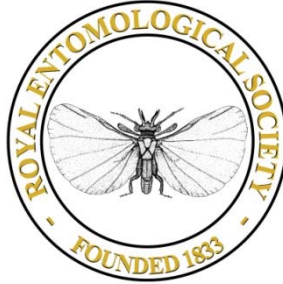


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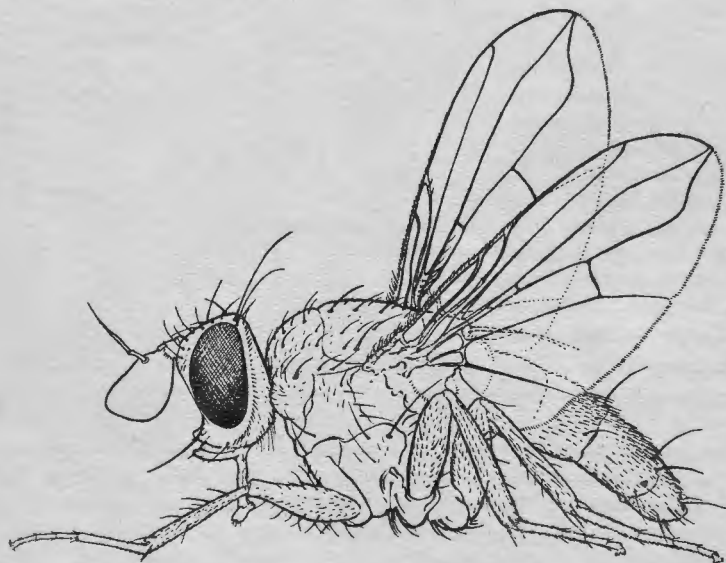
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# HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



DIPTERA CYCLORRHAPHA  
CALYPTRATA (I)  
SECTION (a). TACHINIDAE AND CALLIPHORIDAE

By  
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- 2 (1) Tibiae dark brown (beware of pale reflections). Lower part of parafacialia fully as wide as third antennal segment (fig. 31R). *ad* row of setae of hind tibia consisting of more widely spaced and more unequal setae (see fig. 31L), 3 being conspicuously longer. Black with very thin whitish dust (sometimes brownish in places), almost without bluish reflections, otherwise coloured like *pavida*. ♂: frons a third (0.32–0.33) head-width; subapical scutellars almost twice as widely separated from each other as from basal scutellars (fig. 31Q). ♀: frons slightly more than a third head-width (0.35). ♂: figs. 31Q, R. 7–9 mm.

*Parasite of Plusia gamma L. (AGROTIDAE), Lymantria monacha L. (and abroad a THAUMETOPOEID and a SATURNIID). Almost certainly not British although recorded from Sussex, Cornwall, Gloucs., Hereford., etc.*

*pumicata* Meigen.

### CALLIPHORIDAE.

Like the Tachinids the Calliphoridae have a well-developed ptilinal suture (fig. 1M, *pt*), only three antennal segments with a dorsal arista (fig. 1A), a longitudinal cleft on dorso-exterior surface of second antennal segment (fig. 1A, 2), the spiracles situated in the ventral part of the tergites (fig. 1R, *sp*), and a row of hypopleural setae (fig. 1E, F, *hs*). They differ from the Tachinidae by the absence of a convex postscutellum (fig. 1E, *p*, F). This character is, however, not quite as unambiguous as it sounds or as it appears in typical forms of the families, the postscutellum being in reality only a convex fold of the metanotum, which is separated from it by a more or less deep groove, whilst it is separated from the scutellum by a membranaceous suture. In most Calliphoridae (fig. 1F) it will be seen that the uppermost part of the metanotum is slightly convex in lateral view and defined below by a slight depression. In Tachinidae, however, this depression becomes a deep groove (fig. 1E). The transitional forms are found in Rhinophorinae, a group which undoubtedly connects the two families. It is believed that the key to the families on pp. 1–2 will allow the British forms to be classified correctly.

The most common and best-known Calliphoridae are scavengers, but the habits of the various groups are very diverse, and the phylogeny of the habits in this family is an interesting and unsolved problem. The Rhinophorinae are parasites as far as known, and the larvae of most species live in woodlice. The habits of the Sarcophaginae are very varied, *Sarcophaga* itself developing in a wide range of organic matter, from excrements over dead animals to living ones. The genera most closely related to *Sarcophaga* have similar habits, many species being parasitic, some of them even in mammals. The Miltogrammini and Macronychiini all develop in nests of Sphegidae, Vespidae and Apidae, consuming the food—in many cases paralyzed insects—stored for the development of the Hymenopterous larvae and also devouring the egg or young larva of the host. *Pollenia rudis* is a parasite of earthworms, but nothing is known about other Polleniinae. In Calliphorinae the Rhiniini attack insect eggs and pupae (Patrizi!), the Cephomyiini parasitize mammals, some Calliphorini snails, others earthworms, others occasionally sheep and other mammals whilst living normally on dead organic matter, one of the Phormiini is a regular external parasite of bird nestlings, the others being scavengers. It seems that all these habits can most easily be derived from necrophagy on fresh dead bodies, but whether nature has really worked in this way remains an open question.

For a reliable identification the male genitalia must be exposed in most genera of this group, so it is a good plan to mount all male Calliphoridae with exerted genitalia (see pp. 4-5).

## KEY TO SUBFAMILIES.

- 1 (6) Propleural depression bare (fig. 32A, *d*). Prosternum (fig. 32C, *p*) bare (in some specimens with 1-2 odd hairs), seldom setulose, in these cases the notopleura with 3 (*Helicobosca*) or 4 (fig. 32A, *n*; a few *Sarcophaga* with sparsely setulose prosternum) setae in addition to any hairs. The outermost (and often only) *ph* (fig. 32A, *y*) lies inward of, or on, a longitudinal line imagined through the *prst* (fig. 32A, *x*). Stem vein bare (fig. 33H, *s*). Mouthparts always well developed. Never metallic blue or green.
- 2 (5) Thorax with normal stiff setulose hairs in addition to the setae (fig. 32E).
- 3 (4) Free inner margin of lower calyptra (*l. c.*) broadly rounded off, diverging from lateral margin of scutellum from base onwards, broadly separated from scutellum everywhere except at base, and passing gradually into the strongly rounded apical margin (fig. 32G). Bend of *m* rounded, obtuse or indistinct, not prolonged towards margin in the main direction of *m* (figs. 32I, *k*, *l*). Ventrites as a rule broadly exposed. . . RHINOPHORINAE (p. 97).
- 4 (3) Free inner margin of lower calyptra (*l. c.*) more or less straight, following lateral margin of scutellum for a considerable distance, and turning outwards as a rule rather abruptly into the almost truncate apical margin (fig. 32H). Bend of *m* angular, almost always prolonged towards margin in the main direction of *m* by an appendage or darkened fold . . . SARCOPHAGINAE (p. 101).
- 5 (2) Thorax with long wavy golden (seldom dark brown) hair (fig. 32F) in addition to the black setae and setulose hairs (the wavy hair is easily rubbed off, especially on dorsum, but can always be traced on the more protected parts of the pleurae, e.g., behind the row of mesopleural setae (fig. 32F)) . . . POLLENINAE (p. 116).
- 6 (1) Propleural depression (fig. 32B, *d*) setulose, except in *Stomorphina* (with bristles on postero-dorsal surface of stem vein) and *Pharyngomyia* (with vestigial mouthparts). Prosternum setulose (fig. 32D, *p*), except in many *Pseudonesia* and *Engyops*. The outermost *ph* (fig. 32B, *y*) lies outward of a longitudinal line imagined through the *prst* (*x*), or setae of anterior part of thorax indistinct among the hair. . . . . CALLIPHORINAE (p. 118).

## Subfamily RHINOPHORINAE.

Small slender black flies with the main parts of the body conspicuously set off from one another. Antennae as a rule inserted below middle of eyes. Frontal setae not or hardly descending below base of antennae. *prst acr* absent or consisting of one (the intermediate) pair. Posterior operculum of the metathoracic spiracle small or absent.

The flies combine features of the more primitive Tachinidae, Calliphoridae and Muscidae. As far as the hosts are known, the species are parasitic in terrestrial Isopoda (Thompson, 1934), although there is a creditable report of *Melanophora* being also predacious in egg-cocoons of spiders (*Aranea foliata* Fourc.) and of *Cinochira* parasitizing a bug. (A record, on pure assumption, according to which *Stevenia* might be parasitic in *Callidium* (CERAMBYCIDAE) and a probably no less unreliable record of *Melanophora* being parasitic in *Pyrallis farinalis* L. should be entirely discounted.)

## KEY TO GENERA.

- 1 (12)  $R_5$  without a stalk (fig. 32I), or with a stalk which is not longer than  $r-m$  (fig. 32K).
- 2 (7)  $R_5$  open at apex of wing (fig. 32I), *m* being only slightly or moderately up-curved and without a distinct, or with only a flatly rounded bend. Length 2.5-4.5 mm.

- 3 (4) *m* almost straight,  $R_5$  therefore about twice as wide at apex as at *r-m* (fig. 11). Halteres yellowish. Parafacialia bare, very narrow (fig. 32o). Arista with very short decumbent hairs. Scutellum with 3-4 pairs of marginals; apical ones diverging (fig. 32M). Frons wider than an eye ( $\delta$ ♀), anterior part orange like face, palpi and base of antennae. Fuscous brown, with very thin brownish dust. ♀: genitalia forceps-like, but small and inconspicuous, bent downward and forward. ♂: figs. 11, 32M, o. 2.5-3 mm.  
*Recorded from Eremocoris plebeius Flm. (LYGAEBIDAE) Michalk, 1938, Arb. phys. angew. Ent. 5: 259, and possibly better placed in PHASIINAE (DUFOURIINI or a separate tribe). Hants. to Cornwall to Hereford. to Norfolk. e.v- b.ix, rare.....Cinochira atra Zetterstedt.*
- 4 (3) Apical section of *m* with a conspicuous bend, which forms a rounded obtuse angle (fig. 32i),  $R_5$  about as wide at apex as at *r-m*. 3-5 mm.
- 5 (6) Arista pubescent. Parafacialia quite bare. Halteres yellow. Subbasal scutellars absent, subapical ones strong, apical ones rather small, decussate. Third abdominal segment often with discals, especially in female. Black, last three abdominal segments of male greyish dusted anteriorly. ♂: frons one-fifth to two-sevenths head-width, with a proclinate orbital. 4.5 mm. *Norfolk: Horning, 27.viii.28 ♂ (J. Collins), 14.viii.32 (♂), 30.vi.52 (♀) (J. E. Collin). Hants.: Wick, 16.vi.45 (Wainwright, !)*  
*Angioneurilla cyrtoneurina Zetterstedt.*
- 6 (5) Arista short-plumose in basal half, longest rays about as long as width of antenna (fig. 32P). Parafacialia finely setulose. Halteres fuscous. Scutellum (fig. 32U) with small decussate apicals and in addition only one pair of strong diverging marginals at middle of sides. Anterior three abdominal segments without, fourth sometimes with, discals. Wholly fuscous or piceous, thinly brownish grey dusted, especially sides of thorax and in male intermediate abdominal segments, a broad median vitta and hind margins dark. Wings (fig. 32t) broadly infusate anteriorly, especially along  $r_{2+3}$ . ♂: eyes subcontiguous, proclinate orbitals absent. ♂: figs. 32t, P, Q, U. 3.3-4.5 mm. (= *Anthracomia melanoptera* Meigen of British authors.)  
*England, Wales, Scotland (to Inverness. and Aberdeen.), generally distributed. e.v-e.viii, hedges and wastes, common.....Morinia nana Meigen,*
- 7 (2)  $R_5$  ending at apical part of front margin, conspicuously before apex of wing, almost closed or with a very short stalk (fig. 32k), bend obtuse. Parafacialia conspicuously setulose. 4.5-9 mm.
- 8 (9)  $R_5$  closed in margin or very narrowly open. Palpi, mouth-margin, tibiae ( $\delta$ ) or tibiae and at least a broad apical part of femora ( $\eta$ ) testaceous.

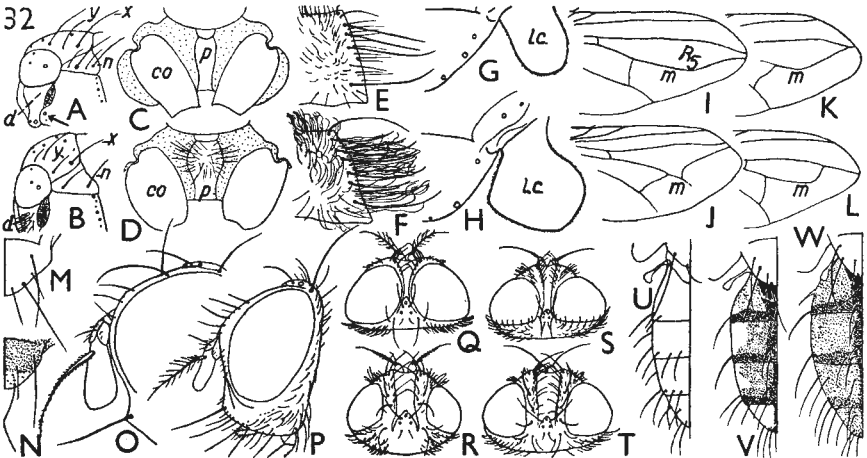


FIG. 32.

Scutellum in addition to the strong decussate apicals with only one pair of strong subparallel setae between middle and base (fig. 32N). Thorax with three conspicuous narrow brown-dusted vittae. Intermediate abdominal segments without discals. ♂: frons more than a third head-width at vertex, with a proclinate orbital (fig. 32R); apex of scutellum, anterolateral part of intermediate tergites, and the large raised lobes of fourth ventrite yellowish translucent. ♀: basal two antennal segments orange. ♂: figs. 32N, R. 4.5–6.5 mm. (= *trilineata* Meigen.)

*Larva in woodlice. England and Wales, generally distributed. Angus, Moray. Channel Is. e.v-b.ix, woods and heaths, uncommon*

**Frauenfeldia rubricosa** Meigen.

- 9 (8)  $R_5$  with a very short stalk (fig. 32K). Legs wholly black. Scutellum in addition to the decussate strong apical setae with two (to three) pairs of strong marginals (figs. 32V, W), one, at middle, strongly diverging, the other between middle and base, somewhat weaker. Thorax with undusted fuscous, but without distinct brown-dusted, vittae. Scutellum wholly dark in ground-colour. ♂: frons less than a third head-width.
- 10 (11) First tergite without marginals, second (and third) without discals (fig. 32V). Thorax in front of suture with five (seven) irregular black vittae, the median vitta between the *dc* being divided. Palpi fuscous. Occipital dilation with upper and lower margins almost parallel, closely approaching the setulae near the vibrissae. ♂: frons (fig. 32S) an eighth head-width, without a proclinate orbital. ♂: figs. 32K, S, V. 5–8 mm. (*Protachaeta* Enderlein, 1936, n. syn.)

*Parasite of woodlice. Dorset. to Cornwall to Gloucs., Middx. (!). m.v-b.ix, coastal wastes and gardens. . . . . Styloeneuria discrepans* Pandellé.

- 11 (10) First tergite with marginals, (second and) third with discals (fig. 32W). Thorax in front of suture with three black vittae. Palpi ferruginous. Occipital dilation short, separated by a broad bare space from the setulae near the vibrissae, upper margin strongly oblique. ♂: frons almost a third head-width, with two proclinate orbitals (fig. 32T). ♂: fig. 32G, T, W. 4.5–9 mm.

