Acta zoologica cracoviensia, **45**(3): 185-196, Kraków, 30 Sep., 2002

A review of ARROW's types of *Trichillum* and *Pedaridium* with description of two new species of *Pedaridium* (Coleoptera: Scarabaeinae, Ateuchini)

François GÉNIER and Fernando Z. VAZ-DE-MELLO

Received: 15 Sept., 2001
Accepted for publication: 18 Feb., 2002

GÉNIER F., Z. VAZ-DE-MELLO F. 2002. A review of ARROW's types of *Trichillum* and *Pedaridium* with description of two new species of *Pedaridium* (Coleoptera: Scarabaeinae, Ateuchini). *Acta zoologica cracoviensia*, **45**(3): 185-196.

Abstract. All type material belonging to the genera *Trichillum* and *Pedaridium* described by ARROW is studied. As a result *Trichillum cristatum* ARROW is transferred to the genus *Pedaridium* and the following synonymies are here established (the second name being valid): *Pedaridium mansosotoi* MARTÍNEZ = *Pedaridium cryptops* ARROW, *Pedaridium martinezi* FERREIRA & GALILEO = *Pedaridium fulgens* ARROW, *Pedaridium equatoriensis* FERREIRA & GALILEO = *Pedaridium cristatum* (ARROW). A diagnosis and pertinent information is given for each species. *Pedaridium margareteae* sp. nov. is herein described as a result of a misuse of the name *Pedaridium cryptops* ARROW, and *Pedaridium galileoae* sp. nov. as a result of misidentification of *P. fulgens* ARROW.

Key words: Ateuchini, *Trichillum*, *Pedaridium*, types, new species, Neotropics.

François GÉNIER, Canadian Museum of Nature, C.P. 3443, Sta. D, Ottawa, ON, Canada K1P 6P4.
E-mail: fgenier@mus-nature.ca
Fernando Z. VAZ-DE-MELLO, Departamento de Entomologia, and Departamento de Biologia, Universidade Federal de Lavras, Lavras, MG 37200-000 BRAZIL.
E-mail: scarab@ufla.br

I. INTRODUCTION

In the past few years a growing interest in the systematics of Neotropical Scarabaeinae has prompted some workers to revise certain Neotropical genera as this group of beetles is increasingly used in rapid assessment of biodiversity (FAVILA & HALFFTER 1997). More specifically an effort has been done to revise poorly known groups such as *Trichillum* HAROLD, 1868 and *Pedaridium* HAROLD, 1868 (MARTÍNEZ 1968; FERREIRA & GALILEO 1993). For various reasons it was not possible for these workers to study type material deposited in European museums at the time. As usual these revisions have instigated a greater interest in these groups and further investigation has revealed that additional work is required as more systematic problems have been found at the generic as well as specific levels in the genera (VAZ-DE-MELLO, pers. obs.). This paper serves to clarify the identity of ARROW's type material which was not studied previously by reviewers of the groups. This is especially crucial now as these two genera are being studied again by one of the authors

(VAZ-DE-MELLO). In 1978 M.E. BACCHUS published "A catalogue of the type-specimens of the Scarabaeinae (Scarabaeidae) and the smaller Lamellicorn families (Coleoptera) described by G. J. ARROW". The purpose of this paper was to identify the exact specimens studied by ARROW and designate lectotype where possible. In some instances, where dissection was necessary to identify the sex of the specimen, BACCHUS did not designate lectotype but rather label the specimens as syntypes and stated that the lectotype designation would be "better left to specialist workers in the future". This was the case for all species of *Pedaridium* and *Trichillum*, except *Pedaridium quadridens* which was described on a single specimen and already had holotype status.

Since all of the species studied here have been recently redescribed only short diagnoses will be presented in addition to illustrations of the dorsal view of the head. This paper is divided in two sections. The first section is a review of ARROW's type with remarks on the type material, current taxonomic status and other pertinent information. The second section is the description of two new species resulting from the taxonomical changes proposed in the first section.

ARROW's material has been borrowed from the Natural History Museum in London. All of the material with the exception of one species (*Pedaridium quadridens* ARROW) consists of syntypes. For each series of syntypes a lectotype and paralectotypes are designated. Species are treated in chronological order of publication dates. All of the species treated herein were originally described in three publications (ARROW 1913, 1931, 1932). The format and terminology used here is the same as in GÉNIER (1996).

Abbreviations for deposition of material are as follow:

AMBC: Ayr M. BELLO personal collection, Rio de Janeiro, RJ, Brazil.

BDGC: Bruce D. GILL personal collection, Woodlawn, Ontario Canada.

BMNH: The Natural History Museum, London, England.

CMNC: Canadian Museum of Nature, Ottawa, Canada.

FVMC: Fernando VAZ-DE-MELLO personal collection, Lavras, MG, Brazil.

MNHN: Muséum national d'Histoire naturelle, Paris, France.

MZSP: Museu de Zoologia da Universidade de São Paulo, SP, Brazil.

NHMB: Naturhistorisches Museum, Basel, Switzerland.

ZMHB: Museum für Naturkunde der Humboldt-Universität, Berlin, Germany.

A c k n o w l e d g m e n t s. We wish to thank Malcolm KERLEY (BMNH) for sending specimens for study, Henry HOWDEN, Serge LAPLANTE & Aleš SMETANA for providing literature and many useful comments during the preparation of the manuscript and Bob ANDERSON for reviewing the manuscript. We thank also the curators of the remaining examined collections, namely Ayr BELLO (AMBC), Bruce GILL (BDGC), Eva Sprecher (NHNB), Yves CAMBEFORT and Olivier MONTREUIL (MNHN), Ubirajara MARTINS, Sergio IDE and Carlos CAMPANER (MZSP), and Hella WENDT (ZMHB). This is a part of the MSc dissertation of the second author, submited to Programa de Pós-Graduação em Entomologia, Universidade Federal de Lavras. The second author received a MSc grant from CAPES.

II. REVIEW OF ARROW's TYPES

Pedaridium cryptops ARROW

Fig. 1

Pedaridium cryptops ARROW, 1913: 458; ARROW 1932: 226; BALTHASAR 1938: 220; BLACKWELDER 1944: 203; VAZ-DE-MELLO 2000: 194.

