SPECIES FORMERLY IN THE GENERA *Trichillum* HAROLD, 1868 AND *Pedaridium* HAROLD, 1868 (COLEOPTERA: SCARABAEIDAE)

FERNANDO ZAGURY VAZ DE MELLO

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Dissertação apresentada à Universidade Federal de Lavras, como parte das exigências do Curso de Mestrado em Entomologia, para obtenção do título de "Mestre".

Orientador

Prof. Júlio Neil Cassa Louzada

LAVRAS
MINAS GERAIS - BRASIL
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APROVADA em 26 de fevereiro de 2003

Dr. Sergio Ide	Instituto Biológico
Profa. Brígida Souza	UFLA

Prof. Júlio Neil Cassa Louzada
UFLA
(Orientador)

LAVRAS
MINAS GERAIS - BRASIL

I dedicate this dissertation to my wife, Silvia …

… and to my son Léo and his forthcoming brothers and sisters, hoping they will live in a world where titles are not so important, and then dissertations and thesis not so necessary.

"...

Por onde, pelo comum, poder-se corrigir o ridículo ou o grotesco, até levá-lo ao sublime; seja daí que seu entrelimite é tão tênue. E não será esse um caminho por onde o perfeitíssimo se alcança? Sempre que algo de importante e grande se faz, houve um silogismo inconcluso, ou, digamos, um pulo do cômico ao excelso.

Conflui, portanto, que:

Os dedos são anéis ausentes?
Há palavras assim: desintegração...
O ar é o que não se vê, fora e dentro das pessoas.
O mundo é Deus estando em toda parte.
O mundo, para um ateu, é Deus não estando nunca em nenhuma parte.
Copo não basta: é preciso um cálice ou dedal com água, para as grandes tempestades.
O O *é um buraco não esburacado.*
O que é – automaticamente?
O avestruz é uma girafa; só o que tem é que é um passarinho.
Haja a barriga sem o rei. (Isto é, o homem sem algum rei na barriga.)
Entre Abel e Caim, pulou-se um irmão começado por B.
Se o tolo admite, seja nem que um instante, que é nele mesmo que está o que não o deixa entender, já começou a melhorar em argúcia.
A peninha no rabo do gato não *é apenas "para atrapalhar".*
Há uma rubra ou azul ausência no roxo (e no não roxo).
O copo com água até a metade: está meio cheio, ou meio vazio?
Saudade é o predomínio do que não está presente, diga-se, ausente.
Diz-se de um infinito – rendez-vous *das paralelas todas.*
O silêncio proposital dá a maior possibilidade de música.
Se viemos do nada, é claro que vamos para o tudo.
Veja-se, vezes, prefácio como todos gratuito.

Ergo:

O livro pode valer pelo muito que nele não deveu caber.

Quod erat demonstrandum."

(João Guimarães Rosa, *Aletria e Hermenêutica*, *in* Tutaméia – Terceiras Estórias)

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Silvia and Léo are responsible by most events that permitted me to forget this work in critical occasions, and that was essential to its completing.

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muddled me: without you, that dissertation would be much less careful and I would have learned much less about human relations.

SUMMARY

DISCLAIM

This dissertation does not intent to be a valid publication under articles 7-9 of the International Code of Zoological Nomenclature, so new zoological names, synonyms and combinations published here are not valid or available until their publication in other sources.

RESUMO

VAZ DE MELLO, Fernando Zagury. **Espécies originalmente nos gêneros *Trichillum* Harold, 1868 e *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. 266p. Dissertação (Mestrado em Entomologia)- Universidade Federal de Lavras, Lavras.*

Este trabalho apresenta uma revisão dos Scarabaeidae (Coleoptera), anteriormente agrupados nos gêneros *Trichillum* e *Pedaridium.* Esse grupo é caracterizado pela distribuição neotropical, aliada à presença de pilosidade dorsal, pelo menos no ápice elitral e fusão dos esternitos abdominais visíveis no meio. Separa-se, à primeira vista, de *Aphengium*, que compartilha esses caracteres, por carecer de carena lateral nos élitros. O grupo contava, anteriormente ao presente estudo, com 26 espécies no gênero *Pedaridium* e 15 no gênero *Trichillum*, com dois subgêneros, além de duas espécies de gênero incerto. Os capítulos 2 e 3 resultam de exame de tipos de espécies duvidosamente identificadas e apresentam como resultado a descrição de cinco novas espécies anteriormente identificadas erroneamente, e a sinonimização de cinco espécies anteriormente descritas. Os capítulos 4 e 5 apresentam a descrição de duas novas espécies morfológica e biogeograficamente muito significativas. O capítulo 6 apresenta uma análise filogenética do grupo, agrupando suas espécies em 20 gêneros (um com dois subgêneros), sendo cinco baseados em espécies também novas (uma descrita no capítulo 4). Finalmente, o capítulo 7 apresenta uma sinopse taxonômica do grupo em nível específico, resultando num total de 97 espécies, sendo 60 novas. Pela nova estruturação genérica do grupo, as espécies estão agrupadas como segue (número total de espécies, seguido pelo número de espécies descritas no presente trabalho, entre parênteses após o nome do gênero ou subgênero): *Besourenga* (12, 9), *Boreopedaridium* (1, 1), *Boreotrichillum* (1, 0); *Bradypodidium* (5, 2), *Degallieridium* (1, 1), *Eutrichillum* (6, 3), *Feeridium* (1, 1), *Genieridium* (8, 2), *Gillidium* (1, 1), *Horridotrichillum* (1, 0), *Howdenidium* (1, 0), *Leotrichillum* (2, 1), *Martinezidium* (7, 5), *Onoreidium* (4, 1), *Pedaridium* (2, 1), *Pereiraidium* (1, 0), *Silvia* (1, 1), *Trichillidium* (2, 0), *Trichillum (Paratrichillum)* (2, 0), *Trichillum (Trichillum)* (37, 31), *Youngidium* (1, 0).

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* Comitê Orientador: Dr. Júlio Neil Cassa Louzada - UFLA (Orientador), Dr. Gonzalo Halffter Salas - IEcol, Dr. Sergio Ide - IB-SP e Dr. Mario Zunino – UniUrb.

ABSTRACT

VAZ DE MELLO, Fernando Zagury. **Species formerly in the genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. 266p. Dissertation (Master Program in Entomology)- Universidade Federal de Lavras, Lavras.*

This work presents a revision of the Scarabaeidae (Coleoptera) formerly grouped in the genera *Trichillum* and *Pedaridium*. This group is characterized by its Neotropical distribution, presence of dorsal setae at least in the elytral apex, and visible abdominal sternites fusionated in the middle. It differs from *Aphengium*, that have these same characters, by lacking a lateral elytral carina. This group included, prior to the present study, 26 species in the genus *Pedaridium* and 15 in the genus *Trichillum*, divided in two subgenera, and two species of dubious generic placement. Chapters 2 and 3 present the results of examining types of species with doubtfull identities, and result in the description of five new species, and synonymization of five previously described species. Chapters 4 and 5 present descriptions of two new species, of great morphological or biogeographical significance. Chapter 6 presents phylogenetic analyses of the group, grouping its included species in 20 genera (one with two subgenera), five based on new species (one described in chapter 4). Finally, chapter 7 presents a taxonomic synopsis of the group at specific level, resulting in 97 valid species, 60 being new. Following the new generical structuration of the group, numbers of species are as follows (total number of species, followed by number of species described in this work, are in brackets after each genus or subgenus name): *Besourenga* (12, 9), *Boreopedaridium* (1, 1), *Boreotrichillum* (1, 0); *Bradypodidium* (5, 2), *Degallieridium* (1, 1), *Eutrichillum* (6, 3), *Feeridium* (1, 1), *Genieridium* (8, 2), *Gillidium* (1, 1), *Horridotrichillum* (1, 0), *Howdenidium* (1, 0), *Leotrichillum* (2, 1), *Martinezidium* (7, 5), *Onoreidium* (4, 1), *Pedaridium* (2, 1), *Pereiraidium* (1, 0), *Silvia* (1, 1), *Trichillidium* (2, 0), *Trichillum (Paratrichillum)* (2, 0), *Trichillum (Trichillum)* (37, 31), *Youngidium* (1, 0).

* Guidance Committee: Júlio Neil Cassa Louzada - UFLA (Main Advisor), Gonzalo Halffter Salas - IEcol, Sergio Ide - IB-SP and Mario Zunino –UniUrb.

CHAPTER 1

1 General Introduction

In the past few years a growing interest in the systematics of Neotropical Scarabaeinae has prompted few workers to revise certain Neotropical genera as this group of beetles is used in rapid assessment of biodiversity. More specifically an effort has been done to revise poorly known groups such as *Trichillum* and *Pedaridium.* 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 level in the genera.

The aim of this work is to redefine generic and specific entities in the group *Trichillum-Pedaridium*, verifying its monophyly, solving systematic and taxonomic problems, based primarily on phylogenetic inferences, using mainly morphological characters and relating it to biogeographic patterns.

This work is divided in five main sections: Section 1 (Chapter 1) summarizes current knowledge of the group. Section 2 (Chapters 2 and 3) results from observation of primary types not examined by previous reviewers of the group and designates necessary lectotypes, presents some new synonymies and describes some new species that have been misidentified in previous works. Section 3 (Chapters 4 and 5) describes new species that were under study by other specialists when this project begun. Section 4 (Chapter 6) presents a phylogenetic analysis of the group studied and its generic reestructuration, describing as new type-species of those genera not represented by already described species and a very unusual species belonging to one of the previously known genera, whoose description is necessary to define generic limits. Finally, Section 4 (Chapter 7) presents keys for generic and specific identifications and reviews genera as defined in Chapter 6 in specific level.

The first section is co-authored by François Génier (Canadian Museum of Nature, Ottawa, Canada), the second is separately co-authored by respectively Gonzalo and Violeta Halffter (Instituto de Ecología, Xalapa, Mexico, Chapter 4) and Bruce Gill (Agriculture Canada, Ottawa, Canada, Chapter 5) and the remaining sections belong exclusively to the present author.

2 Theoretical Reference

2.1 Taxonomic and Systematic history

The genus *Pedaria* was erected by Laporte (1832), by a single species, *P. nigra*, from Senegal. He stated that the genus could be distinguished from all other scarabaeids by its abdomen with only one segment (that is, fused abdominal sternites). Later, the same author (as Castelnau, 1840) described two other species of *Pedaria* also from Africa, he commented that the genus was very close to *Choeridium* Serville, 1825 (now *Ateuchus* Weber, 1801), differing by its elongated and convex body form, emarginated clypeus, elevated pronotum, elytra covering completely the abdomen, "solded abdominal segments" and absence of hind wings (!). He also commented they resemble *Aphodius* Illiger 1798 and both were endemic to Africa.

In 1859, Harold described the first non-African species of this genus, *Pedaria hirsuta*, based on a number of specimens from Brazil, from his own and Sturm's collections. Harold (1875) tranferred the Australian species *Aphodius geminatus* MacLeay 1871 to *Pedaria*.

In 1868, Harold erected one more scarabaeid genus, *Trichillum*, including in it, *T. heydeni* Harold, 1868, based on specimens from Brazil, from various collections. In the same paper, Harold established the genus *Pedaridium* for the American species of *Pedaria*, and differentiated it from *Trichillum* by the shorter hind basitarsomere and unexpanded epipleuron. He did not designate a type species for *Pedaridium*, however, as only *Pedaria hirsuta* was described from the Americas, it can be considered an implicit designation.

Gemminger & Harold (1869) cited *Trichillum heydeni* from Brazil. They made, for the first time, the combination *Pedaridium hirsutum*, cited it from Brazil to.

Borre (1880) described another species of *Trichillum*: *T. externepunctatum*, based on a specimen from the Thomson collection labeled "Colombia", and "*Uroxys hirtus*", the latter by Guérin-Ménéville, and cited three more specimens of *T. heydeni* from Brazil, in Candèze collection.

Ohaus (1909) briefly commented on a new species of *Trichillum*, in Ecuador, breeding on cow dung without building a nest. That was the first citation of species in the studied group for Ecuador, probably it refers to both *T. ohausi* and *T. cristatum*, described by Arrow in 1931. That was also the first comment on breeding without nesting in true dung beetles (Scarabaeidae *s. str.*). This observation was cited also by Halffter & Matthews (1966).

Gillet (1911) cited *Pedaridium hirsutum*, *Trichillum heydeni* and *T. externepunctatum* in his catalogue. He also cited for the first time *T. heydeni* for Argentina. He followed Harold (1875) and considered *A. geminatus* in *Pedaria*.

Arrow (1913) described three more species of *Pedaridium*: *P. cryptops*, from Brazil, based on three specimens, one from Jataí, Goiás, and the others from Natal, Rio Grande do Norte; *P. fulgens*, based on two specimens from Río Salado, Gran Chaco, Argentina; and *P. argentinum*, based on an unspecified number of specimens from Icaño and Río Salado, Gran Chaco, Argentina. This last species has been erroneously called *P. rugiceps* in the key given just after the description of *P. cryptops*. In the comments under *P. argentinum*, the author compared it with *Pedaridium setosum*. This last named has never been formally described and should be considered *in litteris* or *lapsus* for *P. hirsutum* (Harold, 1859).

Lea (1923) described another Australian species of *Pedaria*, *P. alternata*.

Boucomont (1928) described *Trichillum hirsutum* based on a single specimen from São Paulo, Brazil, and *Trichillum bradyporum* from a specimen

taken in 1925 by Nevermann in the anus of a sloth in Santa Clara Province, Costa Rica.

Arrow, in 1931, revised the genus *Trichillum* and described three new species: *T. hystrix*, based on specimens from Argentina (La Noria, Río San Javier, Santa Fé); *T. ohausi* and *T. cristatum*, both from Ecuador, the former from Loja, Calvario and Piscobamba, and the later from Loja and Piscobamba. In this paper, the author did not mention the species described in 1928 by Boucomont.

The same author, one year later (Arrow, 1932) described two more species of *Pedaridium*: *P. paranense*, based on four specimens from Castro, Paraná, Brazil, and *P. quadridens*, based on a single specimen from Santa Elena, Entre Ríos, Argentina. He also gave an updated key for the genus *Pedaridium* and comments about Boucomont's (1928) descriptions of *Trichillum*, adding that *T. hirsutum* would be close to *T. hystrix* Arrow, 1931.

Saylor (1935) described three more species of *Trichillum*, all based on single specimens and all from Horquetá, Paraguay. The described species were *T. minutum*, *T. arrowi* and *T. boucomonti*, the second was related to *T. hystrix* and the last to *T. ohausi*.

Carter (1936) described a third Australian species of *Pedaria*.

Paulian (1936) described the homonymous *T. arrowi* based on a single specimen from Pará, Brazil, giving a new key for the species known in this genus, except for that for Saylor (1935), whose work was surely unknown to him. The author cited once more *T. heydeni* Harold, 1868 as occurring in Argentina.

Balthasar (1938) described *Pedaridium bidens* based on nine specimens from Jataí, Goiás, Brazil, and Horquetá, Paraguay. In the same paper, the author presented a key for all species of *Pedaridium* known at that time.

The same author (Balthasar, 1939) reviewed the genus *Trichillum* and described two new species, *T. elongatum* and *T. vejdovskyi*, the former from Argentina, Cordoba, Rosario, and the later from Bolivia, Santa Cruz, Buenavista, based on a single specimen. In the same paper the author cited *T. heydeni* from Porto Alegre, Rio Grande do Sul, Brazil, *T. externepunctatum* from Paraguay, *T. boucomonti* from Buenos Aires, Argentina, *T. hirsutum* from Tucumán, Argentina, *T. hystrix* from Paraguay, and gave a new name for *T. arrowi* Paulian: *T. pauliani.*

Pessôa & Lane (1941) cited *P. hirsutum* from Franca, São Paulo state, Brazil, and *T. heydeni* from Vila Nova, Bahia, Brazil. They also stated that there was a common species in São Paulo dobtfully identified as *T. externepunctatum.*

Balthasar, in 1942, described *Trichillum depilatum* based on a single specimen from São Paulo, and related it to *T. externepunctatum.*

Blackwelder (1944) cited in his catalog all species known at that time of *Pedaridium*, and all *Trichillum* except those described by Balthasar (1939, 1942). He also gave a new name, *T. homonymum*, for *T. arrowi* Paulian, 1936.

Pereira (1946) described a horned *Pedaridium*, *P. almeidai*, based on specimens from Piraquara, Guaraúna and Itupava, Paraná, and Glória, Rio Grande do Sul, Brazil.

Martínez (1947), in his *addenda y corrigenda* to Blackwelder (1944) listing, added species described by Balthasar (1939) and Pereira (1946), and synonymized *Trichillum homonymum* Blackwelder, 1944 with *T. pauliani* Balthasar, 1939.

Robinson (1948) described *Trichillum pilosus* based on two specimens from Barro Colorado Island, Panama, and compared it with *T. bradyporum* Boucomont, 1928.

Martínez (1951) described *Pedaridium mansosotoi* from Paraguay and Argentina, and compared it with *P. bidens* and *P. cryptops*.

In addition, Martínez (1959) cited in his catalogue of Argentinean scarabaeids: *Pedaridium argentinum, P. fulgens, P. mansosotoi, P. quadridens, Trichillum elongatum, T. externepunctatum, T. heydeni* and *T. hystrix*. He still cited *T. externepunctatum* from Brazil, Bolivia, Uruguay, Paraguay and Colombia, and hypothesized that *T. hystrix* and *T. boucomonti* could be synonyms.

In another paper in the same year, Pereira & Martínez (1959) redescribed *Trichillum arrowi* Saylor, 1935, comparing it to *T. externepunctatum* Borre, 1880 and *T. depilatum* Balthasar, 1942, based on specimens from Boquerón, Paraguay.

