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A new species of *Berosus* LEACH from southeastern Brazil (Coleoptera : Hydrophilidae)*

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Abstract

A new species of Berosus *is described from southeastern Brazil (Itatiaia National Park). It has compressed male genitalia, with paramera forming a dihedrous angle, largely encased in the basal piece, their free portion widened, then tapering gradually to an acuminate apex; there are no spine-like hairs on the elytra or lateral depressiones on the first urosternite, which bears a short, thick carina. These characters place the species in the adustus-complex (OLIVA, 1989). The new species is remarkable for its semiglobular shape and smooth dorsal surface. Some comments are made on a habitus so different from that of most species in the genus* Berosus.

Key words: Coleoptera, Hydrophilidae, *Berosus*, new species, Neotropical fauna.

Resumen

Se describe una especie nueva del sudeste de Brasil (Parque Nacional de Itatiaia). Los genitales masculinos son comprimidos, los parámeros forman un ángulo diedro, están incluidos en su mayor parte dentro de la pieza basal, con la porción libre ensanchada, luego angostada en forma gradual hasta el extremo acuminado; no existen pelos espiniformes sobre los élitros ni depresiones laterales en el primer urosternito. Estos caracteres ubican a la especie en el complejo adustus *(OLIVA, 1989). La especie nueva es llamativa por su forma semiglobosa y su superficie dorsal muy lisa. Se formulan algunos comentarios sobre un habitus tan diferente del de la mayoría de las especies de* Berosus.

* Received: 3.III.1997.

Introduction

Some interesting material of water beetles from the National Park of Itatiaia (Brazil: Rio de Janeiro) was communicated to me by Dr J.S. Denton. One species proved new to science; it is here described and figured, and an addendum to my key for South-American species of *Berosus* (OLIVA, 1993) is given.

Systematic part

Berosus margaritinus sp. nov. (Figs 1, 3-9)

Size moderate. Length of males 5.0-5.5 mm; length of single female: 5.7.

Shape short, broad, high, semiglobular; humeral humps effaced (Fig. 3). Length/ maximal width - humeral width: Male holotype: 11.0; male paratype, 11.0; second male paratype, 16.66; female paratype: 14.25. Length/height: second male paratype: 2.17; female paratype: 2.19. Eyes not prominent. Ocular index: male holotype: 4.66; male paratypes: 4.66 and 4.33; female paratype: 5.0.

Head melanic with metallic sheen, dark green with bronze or purplish iridescence. Pronotum testaceous with moderate-sized melanic spot, divided by a testaceous median line, in some specimens with a metallic iridescence. Scutellum dark, iridescent or not. Elytra testaceous with small but evident melanic spots, the lateral one of a deep black. Sternites black; femora testaceous with pubescent part black. Distal segment of maxillary palpi melanic only in the extreme apex.

Punctures on clypeus regular, about the size of an ommatidion; on frons a little coarser, more irregularly spaced. Clypeus swollen in lateral view (Fig. 1). Punctures on pronotum about the size of one to two ommatidia, round, rather shallow, moderately dense, irregularly spaced. Background smooth and shining in both sexes. Elytra with humeral humps effaced, their greatest width about the middle of the total body length (Fig. 3); in lateral view very highly and regularly domed (Fig. 1; compare *B. adustus* KNISCH, 1922, Fig. 2). Edge of elytra slightly expanded in anterior half, specially under humeral humps. Elytral striae fine, deeply impressed, with small round punctures spaced by the equivalent of their diameters. On the lateral spot which marks the rough patch of the stridulatory apparatus, the interstriae are deepened and a little widened, but not deflected. The punctures on the striae are here a little enlarged, but not more than twice as large as the punctures on the interstriae, and round. Interstriae wide, flat, save for 10th and 11th, weakly convex on a short stretch in front of stridulatory patch; with a single irregular row of punctures about the same size of those on striae; background smooth and shining in both sexes; no spine-like hairs. Elytral apices produced into blunt triangles (Fig. 3).