Pedaridium mansosotoi MARTÍNEZ, 1951: 35; FERREIRA & GALILEO 1993: 18; VAZ-DE-MELLO 2000: 194, **new synonymy**.

Pedaridium bidens BALTHASAR: FERREIRA & GALILEO 1993: 15, misidentification.

L e c t o t y p e ♀ (BMNH): Syntype (blue disc)/ Type (red disc, upside down)/ LECTOTYPE (red paper)/ Jahaty, Prov. Goyas. Brésil (green paper)/ Fry coll., 1905-100/ *Pedaridium cryptops* type ARROW (ARROW's handwriting)/ *Pedaridium cryptops* Arr. M. E. BACCHUS det 1975, SYNTYPE/ LECTOTYPE, *Pedaridium cryptops* ARROW, dés. F. GÉNIER & F. VAZ-DE-MELLO, 2001. The lectotype is designated here in order to establish the specimen with the most diagnostic character (acute clypeal teeth) to become the type of the species as the two other specimens in the syntypic series represent two different species.

D i a g n o s i s. Clypeal teeth (Fig. 1) long, acute, dorsal surface below the surface of clypeus and separated with a strong and sharp carina. Median emargination of clypeus moderately broad and very shallow in dorsal view. Clypeal punctures feebly impressed, lacking sharp raspy edge anteriorly and separated by more than one diameter anteriorly. Dorsum glossy between punctures and lacking distinct opalescent sheen (in clean specimens). Elytral striae with punctures feebly umbilicate and feebly encroaching on intervals. Elytral interstriae 1-6 with either one or two aligned rows of setae on disc.

R e m a r k s. The material deposited in the Natural History Museum in London consists of 3 specimens belonging to three different species. Two specimens collected in Jatahi (sic) (=Jataí) (Goiás) and one specimen from Natal (Rio Grande do Norte). The specimen from Natal, which is labeled by ARROW as "*Pedaridium cryptops*" was collected by W. M. MANN. According to the original description two specimens have been collected by Mr. W. MANN. This suggests that at least one specimen is missing from the original series. One of the two specimens collected in Jataí bear ARROW's original label which states "type". This female specimen is selected as lectotype. ARROW's description clearly states that the clypeus of his new species possess acute teeth ("utrique acute dentato"), and this is especially visible in this specimen. The other two specimens have small triangular teeth on the clypeus. It is possible that ARROW considered that they were worn and included these two specimens in the type series. The lectotype is identical to *Pedaridium mansosotoi* MARTÍNEZ and we consider the latter a junior synonym of *P. cryptops* as a result. The other specimen from the same locality is a *Pedaridium bidens* BALTHASAR and therefore excluded from the type series. The specimen from Natal represents consequently a new species which we describe later herein (see descriptions of new species section at the end).

Pedaridium fulgens ARROW

Fig. 2

Pedaridium fulgens ARROW, 1913: 458; 1932: 226; BLACKWELDER 1944: 203.

Pedaridium martinezi FERREIRA & GALILEO, 1993: 30, **new synonymy**.

L e c t o t y p e ♀ (BMNH): Syntype (blue disc)/ Type (red disc, upside down)/ LECTOTYPE (red paper)/ N. ARGENTINA, Rio Salado, Gran Chaco, E. WAGNER. 1907-384/ *Pedaridium fulgens* type ARROW (ARROW's handwriting)/ *Pedaridium fulgens* ARROW, M. E. BACCHUS det 1975, SYNTYPE/ LECTOTYPE, *Pedaridium fulgens* ARROW, dés. F. GÉNIER & F. VAZ-DE-MELLO, 2001.

Paralectotype: Same data as lectotype (1♀ BMNH).

The lectotype is here designated to avoid confusion if this species would eventually reveal to be a species complex.

D i a g n o s i s. Clypeus (Fig. 2) with three teeth on each side, a large and acute anterior tooth and two smaller broadly triangular teeth laterally. Median emargination of clypeus broadly arcuate in dorsal view. Dorsum glossy between punctures and with a distinct coppery sheen. Elytral striae with punctures distinctly encroaching on intervals.

R e m a r k s. The material consist of two females syntypes. The cleanest specimen which bears ARROW's handwritten label is selected as lectotype. The other specimen, with the same data, is designated as paralectotype. After a careful examination of closely related species we came to the

conclusion that *Pedaridium martinezi* FERREIRA & GALILEO is identical in all respect to *P. fulgens* ARROW, consequently we consider *P. martinezi* as a junior synonym of *P. fulgens*. The species currently recognized as *P. fulgens* is a new taxon which is described later herein (see descriptions of new species section at the end). In the original description, ARROW wrote "...dentibus haud valde approximatis, denticuloque utrinque externo...", giving rise to the interpretation of one pair of external clypeal denticles instead of two, as did BALTHASAR (1938). This appears to have caused the misidentification of the new species (that bears one pair of external denticles) with the true *P. fulgens* (bearing two pairs).

Pedaridium argentinum ARROW

Fig. 3

Pedaridium argentinum ARROW, 1913: 459; 1932: 226; BALTHASAR 1938: 220; BLACKWELDER 1944: 203; MARTÍNEZ 1959: 62; MARTÍNEZ, 1987: 60; FERREIRA & GALILEO 1993: 24; MONTERESINO *et al.* 1996: 107.

Pedaridium rugiceps ARROW, 1913: 458, synonymized by FERREIRA & GALILEO 1993: 24-25.

Trichillum elongatum BALTHASAR, 1934: 24, synonymized by MARTÍNEZ 1987: 60.

Pedaridium elongatum (BALTHASAR): MARTÍNEZ 1968: 119.

L e c t o t y p e ♂ (BMNH): Syntype (blue disc)/ Type (red disc, upside down)/ LECTOTYPE (red paper)/ N. ARGENTINA, Rio Salado, Gran Chaco, E. WAGNER. 1907-384/ *Pedaridium argentinum* type ARROW (ARROW's handwriting)/ *Pedaridium argentinum* ARROW, M.E. BACCHUS det 1975, SYNTYPE/ LECTOTYPE, *Pedaridium argentinum* ARROW, dés. F. GÉNIER & F. VAZ-DE-MELLO, 2001.

Paralectotypes: Same data as lectotype (3♂♂ BMNH); same data except: Icano (1♂, 2♀♀ BMNH) (1♀ MNHN).

