

New species and records of *Neotrichia* (Trichoptera: Hydroptilidae) from Central Amazonia, Brazil

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ABSTRACT. Twelve new species of *Neotrichia* Morton, 1905 from state of Amazonas, Brazil are described and illustrated: *N. gilmaryi* sp. nov., *N. djalmasantosi* sp. nov., *N. bellinii* sp. nov., *N. orlandoi* sp. nov., *N. niltonsantosi* sp. nov., *N. zitoi* sp. nov., *N. didii* sp. nov., *N. vavai* sp. nov., *N. garrinchai* sp. nov., *N. zagalloi* sp. nov., *N. pelei* sp. nov., and *N. feolai* sp. nov. *Neotrichia gilmaryi* sp. nov. can be recognized by elongate and bifid processes on posterodorsal margin of segment IX; *Neotrichia djalmasantosi* sp. nov. is distinguished from *N. colmillosa* Harris, 1990 by the posteromesal margin of the segment IX produced into two long lobes in lateral view; *N. bellinii* sp. nov. differs from *N. yanomonoa* Harris & Davenport, 1992 by subgenital plate divided apically and with long lateral processes; *N. orlandoi* sp. nov. is distinguished from *N. cuernuda* Harris, 1990 by short inner portion of the inferior appendages and by phallus with stout apical hook; *N. niltonsantosi* sp. nov. is characterized by phallus with two short acute apical processes and a stout subapical spine; *N. zitoi* sp. nov. differs from other species particularly by phallic apex membranous and with flattened process; *N. didii* sp. nov. is somewhat similar to *N. orlandoi* sp. nov., but can be distinguished by stout posterolateral process of segment IX posteriorly directed and the paramere extending anteriorly; *N. vavai* sp. nov. is easily distinguished from other species of *Neotrichia* by the chelate processes on posterolateral margins of the segment IX; *N. garrinchai* sp. nov. can be recognized by asymmetrical posterolateral processes on segment IX and by long subgenital plate; *N. zagalloi* sp. nov. resembles *N. dientera* Harris, 1990, but can be easily recognized by broad, quadrangular inferior appendages with two excisions on apical margin and by phallic apex flattened and narrowing apically; *N. pelei* sp. nov. is characterized by narrow subgenital plate and by phallus apically with three lobes and a sclerotized hook; *Neotrichia feolai* sp. nov. is distinguished from *N. biuncifera* Flint, 1974 by phallus with only one apical process. In addition, *N. browni* Harris, 1990 and *N. colmillosa* Harris, 1990 are recorded from Brazil for the first time. With these new species and the new records, 26 species are now known from Brazil.

KEY WORDS. Amazonas; microcaddisflies; Neotrichiini; taxonomy.

The Hydroptilidae are the most diverse family in the order Trichoptera, currently with about 2,000 described species occurring on every habitable continent (HOLZENTHAL *et al.* 2007a). The hydroptilids, or microcaddisflies, are recognized by their small size, generally no more than 5.0 mm. The family is divided into two subfamilies, the Ptilocolepinae with only two genera and restricted to the Holarctic and Oriental regions and the Hydroptilinae with the majority of genera and species (MARSHALL 1979, FLINT *et al.* 1999, HOLZENTHAL *et al.* 2007a). Ptilocolepinae were raised to family status by MALICKY (2001), but in the most recent phylogenetic studies, the two genera of Ptilocolepinae were grouped with other Hydroptilidae (KJER *et al.* 2001, 2002, HOLZENTHAL *et al.* 2007b). Therefore, we retain here the classification proposed by MARSHALL (1979), in that two subfamilies are recognized, and with Hydroptilinae divided into six tribes, Hydroptilini, Leucotrichiini, Neotrichiini, Ochrotichiini, Orthotrichiini, and Stactobiini.

Four genera are placed in the exclusively New World tribe Neotrichiini, *Kumanskiella* Harris & Flint, 1992, *Mayatrichia* Mosely, 1937, *Neotrichia* Morton, 1905, and *Taraxitrichia* Flint & Harris, 1991. The nominotypical genus is the largest in species diversity in the tribe, with 112 of the 122 known species. *Neotrichia* occurs from South to North America, being particularly diverse in the Neotropics. MARSHALL (1979) divided the genus into six species groups, but with the large number of species described recently, these groups became less clearly defined (HARRIS 1990, FLINT *et al.* 1999). Many species have been described from the Amazon Region, from Colombia, Peru, Surinam, Venezuela, and one from state of Roraima, Brazil, *N. rotundata* Flint, 1974, the unique Amazonian species of the twelve reported from the country (FLINT 1974, 1992, HARRIS 1990, FLINT & REYES 1991, HARRIS & DAVENPORT 1992, 1999). Although no species has been described from state of Amazonas, PES *et al.* (2005) recorded the occurrence of larvae in this Brazilian state.

Neotrichia larvae have similarities with those of *Kumanskiella* and *Mayatrichia*, and occur on rocky substrates in rapid sections of rivers and streams, as *Mayatrichia* larvae do (HARRIS & FLINT 1992, WIGGINS 1996). *Neotrichia* larvae can be distinguished from *Mayatrichia* larvae by their cases covered with tiny sand grains and by having distinct abdominal segments (HARRIS & FLINT 1992, WIGGINS 1996), and can be distinguished from *Kumanskiella* larvae by their elongate thoracic setae.

Adults of *Neotrichia* are minute, generally ranging from 1.5 to 2.5 mm. Besides the size, they can be recognized by the presence of three ocelli, mesoscutellum lacking a transverse suture, and tibial spur formula 0-2-3 (MARSHALL 1979). The phallus is elongate, usually with constriction at mid-length, from which arises a spiral process.

Entomological material collected in Central Amazonia revealed 12 new species, which are described in this paper. In addition, *N. browni* Harris, 1990 and *N. colmillosa* Harris, 1990 are recorded from Brazil for the first time.

MATERIAL AND METHODS

The specimens were collected with light traps and preserved in 80% ethanol. In order to observe the structures of the male genitalia, the abdomen was removed and cleared in 10% KOH. The terminology for the male genitalia follows MARSHALL (1979). Female associations were not possible because they are very similar to each other morphologically and more than one species occurred in the same place. Length was measured from the tip of the head to the end of the wings and is given as a range of a series of specimens.

Holotypes of the newly described species are deposited in the Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA). Paratypes are deposited in the latter institution and also in the Coleção Entomológica Professor José Alfredo Pinheiro Dutra, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro (DZJR), and in the Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro (MNRJ).

TAXONOMY

Neotrichia gilmaryi sp. nov.

