



***Mitinha* and *Tamanduamyia*, two new genera of Mythicomyiinae (Diptera, Mythicomyiidae) from northeast Brazil**

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Abstract

Two new genera and two new species of Mythicomyiinae are described based on material collected in Parque Nacional Serra das Confusões, Piauí state, northeast Brazil, an arid region: *Mitinha*, **gen. nov.**, type-species *M. neri*, **sp. nov.** and *Tamanduamyia*, **gen. nov.**, type-species *T. bandeira*, **sp. nov.** An illustrated key is presented for world Mythicomyiinae genera.

Key words: Mythicomyiidae, *Mitinha*, *Tamanduamyia*, taxonomy

Introduction

Previous to this study, only one species of Mythicomyiidae (Diptera) was recorded from Brazil (Evenhuis 2002b), *Pieza kake* Evenhuis (Evenhuis 2002a) from Minas Gerais. The Diptera project number 472.158/2012-0, with CNPq financial funds, has resulted in a large collection of flies from the arid Caatinga vegetation, in Parque Nacional Serra das Confusões, Piauí. The Caatinga biome falls entirely in northeast Brazil and it is typified by a long dry season and irregular rainfall. It has xeric vegetation, which has a bushy aspect, its plants having small leaves or thorns. Cacti, thick-stemmed plants, thorny brush, and arid-adapted grasses make up the ground layer. Some species undergo loss of leaves in the dry season, while some others, like bromeliaceae and cacti, can store water.

The insect collections that are being conducted in this biome have revealed a high richness. A high number of mythicomyiid specimens, more than two hundred, have been collected representing different genera. Two of these genera are new and are described here. Work treating the remaining collected specimens of *Pieza* Evenhuis, *Glbellula* Bezzi and *Mythicomyia* (*Heterhybos*) Brèthes is forthcoming.

Material and methods

This study is based on the examination of specimens housed in the Coleção Zoológica do Maranhão (CZMA), Caxias, Maranhão. Specimens examined in this study will additionally be deposited in the following collections: INPA = Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil; BPBM = Bishop Museum, Honolulu, Hawaii, USA; MNRJ = Museu Nacional do Rio de Janeiro, Rio de Janeiro, Brazil and MZSP = Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.

The descriptions were based mainly on dried specimens, but some characters were also based on alcohol preserved specimens. The description was made using a Leica M125 stereoscopic microscope with an incident white-light source. The description was based on the holotype and paratype specimens, and that of the opposite sex was based on paratypes. The specimens length was based on the straight distance measured from the frons at

antenna level (antenna excluded) to the apex of the abdomen. Wing length is the straight distance measured from the base of the costal vein to the wing apex. Label data are cited in full, including the original spelling, enclosed in quotation marks (“”), with punctuation and date transcribed from the top downward. Square brackets [] are used to indicate information that is not included in the original label.

The entire body was macerated in heated 85% lactic acid, then examined in a depression slide with glycerin. The specimens were then placed in a microvials with glycerin and the microvial pinned with their associated label. Structures were photographed using a Leica DFC500 digital camera fitted on a Leica MZ205 stereomicroscope and connected to a personal computer with the Leica Application Suite software, which includes an Auto-Montage module (Syncroscopy software). Morphological terminology follows basically Cumming & Wood (2009) except spermathecal terminology that follows Yeates (1994).

Taxonomy

Mitinha, gen. nov.

(Figs 1–11)

Type-species: *Mitinha neri*, sp. nov. by present designation. Gender masculine.

Diagnosis. This genus has typical Mythicomyiinae wing venation: vein R_{2+3} ending in R_1 before junction with costa forming a small triangular cell r1, and vein R_{4+5} ending in costa at a level clearly beyond end of vein M_2 (Fig. 3). It can be separated from other genera in the subfamily by the following combination of characters: antennal stylus placed apically on second flagellomere (Fig. 2); costal vein circumambient; vein R_{4+5} gently sinuous; r-m crossvein placed slightly beyond basal third of cell dm; cell dm short; crossvein dm-cu slightly longer than m-m crossvein; vein M_1 rather straight, more than two times cell dm length; vein A_1 short, stopping at alular incision level; anal lobe not keel-shaped (Fig. 3); three spermathecae; sperm pump jar-shaped with translucent dilation (Fig. 9); each spermathecal duct extremely elongated, twisted, spiraled distally (Fig. 10).

Etymology. The generic epithet *Mitinha* is a noun in apposition and refers to the nickname of José Wilmington Paes Landim Ribeiro, administrator of the Parque Nacional Serra das Confusões, who helped us with field logistics, transportation and laboratory facilities.