*Larva in woodlice. Kent to Cornwall to Pems. to Salop to Lincs. Channel Is. m.v-m.x, wastes, especially coastal, common*

**Phyto melanocephala** Meigen.

- 12 (1)  $R_5$  with a stalk which is much longer than *r-m* (fig. 32L). Scutellum (fig. 33A) in addition to the decussate apical setae with only one pair of strong setae (and sometimes a weak one near base).
- 13 (16) Parafacialia bare (fig. 33C). Wings with basal half paler than apical half (fig. 33H) or wholly hyaline, in the latter case an anterior weaker pair of scutellar marginals close to base (fig. 33B). *m-m* meeting fourth vein nearer base than fifth (fig. 33H), anterior apical angle of discal cell therefore more or less obtuse, posterior one acute unless *m-m* is somewhat convex, so that the posterior angle also becomes slightly obtuse. Halteres fuscous. 1 + 1 *stpl*.
- 14 (15) Anterior scutellar marginal close to base (fig. 33A). Palpi vestigial (fig. 33C, ↑). *prst ia* present, anterior *post ia* small. Wings (fig. 32L) wholly hyaline. Abdomen without marginal or other setae on disc. Body stout, reminiscent of *Alophora*. Thorax and abdomen shining black, without pale pollinosity; face silver dusted. ♂: eyes subcontiguous (fig. 33F), in ♀ more widely separated, in ♂♀ without proclinate orbitals. ♂: figs. 32L, 33A, C, F. c. 4.5 mm. (*Lithophasia* auct., erroneous emendation.)
- Hosts unknown. Sussex: Guestling, Hastings, 1887*
- Lithophasia hyalipennis** Fallén.
- 15 (14) Anterior strong scutellar marginals at or beyond middle, strongly diverging. Palpi well developed, though only half as long as mentum, yellowish. *prst ia* absent, anterior *post ia* strong. Wings with a conspicuous apical cloud beyond level of *r-m*, basal part pale hyaline (fig. 33H). Abdomen (fig. 33I) with strong marginals, median ones on posterior three segments somewhat in front of hind margin. Body slender as in *Stevenia*, etc. Thorax with very thin whitish grey dust and four black vittae; abdomen (fig. 33I) with narrow whitish-dusted fore margins on the lateral part of intermediate segments. ♂♀: frons (fig. 33G) about a quarter head-width, with

two strong proclinate orbitals. ♂: figs. 33B, G, H, I. 5.5-7.5 mm. (*Plesina* auct., nec Meigen; *Euplesina* Wainwright.)

*Larva parasitic in woodlice. England, Wales, Scotland (to Inverness, Aberdeen.), generally distributed. e.vi-m.ix, woodlands, rare*

**Parafeburia maculata** Fallén.

16 (13) Parafacialia setulose, often with one or several strong setae on lower half, which are curved downwards (figs. 33D, E). Basal half of fore margin of wing not paler than apical half, posterior apical angle of discal cell right or obtuse, *m-m* running in the normal direction. Anterior pair of scutellar marginals at or beyond middle, strongly diverging.

17 (20) Parafacialia with fine setulae, which have only a fraction the length of the peristomal setae (fig. 33D). Abdominal segments 1-3 with marginals, but without discals (very small ones sometimes on third segment). Pollinosity of thorax very inconspicuous, not forming vittae, greyish brown. 3-5.5 mm.

18 (19) Halteres fuscous. Calyptrae strongly infusate. Costal spine absent; stalk of *R*<sub>5</sub> longer than apical cross-vein. Parafacialia almost twice as wide as antennae. Parafrontalia with a complete row of strong proclinate setae (♂♀). Virtually without pollinosity, fuscous-black and shining. Wings strongly and wholly infusate, in ♀ with a large milky-white apical spot behind apex of *r*<sub>4+5</sub>. ♂♀: frons more than a third head-width. 3.3-5.5 mm.

*Larva parasitic in woodlice and predacious in egg-cocoons of spiders. England, generally distributed. Co. Dublin. m.v-e.viii, ix, houses and gardens, rather common.*

**Melanophora roralis** L.

19 (18) Halteres yellow. Calyptrae white. Costal spine much longer than *r-m*, stalk of *R*<sub>5</sub> shorter than apical cross-vein. Parafacialia hardly wider than antennae (fig. 33D), which reach level of vibrissae. Parafrontalia without (♂) or with two (♀) proclinate setae. Intermediate tergites conspicuously whitish dusted on basal half, with a complete median vitta. Wings uniformly brownish grey (♂♀). ♂: frons one-fifth head-width. ♂: fig. 33D. 3-5.5 mm.

*Larva parasitic in woodlice. Kent to Cornwall to Glam. to Hereford. to Warwks. to Norfolk. b.vii-b.ix, gardens and wastes, common*

**Rhinophora lepida** Meigen.

20 (17) Parafacialia in addition to setulae with one or several strong setae, which are curved downwards, and which are as strong as the peristomal setae (fig. 33E). Thorax (in an oblique posterior view) with two rather broad

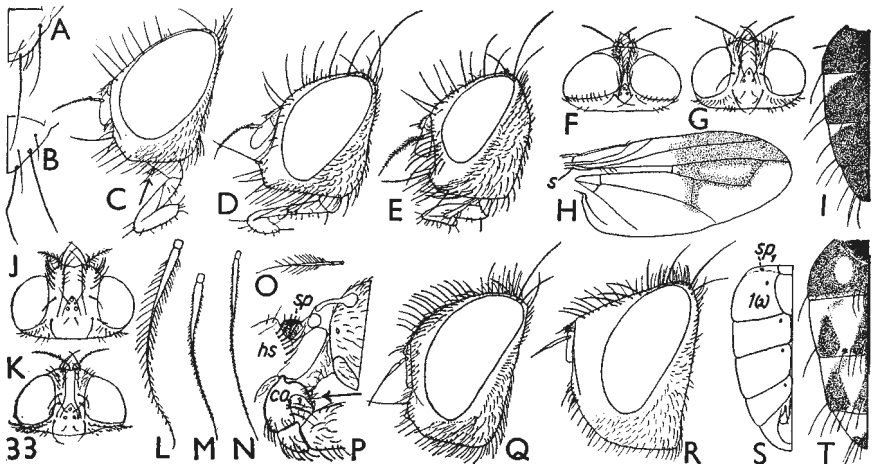


FIG. 33.

and conspicuous white-dusted vittae. Wings conspicuously browned along fore margin. ♂: frons (as in ♀ or) as in *Rhinophora* ♂, mid femora at apex of *pv* surface with a comb of small, stout spinules. 5.5-8.5 mm.  
*Larva parasitic in woodlice*.....**Stevenia** (p. 101).

### Stevenia Robineau-Desvoidy, 1830.

- 1 (2) Abdominal segments two (and usually three) without discals, but segments 1-3 with marginals. Arista short-pubescent, the pubescence decumbent and less than half as long as basal width of arista (fig. 33M). Pollinosity less conspicuous. (*Stevenia*, s. str.)  
 (Not British?, the only specimen mentioned by Wainwright, a female, not male, having arista hairs like *atramentaria* and being apparently a specimen of the latter without discals).....**umbratica** Fallén.
- 2 (1) Abdominal segments 2-3 (normally) with discals and marginals. Arista conspicuously haired, the longest hairs on both dorsal and ventral surfaces being longer than basal diameter of arista (fig. 33L). Pollinosity more conspicuous. (Sbg. *Ptilocerina* Macquart.) ♂: fig. 33E. 5.5-8.5 mm.  
*Kent, Oxon., recorded from Sussex and Suffolk.* v, b.-e.vi, m.vii, b.-e.viii, locally not uncommon.....**atramentaria** Meigen.

### Subfamily SARCOPHAGINAE.

#### KEY TO GENERA.

- 1 (26) Hind coxae bare on posterior surface. ♂: 1 (2) free ventrites (fig. 33s), but all ventrites free in *Helicobosca* and somewhat exposed in *Macronychiini*.
- 2 (17) Arista bare (fig. 33Q) or very short-pubescent, the hairs velvet-like (fig. 33N).
- 3 (14) Jowls in a strictly lateral view up to about a quarter the height of an eye (figs. 33Q, R, 34A-C). Mid tibia as a rule with one strong *ad* seta only, but in addition often with a number of setulae, especially basad. Ventrites 3 and 4 largely hidden by tergites. Vibrissal angles broadly rounded or slightly projecting, in the latter case the head as a rule shorter at vibrissal angles than at lunula. ♂♀: frons of equal width and with proclinate orbitals (often more than two and correspondingly finer, in *Pachyophthalmus* a complete row) (MILTOGRAMMINI).  
*Larvae in nests of fossorial Hymenoptera including APIDAE and VESPIDAE; adults mainly in sunny, especially sandy places, often "shadowing" the female Hymenoptera.*
- 4 (11) Head not or only moderately shorter at vibrissal angle than at lunula, vibrissal angle rounded or somewhat prominent, vibrissae above mouth-margin; frons not conically projecting anteriorly (figs. 33Q, R, 34A).
- 5 (6) Numerous proclinate hairlike orbitals, in a row close to inclinate frontals (fig. 33Q). Antennae inserted below middle of eyes. Tergites 1-4 with strong marginals. Ground-colour wholly fuscous-black. Hairs on parafacialia and jowls black. Thorax grey dusted with three brownish black vittae; abdomen (fig. 33T) whitish grey dusted, each segment with three oblong black spots, the anterior half of the paired spots somewhat curved mediad. ♂: pulvilli and claws as long as last tarsal joint. ♂: figs. 33Q, s, r. 5-9 mm.  
*Larva in the nests (both underground, in hollow branches, and free) of SPHEGIDAE, VESPIDAE and some APIDAE; the female settles near the nest and enters as soon as the host female leaves; viviparous. Sussex to Somerset to Gloucs. to Suffolk.* m.v, b.vi-b.viii, wastes, rare  
**Pachyophthalmus signatus** Meigen.
- 6 (5) 2-5 more or less strong proclinate orbitals (figs. 33R, 34A). Antennae inserted above middle of eyes.
- 7 (8) Vibrissae not clearly differentiated from the adjacent setulae (fig. 33R). Head orange, except for most of occiput; thorax and abdomen dark in ground-colour, moderately densely dusted with seven incomplete black vittae. Hair of jowls very fine, pale golden yellow, of parafacialia minute, pale. ♂♀: pulvilli and claws short.



*Larvae preying on the stored food of fossorial HYMENOPTERA, including APIDAE; eggs deposited in the burrows or on the prey while this is being carried to the burrow.....Miltogramma (p. 105).*

8 (7) Vibrissae well developed, crossing (fig. 34A). Hair of jowls black as a rule at least on posterior half of occipital dilation.

9 (10) Head (fig. 34A) blackish in ground-colour, only epistoma reddish; palpi normally fuscous. Hairs of jowls all black. Abdomen (fig. 34F) with brown dusted median vitta and paired longitudinal black and shining spots, the latter somewhat converging anteriorly on the intermediate segments and thus tending to form a semicircle. ♂: pulvilli and claws (fig. 34E) as long as the last tarsal segment. ♂: figs. 34A, E, F. 3.5-5.5 mm.

*Larva in nests of SPHEGIDAE; oviposition apparently on the female wasps carrying prey. England, Wales, Scotland (to Moray.), generally distributed. b.vi-b.ix, sandy places, common.....Senotainia conica Fallén.*

10 (9) Head rufous in ground-colour; palpi yellow. Hairs on anterior part of occipital dilation yellow. Abdomen (fig. 34G) densely grey dusted, with shifting transverse or without distinct spots, never with well-defined vittae or longitudinal spots. ♂♀: pulvilli and claws much shorter than last tarsal segment (fig. 34D). ♂: figs. 34D, G. 6-8 mm.

*Larva found in Cerceris-burrows in the Clythra collected by the female as food for its larvae. Surrey: Oxshott; Esher; Pirbright; Egham; Hants.: New Forest; Barton-on-Sea; Cornwall: Padstow; Oxon.: Lye Hill; Berks.: Tubney. b.vi, b.vii, b.viii, sandy places, scarce....Setulia grisea Meigen.*

11 (4) Head (figs. 34B, c) much shorter at vibrissal angle than at lunula, frons conically projecting anteriorly, vibrissal angle rounded and strongly receding, profile thus subtriangular; vibrissae at mouth-margin (in *Ptychoneura cylindrica* often apparently a little above it). Ground-colour of head and body dark, at most face and anterior part of interfrontalia somewhat dull orange.

12 (13) Parafacialia on their entire length with a row of strong setae, which are curved downwards (fig. 34B). Facial ridges bare on upper two-thirds or more. Abdomen (fig. 34H) with strong marginals on first to fourth segments. Two strong *prst dc*. Frons wider at vertex than an eye. Arista incrassate in less than basal half.

*Apparently viviparous; larva in nests of SPHEGIDAE, APIDAE and Pompilus, the female either entering the nest of the host (and sometimes buried in the nest) or pouncing upon the prey that is being dragged in...Metopia (p. 105).*

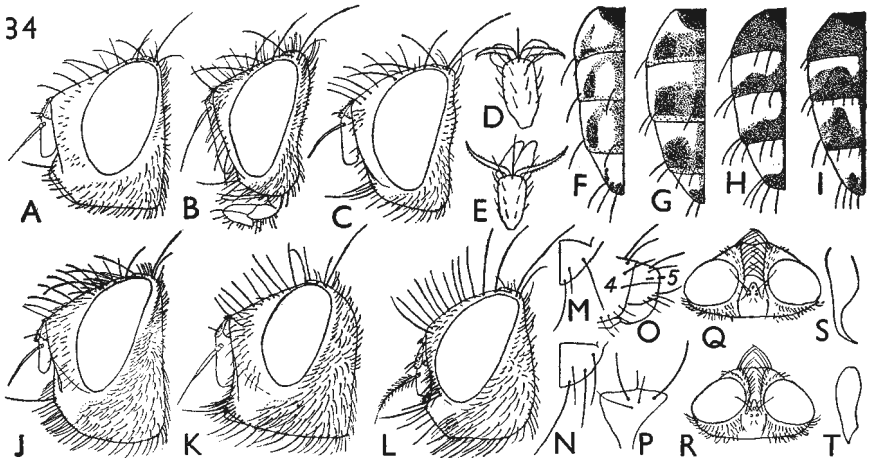


FIG. 34.

