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Source: Journal of Orthoptera Research, 20(1) : 61-73

Published By: Orthopterists' Society

URL: https://doi.org/10.1665/034.020.0106

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New synonyms and combinations in the family Proscopiidae (Orthoptera, Caelifera)

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Abstract

This paper proposes new synonyms and combinations for species of *Bolidorhynchus, Cephalocoema, Orienscopia, Pseudastroma* and *Scleratoscopia;* phallic complexes, seminal receptacles and distributions are illustrated. Most of the synonymized species were originally described by Dr. Salvador de Toledo Piza Jr., whose types were found in the collection of the Museu da Escola Superior de Agricultura "Luiz de Queiroz", Piracicaba, São Paulo, Brasil.

Tetanorhynchus insignis Hebard, 1931 is transferred to *Bolidorhynchus; T. montanus* Piza, 1977 and *T. fornicator* Piza, 1981 are synonymized under *Cephalocoema dubia* (Mello-Leitão, 1939), and the lectotype of *T. fornicator* is designated; *T. rostratus* Piza, 1977, *T. proximus* Piza, 1981 and *T. spitzi* Piza, 1981 are synonymized under *Cephalocoema sica* (Serville, 1839); *T. guairai* Piza, 1981 is synonymized under *Cephalocoema simillima* (Piza, 1943); *T. uruguaiensis* Piza, 1977 is synonymized under *Orienscopia angustirostris* (Brunner von Wattenwyl, 1890); *Cephalocoema multispinosa* Brunner von Wattenwyl, 1890 is transferred to *Pseudastroma* and *Cephalocoema leonardosi* Mello-Leitão, 1939 is synonymized under it; *T. taeniatus* Piza, 1981 is synonymized under *Pseudastroma perducta* (Mello-Leitão, 1939) and *Tetanorhynchus silvai* Rehn, 1957 is transferred back to *Scleratoscopia* and *T. mamanguapensis* Piza, 1981 is synonymized under it.

Keywords

Cephalocoema, *Tetanorhynchus*, *Pseudastroma*, *Scleratoscopia*, *Orienscopia*, *Bolidorhynchus*, new combinations, new synonyms, Brazil, genitalia

Introduction

Since Jago's revision of the family Proscopiidae (1989), male and female genital characters have taken a central place in studies of proscopiid taxonomy and systematics. Classification of the family has suffered many changes since then, as authors attempted to organize it into more coherent groups (Bentos-Pereira 1998, 2000, 2003a, 2003b, 2006a, 2006b, 2006c, 2007; Bentos-Pereira & Rowell 1999). Nevertheless, some genera remained unrevised, mainly due to inaccessibility of the primary types or lack of sufficient material.

This paper results from Master's degree work by the first author, in which the genus *Tetanorhynchus* Brunner von Wattenwyl, 1890 was revised. Most of the synonymized species were described by Dr. Salvador de Toledo Piza Jr., a Brazilian researcher who named a number of proscopiids from the forties on. Although some of his types were said to be lost (Paschoal & Barros 1977), these were subsequently found in the collection of the Museu da Escola Superior de Agricultura "Luiz de Queiroz", Piracicaba, São Paulo, Brazil. This collection was recently incorporated into the entomological collection of the Department of Entomology, Escola Superior de Agricultura "Luiz de Queiroz".

Proscopiidae is a family with a very complex taxonomic and systematic history. Species were moved often, changing between genera, according to the criteria of the specialist. This situation is clearly seen in the works of Mello-Leitão and Piza. A reliable way of classifying this cluster of species was not obtained until the study and description of the genitalia (male by Jago, female by Bentos-Pereira). Liana (1980) placed genera she thought related in subfamilies as a first and partial organization. However, our present research shows some of her conclusions are not correct.

The subfamily Proscopiinae contains two tribes, each with genera clearly related by their external and internal morphology, their habits and their distribution: **tribe Proscopiini** — Amazonic, arboreal, mostly of large size, with marked sexual dimorphism, male genitalia with complex sclerotized structures in the endophallus, and female genitalia with a single spermatheca more or less complex. Included genera are *Proscopia* Klug, 1820 (22 valid species), *Apioscelis* Brunner von Wattenwyl, 1890 (8 valid species), *Prosarthria* Brunner von Wattenwyl, 1890 (2 valid species and approximately 4 new species to be described soon), *Pseudoproscopia* Bentos-Pereira, 2006 (7 valid species) and *Carbonellis* Bentos-Pereira, 2006 (3 valid species); **tribe Tetanorhynchini** — median or small size, slight sexual dimorphism, terrestrial habits, inhabiting flatlands, cerrados and pampas, with ventral spines on their hind tibiae, male genitalia simple and membranous and female genitalia with several spermathecae. Included genera are *Tetanorhynchus* Brunner von Wattenwyl, 1890 (hitherto with 28 valid species), *Cephalocoema* Serville, 1893 (48 valid species), *Mariascopia* Bentos-Pereira, 2003 (3 valid species), *Orienscopia* Bentos-Pereira, 2000 (3 valid species), *Scleratoscopia* Jago, 1989 (hitherto with 2 valid species) and *Pseudastroma* Jago, 1989 (hitherto with 2 valid species).

More study is needed before other genera in the subfamily can be placed in tribes.

Materials and methods

Most of the studied specimens are housed at the following institutions: Escola de Agricultura "Luiz de Queiroz" (ESLQ – Piracicaba, Brazil), Laboratório de Entomologia do Instituto de Biologia da Universidade Federal do Rio de Janeiro (IBRJ – Rio de Janeiro, Brazil), Instituto Biológico (IBSP – São Paulo, Brazil), Museu Nacional da Universidade Federal do Rio de Janeiro (MNRJ – Rio de Janeiro, Brazil), Museu Parense "Emílio Goeldi" (MPEG – Belém, Brazil) and Museu de Zoologia da Universidade de São Paulo (MZSP – São Paulo, Brazil). These specimens are now labeled with a registry number preceded by the initials FCD. Other type specimens were revised by the second author, dissected and labeled with a registry number with the initials ABP. They belong principally to

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the type series at the British Museum of Natural History (BMNH – London, England), Faculdad de Ciencias (FCIEN – Universidad de la República, Montevideo, Uruguay), Staatliches Museum für Naturkunde (SMNS – Sttutgart, Germany), Naturhistorisches Museum (NMW – Vienna, Austria) and Muséum National d'Histoire Naturelle (MNHN – Paris, France).

Genera and species are listed in alphabetic order. For each species a synonymic list is presented in which we mention the depositary institution of the primary types. The following abbreviations are used, in addition to those provided above: ANSP (Academy of Natural Sciences of Philadelphia – Philadelphia, USA) and MZPW (Museum of the Institute of Zoology – Polish Academy of Science, Warsaw, Poland). Distribution maps were prepared based on collection data and the literature.

Dissection of the male genitalia followed the traditional methodology proposed by Roberts (1941). The female genitalia were dissected using a method developed by Bentos-Pereira (1996). After examination, the phallic complexes and seminal receptacles were kept with the specimens in microgenital vials, with a small label inside bearing the registry number and correspondent author initials. The specimens which had their genitalia removed are indicated in "examined material" with an asterisk after the registry number (for the FCD series).

All drawings were made under a stereomicroscope with the aid of a camera lucida. Names for external morphology follow Zolessi (1968). For the phallic complex, terminology is basically that of Jago (1989), with some terms from Bentos-Pereira (2003b) and from Kevan *et al.* (1968); other terms are proposed here (Figs 1-6). The terminology adopted for the female internal genitalia follows Amedegnato (1976). The proscopiid female internal genitalia are a seminal receptacle with a copulatory chamber that may be broad or narrow and of varied length, from which a single or several spermathecae arise. The spermathecae usually present a short or long duct and an apical diverticulum (Fig. 7).

Results with discussion

Bolidorhynchus Jago, 1989

Type species.— *Tetanorhynchus borellii* Giglio-Tos, 1897 by original designation.
Cephalocoema Serville, 1839 (*Partim*).
Tetanorhynchus Brunner von Wattenwyl, 1890 (*Partim*).

The genus *Bolidorhynchus* was defined by Jago (1989) based upon the following species: *Tetanorhynchus borellii* Giglio-Tos, 1897 (designated type-species of the genus by the author), *T. rileyi* Mello-Leitão, 1939 and *Cephalocoema magna* Giglio-Tos, 1897 (defined by the author as senior synonym of *C. gigantea* Giglio-Tos, 1897, *C. obtuse* Giglio-Tos, 1897 and *C. caizana* Giglio-Tos, 1897). All three species share distinctive morphological characters: slender and elongated body, a long fastigium apically unfolded in four foliaceous expansions. The phallic complex also exhibits peculiar sclerites, with characters found in no other proscopiid species.

Bolidorhynchus insignis (Hebard, 1931), new combination

Tetanorhynchus insignis Hebard, 1931: 267; 4 figs. Holotype ♀, "202 abp" (SMNS). Type locality: Argentina; province of Formosa; Pilcomayo River; Escondido. Mello-Leitão 1939: 333 (redescription); 7 figs. Liebermann 1939: 143. Carbonell 1977: 28. Eades & Otte 2010.

We transfer this species to *Bolidorhynchus* mainly because of the long and slender fastigium clearly observed on the female holotype, one third dramatically apically expanded in four fins crossed with several tiny striae (see Fig. 2, Pl. 1 of Hebard 1931). The species also exhibits a distinct seminal receptacle, not observed in any other *Tetanorhynchus* species.

Seminal receptacle.— (Fig. 8) **Copulatory chamber:** large and not folded. A thick folded duct begins at the end, suddenly becoming straight, opaque and smooth. **Spermatheca:** very long and single, with a thin, tiny and long prolongation at the beginning; without apical diverticulum.

Distribution.— (Fig. 34) The species ranges across the north of Argentina and the south of Bolivia and Paraguay, in the inner continent. The points plotted on the distribution map for this species are based on places where the holotype and paratypes were collected: Argentina, province of Formosa, Pilcomayo river (lat 25°22′0″S, long 57°39′0″W); Bolivia, department of Tarija, Samayhuate, Chaco Boreal (lat 21°48′0″S, long 62°55′0.12″W); and Paraguay, department of Presidente Hayes, Boquerón, Fortín Esteros (lat 23°47′0″S, long 61°1′0″W).

