

# Papéis Avulsos de Zoologia

Museu de Zoologia da Universidade de São Paulo

Volume 49(34):467-475, 2009

www.mz.usp.br/publicacoes  
www.revistasusp.sibi.usp.br  
www.scielo.br/paz

ISSN impresso: 0031-1049  
ISSN on-line: 1807-0205

## NEW NICOLETIIDAE (ZYGENTOMA: INSECTA) FROM BRAZIL LIVING IN FIRE-ANT (HYMENOPTERA: INSECTA) NESTS

LUIS F. MENDES<sup>1</sup>  
EDUARDO G. P. FOX<sup>2,3</sup>  
DANIEL R. SOLIS<sup>2,4</sup>  
ODAIR C. BUENO<sup>2,5</sup>

### ABSTRACT

*A new myrmecophilous silverfish (Zygentoma: Nicoletiidae: Subnicoletiinae) from Rio de Janeiro, Brazil, found living in fire ant (Solenopsis saevissima, Formicidae: Myrmicinae) nests is described: Allotrichotriura saevissima gen. nov. sp. nov. is compared with the other genera and subgenera known in the subfamily. The main diagnostic features would include the combination of body shape, body and head setation, morphology of praetarsus, and number of abdominal stylets and vesicles. Although further quests were attempted at the type-locality, only the original described material, exclusively composed of females, remains known.*

KEYWORDS: New genus; New species; Subnicoletiinae; Myrmecophilous; Brazil.

### INTRODUCTION

The fauna of the Nicoletiidae (Zygentoma) in Brazil remains largely unknown and currently includes 19 known species distributed in 11 genera, including leaf-litter and soil-dwelling (edaphic: ED), myrmecophilous (MY), termitophilous (TE – all living with Termitidae) species and species living with yet undetermined hosts (UH) or even in unknown biotopes (UB), as well as cave-dwellers (troglobites: TR). The Atelurinae, with 13 species are the most diverse group, being

*Grassiella* (Atelurinae) so far the most diverse genus, with six Brazilian species of which five are endemic.

One new species solely represented by female specimens, belonging to a new genus of Subnicoletiinae was obtained from fire ant nests (*Solenopsis saevissima*, Formicidae: Myrmicinae) from Rio de Janeiro State. It is described below and the new genus is compared with the genera and subgenera in that subfamily.

Brazilian Nicoletiidae were reported from Amazonas (AM), Bahia (BA), Espírito Santo (ES), Goiás (GO), Mato Grosso (MT), Minas Gerais (MG), Pará

1. Instituto de Investigação Científica Tropical, IICT/JBT, Unidade de Zoologia, Rua da Junqueira, nº 14, 1300-343, Lisboa, Portugal.  
E-mail: luis.mendes@iict.pt

2. Centro de Estudos de Insetos Sociais, São Paulo State University, CEIS/UNESP, Avenida 24A, nº 1.515, Bela Vista, 13506-900, Rio Claro, São Paulo, Brasil.

3. E-mail: ofoxofox@gmail.com

4. E-mail: entomo75@yahoo.com

5. E-mail: odaircb@rc.unesp.br

(PA), Pernambuco (PE), Rio de Janeiro (RJ), Santa Catarina (SC) and São Paulo (SP), according with the following alphabetic list. Authors of the respective citations are reported; species known as endemic to Brazil are marked with an\*.

### Subfamily ATELURINAE

- \**Atelurina pernambucensis* Wygodzinsky, 1943 – PE (UH) (Wygodzinsky, 1943a).
- \**Goiasatelura goianella* Wygodzinsky, 1942 – GO (? TE) (Wygodzinsky, 1942).
- \**Goiasatelura goianensis* Wygodzinsky, 1942 – GO (TE – *Syntermes*, Nasutitermitinae) (Wygodzinsky, 1942).
- \**Grassiella aepsera* Wygodzinsky, 1958 – RJ (MY – *Camponotus*, Formicinae, and *Atta*, Myrmicinae; possibly TE also) (Wygodzinsky, 1958a).
- \**Grassiella amazonica* Mendes, 1996 – AM (UB) (Mendes, 1996).
- \**Grassiella arripoda* Wygodzinsky, 1958 – ES (UB) (Wygodzinsky, 1958a).
- \**Grassiella carioca* Wygodzinsky, 1958 – RJ (UB) (Wygodzinsky, 1958a).
- \**Grassiella negroensis* Mendes, 2002 – AM (MY – unidentified Myrmicinae) (Mendes, 2002).
- Grassiella praestans* Silvestri, 1898 – MG, SC, SP, RJ (MY – unidentified ants) (Escherich, 1905 as *Atelura*, Silvestri, 1946, Wygodzinsky, 1958a).
- \**Heterolepidella synoeketa* (Silvestri, 1901) – MT (TE – ? *Eutermes debilis*, Nasutitermitinae) (Escherich, 1905 as *Atelura*; Silvestri, 1901a,c, 1903 as *Grassiella*).
- \**Heterolepidella termitobia* (Silvestri, 1901) – MT (TE – *Anoplotermes tenebrosus* and *Amitermes amifer*, Amitermitinae) (Escherich, 1905 as *Atelura*; Silvestri, 1901a,c, 1903 as *Grassiella*).
- Lasiotheus nanus* (Escherich, 1903) – RJ (MY – *Pre-nolepis*, Formicinae) (Wygodzinsky, 1958a, wrongly identified as *Cryptocephalina minutella*, rectified by Mendes, 1986).
- \**Pseudogastrotheus synterminus* (Silvestri, 1946) – RJ (MY – undetermined ants; and TE – *Syntermes*, Nasutitermitinae) (Silvestri, 1946, Wygodzinsky, 1958a, both as *Gastrotheus*).