Vulcano & Pereira (1967) included both *Pedaridium* and *Trichillum* among the Scarabaeidae occuring in Amazonian Region. They cited the only described *Pedaridium* species that occurs there, *P. cryptops* Arrow, 1913, and gave a key to *Trichillum* species in this region, including *T. externepunctatum, T. cristatum, T. ohausi, T. vejdovskyi* and *T. pauliani.*

Martínez (1968) erected the subgenus *Eutrichillum* for *Trichillum*, including in it *T. boucomonti* (type species), *T. minutum, T. vejdovskyi*, and, based on descriptions, *T. hystrix* and *T. pauliani.* He also synonymized (again, done before in 1947 by himself) *T. homonymum* with *T. pauliani*, hypothesized that *T. pauliani* also could be (with *T. hystrix*) a synonym of *T. boucomonti*. He also transferred *T. bradyporum, T. ohausi* and *T. elongatum* to *Pedaridium*, hypothesized *T. hirsutum* could also be a *Pedaridium* and in this case would need a new name, and considered the last and *T. cristatum* as *incertae sedis*. In the same paper the author reviewed the subgenus *Trichillum*, describing the following new species: *T. (T.) adjunctum*, from São Paulo and Paraná, Brazil, *T. (T.) pereirai* from São Paulo and Minas Gerais, Brazil, *T. (T.) halffteri* from Misiones, Argentina, and Santa Catarina and Rio Grande do Sul, Brazil, and *T.* (subgenus?) *horacioi*, from Nueva Moka, Sara, Santa Cruz, Bolivia. The

following species were considered in the subgenus *Trichillum*: *T. heydeni*, *T. externepunctatum*, *T. depilatum* and *T. arrowi*. The new citations included *T. heydeni* for Córdoba, Argentina, *T. externepunctatum* from Brazil, Bolivia, Paraguay and Argentina, and *T. depilatum* from Córdoba, Argentina. In this paper, the author omitted any comments about *T. pilosus* Robinson, 1948.

Martínez (1974) described *"Pedaridium* (?) *caingua"* based on three females from Argentina, and stated that this new species, together with *P. quadridens*, should form a new taxon under study by him.

In 1976, Matthews erected the new genus *Notopedaria* for Australian species of *Pedaria*.

Bacchus (1978) listed Arrow's syntypes and holotypes of his described *Trichillum* and *Pedaridium*, but did not designate lectotypes among this material, as he considered necessary to dissect them to differentiate males and females. In his list, he called sometimes *Pedaridium* either as *Pedarium* or *Pedarius*. He considered seven syntypes for *P. argentinum*, three for *T. cristatum*, three for *P. cryptops* (pointing out that there was a fourth specimen missing – and this was not corroborated by the original description), eight for *T. hystrix*, five for *T. ohausi*, four for *P. paranense*, and the holotype for *P. quadridens*.

Ratcliffe (1980) described adults, larvae and pupae of a species of *Trichillum*, *T. adisi*, taken from the pellage of three-toed sloths in Brazilian Amazonia. He also gave both keys for subgenera of *Trichillum* and for species in the subgenus *Eutrichillum*, including *T. hirsutum* Boucomont, 1928, and stating that it has elytral intervals uniseriately punctate, instead of biseriately punctate as stated by the author of this last species. The same author (Ratcliffe, 1981) redescribed the type of *Trichillum hirsutum*. In this paper, he also cited both *T. hirsutum* and *T. boucomonti* as occurring in Manaus, Amazonas, Brazil.

Howden & Young (1981) described two species of *Pedaridium* from Panama, *P. bottimeri* and *P. brevisetosum*, both based on unique specimens from Barro Colorado Island. They also assigned *Trichillum pilosus* Robinson, 1948 to *Pedaridium*, based on characters used by Paulian (1936) and Martínez (1968) to distinguish these genera, cited *P. pilosum* from Costa Rica and Ecuador, and commented on the confusion regarding distinguishing characters between *Trichillum* and *Pedaridium*, and the need of comprehensive revisions of both. They also stated the possibility of occurrence of *Pedaridium bradyporum* (Boucomont, 1928) in Panama, comparing it to *P. pilosum.*

In 1986, Matthews & Stebnicka synonymized *Notopedaria* with *Demarziella* Balthasar, 1961, considered since its description as belonging to the Aphodiidae, and forming the monobasic tribe Demarziellini (Matthews & Stebnicka, 1986).

Martínez (1987), in his catalog of scarabaeid species occurring in Salta, cited from there *Pedaridium argentinum*, *P. quadridens*, *Trichillum externepunctatum*, *T. boucomonti*; once more stated that he found no differences between this later species and *Trichillum hystrix*, and synonymized *Trichillum elongatum* Balthasar, 1939 with *Pedaridium argentinum.*

D'Hotman & Scholtz (1990) included *Pedaridium* among examined genera in a paper dealing with male genitalia in the Scarabaeoidea, but did not illustrate or comment on the genus specifically. The same occurred with other papers dealing with general Scarabaeoidea systematics (e.g. Browne & Scholtz 1995, 1998, 1999). Nel & Scholtz (1990) in a paper on adult scarab mouthparts cited *Pedaria pilosa* Robinson (*sic*) among examined material.

Martínez (1992) described a Venezuelan species, *P. bordoni*, based on specimens from Guárico, Barinas, Monagas and Anzoátegui states. In the abstract of this paper, in both Spanish and English, the author cited *Pedaridium maya*, an undescribed species, from Mexico.

Ferreira & Galileo (1993) revised the genus *Pedaridium*, excepting for *P. bordoni* Martínez, 1992, that was probably not known to them. In this revision, they transferred *T. adisi* to *Pedaridium*, misspelling it *P. adissi*, and synonymized *Pedaridium rugiceps* Arrow, 1913 objectively under *P. argentinum* Arrow, 1913. Six species were described in this revision: *P. equatoriensis* and *P. howdeni*, from Ecuador, *P. brasiliensis*, from Brazil, *P. venezuelensis*, from Venezuela, and *P. martinsi* and *P. martinezi*, both from Argentina. They apparently erroneously considered *Pedaridium* male in gender, and not neuter as stated by the suffix *"idium"*, as they modified some species names and used the male gender for the new ones. *P. bottimeri* was cited for the first time from Venezuela, *P. mansosotoi* from Brazil, *P. quadridens* from Bolivia and Paraguay, and *P. pilosum* from Bolivia. It is important to point out that the authors did not exam most types, which are in European museums.

Monteresino *et al.* (1996) cited *P. argentinum*, *P. fulgens*, *P. quadridens*, *Trichillum depilatum*, *T. externepunctatum*, *T. heydeni* and *T. boucomonti* from Córdoba, Argentina. They apparently did not know the Ferreira & Galileo (1993) revision, as other species were cited from Córdoba in this last.

Verdú & Galante (1997) described *Trichillum morellii*, from Uruguay, comparing it to *T. externepunctatum*, and gave a new key for species in the subgenus *Trichillum*.

Montreuil (1998), in a paper on phylogenetic relations between Ateuchini and Coprini, examined *Pedaridium* (the type species and, possibly, some additional species not stated), and placed it in an unsolved clade including *Demarziella*, *Pedaria*, *Sarophorus* Erichson, 1847, and the clade *Bdelyrus* Harold, 1869 + *Bdelyropsis* Pereira, Vulcano & Martínez, 1960. This paper did not included *Trichillum*.

Vaz-de-Mello & Canhedo (1998) described *Pedaridium louzadaorum* and *P. zanunciorum*, both from Minas Gerais state, Brazil, and included those and *P. bordoni* Martínez, 1992 in the Ferreira & Galileo (1993) key for species.

Escobar (2000) cited a *Pedaridium* species close to *P. pilosum* from the Cinturón Árido Pericaribeño, *Trichillum hystrix* from Amazonía, and *T. externepunctatum* with no locality, from Colombia.

Vaz-de-Mello (2000) listed for Brazil, all *Pedaridium* species cited from that country by Ferreira & Galileo (1993), adding the species described by Vaz-de-Mello & Canhedo (1998), and all *Trichillum* previously cited from Brazil.

In 2001, Aguilar described *Pedaridium amarillai*, based on a single female specimen from Paraguay. The author did not cite the revision by Ferreira & Galileo (1993), and stated that the new species had sinuate epipleura, a character that would place the species in *Trichillum* according to Ferreira & Galileo (1993).

Verdú & Galante (2001) described larvae and breeding behaviour of *Pedaridium brasiliense* and *P. almeidai*. They also reexamined larvae of *P. adisi* and concluded the genus seems to be polyphyletic based on larval morphological characters. A short comment was made on *Trichillum externepunctatum* corroborating Ohaus' (1909) and their own data on *Pedaridium*, that those genera do not present nesting behaviour.

Barbero (2001) cited for the first time *Pedaridium pilosum* from Nicaragua, establishing the department of Río San Juan as the northern limit for that genus.

Medina et al. (2001) cited *Pedaridium pilosum*, *Trichillum externepunctatum*, *T. hystrix* and *T. hirsutum* from Colombia.

Génier & Vaz-de-Mello (2002) diagnosed and designated lectotypes for those species described by Arrow in bot *Trichillum* and *Pedaridium*, synonymized *P. equatoriensis* under *T. cristatum*, transferring that last to

Pedaridium, *P. martinezi* under *P. fulgens*, *P. mansosotoi* under *P. cryptops*, observed gender consideration mistakes made by Ferreira & Galileo (1993) for *Pedaridium*, and described *P. margareteae* for the species erroneusly identified as *P. cryptops*, and *P. galileoae* for the species erroneusly identified as *P. fulgens* in that last work.

Solís & Kohlmann (2003) described *Trichillum (Eutrichillum) arcus* from Costa Rica, relating it to *T. boucomonti*, and illustrated and commented the distribution of *Pedaridium bradyporum*, cited that species for the first time from the Pacific slope in Costa Rica.

Vaz-de-Mello, Halffter & Halffter (in press) described *Pedaridium maya* from Southern Mexico and Guatemala.

Gill & Vaz-de-Mello (in press) described *Pedaridium medinae*, from Cundinamarca, Risaralda and Quindio in Colombia.

2.2 Present systematic status

Since the beginning, both genera have been since the beginning placed near *Ateuchus* Weber, 1801, and thus are considered actually belonging to the tribe Ateuchini (subtribe Ateuchina of some authors). Morphological differences between *Pedaridium* and *Pedaria* have never been pointed out in literature, and need to be exposed, since the only commented difference between them is geographical.

Morphological differences between *Pedaridium* and *Trichillum* have not been clearly stated. Harold (1868) distinguished them in his key by shape of epipleuron and hind tarsi. In later keys (e.g. Luederwaldt, 1931, Paulian, 1936, Pessôa & Lane, 1941, Pereira, 1954, Vulcano & Pereira, 1967) the only noted difference is in hind tarsi. However, *P. almeidai* Pereira, 1946 shows *Trichillum*-like hind tarsi (i.e., basitarsomere longer than second tarsomere). The genus

Aphengium Harold, 1868 is commonly placed near *Trichillum* and *Pedaridium* in keys cited above, sharing with these genera the fused abdominal sternites and pilose elytra, being separated from *Pedaridium* generally by longer hind basitarsus and from *Trichillum* by shape of pygidium. However, other characters such as meso- and metasternal shape, and genitalia, appear to put it closer to *Ateuchus* than to the *Trichillum-Pedaridium* complex (personal observation).

Martínez (1968) wrote short comments on this, transferring some species from *Trichillum* to *Pedaridium*, but did not clearly point out differences between them. In addition, Martínez (1974) put doubts on the generic classification of the group *Trichillum+Pedaridium* in his description of *P.* (?) *caingua*.

Ferreira & Galileo (1993) used only the epipleuron to stablish generic differences, transferring some more species from *Trichillum* to *Pedaridium* based on this, but did not comment on characters other than tarsi, that was considered useless. The monophyly of both genera have never been commented on, and most characters vary considerably among species in both genera, giving rise to the consideration that this classification, based solely on one character (shape of epipleuron), is not now a good one.

Larval characters did not appear to support *Pedaridium* as a monophyletic group (Verdú & Galante, 2001).

2.3 Present taxonomic status

Up to now, the genus *Pedaridium* contains 29 valid species, four names that are synonyms of valid species, one *nomen nudum* (that can be simply a *lapsus*), and one misspelling of species name. The genus name has been misspelled twice, either as *Pedarium* or *Pedarius*. Some species names have

been described as male nouns, however *Pedaridium* is clearly a neutral one and those names are in need of correction.

The genus *Trichillum* has no synonyms and includes two subgenera. The nominotypical one contains eight valid species names, and no synonyms at species level. The other, *Trichillum (Eutrichillum)*, contains seven valid species names, and two synonyms at species level, one of which is a senior synonym, homonym of a name previously in *Trichillum (Trichillum)*. One species names is considered as *incertae sedis*, without subgeneric placement.

The following lines summarize the current understanding of the group, listing modifications that occurred in status, combination and spelling of names.

Genus 1. *Pedaridium* Harold, 1868

Pedarius – misspelling in Bacchus, 1978

Pedarium – misspelling in Bacchus, 1978

Species 1.1. *Pedaridium hirsutum* (Harold, 1859)

Pedaria hirsuta Harold, 1859

Pedaridium hirsutum – comb. in Gemminger & Harold (1869)

?*Pedaridium setosum* – Arrow, 1913 (*lapsus*?)

Species 1.2. *Pedaridium cryptops* Arrow, 1913

Pedarium cryptops Arrow, 1913 – misspel. in Bacchus (1978)

Pedaridium mansosotoi Martínez, 1951 – syn. in Génier & Vaz-de-Mello (2002)

Species 1.3. *Pedaridium fulgens* Arrow, 1913

Pedarius fulgens Arrow 1932 – misspel. in Bacchus (1978)

Species 1.4. *Pedaridium argentinum* Arrow, 1913

Pedaridium rugiceps Arrow, 1913 (*lapsus*) – syn. in Ferreira & Galileo (1993)

Trichillum elongatum Balthasar, 1939 – syn. in Martínez (1987)

Pedaridium elongatum (Balthasar, 1939) – comb. in Martínez (1968)

Pedarium argentinum Arrow, 1913 – misspel. in Bacchus (1978)

Species 1.5. *Pedaridium bradyporum* (Boucomont, 1928)

Trichillum bradyporum Boucomont, 1928

Pedaridium bradyporum (Boucomont, 1928) – comb. in Martínez (1968)

Species 1.6. *Pedaridium ohausi* (Arrow, 1931)

Trichillum ohausi Arrow, 1931

Pedaridium ohausi (Arrow, 1931) – comb. in Martínez (1968)

Species 1.7. *Pedaridium cristatum* (Arrow, 1931)

Trichillum cristatum Arrow, 1931

Pedaridium cristatum (Arrow, 1931) – comb. in Génier & Vaz-de-Mello (2002)

Pedaridium equatoriensis Ferreira & Galileo, 1993 – syn. in Génier & Vaz-de-Mello (2002)

Species 1.8. *Pedaridium paranense* Arrow, 1932

Pedaridium paranensis Arrow, 1932 – misspel. in Ferreira & Galileo (1993)

Species 1.9. *Pedaridium quadridens* Arrow, 1932

Species 1.10. *Pedaridium bidens* Balthasar, 1938

Species 1.11. *Pedaridium almeidai* Pereira, 1946

Species 1.12. *Pedaridium pilosum* (Robinson, 1948)

Trichillum pilosus Robinson, 1948

Pedaridium pilosum (Robinson, 1948) – comb. in Howden & Young (1981)

Pedaria pilosa (Robinson, 1948) – miscombination in Nel & Scholtz (1990)

Species 1.13. *Pedaridium caingua* Martínez, 1974

Pedaridium (?) *caingua* Martínez, 1974

Pedaridium caingua Martínez, 1974 – Ferreira & Galileo (1993)

Species 1.14. *Pedaridium adisi* (Ratcliffe, 1980)

Trichillum (Eutrichillum) adisi Ratcliffe, 1980

Pedaridium adissi (Ratcliffe, 1980) – comb./misspel. in Ferreira & Galileo (1993)

Species 1.15. *Pedaridium brevisetosum* Howden & Young, 1981

Species 1.16. *Pedaridium bottimeri* Howden & Young, 1981

Species 1.17. *Pedaridium bordoni* Martínez, 1992

Species 1.18. *Pedaridium howdeni* Ferreira & Galileo, 1993

Species 1.19. *Pedaridium brasiliensis* Ferreira & Galileo, 1993

Species 1.20. *Pedaridium venezuelensis* Ferreira & Galileo, 1993

Species 1.21. *Pedaridium martinsi* Ferreira & Galileo, 1993

Species 1.22. *Pedaridium martinezi* Ferreira & Galileo, 1993

Species 1.23. *Pedaridium louzadaorum* Vaz-de-Mello & Canhedo, 1998

Species 1.24. *Pedaridium zanunciorum* Vaz-de-Mello & Canhedo, 1998

Species 1.25. *Pedaridium amarillai* Aguilar, 2001

Species 1.26. *Pedaridium margareteae* Génier & Vaz-de-Mello, 2002

Species 1.27. *Pedaridium galileoae* Génier & Vaz-de-Mello, 2002

Species 1.28. *Pedaridium maya* Vaz-de-Mello, Halffter & Halffter (in press)

Pedaridium maya Martínez, 1992 – *nomen nudum*

Species 1.29. *Pedaridium medinae* Gill & Vaz-de-Mello (in press)

Nomen nudum 1.1. *Pedaridium setosum* Arrow, 1913, see remarks under *P. hirsutum* (Harold, 1859)

Genus 2. *Trichillum* Harold, 1868

Subgenus 1. *Trichillum (s. str.)* – defined by Martínez (1967)

Species 2.1. *Trichillum (Trichillum) heydeni* Harold, 1868

Trichillum heydeni Harold, 1868

Trichillum (Trichillum) heydeni Harold, 1868 – comb. in Martínez (1968)

Species 2.2. *Trichillum (Trichillum) externepunctatum* Borre, 1880

Uroxys hirta – nomen in litteris attributed to Guérin-Ménéville by Borre (1880)

