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Xenogeniates, a New and Unusual Genus of Geniatine Scarab (Coleoptera: Scarabaeidae: Rutelinae: Geniatini) from Brazil

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ABSTRACT A new genus and species of geniatine scarab is described from southeastern Brazil. The genus *Xenogeniates* is characterized by the unusual shape of the mesosternum, which is strongly invaginated and concave. Unusual characteristics of the taxon are discussed in relation to the Rutelinae and the Scarabaeidae.

RESUMEN Se describe un nuevo género y especie de escarabajo geniatine del sureste de Brazil. El género *Xenogeniates* se caracteriza por la forma inusual del mesosterno que es profundamente invaginada y concava. Características inusuales de este taxon se discuten en relación a Rutelinae y Scarabaeidae.

KEY WORDS Scarabaeidae, Rutelinae, Geniatini, systematics, taxonomy, Brazil

THE TRIBE GENIATINI is one of six tribes in the scarab subfamily Rutelinae, and it contains 12 genera and ≈318 species that are endemic to the Neotropics (Villatoro 2001, Villatoro and Jameson 2001). Adults of most species are 1–2 cm in length, tan to black in color, lack elaborate horns and armature, and are attracted to lights at night. Aside from the catalogs of Machatschke (1972, 1974) and Blackwelder (1944) and scattered taxonomic literature on some members of the tribe (Frey 1976, Lacroix 2000, Machatschke 1965, Martínez 1964a, Martínez 1964b, Ohaus 1931), there have been few taxonomic studies for members of the group. For this reason, systematics research on the tribe was initiated (Villatoro 2000). This paper is a result of ongoing research on the phylogeny, biogeography, and taxonomy of the Geniatini.

Within the subfamily Rutelinae (see Jameson 1990 and 2001b for keys to tribes of Rutelinae), the tribe Geniatini is characterized by the following combination of characters: (1) labrum vertically produced with respect to the clypeus and with an apicomedial projection, (2) male protarsomeres usually dorsoventrally flattened, enlarged, and densely setose ventrally, (3) elytral margin with or without membrane, (4) terminal spiracle positioned in the pleural suture, and (5) protibia with apical protibial spur (Jameson 2001a). With the addition of the new genus, described here, the tribe Geniatini includes 13 genera.

Materials and Methods

Specimens for this research are deposited at MACN (Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina), CMNC (Canadian Museum of Nature, Ottawa, Ontario, Canada), HAHC (Henry and Anne Howden Collection, Ottawa, Ontario, Canada), MZSP (Museu de Zoologia da Universidade de São Paulo, Brazil), and BMNH (The Natural History Museum, London, England).

Body measurements, puncture density, puncture size, and density of setae are based on the following standards. Body length was measured from the apex of the pronotum (at the middle) to the apex of the elytra. Body width was measured across the elytral humeri. Puncture density was considered “dense” if punctures were nearly confluent to less than two puncture diameters apart, “moderately dense” if punctures were from two to six puncture diameters apart, and “sparse” if punctures were separated by more than six puncture diameters. Puncture size was defined as “small” if punctures were 0.02 mm or smaller; “moderate” if 0.02–0.07 mm, “moderately large” if 0.07–0.12, and “large” if 0.12 mm or larger. Setae were defined as “dense” if the surface was not visible through the setae, “moderately dense” if the surface was visible but with many setae, and “sparse” if there were few setae. The interocular width measures the number of transverse eye diameters that fit between the eyes.

The phylogenetic species concept (Wheeler and Platnick 2000) was applied in this work: “A species is the smallest aggregation of (sexual) populations or (asexual) lineages diagnosable by a unique combination of character states.”

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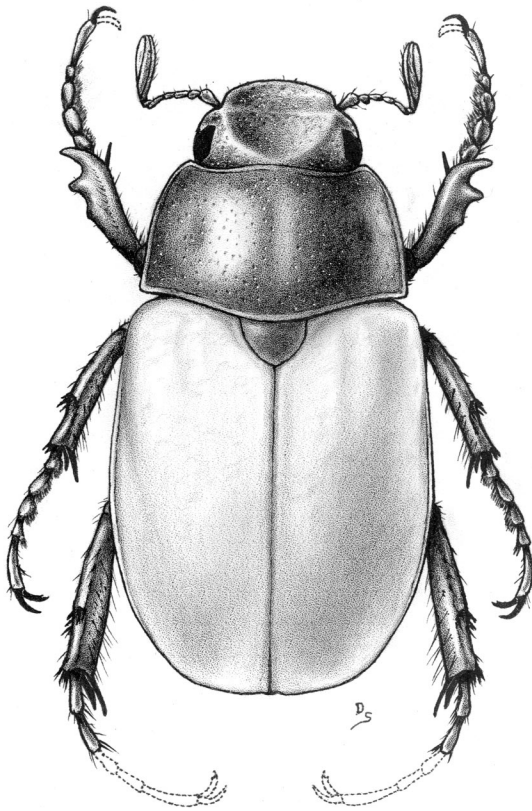


Fig. 1. Dorsal habitus of the holotype (male) of *Xenogeniates martinezi* Villatoro & Jameson, new species.

