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SOME SPECIES OF THE GENUS *MEONEURA* (DIPTERA).

BY J. E. COLLIN, F.E.S.

PLATE III.

Flies of this genus rank among some of the smallest of the Acalyptrate Muscids, and have received but scanty attention from Entomologists. Little is also known of the particular function performed by them in that wonderful orderly arrangement of interwoven forces and processes of the material world called Nature; some species are to be found in numbers on carrion, others have been bred from old nests of different species of birds, while quite recently Dr. F. G. Holdaway in France has bred a species from the damaged puparium of another Dipteron (*Sarcophaga* sp.). The submission of Dr. Holdaway's specimens to me for identification by my friend the Director of the Imperial Bureau of Entomology, and the discovery that they represented yet another undescribed species, has induced me to publish a revision of the species known to me.

Rondani in 1856 was the first to recognise that *Agromyza obscurella* Fall. was generically distinct from *Agromyza*, and made it the type of a new genus *Meoneura*. For many years, however, the genus remained unrecognised or overlooked, and so late as 1902 Becker created a synonym by founding a genus *Psalidotus* on a new species *primus* from Egypt.* Hendel in 1903 (Wien. Ent. Zeit., XXII, p. 251) placed the genus in the Milichidae, but more recently (Die Teirwelt Deutschlands, Teil XI, 1928, p. 105) he has separated *Meoneura* and *Carnus* from the Milichidae under the family name Carnidae and distinguishes them from the other Acalyptrates as follow :—

Costa of wing with two breaks, one just beyond humeral crossvein and one immediately before end of subcostal vein; mediastinal vein very indistinct soon after humeral crossvein. Ocellar triangle well developed. Incurved lower fronto-orbital bristles present and the orbital bristle immediately above these incurved ones directed outwards and somewhat forwards. Postvertical bristles parallel. Frontalia with at least a pair of supra-antennal bristles. Labellae of proboscis short, not strongly geniculate. Peristomial bristles as strong as vibrissae.

Not only is the chaetotaxy of the head distinctive in *Meoneura*, but its shape, with antennae lying in deep groves very narrowly separated by a slender median keel, and deep jowls sloping sharply inwards towards mouth-opening and bearing bristles, differs from that of most other Acalyptrates. The frons is often more or less

* The identity of Becker's genus with *Meoneura* is certain, but the suggested synonymy of *primus* Beck. with *obscurella* Fall. needs confirmation in view of the large number of superficially similar species that undoubtedly exist in the genus.

lurid red or yellow in front and the venation reminiscent of that of *Agromyza*, but there is no dividing cross vein between second basal and discal cells, the costa ends at wing-tip at end of cubital vein; the crossveins are close together before middle of wing and discal vein very faint and indistinct from discal crossvein to wing-margin.

The following described species certainly belong to this genus :— *Agromyza obscurella*, *vagans* and *lacteipennis* of Fallen 1823, *A. infuscata* and *pectinata* of Meigen 1830, *A. elongella* (1838) and *minutissima* (1860) of Zetterstedt, *Psalidotus primus* (1903) and *Meoneura glaberrima* (1907) of Becker. In Kertesz' Catalogue *Agromyza lonicerae* Kalt. is incorrectly given as a synonym of *obscurella* Fall.; it is obvious from the description that it is a leaf-mining Agromyzid, and not a species of *Meoneura*.

The structure of the male hypopygium affords the best and most striking character for separating the species, but the ten British and one French species known to me may be distinguished as follows :—