### Subfamily COLETINIINAE

- \**Coletinia brasiliensis* Mendes & Ferreira, 2002 – BA (TB in “Toca do Morrinho” Cave) (Mendes & Ferreira, 2002).

### Subfamily CUBACUBANINAE

- \**Anelpistina spelaea* (Galán, 2001) – BA (TB in “Toca da Boavista” Cave) (Galán, 2001 as *Cubacubana*). See Note 3.

### Subfamily NICOLETHINAE

*Nicoletia phytophila* Gervais, 1844 (females only) – PA (ED) (Picchi, 1972 as *N. meinerti*). Silvestri (1912) suggested *N. meinerti* as a synonym for *N. phytophila* and Wygodzinsky (1980) (no precise data, probably the Picchi material from Pará) registered the presence of *N. phytophila* in the Brazilian Amazon, confirming Silvestri's synonymic proposal. Also present in the rain forests of AM (unpublished data).

### Subfamily SUBNICOLETHINAE

- \*<sup>(?)</sup>*Hemateleura convivens* Escherich, 1906 – PA (TE – non-identified termites) (Escherich, 1906). Species described from a single female holotype which is almost certainly lost; incomplete description lacking details puts the validity of this species in question.
- Trichatelura borgmeieri* Silvestri, 1933 – GO (MY – army ants: *Eciton crassicorne*, *E. diana*, *E. dulcis*, *E. minense*, *E. praedator* and *E. schlehtendali*, Dorylinae) (Wygodzinsky, 1943b).
- Trichatelura manni* (Caudell, 1925) – GO (MY – army ants: *Eciton crassicorne* and *E. praedator*, Dorylinae) (Wygodzinsky, 1943b).

Note 1: The validity of *Nicoletia neotropicalis* Silvestri, 1901 – MT (ED) (Silvestri, 1901b,c; Escherich, 1905) warrants investigation; the con-specificity of samples from Argentina, Brazil, Paraguay and Uruguay recorded under this name needs to be revised (they hardly pertain to *Nicoletia*, and they may not even belong to Nicoletiinae).

Note 2: *Nicoletia armata* Silvestri, 1901 (ED), probably a Cubacubaninae in need of revision, was reported by Escherich (1905) to occur in Brazil: “...*Silvestri fand sie in Brasilien, Uruguay und Paraguay*...”. In fact, this enigmatic species was registered by Silvestri (1901b,c) from Argentina, Paraguay (Paraná) and Uruguay, but never from Brazil.

Note 3: We never studied this species but Espinasa (pers. comm.) believes that its description is incorrect and that it will be no more than *Coletinia brasiliensis*; so, the correct nomenclature of these species remains debatable, as it is the real occurrence of the Cubacubaninae in Brazil.

## MATERIAL AND METHODS

The studied material is deposited in the entomological collections of the Museu de Zoologia da Universidade de São Paulo, SP, Brazil (MZUSP) and of the IICT/JBT Zoologia, Lisbon, Portugal (CZ, the former Centro de Zoologia). *Allotrichotriura* were dissected under a stereomicroscope in ca 70-80% ethanol, being the dissected pieces directly mounted in "Tendeiro Liquid" and dried at 40°C for about one week (before observation) and for 2-3 weeks (before storage, until solidification); whole specimens remained alcohol-preserved. Observations and species identification were performed with a compound microscope and drawings made with camera-lucida.

## RESULTS AND DISCUSSION

### *Allotrichotriura* gen. nov.

*Description:* Female: Nicoletiidae Subnicoletiinae of small body size (< 4 mm), ateluriform (short and stout), lacking pigment and without scales; most of the setae are thin and very short (only a few acute or apically slightly bifurcated macrochaetae exist on the head and tergites). Head exposed, setose. Nota, abdominal tergites and sternites, with setae arranged in several irregular rows. Incisive and molar areas of mandibles well developed. Galea and lacinia equally developed; galea with 1 apical conule only, the prosthema not clearly longer than the apical tooth of lacinia. Maxillary and labial palps typical. Praetarsus simple and complete. All abdominal segments exposed. Stylets on abdominal segments VI-IX (4 pairs), vesicular structures reduced to pseudovesicles VII. Subgenital plate widely elliptical, the ovipositor spindle-shaped, with thin setae only and clearly longer than level of stylets IX. Cerci and paracercum short, lacking spines. Male sex unknown.

*Type-species:* *Allotrichotriura saevissima* sp. nov.

*Etymology:* From the Greek, *Allos*: other, and from *Trichotriura* Silvestri, 1918, a West African genus probably quite close to the new endemic Brazilian genus.

