SOME MILICHIIDAE (DIPTERA, CYCLORRHAPHA) FROM THE CANARY ISLANDS

BY J.C. DEEMING & M. BÁEZ

The Milichiidae of the Canary Islands have been treated by Frey (1936)and Hennig (1937). One of us (M.B.) has made extensive collections of Diptera on the various islands of the group, of which the Milichiidne are treated here. This material is deposited in the collections of the University of La Laguna, with duplicate specimens in the National Museum of Wales. Further material in the British Museum (Nat. Hist.), collected by K.M. Guichard and G. Smith. is also included.

Of the ten species of Milichiidae recorded by Frey (1936) from the Canary Islands this material includes all but the common palaearctic *Madiza glabra* Fallén.

It is unfortunate that often revisionary work on the insect fauna of offshore islands is undertaken in ignorance of the fauna of the adjacent mainland. This can lead to totally false concepts of the peculiarities of the island faunas. One would have expected the Milichiinae, with their easily seen and collected males, to have been well collected in Morocco, but the only records known to us of this subfamily from north-west Africa are *Milichia speciosa* Meigen (Séguy 1934: 636) and *M. albomaculata* Strobl (Pont & Singh 1965: 7) both from Morocco and *M. seguyi* Hennig (Hennig 1937: 23) from Algeria.

MADIZINAE

Desmometopa m-nigrum (Zetterstedt) 1848: 2743.

A species that is widespread within the Palaearctic region and recorded from various other parts of the world. Frey (1936: 125) records the species from Gran Canaria, Tenerife. Palma and Gomera.

Further material: ♂ La Gornera. Hermigua, 9.iv.1974: ♂ Chejelipes, 11.iv.**1975:** ♂ Tenerife. Las Cañadas, 2.ix.**1977:** ♂ Fasnia, 20.v.**1973:** ♂ Fuerteventura. Vega Rio Palmas, 12.ii.1977; ♀ Antigua. 19.ii.1980; ♂ Gran Tarajal, 9.v.1974; ♂ Gran Canaria. Fataga. 30.xii.1980; ♂ Laiiznrote. Teguise, 23.ii. 1979: ♂ **Janubio**, 22.ii. **1979:** ♂ Hierro, San Andrés, 27.xi.**1979**; ♂ Frontera, 30.v.**1976**.

Leptometopa rufifrons Becker 1903: 188

Described from Egypt, this species is known from the Mediterranean. S. Yemen. Central Asia and southern Africa. It is also a common species in northern Nigeria. Frey (1936: 125) records it under the name of *Hypaspistomyia latigenis* Hendel from Gran Canaria. Tenerife. Palma and Gornera.

Further material: 3 ♀♀ Gran Canaria. Maspalonias. 17.vi.1964 (*K.M. Guichard*).

MILICHIINAE

Milichia speciosa Meigen form *canariensis* Becker 1907: 517.

This form was described from Palma and recorded by Frey (1936: 124) from Sta. Brigida.

Comparison of the male genitalia of this form with a Turkish example of the typical form reveals no appreciable difference.

Further material: ♀ Tenerife. Mte. los Silos. 17.vi. 1976: 4 ♂♂ Las Cañadas. 2100 m. 31.v.1964. (*K.M. Guichard*); 2 ♂♂ Orotava. 1909 (*G. Smith*).

Miiichia pubescens Becker 1907: 519.

Milichia mediocris Sabrosky **1958: 1. Syn. n.**

Described from the Canary Islands (Gran Canaria) and Egypt, and further recorded from Tenerife (Frey 1936: 124) and Formosa (Hendel 1913: 106), this last record being queried by Sabrosky (1977: 273), though Hennig (1937: 23) examined the material upon which the Formosan record was based and believed it to belong to this species. Much further material is now available, being:

Further material: ♀ Tenerife. Santa Cruz. 15.xi.1973: 36 ♂♂, 14 ♀♀ N. NIGERIA. Zaria, Samaru. 1966–79. (*J.C. Deeming*) many of which were collected feeding on the **hoiieydew** of the coccid *Udinia catori* (Green) and in mrrcury vapour light traps: 2 ♂♂, 2 ♀♀ S. NIGERIA, Lagos, Ikoyi and Tarkwa Bay, 1974. (***M.A.** Cornes*); ♂, 2 ♀♀ CAPE VERDE IS., St. Vincent. 13.iv. 1896. (O. *Thomas*), ♀ CORFU. 22–27.vi.1891; ♂, 6 ♀♀ PALESTINE. 12–15 miles wrst of Jerusalem, El Athroun. 30.xi.1917. (*E.E. Austen*); 2 ♀♀ (heavily damaged) SUDAN. Wad Medani, xii.1954, (***A.K.** Abdalla*), pit latrine, "bred"; ♀ (headless) Wad Medani. 8.v. 1946. (*D.J. Lewis*), latrine bucket. "bred"; 3 ♂♂ (one headiess) PAKISTAN. Karachi, i.1958. (*S. Mahdihassan*), associated with Lac insects. A further female labelled Tenerife. Santa Cruz. 15.xi.1973, (*M. Báez*) and identiiied by Dr Sabrosky is in thc U.S. National Museuni. Washington D.C.

All but the Tenerife and Nigerian specimens are to be found in the British Museum (Nat. Hist.). The Pakistan material was identified by F.I. van Emden as *M. posticata* Becker, but does not exhibit the silvery grey pollinosity on tergite 5 as was described **for** the male of that species. The Wad Medani material was also identified by van Emden. but as M. *pubescens*. The male genitalia of specimens from Nigeria. Palestine, the Cape Verde Islands, the Sudan and Pakistan were dissected, compared with and found to be identical to those of the holotype of *Mifichia mediocris* Sabrosky (1958: 1) from Mogadishu (fig. **3)** and Hardy & Delfinado's (1980: 363) figure of *Milichia orientalis* Malloch (1913: 109) from Guam and Hawaii, both of which species also appear to be identical on the basis of external characters. A minor sexual dimorphism in chaetotaxy, frons width and wing venation (figs. 1–2) occurs in *M. pubescens* and further slight variation between individuals of the same sex and froin the same locality in the last two of these characters. It seems probable to us that all this material represents a single variable species ranging across the tropics and subtropics of the Old World. The material reared by **A.K.** Abdalla at Wad Medani is

accompanied by two damaged puparia. from the use of both of which a full pupal description has been prepared.

Puparium 4.2 mm in length, 1.5 mm in greatest width, subshining, brown with spiracular bases black. Spicular zones (fig. 5) nine in number ventrally, of these the first (most anterior) narrow, consisting of 3-4 rows of coarse pointed spicules; zones 2-6 longer, wider and consisting of more rows of spicules, some of the larger of which are finely pointed to the extent of appearing hairlike apically; zones 7-8 yet larger; zone 9 narrow, bandlike, situated immediately in front of the short rounded anal plate; laterally and dorsally zones 1-8 are continued around puporium on ridges, zone 1 as a single row and zones 2-8 as two widely-separated rows of irregularly spaced hairlike spicules; a further irregular pntch of minute spicules dorsally preceding bases of posterior spiracles. Anterior spiracles (fig. 6) each bearing nine slender digitations. Posterior spiracles (fig. 7) on elevated bases and with the usual hair groups surrounding the three spiracular openings. Cephalopharyngeal skeleton (fig. 8) black and brown with an oblique hyaline band on the ventral wing of the pharyngeal sclerite.

Milichia mixta Becker 1907: 518.

Described from Tenerife. The male head (fig. 9), dorsum of abdomen (fig. 10) and surstylus (fig. 11) are figured.

Further material: 3 ♂♂, 2 ♀♀ Hierro. La Lajura, 28.v.1976. A further female labelled Fuerteventura. Landia, 9.v.1974 (M. *Báez*), identified by Dr Sabrosky, is in the U.S. National Museum.