The lectotype is designated here in order to select a male specimen which bear the most diagnostic characters to separate this species from closely related species and to establish "Rio Salado" as the type locality.

D i a g n o s i s. Body dark reddish brown, elongate, almost parallel sided medially. Clypeus (Fig. 3) with two large upturned triangular teeth. Median emargination of clypeus broadly V-shaped. Clypeal punctures coalescent, forming more or less transverse ridges. Dorsum glossy between punctures lacking metallic sheen. Elytral striae narrow, almost parallel sided, punctures feebly indicated. Elytral interstriae 2-6 with two aligned rows of setae on disc.

R e m a r k s. ARROW's type material consists of 8 specimens (7 BMNH) (1 MNHN). The lectotype male is here designated and bear ARROW's "type" handwritten label. The rest of the syntype series matches the lectotype and specimens are here designated as paralectotypes. In his identification key ARROW uses the name *rugiceps* instead of *argentinum*. This has been noted by FERREIRA & GALILEO (1993), who considered *P. rugiceps* as an objective synonym of *P. argentinum*. This is a typographical error as the name *rugiceps* in the copy of the reprint located at the CMNC has been corrected by ARROW himself to *argentinum*. MARTÍNEZ (1986) synonymized *P. elongatum* BALTHASAR without comment. The three female type specimens of *P. elongatum* have been compared to ARROW's types and the synonymy proposed by MARTÍNEZ is here confirmed.

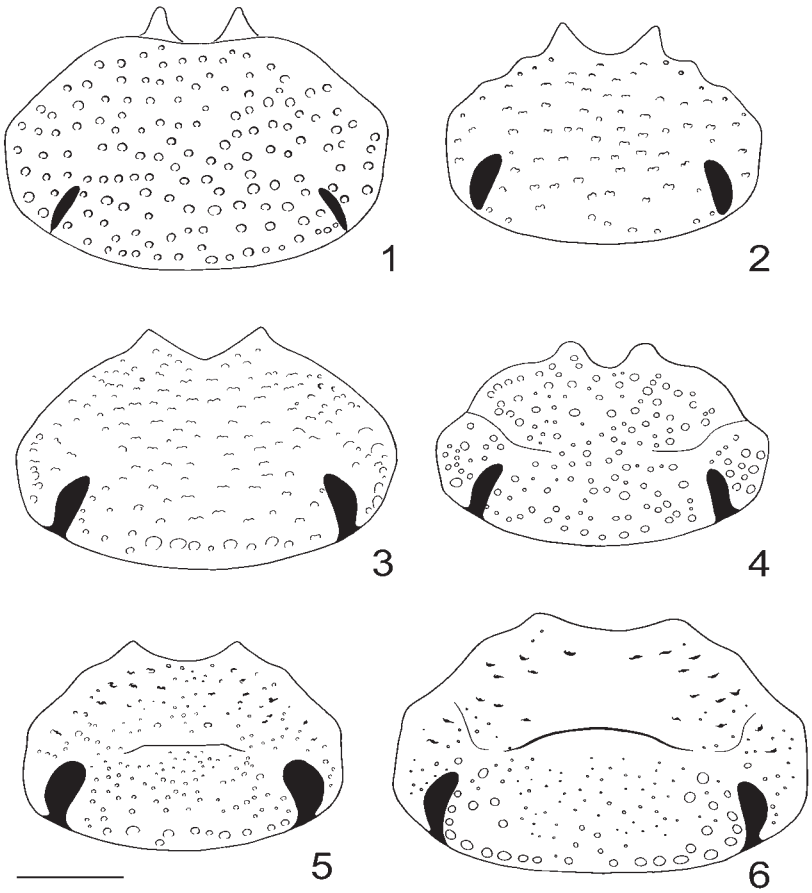
Trichillum hystrix ARROW

Fig. 4

Trichillum hystrix ARROW, 1931: 609; PAULIAN 1936: 206; BALTHASAR 1939: 25; BLACKWELDER 1944: 204; MARTÍNEZ 1987: 60.

Trichillum (*Eutrichillum*) *hystrix* ARROW: MARTÍNEZ 1968: 120; RATCLIFFE 1980: 341.

L e c t o t y p e ♂ (BMNH): Syntype (blue disc)/ Type (red disc, upside down)/ LECTOTYPE (red paper)/ Estancia la Noria, Rio San Javier, Santa Fe Argentine, G. E. BRYANT,



Figs 1-6. Head dorsal view (without setae): 1 – *Pedaridium cryptops* ARROW; 2 – *P. fulgens* ARROW; 3 – *P. argentinum* ARROW; 4 – *Trichillum hystrix* ARROW; 5 – *Pedaridium ohausi* (ARROW); 6 – *P. cristatum* (ARROW). Scale bar = 0.5 mm.

27.XII.1911/ G. BRYANT Coll., 1919-147/ *Trichillum hystrix* type ARROW (ARROW's handwriting)/ *Trichillum hystrix* ARROW, M. E. BACCHUS det 1975, SYNTYPE/ LECTOTYPE, *Trichillum hystrix* ARROW, dés. F. GÉNIER & F. VAZ-DE-MELLO, 2001.

Paralectotypes: Same data as lectotype except: XII.1911 (1♂, 1♀ BMNH), 10.XII.1911 (1♀ CMNC), 14.XII.1911 (1♂ BMNH), 20.XII.1911 (2♀♀ BMNH), 23.XII.1912 (2♀♀ BMNH), 3.I.1912 (1♂ BMNH).

The lectotype is designated here in order to select a male specimen which bear the most distinctive characters to separate this species from closely related species.

D i a g n o s i s. Body reddish brown to dark brown, oval, sides broadly arcuate medially in dorsal view. Clypeus (Fig. 4) with two large closely set upturned blunt teeth. Anterior margin of clypeus and gena distinctly upturned in non abraded specimens. Median emargination of clypeus U-shaped. Clypeal punctures of different sizes, more or less well defined and in most cases separated by more than one diameter. Eyes at the same level as the rest of the head, elongate oval, ap-

proximately three times as long as wide. Dorsum glossy between punctures lacking metallic sheen. Elytral striae narrow, almost parallel sided, punctures feebly indicated. Elytral interstriae 1-2 with a more or less complete row of setae on external side, interstriae 3-6 with a single row of setae on the internal side on disc. Anterior tarsal claws of male (similar to Fig. 10) expanded into translucent lobe basally, distal portion slender and abruptly bent forward. Apex of large sclerite of internal sac of aedeagus with a single acute dentiform projection (two in *P. hirsutum* BOUCOMONT).