Figs 1-4

Description. Male. Length 1.6-1.8 mm. General color (in alcohol) yellowish-brown. Antennae with 18 segments, covered by short brown setae. Head and dorsum of thorax with golden setae. Wings covered by long brown setae. Abdominal segment VIII annular with very long setae. Segment IX, in dorsal view, with pair of papillae, each bearing a long seta (Fig. 1); in ventral view, posteromesal margin produced into triangular lobe (Fig. 2); in lateral view, anterior margin rounded; posterodorsal margin produced into a long, bifid, slightly curved downward process (Fig. 3); posteromesal margin produced into two processes, upper one curved downward, lower one with long spine-like setae on apex (Fig. 3). Segment X fused with segment IX, broad

basally, with short mesal notch distally (Fig. 1). Subgenital plate prominent, dome-shaped in ventral view, with narrow apex bearing pair of stout setae (Fig. 2); with broad subapical lobe in lateral view. Inferior appendages broad with posterior margin divided into two acute lobes, lower lobe curved inward (Fig. 2). Phallus with slender distal portion, ending with a short spine, ejaculatory duct protruding subapically (Fig. 4); paramere partially around shaft and extending posteriorly (Fig. 4).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Rio Preto da Eva (tributary to Rio Urubu, 02°31'01.3"S, 59°43'13.7"W), 25.IV.2004, J.L. Nessimian leg., light trap (INPA). Paratypes: same data as holotype, except 3 males (INPA); (tributary to Rio Urubu, 02°27'48.1"S, 59°37'07.7"W), 7 males, 27.V.2004, J.L. Nessimian leg. (DZJR); (tributary to Rio Preto da Eva, 02°32'09.4"S, 59°49'59.3"W), 1 male, 20.IV.2004, J.L. Nessimian leg. (INPA); (tributary to Rio Preto da Eva, 02°31'52.1"S, 59°44'12.0"W), 1 male, 26.IV.2004, J.L. Nessimian leg. (INPA); Manaus (tributary to Rio Cuieiras, 02°42'25.1"S, 60°22'28.2"W), 4 males, 19.VII.2004, J.L. Nessimian & L. Fidelis leg. (MNRJ).

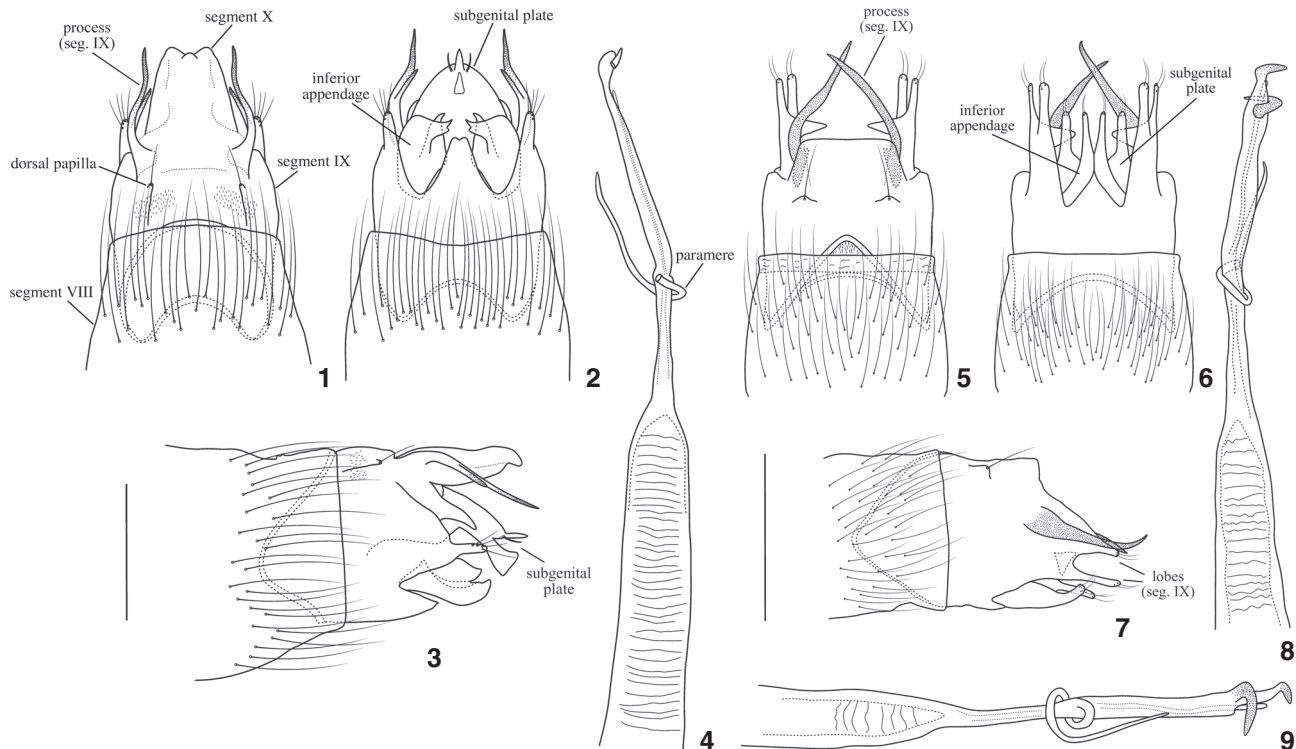
Etymology. All new species in this paper are named in commemoration to the 50th anniversary of the first Brazilian football world championship (FIFA's World Cup of 1958 in Sweden). The names of the new species refer to the eleven players that participated in the final match and to the team coach. This new species is named in honor of Gilmar (Gilmar dos Santos Neves), goalkeeper of the Brazilian soccer team of 1958.

Remarks. *Neotrichia gilmaryi* sp. nov. shares the elongate posterodorsal processes of the segment IX with *N. browni* Harris, 1990, *N. colmillosa* Harris, 1990, and *N. yanomonoa* Harris & Davenport, 1992. Nevertheless, the new species has the processes bifid (Fig. 3), and also differs from the above species in the structure of the subgenital plate and inferior appendages (Fig. 2).

Neotrichia djalmasantosi sp. nov.

Figs 5-9

Description. Male. Length 1.4-1.5 mm. General color (in alcohol) brown. Antennae with 18 segments, covered by short dark brown setae. Head and dorsum of thorax with dark brown setae. Wings densely covered by long dark brown setae. Abdominal segment VIII annular with very long setae. Segment IX with long, thin processes on posterodorsal margin, which crisscross, in dorsal and ventral views (Figs 5 and 6); dorsal pair of papillae, each bearing a long seta (Fig. 5); in lateral view with posteromesal margin produced into two long processes, bearing apical setae (Fig. 7). Segment X short and fused with segment IX; posterior margin truncated (Fig. 5). Subgenital plate bilobed in ventral view, lobes digitated (Fig. 6). Inferior appendages short and narrow, separate basally, converging mesally and tapering apically (Fig. 6). Phallus with slender distal portion, with large sclerotized hook on subapical area and ending with curved hook, ejaculatory duct protruding apically (Figs 8 and 9); paramere around shaft and extending posteriorly (Figs 8 and 9).



Figures 1-9. Male genitalia. (1-4) *Neotrichia gilmaris* sp. nov.: (1) dorsal; (2) ventral; (3) left lateral; (4) phallus, dorsal. (5-9) *Neotrichia djalmasantosi* sp. nov.: (5) dorsal; (6) ventral; (7) left lateral; (8) phallus, dorsal; (9) phallus, left lateral. Scale = 0.1 mm.