*Discussion:* The new genus fits within Subnicoletiinae (*sensu* Mendes, 1994), probably a polyphyletic group as judiciously suggested by Smith (1998), known from the Neotropical, Afrotropical, Oriental and Australian Regions. It includes 11 genera, namely *He-*

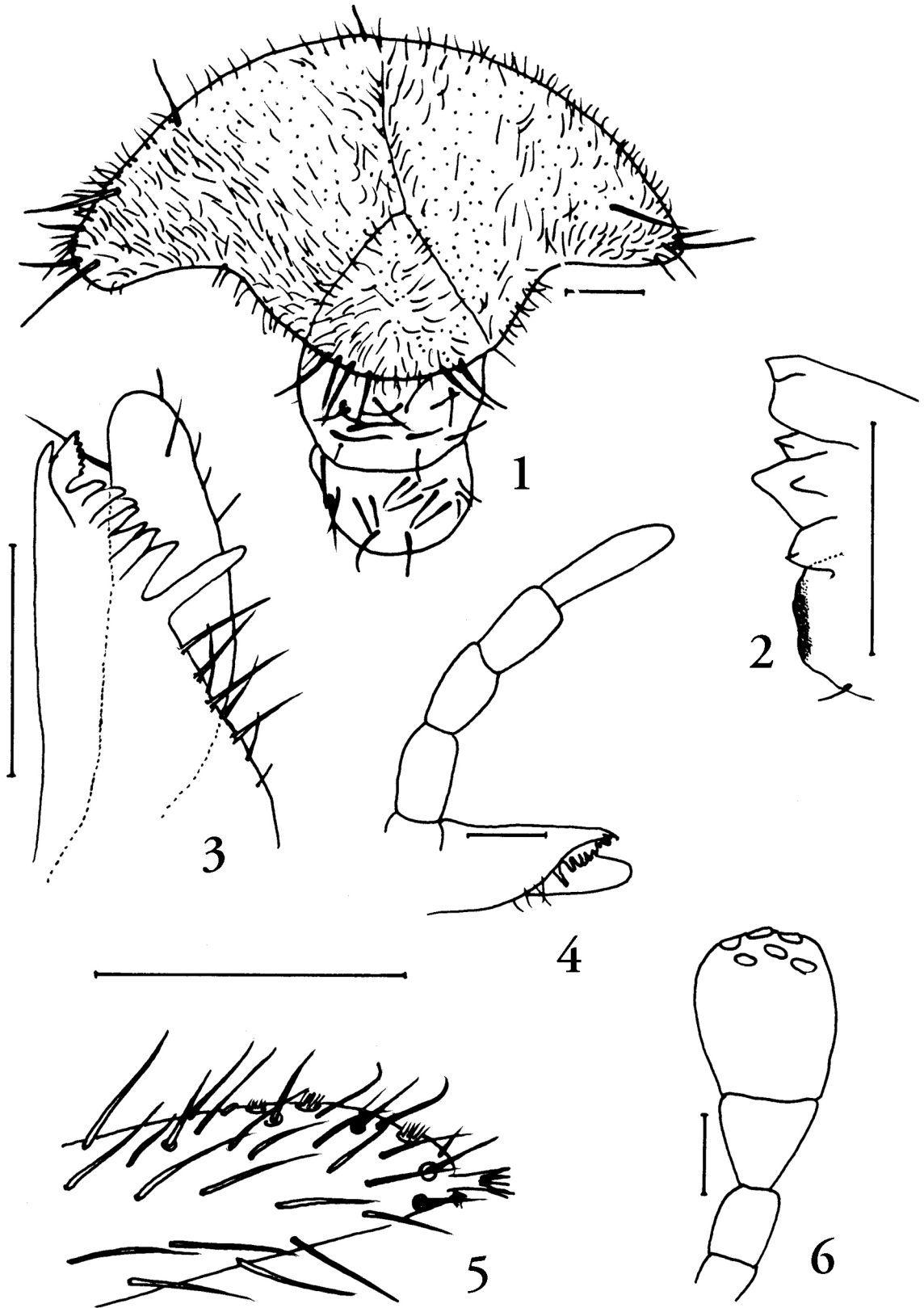
*matelura* Escherich, 1906, *Hemitrinemura* Mendes, 1994, *Metrinura* Mendes, 1994, *Subnicoletia* Silvestri, 1908, *Subtrinemura* Smith, 1998, *Trichatelura* Silvestri, 1932, *Trichotriura* Silvestri, 1918, *Trichotriurella* Mendes, 2002, *Trichotriuroides* Mendes *et al.*, 1994, *Trinemura* Silvestri, 1908 and *Trinemurodes* Silvestri, 1916.

*Allotrichotriura* differs from the "nicoletiid-shaped" (long, thin, parallel-sided) genera in its shape and by the smaller subgenital plate as well as the number of abdominal stylets and/or vesicles (stylets VI-IX, vesicles VII only in the new genus). *Trinemura* s.s. (*sensu* Mendes, 1994, Smith, 1998) also has vesicular structures only on VII but has stylets on III-IX, *Hemitrinemura*, *Metrinura*, *Subtrinemura* and *Trinemurodes* have stylets on II (III-IX) and vesicles on II (III-VII). *Trinemurodes* lacks, further, empodial claw. *Subnicoletia* Silvestri, 1908 similarly presents, more numerous abdominal stylets (IV-IX) and vesicular structures (IV-VII).