- 13 (12) Parafacialia bare below and with fine setulose hairs above (fig. 34c). Facial ridges with setulae ascending to about middle or beyond. Abdomen without differentiated marginals, but on the posterior segments with a marginal row of long decumbent setulose hairs (fig. 34i). Three *prst dc*, only the last strong, second rather weak and the front one almost indistinct. Frons narrower at vertex than an eye. Arista short, incrassate and subcylindrical to beyond middle (fig. 34c).  
*Larvae in nests of SPHEGIDAE* (Coelocrabro, Cemonus, Rhopalum, Pemphredon)..... **Ptychoneura** (p. 106).
- 14 (3) Jowls in a strictly lateral view of the head at least a third height of eye (figs. 34j, k). Mid tibia with at least two strong submedian *ad setae*. Ventrites 3 and 4 moderately exposed. Parafacialia with several irregular rows of black setulose hairs. ♂: frons somewhat narrower, with or without proclinate orbitals. (MACRONYCHINI; a transitional group, *Brachycoma* being more agriine and *Macronychia* more miltogrammine in characters.)  
*Larvae in nests of HYMENOPTERA*.
- 15 (16) Vibrissae conspicuously above mouth-margin, vibrissal angles not projecting, rounded, head (fig. 34j) somewhat shorter at mouth-margin than at lunula. Setulae of parafacialia fine and subequal. *prst acr* fine but as a rule clearly distinguishable. Thorax with four or five vittae in front, greyish pollinosity rather dense; abdomen with or without spots. ♂: proclinate orbitals present.  
*Larvae in nests of VESPIDAE, SPHEGIDAE and Bombus Macronychia* (p. 106).
- 16 (15) Vibrissae at mouth-margin, vibrissal angles somewhat produced, head at least as long at mouth margin as at lunula (fig. 34k). Setulae of parafacialia very unequal, the anterior row much stronger. *prst acr* not distinguishable from the hairs. Thorax with three broad black vittae, like the abdomen moderately densely white-dusted, apical half or less of segments 2-4 black, median vitta complete. ♂: proclinate orbitals absent. ♂: fig. 34k. 6-10 mm.  
*The female deposits young larvae in Bombus and Vespa nests, where the larvae are very common; these attack and kill the prepupal stage of the host and pupate in the nest material (summer pupae) or soil nearby (hibernating pupae). England, Wales, Scotland (to Moray), Ireland, generally distributed, e. iv-e. viii, downs and wastes, on chalk, common.. Brachycoma devia* Fallén.
- 17 (2) Arista plumose on basal half or so (fig. 34l). Vibrissae at mouth margin (fig. 34l).  $R_5$  (normally) open. ♂: except in *Sarcophila*, with narrower frons than ♀ and without proclinate orbitals. (AGRIINI.)
- 18 (25) Prosternum bare (fig. 32c, p). Notopleura (see fig. 32b) with two setae (and some setulose hairs). 1 (2) ventrites fully exposed, their margins covering ventral margins of tergites (see fig. 33s).
- 19 (20) Abdomen wholly black and glossy. Parafacialia with a more or less double or treble row of setulose hairs, which become much longer on lower half (fig. 34l). Base and fore margin of wings fuscous black. Scutellum (fig. 34m) with crossed apicals and one other (subbasal) pair of marginal setae only.  $R_5$  sometimes closed or petiolate. Slender and glossy black. 3.5-8 mm.  
*Parasitic in weevils (Lixus). Kent to Cornwall to Hereford. to Notts. to Norfolk. b. v-b. ix, chalk wastes, waysides, common*  
**Nyctia halterata** Panzer.
- 20 (19) Abdomen pollinose with or without dark spots. Parafacialia with a single to treble row of fine hairs, which may become slightly longer below. Wings hyaline, extreme base slightly browned in *Agria*. Scutellum (fig. 34n) with crossed apicals and two other pairs of marginals. Stout. ♂: fifth visible tergite hood-shaped (fig. 34o), with a discal and a marginal row of strong setae, hind margin situated at lower end of posterior declivity.
- 21 (24) Appearing blackish grey, the grey dust being less dense and extended, thorax with three moderately broad black undusted vittae, the outer ones not narrower behind suture than the median one, in addition a pair of distinct linear paramedian vittae anteriorly; median spot of third tergite forming a complete vitta. Outer *ph* well developed, normally at least half as long as *pra* or intermediate *post ia*. ♂: frons about one-fifth to one-seventh

head-width, without proclinate orbitals (figs. 34Q, R); mid-tibia without a *v* seta; claws and pulvilli long.

- 22 (23) Palpi orange with brownish base. 3 + 1 *stpl*, the anterior three arranged in an isosceles triangle (fig. 34P). Lower calyptra whitish, in male with a sooty brown shadow behind middle. ♂: frons fully one-fifth head width (fig. 34Q); hypopygium without wart-shaped processes (fig. 34O); superior forceps (fig. 34S) long with long and slender curved apical part. ♀: frons more than a third head width. ♂: figs. 34N-Q, s, 35A. 8-11 mm.

Larvae have been found abroad in superficial wounds of man and horse. Surrey: Wimbleton Common, 18.v.52 (D. J. Clark & I. A. J. Boyer).

**Angiometopa ruralis** Fallén.

- 23 (22) Palpi fuscous black. As a rule 3 *stpl* (2 + 1). Lower calyptra whitish grey, in male wholly smoky except for basal part. ♂: frons a seventh head width (fig. 34R); superior forceps (fig. 34T) short and broad, apical free part small, broadly triangular, about as long as wide. ♀: frons not quite a third head width. 4.5-8 mm.

Larva polyphagous, frequently parasitic or predacious on insects, especially lepidopterous larvae and pupae. . . . . **Agria** (p. 107).

- 24 (21) Densely cinereous grey dusted, thorax with three faint vittae, outer ones much narrower than median one; abdomen (fig. 35B) on second and third segments with three shining black spots, median one as a rule not extended to base on third tergite. Outer *ph* very small or indistinct. ♂♀: frons considerably wider than an eye and with proclinate orbitals; claws and pulvilli short. ♂: mid tibia with a strong *v* seta at apical fourth. ♀: as a rule with 4 *stpl*. 4.5-9 mm.

Larva on carrion, dead insects, possibly also living insects (recorded from various ACRIDIIDAE). Cornwall to Glam. to Kent to Norfolk. Channel Is. e.v-m.ix, seaside, local. . . . . **Sarcophila latifrons** Fallén.

- 25 (18) Prosternum setulose (see fig. 32D). Notopleura with three setae. All ventrites broadly exposed, margins covered by margins of tergites (fig. 35D). Thorax thinly whitish dusted with three broad undusted vittae. Abdominal segments whitish dusted with shifting dark reflections and undusted hind margins (fig. 35C). Palpi orange. 9-11 mm.

Viviparous, newly-born larva about 5 mm. long; living on dead snails, Kent to Devon. to Gloucs. to Bucks. b.vi-e.viii, woods and waysides, on chalk, uncommon. . . . . **Helicobosca distinguenda** Villeneuve.

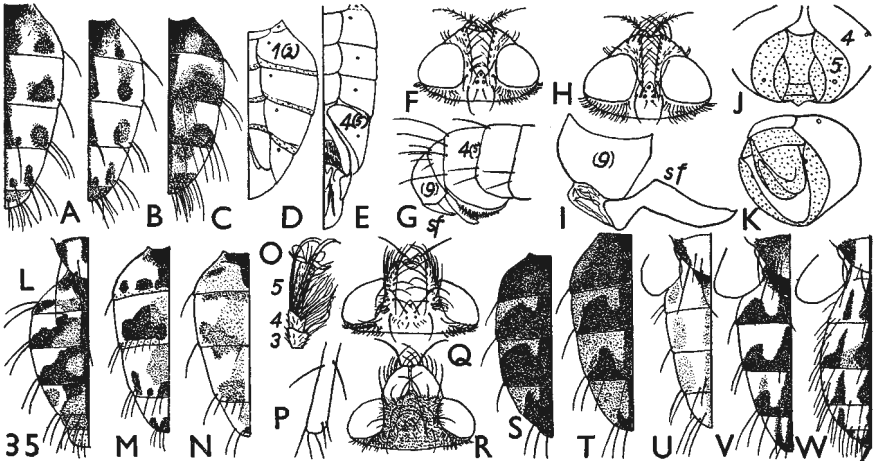


FIG. 35.

- 26 (1) Hind coxae (*co*<sub>3</sub>) setulose at apex of posterior surface (fig. 33P, ↑). Two smaller notopleurals present in addition to, and alternating with, the normal two notopleurals (fig. 32A n). Arista plumose on basal half (fig. 33o). ♂: 3(4) free ventrites (fig. 35E).
- 27 (28) The row of inclinate frontal setae straight or very slightly and evenly curved outwards at front end (fig. 35F). Scutellum without apical setae, thus with only 2-3 pairs of marginals (fig. 35L). Three strong *post dc.* Abdomen (fig. 35L) with a conspicuous shifting pattern, second segment without marginals. ♂: hypopygium large and protruding (fig. 35G), orange; mid tibia without a *v* seta. ♀: with a large oblong shining orange plate at ventral hind end (fig. 35J), fifth tergite broadly emarginate at apex in dorsal view, anus and ovipositor on dorsal hind end. ♂: figs. 35F, G, L. ♀: fig. 35J. 4-8.5 mm. (= *haematodes* Meigen; ? *pernix* Harris.)  
*Parasitic in molluscs and insects. Kent to Cornwall to Hereford. to Notts. to Norfolk. b.v-b.ix, woods and wastes..... Ravinia striata F.*
- 28 (27) The row of inclinate frontal setae straight, but the anterior one or more setae abruptly placed somewhat farther outwards (fig. 35H), so that the fore end of the row is obtusely bent outwards. ♂: hypopygium less bulbous and large.
- 29 (30) ♂: abdomen not tessellate (fig. 36c), or mid tibia without a postmedian *v* seta; superior forceps separated from hypopygium by a subangular emargination as though having been bent backward (fig. 35I). ♀: with an exerted shining chitinous ovipositor (figs. 35K, 36H-J). (3 equal strong *post dc. prst acr* well developed. *r*<sub>1</sub> bare.)  
*Ovoviviparous; larvae parasitic in Saltatoria..... Blaesoxipha (p. 107).*
- 30 (29) Abdomen conspicuously tessellate, the spots shifting (fig. 36zz). ♂: mid tibia with a postmedian *v* seta; superior forceps without a subangular emargination (figs. 36S, 37D-F sf), its outer margin more or less in line with that of hypopygium (see fig. 35G sf). ♀: without a sclerotized ovipositor (figs. 36N, o)..... *Sarcophaga* (p. 108).

Genus *Miltogramma* Meigen, 1803.

## KEY TO SPECIES.

- 1 (2) Tergites with (usually three) fixed brown spots near hind margin (fig. 35M). Third antennal segment fuscous, only extreme base orange red. Thorax more greyish dusted with less clearly defined, more shifting vittae. ♂: fourth segment of fore tarsus at apex of *p* surface with two tufts of long black bristles (fig. 35o), *a* surface with numerous setulose hairs. ♂: figs. 35M, o. 5.5-9.5 mm.  
*England, Wales, Scotland (to Sutherland.), Ireland, generally distributed. Channel Is. m.v, vi, b.vii-e.viii, sandy places, common punctatum* Meigen.
- 2 (1) Tergites without fixed but with very large and contrasting shifting dark spots (fig. 35N), which cause a very conspicuous asymmetric pattern. Third antennal segment fuscous at apex and dorsal (anterior) surface, basal ventral (posterior) part broadly orange. Thorax more brownish grey dusted with rather clearly defined and not much shifting vittae. ♂: fore tarsi simple. ♂: fig. 33R, 35N. 5.7-8.5 mm.  
*Hants., Cornwall, Berks., Suffolk, Norfolk, Glam., Channel Is. vi, m.vii-e.viii, sandy places, scarce..... germari* Meigen.

Genus *Metopia* Meigen, 1803.

## KEY TO SPECIES.

- 1 (2) Mid tibia with a strong *av* seta near apical third (fig. 35P). Ocellars at least as strong as inclinate frontals except the first one (fig. 35Q). Tergites with a black median vitta and black hind margins, the latter slightly broadened at middle of either side (fig. 34H). Interfrontalia more than twice as wide as a parafrontale (fig. 35Q), similar in both sexes. ♂: figs. 34B, H, 35P, Q. 5-8 mm.

*England, Scotland (to Sutherland.), generally distributed. S.W. Ireland. e. v-e. viii, ix, woods and heaths, common. . . . . campestris* Fallén.

- 2 (1) Mid tibia without an *av* seta. Ocellars much weaker than the stronger inclinate frontals. Tergites with a brown-dusted median vitta (in posterior view in its place an elongate triangular spot with the apex in front) and on either side an oblong spot from hind margin almost to fore margin; this spot appears blackish in posterior and silvery or pale golden in anterior view. Interfrontalia narrower in front than parafrontalia; in male (fig. 35r) linear in anterior half where the parafrontalia are broad and contiguous, roof-shaped and wholly silver-white. 4.5-7.5 mm.

*England, Wales, Scotland (to Moray.), generally distributed. b. v-b. ix, sand dunes, sand pits, etc., common, also woods. . . . . leucocephala* Rossi.

**Genus *Ptychoneura* Brauer & Bergenstamm, 1890.**

KEY TO SPECIES.

- 1 (2) Tarsi, parafacialia, facial ridges, lunula and usually anterior part of interfrontalia dull orange, last 2-3 tarsal segments infuscate. Tergites (fig. 35s) weakly dusted, with a black median vitta and a rather broad black hind margin, which is somewhat rounded-dilated on either side; *post* median vitta of thorax indistinct or absent. ♂: fig. 35s. 3-5 mm.

*England, generally distributed to Yorks. and Lancs. Glam. Aberdeen. m. v-e. viii, woods . . . . . rufitarsis* Meigen.

- 2 (1) Wholly black in ground-colour. Tergites (fig. 35t) with pollinosity and pattern somewhat more conspicuous, forming a median vitta (narrower on each following segment) and an oblong spot on either side, similar to that in *Metopia leucocephala* but not or hardly shifting. ♂: figs. 34c, 35t. 3.8-5.5 mm.

*Kent to Cornwall to Ches. to Norfolk, Lancs., Glam., Perth. to Ross. Channel Is. b. vi-e. vii, b. ix ("iii-vii"), woods. . . . . cylindrica* Fallén.

**Genus *Macronychia* Rondani, 1859.**

KEY TO SPECIES.

- 1 (2) Basicosta yellow. No distinct dark brown pattern present, grey-dusted with more thinly dusted narrow thoracic and a median abdominal (fig. 35u) vitta, *prst* part of thorax with four vittae; first tergite without marginals.

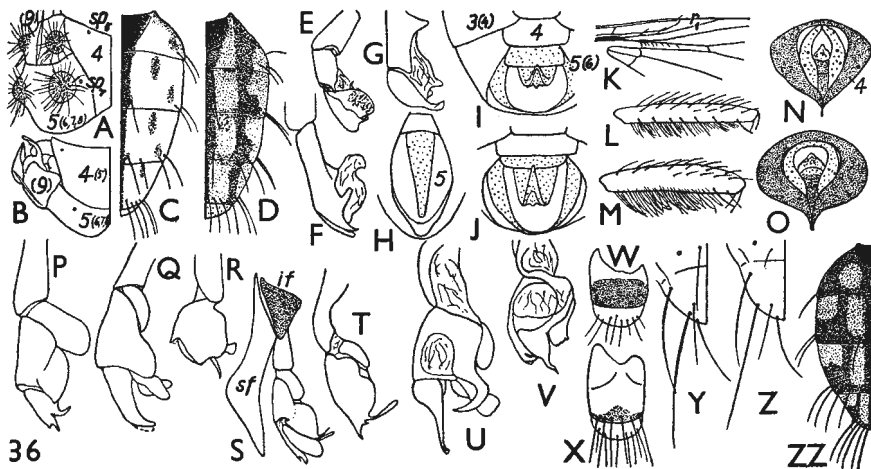


FIG. 36.