Material examined.—ARGENTINA. [Province of Formosa], Pilcomayo (lat 11°3′0″S, long 45°3′0″W), Escondido, III.1926, Lindner *leg.*, D. Chaco, 1 ♀ (abp 202, *T. insignis* **holotype**), SMNS.

Cephalocoema Serville, 1839

Type species.—*Proscopia* (*Cephalocoema*) *sica*, Serville 1839, by monotypy.
Proscopia Klug, 1820 (*Partim*).
Astroma Charpentier, 1841 (*Partim*).
Cephalocaema Scudder, 1869 (orthographic error).
Prosarthria Brunner von Wattenwyl, 1890 (*Partim*).
Tetanorhynchus Brunner von Wattenwyl, 1890 (*Partim*).
Astromascopia Jago, 1989. Type species: *Cephalocoema daguerrei* Mello-Leitão, 1939, by original designation of Jago, 1989.

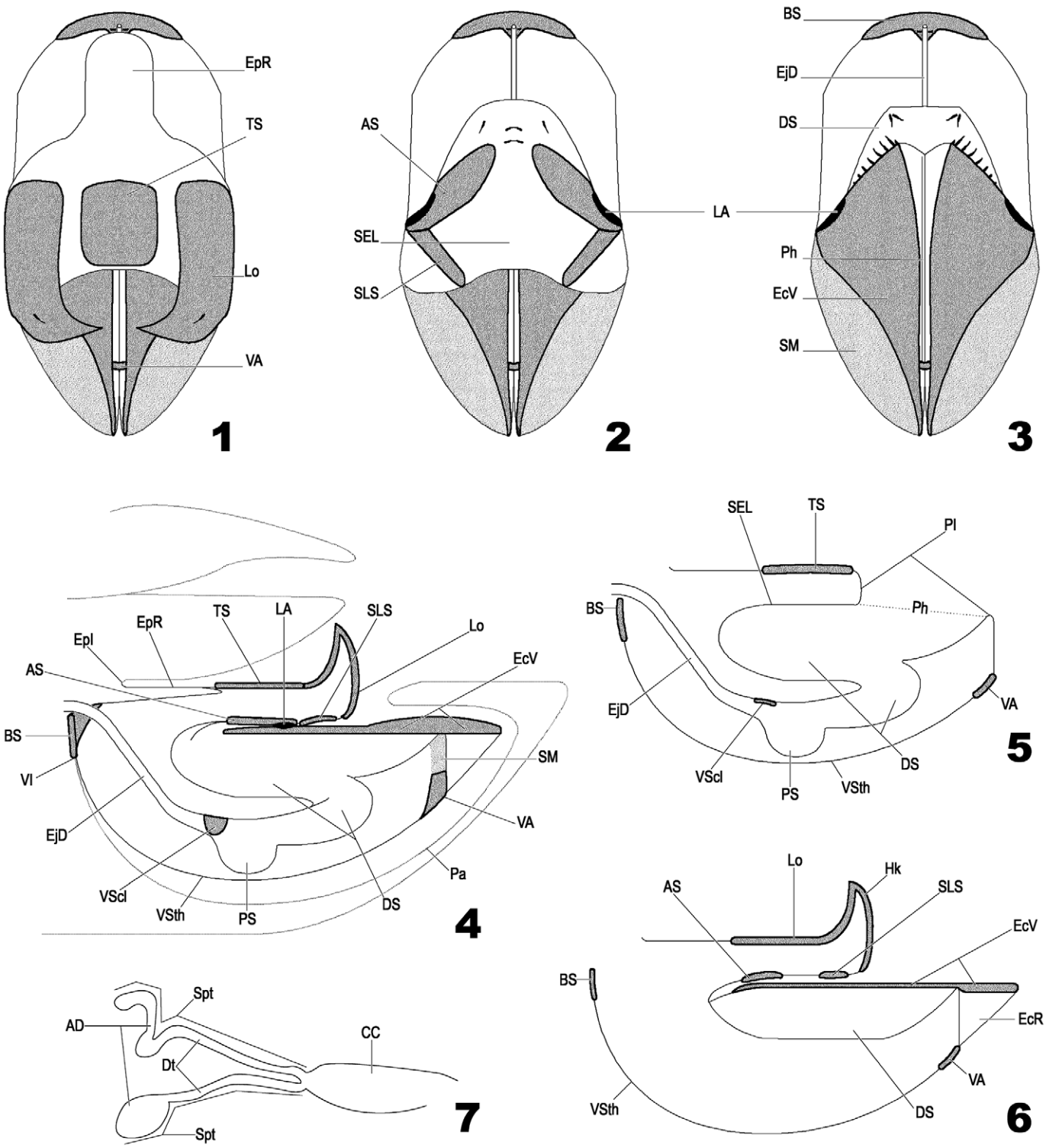
The genera *Cephalocoema* and *Tetanorhynchus* have always been placed together as close groups (Bentos-Pereira 2003b, 2007; Jago 1989; Mello-Leitão 1939). The species of these genera are certainly very similar in external morphology, and the limits between these groups remained unclear for a long time (Bentos-Pereira 2003b). It was only in 1989 that these genera were better characterized in the paper of Jago. The author suggested some new synonyms and combinations and defined both genera based on genital characters. Even though Jago (*op. cit.*) illustrated the phallic complex of all species of *Cephalocoema* examined by him, he didn't include all species of the genus in his work. In 2007, Bentos-Pereira revised the genus *Cephalocoema*, describing its seminal receptacles and proposing some modifications in the classification.

Cephalocoema dubia (Mello-Leitão, 1939)

Tetanorhynchus dubius Mello-Leitão, 1939: 330; 7 figs. Holotype ♀ (BMNH). Type locality: Brazil; state of Paraná. Carbonell 1977: 27. Liana 1980: 249. Bentos-Pereira 2007: 414 (transference to *Cephalocoema*: *C. dubia*). Eades & Otte 2010 (*C. dubia*).

Tetanorhynchus montanus Piza, 1977, **new synonym.** Piza 1977: 73. Holotype ♂ (ESLQ). Type locality: Brazil; state of Minas Gerais; Serra

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Figs 1-7. Schematic proscopiid internal genitalia. **1-3.** Phallic complex in dorsal view: 1. Phallic complex with all layers. 2. Epiphallic layer removed. 3. Epiphallic and subepiphallic layers removed. **4-6**. Phallic complex in lateral view: 4. Lateral inner view of the end of the abdomen. 5. Sagittal section of the phallic complex. 6. Parasagittal section of the phallic complex through the lophus. **7**. Seminal receptacle in lateral view. **AD**, apical diverticula; **AS**, articulated sclerites; **BS**, basal sclerite; **CC**, copulatory chamber; **Dt**, duct; **DS**, distal sac; **EcR**, ectophallic rim; **EcV**, ectophallic valves; **EjD**, ejaculatory duct; **EpI**, epiphallic infold; **EpR**, epiphallic rim; **Hk**, hook; **LA**, lateral articulation; **Lo**, lophus; **Pa**, pallium; **PI**, periphallic infold; **Ph**, phallotreme; **PS**, proximal sac; **SEL**, subepiphallic layer; **SLS**, sublophal sclerites; **SM**, sclerotized membrane; **Spt**, spermatheca; **TS**, transverse sclerite; **VA**, ventral annulus; **VI**, ventral infold; **VScl**, valvular sclerite; **VSth**, ventral sheath.

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da Mantiqueira. Mesa & Ferreira 1981: 211; 1 fig. Eades & Otte 2010.

Tetanorhynchus fornicator Piza, 1981, **new synonym.** Piza 1981: 22. Lectotype ♂, **here designated** (ESLQ). Type locality: Brazil; state of São Paulo; Campos de Jordão, Eugênio Lefevre, 1200m. Eades & Otte 2010.

We analyzed the types of all synonymized species proposed here. The only hitherto known specimen of *T. dubius* was the female holotype, and for *T. montanus* the only known specimens were the three male types. The synonymy of these species is based on the comparison of these specimens with *T. fornicator* types (a male and a female collected *in copula*). We observed the same basic characteristics between the holotype of *T. dubius* and the female paralectotype of *T. fornicator,* as between the male lectotype of *T. fornicator* and the types of *T. montanus.*

The only difference found between the types of *T. montanus* and the other analyzed males is that the subgenital plate of these types is a little longer than those in most of the other specimens, an intraspecific variation. The phallic complex of the holotype of this species could not be analyzed because it had been previously removed by another researcher and not attached to the type-specimen. However, one of the paratypes had not been previously dissected and its genitalia were examined.

Phallic complex.—(Figs 12-14) **Epiphallic layer:** transverse sclerite curved and slender, fused to the lophi forming a bridge-shaped epiphallus; lophi slender and delicate; conical hooks curved posteriorly and not much developed, but always present; epiphallic rim elongated, nearly half the length of all the epiphallic layer. **Subepiphallic layer:** all sclerites slightly sclerotized; sublophal sclerites slender, the posterior margin resting beneath the transverse sclerite of the epiphallus; articulated sclerites oblique to the phallotreme, positioned above the posterior external margin of the ectophallic valves. **Ectophallic layer:** ectophallic valves elongated, largely curved, the portion bordering the phallotreme greatly raised; ectophallic rim well developed, opening widely during genitalia eversion; ventral annulus short and reduced, ventrally binding the ectophallus; basal sclerite slender, curved and lunulated. **Endophallic layer:** distal sac totally membranous, short, distally folded under the ectophallic valves; proximal sac laterally flattened and dorsoventrally expanded; valvular sclerite well sclerotized.

Seminal receptacle.—(Fig. 9) **Copulatory chamber:** elongated, with long dorsal longitudinal furrows and a rigid membrane anteriorly projected which gives rises to two spermathecae, a dorsal and a ventral one. **Dorsal spermatheca:** thick and long duct, without apical diverticulum. **Ventral spermatheca:** short and thin duct with a reniform apical diverticulum bearing a secondary elongated diverticulum.

Distribution.—(Fig. 34) The examined specimens came from a region next to the coastal zone of the states of Santa Catarina and São Paulo. This species certainly occurs in the state of Paraná, considering that the type-specimen of *Tetanorhynchus dubius* was collected in that state. However, the locality of the specimen was not plotted on the distribution map because the specimen label is too vague: "Brazil, state of Paraná".

