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TRANSACTIONS OF THE SOCIETY FOR BRITISH ENTOMOLOGY

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A Short Synopsis of British Chamaemyiidae (Dipt.)

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Flies of the family Chamaemyiidae are very small (2 mm. or less), usually light grey species which have the following combination of characters:—

> Postvertical bristles convergent or absent; vibrissae absent; palpi well developed; legs normal; tibae without preapical bristles; costal vein unbroken; subcostal vein complete, even if faint apically and more or less parallel with vein 1; vein 5 not reaching wing margin; vein 6 vestigial.

The use of highly variable colour characters by early authors has led to much confusion of the species and a consequent neglect by students and collectors. The larvae of *Leucopis* and related genera are predaceous on Hemiptera-Homoptera of the families Aphididae, Adelgidae and Coccidae and the economic importance of certain species has led to a considerable amount of recent biological and taxonomic work in Europe (Delucchi and Pschorn-Walcher, 1954; Morge, 1959, 1962), U.S.S.R. (Tanasijtshuk, 1958-62), and Canada (Brown & Clark, 1956-7; McAlpine, 1960).

A few years ago (Smith, 1958), I was able to fix the identity of *Leucopis griseola* Fallén from dissection of type material, but an intended revision of the British species was prevented by the inaccessibility of many types. Recently Dr. Günther Morge of Berlin, during the preparation of a monograph of Palaearctic Chamaemyiidae, has been able to study the important types of Rondani (Morge, 1959, 1962) and others, and has very kindly reported (*in litt.*) on comparisons he has made with these and bred British material submitted by me. Dr. N. V. Tanasijtshuk has also very kindly compared bred British specimens with the types of species described during his own intensive studies in the U.S.S.R. This kind co-operation has enabled me to offer a tentative key to the British species of *Leucopis*. A short review of other British genera is given. No detailed descriptions are given at this stage (except for one new species) and stress is laid on diagnostic features in the male genitalia and the immature stages. In the author's opinion much more work is required in this country before it will be possible to diagnose species of *Leucopis* satisfactorily on external adult characters alone. Dr. Morge's intended revision will, no doubt, bring the family into much better taxonomic order, but in the meantime it is hoped that the pre-

sent preliminary account will at least stimulate the collection and study of British material by economic workers, especially those working with Aphididae and Coccidae. McAlpine (1960) has given a key to world genera and subgenera of Chamaemyiidae, and the following key to British genera and subgenera is based on his work.

Key to the British genera and subgenera of Chamaemyiidae

1. Orbital bristles absent 2
—. Orbital bristles present 5
2. Costa ends at or just beyond R_{4+5} ... *Lipoleucopis* de Meijere
—. Costa extends to M ..... *Leucopis* Meigen *sensu lato*
3. Prescutellar acrostichal bristles present 4
—. Prescutellar acrostichal bristles absent ..... subgenus *Leucopis* Meigen *sensu stricto*
4. Mesonotum without a sublateral stripe; ocellar bristles usually present; larvae associated with adelgids ..... subgenus *Neoleucopis* Malloch
—. Mesonotum with a sublateral stripe; ocellar bristles usually absent; larvae associated with scale insects ..... subgenus *Leucopomyia* Malloch
5. 1 presutural and 2 postsutural pairs of dorsocentral bristles ... *Chamaemyia* Panzer
—. 1 presutural and 3 postsutural pairs of dorsocentral bristles 6
6. Mesopleura with at least one bristle ... *Parochthiphila* Czerny
—. Mesopleura bare; frons with a dark cross-band; lower orbital bristle nearer to upper orbital bristle than to lunule; abdomen of both sexes with paired dots ..... *Euestelia* Enderlein

Lipoleucopis de Meijere

Lipoleucopis, de Meijere, 1928, *Tidschr. Ent.,* **71**: 76.

Lipoleucopis praecox de Meijere.

The only British species, known to me from six specimens in the British Museum (Nat. Hist.) as follows:—BUCKS.: Dorney Hill, bred 5.iii.1932, 'larvae predaceous on *Chermes pini*', S. Garthside (B.M.1932.178). NORFOLK: Wells, 9.iv.1932, F. W. Edwards (B.M.1932.188). SURREY: Oxshott, 27.iii.1922, beaten from pine trees, C. L. Withycombe (B.M.1922.136). INVERNESS: Cairn Gorm, 3,000 feet, v.1934, F. W. Edwards (B.M.1934.294).

