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REVISION OF NEOTROPICAL SETOMIMINI
(DIPTERA: PSYCHODIDAE: PSYCHODINAE)

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REVISION OF NEOTROPICAL SETOMIMINI (DIPTERA:
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LAURENCE W. QUATE¹ AND BRIAN V. BROWN²

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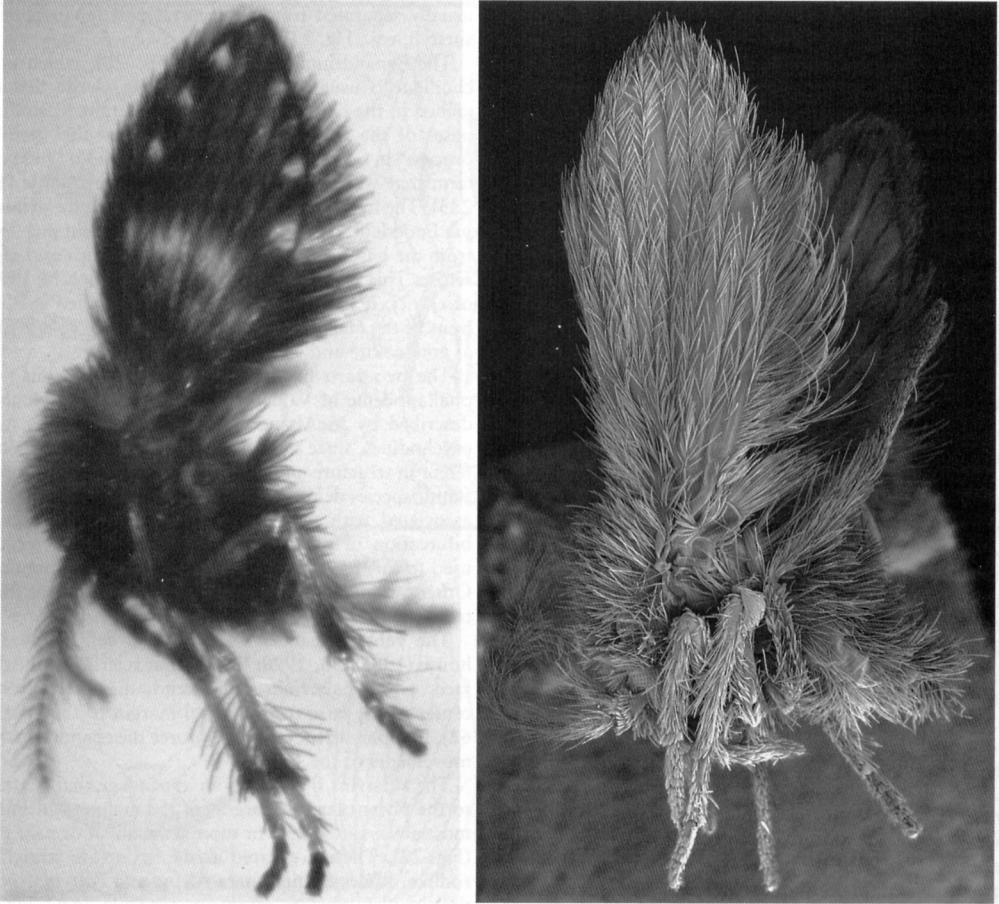


Figure 1 *Alepia* spp. Left. Male, habitus. Right. Female, habitus (scanning electron micrograph)

house, 1973) and redescrptions of poorly defined species of Knab, Dyar and Coquillett (Duckhouse, 1974a) and Rapp and Curran (Duckhouse, 1974b). Bravo and Amorim (1995) and Bravo (1999) also produced careful studies of *Brunettia* Annandale and Trichomyiinae. The first general revision of Neotropical psychodids with keys, descriptions, illustrations, and tribal assignments was that of Quate (1996).

The tribal classification within the largest subfamily, the Psychodinae, is still being vigorously debated (e.g., Duckhouse, 1987; Vaillant, 1990). Most recently for the Neotropical taxa, Quate (1996, 1999) recognized Pericomini Enderlein, Maruinini Enderlein, Paramormiini Enderlein, Mormiini Enderlein, and Psychodini Enderlein. Within Maruinini, he classified the species that we herein place in a separate group, the Setomimini.

The objective of this study was to provide descriptions, illustrations, and keys to all known species of the Setomimini. This tribe was selected for revision because of its richness in the Neotropical Region and to lay the groundwork for future stud-

ies on the phylogeny and zoogeography of the group and its Old World relatives. Although a large number of specimens were examined, they represent only a small part of the total Setomimini fauna that we estimate is still largely unknown.

METHODS AND MATERIALS

This revision is the result of the scientific investigations of the senior author before his death in 2002. In 2001, an earlier version of the manuscript was submitted by Quate, but it needed extensive revision that he was unable to complete. The junior author was responsible for thoroughly revising, organizing, and preparing the work for final publication. Thanks to his wife, Valerie, Quate's collection and field notes have been deposited in the Entomology Section of the Natural History Museum of Los Angeles County, and further details of his remarkable life have been recorded (Brown, 2003).

COLLECTING METHODS

Most specimens of Setomimini were obtained with Malaise traps, which generally capture a wider variety of species than other methods. Specimens of Setomimini are the

predominant psychodids caught by Malaise traps. Fewer specimens were obtained in light traps, as most psychodine specimens collected by that method are of the tribe Psychodini.

SPECIMENS

Most of the specimens examined for this work were from personally funded field collections made by the senior author, specifically to Argentina and Chile (1994), the Bahamas (1997), Bolivia (1990), Brazil (1998, 1999), Costa Rica (1992, 1993, 1995, 1997, 1999), French Guiana (1994), Nicaragua (2000), Peru (1997, 1999), Puerto Rico (1998), Surinam (1994, 1996), and Venezuela (1993, 1995, 2001). Some specimens were sent to him by the Arthropods of La Selva (ALAS) project (Longino, 1994) or were borrowed from other institutions.

Some specimens from Costa Rica have separate barcoded labels. In holotype specimens, the data from these labels are given in square brackets.

Descriptions are based on slide-mounted specimens. Specimens were cleared with lactic acid (Cumming, 1992) or potassium hydroxide. Great care was taken with potassium hydroxide, as overcleared specimens often result from treatment with this chemical. Cleared specimens were then dehydrated and dissected in a thin solution of Canada balsam on the underside of a cover slip, with various body parts arranged for the best viewing. After the balsam dried thoroughly, the cover slip was inverted on a slide with a further drop of Canada balsam and dried upside down.

Keys to species are generally based on male specimens only. Female specimens possess too few diagnostic characters at the species level to allow ready identification.

Species recognition in Neotropical psychodids is still in its relative infancy. In some instances, there are variants of species (e.g., *Didimioza symphyllia* (Quate)) whose characters are described separately. More specimens or collections from intervening areas are necessary to resolve these situations, but for this monograph, we used our best judgment on whether species status is warranted.

All scale lines in illustrations are 0.1 mm.

MORPHOLOGICAL TERMS

Morphological terms are those of McAlpine (1981), except as noted below. Bravo and Amorim (1995) suggested an alternate interpretation of the mesothoracic sclerites, but we continue to use the definition given by McAlpine, recognizing the anepisternite as the sclerite bearing the anterior spiracle. The alveolar (hair scar) patterns of the anepisternite sometimes offer diagnostic characters.

The second costal node of the wing may be hard to distinguish, because there is almost always an enlargement of the costa beyond the costal node. However, we define the node as present when the apex is clearly demarcated and ends abruptly (see Fig. 284). If the apex tapers into the costa, we then define the second costal node as absent. Relative positions of the radial and medial forks are often referenced by "cell widths." The cell width is the width of the wing cell immediately posterior to the first fork stated in the description.

The terminalia of male psychodids are complex and rich in characters of taxonomic importance. An illustration showing the relationships of the major components was given by Quate and Vockeroth (1981: fig. 17.18). In slide mounts of specimens, the dorsal part of the terminalia (including the hypandrium and gonopods, e.g., Fig. 20) is

usually separated from the ventral part (epandrium and surstyli, e.g., Fig. 22).

The hypandrium is sternite 9 (Fig. 20), which in Psychodidae is usually seen as a narrow sclerite that is attached to the base of the epandrium (tergite 9) and/or the bases of the gonocoxites. It was termed the "parabasol process" in an earlier paper (Quate, 1996:33), a use of the term that was incorrect as defined by Duckhouse (1987: 233). The hypandrium is highly modified in the genus *Alepia* Enderlein, in which it is a broad plate that may extend from the base of the gonocoxites to their tips and often is setose. This sclerite is rarely absent, although for the sake of clarity, it frequently has not been included in illustrations of the male genitalia. The gonopods consist of a basal gonocoxite and a distal gonostylus (Fig. 20).

The two parts of the aedeagus, the basiphallus (= the phallapodeme of Vaillant, 1986:333) and distiphallus, as described by McAlpine (1981), are useful terms for the psychodines, since the basal and distal parts are quite different in structure and the distiphallus is usually more useful for species definitions (Fig. 43). The paramere is closely associated with the distiphallus and often appears as a bifurcation of that structure (Fig. 43). These terms are used in this paper to make the descriptions more precise. Other authors have referred to the distiphallus as the "intromittent organ."

The ventral epandrial sclerite was defined by Duckhouse (1987:233, 1990:723) as that sclerite on the dorsal face of the epandrium that extends diagonally from the center of the base to the lateral margin of the apex (Fig. 62). It apparently serves to reinforce the epandrium during movements of the surstyli.

The surstylus (Fig. 22) is an appendage that is attached to the posterolateral margins of the male epandrium. Almost always it bears 1 or more tenacula at or near the tip (Fig. 22). These are flared at the tip or are straight and rodlike. Males of the genera *Alepia* and *Platyplastinx* Enderlein also possess accessory tenacula (e.g., Fig. 83), which are long, filamentous structures with modified tips; in these taxa, typical tenacula are often absent.

In Psychodidae, the abdominal segments posterior to the eighth are rotated 180°. This rotation, which can occur in either direction (Just, 1973), has not been studied in great detail in many taxa. All references to the dorsal and ventral aspects are in reference to position after this rotation has taken place.

Parts of the female genitalia have been defined by earlier authors (Vaillant, 1971; Quate, 1996, 1999). The chitinous arch (Fig. 5) is the membranous arch which usually extends to or little beyond the apical margin of the subgenital plate between base of its lobes. Longitudinal struts and lateral struts (Fig. 5) are the sclerotized bars that extend longitudinally and laterally from near the center of the hemispherical lobes of the "spermathecae" or genital ducts (true spermathecae are lacking in psychodids; Burini and Dallai, 1975). The membranous plate is the flat dorsal portion of the spermathecal complex and contains various sclerotized structures; the margins of the plate may be lightly sclerotized and difficult to differentiate, but the shape often provides diagnostic features of the females.

MUSEUM ABBREVIATIONS

Material was borrowed from or deposited in the following collections (most abbreviations from Arnett et al., 1993).

AMNH American Museum of Natural History, New York, USA

BMNH	Natural History Museum, London, UK
CNFV	Centro Nacional de Referencia de Flebótomos, BIOMED, Universidad de Carabobo, Maracay, Venezuela
EMUS	Utah State University, Logan, USA
INBC	Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica
INPA	Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil
IZAV	Universidad Central de Venezuela, Maracay, Venezuela
LACM	Natural History Museum of Los Angeles County, Los Angeles, USA
MLPA	Museo de La Plata, La Plata, Argentina
MUSM	Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru
RW	Collection of Rüdiger Wagner, Limnologische Flußstation, Schlitz, Germany
ULMG	University of Leipzig, Leipzig, Germany
USNM	National Museum of Natural History, Washington, DC, USA
ZMHB	Zoologisches Museum, Berlin, Germany
ZSMC	Zoologische Staatssammlung, München, Germany

SYSTEMATICS

Tribe Setomimini Vaillant

Setomimini Vaillant, 1982:191–192; 1986:339; 1990:161.
Mormiini Enderlein, 1937:96–107 (in part).
Arisemini Vaillant, 1982:190–191.
Maruinini Enderlein; Duckhouse 1987:234; 1990:724–725; Quate, 1996:18–19 (in part).

DESCRIPTION. Head with eyes contiguous or separated, if separated, interocular suture nearly always present, almost always with 3 facet rows; terminal 3 flagellomeres may be reduced; labellum flattened or bulbous, apex with spines, but without apical rods (“teeth”).
Thorax usually without sensory organs on anepisternite. Wing plain or patterned; radial fork on same level as or basad of medial, both at center or basad of center; R_5 ends in or beyond wing apex.
Anterior gonocoxal apodemes expanded plate-like and connected to basiphallus with median keel (Fig. 44).
NOTES ON SYNONYMY. The classification of psychodid flies is highly unstable, as reflected in the complex synonymy, above. Vaillant (1982) first proposed tribe Setomimini but attributed it to Enderlein, in spite of Enderlein’s placement of *Setomima* Enderlein in Mormiini. Vaillant (1982) also proposed the tribe Arisemini for the genus *Arisemus* Satchell, but in a later classification (1990), he rejected this taxon. Vaillant (1990) placed *Arisemus*, as well as *Alepia*, *Neoarisemus* Botosaneanu and Vaillant, *Neurosystasis* Satchell, *Bazara* Vaillant, *Paratelmatoscopus* Satchell, *Parasetomima* Duckhouse, and *Tonnoiriella* Vaillant, in the tribe Setomimini.
At this time, we do not have strong evidence that Setomimini is a monophyletic tribe, and at our present level of knowledge, relationships of the various

taxa are unclear. It is treated as a group of convenience for those distinctive Neotropical genera that are characterized by the expanded anterior gonocoxal apodeme (Fig. 44). Other Setomimini are found in other parts of the world, but their relationships to the Neotropical species are not considered herein.
Duckhouse (1987) placed psychodine genera with expanded gonocoxal apodemes into the tribe Maruinini. We, however, regard Maruinini as a separate tribe containing only the genus *Maruina* (as did Vaillant, 1990). It differs from Setomimini in possession of an aedeagal sheath (described by Hogue, 1973:6), the structure that encloses the elements of the distiphallus. Also, the aquatic habitat of the immature stages of Maruinini is distinct from most Setomimini.
NATURAL HISTORY. The lifestyle of most Setomimini is unknown. Like that of most small, inconspicuous Diptera, psychodid natural history has generally been discovered accidentally by workers on other projects.
Adult behavior is particularly poorly studied. As noted, Setomimini are less attracted to lights than some other psychodids, possibly indicating that they are less nocturnal in their activities. Males of one species, *Caenobrunettia sarculosa* Quate, were collected as they swarmed on leaves of an undergrowth plant, exhibiting a “dancing” behavior that might serve to attract females.
Like most other psychodids, larvae of Setomimini are probably detritivorous scavengers. Some, such as *Tonnoira cavernicola* n. sp., are found in caves, associated with organic debris from colonies of oil birds and bats. One species, *Alepia longinoi* n. sp., was collected in colonies of ants of the genus *Azteca*. Duckhouse (1974a) noted that many species of Neotropical psychodines (including *Alepia*) are container breeders whose larvae are found in small pockets of moisture held by bromeliads, leaves, seeds, etc.; in this paper, we report on such a habitat for *Neurosystasis amplipenna* (Knab).
KEY TO GENERA OF SETOMIMINI OF THE NEOTROPICAL REGION
Males only.
1 R_5 ends beyond (posterior to) wing apex (e.g., Figs. 7, 30, 34) 2
– R_5 ends in wing apex (e.g., Fig. 104) 4
2 Ascoids consist of a single branch (Fig. 47); terminal 2 flagellomeres may be reduced, but usually none reduced 3
– Ascoids with 2–5 branches (Fig. 8), rarely with 1; terminal 3 flagellomeres reduced (as in Fig. 206) *Didicrum* Enderlein
3 Eye bridge with 3 facet rows (Fig. 40)
..... *Desmioza* Enderlein
– Eye bridge with 4 facet rows (Fig. 46)
..... *Didimioza* new genus

- Eye bridge with more than 4 facet rows (Fig. 28) *Thrysocanthus* Enderlein
- 4 Sc short, does not extend beyond the base of R₅ (Fig. 7) 5
- Sc long, extends beyond the radial fork (Fig. 297) *Nemoneura* Tonnoir
- 5 Head with same coloration above and below eyes 6
- Head bicolored, vertex darker than the frontal area; eye bridge slender, narrowing to single facet on inner margin (Fig. 281); interocular suture straight; wing plain, without infuscations (Fig. 284) *Valerianna* new genus
- 6 Antenna usually shorter than the wing, at most little longer than the wing 7
- Antenna much longer than wing 12
- 7 Eyes separated 8
- Eyes contiguous 11
- 8 Ascoids long, at least 3 times the length of the segment bearing them 9
- Ascoids absent or indistinguishable from hairs 10
- Ascoids short, at most a little longer than the segment bearing them *Australopericoma* Vaillant
- 9 Eye bridge normal, extends to or close to midline (Fig. 148); flagellomere 1 spherical, much smaller than following segments (Fig. 148) *Balbagathis* Quate
- Eye bridge short (Fig. 273); flagellomere 1 similar to following segments *Caenobrunettia* Wagner
- 10 Gonopod composed of gonocoxite and articulated gonostylus (Fig. 82); surstylus not bifurcate *Alepia* Enderlein
- Elongate gonostylus fused to gonocoxite; surstylus apically bifurcate *Neurosystasis* Satchell
- 11 Terminal 3 flagellomeres not reduced, terminal 1 may be reduced but not all 3; palpomere 4 subequal to or shorter than palpomere 3 (Fig. 260); antepronotum with band of dense pores over most of sclerite *Micrommatos* new genus
- Terminal 3 flagellomeres reduced and smaller than preceding flagellomeres (Fig. 206); palpomere 4 longer than palpomere 3 (Fig. 200); antepronotum without band of pores *Arisemus* Satchell
- 12 Ascoids long, at least 3 times the width of segment bearing them (Fig. 166); wing with infusate patterns (Fig. 167) *Platyplastinx* Enderlein
- Ascoids absent or indistinguishable from hairs; wing without infusate patterns *Tonnoira* Enderlein

Didicrum Enderlein

Didicrum Enderlein, 1937:105; Quate, 1963:184; Duckhouse, 1990:734-735.

Podolepria Enderlein, 1937:105. Type species: *Pericoma inornata* Tonnoir, by original designation. *Mecysmia* Enderlein, 1937:106. Type species: *Pericoma schoenemanni* Enderlein, by original designation.

