

## Taxonomy and Systematic / Taxonomia e Sistemática

# Description of two new species of *Palpomyia* Meigen (Diptera: Ceratopogonidae) from the Brazilian Amazon

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*Palpomyia amazonensis* sp. nov.: [urn:lsid:zoobank.org:act:E7E03E77-67B2-402E-9E0E-355E6F7AC598](http://urn:lsid:zoobank.org:act:E7E03E77-67B2-402E-9E0E-355E6F7AC598)  
*Palpomyia lanceolata* sp. nov.: [urn:lsid:zoobank.org:act:704D7EE3-F301-447A-957D-3FBBEE090499](http://urn:lsid:zoobank.org:act:704D7EE3-F301-447A-957D-3FBBEE090499)

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**Abstract.** Two new Amazonian predaceous midge of the genus *Palpomyia*, from the *distincta* group, were described based on male specimens. This genus is an important bioindicator of aquatic environments. The immatures of *Palpomyia amazonensis* sp. nov. and *Palpomyia lanceolata* sp. nov. were collected with ovitraps and reared in laboratory until adulthood. Both new species are similar with *Palpomyia guyana* Clastrier, 1992 and *Palpomyia turnbowi* Grogan *et al.*, 2013 but differs from *Palpomyia versicolor* Macfie, 1939, the unique species described in Brazilian Amazon until now. With the description of these new species we increase to three the representative species of the *distincta* group in the Brazilian Amazon and to 32 the number of Brazilian species of *Palpomyia*.

**Keywords:** Predaceous midges; Male; *Palpomyia amazonensis*; *Palpomyia lanceolata*; Taxonomy.

### Descrição de duas novas espécies de *Palpomyia* Meigen (Diptera: Ceratopogonidae) da Amazônia brasileira

**Resumo.** Duas novas espécies de insetos predadores e bioindicadores da qualidade da água do gênero *Palpomyia*, grupo *distincta*, são descritas e ilustradas baseadas em espécimes machos. Os imaturos das espécies *Palpomyia amazonensis* sp. nov. e *Palpomyia lanceolata* sp. nov. foram coletados em armadilhas ovitrampas e criados em laboratório até adultos. Ambas novas espécies são semelhantes a *Palpomyia guyana* Clastrier, 1992 e *Palpomyia turnbowi* Grogan *et al.*, 2013 e diferem de *Palpomyia versicolor* Macfie, 1939, única espécie do grupo *distincta* descrita na Amazônia Brasileira. Com as duas descrições, foram aumentadas para três o número de espécies para a Amazônia e 32 para o Brasil.

**Palavras-Chave:** Insetos predadores; Machos; *Palpomyia amazonensis*; *Palpomyia lanceolata*; Taxonomia.

**B**iting midges of the genus *Palpomyia* (Culicomorpha: Ceratopogonidae) are small predaceous Diptera. According to BORKENT & SPINELLI (2007), this genus is characterized by elongated flagellum, at least 2.5 times longer than the breadth of the head; a stouter thorax not dorsally flattened; wing membrane with 2 radial cells and a poorly developed anal lobe; fore femur with stout spines and hind femur not swollen. *Palpomyia* is divided into four groups: *distincta*, *flavipes*, *tibialis* and *lineata*. The *distincta* group presents sternite 8 with prominent setose lobes arising from anterolateral margins at females. The males has gonocoxite with setose mesoventral lobe and parameres divided or fused, with rounded tips.

These midges are important because the immature specimens are usually common inhabitants of aquatic and semiaquatic environments and can be used as bio-indicators of both water

quality and the trophic structure of the zoobenthos in an environment (REMM 1976; GROGAN & WIRTH 1979). The *Palpomyia* genus are widely distributed, with 281 species recognized worldwide, 51 reported to Neotropical Region and 30 to Brazil. In Brazilian Amazon Region only four species were recorded: *Palpomyia oliveirai* Lane, 1947; *Palpomyia pseudolacustris* Dippolito & Spinelli, 1995 and *Palpomyia versicolor* Macfie, 1939 to state of Rondônia and *Palpomyia paraensis* Lane, 1960 to state of Pará. (BORKENT 2016; SANTARÉM & FELIPPE-BAUER 2016). TORREIAS *et al.* (2013) were the first to document the presence of the genus in the state of Amazonas, without species identification.

