

AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Bickel, Daniel J., 1987. A revision of the Oriental and Australian *Medetera* (Diptera: Dolichopodidae). *Records of the Australian Museum* 39(4): 195–259. [30 September 1987].

doi:10.3853/j.0067-1975.39.1987.170

ISSN 0067-1975

Published by the Australian Museum, Sydney

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A Revision of the Oriental and Australasian *Medetera* (Diptera: Dolichopodidae)

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ABSTRACT. The Oriental and Australasian *Medetera* (Diptera: Dolichopodidae) are revised and 61 species are recognized, 43 of them new, with 27 Oriental, 29 Australasian, and 5 species occurring in both zoogeographical regions. All species are described and figured except *M. adsumpta* Becker, *M. nudicoxa* Becker and *M. longa* Becker, which were not seen. A key is provided for the separation of males.

The following species are newly placed in synonymy: *M. atrata* Van Duzee, *M. cilifemorata* Van Duzee, *M. hawaiiensis* Van Duzee and *M. palmae* Hardy (= *M. grisescens* de Meijere); and *Elongomedetera thoracica* Hollis (= *M. gracilis* Parent). Lectotypes are designated for *M. apicipes* de Meijere, *M. grisescens* de Meijere, *M. longitarsis* de Meijere, *M. minima* de Meijere, *M. olivacea* de Meijere, *M. opaca* de Meijere, *M. platychira* de Meijere, *M. pumila* de Meijere and *M. vivida* Becker. A neotype is designated for *M. femoralis* Becker. *Medetera comes* Hardy and *M. extranea* Becker are regarded as *nomina dubia*. *Micromorphus vegandris* (Frey) is a new combination for *Medetera vegandris* Frey.

Of particular interest is the secondary segmentation and articulation of the male cercus in the *salomonis* group, unique among Brachycera. Here the cercus has been divided into discrete basal and distal sections, with the distal section freely articulated on basal section.

Three high altitude species from Nepal have relatively long and broad wings. Several species have orientated silvery pruinosity.

A phylogenetic analysis of the major *Medetera* species groups is presented.

The Australasian *Medetera* fauna, although with distinctive elements, is derived from the Oriental fauna. The Pacific Ocean has progressively fewer species moving eastwards from the Oriental-Australasian source area. *Medetera grisescens* is a widespread tramp species, from the western Indian Ocean to Hawaii, while the Australasian *M. salomonis* ranges from French Polynesia to the Philippines. Elements from the predominantly holarctic *apicalis* and *diadema-veles* groups are present in the Orient and Australasia. *Medetera kinabaluensis*, from high elevation in Sabah, belongs to the circumboreal, primarily conifer-associated scolytid predator *signaticornis-pinicola* group. The disjunct distribution of the *aberrans* group in the Orient and the New World is regarded as a vicariant distribution resulting from progressive cooling and southward retreat of early Tertiary circumboreal warm mesophytic forests.

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Introduction

Medetera is a cosmopolitan genus of more than 300 described species. The adults are small, mostly dark metallic green flies, often found in numbers on tree trunks where they adopt a characteristic vertical upright posture. In the holarctic region, *Medetera* larvae are often predators of scolytid bark beetle larvae within their galleries, and thus are important biological control agents of these forest pests.

In recent years, major revisions have appeared for the palearctic (Negrobov 1971–77) and the nearctic (Bickel, 1985) *Medetera*. These two faunas constitute a holarctic fauna since a number of species and most species groups occur in both regions. These revisions have provided a morphological and phylogenetic framework for the study of the remaining world fauna.

The present work treats both the Oriental and Australasian *Medetera*. It is useful to consider these two zoogeographical regions together since a number of species occur in both regions, and the Australasian *Medetera*, although with distinctive elements, appears to be derived from the Orient.

Previous workers have described 14 nominal species from the Oriental region (de Meijere, 1916; Becker, 1922; Parent, 1935; Hollis, 1964) and 10 nominal species from the Australasian region, east of Weber's Line (Becker, 1922; Parent, 1932a, 1932b; Parent, 1941; Hardy, 1939; Van Duzee, 1933). This revision recognizes 61 valid species, 43 of them newly described, with 27 Oriental, 29 Australasian and 5 species occurring in both zoogeographical regions. The true diversity of these two regions is probably much larger, since many areas, especially in the Orient, are very poorly collected.

The morphology, bionomics and taxonomy of *Medetera* have been treated extensively by Bickel (1985) and will not be repeated here. Instead, only topics relating directly to Oriental and Australasian

Medetera or matters needing clarification will be considered in the introductory section.

Materials and Methods

This study is based on specimens of *Medetera* borrowed principally from the Bishop Museum, Honolulu, and supplemented by holdings of Australian, European and North American collections (see Acknowledgements for listings and abbreviations).

Surviving type material of all Oriental and Australasian *Medetera* were examined by me except for *M. adsumpta* Becker and *M. nudicoxa* Becker (both housed at Zoological Survey of India, Calcutta), and *M. longa* Becker (= *M. longicauda* Negrobov & Thunberg) (surviving syntype, housed at DEI, could not be located; G. Morge, letter). Unfortunately, all dolichopodid types described by Becker (1922) and housed at the Hungarian National Museum, Budapest, are destroyed. In cases where syntypes were placed in other institutions, lectotypes are designated, and neotypes are erected in cases where the original description enabled accurate identification. The types of *M. comes* and *M. palmae*, described by Hardy (1939), could not be located in any Australian collection and are considered lost.

In this study, species are defined primarily on the basis of male genitalia. Isolated females of species lacking diagnostic characters were left unidentified, but usually assigned to a species group. Keys are based on non-genital characters where possible, although in most cases accurate identification requires clearing of the male postabdomen.

Drawings of genitalia were made with a camera lucida attached to a compound microscope. The left lateral view is illustrated for all species, supplemented by ventral views of the hypandrium, aedeagus or entire hypopygium. In describing the

hypopygium, 'dorsal' and 'ventral' refer to morphological position prior to genitalic rotation and flexion. Thus, in figures showing a lateral view of the hypopygium, the top of the page is morphologically ventral, while the bottom is dorsal (Fig. 1a).

Features common to a group of species are listed in the introductory discussion and not repeated in species description unless needing clarification. Measurements are in millimetres (mm). The measurements were made on representative specimens (normally the holotype) and should not be considered as invariable for a species. Body length in males is measured from the base of the antennae to the tip of the seventh abdominal segment. Female body length is generally similar to the male of its species unless otherwise noted. Wing length is the perpendicular distance to the apex from an imaginary extension of the humeral crossvein; wing width is measured from the junction of R_1 with the costa to the opposite side of the wing, perpendicular to the wing's long axis (Fig. 1c). The CuAx ratio (termed 'wing ratio' in Bickel, 1985) is the length of the m-cu

crossvein/distal section CuA. The position of features on elongate structures is given as a fraction of the total length, starting from the base. The podomere lengths were actual measurements, but should be regarded more as representative ratios. Leg podomere measurements for each leg are given in the formula: trochanter + femur; tibia; tarsomere 1/2/3/4/5. The following abbreviations are used (see Fig. 1b for thoracic chaetotaxy):

- I, II, III pro-, meso-, metathoracic legs
- T tibia
- F femur
- ac acrostichal bristles
- a-v anteroventral
- dc dorsocentral bristles
- d-v dorsoventral
- hm postpronotal bristles
- np notopleural bristles
- pa postalar bristles
- pm presutural supra-alar bristles
- ppls proepisternal bristles
- sa postsutural supra-alar bristles

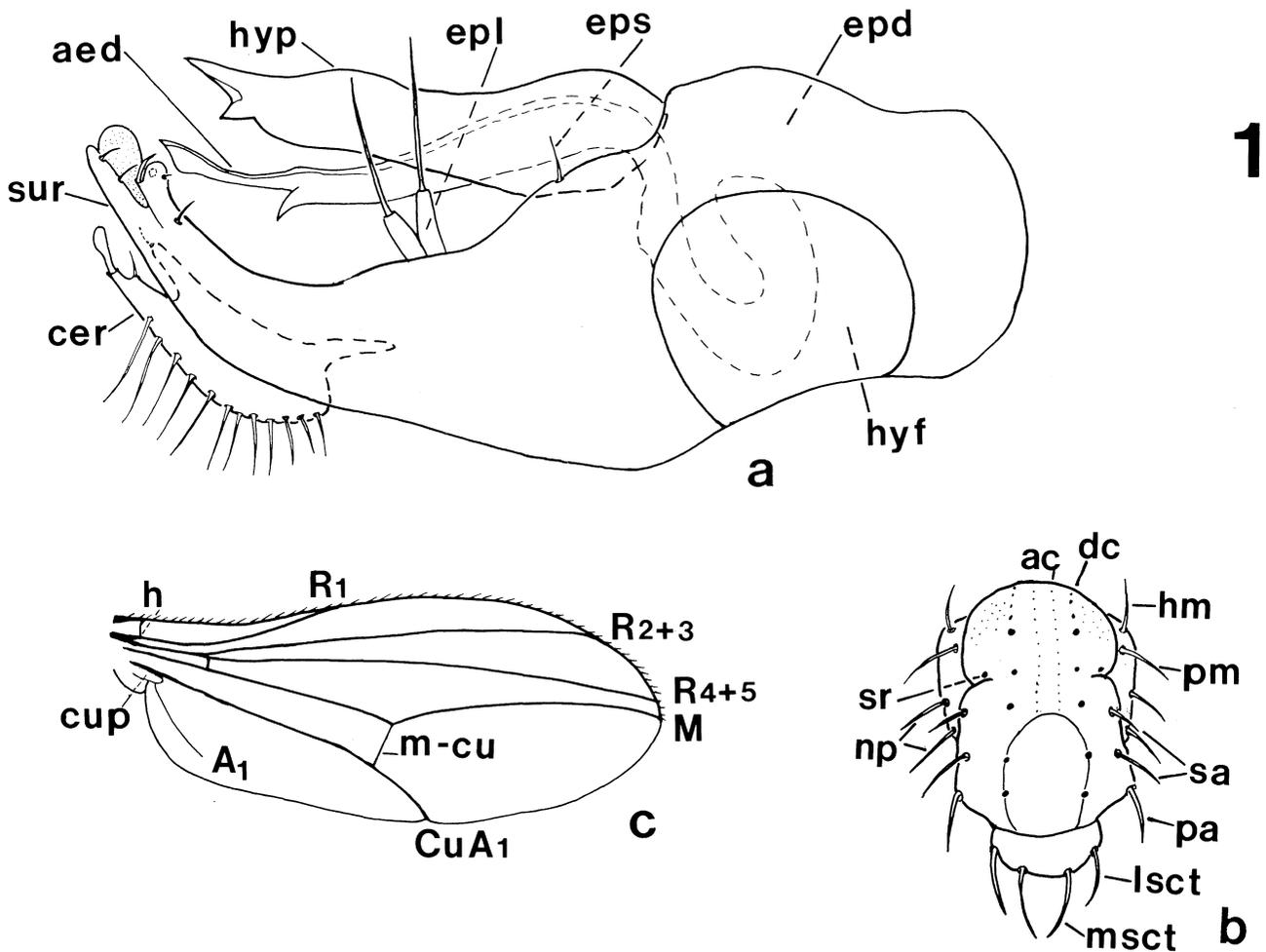


Fig. 1. Morphology of *Medetera* (generalised). a, hypopygium, left lateral: aed, aedeagus; cer, cercus; epd, epandrium; epl, epandrial lobe; eps, epandrial seta; hyf, hypopygial foramen; hyp, hypandrium; sur, surstylus. b, thoracic chaetotaxy, dorsal view: ac, acrostichals; dc, dorsocentrals; hm, postpronotal; lsct, lateral scutellars; msct, median scutellars; np, notopleurals; pa, postalar; pm, presutural supraalars; sa, postsutural supraalars; sr, presutural intraalars. c, wing.

sr presutural intra-alar bristles
 t₁₋₅ tarsomeres 1 to 5
 MSSC Male secondary sexual character(s);
 nongenitalic characters found only on
 male body

The Oriental and Australasian zoogeographic
 regions cover varied landmasses of complex

geographical and political association. I have used the
 term 'Australasian' for the zoogeographical region
 east of Weber's Line, avoiding confusion between the
 use of 'Australian Zoogeographical Region' and
 Australia in the political-geographical sense.
 Localities are listed under modern political
 affiliation and follows the "Guide for Contributors to

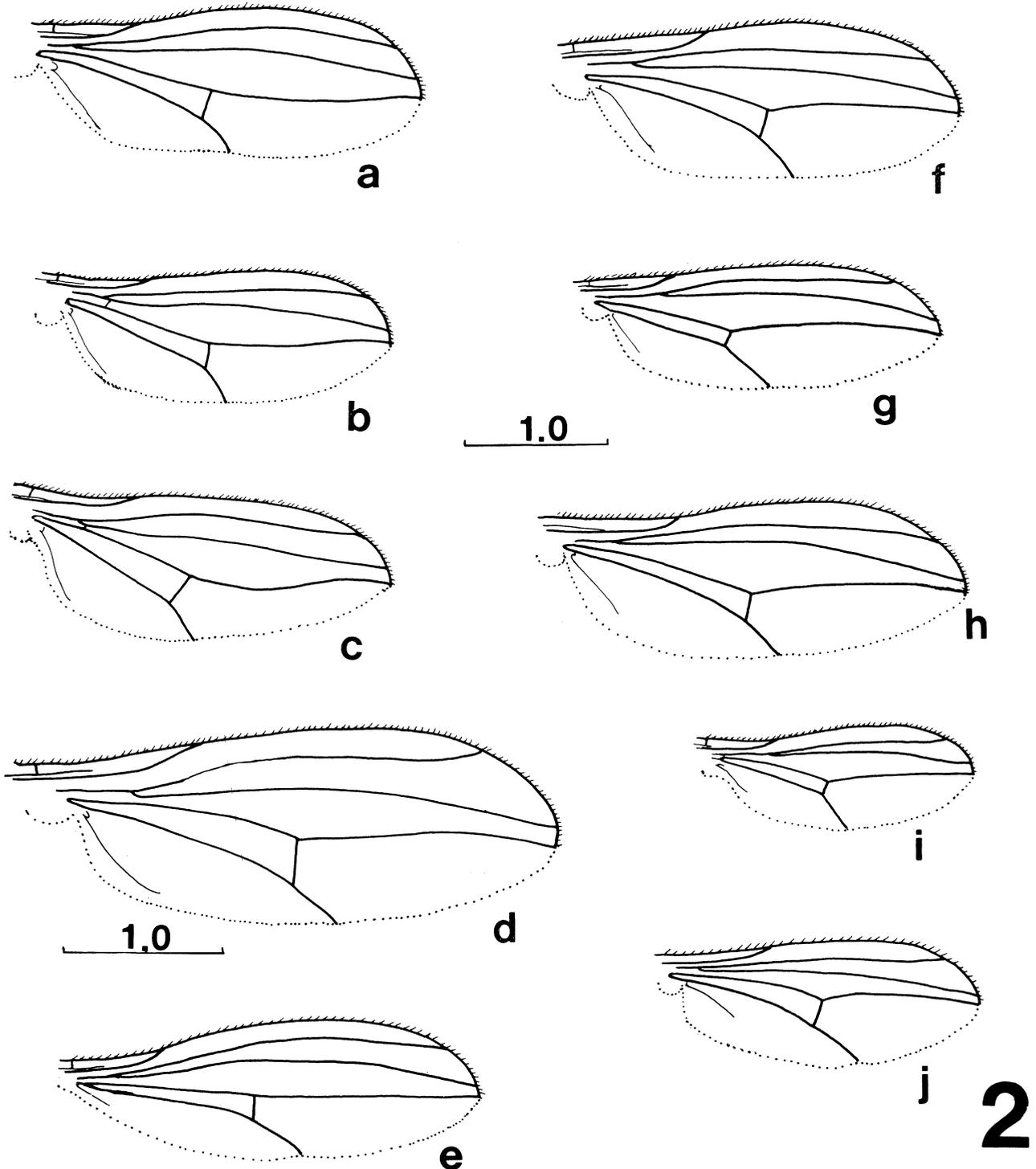


Fig. 2. Right wing, dorsal view: a, *M. femoralis*; b, *M. salomonis*; c, *M. nigrohalterata*; d, *M. himalayensis*; e, *M. gracilis*; f, *M. austroapicalis*; g, *M. flaviscutellum*; h, *M. mosmanensis*; i, *M. minima*; j, *M. platychira*.

the Catalog of Australasian and Oceanian Diptera" (distributed by the Bishop Museum, Honolulu). Thus specimens from the same geographical area might be listed under different headings, for example: Borneo (Indonesia and Malaysia), New Guinea (Indonesia and Papua New Guinea), Samoan Islands (American Samoa and Western Samoa).

Bionomics

Medetera adults characteristically are found in numbers on vertical surfaces such as tree trunks. Here the typical stance of the genus is most evident, the head always facing upwards and the forelegs positioned so that the body is leaning outwards from the surface. If disturbed, they fly directly outwards from the surface and land a short distance away. At other times they run a short way to the side or backwards, without turning, always maintaining the upright position. When flying to a new position on a tree trunk, they generally land diagonally higher, about $\frac{1}{4}$ to $\frac{1}{3}$ the circumference of the trunk with each move. Thus, they tend to spiral up the trunk in progressive steps. On large, smooth-barked eucalypts in Australia, I have observed *Medetera* gradually working their way up a trunk in a spiral fashion until out of sight. *Medetera* often congregate at tree bases and rest there.

The aggregations of *Medetera* on tree trunks serve to facilitate mating and should be regarded as leks, or mating assemblies. Not all trees are equally favored as assembly sites. Smooth-barked trees seem more attractive than trees with rough, gnarled bark. In Australia, for example, smooth barked *Eucalyptus* spp. and *Angophora* spp. are favored in dry and wet sclerophyll forest habitats, while in closed forest, smooth barked palms such as *Archontophoenix cunninghamiana* and other trees are favoured. This is understandable in that individuals would be able to see each other more readily on smooth bark.

In the usual mating sequence, the male approaches the female from behind and arches over the receptive female so that he occupies a position dorsal and posterior to her. He then curls his abdomen forward so that the hypopygium is thrust forward between his legs, with the surstyli and cerci clasping the distal end of the female's abdomen. This sequence of mating behaviour, described in detail by Bickel (1985), has also been observed in Australian *M. griseescens* and *M. nigrohalterata*. The courtship behaviour of those species with obvious male secondary sexual characters, such as flattened foretarsi of the *aberrans* group and *M. killertonensis*, or orientated silvery body pruinosity, is unknown.

Although the larval associations of many holarctic *Medetera* species are fairly well known, almost nothing is known of the immature stages of the Oriental and Australasian species. Most *Medetera* larvae are subcortical predators and live under the bark of dead or dying trees. Species have also been

reared from bracket fungi and decaying cacti, which are extensions of the subcortical environment. The association of *Medetera* with scolytid bark beetle galleries in the Holarctic is well documented. Not only have female *Medetera* been observed to oviposit at gallery entrances, but they are known to utilize bark beetle aggregation pheromones to locate infested trees. The only known larval host association from the Oriental and Australasian regions is that of *M. nigrohalterata* having been reared from grass tree, *Xanthorrhoea* sp. (Xanthorrhoeaceae) in the Australian Capital Territory.

In Australia, *Medetera* appears to be more abundant and diverse in tropical and subtropical closed and wet sclerophyll forests, and less successful in cooler and drier habitats. This reflects a moist tropical origin for the Australian fauna (see Zoogeography). Only one species, *M. nigrohalterata*, is commonly found in the forests of southern and south-western Australia, and I have seen no Tasmanian specimens. In drier habitats, *Medetera* perhaps faces competition from another medeterine genus, *Corindia* (Bickel, 1986a). The two genera belong to the same ecological guild and they utilize tree trunks in a similar manner. *Corindia* is often abundant in dry sclerophyll forest and occurs across monsoonal northern Australia where *Medetera* is rarely found. *Corindia* possibly is able to outcompete *Medetera* in these more xeric habitats.

Taxonomy

Genus *Medetera* Fischer von Waldheim

Medetera Fischer von Waldheim 1819: 7 (as genus). Type species, *Medetera carnivora* Fischer von Waldheim (monotypy) (= *Musca diadema* Linnaeus).

Oligochaetus Mik, 1878: 7 (as genus). Type species, *Medeterus plumbellus* Meigen, 1824 (orig. designation).

Saccopheronta Becker, 1914: 125 (as genus). Type species, *Saccopheronta nudipes* Becker, 1914 (monotypy).

Elongomedetera Hollis, 1964: 26 (as genus). Type species, *Elongomedetera thoracica* Hollis, 1964 (orig. designation).

Asioligochaetus Negrobov, 1966: 877 (as subgenus). Type species, *Oligochaetus vlasovi* Stackelberg, 1937 (orig. designation).

Lorea Negrobov, 1966: 878 (as subgenus). Type species, *Medetera spiniger* Stackelberg, 1937 (orig. designation).

The name *Medetera* was originally used in the feminine although many authors, including de Meijere (1916), have incorrectly used the masculine form, *Medeterus*.

Medetera is the principal genus of the dolichopodid subfamily Medeterinae, which is superficially distinguished from all other dolichopodid subfamilies by the following combination of characters: mesoscutum distinctly flattened posteriorly; femora II and III lacking anterior preapical bristles; antennal scape without dorsal

setae; arista apical; postcranium strongly concave dorsally; vein M unbranched and lacking a flexion in the distal sector; frontoclypeal suture distinct, usually marked by a band of pruinosity; hypopygium large, on elongate peduncle formed by abdominal segment 7; epandrium distally with surstyli, each divided into dorsal and ventral arms; epandrial seta present ventrobasally; pair of epandrial lobes arising distally along ventral margin near base of surstylus, each lobe bearing strong bristle (for further information on the Medeterinae, see Negrobov, 1971–77 and Bickel, 1985). The five included Australian genera, *Medetera*, *Atlaltia*, *Systemus*, *Corindia* and *Thrypticus* are considered in Bickel, 1986a, 1986b, 1986c, and the present work.

Diagnosis. Eyes bare; proboscis usually heavily sclerotized; 2 sa present, posterior stronger and anterior weaker; coxa III with only 1 lateral seta; femur II without posterior subapical seta; wing veins M and R_{4+5} distinctly bowed anteriorly distad of m-cu crossvein, and converging towards wing apex; anal vein usually distinct.

Medetera is a genus of relatively small dolichopodids, 1.2 to 5.0 mm in length, usually dark metallic green to black, the colouration often obscured by waxy grey or brown pruinosity, but sometimes bright metallic green, little obscured by pruinosity. The genus has a distinctive habitus and life stance which, with little practice, is easily recognized by the unaided eye.

Morphological Notes

1. The secondary segmentation and articulation of the male cercus in the *salomonis* group is unique among Brachycera. Here the cercus has been divided into discrete basal and distal sections, with the distal section freely articulated on basal section and folding back on it, not unlike the blade of a pocket knife (Figs 14c–d; 15a, c, e–f). The distal section is often greatly expanded, sometimes with a corresponding reduction of the surstylus.

2. An unusual combination of a weakly sclerotized and unmelanized postabdomen and basal epandrium occurs in three species of the *melanesiana* group: *M. macalpinei*, *M. rtheura* and *M. niuginiensis*. Here the distal half of segment 6, all of segments 7 and 8, and basal portion of epandrium are pale cream and weakly sclerotized, contrasting strongly with the preceding metallic green segments and distal epandrium. This lack of sclerotization and melanization seems to occur in conjunction with a tendency for the hypopygial foramen to become basal in position (see Fig. 6a,f).

3. Prolongation of thorax with increased separation of coxae I and II, prolongation of the legs, and reduction of anal angle (Fig. 2e) are marked tendencies in the *gracilis* group, being best developed in *M. gracilis* itself. These trends show a marked

convergence with the habitus of many ‘stilt-legged flies’ such as Micropezidae. Although nothing is known of the biology of *M. gracilis*, perhaps this species has adopted habits similar to the micropezids, being primarily cursorial and possible ant mimics.

4. Three related high-altitude species from the Himalayas, *M. stomias*, *M. nepalensis* and *M. himalayensis* have relatively long and broad wings, the wing length being distinctly longer than body length (in most *Medetera* species, the wing is shorter than or at most subequal to the body length). This wing prolongation is possibly an adaptation to high altitude conditions. However, the correlation of increased wing length with increased altitude has not been noted in any other insect group. A far more common trend among high altitude flies is the reduction and loss of wings, leading to flightlessness (Mani, 1968).

5. The proboscis is greatly enlarged and projecting in *M. stomias* (Fig. 17f–g).

6. Most members of the *toxopeusi*, *flaviscutellum* and *gracilis* species groups have a yellowish scutellum, posterior mesonotum, and postpronotum, contrasting with the generally darker metallic thoracic colouration. The extent of the yellowish colouration appears to vary intraspecifically among specimens. There appears to be no sharp delimitation between yellowish and metallic areas, since it is possible to detect incipient darkening on yellowish cuticle. The more rubbed, possibly older specimens often appear metallic green with only the scutellum and mesonotal depression retaining a yellowish colour, suggesting increasing melanization of the yellowish areas with age.

7. Male Secondary Sexual Characters (MSSC):

a. Flattened foretarsi. In the *aberrans* group, tarsomeres 2–3 on male leg I are usually flattened and modified (Fig. 3b,e). *Medetera killertonensis* has male leg I tarsomeres 3–5 flattened and black, forming an ovate ‘flag’ (Fig. 12f).

b. Distinctive leg setation is present on males in the *salomonis* group (*M. mooneyensis* and *M. femoralis* with ventral spine-like setae on FII), *flaviscutellum* group (*M. dorrigenis* with ventral dark spine-like setae on FII) and *melanesiana* group (*M. macalpinei* and *M. rtheura* with FIII setae) (Fig. 6e,h).

c. *Medetera wongabelensis* has patches of anterior silvery hairs on the basal $\frac{1}{2}$ to $\frac{2}{3}$ of each tarsomere 1–3 on leg I, giving appearance of 3 silvery patches separated by darker integument.

8. Orientated silvery pruinosity:

a. In the *gracilis* group and on *M. pumila* (*apicalis* group) patches of orientated pruinosity are present on the thorax, legs, abdomen of both sexes (Fig. 11b), appearing grey in lateral view but bright silvery when viewed from between an angle of 0–45 degrees either side of the median sagittal plane.

b. In the *salomonis* group, only male *M. austrofemoralis* have orientated silvery pruinosity on the pleura and legs II and III (MSSC) while in *M.*

femoralis, both male and female have a similar orientated pruinosity.

Some female *Medetera* species show apparently male secondary sexual characters (e.g., orientated silvery pruinosity, noted above, and distinctive leg

setation of female *M. dorrigenis*). This might reflect a secondary (and sometimes weaker) expression in females of what was originally only a male character.

Key to Males of Oriental and Australasian *Medetera*
(excluding *M. adsumpta* Becker and *M. nudicoxa* Becker)

1. Tibia longer than femur on all legs; abdominal segment 7, the hypopygial peduncle, twice as long as segment 6 (Fig. 20d); 3 strong dc, decreasing anteriorly (SE Asia) *M. longa*
- At least FI longer than TI; hypopygial peduncle usually short, not much longer than segment 6; dc various 2
2. Mesonotum bright metallic green or blue-violet, with little pruinosity; distal section of vein M close and subparallel to R_{4+5} (Fig. 2j); FII and/or FIII with strong, usually pale anterior and anteroventral setae; dorsal arm surstylus prolonged, with ventral arm reduced to subtending lobe or lost; male TIII with black apical tooth which is received into excavation on IIIIt₁ (*aberrans* and *melanesiana* groups) 3
- Mesonotum dark metallic green or black, or with posterior mesoscutum and scutellum brownish, and usually with dense pruinosity; wing veins various (Fig. 2a–i); FII and FIII with normal vestiture; dorsal and ventral surstylar arms usually subequal; male TIII normal 13
3. Face and clypeus coriaceous blue-green, obscured by pruinosity; antenna usually with yellowish segments; tarsomeres 2–3 of male leg I often flattened; epandrium cylindrical; hypopygial foramen always left dorsal in position (*aberrans* group) 4
- Face and clypeus shining blue-violet, with no pruinosity; antenna black; male leg I normal; epandrium dorsoventrally flattened; hypopygial foramen usually basal in position (*melanesiana* group) 8
4. Cercus with distinct elongate ventrolateral digitiform projection 5
- Cercus lacking ventrolateral digitiform projection 7
5. Dorsal surstylar arm greatly expanded and rounded apically, clavate (Fig. 4a) (Philippines) *M. luzonensis*
- Dorsal surstylar arm parallel-sided 6
6. Apex of surstylus with branched modified seta; tarsomeres 2–3 on leg I flattened and ventrally concave (Fig. 3b); ventrolateral cercal projection relatively short (Fig. 3a) (widespread Oriental) *M. platychira*
- Apex of surstylus with normal setae only; tarsomeres 2–3 on leg I only slightly flattened; ventrolateral cercal projection long and stout (Fig. 3c) (Philippines) *M. mindanensis*
7. Cercus blunt, distally upturned; dorsal surstylar arm reduced to small thumblike projection on ventral arm (Fig. 3d–e); tarsomere 3 only of leg I expanded, with apical curved projection (Fig. 3f); thoracic setae black (New Guinea) *M. gomwa*
- Cercus boat-shaped, with strong ventral margin and curved subapical setae; surstylus elongate, ribbon-like (Fig. 4b); (leg I missing on specimen); thoracic setae yellow (Borneo) *M. maai*

8. Coxa I and basal $\frac{2}{3}$ of femur I dark brown; thorax shining metallic blue violet; thoracic setae black 9
- Coxa I and all femora at least partially yellow; thorax usually metallic green or blue-green; thoracic setae yellowish 10
9. Abdomen entirely dark metallic green; aedeagus lacking internal appendix; pedicels of epandrial lobes weakly developed but present; ventral surstylar arm present as stub; dorsal surstylar arm not capitate (Fig. 5a–b) (New Guinea) *M. morobensis*
- Abdomen often with distal half of segment 6, all of segments 7 and 8, and basal portion of epandrium pale cream colour and weakly sclerotized, contrasting with metallic green of anterior segments; aedeagus with internal appendix; pedicels of epandrial lobes absent; surstylus strongly curved and relatively short, and capitate (Fig. 5d) (New Guinea) *M. niuginiensis*
10. Abdomen with distal half of segment 6, all of segments 7 and 8, and basal portion of epandrium pale cream and weakly sclerotized, contrasting with metallic green of anterior segments; hypopygial foramen basal, only slightly left lateral in position 11
- Abdomen entirely metallic green; hypopygial foramen left dorsolateral 12
11. FIII with long anteroventral setae (Fig. 6e); surstylus relatively short, with capitate arm; epandrium basally truncate (Fig. 6a–d) (New Guinea, Queensland) *M. macalpinei*
- FIII ventrally with long pale ventral seta at $\frac{1}{4}$, about as long as entire femur (Fig. 6h); surstylus prolonged and narrow, with arms arched medianly; epandrium basally bent, elongate (Fig. 6f–g) (New Guinea) *M. rhetheura*
12. Aedeagus with internal appendix; surstylus curved, with distinctive ventral striated projection and various strong curved apical setae (Fig. 5e). (Melanesia, northern Queensland) *M. melanesiana*
- Aedeagus lacking internal appendix; surstylus short, rounded, capitate (Fig. 5c)(New Guinea) *M. kokodensis*
13. 4–6 strong dc present, decreasing in size anteriorly 14
- Only 2 strong dc present, bordering mesoscutal depression, strongly contrasting with anterior short setulae 31
14. Cercus divided into articulating basal and distal sections, with distal cercus often expanded; vein M bowed posteriorly (Fig. 2a–c); TIII with strong subapical dorsal seta; scape and pedicel usually yellowish (*salomonis* group, part) 15
- Cercus undivided; vein M usually bowed anteriorly (Fig. 2d–i); antenna colour various 18
15. Legs black; aedeagus recurved within epandrium, and with dorsoapical triangular projections; surstylus broad; distal section of cercus curved with apical cuticular projections, and with strong ventrobasal curved seta and midventral blade-like projection (Fig. 14d)(Malaya) *M. malayensis*
- At least tibiae yellowish; aedeagus not recurved within epandrium, and simple distally; other hypopygial features variable 16
16. Pleura and coxa I with dense silvery orientated pruinosity; FI with long black pv setae; FII with row of 7–8 black spine-like ventral setae; wing membrane milky; M almost straight, gradually approaching R_{4+5} (Fig. 2a); surstylus as curved tapering arm; distal cercus greatly expanded with strong ventral seta (Fig. 15e) (New Guinea) *M. femoralis*
- Pleura and coxa I without silvery pruinosity; legs without distinctive setation; wing membrane hyaline; venation and details of hypopygium otherwise 17

17. M and R₄₊₅ somewhat bowed (Fig. 2b); epandrial lobes subequal; side lamella present along ventrolateral wall of genital chamber; surstylus curved and broad; distal cercus with ventrobasal triangular structure, midventral lobe, and 2 outer elongate finger-like projections (Fig. 15a–b) (widespread Australasia, Philippines) *M. salomonis*
- M almost straight, gradually approaching R₄₊₅ (as in Fig. 2a); distal epandrial lobe larger than basal lobe, with stout, elongate pedicel and strong bristle, (Fig. 15c–d); surstylus twisted and curved, ribbon-like; distal cercus greatly expanded with large lobate basal portion and narrow outer arm (Melanesia, Queensland) *M. pseudofemoralis*
18. With 5–6 strong dc, decreasing in size anteriorly 19
- With only 4 strong dc, decreasing in size anteriorly, with the anteriormost strong dc (usually at level of mesoscutal suture) at least 3 times as long as anterior short setulae 20
19. Scape and pedicel yellow; cercus massive, hemispheroidal in dorsal view, without apical blade-like setae; epandrial lobes separate large cylindrical bases, positioned laterad of each other (Fig. 19a–b); lower calypter yellow with dark brown rim (Sabah) *M. kinabaluensis*
- Antenna black; cercus relatively short, with 2 strong apical blade-like setae; epandrial seta strong, arising from short pedicel (Fig. 14a); lower calypter entirely yellow (south-east Asia to New Guinea) *M. olivacea*
20. Aedeagus in ventral view with subapical anchor-shaped apical hooks; epandrial seta very long, longer than bristles of epandrial lobes; surstylus with 2 very long dorsal setae; cercus short and blunt (Fig. 20a)(Burma) *M. malaisei*
- Aedeagus tapering; epandrial seta never longer than bristles of epandrial lobes; cercus with apical blade-like setae 21
21. Male basitarsus III with distinct basal anteroventral tooth; hypopygium pyriform, inflated basally; epandrial lobes with bases almost completely fused, forming an elongate collar from which the two bristles arise; hypandrium and aedeagus elongate, narrow, epandrial seta absent (*diadema-velis* group) 22
- Male basitarsus III without tooth; hypopygium subrectangular; epandrial lobes with bases distinct and separated; hypandrium subrectangular, often basally clasping aedeagus and held out at angle from hypopygium; epandrial seta present (*apicalis* group) 23
22. Lateral scutellars reduced to weak hairs; clypeus dark green to blackish; body length less than 2.0; thorax with 3 brown vittae; dorsoapical blade-like seta tapering with smooth external margin (Fig. 18a)(SE Asia) *M. opaca*
- Lateral scutellars about $\frac{2}{3}$ length of median ones; clypeus satiny metallic blue-green; body length greater than 2.5; thorax with 3 bronze vittae; dorsoapical blade-like seta with weak internal tooth and serrated external margin (Fig. 18b–c) (widespread, common) *M. grisescens*
23. Wing distinctly longer than body (Nepal) 24
- Wing shorter than or at most subequal to body length 26
24. Proboscis greatly enlarged, almost as long as eye height, and sometimes drawn up flap-like (Fig. 17f–g); cercus stout and curved, without apical blade-like seta; face dark brown with blue reflections; wing membrane hyaline (Fig. 17e) . . . *M. stomias*
- Proboscis normal, much shorter than eye height; cercus with dorsoapical blade-like seta; face metallic blue-violet; wing membrane milky, with contrasting dark brown veins 25
25. Epandrial seta on mound; epandrial lobes with distinct collar-like bases; short setulae present along ventral margin of epandrium between epandrial seta and

- epandrial lobes; ventral surstylar arm with simple curved seta; cercus with short blade-like seta and long digitiform projection (Fig. 17c–d). *M. himalayensis*
- Epandrial seta on flat epandrial margin; epandrial lobes arise from epandrial margin without collar-like bases; ventral epandrial margin bare; ventral surstylar arm with flattened frayed seta; cercus with elongate curved apical seta and ventral costate blade-like seta (Figs 17a–b) *M. nepalensis*
26. Tarsomere 2 distinctly longer than adjacent tarsomere 1 on all legs (Fig. 16b) (Indonesia) *M. longitarsis*
- At least on legs I and II, tarsomere 1 greater than or subequal to tarsomere 2 on all legs 27
27. Thoracic setae yellow; size small, length < 2.0; face polished green-violet; coxae I and II with bright silvery pruinosity; distal ¼ of hypandrium weakly sclerotized (Fig. 17h) (Oriental) *M. pumila*
- Thoracic setae black; length > 2.0; face with grey pruinosity; coxae without silvery pruinosity; hypandrium equally sclerotized along entire length 28
28. Surstylus expanded dorsally, with cuticular striae; cercus with strong, curved blade-like dorsoapical seta, subtended ventrally by 2 blade-like setae, curled pedunculate seta, and longer straight pedunculate seta; scape and pedicel yellow; epandrial seta strong and midway between epandrial lobe and base of hypandrium (Fig. 16d)(Sri Lanka) *M. chandleri*
- Surstylus more or less parallel-sided; cercus without curled pedunculate seta, and longer straight pedunculate seta; scape and pedicel various; epandrial seta various 29
29. Scape and pedicel usually yellow, although sometimes strongly infuscated; cercus with thin, curved dorsoapical seta on short cuticular peduncle; cercus with lateral leaf-shaped seta (Fig. 16e)(widespread) *M. austroapicalis*
- Scape and pedicel always dark brown; cercus with flattened, curved blade like dorsoapical seta 30
30. Segment 7 (hypopygial peduncle) relatively long, about equal to length of epandrium; epandrial seta near base of hypandrium; cercus with apical bladelike seta subtended by subrectangular cuticular projection bearing short apical seta (Fig. 16a)(Philippines) *M. liwo*
- Segment 7 not much longer than segment 6 or about half length of epandrium; epandrial seta near surstylar lobes; cercus with apical blade-like seta subtended by 2 short rounded setae as in Fig. 16b; (Fig. 16c)(Indonesia) *M. apicipes*
31. Cercus divided into articulating basal and distal sections; vein M bowed posteriorly (Fig. 2a–c); antenna black; TIII with strong subapical dorsal seta; coxae, femora and tibiae dark brown to black (*salomonis* group, part, Australia) 32
- Cercus undivided; vein M usually bowed anteriorly (Fig. 2d–i); antenna and leg colour various 34
32. Haltere distinctly dark brown to black; lower calypter yellow with brown rim; M slightly flexed just before apex (Fig. 2c); hypandrium with subapical ventral denticles; surstylus curved and with strong ventral seta; distal cercus with ventral rectangular projection basally, clavate distal arm, and expanded midsection (Fig. 14c) *M. nigrohalterata*
- Haltere and lower calypter entirely yellow; hypandrium with ventral surface bare; surstylus and cercus otherwise 33
33. FII with row of black spine-like setae along entire ventral margin; legs and pleura with grey pruinosity; distalmost epandrial lobe twice as long as proximal lobe but of similar strength; surstylus with ventral costate seta; distal cercus cap-like, with strong, striated, curved dorsoapical seta (Fig. 14b) *M. mooneyensis*