R e m a r k s. ARROW's syntype series consist of 4♂♂ and 5♀♀ specimens (BMNH) plus an additional female specimen *ex*. collection Antonio MARTÍNEZ (now in CMNC). All of the specimens are from the same locality, but collected on different dates. A slightly teneral male specimen showing a complete (not worn) anterior margin of the clypeus and complete vestiture has been selected for lectotype. The lectotype also bears ARROW's original "type" label. *Trichillum hystrix* belong to a complex of very closely related species which can be separated with certainty only by the configuration of the sclerites of the internal sac of the aedeagus. MARTÍNEZ (1987) considered *T. hystrix* undistinguishable from *Trichillum boucomonti* SAYLOR. The relationship between *T. boucomonti* and *T. hirsutum* BOUCOMONT will be discussed in a separate publication in preparation. The "type" of *T. hirsutum* BOUCOMONT has been studied and appears to be the closest species to *T. hystrix*. It can be separated from *T. hystrix* by the shape of the dorsal portion of the eyes and the shape of the sclerite of the internal sac (see diagnosis) and the apicoventral portion of the tubus of the aedeagus which bears a single small tubercle in *T. hystrix* and a broader triangular tubercle divided medially in *T. hirsutum*. However, the "type" of *T. hirsutum* is a female from Sao Paulo (whether this refers to state or city is not known) and the previously mentioned diagnostic characters are based on a non-type specimen dissected and collected from São Paulo deposited in the CMNC. This specimen seems to match BOUCOMONT's "type" and it seems reasonable here to believe that *T. hirsutum* is in fact a different species from *T. hystrix*.

Pedaridium ohausi (ARROW)

Fig. 5

Trichillum ohausi ARROW, 1931: 610; PAULIAN 1936: 206; BALTHASAR 1939: 22; BLACKWELDER 1944: 204.

Pedaridium ohausi (ARROW): MARTÍNEZ 1968: 119; FERREIRA & GALILEO 1993: 12.

L e c t o t y p e ♂ (BMNH): Syntype (blue disc)/ Type (red disc, upside down)/ LECTOTYPE (red paper)/ Loja Punzara, F. Ohs. 7.8.05/ Ecuador, F. OHAUS, B. M. 1931-387/ *Trichillum ohausi* type ARROW (ARROW's handwriting)/ *Trichillum ohausi* ARROW, M.E. BACCHUS det 1975, SYNTYPE/ LECTOTYPE, *Trichillum ohausi* ARROW, dés. F. GÉNIER & F. VAZ-DE-MELLO, 2001.

Paralectotypes: Same data as lectotype except: Loja Calvario, 4.8.05 (1 sex undetermined BMNH), Loja (1 sex undetermined BMNH), Ecuador, no locality (2 sex undetermined BMNH).

The lectotype is designated here in order to select a male specimen which bear the most distinctive characters to separate this species from closely related species

D i a g n o s i s. Body dark brown with feeble but distinct greenish and coppery reflections on elytra, elongate, almost parallel sided medially. Clypeus (Fig. 5) with two large slightly upturned sharp triangular teeth. Median emargination of clypeus broadly arcuate. Clypeal punctures separated by at least one diameter and of three different types, minute without setae, larger with setae and few ill defined punctures with a small sharp granule on each side of clypeus. Eyes large, oval in shape dorsally. Dorsum with feeble but distinct microsculpture between punctures. Elytral striae narrow, almost parallel sided, punctures feebly indicated separated by at least three diameters on disc. Elytral interstriae 1-6 with few scattered short setae on disc, apical declivity with regularly spaced setae, interstriae 1, 3, 5 with few distinct sharply granulate punctures on disc.

R e m a r k s. ARROW's syntype series consist of 5 specimens. The specimen with ARROW's hand written type label agrees with the original description and has been selected as lectotype. This species does not exhibit obvious secondary sexual characters therefore this specimen has been dis-

sected and is a male. The remaining four specimens (undetermined sex) are all conspecific and designated paralectotypes. The name *P. ohausi* is appropriately applied in FERREIRA & GALILEO (1993).

Pedaridium cristatum (ARROW), **new combination**

Fig. 6

Trichillum cristatum ARROW, 1931: 610; PAULIAN 1936: 206; BALTHASAR 1939: 22; BLACKWELDER 1944: 204; MARTÍNEZ 1968: 119.

Pedaridium equatoriensis FERREIRA & GALILEO, 1993: 14, **new synonymy**.

L e c t o t y p e ♂ (BMNH): Syntype (blue disc)/LECTOTYPE (red paper)/ 19 (handwriting)/ S. ECUADOR, Piscobamba, M. WITT (recto), L11 . Lobl (verso)/ *Trichillum externepunctatum* ? Borre (handwriting)/ *Trichillum cristatum* ARROW, M. E. BACCHUS det 1975, SYNTYPE/ LECTOTYPE, *Trichillum cristatum* ARROW, dés. F. GÉNIER & F. VAZ-DE-MELLO, 2001.

Paralectotypes: ECUADOR, Loja, OHAUS S. (recto), 2200 m. malader Stadt (verso)/ Ecuador, F. OHAUS, B.M. 1931-387/ *Trichillum* sp.1. unic. (handwriting)/ *Trichillum cristatum* ARROW, M. E. BACCHUS det 1975, SYNTYPE (1♀ BMNH).

The lectotype is designated here in order to select a male specimen which matches ARROW's description and which bear the most distinctive characters to separate this species from closely related species and to establish Piscobamba as type locality.

D i a g n o s i s. Body dark brown with distinct greenish and coppery reflections on dorsum, elongate oval, sides broadly arcuate. Clypeus (Fig. 6) with two slightly upturned broadly triangular teeth and distinctly emarginate clypeogenal area. Median emargination of clypeus broadly arcuate. Clypeal punctures separated by at least one diameter and of three different types, minute without setae on disc, larger coarse with setae near eyes and posterior edge and few ill defined punctures with a small sharp granule on each side of clypeus. Eyes moderate in size, oval in shape dorsally. Dorsum with feeble but distinct microsculpture between punctures. Elytral striae moderately large, with punctures encroaching on intervals, punctures not umbilicate, separated by approximately one diameter on disc. Elytral interstria 1 with a single row of setiferous punctures along external edge, interstriae 2-6 with a rows of regularly spaced setiferous punctures on each side.