Milichia nitida Becker 1907: 520

Described from Gran Canaria from the female. The male of this species resembles that of M. *mixta* in having identical abdominal markings, but has the surstylus (fig. 12) of a slightly different shape and has, as does the female, the mesonotum darker dusted and subshining. The depth of the head beneath the eye (cheek plus jowl) is diagnostic in this species and ***M. mixta,*** in both being considerably wider than in ***M. apicalis*** Sabrosky from Tanzania and some undescribed species from the African mainland having similarly marked male abdomens.

The description of the male of ***M. nitida*** given by Steyskal (1966: 120) from material collected in Sinai must refer to a different species, as in his description the colour of the squama and its fringe is given as being white.

Further material: 3 ♂♂ Fuerteventura. Vallebrón, 21.ii.1980; ♀ Tindaya, 16.ii.1977; ♀ La Matilla, 17.ii.1977; ♂ Lanzarote, Orzola, 23.iv.1977.

Milichia sp.

A single male of an undescribed species near *M. albomaculata* Strobl. but having the squamal fringe pale, rather than chocolate brown, and distinctive differences in genitalia is available. As it appears to be conspecific with two males from N. Nigeria which are in better condition than it is, its description will have to await a revision of the African species of its group.

Material: ♂ Fuerteventura. Coti. 7.v.1964, (K.M. *Guichard*).

Milichiella lacteipennis (Loew) 1866: 185

Described from Cuba, this species is tropically almost cosmopolitan. Notes on its biology are given by Bohart & Gressitt (1951: 98) along with a figure of the puparium (plate 12). Frey (1936: 124) gives numerous records from the Canary Islands. A single female collected at

Samaru, Zaria, N. Nigeria on 18.viii.1971 was seemingly feeding on secretions on the lateral margins of the terga of an *Odius* sp. (Pentatomidae) nymph.

Further material: ♂ Fuerteventura. Betancuria. 12.v.1974; ♂ Valle de Ortega. 8.v.1974; 2 ♂♂ La Gomera. Hermigua. 9.viii.1974; 4 ♂♂ Tenerife. La Cuesta. 15.x.1972; ♀ La Cuesta. 21.vi.1973.

Milichiella bimacufata Becker 1907: 534

Eccoptomma freyi Hendel in Frey **1936:** 125. **Syn. n.**

M. bimaculata was described from the male from Gran Canaria and was further recorded by Frey (1936: 124) from Tenerife. ***E. freyi*** was described from the female from Tenerife. ***Eccoptomrna*** Becker was placed as **a** junior synonym of *Milichiella* Giglio-Tos by Sabrosky (1980: 688). Becker's description of ***bimaculata*** gives no mention of presutural dorsocentral bristles and his figure of the head (plate 12, fig. 10) shows a long proboscis folded beneath the head unlike that (fig. 13) of material we have seen. The presence or absence of presutural dorsocentral bristles in species of this genus is somewhat variable between specimens of the same series and between the two sides of the same specirnen. Were the proboscis as long as that figured by Becker then his new species would not have traced in his key to genera (pp. 513–514) in the same paper to either ***Eccoptornrna*** or *Milichiella*, but would have agreed in that respect with his new neotropical genus *Ulia*.