- FII without spines; pleura, anterior femora and tibiae I and II covered with dense silvery orientated pruinosity; distal epandrial lobe much longer and wider than proximal lobe; surstylus U-shaped; distal cercus elongate, curved, and divided into 3 elongate overlapping sections (Fig. 15f) (Queensland) . *M. austrofemoralis*
34. Wing with reduced anal angle (Fig. 2e); ac reduced to absent; face shining metallic blue-violet; lateral scutellars reduced to weak hairs; coxae I, legs mostly yellow; silvery pruinose patches often present on bodies (Fig. 11b) (south-east Asia) (*gracilis* group) 35
- Wing with distinct anal angle; ac present, short; face usually with pruinosity; lateral scutellars and leg colour various; bodies without silvery pruinose patches 38
35. Scape and pedicel yellow; It_2 shorter than It_1 ; central surstylar arm distally curved; ventral surstylar arm with digitiform seta; cercus with distinctive ventral pedunculate expanded seta (Fig. 11d) *M. borneensis*
- Antenna entirely brown; $It_2 > It_1$; surstylus otherwise; cercus lacking with distinctive ventral expanded seta; silvery pruinose patches present on thorax, coxae and abdomen 36
36. Thorax elongate, length more than twice width; length $t_2 > t_1$ on all legs; anal angle highly reduced; distal epandrial lobe with pedicel twice as long as that of basal lobe; surstylus clavate, dorsal surstylar arm with distinctive, stout branched seta (Fig. 11e) *M. gracilis*
- Thoracic length not more than $1\frac{1}{2}$ width; length $t_2 > t_1$ on I and III only; anal angle not so strongly reduced; surstylus only slightly expanded distally 37
37. Distal epandrial lobe pedicel much longer than that of basal lobe; cercus with 2 distinctive ventral setae: stout triangular apical seta and narrower tapering blade-like seta at $\frac{2}{3}$ (Fig. 11a) *M. sandakanensis*
- Pedicels of epandrial lobes subequal in length; cercus rather stout, with 2 distinctive ventral setae: blade-like apical seta and hatchet-shaped seta at $\frac{2}{3}$ (Fig. 11c) *M. penangensis*
38. Aedeagus strongly recurved within epandrium, often reaching base of epandrium before curving back (Figs 8–10) (*australiana* + *toxopeusi* groups) 39
- Aedeagus not recurved within epandrium, but bent at right angle after entering epandrium 49
39. Cercus with distinctive pilose capitate ventral knob; lower calypter yellow with dark brown rim; length 1.6 or less; antenna black (Fig. 10a–b) (south east Asia) . . . *M. vivida*
- Cercus without pilose capitate ventral knob, but with various projections; lower calypter usually entirely yellow; length usually > 2.0 ; antenna various 40
40. Antenna entirely black; lateral scutellars about $\frac{3}{4}$ length of medians; arista about as long as head height; bristle of distal epandrial lobe simple or forked; cercus without apical setal projections and without ventral projections (*australiana* group) (Australia) 41
- Scape and pedicel yellow; lateral scutellars less than $\frac{1}{2}$ length of medians; arista usually longer than twice head height; bristle of distal epandrial lobe often with numerous hair-like branches; cercus usually with apical modified setal projections and often with ventral lobate projection (*toxopeusi* group) 44
41. Lower calypter entirely pale; coxae and basal $\frac{2}{3}$ of femora with bright silvery pruinosity; distance between epandrial lobes much less than distance between basal epandrial lobe and epandrial seta 42
- Lower calypter pale with distinct brown rim; coxae and femora with grey pruinosity; distance between epandrial lobes greater than distance between basal epandrial lobe and epandrial seta 43

42. Male tarsus I with distinct silvery hairs on basal $\frac{1}{2}$ to $\frac{2}{3}$ of It_1 , It_2 and It_3 ; cercus tapering; bristle of distal epandrial lobe forked; dorsal surstylar arm with subapical branched seta (Fig. 8b) *M. wongabelensis*
 — Male tarsus I with pale hairs only; cercus blunt; bristle of distal epandrial lobe simple; surstylar setae as figured (Fig. 8d) *M. queenslandensis*
43. Tibiae yellowish; cercus elongate, tapering; ventral surstylus with striated seta; dorsal surstylar arm elongate with ventral subapical setae as figured (Fig. 8a) *M. mosmanensis*
 — Tibiae dark brown to black; cercus stouter, apically curved; surstylus relatively short, with dorsal arm clavate (Fig. 8c) *M. australiana*
44. Thorax dark metallic green; coxae, basal femora brown 45
 — Thorax metallic green with scutellum, posterior mesoscutum and humeral area yellow-brown; coxa I and all femora yellow 46
45. Surstylus not deeply cleft; cercus with short apical setae; bristle of distal epandrial lobe branched; dorsal surstylar arm curved and capitate (Fig. 9e) (New Guinea) *M. irianensis*
 — Surstylus deeply cleft; cercus blunt apically with medioapical curved bladeliike seta and with weak ventral mound which bears 4 setae; bristle of distal epandrial lobe unbranched (Fig. 10c–e) (New Guinea) *M. gressitti*
46. Cercus with long thin apical seta; cercus without distinct ventral projection (Fig. 9d) (New Guinea) *M. papuensis*
 — Cercus with apical blade-like seta; cercus with distinct midventral setose projection 47
47. Distal cercus not greatly expanded, but with large blade-like seta; dorsal surstylar arm with apical spatulate seta (Fig. 9a) (New Guinea, Solomons) *M. cheesmanae*
 — Distal cercus greatly expanded, with setae as figured (Fig. 9b); dorsal surstylar arm without apical spatulate seta 48
48. Ventral surstylar arm with deep V-shaped cleft; dorsal surstylar arm subequal to ventral arm, and with apical setae (Fig. 9c) (New Guinea) *M. toxopeusi*
 — Ventral surstylar arm not so deeply cleft; dorsal surstylar arm longer than ventral arm, and with strong dorsal seta (Fig. 9b) (New Guinea) *M. waris*
49. Small, length 1.8 or less; antenna black 50
 — Larger, length ' 2.5; scape and pedicel yellowish 52
50. Cercus without distinct ventral projection, but blunt, with 3 distinct apical blade-like setae; (Fig. 20e) (south-east Asia to Solomons, Queensland) *M. minima*
 — Cercus with distinct ventral knob or projection 51
51. Posterior half of mesonotum brownish; basal half of femora brown; pedicel of distal epandrial lobe twice as long as that of basal lobe; cercus with thin, curved apical seta, and with tapering ventral projection which bears strong apical seta and 3 weaker proximal setae (south-east Asia) (Fig. 7b) *M. bishopae*
 — Mesonotum dark metallic blue-black; femora entirely yellow; distal and proximal epandrial lobes subequal; cercus with curved blade-like apical seta, and with capitate ventral projection which bears 4 subequal setae (Fig. 7a) (Nepal) *M. chillcotti*
52. Scutellum and posterior mesoscutum green, without evidence of yellow colouration 53
 — Scutellum and posterior mesoscutum at least partially yellow-brown in colour 54

53. Ventral surstylar arm striated with subapical setal flag and very long seta projecting from adjacent arm; cercus thin basally, with midventral lobe and thin dorsoapical seta (Fig. 13f) (eastern Australia) *M. gingra*
 — Dorsal surstylar arm with distinctive strong cuticular hook; cercus with 2 strong ventral projections as figured (Fig. 13g) (Queensland) *M. bunyensis*
54. Surstylus divided into 3 arms, with distinctive basoventral triangular arm; zone of weakness evident at join between surstylus and epandrium 55
 — Surstylus without basoventral triangular arm; surstylus usually solidly fused to epandrium 56
55. Male tarsomeres 3–5 on leg I flattened, black, ovate (Fig. 12f); coxa I brown; lower calypter entirely pale yellow; lateral scutellars reduced to weak hairs; epandrial seta very short, not close to epandrial lobes; dorsal surstylar arm with single apical seta (Fig. 12d–e) (New Guinea) *M. killertonensis*
 — Male tarsus I not flattened; coxa I yellow; lower calypter pale yellow with dark brown rim; lateral scutellars about ½ length of medians; epandrial seta very short, close to epandrial lobes; dorsal surstylar arm with strong median cuticular hook and with apical seta (Fig. 12c) (New Guinea) *M. flaviscutellum*
56. Hypandrium with pair of lateral projections arising basally (Fig. 12b); cercus with distinctive set of apical setae including elongate outer seta and leaf shaped inner seta (Fig. 12a) (Queensland) *M. athertonensis*
 — Hypandrium without lateral projections (e.g. Fig. 13b); cercus various 57
57. Epandrial lobes strongly diverging and bearing bristles of similar length; dorsal surstylar arm curved, ribbon-like, with strong lateral side seta (Fig. 12g) (Philippines) *M. philippinensis*
 — Epandrial lobes subparallel and with bristle of proximal lobe longer than that of distal lobe; dorsal surstylar arm massive, distinctly bent 58
58. FII with 6–7 dark, spine-like ventral setae distally (Fig. 13c); FIII with long pale a-v setae along entire length; ventral surstylar arm with blade-like seta on subtriangular mound; outer strong cercal seta not pedunculate (Fig. 13a–b) (New South Wales) *M. dorrigenis*
 — FII with only weak pale hairs ventrally; FIII with only short setae; dorsal surstylar arm strongly developed dorsoapically, and with stout projecting seta; outer strong cercal seta on peduncle (Fig. 13e) (eastern Australia) *M. uda*

The *aberrans* and *melanesiana* Groups

The *aberrans* and *melanesiana* groups share the following features: body colouration bright metallic blue-green to blue-violet, with only thin dusting of pruinosity; dorsal postcranium strongly concave; proboscis relatively small; Ac well developed; Dc strong, prominent, usually 4–5 present; two strong sa present; lateral scutellars well developed, about ¾ length of medians; FIII and sometimes FII in both sexes with 2–5 strong anterior setae; TIII with black, apical tooth-like projection which is received into excavation on III_{t1} (on only Oriental and Australasian *aberrans* group and all *melanesiana* group) (MSSC); wing venation distinctive: M not strongly arched, but lies almost subparallel to R₄₊₅ (similar to Fig. 2j); hypandrium arising from approximately halfway along ventral margin;

epandrial lobes separate and positioned distad on epandrium, with marked tendency to lose collar-like pedicels, such that the bristles appear to rise directly from ventral margin of epandrium; epandrial seta closer to epandrial lobes than to base of hypandrium; dorsal surstylar arm extending well beyond ventral surstylar arm and often apically expanded; ventral surstylar arm often reduced to seta-bearing mound (apomorphy); cercus with elongate ventrolateral arm, separated by a deep furrow from the more dorsobasal portion (apomorphy).

The *aberrans* and *melanesiana* groups are closely related and the *melanesiana* group appears to have been derived from the *aberrans* group.

The *aberrans* group is characterized by the following features: antenna often yellowish; face and clypeus often with pruinosity; male leg I usually with t₂₊₃ flattened and modified (MSSC) (apomorphy);

male TIII with group of pale dorsal subapical setae (MSSC); male postabdomen always strongly melanized and sclerotized; epandrium cylindrical, not strongly flattened; cerci free, not medially fused; hypopygial foramen always left dorsolateral in position.

The *aberrans* group is found in the Nearctic, Neotropical, Oriental and Australasian zoogeographic regions but is particularly diverse in the New World tropics (Bickel, 1985). The five species considered below represent a disjunct or vicariant distribution from the major New World radiation (Fig. 22). There is little doubt that the *aberrans* group is monophyletic, since the hypopygial form, general habitus and colouration, and flattened male foretarsomeres are distinctive for the group. The Oriental *Medetera platychira*, considered below, is strikingly similar to the eastern nearctic *M. aberrans* (see figures in Bickel, 1985). For further discussion, see Zoogeography.

Of the five species considered below, *Medetera platychira*, *M. maai*, *M. luzonensis* and *M. mindanensis* are found in the Oriental tropics, while *M. gomwa* is from New Guinea. Most of the specimens were collected from rainforest habitats.

The *melanesiana* group is characterized by the following features: antenna black; face and clypeus usually shiny metallic blue-violet; male leg I normal, without flattened tarsomeres; male femur III with rows of long anterior and anteroventral setae; tendency in some species for the distal half of abdominal segment 6, all of segments 7 and 8, and basal portion of epandrium to be pale cream and weakly sclerotized, in contrast with metallic green of anterior segments (MSSC); tendency for hypopygial foramen to become dorsobasal in position (apomorphy); epandrium strongly flattened dorsoventrally (apomorphy); only single (dorsal) surstylar arm present, and tending towards prolongation (apomorphy) (ventral surstylar arm totally absent or present only as seta-bearing mound); surstylus fused to epandrium, without evidence of suture; aedeagus sometimes with internal appendix; cerci fused medially (apomorphy).

The *melanesiana* group is confined entirely to the Australasian region, from New Guinea to the Solomons and Queensland, and includes 6 species: *M. morobensis*, *M. niuginiensis*, *M. macalpinei*, *M. rhetheura*, *M. melanesiana* and *M. kokodensis*. The tendency for prolongation of the surstylus and for abdominal segments 6, 7 and 8, and basal portion of epandrium to become pale cream and weakly sclerotized is most marked in *M. rhetheura*.

The *aberrans* Group

Medetera platychira de Meijere

Medeterus platychirus de Meijere, 1916: 261.

Type material. *Medetera platychira* was described from a

syntype series of 6♂♂ and 3♀♀ taken in Java. I have designated a male, bearing the label "Batavia/ i-1907/ Jacobson", as lectotype (ZMUA, examined). A female from Malaya bearing a Parent holotype label with the name "*Medetera luteinervis*" (BMNH) represents an unpublished manuscript name and is identical in all respects with females of *M. platychira*.

Additional material. **Hong Kong:** Taipohau, Kowloon, Sheng Shui District, 15 June to 24 Sept 1965 (BPBM). **Indonesia:** Sumatra, Anai Kloof, 500 m, 1926 (BMNH). **Malaysia:** Sarawak: Sandong, Kampong, Tapuh, 300–400 m, 4–9 July 1958; Nanga Pelagus, near Kapit, 180–585 m, 7–14 Aug 1958; Pueh Lundu District, Kampong, 690–1500 m, 6–12 June 1958. Sabah: Ranau, 500 m, 28 Sept to 7 Oct 1958; Liawa, 15 Jan 1959; Tawa Residency, Kalabakan River, Tawau, 9–18 Nov 1958 (all BPBM). West Malaysia: Cameron Highlands, Mt Bricchang, 5 Jan 1959 (BPBM); Perak Batang Padang, 360 m, 8 March 1925; Selangor Bukit Kutu, 10 Jan 1973 (BMNH). **Nepal:** (♀♀ only) Lothar, near Birganj, 135 m, 11 Sept 1967 (CNC). **Philippines:** Luzon, Mt Montalban, 150–200 m, 14 March 1965; Mindanao, Agusam, S. Francisco, 14 Nov 1959; Misamis Or, Balason, 4–5 April 1960 (all BPBM). **Sri Lanka:** Kandy District, Perideniya Mahawali River, 23 Feb 1974 (BMNH); Kohuwala W.P., 31 Nov 1966 (CNC). **Taiwan:** Taihorin, July 1917 (ZMH). **Thailand:** Chiangmai Province, Doi Suthep, 3 April 1958 (BPBM). 38♂♂, 28♀♀ specimens examined. In addition, Becker (1922) recorded this species from Bangladesh and West Bengal, India.

Description. Male: length 2.5–2.8; wing dimensions 2.7 x 1.0.

HEAD: vertex, frons, face, clypeus dark metallic bluegreen, with some grey pruinosity; proboscis dark brown; scape and pedicel dark brown; 1st flagellomere yellowish; arista about as long as head height.

THORAX: dorsum metallic green with dusting of silvery pruinosity; pleura covered with dense silvery pruinosity; setae black, and strongly developed; 10–12 pairs ac, increasing in length posteriorly, length of posteriormost 1½ times longer than width of ac band; 4 strong dc present, decreasing anteriorly, with 7–8 short setulae anteriormost.

LEGS: coxae, trochanters and basal ⅔ of femora dark brown, remainder of legs yellow; relative podomere ratios as I: 1.5; 1.4; 0.7/0.4/0.3/0.2/0.2; It_{2-3} flattened and ventrally concave (Fig. 3b) (MSSC); \bar{II} : 1.9; 1.4; 0.9/0.4/0.3/0.2/0.2; TII with strong subapical ventral seta; III: 2.4; 2.5; 0.6/0.9/0.7/0.4/0.2.

WING: M not strongly arched, but almost subparallel with R_{4+5} (Fig. 2j); CuAx ratio 0.6; lower calypter yellow with fan of yellowish setae; haltere yellow.

ABDOMEN: bright metallic green with dusting of grey pruinosity and with short pale setulae; segment 7 not greatly elongated; hypopygium dark brown with yellowish cerci (Fig. 3a); epandrium elongate, oblong, with hypandrium arising from beyond midventral position; hypandrium simple, relatively short; aedeagus simple, with sharp dorsoapical projections; epandrial seta weak, positioned near epandrial lobes;

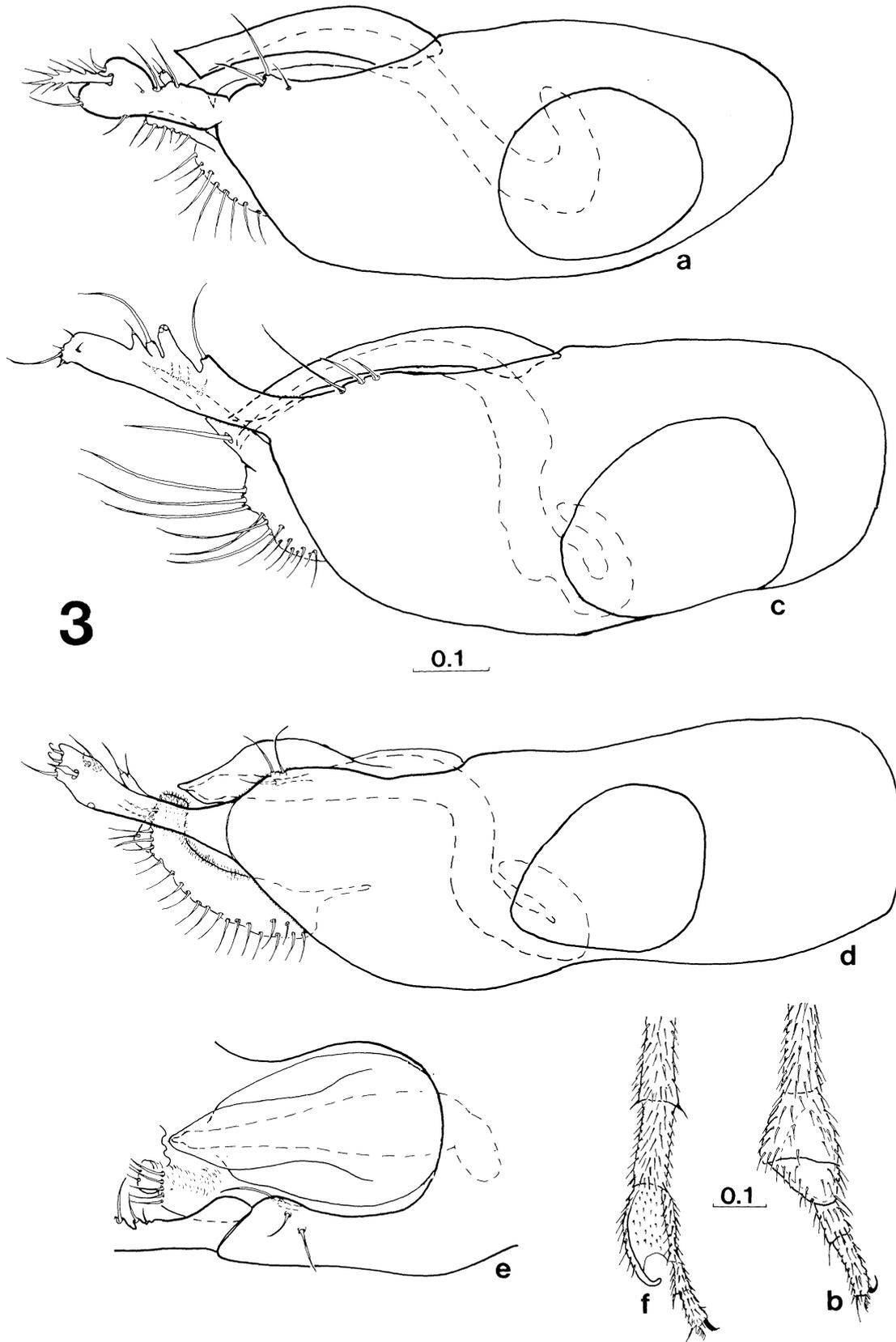


Fig. 3. a-b, *M. platychira*, Java; a, hypopygium, left lateral view; b, male left tarsus I, dorsoposterior view. c, *M. mindanensis*, Mindanao; hypopygium, left lateral view. d-f, *M. gomwa*, Fergusson Island, Papua New Guinea; d, hypopygium, left lateral view; e, left hypopygium, dorsal view; f, male left tarsus I, dorsal view.

basal epandrial lobe with distinct collar-like pedicel, but distal lobe with bristle only, lacking pedicel; surstylus relatively short, fused to epandrium, join marked by dorsal and ventral indentations; ventral surstylar arm as short projection arising from dorsal arm; dorsal surstylar arm somewhat expanded distally, bearing distinctive branched seta and other setae as figured; cercus rounded basally and separated by furrow from distal arm-like projection.

Female: similar to male except lacking MSSC.

Remarks. *Medetera platychira* is widely distributed across the Oriental region, in an area bounded by Sri Lanka, lowland Nepal, southern China, the Philippines and eastern Indonesia (Fig. 22). The branched surstylar seta varies somewhat among specimens. This species bears a close resemblance to the nearctic *M. aberrans*.

Medetera mindanensis n. sp.

Type material. HOLOTYPE ♂: **Philippines:** Mindanao, Lanao, Butig Mtns, 24 km north-east of Butig, 1080 m, light trap in rainforest, 20 June 1958, H. E. Milliron (BPBM).

Other material. Possible ♀: **Philippines:** Camarine Sur, Mt Isarog, 20 km east of Naga, 500–600 m, 7 April 1963 (BPBM).

Description. Male: length 2.7; wing dimensions, width 2.6 x 1.0; similar to *M. platychira* except as noted.

THORAX: dorsum metallic green with brownish pruinosity.

LEGS: colouration, relative podomere ratios and setation similar except as noted: It_2 only slightly expanded apically; It_3 distinctly widened and flattened, at least twice as wide as It_4 (MSSC).

WING: CuAx ratio 0.7; lower calypter yellow with fan of black setae.

ABDOMEN: dark metallic green with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 3c); epandrium oblong, subrectangular; hypandrium and aedeagus simple; epandrial seta positioned distad, near epandrial lobes; epandrial lobes represented by bristles only, collar-like bases not evident, and distal bristle longer than basal bristle; surstylus with 4 ventral cuticular projections which bear setae as figured, and second basal projection probably represents remnant ventral surstylar arm; cercus tapering, bearing strong dorsal setae on basal half and distally with 4 short ventral setae and short apical seta.

Female: similar to male except without modified $It_{2,3}$.

Remarks. *Medetera mindanensis* is restricted to the Philippine Islands and appears to be closely related to *M. luzonensis*.

Medetera gomwa n. sp.

Type material. HOLOTYPE ♂, PARATYPE ♂: **Papua New**

Guinea: Fergusson Island, Deidei, Gomwa Bay, 0–20 m, 2–6 July 1956, Fifth Archbold Expedition to New Guinea, L. J. Brass (AMNH).

Description. Male: length 2.4; wing dimensions 2.0 x 0.8; similar to *M. platychira* except as noted.

HEAD: scape and pedicel brown, 1st flagellomere missing.

THORAX: 2 strong dc bordering mesoscutal depression, with somewhat shorter anterior dc near mesonotal suture, and 7–8 short setulae anteriormost.

LEGS: coxae and femora dark brown to femoral ‘knees’; remainder of legs yellow, although distal tarsomeres darkened; relative podomere ratios similar; It_3 expanded with apical projection (Fig. 3f) (MSSC).

WING: similar to Fig. 2j, but M and R_{4+5} not as close to each other; CuAx ratio 0.8.

ABDOMEN: bright metallic green with dusting of grey pruinosity; hypopygium dark brown with yellowish cerci (Fig. 3d); epandrium elongate, with hypandrium arising at $\frac{2}{3}$ along ventral margin; hypandrium in lateral view appearing ventrally sinuate; hypandrium in ventral view (Fig. 3e) with sinuate region appearing to arise from broad base; aedeagus simple; epandrial seta arising from elongate collar-like pedicel lying hidden from external view along lateral margin of genital chamber; epandrial lobes lacking collar-like bases and only represented by two relatively short bristles; surstylus with short ventral arm arising from elongate dorsal arm; dorsal surstylar arm with blade-like seta and other setae as figured; cercus with upturned blunt apex and with dorsal setae as figured.

Female: unknown.

Remarks. *Medetera gomwa* occurs in New Guinea and is the only member of the *aberrans* group east of Weber’s Line. The cercus is unique in having a blunt upturned apex, and in lacking the basal furrow and ventrolateral arm. Only It_3 is flattened in the male, whereas in *M. platychira* and *M. mindanensis*, both It_3 and It_2 are flattened.

Medetera luzonensis n. sp.

Type Material. HOLOTYPE ♂: **Philippines:** Luzon, Rizal Province, Wa-Wa Dam, Mt Montalban, 150 m, light trap, 13 March 1965, H. M. Torrevillas (BPBM).

Description. Male: length 2.0; wing dimensions 1.8 x 0.7; holotype somewhat rubbed, missing thoracic setae and distal leg I; similar to *Medetera platychira* except as noted.

HEAD: antenna entirely yellow.

THORAX: dorsum bright metallic green with dusting of grey pruinosity; setae yellowish.

LEGS: coxae and basal half of femora brown, remainder of legs yellow; relative podomere ratios as: I: 1.8; 1.5; remainder of leg I missing; II: 2.0; 1.7; 1.1/0.4/0.3/0.2/0.2; TII with strong pale ventral

subapical seta; III: 2.0; 2.4; 0.5/0.9/0.6/0.3/0.2.

WING: CuAx ratio 0.6.

ABDOMEN: bright metallic green with short pale setulae; hypopygium dark brown with yellowish cerci (Fig. 4a); epandrium elongate, with hypandrium arising at $\frac{2}{3}$ along ventral margin; hypandrium and aedeagus simple; epandrial seta positioned distad, near epandrial lobes; epandrial lobes represented by bristles only, collar-like pedicels absent; surstylus elongate, with 4 ventral cuticular projections, each bearing apical seta; surstylus with weakly sclerotized, apically expanded clavate projection; cercus basally expanded, separated by furrow from ventrodistal projection which bears setae as figured; apical portion of cercus possibly missing.

Female: unknown.

Remarks. Since leg I of the male specimen is missing, it is not known if It_{2+3} are expanded.

Medetera maai n. sp.

Type material. HOLOTYPE ♂: **Malaysia:** Sarawak, Bau District, Pangkalan Tebang, 300–450 m, Sept 1958, T. C. Maa (BPBM).

Description. Male: length 2.0; wing dimensions 2.0 x 0.8; specimen somewhat rubbed.

HEAD: vertex, frons metallic green with grey pruinosity; face, clypeus shining metallic blue with dusting of pruinosity; proboscis brown; scape and

pedicel black, 1st flagellomere missing.

THORAX: dorsum metallic blue-green; setae missing but pale coloured.

LEGS: coxae, femora brown to femoral 'knees', remainder of legs yellow; relative podomere ratios as: I: missing; II: 2.5; 2.3; 1.2/0.6/0.4/0.3/0.2; TII with strong apical ventral seta; III: 2.8; 3.0; 0.7/1.3/0.7/0.5/ remainder missing.

WING: similar to Fig. 2j; CuAx ratio 0.7; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: metallic green-bronze with short pale setulae; hypopygium dark brown with yellowish cerci (Fig. 4b); epandrium elongate, with hypandrium arising at approximately midventral position; hypandrium and aedeagus simple; epandrial seta absent; epandrial lobes with short collar-like bases, and positioned near base of surstylus; surstylus fused to epandrium and elongate, ribbon-like, with setae as figured; surstylus with 2 arms, corresponding to dorsal and ventral surstylar arms, and ventral surstylar arm longer; cercus boat-shaped, with strong ventral margin or costa, distally bearing strong dorsally projecting curved setae, and basally with strong dorsal seta.

Female: unknown.

Remarks. *Medetera maai* has a rather unusual ribbonlike surstylus and a distinctive boat-shaped cercus. Although leg I is missing, I have associated this species with the *aberrans* group based on similarity of MSSC and general habitus.

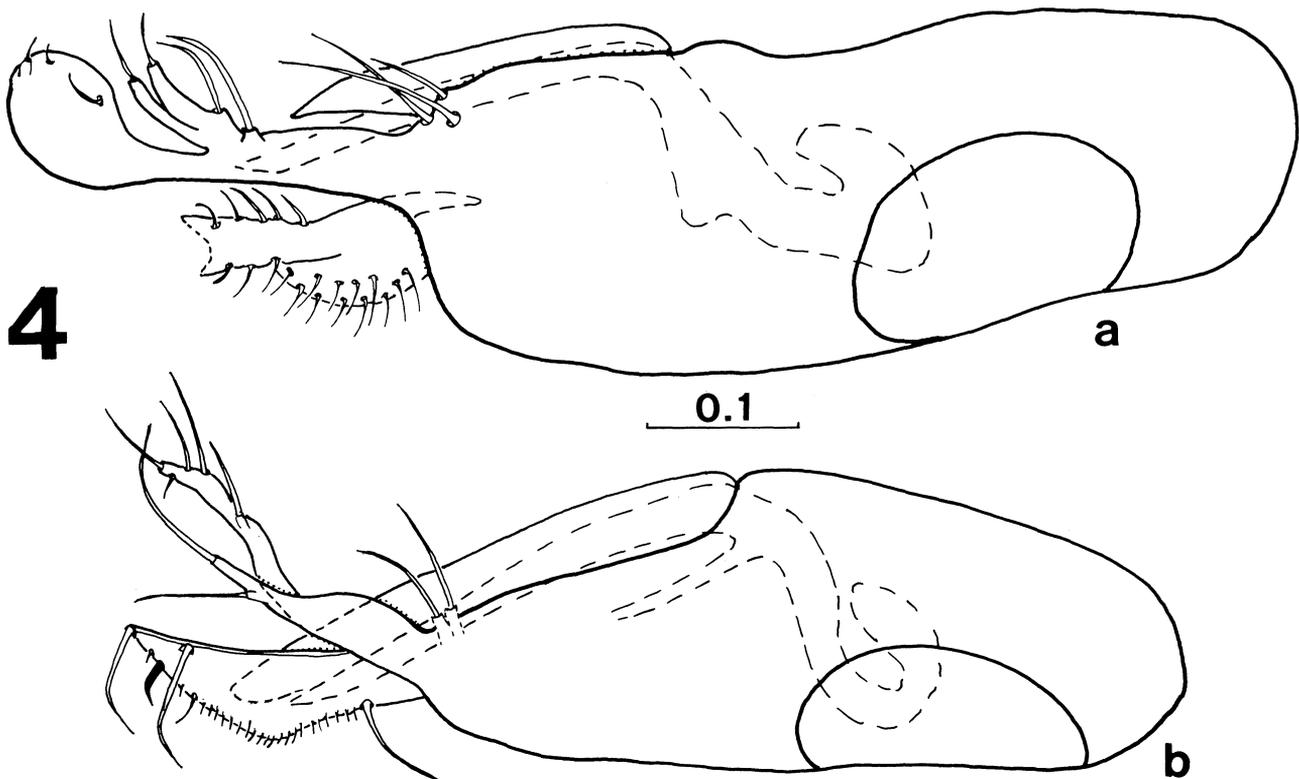


Fig. 4. a. *M. luzonensis*, Luzon; hypopygium, left lateral view. b. *M. maai*, Sarawak; hypopygium, left lateral view.

The *melanesiana* Group***Medetera melanesiana* n. sp.**

Type material. HOLOTYPE ♂: **Solomon Islands:** Vella Lavella, Ulo Crater, 10 m, malaise trap, 21 Dec 1963, P. Shanahan (BPBM). PARATYPES: **Australia:** 1♂, 1♀, Queensland, Iron Range, 16 Aug 1971 (ANIC); **Indonesia:** Irian Jaya: 2♂♂, Nabire, 5–50 m, 25 Aug to 2 Sept 1962; 1♂, Waris, south of Jayapura, 450–500 m, 8–15 Aug 1959 (BPBM); **Papua New Guinea:** 2♂♂, Central Province, Laloki, 15 May 1984, (PDPI); ♂, New Britain, Gazelle Peninsula, 130 m, 28 Oct 1962 (BPBM).

Additional material. Probable ♀♀: **Papua New Guinea:** Maprik, 160 m, 29 Dec 1959 to 17 Jan 1960 (BPBM). **Solomon Islands:** Santa Ysabel, south of Tatumba, 0–50 m, 8 Nov 1964 (BPBM).

Description. Male: length 2.0; wing dimensions 1.9 x 0.7.

HEAD: vertex and frons metallic blue-green, covered with dusting of grey pruinosity; face and clypeus shining metallic blue-violet; proboscis dark brown, not strongly developed; arista with short hairs, and about as long as head height.

THORAX: dorsum bright metallic blue-green with dusting of grey pruinosity; pleura covered with dense grey pruinosity; setae yellow; 6–7 pairs ac, well developed and longer than width of ac band; 4 strong dc, decreasing anteriorly with short setulae anteriormost; lateral scutellars $\frac{3}{4}$ length of medians.

LEGS: coxae brownish basally and anteriorly on I and II; distal coxae and remainder of legs yellow; leg setae yellow; relative podomere ratios as I: 2.1; 1.8; 0.7/0.6/0.4/0.3/0.2; II: 2.2; 2.1; 1.1/0.6/0.5/0.3/0.2; TII with strong subapical ventral seta; III: 2.4; 2.5; 0.6/1.0/0.5/0.3/0.2; FIII with anterior and anteroventral rows of long pale setae (MSSC).

WING: M not strongly arched, but lies almost subparallel with R_{4+5} , similar to Fig. 2j; CuAx ratio 0.6; lower calypter yellow with fan of yellowish setae; haltere yellow.

ABDOMEN: entirely dark metallic green with bronze reflections, with dusting of grey pruinosity, and with short pale setulae; hypopygium dark brown with yellowish cerci (Fig. 5e); epandrium strongly flattened, subrectangular, elongate, with hypandrium arising from midventral position; hypopygial foramen left dorsolateral but almost basal in position; hypandrium simple; aedeagus simple, with internal appendix; epandrial seta positioned distad, near epandrial lobes; pedicels of epandrial lobes absent, with the 2 bristles of lobes arising directly from epandrium, distal bristle much stronger than basal bristle; surstylus fused to epandrium, bent, with single capitate arm which bears distinctive ventral striated projection and various strong curved apical setae; cercus fused medianly, and with short distolateral projection which bears short apical setal projection.

Female: similar to male but lack MSSC.

Remarks. *Medetera melanesiana* is known from

New Guinea, the Solomon Islands, and Cape York Peninsula, Queensland.

***Medetera kokodensis* n. sp.**

Type material. HOLOTYPE ♂: **Papua New Guinea:** Kokoda-Pitoki, 400 m, 23 March 1956, J.L. Gressitt (BPBM)

Description. Male: length 2.0; wing dimensions 1.9 x 0.7; similar to *M. melanesiana* except as noted.

HEAD: vertex, frons, face and clypeus shining metallic violet.

LEGS: coxa I yellow, with some metallic green infuscation anteriorly; coxae II and III brown; femora yellowish; remainder of legs yellow; setae yellow.

ABDOMEN: entirely dark metallic green with bronze reflections, with dusting of grey pruinosity, and with short dark setulae; segment 7 not greatly elongated; hypopygium dark brown with yellowish cerci (Fig. 5c); epandrium flattened, subrectangular, elongate, with hypandrium arising from midventral position; hypopygial foramen left dorsolateral in position; hypandrium simple, relatively short; aedeagus simple, lacking internal appendix; epandrial seta strong, positioned distad, near epandrial lobes; pedicels of epandrial lobes absent, with the 2 bristles of lobes arising directly from epandrium; surstylus fused to epandrium, relatively short, with single capitate arm which bears 2 strong curved apical setae; cercus fused medianly, and with short deflexed distolateral projection.

Female: unknown.

***Medetera morobensis* n. sp.**

Type material. HOLOTYPE ♂: **Papua New Guinea:** Wau, Morobe District, 1250 m, 13 Oct 1962, J. Sedlacek (BPBM). PARATYPES: ♂, 6♀♀, same location but with dates Jan, July, Sept, Oct, Nov, 1961–1963; ♂, **Indonesia:** Irian Jaya: Nabire, 5–50 m, 25 Aug to 2 Sept 1962 (BPBM).

Description. Male: length 2.3; wing dimensions 2.1 x 0.8; similar to *M. melanesiana* except as noted.

THORAX: dorsum shining metallic blue-violet with dusting of grey pruinosity; setae black; 6–7 pairs ac present.

LEGS: coxae and basal $\frac{2}{3}$ of femora brown; remainder of legs yellow although TI sometimes infuscated and distal tarsomeres darkened; leg setae yellowish to brown.