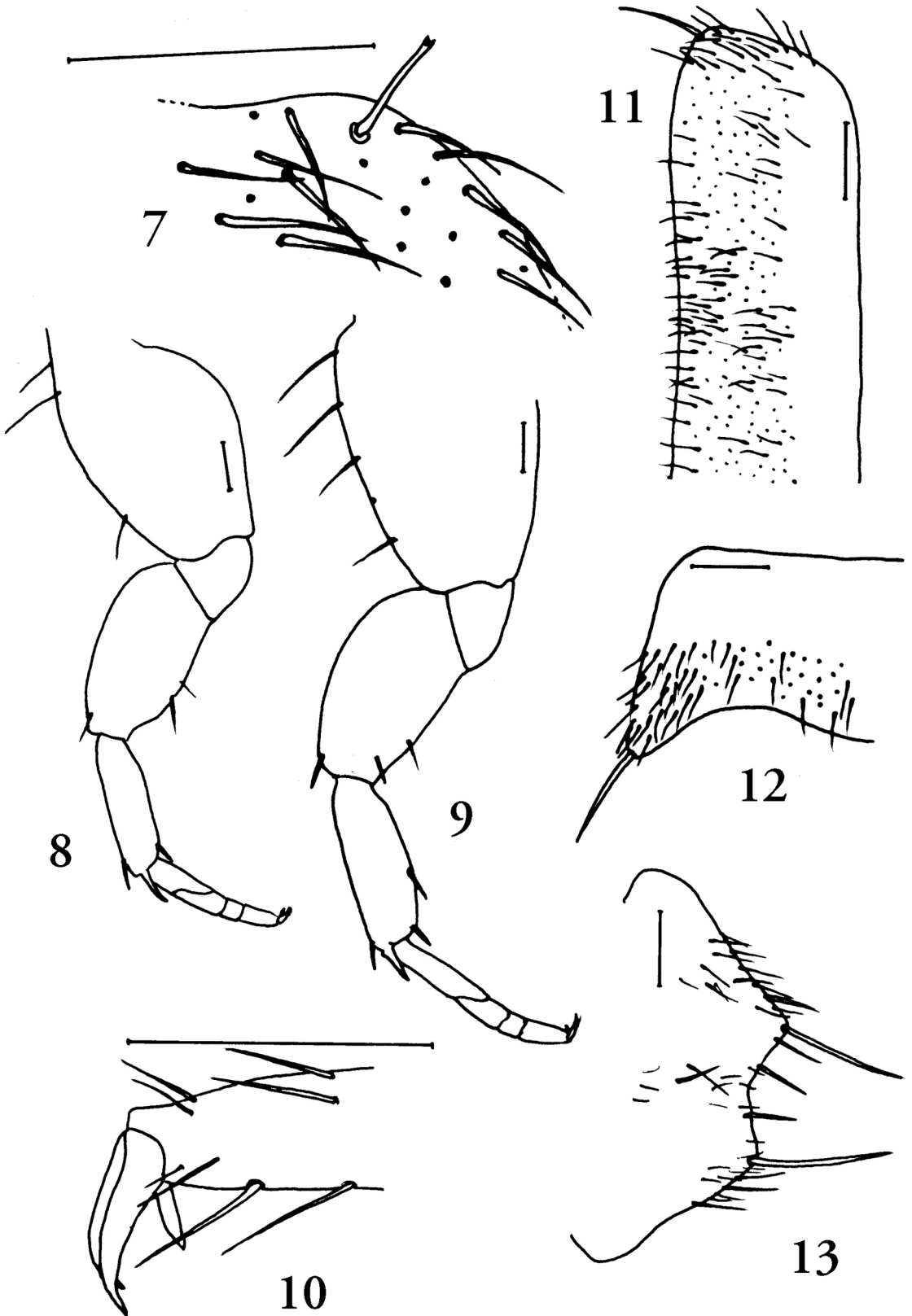
Like the new genus, *Hematelura* (Escherich, 1906 and Wygodzinsky, 1958b) and, mainly, *Trichatelura* Silvestri, 1932, *Trichotriura* Silvestri, 1918, *Trichotriurella* Mendes, 2002 and *Trichotriuroides* Mendes *et al.*, 1994 have, like the new genus, more or less "atelurid-shaped" bodies, round, short and broad, as well as a clear reduction of both, the number of abdominal stylets and vesicular structures; the last aforementioned four genera share with *Allotrichotriura* the single apical conule in the galea but they have stylets restricted to urosternites VII-IX (3 pairs only) or these structures can be even less numerous (one pair only in *Trichotriurella*).

Furthermore, *Trichatelura*, ecitophilous and Neotropical, with 2 known species from Brazil, has a single row of strong setae along the posterior border of the urotergites, thin and cylindrical labial palp apical article, very different subgenital plate, and a much shorter ovipositor. In the new genus all tergal and sternal setae are similarly developed, thin, short and arranged in several irregular rows, being slightly more dense and more developed on posterolateral areas only, with just a single macrochaeta postero-laterally. *Trichotriura*, termitophilous from Nigeria, with even smaller specimens, shows, like the preceding genus, different dorsal setation, urotergites provided with just one posterior row of well-developed setae; furthermore, the distal article of labial palp is also almost sub-cylindrical.

