

Two New Species of the Genus *Macrocrates* (Coleoptera, Lucanidae) from South Brazil

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Abstract Two new species of the genus *Macrocrates* is described from South Brazil, under the name of *M. invenireus* sp. nov. and *M. galantorum* sp. nov.

Up to the present, two species of the Lucanidae genus *Macrocrates* BURMEISTER, 1847 are well known. One is *Macrocrates bucephalus* (HOPE et WESTWOOD, 1845) from Brazil meridionalli, and the other is *Macrocrates australis* (LUEDERWALDT, 1935) from Santa Catarina (SC), Joinville, Brazil. In the genus *Macrocrates*, some species other than above two species were described, but they including *Macrocrates formosus* (DIDIER, 1926) were synonymized by BENESH (1955). In 1963, WEINREICH gave detailed description on *Macrocrates* species. The author (T. F., 2010) thought whether *M. australis* might be synonym of *M. bucephalus* by there being extremely little number of this genus collection, but recently it came to be collected some of this genus, the author had an opportunity to examine some specimens of this genus. Examining those specimens, the author noticed that *M. bucephalus* and *M. australis* can be simply distinguished by each mandibles, *i.e.*, the mandibles of *M. bucephalus* have four teeth near the apex and one tooth near the base, while the mandibles of *M. australis* have three teeth near the apex and two teeth near the base. And recently the author had an opportunity to examine some specimens of the genus *Macrocrates* from Brazil in the Museum of Nature and Human Activities, Hyōgo (MNHAH) (Japan) and those in the Institute Royal des Sciences Naturellus de Belgique (IRSNB) (Belgium). Each of all them from Brazil apparently belonged to two species of the Lucanidae genus *Macrocrates*. Comparing each of specimens with those of hitherto known members of the genus *Macrocrates* including *M. bucephalus* and *M. australis*, the author found that those both have different form from *M. bucephalus* and *M. australis*, and it was concludes that each of specimens were distinct from all the known congeners. Thus, the present author describes each of specimens as two new species of *Macrocrates*.

List of acronyms

IRSNB	Institute Royal des Sciences Naturellus de Belgique, Bruxells, Belgium
MNHAH	Museum of Nature and Human Activities, Hyōgo, Japan
NHMUF	Natural History Museum University of Florence, Firenze, Italy
OXUM	Hope Entomological Collections, University Museum, Oxford
MP	Museu Paulista, Universidade de São Paulo, Brasil
LBC	Collection of Dr. Luca BARTOLOZZI, Firenze, Italy
TKC	Collection of Mr. T. KANEKO, Tokyo, Japan
TFC	Collection of T. FUJII, Hyōgo, Japan

Macrocrates bucephalus (HOPE et WESTWOOD, 1845)

(Figs. 6–10, 17, 22, 26, 30, 34, 38, 39)

Macrocrates bucephalus HOPE et WESTWOOD, 1845: 15; BURMEISTER, 1847: 381–382; DOHRN, 1862: 155; PARRY, 1864: 44, pl. 10, f. 9; HEYNE, 1908: 54, pl. 8, f. 3; BOILEAU, 1913: 237, pl. 1; DIDIER, 1926: 83; LUEDERWALDT, 1934: 388; 1935: 509, pl. 3, f. 39; BLACKWELDER, 1944: 196; DIDIER & SEGUY, 1952: pl. 94; 1953: 131; BENESH, 1955: 57–60; 1960: 54; WEINREICH, 1963: 198–202, pl. 13, f. 7–8; BLACKWELDER, 1982: 196; NAGAI, 1985: 185; MAES, 1992: 62; MIZUNUMA & NAGAI, 1994: 278; KRAJCIK, 2001: 29; 2003: 111.

Psalicerus nigripes DEJEAN, 1833: 174 (nomen nudum); BOILEAU, 1913: 237.

Lucanus bucephalus WESTWOOD, 1845: 15.

Lucanus longicornis BURMEISTER, 1847: 382.

Macrocrates longicornis PARRY, 1864: 86.

Psalicerus rotundicollis (GORY) (nomen nudum); BOILEAU, 1913: 237.

Macrocrates formosus DIDIER, 1926: 83; LUEDERWALDT, 1935: 513, pl. 3, f. 38.

Macrocrates formosa BENESH, 1955: 57.

Macrocrates bucephala BENESH, 1960: 54.

Holotype depository. 1 ♂, OXUM (Col: 269).

Holotype locality. Brasilia meridionali.

Distribution. Urubici (Santa Catharina), São Joaquim (Santa Catharina), South Brazil

Notes. The genus *Macrocrates* was established by BURMEISTER (1847) based on *Lucanus bucephalus* WESTWOOD (1845) as type species. The holotype of *M. bucephalus* was examined and illustrated by WEINREICH (1963) as shown in Fig. 6. WEINREICH (1963) gave detailed description on *Macrocrates* species. In here, the author add the result that examined in detail some specimens of the *M. bucephalus* from Urubici and São Joaquim to the description by WEINREICH and illustrate about *M. bucephalus* as the following;

M a l e. Body matt dark reddish brown, mandibles, more shiny reddish brown. Extremely fine stippling.