1 (4). Only one pair of dorsocentral bristles. Frons all dark.
2 (3). Ocellar triangle reaching to about middle of frons. Wings rather whitish ..... 1. *vagans* Fall.
3 (2). Ocellar triangle extending to front of frons. Wings not whitish. ..... 2. *exigua* sp. n.
4 (1). At least three pairs of dorsocentrals. Frons usually pale in front.
5 (6). Four pairs of dorsocentrals. Male with a longitudinal concave furrow to fourth abdominal tergite armed at sides with long incurved bristles, and some long hairs behind first joint of middle tarsi. ..... 3. *minutissima* Zett.
6 (5). Only three pairs of dorsocentrals, the presutural pair missing. Male abdomen normal.
7 (8). Front of frons broadly, whole of face and a narrow strip below eyes yellow ..... 4. *flavifacies*, sp. n.
8 (7). Face at least darkened.
9 (10). Ocellar triangle small, not reaching half-way to front of frons, which is very broadly reddish-yellow. Male hypopygium with large, broad secondary lamellae clothed with very long curved black hairs. ..... 5. *lamellata*, sp. n.
10 (9). Ocellar triangle larger, extending at least half-way down frons, which is usually (except in *obscurella*) much more narrowly or not at all reddish.
11 (12). Wings distinctly milk-white. Four posterior femora with a tiny spinose bristle at base beneath ..... 6. *lacteipennis* Fall.
12 (11). Wings not milk-white. Posterior femora without tiny spine at base beneath.
13 (18). Ocellar triangle not reaching to front of frons.
14 (15). Thorax distinctly dull, dusted brownish-grey. Legs longer and more slender. Larger species ..... 7. *obscurella* Fall.
15 (14). Thorax not so distinctly dusted. Legs shorter. Smaller species.

16 (17). Frons narrowly yellowish in front. Male hypopygium large and bearing two tufts of remarkably long, pale hairs .. 8. *neottiophila*, sp. n.
17 (16). Frons all dark. Male hypopygium smaller and without tufts of pale hairs ..... 9. *bicuspidata*, sp. n.
18 (13). Ocellar triangle reaching to front of frons.
19 (20). Frons all black. Thorax slightly dusted ..... 10. *triangularis*, sp. n.
20 (19). Frons lurid in front. Thorax more shining ..... 11. *neglecta*, sp. n.

Though the species are so small, the preparation of a 'mount' of the male abdomen showing the characters of the genitalia is by no means difficult. The abdomen clears readily, and no dissecting out of the genital parts is necessary. What appears to be the penis is very remarkable both in size and structure; when normally expanded it probably resembles that shown in fig. 6, but more usually appears in the collapsed condition shown in the other figures.

1. *Meoneura vagans* Fall.

Agromyza vagans Fallen, Dipt. Suec. Agromyz, 5 (1823).

Black. Frons sometimes rather lurid red in front. Ocellar triangle extended to about middle of frons. Thorax very faintly dusted brownish, with only one pair of dorsocentral bristles. Wings somewhat whitish. Male genitalia (fig. 2) with well developed anal lamellae, bearing long curved pale hairs beneath, and somewhat elongate pointed side lamellae with 4—5 short hairs spaced out on front margin and more numerous longer pale hairs behind. Last sternite with longer bristles than usual.

Length about 1 mm.

This is one of the commonest British species which I have taken in May, June and July in Cambridgeshire, Suffolk and Essex. It occurred on Carrion in Chippenham Fen (Cambs.) on May 27th, 1898, and in Wydgham Wood (Cambs.) on May 9th, 1901.

It has probably often been confused with both *lacteipennis* and *obscurella*; certainly Zetterstedt included specimens of *obscurella* with darkened frons under the name *vagans*, but the distinctions he gave in Dipt. Scand., VIII, p. 2,364, between the two species support my interpretation of Fallen's *vagans* as being a smaller rather more shining species with more whitish-hyaline wings. This is the only species known to me with well-developed projecting anal lamellae.

2. **Meoneura exigua** sp. n. ♂♀

Resembling *vagans* in having only one pair of dorsocentral bristles and normally all black frons, but ocellar triangle larger, reaching practically to front of frons. Thorax only very faintly dusted greyish. Legs with tarsi indistinctly yellowish. Wings not whitish. Male genitalia (fig. 3) very different from that of *vagans*. Basal shell with two pairs of distinctive black bristles; anal lamellae very small, hardly visible in profile and quite short-haired; side lamellae shaped like a boxing-glove and without long hairs.

Length about 1 mm.

Described from three males and four females in poor condition bred at the end of July and beginning of August, 1929, by Dr. F. G. Holdaway at Toulouse, France, from the damaged puparium of a species of *Sarcophaga*.