In this paper two new species of *Palpomyia* from Brazilian Amazon Region are described and illustrated based on male specimens.

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## MATERIAL AND METHODS

The individuals described herein were obtained from material reared from larvae collected in the rural settlement of Rio Pardo, Presidente Figueiredo Municipality, State of Amazonas, Brazil. The larvae were collected with ovitraps (JAKOB & BEVIER 1969) and reared in laboratory conditions. The larvae were kept in small containers with water and fed with fish food (TetraMin®), at room temperature (25 °C), for nearly two weeks, due to different larval instars collected in the field. The emerged adults were preserved in 70% alcohol, then dissected and mounted on microscope slides in phenol-balsam, following WIRTH & MARSTON (1968). The genus identification was done following the key proposed by BORKENT & SPINELLI (2007). The diagnostic characteristics were micro-photographed using a digital system (Synoptics™, Cambridge, UK) coupled to an optical microscope (Leica DMTM1000, Frankfurt, Germany). The program Auto Montage 4.0 was used to obtain the final images. Species descriptions use the morphological terminology of SPINELLI *et al.* (2009). The holotypes were deposited in Instituto Leônidas e Maria Deane/Laboratório de Ecologia e Doenças Transmissíveis da Amazônia (ILMD/LEDTA) Fiocruz, Amazônia.

## RESULTS

### *Palpomyia amazonensis* Feijó, Farias, Alencar & Pessoa **sp. nov.**

Figures 1 A-H; 2 A-E

**Diagnosis:** The only Neotropical species of *Palpomyia* in the *distincta* group with the following combination of characters: scutum with anterior tubercle; fore femur moderately swollen with 14–15 ventral spines; gonocoxite with broad mesoventral lobe, gonostylus tapering to pointed tip, with four subapical projections; parameres fused, lanceolate, apical portion with shallow cleft; aedeagus subrectangular with a well-defined circular membrane projection in the apex. Female unknown.

**Description of the male (n=1):** Head: dark brown (Figure 1A). Eyes widely separated, by diameter of five ommatidia. Antenna flagellomeres: brown, pale at base; flagellomeres 2–10 short, subspherical; flagellomeres 11–13 elongated, cylindrical; 12–13 considerably longer than 11; 12–13 equal sized; antennal ratio (11-13/1-10) 1.2. Clypeus with 9 setae. Palpus brown; 3<sup>rd</sup> segment with two well-defined sensory pits in middle portion of segment, proximal one being smaller than distal one (Figure 1B); palpal ratio 1.8.

Thorax: brown. Scutum brownish, with two medio-apical strip bands, that are continuous until the posterior margin, and two lateral strip bands in anterior submedian portion, slightly in comma shape, broader width than medio-apical strips; both dark brown (Figure 1C). Thorax chaetotaxy: conspicuous anterior tubercle (Figure 1D), covered with short setae, with five large prealar setae; scutellum brown, darker on apical portion, with four large setae. Legs (Figure 1E): femora dark brown, slightly paler apically, tibiae and tarsi pale brown; fore femur moderately swollen with 14–15 ventral spines (Figure 1F), mid, hind femora unarmed; fore tibia slightly arcuate; 5<sup>th</sup> tarsomeres without ventral setae; claws small, equal-sized, without basal inner tooth (Figure 1G). Wing (Figure 1H) membrane slightly infuscated, veins dark brown, 2<sup>nd</sup> radial cell 1.7 times longer than 1<sup>st</sup>; wing length 1.2 mm, width 0.45 mm; costal ratio 0.70. Halter brown.