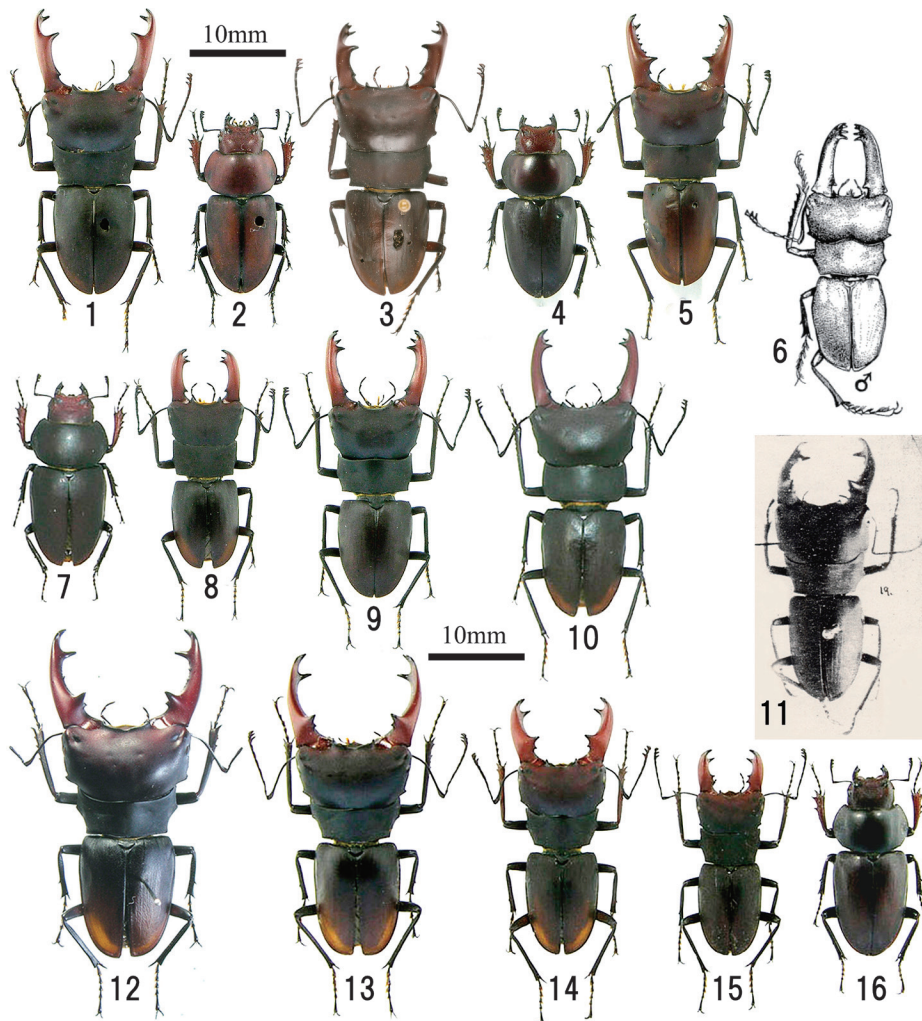
Head very broad, transverse and highly arched, anterior margin slightly sloping. Two slightly sharp straight projections in the middle of front edge. Edge on both sides bounded by an eye lower sharp protuberance in last one-third of length. Labrum broad and rounded, outside bristles. Mandibles longer than head, almost straight protruded, symmetrical. Outer edge slightly curved inward. Apex carries three inwardly directed end teeth, in front, in upper, and in lower (ft, ut, lt). A strong, somewhat upwardly bent inner tooth in apical quarter of the length (st). A smaller, inwardly and upwardly tooth near the base (bt).

Antennae long and slender, basal S-shaped curved, six filiform segments, club tripartite, the last relatively small. Club flagellomeres flat.

Pronotum narrower than the head, the front of the widest, middle and front corners slightly prefer reddish side corners sharp, posterior angles almost right angles. Between front and side corners, and side and rear corners each have a concave indentation. Outline only sides and rear clear. Width of posterior edge 0.88–0.9 times of width of the middle. Scutellum heart shaped, shiny, with a few points in front half.

Elytra dull, without rows of dots, about 1.3 times as long as wide. Shoulders rounded, without tooth. Sutural area slightly more polished.

Legs. Foreleg-tibiae very slim, with a long, powerful end tooth, behind mostly four of almost equal size smaller teeth. Middleleg-tibiae with an outer tooth on basal third, hindleg-tibiae without teeth. Tarsi about as long as tibiae, with long yellow bristles on its lower bottom mat, without consp-



Figs. 1–16. *Macrocrates* spp. — 1–3, *Macrocrates invenireus* sp. nov. — 1, ♂ (holotype); 2, ♀ (paratype); 3, ♂ (paratype) from Encruzilhada, Rio Grande do Sul, Brazil. — 4–5, *Macrocrates galantorum* sp. nov.; 4, ♀ (paratype); 5, ♂ (holotype) from Brazil. — 6–10, *Macrocrates bucephalus*; 6, after WEINREICH, E., 1963 [as shown Fig. 7. *Macrocrates bucephalus* (WESTWOOD), ♂ (Holotypes), in OXUM, specimen no. Col: 269]; 7, ♀, 8, 10, ♂ from Urubici, Santa Catarina, Brazil; 9, ♂ from São Joaquim, Santa Catarina, Brazil. — 11–16, *Macrocrates australis*; 11, after LUEDERWALDT, H., 1935 [Joinville (Santa Catarina). Da collecao de SCHMALZ, “1990” (=should be a misspelling of 1900), 1 ♂, TYPOS]; 12, ♂ from campo limpo of Jaragua do Sul, Santa Catarina, Brazil; 13–15, ♂; 16, ♀ from Quiriri, Parana, Brazil.

uous dots.