M. glaberrima Beck. described from Corsican specimens without mention of the number of dorsocentral bristles, even if belonging to this group, must have the thorax still more shining black and a smaller ocellar triangle extending to middle of frons only.

M. elongella Zett. is another species with only one pair of dorsocentral bristles according to a note I made when examining the type some years ago. It is, however, larger than any other species with this character, and was described as having dark halteres, a most unusual feature, which I have not found in any other species of the genus.

3. *Meoneura minutissima* Zett. ♂♀

Agromyza minutissima Zetterstedt, Dipt. Scand., XIV, p. 6,459 (1860).

Very distinct in the male, owing to the characters given in the Table of Species. Frons usually reddish in front. Ocellar triangle extending rather beyond middle of frons. The five long pale hairs behind the first joint of middle tarsi are represented on the second joint by two much shorter hairs. The concavity of fourth tergite is continued on to the third, but there are only a few incurved bristles at sides towards end of this tergite (fig. 5). Anal lamellae of male genitalia represented by two long narrow plates each side of anus, hardly visible in profile; side lamellae of peculiar shape, having a triangular projection on hinder side and bearing about four spaced hairs in front. A narrow girdle supporting the internal organs associated with the penis bears a long curved bristle on each side near base.

Length about 1 mm.

I have taken this species here at Newmarket (Suffolk) in May and June, at Chillesford (Suffolk) in May and Woodditton Wood (Cambs.) also in May.

I examined the type of Zetterstedt's *minutissima* (a female) some years ago, and have a note that it possessed a fourth (presutural) dorsocentral bristle, so presumably it is the same as our British species, the only one known to me with four dorsocentrals.

4. **Meoneura flavifacies** sp. n. ♂♀

Front of frons broadly, whole of face (except perhaps bottom of antennal grooves) and a narrow stripe below eyes widening out towards front where it joins face, yellow. Ocellar triangle extending only to about middle of frons.

Second antennal joint often indistinctly yellowish. Thorax dusted greyish. Legs with front knees narrowly, and tarsi indistinctly, yellowish. Male hypopygium (fig. 9) more bristly than usual. Anal lamellae very small, hardly visible in profile, being on level of anal membrane; side lamellae small, conical, with a rounded tip and quite bare; in front of side lamellae a smaller narrow, round-ended process bearing 3—4 apical bristles.

Length rather less than 1 mm.

I have seen this species from Cornwall, Devon, Hampshire, Essex, Suffolk and Cambridgeshire taken in every month from May to September. It occurs not uncommonly in the flowers of the white-thorn, especially when the petals are beginning to fall.

5. **Meoneura lamellata** sp. n. ♂♀

Quite the front half of frons yellow, and face often indistinctly yellowish. Ocellar triangle smaller than usual, not reaching the middle of frons. Jowls rather deeper than usual. Thorax quite distinctly dusted greyish. Front knees narrowly or even all knees indistinctly yellowish, but this is not always evident. Male genitalia (fig. 7) with small anal lamellae just visible in profile, narrow curved and pointed side lamellae bearing a few short bristles behind towards base, and a rather longer secondary appendage (apparently) of the side lamellae, which widens out to a rounded tip and bears numerous very long curved black bristly hairs; a long curved bristle also arises from each side of the internal organs associated with the base of penis.

Length about 1.5 mm.

I have taken this species in Dorset, Suffolk and Norfolk in July, August and September. It occurs about the openings of Sand Martins' burrows. Mr. F. W. Edwards and O. W. Richards have taken it in similar situations.

6. *Meoneura lacteipennis* Fall. ♂♀.

Agromyza lacteipennis Fallen. Dipt. Suec. Agromyz, 4 (1823).

Frons reddish in front, sometimes very obscurely so. Ocellar triangle extending about half-way down frons. Thorax slightly dusted greyish, with the three pairs of dorsocentral bristles of this section. Legs with a distinctive short spinose bristle at the base beneath of four posterior femora. Wings conspicuously milk-white. Male genitalia (fig. 10) of the same type as that of *flavifacies* and *neglecta*; anal lamellae small and flat; side lamellae slightly concave on front side, distinctly rounded behind and here bearing some long, fine hairs; a very small supplementary projection in front at base of side lamellae is bare. Basal shell with a long, distinctive bristle at each lower hind corner.