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Rio Preto da Eva (tributary to Rio Preto da Eva, 02°36'45.5"S, 59°43'59.1"W), 23.IV.2004, J.L. Nessimian *leg.*, light trap (INPA). Paratypes: same data as holotype, except Manaus (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 2 males, 23.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (DZRJ).

Etymology. This species is named in honor of Djalma Santos (Dejalma dos Santos), attacking full-back of the Brazilian soccer team of 1958.

Remarks. *Neotrichia djalmasantosi* sp. nov. is most similar to *N. colmillosa* in several aspects. Both species have long dorso-lateral processes on abdominal segment IX, which crisscross, the subgenital plate is bilobed in ventral view, and the phallus bears a stout subapical hook. The new species can be distinguished from *N. colmillosa* by the posteromesal margin of the segment IX produced into two long lobes in lateral view (Fig. 7), and the phallic apex ending in a unique curved hook (Figs 8 and 9).

Neotrichia bellinii sp. nov.

Figs 10-13

Description. Male. Length 1.6-1.8 mm. General color (in alcohol) brown. Antennae with 18 segments, covered by short brown setae. Head and dorsum of thorax with golden setae. Wings densely covered by long brown setae. Abdominal segment

VIII annular with very long setae. Segment IX with pair of papillae on dorsum, each bearing a long seta (Fig. 10); in lateral view with posteroventral margin produced into two broad and short processes, bearing long setae (Fig. 12); posterodorsal margin with two processes, upper one shorter, lower one long and thin, slightly curved upward, in lateral view (Fig. 12). Segment X very short, almost membranous and fused with segment IX (Fig. 10). Subgenital plate with apical margin emarginated, with stout ventrolateral processes (Fig. 11). Inferior appendages wide basally, with apex somewhat capitate (Fig. 11). Phallus with slender distal portion, apically divided into two short processes (Fig. 13); paramere short, around shaft and extending posteriorly (Fig. 13).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Rio Preto da Eva, (tributary to Rio Preto da Eva, 02°36'45.5"S, 59°43'59.1"W), 23.IV.2004, J.L. Nessimian *leg.*, light trap (INPA). Paratypes: same data as holotype, except 3 males (INPA); (tributary to Rio Preto da Eva, 02°32'09.4"S, 59°49'59.3"W), 1 male, 20.IV.2004, J.L. Nessimian *leg.* (DZRJ); Manaus (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 1 male, 23.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (MNRJ).

Etymology. This species is named in honor of Bellini (Hildevaldo Luiz Bellini), captain of the Brazilian soccer team of 1958.

Remarks. This species is similar to *N. yanomonoa* Harris & Davenport, 1992 in the long lateral processes of the segment

IX. The new species is easily distinguished by the subgenital plate divided posteriorly and with long lateral processes (Fig. 11), by the shape of the inferior appendages (Fig. 11), and by the bilobed phallic apex (Fig. 13).

Neotrichia orlando sp. nov.

Figs 14-17

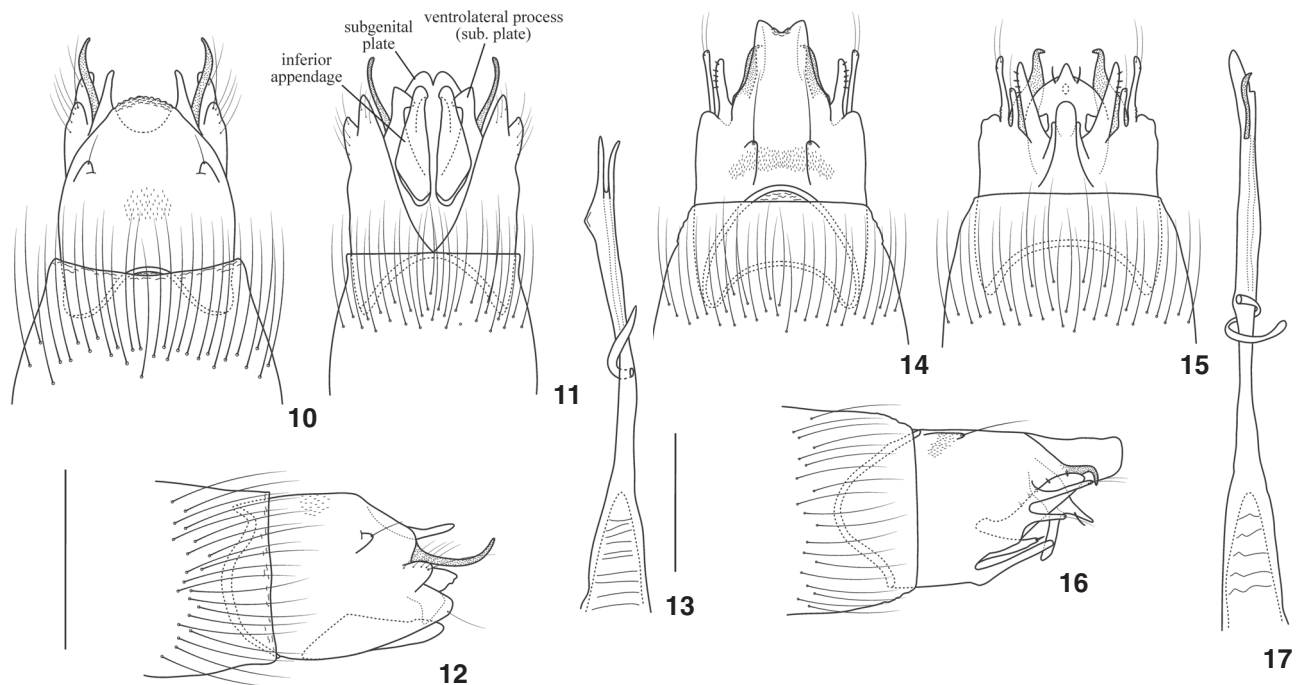
Description. Male. Length 1.5-1.7 mm. General color (in alcohol) brown. Antennae with 18 segments, covered by short brown setae. Head and dorsum of thorax with golden setae. Wings densely covered by long brown setae. Abdominal segment VIII annular, covered by very long setae. Segment IX with pair of papillae on dorsum, each bearing long seta (Fig. 14); posterior margin produced into a rounded lobe in ventral view (Fig. 15); in lateral view, anterior margin rounded; posterodorsal margin with sclerotized processes curved downward (Fig. 16); posteromesal margin produced into two processes with apical setae, lower process about half length of upper one (Fig. 16). Segment X broad basally and fused with segment IX; in dorsal view, posterior margin with a short incision (Fig. 14). Subgenital plate prominent, dome-shaped in ventral view, with narrow apex bearing pair of stout setae (Fig. 15); in lateral view, with long subapical lobe (Fig. 16). Inferior appendages appearing bifid, inner portion short and digitated, outer portion long, narrowing to apex, with spine-like setae on distal half (Fig. 15).