Genitalia did not be shown in the previous study of *Macrocrates*, and are firstly investigated several materials in this paper. Form simple. Ninth abdominal segment elongate oblong, length (4.4 mm) about twice as long as width (2.4 mm). Genital capsule similar to those of other Lucaninae species. Aedeagus symmetric; averted internal sac significantly elongate, maximum length than 30 mm, width generally about 0.1 mm. Penis cylindrically form, length (2.0 mm), width (0.6 mm), center and base

recessed. Base of penis strongly constriction, length (0.5 mm), width (0.4 mm), and shaped dip (0.45 mm) at both sides. Parameres triangle form, the sides diversified apically, length (1.7 mm), width (0.75 mm), outside of apex gentle curve to a straight line. Basal piece shaped elongate trapezoidal tube form, both sides of edge notably linearly form, and thin flat, length (1.95 mm), up width (1.4 mm), down width (1.0 mm).

F e m a l e. Body dark brown, head and pronotum more shining than in ♂.

Head cross-rectangular, straight leading edge; labrum broad and somewhat rounded including outstanding. Front and outer corners rounded in the eye canthus half sharing wide-butt on the head here widest. Many stippling pierced particularly dense in the middle and behind the eyes. Mandibles narrow slightly bent inward with a sharp tip of a fine tooth, a front-facing also pointed inner tooth and a cusp on the top.

Antennae short and stocky, round filiform segments, hardly longer than broad, built club as in ♂, only closer together. The apicalmost flagellomere also smaller than the previous one.

Pronotum. Anterior margin stepping forward truncated rectangular. Center of the disc covered-dish with scatterreddish pierced stippling that are closer to the edges. Fringe only interrupted in the middle of front edge. In the middle of side panels each having a more or less depressed pit.

Elytra as in ♂ built rounded shoulders even more.

Legs. Foreleg-tibiae strong and wide. Five from front to back with decreasing in size triangular outer teeth. Middleleg-tibiae strong outer tooth in basal third and about 2–3 smaller. Hindleg-tibiae with one outer tooth. Tarsi normal, as in the ♂ on bottom bristles strong light yellow. Bottom pitch-brown mat.

Genitalia was illustrated by WEINREICH (1963). Genitalia form simple, similar to those of other species of Lucaninae. Stylus tiny oblong. Hemisternite round-edged rectangular, length about 2.8× longer than width, outer edge of 1/2 form sunken shape, lower part broad, inner edge form slowly sunken shape of lower part.

Variation of size. Length: ♂, 23.1–32.0 mm (including mandible); ♀, 18.0–22.0 mm (including mandible). Width: ♂, 8.0–13.0 mm; ♀, 7.0–9.0 mm.

Specimens examined. 1 ♂, São Joaquim, Santa Catarina, Brazil, 22–III–2012 (TFC), 2 ♂♂, 1 ♀, Urubici, Santa Catarina, Brazil, 26–II–2009 (TFC, TKC), 1 ♂, 1 ♀, Urubici, Santa Catarina, Brazil, III–2011 (LBC). São Joaquim is near Urubici and approximately 40 km South West of Urubici. These two areas belong to the group of the same mountain.

***Macrocrates australis* (LUEDERWALDT, 1934)**

(Figs. 11–16, 20, 21, 25, 29, 33, 37, 44, 45)

Macrocrates australis LUEDERWALDT, 1934: 388, pl. 116; 1935: 510, pl. 2, f. 15, 19, pl. 4, f. 68; BLACKWELDER, 1944: 196; DIDIER, 1933: 25; DIDIER & SEGUY, 1952: pl. 94; 1953: 131; BENESH, 1960: 54; WEINREICH, 1963: 200–202, pl. 13, f. 9–10; BLACKWELDER, 1982: 196; MAES, 1992: 62; MIZUNUMA & NAGAI, 1994: 278, pl. 116.; KRAJCIK, 2001: 29; 2003: 111; MIZUNUMA, NAGAI & SUZUMURA, 2010: 283, pl. 189.

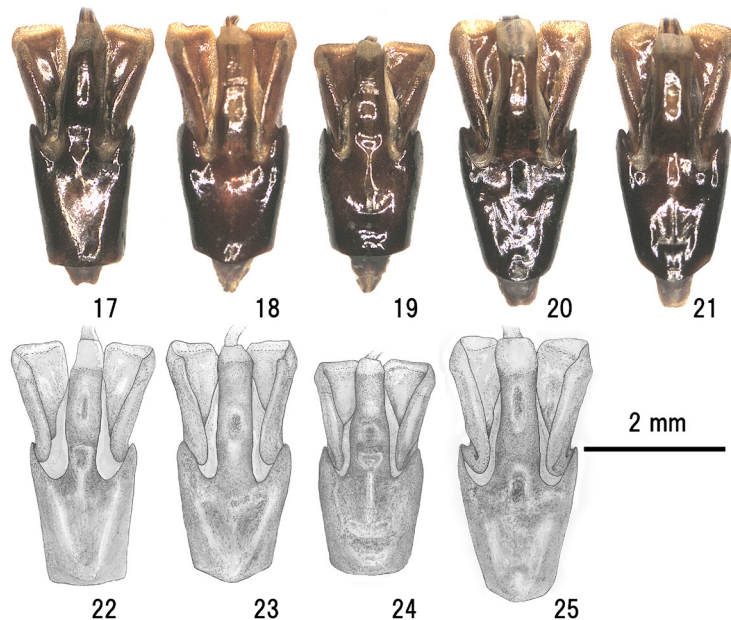
Macrocrates bucephala DIDIER 1933: 25; HEYNE & TASCHBG, 1908: 54, pl. 8, f. 39; DIDIER & SEGUY, 1953: pl. 94.