Mesosternal process (Fig. 5) laminar, thick, with a convex anterior edge forming a short, thick tooth which points downwards and backwards; ventral edge straight, minutely serrate, weakly declivous backwards. Metasternal process short and broad, with small deep median depression (Fig. 6); poste-

ro-lateral angles produced into short, blunt laminae; posterior angle raised into a straight, flat lamina, not more strongly raised than the posterolateral angles (Fig. 5). First ventrite bearing a thick carina on the anterior 2/3 (Fig. 6), without lateral depressions. Ventrites second to fifth not carinate. Fift ventrite with margin minutely serrate; apical notch deep, rather narrow, with bottom produced into a triangular tooth (Fig. 7). Pubescence on fore femora covering about basal 2/5, on middle femora covering the basal half, on posterior femora covering a little more than half; limit convex. Protarsi of males with small adhesive soles in the two apparent basal segments, which are slightly swollen; the first segment is about twice as long as the second; the fourth slender, longer than the first three taken together (Fig. 4). Claws long, slender, weakly arched.

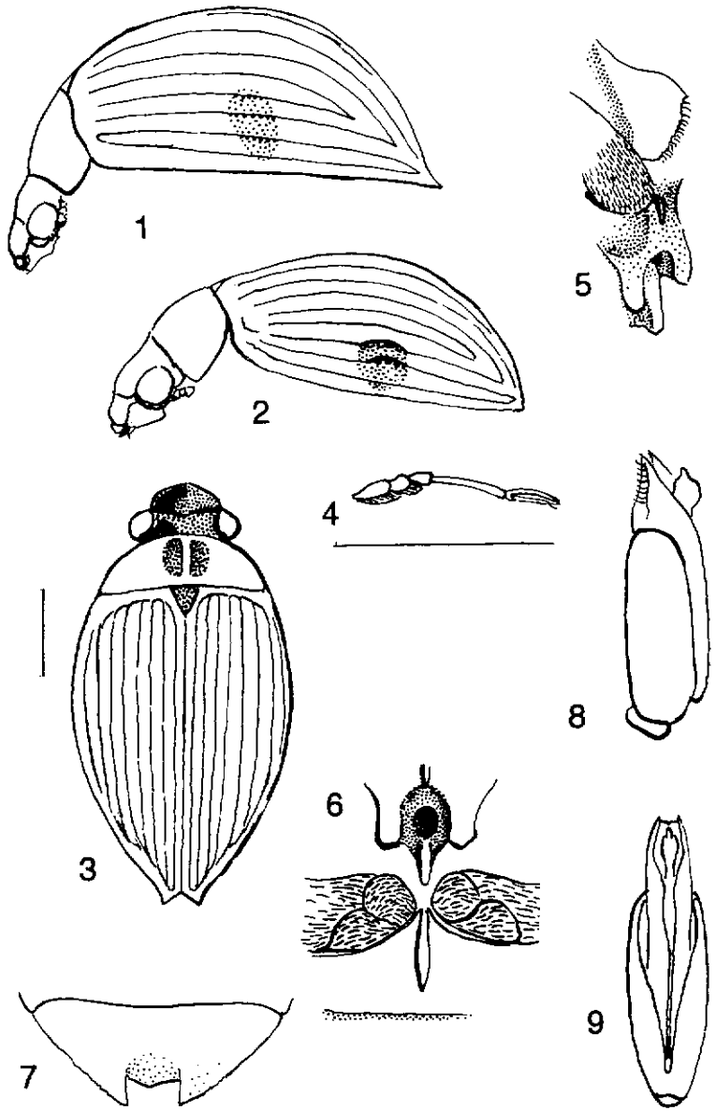
Male genitalia (Figs 8-9): Basal piece long, nearly three times as long as wide, and enclosing most of the distal pieces. Paramera forming a dihedrous angle, the portion free of the basal piece weakly broadened into a lanceolate shape, apices gradually acuminate. Median lobe subcylindrical, shorter than paramera; apex spindle-shaped, weakly, but abruptly swollen.

Material examined: Male holotype, two male paratypes and one female paratype, from Brazil: Rio de Janeiro: National Park Itatiaia, leg. J.S. DENTON, 5.XI.1995.

Holotype in the Museu de Zoologia da Universidade de Sao Paulo; one male paratype at the National History Museum of London; a paratype of each sex at the MACN.

Discussion of species: the name derives from *margarita*, *-ae* (or *margaritum*, *-i*), meaning "pearl", given the adjectival form: *margaritinus* = "pearl-like", alluding to the semiglobular shape and smooth surface.

