

Milichiidae and Carnidae (Diptera: Cyclorrhapha) from the Arabian Peninsula

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Abstract: Thirteen known species of Milichiidae and two of Carnidae are identified and recorded from the Arabian Peninsula and the Gulf. A further five species of Milichiidae of which there is inadequate material for taxonomic treatment are reported.

Milichiidae و Carnidae (ثنائية الأجنحة: Cyclorrhapha) من شبه الجزيرة العربية

جون ديمنج

خلاصة: تم التعرف و تسجيل ١٣ نوعا من عائلة Milichiidae ونوعين من عائلة Carnidae من شبه الجزيرة العربية والخليج العربي. كذلك تم تسجيل ٥ أنواع إضافية من عائلة Milichiidae، إلا انه لم تكن هناك عينات كافية منها للدراسة التصنيفية.

INTRODUCTION

Until recently the Carnidae was considered to be a subfamily of the Milichiidae. Since both families are covered in the same series of papers, the two are best treated together.

The Milichiidae is a family which, in terms of the number of described species, is small, but of which the rich tropical fauna has, with the exception of *Desmometopa*, been almost totally neglected. The biology of the family is little known and the immature stages of only a few species have been described. Some species are associated with ants and develop in their nests, some are filth flies and others have been reared from pupae found under bark and in the nests of birds. In Nigeria I have seen single females of unidentified *Milichia* species doggedly pursuing worker ants, which were well aware of their presence and attempting to escape from them. The males of some species of Milichiinae have broad abdomens bearing highly reflective dusting, and these are conspicuous when swarming. In Africa I have frequently collected whole such swarms, without ever finding a female amongst them. Otherwise species tend to be small and inconspicuous and the collecting of them has been largely neglected. Adults are sometimes attracted to the odour-producing glands of bugs, to the gore of insects being eaten by predaceous arthropods, to the nectaries of certain plants, to flowers and in the case of some *Desmometopa* to the mouths of pipe-smokers.

The Carnidae is a yet smaller family and these also are small and insignificant flies, often to be found in association with the nests of birds, although some species breed in carrion or dung, and in one instance have been reared from a damaged Sarcophagine pupa (Diptera). *Carnus hemapterus* Nitzsch, 1818 has adults that are bloodsucking ectoparasites of birds. Once it has found its host,

the fly usually discards its wings to facilitate its movement between the feathers. With very few exceptions, the family is restricted to the Palaearctic and Nearctic regions.

Abbreviations

BMNH	Natural History Museum, London
NHMB	Naturhistorisches Museum, Basel
NMWC	National Museum of Wales, Cardiff
ONHM	Oman Natural History Museum, al-Khuwair, Muscat

TAXONOMIC ACCOUNT

Family Milichiidae

The following key should be used with reservation, since the collection treated here cannot be regarded as being sufficiently large or from a sufficient range of localities truly to reflect the fauna of the region, there being genera which one would expect to occur in Arabia, but which have not yet been collected. Workers are advised to consult HENNIG's (1937) treatment of the Palaearctic fauna and SABROSKY's (1983) revision of *Desmometopa*.

Key to the Milichiidae of the Arabian Peninsula

- | | | |
|---|--|----|
| 1 | Costa deeply indented at point of its junction with the subcosta (Fig. 13). Cheek plus jowl narrow, not or hardly exceeding width of third antennal segment (Milichiinae) | 2 |
| – | Costa lacking a deep indentation (Madizinae) | 8 |
| 2 | Hind margin of eye indented at mid height (<i>Milichiella</i>) | 3 |
| – | Hind margin of eye lacking such an indentation (<i>Milichia</i>) | 5 |
| 3 | Tergites of male predominantly silvery dusted and strongly reflective
<i>Milichiella argentiventris</i> | |
| – | Tergites of male of sombre coloration | 4 |
| 4 | Tergites of male heavily dark grey dusted
<i>Milichiella</i> sp. 2 | |
| – | Tergites of male faintly brown dusted, the apical tergite shining
<i>Milichiella lacteipennis</i> | |
| 5 | Males | 6 |
| – | Females | 7 |
| 6 | Dorsum of abdomen olive to ash grey dusted, which is similar to but less heavy than that of the mesonotum
<i>Milichia pubescens</i> | |
| – | Tergites silvery grey dusted with a pair of subtriangular dark markings on tergites 3 and 4
<i>Milichia albomaculata</i> | |
| 7 | Dorsum of abdomen olive to ash grey dusted, the dusting similar to that of the mesonotum, but less heavy
<i>Milichia pubescens</i> | |
| – | Dorsum of abdomen black and shining
<i>Milichia albomaculata</i> and <i>Milichia</i> sp. | |
| 8 | Frons deep matt black, the orbital and interfrontal plates and ocellar triangle subshining grey, forming a distinctive M-shaped marking on the dark background (Figs 1-2; <i>Desmometopa</i>) | 9 |
| – | Frons lacking such a distinctive marking | 13 |