♀: ovipositor normal, inconspicuous, retractile. ♂: fig. 35v. 5.5-6.5 mm.  
*Surrey: Oxshott; Dorset: Moreton; Glam.: Porthcawl; Camb: Devils Ditch; Suffolk: Worlington; Norfolk: N. Walsham. m-e. vi., sandpits*

- griseola** Fallén.
- 2 (1) *Basicosta* fuscous. Thorax and abdomen (figs. 35v, w) with a conspicuous dark-brown dusted pattern, which includes five conspicuous thoracic vittae and three elongate-triangular spots on the abdominal segments, the bases of which triangles are sometimes fused so as to form a narrow brown hind margin. 6-10 mm.
- 3 (4) First tergite without marginals, hardly as long as second, pattern rather broadly fused behind (fig. 35w). Lower calyptra of normal size, exceeding apical level of scutellum by up to a third length of latter (fig. 35v). ♀: ovipositor normal, inconspicuous, retractile. ♂: figs. 34J, 35v).  
*Dorset., Gloucs., Oxon., Sussex, Suffolk, Norfolk, Moray, probably more generally distributed. b.v, m.vi-e.viii, woods, rare..... polyodon* Meigen.
- 4 (3) First tergite with well developed marginals (fig. 35w), longer than second, abdomen rather elongate and markedly flattened, spots of first tergite more clearly separated. Lower calyptra very large, exceeding apex of scutellum by about two-thirds length of latter (fig. 35w). ♀: ovipositor exerted, terminating in a straight spine-shaped black piercer (fig. 35w).  
*Kent, Sussex to Somerset to Gloucs. to Cambs. m.v-e.viii, in nests of Clytochrysus cavifrons Thoms..... unguans* Pandellé.

### Genus *Agria* Robineau-Desvoidy, 1830.

#### KEY TO SPECIES.

- 1 (2) ♂: first genital segment (fig. 36A, 5) on either side of ventral surface with a setulose wart-shaped prominence, hypopygium (*g*) with a similar prominence on either side behind base of forcipes. ♂: fig. 34T, 36A.  
*Sussex: Clayton; London area (S.E.); Oxon.: Oxford. m.v-b.vii, viii, gardens, scarce ..... mamillata* Pandellé.
- 2 (1) ♂: first genital segment and hypopygium without wart-shaped haired prominences (fig. 36B).  
*Kent: Ham Street Woods, 2.vi.36..... affinis* Fallén.

### Genus *Blaesoxipha* Loew, 1861.

#### KEY TO SPECIES.

- 1 (2) Genital segments black (fig. 36H 5). Body densely grey dusted, tessellate pattern of abdomen (fig. 36c) indistinct, but in addition to a median vitta two longitudinal rows of faint elongate dark (not shifting) spots visible in posterior view, especially in male. Wing membrane not coloured near base.<sup>80</sup>  
 ♂: mid tibia with a strong *v* seta beyond middle; apical part of penis rather large (fig. 36E). ♀: ovipositor elongate triangular (fig. 36H), more than twice as long as wide at base, slightly curved ventrad at apex. ♂: figs. 36C, E. ♀: fig. 36H. 4.5-8 mm.  
*Surrey to Dorset., Berks, Middx. b.vi-e.viii, heaths and grassy wastes, scarce*  
**gladiatrix** Pandellé.<sup>80</sup>
- 2 (1) Genital segments reddish orange (♂♀). Body less densely dusted, appearing blackish, tessellate pattern of abdomen conspicuous (fig. 36D), especially in male. ♂: mid tibia without a *v* seta.

<sup>80</sup> Wing membrane markedly rusty yellow near base; dorsal surface evenly yellowish grey dusted: *Tephromyia grisea* Meig. Apical part of the penis much smaller, ovipositor very much broader and larger, appearing as wide as long but for the strongly curved (ventrad) apical part, which is much narrower and suddenly set off. Recorded as British by Wainwright (1928: 227), but the female in the British Museum is *B. gladiatrix* Pandellé, and so are the males in coll. Wainwright. The British form corresponds to *B. gladiatrix* Pandellé, Villeneuve, 1911. Whether this is really *grylloctona* Loew and *laticornis* Meig., as stated by Rohdendorf, is open to considerable doubt according to Mr. J. E. Collin.

- 3 (4) Second tergite with a pair of strong marginals (fig. 36D). ♂: median edges of superior forceps evenly diverging; penis forked and without other sclerotized processes (fig. 36F). ♀: 4th (5th) ventrite about one-third wider and shorter than 2nd (3rd), 5th (6th) of the same width and 2.5-3.5 times as wide as long (fig. 36I); frons slightly less than three-tenths head-width; the broad longitudinal concavity of the ovipositor almost reaching tip, and the ventral outline of the ovipositor concave to the tip. ♂: figs. 36D, F. ♀: fig. 36I. (5-5-) 7-10 mm.  
*Kent*: Wye Downs; *Dorset*: Tyneham; *White Nothe*; *Durlston*; *Corfe Castle*; *Somerset*: Edington. b.vi-b.viii.....**erythrura** Meigen.
- 4 (3) Second tergite without marginals. ♂: median edges of superior forceps with a distinct kink or bend, the outer edges with marked setulose swellings; penis, fig. 36C. ♀: 4th (5th) ventrite about one-half wider and two-fifths to one-half shorter than 2nd (3rd), 5th (6th) even wider, 4-5 times as wide as long (fig. 36J); frons three-tenths to almost one-third head-width; apical part of ovipositor plane and straight, the dorsal longitudinal concavity and the ventral concave curvature ending considerably before tip (fig. 36J). ♂: figs. 35H, I, 36C. ♀: figs. 35K, 36J. 7-9 mm.  
*Hants.*: New Forest; *Farley Downs*; *Dorset.*: Studland; *Somerset*: Edington. b.vii-b.viii, on stones on barer parts of Downs..**rossica** Villeneuve.

### Genus *Sarcophaga* Meigen, 1826. Fleshfly.

The chaetotactic characters are somewhat unreliable, and the only way of obtaining quite definite identifications is by comparing the male genitalia (see figs. 36-39). This study is, of course, greatly facilitated if all *Sarcophaga* males are mounted with exposed genitalia (see pp. 4-5). The terminal sclerites of the females, too, supply useful characters (see Patton and Wainwright, 1935-1937, *Ann. trop. Med. Parasit.* 29: 73-90, 517-543; 30: 187-201, 337-350; 31: 303-317). This sex will be found by no means indeterminate, but much work still has to be done before the characters can be used in a quite satisfactory way. Females caught in copula, specially marked, should therefore always be kept associated with their males.

The females are viviparous and deposit at the same time a moderate to large number of first-stage larvae. All larval stages in this and related genera are conspicuous by a large terminal cavity, which contains the posterior pair of spiracles. Most species are probably very polyphagous, they develop in excrements, decaying vegetable matter, decomposing or fresh bodies of vertebrates, molluscs and insects, and sometimes as ecto- or endoparasites in living animals. Most British species have in this way occasionally been observed as parasites, especially of Lepidoptera pupae and molluscs, but it is unlikely that any of them should be regular or exclusive parasites of insects (whilst this seems to be the case in some American species). Development in fresh dead bodies is perhaps the original habitat of this genus from which the other habitats have evolved.

The numerous micro-genera into which this group has been divided by Enderlein, Townsend and others are not accepted here, as atypical specimens occur rather frequently, which would then be traced to an entirely different "genus."

#### KEY TO SPECIES.

- 1 (10)  $r_1$  setulose on dorsal surface, sometimes with 1-2 setulae only (fig. 36K). Second tergite with marginals (see fig. 36zz). Three almost equal strong *post dc*, first of them closer to suture than to second (see fig. 38N); *prsc* present; *prst acr* seldom distinct.

- 2 (5) Genital segments to a large extent orange, but first of male largely fuscous-black, glossy, with a small dorsal patch of pruinosity and strong marginal setae (fig. 36x). ♀: fifth tergite orange, with a double row of marginals, the more distal (interior) ones finer.
- 3 (4) ♂: Hind femora with strong *av* setae (fig. 36L), which are as thick as the preapical one, in addition with fine long hairs; dusted spot of first genital segment inconspicuous, small, longer than wide; penis, fig. 36P. ♀: fifth tergite softish or membranous on dorsal median line, the apical opening therefore somewhat spindle-shaped, and *angular at dorsal median line* (fig. 36N). Setulae on  $r_1$  present (f. *cruenta* Pandellé) or absent. ♂: figs. 36K, L, P. ♀: fig. 36N. 8-10 mm. (= ? *vagans* Meigen.)  
*England, generally distributed. Channel Is. m. iv-e. viii, ix, woods and wastes, common. . . . . frenata* Pandellé.
- 4 (3) ♂: hind femora with weak or indistinct *av* setae (fig. 36M) apart from the preapical, which is twice as thick; dusted spot of first genital segment large, wider than long; penis, fig. 36Q. ♀: fifth tergite sclerotized on dorsal median line, apical opening inverted-drop-shaped or subtriangular, *truncate or broadly rounded at dorsal median line* (fig. 36O). ♂: figs. 36M, Q. ♀: fig. 36O. 5-10 mm.  
*Kent to Cornwall to Pembs. to Radnrs. to Lincs., Co. Kerry. m. v-e. viii, ix. Chalk wastes, sea cliffs, woods and heaths, common. Parasite of snails (Helix hortensis Müll.) . . . . . haemorrhoea* Meigen.
- 5 (2) Genital segments more or less wholly fuscous black.
- 6 (7) ♂: first genital segment wholly dusted<sup>31</sup>, only slightly shining, without outstanding setae (fig. 36W); frons more than a quarter head-width; apical scutellars strong, about as long as scutellum; penis: fig. 36R. ♀: fifth tergite of *frenata* type (see fig. 36N), abdomen with markedly tessellate pattern, without a distinct vitta on each lateral half; frons almost two-fifths head-width. ♂: figs. 36W, X. 5-7.5 mm.  
*Kent to Cornwall to Gloucs. to Cambs., Lancs., Channel Is. b. vi-m. xi, sea cliffs and grassy wastes on chalk, common. Parasite of Helix acuta Müll. setipennis* Rondani.
- 7 (6) ♂: first genital segment (fig. 36X) largely undusted and glossy, with strong marginal setae<sup>32</sup>; frons up to about a fifth head-width. ♀: fifth tergite of *haemorrhoea* type (see fig. 36O); abdomen with more extensive black coloration, which extends over the whole length of the segments on middle of each lateral half; frons up to a third head-width.
- 8 (9) ♂: apical scutellars absent; first genital segment with a median spot of dust on posterior half; penis and forceps: fig. 36S. ♀: abdominal segments each with three black vittae; these are separated by a pair of dusted brownish bronze to grey vittae, which almost reach hind margins of segments; abdomen less broad and more convex. 4.5-8.5 mm. (= *obscurata* Rohden-dorf)  
*Kent to Cornwall to Glam. to Salop to Suffolk. b. v, b. vi-m. ix, limestone wastes, scarce. . . . . offuscata* (Meigen?) Schiner.
- 9 (8) ♂: apical scutellars strong, about as long as scutellum; first genital segment without dust except along extreme hind margin behind the setae; penis: fig. 36T. ♀: abdominal segments largely black, the pale-dusted paramedian and dorsolateral vittae distinct only near front margin of each segment, abdomen broader and more flattened. 4-8.5 mm.  
*Sussex to Cornwall to Hereford. to Yorks. e. iv-e. viii, ix, woods and wastes, common . . . . . dissimilis* Meigen.
- 10 (1)  $r_1$  bare on dorsal surface.
- 11 (40) Three subequal strong *post dc*, first not more distant from suture than from second (fig. 38N).
- 12 (17) Several pairs of distinct *prst acr* present. Second tergite with strong marginals (fig. 36ZZ). Genital segments black. Hind femur always with a number of well developed *av* setae (see fig. 36L) in addition and similar to the pre-

<sup>31</sup> ♂: first genital segment shining with a rather broad dusted hind margin and without marginal setae; frons less than a sixth head-width. ♀: fifth tergite as in *setipennis*, but shifting pattern of abdomen consisting of longitudinal spots, see *clathrata* Meigen, which may or may not have a few setulae on  $r_1$ .



apical and in male in addition to any long hairs. ♂: first genital segment without outstanding setae (see fig. 36w). ♀: fifth tergite of *frenata* type (see fig. 36x).

- 13 (16) *prsc* absent or weak (fig. 36z). ♂: frons about one-quarter head-width.
- 14 (15) ♂: apical scutellars absent (but the discal scutellars, slightly in front of hind margin and not decussate, present); end process of penis (fig. 36u) lengthened. ♀: at present not distinguishable from *nigriventris*. 4-8 mm.  
*Dorset.*: Lewell Marsh, Dorchester; Woodsford; Ozon.; Yarnton; Somerset: Clevedon; Walton Moor; Ches. b. vi, e. vi, b. viii-m. ix, marshes, rare ..... *villeneuvei* Boettcher.
- 15 (14) ♂: apical scutellars present in addition to the discal scutellars, decussate (fig. 36z); end process of penis not lengthened (fig. 36v). ♀: at present not distinguishable from *villeneuvei*. 4-8 mm.  
*Kent to Cornwall to Merioneth. to Lincs. S. Ireland. Moray. Channel Is. b. iv-b. x, chalk wastes and woods, common. Parasitizing living snails (Helicella ericetorum itala L. (!) and Theba cantiana Mont.), also reared from a locust, a Carabus, a moribund Necrophorus, and a Blaps.*  
**nigriventris** Meigen.
- 16 (13) *prsc* strong and long (fig. 36y). Abdominal hairs long and fine, largely a third length of segment, in male erect<sup>32</sup>. ♂: frons less than a sixth head-width; apical scutellars present, decussate; first genital segment shining on anterior half, with a broad dusted hind margin; superior forceps and penis: fig. 37A. ♀: shifting pattern of abdomen (fig. 36zz) consisting of longitudinal spots, the posterior half of each of which does not contrast strongly with the anterior half, and which are separated by a complete black vitta along the middle of each lateral half of the segments. 5-5-9 mm.  
*Kent to Dorset. to Hereford. to Lincs. m. v-e. viii, woods. In egg cocoon of Epeira cornuta Koch, also recorded as locust parasite.... clathrata* Meigen.
- 17 (12) No distinct *prst* *acr* setae among the hairs, though one pair of hairs on anterior half of *prst* part of thorax may be somewhat stronger.
- 18 (27) Second tergite with strong marginals (see fig. 36zz). Genital segments black.<sup>33</sup>
- 19 (20) Anterior surface of mid femora with an oblong patch of decumbent whitish to brown golden hair-scales on apical two fifths (fig. 37L). ♂: frons almost

<sup>32</sup> Abdominal hair short, stronger and decumbent, subequal in both sexes: see *agnata* Rondani, in which the *prst* *acr* are often distinct.  
<sup>33</sup> Second genital segment red: see *haemorhoa* Meigen and *frenata* Pandellé, in which the setulae of  $r_1$  are sometimes absent.