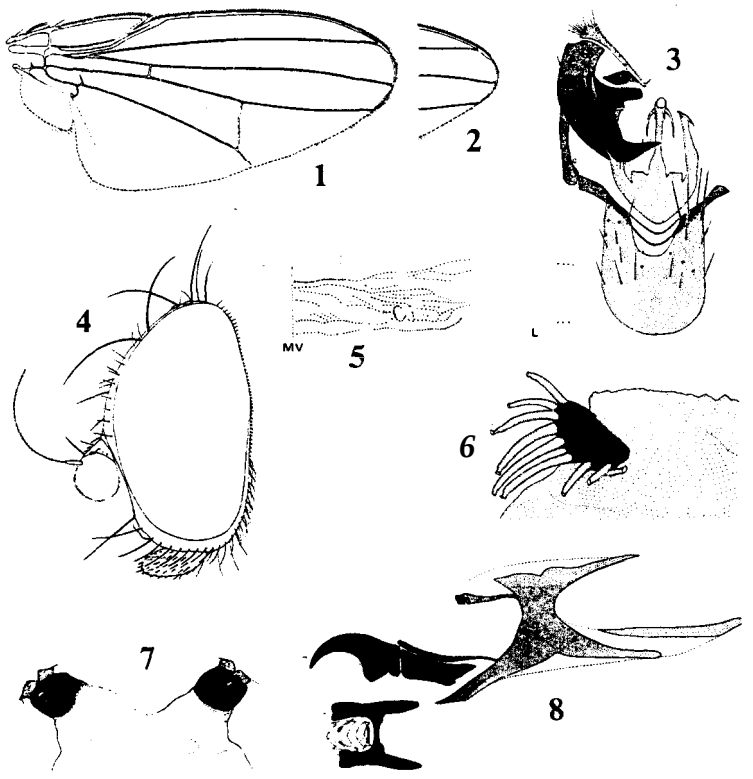
This species, unlike ***M. lacteipennis***, has the postocellar bristles of the male as long and strong as the internal verticals. The length of the postocellar bristles is of particular diagnostic importance, there being a closely-related West African species of uncertain identity in which these are short and weak.

Further material: ♂ Tenerife. El Cantillo, 6.i. **1966 (*J.M. Fernandez*):** ♂ Teno, **7.i.1979; 3** ♂♂ Teno. **ZO.iii.1974;** ♂ La Gomera. Hermigua. 9.iv.1974; ♂ Tecina, 11.iv. **1975;** 3 ♂♂ Gran Canaria. Bandania, 14.ix.1976; ♂ Tafira, 13.ix. **1974;** ♂ Fuerteventura, Cumbres Jandia. **15.ii.1977;** ? Hierro. Frontera, **26.v.1976.**

KEY TO THE MILICHIIDAE OF THE CANARY ISLANDS

1. Costa deeply indented at mouth of subcosta (fig. 1). Cheek plus jowl narrow. not or hardly exceeding width of third antennal segment. (Milichiinae) 2
— Costa lacking a deep indentation (Madizinae) 8
2. Hind inargin of eye at mid height indented (fig. 13). (*Milichiella* Giglio-Tos) **3**
— Hind margin of eye lacking such an indentation (figs. **4** and Y) (*Milichia* Meigen) 4
3. Male with fifth tergite bearing a pair of large silvery grey dusted spots and with **haltere** eiitirely dark. Both sexes usually with presutural acrostical and dorsocentral bristles. Female abdomen nowhere distinctly rhining ..... *Milichiella bimaculata* Becker
— Male with abdomen lacking dusted spots and with haltere knob yellow. Both sexes lacking acrostical and dorsocentral bristles presuturally situated. Female abdomen with fifth tergite distinctly shining ..... *Milichiella lacteipennis* (Loew)
4. Squamal fringe pale. Male tergites with distinctive silvery grey and dark brown dusted pattern ..... *Milichia* sp.
— Squamal fringe brown to black. Male abdominal pattern variable 5

