.). Uncommon. England: Cornwall to Cheshire to Yorks. to Kent; Wales: Denbigh, Glamorgan, Pembroke. vi-ix.



FIGS. 26–27.—*Leopoldius*, female abdomens in dorsal view: 26, *L. signatus*; 27, *L. brevivirostris*.

Subfamily MYOPINAE

Rather dull flies, muscid-like in appearance, of medium to small size and easily overlooked.

KEY TO GENERA

- 1 Proboscis bent only once, near base (fig. 28); end of vein *sc* well separated from end of vein r_{1+2} along costa, but the veins joined by a distal cross-vein and cell R_5 usually closed (fig. 30); small greyish species..... **Zodion** Latreille (p. 13)
- Proboscis doubly geniculate (fig. 29); once near base and again near tip; no cross-vein joining *sc* to r_{1+2} ; small black or medium-sized reddish-brown species..... 2
- 2 End of vein *sc* well separated from end of r_{1+2} along costa; end of vein *rs* close to end of vein r_{1+2} (fig. 31)..... **Sicus** Scopoli (p. 13)
- Ends of veins *sc* and r_{1+2} very close together along costa; end of vein *rs* a long way from end of vein r_{1+2} (fig. 32)..... 3
- 3 Jowls below eyes at least as deep as half vertical diameter of eye; prothoracic episternite bare; usually no hairs on posterior margin of hind coxae; reddish-brown species..... **Myopa** Fabricius (p. 14)
- Jowls below eyes less than half as deep as vertical diameter of eye; prothoracic episternite with setae; hairs and bristles present on hind coxae; black species **Thecophora** Rondani (p. 16)

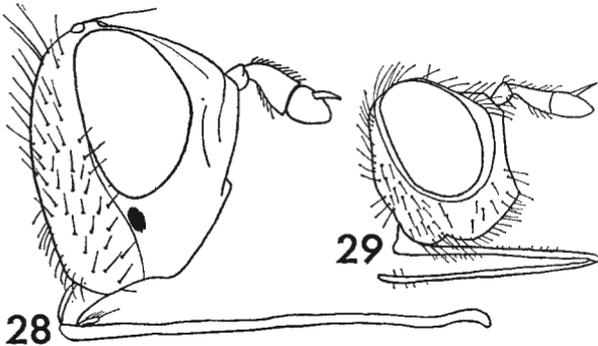
Genus *Zodion* Latreille, 1796

Small greyish species usually taken by sweeping, but sometimes seen at flowers such as *Mentha aquatica* L., *Iberis* spp., *Ranunculus* spp., etc.

Zodion is parasitic on bees and has not been reared in Britain, but its known continental hosts are given in the key. A good description of the larva of the American species *Z. obliquefasciatum* (Macquart) is given by Howell (1967). *Z. notatum* is probably only a colour form of *Z. cinereum*, but the type of the former has yet to be examined.

KEY TO SPECIES

- 1 Antennae yellowish-brown to reddish brown; 4-9.5 mm. . . . **cinereum** (Fabricius)
Parasitic on Hylaeus quadricinctus (F.), *Halictus rubicundus* (Christ) and *H. nylanderi* Per. on the continent. Uncommon, though widely distributed. England: Dorset to Hereford to Norfolk to Kent, also Northumberland and Yorkshire; Ireland (Monaghan, J. K. Fraser). v-vi.
- Antennae entirely black, or at most third segment only slightly brownish at base; 4-6 mm. **notatum** Meigen
Hosts unknown. Rare. England; Dorset (Swanage, H. W. Andrews); *Hants.* (Breamore, H. W. Andrews); *Herts.* (Felden, Gibbs and Barraud). vi.



FIGS. 28-29.—Myopinae heads, male, in lateral views: 28, *Zodion cinereum*; 29, *Thecophora atra*.

Genus *Sicus* Scopoli, 1763

Medium-sized flies of reddish-brown to dark brown coloration. The abdomen is thickened in the males and more elongated in the females. For a long time it was thought that the genus was represented in Britain by only one species, *S. ferrugineus* (L.). However in a recent revision of the genus, Chvala (1963) recognized a second British species.