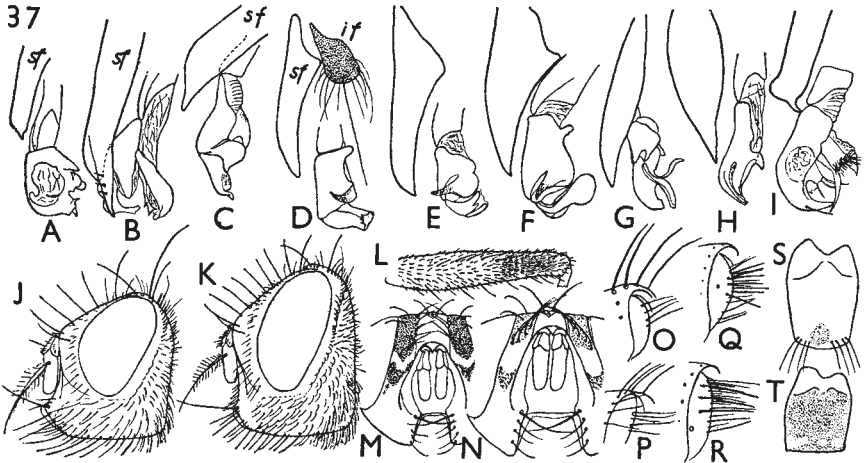


FIG. 37.

a fourth head-width; first genital segment undusted and glossy without distinct marginal setae; superior forceps and penis: fig. 37B. ♀: frons almost two-fifths head-width; fifth tergite thinly dusted and rather glossy, of *frenata* type (see fig. 36N). 4-9 mm.

*Sussex to Cornwall to Anglesey to Ches. to Norfolk.* b.v-b.vi, e.vi, m.vii-m.ix, *marshes, scarce* ..... *sinuata* Meigen

20 (19) Mid femora without a patch of decumbent hair-scales.

21 (22) Mouth-margin slightly projecting between vibrissae, somewhat more projecting than anterior extremity of frons (fig. 37J); vibrissae inserted slightly above mouth-margin. Pollinosity cinereous. Abdomen elongate, even in female. ♂: frons more than a fourth (0.27) head-width, first genital segment without appreciable pollinosity but with conspicuous marginal setae; hind tibiae without long *av* hairs (though with a strong *av* seta and a few short *av* setulae); superior forceps and penis: fig. 37C. ♀: frons well over a third head-width; fifth tergite as densely dusted as fourth, somewhat as in *haemorrhoea* (see fig. 36O). 5-5-10 mm.

*Hants. to Cornwall to Glam. to Derby. to Norfolk.* b.v-m.vi, b.-m.viii, *grassy chalk wastes, uncommon. Bred from Helix* ..... *filia* Rondani.

22 (21) Mouth margin not projecting between vibrissae, head more or less distinctly shorter at mouth margin than at lunula (fig. 37K); vibrissae inserted at mouth margin. Pollinosity more grey with only slight yellowish reflections. Abdomen stout, in female almost subcircular in outline. ♂: frons less than a fourth head-width; first genital segment pollinose, without conspicuous marginal setae (see fig. 36W).

23 (24) Epistoma hardly wider than parafacialia, facial ridges strongly curved (fig. 37M). *prst acr* often indicated. ♂: mid femur with some strong *pv* setae on basal half and a comb of short strong *pv* setulae at apex, these setulae much shorter than width of femur; hind tibiae in addition to a strong *av* seta with only 3-5 long *av* near middle and a moderate number of long *pv* setulose hairs; forceps and penis: fig. 37D. ♀: the spot of pale reflections just below the descending frontal setae broadly V-shaped, much wider than high (fig. 37M); frons not quite a third head-width. 7-10 mm.

*Kent to Cornwall to Glam. to Worcs. to Cambs., Lancs.* m.iv, m.v-m.vi, b.vii-m.viii, *woods, uncommon. Bred from Helix aspersa* Müll.

*agnata* Rondani.

24 (23) Epistoma considerably wider than parafacialia, facial ridges only moderately curved (fig. 37N). ♂: mid femur without strong *pv* setae, setulose *pv* hairs near apex as long as width of femur or longer; hind tibia with long setulose *av* hairs over half its length or more and with dense very long setulose *pv* hairs. ♀: the spot of pale reflections just below the descending frontal setae bullet-shaped, not or hardly wider than high (fig. 37N); fifth tergite of *frenata* type (see fig. 36N).

25 (26) ♂: hind femora with the *av* and *pv* setae conspicuously differentiated and very long, many much longer than width of femur, forming a complete row; superior forceps with the outer margins (in posterior or ventral view) very strongly converging from base to middle, apical half glossy with few and small punctures; penis and superior forceps (fig. 37E) ♀: marginal setae of fifth tergite hardly a third the thickness of those of the fourth (fig. 37O). 5-9 mm.

*England, Wales, Scotland (to Sutherland.) generally distributed. Channel*

*Is.* m.iv-b.ix, *waysides and marshes, common* ..... *crassimargo* Pandellé.

26 (25) ♂: hind femora with the *av* and *pv* setae indistinct among the hairs, especially on basal half where only one or two are longer than width of femur; superior forceps broad and stout, everywhere strongly punctured and not very shining; penis and superior forceps: fig. 37F. ♀: marginal setae of fifth tergite only slightly weaker than those of fourth (fig. 37F). 6.5-11 mm.

*Kent to Devon. to Gloucs. to Cambs., Glam., Perth.* m.iv-e.vi, m.vii-e.ix, *woods and gardens, scarce* ..... *rosellei* Böttcher.

27 (18) Second tergite without distinct erect marginals.

28 (37) Both genital segments black.

29 (30) Scutellum without cruciate apicals (♂♀) and without or with small discals (♂♀). Head as long (♂) or slightly longer (♀) at mouth-margin than at lunula. 3-6(-8) mm. ♂: first genital segment almost twice as long as

wide (fig. 37s), glossy with a small pollinose apical spot and with long but not very strong marginals; hind femur without distinct *av* setae (see fig. 36m); frons a fifth head-width; superior forceps and penis: fig. 37c ♀: fifth tergite with very thin and inconspicuous pollinosity; frons a third head-width.

*Kent to Cornwall to Pembs. to Notts. to Norfolk. Inverness., Sutherland. m. v-b. ix, grassy wastes, on chalk, uncommon.....pumila* Meigen.

- 30 (29) Scutellum with cruciate apicals in male, and with long discals. Head distinctly shorter at mouth-margin than at lunula. 5.8-13 mm. ♂: first genital segment only slightly longer than wide (fig. 37r), its dorsal surface completely dusted (but for the basal depression) or completely undusted and glossy (but for a narrow apical margin behind the marginal setae). ♀: fifth tergite conspicuously dusted, not markedly less than the preceding tergites.

- 31 (34) ♂: first genital segment without marginal setae, dusted (fig. 37r). ♀: frons just over a third head-width (up to 0.36).

- 32 (33) ♂: hind femur without *av* setae but with dense long hairs on the *v* surfaces; mid femur densely setulose on apical part of *pv* surface, without a comb of stout short pointed setae; mid tibia villous like the hind one; superior forceps and penis fig. 37h. ♀: marginal row of fifth tergite consisting of strong and fine setae, the strong ones equal to those of the outer row (fig. 37q); mid femur with a long bare pale ferruginous undusted streak extending over apical half of *p* surface above the *pv* setae. 7.5-13 mm.

*Sussex to Cornwall to Somerset; Cambs.: Devils Ditch (common). b. iv, m. v-b. ix, especially sea cliffs, common.....hirticus* Pandellé.

- 33 (32) ♂: hind femur with stout *av* setae in addition to the hairs of the *v* surfaces; mid femur with a comb of stout short pointed setae on apical part of *pv* surface; mid tibia with short hair only, hind tibia with sparse long hairs; superior forceps and penis fig. 37i. ♀: marginal row of fifth tergite consisting of fine setae of very uneven length, but all of them very much thinner than setae of outer row (fig. 37r); the bare undusted streak on the *p* surface of the mid femur fuscous black, restricted to less than middle third and inconspicuous. 5.8-13 mm.

*England, generally distributed. Pembs. Moray. e. iv-b. ix, woods, wastes and marshes, common. Larva in excrements, also bred from locusts*

*incisilobata* Pandellé.

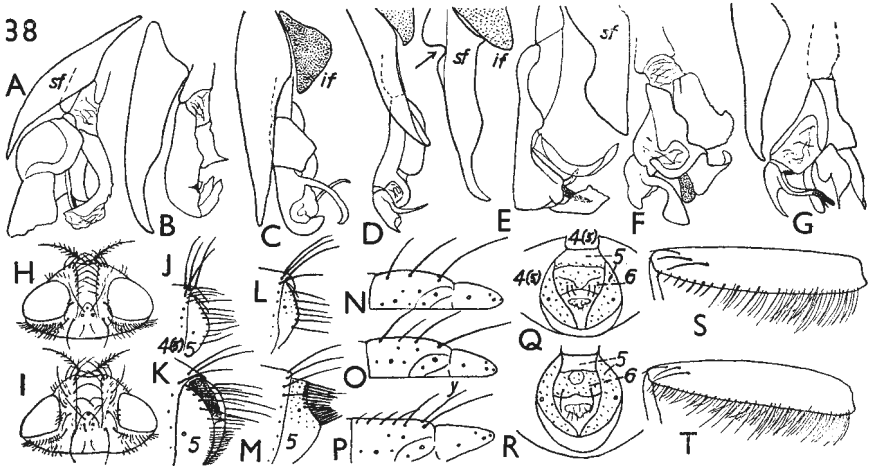


FIG. 38.

- 34 (31) ♂: first genital segment with conspicuous marginal setae (see fig. 37s). ♀: frons either two-fifths (fig. 38r) or slightly less than a third head-width.
- 35 (36) Frons of normal width, in male one-fifth head-width, in female slightly less than a third head-width. ♂: first genital segment with quite conspicuous grey pollinosity; superior forceps and penis, fig. 38A; *av* setae of hind femora long and fine, more or less indistinct among the long hairs (see fig. 36x), especially indistinct on basal half. ♀: setae at margin of fifth tergite hardly half as thick and long as marginals of fourth (fig. 38j); fifth tergite of normal shape. 7.5–11 mm.

*Kent*: Ham St.; *Devon.*: Lynton; *Heddon's Mouth*; *Somerset*: Clevedon; *Worcs.*: Alfrick; *Abberley Hill*. m.v, b.-e.vi, e.vii-b.ix

**laciniata** Pandellé.

- 36 (35) Frons unusually broad, in male (fig. 38n) more than a fourth (0.26–0.29), in female (fig. 38i) two-fifths head-width. ♂: first genital segment glossy, undusted but for a narrow hind margin, superior forceps and penis (fig. 38B); *av* setae of hind femora short and strong, conspicuous among the long hairs, even on basal half (see fig. 36L). ♀: setae at hind margin of fifth tergite hardly thinner and shorter than marginals of fourth; fifth tergite laterally compressed, the dorsal part with an oblong black vertical pit-like median impression, which makes the anal opening appear to lie on dorsal surface (fig. 38k). 6.5–12.5 mm.

*England, Wales, Scotland, generally distributed. Co. Cork. Channel Is. e.iv-m.v, b.vi-ix, mainly sea cliffs and salt marshes. Larva in decaying organic matter, sometimes parasitic on Molluscs, insects, birds or mammals*

**melanura** Meigen.

- 37 (28) Second genital segment of male and fifth tergite of female red, first genital segment of male with marginal setae (see fig. 37s). Head at least as long at mouth-margin as at lunula. ♂: mid femora without a comb of stout short setae at apex (fig. 38t).

- 38 (39) Dust yellowish to brownish grey, rather dense, the fly therefore appearing cinereous-grey. ♂: first genital segment with a large transverse spot of grey dust on posterior third; forcipes and penis, fig. 38c. ♀: marginal setae of fifth tergite half as thick and two-thirds as long as marginals of fourth, separated from each other by 2–3 times their own width (fig. 38L) 7–10 mm.

*Camb.*: Devil's Ditch (numerous); *Dorset.*: Culliford Tree, Came. e.v-b.vi, e.viii ("v-ix" Day), chalk wastes.....

**arcipes** Pandellé.

- 39 (38) Dust silver grey and rather thin, the fly appearing blackish grey. ♂: first genital segment with at most a small longitudinal dot of pollinosity, otherwise glossy fuscous-black; forcipes and penis fig. 38D. ♀: marginal setae of fifth tergite almost as thick as those of fourth, very closely placed, separated from each other by hardly their own width (fig. 38M). 8.5–13 mm.

*Co. Waterford*, 4.viii.06. Recorded from *Gloucs. and Scotland* ("vi").

**ebrachiata** Pandellé.

- 40 (11) Four or more *post dc* (figs. 38o, p), the anterior one or ones often (fig. 38p) indistinct, the first of three strong ones then much more distant from suture than from the second strong one.

- 41 (46) Second genital segment of male and fifth tergite of female red. Second tergite without marginals (see fig. 39I). ♂: mid femur with a *pv* apical comb of short stout pointed setae (see fig. 38s); hind femur with distinct *av* setae among the long hairs (see fig. 36L).

- 42 (43) *prsc* absent. Anterior *post dc* weak (see fig. 38P). ♂: first genital segment wholly dusted except for the basal depression, with strong marginal setae; superior forceps at base of (median and) hind margin with a triangular excision (fig. 38E, ↑); forcipes and penis, fig. 38E. ♀: dorsal half or third of fifth tergite undusted and glossy, of *frenata* type, sixth and seventh ventrites (fig. 38Q) very broadly exposed, red, sixth broadly embossed before apex, apical margin on either side with 2–3 setae, those two groups separated by a wide space, seventh ventrite visible only as a narrow seam. 8–14 mm.

*Kent to Dorset., recorded from England to Lancs. and Durham. b.vi, e.vii-b.x. Larva in decaying organic matter including dead animals, sometimes parasitic, even in man, causing myiasis.....*

**haemorrhoidalis** Fallén.

- 43 (42) *prsc* present and well developed (fig. 38P, *y*). ♂: first genital segment either only partly dusted and with small marginals, or wholly dusted and without marginals (see fig. 37T); superior forceps (figs. 38F, G) without a triangular excision at base. ♀: fifth tergite wholly dusted, though the dust is conspicuous in certain views only; sixth ventrite red and with a knob-shaped tubercle at base (fig. 38R), or fuscous and plane and seventh longer and distinct, with a prominent median tubercle.
- 44 (45) Anterior *post dc* very small and tending to be indistinct (fig. 38P). ♂: first genital segment glossy with a broadly triangular dusted spot on posterior half or third, and with small but distinct marginal setae; superior forceps and penis, fig. 38F. ♀: fifth tergite angular in posterior view as in *frenata*, though not membranous on dorsal median line, sixth ventrite red with a knob-like median tubercle on basal half (fig. 38R). 7-13 mm. (= *fulcalata*, Pandellé.)  
*London; Surrey: Croydon; Oxon.: Oxford; Yarnton; Notts.: Nottingham; recorded from Ches.; Lancs. m.-e.v, m.-e.vi, m.vii-b.ix.*  
*On decomposing animals, including snails and locusts. . . . barbata Thomson.*
- 45 (44) Anterior *post dc* rather long and conspicuous (see fig. 38O). ♂: first genital segment wholly dusted, except for the basal depression, and without marginal setae (see fig. 37T); superior forceps and penis fig. 38G. ♀: fifth tergite of *haemorrhhoa* type, sixth ventrite fuscous-black, plane. 9-13.5 mm.  
*Norfolk: Blakeney Point; (not "Dorset coast"). b.vi, b.viii. In decaying organic matter, including dead animals, sometimes parasitic in snails, Lepidoptera, Diprion, Orthoptera, etc.*
- tuberosa* var. *exuberans* (Pandellé) Wainwright.
- 46 (41) Genital segments black, or, if not, second tergite with marginals. ♀: fifth tergite of *frenata* type (figs. 39J, K, M, N, P-R).
- 47 (56) Second tergite normally without marginals. ♂: first genital segment almost wholly dusted except on the depressed basal part.
- 48 (49) ♂: first genital segment with marginal setae (fig. 39I), conspicuously dusted; second genital segment slightly but distinctly flattened on disc; superior forceps and penis fig. 39A; hair of ventral and lateral surfaces of abdomen very dense and long, largely about as long as greatest diameter of hind femur, tips conspicuously wavy (fig. 39I). ♀: fifth tergite (fig. 39J) almost as long as fourth, strongly protruding and laterally compressed; fifth and sixth ventrites (fig. 39K) very broadly exposed, fifth half as wide again at apex as the fourth, the sixth trapezoidal. Pollinosity not very dense

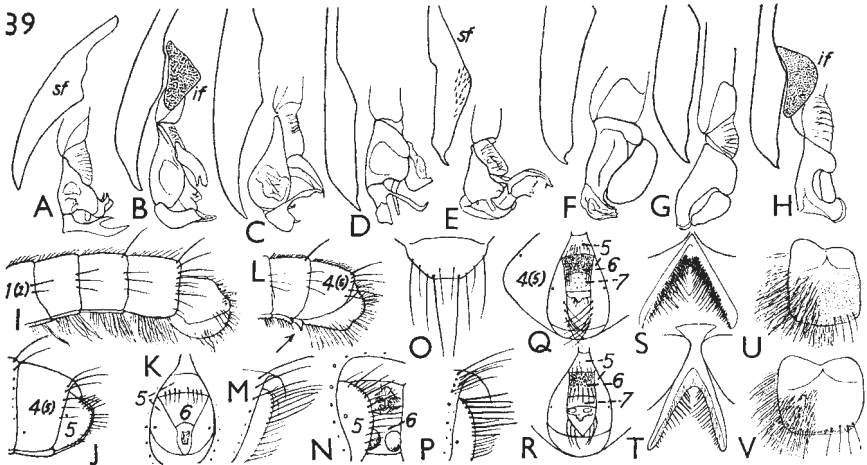


FIG. 39.

therefore a rather blackish species. Anterior *post dc* rather strong (see fig. 38o). 9–15 mm.