R e m a r k s. ARROW's syntype series consist of 3 specimens. The specimen with ARROW's hand written type label is a *T. ohausi* with worn clypeal teeth and does not agree with the original description. In order to reflect ARROW's species concept for this taxon the male specimen which agrees with the original description has been selected as lectotype, even thought it was not labeled as such by ARROW. The other specimen which matches the original description is a female and differs externally from the male by its more densly punctate head and less elevated cephalic carina. We studied the holotype of *P. equatoriensis* FERREIRA & GALILEO, a female, which has been collected from the same locality (Loja) and it is in all respects identical to *Trichillum cristatum* ARROW. We consequently consider *P. equatoriensis* a junior synonym of *T. cristatum* here.

Pedaridium paranense ARROW

Fig. 7

Pedaridium paranense ARROW, 1932: 224; BALTHASAR 1938: 219; BLACKWELDER 1944: 203;

Pedaridium paranensis ARROW: FERREIRA & GALILEO 1993: 9; VAZ-DE-MELLO & CANHEDO 1998: 100; VAZ-DE-MELLO, 2000: 194.

L e c t o t y p e ♂ (BMNH): Syntype (blue disc)/LECTOTYPE (red paper)/ 11.248 (handwriting)/ Castro, Parana, S. Brazil, 1926-304/ *Pedaridium paranense* ARR, M. E. BACCHUS det 1975, SYNTYPE/ LECTOTYPE, *Pedaridium paranense* ARROW, dés. F. GÉNIER & F. VAZ-DE-MELLO, 2001.

Paralectotypes: Same data as lectotype (2♂♂, 1♀ BMNH).

The lectotype is designated here in order to select a male specimen which bear the most distinctive characters to separate this species from closely related species.

D i a g n o s i s. Clypeal teeth (Fig. 7) lacking. Median emargination of clypeus moderately broad and shallow in dorsal view. Clypeal punctures coarse, lacking sharp raspy edge anteriorly and separated by one to two diameters anteriorly, each puncture with a long stout seta. Dorsum with surface between punctures dull on disc of pronotum and elytra, becoming glossier laterally, with distinct opalescent sheen and some metallic reflections (in clean specimens). Elytral stria 1 effaced on anterior half, stria 2 well defined on entire length, striae 3-5 effaced posteriorly, stria 6 effaced on entire length. Elytral interstriae 1-6 with two aligned row of long and trout setae on disc.

R e m a r k s. ARROW's syntype series consist of 4 specimens collected from the same locality (Castro) in Paraná state of Brazil. The specimen which bears ARROW's handwritten type label is a female but we have decided to choose a male specimen instead, which show better diagnostic characters, as lectotype. All specimens are conspecific and therefore included in the lectotype series. The use of the name *P. paranense* is correct in FERREIRA & GALILEO (1993). FERREIRA & GALILEO (1993) have, in error, changed the accord of the specific epithet. *Pedaridium* is neutral therefore *paranense* is the proper spelling.

Pedaridium quadridens ARROW

Fig. 8

Pedaridium quadridens ARROW, 1932: 225; BALTHASAR 1938: 220; BLACKWELDER 1944: 203; MARTÍNEZ 1959: 62; MARTÍNEZ 1987: 60; FERREIRA & GALILEO 1993: 33.

H o l o t y p e ♀ (BMNH): Holotype (red disc)/ Santa Elena, Entre Rios, Argentine. G. E. BRYANT, 30.I.1912/ G. BRYANT Coll., 1919-147/ *Pedaridium quadridens*, type ARROW (ARROW's handwriting)/ *Pedaridium quadridens* ARR, M. E. BACCHUS det 1975, HOLOTYPE.

D i a g n o s i s. Clypeal margin (Fig. 8) with 4 acute and upturned teeth, two inner teeth slightly longer and slender, teeth with anterior edge as a continuation of the fine, sharp and upturned edge of the clypeus. Median emargination of clypeus broad and very shallow in dorsal view, much wider than distance between lateral and median teeth. Clypeal punctures ill defined, each puncture with a fine and long seta and a small and sharp granule anteriorly, each granule separated by more than one diameter. Front with closely set more or less well defined umbilicate punctures. Dorsum glossy between punctures and some individual showing distinct metallic reflections (in clean specimens). Elytral striae with punctures forming a sinuous elevated carina, strongly encroaching on intervals. Elytral interstriae 1-6 with two aligned row of setae on disc, each row composed of a long erect brownish seta alternating with a shorter apposed diagonally oriented and whitish seta.

R e m a r k s. The unique specimen studied by ARROW is a female. The identity of this species is unambiguous.

III. DESCRIPTION OF NEW SPECIES

Pedaridium margareteae sp. nov.

(Figs 9, 11-14)

Pedaridium cryptops sensu BALTHASAR, 1938: 220.

Pedaridium cryptops sensu FERREIRA & GALILEO 1993: 20.

Pedaridium cryptops sensu VAZ-DE-MELLO 2000 (pars): 194.

D i a g n o s i s. Clypeal teeth (Fig. 9) short, triangular, dorsal surface at the same level as the clypeus and separated with a fine and sharp carina. Median emargination of clypeus broad and shallow in dorsal view. Clypeal punctures deeply impressed, raspy and separated by less than one diameter anteriorly. Dorsum feebly glossy between punctures and with a distinct opalescent sheen (in clean specimens). Elytral striae with punctures umbilicate and encroaching on intervals. Elytral interstriae 1-6 with two aligned row of setae on disc.

