Social wasp species of *Mischocyttarus* (*Phii*) related to *M. alfkenii* (Ducke) and *M. paraguayensis* Zikán (Hymenoptera, Vespidae, Polistinae)

Orlando Tobias Silveira

ABSTRACT. Social wasp species of *Mischocyttarus* (*Phii*) related to *M. alfkenii* (Ducke) and *M. paraguayensis* Zikán (Hymenoptera, Vespidae, Polistinae). A revision of the taxonomic status and an identification key are presented for species of the genus *Mischocyttarus* related to *M. alfkenii* (Ducke) and *M. paraguayensis* Zikán. Seven new species are proposed in the *alfkenii* and *basimacula* groups (*M. achagua* sp. nov.; *M. arawak* sp. nov.; *M. asa* sp. nov.; *M. embera* sp. nov.; *M. musica* sp. nov.; *M. uniformis* sp. nov.; *M. waunan* sp. nov.), with five new synonymies (*M. mamirauae* Raw = *M. alfkenii* (Ducke); *M. alfkenii* excrucians Richards = *M. flavicornis* nigriorcirus Zikán = *M. flavicornis* Zikán; *M. basimacula* superpicitus Richards = *M. basimacula* (Cameron)). Specific status is also newly recognized for *M. trinitatis* Richards. Two new species are described in the *paraguayensis* and *bahiae* group (*M. suzannae* sp. nov.; *M. tayacaju* sp. nov.), while fifteen new synonymies are proposed (*M. aracatubaensis* Zikán = *M. ararajo* Zikán = *M. costatimai* Zikán = *M. gilvus* Zikán = *M. infrastrigatoides* Zikán = *M. infrastrigatus* Zikán = *M. ornatus* Zikán = *M. riograndensis* Richards = *M. rivulorum* Richards = *M. schrottkyi* Zikán = *M. similars* Zikán = *M similatus* Zikán = *M. paraguayensis* Zikán). These numbers change the picture of diversity in these species groups, as partly found in Richards's revision, published in 1978, reflecting higher diversity in northern Andean areas than in the Brazilian Atlantic region.

KEYWORDS. Insecta; Neotropical; new species; taxonomy.

*Mischocyttarus* de Saussure, 1853 is the largest genus of social vespids with more than two-hundred species arranged in eleven subgenera (Silveira 2008). It is essentially a Neotropical taxon, with a few species occurring north of México (Cooper 1996a, 1996b, 1997a, 1997b, 1998a, 1998b; Richards 1941, 1945, 1978; Silveira 2006, 2008; Zikán 1935, 1949). Social organization is relatively simple, with a dominance hierarchy being established among females in a colony by way of physical attacks and oophagy. Nests usually consist of an open architecture were compared with those of a taxonomically distant species, *Mischocyttarus surinamensis* (de Saussure, 1854). The new species was collected by Ducke in the Brazilian states of Amapá (Mazagão and Oiapoque) and Pará (Óbidos) in the eastern Amazon region. Only in subsequent papers (Ducke 1905a, b) did the author specifically describe characters such as the shape of the antennae of the male and publish photographs of nests (one belonging to the type series from Amapá [Fig. 24b] and the other from the lower Rio Japurá [Fig. 24a]). The distribution limits of the species were therefore extended westward to include locations along the middle Amazonas-Solimões River (Tefé and Japurá). Richards (1978) designated as the lectotype a female from Rio Villanova (Amapá) deposited in the São Paulo Museum (MZSP). The literature also mentions three other female paratypes from Amapá: two in the Paris Museum (MNHN; Richards 1978) and a third in the Bern Museum (NHMB; Obrecht & Huber 1993; see also Carpenter 1999). An additional female with the same data as the lectotype is maintained in the Museu Goeldi (MPEG). The literature also mentions three other female paratypes from Amapá: two in the Paris Museum (MNHN; Richards 1978) and a third in the Bern Museum (NHMB; Obrecht & Huber 1993; see also Carpenter 1999). An additional female with the same data as the lectotype is maintained in the Museu Goeldi (MPEG).
M. consimilis. In this latter work, Zikán presented a long redescriptive article of M. paraguayensis, with illustrations and photographic detail of the species to include the states of Santa Catarina and Rio Grande do Sul, in Brazil. Richards (1978) designated a male deposited in the São Paulo Museum (MZSP) as lectotype, with paralectotypes in the Zikán Collection in Rio de Janeiro (IOC).

Of the two species considered above, only M. alfkenii was actually examined by Richards (1945), placed by him in the subgenus Kappa, group of M. cubensis (de Saussure, 1854), which could be distinguished from the alternative group of M. flavitarsis (de Saussure, 1854) by the shorter 13th antennal article of the male, among other characters. In his last major study of the genus, Richards (1978) created the new subgenus Monocyttarus (= Phi de Saussure) to accommodate the species groups of M. flavitarsis and M. cubensis of the 1941 and 1945 papers. However, as presented in 1978, Richards’s species groups had already been considerably modified, with M. alfkenii and M. paraguayensis (and many other species described by Zikán in 1935 and 1949) being placed into a large group of “M. alfkenii and M. consimilis”. The course of the extensive changes in the infrageneric classification of Mischocyttarus since 1941 was discussed by Silveira (2008) in the first cladistic study of the genus treating all subgenera and species groups. In that work, while limited support was found for monophyly of the subgenus Phi, none of the species groups considered in Richards (1978), or any other grouping of species in Phi resulted monophyletic in a consistent way. An exception was a clade formed by part of the species of the group of M. flavitarsis. However, based on purely phenetic aspects and as reference for further studies, Silveira (2008) presented a revised and extended version of Richards’s arrangement of species groups, with new diagnoses.

In this study, a revision is presented of the taxonomic status of species-level taxa in two of the new species groups of Phi, reported by Silveira (2008) as “M. alfkenii and M. basimacula” and “M. infrastrigatus and M. costalimala” respectively (see below). These two groups comprise a significant portion of the taxonomic diversity of the subgenus in South America, in Andean regions and especially southeastern Brazil from where many species were described by Zikán (1935, 1949).

**MATERIAL AND METHODS**

Source collections. This study benefited from loans from various institutions (see below and the Acknowledgments section), and especially from visits to the Fundação Oswaldo Cruz (Rio de Janeiro, December/2009 and November/2011), the Museu de Zoologia de São Paulo (São Paulo, December/2009), the Natural History Museum (London, April/2010), and the Universidad Nacional de Colombia (Bogotá, September/2012).

Additional collections: American Entomological Institute, Gainesville (AEIC), Dr. David Wahl; American Museum of Natural History, New York (AMNH), Dr. James M. Carpenter; Natural History Museum, London (NHM), Dr. Gavin Broad; Estación de Biología Chamela, San Patricio, México (EBCC), Dr. Alicia Rodriguez-Palafos (in memoriam), Dr. Ricardo Ayala-Barajas; Essig Museum, Berkeley (EMEC), Dr. Cheryl B. Barr; Florida State Collection of Arthropods, Gainesville (FSCA), Dr. J. Wiley; Museo Fairchild, Universidad de Panamá (GBFM), Dr. Roberto Cambra T.; Instituto de Pesquisas Científicas e Tecnológicas do Estado do Amapá, Macapá (IEPA), Sr. José Madson de Freitas Gama; Instituto Nacional de Biodiversidade, Santo Domingo (INBC), Dr. Jesus Ugalde and Dr. Jorge Carvajal Alfaro; Museo Nacional de Historia Natural del Paraguay, Asunción (INBP), Dr. John Kochalka and Bolivar Garce-Barrett; Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA), Dr. Augusto Henriques; Fundação Instituto Oswaldo Cruz, Rio de Janeiro (IOC), Dr. Marcio Félix; Museu de Zoologia da Universidade de São Paulo, São Paulo (MZSP), Dr. Carlos R. F. Brandão; Bohart Museum, University of California at Davis, Davis (UCDC), Dr. S. L. Heydon; Universidad Nacional de Colombia, Bogotá (ICN), Dr. Carlos Sarmiento; Smithsonian Institution, Washington (USNM), Dr. Ronald J. McGinley and Dr. David G. Foruth; Zoologische Sammlung des Bayerischen Staates, Munich (ZSMC), Dr. Johannes Schubert.

Material examined. A little more than 500 specimens are listed in this article, but considerably more were actually examined during visits to collections, especially to the Zikán Collection in Rio de Janeiro, where large nest series are often available. Types of nearly all specific and subspecific taxa were examined, with exception of M. mamirauae Raw, M. bacoii Starr, M. basimacula guatemalensis Richards, and M. basimacula superpictus Richards.

Observations and drawings. The specimens were examined under dissecting stereomicroscopes, and drawings were made using a camera lucida adapted to ZEISS SV-11 equipment. Photographs were obtained using a LEICA DFC-420 camera adapted to a LEICA MZ-16 stereomicroscope. Male genitalia were not investigated since previous observations of Phi species (Silveira 2008) did not reveal significant interspecific variation. Terminology was the same utilized by Silveira (2008).

Measurements. The following measurements and ratios were obtained from data collected using a ZEISS SV-11 stereomicroscope with an ocular micrometer (see Fig. 1): FHH: height of head in frontal view (Fig. 1A); INTOW: distance between eyes at the level of ocellar sinus (Fig. 1A); HCLP: height of clypeus (Fig. 1A); WCLP: width of clypeus (Fig. 1A); flm: length of free upper part of lateral margin of the clypeus (Fig. 1A); WCA: width of pronotal carina from above (Fig. 1B); LMS: length of mesoscutum (Fig. 1B); WMS: width of mesoscutum (Fig. 1B); HMP: height of mesopleuron from secondary spiracular entrance to articulation of mid coxa (Fig. 1E); Wng: length of fore wing (given in millimeters); LDIS: length of discal cell of fore wing; LSI: length of first metasomal segment from the ligament aperture to the apex; WSI: width of first metasomal segment at the apex; mWSI: width of first metasomal segment at the base; FHH/INTOW: aspect ratio of head in frontal view; H/WCLP: aspect ratio of clypeus; flm/HCLP: ratio between the length of upper part of lateral margin
and the height of clypeus; WCA/WMS: ratio between the width of pronotal carina and the width of mesoscutum; L/WMS: aspect ratio of mesoscutum; LDIS/HMP: ratio between the length of discal cell and height of mesopleuron; LSI/HMP: ratio between the length of first metasomal segment and height of mesopleuron; WSI/mWSI: ratio between two widths (apical/basal) of first metasomal segment.

Geographic distributions. Data concerning distributions of the species (as inferred from the material actually examined) were obtained from the specimens labels and mapped with GIS software; geographic coordinates were obtained from the collection labels and by using the Google Earth program (version 5.2.1.1588). The distribution maps of the species were generated using ArcView 3.3.

Fig. 1. Schematic drawings of the head (A) and thorax (B, C) indicating measurements used in this work (FHH: height of head in frontal view; INTOW: distance between eyes at the level of ocular sinus; HCLP: height of clypeus; WCLP: width ofclypeus; WCA: width of pronotal carina from above; LMS: length of mesoscutum; WMS: width of mesoscutum; HMP: height of mesopleuron from secondary spiracular entrance to articulation of mid coxa), and apex of the male antenna to show the aspect of the 13th article in particular is quite short, never more than 2.5 times longer than broad (Figs. 1 D, E). In all other species of Phi, the male antennal apex is slender, either hooked or longer and coiled (see Silveira 2008). However, in the mexicanus group the metanotum is distinctly more convex and the hairs and the height of clypeus are shorter than hind femur + trochanter, never exceedingly slender. The species are distributed through southeastern North America (coastal areas and islands), Central America and the Caribbean, with M. angulatus also occurring in northwestern South America.

Species of the alfkenii and paraguayensis groups can be differentiated from other Phi species by the following combination of characters: (1) apex of male antenna with articles generally broad, 13th at most 2.5 times as long as wide at base; (2) male clypeus never presenting abundant silvery appressed pubescence; (3) pronotal secondary margin sharp and projecting over anteromedian lamella; (4) pronotal carina not completely absent at center, its course still perceptible there; (5) female clypeus with apex narrowly truncate; (6) metanotum noticeably flattened; (7) body hairs shorter and less conspicuous; (8) first metasomal segment shorter than hind femur + trochanter, never exceeding 2.5 times more than hind femur + trochanter, never exceeding 2.5 times longer than broad (Figs. 1 D, E). In all other species of Phi, the male antennal apex is slender, either hooked or longer and coiled (see Silveira 2008). However, in the mexicanus group the metanotum is distinctly more convex and the hairs on the head and propodeum tend to be longer. The species are distributed through southeastern North America (coastal areas and islands), Central America and the Caribbean, with M. angulatus also occurring in northwestern South America.