Distribution. State of Piauí, Brazil, Parque Nacional Serra das Confusões, one of the more arid places in Northeast Brazil, with typical Caatinga vegetation.

Discussion. Within Mythicomyiinae, *Mitinha* shares the apical stylus with *Mythenteles* Hall & Evenhuis but can be easily separated from it by the circumambient costal vein (costa incomplete, stopping between R_{4+5} and M_1 in *Mythenteles* (Fig. 22)); it shares the circumambient costa and small dm cell with *Reissa* Evenhuis & Baéz but can be separated from that by the apical stylus (subapical in *Reissa*), r-m crossvein placed slightly beyond the basal third, and cell dm rather parallel sided and same length as last section of vein CuA_1 (r-m placed slightly before middle and cell dm rather angulated and shorter than last section of vein CuA_1 in *Reissa* (Fig. 23)).

Mitinha neri, sp. nov.

(Figs 1–11)

Description. Length based on alcohol preserved specimens. Male body length: 1.42 mm (n = 9), varying from 1.34 to 1.53; wing length: 1.12 mm (n = 9), varying from 0.98 to 1.30. Female, body length: 1.47 mm (n = 7), varying from 1.39 to 1.56. Wing length: 1.14 mm (n = 7), varying from 1.01 to 1.21. **Head.** Black, dichoptic. Eye dark reddish. Ocellar tubercle black, concolorous with occiput, with 3–4 pairs of tiny brown to black setae. Frons below medial ocellus as wide as high, subparallel sided, brown dorsally with 4 pairs of tiny lateral setae, yellow at lower part near antennae. Ocelli yellow, lateral ocellus separated from eye margin by approximately diameter of lateral ocellus. Face about twice as high as wide, brown, not protuberant beyond curve of eye. Mouth margin black. Postcranium and occiput black, subshining, sparsely brown dusted with covering of short blackish setae. Antenna (Figs 1, 2) dark brown to black; second flagellomere one-third length of first flagellomere; stylus apical,