TYPE SPECIES. *Pericoma griseata* Tonnoir, by original designation.

DESCRIPTION. Male and Female. Eyes separated, interocular suture present but may be interrupted in the center; bridge with 3 (rarely 4) facet rows; frons hair patch quadrate, not separated in center; if dorsal projection present, alveoli sparse and separated; antenna shorter than wing width, scape and pedicel of normal length; with 14 fusiform flagellomeres (but see *Didicrum pyramidon* n. sp., below), terminal 3 reduced, terminal with clavate apiculis, ascoids usually composed of 2-5 anterior branches, occasionally with 1; labellum bulbous; palpus extends to about center of antenna, palpomere 1 about one-half length of 2 and 4 longer than 3.

Thorax usually without sensory organ but rarely with organ on base of forecoxa; anepisternite with alveoli evenly distributed and occupying dorsal two-thirds of sclerite; midcoxa with patch of hairs on anteroapical margin. Wing lacking second costal node; base of R₂₊₃ attached to R₄; radial fork basad of medial; R₅ ending beyond wing apex.

Hypandrium a narrow band between bases of gonocoxites; aedeagus asymmetrical; distiphallus consisting of dorsal and ventral processes; basiphallus broad; paramere present; surstylus with 1 tenaculum.

REMARKS. *Didicrum* is distinguished by the branched ascoids, fusiform flagellomeres with terminal 3 reduced, radial and medial forks basad of the wing center, R₅ ending beyond the wing tip, and usually 1 tenaculum. Superficially, it resembles *Pericoma* (tribe Pericomini), and many of its species were originally placed in that genus. However, the expanded anterior gonocoxal apodemes place *Didicrum* and *Pericoma* in different tribes under the present classification.

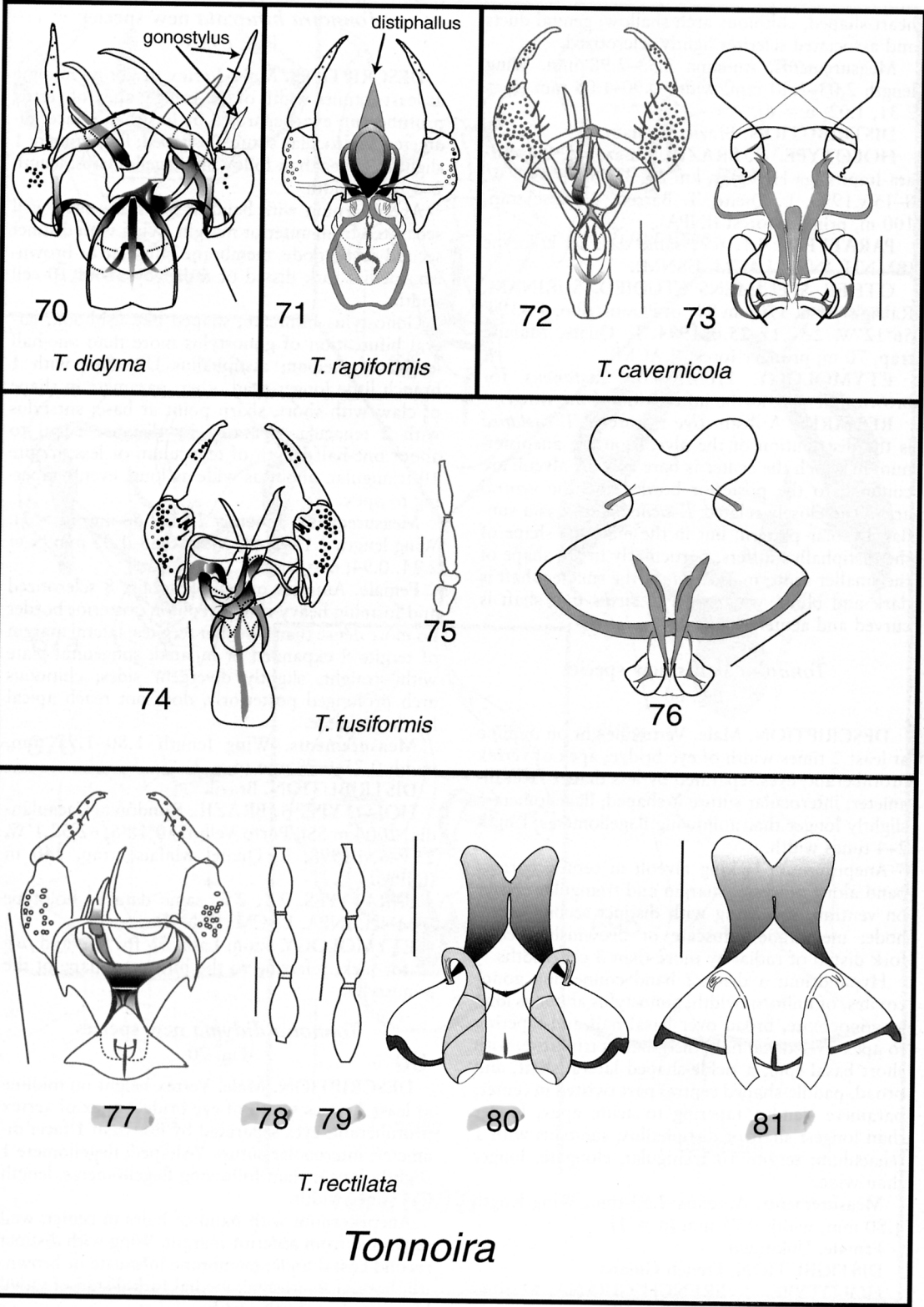
DISTRIBUTION. This genus is common in temperate South America, Australia, New Zealand, and New Guinea (Duckhouse, 1990). It is a major component of these psychodid faunas.

Didicrum griseatum (Tonnoir)
Fig. 2

Pericoma griseata Tonnoir, 1929:22, pl. III, figs. 42-45.

Didicrum griseatum; Enderlein, 1937:105; Quate, 1963:184-185.

DESCRIPTION. Male. Unknown.
Female. Eyes separated by 2.5-3 facet diameters; bridge with 3 facet rows; interocular suture elongate, inverted V-shaped, slightly interrupted in center; frons hair patch undivided, without median band; ascoids with 5 anterior branches.



Figures 70–81 *Tonnoira* spp. 70. *T. didyma*, male genitalia, dorsal. 71. *T. rapiformis*, male genitalia, dorsal. 72–73. *T. cavernicola*: 72. male genitalia, dorsal; 73. female genitalia. 74–76. *T. fusiformis*: 74. male genitalia, dorsal; 75. base of male antenna; 76. female genitalia. 77–81. *T. rectilata*: 77. male genitalia, dorsal; 78. flagellomeres 4–6, female; 79. flagellomeres 4–6, male; 80. female genitalia (Brazil); 81. female genitalia (Panama). All scale lines = 0.1 mm

ited by a colony of oil birds, *Steatornis caripenis* (Steatornithidae). Adults were on a moist, rock wall within 10 cm of the ground and close to the cave entrance. A moist layer of decomposed manure covered the ground and a shallow, slow-moving stream flowed past the wall harboring the adults. Since other specimens were collected in a forested area, the presence in the cave was probably related to breeding in the moist, organic soil on the cave floor.

Tonnoira fusiformis new species

Figs. 74–76

DESCRIPTION. Male. Vertex height on midline at least 2 times width of eye bridge; apex of vertex protuberant; eyes separated by less than 1 facet diameter; interocular suture Y-shaped; flagellomere 1 longer and thinner than following flagellomeres, length at least 5 times width.

Anepisternum with band of hairs in center, well separated from anterior margin. Wing with distinct second costal node; membrane infuscate or brownish; medial fork distad of radial by more than 3 cell widths.

Hypandrium a distinct band connecting gonocoxites, of uniform width, with quadrate or angulate lateral margins; posterior gonocoxal apodeme well developed; gonostylus elongate, about as long as gonocoxite, tapering from base to apex without abrupt change; distiphallus a straight, broad shaft extending beyond apex of gonocoxite with apex abruptly narrowing to acute apex; paramere curved away from distiphallus, shorter and thinner than distiphallus; surstylus with 2 tenacula separated by distance equal to about one-half length of tenaculum or less; tergite 10 triangular, elongate, longer than wide.

Measurements. Antenna 3.93–4.33 mm ($n = 2$). Wing length 2.50–2.98 mm, width 1.10–1.38 mm ($\bar{x} = 2.72, 1.24; n = 10$).

Female. Anterior margin of tergite 8 unmodified, alveoli on posterior border no denser than on other tergites; lateral margin of tergite 9 expanded or inflated.

Measurements. Antenna 2.90 mm. Wing length 2.70 mm, width 1.05 mm ($n = 1$).

DISTRIBUTION. Costa Rica, Ecuador.

HOLOTYPE. ♂, ECUADOR, E Santo Domingo, 8–14.v.1988, Hanson and Bohart (LACM).

PARATYPES. 3♂, 2♀, same data as holotype (EMUS, LACM). COSTA RICA, Cartago, Turrialba, 1♂, 26–29.vi.1986, Bohart and Hanson (LACM); Guanacaste, 5 km SE Rio Naranjo, 1♂, 24–31.x.1992, F. D. Parker (LACM), 3♂, 4–8.viii.1993, F. D. Parker (EMUS, LACM); Heredia, Est. Biol. La Selva, 3♂, 11–17.vi.1986, Hanson and Bohart (EMUS, INBC).

ETYMOLOGY. From latin *fusus* for spindle and *formis* for shape, referring to the spindle shaped appearance of flagellomere one.

REMARKS. Most of the males from Ecuador

and Costa Rica are indistinguishable, but some males from Costa Rica have larger posterior gonocoxal apodemes, and tergite 10 is slightly shorter. Although widely separated geographically, these slight differences in some specimens does not preclude their inclusion in the type series.

Tonnoira rectilata Quate

Figs. 77–81

Tonnoira rectilata Quate, 1999:429–430, figs. 10H–I.

DESCRIPTION. Male. Vertex height on midline at least 2 times width of eye bridge; apex of vertex smooth, not protuberant; eyes separated by less than 1 facet diameter; interocular suture Y-shaped; flagellomere 1 slightly longer than following flagellomeres, length 2–4 times width.

Anepisternum with band of hairs in center, well separated from anterior margin. Wing with distinct second costal node, membrane clear, uncolored; medial fork distad of radial by more than 3 cell widths.

Hypandrium of uniform width, without setose lobe in center; gonostylus elongate, about as long as gonocoxite, ending in single apex, tapering from base to apex without abrupt change; distiphallus unipartite, nearly straight beyond rodlike thickening at base; paramere sickle-shaped, longer than distiphallus; surstylus with 2 tenacula, separated by distance equal to about one-half length of tenaculum or less; tergite 10 triangular, about as wide as long, evenly tapering to apex.

Measurements. Antenna 1.53–2.03 mm ($\bar{x} = 1.71; n = 10$). Wing length 1.40–1.68 mm, width 0.58–0.65 mm ($\bar{x} = 1.49, 0.62; n = 10$).

Female. Anterior margin of tergite 8 sclerotized and forming heavy rim; lateral margin of tergite 9 expanded or inflated.

Measurements. Antenna 1.50–1.88 mm ($\bar{x} = 1.71; n = 10$). Wing length 1.65–1.95 mm, width 0.65–0.83 mm ($\bar{x} = 1.81, 0.75; n = 10$).

DISTRIBUTION. Nicaragua, Panama, Surinam, Brazil.

HOLOTYPE. ♀, PANAMA, Nusagandi, i.1994, J. Pickering, Malaise trap (USNM; examined).

NEW SPECIMENS STUDIED. BRAZIL, Amazonas, Itacoatiara-Itapiranga Highway, km 23, 3°3'S, 58°43.5'W, 10♂, 63♀, 8–15.v.1999, L. Quate, T. Barrett, Malaise trap, 100 m, primary forest (INPA, LACM), 1♂, same data as previous specimens except CDC light trap (LACM), Manacapura, 74 km WSW Manaus, 3°17.8'S, 60°37.63'W, 14♂, 18.iv.1998, CDC light trap, INPA lot 0107 (INPA, LACM), Manacapuru-Novo Airão, km 46–50, 2°59.3'S, 60°53.6'W, 1♂, 1♀, 30.iv–6.v.1999, L. Quate, T. Barrett, Malaise traps, 50 m, disturbed forest (LACM), 1♂, 1♀, same data as previous specimens except CDC light trap, T. Barrett (INPA), Pitinga, 258 km N Manaus, 0°45'S, 60°4'W, 1♂, 16.xii.1997, Bica, CDC light trap (LACM); Rondônia, Cacaulândia, 200 km SSE

Porto Velho, 10°18'S, 62°52.1'W, 2♂, 25.vi.1998, L. Quate, Malaise trap, 140 m (LACM). NICARAGUA, Rio San Juan, Refugio Bartola, SE San Carlos, 10°58'N, 84°20'W, 3♂, 9♀, 6–10.ii.2000, L. Quate, Malaise trap, 30 m, lowland rain forest (LACM), 1♂, same data as previous specimens except light trap (LACM).

REMARKS. This is the first description of males, which were associated with females by the large numbers in sympatric distribution and by the unusually small size of the species. Both the male and female genitalia are distinctive and should not be confused with other species of *Tonnoira* presently known.

Females from Brazil show some differences from those in other areas in that the posterior extension of the genital ducts is larger and extends well beyond the apical margin of the subgenital plate (Fig. 80).

Tonnoira pelliticornis Enderlein

Tonnoira pelliticornis Enderlein, 1937:106; Quate, 1963:189, figs. 7a–d.

DESCRIPTION. Female. Vertex height on midline at least 2 times width of eye bridge; apex of vertex smooth, not protuberant; eyes separated by less than 1 facet diameter; interocular suture a single suture without stem; flagellomere 1 longer and thinner than following flagellomeres and length at least 5 times width.

Male. Unknown.

DISTRIBUTION. Peru.

HOLOTYPE. ♀, PERU, Callanga, Staudinger, [no other data] (ZMHB; examined).

REMARKS. As the type species of the genus, it is unfortunate that this species is known only from the female. At present, females do not offer distinguishing features and unless associated with males, are difficult to identify. While there are many specimens from Peru, none resemble the holotype of *T. pelliticornis*. However, the very distinct antenna of the genus *Tonnoira* is present in this female and clearly identifies the genus.

KEY TO MALES OF TONNOIRA

The male of *T. pelliticornis* is unknown.

- 1 Surstylus with 1 tenaculum (Fig. 62) 2
- Surstylus with 2 tenacula 5
- Surstylus with 3 tenacula (only 2 of which are visible in Fig. 66) *T. mirabilis* Wagner
- 2 Gonostylus elongate, about as long as gonocoxite, ending in single apex; paramere present (e.g., Fig. 68) 3
- Gonostylus short, much shorter than gonocoxite, ending in 2–4 blunt projections, apex concave (Fig. 60); paramere absent *T. protuberata* n. sp.
- 3 Tergite 10 triangular; wing with distinct second costal node; base of R_3 without black granules; hypandrium of uniform width (Figs. 67–68) 4

- Tergite 10 somewhat cruciate with 2 lateral arms before apex; wing without second costal node; base of R_3 with cluster of black granules (Fig. 63); hypandrium enlarged in center (Fig. 64) ... *T. psacadoptera* n. sp.
- 4 Gonostylus broad over most of length, narrowing at about distal one-quarter (Fig. 67); distiphallus unipartite; anepisternum with band of hairs in center, well separated from anterior margin *T. castanea* n. sp.
- Gonostylus tapering from base to apex without abrupt change (Fig. 68); distiphallus bipartite; anepisternum lacking alveoli in center, narrow band along posterior margin ... *T. sicilis* n. sp.
- 5 Gonostylus bifurcate (Figs. 69–70) 6
- Gonostylus single (e.g., Fig. 71) 7
- 6 Lateral bifurcation of gonostylus more than one-half length of median (Fig. 69); distiphallus bipartite; paramere about as long as distiphallus; tenacula separated by distance equal to about one-half length of tenaculum or less *T. bifurcata* n. sp.
- Lateral bifurcation of gonostylus less than one-half length of median (Fig. 70); distiphallus tripartite; paramere longer than distiphallus; tenacula separated by distance equal to length of tenaculum *T. didyma* n. sp.
- 7 Distiphallus various, but not turnip-shaped; paramere present; medial fork distad of radial by more than 3 cell widths; hypandrium a distinct band connecting gonocoxites 8
- Distiphallus turnip-shaped, bulbous at base and tapering to small apex (Fig. 71); paramere absent; medial fork on same level as radial; hypandrium vestigial, small band only from gonocoxite to distiphallus and lacking in center *T. rapiformis* n. sp.
- 8 Hypandrium of uniform width (Figs. 74, 77); distiphallus single; paramere shorter than distiphallus; tenacula separated by distance equal to about one-half length of tenaculum or less ... 9
- Hypandrium enlarged in center (Fig. 72); distiphallus bipartite; paramere about as long as distiphallus; tenacula separated by distance equal to length of tenaculum *T. cavernicola* n. sp.
- 9 Flagellomere 1 slightly longer than following flagellomeres and length 2–4 times width (Figs. 78–79); tergite 10 about as wide as long; wing membrane clear, uncolored *T. rectilata* Quate
- Flagellomere 1 longer and thinner than following flagellomeres and length at least 5 times width (Fig. 75); tergite 10 elongate, longer than wide; wing membrane infusate *T. fusiformis* n. sp.

Alepia Enderlein

Alepia Enderlein, 1937:94; Quate, 1963:192; Duckhouse, 1968:31, 1974a:145.

TYPE SPECIES. *Alepia scripta* Enderlein, by original designation.

DESCRIPTION. Head without sensory organ;

trap (LACM). TRINIDAD, Asa Wright Nature Center, 1♂, 15.i.1981, G. Bohart (LACM).

REMARKS. The small tubercle with several hairs at the base of the gonostylus is not found in any other species of *Alepiea*.

Alepiea eburna (Rapp)

Figs. 134–135

Psychoda eburna Rapp, 1945:309.

Alepiea eburna; Duckhouse, 1974b:55–57, figs. 1–6.

DESCRIPTION. Male. Vertex without suture on midline and flattened; eyes separated by about 4 facet diameters; inner margin of eye bridge tapered to width of only 1 facet on inner margin, bridge with 2 facet rows; interocular suture present, without spur on midline, flattened at center; frons hair patch undivided; flagellomeres not as wide as pedicel; palpomere 2 normal, no wider than other palpomeres; 4 as long as or longer than 3.