Leucopis Meigen

Leucopis Meigen, 1830, *Syst. Beschr. Zweifl. Ins.,* **6**: 133.

Nine British species are now recognised, but there is no doubt that many more species will be found to occur in this country. Work is needed on the biology and the relationship between *Leucopis,* the aphids and their foodplants before an accurate assessment of the species, subspecies or races involved can be

made. Tanasijtshuk (1959: 939) in a study of species in the Crimea divides the genus into three biological groups as follows.

(1) The eggs are deposited in the colonies of different species of aphids living openly. The larvae crawl on twigs and leaves of the plant and feed on aphids. They pupate either on the plant or in the soil and hibernate as puparia. The number of generations per year is never less than two. *L. melanopus* Tan. belongs to this group.

(2) Eggs are deposited inside aphid galls. Both the feeding of larvae on aphids and pupating take place inside the galls. So far nothing is known about the hibernation or the number of generations per year. *L. palumbi* Rond. belongs to this group, but is not known from Britain.

(3) The eggs are deposited in the ovisacs of coccids. The larvae develop and pupate in the ovisacs. There are two generations per year. As yet nothing is known concerning hibernation. So far the group includes only the subgenus *Leucopomyia.*

The following key to British species is tentative and a careful study of the figures of genitalia and immature stages should be made before attempting a final determination. The numerous papers of Tanasijtshuk and Morge are well illustrated and should enable workers to identify species not yet recorded from Britain.

Key to the British species of *Leucopis* Meigen sensu lato

1. Prescutellar pair of acrostichal bristles present 2
—. Prescutellar pair of acrostichal bristles absent 3
2. Larger (2·5 mm.), light grey species with tibiae extensively yellowish ..... *annulipes* Zett. (=*alticeps* Czerny **syn. nov.**)
—. Smaller (1·5 mm.), dark grey species with tibiae blackish ..... *obscura* Haliday
3. Thorax without brown stripes ..... *impunctata* V. Roser (= *argentata* Heeger)
—. Thorax with two distinct brown stripes under line of dorsocentrals 4
4. Hypopygium (fig. 9) large, gonocoxite (g) very small. Puparium whitish, spiracular horns small (fig 10) ..... *griseola* Fallen
—. Hypopygium smaller, gonocoxite larger. Puparium (where known) brownish, spiracular horns larger (figs. 5 & 8) 5
5. Gonocoxite and anterior paramere broad and sharply curved; parameres much shorter than gonocoxite (figs. 11 & 12) ..... **morgei** sp. n.
—. Gonocoxite and anterior paramere longer, more slender and evenly curved 6
6. Gonocoxites (g) long and slender so that in ventral view their tips nearly touch (fig. 3) 7

—. Conocoxites (g) shorter and broader so that in ventral view their tips are widely separated (fig. 1) 8
7. Larger species (2·5 mm. or more); anterior parameres (a) thickened (fig. 3) ..... *albipuncta* Zetterstedt
—. Smaller species (2 mm. or less); anterior parameres slender; puparium with two medium papillae, between posterior spiracles, a little longer than the others (fig. 5) ..... *atritarsis* Tanasijtshuk
8. In ventral view, the gonocoxite is slender with a curved tip (fig. 1) ..... *puncticornis* Meigen
—. In ventral view, the gonocoxite broader without curved tip (fig. 2) ..... *melanopus* Tanasijtshuk

Subgenus *Neoleucopis* Malloch

Neoleucopis Malloch, 1921, *Bull. Ill. State Nat. Hist. Survey,* **13**: 348.

Leucopis (*Neoleucopis*) *obscura* Haliday.

I have seen material of this species as follows:—

ENGLAND. HANTS: New Forest, 11.viii.1910, J. J. F. X. King (B.M. 1938-52); Milton, 21.viii.1907, J. J. F. X. King (B.M. 1938-52). SUFFOLK: Orford, 29.vi.1908, J. J. F. X. King (B.M. 1938-52). SURREY: Merton Park, 5.vii.1915, C. B. Williams, bred from larvae feeding on *'Chermes pini'*, (B.M. 1915-257).