KEY TO SPECIES

- 1 ♀ abdomen long and slender; second abdominal segment nearly twice as long as wide, theca very small (fig. 34), scarcely visible; ♂ second abdominal segment somewhat longer; 8-13 mm. **ferrugineus** (Linnaeus)
Parasitic on Bombus terrestris (L.), *B. agrorum* (F.), *B. hortorum* (L.) and *B. lapidarius* (L.). Uncommon, but generally distributed in the British Isles. v-ix.

- ♀ abdomen shortened, dorsoventrally flattened at base, second abdominal segment as long as or somewhat longer than wide, theca large (fig. 33); 8-11 mm.
(= *vaginalis* Kröber) *abdominalis* Kröber

Hosts unknown. Only British record Suffolk (Barton Mill, ♀, 9.viii.1906, A. H. Hamm).

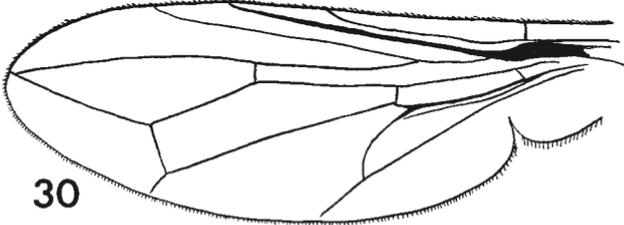


FIG. 30.—*Zodion cinereum*, wing.

Genus *Myopa* Fabricius, 1775

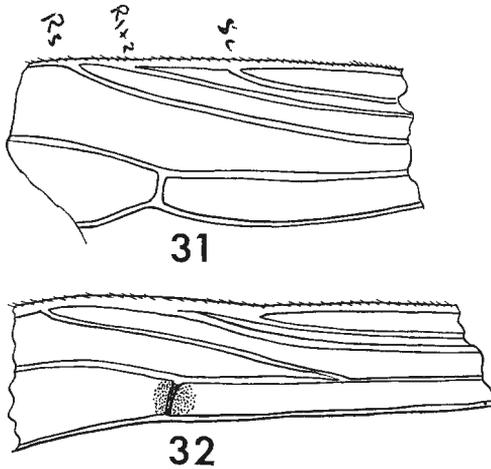
Small to medium reddish-brown flies, usually found at flowers of *Allium ursinum* L., *Crataegus* spp., *Taraxacum officinale* agg., etc. The genus has been little understood until the recent revision of Collin (1960), upon whose work the present key is based. Of special interest is the circumpolar species *M. vicaria* known from Sweden (Ringdahl, 1945, 1947, as *M. polystigma* var. *villosa* Ringdahl), England (Collin, 1960), and Canada (Smith, 1959b, 1961).

The hosts of the British species of *Myopa* are unknown, but on the continent unidentified species have been reared from *Eucera* sp., *Bombus* sp., *Andrena* spp., *Colletes* sp. and *Vespula* sp. (see summary in Smith 1966). No description of a *Myopa* larva has yet been published.

KEY TO SPECIES

(after Collin, 1960)

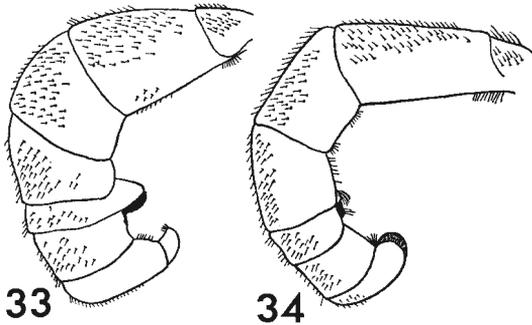
- 1 Wings without dark spots or patches, middle cross-vein (*r-m*) neither strongly infuscated nor whitish; no "beard" of fine hairs on lower margin of jowls; hind femora with a posteroventral in addition to an anteroventral row of short, stubby bristles towards tip; all tibiae beneath, about base, with a double row of closely adpressed spinose bristles; sixth male abdominal tergite with obvious indications of lines of fusion with seventh and eighth tergites. 2
- Wings often with cloudy patches, or at least with middle cross-vein either distinctly infuscated, or whitish; lower margin of jowls with "beard" of long whitish hairs; no posteroventral short stubby spinose bristles on hind femora similar to the anteroventrals, or at most only a very few much smaller ones; at least hind tibiae without closely adpressed spinose bristles beneath about base; sixth male abdominal tergite with far less indications of being fused with seventh and eighth tergites. 4
- 2 Second antennal segment almost equal in length to third segment and shining ocellar triangle almost equilateral; humeri and sides of thoracic disc darkened; last section of proboscis very short; all femora very strongly spinose both antero- and posteroventrally; 5-6 mm. *occulta* Meigen
Hosts unknown. Only two British specimens known. England: Hants., (Breamore, H. W. Andrews), (Bordean, J. C. Dale). vii-viii.
- Second antennal segment usually distinctly longer than third segment, or, if sub-equal, then the shining ocellar triangle is longer than wide at base, and narrow. . . 3