Species of the alfkenii and paraguayensis groups can be differentiated from other Phi species by the following combination of characters: (1) apex of male antenna with articles generally broad, 13th at most 2.5 times as long as wide at base; (2) male clypeus never presenting abundant silvery appressed pubescence; (3) pronotal secondary margin sharp and projecting over anteromedian lamella; (4) pronotal carina not completely absent at center, its course still perceptible there; (5) female clypeus with apex narrowly truncate; (6) metanotum noticeably flattened; (7) body hairs shorter and less conspicuous; (8) first metasomal segment shorter than hind femur + trochanter, never exceeding 2.5 times longer than broad (Figs. 1 D, E). In all other species of Phi, the male antennal apex is slender, either hooked or longer and coiled (see Silveira 2008). However, in the mexicanus group the metanotum is distinctly more convex and the hairs on the head and propodeum tend to be longer. The species are distributed through southeastern North America (coastal areas and islands), Central America and the Caribbean, with M. angulatus also occurring in northwestern South America.

Species of the alfkenii and paraguayensis groups can be differentiated from other Phi species by the following combination of characters: (1) apex of male antenna with articles generally broad, 13th at most 2.5 times as long as wide at base; (2) male clypeus never presenting abundant silvery appressed pubescence; (3) pronotal secondary margin sharp and projecting over anteromedian lamella; (4) pronotal carina not completely absent at center, its course still perceptible there; (5) female clypeus with apex narrowly truncate; (6) metanotum noticeably flattened; (7) body hairs shorter and less conspicuous; (8) first metasomal segment shorter than hind femur + trochanter, never exceeding 2.5 times longer than broad (Figs. 1 D, E). In all other species of Phi, the male antennal apex is slender, either hooked or longer and coiled (see Silveira 2008). However, in the mexicanus group the metanotum is distinctly more convex and the hairs on the head and propodeum tend to be longer. The species are distributed through southeastern North America (coastal areas and islands), Central America and the Caribbean, with M. angulatus also occurring in northwestern South America.

Species of the alfkenii and paraguayensis groups can be differentiated from other Phi species by the following combination of characters: (1) apex of male antenna with articles generally broad, 13th at most 2.5 times as long as wide at base; (2) male clypeus never presenting abundant silvery appressed pubescence; (3) pronotal secondary margin sharp and projecting over anteromedian lamella; (4) pronotal carina not completely absent at center, its course still perceptible there; (5) female clypeus with apex narrowly truncate; (6) metanotum noticeably flattened; (7) body hairs shorter and less conspicuous; (8) first metasomal segment shorter than hind femur + trochanter, never exceeding 2.5 times longer than broad (Figs. 1 D, E). In all other species of Phi, the male antennal apex is slender, either hooked or longer and coiled (see Silveira 2008). However, in the mexicanus group the metanotum is distinctly more convex and the hairs on the head and propodeum tend to be longer. The species are distributed through southeastern North America (coastal areas and islands), Central America and the Caribbean, with M. angulatus also occurring in northwestern South America.

Species of the alfkenii and paraguayensis groups can be differentiated from other Phi species by the following combination of characters: (1) apex of male antenna with articles generally broad, 13th at most 2.5 times as long as wide at base; (2) male clypeus never presenting abundant silvery appressed pubescence; (3) pronotal secondary margin sharp and projecting over anteromedian lamella; (4) pronotal carina not completely absent at center, its course still perceptible there; (5) female clypeus with apex narrowly truncate; (6) metanotum noticeably flattened; (7) body hairs shorter and less conspicuous; (8) first metasomal segment shorter than hind femur + trochanter, never exceeding 2.5 times longer than broad (Figs. 1 D, E). In all other species of Phi, the male antennal apex is slender, either hooked or longer and coiled (see Silveira 2008). However, in the mexicanus group the metanotum is distinctly more convex and the hairs on the head and propodeum tend to be longer. The species are distributed through southeastern North America (coastal areas and islands), Central America and the Caribbean, with M. angulatus also occurring in northwestern South America.

Species of the alfkenii and paraguayensis groups can be differentiated from other Phi species by the following combination of characters: (1) apex of male antenna with articles generally broad, 13th at most 2.5 times as long as wide at base; (2) male clypeus never presenting abundant silvery appressed pubescence; (3) pronotal secondary margin sharp and projecting over anteromedian lamella; (4) pronotal carina not completely absent at center, its course still perceptible there; (5) female clypeus with apex narrowly truncate; (6) metanotum noticeably flattened; (7) body hairs shorter and less conspicuous; (8) first metasomal segment shorter than hind femur + trochanter, never exceeding 2.5 times longer than broad (Figs. 1 D, E). In all other species of Phi, the male antennal apex is slender, either hooked or longer and coiled (see Silveira 2008). However, in the mexicanus group the metanotum is distinctly more convex and the hairs on the head and propodeum tend to be longer. The species are distributed through southeastern North America (coastal areas and islands), Central America and the Caribbean, with M. angulatus also occurring in northwestern South America.

Species of the alfkenii and paraguayensis groups can be differentiated from other Phi species by the following combination of characters: (1) apex of male antenna with articles generally broad, 13th at most 2.5 times as long as wide at base; (2) male clypeus never presenting abundant silvery appressed pubescence; (3) pronotal secondary margin sharp and projecting over anteromedian lamella; (4) pronotal carina not completely absent at center, its course still perceptible there; (5) female clypeus with apex narrowly truncate; (6) metanotum noticeably flattened; (7) body hairs shorter and less conspicuous; (8) first metasomal segment shorter than hind femur + trochanter, never exceeding 2.5 times longer than broad (Figs. 1 D, E). In all other species of Phi, the male antennal apex is slender, either hooked or longer and coiled (see Silveira 2008). However, in the mexicanus group the metanotum is distinctly more convex and the hairs on the head and propodeum tend to be longer. The species are distributed through southeastern North America (coastal areas and islands), Central America and the Caribbean, with M. angulatus also occurring in northwestern South America.
Identification Key (for females, except as noted)

1. Female clypeus more extensively in contact with eye, free upper part of lateral margin longer (Figs. 1A; 3A), normally more than 0.33 times the clypeus height at middle; apex of male antenna with articles very broad and short (Fig. 1D), 13th about 1.5 times as long as wide at base; male clypeus clearly touching eyes; first metasomal segment relatively short, hardly longer than 1.1 times height of mesopleuron; color yellow with black or brown marks (group of alkfenii and basimacula) .............................................. 2

1’. Female clypeus less extensively in contact with eye, free upper part of lateral margin longer (Figs. 1A; 3A), normally more than 0.33 times the clypeus height at middle; apex of male antenna with 13th article 2–2.5 times as long as wide at base (Fig. 1E); male clypeus narrowly separated from eyes; first metasomal segment normally longer than 1.1 times height of mesopleuron (group of paraguayensis and bahiae) .............................................. 13

2. Subalar plate largely black or dark brown (Fig. 3D); propodeum with distinct black or brown marks, at least a central stripe and paired dorsal and ventral triangular marks ............. 3

2’. Subalar plate yellow (Fig. 3C), without noticeable dark parts; propodeum yellow, at most with central line or lateral ventral orifices darker, occipital band always strongly reduced on its posterior lower parts ........................................... 7

3. Larger inner claw of hind tarsus with apex broad and tendency to a round contour (Fig. 5F); occipital band largely reduced on its posterior lower parts, dark marks on pronotum and mesoscutum normally developed; metasomal segment 1 unusually long, more than 1.1 times height of mesopleuron, distal campanula elongate; Colombia (Meta; male unknown) .............................................. M. achagua sp. nov. (Fig. 3E)

3’. Larger inner claw of hind tarsus with apex narrowly pointed (Fig. 5G); occipital band not reduced on its posterior lower parts; metasomal segment 1 short, normally less than 1.1 times height of mesopleuron ........................................ 4

4. Antennal flagellum entirely light orange or yellowish brown (Fig. 3B, D); supra clypeal plate normally without noticeable brown marks, at most with a discontinuous faint mark on interantennal area; fore wing longer, length of discal cell more than 2.5 times the height of mesopleuron .... 5

4’. Antennal flagellum dark brown or black at least basally (Fig. 4A, 5A); interantennal area usually with a strong continuous brown horizontal bar ........................................ 6

5. Antennal scape and pedicel light yellowish brown, at most with rather diffuse distal mark above, more often with the same color of flagellum; transition between dark and pale colors more gradual ........... M. alkfenii (Duke) (Fig. 3B)

5’. Antennal scape and pedicel distinctly black above, contrasting with light orange or yellowish flagellum; transition between dark and pale colors very sharp, at least on head and thorax ......................... M. flavicornis Zikán (Fig. 3D)

6. Scape, pedicel and first flagellomere black above, distinctly contrasting with lighter distal part of flagellum, second metasomal sternum nearly always with a tridentate dark mark .................. M. basimacula (Cameron) (Fig. 4A)

6’. Dorsum of antennal flagellum brown; if scape, pedicel and first flagellomere darker, then transition more gradual to distal articles; second metasomal sternum normally without a tridentate dark mark; last segment of hind tarsus brownish above; México, Panama, and Colombia (west coast) ......................... M. waunan sp. nov. (Fig. 5A)

7. Larger inner claw of hind tarsus with apex broad and tendency to a round contour (Fig. 5F); brown frontal mark blurred, contour poorly defined, metasomal terga testaceous without distal yellow bands; Panama (male unknown) ....................... M. embera sp. nov. (Fig. 3F)

7’. Larger inner claw of hind tarsus with apex narrowly pointed (Fig. 5G) .............................................. 8

8. Antenna quite dark, black or dark brown above, lighter only distally beneath; pronotal carina never excessively prominent at sides ........................................ 9

8’. At least antennal flagellum light orange or (at most) reddish brown, scape concolor or with a distal diffuse mark (Figs. 3C) .............................................. 10

9. Metasomal terga testaceous with narrow distal yellow bands, sometimes widening at sides; Colombia (eastern range) ......................... M. mutica sp. nov.

9’. Metasomal terga dark brown with narrow distal yellow bands; first metasomal tergum very narrow at apex; Guyana (Fig. 4C, D) ......................... M. arawa sp. nov.

10. At least metasomal terga 3 to 5 dark brown with wide distal yellow bands, marks on mesoscutum definitely of a darker brown color (Fig. 4B) ......................... 11

10’. Metasomal terga testaceous with yellow bands (sometimes inconspicuous), dark marks on head and thorax light reddish brown, often blurred (Figs. 4E, F) ......................... 12

11. Nest with eccentric peduncle (Figs. 3C, 4B) .................................................. M. trinitatis Richards n. stat.

11’. Nest with centric peduncle and roughly circular comb (Fig. 6B), only recorded from Trinidad... M. baconi Starr

12. Pronotal carina prominent at sides, often with more or less distinct lobes; metasomal tergum 1 wide at apex, its width about 0.44 of length; northern Colombia (Fig. 4F) ......................... M. uniformis sp. nov.

12’. Pronotal carina never exceedingly prominent at sides; metasomal tergum 1 not noticeably widened at apex, width about 0.4 of length; western Ecuador (Fig. 4E) .................................................. M. awa sp. nov.

13. Larger inner claw of hind tarsus with apex acute; propodeal cavity unusually deep for this group; largely black with yellow brown clypeus and legs; relatively large species, wing-length 11 mm; Peru (Huanacavélica; male unknown) (Fig. 5B) ......................... M. tayacaja sp. nov.