Phallus slender in distal portion, apex with sclerotized hook (Fig. 17); paramere short and with rounded apex, around shaft at mid-length (Fig. 17).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Manaus (tributary to Rio Branquinho, 02°31'24.6"S, 60°20'05.3"W), 25.VIII.2004, J.L. Nessimian & L. Fidelis leg., light trap (INPA). Paratypes: same data as holotype, except 10 males (INPA); (tributary to Rio Branquinho, 02°29'35.1"S, 60°20'03.1"W), 2 males, 26.VIII.2004, J.L. Nessimian & L. Fidelis leg. (DZRJ); (tributary to Rio Cuieiras, 02°32'10.0"S, 60°19'01.9"W), 3 males, 23.VIII.2004, J.L. Nessimian leg. (DZRJ); (tributary to Igarapé do Lobisomem, 02°33'46.4"S, 60°19'03.4"W), 1 male, 22.VIII.2004, J.L. Nessimian & L. Fidelis leg. (MNRJ); (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 2 males, 23.VIII.2004, J.L. Nessimian & L. Fidelis leg. (MNRJ).

Etymology. This species is named in honor of Orlando (Orlando Peçanha de Carvalho), defender of the Brazilian soccer team of 1958.

Remarks. *Neotrichia orlando* sp. nov. is similar to *N. cuernuda* Harris, 1990 in the posterodorsal processes of abdominal segment IX and in the bifid aspect of the inferior appendages. The new species differs from this species by the short inner portion of the inferior appendages (Fig. 15), by the phallus with stout apical hook and by the short paramere at mid-length (Fig. 17).



Figures 10-17. Male genitalia. (10-13) *Neotrichia bellinii* sp. nov.: (10) dorsal; (11) ventral; (12) left lateral; (13) phallus, dorsal. (14-17) *Neotrichia orlando* sp. nov.: (14) dorsal; (15) ventral; (16) left lateral; (17) phallus, dorsal. Scale = 0.1 mm.

Neotrichia niltonsantosi sp. nov.

Figs 18-21

Description. Male. Length 1.8 mm. General color (in alcohol), brown. Antennae with 18 segments, covered by short brown setae. Head and dorsum of thorax with pale yellow setae. Wings densely covered by long dark brown setae. Abdominal segment VIII annular, densely covered by very long setae. Segment IX bearing pair of papillae on dorsum, each bearing long seta (Fig. 18); in ventral view, posterior margin slightly produced into a short lobe between inferior appendages (Fig. 19); in lateral view, posteromesal margin produced into two processes with similar lengths and bearing apical setae (Fig. 20); posterodorsal margin with long, thin processes curved downward (Fig. 20). Segment X almost membranous and fused with segment IX, posterior margin truncate in dorsal view (Fig. 18). Subgenital plate trapezoidal in ventral view (Fig. 19), apex narrow and bearing pair of long setae and bending ventrad in lateral view (Fig. 20). Inferior appendages appearing bifid (Fig. 19); in ventral view, outer portion long, basally curved inward, apically narrow, inner portion short, digitated and bearing apical seta (Fig. 19). Phallus slender in distal portion, apex curved upward and ending into two short acute processes and bearing a stout subapical spine, ejaculatory duct protruding subapically (Fig. 21); paramere around shaft and extending posteriorly (Fig. 21).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Manaus (tributary to Igarapé da Cachoeira, 02°41'45.4"S, 60°17'42.7"W), 20.VIII.2004, J.L. Nessimian & L. Fidelis *leg.*, light trap (INPA). Paratypes: same data as holotype, 1 male (DZRJ).

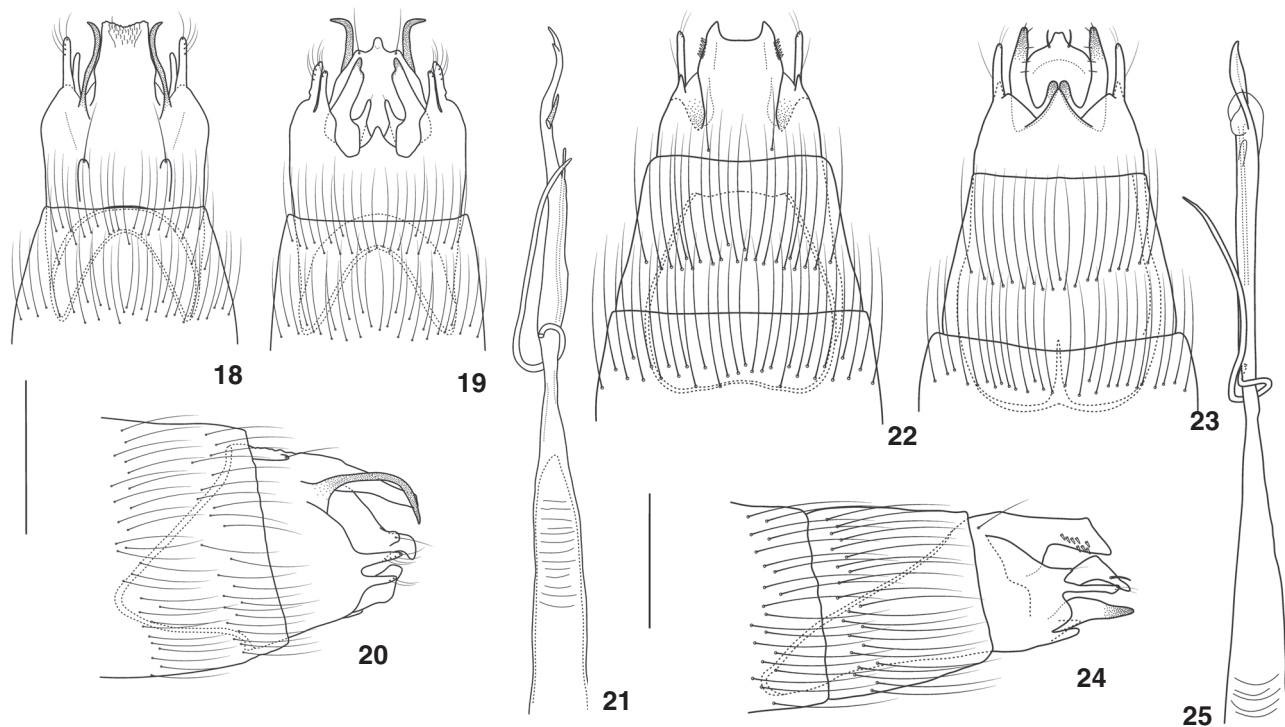
Etymology. This species is named in honor of Nilton Santos, attacking full-back of the Brazilian soccer team of 1958.

Remarks. This species has some similarity with *N. orlando* in the ventral aspect of inferior appendages and in the posterodorsal processes of the segment IX, which are curved downward, in lateral view. *N. niltonsantosi* sp. nov. differs from *N. orlando* by the trapezoidal subgenital plate (Fig. 19) and by the phallus ending into two short acute processes and with subapical stout spine (Fig. 21).

Neotrichia zitoi sp. nov.