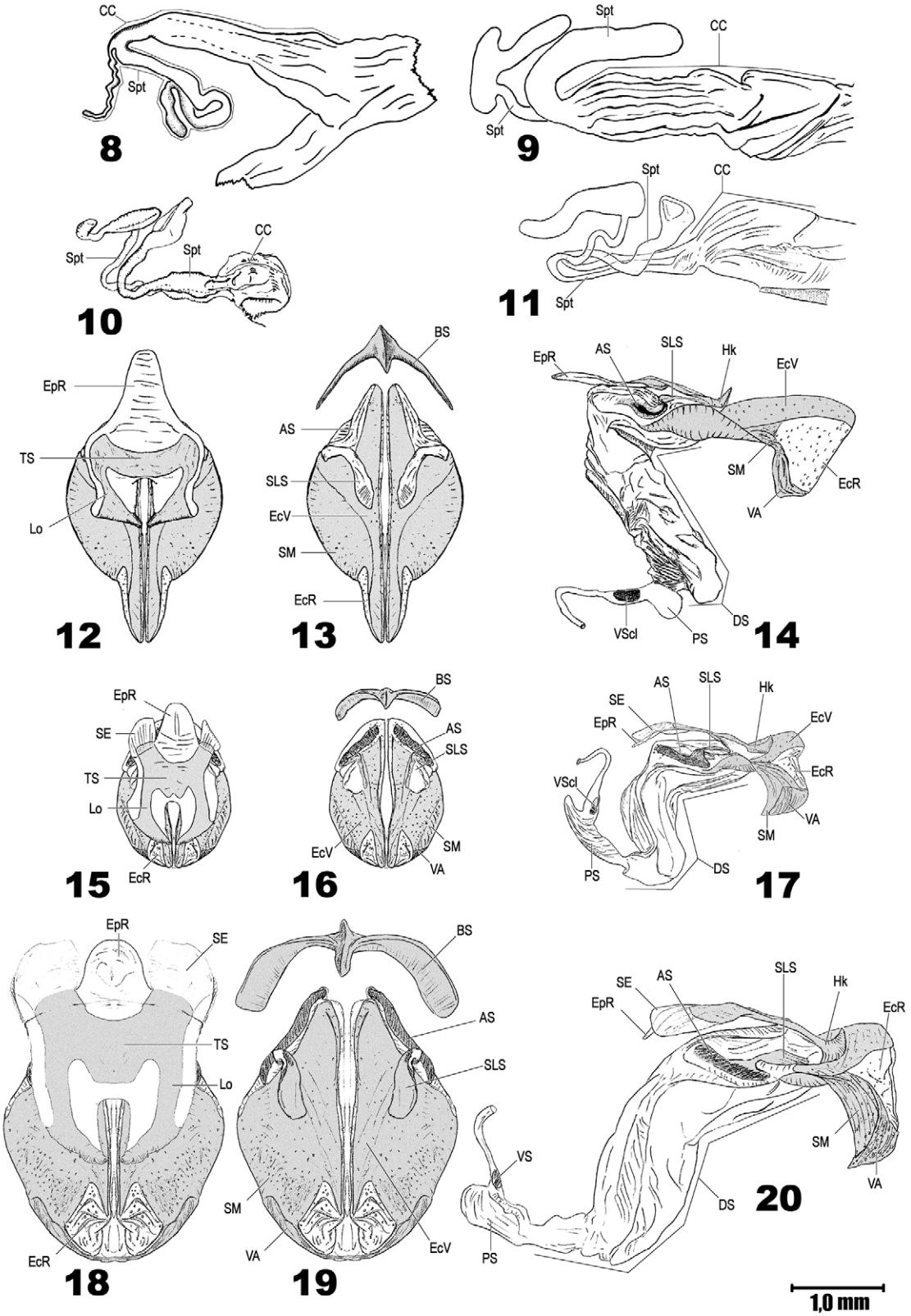
Material examined.—BRAZIL. State of Minas Gerais: Serra da Mantiqueira [21°23′24″S, 44°18′0″W]: 1.I.1962, A. Mesa *leg.*, 1 ♂ (FCD214*, *T. montanus* **paratype**), ESLQ; 31.XII.1961, A. Mesa *leg.*, 2 ♂ (FCD213, *T. montanus* **paratype**; FCD215, *T. montanus* **holotype**), ESLQ. State of Santa Catarina: Joinville [lat 26°18′0″S, long 48°49′59.88″W]: 1955, von Dirings hofen *col.*, 1 ♂ (FCD206), MZSP; no date, Schmalz *leg.*, 1 ♂ (FCD207), MZSP; 18.X.1956, Ritz *leg.*, 1 ♀ (FCD196), MZSP; 20.VII.1956, Ritz *leg.*, 1 ♂ (FCD205) and 2 ♀ (FCD014*; FCD195), MZSP; VII.1959, von Dirings hofen *col.*, 1 ♀ (FCD198), MZSP; Joinville [lat 26°16′59.88″S, long 49°19′59.88″W], Rio Vermelho, I.1960, von Dirings hofen *col.*, 4 ♂ (FCD208; FCD209*; FCD210; FCD211), MZSP; Timbó [lat 26°50′0″S, long 49°18′0″W], XI.1956, von Dirings hofen *col.*, 1 ♀ (FCD199), MZSP. State of São Paulo: Campos de Jordão [lat 22°44′0″S, long 45°35′0″W]: Sítio do Jaú, 15.IX.1979, E. M. Cancello *leg.*, 1 ♂ (FCD046*, in alcohol), MZSP; Eug. Lefevre, 1200 m: 22.III.1963, J. Guimarães, E. Rabello, A. Barroso & L. T. F. *leg.*, 1 ♀ (FCD190*, *Tetanorhynchus fornicator* **paralectotype**, collected in copula with FCD191) and 1 ♂ (FCD191*, *T. fornicator* **lectotype**, collected in copula with FCD190), ESLQ; 24.I.1963, J. Guimarães, Medeiros, L. Siva, A. Rocha & L. T. F. *leg.*, 1 ♂ (FCD189*, *T. fornicator* **paralectotype**), ESLQ; Ilha da Queimada Grande [lat 24°28′59.88″S, long 46°39′59.76″W], 2.X.1947, Instituto Butantã *leg.*, 1 ♂ (FCD185*), ESLQ; Itanhaém [24°11′0″S, 46°47′0″W], 7 km sul da Cidade Santa Júlia: 22.XI.1985, L. R. Fontes *leg.*, 1 ♂ (FCD310, in alcohol), MZSP; 29.XII.1985, L. R. Fontes *leg.*, 1 ♀ (FCD311, in alcohol), MZSP; Parque Estadual do Jacupiranga, Núcleo Cedro [lat 24°57′47″S, long 48°25′0″W], 27.I-02.II.2006, E. Aguiar & M. G. Esteves *leg.*, 1 ♂ (FCD350*, in alcohol), MZSP; Parque Estadual do Jacupiranga, Núcleo Caverna do Diabo [lat 24°38′9.9″S, long 48°24′11.4″W], 29.xi-05.XII.2005, E. Aguiar & D. M. Carolino *leg.*, 1 ♂ (FCD349*, in alcohol), MZSP; Salesópolis, Estação Biológica de Boracéia [lat 23°39′0″S, long 45°52′58.8″W]: 02-08.IV.2004, F.A.G. Mello *leg.*, 3 ♂ (FCD001*; FCD002*; FCD067*), MZSP; Trilha dos Pilões, 18-28.IV.2003, A. P. Aguiar & F. M. Rodrigues *leg.*, 1 ♂ (FCD312, in alcohol), MZSP; 19-23.XII.2002, F. C. Domenico & E. Aguiar *leg.*, 1 ♂ (FCD043*), MZSP; Santos [lat 23°57′0″S, long 46°20′0″W], Praia do Itaguaré: 13.III.1962, L. L. O. Rabello *leg.*, 1 ♂ (FCD040*), MZSP; 9.I.1961, Rabello *leg.*, 1 ♂ (FCD186), ESLQ; São Paulo [lat 23°31′59.88″S, long 46°37′0.12″W]: Cantareira, IV.1934, Camargo *leg.*, 1 ♂ (FCD188), MZSP; Capital, III.1938, Schwbel *leg.*, 2 ♀ (FCD192; FCD193), ESLQ; V.1938, E. Schw *leg.*, 1 ♀ (FCD018*), ESLQ; III.1950, Schwbel *leg.*, 1 ♂ (FCD187), ESLQ; São Pedro [lat 21°31′0″S, long 47°20′0″W], Alto da Serra, 07.II.1982, F. Mello & J. Justi Jr *leg.*, 1 ♂ (FCD184), ESLQ; São Vicente [lat 23°58′0″S, long 46°23′0″W], 8.I.1947, d'Andretta *leg.*, 1 ♂ (FCD204), MZSP. State of Paraná, XII.1907, E. Dukinfield Jones *leg.*, 1 ♀ (abp 113, *T. dubius* **holotype**), BMNH.

Cephalocoema sica (Serville, 1839)

Proscopia (Cephalocoema) sica Serville 1839: 577. Lectotype ♂ designated by Jago (1989) (MNHN). Type locality: Brazil; "partie méridionale de Campos Geraes [?]". Burmeister 1882: 8 (new status for the sub-genus *Cephalocoema*: *C. sica*). Brunner von Wattenwyl 1890: 115 (*C. sica*). Rehn (1904): 680 (*C. sica*). Kirby 1910: 88 (*C. sica*). Hebard 1924: 164 (*C. sica*). Mello-Leitão 1939: 320; 10 figs (*C. sica*). Liebermann 1939: 144 (*C. sica*). Piza 1943b: 157 (*C. sica*). Ferreira 1978: 228; 1 fig (*C. sica*). Carbonell 1977: 16 (*C. sica*). Liana 1980: 250 (*C. sica*). Bentos-Pereira 2007 (*C.sica*). Eades & Otte 2010 (*C. sica*).

Tetanorhynchus mendesi Piza 1943b: 45; 4 figs. Lectotype ♂ designated by Bentos-Pereira (2007) (ESLQ). Type locality: Brazil; state of São Paulo; Campinas. Piza 1943a: 347. Piza 1946: 157 (synonymized under *C. sica*). Mesa 1973: 158. Paschoal & Barros 1977: 244. Bentos-Pereira 2007: 406.