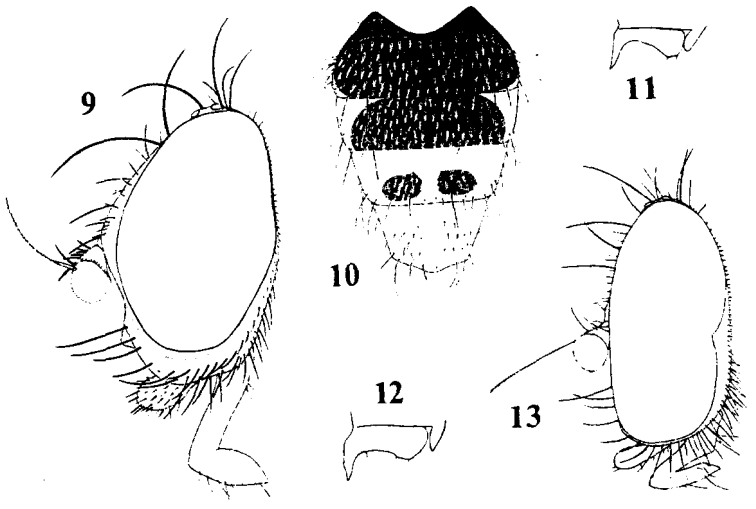
5. Base and fore margin of wing diffusely infuscate, the latter so on all but the middle one sixth of its length. Dorsum of abdomen densely pale pouder-grey diisted on all but tergite 1 in male, only on a pair of transverse bandson tergite 2 in female .... *Milichia speciosa* Meigen form *canariensis* Becker
— Wing hyaline 6
6. hlesonotum with heavy olive to ash grey dusting completely obscuring the ground colour. Dorsum of abdomen of both sexes with similar but less heavy dusting to that of the mesonotum. Head brneath eye shallower (fig. 4) .... *Milichia pubescens* Becker
— Mesonotum to some extent subshining. Head beneath eye deeper (fig. 9). Dorsum of abdomen of male with a distinct silvery grey and dark brown dusted pattern 7
7. Female with dorsum of abdomen completely undusted. the mesonotum scarcely dusted and strongly shining, especially so laterally, and dusting cf frons coal black. Male* surstylus (fig. 12) .... *Milichia nirida* Becker
— Female with dorsurn of abdomen faintly dusted. the mesonotum a little more heavily dusted but subshining and dusting of frons grey. Male* surstylus (fig. 11) .... *Milichia mixta* Becker



Figs 1–8. — 1–3. *Milichia mediocris* Sabrosky: 1, female allotype, wing: 2. male holotype, apex of wing; 3. male holotype, fifth sternite and genitalia (right sides of epandrium and hypandrium omitted). 4–8, *M. pubescens* Becker: 4, female (Santa Cruz). head in profile; 5, puparium (Wad Medani), left side of sixth ventral spicular zone (MV denotes mid ventral line, L lateral): 6. puparium, anterior spiracle; 7, puparium, posterior spiracles; 8. puparium. cephalopharyngeal skeleton in profile (inset hypostomal sclerite from above).

8. Thorax. abdonien and orbital plates shining black. totally undusted .... *Madiza glabra* Fallén
— These all dusted 9
9. Head deeper than long, the mouth margin in profile shorter than the length of the eye. Frons coal black, the orbital plates, interfrontal lines and ocellar triangle forrning of the remainder of the frons a M-shape ..... *Desmometopa m-nigrum* (Zetterstedt)
— Head longer than derp. the rnouth margin in profile much longer than an eye. Frons reddish yellow ..... *Leptometopa rufifrons* Becker

* The males of these two species share with their females the difference in the degree of intensity of mesonotal dusting, but both have the dusting of the frons grey.



Figs **9–13.** — 9–11, ***Milichia mixta*** Becker: **9,** male (Hierro), head in profile; 10, male (Hierro), abdomen from above; 11, male (Hierro), right surstylus and adjacent margin of epandrium. 12, M. *nitida* Becker, rnale (Orzola), right surstylus and adjacent margin of epandrium; **13,** ***Milichiella bimaculata*** Becker, rnale (Teno), head in profile.

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REVIEW

'THE SEX LIFE OF FLOWERS' By BASTIAAN MEEUSE and SEAN MORRIS. 21.5 x 28.5 cm. 152 pp. Photographs by Oxford Scientific Films, drawings by Michael Woods. Faher & Faber. London. 1984. Price £12.50.

This is the book of the award winning television film 'Sexual Encounters of a Floral Kind' made by Oxford Scientific Films. It is 23 years since the late Professor Varley reviewed the first major production **of** this organization in this Magazine (*antea* **97:** i).

This beautiful book typifies the major scientific contributions rnade by O.S.F. since then. by their unique cornbination of stunning photography and informal scientific comrnentary. The book is by no means just photographs. but in a substantial text tells the fascinating story of the evolution of plant sex and the subsequent co-evolution of plants and animals (especially insects) by a bizarre series of adaptations.