Trichillum externepunctatum Borre, 1880

Trichillum (Trichillum) externepunctatum Borre, 1880 – comb. in Martínez (1968)

Species 2.3. *Trichillum (Trichillum) arrowi* Saylor, 1935

Trichillum arrowi Saylor, 1935 (not Paulian, 1936)

Trichillum (Trichillum) arrowi Saylor, 1935 – comb. in Martínez (1968)

Species 2.4. *Trichillum (Trichillum) depilatum* Balthasar, 1942

Trichillum depilatum Balthasar, 1942

Trichillum (Trichillum) depilatum Balthasar, 1942 – comb. in Martínez (1968)

Species 2.5. *Trichillum (Trichillum) adjunctum* Martínez, 1968

Species 2.6. *Trichillum (Trichillum) pereirai* Martínez, 1968

Species 2.7. *Trichillum (Trichillum) halffteri* Martínez, 1968

Species 2.8. *Trichillum (Trichillum) morellii* Verdú & Galante, 1997

Subgenus 2. *Trichillum (Eutrichillum)* Martínez, 1968

Species 2.9. *Trichillum (Eutrichillum) hirsutum* Boucomont, 1928

Trichillum hirsutum Boucomont, 1928 – as *incerta sedis* in Martínez (1968)

Trichillum (Eutrichillum) hirsutum Boucomont, 1928 – comb. in Ratcliffe (1980)

Species 2.10. *Trichillum (Eutrichillum) hystrix* Arrow, 1931

Trichillum hystrix Arrow, 1931

Trichillum (Eutrichillum) hystrix Arrow, 1931 – comb. in Martínez (1968)

Species 2.11. *Trichillum (Eutrichillum) boucomonti* Saylor, 1935

Trichillum boucomonti Saylor, 1935

Trichillum (Eutrichillum) boucomonti Saylor, 1935 – comb. in Martínez (1968) (type species)

Species 2.12. *Trichillum (Eutrichillum) minutum* Saylor, 1935

Trichillum minutum Saylor, 1935

Trichillum (Eutrichillum) minutum Saylor, 1935 – comb. in Martínez (1968)

Species 2.13. *Trichillum (Eutrichillum) pauliani* Balthasar, 1939

Trichillum arrowi Paulian, 1936 (not Saylor, 1935)

Trichillum pauliani Balthasar, 1939 – *nomen novum*

Trichillum homonymum Blackwelder, 1944 – *nomen novum* – syn. in Martínez (1947)

Trichillum (Eutrichillum) pauliani Balthasar, 1939 – comb. in Martínez (1968)

Species 2.14. *Trichillum (Eutrichillum) vejdovskyi* Balthasar, 1939

Trichillum vejdovskyi Balthasar, 1939

Trichillum (Eutrichillum) vejdovskyi Balthasar, 1939 – comb. in Martínez (1968)

Species 2.15. *Trichillum (Eutrichillum) arcus* Solís & Kohlmann, 2003

Incertae sedis (stated by Martínez, 1968):

Species 2.16. *Trichillum* (?) *horacioi* Martínez, 1968

2.4 Present state of names

(species epithets with original genus in parenthesis):

1. *adisi* Ratcliffe, 1980 *(Trichillum)* – valid, now in *Pedaridium* (Ferreira & Galileo, 1993)
2. *adissi* (Ratcliffe, 1980) *(Pedaridium)* – misspelling of *P. adisi* (Ratcliffe, 1980) in Ferreira & Galileo (1993)
3. *adjunctum* Martínez, 1968 *(Trichillum (Trichillum))* – valid
4. *almeidai* Pereira, 1946 *(Pedaridium)* – valid
5. *amarillai* Aguilar, 2001 *(Pedaridium)* – valid
6. *arcus* Solís & Kohlmann, 2003 (*Trichillum(Eutrichillum))* – valid
7. *argentinum* Arrow, 1913 *(Pedaridium)* – valid
8. *arrowi* Paulian, 1936 (not, Saylor 1935) *(Trichillum)* – senior synonym of *Trichillum (Eutrichillum) pauliani* Balthasar, 1939 (Balthasar, 1939)
9. *arrowi* Saylor, 1935 *(Trichillum)* – valid, now in *Trichillum (Trichillum)* (Martínez, 1968)
10. *bidens* Balthasar, 1938 *(Pedaridium)* – valid
11. *bordoni* Martínez, 1992 *(Pedaridium)* – valid
12. *bottimeri* Howden & Young, 1981 *(Pedaridium)* – valid
13. *boucomonti* Saylor, 1935 *(Trichillum)* – valid, now in *Trichillum (Eutrichillum)* (type species) (Martínez, 1968)
14. *bradyporum* Boucomont, 1928 *(Trichillum)* – valid, now in *Pedaridium* (Martínez, 1968)

15. *brasiliensis* Ferreira & Galileo, 1993 *(Pedaridium)* – valid, but misspelled – would be *P. brasiliense*
16. *brevisetosum* Howden & Young, 1981 *(Pedaridium)* – valid
17. *caingua* Martínez, 1974 *(Pedaridium?)* – valid, as *Pedaridium* (Ferreira & Galileo, 1993)
18. *cristatum* Arrow, 1931 *(Trichillum)* – valid, now in *Pedaridium* (Génier & Vaz-de-Mello, 2002)
19. *cryptops* Arrow, 1913 *(Pedaridium)* – valid
20. *depilatum* Balthasar, 1942 *(Trichillum)* – valid, now in *Trichillum (Trichillum)* (Martínez, 1968)
21. *elongatum* Balthasar, 1939 *(Trichillum)* – synonym of *Pedaridium argentinum* Arrow, 1913 (Martínez, 1987)
22. *equatoriensis* Ferreira & Galileo, 1993 *(Pedaridium)* – misspelled – would be *P. equatoriense*, synonym of *P. cristatum* (Arrow, 1931) (Génier & Vaz-de-Mello)
23. *Eutrichillum* Martínez, 1968 (subgenus of *Trichillum*) – valid
24. *externepunctatum* Borre, 1880 *(Trichillum)* – valid, now in *Trichillum (Trichillum)* (Martínez, 1968)
25. *fulgens* Arrow, 1913 *(Pedaridium)* – valid
26. *galileoae* Génier & Vaz-de-Mello, 2002 *(Pedaridium)* – valid
27. *halffteri* Martínez, 1968 *(Trichillum (Trichillum))* – valid
28. *heydeni* Harold, 1868 *(Trichillum)* – valid, now in *Trichillum (Trichillum)* (type species) (Martínez, 1968)
29. *hirsuta* Harold, 1859 *(Pedaria)* – valid, now *Pedaridium hirsutum* (Gemminger & Harold, 1869)
30. *hirsutum* Boucomont, 1928 *(Trichillum)* – valid, now in *Trichillum (Eutrichillum)* (Ratcliffe, 1980)

31. *hirta* Guérin-Méneville, *in litteris (Uroxys)* – synonym of *Trichillum (Trichillum) externepunctatum* Borre, 1880 (cited by Borre, 1880)
32. *homonymum* Blackwelder, 1944 *(Trichillum)* – junior synonym of *Trichillum (Eutrichillum) pauliani* Balthasar, 1939 (Martínez, 1947, 1968)
33. *horacioi* Martínez, 1968 *(Trichillum)* – valid, *incerta sedis* (Martínez, 1968)
34. *howdeni* Ferreira & Galileo, 1993 *(Pedaridium)* – valid
35. *hystrix* Arrow, 1931 *(Trichillum)* – valid, now in *Trichillum (Eutrichillum)* (Martínez, 1968)
36. *louzadaorum* Vaz-de-Mello & Canhedo, 1998 *(Pedaridium)* – valid
37. *mansosotoi* Martínez, 1951 *(Pedaridium)* – synonym of *P. cryptops* Arrow, 1913 (Génier & Vaz-de-Mello, 2002)
38. *margareteae* Génier & Vaz-de-Mello, 2002 *(Pedaridium)* – valid
39. *martinezi* Ferreira & Galileo, 1993 *(Pedaridium)* – synonym of *P. fulgens* Arrow, 1913 (Génier & Vaz-de-Mello, 2002)
40. *martinsi* Ferreira & Galileo, 1993 *(Pedaridium)* – valid
41. *maya* Martínez, 1992 *(Pedaridium)* – *nomen nudum*, synonym of *P. maya* Vaz-de-Mello, Halffter & Halffter (in press)
42. *maya* Vaz-de-Mello, Halffter & Halffter (in press) *(Pedaridium)* – valid
43. *medinae* Gill & Vaz-de-Mello (in press) *(Pedaridium)* – valid
44. *minutum* Saylor, 1935 *(Trichillum)* – valid, now in *Trichillum (Eutrichillum)* (Martínez, 1968)
45. *morellii* Verdú & Galante, 1997 *(Trichillum (Trichillum))* – valid
46. *ohausi* Arrow, 1931 *(Trichillum)* – valid, now in *Pedaridium* (Martínez, 1968)
47. *paranense* Arrow, 1932 *(Pedaridium)* – valid
48. *paranensis* Arrow, 1932 *(Pedaridium)* – misspelling of *P. paranense* Arrow, 1932 in Ferreira & Galileo (1993)

49. *pauliani* Balthasar, 1939 *(Trichillum)* – valid, now in *Trichillum (Eutrichillum)* (Martínez, 1968)
50. *Pedaridium* Harold, 1868 – valid
51. *Pedarium* – misspelling of *Pedaridium* in Bacchus (1978)
52. *Pedarius* – misspelling of *Pedaridium* in Bacchus (1978)
53. *pereirai* Martínez 1968 *(Trichillum (Trichillum))* – valid
54. *pilosum* (Robinson 1948) *(Pedaridium)* – correct spelling and new combination for *Trichillum pilosus* Robinson, 1948 (Howden & Young, 1981)
55. *pilosus* Robinson, 1948 *(Trichillum)* – valid, now in *Pedaridium* (Howden & Young, 1981), misspelled, should be *T. pilosum.*
56. *quadridens* Arrow, 1932 *(Pedaridium)* – valid
57. *rugiceps* Arrow, 1913 (*Pedaridium*) – senior objective synonym of *Pedaridium argentinum* Arrow, 1913 (Ferreira & Galileo, 1993)
58. *setosum* Arrow, 1913 *(Pedaridium) – nomen nudum* or *lapsus* for *P. hirsutum* (Harold 1859)
59. *Trichillum* Harold, 1869 – valid
60. *vejdovskyi* Balthasar, 1939 *(Trichillum)* – valid, now in *Trichillum (Eutrichillum)* (Martínez, 1968)
61. *venezuelensis* Ferreira & Galileo, 1993 (Pedaridium) – valid, but mispelled – would be *P. venezuelense*
62. *zanunciorum* Vaz-de-Mello & Canhedo, 1998 *(Pedaridium)* – valid

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CHAPTER 2

A Review of Arrow's Types of *Trichillum* and *Pedaridium* with Description of Two New Species of *Pedaridium*[1]

[1] Paper submitted to Acta Zoologica Cracoviensia, Kraków, authored by François Génier and Fernando Zagury Vaz-de-Mello.

1 Resumo

VAZ DE MELLO, Fernando Zagury. Revisão dos tipos de *Trichillum* e *Pedaridium* de Arrow, com descrição de duas novas espécies de *Pedaridium*. In: _____. **Espécies originalmente nos gêneros *Trichillum* Harold, 1868 e *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Cap. 2, p.33-61. Dissertação (Mestrado em Entomologia)-Universidade Federal de Lavras, Lavras.*

Todo o material-tipo das espécies pertencentes aos gêneros *Trichillum* e *Pedaridium* descritas por Arrow é estudado no presente trabalho. Como resultado, *Trichillum cristatum* Arrow é transferido para o gênero *Pedaridium* e as seguintes sinonímias são estabelecidas (o segundo nome sendo válido): *Pedaridium mansosotoi* Martínez = *Pedaridium cryptops* Arrow, *Pedaridium martinezi* Ferreira & Galileo = *Pedaridium fulgens* Arrow, *Pedaridium equatoriensis* Ferreira & Galileo = *Pedaridium cristatum* (Arrow). Para cada espécie são fornecidas uma diagnose e informações pertinentes. *Pedaridium margareteae* sp. nov. é descrito como resultado da utilização errônea do nome *Pedaridium cryptops* Arrow, e *Pedaridium galileoae* sp. nov., como resultado da identificação errônea de *P. fulgens* Arrow.

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2 Abstract

VAZ DE MELLO, Fernando Zagury. A Review of Arrow's Types of *Trichillum* and *Pedaridium* With Description of Two New Species of *Pedaridium.* In: _____. **Species formerly in the genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Chap. 2. p. 33-61. Dissertation (Master Program in Entomology)-Universidade Federal de Lavras, Lavras.*

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.

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3 Introduction

In the past few years a growing interest in the systematics of Neotropical Scarabaeinae has prompted few workers to revise certain Neotropical genera as this group of beetles is 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 level in the genera (pers. obs.).

This note serves to clarify the identity of Arrow's type material, which was not studied previously by reviewers of the groups. 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.

4 Material and Methods

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 follows:

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.

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.

5 Results and Discussion

Pedaridium cryptops Arrow

Pedaridium cryptops Arrow, 1913: 458.
Pedaridium cryptops Arrow, 1932: 226.
Pedaridium cryptops Arrow: Balthasar, 1938: 220.
Pedaridium cryptops Arrow: Blackwelder, 1944: 203.
Pedaridium mansosotoi Martínez, 1951: 35, **new synonymy**.
Pedaridium bidens Balthasar: Ferreira & Galileo, 1993: 15, misidentification.
Pedaridium mansosotoi Martínez: Ferreira & Galileo, 1993: 18.
Pedaridium cryptops Arrow: Vaz-de-Mello, 2000: 194.
Pedaridium mansosotoi Martínez: Vaz-de-Mello, 2000: 194.

Lectotype ♀ (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 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.

Diagnosis. Clypeal teeth (FIGURE 1) long, acute, dorsal surface bellow the surface of clypeus and separated with a strong and sharp carina. Median emargination of clypeus (FIGURE 1) moderately broad and very shallow in dorsal view. Clypeal punctures (FIGURE 1) 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.

Remarks. The material deposited in the Natural History Museum in London consists of 3 specimens belonging to three different species. Two specimens collected in Jahaty (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 is suggesting 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 is stating "type". This specimen is selected as lectotype. Arrow's description clearly states that the clypeus of his new species possesses 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 abraded, and included these two specimens in the type series. The lectotype is identical to *Pedaridium mansosotoi* Martínez and we synonymize this species herein 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 here.

***Pedaridium fulgens* Arrow**

Pedaridium fulgens Arrow, 1913: 458.

Pedaridium fulgens Arrow, 1932: 226.

Pedaridium fulgens Arrow: Blackwelder, 1944: 203.

Pedaridium martinezi Ferreira & Galileo, 1993: 30, **new synonymy**.

Lectotype ♀ (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.

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

Remarks. The material consists of two females syntypes. The cleanest specimen, which bear Arrow's handwritten label, is selected as lectotype. The other specimen, with the same data, is designated as paralectotype. After a careful examination of the closely related species we came to the conclusion that *Pedaridium martinezi* Ferreira & Galileo is identical in all respect to *P. fulgens* Arrow, consequently we synonymize herein this species. The species currently recognized as *P. fulgens* is a new taxon, which is described here. 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), originating the misidentification of the new species (that bear one pair of external denticles) with the true *P. fulgens* (bearing two pairs).

***Pedaridium argentinum* Arrow**

Pedaridium argentinum Arrow, 1913: 459.
Pedaridium rugiceps Arrow, 1913: 458, synonymized by Ferreira & Galileo, 1993: 24-25.
Pedaridium argentinum Arrow, 1932: 226.
Trichillum elongatum Balthasar, 1934: 24, synonymized by Martínez, 1987: 60.
Pedaridium argentinum Arrow: Balthasar, 1938: 220.
Pedaridium argentinum Arrow: Blackwelder, 1944: 203.
Pedaridium argentinum Arrow: Martínez, 1959: 62.
Pedaridium elongatum (Balthasar): Martínez 1968: 119.
Pedaridium argentinum Arrow: Martínez, 1987: 60.
Pedaridium argentinum Arrow: Ferreira & Galileo, 1993: 24.
Pedaridium argentinum Arrow: Monteresino *et al.*, 1996: 107.

Lectotype ♂ (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 bears the diagnostic characters to separate this species from closely related species and to establish “Rio Salado” as the type locality.

Diagnosis. Body dark reddish brown, elongate, almost parallel sided medially. Clypeus (FIGURE 3) with two large upturned triangular teeth. Median emargination of clypeus (FIGURE 3) 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.

Remarks. Arrow’s type material consists of 7 specimens in BMNH and one specimen, which was deposited at the Muséum national d’Histoire naturelle in Paris. The lectotype male is here designated and bears Arrow’s “type” handwritten label, all of the rest of the syntype series matches the lectotype and specimens are here designated as paralectotypes. In his identification key Arrow is using the name *rugiceps* instead of *argentinum.* This has been noted by Ferreira & Galileo (1993), who considered *P. rugiceps* as an objective synonymy of *P. argentinum.* This has been obviously a typographical mistake as the name *rugiceps* in the copy of the reprint located at the CMNC has been corrected by Arrow himself to *argentinum.* Martínez (1986) has synonymized *P. elongatum* Balthasar without any comments. The three female type specimens of *P. elongatum* have been compared to Arrow’s types and the synonymy established by Martínez is here confirmed.

***Trichillum hystrix* Arrow**

Trichillum hystrix Arrow, 1931: 609.

Trichillum hystrix Arrow: Paulian, 1936: 206.

Trichillum hystrix Arrow: Balthasar, 1939: 25.

Trichillum hystrix Arrow: Blackwelder, 1944: 204.

Trichillum (Eutrichillum) hystrix Arrow: Martínez, 1968: 120.

