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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. hawaiensis Van Duzee and M. palmae Hardy (≡M. grisescens de Meijere); and Elongomedetera thoracica Hollis (≡M. gracilis Parent). Lectotypes are designated for M. apicpes 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 diademasveles groups are present in the Orient and Australasia. Medetera kinabaluisensis, from high elevation in Sabah, belongs to the circumboreal, primarily conifer-associated scolytid predator signaticorns-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.

Key to Males of Oriental and Australasian Medetera

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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 neararctic (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. adsompta Becker and M. nudicoda Becker (both housed at Zoological Survey of India, Calcutta), and M. longa Becker (= M. longicauda Negrobov & Thuneberg) (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-genitalic 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 R1 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 supraalar bristles
ppls proepisternal bristles
sa postsutural supraalar bristles

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**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, postpronotals; lsct, lateral scutellars; msct, median scutellars; np, notopleurals; pa, postalar; pm, presutural supraalars; sa, postsutural supraalars; sr, presutural intraalars. c, wing.
presutural intra-alar bristles
tarsomeres 1 to 5
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 ¼ to ½ 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. griseascens_ and _M. nigrohalterata_. The courtship behaviour of those species with obvious male secondary sexual characters, such 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


_Oligochaetus_ Mik, 1878: 7 (as genus). Type species, _Oligochaetus plumbeus_ 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).


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; froutoclypeal suture distinct, usually marked by a band of pruinosity; hypopygium large, on elongate peduncle formed by abdominal segment 7; epandrium distally with surstyla, each divided into dorsal and ventral arms; epandrial seta present ventrobasally; pair of epandrial lobes arising distally along ventral margin near base of surstyla, each lobe bearing strong bristle (for further information on the Medeterinae, see Negrobov, 1971–77 and Bickel, 1985). The five included Australian genera, Medetera, Atlaltria, Systenus, Corindia and Thyripticus 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+1 distinctly bowed anteriorly distal 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–f). The distal section is often greatly expanded, sometimes with a corresponding reduction of the surstyla.

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. rhetheura* and *M. nigruinskiisi*. 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 toxopesi, 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 kilditionensis* 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. dorrigensis* with ventral dark spine-like setae on FII) and *melanesiana* group (*M. macalpinei* and *M. rhetheura* with FIII setae) (Fig. 6e,h).
   c. *Medetera wongabelensis* has patches of anterior silvery hairs on the basal ½ to ⅔ 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. dorrigensis*). 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. adsumpita* 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<sub>4+5</sub> (Fig. 2j); FIII 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 III<sub>1</sub>, *(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 ⅓ of femur I dark brown; thorax shining metallic blue violet; thoracic setae black

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 capitae (Fig. 5a–b) (New Guinea)

10. Abdomen 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; hypopygial foramen basal, only slightly left lateral in position

11. FIII with long anteroventral setae (Fig. 6c); surstylus relatively short, with capitae arm; epandrium basally truncate (Fig. 6a–d) (New Guinea, Queensland)

12. Aedeagus with internal appendix; surstylus curved, with distinctive ventral striated projection and various strong curved apical setae (Fig. 5c). (Melanesia, northern Queensland)

13. 4–6 strong dc present, decreasing in size anteriorly

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. 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)

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 R₄₅ (Fig. 2a); surstylus as curved tapering arm; distal cercus greatly expanded with strong ventral seta (Fig. 15e) (New Guinea)

17. Pleura and coxa I without silvery pruinosity; legs without distinctive setation; wing membrane hyaline; venation and details of hypopygium otherwise
17. M and R \(_{4+5}\) 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) ................................. \(M. \text{salomonis}\)

\(M\) almost straight, gradually approaching \(R \_4+5\) (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) ................................................ \(M. \text{pseudofemoralis}\)

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 setae ........................................ 20

19. Scape and pedicel yellow; cercus massive, hemispheroidal in dorsal view, without apical blade-like setae; epandrial lobes separate large cylindrical bases, positioned lateral of each other (Fig. 19a-b); lower calypter yellow with dark brown rim (Sabah) ........................................ \(M. \text{kinabaluensis}\)

