A new species of *Buenoa* Kirkaldy (Hemiptera, Heteroptera, Notonectidae) from Rio de Janeiro, Brazil

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ABSTRACT. A new species of *Buenoa* Kirkaldy (Hemiptera, Heteroptera, Notonectidae) from Rio de Janeiro, Brazil. Members of *Buenoa* are restricted to the Western Hemisphere, with the greatest diversity of species in South America. There are about 50 described species and approximately 20 of them have been reported from Brazil. *Buenoa pseudomutabilis* Barbosa, Ribeiro and Nessimian, **sp**. **nov**. is described here from Maricá, Rio de Janeiro State. This species resembles *B. mutabilis* Truxal, 1953 because males have a stridulatory area on inner surface of forefemur, forefemur narrowed at apex, with length more than three times its width at apex, and rostral prong longer than third rostral segment. Males of *B. pseudomutabilis* **sp**. **nov**. can be readily recognized by the presence of 21 to 25 teeth in the stridulatory comb of foretibia, whereas in *B. mutabilis* the stridulatory comb of foretibia consists of approximately 33 to 38 teeth. Males of *B. pseudomutabilis* **sp**. **nov**. bear one nodule on each ventral laterotergite 1 of abdomen. A key to male species of *Buenoa* occurring in Rio de Janeiro State, including the new species, is provided.

KEYWORDS. Backswimmers; male genitalia; Neotropics; Nepomorpha.

RESUMO. Uma nova espécie de *Buenoa* Kirkaldy (Hemiptera, Heteroptera, Notonectidae) ocorrente no Rio de Janeiro, Brasil. Os representantes de *Buenoa* restringem-se ao hemisfério ocidental, sendo a América do Sul a região que abriga o maior número de espécies descritas. Das 50 espécies descritas, cerca de 20 ocorrem no Brasil. *Buenoa pseudomutabilis* Barbosa, Ribeiro & Nessimian, **sp**. **nov**. é descrita com base em representantes de Maricá, Estado do Rio de Janeiro, sendo similar à *B. mutabilis* Truxal, 1953 quanto à presença de uma área estridulatória na superfície interna do fêmur anterior dos machos, pelo aspecto estreito do ápice desse fêmur (com o comprimento maior que três vezes a largura do seu ápice) e pelo dente lateral do rostro maior que o seu terceiro segmento. Espécimes machos de *B. pseudomutabilis* **sp**. **nov**. podem ser distinguidos facilmente pela presença de um pente com 21 a 25 dentes na tíbia anterior, enquanto o dos machos de *B. mutabilis* consiste de aproximadamente 33 a 38 dentes. Os machos de *B. pseudomutabilis* **sp**. **nov**. apresentam um nódulo em ambos os lados do primeiro tergito látero-ventral do abdome. Uma chave de identificação para os representantes machos das espécies de *Buenoa* ocorrentes no Rio de Janeiro com a espécie nova incluída é fornecida.

PALAVRAS-CHAVE. Genitália masculina; Nepomorpha; notonectídeos; Região Neotropical.

In terms of species richness, the notonectid genus *Buenoa* Kirkaldy, 1904 is among the largest in the Anisopinae backswimmers, with about 50 described species (Nieser *et al.* 1997). Although *Buenoa* species were reported in southern Canada (Nieser 1975), North America, and North of Mexico (Polhemus & Polhemus 1988), the genus is primarily tropical restricted to the Western Hemisphere and have a limited representation in Hawaii (Nieser 1968), with the greatest number of species per area in the lowlands of tropical South America (Nieser 1975; Nieser *et al.* 1997). The genus contains over 20 described species in Brazil (Truxal 1953, 1957; Roback & Nieser 1974; Nieser 1968, 1970, 1975; Angrisano 1982; Padilla-Gil & Nieser 1992; Nieser & Pelli 1994; Nieser & Melo 1997; Nieser *et al*. 1997; Padilla-Gil 2003).

