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GROUP OF BEE-KILLING FLIES
(DIPTERA: PHORIDAE)

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REVISION OF THE *MELALONCHA UNGULATA*-GROUP OF BEE-KILLING FLIES (DIPTERA: PHORIDAE)

BRIAN V. BROWN¹ AND GIAR-ANN KUNG²

ABSTRACT. The *Melaloncha ungulata*-group is a hypothesized monophyletic lineage based on the presence of a 3-pronged dorsal process, here called the trident, of intersegment 7–8 of the female abdomen. The group is revised and, exclusive of the *M. ungulata*-series, consists of 3 described species, *M. flava* Borgmeier, *M. nigrifrons* Borgmeier, and *M. nigrita* Borgmeier, plus the following 17 new to science: *M. acoma*, *M. adusta*, *M. candida*, *M. caligula*, *M. claviapex*, *M. cristula*, *M. culmena*, *M. debilis*, *M. diastata*, *M. fuscipalpis*, *M. juxta*, *M. platypoda*, *M. setitibialis*, *M. spina*, *M. tambopatensis*, *M. tuparroensis*, and *M. ustulata*. A further described species, *M. ungulata* Borgmeier, and the following 8 new to science are classified in the *M. ungulata*-series: *M. atrilingula*, *M. borgmeieri*, *M. castanea*, *M. curtibrachia*, *M. inicua*, *M. laticlava*, *M. pegmata*, *M. strigosa*, and *M. trita*. Phylogenetic relationships within this group are partially resolved, with *M. acoma*, *M. adusta*, *M. candida*, and *M. nigrita* considered closely related, the *M. ungulata*-series forming a second monophyletic group, and the majority of the rest of the species belonging, although with unresolved relationships, within a larger monophyletic group containing the *M. ungulata*-series. Hosts and behavior of several species of these Neotropical bee-killing flies are recorded.

INTRODUCTION

The genus *Melaloncha* Brues is a group of colorful, bee-parasitizing phorid flies (Fig. 1) found almost exclusively in the New World tropics. Before recent attention this was a relatively small group, with 32 described species (Borgmeier, 1968, 1971b), but recent revisions (Brown, 2004a, 2004b, 2005; Gonzalez and Brown, 2004) have described many new forms, such that the final number of species is now expected to be between 200 and 300.

Besides their diversity, this group is of interest for their parasitoid habits and the interesting behaviors of adult females as they attack their hosts. A greater knowledge of the species in this genus, both in the laboratory and in the field, will allow us to better understand the history and function of their diverse body forms and structures.

In his first paper about *Melaloncha*, Brown (2004b) hypothesized some monophyletic groups, including 2 subgenera, *Udamochiras* Enderlein and *Melaloncha* s.s. Within *Melaloncha* s.s., there is a distinctive group of species that we here term the *M. ungulata*-group, with a 3-pronged structure at intersegment 7–8 (Fig. 5). This paper describes the known species of the group and proposes some preliminary ideas about their relationships. The phylogeny of this group is also being studied in a combined morphological and molecular project by B. Brown and P. Smith (in preparation).

MATERIALS AND METHODS

This revision is based almost exclusively on female specimens. Males of *Melaloncha* are extremely similar to each other (at least within subgroups), are often highly divergent in structure and color from females, and show too few differences to be useful in characterizing species. Only the few known males that were collected *in copula* with females are described here. If mating pairs could be collected reliably, there would be the possibility of making further progress in the taxonomy of males, but unfortunately, in our experience, it is extremely rare that such pairs are encountered.

All specimens have a bar-coded insect label, and their data are stored at the LACM. Bar-code data for holotypes is presented in square brackets for their easy identification.

Material is deposited in the following collections (for more details on collections, see Arnett et al., 1993):

- AMNH Department of Entomology Collection, American Museum of Natural History, New York, New York, USA
- CBFC Colección Boliviana de Fauna, La Paz, Bolivia
- CMNH Section of Invertebrate Zoology, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA
- EMUS Department of Biology, Utah State University, Logan, Utah, USA
- FMNH Insect Collection, Field Museum of Natural History, Chicago, Illinois, USA
- INBC Instituto Nacional de Biodiversidad, Heredia, Costa Rica
- INPA Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil
- LACM Entomology Section, Natural History Museum of Los Angeles County, Los Angeles, California, USA
- MACN Division Entomología, Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina

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Figure 1 *Melaloncha acoma* n. sp. (right) attacking *Plebia* aff. *jatiformis* (Cockerell) in the field at Zona Protectora El Rodeo, Costa Rica (photo by B. Brown)

MCZC	Entomology Department, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA
MIUP	Museo de Invertebrados, Universidad de Panama, Panama
MPEG	Departamento de Entomologia, Museu Paraense Emilio Goeldi, Belem, Brazil
MUCR	Museo de Insectos, Universidad de Costa Rica, San José, Costa Rica
MUSM	Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru
MZSP	Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil
NHRS	Naturhistoriska Riksmuseet, Sektionen fur Entomologi, Stockholm, Sweden
QCAZ	Quito Catholic Zoology Museum, Departamento de Biología, Quito, Ecuador
UNCB	Museo de Historia Natural, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Colombia
USNM	United States National Museum, Smithsonian Institution, Washington, DC, USA

Color images of specimens of each species are posted at B. Brown's Web site, currently at www.phorid.net/phoridae/Melaloncha/products.html. These images should be consulted in conjunction with the key herein when identifying specimens.

Structural terms are those of the Manual of Nearctic Diptera (McAlpine, 1981), except for some new terms for *Melaloncha* derived by Brown (2004b). Frontal width was measured at midlength of the frons.

Most specimens in this revision were collected by spraying a mixture of honey and water to attract bee hosts, which in turn attracted parasitic phorid flies. In earlier collections we sprayed honey on a white sheet, termed a bee screen (Brown, 2001), but later collections were made directly from honey-sprayed undergrowth vegetation.

SYSTEMATICS

PHYLOGENETIC ANALYSIS

There are relatively few structural characters that we have identified for hypothesizing relationships

within this group. Most are associated with the female intersegment 7–8 and foretarsomeres. These characters are listed below, with the presumed primitive state labeled (0) and the derived states labeled (1).

1. Intersegment 7–8 of female abdomen with sclerotized apex forming a simple elongate process (0), formed into a 3-pronged process, and herein referred to as the trident (Figs. 4–43) (1). The structure of the trident is a dorsomedial process and 2 more ventral lateral arms. It is situated dorsally on the intersegment (Fig. 5) and apparently is used to help guide the female terminalia for deposition of eggs in the host.
2. Foretarsomere 1 parallel-sided (0), broadened at base (Fig. 44) (1).
3. Lateral setae of foretarsomeres small, unmodified (0), lateral setae, especially those of tarsomeres 2–4, modified, with inner (anterior) seta elongate and outer (posterior) seta thickened, curved (Figs. 51, 54, 59) (1).
4. Venter of foretarsomeres 1–2 without differentiated setae (0), venter of foretarsomeres 1–2 with thickened setae along posterior margin (Figs. 45, 50, 53, 58) (1). The form of the differentiated setae varies among groups, and the setae are more differentiated in some than in others.
5. Dorsomedial process of trident not enlarged or laterally flattened (0), dorsomedial process enlarged, laterally flattened (Figs. 15–23) (1).
6. Dorsomedial process of trident, although enlarged, not with large dorsoventral expansion (0), dorsomedial process greatly dorsoventrally expanded (Figs. 18–23) (1).
7. Foretarsal claws subequal to somewhat unequal (Fig. 47) (0), foretarsal claws greatly

unequal, with posterior (outer) claw 2.5× length of anterior (inner) claw (Figs. 54–55, 57) (1).

8. Dorsum of foretarsomere 5 without large, differentiated seta (0), dorsum of foretarsomere 5 with large apical seta (Fig. 56) (1).
9. Apex of dorsomedial process without dark margins (0), apex of dorsomedial process with dark lateral margins (Figs. 41–43) (1).

The characters above are all consistent within groups and thus represent a conservative sampling of attributes used for analysis. Based on these characters, phylogenetic trees (Figs. 2–3) were manually constructed, and we have derived the following preliminary classification for this group:

M. ungulata-group

M. flava Borgmeier

M. nigrita-subgroup

M. acoma new species

M. adusta new species

M. candida new species

M. nigrita Borgmeier

M. ungulata-subgroup

M. nigrifrons Borgmeier

M. platypoda new species

M. ungulata-infragroup

M. diastata new species

M. fuscipalpis new species

M. juxta new species

M. ustulata new species

M. caligula-series

M. claviapex new species

M. debilis new species

M. setitibialis new species

M. caligula-subseries

M. caligula new species

M. cristula new species

M. culmena new species

M. spina new species

M. tambopatensis new species

M. tugarroensis new species

M. ungulata-series

M. genitalis Borgmeier, *incertae sedis*

M. glabrifrons Borgmeier, *incertae sedis*

M. borgmeieri new species

M. curtibrachia new species

M. ungulata-subseries

M. castanea new species

M. laticlava new species

M. strigosa new species

M. trita new species

M. ungulata Borgmeier

M. pegmata infraseries

M. atrilingula new species

M. inicua new species

M. pegmata new species

TAXONOMY

Melaloncha Brues, 1904

Melaloncha, subgenus *Melaloncha* Brues, 1904

Melaloncha ungulata-group

DIAGNOSIS. Wing vein R_{2+3} absent. Coxal setae black (except yellow in *M. platypoda*). Claws of forelegs slightly bifid (Fig. 47), except those of *M. ungulata*-series, which are otherwise modified (Fig. 55); those of mid- and hind legs not bifid. Hind tibia without anterodorsal rows of setae (although with irregular rows of longitudinal setal palisades). Abdominal tergites without long setae. Ovipositor (segment 7) relatively uniform, short, slightly upturned, setose (except bare dorsally in *M. acoma* and *M. adusta*). Venter of ovipositor without cercuslike lobes. Apex of intersegment 7–8 with elaborate, 3-pronged process herein termed the trident, consisting of single dorsomedial process and 2 lateral arms (Fig. 4).

INCLUDED SPECIES. *Melaloncha flava*, plus species of the *M. nigrita*-subgroup and the *M. ungulata*-subgroup.

NOTE ON SPECIES KNOWN ONLY FROM MALES. Females of *Melaloncha* have a number of taxonomically useful characters, found mostly in the head, legs, and ovipositor. Males, on the other hand, are extremely similar in structure, as well as being highly divergent in structure and color from females. Therefore, it is lamentable that Borgmeier described several species of *Melaloncha* from male specimens only (he later realized the problems he had created; Borgmeier, 1971a:125). Species based on males are extremely problematic and cannot be matched with females with any confidence, although Borgmeier tried to do so on several occasions. Additionally, it is not possible to segregate males that belong in the *M. ungulata*-group from those of other subgroupings of the subgenus *Melaloncha* (except those of the *M. furcata*-group, which are highly distinctive). We therefore treat the male-only species as unknowns and describe new species based on females, even though some synonyms possibly will be produced.

The following male-only species could potentially fall within the group treated herein: *M. genitalis* Borgmeier, *M. glabrifrons* Borgmeier, *M. luteipleura* Borgmeier, and *M. zikani* Borgmeier. Of these, *M. genitalis* and *M. glabrifrons* >have been associated with the *M. ungulata*-subgroup and are discussed later in this paper.

Melaloncha flava Borgmeier

(Fig. 4)

Melaloncha flava Borgmeier, 1959:182–184, fig. 77.

HOLOTYPE. ♀, BRAZIL: Santa Catarina: Nova Teutônia, 27.18°S, 52.38°W, v.1952, F. Plaumann (MZSP; examined but not bar-coded).

RECOGNITION. This species is easily recognized by the overall yellow color and the abdominal tergites that lack any black markings.

Males are similar in color to females, and were keyed by Borgmeier (1971a).

DESCRIPTION. Female. Body length 1.3–1.7 mm. Frons yellow, except ocellar triangle black; with fine, reticulate sculpturing. Mean frontal width 0.44 head width. Flagellomere 1 yellow. Palpus yellow, palpal setae yellow. Postocular setae black dorsally, yellow ventrally. Genal setae yellow. Scutum brownish-yellow. Pleuron brownish-yellow. Legs brownish-yellow. Venter of foretibia lacking enlarged setae. Foretarsomeres relatively elongate, narrow. Posteroventral margin of tarsomeres 1–2 without enlarged setae. Large, lateral setae of foretarsomeres relatively small, inconspicuous. Posterior (outer) tarsal claw subequal to anterior claw. Mean costal length 0.45 wing length, range 0.43–0.47. Halter yellow. Abdominal tergites completely yellow. Ovipositor yellow basally, otherwise dark brown, with short setae, slightly dorsally curved. Lateral arms of trident narrow. Dorsomedial process of trident subequal in length to lateral arms.

Male. Frons yellow, except ocellar triangle black. Flagellomere 1 yellow. Palpus yellow; palpal setae black, well developed. Postocular and genal setae black. Scutum and pleuron yellowish-brown. Legs yellowish-brown, except foretarsomeres dark brown. Foretarsomere 1 about twice as long as broad; other foretarsomeres about as long as broad; pulvilli enlarged, yellow. Abdominal tergites yellowish-brown. Venter of abdomen yellow. Cercus apparently dark brown, although the entire body is darkened from poor preservation. Surstylus with short apical setae.

HOST. Borgmeier (1959) recorded *Tetragonisca angustula fiebrigi* Schwarz (as *Tetragona* [*Tetragonisca*] *jaty fiebrigi*) as the host of this species.

GEOGRAPHICAL DISTRIBUTION. South-eastern Brazil.

MATERIAL EXAMINED. BRAZIL: Santa Catarina: Nova Teutônia, 27.18°S, 52.38°W, 1♂, 8♀, v.1952, 1♀, xi.1959, 2♀, vii.1972, F. Plaumann (FMNH, LACM, MCZC, MZSP).

Melaloncha nigrita-subgroup

DIAGNOSIS. Foretarsomere 1 broad, enlarged subbasally, elongate (Fig. 44).

INCLUDED SPECIES. *Melaloncha acoma*, *M. adusta*, *M. candida*, and *M. nigrita*.

Melaloncha acoma n. sp.

(Figs. 1, 5, 44)

RECOGNITION. The females of this species are easily recognized by the yellow color, bare

dorsum of the ovipositor, and enlarged tarsomere 1.

Three male specimens were collected in the field while they were copulating with females. These males were extremely different in body color and form from the associated females. Males key to *M. glabrifrons* in couplet 16 (the last couplet) in Borgmeier's (1971a) key to males of *Melaloncha*, but the surstyli of *M. glabrifrons* are much longer than those of *M. acoma*, and it is highly unlikely that they are the same species.

DESCRIPTION. Female. Body length 1.7–2.5 mm. Frons yellow, except ocellar triangle black; with fine, reticulate sculpturing. Mean frontal width 0.45 head width. Flagellomere 1 white basally, yellow apically. Palpus yellow, palpal setae yellow, thin. Postocular setae black dorsally, yellow ventrally. Genal setae yellow. Scutum anteriorly light brown, posteriorly dark brown. Pleuron brownish-yellow. Legs yellow. Venter of foretibia lacking enlarged setae. Foretarsomeres 2–5 relatively elongate, narrow; tarsomere 1 greatly elongate, somewhat widened. Posteroventral margin of tarsomeres 1–2 without enlarged setae. Large, lateral setae of foretarsomeres relatively small, inconspicuous. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Mean costal length 0.49 wing length, range 0.44–0.53. Halter yellow. Abdominal tergites anteriorly yellow, with black posterior margins. Ovipositor yellow basally, otherwise dark brown to black, bare dorsally, with short lateral and ventral setae, slightly dorsally curved. Lateral arms of trident broad at apex. Dorsomedial process of trident subequal in length to lateral arms.

Male. Frons orange to darker brown medially, except ocellar triangle black. Flagellomere 1 basally white, apically brown. Palpus whitish-yellow; palpal setae black, well developed. Postocular and genal setae black. Scutum anteriorly light brown, posteriorly dark brown, with well-defined anteromedial projection of dark color. Pleuron dark brown, except proepisternum and anterior portion of anepisternum light brown. Legs yellowish-brown, except forefemur and apex of hind femur dark brown. Foretarsomere 1 twice as long as broad, yellowish-brown; other foretarsomeres about as long as broad and dark brown; pulvilli enlarged, brown. Abdominal tergites black, anteriorly with silvery pollinosity. Basal one-third of cercus brown, apical two-thirds yellow. Surstylus with short apical setae.

HOST. We have observed females attacking a wide variety of bees, including *Plebeia frontalis* (Friese), *P. aff. jatiformis* Cockerell (Fig. 1), *Plebeia* spp., *Tetragona clavipes* (F.), *Trigona corvina* Cockerell, *T. fulviventris* Guerin, and *T. silvestriana* Vachal. Flies approach bees on foot, often from behind, and gradually move around to face the front of the bee at a 45-degree angle. At all times during an attack the abdomen is curled

forward under the body (as in Fig. 1). After attaining the proper position, the fly then dashes in and attacks the bee, possibly at the mandibular suture on the head.

GEOGRAPHICAL DISTRIBUTION. This is one of the most widely distributed species of *Melaloncha*, being found at mid- to low elevations from Mexico to Argentina.

DERIVATION OF SPECIFIC EPITHET. From Greek *akomos* for “bald,” referring to the bare dorsum of the ovipositor.

