UNIVERSIDADE FEDERAL DO PARANÁ

DIANA ISABEL RENDÓN MERA

RIQUEZA INESPERADA DO GÊNERO *MITRAPSYLLA* (HEMIPTERA: PSYLLOIDEA: PSYLLIDAE) NO BRASIL

CURITIBA

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Dissertação apresentada à Coordenação do Programa de Pós Graduação em Ciências Biológicas, Área de Concentração em Entomologia, Setor de Ciências Biológicas da Universidade Federal do Paraná, como requisito parcial para a obtenção do título de Mestre em Ciências Biológicas.

Orientador: Prof. Dr. Rodney Ramiro Cavichioli
Coorientadores: Dra. Dalva Luiz de Queiroz
Dr. Daniel Burckhardt

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Os membros da Banca Examinadora designada pelo Colegiado do Programa de Pós-Graduação em CIÊNCIAS BIOLÓGICAS (ENTOMOLOGIA) da Universidade Federal do Paraná foram convocados para realizar a arguição da dissertação de Mestrado de **DIANA ISABEL RENDÓN MERA** intitulada: **Riqueza inesperada do gênero *Mitrapsylla* (Hemiptera: Psylloidea: Psyllidae) no Brasil.**, após terem inquirido a aluna e realizado a avaliação do trabalho, são de parecer pela sua APROVAÇÃO no rito de defesa.

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CURITIBA, 29 de Março de 2019.

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RESUMO

Mitrapsylla Crawford, 1914 é um gênero do Novo Mundo encontrado desde o sul dos Estados Unidos até Paraguai. É o terceiro maior gênero da subfamília Ciriacreminae, com 24 espécies descritas. O gênero foi revisado pela última vez por Brown & Hodkinson em 1988 para as espécies do Panamá, onde forneceram uma nova e mais detalhada descrição do gênero, além de informações sobre a distribuição e plantas hospedeiras. Porém, o gênero é ainda pobremente conhecido, sendo que, para apenas 16 espécies as plantas hospedeiras são conhecidas, todas dentro de Leguminosae e, até 2019, a maioria das espécies descritas de *Mitrapsylla* eram exclusivas da América Central, dando a impressão que o gênero seria mais diverso nesta região. No entanto, isto resultou ser um artefato da falta de conhecimento, em particular, da fauna sul-americana, já que após um extensivo trabalho de campo do projeto "Manejo e biodiversidade de Psylloidea no Brasil" da Embrapa Florestas, realizado em 15 estados do Brasil num período de 5 anos, muitas espécies novas de *Mitrapsylla* foram encontradas. Recentemente, várias espécies associadas com o pau-de-óleo (*Copaifera* spp.) foram descritas, elevando o número de espécies de *Mitrapsylla* no Brasil de 3 para 12. Contudo, muitas outras espécies continuam a serem estudadas. Assim, o presente trabalho teve como objetivo realizar um estudo taxonômico das espécies de *Mitrapsylla* no Brasil, redescrevendo as espécies já conhecidas e descrevendo as novas espécies, assim como registrando as plantas hospedeiras e atualizando sua distribuição geográfica. No total, foram revisados 6830 espécimes, correspondendo a quatro espécies descritas, uma delas *M. longicauda* que representa um novo registro para o país, e 27 espécies novas. Descrições foram realizadas para todas as espécies, para o qual foram confeccionadas 124 lâminas. Uma descrição atualizada do gênero é proporcionada. Uma chave de identificação para machos é fornecida, junto com fotografias e desenhos de todas as espécies. Foram registrados seis gêneros hospedeiros adicionais, todos pertencentes à família Leguminosae e distribuídos em diferentes tribos das subfamílias Caesalpinioideae e Papilionoideae. Plantas hospedeiras foram confirmadas para 14 das espécies novas, e são registradas as potenciais para seis espécies novas e uma conhecida. O gênero foi encontrado em todos os estados brasileiros onde foi prospectado, porém, apesar de que o trabalho de campo tenha sido principalmente focado na Região Sul, a maioria das espécies foi encontrada em áreas tropicais, sugerindo que *Mitrapsylla* é predominantemente tropical. Por último, o presente estudo atualiza o número de espécies descritas de *Mitrapsylla* para 51, elevando o gênero, em termos de número de espécies, do terceiro para o primeiro lugar dentro de Ciriacreminae. Já para o Brasil, junto com as espécies descritas recentemente por Burckhardt & Queiroz, o número de espécies de *Mitrapsylla* registradas aumentou de 3 para 40. Considerando que este número foi elevado por um fator de mais de 10, a estimativa de cerca de 1000 espécies de psilídeos ocorrendo no Brasil parece possível.

Palavras-chave: Espécies novas. Leguminosae. Psilídeos. Sternorrhyncha.

ABSTRACT

Mitrapsylla Crawford, 1914 is a New World genus found from the southern United States to Paraguay. It is the third largest genus of the subfamily Ciriacreminae with 24 described species. The genus was last revised by Brown & Hodkinson in 1988 for the species of Panama, where they provided a new and more detailed description of the genus, as well as information on distribution and host-plants. However, the genus is still poorly known, since host-plants are known for only 16 species, all within Leguminosae, and, by 2019, most of the described species of *Mitrapsylla* were exclusive to Central America, giving the impression that the genus would be more diverse in this region. However, this proved to be an artefact of the lack of knowledge, in particular, of the South American fauna, since after an extensive fieldwork of the project "Management and biodiversity of Psylloidea in Brazil" of Embrapa Florestas, conducted in 15 states of Brazil in a period of 5 years, many new species of *Mitrapsylla* were found. Recently, several species associated with *Copaifera* spp. were described, increasing the number of species of *Mitrapsylla* in Brazil from 3 to 12. However, many other species are yet to be studied. Thus, the present work aimed to conduct a taxonomic study of the species of *Mitrapsylla* in Brazil, redescribing the known species and describing the new ones, as well as registering the host-plants and updating their geographical distribution. In total, 6830 specimens were revised, corresponding to four described species, one of them *M. longicauda* that represents a new country record, and 27 new species. All species were described, for which 124 slides were made. An updated description of the genus is presented. An identification key for males is provided, along with photographs and drawings of all species. Six additional host genera were recorded, all belonging to the Leguminosae and distributed within different tribes of subfamilies Caesalpinioideae and Papilionoideae. Host-plants have been confirmed for 14 of the new species, and the potential host-plants of six new and one known species are recorded. The genus was found in all Brazilian states where it was prospected. However, although fieldwork was mainly focused on the Southern region, most species were found in tropical areas, suggesting that *Mitrapsylla* is predominantly tropical. Finally, the present study brings the number of described species of *Mitrapsylla* to 51, raising the genus, in terms of number of species, from third to first place within Ciriacreminae. As for Brazil, along with the recently described species by Burckhardt & Queiroz, the number of recorded *Mitrapsylla* species increased from 3 to 40. Considering that this number was elevated by a factor of more than 10, the estimative of about 1000 species of psyllids occurring in Brazil seems possible.

Keywords: New species. Leguminosae. Psyllids. Sternorrhyncha.

SUMÁRIO

Unexpected species richness in the genus *Mitrapsylla* (Hemiptera: Psylloidea: Psyllidae) in Brazil

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Abstract

The Brazilian species of the genus *Mitrapsylla* Crawford were studied. 27 species are described as new, bringing the number of known species to 51. *Mitrapsylla ceplaciensis* (White & Hodkinson), *M. cubana* Crawford and *M. itaparica* (Crawford) are redescribed. *M. longicauda* Brown & Hodkinson is a new country record. All species are illustrated and a key for the identification of adults is provided. 14 species are associated with host-plants, all of them within the Leguminosae. The genus is predominantly tropical but extends to the subtropical states in South Brazil.

Key words: psyllids, Sternorrhyncha, Leguminosae, new species

Introduction

The Psylloidea (jumping plant-lice) is perhaps the least known superfamily within the sternorrhynchous Hemiptera. It is a group of phloem-feeding insects found in all biogeographical regions of the world but it is more diverse in the tropics and south temperate regions. While the Palaearctic fauna is fairly well studied, that of the Afrotropical and Neotropical realms remains poorly explored. From China, for instance, around 1000 psyllid species are reported whereas from Brazil, only slightly smaller than China and mostly located in the tropics, only 90 species have been reported. Consequently, our knowledge on the diversity of Psylloidea is poor and fragmentary, so the nearly 4000 described species that currently compose the superfamily may represent less than half of the total existing species in the world (Hollis 2004; Hodkinson 2009; Li 2011; Burckhardt & Queiroz 2012; Percy *et al.* 2018; Ouvrard 2019).

Despite that less than 1% of psyllid species has a serious impact in agriculture, forestry and horticulture, jumping plant-lice have reached notoriety as economically important pests of crops, as well as potential biological controllers of exotic invasive plants (Burckhardt 1994; Ouvrard *et al.* 2015; Burckhardt *et al.* 2018b). For instance, *Glycaspis brimblecombei* Moore (Aphalaridae) is an important pest on eucalypts due to excessive removal of plant sap and promotion of sooty mould growth, with reports of outbreaks causing large production losses (Santana & Burckhardt 2007). *Diaphorina citri* Kuwayama (Liviidae) is a vector of the bacteria Candidatus *Liberibacter* spp., the causal agents of the citrus greening disease or Huanglongbing (HLB), which is arguably the most serious disease of citrus (Bové 2006). Lastly, *Calophya latiforceps* Burckhardt, *C. lutea* Burckhardt, *C. praestigiator* Burckhardt and *C. terebinthifolii* Burckhardt & Basset (Calophyidae) represent promising control agents

of the Brazilian peppertree (*Schinus terebinthifolia*), which is one of the most invasive weeds in Florida (Burckhardt *et al.* 2018b).

Psylloids are particularly interesting among the phytophagous hemipterans for their host-specificity. Most of the species are monophagous or narrowly oligophagous, i.e. immatures of individual species can complete their development on only one or a few closely related plant species of the same genus (Hodkinson 1974; White & Hodkinson 1985; Hollis 2004; Burckhardt *et al.* 2014). Additionally, many psylloid genera, some subfamilies and even a few families are restricted to particular plant taxa, such as *Tainarys* Brèthes on Anacardiaceae (Burckhardt & Queiroz 2017), *Calinda* Blanchard on Asteraceae (Olivares & Burckhardt 1997), Togepsyllinae (Aphalaridae) on the Magnoliales-Laurales clade (Hodkinson 1990) or the Homotomidae on Moraceae (Hollis & Broomfield 1989; Burckhardt *et al.* 2018a).

Also, psylloids are considered potential models for testing hypotheses about the evolution of phytophagous insects and their host-plants. One way to achieve this is through phylogenetic analyses but for that, a previous solid taxonomic base is essential (Burckhardt & Basset 2000; Percy 2003; Ouvrard *et al.* 2015, Serbina & Burckhardt 2017).

Jumping plant-lice are mostly associated with eudicots and magnoliids, a few with monocots and less than a handful with conifers (Hollis 2004; Burckhardt 2005; Hodkinson 2009). The Leguminosae hosts the largest number of psylloid genera (40 genera), followed by Myrtaceae and Asteraceae (26 and 17 genera, respectively) (Ouvrard *et al.* 2015). Many members of the Psyllidae, the largest family of Psylloidea, are associated with Leguminosae (Fabales) which is also true for the Ciriacreminae, its second largest subfamily (Burckhardt 2005; Ouvrard 2019).

In the classification of Burckhardt & Ouvrard (2012) the Ciriacreminae is composed of the genera **Heteropsylla* Crawford (40 spp.), **Ciriacremum* Enderlein (30 spp.), **Mitrapsylla* Crawford 24 spp.), *Insnesia* Tuthill (18 spp.), **Euceropsylla* Boselli (14 spp.), *Kleiniella* Aulmann (9 spp.), **Auchmerina* Enderlein (6 spp.), **Isogonoceraia* (2 spp.), *Trigonon* Crawford (2 spp.), **Auchmeriniella* Brown & Hodkinson (1 sp.), **Manapa* Brown & Hodkinson (1 sp.) and *Palmapenna* Hollis (1 sp.) (Burckhardt & Ouvrard 2012; Ouvrard 2019). Genera with species in the New World are marked with an asterisk. Species of Ciriacreminae are mostly restricted to hosts within Leguminosae, including representatives of three of the six currently recognised legume subfamilies (Ouvrard 2019). *Mitrapsylla*, the third largest ciriacremine genus, is reported from *Copaifera* (Detarioideae), *Senna* (Caesalpinioideae), *Andira, Centrosema, Desmodium, Machaerium* and *Sophora* (Papilionoideae) (Brown & Hodkinson 1988; Burckhardt & Queiroz 2019; Ouvrard 2019); plants that are wild, some of which are considered weeds, or cultivated for different purposes such as green manure, cover crops in different plantations, ornamentals and traditional medicine. (Fern 2018).

Mitrapsylla is a New World genus recorded from the United States (Florida), through Central America, the Caribbean islands to Paraguay (Burckhardt 1987; Rendón-Mera *et al.* 2017; Ouvrard 2019). It is currently composed by 24 species and was erected by Crawford in 1914, in his monography of the New World jumping plant-lice, to include the type species *M. albalineata* and *M. cubana* Crawford; the former originally described from Mexico, Nicaragua and El Salvador, and the latter from Cuba. That same year, Šulc (1914) described *Psylla surinamensis* Šulc from Surinam, which was afterwards transferred to *Mitrapsylla* by Burckhardt (1987). Crawford (1925) later described *Psylla itaparica* from Brazil, which was initially transferred to *Euceropsylla* by Costa Lima (1942) and lastly to *Mitrapsylla* by Brown & Hodkinson (1988). Subsequently, Caldwell (1944) described *M. deserata* from Mexico. Caldwell & Martorell (1952) described *M. cambalachensis* Caldwell & Martorell and *M. vulgaris* Caldwell & Martorell from Puerto Rico. White & Hodkinson (1980) described *Acizzia ceplaciensis* White & Hodkinson (1980) from Brazil, which was then transferred to

Mitrapsylla by Burckhardt (1987). The first to revise the genus were Brown & Hodkinson (1988) in their monography of the Psylloidea from Panamá. There, they redescribed the genus and described species *M. arcuata* Brown & Hodkinson, *M. burckhardti* Brown & Hodkinson, *M. fusca* Brown & Hodkinson, *M. longicauda* Brown & Hodkinson, *M. minuticonis* Brown & Hodkinson, *M. panamensis* Brown & Hodkinson and *M. spinosa* Brown & Hodkinson. They additionally redescribed *M. cubana* and *M. surinamensis*, and improved the information on host-plants and distribution of the genus. Lastly, Burckhardt & Queiroz (2019) recently described nine new species from Brazil (here referred to as sp. A−sp. I).

Despite the valuable contributions by Brown & Hodkinson (1988) and Burckhardt & Queiroz (2019), the genus is still poorly known in terms of host-plants and distribution, and its internal relationships remain unexplored. Of the 24 described species, 16 have associated host-plant data, and 13 are reported from Central America, eight of which are exclusively from there (Rendón-Mera *et al.* 2017; Ouvrard 2019), giving the impression that the genus may be most diverse in this region. However, this is an artefact reflecting the lack of knowledge and exploration, especially, of the South American fauna.

Notably, after Brown & Hodkinson's revision of the Panamanian psylloids, records were increased from only 4 species to over 100, most of them new (Brown & Hodkinson 1988). As for Brazil, considering its localization and the high diversity of habitats that are found there, Burckhardt & Queiroz (2012) estimated the occurrence of at least 1000 psylloid species. This means that less than 10% of the Brazilian species are currently known (Burckhardt & Queiroz 2017), including 12 species of *Mitrapsylla* (Burckhardt & Queiroz 2012, 2019).

Consequently, looking to contribute to the knowledge of the Brazilian and, by extension, of the South American fauna, extensive fieldwork has been conducted in Brazil since 2013 in the framework of the project "Management and biodiversity of Psylloidea (Insecta, Hemiptera) in integrated agro-forestry system and citrus crops in Brazil" of the Brazilian Agricultural Research Corporation, Forestry Unit (Embrapa Florestas) in collaboration with the Swiss Naturhistorisches Museum Basel. As a result, many undescribed species of *Mitrapsylla* were found, suggesting that the genus is very species-rich in the tropics of South America and, in particular, in Brazil.

Furthermore, considering Leguminosae is the second most economically important family (LPWG 2017), with a wide range of uses (e.g. source of food and wood, local medicine, reforestation, soil erosion control, cover for crop, nitrogen fixing, green manure) (Fern 2018), the knowledge on the insects associated with it is essential for the successful and sustainable use, management and conservation of these plants. The first step to know this biodiversity is the improvement of a taxonomic base, that possibilities the accurate identification of these species.

Thus, the present work aims to contribute to this base by conducting a morphological taxonomic study of the species of *Mitrapsylla* from Brazil. Here, we redescribe three known species and describe 27 new ones; we provide an illustrated identification key for males, register the host-plants, and update their geographical distribution.

Material and methods

Material was examined from the following institutions:

BMNH	British Museum of Natural History, London, United Kingdom.
DZUP	Coleção Entomológica Padre Jesus Santiago Moure, Centro Politécnico, Universidade Federal do Paraná, Curitiba, Paraná, Brazil.
INPA	Coleção de Invertebrados, Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil.

NHMB Naturhistorisches Museum, Basel, Switzerland.

Most of the material was collected by D. Burckhardt and D. Queiroz within the project "Management and biodiversity of Psylloidea (Insecta, Hemiptera) in integrated agro-forestry system and citrus crops in Brazil" (code: 02.12.01.028.00.00) of the Brazilian Agricultural Research Corporation, Forestry Unit (Embrapa Florestas) in collaboration with the Swiss Naturhistorisches Museum Basel (Fig. 10). Specimens are preserved pinned, in 70% ethanol or slide-mounted. Collecting method and slide preparation protocol follows Queiroz *et al.* (2017).

We list all species recorded in Brazil, included those not treated in this study. The species are arranged alphabetically. An updated genus description is provided based on that of Brown & Hodkinson (1988), along with a character assessment.

Morphological terminology (Figs 1−2, 4−5, 7−9) mostly follows Brown & Hodkinson (1988); Hollis (2004) is followed for the forewing cell nomenclature. We did not adopt the term 'bipartite' (s. Brown & Hodkinson, 1988) for the condition of the dorsal lobe of the aedeagus since it is in fact 'unipartite' as shown in figures 8−9. Furthermore, we propose the terms 'ventral process' and 'tubercles of the ventral process' (Figs 7−8) instead of 'apical lateral lobes' (s. Brown & Hodkinson, 1988) to provide a more accurate description of the structure (see Description and character assessment section).

Measurements (Figs 1, 3−5) were taken from slide-mounted specimens except for the body length, which was taken from ethanol-preserved specimens in lateral view, measuring the distance from the tip of genal processes to the tip of wings when folded over the body. Measurements are given in mm and expressed as range (mean ± standard deviation). The following abbreviations are used:

AL antennal length (summation of the lengths of individual segments)
CRP circumanal ring length.
DL length of distal segment of aedeagus
FL forewing length
FP female proctiger length
FW forewing width
GL genal process length
HW head width
LAB2 length of median labium segment (ventral outline in lateral view)
LAB3 length of apical labium segment
MP male proctiger length
PL paramere length
SP female subgenital plate length
TL metatibia length
VL vertex length along midline

Photos from dry specimens were taken with a Leica DFC 500 camera coupled to a Leica MZ16 stereomicroscope. Focus stacking was performed with Zerene Stacker v. 1.04. Photos of slide mounted specimens were taken with a Zeiss AxioCam ER5s camera coupled to a Zeiss Axio Lab.A1 laboratory microscope. Editing was done using Adobe Photoshop CS6. Line drawings were made from cleared specimens, temporarily slide-mounted in glycerine, using an Olympus BX50F4 compound microscope with subsequent digitalizing of the images with Adobe Illustrator CS6.

Under "Material examined" available label data are arranged as follows: locality, coordinates, altitude, date, associated plant, collecting method, collectors, collecting code, depository institution and preservation type. Unless stated otherwise, material was collected by sweeping. Plants mentioned here are not necessarily host-plants as defined by Burckhardt *et al.* (2014).

Plant names are cited according to 'The Plant List' (2013) and classification mainly follows LPWG (2017).

The maps were generated with ArcGis 10.4.1 (ESRI 2016) based on label data. Localities without coordinates were georeferenced using Google Earth. The biome layer (Fig. 10) was taken from IBGE (2019).

Results

Mitrapsylla Crawford

Mitrapsylla Crawford, 1914: 134; Brown & Hodkinson, 1988: 61. Type species: *Mitrapsylla albalineata* Crawford, by original designation.

Description and character assessment

Adult. Coloration. Most *Mitrapsylla* species present following pattern which is referred to as "striped-pattern" in the species description. Exceptions include *M.* sp. nov. 22, in which is completely absent, *M.* sp. nov. 14, *M.* sp. nov. 19 and *M.* sp. nov. 27 in which is very inconspicuous and restricted to the thorax when present, and *M.* sp. nov. 18 in which is rather faint. Although the general arrangement is mostly stable, stripes can be only slightly lighter than body to white or yellow (*M.* sp. nov. 17), complete or partially interrupted, wide or narrow, relatively straight or irregular, and present or lack a dark outline. These variations occur intraspecifically, and are mostly associated with the maturity of the specimens, as younger adults are lighter with a faint and more expanded pattern, and older specimens are darker with a distinct pattern. Variations of the striped pattern are presented in each species colour description

Striped-pattern. Occiput lighter to white. Vertex with stripe present on either side of coronal suture longitudinally, along lateral margins obliquely and along posterior margin transversely; dot adjacent to lateral ocellus and on anteorbital tubercle. Anteoccipital sclerite lighter to white. Gena with spot laterally between antenna and eye; genal process with transversal stripe at base. Pronotum with two longitudinal stripes medially and spot on each lateral tubercle, sometimes with additional markings. Mesopraescutum with longitudinal stripe medially, along lateral margins and spot on posterior margin laterally. Mesoscutum with longitudinal stripe medially, submedially and two sublaterally, sometimes with additional markings laterally. Mesoscutellum with stripe along lateral margins, usually weak towards apex. Metascutellum with two longitudinal stripes medially. Metapostnotum with longitudinal stripe medially, usually confined to posterior half. Parapterum lighter to white. Mesoepisternum with U-shaped marking dorsally with spot below anteriorly. Other thoracic pleurites sometimes with additional markings. Abdominal tergites with spot medially, submedially and laterally; spiracular sclerites sometimes with spot posteriorly.

Structure. Head slightly wider than mesonotum, inclined at 30° or more from longitudinal body axis (Figs 11–40). Vertex slightly to strongly concave posteriorly, anteriorly projected and bearing poorly to well-developed longitudinal ridge on either side of coronal suture, weakly to strongly indented around fovea, with anteorbital and lateral ocellar tubercles poorly to well-developed (Figs 41–70); covered with microscopic sparsely spaced setae; surface microsculpture subrhomboidal. Anteoccipical sclerite developed along anterior half of eye. Gena swollen laterally, covered with short setae; genal process subconical to swollen, evenly or irregularly narrowing towards acute to narrowly or broadly rounded apex, 0.3–0.9 times as long as vertex along midline, with dorsum slightly swollen basally, apex slightly upturned in lateral view, covered with short to long setae towards apex and two longer subapically;

surface microsculpture transversely striate. Antenna 10-segmented, filiform, 1.8–4.4 times as long as head width, segments 7 or 8 always the longest; segments 3–8 with dark apices becoming more extended towards apex, segments 9 and 10 black; single subapical rhinarium present on segments 4, 6, 8 and 9; terminal setae subequal or one seta about half the length of the other, slightly shorter to slightly longer than segment 10. Clypeus, in ventral view, pyriform; in lateral view, protruding anteriorly; covered with numerous short setae and two long setae medially. Labium, in lateral view, with apical segment and sometimes part of median segment visible; apical segment 0.1–0.2 times as long as head width, 0.5–0.8 times as long as median segment length, bearing long setae medially and subapically. Thorax, in lateral view, with dorsal margin weakly to strongly arched. Pronotum declivous, merging smoothly with propleurites laterally, slightly projected posterad medially, bearing three lateral tubercles; propleurites subequal, narrow, elongate, mostly concealed by eye. Forewing obovoid, oval to sub rhomboidal, rounded apically, 2.3–3.3 times as long as head width, 2.0–2.5 times as long as broad; membrane with dark brown spots around radular areas in cells m1, m2, cu1 as well as apex of clavus (except *M.* sp. nov. 19 and *M.* sp. nov. 22); veins bearing microscopic setae subequal or slightly longer than veins width, irregularly spaced; costal break present; pterostigma present, variously developed, lacking a distinct apex; vein Cula strongly arched so that cell cula tall; anal break close to apex of vein Cu1b; radular spinules forming narrow linear to subtriangular patches in cells m1, m2 and cu1; surface spinules present, sometimes much reduced, distinctly to densely spaced forming rhomboids (Figs 101–103) or densely spaced forming irregular groups separated from each other (Fig. 104), leaving spinule-free spaces along veins (Figs 2, 87) or covering cells up to veins apically (Fig. 95). Hindwing with prominent M+Cu1 vein, costal setae distinctly grouped. Metacoxa bearing horn-shaped, pointed meracanthus; metatibia 0.5–0.9 times as long as head width, bearing distinct genual spine and 1+3+1 apical spurs. Metabasitarsus with two lateral spurs.

Male terminalia (Fig. 4). Proctiger, in lateral view, 0.3–0.4 times as long as head width, with variously developed, straight or down-curved posterior lobe basally. Subgenital plate, in lateral view, relatively short, subglobular. Paramere, in lateral view, irregularly lamellar (Figs 108, 123, 150, 162), sublanceolate (Fig. 186), weakly (Figs 105, 114, 129) or strongly clavate (Figs 111, 132, 157, 171) to capitate (Fig. 153); apex usually with sclerotised ridge, bearing a posterior tooth (Figs 195–198, 223) or inward produced, variously sclerotised (Figs 199, 210, 219); outer face covered with long setae mostly in apical two thirds, longer and more densely spaced along posterior margin; inner face mostly covered with short to long setae, usually longer basally and along posterior margin, often with a row of thick setae along apical anterior margin and group of thick setae below sclerotised ridge and on apical posterior margin (Figs 130, 133, 148, 154). Aedeagus of the type simple (Fig. 155), complex unipartite (Fig. 6–7) or complex tripartite (Fig. 8–9) (as defined as follows); end tube of the ductus ejaculatorius weakly curved; sperm pump with narrow barrel and large end-plates.

Type of aedeagus. Simple aedeagus. In which the ‘head of the aedeagus’, that bears the end tube of the ductus ejaculatorius, consists of the single expansion following the ‘stem of the aedeagus’(Fig. 155; Brown & Hodkinson 1988, p. 12, Fig. E).

Complex aedeagus. In which the ‘head of the aedeagus’ is modified into two structures that follow the ‘stem of the aedeagus’: 1) a dorsal lobe, which bears the end tube of the ductus ejaculatorius; and 2) a ventral process, which is expanded apically and bears two subapical tubercles (Figs 6–9). This type of aedeagus is subdivided into two types as follows:

Unipartite. In which the dorsal lobe consists of one single lobe, without subdivisions (Fig. 6–7).—**Tripartite**. In which the dorsal lobe divided in three lobules (Fig. 8): one median lobule that bears the end tube of the ductus ejaculatorius, and two lateral lobules; and basally bears a membranous pouch (Fig. 8–9).

Female terminalia (Fig. 5). Proctiger, in lateral view, 0.7–1.6 times as long as head width, cuneate; dorsal margin slightly to strongly concave distal to circumanal ring, apical extension straight (Figs 230, 240, 245, 252) or sinuous (Figs 242, 246, 251, 253), apex straight (Figs 245, 252, 230) to strongly upturned (Figs 235, 244, 250); apical extension covered with peg-setae, with a longitudinal row of dorsomedial long setae along each side. Circumanal ring double, 0.2–0.4 times as long as proctiger. Subgenital plate, in lateral view, cuneate, 0.4–0.6 times as long as proctiger, truncate or well-developed apically; ventral outline almost straight or slightly sinuous (Figs 229, 235, 239, 242, 244), convex (Figs 230, 240) to strongly swollen (Figs 252, 231, 234, 248, 249); variously hirsute, usually covered with medium long setae in medial third and ventrally throughout, short setae in apical third and long setae at apex, with or without a group of long setae subapically on dorsum, with or without a seta-free patch subapically.

Immature. General description see Burckhardt & Brown (1992) and Burckhardt & Queiroz (2019). Immatures are not treated here because they were not available for many species, some cases same host many spp, impossible to associate them.

Key to *Mitrapsylla* males

1 Aedeagus simple (Fig. 155) … 2
- Aedeagus complex (Figs 6−9) … 12
2 Paramere, in lateral view, clavate or capitate … 3
- Paramere, in lateral view, irregularly lamellar, lamellar … 4
3 GL/VL ≥ 0.7. Paramere clavate. Aedeagus, in lateral view, lacking subapical hook. On *Copaifera langsdorffii* … *M.* sp. I
- GL/VL ≤ 0.6 (Fig. 57). Paramere capitate (Fig. 153). Aedeagus, in lateral view, with subapical hook (Fig. 155) … *M.* sp. nov. 15
4 Forewing slightly angular near apex of vein Rs … 5
- Forewing evenly rounded near apex of vein Rs (Figs 71−100) … 7
5 Forewing with dark subapical band. Distal portion of aedeagus, in lateral view, only weakly expanded apically, lacking a subapical tooth. On *Copaifera cearensis* … *M.* sp. C
- Forewing without dark subapical band, usually with dark marginal spots in the middle of cells. Distal portion of aedeagus, in lateral view, strongly expanded apically with a subapical tooth. On other *Copaifera* spp. … 6
6 Forewing membrane infuscate in addition to brown patches along wing margin. Paramere, in lateral view, with slightly angular posterior margin in apical third. On *Copaifera oblongifolia* … *M.* sp. E
- Forewing membrane colourless apart from brown patches along wing margin. Paramere, in lateral view, more or less evenly tapering in apical half to blunt apex. On *Copaifera langsdorffii* … *M.* sp. D
7 Paramere irregularly lamellar; in lateral view, with posterior margin with an apical and basal projection … *M. longicauda*
- Paramere evenly lamellar; in lateral view, posterior margin lacking projections … 8
8 Body dimensions larger: antenna length > 2.0 mm, forewing length > 2.0 mm. Paramere, in lateral view, with slightly narrow apex … 9
- Body dimensions smaller: antenna length < 1.9 mm, forewing length < 2.0 mm. Paramere, in lateral view, with wide apex … 10
9 GL/VL 0.7–0.9. Antenna length > 2.6 mm, forewing length > 2.4 mm. Paramere, in lateral view, with sclerotised apex hook-shaped. Aedeagus, in lateral view, with two large subapical spines … *M.* sp. A

- GL/VL 0.5–0.7. Antenna length < 2.5 mm, forewing length < 2.5 mm. Paramere, in lateral view, with sclerotised apex truncate, with slightly larger anterior and smaller posterior point. Aedeagus, in lateral view, lacking subapical spines … *M.* sp. H

10 Paramere, in lateral view, strongly rounded apically; inner face lacking a group of dense bristles along posterior margin near apex. Aedeagus, in lateral view, hardly expanded apically … *M.* sp. G

- Paramere, in lateral view, not as above; inner face with a group of dense bristles along posterior margin near apex. Aedeagus, in lateral view, strongly expanded apically … 11

11 Paramere, in lateral view, weakly expanded apically. Apical inflation of aedeagus, in lateral view, about one third length of distal segment. On *Copaifera cearensis* … *M.* sp. B

- Paramere, in lateral view, strongly expanded apically. Apical inflation of aedeagus, in lateral view, about half length of distal segment. On *Copaifera langsdorffii, C. marginata* … *M.* sp. F

12 Aedeagus unipartite; in lateral view, dorsal lobe lacking membranous pouch (Figs 6−7) … 13

- Aedeagus tripartite; in lateral view, dorsal lobe bearing membranous pouch (Figs 8−9) … 29

13 Paramere weakly or strongly clavate … 14

- Paramere sublanceolate, lamellar or irregularly lamellar … 24

14 Paramere, in lateral view, with apex deeply indented at anterior half, forming a prominent anteriorly pointing hook in posterior half (Fig. 147). Aedeagus, in lateral view, with dorsal lobe subglobular; ventral process weakly expanded, rounded (Fig. 149). Forewing bearing dark brown median spot apically in cell r2 (Fig. 85). On *Machaerium amplum* … *M.* sp. nov. 13

- Paramere not as above. Aedeagus, in lateral view, with dorsal lobe obovoid or subtriangular; ventral process strongly expanded, irregularly oval or globular. Forewing lacking dark brown median spot apically in cell r2 … 15

15 Paramere strongly expanded apically; apex, in lateral view, following the longitudinal axis of paramere, rather straight; sclerotised ridge posteriorly or subposteriorly; (Figs 112, 133, 157, 172, 184, 190) … 16

- Paramere weakly or moderately expanded apically; apex, in lateral view, weakly to strongly deflected from longitudinal axis of paramere, posteriorly directed; with sclerotised ridge medially (Figs 106, 115, 130, 139) … 21

16 Head and thorax usually multi-coloured, ventrally darker (Fig. 33). Paramere, in lateral view, more expanded posteriorly than anteriorly (Fig. 171). On *Periandra mediterranea* … *M.* sp. nov. 20

- Head and thorax not as above. Paramere, in lateral view, subequally expanded anteriorly and posteriorly, or more expanded anteriorly … 17

17 Paramere, in lateral view, with apex subequally expanded, mostly angulated; apex with sclerotised ridge in posterior third; posterior margin indented along median third (Figs 112). On *Andira fraxinifolia* … *M.* sp. nov. 3

- Paramere, in lateral view, with apex more expanded anteriorly; mostly rounded, with apex sclerotised ridge in about posterior half; posterior margin lacking such indention, at most concave subapically (Figs 133, 157, 184, 190) … 18

18 Paramere, in lateral view, with apex irregularly straight; anterior margin never expanded dorsad (Fig. 156). Surface spinules completely covering cells r1, r2, m1, m2, cu1 and cu2. On *Sophora tomentosa* … *M. itaparica*

- Paramere, in lateral view, with apex weakly or strongly indented; anterior margin weakly or strongly expanded dorsad (Fig 132, 183, 189). Surface spinules variable … 19

19 Paramere, in lateral view, with apex weakly indented submedially; anterior margin weakly expanded dorsad (Fig. 183). Surface spinules in cells m1, m2 and cu1 restricted to radular areas, sometimes much reduced. On *Andira paniculata* … *M.* sp. nov. 24

- Paramere, in lateral view, with apex strongly indented in anterior third; anterior margin strongly expanded dorsad (Figs 132, 189). Surface spinules completely covering cells m1, m2, and cu1, sometimes restricted to radular areas … 20

20 Paramere, in dorsal view, with smoothly inward directed sclerotised ridge separated from posterior tooth by deep indention (Fig. 204). On *Andira* sp. nov. 8 … *M.* sp. nov. 8

- Paramere, in dorsal view, with slightly sinuous sclerotised ridge not separated from posterior tooth by deep indention (Fig. 223). On *Machaerium villosum* … *M.* sp. nov. 26

21 Genal process with broadly or narrowly rounded apex (Fig. 41). Paramere, in lateral view, with anterior margin almost straight in median two quarters, somewhat abruptly curving towards apex (Fig. 105); in dorsal view, with irregularly inward directed sclerotised ridge (Fig. 195). On *Aeschynomene paniculata* … *M.* sp. nov. 1

- Genal process with subacute or acute apex, rarely rounded (Figs 44, 49, 52). Paramere, in lateral view, with anterior margin weakly to strongly sinuous; in dorsal view, with irregularly straight or subrectangular sclerotised ridge (Figs 198, 203, 206) … 22

22 Surface spinules densely spaced, forming irregular groups somewhat separated from each other (Fig. 104), seldom moderately spaced (Fig. 103), completely covering cells c+sc, r1, r2, m1, m2, cu1 and cu2. Paramere, in lateral view, with apex squarish, strongly directed posteriorly (Fig. 114) … *M.* sp. nov. 4

- Surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), present around radular areas of cells m1, m2 and cu1, sometimes much reduced. Paramere, in lateral view, with apex irregularly rounded to subtruncate, slightly to strongly directed posteriorly … 23

23 Paramere, in lateral view, with anterior margin broadly rounded in apical third; apex strongly directed posteriorly (Fig. 138). Surface spinules absent or very scattered around radular areas of cells m1, m2 and cu1. On *Desmodium album* … *M.* sp. nov. 10

- Paramere, in lateral view, with anterior margin weakly rounded in apical third: apex slightly directed posteriorly (Fig. 129). Surface spinules present around radular areas of cells m1, m2 and cu1, sometimes much reduced. On *Desmodium adscendens* … *M. cubana*

24 Paramere sublanceolate (Fig. 186); inner surface, in lateral view, with thick setae along posterior margin (Fig. 187) … *M.* sp. nov. 25

- Paramere lamellar or irregularly lamellar; inner surface, in lateral view, with thick setae restricted to apical posterior margin when present (Figs 109, 118, 121, 124, 136, 151, 163, 166, 169, 175, 178, 193) … 25

25 Paramere, in lateral view, with a prominent median projection at apex; posterior margin expanded posteriorly in basal third (Figs 150−151). Aedeagus, in lateral view, with dorsal lobe almost as long as ventral process; ventral process weakly expanded apically (Fig. 152). Forewing usually with contrasting dark veins and clear colourless membrane … *M.* sp. nov. 14

- Paramere, in lateral view, irregularly rounded or truncate at apex; posterior margin not expanded in basal third. Aedeagus, in lateral view, with dorsal lobe shorter than

ventral process; ventral process moderately to strongly expanded apically. Forewing not as above (Figs 165−170, 174−176, 192−194) … 26

26 Paramere, in lateral view, irregularly rounded at apex (Figs 168, 192). Dorsal lobe of the aedeagus, in lateral view, indented on dorsal outline (Figs 170, 194) … 27

- Paramere, in lateral view, strongly truncate at apex (Figs 165, 174). Dorsal lobe of the aedeagus, in lateral view, not as above (Figs 167, 176) … 28

27 Paramere, in lateral view, strongly sinuous; slightly notched anteriorly at apex (Fig. 168). Surface spinules covering cells up to veins in apical half of forewing (Fig. 92). On *Pterodon emarginatus* … *M.* sp. nov. 19

- Paramere, in lateral view, almost straight; apex not as above (Fig. 192). Surface spinules leaving broad spinule-free spaces along the veins … *M.* sp. nov. 27

28 Paramere, in lateral view, with posterior margin strongly indented along most apical third (Fig. 174); in dorsal view bearing a posterior tooth (Fig. 218). Dorsal lobe of the aedeagus, in lateral view, larger than apical expansion of the ventral process (Fig. 176) … *M.* sp. nov. 21

- Paramere, in lateral view, with posterior margin not as above, weakly sinuous (Fig. 165); in dorsal view bearing each a small anterior, median and posterior tooth (Fig. 215). Dorsal lobe of the aedeagus, in lateral view, subequal with apical expansion of the ventral process (Fig. 167) … *M. ochra*

29 Paramere clavate … 30

- Paramere lamellar or irregularly lamellar … 34

30 Paramere, in lateral view, mitten-shaped, with anterior half strongly expanded dorsad and posterior half deeply concave towards strongly developed posterior process (Fig. 180) … *M.* sp. nov. 23

- Paramere different … 31

31 Paramere, in lateral view, gradually expanding towards apex, almost straight; apex irregularly oblique (Fig. 159); in dorsal view, with a subposterior and posterior sclerotized ridges, the former in a lower level than the latter (Fig. 213). Ventral process of the aedeagus, in lateral view, weakly expanded, globular (Fig. 161). On *Machaerium hirtum* … *M.* sp. nov. 16

- Paramere, in lateral view, irregularly expanding towards apex, weakly sinuous; apex irregularly rounded; in dorsal view, bearing a posterior tooth (Figs 202, 207, 208). Ventral process of the aedeagus, in lateral view, strongly expanded, oval or oblong-oval (Figs 128, 143, 146) … 32

32 Head and thorax pale orange, yellow to yellowish-brown (Figs 23, 24). Paramere, in lateral view, with posterior margin forming a small lobe in apical third (Figs 141, 144); in dorsal view, posterior tooth strongly protruding (Figs 207, 208) … 33

- Head and thorax usually multi-coloured, ventrally darker (Fig. 18). Paamere, in lateral view, with posterior margin not forming a lobe, slightly angulated in apical third; in dorsal view, posterior tooth weakly protruding (Fig. 202) … *M.* sp. nov. 7

33 Aedeagus, in lateral view, with dorsal lobe bearing elongated membranous pouch basally; ventral process of the aedeagus oval (Fig. 143). Proctiger, in lateral view, tapered. Surface spinules present around radular areas of cells m1, m2 and cu1 … *M.* sp. nov. 11

- Aedeagus, in lateral view, with dorsal lobe bearing small membranous pouch basally; ventral process oblong-oval (Fig. 146). Proctiger, in lateral view, blunt. Surface spinules covering most of cells m1, m2 and cu1 … *M.* sp. nov. 12

34 Ventral process of the aedeagus, in lateral view, poorly expanded apically, considerably smaller than dorsal lobe (Fig. 119, 125) … 35

- Ventral process of the aedeagus, in lateral view, strongly expanded apically, subequal or larger than dorsal lobe (Fig. 110, 122, 137, 164, 179) … 36

35 Paramere, in lateral view, with apex straight, irregularly rounded, slightly notched medially (Fig. 117); anterior margin convex in apical two thirds; posterior margin subequally expanded in apical third and basal two thirds; in dorsal view, with one large anteriorly directed posterior tooth (Fig. 199) … *M.* sp. nov. 5

- Paramere, in lateral view, with apex strongly curved posteriorly, truncate, never notched (Fig. 123); anterior margin almost straight along median two quarters; posterior margin strongly concave along apical half; in dorsal view, with wavy sclerotised ridge and a blunt posterior tooth, the former in a lower level than the latter (Fig. 201) … *M. ceplaciensis*

36 Forewing lacking dark brown spots around radular areas (Fig. 95). Surface spinules densely spaced (Fig. 103); covering cells up to veins (Fig. 95). Paramere, in lateral view, with anterior and posterior margin subparallel; apex with posterior half expanded dorsad, displaced from plane of anterior half (Fig. 177). On *Pterogyne nitens* … *M.* sp. nov. 22

- Forewing with dark brown spots around radular areas (Figs 72, 76, 81, 90). Surface spinules, when present, moderately to distinctly spaced (Figs 101−102; leaving spinule-free spaces along veins. Paramere, in lateral view, not as above … 37

37 GL/VL ≤ 0.4; genal process with apex acute (Fig. 42). Dorsal lobe of the aedeagus, in lateral view, with concealed median lobule, smaller than lateral lobules (Fig. 110) … *M.* sp. nov. 2

- GL/VL ≥ 0.5; genal process with apex subacute, narrowly or broadly rounded (Figs 46, 51, 60). Dorsal lobe of the aedeagus, in lateral view, with slightly prominent median lobule, subequal with lateral lobules (Figs 122, 137, 164) … 38

38 Head and thorax medium brown to dark brown with very fine inconspicuous stripes or scattered spots (Figs 30, 60). Paramere, in lateral view, with posterior margin expanded in apical third and not expanded in basal two thirds (Fig. 162); in dorsal view, with poorly developed ridge (Fig. 214). On *Machaerium amplum* … *M.* sp. nov. 17

- Head and thorax yellow, ochreous to yellowish-brown with fine or thick conspicuous stripes (Figs 16, 21, 46, 51). Paramere, in lateral view, with posterior margin expanded each in apical third and basal two thirds (Figs 120, 135); in dorsal view, with protruding ridge (Figs 200, 205) … 39

39 Paramere, in lateral view, with apex strongly rounded, posteriorly directed (Fig. 135). Surface spinules much reduced and scattered; absent or at most a few around radular areas of cells m1, m2 and cu1. Body usually darker ventrally (Fig. 21); older specimens with markings with dark outline. On *Machaerium paraguariense* … *M.* sp. nov. 9

- Paramere, in lateral view, with apex irregularly rounded, slightly angulated posteriorly, rather straight (Fig. 120). Surface spinules moderately to distinctly spaced; covering most of cells m1, m2, and cu1, rarely restricted to radular areas. Body ventrally concolorous (Fig. 16); older specimens lacking markings with dark outline. On *Cassia leptophylla* … *M.* sp. nov. 6

***Mitrapsylla* sp. A Burckhardt & Queiroz**

Mitrapsylla sp. A Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Minas Gerais, Vargem Bonita, Parque Nacional da Serra da Canastra, Cachoeira Casca d'Anta, around park entrance, -20.3083, -46.5217, 850–860m, 4–8.ix.2014, transition from riparian to Cerrado vegetation, *Copaifera langsdorffii* (D. Burckhardt & D. L. Queiroz), #141(12) (MZSP, dry).

Description of adult and immature by Burckhardt & Queiroz (2019).

Distribution. Brazi: Ceará, Minas Gerais, Paraná (Fig. 285) (Burckhardt & Queiroz 2019).

Host-plant. *Copaifera langsdorffii* Desf. (Leguminosae, Detarioideae, Detarieae) (Burckhardt & Queiroz 2019).

***Mitrapsylla* sp. nov. 1**
(Figs 11, 41, 71, 105−107, 195, 225, 255, 285)

Material examined. Holotype m$, Brazil: Maranhão, Araioses, Povoado Parangi, BR-402 9 km from MA-PI border, -3.0633, -41.9983, 30m, 29.vi.2016, *Aeschynomene paniculata* (D. Burckhardt & D. L. Queiroz), #210(2) (DZUP, dry).

Paratypes: Maranhão: 50 m$, 52 f£, 4 immatures, same data as holotype (D. Burckhardt & D. L. Queiroz), #210(2) (DZUP, NHMB, dry, slide mounted, 70% ethanol).

Description. Colouration. Body with whitish striped-pattern; variation: somewhat faint; vertex with stripe along posterior margin weak or absent; mesoscutellum sometimes with additional stripe along anterior margin; older specimens with markings with dark outline.—Head and thorax light yellowish-brown, light orange to light orange-brown. Gena sometimes light brownish anteriorly and ventrally; genal process lighter than rest of gena. Eye grey to dark red; ocelli colourless to orange. Antenna light yellow, segments 1–2 sometimes darker. Clypeus yellow to orange, lighter medially and darker along edges; rostrum light to dark yellow. Thorax usually with margins of sclerites darker. Pronotum usually slightly lighter than rest of thorax. Mesopraescutum rarely with posterior half irregularly coloured. Forewing colourless to slightly yellowish; veins dark yellow to light brown, sometimes slightly darker towards apex; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow with tarsi brown to dark brown, hindleg light yellow with telotarsus sometimes brownish. Abdomen lighter to concolorous with rest of body, sometimes darker ventrally; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia irregularly light yellow to yellowish-brown, proctiger usually darker than rest of terminalia. Female terminalia irregularly light yellow, proctiger darker than subgenital plate and brownish apically.

Structure. Body length m$ 2.1–2.2 mm (2.14±0.05 mm), f£ 2.2–2.4 mm (2.26±0.07 mm) (5 m$, 5 f£). Genal process (Fig. 41) swollen, evenly or irregularly narrowing towards broadly or narrowly rounded apex, 0.4–0.5 times as long as vertex along midline. Antenna 1.9–2.1 times as long as head width; longest terminal seta shorter than segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 71) 2.7–2.8 times as long as head width, 2.2–2.3 times as long as wide, obovoid or suboval, narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.4–1.6; ratio c/d 0.8–1.0; ratio e/f 0.6–0.9; surface spinules usually moderately spaced, forming rhomboids (Fig. 102), denser towards apex of cells, absent, much reduced or covering apical half of cell c+sc fully covering area, apical half or third of cell r1, apical half of cell r2, around radular areas of cells m1, m2 and cu1 (seldom much reduced), m2 basally and most of cell cu2, leaving spinule-free spaces along veins. Metatibia 0.6–0.7 times as long as head width.