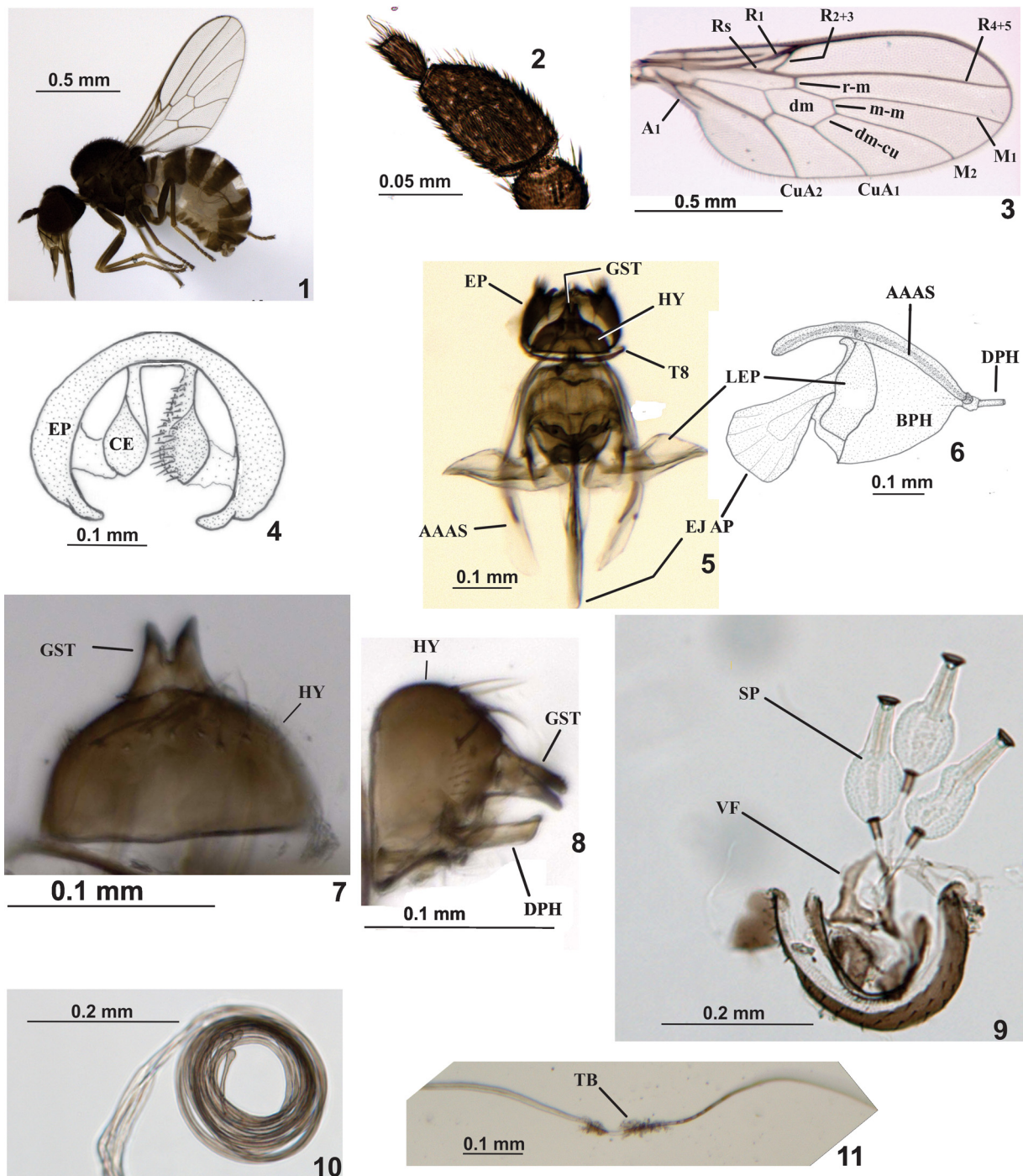
translucent (Fig. 2). Proboscis (Fig. 1) brown, robust, downward directed, slightly higher than head height (mainly in alcohol preserved specimens). Clypeus brown medially, yellow laterally and distally, with 4 pairs of setae, lower pair more robust. Labrum brown, shorter than longest diameter of eye, with minute teeth ventrally on each side. Palpus absent. **Thorax.** Pronotum and mesonotum black, subshining, lightly brown dusted. Mesonotum with rather inconspicuous yellow U-shaped mark from level of transverse suture to near base of scutellum (visible only in specimens preserved in alcohol). Disc of mesonotum with scattering of short black setae, rather randomly distributed but posterior dorsocentral line of more robust setae apparent, with posterior setae larger, reclinate. Scutellum black, subshining, with two pairs of setae, apical pair more robust. Postpronotal lobe yellow with 3 minute setae. Two supra-alar setae more robust than surrounding setae. Postalar callus yellow with small black seta. Mesopleuron brown, subshining, lightly brown dusted, except on black shining bare areas. Notopleuron with pair of more robust setae and 2–3 minute setae. Anepisternum with 4–5 minute setae dorsally, narrow yellow spotted anterodorsally (spot only anteriorly and dorsally visible in alcohol preserved specimens; spots extend posteriorly to white area just in front of and below wing base). **Legs.** Brown with apex of femora-tibial articulation yellow; distal half of tibiae and basal tarsomeres yellow, last two tarsomeres progressively darker. **Wing** (Fig. 3). Hyaline; veins brown; costa circumambient. Vein Sc incomplete, ending at about middle of Rs. Rs thinner at basal half. R_{2+3} originating from Rs about two-thirds distance from R_1 to r-m crossvein. R_{4+5} slightly sinuous. Vein M_1 more than two times length of cell dm, slightly downcurved distally. M_2 more distinctly curved than M_1 . Crossvein r-m slightly beyond basal third of short cell dm. Crossvein dm-cu straight, slightly longer than m-m crossvein vein. CuA_1 and CuA_2 well developed to wing margin. A_1 short, ending at level of alular incision. Anal lobe normal. Halter with light brown stem, knob light yellow to whitish. **Abdomen.** Tergites brown, subshining. Tergites IV–VI with rather inconspicuous narrow pale yellow band across posterior margin. Sternites concolorous with tergites. Tergosternite VIII (Fig. 5) thin, almost complete circular band. **Male genitalia** (Figs 4–8). Brown, except extreme apex of epandrial projection and extreme apex of gonostylus black, subshining. Epandrium produced inwards posteroventrally (Fig. 4). Cercus subtriangular with small marginal setae on internal face (Fig. 4). Gonostylus fused, bifid at apex (Figs 7, 8). Anterior arm of aedeagal sheath elongate, thin (Fig. 6). Ejaculatory apodeme expanded distally. Lateral ejaculatory process (Figs 5, 6) rather translucent. **Female genitalia.** Tergite IX thinner than preabdominal tergites. Apical sternite longer than anterior ones. Vaginal furca as in Figure 9, with lateral arms slightly projected laterally; one short basal sperm duct; three spermathecae, each one same length with basal jar-shaped sperm pump and spermathecal reservoir extremely elongate with microvilli tubules in two areas along duct (Fig. 11); spermathecal reservoir coiled distally (Fig. 10); each duct slightly dilated at apex and placed within spiral.