- 9 Cheek below eye exceptionally broad, shining black in contrast to the dusted jowl and triangular in shape, at its greatest depth equal to the breadth of the third antennal segment or nearly so *Desmometopa m-nigrum*
- Cheek much narrower, never exceeding half of breadth of third antennal segment . . . 10
- 10 Orbital and interfrontal plates wide and ocellar triangle long, nearly twice as long as its width, hence the deep black M between them with exceptionally narrow sections, the vertical lines of the M being narrower than either the orbital or interfrontal plates (Fig. 1) *Desmometopa interfrontalis*
- Orbital and interfrontal plates much narrower and ocellar triangle hardly longer than its width, hence the vertical lines of the M being considerably wider than either the orbital or the interfrontal plates (Fig. 2) 11
- 11 Thoracic pleuron lacking a polished black spot behind fore coxa. Dusting of mesonotum with a distinct golden tinge *Desmometopa inaurata*
- Thoracic pleuron with a polished black spot. Dusting of mesonotum without a golden tinge 12
- 12 Polished black spot on thoracic pleuron, posterodorsad of fore coxa, relatively large, including elongate oval area along anteroventral margin of mesopleuron *Desmometopa* sp.
- This spot relatively small, confined to anterior slope of sternopleuron, the mesopleuron not polished anteroventrally. Male palpus very long and prominent, strongly projecting, in profile much expanded at mid length and apically tapering to a rounded point *Desmometopa varipalpis*
- 13 Three pairs of superior orbital bristles present (Fig. 12). Third costal sector shorter than the fourth. Hind tibia of male unmodified *Phyllomyza* sp.
- Two pairs of superior orbitals (Figs 3, 4, 6, 8, 10). Third costal sector longer than the fourth. Male hind tibia greatly thickened and flattened, club-like (*Leptometopa*) . . . 14
- 14 Head predominantly of a yellow ground colour and longer than deep, the combined cheek and jowl very broad (Figs 4, 10) 15
- Head predominantly of a dark ground colour, sometimes largely pale dusted, higher than long and with the combined cheek plus jowl shallower in relation to height of eye 16
- 15 The prescutellar pair of dorsocentral bristles short, in length only two thirds of the distance separating their bases. Apical marginal bristle of scutellum as long as or hardly longer than the lateral marginal. Mesonotum subshining through very weak, hardly perceptible dusting *Leptometopa kaszabi*
- The prescutellar dorsocentral bristles long, as long as the distance separating their bases. Apical marginal bristle of scutellum quite one and a half times as long as the lateral marginal. Mesonotum grey dusted with shining points at bases of setae *Leptometopa rufifrons*
- 16 Frons black throughout. Tibiae lacking pale rings 17
- Frons conspicuously orange coloured on its anterior half. Fore and mid tibiae each with a pair of whitish-yellow rings *Leptometopa latipes*
- 17 Mesonotum grey dusted with shining points at bases of setae. Scutellum undusted on all but its sides. A narrow line of grey dust on orbital plates and along anterior and lower edges of jowl *Leptometopa coquilletti*
- Mesonotum and scutellum subshining through sparse dark grey dusting. No such dusted line on head. Epistomal triangle white *Leptometopa nilssoni*

Subfamily Madizinae

Genus *Desmometopa* Loew, 1866

Desmometopa Loew, 1866. — Berl. ent. Z. 9 (1865): 184-185.

Type species: *Agromyza m-atrum* Meigen, 1830 (= *Madiza sordida* Fallén, 1820), by designation of HENDEL (1903: 251).

Desmometopa inaurata Lamb, 1914

Desmometopa inauratum Lamb, 1914. — Trans. Linn. Soc. London, ser. 2 (Zool.) 16: 363.

Desmometopa semiaurata Sabrosky, 1958. — Stuttg. Beitr. Naturk. 4: 4.

Material: Yemen: 9 ♂♂, 2 ♀♀, Sana'a, IX.1992, A. van Harten, NMWC.

Described from the Seychelles Islands, this species is widespread in the Neotropical and Afrotropical regions and Oceania and occurs also in eastern and southern Australia. SABROSKY (1983: 23) comments on the lack of records from the Oriental Region. My record (DEEMING 1971: 134) of *D. tarsalis* Loew, 1866 from Nigeria is a misidentification of this species.

Desmometopa interfrontalis Sabrosky, 1965

Fig. 1

Desmometopa interfrontalis Sabrosky, 1965. — Stuttg. Beitr. Naturk. 138: 3.

Material: Oman: 1 ♀, Muscat, al-Khuwair, X.1990, J.C. Deeming, ONHM; 1 ♀, al-Khuwair, on chenopods at head of beach, 3.XII.1992, J.C. Deeming; 1 ♂, Bowsher, on *Tephrosia* sp. in ravine, 28.X.1990, M.D. Gallagher & J.C. Deeming; 2 ♂♂, 1 ♀, Muscat, Qurm beach, 23.X.1990, J.C. Deeming; all NMWC.

Described from Tanzania, this species is recorded from Cameroun, Ivory Coast, Liberia, Namibia, Nigeria and Uganda.

Desmometopa m-nigrum (Zetterstedt, 1848)

Agromyza M nigrum Zetterstedt, 1848. — Dipt. Scand. 7: 2743.

Desmometopa [sic] *niloticum* Becker, 1903. — Mitt. Zool. Mus. Berlin 2: 188.

Desmometopa M nigra. — Duda 1935; Maandblad 24: 25.

Material: Oman: 1 ♀, Yiti, cultivation, 20.III.1992, M.D. Gallagher, ONHM; 8 ♂♂, 3 ♀♀, Khabura, 17-18.II.1980, R.P. Whitcombe, BMNH. — Yemen: 1 ♂, Dhamar, alfalfa field, A. van Harten, H. Mahdi & M. Mahyoub; 1 ♂, Sana'a, I.1993, A. van Harten; 2 ♂♂, 1 ♀, same data but IX.1992; all NMWC.