*England, generally distributed. Pems., Argyll., Perth. Channel Is. b.v–m.vi, b.vii–e.ix, woods and marshes. Bred from Lymantria monacha L.*

*scoparia* Pandellé.

- 49 (48) ♂: first genital segment without marginal setae; second genital segment evenly convex on disc; ventral and lateral surfaces of abdomen with normal hair which is largely shorter and not or hardly wavy at apices (fig. 39L). ♀: fifth tergite hardly a third length of fourth, not or slightly protruding beyond apex of latter, and not laterally compressed (fig. 39M); fifth and sixth ventrites not so broadly exposed and not so wide.

- 50 (51) ♂: median part of fourth ventrite gradually raised from base to apex, so that in lateral view it forms a large triangular glossy tooth (fig. 39L, ↑); forceipes and penis, fig. 39B; apical fifth or sixth of mid femora with curved half-erect setulae only on *pv* surface, but fourth fifth with about 4–6 not very closely set short pointed comb-setae; hind femur with strong *av* setae on apical three-fifths, these form as a rule a double or treble row at middle of femur or are somewhat more *v* in position at this part. ♀: marginal setae of ventral three-fifths of fifth tergite hairlike, not much longer than the setulose hairs in front of them (fig. 39M). Anterior *post dc* rather strong. 7.5–13 mm.

*Kent to Cornwall to Glam. to Hereford. to Norfolk. Channel Is. m.v–e.vi, m.vii–b.ix, woods and marshes. Bred from Lymantria monacha L. and Prionus coriarius L. . . . . aratrix* Pandellé.

- 51 (50) ♂: median part of fourth ventrite not forming a tooth-like elevation. ♀: marginal setae of fifth tergite gradually becoming somewhat finer on ventral half or so, but always conspicuously stronger than the setulose hairs in front of them.

- 52 (53) ♂: lobes of fourth ventrite (fig. 39s) with the ventral edge gradually dilated to base, and on basal half or third of this edge with a well-defined pad of evenly short stubby thickly set setulae, the edge otherwise with the normal erect short setae which are mainly directed mediad; long hairs of hind tibia absent from *av* surface and not very dense and moderately long on *pv* surface; penis (fig. 39c) without a blunt, half-soft terminal part beyond the strap-like processes. ♀: marginal setae of fifth tergite (fig. 39N) all very fine, long, and rather widely spaced, separated from each other by 4–5 times their own diameter, halves of fifth tergite very broadly separated dorsally; sixth ventrite with a pair of large roundish glossy tubercle near base. Anterior *post dc* weak (fig. 38P). 7–13 mm.

*Hants.: Hengistbury Head; Mudeford; Dorset.: Arne; Studland; Hamworth Marshes; Poole Harbour. e.v–b.vi, m.vii–m.ix, sandy shores*

*similis* Pandellé.

- 53 (52) ♂: lobes of fourth ventrite (fig. 39T) with linear ventral edges, which are fringed by erect short pointed setae of uneven length, most of them directed mediad. ♀: marginal setae of fifth tergite stouter and denser, largely separated by 1–3 times their own diameter (fig. 39P).

- 54 (55) ♂: *av* surface of hind tibiae apart from the setae without any hairs which are markedly longer than greatest diameter of tibia, *pv* surface with a moderate number of long erect hairs; penis (fig. 39D) with a blunt half-soft end-part beyond the strap-like processes. ♀: sixth ventrite (fig. 39Q) (the last conspicuously sclerotized one) with some very fine hairs only in an oblique transverse row along either side of apical margin, these hairs even smaller towards middle, ventrite entirely covered with fine whitish-grey pile. Anterior *post dc* strong (see fig. 38o). 8–12.5 mm. (= *kroeberti* Rohden-dorf.)

*Kent to Cornwall to Pems. to Norfolk. Channel Is. iv–b.ix, woods, coasts and wastes, common. . . . . teretirostris* Pandellé.

- 55 (54) ♂: *av* surface of hind tibiae in addition to the setae with a moderate number of long outstanding hairs, the longest of which have about twice length of greatest tibial diameter, *pv* surface with a large number of similar hairs; penis (fig. 39E) without a projecting blunt half-soft terminal part. ♀: sixth ventrite (fig. 39R) with a transverse row of about five strong setae across middle. Anterior *post dc* weak (see fig. 38P). 9–14 mm.

- Kent to Dorset., Worcs., recorded from Norfolk, Suffolk, Clyde area, Inverness.* m.vi, b.vii-m.ix. *Bred from Lymantria and other Lepidoptera, from SCARABAEIDAE and Saperda.* . . . . . **albiceps** Meigen.
- 56 (47) Second tergite normally with strong marginals. Four strong *post dc*, but sometimes the *second* weaker (fig. 38o). ♂: first genital segment (figs. 39u, v) with marginal setae. ♀: subapical marginal seta of scutellum doubled or trebled (fig. 39o), the auxiliary one to the outer side of the main one more than half as long as the latter except in small specimens; fifth tergite of *frenata* type (see fig. 36N); margins of fifth tergite often broadly ferruginous translucent.
- 57 (58) ♂: first genital segment (fig. 39u) thinly but distinctly dusted, except on basal part, hind margin densely dusted; hair denser, finer, longer, largely with wavy tip, those on disc largely half as long as width of segment; apical hook of superior forceps small but strongly set off and strongly curved, its tip not projecting towards body beyond level of distal half of anterior margin (fig. 39f); parameres subequal, penis, fig. 39f. ♀: 8th tergite absent. 8-15 mm.
- England, generally distributed. Inverness., Moray. Co. Waterford. Channel Is.* m.v-e.ix, x, *very common.* . . . . . **subvicina** Rohdendorf.
- 58 (57) ♂: first genital segment (fig. 39v) perfectly glossy and undusted, except for the densely dusted hind margin, hair shorter, less dense, only the longest with wavy tip, those on disc largely less than a third as long as width of segment; apical hook of superior forceps (figs. 39g, h) moderately long, its tip projecting towards body beyond level of anterior edge; anterior paramere half as long again as posterior one and somewhat clubbed. (Apical part of penis bent forward at an angle of about 100-110° as in fig. 39h: typical form; at an angle of about 130-140° as in fig. 39g: f. *vulgaris* Rohdendorf.)<sup>34</sup> ♀: 8th tergite present, visible in fresh and in relaxed dry specimens (according to Patton). 8-16 mm.
- England, Wales, Scotland (to Moray.), Ireland, generally distributed. Channel Is.* b.iv-m.x, *very common.* (var. *vulgaris* seen *Kent to Devon. to Pems. to Notts. to Norfolk. Moray. Co. Cork, Co. Waterford.*) Larva in decomposing organic matter, including dead animals, sometimes parasitic, even in man, causing intestinal myiasis, etc. . . . . **caritaria** L.

## Subfamily POLLENIINAE.

Genus *Pollenia* Robineau-Desvoidy, 1830. Clusterfly.

Adults found throughout the year, on flowers, stones, soil; in autumn, winter and spring striking by their sluggish behaviour, often in large numbers in the upper parts of houses ("clusterflies"); oviparous. Larva parasitic in earthworms, also recorded from a Lepidopterous pupa; breeding experiments with dead animal matter of different kinds have been unsuccessful, in spite of an old record (Riley, 1883) according to which *P. rudis* was bred from cow-dung. The ground-colour of the British species is wholly fuscous-black but for parts of the head and its appendages.

## KEY TO SPECIES.

- 1 (2) Abdomen glossy black, without any conspicuous pollinosity, the thin pollinosity in posterior view appearing uniform or, if the light comes from the side, appearing uniformly absent from the half nearer the light. Thorax

<sup>34</sup> *vulgaris* was described by Rohdendorf (1937: 287) as a subspecies of *subvicina*, but I agree with Day (1948: 96) that it should be transferred to *caritaria*, to which it is much more similar in all its characters. It can hardly be a subspecies of either as it occurs together with them, both geographically and apparently ecologically. The form *vulgaris* must therefore be either a "good" species or an insignificant modification, the former being almost certainly correct.

thinly cinereous dusted. Mid tibia with 2-3 *ad* setae. Facial keel very distinct but narrow (fig. 40A). ♂: eyes separated by less than half width of third antennal segment. ♂: fig. 40A. 4.7-10 mm.

*England, Scotland (to Sutherland.), generally distributed. Co. Mayo, Co. Galway. m. iii-e. v, m. vi-m. x, marshes, common. . . . . vespillo F.*

- 2 (1) Abdomen with conspicuous pollinosity, which is addressed in different directions so as to create a shifting pattern (figs. 40E-G).
- 3 (4) Thorax with three conspicuous broad dark vittae, the median one reaching the line of the *acr* (fig. 40C). Abdomen of bluish black ground colour with the pollinosity more uniform and the shifting pattern less conspicuous (fig. 40E) and not tessellate: pollinosity silver-white with a linear brown-black median vitta, the shifting spots large and extending over the full width of one half of the abdomen. Mid tibia with one *ad* seta. Third antennal segment not much longer than second (fig. 40B). ♂: eyes separated by less than half the width of the third antennal segment. ♂: figs. 40B, C, E. 7-11 mm.

*Surrey: Walton-on-Thames; Salop: Oswestry; Notts.: Sherwood Forest. Wales. b.-m. iv, v, m. viii, m. xii. . . . . vagabunda Meigen.*

- 4 (3) Thorax in front of suture with four dark vittae (fig. 40D), the paramedian ones very narrow and faint, halfway between the *acr* and *dc*. Abdomen of an olive-brassy black ground-colour with a more conspicuous shifting pattern (figs. 40F, G). Antennae longer.
- 5 (6) Scutellum with three strong (and sometimes a weak lateral) marginals (fig. 40F). Mid tibia with a single (strong) *ad* seta only. Dark abdominal pattern in posterior view consisting of a narrow median vitta and marginal bands which become somewhat tessellate only towards outer margin, dark coloration sometimes broadly reaching median half of fore margin. Intermediate *post acr* often absent. *R*<sub>5</sub> often closed. Facial keel absent. ♂: superior forceps (fig. 40H) somewhat widened from middle to apical fourth, apices flattened and concave. ♂: figs. 40D, F, H. 4.8-7 mm.

*Surrey to Cornwall to Warwks. to Norfolk. Inverness. to Sutherland. i-b. x . . . . . varia Meigen.*

- 6 (5) Scutellum with four distinct marginals on either side, all of which are usually strong (fig. 40G). Dark abdominal pattern in posterior view more tessellate and irregular (fig. 40G).
- 7 (8) Facial keel prominent, broad and flattened on edge, the latter more than half as wide as the third antennal segment (fig. 40L). Palpi yellow with darkened base.<sup>35</sup> ♂: forcipes fig. 40I; hair on ventral surface of tergites not very dense, separated by about 2-3 times the width of a spiracle (including the shining tubercle on which it lies). ♂: figs. 40I, L. 7.3-9.5 mm.

*Kent to Cornwall to Anglesey to Lancs. to Norfolk. "iii-viii," b. vii-b. viii, coast and downs. . . . . carinata Wainwright.*

- 8 (7) Facial keel narrow and sharp-edged (figs. 40N, O) or obsolete (fig. 40M). Palpi fuscous.
- 9 (10) Basicosta fuscous-black. Third antennal segment more than twice as long as second. Facial keel absent or very slight (fig. 40M). Head darker and with very narrow frons. ♂: forcipes, fig. 40J; hair on ventral surface of tergites not very dense, separated by 2-3 times the width of a spiracle (including the shining tubercle on which it lies). ♂: figs. 40J, M. 5.5-10 mm. (= ? *intermedia* Macquart.)

*Kent to Devon. to Merioneth. to Salop, Westmorland. Scotland, generally distributed to Sutherland. Co. Donegal. m. iv, e. v-m. ix, b. xii*

- excarinata* Wainwright.
- 10 (9) Basicosta pale to dull testaceous. Third antennal segment less than twice as long as second. Facial keel distinct (figs. 40N, O). ♂: forcipes, fig. 40K.

*England, Wales, Scotland (to Sutherland. and Hebrides), Ireland, generally distributed (the var. not seen from Wales and Ireland). i-e. v, m. vi-xii, on wing on warm winter days. . . . . rudis F. . . . . 11.*

<sup>35</sup> *P. fulvipalpis* Macq. from the Channel Isles is extremely similar to *carinata*; the male genitalia are formed as in *varia* but much more elongate.



- 11 (12) Mid tibia with more than one *ad* seta; upper part of parafacialia more than half as wide as eye (fig. 40N); ♂: frons (fig. 40N) about as wide as third antennal segment; hair on ventral surface of tergites dense, separated by little more than width of a spiracle, including the shining tubercle on which it lies. ♂: figs. G, K, N. 5.5-10 mm.....**rudis rudis** F.
- 12 (11) Mid tibia usually with one strong *ad* seta only; upper part of parafacialia up to two-fifths the width of an eye (fig. 40O). ♂: frons about half as wide as third antennal segment, hair on ventral surface of tergites as in *excarinata*. ♂: fig. 40O. 4.5-9 mm.....**rudis f. angustigena** Wainwright.

Subfamily CALLIPHORINAE.