Geographical records. Brazil (Piauí).

Type specimens. **HOLOTYPE** ♂ labeled: “BRAZIL, Piauí, Caracol, Parque Nac.[=Nacional] Serra das Confusões, Riacho dos Bois, 575 m, 09°13'11,9"S – 43°29'26.2"W”; “catação em flor [collected in flower], 26–28.ii.2014, J.A. Rafael, F. Limeira-de-Oliveira, T.L. Rocha, S. Pereira” (mounted from alcohol, CZMA). **PARATYPES:** same data as holotype (♂: 2 pinned, 14 in alcohol, 4 in microvial with glycerine; ♀: 3 pinned, 9 in alcohol, 1 in microvial with glycerine); 8♂, 5♀, CZMA; 8♂, 5♀, INPA; 4♂, 3♀, BPBM); same except, 05–07.vi.2013, J.A. Rafael, F. Limeira-de-Oliveira, A.A. Santos (pinned: 2♂, 5♀; 1♂, 2♀, CZMA; 1♂, 2♀, INPA; 1♀, BPBM); 03–05.v.2014, J.A.Rafael, F. Limeira-de-Oliveira, T.L. Rocha, G.A. Reis (in alcohol: 4♂, 3♀, CZMA; 4♂, 2♀, INPA; 4♂, 2♀, MNRJ; 4♂, 2♀, MZSP); Guaribas, 515 m, 09°08'27.8"S 43°33'42.1"W, catação em flor [collected in flower], 03–05.v.2014, J.A.Rafael, F. Limeira-de-Oliveira, T.L. Rocha, G.A. Reis (in alcohol, ♀: 1 CZMA, 1 INPA, 1 BPBM).

Etymology. The specific epithet is a noun in apposition and refers to the first name of Neri Pereira da Trindade, who helped us in the field collection.

Habitat. Specimens were hand-collected from unidentified flowers in Parque Nacional Serra das Confusões, Piauí state, Brazil, in typical Caatinga vegetation, one of the more arid areas in Brazil.



FIGURES 1–11. *Mitinha neri*, sp. nov., paratype specimens. **1.** Habitus, lateral view, female. **2.** Antenna, male; **3.** Wing, male; **4.** Epandrium and cerci, male, posterior view; **5.** Male terminalia, dorsal; **6.** Phallus, lateral view; **7.** Hypandrium and gonostylus, dorsal view; **8.** Hypandrium and gonostylus, lateral view; **9.** Vaginal furca and sperm pump, female; **10.** Apex of spermathecal duct; **11.** Mid part of apical spermathecal duct with microvilli tubules. Abbreviations: AAAS, anterior arm of aedeagal sheath; BPH, basiphallus; CE, cercus; DPH, distiphallus; EJ AP, ejaculatory apodeme; EP, epandrium; GST, gonostylus; HY, hypandrium; LEP, lateral ejaculatory process; DPH, distiphallus; SP, sperm pump; T8, tergosternite VIII; VF, vaginal furca.

Tamanduamyia, gen. nov.

Type-species: *Tamanduamyia bandeira*, sp. nov. by present designation. Gender feminine.

Diagnosis. This genus has typical Mythicomyiinae wing venation: vein R_{2+3} ending in R_1 before junction with costa forming a small triangular cell r_1 and vein R_{4+5} ending in costa at a level clearly beyond end of vein M_2 (Fig. 16). It can be separated from other genera in the subfamily by the following combination of characters: postcranium extremely developed with a well-developed semicircular keel connecting postgenae (Fig. 12); oral cavity with distinct ventral sulcus; only one flagellomere with minute inconspicuous distal stylus (Figs 14, 15); rather robust setae on ocellar tubercle, pronotum, postpronotal lobe, posterior dorsocentral, notopleuron, supra-alar, postalar and scutellum; costal vein circumambient; R_{4+5} rather straight; r-m crossvein placed slightly before basal quarter of cell dm; cell dm short; cross vein dm-cu slightly longer than m-m crossvein; vein M_1 rather straight, almost two times cell dm length; A_1 short, incomplete, ending at level of alular incision; anal lobe not keel-shaped (Fig. 16); vaginal furca translucent, undefined shape, with small sclerotized sclerite distally (Fig. 19); three spermathecae; sperm pump (Fig. 20) elongate, coniform; each duct elongate with no apparent modifications, ending in thin elongate spermathecal reservoir folded in half on itself with each half thin, elongate, of equal width, extremely thin at fold (Fig. 20).