Clear and accurate line illustrations explain the various and complex pollinating mechanisms involved and there is **a** glossary of technical terms. For readers wishing to pursue the subject further there is a list of 292 references to the specialist literature.

In a final chapter 'pollination and mankind' man's sophisticated manipulation **of** pollination is descrihed. with its attendant successes and failures and a note of caution for his future activities.

The authors end with the comment: 'It is obvious that we need education and eye-openers. and **without** any preachiness. pretence, smugness or condescension we venture to express the hope **that** in its own humble way our present book can indeed by an eye opener'.

The films produced by O.S.F. **are** always educational and eye openers, even to experienced naturalists. This **hook** is also an eye opener and will almost certainly contain something ncw and of interest to any biologist. Lay readers should benefit frorn the insight it will give them into the often precarious intricacies of biological systems and why man must learn to live in harmony with them. if only in the interests of his own survival. — K.G.V. SMITH.

REVIEWS

'BREEDING THE BRITISH BUTTERFLIES.' by **P.W.** CRIBB. 60 pp., **5** pls; *6* figs. wrappers. Amateur Entomologist Vol. 18. AES Publication. 1983. Price £2.30 inclusive of postage.

This latest Amateur Entomologist's Society booklet is the product of a symposium held during their annual exhibition in 1981. The result is one of the most useful contributions to the popular literature on British butterflies for many years. Despite the modest size of this **work,** individual notes are provided on breeding all species of British butterflies. The information is practical and thorough and is evidently based to a large extent on the personal experience of the author and his colleagues.

The introductory section commences **with** a well argued discussion of the reasons for breeding butterflies. with sensible comment on the desirability and practicality of reintroducing species and reinforcing existing populations by breeding. The following sections deal with foodplants. breeding cages. disease, and breeding methods and techniques. Much of this information will also be of value to those breeding butterflies from other parts of the world. the section on hand pairing being **of** particular interest to those rearing large exotic species. At the end of the booklet, a useful list of referenccs is arranged by journal with an indication of the content of each article.

In the notes on species. attention is drawn to ihe fact that some are protected, but it is not made clear that it is illegal to collect any protected species without a licence and that similar restrictions apply to the importation of European stock. Another minor quibble is that the monochrome plates of photographs by Richard Revels are too large to do them justice and one has to refer to the contents page to find the captions.

For breeders. this is an indispensable adjunct to the standard works on British butterflies and deserves the widest circulation. — D.J. CARTER.

'HXNDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS'. Royal Entomological Society **of** London. Vol. 10. Part **7.** KEDS, FLAT-FLIES AND BAT-FLIES (DIPTERA. HIPPOBOSCIDAE AND NYCTERIBIIDAE). By A.M. HUTSON. 40 **pp..** 44 figs. 1984. Price £4.00.

The Hippohoscidae. Nycteribiidae and Streblidae were formerly known collectively **as** the Pupipara. Hippohoscidae are parasitic on birds and artiodactyl mammals (with a few species on other mammals) while Nycteribiidae and Streblidae are exclusively parasitic on bats. Thc Streblidae are mostly tropical. do not occur in Britain, and are not therefore included in this Handbook.

This publication admirably lives up to thc title of 'Handbook' with substantial introductory sections on general biology, collection. preparation and storage. Because of their differing biologies, each family is also preceded by its own section on 'life history' and 'host relationships' with further considerations 'sex-ratio, seasonability and infestation rates' for the Hippoboscidae and 'parasites and pathogens' for the Nycteribiidae. Further information on hosts etc is included under each genus. There is also a separate Check List and Glossary for each family.

The usual taxonomic keys to genera and species includc additional species that may be found to occur in Britain, a valuable feature considering the migratory habits of many of thc hosts. Useful shorter field keys are also included and are restricted to thc known British species. All the keys are well illustrated. **A** bibliography and index complete the work.

Mr Hutson is to be congratulated on producing such **a** thorough treatment of a fascinating and unusual group of Diptera. This Handbook will be welcomed by mammalogists and ornithologists and ecologists (especially hird and bat ringers) as well **as** entomologists. — K.G.V. SMITH.