KEY TO GENERA

- 1 (6) Stem-vein with some setulose hairs on postero-dorsal surface (fig. 40P, s).
- 2 (3) First ventrite (fig. 40Q, v I(2)) shield-like, its lateral margins covering the margins of the tergites (I(2)) in their entire length. Occiput with a bare shining band behind upper half of occipital row (RHINIINI). Prostigmatal seta absent (RHINIINI). 1 + 1 *stpl.* Mouth margin strikingly produced (fig. 40U). Arista bare on ventral surface but with long rays on dorsal surface (fig. 40V). Thorax with three rather broad blackish vittae on thinly grey dusted ground; abdominal segments 1-3 reddish yellow at sides with a broad blackish median vitta and rather narrow black hind margins, pale coloration less conspicuous and whitish dust denser in female. ♂: figs. 40P, Q, v. 5-8 mm.
- Hants. to Cornwall to Gloucs., Herts., Cambs. (Wainwright, 1949, J. Soc. Brit. Ent. 3 : 97). e.vi, e.vii-b.x, probably a migrant, rare. Larva in egg pods of locusts (Jannone, 1950, Boll. Lab. Ent. agr. Portici 9 : 155); it is unknown whether the species breeds in Britain, in this case the larvae would be expected to live in egg-pods of native grasshoppers.....Stomorhina lunata* F.
- 3 (2) First ventrite (fig. 40R, v I(2)) narrower, with more or less concave side margins, which do not cover the margins of the tergites (I(2)) on at least posterior half. Prostigmatal seta present (fig. 32A, ↑). 2 + 1 or 1 + 1 *stpl.* Propleural depression densely setulose (fig. 32B, d). Mouth-margin not much produced (fig. 40V). Arista plumose (fig. 40V). Body wholly metallic purple, blue or green. (PHORMIINI)
- 4 (5) Lower calyptra of *Musca*-type (fig. 40S, l.c.), i.e., the inner margin more or less closely adjacent for some distance to scutellum and converging backward

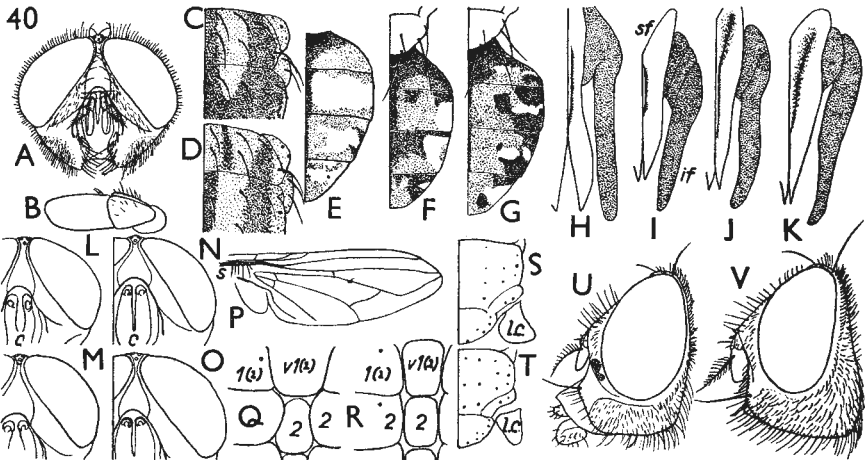


FIG. 40.

with longitudinal axis of fly, apex more or less truncate; upper calyptra on its exposed (when the wing is in resting position, upper) surface, with fine erect (black or white) hairs. 4 *post dc*, the second often indistinct and only the last strong (fig. 40s). Setulose area of parafacialia not reaching middle level of third antennal segment. Thorax with at most slight dust, without vittae.

- Larvae in decaying animal matter* . . . . . **Phormia** (p. 121).  
 5 (4) Lower calyptra of *Phaonia* type (fig. 40r), i.e., basal part of inner margin strongly diverging backwards from margin of scutellum, apex strongly rounded; upper calyptra without hairs except at margin; calyptrae normally whitish. 3 strong *post dc* (fig. 40r). Setulose area of parafacialia reaching or exceeding middle level of third antennal segment (fig. 40v). Thorax with greyish white, in female much denser, pollinosity and three undusted moderately broad vittae, abdomen with pollinosity and a linear undusted median vitta and hind marginis. Several pairs of strong *prst* and *post acr* (fig. 40r). 2 + 1 *stpl*. Anterior thoracic spiracle black or dark brown. ♂: frons slightly wider than third antennal segment. ♂: figs. 40r, v. 7.5–11 mm. (= *coerulea* Robineau-Desvoidy of Bezzi, nec Robineau-Desvoidy, *azurea* auct.)

*Larvae in birds' nests, sucking the blood of the nestlings and often destroying them.* Kent to Cornwall to Radnrs. to Ches. to Notts. to Norfolk. b. iv–b. vi, e. vi–b. x, woods, marshes, sometimes in numbers in houses

**Protocalliphora sordida** Zetterstedt.

- 6 (1) Stem-vein bare.  
 7 (10) Setae of at least anterior part of thorax not distinguishable from the hairs. Mouthparts (fig. 41a, m) strongly reduced, palpi subglobular. Antennae very short, arista appearing bare (figs. 41a, b). Clypeus deeply sunk.

*The eggs are deposited in or near the nostrils of deer; the larvae live in the nasal passages but occasionally farther in the interior, e.g., in the soft palate, base of tongue or even lungs.* (CEPHENOMYIINI).

- 8 (9) Hair short and moderately dense (fig. 41a), integument everywhere easily visible; pleurae and margins of mesonotum with some distinct setae. Thorax densely whitish-grey pollinose with a pair of narrow vittae and of dots before and two pairs of spots behind suture black; a subtriangular median area behind neck with dark brownish grey or olive grey dust, a pair of similar spots in front of the *prst* dots. Fig. 41a. 13–16 mm.

*Extinct in Britain?* . . . . . **Pharyngomyia picta** Meigen.

- 9 (8) Hair long and furry (fig. 41b), fly bumble-bee-like, setae indistinct among the hair. Mesonotum with olive-grey hair before, and black hair behind, suture, the black hair sometimes extending forward across suture or backward over scutellum, which is more usually grey-haired; abdomen with yellowish grey, yellow or fulvous fur, which turns to black towards sides. Fig. 41b. 14–16 mm.

(*C. nasalis* L. 1758 = *trompe Modeer*, 1786, which has been introduced with reindeer and which may establish itself with this mammal in the Scottish mountains, differs by the hair on the disc of the abdomen being largely black, the costal segment in Sc being almost as long as that in R<sub>1</sub> (in aur. much shorter), and by the tarsal segments being piceous (in aur. testaceous with darkened tips)). The sensational reports by Townsend on the huge speed of an American species are based on an extremely crude and unscientific observation by the unaided human eye and should be disregarded. Scottish Highlands: Perth. to Sutherland. e. v–vii, scarce. . . . . **Cephenomyia auribarbis** Meigen.

- 10 (7) Setae of anterior part of mesonotum very distinct among the hairs, always three *post dc* present. *prst acr* well developed (fig. 42k). Mouthparts well developed. Antennae of normal length; arista at least shortly plumose (fig. 41j, etc.). Propleural depression always setulose (fig. 32b, d). (CALLIPHORINI.)

- 11 (12) Posterior part of suprasquamal ridge (fig. 41c, s) with a tuft of black setulose erect hairs on a small well-defined black sclerite. Integument bright metallic green, bluegreen, brassy green, sometimes coppery green, etc. Lower calyptra quite bare on dorsal surface (fig. 41c, l.c.).

*Oviparous; larvae in decaying animal matter including excrements, or on dead or living fresh animal tissue, often harmful as sheep blowflies*

**Lucilia** (p. 122).

- 12 (11) Posterior part of suprasquamal ridge bare (fig. 41D, *s*). Integument dark steel blue, dark purplish blue, or darker brassy green than in *Lucilia*, sometimes without metallic sheen.
- 13 (18) Lower calypttra quite bare on dorsal surface (see fig. 41C, *l.c.*) (in *Pseudonesia* sometimes with 1-3 odd hairs).
- 14 (17) Apical cross-vein straight or virtually straight (evenly slightly concave) behind bend (figs. 41E, F). Dorsal surface without metallic reflections, at most with a slight brassy sheen. Only 1 + 2(1) *acr* in narrowly separated rows, or postalar declivity (below postalar setae and above suprasquamal ridge) bare.
- 15 (16) Postalar declivity bare. Mouth margin not, vibrissal angles hardly, produced, head shorter at level of vibrissae than at lunula (fig. 41J); parafacialia with 2-3 complete rows of setulose hairs. Last section but one of *m* not or hardly shorter than *m-m*, apical cross vein slightly concave (fig. 41E); *R*<sub>5</sub> open. Halteres fuscous. 2(1) + 3(2) *acr*. Ventrites all broadly exposed, their margins covered by those of the tergites. Slender, shining black, thorax with very thin greyish-brown dust and only traces of vittae; abdomen with a narrow undusted median vitta and moderately broad hind margins. ♂: figs. 41E, J. 5-9 mm. (Frequent spellings *Engyzops* and *Engyops*, the latter being philologically correct.)

*Viviparous, parasitic in snails. Hants. to Somerset. to Hereford. to Warwks. to Suffolk. e.v-e.viii. hedgerows, scarce. .Eggisops pecchiolii* Rondani.

- 16 (15) Postalar declivity with a few black setulae (see fig. 41D, *pd*). Mouth margin conspicuously projecting between vibrissal angles, the latter produced, head thus slightly longer mouth at margin than at lunula (fig. 41K); parafacialia broader, with 2-3 rows of hairs on upper two-thirds. Last section of *m* but one much shorter than *m-m*, apical cross vein straight or almost so (fig. 41F); *R*<sub>5</sub> very narrowly open or closed in margin. Halteres dull reddish yellow. 1 + 2(1) *acr*. Ventrites all broadly exposed, covering margins of tergites. With brownish grey dust and shifting reflections, thorax with five (in front of suture seven) irregular vittae, abdomen with a somewhat tessellate pattern. ♂: figs. 41F, K. 4.5-7 mm.

*Biology unknown. Scotland: Bute to Sutherland., St. Kilda. e.v-b.ix, not rare on boulders among heather. . . . .Pseudonesia puberula* Zetterstedt.

- 17 (14) Apical cross-vein with a distinct slight dip behind bend (fig. 41G); *R*<sub>5</sub> open. Dorsal surface metallic steel-blue, abdomen evenly thinly dusted except for a narrow median vitta and moderately broad undusted hind margins, thorax whitish dusted with three narrow vittae. Normally 2 + 3 *acr*

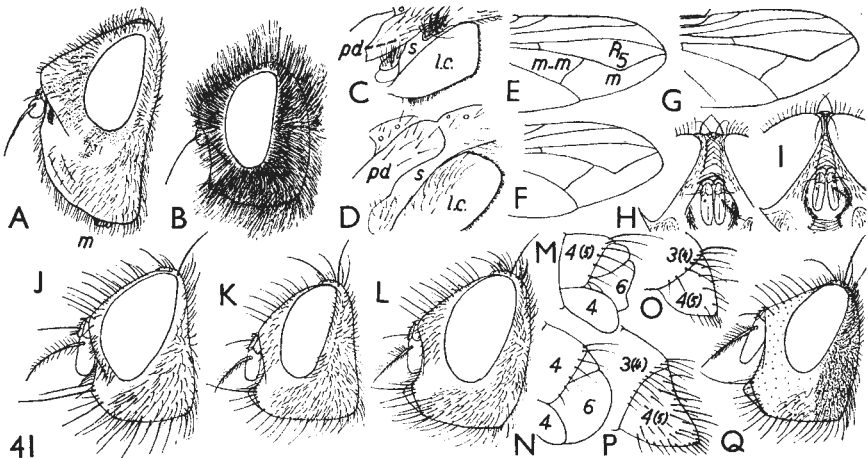


FIG. 41.

(fig. 42κ, a). Postalar declivity conspicuously setulose (see figs. 41c, d, pd).

*Eggs deposited in the mantle cavity of living snails and slugs, where the young larva lives as a parasite, the host is later killed and the older larva thus is necro- and in the end saprophagous on the remains. . . . . Melinda (p. 124).*

18 (13) Lower calyptra with erect setulose hairs on dorsal surface, at least on inner part towards base of scutellum (fig. 41d, l.c.).  $R_5$  open. Dorsal surface metallic olive green, blue or purplish. 2-3 *prst* *acr*.

19 (20) Parafacialia setulose on most of their length (fig. 41l), the setulae rather long and conspicuous. Posterior third and outer half of lower calyptra wholly bare on dorsal surface (fig. 41d, l.c.). Abdomen dark metallic olive-green or blue-green, with conspicuous dust. Parafacialia wholly blackish in ground-colour, as is the occipital dilation.

*Viviparous; larvae in earthworms (Keilin) and apparently generally in decaying animal matter (Lundbeck). . . . . Onesia (p. 124).*

20 (19) Parafacialia setulose on upper half or less, the hairs rather fine and often inconspicuous (figs. 41q, 42q, r). Setulose area of lower calyptra as a rule more extended, occupying two-thirds of the width and length of the dorsal surface or more. Abdomen dark purple or purplish blue, seldom olive green or blue green, but then without any pollinosity.

21 (24) Abdomen with conspicuous pollinosity. Parafrontalia wholly blackish in ground-colour (figs. 42q, r). Bare margin of lower calyptra moderately broad or broad. ♂: sixth abdominal segment shorter than fourth (fig. 41m). ♀: discals of fourth and marginals of third and fourth tergites well developed but not strikingly long, fourth tergite broadly convex (fig. 41o).

*Larvae in dead or decaying animal matter, on which the female deposits its eggs; apparently sometimes accidental parasites.*

22 (23) Lower calyptra more or less broadly infusate (less intensively in female). ♂: hypopygium including fourth ventrite hardly protruding

**Calliphora** (p. 124).

23 (22) Lower calyptra greyish white, with the part adjacent to the scutellum somewhat infusate. ♂: hypopygium rather protruding, especially lobes of fourth ventrite very large and erect (fig. 41m). . . . . **Acrophaga** (p. 125).

24 (21) Abdomen wholly devoid of pollinosity. Anterior half or more of frons, including parafrontalia, and the whole face including jowls bright orange (fig. 41q). Bare margins of the lower calyptra rather narrow. ♂: hypopygium very large, sixth abdominal segment twice as long as wide, much longer than fourth (fig. 41n). ♀: fourth abdominal segment and hind margin of third with numerous strikingly long setae, fourth almost as long as wide and with a broad shallow dorsal depression (fig. 41r). ♂: figs. 41n, q. ♀: fig. 41r. 8-15 mm.

*Especially in carrion. England (Sussex to Somerset to Lancs. to Durham). Scotland (to Orkneys and Hebrides, St. Kilda). e.iv-m.x, woods and wastes, scarce in S. England. . . . . Cynomia mortuorum L.*

Genus **Phormia** Robineau-Desvoidy, 1830.

KEY TO SPECIES.

1 (2) Hair on exposed (if wings in resting position) surface of upper calyptra black, calyptrae strongly infusate with fuscous border and fringe. Anterior thoracic spiracle dark brown or black. *acr* absent or hairlike, not more than 1 + 1 distinct (fig. 40s). 2 + 1 *stpl*. Pollinosity in dorsal view absent. Setulose area of parafacialia not exceeding level of arista (fig. 41n). ♂: frons  $1\frac{1}{2}$ -2 times as wide as third antennal segment (fig. 41n). ♂: figs. 40r, s, 41n. 7.5-11 mm. (Sbg. *Protophormia* Townsend; = *groenlandica* Zetterstedt, 1838, *azurea* Fallén, 1816, pars,<sup>36</sup> Zetterstedt, 1838, Hennig, 1939, Ringdahl, 1945.)