Etymology. The generic epithet *Tamanduamyia* is a combination of two names. Tamanduá is the common name of the anteater in Brazil and is related to the appearance of the head of this fly and the tamanduá is also the symbol of the Parque Nacional Serra das Confusões; *myia* from Greek μυια, meaning fly.

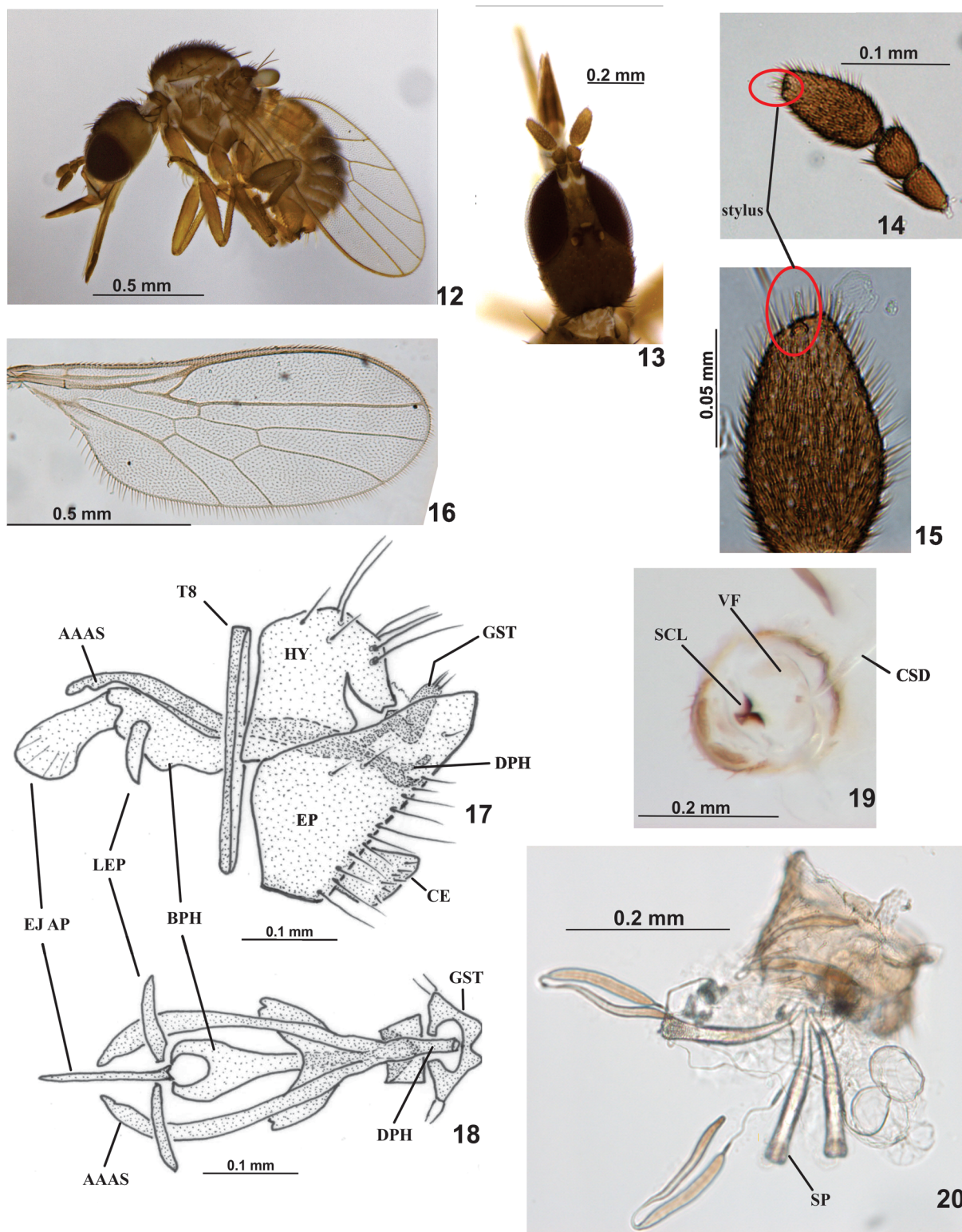
Distribution. State of Piauí, Brazil, Parque Nacional Serra das Confusões, one of the more arid places in northeast Brazil, with typical Caatinga vegetation.