Xenogeniates Villatoro & Jameson, new genus
(Figs. 1-14)

Type Species. *Xenogeniates martinezi* Villatoro and Jameson, n. sp. (here designated).

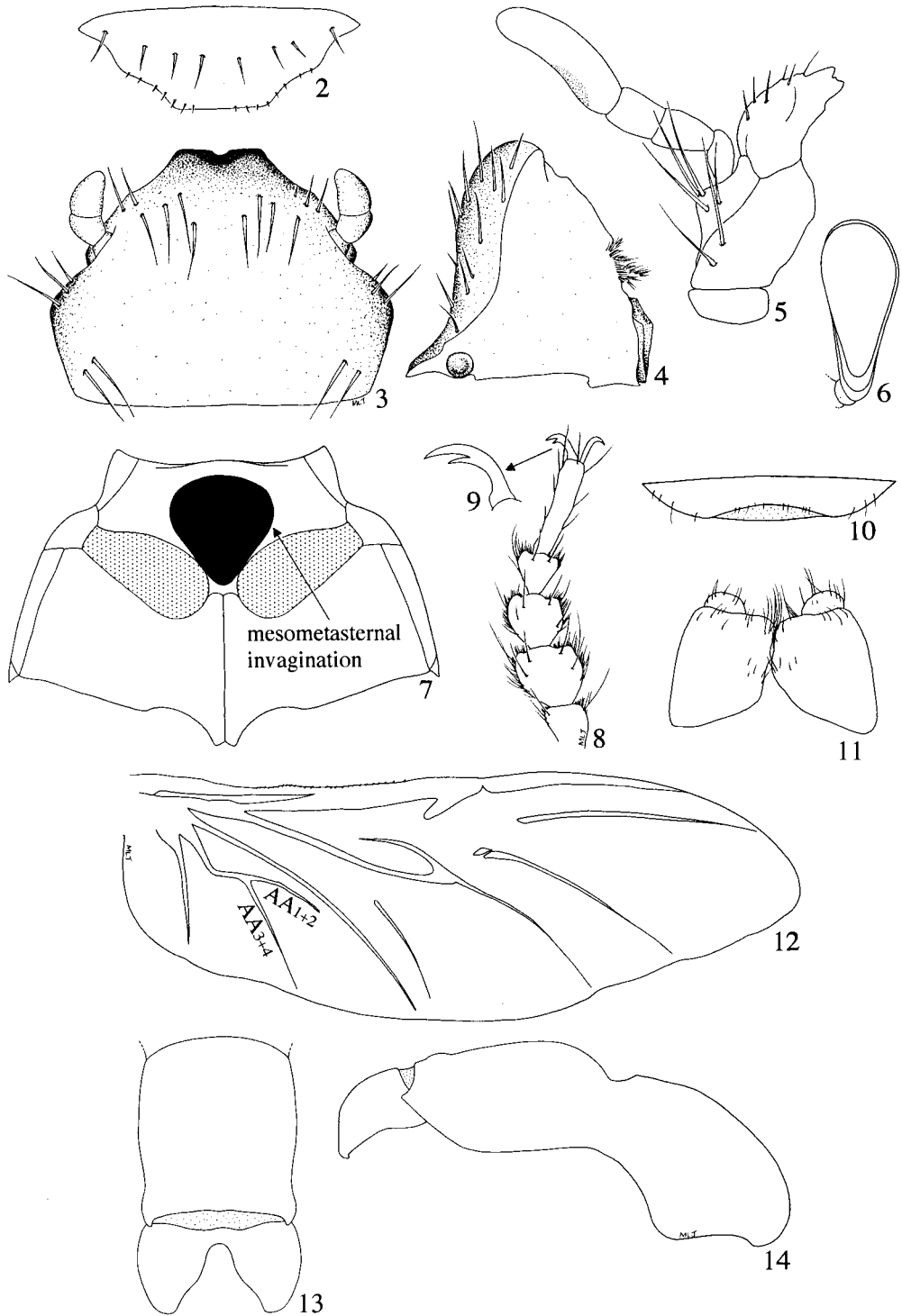
Description. Scarabaeidae: Rutelinae: Geniatiini. *Form* (Fig. 1). Body elongate oval, sides subparallel, dorsum convex, pygidium exposed, elytral apex broadly rounded. *Head.* Surface punctate. *Frons* weakly concave. Frontoclypeal suture complete, straight. Eye canthus simple, not carinate. *Clypeus* with apex reflexed, lacking bead. *Mandible* (Fig. 4) with baso-external edge round, apex with one reflexed, round tooth; inner teeth present or lacking. *Labrum* (Fig. 2) apicomediaally with forward-projecting tooth. *Maxilla* (Fig. 5) with baso-external edge of mala round, with reduced teeth; stipes weakly produced mediolaterally. *Mentum* (Fig. 3) in ventral view subhexagonal; deep sulcus present near insertion of palpus (extending to lateral margin), margin laterad of insertion with rounded angle. Apex with median, dorsally produced tooth; tooth indented at apex (appearing bifid). *Antenna* 9-segmented with 3-segmented club; club obovate (wider toward apex) in lateral view (Fig. 6). *Pronotum.* Widest at middle; anterior angles slightly acute. In frontal view, dorsal surface weakly convex. Surface variably punctate. Marginal bead complete. *Scutellum.* Parabolic, apex weakly acute, length subequal