ABDOMEN: entirely dark metallic green with bronze reflections, with dusting of grey pruinosity and short pale setulae; hypopygium dark brown with yellowish cerci (Fig. 5a–b); epandrium strongly flattened, subrectangular, elongate, with hypandrium arising from midventral position; hypopygial foramen left basolateral in position; hypandrium simple; aedeagus simple, lacking internal appendix; epandrial seta short, positioned adjacent to epandrial lobes; pedicels of epandrial lobes weakly developed but

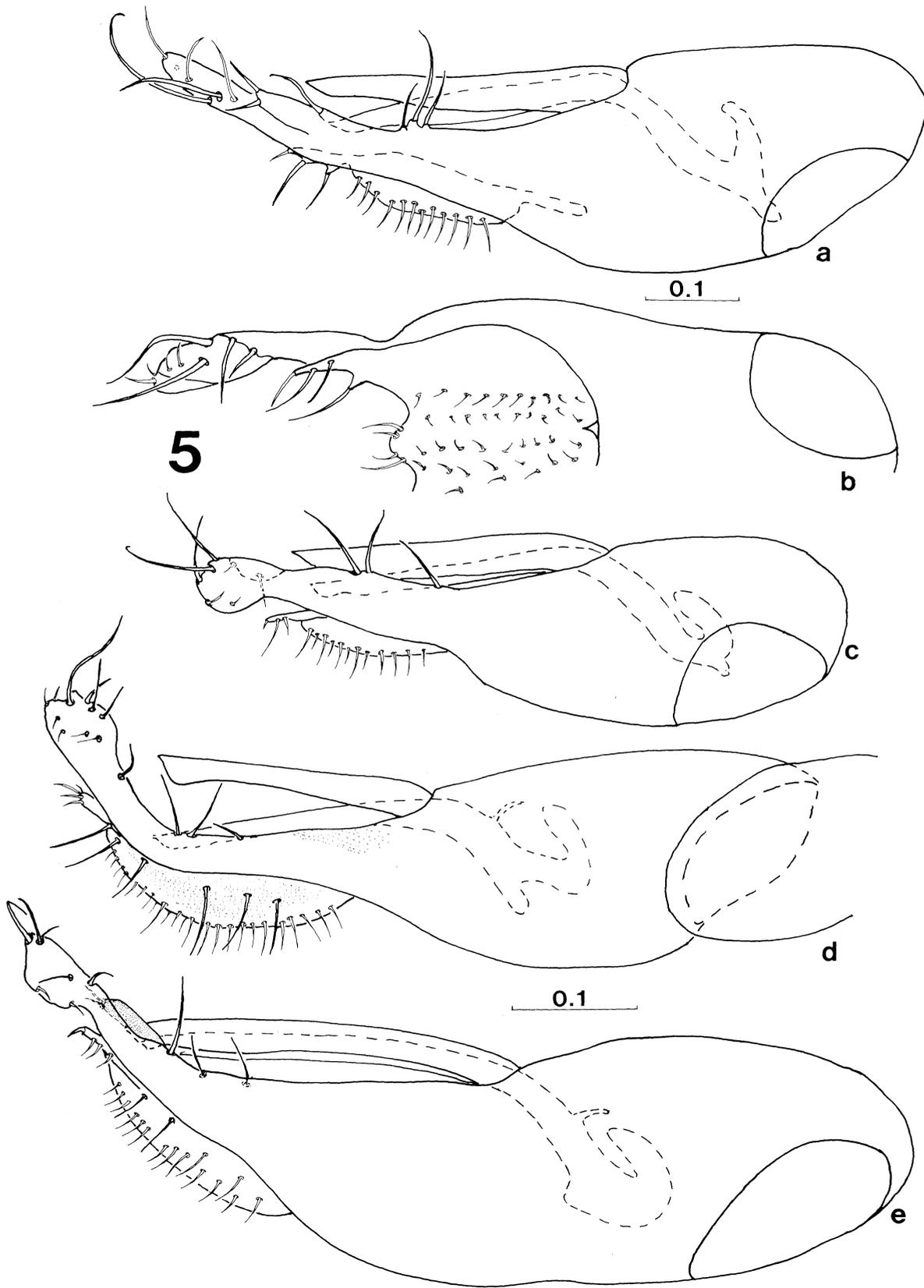


Fig. 5. a-b, *M. morobensis*, Wau, Papua New Guinea; a, hypopygium, left lateral view; b, left hypopygium, dorsal view. c, *M. kokodensis*, Kokoda, Papua New Guinea; hypopygium, left lateral view. d, *M. niuginiensis*, Mt Hagen, Papua New Guinea; hypopygium, left lateral view. e, *M. melanesiana* New Britain; hypopygium, left lateral view.

present, with bristle of basal lobe longer than that of distal lobe; surstylus fused to epandrium, ventral arm of surstylus evident overlapping longer dorsal arm; dorsal surstylar arm not capitate and bearing some strong curved distal setae; cercus fused medianly, and with short distolateral projection which bears apical seta, 2 strong dorsal setae, and curved pedunculate median seta.

Female: similar to male but lacks long pale anteroventral setae of FIII.

Remarks. *Medetera morobensis* is known only from New Guinea. It retains some plesiomorphic characters with respect to other members of the *melanesiana* group, in particular, the presence of short peduncular bases on the epandrial lobe and the remnant of the ventral surstylar arm.

Medetera niuginiensis n. sp.

Type material. HOLOTYPE ♂: Papua New Guinea: West Highlands, Hagen, south-east of Koinfam, 15 Oct 1958, J.L. Gressitt (BPBM). PARATYPES: 2♂♂, Wau, 1250 m, 20 May 1965 (BPBM); ♂, Brown River, near Port Moresby, 21 Oct 1963 (AMS).

Additional material. Possible ♀: Papua New Guinea: West Highlands, Baiyer River, 1200 m, 5 Aug 1982 (PDPI).

Description. Male: length 2.3; wing dimensions 2.1 x 0.8; similar to *M. melanesiana* except as noted.

THORAX: dorsum shining metallic blue-violet with dusting of grey pruinosity; setae black; 6–7 pairs ac.

LEGS: coxae and basal $\frac{2}{3}$ of femora brown; remainder of legs yellow although TI sometimes infuscated and distal tarsomeres darkened; setae yellowish.

ABDOMEN: dark metallic green with bronze reflections, with dusting of grey pruinosity, and with short pale setulae; distal half of segments 6–8 and basal portion of epandrium pale cream and weakly sclerotized in specimens from Wau (see Remarks); hypopygium dark brown with yellowish cerci (Fig. 5d); epandrium strongly flattened, subrectangular, elongate, with hypandrium arising from midventral position; hypopygial foramen left basolateral in position; hypandrium simple; aedeagus simple, with internal appendix; epandrial seta short, positioned distad, near epandrial lobes; pedicels of epandrial lobes absent, with 2 subequal bristles of lobes arising directly from epandrium; surstylus fused to epandrium, strongly curved ventrally, relatively short, with single capitate arm which bears various strong curved apical setae; cercus fused medianly, and with short distolateral projection.

Female: similar to male but lacks MSSC; abdomen entirely metallic green.

Remarks. *Medetera niuginiensis* is known only from New Guinea, especially the Highlands area. The males from Wau only had the distal half of segments 6–8 and basal portion of epandrium pale cream and weakly sclerotized. In all other respects, however,

their hypopygia were identical to those of the other males. The development of a weakly sclerotized and melanized male postabdomen is also found in *M. rhetheura* and in *M. macalpinei*.

Medetera macalpinei n. sp.

Type material. HOLOTYPE ♂: Papua New Guinea: Woitape, Wharton Range, 20 Oct 1963, D.K. McAlpine. PARATYPES: 2♂♂, same locality, 19 Oct 1963, 11 Oct 1963 (AMS); 2♂♂, Wau, 1250 m, 7–21 Aug 1965 (BPBM); 1♂, 1♀, Aiyura, East Highlands, 1800 m, 7 Jan 1964 (BPBM).

Additional material. 10♂♂, 11♀♀, Australia: Queensland, 4 km south-east of Kumbia, on *Eucalyptus* trunks, 10 April 1982 (ANIC).

Description. Male: length 2.0; wing dimensions 1.9 x 0.7; similar to *M. melanesiana* except as noted.

THORAX: setae yellowish to dark brown.

LEGS: coxae basally brown, distally yellowish to infuscated; femora yellowish to infuscated brownish; remainder of legs yellow although distal tarsomeres darkened; leg setae yellowish; relative podomere ratios similar; FIII with anterior and anteroventral rows of setae, the anteroventral row particularly long (Fig. 6e) (MSSC).

ABDOMEN: basally dark metallic green with bronze reflections, with dusting of grey pruinosity, and with short pale setulae; distal half of segments 6–8 and basal portion of epandrium pale cream colour and weakly sclerotized (MSSC); hypopygium dark brown distally with yellowish cerci (Fig. 6a–d); epandrium strongly flattened, subrectangular, basally truncate, with hypandrium arising from midventral position; hypopygial foramen left basolateral in position; hypopygial foramen basal, only slightly left lateral in position; aedeagus simple, with internal appendix; epandrial seta positioned distad, near basal epandrial lobe; pedicels of epandrial lobes absent, with 2 subequal bristles of lobes arising directly from epandrium; surstylus fused to epandrium, relatively short, with single capitate arm which bears various strong curved apical setae; cercus fused medianly, and with short distolateral projection which bears strong short apical seta.

Female: similar to male but without MSSC; abdomen entirely metallic green.

Remarks. *Medetera macalpinei* is known from New Guinea and south-eastern Queensland. The distal half of segments 6–8 and the basal portion of epandrium are pale cream colour and weakly sclerotized in all specimens. There is some variation in the development of the surstylus and the arrangement of the curved surstylar setae (Fig. 6a–c). Even the holotype and paratype from Woitape, New Guinea, show marked differences in the distal surstylus. For this reason, the specimens from Kumbia, Queensland, in rather semiarid country near the Bunya Mountains, were considered conspecific even though the distal surstylus differed

somewhat from that of the holotype. Coxa I and the femora of the Kumbia specimens are also somewhat paler than those of the New Guinea specimens. However, all male specimens have the elongate ventral setae on FIII.

Medetera rtheura n. sp.

Type material. HOLOTYPE ♂, PARATYPES 7♂♂, 2♀♀: **Papua New Guinea:** Korogo, Sepik River, 10 March 1964, D.H. Colless (ANIC).

Additional material. **Indonesia:** Irian Jaya: 2♂♂, 1♂, Nabire, south of Geelvinck Bay, 5–50 m, 25 Aug to 2 Sept 1962. **Papua New Guinea:** 1♂, Wau, 1250 m, 20 Aug 1965; 1♂, Daradae, 80 km north of Port Moresby, 80 m, 5 Sept 1959; 1♂, south-east Murua River, 10 m, 20 Dec 1964; 6♀♀,

either *M. rtheura* or *M. melanesiana*: Waghi Valley; Kerowagu; Wau, Morobe District; Sepik, Angoram; Eliptamin Valley, 1350–1665 m (all BPBM).

Description. Male: length 2.0; wing dimensions 1.9 x 0.7; similar to *M. melanesiana* except as noted.

LEGS: FIII with long pale ventral seta at $\frac{1}{4}$, about as long as entire femur (Fig. 6h) (MSSC).

ABDOMEN: dark metallic green with bronze reflections, with dusting of grey pruinosity, and with short pale setulae; distal half of segments 6–8 and basal portion of epandrium pale cream colour and weakly sclerotized, contrasting strongly with the preceding segments; distal epandrium dark brown with yellow cerci (Fig. 6f–g); epandrium strongly flattened, basally bent, subrectangular, elongate, with

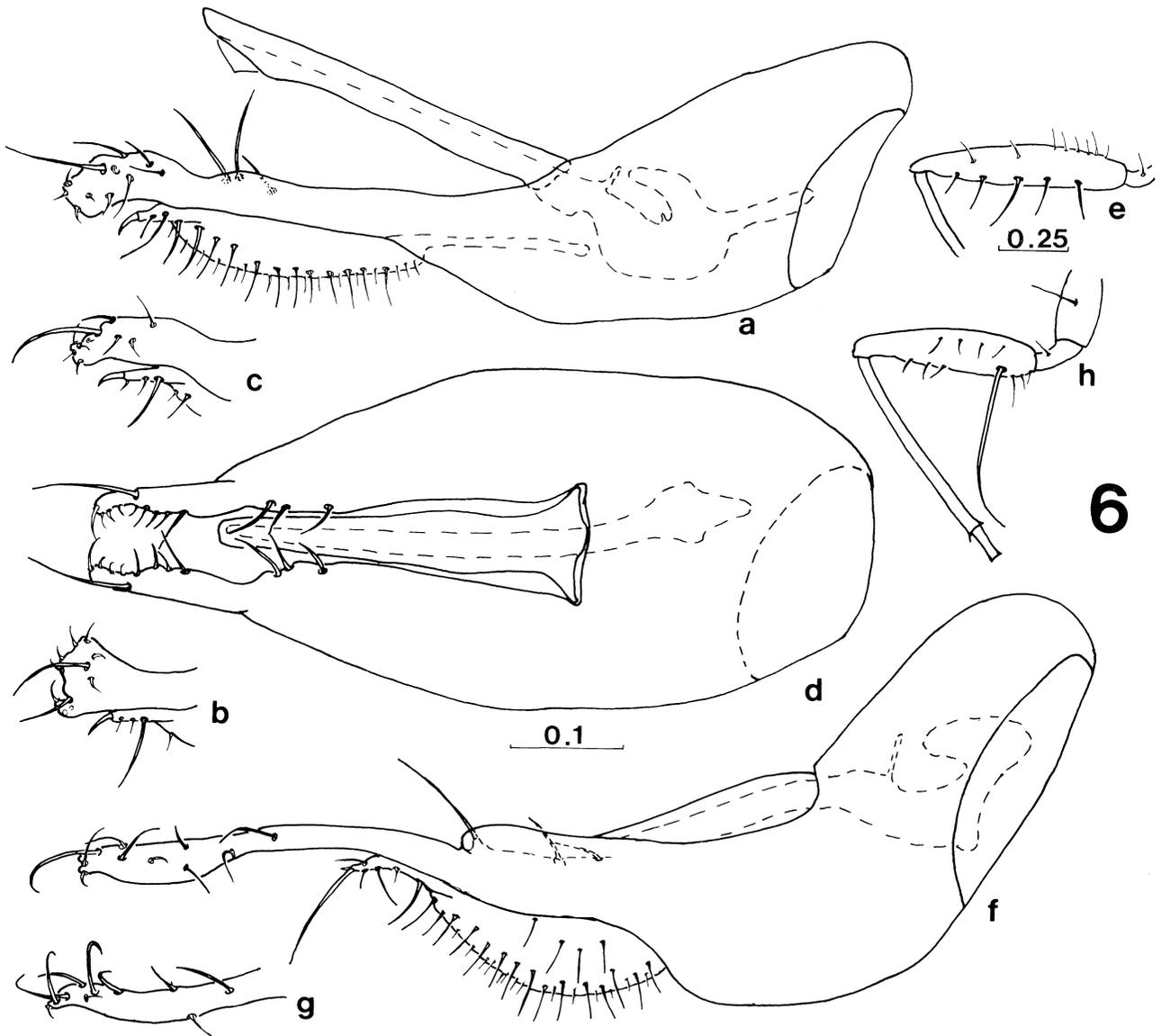


Fig. 6. a–e, *M. macalpinei*: a–b, Woitape, Papua New Guinea; a, holotype, hypopygium, left lateral view; b, paratype, surstylus and distal cercus, left lateral view. c–e, Kumbia, Queensland; c, surstylus and distal cercus, left lateral view; d, hypopygium, ventral view; e, basal right leg male, anterior view. f–h, *M. rtheura*: f, Nabire, Irian Jaya; hypopygium, left lateral view. g–h, Sepik River, Papua New Guinea; g, surstylus, left lateral view; h, basal right leg male, anterior view.

hypandrium arising from midventral position; hypopygial foramen dorsobasal, only slightly left lateral in position; hypandrium simple; aedeagus simple, with internal appendix; lateral development of epandrium covers epandrial seta and epandrial lobes in lateral view; epandrial seta positioned distad, near basal epandrial lobe; epandrial lobes well separated; surstylus fused to epandrium, greatly prolonged and narrow, with arms arched medianly, and with curved apical setae as figured; cercus fused medianly, and with short distolateral projection which bears long apical seta.

Female: similar to male but lacks long pale ventral seta of FIII and tooth-like projection of III_t; abdomen entirely metallic green.

Remarks. *Medetera rhetheura* is known only from New Guinea. The elongate surstylus, cream coloured postabdomen and basal epandrium, and the long ventral seta of the male FIII are distinctive. Some variation exists in the configuration of the apical surstylar setae (Fig 6f–g). This species is closely related to *M. melanesiana*, and isolated females cannot be accurately separated.

The *chillcotti* Group

The *chillcotti* group is defined by the following features: small, less than 1.5 in length; Ac reduced to minute hairs; two strong dc, bordering mesonotal depression, anterior dc reduced to short setulae; lateral scutellars reduced to weak hairs; M not strongly curved anteriorly, but rising gradually toward R₄₊₅ (as in Fig. 2i); surstylus fused to epandrium, without membranous connection; epandrial lobes separate, each bearing a strong bristle; surstylus divided into three arms; aedeagus not recurved within epandrium; hypandrium simple, subrectangular; cercus with dorsoapical blade-like seta; cercus with distinctive ventral setose protuberance.

The *chillcotti* group comprises two closely related species, *Medetera chillcotti* and *M. bishopae*, and has an Oriental distribution. This group is not characterized by any strong autapomorphy. In cercal and surstylar structure it seems closely allied to *M. vivida* of the *toxopeusi* group, but lacks the distinctive recurved aedeagus.

From Becker's description, *M. adsumpta* from India might belong to this group.

Medetera bishopae n. sp.

Type material. HOLOTYPE ♂: **Malaysia:** West Malaysia: Fraser's Hill, 1300 m, 16 March 1966, J. Sedlacek. PARATYPES: ♀, Pahang Kuala Tahan, 12–14 Dec 1958; ♂, Sabah: Sandakan Bay (SW), Sapagaya Lumber Camp, 2–20 m, 5 Nov 1957 (all BPBM).

Description. Male: length 1.3; wing dimensions 1.2 x 0.5.

HEAD: vertex, frons, face, clypeus dark metallic green with grey pruinosity; proboscis dark brown; antenna black; arista very long, more than twice the head height.

THORAX: dorsum metallic green, posterior portion of mesonotum brownish; pleura covered with dense grey pruinosity; setae yellowish.

LEGS: coxae and basal half of femora brown; remainder of legs yellow; relative podomere ratios as I: 1.1; 1.1; 0.3/0.3/0.2/0.1/0.1; II: 1.2; 1.4; 0.5/0.3/0.2/0.1/0.1; III: 1.5; 1.8; 0.3/0.6/0.3/0.2/0.1.

WING: similar to Fig. 2i; CuAx ratio 0.3; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: metallic green with some grey pruinosity; hypopygium dark brown with yellowish cerci (Fig. 7b); hypandrium and aedeagus elongate, simple; epandrial seta positioned adjacent to epandrial lobes; pedicel of distal epandrial lobe more than twice length of basal lobe; middle surstylar arm bearing strong lateral seta; ventral surstylar arm narrow with apical seta; cercus with apical seta, and with tapering ventral projection which bears strong distal seta and 3 somewhat weaker setae on proximal side.

Female: similar to male.

Remarks. *Medetera bishopae* is found on the Malay Peninsula and Borneo, and is named after Bernice P. Bishop, benefactor of the Bishop Museum.

Medetera chillcotti n. sp.

Type material. HOLOTYPE ♂, PARATYPE ♂: **Nepal:** Lothar, near Birganji, 138 m, malaise trap, 17 Sept 1967, Canadian Nepal Expedition (CNC).

Description. Male: length 1.4; wing dimensions 1.4 x 0.5.

HEAD: vertex, frons, face, clypeus black with metallic blue reflections, and covered with dense brown pruinosity; proboscis black; antenna black; arista about 1 ½ times as long as head height.

THORAX: black with metallic blue reflections and covered with dense grey-brown pruinosity; setae brownish.

LEGS: coxae brown, with coxa I yellowish laterally; remainder of legs entirely yellow with only distal tarsomeres darkened; podomere ratios as in *M. bishopae*.

WING: similar to Fig. 2i; CuAx ratio 0.3; lower calypter and haltere yellow.

ABDOMEN: dark brown with metallic blue reflections, and with short yellowish setulae; hypopygium dark brown with yellowish cerci (Fig. 7a); hypandrium and aedeagus simple; epandrial lobes with short collar-like bases; surstylus divided into 3 arms which are curved mediad, and bearing setae as figured; cercus with dorsoapical blade-like seta and capitate ventral prominence bearing 4 strong setae.

Female: unknown.

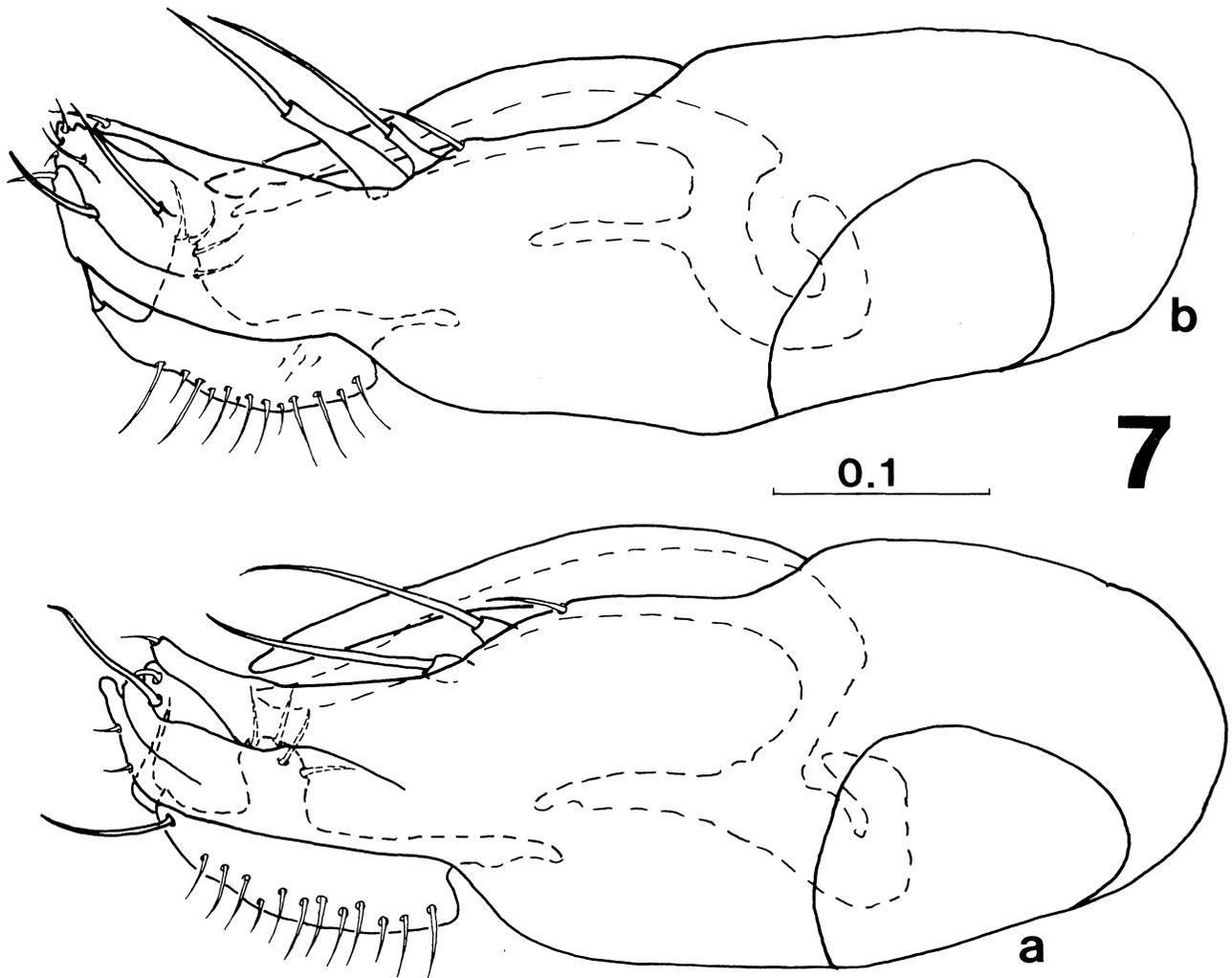


Fig. 7. a, *M. chillcotti*, Nepal; hypopygium, left lateral view. b, *M. bishopae*, Kedah, Malaysia; hypopygium, left lateral view.

Remarks. *Medetera chillcotti* is known only from lowland Nepal and is named after the dipterist J.G. Chillcott, who died while on the Canadian Nepal Expedition. This species and *M. bishopae* have similar hypopygia.

The *australiana* and *toxopeusi* Groups

The *australiana* and *toxopeusi* groups both share the following features: proboscis keel-like and projecting anteriorly; two strong dc bordering mesoscutal depression, the anterior dc reduced to short setulae; epandrium elongate and cylindrical, and distance between distal epandrial lobe and hypandrial base greater than distance between hypandrial base and base of epandrium; epandrial lobes positioned distad, such that the distalmost lobe is adjacent to the join of the surstylus with the epandrium; hypandrium elongate, subrectangular; aedeagus strongly recurved within the epandrium, extending far basad within the epandrium before

curving back on itself and forming the ejaculatory bulb (e.g., Figs 8, 9) (synapomorphy for the two groups); surstylus usually with membranous attachment to epandrium; surstylus usually deeply cleft.

The *australiana* group has the following features: antenna entirely black; arista length approximately equal to head height; pleura and coxae with grey or bright silvery pruinosity; lateral scutellars about $\frac{3}{4}$ length of median scutellars; coxae and basal $\frac{2}{3}$ of femora black; cercus relatively simple, tapering or blunt, without apical modified setal projections.

The *australiana* group includes four species from the eastern coasts and ranges of Australia which, as distinguished in the key, can be divided into two pairs of closely related species, *Medetera australiana* and *M. mosmanensis*, and *M. queenslandensis* and *M. wongabelensis*.

The *toxopeusi* group has the following features: scape and pedicel usually yellow, and 1st flagellomere black; arista relatively long, usually greater than twice head height; scutellum, posterior mesonotum and

postpronotum often appearing yellow-brown, in contrast to the general darker metallic colouration of the thorax; lateral scutellars usually less than $\frac{1}{2}$ length of median scutellars; bristle of the distal epandrial lobe often with hair-like branches; epandrial seta positioned distad along ventral epandrial margin; cercus often with distinctive ventral lobes and/or setae, and usually with modified apical seta.

The *toxopeusi* group comprises 7 species, all except *M. vivida* from the Papuan region east of Weber's Line. *Medetera toxopeusi*, *M. waris*, *M. papuensis* and *M. cheesmanae* are closely related with similar hypopygia and body colouration. *Medetera vivida* and *M. gressitti* have an unbranched distal surstylar bristle, and entirely metallic green thorax. *Medetera irianensis* appears somewhat isolated, lacking both a deep surstylar cleft and modified cercal setae, and in having the surstylus fused to the epandrium.

The *australiana* Group

Medetera mosmanensis n. sp.

Type material. HOLOTYPE ♂ (ANIC), PARATYPES ♂, 3♀♀: **Australia:** New South Wales: Mosman, Ashton Park, on trunks of *Angophora costata*, 12 Oct 1980, D. J. Bickel. PARATYPES: ♂, same except 12 Feb 1984; 8♂♂, 4♀♀, Mosman, Balmoral Beach, on trunks of *Ficus macrophylla*, 21 Sept to 15 Nov 1980 (paratypes AMS, ANIC).

Description. Male: length 2.5–2.7; wing dimensions 2.7 x 0.8.

HEAD: vertex, frons metallic green-black with bronze reflections and covered with some brown pruinosity; face, clypeus bright satiny metallic blue-green with some pruinosity laterally and on frontoclypeal suture; proboscis black, massive.

THORAX: dorsum dark metallic green with bronze reflections, with brown pruinosity dorsally and grey pruinosity on pleura and coxae; setae black; 8–10 pairs ac about as long as width of ac band.

LEGS: coxae, basal $\frac{2}{3}$ of femora black with grey pruinosity; distal femora, remainder of legs yellow to infuscated red-brown; podomere ratios as: I: 2.6; 2.3; 0.9/0.9/0.5/0.3/0.3; II: 2.8; 2.7; 1.4/1.0/0.6/0.4/0.2; III: 2.7; 3.1; 0.5/1.5/0.8/0.4/0.4.

WING: M gradually approaches R_{4+5} (Fig. 2h); CuAx ratio 0.6; lower calypter yellow with brown rim and fan of pale setae; haltere yellow.

ABDOMEN: metallic black-bronze with short black setulae; hypopygium black with brownish cerci, elongate, cylindrical and somewhat dorsoventrally flattened (Fig. 8a); hypandrium elongate, forming an inverted trough over aedeagus; epandrial seta and epandrial lobes positioned far distad near junction between surstylus and epandrium; surstylus deeply cleft into dorsal and ventral arms; dorsal surstylar arm elongate with ventral subapical seta; ventral surstylar arm with a recurved striated seta and other setae as figured; cercus elongate, tapering.

Female: similar to male but with wider face.

Remarks. *Medetera mosmanensis* is known only from the Sydney district. Both *M. mosmanensis* and *M. australiana* have been collected off trunks of smoothbarked trees, and they are sympatric at least in the Sydney district.

Medetera australiana n. sp.

Type material. HOLOTYPE ♂, PARATYPES ♂, ♀, **Australia:** New South Wales: Coffs Harbour, on trunk *Eucalyptus* sp., 24 Oct 1980, D. J. Bickel (ANIC). PARATYPES: 2♂, Mosman, Ashton Park, on trunks *Angophora costata*, 18 Oct 1980 (AMS); ♂, Mooney Mooney Creek, near Gosford, 18 Jan 1980 (AMS).

Description. Male: length 2.9–3.1; wing dimensions 3.0 x 0.8; similar to *M. mosmanensis* except as noted.

LEGS: coxae, femora black with grey pruinosity; remainder of legs dark brown to black.

WING: CuAx ratio 1.0; haltere yellow to reddish brown.

ABDOMEN: aedeagus in lateral view somewhat expanded apically (Fig. 8c); surstylus with membranous attachment to epandrium; dorsal surstylar arm clavate; ventral surstylar arm short, stout, curved, and with prominent setae as figured; cercus stout, apically curved with long subapical seta on ventral margin.

Female: similar to male.

Remarks. *Medetera australiana* ranges from the northern New South Wales coast to the Sydney district.

Medetera queenslandensis n. sp.

Type material. HOLOTYPE ♂: **Australia:** Queensland: Mt Tamborine, 20 March 1965, T. Weir (UQIC, deposited QMB). PARATYPE: ♂, New South Wales: Mt Warning National Park, on trunk *Archontophoenix cunninghamiana*, 24 Nov 1985 (AMS).

Description. Male: length 3.4; wing dimensions 3.1 x 1.1; similar to *M. mosmanensis* except as noted.

THORAX: bright metallic green-bronze reflections; pleura and coxae with pruinosity which appears bright silvery when viewed anteriorly.

LEGS: coxae and basal $\frac{2}{3}$ of femora black with silvery pruinosity; remainder of legs yellow.

WING: CuAx ratio 0.7.

ABDOMEN: hypopygium elongate, cylindrical (Fig. 8d); aedeagus with subapical triangular projection; epandrial seta short, positioned midway between base of hypandrium and distal epandrial lobe; surstylus with membranous attachment to epandrium; dorsal surstylar arm keel-shaped with strong lateral seta; ventral surstylar arm with prominence bearing 2 strong setae, and tapering distally with apical stout seta; cercus with blunt apex.

Female: unknown.

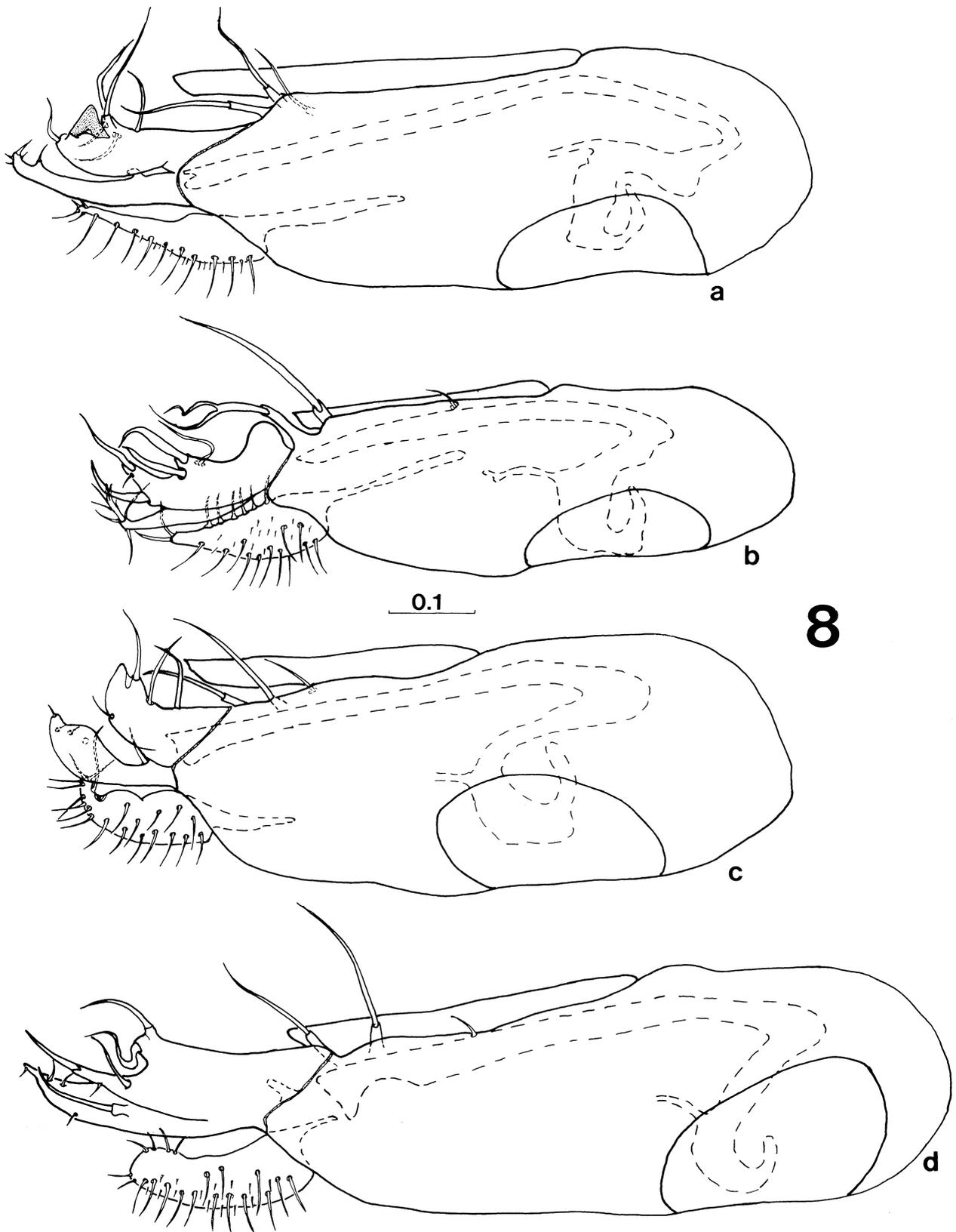


Fig. 8. a, *M. mosmanensis*, Mosman, New South Wales; hypopygium, left lateral view. b, *M. wongabelensis*, Atherton, Queensland; hypopygium, left lateral view. c, *M. australiana*, Coffs Harbour, New South Wales; hypopygium, left lateral view; d, *M. queenslandensis*, Mt Tamborine, Queensland; hypopygium, left lateral view.

Remarks. *Medetera queenslandensis* is known from south-eastern Queensland and north-eastern New South Wales. This species is relatively large in comparison with other members of the *australiana* group.

***Medetera wongabelensis* n. sp.**

Type material. HOLOTYPE ♂: **Australia:** Queensland: Wongabel State Forest, near Atherton, 17°20'S 145°31'E, at light, 18 Nov 1981, D. H. Colless (ANIC).

Description. Male: length 2.6; wing dimensions 2.3 x 1.0.

HEAD: vertex, frons, face metallic blue-black with grey pruinosity; clypeus satiny metallic blue; proboscis black.

THORAX: dorsum dark metallic green with bronze reflections and covered with brown pruinosity dorsally; pleura and mesonotal depression covered with dense silvery pruinosity, evident in anterior view; setae black; 8–10 pairs ac, increasing in length posteriorly.

LEGS: coxae, basal $\frac{2}{3}$ of femora black with silvery pruinosity, remainder of legs yellowish with distal tarsomeres darkened; podomere ratios similar to *M. mosmanensis*; It_{1-3} with bright anterior silvery hairs on the basal $\frac{1}{2}$ to $\frac{2}{3}$ of each tarsomere, thus giving appearance of 3 silvery patches separated by darker integument (probably MSSC); TIII with pale preapical dorsal seta.

WING: CuAx ratio 0.6; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: black with metallic green-bronze reflections; short black setulae; hypopygium elongate, cylindrical, and black with yellowish cerci (Fig. 8b); epandrial seta short, positioned midway between epandrial lobes and base of hypandrium; distal epandrial lobe with forked bristle; surstylus with membranous attachment to epandrium; dorsal surstylar arm with distinctive subapical branched seta; ventral surstylar arm with strong setae as figured; cercus tapering with apical seta and ventral row of 5 setae.

Female: unknown.

Remarks. The patches of silvery hairs on tarsomeres 1–3 on leg I are probably a male secondary sexual character.

The *toxopeusi* Group

***Medetera waris* n. sp.**

Type material. HOLOTYPE ♂: **Indonesia:** Irian Jaya: Waris, south of Hollandia, 450–500 m, 8–15 July 1959, T. C. Maa (BPBM).

Description. Male: length 3.2; wing dimensions 2.9 x 1.0.

HEAD: vertex, frons, face and clypeus metallic bluegreen with grey pruinosity; proboscis brown,

massive, protruding keel-like; scape and pedicel yellow; 1st flagellomere brown.

THORAX: metallic green with grey pruinosity; rim of scutellum brown; ac short, less than width of ac band; lateral scutellars less than $\frac{1}{3}$ length of medians.

LEGS: coxa I yellow; coxae II and III brown; remainder of legs yellow; podomere ratios as: I: 2.7; 2.6; 1.0/1.0/1.0/0.5/0.4; II: 2.7; 2.6; 1.7/1.4/1.0/0.5/0.4; III: 3.0; 3.3; 0.8/2.0/1.1/0.5/0.4.