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Figs 8-20. Internal genitalia of *Bolidorhynchus* and *Cephalocoema* species. **8-11**. Seminal receptacles (dorsolateral view): 8. *B. insignis*. 9. *C. dubia*. 10. *C. sica*. 11. *C. simillima*. **12-20**. Phallic complexes with ventral sheath removed: 12-14. *C. dubia* (dorsal view, dorsal view without epiphallic layer and lateral view). 15-17. *C. sica* (dorsal view, dorsal view without epiphallic layer and lateral view). 18-20. *C. simillima* (dorsal view, dorsal view without epiphallic layer and lateral view). **AS**, articulated sclerites; **BS**, basal sclerite; **CC**, copulatory chamber; **DS**, distal sac; **EcR**, ectophallic rim; **EcV**, ectophallic valves; **Hk**, hook; **Lo**, lophus; **PS**, proximal sac; **SE**, sclerotized expansions; **SLS**, sublophal sclerites; **SM**, sclerotized membrane; **Spt**, spermatheca; **TS**, transverse sclerite; **VA**, ventral annulus; **VScl**, valvular sclerite. All figures at same scale. Sclerotized structures in gray.

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Cephalocoema modesta Piza & Wiendl 1969: 60; 2 figs. Holotype. ♀ (ESLQ). Type-locality: Brazil; state of Mato Grosso do Sul; Corumbá. Carbonell 1977: 15. Paschoal & Barros 1977: 239. Piza 1981: 25 (transference to *Tetanorhynchus*: *T. modestus*). Bentos-Pereira 2007: 406 (synonymized under *C. sica*).

Tetanorhynchus rostratus Piza 1977, **new synonym**. Piza 1977: 72. Holotype ♂ (ESLQ). Type locality: Brazil; state of São Paulo; Itaiúba. Eades & Otte 2010.

Tetanorhynchus proximus Piza 1981, **new synonym**. Piza 1977: 71. Holotype ♂ (ESLQ). Type locality: Brazil, state of São Paulo; Piracicaba. Mesa 1981: 211; 1 fig. Eades & Otte 2010.

Tetanorhynchus spitzi Piza 1981, **new synonym.** Piza 1981: 25; 1 fig. Holotype ♀ (ESLQ). Type locality: Brazil, state of São Paulo; Campos de Jordão; Eugênio Lèfreve, 1200m. Eades & Otte 2010.

The holotypes of *Tetanorhynchus proximus* and *T. rostratus* were examined, but the phallic complexes from both specimens had been previously removed. Hence, their internal genitalia could not be analyzed. The synonyms here proposed are based on the external morphology, which exhibits almost the same characters described for *Cephalocoema sica* by Bentos-Pereira (2007). Some characteristics are strikingly similar, such as the shape and size of the fastigium and the subgenital plate or the prothorax coloration, with distinct and bright lateral bands on the pronotum and on the median zone of the prosternum.

In the original description of *T. proximus*, Piza (1977) compares this species with *T. mendesi* (previously synonymized under *C. sica* by the same author in 1946), stating that it would differ from *T. mendesi* "only in the antennae almost reaching the top of the fastigium (quite more distant in *mendesi*) and the subgenital plate end not bifid". However, we found a great intraspecific variation in these characters among the specimens classified as *C. sica*. If one analyses only these characteristics cited by Piza (1977), it would not be possible to distinguish *T. proximus* from *C. sica*; the general aspect of the holotype of *T. proximus* is the same as *C. sica*.

Piza (1977), in the description of *T. rostratus*, again draws a comparison with *T. mendesi*, but *T. rostratus* would differ "by possessing a head clearly longer than the pronotum". Actually, the holotype of *T. rostratus* exhibits a long head, but taking into account that all the other characters of the external morphology agree with those described for *C. sica*, we think that the longer head represents only an intraspecific variation of *C. sica*.

Tetanorhynchus spitzi was also described by Piza (1981). Both holotype and paratype are females and show the same characters of *C. sica*, excepting that these specimens are a bit smaller than the others. Their seminal receptacles are just like the ones found in the other exemplars. Thus, the synonymy of *T. spitzi* under *C. sica* is proposed and the difference in size would represent only an intraspecific variation.

Phallic complex.— (Figs 15-17) **Epiphallic layer:** transverse sclerite fused to the lophi, with two subtriangular posterior expansions; lophi easily distinguished, parallel, bearing well-developed hooks pointed to the phallotreme; epiphallic rim nearly a third of the total length of the epiphallic layer; anterior sclerotized expansions present in the epiphallus (Fig. 2b). **Subepiphallic layer:** sublophal sclerites slightly sclerotized, lying below the epiphallus; articulated sclerites oblique to the phallotreme, a little more sclerotized than the sublophal sclerites. **Ectophallic layer:** ectophallic valves short and depressed, fused to the ventral annulus by a sclerotized membrane; ectophallic rim also short, not much developed; ventral annulus well sclerotized; basal sclerite enlarged and very sclerotized. **Endophallic layer:** distal sac totally membranous, the distal part of it folded below the ectophallic valves and the proximal part wide and folded below the distal region; proximal sac laterally flattened and dorsoventrally expanded; valvular sclerite not much sclerotized.

Seminal receptacle.— (Fig. 10) **Copulatory chamber:** short, with two spermathecae arising from its anterior border, a dorsal and a ventral one. **Dorsal spermatheca:** long and wide duct with an elongated or sometimes globulose apical diverticulum. **Ventral spermatheca:** duct longer and more slender than the dorsal one, with an elongated apical diverticulum bearing a little secondary diverticulum which varies in length.

Distribution.— (Fig. 34) This species is found only in the state of São Paulo. The type locality of *Cephalocoema sica* is vague and confusing: "Brazil, partie méridionale de Campos Geraes". However, since Jago (1989) says that the label refers to some locality in the state of São Paulo, we decided to plot it at the center of the state (lat 22°16′15″S, long 48W44′15″W).

Material examined.—BRAZIL. State of Minas Gerais: Pouso Alegre [lat 22°13′0″S, long 45°56′0″W], XII.1953, Pe. Pereira *leg.*, 1 ♀ (FCD097), MZSP; Santa Rita de Caldas [lat 22°1′59.88″S, long 46°19′59.88″W], XII.1953, Pe. Pereira *leg.*, 1 ♂ (FCD096), MZSP. State of São Paulo: Bocaina [lat 21°21′0″S, long 47°47′0″W], IV.1924, no collector, 1 ♂ (FCD232), MZSP; Campinas [lat 22°54′0″S, long 47°5′0″W]: 1.V.1938, O. B. *leg.*, 1 ♀ (FCD080, *T. mendesi* **paralectotype**), ESLQ; 20.XII.1938, A. J. T. M. *leg.*, 5 ♂ (FCD064*, FCD074, FCD082, FCD083, FCD091, all *T. mendesi* **paralectotype**) and 1 ♀ (FCD076*, *T. mendesi* **paralectotype**), ESLQ; Sítio São Francisco, 25.XII.2004, G. I. M. Santos *leg.*, 1 ♂ (FCD047*), MZSP; 31.X.1939, A. P. V. *leg.*, 1 ♀ (FCD088, *T. mendesi* **paralectotype**), ESLQ; II.1937, L. O. T. M. *leg.*, 1 ♂ (FCD087, *T. mendesi* **paralectotype**), ESLQ; III.1937, O. B. *leg.*, 1 ♀ (FCD085, *T. mendesi* **paralectotype**), ESLQ; V.1937, L. O. T. M. *leg.*, 1 ♂ (FCD075*, *T. mendesi* **lectotype**), ESLQ; VI.1937, L. O. T. M. *leg.*, 1 ♂ (FCD072, *T. mendesi* **paralectotype**), ESLQ; VII.1936, L. O. T. M. *leg.*, 1 ♀ (FCD077, *T. mendesi* **paralectotype**), ESLQ; VIII.1937, L. O. T. M. *leg.*, 1 ♂ (FCD073, *T. mendesi* **paralectotype**), ESLQ; X.1937, O. B. *leg.*, 1 ♀ (FCD090, *T. mendesi* **paralectotype**), ESLQ; XI.1937, O. B. *leg.*, 1 ♀ (FCD089*, *T. mendesi* **paralectotype**), ESLQ; XII.1938, A. J. T. M. *leg.*, 1 ♀ (FCD079, *T. mendesi* **paralectotype**), ESLQ; Campos de Jordão [lat 22°44′0″S, long 45°35′0″W], Eug. Lefevre; 1200m, 7.XII.1926, Spitz *leg.*, 1 ♀ (FCD227*, *T. spitzi* **holotype**), ESLQ; Itaituba [Itaiúba, lat 20°44′0″S, long 49°53′0″W], 22.XI.1961, A. Mesa *leg.*, 1 ♂ (FCD217, *T. rostratus* **holotype**), ESLQ; Itú, Faz. Pau d'Alho [lat 23°16′0″S, long 47°19′0″W]: 30.IX.1977, Curso de Entomologia *leg.*, 2 ♂ (FCD058*, FCD059*), MZSP; X.1962, no collector, 1 ♂ (FCD061*), MZSP; Jibóia [lat 22°49′33″S, long 47°52′3″W], X.1949, Lordelo *leg.*, 1 ♂ (FCD093), ESLQ; Leme [lat 22°12′0″S, long 47°24′0″W], 8.X.1973, Egle *leg.*, 1 ♀ (FCD099), ESLQ; Morungaba [lat 22°52′0″S, long 46°48′0″W], 19.II.1985, L. R. Fontes *leg.*, 1 ♀ (FCD278*), MZSP; Nova Europa [lat 21°46′0″S, long 48°33′0″W], 30.IV.1968, K. Lenko *leg.*, 1 ♂ (FCD016*), MZSP; Piracicaba [lat 22°43′0″S, long 47°38′0″W]: 27.XI.1961, A. Mesa *leg.*, 1 ♂ (FCD095, *T. proximus* **holotype**), ESLQ; Paredão Vermelho, 22.V.1962, A. Mesa *leg.*, 1 ♂ (FCD094*), ESLQ; sem data, sem coletor, 1 ♂ (FCD078, *T. mendesi* **paralectotype**), ESLQ; Santo Amaro [lat 23°39′0″S, long 46°42′0″W], III.1957, no collector, 1 ♀ (FCD012*),

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MZSP; São Paulo [lat 23°32′0″S, long 46°37′0″W]: 18.VIII.1961, A. G. Faria *leg.*, 1 ♂ (FCD216), MZSP; III.1926, no collector, 1 ♀ (FCD102), MZSP; III.1958, Sahahel *leg.*, 1 ♂ (FCD045*), ESLQ; XII.1944, Navajas *leg.*, 1 ♀ (FCD229), IBSP; Ypiranga, no collector, 1 ♀ (FCD098), MZSP; Capital, Brooklin Paulista, 5.III.1962, L. G. Travassos *leg.*, 1 ♀ (FCD228, *T. spitizi* **paratype**), ESLQ; São Paulo, Cumbica, no date, Hélio Lódi *leg.*, 1 ♀ (FCD230), IBSP.