Members of *Buenoa* are notable because of their hemoglobin-containing cells concentrated in abdominal segments 3-7, providing neutral buoyancy (Schuh & Slater 1995). Along with Chaoborinae (Diptera, Culicidae) larvae, the Anisopinae are among the few really nektonic/planktonic insects, since they float part of the time and swim or actively move at other times. They tend to be very strong swimmers that are most efficient in capturing small, fast-moving prey (McCafferty 1981).

Despite the existence of a revision of the *Buenoa* by Truxal (1953), the current study revealed that the taxonomy of *Buenoa* in the Neotropical region was still in disarray. Following the appearance of Truxal's work, 14 additional Neotropical species have been described, rendering Truxal's work inadequate for identifications at the species level. In the current work, we describe and illustrate a new *Buenoa* species based on specimens from Maricá Municipality (Rio de Janeiro State, Brazil). A key to male of species of *Buenoa* occurring in Rio de Janeiro State is also provided here.

MATERIAL AND METHODS

The results presented here are based on 22 specimens deposited in the Coleção Entomológica Prof. José Alfredo

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In the following transcriptions of label data, a comma (,) separates different information and a semicolon (;) separates information on different specimens. Collectors and deposition institutions are cited in parentheses. The full citation of individual specimens collected at the same locality on different dates is not cited. The letter "m" refers to male specimens and the letter "f" to females. All localities are organized in order, from north to south.

Morphological terms follow Truxal (1953), Nieser (1975), and Nieser *et al.* (1997). All measurements are in millimetres (with minimum and maximum values given) and based on all examined specimens. The specimens are preserved in 80% ethanol. Measurement derivation is illustrated in Figs. 1–2. Some specimens are damaged and therefore were not measured.

RESULTS

Key to male adult members of *Buenoa* species occurring in Rio de Janeiro State, Brazil.

1a. Length of rostral prong shorter than third rostral segment (Figs. 7, 9); forefemoral stridulatory area absent .. 2

Length of rostral prong larger than third rostral segment (Figs. 2, 4, 10); forefemoral stridulatory area present (Fig. 11, fsa) 3

2a(1a).Greatest width of head four times anterior width of vertex in dorsal view (Fig. 1); rostral prong with somewhat rectilinear lateral margins, convex medially and acute at apex (Fig. 9); foretibia with stridulatory comb consisting of 22 teeth; anterior tarsi not swollen, claws not hooked [Brazil only—Mato Grosso do Sul, Minas Gerais, Pará, Rio de Janeiro (Macaé, Maricá)] .... *Buenoa konta* Nieser & Pelli

Greatest width of head five times anterior width of vertex in dorsal view; rostral prong notched medially on inner margin, sligthly acute at apex (Fig. 7); foretibia with stridulatory comb consisting of approximately 19 to 20 teeth; anterior tarsi, notably basal segment, swollen, claws hooked (Fig. 8, clh) [In Brazil—Pará, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Minas Gerais, Rio de Janeiro (Rodovia São Paulo, Maricá), Tocantins] ..... *B. unguis* Truxal

3a(1b).Rostral prong with base originating laterally at proximal end of third rostral segment (Fig. 10) 4

Rostral prong with base originating about halfway or laterally at distal end of third rostral segment (Figs. 2, 4) 6

4a(3a).Foretibia with stridulatory comb consisting of more than 28 teeth; abdomen without nodule on ventral laterotergite 1 5

Foretibia with stridulatory comb consisting of 21 to 25 teeth (Fig. 11); abdomen generally with distinct nodule on ventral laterotergite 1 (Fig. 12, nod) [Brazil only—Rio de Janeiro (Maricá)] (Figs. 10–14) .... *B. pseudomutabilis* Barbosa, Ribeiro & Nessimian, **sp. nov.**

5a(4a).Forefemur with stridulatory area consisting of 17 to 23 ridges on inner surface; tibial comb with 32 to 40 teeth; middle legs with first tarsal segment deeply emarginate on inner margin (Fig. 6, tse) .... *B. tarsalis* Truxal [Brazil only—Amazonas, Pará, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Minas Gerais, Rio de Janeiro (Rodovia Rio-São Paulo, Arraial do Cabo, Maricá, Rio de Janeiro)] (Fig. 5).