Wing with infuscate pattern consisting largely of broad, arched band across wing near center; second costal node absent; Sc short, ends at or before base of R_4 ; radial fork basad of medial, distad of base of R_4 by more than 2 cell widths; base of R_{2+3} attached; medial fork incomplete, M_2 not attached to M_1 .

Hypandrium a dome-shaped bar between gonocoxites; gonocoxite without tubercle at base, vestiture normal; gonostylus sickle-shaped, ending in small hook; distiphallus straight, bifurcate, sides convergent; surstylus with cluster of subbasal accessory tenacula arising from dark pad, with single rodlike tenaculum.

Female. Unknown.

DISTRIBUTION. Nicaragua, Panama.

HOLOTYPE. ♂, PANAMA, Canal Zone, Barro Colorado I., 10.i.1929, C. Curran (AMNH; not examined).

SPECIMEN STUDIED. 1♂, NICARAGUA, Jinotego, Cerro Muri, 7–10.x.1997, Maes and Hernandez, Malaise trap (LACM).

Alepiea imitata new species

Figs. 136–138

DESCRIPTION. Male. Vertex protuberant, with suture on midline; eyes separated by 2–3 facet diameters, bridge with 3 facet rows, inner margin obtusely rounded; interocular suture inverted Y-shaped; frons hair patch undivided, hemispherical with median concavity on anterior margin; flagellomere 1 nearly as wide as pedicel, ovoid without internode, following flagellomeres progressively becoming smaller and thinner and internodes lengthening, flagellomere 14 with elongate apiculus; palpomere 2 normal, 4 little longer than 3, ratio of palpomeres 10:16:18:20.

Anepisternum largely covered with alveoli except around spiracle and anterior oval area below spiracle. Wing lightly infuscated with darker areas at vein tips and on forks with pale areas between vein

tips; second costal node absent; Sc short, ends between bases of R_4 and R_5 ; radial and medial forks on same level, radial fork distad of base of R_4 by more than 2 cell widths; medial fork complete.

Hypandrium a delicate, membranous plate between gonocoxites with slightly concave apex; gonocoxites clothed in dense vestiture giving genitalia shaggy appearance, with straight, slender shaft originating near center and extending well beyond tip of distiphallus; gonostylus shorter than gonocoxite, ending in sharp, curved point, with small lobe near center of median margin; distiphallus dark with central shaft flanked by 2 curved bars at base giving appearance of fleur-de-lis; epandrium with well-developed ventral epandrial sclerite (which may appear as part of basiphallus); surstylus ovoid, devoid of vestiture except patch of umbellate accessory tenacula arising from black pad near base and clavate tenaculum near center.

Measurements. Antenna 1.25–1.32 mm ($n = 4$). Wing length 1.88–1.95 mm, width 0.68–0.75 mm ($\bar{x} = 1.90, 0.70; n = 10$).

Female. Flagellomeres smaller and more slender than those of male. Genitalia with apical lobes in form of fishtail; few large spines on ventral surface; chitinous arch penetrates apical margin; setal sclerite with pair of rows of 3 setae each flanking midline near center; genital ducts with small fringe on border, basal margin of plate extends posteriorly as dark, median bar.

Measurements. Antenna 1.23–1.30 mm ($\bar{x} = 1.26; n = 5$). Wing length 1.88–2.08 mm ($\bar{x} = 2.00; n = 9$), width 0.64–0.72 mm ($\bar{x} = 0.68; n = 6$).

DISTRIBUTION. Brazil.

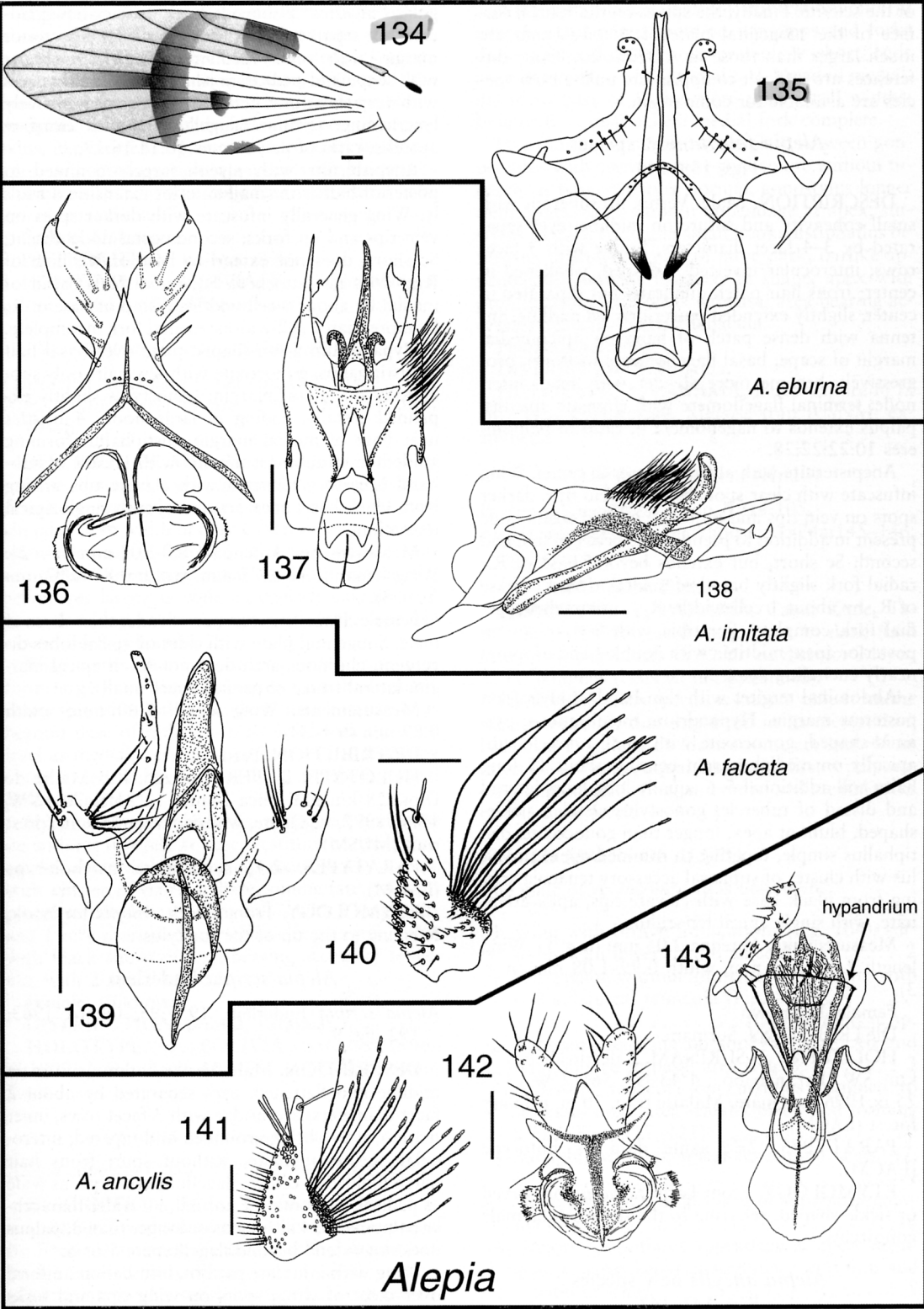
HOLOTYPE. ♂, BRAZIL, Amazonas, Manacapuru–Novo Airão, km 46–50, 2°59.3'S, 60°53.6'W, 30.iv–6.v.1999, L. Quate, T. Barrett, Malaise trap, 50 m, disturbed forest (INPA).

PARATYPES. 9♂, 3♀, same data as holotype (BMNH, LACM, USNM), Itacoatiara–Itapiranga Highway, km 23, 3°3'S, 58°43.5'W, 5♀, 8–15.v.1999, L. Quate, T. Barrett, Malaise trap, 100 m, primary forest (BMNH, INPA, LACM, USNM).

ETYMOLOGY. From Latin *imitatus* for copy, referring to the close similarity to *A. fruticosa*.

REMARKS. The two species, *A. fruticosa* and *A. imitata*, are similar and differ only in details of the genitalia of both sexes. The distinctive fleur-de-lis shape of the distiphallus and the structure of the gonostylus distinguishes *A. imitata*. Females differ in the structure of the genital ducts; the apical lobes also are slightly different.

The subgenital plate of females of *A. fruticosa* and *A. imitata* resembles that of *A. piscicauda*, which also has lobes in the shape of a fishtail. However, those of *A. piscicauda* are longer and more attenuate than in *A. fruticosa*. Also, *A. fruticosa* and *A. imitata* have a pair of irregular rows of small setae in the center of the setal sclerite, whereas *A. piscicauda* has a pair of similar setae in a cluster flanking the midline near the basal margin



Figures 134–143 *Alepia* spp. 134–135. *A. eburna*: 134. wing; 135. male genitalia, dorsal. 136–138. *A. imitata*: 136. female genitalia; 137. male genitalia, dorsal; 138. male gonopods and aedeagus, lateral. 139–140. *A. falcata*: 139. male genitalia, dorsal; 140. male surstylus, lateral. 141–143. *A. ancylis*: 141. male surstylus, lateral; 142. female genitalia; 143. male genitalia, dorsal. All scale lines = 0.1 mm

Hyandrium a membranous, dome-shaped plate above distiphallus; gonocoxite vestiture normal, not unusually dense; gonostylus as long as gonocoxite; without appendage at apex, with small tubercle at base bearing 4 long bristles, apex blunt; distiphallus long, extends nearly to apex of gonostylus, expanded at tip; surstylus irregular in shape, apex with prolongation; surstylus with black subbasal area bearing accessory tenacula, with 1 subapical tenaculum.

Female. Unknown.

DISTRIBUTION. Bolivia.

HOLOTYPE. ♂, BOLIVIA, Yungas, Staudinger, [no other data] (ZMHB; examined).

Alepia albicollare (Enderlein)

Chirolepis albicollare Enderlein, 1937:104.

Alepia albicollare; Quate, 1963:193-194, figs. 10a-h.

DESCRIPTION. Male. Vertex without suture on midline, flattened; eyes separated by about 4 facet diameters; eye bridge with 3 facet rows, inner margin tapered to width of only 1 facet on inner margin; interocular suture flattened at center, without spur on midline; frons hair patch divided in center; flagellomeres large, as wide as pedicel; palpomere 2 normal, 4 longer than 3, palpus very long, probably extends to flagellomere 7.

Wing with infusate patterns, infuscation uniform largely on distal half with basal half mostly clear; second costal node absent; Sc long, extends beyond base of radial sector; radial fork on same level as medial; very close to base of R_4 , distad by about 1 cell width; base of R_{2+3} attached; medial fork complete.

Hypanthrium membranous, triangular; gonocoxite without tubercle at base, vestiture normal; gonostylus about as long as gonocoxite, sickle-shaped, with cluster of hairs at base, unidigitate, without protuberance at base; distiphallus with 2 long staffs and 1 very short staff; surstylus elongate triangular, with black subbasal area bearing accessory tenacula, with 2 apical tenacula.

Female. Unknown.

DISTRIBUTION. Bolivia, Paraguay.

HOLOTYPE. ♂, BOLIVIA, Sara, xi.1906–iii.1907, J. Steinbach, 600–700 m (ZMHB; examined).

Alepia copelata Quate

Alepia copelata Quate, 1999:422–423, figs. 3E–F.

DESCRIPTION. Male. Vertex with distinct V-shaped notch and suture on midline; eyes separated by 7 facet diameters; eye bridge with 3 facet rows, bridge tapered to width of only 1 facet on inner margin; interocular suture flattened at center, without spur on midline; frons hair patch undivided; flagellomeres narrower than pedicel; palpomere 2 normal, no wider than other palpomeres, 4 as long as or longer than 3.

Wing with infusate pattern, infuscation uniform over most of wing, spots on wing tips and forks darker; second costal node present; Sc short, ends at or before base of R_4 ; radial fork basad of medial, distad of base of R_4 by more than 2 cell widths; base of R_{7+8} unattached; medial fork complete.

Hypandrium a membranous plate between gonocoxites with convex apex; gonocoxite without tubercle at base, vestiture normal; gonostylus longer than gonocoxite, without appendage at apex; surstylus slender, ending in small hook; distiphallus bifurcate, in shape of pair of large dark, oarlike appendages; surstylus irregular in shape, apex with prolongation, with black subbasal area bearing accessory tenacula, with 2 tenacula.

Female. Unknown.

DISTRIBUTION. Panama.

HOLOTYPE. ♂, PANAMA, Barro Colorado I, viii.1993, J. Pickering, Malaise trap (USNM; examined).

Alepia incompleta (Knab)

Psychoda incompleta Knab, 1914:105.

Alepia incompleta; Duckhouse, 1974a:145-146, figs. 14-16.

DISTRIBUTION. Panama.

HOLOTYPE. ♀, PANAMA, Canal Zone, Tabernilla, iv.1909, reared from larva in dark fluid held by flower bracts of *Calathea discolor* Meyer, A. H. Jennings (USNM; not examined).

REMARKS. This species is known only from the female. Features that might aid in its recognition, based on Duckhouse's illustrations, are lack of an interocular suture, equal lengths of first 3 palpomeres, unpatterned wing, and radial and medial forks on the same level.

KEY TO MALES OF *ALEPIA*

The male of *A. incompleta* is unknown.

- 1 Wing with brown infuscations (Fig. 104); surstylus with fewer than 6 tenacula 2
– Wing plain, without infuscations; surstylus with 6–8 subapical tenacula (Fig. 83)
. *A. amputonis* n. sp.
2 Accessory tenacula on surstylus scattered and not confined to basal area (Fig. 87) 3
– Accessory tenacula on surstylus confined to subbasal area, area usually black and forming a pad (Figs. 117, 121) 20
3 Surstylus without apical tenaculum (Figs. 87, 89) 4
– Surstylus with 1 or 2 apical or subapical tenacula (Fig. 115) 16
4 Gonostylus without appendage at apex; membranous area between sternites 5 and 6, 6 and 7 without scales 5
– Gonostylus with paddle-like appendage at apex (Fig. 85); membranous area between sternites 5 and 6, 6 and 7 with small patch of scales on each side of midline *A. azulita* n. sp.

- 5 Gonostylus without subapical spur; hypandrium membranous and very faint 6
- Gonostylus with subapical spur giving appearance of harpoon tip (Fig. 88); hypandrium sclerotized and visible, with transverse wrinkles *A. uncinota* n. sp.
- 6 Eye bridge with 3 facet rows 7
- Eye bridge with 4 facet rows *A. lanceolata* n. sp.
- 7 Gonostylus bifurcate (Fig. 99) 8
- Gonostylus unidigitate 11
- Gonostylus trifurcate (Figs. 94-95) *A. condylaria* n. sp.
- 8 Gonostylus much shorter than gonocoxite (Fig. 99) 9
- Gonostylus as long as gonocoxite 10
- 9 Gonostylus very short, about one-fifth length of gonocoxite, bifurcate at apex (Wagner, 1993: fig. 19) *A. martinicana* Wagner
- Gonostylus about one-half length of gonocoxite, bifurcation at base (Fig. 99) *A. hirtiventris* (Tonnoir)
- 10 Apex of distiphallus 2 broad blades (Quate, 1996:fig. 8a) *A. valentia* Quate
- Apex of distiphallus 2 sharp points (Quate, 1999:fig. 4G) *A. fissura* Quate
- 11 Gonocoxite without long projection from apex 12
- Gonocoxite with long projections from medial apex and shorter 1 from lateral apex (Fig. 105); surstylus ends in 2 small, blunt knobs *A. absona* n. sp.
- 12 Gonostylus not constricted at apex 13
- Gonostylus constricted at apex and ending in small, digitlike tip (Fig. 100) *A. digitula* n. sp.
- 13 Radial fork on same level as medial; gonostylus without globular protuberance at apex ... 14
- Radial fork basad of medial (Fig. 104); alveoli of anepisternite form dorsal and ventral clusters; gonostylus with globular protuberance bearing 5-6 long bristles (Fig. 103) *A. litotes* n. sp.
- 14 Gonostylus much shorter than gonocoxite (Fig. 111) *A. labyrinthica* n. sp.
- Gonostylus subequal in length to gonocoxite (Figs. 106, 110) 15
- 15 Distiphallus broad, straight, ending posterior to gonostyli; right paramere heavily sclerotized, in form of cock's comb (Fig. 110) *A. piscicauda* n. sp.
- Distiphallus in form of 2 apically narrowed, relatively slender shafts, neither of which extend posterior to apex of gonostyli; paramere slender, elongate (Fig. 106) *A. ferruginea* n. sp.
- 16 Gonostylus unidigitate apically, at most with subapical spur (e.g., Fig. 114); hypandrium membranous, faint 17
- Gonostylus deeply bifurcate with long, pointed, larger shaft (Duckhouse, 1974a:fig. 12); hypandrium sclerotized *A. tricolor* (Knab)
- 17 Gonostylus without subapical spur 18
- Gonostylus with subapical spur giving appearance of harpoon tip (Fig. 114) *A. caceresi* n. sp.
- 18 Spur from interocular suture does not extend to vertex; radial fork on same level as medial; surstylus triangular or elongate triangular ... 19
- Spur from interocular suture reaches vertex; radial fork basad of medial; surstylus globular or ovoid, without prolongation *A. alcobregma* Quate
- 19 Gonocoxite without long projection from apex; gonostylus little longer than gonocoxite, ending in S-shaped curve *A. relativa* Quate
- Gonocoxite with long projection from center of mesal margin; gonostylus short and ending in straight, blunt tip (Fig. 113) *A. scolomeris* n. sp.
- 20 Eye bridge with only 1 or 2 facet rows, eyes widely separated by more than 3 facet diameters 21
- Eye bridge with 3 facet rows, eyes separated by less than 3 facet diameters 22
- 21 Eyes widely separated by 10 facet diameters, short eye bridge with 2 facet rows *A. diocula* n. sp.
- Eyes separated by 3 facet diameters, bridge reduced, with only 1 facet row (Fig. 118) *A. longinoi* n. sp.
- 22 Gonostylus unbranched, unidigitate (Fig. 132) 23
- Gonostylus trifurcate, with 2 pointed and 1 short blunt apices (Figs. 128-129) *A. fruticosa* n. sp.
- 23 Surstylus without apical tenaculum 24
- Surstylus with 1 apical or subapical tenaculum (Fig. 140) 27
- Surstylus with 2 apical or subapical tenacula ... 31
- 24 Medial fork complete 25
- Medial fork incomplete 26
- 25 Radial fork distad of medial; frons hair patch divided in center *A. busckana* (Dyar)
- Radial fork basad of medial; frons hair patch undivided *A. apachis* Quate
- 26 Gonostylus without protuberance at base ... *A. alfaroana* (Dyar)
- Gonostylus with protuberance at base bearing 5-6 long bristles (Fig. 132) *A. bisubulata* Duckhouse
- 27 Eye bridge with 3 facet rows; medial fork complete; radial fork on same level as medial ... 28
- Eye bridge with 2 facet rows; medial fork incomplete; radial fork basad of medial ... *A. eburna* (Rapp)
- 28 Hypandrium a membranous, faint band ... 29
- Hypandrium a large fan-shaped plate above distiphallus (Fig. 143) 30
- 29 Distiphallus in shape of fleur-de-lis with pair of short curved shafts at base (Fig. 137); eyes separated by 2-3 facet diameters *A. imitata* n. sp.