By the structure of the male genitalia, this species must be placed in what I have called the adustus-complex (see OLIVA, 1989, 1993); it also shows the characteristic shape of the metasternal process and the deepening of the outer elytral striae on the lateral melanic spot. Most of the known species of this complex (which appears to be a worldwide one) have angular humeral humps and a coarse dorsal sculpture. They are not of semiglobular shape, although the values for the ratios length/maximal width - humeral width and length/height of the species *Berosus adustus, B. cornicinus* KNISCH, 1922 and *B. bruchianus* KN., 1924 (OLIVA, 1989), do not diverge significantly from those of the new species. The difference in shape in dorsal aspect is due to the maximal length placed about the middle of the total length, with the shape curving evenly due to effaced humeral humps; in lateral view, the new species is not, perhaps, more convex than *B. adustus*, but here again the curve is smooth and regular: compare figs 1, 2. *B. asphaltinus* KN., 1922, has a shape more reminiscent of the new species, but distinctly more slender, with maximal width exceeding little the humeral width and placed behind the middle of the total body length; also, the elytral apices are not produced. *B. margaritinus* sp. nov. may be also distinguished readily from *B. cornicinus* by the produced elytral apices, and from *B. adustus* and *B. bruchianus* by characters given in the *addendum* to the key in OLIVA, 1993.



Figs 1-9. 1: *Berosus margaritinus* sp. n., schematic lateral view, 20×. 2: *B. adustus* KNISCH, 1922, schematic lateral view. 3: *B. margaritinus*, schematic dorsal view showing produced elytral apices and body shape with the greater width about the middle of total length. 4: ditto, protarsus of male. 5: ditto: meso- and metasternal processes, ventro-lateral view. 6: ditto, metasternal process and median carina on first apparent urosternite, ventral viex. 7: ditto: fifth apparent urosternite, ventral view. 8: ditto: male genitalia, lateral view. 9: ditto: male genitalia, tergal view. Figs 1, 2, 3: 20×; 4, 5, 6, 7, 8, 9: 50×.

The new species keys to couplet 34 of this key. This should run:

34 - Elytral apices emarginate into a quarter of a circle, with dehiscent sutural angle and a broad parasutural point. Mesosternal process with posterior and postero-lateral angles not raised. Basal piece very long, about 2/3 of total length because the paramera are also long. Paramera gradually acuminate, with subapical narrowing followed by slight expansion; in tergal view, apices acute, pointing outwards. Median lobe shorter than paramera, apex hardly swollen .... *B. bruchianus* KNISCH, 1924

(Argentina: B. Aires, R. Negro; Chile; Uruguay: Brasil: Rio Grande do Sul)

34' - Elytral apices not emarginate, simply produced. Metasternal process with posterior angle raised into a lamina ..... 34 bis

34bis - Outer striae very strongly arched over stridulatory patch, in particular the eighth, which here bears coarse squarish punctures several times larger than punctures on interstriae. Punctures on pronotum coarse, contiguous. Posterior lamina of the metasternal process convex in lateral view. Shape sturdy, not semiglobular (Fig. 2), with humeral humps prominent; greatest width about 2/3 of total length. Portion of paramera free of basal piece strongly broadened, then notched forming an acuminate apex. Median lobe nearly as long as paramera; apex with gradual subapical thickening ..... *B. adustus* KNISCH, 1922

(Argentina: E; Uruguay)

