

## SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

Ultrastructure and Redescription of *Notozulia entreriana* (Berg)  
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Ultraestrutura e Redescrição de *Notozulia entreriana* (Berg) (Hemiptera: Cercopidae)

RESUMO - A morfologia ultra-estrutural da cigarrinha *Notozulia entreriana* (Berg) é apresentada. Resultaram 32 ilustrações, utilizando-se microscópio eletrônico de varredura, bem como uma detalhada descrição da espécie.

PALAVRAS-CHAVE: Auchenorrhyncha, cigarrinha-das-pastagens, taxonomia, morfologia

ABSTRACT - The ultrastructure of the spittlebug *Notozulia entreriana* (Berg) is presented. The study resulted in 32 scanning electron microscope photos, with detailed species description.

KEY WORDS: Auchenorrhyncha, spittlebug, taxonomy, morphology

Fennah (1953) divided the genus *Zulia* Fennah, 1949 into two subgenera: *Zulia s. str.* and *Neozulia*. Later, Fennah (1968) described the subgenus *Notozulia* based on *Tomaspis entreriana* Berg, keeping *Monecphora alboornata* Lallemand as synonymous.

Carvalho (1995), revising the genera of Neotropical cercopids, elevated *Notozulia* to the taxonomic status of genus based on the postclypeus pattern, which is angulate in the type subgenus. Besides, examining the genitalia, Carvalho found differences within the patterns, corroborating the change.

*Notozulia entreriana* (Berg) is one of the most important pasture pests in several Brazilian states. Damaged caused by this insect reduces plant growth, lowering the stocking rates of the pastures. Although nymphal feeding may result in some damage, major damage, however, is caused by the adult spittlebugs. Toxic saliva injected during adult feeding interferes with photosynthetic activity, creating, at first, chlorotic and then, necrotic lesions that spread longitudinally on the leaf (Valério & Nakano 1987, 1992; Valério 1989; Valério *et al.* 2001).

### Material and Methods

The examined material represented by dry specimens as well as by others kept in 70% alcohol were deposited in the Museu de Ciência e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul (MCTP).

The specimens were examined under stereomicroscope and measurements were taken using a micrometer attached

to the eyepiece. The head, thorax and genitalia were detached, prepared and photographed with a Scanning Electron Microscope at the Centro de Microscopia e Microanálises (CEMM) of the Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS).

### *Notozulia entreriana* (Berg)

*Notozulia entreriana* (Berg, 1879: 215) (*Tomaspis*); Metcalf, 1961: 93-94 (*Tomaspis*); Fennah, 1968, figs 3A-D; Carvalho, 1995, figs 1-6. Holotype female, Argentina (UNLP - Facultad de Ciencias, Naturales y Museo, Universidad Nacional de La Plata, La Plata - Argentina).

= *partenia* Melichar, 1915: 13 (*Triecphora*); Metcalf, 1961: 228 (*Monecphora*); Carvalho & Webb, 2005: 80 (syn.)