Forefemur with stridulatory area consisting of 6 to 7 ridges on inner surface; tibial comb with 28-31 teeth; intermediate leg with first tarsal segment not emarginate on inner margin .... *B. antigone* (Kirkaldy) [In Brazil—Minas Gerais, Rio de Janeiro (Teresópolis), Rio Grande do Norte, São Paulo, Santa Catarina] (Fig. 3)

6a(3b).Rostral prong in side view with base originating near distal end of third rostral segment (Fig. 2); pronotum distinctly tricarinate; forefemur with stridulatory area consisting of 11 to 14 ridges on inner surface [In Brazil—Goiás, Maranhão, Mato Grosso, Pará– as Amazonas in Nieser (1968), Rio de Janeiro (Arraial do Cabo, Maricá)] ..... *B. platycnemis* (Fieber)

Rostral prong in side view with base not originating near distal end of third rostral segment (Fig. 4); pronotum not or faintly tricarinate; forefemur with stridulatory area consisting of 6 to 7 ridges on inner surface [In Brazil—Amazonas?, Espírito Santo, Rio de Janeiro (Teresópolis)] ..... *B. nitida* Truxal

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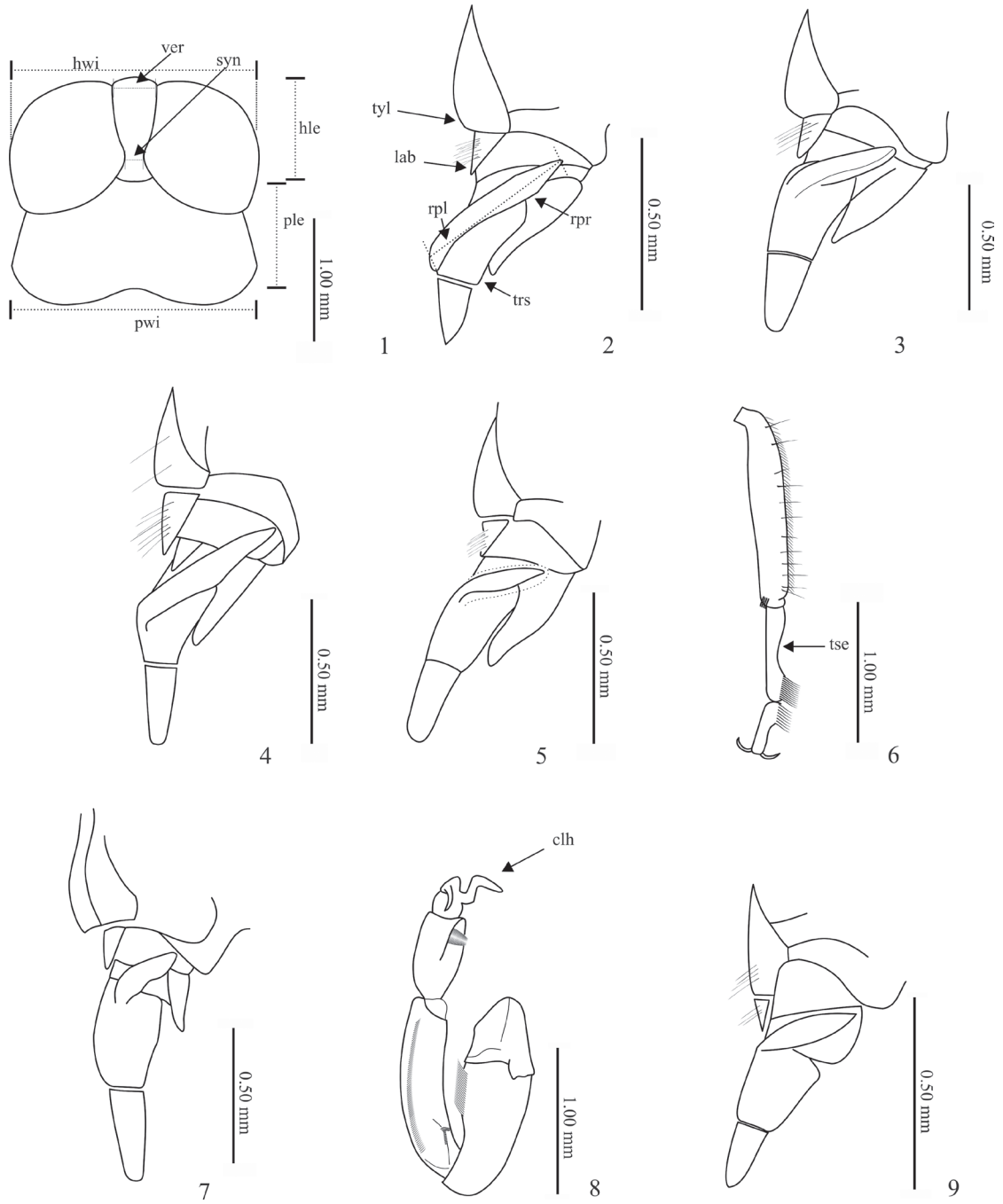
(Figs. 1, 10–14)