Types depositor. Holotype, ♂ (08883), paratype, ♀ (08884), MP.

Types locality. Joinville (Santa Catharina).

Distribution. Quiriri (Parana), Joinville (Santa Catharina), South Brazil.

Notes. The holotype of *M. australis* was showed by LUEDERWALDT (1935) as shown in Fig. 11. WEINREICH (1963) gave detailed description on *Macrocrates* species. In here, the author add the result that examined in detail some specimens of the *M. australis* from Quiriri and Jaragua do Sul near Join-



Figs. 17–25. Male genitalia of *Macrocrates* spp. — 17, 22, *M. bucephalus*; 18, 23, *M. invenireus* sp. nov. (holotype); 19, 24, *M. galantorum* sp. nov. (holotype); 20, 25, *M. australis* large male (length 31 mm); 21, *M. australis* small male (length 21.4 mm).

ville to the description by WEINREICH and illustrate about *M. australis* as the following;

Male. The only differences to previous species (*M. bucephalus*) are observed in the construction of the head and mandibles.

Head. Narrow, sharp transverse strip in front center of head edge, which runs at *Bucephalus* almost straight, and flanked on both sides by a tooth is bent wavy at *australis*, and on both sides at an angle offset, without forming special teeth. Mandibles being of the same size as in the previous type (*M. bucephalus*), but outer reddish-gentle curved gently inward and downward, they contribute to the tip end three teeth (ft, ut, lt), where tip end tooth in lower is large and somewhat away from apex. Large, cone-shaped, strong upward tooth (st) far away from apex and exist in the basal quarter of a length near base. Smaller, inwardly tooth at its inner bottom (bt) very small teeth and overlap with a strong tooth (st). In addition, the large ♂ having extremely small tooth of trace degree between the tip and base teeth.

Pronotum. Width of posterior edge smaller than the *Bucephalus*, 0.75–0.77 times of width of the middle.

Genitalia did not be shown in the previous study of *Macrocrates*, and are firstly investigated several materials in this paper. Form simple; genital capsule similar to those of other Lucaninae species. Aedeagus symmetric; averted internal sac extremely elongate, maximum length than 40 mm, width generally about 0.1 mm. Penis cylindrically form, length (2.05 mm), width (0.6 mm), center and lower of base recessed. Base of penis notably little constriction, length (0.5 mm), width (0.55 mm), and shaped dip (0.45 mm) at both sides. Parameres triangle form, the sides diverged apically, length (1.95 mm), width (0.8 mm), outside of apex gentle curve to a straight line. Basal piece shaped isosceles triangle form, and thin flat, length (2.1 mm), up width (1.7 mm), down width (0.9 mm), lower edge

shape squeezable form.

F e m a l e. External form is broad agreement of all characteristics with those of *M. bucephalus*.

Genitalia was illustrated by WEINREICH (1963). However, the author could examine the genitalia of three female specimens of *M. australis*, then show the photo of the genitalia and its illustration in Figs. 29, 33. Genitalia form simple, similar to those of other species of Lucaninae. Stylus tiny triangle. Hemisternite broad trapezoid form, length (1.05 mm) about 1.9× longer than width (0.55 mm), outer edge of 1/3 form sharp pointed, outer edge of 1/2 form weakly constriction, inner edge form slowly sunken shape at lower part, lower edge strongly shape toward to outside.

Variation of size. Length: ♂, 21.4–34.5 mm (including mandible); ♀, 17.9–22.0 mm (including mandible). Width: ♂ 7.3–12.0 mm; ♀ 7.2–9.0 mm.

Specimens examined. 1 ♂, 1 ♀, Jaragua do Sul, Santa Catarina, Brazil, II–2007 (TFC), 6 ♂♂, 2 ♀♀, Quiriri, Parana, Brazil, II–2012 (TFC). Jaragua do Sul is near Joinville and approximately 30 km south west of Joinville, Quiriri is near Joinville and approximately 20 km west north of Joinville, These three areas belong to the group of the same mountain. By the way, Joinville is located 200 km north of Urubici, and these two areas belong to the different mountain group.

Note. Genitalian form have not considerable variations between different body size of specimens.

Macrocrates invenireus sp. nov.