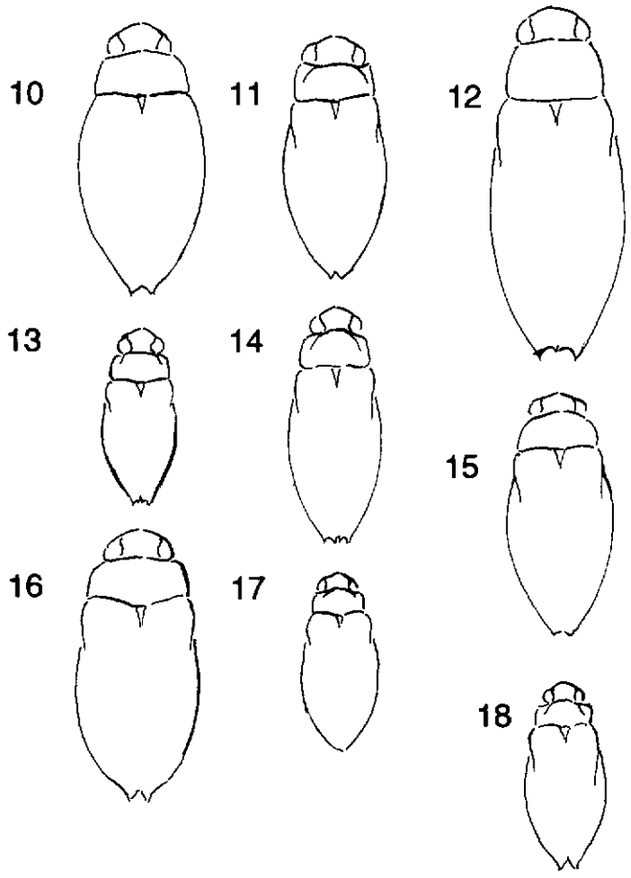
34bis' - Outer elytral striae only deepened over stridulatory patch, not curved; punctures here a little enlarged, but not more than twice the size of those on interstriae, round. Punctures on pronotum rather fine, moderately dense. Posterior lamina of metasternal process straight in lateral view. Shape short and wide, semiglobular (Figs 1, 3), with humeral humps effaced; greatest width about the middle of total length. Portion of paramera free of basal piece weakly broadened, narrowing gradually to acuminate apices. Median lobe shorter than paramera, with weak, but abrupt subapical thickening .... *B. margaritinus* sp. n.

This carries the number of described South-American species to eighty-four (*B. obscurus* CASTELNAU, 1840 remaining, however, as species inquirenda).

Discussion of morphological adaptations

A tendency towards an elongate shape may be observed in several different lineages of *Berosus*, often together with produced or bispinous elytral apices. On the contrary, the shape and sculpture of *B. margaritinus* sp. n. is remarkably short, broad and spheroidal, and its dorsal sculpture smooth by comparation with other species of the adustus-complex. Figure 10 shows the outline of *Berosus margaritinus* sp. n. in dorsal view. The shape of *B. adustus* and *B. bruchianus* (Figs 11-12) is what I have called sturdy-elongate. In the same spe

cies-complex are found *B. asphaltinus* with an oval-elongate shape, in between that of the new species and that of *B. bruchianus*, and *B. cornicinus* KNISCH, 1922, with a distinctly broad shape. Comparative drawings of these species (schematic) may be found in OLIVA (1993). (The five species discussed are those described up to now from South America in this complex.) Figures 13 and 14 (*B. patruelis* BERG, 1887 and *B. pedregalensis* JENSEN-HAARUP, 1910) are examples of what I call elongate shape; these species have long legs and swim swiftly. Figures 15, 16, 17 and 18 illustrate the variation of elongate shape within the *chalcocephalus*-complex (OLIVA, 1989). All the species of this complex bear spine-like hairs on their elytra; of the illustrated species, 2



Figs 10-18. 10. *B. margaritinus* sp. n., dorsal view, schematic. 11: ditto, *B. adustus*. 12: ditto, *B. bruchianus* KNISCH, 1924. 13: ditto, *B. patruelis* BERG, 1887. 14: ditto, *B. pedregalensis* JENSEN-HAARUP, 1910. 15: *B. coptogonus* JENSEN-HAARUP, 1910. 16: *B. pallipes* BRULLÉ, 1841. 17: *B. chalcocephalus* GERMAIN, 1865. 18: *B. toxacanthus* OLIVA, 1989. Figs 10-18: 10×. Scale-lines: 1.0 mm.

have these hairs on all the elytral interstriae, while in 2 they are restricted to interstria 11th. *B. pallipes* BRULLÉ, 1841 (Fig. 16) is possibly the most pioneering species in South America. As it can be observed, its shape is elongate, but clearly sturdier than those of *B. patruelis* or *B. pedregalensis*. *B. pallipes* is often found with these, but is definitely less agile as a swimmer. *B. coptogonus* JENSEN-HAARUP, 1910 and *B. chalcocephalus* GERMAIN, 1865 (Figs 15, 17) usually live in temporary pools in the plains. *B. toxacanthus* OLIVA, 1989, from mountain areas, has not been observed in the field.

Out of 80 species of Neotropical *Berosus* checked, 20 have the broad shape associated with coarse, dense sculpture and shared with the allied genus *Hemiosus*. Six species are sturdy-elongate, 10 oval-elongate, 13 broad-depressed (a shape associated with small size) and 30 elongate, with the new species as the only one exhibiting a short-oval shape.