*Trichotriuroides*, monotypical and endemic to the Equatorial Guinean island of Bioko (formerly Macias Nguema, before that Fernando Poo) seems more similar to *Allotrichotriura* though the comparison remains



FIGURES 1-6: *Allotrichotriura saevissima* gen. nov. sp. nov., female. 1. Head. 2. Mandible. 3. Maxilla. 4. Maxillary palp. 5. Id, detail of the distal article. 6. Labial palp. Scale bars: 0.1 mm.

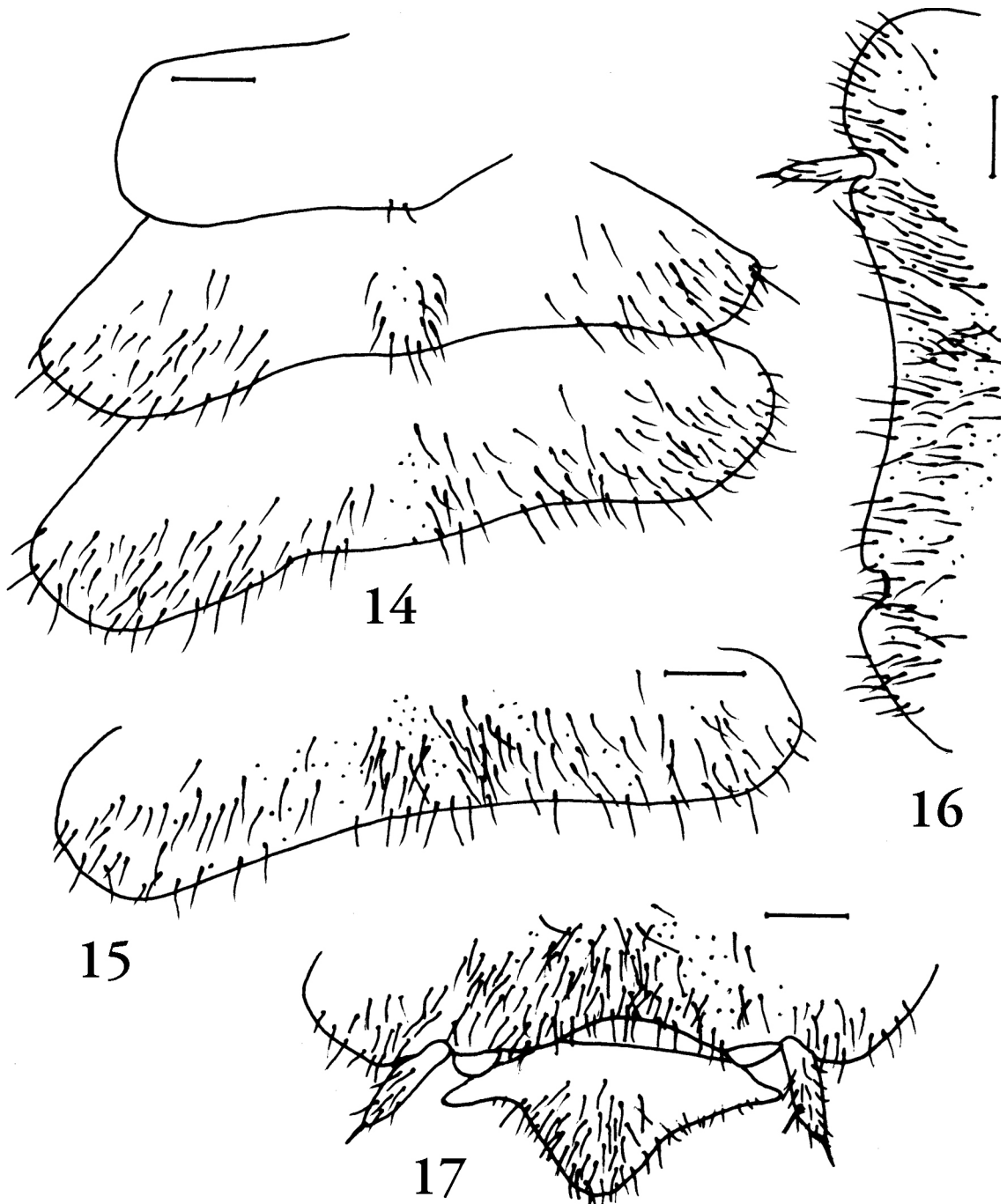


FIGURES 7-13: *Allotrichotriura saevissima* gen. nov. sp. nov., female. 7. Antero-lateral area of pronotum. 8. P I. 9. P III. 10. Praetarsus and empodium. 11. Urotergite III. 12. Urotergite IX. 13. Urotergite X. Scale bars: 0.1 mm.

difficult as the type-series of the new genus includes exclusively females while *Trichotriuroides* remains known from a single male. Main differences seem to concern the almost completely concealed abdominal tergite I due to the proportional development of the thorax (free in the new genus), the cylindrical labial

palp distal article (oval in *Allotrichotriura*), the distinct empodium, the density of setae along the body (mainly nota) and the lack of thoracic macrochaetae.