(Figs. 1–3, 18, 23, 27, 31, 35, 40, 41)

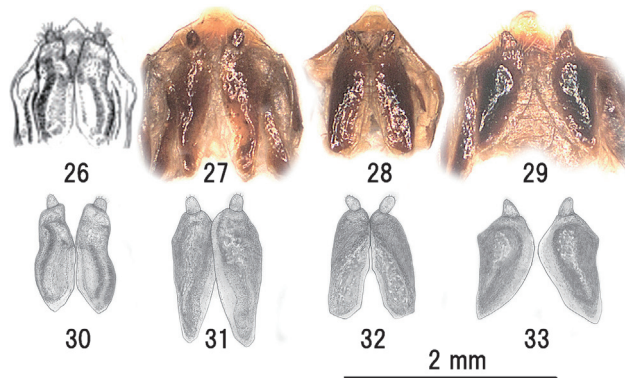
Diagnosis. *Macrocrates invenireus* sp. nov. is easily distinguishable from the previous species (*M. bucephalus*, *M. australis*) by the position of a large, strong inward tooth in mandibles and the form of the mandibles of ♂. The mandibles are of the same size as in the *M. bucephalus*, and have the tip end three teeth (ft, ut, lt), and a smaller, inwardly tooth at its inner bottom near base (bt), but a large, strong inward tooth (st) is far away from apex and exist at apical one-third of the length. While the position of a large, strong inward tooth in mandibles is in apical quarter of the length at *M. bucephalus*, and is in basal quarter of the length at *M. australis*. The mandibles of *Macrocrates invenireus* sp. nov. seem straight in the dosal view, but bend downward at the position of the large, strong inward tooth (st) in the lateral view. While the mandibles of *M. bucephalus* are almost straight protruded, those of *M. australis* curved gently inward and downward,

Description of the holotype. **M a l e.** Body matt blackish brown, mandibles, more shiny reddish brown. Extremely fine stippling. Length: 29.5 mm (including mandible), 21.0 mm (excluding mandible), width: 8.4 mm (pronotum).

Head closely allied to the *M. bucephalus*, very broad, transverse and highly arched, the anterior margin slightly sloping. Two slightly sharp straight projections in the middle of front edge. Edge on both sides bounded by a eyes lower sharp protuberance in apical one-third of length. Labrum broad and rounded, outside bristles. Mandibles longer than head, almost straight protruded in dorsal view, but bend downward at position of large, strong inward tooth (st) in lateral view. Apex carries three inwardly directed end teeth, in front, in upper, and in lower (ft, ut, lt). A large, strong inward tooth (st) exist at one-third from the apex. A smaller, inwardly tooth at its inner bottom near base (bt).

Antennae long and slender, basal S-shaped curved, six filiform segments, club tripartite, the apicalmost relatively small. Club segments flat.

Pronotum narrower than the head, the front of widest, middle and front corners slightly preferred reddish side corners sharp, posterior angles almost right angles. Between front and side corners, and side and rear corners each have a concave indentation. Outline only sides and rear clear. Width of



Figs. 26–33. Female genitalia of *Macrocrates* spp. — 26, 30, *M. bucephalus*; 27, 31, *M. invenireus* sp. nov. (paratype); 28, 32, *M. galantorum* sp. nov. (paratype); 29, 33, *M. australis*.

posterior edge almost same as the *Bucephalus*, 0.9 times of the width of the middle. Scutellum transversely-kidney shaped, shiny.

Elytra dull, without rows of dots, about 1.33 times as long as wide. Shoulders rounded, without tooth. Sutural area slightly more polished.

Legs. Foreleg-tibiae very slim, with a long, powerful end tooth, behind mostly four of almost equal size smaller teeth. Middleleg-tibiae with an outer tooth on basal third, hindleg-tibiae without teeth. Tarsi about as long as tibiae, with long yellow bristles on its lower bottom mat, without conspicuous dots.

Genitalia. Form simple. Ninth abdominal segment elongate oblong, length (4.2 mm) about twice as long as width (2.1 mm). Genital capsule similar to those of other Lucaninae species. Aedeagus symmetric; averted internal sac significantly elongate, maximum length than 20 mm, width generally about 0.1 mm. Penis cylindrical form, length (1.9 mm), width (0.6 mm). Base of penis notably little constriction, length (0.45 mm), width (0.5 mm), and shaped dip (0.5 mm) at both sides. Parameres triangle form, the sides diversified apically, length (1.8 mm), width (0.72 mm), outside of apex gentle curve to a straight line. Basal piece shaped trapezoidal tube form, and thin flat, length (1.9 mm), up width (1.6 mm), down width (1.1 mm), projection rounded bulge somewhat at lower edge. Each of center of penis and basal piece are somewhat recessed.

Description of the paratype. Female. There is broad agreement of all characteristics with the previous *Macrocrates* species.

Body elongate oval, dark brown, head and pronotum more shining than in ♂. Length: 18.8 mm (including mandible), 17.0 mm (excluding mandible), width: 7.5 mm (pronotum).

Head cross-rectangular, straight leading edge; labrum broad and somewhat rounded including outstanding. Front and outer corners rounded in the eye canthus half sharing wide-butt on the head here widest. Many stippling pierced particularly dense in the middle and behind the eyes. Mandibles narrow slightly bent inward with a sharp tip of a fine tooth, a front-facing also pointed inner tooth and a cusp on the top.

Antennae short and stocky, round filiform segments, hardly longer than broad, built the club as in ♂, only closer together. Apicalmost flagellomere also smaller than the previous one.

Pronotum. Anterior margin stepping forward truncated rectangular. Center of disc covered reddish with scattered reddish pierced stippling that are closer to edges. Fringe only interrupted in the middle of front edge. In the middle of side panels each have a more or less depressed pit. Labels heart shaped,

shiny, with a few points in front half.

Elytra as in ♂ built, rounded shoulders even more. Length about 1.33 times as long as wide.