Terminalia. Male. Proctiger, in lateral view, 0.4 as long as head width; in lateral view, with long, blunt or weakly tapered, weakly to strongly down-curved posterior lobe. Paramere (Figs 105−106) 0.8 times as long as proctiger; in lateral view, clavate, moderately expanded apically; anterior margin almost straight in median two quarters, somewhat abruptly curving towards apex, posterior margin angulate and expanded in about apical third, weakly convex in basal two thirds; apex irregularly rounded, slightly directed posteriorly, with sclerotised ridge medially (Fig. 106); inner surface (Fig. 106) covered with short setae, longer basally and

along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 195), sclerotised ridge irregularly inward directed, bearing posterior tooth. Aedeagus (Fig. 107) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process weakly upturned, apical expansion larger than dorsal lobe, irregularly globular, bearing short, conical tubercle.—Female (Fig. 225). Proctiger 0.9–1.0 times as long as head width; in lateral view, dorsal outline weakly to strongly concave distal to circumanal ring, apical extension slightly to strongly sinuous, apex slightly to moderately upturned, smoothly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5–0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched submedially; covered with medium long setae in median third, ventrally throughout, and shorter setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 255), lateral margins somewhat unevenly, strongly narrowing at half towards narrow, subtruncate apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.58–0.59 (0.59±0.01), f£ 0.58–0.60 (0.59±0.01); AL m$ 1.16–1.26 (1.21±0.05), f£ 1.15–1.23 (1.18±0.04); LAB2 m$ 0.13–0.15 (0.14±0.01), f£ 0.13–0.14 (0.14±0.01); LAB3 m$ 0.09, f£ 0.08–0.09 (0.09±0.01); FL m$ 1.56–1.65 (1.61±0.05), f£ 1.58–1.66 (1.62±0.04); TL m$ 0.38–0.41 (0.4±0.02), f£ 0.38–0.41 (0.39±0.02); MP 0.24–0.25 (0.25±0.01); PL 0.20; DL 0.24–2.66 (1.05±1.39); FP 0.52–0.56 (0.54±0.02).

Distribution. Brazil: Maranhão (Fig. 285).

Host-plant. *Aeschynomene paniculata* Vogel (Leguminosae, Papilionoideae, Aeschynomeneae).

Comments. *M.* sp. nov. 1 resembles *M.* sp. nov. 5 in the short rounded genal processes but differs in the shorter antenna, the unipartite aedeagus and the shape of the paramere. See comments section under *M.* sp. nov. 4.

***Mitrapsylla* sp. nov. 2**
(Figs 12, 42, 72, 108−110, 196, 226, 256, 285)

Material examined. Holotype m$, Brazil: Amazonas, Novo Airão, Parque Nacional de Anavilhanas, -2.5367, -60.0833, 20–30m, 18–20.iv.2014, Amazonas inudation forest, Fabaceae (D. Burckhardt & D. L. Queiroz), #128(2) (DZUP, dry).

Paratypes: Amazonas: 3 m$, 5 f£, 4 immatures, same data as holotype (D. Burckhardt & D. L. Queiroz), #128(2) (DZUP, NHMB, dry, slide mounted, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripes along lateral and posterior margins very faint; mesopraescutum with lateral stripes fused to lateral spots on posterior margin; abdominal tergites lacking distinct pattern; older specimens with markings with dark outline.—Head and thorax yellowish-brown to medium brown; genal process lighter than head, yellowish. Eye grey to red; ocelli colourless to orange. Antenna light yellow, segments 1–2 concolorous with head. Clypeus concolorous or lighter than head, slightly lighter medially and darker along edges; rostrum yellow to yellowish-brown. Thorax usually with margins of sclerites darker. Forewing colourless; veins light yellow, sometimes slightly darker towards apex; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow with tarsi sometimes darker, hindleg light yellow with base of femur sometimes slightly darker. Abdomen light straw-coloured, light yellow to light yellowish-brown; intersegmental membranes concolorous with rest of abdomen; spiracular sclerites concolorous with tergites. Male terminalia light straw-coloured to yellow, usually darker than abdomen. Female terminalia light straw-coloured to yellow, proctiger usually darker, brownish apically and sometimes around anus.

Structure. Body length m$ 1.8 mm f£ 2.2–2.3 mm (2.26±0.03 mm) (1 m$, 2 f£). Genal process (Fig. 42) subconical, irregularly narrowing towards acute apex, inner margin markedly sinuous, 0.3–0.4 times as long as vertex along midline. Antenna 2.0–2.1 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 72) 2.9–3.0 times as long as head width, 2.3 times as long as wide, obovoid, narrowly rounded apically; vein M+Cu1 0.5 times as long as Cu1; ratio a/b 1.6–1.7; ratio c/d 0.8; ratio e/f 0.8; surface spinules distinctly spaced, forming rhomboids (Fig. 101), usually absent in cell c+sc covering apical half of cells r1 and r2, much reduced around radular areas of cells m1, m2 and cu1, covering m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, almost straight posterior lobe. Paramere (Figs 108−109) 0.9 times as long as proctiger; in lateral view, irregularly lamellar; anterior margin irregularly convex in apical two thirds, posterior margin slightly constricted submedially, with apical and basal half irregularly convex; apex subtruncate, with sclerotised ridge posteriorly (Fig. 109); inner surface (Fig. 109) covered with long setae, longer basally and along posterior margin, with row of slightly thicker setae along apical anterior margin, several thick setae below sclerotised ridge and group of thick setae on apical posterior margin; in dorsal view (Fig. 196), bearing small anterior and larger posterior tooth. Aedeagus (Fig. 110) complex tripartite; in lateral view, median lobule concealed, rounded; lateral lobules larger than median lobule, subtriangular; membranous pouch rather broad; ventral process weakly upturned, apical expansion subequal with dorsal lobe, irregularly globular, bearing short, blunt tubercle.—Female (Fig. 226). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline weakly concave distal to circumanal ring, apical extension sinuous, apex moderately upturned, smoothly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline sinuous along basal two thirds, slightly notched subapically and apical third slightly convex; covered with medium long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and group of long setae subapically on dorsum, without seta-free patch subapically; in ventral view (Fig. 256), lateral margins evenly, weakly narrowing towards moderately broad, rounded apex.

Measurements (in mm) (1 m$, 1 f£). HW m$ 0.52, f£ 0.58; AL m$ 1.07, f£ 1.19; LAB2 m$ 0.15, f£ 0.16; LAB3 m$ 0.09, f£ 0.11; FL m$ 1.48, f£ 1.74; TL m$ 0.38, f£ 0.43; MP 0.21; PL 0.18; DL 0.24; FP 0.55.

Distribution. Brazil: Amazonas (Fig. 285).

Host-plant. Unknown.

***Mitrapsylla* sp. nov. 3**
(Figs 13, 43, 73, 111−113, 197, 227, 257, 285)

Material examined. Holotype m$, Brazil: Paraná, Matinhos, Rodovia Elisio Pereira Alves Filho, -25.7100, -48.5617, 0–10m, 29.xi.2012, coastal Atlantic forest, *Andira fraxinifolia* (D. Burckhardt & D. L. Queiroz), #81(7) (DZUP, dry).

Paratypes: Mato Grosso: 3 m$, 2 f£, Acorizal, MT010, Acorizal, -15.1267, -56.3400, 220m, 4.xi.2012, degraded forest edge along road (D. Burckhardt & D. L. Queiroz), #59(-) (NHMB, 70% ethanol); 2 m$, ca. 120 km SE of Rondonópolis, BR364, -16.9000, -53.6550, 720m, 1.xi.2012 (D. Burckhardt & D. L. Queiroz), #54(-) (NHMB, 70% ethanol).—Minas Gerais: 1 m$, 1 f£, Coromandel, Fazenda Laje, -18.5610, -46.9020, 1060m, 12.ii.2018, Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #263(-) (NHMB, 70% ethanol).—

Paraná: 60 m$, 59 f£, 31 immatures, same data as holotype (D. Burckhardt & D. L. Queiroz), #81(7) (DZUP, NHMB, dry, slide mounted, 70% ethanol); 2 m$, 1 f£, Antonina, RPPN Reserva Natural Guaricica, -25.3117, -48.6717, 15m, 24.x.2017, ? *Desmodium* sp. (D. Rendón) (NHMB, slide mounted); 15 m$, 15 f£, Colombo, Embrapa Florestas, -24.8526, -48.7147, 846m, 11.ii.2014, *Andira fraxinifolia* (D. L. Queiroz), #589 (NHMB, 70% ethanol); 5 m$, 7 f£, same but 817m, 12.ii.2014 (D. L. Queiroz), #594 (NHMB, 70% ethanol); 1 m$, 1 f£, Curitiba, Parque Passaúna, -25.4750, -49.3767, 940m, 5.ii.2013, planted park vegetation and edge of Araucaria forest remnant (D. Burckhardt & D. L. Queiroz), #89 (-) (NHMB, 70% ethanol); 3 m$, 2 f£, Curitiba, Parque Tingui, -25.3867, -49.3067, 910–920m, 31.i.2016, planted park vegetation and remnants of Araucaria forest edge (D. Burckhardt & D. L. Queiroz), #189 (-) (NHMB, 70% ethanol); 9 m$, 14 f£, Ilha do Mel, -24.8976, -48.7796, 19.xi.2013, *Andira fraxinifolia* (D. L. Queiroz), #598(7) (NHMB, 70% ethanol); 13 m$, 10 f£, 11 immatures, Morretes, BR277, Cachoeira, -25.4769, -48.8339, 28.xi.2012, Atlantic forest, *Andira fraxinifolia* (D. Burckhardt & D. L. Queiroz), #80(1) (NHMB, 70% ethanol); 10 m$, 9 f£, Parque Nacional do Superagui, Barra do Superagui, Ilha do Superagui, -25.4567, -48.2333, 0m, 4.vii.2012, mangroves and coastal scrub, *Andira fraxinifolia* (D. Burckhardt & D. L. Queiroz), #32(2) (NHMB, 70% ethanol).—São Paulo: 6 m$, 5 f£, Ubatuba, Maranduba, -23.5411, -45.2351, xii.1985 (M. G. Oliveira) (MZSP, dry).

Description. Colouration. Body with whitish striped-pattern; variation: vertex with stripes along lateral and posterior margins usually weak; mesopraescutum with lateral stripes fused to lateral spots on posterior margin; older specimens with markings with dark outline.—Head and thorax multi-coloured, ground colour yellowish-brown, orange-brown to medium brown. Gena sometimes slightly darker to brown ventrally; genal process yellowish. Eye grey to red; ocelli colourless to orange. Antenna light yellow, segments 1–2 slightly darker. Clypeus yellow to dark yellow, slightly lighter medially and darker along edges; rostrum light yellow to yellow. Thorax usually darker lateroventrally, with margins of sclerites darker. Mesopraescutum rarely with posterior half irregularly coloured. Forewing colourless to yellowish-brown, usually yellow around vein Cu1b; veins dark yellow to medium brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow to brown with tarsi sometimes darker, hindleg entirely light yellow or metafemur concolorous with rest of legs in basal two thirds. Abdomen light yellowish-brown, light brown to medium brown, sometimes darker ventrally; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male proctiger and subgenital plate irregularly dark yellow to brown, paramere dark yellow. Female terminalia irregularly dark yellow, proctiger usually brownish apically and around anus, subgenital plate usually brownish basally.

Structure. Body length m$ 2.3–2.5 mm (2.41±0.07 mm), f£ 2.5–2.8 mm (2.62±0.13 mm) (5 m$, 5 f£). Genal process (Fig. 43) swollen or subconical, evenly or irregularly narrowing towards subacute or narrowly rounded apex, 0.5–0.7 times as long as vertex along midline. Antenna 2.3–2.7 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 73) 2.7–3.1 times as long as head width, 2.2 times as long as wide, obovoid, narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.5–1.7; ratio c/d 0.7–0.9; ratio e/f 0.5–1.6; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), covering cell r1 apically, apical half of cell r2, around radular areas of cells m1, m2 and cu1 (sometimes much reduced), m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7–0.8 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with short, weakly to strongly tapered, weakly down-curved posterior lobe. Paramere (Figs 111−112)

0.8–0.9 times as long as proctiger; in lateral view, clavate, strongly expanded apically; anterior margin almost straight to concave before apex, posterior margin indented along median third; apex somewhat straight, subequally expanded anteriorly and posteriorly, with sclerotised ridge in posterior third (Fig. 112); inner surface (Fig. 112) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 197), sclerotised ridge subrectangular, bearing posterior tooth after conspicuous indention. Aedeagus (Fig. 113) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process weakly upturned to relatively straight, apical expansion slightly larger than dorsal lobe, globular, bearing long, conical tubercle.—Female (Fig. 227). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension almost straight, apex slightly upturned, obliquely rounded to smoothly obliquely truncate; circumanal ring 0.4 times as long as proctiger. Subgenital plate 0.4–0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched submedially; covered with medium long setae in median third, ventrally throughout and in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 257), lateral margins abruptly narrowing at half, with apical half strongly narrowing towards slightly broad, subtruncate apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.63–0.69 (0.65±0.03), f£ 0.66–0.70 (0.68±0.02); AL m$ 1.52–1.79 (1.63±0.14), f£ 1.77–1.80 (1.78±0.02); LAB2 m$ 0.15–0.17 (0.16±0.01), f£ 0.17–0.18 (0.18±0.01); LAB3 m$ 0.11, f£ 0.12; FL m$ 1.75–1.87 (1.82±0.07), f£ 1.95–2.11 (2.05±0.09); TL m$ 0.45–0.49 (0.47±0.02), f£ 0.50–0.51 (0.5±0.01); MP 0.24–0.26 (0.25±0.01); PL 0.21–0.22 (0.22±0.01); DL 0.21–0.25 (0.24±0.02); FP 0.66–0.69 (0.68±0.02).

Distribution. Brazil: Mato Grosso, Minas Gerais, Paraná, São Paulo (Fig. 285).

Host-plant. *Andira fraxinifolia* Benth. (Leguminosae, Papilionoideae, Aeschynomeneae).

***Mitrapsylla* sp. nov. 4**
(Figs 14, 44, 74, 104, 114−116, 198, 228, 258, 285)

Material examined. Holotype m$, Brazil: Roraima, Boa Vista, 28 km E Boa Vista, Campo Esperimental Água Boa, 2.6717, -60.8400, 80m, 2.iv.2015, degraded Cerrado vegetation, Fabaceae (D. Burckhardt & D. L. Queiroz), #154(2) (DZUP, dry).

Paratypes: Roraima: 17 m$, 23 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #154(2) (DZUP, NHMB, dry, slide mounted, 70% ethanol).

Description. Colouration. Body overall pale with faint striped-pattern; variation: mesopraescutum with lateral stripes fused to lateral spots on posterior margin; mesoscutum with median and submedian stripes sometimes fused; mesoscutellum with stripe along lateral margins sometimes expanded and covering most of sclerite.—Head and thorax light, pale yellow to light orange; genal process slightly to conspicuously lighter than head. Eye grey to red; ocelli colourless to orange. Antenna light yellow, segments 1–2 concolorous with head. Clypeus concolorous or slightly darker than head, slightly lighter medially and slightly darker along edges; rostrum light yellow to yellow. Thorax seldom with margins of sclerites darker. Pronotum usually slightly lighter than rest of thorax. Mesopraescutum rarely with posterior half irregularly coloured. Metascutellum almost entirely white. Forewing colourless to slightly yellowish, sometimes slightly darker around Cu1b; veins light yellow to light brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Legs pale yellow with tarsi sometimes darker, hindleg light yellow. Abdomen lighter to concolorous with rest of body; intersegmental membranes light straw-coloured; spiracular sclerites concolorous

with tergites. Male terminalia light to pale yellow. Female terminalia light to pale yellow, proctiger usually darker than subgenital plate and dark yellow apically.

Structure. Body length m$ 1.9–2.2 mm (2.06±0.12 mm), f£ 2.1–2.4 mm (2.24±0.10 mm) (5 m$, 5 f£). Genal process (Fig. 44) subconical, irregularly narrowing towards acute apex, 0.4–0.5 times as long as vertex along midline. Antenna 1.9–2.1 times as long as head width; longest terminal seta about half of segment 10. Apical labium segment 0.2 times longer than head width and 0.6–0.8 times longer than median segment. Forewing (Fig. 74) 2.7–2.9 times as long as head width, 2.1–2.2 times as long as wide, obovoid or oval, narrowly or slightly broadly rounded apically; vein M+Cu1 0.3–0.5 times as long as Cu1; ratio a/b 1.4–1.6; ratio c/d 0.8–0.9; ratio e/f 0.5–0.8; surface spinules usually densely spaced forming irregular groups somewhat separated from each other (Fig. 104), seldom moderately spaced (Fig. 102), fully covering cells c+sc, r1, r2, m1, m2, cu1 and cu2 leaving spinule-free spaces along veins, seldom covering cells up to veins apically; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.6–0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, weakly tapered, weakly to strongly down-curved posterior lobe. Paramere (Figs 114−115) 0.8–0.9 times as long as proctiger; in lateral view, clavate, weakly expanded apically; anterior margin strongly sinuous, broadly rounded in apical third, posterior margin angulate and expanded in apical third, weakly convex in basal two thirds; apex squarish, strongly directed posteriorly, with sclerotised ridge medially (Fig. 115); inner surface (Fig. 115) covered with short setae, longer along apical posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 198), sclerotised ridge prominent, bearing posterior tooth. Aedeagus (Fig. 116) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process weakly upturned, apical expansion larger than dorsal lobe, irregularly globular, bearing short, conical tubercle.—Female (Fig. 228). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension almost straight to sinuous, apex moderately to strongly upturned, smoothly to strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline slightly sinuous to slightly convex, sometimes slightly notched submedially; covered with medium long setae in median third, ventrally throughout, short setae in apical third, very sparsely spaced, several longer setae at apex, and long setae submedially, with seta-free patch subapically; in ventral view (Fig. 258), lateral margins abruptly narrowing at half, with apical half weakly narrowing towards slightly broad, subtruncate apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.54–0.57 (0.56±0.02), f£ 0.54–0.60 (0.58±0.03); AL m$ 1.08–1.20 (1.15±0.06), f£ 1.01–1.16 (1.11±0.08); LAB2 m$ 0.14, f£ 0.14–0.15 (0.14±0.01); LAB3 m$ 0.09–0.10 (0.1±0.01), f£ 0.10–0.11 (0.11±0.01); FL m$ 1.43–1.55 (1.5±0.07), f£ 1.58–1.72 (1.63±0.08); TL m$ 0.37–0.39 (0.38±0.01), f£ 0.36–0.39 (0.37±0.02); MP 0.24–0.25 (0.24±0.01); PL 0.20; DL 0.22–0.26 (0.24±0.02); FP 0.56–0.60 (0.58±0.02).

Distribution. Brazil: Roraima (Fig. 285).

Host-plant. Unknown.

Comments. *M.* sp. nov. 4 resembles *M.* sp. nov. 1 but differs in the densely spaced surface spinules covering all area of all cells and in the paramere with squarish apex, strongly directed posteriorly.

Mitrapsylla sp. B Burckhardt & Queiroz

Mitrapsylla sp. B Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Piauí, Teresina - em frente a jaula do urso, -5.0400, -42.7697, 82m, 26.xii.2014 (M. R. Barreto), #28(MZSP, dry).

Description of adult by Burckhardt & Queiroz (2019). Immature unknown.

Distribution. Brazil: Piauí (Fig. 286) (Burckhardt & Queiroz 2019).

Host-plant. Adults were collected on *Copaifera cearensis* Ducke and *C. langsdorffii* Desf. (Leguminosae, Detarioideae, Detarieae) which are likely hosts (Burckhardt & Queiroz 2019).

***Mitrapsylla* sp. nov. 5**
(Figs 15, 45, 75, 117−119, 199, 229, 259, 286)

Material examined. Holotype m$, Brazil: Roraima, Mucajaí, Campo experimental Serra da Prata, Embrapa, 2.3983, -60.9800, 90m, 16–17.iv.2015, experimental plantations, edges of degraded rain forest, *Machaerium* cf. *hirtum* (D. Burckhardt & D. L. Queiroz), #163(4) (DZUP, dry).

Paratypes: Roraima: 17 m$, 29 f£, 210 immatures, same data as holotype (D. Burckhardt & D. L. Queiroz), #163(4) (DZUP, NHMB, dry, slide mounted, 70% ethanol); 5 m$, 4 f£, Boa Vista, BR 174, Igarapé Água Boa bridge, SE Boa Vista, 2.7267, -60.8100, 90m, 2.iv.2015, degraded Cerrado vegetation, *Machaerium* cf. *hirtum* (D. Burckhardt & D. L. Queiroz), #153(2) (NHMB, dry, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripes along lateral margins absent and along posterior margin sometimes weak; genal process with transversal stripe faint and expanded, covering most of process; mesopraescutum with lateral stripes fused to lateral spots on posterior margin; mesoscutellum usually with an additional stripe along posterior margin; abdominal tergites lacking distinct pattern.—Head and thorax pale yellow to yellowish-brown; genal process lighter than head. Eye grey to red; ocelli colourless to orange. Antenna light to dark yellow. Clypeus concolorous or lighter than head, sometimes slightly darker along edges; rostrum dark yellow. Thorax seldom with margins of sclerites darker. Forewing colourless, sometimes slightly yellowish around Cu1b; veins light yellowish-brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow, hindleg light yellow. Abdomen light straw-coloured to concolorous with rest of body; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia light yellow. Female terminalia light yellow, proctiger usually dark yellow apically.

Structure. Body length m$ 2.1–2.4 mm (2.25±0.10 mm), f£ 2.5 mm (2.49±0.03 mm) (4 m$, 4 f£). Genal process (Fig. 45) swollen, evenly or irregularly narrowing towards broadly or narrowly rounded apex, 0.4–0.5 times as long as vertex along midline. Antenna 2.2–2.5 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.2 times longer than head width and 0.6–0.8 times longer than median segment. Forewing (Fig. 75) 2.6–2.8 times as long as head width, 2.1–2.2 times as long as wide, obovoid, broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.3–1.5; ratio c/d 0.8–0.9; ratio e/f 0.5–1.0; surface spinules moderately spaced when present, forming rhomboids (Figs. 102), covering cells r1 and r2 apically, absent or much reduced around radular areas of cells m1, m2 and cu1, covering m2 basally and around Cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with massive, blunt, weakly down-curved posterior lobe. Paramere (Figs 117−118) 1.0–1.1 times as long as proctiger; in lateral view, irregularly lamellar; anterior margin slightly convex in apical two thirds, posterior margin subequally expanded in apical third and basal two thirds; apex irregularly rounded, slightly notched medially, directed posteriorly); inner surface (Fig. 118)

covered with short setae, longer along apical posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of thick setae on apical posterior margin; in dorsal view (Fig. 199), bearing one large posterior tooth, slightly directed anteriorly. Aedeagus (Fig. 119) complex tripartite; in lateral view, median lobule with slightly prominent median lobule; lateral lobules larger than median lobule, subtriangular, strongly truncate apically; membranous pouch stout, elongate; ventral process relatively straight, slender apical expansion weak, considerably smaller than dorsal lobe, bearing short, conical tubercle.—Female (Fig. 229). Proctiger 0.9–1.0 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension almost straight to slightly sinuous, apex straight to moderately upturned, strongly obliquely truncate; circumanal ring 0.2–0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched subapically; covered with medium long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 259), lateral margins evenly, strongly narrowing at half, with apical half subparallel basally and strongly narrowing towards narrow, subtruncate apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.61–0.65 (0.63±0.02), f£ 0.64–0.70 (0.67±0.03); AL m$ 1.43–1.44 (1.44±0.01), f£ 1.51–1.63 (1.59±0.07); LAB2 m$ 0.15–0.17 (0.16±0.01), f£ 0.17–0.19 (0.18±0.01); LAB3 m$ 0.11–0.12 (0.11±0.01), f£ 0.12–0.13 (0.13±0.01); FL m$ 1.63–1.67 (1.65±0.02), f£ 1.79–1.90 (1.84±0.06); TL m$ 0.42–0.45 (0.44±0.02), f£ 0.46–0.49 (0.47±0.01); MP 0.23–0.24 (0.24±0.01); PL 0.24–0.25 (0.24±0.01); DL 0.29–0.30 (0.3±0.01); FP 0.64–0.67 (0.65±0.02).

Distribution. Brazil: Roraima (Fig. 286).

Host-plant. *Machaerium* sp. (Leguminosae: Papilionoideae: Aeschynomeneae).

Comments. See comments section under *M.* sp. nov. 1 and *M.* sp. nov. 6.

***Mitrapsylla* sp. nov. 6**

(Figs 16, 46, 76, 101, 120−122, 200, 230, 260, 286)

Material examined. Holotype m$, Brazil: Paraná, Curitiba, Praça Brigadeiro do Ar M. C. Eppinghaus, -25.4297 -49.2719 4.i.2012, park, *Cassia leptophylla* (D. Burckhardt & D. L. Queiroz), #28(4) (DZUP, dry).

Paratypes: Minas Gerais: Conselheiro Lafaiete, -20.5806, -43.7218, 1042m, 20.viii.2013, Toona plantation (D. L. Queiroz) #561 (NHMB, 70% ethanol).—Paraná: 104 m$, 87 f£, 4 immatures, same data as holotype (D. Burckhardt & D. L. Queiroz), #28(4) (DZUP, NHMB, dry, slide mounted, 70% ethanol); 2 m$, 7 f£, 6 immatures, 1 skins, Colombo, -25.2919, -49.2239, 1010m, *Cassia leptophylla* (D. L. Queiroz) (NHMB, 70% ethanol); 1 m$, 1 f£, same but 22.ix.2009 (D. L. Queiroz), #50 (NHMB, dry); 6 m$, 6 f£, Colombo, Embrapa Florestas, -25.3200, -49.1567, 920m, 6.i.2012 (J. T. Cremonese) (NHMB, 70% ethanol); 1 f£, same but -25.3256, -49.1595, park, plantation, secondary vegetation (D. Burckhardt & D. L. Queiroz), #30(-) (NHMB, 70% ethanol); 9 m$, 5 f£, same but 928m (D. L. Queiroz) (NHMB, 70% ethanol); 1 m$, 1 f£, same but -25.2919, -49.2239, 936m, 24.vii.2017, *Cassia leptophylla* (D. Rendón) (NHMB, slide mounted); 22 m$, 27 f£, 1 immatures, Curitiba, -25.4297, -49.2719, 1.i.2012, park and trees in street, *Cassia leptophylla* (D. Burckhardt & D. L. Queiroz), #27(4) (NHMB, 70% ethanol); 2 f£, Curitiba, Jardim Botânico, -25.4417, -49.2367, 930m, 19.vii.2012, planted park vegetation and remnant of Araucaria forest edge (D. Burckhardt & D. L. Queiroz), #44(-) (NHMB, 70% ethanol); 4 m$, 6 f£, same but 921m, 16.xii.2014 (D. L. Queiroz), #661 (NHMB, 70% ethanol); 9 m$, 9 f£, Curitiba, Parque Bacacheri, -25.3200, -49.1567, 920m, 17.i.2016, park, remnants of Atlantic forest, *Cassia leptophylla* (D. Burckhardt & D. L. Queiroz), #175(5) (NHMB, 70% ethanol);

7 m$, 14 f£, 1 immatures, same but 6.iv.2013 (D. Burckhardt & D. L. Queiroz), #98(6) (NHMB, 70% ethanol); 1 f£, Curitiba, Parque Barigui, -25.4150, -49.3100, 900m, 19.vii.2012, park with remnant of natural Araucaria forest (D. Burckhardt & D. L. Queiroz), #43(-) (NHMB, 70% ethanol); 1 f£, Curitiba, Parque São Lourenço, -25.3850, -49.2650, 940m, 26.iv.2015, planted park vegetation (D. Burckhardt & D. L. Queiroz), #170(-) (NHMB, 70% ethanol); 5 m$, 8 f£, same but 16.i.2016 *Cassia leptophylla* (D. Burckhardt & D. L. Queiroz), #174(7) (NHMB, 70% ethanol); 1 m$, Curitiba, UFPR, Centro Politécnico, -25.4467, -49.2317, 900m, 7.v.2014, park with planted trees, remnants of Araucaria forest *Cassia leptophylla* (D. Burckhardt & D. L. Queiroz), #136(4) (NHMB, 70% ethanol); 29 m$, 49 f£, 1 immatures, same but 1.vii.2015 (D. Burckhardt & D. L. Queiroz), #173(6) (NHMB, 70% ethanol); 5 f£, same but 15.vi.2016 (D. Burckhardt & D. L. Queiroz), #200(6) (NHMB, 70% ethanol); 1 m$, 1 f£, same but 844m, 23.vi.2017 (D. Burckhardt & D. L. Queiroz), #244(6) (NHMB, 70% ethanol); 1 m$, 2 f£, same but (D. Burckhardt & D. L. Queiroz), #231(5) (NHMB, 70% ethanol); 1 m$, 2 f£, same but (D. Rendón) (NHMB, slide mounted); 2 m$, 2 f£, same but 894m, 1.vii.2015 (D. L. Queiroz), #723(-) (NHMB, 70% ethanol); 1 f£, same but -25.4450, -49.2345, 890–920m, 3–7.xii.2012 (D. Burckhardt & D. L. Queiroz), #84(-) (NHMB, 70% ethanol); 50 m$, 50 f£, 7 immatures, same but -25.4466, -49.2321 (D. Burckhardt & D. L. Queiroz), #84(10) (NHMB, 70% ethanol); 3 m$, 2 f£, Parque Nacional do Iguaçu, trilha mata preta, trilha do macaco, -25.6485, -54.4573, 219m, 30.vii.2014, legume (D. L. Queiroz), #644 (NHMB, 70% ethanol); 3 m$, Tibagi, Parque Estadual do Guartelá, -24.5617, -50.2583, 920–950m, 23–25. vi.2015, Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #171(-) (NHMB, 70% ethanol).—Rio Grande do Sul: 4 m$, 1 f£, Passo Fundo, -28.2628, -52.4069, 25.vi.2012, *Cassia leptophylla* (A. L. Marsaro Júnior) (NHMB, 70% ethanol); 4 m$, 4 f£, 10 immatures, same but 14.xi.2012 (A. L. Marsaro Júnior) (NHMB, 70% ethanol); 1 m$, same but 7.ix.2012 (A. L. Marsaro Júnior) (NHMB, 70% ethanol); 3 m$, 58 immatures, same but 31.x.2012 (A. L. Marsaro Júnior) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern. Head and thorax dark yellow to yellowish-orange; genal process lighter than head. Eye grey to dark red; ocelli colourless to orange. Antenna light to dark yellow. Clypeus concolorous with head; rostrum dark yellow. Mesopraescutum seldom with irregular markings on posterior half. Forewing yellowish, usually darker around Cu1b; veins dark yellow to light brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Legs light yellow to light brown. Abdomen lighter to concolorous with rest of body; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia irregularly light yellow to yellow, proctiger usually darker, sometimes brownish. Female terminalia yellow, sometimes subgenital plate lighter, proctiger usually brownish apically.

Structure. Body length m$ 2.8–3.0 mm (2.86±0.10 mm), f£ 2.8–3.1 mm (2.97±0.14 mm) (4 m$, 3 f£). Genal process (Fig. 46) swollen, irregularly narrowing towards subacute or narrowly rounded apex, 0.5–0.7 times as long as vertex along midline. Antenna 2.5–2.6 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 76) 2.9–3.1 times as long as head width, 2.3–2.4 times as long as wide, obovoid, narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.7–2.1; ratio c/d 0.8–0.9; ratio e/f 0.6–0.8; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), fully covering cells r1, r2, m1, m2, cu1 and cu2, (rarely restricted to radular areas) leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.6–0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, strongly down-curved posterior lobe. Paramere (Figs 120−121) 0.9 times as long as proctiger; in lateral view, irregularly lamellar; anterior margin almost straight to concave, posterior margin expanded and somewhat angulate in apical third, expanded and irregularly convex

basal two thirds; apex irregularly rounded, with sclerotised ridge posteriorly (Fig. 121); inner surface (Fig. 121) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and on apical posterior margin along with several stout setae; in dorsal view (Fig. 200), bearing blunt anterior and posterior tooth. Aedeagus (Fig. 122) complex tripartite; in lateral view, median lobule with slightly prominent median lobule; lateral lobules subequal with median lobule, subtriangular; membranous pouch with narrow, elongate; ventral process strongly upturned, apical expansion larger than dorsal lobe, irregularly oval, bearing long, conical tubercle.—Female (Fig. 230). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension almost straight, apex straight, irregularly acutely rounded; circumanal ring 0.3–0.4 times as long as proctiger. Subgenital plate 0.5–0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline convex in basal two thirds, sometimes slightly notched subapically, apical third straight or slightly convex; covered with medium long setae in median third, subapically in dorsum, ventrally throughout, and in apical third, long setae at apex, and several long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 260), lateral margins abruptly narrowing at half, with apical half subparallel and broadly truncate apex, sometimes concave.

Measurements (in mm) (3 m$, 2 f£). HW m$ 0.69–0.74 (0.72±0.03), f£ 0.77; AL m$ 1.80–1.96 (1.86±0.09), f£ 2.00; LAB2 m$ 0.15–0.17 (0.16±0.01), f£ 0.17–0.18 (0.18±0.01); LAB3 m$ 0.10–0.11 (0.1±0.01), f£ 0.11; FL m$ 2.01–2.15 (2.09±0.07), f£ 2.35–2.39 (2.37±0.02); TL m$ 0.46–0.49 (0.47±0.02), f£ 0.50–0.52 (0.51±0.01); MP 0.26–0.28 (0.27±0.01); PL 0.25–0.26 (0.25±0.01); DL 0.32–0.36 (0.34±0.02); FP 0.73–0.76 (0.74±0.02).

Distribution. Brazil: Minas Gerais, Paraná, Rio Grande do Sul (Fig. 286).

Host-plant. *Cassia leptophylla* Vogel (Leguminosae, Caesalpinioideae, Cassieae).

Comments. *M.* sp. nov. 6 resembles *M.* sp. nov. 27 in the colouration and shape of the paramere but differs in the tripartite aedeagus. It also resembles *M.* sp. nov. 5 in the shape of the paramere and the tripartite aedeagus but differs in the longer genal processes and in the ventral process of the aedeagus strongly expanded apically.

***Mitrapsylla ceplaciensis* (White & Hodkinson)**
(Figs 17, 47, 77, 123−125, 201, 231, 261)

Acizzia ceplaciensis White & Hodkinson, 1980: 78.
Mitrapsylla ceplaciensis, Burckhardt (1987): 189.

Material examined: Minas Gerais: 4 m$, 1 f£, Vazante, Fazenda Bainha, -17.8817, -46.8833, 660–670m, 29–30.x.2012, Cerrado vegetation, edges of disturbed forest, eucalypt plantation, creek, *Machaerium aculeatum* (D. Burckhardt & D. L. Queiroz), #50 (10) (NHMB, slide mounted, 70% ethanol); 7 m$, same but -17.6451, -46.7086, 904m, 06.i.2016 (D. L. Queiroz), #747(-) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripes along lateral and posterior margins sometimes absent; older specimens with markings with dark outline.—Head and thorax dark yellow to yellowish-brown; genal process lighter than head. Eye grey to dark red; ocelli colourless to orange. Antenna light to dark yellow, segments 1–2 concolorous with head. Clypeus light yellow to concolorous with head; rostrum light yellow to dark yellow. Thorax with margins of sclerites darker. Forewing colourless, sometimes yellowish around veins M1+2, Cu1a and Cu1b; veins very light yellow to very light brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Legs light to dark yellow with tarsi light brown, hindleg sometimes lighter than rest of legs.

Abdomen light straw-coloured to light brown; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia irregularly yellowish. Female terminalia irregularly yellow, proctiger darker than subgenital plate, usually darker around anus.

Structure. Body length m$ 2.4–2.6 mm (2.53±0.08 mm), f£ 2.4 mm (3 m$, 1 f£). Genal process (Fig. 47) subconical, evenly or irregularly narrowing towards subacute or narrowly rounded apex, 0.4 times as long as vertex along midline. Antenna 2.6 times as long as head width; longest terminal seta about as long as or slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.7 times longer than median segment. Forewing (Fig. 77) 2.7 times as long as head width, 2.2–2.3 times as long as wide, obovoid, narrowly or broadly rounded apically; vein M+Cu1 0.4 times as long as Cu1; ratio a/b 1.6–1.8; ratio c/d 0.7–0.9; ratio e/f 0.7–1.0; surface spinules moderately spaced when present, forming rhomboids (Figs. 102), sometimes covering apical half of cells r1 and r2, absent or much reduced around radular areas of cells m1, m2 and cu1, covering m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, strongly tapered, strongly down-curved posterior lobe. Paramere (Figs 123−124) 0.9–1.0 times as long as proctiger; in lateral view, irregularly lamellar; anterior margin almost straight before apex, strongly concave along apical half, weakly convex in basal half; apex truncate, strongly directed posteriorly,); inner surface (Fig. 124) covered with long setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and on apical posterior margin; in dorsal view (Fig. 201), sclerotised ridge wavy sclerotised ridge and blunt posterior tooth, the former in lower level than the latter. Aedeagus (Fig. 125) complex tripartite; in lateral view, median lobule with prominent median lobule; lateral lobules smaller than median lobule, elongate, suboval; membranous pouch rather broad; ventral process strongly upturned, apical expansion weak, considerably smaller than dorsal lobe, bearing short, conical tubercle.—Female (Fig. 231). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline moderately concave distal to circumanal ring, apical extension sinuous, apex moderately upturned, smoothly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline basal half strongly swollen, apical half almost straight or slightly sinuous; covered with medium long setae in median third, ventrally throughout, and in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 261), lateral margins evenly, strongly narrowing at half towards narrow, subtruncate apex.

Measurements (in mm) (2 m$, 1 f£). HW m$ 0.69–0.71 (0,7±0.01); AL m$ 1.80–1.86 (1.83±0.04); LAB2 m$ 0.18–0.20 (0.19±0.01); LAB3 m$ 0.12–0.13 (0.13±0.01); FL m$ 1.89–1.94 (1.91±0.04); TL m$ 0.48–0.50 (0.49±0.02); MP m$ 0.26–0.28 (0.27±0.01); PL m$ 0.26; DL m$ 0.34–0.35 (0.35±0.01); FP 0.56.

Distribution. Brazil: Bahia (White & Hodkinson 1980, as *Acizzia ceplaciensis*).—New state record for Brazil: Minas Gerais (Fig. 286).

Host-plant. Adults were collected on *Machaerium aculeatum* Raddi (Leguminosae, Papilionoideae, Aeschynomeneae) but confirmation is needed.

***Mitrapsylla* sp. nov. 7**
(Figs 18, 48, 78, 126−128, 202, 232, 262, 286)

Material examined. Holotype m$, Brazil: Distrito Federal, BR040 km 1, -15.9860, -47.9870, 1220m, 14.ii.2018, Cerrado, Fabaceae (D. Burckhardt & D. L. Queiroz), #264(2) (DZUP, dry).

Paratypes: Distrito Federal: 2 m$, 10 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #264(2) (DZUP, NHMB, dry, slide mounted, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: mesopraescutum with an additional stripe along posterior margin; mesoscutellum with stripe along lateral margins sometimes slightly projected towards anterior and posterior margins; older specimens with markings with dark outline.—Head and thorax multi-coloured, ground colour yellowish-brown, orange, reddish-brown to brown. Vertex sometimes with dark markings. Gena brown to dark brown anteriorly and ventrally; genal process lighter than rest of gena. Eye grey to dark red; ocelli colourless to orange. Antenna yellow to light brown, segments 1–2 slightly darker. Clypeus yellow to brown, darker along edges; rostrum light yellow to dark yellow. Thorax brown to dark brown lateroventrally, sometimes with margins of sclerites darker. Mesopraescutum usually with median light to white irregular transversal marking and posterior half irregularly coloured. Forewing colourless to yellowish, usually yellow around vein Cu1b; veins light to dark yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow, sometimes with tarsi darker, hindleg yellow with femur brown to dark brown except apically. Abdomen yellowish-brown to dark brown, sometimes darker ventrally; intersegmental membranes light straw-coloured to orange; spiracular sclerites concolorous with tergites. Male proctiger and subgenital plate irregularly brown and paramere yellowish. Female proctiger irregularly brown and subgenital plate yellowish, brown basally.

Structure. Body length f£ 2.6–3.2 mm (2.94±0.25 mm) (5 f£). Genal process (Fig. 48) subconical, irregularly narrowing towards subacute apex, 0.4–0.7 times as long as vertex along midline. Antenna 2.4–2.8 times as long as head width; longest terminal seta about as long as or slightly shorter than segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 78) 3.0–3.1 times as long as head width, 2.3–2.4 times as long as wide, obovoid or suboval, narrowly or slightly broadly rounded apically; vein M+Cu1 0.2–0.4 times as long as Cu1; ratio a/b 1.6–1.8; ratio c/d 0.8–0.9; ratio e/f 0.5–1.3; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), covering apical half of cells r1 and r2, around radular areas of cells m1, m2 and cu1, m2 basally and most of cell cu2, leaving spinule-free spaces along veins. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, weakly down-curved posterior lobe. Paramere (Figs 126−127) 0.8 times as long as proctiger; in lateral view, clavate, weakly expanded apically, weakly sinuous, with posterior margin slightly angulate apically; apex irregularly rounded); inner surface (Fig. 127) covered with long setae, longer along posterior margin, with row of thick setae along apical anterior margin, and several thick setae below sclerotised ridge, one of which very long; in dorsal view (Fig. 202), bearing posterior tooth. Aedeagus (Fig. 128) complex tripartite; in lateral view, median lobule lobe with prominent median lobule; lateral lobules about as half as long as median lobule, subtriangular, truncate apically; membranous pouch narrow, elongate; ventral process weakly upturned, apical expansion larger than dorsal lobe, oval, bearing short, conical tubercle.—Female (Fig. 232). Proctiger 1.0–1.1 times as long as head width; in lateral view, dorsal outline moderately to strongly concave distal to circumanal ring, apical extension almost straight to sinuous, apex strongly upturned, strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.4–0.5 times as long as proctiger; in lateral view, apex moderately truncate, ventral outline slightly to strongly sinuous along basal two thirds, slightly notched subapically, apical third oblique; covered with medium long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 262), lateral margins abruptly narrowing at apical third, with apical quarter subparallel and apex broadly truncate.

Distribution. Brazil: Distrito Federal (Fig. 286).

Host-plant. Unknown.

Comments. *M.* sp. nov. 7 is similar to *M. fusca* Brown & Hodkinson in the dark body colour and the relatively narrow, S-shaped paramere and the distal segment of the aedeagus but differs in the longer genal processes; the less sinuate hind margin of the paramere, in lateral view; the apical aedeagal segment which has apically truncate, rather than narrowly rounded lateral lobes and the apical swelling oval rather than globular; the apically obliquely truncate female proctiger; and the shorter and irregularly narrowing female subgenital plate. Female of *M.* sp. nov. 7 resembles *M.* sp. nov. 16, *M.* sp. nov. 23 and *M. surinamensis* (Šulc) in the moderately truncate subgenital plate, but differs from *M.* sp. nov. 16 in the acutely pointed proctiger and apex of subgenital plate truncate in ventral view, from *M.* sp. nov. 23 in the group of long setae subapically on dorsum, and from *M. surinamensis* (Šulc) by the subgenital plate with short setae apically.

Mitrapsylla sp. C Burckhardt & Queiroz

Mitrapsylla sp. C Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Piauí, Brasileira/Piracuruca, Parque Nacional de Sete Cidades, -4.0733, -41.6800, 130–210m, 21–24.vi.2016, Cerrado vegetation with open areas and more humid areas around pond, *Copaifera cearensis* (D. Burckhardt & D. L. Queiroz), #201(5) (MZSP, dry).

Description of adult by Burckhardt & Queiroz (2019). Immature unknown.

Distribution. Brazil: Piauí (Fig. 287) (Burckhardt & Queiroz 2019).

Host-plant. Adults were collected on *Copaifera cearensis* Ducke (Leguminosae, Detarioideae, Detarieae) which is a likely host (Burckhardt & Queiroz 2019).

Mitrapsylla sp. D Burckhardt & Queiroz

Mitrapsylla sp. D Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Minas Gerais, Vargem Bonita, Parque Nacional da Serra da Canastra, Cachoeira Casca d'Anta, around park entrance, -20.3083, -46.5217, 850–860m, 4–8.ix.2014, transition from riparian to Cerrado vegetation, *Copaifera langsdorffii* (D. Burckhardt & D. L. Queiroz), #141(4) (MZSP, dry).

Description of adult and last instar immature by Burckhardt & Queiroz (2019).

Distribution. Brazil: Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo (Fig. 287) (Burckhardt & Queiroz 2019).

Host-plant. *Copaifera langsdorffii* Desf. and perhaps *C. oblongifolia* Mart. (Leguminosae, Detarioideae, Detarieae) (Burckhardt & Queiroz 2019).

Mitrapsylla cubana Crawford
(Figs 19, 49, 79, 129−131, 203, 233, 263)

Mitrapsylla cubana Crawford, 1914: 135.
Arytaina unga Caldwell, 1942: 30; synonymised by Brown & Hodkinson 1988: 69.
Psylla cedusa Caldwell, 1944: 135; synonymised by Brown & Hodkinson 1988: 69.
Mitrapsylla unga (Cladwell); Caldwell & Martorell 1952: 611.
Mitrapsylla cedusa (Cladwell); Caldwell & Martorell 1952: 611.

Material examined: Amazonas: 3 m$, Manaus, Bairro Tarumã-Açu, BR-174 km 1, -2.9467, -60.0333, 100m, 2.v.2014, forest edge, *Desmodium* sp. (D. Burckhardt & D. L. Queiroz), #134(4) (NHMB, 70% ethanol); 11 m$, 15 f£, 24 immatures, Novo Airão, -2.6183, -60.9483, 50m, 20–22.iv.2014, degraded forest edge and planted ornamentals, *Desmodium* sp. (D. Burckhardt & D. L. Queiroz), #129 (3) (NHMB, 70% ethanol).—Mato Grosso do Sul: 19 m$, 27 f£, 33 immatures, Dourados, -22.2833, -54.9667, xi.2012, *Desmodium* sp. (L. A. Z. Machado) (NHMB, 70% ethanol).—Minas Gerais: 1 m$, Barroso, Mato do Bau, -21.1869, -43.9758, 1000 m, 13–14.vi.2010 Cerradão semideciduous forest, along forest edge (D. Burckhardt), #7(-) (NHMB, dry); 44 m$, 26 f£, 26 immatures, 5 skins, Vazante, Fazenda Bocaina, -17.8917, -46.9100, 670–690m, 22.ix.2011, Cerrado near river, ? *Dimorphandra mollis* (D. Burckhardt & D. L. Queiroz), #17(4) (NHMB, 70% ethanol); 21 m$, 21 f£, 44 immatures, 4 skins, Viçosa, -20.7539, -42.8819, 657m, *Desmodium* sp. (D. L. Queiroz) (NHMB, 70% ethanol).—Paraná: 3 m$, 3 f£, Antonina, RPPN Reserva Natural Guaricica, -25.3133, -48.6686, 13m, 26.x.2017, ? *Desmodium* sp. (D. Rendón) (NHMB, slide mounted); 68 m$, 64 f£, 30 immatures, 1 skins, Antonina, Usina Parigot de Souza, -25.2438, -48.7511, 28m, 17–20.vii.2017, roadside vegetation, Atlantic forest, *Desmodium* adscendens (D. Burckhardt & D. L. Queiroz), #248(4) (NHMB, dry, 70% ethanol); 2 f£, Curitiba, Parque Barigui, -25.4267, -49.3133, 910m, 9.ii.2016, planted park vegetation and edge of remnants of Araucaria forest, *Desmodium* adscendens (D. Burckhardt & D. L. Queiroz), #196(5) (NHMB, 70% ethanol); 17 m$, 15 f£, 33 immatures, Curitiba, Parque São Lourenço, -25.3850, -49.2650, 940m, 16.i.2016, planted park vegetation, *Desmodium* adscendens (D. Burckhardt & D. L. Queiroz), #174(4) (NHMB, 70% ethanol); 2 f£, same but 920m, 13.ii.2013 (D. Burckhardt & D. L. Queiroz), #93(5) (NHMB, 70% ethanol); 39 m$, 29 f£, 24 immatures, Curitiba, Parque Tanguá, -25.3817, -49.2850, 930m, 6.ii.2013, old mine redone as park with seminatural biotopes, mixed Atlantic Araucaria forest, *Mimosa oblonga* var. *oblonga* (D. Burckhardt & D. L. Queiroz), #90(17) (NHMB, 70% ethanol); 1 m$, 2 f£, Curitiba, Parque Tingui, -25.3950, -49.3050, 870m, 10.xii.2012, planted park vegetation and edge of remnants of Araucaria forest, ? *Mimosa pilulifera* var. *pseudoincana* (D. Burckhardt & D. L. Queiroz), #88(5) (NHMB, 70% ethanol); 1 m$, 5 f£, Morretes, BR277, Cachoeira, -25.4769, -48.8339, 28.xi.2012, Atlantic forest (D. Burckhardt & D. L. Queiroz), #80(-) (NHMB, 70% ethanol); 1 m$, São José dos Pinhais, Campina do Taquaral, -25.6040, -49.1940, 880m, 1.ii.2018, remnants of Araucaria forest, Baccharis scrub (D. Burckhardt & D. L. Queiroz), #255(-) (NHMB, 70% ethanol).—Santa Catarina: 4 m$, 7 f£, 4 immatures, Indaial, -26.9317, -49.2883, 70m, 30.iv.2013, edge of Atlantic forest, *Desmodium* adscendens (D. Burckhardt & D. L. Queiroz), #118(1) (NHMB, 70% ethanol).—São Paulo: 7 m$, 8 f£, Santa Maria da Serra, Mina Velha, -22.6820, -48.3050, 450m, 7.ii.2018, vegetable and fruit gardens, edge of Cerrado, *Desmodium* adscendens (D. Burckhardt & D. L. Queiroz), #259(4) (NHMB, 70% ethanol).