Type material.—BRAZIL. Rio de Janeiro State, Restinga de Maricá, Maricá Municipality, 15.XI.1988, (J. L. Nessimian), J. F. Barbosa det.; 1 m (DZRJ 2654), macropterous, holotype; 10 m and 12 f (DZRJ 2655), macropterous, paratypes.

Description of holotype (macropterous form).

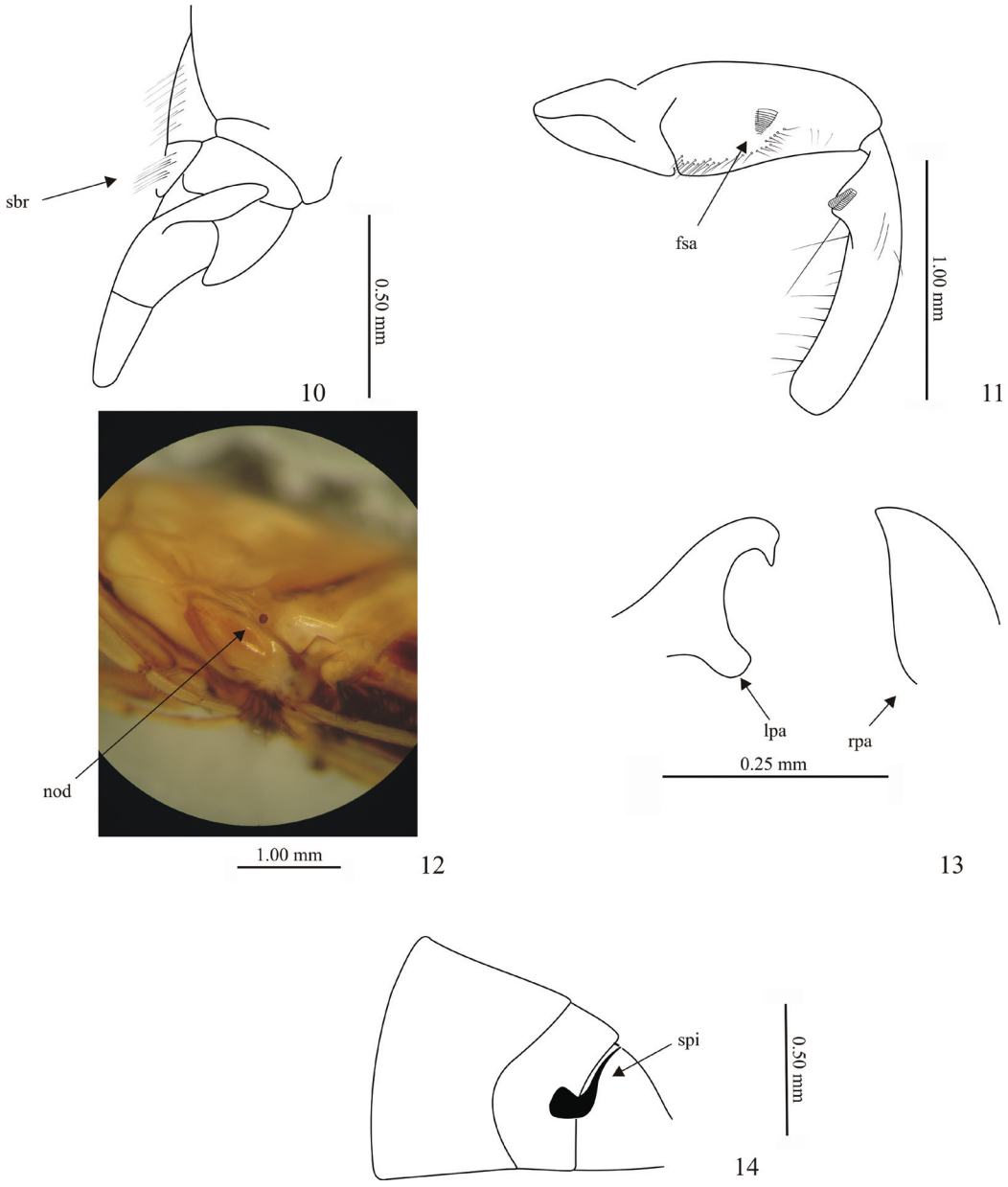
Measurements.—Body length (from apex of head to apex of hemelytra at rest): 6.01; anterior width of vertex: 0.24; length of head (at midline): 0.56; greatest width of head: 1.32; synthlipsis: 0.10; length of pronotum (at midline): 0.72; greatest width of pronotum: 1.30; length of scutellum (at midline): 1.00.