H o l o t y p e. Male. Length 4.4 mm, greatest width 2.5 mm. Body elongate oval in dorsal view. Color brownish with a distinct opalescent sheen (in clean specimens). **Head** (Fig. 9). Anterior edge with a broad median emargination, limited on each side by a small triangular tooth, almost straight on a short distance laterally. Dorsal surface glossy between punctures, punctures rounded, slightly raspy and denser anteriorly, separated by about one diameter on anterior half, each punctures bearing an elongate squamiform setae. Eyes with dorsal portion narrow, approximately three times longer than wide. **Pronotum**. Evenly convex, surface glossy between punctures, punctures and setae similar in size and density to those on posterior half of the head on disc, punctures slightly larger and denser with longer setae on lateral declivities. **Elytra**. Distinctly tentiform on disc. Elytral striae 1 and 6 narrower and shadowily impressed. Striae 2-5 wider, deeply impressed and sharply delimited, with punctures more or less oval and umbilicate. Striae 1-3 wider and much more deeply impressed on apical declivities. Interstriae 1-6 with two aligned rows of raspy and setose punctures on each side, setae squamiform and longer on internal side. **Legs**. Anterior tarsal claws (Fig. 11) expanded into translucent lobe basally, distal portion slender and abruptly bent forward. Posterior tibia produced into a hook on internal margin at apex. **Thoracic sterna**. Mesosternum distinctly concave, punctures coarse, umbilicate and large smaller and more widely separated along midline. Metasternum with punctures small on disc, lateral lobes with coarse, raspy, confluent transverse puncture anteriorly and lacking puncture posteriorly except along metacoxal edge, median lobe with anterior margin bluntly angulate, with few scattered setose punctures. **Abdomen**. Sternites 2-5 with a single row of closely set elongate puncture covering the entire length laterally, punctures divided in two row on a small surface of segment 5 laterally. Segment 6 covered with more or less rounded umbilicate punctures, punctures becoming smaller and feebly impressed medially and posteriorly. Pygidium with more or less fused oval punctures, punctures becoming smaller and feebly impressed at apex. **Male genitalia**. Aedeagus as in Figs 13-14, Sclerites of internal sac as in Fig. 12.

A l l o t y p e. Female. Length 4.9 mm, greatest width 2.8 mm. Similar to male except: Anterior tarsal claws slender and evenly arcuate in lateral view. Posterior tibia lacking hook on internal margin at apex. Abdominal sternite 6 with a V-shape sulcus posteriorly, sulcus sharply delimited anteriorly.

M a t e r i a l s t u d i e d. 18♂♂, 23♀♀, 9 sex not determined (AMBC, BMNH, CMNC, FVMC, MZSP, NHMB).

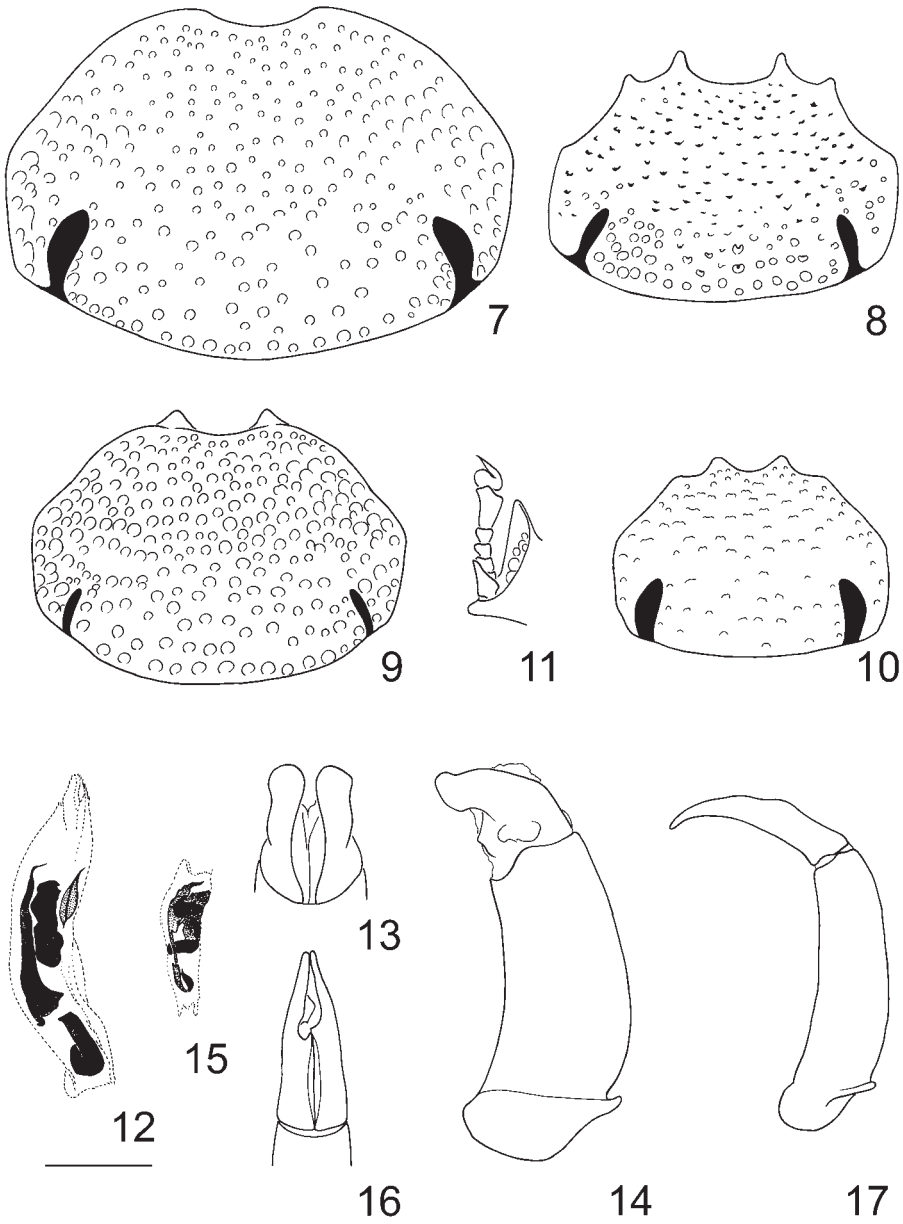
Holotype ♂ (MZSP, *ex*. FVMC): BRASIL: PI [=Piauí], S[ão]. R[aimundo]. Nonato, P[arque]. N[acional da]. S[erra] da Capivara, I-1999, CA Matrangolo

Allotype ♀ (MZSP, *ex*. FVMC): Same data as holotype.