Forty-eight species have spine-like hairs on their elytra and 32 species have none; of the first, 12 species bear them only on the posterior part of interstria 11th, and in 35 they are found on all the interstriae.

An elongate body-shape is usually associated with hydrodynamic devices: spine-like hairs on the elytra, produced or bispinous elytral apices, and often a fine dorsal sculpture. Since many of the species with what seem obvious adaptations to swift flow live in stagnant water (at least *B. patruelis, B. pedregalensis, B. pallipes, B. obscurifrons* KNISCH, 1921, *B. reticulatus* KNISCH, 1921, *B. decolor* KNISCH, 1924, *B. speciosus* KNISCH, 1921 and *B. truncatipennis* CASTELNAU, 1840 have been personally observed by the author), it may be assumed that the flow that they encounter is created by their own swimming.

In contrast with these species, *Berosus margaritinus* has a spheroidal shape, smooth dorsal surface and slightly expanded elytral edges. Actually, it looks rather like an old-fashioned cupping glass. Dr DENTON found this species in "a large stagnant pond with many fish... a stoney bottom, with little emergent vegetation". Perhaps the beetles risk dislodgement by fish.

The Serra da Mantiqueira, where the Itatiaia Park is placed, is an example of mountain rain-forest. Rio de Janeiro has the distinction of being the type-locality for three species of Berosini not found elsewhere (*Berosus sticticus* BOHEMAN, 1859; *Hemiosus variegatus* (BOHEMAN, 1859) and *H. moreirai* ORCHYMONT, 1921) and of one which was afterwards found also in Santa Catharina *(H. dimorphus* ORCHYMONT, 1940). *H. moreirai* and *H. dimorphus* are remarkable for their fine dorsal sculpture, and one specimen of the first species was also captured by Dr. DENTON at Itatiaia. Some specimens of *Derallus anicatus* ORCHYMONT, 1940, were found at the same locality. This species, one of the largest in the genus, has a very smooth elytral disk, and in a general way it ressembles *B. margaritinus* in habitus.

However tempting it is to speculate on environment factors which may lead to smooth- sculpture species in this area, at present we cannot pursue any serious line of research. No serious hydrodynamics work could be performed without estimating in the first place the Reynolds number, which would depend of the size of the beetle, its swimming velocity, the presence of currents, and even, for all we know, of factors affecting water density and viscosity,

which are practically never checked by the field naturalist. Thus we are condemned to theoretical speculation until we have more information.

Acknowledgements

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Mise en synonymie de l'espèce récemment décrite, *Plesiopanurgus hanno* BAKER, 1997 et considérations sur la position subgénérique des *Plesiopanurgus* CAMERON, 1907 (Hymenoptera : Andrenidae)

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Summary

Four species of the genus Plesiopanurgus *CAMERON, 1907 are actually known. Only one has been described from Morocco,* Plesiopanurgus zizus *WARNCKE, 1987. The new species* Plesiopanurgus hanno *BAKER, 1997 is, in fact, a junior synonym for the WARNCKE'species. Moreover, it seems that* Plesiopanurgus *is a genus rank taxon and not a subgenus as WARNCKE suggested (1985, 1987) and that all the known taxa (*cinerarius, richteri, ibex *and* zizus*) are species and not subspecies of* cinerarius.

Key words : *Plesiopanurgus*, *Convolvulus* L., glossa, labial palpus, genitalia.

Résumé

Quatre espèces de Plesiopanurgus *CAMERON, 1907 ont été décrites à l'heure actuelle. Une seule est connue du Maroc,* Plesiopanurgus zizus *WARNCKE, 1987. L'espèce décrite comme nouvelle par BAKER (1997),* Plesiopanurgus hanno, *doit être considérée comme un synonyme plus récent de* Plesiopanurgus zizus *WARNCKE, 1987. De surcroît, il est de l'avis de l'auteur que* Plesiopanurgus *doit être considéré comme un genre et non un sous-genre de* Panurgus *PANZER, 1806 et que les quatre taxons connus* cinerarius, richteri, ibex *et* zizus, *ne peuvent être maintenus dans la position subspécifique qui est la leur actuellement mais doivent être envisagés comme des espèces.*