WING: M gradually approaches R_{4+5} ; CuAx ratio 0.5; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: metallic green with bronze reflections and short black setulae; hypopygium dark brown with yellowish cerci (Fig. 9b); hypandrium elongate, tapering distally; aedeagus strongly recurved within epandrium and tapering distally; distal epandrial lobe with plumose bristle; surstylus with membranous attachment to epandrium; dorsal surstylar arm long, extending beyond ventral arm; ventral surstylar arm with V-shaped cleft and with setae as figured; cercus apically clavate and bearing ventrally directed blade-like seta; plumose setal projection borne medioventrally on cercus, other setae as figured.

Female: unknown.

Remarks. See below under *M. toxopeusi*.

***Medetera toxopeusi* Parent**

Medetera toxopeusi Parent, 1932b: 352.

Type material. HOLOTYPE ♂: **Indonesia:** Maluku: Buru Island, Station 9, 21 May 1921, L. J. Toxopeus (ZMUA, examined).

Description. Male: length 2.5; wing dimensions 2.6 x 0.95; similar to *M. waris* except as noted.

THORAX: anterior mesonotum, lower pleura metallic blue-green; posterior mesonotum including depression, humeral area, upper pleura, metapostnotum and scutellum brown yellow.

WING: CuAx ratio 0.3.

ABDOMEN: metallic green with grey pruinosity; hypopygium similar to *M. waris* except for details of surstylus (Fig. 9c); dorsal surstylar arm with some apical setae; ventral surstylar arm with deep V-shaped cleft, ventrally bearing flattened curved setae, and dorsally with strong tapering apical seta.

Female: unknown.

Remarks. *Medetera toxopeusi* and *M. waris* are very closely related species, exhibiting the same complex cercal structure. They are possibly conspecific, differing primarily in size and surstylar structure. The yellowish thoracic colouration of *M. toxopeusi* may reflect a teneral condition. However, such a pattern is also found in *M. cheesmanae* and widely in the *flaviscutellum* and *gracilis* species groups, and is possibly the mature colouration.

Medetera cheesmanae n. sp.

Type material. HOLOTYPE ♂, PARATYPES 1♂, 1♀: **Papua New Guinea:** Kokoda, 60 m, Sept to Oct 1933, L. E. Cheesman (BMNH). PARATYPES: 2♂♂, 1♀: Wau, 1050–1230 m, June, Oct, Nov 1965 (BPBM); 1♂, **Solomon Islands:** Guadalcanal, Roroni, 35 km east of Honiara, 12 May 1964 (BPBM).

Description. Male: length 1.9–2.0; wing dimensions 2.0 x 0.7; similar to *M. waris* except as noted.

THORAX: light brown with metallic green reflections on mesonotum and metapostnotum; pleura brownish with some grey pruinosity; scutellum mostly yellow; lateral scutellars about ½ length of medians.

WING: CuAx ratio 0.4.

ABDOMEN: dark brown with dusting of grey pruinosity; hypopygium brown with yellowish cerci (Fig. 9a); hypandrium elongate, tapering; epandrial seta strong; proximal epandrial lobe with long bristle, distal epandrial lobe with plumose bristle; surstylus with membranous attachment to epandrium; dorsal surstylar arm tapering with apical spatulate seta; ventral surstylar arm distally U-shaped with setae as figured; cercus with distinctive large subapical blade-like seta and setabearing cuticular projection on ventral surface, other setae as figured.

Female: similar to male except somewhat larger, body length 2.2–2.3.

Remarks. The colouration of the anterior mesonotum varies from light brown to a light metallic green with only the humeral area remaining brown. The thorax may become increasingly metallic coloured with age. *Medetera cheesmanae* is distributed from eastern New Guinea to the Solomon Islands.

Medetera papuensis n. sp.

Type material. HOLOTYPE ♂: **Papua New Guinea:** Central Province, Daradae, near Javarera, Aieme River, 100 m, 3 Oct 1958, J. L. Gressitt (BPBM).

Description. Male: length 1.8; wing dimensions 1.7 x 0.6; similar to *M. waris* except as noted.

HEAD: vertex, frons, face, clypeus black with green reflections, and covered with grey pruinosity; arista very long, more than twice head height.

THORAX: dorsum dark metallic green with bronze reflections and covered with grey pruinosity.

LEGS: all coxae and legs yellow.

WING: CuAx ratio 0.4.

ABDOMEN: dark brown with metallic green reflections and dusting of grey pruinosity; hypopygium brown with yellowish cerci (Fig. 9d); epandrial seta strong; proximal epandrial lobe with long bristle, distal epandrial lobe with plumose bristle; dorsal surstylar arm with long seta arising midmedianly and apical rectangular cuticular projection; ventral surstylar arm cleft with setae as

figured; cercus with distinctive thin apical seta, other setae and projections as figured.

Female: unknown.

Medetera irianensis n. sp.

Type material. HOLOTYPE ♂, PARATYPE 1♀: **Indonesia:** Irian Jaya, Nabire, 5–50 m, malasia trap, 25 Aug to 2 Sept 1962, J. Sedlacek (BPBM) (both specimens badly rubbed).

Description. Male: length 1.6; wing dimensions 1.6 x 0.7; similar to *M. waris* except as noted.

HEAD: vertex, frons, face, clypeus dark metallic green with grey pruinosity.

THORAX: metallic green with bronze reflections; setae missing from specimens.

LEGS: coxae and basal portion of femora brown; distalmost femora and remainder of legs yellow; leg I missing but podomere ratios of legs II and III similar to *M. waris*.

WING: CuAx ratio 0.4.

ABDOMEN: black with metallic green reflections; hypopygium brown with yellowish cerci (Fig. 9e); epandrial seta and both epandrial lobes with elongate basal collars, and distal epandrial lobe bristle apically branched; surstylus fused to epandrium; surstylus with only shallow indentation separating dorsal and ventral arms; dorsal surstylar arm prolonged, curved, and capitate; surstylar setae as figured; cercus tapering and curved distally, with short apical setae.

Female: similar to male.

Medetera vivida Becker

Medetera vivida Becker, 1922: 51.

Type material. Becker described *Medetera vivida* from 1♂, 3♀♀ syntypes collected in Taiwan. I here designate the male, bearing the label “Formosa / Hoozan/ Sauter”, as lectotype (DEI, examined).

Additional material. 1♂, **Indonesia:** Java, Tjibodas, 20 Sept 1958. 1♂, **Laos:** Vientiane Province, Ban Van Eue, 15–31 May 1965. 1♂, 1♀, **Singapore:** 4 June 1985 (CED). 1♂, **Taiwan:** Chiayi Chiayi Hsien, 12–13 April 1965 (all BPBM except where noted).

Description. Male: length 1.6; wing dimensions 1.6 x 0.7.

HEAD: vertex, frons, face, and clypeus black with metallic green reflections, and with grey pruinosity except clypeus; proboscis and antenna black; arista about as long as head height.

THORAX: dorsum shiny metallic green with dusting of grey pruinosity; setae yellowish; ac about as long as width of ac band; lateral scutellars about ½ length of medians.

LEGS: coxae and basal half of femora brown, remainder of legs yellow; podomere ratios as: I: 1.6; 1.5; 0.7/0.3/0.2/0.2/0.1; II: 2.0; 1.9; 1.0/0.4/0.3/0.2/0.2; III: 2.1; 2.3; 0.5/1.0/0.4/0.3/0.2.

WING: M gradually approaches R_{4+5} ; CuAx ratio 0.4; lower calypter yellow with distinct brown rim

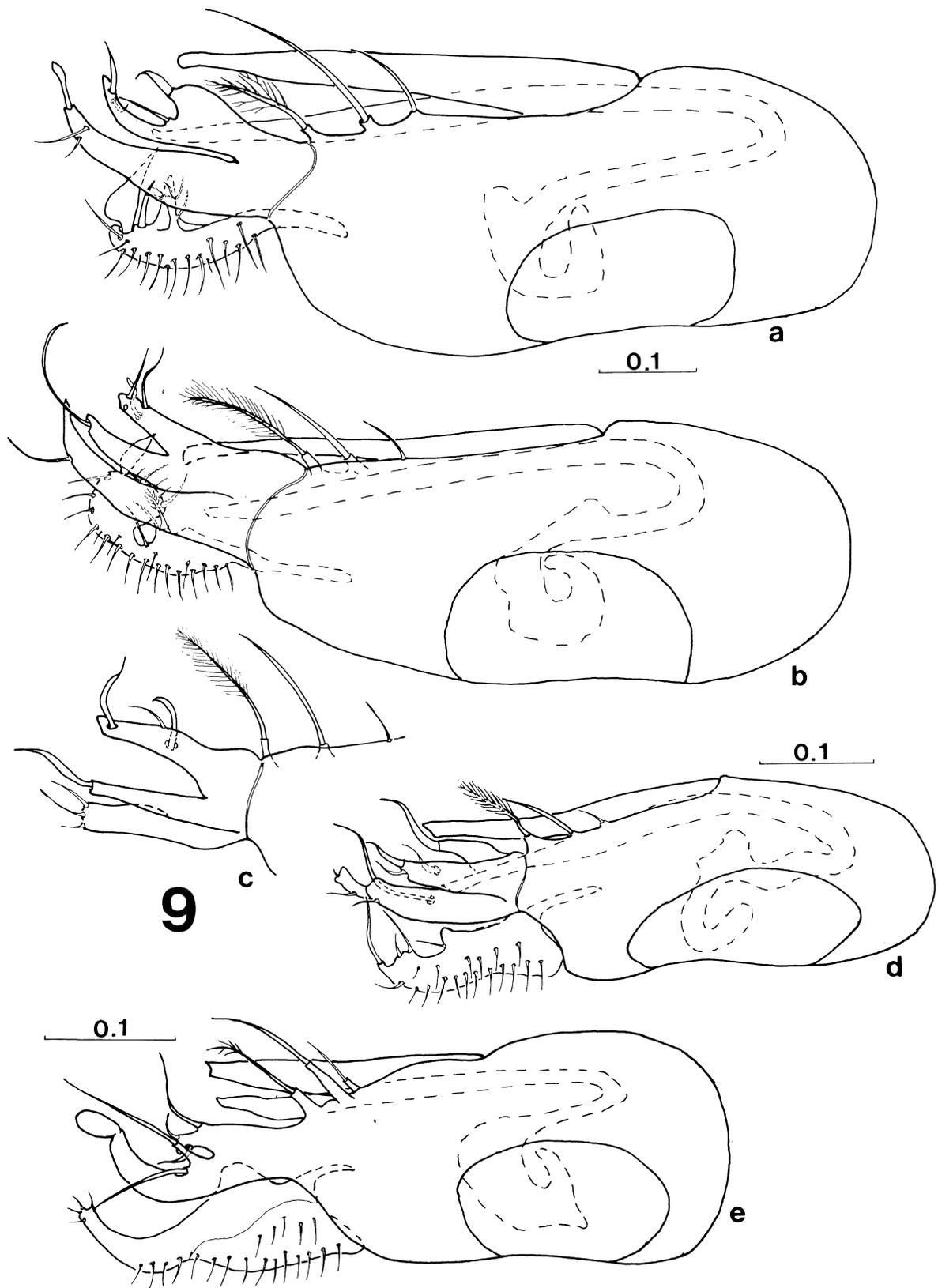


Fig. 9. a, *M. cheesmanae*, Kokoda, Papua New Guinea; hypopygium, left lateral view. b, *M. waris*, Waris, Irian Jaya; hypopygium, left lateral view. c, *M. toxopeusi*, Malku, Indonesia; surstylus, left lateral view. d, *M. papuensis*, Musgrave River, Papua New Guinea; hypopygium, left lateral view. e, *M. irianensis*, Nabire, Irian Jaya; hypopygium, left lateral view.

and fan of pale setae; haltere yellow.

ABDOMEN: metallic green with bronze reflections, and with short yellowish setulae; hypopygium dark brown with yellowish cerci (Fig. 10a–b); aedeagus with dorsoapical lobe and strongly recurved within epandrium; epandrial seta long, positioned midway between epandrial lobes and base of hypandrium; epandrial lobes each bearing strong simple bristle; surstylus with only weak suture marking attachment to epandrium; surstylus with cuticular projections and setae as figured; cercus ventrally with distinctive pilose capitate knob with blade-like seta at base which is partially obscured by lobate projection; cercus with strong apical curved blade-like seta.

Female: similar to male.

Remarks. *Medetera vivida* is distributed across southeastern Asia, from Taiwan and Indochina to Indonesia. The capitate knob of the cercus is distinctive.

Medetera gressitti n. sp.

Type material. HOLOTYPE ♂: Papua New Guinea: Kokoda-Pitoki, 400 m, 23 March 1956, J. L. Gressitt. PARATYPE: ♀, Kokoda, 28–29 March 1956 (BPBM).

Description. Male: length 1.6; wing dimensions 1.7 x 0.6.

HEAD: vertex, frons metallic green covered with

grey pruinosity; face, clypeus metallic blue-green; proboscis black; scape and pedicel yellowish; 1st flagellomere black; arista about as long as head height.

THORAX: dorsum dark metallic green with bronze reflections; pleura with dense grey pruinosity; setae black; ac about as long as width of ac band; lateral scutellars reduced to weak hairs.

LEGS: coxae, femora brown; femoral ‘knees’ and remainder of legs yellow; podomere ratios as: I: 1.6; 1.4; 0.3/0.2/0.2/0.1/0.1; II: missing; III: 1.6; 1.9; 0.3/0.9/0.4/0.3/0.2.

WING: M gradually approaching R_{4+5} ; CuAx ratio 0.3; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 10c–e); hypandrium subrectangular; aedeagus tapering with pair of lateral processes; epandrial seta nearer to epandrial lobes than base of hypandrium; epandrial lobes positioned near membranous junction between surstylus and epandrium; lobate process arising from lateral wall of genital chamber present mediad of epandrial lobes; surstylus with ventral striae, arms, and setae as figured; cercus with curved blade-like apical seta, subtended by ventral mound bearing 4 strong setae.

Female: similar to male.

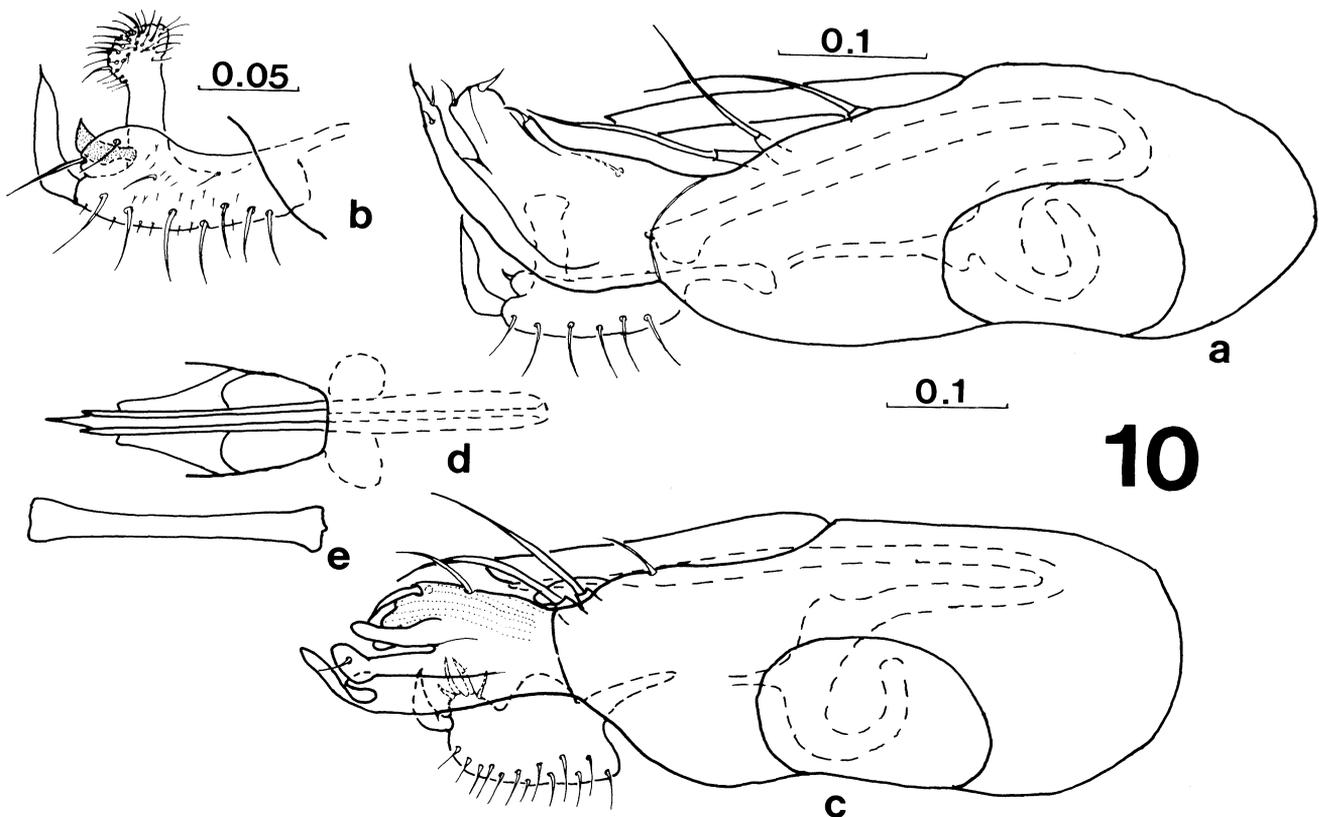


Fig. 10. a–b, *M. vivida*, Java; a, hypopygium, left lateral view; b, cercus, left lateral view. c–e, *M. gressitti*, Kokoda, Papua New Guinea; c, hypopygium, left lateral view; d, aedeagus, ventral view; e, aedeagus, ventral view.

The *gracilis* Group

The *gracilis* group is characterized by the following features: face shiny metallic blue-violet; tendency for posterior mesonotum to be yellow-brownish; ac reduced to absent (apomorphy); two strong dc bordering mesonotal depression, with the anterior dc much shorter and decreasing anteriorly; tendency for reduction and loss of posterior npl seta (apomorphy); lateral scutellars reduced to weak hairs, less than $\frac{1}{10}$ length of stronger medians; silvery pruinose patches usually present on bodies of both sexes (apomorphy); tendency for prolongation of legs, with II_t_2 longer than III_t_1 and TII greater than FII in most species, also leg II longer than leg III (apomorphies); coxae I, legs mostly yellow; anal angle of wing reduced (Fig. 2e)(apomorphy).

The *gracilis* species group is confined to the Oriental tropics of Indonesia and Malaysia and includes four species: *M. gracilis*, *M. borneensis*, *M. sandakanensis* and *M. penangensis*.

The following tendencies are evident within the *gracilis* group, being best developed in *M. gracilis* itself: prolongation of the legs (with tarsomere 2 longer than tarsomere 1 on all legs), prolongation of the body with increased separation of coxa I and coxa II, and reduced anal angle of the wing (habitus figure in Hollis, 1964) (also, see Morphological Note 3).

Medetera borneensis n. sp.

Type material. HOLOTYPE ♂: **Malaysia:** Sabah (SE): Forest Camp, 19 km north of Kalabakan, 16 Nov 1962, K.J. Kuncheria (BPBM).

Description. Male: length 1.7; wing length x width 1.6 x 0.4.

HEAD: vertex, frons, metallic green with bronze reflections; upper half of face shiny metallic blue; lower half of face and clypeus dull coriaceous metallic green-bronze; proboscis somewhat weak, not strongly developed; scape and pedicel yellow; 1st flagellomere brownish; arista length about equal to $1\frac{1}{2}$ head height.

THORAX: dorsum mostly metallic green with bronze reflections and with dusting of grey pruinosity; posterior portion of mesoscutum and scutellum brownish; setae black; ac short, less than width of ac band.

LEGS: entirely yellow, with only coxae II and III infuscated at bases; I: 1.6; 1.3; 0.5/0.4/0.3/0.3/0.2; II: 2.0; 1.9; 0.9/0.7/0.4/0.3/0.3; III: 1.6; 1.9; 0.4/0.8/0.4/0.3/0.2.

WING: ovate in shape with reduced anal angle, similar to Fig. 2e; CuAx ratio 0.3; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green-bronze with short black setulae; hypopygium dark brown with yellow cerci (Fig. 11d); epandrium subrectangular; hypandrium trough-shaped, relatively short, only extending slightly beyond half-length of aedeagus;

aedeagus elongate, apically upturned; epandrial seta short, near base of hypandrium; epandrial lobes with short, separate, but adjacent pedicels, each bearing strong bristle; surstylus expanded distally, longitudinally striated, and divided into 3 arms; dorsal surstylar arm narrow; central surstylar arm distally curved; ventral surstylar arm bearing digitiform seta and other short setae as figured; cercus relatively short, with apical blade-like seta and distinctive ventral pedunculate expanded seta on peduncle.

Female: unknown.

Remarks. *Medetera borneensis* has an elongate body form and reduced anal angle, characteristic of the *gracilis* group. However, *M. borneensis* is the least derived of the *gracilis* group, without silvery pruinose body patches and prolonged legs (i.e., II_t_2 longer than III_t_1 and TII longer than FII), present in the other members of the group. In cercal structure, *M. borneensis* shows some similarities to *M. vivida*.

Medetera sandakanensis n. sp.

Type material. HOLOTYPE ♂, PARATYPES 2♂♂: **Malaysia:** Sabah: Sandakan Bay (SW), Sapagaya Lumber Camp, 2–20 m, 7 Nov 1957, J.L. Gressitt. PARATYPES: 2♂♂, Kedah: Penang, 22–26 Dec 1958, L.W. Quate (BPBM).

Additional material. Females of either *M. sandakanensis* or *M. penangensis* from type localities (see Remarks below): 5♀♀, **Malaysia:** Sabah: Sandakan Bay (SW), Sapagaya Lumber Camp, 2–20 m, 7 Nov 1957; 7♀♀, Kedah: Penang, 22–26 Dec 1958 (BPBM); possible females of these 2 species: ♀, Sabah (SE): Forest Camp, 19 km north of Kalabakan, 16 Nov 1962 (BPBM); ♀, Kalabakan, 10–19 July 1958 (BPBM). **Laos:** ♀, Vientiane Province, Ban Van Eue, 30 Sept 1967 (BPBM). **Philippines:** ♀, Luzon, Los Banos, April 1914 (ZMH); ♀, Camarines Sur, Mt Isarog, 20 km east of Naga, 6 April 1963 (BPBM).

Description: Male: length 2.9–3.1; wing dimensions 2.8 x 0.6.

HEAD: vertex, frons, metallic green with bronze reflections and some grey pruinosity; clypeus dull metallic green-bronze; proboscis and palpi black; antenna brown; arista length about equal to $1\frac{1}{2}$ head height.

THORAX: dorsum, pleurae mostly metallic green-bronze with dusting of grey pruinosity; posterior portion of mesoscutum and scutellum brownish in some specimens; setae black; ac short, less than width of ac band.

SILVERY PRUINOSITY: patches of orientated pruinosity which appear matt grey in lateral perpendicular view but bright silvery when viewed from angle of 0–45 degrees either side of median sagittal plane present on following structures (Fig. 11b): anterior forecoxae, ventral to mesoscutal suture just above notopleural suture, large patch just below notopleural suture, tip of meskatepisternum, top of metepimeron, ventrolaterally on abdominal terga 1 and 2, and posteroventrally on tergum 3.

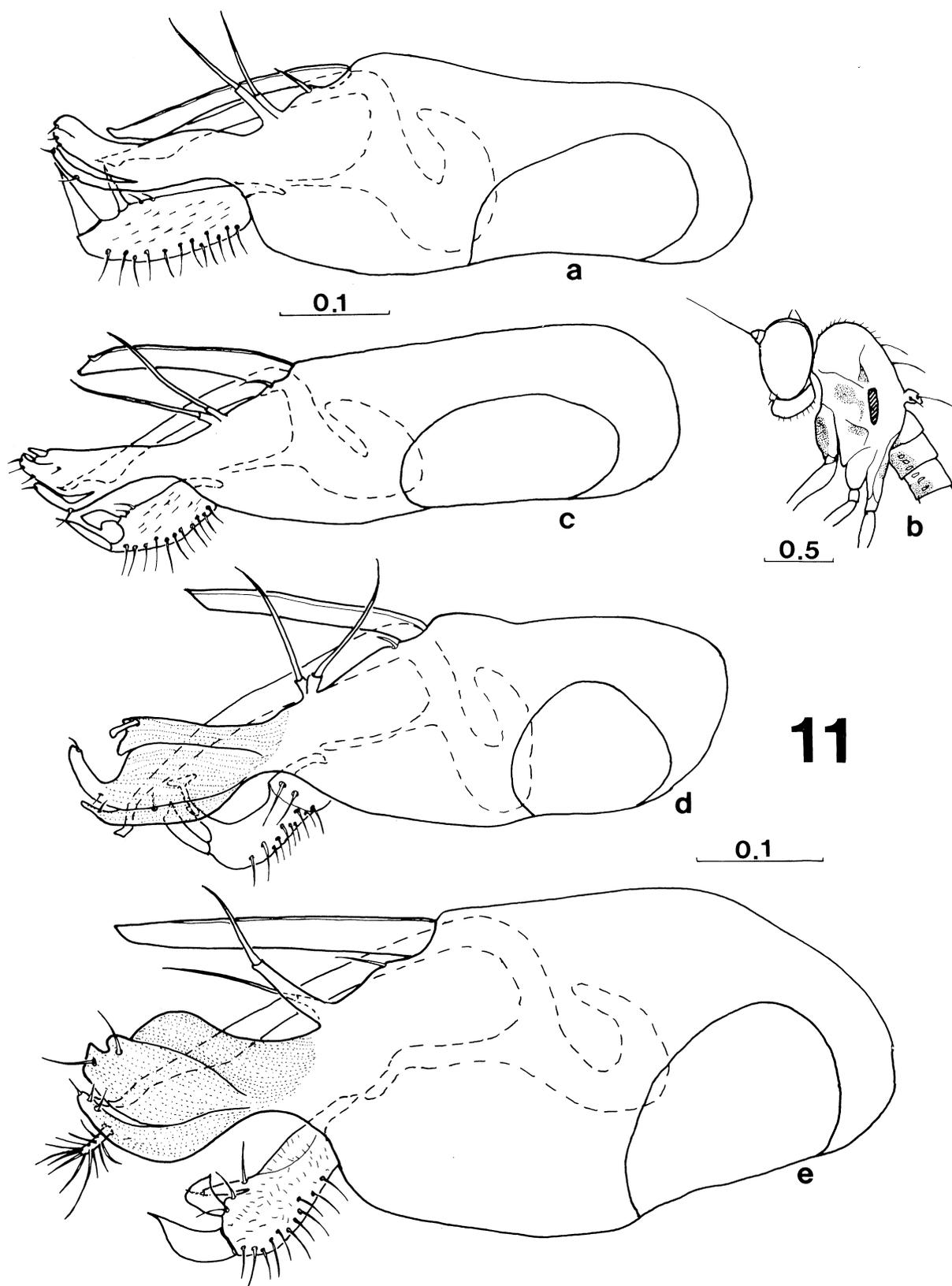


Fig. 11. a-b, *M. sandakanensis*, Sabah; a, hypopygium, left lateral view; b, head, thorax, and anterior abdomen, left lateral view (silvery pruinose patches indicated by stippling). c, *M. penangensis*, Penang, Malaysia; hypopygium, left lateral view. d, *M. borneensis*, Sabah; hypopygium, left lateral view. e, *M. gracilis*, Sumatra; hypopygium, left lateral view.

LEGS: coxa I yellow; coxae II and III dark brown; remainder of legs yellow; I: 2.2; 2.0; 0.7/0.9/0.6/0.3/0.3; t_1 , longer than t_2 ; II: 2.2; 2.5; 1.1/0.9/0.6/0.4/0.3; TII longer than FII; III: 2.2; 2.4; 0.4/1.1/0.6/0.4/0.3.

WING: ovate in shape with reduced anal angle, similar to Fig. 2e; CuAx ratio 0.4; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green-bronze with short black setulae; hypopygium dark brown with yellow cerci (Fig. 11a); epandrium subrectangular; hypandrium trough-shaped, slightly upturned apically, and almost reaching apex of aedeagus; aedeagus elongate; epandrial seta short, near base of hypandrium; distal epandrial lobe with pedicel much longer than that of basal lobe; surstylus slightly expanded distally, deeply cleft, with narrow dorsal arm and wider ventral arm, and with setae as figured; cercus rather stout, with 2 distinctive ventral setae; stout triangular apical seta and narrower tapering blade-like seta at $\frac{2}{3}$.

Female: similar to male, including silvery pruinose patches and shiny metallic blue face.

Remarks. *Medetera sandakanensis* and *M. penangensis* are very closely related species, and males of both species were taken together in mixed series at two rather distant localities in Malaysia: at Sandakan Bay, Sabah, on the north-eastern tip of Borneo, and at Penang, on the western coast of the Malay Peninsula. The two species are identical in all non-genitalic characters, indicating that little character displacement has taken place apart from the hypopygia (all male specimens had to have their genital capsules cleared in order to place them according to the two hypopygial types). The two hypopygial types are constant in their cercal structure and are considered as representing two widespread sympatric sister species. However, the possibility remains that they represent a single species with dimorphic hypopygia.

Females associated with the two species cannot be separated and specimens from localities in the Philippines, Laos, and elsewhere in Sabah may represent them.

Medetera penangensis n. sp.

Type material. HOLOTYPE ♂, PARATYPE ♂: **Malaysia:** Kedah: Penang, 22–26 Dec 1958, L.W. Quate. PARATYPE ♂: Sabah, Sandakan Bay (SW), south of Sapagaya Lumber Camp, 2–20 m, 7 Nov 1957, J.L. Gressitt (all BPBM).

Description. Male: length 2.9–3.1; wing dimensions 2.8 x 0.6; similar in all respects to *M. sandakanensis* except as noted.

ABDOMEN: dark metallic green-bronze with short black setulae; hypopygium dark brown with yellow cerci (Fig. 11c); hypandrium trough-shaped, slightly upturned subapically; epandrial seta short, near base of hypandrium; pedicels of epandrial lobes subequal in length; surstylus slightly expanded distally, deeply

cleft, with narrow dorsal arm and wider ventral arm, and with setae as figured; cercus rather stout, with 2 distinctive ventral setae; blade-like apical seta and hatchet-shaped seta at $\frac{2}{3}$.

Female: similar to male, including silvery pruinose patches and shining metallic blue face.

Remarks. See Remarks under *M. penangensis*, above.

Medetera gracilis Parent

Medetera gracilis Parent, 1935: 523.

Elongomedetera thoracica Hollis, 1964: 260, n. syn.

Type material. Parent described *M. gracilis* from a single male taken in Sabah, at Bettotan, near Sandakan (BMNH, examined). Hollis described the monotypic genus *Elongomedetera* from Indonesia. He distinguished this genus from *Medetera* by its having an elongate thorax, relatively long legs, and the lack of an anal lobe. However, its hypopygial structure is characteristic of *Medetera* and separate generic status is unwarranted. I have examined together the male holotypes of both *M. gracilis* and *E. thoracica* from Fort de Kock, Sumatra (ZMUA). Despite some variation between the two holotypes, I regard them as conspecific, as will be discussed below.

Additional material. (All BPBM except where noted) **Indonesia:** 1♂, Sumatra, Njuruk Dempu, 1600 m, Aug 1916 (ZMUA). **Malaysia:** Sabah: 1♂, Forest Camp, south-west of Tenom, 19 Dec 1962; 1♂, Tawau, Quoin Hill, Forest Camp, 3–5 km west of Cocoa Res. Stn, 9–20 July 1962. Sarawak: 1♂, 1♀, Kapit Dist., Merirai V., 30–300 m, secondary forest, 1–6 Aug 1958; 1♀, Sadong Kampong, Tapuh, 300–440 m, 10 July 1958. West Malaysia: 1♂, Cameron Highlands, Mt Brichang, 2–7 Jan 1959.

Description. Male: length 2.4–3.2; wing dimensions 2.2–3.0 x 0.6–0.8.

HEAD: vertex, frons, metallic blue-green with some grey pruinosity; clypeus metallic green-bronze with some grey pruinosity; palpi black; proboscis black, massive; antenna dark brown; arista length about equal to $1\frac{1}{2}$ head height.

THORAX: elongate, more than twice as long as wide; dorsum mostly metallic green-bronze anteriorly with dusting of grey pruinosity; posterior mesoscutum and scutellum brownish in some specimens; pleura brownish; setae black; ac biserate, very short and reduced.

SILVER PRUINOSITY: patches of orientated pruinosity, which appear matt grey in lateral perpendicular view but bright silvery when viewed from angle of 0–45 degrees either side of median sagittal plane, have a distribution similar to *M. sandakanensis* (Fig. 11b).

LEGS: legs elongate; coxa I yellow; coxae II and III yellowish to brown; remainder of legs yellow; leg setae yellowish; I: 2.8; 2.6; 0.9/1.5/1.1/0.4/0.5; II: 3.5; 4.3; 1.5/1.8/1.1/0.5/0.4; TII longer than FII; III: 3.7; 4.3; 0.7/2.2/1.1/0.8/0.5; t_2 distinctly longer than t_1 on all legs.

WING: ovate in shape with greatly reduced anal

angle (Fig. 2e); M gradually approaching R_{4+5} to apex; CuAx ratio 0.4–1.0 (see Remarks below); lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green-bronze with short black setulae; hypopygium dark brown with yellow cerci (Fig. 11e); epandrium rounded subrectangular; hypandrium trough-shaped and not reaching apex of aedeagus; aedeagus elongate, apically upturned; epandrial seta near base of hypandrium; distal epandrial lobe with pedicel much longer than that of basal lobe; surstylus expanded distally and clavate, longitudinally striated, and divided into 3 arms; dorsal surstylar arm bears distinctive stout branched seta; cercus with broad apical blade-like seta, subtended ventrally by smaller blade-like seta and digitiform cuticular projection.

Female: similar to male, including silvery pruinose patches and shiny metallic blue face.

Remarks. *Medetera gracilis* is known from Malaya, Borneo and Sumatra. It is a distinctive species with elongate body and legs, and wings with a reduced anal angle (see Fig. 30 in Hollis, 1964, for habitus), and is the most derived member of the *gracilis* species group. The hypopygium of all male specimens has a distinctive stout branched modified seta on the dorsal surstylar arm.

The holotype of *E. thoracica* has biserial ac, not uniserial as mentioned in Hollis' description. Since the ac are highly reduced, and in some cases absent or not clearly visible, it might appear that they are uniserial. However, in anterior view, the visible ac are seen to fall into 2 rows.

Some notable variation is evident among nongenital characters, especially body and wing length and CuAx ratio. As noted above, male body length ranges from 2.4–3.2, and correspondingly, wing length ranges from 2.2–3.0. This is a fairly large range of variance for *Medetera*. Of the 7 males examined, 6 had a wing length between 2.7 and 3.0, and only one small male from the Kapit District, Sarawak, had a wing length of 2.2. The CuAx ratio range of 0.4–1.0 seems to vary according to wing length, with the small Sarawak male having a ratio of 0.4, while the largest specimen, the *M. gracilis* holotype, has a ratio of 1.0. The other specimens have CuAx ratios of 0.6–0.7.

The distinctive silvery pruinose patches are not always evident on specimens, especially if they appear somewhat teneral with the thorax mostly brownish. However, differentially contrasting pruinosity, even on teneral specimens indicate the presence of these patches.

The *flaviscutellum* Group

The *flaviscutellum* group is characterized by the following features: antennal scape and pedicel yellowish; arista usually long, length $1\frac{1}{2}$ to 2 times head height; scutellum and posterior mesoscutal

slope usually yellowbrown; anterior ac short, less than width of ac band, posterior ac just longer than width of ac band; two strong dc bordering mesonotal depression, with the anterior dc much shorter and decreasing anteriorly; abdominal segment 7 somewhat elongated, distinctly longer than segment 6 and with strong development of both tergum and sternum; surstylus usually with membranous attachment to epandrium, although fused in some species; surstyli broad, massive, often with cuticular striae; epandrial lobes usually positioned distad, near join of epandrium and surstylus; aedeagus not internally recurved; cercus upcurved apically, and with ventral projections.

Although the *flaviscutellum* group is not defined by any strong autapomorphy, I believe it forms a monophyletic assemblage based on similarity of hypopygial structure. Most members of group display a yellowish scutellum and posterior mesonotal slope, which grades into metallic green colour anteriorly (see Morphological Note 6).

Male secondary sexual characters on some species include distinctive setation on the femora, and a flattening of the male foretarsus (*M. killertonensis*).

This group is found principally in Australasia although *M. philippinensis* is described from the Philippines. Of the remaining species, *M. killertonensis* and *M. flaviscutellum* are from New Guinea, while *M. dorrigenensis*, *M. uda*, *M. athertonensis*, *M. bunyensis* and *M. gingra* are from the forests of eastern Australia.

Medetera flaviscutellum n. sp.

Type material. HOLOTYPE ♂: Papua New Guinea: Karimui, south of Goroka, 1000 m, 3 June 1961, J. L. & M. Gressitt (BPBM). PARATYPE: ♂, Woitape, Wharton Range, 20 Oct 1963 (AMS).

Description. Male: length 2.0–2.1; wing dimensions 2.0 x 0.7.

HEAD: vertex, frons, face, clypeus metallic green with brown pruinosity; proboscis brown, massive.

THORAX: anterior mesonotum and pleura dark metallic green with dusting of grey-brown pruinosity; posterior mesoscutal slope yellow; scutellar base greenish, remainder yellow; (in the specimen from Woitape, most of the dorsum is redyellow, and only area anterior to mesoscutal depression is dark green); setae black; ac short, posterior pairs only about as long as width of ac band; 2 strong dc bordering mesoscutal depression, anterior dc as short setulae; median scutellars strong, laterals about $\frac{1}{2}$ length of medians.

LEGS: coxa I yellow, coxae II, III yellow to infuscated; remainder of legs entirely yellow; relative podomere lengths as: I: 2.4; 2.1; 0.6/0.4/0.3/0.2/0.2; II: 2.6; 2.4; 1.1/0.6/0.4/0.3/0.3; III: 2.8; 3.0; 0.5/1.1/0.5/0.3/0.3.