Cephalocoema simillima (Piza, 1943)

Tetanorhynchus simillimus Piza 1943b: 47; 1 fig. Lectotype ♀ designated by Bentos-Pereira (2007) (ESLQ). Type locality: Brazil; state of São Paulo; Marília. Piza 1946: 158 (transference to *Cephalocoema* and male description: *C. simillima*); 4 figs. Carbonell 1977: 16 (*C. simillima*). Paschoal & Barros 1977: 238. Bentos-Pereira 2007: 410 (*C. simillima*). Eades & Otte 2010 (*C. simillima*).

Tetanorhynchus guairai Piza 1981, **new synonym.** Piza 1981: 23; 1 fig. Holotype ♀ (ESLQ). Type locality: Brazil; state of São Paulo; Guairá; Sete Quedas. Eades & Otte 2010.

The synonym here proposed for *Cephalocoema simillima* is based on shared characters observed in all the analyzed specimens. Though some variation was observed in the size of some structures the specimens exhibit the same pattern.

Tetanorhynchus guairai was described by Piza (1981) based exclusively on external characters of a single female. In that paper, Piza asserted that the specimen "is very similar to the female of some related species [without any specification of which species they were], from which it can be distinguished by the deep and distinct sternal suture, by the white bands in the thorax and by the anterior and mesofemora clearly thicker in the base". However, all the mentioned characters show a great intraspecific variation, and the chromatic character is not very clear and could be a preservation artifact or arise from the way the insect was killed. All the other characters found in the specimen are the same as those found in *Cephalocoema simillima*, the seminal receptacle also exhibiting the same structure.

Phallic complex.— (Figs 18-20) **Epiphallic layer:** transverse sclerite fused to the lophi, with a trapezoid expansion on the posterior border; lophi distinct, roughly parallel to each other, with delicate hooks turned to the phallotreme, but without touching each other; epiphallic rim with one third of the total length of the epiphallic layer. **Subepiphallic layer:** sublophal sclerites not much sclerotized, located beneath the lophi and reaching the posterior border of the transverse sclerite of the epiphallus; articulated sclerites also not much sclerotized, wide and obliquely oriented in relation to the phallotreme. **Ectophallic layer:** ectophallic valves short and depressed, fused to the ventral annulus by a sclerotized membrane; ectophallic rim very short; ventral annulus very sclerotized and with visible borders; basal sclerite well sclerotized, semilunated. **Endophallic layer:** distal sac totally membranous, the distal part folded beneath the ectophallic valves, its limits vaguely distinct from the proximal part, which is very ample; proximal sac laterally flattened and dorsoventrally expanded, elongated; valvular sclerite not much sclerotized.

Seminal receptacle.— (Fig. 11) **Copulatory chamber:** prominent, with two spermathecae arising from the anterior border, a dorsal and a ventral one. **Dorsal spermatheca:** long and thin duct with a globular apical diverticulum. **Ventral spermatheca:** long and thin duct with almost the same length as the dorsal one, bearing a curveted and elongated apical diverticulum, sometimes less extensive.

Distribution.— (Fig. 34) This species occurs exclusively in Brazil, in the states of São Paulo and Paraná.

Material examined.—BRAZIL. State of Paraná: Guaíra [lat 24°4′0.12″S, long 54°15′0″W], Sete Quedas, 9.XII.1969, G. R. Kloss *leg.*, 1 ♀ (FCD201*, *T. guairae* **holotype**), ESLQ; Londrina [lat 23°18′0″S, long 51°9′0″W], 1942, von Dirings hofen *coll.*, 1 ♂ (FCD203), MZSP; Rolândia [lat 23°18′0″S, long 51°22′0.12″W], X.1949, von Dirings hofen *coll.*, 1 ♀ (FCD202*), MZSP. State of São Paulo: Marília [lat 22°13′0.12″S, long 49°55′59.88″W]: II.1938, P. V. C. B. *leg.*, 2 ♀ (FCD132, FCD137, both *C. simillima* **paralectotype**), ESLQ; XI.1937, P. V. C. B. *leg.*, 1 ♀ (FCD131*, *C. simillima* **lectotype**) and 5 ♀ (FCD133*, FCD134, FCD138*, FCD139, FCD140, all *C. simillima* **paralectotype**), ESLQ; Porto Cabral [lat 22°16′59.88″S, long 52°37′59.88″W], Rio Paraná: 1-25.IV.1944, Trav. F°, Carrera & E. Dente *leg.*, 2 ♂ (FCD274, FCD277) and 2 ♀ (FCD275*, FCD276*), MZSP; 20-31.III.1944, Trav. F°, Carrera & EDente *leg.*, 11 ♀ (FCD003*, FCD116, FCD117, FCD118*, FCD121, FCD122, FCD123, FCD124, FCD125*, FCD126, FCD127) and 5 ♂ (FCD119, FCD120, FCD128, FCD129*, FCD279*), MZSP, and 1 ♂ (FCD130), ESLQ; Ribeirão Preto [lat 21°10′0″S, long 47°48′0″W], II.1937, L. O. T. M. *leg.*, 1 ♂ (FCD135*), MZSP; Estação Salto Grande [Salto Grande, lat 22°54′0″S, long 49°59′0″W], II.1911, Luederwaldt *leg.*, 1 ♂ (FCD066*), MZSP; Rodrigues Alves [São Paulo, lat 23°31′59.88″S, long 46°37′0.12″W], 9-11.XII.1943, Araujo & Prado *leg.*, 1 ♀ (FCD136), IBSP.

Orienscopia Bentos-Pereira (2000)

Type species.—*Orienscopia sanmartini* Bentos-Pereira, 2000, by original designation.
Cephalocoema Serville, 1839 (*Partim*).
Tetanorhynchus Brunner von Wattenwyl, 1890 (*Partim*).

In 1989, Jago defined the genus *Astromascopia* to accommodate *Cephalocoema daguerrei* Mello-Leitão, 1939 (designated as the type-species by the author) and *C. albrechti* Zolessi, 1968. The genus remained unaltered until 2000, when Bentos-Pereira (2000) transferred *A. daguerrei* back to *Cephalocoema*, where it had been originally described. Bentos-Pereira described the new genus *Orienscopia* to accommodate *C. albrechti* (defined as junior synonym of *C. angustirostris* Brunner von Wattenwyl, 1890 and senior synonym of *C. puella* Piza 1955), *C. costulata* Burmeister, 1882 (designated as senior synonym of *C. cordobensis* Mello-Leitão 1941 and *C. uruguaiensis* Piza, 1955) and *Orienscopia sanmartini* (a new species designated by Bentos-Pereira as the type-species of the genus).

Orienscopia angustirostris (Brunner von Wattenwyl, 1890)

Tetanorhynchus angustirostris Brunner von Wattenwyl 1890: 107. Holotype ♀ (NMW). Type locality: Argentina; province of Entre Rios; San José. Giglio-Tos 1894: 5. Giglio-Tos 1897: 19. Bruner 1900: 19. Bruner 1906: 619. Kirby 1910: 86. Mello-Leitão 1939: 326, 6 figs. Liebermann 1939: 142. Carbonell 1977: 26. Bentos-Pereira 2000: 152, 6 figs. (transference to *Orienscopia*: *O. angustirostris*). Eades *et al.* 2010 (*O. angustirostris*).

Cephalocoema puella Piza 1955: 159. Holotype ♂ (FCIEN). Type locality: Uruguay; department of Artigas; Sepulturas. Carbonell 1977:

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16. Bentos-Pereira 2000: 152 (synonymizes under *O. angustirostris*). *Cephalocoema albrechti* Zolessi 1968: 56; 99 figs. Holotype ♂ (MNHN). Type locality: Uruguay; department of Paysandú; Puerto Pepe Ají. Descamps 1973: 86, 5 figs. Carbonell 1977: 12. Eades & Otte 2010. Jago 1989: 265; 2 figs. (transference to *Astromascopia*: *A. albrechti*). Bentos-Pereira 2000: 152 (*A. albrechti*: synonymizes under *O. angustirostris*).

Tetanorhynchus uruguaiensis Piza 1977, **new synonym.** Piza 1977: 72. Holotype ♂ (ESLQ). Type locality: Uruguay; department of Artigas; San Gregório. Eades & Otte 2010.

The synonymy of *T. uruguaiensis* is here established, based on an examination of the type for the characters described by Bentos-Pereira (2000) for *Orienscopia angustirostris*.

Phallic complex.— (Figs 21-22) **Epiphallic layer:** transverse sclerite absent; lophi slender and elongated, with small and delicate hooks; epiphallic rim narrow and short, with a pair of anteriorly projected sclerotized membranes extending to the basal sclerite of the ectophallic membrane, forming a circular structure through which the ejaculatory duct passes. **Subepiphallic layer:** sublophal sclerites short and not much sclerotized; articulated sclerites more sclerotized, posteriorly connected to the sublophal sclerites and projected into the spermatophore sac. **Ectophallic layer:** ectophallic valves elongated and delicate, with the margin of the phallotreme raised; ectophallic rim posteriorly projected; ventral annulus short and not much sclerotized, fused to the ectophallic valves by a sclerotized membrane that surrounds those valves from its articulation with the articulated sclerites until the beginning of the ectophallic rim; basal sclerite very distinctive, semicircular and very sclerotized, located beyond the anterior sclerotized membranes of the epiphallic layer. **Endophallic layer:** distal sac with a pair of dorsal semispherical invaginations and a pair of thin and elongated sacs arising from the distal region which remains folded beneath the ectophallic valves; proximal sac well developed, laterally flattened and dorsoventrally expanded; valvular sclerite large but not much sclerotized.