SCOTLAND. ANGUS: Braedownie, 816 ft., 24.vii.1937, R. L. Coe (B.M. 1937-540). MIDLOTHIAN: v.1953, N. W. Hussey *ex* colonies of *Pineus* (= *Adelges*) *pini* on Scots pine (B.M. 1953-357). NAIRN: 18.vii.1909, J. J. F. X. King (B.M. 1938-52). ROSS: Dingwall, 8.vii.1909, 22.vii.1909, J. J. F. X. King.

Subgenus *Leucopomyia* Malloch

Leucopomyia Malloch, 1921, *Bull. Ill. State Nat. Hist. Survey,* **13**: 357.

L. (*Leucopomyia*) *annulipes* Zett. (= *alticeps Czerny* **syn. nov.**)

In the British Museum (Nat. Hist.) were 3 specimens of this species standing over the name *Leucopis annulipes* Zett. though obviously referable to *Leucopomyia alticeps* Czerny.

Czerny (1936: 8) described *L.* (*Leucopomyia*) *alticeps* from Germany and Tanasijtshuk (1959: 938) has recorded it from the Crimea and figures the genitalia. It occurred to me that this species may be synonymous with *L. annulipes* Zett., and knowing that both Morge and McAlpine had seen Zetterstedt's type, I wrote to the former. Dr. Morge replied that 'The type specimen of *annulipes* I could examine is a female, and in the prescutellar area the greater number of bristles and hairs are broken off. But I am nearly sure that there are prescutellar acrostichals although one can only see stumps of the bristles. Probably Czerny had overlooked them and, therefore, put *annulipes* to *Leucopis*'.

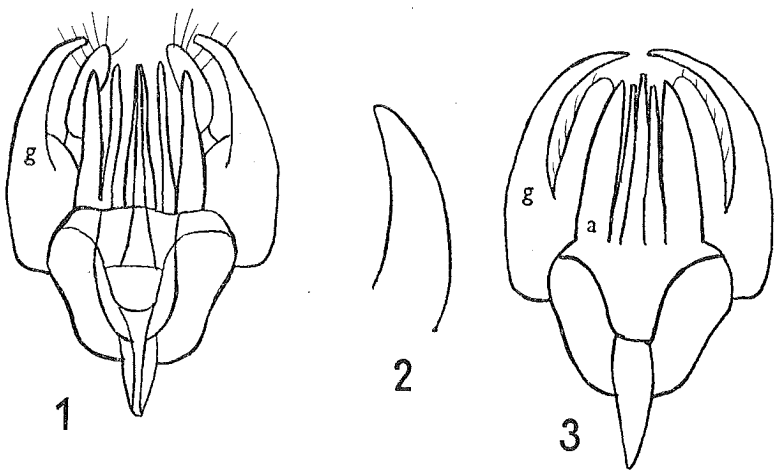
Morge, McAlpine and myself concur in regarding *alticeps* Czerny as a synonym since Czerny's type was destoyed in the last war, thus preventing a direct comparison.

DORSET: Studland, 17.vi.1907, J. W. Yerbury. SURREY: Box Hill, Happy Valley, on grass, 18.vii.1959, J. A. J. Clark, *ex Eriococcus* sp., em. 1-9.viii.1959. ? county: bred from hibernating egg mass of *Eriopeltis festucae* (Fonsc.), 26.v.09, W. R. Jeffrey (Verrall Bequest, B.M. 1911-411).

Leucopis Meigen sensu stricto

Leucopis (*s. s.*) *puncticornis* Meigen (fig. 1).

The identity of this species has for long been uncertain. The species figured by Hennig (1938: 209, fig. 7) and Tanasijtshuk (1958: 90, fig. 1) is almost certainly *L. griseola* Fallén (compare Smith 1958: 246, fig. 1). I have examined the three 'type' specimens mentioned by Becker (1902: 314), which are in Winthem's collection in Vienna. Dr. A. F. G. Dixon has bred this species from larvae feeding on *Brachycaudus cardui* (L.) on *Cirsium vulgare,* and *Microlophium evansii* (Theob.) and *Aphis urticata* Gmelin on *Urtica dioica* L., all from Wytham Wood, Berkshire, during August 1955.