- Distiphallus a simple, straight shaft (Fig. 139); eyes separated by more than 3 facet diameters *A. falcata* n. sp.
- 30 Medial fork incomplete; gonostylus hooked at apex (Fig. 143) *A. ancylis* n. sp.
- Medial fork complete; gonostylus straight at apex *A. scripta* Enderlein
- 31 Distiphallus consists of 3 shafts, 2 long and dissimilar and 1 very short (Quate, 1963:figs. 10f, h) *A. albicollare* Enderlein
- Distiphallus a pair of oarlike shafts of equal size and shape (Quate, 1999:fig. 3E) *A. copelata* Quate

Neurosystasis Satchell

Telmatoscopus (*Neurosystasis*) Satchell, 1955:86.
Neurosystasis; Duckhouse, 1974a:142.

TYPE SPECIES. *Telmatoscopus* (*Neurosystasis*) *terminalis* Satchell, by original designation.

DESCRIPTION. Eye bridge extends to or close to midline, with 3 facet rows; eyes separated; interocular suture present; antenna longer than wing width and shorter than wing length; flagellomeres fusiform or barrel-shaped, without internodes, terminal 3 flagellomeres not reduced, ascoids indistinguishable; palpus normal, extends to about center of antenna, palpomere 4 longer than palpomere 3.

Anteprenotum without band of pores; sensory organs of thorax absent; wing without infusate patterns; Rs pectinate; base of R_{2+3} not attached to R_4 ; radial fork without spur, very close to base of R_4 , basad of medial fork; R_5 ends in wing apex.

Anterior gonocoxal apodemes form pair of anterior, expanded lobes; hypandrium a bar connecting gonocoxites; gonostyli dimorphic; aedeagus asymmetrical; surstylus bifurcate, with 1 tenaculum.

REMARKS. The bifurcate surstylus is the most distinctive feature of this genus.

Neurosystasis terminalis (Satchell)

Telmatoscopus (*Neurosystasis*) *terminalis* Satchell, 1955:86, figs. 1A–F.

DESCRIPTION. Male. Radial and medial forks on same level, basad of wing center; M_1 , M_2 , and M_3 joined at medial fork to form triad. Gonostyli dimorphic, right trifurcate with 1 short, sharp branch, 1 broad and blunt branch and 1 long and slender with blunt apex; left gonostylus bifurcate, longer than right, 1 branch slightly sinuous with blunt apex, 1 shorter branch slender with acute apex; branches of surstylus nearly equal in length, 1 blunt and 1 acute at apex.

Female. Subgenital plate weakly bilobed; chitinous arch separates lobes.

DISTRIBUTION. Jamaica.

HOLOTYPE. ♂, JAMAICA, Montague, 12.ii.1905, Walsingham (BMNH; not examined).

REMARKS. This species can be separated from *N. amplipenna* (below) by its unusual wing venation with the 3 medial veins arising from a single point.

Neurosystasis amplipenna (Knab).

Psychoda amplipenna, Knab, 1914:103.

Neurosystasis amplipenna; Duckhouse, 1974a:142, figs. 1–6.

DESCRIPTION. Male. Wing membrane lightly infusate with clear spots between most vein tips; radial fork basad of medial and very near base of R_4 ; branches of M normal. Gonocoxite with long, slender protuberance from apicomedial margin, right little longer than left; gonostylus variable, dimorphic, right unbranched, left longer and in some specimens bifurcate with lateral branch much shorter than medial (other specimens with shorter or no bifurcation); surstylus with branches about same length with blunt apices, lateral branch with right-angle bend at apex, cluster of dark hairs at base of bifurcation.

Female. Unknown.

DISTRIBUTION. Cuba, USA.

HOLOTYPE. ♂, CUBA, San Antonio de Los Baños, reared from larva in water at leaf base of epiphytic bromeliad, J. H. Pazos (USNM; not examined).

NEW MATERIAL EXAMINED. USA, Florida, Orange County, Christmas, 3♀, 25.vi.1976, D. Fish, ex *Tillandsia utriculata* (Bromeliaceae) (LACM, USNM).

REMARKS. Larvae of this species are found in the leaf axils of bromeliads and probably are restricted to this habitat.

Balbagathis Quate

Balbagathis Quate, 1996:31.

TYPE SPECIES. *Balbagathis sylvatica* Quate, by original designation.

DESCRIPTION. Eye bridge usually with 3 facet rows, rarely 4, width usually about one-half length of vertex; interocular suture present, without posterior stem; eyes narrowly separated by less than 1 facet diameter, upper and lower margin angulate; frons hair patch moderately dense, not separated in center, posterior margin with concavity; antenna longer than wing width and shorter than wing length; flagellomere 1 smaller than following segments, without internode, other flagellomeres strongly nodiform, sometimes terminal flagellomere reduced, ascoids single, very long and curled, much longer than flagellomeres; labellum expanded but not bulbous; palpus shorter than antenna.

Anepisternum with dense patch of alveoli on posterior one-half, anterior one-half clear. Wing clear, unmarked; radial sector pectinate; radial fork basad of medial by 4–5 cell widths; R_5 ends in wing apex.

Gonocoxite unmodified; hypandrium a band between gonocoxites, often with posterior projections; aedeagus asymmetrical; surstylus with 1 te-

PARATYPES. 4♂, same data as holotype (LACM, USNM), 10 km NW El Limon, 1♂, 19.ix.1993, L. Quate, light trap (LACM).

ETYMOLOGY. From Latin *confragus* for broken, referring to the secondary articulation of the paramere.

Balbagathis discuspis new species

Fig. 152

DESCRIPTION. Male. Eye bridge with 3 facet rows.

Gonocoxal apodeme with basal margin straight or with concavity but not bilobed, widely expanded; gonostylus with slight curvature; hypandrium without posterior projections, concave in center, lateral margin of concavity rounded and prominent; base of basiphallus straight, not bilobed, wider than posterior part; distiphallus a single shaft tapering to acute apex; paramere large, wider than distiphallus, lateral margin in form of dark, pointed bar, median section pale with rounded apex.

Measurements. Antenna 1.30–1.35 mm ($n = 3$). Wing length 1.53–1.78 mm, width 0.58–0.65 mm ($\bar{x} = 1.65, 0.60; n = 5$).

Female. Unknown.

DISTRIBUTION. Costa Rica.

HOLOTYPE. ♂, COSTA RICA, Limón, Res. Biol. Hitoy Cerere, 9°48.4'N, 83°1.5'W, 17–26.ii.1999, L. Quate, Malaise trap, 100–200 m, primary forest [barcode INBIOCRI001472817] (INBC).

PARATYPES. 4♂, same data as holotype (LACM).

ETYMOLOGY. From Latin *dis* for without and *cuspis* for point, referring to the hypandrium, which is without projections.

Balbagathis barva new species

Figs. 153–154

DESCRIPTION. Male. Eye bridge with 4 facet rows.

Gonocoxal apodeme with basal margin straight or with concavity but not bilobed; gonostylus with slight curvature; hypandrium with 2 pairs of posterior projections, lateral pair slender and median pair thicker; distiphallus a nearly straight dark shaft, enclosed in membranous film; paramere a single shaft a little longer and thinner than distiphallus; tergite 10 with quadrate or angular apex.

Measurements. Wing length 2.63–2.83 mm, width 0.95–1.05 mm ($\bar{x} = 2.72, 1.02; n = 5$).

Female. Apical lobes of subgenital plate slender; chitinous arch extends nearly to apex of lobes.

Measurements. Wing length 2.68 mm ($n = 1$).

DISTRIBUTION. Costa Rica.

HOLOTYPE. ♂, COSTA RICA, Heredia, Parque Braulio Carrillo, Volcan Barva, vi–viii.1995, L. Quate, Malaise trap, 2800 m [barcode INBIOCRI001471929] (INBC).

PARATYPES. 4♂, same data as holotype (LACM, USNM), 1♂, 1♀, same data as holotype

except 9–17.vi.1995, L. Quate, Malaise trap, 2250 m (INBC, LACM).

ETYMOLOGY. Named for Volcan Barva near the type locality.

REMARKS. This is the only known species of *Balbagathis* with 4 facet rows, which readily separates it from other species of the genus.

Balbagathis talamanca Quate

Figs. 155–157

Balbagathis talamanca Quate, 1996:33, figs. 12d–h; Collantes and Martínez-Ortega, 1999b:25.

DESCRIPTION. Male. Eye bridge with 3 facet rows, width about one-half vertex height.

Gonocoxal apodeme prominent and bilobed; gonostylus nearly straight, with small subapical curvature; hypandrium with 2 lateral projections, variable, usually symmetrical, but 1 may be reduced (Fig. 156), large triangular projection between 2 slender projections, ends in blunt tip, striations on dorsal surface, sclerotized bar at one side, extends to tip of distiphallus; base of basiphallus widely expanded; distiphallus a single, broad shaft slightly curving outward from midline; paramere single, with rounded curve at base; tergite 10 rounded and domelike.

Measurements. Antenna 0.95–1.40 mm ($n = 3$). Wing length 1.30–2.15 mm, width 0.48–0.75 mm ($\bar{x} = 1.80, 0.67; n = 10$).

Female. Apical lobes of subgenital plate moderately wide; chitinous arch extends posteriorly between lobes well beyond posterior margin; lobes of genital duct well defined with distinct lateral and horizontal struts; membranous plate with dark ellipse at anterolateral and anteromedial areas.

Measurements. Antenna 1.20 mm ($n = 1$). Wing length 1.95–2.25 mm, width 0.70–0.78 mm ($n = 4$).

DISTRIBUTION. Nicaragua, Costa Rica.

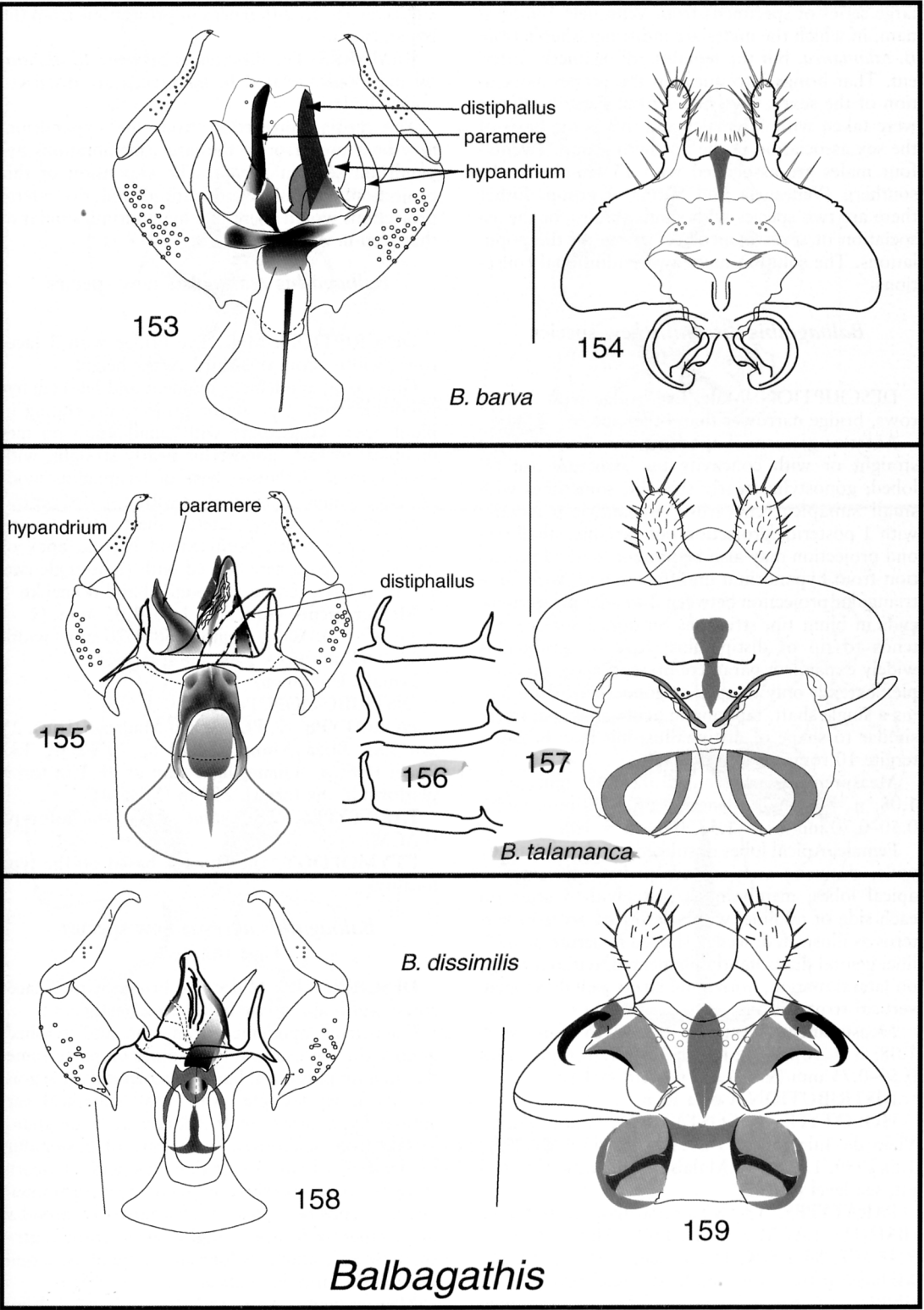
HOLOTYPE. ♂, COSTA RICA, Limón, Puerto Viejo de Talamanca, 20–22.vii.1993, L. Quate (INBC; examined).

NEW SPECIMENS STUDIED. COSTA RICA, Heredia, San Rafael de Vara Blanca, Rio Santo Domingo, 3♂, 18–26.vii.1993, L. Quate, light trap, 1700 m (LACM), La Selva, 1♂, 18.ii.1992, L. Quate, at light (LACM); Puntarenas, Estación Pittier, 22 km N San Vito, 9°1.4'N, 82°57.5'W, 3♂, 11–16.vi.1995, L. Quate, light trap, 1670 m (LACM).

REMARKS. The lateral projections of the hypandrium are variable as shown in Fig. 156.

This species is separable from its nearest relative, *Balbagathis dissimilis* n. sp., in the shape of the triangular projection of the hypandrium, which has a bar at its side in *B. talamanca* but is absent in *B. dissimilis* (for further discussion of the median projection from the hypandrium, see “Remarks” section for *B. dissimilis*). Females have very different ornamentations on the membranous plate of the genitalia.

In addition to the specimens above, there is a



Figures 153–159 *Balbagathis* spp. 153–154. *B. barva*: 153. male genitalia, dorsal; 154. female genitalia. 155–157. *B. talamanca*: 155. male genitalia, dorsal; 156. hypandrium, variants; 157. female genitalia. 158–159. *B. dissimilis*: 158. male genitalia, dorsal; 159. female genitalia. All scale lines = 0.1 mm

large series of specimens from Venezuela and Surinam, in which the males are indistinguishable from *B. talamanca*, but the females are distinctly different. That brings into question the proper association of the sexes. Two males from Estación Pittier were taken with 5 females and this is the basis of the sex association in the northern group. Twenty-four males are associated with 15 females in the southern (Venezuela and Surinam) group. Either there are two species with similar males, or the association of sexes is incorrect in one of the populations. The solution must await additional collections.

Balbagathis dissimilis new species

Figs. 158–159

DESCRIPTION. Male. Eye bridge with 3 facet rows, bridge narrower than other species.

Anterior gonocoxal apodeme with basal margin straight or with concavity but structure not bilobed; gonostylus nearly straight, sometimes with small subapical curvature; hypandrium usually with 1 posterior projection but variable, small second projection may also be present; base of projection from hypandrium undifferentiated, with large triangular projection between 2 smaller projections, ends in blunt tip, striations on dorsal surface, extends to tip of distiphallus; base of basiphallus widely expanded; paramere present; aedeagal complex extends only to apex of gonocoxite; distiphallus a single shaft, tapering in acute apex; paramere similar to shape of distiphallus, but base broader; tergite 10 rounded and domelike.

Measurements. Antenna 1.02–1.14 mm (\bar{x} = 1.08; n = 6). Wing length 1.28–1.70 mm, width 0.50–0.70 mm (\bar{x} = 1.53, 0.64; n = 10).

Female. Apical lobes of subgenital plate relatively wide; chitinous arch extends to beyond center of apical lobes; membranous plate with 5 setae on each side of midline, with sclerotized areas in patterns as illustrated; wedge-shaped structure on midline; genital ducts lightly pigmented, without fringe on lateral margin, horizontal struts well developed, vertical struts slender.

Measurements. Antenna 0.98–1.15 mm (\bar{x} = 1.08; n = 10). Wing length 1.49–1.75 mm; width 0.50–0.75 mm (\bar{x} = 1.66, 0.60; n = 10).

DISTRIBUTION. Costa Rica.

HOLOTYPE. ♂, COSTA RICA, Limón, Puerto Viejo de Talamanca, 9°39.4'N, 82°45.9'W, 25.ii–1.iii.1999, L. Quate, Malaise trap, secondary forest, sea level (INBC).