13’. Larger inner claw of hind tarsus with apex just narrowly pointed, not really acute (see Fig. 5G); color variable, size generally a little smaller ................... 14
14. Yellow species with all the metasomal segments entirely black, unbande ............................................................................. 14. M. flavoniger Zikán
14’. Color variable, if metasoma is black, then the entire insect is black ............................................................................. 15
15. Mainly yellow wasps with metasomal terga testaceous, hardly showing banded patterns; mesopleuron yellow, rarely with a small ventral brown spot; propodeum yellow with central black or brown stripe and lateral maculation including paired dorsal triangles of light brown color (sometimes propodeum almost totally yellow) ..... M. bahiae Richards
15’. Extremely variable in color, from richly patterned to almost entirely black wasps; metasomal segments often showing well-developed banded patterns (Fig. 5D), but sometimes with terga 3–6 black, unbande (Fig. 5C), or the whole insect black; mesopleuron and propodeum similarly variable, sometimes completely yellow, but more normally with dark marks ............................................................................. 16
16. Pronotal carina very salient at sides .......................................................... M. catharinaensis Zikán
16’. Pronotal carina normal, lower, not strongly projecting at sides ............................................................................. 17
17. Pronotum with humeral region less projecting, nearly rounded, carina very low, almost without a lamellar portion; wings very short, length of discal cell of fore wing less than 2.0 times the height of mesopleuron; color black or dark brown, clypeus with a ventral clearly delimitated “U-shaped” yellow mark, pleuron, propodeum and first metasomal segment lighter brown, mid and hind legs light brown without yellow marks, all tergal segments dark; Brazil (Pará) (Fig. 5E) ............... M. suzannae sp. nov.
17’. Humeral region angularly produced, pronotal carina with distinct lamellar portion; wings normally elongated, length of discal cell of fore wing more than 2.0 times the height of mesopleuron; color variable, if black or dark brown, then mid and hind legs with light marks (included tergal segments), clypeus if yellow marked, then mark not “U-shaped” (Fig. 5C, D) ............... M. paraguayensis Zikán

Group of M. alfkenii and basimacula

Refers to a group of 12 known species with the characters given in couplet 1 of the key. Contrary to Silveira (2008), forms referred by Richards (1978) to the names M. paraguayensis and M. bahiae (and M. aracatubaensis, and M. gilvus) do not pertain here.

Mischocyttarus alfkenii (Ducke, 1904) (Fig. 3B)

Megacanthopus alfkenii Ducke, 1904: 362; Lectotype: Female, Brazil, AP, Rio Villanova (MZSP); designated by Richards (1978) [examined].

Mischocyttarus alfkenii: Ducke, 1905a: 22; 1905b: 688, pl. 4, figs. 24a, b; 1907: 188; Richards, 1945: 395, figs. 66, 68 (in part; except varieties bahiae Richards, excrucians Richards, trinitatis Richards, and Zikánii Richards); 1978: 343, 344 (in part; except subspecies excrucians and trinitatis); Silveira, 2008: 516, 518, 540, 546, fig. 88; table ii; O’Connor et al. 2011: 447(misidentification).

Mischocyttarus japuraensis Zikán, 1949: 147; synonymy by Richards (1978). Holotype Female, Brazil, AM, R. Japura (MZSP 17.706) [examined].

Mischocyttarus mamirauae Raw, 1996: 3. Holotype Female and “Allotype” (author’s private collection); Paratypes: USNM; INPA (not found); MPEG (not found) and Oxford University Museum; N. syn.

Female: length of fore wing 10–11 mm; clypeus wider than high, H/WCLP about 0.93, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; oceli as in an equilateral triangle; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflexed, region immediately behind produced into a secondary margin which is acute and projecting over the lamella; humeral angle well developed, carina salient at sides but not forming true lobes, mostly reduced at center, not lamellate there, nearly straight, not really reflexed at sides, with a very narrow translucent lamellar portion, total width of carina about 1.1 to 1.2 times larger than that of mesoscutum (wider in larger specimens), sides of the pronotum as seen from above not noticeably converging; mesoscutum about as long as wide, L/WMS around 1.0; fore wing very elongated, LDIS/HMP about 2.5; inner claw of hind tarsus with the apex narrowly pointed, but not acute; propodeum with median furrow rather shallow and narrow, developed on 2/3 of the length of propodeal dorsum, propodeal valve very narrow, with a subquadrate outline; first segment of metasoma evidently short, LSI/HMP only about 1.03, about 2.5 times wider at the apex than at the basal petiole, spiracles not noticeably prominent.

Sculpture: indistinct, disk of clypeus mostly with shallow small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate and shining, with a few isolated large punctures; mesopleuron with shallow fine punctures, integument rather shining.

Vestiture: hairs bare; hairs beneath gena only moderately long.

Color: yellow; antenna light orange yellow, except (sometimes) for an indistinct brownish dorsal mark on scape distally, and for the yellow underside of scape and pedicel; sometimes a very indistinct and narrow streak on interantennal area, bifid frontal mark with anterior arms truncate or tapering, basally with winglets beside posterior ocelli, and posteriorly connected to an occipital band in which a lower median “window” is formed, laterally with two narrow extensions reaching the composite eyes (sometimes bifurcating and connecting to the basal winglets and thus enclosing two small spots), variably wide mark on pronotal anterior face (often lighter), moderately large humeral mark (often lighter), three wide stripes on mesoscutum coalescing at the extremities, opposite anterior and posterior triangular (more often) scutellar marks connected by a median line, posterior half or more of metanotum, wide median stripe and paired triangular anterior and posterior marks on propodeum, the
latter pair of marks continuing anteriorly into lateral lines (the whole pattern producing more or less clear lateral V-shaped yellow marks), mesepisternal and scrobal sulci linked to large spot on subalar area, dark brown or black; two stripes on mid coxa, two or three on hindcoxa, large elongated marks on dorsum of mid and hind femora and tibiae, distal segments of mid and hind tarsi, most of metasomal terga proximally, light testaceous brown (metasoma tergal pattern with distal yellow bands); all metasoma sterna yellow; wing hyaline with yellow brown veins.

Male: length of fore wing 10 mm; clypeus touching eyes, a little wider than high, H/WCLP 0.93, ventral angle obtuse, apex narrowly rounded; antenna with the scape relatively shorter and wider, ventral surface of the flagellum with tyloid reduced or fragmented, apex of the antenna very short and broad, antemomere 13 about 1.5 times longer than wide; clypeus without very conspicuous or shining pubescence; hairs on frons and gena behind not very different of the condition in female.

Color: similar to female; occipital band more strongly reduced.

Variation: some variation exists in degree of lateral prominence of the pronotal carina (that is probably related to size variation) and width of the first metasomal tergum. Some specimens have the brown marks on propodeum and antennal scape a little darker and more extensive.

Nest: the nest has been shown by Ducke (1905b) in photographs of two exemplars presenting the gymnodomes stelocytarous architecture usual for the genus. The photographs demonstrate variation in peduncle position and comb shape, with a small exemplar from one of the type localities (Amapá; Fig. 24b) having a strongly eccentric peduncule and more elongated comb, while another much larger nest from western Amazon (Rio Japurá; Fig. 24a) shows a nearly perfectly circular comb and (inferred) centric peduncle.

Distribution: Brazil: Amazonas, Amapá, Pará, Maranhão; Peru: Loreto.

Remarks: Ducke’s specimens from Iquitos (mentioned in the author’s 1907 paper) could not be found in the Museu Goeldi. There is some possibility that they could be M. flavicornis, which was recorded from Acre (Richards, 1978) and western Amazonas, Rio Jururá (see below). Mischocyttaruss excrucians and M. trinitatis described as varieties by Richards (1945) and treated as subspecies by Richards (1978) are not the same species as M. alfkenii (see below). All of the references made by O’Connor et al. (2011) to M. alfkenii are either incorrect (Trinidad specimens), or dubious (Venezuela specimen; from Arévalo et al., 2004). Mischocyttaruss marinerae was described by Raw (1996) as an Amazonian representative of the “M. cassumunga group”. However, the described shape of the male antenna and other characters clearly show that this form belongs instead to the alfkenii and basimacula group (see also Silveira 2008). While types could not be examined, specimens collected in Mamirauá by Gorayeb & Silveira (MPEG) unequivocally indicate that M. marinerae Raw is a junior synonym of M. alfkenii (Ducke).


Mischocyttaruss flavicornis Zikán, 1935
(Figs. 3D)

Mischocyttaruss flavicornis Zikán, 1935: 168; Lectotype: Female, Brazil, Goiás, Santa Rita da Anta (MZSP); designated by Richards (1978) [examined].


Mischocyttaruss basimacula var. flavicornis: Richards, 1945: 394.

Mischocyttaruss flavicornis race nigricornis: Zikán, 1949: 154. Lectotype Male, Peru, Cusco, R. Urubamba (IOC); designated by Richards (1978) [examined]; N. syn.


Mischocyttaruss alfkenii var. excrucians Richards, 1945: 396. Holotype Female, Colombia, Meta, Restrepo (MCZC), Paratype Female, Surinam, R. Surinam, Saint Barbara Plantation, 15.v.x.1927 (NHM) [examined]; N. syn.


Female: morphology similar to the preceding species; length of fore wing 10.5–11.5 mm; clypeus wider than high, H/WCLP about 0.92; total width of pronotal carina about 1.1 to 1.2 times larger than that of mesoscutum (wider in larger specimens); mesoscutum about as long as wide, L/WMS around 1.0; fore wing very elongated, LDI/HMP about 2.5 to 2.7; inner claw of hind tarsus with the apex narrowly pointed, but not quite acute; propodeum with median furrow rather shallow and narrow, developed on 2/3 of the length of propodeal dorsum, propodeal valve narrow, with a subquadratic outline; first segment of metasoma evidently short, LSI/HMP only about 1.05, about 2.6 times wider at the apex (than at the basal petiole), spiracles not noticeably prominent.

Sculpture: indistinct, disk of clypeus mostly with shallow small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate and shining, with a few isolated large punctures; mesopleuron with shallow fine punctures, integument rather shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow with sharply contrasting black marks on head and thorax, brown on metasoma; antenna light orange yellow, except for a distinct sharply defined black dorsal mark on scape and pedicel, and for the yellow underside of scape and pedicel; sometimes a very indistinct and narrow streak on interantennal area, bifid frontal mark with anterior arms truncate (more often) or tapering, basally with winglets beside posterior ocelli, and posteriorly connected to an occipital band in which a lower median window (small) is formed, laterally with two narrow extensions reaching the composite
Social wasp species of *Mischocyttarus (Phi)* related to *M. alfkenii* and *M. paraguayensis*

Revista Brasileira de Entomologia 57(2): 173–196, June 2013

eyes, small mark on pronotal anterior face (often lighter), moderately large humeral mark (sometimes lighter), three wide stripes on mesoscutum coalescing at the extremities, opposite anterior and posterior triangular (more often) scutellar marks connected by a median line, posterior half or more of metanotum, wide median stripe and paired triangular anterior and posterior marks on propodeum, the latter pair of marks continuing anteriorly into lateral lines (the whole pattern producing more or less clear lateral V-shaped yellow marks), mesepisternal and scrobal sulci linked to large spot on subalar area, black; two stripes on mid coxa, two or three on hind coxa, large elongated marks on dorsum of mid and hind femora and tibiae, distal segments of mid and hind tarsi, most of metasomal terga proximally, light testaceous brown (metasomal tergal pattern with wide distal yellow bands); all metasomal sterna yellow; wing membrane hyaline with pale yellowish hairs, and yellowish brown veins.

Male: length of fore wing 11 mm; clypeus touching eyes, a little wider than high, H/WCLP 0.93, ventral angle obtuse, apex narrowly rounded; ventral surface of the antennal flagellum with tyloids reduced or fragmented, apex of the antenna very short and broad, antennomere 13 about 1.5 times longer than wide; clypeus without very conspicuous or shining pubescence; hairs on frons and gena beneath not very different of the condition in female.

Color: similar to female; arms of frontal mark wider.

Nest: the nest has been described by Richards (1978: 341) based upon two exemplars from Brazil, Mato Grosso, “Base Camp” (completed cell 14.0 x 3.2 mm), and from Peru, Huanuco, Tingo Maria (completed cell 13.0 x 3.0 mm). The peduncle may be centric or eccentric.

Distribution: Colombia: Nariño [?], Meta and Putumayo (as excrucians in Richards, 1978); Guyana and Surinam (as excrucians); Brazil: Acre (as excrucians), Amazonas, Pará.
Maranhão, Goiás, Mato Grosso, Rondônia; Bolivia: Beni; Ecuador: Manabi [?]; Peru: Casco, Junin, Huánuco, Pasco, Loreto.