Antenna black; cercus relatively short, with 2 strong apical blade-like setae; epandrial seta large, arising from short pedicel (Fig. 14a); lower calypter entirely yellow (south-east Asia to New Guinea) ................................. \(M. \text{olivacea}\)

20. Aedeagus in ventral view with subapical anchor-shaped apical hooks; epandrial seta strong, arising from short pedicel; surstylus with 2 very long dorsal setae; cercus short and blunt (Fig. 20a) (Burma) ................................. \(M. \text{malaisei}\)

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-veles 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) ................................. \(M. \text{opaca}\)

Lateral scutellars about \(\frac{3}{5}\) 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) ................................. \(M. \text{grisescens}\)

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) .............. \(M. \text{stomias}\)

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. astroapicalis

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 blade-like 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
FIII 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

35. Scape and pedicel yellow; It2 shorter than It1; central surstylar arm distally curved; ventral surstylar arm with digitiform seta; cercus with distinctive ventral pedunculate expanded seta (Fig. 11d) .............................................. *M. borneensis*

36. Thorax elongate, length more than twice width; length t2 > t1 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*

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 2/3 (Fig. 11a) .................................................. *M. sandakanensis*

38. Aedeagus strongly recurved within epandrium, often reaching base of epandrium before curving back (Figs 8–10) *(australiana + toxopeusi groups)* ................................. 39

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*

40. Antenna entirely black; lateral scutellars about 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

41. Lower calypter entirely pale; coxae and basal 2/3 of femora with bright silvery pruinosity; distance between epandrial lobes much less than distance between basal epandrial lobe and epandrial seta .............................................. 42

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 $\frac{3}{5}$ of It, It, and It; 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. 8e) ............................. *M. irianensis*

**Surstylus deeply cleft; cercus blunt apically with medioapical curved bladelike 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. 20c) (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 capititate ventral projection which bears 4 subequal setae (Fig. 7a) (Nepal) ............................. *M. chillcottii***

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 dorosoapical 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. dorrigensis

   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 ¼ 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 III1 (on only Oriental and Australasian aberrans group and all melanesiana group) (MSSC); wing venation distinctive; M not strongly arched, but lies almost subparallel to R+5 (similar to Fig. 2); hypandrium arising from approximately halfway along ventral margin; epandrial lobes separate and positioned distad on epandrium, with marked tendency to lose collar-like pedicles, 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+t3 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 dorsi basal 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. rhetreusa, M. melanthesiana and M. kokodenisis. 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. rhetreusa.

The aberrans Group

Medetera platychira de Meijere


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 (ZMU A, examined). A female from Malay bearing a Parent holotype label with the name “Medetera lutheinervis” (BMNH) represents an unpublished manuscript name and is identical in all respects with females of M. platychira.

Additional material. Hong Kong: Tai po hua, 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; Tawau Residency, Kalabakan River, Tawau, 9-18 Nov 1958 (all BPBM). West Malaysia: Cameron Highlands, Mt Brichang, 5 Jan 1959 (BPBM); Perak Batang, Padang, 360 m, 8 March 1925; Selangor Bukit Kute, 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, Agusan, 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); Kandyula W.P., 31 Nov 1966 (CNC). Taiwan: Tahan or, July 1917 (ZMH). Thailand: Chiangmai Province, Doi Suthep, 3 April 1958 (BPBM), 3 June 1966; 1835 m, 2855 m. Additional material. Hong Kong: Tai po hua, Kowloon, Sheng Shui District, 15 June to 24 Sept 1965 (BPBM).

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

Head: vertex, frons, face, clypeus dark metallic blue-green, with some grey pruinosity; proboscs 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 anterioriormost.

Legs: coxae, trochanters and basal ½ of femora dark brown, remainder of legs yellow: relative podomere ratios as I: 1.5, 1.4; II: 0.7/0.4, 0.3/0.2; III: 0.6/0.4, 0.3/0.2; IV: 0.6/0.4, 0.3/0.2.