Distribution.— (Fig. 34) This species occurs only in the north of Argentina and in Uruguay, in the inner continent. In addition to the localities of the examined material, we plotted on the distribution map the type localities of *C. angustirostris* [Argentina, province of Entre Rios, San José (de Feliciano) (lat 30°22'59.88"S, long 58°45'0"W)], *C. albrechti* [Uruguay, department of Paysandu, (province of Paysandu), Puerto Pepe Ají (lat 32°19'17.04"S, long 58°4'32.16"W)] and *C. puella* [Uruguay, department of Artigas, Sepulturas (lat 30°46'0"S, long 56°4'0"W)].

Material examined.—URUGUAY. Department of Artigas: San Gregório [30°33'0"S, 57°52'0"W], 23.III.1959, A. Mesa y P. San Martin *leg.*, 1 ♂ (FCD115*, *T. uruguaiensis* **holotype**) and 1 ♂ (FCD114, *T. uruguaiensis* **paratype**), ESLQ.

Pseudastroma Jago, 1989

Type species.— *Tetanorhynchus gracilis* Bruner, 1913, by original designation.
Cephalocoema Serville, 1839 (*Partim*).
Tetanorhynchus Brunner von Wattenwyl, 1890 (*Partim*).

The genus *Pseudastroma* was established by Jago (1989) including *Tetanorhynchus gracilis* Bruner, 1913 (designated as the type species) and *Cephalocoema perducta* Mello-Leitão, 1939. Both species share some exclusively genital characters which distinguish them from all other proscopiids. We add here some species and female characteristics.

Pseudastroma multispinosa (Brunner von Wattenwyl, 1890), new combination

Cephalocoema multispinosa Brunner von Wattenwyl 1890: 116. Holotype ♀ (NMW). Type locality: Brazil; state of Rio Grande do Sul; Porto Alegre. Mello-Leitao 1939: 314. Liana 1972: 423. Carbonell 1977: 15. Bentos-Pereira 2007: 418.

Cephalocoema leonardosi Mello-Leitão 1939, **new synonym.** Mello-Leitão 1939: 311; 11 figs. Holotype ♂ (MNRJ). Type locality: Brazil; state of Mato Grosso; Alto Araguaia. Carbonell 1977: 15. Jago 1989: 302; 2 figs (transference to *Tetanorhynchus*: *T. leonardosi*). Eades & Otte 2010 (*T. leonardosi*).

Cephalocoema maculatissima Mello-Leitão 1939: 313; 6 figs. Holotype ♀ (MNRJ). Type locality: Brazil; state of Mato Grosso; Alto Araguaia. Carbonell 1977: 15. Jago 1989: 302 (synonym with *T. leonardosi*).

From the analysis of the male holotype and female paratype of *C. leonardosi*, female holotype of *C. multispinosa* and female holotype of *C. maculatissima*, we found that these three names are synonyms and belong in *Pseudastroma*. They share a very typical seminal receptacle, and the only male examined has the characteristic phallic complex described by Jago (1989) when he diagnosed his new genus. In addition, the external morphological characters of the type specimens of *T. leonardosi* and *C. maculatissima* agree with those found in *Pseudastroma*. Even the dark longitudinal median stripe we observed on the species of *Pseudastroma* is found on the female holotype of *T. leonardosi* [pr. II, fig. 5 of Mello-Leitão (1939)]. The phallic complex [illustrated by Jago (1989)] is indeed a little different from the basic pattern of *Pseudastroma*. Nevertheless, Jago says that it "suffers from both its immaturity and previous preservation in alcohol". We agree with that; it is an adult which appears to have suffered some injury, probably during its imaginal moult.

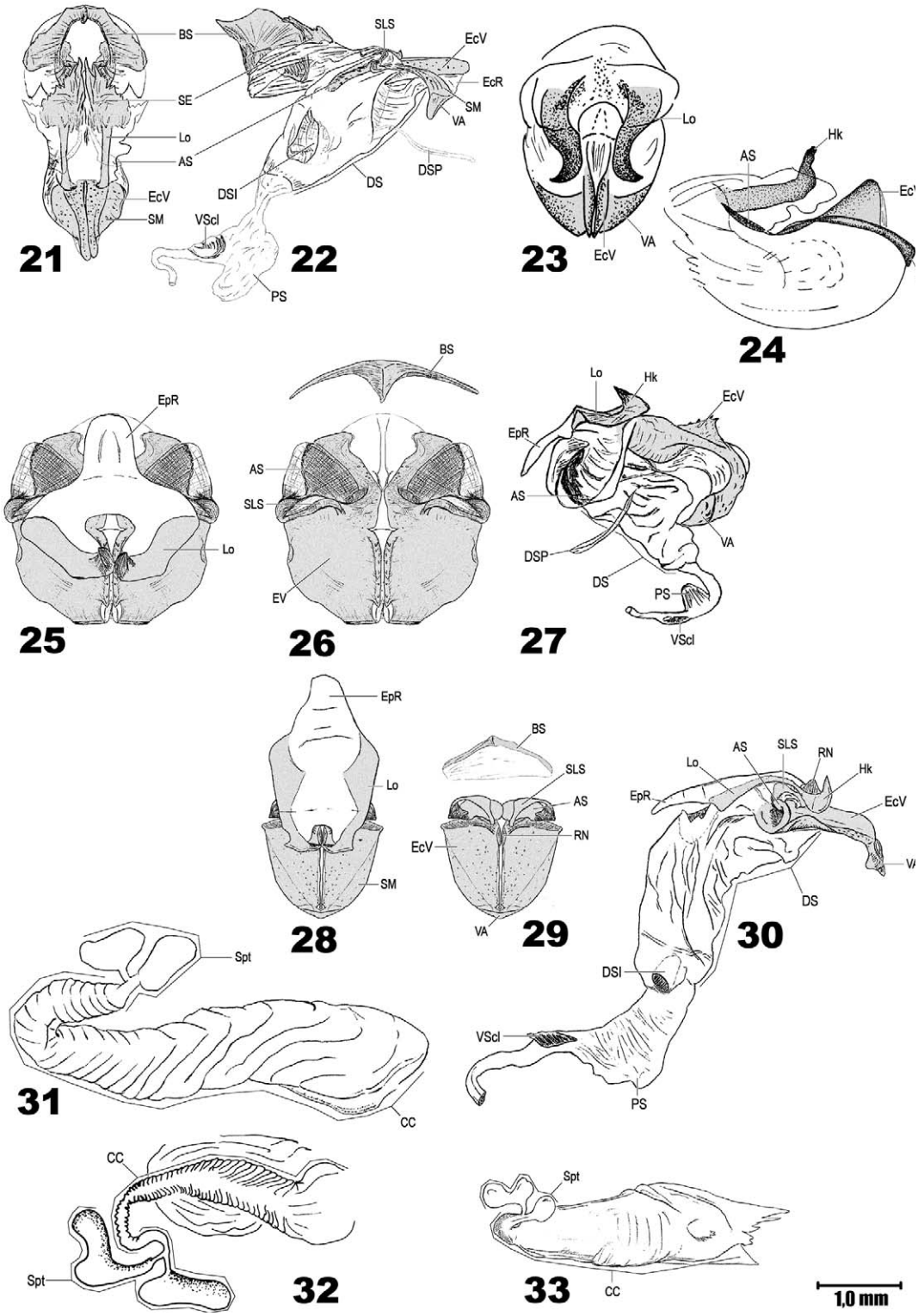
Nonetheless, the phallic complex shows some resemblance to those of *Pseudastroma*, and since the seminal receptacle and the external morphological characters of this species agree with those found in *Pseudastroma*, we propose here the transference of this species to *Pseudastroma*.

Phallic complex.— (Figs 23-24) **Epiphallic layer:** transverse sclerite absent; robust lophi with very distinctive shape; hooks turned outward in *C. leonardosi* holotype and folded upon themselves and turned inward in the other specimens. **Subepiphallic layer:** small and oblique articulated sclerites. **Ectophallic layer:** ectophallic valves slender and not much developed, bordering an ample and prominent phallotreme; ventral annulus elongated. **Endophallic layer:** all sacs totally membranous, with simple proximal sac.

Seminal receptacle.— (Fig. 32) **Copulatory chamber:** elongated and entirely pleated, like a spiral tube one and a half times longer than the spermathecae, with a short and thick terminal prolongation which gives rise to the spermathecae. **Spermathecae:** two spermathecae of similar size originate from the copulatory chamber, each with a short duct and a globulose or reniform apical diverticulum.

Distribution.— (Fig. 34) This species is widely distributed, from the

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Figs 21-33. Internal genitalia of *Orienscopia*, *Pseudastroma* and *Scleratoscopia* species. **21-30**. Phallic complexes with ventral sheath removed: **21-22.** *O. angustirostris* (dorsal view and lateral view). **23-24.** *P. multispinosa* (dorsal view and lateral view). **25-27.** *S. silvai* (dorsal view, dorsal view without epiphallic layer and lateral view). **28-30.** *P. perducta* (dorsal view, dorsal view without epiphallic layer and lateral view). **31-33**. seminal receptacles (dorsal view): **31.** *P. perducta*. **32.** *P. multispinosa*. **33.** *S. silvai*. **AS**, articulated sclerites; **BS**, basal sclerite; **CC**, copulatory chamber; **DS**, distal sac; **DSI**, semi-spherical invagination; **DSP**, distal sac projection; **EcR**, ectophallic rim; **EcV**, ectophallic valves; **Hk**, hook; **Lo**, lophus; **PS**, proximal sac; **RN**, raised nodule; **SE**, sclerotized expansions; **SLS**, sub-lophal sclerites; **SM**, sclerotized membrane; **Spt**, spermatheca; **TS**, transverse sclerite; **VA**, ventral annulus; **VScl**, valvular sclerite. All figures at same scale. Sclerotized structures in gray.

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south to the northeast of Brazil, being found also in the central-western region. It seems to be associated with inner-continent vegetation.