Paratypes: **BRAZIL**: **Bahia**: Caetité, C. Uran. Lagoa Real - INB, 8-16.I.2000, Nessimian & Baptista legs (2♂♂, 2♀♀ FVMC); Encruzilhada, XII.1980/ A. Martínez & M. Alvarenga (2♂♂, 1♀ CMNC); same data as before except: XII.1997, Vaz-de-Mello & Bello (4 FVMC); Jequié, II.1995, C. Sperber (1♂ FVMC); S. Antonio da Barra, XI-XII.1888, Gounelle (1♀ ZMHB); Vila Nova, 1908 (1♀ MZSP); X.1938, Dr. Nick, Coll. Martínez (1♂, 1♀ CMNC). **Mato Grosso**: Chapada do Guimarães, XI.1963, Alvarenga (4♂♂, 5♀♀ MZSP). **Minas Gerais**: Águas Vermelhas, XII.1997, A. Bello (2♂♂, 2♀♀ ABIC). **Pernambuco**: Pery-Pery, V-VI.1892, Gounelle (1♂, 1♀ ZMHB); same as before except: XI-XII.1892 (1♂ ZMHB). **Piauí**: São Raimundo Nonato, PN Serra da Capivara, I.1999, C. A. Matrangolo (2♂♂, 3♀♀ FVMC). **Rio Grande do Norte**: Natal (5 NHMB); same as before except: W. M. Mann, Stanford Exped., 1913-56 (1♂ BMNH); same as before except: III. 1952, Alvarenga (4♀♀ MZSP); III.1954, Alvarenga leg, Coll. Martínez (1♀ CMNC).

R e m a r k s. Paratypes vary in length from 4.0-4.5 mm. Two of the paratypes from Villa Nova (Bahia) have the clypeal teeth less widely separated and the parameres possess a less sinuous internal edge in frontal view. However, the sclerites of the internal sac are identical and for this reason this variation is here consider intraspecific.

E t y m o l o g y. We dedicate this species to Ana Margarete M. Ferreira who recently revised the genus *Pedaridium*.



Figs 7-17. 7-10: Head dorsal view (without setae): 7 – *Pedaridium paranense* ARROW, 8 – *P. quadridens* ARROW, 9 – *P. margareteae* sp. nov., 10 – *P. galileoae* sp. nov. 11-14: *Pedaridium margareteae* sp. nov. 11 – Anterior tarsus (right tarsus, internal view); 12 – Internal sac of aedeagus; 13 – Parameres (frontal view); 14 – Aedeagus (lateral view). 15-17: *P. galileoae* sp. nov. 15 – Internal sac of aedeagus; 16 – Parameres (frontal view); 17 – Aedeagus (lateral view). Scale bar = 0.5 mm.

Pedaridium galileoae sp. nov.

(Figs 10, 15-17)

Pedaridium fulgens sensu BALTHASAR, 1938: 458.

Pedaridium fulgens sensu MARTÍNEZ 1959: 62.

Pedaridium fulgens sensu FERREIRA & GALILEO 1993: 37.

Pedaridium fulgens sensu MONTERESINO *et al.* 1996: 107.

D i a g n o s i s. Clypeus (Fig. 10) with two teeth on each side, median teeth acute, triangular and moderately large, narrower than lateral teeth at base. Median emargination of clypeus broadly V-shaped and moderately shallow in dorsal view. Clypeal punctures fine, transverse and separated by two to four diameters anteriorly. Dorsum glossy between punctures, with feeble microsculpture along margins of pronotum and elytra, with a distinct coppery sheen (in clean specimens). Elytral striae straight and sharply delimited throughout, with punctures feebly indicated and only slightly umbilicate. Elytral interstriae flat, interstria 1 with a single row of setiferous punctures along external edge, interstriae 2-6 with a rows of irregularly spaced setiferous punctures on each side.

H o l o t y p e. Male**.** Length 3.3 mm, greatest width 1.8 mm. Body elongate-oval in dorsal view. Color dark reddish brown, elytra lighter in color, dorsum with a distinct coppery sheen. **Head**. Anterior edge broadly V-shaped medially, median emargination limited on each side by a small triangular tooth and a second blunt and broader lateral tooth, edge almost straight on a short distance laterally. Dorsal surface glossy between punctures on disc and with feeble microsculpture along margins, punctures transverse, separated by two to four diameters on anterior half, each punctures bearing an elongate and feeble squamiform setae. Eyes with dorsal portion oval, approximately two times longer than wide. **Pronotum**. Evenly convex, surface glossy between punctures, punctures oval and longitudinally oriented, distinctly coarser than those on dorsal surface of the head, lacking on midline of disc, setae similar in size to those on posterior half of the head on disc, punctures slightly larger and denser with longer setae on lateral declivities. **Elytra**. Evenly convex on disc. Elytral striae 1-6 similarly impressed, narrow and sharply delimited, with punctures feebly indicated. Interstria 1 with a single row of setiferous punctures along external edge, interstriae 2-6 with a rows of irregularly spaced setiferous punctures on each side. **Legs**. Anterior tarsal claws simply arcuate, similar in shape and size to middle and posterior claws. Posterior tibia lacking dentiform process on internal margin at apex. **Thoracic sterna**. Mesosternum convex, punctures oval, moderately coarse, umbilicate, smaller and more widely separated along midline. Metasternum with punctures small on disc, lateral lobes with coarse, raspy, confluent transverse puncture anteriorly and lacking puncture posteriorly except along metacoxal edge, median lobe with anterior margin bluntly angulate, with few scattered setose punctures. **Abdomen**. Sternites 2-5 with a single row moderately spaced elongate puncture covering the entire length laterally, punctures divided in two row on a small surface of segment 4-5 laterally. Segment 6 covered with few irregular, in size and density, punctures. Pygidium with few fine scattered punctures. **Male genitalia**. Aedeagus as in Figs 16-17, Sclerites of internal sac as in Fig. 15.

A l l o t y p e. Female. Length 3.2 mm, greatest width 1.7 mm. Similar to male except: Lateral clypeal teeth longer and more upturned. Disc of mesosternum with puncture less numerous and more widely separated. Abdominal segment 6 longer medially, subequal in length to pygidium.

M a t e r i a l s t u d i e d, 11♂♂, 13 ♀♀, 4 sex? (BDGC, CMNC, FVMC)

Holotype ♂ (CMNC): ARGENTINA, CORRIENTES, Ituzaingó, Arenal de la Costa, Set. 975, Coll. MARTÍNEZ/ H. & A. HOWDEN COLLECTION, *ex.* A. MARTÍNEZ coll./ *Pedaridium fulgens* ARROW, 1993/ HOLOTYPE/ *Pedaridium galileoae* sp. nov. F. GÉNIER & F. VAZ-DE-MELLO.