Description. Colouration. Body with whitish striped-pattern; variation: vertex with stripe along lateral margins weak and along posterior margin absent; mesopraescutum with lateral stripes fused to lateral spots on posterior margin; older specimens with markings with dark outline.—Head and thorax dark yellow, yellowish-brown to reddish. Gena sometimes slightly darker to brownish ventrally; genal process yellowish to light brown. Eye grey to red; ocelli orange. Antenna light yellow, segments 1–2 slightly darker. Clypeus dark yellow to yellowish-brown, lighter medially and darker along edges; rostrum light yellow to yellow. Thorax sometimes darker than head, usually with margins of sclerites darker. Pronotum sometimes lighter anteriorly. Mesopraescutum sometimes with posterior half irregularly coloured. Forewing slightly yellowish, sometimes slightly darker around Cu1b; veins yellow or light brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Legs light yellow with pro- and meso- femora dark yellow, protarsus usually darker. Abdomen dark yellow, yellowish-brown to light brown; intersegmental membranes light

straw-coloured to reddish; spiracular sclerites concolorous or slightly darker than tergites. Male terminalia light to dark yellow. Female terminalia dark yellow, usually darker apically and around anus.

Structure. Body length m$ 2.0–2.2 mm (2.12±0.06 mm), f£ 2.3–2.4 mm (2.36±0.05 mm) (5 m$, 5 f£). Genal process (Fig. 49) subconical, evenly or irregularly narrowing towards acute or subacute apex, 0.5–0.6 times as long as vertex along midline. Antenna 2.1–2.3 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.7–0.8 times longer than median segment. Forewing (Fig. 79) 2.7–3.0 times as long as head width, 2.1–2.3 times as long as wide, suboval, oval or subrhomboidal narrowly or slightly broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.4–1.7; ratio c/d 0.7–0.8; ratio e/f 0.5–0.8; surface spinules moderately spaced, forming rhomboids (Fig. 102), covering apical half of cells r1 and r2, around radular areas of cells m1, m2 and cu1 (sometimes much reduced), m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.8 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, weakly to strongly down-curved posterior lobe. Paramere (Figs 129−130) 0.8 times as long as proctiger; in lateral view, clavate, weakly expanded apically; anterior margin weakly and irregularly sinuous, posterior margin angulate and expanded in apical third, weakly convex in basal two thirds; apex subtruncate, slightly directed posteriorly, with sclerotised ridge medially (Fig. 130); inner surface (Fig. 130) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 203), sclerotised ridge subrectangular, slightly larger anteriorly, bearing posterior tooth. Aedeagus (Fig. 131) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process weakly upturned, apical expansion larger than dorsal lobe, irregularly globular, bearing long, conical tubercle.—Female (Fig. 233). Proctiger 1.0–1.1 times as long as head width; in lateral view, dorsal outline weakly to strongly concave distal to circumanal ring, apical extension almost straight to sinuous, apex moderately to strongly upturned, smoothly to strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline slightly sinuous to slightly convex, sometimes slightly notched submedially; covered with medium long setae in median third, ventrally throughout, and shorter setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 263), lateral margins abruptly narrowing at half, with apical half strongly narrowing towards broad, subtruncate apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.55–0.57 (0.56±0.01), f£ 0.54–0.62 (0.59±0.04); AL m$ 1.16–1.30 (1.24±0.07), f£ 1.14–1.31 (1.25±0.09); LAB2 m$ 0.13–0.15 (0.14±0.01), f£ 0.13–0.16 (0.15±0.01); LAB3 m$ 0.10–0.11 (0.1±0.01), f£ 0.10–0.11 (0.11±0.01); FL m$ 1.48–1.53 (1.51±0.03), f£ 1.55–1.80 (1.7±0.13); TL m$ 0.42–0.47 (0.45±0.02), f£ 0.40–0.48 (0.45±0.04); MP 0.23–0.25 (0.24±0.01); PL 0.18–0.20 (0.19±0.01); DL 0.23–0.25 (0.25±0.01); FP 0.53–0.66 (0.61±0.07).

Distribution. Brazil: Mato Grosso do Sul, Cuba, Mexico, Panama, Puerto Rico (Crawford 1914; Caldwell 1942, 1944; Caldwell & Matorell 1952; Brown & Hodkinson 1988).—New state records for Brazil: Amazonas, Minas Gerais, Paraná, Santa Catarina, São Paulo (Fig. 287).

Host-plant. *Desmodium adscendens* (Sw.) DC. (Leguminosae, Papilionoideae, Desmodieae). The record of *Centrosema* sp. (Leguminosae, Papilionoideae, Phaseoleae) (Brown & Hodkinson 1988) needs confirmation.

Comments. See comments section under *M.* sp. nov. 10

***Mitrapsylla* sp. nov. 8**
(Figs 20, 50, 80, 132−134, 204, 234, 264, 287)

Material examined. Holotype m$, Brazil: Goiás, Alto Paraíso do Goiás, near São Jorge, Parque Nacional da Chapada dos Veadeiros, around researchers' accommodations, -14.1600, -47.7920, 1060m, 15.ii.2018, Cerrado vegetation, planted trees, *Andira cordata* (D. Burckhardt & D. L. Queiroz), #265(6) (DZUP, dry).

Paratypes: Distrito Federal: 5 m$, 10 f£, BR040 km 1, -15.9860, -47.9870, 1220m, 14.ii.2018, Cerrado (D. Burckhardt & D. L. Queiroz), #264(3) (NHMB, slide mounted, 70% ethanol).—Goiás: 10 m$, 13 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #265(6) (DZUP, NHMB, dry, 70% ethanol); 11 m$, 20 f£, same but -14.1610, -47.8300, 880m, 16.ii.2018, *Andira cujabensis* (D. Burckhardt & D. L. Queiroz), #266(1) (NHMB, dry, 70% ethanol); 9 m$, 12 f£, 1 immatures, same but (D. Burckhardt & D. L. Queiroz), #266(2) (NHMB, 70% ethanol); 2 m$, 1 f£, Alto Paraíso do Goiás, São Jorge, -14.1780, -47.8100, 1010m, 17–18.ii.2018, forest edge, planted trees (D. Burckhardt & D. L. Queiroz), #269(-) (NHMB, 70% ethanol); 1 m$, 3 f£, 2 km NE Mossâmedes, Fazenda Ribeirão Bonito, -16.1150, -50.1970, 640m, 20.ii.2018, gallery forest, forest edge along pasture (D. Burckhardt & D. L. Queiroz), #274(-) (NHMB, 70% ethanol); 1 m$, 6 f£, ca. 15 km NW of Mineiros, BR364, -17.4617, -52.5850, 860m, 1.xi.2012, degraded Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #53(-) (NHMB, 70% ethanol); 3 m$, 7 f£, Mossâmedes, -16.1180, -50.2040, 690m, 20.ii.2018, isolated trees in city and along pasture, *Andira cujabensis* (D. Burckhardt & D. L. Queiroz), #275(2) (NHMB, 70% ethanol); 10 m$, 11 f£, Mossâmedes, Parque Estadual da Serra Dourada, Reserva Biológica da Universidade Federal de Goiás, -16.0720, -50.1840, 1000m, 19.ii.2018, Cerrado, *Andira cujabensis* (D. Burckhardt & D. L. Queiroz), #273(1) (NHMB, 70% ethanol); 9 m$, same but *Pterodon emarginatus* (D. Burckhardt & D. L. Queiroz), #273(3) (NHMB, 70% ethanol); 1 m$, São João da Alliança, -14.7170, -47.5260, 1030m, 18.ii.2018, isolated trees (D. Burckhardt & D. L. Queiroz), #272(-) (NHMB, 70% ethanol).—Mato Grosso: 6 m$, 5 f£, Cáceres, -16.0946, -57.2643, 161m, 16.ix.2016 (R. Ben-Hur), #95 (NHMB, 70% ethanol); 2 m$, Chapada dos Guimarães, Caverna Aroe Jari, -15.5683, -55.4817, 750m, 2.xi.2012, Cerrado (D. Burckhardt & D. L. Queiroz), #56(-) (NHMB, 70% ethanol); 1 m$, 3 f£, Nobres, Bom Jardim, -14.5283, -55.8050, 250–300m, 10.xi.2012, transitional forest (D. Burckhardt & D. L. Queiroz), #65(-) (NHMB, 70% ethanol).—Mato Grosso do Sul: 1 m$, Ponta Porã, -22.5358, -55.7258, 660m (D. L. Queiroz) (NHMB, 70% ethanol); 2 m$, 1 f£, 7 immatures, Ribas do Rio Pardo, -20.2669, -53.5751, 500m, 7.iii.2012 (D. L. Queiroz), #298 (NHMB, 70% ethanol); 1 m$, 2 f£, same but 8.iii.2012 (D. L. Queiroz), #301 (NHMB, 70% ethanol); 1 m$, 5 f£, same but (D. L. Queiroz), #302 (NHMB, 70% ethanol).—Minas Gerais: 2 m$, Uberlândia, Clube caça e pesca Itororo, -18.9930, -48.3070, 830m, 9.ii.2018, Cerrado (D. Burckhardt & D. L. Queiroz), #262(-) (NHMB, 70% ethanol); 2 m$, 2 f£, Uberlândia, Panga, -19.1840, -48.3960, 810m, 8.ii.2018, Cerrado (D. Burckhardt & D. L. Queiroz), #261(-) (NHMB, 70% ethanol); 1 m$, Vazante, Fazenda Bainha, -17.8800, -46.9233, 660m, 23.ix.2011, Cerrado, dry natural open scrub, *Pterodon emarginatus* (D. Burckhardt & D. L. Queiroz), #19(2) (NHMB, 70% ethanol); 1 m$, 1 f£, same but -17.6451, -46.7086, 640–650m, 26.xii.2014, disturbed Cerrado vegetation along unpaved road (D. L. Queiroz), #662 (NHMB, 70% ethanol); 1 m$, same but -17.8850, -46.9167, 904m, 06.i.2016 (D. L. Queiroz) 747(-) (NHMB, 70% ethanol); 6 m$, 10 f£, Vazante, Votorantim, -17.6286, -46.7002, 542m, 16.iii.2015 (D. L. Queiroz), #686(-) (NHMB, 70% ethanol); 1 m$, same but -17.6306, -46.6999, 550m, 17.iii.2015 (D. L. Queiroz), #690(-) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: older specimens with markings with dark outline.—Head and thorax light yellowish-brown, yellow, orange to brownish-orange. Gena sometimes slightly darker to brown anteriorly and ventrally; genal

process concolorous with head, dirty yellowish to yellowish-brown. Eye grey to dark red; ocelli colourless to orange. Antenna yellow, segments 1–2 slightly darker or concolorous with head. Clypeus yellowish to orange, slightly lighter medially; rostrum light yellow, dark yellow to orange. Thorax sometimes slightly darker than head to brown ventrally, sometimes with margins of sclerites darker. Mesopraescutum sometimes with posterior half irregularly coloured. Forewing colourless to yellowish, sometimes yellow around Cu1b and seldom around M3+4 and Cu1a; veins light yellow to yellowish-brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow with femora yellowish-brown, hindleg light yellow with femur yellowish-brown. Abdomen light yellowish-brown, yellow, orange to medium brown, sometimes darker ventrally; intersegmental membranes light straw-coloured to orange; spiracular sclerites concolorous with tergites. Male terminalia light yellow to yellowish-brown. Female terminalia light yellow, orange to yellowish-brown, proctiger brown apically and sometimes dorsally.

Structure. Body length m$ 2.3–2.6 mm (2.44±0.13 mm), f£ 2.5–2.7 mm (2.59±0.10 mm) (4 m$, 5 f£). Genal process (Fig. 50) swollen, irregularly narrowing towards broadly or narrowly rounded apex, 0.5–0.7 times as long as vertex along midline. Antenna 2.1–2.5 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 80) 2.9–3.0 times as long as head width, 2.2–2.3 times as long as wide, obovoid, broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.6–1.9; ratio c/d 0.8–0.9; ratio e/f 0.6–0.9; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), covering apical half or fully covering cells r1 and r2, fully covering cells m1, m2, and cu1 (sometimes restricted to radular areas), m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with short, blunt, almost straight posterior lobe. Paramere (Figs 132−133) 0.7 times as long as proctiger; in lateral view, clavate, strongly expanded apically; anterior margin expanding dorsally and anteriorly in apical third, irregularly concave basally, posterior margin expanding in apical third or quarter, slightly concave subapically, weakly convex in basal half; apex strongly indented in anterior third, with sclerotised ridge in posterior half (Fig. 133); inner surface (Fig. 133) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 204), sclerotised ridge smoothly inward directed, bearing posterior tooth after deep indention. Aedeagus (Fig. 134) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process weakly to strongly upturned, apical expansion larger than dorsal lobe, irregularly oval, slightly angulate at apex, bearing long, conical tubercle.—Female (Fig. 234). Proctiger 0.8–0.9 times as long as head width; in lateral view, dorsal outline weakly to strongly concave distal to circumanal ring, apical extension almost straight to sinuous, apex moderately upturned, obliquely rounded, smoothly to strongly obliquely truncate; circumanal ring 0.3–0.4 times as long as proctiger. Subgenital plate 0.5–0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline basal half strongly swollen, apical half almost straight or sinuous; covered with medium long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 264), lateral margins evenly, strongly narrowing at half, apical third narrow, weakly narrowing towards rounded apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.59–0.63 (0.62±0.02), f£ 0.68–0.69 (0.68±0.01); AL m$ 1.44–1.55 (1.51±0.06), f£ 1.46–1.58 (1.53±0.07); LAB2 m$ 0.16, f£ 0.17–0.18 (0.17±0.01); LAB3 m$ 0.10–0.11 (0.1±0.01), f£ 0.11–0.13 (0.12±0.01); FL m$ 1.73–1.86 (1.8±0.07), f£ 1.99–2.05 (2.02±0.03); TL m$ 0.42–0.44 (0.44±0.01), f£ 0.47–0.50

(0.48±0.02); MP 0.26–0.27 (0.26±0.01); PL 0.18; DL 0.24–0.27 (0.26±0.02); FP 0.57–0.60 (0.59±0.02).

Distribution. Brazil: Distrito Federal, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais (Fig. 287).

Host-plant. *Andira cujabensis* Benth. (Leguminosae, Papilionoideae, Aeschynomeneae).

Comments. *M.* sp. nov. 8 is similar to *M.* sp. nov. 24 and *M.* sp. nov. 26 It differs from *M. soror* in the surface spinules covering all area of cells m1, m2 and cu1, and the apex of the paramere expanded dorsad anteriorly and with indention in anterior third. It differs from *M. villosi* in the sclerotized ridge smoothly inward directed and separated from posterior tooth by deep indention, in dorsal view. No differences could be found in the female terminalia. See comment section under *M. itaparica* (Crawford).

***Mitrapsylla* sp. nov. 9**
(Figs 21, 51, 81, 135−137, 205, 235, 265, 287)

Material examined. Holotype m$, Brazil: Minas Gerais, Lavras, -21.2333, -45.0000, 900m, 1–6.vi.2010 edge of Atlantic forest around coffee plantation mixed with pastures (D. Burckhardt), #1(-) (DZUP, dry).

Paratypes: Minas Gerais: 3 m$, 2 f£, same data as holotype (D. Burckhardt), #1(-) (DZUP, NHMB, dry); 1 m$, same but *Stryphnodendron barbatimam* (D. Burckhardt), #1(9) (NHMB, dry); 2 m$, same but *Machaerium nictans* (D. Burckhardt), #1(15) (NHMB, dry); 1 m$, 3 f£, same but (D. Burckhardt), #11(-) (NHMB, dry, 70% ethanol); 2 f£, same but (D. Burckhardt), #2(-) (NHMB, dry); 4 m$, 3 f£, same but *Machaerium nictans* (D. Burckhardt), #2(3) (NHMB, dry, 70% ethanol); 3 m$, 3 f£, same but *Cedrela fissilis* (D. Burckhardt), #2(7) (NHMB, dry); 1 m$, 1 f£, Barroso, Mato do Bau, ca. 1000 m, -21.1869, -43.9758, 13–14.vi.2010 Cerradão semideciduous forest, along forest edge (D. Burckhardt), #7(-) (NHMB, dry); 1 m$, same but 13.vi.2010 campo rupestre vegetation = open vegetation with bare rocks (D. Burckhardt), #8(-) (NHMB, dry); 2 m$, 2 f£, same but Rio das Mortes 12–17.vi.2010 mato ciliar = gallery forest along river (D. Burckhardt), #5(-) (NHMB, dry); 4 m$, same but *Annona cacans* (D. Burckhardt), #5(10) (NHMB, dry, 70% ethanol); 2 m$, 2 f£, Paula Candido, Experimentos agrosilvipastoris/Maira, -20.8060, -42.9798, 785m, 20.viii.2013 (D. L. Queiroz) #565 (NHMB, 70% ethanol); 2 m$, Viçosa, Universidade Federal Viçosa(UFV) campus, Belvedere, -20.7567, -42.8700, 720m, 8.vii.2012, open area planted with various trees (D. Burckhardt & D. L. Queiroz), #34(-) (NHMB, 70% ethanol).—Paraná: 1 m$, Cerro Azul, BR-476 km 69, -25.0683, -49.0883, 870m, 18–19.iv.2013, Atlantic forest (D. Burckhardt & D. L. Queiroz), #106(-) (NHMB, 70% ethanol); 8 m$, 12 f£, Curitiba, Boa Vista, -25.3983, -49.2467, 950m, 8.v.2014, in flat; in dome lamp (D. Burckhardt & D. L. Queiroz), #138(-) (NHMB, dry); 1 m$, Curitiba, Cachoeira, Parque Nascentes do Belém, Rua Rolando Salin Zappa Mansur, -25.3531, -49.2659, 10.vi.2017, Araucaria forest (D. Burckhardt & D. L. Queiroz), #223(-) (NHMB, 70% ethanol); 2 m$, 2 f£, Curitiba, Jardim Botânico, -21.7248, -48.3569, 921m, 16.xii.2014 (D. L. Queiroz), #661 (NHMB, 70% ethanol); 2 m$, 1 f£, Curitiba, Parque Bacacheri, -25.3200, -49.1567, 920m, 6.iv.2013, park, remnants of Atlantic forest (D. Burckhardt & D. L. Queiroz), #98(-) (NHMB, 70% ethanol); 4 m$, 7 f£, Curitiba, Parque São Lourenço, -25.3850, -49.2650, 940m, 19.x.2012, planted park vegetation (D. Burckhardt & D. L. Queiroz), #45(-) (NHMB, 70% ethanol); 1 m$, 5 f£, Curitiba, Parque Tanguá, -25.3817, -49.2850, 930m, 6.ii.2013, old mine redone as park with seminatural biotopes, mixed Atlantic Araucaria forest, Fabaceae (D. Burckhardt & D. L. Queiroz), #90(11) (NHMB, 70% ethanol); 1 m$, 2 f£, Jaguariaíva, Parque do Cerrado, -24.1769, -49.6690, 849m, 10.vii.2013, Cerrado vegetation (D. L. Queiroz), #532 (NHMB, 70% ethanol); 1 m$, 1 f£, same but -24.1829, -49.6618, 873m (D. L. Queiroz), #533 (NHMB,

70% ethanol); 1 m$, Londrina, UEL/IAPAR, -23.3100, -51.1628, 6.iv.2013, *Leucaena* sp. (A. O. Menezes Jr.) (NHMB, 70% ethanol); 1 m$, same but 16.iv.2013 (A. O. Menezes Jr.) (NHMB, 70% ethanol); 3 m$, Parque do Cerrado, -24.1633, -49.6533, 660–780m, 26–27.vi.2015, Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #172(-) (NHMB, 70% ethanol); 1 m$, Piraquara, Marumbi, Estação Carvalho- Sanepar, Coleta com Renê, -24.8976, -48.7796, 20.xi.2013, Atlantic forest (D. L. Queiroz), #599(-) (NHMB, 70% ethanol); 2 m$, Tibagi, Parque Estadual do Guartelá, -24.5683, -50.2553, 938m, 10–12. vii.2017, Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #245(-) (NHMB, 70% ethanol); 1 m$, Tunas do Paraná, Beira da estrada, -25.0386, -49.0910, 776m, 24.vii.2013, degraded Atlantic forest (D. L. Queiroz), #547 (NHMB, 70% ethanol); 2 m$, 9 f£, Tunas do Paraná, Parque das Lauraceas, -25.0688, -49.0888, 1077m, 8.viii.2013, Atlantic forest (D. L. Queiroz) #558 (NHMB, 70% ethanol); 2 m$, 1 f£, Ventania, road BR 153, around 10 km from Ventania, -24.1783, -50.2167, 870m, 18.ix.2014, remnants of Atlantic forest along the road (D. Burckhardt & D. L. Queiroz), #149(-) (NHMB, 70% ethanol).—Rio Grande do Sul: 2 m$, Passo Fundo, Embrapa, -28.2167, -52.4000, 669m, 29.iv.2014 remnants Atlantic forest, *Cedrela* sp. (A. L. Marsaro Júnior) (NHMB, 70% ethanol); 1 m$, 12 immatures, same but -28.2288, -52.4065, 640m, 20.ix.2018, park vegetation, *Machaerium paraguariense* (D. Burckhardt & D. L. Queiroz), #306(9) (NHMB, 70% ethanol); 2 m$, 4 f£, Passo Fundo, RPPN Maragato, -28.2417, -52.4598, 639m, 27.vi.2013, Atlantic forest (D. L. Queiroz), #518 (NHMB, 70% ethanol).—Santa Catarina: 2 m$, 2 f£, 2 immatures, Florianópolis, Morro das aranhas, -12.4841, -55.7638, 250m, 16.ii.2015, *Machaerium hirtum* (D. L. Queiroz), #673(1) (NHMB, 70% ethanol); 1 m$, São Bento do Sul to Corupá, BR-280, km 102–97, -26.3500, -49.3400, 430m, 28.iv.2013, Atlantic forest (D. Burckhardt & D. L. Queiroz), #114(-) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripe along posterior margin weak when present; older specimens with markings with dark outline.—Head and thorax yellowish-brown to ochreous. Gena usually darker to brown anteriorly, slightly darker to dark brown ventrally; genal process lighter than vertex, brownish. Eye red to dark red; ocelli colourless to orange. Antenna yellow to light brown, segments 1–2 concolorous with head. Clypeus brown, lighter medially and darker along edges; rostrum light yellow to dark yellow. Thorax usually slightly darker to dark brown ventrally, usually with margins of sclerites darker. Forewing colourless to yellowish, sometimes slightly darker around Cu1b; veins light yellow to yellowish-brown, usually darker apically; pterostigma concolorous, lighter or darker than veins. Hindwing colourless. Legs light to dark yellow with femora light to dark brown, except apically, sometimes pro- and mesotarsi slightly darker. Abdomen light brown to medium brown, usually darker ventrally; intersegmental membranes light straw-coloured; spiracular sclerites concolorous or slightly darker than tergites. Male terminalia light brown to dark brown, proctiger and paramere usually lighter. Female terminalia irregularly light brown to dark brown, proctiger usually brown apically and subgenital plate brown basally.

Structure. Body length m$ 2.2–2.6 mm (2.43±0.12 mm), f£ 2.5–2.7 mm (2.61±0.07 mm) (5 m$, 5 f£). Genal process (Fig. 51) swollen, irregularly narrowing towards broadly or narrowly rounded apex, 0.6–0.7 times as long as vertex along midline. Antenna 1.9–2.5 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.7 times longer than median segment. Forewing (Fig. 81) 2.8–3.1 times as long as head width, 2.1–2.4 times as long as wide, obovoid, narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.6–1.8; ratio c/d 0.7–0.9; ratio e/f 0.5–0.8; surface spinules covering cells r1 and r2 apically, absent or much reduced around radular areas of cells m1, m2 and cu1, covering m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.6–0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, strongly down-curved posterior lobe. Paramere (Figs 135−136) 0.9 times as long as proctiger; in lateral view, lamellar; anterior margin weakly sinuous, sometimes almost straight before apex, posterior margin rounded in apical third, strongly expanded in basal two thirds; apex strongly rounded, with sclerotised ridge posteriorly (Fig. 136); inner surface (Fig. 136) covered with long setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, group of thick setae below sclerotised ridge along with several stout setae on apical posterior margin; in dorsal view (Fig. 205), sclerotised ridge slightly wavy, blunt, bearing posterior tooth. Aedeagus (Fig. 137) complex tripartite; in lateral view, median lobule slightly prominent median lobule; lateral lobules subequal with median lobule, subobovoid; membranous pouch rather broad; ventral process strongly upturned, apical expansion subequal with dorsal lobe, oval, bearing long, conical tubercle.—Female (Fig. 235). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension almost straight to sinuous, apex strongly upturned, strongly obliquely truncate; circumanal ring 0.2–0.3 times as long as proctiger. Subgenital plate 0.5–0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched subapically; covered with medium long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 265), lateral margins evenly, strongly narrowing at about half towards broad, subtruncate apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.56–0.63 (0.59±0.03), f£ 0.64–0.69 (0.66±0.03); AL m$ 1.18–1.37 (1.29±0.1), f£ 1.47–1.61 (1.55±0.07); LAB2 m$ 0.14–0.15 (0.14±0.01), f£ 0.15–1.59 (0.64±0.83); LAB3 m$ 0.09, f£ 0.09–0.10 (0.1±0.01); FL m$ 1.69–1.76 (1.73±0.04), f£ 1.99–2.06 (2.01±0.04); TL m$ 0.37–0.41 (0.39±0.03), f£ 0.42–0.45 (0.43±0.02); MP 0.25–0.27 (0.26±0.01); PL 0.23–0.25 (0.24±0.01); DL 0.28–0.3 (0.29±0.02); FP 0.66–0.67 (0.67±0.01).

Distribution. Brazil: Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina (Fig. 287).

Host-plant. *Machaerium paraguariense* Hassl. (Leguminosae, Papilionoideae, Aeschynomeneae).

***Mitrapsylla* sp. nov. 10**
(Figs 22, 52, 82, 138−140, 206, 236, 266, 288)

Material examined. Holotype m$, Brazil: Ceará, Parque Nacional de Ubajara, Tianguá, Torres, -3.7983, -40.9050, 880m, 6.vii.2016, Indigofera suffruticosa (D. Burckhardt & D. L. Queiroz), #220(9) (DZUP, dry).

Paratypes: Ceará: 1 m$, 4 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #220(9) (DZUP, NHMB, dry); 2 m$, 1 f£, Frecheirinha to Tianguá, -3.7283, -40.8417, 180m, 4.vii.2016, *Mimosa tenuiflora* (D. Burckhardt & D. L. Queiroz), #215(1) (NHMB, 70% ethanol); 2 m$, 2 f£, 1 immatures, ICMBIO headquarters, -3.8383, -40.9400, 860m, 2–7.vii.2016, *Desmodium album* (D. Burckhardt & D. L. Queiroz), #212(9) (NHMB, 70% ethanol).—Piauí: 1 m$, 1 f£, Parnaíba, Embrapa Meio-Norte, -3.0850, -41.7867, 60m, 27–30.vi.2016, *Copaifera cearensis* (D. Burckhardt & D. L. Queiroz), #207(1) (NHMB, 70% ethanol); 11 m$, 2 f£, Piripiri, Caldeirão, -4.3333, -41.7317, 170m, 23.vi.2016 (D. Burckhardt & D. L. Queiroz), #204(-) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern, usually faint in genal process and thorax; variation: mesoscutellum usually with an additional stripe along anterior margin or with an irregular pattern; older specimens with markings with dark outline.—Head and thorax light yellowish-brown to brownish-orange; genal process lighter than head. Eye

grey to dark red; ocelli colourless to orange. Antenna light yellow, segments 1–2 concolorous with head. Clypeus concolorous with body; rostrum light yellow. Thorax with margins of sclerites darker. Metascutellum sometimes almost completely white. Forewing colourless to slightly yellowish, sometimes slightly darker around Cu1b; veins light yellow to light yellowish-brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg concolorous to darker than body, hindleg lighter than rest of legs. Abdomen light yellowish-brown to light orange-brown; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia yellowish-brown. Female terminalia light yellow, proctiger brown apically.

Structure. Body length m$ 2.2–2.3 mm (2.26±0.02 mm), f£ 2.2–2.3 mm (2.24±0.11 mm) (5 m$, 2 f£). Genal process (Fig. 52) swollen or subconical, irregularly narrowing towards subacute, acute or rounded apex, 0.5–0.6 times as long as vertex along midline. Antenna 1.9–2.3 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.8–0.9 times longer than median segment. Forewing (Fig. 82) 2.8–2.9 times as long as head width, 2.2–2.3 times as long as wide, obovoid or suboval, broadly or slightly narrowly rounded apically; vein M+Cu1 0.4 times as long as Cu1; ratio a/b 1.5–1.7; ratio c/d 0.7–0.8; ratio e/f 0.5–0.9; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), covering apical half of cell r1, apical third of cell r2, absent or much reduced around radular areas of cells m1, m2 and cu1, covering m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.8–0.9 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, strongly tapered, strongly down-curved posterior lobe. Paramere (Figs 138−139) 0.8 times as long as proctiger; in lateral view, clavate, moderately expanded apically; anterior margin strongly sinuous, broadly rounded in apical third, posterior margin angulate and expanded in apical third, weakly convex in basal two thirds; apex irregularly rounded to subtruncate, slightly to strongly directed posteriorly, with sclerotised ridge medially (Fig. 139); inner surface (Fig. 139) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 206), sclerotised ridge irregularly straight, bearing posterior tooth. Aedeagus (Fig. 140) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process relatively straight to upturned, apical expansion larger than dorsal lobe, globular, bearing short, conical tubercle.—Female (Fig. 236). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension sinuous, apex slightly upturned, obliquely rounded; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline irregularly straight to sinuous, sometimes slightly notched medially; covered with medium long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 266), lateral margins abruptly narrowing at half, with apical half weakly narrowing towards slightly broad, rounded apex.

Measurements (in mm) (4 m$, 2 f£). HW m$ 0.56–0.60 (0.57±0.02), f£ 0.55–0.56 (0.55±0.01); AL m$ 1.16–1.27 (1.22±0.05), f£ 1.16–1.19 (1.17±0.02); LAB2 m$ 0.14–0.15 (0.15±0.01), f£ 0.14–0.15 (0.14±0.01); LAB3 m$ 0.11–0.13 (0.12±0.01), f£ 0.12; FL m$ 1.65–1.67 (1.66±0.01), f£ 1.54–1.60 (1.57±0.04); TL m$ 0.46–0.49 (0.47±0.01), f£ 0.42–0.44 (0.43±0.01); MP 0.23–0.25 (0.24±0.01); PL 0.19–0.21 (0.2±0.01); DL 0.26; FP 0.56–0.57 (0.56±0.01).

Distribution. Brazil: Ceará, Piauí (Fig. 288).

Host-plant. *Desmodium album* (Schindl.) J.F. Macbr. (Leguminosae, Papilionoideae, Desmodieae).

Comments. *M.* sp. nov. 10 resembles *M. cubana* Crawford but differs in the surface spinules absent or very scattered around radular areas of cells m1, m2 and cu1, the paramere with anterior margin broadly rounded in apical third and apex strongly directed posteriorly, the sclerotised ridge irregularly straight in dorsal view, and the female proctiger with rounded, slightly upturned apex.

***Mitrapsylla* sp. nov. 11**
(Figs 23, 53, 83, 141−143, 207, 237, 267, 288)

Material examined. Holotype m$, Brazil: Mato Grosso, Sinop, -11.8645, -55.6068, 357m, 25.viii.2012 (D. L. Queiroz), #336 (DZUP, dry).

Paratypes: Mato Grosso: 3 m$, 5 f£, 1 immatures, same data as holotype (D. L. Queiroz), #336 (DZUP, NHMB, dry, slide mounted, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripe along posterior margin absent; mesoscutellum with a stripe along anterior margin or with an anterolateral marking; older specimens with markings with dark outline.—Head and thorax dark yellow. Gena sometimes slightly darker anteriorly and ventrally; genal process concolorous with vertex. Eye grey to dark red; ocelli colourless to orange. Antenna light yellow, segments 1–2 concolorous with head. Clypeus concolorous with body, darker along edges; rostrum light yellow to dark yellow. Thorax with margins of sclerites darker. Forewing colourless to slightly yellowish, sometimes slightly darker around Cu1b; veins light yellow to light yellowish-brown; pterostigma concolorous or slightly darker than veins. Hindwing colourless. Legs concolorous with body, femora usually slightly darker, metatibia lighter. Abdomen dark yellow to yellowish-brown, yellowish-brown to brown ventrally; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with sternites. Male terminalia dark yellow. Female terminalia irregularly dark yellow and yellowish-brown, proctiger usually darker apically.

Structure. Body length m$ 2.1 mm, f£ 2.2–2.5 mm (2.35±0.16 mm) (1 m$, 2 f£). Genal process (Fig. 53) subconical, irregularly narrowing towards acute apex, 0.6 times as long as vertex along midline. Antenna 2.4–2.5 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.5–0.7 times longer than median segment. Forewing (Fig. 83) 2.8 times as long as head width, 2.2 times as long as wide, obovoid, broadly rounded apically; vein M+Cu1 0.4–0.5 times as long as Cu1; ratio a/b 1.8; ratio c/d 0.7–0.8; ratio e/f 0.6–1.0; surface spinules moderately spaced, forming rhomboids (Fig. 102), covering apical half or very apex of cells r1 and r2, around radular areas of cells m1, m2 and cu1 (sometimes much reduced), m2 basally and most of cell cu2, leaving spinule-free spaces along veins. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, strongly tapered, weakly down-curved posterior lobe. Paramere (Figs 141−142) 0.9 times as long as proctiger; in lateral view, clavate, weakly expanded apically; anterior margin sinuous, posterior margin irregularly sinuous, forming small lobe in apical third); inner surface (Fig. 142) covered with long setae, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 207), sclerotised ridge bearing sclerotised posterior tooth. Aedeagus (Fig. 143) complex tripartite; in lateral view, median lobule flattened, elongate median lobule; lateral lobules subequal with dorsal lobule, broadly rounded apically; membranous pouch elongate; ventral process weakly upturned, apical expansion subequal with dorsal lobe, oval,

bearing long, blunt tubercle.—Female (Fig. 237). Proctiger 1.1 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension sinuous, apex strongly upturned, strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous; covered with medium long setae in subasal quarter and ventrally throughout, and short setae in apical half, long setae at apex, and group of long setae subapically on dorsum and submedially with seta-free patch subapically; in ventral view (Fig. 267), lateral margins unevenly, weakly narrowing at half towards broad, subtruncate apex.

Distribution. Brazil: Mato Grosso (Fig. 288).

Host-plant. Unknown.

Comments. See comments section under *M.* sp. nov. 12

Mitrapsylla sp. E Burckhardt & Queiroz

Mitrapsylla sp. E Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Minas Gerais, between Presidente Olegario and Lagamar, -18.3417, -46.4967, 950m, 12.vii.2012, scrub along road, *Copaifera oblongifolia* (D. Burckhardt & D. L. Queiroz), #39(1) (MZSP, dry).

Description of adult and immature by Burckhardt & Queiroz (2019).

Distribution. Brazil: Goiás, Minas Gerais, Mato Grosso do Sul (Fig. 288) (Burckhardt & Queiroz 2019).

Host-plant. *Copaifera oblongifolia* Mart. Ducke (Leguminosae, Detarioideae, Detarieae) (Burckhardt & Queiroz 2019).

Mitrapsylla sp. F Burckhardt & Queiroz

Mitrapsylla sp. F Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Minas Gerais, Vargem Bonita, Parque Nacional da Serra da Canastra, Cachoeira Casca d'Anta, around park entrance, -20.3083, -46.5217, 850–860m, 4–8.ix.2014, transition from riparian to Cerrado vegetation, *Copaifera langsdorffii* (D. Burckhardt & D. L. Queiroz), #141(4) (MZSP, dry).

Description of adult and immature by Burckhardt & Queiroz (2019).

Distribution. Brazil: Distrito Federal, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná, Santa Catarina, São Paulo (Fig. 288) (Burckhardt & Queiroz 2019).

Host-plant. *Copaifera langsdorffi*i Desf., *C. marginata* Benth. (Leguminosae, Detarioideae, Detarieae) (Burckhardt & Queiroz 2019).

Mitrapsylla sp. nov. 12

(Figs 24, 54, 84, 144−146, 208, 238, 268, 288)

Material examined. Holotype m$, Brazil: Mato Grosso do Sul, Ponta Porã, Fazenda Mariana, Conflora, -22.0085, -55.5828, 591m, 9.xii.2008 (D. L. Queiroz) (DZUP, dry).

Paratypes: Mato Grosso do Sul: 2 m$, 2 f£, 12 immatures, same data as holotype (D. L. Queiroz) (DZUP, NHMB, dry, slide mounted, 70% ethanol).

Description. Colouration. Body with white striped-pattern. Head pale orange to yellowish-orange; genal process lighter than head. Eye grey to dark red; ocelli orange. Antenna yellow, segments 1–2 darker. Clypeus dark yellow, slightly lighter medially; rostrum dark yellow to yellowish-brown. Pronotum dark yellow to dark orange. Mesopraescutum dark

yellow to dark orange, sometimes with posterior half irregularly coloured. Forewing yellowish, yellow around Cu1b and slightly around rest of veins apically; veins light yellow to yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellowish, hindleg light yellow. Abdomen dark yellow to orange, sometimes darker ventrally; spiracular sclerites concolorous with sternites. Male terminalia irregularly light yellow. Female proctiger dark yellow, usually darker apically, subgenital plate light yellow to yellow.

Structure. Genal process (Fig. 54) swollen, irregularly narrowing towards subacute or narrowly rounded apex, 0.6 times as long as vertex along midline. Antenna 2.5 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.6 times longer than median segment. Forewing (Fig. 84) 2.8 times as long as head width, 2.4 times as long as wide, obovoid, narrowly rounded apically; vein M+Cu1 0.4 times as long as Cu1; ratio a/b 1.5; ratio c/d 0.8; ratio e/f 0.6; surface spinules moderately spaced, forming rhomboids (Fig. 102), fully covering cells c+sc, r1, r2, m1, m2, cu1 and cu2, leaving spinule-free spaces along veins. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt or weakly tapered, weakly down-curved posterior lobe. Paramere (Figs 144−145) 0.8 times as long as proctiger; in lateral view, clavate, weakly expanded apically; anterior margin weakly sinuous, posterior margin relatively straight in basal two thirds, forming small lobe in apical third); inner surface (Fig. 145) covered with long setae, longer along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and on apical posterior margin; in dorsal view (Fig. 208), sclerotised ridge bearing sclerotised posterior tooth. Aedeagus (Fig. 146) complex tripartite; in lateral view, median lobule slightly flattened, elongate median lobule; lateral lobules about same size as dorsal lobule but slightly shorter, irregularly rounded apically; membranous pouch small; ventral process strongly upturned apical expansion larger than dorsal lobe, oblong-oval, bearing long, blunt tubercle.—Female (Fig. 238). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline moderately to strongly concave distal to circumanal ring, apical extension sinuous, apex moderately upturned, smoothly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline basal half strongly swollen, apical half almost straight; covered with medium long setae in median third, ventrally throughout, and in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 268), lateral margins evenly, strongly narrowing at half, apical third narrow, weakly narrowing towards rounded apex.

Distribution. Brazil: Mato Grosso do Sul (Fig. 288).

Host-plant. Unknown.

Comments. *M.* sp. nov. 12 resembles *M.* sp. nov. 11 in the male terminalia but differs in the slightly posterad directed apex of the paramere, in the absence of a group of stout setae on apical posterior margin on the inner surface, the small membranous pouch of the dorsal lobe of the aedeagus and the oblong-oval ventral process of the aedeagus. *M.* sp. nov. 12 also resembles *M.* sp. nov. 8*, M.* sp. nov. 24 and *M.* sp. nov. 26 in the female terminalia and no differences could be found to discriminate them.

***Mitrapsylla* sp. nov. 13**
(Figs 25, 55, 85, 147−149, 209, 239, 269, 289)

Material examined. Holotype m$, Brazil: Piauí, Parque APA(área de preservação ambiental) Delta de Parnaíba, Ilha Grande, -2.8583, -41.8167, 0m, 28.vi.2016, *Machaerium amplum* (D. Burckhardt & D. L. Queiroz), #208(2) (DZUP, dry).

Paratypes: Piauí: 41 m$, 66 f£, 197 immatures, same data as holotype (D. Burckhardt & D. L. Queiroz), #208(2) (DZUP, NHMB, dry, slide mounted, 70% and 100% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripe along lateral margins fused to dot adjacent to lateral ocellus, and stripe along posterior margin weak when present; mesoscutum with an additional stripe laterally, commonly fused to the sublateral forming a thick stripe; older specimens with markings with dark outline.—Head and thorax dark yellow, yellowish-brown to orange; genal process lighter than head. Eye red to dark red; ocelli colourless to orange. Antenna yellow, segments 1–2 concolorous with head. Clypeus concolorous with head, sometimes slightly darker along edges; rostrum yellow to orange. Thorax sometimes brownish laterally, usually with margins of sclerites darker. Forewing colourless to slightly yellowish, yellow around veins apically; veins light yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg usually dark yellow usually with femora brown, hindleg light yellow usually with femur dark brown. Abdomen light yellowish-brown, light brown to medium brown, usually darker ventrally; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with sternites. Male proctiger irregularly brown, paramere and subgenital plate irregularly dark yellow. Female terminalia dark yellow, proctiger irregularly brown apically and around anus.

Structure. Body length m$ 2.6–2.7 mm (2.62±0.04 mm), f£ 2.8 mm (2.8±0.04 mm) (3 m$, 3 f£). Genal process (Fig. 55) subconical, evenly narrowing towards rounded apex, 0.4–0.5 times as long as vertex along midline. Antenna 2.9–3.1 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 85) 2.7–2.9 times as long as head width, 2.2–2.3 times as long as wide, obovoid, oval or subrhomboidal narrowly rounded apically; vein M+Cu1 0.4–0.5 times as long as Cu1; ratio a/b 1.5, M1+2 sinuous; ratio c/d 0.8–0.9; ratio e/f 0.6–0.8; surface spinules covering cell r1 apically and cell m2 basally, most of cell cu2, absent in rest of cells leaving spinule-free spaces along veins; radular spinules present in cell r2. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, strongly tapered, weakly down-curved posterior lobe. Paramere (Figs 147−148) 1.0 times as long as proctiger; in lateral view, clavate, strongly expanded apically; anterior margin strongly directed anteriorly in apical third, somewhat straight in median third, posterior margin broadly rounded in apical third, weakly concave in basal two thirds; apex deeply indented in anterior half, forming prominent hook in posterior half); inner surface (Fig. 148) covered with long setae, longer and thicker along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and on apical posterior margin and group of stout setae on apical posterior margin; in dorsal view (Fig. 209), sclerotised ridge produced into massive inward directed median tooth. Aedeagus (Fig. 149) complex unipartite; in lateral view, dorsal lobe subglobular; ventral process weakly upturned, apical expansion weak, subequal with dorsal lobe, subglobular, bearing short, conical tubercle.—Female (Fig. 239). Proctiger 1.1 times as long as head width; in lateral view, dorsal outline moderately concave distal to circumanal ring, apical extension sinuous, apex moderately upturned, smoothly to strongly obliquely truncate; circumanal ring 0.2–0.3 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched subapically and convex apically; covered with long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and medium length setae on dorsum subapically, without seta-free patch subapically; in ventral view (Fig. 269), lateral margins evenly, weakly narrowing towards narrow, rounded apex.

Measurements (in mm) (2 m$, 2 f£). HW m$ 0.71, f£ 0.71–0.72 (0.71±0.01); AL m$ 2.08–2.20 (2.14±0.09), f£ 2.10–2.17 (2.13±0.05); LAB2 m$ 0.17, f£ 0.16; LAB3 m$ 0.10, f£ 0.09–0.11 (0.1±0.01); FL m$ 1.92, f£ 2.03–2.09 (2.06±0.04); TL m$ 0.52–0.53 (0.53±0.01), f£ 0.51; MP 0.29–0.31 (0.3±0.01); PL 0.30; DL 0.28–0.34 (0.31±0.05); FP 0.74–0.77 (0.75±0.02).

Distribution. Brazil: Piauí (Fig. 289).

Host-plant. *Machaerium amplum* Benth. (Leguminosae, Papilionoideae, Aeschynomeneae).

***Mitrapsylla* sp. nov. 14**
(Figs 26, 56, 86, 150−152, 210, 240, 270, 289)

Material examined. Holotype m$, Brazil: Minas Gerais, Lavras, Universidade Federal de Lavras – UFLA, -21.2333, -45.0000, 900m, 1–6.vi.2010 park trees, forest edge, hedges and plantations Holocalyx balansae (D. Burckhardt), #2(9) (DZUP, dry).

Paratypes: Mato Grosso do Sul: 1 m$, Bodoquena, Fazenda Boca da Onça, -20.7385, -56.7347, 214m, 15.ix.2013 (D. L. Queiroz), #582 (NHMB, 70% ethanol).—Minas Gerais: 199 m$, 255 f£, same data as holotype (D. Burckhardt), #2(9) (DZUP, NHMB, dry, slide mounted, 70% ethanol).—São Paulo: 1 m$, Piracicaba, Universidade de São Paulo, Esalq(Escola Superior de Agricultura "Luiz de Queiroz") campus, -22.7110, -47.6320, 550m, 6.ii.2018, park vegetation (D. Burckhardt & D. L. Queiroz), #257(-) (NHMB, 70% ethanol); 3 m$, 3 f£, Saltinho, Mata do Pinheirinho, -22.8700, -47.6770, 620m, 6.ii.2018, forest edge (D. Burckhardt & D. L. Queiroz), #258(-) (NHMB, 70% ethanol); 2 m$, 1 f£, Santo Amaro, -23.6532, -46.7066, xii.1985 (M. G. Oliveira) (MZSP, dry).