PHYLOGENETIC RELATIONSHIPS. This species is possibly most closely related to *M. adusta*, as both have an unusual dorsally bare ovipositor.

HOLOTYPE. ♀, COSTA RICA: Heredia: La Selva Biological Station, 10.43°N, 84.02°W, 24.vii.2000, G. Kung, bee screen #1 [LACM ENT 152935] (LACM).

PARATYPES. ARGENTINA: Misiones: Loreto, Ruinas Jesuíticas, 27.77°S, 57.28°W, 1♀, 24.viii.2000, P. Fidalgo, yellow pan trap (LACM). BOLIVIA: Beni: 5 km N Rurrenabaque, 14.43°S, 67.51°W, 1♀, 23.iv.2003, B. Brown, S. Marcotte, E. Zumbado, honey spray (LACM), La Paz: Coroico, Hotel Don Quixote, 16.19°S, 67.72°W, 1♀, 6.iv.2001, B. Brown, G. Kung, *Phoenix* palm flowers, 1750 m (LACM). COLOMBIA: Chocó: PNN Utría, Sendero Boroboro, 6.03°N, 77.32°W, 1♀, 4.vii.2000, honey-sprayed leaves, 2♀, 5.vii.2000, B. Brown, G. Kung, bee screen (LACM, UNCB); Magdalena: PNN Tayrona, Zaino, 11.33°N, 74.03°W, 1♀, 29.ix–17.x.2000, R. Henriquez, Malaise trap, CAP-793, 50 m (UNCB). COSTA RICA: Heredia: La Selva Biological Station, 10.43°N, 84.02°W, 15♀, 15.ii–2.iii.1993, ALAS, Malaise trap, M/06/021, M/07/022, M/08/023, M/12/027, M/13/028, M/15/030, 1♂, 15.iii.1993, ALAS, Malaise trap M/03/034, 1♀, 1.iv.1993, ALAS, Malaise trap M/05/052, 1♀, 14.vi.1993, ALAS, Malaise trap M/07/129, 3♀, 15.vii.1993, ALAS, Malaise trap, M/04/155, 1♀, 3.viii.1993, ALAS, Malaise trap M/13/175, 1♀, 15.iii.1994, ALAS, Malaise trap M/09/379, 1♀, 30.vi.1995, ALAS, Malaise trap M/08/393, 2♀, 1.viii.1995, ALAS, Malaise trap M/08/417, 1♀, 16.viii.1995, ALAS, Malaise trap M/12/433, 1♀, 14.ix.1995, ALAS, Malaise trap M/03/449, 1♀, 16.x.1995, ALAS, Malaise trap M/04/474, 1♀, 30.ix.1998, ALAS, light trap L/09/478 (INBC, LACM), 1♀, 21.vii.2000, G. Kung, bee screen #6 (LACM); Puntarenas: Las Alturas, 8.95°N, 82.83°W, 1♀, xi.1991, P. Hanson, Malaise trap, 1500 m (LACM), 24 km W Piedras Blancas, 8.77°N, 83.40°W, 1♀, x.1991, P. Hanson, Malaise trap, 200 m (LACM), 3 km SW Rincon, 8.68°N, 83.48°W, 1♀, iii–iv.1991, P. Hanson, Malaise trap, 10 m (LACM), 5 km SW Rincon, Tropical Youth Center, 8.70°N, 83.51°W, 1♀, 31.v–7.vi.1998, B. Brown, V. Berezovskiy, Malaise trap #5, 40 m (LACM), 1♀, 10.viii.2001, B. Brown, V. Berezovskiy, E.

Zumbado, honey-sprayed leaves (LACM), Wilson Botanical Garden, Las Cruces, 8.79°N, 82.95°W, 2♀, 12.vi.1998, B. Brown, V. Berezovskiy, flowers of *Syagrus coronata* (palm) (LACM), 1♀, 18.v.2000, G. Kung, flowers of *Syagrus coronata*, 1♀, 19.v.2000, G. Kung, fruits of *Syagrus coronata* (LACM); San José: University for Peace, 9.92°N, 84.28°W, 1♀, 2.viii.2001, G. Kung, honey-sprayed leaves (LACM), Zona Protectora El Rodeo, 9.91°N, 84.28°W, 5♀, 1–5.viii.2001, 5♀, 3–8.viii.2001, B. Brown, V. Berezovskiy, G. Kung, Malaise trap (LACM), 1♂, 1♀, 5.viii.2001, 2♂, 2♀, 6.viii.2001, B. Brown, G. Kung, *in copula* on leaves (LACM), 2♀, 1.viii.2001, 17♀, 2.viii.2001, 14♀, 3.viii.2001, 3♀, 4.viii.2001, 3♀, 5.viii.2001, 36♀, 8.viii.2001, B. Brown, G. Kung, honey-sprayed leaves (LACM, MUCR, MCZC, NHRS, USNM). MEXICO: Veracruz: 33 km NE Catemaco, Los Tuxtlas Biological Station, 6♀, 1.vii–1.viii.1983, S. & J. Peck, flight intercept trap, rain forest (LACM). PERU: Madre de Dios: Tambopata Research Center, 13.14°S, 69.61°W, 2♀, 19.vii.2001, 1♀, 20.vii.2001, 3♀, 23.vii.2001, 1♀, 24.vii.2001, B. Brown, G. Kung, honey-sprayed leaves (LACM, MUSM), 2♀, 19.vii.2001, B. Brown, G. Kung, attacking host bee [*Tetragona clavipes* (F.)] (LACM), 1♀, 20–23.vii.2001, B. Brown, G. Kung, Malaise trap #5 (LACM); San Martín: Estación “Biodiversidad”, 19 km NE Tarapoto, 6.46°S, 76.29°W, 1♀, 6.vii.2004, B. Brown, E. Corona, honey-spray, 950 m (LACM), San Antonio de Cumbaza, 6.40°S, 67.41°W, 1♀, 4.vii.2004, 1♀, 5.vii.2004, B. Brown, E. Corona, honey-spray, 400 m (LACM, MUSM).

Melaloncha adusta n. sp.

(Fig. 6)

RECOGNITION. This species is similar to *M. acoma* but is much darker in color and has the trident with longer lateral arms.

DESCRIPTION. Female. Body length 1.8–2.4 mm. Frons orange, darkening to brown medially, ocellar triangle black; with fine, reticulate sculpturing. Mean frontal width 0.4 head width. Flagellomere 1 orange. Palpus yellow, palpal setae black. Postocular setae black. Genal setae black. Scutum anteriorly light brown, posteriorly dark brown, with diffuse anteromedial projection of dark color; scutellum apically light brown. Pleuron light brown, with darker markings. Legs brownish-yellow (hind femur darker and with dark brown apex). Venter of foretibia lacking enlarged setae. Foretarsomeres 2–5 relatively elongate, narrow; tarsomere 1 greatly elongate, somewhat widened. Posteroventral margin of tarsomeres 1–2 without enlarged setae. Large, lateral setae of foretarsomeres relatively small, inconspicuous. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Mean costal length

0.49 wing length, range 0.47–0.53. Halter yellow. Abdominal tergites black to blackish-brown, with dull silver pollinosity and lateral triangular areas of light brown. Ovipositor yellow basally, otherwise dark brown, bare dorsally, with short lateral and ventral setae, slightly dorsally curved. Lateral arms of trident narrow. Dorsomedial process of trident slender, shorter than lateral arms.

Male. Unknown.

HOST. We observed females of this species at Las Cruces attacking *Apis mellifera*, *Paratrigona ornaticeps* (Schwarz), and *Partamona cupira* (F. Smith).

GEOGRAPHICAL DISTRIBUTION. Costa Rica, Panama.

DERIVATION OF SPECIFIC EPITHET. Latin for dark, referring to the dark color of this species relative to the similar *M. acoma*.

PHYLOGENETIC RELATIONSHIPS. This is possibly the sister-species of *M. acoma*, sharing the dorsally bare ovipositor.

It is interesting to note that the dark coloration of females of this species is similar to that of males of *M. acoma*, whose females are bright yellow. Males of *M. adusta* are not yet recognized.

HOLOTYPE. ♀, COSTA RICA: Puntarenas: Wilson Botanical Garden, Las Cruces, 8.79°N, 82.95°W, 14.vi.1998, V. Berezovskiy, flowers of *Syagrus coronata* palm [LACM ENT 116411] (LACM).

PARATYPES. COSTA RICA: Heredia: Chilamate, 10.45°N, 84.08°W, 1♀, v.1989, P. Hanson, Malaise trap, 75 m (LACM), La Selva Biological Station, 10.43°N, 84.02°W, 1♀, 4.x.1993, ALAS, Malaise trap M/15/223 (INBC); Puntarenas: Wilson Botanical Garden, Las Cruces, 8.79°N, 82.95°W, 1♀, 12.vi.1998, 10♀, 13.vi.1998, 5♀, 14.vi.1998, 5♀, 16.vi.1998, B. Brown, V. Berezovskiy, flowers of *Syagrus coronata* palm (LACM, MCZC, MUCR, NHRS, USNM), 4♀, 17.v.2000, G. Kung, bee screen (LACM), 1♀, 16.v.2000, 4♀, 17.v.2000, 1♀, 18.v.2000, G. Kung, on *Syagrus coronata* flowers (INBC, LACM). PANAMA: San Blas: Nusangandi Reserve, 9.33°N, 79.00°W, 1♀, 16–23.iv.1994, J. Pickering, Malaise trap #2862 (MIUP).

Melaloncha candida n. sp.

(Fig. 7)

RECOGNITION. Females of this species can be recognized by the elongate, relatively straight dorsomedial process of the trident, the dark brown color, and the white legs, palpus, and flagellomere.

Males key to *M. zikani* in the latest key to males (Borgmeier, 1971a); however, the sculpturing of the frons of *M. candida* is strongly reticulated, with distinctive, raised lines (as in Figs. 48–49), whereas in *M. zikani* the frons is smoother (similar to Fig. 52). Unfortunately, there are so few males of small, dark *Melaloncha*, and

there are so few distinguishing characters of males, that identification of *M. zikani* males cannot be verified at this time.

DESCRIPTION. Female. Body length 1.5–1.8 mm. Frons dark brown, lighter at dorsolateral and anterior extremes (setal bases dark brown), with reticulate sculpturing, appearing almost like leather grain. Mean frontal width 0.47 head width. Flagellomere 1 white. Palpus white, palpal setae yellow. Postocular setae black dorsally, yellow ventrally. Genal setae yellow. Scutum dark brown (anterolateral corner light brown). Pleuron light brown, with darker markings (ventrally white). Legs white, apex of hind femur dark brown. Venter of foretibia lacking enlarged setae. Foretarsomeres relatively elongate, narrow. Posteroventral margin of tarsomeres 1–2 without enlarged setae. Large, lateral setae of foretarsomeres relatively small, inconspicuous. Posterior (outer) tarsal claw subequal to anterior claw. Mean costal length 0.47 wing length, range 0.46–0.49. Halter whitish-yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, relatively straight. Lateral arms of trident narrow. Dorsomedial process of trident slender, apically pointed, longer than lateral arms, slightly expanded apically.

Male. Frons dark brown, except orange ventrally and dorsolaterally. Flagellomere 1 yellow. Palpus white; palpal setae black, well developed. Postocular and genal setae black. Scutum blackish-brown. Pleuron dark brown, except proepisternum and anterior portion of anepisternum light brown. Legs yellowish-brown, except foretarsomeres 4–5 and apex of hind femur dark brown; coxae whitish-yellow. Foretarsomere 1 about twice as long as broad, other tarsomeres about as long as broad; pulvilli enlarged, white. Abdominal tergites black, anteriorly with silvery pollinosity. Basal one-third of cercus brown, apical two-thirds white. Surstylus with short apical setae.

HOST. One specimen was attracted to an aggregation of *Trigonisca atomaria* (Cockerell), whereas others were collected attacking *Trigona setentrionalis* Almeida on *Attalea* palm flowers.

GEOGRAPHICAL DISTRIBUTION. Amazon Basin.

DERIVATION OF SPECIFIC EPITHET. Latin *candidus* for “white,” referring to the color of the ventral part of the body.

HOLOTYPE. ♀, BRAZIL: Pará: Caiçara, 1.78°S, 51.43°W, 7.x.2001, B. Brown, A. Rodrigues, flowers of *Attalea maripa* palm [LACM ENT 075922] (MPEG).

PARATYPES. BRAZIL: Amazonas: Manaus, Reserva Ducke, 3.13°S, 60.02°W, 1♀, 8–15.iv.1992, J. Vidal, Arm-Cola. 1-B-10m (INPA); Pará: 2♀, same data as holotype, 2♂, 1♀, same data except 6.x.2001 (LACM, MPEG). COLOMBIA: Amazonas: PNN Amacayacu, 3.82°S, 70.26°W, 1♀, 11.iii.2000, B. Brown, G. Kung, attacking *Trigonisca atomaria* (UNCB), 1♀,

22 km NW Leticia, 4.04°S, 69.99°W, 1♀, 4-7.ix.1997, M. Sharkey, Malaise trap #2 (UNCB).

Melaloncha nigrita Borgmeier
(Fig. 8)

Melaloncha nigrita Borgmeier, 1959:185-186, figs. 72-74, 76.

HOLOTYPE. ♀, BRAZIL: Santa Catarina: Nova Teutônia, 27.18°S, 52.38°W, v.1952, F. Plaumann [LACM ENT 116531] (MZSP; examined).

RECOGNITION. Females of this species can be recognized by the short processes of the trident and the dark body color. They are most similar to *M. juxta* species, from which they differ by the characters in the key.

DESCRIPTION. Female. Body length 1.3-1.6 mm. Frons dark brown, lighter at dorsolateral and anterior extremes, strongly reticulate. Mean frontal width 0.45 head width. Flagellomere 1 yellow. Palpus yellow, palpal setae yellow, with 1 black, apical seta. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown except anterior portion of anepisternum light brown. Legs whitish-yellow. Venter of foretibia lacking enlarged setae. Foretarsomeres relatively elongate, narrow. Posteroventral margin of tarsomeres 1-2 without enlarged setae. Large, lateral setae of foretarsomeres relatively small, inconspicuous. Posterior (outer) tarsal claw subequal to anterior claw. Mean costal length 0.44 wing length, range 0.39-0.45. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor yellow basally, otherwise dark brown, with short setae, slightly dorsally curved. Lateral arms of trident short, relatively narrow. Dorsomedial process of trident subequal in length to lateral arms.

Male. Unknown.

HOST. Specimens were attracted to mixed aggregations of bees in Argentina, where the most likely host (based on size) was *Plebeia* sp.

GEOGRAPHICAL DISTRIBUTION. South-eastern Brazil and northeastern Argentina.

OTHER MATERIAL EXAMINED. ARGENTINA: Misiones: Reserva Vida Silvestre Urugua-í, 25.97°S, 54.11°W, 6♀, 10.xii.2003, 6♀, 11.xii.2003, 5♀, 12.xii.2003, B. Brown, G. Kung, bee screen, honey spray, 3♀, 17.xii.2003, 1♀, 18.xii.2003, L. Gonzalez, G. Kung, honey spray, 400 m (LACM, MACN). BRAZIL: 3♀ paratypes, same data as holotype, except vii.1946 (MCZC, MZSP, USNM).

Melaloncha ungulata-subgroup

DIAGNOSIS. Setae of at least foretarsomere 2 enlarged: inner (anterior) seta of elongate, outer (posterior) thickened, curved (Fig. 51).

INCLUDED SPECIES. *Melaloncha nigrifrons*, *M. platypoda*, plus the *M. ungulata*-series.

Melaloncha nigrifrons Borgmeier
(Fig. 9)

Melaloncha nigrifrons Borgmeier, 1971a:133-134, figs. 173-174.

HOLOTYPE. ♀, COSTA RICA: San José, 15.vii.[no year], H. Schmidt (MZSP; examined but not bar-coded).

RECOGNITION. Both sexes can be recognized by the yellowish body with the dark, shiny frons. Additionally, females have the lateral arms of the trident greatly elongate.

We collected males of this species for the first time; they are recognizable by the shiny, dark-colored frons with the yellowish-colored body, and their co-occurrence with females. They key to *M. clavata* Schmitz in the most recent key to males (Borgmeier, 1971a), a species not considered part of the *M. ungulata*-group because females lack a trident. The identification of the male of *M. clavata*, however, is questionable, as the specimen was obtained from a single parasitized bee, and no female *Melaloncha* specimens were associated with it (Borgmeier, 1938). The males of *M. borgmeieri* (below) also key to this couplet but differ by their yellow frons and dark brown foretarsomeres.

DESCRIPTION. Female. Body length 1.7-1.9 mm. Frons varying from almost completely dark brown or black, to having various amounts of yellowish-brown at dorsolateral corners and on setal bases of all frontal setae; shiny, but with fine, reticulate sculpturing. Mean frontal width 0.43 head width. Flagellomere 1 white basally, yellow apically. Palpus white, palpal setae black to yellow. Postocular setae black dorsally, yellow or black ventrally. Genal setae yellow to black. Scutum anteriorly light brown, posteriorly dark brown, with well-defined anteromedial projection of dark color. Pleuron brownish-yellow. Legs brownish-yellow. Venter of foretibia lacking enlarged setae. Foretarsomeres relatively elongate, narrow. Posteroventral margin of tarsomeres 1-2 without enlarged setae. Large, lateral setae of foretarsomeres asymmetrical: posterior setae shorter, thicker, curved; anterior setae longer, thinner, straight. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Mean costal length 0.47 wing length, range 0.44-0.52. Halter yellow. Abdominal tergites anteriorly yellow, with black posterior margins. Ovipositor brown basally, darker brown apically, with short setae, slightly dorsally curved. Lateral arms of trident elongate, narrow, with narrower dorsoapical process. Dorsomedial process of trident much shorter than lateral arms.