Abdomen: brown. Genitalia (Figure 2A): tergite 9 gradually tapering distally, subtriangular apex; cerci slender, elongated, with apical setae; sternite 9 2.5 times broader than long, deep posteromedian excavation. Gonocoxite straight, 2.2 times longer than broad, with broad mesoventral lobe bearing setae on external margin (Figure 2B); gonostylus short, curved, tapering

distally to pointed tip, presenting four subapical projections with rounded tip (Figure 2C). Parameres (Figure 2D) fused, lanceolate, heavily sclerotized, with internal sclerotized Y shaped median area; basal apodemes truncated, recurved; distal portion bulbous, apex round with shallow cleft in apical portion. Aedeagus (Figure 2E) subrectangular, slightly broader than long, ventral surface covered with dense microthrichia, basal arms straight, basal arch extending to 0.35 of total length; distal portion sclerotized, with straight apex, slightly tapering in middle with well-defined membranous circular projection apically.

Female: Unknown.

**Distribution:** This species is distributed only in its type-locality: Presidente Figueiredo, Amazonas State – Brazil.

**Type material:** Male holotype, Brazil, Amazonas State, Presidente Figueiredo, Rio Pardo (1°48' S 60°19' W), 01-IV-2005, 0001-43 (1 male), ovitraps, F.A.C. Pessoa collector.

**Etymology:** This species is named after its type locality in Amazonas State, Brazil.

### *Palpomyia lanceolata* Feijó, Farias, Alencar & Pessoa **sp. nov.**

Figures 3 A-H; 4 A-C

**Diagnosis:** The only Neotropical species of *Palpomyia* in the *distincta* group with the following combination of characters: scutum with anterior tubercle; fore femur greatly swollen with 19–20 ventral spines; gonocoxite with slender mesoventral lobe; gonostylus curved, tapering distally to pointed tip; parameres fused, lanceolate, distal portion bulbous presenting two ventromedial process, lateral process bifid; aedeagus subrectangular, covered by amorphous membranous projection extending to 3/4 of total length. Female unknown.

**Description of the male (n=1).** Head: dark brown (Figure 3A); dark brown. Eyes widely separated by diameter of three ommatidia. Antenna flagellomeres uniformly brown; flagellomeres 2–10 short, subspherical; 11–13 elongated, cylindrical; 12–13 considerably longer than 11; 12–13 equal sized; antennal ratio (11-13/1-10) 0.80. Clypeus with 16 setae. Palpus brown; 3<sup>rd</sup> segment with two well-defined sensory pits in middle portion of segment, proximal one being larger than distal one (Figure 3B); palpal ratio 1.2.

Thorax: Brown. Scutum (Figure 3C) without definite pattern in slide mounted specimen, with conspicuous anterior tubercle (Figure 3D), moderately pilose, with six large prealar setae; scutellum brown, with four large setae. Legs (Figure 3E): femora dark brown; mid, hind femora slightly pale apically, tibiae and tarsi pale brown; fore femur greatly swollen with 19–20 ventral spines (Figure 3F), mid, hind femora unarmed; fore tibia slightly arcuate; 5<sup>th</sup> tarsomeres without ventral setae; claws small, equal-sized, without basal inner tooth (Figure 3G). Wing (Figure 3H) membrane slightly infuscated, veins dark brown, 2<sup>nd</sup> radial cell 1.85 times longer than 1<sup>st</sup>; wing length 1.35 mm, width 0.47 mm; costal ratio 0.72. Halter brown.