Trichillum (Eutrichillum) hystrix Arrow: Ratcliffe, 1980: 341.

Trichillum hystrix Arrow: Martínez, 1987: 60.

Lectotype ♂ (BMNH): Syntype (blue disc)/ Type (red disc, upside down)/ LECTOTYPE (red paper)/ Estancia la Noria, Rio San Javier, Santa Fe Argentine, G.E. Bryant, 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.1911 (2♀♀ BMNH), 3.I.1912 (1♂ BMNH).

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

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

approximately 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 FIGURE 11) expended into translucent lobe basally, distal portion slender and abruptly bent forward. Apex of large sclerite of internal sac of edeagus with a single acute dentiform projection (two in *P. hirsutum* Boucomont).

Remarks. Arrow's syntype series consists 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 abraded) anterior margin of the clypeus and complete vestiture has been selected for lectotype. The lectotype also bears Arrow's original "type" label. *Trichillum hystrix* belongs 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 edeagus. Martínez (1987) considered *T. hystrix* undistinguishable from *Trichillum boucomonti* Saylor. The relations 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 appeared 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 diagnose) and the apicoventral portion of the tube of edeagus, which bear 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 São Paulo (state or city?) 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 type and it seems reasonable here to believe that *T. hirsutum* is in fact different from *T. hystrix*.

***Pedaridium ohausi* (Arrow)**

Trichillum ohausi Arrow, 1931: 610.
Trichillum ohausi Arrow: Paulian, 1936: 206.
Trichillum ohausi Arrow: Balthasar, 1939: 22.
Trichillum ohausi Arrow: Blackwelder, 1944: 204.
Pedaridium ohausi (Arrow): Martínez, 1968: 119.
Pedaridium ohausi (Arrow): Ferreira & Galileo, 1993: 12.

Lectotype ♂ (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 bears the distinctive characters to separate this species from closely related species.

Diagnosis. Body dark brown with feeble but distinct greenish and coppery reflections on elytra, elongate, almost parallel sided medially. Clypeus (FIGURE 5) with two large slightly upturned sharp triangular teeth. Median emargination of clypeus (FIGURE 5) broadly arcuate. Clypeal punctures (FIGURE 5) 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 (FIGURE 5) 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.

Remarks. Arrow's syntype series consist of 5 specimens, the specimen with Arrow's hand written type label agree with the original description and has been selected for lectotype. Because this species does not exhibit obvious secondary sexual characters, this specimen has been dissected 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)**

Trichillum cristatum Arrow, 1931: 610.
Trichillum cristatum Arrow: Paulian, 1936: 206.
Trichillum cristatum Arrow: Balthasar, 1939: 22.
Trichillum cristatum Arrow: Blackwelder, 1944: 204.
Trichillum cristatum (Arrow): Martínez 1968: 119.
Pedaridium cristatum (Arrow), **new combination**.
Pedaridium equatoriensis Ferreira & Galileo 1993: 14, **new synonymy**.

Lectotype ♀ (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.

Paralectotype: ECUADOR, Loja, Ohaus S. (recto), 2200m. 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 bears the distinctive characters to separate this species from closely related species and to establish Piscobamba as type locality.

Diagnosis. Body dark brown with distinct greenish and coppery reflections on dorsum, elongate oval, sides broadly arcuate. Clypeus (FIGURE 6) with two slightly upturned broadly triangular teeth and distinctly emarginate clypeogenal area. Median emargination of clypeus (FIGURE 6) broadly arcuate. Clypeal punctures (FIGURE 6) 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 (FIGURE 6) 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.

Remarks. Arrow's syntype series consists of 3 specimens. The specimen with Arrow's hand written type label is a *T. ohausi* with abraded 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 agree with the original description, has been selected for 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 is in all respect identical to *Trichillum cristatum* Arrow. We consequently synonymize *P. equatoriensis* with *T. cristatum* here.

***Pedaridium paranense* Arrow**

Pedaridium paranense Arrow, 1932: 224.
Pedaridium paranense Arrow: Balthasar, 1938: 219.
Pedaridium paranense Arrow: Blackwelder, 1944: 203.
Pedaridium paranensis Arrow: Ferreira & Galileo, 1993: 9.
Pedaridium paranensis Arrow: Vaz-de-Mello & Canhedo, 1998: 100.
Pedaridium paranensis Arrow: Vaz-de-Mello, 2000: 194.

Lectotype ♂ (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 distinctive characters to separate this species from closely related species.

Diagnosis. Clypeal teeth (FIGURE 7) lacking. Median emargination of clypeus (FIGURE 7) moderately broad and shallow in dorsal view. Clypeal punctures (FIGURE 7) 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.

Remarks. Arrow's syntype series consists 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 and we have decided to choose a male specimen instead, which show better diagnostic character instead, for lectotype. All specimens are conspecific and therefore included in the lectotype series. The usage of the name *P. paranense* is correct in Ferreira & Galileo (1993). Ferreira & Galileo (1993) have changed, in error, the accord of the specific epithet. *Pedaridium* is neutral therefore, *paranense* is the proper spelling.

***Pedaridium quadridens* Arrow**

Pedaridium quadridens Arrow, 1932: 225.
Pedaridium quadridens Arrow: Balthasar, 1938: 220.
Pedaridium quadridens Arrow: Blackwelder, 1944: 203.
Pedaridium quadridens Arrow: Martínez, 1959: 62.
Pedaridium quadridens Arrow: Martínez, 1987: 60.
Pedaridium quadridens Arrow: Ferreira & Galileo, 1993: 33.

Holotype ♀ (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.

Diagnosis. Clypeal margin (FIGURE 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 (FIGURE 8) broad and very shallow in dorsal view, much wider than distance between lateral and median teeth. Clypeal punctures (FIGURE 8) 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.

5.1 New Species

***Pedaridium margareteae* sp. nov.**
(FIGURES 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.

Etymology. We dedicate this species to Ana Margarete M. Ferreira, which recently revised the genus *Pedaridium.*

Diagnosis. Clypeal teeth (FIGURE 9) short, triangular, dorsal surface at the same level as the clypeus and separated with a fine and sharp carina. Median emargination of clypeus (FIGURE 9) broad and shallow in dorsal view. Clypeal punctures (FIGURE 9) 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.

Holotype. ♂**.** 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** (FIGURE 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 (FIGURE 9) rounded, slightly raspy and denser anteriorly, separated by about one diameter on anterior half, each punctures bearing an elongate squamiform setae. Eyes (FIGURE 9) 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 (FIGURE 11) expended 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**. Edeagus as in FIGURES 13-14, sclerites of internal sac as in FIGURE 12.

Allotype. ♀. 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.

Material studied. 18 ♂♂, 23 ♀♀, 9 sex? (AMBC, BMNH, CMNC, FVMC, MZSP)

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 (4 FVMC); Encruzilhada, XII.1980/ A. Martínez e M. Alvarenga (3 CMNC); same

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); same as before except: X.1938, Dr. Nick, Coll. Martínez (2 CMNC). **Mato Grosso**: Chapada do Guimarães, XI.1963, Alvarenga (9 MZSP). **Minas Gerais**: Águas Vermelhas, XII.1997, A. Bello (4 AMBC). **Pernambuco**: Pery-Pery, V-VI.1892, Gounelle (2 ZMHB); same as before except: XI-XII.1892 (1 ZMHB). **Piauí**: São Raimundo Nonato, PN Serra da Capivara, I.1999, C.A. Matrangolo (5 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).

Remarks. Paratypes vary in length from 4.0-4.5 mm. The two paratypes from Villa Nova (Bahia) in CMNC have the clypeal teeth less widely separated and the parameres present 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.

***Pedaridium galileoae* sp. nov.**
(FIGURES 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.

Etymology. A patronymic in honor of Maria Helena M. Galileo, a Brazilian cerambycidologist who was very helpful in providing specimens for our studies.

Diagnosis. Clypeus (FIGURE 10) with two teeth on each side, median teeth acute, triangular and moderately large, narrower than lateral teeth at base. Median emargination of clypeus (FIGURE 10) broadly V-shaped and moderately shallow in dorsal view. Clypeal punctures (FIGURE 10) 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.

Holotype. ♂**.** 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** (FIGURE 10). 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 dsc and with feeble microsculpture along margins, punctures (FIGURE 10) transverse, separated by two to four diameters on anterior half, each punctures bearing an elongate and feeble squamiform setae. Eyes (FIGURE 10) 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 row 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 rows 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**. Edeagus as in FIGURES 16-17, sclerites of internal sac as in FIGURE 15.

Allotype. ♀. 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.

Material studied, 11 ♂♂, 13 ♀♀, 8 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**: **Córdoba**: Ciudad, I.1945, Coll. Martínez (1 CMNC); Do. Cruz del Eje, Guanaco Muerto, I.1977, Coll. Martínez (1 CMNC). **Corrientes**: Alto Paraná, Ituzaingó, XI.1975, Coll. Martínez (1 FVMC); Ituzaingó, Arenal de la Costa, IX. 1975, Coll. Martínez (1 BDGC, 6 CMNC); Dº Ituzaingo, Villa Olivari, Coll. Martínez (8 CMNC); same as before except: XII.1982 (1 BDGC). **La Rioja**: no locality, XI.1959, M.J. Viana (1 CMNC); Olta, II.1934, M. Gómez leg., Coll. Martínez (1 CMNC). **Mendoza**: no locality, Bruch (1 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 (2 CMNC).

Remarks. Paratypes vary in length from 2.8-3.7 mm. See remarks under *P. fulgens*.

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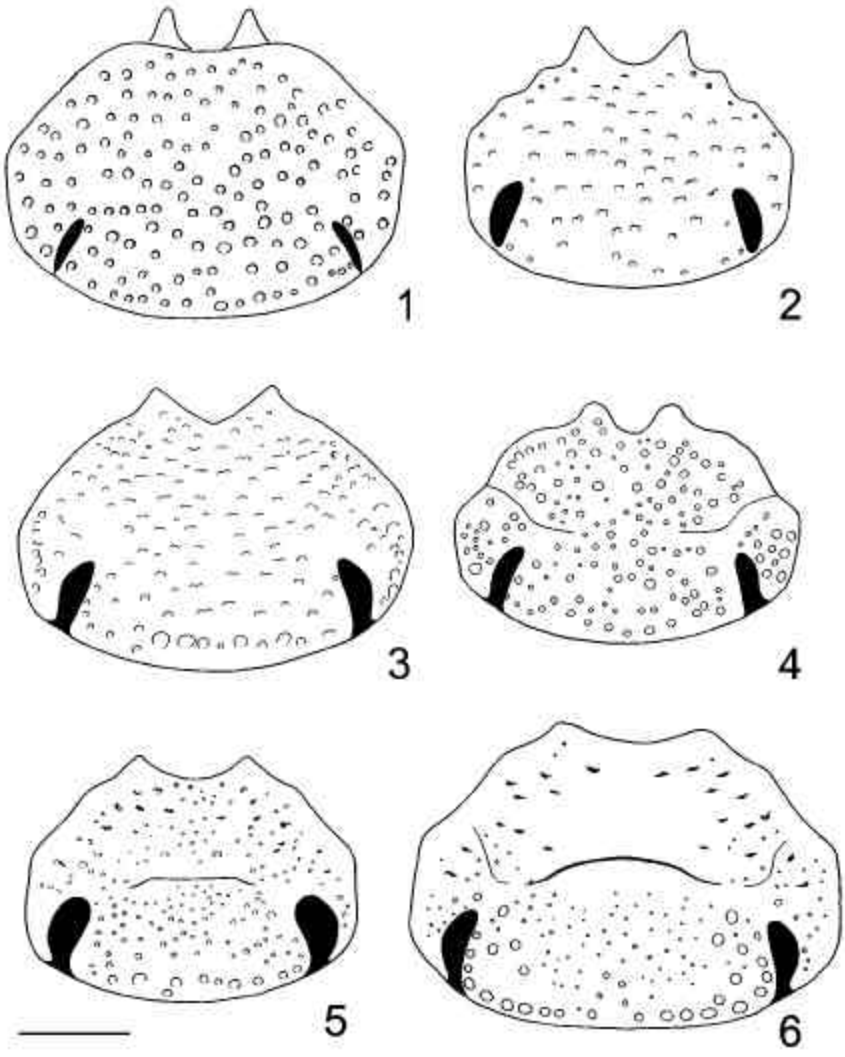
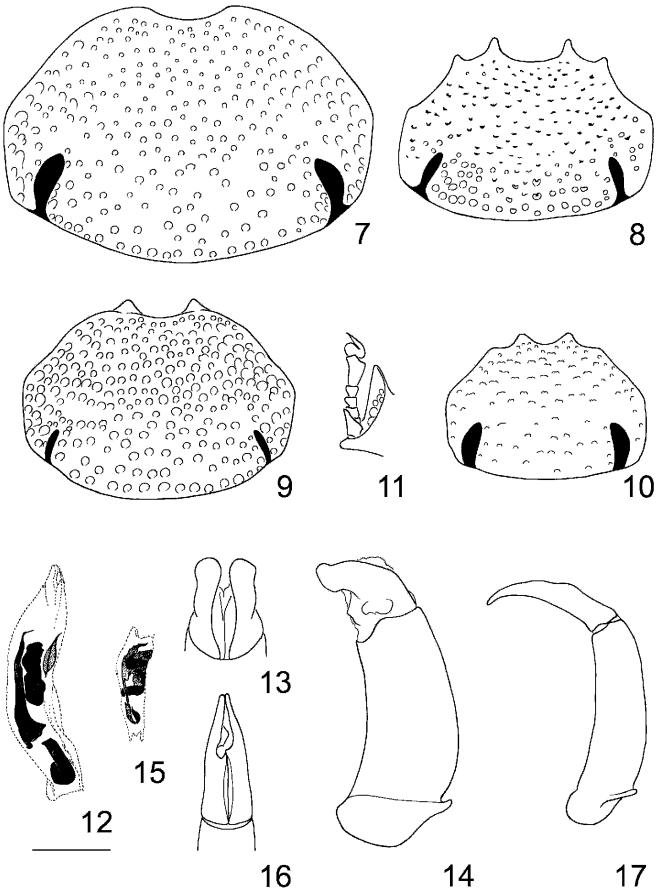


FIGURES 1-6. Head, dorsal view (without setae). 1. *Pedaridium cryptops*, 2. *P. fulgens*, 3. *P. argentinum*, 4. *Trichillum hystrix* 5. *P. ohausi*, 6. *P. cristatum.* Scale bar = 0.5mm.



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

CHAPTER 3

Lectotype Designations, New Synonymies and New Species in the Genera *Trichillum* and *Pedaridium*[1]

1 Resumo

VAZ DE MELLO, Fernando Zagury. Designações de lectótipos, novas sinonímias e novas espécies nos gêneros *Trichillum* e *Pedaridium*. In: _____. **Espécies originalmente nos gêneros *Trichillum* Harold, 1868 e *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Cap. 3, p. 62-76. Dissertação (Mestrado em Entomologia)-Universidade Federal de Lavras, Lavras.*

Três novas sinonímias são propostas nos gêneros *Trichillum* e *Pedaridium* (o segundo nome é o válido): *T. pereirai* Martínez, 1959 = *T. heydeni* Harold, 1868, *T. boucomonti* Saylor, 1935 = *T. hirsutum* Boucomont, 1928 e *P. brasiliense* Ferreira & Galileo, 1993 = *P. bidens* Balthasar, 1938. Uma sinonímia anterior (*T. elongatum* Balthasar, 1939 = *P. argentinum* Arrow, 1913) é confirmada. Designam-se lectótipos três nomes de espécies (incluindo um sinônimo): *T. heydeni*, *P. bidens* e *T. elongatum*. As espécies erroneamente identificadas como *T. heydeni*, *T. arrowi* Saylor, 1935 and *T. depilatum* Balthasar, 1942 em trabalhos anteriores são descritas como novas, respectivamente *T. tishechkini* sp. nov., *T. pseudoarrowi* sp. nov. e *T. cordobense* sp. nov. Breves diagnoses e ilustrações são apresentadas para as espécies tratadas.

* Comitê Orientador: Dr. Júlio Neil Cassa Louzada - UFLA (Orientador), Dr. Gonzalo Halffter Salas - IEcol, Dr. Sergio Ide - IB-SP e Dr. Mario Zunino – UniUrb.

2 Abstract

VAZ DE MELLO, Fernando Zagury. Lectotype Designations, New Synonymies and New Species in the genera *Trichillum* and *Pedaridium.* In: _____. **Species formerly in the genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Chap. 3. p. 62-76. Dissertation (Master Program in Entomology)-Universidade Federal de Lavras, Lavras.*

Three new synonymies are proposed in the genera *Trichillum* and *Pedaridium* (second name is valid): *T. pereirai* Martínez, 1959 = *T. heydeni* Harold, 1868, *T. boucomonti* Saylor, 1935 = *T. hirsutum* Boucomont, 1928 and *P. brasiliense* Ferreira & Galileo, 1993 = *P. bidens* Balthasar, 1938. One previous synonym (*T. elongatum* Balthasar, 1939 = *P. argentinum* Arrow, 1913) is confirmed. Lectotypes are designated for three species names (including one synonym): *T. heydeni, P. bidens* and *T. elongatum.* Species previously misidentified as *T. heydeni, T. arrowi* Saylor, 1935 and *T. depilatum* Balthasar, 1942 are described as new, respectively *T. tishechkini* sp. nov., *T. pseudoarrowi* sp. nov. and *T. cordobense* sp. nov. Brief diagnosis and illustrations are given for treated species.

* Guidance Committee: Júlio Neil Cassa Louzada - UFLA (Main Advisor), Gonzalo Halffter Salas - IEcol, Sergio Ide - IB-SP and Mario Zunino –UniUrb.

3 Introduction

The Neotropical genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 form a characteristic group within the tribe Ateuchini (*sensu* Montreuil, 1998). Reviewing types of already described species allowed to discover a few synonymies, and it was necessary, for nomenclatural reasons (maintain and (re-)define the original identifications of already described species), to designate lectotypes for a number of species.