Legs. Foreleg-tibiae strong and wide; five from apex to base with decreasing in size triangular outer teeth, with the apicalmost a long. Middleleg-tibiae strong outer tooth in basal third and about 2–3 smaller. Hindleg-tibiae with an outer tooth. Tarsi normal, as in the ♂ on the bottom bristles strong light yellow. Bottom pitch-brown mat.

Genitalia form simple, stylus tiny oblong. Hemisternite strongly elongate oblong, length (1.3 mm) about 2.6× longer than width (0.5 mm), inner edge form strong sunken shape at lower part, lower part narrow, lower edge strongly shape toward to under.

Variation of size. Length: ♂, 29.5–28.0 mm (including mandible), 21.0 mm (excluding mandible); ♀, 18.8 mm (including mandible), 17.0 mm (excluding mandible). Width: ♂ 8.0–9.0 mm (pronotum); ♀ 8.0 mm (pronotum).

Type series. Holotype: ♂, Bresil (=Brazil), RIO GRDE DO SUL, “Encruzilhada” (=should be a misspelling of Encruzilhada), 1966, Leg. J. FAURA, in collection of MNHAH. Paratypes: ♀, same data as the holotype, in collection of MNHAH. ♂, same data as the holotype, in Collection of Dr. Luca BARTOLOZZI.

Holotype and paratype ♀ will be deposited in the Museum of Nature and Human Activities, Hyôgo, Japan.

Distribution. Encruzilhada (Rio Grande do Sul), Brazil. Encruzilhada is far away from Urubici, located 500 km south of Urubici, and these two areas belong to the different mountain group.

Etymology. The new specific name “*invenireus*” means “we do find”, since the name of the species means people find new study from the past study.

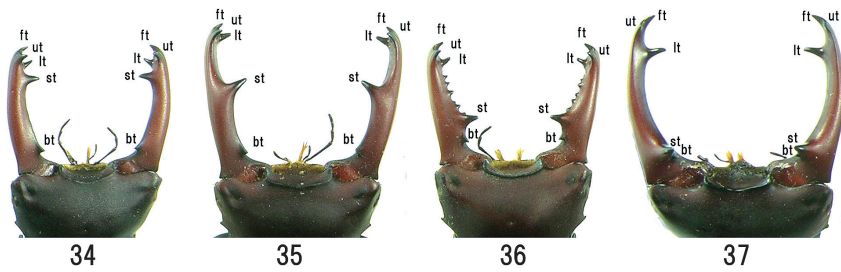
***Macrocrates galantorum* sp. nov.**

(Figs. 4–5, 19, 24, 28, 32, 36, 42, 43)

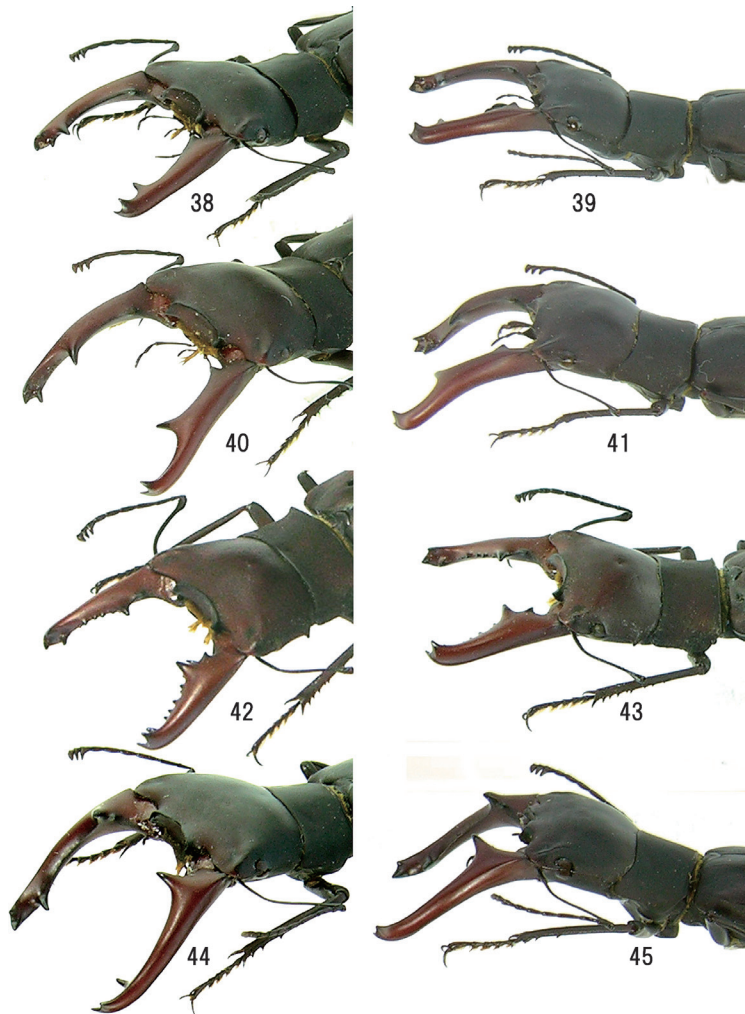
Diagnosis. *Macrocrates galantorum* sp. nov. is easily distinguishable from the previous species (*M. bucephalus*, *M. australis*) by the position of a large, strong inward tooth in mandibles and the form of the mandibles and the pronotum of ♂. Mandibles have the tip end three teeth (ft, ut, lt), and a smaller, inwardly tooth at its inner bottom near base (bt) as in the previous species, but the length of mandibles are shorter than the previous species, are the same size as the head, a large, strong inward tooth (st) is far away from apex and exist at two-third from the apex. While the position of a large, strong inward tooth in mandibles is in apical quarter of the length at *M. bucephalus*, and is in apical quarter of the length at *M. australis*. The mandibles of *Macrocrates galantorum* sp. nov. seem straight in the dorsal view, and tend to face downward in a straight line in the lateral view, fat in a base and narrow as approaching the apex. While the mandibles of *M. bucephalus* are almost straight protruded, those of *M. australis* curved gently inward and downward. In addition, the mandibles of *Macrocrates galantorum* sp. nov. have remarkable microdontia plural teeth between the tip and base teeth. While the mandibles of *M. bucephalus* have no plural teeth between the tip and base teeth, those of *M. australis* only large ♂ have extremely small tooth of trace degree between the tip and base teeth. The width of the posterior edge of pronotum is larger than the *Bucephalus*, is 0.93 times of the width of the middle. While that of *M. australis* is smaller as 0.75–0.77 times of the width of the middle.