Abdomen: brown. Genitalia (Figure 4A): tergite 9 gradually tapering distally, rounded apex; cerci slender, extending beyond gonocoxite, with apical setae; sternite 9 2.2 times broader than long, deep posteromedian excavation. Gonocoxite straight, 2 longer than broad, with slender mesoventral lobe, bearing setae on external margin; gonostylus short, curved, tapering distally to pointed tip. Parameres (Figure 4B) fused, lanceolated, heavily sclerotized, with internal sclerotized Y shaped median area; basal apodemes truncated, distal portion bulbous, with two ventromedial processes with round apex; lateral process bifid, extending from middle portion. Aedeagus (Figure 4C) subrectangular, slightly broader than long, ventral surface

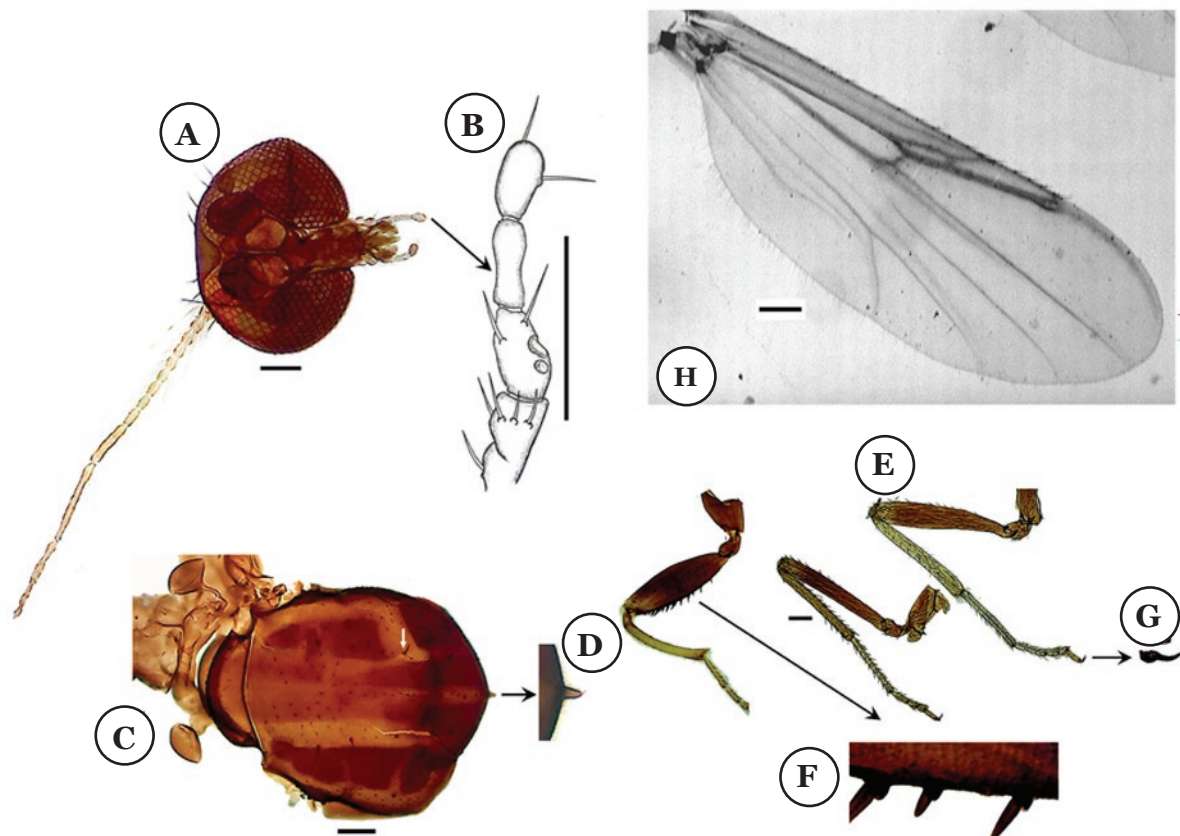


Figure 1. *Palpomyia amazonensis* sp. nov. male. A. Head; B. Palpus; C. Thorax (dorsal view); D. Anterior tubercle of scutum; E. Fore, mid and hind legs (left to right); F. Fore femur ventral spines; G. Claws of 5<sup>th</sup> mid tarsomere; H. Wing.