WING: M gradually approaches R_{4+5} (Fig. 2g);

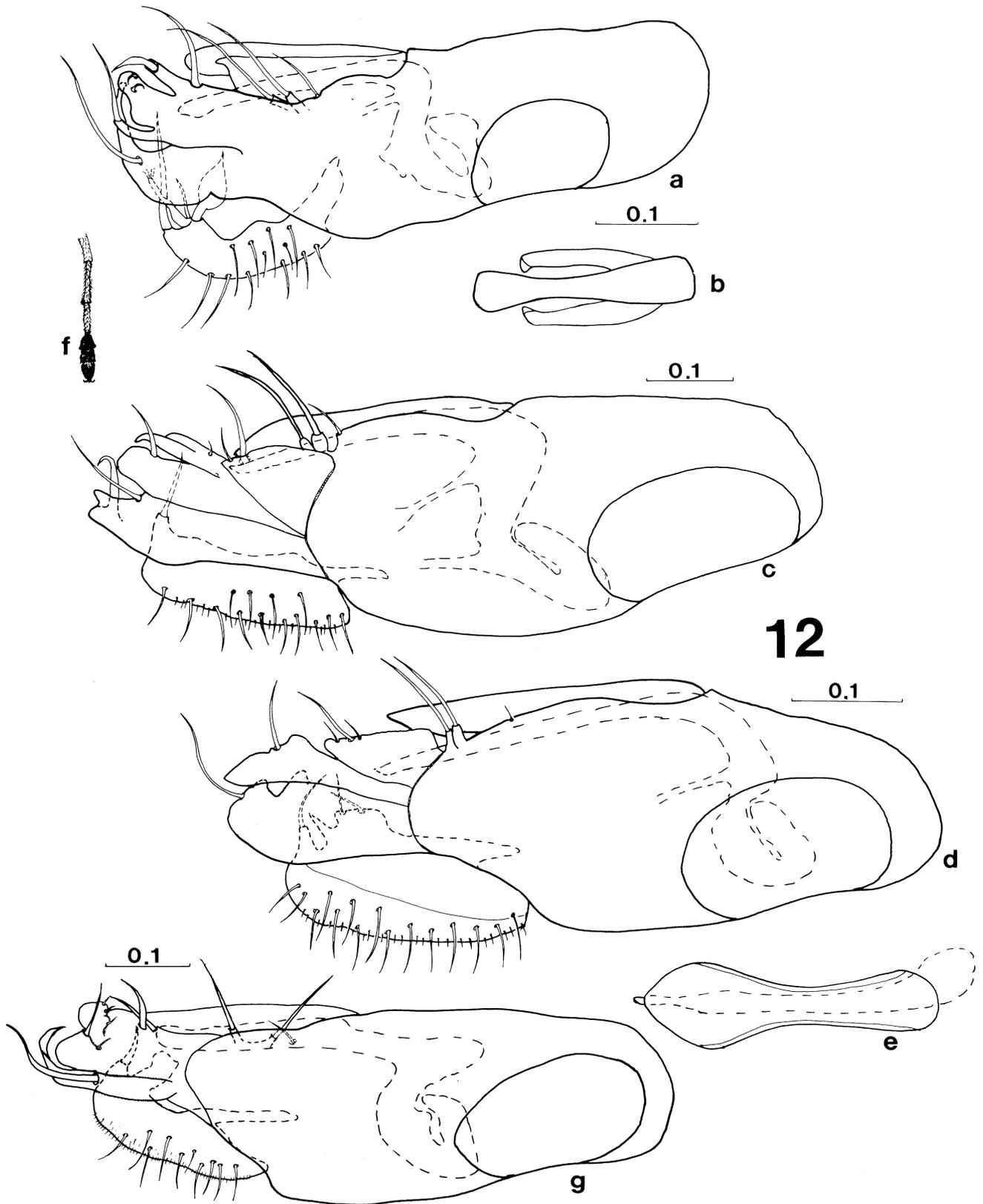


Fig. 12. a-b, *M. athertonensis*, Atherton, Queensland; a, hypopygium, left lateral view; b, hypandrium, ventral view. c, *M. flaviscutellum*, Goroka, Papua New Guinea; hypopygium, left lateral view. d-f, *M. killertonensis*, Cape Killerton, Papua New Guinea; d, hypopygium, left lateral view; e, hypandrium and aedeagus, ventral view; f, male left tarsus I, anterior view. g, *M. philippinensis*, Luzon; hypopygium, left lateral view.

CuAx ratio 0.4; lower calypter yellow with distinct brown rim and fan of pale setae; haltere yellow.

ABDOMEN: black with metallic green reflections and with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 12c); epandrial seta well developed and positioned near epandrial lobes; surstylus with cuticular striae; dorsal surstylar arm with large subapical median cuticular hook-like projection; ventral surstylar arm with basal subtriangular section bearing strong ventral seta; cercus subrectangular in lateral view with strong apicoventral seta.

Female: unknown.

Remarks. *Medetera flaviscutellum* and *M. killertonensis* have a similar hypopygial structure and are probably closely related.

Medetera killertonensis n. sp.

Type material. HOLOTYPE ♂: Papua New Guinea: Cape Killerton, malaise trap, 0–5 m, 6–13 May 1965, W. A. Steffan (BPBM).

Description. Male: length 1.8; wing dimensions 1.8 x 0.6; similar to *M. flaviscutellum* except as noted.

THORAX: anterior mesonotum and pleura metallic green with bronze reflections and covered with grey pruinosity; posterior mesonotum and scutellum yellowish; major setae black, shorter setae brownish; chaetotaxy similar to *M. flaviscutellum* except lateral scutellars reduced to short hairs, less than ¼ length of medians.

LEGS: coxae brown, remainder of legs yellow except where noted; relative podomere ratios similar to *M. flaviscutellum*; It₃₋₅ flattened, black, forming an ovate ‘flag’, in sharp contrast to pale basal tarsomeres (MSSC)(Fig. 12f); FIII with 4 strong pale anterior setae on distal half.

WING: CuAx ratio 0.5; lower calypter and haltere entirely yellow.

ABDOMEN: black with metallic green reflections; hypopygium dark brown with yellowish cerci (Fig. 12d); hypandrium in ventral view expanded subapically (Fig. 12e); aedeagus simple, tapering; epandrial seta short, positioned basad of epandrial lobes; epandrial lobes adjacent to suture between surstylus and epandrium; surstylus with cuticular striae; dorsal surstylar arm with long apical seta; ventral surstylar arm with basal subtriangular section and with setae as figured; cercus massive, stout, and with ventral projections and setae as figured, and with strong apicoventral seta, similar to *M. flaviscutellum*.

Female: unknown.

Remarks. The flattened leg I tarsomeres 3–5 in *M. killertonensis* represents an independent development of this male secondary sexual character in *Medetera*. Flattened male foretarsi, usually involving only tarsomeres 2 and 3, are common in the *aberrans* group (q.v.).

Medetera philippinensis n. sp.

Type material. HOLOTYPE ♂: Philippines: Luzon, Dalton Pass, Nueva Vizcaya, 9–10 April 1968, collector unknown (BPBM).

Description. Male: length 3.0; wing dimensions 2.9 x 0.8.

HEAD: vertex, frons, face, clypeus metallic green with some silvery pruinosity; proboscis brown; arista about as long as head height.

THORAX: anterior mesonotum metallic green with bronze reflections; posterior mesoscutum, scutellum and metapostonum yellowish; thoracic setae pale; major thoracic setae missing on specimen but apparently strong median and lateral scutellars present.

LEGS: coxae yellow, although coxae II and III infuscated basally; remainder of legs yellow; relative podomere ratios as: I: 1.7; 1.4; 0.6/0.5/0.4/0.3/0.3; II: 2.0; 2.1; 0.9/0.6/0.4/0.3/0.2; III: 2.1; 2.5; 0.5/1.0/0.4/0.3/0.3.

WING: venation similar to *M. flaviscutellum*; CuAx ratio 0.4; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green with bronze reflections and covered with short yellowish setulae; hypopygium dark brown with yellowish cerci (Fig. 12g); epandrium elongate; hypandrium and aedeagus simple; epandrial lobes diverging; surstylus with membranous connection to epandrium; dorsal surstylar arm becoming ribbon-like distally and curving mediad, and bearing strong external seta; ventral surstylar arm lobate, with 2 strong ventral setae and other setae as figured; cercus massive, bearing strong apicoventral seta, subtended ventrally by strong lobate projection.

Female: unknown.

Medetera dorrigenensis n. sp.

Type material. HOLOTYPE ♂ (ANIC), PARATYPES 11♂♂, 10♀♀ (ANIC, AMS): Australia: New South Wales, Dorrigo National Park, 24 Oct 1980, D. J. Bickel.

Description. Male: length 2.4; wing dimensions 2.3 x 0.9.

HEAD: vertex, frons, face, clypeus metallic green with bronze reflections, and with dusting of grey pruinosity; proboscis black.

THORAX: dorsum metallic bronze-green with dusting of grey-brown pruinosity; pleura with dense grey pruinosity; scutellum varies from yellowish to greenbrown with only yellowish rim in some specimens; ac short, but posterior pair, just anterior to mesonotal depression is particularly strong, longer than width of ac band; median scutellars strong, the laterals as weak hairs, less than ¼ length of medians.

LEGS: coxae brown with metallic green reflections; basal half of femora yellow to brown; remainder of legs yellow; relative podomere ratios as: I: 2.1; 1.8;

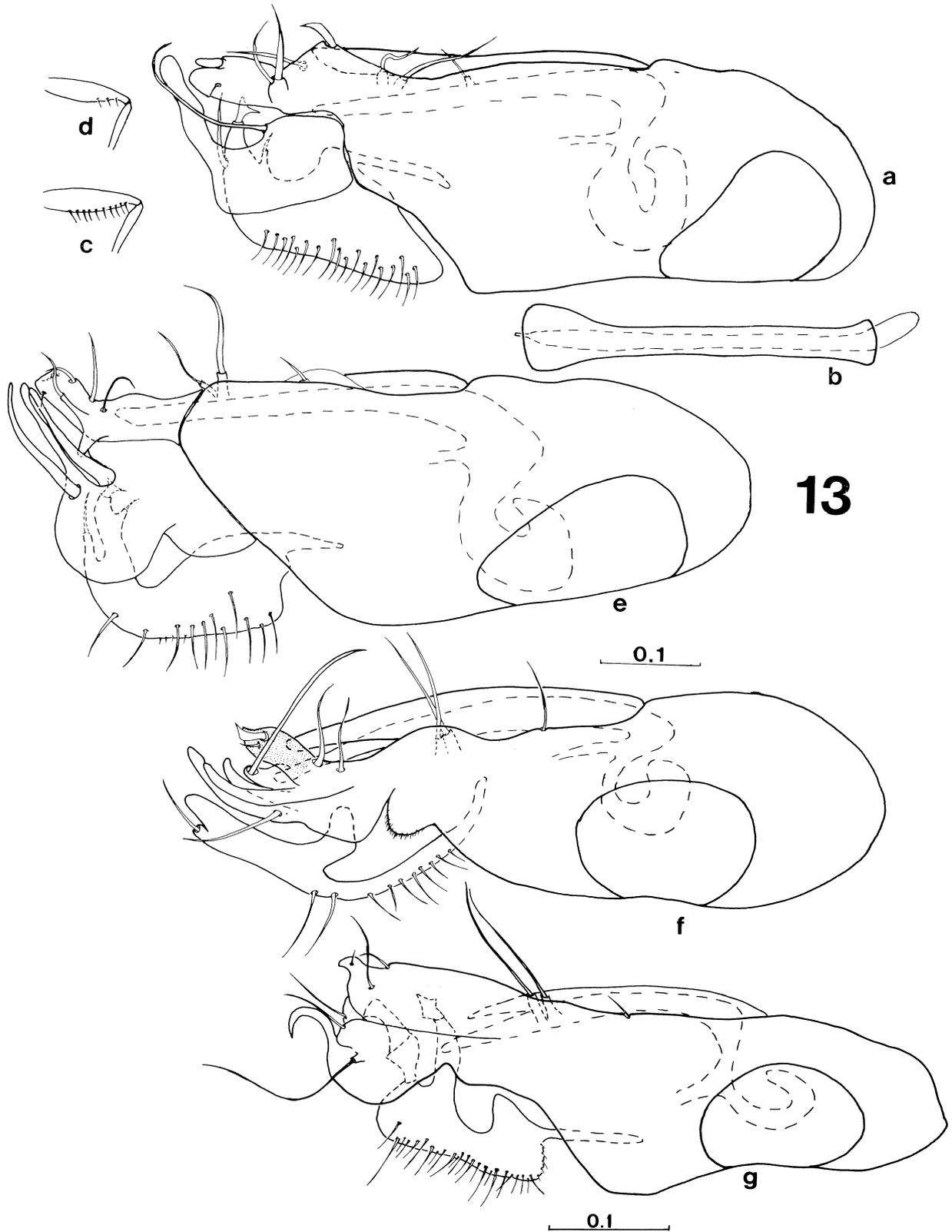


Fig. 13. a-d, *M. dorrigenis*, Dorrigo, New South Wales; a, hypopygium, left lateral view; b, hypandrium and aedeagus, ventral view; c, male left femur II, anterior view; d, female left femur III, anterior view. e, *M. uda*, Dorrigo, New South Wales; hypopygium, left lateral view. f, *M. gingra*, Blue Mountains, New South Wales; hypopygium, left lateral view. g, *M. bunyensis*, Bunya Mountains, Queensland; hypopygium, left lateral view.

0.7/0.5/0.4/0.3/0.3; FI ventrally with 6–7 long pale setae (MSSC); II: 2.1; 2.0; 0.9/0.5/0.3/0.2/0.2; FII ventrally on basal half with row of 5–6 pale setae, on distal half continuing as row of 5–6 dark spine-like setae (MSSC)(Fig. 13c); III: 2.2; 2.5; 0.5/0.9/0.4/0.2/0.3; FIII anteroventrally along entire length with row of 8–10 long pale setae (MSSC).

WING: similar to Fig. 2g; CuAx ratio 0.4; lower calypter yellow with dark brown rim and with fan of pale setae; haltere yellow.

ABDOMEN: black with metallic green reflections and with short black setulae; hypopygium black with brownish cerci (Fig. 13a); epandrium with transverse cuticular striae; hypandrium elongate, subrectangular, and expanded apically in ventral view (Fig. 13b); aedeagus tapering, simple; epandrial seta arising internally in lateral view, and with short peduncular base; bristle of basal epandrial lobe longer than that of distal lobe; surstylus massive; dorsal surstylar arm with apical lobate projection and bearing long curved external seta near base; ventral surstylar arm with bladlike setal projection on triangular mound and with other major setae as figured; cercus distally upcurved and with strong outer seta, apical anvil-shaped seta, and inner short pedunculate seta as figured.

Female: similar to male except as noted: FI, FII lacking distinctive ventral setae; FIII with 2–3 long pale anteroventral setae in distal ¼ (Fig. 13d).

Remarks. Specimens of *M. dorrigenis* and *M. uda* were taken together in a mixed series of 38 individuals. Both species were collected in the early morning off trunks of pencil cedar, *Polyscias elegans* (Araliaceae) at the 'Glades Picnic Ground', Dorrigo National Park. The surrounding vegetation is subtropical rainforest. These two sympatric species are virtually identical except for details of the male femoral setation and genitalia, and they are probably sister species. The development of distinctive femoral setation is also evident in female *M. dorrigenis*, such that females have three distinctive FIII setae, which are lacking in female *M. uda*.

Medetera uda n. sp.

Type material. HOLOTYPE ♂ (ANIC), PARATYPES 4♂♂, 11♀♀ (ANIC, AMS): **Australia:** New South Wales, Dorrigo National Park, 760 m, 24 Oct 1980, D. J. Bickel.

Additional material. New South Wales: 1♂, Mt Warning National Park, rainforest, on trunk *Archontophoenix cunninghamiana* (Palmae), 24 Nov 1985 (AMS). Queensland: 1♂, Lamington National Park, O'Reilly's, rainforest, malaise trap, 3 Feb to 2 March 1980 (QDPI).

Description. Male: this species is similar in all respects to *M. dorrigenis*, except as noted.

LEGS: femora I and III without long ventral setae; femur II only with scattered weak ventral setae basally, lacking dark anteroventral setae on distal half.

ABDOMEN: hypopygium black with brown cerci (Fig. 13e); epandrium with cuticular striae; epandrial seta short; basal epandrial lobe much larger than distal lobe; surstylus with membranous attachment to epandrium; dorsobasally, surstylus weakly sclerotized near junction with epandrium; dorsal surstylar arm massive with large dorsoapical development and with large stout projecting seta and with lateral triangular projection as figured; ventral surstylar arm with setae and cuticular projections as figured; cercus distally upcurved with outer seta on cuticular pedicel, apical anvil-shaped seta, and short inner pedunculate seta.

Female: similar to female *M. dorrigenis* except lacking long pale anteroventral setae on FIII.

Remarks. *Medetera uda* is found in subtropical rainforest in north-eastern New South Wales and southeastern Queensland. It has been collected off the trunks of smooth barked trees, off pencil cedar at Dorrigo and off bangalow palm at Mt Warning. *Medetera uda* possibly represents an ancestral type from which the more derived *M. dorrigenis* (with distinctive MSSC leg setation) could have arisen.

Medetera athertonensis n. sp.

Type material. HOLOTYPE ♂: **Australia:** Queensland, Wongabel State Forest near Atherton, 17°20'S 145°31'E, malaise trap, 19 Nov 1981, D. H. Colless (ANIC).

Description. Male: length 2.0; wing dimensions 1.8 x 0.8; similar to *M. dorrigenis* except as noted.

LEGS: podomere ratios similar to *M. dorrigenis*; lacking distinctive setation on F II and III.

WING: CuAx ratio 0.3.

ABDOMEN: hypopygium dark brown with yellowish cerci (Fig. 12a); hypandrium with pair of lateral winglike processes arising basad, and aedeagus apically clavate in ventral view (Fig. 12b); epandrial lobes each with collar-like pedicel; surstylus broad and divided into dorsal and ventral arms; dorsal surstylar arm narrowed and ventrally curved distad, and with a strong lateral seta; ventral surstylar arm with strong setae and cuticular projections as figured; cercus upcurved distally, with distinctive apical projections, including an elongate outer seta and large leaf-shaped inner seta.

Female: unknown.

Medetera gingra n. sp.

Type material. HOLOTYPE ♂: **Australia:** New South Wales, Blue Mtns, Kanangra-Boyd National Park, junction Kowmung River and Gingra Creek, 12 Oct 1980, D. J. Bickel (ANIC). PARATYPES: 1♂, 2♀♀, 30 km north of Taree, Pacific Hwy, on *Eucalyptus* sp., 23 Nov 1985 (AMS); 1♂, 1♀, Queensland: Bunya Mountains National Park, Horse Gully Creek, on *E. punctata*, 6 Dec 1985 (AMS).

Description. Male: length 2.6; wing dimensions 2.3 x 0.8.

HEAD: vertex, frons, face, clypeus black with dusting of grey pruinosity; proboscis dark brown-black; arista about as long as head height.

THORAX: dorsum metallic green-bronze with some grey pruinosity; pleura with dense grey pruinosity; scutellum entirely dark, without yellow-brown colouration; setae yellowish; lateral scutellars $\frac{2}{3}$ length of medians.

LEGS: coxae dark brown, becoming yellowish distally; legs yellowish although femora brownish dorsally and basally; relative podomere ratios as: I: 3.2; 2.7; 1.1/0.8/0.6/0.4/0.4; II: 3.4; 3.1; 1.9/0.9/0.5/0.4/0.4; III: 2.9; 3.6; 0.8/1.7/0.8/0.4/0.3.

WING: elongate; M gradually approaches R_{4+5} ; CuAx ratio 0.3; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green-bronze with short yellowish setulae; hypopygium dark brown with yellowish cerci (Fig. 13f); epandrium elongate with cerci held between surstyli at rest; hypandrium and aedeagus simple; epandrial seta strong, positioned midway between epandrial lobes and base of hypandrium; junction of epandrium and surstylus fused but marked dorsally by deep cleft; dorsal surstylar arm elongate, tapering with strong lateral seta; ventral surstylar arm with striated lobe bearing subapical setal flag and subtended by strong seta projecting ventrad; other surstylar lobes and setae as figured; cercus narrow basally, with midventral lobe marking beginning of wider distal half which bears thin dorsoapical seta.

Female: similar to male.

Remarks. All specimens of *Medetera gingra* were collected off the trunks of *Eucalyptus* spp. in dry and wet sclerophyll forest from the Blue Mountains, New South Wales, to southern Queensland. Neither this species nor *M. bunyensis* has the yellowish posterior mesonotum and scutellum found in other members of the *flaviscutellum* group.

Medetera bunyensis n. sp.

Type material. HOLOTYPE ♂, PARATYPE ♂: **Australia:** Queensland: Bunya Mountains National Park, Horse Gully Creek, on *Eucalyptus punctata*, 6 Dec 1985, D. J. Bickel (AMS).

Description. Male: length 2.4; wing dimensions 1.9 x 0.8; similar to *M. gingra* except as noted.

THORAX: also with metallic green scutellum and yellowish setae.

ABDOMEN: dark metallic green-bronze with short yellowish setulae; hypopygium dark brown with yellowish cerci (Fig. 13g); epandrium subrectangular; hypandrium and aedeagus simple; epandrial seta relatively short, positioned midway between epandrial lobes and base of hypandrium; epandrial lobes strong; epandrium and surstylus fused; dorsal surstylar arm with distinctive strong cuticular hook and elongate lateral seta; ventral surstylar arm with

striated lobe bearing setae as figured; cercus blunt apically, with midventral excavation and with 2 strong ventral projections as figured.

Female: unknown.

Remarks. Both specimens of *Medetera bunyensis* were collected off the smooth trunks of *Eucalyptus punctata* in the Bunya Mountains, Queensland. This species is closely related to *M. gingra*, and they occur sympatrically, having been collected together off the same trees.

The *salomonis* Group

The *salomonis* group is characterized by the following: antennal colour various, either all black or with scape and pedicel yellow; thoracic setae black; either 5–6 dc present, or with 2 strong dc bordering mesoscutal depression and only short setulae present anteriorly; males with pale subapical dorsal seta on TIII (MSSC) (group autapomorphy); males sometimes with distinctive ventral setae on femora, or with orientated silvery pruinosity (MSSC); in *M. femoralis*, both male and female have orientated silvery pruinosity; wing vein M often either straight or bowed posteriorly (Figs 2a–c) (group autapomorphy); cercus secondarily segmented, with distal section of cercus articulated with basal section (strong group autapomorphy); tendency for distal section of cercus to become enlarged and expanded, sometimes with corresponding decrease in strength of surstylus (e.g., Fig. 15c).

The *salomonis* group has radiated primarily in Australasia but it also has spread into the Oriental region. *Medetera olivacea*, with a distribution from south-eastern Asia to New Guinea, has a posteriorly bowed vein M. Although its cercus is not articulated, the distal portion is distinctly demarcated, and this condition might be regarded as ancestral for the group. The *salomonis* group s.s. with an articulated distal section of the cercus might be divided into 2 assemblages:

1. *Medetera nigrohalterata*, *M. mooneyensis* and *M. austrofemoralis*, all from Australia, have the antenna black and 2 strong dc bordering the mesoscutal depression.

2. *Medetera salomonis* (widespread Australasia, Philippines), *M. femoralis* (New Guinea), *M. pseudofemoralis* (Melanesia, Queensland) and *M. malayensis* (Malaya) have the scape and pedicel yellow and 4–6 strong dc, decreasing in size anteriorly.

The secondary segmentation and articulation of the cercus is an unusual character, possibly unique in the Diptera Brachycera.

Medetera olivacea de Meijere

Medeterus olivaceus de Meijere, 1916: 260.

Type material. De Meijere described *M. olivaceus* from

4♀♀ syntypes taken at Batavia, Java. I have designated a ♀, bearing the label "Batavia/ iv 1908/ E. Jacobson" as LECTOTYPE (ZMUA, examined).

Additional material. (All BPBM except where noted) **Indonesia:** Sumatra, Fort de Kock, Oct 1913 (ZMUA). Irian Jaya: Nabire, 5–50 m, 25 Aug to 2 Sept 1962; HollandiaBinnen, 100 m, 31 Oct 1958; Bodem-Sarmi Aarea, 10 July 1959; Waris, south of Hollandia, 450–500 m, 8–15 Aug 1959; Japen Island, south-south-east Sumburbaba, Dawai River, 2 Nov 1962. **Malaysia:** Sabah: Paring, near Ranau, 23 Jan 1958; Tawau Residency, Kalabakan River, primary forest, 9–18 Nov 1958; Tawau, Quoin Hill, 3–7 July 1962; Sandakan Bay, Sapagaya Lumber Camp, 8 Nov 1957; Kalakakan, primary forest, 30 Oct 1962. **Papua New Guinea:** Wau, Morbe District, 1150–1200 m, Jan, March, April, Aug, Nov, 1962, 1965; Sepik-Maprik, 160 m, 27 Aug 1957. **Philippines:** Camarines Sur, Mt Isarog, 750–800 m, 24 April 1963. (10♂♂, 20♀♀ specimens examined).

Description. Male: length 2.5–2.6; wing dimensions 2.4 x 0.8.

HEAD: vertex, frons metallic green with bronze reflections and with grey pruinosity; face, clypeus metallic blue-green with grey pruinosity; proboscis black; antenna black; arista about as long as head height.

THORAX: dorsum metallic green with bronze reflections; pleura covered with dense grey pruinosity; ac about as long as width of ac band; 5–6 dc present, with 2 strong dc bordering mesonotal depression and 3–4 shorter dc anteriorly, and with short setulae anteriormost; lateral scutellars about ¼ length of medians.

LEGS: coxae and remainder of legs entirely black; relative podomere ratios as I: 2.3; 2.0; 1.0/1.0/0.7/0.4/0.3; II: 2.6; 2.4; 1.6/1.0/0.7/0.3/0.3; III: 2.5; 2.9; 0.7/1.5/0.8/0.4/0.3.

WING: venation similar to Fig. 2b; CuAx ratio 0.7; lower calypter and haltere yellow.

ABDOMEN: dark metallic green-bronze with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 14a); epandrium elongate; hypandrium and aedeagus elongate, tapering; epandrial seta strong, arising from short pedicel, and positioned closer to epandrial lobes than base of hypandrium; epandrial lobes each bearing strong bristle and long collar-like base; surstylus with weak membranous attachment to epandrium; surstylus divided into 3 arms, ventral arm with 2 strong ventrally projecting setae, middle arm clavate and weakly sclerotized, dorsal arm elongate; cercus with distinct adjoining but not articulated basal and distal sectors; basal sector with ventral seta and distal sector with 2 strong blade-like setae.

Female: similar to male but lacks MSSC..

Remarks. *Medetera olivacea* is distributed from the Philippines and Borneo through Indonesia to New Guinea (Fig. 23). In some respects, this species could be regarded as ancestral to the remaining *salomonis* group: the cercus is demarcated into distinct basal and distal sections, the basal section bearing a strong

ventral seta and the distal section with 2 blade-like seta. Such a demarcation might be ancestral to the articulated cercus of the *salomonis* group as seen in *M. mooneyensis*.

Medetera mooneyensis n. sp.

Type material. HOLOTYPE ♂: **Australia:** New South Wales, Mooney Mooney Creek near Gosford, wet sclerophyll forest, 1 Jan 1975, D. K. McAlpine (AMS). PARATYPES: 1♂, same data but 29 Nov 1975; 4♀♀, same data but 3 Dec 1984; 2♂♂, Mosman, on *Angophora costata*, 2 Dec 1984 (AMS, ANIC).

Description. Male: length 1.8; wing dimensions 1.8 x 0.7.

HEAD: vertex, frons, face black with brown pruinosity; clypeus shiny black; proboscis and antenna black; arista about as long as head height.

THORAX: dark metallic green with bronze reflections; bronze vittae over ac band and laterally over dc row; ac increasing in length posteriorly, the posteriormost about as long as width of ac band; 2 strong dc bordering mesonotal depression, anterior dc as short setulae; lateral scutellars about ⅓ length of medians.

LEGS: coxae, legs dark brown to black; relative podomere ratios as I: 1.7; 1.5; 0.6/0.4/0.3/0.2/0.1; II: 1.8; 1.7; 0.9/0.6/0.4/0.2/0.2; FII with row of black spine-like setae along entire ventral margin (MSSC); III: 1.9; 2.2; 0.5/1.0/0.5/0.3/0.2; TIII with strong pale dorsal at ¼, not subapically.

WING: M almost straight, only slightly bowed anteriorly; CuAx ratio 0.5; lower calypter entirely yellow with fan of yellow setae; haltere pale yellow.

ABDOMEN: black with metallic green and bronze reflections, and with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 14b); hypandrium and aedeagus simple; epandrial seta short, positioned midway between epandrial lobes and base of hypandrium; epandrial lobes positioned distally, distalmost lobe almost twice as long as proximal lobe; surstylus with membranous attachment to epandrium; surstylus with broad base and strong ventral hump, and continuing distally as single fused arm; surstylus with distinctive costate seta ventrally, median seta bearing projection, and short setae as figured; cercus divided into distinct setose basal section and articulated distal cap-like section; distal cercus with strong striated curved dorsoapical seta and ventroapical cuticular projection with basal and distal setae as figured.

Female: similar to male but lacks MSSC.

Remarks. *Medetera mooneyensis* is known only from the Sydney district and is relatively small in comparison with other members of the group. This species represents the most plesiomorphic condition within the *salomonis* group regarding the development of a secondarily divided and articulated

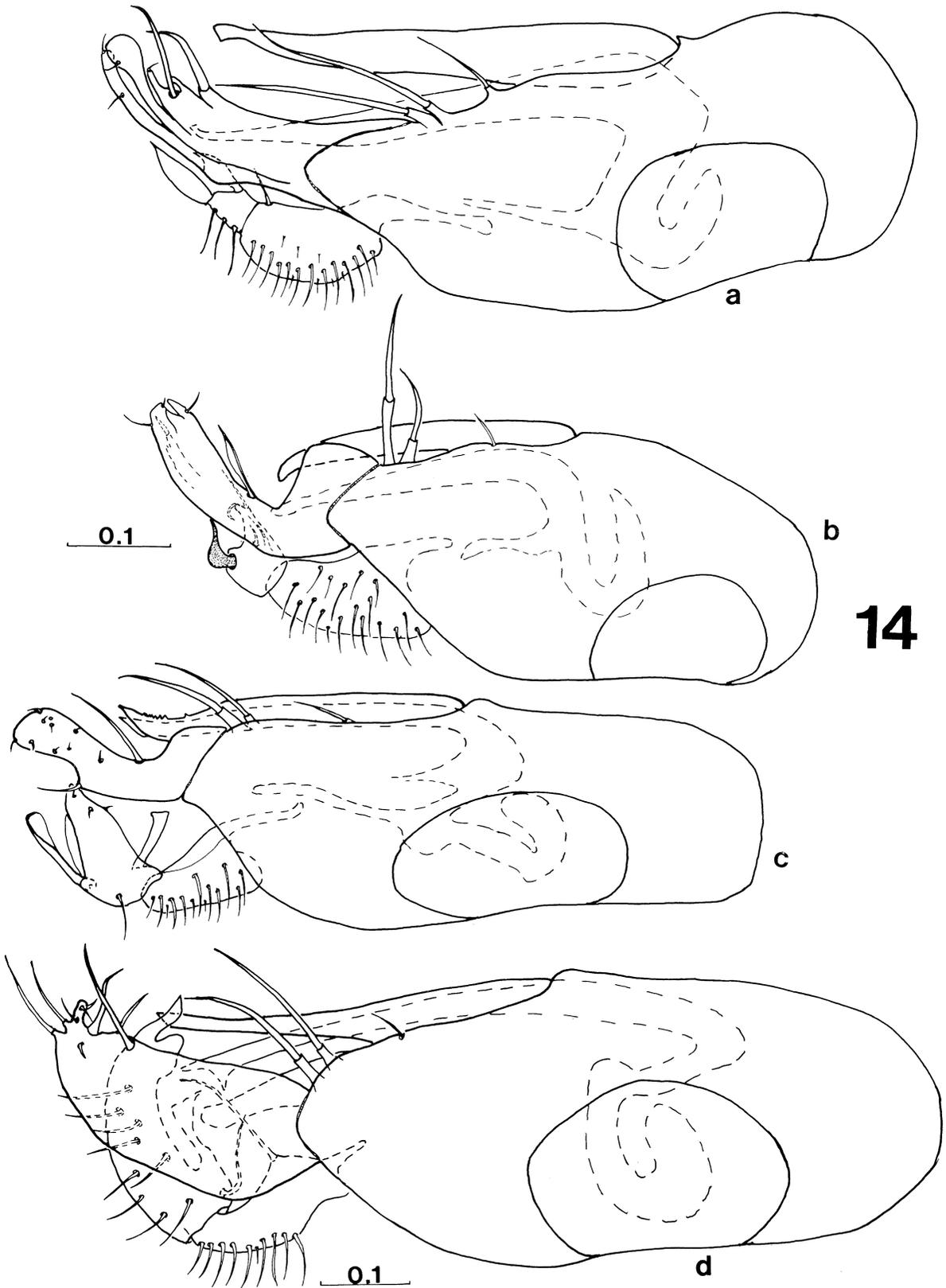


Fig. 14. a, *M. olivacea*, Selangor, Malaysia; left lateral view. b, *M. mooneyensis*, Gosford, New South Wales; hypopygium, left lateral view. c, *M. nigrohalterata*, Broken Bay, New South Wales; hypopygium, left lateral view. d, *M. malayensis*, Kulala Lumpur, Malaysia; hypopygium, left lateral view.

cercus. Here the distal cercus is cap-like and not as expanded or freely articulated as in other members of the *salomonis* group. The venation is plesiomorphic with respect to the rest of the *salomonis* group in that M is slightly bowed anteriorly.

***Medetera nigrohalterata* Parent**

Medetera nigrohalterata Parent, 1932a: 175.

Type material. HOLOTYPE♀: **Australia:** Australian Capital Territory, Brindabella Rd, bred from *Xanthorrhoea* sp., A. M. Wade (ANIC, examined).

Additional material. **Australia:** Australian Capital Territory: Mt McDonald, north of Cotter Dam. New South Wales: Broken Bay; Batemans Bay; Narooma, on trunks *Eucalyptus maculata*; Dromedary Ck, near Central Tilba, on trunks *E. maculata*; Meadowbrook; Washpool National Park, near Baryugil, on trunks *Eucalyptus* sp.; Mosman, on trunks *Angophora costata* and *Ficus macrophylla*; Ku-ring-gai Chase National Park; Royal National Park, on trunks *E. haemastoma*; Tinda Creek, Putty Rd, on trunks *Eucalyptus* sp. (collection dates A.C.T. and N.S.W.: Sept to May inclusive). South Australia: Taratap Stn, 36°37'S 139°57'E, 23 Jan 1965. Western Australia: Darling Ranges, John Forrest National Park, 22 Jan 1971. (83 specimens examined: AMS, ANIC, BMNH, SAM).

Description. Male: length 2.1–2.2; wing dimensions 2.2 x 0.8.

HEAD: vertex, frons, face, clypeus black with brown pruinosity; proboscis black; antenna black; arista relatively short, length less than head height.

THORAX: black with metallic green reflections and with brown pruinosity dorsally and grey pruinosity on pleura; ac relatively short, less than width of ac band; 2 strong dc bordering mesonotal depression, anterior dc as short setulae; lateral scutellars about 1/2 length of medians.

LEGS: coxae, legs black, with short pale hairs; relative podomere ratios as: I: 1.9; 1.6; 0.8/0.5/0.3/0.2/0.2; II: 2.3; 1.9; 1.1/0.6/0.4/0.2/0.2; III: 2.2; 2.5; 0.6/1.0/0.6/0.3/0.3; FIII and TIII with short silvery hairs anteriorly.

WING: (Fig. 2c); M with distinctive curvature, slightly flexed just before apex, although M sometimes bowed as in *M. salomonis* (Fig. 2b); CuAx ratio 1.0; lower calypter yellow with distinct brown rim and fan of pale yellow setae; haltere stem and club blackish.

ABDOMEN: black with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 14c); epandrium elongate; hypandrium with subapical denticles on ventral surface; aedeagus elongate, tapering; epandrial seta midway between epandrial lobes and base of hypandrium; pedicel of distal epandrial lobe larger than that of adjacent proximal lobe; surstylus with membranous attachment to epandrium; surstylus fused as single arm, curved with strong ventral seta at base of curvature, short setae distally, and dorsal seta; cercus divided into articulated basal and distal sections;

basal section with dorsal setae; distal section of cercus with ventral rectangular projection basally and a clavate distal arm and both can move with respect to expanded midsection; distal section of cercus with strong dorsal seta.

Female: similar to male but lacks MSSC.

Remarks. *Medetera nigrohalterata* is found along the coast and ranges of south-eastern Australia from New South Wales to South Australia, and also in southwestern Australia (Fig. 24). The specimens from the Darling Ranges, Western Australia, have fewer subapical denticles on the hypandrium, otherwise they are identical to specimens from New South Wales and South Australia. The presence of isolated populations of *M. nigrohalterata* in eastern Australia and Western Australia suggests a great age for the species, which must have been widely distributed across southern Australia before increasing post-Miocene aridity split the species into two isolated populations.

***Medetera malayensis* n. sp.**

Type material. HOLOTYPE♂: **Malaysia:** Kuala Lumpur, Klang Gates, 31 Dec 1958, L. W. Quate (BPBM).

Additional material. 3 probable ♀♀ of this species: **Malaysia:** Pahang, Kuala Tahan, 12–14 Dec 1958. Sabah (SE), Forest Camp, 19 km north of Kalabakan, 60 m, 17 Oct 1962; Sarawak: Gomatong Caves, 22–26 Nov 1958 (BPBM).

Description. Male: length 2.6; wing dimensions 2.5 x 0.9; the holotype is badly greased and rubbed.

HEAD: vertex, frons metallic green with bronze reflections; face and clypeus satiny metallic blue; proboscis black; scape and pedicel yellow; 1st flagellomere dark brown; arista about 1½ as long as head height.

THORAX: dorsum dark metallic green with bronze reflections; ac increasing in length posteriorly, posteriormost as long as width of ac band; 4 strong dc present, decreasing in size anteriorly, and with short setulae anteriormost.

LEGS: coxae, legs black; relative podomere ratios as: I: 2.5; 2.2; 1.4/1.0/0.7/0.4/0.3; II: 3.0; 2.7; 2.0/1.0/0.7/0.3/0.2; III: 3.0; 3.5; 0.8/1.7/1.0/0.4/0.3.

WING: venation similar to *M. salomonis* (Fig. 2b); CuAx ratio 0.7; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green-bronze with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 14d); hypandrium elongate, simple; aedeagus elongate, slightly recurved within epandrium, and with subapical dorsal triangular projection visible in lateral view; epandrial seta short, positioned midway between epandrial lobes and base of hypandrium; epandrial lobes subequal, each bearing strong bristle; surstylus with membranous attachment to epandrium; cuticular projection present along ventrolateral wall of genital chamber

adjacent to epandrial lobes and base of surstylus; surstylus as single broad arm, with 2 strong ventral bristles and other setae as figured; basal section of cercus with single strong projecting ventral seta and usual short dorsal setae; distal section of cercus curved with apical cuticular projections, and bearing strong ventrobasal curved seta and midventral blade-like projection.