Material examined.—BRAZIL. State of Bahia: Campo Formoso [lat 11°19′0″S, long 42°1′0″W], 21.VI.1990, C. Amedegnato & S. Poulain *leg*. 1 ♀ (abp 365), MNHN. State of Mato Grosso do Sul: Alto Araguaya [lat 17°19′0″S, long 53°12′0″W], Dr. Othon Leonardos *leg*., 1 ♂ (abp 389, No. 11044, *Cephalocoema leonardosi* **holotype**) and 1 ♀ (abp 16, No. 11078, *Cephalocoema maculatissima* **holotype**), MNRJ; 100 Km. N. de Campo Grande [lat 19°31′13″S, long 54°38′59″W], 21.I.1972, M. Descamps *leg*. (abp 375), MNHN; Uirapuru, Usina Alcomet [lat 14°6′4″S, long 59°14′W], 20.I.1996, A. Foucart *leg*., 1 ♂ (abp 518), MNHN; Três Lagoas [lat 20°45›04»S, long 51°40›42»W], Horto Rioverde, 1.II.1996, Ottati *leg*., 1 ♂ (abp 553), MNHN. State of Pernambuco: Custódia [lat 8°7′0″S, long 37°39′0″W], Br. 232, Serra Talhada, 21.VII.1990, C.Amedegnato & S.Poulain *leg*. 2 ♀ (abp 359, abp 363), MNHN. State of Rio Grande do Sul: Porto Alegre [lat 30°2′0″S, long 51°12′0″W], Hensel S. *leg*., 1 ♀ (abp 201, No. 2228 bai Brunner, *Cephalocoema multispinosa* **holotype**), NMW.

Pseudastroma perducta (Mello-Leitão, 1939)

Cephalocoema perducta Mello-Leitão 1939: 318; 5 figs. Holotype ♂ (BMNH). Type locality: Brazil; state of Mato Grosso. Jago 1989: 284; 3 figs (transference to *Pseudastroma*: *P. perducta*). Eades & Otte 2010 (*P. perducta*).

Tetanorhynchus taeniatus Piza 1981, **new synonym.** Piza 1981: 25. Holotype ♂ (ESLQ). Type locality: Brazil; [Mato Grosso do Sul]; Rio Butantan. Eades & Otte 2010.

We could not examine the holotype of *Pseudastroma perducta*, but identification was possible due to descriptions in the papers of Mello-Leitão (1939) and Jago (1989). In his work, Mello-Leitão described the species based on external morphological characters, presenting drawings and photographs of the male holotype. Jago complements Mello-Leitão's work with detailed drawings of the phallic complex of the species, based upon the same type material.

The specimen Piza (1981) described as *Tetanorhynchus taeniatus* shows the same characters that Mello-Leitão (1939) and Jago (1989) described for *Pseudastroma perducta*, the only difference being that the specimen of Piza shows a dark longitudinal median stripe along its dorsal region. Piza compares the species with *T. gracilis* (transferred afterwards to *Pseudastroma* by Jago in 1989), stating that *T. taeniatus* differs by its "longer antennae and by the dark stripe on the head and body". However, we found great intraspecific variation for these characters in the analyzed specimens: some show a pale stripe, but clearly recognizable; others exhibit an indistinct stripe. Nevertheless, all these specimens share the same characters described by Jago and Mello-Leitão for *Pseudastroma perducta*.

The females of *P. perducta* had not been described, in spite of the fact that Jago (1989) listed three females in his examined material, all of them from the state of Mato Grosso (Brazil). The association of the female specimens here described with the males of *P. perducta* was possible due to the series collected by Carlos Campaner, in Colinas do Sul (state of Goiás, Brazil), which includes males and females taken together. Unfortunately, no single pair was collected in copula, but the specimens of both sexes share some characters which led us to assume they belong to the same species (such as the subtrapezoid shape of the anterior half of the prosternum, in transverse section). Also their seminal receptacle differs from that of all the other genera of proscopiids.

Phallic complex.— (Figs 28-30) **Epiphallic layer:** transverse sclerite absent; lophi not much sclerotized, slender, with small but distinct hooks turned upward; epiphallic rim short and wide. **Subepiphallic layer:** sublophal sclerites distinct, connected to the articulated sclerites in the lateral region of the phallic complex, extending posteriorly to the median area of the fold between the epiphallic and the subepiphallic layers, with a peculiar bend; articulated sclerites wide, vertically positioned in relation to the ectophallic valves, folded in the lateroposterior area, which articulates with the sublophal sclerites. **Ectophallic layer:** ectophallic valves short, as large as wide, with a raised area surrounding the phallotreme forming a crest extending to the posterior edge and a small pair of raised nodules positioned between the hooks of the epiphallus; ventral annulus very short, sometimes indistinct, fused to the ectophallic valves through a sclerotized membrane; basal sclerite slender and lunulated. **Endophallic layer:** distal sac very elongated, with a pair of digitform invaginations in the proximal part of it, next to the limit of the proximal sac; proximal sac very large, laterally flattened and dorsoventrally expanded; valvular sclerite very sclerotized.

Seminal receptacle.— (Fig. 31) **Copulatory chamber:** well developed and elongated, anteriorly projected as a pleated pouch with the lumen progressively shorter, with an anterior fold. **Spermathecae:** two small spermathecae arise from the distal edge of the copulatory chamber, but it is not apparent whether they diverge from a unique duct or from two distinct ducts; both spermathecae bear a small duct and a reniform or sometimes globulose apical diverticulum.

Distribution.—(Fig. 34) This species occurs only in Brazil, in the states of Mato Grosso, Goiás and Tocantins. It is restricted to the inner continent. The label for the *Tetanorhynchus taeniatus* holotype mentions only "Rio Butantan" and "3 léguas da nascente" as the locality. There is no information about who collected the insect. Piza (1981), in the original description of the species, says that the locality is situated in the state of São Paulo. However, he does not explain in which city the locality would be, nor how he came to that conclusion. We did not find a registry of *Pseudastroma perducta* collected in the state of São Paulo, and the most southern locality where it has been collected is in the south of the state of Mato Grosso do Sul. Also, we failed to find a "Butantan River" in the state of São Paulo, but we did find a reference to a river with that name in Vanzolini's (1992) catalogue, from a locality in the state of Goiás. That locality is next to the localities where the other specimens of the species have been collected. We opted to adopt that as the type-locality mentioned on the label.

Material examined.—BRAZIL. State of Goiás: Campinaçu [lat 13°52′0″S, long 48°22′48″W], Serra da Mesa, 18.II-2.III.1996, R. Silvestre, C. R. F. Brandão & C. Yamamoto *leg.*, 1 ♀ (FCD340), MZSP; Colinas do Sul [lat 14°1′0″S, long 48°12′0″W], Serra da Mesa, 2-15. XII.1995, C. Campaner *leg.*, 7 ♂ (FCD042*, FCD063*, FCD031*, FCD333, FCD334, FCD335, FCD337) and 3 ♀ (FCD032*, FCD336, FCD338), MZSP; Minaçu [lat 13°31′58″S, long 48°13′12″W], 4.XII.1996, D. Malbo *leg.*, 1 ♂ (FCD342), IBRJ; Niquelândia [lat 14°1′0″S, long 48°18′0″W], 24.IX-6.X.1995, R. Silvestre, B. Dietz & C. R. F. Brandão *leg.*, 1 ♂ (FCD341), MZSP. State of Mato Grosso: Buriti [lat 15°7′60″S, long 56°37′60″W], Chapada dos Guimarães, X.1973, G. R. Kloss & F. Val *leg*, 1 ♀ (FCD038*), ESLQ; Rondonópolis [lat 16°28′0″S, long 54°37′60″W], 24.XI.1950, von Dirings hofen coll., 1 ♀ (FCD104*), MZSP. [State of Mato Grosso do Sul]: Rio

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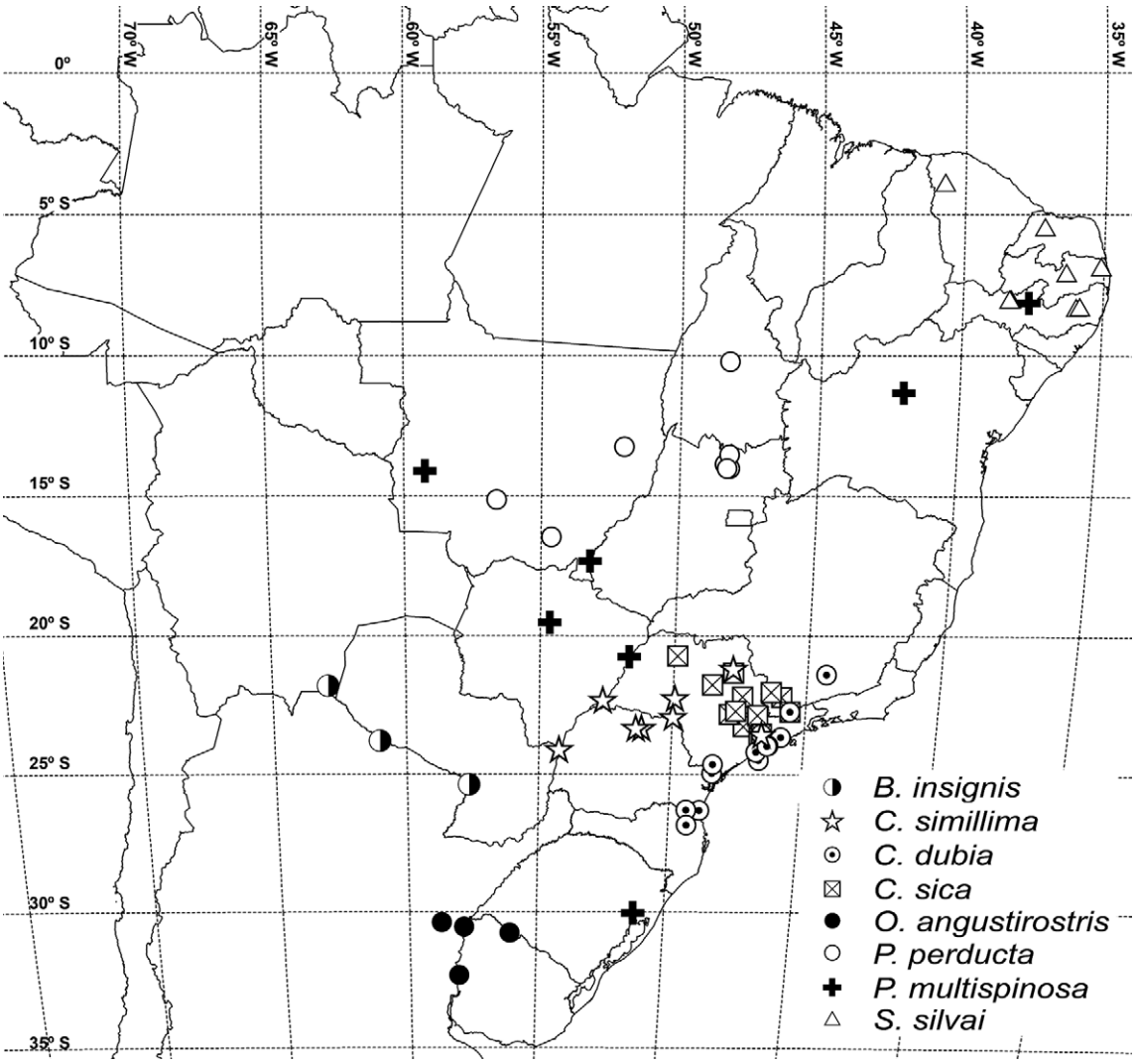


Fig. 34. Distribution map for *Bolidorhynchus, Cephalocoema, Orienscopia, Pseudastroma* and *Scleratoscopia* analyzed species.