Male. Frons black, with lighter color at dorsal and ventral extremes and, in some specimens, on setal bases. Flagellomere 1 yellow. Palpus white; palpal setae black, well developed. Postocular and genal setae black. Scutum on anterior two-thirds

light brown, on posterior two-thirds dark brown, with or without a slight anteromedial projection of dark color. Pleuron light brown. Legs yellowish-brown, except apex of hind femur with small posterodorsal margin of dark brown. Foretarsomere 1 twice as long as broad; other foretarsomeres about as long as broad; pulvilli enlarged, light brown. Abdominal tergite 1 black; tergites 2 and 6 mostly yellow with thin posterior black band; tergites 3–5 black with central yellow spot decreasing in size posteriorly. Venter of abdomen yellow. Basal one-third of cercus brown, apical two-thirds yellow. Surstylus with short apical setae.

VARIATION. Besides the variation in color of the frons and setae of the head noted above, female (but not male) specimens from Finca Montezuma have flagellomere 1 brown tipped. Specimens from Bolivia are significantly larger than the others, have the process of the lateral arms of the trident smaller, and might represent a separate species.

HOST. Flies were attracted to mixed aggregations of bees, but no attacks were seen.

GEOGRAPHICAL DISTRIBUTION. Costa Rica to Argentina.

MATERIAL EXAMINED. ARGENTINA: Misiones: Reserva Vida Silvestre Uruguay-1, 25.97°S, 54.11°W, 1♀, 11.xii.2003, B. Brown, G. Kung, bee screen, 400 m (MACN). BOLIVIA: La Paz: 40 km N Caranavi, Cumbre Alto Beni, 3♀, 13.iv.2003, B. Brown, S. Marcotte, E. Zumbado, honey spray (CBFC, LACM), 2♀, 21.iv.2004, E. Zumbado (LACM). COSTA RICA: Guanacaste: Rio Naranjo, Finca Montezuma, 10.67°N, 85.06°W, 2♂, 4♀, 26.ii.2002, 1♂, 27.ii.2002, B. Brown, L. Gonzalez, K. Walker, E. Zumbado, honey-sprayed undergrowth (INBC, LACM, MUCR); Puntarenas: Las Alturas, 8.95°N, 82.83°W, 1♀, vi.1992, P. Hanson, Malaise trap, 1500 m (LACM); San José: San Antonio de Escazu, 9.90°N, 84.15°W, 1♂, i–ii.1989, W. Eberhard, Malaise trap, 1300 m (LACM), Zona Protectora El Rodeo, 9.91°N, 84.28°W, 2♀, 1–5.viii.2001, B. Brown, V. Berezovski, G. Kung, Malaise trap (LACM).

Melaloncha platypoda n. sp.
(Figs. 10, 24)

RECOGNITION. This species can be distinguished from all other *Melaloncha* by the greatly enlarged, flattened foretarsomeres. It is additionally recognized within the *M. unguolata*-group by the yellow coxal setae and the trident with a large dorsomedial process and extremely short lateral arms.

One male specimen was collected *in copula* with a female. It is extraordinarily divergent from the female, being almost entirely dark brown (except the frons), with normal (for a male)

forelegs. In Borgmeier's (1971a) key to males, it runs to either *M. genitalis* or *M. glabrifrons*, depending on whether one takes the first or second lead in couplet 7, which specify a medium-sized (2.5 mm) or small (1.8–2.0 mm) specimen, respectively. The terminalia of *M. platypoda* differ from those of *M. genitalis*, in which the surstylar lobes are greatly elongate. The male of *M. glabrifrons* is much lighter in color than that of *M. platypoda*.

DESCRIPTION. Female. Body length 2.1–2.5 mm. Frons yellow, except ocellar triangle black; with fine, reticulate sculpturing. Mean frontal width 0.41 head width. Flagellomere 1 white basally, yellow apically. Palpus yellow, palpal setae yellow. Postocular setae black dorsally, yellow ventrally. Genal setae yellow. Scutum anteriorly light brown, posteriorly dark brown, with well-defined anteromedial projection of dark color. Pleuron brownish-yellow. Legs brownish-yellow. Coxal setae yellow. Venter of foretibia lacking enlarged setae. Foretarsomeres extraordinarily modified: broad, flat, combined length 1.4× length of foretibia. Posteroventral margin of tarsomeres 1–2 without enlarged setae. Large, lateral setae of foretarsomeres asymmetrical: anterior seta longer, thicker. Posterior (outer) tarsal claw subequal to anterior claw. Long setae of coxae yellow (black in most other *Melaloncha*). Mean costal length 0.50 wing length, range 0.48–0.53. Halter yellow. Abdominal tergites anteriorly yellow, with black posterior margins. Ovipositor yellow basally, otherwise dark brown, with short setae, slightly dorsally curved. Lateral arms of trident extremely short, pointed. Dorsomedial process of trident short, broad, apically truncate in lateral view.

Male. Body length 2.1 mm. Frons orange, except setal bases dark brown and ocellar triangle black. Flagellomere 1 orange. Palpus white; palpal setae black, well developed. Postocular and genal setae. Thorax and legs almost completely dark brown, except small spot of light brown at posterior apex of postpronotal lobe; foretibia and foretarsomeres 1–4 light brown. Foretarsomere 1 about twice as long as broad; other foretarsomeres about as long as broad; pulvilli enlarged, yellow. Abdominal tergites black, anteriorly with silvery pollinosity. Venter of abdomen gray. Basal one-third of cercus brown, apical two-thirds yellow. Surstylus with short apical setae.

HOST. At the Wilson Botanical Garden in Costa Rica, we observed this species attacking *Trigona nigerrima* Cresson, *T. corvina* (Cockerell), and *T. fulviventris* Guérin on flowers of the exotic Brazilian palm *Syagrus coronata*. At other sites they were attracted to mixed aggregations of bees, but no attacks were observed.

GEOGRAPHICAL DISTRIBUTION. Costa Rica to Bolivia.

DERIVATION OF SPECIFIC EPITHET. Greek for “flat foot,” referring to the broad, flattened tarsomeres of the female foreleg.

HOLOTYPE. ♀, COSTA RICA: San José: Zurquí de Moravia, 10.05°N, 84.02°W, v.1992, P. Hanson, Malaise trap, 1600 m [LACM ENT 100755] (LACM).

PARATYPES. BOLIVIA: La Paz: 40 km N Caranavi, Cumbre Alto Beni, 15.83°S, 67.56°W, 1♀, 18.iv.2003, 4♀, 19.iv.2003, B. Brown, S. Marcotte, E. Zumbado, honey spray (CBFC, LACM), 4♀, 16.iv.2004, 5♀, 17.iv.2004, 3♀, 21.iv.2004, B. Brown, E. Zumbado, honey spray (LACM), Coroico, Hotel Don Quixote, 16.19°S, 67.72°W, 1♀, 5.iv.2004, 4♀, 6.iv.2004, B. Brown, E. Zumbado, *Phoenix* palm flowers/honey spray (LACM). COSTA RICA: Puntarenas: Las Alturas, 8.95°N, 82.83°W, 1♀, iii.1992, 1♀, vi.1992, P. Hanson, Malaise trap, 1500 m (LACM), Wilson Botanical Garden/Las Cruces, 8.79°N, 82.95°W, 2♀, 8.vi.1998, 2♀, 12.vi.1998, 4♀, 13.vi.1998, 7♀, 14.vi.1998, 4♀, 16.vi.1998, B. Brown, V. Berezovskiy, flowers of *Syagrus coronata* (INBC, LACM, MCZC, MUCR, MZSP, NHRS, USNM), 1♂, 3♀ (including 1 *in copula* pair), 17.v.2000, 2♀, 18.v.2000, G. Kung, on honey baits (LACM); San José, Zurquí de Moravia, 10.05°N, 84.02°W, 1♀, ix-x.1990, 1♀, vii.1991, 1♀, iii.1992, 1♀, iv-v.1993, P. Hanson, Malaise trap, 1600 m (LACM). ECUADOR: Carchi: Chical, 0.93°N, 78.18°W, 1♀, 22.vii.1983, J. E. Rawlins (CMNH).

Melaloncha ungulata-infragroup

DIAGNOSIS. Venter of tarsomeres 1–2 with enlarged setae along posterior margin; enlarged setae black, contrasting with other tarsal setae, which are yellow.

The degree of specialization of these setae vary among species: some have differentiated setae that only differ slightly from other setae, whereas in others there is a more marked separation (e.g., Figs. 45–46 versus Figs. 58–59). The color differentiation is easily seen in specimens.

INCLUDED SPECIES. *Melaloncha diastata*, *M. fuscipalpis*, *M. juxta*, *M. ustulata*, and the *M. caligula* and *M. ungulata*-series.

REMARKS. Excluding the species of the *M. ungulata*-series, this group includes some of the smallest species of *Melaloncha*. These flies parasitize equally small bees, being parasitoids of small *Leurotrigona*, *Plebeia*, and *Trigonisca* species.

Melaloncha diastata n. sp.

(Figs. 11, 25)

RECOGNITION. Identification of the 4 species of small brown *Melaloncha* with a short dorsomedial process of the trident is difficult and is complicated by the scarcity of specimens. One such species, *M. fuscipalpis*, is relatively easily differentiated by the brown palpus. Two of the remaining 3 species, *M. diastata* and *M. ustulata*, are each represented by single specimens, whereas

there are 3 specimens of *M. juxta*. The single specimen of *M. ustulata* has a much lighter brown frons than the other 2 species, in which the frons is nearly black, and the base of the forefemur in *M. ustulata* is similar in color to the apical one-half, not darkened like in the other 2 species. In *M. juxta* the dorsomedial process is short and not upturned. All these species are extremely similar, and the main differences among them are documented in the key. More specimens are necessary to determine if these differences are consistent, but for now we treat the 3 as separate species.

DESCRIPTION. Female. Body length 1.6 mm. Frons dark brown, lighter at dorsolateral and anterior extremes, coarsely reticulate. Mean frontal width 0.45 head width. Flagellomere 1 white basally, brown apically. Palpus white, palpal setae black. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown. Legs brownish-yellow, except bases of femora and apical one-half of hind femur dark brown. Venter of foretibia lacking enlarged setae. Foretarsomere 1 elongate, twice as long as 2; foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with enlarged setae. Large, lateral setae of foretarsomeres asymmetrical: anterior seta longer, thicker. Posterior (outer) tarsal claw subequal to anterior claw. Costal length 0.42 wing length. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, relatively straight. Lateral arms of trident elongate, narrow, widely spaced. Dorsomedial process of trident slightly shorter than lateral arms; slightly curved dorsally at apex.

Male. Unknown.

HOST. Unknown. The single specimen was attracted to a mixed aggregation of bees attracted to honey.

GEOGRAPHICAL DISTRIBUTION. Amazonian Colombia.

DERIVATION OF SPECIFIC EPITHET. From Greek *diastasis* for “separation,” referring to the widely separated lateral arms of the trident.

HOLOTYPE. ♀, COLOMBIA: Amazonas: Amacayacu National Park, 3.82°S, 70.26°W, 12.iii.2000, B. Brown, G. Kung, attracted to bees, honey on cards [LACM ENT 127879] (UNCB).

Melaloncha fuscipalpis n. sp.

(Figs. 12, 26, 45–47)

RECOGNITION. This species can be recognized by the minute size (relative to other *Melaloncha*), dark body color (including the unusual brown color of the palpus), and the shape of the trident.

DESCRIPTION. Female. Body length 1.4–1.5 mm. Frons dark brown to black, coarsely reticulate. Mean frontal width 0.48 head width. Flagellomere 1 white basally, brown apically.

Palpus dark brown, palpal setae black. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown. Legs mostly dark brown; apical one-quarter of forefemur and apical one-half of midfemur light brown, fore- and midtibia and all tarsomeres light brown. Venter of foretibia lacking enlarged setae. Foretarsomere 1 elongate, twice as long as 2; foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with enlarged setae. Large, lateral setae of foretarsomeres asymmetrical: anterior seta longer, thicker. Posterior (outer) tarsal claw subequal to anterior claw. Mean costal length 0.43 wing length, range 0.42–0.46. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor dark brown, setose, relatively straight. Lateral arms of trident elongate, narrow. Dorsomedial process of trident subequal in length to lateral arms; slightly curved dorsally at apex.

Male. Unknown.

HOST. One fly was collected attacking a worker of *Trigonisca* (an undescribed species) while still in the tube of the aspirator that collected both specimens. It attacked with the ovipositor curved beneath the body (as in Fig. 1).

GEOGRAPHICAL DISTRIBUTION. Southern Peru.

DERIVATION OF SPECIFIC EPITHET. From Latin *fuscus* for “dark,” referring to the color of the palpus.

HOLOTYPE. ♀, PERU: Madre de Dios: Tambopata Research Center, 13.14°S, 69.61°W, 21.vii.2001, B. Brown, G. Kung, honey-sprayed leaves [LACM ENT 075507] (MUSM).

PARATYPES. PERU: Madre de Dios: Tambopata Research Center, 13.14°S, 69.61°W, 2♀, 21.vii.2001, 2♀, 22.vii.2001, 2♀, 23.vii.2001, 2♀, 24.vii.2001, B. Brown, G. Kung, honey-sprayed leaves (LACM, MUSM), 1♀, 20-23.vii.2001, B. Brown, G. Kung, Malaise trap #5 (LACM).

Melaloncha juxta n. sp.

(Figs. 13, 27)

RECOGNITION. See Recognition for *M. diastata*, above.

DESCRIPTION. Female. Body length 1.5–1.6 mm. Frons dark brown to black, coarsely reticulate. Mean frontal width 0.45 head width. Flagellomere 1 white basally, yellow apically (holotype with brown markings at ventral apex). Palpus white, palpal setae black. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown. Legs yellow, except coxae, basal regions of femora, and apex of hind femur dark brown. Venter of foretibia lacking enlarged setae. Foretarsomere 1 elongate, twice as long as 2; foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae (that extends across venter of tarsomere 1). Large, lateral setae of foretarsomeres asymmetrical: posterior setae shorter, thicker, curved; anterior setae longer, thinner, straight. Posterior (outer) tarsal claw subequal to anterior claw. Costa 0.46 wing length. Halter yellow. Abdominal tergites anteriorly brown, with darker

anterior seta longer, thicker. Posterior (outer) tarsal claw subequal to anterior claw. Mean costal length 0.44 wing length, range 0.43–0.45. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, relatively straight. Lateral arms of trident elongate, narrow closely approximated. Dorsomedial process of trident short, pointed.

Male. Unknown.

VARIATION. The paratype from Colombia has thicker lateral arms of the trident. The specimen from Costa Rica has the darkening of the forefemur restricted to the extreme base of the segment, unlike the Colombian specimens, in which the basal one-half is darkened.

HOST. Unknown. In Colombia, the flies were attracted to an aggregation dominated by *Trigonisca* sp.

GEOGRAPHICAL DISTRIBUTION. Colombia and Costa Rica.

DERIVATION OF SPECIFIC EPITHET. Latin word for “near,” referring to the closely approximated bases of the lateral arms of the trident.

HOLOTYPE. ♀, COLOMBIA: Chocó: PNN Utría, Sendero Boroboro, 6.03°N, 77.32°W, 5.vii.2000, B. Brown, G. Kung, bee screen [LACM ENT 075842] (UNCB).

PARATYPES. COLOMBIA: 1♀, same data as holotype (LACM). COSTA RICA: Puntarenas: 5.5 km SW Rincon, Tropical Youth Center, 8.70°N, 83.51°W, 1♀, 11.viii.2001, B. Brown, V. Berezovskiy, E. Zumbado, honey-sprayed leaves (LACM).

Melaloncha ustulata n. sp.

(Figs. 14, 28)

RECOGNITION. See discussion of *M. diastata*. This species also differs from the other 4 small brown species by having a lighter brown frons.

DESCRIPTION. Female. Body length 1.4 mm. Frons brown, setal bases dark brown, coarsely reticulate. Mean frontal width 0.45 head width. Flagellomere 1 yellow. Palpus yellow, palpal setae black. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown. Legs light brown, except midcoxa, hind coxa, and apex of hind femur dark brown. Venter of foretibia with row of enlarged setae. Foretarsomere 1 elongate, twice as long as 2; foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae (that extends across venter of tarsomere 1). Large, lateral setae of foretarsomeres asymmetrical: posterior setae shorter, thicker, curved; anterior setae longer, thinner, straight. Posterior (outer) tarsal claw subequal to anterior claw. Costa 0.46 wing length. Halter yellow. Abdominal tergites anteriorly brown, with darker

posterior margins and silver pollinosity. Ovipositor yellow basally, otherwise dark brown, setose, slightly ventrally curved. Lateral arms of trident short, relatively narrow. Dorsomedial process of trident subequal in length to lateral arms; slightly curved dorsally at apex.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Costa Rica.

DERIVATION OF SPECIFIC EPITHET. Latin for “darkened” or “browned,” referring to the color of the frons.