FIGS. 31—32.—Myopinae, costal area of wing: 31, *Sicus ferrugineus*; 32, *Myopa testacea*.

- 3 Larger species; sides of thoracic dorsum, pleurae and legs more yellowish; setae on frons, especially towards front, short and becoming pale there; scutellum darkened; disc of thorax more distinctly dusted, and dark areas of abdomen less shining black; abdomen at tip very densely and smoothly pollinose; ♀ with sixth abdominal tergite short and extensively dusted above, the seventh abdominal tergite conspicuously dusted above about base; 7–10 mm. *fasciata* Meigen
Hosts unknown. Scarce with a southern distribution. England: Berks., Devon, Dorset, Hants. (incl. Isle of Wight), Norfolk, Oxon. Suffolk, Surrey; Ireland: Co. Kerry. iv-v.
- Smaller darker species with yellowish parts of body and legs more tawny; small setae on front margin of frons not pale; disc of thorax darker (less dusted), and dark parts of abdomen more extensive; proboscis rather shorter; ♂ abdomen not so densely or smoothly pollinose; ♀ with sixth abdominal tergite short with only a small dust spot above and seventh tergite entirely shining; 7.0–7.5 mm. *curtirostris* Kröber
Hosts unknown. Rare. England: Cambs., Norfolk, Oxon, Wilts. vii.
- 4 Middle cross-vein (*r-m*) whitish, wing anteriorly brownish with forks and cross-veins whitish; veins dark brownish, but yellowish in the whitish areas; 8–12 mm. *buccata* (Linnaeus)
Hosts unknown. Uncommon, though generally distributed. England: Cornwall to Cumberland to Norfolk to Kent; Scotland: Aberdeen, Arran, Dumbarton, Elgin, Inverness, Perth, Sutherland; Wales: Glamorgan; Ireland: Carlow, Cork, Kerry, Wexford, Wicklow; Channel Isles. iv-vii.
- Middle cross-vein obviously infuscated. 5
- 5 Thoracic dorsum dark behind on a broad middle stripe right up to scutellum; wings practically without clouds except for the strongly infuscated middle cross-vein (*r-m*) (fig. 32); hairs on upper part of facial orbits mainly pale and therefore inconspicuous; 6–11 mm. *testacea* (Linnaeus)
Hosts unknown. Uncommon, but widely distributed. England: Cornwall to Norfolk to Kent; Scotland: East Lothian, Edinburgh, Dumfries, Inverness, Perth; Ireland: Armagh, Cavan, Dublin; Wales: Brecon, Merioneth, Monmouth. iv-vii.
- Thoracic dorsum not dark behind quite up to base of scutellum; other parts of wing in addition to middle cross-vein (*r-m*) infuscated; usually some black hairs on upper part of facial orbits, but often mainly pale in *polystigma*. 6