*Trichotriurella*, from the former Zaire and also monotypical, with mature specimens also smaller than those of the new genus is similarly known from

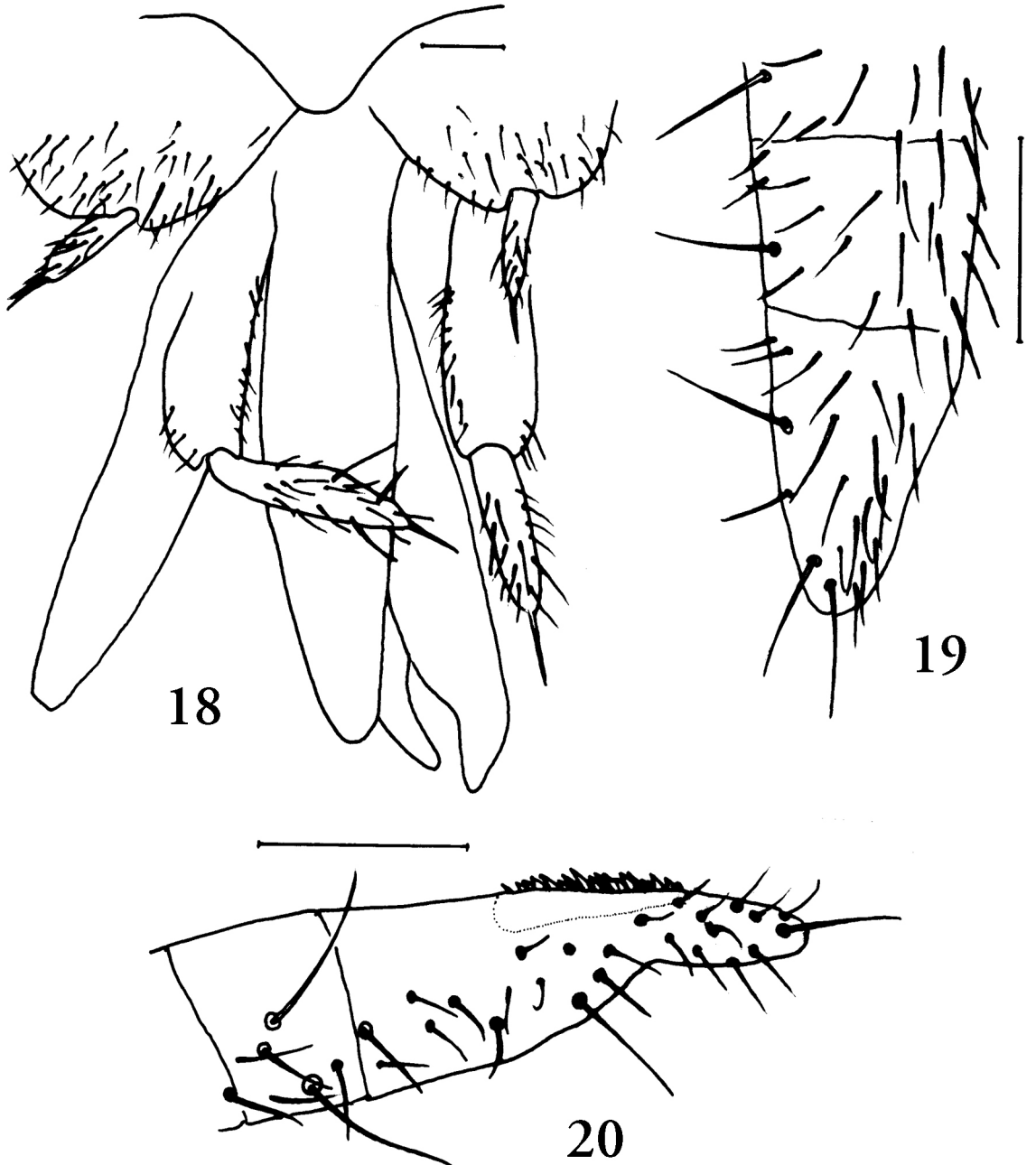


FIGURES 14-17: *Allotrichotriura saevissima* gen. nov. sp. nov., female. 14. Urosternites I-III. 15. Urosternite V. 16. Urosternite VI. 17. Urosternite VII and subgenital plate. Scale bars: 0.1 mm.

females only; among other dissimilarities, there is different cephalic setation, very distinct mandibles and maxillae, longer antennae and only one pair of abdominal stylets.