Female: similar to male but lacks MSSC.

Remarks. *Medetera malayensis* is known from the Malay Peninsula and northern Borneo. It is the only wholly Oriental member of the *salomonis* group.

Medetera austrofemoralis n. sp.

Type material. HOLOTYPE ♂, PARATYPES 1♂, 1♀: **Australia:** Queensland, 1.5 km north of Lawgi, 11 May 1955, K. Norris & I. F. B. Common. PARATYPE: ♂, Mt Cook National Park, near Cooktown, 11–12 Oct 1980 (ANIC).

Description. Male: length 2.3; wing dimensions 2.1 x 0.8.

HEAD: vertex, frons and face metallic green and covered with brown pruinosity; clypeus metallic green with bronze reflections; proboscis black; antenna dark brown; arista about as long as head height.

THORAX: dorsum metallic green with bronze reflections covered with dusting of brown pruinosity; pleura covered with dense orientated pruinosity which appears silvery when viewed anteriorly through an arc 45 degrees either side of median saggital plane, and thus not appearing silvery in lateral view (MSSC); setae black; ac increasing in length posteriorly, the posteriormost about as long as width of ac band; 2 strong dc bordering mesonotal depression with anterior dc as short setulae; lateral scutellars about ½ length of medians.

LEGS: coxae, femora, tibiae black; tarsi yellowish but darkened distally; mass of silvery hairs present on anterior surfaces of femora and tibiae II and III, such that underlying dark cuticle is totally obscured, but silvery hairs somewhat wider and denser on TII (MSSC); posterior surfaces of legs black with pale normal vestiture; relative podomere ratios as I: 2.0; 1.8; 0.9/0.5/0.5/0.3/0.3; II: 2.3; 2.0; 1.0/0.5/0.4/0.3/0.2; III: 2.1; 2.4; 0.5/1.1/0.7/0.3/0.2.

WING: venation similar to *M. nigrohalteralis* (Fig. 2c); CuAx ratio 0.6; lower calypter and haltere yellow.

ABDOMEN: dark metallic green-bronze with grey pruinosity and with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 15f); epandrium oblong; hypandrium and aedeagus simple; epandrial seta short, positioned internally midway between epandrial lobes and base of hypandrium; pedicel of distal epandrial lobe very strong, 2–3 times larger than that of proximal lobe; surstylus fused to epandrium, undivided, U-shaped, and with distal setae as figured; basal section of cercus

with single ventral seta and usual dorsal setae; distal cercus elongate, curved, and divided into 3 overlapping sections, the middle section distally expanded and prolonged beyond others.

Female: similar to male except as noted: lacking orientated silvery pruinosity and hairs on pleurae, tibiae and femora.

Remarks. *Medetera austrofemoralis* is known from southern Queensland and the Cape York Peninsula. The dense silvery pruinosity and pilosity on the pleura and legs II and III are a distinctive MSSC. This contrasting pattern has its full effect when the fly is viewed anteriorly with the legs held out from the body.

Medetera salomonis Parent

Medetera Salomonis Parent, 1941: 233.

Type material. HOLOTYPE ♀, PARATYPES 3♀♀: **Solomon Islands:** Guadalcanal, Rere, 18 Aug 1934, R. A. Lever. PARATYPES: 2♀♀, Russell Island, Pepesata, 10 Nov 1934, R. A. Lever (BMNH, examined).

Additional material. (All BPBM except where noted) **American Samoa:** Tutuila: Taputimu Farm, 30 Oct 1964, 19 Aug 1964; Taputimu, 13 Oct 1954. **Australia:** New South Wales: Coffs Harbour, on trunk *Eucalyptus* sp., 24 Oct 1980 (AMS). Northern Territory:(♀ only) Nourlangie Creek, north of Mt Cahill, 19 Nov 1974 (ANIC). Queensland: Atherton, 7 March 1964 (UQIC); Torres Strait, Sue Island, 17–23 May 1983 (QDPI). **Fiji:** Viti Levu, Lautoka, 3 July 1914 (BMNH); Ovalau, Levuka, 10 July 1938. **French Polynesia:** Austral Islands: Rurutu, near Moerai, 90 m, 24 July 1934. Marquesas Islands: Vaipae Valley, Uahuka, Putataua, 370 m, 20 Sept 1929. Society Islands: Tahiti, Papara District, 23 Feb 1926. **Indonesia:** Irian Jaya: Nabire, Geelvinck Bay, 2 July to 7 Sept 1963; Hollandia-Binnen, 100 m, 31 Oct 1958; Star Mtns, Sibil Valley, 1245 m, Oct–Nov 1961; Vogelkop, Manokauri, 75 m, 19 July 1957; mouth of River Tor, east of Maffen, 2–5 July 1959. **Papua New Guinea:** New Britain: Malmalwan/Vunakanau, Gazelle Pen., 11–13 May 1956; Rabaul, no date (USNM). Rossel Island, Abaletic, 0–50 m, 27 Sept 1956 (AMNH); Fergusson Island, Gomwa Bay, Deidei, 2–6 July 1956 (AMNH); Morobe District, Wau, 1150–1250 m, 14 Feb 1963, 25 March 1968; Busu River, north-east of Lae, Sangeman Village, 30 July 1957; Mendi, south Highlands, 1660 m, 13 Oct 1958. **Philippines:** Mindanao, Cotabato Province, General Santos, 15 Aug 1958; Kidpawan, 18 Aug 1958. Sulu, Jolo Island, Talipo, 15–30 m, 31 Aug 1958; Bukidon, Malaybalay, Alanib, 910 m, 25 Oct 1959; Camirines Sur, Mt Isarog, 750–800 m, 26 April 1963; Albay Province, Libon, Caguscus, 200 m, 20 May 1965. **Solomon Islands:** Guadalcanal: Kukum, near Honiara; Tambalia; mouth of Matanikau River; Honiara. San Cristobal: Kira Kira, Maniata; Napagiwae. Rennell Island, Hutuna (ZMUC). Santa Isabel: Tatamba, 0–50 m; Buala. Choiseul: Kolombangara River, 80 m. Malaita: Dala. Vella Lavella: Gingola, 60 m. Florida Group: Vunuka, Small Ngela. (Solomon Island collection dates: Feb to Oct, inclusive). **Tokelau Islands:** Tokelau, 2 m, 1 March 1955. **Vanuatu:** Epi Island, Vaemali, 100–150 m, 8 July to 20 Aug 1967. **Western Samoa:** Upolu: Afiamalu, March, 1962 (MCZ); Utumapu, 14 July (BMNH); Apia, Feb 1955; Fagatogo, 1 May, 9 Nov 1953. (147 specimens examined).

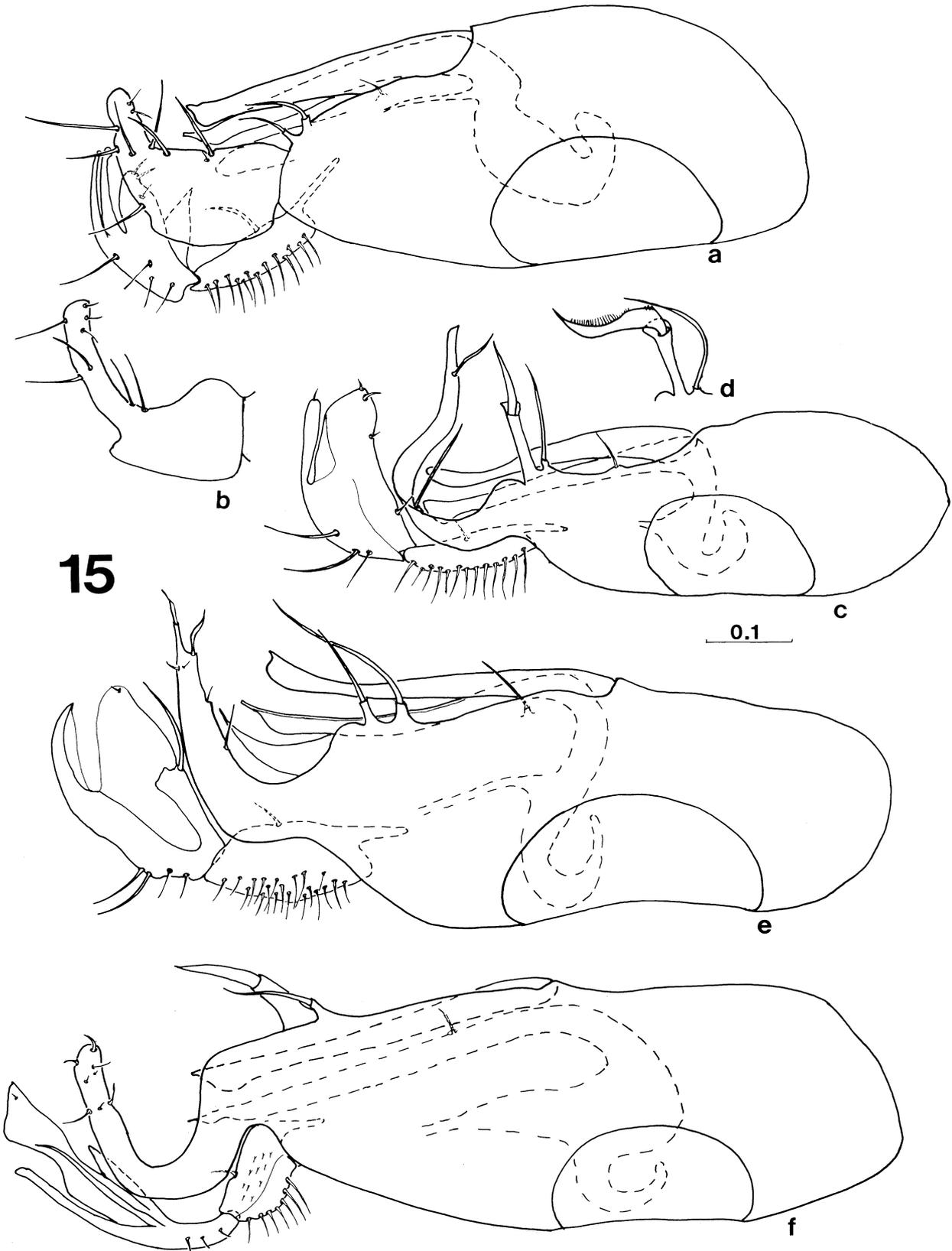


Fig. 15. a–b, *M. salomonis*; a, Malaita, Solomon Islands, hypopygium, left lateral view; b, Atherton, Queensland, surstylus, left lateral view. c–d, *M. pseudofemoralis*; c, Wau, Papua New Guinea, hypopygium, left lateral view; d, San Cristobal, Solomon Islands, epandrial lobes, left lateral view. e, *M. femoralis*, New Britain; hypopygium, left lateral view. f, *M. austrofemoralis*, Lagwi, Queensland; hypopygium, left lateral view.

Description. Male: length 2.5–2.8; wing dimensions 2.5 x 0.7.

HEAD: vertex, frons, face, clypeus metallic green, covered with grey pruinosity, although clypeus with less pruinosity; proboscis brown; scape and pedicel yellow to orange; 1st flagellomere black, subrectangular; arista about as long as head height.

THORAX: dorsum dark metallic green with bronze reflections and with dusting of brown pruinosity; pleura covered with dense grey pruinosity; ac increasing in length posteriorly, posteriormost about as long as width of ac band; 4 strong dc, decreasing in size anteriorly, and with short setulae anteriormost; lateral scutellars less than $\frac{1}{3}$ length of medians.

LEGS: coxae and femora black, with femoral 'knees' yellowish; remainder of legs yellowish to infuscated; relative podomere ratios as I: 2.0; 1.7; 0.9/0.6/0.4/0.2/0.3; II: 2.1; 1.9; 1.1/0.6/0.4/0.3/0.2; TII with strong ad-pd pair at $\frac{1}{4}$; III: 2.0; 2.4; 0.5/1.1/0.6/0.3/0.2.

WING: venation distinctive, with M and R_{4+5} somewhat bowed (Fig. 2b); CuAx ratio 0.6; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green-bronze with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 15a–b); epandrium ovate; hypandrium and aedeagus simple; epandrial seta short, positioned midway between epandrial lobes and base of hypandrium; epandrial lobes positioned near join with surstylus, subequal with collar-like bases bearing short bristles; surstylus with membranous attachment to epandrium; cuticular projection extending along ventrolateral wall of genital chamber adjacent to epandrial lobes and base of surstylus; surstylus single as single fused curved arm bearing 3 strong ventral setae and strong outer seta as figured (also see 'Remarks', below); cercus divided into basal section articulated with expanded distal section; basal section with strong ventral seta; distal section with ventrobasal triangular structure, midventral lobe with setae as figured, and 2 outer elongate finger-like projections; the distal cercus is freely articulated and can fold back on basal section similar to pocket-knife blade.

Female: similar to male but lacks MSSC.

Remarks. *Medetera salomonis* has a wide distribution across the Pacific, from New Guinea and the Philippines, east through the Solomons, Vanuatu, Fiji, Samoa and French Polynesia, Tokelau, and northern and eastern coastal Australia (Fig. 24).

Medetera salomonis shows some variation in surstylar shape across its range. The characteristic shape from the Solomon Islands, has the surstylus with a broad base and a stout distal arm, and three strong setae along ventral margin (Fig. 15a). In an extreme form from Atherton, Queensland (Fig. 15b), the distal arm is prolonged, only 2 strong ventral setae are present, a ventral mound is present near the base of the surstylus and a distinct dorsal bump is present. Variation in the surstylus occurs variously throughout the range of *M. salomonis*: Philippine,

most Papua New Guinean, Samoan, and most French Polynesian specimens similar to the Solomon Island form (Fig. 15a); Wau, Papua New Guinean specimens similar to Fig. 15a but with only 2 strong ventral setae; Hollandia, Irian Jaya, specimens have an elongate arm similar to Fig. 15b but with 3 strong ventral setae; Nabire, Irian Jaya, specimens similar to Fig. 15b but lack dorsal bump; Torres Straits, Queensland, New South Wales and some specimens from the Marquesas display a surstylar form similar to Fig. 15b. I regard the above variations as intraspecific, with various trends in surstylar configuration developing independently across the wide range of *M. salomonis*. In all specimens, the distinctive cercal configuration is identical, as are details of the general habitus. I do not believe these various forms have speciated, but that they might represent peripheral isolates, perhaps forerunners of incipient speciation.

Medetera femoralis Becker

Medetera femoralis Becker, 1922: 52.

Type material. Becker described *Medetera femoralis* from a single male taken at Stephansort, Astrolabe Bay, Papua New Guinea. The holotype, which was deposited at the Hungarian National Museum, Budapest, has since been destroyed. However, the description was accurate enough to enable recognition of the species and I have designated the following male neotype: **Papua New Guinea:** Wau, 1100 m, 25 March 1968, P. Colman (BPBM).

Additional material. **Papua New Guinea:** Wau, 1200–1250 m, 14 Aug 1976, 14 Feb 1963 (BPBM, USNM); Dreikikir, East Sepik Province, 350 m, 22–25 June 1961 (BPBM); Siutmeri, Sepik River, 16 March 1964 (ANIC); Sangeman Village, near Busu River, north-east of Lae, 30 Aug 1957 (BPBM); Tsenga, Upper Jimmi Valley, 1200 m, 13 Aug 1955 (BPBM). **New Britain,** Gazelle Peninsula, Malmalwan-Vunakanau, 11–13 May 1956 (BPBM); (12♂♂, 7♀♀ specimens examined).

Description. Male: length 2.8–2.9; wing dimensions 2.7 x 1.0.

HEAD: vertex, frons bright metallic green with some grey pruinosity; face, clypeus metallic green covered with bright dense silvery pruinosity; proboscis dark brown; scape and pedicel yellow; 1st flagellomere brown; arista about as long as head height.

THORAX: bright metallic green with bronze reflections and dusting of grey pruinosity; pleura with silvery pruinosity, evident when viewed anteriorly in an arc 45 degrees either side of median sagittal plane; ac shorter than width of ac band; 4 strong dc, decreasing in size anteriorly, and with short setulae anteriormost; lateral scutellars about $\frac{3}{4}$ length of medians.

LEGS: coxa black, coxa I with dense bright silvery pruinosity; coxae II and III with some grey pruinosity; femora dark brown; tibiae yellowish; basal tarsomeres yellow, distal tarsomeres dark brown; relative podomere ratios as I: 2.9; 2.0; 1.1/0.5/

0.4/0.3/0.3; FI with long black posteroventral setae (MSSC); II: 2.6; 2.3; 1.4/0.7/0.4/0.2/0.2; FII with row of 7–8 black spinelike ventral setae, ending abruptly at 6/10 (MSSC); III: 3.0; 3.3; 0.7/1.7/1.0/0.3/0.2.

WING: membrane somewhat milky, veins brown; M almost straight, gradually approaching R_{4+5} (Fig. 2a); CuAx ratio 0.8; lower calypter and haltere yellow.

ABDOMEN: bright metallic green with bronze reflections, and with short black setulae; sterna with some silvery pruinosity; hypopygium dark brown with yellowish cerci (Fig. 15e); epandrium elongate; hypandrium distally outcurved with ventroapical point; aedeagus simple, tapering near apex; epandrial seta strong, near base of hypandrium; each epandrial lobe bearing stout bristle; tapering side lamella arising from lateral wall of genital chamber near bases of epandrial lobes; surstylus fused to epandrium; surstylus fused into single arm, strongly curved ventrally, and tapering with apical blade-like seta and other setae as figured; basal section of cercus with single ventral seta and usual dorsal setae; distal cercus greatly expanded with strong ventral seta and some dorsal setae, and with strong outer arm adjacent to large weakly sclerotized plate which bears 2 short apical setae.

Female: similar to male; also with bright silvery pruinosity on pleurae and coxa I; lacking posteroventral setae on FI and spine-like setae on FII.

Remarks. *Medetera femoralis* is a distinctive species found in New Guinea and the Bismark Archipelago.

Medetera pseudofemoralis n. sp.

Type material. HOLOTYPE ♂: Papua New Guinea: Wau, Big Wau Creek, 1300 m, Nov, 1965, J. Sedlacek. PARATYPE: ♂, south-east Biak Island, 1 July 1962; ♂, Indonesia: Irian Jaya, Nabire, Geelvink Bay, 1–20 m, 2–9 July 1962 (BPBM).

Additional material. Australia: 1♂, 1♀, Queensland, Mt Webb National Park, 15°04'S 145°07'E, 28–29 Sept 1980 (ANIC). Solomon Islands: 1♂, San Cristobal, Napagiwae, 19 Aug 1960 (BPBM).

Description. Male: length 1.9–2.1; wing dimensions 2.0 x 0.6.

HEAD: vertex, frons dark metallic green with bronze reflections, and with some brown pruinosity; face, clypeus satiny metallic green with grey pruinosity laterally; proboscis dark brown; scape and pedicel yellow; 1st flagellomere brown; arista about as long as head height.

THORAX: dorsum metallic green with brownish pruinosity; pleura with dense brown pruinosity; ac about as long as width of ac band; 4 strong dc, decreasing in size anteriorly, and with short setulae anteriormost; lateral scutellars about $\frac{3}{4}$ length of medians.

LEGS: coxae, femora dark brown; femoral 'knees'

and remainder of legs yellowish to infuscated; relative podomere ratios as I: 1.5; 1.3; 0.7/0.3/0.2/0.2/0.1; II: 1.8; 1.6; 0.8/0.4/0.3/0.2/0.1; III: 1.7; 1.9; 0.4/0.8/0.5/0.2/0.2.

WING: venation similar to Fig. 2a; CuAx ratio 0.6–0.8; lower calypter and haltere yellow.

ABDOMEN: metallic green with bronze reflections and with short black setulae; hypopygium black with yellowish cerci (Fig. 15c); epandrium elongate; hypandrium and aedeagus simple; epandrial seta positioned midway between epandrial lobes and base of hypandrium; distal epandrial lobe much larger than basal lobe, with stout, elongate pedicel and strong bristle, which is bent and expanded in specimen from Solomon Islands (Fig. 15d); side lamella not evident; surstylus fused to epandrium, is twisted and curved, ribbon-like, and bears strong setae as figured; basal cercus with strong ventral setae; distal cercus greatly expanded with large lobate basal portion and narrow outer arm, and with distinctive setae as figured.

Female: similar to male but lacks MSSC.

Remarks. *Medetera pseudofemoralis* is found from New Guinea to the Solomon Islands, and northern Queensland. The Solomon Island specimen is somewhat larger than specimens from New Guinea and Australia, and its distal epandrial lobe bears a curved and expanded blade-like bristle with tiny hairs along its outer margin (Fig. 15d). However, in all other respects the Solomon Island specimen is identical with the New Guinea and Australian specimens, down to details of setation on the surstylus and outer cercus. I therefore regard the Solomon Island specimen as a local variant of *M. pseudofemoralis*.

The *apicalis* Group

The *apicalis* group is defined by the following features: four strong dc usually present which decrease in size anteriorly; hypopygium elongate, subrectangular in lateral view; epandrial lobes separate, with short collar-like bases; epandrial seta present; hypandrium often forming an elongate inverted trough over aedeagus and often held out at an angle from epandrium (e.g. see Figs 17h, 16e); aedeagus, as it emerges from epandrium often appears clasped by base of hypandrium; surstylus fused almost to apex; surstylus usually bearing a distinctive curved, frayed seta on ventral surface (autapomorphy); cerci usually with flattened apicodorsal unguiform seta.

The *apicalis* group is most diverse in the holarctic region (see Bickel, 1985). The nine species considered below include the widespread Indo-Pacific 'tramp' species, *M. austroapicalis*, and five Oriental species: *M. pumila*, *M. chandleri*, *M. apicipes*, *M. longitarsis* and *M. liwo*. Three species are described from Nepal, on the southern slopes of the Himalayas: *M.*

nepalensis, *M. himalayensis* and *M. stomias*. *Medetera nudicoxa* Becker (not seen) described from Darjeeling, India, is probably closely related to *M. himalayensis*.

***Medetera austroapicalis* n. sp.**

Type material. HOLOTYPE ♂, PARATYPES 2♂♂, 1♀: Solomon Islands: Roroni, 35 km east of Honiara, 7 May 1964, 10 m. R. Straatmann (BPBM).

Additional material. (All BPBM except where noted) **Australia:** New South Wales: Iluka rainforest, Clarence River, 24 Nov 1970, 22 Feb 1965 (AMS). Queensland: 1 km southeast of Mt Cook, 15°30'S 145°16'E, 13 Oct 1980 (ANIC). **Hong Kong:** Taipoka, 30 June 1964. **India:** Yercaud, near Salem, 4500 ft, 6–10 April 1962 (CNC). **Nepal:** Godavari, Katmandu, 5400 ft, 2 July 1967 (CNC). **Papua New Guinea:** Adelbert Mtns, Wanuma, 800–1000 m, 27 Oct 1958; New Britain, Gazelle Peninsula, 4–13 May 1956. **Philippines:** Negros Is, Camp Lookout, Dumaguete, 15 Feb to 15 April 1961 (AMNH); Camarines Sur, Mt Isarog, 750–800 m, 26 April 1963; Ifugao Province, Liwo, 8 km east Mayoyao, 1000–1300 m, 12 June 1967. **Solomon Islands:** Vella Lavella, Ulo Crater, 17 Dec 1963; Vella Lavella, Pusiasama, 17 Nov 1963; Santa Ysabel, south-east Tatamba, 8 Sept 1964. **Sri Lanka:** Kohuwala W.P., 16 July 1966 (CNC). (17♂♂, 11♀♀ specimens examined).

Description. Male: length 2.0–2.2; wing dimensions 1.8 x 0.6.

HEAD: vertex, frons, face, clypeus metallic green, with grey pruinosity; proboscis brown; scape and pedicel usually yellow, but sometimes strongly infuscated, appearing brown in some specimens; 1st flagellomere black; arista about as long as head height.

THORAX: metallic green with bronze reflections with some grey pruinosity on dorsum and heavy pruinosity on pleura; setae black; ac increasing in size posteriorly; lateral scutellars $\frac{3}{4}$ length of medians.

LEGS: coxae, basal $\frac{2}{3}$ of femora dark brown to black; remainder of legs yellowish except for brown distal tarsomeres; I: 2.0; 1.5; 0.6/0.4/0.3/0.2/0.2; II: 2.1; 1.8; 0.9/0.4/0.3/0.2/0.2; III: 2.2; 2.5; 0.5/0.8/0.4/0.3/0.2.

WING: M gradually approaches R_{4+5} (Fig. 2f); CuAx ratio 0.8; lower calypters yellow with fan of pale setae; haltere yellow to slightly infuscated.

ABDOMEN: dark metallic bronze-green with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 16e); hypandrium simple, slightly expanded distally; aedeagus with distinctive spurred apex; epandrial seta positioned basad along ventral margin of genital chamber; epandrial lobes as separate short collars, each bearing strong bristle; surstylus fused almost to apex, with curved, distally frayed, ventral subapical seta; cercus stout, with strong curved dorsoapical seta, subtended ventrally by subrectangular cuticular projection and lateral leaf-like seta.

Female: similar to male.

Remarks. *Medetera austroapicalis* has the following distribution: Sri Lanka and India, through south-east Asia to the Philippines, New Guinea and the Solomons, and eastern coastal Australia to northern New South Wales. This species is closely related to the widespread holarctic *M. apicalis*, from which it may be separated by the distinctive aedeagal apex and somewhat smaller size (see Bickel, 1985 for discussion of the somewhat variable *M. apicalis*). *Medetera austroapicalis* probably arose as a southern outlier of *M. apicalis*. The scape and pedicel of *M. austroapicalis* are distinctly yellow in most specimens, although they are sometimes infuscated to a dark brown, especially noted in specimens from southern India and Sri Lanka. However, the hypopygium is identical in both yellow and brown antennal forms and thus are regarded as conspecific. A similar colour variation exists among specimens of *M. apicalis* from the south-eastern United States.

The male specimen from Nepal shows characters intermediate between *M. austroapicalis* and *M. apicalis*. It has brown antennae, only a weak spur on the apex of the aedeagus, the basal epandrial bristle stronger than the distal, and a relatively long epandrial seta. *Medetera austroapicalis* and *M. apicalis* are possibly conspecific, or form a widely distributed somewhat polytypic complex of sibling species. It is difficult to resolve this problem at the morphological level alone.

***Medetera chandleri* n. sp.**

Type material. HOLOTYPE ♂: Sri Lanka: Labugama, on tree trunk, 18 Feb 1974, P. J. Chandler (ex. personal collection P. J. Chandler, deposited BMNH).

Description. Male: length 3.0; wing dimensions 2.3 x 0.8; similar to *M. austroapicalis* except as noted.

HEAD: scape and pedicel yellow.

WING: CuAx ratio 0.8; haltere yellow.

ABDOMEN: dark metallic bronze-green with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 16d); hypandrium simple, slightly expanded distally; aedeagus with curved apex; epandrial seta relatively long, positioned midway between epandrial lobe and base of hypandrium; bristles of epandrial lobes strong and arising separately from epandrial margin near base of surstylus; surstylus expanded dorsally, with cuticular striae, and with curved, frayed, subapical ventral seta; cercus with strong curved blade-like dorsoapical seta, subtended ventrally by 2 blade-like setae, curled pedunculate seta, and longer straight pedunculate seta.

Female: unknown.

Remarks. *Medetera chandleri* is known only from Sri Lanka. It is probably derived from *M. austroapicalis*.

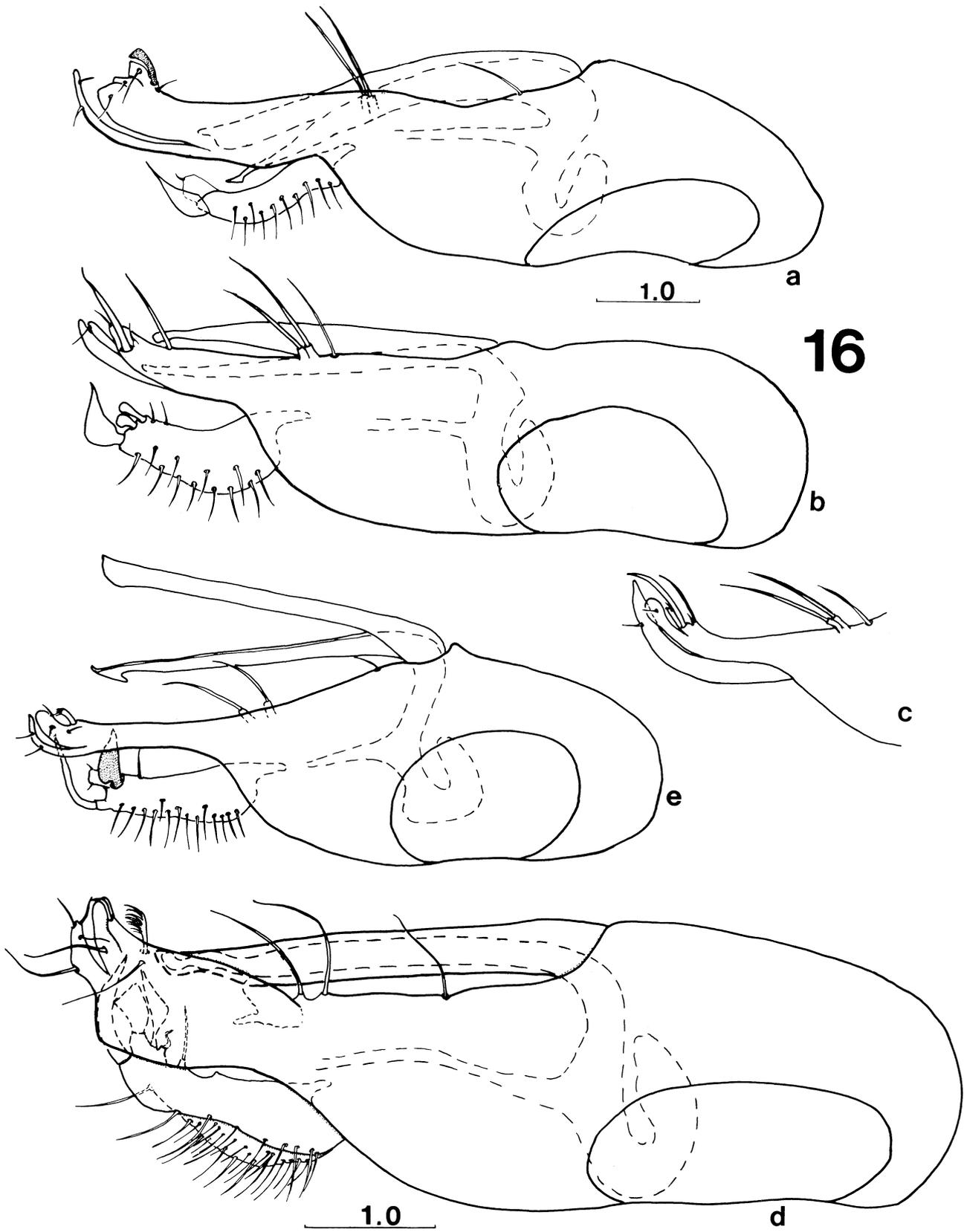


Fig. 16. a, *M. liwo*, Ifuago Province, Philippines; hypopygium, left lateral view. b, *M. longitarsis*, Java; hypopygium, left lateral view. c, *M. apicipes*, Java; surstylus, left lateral view. d, *M. chandleri*, Sri Lanka; hypopygium, left lateral view. e, *M. austroapicalis*, Guadalcanal, Solomon Islands; hypopygium, left lateral view.

Medetera pumila de Meijere*Medeterus pumilus* de Meijere, 1916: 260.

Type material. SYNTYPES: **Indonesia:** Java, 1♂, 1♀, Batavia, March, 1908; 1♂, Semarang, Sept 1905; E. Jacobson. ♂, labelled "Batavia/ iii 1908 /E. Jacobson", is here designated as LECTOTYPE (ZMUA, examined).

Additional material. **Indonesia:** 1♂, Sumatra, Pau Bev, Sept 1914 (ZMUA). **Singapore:** 4 June 1985 (CED). **Sri Lanka:** 2♂♂, 3♀♀, Nugegoda W. P., 19 July to 5 Sept 1967; 1♂, 5♀♀, Colombo W.P., 5 Sept 1967; 1♂, Kohuwala W. P., 16 July 1966 (CNC).

Description. Male: length 1.9–2.0; wing dimensions 1.6 x 0.6; similar to *M. austroapicalis* except as noted.

HEAD: face shining metallic blue-green; scape and pedicel yellow, 1st flagellomere brown.

SILVERY PRUINOSITY: orientated pruinosity which appears bright silvery when viewed at an angle of 0–45 degrees either side of median sagittal plane are present as following: anterior coxae I and II, stripe across pleura just above coxae, and lateral margins of abdominal terga 1.

THORAX: all setae yellow; ac short, length less than width of row; lateral scutellars reduced to weak hairs, less than 1/5 length of medians.

LEGS: coxae and legs entirely yellow although coxae II and III somewhat infuscated; I: 1.8; 1.6; 0.5/0.5/0.4/0.3/0.2; II: 1.9; 2.0; 0.8/0.7/0.4/0.3/0.2; III: 1.9; 2.1; 0.3/1.0/0.4/0.3/0.2.

WING: CuAx ratio 0.7; haltere pale yellow.

ABDOMEN: metallic bronze-green with short pale setulae; hypopygium dark brown with yellowish cerci (Fig. 17h); hypandrium heavily sclerotized on basal 3/4 with 2 upturned short teeth at 3/4; hypandrium in distal 1/4 appears weakly sclerotized and distinct from basal section; aedeagus deflexed dorsoapically; epandrial seta near base of genital chamber; epandrial lobes separate but adjacent, each bearing a strong bristle; surstylus fused basally, with a strong curved ventral blade-like seta present subapically; cercus with large, weakly sclerotized dorsoapical blade-like seta, subtended by rectangular ventral cuticular projection and distinctive ventral capitate projection.

Female: similar to male.

Remarks. *Medetera pumila* is recorded from Indonesia, Singapore and Sri Lanka, and probably occurs across tropical south-east Asia. The orientated silvery pruinosity of the coxae I and II, pleura and abdominal tergum 1, is similar to that found in members of the *gracilis* group.

Medetera longitarsis de Meijere*Medeterus longitarsis* de Meijere, 1916: 262.

Type material. SYNTYPES: **Indonesia:** Java, 2♂♂, Wonosobo, April 1909; 1♂, Nongkodjadar, Jan 1911, leg. E. Jacobson. ♂, labelled "Wonosobo/ iv 1909/ E. Jacobson"

is here designated as LECTOTYPE (ZMUA, examined).

Description. Male: length 3.2–3.3; wing dimensions 3.2 x 1.1; similar to *M. austroapicalis* except as noted.

HEAD: proboscis and antenna black.

LEGS: coxae, femora dark brown; distal 1/6 of femora and remainder of legs yellowish; I: 3.2; 3.4; 1.6/1.9/1.0/0.5/0.4; II: 3.7; 4.4; 2.4/2.7/1.7/0.6/0.4; III: 4.0; 5.6; 0.8/3.3/2.0/0.7/0.4.

WING: M arches gradually towards R_{4+5} ; CuAx ratio 1.0.

ABDOMEN: metallic green with bronze reflections; hypopygium dark brown, elongate, subrectangular (Fig. 16b); hypandrium and aedeagus elongate, tapering; epandrial seta long, positioned distally, near epandrial lobes; epandrial lobes adjacent but separate, each bearing a strong bristle; ventral surstylar arm relatively short, bearing stout blade-like seta and long ventral seta; cercus broad, curved, with strong blade-like dorsoapical seta which is subtended by 2 short spatulate setae.

Female: unknown.

Remarks. *Medetera longitarsis* is known only from Java. On the three male specimens, tarsomere 2 is longer than the adjacent tarsomere 1 on all legs, a relationship unique among *Medetera* species. (Also, see 'Remarks' under *M. apicipes*).

Medetera apicipes de Meijere*Medeterus apicipes* de Meijere, 1916: 262.

Type material. SYNTYPES 1♂, 2♀♀: **Indonesia:** Java, Semarang, Sept 1905, E. Jacobson. The male, bearing the label "Semarang/ ix 1905/ Jacobson" is here designated as LECTOTYPE (ZMUA, examined).

Description. Male: length 2.7; wing dimensions 2.7 x 0.8; similar to *M. longitarsis* except as noted.

LEGS: coxae brown; femora yellowish with brownish infuscation; tibiae, basal tarsomeres yellow, distalmost tarsomeres dark brown; I: 2.7; 2.5; 1.1/1.0/0.7/0.5/0.4; II: 2.6; 2.8; 1.8/1.1/0.8/0.7/0.6; III: 2.5; 2.7; 1.9/1.2/0.9/0.4/0.3.

WING: M gradually approaches R_{4+5} ; CuAx ratio 0.7; lower calypter yellow with pale setae; haltere yellow.

ABDOMEN: metallic green with bronze reflections; hypopygium similar to *M. longitarsis* except for details of surstylus (Fig. 16c); surstylus deeply cleft, the dorsal surstyly arm with spatulate apex, subtended basad by 2 strong setae as figured; ventral surstylar arm distally curved.

Female: similar to male.

Remarks. *Medetera apicipes* is known only from Java and is closely related to *M. longitarsis*. The two species differ primarily in size, details of surstylar setation, and relative tarsomere ratios.