Remarks: In spite of its very wide distribution, this species is remarkably uniform in morphology and coloration. The very small differences in color tonality do not seem to justify recognizing M. flavicornis nigricornis Zikán (or M. flavicornis rufescens Zikán) as subspecies, as partially sustained by Richards (1978). Mischoicyrturus alfkeni excrucians Richards, 1945 is a junior synonym of M. flavicornis based on evidence apparent in Richards’s description, and by examination of specimens from Colombia, Meta, and a paratype from Surinam (Surinam R., Saint Barbara Plantation, 15.iv.1927, NHM). The darker and sharply defined marks, including those on the antennal scape and pedicel, typically observed in M. flavicornis are unequivocal evidence of synonymy. The lighter tones of those marks as reported by Richards (1978) in specimens from the Pacific coast of Colombia and Ecuador make these records uncertain. Examination of material identified by this author deposited in the NHM led to the conclusion that he confounded this species with M. waunan sp. nov. Nevertheless, records of M. flavicornis from southern Pará (Conceição do Araguaia) and Maranhão (Imperatriz) seem to be consistent.

Examined Material. Colombia: Meta, San Juan de Arama, 8.i.1992 (female), San Juan de Arama, Vda. Morrobelo 1150m, 11.i.1992 (female), A. Poliana (ICN), La Macarena, 29.x–7.xi.1976 (female), 11.x.1976 (female), 20–29.xi.1976 (female), M. Cooper (NHM); Surinam, R. Surinam, Saint Barbara Plantation, 15.iv.1927 (female); Paratype of var. excrucians (NHM); Brazil: Amazonas, Ipixuna, Rio Liderdade, Estráz da Preta, 11–15.v.2011 (3 females), J. A. Rafael, J. T. Câmara, R. F. Silva, A. Somavilla, A. Agudelo (MPEG); Goiás, female (no. 17.105; IOC); Mato Grosso, Chapada dos Guimarães, 11.xi.1982 (2 females); Rondônia, Ji-Paraná, 15.vii.1984 (female), R. B. Neto (MPEG); Bolivia: Bení, Rio Bení, 30 km N Buenaventura, 5.xi.1981 note 54 (3 females, 1 male), M. Cooper (NHM); Peru: Casco, Santa Ana, Rio Urbamba 800m, 1.xii.1940 (female Paralectotype of nigricornis), Weyrauch; Junin, Sápto, 31.v.1940 (female); Paralectotype of var. rufescens, 17.xi.1940 (female), 24.x.1940 (female), Paprzyccki (IOC).

**Mischoicyrturus basimacula** (Cameron, 1906)

(Fig. 4A)

*Polybia basimacula* Cameron, 1906: 150; Lectotype: Female, Belize (NHM); designated by Richards (1945) [examined].


*Mischoicyrturus basimacula var. guatemalensis* Richards, 1945: 393. Holotype Female, Guatemala, Solola (MCZC) [not examined]; synonymy by Richards (1978).

*Mischoicyrturus basimacula var. superpictus* Richards, 1945: 393. Holotype Female, Colombia, Cauca, Rio Porce, near Porcecoro (MCZC) [not examined]; N. syn.


Female: morphology similar to the preceding species; length of fore wing 8.5–10.5 mm; clypeus wider than high, H/WCLP about 0.94, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; humeral angle well developed, carina variably salient at sides but not forming true lobes, mostly reduced at center, not lamellate there, nearly straight, not really reflexed at sides, with a very narrow translucent lamellar portion, total width of carina about 1.05 to 1.15 times larger than that of mesoscutum; mesoscutum slightly longer than wide, L/WMS about 1.04; fore wing well elongated, LD/HMP from 2.3 to 2.6; inner claw of hind tarsus with the apex narrowly pointed, but not acute; first segment of metasoma evidently short, L/S/HMP only about 1.07, about 2.5 times wider at the apex than at the basal petiole, spiracles not noticeably prominent.

Sculpture: indistinct, disk of clypeus mostly with shallow small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate and shining, with a few isolated large punctures; mesopleuron with shallow fine punctures, integument rather shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow with sharply contrasting black or dark brown marks; antennal scape and pedicel black above, yellow beneath; first flagellomere black above, contrasting with lighter distal articles, flagellum light orange yellow beneath; supraclypeal plate and interantennal area always with some maculation, sometime almost entirely black enclosing a pale spot; upper segment of lateral margin of clypeus tinged of black; bifid frontal mark with anterior arms truncate (sometime widened and entering the ocular sinus), basally with short winglets beside posterior ocelli, and posteriorly connected to a broad occipital band in which a small median window may be formed, laterally with two extensions reaching the composite eyes, a wide mark on pronotal anterior face, moderately large humeral mark (sometimes lighter), three stripes on mesoscutum coalescing at the extremities, opposite anterior and posterior triangular (more often) scutellar marks connected by a median line, posterior margin of metanotum, wide median stripe and paired anterior and posterior marks on propodeum, the latter pair of marks continuing anteriorly into lateral lines (the whole pattern producing more or less clear lateral V-shaped yellow marks), mesepesternal and scrobal sulci broadly, connected to large spot on subalar area, ventral spot on mesopleuron, mark along the suture between meso and metapleurale, posterior spot on metapleurale, black or dark brown; two stripes on mid coxa, three on hind coxa; mid and hind trochanters mostly posteriorly, small elongated marks on dorsum of fore femur and tibia; large elongated marks on dorsum of mid and hind femora and tibiae, basal segment of mid and hind tarsi, brown; metasomal terga 1–5 proximally black or dark brown (pattern with very wide distal yellow bands), apparent distal parts of tergum 6 yellow; metasomal sternum 1 with lighter brown maculation, sternum 2 nearly always with a basal (sometimes tridentate) dark brown mark, visible remaining sterna yellow; wing membrane hyaline with pale yellowish hairs, and yellowish brown veins.

Revista Brasileira de Entomologia 57(2): 173–196, June 2013
Social wasp species of *Mischocyttarus (Phi)* related to *M. alfkenii* and *M. paraguayensis*

Male: length of fore wing 7–10.5 mm; clypeus touching eyes, wider than high, H/WCLP about 0.90, ventral angle obtuse, apex narrowly rounded; antennal flagellum with tyloids reduced or fragmented, apex of the antenna very short and broad, antennomere 13 about 1.5 times longer than wide; clypeus without very conspicuous or shining pubescence; hairs on frons and gena beneath not very different of the condition in female.

Color: similar to female.

Nest: the nest has been described by Richards (1945) and figured in Rau (1933). The peduncle may be centric or eccentric.

Distribution: México: San Luis Potosi, Tabasco, Veracruz, Oaxaca, Yucatán; Belize; Guatemala; El Salvador; Honduras; Nicaragua; Costa Rica; Panama; Colombia: Antioquia, Boyacá, Cundinamarca, Magdalena, Tolima, Valle; Venezuela: Zulia; Ecuador: Pichincha.

Remarks: Records of the species in Richards (1978) from the Colombian departments of Valle and Nariño refer to another species, here described as *M. waunan* sp. nov. However, the occurrence of *M. basimacula* in Colombian “West coast” seems to be granted as inferred from its occurrence in Pichincha, Ecuador (FSCA). A number of specimens of the form described by Richards (1945) as variety *superpictus*, and subsequently (1978) treated as a subspecies, were examined from Colombia, Antioquia (Porce and San Luis), Cundinamarca and Tolima (UCDC, ICN). They seem to represent only a color variant. Specimens presenting the more typical lighter pattern were also found from Colombia, Antioquia (MPEG), Magdalena (INC) and Venezuela, Zulia (UCDC).

Fig. 4. A: frontal view of head of *M. basimacula*; B-D: general views of *M. trinitatis* (B, dorsal), and *M. arawak* (C, lateral; D, dorsal); E-F: dorsal view of head and thorax of *M. avo* sp. nov. (E) and *M. uniformis* sp. nov. (F).

Mischocyttarus waunan sp. nov.

(FIG. 5A)


Description. Female: length of fore wing 7.5–10 mm; head nearly as high as wide in frontal view, FHH/INTOW about 1.0; clypeus wider than high, H/WCLP about 0.93, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; malar space narrow; tentorial pit a littler closer to eye margin than to antennal socket; occelli as in an equilateral triangle, POL/OOL about 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflected, reflexion generally held behind the lamella produced into a rather incipient secondary margin which is acute but not so strongly projecting over the lamella; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not really reflexed at sides, with a very narrow translucent lamellar portion, total width of carina about 1.14 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging; mesoscutum as long as wide, L/WMS 1.0; fore wing well-elongated, LDIS/HMP 2.4; inner claw of hind tarsus with the apex narrowly pointed, but not acute; propodeum with median furrow long, rather shallow and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve narrow, with subtriangular outline; first segment of metasoma only moderately elongated, L/SHP about 1.07, about 2.6 times wider at the apex (than at the basal petiole), spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: rather indistinct, disk of clypeus dull, mostly with small sized punctures, largerones rare and inconspicuous, area close to the ventral margin finely reticulate with a few isolated large punctures; upper interantennal area and frons similar to clypeus, but with the punctures arranged into a more dense and still duller pattern; mesopleuron with fine punctures, integument never very shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow; antennal flagellum dark brown dorsally based to testaceous beneath at the apex; antennal scape and pedicel dorsally, transversal streak on interantennal area (sometime forming with an upper clypeal line a square shaped mark), bifid frontal mark with wide anterior arms, posteriorly connected to a continuous occipital band which sends a narrow lateral extension to each of the composite eyes, a wide scale on pronotal anterior face, moderately large humeral mark, three wide stripes on mesoscutum coalescing at the extremities, opposite anterior and posterior triangular scutellar marks connected by a median line, moderately wide median stripe and paired anterior triangular and paired posterior oval marks on propodeum, lateral aspect of propisternum, mesepisternal and scrobal sulci linked to spot on subalar area, small posterior ventral marks on meso and metapleural, large proximal portions of metasomal terga 1 to 6, dark brown; two streaks on mid coxa, three streaks on hind coxa, inner aspect of mid and hind trochanters, dorsal elongated marks on femora, linked to a basal ring on mid and hind femora, dorsum of fifth segment of hind tarsus, basal tridentate mark on sternum 2 (rarely), brown or light brown; wing hyaline with brown veins.

Male: length of fore wing 8.0 mm; clypeus touching eyes, a little wider than high, H/WCLP 0.94, ventral angle obtuse, apex narrowly rounded; antenna with the scape relatively shorter and wider, ventral surface of the flagellum with tyloids reduced or fragmented, apex of the antenna very short and broad, antennomere 13 about 1.5 times longer than wide; clypeus without very conspicuous or shining pubescence; frons and gena beneath with more numerous and longer hairs than in female.

Color: similar to female; occipital band with a central discolored window, pronotal marks reduced in size.

Variation: some specimens from Colombia and Panama show the dark marks of a much lighter reddish tonality.

Nest: an examined female specimen (Colombia, Narino, Barbacoas, 7.iv.1974, M. Cooper; NHM/BM1975–33) is referred on the label as from “Nest 67”, but this nest could not be examined.
Social wasp species of *Mischocyttarus* (Phi) related to *M. alfkenii* and *M. paraguayensis*

Distribution: México: San Luis Potosi, Veracruz, Chiapas; Panama; Colombia: Nariño, Valle.

Etymology: the specific epithet is a reference to the Waunan, an indigenous people that lives in the Pacific Coast of northwestern South America, here used as a noun in apposition.

Remarks. This species was confounded with *M. basimacula* by Richards (1978: 342). It is indeed similar, but can be distinguished by the less sharp contrast between the yellow and dark colors, and especially by the more homogeneous coloration of the antennal flagellum, by the blackish dorsum of the last segment of the hind tarsus, and the normal absence of a tridentate mark on the base of the second metasomal sternum. Specimens from México were slightly larger on the average, but appeared to be indistinguishable based on morphology and color. The known geographic distribution of *M. waunan* sp. nov. ranges from central México to the Pacific coast of Colombia, but is now notably discontinuous, and the species has not been collected for more than 1500 km across Central America, from southern México to northern Panama. Importantly, it has not been found in Costa Rica, which is probably the most intensively collected area in the region.


Fig. 5. A-E: general views of *M. waunan* sp. nov. (A), *M. tayacaja* sp. nov. (B), *M. paraguayensis* (C, D), *M. suzannae* sp. nov. (E); F-G: aspect of the apex of the inner claw of hind tarsus of *M. embera* sp. nov. (F), and *M. awa* sp. nov. (G); scale bar measures 1 mm, except in F and G where it is 0.5 mm.
**Mischocyttarus trinitatis** Richards, 1945; n. stat.  
(Figs. 3C, 4B)

*Mischocyttarus alfkenii* var. *trinitatis* Richards, 1945: 397 (in part); Holotype: Female, Trinidad, Quare Riv. Valley (NHM) [examined].  