4 Material and Methods

Species are cited in the genera of their original description because differences between the genera *Trichillum* and *Pedaridium* in their current usage are inconsistent.

Collections studied were (acronyms and curators in brackets): Muséum National d'Histoire Naturelle, Paris (MNHN - Yves Cambefort); Narodní Muzeum, Prague (NMP – Josef Jelínek), United States National Museum, Washington (USNM – Nancy Adams); Canadian Museum of Nature, Aylmer (CMNC - François Génier); The Natural History Museum, London (BMNH – Malcolm Kerley); Naturhistorisches Museum, Basel, Switzerland (NHMB - Eva Sprecher); Museu de Zoologia da Universidade de São Paulo (MZSP - Ubirajara R. Martins); Canadian National Insect Collection, Ottawa (CNIC – Antony Davies); Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires (BRBA – A. Bachmann), Museum für Naturkunde der Humboldt-Universität zu Berlin (MNHU – Hella Wendt), E. Wasmann's Collection, Natuurhistorisch Museum Maastricht, Maastricht (NMM – F. Dingemans-Backels).

In label data for type specimens, roman type indicates printed information, and italics are used for handwritten one.

5 Results and Discussion

Trichillum heydeni Harold, 1868

= *Trichillum pereirai* Martínez, 1968 **syn. nov.**

Trichillum heydeni Harold, 1868. LECTOTYPE **here designated**: ♂, pinned, MNHN. Labels: [1. Harold handwritten] *Heydeni T. Harold* / [2.] Ex. Museo E. Harold / [3. green label] Muséum Paris ex. coll. R. Oberthür 1952 / [4. red label] LECTOTYPE / [5.] *Trichillum heydeni Harold LECTOTYPE* Vaz-de-Mello det. 200*0*.

PARALECTOTYPES **here designated**: ♂, pinned, MNHU. Labels: [1.] 26487 / [2. green] *Brasil v. Olf. nr. 26487* / [3. green] *Heydeni Harold* / [4.] Zool Mus Berlin / [4. yellow label] LECTOTYPE / [5.] *Trichillum heydeni Harold PARALECTOTYPE* Vaz-de-Mello de*s*. 200*1*; ♀, pinned, MNHU, same data except third label missing.

Trichillum pereirai Martínez, 1968. HOLOTYPE ♂ and ALLOTYPE ♀ examined, in BRBA, examined.

HOLOTYPE: ♂, in a card rectangle, with aedeagus in a card triangle. Labels: [1., Martínez handwritten] *BRASIL, Eo. Sao Paulo, Sao Paulo, Aclimação, Coll. Martínez, Dic. 962* / [2. orange label] HOLOTYPUS / [3. red label, Martínez handwritten] *Trichillum heydeni n. sp.* ♂, A. MARTÍNEZ DET 19*67*

ALLOTYPE: ♀ in a card triangle. Labels: [1.] Vicosa, MinasGeraes, Brazil 1931 / [2.] Van Dyke, Collection / [3.] Mrs. Y. Mexia, Collector / [4. orange label] ALLOTYPUS / [5. red label, Martínez handwritten] *Trichillum heydeni n. sp.* ♀, A. MARTÍNEZ DET 19*67*

Diagnosis: Differs from other species of the genus by the large size (3.9-5.0 mm), combined with characteristic head form and punctation (FIGURE 1.) and the unique externally dentate paramera (FIGURE 2).

Remarks: The species diagnosed and figured by Martínez (1968) as *T. heydeni* is described below as *T. tishechkini* **sp. nov**., as it belongs to a different species. In the original description, Harold (1868) do not specify the number of examined specimens. The designated lectotype and two paralectotypes are the only specimens known that have been surely seen by Harold in the time of the description. Martínez (1968) apparently described *T. pereirai* thinking that the true *T. heydeni* was that species from Argentina and Southern Brazil, that is also coincident with the original description of Harold's species.

Trichillum hirsutum Boucomont, 1928

= *Trichillum boucomonti* Saylor, 1935 **syn. nov.**

Trichillum hirsutum Boucomont, 1928. HOLOTYPE: ♀, in a card triangle, in MNHN. Labels: [1.] Brésil Sao Paulo / [2.] Ex Museo N. VAN DE POLL / [3. red label] TYPUS / [4. Boucomont handwritten] *Trichillum hirsutum n. sp.* / [5.] Muséum Paris *Boucomont* / [6. red label] HOLOTYPE *Trichillum hirsutum BOUC*. HOLOTYPE.

Trichillum boucomonti Saylor, 1935. HOLOTYPE ♀, in USNM, examined.

HOLOTYPE: ♀, in a card triangle, in USNM. Labels: [1.] Horqueta Paraguay / [2. red label] HOLOTYPE *Trichillum boucomonti* L.W. Saylor / [3.] TYPE No. *54102* USNM / [4.] *TYPE Trichillum boucomonti Saylor* / [5.] = *Trichillum hirsutum Boucomont compared w. TYPE* Vaz-de-Mello det. 200*0*.

Diagnosis: 3.2-4.0 mm. Externally very similar to *T. hystrix* (see Chapter 2). Differences in eye posterior border (compare FIGURE 4. in Chapter 2 and FIGURE 3 in this chapter), shape of the larger sclerite of the internal sac (with two dentiform projections instead of one in *T. hystrix*) and the apicoventral portion of the phallobase, which bear a broad triangular tubercle divided medially.

Remarks: As both holotypes are females, this is a quite tentative synonymy. Specimens differ in size (*T. boucomonti* is smaller) and in the shape of tibial teeth (abraded in *T. hirsutum*), but all other characters coincide, and these differences are variable amongst a large series of examined material of this species, from a wide distribution range that includes both type localities, whose male genitalia have been compared (both paramera and internal sac) and no differences were seen.

Pedaridium bidens Balthasar, 1938

= *Pedaridium brasiliense* Ferreira & Galileo, 1993 **syn. nov.**

Pedaridium bidens Balthasar, 1938. LECTOTYPE: ♂, in a card rectangle, in NMP. Labels: [1. green label] Paraguay / [2. green label] coll. C. Felsche Kauf 20, 1918 / [3. red label] TYPUS / [4.] *Pedaridium bidens n. sp.* / [5. red label] LECTOTYPE / [6.] *Pedaridium bidens Balth. LECTOTYPE* Vaz-de-Mello det. 200*0*.

PARALECTOTYPES: ♀, in a card rectangle, in NMP. Labels: [1. green label] Jatahy Goyaz / [2. green label] coll. C. Felsche Kauf 20, 1918 / [3. red label] TYPUS / [4.] *Pedaridium bidens m.* / [5. yellow label] PARALECTOTYPE / [6.] *Pedaridium bidens Balth. PARALECTOTYPE* Vaz-de-Mello det. 200*0*; ♀ pinned, in NHMB, same as before except [4. bordered label] *Pedaridium bidens BALTH.* / [5.] Staatl. Museum für Tierkunde, Dresden / [6. yellow label] PARALECTOTYPE / [7.] *Pedaridium bidens Balth. PARALECTOTYPE* Vaz-de-Mello des. 200*2*.

Pedaridium brasiliense Ferreira & Galileo, 1991. HOLOTYPE: in MZSP, examined.

Diagnosis: 3.9-5.3 mm. Characterized by very small eyes (FIGURE 5) combined with equilaterous clypeal teeth and unpunctuated elytral striae. It is adequately described by Ferreira & Galileo (1993).

Remarks: The species misidentified by Ferreira and Galileo (1991) as *P. bidens* is *P. cryptops* Arrow 1913.

Trichillum elongatum Balthasar, 1939

= *P. argentinum* Arrow, 1932 (valid name) synonymy by Martínez (1987), confirmed.

LECTOTYPE: ♂, in a card rectangle, in NMP. Labels: [1.] ARGENTINA, Cordoba, Stempelmann / [2. red label] TYPUS / [3.] *Tr. elongatum m.* Dr. V. Balthasar det. / [4. red label] LECTOTYPE / [5.] *Trichillum elongatum Balth. LECTOTYPE,* Vaz-de-Mello det. 200*0* / [6.] *Pedaridium argentinum Arrow,* Vaz-de-Mello det. 200*0*

PARALECTOTYPES: 2 ♀♀, pinned, in NMP. Labels: [1.] ARGENTINA, Cordoba, Stempelmann / [2. red label] TYPUS / [3. green label, only in one specimen] *elongatum m.* / [4. yellow label] PARALECTOTYPE / [5.] *Trichillum elongatum Balth. PARALECTOTYPE,* Vaz-de-Mello det. 200*0* / [6.] *Pedaridium argentinum Arrow,* Vaz-de-Mello det. 200*0*

Diagnosis and remarks: See Chapter 2 under *P. argentinum* Arrow, 1931.

5.1 New species

Trichillum (Trichillum) tishechkini **sp. nov.**

Type series: Holotype ♂: BRASIL: **Rio Grande do Sul:** Glória, 7-IX-1925, P. Buck, #109a (IBSP ex-FVMC).

Paratypes: ARGENTINA: **Chaco:** Río Bermejo, Pcia. Roca, II-1945, Martínez (1 CMNC); **Córdoba:** Do. Calamuchita, El Sauce, XII-1938, MJ Viana (2 CMNC); Do. Cruz del Eje, Los Leones, II-1967, Chichero (1 CMNC); Do. Santa Maria, Diquecito, XII-1965, Martínez (6 CMNC, 1 CNIC); La Falda, I-1945, Martínez (1 CMNC); San Javier, I-1943, Martínez (1 CMNC); **Formosa:**

Ciudad, Puerto, II-1949, Martínez (1 CMNC); **Misiones:** Loreto, Est. Experim., X-1966, Martínez (2 CMNC); **Santa Fé:** Rosario, Ciudad, I-1941, Martínez (1 CMNC); BRAZIL: **Rio Grande do Sul:** locality unreadable, 20-IX-1926, P. Buck, Ex.: Acromyrmex sp. nest. #168 (1 FVMC, 6 NMM); Glória, 7-IX-1925, P. Buck, #109a (4 FVMC, 1 BDGC); 26-VIII-1925:P. Buck, #98 (1 FVMC, 2 NMM); 3-IV-1925, #50 (1 NMM); Teresópolis, 6-IX-1925, P. Buck, coletado Ex.: Acromyrmex sp. nest. #103 (1 FVMC); Floresta, 20-IX-1925, P. Buck, Ex.: Acromyrmex sp. nest. #115 (1 NMM). All the specimens from Rio Grande do Sul from E.Wasmann's Coll'n Alcohol, mounted by A. Tishechkin, 2000.

Etymology: The epithet is after Alexey Tishechkin, histeridologist who take for himself the work of preparing Wasmann's material in alcohol from NMM.

Diagnosis: 3.8-5.3 mm. The short triangular head and characteristic clypeal punctation, with anastomosed large punctures (FIGURE 9), combined with size, posterior tarsi (basitarsomere more than twice as long as the following article) and distribution (Southern Brazil and Argentina) will be sufficient to separate that species from other species of *Trichillum.*

Remarks: That species is considered to be *T. heydeni* by Martínez (1968), who made a good characterization of it in the key of his paper.

Trichillum (Trichillum) pseudoarrowi **sp. nov.**

Type series: Holotype ♂: PARAGUAY: **Boquerón:** Gran Chaco, km 145 de Pto. Casado, 25-XI-1950, A. Martínez (CMNC).

Paratypes: BOLIVIA: **Tarija?:** Boyoiú, IV-1949, Daguerre (1 CMNC); PARAGUAY: **Boquerón:** Gran Chaco, km 145 de Pto. Casado, XI-1950, A Martínez (1 BDGC); 25-XI-1950 (8 CMNC); 25-XI-1950 (1 FVMC); **Concepción:** Horquetá, IV-1934, Schultze (2 CMNC).

Etymology: A reference to the misidentification of this species as *T. arrowi* Saylor, 1935 in both literature and collections.

Diagnosis: 3.1-3.7 mm. Distinguished by the typical acute clypeal teeth and characteristic head punctation, which is anastomosed instead of well separated and quite ocellate in *T. arrowi*. Also eyes are smaller and narrowed posteriorly (in *T. arrowi* larger and not narrowed posteriorly).

Remarks: That species is adequately and carefully described under the name *T. arrowi* by Pereira & Martínez (1959).

Trichillum (Trichillum) cordobense **sp. nov.**

Type series: Holotype ♂: ARGENTINA: **Córdoba:** El Sauce, Diquecito, XII-1964, Martínez (CMNC).

Paratypes: ARGENTINA: **Buenos Aires:** S. de la Ventana, XI-1981, Bolle (5 CMNC); **Córdoba:** Do. Santa Maria, Diquecito, XII-1965, A Martínez (1 BDGC, 1 CMNC); Alta Gracia, XI-1920, Bruch (2 CMNC); Cabana, I-1944, Prosen (1 CMNC); 28-XII-1925 (1 CMNC); El Sauce, Diquecito, XII-1964, Martínez (1 CMNC).

Etymology: From Córdoba, Argentinean province where the first specimens seen came from.

Diagnosis: 2.8-3.5 mm. Very similar to *T. depilatum*, differing by the presence of discoclypeal settae (lacking in *T. depilatum*), short-triangular shape of head (more rounded in *T. depilatum*) and clypeal teeth not clearly detached from clypeal sides (FIGURE 13.).

Remarks: That species was misidentified by Martínez (1968) as *T. depilatum* (pars), but differ, apart of those characters cited above, by very different paramera, much longer and narrower in *T. depilatum.* The new species appears to be closer to *T. externepunctatum* Borre, 1880 than to *T. depilatum*, judging by paramera form (shorter and narrowed apically).

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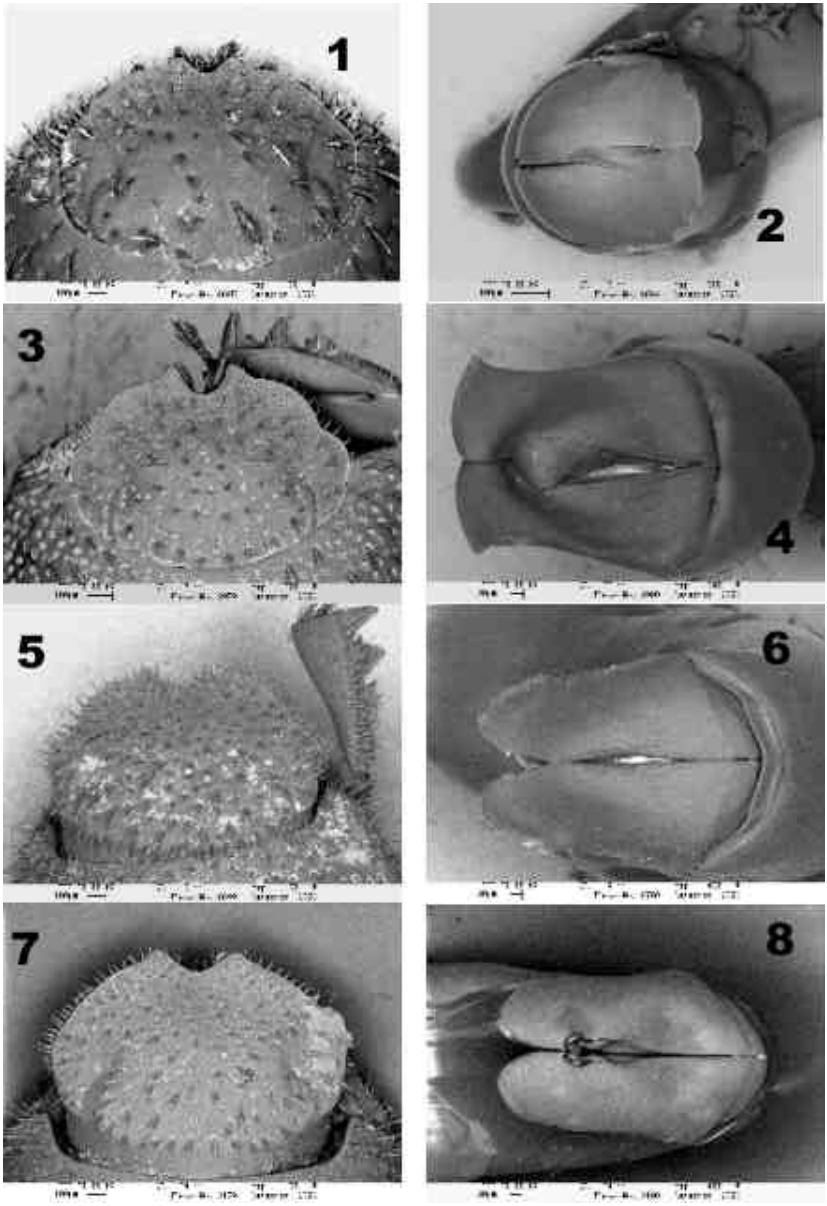
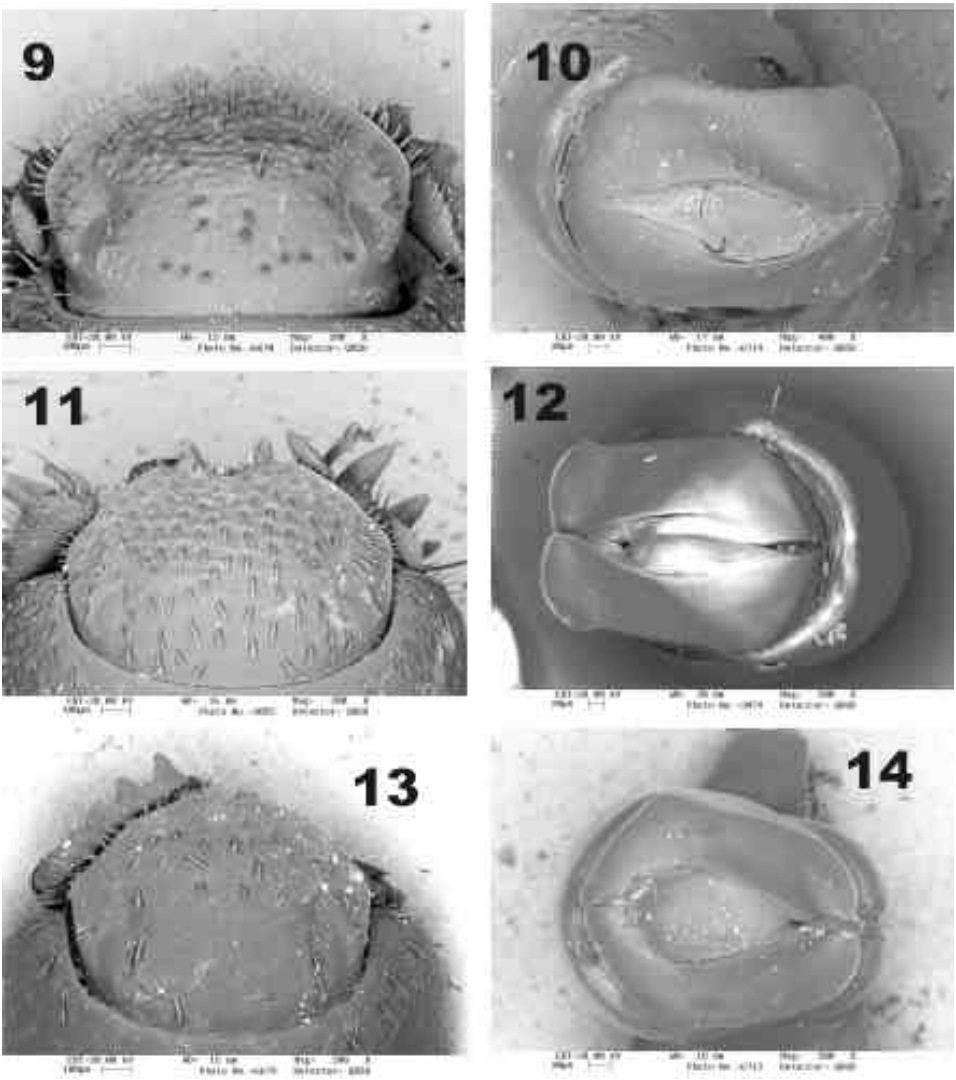
SAYLOR, L. W. New species of *Trichillum* (Col. Copridae). **Stylops,** London, v. 4, p. 207-208, 1935.