Wing: M not strongly arched, but almost subparallel with R₄₊₊ (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 dorsoventral projections; epandrial setae 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 Mts, 24 km north-east of Butig, 1080 m, light trap in rainforest, 20 June 1958, H. E. Milliron (BPBM).

Other material. Possible ♀: Philippines: Camarines 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, only slightly expanded apically; It 1 distinctively widened and flattened, at least twice as wide as It 2 (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 brown to femoral 'knees': remainder of legs yellow, although distal tarsomeses darkened; relative podomere ratios similar; It 1 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 ½ 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 1 is flattened in the male, whereas in M. platychira and M. mindanensis, both It 1 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; TH 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 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 is expanded.

**Medetera maai** n. sp.

**Type material.** **HOLOTYPE ♀**: Malaysia: Sarawak, Bau District, Pangkalan Tebang, 300–450 m, Sept 1958, T. C. Ma (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; III with strong apical ventral seta; IV: 2.8; 3.0; 0.7/1.3/0.7/0.5/0.1

**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.

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**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, maleaise 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, 23 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:** dorum 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; lateral scutellars 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 R4+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 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; hypopygium 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; surstylist fused to epandrium, relatively short, with single capiticate arm which bears 2 strong curved apical setae; cercus fused medially, and with short deflexed distolateral projection.

**Female:** unknown.

**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; hypopygium 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; surstylist fused to epandrium, relatively short, with single capiticate arm which bears 2 strong curved apical setae; cercus fused medially, and with short deflexed distolateral projection.

**Female:** unknown.

*Medetera morobensis* n. sp.


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

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

**Legs:** coxae of basal 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 dark 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; hypopygium 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 medially, 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 niuigeniensis n. sp.


**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 ½ of femora brown; remainder of legs yellow although T1 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; hypopygium fromen left basolateral in position; hypopygial foramen dorsal, only slightly left lateral in position; aedeagus simple, with internal appendix; epandrial seta positioned distad, near epandrial lobe; 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 medially, and with short distolateral projection which bears strong short apical seta.

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

**Remarks.** *Medetera niuigeniensis* 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. rheithraea* and in *M. macalpinei*.

### Medetera macalpinei n. sp.

**Type material.** Holotype ♀: Papua New Guinea: Woiape, Wharton Range, 20 Oct 1963, D.K. McAlpine. Paratypes: 2♂♂, same locality, 19 Oct 1963, 11 Oct 1963 (AMS); ♀, 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. 6c) (M SSC).

**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 (M SSC); 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 dorsal, only slightly left lateral in position; aedeagus simple, with internal appendix; epandrial seta positioned distad, near 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 medially, and with short distolateral projection which bears strong short apical seta.

Female: similar to male but without M SSC; 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 Woiape, 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.
Medetera rhetheura n. sp.

Type material. **HOLOTYPE d, PARATYPES Md, 222:** Papua New Guinea: Korogo, Sepik River, 10 March 1964, D.H. Colless (ANI C).

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

either *M. rhetheura* 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:** FIll with long pale ventral seta at 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

![Image of Medetera rhetheura](image_url)
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 medially, and with curved apical setae as figured; cercus fused medially, and with short distolateral projection which bears long apical seta.

Female: similar to male but lacks long pale ventral seta of FIll and tooth-like projection of IIIt; 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 FIll 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 R2+3, (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 autopomorphy. 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.


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

Head: vertex, frons, face, clypeus dark metallic green with grey pruinosity; proboscis dark brown; antenna black; aristae 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; 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; halttere 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.
Fig. 7. a, M. chillcott, Nepal; hypopygium, left lateral view. b, M. bishopae, Kedah, Malaysia; hypopygium, left lateral view.

Remarks. Medetera chillcott 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 anteriad; 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 ¾ length of median scutellars; coxae and basal ½ 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 ½ 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 toxopeus group comprises 7 species, all except M. vivida from the Papuan region east of Weber's Line. Medetera toxopeus, 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.