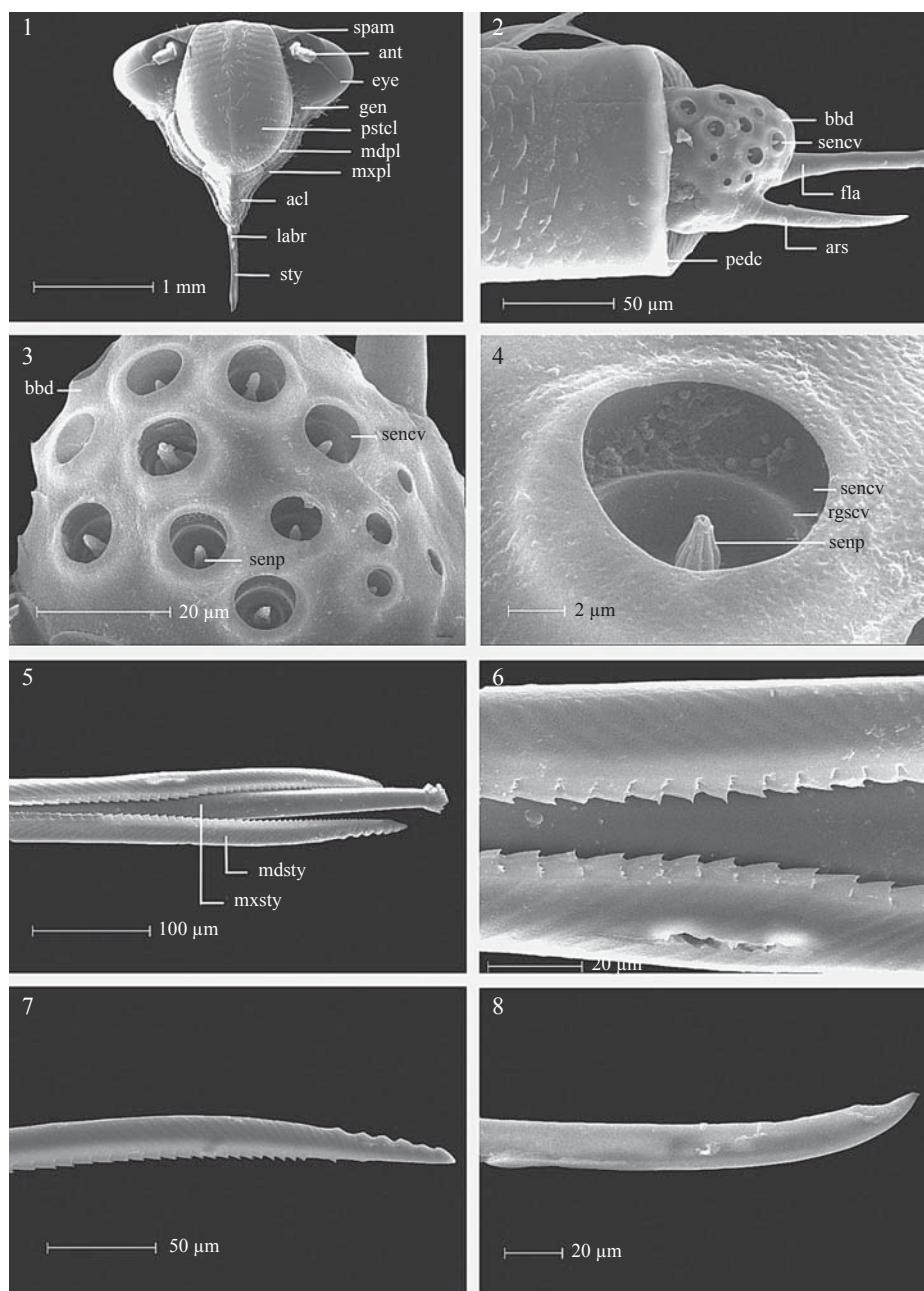
= *alboornata* Lallemand, 1927: 117 (*Monecphora*); Metcalf, 1961: 224; Fennah, 1968: 178 (syn.).

**Diagnosis.** General body coloration black, tegmina black may present whitish marks either as macula or stripes in its extension; thorax black, metathorax reddish, abdomen black, legs black, coxa and apex of the profemur reddish.

**Redescription.** Body length: male – 7.1 mm; female – 7.7 mm. Head narrower than the pronotum and wider than the length of the vertex, which is convex and carinated, with two superficial impressions longitudinal and external to the ocelli; tylus quadrangular, longer than wide, with median carina weakly marked; ocelli brownish, separated from each

other by approximately one ocellus' diameter, they are closer one to the other than the distance to the eyes and posterior margin of the head; eyes (Fig. 1: eye) brownish, globular, conspicuous and transversally disposed; antennae (Fig. 1: ant) dark brown, short and setaceous, with pedicel (Fig. 2: pedc)