Figs 1-8. Head (1, 3, 5 and 7) and paramera, dorsal view (2, 4, 6 and 8). 1, 2. *Trichillum heydeni.*; 3, 4. *T. hirsutum.* 5, 6. *Pedaridium bidens*. 7, 8. *P. argentinum.*



Figs 9-14. Head (9, 11 and 13) and paramera, dorsal view (10, 12 and 14). 9, 10. *Trichillum tishechkini* **n. sp.** 11, 12. *Trichillum pseudoarrowi* **n. sp.** 13, 14. *Trichillum cordobense* **n. sp.**

CHAPTER 4

A New Species of *Pedaridium* from Mexico and Guatemala [1]

1 Resumo

VAZ DE MELLO, Fernando Zagury. Uma nova espécie de *Pedaridium* do México e Guatemala. In: _____. **Espécies originalmente nos gêneros *Trichillum* Harold, 1868 e *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Cap. 4, p. 77-89. Dissertação (Mestrado em Entomologia)-Universidade Federal de Lavras, Lavras.*

Os gêneros *Trichillum* Harold e *Pedaridium* Harold têm distribuição principalmente sul-americana e necessitam urgentemente de revisão. A localidade mais ao norte conhecida é a Costa Rica, mas, no presente trabalho, descreve-se *Pedaridium maya* **n. sp.** do México e Guatemala, que não parece relacionada a nenhuma outra espécie anteriormente descrita.

* Comitê Orientador: Dr. Júlio Neil Cassa Louzada - UFLA (Orientador), Dr. Gonzalo Halffter Salas - IEcol, Dr. Sergio Ide - IB-SP e Dr. Mario Zunino – UniUrb.

2 Abstract

VAZ DE MELLO, Fernando Zagury. A Review of Arrow's Types of *Trichillum* and *Pedaridium* With Description of Two New Species of *Pedaridium.* In: _____. **Species formerly in the genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Chap. 2. p. 77-89. Dissertation (Master Program in Entomology)-Universidade Federal de Lavras, Lavras.*

The genera *Trichillum* Harold and *Pedaridium* Harold are primarily South American and are in need of revision. The northernmost known distribution is Costa Rica, but in this paper we describe a *Pedaridium maya* **new species** from Mexico and Guatemala that does not appear to be closely related to any previously described species.

* Guidance Committee: Júlio Neil Cassa Louzada - UFLA (Main Advisor), Gonzalo Halffter Salas - IEcol, Sergio Ide - IB-SP and Mario Zunino –UniUrb.

3 Introduction

Ateuchina (*sensu* Montreuil, 1998) genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 are endemic to Neotropical region and are in need of revision, as morphological characters separating both genera and the generic status of many species are as yet to be completely defined.

Until now, the Northern limits of the genera have been considered as in Costa Rica, where both *P. pilosum* (Robinson, 1948) and *P. bradyporum* (Boucomont, 1928) occur. Martínez (1992) cited *Pedaridium maya* as occurring in Mexico, but this species has never been described. Thomas (1993) cited a *Pedaridium* sp. from Chiapanecan forests. These two citations surely refer to the new species described here. Despite of its probability to have a new combination in the near future, the actual status of that species, including previous citations without description and the value of its Biogeographical record justify, to our view, its present description.

As the generic limits are not well defined for the genus *Pedaridium*, the new species is placed in this genus because of its gradually expanded epipleuron, the character used for separating this genus from *Trichillum* in the last revision of *Pedaridium* (Ferreira and Galileo, 1993). The new species will probably belong to a new genus-group taxon that will be proposed in a future paper.

4 Material and Methods

A few specimens of the new species here described were first seen in the 1970's, the second and third authors began studying it, as did the late Antonio Martínez in 1990. Some of the specimens seen in that time could not be traced, and a few additional specimens appeared. Specimens used for this paper belong to the following collections (curators in parenthesis):

CMN – Canadian Museum of Nature, Ottawa, Canada (Henry Howden and François Génier).

Delgado – Leonardo Delgado personal collection, Xalapa, Mexico.

Gill – Bruce D. Gill personal collection, Ottawa, Canada.

Halffter – Gonzalo Halffter personal collection, Coatepec, Mexico.

IEX – Instituto de Ecología, Xalapa, Veracruz, México (Miguel Ángel Morón).

Morón – Miguel A. Morón personal collection, Xalapa, México.

UVG – Universidad del Valle de Guatemala, Guatemala, Guatemala (Enio Cano and Jack Schuster).

Vaz-de-Mello – Fernando Z. Vaz-de-Mello personal collection, Lavras, Brazil.

Photos were done in Scanning Electron Microscopes: FIGURES 1 and 8 were done by the first author and Cristiano Lopes-Andrade using a LEO 435 VP at NAP/MEPA, ESALQ-USP. The remaining photos were taken by the Tiburcio Laez Aponte and the third author using a JEOL – T20.

5 Results

Pedaridium maya **n. sp.**

Figs 1-9

Type specimens. Holotype male: México: **Quintana-Roo**, 5 km N Carrillo Puerto, IX-1984, A. Martínez (IEX – *ex* Halffter).

Allotype female: México: **Quintana-Roo**, Reserva de Sian Ka'an, VIII-1984, NTP4A, M. A. Morón (IEX – *ex* Morón).

Paratypes 24 unsexed specimens as follows:

Guatemala: **Petén**, San Andrés, San Miguel La Palotada, 06-VI-1999, M. Tolon, EX1-L4-KK3 (1 UVG); Tikal, 23-26-VIII-1972, S. & J. Peck (1 Halffter, 1 Vaz-de-Mello, 1 CMN).

México: **Campeche**, Chicana, 10 km W Xpujil, 300 m, 12-14-VII-1983, S. & J. Peck (1 CMN); **Chiapas**, Pque. Nal. Sumidero, Coyote Mirador, 1700 m, 19-VI-1989, H. Howden (1 CMN); Pque. Nal. Sumidero, 26-V-1-VI-1990, B. Gill, dung (2 Gill); Pque. Nal. Sumidero, 21-VI-1989, E. Zuccaro & P. K. Lago (2 Gill); **Quintana-Roo**, 100' 20 mi S Felipe C Puerto, 13-VIII-1971, A. Newton (1 Halffter, 1 Vaz-de-Mello); 5 km N Carrillo Puerto, IX-1984, Martínez (1 Halffter); Reserva de Sian Ka'an 1 km al NNE del Rancho "E124", 23-VIII-1985, J. F. Camal, Trampa NTP 80 (1 Halffter); Reserva de Sian Ka'an 2 km al W del Rancho "El Ramonal", 23-VIII-1985, O. Canul, Trampa NTP 80 (1 Halffter); Reserva de Sian Ka'an 5 km del Crucero del camino nuevo a Vigía Chico, 23-VIII-1985, O. Canul, Trampa NTP 80 (1 Halffter); Reserva de Sian Ka'an Bosque Tropical Subcaducifolio, 10 m, 19-VI-1984, O. Canul & S. F. Camal, Trampa NTP 80 (2 Halffter, 1 Vaz-de-Mello, 1 Morón); Reserva de Sian Ka'an km 12 Carretera nueva al Rancho "El Ramonal", 19-VI-1984, J. F. Camal, Trampa NTP 80 (1 Halffter); 5 km N Puerto, IX-1984, Martínez (2 CMN);

Reserva de Sian Ka'an 300 m S de la unión de caminos nuevo y antiguo al Rancho Yuras, 10 m, 19-VI-1984, O Canul & SF Camal, selva tropical subcaducifolia, NTP80 (1 Delgado).

Male: Color dark brown to black, body oval, flattened. Clypeus rounded, with two small teeth separated by wide v-shaped emargination. Clypeofrontal suture not marked, clypeo-genal suture very weak. Eyes wide dorsally, interocular space about six eye widths. Head dorsally covered with irregular setose punctures (FIGURE 1), setae small and erect. Head posteriorly with scattered punctures, posterior margin lacking. Inferior clypeal process with strong angle. Mentum anteriorly emarginate, medially, longitudinally depressed; submentum separated from gula by feeble posteriorly rounded suture. Antennae with large scape (about as long as five following segments), lamellae large.

Pronotum evenly convex, sides almost straight in dorsal view, slightly sinuated posteriorly. Both anterior and posterior angles obtuse, posterior one marginate by a carina (FIGURE 3). Anterior and posterior borders lacking marginal bead. Pronotal surface covered with small scattered setigerous punctures (FIGURE 2), setae small, yellow in color; surface completely microgranulated, with flattened granules. Prosternum projected as small spine between anterior coxa. Meso-and metasternum separated by horseshoe-like suture, metasternum medially with dense setigerous punctures. Fore femur ventrally setosely punctured. Fore tibia with three strong lateral teeth, middle one broader, all with apices acute. External tibial face denticulate from base to basal tooth, apex truncated right angled. Apical spur short, narrower than in females, slightly curved ventrally, with acute apex. Tarsus larger than apical tibial breadth, 5th tarsomere with dorsal setose filiform projection; claws small, simple and curved, with small basal, acute denticle. Middle leg with trochanter distaly with one setigerous puncture. Ventral face of femur with short setose punctures. Middle tibia regularly broader apically, ventro-externally with a very

small median tubercle, ventro- and dorso-external borders shortly bristled and with longitudinal carinae. Both calcars acutely spiniform, the ventral one larger than tarsomere 1, the dorsal one slightly smaller. Middle tarsus quite longer than tibia, 1st tarsomere subequal to 2nd in lenght, claws similar to fore ones, but apical seta in 5th tarsomere shorter. Hind legs with trochanter distally with many setigerous punctures, setae slender and unequal in lenght. Hind femur punctured like the medium one. Hind tibia apicallu regularly broader, laterally bristled, but without longitudinal carinae. Hind tibial spur acutely spiniform, larger than 1st tarsomere. Second tarsomere not as broad as 1st, other tarsomeres and claws similar to those of middle legs.

Elytra with eight striae, including very deep lateral one. Striae slender, well defined, not punctured in the disc, seventh shorter, eighth with lateral sulcus defining discal margins. Interstriae feebly convex on disc, with one line of small setigerous punctures, parallel to internal stria. Punctures variable in deepth and size. Apically, striae much deeper and with large punctures (FIGURE 4).

Abdominal sternites covered by ocellate punctures laterally, 6th sternite ventrally with setae on ocellate punctures (FIGURE 5). Pygidium strongly convex, basally with a deep straight sulcus, apically and laterally with a feeble margin (FIGURE 6). Disc covered by sparse setose punctures, setae short and erect.

Aedeagus with phallobase larger than parameres, these positioned at right angle in relation to phallobase (FIGURE 7). Each paramera conical, curved downwards, without marginal carinae or angles, regularly tapered from basis to about two-thirds, then strongly tapered and curved inwards, with parallel round apex (FIGURE 8).

Total lenght 3.7 to 4.4 mm; pronotal width 1.1 to 1.7 mm; elytral width 1.9 to 2.1 mm.

Female: Differs from male in broader fore tibia, lateral teeth slender and less conspicuous, fore tibial spur shorter, broader basally, shape triangular and slightly curved; abdominal sternite VI longer medially, pygidium wider than long.

Total lenght 4.6 to 4.8 mm; pronotal width 1.85 to 1.9 mm; elytral width 2.7 to 2.8 mm.

6 Discussion

Pedaridium maya is geographically isolated from all other species of both *Trichillum* and *Pedaridium*, and is quickly distinguished by the head shape and sparse hair covering, as well as geographical distribution, black color, and unusual body shape (wider and flatter than most species). The male genital characters appear to relate it to species in the *fulgens* group in the genus *Pedaridium* (especially the conical parameres, not present in other species), but the new species is set completely apart from any known species in the *Trichillum-Pedaridium* complex by its geographical range (*fulgens* group is restricted to Argentina, Paraguay and Southern Bolivia), phallobase shape (shorter in the *fulgens* group) and angulation parameres-phallobase (straight in the *fulgens* group), associated to body shape (elongated), color (metallic cupper-brown) and other external characters.

7 Bibliographical References

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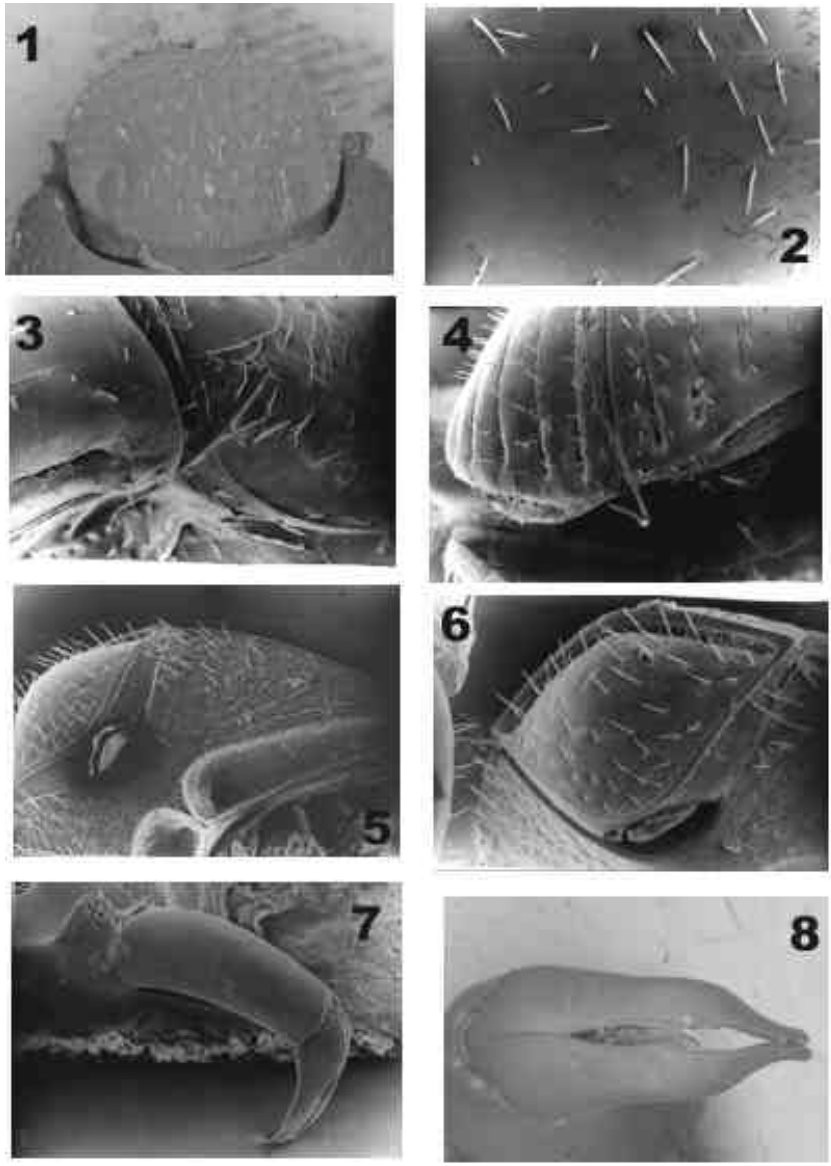

Figs 1-8. *Pedaridium maya* **n. sp.** 1. head; 2. punctures on pronotal disc; 3. pronotal hind angle; 4. elytral apex; 5. abdomen, ventral view; 6. pygidium; 7. aedeagus, lateral view; 8. paramera, dorsal view.