Discussion. Within Mythicomyiinae, *Tamanduamyia* differs from all other genera by having only one flagellomere with an inconspicuous minute stylus placed distally, by the extremely elongated postcranium, by the oral cavity with a distinct ventral sulcus and by the spermathecal reservoir folded upon itself. The postcranium looks very much like the platypygine genera *Cephalodromia* Becker and *Cyrtisiopsis* Séguéy, both Old World genera (Greathead & Evenhuis 2001). It differs from both platypygine genera by the typical mythicomyiine wing venation with a small triangular submarginal cell formed by vein R_{2+3} ending in R_1 before the costal vein.

Tamanduamyia bandeira, sp. nov.

(Figs 12–20)

Description. Length based on alcohol preserved specimens. Male body: 1.57 mm ($n = 3$), varying from 1.3 to 1.70; wing length: 1.17 mm ($n = 3$), varying from 1.1 to 1.13. Female, body length: 1.4 mm ($n = 3$), varying from 1.3 to 1.5. Wing length: 1.2 mm ($n = 3$), varying from 1.1 to 1.3. **Head** (Fig. 12). Black, dichoptic. Eye dark red to black. Ocellar tubercle black, concolorous with occiput, with one anterior pair of more robust black setae and 2–3 minute pairs of black posterior setae. Frons (Fig. 13) black (brown in alcohol preserved specimens), slightly higher than wide, subparallel sided, with 4 pairs of minute black lateral proclinate setae. Ocelli dark reddish brown, lateral ocellus separated from eye margin by approximately diameter of lateral ocellus. Face narrow, inconspicuous. Mouth margin black. Occiput and postcranium black, subshining, sparsely brown dusted with covering of short proclinate blackish setae only dorsally, last two posterior setae more robust. Postcranium (Figs 12, 13) extremely developed, length subequal to eye length. Postgena developed, with semicircular keel connecting right side to left side; oral cavity with distinctly deep ventral sulcus. Antenna (Figs 14, 15) brown to black; only one flagellomere with minute inconspicuous distal stylus surrounded by short distinct setae. Proboscis higher than head height, mixed with brown and yellow, obliquely downward directed (Fig. 12). Clypeus black, prominent, bulging, almost reaching base of antenna, with 1 pair of ventral setae. Labrum black, shorter than longest diameter of eye. Palpus absent. **Thorax.** Pronotum brown with 2 pairs of setae, external pair more robust. Mesonotum black, subshining, with scattering of short, black setae, rather randomly distributed but posteriorly with rather distinct uniseriate row of setae (aligned as acrostichal and dorsocentral rows as in *Eremoneura*) with posterior “dorsocentral” setae larger. Postpronotal lobe yellow with 2 more robust setae and 2 weaker ones. Two supra-alar setae more robust than surrounding setae. Postalar callus yellow with black seta. Scutellum dark brown, subshining, with 2 pairs of setae, apical pair more robust. Notopleuron yellow with 3 pairs of setae, posterior most pair stouter. Mesopleuron brown, subshining, lightly gray-brown dusted with yellow marks on following: anepisternum anteriorly and narrowly dorsally, katepisternum obliquely dorsally, anepimeron dorsally, katepimeron posteriorly, and lower half of katatergite. Metapleuron with yellow colour on metakatepisternum. Anepisternum with 3–4 setae with one more



FIGURES 12–20. *Tamanduaryia bandeira*, sp. nov., paratype specimens. **12.** Habitus, lateral view, male; **13.** Head, dorsal view, male; **14.** antenna, male (stylus inside red circle); **15.** First flagellomere, male (stylus inside red circle); **16.** Wing, male; **17.** Male terminalia, lateral view; **18.** Phallus and gonostylus, dorsal view (epandrium and hypandrium removed); **19.** Sclerite of vaginal furca, female; **20.** Sperm pump and apex of spermathecae. Abbreviations: AAAS, anterior arm of aedeagal sheath; BPH, basiphallus; CE, cercus; CSD, common spermathecal duct; DPH, distiphallus; EJ AP, ejaculatory apodeme; EP, epandrium; GST, gonostylus; HY, hypandrium; LEP, lateral ejaculatory process; SCL, sclerite of vaginal furca; SP, sperm pump; T8, tergosternite VIII; VF, vaginal furca.