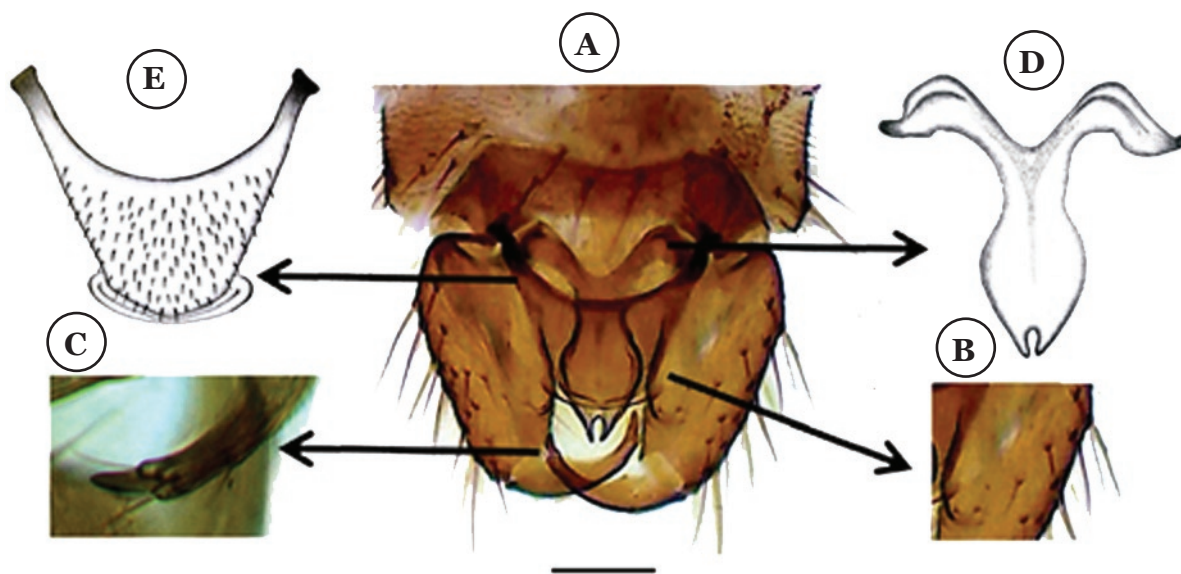


Figure 2. *Palpomyia amazonensis* sp. nov. male. A. Genitalia; B. Mesoventral lobe of the gonocoxite; C. Apex of gonostylus; D. Parameres; E. Aedeagus.

covered with microthrichia, basal arms straight, basal arch extending to 0.35 of total length; distal portion with rounded apex; membranous, amorphous projection covering almost ¾ of total length of structure.

Female: Unknown.

Distribution: This species is distributed only in its type-locality: Presidente Figueiredo, Amazonas State – Brazil.

Type material: Male holotype, Brazil, Amazonas State, Presidente Figueiredo, Rio Pardo (1°48'S 60°19'W), 01-IV-2005, 0001-44 (1 male), ovitraps, F.A.C. Pessoa collector.

Etymology: This species is named after the Latin word for lance, in reference to its lance-shaped parameres.

**Taxonomic discussion.** The species described herein *P. amazonensis* and *P. lanceolata* belong to *distincta* group. Both species are morphologically similar by general coloration of body, subretangular aedeagus, basal arms and bulbous shape of distal portion of parameres, basal arch of aedeagus. Despite the similarities, the new species described herein can be distinguished by many characteristics. In *P. amazonensis* the clypeus has 9 setae, antennal ratio 1.2 and palpal ratio 1.8 while in *P. lanceolata* the clypeus has 16 setae, antennal ratio 0.80 and palpal ratio 1.2. The fore femur of *P. amazonensis* is moderately swollen with 14-15 ventral spines while in *P. lanceolata* is greatly swollen with 19-