Female: length of fore wing 9–11.5 mm; head nearly as high as wide in frontal view, FHH/INTOW about 1:0; clypeus wider than high, H/WCLP about 0.93, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; occelli as in an equilateral triangle, POL/OOL a little less than 1:2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflexed, region immediately behind produced into a secondary margin which is acute and projecting over the lamella; humeral angle well developed and forming weak but distinct lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not reflected at sides but distinctly prominent laterally, with a distinct rather wide translucent lamellae portion, total width of carina about 1.16 to 1.20 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging; mesoscutum a little longer than wide. L/WMS about 1:03; fore wing well elongated, LDIS/HMP around 2.5; inner claw of hind tarsus with the apex narrowly pointed, but not acute; propodeum with median furrow long, rather shallow and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve narrow, with subtriangular outline; first segment of metasoma relatively short, LSI/HMP 1.10, variably wide, from 2.3–2.8 times wider at the apex than at the basal pediole, spiracles not noticeably prominent, pediole cylindrical, not flattened ventrally.

Sculpture: indistinct, disk of clypeus a little shining, mostly with small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate with a few isolated large punctures; mesopleuron with fine indistinct punctures, integument never very shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow; antennal flagellum light reddish yellow beneath, reddish brown above, scape and pedicel yellow beneath, above diffusely tinged of dark brown; interantennal mark absent; bifid frontal mark with tips of arms narrowed and blurred (sometimes strongly occurring), occipital mark strongly reduced, remaining only a narrow transversal strip and the lateral extensions to eyes and median connection to frontal mark, small central spot on anterior surface of pronotum and humeral mark (often lighter and reduced), three stripes on mesoscutum (often with limits blurred), median line on scutellum, posterior margin of metanotum very narrowly, disc of metasomal terga two to five, dark brown; indistinct marks on mid and hind coxae, elongated marks on dorsal surface of mid and hind femora, sometimes an indistinct interrupted line on propodeal furrow and spots on posterior ventral orifices, central area of first metasomal tergum and base of second, light brown; metasomal terga typically with wide bands; all metasomal sterna yellow; wing hyaline with light yellowish brown veins.

Male: length of fore wing 8–10 mm; clypeus touching eyes, wider than high, H/WCLP 0.90, ventral angle obtuse, apex narrowly rounded; antenna with the scape relatively shorter and wider, ventral surface of the flagellum with tyloids reduced or fragmented, apex of the antenna very short and broad, antennomere 13 about 1.5 times longer than wide; clypeus without very conspicuous or shining pubescence; frons and gena beneath with more numerous and longer hairs than in female.

Color: similar to female, dark marks reduced to a greater extent.

Variation: variation occurs in the degree of reduction of dark marks especially on the occiput, humeral region and terga 1 and 2 of the metasoma. Specimens from the continent tend to be a little darker.

Nest: the nest has been described and figured by Richards (1945) from Venezuela, Caracas, and O’Connor et al. (2011) from Trinidad. Two specimens from Trinidad with very ecacentric peduncle were examined (FSCA).

Distribution: Trinidad; Venezuela.

Remarks: This species can easily be distinguished from *M. alfkenii* based on the characters given in the key. Interestingly (because considered by Richards a character of great diagnostic power), the range of variation in the relative length of the first metasomal segment in *M. trinitatis* encompasses most of the summed amplitudes of the *alfkenii* and *paraguayensis* groups (see Fig. 2). The type series included specimens of two other species described here with the names *M. uniformis* sp. nov. (from Colombia, Córdoba, Atlántico and Magdalena) and *M. arawak* sp. nov. (from Guyana). Other records by Richards (1978) from Colombia, Putumayo and Valle seem to be mistaken.


**Mischocyttarus baconi Starr, 2011**


This species was described from a group of genetically differentiated colonies of a peripheral insular population in
Trinidad (Starr 2011; in the appendix of O’Connor et al. 2011). The author considered the concept of *M. alfkenii* sensu Richards (1978) as a reference for comparing the new species, but very probably used only specimens of *M. alfkenii trinitatis* Richards in the genetic assays (as explained earlier, *trinitatis* is a distinct species). *Mischocyttarus baconi* actually can only be diagnosed on the basis of DNA characters. Other differences to sympatric colonies of *M. trinitatis* were found by O’Connor et al. (2011) in nest form (peduncle eccentricity and comb shape), and wing morphology (patterns of distances between venational intersections). However, while taking *M. alfkenii* as reference, the authors missed information in Ducke (1905b) demonstrating the existence of large variation in nest form in this species. Regarding wing morphology, the authors could not derive taxonomic diagnostic characters from the (statistical) differences detected by techniques of geometric morphometrics.

Five examined female specimens from a small centric nest (with darker carton) from Trinidad, Tacarigua, 26.iii.1984 (nest 84–27), S. T. Michaels (FSCA) (Fig. 6B) showed considerably broader marginal cell of the fore wing, and are possibly specimens of *M. baconi*. Types of *M. trinitatis* are in fact a mixture of species, and the only nest mentioned and figured by Richards (1945: pl.1, fig. 130) is a small slightly eccentric exemplar from Venezuela, Caracas (USNM). So, while identification of this specimen by Richards is probably correct, little can be said about variation in nest form in the species. Because the holotype of *M. trinitatis* has the marginal cell of the fore wing normally shaped (i.e. not exceedingly broadened), it is probably safe to consider that it represents the form with eccentric nests in the work of O’Connor et al. (2011), otherwise *M. baconi* should have to be synonymized and a new name created for the form with eccentric nests.

*Mischocyttarus arawak* sp. nov.
(Fig. 4C, D)

*Mischocyttarus alfkenii* var. *trinitatis* Richards, 1945: 397 (in part; misidentification).

Description. Female: length of fore wing 9 mm; head nearly as high as wide in frontal view, FHH/INTOW 0.96; clypeus wider than high, H/WCLP 0.92, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, 0.31 times the clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; ocelli as in an equilateral triangle, POL/OOL a little less than 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflexed, region immediately behind produced into a secondary margin which is acute and projecting over the lamella; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not reflexed at sides, not very prominent laterally, with a very narrow lamellar portion, total width of carina only 1.12 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging; mesoscutum a little longer than wide, L/WMS 1.03; fore wing well-elongated, LDIS/HMP 2.4; inner claw of hind tarsus with the apex narrowly pointed, but not acute; propodeum with median furrow long, rather shallow and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve narrow, with subtriangular outline; first segment of metasoma moderately elongated, LSI/HMP 1.12, considerably narrow, only 2.10 times wider at the apex than at the basal petiole, spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: indistinct, disk of clypeus nearly dull, mostly with small sized punctures, largerones rare and inconspicuous, area close to the ventral margin finely reticulate with a few isolated large punctures; mesopleuron with fine indistinct punctures, integument never very shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.
Color: yellow; antennal flagellum light yellowish brown beneath, dark brown above; scape and pedicel yellow beneath,
above same color of flagellum; interantennal mark absent; bifid frontal mark with arms well-defined and moderately wide, occipital mark strongly reduced, presenting only a narrow transversal strip and the lateral extensions to eyes and median connection to frontal mark, small poorly defined central spot on anterior surface of pronotum and humeral mark (a little lighter), three stripes on mesoscutum, triangular anterior and posterior areas and median line on scutellum, posterior margin of metanotum narrowly, scrobal furrow and its intersection with mesepisternal sulcus, ventral angle of upper metapleural plate, continuous line on propodeal median furrow, spot on propodeal lateral posterior orifices (continuing anteriorly as a short poorly defined linear mark), all metasomal terga except for narrow distal and lateral marginal areas (progressively narrow backwards, so that sixth tergum is actually unbanded), dark brown; indistinct marks on mid and hind coxae and trochanters, elongated marks on dorsal surface of mid and hind femora and tibiae, fifth segment of hind tarsus, light brown; metasomal terga narrowly banded distally; all metasomal sterna yellow; wing hyaline with brown veins.

Male: unknown
Nest: unknown.

Distribution: Guyana.

Etymology: the specific epithet is a reference to the large Arawak family of languages spoken by once numerous indigenous peoples in South America and West Indies, used here as a noun in apposition.

Remarks: The species is only known from the holotype (previously treated by Richards, 1945 as a paratype of *M. trinitatis*) that is significantly different from *M. trinitatis* in the shape of the pronotal carina, width of the first metasomal tergum, and coloration of the antenna and metasoma (compare figures 4B and D).

Type Material: Holotype: Female, Guyana, Mazaruni clearing, 17.ix.1937 (NHM).

*Mischocyttarus muisca* sp. nov.

Description. Female: length of fore wing 10–11 mm; head nearly as high as wide in frontal view, FHH/INTOW about 1.0; clypeus wider than high, H/WCLP about 0.90, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; malar space narrow; tenterial pit a little closer to eye margin than to antennal socket; occieli as in an equilateral triangle, POL/OOL a little less than 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflexed, region immediately behind produced into a secondary margin which is acute and projecting over the lamella; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not really re-flexed at sides, with a narrow but distinct translucent lamellar portion, total width of carina about 1.11 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging; mesoscutum as long as wide, L/WMS about 1.0; fore wing normally elongated; inner claw of hind tarsus with the apex narrowly pointed, but not at all acute; propodeum with median furrow long, rather shallow and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve narrow, with subtriangular outline; first segment of metasoma moderately elongated, LSI/HMP from 1.07 to 1.15, about 2.6 times wider at the apex than at the basal petiole, spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: indistinct, disk of clypeus dull, mostly with small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate with a few isolated large punctures; mesopleuron with fine indistinct punctures, integument not very shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow; antennal flagellum reddish brown distally beneath, above dark brown to black, scape and pedicel beneath yellow, above black; bifid frontal mark sometimes with contour disrupted or blurred, occipital mark reduced on its posterior lower parts (sometimes blurred), small indefinite anterior pronotal spot, wide humeral mark, three stripes on mesoscutum, anterior and posterior margins narrowly and median line on scutellum, posterior margin of metanotum narrowly, mesepisternal sulcus narrowly, pleural and propodeal sulci and concavities including a well-defined median line, dark brown or black; one streak on mid coxa, three streaks on hind coxa, elongate marks on dorsal (inner) surface of femora and tibiae, disc of all metasomal terga light reddish brown (testaceous); metasomal terga with narrow yellow distal bands; all metasomal sterna yellow; wing hyaline with brown veins.

Male: length of fore wing 11 mm; clypeus touching eyes, wider than high, H/WCLP 0.88, ventral angle obtuse, apex narrowly rounded; antenna with the scape relatively shorter and wider, ventral surface of the flagellum with tyloids reduced or fragmented, apex of the antenna very short and broad, antennomere 13 about 1.5 times longer than wide; clypeus without decumbent silvery pubescence, but with well visible short golden hairs ventrally.

Color: similar to female.

Nest: unknown.

Distribution: Colombia: Bolivar, Cundinamarca, and Tolima.

Etymology: the specific epithet is a reference to the Muiscas, an indigenous people from the region of Eastern Range of Colombia, used here as a noun in apposition.

Remarks: This species is similar in the testaceous metasoma to *M. embera* sp. nov. from Panama, *M. uniformis* sp. nov. from northern Colombia, and *M. awa* sp. nov. from Ecuador. The first and second species can be separated by morphological features (enlarged roundly ending hind tarsal claw and sublobate humeral region of pronotum respectively),
while *M. awa* sp. nov. can be differentiated from *M. muisca* sp. nov. by the reddish color of marks on head and thorax, and especially the light colored antenna.


*Mischocyttarus awa* sp. nov.

(Figs. 4E, 5G)

Description. Female: length of fore wing 10–11 mm; head nearly as high as wide in frontal view, FHH/INTOW about 1.0; clypeus wider than high, H/WCLP about 0.93, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; occelli as in an equilateral triangle, POL/OOL a little less than 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflected, region immediately behind produced into a secondary margin which is acute and projecting over the lamella; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not really reflexed at sides, with a narrow but distinct translucent lamellar portion, total width of carina about 1.1 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging; mesoscutum as long as wide, L/WMS 1.0; fore wing well-elongated, LDIS/HMP 2.3; inner claw of hind tarsus with the apex narrowly pointed, but not acute; propodeum with median furrow long, rather shallow and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve narrow, with subtriangular outline; first segment of metasoma moderately elongated, LSI/HMP 1.12, about 2.6 times wider at the apex than at the basal petiole, spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: indistinct, disk of clypeus dull, mostly with small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate with a few isolated large punctures; mesopleuron with fine indistinct punctures, integument never very shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow; antennal flagellum beneath yellowish brown, above light reddish brown, scape and pedicel beneath yellow, above brown; interantennal mark and bifid frontal mark with contour disrupted or blurred, occipital mark reduced on its lower parts, a small indefinite anterior pronotal spot, wide humeral mark, three stripes on mesoscutum, diffuse mark on scutellum, mesepisternal sulcus narrowly, pleural and propodeal sulci and concavities, reddish brown; one streak on mid coxa, three streaks on hind coxa, elongate marks on dorsal (inner) surface of femora and tibiae, disc of all metasomal terga light reddish brown (testaceous); sometimes metasomal terga with differentiated yellow distal bands; all metasomal sternae yellow; wing hyaline with brown veins.