*Hematelura*, from Africa with one only representative (autochthonous?) in Brazil, shows (at least in the Afrotropical species we could study) two well

developed conules on the galea. This genus presents some variability in the number of abdominal stylets and vesicles, and the 3 known species that completely lack scales, *H. convivens* Escherich, 1906, *H. setosa* (Silvestri, 1918 sub as *Monactinella*) and *H. delamarae* Wygodzinsky, 1958 are quite distinct from *Allotrichotriura*. *H. convivens*, from Brazil, if generic



FIGURES 18-20: *Allotrichotriura saevissima* gen. nov. sp. nov., female. 18. Posterior abdomen, ventral (ovipositor outlined). 19. Gonapophyses VIII, distal divisions. 20. Gonapophyses IX, distal divisions. Scale bars: 0.1 mm.

with the remaining species and if correctly characterized, has vesicular structures on the abdominal segments VI-VII in contrast to all the remaining *Hemate-lura* and to the condition in *Allotrichotriura* gen. nov.; furthermore, the ovipositor is much longer than in the new Neotropical genus. *H. setosa*, known exclusively from type material from Guinea, with 5 pairs of stylets (V-IX), is the only species to present (in males) a conspicuous projection on the antennal pedicellus; as a rule in the known females, the ovipositor is much longer than in the new genus; lastly, *H. delamarei*, from the Ivory Coast, known only by its 5 mm long male holotype, also with 5 pairs of abdominal stylets, shows a distinct, acicular empodium and peculiar, scattered, delicate, lanceolate setae on the urotergites (nothing similar occurs in the new genus).

*Allotrichotelura saevissima* sp. nov.  
(Figs. 1-20)

*Type material:* Holotype female, BRAZIL, Rio de Janeiro: Pedro do Rio, 22°20'32.64"S, 43°7'58.96"W, 730 m of altitude, 08/05/2006, within a fire ant (*Solenopsis saevissima*) nest, coll. E.G.P. Fox, (CEIS/UNESP). Paratypes: Same data as holotype, 1 female (MZUSP) 1 female (CZ-5276).

*Description:* Female: Body length: 3-3.2 mm; thorax length: 1.4 mm; thorax width: 1.4 mm; maximum measured length of antennae: 1.3 mm; cerci length: 0.9 mm; terminal filament short, always damaged. Hypodermal pigment absent; setae and macrochaetae hyaline.

Head (Fig. 1) wider than long, the cephalic capsule with numerous thin short setae and with a few frontal acute macrochaetae. Antennae short, without peculiar features. Incisive and molar areas of mandible well developed (Fig. 2). Maxillae without remarkable features, the prosthema slightly longer than the apical tooth of lacinia, as long as the galea, which has only one reduced apical conule (Fig. 3). Maxillary palp delicate the distal article cylindrical and longer than the previous one, and with several apical sensilla (Figs. 4, 5). Labium as usual, the labial palp (Fig. 6) medium-size, its distal article ovoid, ca. 1.2 times longer than wide and with six typical apical papillae.

Nota short and wide, with numerous irregular rows of minute thin setae, their posterior border almost straight (pronotum) to slightly concave (metanotum); only one very short, apically bifid macrochaeta, stronger though not longer than the usual setae, occurs on the anterior-lateral angle of pronotum (Fig. 7). Legs

typical, tibiae (Figs. 8, 9) ca 3 times longer than wide, the empodium simple and complete (Fig. 10).

Urotergites I-VIII like the nota, with several thin short setae, more numerous on the infralateral area; one only stout macrochaeta present (Fig. 11), its robustness increasing from the anterior to the posterior segments; infralateral areas of urotergite IX poorly extended, as in Fig. 12. Urotergite X sub-trapezoidal (Fig. 13), much shorter than wide at base, its posterior notch obtuse, not especially depressed; 1+1 infralateral plus 1+1 shorter lateral macrochaetae on the posterior border and a few thin discal setae.

Urosternite I almost glabrous with a few submedian setae, II with 1+1 lateral plus 1 median well delimited groups of setae (Fig. 14); abdominal sternites III-VII with abundant thin small setae, uniformly distributed, like the dorsal plates (Fig. 15). Four pairs of abdominal stylets, on segments VI-IX (Fig. 16); only pseudovesicles VII are present. Posterior border of urosternite VII clearly concave the subgenital plate wide and short, parabolic to almost triangular (Fig. 17). Coxites VIII and IX typical (Fig. 18); ovipositor spindle-shaped, clearly exceeding the apex of stylet IX; gonapophyses VIII and IX as in Figs. 19, 20 with ca 6 divisions.

Terminal filaments short, without special features.

Male unknown.

*Etymology:* The new species is named after to its known ant host species in Brazil, *Solenopsis saevissima*.

## RESUMO

*Sobre um novo Nicoletiidae (Zygentoma: Insecta) do Brasil vivendo com formigas lava-pés (Hymenoptera: Formicidae). Descreve-se um novo Zygentoma (Nicoletiidae: Subnicoletiinae), mirmecófilo da formiga lava-pés Solenopsis saevissima (Formicidae: Myrmicinae) no Estado do Rio de Janeiro, Brasil: Allotrichotriura saevissima gen. nov. sp. nov. que é comparado com os gêneros e subgêneros conhecidos na subfamília. As principais características diagnósticas respeitam a combinação da forma do corpo, quietotaxia cefálica e do corpo, morfologia do pré-tarso e número de estilos e vesículas abdominais. Embora prospecções recentes tenham sido levadas a cabo na localidade típica, apenas se conhece a amostra original, que integra exclusivamente fêmeas.*

PALAVRAS-CHAVE: Gênero novo; Espécie nova; Subnicoletiinae; Mirmecófilo; Brasil.