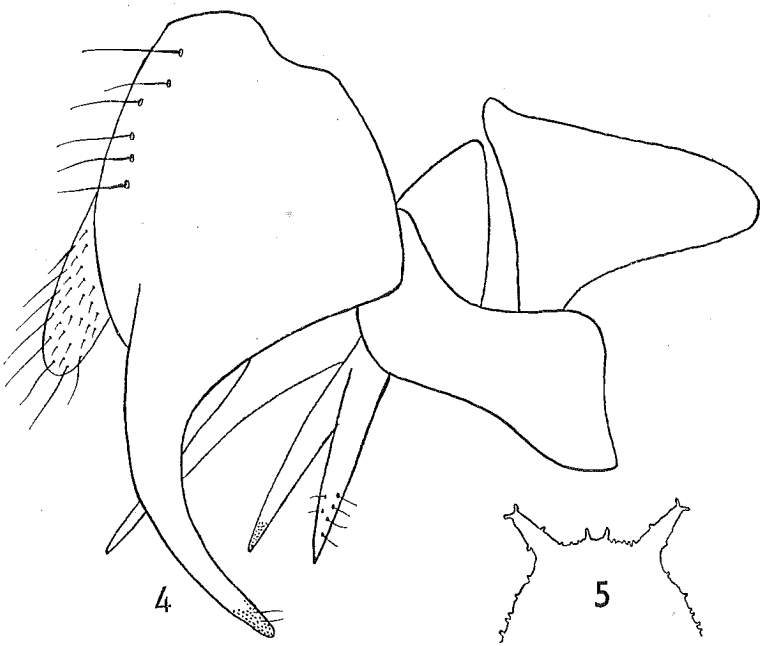
Figs. 1-3.—Genitalia of male *Leucopis* species in ventral view, g= gonocoxite, a=anterior paramere. 1, *L. puncticornis* Meigen; 2, *L. melanopus* Tanasijtshuk, left gonocoxite only; 3, *L. albipuncta* Zetterstedt.

L. albipuncta Zetterstedt (fig. 3).

In the Hope Dept. of Entomology, Oxford, are specimens of this species which Dr. Morge has confirmed. Czerny (1936: 16) regarded this species as a variety of *L. puncticornis* Mg. The genitalia are similar to *L. rufithorax* Tan., but aedeagus and

gonocoxite are longer (compare fig. 3 with Tanasijtshuk, 1958: 93, fig. 1).

DORSET: Studland, 29.vii.1909, J. W. Yerbury. In the British Museum (Nat. Hist.) is a male with puparium—LONDON: bred v.1920, bright yellow larva feeding on aphids on shirley poppy, Miss B. Reid.



Figs. 4-5.—*Leucopis atritarsis* Tanasijtshuk. 4, male genitalia in lateral view; 5, posterior spiracular horns of puparium.

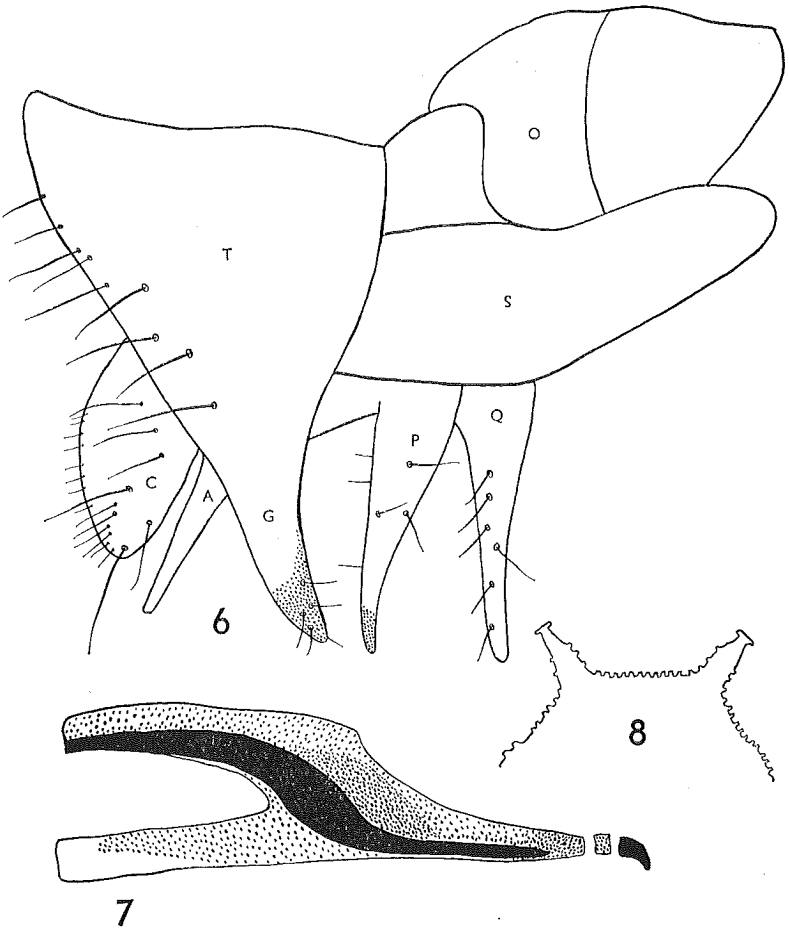
L. atritarsis Tanasijtshuk (figs. 4 and 5).