Allotype ♀ (CMNC): Same data as holotype.

Paratypes: **ARGENTINA**: **Cordoba**: Ciudad, I.1945, Coll. MARTÍNEZ (1♀ CMNC); Dpto Cruz del Eje, Guanaco Muerto, I.1977, Coll. MARTÍNEZ (1♀ CMNC). **Corrientes**: Alto Paraná, Itu-

zaingó, XI.1975, Coll MARTÍNEZ (1sex? FVMC); Ituzaingó, Arenal de la Costa, IX. 1975, Coll. MARTÍNEZ (1♂ BDGC, 4♂♂, 2♀♀ CMNC); Dş Ituzaingo, Villa Olivari, Coll. MARTÍNEZ (3♂♂, 5♀♀ CMNC); same as before except: XII.1982 (1♀ BDGC). **La Rioja**: no locality, XI.1959, M. J. VIANA (1 sex? CMNC); Olta, II.1934, M. GÓMEZ leg., Coll. MARTÍNEZ (1 ♀ CMNC). **Mendoza**: no locality, BRUCH (1 sex? CMNC). **San Luis**: 18 km S. Arizona, 18-23.I.1982, 250m, H. & A. HOWDEN (1♀ CMNC); Desaguadero, II.2000, G. Arriágada (1♂ FVMC); San Geronimo, II.1974, M. VIANA (1♂, 1sex? CMNC).

R e m a r k s. Paratypes vary in length from 2.8-3.7 mm. See also remarks under *P. fulgens*.

E t y m o l o g y. A patronym in honor of Maria Helena M. GALILEO, FERREIRA's supervisor in the revision of *Pedaridium* and a Brazilian cerambycidologist who was very helpful in providing specimens for our studies.

REFERENCES

ARROW G. 1913. Some new Species of Lamellicorn Beetles from Brazil. *Annals and Magazine of Natural History*, **8**: 456-466.

ARROW G. 1931. The Coleopterous Genus *Trichillum* (Copridae), with a key to species. *Annals and Magazine of Natural History*, **10**: 609-611.

ARROW G. 1932. New species of lamellicorn beetles (Subfam. Coprinae) from South America. *Stylops*, **1**: 223-226.

BACCHUS M. E. 1978. A catalogue of the type-specimens of the Scarabaeinae (Scarabaeidae) and the smaller Lamellicorn families (Coleoptera) described by G. J. ARROW. *Bulletin of the British Museum* (*Natural History*), *Entomology series*, **37**: 97-115.

BALTHASAR V. 1938. Neue Gattungen und Arten der Süamerikanischen Coprophagen. *Entomologische Blätter*, **34**: 210-223.

BLACKWELDER R. E. 1944. Checklist of the Coleopterous Insects of Mexico, Central America the West Indies, and South America. *Smithsonian Institution, United State National Museum,* Bulletin 185, Part 2.

FAVILA M. E., HALFFTER G. 1997. The use of indicator groups for measuring biodiversity as related to community structure and function. *Acta Zoologica Mexicana* (n.s.), **72**: 1-25.

FERREIRA A. M. R. M., GALILEO M. H. M. 1993. Revisão taxonômica do gẹnero Pedaridium HAROLD, 1868 (Coleoptera, Scarabaeidae, Scarabaeinae, Coprini). *Iheringhia Série Zoológica*, **74**: 3-69.

GÉNIER F. 1996. A Revision of the Neotropical Genus *Ontherus* Erichson (Coleoptera: Scarabaeidae, Scarabaeinae). *Memoirs of the Entomological Society of Canada*, **170**: 1-169.

MARTÍNEZ A. 1947. Addenda y corrigenda al trabajo de BLACKWELDER "Checklist of the Coleopterous Insects of Mexico, Central America the West Indies, and South America". *Arthropoda*, **1**: 109-114.

MARTÍNEZ A. 1959. Catálogo de los Scarabaeidae Argentinos (Coleoptera). *Revista del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" e Instituto Nacional de investigación de las Ciencias Naturales, Ciencias Zoológicas*, **5**: 1-126.

MARTÍNEZ A. 1968 (1967). Notas para una monografia del genero *Trichillum* HAROLD, 1868 (Col. Scarab. Scarabaeinae-Coprini). *Revista de la Sociedad Mexicana de Historia Natural*, **28**: 119-147.

MARTÍNEZ A. 1987 (1986). La entomofauna de Scarabaeinae de la provincia de Salta (Col. Scarabaeoidea). *Anales de la Sociedad Científica Argentina*, **216**: 45-69.

MONTERESINO E., MARTÍNEZ A., ZUNINO M. 1996. Los Scarabaeinae (Coleoptera, Scarabaeidae) de la província de Córdoba, Argentina. [In:] I.E. di Tada, E. H. BUCHER (ed.) – Biodiversidad de la Província de Córdobapp. *Fauna*, **1**: 101-117

PAULIAN R. 1936. Une nouvelle espĕce de *Trichillum* (Col. Scarabaeidae). *Bulletin de la Société Entomologique de France*, **41**: 205-208.

RATCLIFFE B. C. 1980. New species of Coprini (Coleoptera: Scarabaeidae: Scarabaeinae) taken from the pellage of three toed sloths (*Bradypus tridactylus* L.) (Edentata: Bradypodidae) in Central Amazonia with a brief commentary on scarab-sloth relationships. *The Coleopterists Bulletin*, **34**: 337-350.

VAZ-DE-MELLO F. Z., CANHEDO V. L. 1998. Duas novas espécies brasileiras de *Pedaridium* (Coleoptera, Scarabaeidae, Coprinae, Ateuchini). *Iheringhia Série Zoológica*, **84**: 95-100.

VAZ-DE-MELLO F. Z. 2000. Estado atual de conhecimento dos Scarabaeidae *s. str.* (Coleoptera: Scarabaeoidea) do Brasil. pp. 183-195 [In:] F. MARTÍN-PIERA, J. J. MORRONE, A. MELIC (eds) – Hacia un Proyecto CYTED para el Inventario y Estimación de la Diversidad Entomológica en Iberoamérica: PrIBES 2000. m3m vol. 1, SEA, Zaragoza.