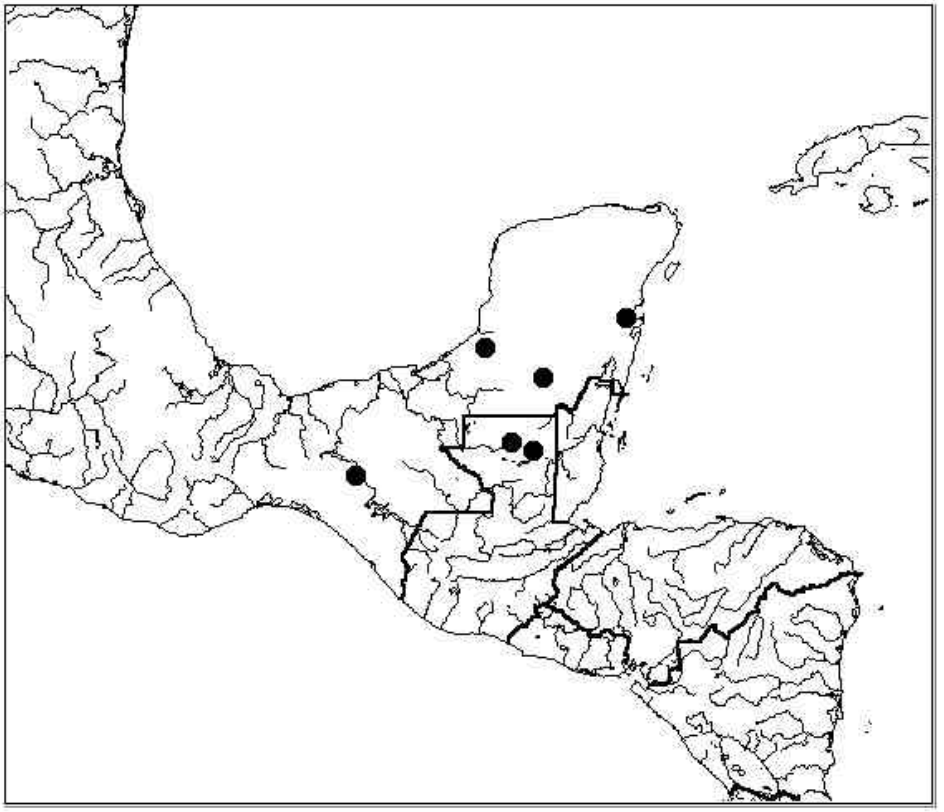

FIGURE 9. Known collecting sites for *Pedaridium maya* **n. sp.** in Mexico and Guatemala.

CHAPTER 5

A New Species of *Pedaridium* from Colombia[1]

[1] Submitted to the Journal of the Entomological Society of Ontario, authored by Bruce Gill and Fernando Zagury Vaz-de-Mello.

1 Resumo

VAZ DE MELLO, Fernando Zagury. Uma nova espécie de *Pedaridium* da Colômbia. In: _____. **Espécies originalmente nos gêneros *Trichillum* Harold, 1868 e *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Cap. 5, p. 90-100. Dissertação (Mestrado em Entomologia)-Universidade Federal de Lavras, Lavras.*

O presente capítulo descreve e ilustra uma nova espécie de Scarabaeidae da Colômbia, *Pedaridium medinae* **n. sp.** A nova espécie se diferencia de todas as outras do gênero pela ausência de olhos na superfície dorsal da cabeça e por alguns caracteres sexuais secundários masculinos incomuns.

* Comitê Orientador: Dr. Júlio Neil Cassa Louzada - UFLA (Orientador), Dr. Gonzalo Halffter Salas - IEcol, Dr. Sergio Ide - IB-SP e Dr. Mario Zunino – UniUrb.

2 Abstract

VAZ DE MELLO, Fernando Zagury. A Review of Arrow's Types of *Trichillum* and *Pedaridium* With Description of Two New Species of *Pedaridium.* In: _____. **Species formerly in the genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Chap. 5. p. 90-100. Dissertation (Master Program in Entomology)-Universidade Federal de Lavras, Lavras.*

A new species from Colombia, *Pedaridium medinae* **n. sp.** is described and illustrated. This new species is readily distinguished from all others in the genus by the lack of eyes on the dorsal surface of the head and by several unusual secondary sexual characters in the male.

* Guidance Committee: Júlio Neil Cassa Louzada - UFLA (Main Advisor), Gonzalo Halffter Salas - IEcol, Sergio Ide - IB-SP and Mario Zunino –UniUrb.

3 Introduction

The Ateuchini genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 currently include 44 described species of small (2 to 8 mm in length) dung beetles. While the generic limits are not well-defined, both of these strictly Neotropical taxa appear to be polyphyletic and are currently under study.

The purpose of this paper is to describe an unusual new species to facilitate ongoing faunistic studies in Colombia (Medina and Lopera 2001, Medina *et al.* 2002). This new species is provisionally placed in the genus *Pedaridium* based on a gradually expanded epipleuron, a diagnostic character used for separating *Pedaridium* from *Trichillum* in a recent revision by Ferreira and Galileo (1993).

4 Material and Methods

Specimens of this new species were collected by the senior author in relict patches of Andean forest using pitfall traps baited with human dung. Additional specimens were borrowed from, or are deposited in, the following collections (curators in parenthesis):

BDGC – Bruce D. Gill personal collection, Ottawa, Canada.

CAMC – Claudia A. Medina personal collection, Cali, Colombia.

CMNC – Canadian Museum of Nature, Ottawa, Canada (H. F. Howden and François Génier).

IAHC – Instituto Alexander von Humboldt, Villa de Leyva, Colombia (Fernando Fernández).

FZVC – Fernando Z. Vaz-de-Mello personal collection, Lavras, Brazil.

Most photographs (Figs 1; 3-6) were taken on a scanning electron microscope (LEO 435 VP) by F.Z.V.M. and Cristiano Lopes-Andrade at NAP/MEPA, ESALQ-USP (Piracicaba, Brazil). Photograph in FIGURE 2 was taken using a Nikon Coolpix 995 digital camera and a Nikon SMZ800 stereoscope.

5 Results

Pedaridium medinae **Gill & Vaz-de-Mello, n. sp.**
FIGURES 1-6

Males. 3.8 – 4.8 mm in length. Body elongate-oval; dorsal surface of body (head, pronotum and elytra) dark gray to dark brown in colour, ventral surface of body and legs dark brown. Punctures on dorsal surface with long reddish-orange setae or much smaller yellowish setae; punctures on ventral surface with predominantly smaller, yellowish setae.

Head (FIGURE 1). Clypeus anteriorly with two small teeth, separated by a broad U-shaped emargination. Emargination bordered with a faint carina connecting the base of the clypeal teeth. Ventral surface of emargination carinate, forming a small median denticle. Lateral margin of clypeus evenly arcuate to gena. Gena abruptly angulate. Clypeal surface coarsely punctate; anteriorly with mixture of small and large punctures, posteriorly with larger, more uniformly-sized punctures. Frons and vertex with uniformly large, closely-spaced punctures; punctures with scattered setae. Eyes not visible in dorsal view.

Pronotum with border unmargined except for a small area at the posterolateral angle. Disc coarsely, densely punctate except for small impunctate callus near lateral margin; punctures similar to those on frons, but larger, especially basally. Anterior angles obtuse, posterior angles rounded, lateral margin sinuate.

Elytron with disc anteriorly flat, posteriorly convex; with rows of long and short setae. Sutural stria simple; discal striae consisting of single rows of large, contiguous, deeply-impressed ocellate punctures (FIGURE 2); diameter of

ocellate punctures approximately one-half to two-thirds interstrial width, punctures forming an unbroken chain from base to apex of elytron. First and second discal striae deeply impressed at apex; lateral stria deeply impressed throughout length. Elytral intervals with 2 rows of small, shallowly-impressed punctures.

Mesosternum covered by large setose punctures; punctures smaller and more rounded anteriorly. Meso-metasternal suture strongly angulate medially; apex directed anteriorly. Metasternum covered by large setose punctures, smaller than those of mesosternum; punctures larger anteriorly and laterally; disc shallowly concave, hind margin of metasternum with a bifid tubercle along midline, close to posterior coxae.

All femora covered ventrally by dense setose punctures. Fore tibia externally with three small teeth in the apical half; inner apical angle projecting inwards as a tooth. Fifth tarsomere laterally compressed and apically dilated. Middle tibia gradually expanded to apex, obtusely truncate apically, with inner apical angle projecting inward as a small tooth. Hind tibia strongly expanded apically; outer margin straight, inner margin strongly curved to a point about two-thirds length, thence abruptly incurved to apex near insertion of metatarsus; inner apex bearing a broad laminar process directed basally (FIGURES 3-4). First tarsomere longer than second, fifth tarsomere about twice as long as fourth. Tibial spurs simple, conical. Tarsal claws very small and strongly curved.

Abdominal sternites and pygidium densely, closely punctured; base of pygidium with a shallow transverse sulcus. Propygidial apex emarginated along midline. Paramera as in FIGURE 5, quite simmetrical, with a very weak external identation.

Females. Similar to males except in the following characters. Pronotum laterally almost rounded. Metasternum flat and without apical bifid tubercle.

Fore tibia without internal apical tooth, and with external teeth more strongly developed. Fifth tarsomere of fore tibia not expanded apically. Middle tibia lacking internal apical tooth. Hind tibia lacking both internal apical concavity and laminar process (FIGURE 6). Abdominal sternites longer along the midline, pygidium shorter.

Type Material: HOLOTYPE male: COLOMBIA: Risaralda: PNR Ucumari, La Pastora, 2400 m Aliso, T. Exc. H., C. Medina, Mayo 7 1995 (IAHC). ALLOTYPE female: COLOMBIA: Risaralda: PNR Ucumari 1800m, La Suiza, Bosque, T. Exc. H., C. Medina, Marzo 29 1995 (IAHC).
PARATYPES: 20 specimens, not sexed. COLOMBIA: Cundinamarca: Tecadama (*sic*) [Tequendama?] Falls, 30 km SW Bogotá, 27-II-6-III-1972, S&J Peck, forest dung trap (1 specimen, CMNC); Quindio, 5 km E Salento, 1800 m, 9-XII-1995, BD Gill, dung trap (9 specimens, BDGC; 1 specimen, CMNC; 4 specimens, FZVC); R Herencia Verde, 1800 m, 12-XII-1995, Medina & Gill, excr hum. (1 specimen, CAMC); Risaralda: Pereira, SFF Otún Quimbaya, Est. La Suiza, 1850 m, 25-IV-04-V-1997, A Vitolo (1 specimen, FZVC); Pque. Nat. Reg. Ucumari, La Suiza 1800 m, CA Medina (1 specimen, CMNC); Pque. Nat. Reg. Ucumari, La Suiza 1800 m, 29-III-1995, F Escobar, excr hum. (two specimens, CAMC).

Etymology: This new species is named in honour of Claudia A. Medina, a specialist in the systematics of Canthonine scarab beetles, who collected part of the type series.

6 Discussion

This species is unique among known *Pedaridium* by the absence of eyes on the dorsal surface of the head, and in the unusual secondary sexual characters of the male, most notably the metasternal tubercle and distinctive hind tibia. *Pedaridium bordoni* Martínez, 1992 from Venezuela shares a toothed inner apical angle of the fore tibia, and a broad laminar process at the inner apex of the hind tibia. Males of *P. bordoni* however lack both the tooth on the inner apical angle of the middle tibia, and the concave excavation on the inner apical margin of the hind tibia, and that species has completely convex elytral disk. *P. hirsutum* (Harold, 1859), from Southeastern Brazil, is the only already described species that shares flat elytral disk, in that case almost completely.

The type series exhibits little variation with the notable exception of the larger setae which appear to be subject to abrasion, being sparse on several of the older, more abraded specimens.

Pedaridium medinae can be readily recognized by the dorsal absence of eyes and the large ocellate punctures on the elytra. It appears to be confined to Andean forests in the Provinces of Risaralda, Quindio and Cundinamarca in Colombia (FIGURE 7) and is now the second species of the genus to be reported for the country (see Medina *et al.* 2002).

7 Bibliographical References

FERREIRA, A. M. R. M.; GALILEO, M. H. M. Revisão taxonômica do gênero *Pedaridium* Harold, 1868 (Coleoptera, Scarabaeidae, Scarabaeinae, Coprini). **Iheringhia, Série Zoologia,** Porto Alegre, v. 74, p. 3-70, 1993.

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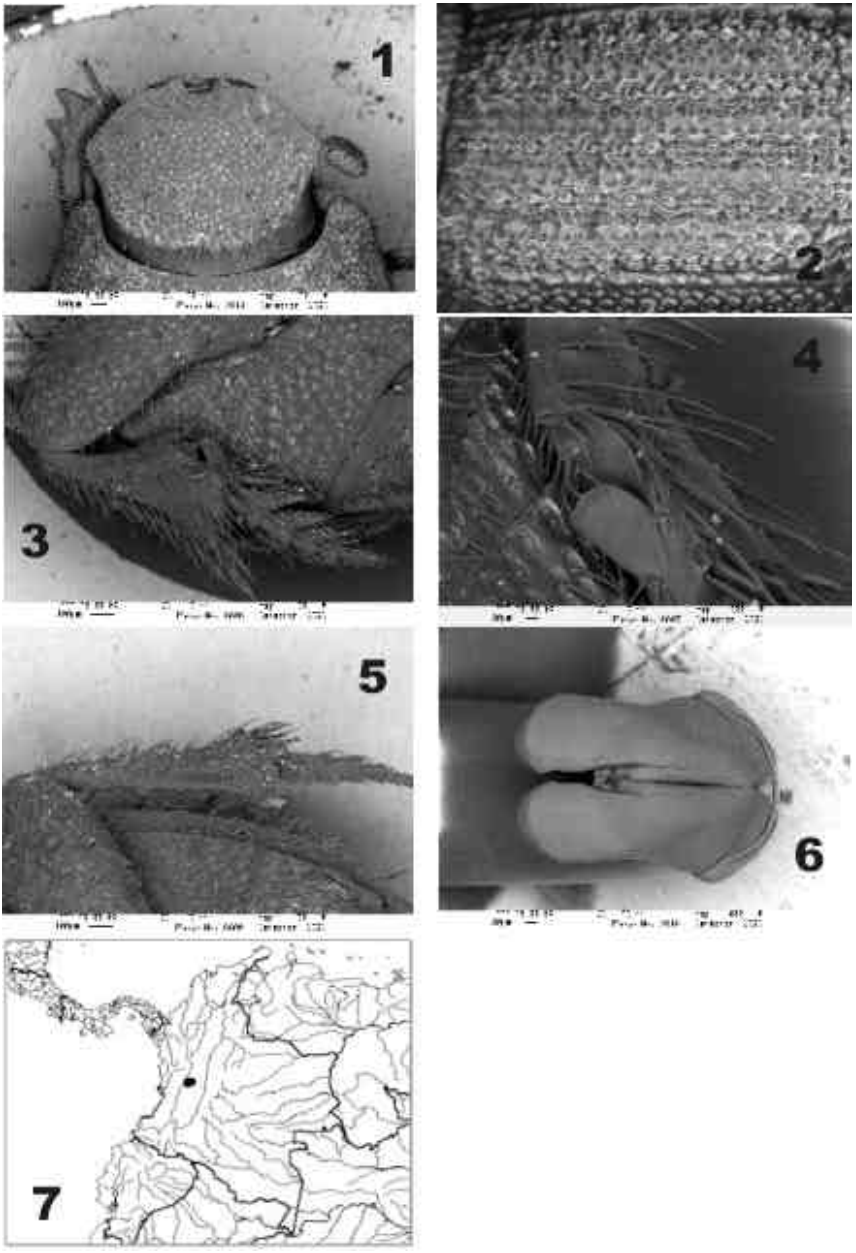

Figs 1-7. ***Pedaridium medinae*** **n. sp.** 1. head; 2. elytron; 3. male hind tibia; 4. same, detail; 5. female hind tibia; 6. male genitalia, dorsal view; 7. distribution in Colombia.

CHAPTER 6

Phylogeny and Generic Rearrangement for the Group *Trichillum*-*Pedaridium*

1 Resumo

VAZ DE MELLO, Fernando Zagury. Filogenia e rearranjo genérico do grupo *Trichillum-Pedaridium.* In: _____. **Espécies originalmente nos gêneros *Trichillum* Harold, 1868 e *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Cap. 6, p. 101-159. Dissertação (Mestrado em Entomologia)-Universidade Federal de Lavras, Lavras.*

Este capítulo apresenta uma revisão em âmbito genérico dos Scarabaeidae (Coleoptera) anteriormente agrupados nos gêneros *Trichillum* e *Pedaridium.* Esse grupo é caracterizado pela distribuição neotropical, aliada à presença de pilosidade dorsal, pelo menos no ápice elitral e fusão dos esternitos abdominais visíveis no meio. Separa-se, à primeira vista, de *Aphengium*, que compartilha esses caracteres, por carecer de carena lateral nos élitros. Apresenta-se uma análise filogenética, agrupando as espécies em 20 gêneros (um com dois subgêneros), sendo dois previamente descritos como gêneros, um elevado a partir da categoria de subgênero e 18 nomes novos (um na categoria de subgênero). Quatro gêneros novos são baseados também em espécies novas. A composição de cada gênero e sua distribuição são também apresentadas e discutidas.

* Comitê Orientador: Dr. Júlio Neil Cassa Louzada - UFLA (Orientador), Dr. Gonzalo Halffter Salas - IEcol, Dr. Sergio Ide - IB-SP e Dr. Mario Zunino – UniUrb.