Male: length of fore wing 10 mm; clypeus touching eyes, wider than high, H/WCLP 0.90, ventral angle obtuse, apex rounded; antenna with the scape relatively shorter and wider, ventral surface of the flagellum with tyloids reduced or fragmented, apex of the antenna very short and broad, antennomere 13 about 1.5 times longer than wide; clypeus without very conspicuous or shining pubescence; frons and gena beneath with more numerous and longer hairs than in female.

Color: similar to female.

Variation: some specimens show the metasomal terga narrowly banded.

Nest: unknown.

Distribution: Ecuador: Manabi, Guayas, El Oro.

Etymology: the specific epithet is a reference to the Awa, an indigenous people that lives in northwestern South America, in Ecuador and Colombia, used here as a noun in apposition.

Remarks: This species may be confused in terms of its color with either (part of) *M. waunan* sp. nov., which is smaller with the subalar area marked of black or brown (and with the occipital mark not reduced behind), or with *M. uniformis* sp. nov., which has a higher and prominent (subolate) pronotal carina at sides (compare Figs. 4 E and F), and a slightly lighter color pattern. Only known from western Ecuador.


*Mischocyttarus uniformis* sp. nov.

(Fig. 4F)

*Mischocyttarus alfkenii* var. *trinitatis* Richards, 1945: 397 (in part; misidentification).

Description. Female: length of fore wing 9–11.5 mm; head nearly as high as wide in frontal view, FHH/INTOW about 1.01; clypeus wider than high, H/WCLP about 0.93, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; occelli as in an equilateral triangle, POL/OOL a little less than 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflected, region immediately behind produced into a secondary margin which is acute and...
projecting over the lamella; humeral angle well developed and forming weak but distinct lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not reflexed at sides but distinctly prominent laterally, with a distinct rather wide translucent lamellar portion, total width of carina about 1.15 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging; mesoscutum as long as wide, L/WMS 1.0; fore wing well-elongated, LDIS/HMP 2.4; inner claw of hind tarsus with the apex narrowly pointed, but not acute; propodeum with median furrow long, rather shallow and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve narrow, with subtriangular outline; first segment of metasoma relatively short, LSI/HMP 1.07, variably wide, from 2.5–2.8 times wider at the apex than at the basal petiole, spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: indistinct, disk of clypeus a little shining, mostly with small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate with a few isolated large punctures; mesopleuron with fine indistinct punctures, integument never very shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow; antennal flagellum uniformly light reddish brown, scape and pedicel beneath yellow, above same color of flagellum; interantennal mark reduced and bifid frontal mark with contour blurred or very narrow, occipital mark strongly reduced on its lower parts, three stripes on mesoscutum, reddish brown; one streak on mid coxa, two streaks on hind coxa, elongate marks on dorsal surface of mid and hind femora and tibiae, disc of all metasomal terga, light to darker testaceous brown; metasomal terga with variably differentiated yellow distal bands; all metasomal sternae yellow; wing hyaline with brown veins.

Male: unknown.

Variation: some specimens show the metasomal terga narrowly banded.

Nest: described by O. W. Richards (unpublished manuscript) as having “a broad peduncle, 4.0 mm long, 3.0 mm wide, light brownish grey in colour… comb long ovals (4.0 x 2.5 cm) … peduncle near the middle of the comb … completed cells 11.0 x 3.5 mm”.

Distribution: Colombia: Atlántico, Córdoba, Magdalena.

Etymology: the specific epithet refers to the rather uniform pale coloration.

Remarks: This species was confounded with *M. trinitatis* by O. W. Richards in the revision of *Mischocyttarus* of 1945, but was subsequently recognized by him as a distinct species in an unpublished manuscript.

Type Material: Holotype: Female, Colombia, Magdalena, N. Sierra Nevada de Santa Marta, Rio Buritaca 100m, 8.iii.1974, M. Cooper (NHM). Paratypes: Colombia: Atlántico, Puerto Colombia, C. Morley (female, Paratype of *M. trinitatis*; NHM); Córdoba, San Antero, Amaya 0m, 14.i.1999 (female), D. Campos; Magdalena, PNN Tayrona (female) (ICN); N. Sierra Nevada de Santa Marta, Rio Buritaca 100m, 8.iii.1974, (3 females) Nest 7, M. Cooper (NHM).

*Mischocyttarus achagua* sp. nov. (Fig. 3E)

Description. Female: length of fore wing 10.5 mm; head nearly as high as wide in frontal view, FH/HINTOW 0.98; clypeus wider than high, H/WCLP 0.92, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; occelli as in an equilateral triangle, POL/OOL about 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflexed, region immediately behind produced into a second margin which is acute and projecting over the lamella; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not really reflexed at sides, with a narrow but definite translucent lamellar portion, total width of carina about 1.13 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging; mesoscutum just a fraction longer than wide, L/WMS 1.03; fore wing moderately elongated, LDIS/HMP 2.25; inner claw of hind tarsus rather broad with the apex round; propodeum with median furrow long, rather shallow and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve relatively wide, with subtriangular outline; first segment of metasoma well elongated, LSI/HMP 1.16, about 2.54 times wider at the apex than at the basal petiole, spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: rather indistinct, disk of clypeus dull, mostly with small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate with a few isolated large punctures; mesopleuron with small punctures with perceptible interstices, not very shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow; antennal flagellum beneath light reddish brown, dark brown above; antennal scape and pedicel beneath yellow, dark brown above; bifid frontal mark with broad anterior arms, posteriorly connected to an occipital band which sends two narrow extensions to composite eyes and is reduced on its lower parts, a wide mark on pronotal anterior face, large humeral mark, three stripes on mesoscutum coalescing at the extremities, dark brown; median line and anterior and posterior margins of scutellum narrowly, posterior margin of metanotum narrowly, median stripe and paired anterior triangular and paired posterior oval marks on propodeum, mesepisternal and scrobal sulci linked to spot on subalar area, ventral angle of upper lobe metapleural plate, small diffuse posterior ventral marks on meso and metapleuron, two streaks on mid coxa, three streaks on hind coxa, dorsal aspect of mid and hind femora, tibiae and tarsi, light brown, distal tarsomeres darker; metasomal terga light brown with narrow yellow distal bands; all metasomal sternae yellow; wing hyaline with brown veins.
Male: unknown.
Nest: unknown.
Distribution: Colombia, Meta.

Etymology: the specific epithet is a reference to the Achagua, an indigenous people that lives in northwestern South America, in Colombia, used here as a noun in apposition.

Remarks: This species and the next share as distinctive feature a large and broadly pointed hind tarsal claw (see Fig. 5F), a unusual character in both groups of alfkenii and paraguayensis. The structure of the head in respect to the shape of the clypeus and relations with other head elements indicate these species pertain to the alfkenii group. However, the relatively long first metasomal segment of M. achagua is unique in this group.


**Mischocyttarus emberra sp. nov.**
(Figs. 3F; 5F)

Description. Female: length of fore wing 10 mm; head nearly as high as wide in frontal view, FHH/INTOW 1.0; clypeus much wider than high, H/WCLP 0.88, apex narrowly truncate, clypeus more extensively in contact with eye, free upper part of lateral margin short, hardly more than 0.3 times the clypeus height at middle; malar space very narrow; tentorial pit distinctly closer to eye margin than to antennal socket; occelli in an equilateral triangle, POL/OOL about 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflexed, region immediately behind produced into a secondary margin which is acute and projecting over the lamella; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not really reflexed at sides, with a narrow but definite translucent lamellar portion, total width of carina about 1.13 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging; mesoscutum just a fraction longer than wide, L/WMS 1.03; fore wing moderately elongated, LDIS/HMP 2.26; inner claw of hind tarsus broad with the apex round; propodeum with median furrow long, rather shallow and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve relatively wide, with subtriangular outline; first segment of metasoma short, LS/HMP 1.08, about 2.43 times wider at the apex than at the basal petiole, spiracles not noticeably prominent, petiolar cylindrical, not flattened ventrally.

Sculpture: rather indistinct, disk of clypeus a little shining, mostly with small sized punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate with a few isolated large punctures; mesopleuron with small but clearly perceptible punctures, interstices a little shining.

Vestiture: eyes bare; hairs beneath gena only moderately long. Color: yellow; antennal flagellum beneath light reddish brown, dark brown above; antennal scape and pedicel beneath yellow, above dark brown; frontal mark with contour blurred, posteriorly connected to a narrow occipital band which sends two extensions to the composite eyes and is reduced on its lower parts, a very small indistinct mark on pronotum anterior face, large humeral mark, three stripes on mesoscutum coalescing at the extremities, median line and anterior triangular mark on scutellum, posterior margin of scutellum and metanotum narrowly, median stripe and paired posterior orifices on propodeum, reddish brown or a little darker, blackish; small diffuse posterior ventral marks on lower metapleuron, diffuse triangular spots on propodeum anteriorly, two streaks on mid coxa, three streaks on hind coxa, dorsal aspect of mid and hind femora and tibiae, metasomal terga, light testaceous brown; metasomal terga unbanded; all metasomal sterna yellow; wing hyaline with brown veins.

Male: unknown.
Nest: unknown.
Distribution: Panama.

Etymology: the specific epithet refers to Emberra as a group of languages spoken by indigenous peoples living in Colombia and Panama, used here as a noun in apposition. In particular, the word means “human being”.

Remarks: This species can be easily separated from M. achagua sp. nov. by its much shorter first metasomal segment, and completely testaceous metasoma. From M. uniformis sp. nov., M. muisco sp. nov., and M. awa sp. nov. it can be distinguished by the enlarged broadly pointed hind tarsal claw (see Fig. 5F).


**Group of M. paraguayensis and bahiae**

Refers to a group of six known species with the characters given in couplet 1’ of the key.

**Mischocyttarus paraguayensis** Zikán, 1935
(Figs. 3A; 5C, D)

*Mischocyttarus paraguayensis* Zikán, 1935: 165, figs. 23, 25, 28, 30; Lectotype: Male, Paraguay, Mbovevo (MZSP) [examined].
*Mischocyttarus alfkeni* var. zikanii Richards, 1945: 399; synonymy by Richards (1978: 339). Holotype Female, Paraguay, Pto. Bertoni (NHM) [examined].

Revista Brasileira de Entomologia 57(2): 173–196, June 2013
Mischocyttarus schrottkyi Zikán, 1949: 159. Holotype Female, Paraguay, Puerto Bertoni (MZSP; n. 16.438) [examined]. N. syn.


Mischocyttarus aracutabensis Zikán, 1949: 162. fig. 412. Holotype Female, Brazil, São Paulo (IOC) [examined]; Richards, 1978: 345. N. syn.


Mischocyttarus rivularum Richards, 1978: 354. Holotype Female, Argentina, Entre Rios, Río Uruguay, Isla Pepe-Aji (IMLA), Paratype Female, same data (NHM) [examined]. N. syn.

Mischocyttarus rioalpamendi Richards, 1978: 363. Holotype Female, Brazil, Rio Grande do Description: Sul, São Leopoldo (MZSP) [examined]. N. syn.