Figs 22-25

Description. Male. Length 1.6-1.7 mm. General color (in alcohol) brown. Antennae with 18 segments, covered by short brown setae. Head and dorsum of thorax with golden setae. Wings densely covered by long brown setae. Abdominal segment VIII annular, densely covered by very long setae. Segment IX bearing pair of long setae on dorsum (Fig. 22); anteroventral margin extending through segment VIII and



Figures 18-25. Male genitalia. (18-21) *Neotrichia niltonsantosi* sp. nov. male genitalia: (18) dorsal; (19) ventral; (20) left lateral; (21) phallus, dorsal. (22-25) *Neotrichia zitoi* sp. nov. male genitalia: (22) dorsal; (23) ventral; (24) left lateral; (25) phallus, dorsal. Scale = 0.1 mm.

reaching posterior third of segment VII, slightly emarginated in ventral view (Fig. 23); posterior margin produced into triangular lobe, in ventral view (Fig. 23); posteromesal margin produced into two narrow processes, in lateral view, lower process much longer than upper one (Fig. 24). Segment X fused with segment IX, posterior margin deeply incised in dorsal (Fig. 22) and ventral views; short spines on lateral surface (Fig. 24). Subgenital plate dome-shaped in ventral view, apex narrow and bearing pair of stout setae (Fig. 23); in lateral view, apex curved downward (Fig. 24). Inferior appendages with short, digitated lobe on base of internal area (Fig. 23); longer portion slightly narrowing to apex in ventral and lateral views (Figs 23 and 24); both long and short lobes darkened toward apex. Phallus slender in distal portion, ending into membranous, rounded apex, from which a short, leaf-like process emerges (Fig. 25); with short, subapical process (Fig. 25); paramere around shaft and extending posteriorly (Fig. 25).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Manaus (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 23.VIII.2004, J.L. Nessimian & L. Fidelis *leg.*, light trap (INPA). Paratypes: same data as holotype, except 1 male (INPA); (tributary to Rio Branquinho, 02°31'24.6"S, 60°20'05.3"W), 1 male, 25.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (DZRJ).

Etymology. This species is named in honor of Zito (José Ely de Miranda), defensive half of the Brazilian soccer team of 1958.

Remarks. This species resembles *N. orlandoi* in the ventral aspect of the male genitalia. Both species have a short lobe on base of each inferior appendage. The anteroventral margin of segment IX reaching segment VII (Fig. 23), the absence of hooks on dorsum of the segment IX (Fig. 22), and the phallus ending into a membranous apex with flattened process (Fig. 25) differentiate *N. zitoi* **sp. nov.**

Neotrichia didii **sp. nov.**

Figs 26-29

Description. Male. Length 1.6 mm. General color (in alcohol) yellowish-brown. Antennae with 18 segments, covered by short brown setae. Head and dorsum of thorax with golden setae. Wings with long dark brown setae. Abdominal segment VIII annular, densely covered by very long setae. Segment IX with pair of small papillae on dorsum, each bearing several short, spine-like setae (Fig. 26); in ventral view, posterior margin produced into long, triangular lobe between inferior appendages (Fig. 27); anterior margin rounded in lateral view, posteromesal margin produced into two processes with apical setae, lower process about one third of length of upper process (Fig. 28); dorsolateral margin with stout acute process (Fig. 28). Segment X long, rectangular and fused with segment IX, posterior margin with short incision (Fig. 26), in dorsal and ventral views; apical area broad in lateral view (Fig. 28). Subgenital plate dome-shaped in ventral view, apex narrow and bearing

pair of stout setae (Fig. 27); in lateral view, with a long, acute subapical process, directed downward (Fig. 28). Inferior appendages bilobed, with imbricate portions (Fig. 27); inner and outer portions narrowing toward apex, outer portion slightly longer than inner portion, in lateral view, broad and slightly incised apically (Fig. 28). Phallus slender in distal portion, ending with membranous, rounded area, with a short, acute, subapical process (Fig. 29); paramere around shaft and extending anteriorly (Fig. 29).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Rio Preto da Eva (tributary to Rio Preto da Eva, 02°38'14.6"S, 59°44'09.9"W), 23.IV.2004, J.L. Nessimian *leg.*, light trap (INPA). Paratypes: BRAZIL, Amazonas: Manaus (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 1 male, 23.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (DZRJ).

Etymology. This species is named in honor of Didi (Valdir Pereira), midfielder of the Brazilian soccer team of 1958.

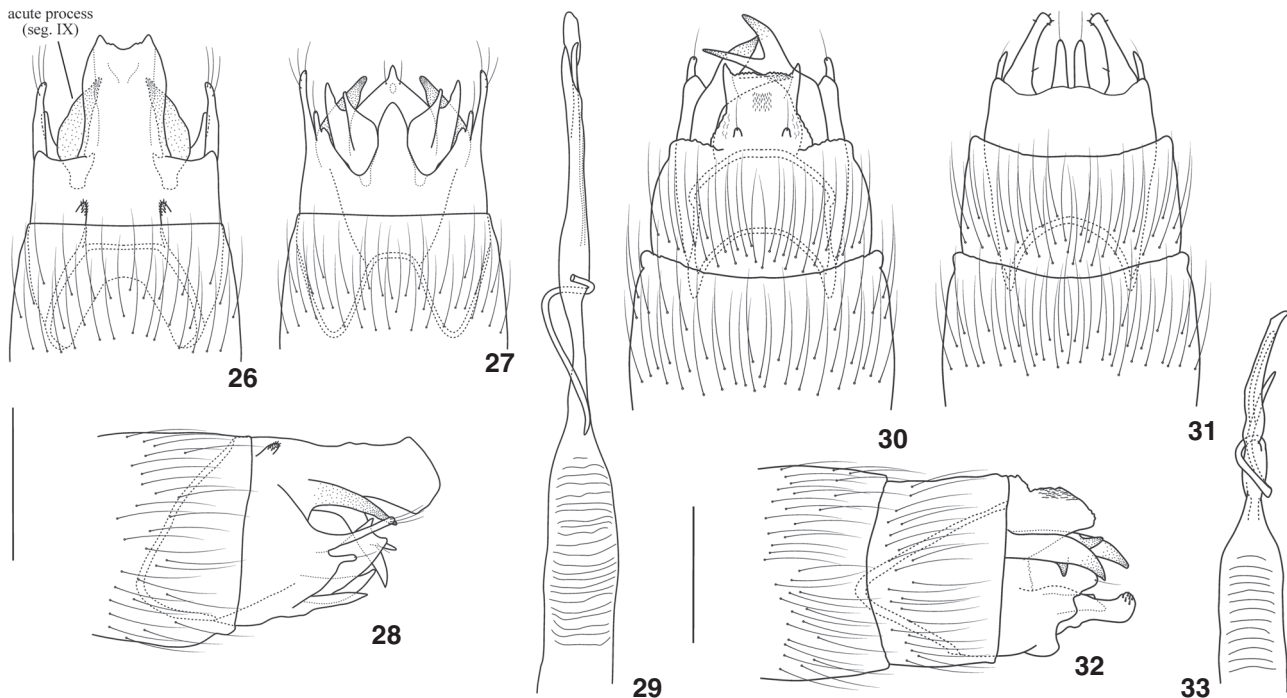
Remarks. *Neotrichia didii* **sp. nov.** is somewhat similar to *N. orlandoi* in the general aspect of the segment IX, with posterolateral hooks and posteromesal processes in lateral view, in the lateral aspect of the subgenital plate, with long, subapical process, and in the bilobed aspect of the inferior appendages. This new species is distinguished from *N. orlandoi* by the inferior appendages broader and shorter (Fig. 27), by the stout, posterolateral process of segment IX posteriorly directed (Figs 26 and 28), and by the paramere extending anteriorly (Fig. 29).