Description. Colouration. Head, pronotum and abdomen lacking distinct pattern, rest of thorax with faint light straw-coloured striped-pattern.—Head light straw-coloured to pale yellow; genal process sometimes slightly darker than head apically. Eye dark red; ocelli colourless to orange. Antenna yellowish-brown, segments 1–2 concolorous with head. Clypeus pale yellow, slightly lighter medially; rostrum light yellow. Thorax pale yellow, with margins of sclerites slightly darker. Mesopraescutum sometimes with anterior half yellow. Metascutellum almost entirely light straw-coloured. Forewing colourless; veins light yellow in basal half of forewing, brownish in apical half; pterostigma concolorous with veins. Hindwing colourless. Fore- and midleg pale yellow with tarsi darker, hindleg light yellow. Abdomen light straw-coloured to pale yellow; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with abdomen. Male terminalia irregularly pale yellow. Female terminalia pale yellow, proctiger with apical half brown, subgenital plate brown apically.

Structure. Body length m$ 2.3–2.6 mm (2.45±0.15 mm), f£ 2.6–2.8 mm (2.66±0.12 mm) (5 m$, 5 f£). Genal process (Fig. 56) swollen, irregularly narrowing towards broadly or narrowly rounded apex, 0.4–0.6 times as long as vertex along midline. Antenna 2.4–2.7 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 86) 2.7–2.9 times as long as head width, 2.3–2.5 times as long as wide, obovoid, narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.7–1.9; ratio c/d 0.7–0.9; ratio e/f 0.7–1.0; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), covering apical half or third of cells r1 and r2, fully covering cells m1, m2, cu1 and cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.6–0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, strongly down-curved posterior lobe. Paramere (Figs 150−151) 1.0–1.1 times as long as

proctiger; in lateral view, lamellar; anterior margin rounded apically, almost straight before apex, almost straight in apical two thirds, expanded posteriorly in basal third; apex with prominent median projection, indented posteriorly); inner surface (Fig. 151) covered with short setae, longer on basal posterior projection an along posterior margin, with row of thick setae along apical anterior margin, group of thick setae below sclerotised ridge and on apical posterior margin; in dorsal view (Fig. 210), apex sclerotised forming squarish, inward and posteriorly directed process. Aedeagus (Fig. 152) complex unipartite; in lateral view, dorsal lobe much expanded and almost as long as ventral process; ventral process strongly upturned, apical expansion weak, considerably smaller than dorsal lobe, bearing long, conical tubercle.—Female (Fig. 240). Proctiger 0.9 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension almost straight, apex straight to slightly up-turned, smoothly transversally truncate to irregularly rounded; circumanal ring 0.3–0.4 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline sinuous to convex along basal half, slightly notched submedially or subapically and convex apically; covered with medium long setae in subasal quarter, and short setae in apical half, long setae at apex without seta-free patch subapically; in ventral view (Fig. 270), lateral margins evenly, weakly narrowing towards broad, rounded apex.

Measurements (in mm) (5 m$, 3 f£). HW m$ 0.63–0.67 (0.65±0.02), f£ 0.71–0.73 (0.72±0.01); AL m$ 1.58–1.70 (1.64±0.05), f£ 1.73–1.79 (1.75±0.03); LAB2 m$ 0.15, f£ 0.16–0.17 (0.16±0.01); LAB3 m$ 0.09–0.11 (0.1±0.01), f£ 0.10; FL m$ 1.75–1.90 (1.83±0.06), f£ 1.98–2.07 (2.02±0.05); TL m$ 0.41–0.44 (0.43±0.01), f£ 0.46–0.48 (0.47±0.01); MP 0.27–0.29 (0.28±0.01); PL 0.28–0.29 (0.29±0.01); DL 0.33–0.37 (0.36±0.02); FP 0.64–0.67 (0.66±0.02).

Distribution. Brazil: Mato Grosso do Sul, Minas Gerais, São Paulo (Fig. 289).

Host-plant. Many adults were collected on *Holocalyx balansae* Micheli (Leguminosae) but confirmation is needed.

***Mitrapsylla* sp. nov. 15**
(Figs 27, 57, 87, 153−155, 211, 241, 271, 289)

Material examined. Holotype m$, Brazil: Amazonas, AM, Itacoatiara, Madereira MIL, -2.7528, -58.6531, 29–30.xi.2005, mobile light trap (J.A. Rafael, R.J.P Machado & A. Silva F°.) (INPA, dry).

Paratypes: Amazonas: 40 m$, 50 f£, AM, Itacoatiara, Madereira MIL, 29–30.xi.2005 (J.A. Rafael, R.J.P Machado & A. Silva F°.) (INPA, dry).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripe along lateral margins weak when present; mesoscutum without stripe submedially, seldom with a submedian marking; older specimens with markings with dark outline.—Head and thorax orange. Gena lighter ventrally; genal process light yellow to yellow. Eye grey to red; ocelli colourless to orange. Antenna light yellow, segments 1–2 sometimes darker. Clypeus light yellow to yellow, sometimes dark along edges; rostrum light yellow to yellow. Pronotum sometimes slightly lighter than rest of thorax. Forewing colourless; veins light yellow to light brown; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Legs yellow, sometimes with tarsi slightly darker and metatibia usually lighter. Abdomen orange, light yellow to yellow ventrally; spiracular sclerites concolorous with tergites. Male proctiger yellow to orange, paramere and subgenital plate yellow. Female proctiger dark yellow, usually darker apically and around anus, subgenital plate light yellow to yellow.

Structure. Body length m$ 1.9–2.1 mm (2.0±0.05 mm), f£ 2.1–2.4 mm (2.3±0.12 mm) (5 m$, 5 f£). Genal process (Fig. 57) swollen or subconical, evenly or irregularly narrowing

towards subacute or narrowly rounded apex, 0.5 times as long as vertex along midline. Antenna 2.7–3.0 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 87) 2.7–2.9 times as long as head width, 2.3–2.5 times as long as wide, obovoid, narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.6–1.8; ratio c/d 0.6–0.7; ratio e/f 0.7–1.1; surface spinules moderately spaced, forming rhomboids (Fig. 102), covering apical half of cells r1 and r2, around radular areas of cells m1, m2 and cu1 (sometimes much reduced), m2 basally and most of cell cu2, leaving spinule-free spaces along veins. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, weakly tapered, weakly down-curved posterior lobe. Paramere (Figs 153−154) 1.0 times as long as proctiger; in lateral view, capitate; anterior margin rounded and strongly expanded dorsally and anteriorly in apical third, almost straight or weakly concave in basal two thirds, posterior margin expanded in apical quarter, almost straight to weakly concave in median two quarters; apex obliquely truncate, with sclerotised ridge along apex (Fig. 154); inner surface (Fig. 154) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 211), sclerotised ridge rather straight, bearing posterior tooth. Aedeagus (Fig. 155) simple in lateral view, aedeagal head longer than stem, strongly expanded, oval, bearing long stout dorsal tubercle subapically dorsal lobe, bearing tubercle.—Female (Fig. 241). Proctiger 1.2 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension sinuous, apex moderately to strongly upturned, strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline slightly convex medially, slightly indented subapically and apical third sinuous to slightly convex; covered with long setae, intercalated with short setae in apical third, longer setae at apex and group of long setae subapically on dorsum, without seta-free patch subapically; in ventral view (Fig. 271), lateral margins evenly, strongly narrowing at about half towards slightly broad, rounded apex.

Measurements (in mm) (2 m$, 2 f£). HW m$ 0.55–0.57 (0.56±0.02), f£ 0.58–0.62 (0.6±0.03); AL m$ 1.51–1.63 (1.57±0.09), f£ 1.71–1.73 (1.72±0.02); LAB2 m$ 0.14, f£ 0.14–0.15 (0.14±0.01); LAB3 m$ 0.09, f£ 0.09; FL m$ 1.53–1.55 (1.54±0.01), f£ 1.70–1.82 (1.76±0.08); TL m$ 0.38, f£ 0.40–0.42 (0.41±0.01); MP 0.23; PL 0.22–0.24 (0.23±0.01); DL 0.27–0.29 (0.28±0.01); FP 0.69–0.74 (0.71±0.04).

Distribution. Brazil: Amazonas (Fig. 289).

Host-plant. Unknown.

Comments. *M.* sp. nov. 15 resembles *M. panamensis* Brown & Hodkinson in the shape of the paramere but differs in aedeagal head bearing a long stout tubercle subapically on dorsal margin.

***Mitrapsylla itaparica* (Crawford)**
(Figs 28, 58, 88, 156−158, 212, 242, 272)

Psylla itaparica Crawford, 1925: 63.
Euceropsylla itaparica, Costa Lima (1942): 106.
Mitrapsylla itaparica, Brown & Hodkinson (1988): 62.

Material examined: Paraná: 8 m$, 10 f£, 20 skins, Matinhos, Praia Mansa, Estrada de Cabaraquara, -25.5079, -49.0001, 15m, 07.ii.2015 (D. L. Queiroz), #667 (NHMB, slide mounted, 70% ethanol); 3 m$, 6 f£, same but *Sophora tomentosa* (D. L. Queiroz), #667 (1)

(NHMB, 70% ethanol).—Santa Catarina: 8 m$, 21 f£, 40 immatures, Florianópolis, Costão do Santinho, -25.8501, -48.5460, 2m, 25.i.2015 (D. L. Queiroz), #665 (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: mesopraescutum with lateral stripes fused to lateral spots on posterior margin; mesoepisternum with markings inconspicuous.—Head and thorax light yellow to pale orange-yellow; genal process light straw-coloured to white. Eye grey to dark red; ocelli colourless to orange. Antenna light yellow, segments 1–2 slightly darker. Clypeus concolorous or slightly lighter than head, slightly lighter medially and slightly darker along edges; rostrum light yellow to light orange-yellow. Thorax with margins of sclerites slightly darker. Mesopraescutum rarely with posterior half irregularly coloured. Forewing yellowish, yellow around Cu1b and seldom around M3+4 and Cu1a and slightly on M1+2; veins light yellow; pterostigma concolorous with veins. Hindwing colourless. Fore- and midleg yellow, sometimes with tarsi slightly darker, hindleg light yellow. Abdomen light yellow to pale orange-yellow; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia concolorous with abdomen, paramere and subgenital plate sometimes slightly darker. Female terminalia concolorous with abdomen, darker apically.

Structure. Body length m$ 2.5–2.6 mm (2.55±0.01 mm), f£ 2.5–2.8 mm (2.68±0.09 mm) (2 m$, 4 f£). Genal process (Fig. 58) swollen, evenly or irregularly narrowing towards broadly rounded apex, 0.5–0.7 times as long as vertex along midline. Antenna 2.4 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.1–0.7 times longer than median segment. Forewing (Fig. 88) 2.9–3.0 times as long as head width, 2.2–2.3 times as long as wide, obovoid or suboval, narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.7–2.0; ratio c/d 0.8–0.9; ratio e/f 0.5–0.7; surface spinules distinctly spaced, forming rhomboids (Fig. 101), sometimes densely spaced in cell r1, forming irregular groups somewhat separated from each other (Fig. 104), fully covering cells r1, r2, m1, m2, cu1 and cu2, leaving spinule-free spaces along veins, covering cells up to veins apically; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.6–0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with short, weakly tapered, weakly down-curved posterior lobe. Paramere (Figs 156−157) 0.7–0.8 times as long as proctiger; in lateral view, clavate, strongly expanded apically; anterior margin expanding in apical third, irregularly concave basally, posterior margin expanding in apical third, weakly to strongly convex in basal two thirds; apex irregularly straight, with sclerotised ridge in most of posterior half (Fig. 157); inner surface (Fig. 157) covered with long setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 212), sclerotised ridge irregularly straight, bearing posterior tooth. Aedeagus (Fig. 158) complex unipartite; in lateral view, dorsal lobe subtriangular; ventral process weakly upturned, apical expansion larger than dorsal lobe, irregularly globular, bearing long, conical tubercle.—Female (Fig. 242). Proctiger 1.0 times as long as head width; in lateral view, dorsal outline weakly concave distal to circumanal ring, apical extension sinuous, apex straight to slightly up-turned, smoothly transversally truncate to obliquely rounded; circumanal ring 0.4 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched subapically; covered with medium long setae in median third, ventrally throughout, short and medium long setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 272), lateral margins evenly, strongly narrowing at about half towards narrow, rounded apex.

Measurements (in mm) (2 m$, 3 f£). HW m$ 0.64–0.70 (0.67±0.04), f£ 0.65–0.66 (0.66±0.01); AL m$ 1.55–1.65 (1.6±0.07), f£ 1.53–1.56 (1.55±0.02); LAB2 m$ 0.17–1.50 (0.84±0.94), f£ 0.15–0.17 (0.16±0.01); LAB3 m$ 0.10, f£ 0.10; FL m$ 1.84–1.99 (1.91±0.1), f£ 1.97–2.01 (1.99±0.02); TL m$ 0.42–0.46 (0.44±0.03), f£ 0.42–0.44 (0.44±0.01); MP 0.27–0.30 (0.29±0.02); PL 0.22; DL 0.26; FP 0.62–0.64 (0.63±0.01).

Distribution. Brazil: Bahia (Tavares 1920, 1922, as 'Psyllídeo'; Crawford 1925, as *Psylla itaparica*; Costa Lima 1942).—New state record for Brazil: Paraná, Santa Catarina (Fig. 289).

Host-plant. *Sophora tomentosa* L. (Leguminosae, Papilionoideae, Sophoreae).

Comments. *M. itaparica* (Crawford) resembles *M.* sp. nov. 8*, M.* sp. nov. 24 and *M.* sp. nov. 26 in the shape of the paramere but differs from them in the surface spinules covering all area of cells r1, r2, m1, m2, cu1 and cu2 and in the paramere with apex irregularly straight and anterior margin never expanded dorsad.

Mitrapsylla longicauda Brown & Hodkinson

Mitrapsylla longicauda Brown & Hodkinson, 1988: 77.

Material examined: Roraima: 1 m$, Mucajaí, km 442–440 along BR-174 S Mucujaí, 2.3583, -60.9133, 70–80m, 18–19.iv.2015, scrub along road (D. Burckhardt & D. L. Queiroz), #165(-) (NHMB, dry).

Description of adult by Brown & Hodkinson (1988). Immature unknown.

Distribution. Panamá (Brown & Hodkinson 1988)—New state record for Brazil: Roraima (Fig. 289).

Host-plant. Unknown.

Comments. This is the first record of this species in Brazil.

Mitrapsylla sp. nov. 16

(Figs 29, 59, 89, 159−161, 213, 243, 273, 290)

Material examined. Holotype m$, Brazil: Minas Gerais, Vazante, Fazenda Bainha, near source of Curtume river, -17.8883, -46.9200, 640–690m, 11.ix.2014, degraded Cerrado vegetation, *Machaerium hirtum* (D. Burckhardt & D. L. Queiroz), #145(4) (DZUP, dry).

Paratypes: Goiás: 6 m$, 4 f£, Mossâmedes, Parque Estadual da Serra Dourada, park entrance, -16.0990, -50.1870, 710m, 20.ii.2018, gallery forest, Cerrado, *Machaerium hirtum* (D. Burckhardt & D. L. Queiroz), #276(3) (NHMB, 70% ethanol).—Mato Grosso: 3 m$, 1 f£, Cotriguaçu, -9.8668, -58.2277, 226m, 30.ix.2013 (L. A. Pezzini) (NHMB, 70% ethanol); 22 m$, 23 f£, Tabaporã, Fazenda Crestani, -11.3133, -55.9617, 330–380m, 6–8.xi.2012, transitional forest near river, forest edges, farm land, park vegetation, *Machaerium aculeatum* (D. Burckhardt & D. L. Queiroz), #62(11) (NHMB, slide mounted, 70% ethanol).—Mato Grosso do Sul: 1 m$, Jardim, near BR267, -21.4500, -55.7917, 380–440m, 18–20.xi.2012, Cerrado edge along unpaved road, gallery forest along river, single trees in field, *Machaerium villosum* (D. Burckhardt & D. L. Queiroz), #76(8) (NHMB, 70% ethanol); 2 m$, 4 f£, Pousada Cabanas, área do parque, -21.1724, -56.4422, 318m, 19.ix.2013 (D. L. Queiroz), #586 (NHMB, 70% ethanol); 1 m$, 1 f£, Rio Verde, MS427, South of Rio Verde, -19.0183, -54.8583, 470m, 14.xi.2012, Cerrado (D. Burckhardt & D. L. Queiroz), #69(-) (NHMB, 70% ethanol); 3 m$, 6 f£, Rochedo, MS080, -19.9683, -54.6500, 350m, 15.xi.2012, Cerrado, *Machaerium aculeatum* (D. Burckhardt & D. L. Queiroz), #73(7) (NHMB, 70% ethanol).—Minas Gerais: 13 m$, 15 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #145(4) (DZUP, NHMB, dry); 1 m$, Patos de Minas, Parque Mocambo, -18.5833, -46.5050, 840m, 27.x.2012, planted trees and forest edge (D. Burckhardt & D. L. Queiroz), #48(-) (NHMB,

70% ethanol); 22 m$, 20 f£, 22 immatures, Vazante, -17.9683, -46.9050, 723m, 27.xii.2011, disturbed vegetation along dirt road, *Machaerium isadelphum* (D. Burckhardt & D. L. Queiroz), #25(1) (NHMB, 70% ethanol); 11 f£, Vazante, Fazenda Bainha, -17.6451, -46.7086, 660–670m, 29–30.x.2012 Cerrado vegetation, edges of disturbed forest, eucalypt plantation, creek *Machaerium* cf. *ruddianum* (D. Burckhardt & D. L. Queiroz), #50 (11) (NHMB, 70% ethanol); 41 m$, 22 f£, same but *Machaerium aculeatum* (D. Burckhardt & D. L. Queiroz), #50 (10) (NHMB, 70% ethanol); 7 m$, same but -17.8817, -46.8833, 904m, 06.i.2016 (D. L. Queiroz) 747(-) (NHMB, 70% ethanol); 3 m$, 4 f£, same but around the house, -17.8900, -46.9233, 660m, 27–28.xii.2011, disturbed vegetation around house, *Albizia* sp. (D. Burckhardt & D. L. Queiroz), #26(4) (NHMB, 70% ethanol); 4 m$, 1 f£, same but Córrego Curtume, -17.8850, -46.9217, 650–660m, 21–22.ix.2011, Cerrado along river, *Machaerium sericiflorum sericiflorum* (D. Burckhardt & D. L. Queiroz), #16(7) (NHMB, 70% ethanol); 2 m$, 2 f£, same but Guariba, -17.8783, -46.9183, 640–660m, 20.ix.2011, Cerrado, edge of natural forest (D. Burckhardt & D. L. Queiroz), #13(-) (NHMB, 70% ethanol); 1 m$, 1 f£, same but near source of Curtume river, -17.8883, -46.9200, 640–690m, 13–14.vii.2012 degraded Cerrado vegetation *Machaerium isadelphum* (D. Burckhardt & D. L. Queiroz), #40(1) (NHMB, 70% ethanol); 107 m$, 128 f£, 185 immatures, same but Paiadão, -17.8917, -46.9217, 670m, 21.ix.2011, Cerrado, edge of natural forest, *Machaerium hirtum* (D. Burckhardt & D. L. Queiroz), #15(3) (NHMB, 70% ethanol); 3 m$, 2 f£, same but *Enterolobium contortisiliquum* (D. Burckhardt & D. L. Queiroz), #15(4) (NHMB, 70% ethanol); 1 m$, Vazante, Fazenda Bocaina, Grotta de Bocaina, -17.8900, -46.9150, 670–710m, 22.ix.2011, Cerrado, vinhático *Plathymenia foliosa*? (D. Burckhardt & D. L. Queiroz), #18(2) (NHMB, 70% ethanol); 1 m$, Vazante, Gruta da Lapa Nova, -17.9833, -46.8900, 660m, 27.xii.2011, disturbed vegetation along forest edge (D. Burckhardt & D. L. Queiroz), #24(-) (NHMB, 70% ethanol); 4 m$, 2 f£, Vazante, Votorantim, -17.6306, -46.6999, 550m, 17.iii.2015 (D. L. Queiroz), #690(-) (NHMB, 70% ethanol).—São Paulo: 2 m$, 6 f£, Gavião Peixoto, Fazenda Maringá, -21.7677, -48.4670, 519m, 2.ix.2014, edges of citrus plantation, *Machaerium uncinatum* (D. Burckhardt & D. L. Queiroz), #139(3) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripes along lateral margins weak and along posterior margin absent; older specimens with markings with dark outline.—Head and thorax dark yellow to orange-yellow. Gena sometimes brownish to brown anteriorly and ventrally; genal process lighter than head. Eye grey to dark red; ocelli colourless to orange. Antenna light yellow, segments 1–2 concolorous with head. Clypeus dark yellow to brownish, slightly lighter medially and slightly darker along edges; rostrum light yellow to light orange-yellow. Thorax sometimes brown ventrally, with margins of sclerites slightly darker. Forewing colourless, yellow around Cu1b and sometimes slightly around M1+2, M3+4 and Cu1a; veins light yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow, sometimes with tarsi slightly darker, hindleg light yellow. Abdomen pale yellow to yellow-orange, sometimes brown ventrally; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with abdomen to light brown. Male terminalia irregularly light to dark yellow, paramere usually lighter. Female terminalia irregularly light to dark yellow, proctiger usually brown apically.

Structure. Body length m$ 2.3–2.5 mm (2.41±0.11 mm), f£ 2.3–2.8 mm (2.63±0.18 mm) (5 m$, 5 f£). Genal process (Fig. 59) swollen, irregularly narrowing towards subacute or narrowly rounded apex, 0.5 times as long as vertex along midline. Antenna 2.5–2.8 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.6–0.8 times longer than median segment. Forewing (Fig. 89) 2.7–2.8 times as long as head width, 2.1–2.3 times as long as wide, obovoid, broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.5–1.6; ratio c/d 0.7–0.9; ratio e/f 0.6–1.0; surface spinules moderately to distinctly spaced,

forming rhomboids (Figs 101–102), covering apical two thirds or more of cell r1, around radular areas of cells m1, m2 and cu1, m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with poorly developed, tubercle-like posterior lobe. Paramere (Figs 159−160) 0.9 times as long as proctiger; in lateral view, clavate, moderately and gradually expanding towards apex; anterior margin rounded apically, almost straight before apex, posterior margin slightly expanded posteriorly and slightly angulate in apical quarter, weakly sinuous in basal three quarters; apex irregularly oblique, with subposterior and posterior sclerotised ridge, the former in lower level than the latter (Fig. 160); inner surface (Fig. 160) covered with long setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 213), with each sclerotised ridge bearing posterior tooth. Aedeagus (Fig. 161) complex tripartite; in lateral view, median lobule flattened, slightly prominent median lobule; lateral lobules larger than median lobule, elongate, suboval; membranous pouch small; ventral process weakly upturned, apical expansion weak, subequal with dorsal lobe, globular, bearing short, conical tubercle.—Female (Fig. 243). Proctiger 0.8–0.9 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension almost straight to sinuous, apex moderately upturned, strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5–0.6 times as long as proctiger; in lateral view, apex moderately truncate, ventral outline slightly sinuous in basal two thirds, apical third strongly oblique; covered with short setae in apical two thirds, long setae ventrally throughout, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 273), lateral margins abruptly narrowing at about half, with apical third subparallel and apex broadly rounded.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.56–0.61 (0.59±0.02), f£ 0.64–0.71 (0.68±0.03); AL m$ 1.51–1.57 (1.55±0.03), f£ 1.61–1.94 (1.81±0.18); LAB2 m$ 0.14–0.16 (0.14±0.01), f£ 0.16–0.17 (0.17±0.01); LAB3 m$ 0.08–0.11 (0.1±0.02), f£ 0.12; FL m$ 1.57–1.65 (1.61±0.04), f£ 1.71–1.95 (1.86±0.13); TL m$ 0.40–0.43 (0.42±0.02), f£ 0.42–0.51 (0.47±0.04); MP 0.23–0.26 (0.24±0.01); PL 0.22; DL 0.19–0.23 (0.21±0.02); FP 0.58–0.61 (0.59±0.02).

Distribution. Brazil: Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo (Fig. 290).

Host-plant. *Machaerium hirtum* (Vell.) Stellfeld (Leguminosae: Papilionoideae: Aeschynomeneae). Adults were collected on *M. aculeatum* Raddi. and *M. uncinatum* (Vell.) Benth. but confirmation is needed.

Comments. *M.* sp. nov. 16 differs from other Brazilian *Mitrapsylla* species in the paramere gradually expanding towards apex and the irregularly oblique apex with each a subposterior and posterior sclerotized ridges, the former in a lower level than the later. See comments section under *M.* sp. nov. 7

Mitrapsylla sp. G Burckhardt & Queiroz

Mitrapsylla sp. G Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Piauí, Parnaíba, campus Embrapa Meio-Norte, -3.0850, -41.7867, 60m, 27–30.vi.2016, *Copaifera cearensis* (D. Burckhardt & D. L. Queiroz), #207(1) (MZSP, dry).

Description of adult by Burckhardt & Queiroz (2019). Immature unknown.

Distribution. Brazil: Bahia, Piauí (Fig. 290) (Burckhardt & Queiroz 2019).

Host-plant. Adults were collected on *Copaifera cearensis* Ducke (Leguminosae, Detarioideae, Detarieae) which is a likely host (Burckhardt & Queiroz 2019).

***Mitrapsylla* sp. nov. 17**
(Figs 30, 60, 90, 162−164, 214, 244, 274, 290)

Material examined. Holotype m$, Brazil: Minas Gerais, Vazante, Votorantim, -17.6306, -46.6999, 550m, 17.iii.2015, *Machaerium amplum* (D. L. Queiroz), #690(1) (DZUP, dry).

Paratypes: Mato Grosso: 1 f£, Nova Mutum, BR163 Road, -14.1367, -56.0983, 330m, 4.xi.2012, transitional forest(Cerrado/Amazonian) (D. Burckhardt & D. L. Queiroz), #60(-) (NHMB, 70% ethanol); 1 m$, 1 f£, Sinop, -11.8650, -55.5217, 380m, 5.xi.2012, edge of degraded forest (D. Burckhardt & D. L. Queiroz), #61(-) (NHMB, 70% ethanol); 7 m$, 10 f£, 3 immatures, Tabaporã, Fazenda Crestani, -11.3133, -55.9617, 330–380m, 6–8.xi.2012, transitional forest near river, forest edges, farm land, park vegetation, *Machaerium* cf. *ruddianum* (D. Burckhardt & D. L. Queiroz), #62(12) (NHMB, 70% ethanol).—Minas Gerais: 20 m$, 12 f£, same data as holotype, *Machaerium amplum* (D. L. Queiroz), #690(1) (NHMB, 70% ethanol); 1 m$, 1 f£, Vazante, Fazenda Bainha, -17.8817, -46.8833, 640–650m, 26.xii.2014, disturbed Cerrado vegetation along unpaved road (D. L. Queiroz), #662 (NHMB, 70% ethanol); 3 m$, same but -17.8800, -46.9233, 660–670m, 29–30.x.2012, Cerrado vegetation, edges of disturbed forest, eucalypt plantation, creek (D. Burckhardt & D. L. Queiroz), #50 (-) (NHMB, 70% ethanol); 7 m$, 5 f£, 4 immatures, same but near source of Curtume river, -17.8883, -46.9200, 640–690m, 13–14.vii.2012, degraded Cerrado vegetation, *Senna pendula* (D. Burckhardt & D. L. Queiroz), #40(2) (NHMB, slide mounted, 70% ethanol); 1 f£, Vazante, Fazenda Bocaina, Grotta de Bocaina, -17.8900, -46.9150, 670–710m, 22.ix.2011, Cerrado (D. Burckhardt & D. L. Queiroz), #18(-) (NHMB, 70% ethanol).

Description. Colouration. Body with whitish or yellowish striped-pattern; variation: stripes very fine or present as scattered spots; mesopraescutum sometimes with additional scattered spots; mesoscutum sometimes with additional markings laterally; abdominal tergites lacking distinct pattern.—Head and thorax medium brown to dark brown; genal process dark yellow to medium brown. Eye grey to dark red; ocelli colourless. Antenna light yellow, segments 1–2 medium brown. Clypeus dark yellow, slightly lighter medially and slightly darker along edges; rostrum dark yellow. Thorax with margins of sclerites slightly darker. Mesopraescutum. Forewing yellowish, yellow around Cu1b and slightly around M1+2, M3+4 and Cu1a; veins light yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow, hindleg light yellow. Abdomen whitish to light yellow; intersegmental membranes concolorous with rest of abdomen; spiracular sclerites concolorous with tergites. Male terminalia irregularly light yellow. Female terminalia whitish to light yellow, proctiger usually dark yellow apically and around anus.

Structure. Body length m$ 2.1–2.4 mm (2.22±0.16 mm), f£ 2.3–2.7 mm (2.48±0.25 mm) (4 m$, 2 f£). Genal process (Fig. 60) swollen, rarely subconical, irregularly narrowing towards subacute, narrowly or broadly rounded apex, 0.5–0.7 times as long as vertex along midline. Antenna 2.4–2.7 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1 times longer than head width and 0.5–0.6 times longer than median segment. Forewing (Fig. 90) 2.6–2.8 times as long as head width, 2.0–2.3 times as long as wide, obovoid or suboval, narrowly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.3–1.6; ratio c/d 0.8–0.9; ratio e/f 0.4–0.7; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), covering apical half of cells r1 and r2, absent or much reduced around radular areas of cells m1, m2 and cu1, and m2 basally, covering most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, weakly tapered to blunt, weakly down-curved posterior lobe. Paramere (Figs 162−163) 0.8 times as long as proctiger; in lateral view, lamellar; anterior margin strongly rounded apically, almost straight before apex posterior margin expanded in apical third, slightly to strongly sinuous in basal two thirds; apex rounded or squarish, directed posteriorly); inner surface (Fig. 163) covered with long setae, longer along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 214), bearing large posterior tooth. Aedeagus (Fig. 164) complex tripartite; in lateral view, median lobule slightly prominent median lobule; lateral lobules subequal with median lobule, subtriangular; membranous pouch rather broad; ventral process weakly upturned, apical expansion subequal with dorsal lobe, oblong-oval, bearing long, conical tubercle.—Female (Fig. 244). Proctiger 0.9 times as long as head width; in lateral view, dorsal outline weakly to strongly concave distal to circumanal ring, apical extension almost straight to slightly sinuous, apex strongly upturned, strongly obliquely or transversally truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched submedially or subapically; covered with medium long setae in submedian quarter, ventrally throughout, and short setae in apical half, long setae at apex, and group of long setae subapically on dorsum and submedially, without seta-free patch subapically; in ventral view (Fig. 274), lateral margins evenly, weakly narrowing towards narrow, subtruncate apex.

Measurements (in mm) (4 m$, 3 f£). HW m$ 0.57–0.69 (0.62±0.05), f£ 0.62–0.67 (0.65±0.02); AL m$ 1.52–1.74 (1.59±0.1), f£ 1.47–1.69 (1.61±0.12); LAB2 m$ 0.13–0.15 (0.14±0.01), f£ 0.14–0.15 (0.14±0.01); LAB3 m$ 0.07–0.08 (0.08±0.01), f£ 0.07–0.08 (0.08±0.01); FL m$ 1.61–1.81 (1.67±0.1), f£ 1.74–1.84 (1.78±0.05); TL m$ 0.39–0.47 (0.42±0.03), f£ 0.43–0.45 (0.44±0.01); MP 0.24–0.26 (0.25±0.01); PL 0.20–0.21 (0.21±0.01); DL 0.26–0.3 (0.28±0.03); FP 0.57–0.60 (0.58±0.02).

Distribution. Brazil: Mato Grosso, Minas Gerais (Fig. 290).

Host-plant. *Machaerium amplum* Benth. (Leguminosae, Papilionoideae, Aeschynomeneae).

***Mitrapsylla* sp. nov. 18**
(Figs 31, 61, 91, 165−167, 215, 245, 275, 290)

Material examined. Holotype m$, Brazil: Roraima, Pacaraima, along RR-174 from Pacaraima to ca. 20 km S of Pacaraima, 4.4033, -61.1483, 490–910m, 15.iv.2015, road side vegetation, *Cassia ferruginea* (D. Burckhardt & D. L. Queiroz), #162(4) (MZSP, dry).

Paratypes: Roraima: 2 m$, 1 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #162(4) (NHMB, dry, slide mounted); 1 f£, Amajari, Tepequém, outside village along road, 3.7783, -61.7217, 610m, 5.iv.2015, planted trees (D. Burckhardt & D. L. Queiroz), #159(-) (NHMB, 70% ethanol); 3 m$, Boa Vista, Embrapa, 2.7550, -60.7300, 80m, 1–2.iv.2015, various experimental plantations, secondary scrub, *Deguelia densiflora* (D. Burckhardt & D. L. Queiroz), #151(3) (NHMB, 70% ethanol).

Description. Colouration. Body with faint striped-pattern; variation: parapterum and mesoepisternum lacking distinct pattern.—Body light straw-coloured to light yellow. Vertex sometimes whitish; genal process concolorous with head. Eye grey to red; ocelli colourless. Antenna yellow, segments 1–2 concolorous with head. Clypeus concolorous with body, slightly lighter medially; rostrum yellow. Thorax with margins of sclerites slightly darker. Forewing yellowish, yellow around Cu1b and slightly around M1+2, M3+4 and Cu1a; veins light yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow with tarsi darker, hindleg light yellow. Abdomen;

intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia light yellow. Female terminalia light yellow, brownish apically.

Structure. Body length f£ 2.6 mm (1 f£). Genal process (Fig. 61) swollen, irregularly narrowing towards broadly or narrowly rounded apex, 0.6 times as long as vertex along midline. Antenna 2.4 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.6 times longer than median segment. Forewing (Fig. 91) 2.7 times as long as head width, 2.4 times as long as wide, subobovoid, narrowly rounded apically; vein M+Cu1 0.3 times as long as Cu1; ratio a/b 1.7; ratio c/d 0.7; ratio e/f 1.0; surface spinules covering apical two thirds of cell r1, apical half of cell r2, around radular areas of cells m1, m2 and cu1, m2 basally (much reduced) and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.6 times as long as head width.

Terminalia. Male. Proctiger 0.3 as long as head width; in lateral view, with long, strongly tapered, strongly down-curved posterior lobe. Paramere (Figs 165−166) 1.1 times as long as proctiger; in lateral view, lamellar; anterior and posterior margin subparallel, weakly sinuous; apex truncate, slightly directed posteriorly,); inner surface (Fig. 166) covered with long setae, with row of thick setae along apical anterior margin, group of thick setae below sclerotised ridge and on apical posterior margin; in dorsal view (Fig. 215), sclerotised ridge bearing small anterior, median and posterior tooth. Aedeagus (Fig. 167) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process weakly upturned, apical expansion subequal with dorsal lobe, oval, bearing long, conical tubercle.—Female (Fig. 245). Proctiger 1.1 times as long as head width; in lateral view, dorsal outline weakly concave distal to circumanal ring, apical extension almost straight, apex straight, slightly obliquely rounded; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline mostly straight, weakly swollen subasally; covered with medium long setae in median third, long setae ventrally throughout, short and medium long setae in apical thirds, longer setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 275), lateral margins unevenly, weakly narrowing towards slightly broad, subtruncate apex.

Distribution. Brazil: Roraima (Fig. 290).

Host-plant. Adults were collected on both *Cassia ferruginea* (Schrad.) DC. (Leguminosae, Caesalpinioideae, Cassieae) and *Deguelia densiflora* (Benth.) A.M.G. Azevedo ex M. Sousa (Leguminosae, Papilionoideae, Aeschynomeneae), but confirmation is needed.

Comments. See the comment section under *M.* sp. nov. 19

***Mitrapsylla* sp. nov. 19**
(Figs 32, 62, 92, 168−170, 216, 246, 276, 290)

Material examined. Holotype m$, Brazil: Mato Grosso do Sul, Jardim, near BR267, -21.4500, -55.7917, 380–440m, 18–20.xi.2012, Cerrado edge along unpaved road, gallery forest along river, single trees in field, *Pterodon pubescens* (D. Burckhardt & D. L. Queiroz), #76(10) (DZUP, dry).

Paratypes: Mato Grosso do Sul: 7 m$, 7 f£, 3 immatures, same data as holotype (D. Burckhardt & D. L. Queiroz), #76(10) (DZUP, NHMB, dry, slide mounted, 70% ethanol).

Description. Colouration. Head and abdomen lacking distinct pattern, thorax dorsum sometimes with faint striped-pattern.—Head and thorax light straw-coloured. Vertex whitish; genal process usually slightly darker than head. Eye grey to dark red; ocelli colourless. Antenna yellow. Clypeus concolorous with body, slightly lighter medially and slightly darker along edges; rostrum light yellow. Thorax with margins of sclerites slightly darker. Metascutellum almost entirely white. Forewing yellowish, sometimes darker apically, yellow

around Cu1b and sometimes slightly around M3+4 and Cu1a; veins light yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg pale yellow, usually with tarsi darker, hindleg light yellow. Abdomen light straw-coloured to whitish; intersegmental membranes concolorous with rest of abdomen; spiracular sclerites concolorous with abdomen. Male terminalia light yellow. Female terminalia light yellow, proctiger dark yellow apically.

Structure. Body length m$ 2.0–2.2 mm (2.18±0.12 mm), f£ 2.3–2.5 mm (2.42±0.08 mm) (4 m$, 5 f£). Genal process (Fig. 62) swollen, irregularly narrowing towards broadly or narrowly rounded apex, 0.4–0.6 times as long as vertex along midline. Antenna 2.4–2.5 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1–0.2 times longer than head width and 0.7 times longer than median segment. Forewing (Fig. 92) 2.6–2.8 times as long as head width, 2.3–2.5 times as long as wide, obovoid, narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.7–2.2; ratio c/d 0.7–0.8; ratio e/f 1.1–1.7; surface spinules moderately spaced, forming rhomboids (Fig. 102), rarely densely spaced in cell r1, forming irregular groups somewhat separated from each other (Fig. 104), fully covering cells c+sc, r1, r2, m1, m2, cu1 and cu2 leaving spinule-free spaces along veins, covering cells up to veins apically; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.6–0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, strongly down-curved posterior lobe. Paramere (Figs 168−169) 0.9 times as long as proctiger; in lateral view, irregularly lamellar, strongly sinuous; anterior margin strongly rounded apically, almost straight before apex posterior margin angulate or slightly rounded and expanded in apical third, strongly expanded and convex in basal two thirds; apex irregularly rounded, slightly notched anteriorly, directed posteriorly); inner surface (Fig. 169) covered with short setae, slightly longer basally and long posterior margin, with row of thick setae along apical anterior margin, group of thick setae below sclerotised ridge and on apical posterior margin along with several stout setae on apical posterior margin; in dorsal view (Fig. 216), sclerotised ridge bearing small anterior and larger posterior tooth. Aedeagus (Fig. 170) complex unipartite; in lateral view, dorsal lobe subtriangular, indented submedially on dorsal outline; ventral process weakly to strongly upturned, apical expansion subequal with dorsal lobe, globular, bearing long, blunt tubercle.—Female (Fig. 246). Proctiger 0.8–0.9 times as long as head width; in lateral view, dorsal outline weakly concave distal to circumanal ring, apical extension sinuous, apex slightly upturned, obliquely rounded to smoothly obliquely truncate; circumanal ring 0.3–0.4 times as long as proctiger. Subgenital plate 0.5–0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched submedially or subapically; covered with long setae in subasal quarter, ventrally throughout, and short setae in apical half, longer setae at apex, and long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 276), lateral margins evenly, strongly narrowing at about half towards slightly broad, subtruncate apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.60–0.61 (0.6±0.01), f£ 0.62–0.70 (0.67±0.04); AL m$ 1.48–1.50 (1.48±0.01), f£ 1.48–1.71 (1.62±0.12); LAB2 m$ 0.14–0.15 (0.15±0.01), f£ 0.14–0.16 (0.15±0.01); LAB3 m$ 0.10–0.11 (0.11±0.01), f£ 0.10–0.11 (0.1±0.01); FL m$ 1.58–1.66 (1.63±0.04), f£ 1.67–1.86 (1.79±0.1); TL m$ 0.38–0.42 (0.41±0.02), f£ 0.40–0.44 (0.43±0.02); MP 0.21–0.23 (0.22±0.01); PL 0.20; DL 0.21–0.24 (0.23±0.01); FP 0.52–0.59 (0.56±0.03).

Distribution. Brazil: Mato Grosso do Sul (Fig. 290).

Host-plant. *Pterodon emarginatus* Vogel (Leguminosae, Papilionoideae, Dipterygeae).

Comments. *M.* sp. nov. 19 resembles *M.* sp. nov. 18 in the pale body colour and the lamellar paramere but differs in the more sinuate paramere and in the surface spinules covering cells up to veins in apical half of forewing.

***Mitrapsylla* sp. nov. 20**
(Figs 33, 63, 93, 171−173, 217, 247, 277, 291)

Material examined. Holotype m$, Brazil: Paraná, Tibagi, Parque Estadual Guartelá, -24.5683, -50.2553, 938m, 10–12. vii.2017, Cerrado vegetation, *Periandra mediterranea* (D. Burckhardt & D. L. Queiroz), #245(6) (DZUP, dry).

Paratypes: Minas Gerais: 3 m$, 2 f£, Vargem Bonita, Parque Nacional da Serra da Canastra, Cachoeira Casca d'Anta, near waterfall, -20.3083, -46.5233, 860m, 5.ix.2014, transition from riparian to Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #143(-) (NHMB, 70% ethanol); 32 m$, 42 f£, 233 immatures, 5 skins, same but around park entrance 850–860m, 4–8.ix.2014, *Periandra mediterranea* (D. Burckhardt & D. L. Queiroz), #141(13) (NHMB, dry, 70% ethanol); 1 m$, 1 f£, Vazante, Fazenda Bocaina, -17.8917, -46.9100, 670–690m, 22.ix.2011, Cerrado near river, *Dalbergia miscolobium* (D. Burckhardt & D. L. Queiroz), #17(7) (NHMB, 70% ethanol).—Paraná: 7 m$, 7 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #245(6) (DZUP, NHMB, dry, 70% ethanol); 1 m$, 1 f£, same but 10.vii.2017 (M. R. Barreto) (NHMB, 70% ethanol); 2 m$, same but 933m, 8.vii.2013 (D. L. Queiroz), #522 (NHMB, 70% ethanol); 1 m$, 3 f£, same but -24.5621, -50.2581, 9.vii.2013 (D. L. Queiroz) #527 (NHMB, 70% ethanol); 30 m$, 30 f£, same but -24.5595, -50.2565, 938m, 21–24.vi.2016 (A. C. Domahovski) (DZUP, NHMB, slide mounted, 70% ethanol); 17 m$, 11 f£, same but -24.5617, -50.2583, 920–950m, 23–25. vi.2015, Fabaceae (D. Burckhardt & D. L. Queiroz), #171(11) (NHMB, 70% ethanol); 1 m$, Bocaiuva do Sul, BR-476 km 72, -25.0800, -49.0933, 1140m, 21.iv.2013, remnants Atlantic forest (D. Burckhardt & D. L. Queiroz), #108(-) (NHMB, 70% ethanol); 13 m$, 7 f£, 3 immatures, Curitiba, Parque Atuba, -25.3817, -49.2033, 890m, 12.ii.2013, planted park vegetation, river bank and remnants of Atlantic forest, *Desmodium* adscendens (D. Burckhardt & D. L. Queiroz), #92(4) (NHMB, 70% ethanol); 1 m$, 2 f£, Jaguariaíva, Parque Estadual do Cerrado, -24.1655, -49.6663, 768m, 10.vii.2013, Cerrado vegetation (D. L. Queiroz), #529 (NHMB, 70% ethanol); 11 m$, 8 f£, same but -24.1683, -49.6533, 780–820m, 15–16.ii.2016, *Periandra mediterranea* (D. Burckhardt & D. L. Queiroz), #197(9) (NHMB, 70% ethanol); 10 m$, 3 f£, same but -24.1633, -49.6533, 660–780m, 26–27.vi.2015, Fabaceae (D. Burckhardt & D. L. Queiroz), #172(4) (NHMB, 70% ethanol); 1 m$, Ponta Grossa, Parque Estadual de Vila Velha, -25.2238, -49.9927, 750–870m, 12–14.vii.2017, Araucaria forest, transitional forest, Baccharis scrub (D. Burckhardt & D. L. Queiroz), #246(-) (NHMB, 70% ethanol); 2 m$, 2 f£, Tunas do Paraná, Parque Campinhos, -25.0367, -49.0900, 873m, 8.v.2014, edges of transitional Araucaria/Atlantic forest, park, *Desmodium* sp. (D. Burckhardt & D. L. Queiroz), #137(3) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: pronotum and mesoscutum sometimes with additional irregularly scattered markings; older specimens with markings with dark outline.—Head and thorax multi-coloured, ground colour light orange-yellow, dark orange to dark brown. Vertex sometimes irregularly lighter posteriorly. Gena usually brownish to dark brown anteriorly and ventrally; genal process lighter than rest of gena. Eye grey to dark red; ocelli orange. Antenna light yellow, segments 1–2 darker. Clypeus yellow to medium brown, lighter medially and darker along edges; rostrum light yellow to yellowish-orange. Thorax usually brownish to dark brown, with margins of sclerites darker. Mesopraescutum usually with median light to white irregular transversal marking and posterior half irregularly coloured. Forewing colourless to yellowish, yellow around Cu1b and slightly around rest of veins apically; veins light yellowish-brown; pterostigma lighter to

slightly darker than veins. Hindwing colourless. Fore- and midleg dark yellow with femora brown and tarsi usually darker, hindleg light yellow with femur brown. Abdomen yellow, dark orange to medium brown, medium to dark brown ventrally; intersegmental membranes light to dark yellow; spiracular sclerites concolorous with tergites. Male terminalia irregularly dark yellow to medium brown. Female terminalia irregularly dark yellow to medium brown, usually darker apically, sometimes darker basally and around anus.

Structure. Body length m$ 1.9–2.4 mm (2.24±0.21 mm), f£ 2.0–2.6 mm (2.38±0.23 mm) (5 m$, 5 f£). Genal process (Fig. 63) swollen, irregularly narrowing towards subacute, narrowly or broadly rounded apex, 0.5–0.6 times as long as vertex along midline. Antenna 2.3 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.7–0.8 times longer than median segment. Forewing (Fig. 93) 2.8–3.1 times as long as head width, 1.9–2.5 times as long as wide, obovoid or subrhomboidal narrowly or slightly broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.6–1.9; ratio c/d 0.7–0.9; ratio e/f 0.6–0.7; surface spinules moderately spaced, forming rhomboids (Fig. 102), covering apical half or two thirds of cell r1, apical half or very apex of cell r2, around radular areas of cells m1, m2 and cu1 (sometimes much reduced), m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules present in cell r2, sometimes inconspicuous. Metatibia 0.7–0.8 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with short, blunt, weakly down-curved posterior lobe. Paramere (Figs 171−172) 0.8–0.9 times as long as proctiger; in lateral view, clavate, moderately expanded apically; anterior margin expanded and broadly or narrowly rounded in apical third, posterior margin rounded and strongly expanded in apical third, weakly to strongly convex in basal two thirds; apex somewhat straight, more expanded posteriorly than anteriorly, with sclerotised ridge subapically (Fig. 172); inner surface (Fig. 172) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 217), sclerotised ridge irregularly subrectangular, slightly larger anteriorly, bearing posterior tooth. Aedeagus (Fig. 173) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process weakly upturned, apical expansion larger than dorsal lobe, subglobular, bearing short, conical tubercle.—Female (Fig. 247). Proctiger 1.0–1.2 times as long as head width; in lateral view, dorsal outline weakly to strongly concave distal to circumanal ring, apical extension almost straight to sinuous, apex slightly to moderately upturned, obliquely rounded; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline almost straight to slightly sinuous, sometimes slightly notched submedially or subapically; covered with medium long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 277), lateral margins somewhat unevenly strongly narrowing submedially towards narrow, rounded apex.