Described from Sweden, this species is found in all continents apart from Antarctica, though I know of no previous record from Arabia. SABROSKY (1983: 28) has suggested that it has probably been spread around the world by commerce.

Desmometopa varipalpis Malloch, 1927

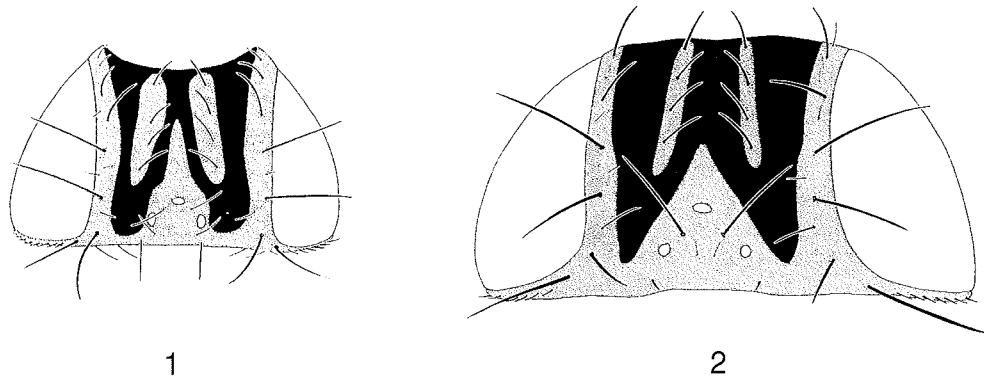
Fig. 2

Desmometopa varipalpis Malloch, 1927. — Proc. Linn. Soc. N.S. Wales 52: 7.

Material: Saudi Arabia: 1 ♀ (discoloured), Riyadh, 4.X.1977, W. Büttiker, NHMB; 1 ♀, vicinity of Riyadh, 3.III.1975, W. Büttiker; 1 ♀, same data but I.1977; 1 ♂, Bureida, 28.V.1978, W. Büttiker, BMNH; 1 ♂, 1 ♀, Wasia, III.1981, G. Fraser, NMWC; 1 ♂, Wadi Mutai, Wiyah, 18.III.1977, W. Büttiker, BMNH. — Oman: 6 ♂♂, 12 ♀♀, Eastern Sands, Mintirib, Res. Camp, 22°25'N 58°49'E, 269 m, 12-28.II.1986, W. Büttiker; 2 ♀♀, same data but 15-16.I.1986; 56 ♂♂, 67 ♀♀, same data but 1-8.II.1986; 18 ♂♂, 18 ♀♀, same data but 19-28.I.1986; 56 ♂♂, 85 ♀♀, same data but 16-18.II.1986; all NHMB; 43 smps, Muscat, Ruwi, 10.IX.1987, found dead on windowsill, M.J. Ebejer, NMWC; 25 smps, Muscat, al-Khuwair, congregating on small fruit of *Calotropis procera*, 15.X.1990, J.C. Deeming, NMWC & ONHM; 1 ♀, Batinah, Shinas, on *Mormordica charantia*, 7.XII.1992, J.C. Deeming; 1 ♂, 8 ♀♀, Dhofar, Wadi Nahiz, Malaise trap, 21-25.X.1988, M.J. Ebejer. — Yemen: 1 ♀, Sana'a, VIII.1992, A. van Harten; all NMWC.

Described from New South Wales, Australia, this species is found in all faunal regions. It has been recorded in the Arabian Peninsula from Yemen, Iraq, Saudi Arabia and (in Australia) on board a ship that had sailed from Kuwait. There are several records of it being found in the holds of ships and in two cases the cargoes were specified as being of potatoes. There has been much

possibly
D. leptometopoides



Figs 1-2: 1: *Desmometopa interfrontalis*, frons. Specimen from Samaru, northern Nigeria. 2: *Desmometopa varipalpis*, frons. Specimen from Shinas.

confusion between this species and *D. singaporensis* Kertész, 1899 and one recorded misidentification each as *D. tarsalis* and *D. m-nigrum*, the recorded misidentifications being listed by SABROSKY (1983: 41).

Desmometopa sp. near *ciliata* Hendel, 1919

Material: Yemen: 1 ♀, Sana'a, VIII.1992, A. van Harten, NMWC.

A single example seemingly representing a new species, differs from the description of *D. ciliata* in having no long genal bristles and the black postocular strip rather broad. It is inadequate material upon which to erect a new species, especially as sexual dimorphism is common in this genus.

Genus *Leptometopa* Becker, 1903

Leptometopa Becker, 1903. — Mitt. zool. Mus. Berl. 2 (3): 188.

Type species: *Leptometopa rufifrons* Becker, 1903, by monotypy.

Whereas the distinctive enormously swollen and flattened male hind tibia is present in all species of *Leptometopa* of which males are known, it is not confined to that genus, being present also in the male of the West African species *Desmometopa leptometopoides* Sabrosky, 1983.

Leptometopa coquilletti (Hendel, 1907)

Fig. 3

Hypaspistomyia coquillettii Hendel, 1907. — Wien. ent. Ztg. 26: 241.

Described as the type species of the genus *Hypaspistomyia* Hendel, 1907, of which *Leptometopa* is a senior synonym, this species is known from Yemen (Aden) and Sudan. It also occurs widely in northern Nigeria (Samaru, Mokwa and Yelwa). The male remains unknown.

Leptometopa kaszabi Papp, 1976

Figs 4-5

Leptometopa kaszabi Papp, 1976. — Acta zool. hung. 22: 371.