HOLOTYPE. ♀, COSTA RICA: Puntarenas: 3 km SW Rincon, 8.68°N, 83.48°W, xii.1989, P. Hanson, Malaise trap, 10 m [LACM ENT 004669] (LACM).

Melaloncha caligula-series

DIAGNOSIS. Unusually small species of *Melaloncha* (as are the 4 preceding species). Dorsomedial process of trident slightly to greatly enlarged, laterally flattened (Figs. 15–23).

INCLUDED SPECIES. *Melaloncha claviapex*, *M. debilis*, *M. setitibialis*, and the *M. caligula*-subseries.

Melaloncha claviapex n. sp.

(Fig. 15)

RECOGNITION. This species is easily recognized by the elongate, straight dorsomedial process of the trident, along with the clavate lateral arm. Its trident is most similar to that of *M. setitibialis*, but it lacks the elongate foretibial setae of that species.

DESCRIPTION. Female. Body length 1.6 mm. Frons dark brown, coarsely reticulate. Mean frontal width 0.46 head width. Flagellomere 1 white basally, yellow apically. Palpus white, palpal setae black. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown. Legs brownish-yellow, except midcoxa, hind coxa and apical one-quarter of hind femur dark brown. Venter of foretibia lacking enlarged setae. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: anterior seta longer, thicker; setae of tarsomeres 2–3 unusually and distinctively enlarged, those of tarsomere 4 relatively small. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Costa 0.46 wing length. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, with short setae, slightly dorsally curved. Lateral arms of trident elongate, apically expanded and club-tipped. Dorsomedial process of trident elongate, laterally flattened, shorter than lateral arms.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Southern Peru.

DERIVATION OF SPECIFIC EPITHET. From Latin *clava* for “club” and *apex* for “tip,” referring to the club-tipped apices of the lateral arms of the trident.

HOLOTYPE. ♀, PERU: Madre de Dios: Tambopata Research Center, 13.14°S, 69.61°W, 24.vii.2001, B. Brown, G. Kung, honey-sprayed leaves [LACM ENT 074467] (MUSM).

Melaloncha debilis n. sp.

(Figs. 16, 48–51)

RECOGNITION. The species can be recognized by the dorsomedial process of the trident, which is small, knoblike, and supported by a short stalk.

DESCRIPTION. Female. Body length 1.4–1.7 mm. Frons dark brown, lighter at dorsolateral and anterior extremes, coarsely reticulate. Mean frontal width 0.47 head width. Flagellomere 1 yellow. Palpus yellow, palpal setae black. Postocular setae black. Genal setae black. Scutum anteriorly light brown, posteriorly dark brown. Pleuron light brown, with darker markings. Legs brownish-yellow. Foretibia with posteroventral row of enlarged setae that are about equal in length to depth of tibia. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: posterior setae shorter, thicker, curved; anterior setae longer, thinner, straight. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Mean costal length 0.46 wing length, range 0.43–0.48. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor dark brown, setose, slightly dorsally curved. Lateral arms of trident broad. Dorsomedial process of trident slender, longer than lateral arms, slightly expanded apically.

Male. Unknown.

HOST. We observed this bee attacking *Trigonisca* (an undescribed species) in Colombia; otherwise, it has been attracted to mixed aggregations of bees.

GEOGRAPHICAL DISTRIBUTION. Colombia and Costa Rica.

DERIVATION OF SPECIFIC EPITHET. Latin for “weak,” referring to the relatively small, poorly developed apex of the dorsomedial process of the trident.

HOLOTYPE. ♀, COSTA RICA: Heredia: La Selva Biological Station, 10.43°N, 84.02°W, 16.ii–2.iii.1993, ALAS, Malaise trap M/07/022 [INBIOCRI001264310] (INBC).

PARATYPES. COLOMBIA: Chocó: PNN Utria, Sendero Boroboro, 6.03°N, 77.32°W, 2♀, 5.vii.2000, B. Brown, G. Kung, bee screen

(LACM, UNCB). COSTA RICA: Heredia: La Selva Biological Station, 10.43°N, 84.02°W, 6♀, 3.iii.1993, ALAS, Malaise trap M/06/021, M/16/031, 4♀, 15.iii.1993, ALAS, Malaise trap M/06/037, 2♀, 2.iv.1993, ALAS, Malaise trap M/15/062, 1♀, 4.iv.1994, ALAS, Malaise trap M/12/390, 1♀, 14.ix.1995, ALAS, Malaise trap M/04/450, 1.iv.1996, ALAS, Malaise trap M/07/608 (INBC, LACM, MUCR), 1♀, 17.ii.2002, L. Gonzalez, honey-sprayed undergrowth (LACM).

Melaloncha setitibialis n. sp.

(Fig. 17)

RECOGNITION. This species is most similar to *M. claviapex* but differs by the shape of the trident and by the long setae on the venter of the foretibia.

DESCRIPTION. Female. Body length 1.6–1.7 mm. Frons dark brown, lighter at dorsolateral and anterior extremes, coarsely reticulate. Mean frontal width 0.4 head width. Flagellomere 1 yellow. Palpus white, palpal setae black. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown except proepisternum and anterior portion of anepisternum light brown. Legs brownish-yellow except apex of hind femur dark brown. Foretibia with posteroventral row of extremely enlarged setae that are approximately twice width of tibia. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: posterior setae shorter, thicker, curved; anterior setae longer, thinner, straight. Posterior (outer) tarsal claw greatly enlarged, about twice size of anterior claw. Mean costal length 0.47 wing length, range 0.45–0.49. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor dark brown, setose, slightly dorsally curved. Lateral arms of trident elongate, apically expanded and club-tipped. Dorsomedial process of trident elongate, apically rounded and dorsoventrally flattened.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Southern Peru.

DERIVATION OF SPECIFIC EPITHET. Latin *seta* for “bristle” and *tibialis* for “of the leg,” referring to the long setae on the foretibia.

HOLOTYPE. ♀, PERU: Madre de Dios: Tambopata Research Center, 13.14°S, 69.61°W, 22.vii.2001, B. Brown, G. Kung, honey-sprayed leaves [LACM ENT 075454] (MUSM).

PARATYPE. 1♀, same data as holotype (LACM).

Melaloncha caligula-subseries

DIAGNOSIS. Dorsomedial process with greatly enlarged, flattened flange (Figs. 18–23).

INCLUDED SPECIES. *Melaloncha caligula*, *M. cristula*, *M. culmena*, *M. spina*, *M. tambopatensis*, and *M. tuparroensis*.

Melaloncha caligula n. sp.

(Fig. 18)

RECOGNITION. This species is recognized by the dorsomedial process of the trident, which is greatly expanded but has only a minute notch below.

DESCRIPTION. Female. Body length 1.6 mm. Frons dark brown, lighter at dorsolateral and anterior extremes, coarsely reticulate. Mean frontal width 0.47 head width. Flagellomere 1 yellow. Palpus yellow, palpal setae yellow, with 1 black, apical seta. Postocular setae black. Genal setae black. Scutum anteriorly light brown, posteriorly dark brown, with well-defined anteromedial projection of dark color. Pleuron dark brown, except proepisternum and anterior portion of anepisternum light brown. Legs yellow, apex of hind femur dark brown. Venter of foretibia with row of enlarged setae. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: anterior seta longer, thicker. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Costa 0.43 wing length. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, slightly dorsally curved. Lateral arms of trident broad, short. Dorsomedial process of trident greatly enlarged, laterally flattened, broadly attached, with only minute notch below.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Amazonian Colombia.

DERIVATION OF SPECIFIC EPITHET. Latin diminutive for “boot,” referring to the shape of the trident in lateral view.

HOLOTYPE. ♀, COLOMBIA: Amazonas: Amacayacu National Park, 3.82°S, 70.26°W, 12.iii.2000, B. Brown, G. Kung, attracted to bees, honey on cards [LACM ENT 127887] (UNCB).

Melaloncha cristula n. sp.

(Fig. 19)

RECOGNITION. The narrow dorsal crest of the dorsomedial process of the trident is distinctive.

DESCRIPTION. Female. Body length 1.5–1.6 mm. Frons dark brown, lighter at dorsolateral and anterior extremes, coarsely reticulate. Mean frontal width 0.5 head width. Flagellomere 1 yellow. Palpus white, palpal setae black to brown, with 1 black, apical seta. Postocular setae brown.

Genal setae brown. Scutum dark brown. Pleuron dark brown except anterior portion of anepisternum light brown. Legs brownish-yellow except apex of hind femur dark brown. Venter of foretibia with row of enlarged setae. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: posterior setae shorter, thicker, curved; anterior setae longer, thinner, straight. Posterior (outer) tarsal claw greatly enlarged, about twice size of anterior claw. Mean costal length 0.43 wing length, no variation. Halter whitish-yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, slightly dorsally curved. Lateral arms of trident elongate, apically expanded and club-tipped. Dorsomedial process of trident greatly enlarged, laterally flattened, with elongate stalk, tall dorsal crest and pointed ventral apex.

Male. Unknown.

HOST. The holotype was attacking a worker of *Neurotrigona muelleri* (Friese).

GEOGRAPHICAL DISTRIBUTION. Southern Peru.

DERIVATION OF SPECIFIC EPITHET. From Latin *crista* for “crest,” referring to the shape of the dorsomedial process of the dorsomedial process of the trident.

HOLOTYPE. ♀, PERU: Madre de Dios, Tambopata Research Center, 13.14°S, 69.61°W, 24.vii.2001, B. Brown, G. Kung, attacking bee host [LACM ENT 075520] (MUSM).

PARATYPES. 1♀, same data as holotype except 22.vii.2001, honey-sprayed leaves (LACM).

Melaloncha culmena n. sp.

(Fig. 20)

RECOGNITION. The dorsomedial process of the trident is long, narrow, and dorsally truncated in this species.

DESCRIPTION. Female. Body length 1.4 mm. Frons brown, coarsely reticulate. Mean frontal width 0.5 head width. Flagellomere 1 yellow. Palpus yellow, palpal setae yellow. Postocular setae brown. Genal setae brown. Scutum dark brown. Pleuron dark brown. Legs brownish-yellow except apex of hind femur with dark brown spot. Venter of foretibia with row of enlarged setae. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: anterior seta longer, thicker. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Costa 0.44 wing length. Halter whitish-yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, slightly

dorsally curved. Lateral arms of trident broad. Dorsomedial process of trident greatly enlarged, laterally flattened, with elongate stalk; consists of strongly sclerotized, dorsal support and small, ventral, lighter brown flattened area; dorsal apex slightly narrowed, rounded, knoblike; posteroventral portion of flattened area without concavity; circular excision below stalk relatively small.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Amazonian Brazil.

DERIVATION OF SPECIFIC EPITHET. From Latin *culmen* for “top,” referring the dorsal development of the dorsomedial process of the trident.

HOLOTYPE. ♀, BRAZIL: Amazonas: 60 km N Manaus, Reserva Campina, 2.67°S, 60.02°W, 8–19.vi.1992, J. Vidal [LACM ENT 122639] (INPA).

Melaloncha spina n. sp.

(Fig. 21)

RECOGNITION. This species can be recognized by the shape of the dorsomedial process of the trident, which has a small, posterodorsal concavity.

DESCRIPTION. Female. Body length 1.4 mm. Frons dark brown, lighter at dorsolateral and anterior extremes, coarsely reticulate. Mean frontal width 0.45 head width. Flagellomere 1 yellow. Palpus white, palpal setae black. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown, except proepisternum and anterior portion of anepisternum light brown. Legs brownish-yellow, except apex of hind femur dark brown. Venter of foretibia with row of enlarged setae. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: posterior setae shorter, thicker, curved; anterior setae longer, thinner, straight. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Costa 0.43 wing length. Halter whitish-yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, slightly dorsally curved. Lateral arms of trident broad. Dorsomedial process of trident greatly enlarged, laterally flattened, with elongate stalk; dorsal margin dark brown, ventrally with lighter brown flange; posterodorsal apex with small concavity; circular excision below stalk relatively small.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Southern Peru.

DERIVATION OF SPECIFIC EPITHET. Latin for "spine" or "backbone," referring to the dark ridge on the dorsal margin of the dorsomedial process of the trident.

HOLOTYPE. ♀, PERU: Madre de Dios: Tambopata Research Center, 13.14°S, 69.61°W, 22.vii.2001, B. Brown, G. Kung, honey-sprayed leaves [LACM ENT 075716] (MUSM).

Melaloncha tambopatensis n. sp.
(Fig. 22)

RECOGNITION. This species differs from other *M. culmena*-subseries species by the dorso-medial process of the trident, which is dorsoapically rounded and has a small posteroventral concavity.

DESCRIPTION. Female. Body length 1.3–1.4 mm. Frons dark brown, lighter at anterior extreme; coarsely reticulate. Mean frontal width 0.48 head width. Flagellomere 1 yellow. Palpus white, palpal setae black. Postocular setae black. Genal setae black. Scutum dark brown. Pleuron dark brown with silvery pollinosity. Legs brownish-yellow, except apex of hind femur dark brown. Venter of foretibia with row of enlarged setae. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: posterior setae shorter, thicker, curved; anterior setae longer, thinner, straight. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Mean costal length 0.44 wing length, range 0.41–0.46. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, slightly dorsally curved. Lateral arms of trident elongate, apically expanded and club-tipped, truncate. Dorsomedial process of trident greatly enlarged, laterally flattened, with elongate stalk; dorsal crest not rising significantly above line of stalk, posteriorly broadly rounded, truncate; posteroventral apex with small concavity; circular excision relatively large.

Male. Unknown.

HOST. One Peruvian specimen was collected attacking a worker of *Trigonisca scabiosa* Albuquerque.

GEOGRAPHICAL DISTRIBUTION. Amazonian Brazil and Peru.

DERIVATION OF SPECIFIC EPITHET. Named for the type locality.

HOLOTYPE. ♀, PERU: Madre de Dios: Tambopata Research Center, 13.14°S, 69.61°W, 24.vii.2001, B. Brown, G. Kung, honey-sprayed leaves [LACM ENT 074437] (MUSM).

PARATYPES. BRAZIL: Amazonas: Manaus, Reserva Ducke, 3.13°S, 60.02°W, 1♀, 8–15.iv.1992, J. Vidal, Arm. Cola 1-B-10m (INPA). PERU: 1♀, same data as holotype (LACM).

Melaloncha tuparroensis n. sp.
(Fig. 23)

RECOGNITION. This species is characterized by the dorsoapical process of the trident, which is dorsally bluntly pointed, with an evenly convex posterior margin.

DESCRIPTION. Female. Body length 1.3 mm. Frons dark brown, lighter at dorsolateral and anterior extremes, setal bases of ventral interfrontal setae also light brown; coarsely reticulate. Mean frontal width 0.48 head width. Flagellomere 1 yellow. Palpus yellow, palpal setae brown. Postocular setae brown. Genal setae brown, largest setae darker. Scutum dark brown. Pleuron light brown, with darker markings. Legs brownish-yellow except apex of hind femur dark brown. Venter of foretibia with row of enlarged setae. Foretarsomeres 2–5 short, approximately as long as broad. Posteroventral margin of tarsomeres 1–2 with group of short, thick setae. Large, lateral setae of foretarsomeres asymmetrical: anterior seta longer, thicker. Posterior (outer) tarsal claw slightly longer than anterior claw and directed more outwards. Costa 0.44 wing length. Halter yellow. Abdominal tergites black, with dull silver pollinosity. Ovipositor brown basally, darker brown apically, setose, slightly dorsally curved. Lateral arms of trident elongate, apically expanded and club-tipped, truncate. Dorsomedial process of trident greatly enlarged, laterally flattened, with elongate stalk, tall dorsal crest and pointed ventral apex; dorsal apex broadly pointed, posterior margin evenly convex.

Male. Unknown.

HOST. The holotype was attracted to an aggregation of *Tetragona* sp.

GEOGRAPHICAL DISTRIBUTION. Eastern Colombia.

DERIVATION OF SPECIFIC EPITHET. Named for the type locality.

HOLOTYPE. ♀, COLOMBIA: Vichada: PNN El Tuparro, 5.35°N, 67.86°W, 16.vi.2000, G. Kung, bee screen [LACM ENT 055123] (UNCB).

Melaloncha (*M.*) *ungulata*-series

DIAGNOSIS. Foretarsomere 1 with row of long anteroventral setae. Posterior claw of foreleg extremely elongate, 2.5 times length of anterior claw. Ovipositor short, upturned, setose, relatively uniform within group. Trident modified from other *M. ungulata*-subgroup species, with dorso-medial process expanded into rounded bulb (Figs. 32, 34), or dorsally flattened, shelflike structure (Fig. 33); lateral arms extremely short to medium length. The posterior portion of the trident has posterior extension, formed by membrane surrounding an elongate process that is dorsally curved at apex (e.g., Figs. 29–30).

PHYLOGENETIC RELATIONSHIPS. The relationships among species within this group are

mostly unknown. Most species are extremely similar, except for small differences in the structure of intersegment 7–8. A preliminary molecular data set of mitochondrial 12S rRNA, 16S rRNA, NADH 1 and nuclear 28S rRNA included 3 species of this subgroup and strongly supported a closer grouping of *M. castanea* n. sp. and *M. strigosa* n. sp. with each other than with *M. trita* (B. Brown and P. Smith, in preparation). Three other species, *M. atrilingula*, *M. inicua*, and *M. pegmata*, are also hypothesized to belong to a monophyletic group (below).