Female: length of fore wing 8.5–10.5 mm; head nearly as high as in frontal view, FHH/INTOW more often less than 1.0; clypeus considerably wider than high, mean H/WCLP 0.88 (upper limit: 0.93), apex narrowly truncate, clypeus less extensively in contact with eye, free upper part of lateral margin longer, more than 0.33 times clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; occelli as in an equilateral triangle, POL/OOL about 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anter- rior margin of pronotum with the lamella wide but not re- flexed, region immediately behind produced into a secondary margin projecting over the lamella; humeral angle well de- veloped but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, not really reflexed and little prominent at sides, with very narrow lamellar portion, total width of carina about 1.07–1.13 times longer than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging forwards; mesoscutum about as long as wide, L/WMS about 1.0; fore wing well-elongate, LDS/HMP 2.4–2.6, inner claw of hind tarsus with the apex pointed but not acute; propodeum with median furrow long, moderately deep and wide, developed on 4/5 of the length of propodeal dorsum, propodeal valve relatively wide, with a subtriangular outline: first segment of metasoma well elon- gated, mean LSI/HMP 1.12, more than 1.1 in 84% of the instances (see Fig. 2), moderately wide, about 2.4 times wider at the apex than at the basal petiole, spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: moderately distinct, considerably stronger than in M. alfkenii, the small punctures deeper and more conspicu- ous; clypeus mostly with small sized punctures, larger ones more scattered and inconspicuous, area close to the ventral margin finely reticulate and a little shining, with a few iso- lated large punctures; mesopleuron with small punctures, with granule appearance, integument little shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: extremely variable, from almost completely black insects, passing by variegated patterns of black with yellow marks, to mostly yellow with black or brown marks, some- times the whole range (or nearly) of color patterns found within a single nest. Remarkable cases of extreme within-nest variation are the type series of M. araujoi Zikán, and some large colonies of M. gilvus Zikán (Argentina, C. & M. Vardy coll., 1.1.1974, nest 15, NHM; Paraguay, P. N. Ybicuí, 27.II.1995, B. Garcete Barrett, INBP). The latter name was originally as- sociated to a color pattern resembling the epiponine species Agelaia pallipes, a yellow insect with the metasoma distally painted of black, which is imitated by a number of other wasp species (including various Mischocyttarus in different subgene- ra, as M. monte Zikán, M. cerberus Ducke, M. tricolor Richards, and M. collarellus Richards). While not recogniz- ing M. gilvus in material from Paraguay, Garcete-Barrett (1999) commented on the possibility that it could be in fact not more than a color variant of M. paraguayensis.

Male: length of fore wing 9.5 mm; clypeus narrowly sepa- rated from eyes, wider than high, H/WCLP about 0.88, ven- tral angle obtuse, apex narrowly rounded; antenna with the scape relatively shorter and wider, ventral surface of the flagellum with tyloids reduced or fragmented, apex of the antenna short and broad, antennomere 13 about 2.5 times longer than wide; clypeus without very conspicuous or shining pu- bescence; hairs on frons and gena beneath not very different of the condition in female.

Nest: published reports and figures indicate architecture composed of an oval more or less elongate comb and eccen- tric peduncle (Richards 1978; Zikán 1935, 1949). Zikán (1949) presented several photographs of nests under the names M. paraguayensis (Fig. 378), M. infrastrigatus (Fig. 389), M. infrastrigatus (Fig. 390), M. araujoi (Fig. 391), M. ornatulus (Fig. 392), M. costalimai (Fig. 401), and M. aracutabensis (Fig. 412). Particularly the nests in Zikán’s figures 392 and 401 have very long combs up to five times longer than wide.


Remarks: The revised concept of M. paraguayensis pre- sented here resulted from at least three years of careful ob- servations of large numbers of specimens, and included two visits to the Instituto Oswaldo Cruz to study the Zikán Col-
collection. Detailed analyses of published identification keys and of qualitative and morphometric data of specimens referable to the “M. alkenii and consimilis” group of Richards (1978) has failed to recover taxonomic structure in any way resembling the very diversified arrangements of species found in that work or in Zikán (1949). Characters often referred to in keys, such as “length of malar space”, “asymmetry of tarsal segments”, “shape of propodeal furrow”, and “length of first metasomal segment” simply do not vary in ways that could provide diagnostic characters at so fine a level (and so recurrently used) as one can see in the published keys. The numerous species described by Zikán from Itatiaia cannot be separated even by color differences. Furthermore, extreme color variants may exist in a single nest as in the type series of M. araujoi Zikán, or in some large nests of M. gilvus Zikán.


Female: length of fore wing 9–11.5 mm; head nearly as high as wide in frontal view, FHH/INTOW about 1.0; ceypeus considerably wider than high, H/WCLP 0.91, less extensively in contact with eye, free upper part of lateral margin longer, more than 0.33 times ceypeus height at middle; pronotal carina mostly reduced at center, not lamellate there, considerably high and prominent at sides, with a distinct lamellar portion; fore wing well-elongate, LDS/HMP 2.4; first segment of metasoma very elongated, LSI/HMP 1.22, and relatively narrow, 2.3 times wider at the apex than at the basal petiole, spiracles considerably prominent.

Color has been described by Zikán (1949) and Richards (1978) and is generally alike the darker patterns observed in M. paraguayensis.

Male: unknown.

Nest: unknown.

Distribution: Brazil: Santa Catarina.

Remarks: The species is only known from the holotype. Except for the diagnostic features, it is quite similar to dark forms of M. paraguayensis. New material from the relevant localities would be necessary to develop a more well-founded appreciation of the status of M. catharinensis.

Mischocyttarus bahiae Richards, 1945

Mischocyttarus alfkenii var. bahiae Richards, 1945: 398 (in part); Holo-

type: Female, Brazil (NHM) [examined].


Mischocyttarus flavimensis Zikán, 1949: 169, figs. 251, 388; Richards, 1978: 356. Lectotype: Female, Brazil, Rio de Janeiro (IOC) [examined].

Female: length of fore wing 9–11.5 mm; head nearly as high as wide in frontal view, FHH/INTOW about 1.0; ceypeus considerably wider than high, H/WCLP 0.90, apex narrowly truncate, ceypeus less extensively in contact with eye, free upper part of lateral margin longer, more than 0.33 times ceypeus height at middle; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not really reflexed and little prominent at sides, with a very narrow lamellar portion, total width of carina about 1.07–1.12 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging forwards; mesoscutum about as long as wide, L/WMS about 1.0; fore wing well-elongate, LDS/HMP 2.3–2.43, inner claw of hind tarsus with the apex pointed but not acute; propodeum with median furrow long, moderately deep and wide, developed on 4/5 of the length of propodeal dorsum, propodeal valve relatively wide, with a subtriangular outline; first segment of metasoma well elongated, LSI/HMP about 1.12, moderately wide, about 2.4 times wider at the apex than at the basal petiole, spiracles not noticeably prominent.

Sculpture: generally like in M. paraguayensis, not so distinct but a little stronger than in M. alfkenii, the small punctures a little deeper and conspicuous; ceypeus mostly with small sized punctures, larger ones more scattered and inconspicuous, area close to the ventral margin finely reticulate and a little shining, with a few isolated large punctures; mesopleuron with small punctures, integument little shining.
Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: yellow; antennal pedicel and flagellum above reddish brown to black, light reddish brown beneath (lighter to the apex), scape light brown to black above, yellow beneath (including base of pedicel); sometimes dorsal margin of clypeus (narrowly) and an inverted T-shaped mark on interantennal area (sometimes a large quadruple supra- and hypoparasepulm mark); bispin frontal mark with very wide anterior arms sometimes extending laterally into ocular sinus and centrally enclosing a trilobate yellow mark, very broad around ocelli and posteriorly connected to a narrow (looking blurred) occipital band which sends two lateral extensions to the composite eyes, a variably wide dark mark on pronotal anterior face, large (more often) humeral mark, most of mesoscutum letting two narrow yellow stripes centrally, and variably narrow marginal pale areas adjacent to tegulae, opposite triangular (often) anterior and posterior scutellar marks connected by a median line, sometimes mark on posterior third of metanotum with the anterior border angled medially, mesepisternal and scrobal sulci very rarely, rarely a small ventral spot on mesepisternum, ventral angle of upper metapleura, median stripe on propodeal furrow and spots on posterior orifices, dark brown with a reddish tinge on the borders of marks; sometimes a diffuse transversal mark on scutellum, rather large anterior triangular areas on propodeum (sometimes absent and the propodeum almost completely yellow), connecting behind with spots on the posterior orifices and anteriorly with diffuse posterior mark on lower metapleura, two stripes on mid coxa, three on hind coxa, elongated marks on mid and hind femora and tibiae, mid and hind tarsi (distant segments darker), light brown; all metasomal terga and sternae, testaceous brown, without evident banded patterns (rarely reduced or fragmented, apex of the antenna short and broad, ventral surface of the flagellum with tyloids angle obtuse, apex rounded; antenna with the scape relatively shorter and wider, ventral surface of the flagellum with tyloids long, apex of the antenna short and broad, antennomere 13 about 2.5 times longer than wide; clypeus without evident banded patterns (rarely tergum 1 with yellow distal band, tergum 2 basally tinged of yellow, sternum 2 yellow, and remaining segments 3 to 6 black or blackish); wing hyaline with yellow brown veins.

Male: length of fore wing 9.5 mm; clypeus narrowly separated from eyes, a little wider than high, H/WCLP 0.92, ventral angle obtuse, apex rounded; antenna with the scape relatively shorter and wider, ventral surface of the flagellum with tyloids reduced or fragmented, apex of the antenna short and broad, antennomere 13 about 2.5 times longer than wide; clypeus without very conspicuous or shining pubescence; hairs on frons and gena beneath not very different of the condition in female.

Nest: Zikán (1949) presented photographs of two nests, one under the name M. fluminensis (Fig. 388) being a small nest with some fifteen to twenty cells and an eccentric peduncle; the second nest under the name M. bahiae was larger, with about 45 cells and the comb with a more circular contour (Fig. 400).

Distribution: Brazil: Ceará, Pernambuco, Bahia, Rio de Janeiro, Minas Gerais.

Remarks: Mischocyttarus flavoniger Zikán seems to be just a darker form of M. bahiae Richards (several instances of transition having been observed), both differing from M. paraguayensis by the completely testaceous metasoma, practically without banded patterns, and the mostly yellow mesopleuron and propodeum. Two paratypes of M. bahiae from the state of Pernambuco (NHM) have the more distal segments of the metasoma black, in a pattern similar to that observed in the southern form M. gilvus Zikán, which is synonymized here to M. paraguayensis. However, while extreme color variants have been observed in single nests of M. paraguayensis, a relatively large colony (Bau 54, 15 females, 1 male) of M. bahiae observed in the IOC collection only comprised individuals of the typical testaceous pattern.

Examined Material: Brazil: Ceará, Serra de Baturité 700m, 18.vi.1908 (3 females), A. Ducque (MPEG); “Brazil, F. Smith coll. pres. by Mrs. Farren White” (female; Paratype of bahiae Richards) (99–303-NHM), Bahia, 26.x.23 (male; Paratype of bahiae Richards), W. S. Bristowe (30.467 – NHM), Bahia (male; Paratype of bahiae Richards), Gomez (ZMB); Bahia, i.1935, Bau 54 (15 females, 1 male), Fros, Bonfim, ix.1937 (female) coll. J.P.F. (IOC); Rio de Janeiro, Rio de Janeiro (female; Paralectotype of flavoniger Zikán), Hugo Souza Lopes (IOC); (Itatiaia ?), Km 47, Lote 1, xi.1970 (3 females), W. Zikán (MZSP); Minas Gerais, Belo Horizonte, 22.vii.2000 (female), Zanette, L. R. S. (MPEG), Parque Rio Doce (municipalities of Marliéria, Timóteo e Dionísio), 13.1.2010 (female), Souza M., Ladeira T., Ferreira M. & Pires E. (MPEG).

Mischocyttarus flavoniger Zikán, 1949

Mischocyttarus flavoniger Zikán, 1949: 170; Lectotype: Female, Peru, Valle Chanchamayo 800m, Weyrauch (IOC); designated by Richards (1978) [examined]. Richards, 1978: 358.

Female: length of fore wing 10.5 mm; clypeus narrower than long, H/WCLP about 0.90, apex narrowly truncate, clypeus less extensively in contact with eye, free upper part of lateral margin longer, more than 0.33 times clypeus height at middle; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not reflected at sides, with a very narrow lamellar portion, total width of carina about 1.08 times that of mesoscutum, sides of the pronotum as seen from above not noticeably converging forwards; mesoscutum as long as wide, L/WMS 1.0; fore wing well-elongated, LDWS/HMP about 2.43; inner claw of hind tarsus with the apex pointed, but not acute; propodeal valve rather narrow, with subquadrate outline; first segment of metasoma moderately elongate, LSI/HMP 1.14, about 2.4 times wider at the apex than at the basal petiole, spiracles not noticeably prominent.