Measurements (in mm) (4 m$, 3 f£). HW m$ 0.59–0.61 (0.6±0.01), f£ 0.63–0.65 (0.64±0.01); AL m$ 1.37–1.41 (1.39±0.03), f£ 1.44–1.49 (1.47±0.03); LAB2 m$ 0.15–0.16 (0.15±0.01), f£ 0.16–0.18 (0.17±0.01); LAB3 m$ 0.11–0.12 (0.11±0.01), f£ 0.11–0.12 (0.11±0.01); FL m$ 1.68–1.82 (1.76±0.07), f£ 1.90–1.99 (1.94±0.05); TL m$ 0.44–0.48 (0.46±0.02), f£ 0.46–0.48 (0.47±0.01); MP 0.24–0.26 (0.25±0.01); PL 0.20–0.21 (0.2±0.01); DL 0.27–0.28 (0.27±0.01); FP 0.67–0.74 (0.7±0.04).

Distribution. Brazil: Goiás, Minas Gerais, Paraná (Fig. 291).

Host-plant. *Periandra mediterranea* (Vell.) Taub. (Leguminosae, Papilionoideae, Phaseoleae).

Comments. *M.* sp. nov. 20 resembles *M.* sp. nov. 7 and *M.* sp. nov. 25 in the multi-coloured body but differs in the male and female terminalia.

***Mitrapsylla* sp. nov. 21**
(Figs 34, 64, 94, 174−176, 218, 248, 278, 291)

Material examined. Holotype m$, Brazil: Minas Gerais, Vazante, Fazenda Bainha, -17.8850, -46.9167, 660m, 23.ix.2011, Cerrado, dry natural open scrub, *Pterodon emarginatus* (D. Burckhardt & D. L. Queiroz), #19(2) (DZUP, dry).

Paratypes: Bahia: 8 m$, 8 f£, Luiz Eduardo Magalhães, -12.0267, -45.3723, 739m, 25.ix.2012 (D. L. Queiroz), #349 (NHMB, 70% ethanol); 15 m$, 15 f£, same but -12.0294, -45.3636, 740m (D. L. Queiroz), #350 (NHMB, slide mounted, 70% ethanol); 31 m$, 31 f£, same but -11.9877, -45.1728, 736m (D. L. Queiroz), #356 (NHMB, 70% ethanol); 2 m$, same but -11.8944, -45.6014, 698m, 26.ix.2012 (D. L. Queiroz), #357 (NHMB, 70% ethanol); 5 m$, 4 f£, same but -12.1126, -45.3039, 744m (D. L. Queiroz), #360 (NHMB, 70% ethanol).—Distrito Federal: 15 m$, 13 f£, Brasilia, -15.7939, -47.8828, 26.ix.1991, at light (V. E. Eastop) (BMNH, dry).—Goiás: 1 m$, 8 f£, Alto Paraíso do Goiás, near São Jorge, Parque Nacional da Chapada dos Veadeiros, -14.1610, -47.8300, 880m, 16.ii.2018, Cerrado vegetation, *Pterodon emarginatus* (D. Burckhardt & D. L. Queiroz), #266(4) (NHMB, dry); 3 m$, 1 f£, same but park headquartes, -14.1750, -47.8240, 970m, 17.ii.2018, planted trees (D. Burckhardt & D. L. Queiroz), #268(1) (NHMB, 70% ethanol); 9 m$, 20 f£, Mossâmedes, Parque Estadual da Serra Dourada, Reserva Biológica da Universidade Federal de Goiás, -16.0720, -50.1840, 1000m, 19.ii.2018, Cerrado, *Pterodon emarginatus* (D. Burckhardt & D. L. Queiroz), #273(3) (NHMB, 70% ethanol).—Mato Grosso: 5 m$, 13 f£, ca. 120 km SE of Rondonópolis, BR364, -16.9000, -53.6550, 720m, 1.xi.2012, *Pterodon pubescens* (D. Burckhardt & D. L. Queiroz), #54(1) (NHMB, 70% ethanol); 1 m$, 1 f£, Chapada dos Guimarães, Caverna Aroe Jari, -15.5683, -55.4817, 750m, 2.xi.2012, Cerrado (D. Burckhardt & D. L. Queiroz), #56(-) (NHMB, 70% ethanol); 1 m$, 3 f£, Poconé, -15.9366, -56.9322, 206m, 15.ix.2016 (R. Ben-Hur) (NHMB, 70% ethanol).—Mato Grosso do Sul: 1 m$, Ponta Porã, Fazenda Mariana, -22.0085, -55.5828, 591m, 12.ix.2013, edge of Eucalyptus, transitional forest(Atlantic forest/Cerrado) (D. L. Queiroz), #573 (NHMB, 70% ethanol).—Minas Gerais: 35 m$, 36 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #19(2) (DZUP, NHMB, dry, 70% ethanol); 9 m$, 6 f£, same but -17.8833, -46.9167, 660–740m Cerrado, forest edge around farm (D. Burckhardt & D. L. Queiroz), #20(-) (NHMB, 70% ethanol); 1 m$, 2 f£, same but Córrego Curtume, -17.8850, -46.9217, 650–660m, 21–22.ix.2011, Cerrado along river (D. Burckhardt & D. L. Queiroz), #16(-) (NHMB, 70% ethanol); 1 m$, 3 f£, same but Guariba, -17.8783, -46.9183, 640–660m, 20.ix.2011, Cerrado, edge of natural forest (D. Burckhardt & D. L. Queiroz), #13(-) (NHMB, 70% ethanol); 1 f£, same but *Copaifera langsdorffii* (D. Burckhardt & D. L. Queiroz), #13(7) (NHMB, 70% ethanol); 6 m$, 6 f£, 12 immatures, same but Paiadão, -17.8917, -46.9217, 670m, 21.ix.2011, *Enterolobium contortisiliquum* (D. Burckhardt & D. L. Queiroz), #15(4) (NHMB, 70% ethanol); 1 m$, 1 f£, Coromandel, Fazenda Laje, -18.5610, -46.9020, 1060m, 12.ii.2018, Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #263(-) (NHMB, 70% ethanol); 6 m$, 11 f£, near Lagamar, -18.2850, -46.5450, 1000m, 20.ix.2011, degraded Cerrado vegetation along road with hedge, Fabaceae (D. Burckhardt & D. L. Queiroz), #12(1) (NHMB, 70% ethanol); 6 m$, 7 f£, Patos de Minas, -18.5817, -46.5147, 846m, Goiabeira (D. L. Queiroz) (NHMB, 70% ethanol); 3 m$, 4 f£, Patos de Minas, Fazenda Laje, -18.5433, -46.9000, 990–1060m, 28.x.2012, Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #49(-) (NHMB, 70% ethanol); 14 m$, 25 f£, Uberlândia, Clube caça e Pesca Itororo, -25.6044, -49.1938, 828m, 07.x.2017, Fabaceae (D. L. Queiroz), #836(2) (NHMB, 70% ethanol); 3 m$, Vazante, Fazenda Bocaina, Grotta de Bocaina, -17.8900, -46.9150, 670–710m, 22.ix.2011, Cerrado, vinhático *Plathymenia foliosa*?

(D. Burckhardt & D. L. Queiroz), #18(2) (NHMB, 70% ethanol).—Paraná: 1 m$, 1 f£, Morretes, Recanto Engenheiro Lacerda PR 410, -25.3367, -48.9083, 780–870m, 13.ix.2011, Atlantic forest (D. Burckhardt & D. L. Queiroz), #2(-) (NHMB, 70% ethanol).—Santa Catarina: 1 m$, 1 f£, Canoinhas, -26.1917, -50.3633, 800–830m, 15.ix.2011, Atlantic forest (D. Burckhardt & D. L. Queiroz), #7(-) (NHMB, 70% ethanol).—São Paulo: 2 m$, 4 f£, Matão, -21.6033, -48.3658, x.2006, *Citrus sinensis* cultivar Hamlin (L. H. Montesino) (NHMB, dry).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripe along lateral margins seldom absent; older specimens with markings with dark outline.—Head and thorax pale yellowish-orange, orange to yellowish-brown. Gena and genal process lighter than head. Eye grey to dark red; ocelli colourless to orange. Antenna light to dark yellow, segments 1–2 concolorous with vertex. Clypeus concolorous or slightly lighter than vertex, lighter medially and slightly darker along edges; rostrum light to dark yellow. Thorax sometimes with margins of sclerites slightly darker. Mesopraescutum sometimes with posterior half irregularly coloured. Forewing colourless to yellowish, yellow around Cu1b and sometimes around rest of veins apically; veins light to dark yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Legs light to dark yellow with pro- and mesotarsi darker. Abdomen dark yellow, orange to medium yellowish-brown, usually lighter ventrally; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia irregularly dark yellow to yellowish-brown. Female terminalia irregularly light to dark yellow, proctiger darker apically.

Structure. Body length m$ 2.2–2.6 mm (2.42±0.14 mm), f£ 2.3–2.9 mm (2.73±0.24 mm) (5 m$, 5 f£). Genal process (Fig. 64) swollen or subconical, irregularly narrowing towards acute, subacute or narrowly rounded apex, 0.5–0.6 times as long as vertex along midline. Antenna 2.0–2.3 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.7 times longer than median segment. Forewing (Fig. 94) 2.7–3.2 times as long as head width, 2.3–2.5 times as long as wide, obovoid, broadly rounded apically, rarely somewhat angulate apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.4–1.9; ratio c/d 0.7–0.8; ratio e/f 0.4–0.9; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), covering apical half or third of cells r1 and r2, much reduced around radular areas of cells m1, m2 and cu1, and m2 basally, covering most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7–0.8 times as long as head width.

Terminalia. Male. Proctiger 0.3–0.4 as long as head width; in lateral view, with massive, blunt, weakly down-curved posterior lobe. Paramere (Figs 174−175) 0.9–1.1 times as long as proctiger; in lateral view, irregularly lamellar; anterior margin strongly sinuous, posterior margin strongly indented along apical third, convex in basal two thirds; apex squarish, with sclerotised ridge along apex (Fig. 175); inner surface (Fig. 175) covered with long setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, group of thick setae below sclerotised ridge and on apical posterior margin; in dorsal view (Fig. 218), bearing posterior tooth. Aedeagus (Fig. 176) complex unipartite; in lateral view, dorsal lobe subtriangular; ventral process strongly upturned, apical expansion weak, smaller than dorsal lobe, globular, bearing long, conical tubercle.—Female (Fig. 248). Proctiger 0.9 times as long as head width; in lateral view, dorsal outline weakly to moderately concave distal to circumanal ring, apical extension almost straight to sinuous, apex moderately upturned, smoothly transversally truncate to obliquely rounded; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline basal half strongly swollen, apical half almost straight to convex; covered with medium long setae in subasal quarter, ventrally throughout, and short setae in apical half, longer setae at apex, with seta-free patch subapically; in ventral view (Fig.

278), lateral margins evenly strongly narrowing at about half towards slightly broad, rounded apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.56–0.66 (0.62±0.05), f£ 0.62–0.65 (0.64±0.01); AL m$ 1.26–1.40 (1.33±0.07), f£ 1.30–1.36 (1.33±0.03); LAB2 m$ 0.14–0.16 (0.15±0.01), f£ 0.15–0.17 (0.16±0.01); LAB3 m$ 0.10–0.12 (0.11±0.01), f£ 0.11–0.12 (0.12±0.01); FL m$ 1.63–1.89 (1.75±0.13), f£ 1.90–2.11 (2±0.1); TL m$ 0.41–0.48 (0.45±0.04), f£ 0.46–0.50 (0.48±0.02); MP 0.2–0.23 (0.22±0.02); PL 0.21–0.22 (0.21±0.01); DL 0.24–0.27 (0.26±0.02); FP 0.54–0.57 (0.55±0.02).

Distribution. Brazil: Bahia, Distrito Federal, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná, Santa Catarina, São Paulo (Fig. 291).

Host-plant. Many adults were collected on *Pterodon emarginatus* Vogel (Leguminosae, Papilionoideae, Dipterygeae) but confirmation is needed.

Comments. See comments section under *M.* sp. nov. 22

***Mitrapsylla* sp. nov. 22**
(Figs 35, 65, 95, 103, 177−179, 219, 249, 279, 291)

Material examined. Holotype m$, Brazil: Goiás, Alto Paraíso do Goiás, near São Jorge, Parque Nacional da Chapada dos Veadeiros, -14.1610, -47.8300, 880m, 16.ii.2018, Cerrado vegetation, *Pterogyne nitens* (D. Burckhardt & D. L. Queiroz), #266(3) (DZUP, dry).

Paratypes: Goiás: 15 m$, 18 f£, 21 immatures, 1 skins, same data as holotype (D. Burckhardt & D. L. Queiroz), #266(3) (DZUP, NHMB, dry, slide mounted, 70% ethanol); 10 m$, 12 f£, 5 immatures, same but Mirante, -14.1840, -47.8430, 1030m, 17.ii.2018, Cerrado vegetation, *Pterogyne nitens* (D. Burckhardt & D. L. Queiroz), #267(1) (NHMB, slide mounted, 70% ethanol).

Description. Colouration. Head and abdomen lacking distinct pattern, thorax with faint, pale pattern as follows: mesoscutum sometimes with wide longitudinal stripe medially and sublaterally; mesoscutellum and metascutellum with longitudinal stripe along lateral margins; mesoepisternum with semicircular transversal marking dorsally.—Body light yellowish-orange to orange; genal process usually lighter than head. Eye grey to dark red; ocelli colourless to orange. Antenna light yellow to light yellowish-orange, segments 1–2 concolorous with head. Clypeus concolorous with body; rostrum light yellow to light yellowish-orange. Forewing yellow, sometimes darker around veins; veins light yellow to light orange; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Foreleg, midleg and metafemur dark yellow to yellowish-orange, metatibia and metatarsus light yellow. Abdomen; intersegmental membranes lighter than body; spiracular sclerites concolorous with abdomen. Male terminalia light yellow to light yellowish-orange. Female terminalia light yellow to yellowish-orange, proctiger usually darker apically.

Structure. Body length m$ 2.0–2.2 mm (2.08±0.08 mm), f£ 2.2–2.4 mm (2.26±0.09 mm) (5 m$, 5 f£). Genal process (Fig. 65) subconical, irregularly narrowing towards subacute or narrowly rounded apex, 0.5–0.7 times as long as vertex along midline. Antenna 2.2–2.6 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.1 times longer than head width and 0.5–0.6 times longer than median segment. Forewing (Fig. 95) 2.8–3.1 times as long as head width, 2.3–2.4 times as long as wide, obovoid, broadly rounded apically; vein M+Cu1 0.4–0.5 times as long as Cu1; ratio a/b 1.6–2.0; ratio c/d 0.6–0.7; ratio e/f 0.9–1.5; surface spinules densely spaced, forming rhomboids (Figs 103), fully covering cells c+sc, r1, r2, m1, m2, cu1 and cu2 covering cells up to veins but scattered along them. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, very narrow, blunt, weakly down-curved lobes basally. Paramere (Figs 177−178) 0.9 times as long as proctiger; in lateral view, lamellar; anterior and posterior margins subparallel, almost

straight in apical three quarters; apex squarish, with posterior half expanded dorsally, displaced from plane of anterior half); inner surface (Fig. 178) covered with short setae, longer basally, with several thick setae along apical anterior margin, below sclerotised ridge and on apical posterior margin and several thick short setae on posterior margin; in dorsal view (Fig. 219), with squarish posterior inward and anteriorly directed process. Aedeagus (Fig. 179) complex tripartite; in lateral view, median lobule slightly prominent median lobule; lateral lobules subequal with median lobule, elongate, suboval; membranous pouch rather broad; ventral process relatively straight, apical expansion subequal with dorsal lobe, elongate oval, bearing long, conical tubercle.—Female (Fig. 249). Proctiger 0.7–0.8 times as long as head width; in lateral view, dorsal outline weakly concave distal to circumanal ring, apical extension almost straight to sinuous, apex straight to slightly upturned, irregularly rounded; circumanal ring 0.4 times as long as proctiger. Subgenital plate 0.5–0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline basal half strongly swollen, apical half almost straight to convex; covered with long setae in subasal two thirds, ventrally throughout, and short setae in apical third; in ventral view (Fig. 279), lateral margins evenly, strongly narrowing at apical thirds towards slightly broad, rounded apex.

Measurements (in mm) (3 m$, 3 f£). HW m$ 0.50–0.51 (0.51±0.01), f£ 0.55–0.60 (0.57±0.02); AL m$ 1.20–1.28 (1.23±0.05), f£ 1.30–1.46 (1.36±0.09); LAB2 m$ 0.11–0.13 (0.12±0.01), f£ 0.13–0.14 (0.13±0.01); LAB3 m$ 0.06–0.07 (0.07±0.01), f£ 0.08; FL m$ 1.42–1.49 (1.46±0.04), f£ 1.66–1.83 (1.75±0.11); TL m$ 0.34–0.36 (0.34±0.01), f£ 0.37–0.40 (0.38±0.02); MP 0.21–0.23 (0.22±0.01); PL 0.19–0.20 (0.19±0.01); DL 0.20–0.22 (0.21±0.01); FP 0.40–0.49 (0.46±0.05).

Distribution. Brazil: Goiás (Fig. 291).

Host-plant. *Pterogyne nitens* Tul. (Leguminosae, Caesalpinioideae, Caesalpinieae).

Comments. *M.* sp. nov. 22 resembles *M.* sp. nov. 21 in the female subgenital plate strongly swollen basally and lacking a group of long setae subapically on dorsum, but differs in that it lacks a seta-free patch subapically.

Mitrapsylla sp. H Burckhardt & Queiroz

Mitrapsylla sp. H Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Paraná, Tibagi, Jardim Botânico, Parque Guartelá, -24.5595, -50.2565, 934m, 9.vii.2013, vegetação de Cerrado (D. L. Queiroz), #525(MZSP, dry).

Description of adult and immature by Burckhardt & Queiroz (2019).

Distribution. Brazil: Minas Gerais, Paraná (Fig. 291) (Burckhardt & Queiroz 2019).

Host-plant. Adults were collected on *Copaifera langsdorffii* Desf. (Leguminosae, Detarioideae, Detarieae) which is a likely host (Burckhardt & Queiroz 2019).

Mitrapsylla sp. nov. 23

(Figs 36, 66, 96, 102, 180−182, 220, 250, 280, 291)

Material examined. Holotype m$, Brazil: Goiás, Mossâmedes, Parque Estadual da Serra Dourada, park entrance, -16.0990, -50.1870, 710m, 20.ii.2018, gallery forest, Cerrado, *Machaerium hirtum* (D. Burckhardt & D. L. Queiroz), #276(3) (DZUP, dry).

Paratypes: Goiás: 3 m$, 9 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #276(3) (DZUP, NHMB, dry, slide mounted, 70% ethanol).—Minas Gerais: 1 m$, Vazante, -17.9683, -46.9050, 723m, 27.xii.2011, disturbed vegetation along dirt road (D. Burckhardt & D. L. Queiroz), #25(-) (NHMB, 70% ethanol); 1 m$, Vazante, Fazenda Bainha, -17.8817, -46.8833, 660–670m, 29–30.x.2012, Cerrado vegetation, edges of disturbed forest,

eucalypt plantation, creek, *Machaerium* cf. *ruddianum* (D. Burckhardt & D. L. Queiroz), #50 (11) (NHMB, slide mounted); 1 m$, same but -17.8800, -46.9233, 640–650m, 13.vii.2012, disturbed Cerrado vegetation along unpaved road (D. Burckhardt & D. L. Queiroz), #41(-) (NHMB, 70% ethanol); 3 m$, 3 f£, same but Córrego Curtume, -17.8850, -46.9217, 650–660m, 21–22.ix.2011, Cerrado along river, *Machaerium sericiflorum sericiflorum* (D. Burckhardt & D. L. Queiroz), #16(7) (NHMB, slide mounted, 70% ethanol); 2 m$, same but near source of Curtume river, -17.8883, -46.9200, 640–690m, 13–14.vii.2012, degraded Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #40(-) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripe along lateral margins and posterior margin absent. Mesoscutum with submedian stripe usually faint or absent; abdominal tergites lacking distinct pattern; older specimens with markings with dark outline.—Head and thorax dark yellow to orange; genal process sometimes sligthly lighter than head. Eye grey to dark red; ocelli colourless to orange. Antenna yellow, segments 1–2 concolorous with head. Clypeus dark yellow, lighter medially and darker along edges; rostrum yellow. Thorax lighter ventrally, with margins of sclerites slightly darker. Forewing colourless to yellowish, yellow around Cu1b and sometimes slightly around M3+4 and Cu1a; veins yellow; pterostigma concolorous with veins. Hindwing colourless. Fore- and midleg dark yellow with tarsi darker, hindleg light yellow. Abdomen pale yellow; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with abdomen. Male terminalia dark yellow. Female terminalia irregularly dark yellow, usually darker apically.

Structure. Body length m$ 2.5–2.8 mm (2.65±0.18 mm), f£ 2.9 mm (2 m$, 1 f£). Genal process (Fig. 66) swollen, irregularly or evenly narrowing towards acute or subacute apex, 0.6 times as long as vertex along midline. Antenna 2.6–2.8 times as long as head width; longest terminal seta about as long as or slightly longer than segment 10. Apical labium segment 0.1 times longer than head width and 0.6 times longer than median segment. Forewing (Fig. 96) 2.9 times as long as head width, 2.2–2.3 times as long as wide, suboval, narrowly rounded apically; vein M+Cu1 0.3–0.5 times as long as Cu1; ratio a/b 1.5; ratio c/d 0.7–0.8; ratio e/f 0.5–0.6; surface spinules moderately spaced, forming rhomboids (Fig. 102), usually absent in cell c+sc covering apical half of cell r1 very apex of cell r2, much reduced around radular areas of cells m1, m2 and cu1, covering m2 basally and around Cu2, leaving spinule-free spaces along veins. Metatibia 0.7–0.8 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, weakly down-curved posterior lobe. Paramere (Figs 180−181) 1.0 times as long as proctiger; in lateral view, clavate, mitten-shaped; anterior half strongly expanded dorsally posterior half deeply concave, expanded posteriorly; apex with two sclerotised teeth, one apically on posterior projection and one subapically); inner surface (Fig. 181) covered with long setae, with row of thick setae along apical margin and group of thick setae right below and on apical posterior margin; in dorsal view (Fig. 220), bearing small anterior and larger, strongly sclerotised posterior tooth, former in lower level than latter. Aedeagus (Fig. 182) complex tripartite; in lateral view, median lobule flattened, slightly prominent median lobule; lateral lobules slightly smaller than median lobule, elongate, suboval; membranous pouch rather broad; ventral process weakly upturned, apical expansion weak, subequal with dorsal lobe, globular, bearing short, conical tubercle.—Female (Fig. 250). Proctiger 0.9 times as long as head width; in lateral view, dorsal outline strongly concave distal to circumanal ring, apical extension almost straight to sinuous, apex strongly upturned, strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex moderately truncate, ventral outline slightly sinuous in basal three quarters, apex irregularly oblique; covered with medium long setae in median third, ventrally throughout, and short setae in apical half, very long setae at apex; in ventral view (Fig. 280), lateral margins abruptly narrowing at apical fourth towards broad, rounded apex.

Measurements (in mm) (1 m$, 1 f£). HW m$ 0.68, f£ 0.66; AL m$ 1.78, f£ 1.83; LAB2 m$ 0.16, f£ 0.15; LAB3 m$ 0.09, f£ 0.10; FL m$ 1.98, f£ 1.94; TL m$ 0.50, f£ 0.50; MP 0.24; PL 0.25; DL 0.25; FP 0.58.

Distribution. Brazil: Goiás, Minas Gerais (Fig. 291).

Host-plant. Adults were collected on *Machaerium hirtum* (Vell.) Stellfeld and *M. sericiflorum* Vogel (Leguminosae, Papilionoideae, Aeschynomeneae) but confirmation is needed.

Comments. *M.* sp. nov. 23 resembles *M. machaerii, M.* sp. nov. 7 and *M. surinamensis* (Šulc) in the moderately truncate female subgenital plate, but differs from them as it lacks a group of long setae subapically on dorsum.

***Mitrapsylla* sp. nov. 24**
(Figs 37, 67, 97, 183−185, 221, 251, 281, 292)

Material examined. Holotype m$, Brazil: Piauí, Piracuruca, from city to Rio Piracuruca, -3.9383, -41.6750, 60–80m, 25.vi.2016, *Andira fraxinifolia*/paniculata (D. Burckhardt & D. L. Queiroz), #206(4) (DZUP, dry).

Paratypes: Bahia: 1 m$, 1 f£, Luiz Eduardo Magalhães, -12.0789, -45.3652, 742m, 25.ix.2012 (D. L. Queiroz), #347 (NHMB, 70% ethanol); 1 m$, same but -12.0267, -45.3723, 739m (D. L. Queiroz), #349 (NHMB, 70% ethanol).—Piauí: 6 m$, 7 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #206(4) (DZUP, NHMB, dry, slide mounted, 70% ethanol); 1 m$, Brasileira/Piracuruca, Parque Nacional de Sete Cidades, -4.0733, -41.6800, 130–210m, 21–24.vi.2016, Cerrado vegetation with open areas and more humid areas around pond (D. Burckhardt & D. L. Queiroz), #201(-) (NHMB, 70% ethanol); 2 m$, 2 f£, Teresina - parque municipal, -5.0581, -42.8106, 65m, 27.xii.2014 (M. R. Barreto), #89 (NHMB, 70% ethanol); 1 m$, Teresina - Trilha 1 – zoológico, -5.0419, -42.7713, 87m, 26.xii.2014 (M. R. Barreto), #29 (NHMB, 70% ethanol); 1 m$, same but -5.0407, -42.7728, 89m (M. R. Barreto), #218 (NHMB, 70% ethanol).—Roraima: 1 m$, 1 f£, Boa Vista, Praia do Polar, 2.8667, -60.6483, 80m, 20.iv.2015, degraded riverine forest (D. Burckhardt & D. L. Queiroz), #167(-) (NHMB, 70% ethanol).

Description. Colouration. Body with white striped-pattern. Head and thorax light yellow, yellow to orange; genal process lighter than head. Eye grey to dark red; ocelli colourless to orange. Antenna yellow, segments 1–2 concolorous with head. Clypeus concolorous with head, slightly lighter medially; rostrum light yellow to orange. Thorax with margins of sclerites slightly darker. Mesopraescutum sometimes with posterior half irregularly coloured. Forewing yellowish, sometimes darker apically, leaving two colourless semicircles in cells m1, m2 and cu1 apically, yellow around Cu1b and slightly around M1+2, M3+4 and Cu1a; veins light yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow, hindleg light yellow. Abdomen light brown to dark yellow; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with abdomen. Male terminalia irregularly dark yellow. Female terminalia irregularly yellow, proctiger darker than subgenital plate, usually brownish apically.

Structure. Body length m$ 2.4–2.6 mm (2.48±0.12 mm), f£ 2.6–2.7 mm (2.66±0.07 mm) (3 m$, 4 f£). Genal process (Fig. 67) swollen or subconical, irregularly narrowing towards acute, subacute or narrowly rounded apex, 0.5–0.7 times as long as vertex along midline. Antenna 2.3–2.4 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.2 times longer than head width and 0.6–0.7 times longer than median segment. Forewing (Fig. 97) 2.8–3.0 times as long as head width, 2.2–2.3 times as long as wide, obovoid, slightly narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.6–1.8; ratio c/d 0.7–0.9; ratio e/f 0.8–1.1; surface spinules moderately spaced, forming rhomboids (Fig. 102), usually absent or much reduced in

cell c+sc covering apical half of cells r1 and r2, around radular areas of cells m1, m2 and cu1 (sometimes much reduced), m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.7 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, weakly tapered, weakly down-curved posterior lobe. Paramere (Figs 183−184) 0.7 times as long as proctiger; in lateral view, clavate, strongly expanded apically; anterior margin expanding in apical half, irregularly concave basally, posterior margin strongly expanding in apical third, weakly to strongly convex in basal two thirds; apex slightly indented submedially, with sclerotised ridge in posterior half (Fig. 184); inner surface (Fig. 184) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 221), sclerotised ridge irregularly straight, bearing posterior tooth. Aedeagus (Fig. 185) complex unipartite; in lateral view, dorsal lobe obovoid; ventral process weakly upturned, apical expansion larger than dorsal lobe, irregularly globular, bearing long, conical tubercle.—Female (Fig. 251). Proctiger 0.8–0.9 times as long as head width; in lateral view, dorsal outline moderately concave distal to circumanal ring, apical extension sinuous, apex slightly to moderately upturned, smoothly transversally truncate to obliquely rounded; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5 times as long as proctiger; in lateral view, apex well-developed, ventral outline basal half strongly swollen, apical half almost straight to slightly convex; covered with medium long setae in median third, ventrally throughout, and short and long setae in apical half, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 281), lateral margins evenly, strongly narrowing at apical fourth towards narrow, acutely rounded apex.

Measurements (in mm) (2 m$, 2 f£). HW m$ 0.64–0.66 (0.65±0.02), f£ 0.64; AL m$ 1.54–1.58 (1.56±0.02), f£ 1.48–1.57 (1.52±0.06); LAB2 m$ 0.17, f£ 0.16–0.17 (0.16±0.01); LAB3 m$ 0.11–0.12 (0.11±0.01), f£ 0.12; FL m$ 1.79–1.88 (1.84±0.07), f£ 1.90–1.95 (1.93±0.04); TL m$ 0.46–0.48 (0.47±0.02), f£ 0.47–0.48 (0.47±0.01); MP 0.27–0.28 (0.28±0.01); PL 0.18–0.20 (0.19±0.01); DL 0.22–0.27 (0.25±0.04); FP 0.54–0.59 (0.57±0.03).

Distribution. Brazil: Bahia, Piauí, Roraima (Fig. 292).

Host-plant. Adults were collected on *Andira paniculata* Benth. (Leguminosae, Papilionoideae, Aeschynomeneae) but confirmation is needed.

Comments. See comments section under *M.* sp. nov. 8 and *M. itaparica* **sp. nov.**

***Mitrapsylla* sp. nov. 25**
(Figs 38, 68, 98, 186−188, 222, 252, 282, 292)

Material examined. Holotype m$, Brazil: Minas Gerais, Lavras, -21.2333, -45.0000, 900m, 1–6.vi.2010 edge of Atlantic forest around coffee plantation mixed with pastures (D. Burckhardt), #1(-) (DZUP, dry).

Paratypes: Minas Gerais: 1 m$, 1 f£, same data as holotype (D. Burckhardt), #1(-) (DZUP, NHMB, dry).—Paraná: 1 m$, Colombo, Embrapa Florestas, -24.8526, -48.7147, 846m, 11.ii.2014, *Andira fraxinifolia* (D. L. Queiroz), #590 (NHMB, 70% ethanol); 1 m$, 2 f£, same but (D. L. Queiroz), #594 (NHMB, 70% ethanol); 1 m$, Morretes, BR277, Cachoeira, -25.4769, -48.8339, 28.xi.2012, Atlantic forest, *Andira fraxinifolia* (D. Burckhardt & D. L. Queiroz), #80(1) (NHMB, slide mounted).

Description. Colouration. Body with white striped-pattern; variation: older specimens with markings with dark outline.—Head and thorax yellow to dark reddish-brown. Gena anteriorly sometimes darker anteriorly and darker to brown ventrally; genal process lighter

than head. Eye red to dark red; ocelli orange. Antenna yellow, segments 1–2 concolorous with head. Clypeus dark yellow to brownish, slightly lighter medially and darker along edges; rostrum light to dark yellow. Thorax sometimes brown lateroventrally, with margins of sclerites slightly darker. Mesopraescutum sometimes with posterior half irregularly coloured. Forewing yellowish, yellow around Cu1b; veins light yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Foreleg, midleg and metafemur dark yellow, hindleg and sometimes apex of metafemur light yellow. Abdomen dark yellow to orange, sometimes darker to brown ventrally; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with ventrites. Male terminalia irregularly light yellowish-brown, proctiger lighter posteriorly and subgenital plate darker. Female terminalia irregularly light yellow, proctiger brownish apically.

Structure. Body length m$ 2.5 mm f£ 2.6 mm (1 m$, 1 f£). Genal process (Fig. 68) swollen, irregularly or evenly narrowing towards subacute or narrowly rounded apex, 0.5 times as long as vertex along midline. Antenna 2.7 times as long as head width; longest terminal seta slightly shorter than segment 10. Apical labium segment 0.2 times longer than head width and 0.7 times longer than median segment. Forewing (Fig. 98) 2.8 times as long as head width, 2.2 times as long as wide, obovoid, broadly rounded apically; vein M+Cu1 0.3 times as long as Cu1; ratio a/b 1.6; ratio c/d 0.9; ratio e/f 1.0; surface spinules moderately spaced, forming rhomboids (Fig. 102), covering apical half of cell r1, very apex of cell r2, much reduced around radular areas of cells m1, m2 and cu1, and around Cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.8 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, blunt, weakly down-curved posterior lobe. Paramere (Figs 186−187) 0.8 times as long as proctiger; in lateral view, sublanceolate; anterior margin almost straight throughout, posterior margin slightly convex with subapical indentation; apex irregularly rounded); inner surface (Fig. 187) covered with long setae, with row of thick setae along apical anterior margin, group of thick setae below sclerotised ridge and along posterior margin; in dorsal view (Fig. 222), apex sclerotised. Aedeagus (Fig. 188) complex unipartite; in lateral view, dorsal lobe small, irregularly oval; ventral process strongly upturned, apical expansion larger than dorsal lobe, subglobular, bearing long, conical tubercle.—Female (Fig. 252). Proctiger 0.9 times as long as head width; in lateral view, dorsal outline moderately to strongly concave distal to circumanal ring, apical extension almost straight, apex straight, irregularly rounded; circumanal ring 0.4 times as long as proctiger. Subgenital plate 0.4 times as long as proctiger; in lateral view, apex strongly truncate, ventral outline strongly swollen, apex slightly straight; covered with medium long setae except in very base, and shorter setae in apical third, very long setae at apex, and group of long setae subapically on dorsum, without seta-free patch subapically; in ventral view (Fig. 282), lateral margins unevenly, weakly narrowing at apical fourth towards broad, subtruncate apex.

Distribution. Brazil: Minas Gerais, Paraná (Fig. 292).

Host-plant. Adults were collected on *Andira fraxinifolia* Benth. (Leguminosae, Papilionoideae, Aeschynomeneae) but confirmation is needed.

***Mitrapsylla* sp. nov. 26**
(Figs 39, 69, 99, 189−191, 223, 253, 283, 292)

Material examined. Holotype m$, Brazil: Mato Grosso do Sul, Jardim, near BR267, -21.4500, -55.7917, 380–440m, 18–20.xi.2012, Cerrado edge along unpaved road, gallery forest along river, single trees in field, *Machaerium villosum* (D. Burckhardt & D. L. Queiroz), #76(8) (DZUP, dry).

Paratypes: Mato Grosso do Sul: 42 m$, 40 f£, 9 immatures, same data as holotype (D. Burckhardt & D. L. Queiroz), #76(8) (DZUP, NHMB, dry, slide mounted, 70% ethanol); 28 m$, 25 f£, Rochedo, MS080, -19.9683, -54.6500, 350m, 15.xi.2012, Cerrado, *Racosperma mearnsii* (D. Burckhardt & D. L. Queiroz), #73(2) (NHMB, slide mounted, 70% ethanol).

Description. Colouration. Body with white striped-pattern; variation: vertex with stripe along posterior margin weak when present; mesopraescutum with lateral stripes fused to lateral spots on posterior margin; metascutellum almost entirely lighter than rest of thorax; mesoepisternum with markings usually inconspicuous; older specimens with markings with dark outline.—Head and thorax pale yellow, yellowish-orange, yellowish-brown; genal process slightly lighter than head. Eye grey to dark red; ocelli colourless to orange. Antenna light yellowish-brown, segments 1–2 concolorous with head. Clypeus concolorous with head, slightly lighter medially and slightly darker along edges; rostrum light yellow. Thorax with margins of sclerites slightly darker. Forewing colourless to yellowish, yellow around Cu1b and sometimes slightly around M1+2, M3+4 and Cu1a; veins yellow; pterostigma concolorous or slightly lighter than veins. Hindwing colourless. Fore- and midleg dark yellow, hindleg light yellow. Abdomen light straw-coloured, pale yellow to light yellowish-brown; intersegmental membranes light straw-coloured; spiracular sclerites concolorous with tergites. Male terminalia irregularly light to dark yellow. Female terminalia irregularly light to dark yellow, proctiger darker apically.

Structure. Body length m$ 2.2–2.5 mm (2.35±0.1 mm), f£ 2.3–2.6 mm (2.48±0.13 mm) (5 m$, 5 f£). Genal process (Fig. 69) swollen or subconical, irregularly narrowing towards acute, subacute or narrowly rounded apex, 0.6 times as long as vertex along midline. Antenna 2.2–2.5 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.2 times longer than head width and 0.7–0.8 times longer than median segment. Forewing (Fig. 99) 2.8–2.9 times as long as head width, 2.3 times as long as wide, obovoid, slightly narrowly or broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.4–1.7; ratio c/d 0.7–0.8; ratio e/f 0.5–1.0; surface spinules moderately to distinctly spaced, forming rhomboids (Figs 101–102), covering apical half of cell r1, apical half or thrid of cell r2, fully covering cells m1, m2, and cu1 (sometimes restricted to radular areas), m2 basally and most of cell cu2, leaving spinule-free spaces along veins; radular spinules sometimes present in r2 but inconspicuous. Metatibia 0.6–0.8 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with long, weakly tapered, weakly down-curved posterior lobe. Paramere (Figs 189−190) 0.7–0.8 times as long as proctiger; in lateral view, clavate, strongly expanded apically; anterior margin expanding dorsally and anteriorly in apical third, irregularly concave basally, posterior margin strongly expanding in apical third or quarter, slightly concave subapically, weakly convex in basal half; apex strongly indented in anterior third, with sclerotised ridge in posterior half (Fig. 190); inner surface (Fig. 190) covered with short setae, longer basally and along posterior margin, with row of thick setae along apical anterior margin, several thick setae below sclerotised ridge and group of stout setae on apical posterior margin; in dorsal view (Fig. 223), sclerotised ridge slightly sinuous, bearing posterior tooth. Aedeagus (Fig. 191) complex unipartite; in lateral view, dorsal lobe subtriangular; ventral process weakly to strongly upturned, apical expansion larger than dorsal lobe, irregularly oval, slightly angulate at apex, bearing long, conical tubercle.—Female (Fig. 253). Proctiger 0.9 times as long as head width; in lateral view, dorsal outline moderately to strongly concave distal to circumanal ring, apical extension sinuous, apex slightly to moderately upturned, smoothly transversally truncate to strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.5–0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline basal half strongly swollen, apical half almost straight to slightly convex; covered with medium long setae in median third, ventrally throughout, and short setae in

apical third, long setae at apex, and group of long setae subapically on dorsum, with seta-free patch subapically; in ventral view (Fig. 283), lateral margins evenly, strongly narrowing at apical third towards narrow, acutely rounded apex.

Measurements (in mm) (3 m$, 2 f£). HW m$ 0.57–0.62 (0.6±0.02), f£ 0.64–0.68 (0.66±0.03); AL m$ 1.34–1.53 (1.42±0.1), f£ 1.43–1.58 (1.5±0.11); LAB2 m$ 0.15, f£ 0.15–0.16 (0.15±0.01); LAB3 m$ 0.11–0.12 (0.11±0.01), f£ 0.12; FL m$ 1.61–1.71 (1.67±0.05), f£ 1.87–1.92 (1.89±0.04); TL m$ 0.42–0.46 (0.44±0.02), f£ 0.43–0.44 (0.43±0.01); MP 0.23–0.26 (0.24±0.01); PL 0.18–0.19 (0.18±0.01); DL 0.26–0.27 (0.26±0.01); FP 0.56–0.58 (0.57±0.02).

Distribution. Brazil: Mato Grosso do Sul (Fig. 292).

Host-plant. *Machaerium villosum* Vogel (Leguminosae, Papilionoideae, Aeschynomeneae).

Comments. See comments section under *M.* sp. nov. 8 and *M. itaparica* **sp. nov.**

Mitrapsylla sp. I Burckhardt & Queiroz

Mitrapsylla sp. I Burckhardt & Queiroz, 2019: in prep.

Material examined. Holotype m$, Brazil: Paraná, Jaguariaíva, Parque Estadual do Cerrado, -24.1683, -49.6533, 780–820m, 15–16.ii.2016, Cerrado vegetation, *Copaifera langsdorffii* (D. Burckhardt & D. L. Queiroz), #197(1) (MZSP, dry).

Description of adult and immature by Burckhardt & Queiroz (2019).

Distribution. Brazil: Minas Gerais, Paraná (Fig. 292) (Burckhardt & Queiroz 2019).

Host-plant. Adults were collected on *Copaifera langsdorffii* Desf. (Leguminosae, Detarioideae, Detarieae) which is a likely host.

Mitrapsylla sp. nov. 27

(Figs 40, 70, 100, 192−194, 224, 254, 284, 292)

Material examined. Holotype m$, Brazil: Paraná, Parque Guartelá, -24.5617, -50.2583, 920–950m, 23–25. vi.2015, Cerrado vegetation (D. Burckhardt & D. L. Queiroz), #171(-) (NHMB, dry).

Paratypes: Paraná: 8 m$, 13 f£, same data as holotype (D. Burckhardt & D. L. Queiroz), #171(-) (NHMB, dry, slide mounted, 70% ethanol).

Description. Adult. Colouration. Head and abdomen lacking distinct pattern, thorax with light yellow striped-pattern. Head and thorax dirty yellow. Occiput dark brown. Genal process light brown. Eye red to almost black; ocelli yellowish. Antenna light brown. Clypeus dirty yellowish; rostrum yellow. Thorax dirty yellow, with margins of sclerites brown. Legs dirty yellowish. Forewing colourless, dark yellow or ochreous; veins concolorous with membrane or slightly darker. Hindwing almost colourless, transparent. Abdomen dirty whitish. Terminalia yellow to light brown; articulatory sclerites of valvulae conspicuously dark brown. Younger specimens with less expanded dark colour.

Structure. Genal process (Fig. 70) subconical with subacute apex, 0.8 times as long as vertex along midline. Antenna 2.6–2.9 times as long as head width; longest terminal seta about as long as segment 10. Apical labium segment 0.1 times longer than head width and 0.5–0.6 times longer than median segment. Forewing (Fig. 100) 2.8–3.1 times as long as head width, 2.3 times as long as wide, obovoid, broadly rounded apically; vein M+Cu1 0.3–0.4 times as long as Cu1; ratio a/b 1.1–1.9; ratio c/d 0.8–0.9; ratio e/f 0.7–0.8; surface spinules moderately spaced, forming rhomboids (Fig. 102), fully covering all cells except c+sc areas of

surface spinules narrowing near wing margin in cells r2, m1, m2 and cu1, leaving spinule-free spaces along veins. Metatibia 0.6 times as long as head width.

Terminalia. Male. Proctiger 0.4 as long as head width; in lateral view, with narrow, almost straight posterior lobe. Paramere (Figs 192−193) 0.9 times as long as proctiger; in lateral view, irregularly lamellar; anterior margin irregularly straight to slightly concave, posterior margin weakly, irregularly wavy; apex irregularly rounded); inner surface (Fig. 193) covered with long setae, longer along posterior margin, with row of thick setae along apical anterior margin and several thick setae below sclerotised ridge; in dorsal view (Fig. 224), bearing blunt anterior and posterior tooth. Aedeagus (Fig. 194) complex unipartite; in lateral view, dorsal lobe irregularly oval, indented subasally on dorsal outline; ventral process relatively straight, apical expansion larger than dorsal lobe, irregularly globular, bearing long, blunt tubercle.—Female (Fig. 254). Proctiger 1.1 times as long as head width; in lateral view, dorsal outline weakly concave distal to circumanal ring, apical extension almost straight, apex slightly upturned, strongly obliquely truncate; circumanal ring 0.3 times as long as proctiger. Subgenital plate 0.6 times as long as proctiger; in lateral view, apex well-developed, ventral outline mostly straight, weakly convex at apex; covered with medium long setae in median third, ventrally throughout, and short setae in apical third, long setae at apex, and group of long setae subapically on dorsum, without seta-free patch subapically; in ventral view (Fig. 284), lateral margins evenly, weakly narrowing towards narrow, acutely rounded apex.

Distribution. Brazil: Paraná (Fig. 292).

Host-plant. Unknown.

Comments. See comments section under *M.* sp. nov. 6

Discussion and conclusion

This taxonomic study brings the number of described species of *Mitrapsylla* to 51, raising the genus, in terms of number of species, from third to first place within the Ciriacreminae.

Furthermore, along with the species recently described by Burckhardt & Queiroz (2019), the number of *Mitrapsylla* species registered from Brazil was increased from 3 (Burckhardt & Queiroz 2012) to 40. Considering this number was elevated by a factor of more than 10, the estimative of about 1000 psylloid species occurring in Brazil seems possible.

Host-plants are confirmed for 14 *Mitrapsylla* species by the presence of immatures and are likely for another six species. For seven species no host information is available. *Mitrapsylla* seems to strictly develop in Leguminosae but is less specific at subfamily and genus level since, including previous records, 13 different genera within the subfamilies Caesalpinioideae, Detarioideae and Papilionoideae are found as host. However, single species seem to be genus-specific as none was confirmed developing on more than one genus. Additionally, consistent with previous records, the Papilionoideae sustains most of the diversity of *Mitrapsylla*, as 17 of the new species described herein develop in seven different genera within the subfamily, whereas only three species where found in three genera within the Caesalpinioideae. Additionally, the following plant genera are particularly interesting to *Mitrapsylla* as suggested by the number of species they host: *Copaifera* (nine species), *Machaerium* (eight species) and *Andira* (six species).

Mitrapsylla is a morphologically very homogeneous genus. The taxonomy of relies largely on differences in the male terminalia. Females and immatures are often difficult to assign with certainty to a particular species. For this reason we provide here only a an identification key for the males.

Most of *Mitrapsylla* species present a rather homogeneous morphology, with many overlapping character states. Diagnostic species characters are the shape of the paramere and to a lesser extent, the spacing and coverage of the forewing surface spinules. The female

terminalia is not diagnostic for many species, for which a satisfactory identification is based on the male. However, two major groups of species can be recognised based on the type of aedeagus: 1. with simple aedeagus (Fig. 155); and 2. with complex aedeagus (Figs 6−9).

The latter type seems to be the most successful within the genus since it is found in 32 species, while only 15 present a simple aedeagus (*M.* sp. A*, M. arcuata, M*. sp B*, M. burckhardti, M.* sp. C*, M.* sp. D*, M.* sp. E*, M.* sp. F*, M*. sp. nov. 17*, M. longicauda, M.* sp G*, M. minuticonis, M. panamensis, M.* sp. H *and M.* sp. I). Notably, before the present paper most of the known *Mitrapsylla* species belonged to the simple aedeagus group (14 species) while only 6 presented the complex type. Moreover, within the complex aedeagus group, two further groupings are diagnosed based on the condition of the dorsal lobe of the aedeagal head: 1. with unipartite condition (Figs 6−7); and 2. with tripartite condition (Figs 8−9); the former composed by 19 species (*M.* sp. nov. 1, *M.* sp. nov. 3, *M.* sp. nov. 4, *M.* cubana, *M.* sp. nov. 8, *M.* sp. nov. 10, *M.* sp. nov. 13, *M.* sp. nov. 14, *M. itaparica*, *M.* sp. nov. 18, *M.* sp. nov. 19, *M.* sp. nov. 20, *M.* sp. nov. 21, *M.* sp. nov. 24, *M. spinosa*, *M. surinamensis*, *M.* sp. nov. 25, *M.* sp. nov. 26 and *M.* sp. nov. 27) and the latter by 13 (*M.* sp. nov. 2, *M.* sp. nov. 5, *M.* sp. nov. 6, *M. ceplaciensis, M.* sp. nov. 7, *M.* sp. nov. 11, *M. fusca, M.* sp. nov. 12, *M.* sp. nov. 16, *M.* sp. nov. 17, *M.* sp. nov. 22 and *M.* sp. nov. 23). In this numbers, we did not include *M. albalineata, M. cambalachensis, M. deserata* and *M. vulgaris* as we were not able to confirm their type of aedeagus.