PARATYPES. 3♂, 8♀, same data as holotype (BMNH, LACM), Res. Biol. Hitoy Cerere, 9°48.4'N, 83°1.5'W, 1♀, 17–26.ii.1999, L. Quate, Malaise trap, over small stream, 100–200 m (INBC), 2♂, 6♀, same data as previous specimen except Rio Cerere, primary forest (LACM, USNM), 4♂, 1♀, same data as previous specimens except *Heliconia* floodplain (LACM).

ETYMOLOGY. From Latin *dissimilis* for differ-

ent, referring to differences in projections from the hypandrium.

REMARKS. The differences between *B. dissimilis* and closely related *B. talamanca* are discussed under the latter.

The median projection from the hypandrium may be a precursor to the large, membranous hypandrium seen in *Alepia*. The expansion of this projection, loss of sclerotization, and the lateral projections would result in a hypandrium*similar to that seen in *Alepia*.

Balbagathis manuensis new species

Fig. 160

DESCRIPTION. Male. Eye bridge with 3 facet rows; width about one-third vertex height.

Gonocoxal apodeme prominent and bilobed; hypandrium with 2 posterior projections, ending in blunt apex; gonocoxite with small knob on medioapical margin; gonostylus nearly straight, with small central curvature; base of basiphallus moderately expanded; distiphallus with 2 shafts, central shaft straight, short, lateral shaft little longer, curved, apex acute, both extend beyond apex of gonocoxite; paramere curved with right-angle curvature at base; tergite 10 rounded and domelike.

Measurements. Antenna 1.03–1.05 mm (\bar{x} = 1.04; n = 2). Wing length 1.68–1.70 mm, width 0.63–0.64 mm (\bar{x} = 1.69, 0.63; n = 2).

Female. Unknown.

DISTRIBUTION. Peru.

HOLOTYPE. ♂, PERU, Rio Madre de Dios, 28 km ESE Boca Manu, 12°21'S, 70°42'W, 13–24.vii.1997, L. Quate, light trap at 36.5 m [on a platform in the forest], 250 m (MUSM).

PARATYPES. 2♂, same data as holotype (LACM).

ETYMOLOGY. The name is based on the type locality.

Balbagathis agrestis new species

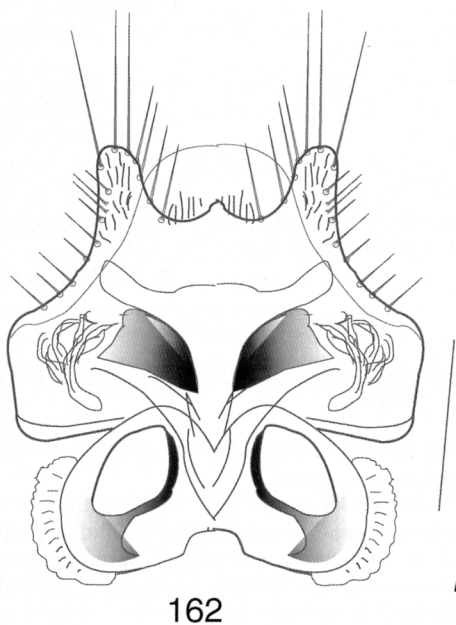
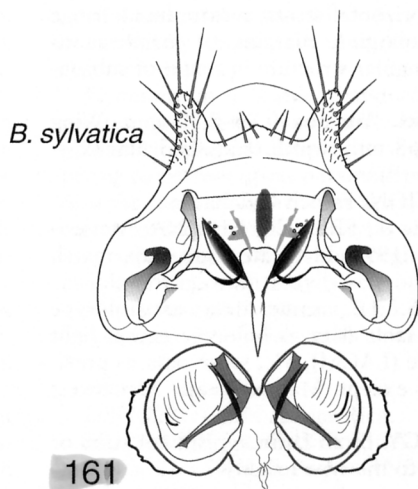
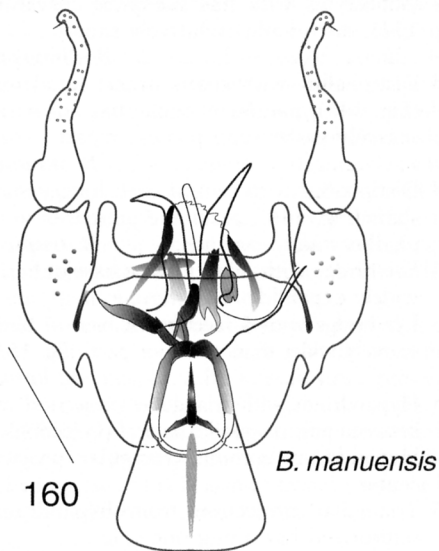
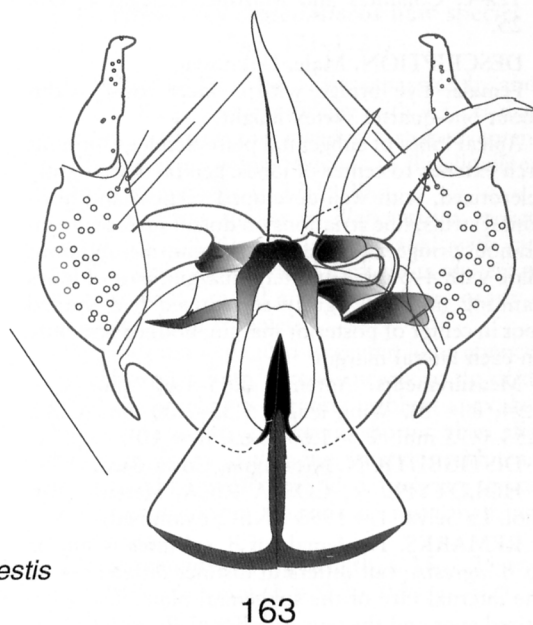
Figs. 162–163

DESCRIPTION. Male. Eye bridge with 3 facet rows; width about one-half vertex height.

Gonocoxal apodeme prominent and bilobed; gonocoxite with several long spines on posterio-medial margin plus usual hairs along lateral area; gonostylus nearly straight, with small subapical curvature; hypandrium with 2 large, hornlike spines arising from sclerotized base; base of basiphallus moderately expanded; distiphallus with a nearly straight shaft tapering to acute apex; paramere large, extends beyond apex of gonocoxite, broad at base, tapering to apex, angled away from central shaft by 45°, about as long as distiphallus; tergite 10 rounded and domelike.

Measurements. Antenna 1.05 mm (n = 2). Wing length 1.58 mm, width 0.60 mm (n = 2).

Female. Apical lobes of subgenital plate small, with many long spines; chitinous arch extends posteriorly beyond apical margin and nearly to apex

*B. agrestis*

Balbagathis

of lobes; genital ducts well defined, with distinct vertical and horizontal struts, membranous fringe along lateral margins; margins of membranous plate form triangular structure in center of subgenital plate.

Measurements. Antenna 0.83–0.90 mm. Wing length 1.43–1.68 mm, width 0.53–0.63 mm (\bar{x} = 1.54, 0.56; n = 9).

DISTRIBUTION. French Guiana.

HOLOTYPE. ♂, FRENCH GUIANA, Maripasoula, 17–22.iii.1994, L. Quate, light trap, marsh (LACM).

PARATYPES. 1♂, same data as holotype (LACM), 1♀, same data as holotype except light trap, streamside (LACM), 5♀, same data as previous specimen except Malaise trap, dry forest (LACM).

ETYMOLOGY. From Latin *agrestis* for rural or wild, referring to the type locality.

Balbagathis sylvatica Quate

Fig. 161

Balbagathis sylvatica Quate, 1996:32–33, figs. 12a–c; Collantes and Martínez-Ortega, 1999b: 25.

DESCRIPTION. Male. Unknown.

Female. Eye bridge with 3 facet rows, width about one-quarter vertex height.

Apical lobes of subgenital plate slender, chitinous arch extends to center of lobes; genital ducts lightly sclerotized, with well-developed vertical and horizontal struts, fine striations on dorsal surface, membranous fringe along lateral margin; membranous plate with 4–6 setae at lateral margin, pair of lobes flanking midline, lightly sclerotized leaf-shaped spot in center of posterior margin, hooked structure on each lateral margin.

Measurements. Antenna 0.85–1.00 mm (\bar{x} = 0.94; n = 5). Wing length 1.33–2.00 mm, width 0.53–0.75 mm (\bar{x} = 1.65, 0.63; n = 10).

DISTRIBUTION. Nicaragua, Costa Rica.

HOLOTYPE. ♀, COSTA RICA, Heredia, Est. Biol. La Selva, 1.iv.1993 (INBC; examined).

REMARKS. The female of *B. sylvatica* is similar to *B. agrestis*, but differs in distinct differences on the internal face of the subgenital plate. The sclerotized spot and the pair of lobes of *B. sylvatica* are the most evident differences. Both species possess a fringe along the lateral margin of the genital ducts, a similarity with females of *Alepia*.

KEY TO MALES OF BALBAGATHIS

The male of *B. sylvatica* is unknown.

- 1 Hypandrium without posterior projection (Fig. 144) 2
- Hypandrium with posterior projection(s) (Fig. 151) 4
- 2 Gonostylus sinuous, strongly curved, nearly S-shaped (Figs. 144, 146); distiphallus extends nearly as far posteriorly as gonostyli 3

- Gonostylus with less subapical curvature (Fig. 152); distiphallus relatively short *B. discuspis* n. sp.
- 3 Distiphallus with shafts about equal in length (Fig. 144); paramere single; base of basiphallus scarcely wider than posterior part *B. sinuosa* n. sp.
- Distiphallus with central shaft longer than other shaft (Fig. 146); paramere paired; base of basiphallus widely expanded . . . *B. trispica* n. sp.
- 4 Eye bridge with 3 facet rows; base of basiphallus widely expanded 5
- Eye bridge with 4 facet rows; base of basiphallus scarcely wider than posterior part (Fig. 153) *B. barva* n. sp.
- 5 Hypandrium with triangular projection in center between pair of smaller, lateral projections . . . 6
- Hypandrium without triangular projection in center 7
- 6 Triangular projection from hypandrium with sclerotized bar along one side *B. talamanca* Quate
- Triangular projection without sclerotized bar *B. dissimilis* n. sp.
- 7 Gonostylus elongate, longer than gonocoxite (Figs. 151, 160) 8
- Gonostylus shorter than gonocoxite; distiphallus extends posteriorly as far as apex of gonostylus (Fig. 163) *B. agrestis* n. sp.
- 8 Hypandrial processes apically rounded, ending freely (Fig. 160) *B. manuensis* n. sp.
- Hypandrial processes apically acute, merging into aedeagal structures (Fig. 151) *B. confraga* n. sp.

Platyplastinx Enderlein

Platyplastinx Enderlein, 1937:107; Quate, 1963: 195, 1999:433.

TYPE SPECIES. *Platyplastinx solox* Enderlein, by original designation.

DESCRIPTION. Male. Eye bridge with 3 or 4 facet rows, normal, nearly extends to midline, separated or contiguous, interocular suture present when separated; hair patch of frons dense, undivided, extends posteriorly to posterior margin of scape; antenna longer than wing length, flagellomeres fusiform, distal segments gradually become somewhat pyriform with small internodes, terminal 3 segments not reduced, terminal with long apiculis; ascoids simple, digitate, paired on all flagellomeres, very long, more than 3 times the length of segment bearing them.

Thorax without sensory organs; anepisternum with alveoli on posterior half, anterior half free of alveoli except ventral third which has sparse patch of alveoli less dense than on posterior; metapleuron with sparse alveoli except circular patch dorsally; midcoxa with tuft of long hairs arising from elevated knob of anteroventral margin. Wing with infusate patterns; second costal node present; radial

HOLOTYPE. ♂, CUBA, Palenque, 31.iii.1969, L. Botosaneanu, 420 m (CNFV; not examined).

Arisemus boxi (Satchell)

Fig. 186

Telmatoscopus (Arisemus) boxi Satchell, 1955:89–90, fig. 3.

Arisemus boxi; Botosaneanu and Vaillant, 1970: 178; Vaillant, 1986:336; Wagner, 1993:124.

DESCRIPTION. Male. Eyes contiguous; pedicel with few dark scales on mesal surface; flagellomeres lacking; ratio of palpomeres 10:13:17:25.

Anepisternum with black sensory organ above spiracle, organ composed of densely packed scales or granules arranged in sphere, about 2 times size of spiracle; alveoli confined to lower part of anterior half. Wing with brown spots on vein tips, except R_5 and base of CuA_2 ; second costal node absent, small pad at base of costa with small tuft of hairs; Sc short, ends at level of base of R_{2+3} ; Rs not pectinate, base of R_4 curved anteriorly to lie close to R_{2+3} , with row of long hairs on curved section basad of radial fork; CuA_2 extends to wing margin; alula with large tuft of hairs.

Gonocoxite with small conical process near base, right side bearing tuft of 3 hairs; distiphallus and paramere extend well beyond gonocoxite apex; distiphallus with 2 branches, 1 large and curved away from center, other small and mostly obscured by paramere; paramere as long as major branch of distiphallus, with subapical enlargement.

Measurements. Wing length 1.85 mm, width 0.73 mm.

Female. Unknown.

DISTRIBUTION. St. Lucia, Martinique.

HOLOTYPE. ♂, ST. LUCIA, Bar de l'Isle, 20.x.1935, H. E. Box (BMNH; examined).

REMARKS. The distinguishing features of the males of *A. boxi* are the scales on the pedicel, the alular tuft of hairs, the unusual curvature in R_4 , and the genitalic characters, all of which have been illustrated by Satchell (1955: fig. 3) and Wagner (1993: figs. 50–56). However, there are discrepancies in the illustrations of the two authors. Satchell (fig. 3B) shows a row of long hairs on a curved base of R_4 , which is not shown by Wagner (fig. 54); the senior author has confirmed that these are present in the holotype. Satchell (fig. 3C) illustrates the distiphallus with a single branch, but Wagner (fig. 56) figures it with 2 branches; the senior author has confirmed that there are 2 branches in the holotype, although the smaller is largely hidden by the paramere. The apical prolongation of the gonocoxite is shown by Satchell to be dark and with 4 setae, while Wagner shows it to be clear and with 7 setae; in the holotype, the senior author found that the prolongation is clear and possesses 3 bristles. The differences in Wagner's illustration are minor and there is no doubt that he properly identified the Martinique specimens.

Arisemus maesi new species

Figs. 180–181

DESCRIPTION. Male. Apex of vertex plain; frons hair patch without median extension, center of frons hair patch divided; dark scales on antenna of male absent; scape normal, ratio of pedicel about 1.5:1; flagellomeres 1 and 2 separated, 1 normal; terminal 3 globular, reduced, smaller than preceding segments.

Thorax with sensory organ on anepisternum, located posterior of spiracle, marked by small, dense cluster of black, spatulate hairs, organ small, no larger than spiracle. Wing normal, length 2–2.5 times width; infusate patterns limited to vein tips and forks; second costal node absent; costa normal, without concavity; Sc short, ends at or before base of R_{2+3} ; Rs pectinate, R_1 normal; radial fork complete, i.e., R_2 and R_3 attached, at about same level as medial; R_4 normal; medial fork complete, M_2 joined to M_1 ; CuA_2 without enlargement, apex does not reach margin.

Abdominal sternites without black scales. Gonocoxite simple, without processes or large spines; base of gonocoxites on dorsal side not joined; hypandrium inconspicuous; gonostylus without cluster of hairs; distiphallus undivided, apex beaklike, nearly as long as gonocoxite; paramere sausage-shaped, broader than and same length as distiphallus; epandrium width equals or exceeds length; surstylus without spatulate hairs; tergite 10 dome-shaped.

Measurements. Antenna 0.79 mm ($n = 2$). Wing length 1.75 mm, width 0.63 mm ($n = 2$).

Female. Subgenital plate quadrangular, with V-shaped apical concavity, chitinous arch varies from extending nearly to apical border to ending some distance from the border, inner face with conspicuous median bar; lateral and longitudinal struts absent.

Measurements. Antenna 0.76–0.83 mm ($\bar{x} = 0.78$; $n = 6$). Wing length 1.72–1.94 mm, width 0.55–0.62 mm ($\bar{x} = 1.87$, 0.60; $n = 7$).

DISTRIBUTION. Nicaragua.

HOLOTYPE. ♂, NICARAGUA, Granada, Volcan Mombacho, 11°50'N, 85°51'W, 15.xi.1998, J. Maes, Malaise trap, 1100 m (LACM).

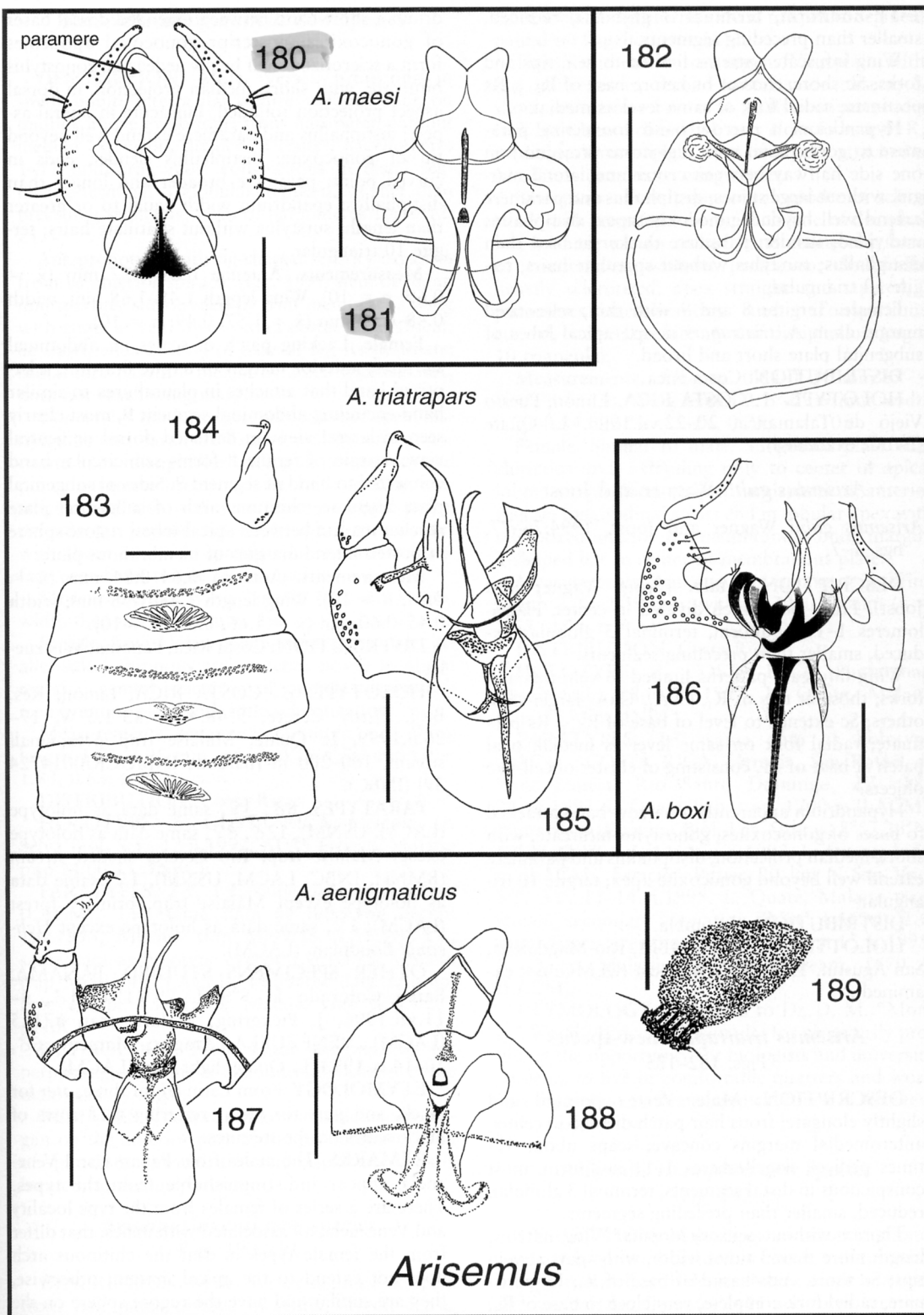
PARATYPES. 1♂, 4♀, same data as holotype (LACM), 1♀, same data as holotype except 30.ix.1998, 1♀, same data as holotype except 30.x.1998, 2♀, same data as holotype except 30.xi.1998 (LACM, Museo Entomologico, Leon, Nicaragua).