General facies yellowish. Lateral portion of abdominal tergites 3-4, and most of abdominal tergites 5-6 with light brown patches. Greatest width of head slightly wider than width of pronotum; margins of frons moderately divergent in ventral view; anterior margin of vertex indented with that of eyes as viewed from above (Fig. 1); greatest width of head 5.5



Figs. 1–9. External morphology of male *Buenoa* Kirkaldy (Notonectidae) species occurring in Rio de Janeiro State, Brazil. Fig. 1: Dorsal aspect of head and pronotum of *Buenoa pseudomutabilis* Barbosa, Ribeiro & Nessimian, **sp**. **nov.,** showing the major morphological features referred to in the taxonomic description. Figs. 2–5, 7, 9: Tylus, rostrum, and rostral prong (lateral view). Fig. 2: *B. platycnemis* (Fieber); Fig. 3: *B. antigone* (Kirkaldy); Fig. 4: *B. nitida* Truxal; Fig. 5: *B. tarsalis* Truxal; Fig. 7: *B. unguis* Truxal; Fig. 9: *B. konta* Nieser & Pelli. Fig. 6: Middle leg of male of *B. tarsalis* with first tarsal segment deeply emarginate on inner margin. Fig. 8: Anterior tarsi of *B. unguis*, notably basal segment, swollen, claws hooked. clh, claws hooked; hle, head length (at midline); hwi, head width; lab, labrum; ple, pronotum length (at midline); pwi, greatest pronotum width; rpl, length of rostral prong; rpr, rostral prong; syn, synthlipsis; trs, third rostral segment; tse, tarsal segment emarginate; tyl, tylus; ver, vertex.

times anterior width of vertex; synthlipsis about two-fifths the anterior width of vertex; tylus somewhat inflated, with distinct tuft of bristles; labrum with sparse bristles (Fig. 10); rostral prong slightly longer than third rostral segment, in side view projecting before anterior border of third rostral segment, with base originating laterally at proximal end of third rostral segment; apex bluntly rounded in lateral view (Fig. 10); head shorter than pronotum in dorsal view. Greatest width of pronotum more than three times synthlipsis; pronotum with lateral margins somewhat divergent, with faint median carina, not tricarinate; posterior margin straight; greatest width of pronotum approximately 1.8 times its median length; length of scutellum at midline greater than that of pronotum; forefemur narrowed at apex, with length more than three