<sup>36</sup> Zetterstedt (1838, *Ins. Lapp.*: 657) divided *azurea* Fallén, at the hand of Fallén's typical series (cfr. Horn & Kahle, *Ent. Beih., Berlin-Dahlem* 2-4: 338) into *groenlandica* and *azurea* Fallén s.str., Zetterstedt, which latter species is a *Protocalliphora* unknown from the British Isles.

*Larva in various kinds of decaying animal matter, sometimes causing external myiasis. England, Scotland, generally distributed (Kent to Cornwall to Orkneys). m.v-b.iv, adult hibernating, marshes and wastes, very common, sometimes in winter in houses.....terrae-novae* Robineau-Desvoidy.

- 2 (1) Hair on exposed surface of upper calyptra white, inconspicuous, calyptrae including border and fringe whitish. Anterior thoracic spiracle light brown to yellowish. Several distinct though fine *prst* and *post acr.* 2 + 1 or 1 + 1 *stpl.* Thorax with uniform slight pollinosity. Setulose area of parafacialia extending beyond level of arista (fig. 41r). ♂: eyes subcontiguous (fig. 41r). 7-9.5 mm.

*Larva in carrion, sometimes attacking living animals including man. Ireland: Dublin. S. England: Oxon. vii.....regina* Meigen.

Genus **Lucilia** Robineau-Desvoidy, 1830. Green Bottle ; (Green) Blow Fly.

KEY TO SPECIES.

- 1 (4) Basicosta (see fig. 25q†) creamy yellow. Subcostal sclerite (see fig. 42A, s) with yellowish microscopic pile only. Three *post acr* (see fig. 42k, a). Second tergite without distinct marginals. (*Phaenicia* Robineau-Desvoidy.)
- 2 (3) Mid tibia with one *ad* seta only. ♂: eyes separated by 2-3 times width of third antennal segment (fig. 42c); abdomen usually with a fine dark green median line on at least the second segment. ♀: third antennal segment only slightly longer than width of interfrontalia; abdomen with conspicuous whitish dust if seen posteriorly, reflections halved on median line. 4.5-9 mm.

*Larvae in decomposing flesh and other rotting animal matter, occasionally in manure; the principal sheep blowfly in this country, sometimes in wounds (myiasis) in other mammals, including man. England, Wales, generally distributed. Inverness. S.E. Ireland. b.iv, e.v-e.ix, wastes, gardens, very common. "Sheep maggot fly".....sericata* Meigen.

- 3 (2) Mid tibia with two strong *ad* setae (fig. 42b). ♂: eyes separated by not much more than width of third antennal segment (fig. 42d); abdomen without a dark median line. ♀: third antennal segment as long as width of frons;

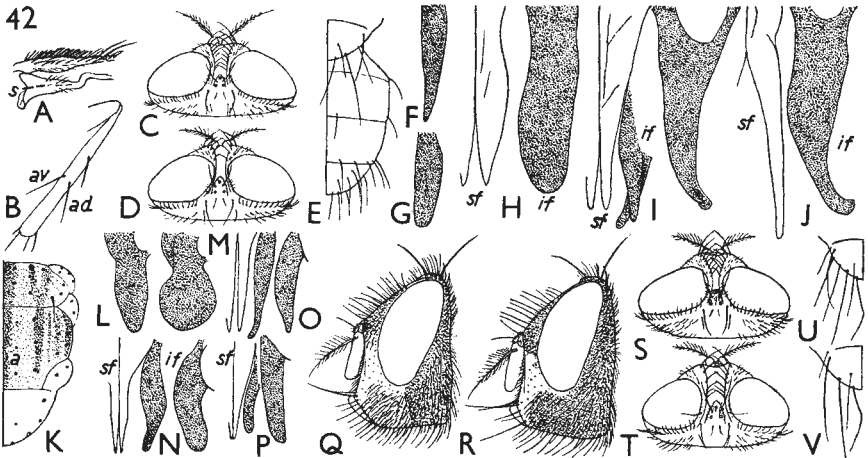


FIG. 42.

abdomen with very slight pollinosity towards sides only, not divided on median line. ♂: figs. 42B, D. 5-9 mm.

*Kent to Cornwall to Glam. to Lancs. to Notts. to Norfolk.* b. iv-b. vi, e. vi-b. ix, wastes and commons, very common. . . . . **richardsi** Collin.

- 4 (1) Basicosta black, brown, or deep orange.
- 5 (8) Subcostal sclerite (see fig. 42A<sub>s</sub>) with microscopic pile only. Second tergite with conspicuous marginals (fig. 42E) (*Bufo lucilia* Townsend). *Parasitic in toads and frogs* (BUFO, RANA; on the Continent also ALYTES, BOMBINATOR, PELOBATES and even SALAMANDRA), the eggs being deposited on the host and the larvae entering through nostrils and eyes. "Toadfly."
- 6 (7) Three *post acr* (see fig. 42K). Palpi fuscous brown to black. ♂: inferior forceps (in lateral view) tapering from middle to apex, spine-shaped (fig. 42F). ♀: frons about a third head-width. ♂: figs. 42E, F. 5.5-8 mm.  
*Sussex to Cornwall to Ches. to Yorks.* iii, e. v-b. vi, e. vi, m. vii-m. ix, wastes and hedgerows, uncommon. . . . . **silvarum** Meigen.
- 7 (6) As a rule with only the posterior two *post acr*. Palpi grey brown with dull light brown basal half. ♂: inferior forceps (in lateral view) almost parallel-sided (fig. 42G). ♀: frons a quarter head-width or slightly wider. 4.5-9 mm.  
*Sussex to Cornwall to Hereford. to Bucks.* e. v-e. vi, vii, b. viii-b. ix, local **bufonivora** Moniez.
- 8 (5) Subcostal sclerite in addition to the microscopic pile with some blackish setulae near apex (fig. 42A). Second tergite without outstanding marginal setae. (*Lucilia* s. str.)  
*Larvae mainly in carrion, sometimes causing myiasis in living animals.*
- 9 (10) ♂: inferior forceps (in lateral view) almost parallel-sided with the apex very broadly rounded (fig. 42H, *i.f.*) and the outer surface covered with long dense fine wavy hair; arms of superior forceps (posterior, ventral view) widened distad of middle, flattened (fig. 42H, *s.f.*); eyes subcontiguous, separated by about half the width of the third antennal segment. ♀: third antennal segment longer than width of frons, more than four times as long as wide; underside of arista with 18-20-21 rays; fifth (sixth tergite much as in *illustris*. 6-9.5 mm.  
*Sussex to Cornwall to Ches. to Notts.* m. v-e. vi, e. vii-x, woods, scarce. Occasional internal parasite of toad. (Britten, 1943, **North W. Nat.** 18: 189) **ampullacea** Villeneuve.
- 10 (9) ♂: inferior forceps tapering from base to apex, the latter very narrow (figs. 42I, J, *i.f.*), the outer surface shining with not very dense hairs, the latter shorter than the basal width of the inferior forceps, except for some long stiff bristles on anterior edge; arms of superior forceps evenly tapering (posterior, ventral view), spine-shaped (figs. 42I, J, *s.f.*). ♀: third antennal segment shorter than width of frons, 2.5-3.1 times as long as wide; underside of arista with fewer rays.
- 11 (12) ♂: inferior forceps bifid at apex (fig. 42I, *i.f.*), the posterior arm twisted forward over the anterior arm (reminiscent of a middle finger laid over the fore finger); superior forceps with the inner edges contiguous except at apex (fig. 42I, *s.f.*); eyes subcontiguous, separated by about half the width of the third antennal segment. ♀: hind margin of fifth (sixth) tergite in addition to some lateral setae with only 2-4 small setae at middle, disc of tergite somewhat inflated, convex in lateral view, underside of arista with 13-15-17 rays; (third antennal segment fully as long as combined width of interfrontalia plus one parafrontale, thrice as long as wide). 5.5-10 mm.  
*Generally distributed.* iv, b. v-e. x, woods, wastes, gardens, very common **caesar** L.
- 12 (11) ♂: inferior forceps simple, pointed and with a slight apical knob, which is curved forward (fig. 42J, *i.f.*); superior forceps with the inner edges evenly diverging and straight (fig. 42J, *s.f.*); eyes separated by almost the width of the third antennal segment. ♀: hind margin of fifth (sixth) tergite with a complete row of rather strong marginals, disc of tergite not inflated, straight in lateral view; underside of arista with 9-11-12 rays; (third antennal segment less long than width of interfrontalia plus one parafrontale, 2.5 times as long as wide). 5.5-8.5 mm.  
*England, Wales, generally distributed.* iv, b. v-m. vi, b. vii-m. x, marshes and wastes, common. . . . . **illustris** Meigen.

Genus **Melinda** Robineau-Desvoidy, 1830.

## KEY TO SPECIES.

- 1 (2) *prst ia* present and quite strong (fig. 42K). Lateral vitta of thorax (outward to the *dc*) somewhat indefinitely divided in front of suture into two vittae. Stouter and larger; abdomen subcordate, about as wide as long. Lower calyptra fully as wide as long. ♂: apical part of inferior forceps (fig. 42L) subtriangular (lateral view). ♂: figs. 42K, L. 5-8.5 mm. (= *gentilis* Stein.)  
*Kent to Cornwall to Salop to Notts. to Norfolk.* e.iii-b.vii, b.viii-e.x, woods and chalk wastes, common.....**anthracina** Meigen.
- 2 (1) *prst ia* absent. Lateral vitta of mesonotum broad and undivided in front of suture. More slender and smaller; abdomen ovate, longer than wide. Lower calyptra longer than wide. ♂: inferior forceps in lateral view almost circular (fig. 42M). ♂: figs. 41G, 42M. 4.8-8 mm. (= *cognata* auct.)  
*England, Wales, generally distributed. Co. Mayo.* e.iii-e.vi, m.vii-b.x, woods and chalk wastes, common. (Biology: Keilin, 1919, *Parasito.* 11: 430)  
**caerulea** Meigen.

Genus **Onesia** Robineau-Desvoidy, 1830.

## KEY TO SPECIES

In the British species the two posterior *post ia* only are present and strong (though a weaker first one may be found on one side), whilst the continental *sepulchralis* Meigen (and a few other species) have 3 strong *post ia*.

- 1 (2) Fore tibia as a rule with two *pv* setae. ♂: inferior forceps, fig. 42N, *i.f.*; superior forceps, fig. 42N, *s.f.* ♂: figs. 41L, 42N. 5.5-9 mm.  
*Dorset. and Devon. to Ches., also recorded from Lincs. Merioneth.* b.vi, b.vii, b.-e.viii ..... **biseta** Villeneuve.
- 2 (1) Fore tibia with one *pv* seta only. ♂: inferior forceps much more slender and straight (figs. 42o, P), superior forceps narrowed from base to apex (figs. 42o, P, *s.f.*).
- 3 (4) *prst dc* usually connected by a slight undusted vitta; shining abdominal median vitta rather clearly defined and narrow. ♂: forceps, fig. 42o. ♂: figs. 41D, 42o. 4-9 mm.  
*England, Wales, Scotland (to Orkneys), Ireland, generally distributed. Channel Is.* e.iv-b.x, marshes and wastes, very common....**agilis** Meigen.
- 4 (3) *prst dc* not connected by a well-defined undusted vitta; shining abdominal median vitta not very sharply defined and broader. ♂: forceps, fig. 42P 4.7-9.5 mm.  
*England, Wales, Scotland (to Sutherland.), generally distributed. Co. Cork.* m.iv-e.ix, woods and marshes, common.....**aculeata** Pandellé.

Genus **Calliphora** Robineau-Desvoidy, 1830. Blowfly, Blue Bottle.

- 1 (2) Basicosta (see fig. 25q †) largely testaceous or pale ferruginous, epaulet dull ferruginous. Anterior thoracic spiracle orange. Jowls ferruginous, except for posterior third of occipital dilation (fig. 42q). 6-12 mm.  
*England, Wales, Scotland (to Outer Hebrides and Sutherland.), Ireland, generally distributed. Channel Is.* b.i-m.vi, b.vii-e.xii, on wing on warm winter days, very common.....**erythrocephala** Meigen.
- 2 (1) Basicosta and epaulet wholly fuscous-black. Anterior thoracic spiracle strongly infusate.
- 3 (4) Hair on lower part of jowls near and along mouth-margin and on lower part of occiput fulvous. 8.5-14 mm.  
*England, Wales, Scotland (to Sutherland.), Ireland, generally distributed. Channel Is.* b.ii-e.vi, m.vii-b.xii, very common.....**vomitaria** Meigen.

- 4 (3) Hair on jowls and occiput all black<sup>37</sup>.
- 5 (6) Thorax with three (five) distinct vittae, the median one conspicuous particularly in its *prst* part. Parafacialia with a small but striking spot of silver-white pollinosity which defines the lower end of a conspicuous spot of fuscous reflections (fig. 42r). Occipital dilation wholly fuscous, anterior part of jowls usually fuscous. ♂: fig. 42r. 6-10.5 mm. (= *germanorum* Villeneuve.)  
*Scotland: Angus to Inverness. to Sutherland. m.vi-m.viii, uncommon. loewi* Enderlein.
- 6 (5) Thorax almost evenly bluish grey dusted anteriorly, with only slight traces of dark lines, median one not or hardly indicated. Parafacialia greyish or brownish golden dusted on upper part, with only slightly darker shifting reflections at level of second antennal segment. Occipital dilation reddish orange on more than anterior half, similar to that of *erythrocephala* but somewhat infuscate. *acr* rows less widely separated. 8-11 mm.  
*Scotland: Sutherland.: Tongue area. Hebrides: St. Kilda. b.vii-b.viii, rare . . . . . uralensis* Villeneuve.

Genus *Acrophaga* Brauer & Bergenstamm, 1891.

KEY TO SPECIES.

- 1 (2) Scutellum with four to five pairs of strong marginals, lateral seta present and well developed (fig. 42v). *acr* rows in front of suture almost as distant from each other as from the *dc* rows. ♂: mid tibia usually without a *v* seta; interfrontalia at narrowest part about as wide as an ocellus; frons hardly one-tenth head-width, without an orbital seta (fig. 42s). ♂: figs. 42s, u. 7-11 mm. (= *alpina* auct. nec Zetterstedt.)  
*Radnors. to Hereford. to Warwks. to Yorks. to Inverness. to Moray. m.v, e.vi-e.ix, uncommon. . . . . subalpina* Ringdahl.
- 2 (1) Scutellum with only three pairs of strong marginals, lateral seta absent (fig. 42v). *acr* rows much less distant from each other in front of suture than from the *dc*. Hair of lower calyptera restricted to about half its width and length. Thorax more thinly dusted than in *subalpina*, median vitta inconspicuous. ♂: mid tibia with a *v* seta; interfrontalia at narrowest part as wide as ocellar tubercle, frons about one-sixth head-width, with an orbital seta behind (fig. 42r). ♂: figs. 42r, v. 7.5 mm.  
*Inverness.: Glenmore, 5.viii.35. . . . . alpina* Zetterstedt.

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<sup>37</sup> If the calypterae are whitish and the fourth tergite with strong grey discals and marginals, see *Acrophaga*, which can easily be confused with *Calliphora*.



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