Color: yellow with black marks on head and metasoma, metasoma entirely black (see Zikán 1949 and Richards 1978).

Male: unknown.

Nest: unknown.

Distribution: Peru: Chanchamayo.

Remarks: Richards (1978) commented on differences in the first metasomal segment amongst specimens of the type series of M. flavoniger, and on the taxonomic position of the species with respect to the group of M. cassumunga (von Ihering, 1903). Zikán's M. flavoniger is definitely a member of the group of M. paraguayensis in regard of the just partial reduction of the pronotal carina, the flattened metanotum, and the narrowly pointed (but not sharp) inner claw of the hind tarsus.

Revista Brasileira de Entomologia 57(2): 173–196, June 2013
Examined material: Peru: (Chanchamayo) Oreja de Capelo 1.600m, 1.v.1943 (female, Paralectotype), Weyrauch (IOC).

*Mischocyttarus* tayacaja sp. nov.  
(Fig. 5B)

Description. Female: length of fore wing 11 mm; head nearly as high as wide in frontal view, FHH/INTOW 0.98; clypeus wider than high, H/WCLP 0.91, apex narrowly truncate, clypeus less extensively in contact with eye, free upper part of lateral margin longer, more than 0.33 times clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; occelli as in an equilateral triangle, POL/OOL about 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflexed, region immediately behind produced into a secondary margin projecting over the lamella; humeral angle well developed but not produced into lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not really reflexed at sides, with a very narrow opaque lamellar portion, total width of carina about 1.08 times larger than that of mesoscutum, sides of the pronotum as seen from above not noticeably converging forwards; mesoscutum a little longer than wide, L/WMS 1.06; fore wing well elongated, LDIS/HMP 2.44; inner claw of hind tarsus with the apex definitely acute; propodeum with median furrow long, quite deep and moderately wide, developed on 4/5 of the length of propodeal dorsum, propodeal valve narrow, with a round outline; first segment of metasoma well elongated, LSI/HMP 1.16, but also very wide distally, 2.72 times wider at the apex than at the basal petiole, spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: relatively stronger on frons, pronotum, mesoscutum, mesopleuron and propodeum, but mostly consisting of small punctures; clypeus a little shining with small punctures and scattered inconspicuous larger ones, area close to the ventral margin finely reticulate and moderately shining, with a few isolated large punctures; mesopleuron with granulate aspect, little shining.

Vestiture: eyes bare; hairs beneath gena only moderately long.

Color: black; apical teeth of mandible, antennal flagellum beneath at the apex, basal dorsal aspect of scape, gena especially on dorsal half, narrow areas near pronotal anterior and posterior margins, diffuse marks on humerus and upper mesepisternal plate, a pair of such marks on scutellum, reddish brown; mandible, clypeus except for upper marginal area, inner orbit to ocular sinus, ventral parts of gena and lower half of outer orbit, pronotal spot adjacent to fovea, anterior aspect of fore coxa, anterior spot on mid coxa, extensive marks on fore and mid trochanters and femora, less extensive anterior mark on hind femur, all tibiae and tarsi, yellow; hind tibia a little darker, last segments of mid and hind tarsi blackish; wing hyaline, costal region amber, veins brown.

Male: unknown.

Nest: unknown.

Distribution: Peru: Huancavelica.

Etymology: the specific epithet “tayacaja” is a composite of two words in the Quechua language referring respectively to an Andean plant (tuya), and to an aspect of the regional landscape (ccaccac “peñasco”, hill) (http://www.munitayacaja.gob.pe/tayacaja/09.php). Tayacaja is also the name of one of the provinces of the Peruvian department of Huancavelica. It is used here as a noun in apposition.

Remarks: The female holotype is the only known representative of this species. It is larger than usual in its group and has a sharply pointed hind tarsal claw. However, the structure of the clypeus and face, and of the pronotum indicate membership in the *M. paraguayensis* group.

Type Material: Holotype: Female, Peru, Huancavelica, Campo Arminó, 1600m, 27.vii.1976 (female), R. García (NHM).

*Mischocyttarus* suzanneae sp. nov.  
(Figs. 5E and 6A)

Description. Female: length of fore wing 9 mm; head nearly as high as wide in frontal view, FHH/INTOW about 1.0; clypeus wider than high, H/WCLP about 0.92, apex narrowly truncate, clypeus less extensively in contact with eye, free upper part of lateral margin longer, more than 0.33 times clypeus height at middle; malar space narrow; tentorial pit a little closer to eye margin than to antennal socket; occelli as in an equilateral triangle, POL/OOL about 1/2; occiput rounded, carina absent; gena considerably narrower than the upper lobe of the eye; pronotum with lateral fovea, central part of the anterior margin of pronotum with the lamella wide but not reflexed, region immediately behind produced into a secondary margin projecting over the lamella; humeral angle poorly developed, approaching a round profile, not at all forming lobe, pronotal carina mostly reduced at center, not lamellate there, nearly straight, not really reflexed at sides, with a very narrow lamellar portion, total width of carina about 1.07 times larger than of mesoscutum, sides of the pronotum as seen from above a little more converging forwards; mesoscutum about as long as wide, L/WMS 1.0; fore wing very short, LDIS/HMP only about 2.13; inner claw of hind tarsus with the apex roundly pointed, not acute; propodeum with median furrow long, rather deep and narrow, developed on 5/6 of the length of propodeal dorsum, propodeal valve moderately wide, with triangular outline; first segment of metasoma variable in length, LSI/HMP from 1.02 to 1.11, apical width varying from 2.18 to 2.31 times that at the basal petiole, spiracles not noticeably prominent, petiole cylindrical, not flattened ventrally.

Sculpture: indistinct, disk of clypeus considerably shining, mostly with very small punctures, larger ones rare and inconspicuous, area close to the ventral margin finely reticulate and considerably shining, with a few isolated large punctures; upper interantennal area and frons with minute punctures arranged into a dense and dull granulate pattern; mesopleuron with very fine indistinct punctures, considerably shining.
Vestiture: eyes bare; most body parts covered with a short appressed shining whitish pubescence, hairs beneath gena very short.

Color: black; base of mandible, upper third of clypeus, dorsal area on gena, anterior face and lateral area of pronotum, spots on meso and metapleura, propodeum, legs and first metasomal tergum, reddish brown; apex of mandible, anten- nal flagellum beneath, tegula, light testaceous; ventral U-shaped mark on clypeus, inner orbit to ocular sinus, two minute spots below antennal sockets, two small streaks on interantennal area above, pronotal carina, pronotal posterior margin, area adjacent to fovea, proepisternum, anterior aspect of fore coxa, anterior transversal marks and axillary crests of scutellum and metanotum, two small elongate spots on propodeum and val- vular region, very narrow distal band on proximal metasomal terga, yellow; wing hyaline with light yellow-brown veins; last segment of mid and hind tarsi darker brown.

Male: length of fore wing 9.0 mm; clypeus narrowly sepa- rated from eyes, considerably wider than high, HWCLP about 0.90, ventral angle obtuse, apex narrowly round; anten- nata with the scape relatively shorter and wider, ventral sur- face of the flagellum with tyloids reduced or fragmented, apex of the antenna short and broad, antennomere 13 about 2.0 times longer than wide; clypeus covered with short appressed silvery hairs a little more conspicuous than in fe- male; hairs on frons and gena beneath not very different of the face of the flagellum with tyloids reduced or fragmented, apex of the antenna short and broad, antennomere 13 about 2.0 times longer than wide; clypeus covered with short appressed silvery hairs a little more conspicuous than in female; hairs on frons and gena beneath not very different of the condition in female.

Color: similar to female, but with more extensive yellow marks, i.e. nearly all the mandible and clypeus (the latter only with a central dark mark), most of supra clypeal plate and interantennal area, inner orbit broadly, outer orbit (with a short interruption), pronotal ventral angle, proepisternum and fore coxa, spot on upper mesepisternal plate, mesopleuron medio-ventrally, base of mid coxa anteriorly, narrow bands on proximal metasomal terga.

Nest: a very elongate comb (Fig. 6A), quite similar to some nests figured by Zikán (1949) for the Brazilian south- eastern fauna (eg. Fig. 392 nest of “M. ornatus”), and Fig. 401 nest of “M. costalima”).

Distribution: Brazil: Pará.

Etymology: the specific epithet is homage to Ms. Suzanna S. Silva, student of the Neotropical social wasps and collector of part of the type specimens and the nest in Serra dos Martirios-Andorinhas.

Remarks: This species is definitely a member of the M. paraguayensis group based on the structure of the head of the female, and the forms of the male antenna and clypeus. The very short fore wing is truly remarkable as well as the geographical positions of the sites recorded for the known specimens, well within the limits of southeastern Amazonia, nearby the confluence of the Tocantins and Araguaia rivers.

CONCLUDING REMARKS

The balance between synonymization and new taxa des- cRIPTION in this work points to a new picture of diversity in the species groups here considered, to the contrary of the situation described by Richards (1978). Seven new species are proposed in the alfkenii and basimacula group (M. baconi Starr would be an eighth additional species), with five new synonyms (four of subspecific rank). On the other hand, only two new species are described in the paraguayensis and bahiae group, while fifteen new synonyms are proposed (all of specific rank). So while species number increased from three to twelve in the first group, a marked reduction resulted in the second group, from nineteen to only six species. In geographic terms, these numbers reflect higher diversity in northern Andean areas than in the Brazilian Atlantic region. Quite remarkably, Amazonian and Guyanan lowlands count only four species, if we consider the peripherally distributed new species M. suzannae and M. arawak.

In Fig. 7, four general distributions types can be perceived for the alfkenii-basimacula group: (1) M. basimacula and M. waunan occurring from Mexico to trans-Andean areas in Ecuador, Colombia and Venezuela (Fig. 7A); (2) species that have subalar area unpainted occurring in trans-Andean areas and along the Caribbean coast (M. muisca, M. aza, M. embera, M. uniformis, M. trinitatis, M. baconi) (Fig. 7B); (3) species occurring in Amazonia-Guyana (M. alfkenii, M. arawak) (Fig. 7A); and (4) species with per- Amazón distribution (M. flavicornis, M. achagua) (Fig. 7A). With respect to the paraguayensis-bahia group, the species are mainly distributed through eastern South America, from the south bank of the Rio da Plata estuary to Ceará state in Brazil (Fig. 7C). Specimens of M. bahiae from Ceará were collected by Ducke in Serra de Baturité, in a region of moderately elevated highlands (600 meters or more) containing fragments of moist forests in the other- wise semi-arid Caatinga domain (Ab’Saber 1977; Andrade & Lins 1964). Several authors have pointed to historical relations of these forests (“brejos de altitude”) with the Brazilian Atlantic Forest (see Borges-Nojosa & Caramaschi 2003). However, three species of this group occur in more isolated and biogeographically unrelated localities (in terms of the present-day biome distributions): M. flavoniger and M. tayacaja in sub-Andean Peru, and M. suzannae within the southeastern limits of Amazonia. The distribution of M. suzannae as an Amazonian representative of the group of M. paraguayensis and bahia may possibly be explained in the context of historical relationships between South American humid forests (see Amorim 2001; Cracraft & Prum 1988). Amorim’s hypothesis of “Dos Amazonias” maintains that southeastern Amazonian areas would have closer historical relationships with Atlantic Forest than with northwestern Amazonia. Unfortunately, it has been imprac- tical to study the phylogenetic relationships within these Mischocyttarus species groups based only on morphologi- cal characters given the observed form homogeneity.
ACKNOWLEDGMENTS

I would like to thank all of the curators of the collections which provided specimens for this study for their collaboration and patience. In particular, I thank Dr. Jane Costa, Dr. Márcio Félix, and Ms. Daniele Cerri for their hospitality at Instituto Oswaldo Cruz in Rio de Janeiro; Dr. Carlos Roberto Ferreira Brandão at the Museu de Zoologia in São Paulo; Dr. Gavin Broad at the Natural History Museum in London; and Dr. Carlos Sarmiento at the Universidad Nacional de Colombia in Bogotá who also read a previous version of the manuscript. Dr. Claudia Lopez kindly helped with correct use of indigenous names. I am also grateful for the valuable suggestions made by two referees. A grant for visiting the London Museum was conceded by the Brazilian Ministry of Science, Technology and Inovation. The Brazilian Government Program for Study of Amazonian Biodiversity (PPBIO) also gave support for travelling to Rio de Janeiro (IOC) and São Paulo (MZSP).