Length about 1 mm.

For some years I possessed only an odd specimen or two taken in Suffolk in May and June and a female taken at Dartford (Kent), but on June 5th, 1921, I found it in some numbers round an artificial pond in the garden at Sussex Lodge, Newmarket.

This species superficially resembles *vagans*, but in addition to the greater number of dorsocentral bristles and small bristle at base of posterior femora, the small setulae in front of middle

femora and tibiae of at least the male are longer. Some years ago I examined three pairs standing under this name in Zetterstedt's Collection labelled as collected at 'Esperod'; five were the above species and one was *vagans*.

7. *Meoneura obscurella* Fall. ♂♀.

Agromyza obscurella Fallen. Dipt. Scand. Agromyz, 6 (1823).

Front half or sometimes even more of frons yellowish, and then face obscurely yellow; in darker specimens only front of frons lurid red and face quite black. Ocellar triangle rather beyond middle of frons. Middle bristle of the three on vibrissal angle as strong as others, whereas in other species it is much smaller. Thorax distinctly dulled by greyish dust, bristles and setulae rather longer than usual. Abdomen with first three tergites (counting the very short first with the second as one) distinctly dulled and greyish in some lights compared with the shining fourth. Legs longer and more slender than usual, posterior tarsi especially long. Front femora with only one distinct postero-ventral bristle towards tip. Wings yellowish. Male genitalia (fig. 1) with two extraordinary tufts of very long whitish hairs arising from internal plates, one on each side, in front of the side lamellae; these side lamellae somewhat similar in shape to those of *lacteipennis*, but more pointed and curved towards tip and with only 6—7 hairs in a row behind. Anal lamellae consisting of two narrow plates lying flat on anal membrane.

Length 1.75—2 mm.

My specimens were mainly taken in August and September at Three Bridges (Sussex), Padstow (Cornwall), Worms Head (Glamorgan) and Durlston (Dorset), where it was common in the Tilly Whim Caves. Mr. H. Britten, however, has sent me specimens taken in the cellar of the Manchester Museum in April, and I have seen it from Cornwall, Cambridge and Nethy Bridge (Inverness).

I have an old note made some years ago that Zetterstedt's *obscurella* (including a specimen from Fallen's Collection) and his *infuscata* were the same as our British species described above.

8. **Meoneura neottiophila** sp. n. ♂♀.

Frons narrowly yellow in front. Ocellar triangle particularly large and shining, extending well beyond middle of frons. Thorax slightly dusted brownish-grey, with three pairs of dorso-central bristles. Abdomen more shining than in *obscurella*. Male genitalia (fig. 4) large and very distinctive, a smaller tuft than in *obscurella* of very long, pale hairs arise from the rounded end of a thigh bone-like structure projecting, one on each side, from the inside of the genital cavity, this thigh bone having a supplementary more slender fibula-like support in front. Anal lamellae present as small narrow plates on the anal membrane. Side lamellae split into a shorter upper pointed, and a much longer, slender, slightly curved lower process.

Length 1.50—1.75 mm.

I have bred this species in March from the old nests of birds taken at Newmarket (Suffolk). Mr. A. H. Hamm has done the

same at Oxford, Dr. Norman Joy at Reading, Dr. Hugh Scott at Henley-on-Thames and Mr. F. W. Edwards at Weston (Herts). The species has been taken here at Newmarket in April and May and on a stable window in July, while at Chippenham (Cambs.) on May 27th, 1908, it was found on Carrion. I have also seen specimens from the New Forest (Hants) and Logie (Elgin).

9. **Meoneura biouspidata** sp. n. ♂♀.

Frons all dark, at most only with a faint tinge of lurid red in front. Ocellar triangle large and shining, extending rather beyond middle of frons. Thorax with a little faint brownish dusting when seen from in front, otherwise shining black. Three pairs of dorsocentral bristles, the two front pairs short and weak. Front femora with a row of 3—4 postero-ventral bristles. Wings rather whitish-hyaline with yellowish veins. Male genitalia (fig. 8) with the usual small inconspicuous anal lamellae on the anal membrane; side lamellae somewhat crescent-shaped, with the points compressed towards each other, and the front point shorter than hind one; a distinct long bristle each side at lower hind corner of basal shell of hypopygium.