ETYMOLOGY. Named to recognize the collector, J. M. Maes, and his important contributions to the entomology of Nicaragua.

Arisemus salazari Quate

Arisemus salazari Quate, 1996:25, figs. 9h–i.

DESCRIPTION. Male. Frons hair patch without median extension, divided in center; flagellomeres



Figures 180–189 *Arisemus* spp. 180–181. *A. maesi*: 180. male genitalia, dorsal; 181. female genitalia. 182–185. *A. triatrapars*: 182. female genitalia; 183. abdominal sternites 5–7; 184. male gonostylus; 185. male genitalia, dorsal. 186. *A. boxi*, male genitalia, dorsal. 187–189. *A. aenigmaticus*: 187. male genitalia, dorsal; 188. female genitalia; 189. sensory organ on anepisternite. All scale lines = 0.1 mm

Arisemus mariannae Wagner and Masteller

Arisemus mariannae Wagner and Masteller, 1996: 457–459, figs. 32–37.

DESCRIPTION. Male. Flagellomeres 1–11 nodiform, terminal 3 reduced and globular without internodes; hair patch on frons divided in center, without median extension.

Wing with spots at vein tips; second costal node absent; Sc short, ends before base of R_{2+3} ; radial and medial forks on same level; Rs not pectinate; apical two-thirds of CuA_2 enlarged, not ending in wing margin.

Male genitalia with unusual distiphallus with preapical curvature and heavily sclerotized “sclerite” (possibly the gonocoxal apodeme) at base of gonocoxite; tergite 10 dome-shaped.

Female. Unknown.

DISTRIBUTION. Puerto Rico.

HOLOTYPE. ♂, PUERTO RICO, tributary Mayes, Bisley stream, Luquillo Experimental Forest, 2.ii.1991, E. Masteller, emergence trap (USNM; not examined).

Arisemus martinezi Wagner and Joost

Arisemus martinezi Wagner and Joost, 1994:79–82, figs. 19–23.

DESCRIPTION. Male. Flagellomeres 1–11 fusiform, terminal flagellomeres not reduced, cylindrical, 1–11 with pair of short, sclerotized ascoids.

Wing with small spots at tips of all veins, except CuA_2 has large quadrangular spot at apex and also incassation on basal third.

Gonocoxite long and slender, gonostylus narrowing near center; hypandrium inconspicuous; distiphallus and paramere much shorter than gonocoxite, both ending in sharp, beaklike tip; tergite 10 triangular.

Female. Unknown.

DISTRIBUTION. Colombia.

HOLOTYPE. ♂, COLOMBIA, Bogota, Quebrada Chico, 8.xi.1987, W. Joost (ULMG; not examined).

Arisemus waidei Wagner and Masteller

Arisemus waidei Wagner and Masteller, 1996:459–461, figs. 38–41.

DESCRIPTION. Male. (From Wagner and Masteller). Scape normal, ratio to pedicel about 1.5:1; flagellomeres fusiform, terminal 3 segments not reduced.

Wing with small spots at vein tips only; second costal node present; Sc extends to level of base of R_{2+3} ; Rs pectinate; radial fork at about same level as medial; CuA_2 reaching wing margin.

Genitalia with distiphallus and paramere extending to gonocoxite apex; distiphallus wider than paramere with rounded apex; paramere reverse J-shaped, slender; tergite 10 triangular.

Female. Unknown.

DISTRIBUTION. Puerto Rico.

HOLOTYPE. ♂, PUERTO RICO, El Verde, Quebrada Prieta, 2.iii.1992, Buzby and Masteller, emergence trap (USNM; not examined).

Arisemus spilotos Quate

Arisemus spilotos Quate, 1996:23, figs. 9a–j.

DESCRIPTION. Male. Frons hair patch without median extension, divided in center; scape elongate, ratio to pedicel at least 3:1; flagellomeres 1–11 nodiform, terminal 3 globular, reduced, smaller than preceding segments, without internodes.

Thorax with anepisternal sensory organs located posterior of spiracle, diameter greater than spiracle width. Wing with spots at vein tips; second costal node absent; Rs not pectinate, bases of R_2 and R_3 free and not attached to other veins; CuA_2 greatly enlarged basally and strongly curved in center toward margin.

Hypandrium an arched band connecting bases of gonocoxites, with thick, triangular projection on one side halfway between center and lateral margin; paramere sickle-shaped, apex acute, shorter than distiphallus; distiphallus shaft nearly straight, with 45° curve at apex.

Female. Apical lobes of subgenital plate quadrate, small enlargement at base of lobes; chitinous arch does not reach apical margin.

DISTRIBUTION. Costa Rica.

HOLOTYPE. ♂, COSTA RICA, Heredia, San Rafael de Vara Blanca, Rio Santo Domingo, 18–26.vii.1993, L. Quate, light trap, 1700 m (INBC; examined).

Arisemus atrasetus (Rapp)

Psychoda atrasetus Rapp, 1945:310.

Arisemus atrasetus; Duckhouse, 1974b:58–60, figs. 12–17.

Arisemus lepidotos Quate, 1996:23–25, figs. 9d–g.

New synonymy.

Arisemus stylofurcatus Collantes and Martínez-Ortega, 1999a:216–218. **New synonymy.**

DESCRIPTION. Male. Dark scales on antennae and wings; vertex elongate and pointed; frons hair patch without median extension, divided in center; scape very long, about 3 times length of pedicel; flagellomeres 1–11 nodiform, terminal 3 globular, reduced, smaller than preceding segments; palpomere 4 about 1.5 times palpomere 3.

Wing length about 2.5 times width; brown spots at tips of veins and on forks; Sc short, ends at or before base of R_{2+3} ; Rs pectinate; CuA_2 extends to wing margin.

Hypandrium a broad band between gonocoxites, with digitiform projection on one side; male gonostylus bifurcate, bifurcation near base, smaller appendage more than one-half length of main shaft; distiphallus and paramere extend well beyond gonocoxite apex; distiphallus sickle-shaped, shorter

than paramere; paramere slightly curved, apex blunt.

Female. (After Collantes and Martínez-Ortega, 1999a). Subgenital plate with apical lobes somewhat quadrate; chitinous arch reaches apical margin; genital ducts covered with fine striations; longitudinal and lateral struts developed; rod in center of membranous plate.

DISTRIBUTION. Guatemala, Nicaragua, Costa Rica, Panama.

HOLOTYPE. *Arisemus atrisetus*, ♂, PANAMA, Barro Colorado I., 10.i.1929, C. Curran (AMNH; examined). *A. lepidotus*, ♂, COSTA RICA, Heredia, Est. Biol. La Selva, 22.vii.1993, L. Quate, fluorescent light (INBC; examined). *A. stylofurcatus*, ♂, NICARAGUA, Carazo, Biorreserva Chococente, 11°30'N, 86°10'W, 13.ix.1992, J. Maes, light trap (Departamento de Biología Animal, Universidad de Murcia, Spain; not examined).

REMARKS. The illustration of the male gonostylus of *A. atrisetus* by Duckhouse (1974b) appears quite different from that figured for *A. lepidotus* by Quate; the differences, however, are an artifact of the tilted position of the gonostylus, making the bifurcation appear shorter than it actually is. The divergent position of the distiphallus and paramere of *A. atrisetus* probably was caused by the compression of the cover slip during slide preparation.

Collantes and Martínez-Ortega (1999a) state that the "aedeagal complex" of *A. stylofurcatus* differs from that of *A. atrisetus*. However, in the senior author's opinion, the illustration shows a normal variant of the aedeagus and might be partly or entirely due to the position of the aedeagus on the slide.

Arisemus caceresi new species

Figs. 199–201

DESCRIPTION. Male. Antenna of male without dark scales; apex of vertex plain; median extensions dense anteriorly, sparse posteriorly; scape elongate, ratio to pedicel at least 3:1; flagellomeres 1 and 2 sometimes fused, with terminal 3 segments globular, smaller than preceding.

Thorax without sensory organs. Wing length 2–2.5 times width; infusate patterns limited to vein tips and forks; rectangular infuscation at base of CuA₂ absent; second costal node absent; costa normal, without concavity; Sc ends at or before base of R₂₊₃; Rs pectinate; radial fork complete, i.e., R₂ and R₃ attached at about same level as medial; medial fork incomplete, M₂ not joined to M₁; CuA₂ without enlargement, except basal section sometimes slightly enlarged; apex of CuA₂ extends to wing margin; alula without tuft of hairs.

Abdominal sternites without black scales. Hypandrium an arched band connecting bases of gonocoxites, with pair of triangular projections near midline; gonocoxite simple, without processes, with very long setae from apical border, as long as gonostylus; gonostylus undivided, monomorphic, with-

out cluster of hairs; distiphallus and paramere barely extend beyond apex of gonocoxite; apex of distiphallus straight, acute; paramere a single structure, straight or slightly curved, slender, at most, little longer than distiphallus; epandrium width equal to or greater than length; surstylus without spatulate hairs; tergite 10 triangular.

Measurements. Antenna 0.95–1.12 mm (\bar{x} = 1.06; n = 10). Wing length 2.33–2.68 mm, width 1.00–1.13 mm (\bar{x} = 2.55, 1.08; n = 10).

Female. Scape also elongate; subgenital plate with weak apical concavity; chitinous arch rounded, does not reach posterior margin of plate; membranous plate with irregular, rugose posteromedial margins; genital ducts elongate, sclerotized, longitudinal struts curved, lyre-shaped.

Measurements. Antenna 0.93–1.10 mm (\bar{x} = 1.02; n = 10). Wing length 2.50–2.95 mm, width 0.95–1.25 mm (\bar{x} = 2.69, 1.08; n = 10).

DISTRIBUTION. Peru.

HOLOTYPE. ♂, PERU, Cuzco, Manu Nat. Park, El Mirador to San Pedro, 13°6'S, 71°34'W, 1–9.ix.1999, L. Quate, A. Cáceres, Malaise trap, 1910 m (MUSM).

PARATYPES. 4♂, same data as holotype (BMNH, LACM, USNM), 4♂, 2♀, same data as holotype except 13°4'S, 71°33'W, 1680 m (LACM), 2♂, 4♀, same data as previous specimens except 1780 m (LACM), 3♂, 5♀, same data as previous specimens except 13°6'S, 71°34'W, 1970 m (BMNH, LACM, USNM), 17♂, 4♀, same data as previous specimens except 13°7'S, 71°34'W, 2030 m (LACM, MUSM), 2♂, same data as previous specimens except 13°12'S, 71°36'W, 2120 m (LACM), 9♂, 9♀, same data as previous specimens except 13°8'S, 71°34.8'W, 2150 m (LACM), 4♂, 2♀, same data as previous specimens except 13°9'S, 71°35'W, 2280 m (LACM), 1♀, same data as previous specimens except 13°12'S, 71°36'W, 3350 m (LACM), 26 km W Pilcopata, 13°3'S, 71°32'W, 3♂, 2♀, 1–9.ix.1999, L. Quate, A. Cáceres, Malaise trap, 1480 m (LACM).

ETYMOLOGY. Named for the co-collector, Abraham Cáceres.

REMARKS. *Arisemus caceresi* was the most common species taken in Malaise traps on an altitudinal transect in the Reserved Zone of Manu National Park from 1480–3350 m.

Arisemus obandoi Wagner and Joost

Arisemus obandoi Wagner and Joost, 1994:79, figs. 14–18.

DESCRIPTION. Male. (From Wagner and Joost). Frons with hair patch U-shaped, lacking from center; scape elongate, 3–4 times length of pedicel; flagellomeres 1–11 fusiform, 1 and 2 much larger than following segments, terminal flagellomeres not reduced.

Thorax with large, hairy sensory organ behind anterior spiracle. Wing uniformly infusate except clear spots between vein tips; second costal node

lobes, apical notch long and slender; chitinous arch slender apically, extends to margin but does not break margin; genital ducts lightly sclerotized, hemispherical, basal half with granulate surface; pair of lightly sclerotized lobes in apical part of membranous plate; cercus very long and slender, length about 10 times basal width.

Measurements. Antenna 0.90–1.22 mm (\bar{x} = 1.02; n = 10). Wing length 2.05–2.39 mm, width 0.65–0.72 mm (\bar{x} = 2.19, 0.67; n = 10).

DISTRIBUTION. Venezuela.

HOLOTYPE. ♂, VENEZUELA, Merida, Merida, 1650–2100 m, 10–22.ix.1995, L. Quate, Malaise trap (IZAV).

PARATYPES. 1♀, same data as holotype (IZAV), Jají, 8°36'N, 71°21'W, 6♀, 14.ix.1995, L. Quate, Malaise trap, 2100 m (LACM), La Azulita, 8°43'N, 71°26'W, 5♂, 10.ix.1995, L. Quate, Malaise trap, 900 m (BMNH, LACM), 3♀, same data as previous specimens except 8°42'N, 71°28'W, 17–18.ix.1995, light trap, 1400 m (LACM), 1♂, same data as previous specimens except 19.ix.1995 (LACM), La Mesa, W Merida, 8°34'N, 17°19'W, 2♂, 2♀, 20.ix.1995, L. Quate, Malaise trap, 1650 m, gorge, secondary vegetation (LACM), Merida, 8°38'N, 71°9'W, 6♀, 22.ix.1995, L. Quate, Malaise trap, 1650 m (BMNH, LACM, USNM), 8♂, 1♀, same data as previous specimens except 8°41'N, 71°6'W, 11.ix.1995, 2100 m (LACM, USNM).

OTHER SPECIMENS STUDIED. VENEZUELA, Aragua, El Vigía, 8°38'N, 71°9'W, 1♂, 22.ix.1995, L. Quate, Malaise trap, 1650 m (LACM), Jají, 8°36'N, 71°21'W, 1♂, 14.ix.1995, L. Quate, Malaise trap, 2100 m (LACM), La Azulita, 8°42'N, 71°28'W, 3♀, 17–18.ix.1995, L. Quate, light trap, Malaise trap, 1400 m (LACM), 2♂, same data as previous specimens except 19.ix.1995, La Mesa, W Merida, 8°34'N, 17°19'W, 4♂, 20.ix.1995, L. Quate, Malaise trap, 1650 m, gorge, secondary vegetation (LACM), Merida, 8°38'N, 71°9'W, 3♂, 22.ix.1995, L. Quate, Malaise trap, 1650 m (LACM), 1♂, same data as previous specimens except 8°41'N, 71°6'W, 11.ix.1995, 2100 m (LACM).

ETYMOLOGY. From Latin *sesquipedalis* for excessively long, referring to the female cerci.

REMARKS. The other specimens studied are those males that have broad parameres differing from the holotype (see Figs. 221–222). In all other respects they appear identical to the holotype, and since they are sympatric, they are treated as belonging to *A. sesquipedalis*. We exclude them from the type series in the event it is shown they belong to a different species.

The infuscations on the wing tips of this very pale species are not always visible on slide mounts, especially if specimens are overcleared.

Arisemus confertus new species

Figs. 224–225

DESCRIPTION. Male. Vertex rounded with small apical protrusion, vertex 3 times width of eye

bridge, with row of long hairs behind eye bridge; spur on midline as long as width of bridge; hair patch on frons undivided, sides converging posteriorly, with median anterior and posterior notch; flagellomeres 1–11 fusiform, terminal flagellomeres not reduced; ratio of palpal segments 10:15:20:25.

Wing with small spots at vein tips, no spots on internal surface; second costal node present; costa with concavity, or indentation; Sc extends little beyond base of Rs; Rs pectinate; radial fork distad of medial by about 1 cell width; CuA₂ extends to wing margin.

Hypandrium a small arched band connected to bases of gonocoxites; gonostylus with 25–30 hairs on medial face before center, apex constricted beyond hair patch and tapering to rounded apex; distiphallus and paramere do not extend beyond gonocoxite apex; distiphallus slender, extends little beyond apex of paramere; paramere broad and rounded at apex; tergite 10 dome-shaped.

Measurements. Antenna 0.85–0.99 mm (\bar{x} = 0.89; n = 5). Wing length 1.49–1.81 mm, width 0.51–0.63 mm (\bar{x} = 1.62, 0.55; n = 5).

Female. Similar to male. Apical lobes of subgenital plate nearly straight, sides slightly divergent; chitinous arch extends to and breaks apical margin; genital ducts small, circular.

Measurements. Wing length 1.69–1.83 mm, width 0.51–0.60 mm (\bar{x} = 1.72, 0.54; n = 5).

DISTRIBUTION. Bahamas, Puerto Rico.