Interestingly, all known hosts of the simple aedeagus group belong to the Detareoidea, whereas those of the complex unipartite aedeagus group belong to the Papilionoideae and the ones of the complex tripartite aedeagus group belong to both Caesalpinioideae and Papilionoideae.

Extensive fieldwork in Brazil, mainly focused in the South Region (Fig. 10), shows that *Mitrapsylla* is predominantly tropical since, in addition to previous records which are mostly from Central and northern South America, most species were found in tropical areas of Brazil, while only 13 species were recorded in the temperate states (Paraná, Rio Grande do Sul, Santa Catarina).

Finally, material at hand of additional species, too incomplete for description, suggests that many more *Mitrapsylla* species can be expected. Thus, more targeted fieldwork conducted especially in Tropical Brazil should likely yield many more species.

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References

Bové, J.*M.* (2006) Huanlongbing: a destructive, newly-emerging, century-old disease of Citrus. Journal of Plant Pathology, 88 (1), 7–37.

Brown, R.G. & Hodkinson, I.D. (1988) Taxonomy and Ecology of the Jumping Plant-Lice of Panama (Homoptera: Psylloidea). E. J. Brill, Leiden, 304 pp.

Burckhardt, D. & Basset, Y. (2000) The jumping plant-lice (Hemiptera: Psylloidea) associated with Schinus (Anacardiaceae): systematics, biogeography and Host-plant relationships. Journal of Natural History, 34, 57–155.

Burckhardt, D. & Ouvrard, D. (2012) A Revised Classification of the Jumping Plant-Lice (Hemiptera: Psylloidea). Zootaxa, 3509 (1), 1–34.

Burckhardt, D. & Queiroz, D.L. (2012) Checklist and comments on the jumping plant-lice (Hemiptera: Psylloidea) from Brazil. Zootaxa, 3571, 26–48.

Burckhardt, D. & Queiroz, D.L. (2017) The jumping plant-lice of the Neotropical genus Tainarys (Hemiptera: Psylloidea) associated with Anacardiaceae. Zootaxa, 4232 (4), 535–567.

Burckhardt, D. & Queiroz, D.L. (2019) Neotropical jumping plant-lice (Hemiptera, Psylloidea) associated with plants of the tribe Detarieae (Leguminosae, Detarioideae). Unpublished manuscript.

Burckhardt, D. (1987) Jumping plant lice (Homoptera: Psylloidea) of the temperate Neotropical region. Part 2. Psyllidae (subfamilies Diaphorininae, Acizziinae, Ciriacreminae and Psyllinae). Zoological Journal of the Linnean Society, 90, 145205.

Burckhardt, D. (1994) Psylloid pests of temperate and subtropical crop and ornamental plants (Hemiptera, Psylloidea): A review. Trends in Agricultural Sciences, Entomology, 2, 173–186.

Burckhardt, D. (2005) Biology, Ecology, and Evolution of Gall-inducing Psyllids (Hemiptera: Psylloidea). In: Raman, ASchaefer, C.W. & Withers, T.*M.* (Ed.), Biology, Ecology, and Evolution of Gall-inducing Arthropods. Vol. 1. Science Publishers, Inc., Enfield, NH, pp. 143–157.

Burckhardt, D., Cho, G. & Lee, S. (2018a) Moriphila furva gen. and **sp. nov.** (Hemiptera: Psylloidea: Homotomidae), a new jumping plant-louse from Korea associated with Morus australis (Moreaceae). Zootaxa, 4444 (3), 299–315. http://dx.doi.org/10.11646/zootaxa.4444.3.5

Burckhardt, D., Cuda, J.P., Diaz, R., Overholt, W., Prade, P., Queiroz, D.L.d., Vitorino, *M.*D. & Wheeler, G.S. (2018b) Taxonomy of Calophya (Hemiptera: Calophyidae) species associated with Schinus terebinthifolia (Anacardiaceae). Florida Entomologist, 101, 178–188. https://doi.org/10.1653/024.101.0205

Burckhardt, D., Ouvrard, D., Queiroz, D. & Percy, D. (2014) Psyllid host-plants (Hemiptera: Psylloidea): Resolving a semantic problem. Florida Entomologist, 97 (1), 242–246.

Caldwell J.S. (1944) Notes on Mexican and Central American Psyllidae. Ohio Journal of Science, 44, 57–64.

Caldwell, J.S. & Martorell, L.F. (1951) A brief review of the Psyllidae of Puerto Rico (Homoptera). Annals Entomological Society of America, 44, 603–613.

Costa Lima, A.*M.*d. (1942) Insetos do Brasil (Vol. 3 Homópteros): Escola Nacional de Agronomia.

Crawford, D.L. (1914) A monograph of the jumping plant-lice or Psyllidae of the New World. Bulletin of The United States National Museum, 85, 1–186.

Crawford, D.L. (1925) Psyllidae of South America. Brotéria: Serie Zoologica, 22, 56–74.

ESRI (2016) ArcGIS Desktop: release 10.4.1. Environmental Systems Research Institute, Redlands, California, USA.

Fern, K. (2018) Useful Tropical Plants Database. Available from: http://tropical.theferns.info/ (accessed 29 October 2018).

Hodkinson, I.D. (1974) The biology of the Psylloidea (Homoptera): a review. Bulletin of Entomological Research, 64, 325–339.

Hodkinson, I.D. (1990) A new species of Syncoptozus Enderlein from Mexico with a redefinition of the subfamily Togepsyllinae Bekker-Migdisova (Insecta: Homoptera: Psylloidea). Journal of Natural History, 24, 711–717. https://doi.org/10.1080/00222939000770491

Hodkinson, I.D. (2009) Life cycle variation and adaptation in jumping plant lice (Insecta: Hemiptera: Psylloidea): a global synthesis. Journal of Natural History, 43, 65–179.

Hollis, D. & Broomfield, P.S. (1989) Ficus-feeding psyllids (Homoptera), with special reference to the Homotomidae. Bulletin of the British Museum (Natural History) (Entomology), 58, 131–183.

Hollis, D. (2004) Australian Psylloidea: Jumping plantlice and lerp insects. Department of the Environment and Heritage, Canberra, 216 pp.

IBGE (Instituto Brasileiro de Geografia e Estatística) (2019). Serviços do ArcGis. Available from: https://mapas.ibge.gov.br/interativos/servicos/wms-do-arcgis.html (accessed 16 February 2019)

Li, F. (2011) Psyllidomorpha of China (Insecta: Hemiptera). Science Press, Beijing, 1976 pp.

LPWG (The Legume Phylogeny Working Group) (2017). A new subfamily classification of the Leguminosae based on taxonomically comprehensive phylogeny. Taxon, 66 (1), 44–77.

Olivares, T.S. & Burckhardt, D. (1997) Jumping plant-lice of the New World genus Calinda (Hemiptera: Psylloidea: Triozidae). Revue Suisse de Zoologie, 104 (2), 231–344. https://doi.org/10.5962/bhl.part.79999

Ouvrard, D. (2019) Psyl'list—The World Psylloidea Database. Available from: https://www.hemiptera-databases.org/psyllist/?&lang=en (accessed 20 January 2019)

Ouvrard, D., Chalise, P. & Percy, D.*M.* (2015) Host-plant leaps versus host-plant shuffle: a global survey reveals contrasting patterns in an oligophagous insect group (Hemiptera, Psylloidea). Systematics and Biodiversity, 2015, 1–21. https://doi.org/10.1080/14772000.2015.1046969

Percy, D.*M.* (2003) Radiation, diversity, and host-plant interactions among island and continental legume-feeding psyllids. Evolution, 57 (11), 2540–2556. https://doi.org/10.1111/j.0014-3820.2003.tb01498.x

Percy, D.*M.*, Crampton-Platt, A., Sveinsson, S., Lemmon, A.R., Moriarty Lemmon, E., Ouvrard, D. & Burckhardt, D. (2018) Resolving the psyllid tree of life: phylogenomic analyses of the superfamily Psylloidea (Hemiptera). Systematic Entomology, 1–15. https://doi.org/10.1111/syen.12302

Queiroz, D.L.d., Burckhardt, D., & Garrastazu, *M.*C. (2017) Protocolo de montagem e coleta de psilídeos. Embrapa Florestas, Comunicado Técnico 393, 11 pp.

Rendón-Mera, D.I., Serna, F. & Burckhardt, D. (2017) Generic synopsis of the jumping plant-lice (Hemiptera: Sternorrhyncha: Psylloidea) from Colombia. Zootaxa, 4350 (3), 436–468. https://doi.org/10.11646/zootaxa.4350.3.2

Santana, D.L. de Q. & Burckhardt, D. (2007) Introduced Eucalyptus psyllids in Brazil. Journal of Forestry Research, 12, 337–344. https://doi.org/10.1007/s10310-007-0035-7

Serbina, L., & Burckhardt, D. (2017) Systematics, biogeography and host-plant relationships of the Neotropical jumping plant-louse genus Russelliana (Hemiptera: Psylloidea). Zootaxa, 4266 (1), 001–114.

Šulc, K. (1914) Eine neue Psylla und eine neue Rhinocola aus Surinam. Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathematisch-naturwissenschaftliche Classe, 4, 1–10.

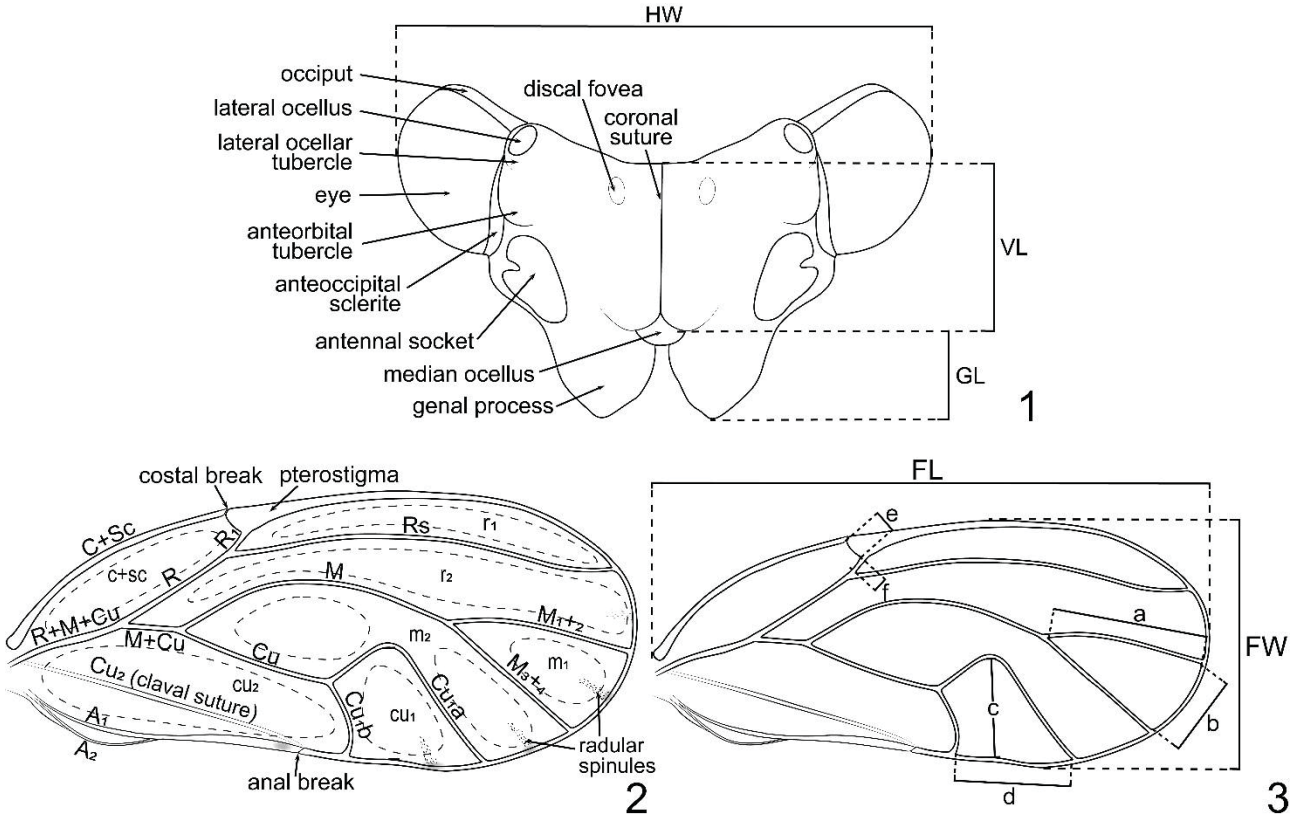
The Plant List (2013) Version 1.1. Published on the Internet. Available from: http://www.theplantlist.org/ (accessed 7 July 2017)

White, I.*M.* & Hodkinson, I.D. (1980) New psyllids (Homoptera, psylloidea) from the Cocoa Region of Bahia, Brazil. Revista Brasileira de Entomologia, 24, 75−84.

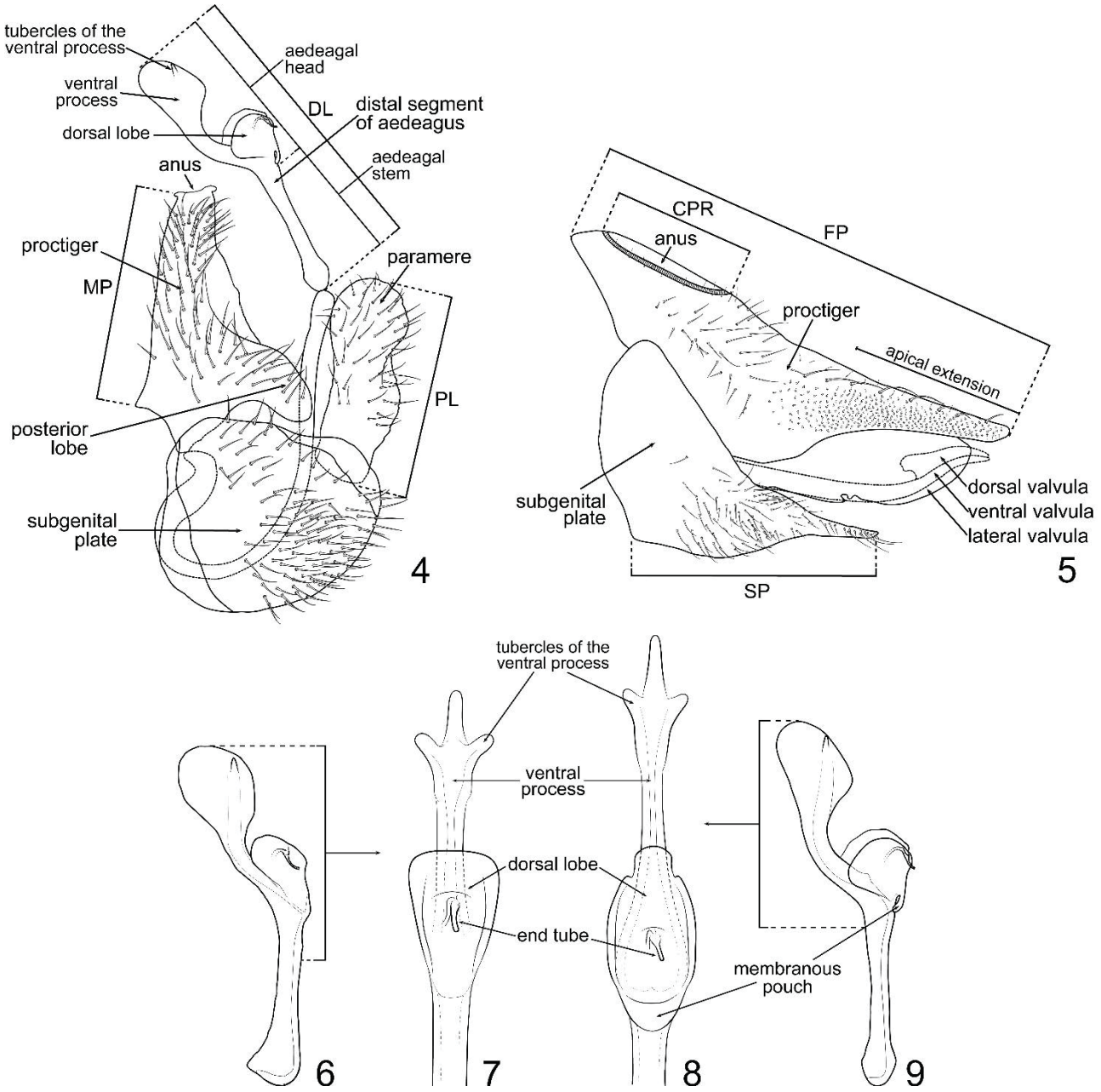
White, I.*M.* & Hodkinson, I.D. (1985) Nymphal taxonomy and systematics of the Psylloidea. Bulletin of the British Museum (Natural History) (Entomology), 50, 153–301.

Table 1. Distribution records by region and state for the *Mitrapsylla* species found in Brazil. Records from literature are marked with an asterisk (see Distribution section under each species).
States abbreviations: AM: Amazonas; BA: Bahia; CE: Ceará; DF: Distrito Federal; GO: Goiás; MA: Maranhão; MG: Minas Gerais; MS: Mato Grosso do Sul; MT: Mato Grosso; PI: Piauí; PR: Paraná; RR: Roraima; RS: Rio Grande do Sul; SC: Santa Catarina; SP: São Paulo.

	North		**Northeast**				**Central-West**				**Southeast**		**South**		
Species	AM	RR	BA	CE	MA	PI	DF	GO	MT	MS	MG	SP	PR	RS	SC
***M.* sp. A**				*							*		*		
***M.* sp. nov. 1**					x										
***M.* sp. nov. 2**	x														
***M.* sp. nov. 3**									x		x	x	x		
***M.* sp. nov. 4**		x													
***M.* sp. B**						*									
***M.* sp. nov. 5**		x													
***M.* sp. nov. 6**											x		x	x	
M. ceplaciensis			*								x				
***M.* sp. nov. 7**							x								
***M.* sp. C**						*									
***M.* sp. D**								*	*	*	*	*			
M. cubana	x									*	x	x	x		x
***M.* sp. nov. 8**							x	x	x	x	x				
***M.* sp. nov. 9**											x		x	x	x
***M.* sp. nov. 10**				x		x									
***M.* sp. nov. 11**									x						
***M.* sp. E**								*		*	*				
***M.* sp. F**							*	*	*	*	*	*	*		*
***M.* sp. nov. 12**										x					
***M.* sp. nov. 13**						x									
***M.* sp. nov. 14**										x	x	x			
***M.* sp. nov. 15**	x														
M. itaparica			*										x		x
M. longicauda		x													
***M.* sp. nov. 16**								x	x	x	x	x			
***M.* sp. G**			*			*									
***M.* sp. nov. 17**									x		x				
***M.* sp. nov. 18**		x													
***M.* sp. nov. 19**										x					
***M.* sp. nov. 20**								x			x		x		
***M.* sp. nov. 21**			x				x	x	x	x	x	x	x		x
***M.* sp. nov. 22**								x							
***M.* sp. H**											*		*		
***M.* sp. nov. 23**								x			x				
***M.* sp. nov. 24**		x	x			x									
***M.* sp. nov. 25**											x		x		
***M.* sp. nov. 26**										x					
***M.* sp. I**											*		*		
***M.* sp. nov. 27**													x		



FIGURES 1–3. Morphological terminology and measurements; *Mitrapsylla* sp. nov. 6: 1. Head, dorsal view; 2. Forewing, nomenclature of veins and cells; dashed lines indicate extent of areas covered by surface spinules; 3. Forewing, measurements. For abbreviations see Material and methods.



FIGURES 4−9. Morphological terminology and measurements: 4-5, 8−9. *Mitrapsylla* sp. nov. 6; 6−7. *M. cubana* Crawford. 4. Male terminalia, lateral view; 5. Female terminalia, lateral view; 6, 9. Distal segment of aedeagus, lateral view; 7−8. Apical part of apical segment of aedeagus, dorsal view. For abbreviations see Material and methods.

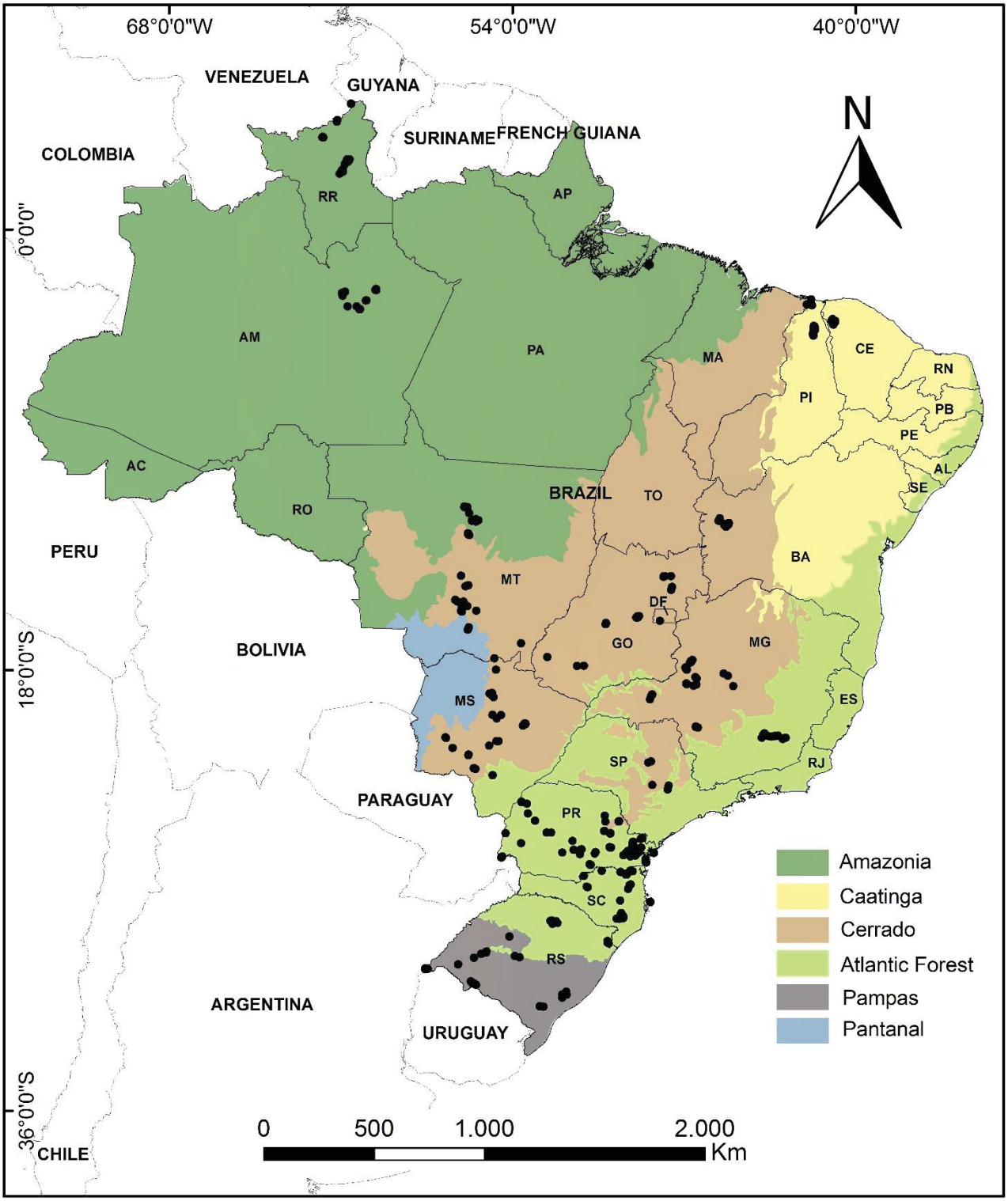
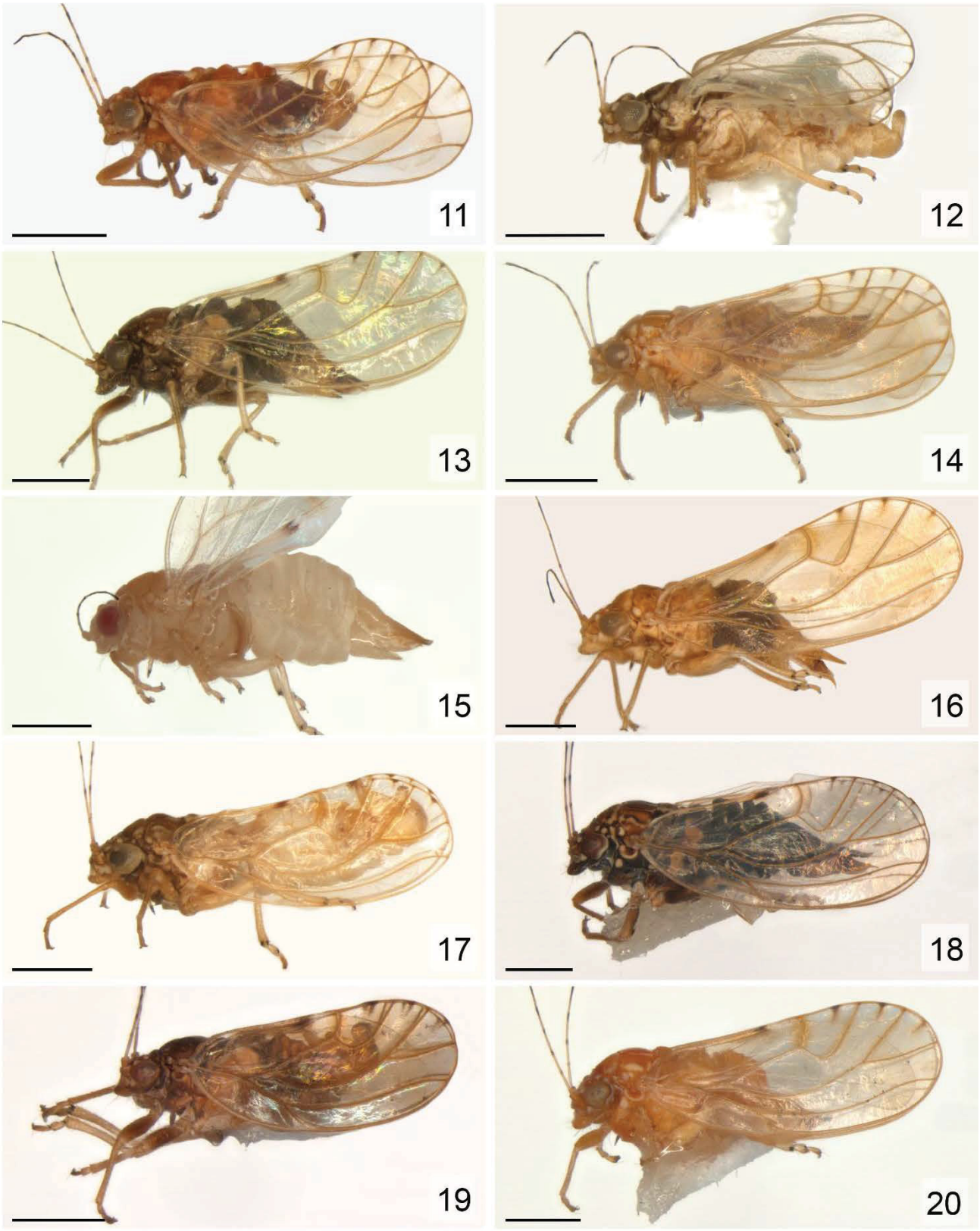
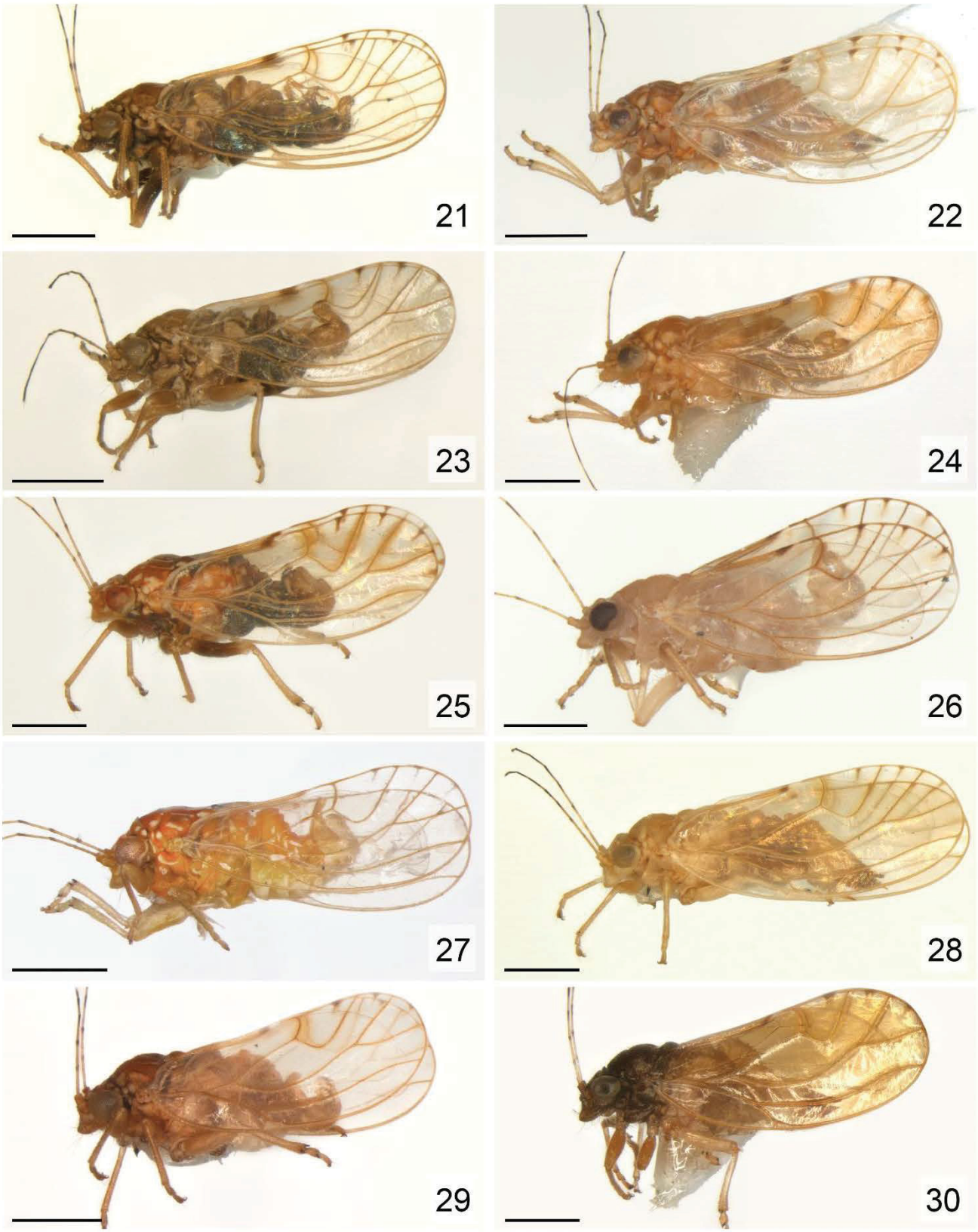


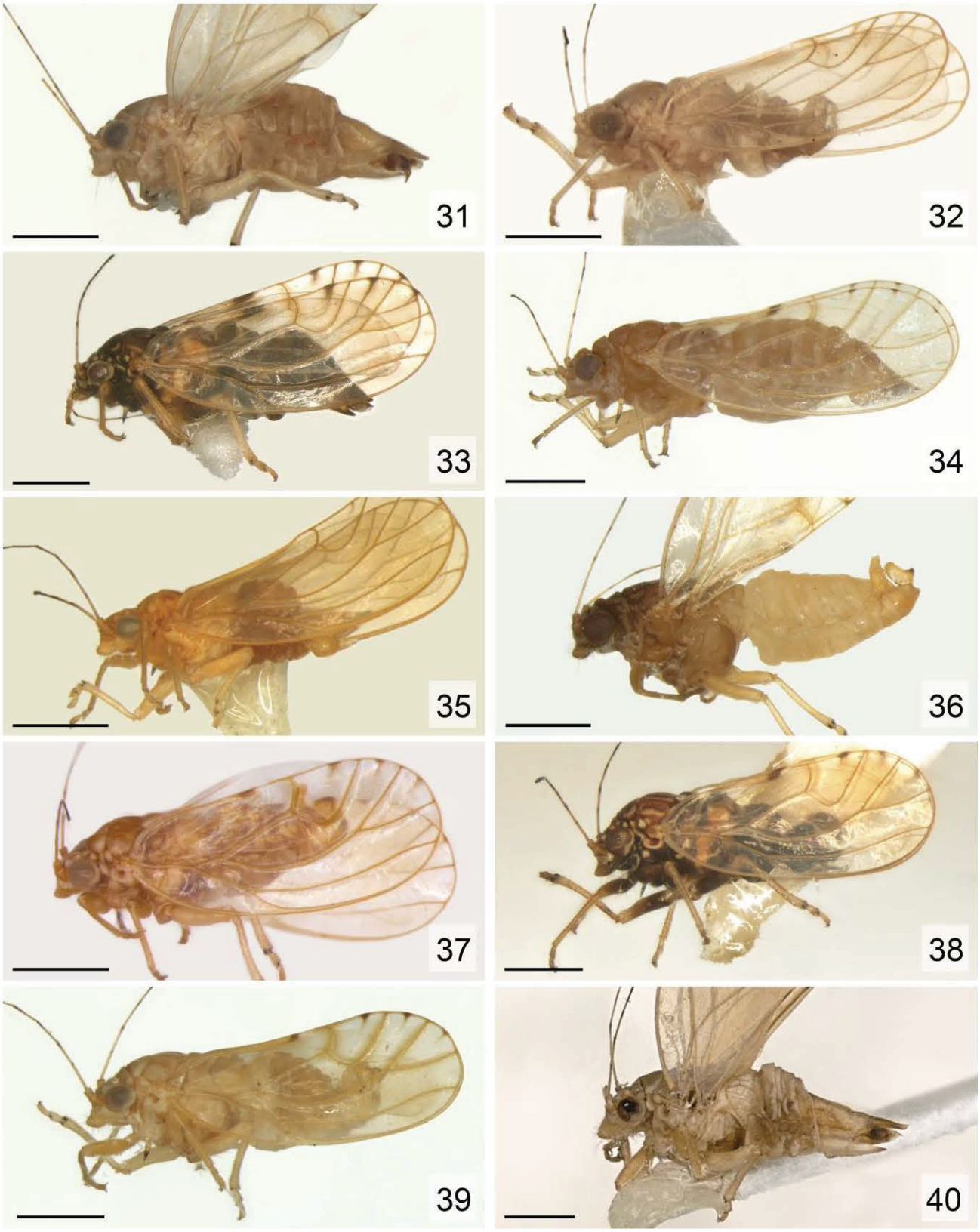
FIGURE 10. Collecting points of the project "Management and biodiversity of Psylloidea (Insecta, Hemiptera) in integrated agro-forestry system and citrus crops in Brazil" (code: 02.12.01.028.00.00) of the Brazilian Agricultural Research Corporation, Forestry Unit (Embrapa Florestas) in collaboration with the Swiss Naturhistorisches Museum Basel.



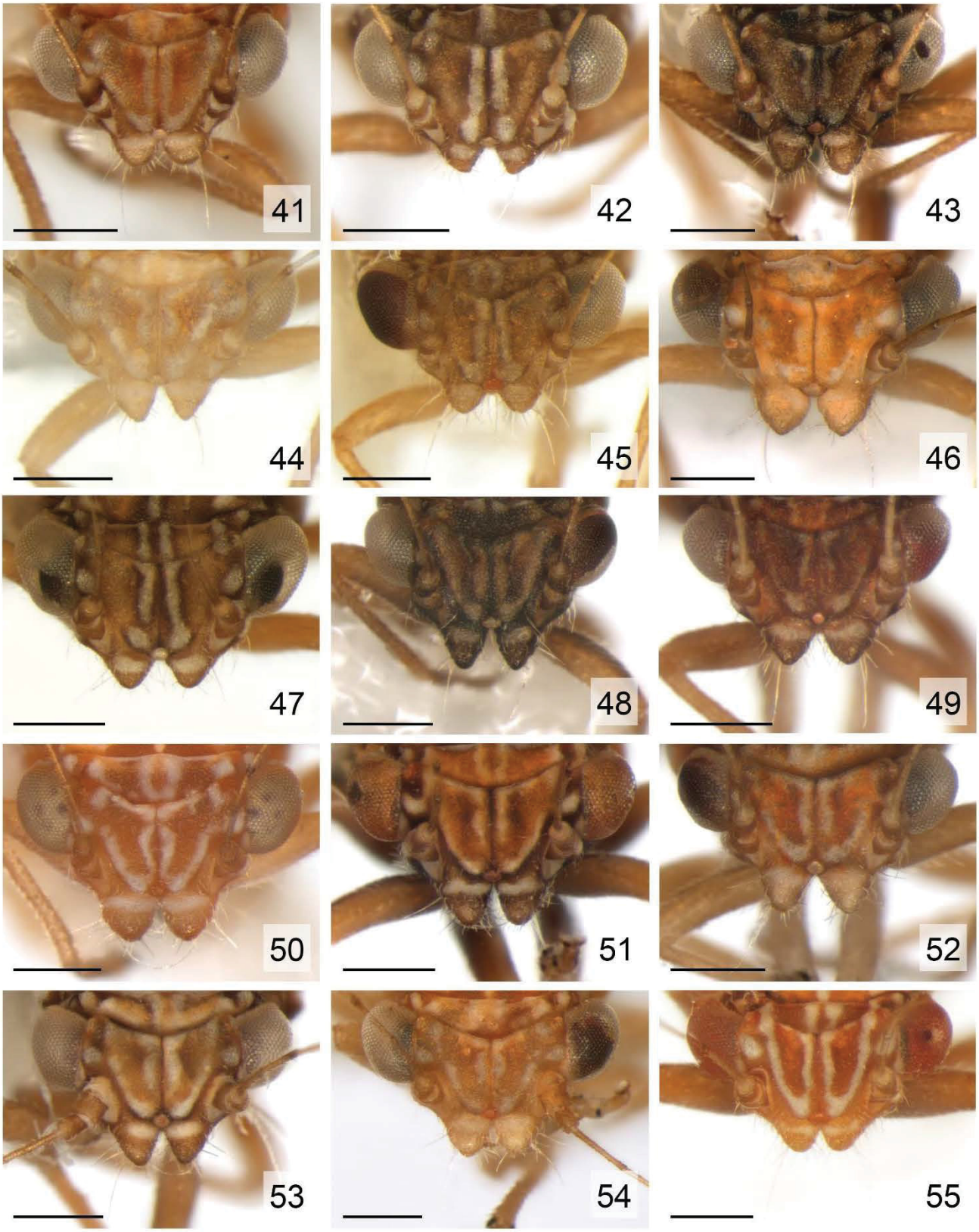
FIGURES 11–20. *Mitrapsylla* spp., lateral view: 11. *M.* sp. nov. 1; 12. *M.* sp. nov. 2; 13. *M.* sp. nov. 3; 14. *M.* sp. nov. 4; 15. *M.* sp. nov. 5; 16. *M.* sp. nov. 6; 17. *M. ceplaciensis* (White & Hodkinson); 18. *M.* sp. nov. 7; 19. *M. cubana* Crawford; 20. *M.* sp. nov. 8. Scale bar = 0.5 mm.



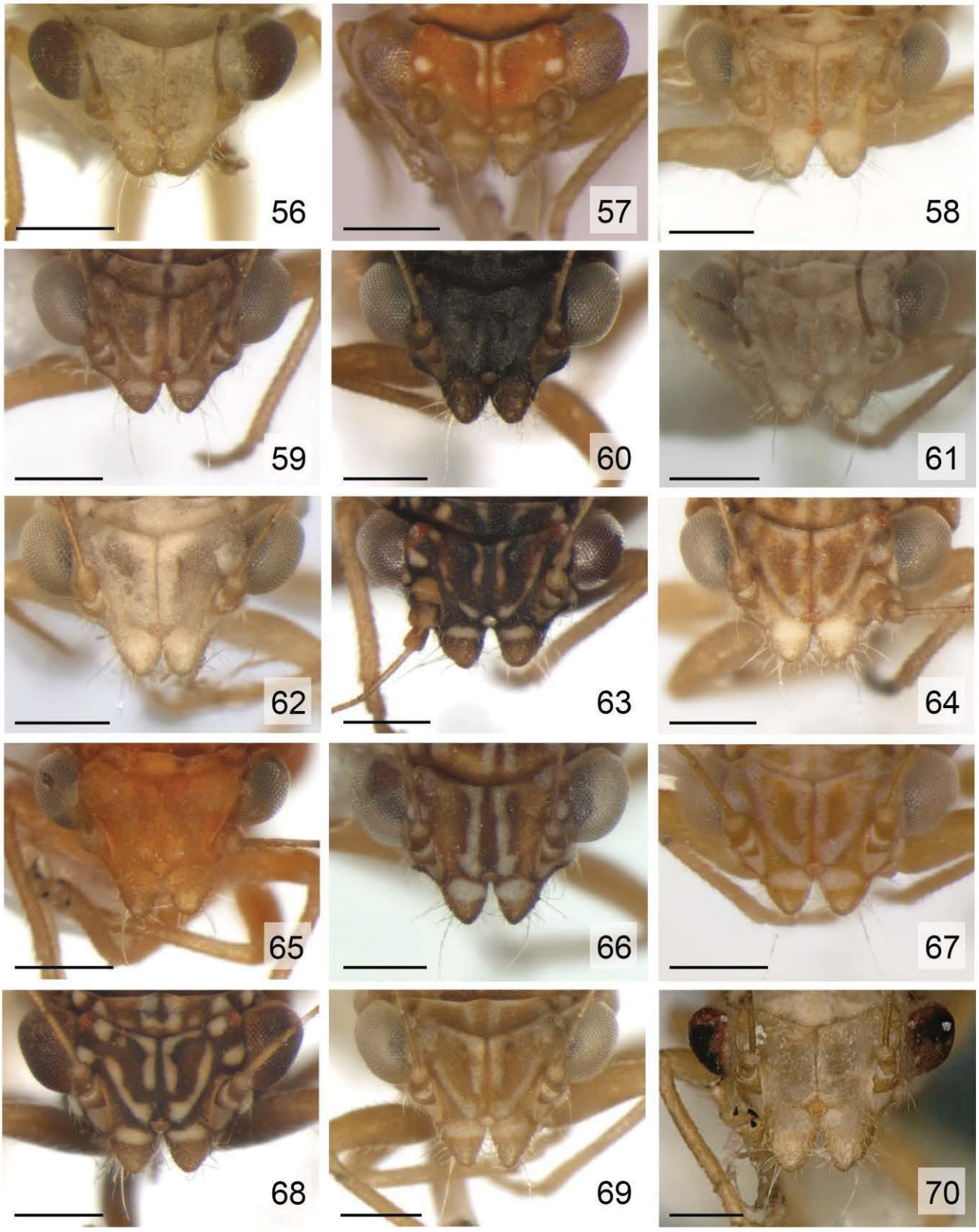
FIGURES 21–30. *Mitrapsylla* spp., lateral view: 21. *M.* sp. nov. 9; 22. *M.* sp. nov. 10; 23. *M.* sp. nov. 11; 24. *M.* sp. nov. 12; 25. *M.* sp. nov. 13; 26. *M.* sp. nov. 14; 27. *M.* sp. nov. 15; 28. *M. itaparica* (Crawford); 29. *M.* sp. nov. 16; 30. *M.* sp. nov. 17. Scale bar = 0.5 mm.



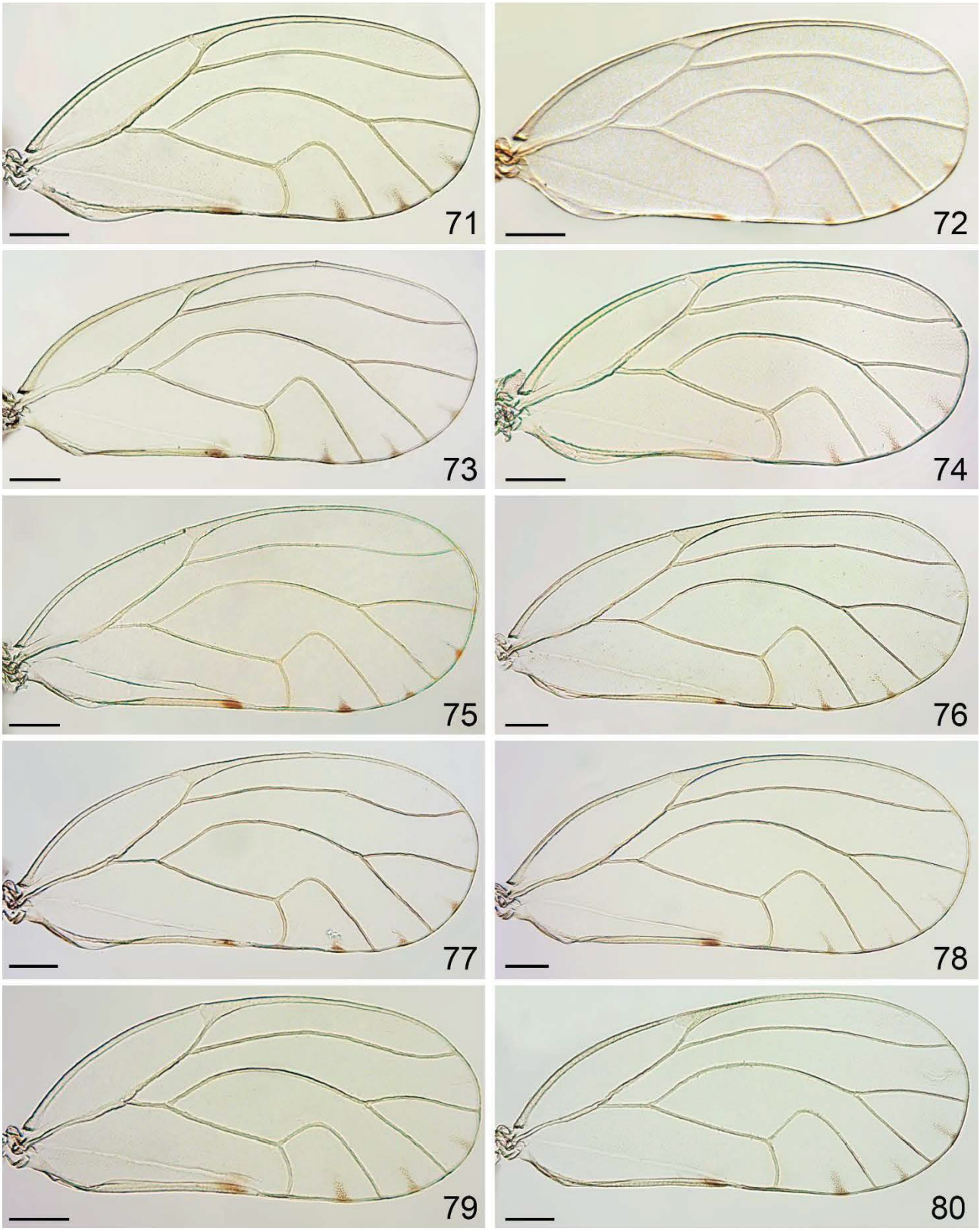
FIGURES 31−40. *Mitrapsylla* spp., lateral view: 31. *M.* sp. nov. 18; 32. *M.* sp. nov. 19, 33. *M.* sp. nov. 20; 34. *M.* sp. nov. 21; 35. *M.* sp. nov. 22; 36. *M.* sp. nov. 23; 37. *M.* sp. nov. 24; 38. *M.* sp. nov. 25; 39. *M.* sp. nov. 26; 40. *M.* sp. nov. 27. Scale bar = 0.5 mm.