The species was described (Tanasijtshuk, 1958: 96) from the Leningrad region of the U.S.S.R. where it was predaceous on the aphids *Hyalopterus pruni* (Geoff.) (= *arundinis* (F.)) on *Phragmites, Microlophium urticae* (Schr.) on nettles and *Aphis pimpinellae* Kalt. on *Pimpinella saxifraga* L. Dr. A. F. G. Dixon found larvae among aphids on nettles in BERKS., Wytham Wood, during 1956. The larvae pupated 5.viii.1956 and adults emerged 25.viii.1956.

L. melanopus Tanasijtshuk (figs. 2, 6, 7, and 8).

This species was described (Tanasijtshuk, 1959: 931) from the Crimea where it was predaceous on *Dactynotus* sp. on *Lactuca viminea* Presl.; *Brachycaudus cardui* (L.) on *Carduus, Aphis laburni* Kalt. on Spanish gorse (*Genista hispanica* L.), *Myzus persicae* Sulz. on henbane and on aphids from sage.

Dr. C. J. Banks has bred this species from among colonies of *Brevicoryne brassicae* (L.) on kale during August 1952 and from *Phorodon humulis* (Shrk.) on hops during September 1955, both at HERTS.: Harpenden, Rothamsted Experimental Station. Dr. A. J. Pontin has bred it from among *Myzus ornatus* Laing on *Cydonia speciosa* Sweet in OXFORD.

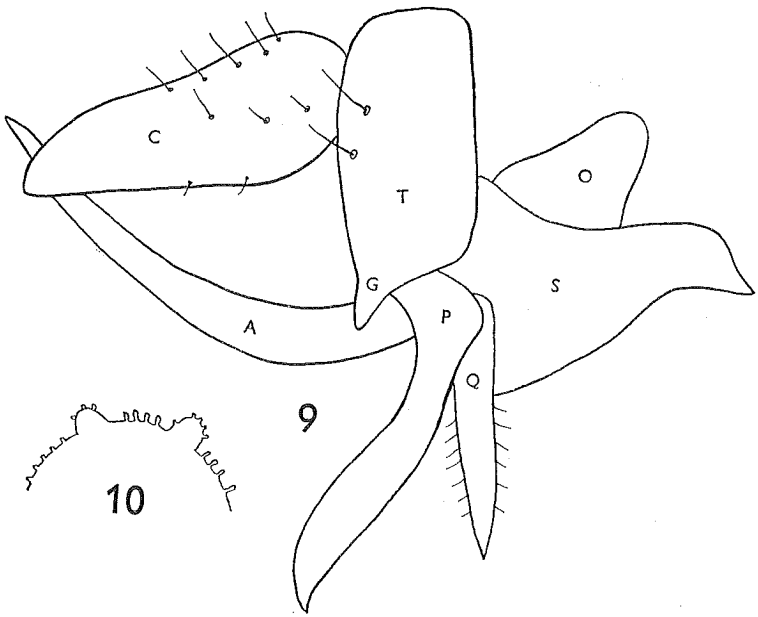


Figs. 6-8.—*Leucopis melanopus* Tanasijtshuk. 6, male genitalia in lateral view, A=aedeagus, C=cerci, G=gonocoxite, O=apodeme, P=posterior paramere, Q=anterior paramere, S=9th sternite, T=9th tergite; 7, mouthparts of larva in lateral view; 8, posterior spiracular horns of puparium.