Length 1.5 mm.

Described from a pair taken by myself on the Skelbo sandhills near Dornoch (Sutherland) on July 27th, 1914, but Dr. C. G. Lamb has taken it at St. Merryn (Cornwall) in June, and Frinton-on-Sea (Essex) in July.

10. **Meoneura triangularis** sp. n. ♂♀.

Frons all black, only the actual frontal suture somewhat yellowish. Ocellar triangle very large and shining, extending right to front of frons. Thorax only very faintly dusted when viewed from in front, otherwise shining. Three pairs of dorso-central bristles, the two front pairs shorter than hind, but quite distinct. Legs with tarsi indistinctly yellowish. Front femora with at least three distinct posteroventral bristles. Wings not whitish. Halteres, as usual, whitish-yellow. Male genitalia (fig. 6) comparatively simple; anal lamellae, as usual, lying on the anal membrane; side lamellae triangular, broad at base, pointed at tip, angle at base in front about 90 degrees, the long hinder side bearing some scattered bristles.

Length about 1.25 mm.

A pair taken *in coitu* here at Newmarket on 22nd May, 1921.

11. **Meoneura neglecta** sp. n. ♂.

Not easily separated from specimens of *triangularis*; it is, however, smaller, with frons lurid reddish in front; thorax distinctly more shining, without dust even when viewed from in front; scutellum, however, dusted greyish. Front two pairs of dorsocentral bristles smaller and weaker than in *triangularis*. Male genitalia (fig. 11) very different and much more like *lacteipennis*, but the side lamellae smaller and with fewer hairs behind, while the small supplementary projection in front of base of side lamellae bears some distinct hairs; there is, further, no long bristle at lower hind corner of basal shell of hypopygium as is present in *lacteipennis*.

Length barely 1 mm.

Described from two males taken at Moulton (Suffolk) on 29th June, 1894.

This species resembles *glaberrima* Becker in having a brightly shining thorax and dusted scutellum. In Becker's species, however, the frons is said to be entirely dark (as may possibly be the case sometimes in *neglecta*), while the ocellar triangle extends only to middle of frons, whereas in *neglecta* it almost reaches the front of frons ending on a level with the supra antennal bristles. If such a difference exists, it is practically certain that an examination of the male genitalia will prove the two species to be distinct. Unfortunately Becker does not mention the number of dorsocentral bristles present in his species.

EXPLANATION OF PLATE III.

The figures represent the end of the male abdomen of each species as it appears after maceration in a ten per cent. solution of caustic potash, and before mounting.

Fig. 1. *M. obscurella* Fln.
,, 2. *M. vagans* Fln.
,, 3. *M. exigua*, sp. n.
,, 4. *M. neottiophila*, sp. n.
,, 5. *M. minutissima* Zett.
,, 6. *M. triangularis*, sp. n.
,, 7. *M. lamellata*, sp. n.
,, 8. *M. bicuspidata*, sp. n.
,, 9. *M. flavifacies*, sp. n.
,, 10. *M. lacteipennis* Fln.
,, 11. *M. neglecta*, sp. n.

Raylands, Newmarket.
March, 1930.

Coleoptera in Dumfriesshire.—During the past four years I have met with over 600 species of Coleoptera in this district, some of which are uncommon. My collecting has been done chiefly in the south-eastern corner of the county, that is between the River Annan and the English border. The genus *Carabus* is represented by single specimens of *C. nemoralis* Müll. and *C. granulatus* L.; *Notiophilus palustris* Duft. is not uncommon; *Clivina collaris* Herbst, on sand along the estuary in May; *Dyschirius nitidus* Dej., in flood refuse, rare; *Amara aulica* Panz., frequent in the sweeping-net; *Agonum piceum* L., in flood refuse from the River Kirtle; *Cillenus lateralis* Sam., a nice series under stones below high-water mark at Eastriggs in May. Along the estuary near Gretna many *Bembidia* occur, including *varium* Ol. (one only), *aeneum* Germ., *minimum* F., and *concinnum* Steph. On gravel beds in the River Kirtle we find *B. tibiale* Duft., *atrocoeruleum* Steph., *decorum* Panz., *monticola* Sturm, *femoratum* Sturm, *bipunctatum* L., *punctulatum* Drap. and *prasinum* Dufts. *Trechus micros* Herbst, in flood refuse, rare. Water-beetles seem hard to come by, but I have *Hydroporus pubescens* Gyll. from a small pool in a field. *Cercyon littoralis* Gyll. occurs along the shore, and *C. haemorrhoidalis* Fab., *C. lateralis* Marsh., *C. melanocephalus* L., and *C. unipunctatus* L. are more or less common