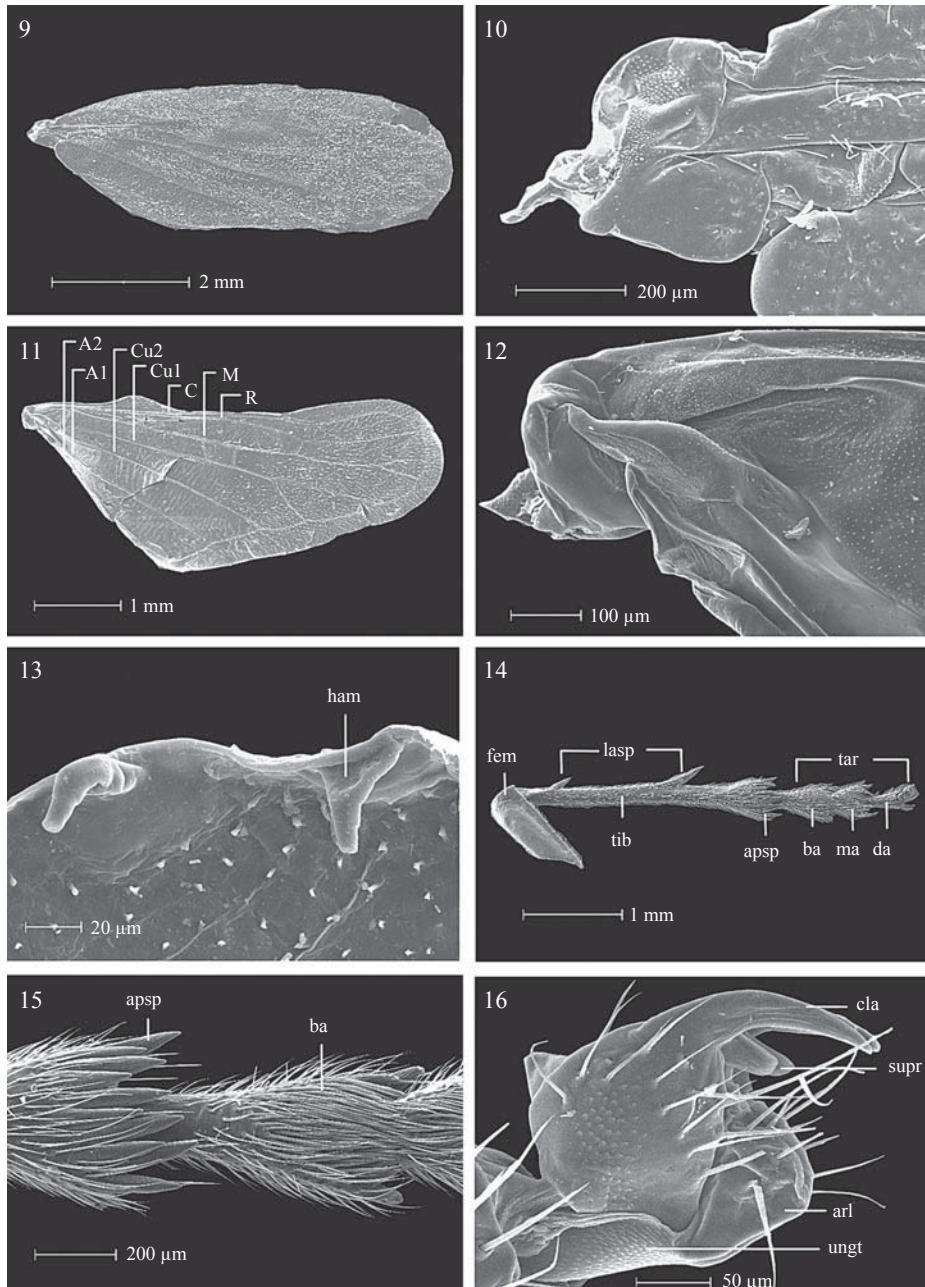
visible dorsally, cylindrical and longer than the scape; basal body (Fig. 2: bbd) of flagellum sub-cylindrical, projected outward of the pedicel, bearing an arista (Fig. 2: ars) shorter than this basal body, the expanded flagellar base is provided with several coeloconic sensilla (Figs. 2,3) with a conical



Figs. 1-8: Head, antenna and mouth parts. 1. Head, frontal view. 2. Antenna, lateral view. 3. Basal body of flagellum. 4. Coeloconic sensillum. 5. Mouth parts. 6. Detail of mouthparts. 7. Mandibular stylet. 8. Maxillary stylet. acl, anteclypeus. ant, antenna. ars, arista. bbd, basal body. eye, eye. fla, flagellum. gen, gena. labr, labrum. mdpl, mandibular plate. mdsty, mandibular stylet. mxpl, maxillary plate. mxsty, maxillary stylet. pedc, pedicel. pstcl, postclypeus. rgscv, ring of sensorial cavity. sencv, sensorial cavity. senp, sensorial process. spam, supraantennal margin. sty, feeding stylets.

sensorial process (Figs. 3,4: senp), presenting longitudinal valves in its extension, located in a deep cavity (Figs. 3,4: sencv); supraantennal margin (Fig. 1: spam) overlapping portion of the scape, with an area slightly larger than the tylus width; postclypeus (Fig. 1: pstcl) black, inflated, of convex profile, lateral grooves coarsely marked, carina