HOLOTYPE. ♂, PUERTO RICO, Luquillo, Caribbean National Forest, El Verde Experimental Station, El Verde Section, 18°19.3'N, 65°49.6'W, 2–9.i.1998, L. Quate, Malaise trap, 450 m (LACM).

PARATYPES. 1♂, 3♀, same data as holotype except El Yunque Section, 600 m (LACM). BAHAMAS, Abaco I., Treasure Cay, 26°49.8'N, 77°17.3'W, 1♂, 26–31.xii.1997, L. Quate, Malaise trap, sea level (LACM).

ETYMOLOGY. From Latin *confertus* for compressed, referring to the constriction in the male gonostylus.

KEY TO MALES OF *ARISEMUS*

The male of *A. maculosus* is unknown.

- 1 Gonostylus bifurcate or trifurcate, divided at base and branches widely separated (Botosaneanu and Vaillant, 1970:pl. II, figs. 5–6; pl. III, fig. 4); gonocoxites broadly fused at base . . . 2
- Gonostylus usually undivided, if divided, branch occurs near center and narrowly separated from main branch; gonocoxites connected by hypandrium 3
- 2 Scape bearing long hair on lateral expansion (Botosaneanu and Vaillant, 1970:pl. II, fig. 3); gonostylus trifid
- . . . *A. hexadactylus* Botosaneanu and Vaillant
- Scape normal, gonostylus bifid with 1 short and

- 1 long, slender shafts
... *A. tetradactylus* Botosaneanu and Vaillant
- 3 Gonostylus without cluster of hairs 4
- Gonostylus with 25–30 hairs on basal half of mesal surface (Fig. 215) 24
- 4 Scape normal, ratio to pedicel about 1.5–2.0:1 5
- Scape elongate, ratio to pedicel at least 3:1 (Fig. 205), or greatly enlarged (Fig. 209) 18
- 5 CuA₂ without enlargement 6
- CuA₂ with some part enlarged (Wagner and Masteller, 1996:fig. 28) 15
- 6 Infusate patterns on wing present 7
- Wing plain, without infusate patterns ... 13
- 7 Gonostylus undivided 8
- Gonostylus bifurcate or with short, median projection (Fig. 184) 11
- 8 Apex of CuA₂ extends to wing margin ... 9
- Apex of CuA₂ does not extend to wing margin 10
- 9 Infusate patterns limited to vein tips and forks; gonocoxite with protuberance or projection; paramere as long as or longer than distiphallus; surstylus with about 30 black, spatulate hairs on dorsal margin near base; alula with thick tuft of straight, squamose hairs
..... *A. boxi* (Satchell)
- Infusate patterns more extensive than just at vein tips and forks; gonocoxite simple, without processes; paramere broad, with broadly rounded apex, longer than distiphallus; surstylus without spatulate hairs; alula normal, without tuft of hairs *A. grabhamana* (Dyar)
- 10 Paramere as long as or longer than distiphallus; paramere rounded-elongate, curved (Fig. 180)
..... *A. maesi* n. sp.
- Paramere shorter than distiphallus; paramere short, dark, and stublike ... *A. salazari* Quate
- 11 Base of wing vein M₂ without glandular structure 12
- Round cluster of glandular cells at base of M₂ (Wagner and Joost, 1994:fig. 3)
..... *A. gubli* Wagner and Joost
- 12 Surstylus without spatulate hairs; abdominal sternites with band of black scales in center of anterior margins (Fig. 183)
..... *A. triatrapars* n. sp.
- Surstylus with about 30 black, spatulate hairs on dorsal margin near base; abdominal sternites without black scales ... *A. aenigmaticus* n. sp.
- 13 Medial fork complete, M₂ joined to M₁ ... 14
- Medial fork incomplete, M₂ not joined to M₁ *A. woodi* n. sp.
- 14 Anepisternal sensory organs located posterior of spiracle; costa normal, without concavity; apex of distiphallus straighter than that of *A. grandilobus*, not tapering
..... *A. rhampbos* n. sp.
- Anepisternal sensory organs located anterior of spiracle; costa with concavity, or indentation, at end of second node (Fig. 194); apex of distiphallus slightly curved, tapering
..... *A. grandilobus* n. sp.
- 15 Second node of costa absent; distiphallus and paramere extend well beyond gonocoxite apex; flagellomere with terminal 3 segments globular, smaller than preceding segments; apex of CuA₂ does not extend to wing margin 16
- Second node of costa present and often unusually large; distiphallus and paramere short, shorter than gonocoxite or barely extend beyond its apex; flagellomere with terminal 3 fusiform, slightly smaller than preceding flagellomeres, but not globular; apex of CuA₂ extends to wing margin 17
- 16 Gonostylus with small bifurcation near apex; Rs not pectinate
..... *A. buzbyae* Wagner and Masteller
- Gonostylus not bifurcate; Rs pectinate ...
..... *A. mariannae* Wagner and Masteller
- 17 Base of CuA₂ with large, rectangular spot ...
..... *A. martinezi* Wagner and Joost
- Base of CuA₂ with small, circular spot
..... *A. waidei* Wagner and Masteller
- 18 Wing with infusate patterns 19
- Wing plain, without infusate patterns ... 23
- 19 CuA₂ not enlarged 20
- CuA₂ with central part enlarged (Quate, 1996: fig. 9b); medial fork complete; hypandrium with digitiform projection on one side halfway between center and lateral margin; infusate patterns limited to vein tips and forks; radial fork complete, i.e., R₂ and R₃ attached
..... *A. spilotos* Quate
- 20 Apex of CuA₂ extends to wing margin; infusate patterns do not form bands 21
- Apex of CuA₂ does not extend to wing margin; infusate patterns forming bands across wing (Fig. 202) *A. pigmentatus* n. sp.
- 21 Flagellomere with terminal 3 segments globular, smaller than preceding segments; radial fork basad or at same level as medial; infusate patterns limited to vein tips and forks; radial fork complete, i.e., R₂ and R₃ attached; Rs pectinate 22
- Flagellomere with terminal 3 fusiform, only slightly smaller than preceding flagellomeres, but not globular; radial fork distad of medial; infusate patterns more extensive than just at vein tips and forks; radial fork incomplete, R₃ not attached; Rs not pectinate
..... *A. obandoi* Wagner and Joost
- 22 Distiphallus and paramere extend well beyond gonocoxite apex; medial fork complete, M₂ joined to M₁ *A. atrasetus* (Rapp)
- Distiphallus and paramere short, shorter than gonocoxite or barely extend beyond its apex (Fig. 201); medial fork incomplete, M₂ not joined to M₁ *A. caceresi* n. sp.
- 23 Flagellomere 1 not enlarged (Fig. 209); anepisternal sensory organs posterior of spiracle; tergite 10 triangular; wing normal, length 2–2.5

- times the width; medial fork complete, M_2 joined to M_1 *A. ampliscapus* n. sp.
- Flagellomere 1 enlarged, much larger than following segments (Fig. 210); anepisternal sensory organs anterior of spiracle; medial fork incomplete, M_2 not joined to M_1 (Fig. 212) *A. barbarus* n. sp.
- 24 Second costal node present and often unusually large 25
- Second costal node absent *A. amydrus* n. sp.
- 25 Radial fork basad of or at same level as medial; wing normal, length 2–2.5 times width *A. sesquipedalis* n. sp.
- Radial fork distad of medial; wing narrow, length about 3 times width *A. confertus* n. sp.

Australopericoma Vaillant

Australopericoma Vaillant, 1975:172–174; Duckhouse, 1990:722.

TYPE SPECIES. *Pericoma wirthi* Quate (= *Pericoma caudata* Satchell) by monotypy.

DESCRIPTION. Eye bridge with 3 facet rows, separated; interocular suture present; labellum flattened, without apical rods (“teeth”); antenna longer than wing width but shorter than wing length, basal flagellomeres fusiform, distal segments may lengthen and form short internode to become pyriform, terminal 3 segments sometimes reduced; ascoids simple, single rods, shorter than segment bearing them.

Anepisternite sometimes with sensory organs, with central patch of hairs; midcoxa with patch of hairs on anteroapical margin; wings plain and unmarked; Rs usually pectinate; radial and medial forks close to base, well basad of center; R_5 ends in wing apex.

Male. Hypandrium a band connecting gonocoxites; anterior gonocoxal apodemes broad and joined in center; with keel connected to aedeagus; base of gonocoxites with or without dorsal connection; distiphallus asymmetrical; basiphallus large and spoon- or paddle-shaped; surstylus with 1 tenaculum; epandrium with 2 foramina; ventral epandrial sclerite T-shaped, only one-half length of epandrium.

Female. Subgenital plate bilobed at apex; apical lobes usually poorly defined and separated by rounded concavity; genital ducts hemispherical with indistinct posterior margin; setal sclerite lacking; cercus much longer than wide.

REMARKS. Named without a description but with a type species designation by virtue of listing only one species in the new genus, Vaillant (1975) created *Australopericoma* for those Neotropical species similar to *Pericoma* with an asymmetrical aedeagus and 1 tenaculum. The type species was not clearly designated, but *Pericoma wirthi* Quate (a synonym of *Pericoma caudata* Satchell) was the only named species assigned to the genus and hence

becomes the type species by monotypy. This is an unfortunate selection, because this species is atypical for the genus and so divergent that it may prove to be a genus separate from the other species now assigned to *Australopericoma*. The atypical features of the type species, *A. caudata*, are the paired parameres and distiphallus (nearly symmetrical) and the broad hypandrium with spines in the center, features which are found in no other species of *Australopericoma*. Despite the reservations expressed, the genus *Australopericoma* is the logical taxon for the following group of highly diverse species and is used for the present.

Australopericoma roessleri (Wagner and Joost) new combination

Arisemus roessleri Wagner and Joost, 1994:77–78, figs. 8–13.

DESCRIPTION. Male. Eyes narrowly separated by less than 1 facet diameter; frons hair patch without median extension, undivided; scape elongate, ratio to pedicel at least 3:1; flagellomeres 1 and 2 modified, fusiform and larger than following flagellomeres, 3–14 fusiform, terminal flagellomeres not reduced.

Thorax without sense organ. Wing with basal one-third of wing infuscate, infuscation also in costal cell, along R_5 and CuA_1 ; Rs pectinate; radial and medial forks on same level; CuA_2 not enlarged, reaches margin.

Genitalia with paramere U-shaped, longer than distiphallus.

DISTRIBUTION. Colombia.

HOLOTYPE. ♂, COLOMBIA, San Agustin, Rio Magdalena, 15.xii.1987, W. Joost (ULMG; not examined).

REMARKS. This species shares some similarities with *Arisemus obandoi*, *Arisemus spilotos*, and *Arisemus pigmentatus*; males have an enlarged scape and modified flagellomeres 1 and 2, but lack thoracic sensory organs.

Australopericoma abnormalis new species
Figs. 226–228

DESCRIPTION. Male. Vertex protuberant at apex; hair patch on frons undivided, with small indentation at center of posterior margin; eyes narrowly separated by less than 1 facet diameter, inner margin of bridge convex; interocular suture without median spur; scape and pedicel normal; flagellomeres elongate fusiform, terminal 3 segments slightly differentiated, terminal with long apiculus; ascoids not observed on flagellomeres 1–3, paired, digitiform on 4–11, arising near center and extend to tip of segment; ratio of palpomeres 10:16:20:27.

Thorax without sensory organ. Wing plain, without infuscations; second costal node present; costa concave beyond that node; Rs pectinate; radial and medial forks on same level; radial fork distad of base of Rs by 3 cell widths; CuA_2 extends to wing margin.

puru-Novo Airão, km 46–50, 2°59.3'S, 60°53.6'W, 30.iv–6.v.1999, L. Quate, T. Barrett, Malaise trap, disturbed forest, 50 m (INPA).

PARATYPES. BRAZIL, Amazonas, Manacapura, 74 km WSW Manaus, 3°17.8'S, 60°37.63'W, 1♂, 21.iv.1998, CDC light trap, R. Quieroz (INPA). FRENCH GUIANA, Maripasoula, 1♂, 17–22.iii.1994, L. Quate, Malaise trap, dry forest (LACM). SURINAM, Brownsberg Nature Park, 100 km S Paramaribo, 4°57'N, 55°11'W, 4♂, 28–30.ix.1996, L. Quate, Malaise trap, primary forest, 300–450 m (LACM), Raleighvallen, 170 km SW Paramaribo, 4°43'N, 56°12'W, 10♂, 17–25.ix.1996, L. Quate, Malaise trap, primary forest, 70 m (LACM), 1♂, same data as previous specimens except light trap (LACM).

ETYMOLOGY. From Latin *subditicius* for counterfeit, referring to the unusual male genitalia.

Caenobrunettia pollicaris new species

Figs. 265–266

DESCRIPTION. Male. Eyes separated by about 16 facet diameters; basal flagellomeres globular, as wide as long; terminal apiculus long and slender; ratio of palpomeres 10:44:35:35.

Gonocoxites fused on midline; gonostylus without protrusion at base, Y-shaped, stem of gonostylus shorter than terminal bifurcations, apex of lateral bifurcation blunt, lateral projection bearing large spine; distiphallus asymmetrical, with 1 long stalk extending little beyond tip of gonostylus and 1 very short stalk, both straight and slender; paramere absent (but may be 1 branch of distiphallus); basiphallus small; surstylus long and slender, much longer than epandrium; tergite 10 triangular, width and length subequal, with longitudinal ridge in center.

Measurements. Antenna 1.18–1.22 mm ($n = 2$). Wing length 2.33–2.35 mm, width 0.90 mm ($n = 2$).

Female. Subgenital plate with prominent apical lobes; chitinous arch extends well beyond apical margin in sharp projection; genital ducts small, simple, lacking horizontal struts; membranous plate with sclerotized band in center; setal sclerite triangular, bearing 10 setae.

Measurements. Antenna 1.05–1.08 mm ($n = 2$). Wing length 2.25–2.28 mm, width 0.80–0.85 mm ($n = 2$).

DISTRIBUTION. Peru.

HOLOTYPE. ♂, PERU, Cuzco, 26 km W Pilcopata, 13°3'S, 71°32'W, 24.vii–2.viii.1997, L. Quate, Malaise trap, cloud forest, 1500 m (MUSM).

PARATYPES. 1♂, 2♀, same data as holotype (LACM, MUSM).

ETYMOLOGY. From Latin *pollicaris* for “of the thumb,” referring to the shape of the bifurcations of the gonostylus.

Caenobrunettia plegas Quate

Figs. 267–268

Caenobrunettia plegas Quate, 1996:27–28, figs. 10a–d.

DESCRIPTION. Eyes separated by more than 10 facet diameters; basal flagellomeres little longer than wide.

Gonocoxites joined by arched hypandrium, with pincerlike apical projection, median branch acutely pointed and lateral blunt; gonostylus without protrusion at base, with subapical projection, several spines on distal part; distiphallus short and curves to acute apex; paramere scimitar-shaped, acutely pointed, extends beyond tip of gonostylus, lightly sclerotized; surstylus short and stocky, little longer than epandrium; tergite 10 elongate, longer than wide.

DISTRIBUTION. Nicaragua, Costa Rica.

HOLOTYPE. ♂, COSTA RICA, Heredia, La Selva Biological Station, 2.v.1993, ALAS project, Malaise trap (INBC).

NEW SPECIMENS STUDIED. NICARAGUA, Rio San Juan, Refugio Bartola, 10°58'N, 84°20'W, 3♂, 1♀, 6–10.ii.2000, L. Quate, Malaise trap, 30 m lowland rain forest, (LACM).

Caenobrunettia laselva Quate

Figs. 269

Caenobrunettia laselva Quate, 1996:28, figs. 10e–h.

DESCRIPTION. Male. Eyes separated by about 10 facet diameters; ratio of palpomeres 10:30:37:25.

Hypandrium an arched band connecting gonocoxites; gonocoxite with dark, blunt, thumblike apical projection from ventral surface, gonostylus very short, little longer than thumblike projection of gonocoxite, darkly sclerotized; distiphallus broad shaft, slightly curved, with rounded apex; paramere thinner, same length as distiphallus, also bluntly pointed; epandrium with concave base; surstylus stocky, little longer than epandrium; tergite 10 triangular with blunt apex, length about equal to basal width.

Measurements. Antenna 1.45–1.58 mm. Wing length 2.25–2.50 mm, width 0.98–1.05 mm ($n = 2$).

Female. Unknown.

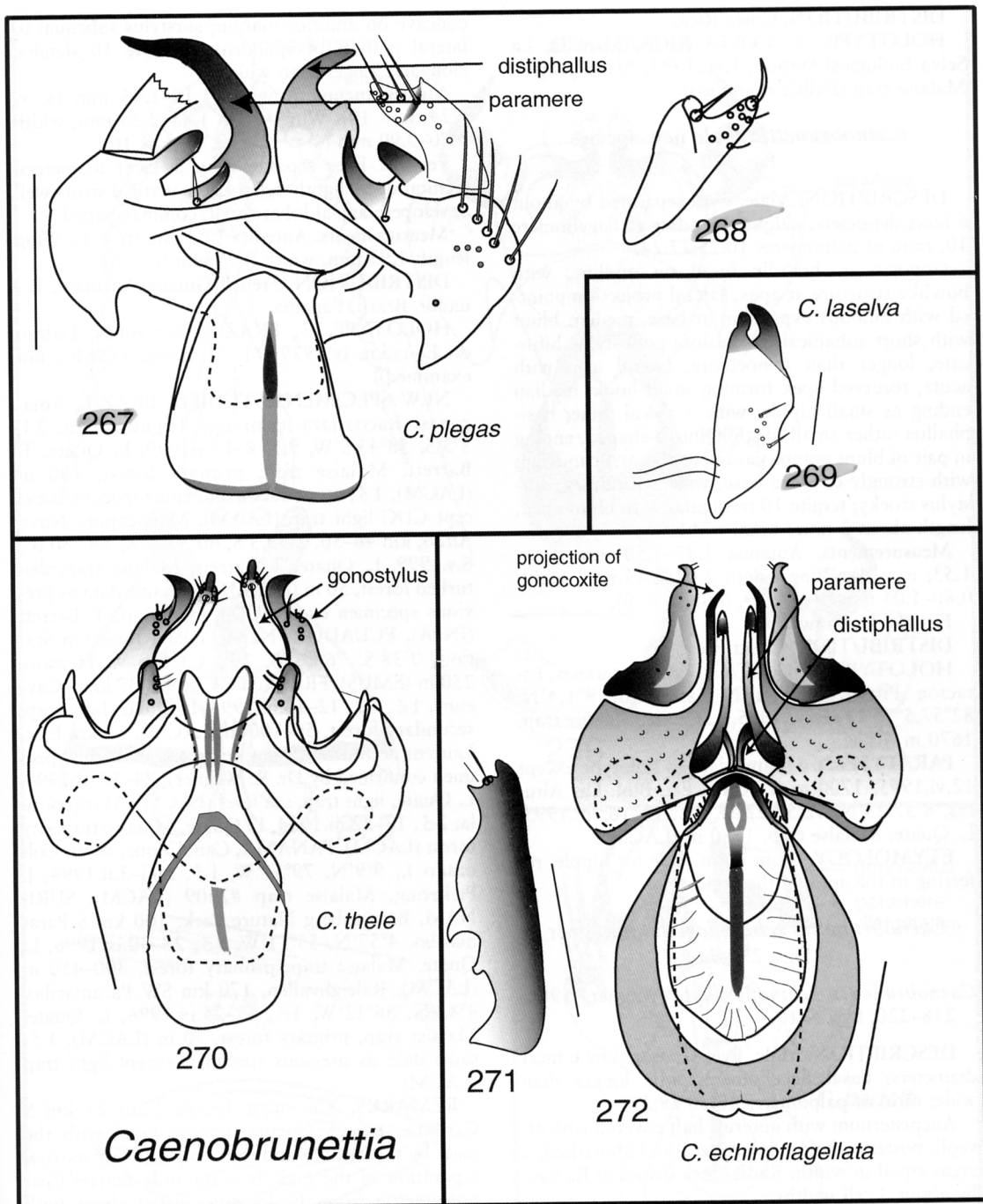
DISTRIBUTION. Costa Rica, French Guiana.