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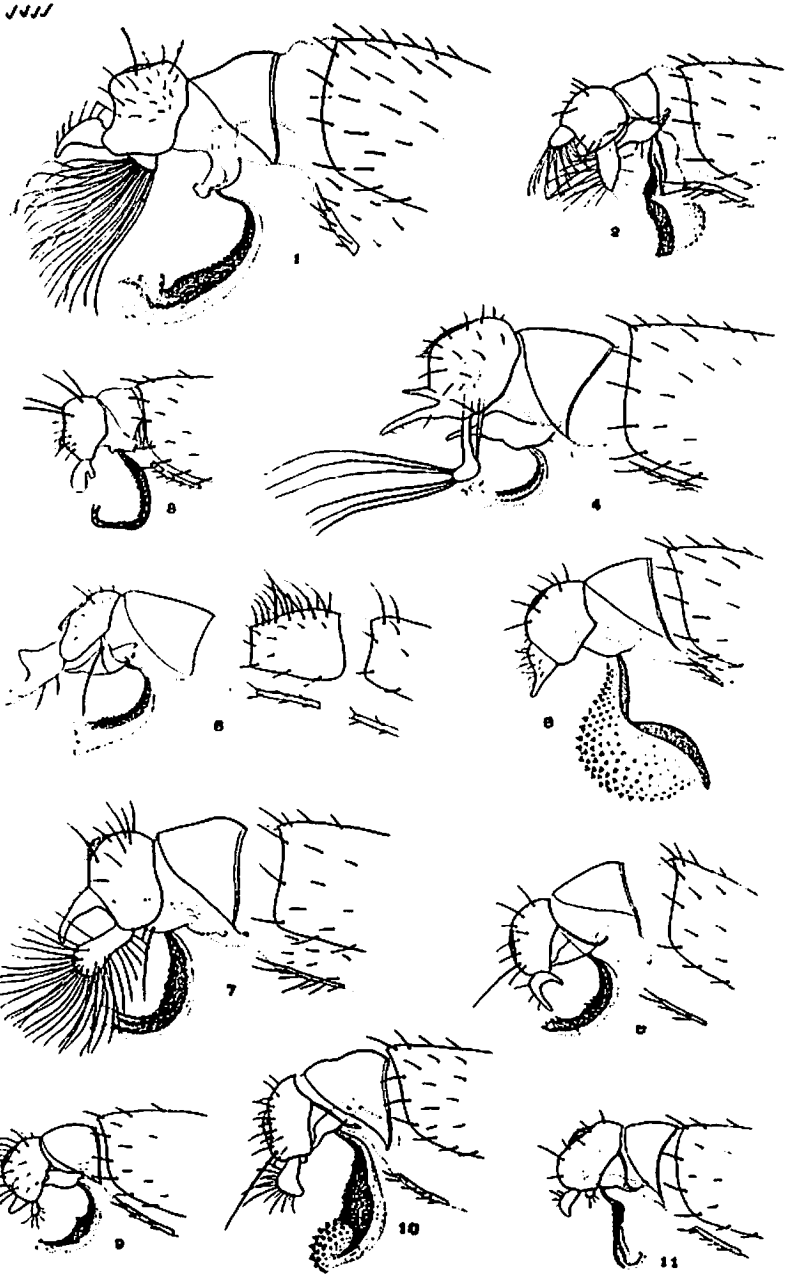

MALE GENITALIA OF SPECIES OF *MEONEURA* (DIPTERA).