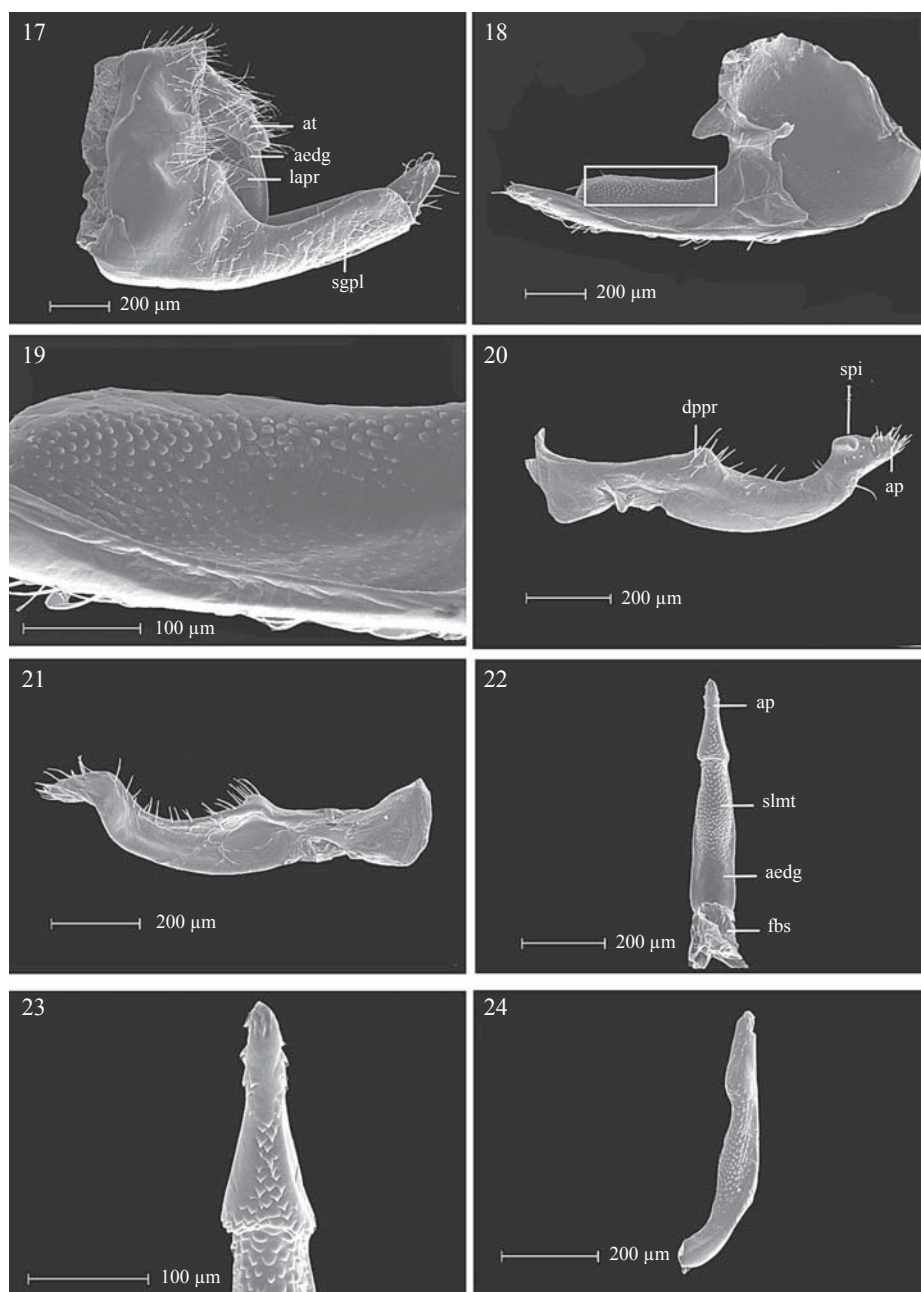
longitudinal and conspicuous, originating a triangle in the apex with the tylus; anteclypeus (Fig. 1: acl) black, bigger than the last segment of the rostrum, which, in turn, is smaller than the anterior one; rostrum black, with second segment reddish, reaching the apex of the mesocoxae; labrum (Fig. 1: labr) small and triangular, shorter than the anteclypeus,



Figs. 9-16: Thorax. 9. Right tegmina. 10. Anterior axillary sclerites. 11. Right wing. 12. Posterior axillary sclerites. 13. Detail of the wing. 14. Metathoracic leg. 15. Metathoracic leg, apex of the tibia and basitarsus. 16. Metathoracic leg, apex of the tarsus. apsp, apical spines of the tibia. arl, arolium. ba, basal tarsal article. cla, claw. da, distal tarsal article. fem, femur. ham, hamuli. lasp, lateral spines. ma, median tarsal article. supr, subungual process. tar, tarsus. ungt, unguitactor.