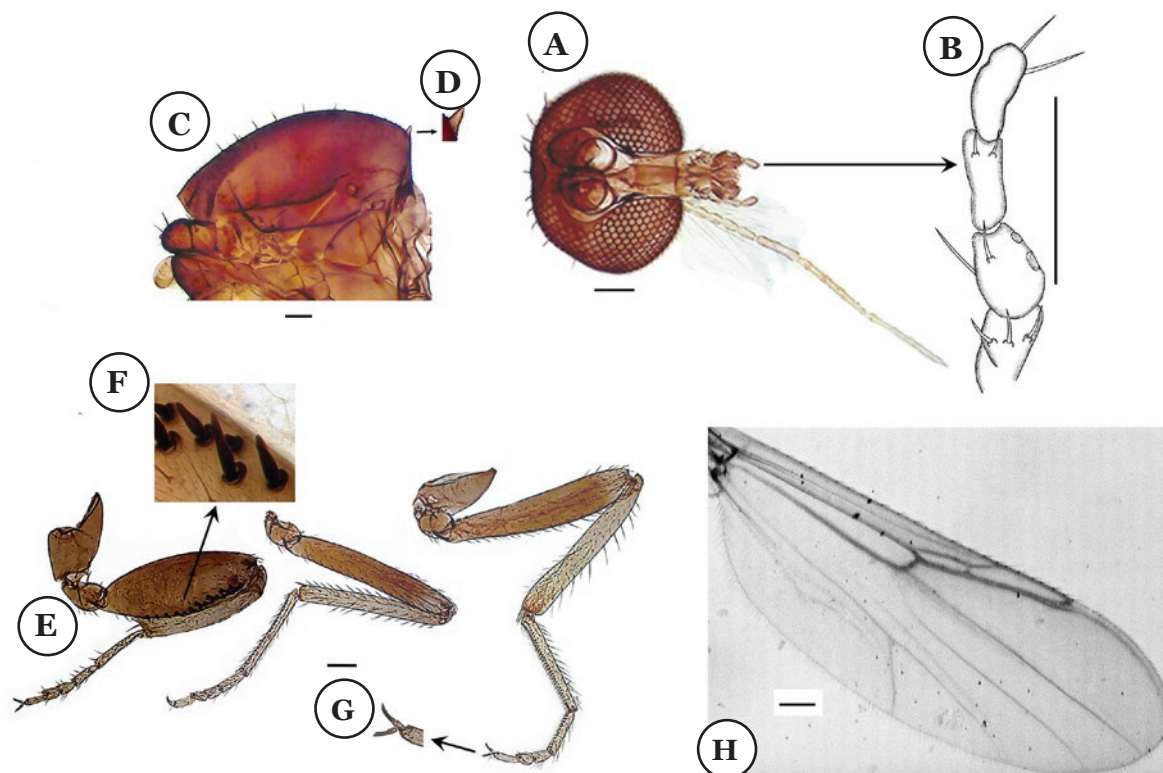


Figure 3. *Palpomyia lanceolata* sp. nov. male. A. Head; B. Palpus; C. Thorax (lateral view); D. Anterior tubercle of scutum; E. Fore, mid and hind legs (left to right); F. Fore femur ventral spines; G. Claws of 5<sup>th</sup> mid tarsomere; H. Wing.