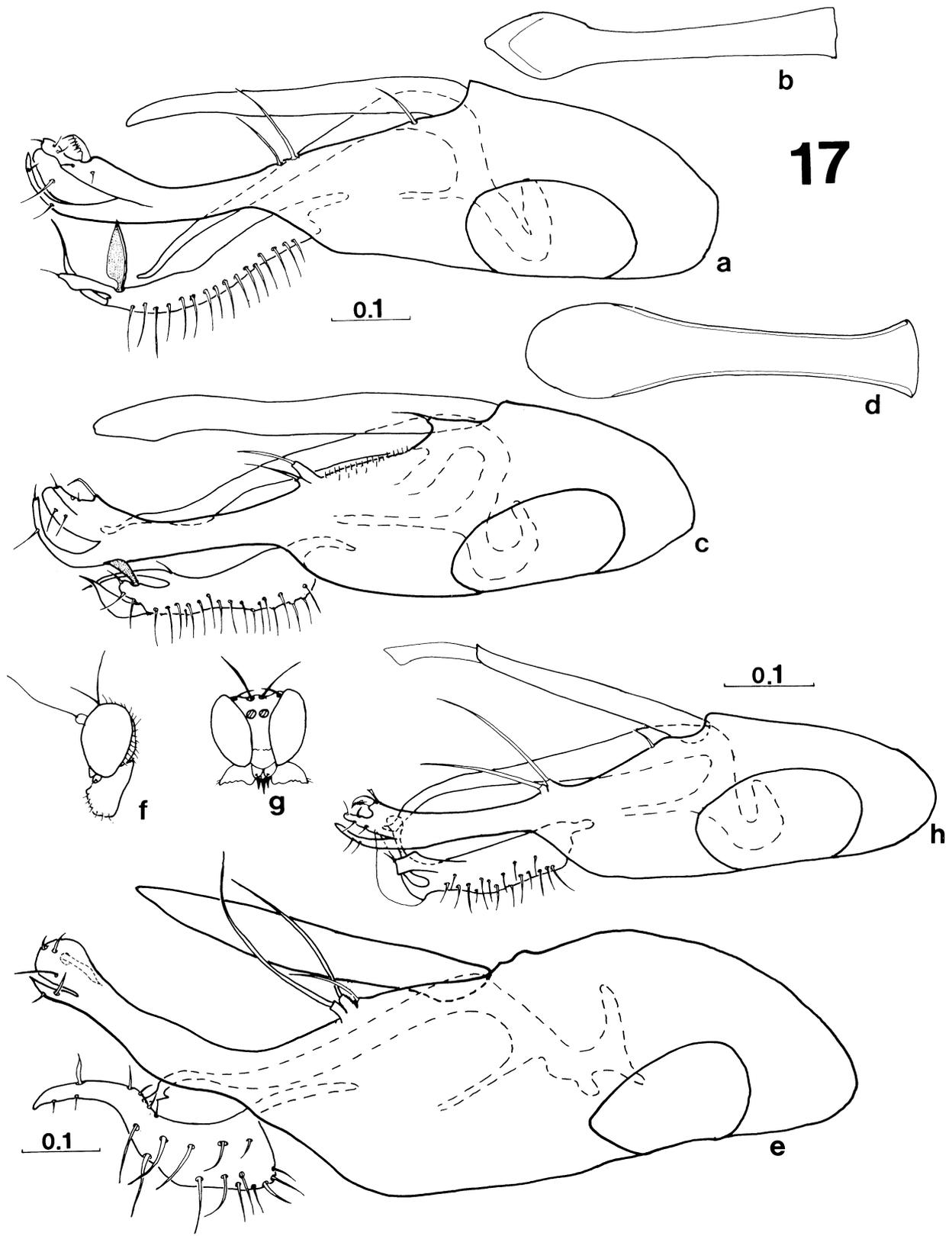


Fig. 17. a–b, *M. nepalensis*, Nepal; a, hypopygium, left lateral view; b, hypandrium, ventral view; c–d, *M. himalayensis*, Nepal; c, hypopygium, left lateral view; d, hypandrium, ventral view. e–g, *M. stomias*, Nepal; e, hypopygium, left lateral view; f, head, male, left lateral view; g, head, male, anterior view. h, *M. pumila*, Sri Lanka; hypopygium, left lateral view; .

Medetera liwo n. sp.

Type material. HOLOTYPE ♂, PARATYPE ♂: **Philippines:** Ifugao Province, Liwo, 8 km east of Mayoyao, 1000–1300 m, 11–12 June 1967, H. M. Torrevillas (BPBM). Both specimens somewhat rubbed and covered with moth scales.

Description. Male: length 1.9; wing dimensions 1.8 x 0.6; similar to *M. austroapicalis* except as noted.

HEAD: vertex, face, frons, clypeus dark metallic green, with dusting of brownish pruinosity; antenna dark brown; arista about as long as head height.

THORAX: dark metallic green with dusting of brownish pruinosity; setae black; scutellars missing.

LEGS: (leg I and most of leg II missing from specimens); coxae and femora black; tibia and tarsis of leg III dark brown; III: 1.6; 1.9; 0.4/0.7/0.4/0.3/0.2/0.2; FIII with pale hairs ventrally.

WING: M gradually approaching R_{4+5} , as in wing of *M. minima* (see Fig. 2i); CuAx ratio 0.6; lower calypter yellow with distinct brown rim and yellow setae.

ABDOMEN: black with metallic green and bronze reflections; segment 7 (peduncle) relatively long, about as long as length of epandrium from base to insertion of cercus; hypopygium dark brown with yellowish cerci (Fig. 16a); hypandrium and aedeagus elongate; epandrial seta positioned basad along ventral margin of genital chamber; epandrial lobes adjacent but separate, collar-like, each bearing strong bristle; surstylus with deep cleft; ventral surstylar arm stout with curved expanded seta; dorsal surstylar arm thin, curving distad of ventral arm; cercus with apical blade-like seta subtended by subrectangular cuticular projection bearing apical seta.

Female: unknown.

Medetera nepalensis n. sp.

Type material. HOLOTYPE ♂, PARATYPE ♀: **Nepal:** 27°57'N 84°59'E, 10,000 ft, malaise trap 5, 18 May 1967, Canadian Nepal Expedition. PARATYPE: ♂, same data but 30 May 1967 (CNC).

Additional material. Probable females of this species: **Nepal:** 27°58'N 85°00'E, 11,200 ft; 27°56'N 85°00'E, 10,000ft; 28°00'N 85°00'E, 9,900 ft; Katmandu, Pulchauki, 8,000 ft; all dates 24 May to 1 June 1967 (CNC).

Description. Male: length 2.7–2.8; wing dimensions 3.2 x 1.2.

HEAD: vertex, frons metallic green, covered with grey pruinosity; face and clypeus coriaceous deep metallic blue-violet, with some pruinosity adjacent to suture; proboscis dark brown; antenna dark brown; 1st flagellomere subrectangular, arista about as long as head height.

THORAX: metallic blue-green, covered with grey pruinosity; brown vittae over ac band and laterally adjacent to dc line, and spreading across anterior half of mesoscutal depression; 5–6 pairs ac, increasing in length posteriorly, the posteriormost pair almost

twice the width of ac band; lateral scutellars $\frac{2}{3}$ length of medians.

LEGS: coxae and legs dark brown, only distalmost femora yellowish; podomere ratios similar to *M. austroapicalis*; FII and FIII with 5–7 long brown a-v setae.

WING: relatively long and broad compared to body length; wing veins dark brown; venation similar to *M. himalayensis* but without distinct bend in R_{2+3} ; CuAx ratio 0.85; lower calypter pale yellow with yellow marginal setae; haltere pale yellow.

ABDOMEN: metallic green-blue with bronze reflections and with short dark setulae, although pale hairs present along edge of tergum 1; hypopygium dark brown with yellowish appendages (Fig. 17a); hypandrium broad, expanded distally in ventral view (Fig. 17b); aedeagus elongate, tapering; epandrial seta positioned basad; epandrial lobes distad, without distinct collar-like bases, but bristles arise directly from margin of epandrium; surstylus elongate, fused basally, expanded and cleft distad; ventral surstylar arm with distinct flattened and frayed seta and with lobes as figured; cercus with apical curved flattened seta, subtended by cuticular projection and subapical ventral blade-like seta.

Female: similar to male, including presence of a-v hairs on FII and FIII.

Remarks. See 'Remarks' under *M. himalayensis*.

Medetera himalayensis n. sp.

Type material. HOLOTYPE ♂: **Nepal:** 27°58'N 85°00'E, malaise trap 3, 11,400 ft, 15 May 1967, Canadian Nepal Expedition (CNC).

Additional material. 3♀, probably of this species: **Nepal:** 27°58'N 85°00'E, 11,200 ft, 17 May to 1 June 1967 (CNC).

Description. Male: length 2.4; wing dimensions 2.7 x 1.2; similar to *M. nepalensis* except as noted.

WING: veins dark brown on a milky coloured membrane; R_{2+3} with distinctive bend distally (Fig. 2d).

ABDOMEN: hypandrium in ventral view expanded distally (Fig. 17d); epandrial seta positioned basad on distinct protuberance (Fig. 17c); epandrial lobes adjacent but separate, and basal lobe longer than distal lobe; short setae present along ventral margin between epandrial lobes and epandrial seta; surstylus expanded distally with wedge-shaped cleft; ventral surstylar arm with thin curved seta; cercus with apical blade-like seta subtended by cuticular projection bearing curved flattened seta; cercus with ventral digitiform cuticular projection at $\frac{2}{3}$.

Female: similar to male.

Remarks. *Medetera himalayensis* and *M. nepalensis* were both taken at relatively high altitudes in Nepal. They are closely related, differing primarily in size and in details of the hypopygium. Females of the two species cannot be reliably separated. Both

species have relatively long, broad wings, the wing length being distinctly longer than body length (in most *Medetera* species, the wing is shorter or subequal to the body length).

Medetera himalayensis has a distinct bend in wing vein R_{2+3} . *Medetera nudicoxa* Becker (not seen) from Darjeeling, India, is described as having a bend in the third long vein, and the two species could be closely related.

Medetera stomias n. sp.

Type material. HOLOTYPE ♂, PARATYPES 13♂♂, 10♀♀: **Nepal:** 27°56'N 85°00'E, 9,000–10,000 ft, oak forest, malaise trap, 22–29 May 1967. PARATYPES: 19♂♂, 9♀♀, 27°58'N 85°00'E, 11,100–11,400 ft, 21 May to 24 June 1967; 3♂♂, 3♀♀, 28°00'N 85°00'E, 9,900–10,500 ft, 26 May to 1 June 1967; all from Canadian Nepal Expedition (CNC).

Description. Male: length 3.2–3.4; wing dimensions 3.5 x 1.5.

HEAD: vertex, frons dark brown with metallic green-blue reflections, covered with brown pruinosity; face and clypeus shiny dark brown, with blue reflections, divided medianly by thin pruinosity strip which is expanded ventrally across frontoclypeal suture and over clypeus; proboscis dark brown, enlarged, projecting ventrally (Fig. 17f); labellae drawn up horizontally in some specimens, flap-like (Fig. 17g), such that 6 dark radial pseudotracheae are visible on pale median surface; antenna red-brown; arista about as long as head height.

THORAX: dorsum dark brown with metallic green-blue reflections; dorsum and pleura covered with dense brown pruinosity; 5–6 pairs ac, about as long as width of ac band, posteriormost pair 1½ length of ac band; lateral scutellars ⅔ length of medians.

LEGS: coxae dark brown, legs red-brown with femora apically yellow; podomere ratios as: I:9.0; 7.5; 3.0/2.0/1.5/1.0/1.0; II:9.0; 10.0; 5.0/3.0/2.5/1.2/1.0; III: 10.0; 13.0; 3.0/5.0/2.5/1.5/1.0.

WING: M gradually rising towards R_{4+5} ; CuAx ratio 0.75; lower calypter yellow with fan of black setae; haltere yellow.

ABDOMEN: dark red-brown with metallic green reflections, covered with dusting of grey pruinosity, and with short black setulae; hypopygium dark red-brown with yellowish cerci (Fig. 17e); hypandrium broad in ventral view; aedeagus in lateral view tapering with distinctive spurred apex; epandrial seta on short protuberance adjacent to epandrial lobes; epandrial lobes with short collars and bearing long strong bristles; surstylus fused almost to apex, with shallow apical cleft; surstylus bearing strong blade-like seta mediad; cercus curved and narrowing distally, and bearing setae as figured; cercus lacking blade-like dorsoapical seta.

Female: similar to male, also with distinctive broad proboscis.

Remarks. The large projecting proboscis of *M. stomias* is unique among *Medetera* species. In hypopygial structure, *M. stomias* is very close to the western palearctic *M. cuspidata*, especially in the shape of the cercus (see figures in Negrobov 1971–77), although *M. cuspidata* is much smaller and has a normal proboscis. *Medetera stomias* has long broad wings, similar to those of *M. nepalensis* and *M. himalayensis*. The specific name, *stomias* is Greek for 'large or hardmouthed animal'.

The *diadema-veles* Group

The *diadema-veles* group is characterized by the following features: four strong dc present, decreasing in size anteriorly; TII longer than FII in all species; male basitarsus III with anteroventral tooth near tibial joint (apomorphy); hypopygium pyriform, inflated basally (autapomorphy); epandrial lobes with bases adjacent, partially to completely fused, forming an elongate collar from which the two bristles arise (autapomorphy); epandrial seta reduced or lost (autapomorphy); surstylus fused almost to tip; dorsal surstylar arm usually extending somewhat beyond the ventral; hypandrium elongate, narrow, tapering (autapomorphy); aedeagus elongate, tapering, usually with a pair of wing-like appendages basally; cercus usually with apical flattened blade-like or unguiform seta.

The *diadema-veles* group is one of the most derived *Medetera* species groups and has radiated extensively in the holarctic region (Bickel, 1985). The two species considered here, *Medetera opaca* and *M. grisescens*, belong to the 'veles assemblage', having totally lost the epandrial seta and with the bases of the epandrial lobes almost completely fused.

Members of this group have become established in all zoogeographical regions and some, such as the Indo-Pacific *M. grisescens*, are widespread 'tramp' species.

Medetera opaca de Meijere

Medeterus opacus de Meijere, 1916: 258.

Type material. SYNTYPES: **Indonesia:** Java, 2♂♂, 1♀, Salitiga, May 1909, Docters van Leeuwin; 1♀, Batavia, Jan 1900, E. Jacobson. ♂, bearing the label "Salitiga/ v 1909/ Docters van Leeuwin" is here designated as LECTOTYPE (ZMUA, examined).

Additional material. **Hong Kong:** 1♂, New Territory, Sai Kung Sta., 4 May 1965. **Vietnam:** 2♂♂, Dalat, 1500 m, 26–27 Sept 1960; 1♀, Ban Me Thout, 500 m, 16–18 May 1960 (BPBM).

Description. Male: length 1.7–1.8; wing dimensions 1.8 x 0.6.

HEAD: vertex, frons, face, clypeus metallic green-black, covered with dense grey pruinosity; proboscis dark brown; antenna black; arista about as long as head height.

THORAX: dorsum dark metallic green with dense

grey pruinosity; brown vittae present over ac band and laterad over dc bands; 8–9 pairs ac, increasing in length posteriorly; lateral scutellars reduced to short hairs.

LEGS: coxae brown, femora yellow to somewhat infuscated, remainder of legs yellow; podomere ratios as I: 1.6: 1.5; 0.8/0.6/0.4/0.3/0.2; II: 2.0; 2.2; 1.1/0.8/0.5/0.4/0.2; III: 2.2; 2.4; 0.6/1.1/0.6/0.3/0.2.

WING: M gently arches towards R_{4+5} ; CuAx ratio 0.8; lower calypter and haltere yellow.

ABDOMEN: black with grey pruinosity; hypopygium dark brown with yellowish cerci (Fig. 18a); aedeagus with subapical swelling; epandrial seta absent; bristles of fused epandrial lobes branched apically; cercus with dorsoapical blade-like seta on stout base, and subtended by ventral lobate projection bearing 2 setae.

Female: similar to male.

Remarks. *Medetera opaca* is found in south-eastern Asia and is distinguished from all other holarctic

members of the 'velis assemblage' by its relatively small size, reduced lateral scutellars, and distinctive cercal structure.

Medetera grisescens de Meijere

Medeterus grisescens de Meijere, 1916: 259.

Medetera hawaiiensis Van Duzee, 1933: 343 (syn.

Medetera atrata, Hardy & Kohn, 1964: 254), n. syn.

Medetera atrata Van Duzee, 1933: 344, n. syn.

Medetera cilifemorata Van Duzee, 1933: 344, n. syn.

Medetera palmae Hardy, 1939: 351, n. syn.

Type material. De Meijere described *Medeterus grisescens* from 3 SYNTYPES: **Indonesia:** Java: 1♂, Batavia, Oct 1907; 1♀, Batavia, Aug 1907; 1♀, Wonosobo, April 1909; all E. Jacobson; the ♂, bearing the label "Batavia/ x 1909/ Jacobson" is here designated as LECTOTYPE (ZMUA, examined). Van Duzee (1933) designated male HOLOTYPEs for *Medetera hawaiiensis*, *M. atrata* and *M. cilifemorata*, all collected on Oahu, Hawaiian Islands. I have examined the 3 holotypes (all BPBM) and regard them as belonging to *M.*

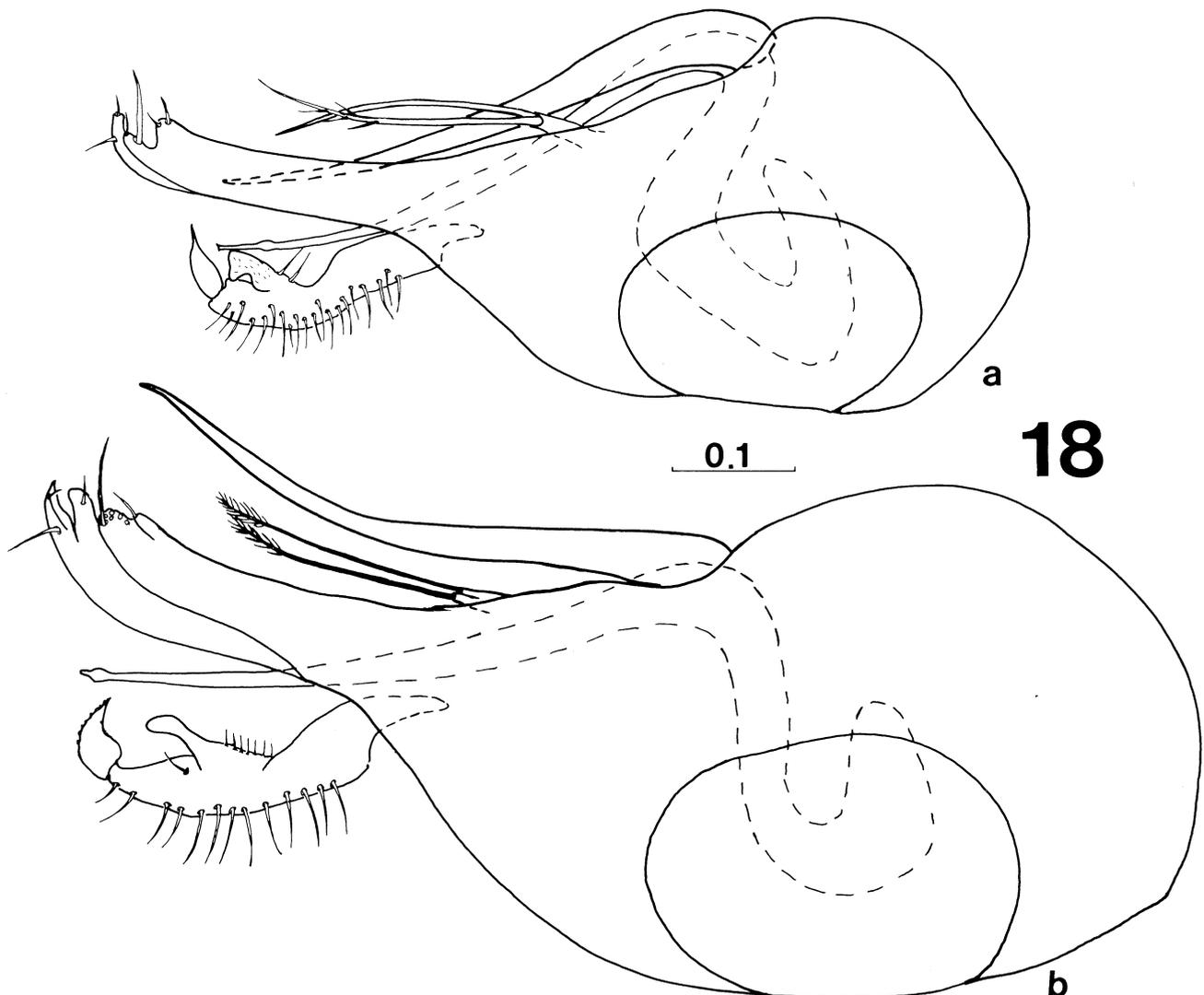


Fig. 18. a, *M. opaca*, Java; hypopygium, left lateral view. b, *M. grisescens*, Honolulu, Hawaii; hypopygium, left lateral view.

grisescens. Hardy (1939) described *M. palmae* from specimens collected at Brisbane, Queensland. The types have been lost, but from his description, especially noting the large swollen hypopygial base, I regard this species as a synonym of *M. grisescens*.

Additional material. **American Samoa:** Tutuila, Taputimus. **Australia:** New South Wales: metropolitan Sydney; Washpool National Park, near Baryugil. Queensland: Biloela; Cooloola National Park; Booloomba Creek. Conondale Ranges; metropolitan Brisbane; Ingham; Peerman; Milla-Milla; Maalan; Townsville; Lamington National Park. **China:** Fukien, Yungan City. **Fiji:** Nadi. **Hawaiian Islands:** Hawaii, Hawaiian Volcanoes National Park; Oahu, Honolulu. **Hong Kong:** New Territory, Lantau Is.; Kowloon, Taipokau. **India:** Silchar Cachar; Bihar Bunhar; Nedungadu, Tenjore; Kodaikanal, Pulney Hills, 1950 m. **Indonesia:** Sumatra, Fort de Kock, 920 m. **Japan:** Ryukyu Islands: Okinawa, Iwa; Ishigaki Is., Banna. **Laos:** Sayaboury. **Malaysia:** Kedah, Kuala Lumpur; Selangor, near Batu Caves. Sabah: Tawau, Quoin Hill; Sarawak: Kuching, Santubong. **Nepal:** Pokhara, 910 m. **New Caledonia:** Noumea. **Seychelles:** Mahe. **Singapore, Sri Lanka:** Colombo W.P.; Nugegoda W.P.; Piliyandala W.P.; Pevadenija; Luduganga. **Taiwan:** Anping; Liukuei, Kaohsiungshien; Hengchun, Pingtungshien; Kuraru; Taipei, Yehliu Beach. **Thailand:** Biserat; Chieng Mai Province, Chieng Mai, 300 m. **Western Samoa:** Upolu, Malololelei, 600 m. (285 specimens examined: AMS, ANIC, BMNH, BPBM, CNC, MCZ, QMB, UQIC, USNM).

Description. Male: length 2.7–3.0; wing dimensions 2.8 x 0.7.

HEAD: vertex, frons, face metallic green with grey pruinosity; clypeus satiny metallic blue-green; proboscis dark brown; antenna black.

THORAX: metallic green-bronze with grey-brown pruinosity dorsally and dense grey pruinosity on pleura; bronze vittae present over ac band and laterally over dc bands; mesonotal depression with dense grey pruinosity; ac relatively short, not as long as width of ac band; lateral scutellars about $\frac{2}{3}$ length of medians.

LEGS: coxae brown, femora yellow to infuscated, distalmost femora and remainder of legs yellow; podomere ratios as: I: 2.5; 2.3; 1.0/0.8/0.4/0.4/0.3; II: 2.3; 2.6; 1.7/0.8/0.5/0.3/0.2; III: 2.6; 3.4; 0.7/1.6/0.7/0.4/0.3.

WING: venation similar to Fig. 2h; CuAx ratio 0.6; lower calypter and haltere yellow.

ABDOMEN: dark metallic green-bronze with grey pruinosity and short black setulae; hypopygium dark brown with yellowish cerci (Fig. 18b–c); epandrium greatly inflated basally; aedeagus with apical swelling; epandrial seta absent; bases of epandrial lobes almost completely fused; epandrial lobe bristles branched distally; cercus with apical toothed blade-like seta bearing irregular serrations on external surface; cercus with distinctive midventral clavate projection.

Female: similar to male.

Remarks. *Medetera grisescens* has a wide distribution, from the Seychelles, Sri Lanka and the

Indian subcontinent, throughout south-east Asia including southern China and the Ryukyu Islands, to coastal eastern Australia and many Pacific islands, including Hawaii (Fig. 21). I have seen no specimens from New Guinea or the Solomon Islands, although I would expect the species to be there, especially around settled regions. The species appears to be absent from New Zealand. *Medetera grisescens* probably originated in the Orient as a southern outlier of the diverse holarctic *diadema-veles* species group. Undoubtedly it has a broad ecological tolerance and is well adapted for dispersal throughout the Indian and Pacific oceans as a ‘tramp’ species, perhaps aided by human transport. *Medetera grisescens* is often found in large numbers resting on tree trunks in disturbed and settled areas, although it is also found in relatively undisturbed habitats.

Collection dates for *Medetera grisescens* suggest year round adult activity in the humid tropics, with more seasonal occurrence in temperate regions. In the Sydney district, for example, *M. grisescens* is common in parks and gardens throughout the warm months from late September to early May, but is not found during the winter months.

Although the femora are usually yellowish, some specimens have distinctly brown femora I and II. Also, the basal tooth of the cercal blade-like seta is more pronounced in some specimens. However, *M. grisescens* maintains a fairly constant facies across its entire range.

The *signaticornis-pinicola* Group

The *signaticornis-pinicola* group is defined by the following features: relatively large species, usually longer than 2.8; scape and pedicel usually yellow; dc 6–10, strong, decreasing anteriorly, and merging into a field of setulae; median and lateral scutellars both strongly developed; hypopygium often large and massive, as large as preabdomen; hypandrium broad, flat; epandrial lobes with separate cylindrical bases, often positioned laterad of each other; epandrial seta present, positioned near base of hypandrium.

The *signaticornis-pinicola* group is a diverse assemblage which is closely associated with the holarctic circumboreal forests and contains many important predators of conifer-attacking Scolytidae (see Bickel, 1985). The single Oriental species considered below, *Medetera kinabaluensis*, from high altitude forests in Borneo, definitely belongs in this species group, and is associated with the *pinicola* subgroup, which in the holarctic region is characterized by the following features: cercus large, often massive, appearing hemispheroidal in dorsal view; epandrium subrectangular in lateral view; aedeagus elongate, tapering, and simple; surstylus broad, massive, with elongate, seta-bearing arms; pair of ‘bottle-brush’ shaped appendages arising internally from aedeagus (not present on *M. kinabaluensis*).

Medetera kinabaluensis n. sp.

Type material. HOLOTYPE ♂: **Malaysia:** Sabah: Mt Kinabalu, Kamaranga, 2140 m, 31 Oct 1958, T. C. Maa (BPBM).

Additional material. Possible ♀ of this species: **Malaysia:** Sabah: Tenompok, 13 Feb 1959 (BPBM).

Description. Male: length 3.7; wing dimensions 4.0 x 1.5; a large, dark green species.

HEAD: vertex, frons, face, and clypeus metallic green with bronze reflections; face and clypeus with coriaceous texture; proboscis, black, massive; scape and pedicel yellow; 1st flagellomere black; arista about as long as head height.

THORAX: dorsum dark metallic green with bronze reflections, and with thin layer of grey pruinosity; pleura with dense grey pruinosity; setae black; ac strong, and increasing in length posteriorly, the posteriormost twice as long as width of ac band; dc missing, but distinct sockets indicate at least 5–6 strong setae present.

LEGS: entirely black, femoral ‘knees’ somewhat paler; relative podomere ratios as: I: missing; II: 3.9; 3.7; remainder missing; TII with strong apicoventral seta; III: 3.6; 4.2; 1.0/1.7/1.0/0.5/0.3.

WING: M approaching R_{4+5} in gradual arc, similar to wing of *M. signaticornis* (see Bickel, 1985); CuAx ratio 0.6; lower calypter yellow with dark brown rim, and bearing fan of pale setae; haltere yellow.

ABDOMEN: black with metallic green reflections, and with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 19a); hypandrium in ventral view subrectangular and with pointed apex (Fig. 19b); aedeagus tapering, simple; epandrial seta strong, positioned near base of hypandrium;

epandrial lobes with large cylindrical bases, positioned laterad of each other, and each bearing strong bristle; surstylus fused to epandrium; surstylus massive, with ventral cuticular striae, not deeply divided, and bearing distal lobes and setae as figured; cercus expanded and bulbous distally, and bearing 2 distinctive ventral projections; basal ventral projection with 3 apical setae.

Female: similar to male.

Remarks. *Medetera kinabaluensis* is found on high altitude slopes of Mt Kinabalu in Borneo. The presence in Borneo of a member of a circumboreal group is an interesting disjunction which is discussed further under ‘Zoogeography’.

Other *Medetera* Species

The following species are phylogenetically somewhat isolated and do not appear to fit into any of the previously described groups.

Medetera minima de Meijere

Medeterus minimus de Meijere, 1916: 259 (nec. *Medetera minima* Van Duzee, 1925 = *M. postminima* Steyskal, 1967: 224).

Type material. SYNTYPES: **Indonesia:** 2♂♂, Java, Depok, Oct 1909, E. Jacobson; Batavia, Feb 1908, E. Jacobson (this specimen is male, not female as described by de Meijere). The male bearing the label “Depok/x-09/Jacobson” is here designated LECTOTYPE (ZMUA, examined).

Additional material. **Australia:** Queensland, Mt Cook National Park, 15°29’S, 145°16’E, 10 May 1981 (ANIC). **Indonesia:** Sumatra, Fort de Kock (ZMUA). Irian Jaya: Biak Island, 22 June to 1 July 1962; Nabire, 5–50 m, 25 Aug

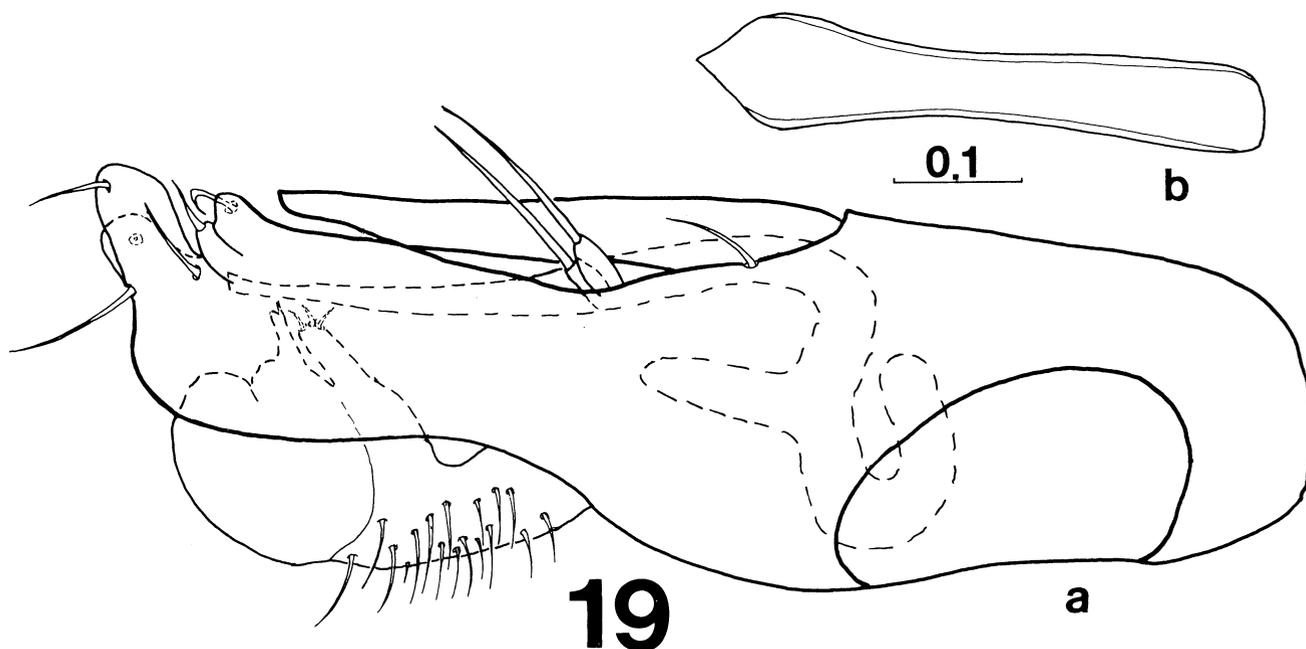


Fig. 19. *M. kinabaluensis*, Sabah; a, hypopygium, left lateral view; b, hypandrium, ventral view.

to 2 Sept 1962 (BPBM). **Malaysia:** Selangor, Kelang, on tree trunk, 10 March 1982 (BMNH). **Papua New Guinea:** Wau, Hospital Creek, 1250 m, 22 May 1965; Wewak, 2–20 m, 11 Oct 1957; Cape Rodney, 10 m, 3 Nov 1960. New Britain, Linga Linga, west of Willaumez Pen., 15 April 1956 (BPBM). **Solomon Islands:** Santa Isabel, Tatumba, 2 Oct 1965 (BMNH) (12 ♂♂, 3 ♀♀ specimens examined).

Description. Male: length 1.7–1.8; wing dimensions 1.7 x 0.5.

HEAD: vertex, frons, face, clypeus dark metallic green with brownish pruinosity; proboscis dark brown; antenna black; arista about as long as head height.

THORAX: dorsum dark metallic green with bronze reflections; pleura covered with brownish pruinosity; setae black; 10–12 pairs ac, increasing in length

posteriorly, the posteriormost longer than width of ac band; 2 strong dc bordering mesonotal depression, the anterior dc as short setulae; lateral scutellars reduced to weak hairs.

LEGS: coxae, femora black to femoral 'knees'; remainder of legs yellow, with distal-most tarsomeres darkened; relative podomere ratios as I: 1.2; 0.9; 0.4/0.3/0.2/0.2/0.2; II: 1.1; 1.2; 0.6/0.4/0.3/0.2/0.2; TII with single ad at $\frac{1}{4}$; III: 1.3; 1.4; 0.2/0.6/0.4/0.2/0.2.

WING: M gradually approaches R_{4+5} (Fig. 2i); CuAx ratio 0.5; lower calypter yellow with fan of pale setae; haltere yellow.

ABDOMEN: dark metallic green with short black setulae; hypopygium dark brown with yellowish cerci

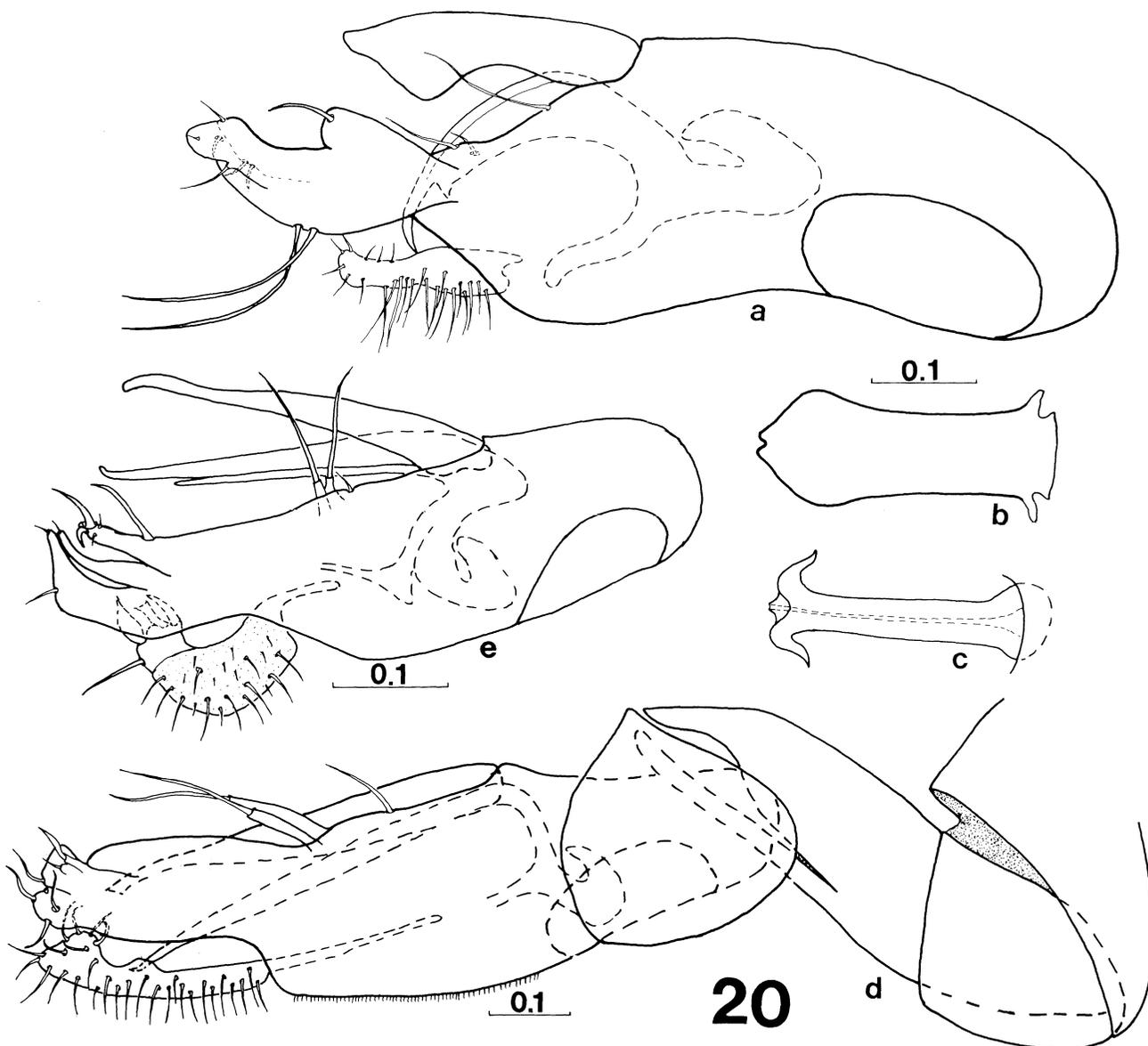


Fig. 20. *M. malaisei*, Kambalti, Burma; a, hypopygium, left lateral view; b, hypandrium, ventral view; c, aedeagus, ventral view; d, *M. longa*, Vientiane, Laos, hypopygium, left lateral view; e, *M. minima*, Selangor, Malaysia, hypopygium, left lateral view.

(Fig. 20e); hypandrium elongate; aedeagus slightly recurved within epandrium; aedeagus elongate with curved tip and with side lamellae; epandrial seta short, adjacent to epandrial lobes; epandrial lobes each with strong simple bristle; surstylus fused to epandrium; dorsal surstylar arm curved medially; middle surstylar arm narrow with apical seta; ventral surstylar arm with strong ventral and apical setae; cercus stout, curved, with strong subapical dorsal seta, and with 3 distinctive apical blade-like setae as figured.

Female: similar to male.

Remarks. *Medetera minima* has a distinctive hypopygium and is distributed from Malaysia to the Solomons, including northern Queensland (Fig. 23). This species has certain similarities with the *flaviscutellum* group (cercus with dorsoapical blade-like setae, two strong dc bordering mesoscutal depression). However, the somewhat basal position of the epandrial lobes, fusion of surstylus with epandrium, aedeagus with side lamellae, black antenna, relatively short arista, places the species outside that group.