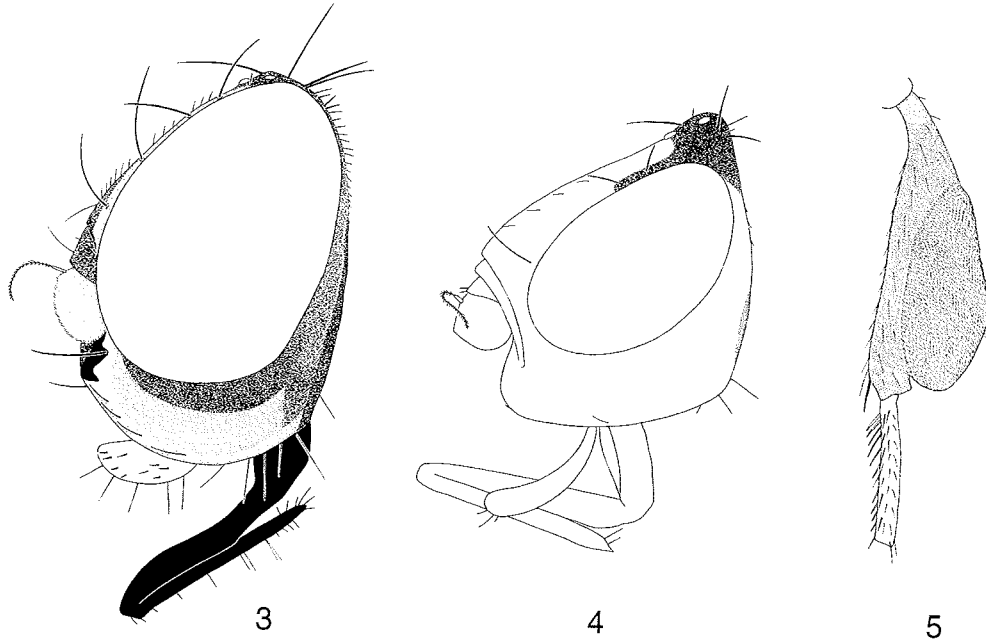
Material: Saudi Arabia: 2 ♂♂, 1 ♀, Kushm Khafs, from *Cistanche phebypaca* flowers, 20.II.1981, W. Büttiker. — Kuwait: 4 ♂♂, Kubbar Island, 29°04'N 48°29'E, 17.III.1988, W. Büttiker; all NHMB apart from 1 ♂ in NMWC.

Described from both sexes from Mongolia.

Leptometopa latipes (Meigen, 1830)

Figs 6-7

Agomyza latipes Meigen, 1830. — Syst. Besch. 6: 177.



Figs 3-5: 3: *Leptometopa coquilletti*, head in profile. Specimen from Mokwa, northern Nigeria. 4-5: *Leptometopa kaszabi*, specimen from Kuwait. 4: Head in profile. 5: Male hind tibia and basitarsus.

Agromyza annulimana von Roser, 1840. — CorrespBl. württ. landw. Ver. Stuttg. (N.S.) 17 (1): 63.

Agromyza annulitarsis von Roser, 1840. — CorrespBl. württ. landw. Ver. Stuttg. (N.S.) 17 (1): 63.

Madiza annulitarsis. — Zetterstedt 1848; Dipt. Scand. 7: 2674.

Material: Oman: 1 ♀, Dhofar, Wadi Nahiz, cow byre, 11.XI.1992, J.C. Deeming, NMWC. — Yemen: 2 ♂♂, near Ta'izz, field on road to Mocha, c. 4100 ft., 16.XII.1937, H. Scott & E.B. Britton, BMNH; 4 ♂♂, 2 ♀♀, Sana'a, II.1991, A. van Harten; 6 ♂♂, same data but VII.1991. — Bahrain: 1 ♀, Awali Oasis, near Marine Research Station and Power station, 18.III.1995, C.R. Turner; all NMWC. — Saudi Arabia: 1 ♀, Wadi Mutai, Wiyah, 18.III.1977, W. Büttiker. — Iraq (as "Mesopotomia"): 1 ♀, Tonooma, Basrah area, 20-25.II.1919, P.J. Barraud. — Arabian Gulf: 1 ♂, Mahommerah, XII.1907, G.C. Rehling; all BMNH.

Described from Germany, this species is widespread in the Holarctic and is also known from the Cape Verde Islands, South Africa, Sudan and Yemen.

Leptometopa nilsoni Sabrosky, 1987

Figs 8-9

Leptometopa nilsoni Sabrosky, 1987. — Proc. ent. Soc. Wash. 89 (2): 242.

Material: Madagascar: 1 ♂, near Ambilobe, Ankarana, cānon forestier, Malaise trap, IX.1986, S.V. Fowler, NMWC. — Cape Verde Is.: 2 ♂♂, São Jorge dos Orgãos, 28-31.VII.1988, A. van Harten; 1 ♂, 1 ♀, same data but VIII.1988; 1 ♂, 1 ♀, same data but IX.1988; 1 ♀, same data but IX.1989; all NMWC. — R. P. Benin (Dahomey): 4 ♂♂, 2 ♀♀, Abomey-Cala vi, c. 25 km N of Cotonou, XII.1988, J.S. Noyes, BMNH. — Yemen: 2 ♂♂, al-Boun, beaten from peach tree, I.1993, M. Knapp, NMWC.