to width; surface variably punctate. *Elytron.* Surface with poorly defined punctures and striae. Elytral suture length subequal to width of both elytra. Margins beaded; bead obscured at base and apex. Elytral apex weakly rounded. *Epipleuron* rounded in cross section; ventral side bare, lacking setose ridge or hairs, membrane present from metacoxa to apex. *Pygidium.* Shape subtriangular. Surface variably sculptured. Margin with sides and apex beaded. *Venter* (Fig. 7). *Prosternal shield* present, posteriorly produced, hidden between procoxae. Mesometasternal keel lacking. Mesosternum invaginated, strongly concave and forming a broad, rounded pit (Fig. 7). In lateral view, male abdominal sternites flat, female abdominal sternites weakly convex. *Terminal sternite* (Fig. 10) in male with apex weakly emarginate or not. *Legs.* *Protibia* with three teeth, basal tooth reduced, weakly removed from other teeth; inner apex with spur; base without notch. *Male protarsomeres* 1-4 (Fig. 8) dorsoventrally flattened, densely setose ventrally; setae short, tawny. Protarsomere five cylindrical, lacking ventral pilosity, inner apex lacking longitudinal slit. Protarsus with inner, modified claw unequally split dorso-ventrally (Fig. 9); unguitactor plate cylindrical, weakly exposed beyond apex of protarsomere 5, bisetose. *Female protarsomeres* missing, not observable. *Meso- and metatibia* each weakly expanded apically (mesotibial apex slightly more expanded in females); external edge with two weakly developed carinae; apex with spurs and spines; two spurs at inner apex placed in depression. Surface variably punctate, metatibia more clearly sculptured than mesotibia. *Male meso- and metatarsomeres* 1-4 ventrally flattened, setose ventrally (less setose than protarsomeres), setae short, tawny; mesotarsus with outer claw subequally split dorso-ventrally; meso- and metatarsomere five cylindrical, lacking ventral pilosity, inner apex with weak longitudinal slit. *Metafemur* with dorsal, apicolateral area smooth, lacking stridulatory file. *Female meso- and metatarsomeres* missing, not observable. *Hind Wing* (Fig. 12). Well developed hooks on precostal membrane present. Anterior edge from medial fold to apex of wing lacking setae. Vein $AA_{1+2} \approx \frac{1}{2}$ length of vein AA_{3+4} . *Parameres* (Figs. 13-14). Symmetrical. *Female Gonocoxites* (Fig. 11). Symmetrical.

Diagnosis. *Xenogeniates* is easily distinguished from other genera of Geniatiini by the following combination of characters: mesosternum strongly invaginated and concave (Fig. 7), lack of longitudinal slit at inner apex of protarsomere 5, and antennal club obovate-shaped in lateral view (Fig. 6).

Distribution. Brazil.