NOTES ON INCLUDED SPECIES. Two of the male-only species described by Borgmeier could potentially fall within the group treated herein: *M. genitalis* and *M. glabrifrons*. Borgmeier's potentially spurious associations of these species names with *M. ungulata* gives rise to considerable confusion (discussed below).

Species that clearly belong to the *M. ungulata*-series include *M. borgmeieri* and *M. curtibrachia* and species of the *M. ungulata*-subseries.

Melaloncha genitalis Borgmeier

Melaloncha genitalis Borgmeier, 1934, p. 181, plate 3, fig. 15.

HOLOTYPE. ♂, BRAZIL: Espirito Santo: Laranja da Terra, 21.iv.1928, O. Conde, [LACM ENT 100112] (MZSP).

RECOGNITION. This species is known from a single male specimen from Espirito Santa, Brazil. Borgmeier later (1971a) synonymized *M. ungulata*, a species known from both sexes (from Nova Teutonia, Santa Catarina, Brazil), with *M. genitalis*. This synonymy was based on the supposed inadequacy of the differences between males of the 2 species cited in his (1959) key with this species. Our comparison of the terminalia of *M. genitalis* with those of presumed males of *M. ungulata*, however, shows little similarity: the lower (surstyler) lobe of the left side of the epandrium is much larger in *M. genitalis*. Based on this observation, we remove *M. ungulata* from synonymy with *M. genitalis* and reinstate it as a valid species (below). Furthermore, there is no support for the inclusion *M. genitalis* in the *M. ungulata*-group.

Borgmeier (1971a) also noted further Brazilian specimens that he attributed to *M. genitalis*; whether these are *M. genitalis* or *M. ungulata* is unknown.

GEOGRAPHICAL DISTRIBUTION. Brazil.

Melaloncha glabrifrons Borgmeier

Melaloncha glabrifrons Borgmeier, 1934, p. 178, plate 3, fig. 11.

HOLOTYPE. ♂, COSTA RICA: Suiza de Turrialba, 1921 [LACM ENT 122184] (Hungarian Natural History Museum, Budapest, Hungary). Note that Borgmeier's original description

gives the collection date as 4.vi.1921, but these details are not on the specimen label.

RECOGNITION. This species is known from a single male specimen from Suiza de Turrialba, Costa Rica. Many years after description of the holotype, Borgmeier (1959) also associated a series of male and female specimens from Nova Teutônia, Brazil, with the name *M. glabrifrons*. The males were considered to be the same species based on coloration of the legs (a contrastingly dark forefemur), a highly suspect character especially when considering the numerous undescribed species of *Melaloncha*. Comparison of the female specimens from Brazil with those of the *M. ungulata*-subgroup from Costa Rica shows that they are different and should be considered separate species (see *M. borgmeieri*, below). Furthermore, the male of *M. borgmeieri* has now been collected (below) and shows that the association of the *M. glabrifrons* males with females from Brazil was entirely spurious, as the newly collected males of *M. borgmeieri* have a light-colored, not dark, forefemur. There is therefore no credible evidence that *M. glabrifrons* belongs in the *M. ungulata*-group.

GEOGRAPHICAL DISTRIBUTION. Costa Rica.

Melaloncha borgmeieri n. sp.

(Figs. 29, 52–55)

Melaloncha glabrifrons: 1959, pp. 178–179 (specimens from Nova Teutônia, Brazil).

RECOGNITION. Females of this species are distinguished from the only other species lacking a bristlelike seta at the apex of foretarsomere 5, *M. curtibrachia*, by the small, nonprotruding knoblike dorsomedial process.

The male of this species was recently collected, as we found 2 pairs *in copula*. This species cannot be the same as the specimens of *M. glabrifrons*, with which the females were formerly associated, because they lack the strikingly darkened forefemur referred to by Borgmeier (1959:179). The males of *M. borgmeieri* key to *M. clavata* Schmitz in the most recent key to males (Borgmeier, 1971a), a species not considered part of the *M. ungulata*-group because females lack a trident. The identification of the male of *M. clavata*, however, is questionable, as the specimen was obtained from a single parasitized bee, and no female *Melaloncha* specimens were associated with it (Borgmeier, 1938). Males of *M. nigrifrons* (above) also key to this couplet but are easily distinguished by their dark brown frons and yellow foretarsomeres.

DESCRIPTION. **Female.** Body length 1.5–2.0 mm. Frons yellow, except anterior margin of ocellar triangle black; with finely reticulate sculpturing (Fig. 52). Mean frontal width 0.50 head width. Flagellomere 1 yellow. Palpus yellow,

with short yellow setae; apical seta brown. Dorsal postocular setae brown; genal and other postocular setae yellow. Scutum yellow with posterolateral black spot. Pleuron yellow. Legs yellow. Foretibia without strongly differentiated rows of dorsal setae; with generally bare area dorsally. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with numerous enlarged setae on anterior margin, although these setae not strongly differentiated from other setae on venter of tarsomere; posterior margin with row of larger setae. Venter of foretarsomeres 2–3 with many longer, spinelike setae on posterior margin; apicoventral seta on anterior side greatly enlarged. Venter of foretarsomere 4 without spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side. Dorsum of foretarsomere 5 without thick, apical seta. Posterior claw of foreleg greatly enlarged, mean 2.33 times length of anterior claw, range 2.25–2.50. Mean costal length 0.47 wing length, range 0.45–0.50. Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black. Trident of intersegment 7–8 with barely developed dorsal bulge of dorsomedial process; lateral arms short.

Male. Frons yellow, except anterior margin of ocellar triangle black. Flagellomere 1 yellow. Palpus white; palpal setae black, well developed. Postocular and genal setae black. Scutum anteriorly light brown, posteriorly dark brown, with well-defined anteromedial projection of dark color. Pleuron light brown, with sinuous longitudinal line of dark brown across entire length. Legs yellowish-brown, except foretarsomeres and apex of hind femur dark brown. Foretarsomere 1 twice as long as broad; other foretarsomeres about as long as broad; pulvilli enlarged, light brown. Abdominal tergite 1 black; tergites 2 and 6 mostly yellow with thin posterior black band; tergites 3–5 black with central yellow spot decreasing in size posteriorly. Venter of abdomen yellow. Basal one-third of cercus brown, apical two-thirds yellow. Surstylus with short apical setae.

HOST. At Urugua-í we observed these flies attacking *Plebeia* sp. and *Tetragomisca angustula* (Latreille). One fly attacked a worker of *T. angustula* on Brown's hand and was observed at close range. The fly approached the bee directly in front of the bee's head. The fly was on foot, with its ovipositor curved under the body and projecting anteriorly (as in Fig. 1). Suddenly, the fly darted forward, apparently attacking the bee's head. The attack was extremely rapid and knocked the bee over, somersaulting it backwards onto its back. It remained in this position for several seconds, weakly waving its legs and appearing stunned.

GEOGRAPHICAL DISTRIBUTION. Northern Argentina, southeastern Brazil.

DERIVATION OF SPECIFIC EPITHET. Named for the great phoridologist Thomas Borgmeier.

HOLOTYPE. ♀, ARGENTINA: Misiones: Reserva Vida Silvestre Urugua-í, 25.97°S, 54.11°W, 28.xii.2003, L. Gonzalez, honey spray [LACM ENT 188203] (MACN).

OTHER MATERIAL EXAMINED. ARGENTINA: Misiones: Reserva Vida Silvestre Urugua-í, 25.97°S, 54.11°W, 1♀, 8.xii.2003, B. Brown, 1♀, 10.xii.2003, G. Kung, bees on organic waste (LACM), 3♀, 11.xii.2003, 6♀, 12.xii.2003, B. Brown, G. Kung, bee screen (LACM), 43♀, 17.xii.2003, 45♀, 18.xii.2003, B. Brown, G. Kung, L. Gonzalez, honey spray (EMUS, LACM, MCZC, USNM), 1♀, 21.xii.2003, 6♀, 22.xii.2003, 2♀, 26.xii.2003, 1♂, 53♀ (including 1 *in copula* pair), 27.xii.2003, 12♀, 28.xii.2003, 1♂, 22♀ (including 1 *in copula* pair), 29.xii.2003, L. Gonzalez, attracted to honey spray, 400 m (LACM, MACN). BRAZIL: Santa Catarina: Nova Teutonia, 27.18°N, 52.38°W, 3♀, vii.1946, F. Plaumann (MZSP, USNM).

Melaloncha curtibrachia n. sp.

(Fig. 30)

RECOGNITION. Females of this species differ from the only other species lacking a bristlelike seta at the apex of foretarsomere 5, *M. borgmeieri*, by the downturned apex of the dorsomedial process, and by the extremely short lateral arms of the trident.

DESCRIPTION. Female. Body length 1.7–1.8 mm. Frons yellow, except anterior margin of ocellar triangle black; finely reticulate. Mean frontal width 0.55 head width. Flagellomere 1 yellow. Palpus yellow, with short yellow setae; apical seta black. Dorsal postocular setae black; genal and other postocular setae yellow. Scutum yellow with posterolateral black spot. Pleuron yellow. Legs yellow. Foretibia with 2 rows of slightly enlarged dorsal setae separated by dorsal bare area. Foretarsomeres slightly enlarged, slightly flattened. Venter of foretarsomere 1 with numerous enlarged setae on anterior margin, although these setae not strongly differentiated from other setae on venter of tarsomere; posterior margin with row of larger setae. Venter of foretarsomeres 2–3 with many longer, spinelike setae on posterior margin; apicoventral seta on anterior side greatly enlarged. Venter of foretarsomere 4 without spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side. Dorsum of foretarsomere 5 without thick, apical seta. Posterior claw of foreleg greatly enlarged, 2.38 times length of anterior claw (no variation). Mean costal length 0.51 wing length, range 0.48–0.54. Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black. Trident of interseg-

ment 7–8 with dorsomedial process not developed, curved ventrally at apex; lateral arms extremely short, difficult to see except in dorsal view.

Male. Unknown.

HOST. Unknown. The holotype was collected at an aggregation of bees attracted to honey spray.

GEOGRAPHICAL DISTRIBUTION. Costa Rica.

DERIVATION OF SPECIFIC EPITHET. Based on Latin words for “short arm,” referring to the short lateral arms of the trident.

HOLOTYPE. ♀, COSTA RICA: Puntarenas: R. Privada Karen Mogensen, camino a sendero El Viejo Nispero, 300–500 m, 8.vii.2003, Y. Cardenas, red con aguamiel [INB0003738670] (INBC).

PARATYPES. COSTA RICA: Guanacaste, Nandayure, Bellavista, Cerro Azul, 27♀, 28.ii–5.iii.2004, W. Porras, honey spray, 1050 m, #76449 (INBC, LACM), 3 km SE Rio Naranjo, 1♀, 2–31.i.1992, F. D. Parker (LACM); San José: trail to PN La Cangreja, 9.68°N, 84.37°W, 6♀, 17.vii.2004, W. Porras, honey spray, 300 m, #77716 (INBC, LACM).

Melaloncha ungulata-subseries

DIAGNOSIS. Dorsum of foretarsomere 5 with enlarged seta at apex.

INCLUDED SPECIES. *Melaloncha castanea*, *M. laticlava*, *M. strigosa*, *M. trita*, *M. ungulata*, and the species of the *M. atrilingula*-infraseries.

Melaloncha castanea n. sp.

(Fig. 31)

RECOGNITION. This species is most similar to *M. ungulata*, from which it differs not only by the darker color but also by the dorsomedial process of the trident, which in dorsal view is gradually broadened apically. In contrast, the dorsomedial process of *M. ungulata* is narrower at both midlength and apically.

Males were collected at the same bee nest entrances as females and resemble them in general appearance. Although no pairs were collected *in copula*, we consider them to be conspecific. They key to couplet 9 in Borgmeier’s latest (1971a) key to males, which differentiates larger (2.5 mm) from smaller (1.8–2.0 mm) species. Because *M. castanea* is intermediate, we tried both ways in the key. Treating them as larger, they key to *M. genitalis*, whose surstyli are massive and much larger than those of *M. castanea*. Treating them as small species leads to *M. glabrifrons*, from which they differ in having the forefemur only partly brown, but there are insufficient characters to definitely exclude this possibility. The large geographic separation of the collecting localities of the specimens, Costa Rica versus the mouth of the Amazon River, however, suggests that they are not conspecific.

DESCRIPTION. Female. Body length 1.9–2.3 mm. Frons yellow, except anterior margin of ocellar triangle black; with fine, reticulate sculpturing. Mean frontal width 0.42. Flagellomere 1 yellow, with dark brown encircling band. Palpus white, with medium-sized, black setae. Postocular and genal setae black. Scutum yellowish-brown, with dark brown median band extending to anterior margin, shorter lateral dark brown bands, and posteriorly dark brown. Proepisternum and dorsal part of anepisternum yellowish-brown; rest of pleuron dark brown. Coxae, forefemur and apex of hind femur dark brown; rest of legs yellowish-brown. Foretibia with 2 irregular rows of enlarged dorsal setae, separated by narrow bare area; bare area less developed than in other species. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with several rows of enlarged setae on anterior margin; posterior margin with row of longer setae. Venter of foretarsomeres 2–3 with many small, spinelike setae on posterior margin; apicoventral seta on anterior side elongate. Venter of foretarsomere 4 without small, spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side. Dorsum of foretarsomere 5 with thick, apical seta. Posterior claw of foreleg greatly enlarged, mean 2.70 times length of anterior claw, range 2.5–2.75. Mean costal length 0.51 wing length, range 0.49–0.54. Halter yellow. Abdominal tergites mostly black, with small anterior yellow markings. Venter of abdomen gray. Trident of intersegment 7–8 slightly flattened anterodorsally; in dorsal view gradually broadening apically to rounded, broad apex; lateral arms medium-sized, rounded apically.

Male. Frons yellow, except ocellar triangle black. Flagellomere 1 orange, with dark brown band encircling basal one-third. Palpus white; palpal setae black, well developed. Postocular and genal setae black. Scutum dark brown, except light brown at anterolateral corners. Pleuron dark brown, except proepisternum and anterior and dorsal portions of anepisternum light brown. Legs light brown, except apex of hind femur dark brown. Foretarsomere 1 twice as long as broad; other foretarsomeres about as long as broad; pulvilli enlarged, light brown. Abdominal tergites black, anteriorly with silvery pollinosity. Venter of abdomen gray. Basal one-third of cercus brown, apical two-thirds yellow. Surstylus with short apical setae.

HOST. All specimens were collected at entrances to the nests of *Frieseomellita varia* Lepeletier and *F. silvestri* Friese. The bees were nesting in the hollow metal tubing used to construct a canopy tower, above the level of the tallest trees.

GEOGRAPHICAL DISTRIBUTION. Eastern Brazil.

DERIVATION OF SPECIFIC EPITHET. Latin for “chestnut-colored,” referring to the brown pleural color.

HOLOTYPE. ♀, BRAZIL: Pará: Caxiuaña Station, 1.73°S, 51.45°W, 5.x.2001, B. Brown, A. Rodrigues, bee nests on canopy tower 60 m aboveground [LACM ENT 075990] (MPEG).

PARATYPES. BRAZIL: Pará: Caxiuaña Station, 1.73°S, 51.45°W, 2♂, 3♀, 5.x.2001, 5♂, 7♀, 6.x.2001, 2♂, 3♀, 7.x.2001, B. Brown, A. Rodrigues, bee nests on canopy tower 60 m aboveground (LACM, MPEG).

Melaloncha laticlava n. sp.

(Figs. 32, 37)

RECOGNITION. This species can be recognized by the dorsomedial process of the trident, which is an extremely broad, bulbous knob. It is most similar to *M. trita*, whose knob is much narrower in dorsal view, and in which the posterior, elongate process is much shorter than in *M. latibrachia* (compare Figs. 37 and 39).

DESCRIPTION. Female. Body length 2.2 mm. Frons yellow, except anterior margin of ocellar triangle black; with fine reticulate sculpturing. Frons 0.45 head width. Flagellomere 1 yellow, white at base. Palpus white, with short, yellow setae. Dorsal postocular setae black; genal and other postocular setae yellow. Scutum yellow, with posterolateral dark spot. Pleuron yellow. Legs brownish-yellow. Foretibia with 2 rows of enlarged dorsal setae, separated by a large bare area. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with several rows of enlarged setae on anterior margin; posterior margin with row of longer setae. Venter of foretarsomeres 2–3 with many small, spinelike setae on posterior margin; apicoventral seta on anterior side elongate. Venter of foretarsomere 4 without small, spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side. Dorsum of foretarsomere 5 with thick, apical seta. Posterior claw of foreleg greatly enlarged, 2.25 times length of anterior claw. Costa 0.49 wing length. Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black. Trident of intersegment 7–8 with broad, bulbous dorsomedial process, lateral arms well developed, broad.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Amazonian Ecuador.

DERIVATION OF SPECIFIC EPITHET. Latin for “broad club,” referring to the swelling of the dorsomedial process of intersegment 7–8.

HOLOTYPE. ♀, ECUADOR: Sucumbios: Sacha Lodge, 0.5°S, 76.5°W, 4-14.iii.1994, P.

Hibbs, Malaise trap, 270 m [LACM ENT 036619] (QCAZ).

Melaloncha strigosa n. sp.

(Figs. 33, 38)

RECOGNITION. The trident of this species is distinctive in dorsal view, with its broadly pointed dorsomedial process and long, curved lateral arms.