- 6 Longer haired species, especially those hairs on disc of last 2 abdominal tergites longer than first segment of hind tarsi.....7
- Shorter haired species; hairs on disc of last 2 abdominal tergites not longer than first segment of hind tarsi.....8
- 7 A particularly long-haired species; many of the hairs on the facial orbits considerably longer than length of antennal style and hairs on all tibiae particularly long, many more than twice as long as tibia is thick; abdomen of somewhat dingy orange-yellow colour; ptero-, sterno- and hypopleura with conspicuously darkened patches; all tibiae only hairy beneath, with no indications of postero-ventral adpressed spinose bristles about base; 6-9 mm..... **vicaria** Walker
Hosts unknown. Rare. England: Suffolk (Barton Mills, J. E. Collin). iv.
- Hairs on facial orbits shorter, particularly so in female, and hairs on tibiae scarcely longer than tibiae are thick; abdomen more blood-red in colour; pleurae much more uniformly yellowish; four anterior tibiae with a postero-ventral row of short, very adpressed, spinose bristles about bases; ♂ with sixth abdominal tergite less dusted about base, especially when viewed from above; 5-9 mm.
strandii Duda
Hosts unknown. Rare. England: Cambs. (Chippenham Fen, J. E. Collin); Devon (Plym Valley, G. M. Spooner); Kent (Farningham, 23.iv.1903, H. W. Andrews); Somerset (Minehead, G. M. Spooner); Suffolk (Barton Mills, J. E. Collin). iv.
- 8 Palpi tawny brown; last section of proboscis shorter than front tarsus; a smaller blunt tooth (paralobe) at end of each side of male genital tergite; posteroventral hairs next to bare space beneath hind femora near tip, very short and fine; 5.5-8 mm..... **polystigma** Rondani
Hosts unknown. Scarce. England: Devon to Yorks. to Cambs. to Kent; Ireland: Dublin. iv-v.
- Palpi distinctly yellow; last section of proboscis longer, about as long as front tarsus; a larger blunt tooth (paralobe) to male genital tergite; posteroventral short setae next to bare spaces beneath hind femora somewhat stout and spine-like; 6.5-10 mm..... **extricata** Collin
Hosts unknown. Scarce. England: Cornwall, Essex, Hants. (Isle of Wight only), Kent, Oxon, Somerset, Sussex. iv-v.



FIGS. 33-34.—*Sicus*, female abdomens in lateral views: 33, *S. abdominalis*; 34, *S. ferrugineus*.

Genus *Thecophora* Rondani, 1845

(*Occeomyia* R.-D., 1853; *Oncomyia* Loew, 1866.)

Small inconspicuous black flies, found at flowers of *Scabiosa succisa* L., *Hieracium* spp., thistles, *Veronica* sp., *Senecio* spp., etc., or near *Halictus* colonies. *T. atra* (F.) is very variable in size and at one time small specimens were regarded as *T. pusilla* (Meigen). *T. fulvipes* (Desv.) (= *sundewalli*

Zetterstedt) was included as British by Curtis (1838 : pl. 677), but was overlooked until recently (see Smith, 1955c). Some records of *T. atra* from Ireland and the Isles of Scilly given in Smith (1959a) refer to *T. fulvipes* and are treated as new records for that species below.

Thecophora has not been reared in Britain, but is usually associated with colonies of *Halictus*. The larva of the Nearctic *T. occidentalis* Walker has been described (Smith, 1966).

KEY TO SPECIES

- 1 Legs shining black with hind femora on basal half and all knees yellowish; dorsum of thorax with 3 inconspicuous longitudinal stripes; 4-7 mm. . . . *atra* (Fabricius)
Hosts unknown, but occurs near Halictus nests, upon which it is probably parasitic. Uncommon, though widely distributed. England: Cornwall to Derby to Norfolk to Kent, also Westmorland; Ireland: Down, Mayo, Waterford; Scotland: Arran, Edinburgh, Elgin. Wales: Glamorgan, Pembroke. v-x.
- Legs more extensively yellowish, anterior and median femora dark above and yellowish below, hind femora yellow on basal two-thirds or more; dorsum of thorax with 3 distinct black stripes; 6-9 mm.
 (= *sundewalli* Zetterstedt) *fulvipes* (Desvoidy)
Hosts unknown, but has been recorded among Halictus colonies abroad. Scarce. England: Berks., Cornwall, Devon, Dorset, Glos., Hants., Hereford, Oxon, Westmorland; Scotland: Argyll, Arran, Inverness; Wales: Anglesey; Ireland: Co. Cavan (Cornoflan, R. C. Farris); Killarney (Fleek, 5.viii.1940, B. P. Bierne); Isles of Scilly. vi-ix.

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