Butantan [lat 13°15′0″S, long 52°1′12″W], 3 léguas da nascente, 31.X.1949, no colector, 1 ♂ (FCD212*, *T. taeniatus* **holotype**), ESLQ. State of Tocantins: Palmas [lat 10°13′22.08″S, long 48°16′40.08″W], gride C: camp. 3, XII.2001, D. Pavan *leg.*, 2 ♂ (FCD329*, FCD330), MZSP; camp. 9, XII.2002, D. Pavan *leg.*, 2 ♂ (FCD354, FCD355) and 1 ♀ (FCD353), MZSP; camp. 7, XII.2002, D. Pavan *leg.*, 2 ♀ (FCD356, FCD357), MZSP.

Scleratoscopia Jago, 1989

Type species.—*Cephalocoema protopeirae* Amedegnato 1985, by original designation.
Cephalocoema Serville 1939 (*Partim*).
Tetanorhynchus Brunner von Wattenwyl 1890 (*Partim*).

The genus *Scleratoscopia* was defined by Jago (1989) to accommodate three proscopiid species from northeastern Brazil which shared some genital characters: *S. protopeirae* (Amedegnato, 1986), *S. spinosa* Jago, 1989 and *S. silvai* (Rehn, 1957). The first species, designated as the type species by Jago (*op. cit.*), was described by Amedegnato (1985) in *Cephalocoema*. The second one was described by Jago in this same work where he defined the genus. The last species was originally described in the genus *Tetanorhynchus* by Rehn (1957) and transferred to *Scleratoscopia* by Jago in 1989. Moura *et al.* (1996), based on the karyotype and phallic complex analysis of the three species that composed *Scleratoscopia*, proposed the transfer of *S. silvai* back to *Tetanorhynchus*.

Scleratoscopia silvai (Rehn, 1957), new combination

Tetanorhynchus silvai Rehn 1957: 112; 6 figs. Holotype ♂ (ANSP). Type locality: Brazil; state of Rio Grande do Norte; Baixa Verde. Carbonell 1977: 29. Jago 1989: 289, 1 fig. (*Scleratoscopia silvai*). Moura *et al.* 1996: 169, 8 figs. (*T. silvai*). Eades & Otte 2010 (*T. silvai*).

Tetanorhynchus mamanguapensis Piza 1981, **new synonym.** Piza 1981: 24; 1 fig. Holotype ♂ (ESLQ). Type locality: Brazil; state of Paraíba; Mamanguape. Eades & Otte 2010.

The holotype of *Tetanorhynchus silvai* was not examined, but the original description of the species (Rehn 1957) is very detailed, with clear illustrations of the end of the abdomen of the holotype and photographs of habitus of that specimen in dorsal and lateral views. Moreover, Jago (1989) examined a paratype of *T. silvai* collected at the same locality as the holotype and presented clear illustrations of the phallic complex of the species.

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Moura *et al.* (1996) transferred *S. silvai* back to the genus *Tetanorhynchus* based on the analysis of the karyotype and phallic complex of the three species that composed *Scleratoscopia*. The authors stated that *S. protopeirae* and *S. spinosa* shared some genital characters not observed in *S. silvai*, such as the posterior projections of the ectophallic valves. In addition, the karyotypes of these species were more similar to each other than to *S. silvai*.

The transference of *T. silvai* back to *Scleratoscopia* is proposed here in spite of the greater similarity observed between the phallic complexes of *S. protopeirae* and *S. spinosa*. The three species show some genital characters that are distinct from the other proscopiids: the shape and degree of sclerotization of the ectophallic valves, "massively sclerotized as ventro-apical lobes" (Jago 1989), the epiphallus structure, the shape and position of the sublophal sclerites, and the short endophallus. The similarity of the karyotypes as stated by Moura *et al.* (1996) cannot be taken as evidence for grouping the two species in a separate genus, because the authors compared only the karyotypes of these three species. It would be necessary to compare these data with the karyotypes of species in other genera, especially with those of some species of *Tetanorhynchus*. That is, we cannot assert that the karyotype of *S. silvai* is more similar to that of *Tetanorhynchus* if we don't know the karyotype of *Tetanorhynchus*.

Phallic complex.— (Figs 25-27) **Epiphallic layer:** transverse sclerite absent or barely sclerotized; lophi very sclerotized, slender, oblique to the phallotreme, with well-developed hooks, anteriorly turned, touching each other in the median line; epiphallic rim short, with one third of the length of the epiphallic layer. **Subepiphallic layer:** sublophal sclerites distinct, thin and perpendicular to the phallotreme; articulated sclerites distinctly differentiated and very sclerotized, wide, semi-ovoid and ventrally oriented, with an even more sclerotized region next to the articulation with the ectophallic valves. **Ectophallic layer:** ectophallic valves laterally expanded, semi-circular in dorsal view, with the portion bordering the phallotreme raised and with a longitudinal series of spines; ventral annulus short and strong, fused to the ectophallic valves through a sclerotized membrane, located behind the posterior edge of the ectophallus; basal sclerite wide, slender and elliptical. **Endophallic layer:** distal sac short, with a pair of thin and elongated sacs arising laterally in its distal part; proximal sac also short, laterally flattened and dorsoventrally expanded; valvular sclerite well sclerotized.

Seminal receptacle.—(Fig. 33) **Copulatory chamber:** anteriorly projected as an inflated sac, with an ample base that becomes progressively shorter and a short and slender duct arising from its distal edge, which is folded and posteriorly oriented and diverges into two spermathecae. **Spermathecae:** both arise from a common duct and each presents a very short and delicate duct; the first bears a globulose apical diverticulum, the other a reniform apical diverticulum, sometimes also globulose.

Distribution.— (Fig. 34) The species *Scleratoscopia silvai* occurs only in northeastern Brazil, in the states of Pernambuco, Paraíba, Rio Grande do Norte and Ceará. This distribution may be associated with the Biome of Caatinga. In addition to the localities of the examined material, we plotted on the distribution map the type locality of *Tetanorhynchus silvai* [Brazil, state of Rio Grande do Norte, Baixa Verde (lat 5°26′15″S, long 37°9′7″W)].

Material examined.—BRAZIL. State of Ceará: Carquejo [lat 3°52′0″S, long 40°43′60″W], V.1961, von Dirings hofen *coll.*, 3 ♂ (FCD283, FCD284, FCD285) and 1 ♀ (FCD352*), MZSP. State of Paraíba: Mamanguape [lat 6°49′60″S, long 35°7′0″W], VII.1957, Exp. Dept. Zool. *leg.*, 1 ♂ (FCD103*, *T. mamanguapensis* **holotype**), ESLQ; Soledade [lat 7°3′0″S, long 36°21′0″W], Juazerinho, VII.1956, A. G. A. Silva *leg.*, 1 ♀ (FCD281), MNRJ. State of Pernambuco: Serra Talhada [lat 7°59′0″S, long 38°18′0″W], Granja Experimental do IPA, 4.V.1991, C. S. Carbonell & A. Mesa *leg.*, 2 ♂ (abp 637, abp 639) and 3 ♀ (abp 636, abp 638, abp 640), FCIEN; 3km oeste de Serra Talhada [lat 7°59′25″S, long 38°21′1″W]: 18.VI.1993, Rita Moura *leg.*, 1 ♂ (FCD297), MZSP; 19.vi.1993, Rita Moura *leg.*, 2 ♀ (FCD303, FCD304*), MZSP; Caruaru [lat 8°17′0″S, long 35°58′0″W]: 19.V.1981, Exp. Academia Brasileira de Ciências - MZSP *leg.*, 1 ♂ (FCD289) and 6 ♀ (FCD007*, FCD289, FCD290, FCD291, FCD292*, FCD293), MZSP; 20.V.1971, Exp. Academia Brasileira de Ciências - MZSP *leg.*, 2 ♀ (FCD294, FCD295*), MZSP; Mimoso [lat 8°15′0″S, long 35°50′0″W], 19.VI.1993, Rita Moura *leg.*, 2 ♂ (FCD296, FCD298) and 1 ♀ (FCD300*), MZSP.

Acknowledgements

F. De Domenico: I am grateful to Dr. E. Cancello who supported and encouraged me from the very beginning of my studies on Orthoptera; thanks also to Dr. M. Inomoto and Dr. R. Zucchi, both from ESALQ, for loaning the type specimens of Toledo Piza; to Dr. Miguel Monne, Dr. Alcimar do Carvalho, Dr. Ana Lucia and Dr. Sergio Ide for loaning material; to "Conselho Nacional de Desenvolvimento Científico e Tecnológico" (CNPq - Brazil) for financial support.

A. Bentos-Pereira: My appreciation to Prof. Carlos S. Carbonell, Dr. H. Rowell and Dr. C. Amedegnato for sharing knowledge, questions and experience. To the first especially for a life of teaching. H. Rowell and C. Amedegnato invited me to wonderful times at the University of Basel and Museum Nacional of Natural History at Paris. Drs E. Cancello and M. Monne were excellent hosts and friends at the Museum of Zoology at São Paulo and the Museum of Rio de Janeiro in Brazil. Curators of all related museums generously loaned type specimens. A. Olmos, P. Robson de Souza and J. Odriozola are acknowledged for logistic support. The Orthopterists' Society financed most of the work in Brazil; CSIC and PEDECIBA at the University of the Republic in Uruguay gave funds for travel to Europe and to the Museum of Natural History in Paris, where I was employed for work specifically in the proscopiid collection for several months.

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