Neotrichia vavai **sp. nov.**

Figs 30-33

Description. Male. Length 1.6 mm. General color (in alcohol) yellowish-brown. Antennae broken, but with more than 14 segments, covered by short dark brown setae. Head and dorsum of thorax with pale setae. Wings with long brown setae. Abdominal segment VIII annular, densely covered by very long setae. Segment IX largely reduced in dorsal view (Fig. 30); pair of papillae on dorsum, each bearing long seta (Fig. 30); posterolateral margins with chelate processes, which crisscross, in dorsal and ventral views (Figs 30 and 31); in ventral view, with posterior margin slightly emarginated (Fig. 31); anterior margin rounded and extending through segment VIII in lateral view (Fig. 32); posteromesal margin produced into a wide rounded lobe with apical setae (Fig. 32). Segment X almost membranous and fused with segment IX (Fig. 30); in dorsal view, posterolateral margin with short projections (Fig. 30). Subgenital plate short, bilobed in ventral view, apex of each lobe bearing short spines (Fig. 31). Inferior appendages elongate, broad basally and somewhat capitate, in ventral view, apex bearing short, spine-like setae (Fig. 31). Phallus slender in distal portion (Fig. 33); paramere around shaft and extending posteriorly (Fig. 33).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Manaus (tributary to Rio Branquinho, 02°31'24.6"S, 60°20'05.3"W), 25.VIII.2004, J.L. Nessimian & L. Fidelis *leg.*, light trap



Figures 26-33. Male genitalia. (26-29) *Neotrichia didii* sp. nov.: (26) dorsal; (27) ventral; (28) left lateral; (29) phallus, dorsal. (30-33) *Neotrichia vavai* sp. nov.: (30) dorsal; (31) ventral; (32) left lateral; (33) phallus, dorsal. Scale = 0.1 mm.

(INPA). Paratypes: BRAZIL, Amazonas: Manaus (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 1 male, 23.VIII.2004, J.L. Nessimian & L. Fidelis leg. (DZRJ).

Etymology. This species is named in honor of Vavá (Edvaldo Izídio Neto), center forward of the Brazilian soccer team of 1958.

Remarks. This distinctive new species is related to the remaining species treated in this paper in the structure of the segment IX and in the phallus aspect, without spines or processes. However, *N. vavai* sp. nov. is very distinct, being easily recognized by the chelate processes on posterolateral margins of the segment IX (Fig. 30).

Neotrichia garinchai sp. nov.

Figs 34-37

Description. Male. Length 1.4-1.6 mm. General color (in alcohol) yellowish-brown. Antennae with 18 segments, covered by short dark brown setae. Head and dorsum of thorax with pale setae. Wings with long dark brown setae. Abdominal segment VIII annular, densely covered by very long setae. Segment IX reduced in dorsal view (Fig. 34); posterolateral margins with sclerotized asymmetrical processes, right process long and sinuate, left process short and curved downward (Fig. 34); posteroventral margin produced into a wide rounded lobe and a short lobe bearing apical seta (Fig. 35); anterior margin

rounded and extending through segment VIII in lateral view (Fig. 36). Segment X long and fused with segment IX; in dorsal view, posterior margin truncate (Fig. 34). Subgenital plate very elongate, exceeding segment X, in ventral view, with narrow apex and lateral rounded lobes, each bearing seta (Fig. 35). Inferior appendages curved inward in ventral view, with short rounded lobe on internal area bearing apical seta (Fig. 35). Phallus slender in distal portion (Fig. 37); paramere around shaft and extending posteriorly (Fig. 37).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Manaus (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 23.VIII.2004, J.L. Nessimian & L. Fidelis leg., light trap (INPA). Paratypes: same data as holotype, except 3 males (DZRJ); Rio Preto da Eva (tributary to Rio Preto da Eva, 02°38'14.6"S, 59°44'09.9"W), 2 males, 23.IV.2004, J.L. Nessimian leg. (INPA).

Etymology. This species is named in honor of Garrincha (Manoel Francisco dos Santos), right winger and forward of the Brazilian soccer team of 1958.

Remarks. This species and the preceding one have the phallus very similar in general aspect, although the parameres are curved to opposite sides. They also have some similarity in the dorsal reduction of the abdominal segment IX. As remarkable features, *N. garinchai* sp. nov. has asymmetrical posterolateral processes on segment IX (Figs 34 and 36) and the subgenital plate is very long, exceeding the segment X (Fig. 35).

Neotrichia zagalloi sp. nov.