Remarks. Specimens were found in the collection of Antonio Martínez (now at CMNC) with Martínez's label name of "*Xenogeniates*." We have proposed Martínez's label name in his honor and because it is descriptive of the taxon. *Xenogeniates* is unusual among all Scarabaeidae for its concave and invaginated mesosternum. Among the Rutelinae it is unusual because it lacks or has only a weak longitudinal slit at the apices of the fifth tarsomeres, a character that allows for the independent movement of both claws and that is synapomorphic in the Rutelinae. In addition, the onychium is cylindrical (rather than laterally flattened as



Figs. 2-14. Diagnostic characters of *Xenogeniates martinezi*. (2) Labrum, frontal view. (3) Mentum, ventral view. (4) Left mandible, dorsal oblique view. (5) Right maxilla, ventral view. (6) Terminal segment of antennal club, lateral view. (7) Meso- and metasternum, ventral view, showing mesosternal invagination (black region). (8) Right protarsomeres of male, dorsal view. (9) Inner claw, lateral view. (10) Terminal abdominal sternite, ventral view. (11) Female gonocoxites, dorsal view. (12) Left metathoracic wing, ventral view. (13) Male parameres and phallobase, dorsal view. (14) Male parameres and phallobase, lateral view.

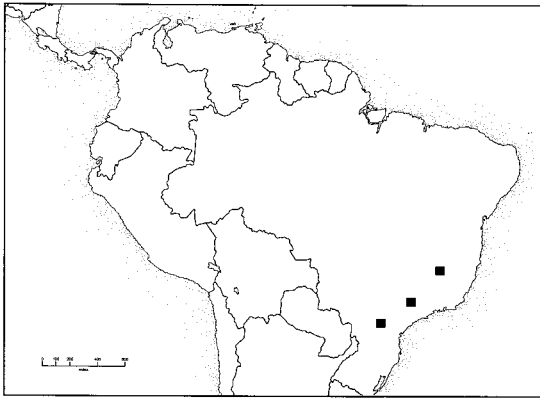


Fig. 15. Distribution of *X. martinezi* Villatoro & Jameson.

in other Rutelinae), and the antennal club is obovate-shaped in lateral view (Fig. 6).

Etymology. The Greek word “*Xenos*” means “strange” or “foreign” and refers to the bizarre form of the mesosternum (deeply invaginated and concave). This character state is not observed in other geniattines, rutelines, or scarabs that are known to us. We consider the name masculine in gender.

***Xenogeniates martinezi* Villatoro & Jameson,
new species
(Figs. 1–15)**

Type Material. Holotype, allotype, and three male paratypes. *Holotype male* from HAHC (housed at CMNC) labeled: a) “Brasil”/“Edo Parana”/“Ponta Grossa”/“Vila Velha”/“Hatsbach-leg.”/“Coll. Martinez”/“November 945,” b) “Xenogeniates”/“costalimai”/“gen. et. sp. nov.”/“A. Martinez- Det. 1975” (green label, handwritten), c) “Paratipo” (green label, typeface), d) our holotype label. Mouthparts card mounted. *Allotype female* from HAHC (housed at CNMC) labeled: a) “Botucatu”/“S.P.-BR”/“7-9-63”/“Mantovan,” b) our allotype label. Mouthparts, hindwing, and genitalia card-mounted; eggs and mites in glycerin-filled vial beneath specimen; specimen missing all tarsomeres. *Paratype male* from MACN (housed at MACN) labeled: a) “Brasil”/“Edo. De Parana”/“Ponta Grossa”/“V. Velho”/“Hatschbach!!!”/“Coll. Martinez”/“November 945,” b) “Xenogeniates”/“costalimai”/“gen. et sp. nov.”/“A. Martinez det. 1975” (red label, handwritten), c) “holotypus” (red label, typeface), d) our paratype label. Mouthparts and genitalia card mounted; specimen missing hind tarsomeres. *Paratype male* from HAHC (housed at MZSP) labeled: a) “Brasil”/“Minas Gerais”/“Belo Horizonte”/“K. Lendo-Leg.”/“Coll. Martinez”/“November 956,” b) “Xenogeniates”/“costalimai”/“gen. et. sp. nov.”/“A. Martinez-Det. 1975” (green label, handwritten), c) “Paratipo” (green label, typeface), d) our paratype label; missing all tarsomeres. *Paratype male* from BMNH labeled: a) “Amer”/“Bor,” b) “Fry Coll.”/“1905–100,” c) “16518” (handwritten, green label), d) “Child,”

e) “Ex Mus Kirby,” f) “Ohaus determ.”/“Geniattine”/“g. n. sp. n.” (handwritten and typeface), g) our paratype label. Mouthparts and genitalia card mounted.