Described from females only from Madagascar, SABROSKY (1987) could give only a tentative generic combination for this species. A male from Madagascar is now available, and its much swollen and flattened hind tibia confirms that Sabrosky was correct in his placement. Further material from Yemen, the Cape Verde Islands and the Republic of Benin, here listed, shows this to be a widespread Afrotropical species. This material agrees with the Madagascan male both in external characters and in male genitalia, the surstylus being roundedly ovate, lacking serrations and being devoid of setae. The hind femur is more swollen than is usual in this genus, that of the female being one third as deep as it is long, and in the male slightly more swollen. The hind

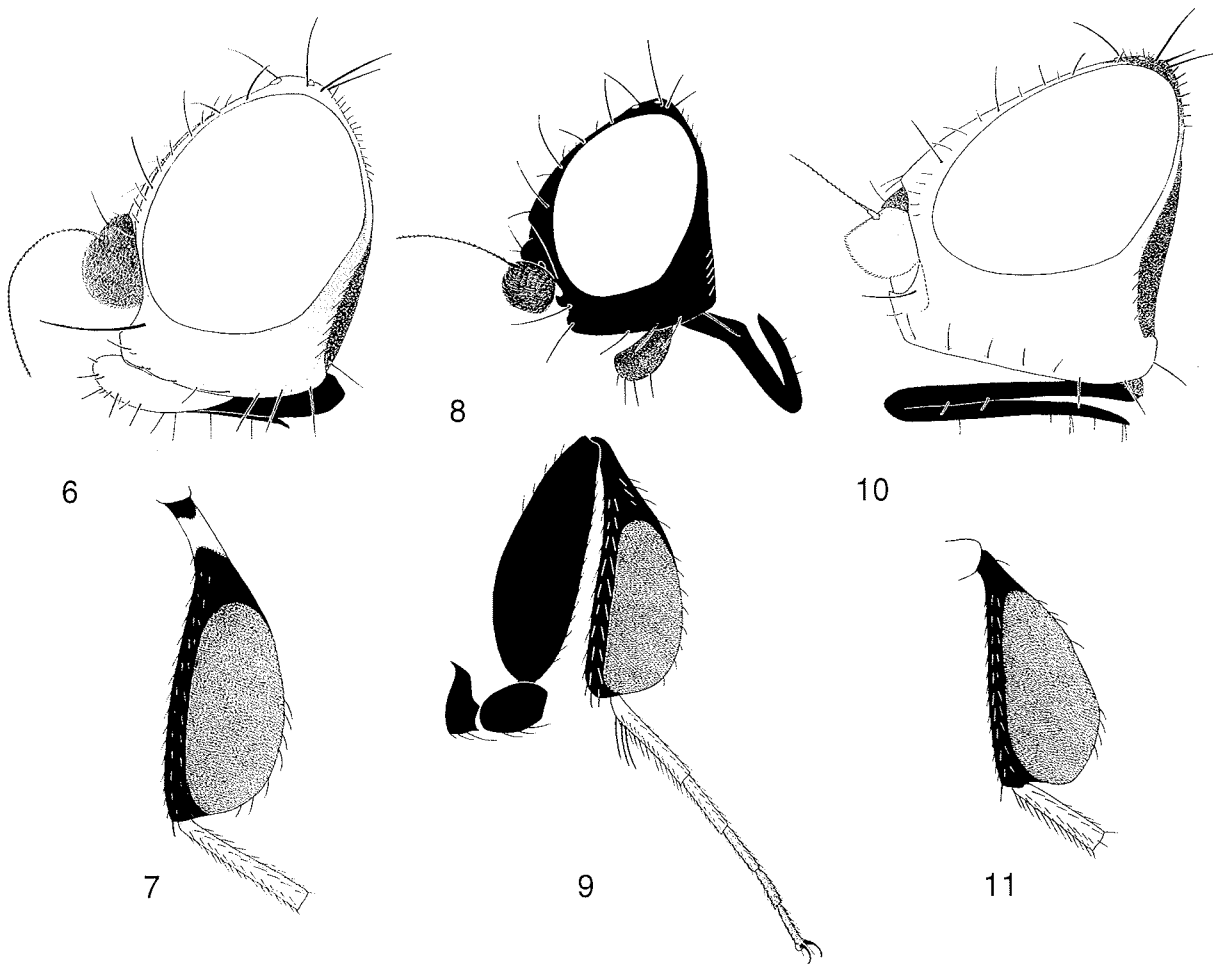


Fig. 6-11: 6-7: *Leptometopa latipes*. 6: Head in profile. Specimen from Wadi Nahiz. 7: Male hind tibia and basitarsus. Specimen from Sana'a. 8-9: *Leptometopa nilssoni*. 8: Head in profile. Specimen from São Jorge de los Orgãos. 9: Male hind leg. Specimen from al-Boun. 10-11: *Leptometopa rufifrons*. 10: Head in profile. Specimen from Wadi Ma'awil. 11: Male hind tibia and basitarsus. Specimen from Bowsher.

basitarsus of the female has short black recumbent ventral bristles along its entire length, whereas in the male there are three long erect black ventral bristles close to the base.

Leptometopa rufifrons Becker, 1903

Figs 10-11

Leptometopa rufifrons Becker, 1903. — Mitt. zool. Mus. Berl. 2 (3): 188.

Leptometopa flavipalpis Séguy, 1932. — Ann. Mus. civ. Stor. nat. Genova 55: 502.

Hypaspistomyia latigenis Hendel, 1933. — Dt. ent. Z. 1933: 54.