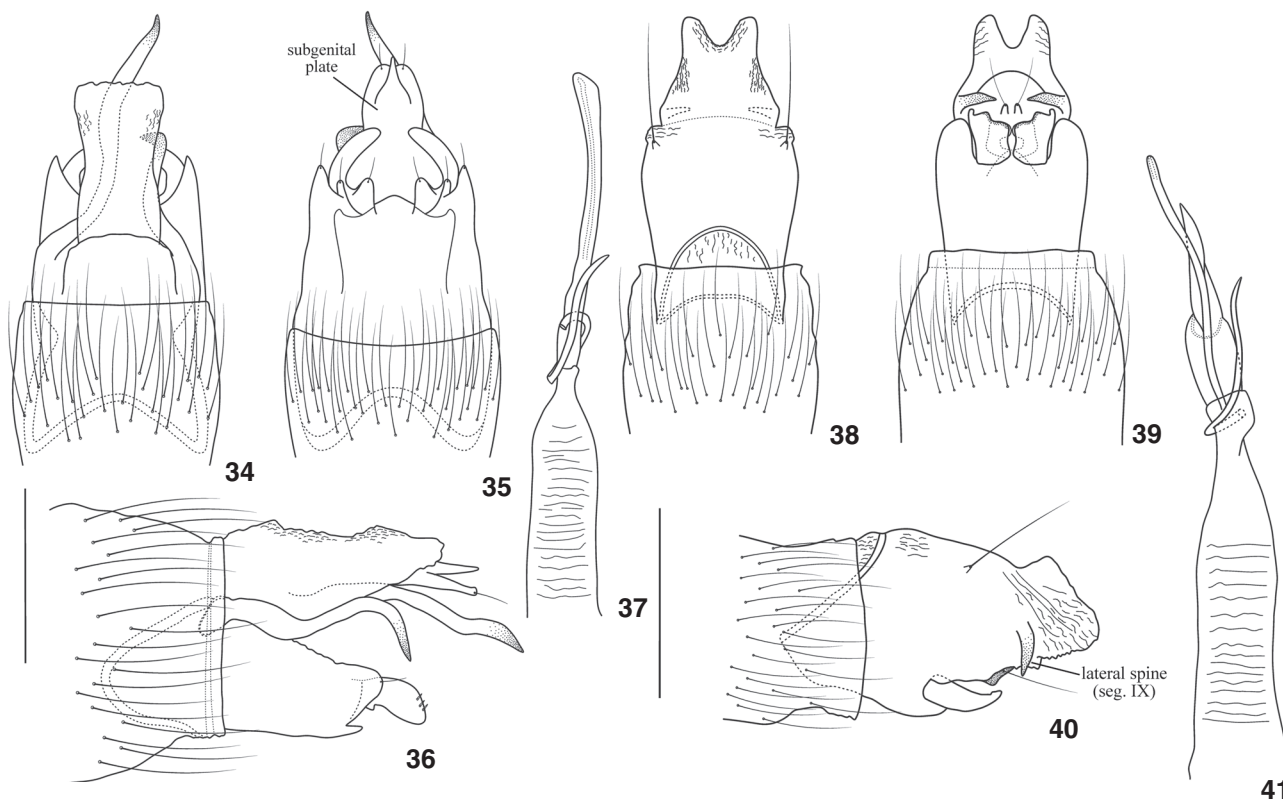
Figs 38-41

Description. Male. Length 1.4-1.6 mm. General color (in alcohol) yellowish-brown. Antennae with 18 segments, covered by short brown setae. Head and dorsum of thorax with golden setae. Wings densely covered by long dark brown setae. Abdominal segment VIII annular, densely covered by very long setae. Segment IX with pair of small papillae on dorsum, each bearing very long seta (Fig. 38); with stout, lateral spine on posteromesal margin (Figs 39 and 40); in ventral view with a short, membranous lobe on posteromesal margin (Fig. 39). Segment X membranous and fused with segment IX, with oblique folds laterally (Fig. 40); posterior margin with large U-shaped incision (Fig. 38). Subgenital plate dome-shaped in ventral aspect, with pair of small mesal papillae, each bearing long seta (Fig. 39). Inferior appendages quadrangular in ventral view, with two excisions on apical margin (Fig. 39). Phallus with constriction at mid-length, ending into flattened and narrowing process, ejaculatory duct protruding for a long extension (Fig. 41); paramere around shaft and extending posteriorly (Fig. 41).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Rio Preto da Eva (Igarapé Jangada, tributary to Rio Urubu, 02°26'32.5"S, 59°32'46.2"W), 28.V.2004, J.L. Nessimian leg., light trap (INPA). Paratypes: BRAZIL, Amazonas: Rio Preto da Eva (tributary to Rio Preto da Eva, 02°38'14.6"S, 59°44'09.9"W), 4 males, 23.IV.2004, J.L. Nessimian leg. (INPA); Manaus (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 2 males, 23.VIII.2004, J.L. Nessimian & L. Fidelis leg. (DZRJ); (tributary to Rio Urubu, 02°06'55.6"S, 59°59'20.7"W), 1 male, 23.V.2004, J.L. Nessimian leg. (MNRJ).

Etymology. This species is named in honor of Zagallo (Mário Zagallo), left forward of the Brazilian soccer team of 1958.

Remarks. *Neotrichia zagalloi* sp. nov. resembles *N. dientera* Harris, 1990 in many aspects of the male genitalia. These species are similar in the acute, lateral spine on the segment IX, and in the general structure of the segment X. *Neotrichia zagalloi* sp. nov. is easily distinguished from *N. dientera* by the broad, quadrangular inferior appendages with two excisions on the apical margin in ventral view (Fig. 39), and by the phallic apex flattened and narrowing apically (Fig. 41).



Figures 34-41. Male genitalia. (34-37) *Neotrichia garrinchai* sp. nov.: (34) dorsal; (35) ventral; (36) left lateral; (37) phallus, dorsal. (38-41) *Neotrichia zagalloi* sp. nov. male genitalia: (38) dorsal; (39) ventral; (40) left lateral; (41) phallus, dorsal. Scale = 0.1 mm.

Neotrichia pelei sp. nov.

Figs 42-45

Description. Male. Length 1.7-1.8 mm. General color (in alcohol) brown. Antennae with 18 segments, covered by short brown setae. Head and dorsum of thorax with golden setae. Wings densely covered by long dark brown setae. Abdominal segment VIII annular, densely covered by long setae. Segment IX bearing pair of small papillae on dorsum, each with heavy seta (Fig. 42); in ventral view, posterior margin produced into short, triangular lobe between inferior appendages (Fig. 43); anterior margin rounded in lateral view, posteromesal margin produced into two processes of similar lengths bearing apical setae, posteriorly with a short spine (Fig. 44). Segment X long, rectangular and fused with segment IX, posterior margin with deep incision (Fig. 42), in dorsal and ventral views. Subgenital plate narrowing to apex, which appears bilobed and bears pair of stout setae (Fig. 43); in lateral view, with a large, subapical process, directed downward (Fig. 44). Inferior appendages elongate, in ventral view, tapering toward rounded, darkened apex (Fig. 43). Phallus slender in distal portion, apex ending with two lobes and a sclerotized hook (Fig. 45); paramere around shaft, extending posteriorly and curved apically (Fig. 45).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Rio Preto da Eva (tributary to Rio Preto da Eva, 02°32'09.4"S, 59°49'59.3"W), 20.iv.2004, J.L. Nessimian *leg.*, light trap (INPA). Paratypes: same data as holotype, except 9 males (INPA); Manaus (tributary to Rio Cuieiras, 02°32'10.0"S, 60°19'01.9"W), 2 males, 23.VIII.2004, J.L. Nessimian *leg.* (INPA); (tributary to Rio Branquinho, 02°31'24.6"S, 60°20'05.3"W), 8 males, 25.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (DZRJ); (tributary to Rio Branquinho, 02°29'35.1"S, 60°20'03.1"W), 4 males, 26.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (MNRJ).

Etymology. This species is named in honor of Pelé (Edson Arantes do Nascimento), center forward of the Brazilian soccer team of 1958.

Remarks. This is a distinctive species, which is not clearly related to other species. In the ventral aspect of the inferior appendages, the new species resembles *N. yagua* Harris & Davenport, 1992, but the two taxa are very dissimilar. *Neotrichia pelei* sp. nov. has a characteristic narrow subgenital plate in ventral view (Fig. 43) and the phallic apex with three lobes and a sclerotized hook (Fig. 45).

Neotrichia feolai sp. nov.

Figs 46-49

Description. Male. Length 1.6 mm. General color (in alcohol) yellowish-brown. Antennae with 18 segments, covered by short golden setae. Head and dorsum of thorax with golden setae. Wings with long brown setae. Abdominal segment VIII annular, covered by long setae. Segment IX short, in lateral view with anterior margin narrowing and extending through segment VIII (Fig. 48); long and broad bracteoles posteroventrally, bear-

ing several short, spine-like setae on internal surface (Figs 46 and 47). Segment X fused with segment IX, posterior margin deeply incised (Fig. 46), in dorsal and ventral views; in lateral view, narrowing to apex (Fig. 48). Subgenital plate triangular in ventral view, with pair of apical papillae, bearing long setae (Fig. 47). Inferior appendages elongate (Fig. 47), narrow in lateral view (Fig. 48); angled on mesal margin subapically, tapering toward rounded apex (Fig. 48). Phallus with apical portion broad (Fig. 49); long process arising immediately after base of paramere, darkening and tapering toward apex (Fig. 49); paramere around shaft and extending posteriorly (Fig. 49).