Description of the holotype. Male. Body matt reddish brown, mandibles shiny reddish brown. Extremely fine stippling. Length: 28.0 mm (including mandible), 20.0 mm (excluding mandible); width: 8.5 mm (pronotum).

Head is closely allied to the *M. bucephalus*, very broad, transverse and highly arched, the anteri-



Figs. 34–37. Anterior angles of male mandibles and head of *Macrocrates* spp. — 34, *M. bucephalus*; 35, *M. invenireus* sp. nov. (holotype); 36, *M. galantorum* sp. nov. (holotype); 37, *M. australis*.



Figs. 38–45. Lateral view of male mandibles, head, pronotum of *Macrocrates* spp. — 38–39, *M. bucephalus*; 40–41, *M. invenireus* sp. nov. (holotype); 42–43, *M. galantorum* sp. nov. (holotype); 44–45, *M. australis*.

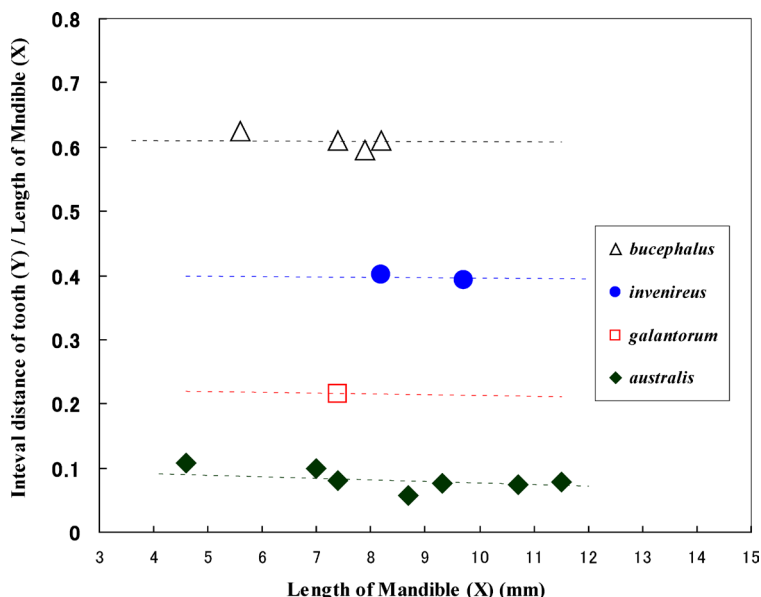


Fig. 46. A ratio of the interval distance Y between the largest strong tooth and small tooth near base for the length X of the mandibles of *Macrocrates* spp.

or margin slightly sloping. Two slightly sharp straight projections in the middle of front edge. Edge on both sides bounded by a eyes lower sharp protuberance in anterior one-third of length. Labrum broad and rounded, outside bristles. Mandibles the same size as the head, almost straight protruded in dosal view, and tend to face downward in a straight line in lateral view, fat in a base and narrow as approaching the apex. The apex carries three inwardly directed end teeth, in front, in upper, and in lower (ft, ut, lt). A large, strong inward tooth (st) far away from apex and exist at two-third from the apex. Smaller, inwardly tooth at its inner bottom near base (bt). In addition, with remarkable microdontia plural teeth between the tip and base teeth.

Antennae long and slender, basal S-shaped curved, six filiform segments, club tripartite, the apicalmost relatively small. Club flagellomeres flat.

Pronotum narrower than the head; front of widest, middle and front corners slightly preferredish side corners sharp, posterior angles almost right angles. Between front and side corners, and side and rear corners each have a concave indentation. Outline only sides and rear clear. Width of posterior edge larger than as the *Bucephalus*, 0.93 times of width of the middle. Scutellum transversely-kidney shaped, shiny.

Elytra dull, without rows of dots, about 1.33 times as long as wide. Shoulders rounded, without tooth. Sutural area slightly more polished.

Legs. Foreleg-tibiae very slim, with a long, powerful end tooth, behind mostly four of almost equal size smaller teeth. Middleleg-tibiae with an outer tooth on basal third, hindleg-tibiae without teeth. Tarsi about as long as the tibiae, with long yellow bristles on its lower bottom mat, without conspicuous dots.