Material: Oman: 1 ♀, Eastern Sands, Mintirib, Res. Camp, 22°25'N 58°49'E, 269 m, 16.I.1986, M.D. Gallagher, NHMB; 2 ♂♂, Dhofar, Marmul, Desert Agricultural Project, on lucerne, 25.XI.1992, J.C. Deeming; 2 ♀♀, same data but swept from Rhodes grass; 1 ♀, Bandar al-Jissah, 10.XII.1992, M.D. Gallagher & J.C. Deeming; 1 ♂, 1 ♀, Wahiba Sands, 21°39'N 59°18'E, *Prosopis* woodland, 4.X.1994, M.D. Gallagher & G. Lowe; 3 ♂♂, 1 ♀, Wadi Batha, 22°08'N 59°14'E, sparse vegetation on bank, 29.XII.1994, B. Skule; 3 ♂♂, Bowsher dunes, 28.X.1990, M.D. Gallagher & J.C. Deeming; 1 ♂, al-Khuwair, X.1990, J.C. Deeming; 2 ♂♂, Wadi Ma'awil, inland dunes, 26.XII.1989, M.J. Ebejer; 1 ♂, arid plain 4 km S of Hazm, 19.X.1990, M.D. Gallagher & J.C. Deeming; all NMWC. — Yemen: 1 ♀, al-Huseini, near Lahej, c. 450 ft., 29.XI.1937, H. Scott & E.B. Britton, BMNH.

Described from Egypt, this species is widespread in the Mediterranean subregion and is recorded from Yemen, Namibia, Nigeria, South Africa, the Canary Islands and Central Asia.

Genus *Phyllomyza* Fallén, 1810

Phyllomyza Fallén, 1810. — Specim. entomolog. novam Diptera disponendi methodum exhibens: 20.

Type species: *Phyllomyza securicornis* Fallén, 1823, by subsequent monotypy (FALLÉN 1823: 8).

Phyllomyza sp.

Fig. 12

Material: Oman: 1 ♀, Eastern Sands, Mintirib, Res. Camp, 22°25'N 58°49'E, 269 m, 16.I.1986, M.D. Gallagher, NHMB; 1 ♀, Wahiba Sands, 21°39'N 59°18'E, *Prosopis* woodland, 4.X.1994, M.D. Gallagher & G. Lowe; 2 ♀♀, edge of Wahiba Sands at al-Khuwaymah, 21°26'N 59°14'E, at light, 27.I.1997, M.D. Gallagher & I.D. Harrison; all NMWC.

Species of this genus exhibit striking sexual dimorphism in the structure of the third antennal segment. Identification based upon lone females would be suspect. The species is of the group of *P. equitans* Hendel, 1919, black with fore tibia, all knees, halteres and tarsi yellow. There is considerable difference in size between individuals, that collected in 1994 having a wing length of only 1.1 mm, whereas in those collected in 1997 it is 1.9 mm.

Subfamily Milichiinae

Genus *Milichiella* Giglio-Tos, 1895

Milichiella Giglio-Tos, 1895. — Anns Soc. ent. Fr. 367.

Type species: *Tephritis argentea* Fabricius, 1805, sensu Giglio-Tos (misidentification, = *Milichiella tosi* Becker, 1907), by monotypy.

Milichiella argentiventris Hendel, 1931

Fig. 13

Milichiella argentiventris Hendel, 1931. — Bull. Soc. ent. Égypte (N.S.) 15 (2): 72.

Material: Oman: 10 ♂♂, edge of Ghubra Bowl, Wakan Village, aerial swarm over road, 5.XI.1992, M.D. Gallagher & J.C. Deeming; 1 ♂, Bandar al-Jissah, at light, 29.X.1990, M.D. Gallagher & J.C. Deeming; 2 ♂♂, Dhofar, Wadi Shaat, 1000 m, small swarm in thorny gully, 11.X.1990, J.C. Deeming; 26 ♂♂ (+ 2 ♂♂ *Simulium* sp.), Wadi Bani Kharus, al-Misfa, swarming at midday (c. 36 °C) over open ground, 19.VIII.1988, M.J. Ebejer. — Yemen: 1 ♂ al-Kowd, 15-28.II.1993, A. van Harten; all NMWC.

The specimen from Yemen (which was originally preserved in alcohol) differs from the original species description in having the tarsi dark, but its genitalia are identical to those of a Wakan specimen.

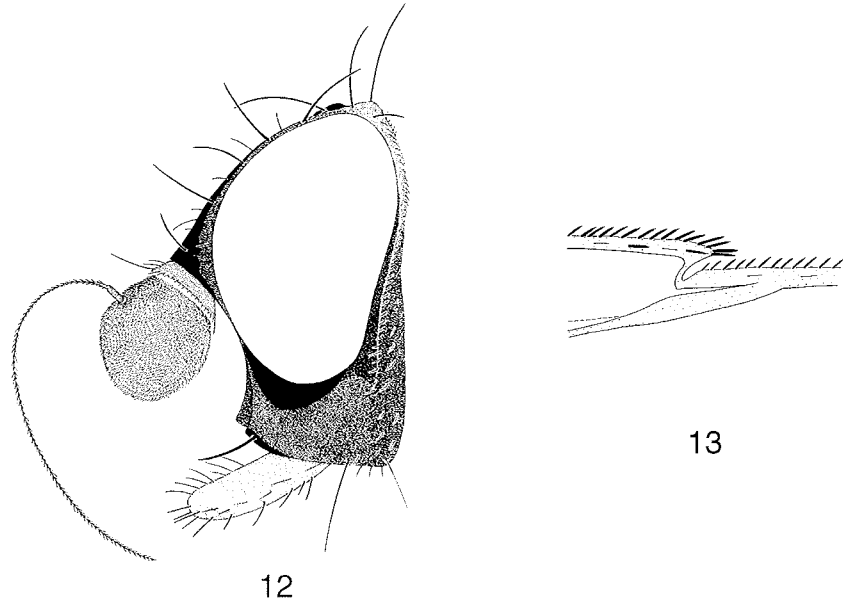
Described from Sudan. FREY'S (1958: 50) record from the Cape Verde Islands is questioned by SABROSKY (1980: 688). I have also found it occurring widely in Nigeria, where Dr. R.A. Johnson reared a long series from rotten yam tubers at Mokwa, Niger State in August to October 1977 (material in NMWC).