DESCRIPTION. Female. Body length 2.4–3.0 mm. Frons yellow, except anterior margin of ocellar triangle black; with finely reticulate sculpturing. Mean frontal width 0.40 head width. Flagellomere 1 yellow, white at base. Palpus white, with short, yellow setae. Dorsal postocular setae black; genal and other postocular setae yellow. Scutum yellow, posteriorly with dark brown posterolateral spot. Pleuron yellow. Legs brownish-yellow; apex of hind femur slightly darker. Foretibia with 2 rows of enlarged dorsal setae, separated by a large bare area. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with several rows of enlarged setae on anterior margin; posterior margin with row of longer setae. Venter of foretarsomeres 2–3 with many small, spinelike setae on posterior margin; apicoventral seta on anterior side elongate. Venter of foretarsomere 4 without small, spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side. Dorsum of foretarsomere 5 with thick, apical seta. Posterior claw of foreleg greatly enlarged, mean 2.87 times length of anterior claw, range 2.63–3.11. Mean costal length 0.50 wing length, range 0.49–0.51. Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black. Trident of intersegment 7–8 with dorsomedial process broad, apically pointed, lateral arms well developed, elongate, strongly divergent in dorsal view.

Male. Unknown.

HOST. The flies were attracted to an aggregation of bees, the commonest of which were *Partamona epiphytophila* Pedro and Camargo and *Plebeia* sp. No oviposition attempts were seen.

GEOGRAPHICAL DISTRIBUTION. Bolivia.

DERIVATION OF SPECIFIC EPITHET. Latin adjective for “thin,” referring to the shape of the lateral arms of the trident.

HOLOTYPE. ♀, BOLIVIA: La Paz: 40 km N Caranavi, Cumbre Alto Beni, 15.83°S, 67.56°W, 14.iv.2001, B. Brown, G. Kung, honey-sprayed leaves, 1600 m [LACM ENT 128400] (CBFC).

PARATYPE. 1♀, same data as holotype (LACM), 1♀, 16.iv.2003, 1♀, 18.iv.2003, B. Brown, S. Marcotte, E. Zumbado (LACM), 7♀, 14.iv.2004, 2♀, 16.iv.2004, 9♀, 17.iv.2004, 2♀,

19.iv.2004, 1♀, 21.iv.2004, E. Zumbado, honey spray (CBFC, LACM).

Melaloncha trita n. sp.

(Figs. 34, 39)

RECOGNITION. This is the commonest and most widely distributed *M. ungulata*-series species. It is distinctive for the bulbous, almost spherical (except for the short apical process, which forms a posterior point) dorsomedial process of the trident, which is smaller than that of *M. laticlava*.

DESCRIPTION. Female. Body length 1.7–2.1 mm. Frons yellow, except anterior margin of ocellar triangle black; with finely reticulate sculpturing. Mean frontal width 0.43 head width. Flagellomere 1 yellow, white at base. Palpus white, with short, yellow setae. Dorsal postocular setae black; genal and other postocular setae yellow. Scutum yellow, posteriorly with dark brown, ranging from posterolateral spot to almost entire posterior one-third. Pleuron yellow. Legs brownish-yellow; apex of hind femur slightly darker. Foretibia with 2 rows of enlarged dorsal setae, separated by a large bare area. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with several rows of enlarged setae on anterior margin; posterior margin with row of longer setae. Venter of foretarsomeres 2–3 with many small, spinelike setae on posterior margin; apicoventral seta on anterior side elongate. Venter of foretarsomere 4 without small, spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side. Dorsum of foretarsomere 5 with thick, apical seta. Posterior claw of foreleg greatly enlarged, mean 2.23 times length of anterior claw, range 1.88–2.50. Mean costal length 0.50 wing length, range 0.47–0.53. Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black. Trident of intersegment 7–8 with rounded dorsomedial process, with small apical point, lateral arms well developed.

Male. Unknown.

HOST. Females were observed attacking *Plebeia jatiformis* Cockerell (sensu Roubik) at Zona Protectora El Rodeo. The flies attacked the bees head-on, apparently ovipositing in the head, similar to the behavior described for *M. borgmeieri*.

GEOGRAPHICAL DISTRIBUTION. Widespread, from Mexico to Bolivia.

DERIVATION OF SPECIFIC EPITHET. Latin adjective *tritus* for “commonplace,” referring to the widespread and common nature of this species.

HOLOTYPE. ♀, COSTA RICA: San José: Zona Protectora El Rodeo, 9.91°N, 84.28°W, 7.viii.2001, B. Brown, G. Kung, honey-sprayed leaves [LACM ENT 095408] (LACM).

PARATYPES. BOLIVIA: La Paz: 40 km N Caranavi, Cumbre Alto Beni, 15.83°S, 67.56°W, 5♀, 14.iv.2004, 3♀, 16.iv.2004, 1♀, 17.iv.2004, 3♀, 19.iv.2004, 1♀, 21.iv.2004, E. Zumbado, honey spray, 1600 m (CBFC, LACM); Coroico, Hotel Don Quixote, 16.19°S, 67.72°W, 1♀, 6.iv.2001, B. Brown, G. Kung, on *Phoenix* palm flowers, 1750 m (LACM). BRAZIL: Amazonas: Manaus, Reserva Ducke, 3.13°S, 60.02°W, 3♂, 8–15.iv.1992, J. Vidal, 1–4–10m, 1♀, 6–17.vii.1992, J. Vidal, Arm. Cola, 1-B–20m (INPA, LACM). COSTA RICA: Alajuela: 20 km S Upala, 1♀, 10–21.v.1991, F. Parker (EMUS); Cartago: Turrialba, 9.93°N, 83.67°W, 2♀, 15–19.vii.1965, P. Spangler (USNM). Guanacaste: Rio Naranjo, Finca Montezuma, 10.67°N, 85.06°W, 1♀, 22.ii.2002, 1♀, 23.ii.2002, 1♀, 26.ii.2002, Brown, Walker, Gonzalez, Zumbado, honey-sprayed undergrowth/bee screen (LACM, MUCR); Heredia: La Selva Biological Station, 10.43°N, 84.02°W, 1♀, 4.iv.1994, ALAS, Malaise trap M/03/385, 1♀, 24.x.1994, ALAS, fogging FVK/30/16, 1♀, 6.iii.2000, ALAS, Malaise trap M/19/743 (INBC). San José: Zona Protectora El Rodeo, 9.91°N, 84.28°W, 1♀, 1.viii.2001, B. Brown, bee screen, 1♀, 2.viii.2001, 1♀, 5.viii.2001, 1♀, 8.viii.2001, B. Brown, G. Kung, honey-sprayed leaves, 1♀, 1–5.viii.2001, 1♀, 3–8.viii.2001, B. Brown, V. Berezovskiy, G. Kung, Malaise trap, 1000 m (LACM). ECUADOR: Sucumbios: Sacha Lodge, 0.5°S, 76.5°W, 1♀, 22.ii–4.iii.1994, P. Hibbs, Malaise trap, 270 m (LACM). MEXICO: Chiapas: Palenque, 3♀, 10.ix.1974, G. Bohart, W. Hanson (EMUS, LACM); Oaxaca: 35 mi W Tehuantepec, 1♀, 16.ix.1974, G. Bohart, W. Hanson (EMUS). PANAMA: Canal Zone: Barro Colorado Island, 9.17°N, 79.83°W, 1♀, 18–25.xi.1992, J. Pickering, Malaise trap #727, 1♀, 7–14.iv.1993, J. Pickering, Malaise trap #961, 2♀, 11–18.v.1994, J. Pickering, Malaise trap #2424 (LACM, MIUP). PERU: Madre de Dios, Tambopata Research Center, 13.14°S, 69.61°W, 1♀, 20.vii.2001, 1♀, 22.vii.2001, B. Brown, G. Kung, honey-sprayed leaves (LACM, MUSM); San Martin: San Antonio de Cumbaza, 6.40°S, 67.41°W, 1♀, 5.vii.2004, B. Brown, E. Corona, honey spray, 400 m (LACM). VENEZUELA: Aragua: 2 km N Ocumare de la Costa, 1♀, 21–22.vi.1976, A. S. Menke, D. Vincent (USNM).

Melaloncha ungulata Borgmeier

(Figs. 35, 40)

Melaloncha ungulata Borgmeier, 1938, p. 45, figs. 5–6, 12–13.

Melaloncha genitalis Borgmeier, 1934, p. 181, plate 3 fig. 15; 1971, pp. 130–131 (in part).

LECTOTYPE. Because of past confusion of this species with the name *M. genitalis*, we here

designate a lectotype to fix the concept of *M. ungulata*: ♀, BRAZIL: Santa Catarina: Nova Teutonia, 27.18°N, 52.38°W, vii.1937, F. Plau-mann [LACM ENT 122572] (MZSP).

RECOGNITION. Females are recognized by the shape of the dorsomedial process of the trident, which is squared in lateral view but arrowhead-shaped in dorsal view.

Males were associated with the females by Borgmeier. They are of similar size as the female specimens, and some were collected at the same time. We have not included them as paralecto-types, as no definitive evidence (*in copula* pairs) has yet been found.

DESCRIPTION. Female (note that colors in this description are based a specimen collected in 1967, not the lectotype; in the lectotype all colors that are here described as yellow are dark yellow to brown, apparently because of their method of preservation). Body length 2.4–2.6 mm. Frons yellow, except anterior margin of ocellar triangle black; with finely reticulate sculpturing. Mean frontal width 0.42 head width. Flagellomere 1 yellow. Palpus white, with short, yellow setae. Dorsal postocular setae black; genal and other postocular setae yellow. Scutum yellow, with small posterolateral dark spot. Pleuron yellow. Legs brownish-yellow; apex of hind femur not darkened. Foretibia with 2 rows of enlarged dorsal setae, separated by a large bare area; bare area in some specimens with few scattered seta. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with several rows of enlarged setae on anterior one-half; posterior margin with row of longer setae. Venter of foretarsomeres 2–3 with many small, spinelike setae on posterior margin; tarsomere 2 with similar setae near apicoventral seta; both tarsomeres with apicoventral seta on anterior side elongate; tarsomere 3 with medium-sized, medial seta near apex. Venter of foretarsomere 4 without small, spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side. Dorsum of foretarsomere 5 with thick, apical seta. Posterior claw of foreleg greatly enlarged, mean 2.43 times length of anterior claw, range 2.36–2.50. Mean costal length 0.48 wing length (all specimens). Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black. Trident of intersegment 7–8 with small, anteriorly flattened dorsomedial process that is narrow in dorsal view, lateral arms medium-sized, relatively broad.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. South-eastern Brazil.

OTHER MATERIAL EXAMINED. Paralecto-types: BRAZIL: Santa Catarina: Nova Teutonia, 27.18°N, 52.38°W, vi.1937, 2♀, vii.1937, 1♀, 194?, 1♀, vi.1941, 1♀, ii.1967 (LACM, MZSP).

Possible males: 2♂, vi.1937, 3♂, vii.1937 (LACM, MZSP).

Melaloncha atrilingula-infraseries

DIAGNOSIS. Dorsomedial process of trident flattened, with dark-colored lateral margins.

INCLUDED SPECIES. *Melaloncha atrilingula*, *M. inicua*, and *M. pegmata*.

Melaloncha atrilingula n. sp.

(Fig. 41)

RECOGNITION. This species can be recognized by the narrow, darkly sclerotized dorsomedial process, best seen in dorsal view.

DESCRIPTION. Female. Body length 2.3–2.4 mm. Frons yellow, except anterior margin of ocellar triangle black; with finely reticulate sculpturing. Mean frontal width 0.43 head width (both specimens). Flagellomere 1 yellow, white at base. Palpus white, with short, yellow setae. Dorsal postocular setae black; genal and other postocular setae yellow. Scutum yellow, posteriorly with dark brown posterolateral spot. Pleuron yellow. Legs brownish-yellow; apex of hind femur slightly darker. Foretibia with 2 rows of enlarged dorsal setae, separated by a large bare area. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with several rows of enlarged setae on anterior margin; posterior margin with row of longer setae. Venter of foretarsomeres 2–3 with many small, spinelike setae on posterior margin; apicoventral seta on anterior side elongate. Venter of foretarsomere 4 without small, spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side. Dorsum of foretarsomere 5 with thick, apical seta. Posterior claw of foreleg greatly enlarged, mean 2.53 times length of anterior claw, range 2.40–2.67. Mean costal length 0.51 wing length, range 0.50–0.51. Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black; relatively straight in lateral view, not curved dorsally as in other species. Trident of intersegment 7–8 with narrow, black-margined dorsomedial process apically rounded in dorsal view; lateral arms well developed, strongly divergent in dorsal view.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Amazonian Brazil.

DERIVATION OF SPECIFIC EPITHET. Latin, derived from words for “black” and “small tongue,” referring to the dorsomedial process of intersegment 7–8.

HOLOTYPE. ♀, BRAZIL: Amazonas: Manaus, Reserva Ducke, 3.13°S, 60.02°W, 6–17.vii.1992, J. Vidal, Arm. Cola, 1B-20 [LACM ENT 008393] (INPA).

PARATYPE. 1 ♀, same data as holotype (LACM).

Melaloncha inicua n. sp.
(Fig. 42)

RECOGNITION. This species is similar to *M. pegmata* but is smaller, the comb of setae on tarsomere 4 is elongated, and the dorsomedial process of the trident is slightly narrower.

DESCRIPTION. Female. Body length 1.8 mm. Frons yellow, except anterior margin of ocellar triangle black; with finely reticulate sculpturing. Frons 0.45 head width. Flagellomere 1 yellow, white at base. Palpus white, with short, yellow setae. Dorsal postocular setae black; genal and other postocular setae yellow. Scutum yellow, posteriorly with dark brown posterolateral spot. Pleuron yellow. Legs brownish-yellow; apex of hind femur slightly darker. Foretibia with 2 rows of enlarged dorsal setae, separated by a large bare area. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with several rows of enlarged setae on anterior margin; posterior margin with row of longer setae. Venter of foretarsomeres 2–3 with many small, spinelike setae on posterior margin; apicoventral seta on anterior side elongate. Venter of foretarsomere 4 without small, spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side; setae of palisade on posterior margin extremely long, about 4 times length of those of tarsomere 3, and totaling about one-half width of tarsomere. Dorsum of foretarsomere 5 with thick, apical seta. Posterior claw of foreleg greatly enlarged, 3.25 times length of anterior claw. Costa 0.52 wing length. Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black; relatively straight in lateral view, not curved dorsally as in other species. Trident of intersegment 7–8 with slightly narrowed, black-margined dorsomedial process apically truncate in dorsal view; lateral arms well developed, strongly divergent in dorsal view.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Bolivia.

DERIVATION OF SPECIFIC EPITHET. The name is based on the Rio Inicua near the type locality and is treated as a noun in apposition.

HOLOTYPE. ♀, BOLIVIA: La Paz: Alto Río Beni, south of Río Inicua, 1100m, 15–18.i.1976, L. Peña [LACM ENT 095673] (AMNH).

Melaloncha pegmata n. sp.
(Fig. 43)

RECOGNITION. This species is similar to *M. inicua* but differs by the extremely broad apex of the dorsomedial process of the trident, the

unmodified palisade of setae on foretarsomere 4, and the larger body size.

DESCRIPTION. Female. Body length 2.5 mm. Frons yellow, except anterior margin of ocellar triangle black; sculpturing finely reticulate with few lateral punctures. Frons 0.38 head width. Flagellomere 1 yellow. Palpus white, with short, yellow setae. Dorsal postocular setae black; genal and other postocular setae yellow. Scutum yellow with small posterolateral dark brown macula. Pleuron yellow. Legs brownish-yellow. Foretibia with 2 rows of enlarged dorsal setae, separated by a large bare area. Foretarsomeres enlarged, flattened. Venter of foretarsomere 1 with several rows of enlarged setae, plus enlarged apical seta on anterior margin; posterior margin with row of longer setae. Venter of foretarsomeres 2–3 with extremely dense areas of many spinelike setae on posterior margin; apicoventral seta on anterior side enlarged. Venter of foretarsomere 4 without small, spinelike setae, but with enlarged apical seta on posterior side and enlarged seta at midlength on anterior side; setae of palisade on posterior margin only slightly longer than those of tarsomere 3. Dorsum of foretarsomere 5 with thick, apical seta. Posterior claw of foreleg greatly enlarged, 2.43 times length of anterior claw. Costa 0.56 wing length. Halter yellow. Abdominal tergites yellow, with posterior black band. Venter of abdomen yellow. Ovipositor basally yellow, apically black. Trident of intersegment 7–8 with large, rounded, dorsally flattened dorsomedial process, with broad, blunt apex with thick, dark margin, lateral arms elongate.

Male. Unknown.

HOST. Unknown.

GEOGRAPHICAL DISTRIBUTION. Costa Rica.

DERIVATION OF SPECIFIC EPITHET.

Greek *pegma* for “thickened,” for the heavily sclerotized, shelflike process of intersegment 7–8.

HOLOTYPE. ♀, COSTA RICA: Guanacaste: 3 km SE Rio Naranjo, 21–31.vii.1992, F. D. Parker [LACM ENT 114131] (LACM).