robust than remainder. **Legs.** Yellow, some specimens with light brown colour on femora. **Wing** (Fig. 16). Hyaline; veins brown; costal vein circumambient; vein Sc incomplete, ending at about middle of Rs. R_{2+3} originating from Rs about midpoint from R_1 to r-m crossvein. R_{4+5} rather straight; r-m crossvein placed at basal quarter of cell dm; crossvein dm-cu longer than m-m crossvein; vein M_1 slightly curved basally, almost two times cell dm length; M_2 more distinctly curved than M_1 . CuA_1 and CuA_2 well developed to wing margin. A_1 vein short, stopping at alular incision level; anal lobe not keel-shaped. Halter with brown stem, knob yellow becoming darker distally. **Abdomen.** Tergites dark-brown to black, subshining. Tergites V–VII with narrow whitish band across posterior margin. Sternites yellow to brown. Tergosternite VIII (Fig. 17) thin, forming complete circular band. **Male genitalia** (Figs 17, 18). Circumverted 180°; yellow to light brown, except black gonostylus. Epandrium placed ventrally with apex curved inwards. Cercus subtriangular. Hypandrium placed dorsally, distinctly curved, with distinct elongate setae. Gonostyli fused, black sclerotized, with small setae distally, apex bilobate in dorsal view (Fig. 18). Anterior arm of aedeagal sheath elongate, thin (Figs 17, 18). Ejaculatory apodeme rather small, translucent. Lateral ejaculatory process well sclerotized. **Female genitalia.** Tergite IX thinner than preabdominal tergites. Tergite X slightly projected posteroventrally. Cercus small. Apical sternite longer than anterior ones. Vaginal furca indistinct, unsclerotized, translucent, with membranous connection to distinct sclerotized small sclerite distally (Fig. 19). Vaginal furca slightly darker in lateral view. Three spermathecae with three basal sperm duct, translucent, each one apparently leaving directly from opening of translucent vaginal furca; sperm pump (Fig. 20) elongate, coniform, darker distally continuing by thin elongate spermathecal duct with no apparent modifications and ending folded in half on itself with each half thin, elongate, of equal width, extremely thin at fold (Fig. 20).

Geographical records. Brazil (Piauí).

Type specimens. **HOLOTYPE** ♂, labeled: “BRAZIL, Piauí, Caracol, Parque Nac.[=Nacional] Serra das Confusões, Riacho dos Bois, 575 m, 09°13'11.9"S – 43°29'26.2"W” “catação em flor [collected in flower], 08–11.viii.2013, J.A. Rafael, F. Limeira-de-Oliveira, T.T.A. Silva” (pinned, CZMA). **PARATYPES:** same data as holotype (♂: 1 pinned, 3 in alcohol, 1 in microvial with glycerin; ♀: 5 pinned, 3 in alcohol, 2 in microvial with glycerin (2♂, 4♀, CZMA; 2♂, 4♀, INPA; 1♂, 2♀, BPBM); 03–05.v.2014, J.A. Rafael, F. Limeira-de-Oliveira, T.L. Rocha, G.A. Reis (in alcohol: 4♂, 4♀, CZMA; 3♂, 3♀, MZSP; 2♂, 2♀, MNRJ).

Etymology. The specific epithet is a noun in apposition and refers to the common name of the anteat in Brazil, Tamanduá bandeira, which is the symbol of the Parque Nacional Serra das Confusões. In addition, it is also an honor to Deusiano Bandeira de Almeida, a professor at Universidade Estadual do Maranhão, Caxias.