Milichiella lacteipennis (Loew, 1866)

Lobioptera lacteipennis Loew, 1866. — Berl. ent. Z. 9 (1865): 185.

Material: Oman: 3 ♂♂, 8 ♀♀, Barinah, Shinas, abundant on sweet potato, but absent from all other crops on farm, 7.XII.1992, J.C. Deeming; 4 ♂♂, edge of Ghubra Bowl, Wakan Village, aerial swarm between pomegranate trees, 5.XI.1992, M.D. Gallagher & J.C. Deeming; 7 ♂♂, 5 ♀♀, Dhofar, Wadi Nahiz, on crusted liquid cow dung effluent from byre, 11.XI.1992, J.C. Deeming; 1 ♀, Muscat, al-Khuwair, X.1990, J.C. Deeming; all NMWC; 1 ♂, Masirah Island, R.A.F. Camp, 24.II.1976, K.M. Guichard, BMNH.

Described from Cuba, this species is found almost throughout the tropics and subtropics of the world. Notes on its biology are given by BOHART & GRESSITT (1951: 98) along with a figure of its puparium (pl. 12).



Figs 12-13: 12: *Phyllomyza* sp., head in profile. Specimen from al-Khuwaymah. 13: *Milichiella argeniventris*, costal indentation. Specimen from al-Kowd.

Milichiella sp. 1

Material: Oman: 4 ♀♀, Hayl al-Ghaf, 23°10'N 58°55'E, cultivation under palms, 6.XI.1992, M.D. Gallagher & J.C. Deeming, NMWC.

A species closely resembling *M. lacteipennis*, but differing from it in having the dorsum of the mesonotum less shining.

Milichiella sp. 2

Material: Oman: 1 ♂, Dhofar, Hajayf (*Euphorbia* zone), 12.X.1990, J.C. Deeming, NMWC.

A species resembling *M. argeniventris*, but having all sclerites of the abdomen dull dark grey dusted. As with the previous species, the material available is insufficient for the description of a new species.

Genus *Milichia* Meigen, 1830

Milichia Meigen, 1830. — Syst. Besch. bekannt. europ. zweiflüg. Insekt.: 131.

Type species: *Milichia speciosa* Meigen, 1830, by designation of WESTWOOD (1840: 151).

Milichia albomaculata (Strobl, 1900)

Lobioptera albomaculata Strobl, 1900. — Wien. ent. Ztg. 19: 9.

Material: Yemen: 1 ♂, near Ta'izz, field on road to Mocha, c. 4100 ft., 16.XII.1937, H. Scott & E.B. Britton, BMNH.

Described from Spain into the genus *Lobioptera* Wahlberg, 1847, which is a junior synonym of *Milichia*, and further recorded by PONT & SINGH (1965: 7) from the Atlas Mountains of Morocco, this latter record overlooked by PAPP (1984: 111) in listing its distribution.

Milichia pubescens Becker, 1907

Milichia pubescens Becker, 1907. — Annls hist. nat. Mus. natn. Hung. 5: 519.

Milichia mediocris Sabrosky, 1958. — Stuttg. Beitr. Naturk. 4: 1.

Material: Oman: 1 ♂, Muscat, Haramel, 13.III.1995, S.P. Dance; 1 ♀, N. Masira Is., B.E.R.S. Camp, 5-7.III.1995, S.P. Dance; both NMWC; 1 ♀, Eastern Sands, Mintirib, Res. Camp, 22°25'N 58°49'E, 269 m, 19-28.I.1986, W. Büttiker, NHMB. — Yemen: 1 ♂, 1 ♀, Sana'a, II.1992, A. van Harten, NMWC.

Described from the Canary Islands and Egypt, and further recorded from Taiwan, this last record is listed as suspect by PAPP (1984: 112). *Milichia mediocris* is described from Somalia. DEEMING & BAÉZ (1985: 64) described the puparium from reared material taken from a latrine in Sudan, and further recorded it from Nigeria, the Cape Verde Islands, Corfu, Palestine and Pakistan. It has since been collected on Malta independently by Dr. M.J. Ebejer and Dr. P. Gatt (specimens in their personal collections).

Milichia sp.

Material: Oman: 1 ♀, Dhofar, Wadi Nahiz, 21-25.IX.1988, M.J. Ebejer, NMWC.

A single specimen of a species that resembles *M. mixta* Becker, 1907, is left untreated for want of male material.