HOLOTYPE. ♂, COSTA RICA, Heredia, La Selva Biological Station, 2.v.1993, ALAS project, Malaise trap (INBC).

NEW SPECIMENS STUDIED. FRENCH GUIANA, 30 km S St. Laurent de Maroni, 1♂, 24–30.iii.1994, L. Quate, light trap, secondary forest, 50–100 m (LACM), 65 km S Cayenne, 1♂, 12–16.iii.1994, L. Quate, light trap, 50–100 m (LACM).

Caenobrunettia tropicalis Quate

Caenobrunettia tropicalis Quate, 1996:28–29, figs. 10i–j.



Figures 267–272 *Caenobrunettia* spp. 267–268. *C. plegas*: 267. male genitalia, lateral; 268. male surstylus, lateral. 269. *C. laselva*, male right gonopod, lateral. 270. *C. thele*, male genitalia, lateral. 271–272. *C. echinoflagellata*: 271. male genitalia, dorsal; 272. male surstylus, lateral. All scale lines = 0.1 mm

DESCRIPTION. Eyes separated by more than 10 facet diameters; basal flagellomeres little longer than wide.

Hypandrium a dorsal band connecting gonocoxites; gonocoxite very short, apex with 2 opposing

clawlike projections; gonostylus very small, much shorter than gonocoxite, ending in small hook; surstylus little longer than epandrium; tergite 10 elongate, longer than wide.

Female. Unknown.

usual, with black globular body bearing acute posterior prolongation and smaller median projection plus additional median projection with small hook at apex and bearing 2 apical and 2 subapical bristles; distiphallus symmetrical, short, extends little beyond apex of gonocoxite, broad and slightly curved, lightly sclerotized, consisting of 2, separated arms; basiphallus large and paddle-shaped; paramere appressed to median branch of gonostylus, black and hooked; epandrium strongly concave at base, with 2 foramina, lacking diagonal struts; surstylus stocky, little shorter than long side of epandrium; tergite 10 triangular with acute apex, length nearly 2 times basal width.

Measurements. Antenna 1.20–1.33 mm (\bar{x} = 1.24; n = 10). Wing length 1.70–1.98 mm, width 0.63–0.78 mm (\bar{x} = 1.80, 0.70; n = 10).

Female. Antenna shorter than in male. Subgenital plate U-shaped, branches uniform; genital ducts lightly sclerotized, longitudinal and lateral struts slender; membranous plate with dark, quadrate spot near posterior margin.

Measurements. Antenna 1.08–1.30 mm (\bar{x} = 1.20; n = 10). Wing length 1.90–2.23, width 0.75–0.93 mm (\bar{x} = 2.12, 0.84; n = 10).

DISTRIBUTION. French Guiana, Surinam, Brazil. **HOLOTYPE.** ♂, BRAZIL, Amazonas, Itacoatiara-Itapiranga Highway, km 23, 3°3'S, 58°43.5'W, 8–15.v.1999, L. Quate, T. Barrett (INPA).

PARATYPES. 32♂, 27♀, same data as holotype (BMNH, EMUS, INPA, LACM, USNM), Manacapuru-Novo Airão, km 46–50, 2°59.3'S, 60°53.6'W, 1♂, 1♀, 30.iv–6.v.1999, L. Quate, T. Barrett, Malaise trap, disturbed forest, 50 m (LACM). FRENCH GUIANA, 30 km SE St. Laurent de Maroni, 2♂, 24–30.iii.1994, L. Quate, Malaise trap, secondary forest, sea level (LACM), Maripasoula, 1♂, 17–22.iii.1994, L. Quate, Malaise trap, dry forest (LACM), 1♂, same data as previous specimen except secondary forest, streamside (LACM), 1♂, same data as previous specimen except secondary forest, streamside, light trap (LACM).

ETYMOLOGY. From Latin *fraudentus* for deceiver, referring to the strange male genitalia.

REMARKS. Females were associated with males on the basis of sympatry and numbers. It is possible that the females of *C. fraudulentus* and *C. barretti* n. sp. are indistinguishable, so this series might contain a mixture of the two.

Caenobrunettia barretti new species

Fig. 280

DESCRIPTION. Male. Eyes separated by more than 10 facet diameters; basal flagellomeres little longer than wide; palpus extends to flagellomere 13, ratio of palpomeres 10:41:49:31.

Gonocoxites without protrusions, connected by short hypandrium; gonostylus branched, 1 lateral, dark projection with tooth at basal one-third and median projection, similar to *C. fraudulentus*, end-

ing in small hook and bearing 2 apical and 2 subapical bristles; paramere also similar to that of *C. fraudulentus*, black with acute, hooked apex; distiphallus symmetrical, short, extends little beyond apex of gonocoxite, broad and slightly curved, lightly sclerotized, consisting of 2 separated arms; basiphallus large and paddle-shaped; epandrium strongly concave at base, with 2 foramina, lacking diagonal struts; surstylus stocky, little shorter than long side of epandrium; tergite 10 triangular with acute apex, length nearly 2 times basal width.

Measurements. Antenna 1.17–1.31 mm (n = 2). Wing length 1.80–2.08 mm, width 0.75–0.80 mm (n = 4).

Female. Unknown.

DISTRIBUTION. Surinam, Brazil.

HOLOTYPE. ♂, BRAZIL, Amazonas, Itacoatiara-Itapiranga Highway, km 20, 3°3'S, 58°43.5'W, 8–15.v.1999, L. Quate, T. Barrett (INPA).

PARATYPES. 6♂, same data as holotype (INPA, LACM, USNM), 8♂, same data as holotype but km 23 (LACM), Manacapuru-Novo Airão, km 46–50, 2°59.3'S, 60°53.6'W, 3♂, 30.iv–6.v.1999, L. Quate, T. Barrett, Malaise trap, disturbed forest, 50 m (LACM). SURINAM, Brownsberg Nature Park, 100 km S Paramaribo, 4°57'N, 55°11'W, 1♂, 28–30.ix.1996, L. Quate, Malaise trap, 300–450 m, primary forest (LACM), Raleighvallen, 170 km SW Paramaribo, 4°43'N, 56°12'W, 2♂, 17–25.ix.1996, L. Quate, Malaise trap, primary forest, 70 m (BMNH, LACM).

ETYMOLOGY. Named in recognition of the generous assistance of Dr. Toby Barrett.

REMARKS. The above two species, *C. fraudulentus* and *C. barretti*, are closely related, but easily distinguished by the gonostylus, which is a black bulb with 2 large projections in *C. fraudulentus* and a simple arm with a tooth on the median margin near the base in *C. barretti*. The structure of the median branch of the gonostylus and the paramere of the two species appear indistinguishable.

The articulation of the paramere with the gonocoxite and aedeagus is difficult to see in most slide preparations of both species and it usually appears as shown in Figs. 274, 277, 280. Some differences are due to the position of the structures on the slide, and relationship of the various parts may seem quite different in different positions, but the structures themselves are constant.

Another related species (left undescribed because of insufficient material) has a median arm of the gonostylus almost identical to the above two species. It also has a black hook, but in this species, it is clearly attached only to the gonocoxite. Probably this structure is also the paramere, which has lost its direct connection to the aedeagus.

KEY TO MALES OF CAENOBRUNETTIA

- 1 Gonostylus with bifurcation beyond center (Figs. 262, 264–265) 2
- Gonostylus usually without bifurcation beyond

- center, if bifurcate, branching occurs near base 5
- 2 Gonostylus Y-shaped, pincerlike bifurcations at end of basal stem (Figs. 262, 264–265) 3
- Gonostylus not Y-shaped, bifurcation formed by rodlike projection from ventral face (Wagner, 1993:fig. 48) *C. stylappendiculata* (Wagner)
- 3 Gonostylus without protrusion at base; lateral projection of gonostylus sometimes bearing large spine 4
- Gonostylus with small finlike protrusion at base with jagged tip (Fig. 262); lateral projection of gonostylus without large spine at base *C. sarculosa* Quate
- 4 Stem of gonostylus longer than terminal bifurcations; gonostylus with large spine on lateral projection (Fig. 264); paramere present *C. subditicia* n. sp.
- Stem of gonostylus shorter than terminal bifurcations; gonostylus without large spine on lateral projection (Fig. 265); paramere absent *C. pollicaris* n. sp.
- 5 Distiphallus extends well beyond tip of gonocoxite (Fig. 267); paramere single 6
- Distiphallus short and ends at about tip of gonocoxite (Figs. 272, 274, 280); paramere absent or paired 7
- 6 Distiphallus broad and curved, ending in acute apex (Fig. 267); gonocoxite with thumblike and sharp spikelike projection at apex *C. plegas* Quate
- Distiphallus nearly straight and with blunt apex (Fig. 269); gonocoxite only with blunt, thumblike projection at apex *C. laselva* Quate
- 7 Gonostylus more than one-half length of gonocoxite 8
- Gonostylus very small, less than one-quarter length of gonocoxite (Quate, 1996:fig. 10i) *C. tropicalis* Quate
- 8 Gonocoxite with long, slender, apical projection extending nearly to apex of gonostylus (Fig. 272); parameres long, slender; gonostylus unipartite *C. echinoflagellata* Wagner
- Gonocoxite without long projection; parameres short; gonostylus bipartite (Figs. 270, 274, 280) 9
- 9 Sclerotized, pointed tip of gonostylus curves outward; pointed and blunt tips of gonostylus close together (Fig. 270) *C. thele* n. sp.
- Sclerotized pointed tip of gonostylus curved inward; tips widely separated (Figs. 274, 280) 10
- 10 Base of pointed, sclerotized hook of gonostylus with elongate, dark process (Fig. 274); hook without short subbasal tooth *C. fraudulentia* n. sp.
- Base of pointed, sclerotized hook of gonostylus without elongate, dark process (Fig. 280); hook with short subbasal tooth .. *C. barretti* n. sp.

Valerianna new genus

TYPE SPECIES. *Valerianna manuensis*, by present designation.

DESCRIPTION. Vertex high with bilobed extension at apex, darker in color than frons; eye bridge reduced to narrow point near midline so median margin with only 1 facet diameter; interocular suture present; antenna with 16 segments; flagellomeres small, much more slender than scape and pedicel, fusiform, with pair of simple, unidigitate ascoids on flagellomeres 1–13, terminal flagellomeres not reduced, 14 with slender apiculis; labelum small and only slightly enlarged with bulbous apex; palpus extends to flagellomere 10, ratio of palpomeres 10:24:36:36.

Thorax without sensory organ; antepnotum and anepisternite largely covered with single patch of alveoli; midcoxa with tuft of hairs on elevated knob and anterior margin. Wing clear, unmarked; base of R_{2+3} attached to R_4 ; radial fork basad of medial by 1–2 cell widths; R_5 ending in wing tip; elongate oval sclerite at base of CuA_2 .

Abdominal sternites 4–7 with V-shaped concavity on midline and posterior margin with dense row of alveoli. Hypandrium a band connecting gonocoxites; anterior gonocoxal apodeme circular, located in center of genitalia and attached to gonostylus by slender bar; aedeagus asymmetrical; epandrium with slender bar on midline; surstylus elongate and slender, with 1 tenaculum.

ETYMOLOGY. This name is dedicated by the senior author to his lovely wife, Valerie Ann, for her constant support and encouragement of the field work that resulted in long periods of her being alone. Of course, the gender is feminine.

REMARKS. This distinctive group of species is doubtfully assigned to the tribe Setomimini only on the basis of the enlarged gonocoxal apodeme, which differs from that of other genera in being a single circular structure in the center rather than the usual bipartite structure extending anteriorly from the gonocoxites. The keel connecting the apodeme to the basiphallus is present as in other Setomimini.

Valerianna manuensis new species

Figs. 281–287

DESCRIPTION. Male. Vertex dark, much darker than frons; interocular suture double; frons with hair patch dense anteriorly and with sparse band extending posteriorly only to base of scape.

Mesonotum very dark, darker than rest of thorax. Costa with second costal node.

Hypandrium a distinct band between bases of gonocoxites; distiphallus consisting of 2 shafts, longer 1 with blunt apex extending to tip of gonocoxite, curved apically, shorter 1 with acute apex nearly straight; basiphallus not expanded anteriorly; paramere much larger than distiphallus and extends well beyond tip of gonocoxite, with oval

length 3.15–3.25 mm, width 1.28–1.35 mm (n = 2).

Female. Frons hair patch very sparse, single. Apical lobes of subgenital plate rounded, chitinous arch does not reach apical margin of plate; genital ducts large, with dark lateral and longitudinal struts; above genital ducts an elongate sclerite between genital ducts and longitudinal strut, another small sclerite at side of apex of longitudinal strut; one specimen with spherical sclerite at apices of longitudinal struts (see “Remarks” section for *N. dealbata*).

Measurements. Antenna 2.08 mm (n = 1). Wing length 3.18–3.35 mm, width 1.33–1.45 mm (n = 3).

DISTRIBUTION. Chile.

HOLOTYPE. ♂, CHILE, Llanquihue, Yerbas Buenas, 13 km NE Ensenada, 4–6.xii.1994, L. Quate, H. Bhat, Malaise trap, 150 m (LACM).

PARATYPES. 1♀, same data as holotype (LACM), 3♀, same data as holotype except 3.xii.1994, sweeping, fuchsias and ferns (LACM), 1♀, same data as holotype except 3.xii.1994, shaded seepage bank (LACM).

ETYMOLOGY. From Greek *liparotes* for fat, referring to the short, broad distiphallus.

KEY TO MALES OF NEMONEURA

The male of *N. punctata* is unknown.

- 1 Interocular suture either inverted V-shaped or interrupted in center; CuA₂ with preapical enlargement 2
- Interocular suture inverted Y-shaped with stem longer than arms; CuA₂ without preapical enlargement *N. liparotes* n. sp.
- 2 Paramere present (Fig. 291)
- *N. dealbata* Tonnoir
- Paramere absent (Fig. 293) . . . *N. confraga* n. sp.

Unplaced Species

Syntomolaba Enderlein

Syntomolaba Enderlein, 1937:100; Quate, 1963: 184.

TYPE SPECIES. *Pericoma complicata* Tonnoir, by original designation.

Syntomolaba complicata (Tonnoir)

Pericoma complicata Tonnoir, 1929:15–16, pl. II, figs. 23–27.
Syntomolaba complicata; Enderlein, 1937:100.

DESCRIPTION. Male. Eyes separated by 1 facet diameter; interocular suture inverted Y-shaped with long stem; bridge with 3 facet rows; frons hair patch quadrate with sides parallel, median band extending posteriorly to lower eye bridge margin; scape elongate, 2 times length of pedicel, basal flagellomeres fusiform and progressively developing

small internodes; palpus normal, palpomere 4 longer than 3.

Anepisternite with alveoli only behind and below spiracle, mostly bare. Wing as shown by Tonnoir (1929: fig. 25), but without crossveins; R₅ ends in wing apex.

Genitalia missing from type.

DISTRIBUTION. Argentina.

HOLOTYPE. ♂, ARGENTINA, Rio Negro, Puerto Blest, Lake Nahuel Huapi, 2–3.xii.1926, F. and M. Edwards (BMNH; examined).

REMARKS. The missing male genitalia makes placement of *S. complicata* conjectural. The branched ascoids suggests placement in *Didicrum*, but R₅ ending in the wing apex, the bifurcate gonostylus, and peculiar shape of distiphallus are not *Didicrum* characters. Therefore, since it cannot be assigned a genus and does possess some unusual features, we leave this species in *Syntomolaba* for the present. It does not belong to *Pericoma* as suggested earlier (Quate, 1963).

In the LACM collection there is another species that resembles *S. complicata* in the possession of mushroom-shaped ascoids and bifurcate gonostyli on the male genitalia; the position of radial and medial forks and ending of R₅ are also similar. The anterior gonocoxal apodemes of the male genitalia are not expanded anteriorly and thus lack a defining Setomimini character. On this evidence, *Syntomolaba* might belong in another tribe.

Chirolepia Enderlein

Chirolepia Enderlein, 1937:103; Quate, 1963:192.

TYPE SPECIES. *Chirolepia maculipennis* Enderlein, by original designation.

Chirolepia maculipennis Enderlein

Chirolepia maculipennis Enderlein, 1937:103.
Alepia maculipennis; Quate, 1963:192, figs. 10i–l.

DISTRIBUTION. Bolivia.

HOLOTYPE. BOLIVIA (ZMHB).

REMARKS. Only fragments of the type species of this genus, *C. maculipennis*, remains in the Enderlein collection and it appears to be a female. Quate (1963) synonymized the genus *Chirolepia* with *Alepia*; however, its simple, but distinct, ascoids and the ending of R₅ beyond the wing apex are not *Alepia* characters. It is impossible to definitively place *Chirolepia* in a tribe at this time.

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