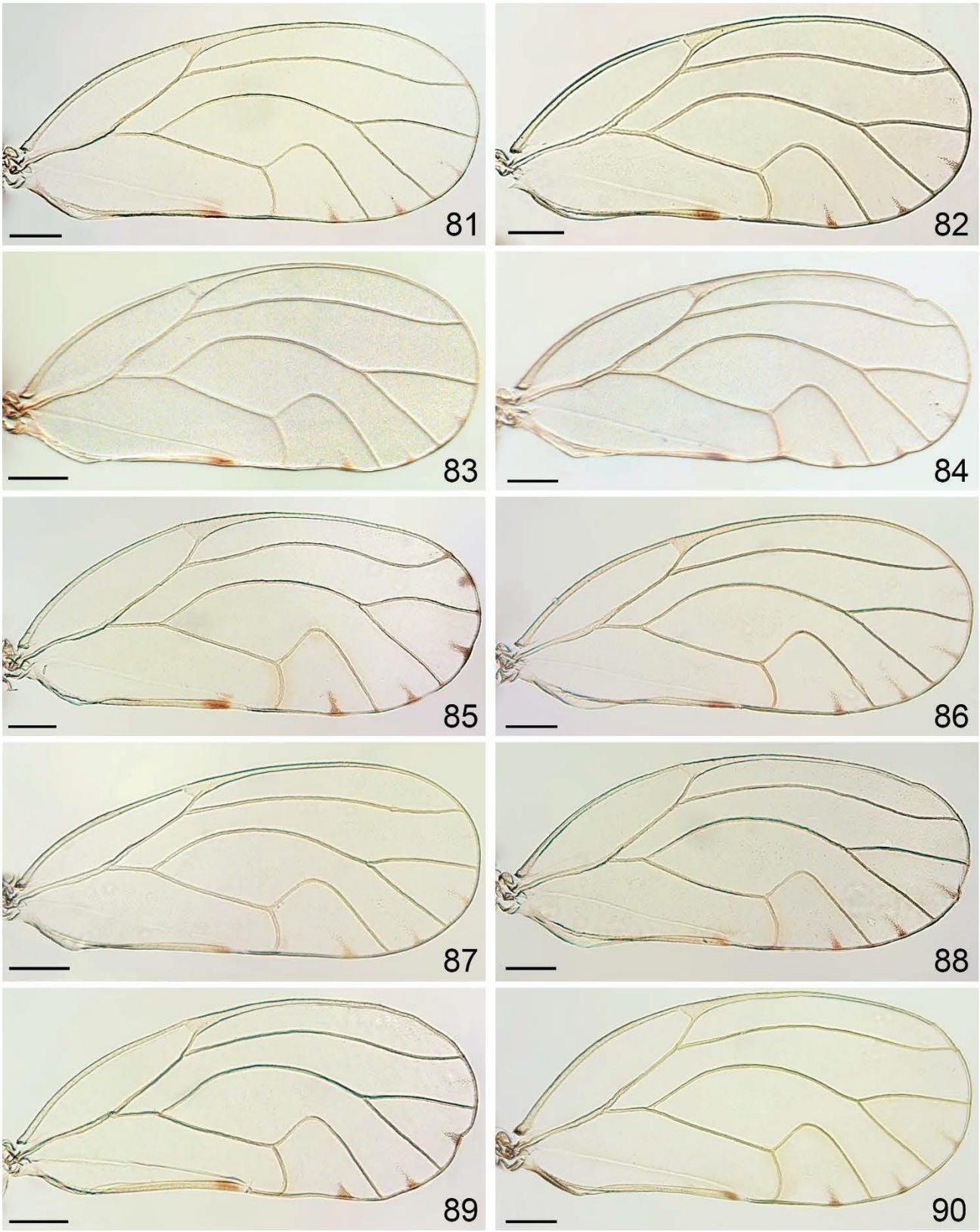
FIGURES 41–55. *Mitrapsylla* spp., head, dorsal view: 41. *M.* sp. nov. 1; 42. *M.* sp. nov. 2; 43. *M.* sp. nov. 3; 44. *M.* sp. nov. 4, 45. *M.* sp. nov. 5; 46. *M.* sp. nov. 6; 47. *M. ceplaciensis* (White & Hodkinson); 48. *M.* sp. nov. 7; 49. *M. cubana* Crawford; 50. *M.* sp. nov. 8; 51. *M.* sp. nov. 9; 52. *M.* sp. nov. 10; 53. *M.* sp. nov. 11; 54. *M.* sp. nov. 12; 55. *M.* sp. nov. 13. Scale bar = 0.2 mm.



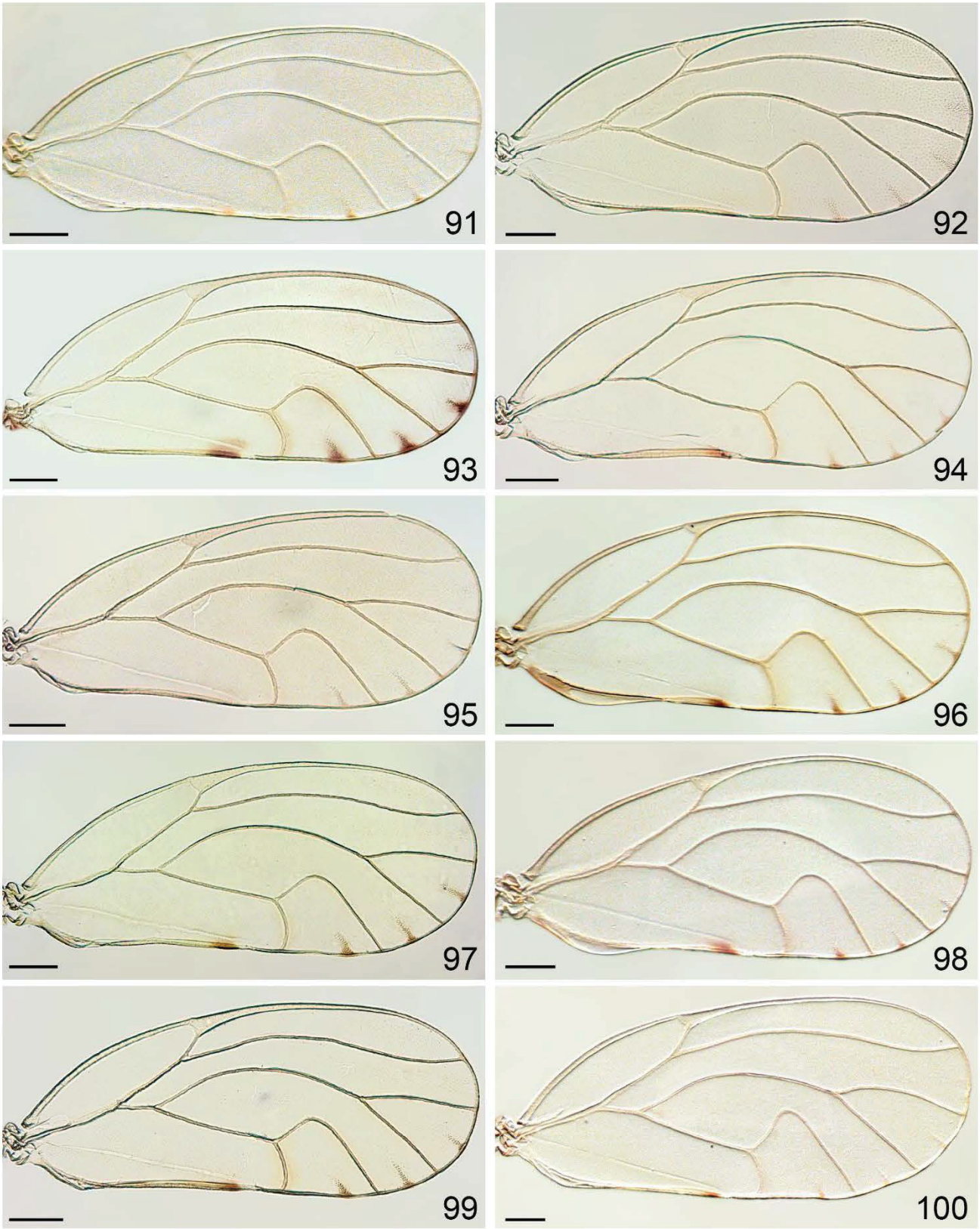
FIGURES 56–70. *Mitrapsylla* spp., head, dorsal view: 56. *M.* sp. nov. 14; 57. *M.* sp. nov. 15; 58. *M. itaparica* (Crawford); 59. *M.* sp. nov. 16; 60. *M.* sp. nov. 17; 61. *M.* sp. nov. 18; 62. *M.* sp. nov. 19; 63. *M.* sp. nov. 20; 64. *M.* sp. nov. 21; 65. *M.* sp. nov. 22; 66. *M.* sp. nov. 23; 67. *M.* sp. nov. 24; 68. *M.* sp. nov. 25; 69. *M.* sp. nov. 26; 70. *M.* sp. nov. 27. Scale bar = 0.2 mm.



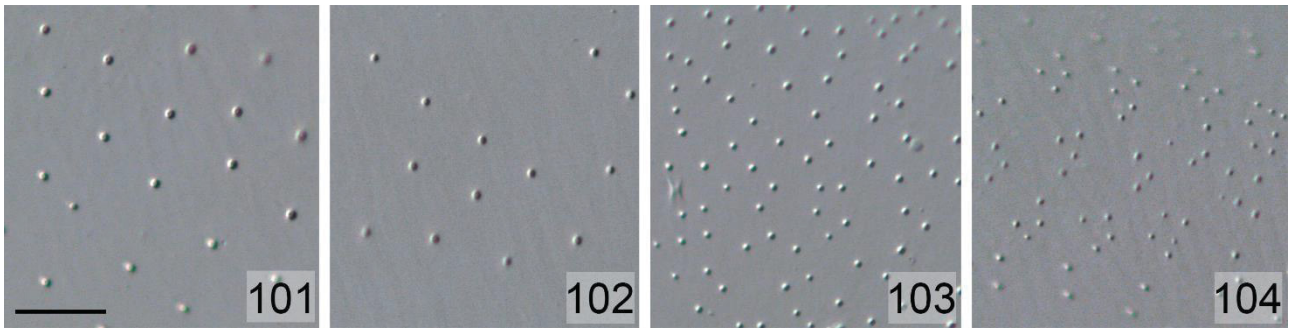
FIGURES 71–80. *Mitrapsylla* spp., forewing: 71. *M.* sp. nov. 1; 72. *M.* sp. nov. 2; 73. *M.* sp. nov. 3; 74. *M.* sp. nov. 4, 75. *M.* sp. nov. 5; 76. *M.* sp. nov. 6; 77. *M. ceplaciensis* (White & Hodkinson); 78. *M.* sp. nov. 7; 79. *M. cubana* Crawford; 80. *M.* sp. nov. 8. Scale bar = 0.2 mm.



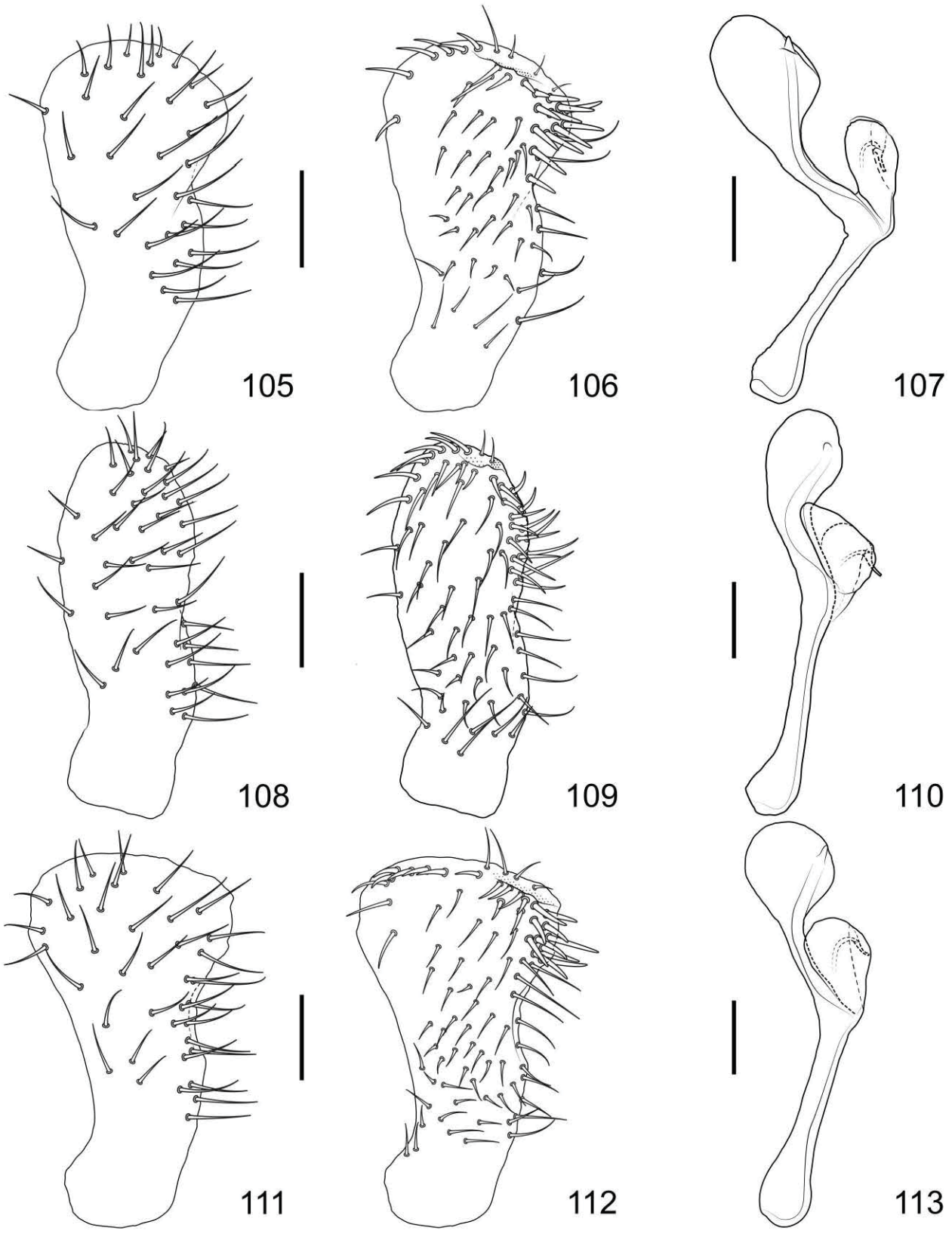
FIGURES 81−90. *Mitrapsylla* spp., forewing: 81. *M.* sp. nov. 9; 82. *M.* sp. nov. 10; 83. *M.* sp. nov. 11; 84. *M.* sp. nov. 12; 85. *M.* sp. nov. 13; 86. *M.* sp. nov. 14; 87. *M.* sp. nov. 15; 88. *M. itaparica* (Crawford); 89. *M.* sp. nov. 16; 90. *M.* sp. nov. 17. Scale bar = 0.2 mm.



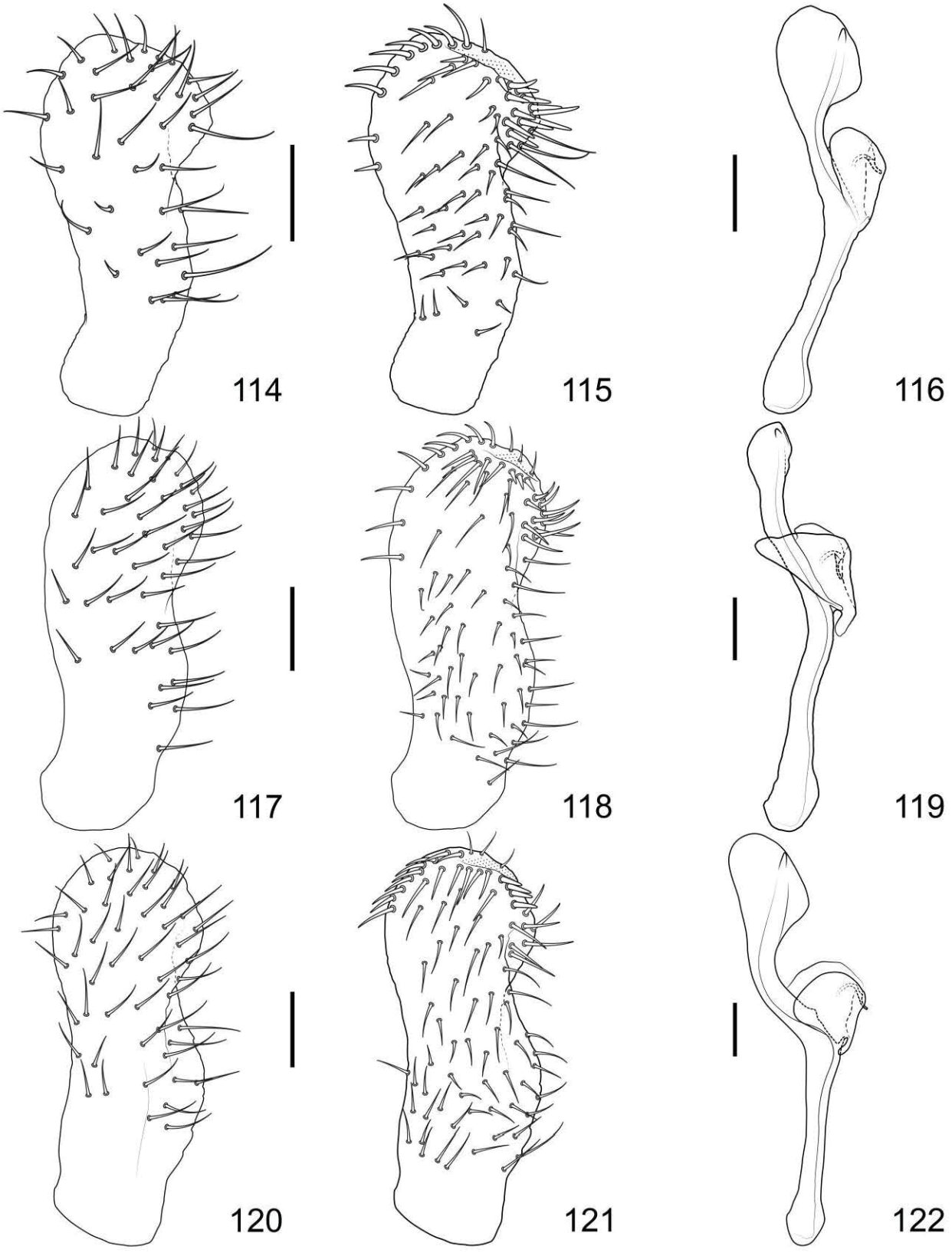
FIGURES 91−100. *Mitrapsylla* spp., forewing: 91. *M.* sp. nov. 18; 92. *M.* sp. nov. 19; 93. *M.* sp. nov. 20; 94. *M.* sp. nov. 21; 95. *M.* sp. nov. 22; 96. *M.* sp. nov. 23; 97. *M.* sp. nov. 24; 98. *M.* sp. nov. 25; 99. *M.* sp. nov. 26; 100. *M.* sp. nov. 27. Scale bar = 0.2 mm.



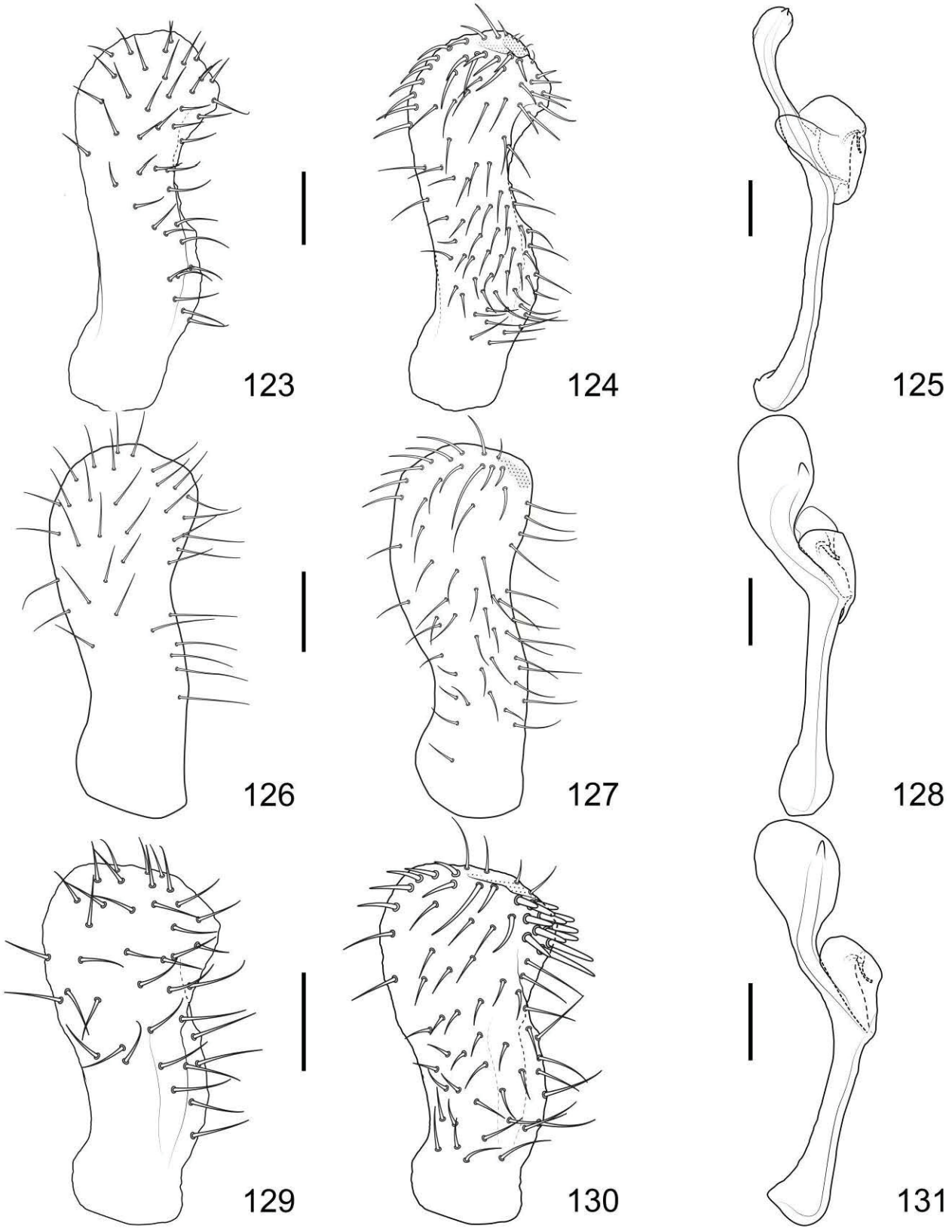
FIGURES 101−104. *Mitrapsylla* spp., forewing surface spinules: 101. *M.* sp. nov. 6; 102. *M.* sp. nov. 23; 103. *M.* sp. nov. 22; 104. *M.* sp. nov. 4



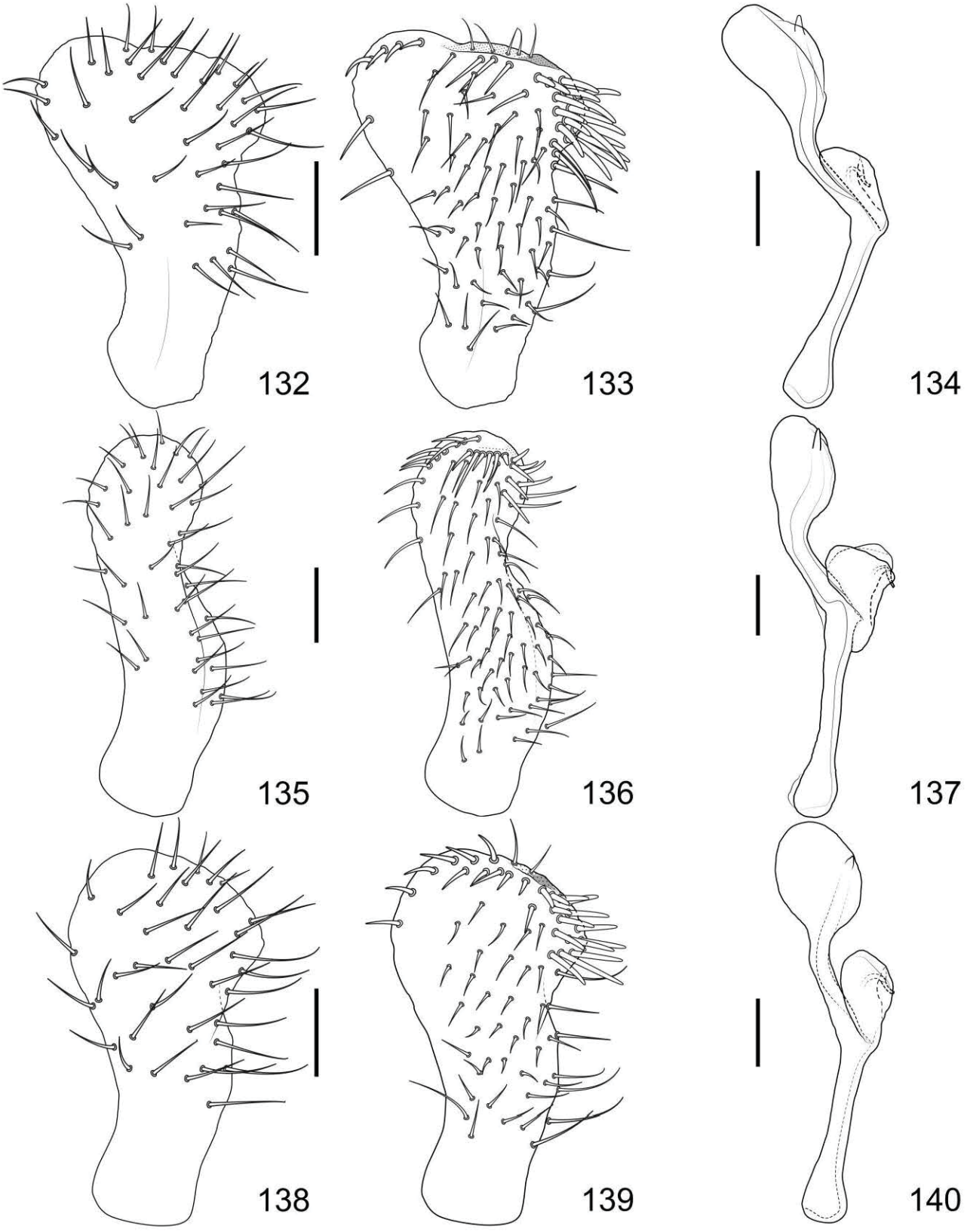
FIGURES 105−113. *Mitrapsylla* spp., male terminalia, lateral view: 105, 108, 111: paramere, outer surface; 106, 109, 112: paramere, inner surface; 107, 110, 113: distal segment of aedeagus. 105−107. *M.* sp. nov. 1; 108−110. *M.* sp. nov. 2; 111−113. *M.* sp. nov. 3. Scale bar = 0.05 mm.



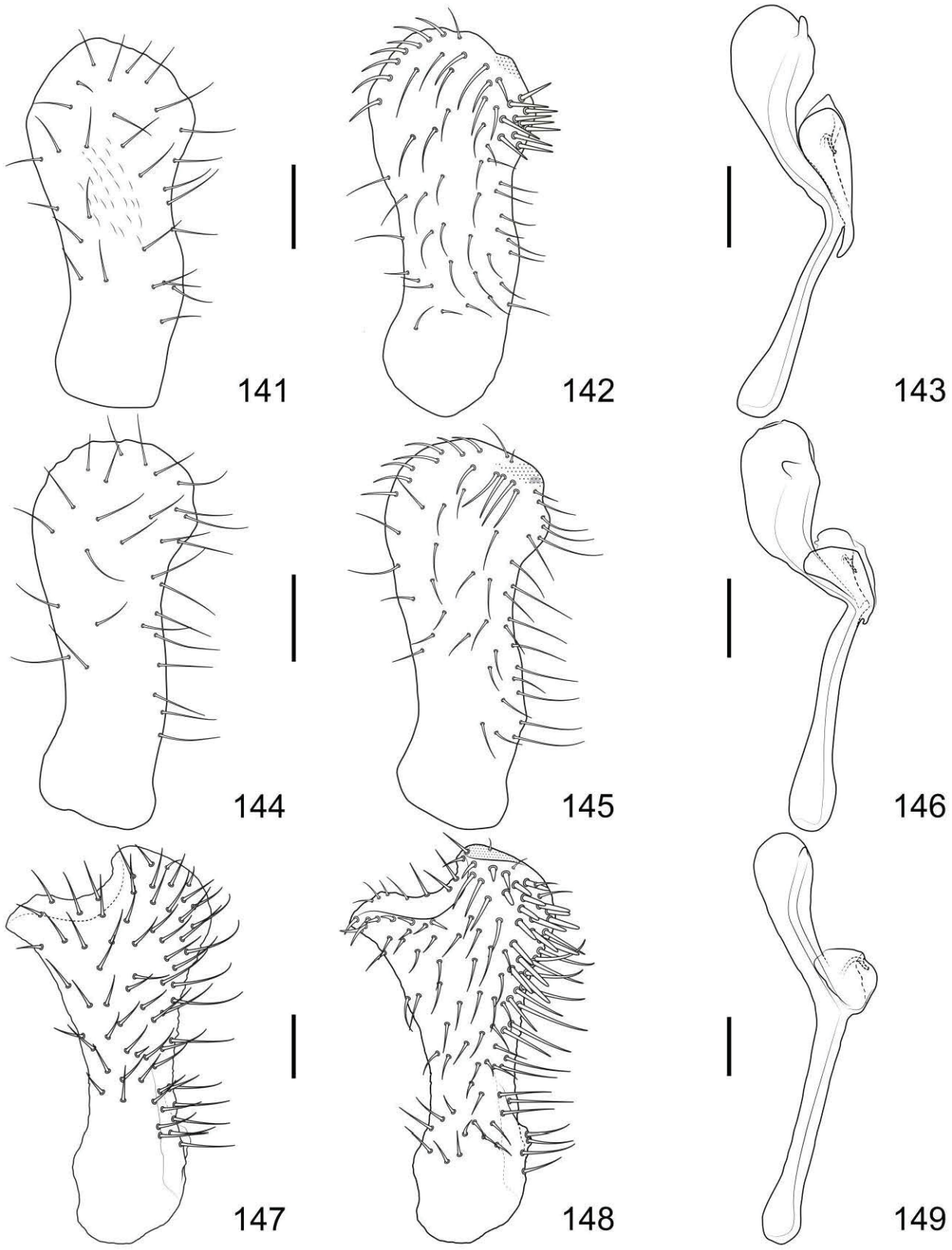
FIGURES 114−122. *Mitrapsylla* spp., male terminalia, lateral view: 114, 117, 120: paramere, outer surface; 115, 118, 121: paramere, inner surface; 116, 119, 122: distal segment of aedeagus. 114−116. *M.* sp. nov. 4; 117−119. *M.* sp. nov. 5; 120−122. *M.* sp. nov. 6. Scale bar = 0.05 mm.



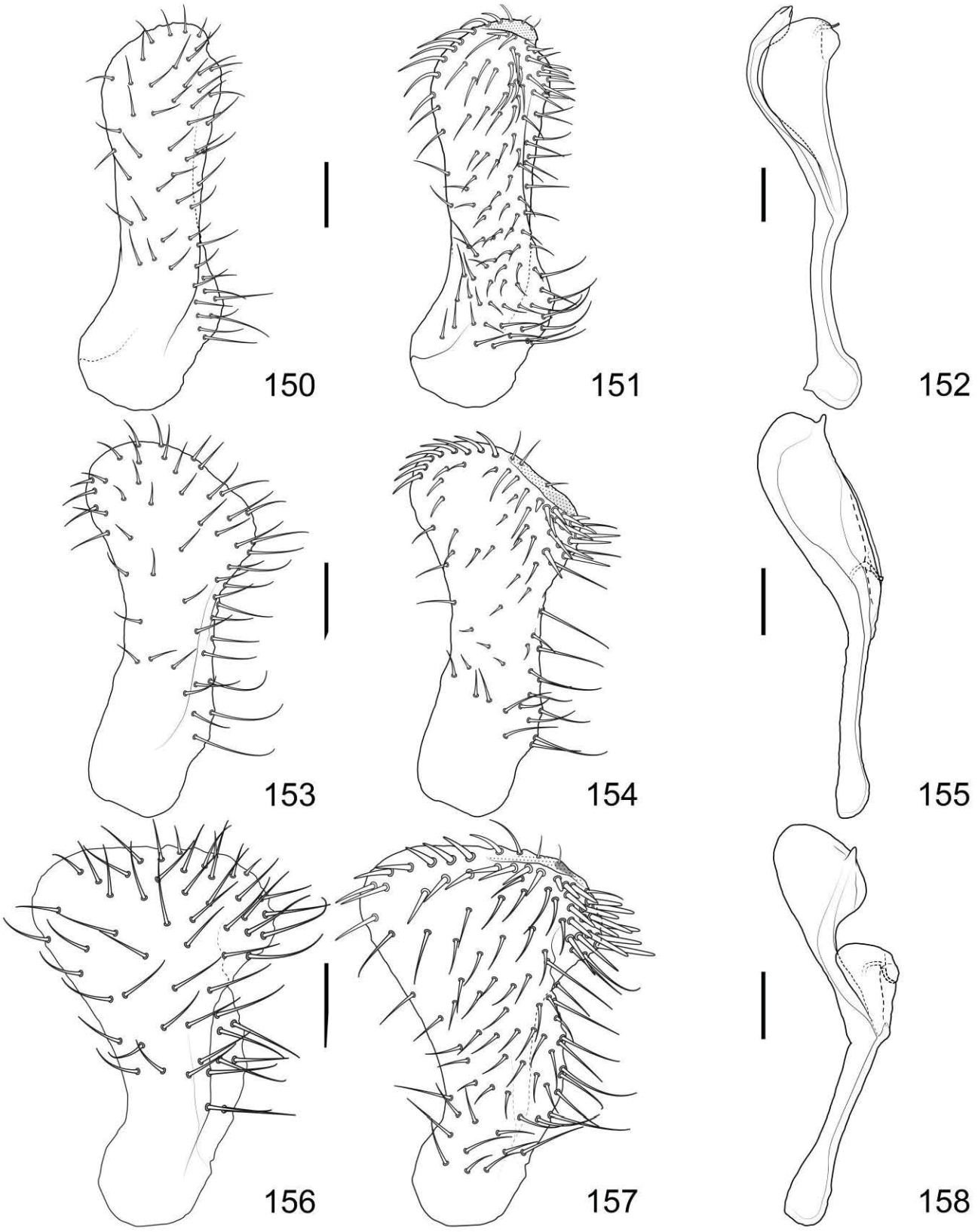
FIGURES 123−131. *Mitrapsylla* spp., male terminalia, lateral view: 123, 126, 129: paramere, outer surface; 124, 127, 130: paramere, inner surface; 125, 128, 131: distal segment of aedeagus. 123−125. *M. ceplaciensis* (White & Hodkinson); 126−128. *M.* sp. nov. 7; 129−131. *M. cubana* Crawford. Scale bar = 0.05 mm.



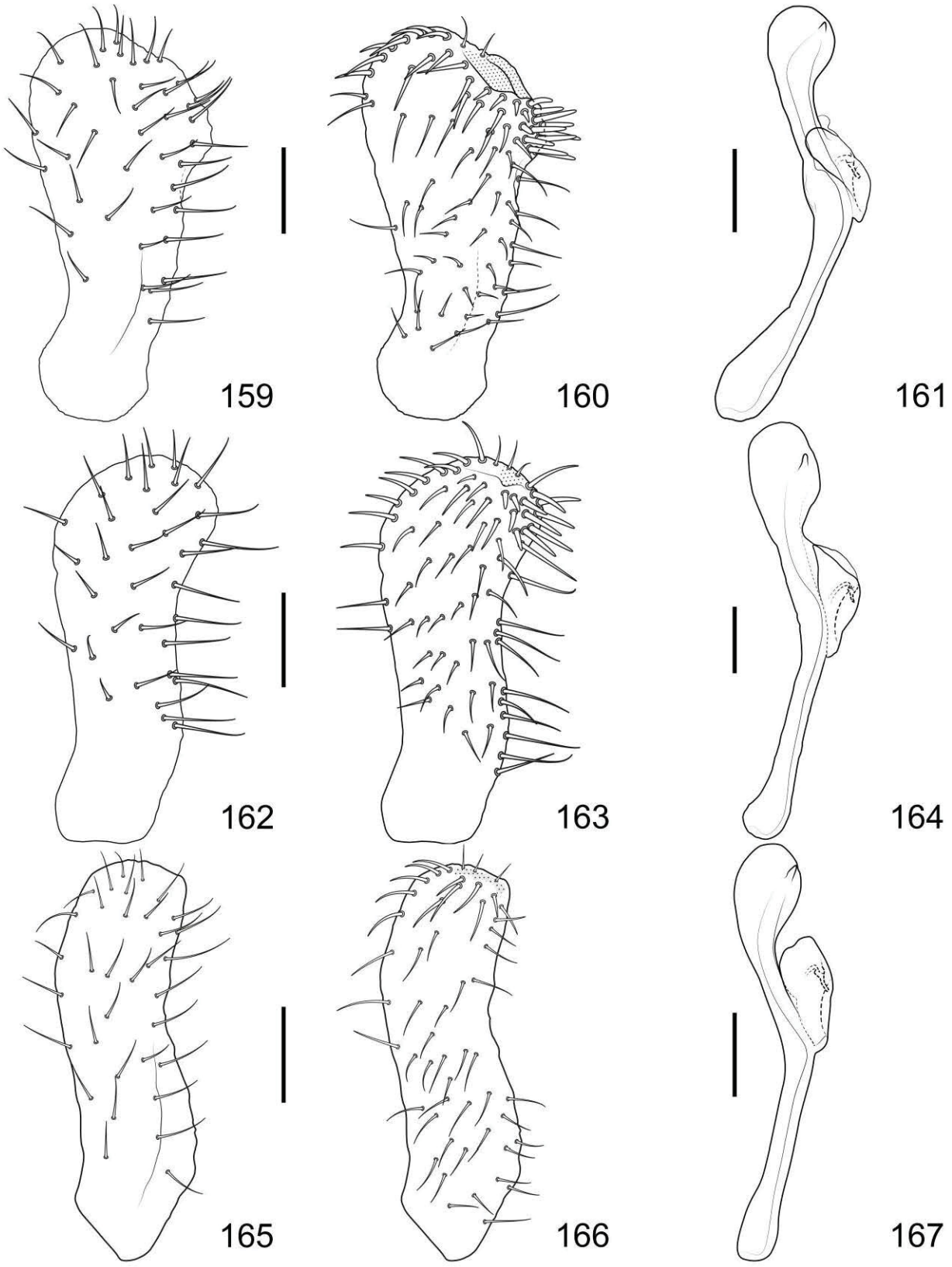
FIGURES 132−140. *Mitrapsylla* spp., male terminalia, lateral view: 132, 135, 138: paramere, outer surface; 133, 136, 139: paramere, inner surface; 134, 137, 140: distal segment of aedeagus. 132−134. *M.* sp. nov. 8; 135−137. *M.* sp. nov. 9; 138−140. *M.* sp. nov. 10. Scale bar = 0.05 mm.



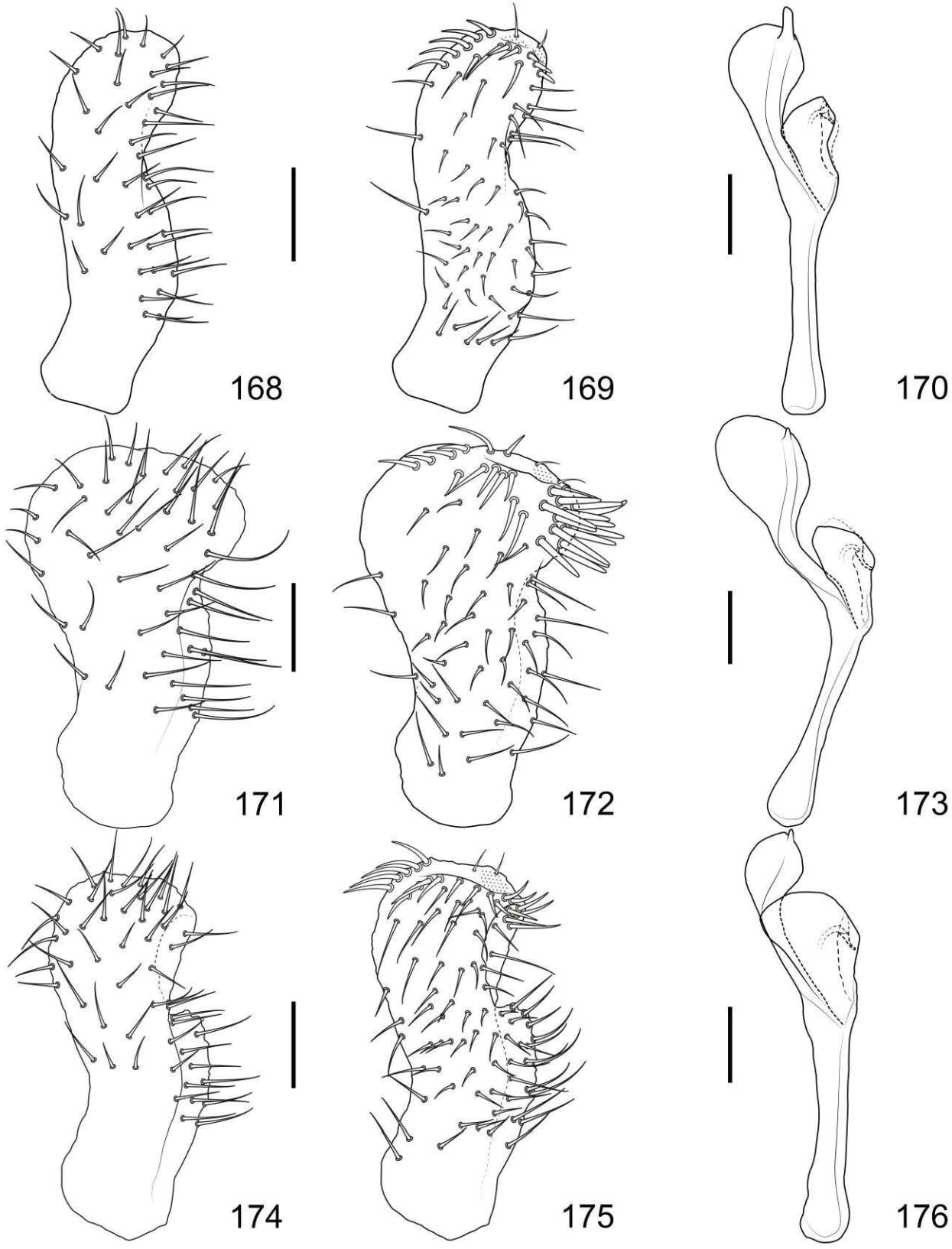
FIGURES 141−149. *Mitrapsylla* spp., male terminalia, lateral view: 141, 144, 147: paramere, outer surface; 142, 145, 148: paramere, inner surface; 143, 146, 149: distal segment of aedeagus. 141−143. *M.* sp. nov. 11; 144−146. *M.* sp. nov. 12; 147−149. *M.* sp. nov. 13. Scale bar = 0.05 mm.



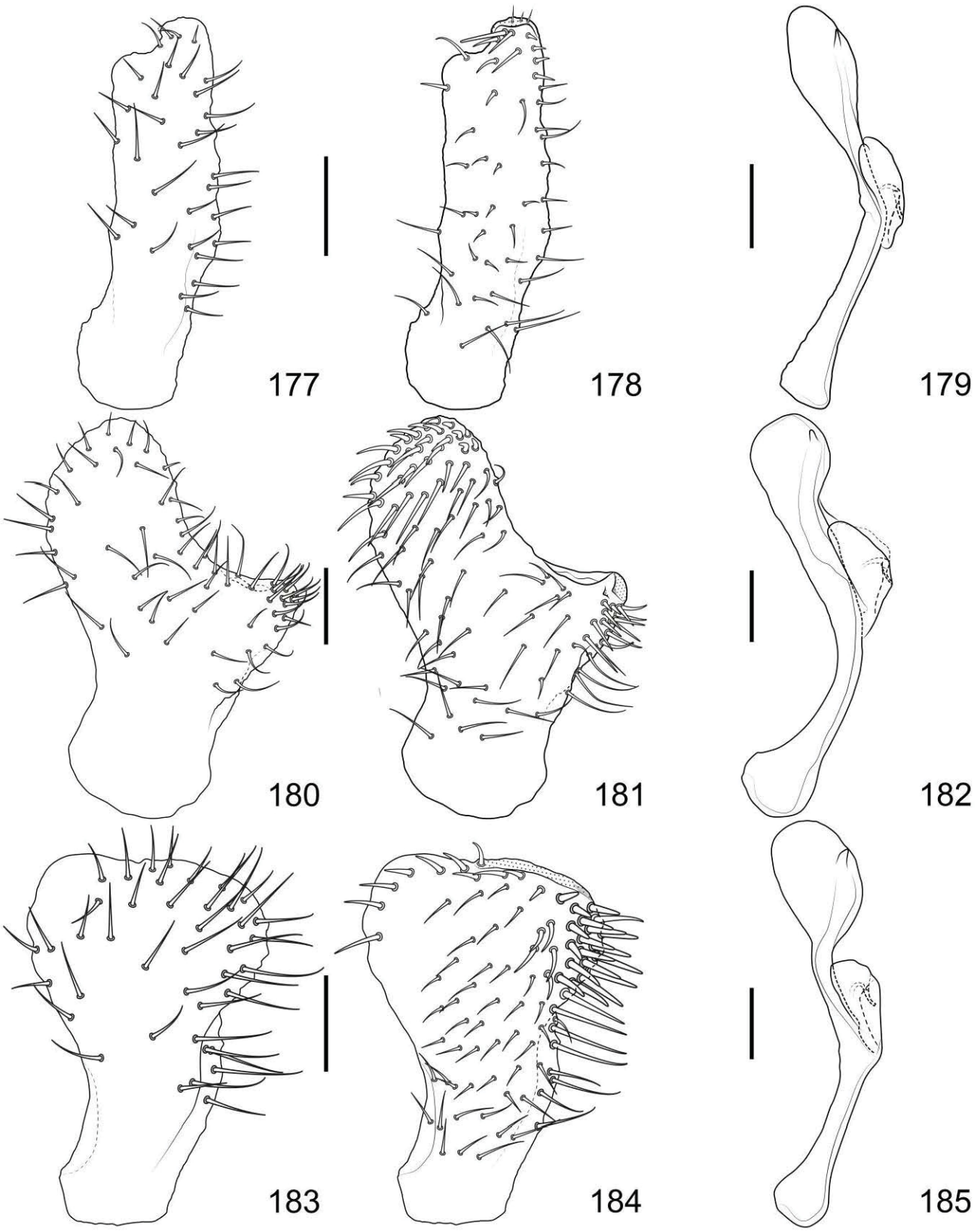
FIGURES 150−158. *Mitrapsylla* spp., male terminalia, lateral view: 150, 153, 156: paramere, outer surface; 151, 154, 157: paramere, inner surface; 152, 155, 158: distal segment of aedeagus. 150−152. *M.* sp. nov. 14; 153−155. *M.* sp. nov. 15; 156−158. *M. itaparica* (Crawford). Scale bar = 0.05 mm.