in which it articulates, covering part of the basal portion of the rostrum; mandibular plate (Fig. 1: mdpl) elongate, maxillary plate (Fig. 1: mxpl) long and narrow, located behind of the mandibular plate; two mandibular and maxillary stylets (Fig. 1: sty; Fig. 5; Fig. 6): maxillary stylets long, smooth, generally closely united throughout their length,

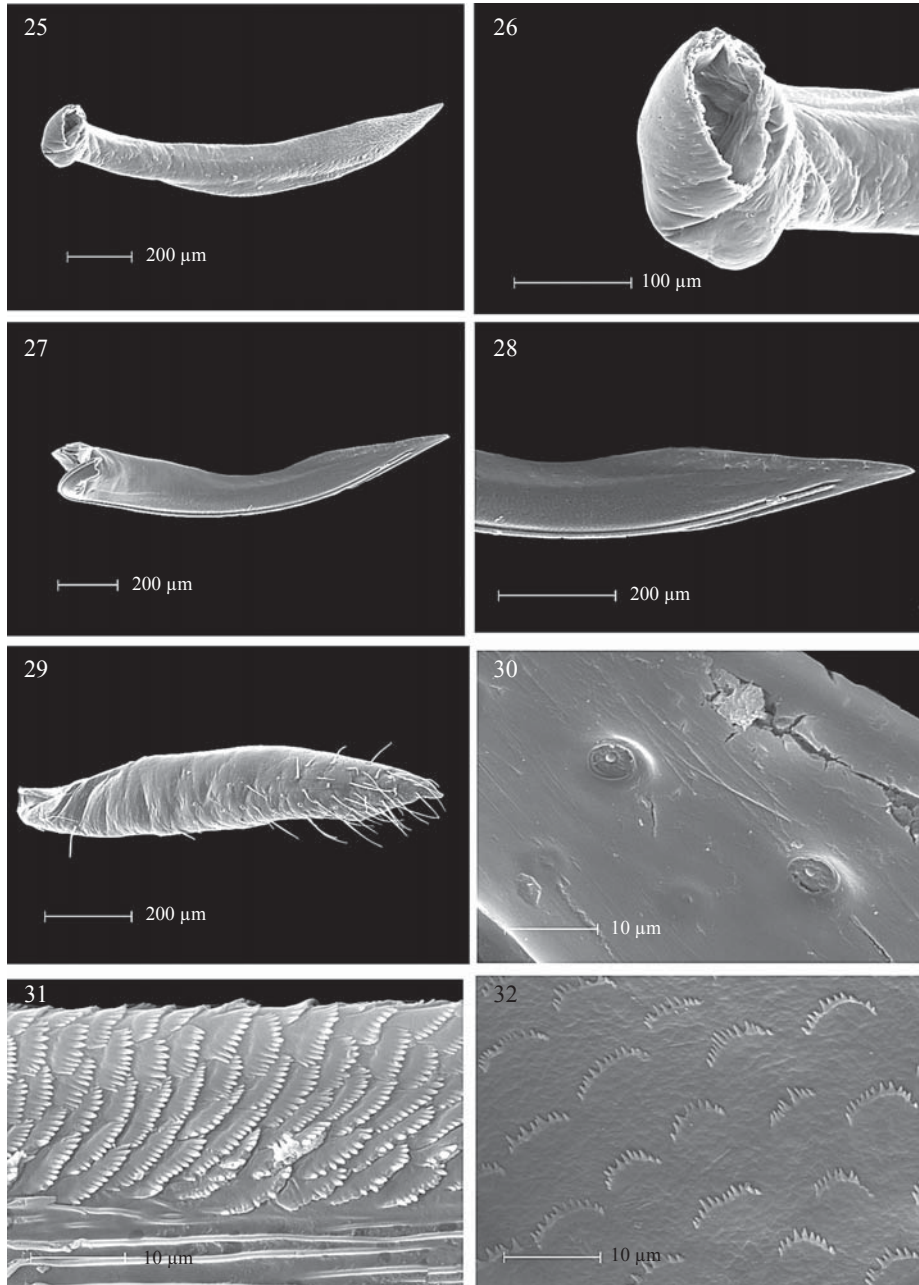
distal portion acute as a knife (Fig. 8); mandibular stylets long, serrated in their distal portion as well as in their inner face, grooved longitudinal and internally (Fig. 7). Pronotum hexagonal wider than long, coarsely punctuated, covered by a thin layer of setae, median carina weakly marked; anterior margin straight, anterolateral margins straight, postlateral