Medetera malaisei n. sp.

Type material. HOLOTYPE ♂: **Burma:** (N.E.), Kambalti, 7000 ft, 23 May 1934, R. Malaise (BMNH).

Description. Male: length 2.3; wing dimensions 2.4 x 1.1.

HEAD: vertex, frons, face black with metallic green reflections and covered with brown-grey pruinosity; clypeus black; proboscis dark brown; scape black, remainder of antenna missing.

THORAX: black with metallic green reflections, and with some grey pruinosity; pleura covered with dense grey pruinosity; setae black; ac increasing in length posteriorly, posteriormost twice as long as width of ac band; 4 strong dc present, decreasing anteriorly, and with much shorter dc and short setulae anteriorly; lateral scutellars $\frac{3}{4}$ length of medians.

LEGS: coxae, femora black to femoral 'knees'; remainder of legs yellowish with distal tarsomeres darkened; relative podomere ratios as: I: 2.0; 1.9; 0.8/0.4/0.3/0.2/0.2; II: 2.1; 2.2; 1.0/0.5/0.3/0.2/0.2; III: 2.4; 2.6; 0.6/0.8/0.4/0.2/0.2.

WING: relatively broad; M gradually approaches R_{4+5} ; CuAx ratio 0.5; lower calypter yellow with fan of pale setae; haltere yellow, but club somewhat infuscated.

ABDOMEN: black with grey pruinosity, and with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 20a); epandrium ovate; hypandrium in ventral view broad, widened subapically, and with apical notch (Fig. 20b); aedeagus in ventral view with subapical backwardly directed hooks, i.e., anchor-shaped (Fig. 20c); epandrial seta very long; epandrial lobes lacking distinct basal pedicels, and only present as 2 setae,

distal seta being twice as long as basal; surstylus fused to epandrium, but distinctly narrowed basally; surstylus somewhat clavate, with ventral mound bearing 1 strong seta, 2 very long setae along dorsal margin, and other setae as figured; cercus short, blunt, with setae as figured.

Female: unknown.

Remarks. *Medetera malaisei* is known only from the highlands of north-eastern Burma. It has an unusual hypopygial structure with an anchor-shaped aedeagus, a very long epandrial seta, a short blunt cercus, and epandrial lobes represented only by setae, totally lacking the usual basal pedicels. This species does not appear to be closely related to any other described palearctic or Oriental species.

Medetera longa Negrobov & Thuneberg

Medetera longicauda Becker, 1922: 50 (preocc. Becker 1917).

Medetera longa Negrobov & Thuneberg, 1970: 143 (replacement name for *longicauda* Becker 1922).

Type material. Becker described *M. longicauda* from 2♂♂ and 1♀ syntypes collected at Kankau, Taiwan. One male and one female were deposited in the Hungarian National Museum and have since been destroyed. The other male, deposited at DEI could not be located (G. Morge, letter). In size, colouration, thoracic chaetotaxy, leg length, and structure of the male postabdomen, Becker's original description and figure are similar to the additional Oriental specimens considered below.

Additional material. ♂: **Laos:** Vientiane Province, Gi Sion Valley, De Tha Ngone, 19–26 Dec 1965; 2♀♀, Sayaboury Province, Sayaboury, 12 Dec 1965 (BPBM). Possible ♀♀ of this species: 1♀, **Malaysia:** Pahang, Cameron Highlands, Tanahkalia, 4800 ft (BMNH); 2♀♀, Philippines: Port Bauge, Jan 1915 (ZMH).

Description. Male: length 3.2; wing dimensions 3.6 x 1.4.

HEAD: vertex and frons metallic green-bronze with some grey pruinosity; face shiny metallic blue, with green reflections; clypeus shiny metallic green with bronze reflections; proboscis black, massive; antenna black; arista about as long as head height.

THORAX: dorsum metallic green with bronze reflections and some grey pruinosity; pleura covered with dense grey pruinosity; setae black; ac increasing in length posteriorly, posteriormost as long as width of ac band; 3 strong dc present, sharply decreasing in size anteriorly, and with short setulae anteriorly; lateral scutellars $\frac{3}{4}$ length of medians; 8–10 long pale ppls present.

LEGS: relatively long; coxae black; remainder of legs yellow with only distal tarsomeres darkened; relative podomere ratios as: I: 3.4; 3.6; 1.9/2.1/1.5/0.7/0.4; II: 3.5; 4.6; 3.8/2.2/1.5/0.6/0.4; III: 3.5; 5.8; 1.3/3.3/1.6/0.4/0.4.

WING: venation similar to Fig. 2h; CuAx ratio 1.0; lower calypter and haltere yellow.

ABDOMEN: dark metallic green-bronze with short

pale setulae; tergum 6 short; segment 7 very long, about as long as epandrium, fused basally and deeply cleft distally near attachment with sternum 8 (Fig. 20d); hypopygium dark brown with yellowish cerci; epandrium elongate, subrectangular; hypandrium and aedeagus elongate, tapering and simple; epandrial seta strong, positioned almost midway between epandrial lobes and base of hypandrium; epandrial lobes each with very long basal collar and strong distal bristle; surstylus fused to epandrium; surstylus with apical setae as figured; cercus elongate, with 2 ventral mounds, the distal mound bearing setae; apical bladelike setae absent.

Female: similar to male.

Remarks: *Medetera longa* is here interpreted on the basis of 1 male and 2 females from Laos. Possible females are also known from the Philippines and the Malay Peninsula.

In describing the original Taiwanese specimens, Becker gave the male body length as 3.5 and that of the female as a much larger 4.5. The Laotian male and females however, are approximately the same length.

Medetera longa has unusually long legs and is distinguished by having the tibia longer than the femur on all three legs. Abdominal segment 7 is very long and is deeply cleft near its attachment with sternum 8.

Zoogeography

Distribution patterns. Widespread Oriental and Australasian species: *M. griseascens* has the most

extensive range, from the western Indian Ocean to Hawaii, including south-eastern Asia to the Ryukyus and eastern Australia (Fig. 21). *Medetera austroapicalis* is also widespread, from the Indian subcontinent to the Solomon Islands, including south-eastern Asia to China and eastern Australia. These two species might be regarded as 'tramps', i.e., species of broad ecological tolerance, well adapted to survive in disturbed areas, and which are easily dispersed, perhaps even aided by human transport.

Oriental species: *M. platychira* (Fig. 22), *M. pumila*, *M. opaca*, *M. beckeri* and *M. vivida* are fairly widespread throughout the Oriental region, west of Weber's Line. The closely related species *M. bishopae* (Malaya, Borneo) and *M. chillcotti* (lowland Nepal) indicate a wide distribution for the *chillcotti* group. The four species of the *gracilis* group are confined to humid tropics of Malaysia, Indonesia and the Philippines. Three fairly closely related species are described from above 3000 m in Nepal: *M. nepalensis*, *M. himalayensis* and *M. stomias*. As well, ten species are known only from their respective type localities in Java, the Philippines, Borneo, Sri Lanka and Burma.

Indo-Australian species: *M. minima* ranges from Malaya to the Solomons, including Cape York Peninsula. The range of *M. olivacea* includes Indonesia, the Philippines and New Guinea (Fig. 23).

Australasian species: *M. salomonis*, an Australasian 'tramp', ranges from French Polynesia in the eastern Pacific through Samoa, Fiji, Melanesia, New Guinea, eastern and northern Australia, and the Philippines (Fig. 24). The other five Australasian

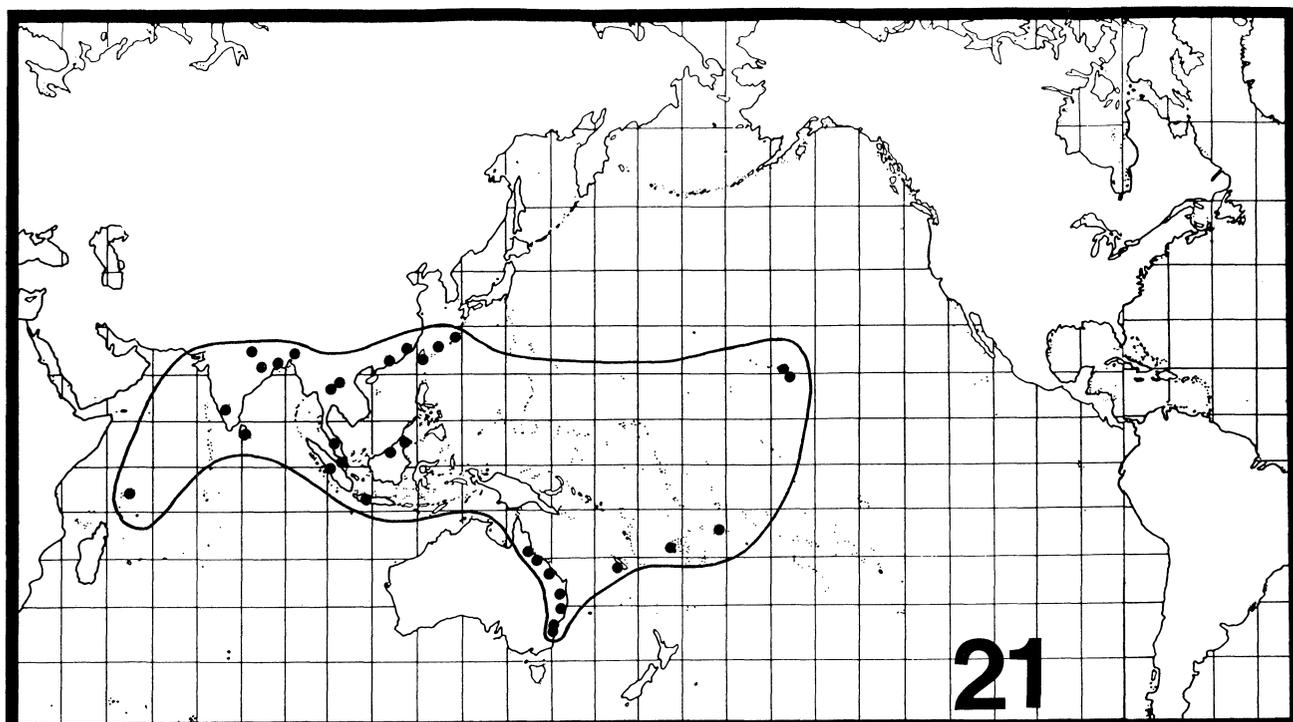


Fig. 21. Distribution map of *Medetera griseascens*.

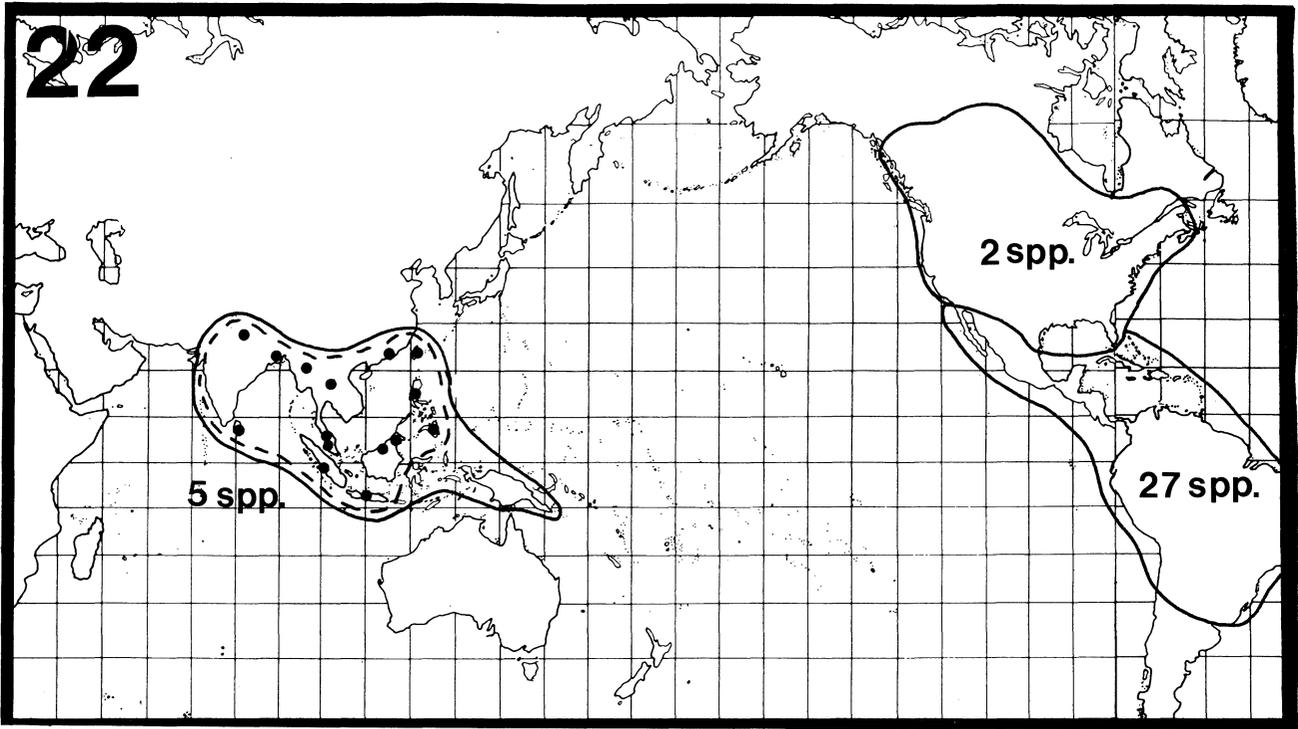


Fig. 22. Distribution map of *Medetera aberrans* species group:
● records of *M. platychira*; — distribution of *aberrans* species group with number of described species from each region.

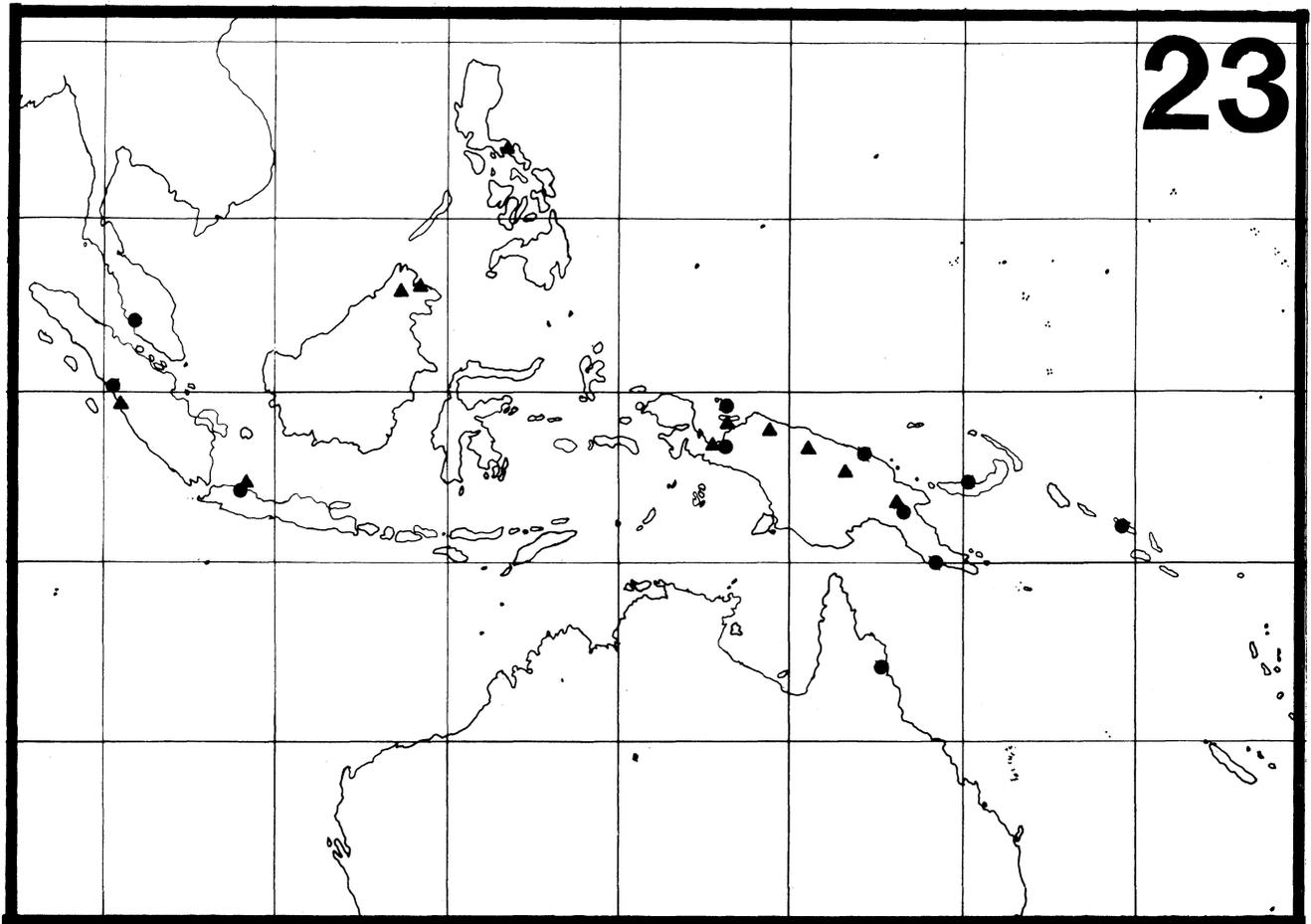


Fig. 23. Distribution map of *Medetera minima* and *Medetera olivacea*: ● *M. minima*; ▲ *M. olivacea*

members of the *salomonis* group are confined primarily to Melanesia and Australia. The *flaviscutellum* and *melanesiana* groups have distributions in New Guinea and eastern Australia, while the *toxopeusi* group is almost entirely confined to New Guinea. The *australiana* group is found only in eastern Australia, while *M. nigrohalterata* is found in both south-eastern and south-western Australia (Fig. 24). Within Australia, *Medetera* is most diverse in the coasts and ranges of Queensland and New South Wales, especially in tropical and subtropical closed forest. Only one species has a range which includes Victoria and Western Australia, and the genus is not recorded from Tasmania.

Pacific species: the patterns of distribution into the Pacific shows a classic 'sweepstake' dispersal pattern, with progressively fewer species towards the East (Fig. 25). In western 'source' areas such as New Guinea and the Philippines, both widespread and endemic species are present while in the eastern Pacific, there are no endemics and the fauna consists only of 'tramps.' *Medetera* has not been found in New Zealand, despite careful search by B. A. Holloway and subsequent personal examination of the NZAC. New Zealand is probably too far south to have received such good dispersalists as *M. grisescens* or *M. salomonis*.

Affinities and history. *Medetera* probably had its

origin in the early Tertiary Northern Hemisphere mesophytic forests (Bickel, 1985). Evidence from the distribution and affinities of the Oriental and Australasian faunas does not contradict this hypothesis. Many Oriental and Australasian species either belong to diverse holarctic groups or can be derived from them. However, the Australasian region is an important secondary centre of diversity with several groups being almost entirely confined to New Guinea and eastern Australia. The absence of the genus from southern South America (Van Duzee, 1930) and New Zealand, and the impoverished fauna of southern Australia argue strongly against any Gondwanaland source area. Therefore, the following history of the Oriental and Australasian *Medetera* is suggested (with information from Matthews, 1979 and Keast, 1981).

Late Cretaceous-Early Tertiary: widespread circumboreal warm mesophytic forests were the centre of diversity in *Medetera*. During this time, broad zones of interchange were available between the northern continents and the genus was probably present throughout Laurasia including what is now southeastern Asia. Since the Australian Plate was positioned much further south and isolated, *Medetera* was undoubtedly absent from ancestral Melanesia-Australia.

Mid-Tertiary: cooling forced the southward retreat

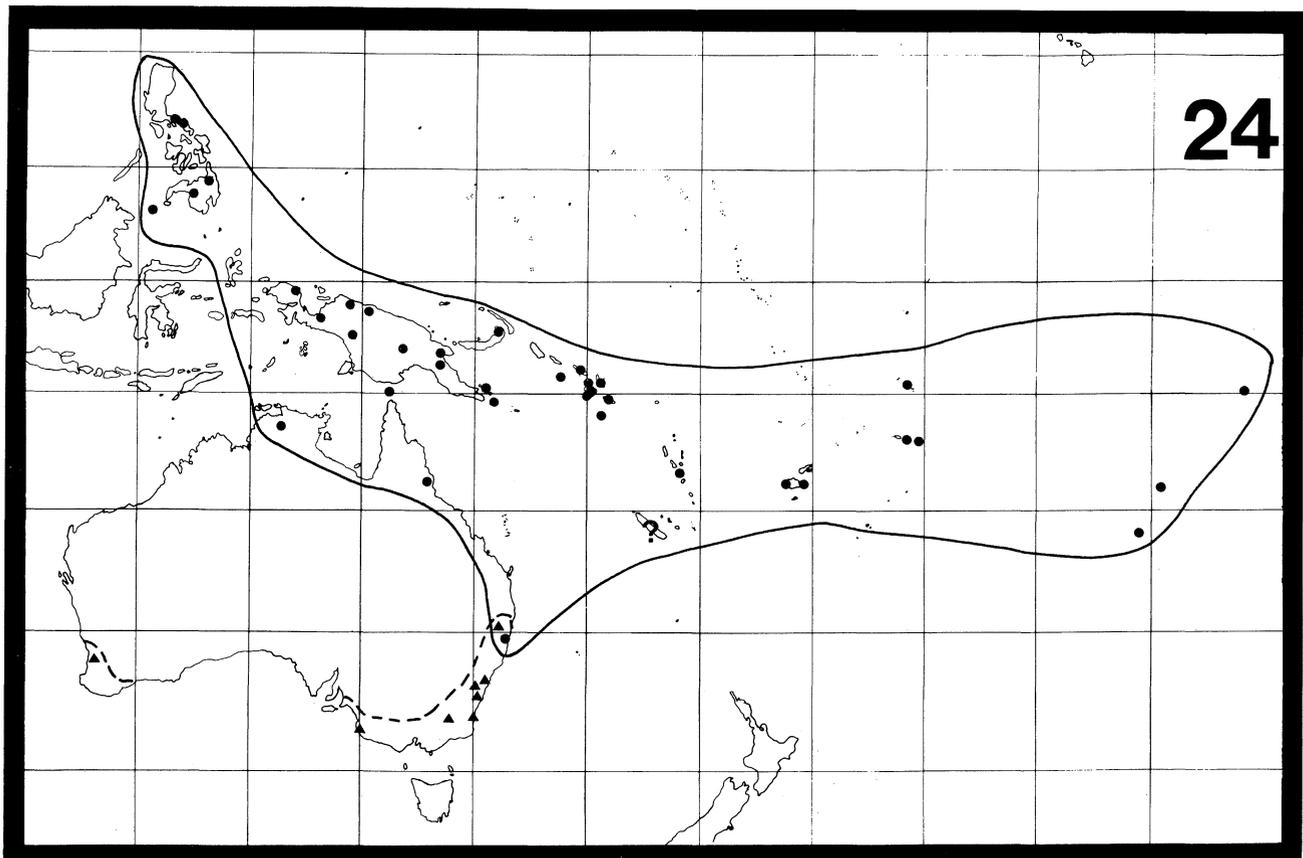


Fig. 24. Distribution map of *Medetera salomonis* and *M. nigrohalterata*: ● *M. salomonis*; ▲ *M. nigrohalterata*.

of circumboreal mesophytic forests and their associated insect faunas, splitting the *aberrans* group into disjunct or vicariant Old World and New World sections (Fig. 22). The Oriental *Medetera platychira*, is strikingly similar to the eastern nearctic *M. aberrans* (see figures in Bickel, 1985), indicating little morphological change since their separation. The palearctic genus *Dolichophorus* probably arose from the *aberrans* group at this time. As the Australian Plate moved closer to the Asian Plate, chance dispersal from the Oriental Region would have become increasingly probable, with successful dispersalists radiating on the Australian Plate, giving rise to the *melanesiana*, *salomonis*, *flaviscutellum*, *australiana* and *toxopeusi* groups.

Late Tertiary-Quaternary: as the Australian Plate moved closer to Asia, vulcanism and uplift along the Australian-Asian Plate boundaries caused formation of island arcs and diverse tropical montane habitats, thereby increasing faunal interchange (in both directions) and speciation. With increased aridity during the Miocene, the once continuous forests along the southern margin of Australia were split, resulting in disjunct populations of *M. nigrohalterata* in southeastern and south-western Australia. During the Quaternary, falling sea level would have facilitated dispersion between some island groups

and across Torres Strait. Some 'tramp' species of successful holarctic groups, such as *M. grisescens* (*diadema-veles* group) and *M. austrapicalis* (*apicalis* group) and a 'tramp' of Australasian origin, *M. salomonis*, probably increased their ranges during this time.

Medetera kinabaluensis, from high elevation (2140 m) on Mt Kinabalu, Sabah is a member of the predominately holarctic circumboreal *signaticornis-pinicola* group. This group contains many important predators of conifer-attacking scolytid beetles, and have been reared from various tree species, principally northern hemisphere conifers. In the New World, species extend southward into tropical Central American montane pine forests (Bickel, 1985). The presence of a member of the *signaticornis-pinicola* group in Borneo is of particular interest. Today, only two species of *Pinus* are found in the Malay Archipelago (Sumatra and the Philippines but not Borneo). However, pollen of three northern conifers, *Pinus*, *Picea* and *Tsuga*, is recorded from the Miocene of Brunei, but today these latter two genera are not found closer than 20°N on the Asian mainland (Whitmore, 1975). This coniferous flora maintained itself in Borneo until late Tertiary when it became extinct, possibly due to peneplanation of the old mountains. The major uplift of Mt Kinabalu was

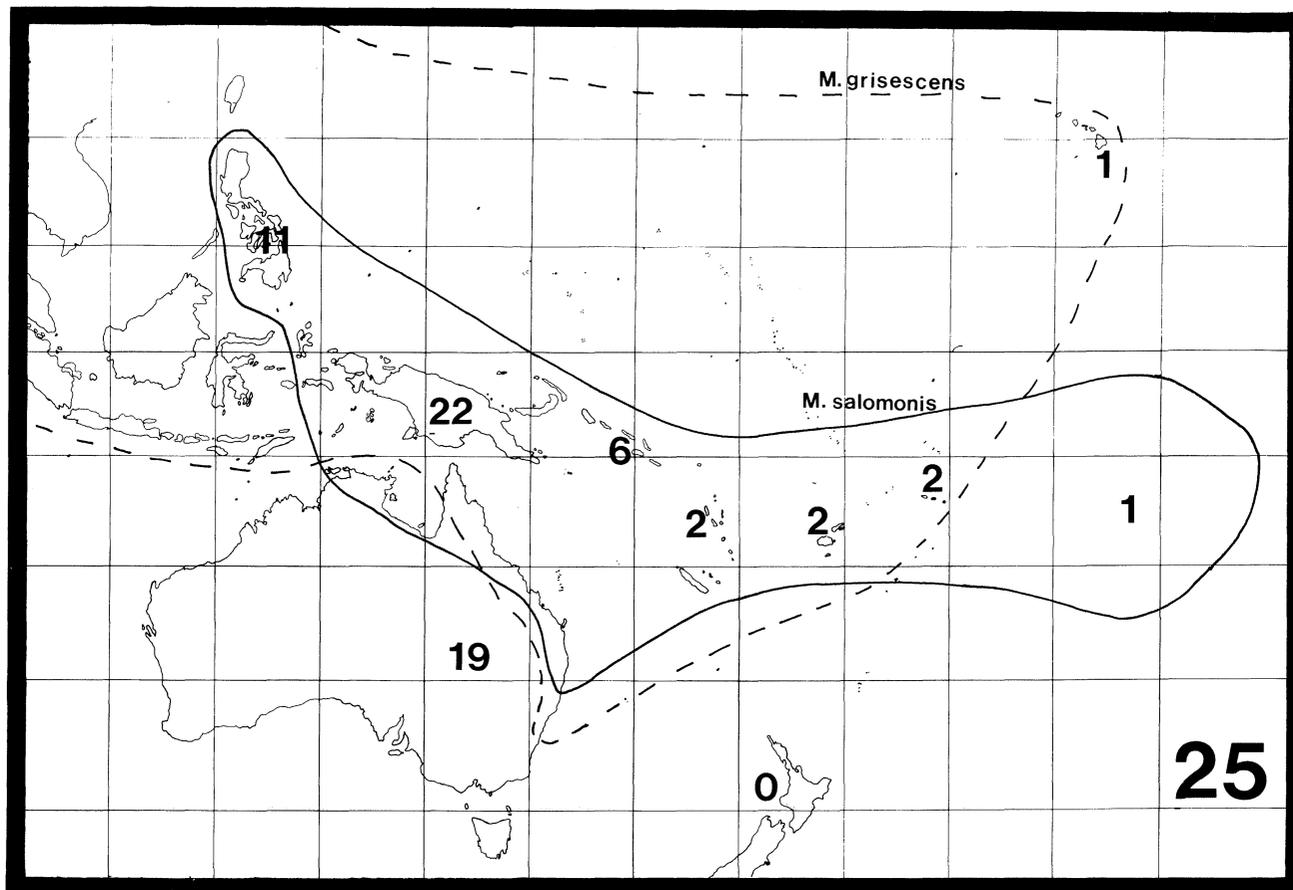


Fig. 25. Number of described *Medetera* species from Australasia and the Philippines. — *M. salomonis*; --- *M. grisescens*.

9. Dorsocentrals (dc): 3–5 present, decreasing in size anteriorly/ only 2 strong dc bordering mesoscutal depression, anteriors as short setulae.
10. Strong anterolateral bristle on coxa I: absent/ present.
11. Coxa III lateral bristles: 1/ 2.
12. Femora II and III: with normal vestiture/ with strong anterior setae.
13. Femur II posterior subapical bristle: present/ absent.
14. Male tibia III: unmodified/ with anteroapical spur (MSSC).
15. Male tarsus I: unmodified/ tarsomeres 2–3 flattened, modified.
16. Male basitarsus III: unmodified/ with anteroventral basal tooth (MSSC).
17. Distal sectors of veins M and R_{4+5} : straight, subparallel to apex/ arched anteriorly, somewhat converging.
18. Distal vein M: arched anteriorly/ arched or bowed posteriorly.
19. Male basal CuA: unmodified/ thickened
20. Anal vein: present/ reduced or lost.
21. Anal angle of wing: present/ lost (Fig. 2e) in the *gracilis* group.
22. Male postabdomen: strongly sclerotized and metallic coloured/ weakly sclerotized and unmelanized distal half of segment 6, all of segments 7 and 8 and basal portion of epandrium found in some species of the *melanesiana* group.
23. Position of the hypopygial foramen: left basolateral/ left mid-dorsolateral.
24. Position of the hypopygial foramen: left middorsolateral/ secondary migration to basal position in some species in the *melanesiana* group.
25. Epandrium (lateral view): subrectangular/ pyriform.
26. Epandrium: cylindrical/ dorsoventrally flattened.
27. Flexion of hypandrium: absent/ present.
28. Hypandrium, attachment to epandrium: basal/ midventral.
29. Hypandrium: broad, rectangular/ narrow, tapering.
30. Hypandrium: flat over aedeagus /‘clasping’ aedeagus.
31. Apex of aedeagus: simple/ cleft, or notched.
32. Epandrial seta: present/ reduced or lost.
33. Epandrial lobe bases: short, collar-like/ long, cylindrical, and positioned laterad of each other.
34. Epandrial lobes: bases separate/ bases fused.
35. Relative length of ventral and dorsal surstylar arms: subequal/ dorsal arm longer.
36. Frayed ventral surstylar seta: absent/ present.
37. Cercus: undifferentiated/ with strong projecting distolateral arm.
38. Aedeagus: bent at right angle upon entering epandrium/ strongly recurved within epandrium.
39. Cercus: undivided/ secondarily segmented, with freely articulated basal and distal sections, as found in

the *salomonis* group.

40. Cerci: free/ fused medially.

A cladogram representing the relationships of *Corindia*, *Thrypticus*, *Dolichophorus* and the major *Medetera* species groups is presented in Fig. 26. The relationship of *Corindia* + *Thrypticus* with *Medetera* was discussed by Bickel, 1986a.

Medetera is defined by strong apomorphies 1, 17, 23 and 28. *Dolichophorus*, a palearctic genus of two species, is defined by autapomorphies 3, 10, 13, 20 and 34 and is considered the sister taxon of the *aberrans* + *melanesiana* groups. Recognition of *Dolichophorus* as a separate genus makes *Medetera* paraphyletic, since it does not include all of its descendant groups. However, *Dolichophorus* is clearly defined, and to submerge this genus within *Medetera* would only serve to dilute the concept of *Medetera*. Perhaps the lineage including *Dolichophorus* and the *aberrans* + *melanesiana* groups should be split off as a separate genus, making it the sister group to *Medetera* s.s. However, I will not alter the current concepts of these two genera, and will let *Medetera* stand as a paraphyletic taxon until an analysis of the world Medeterinae is completed.

The monophyly of the *aberrans* + *melanesiana* complex is strongly supported by synapomorphies 12 and 14. The *melanesiana* group is an Australasian offshoot of the widespread *aberrans* group and is defined by autapomorphies 26 and 40.

Medetera s.s. is rather weakly defined by apomorphy 13, the loss of the FII posterior subapical bristle, which is homoplastic with *Dolichophorus*. Although the holarctic *petulca* group, the *signaticornis-pinicola* group, the *diadema-veles* group and the *apicalis* + *crassivenis* complex are each fairly well defined by autapomorphies, no strong synapomorphies can be found to link them.

The *gracilis*, *flaviscutellum*, *chillcotti*, *australiana* and *toxopeusi* groups all are linked by a moderately strong synapomorphy 9, reduction of dorsocentrals to 2 strong dc bordering the mesoscutal depression. The *australiana* and *toxopeusi* groups share strong synapomorphy 38, the internally recurved aedeagus. The *salomonis* group is strongly defined by autapomorphy 39 and is possibly linked to the five groups considered above.

Additional Oriental Records and Nomenclatorial Notes

In eastern Asia the boundary between the Oriental and palearctic zoogeographical regions is arbitrarily defined. Since no significant physiographic feature acts as a biotic barrier, mixing of elements from the two regions must be expected.

The Ryukyu Islands form part of the northern boundary of the Oriental region. In addition to *M. grisescens*, recorded above, the following holarctic

and palearctic species (see Negrobov, 1971–77, and Bickel, 1985) are present on these islands (BPBM).

Medetera apicalis, 5♂♂, 7♀♀, Amami-Oshima Island, Mt Yuwan-dake, 550 m, 17 July 1963; Iromuk Island, 100 m, 11–12 March 1964.

M. veles, 2♂♂, 2♀♀, Ishigaki Island, Kora-yama, 14–18 March 1964.

Close to *M. jacula* (possibly the closely related *M. flavipes*), 6♂♂, 24♀♀, Ishigaki Island, Kora-yama, 14–18 March 1964.

Medetera adsumpta Becker (1922: 48) and *M. nudicoxa* Becker (1922: 52) were described from India. I have been unable to see the type material (Zoological Survey of India, Calcutta) and therefore have not included the two species in this revision. However, based on Becker's descriptions, *M. adsumpta* is possibly a member of the *chillcotti* group while *M. nudicoxa* is almost certainly in the *apicalis* group and close to *M. himalayensis*-*M. nepalensis*.

The types of *Medetera comes* Hardy (1939: 352), from Brisbane, are lost. From Hardy's brief description it is possible that this species is a member of the *australiana* group. *Medetera comes* is regarded as a *nomen dubium*.

The types of *M. extranea* Becker (1922: 49) described from Sydney and deposited at the Hungarian National Museum, Budapest, have been lost. The species Becker described is very small, 1.0–1.2 mm long, has veins R_{4+5} and M running parallel to the apex, white or pale body setae, and black antenna. I have seen no *Medetera* species which matches this description. If the scape and pedicel were yellow, this description would serve for one of the small species in the medeterine genus *Corindia*. Possibly this species belongs in another subfamily. *Medetera extranea* is therefore regarded as a *nomen dubium*.

I have examined the two male syntypes of *Medetera vegandris* Frey (1925: 24) described from the Philippines (ZMH, Type No. 14020). This species does not belong in *Medetera*. From its small size, wing venation, lack of acrostichals, and male postabdominal structure, it belongs to the genus *Micromorphus*. Therefore, *Medetera vegandris* is regarded as *Micromorphus vegandris* (Frey), new combination.

ACKNOWLEDGEMENTS. I would like to thank the following institutions and their respective curators for the loan of specimens. Any reference to these institutions will use the abbreviations designated below:

AMNH	American Museum of Natural History, New York; P. Wygodzinsky, R. Shuh.
AMS	Australian Museum, Sydney; D.K. McAlpine.
ANIC	Australian National Insect Collection, CSIRO, Canberra; D.H. Colless, Z. Liepa.
BMNH	British Museum (Natural History), London; K. G. V. Smith.
BPBM	Bernice P. Bishop Museum, Honolulu; W. A. Steffan, N. Evenhuis.
CED	C.E. Dye personal collection, Slough, U.K.

CNC	Biosystematics Research Institute, Agriculture Canada, Ottawa; J. R. Vockeroth.
CUIC	Cornell University, Ithaca, New York; L. L. Pechuman.
DEI	Institut für Pflanzenschutzforschung der Akademie der Landwirtschaftswissenschaften der DDR, Eberswalde-Finow, Germany (formerly Deutsches Entomologisches Institut); G. Morge.
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Mass.; A. F. Newton.
MVM	Museum of Victoria, Melbourne; A. Neboiss.
NZAC	New Zealand Arthropod Collection, DSIR, Auckland; B. Holloway.
PDPI	Papua New Guinea Department of Primary Industries, Konedobu; J. Ismay.
QDPI	Queensland Department of Primary Industries, Brisbane; B. Cantrell.
QMB	Queensland Museum, Brisbane; E. C. Dahms.
SAM	South Australian Museum, Adelaide; L. Queale.
UQIC	University of Queensland Insect Collection, Brisbane; M. Schneider.
USNM	National Museum of Natural History, Smithsonian Institution, Washington, D.C.; F.C. Thompson.
ZMH	Zoologiska Museum, Helsinki, Finland; B. Lindeberg.
ZMHB	Zoologisches Museum, Humboldt Universität, Berlin; H. Schumann.
ZMUA	Zoologisch Museum, Universiteit van Amsterdam, Netherlands; T. van Leeuwen, P. Oosterbroeck.
ZUMC	Zoologisch Museum, Universitets Copenhagen, Denmark; L. Lyneborg, V. Michelsen.

I would also like to thank C.E. Dye, Slough, U.K., for notes on type material in the BMNH and stimulating discussion. A generous CanaColl grant during December 1983 enabled me to study CNC holdings at Ottawa.

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