## ACKNOWLEDGEMENTS

The authors are deeply obliged to Dr. Jacques Hubert Charles Delabie for the morphological confirmation of the ant host-species. They also thank the comments of the two anonymous reviewers that made the narrative more clear and incisive.

## REFERENCES

- ESCHERICH, K. 1905. Das System der Lepismatiden. *Zoologica*, Stuttgart, 43(18):1-164.
- ESCHERICH, K. 1906. Beiträge zur Kenntnis der Thysanuren. II Reihe. *Zoologischer Anzeiger*, 30:737-749.
- GALÁN, C. 2001. Nueva especie cavernícola de Thysanura Nicoletiidae de la Toca da Boavista (Estado de Bahia, Brasil). *Boletín de la Sociedad Venezolana de Espeleología*, 35:13-19.
- MENDES, L.F. & FERREIRA, R.L. 2002. On a new cave-dwelling Nicoletiidae (Zygentoma: Insecta) from Brazil. *Garcia de Orta, Zoologia*, 24(1/2):101-106.
- MENDES, L.F. 1986. Nova contribuição para o conhecimento dos tisanuros africanos (Zygentoma: Lepismatidae e Ateluridae). *Revue de Zoologie africaine*, 100(2):213-227.
- MENDES, L.F. 1994. Evolutionary relationships among the Nicoletiidae (Insecta, Zygentoma). *Acta Zoologica Fennica*, 195:98-103.
- MENDES, L.F. 1996. Novos dados e descrições de tisanuros (Microcoryphia e Zygentoma: Insecta) da América do Sul. *Garcia de Orta, Zoologia*, 21(1):129-144.
- MENDES, L.F. 2002. Novos dados sobre tisanuros (Microcoryphia e Zygentoma: Apterygota) e descrição de uma nova espécie do Brasil. *Garcia de Orta, Zoologia*, 24(1/2):81-87.
- PICCHI, V.D. 1972. Parthenogenetic reproduction in the silverfish *Nicoletia meinerti* (Thysanura). *Journal of the New York Entomological Society*, 80(1):2-4.
- SILVESTRI, F. 1901a. Descrizioni di nuovi termitofili e relazioni con gli ospiti. IV. Thysanura. *Bolletino del Museo di Zoologia e Anatomia Comparata di Torino*, 16(398):13-15.
- SILVESTRI, F. 1901b. Materiali per lo studio dei Tisanuri. III. Nuove specie di *Nicoletia*. *Bolletino della Società Entomologica Italiana*, 33:223-227.
- SILVESTRI, F. 1901c. Materiali per lo studio dei Tisanuri. V. Tisanuri trovati da altri e da me nell'America meridionale. *Bolletino della Società Entomologica Italiana*, 33:229-247.
- SILVESTRI, F. 1903. Contribuzione alla conoscenza dei termitidi e termitofili dell'America Meridionale. Termitofili (III – Thysanura). *Redia*, Firenze, 1:179-181.
- SILVESTRI, F. 1908. Thysanura. In: Michaelsen, W. & Hartmeyer, R. (Eds.), *Die Fauna Südwest-Australiens. Ergebnisse der Hamburger Südwest-australischen Forschungsreise 1905*. Gustav Fischer, Jena, p.47-68, Figs. 1-152.
- SILVESTRI, F. 1912. Tisanuri finora noti del Messico. *Bolletino del Laboratorio de Zoologia Generale e Agraria di Portici*, 6:204-221.
- SILVESTRI, F. 1946. Primo contributo alla conoscenza dei termitofili viventi com specie di *Syntermes*. *Commentationes Pontificiae Academiae Scientiarum*, 9(13):515-559.
- SMITH, G. 1998. Review of the Australian Nicoletiinae (Zygentoma: Nicoletiidae). *Invertebrate Taxonomy*, 12:135-189.
- WYGODZINSKY, P. 1942. Um novo gênero e duas novas espécies de lepismatídeo termitófilo do planalto central do Brasil (Lepismatidae, Thysanura). *Revista de Entomologia*, Rio de Janeiro, 13(3):354-359.
- WYGODZINSKY, P. 1943a. Sobre um novo gênero e uma nova espécie da subfamília «Nicoletiinae» (Lepismatidae, Thysanura) do estado de Pernambuco (Brasil). *Revista Brasileira de Biologia*, Rio de Janeiro, 3(3):351-353.
- WYGODZINSKY, P. 1943b. Nota sobre um gênero de lepismatídeo ecitófilo (Thysanura, Lepismatidae). *Revista de Entomologia*, Rio de Janeiro, 14(1/2):260-262.
- WYGODZINSKY, P. 1958a. Sobre algunos «Nicoletiidae» americanos (Thysanura, Insecta). *Acta Zoológica Lilloana*, Tucumán, 16:97-120.
- WYGODZINSKY, P. 1958b. On some Thysanura and Machilida from French West Africa. *Bulletin de l'Institut Français de l'Afrique Noire*, A, 20(4):1145-1175.
- WYGODZINSKY, P. 1980. A survey of the Nicoletiinae of Europe (Nicoletiidae, Thysanura, Insecta). *American Museum Novitates*, 2695:1-24.

Recebido em: 16.05.2009

Aceito em: 07.10.2009

Impresso em: 18.12.2009