Figs. 17-24. Male genitalia. 17. Pygofer, lateral view. Subgenital plate: 18. internal lateral view; 19. internal lateral view. Paramer: 20. external lateral view; 21. internal lateral view. Aedeagus: 22. dorsal view; 23. apex. aedg, aedeagus; 24. lateral view. ap, apex. at, anal tube. dppr, dorsal process of paramer. fbs, phalobase. lapr, lateral process. sgpl, subgenital plate. slmt, scale-like minute teeth. spi, spine.

margins sinuous slightly concave, posterior margin notched, grooved medially; humeral angles acute; scutellum black, with median concavity and transversal rugosities. Tegmina wide (Fig. 9), delicately punctuated, general color black with a whitish macula between the anterior and the median third, close to the costal margin, and a whitish transversal stripe at

the beginning of the posterior third, being either continuous or fragmented, M and Cu1 united by a transversal branch, apical section poorly reticulated, veins visible, A1 present and distinct, A2 absent. Wings (Fig. 11) hyaline, with brownish venation, Cu1 with base portion thickened; external margin may present from two to four hamuli (Fig. 13: ham), varying



Figs. 25-32. Female genitalia. Ovipositor: 25. First valve, external lateral view; 26. basal process, lateral view. Second valve: 27. external lateral view; 28. apex. 29. Third valve. 30. Peg-like sensilla of second valve. Internal ornamentations: 31. Second valve; 32. Third valve.

among specimens. The axillary sclerites (Figs. 10,12) are scattered in the membranous basal area of tegmina and wing, located between the base of the veins and the thorax: collectively referred as pteralia, allowing flexion of the wing. The pro and mesothoracic legs are about the same size, being both ambulatorial; the hind legs (Fig. 14) are longer and fitted for jumping; tarsi with three tarsomeres (Fig. 14: tar, ba, ma, da); hind femur on inner face with conspicuous spine (Fig. 14: fem), tibia elongate, with two lateral spines, being the basal one of the same size as the apical ones, found in number of 10-12, distributed in two rows (Fig. 14: tib; Fig. 15:); basitarsus with 15 apical spines in one row, covered by a dense layer of setae (Fig. 14: ba; Fig. 15: ba); subungueal process present (Fig. 16: supr), arolium located between the pair of claws (Fig. 16: arl, cla); unguis constituted of a small median basal plate (Fig. 16: ungt).

**Male genitalia.** Pygofer (Fig. 17), which encloses the genital parts, with two digit-like processes (Fig. 17: lapr) between the anal tube and the subgenital plate (Fig. 17: sgpl), this plate-like sternite that underlies the genitalia is subrectangular bearing an elongate and rounded apical process, dorsal margin with a row of small teeth, extended through the inner face (Figs. 18, 19); parameres subrectangular, slender, dorsal elevation inconspicuous, subapical tooth, small and curved, turned outward, dorsal margin with a sparse group of setae (Figs. 20, 21); aedeagus joined at the base of parameres (Figs. 22-24: aedg), held by the subcylindrical phallobase, with dorsal face provided of minute triangular teeth (Fig. 22: fbs, slmt); apex hardened and triangular (Fig. 22: ap; Fig. 23).

**Female.** Bigger in size, tegmina with two whitish longitudinal stripes, one extending from the humeral angle until almost half of the median third, the other, along and over the clavus, extending from the anal angle until the end of the median third, and a whitish transversal stripe at the posterior third. First valve of ovipositor long, with acute apex (Fig. 25), basal process inconspicuous (Fig. 26); second valve long, with acute apex (Figs. 27, 28), dorsal margin smooth, external face with a set of sensilla (Fig. 30), internal face with laminar ornamentations (Fig. 31); third valve short and wide, provided of bristles in the ventral margin, and ornamentations in its inner face (Figs. 29, 32).

**Comments.** This species presents a great variation in its alar patterns, and sexual dimorphism: females have the tegmina ornate with two longitudinal stripes, whereas on males they are reduced or even absent, as well as the transversal stripe found on posterior third of tegmina may be reduced on some specimens.

**Material examined.** BRAZIL: **Rio Grande do Sul:** Santa Rosa, 03.XI.2001, D.N. Gassen leg. (ex *Cynodon dactylon* cv. Tifton) 52♂ and 22♀ (MCTP).

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