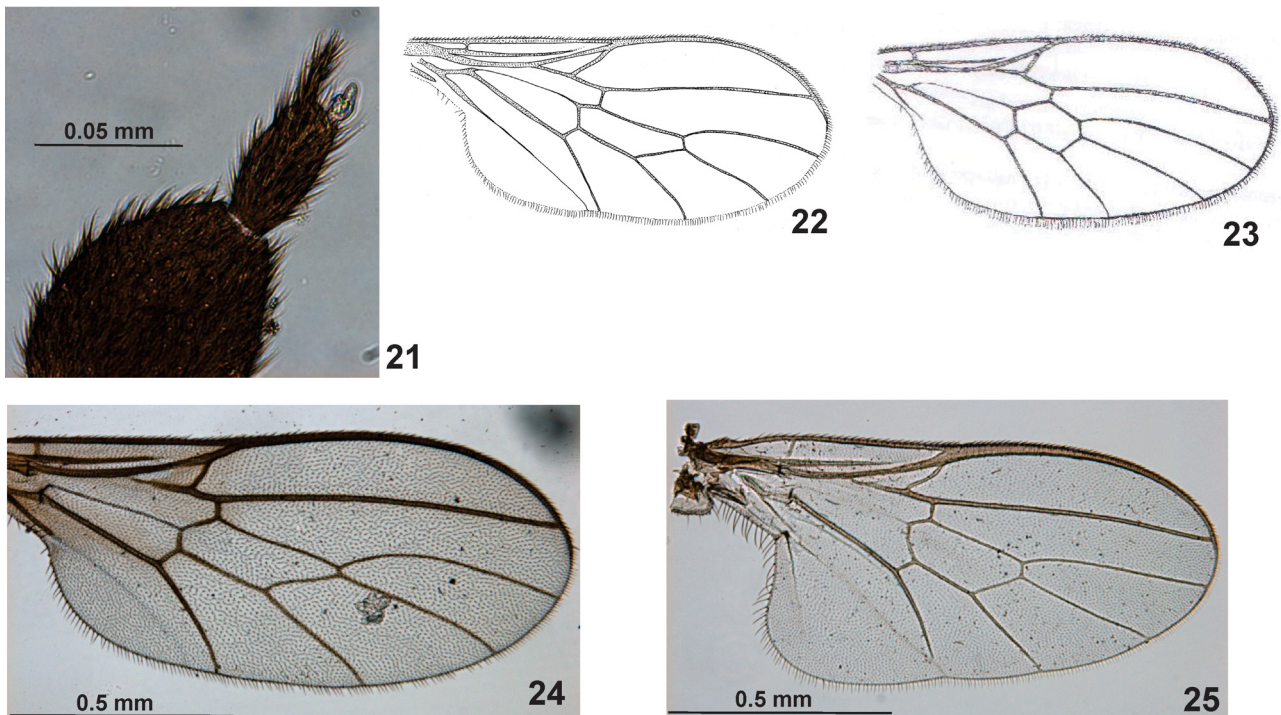
Habitat. Specimens were hand-collected from unidentified flowers at Parque Nacional Serra das Confusões, Piauí state, Brazil, in typical Caatinga vegetation, one of the more arid areas in Brazil.

Key to genera of Mythicomyiinae of the world

(modified from Evenhuis 2002a)

- 1 Antenna with one flagellomere (Fig. 14). Stylus distal, tiny, inconspicuous (visible only in higher magnification); postcranium produced, subequal to eye length (Figs 12, 13)..... *Tamanduamyia*, **gen. nov.**
- Antenna with two flagellomeres and stylus placed apically (Fig. 2) or subapically on the second flagellomere (Fig. 21); postcranium not produced (Fig. 1) 2
- 2 Antenna with stylus placed apically on second flagellomere 3
- Antenna with stylus placed subapically on second flagellomere (Fig. 21)..... 4
- 3 Vein A_1 complete, reaching wing margin (Fig. 22); costal vein incomplete, ending between R_{4+5} and M_1 veins *Mythenteles* Hall & Evenhuis
- Vein A_1 short, incomplete, reaching alular incision level; costal vein circumambient (Fig. 3) *Mitinha*, **gen. nov.**
- 4 Costal vein circumambient; cell dm fairly short, closed apically (Fig. 23) *Reissa* Evenhuis & Baéz
- Costal vein incomplete, ending just beyond end of vein R_{4+5} . Cell dm much longer than wide (Figs 24, 25) or open apically . 5
- 5 Wing with well-developed keel-shaped anal lobe; vein separating basal cells not evident (Fig. 25); males holoptic *Mythicomya* ... 6
- Wing with anal lobe normal, not keel-shaped; vein separating basal cells distinct, often well sclerotized (Fig. 24); males dichoptic 7
- 6 Males with secondary sexual character modifications on the legs (modified shapes of and notches in mid and/or hind legs and presence of pegs and large setae) *Mythicomya* (*Mythicomya*) Coquillett
- Males without secondary sexual character modifications of legs *Mythicomya* (*Heterhybos*) Brèthes

- 7 Wing with cell dm open, distal veins faint or effaced; head as wide as or wider than thorax *Nexus* Hall & Evenhuis
 - Wing with cell dm complete (Fig. 22); distal veins not faint; head usually narrower than thorax *Pieza* Evenhuis



FIGURES 21–25. Mythicomyiidae. **21.** Antennae of *Pieza*, from Piauí, Brazil; **22.** Wing of *Mythenteles*, from Evenhuis (2002a); **23.** Wing of *Reissa*, from Greathead & Evenhuis (2001); **24.** Wing of *Pieza*, from Piauí, Brazil; **25.** Wing of *Mythicomyia*, from Piauí, Brazil.

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