Family Carnidae

HENNIG (1937) gave a good key to the 19 Palaearctic species of *Meoneura* then known, which includes the first of the two species listed here. A further 29 Palaearctic species described since are listed by PAPP (1984: 120-124), who overlooks the second species listed here. A further four new species from the former USSR are described by OZEROV (1991). HENNIG (1937) included in the Carnidae genera which have since been removed to other families. These are *Risa* Becker, 1907 (to Risidae), *Pseudopomyza* Strobl, 1893 (to Pseudopomyzidae), *Cryptochaetum* Rondani, 1875 (= *Cryptochetum*, to Cryptochetidae) and *Horaismoptera* Hendel, 1907 (to Tethinidae).

Genus *Meoneura* Rondani, 1856

Meoneura Rondani, 1856. — Dipt. Ital. Prodrromus 1: 128.

Type species: *Agromyza obscurella* Fallén 1823, by monotypy.

Meoneura baluchistani Duda, 1936

Meoneura baluchistani Duda, 1936. — Ann. Mag. nat. Hist. (10) 18: 337.

Material: Yemen: 1 ♂, 1 ♀, Sana'a, II.1991, A. van Harten, NMWC.

Described from Baluchistan, Pakistan, the genitalia of the holotype male was figured by DEEMING (1976: 32).

Meoneura nitidiuscula Collin, 1949

Meoneura nitidiuscula Collin, 1949. — Bull. Soc. Fouad 1. Ent. 33: 224.

Material: Saudi Arabia: 1 ♂, 40 km S of Riyadh, Hieth, 13.V.1977, W. Büttiker, NHMB. — Oman: 2 ♂♂, Jabal Akhdar, Wadi Mistal, pollinating *Caralluma* sp. (Asclepiadaceae), 29.IX.1989, B. Jonkers; 1 ♂, Wadi al-Uqq, 23°10'N 58°06'E, on *Saccharum griffithii* in wadi bed, 25.X.1990, M.D. Gallagher & J.C. Deeming; 1 ♂, Muscat, Bowsher dunes, 28.X.1990, M.D. Gallagher & J.C. Deeming; 2 ♀♀, Dhofar, Wadi Nahiz, cow byre, 11.XI.1992, J.C. Deeming. — Yemen: 1 ♂, Sana'a, I.1991, A. van Harten; all NMWC.

Described from Egypt, the genitalia of a syntype male was figured by DEEMING (1976: 32). BARRACLOUGH (1994: 21) records it from the Cape Verde Islands.

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REFERENCES

- BARRACLOUGH, D.A. 1994. *Hemeromyia australis* sp. n. and *Meoneura prima* (Becker, 1903) from Namibia and South Africa, the first Carnidae (Diptera: Schizophora) recorded from subequatorial Africa. *Annals of the Natal Museum* 35: 15-24.
- BOHART, G.E. & GRESSITT, J.L. 1951. Filth-inhabiting flies of Guam. *Bulletin of the Bernice P. Bishop Museum* 204: 1-152.
- DEEMING, J.C. 1971. Some species of *Atherigona* Rondani (Diptera, Muscidae) from northern Nigeria, with special reference to those injurious to cereal crops. *Bulletin of Entomological Research* 61: 133-190.
- DEEMING, J.C. 1976. Three new species of *Meoneura* Rondani (Diptera: Milichiidae) from northern Nigeria. *Nigerian Journal of Entomology* 2 (1+2): 29-34.
- DEEMING, J.C. & BAÉZ, M. 1985. Some Milichiidae (Diptera, Cyclorrhapha) from the Canary Islands. *Entomologist's monthly Magazine* 121: 63-69.
- FALLÉN, C.F. 1823. *Agromyzides Sveciae*. 10 pp. Lundae (= Lund).
- FREY, R. 1958. Zur Kenntnis der Dipteren brachycera p.p. der Kapverdischen Inseln. *Commentationes Biologicae* 18 (4): 1-61.
- HENDEL, F. 1903. Kritische Bemerkungen zur Systematik der Muscidae acalyptratae. *Wiener entomologische Zeitung* 22: 249-252.
- HENNIG, W. 1937. Milichiidae et Carnidae. (Fam.) 60a. In: *Die Fliegen der palaearktischen Region*, Lfg. 115. Lindner, E. (ed.): 91 pp.
- OZEROV, A.L. 1991. New species of Micropezidae, Piophilidae and Carnidae (Diptera) from the USSR. *Vestnik Zoologii* 1991 (6): 7-12.
- PAPP, L. 1984. Families Milichiidae, pp. 110-118 and Carnidae, pp. 118-124. In: *Catalogue of Palaearctic Diptera*. Papp, L. & Soós, Á. (eds): 10: 1-40.
- PONT, A.C. & SINGH, B. 1965. *Oxford University Expedition to the High Atlas, Morocco 1963*. 14 pp. Oxford.
- SABROSKY, C.W. 1980. 75. Family Milichiidae. In: *Catalogue of the Diptera of the Afrotropical Region*. Crosskey, R.W. (ed.): 686-689. Brit. Mus. (Nat. Hist.), London.
- SABROSKY, C.W. 1983. A synopsis of the world species of *Desmometopa* Loew (Diptera, Milichiidae). *Contributions of the American Entomological Institute* 19 (8): 1-69.
- SABROSKY, C.W. 1987. A new species of *Leptometopa* (Diptera, Milichiidae) from Madagascar pollinating *Ceropegia* (Asclepiadaceae). *Proceedings of the Entomological Society of Washington* 89 (2): 242-243.
- WESTWOOD, J.O. 1840. *An introduction to the modern classification of insects; founded on the natural habits and corresponding organisation of the different families. Synopsis of the genera of British insects* [part]. Order XIII. Diptera Aristotle. (Antliata Fabricius. Halteriptera Clairv.): 125-154. London.

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