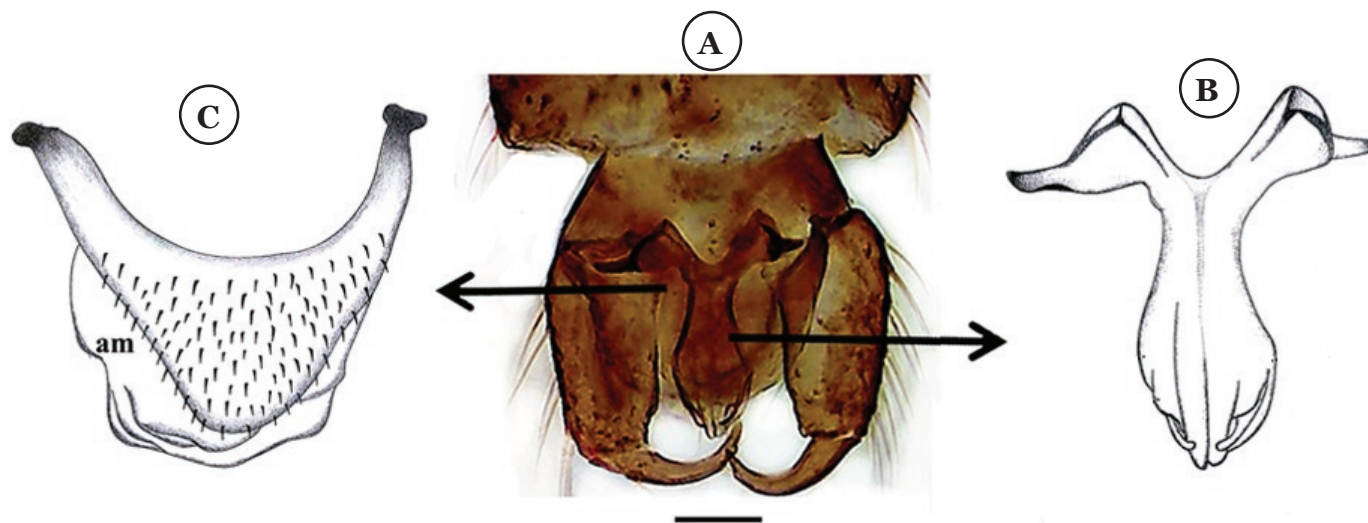


Figure 4. *Palpomyia lanceolata* sp. nov. male. A. Genitalia; B. Parameres; C. Aedeagus, am - amorphous membrane.

20 ventral spines. Both new species can also be distinguished by the characters of genitalia. To *P. amazonensis* the projection of the aedeagus membrane is rounded and limited only to the apex while in *P. lanceolata* this membranous projection is amorphous. In addition, the distal part of the parameres in both new species are different, to *P. amazonensis* possesses a shallow cleft, while in *P. lanceolata* has projections in apical portion. Both new species has basal apodemes of parameres similar to *Palpomyia turnbowi* Grogan *et al.*, 2013, however, in this species they are curved more than 90°, forming a tip in the central external side, whereas in *P. amazonensis* the apodemes are less curved with no tip in the central external side and in *P. lanceolata* they are straight (GROGAN *et al.* 2013). The species *Palpomyia amazonensis* and *P. lanceolata* resembles *Palpomyia guyana* Clastrier, 1992 presenting an arcuate fore tibia, aedeagus quadrangular and absence of arrow-shaped apex. Besides that, *P. guyana* is similar the *P. amazonensis* for presents 18-20 spines in the femur and a cleft in the apex. The *P. guyana* specie differs both new species by absence of the mesoventral lobe of the gonocoxite and hyaline

membrane in the apex of aedeagus (CLASTRIER 1992). *Palpomyia versicolor* Macfie, 1939 is the only species from the *distincta* group recorded in the Brazilian Amazon region (DIPPOLITO *et al.* 1995), but can be distinguished from both new species by the blackish thorax (brown in both new species), the presence of ventral spines in all femora (only in fore femur in the new species) the very slender distal portion of aedeagus with a cap-like tip (straight in *P. amazonensis* and round in *P. lanceolata*) and parameres separated (fused in both new species) (DIPPOLITO *et al.* 1995).

With the description of these new species we increase to three the representative species of the *distincta* group in the Brazilian Amazon and to 32 the number of Brazilian species of *Palpomyia*.

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