KEY TO SPECIES (FEMALES ONLY)

- 1 Claws of foreleg extraordinarily asymmetrical, with outer (posterior) claw about 2.25–3.25 times length of inner (anterior) claw; mostly yellow species, but 1 brown species (*M. castanea*) with well-developed dorsoapical seta on foretarsomere 5 (Fig. 56)
 *M. ungulata*-series (see key below)
- Claws of foreleg subequal or at most only slightly asymmetrical, with outer claw less than 1.5 times length of inner claw, but if outer claw longer (2 times length of inner claw in *M. setitibialis* and *M. cristula*) then brown

species lacking differentiated dorsoapical seta on foretarsomere 5 2

2 Frons yellow to orange; central region of frons in 1 species (*M. adusta*) sometimes brown, but in this exceptional species, ventral margin and lateral margins ventral to ventral fronto-orbital setae orange and dorsum of ovipositor bare 3

– Frons brown to black throughout, except for some lighter color at ventral extremity in some species and orange setal bases in some specimens of *M. nigrifrons*; lateral margin of frons ventral to ventral fronto-orbital setae dark colored; dorsum of ovipositor setose 6

3 Abdominal tergites completely yellow, without substantial black markings
 *M. flava* Borgmeier

– Abdominal tergites yellow with large black markings to completely dark 4

4 Lateral arms of trident extremely short; tarsomeres of foreleg extremely broad, flattened; ovipositor dorsally with small setulae; predominantly yellow-colored species; coxal setae yellow *M. platypoda* n. sp.

– Lateral arms of trident as long as dorsomedial process; tarsomeres of foreleg not strongly flattened; ovipositor dorsally bare; predominantly yellow to mostly dark brown species; coxal setae black 5

5 Abdominal tergites yellow and black; dorsomedial process of trident as long as lateral arms; lateral arms somewhat broadened at apex; yellower species
 *M. acoma* n. sp.

– Abdominal tergites almost completely black to blackish-brown, with small areas of dark orange in some specimens; dorsomedial process of trident shorter than lateral arms; lateral arms thin *M. adusta* n. sp.

6 Dorsomedial process elaborated at tip: expanded, laterally flattened, deepened (Figs. 15–23) 7

– Dorsomedial process simple, apically pointed (Figs. 7–9, 11–14) 15

7 Elaboration of apex of dorsomedial process of trident in the form of relatively small, rounded apical lobe (Figs. 15–17) 8

– Elaboration of apex of dorsomedial process of trident in the form of deep, flattened process (Figs. 18–23) 10

8 Row of posteroventral seta on foretibia extremely long, about twice depth of tibia *M. setitibialis* n. sp.

– Row of posteroventral setae on foretibia relatively short, about equal to depth of tibia 9

9 Lateral arm of trident elongate, narrow, longer than dorsomedial process; dorsomedial process straight (Fig. 15)
 *M. claviapex* n. sp.

– Lateral arm of trident relatively short, thick; dorsomedial process extended dorsally (Fig. 16) *M. debilis* n. sp.

10 Dorsomedial process of trident with narrow stalk proximal to flattened apex (Fig. 19–23) 11

– Dorsomedial process of trident without narrow stalk (Fig. 18) *M. caligula* n. sp.

11 Dorsomedial process of trident relatively narrow and strongly concave posteriorly (Fig. 19) *M. cristula* n. sp.

– Dorsomedial process of trident broader and less concave posteriorly (Figs. 20–23) . . . 12

12 Dorsomedial process of trident with narrow dorsal point and small posterodorsal concavity (Fig. 21); circular excision below stalk relatively small *M. spina* n. sp.

– Dorsomedial process of trident more truncate dorsally, or without posterior concavity; circular excision various 13

13 Dorsomedial process of trident dorsally forming broad point, posteriorly evenly convex (Fig. 23) *M. tuparroensis* n. sp.

– Dorsomedial process of trident dorsally forming truncate or rounded apex; posterior margin not evenly curved (Figs. 20, 22) 14

14 Dorsomedial process of trident relatively narrow; consists of strongly sclerotized, dorsal support and small, ventral, lighter brown flattened area; dorsal apex slightly narrowed, knoblike; posteroventral portion of flattened area without concavity; circular excision below stalk relatively small (Fig. 20).
 *M. culmena* n. sp.

– Dorsomedial process of trident relatively broad; consists mostly of flattened, light brown cuticle; dorsal apex flat, broader; posteroventrally with small concavity; circular excision larger (Fig. 22)
 *M. tambopatensis* n. sp.

15 Pleuron partly to completely yellow or light brown; coxae yellow to white; tarsomere 1 of foreleg elongate 16

– Pleuron completely dark brown; coxae brown, at least 1 coxa dark brown; tarsomere 1 of foreleg short, broad 18

16 Abdominal tergites completely black; dorsomedial process of trident as long as or longer than lateral arms (Figs. 7–8) 17

– Abdominal tergites black and yellow banded; dorsomedial process of trident shorter than lateral arms (Fig. 9) *M. nigrifrons* Borgmeier

17 Dorsomedial process of trident longer than lateral arms (Fig. 7) *M. candida* n. sp.

– Dorsomedial process of trident equal in length to lateral arms (Fig. 8)
 *M. nigrita* Borgmeier

18 Palpus white to yellow 19

– Palpus dark brown *M. fuscipalpis* n. sp.

19 Legs, including coxae, light brown to dark brown 20

- Legs, including coxae, whitish-yellow
 *M. nigrita* Borgmeier
- 20 Basal one-eighth to one-half of forefemur dark brown, apical one-half lighter in color; frons dark brown, almost black; lateral arms of trident longer than dorsomedial process
 21
- Forefemur uniformly yellowish-brown; frons medium brown in color; lateral arms of trident subequal in length to dorsomedial process
 *M. ustulata* n. sp.
- 21 Dorsomedial process slightly upturned at tip (Fig. 11); apical one-half of forefemur brownish-yellow; lateral arms of trident widely separated below tip of dorsomedial process (Fig. 25) *M. diastata* n. sp.
- Dorsomedial process relatively straight, not upturned apically (Fig. 13); apical one-half of forefemur more yellow in color; lateral arms of trident close together (touching) below tip of dorsomedial process (Fig. 27), although this possibly is an artifact of drying
 *M. juxta* n. sp.

KEY TO MELALONCHA UNGULATA-SERIES FEMALES

- 1 Apex of foretarsomere 5 lacking a strongly differentiated dorsal seta 2
- Apex of foretarsomere 5 with large, black, strongly differentiated seta dorsally (Fig. 56) 3
- 2 Apex of intersegment 7-8 not strongly downturned, with small dorsal knob (Fig. 29); lateral arms larger *M. borgmeieri* n. sp.
- Apex of intersegment 7-8 strongly downturned; lateral arms barely differentiated, not noticeable (Fig. 30)
 *M. curtibrachia* n. sp.
- 3 Pleural sclerites light brown to dark brown
 *M. castanea* n. sp.
- Pleural sclerites yellow 4
- 4 Dorsomedial process in dorsal view with darkened margins; dorsum of process flat 5
- Dorsomedial process rounded, bulging dorsally, without darkened margin 7
- 5 Dorsomedial process narrow, apically rounded in dorsal view (Fig. 41)
 *M. atrilingula* n. sp.
- Dorsomedial process apically truncate, broader (Figs. 42-43) 6
- 6 Small species, body length 1.8 mm; setae of palisade on posterior margin of foretarsomere 4 greatly elongate, about 4 times length of those on segment 3 *M. inicua* n. sp.
- Larger species, body length 2.5 mm; setae of palisade on posterior margin of foretarsomere 4 only slightly longer than those of segment 3 *M. pegmata* n. sp.
- 7 Dorsomedial process extremely broad, apically pointed; lateral arms elongate, narrow,

- apically divergent (Fig. 38)
 *M. strigosa* n. sp.
- Dorsomedial process relatively narrow in dorsal view; if broad, then not apically pointed; lateral arms less elongate, thicker 8
- 8 Dorsomedial process broad in dorsal view (Fig. 37) *M. laticlava* n. sp.
- Dorsomedial process narrower in dorsal view (Figs. 39-40) 9
- 9 Small species, body length 1.7-2.1 mm; dorsomedial process rounded, bulging dorsally (Fig. 34) *M. trita* n. sp.
- Larger species, body length 2.4-2.6 mm; dorsomedial process less bulbous, more flat-topped (Fig. 35)
 *M. ungulata* Borgmeier

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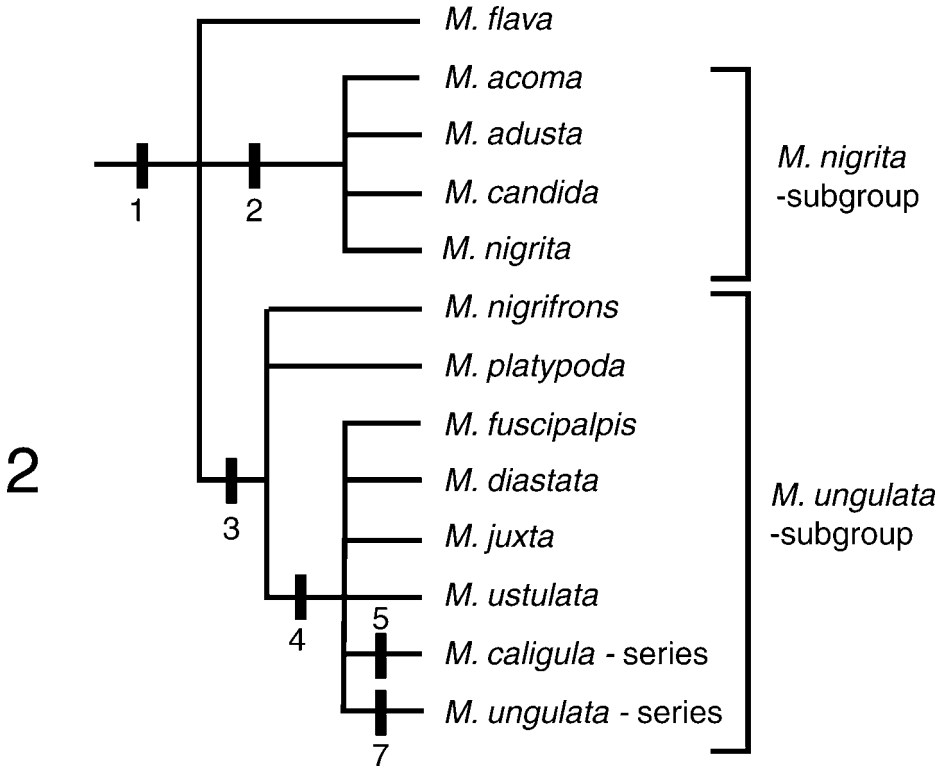


Figure 2 Cladogram of hypothesized relationships of *M. unguata*-group species. Numbers refer to characters discussed in Phylogenetic Analysis

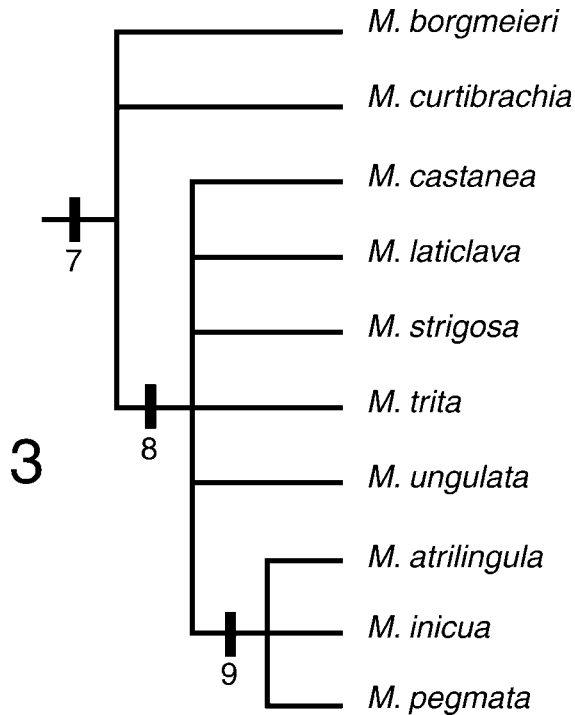
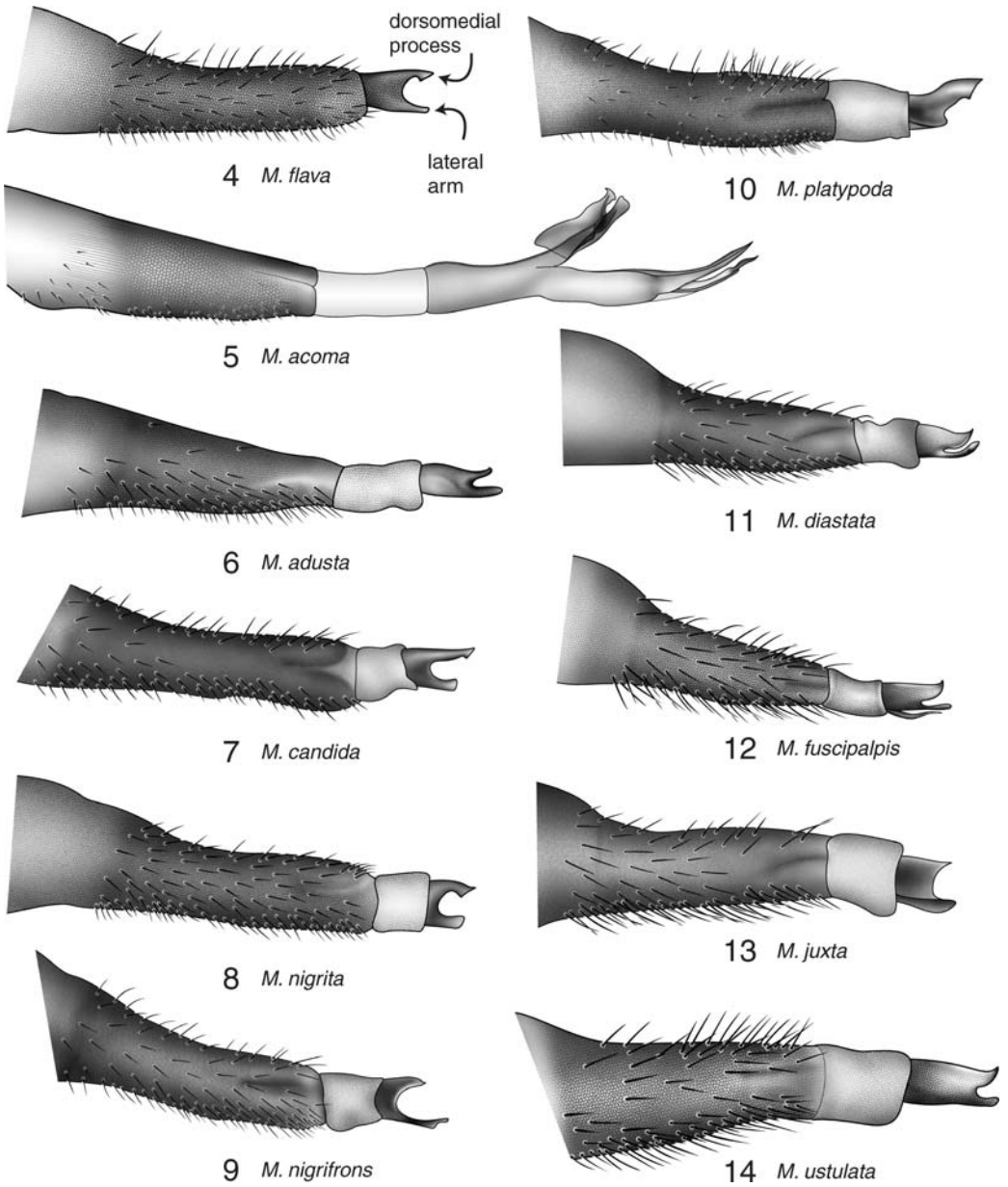
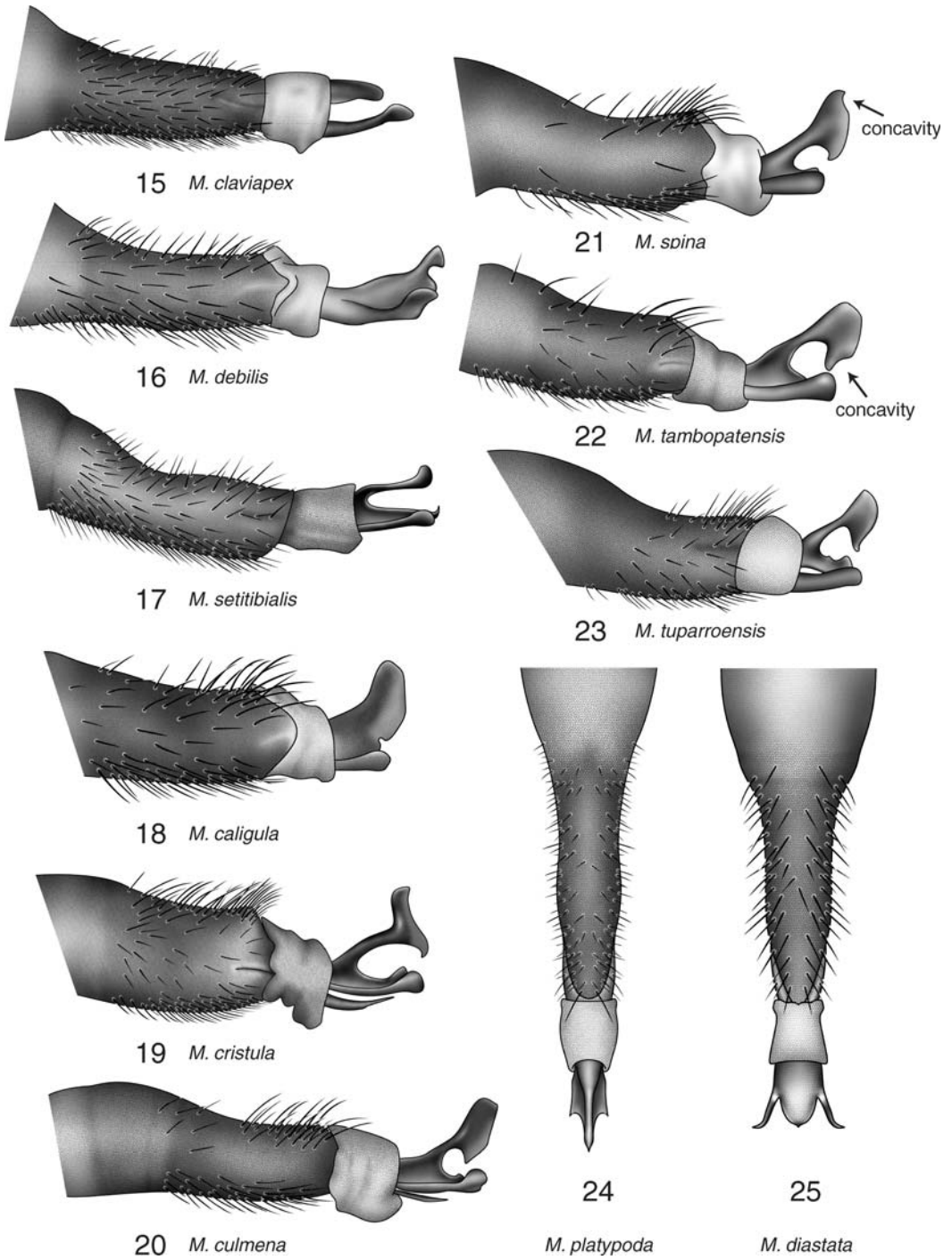