Taxonomic summary. Holotype male: BRAZIL, Amazonas: Rio Preto da Eva (tributary to Rio Preto da Eva, 02°38'14.6"S, 59°44'09.9"W), 23.IV.2004, J.L. Nessimian *leg.*, light trap (INPA).

Etymology. This species is named in honor of Vicente Ítalo Feola, coach of the Brazilian team of 1958.

Remarks. This species has some similarity to *N. biuncifera* Flint, 1974 in the long inferior appendages and in the long, wide and flattened bracteoles. However, the new species is readily distinguished by the phallic apex with only one process (Fig. 49).

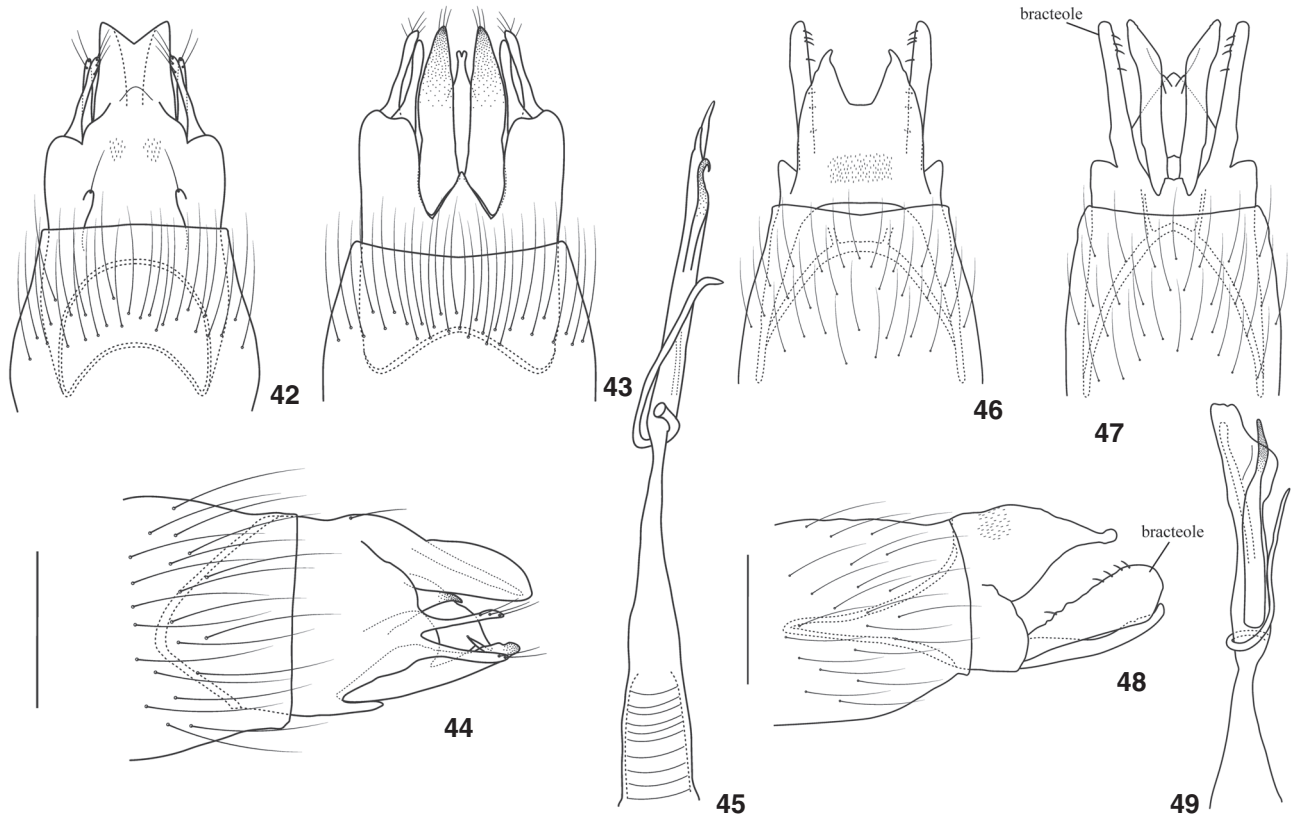
New records of *Neotrichia**Neotrichia browni* Harris, 1990

Material examined. BRAZIL, Amazonas: Manaus (tributary to Rio Cuieiras, 02°42'25.1"S, 60°22'28.2"W), 11 males, 19.VII.2004, J.L. Nessimian & L. Fidelis *leg.*, light trap (INPA); same data, except (tributary to Rio Cuieiras, 02°32'10.0"S, 60°19'01.9"W), 4 males, 23.VIII.2004, J.L. Nessimian *leg.* (MNRJ); same data, except (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 3 males, 23.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (DZRJ); same data, except (tributary to Rio Branquinho, 02°31'24.6"S, 60°20'05.3"W), 18 males, 25.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (INPA); same data, except (tributary to Rio Branquinho, 02°29'35.1"S, 60°20'03.1"W), 4 males, 26.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (MNRJ); same data, except Rio Preto da Eva (tributary to Rio Preto da Eva, 02°41'24.3"S, 59°42'01.8"W), 5 males, 24.IV.2004, J.L. Nessimian *leg.* (DZRJ).

Remarks. This species was described from Venezuela. It is herein recorded from Brazil, with specimens collected in state of Amazonas.

Neotrichia colmillosa Harris, 1990

Material examined. BRAZIL, Amazonas: Manaus (tributary to Rio Cuieiras, 02°42'25.1"S, 60°22'28.2"W), 2 males, 19.VII.2004, J.L. Nessimian & L. Fidelis *leg.*, light trap (MNRJ); same data, except (Igarapé Arumã, tributary to Rio Cuieiras, 02°30'55.2"S, 60°15'44.4"W), 1 male, 23.VIII.2004, J.L. Nessimian & L. Fidelis *leg.* (MNRJ); same data, except Rio Preto da Eva (tributary to Rio Preto da Eva, 02°32'09.4"S, 59°49'59.3"W), 10 males, 20.IV.2004, J.L. Nessimian *leg.* (INPA); same data, except (tributary to Rio Preto da Eva, 02°32'09.4"S, 59°49'59.3"W), 8 males, 20.IV.2004, J.L. Nessimian *leg.* (DZRJ).



Figures 42-49. Male genitalia. (42-45) *Neotrichia pelei* sp. nov.: (42) dorsal; (43) ventral; (44) left lateral; (45) phallus, dorsal. (46-49.) *Neotrichia feolai* sp. nov. male genitalia: (46) dorsal; (47) ventral; (48) left lateral; (49) distal portion of the phallus, dorsal. Scale = 0.1 mm.

Remarks. *Neotrichia colmillosa* Harris, 1990 is similar to *N. browni* Harris, 1990, including the distribution (Venezuela). However, *N. colmillosa* has prominent distal hooks on the phallus, which are absent in *N. browni*. Specimens of *N. colmillosa* were also collected in state of Amazonas, Brazil.

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