L. griseola Fallén (figs. 9 and 10).

The identity of this species was settled by an examination of the genitalia of a male in Fallén's type series (Smith, 1958).

Dr. A. F. G. Dixon has bred the species from larvae feeding on the aphid *Eriosoma ulmi* (L.) on elm, Glasgow, 25.vi.1957. Mr. J. E. Collin has found the species in SUFFOLK. In the British Museum (Nat. Hist.) are 5 specimens with 2 puparia from CAMBRIDGE: vii.1927, Le Pelley, 'with aphids (*Eriosoma* sp.) on elm'. One of these puparia is somewhat brownish in contrast to the whitish colour of all previous specimens I have seen.



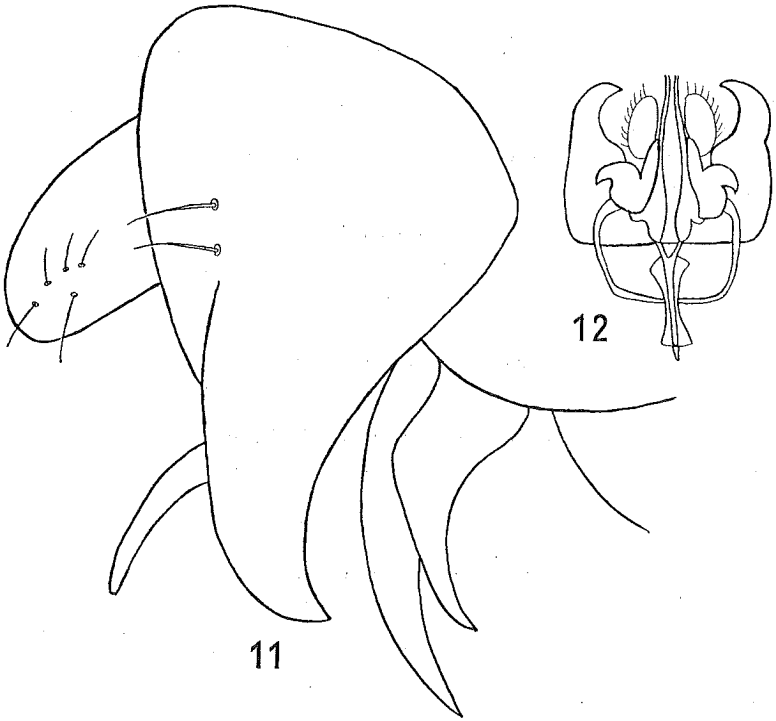
Figs. 9-10.—*Leucopis griseola* Fallén. 9, male genitalia in lateral view (lettering as in fig. 6); 10, posterior spiracular horns of puparium.

Leucopis morgei sp.n. ♂ ♀ (figs. 11 and 12).

Head: light grey except for frons which is broadly darkened between the narrow orbits above the ptilinal suture. Frons and orbits clothed with tiny hairs. Ocellar bristles absent, two pairs of vertical bristles present. Small black bristles present on jowls running back on to cheeks to meet weak postocular bristles. Antennae and palpi black.

Thorax: light grey with two brown side stripes, clothed with tiny bristly hairs, except for bare median stripe and two bare narrower stripes between the rows of bristles on each side of the median stripe and the brown lateral stripes. These bare stripes

are confined to the anterior one-third of the thoracic disc. Two pairs of distinct prescutellar dorsocentral bristles, posterior pair the stronger. A humeral, posthumeral, two notopleural, a supra-alar, a postalar and a posterior intra-alar present. Scutellum grey with 4 marginal bristles. Pleura grey, one strong sterno-pleural bristle present.



Figs. 11-12.—*Leucopis morgei* sp.n., male genitalia; 11, in lateral view; 12, in ventral view.

Abdomen: light grey except for light brownish first tergite and two small light brownish spots on second tergite; clothed with short black hairs. Hypopygium as in figs. 11 and 12.

Legs: black, dusted greyish except for 'knees', base of front metatarsus and basal 2 or 3 segments of median and hind legs which are yellowish. The extent of the yellow coloration is somewhat variable.