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; eye, 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 with pruinosity which appears bright silvery when viewed anteriorly. REMARKS.

Medetera queenslandensis n. sp.


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 ½ of femora black with silvery pruinosity; remainder of legs 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.


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.

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


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 ⅔ of femora black with silvery pruinosity, remainder of legs yellowish with distal tarsomeres darkened; podomere ratios similar to M. mosmanensis; tibiae with bright anterior silvery hairs on the basal ⅔ to ⅔ 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 dark brown with yellowish cerci (Fig. 9b); hypopygium 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 (ZMU, 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, metasternum 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.

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. Maan (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 ⅔ 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 R3+4; 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); hypopygium 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 cheesmanae** n. sp.


**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 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 irianensis** n. sp.


**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 capititate; surstylar setae as figured; cercus tapering and curved distally, with short apical setae.

Female: similar to male.

**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 vivida** Becker


*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).


**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 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 R₄₊₅; CuAx ratio 0.4; lower calypter yellow with distinct brown rim
Fig. 9. a, M. cheesmanaæ, 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; surstulus with only weak suture marking attachment to epandrium; surstulus 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 capitake 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 × 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 surstulus and epandrium; lobate process arising from lateral wall of genital chamber present mediad of epandrial lobes; surstulus 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.

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![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.](image-url)
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 III, longer than II, and II being greater than III 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 I 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 greenbronze; proboscis somewhat weak, not strongly developed; scape and pedicel yellow; 1st flagellomere greenbronze; proboscis somewhat weak, not strongly developed; scape and pedicel yellow; 1st flagellomere greenbronze; proboscis somewhat weak, not strongly developed; scape and pedicel yellow; 1st flagellomere greenbronze; proboscis somewhat weak, not strongly developed.

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; 0.5/0.4/0.3/0.2; II: 2.0; 1.9; 0.9/0.7/0.4/0.3/0.2; 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 calyptery 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., It, longer than It, and II longer than III), present in the other members of the group. In cerical structure, M. borneensis shows some similarities to M. vivida.

Medetera sandakanensis n. sp.

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

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., It, longer than It, and II longer than III), present in the other members of the group. In cerical structure, M. borneensis shows some similarities to M. vivida.
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; II: longer than I; III: 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. 11c); hypandrium trough-shaped, slightly upturned subapically; epandrial seta near base of hypandrium; distal epandral 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: blade-like apical seta and hatchet-shaped seta at ½.

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 respects to M. penangensis, except as noted.

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. Sta, 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 2.9–3.1; 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 ½.

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

Remarks. See Remarks under M. penangensis, above.

Medetera gracilis


Type material. Parent described M. gracilis from a single male taken in Sabah, at Bettoton, near Sandakan (BMNH, examined). Hollis described the monotypic genus Elongomedetera from Indonesia. He distinguished this genus from Medetera by 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. Sta, 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 2.0 mm, approximately 3/4 of head length. PRUINOUSITY: patches of orientated pruinosity, which appear matt grey in lateral view, and bright silvery when viewed from angle of 0–45°.

THORAX: elytra: more than twice as long as wide; vertex of elytra: brown; scutellum brownish in some specimens; pleura brownish; setae black; ac biserate, very short and reduced.

SILVER PRUINOUSITY: patches of orientated pruinosity, which appear matt grey in lateral view, and bright silvery when viewed from angle of 0–45°. TII longer than FII; III: 3.7; 4.3; 0.7/2.2/1.0/0.8/0.5; ½, distinctly longer than ½, 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.

**A underside: dark metallic green-bronze with short black setae; 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 nongenitalic 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 variation 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 1½ 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 mesoscutal 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. dorrigensis, M. uda, M. athertonensis, M. bunyensis and M. gingra are from the forests of eastern Australia.