Genitalia. Form simple. Ninth abdominal segment elongate oblong, length (4.4 mm) about twice as long as width (2.13 mm). Genital capsule similar to those of other Lucaninae species. Aedeagus symmetric; everted internal sac extremely elongate, maximum length than 20 mm, width gen-

erally about 0.1 mm. Penis cylindrically form, length (1.75 mm), width (0.6 mm), lower and base recessed. Base of penis notably little constriction, length (0.4 mm), width (0.55 mm), and shaped dip (0.45 mm) at both sides. Parameres triangle form, the sides diversified apically, length (1.55 mm), width (0.72 mm), outside of apex gentle curve to a straight line. Basal piece shaped trapezoidal tube form, short rectangle, and thin flat, length (1.75 mm), up width (1.43 mm), down width (1.14 mm).

Description of the paratype. F e m a l e. There is broad agreement of all characteristics with the previous *Macrocrates* species. Body elongate oval, matt reddish, head and pronotum strongly lustrous, middle area of pronotum more finely. Length: 18.5 mm (including mandible), 17.0 mm (excluding mandible), width: 7.6 mm (pronotum).

Head cross-rectangular, straight leading edge; labrum broad and somewhat rounded including outstanding. Front and outer corners rounded in the eye canthus half sharing wide-butt on the head here widest. Many stippling pierced particularly dense in the middle and behind the eyes. Mandibles narrow, slightly bent inward with a sharp tip of a fine tooth, a front-facing also pointed inner tooth and a cusp on the top.

Antennae short and stocky, round filiform segments, hardly longer than broad, built the club as in ♂, only closer together. Apicalmost flagellomere also smaller than previous one.

Pronotum strongly lustrous, anterior margin stepping forward truncated rectangular. Center of disc covered reddish with scattered reddish pierced stippling that are closer to the edges. Fringe only interrupted in the middle of front edge. In the middle of side panels each having a more or less depressed pit. Scutellum heart shaped, shiny, with a few points in the front half.

Elytra as in ♂ built, rounded shoulders even more. Length about 1.35 times as long as wide.

Legs. Foreleg-tibiae strong and wide. Five from apex to base with decreasing in size triangular outer teeth, with the apicalmost long. Middleleg-tibiae strong outer tooth in basal third and about 2–3 smaller. Hindleg-tibiae with an outer tooth. Tarsi normal, as in the ♂ on bottom bristles strong light yellow. Bottom pitch-brown mat.

Genitalia form simple. Stylus tiny oblong. Hemisternite rectangular, length (1.05 mm) about 2.8× longer than width (0.375 mm), inner edge form weakly sunken shape at lower part, lower edge form angular-shaped square.

Type series. Holotype: ♂, Bresil, in collection of IRSNB. Paratype: ♀, same data as the holotype.

Type depository. Type series will be deposited in the Institute Royal des Sciences Naturelles de Belgique.

Distribution. Brazil.

Etymology. The new specific name is dedicated to GALANT family. Due to the hard work Mr. Alain GALANT & Mr. Marcel GALANT have done to increase the knowledge of the family Lucanidae via their website and literature.

Note. For the collecting date, it could be assume to about 1900, because labels by Mr. H. BOILEAU were attached to the specimens. This species does not have a discovered record afterwards, but I believe they will be rediscovered because I know that there are many examples which the kind that was not discovered for 100 years were rediscovered in recent years.

Comparison of the Largest Strong Inward Tooth of Mandibles in *Macrocrates* Species

The position of the largest strong inward tooth of mandibles in *Macrocrates* species ♂ is very useful for distinguishing this each species. I show it with the clear difference as a graph in Fig. 46. The graph shows the relation of the length X of the mandibles and the interval distance Y between the

largest strong tooth and small tooth near base about each species. A ratio of the interval distance Y between the largest strong tooth and small tooth near base for the length X of the mandibles is 60% about *bucephalus*, 40% about *invenireus*, 20% about *galantorum*, 10% about *australis*. In this way, it is showed that the species is easily distinguishable by examining a position of the largest strong tooth of mandibles.

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要 約

藤居孝聡：ブラジル南部産オオズクワガタ属の2新種（コウチュウ目クワガタムシ科）。—— 筆者は、兵庫県立「人と自然の博物館」の沢田氏の協力のもと、同博物館所蔵のブラジル、リオグランデ・ド・スル、エンクルジラダ産のオオズクワガタ属 *Macrocrates* の標本群を、また、Alain GALANT 氏、Marcel GALANT 氏の紹介で、ベルギー王立自然史博物館 (IRSNB) の Alain DRUMONT 氏の協力のもと、同博物館の所蔵のブラジル産の一世紀前のオオズクワガタ属の古い標本群を、それぞれ検する機会を得た。これらの標本を、詳細に検討した結果、同じブラジル国内に生息し、これまでの既知種である *M. bucephalus*, *M. australis* と明確に区別できると判明したため、それぞれ *M. invenireus* sp. nov., *M. galantorum* sp. nov. として記載した。*M. invenireus* sp. nov. が有する♂の直線的な大顎、大顎の先端から 1/3 に最大の内歯が備わる特徴、*M. galantorum* sp. nov. が有する♂の直線的な大顎、大顎の先端から 2/3 に最大の内歯が備わる特徴、大顎には複数の顕著な小歯を備える特徴は、同属のどの既知種にも見られない特徴であり、この形質状態において本種らはそれぞれ同属既知種と明瞭に区別できる。

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