Wings: whitish, veins yellow. Halteres white.

Length: 2 mm.

Holotype ♂, paratypes 3 ♂♂, 2 ♀♀, reared from larvae feeding on aphids of the species *Myzus ornatus* Laing on *Cydonia speciosa* Sweet in Oxford, 1955, Dr. A. J. Pontin, holotype and one para-

type ♂ in Hope Dept. of Entomology, Oxford, remainder in British Museum (Nat. Hist.), London.

The above description will almost certainly fit several species of *Leucopis,* but the genitalia (figs. 11 and 12) are distinctive, most resembling *L. glyphinivora* Tanasijtshuk (1961: 437, fig. 7A), but having the anterior paramere more strongly bent and the gonocoxite much longer than the anterior and posterior parameres, whereas in *L. glyphinivora* it is not so obviously longer.

Professor G. C. Varley has found what may represent a further undescribed species of *Leucopis* associated with *Hyalopterus pruni* (Geoff.) on plum trees in his garden at Oxford. The brown puparium has rather short hind spiracular horns, but since only females have been reared I am reluctant to comment on this species beyond saying that it is very close to *L. puncticornis* Mg.

Chamaemyia

Chamaemyia Panzer, 1806, *Fauna Germanica,* **105**: 12.
Ochthiphila, Fallén, 1823, *Dipt. Suec.* Phytomyzides: 9.
Estelia, Robineau-Desvoidy, 1930, *Myodairs*: 635.

Mr. R. L. Coe (1942) has revised the British species of this genus and his key as amended (Coe, 1943) is repeated here.

Key to the British species of *Chamaemyia*

1. Jowls below eyes nearly twice as broad as third antennal segment, wings milky ..... *flavipalpis* Hal.
—. Jowls below eyes about as broad as third antennal segment, wings clear 2
2. Abdomen with three pairs of dorsal black bars and lateral spots, the bars and spots being usually connected ..... *elegans* Panz.
—. Abdomen with or without pairs of dorsal and sometimes lateral black spots 3
3. All tibiae black for at least apical half ..... *geniculata* Zett.
—. All tibiae entirely or mainly yellow 4
4. Third antennal segment usually extensively, at least rather narrowly, yellow at base. (Abdomen always with paired black spots.) ..... *juncorum* Fall.
—. Antennae wholly black 5
5. Abdomen normally with variable number of paired black spots (if ♂ unspotted, examine genitalia) ... *herbarum* R.-D.
—. Abdomen invariably unspotted ..... *aridella* Fall.

Chamaemyia flavipalpis Haliday

Widespread in maritime districts: May-August.

C. elegans Panzer

Only recorded from Aberdeen, Banff, Inverness and Morayshire in Scotland and Hants, Hereford and Hunts. in England: June-August.

C. geniculata Zetterstedt

Only recorded from Brecknock, Cumberland and Dumbarton: June-July.

C. juncorum Fallén

Widespread in the British Isles; May-September.

C. herbarum Robineau-Desvoidy

Since Coe (1943) added this to the British List, Biggs (1951: 237) has recorded it from Norfolk, and I have seen Irish specimens collected by Mrs. B. N. Healy of Dublin. Hamm's Oxford record of *C. geniculata* Zett., in the Victoria County History of that county, is referable to *C. herbarum* as I have examined the specimen in the University Museum, Oxford.

C. aridella Fallén

Widespread in the British Isles; June-July.

Parochthiphila Czerny

Parochthiphila Czerny, 1904, *Wien ent. Ztg.*, **23**: 169.

Parochthiphila coronata Loew

I have seen seven British specimens. ESSEX: Walton-on-Naze, 7.vii.1912, J. W. Yerbury (B.M.1912-304). The species was added to the British List by Collin (1911-233) from specimens found in the same locality by Yerbury in 1909.

Euestelia Enderlein

Euestelia Enderlein, 1927, *Stettin ent. Ztg.*, **88**: 108.

Euestelia spectabilis Loew

Known to me from four British specimens. CAMBS.: Upware, 5.vii.1875, G. H. Verrall (B.M.1911-411); Chippenham, 3.vii.1910, G. H. Verrall (B.M.1911-411).

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