**Medetera flaviscutellum** n. sp.


**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 mesonotal 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 infused; remainder of legs entirely yellow; relative podomere lengths as: I: 2.4: 2.1; 0.6/0.4/0.3/0.2; II: 2.6: 2.4; 1.1/0.6/0.4/0.3; III: 2.8: 3.0; 0.5/1.0/0.5/0.3/0.3.

**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 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; I, II flattened, black, forming an ovate ‘flag’, in sharp contrast to pale basal tarsomeres (MSSC) (Fig. 12f); III 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 basal 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 metapostumum 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; II: 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 oblate, with 2 strong ventral setae and other setae as figured; cercus massive, bearing strong apicoventral seta, subtended ventrally by strong oblate projection.

Female: unknown.

**Medetera dorrigensis n. sp.**

**Type material.** HOLOTYPE ♂: O. S. Bickel (ANIC), PARATYPES 11♂♂, 10♀♀: 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. dorrigensis*, 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.
Description. Male: this species is similar in all respects to *M. dorrigensis*, 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. 13c); epandrium with cuticular striae; epandrial seta short; basal epandrial lobe much larger than distal lobe; surstylus with membranous attachment to epandrium; dorsosubapically, 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. dorrigensis* 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 on 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. dorrigensis* (with distinctive MSSC leg setation) could have arisen.

**Medetera athertonensis** n. sp.


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

LEGS: podomere ratios similar to *M. dorrigensis*; 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 Kwamong 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.
HEADE: vertex, frons, face, clypeus black with dusting of grey pruinosity; proboscis dark brown-black; arista about as long as head height.

THORAX: dorsal metallic green-bronze with some grey pruinosity; pleura with dense grey pruinosity; scutellum entirely dark, without yellow-brown colouration; setae yellowish; lateral scutellars ½ 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: 1.9/0.9/0.5/0.4/0.4/0.4; III: 2.9: 3.6: 0.8/1.7/0.8/0.4/0.3.

WING: elongate; M gradually approaches R4+; CuAx ratio 0.3; lower calypter yellow with fan of pale setae; halteres 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 lobes and base of hypandrium; epandrial seta strong, positioned midway between hypandrium and aedeagus simple; epandrial seta yellowish cerci (Fig. 13g); epandrium subrectangular; yellowish setulae; hypopygium dark brown with yellowish setulae; hypopygium dark brown with yellow-brown setulae; hypopygium dark brown with short 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 Medetera 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 T11 (MSSC) (group autapomorphy); males sometimes with distinctive ventral setae on femora, or with orientated silvery pruinosity (MSSC); in Medetera 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 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 Medetera 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. 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 Medetera bunyensis has the yellowish posterior mesonotum and scutellum found in other members of the flaviscutellum group.

Medeterus olivaceus de Meijere


Type material. De Meijere described Medeterus olivaceus from
4?? syntypes taken at Batavia, Java. I have designated a ? bearing the label “Batavia iv 1908/ E. Jacobson” as LECTOTYPE (ZMU A, 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 pedicle, 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; basi setal 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 Dec 1984; 1♀, same data but 2 Dec 1984. Paratypes: ♀, 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 posterior margin about as long as width of ac band; 2 strong dc bordering mesonotal depression, anterior dc as short setulae; lateral scutellars about ¼ 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; III: 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; THI with strong pale dorsal at ¾, 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 doroapical seta and ventropapical 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*, Kuala 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 Baryulgur, 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 Eucalyptus sp. (collection dates A.C.T. and N.S.W.; Sept to May inclusive). South Australia: Tararat Sn, 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 ½ 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; III 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; halteres 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).


**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; halteres 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 surstyulus; surstyulus 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.


**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:** dorum metallic green with bronze reflections covered with dusting of brown pruinosity; pleura covered with dense oriented pruinosity; upper calypter and haltere grey with bronze reflections covered with dusting of brown pruinosity; clypeus metallic green-bronze with grey pruinosity and with short black setae, the middle section distally expanded and prolonged beyond others.

Female: similar to male except as noted: lacking oriented silvery pruinosity and hairs on pleurane, 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.