Figs. 10–14. *Buenoa pseudomutabilis* Barbosa, Ribeiro & Nessimian, **sp**. **nov**. (Notonectidae): Holotype, male specimen from Maricá, Rio de Janeiro, Brazil (DZRJ 2654). Fig. 10: Tylus, rostrum, and rostral prong (lateral view); Fig. 11: Forefemur narrowed at apex, with triangular stridulatory area and foretibia with stridulatory comb; Fig. 12: Distinct dark nodule on abdominal ventral laterotergite 1; Fig. 13: Left and right parameres; Fig. 14: Spine from caudo-sinistral margin of seventh abdominal tergite. fsa, forefemur stridulatory area; lpa, left paramere; nod, nodule; rpa, right paramere; sbr, sparse bristles; spi, spine.

times its width at apex (Fig. 11); triangular stridulatory area consisting of 14 sclerotized ridges (Fig. 11, fsa); posterior margin of hind femur with 30 setae in ventral row; foretibia with stridulatory comb consisting of 21 teeth (Fig. 11). One dark nodule on each abdominal ventral laterotergite 1 (Fig. 12, nod); parameres abnormal in shape (Fig. 13, rpa, lpa); spine from caudo-sinistral margin of seventh abdominal tergite with apical half very narrow, somewhat curved and strongly acuminate (Fig. 14, spi).

Paratypes.

Measurements (7 male/ 8 female).— Body length (from apex of head to apex of hemelytra at rest): 6.01-6.59 / 6.01-6.79; anterior width of vertex: 0.24-0.28 / 0.28-0.30; length of head (at midline): 0.62-0.72 / 0.55-0.67; greatest width of head: 1.24-1.39 / 1.24-1.34; synthlipsis: 0.10 / 0.08-0.10; length of pronotum (at midline): 0.69-0.74 / 0.62-0.72; greatest width of pronotum: 1.27-1.39 / 1.24-1.39; length of scutellum (at midline): 0.88-1.00 / 0.76-0.93.

Colour and structural features similar to male holotype except for small light brown spot present on connexival margins 3-4, greatest width of head slightly smaller than width of pronotum, and abdomen without nodules on ventral laterotergite 1 in female; triangular stridulatory area consisting of 12 to 14 sclerotized ridges; foretibia with stridulatory comb consisting of 21 to 25 teeth; posterior margin of hind

femur with 30 to 33 setae in ventral row and following ratios: greatest width of head five to 5.4 times anterior width of vertex in males and 4.5 times and females; synthlipsis about one-third the anterior width of vertex in both sexes; greatest width of pronotum 1.8 to twice its median length in females.

Brachypterous form unknown.

Etymology.–The species epithet, *pseudomutabilis*, refers to the superficial similarities found between this new species and *B. mutabilis* Truxal, 1953.

Comments.–*Buenoa pseudomutabilis* **sp**. **nov**. male specimens key out to *B. mutabilis* in the key provided by Truxal (1953). However, males and females of this new species differ from those of *B. mutabilis* in having different greatest width of head/anterior width of vertex ratio. In *B. mutabilis* males the ratio is 6.5 and in females is about 6.0, whereas the ratio is 5.0 to 5.4 in males and 4.5 in females of *B. pseudomutabilis* **sp**. **nov**. *Buenoa mutabilis* and *B. pseudomutabilis* **sp**. **nov**. can also be differentiated by the number of teeth in stridulatory comb of male foretibia. There are approximately 33 to 38 teeth in *B. mutabilis* and 21 to 25 teeth in *B. pseudomutabilis* **sp**. **nov**. (Fig. 11). We have seen male specimens of *B. pseudomutabilis* **sp**. **nov**. with a distinctive dark nodule on the ventral laterotergite 1 (Fig. 12, nod). Evaluation of this structural characteristic must await further specimens, because other species show this nodule variation, like *B. salutis* Kirkaldy, 1904 and *B. amnigenus* (White, 1879). In general, the nodule in these species is translucent, whereas in *B. pseudomutabilis* **sp**. **nov**. the nodule is dark.

Acknowledgements. The manuscript benefited from the useful comments of A. L. Melo (Universidade Federal de Minas Gerais, Minas Gerais, Brazil). This work was sponsored by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

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Received 19/11/2009; accepted 31/10/2010
Editor: Daniela Takiya