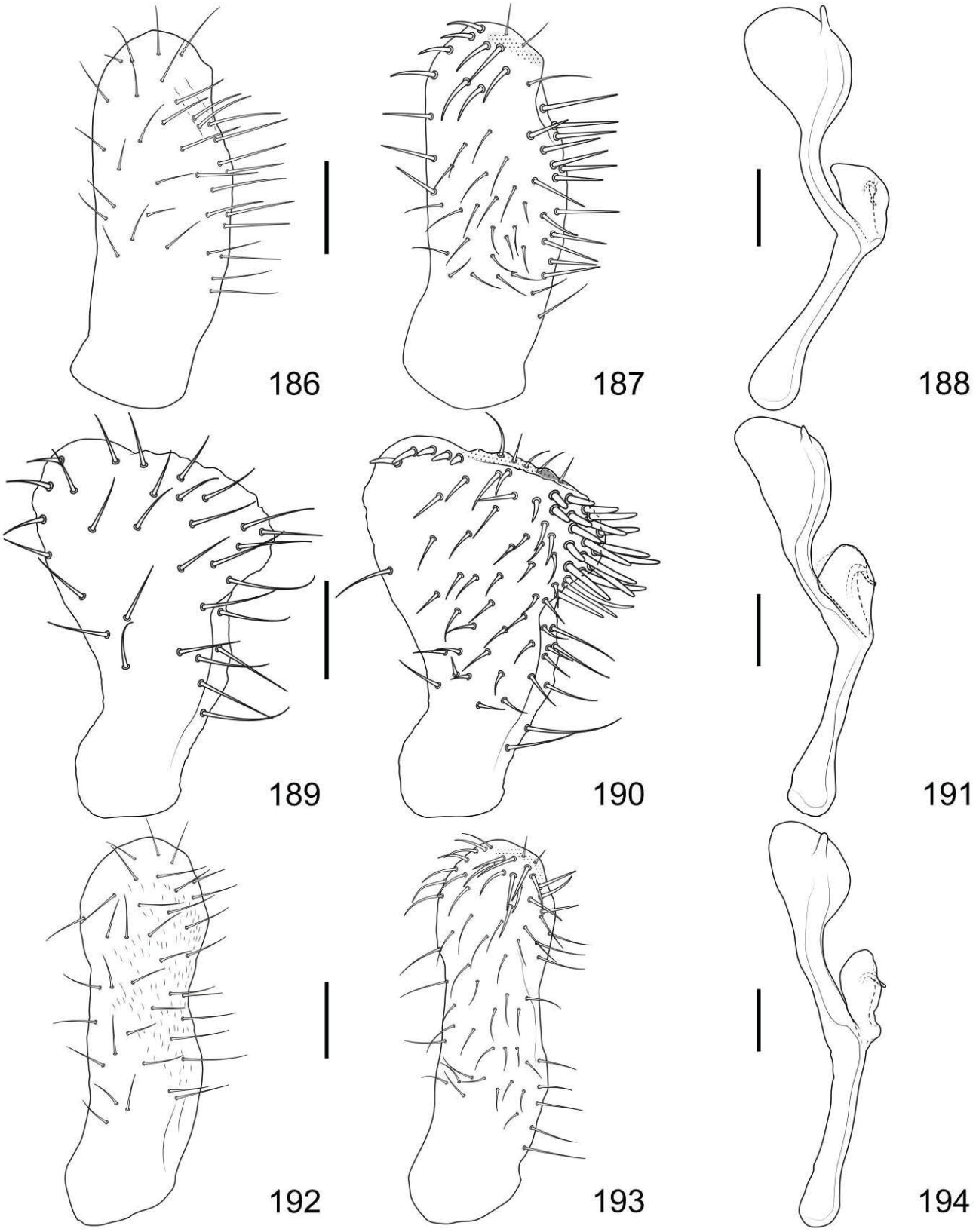
FIGURES 159−167. *Mitrapsylla* spp., male terminalia, lateral view: 159, 162, 165: paramere, outer surface; 160, 163, 166: paramere, inner surface; 161, 164, 167: distal segment of aedeagus. 159−161. *M.* sp. nov. 16; 162−164. *M.* sp. nov. 17; 165−167. *M.* sp. nov. 18. Scale bar = 0.05 mm.



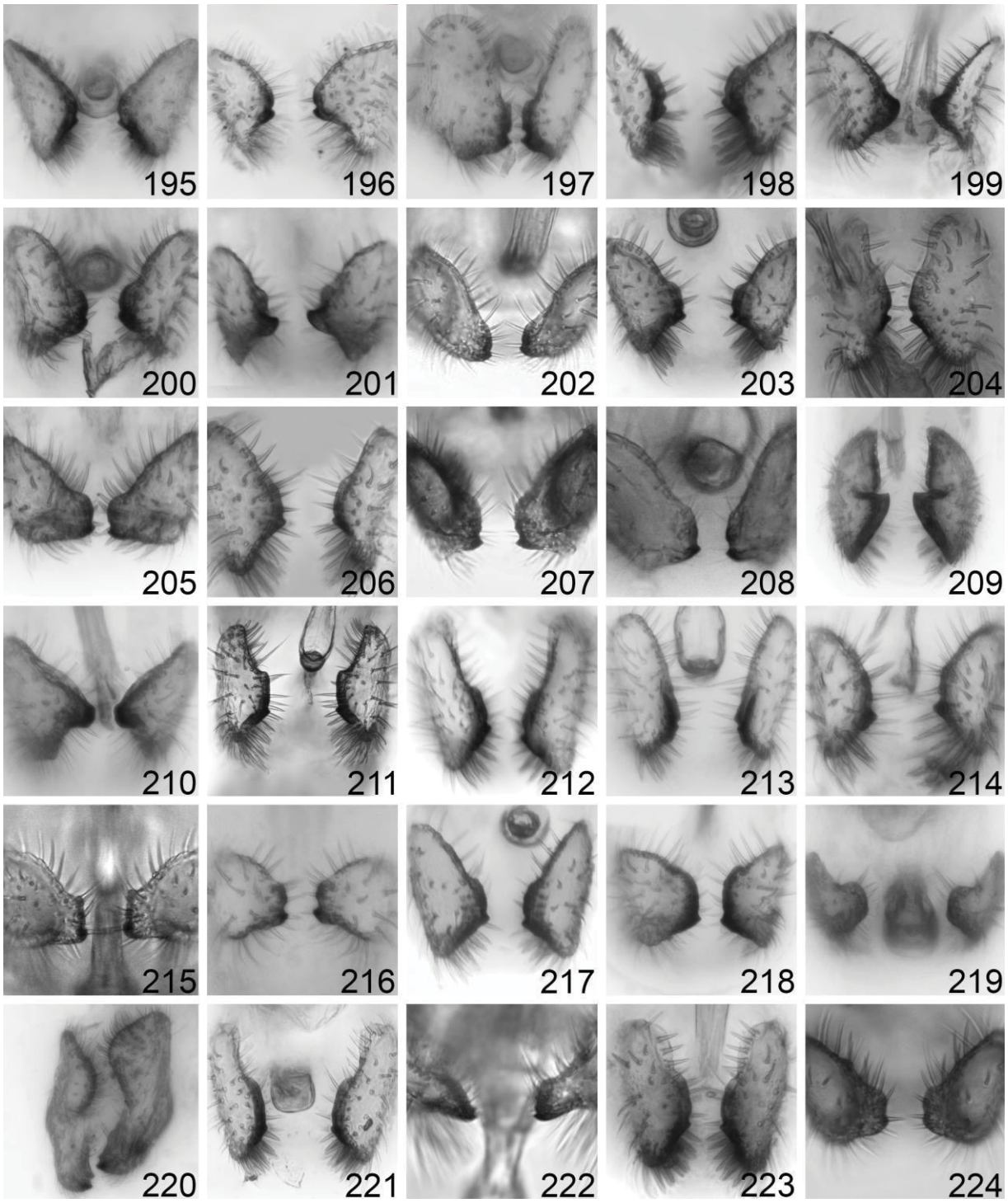
FIGURES 168−176. *Mitrapsylla* spp., male terminalia, lateral view: 168, 171, 174: paramere, outer surface; 169, 172, 175: paramere, inner surface; 170, 173, 176: distal segment of aedeagus. 168−170. *M.* sp. nov. 19, 171−173. *M.* sp. nov. 20; 174−176. *M.* sp. nov. 21. Scale bar = 0.05 mm.



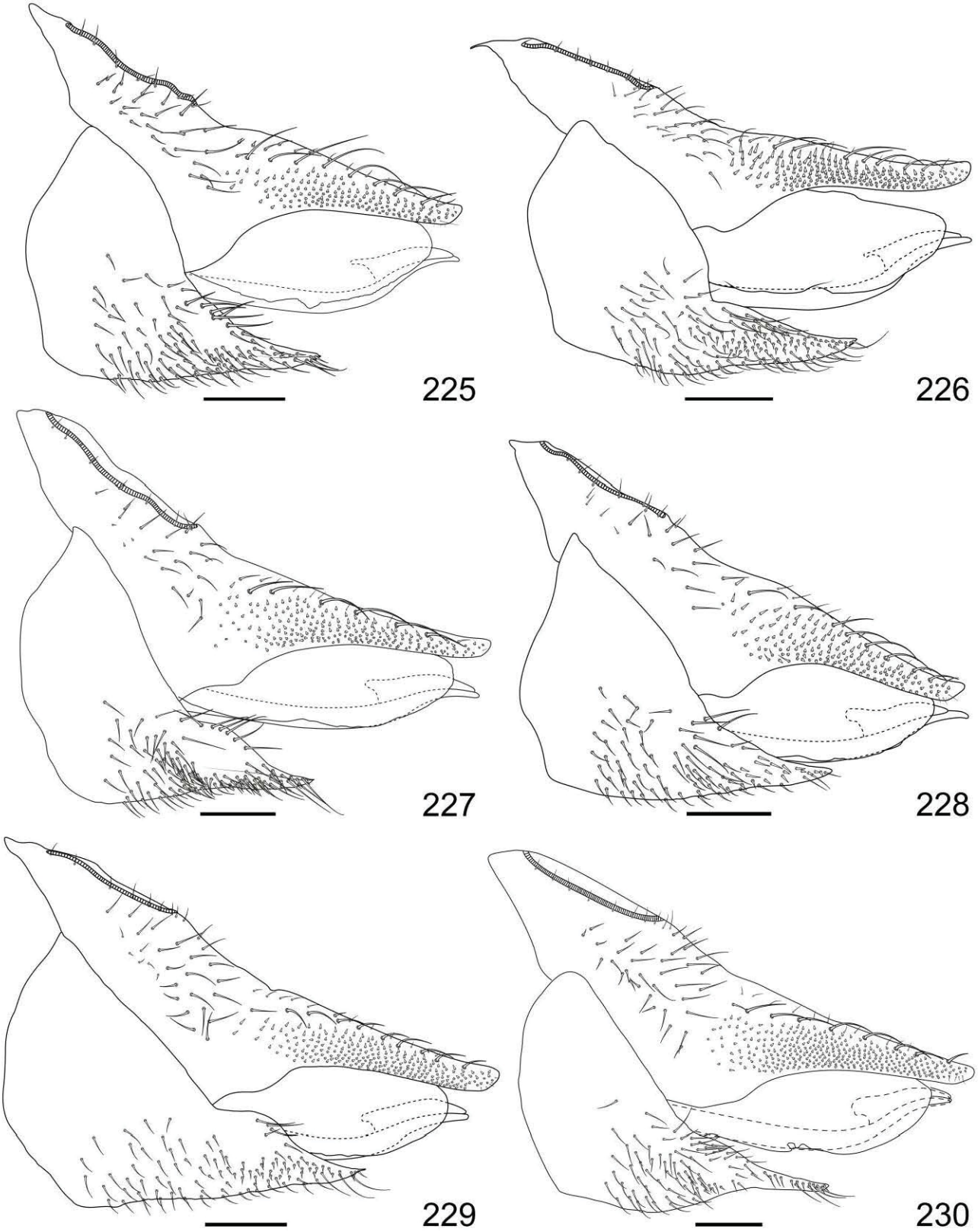
FIGURES 177−185. *Mitrapsylla* spp., male terminalia, lateral view: 177, 180, 183: paramere, outer surface; 178, 181, 184: paramere, inner surface; 179, 182, 185: distal segment of aedeagus. 177−179. *M.* sp. nov. 22; 180−182. *M.* sp. nov. 23; 183−185. *M.* sp. nov. 24. Scale bar = 0.05 mm.



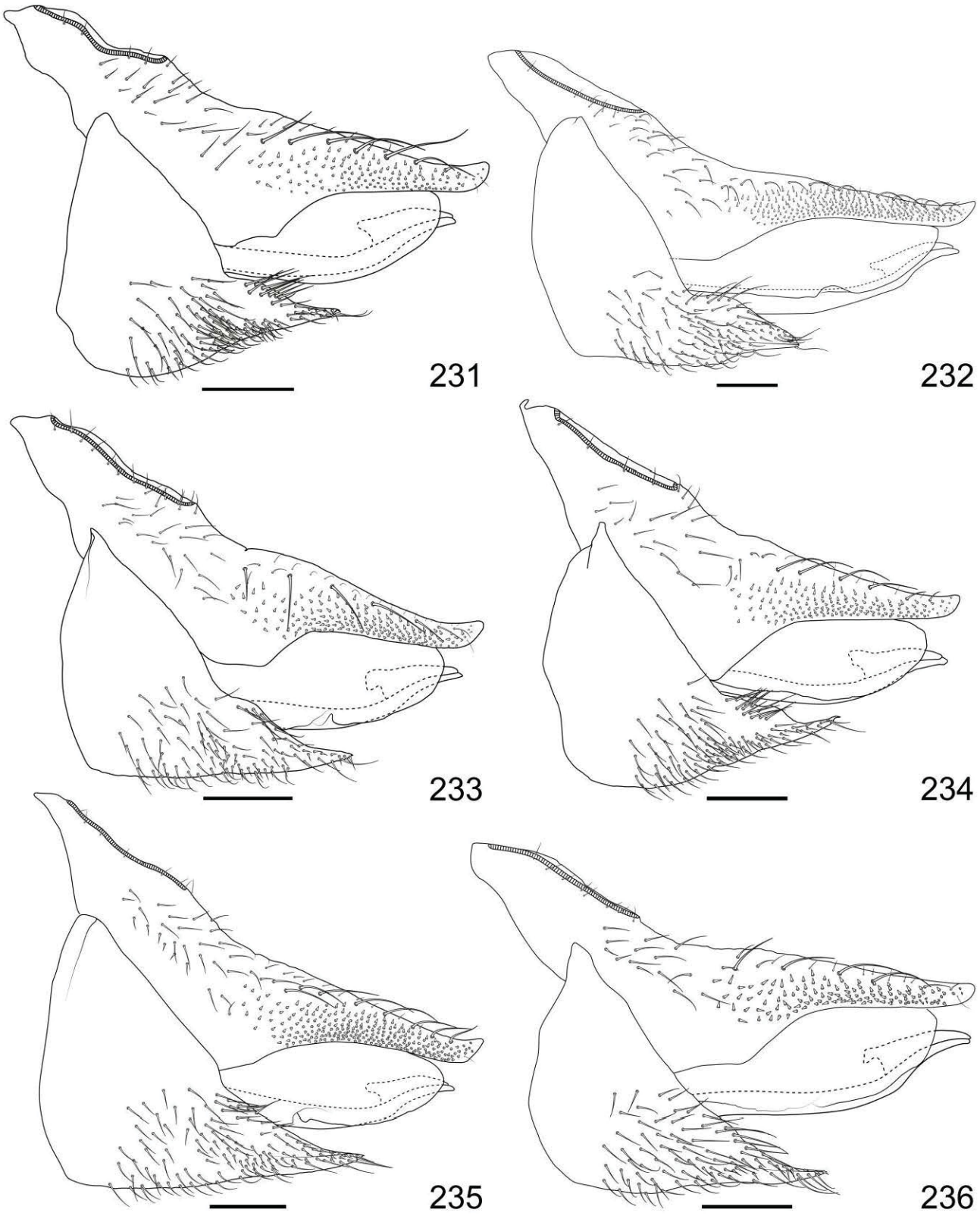
FIGURES 186−194. *Mitrapsylla* spp., male terminalia, lateral view: 186, 189, 192: paramere, outer surface; 187, 190, 193: paramere, inner surface; 188, 191, 194: distal segment of aedeagus. 186−188. *M.* sp. nov. 25; 189−191. *M.* sp. nov. 26; 192−194. *M.* sp. nov. 27. Scale bar = 0.05 mm.



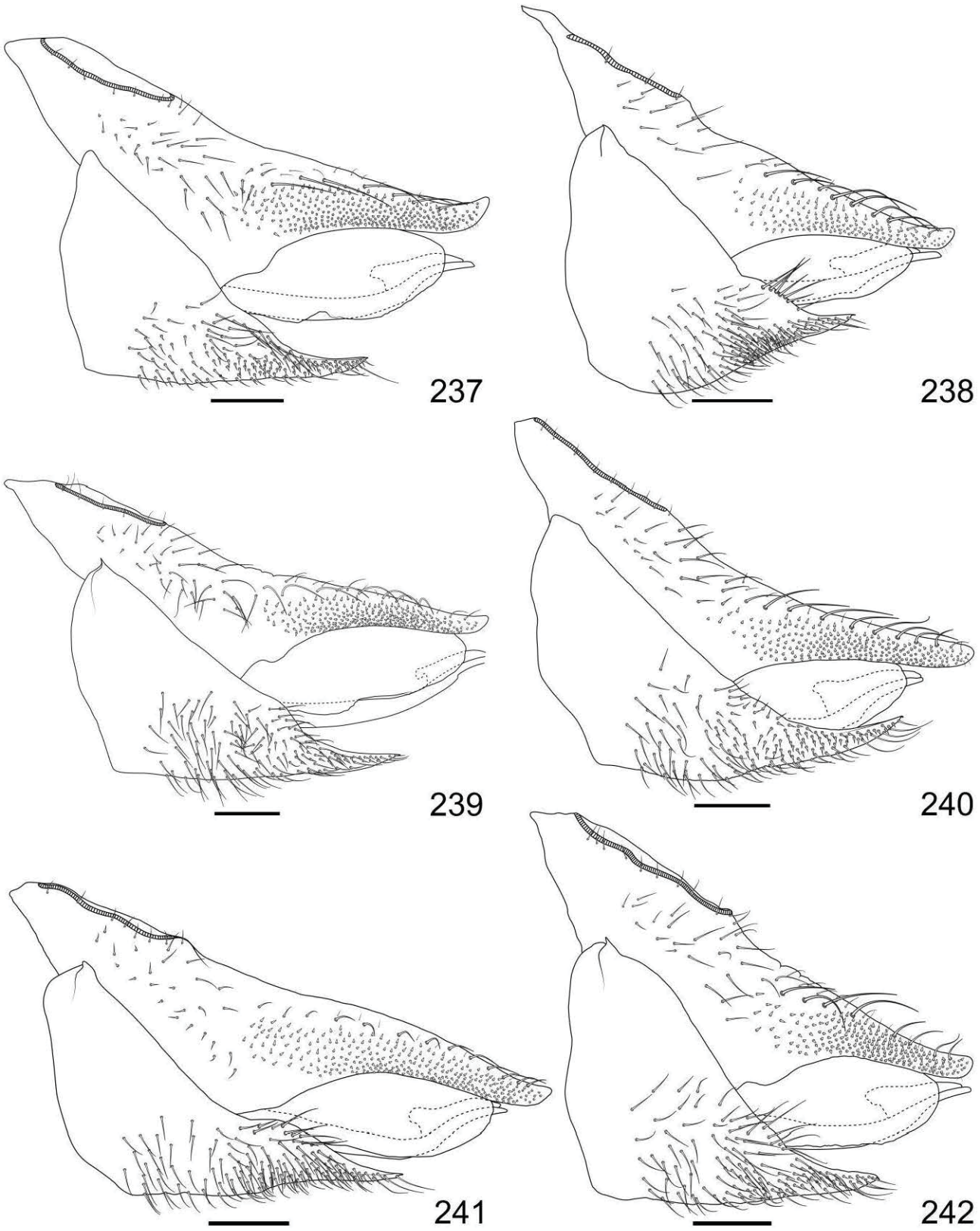
FIGURES 195–224. *Mitrapsylla* spp., parameres, dorsal view: 195. *M.* sp. nov. 1; 196. *M.* sp. nov. 2; 197. *M.* sp. nov. 3; 198. *M.* sp. nov. 4, 199. *M.* sp. nov. 5; 200. *M.* sp. nov. 6; 201. *M. ceplaciensis* (White & Hodkinson); 202. *M.* sp. nov. 7; 203. *M. cubana* Crawford; 204. *M.* sp. nov. 8; 205. *M.* sp. nov. 9; 206. *M.* sp. nov. 10; 207. *M.* sp. nov. 11; 208. *M.* sp. nov. 12; 209. *M.* sp. nov. 13; 210. *M.* sp. nov. 14; 211. *M.* sp. nov. 15; 212. *M. itaparica* (Crawford); 213. *M.* sp. nov. 16; 214. *M.* sp. nov. 17; 215. *M.* sp. nov. 18; 216. *M.* sp. nov. 19; 217. *M.* sp. nov. 20; 218. *M.* sp. nov. 21; 219. *M.* sp. nov. 22; 220. *M.* sp. nov. 23; 221. *M.* sp. nov. 24; 222. *M.* sp. nov. 25; 223. *M.* sp. nov. 26; 224. *M.* sp. nov. 27



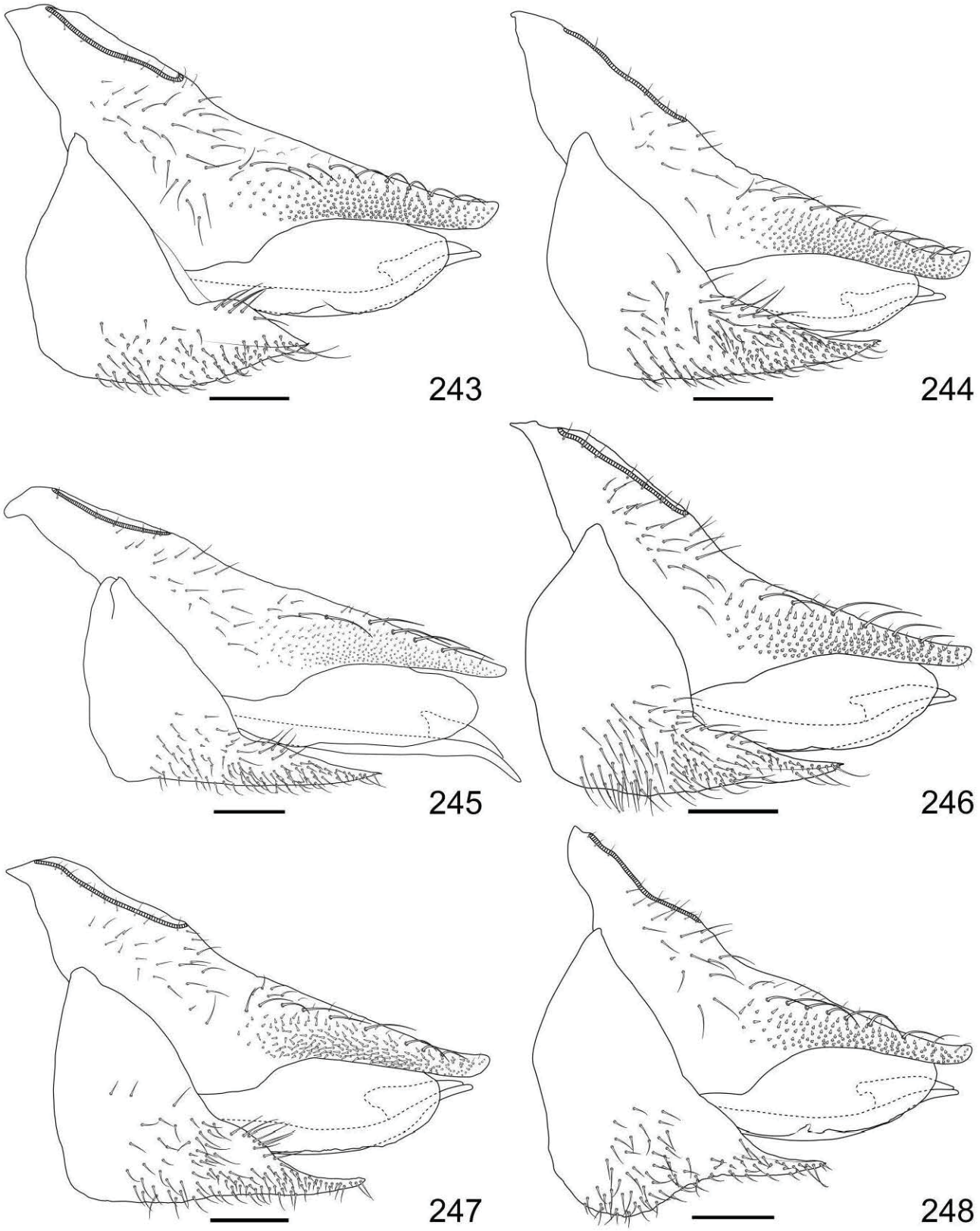
FIGURES 225–230. *Mitrapsylla* spp., female terminalia, lateral view: 225. *M.* sp. nov. 1; 226. *M.* sp. nov. 2; 227. *M.* sp. nov. 3; 228. *M.* sp. nov. 4; 229. *M.* sp. nov. 5; 230. *M.* sp. nov. 6. Scale bar = 0.1 mm.



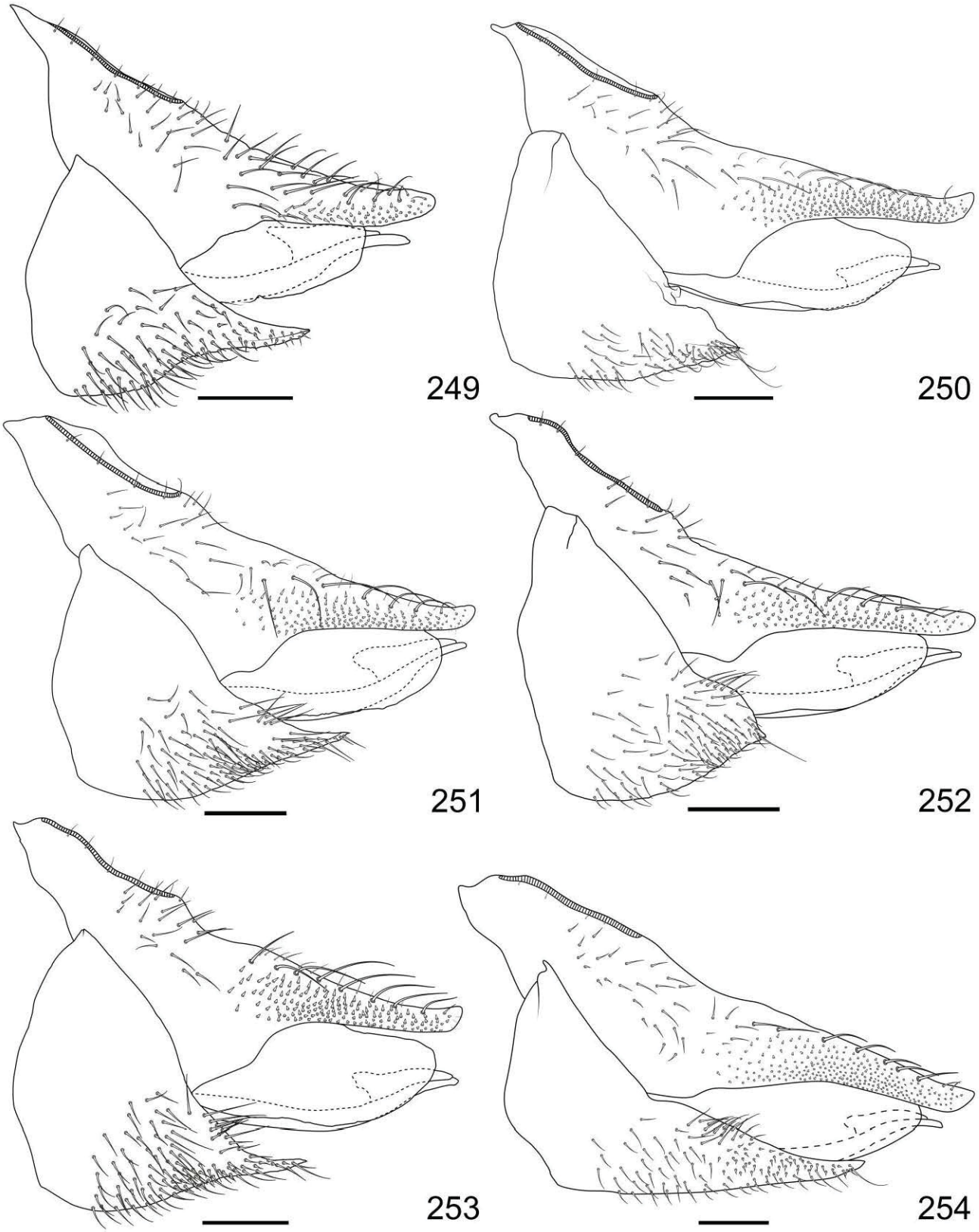
FIGURES 231−236. *Mitrapsylla* spp., female terminalia, lateral view: 231. *M. ceplaciensis* (White & Hodkinson); 232. *M.* sp. nov. 7; 233. *M. cubana* Crawford; 234. *M.* sp. nov. 8; 235. *M.* sp. nov. 9; 236. *M.* sp. nov. 10. Scale bar = 0.1 mm.



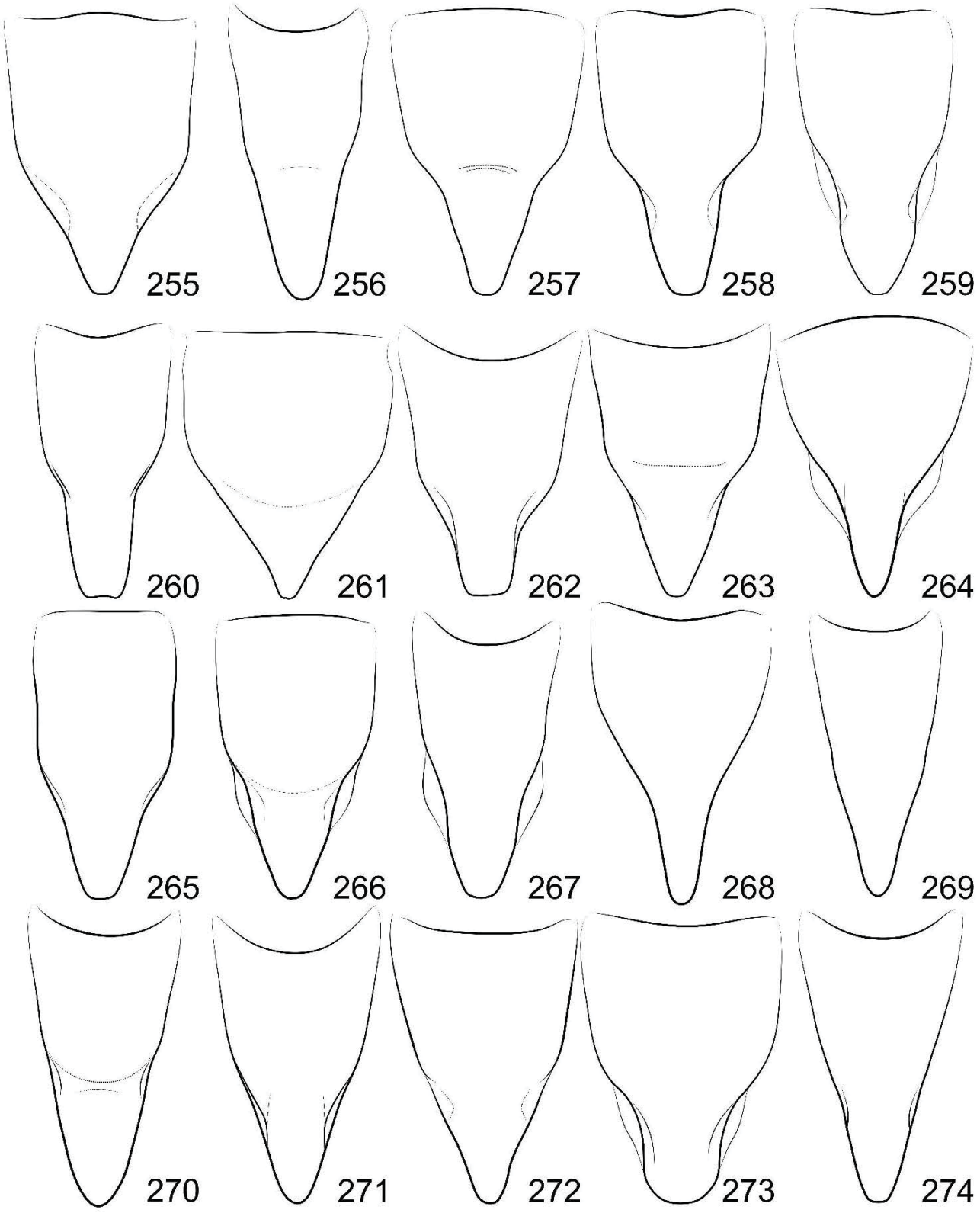
FIGURES 237–242. *Mitrapsylla* spp., female terminalia, lateral view: 237. *M.* sp. nov. 11; 238. *M.* sp. nov. 12; 239. *M.* sp. nov. 13; 240. *M.* sp. nov. 14; 241. *M.* sp. nov. 15; 242. *M. itaparica* (Crawford). Scale bar = 0.1 mm.



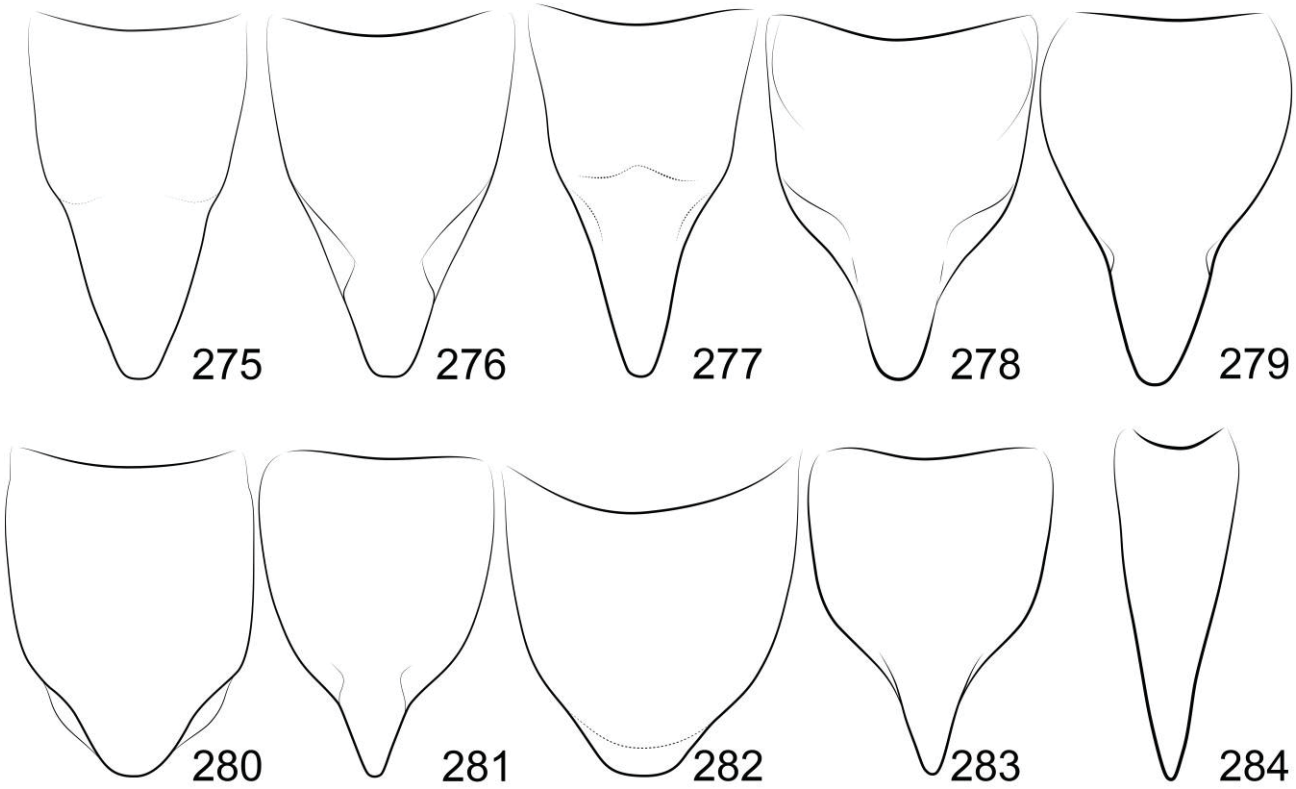
FIGURES 243–248. *Mitrapsylla* spp., female terminalia, lateral view: 243. *M.* sp. nov. 16; 244. *M.* sp. nov. 17; 245. *M.* sp. nov. 18; 246. *M.* sp. nov. 19, 247. *M.* sp. nov. 20; 248. *M.* sp. nov. 21. Scale bar = 0.1 mm.



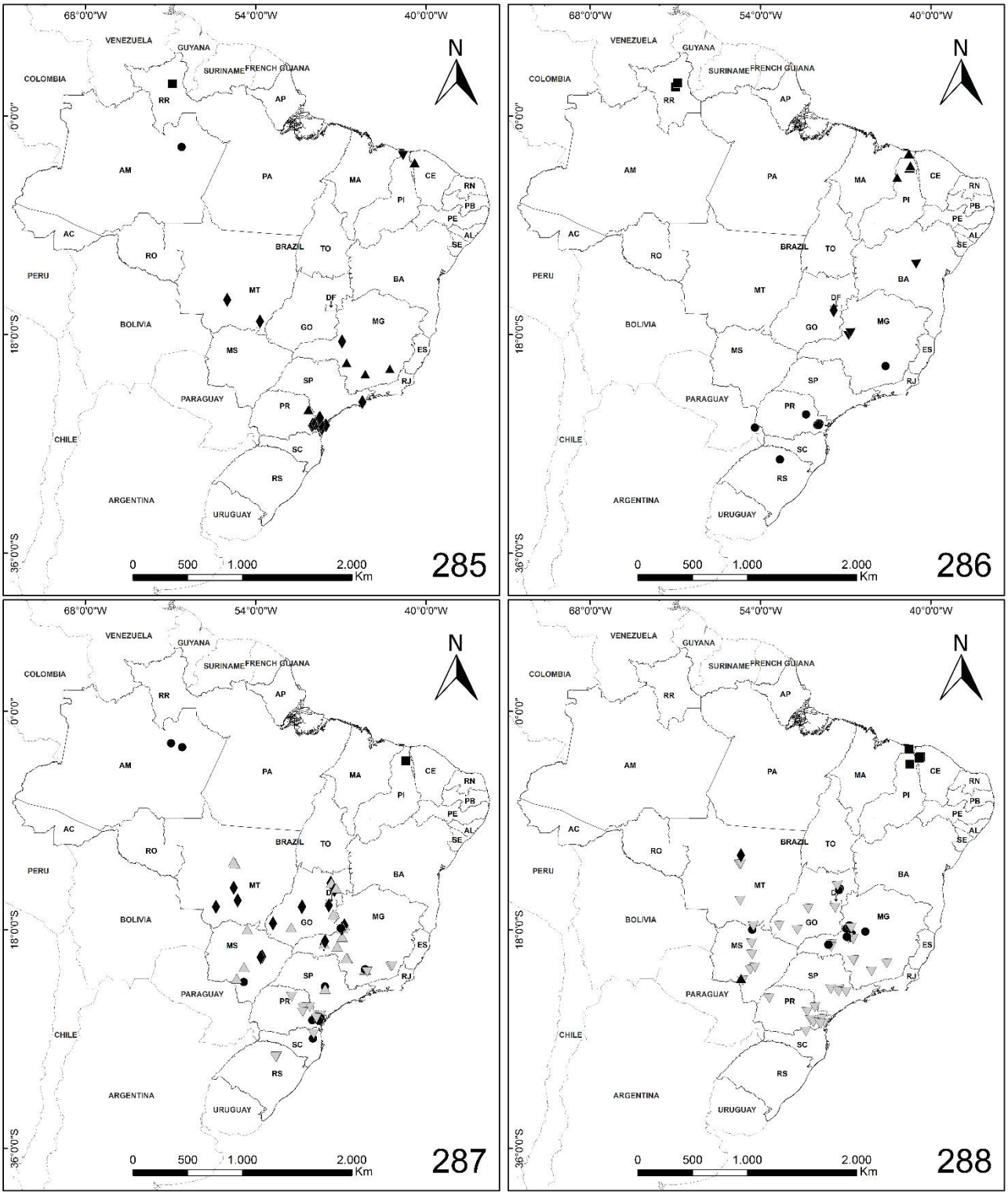
FIGURES 249–254. *Mitrapsylla* spp., female terminalia, lateral view: 249. *M.* sp. nov. 22; 250. *M.* sp. nov. 23; 251. *M.* sp. nov. 24; 252. *M.* sp. nov. 25; 253. *M.* sp. nov. 26; 254. *M.* sp. nov. 27. Scale bar = 0.1 mm.



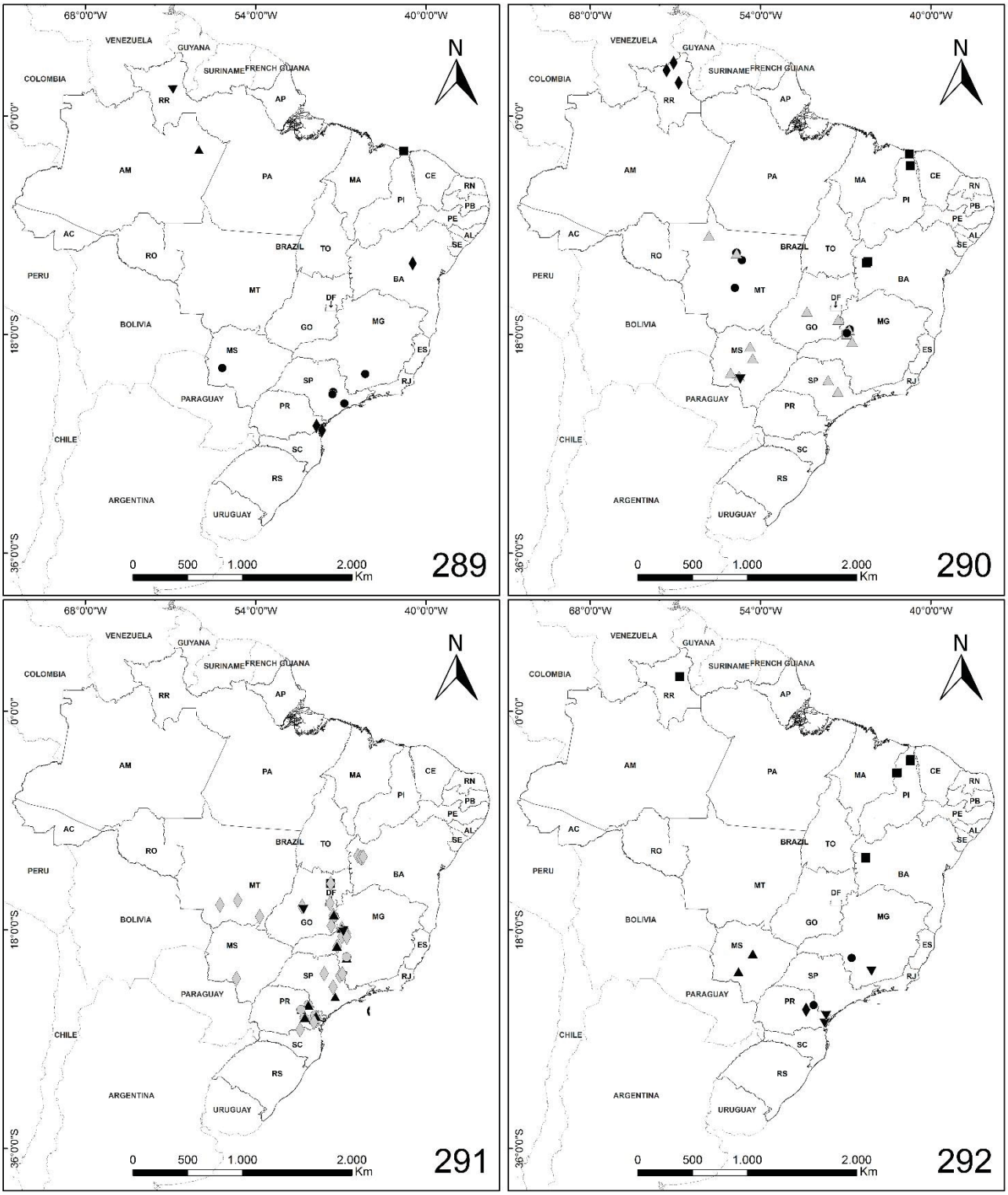
FIGURES 255–274. *Mitrapsylla* spp., female subgenital plate, ventral view: 255. *M.* sp. nov. 1; 256. *M.* sp. nov. 2; 257. *M.* sp. nov. 3; 258. *M.* sp. nov. 4, 259. *M.* sp. nov. 5; 260. *M.* sp. nov. 6; 261. *M. ceplaciensis* (White & Hodkinson); 262. *M.* sp. nov. 7; 263. *M. cubana* Crawford; 264. *M.* sp. nov. 8; 265. *M.* sp. nov. 9; 266. *M.* sp. nov. 10; 267. *M.* sp. nov. 11; 268. *M.* sp. nov. 12; 269. *M.* sp. nov. 13; 270. *M.* sp. nov. 14; 271. *M.* sp. nov. 15; 272. *M. itaparica* (Crawford); 273. *M.* sp. nov. 16; 274. *M.* sp. nov. 17



FIGURES 275−284. *Mitrapsylla* spp., female subgenital plate, ventral view: 275. *M.* sp. nov. 18; 276. *M.* sp. nov. 19; 277. *M.* sp. nov. 20; 278. *M.* sp. nov. 21; 279. *M.* sp. nov. 22; 280. *M.* sp. nov. 23; 281. *M.* sp. nov. 24; 282. *M.* sp. nov. 25; 283. *M.* sp. nov. 26; 284. *M.* sp. nov. 27



FIGURES 285–288. Distribution of *Mitrapsylla* in Brazil: 285. *M.* sp. A Burckhardt & Queiroz (triangle), *M.* sp. nov. 1 (inverted triangle), *M.* sp. nov. 2 (circle), *M.* sp. nov. 3 (rhombus), *M.* sp. nov. 4 (square); 286. *M.* sp. B Burckhardt & Queiroz (triangle), *M.* sp. nov. 5 (square), *M.* sp. nov. 6 (circle), *M. ceplaciensis* (White & Hodkinson) (inverted triangle), *M.* sp. nov. 7 (rhombus); 287. *M.* sp. C Burckhardt & Queiroz (square), *M.* sp. D Burckhardt & Queiroz (triangle), *M. cubana* Crawford (circle), *M.* sp. nov. 8 (rhombus), *M.* sp. nov. 9 (inverted triangle); 288. *M.* sp. nov. 10 (square), *M.* sp. nov. 11 (rhombus), *M.* sp. E Burckhardt & Queiroz (circle), *M.* sp. F Burckhardt & Queiroz (inverted triangle), *M.* sp. nov. 12 (triangle).



FIGURES 289–292. Distribution of *Mitrapsylla* in Brazil: 289. *M.* sp. nov. 13 (square), sp. nov. 14 (circle), *M.* sp. nov. 15 (triangle), *M. itaparica* (Crawford) (rhombus), *M. longicauda* Brown & Hodkinson (inverted triangle); 290. *M.* sp. nov. 16 (triangle), *M.* sp. G Burckhardt & Queiroz (square), *M.* sp. nov. 17 (circle), *M.* sp. nov. 18 (rhombus), *M.* sp. nov. 19 (inverted triangle); 291. *M.* sp. nov. 20 (triangle), *M.* sp. nov. 21 (rhombus), *M.* sp. nov. 22 (square), *M.* sp. H Burckhardt & Queiroz (circle), *M.* sp. nov. 23 (inverted triangle); 292. *M.* sp. nov. 24 (square), *M.* sp. nov. 25 (inverted triangle), *M.* sp. nov. 26 (triangle), *M.* sp. I Burckhardt & Queiroz (circle), *M.* sp. nov. 27 (rhombus).