**Tokelau Islands:** Tokelau, 2 m, 1 March 1955. Vanuatu: Epi Island, Vemali, 100–150 m, 8 July to 20 Aug 1967. Western Samoa: Upolu: Afiamalu, March 1962 (MCZ); Utuamapu, 14 July (BMNH); Apia, Feb 1955; Fagatogo, 1 May, 9 Nov 1955. (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 Cristóbal, 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, posteriorium most about as long as width of ac band; 4 strong dc, decreasing in size anteriorly, and with short setulae anteriormost; lateral scutellars less than ½ 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 ¼; III: 2.0; 2.4; 0.5/1.1/0.6/0.3/0.2.

**Wing:** venation distinctive, with M and R₄₊₊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 ceri (Fig. 1a–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, 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 ⅓ 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/
Medetera pseudofemoralis n. sp.


**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:** dorsal 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 ⅓ 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; 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 femoralis is a species found in New Guinea and the Bismark Archipelago.
nepalensis, M. himalayensis and M. stomiias. Medetera nucicosa Becker (not seen) described from Darjeeling, India, is probably closely related to M. himalayensis.

**Medetera austroapicalis** n. sp.

**Type material.** **Holotype** δ, **Paratypes** 2♂♂, 1♀: **Solomon Islands**: Roroni, 35 km east of Honiara, 7 May 1964, 10 m, R. Straatman (BPPM).


**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 yellow; 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 some heavy pruinosity on pleura; setae black; ac increasing in size posteriorly; lateral scutellars ¾ length of medians.

**Legs:** coxae, basal ½ 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 R1+3 (Fig. 2f); CuAx ratio 0.8; lower calypters yellow with fan of pale seta; haltere yellow to slightly infuscated.

**Abdomen:** dark metallic bronze-green with short black setulae; hypopygium dark brown with yellowish cerci (Fig. 16c); hypandrium simple, slightly expanded distally; aedeagus with distinctive spurred apex; epandrial seta positioned basad along ventral margin of genital chamber; epandrial lobes separated by short collar, each bearing strong bristle; surstyli 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 antenal 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** δ: **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 surstyli; 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. livid*, 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


**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).


**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.

**Silver Pruinosity:** orientated pruinosity which appears bright silvery when viewed at an angle of 0–45° either side of median sagittal plane are present as following: anterior coxae I and II, stripe curved ventral blade-like seta present subapically; cuticular projection and distinctive ventral capitate strong bristle; surstylus fused basally, with a strong distal l/4 appears weakly sclerotized and distinct from hypopygium dark brown, elongate, subrectangular (Fig. 16b); hypandrium and aedeagus elongate, tapering; epandrial lobe long, positioned distally, near epandrial lobes; epandrial lobes adjacent but separate, each bearing a strong bristle; ventral surstylistar 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.

**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 longitarsis** de Meijere

*Medeterus longitarsis* de Meijere, 1916: 262.

**Type material.** Syntypes: Indonesia: Java, 2♂♂, Wonosobo, April 1909; 1♂, Nongkodjadjar, Jan 1911, leg. E. Jacobson. ♀, labelled “Wonsobo/ 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 ½ of femora and remainder of legs yellowish; I: 3.2, 3.4; 1.6/1.9/ 1.6/0.5/0.4; 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 R₄₊ᵢ, 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 surstylistar 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*).
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. stomiias*, 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.


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; FII with pale hairs ventrally.

Wing: M gradually approaching R4+5, as in wing of M. minima (see Fig. 21); 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 ceric (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 setae.

Female: unknown.

Medetera nepalensis n. sp.

Type material. Holotype ♀. Paratype ♀: Nepal: 27°57′N 85°00′E, 10,000 ft, malaise trap 3, 11 May 1967, Canadian Nepal Expedition (CNC).

Additional material. Probable females of this species: Nepal: 27°57′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; R4+5 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 setae; cercus with ventral digitiform cuticular projection at 2/3.

Female: similar to male.