Holotype. MALE: Form (Fig. 1). Length 9.6 mm; width 5.3 mm. **Color.** Head, pronotum, scutellum, pygidium, and venter castaneous; elytra tan. **Head. Frons** in lateral view with base convex, disc slightly concave, punctate on base, disc, and apex; punctures moderate in size, moderately dense. Interocular width 5.6. **Clypeus** in lateral view with base and disc slightly concave; in dorsal view, shape subtrapezoidal, apex weakly rounded, strongly reflexed. Surface densely punctate, punctures moderate in size. **Mandible** (Fig. 4) on inner scissorial region with one reduced (or worn) tooth; molar region reduced (maximum width 0.17 mm), without well-developed lamellae. **Labrum** (Fig. 2) thick (medial length subequal to thickness of clypeal apex), outer edge angulate toward clypeus; apex at middle with stout, ventrally produced tooth. **Maxilla** (Fig. 5) with four reduced teeth; terminal segment of palpus elongate-oval, kidney-shaped, subequal in length to segments 1–3, with oval, shagreened region extending from base to middle of palpus. **Mentum** in lateral view weakly convex, in ventral view subhexagonal; sulcus present near insertion of palpus (extending to lateral margin), margin laterad of insertion with acute angle. **Antenna** with club slightly longer than segments 2–7 combined. **Pronotum.** Surface punctate; punctures dense (on disc) to moderately dense (on sides), moderate in size. **Scutellum** with surface moderately densely punctate, punctures moderate in size. **Elytron.** Surface shagreened, punctate, with weak striae. Punctures shallow, poorly defined, sparse, small. Striae poorly developed (indicated by depressed line): one next to suture, three on disc (reaching neither apex nor base). **Elytral sutural length** 6.4 times length of scutellum. **Pygidium.** Convex in lateral view. Surface moderately densely punctate; punctures shallow, transversely elongate, large. Apical bead simple. **Venter. Prosternal shield** poorly developed, apical margin rounded, disc flat, lacking protuberance; surface sparsely setose, setae long. Mesosternum invaginated, strongly concave, forming broad, rounded pit (Fig. 7). **Base of first sternite** at middle simple, not produced ventrally. **Last sternite** at apex with moderately deep emargination (middle of emargination subequal to ½ length of sternite); middle of emargination rounded (Fig. 10). **Legs. Protarsomeres** 2–3 weakly elongate (maximum width subequal to five-sixths length), dorsal surface convex; protarsomere five elongate (length exceeds ½ length of protarsomeres 2–4). **Metatrochanter** with apex not produced beyond posterior border of femur. **Metafemur** with posterior margin at apex weakly extended, rounded. **Metatibia** with surface moderately punctate; punctures small, round. Outer lateral surface punctate; punctures large, oval, pitted. Outer spur circular in cross section, apex pointed; inner spur semicircular in cross section, apex pointed. **Parameres** (Figs. 13–14), Symmetrical.

Allotype. FEMALE: Length 9.02 mm; width 4.70 mm. Allotype differs from holotype in the following

respects: *Head. Maxilla* with three reduced teeth. *Venter. Last sternite* at apex arcuate, without emargination. *Pygidium*. Base semiparabolic in lateral view; apical bead simple. The allotype possessed 10 eggs in the abdominal cavity, and the mesosternal cavity contained many dead mites (eggs and mites are preserved in a glycerin-filled vial beneath the specimen).

Paratypes. Length 9.3–8.7 mm; width 4.9–4.3 mm. Paratypes (3 males) differ from the holotype in the following respects. *Color.* Elytra tawny or brown. *Head. Maxilla* with 2–4 reduced teeth. *Legs. Metatarsomeres* 1–3 subequal in length; fourth two-thirds length of preceding segment; fifth lacking medial protuberance or longitudinal raised line.

Diagnosis. *Xenogeniates martinezi* is distinguished from other geniatine scarabs by the following combination of characters: mesosternum strongly invaginated and concave; dorsal coloration castaneous (head, pronotum, scutellum, pygidium) and tan or tawny (elytra); longitudinal slit at inner apex of pro-tarsomere five absent; and distinct shape of the male parameres.

Distribution (Fig. 15). Southern and southeastern Brazil.

Material Examined. Five specimens (4 ♂♂, 1 ♀).

Locality Data. BRAZIL (4). *Minas Gerais* (1): Belo Horizonte. *Paraná* (2): Ponta Grossa. *São Paulo* (1): Botucatu. No data (1).

Temporal Data. November (1).

Etymology. *Xenogeniates martinezi* is named in honor of Antonio Martínez for his significant contributions to the knowledge of the Geniatiini.

Remarks. The function of the mesosternal invagination observed in *X. martinezi* is unknown, but we observed that the invagination contained many dead mites in the female allotype specimen. A species profile (habitus pictures and a distributional map) is available on-line (<http://www-museum.unl.edu/research/entomology/Guide/Rutelinae/Geniatiini/Xenogeniates/X.martinezi.htm>).

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