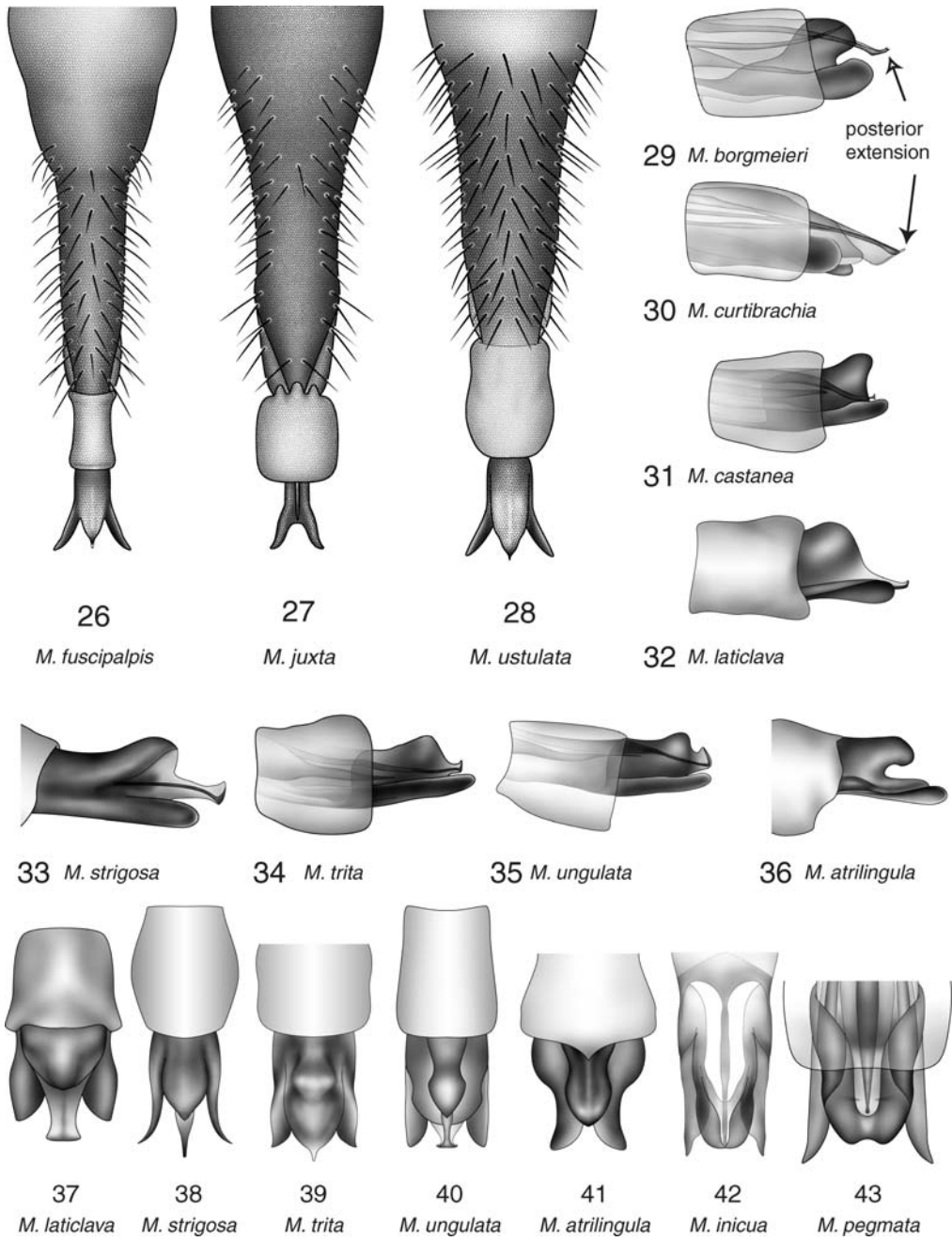
Figure 3 Cladogram of hypothesized relationships of *M. unguata*-series species. Numbers refer to characters discussed in Phylogenetic Analysis



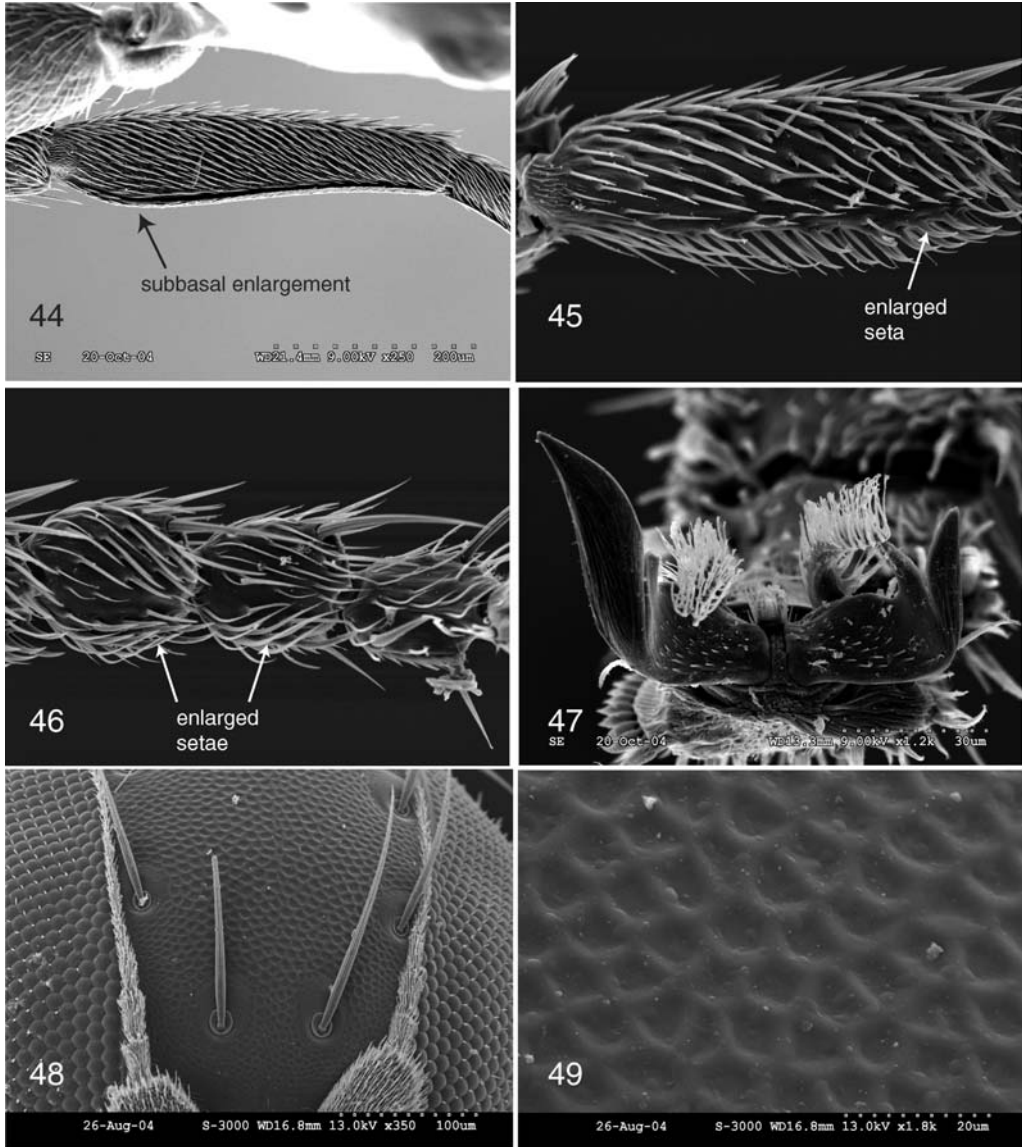
Figures 4–14 Ovipositors, left lateral. Note that Figure 5 is a fully extended ovipositor, whereas others are withdrawn



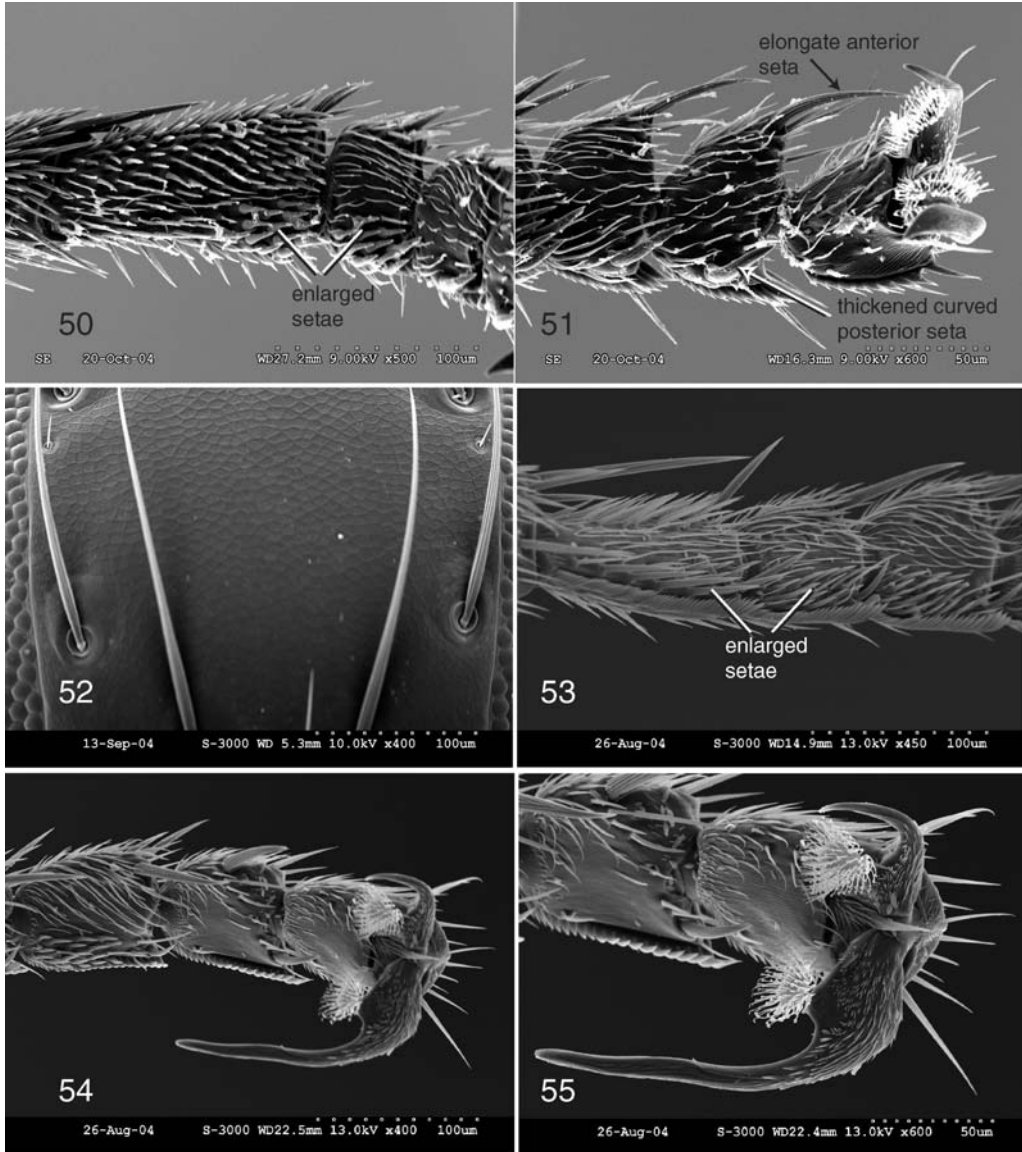
Figures 15–25 Ovipositors: 15–23. left lateral; 24–25. dorsal



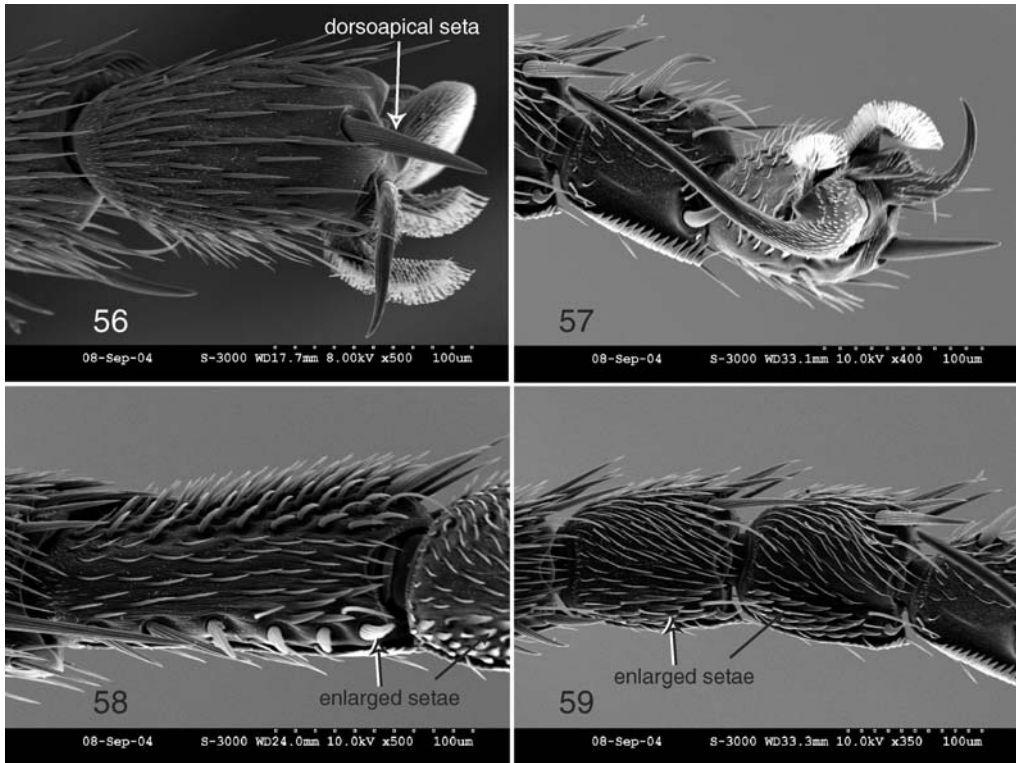
Figures 26–43 Female terminalia: 26–28. ovipositors, dorsal; 29–36. intersegment 7–8, left lateral; 37–43. intersegment 7–8, dorsal



Figures 44–49 Scanning electron micrographs: 44. *M. acoma* n. sp., foretarsomere 1, dorsal; 45–47. *M. fuscipalpis* n. sp. 45. foretarsomere 1, ventral, 46. foretarsomeres 2–4, ventral, 47. claw of foretarsomere 5; 48–49. *M. debilis* n. sp., sculpturing of frons, 48. low magnification, 49. higher magnification



Figures 50–55 Scanning electron micrographs: 50–51. *M. debilis* n. sp. 50. foretarsomeres 1–3, ventral, 51. foretarsomeres 3–5, ventral; 52–55. *M. borgmeieri* n. sp. 52. frons, 53. foretarsomeres 1–3, ventral, 54. foretarsomeres 3–5, ventral, 55. foretarsomeres 4–5, ventral



Figures 56–59 Scanning electron micrographs of *M. strigosa* n. sp.: 56. foretarsomere 5, dorsal; 57. foretarsomeres 4–5, ventral; 58. foretarsomere 1, ventral; 59. foretarsomeres 2–3, ventral

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