Remarks. M. 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 R₄₊₅. Medetera nudicosta 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 1♂♂♂♂, 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 medially by thin pruinose stripe which is expanded ventrally across frontoclypeal suture and over clypeus; proboscis dark brown, elongated, 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 ½ 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 R₄₊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 dorsopapillae.

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 (autapomomorphy); epandrial seta reduced or lost (autapomorphy); surstylus fused almost to tip; dorsal surstalar 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. griscens, 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. griscens, 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 greenblack, 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 de 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 R₄₊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 'veles assemblage' by its relatively small size, reduced lateral scutellars, and distinctive cercal structure.

*Medetera grisescens* de Meijere


*Medetera atrata* Van Duzece, 1933: 344, n. syn.

*Medetera ciliomorata* Van Duzece, 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 Duzece (1933) designated male HOLOTYPES for *Medetera hawaiiensis*, *M. atrata* and *M. ciliomorata*, all collected on Oahu, Hawaiian Islands. I have examined the 3 holotypes (all BPBM) and regard them as belonging to *M.*

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**Fig. 18.** a. *M. opaca*, Java; hypopygium, left lateral view. b. *M. grisescens*, Honolulu, Hawaii; hypopygium, left lateral view.
grisesccns. Hardy (1939) described M. palmatae 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. grisesccns.


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 0.7/0.6/0.4/0.3.

Abdomen: dark metallic green-bronze with 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 grisesccns 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 grisesccns 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 grisesccns 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 grisesccns suggest year round adult activity in the humid tropics, with more seasonal occurrence in temperate regions. In the Sydney district, for example, M. grisesccns 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. grisesccns maintains a fairly constant facies across its entire range.

The signaticornis-pinicoila Group

The signaticornis-pinicoila 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-pinicoila 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; stylus broadly rounded, 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. Kambaranga, 2140 m, 31 Oct 1958, T. C. Maa (BPBM).*

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

**Description.** Male: length 3.7; wing dimensions 4.0 × 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; surstylius fused to epandrium; surstylius 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


**Type material.** *Syntypes:* Indonesia: 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).


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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 1963 (BMNH) (12 $\notin$, 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; III with single ad at $\frac{1}{4}$; III: 1.3; 1.4; 0.2/0.6/0.4/0.2/0.2.

**WING:** R gradually approaches R4+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

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Fig. 20. *M. malaisei*, Kambali, 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. 20c): 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; surstylist fused to epandrium; dorsal surstylar arm curved mediad; 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 hypopygium and is distributed from Malaysia to the Solomons, including northern Queensland. 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 Negrov & Thuneberg

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 twice as long as width of ac band; 4 strong dc present, decreasing anteriad, and with much shorter dc and short setulae anteriormost; lateral scutellars ⅔ length of medians.

LEGS: coxae, femora black to femoral ‘knees’; remainder of legs yellowish with distal tarsomeres darkened; relative podomer 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 R2+3; 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; surstylist fused to epandrium, but distinctly narrowed basally; surstylist 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 longicauda Negrov & Thuneberg 1970: 143 (replacement name for longicauda Becker 1922).

Type material. Becker described M. longicauda from 235 and 17 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. 5: 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 anteriad, and with short setulae anteriormost; lateral scutellars ⅔ length of medians; 8–10 long pale ppls present.

LEGS: relatively long; coxae black; remainder of legs yellow with only distal tarsomeres darkened; relative podomer ratios as: I: 3.4; 3.6; 1.9/2.1/1.5/0.7/0.4; II: 3.5; 4.6; 3.8/2.2/1.5/0.6/0.4/0.3; 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. grisescens 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 astroapicalis 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. 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
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. australapicalis (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.](image-url)
relatively late, in the mid-Pleistocene, supposedly after the disappearance of the northern conifers (Holloway, 1970). At the 1000–2500 m zone on Mt Kinabalu, the vegetation is dominated by lauro-fagaceous forest of south-east Asian and Himalayan foothills affinities, while at higher elevations, a mixture of south temperate and Himalayan plants predominates. Holloway’s analysis of the Mt Kinabalu moth fauna showed that palearctic elements are present only at high altitudes and that these elements have related species on high peaks in Luzon and Sumatra. Since Mt Kinabalu is a young peak, Holloway assumed that palearctic elements must have colonized the mountain relatively recently, since the beginning of the Pleistocene, from a northern source area. However, some of these palearctic elements may not be recent immigrants at all, but remnants of early Tertiary stock originally associated with the ‘northern’ coniferous flora but which became secondarily associated with the present montane forests. The strong association of the *signaticornis-pinicola* group with conifers would support this latter hypothesis, and *Medetera kinabaluensis*, of holarctic affinities, may in fact be a very old member of the Bornean fauna.

**Phylogenetic Analysis**

I presented (Bickel, 1985) a cladistic analysis of the Medeterinae in which the genus *Thrypticus* was regarded as derived from *Medetera*. This analysis was modified in Bickel, 1986, and *Thrypticus* + *Corindia* is now regarded as the sister-group of *Medetera*. The following analysis considers the phylogenetic relationships of the major holarctic, Oriental and Australasian *Medetera* groups.

Most characters and their character states were discussed in Bickel (1985, 1986) and will be summarized in the following format: Character: plesiomorphic (ancestral) state/ apomorphic (derived) state.

1. Vestiture of eyes: short hairs present/ bare.
2. Proboscis: weakly sclerotized/ massive, heavily sclerotized.
3. Postsutural supraalar bristles (sa): 2/1, the anterior bristle lost.
4. Lateral scutellars: strong bristles/ reduced to short hairs or lost.
5. Acrostichals: present/ reduced in size or lost.
6. Thorax: of normal shape/ thorax prolonged with increased separation of coxae I and II.
7. Thorax: unicolourous metallic/ scutellum, posterior mesonotum, and postpronotum yellowish, contrasting with the generally darker metallic thoracic colouration; found in the *toxopeusi*, *flaviscutellum* and *gracilis* species groups.
8. Orientated silvery pruinosity in patches on thorax, legs, and abdomen: absent/ present in the *gracilis* group.

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*Fig. 26. Cladogram of Holarctic, Oriental and Australasian Medetera*

- Apomorphy □ Apomorphy shared by only some members of group.

Abbreviations: aberr, aberrans group; aci, apicalis group; aust, australiana group; chil, chillcotti group; cra, crassivenis group; d-v, diadema-veles group; flav, flaviscutellum group; grac, gracilis group; melan, melanisiana group; sal, salomonis group; s-p, signaticornis-pinicola group; toxo, toxopeusi group; C+T, Corindia + Thrypticus; Dol, Dolichophorus.
9. Dorsocentrals (dc): 3–5 present, decreasing in size anteriorly/ only 2 strong dc bordering mesoscutal depression, anterioris 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.
17. Distal sectors of veins M and R: + 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 melaniesiana 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 melaniesiana group.
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 lateral 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 paleartic genus of two species, is defined by autapomorphies 3, 10, 13, 20 and 34 and is considered the sister taxon of the aberrans + melaniesiana 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 + melaniesiana 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 + melaniesiana complex is strongly supported by synapomorphies 12 and 14. The melaniesiana 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-velae 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 paleartic 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 paleartic species (see Negrobov, 1971–77, and Bickel, 1985) are present on these islands (BPBM).


Close to *M. jacula* (possibly the closely related *M. flavipes*), 680, 2400, 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 R4+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.

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- **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. Dyte 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.
- **ZMH** Zoologiska Museum, Helsinki, Finland; B. Lindeberg.
- **ZMB** Zoologisches Museum, Humboldt Universität, Berlin; H. Schumann.
- **ZMUVA** Zoologisch Museum, Universiteit van Amsterdam, Netherlands; T. van Leeuwen, P. Oosterbroek.
- **ZUMC** Zoologisch Museum, Universitets Copenhagen, Denmark; L. Lyneborg, V. Michelsen.

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