2 Abstract

VAZ DE MELLO, Fernando Zagury. Phylogeny and generic rearrangement for the group *Trichillum-Pedaridium.* In: _____. **Species formerly in the genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Chap. 2. p. 101-159. Dissertation (Master Program in Entomology)-Universidade Federal de Lavras, Lavras.*

This chapter presents a revision in generic level of the Scarabaeidae (Coleoptera) formerly grouped in the genera *Trichillum* and *Pedaridium.* This group is characterized by Neotropical distribution, presence of dorsal pilosity at least at elytral apex, and fusion of visible abdominal sternites in the middle. It is separated from *Aphengium*, that has also those characters, by the lacking of a lateral carina in elytra. A phylogenetic analysis is presented, grouping species in 20 genera (one with two subgenera), being two previously described as genera, one previously described as subgenus, and 18 new names (one with subgenerical rank). Four new genera are based on new species. Composition and distribution of each genus are discussed.

* Guidance Committee: Júlio Neil Cassa Louzada - UFLA (Main Advisor), Gonzalo Halffter Salas - IEcol, Sergio Ide - IB-SP and Mario Zunino –UniUrb.

3 Introduction

Differences between the genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 have been discussed in many papers. In original description of the genera (for *Pedaridium*, in key), Harold (1868) stated that they do differ by shape of epipleuron and length of hind basitarsomere. After that, only the second character was taken in count for assigning new species to one of those genera (Arrow, 1913, 1931, 1932; Balthasar, 1939; Martínez, 1968). Howden & Young (1981) used the unique or double setose puncture rows in the interstriae to differentiate genera. Ferreira & Galileo (1993) used just the shape of epipleuron, pointing out that Pereira (1946) had described a *Pedaridium* with hind basitarsomere longer than the second tarsomere. During the course of the 20th century, some species described in *Trichillum* have been moved to *Pedaridium* by subsequent authors, so did Martínez (1968), with three species, Howden & Young (1981), with one species, and Ferreira & Galileo (1993), who moved one other species.

Verdú & Galante (2001), besd on larval morphology of three species of the genus *Pedaridium*, considered that genus to be probably a polyphyletic group.

All that confusion between genus assignments indicates that those genera probably are not monophyletic groups, and that a revision of this group in specific level is necessary in order to establish consistent genus-level taxa. Moreover, the enormous variability in external usual characters such as dorsal hairs, punctures, legs and clypeal form, also indicate that other characters must be used in order to reach a more accurate generic system for this group.

Genital characters are expected to be less divergent or at least to show less homoplasy, as those could be interpreted as paradaptative characters, i.e.,

characters subjected to strong selection by sexual partner and to much less strong selection by environment (Zunino, 1978).

The objectives of this work are to test the monophyly of the group formed by *Trichillum* and *Pedaridium*, test their monophyly, and to establish new genera, if needed, for consistent monophyletic groups found in the analyses.

4 Materials and Methods

Material examined belongs to the following collections (curators in parenthesis):

ABC: Alberto Ballerio personal collection, Brescia, Italy.

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 (Malcolm Kerley).

BRBA: Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires (A. Bachmann).

CAMC – Claudia A. Medina personal collection, Cali, Colombia.

CMNC: Canadian Museum of Nature, Ottawa, Canada (Henry Howden and François Génier).

CNIC: Canadian National Insect Collection, Ottawa (CNIC – Antony Davies).

ESAP: Escola Superior de Agricultura "Luiz de Queirós" da Universidade de São Paulo, Piracicaba, SP, Brazil (Roberto A. Zucchi).

FEIS: Faculdade de Engenharia de Ilha Solteira da Universidade Estadual Paulista, Ilha Solteira, SP, Brazil (Carlos A. H. Flechtmann).

FMLT: Fundación Miguel Lillo, San Miguel de Tucumán, Argentina (A. Terán).

FVMC: Fernando Vaz-de-Mello personal collection, Lavras, MG, Brazil.

FZRS: Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, RS, Brazil (Maria Helena M. Galileo).

GHC: Gonzalo Halffter personal collection, Coatepec, México.

IAHC – Instituto Alexander von Humboldt, Villa de Leyva, Colombia (Fernando Fernández).

IBSP: Coleção Entomológica "Adolph Hempel", Instituto Biológico, São Paulo, SP, Brazil (Sergio Ide).

IEX: Instituto de Ecología, A.C., Xalapa, México (Miguel Ángel Morón).

IRSN: Institut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium (Marcel Cludts).

LDC: Leonardo Delgado personal collection, México, DF, México.

MAMC: Miguel A. Morón personal collection, Xalapa, México.

MAPA: Museu Anchieta, Porto Alegre, RS, Brazil (Fernando R. Meyer).

MEUA: Museo Entomológico, Universitad d'Alicant, Spain (José Verdú and Eduardo Galante).

MNHN: Muséum National d'Histoire Naturelle, Paris (Yves Cambefort).

MNRJ: Museu Nacional da Universidade Federal do Rio de Janeiro, RJ, Brazil (Miguel A. Monné and Paulo R. Magno).

MTMB: Magyar Természettudomány Muzéum, Budapest, Hungary (Otto Merkl).

MZSP: Museu de Zoologia da Universidade de São Paulo, SP, Brazil (Ubirajara R. Martins).

NHMB: Naturhistorisches Museum, Basel, Switzerland (Eva Sprecher).

NMM: Natuurhistorisch Museum Maastricht, The Netherlands (F. Dingemans-Backels and Alexey Tishechkin).

NMP: Narodní Muzeum, Prague (NMP – Josef Jelínek).

PUCE: Pontifícia Universidad Católica del Ecuador, Quito, Ecuador (Giovanni Onore and Carlos Carpio).

UNSM: University of Nebraska State Museum, Lincoln, NE, USA (Brett Ratcliffe and Mary Liz Jameson).

URRJ: Universidade Federal Rural do Rio de Janeiro, Seropédica, RJ, Brazil (Francisco Racca Filho and Paschoal Grossi)

USNM: United States National Museum, Washington (Nancy Adams)

UVG: Universidad del Valle de Guatemala (Enio Cano and Jack Schuster).

ZMHB: Museum für Naturkunde der Humboldt-Universität, Berlin, Germany (Hella Wendt).

Characters have been collected using traditional techniques, and those described by Zunino (1978) for genital characters. The character polarization was made using the outgroup method (Watrous & Wheeler, 1981). To test the monophyly of the group *in toto*, the multiple outgroup method has been used. The most external outgroup was *Canthidium barbacenicum* Borre, 1886, and the others were *Ateuchus squalidus* (Fabricius, 1771), *Aphengium sordidum* Harold, 1868 and *Scatimus bicarinatus* Harold, 1869.

As an enormous number of different specific entities have been found during material examination (more than 100), species clusters that were very uniform (that is, differentiable only by minor characters such as punctation, small differences in paramera, etc.) have been considered as a single unit for preliminary analyses.

Phylogenetic analyses have been made using both NoNa (Goloboff, 1993b) and PIWe (Goloboff, 1998) softwares. Matrix used for cladistic analyses is in Appendix I.

The use of two different phylogeny programs is due to their different interpretation of character weighting. NoNa uses weights predefined by user, and in that case, all characters had equal weights. NoNa's parsimony minimizes the total number of homoplasies, choosing trees with minimum length (Goloboff, 1993b). PIWe uses the implied weighting method that allows the program to reweigh characters in a non-interactive way, based on the presence of homoplasy. PIWe minimizes the number of homplastic characters fitting trees in a way that character weight is a concave function of its degree of homoplasy (Goloboff, 1993a, 1998). As different concavity constants are available, analyses with all concavity constants were performed.

Each analysis (one for NoNa and six - with concavity constants from 1 to 6 - for PIWe) was performed using 4000 replications of tree bisecting and rearranging each based on 10 Wagner trees (command "mult*") followed by subtree pruning and re-grafting (command "max") of the best trees. A large number of replications were applied in order to search the maximum of the tree universe for tree islands. Those groups that were consistently monophyletic in all analyses and that share sufficient external characters have been chosen to have generic level and were used as terminal groups for definitive analysis.

5 Results and Discussion

5.1 Characters used in cladistic analyses

Consistency and retention indexes presented have been calculated excluding polymorphisms and are interpretable only for the analysis performed with NoNa.

0. dorsal setae: simple = 0; claviform = 1. ci = 100 ri = 100.
1. internally microgranulated dorsal punctures: absent = 0; present = 1. ci = 100 ri = 100.
2. angulation of clypeo-genal border: absent = 0; present = 1. ci = 100 ri = 100.
3. frontal tubercles/horns: absent = 0; present = 1. ci = 100 ri = 100.
4. eyes dorsally: present = 0; absent = 1. ci = 100 ri = 100.
5. dorsal pilosity: simple = 0; double = 1. ci = 25 ri = 0.
6. clypeo-genal suture: conspicuous = 0; inconspicuous = 1. ci = 50 ri = 80.
7. clypeo-genal border: not emarginated = 0; emarginated = 1. ci = 100 ri = 100.
8. clypeo-frontal carina: absent = 0; present = 1. ci = 33 ri = 0.
9. gena: normal = 0; expanded = 1. ci = 33 ri = 50.
10. anterior pronotal margin: present = 0; absent = 1. ci = 50 ri = 75.
11. supra-lateral pronotal carina: absent = 0; present = 1. ci = 50 ri = 60.
12. basal pronotal margin: present = 0; absent = 1. ci = 50 ri = 50.
13. lateral pronotal fovea: present = 0; absent = 1. ci = 100 ri = 100.
14. lateral pronotal smooth callosity: absent = 0; present = 1. ci = 25 ri = 0.
15. pronotal discal pilosity: absent or sparse = 0; present and dense = 1. ci = 25 ri = 50.
16. anterior pronotal angles in male: normal = 0; expanded = 1. ci = 100 ri = 100.

17. setigerous punctures in discal interstriae: absent or sparse = 0; always present = 1. ci = 16 ri = 16.
18. setigerous punctures at elytral apex: absent = 0; present = 1. ci = 100 ri = 100.
19. internal elytral striae apex: very wide = 0; simple = 1. ci = 20 ri = 0.
20. punctation of elytral disc: unorganized = 0; in rows = 1. ci = 50 ri = 66.
21. puncture rows on discal interstriae: only one = 0; two = 1. ci = 20 ri = 55.
22. posterior strong epipleural narrowness: absent = 0; present = 1. ci = 50 ri = 80.
23. anterior strong epipleural narrowness: absent = 0; present = 1. ci = 100 ri = 100.
24. epipleural posterior plane inflexion: absent = 0; present = 1. ci = 50 ri = 50.
25. setigerous punctures above epipleural carina (except on base): absent = 0; present = 1. ci = 25 ri = 70.
26. anterior transversal mesoepimera carina: absent = 0; present = 1. ci = 50 ri = 90.
27. anterior border of metasternal sulcus: feebly rounded = 0; strongly rounded = 1. ci = 50 ri = 66.
28. base of anterior tibia, externally : denticulate = 0; smooth = 1. ci = 14 ri = 33.
29. apical internal tooth of male anterior tibia: absent = 0; present = 1. ci = 33 ri = 80.
30. scale-like setae below protibial teeth: absent = 0; present = 1. ci = 20 ri = 55.
31. male protibia: as in female = 0; narrower than in female = 1. ci = 50 ri = 0.
32. male basal protibial tooth: very conspicuous = 0; reduced = 1. ci = 25 ri = 25.

33. protibial teeth position: at least apical half = 0; apical third or less= 1. ci = 50 ri = 66.

34. female protibial teeth: stronger than in male = 0; as in male = 1. ci = 20 ri = 0.

35. lateral lobe of protibial spur in male: absent = 0; present = 1. ci = 100 ri = 100.

36. protibial spur in male: spatuliform = 0; triangular = 1. ci = 100 ri = 100.

37. 5th. protarsomere in male: simple = 0; modified to receive claw = 1. ci = 33 ri = 60.

38. male anterior claws: normal = 0; modified = 1. ci = 33 ri = 66.

39. relation between length and breadth of mesofemur: >2 = 0; <2 = 1. ci = 25 ri = 0.

40. ventral discal setigerous punctures on mesofemur: present = 0; absent = 1. ci = 50 ri = 0.

41. relation between length and apical breadth of mesotibia: <3 = 0; >4 = 1. ci = 20 ri = 50.

42. external mesotibial denticulation: absent = 0; present = 1. ci = 25 ri = 0.

43. apical internal tooth of male mesotibia: absent = 0; present = 1. ci = 25 ri = 0.

44. mesotibial spurs: sinuated = 0; straight = 1. ci = 100 ri = 100.

45. mesotibial basitarsome: much longer than the following tarsomere = 0; subequal to the following tarsomere = 1. ci = 20 ri = 60.

46. posterior ventral margination of metafemur: absent = 0; present = 1. ci = 33 ri = 80.

47. metatibia: gradually expanded = 0; strongly expanded = 1. ci = 16 ri = 28.

48. metatibial internal carina: absent = 0; present = 1. ci = 100 ri = 100.

49. internal apical tooth of male metatibia: absent = 0; present = 1. ci = 33 ri = 0.

50. internal apical tooth of male metatibia: conical = 0; strongly flattened = 1. ci = 100 ri = 100.

51. relation between length and breadth of female metatibia: > 3 = 0; < 3 = 1. ci = 50 ri = 50.

52. metatibial spur: piramidal = 0; conical = 1. ci = 100 ri = 100.

53. metatarsomeres: laterally flattened = 0; subcilyndrical = 1. ci = 33 ri = 50.

54. posterior basitarsomere: cilyndrical/elongated = 0; dicoidal = 1. ci = 50 ri = 50.

55. relation between first and second metatarsomere length: >2 = 0; >1,<2 = 1; <1 = 2. [additive] ci = 28 ri = 28.

56. abdominal ventrites setigerous punctures: absent = 0; present = 1. ci = 50 ri = 50.

57. setae on pygidium: absent = 0; present = 1. ci = 50 ri = 50.

58. relation between length and breadth of phallobase: <2 = 0; >3 = 1. ci = 33 ri = 71.

59. relation between parameral and phallobase length: <1/2 = 0; >1/2 = 1. ci = 25 ri = 57.

60. paramera dorsally: normally convex = 0; flattened = 1; ogival = 2. [additive] ci = 66 ri = 66.

61. paramera external angle: absent = 0; present = 1. ci = 50 ri = 85.

62. expansion of paramera external angle: absent = 0; present = 1. ci = 100 ri = 100.

63. paramera external angle: other form = 0; straight and flattened = 1. ci = 25 ri = 25.

64. medial external angle of paramera: absent = 0; present = 1. ci = 100 ri = 100.

65. paramera internally: symmetrical = 0; asymmetrical = 1. ci = 100 ri = 100.

66. internal emargination of paramera: absent = 0; present = 1. ci = 50 ri = 0.

67. paramera internal border: simple = 0; idented = 1. ci = 100 ri = 100.

68. paramera internal border: straight = 0; sinuated = 1. ci = 100 ri = 100.

69. parameral apex: rounded/angled = 0; truncated = 1. ci = 33 ri = 33.

70. parameral apex: normal = 0; strongly flattened = 1. ci = 50 ri = 85.

71. paramera external denticles: absent = 0; present = 1. ci = 100 ri = 100.

72. paramera apical external emargination: absent = 0; present = 1. ci = 100 ri = 100.

73. apico-lateral aparameral lobes: absent = 0; present = 1. ci = 100 ri = 100.

74. angle between paramera and phallobase: conspicuous = 0; absent = 1. ci = 33 ri = 33.

75. internal sac basal raspula: present = 0; absent = 1. ci = 100 ri = 100.

76. internal sac pseudoflagellum: absent = 0; present = 1. ci = 100 ri = 100.

77. pseudoflagellum accessory lamellae: reduced = 0; well develloped = 1. ci = 50 ri = 0.

78. pseudoflagellum base: normally narrowed = 0; expanded = 1. ci = 33 ri = 0.

79. fork-like accessocry lamella: absent = 0; present = 1. ci = 33 ri = 33.

80. pseudoflagellum base: normal = 0; much narrower = 1. ci = 100 ri = 100.

81. secondary flattened lamella: simple = 0; idented = 1. ci = 100 ri = 100.

82. pseudoflagellum body: straight or feebly curved = 0; helicoidal = 1. ci = 50 ri = 0.

83. secondary flattened lamella: absent = 0; present = 1. ci = 25 ri = 57.

84. apical raspuliform lamella: absent = 0; present = 1. ci = 100 ri = 100.

85. flattened accessory lamella adjunct to pseudoflaellum base: absent = 0; present = 1. ci = 25 ri = 0.

86. coxites: absent = 0; present = 1. ci = 50 ri = 0.

87. coxites: without teeth = 0; with three teeth = 1. ci = 100 ri = 100.

88. coxites: very reduced = 0; big = 1. ci = 20 ri = 42.

89. coxites: simple = 0; expanded and fusionated = 1. ci = 100 ri = 100.

90. coxites: symmetrical = 0; a symmetrical = 1. ci = 100 ri = 100.

91. paracoxites: absent = 0; present = 1. ci = 50 ri = 0.

92. spermathecal duct adnexed to vagina: normal = 0; sclerotized forming pseudoinfundibulum = 1. ci = 100 ri = 100.

93. spermathecal subapex: normal = 0; narrowed= 1. ci = 33 ri = 66.

94. spermathecal apex: rounded = 0; acute = 1. ci = 50 ri = 50.

95. spermathecal base: normal = 0; elongated = 1. ci = 20 ri = 20.

96. spermathecal basal fold: absent = 0; present = 1. ci = 50 ri = 50.

97. spermathecal duct: normal = 0; very long and enovelated = 1. ci = 25 ri = 0.

98. spermathecal duct: normal = 0; strongly narrowed near spermatheca = 1. ci = 16 ri = 28.

99. spermathecal apex: normally incurved = 0; spiral-shaped = 1. ci = 33 ri = 50.

100. spermathecal base: simple = 0; bulbous = 1. ci = 50 ri = 0.

For some male genitalic characters, especially those related to secondary (that is, other than pseudoflagellum) internal sac lamellae, it was very difficult to establish correct homologies, so it was preferred to consider differently-shaped lamellae as different characters instead of different states of one character (that is, different forms of homologous lamellae). Other characters such as those on clypeal teeth and in some cases punctation have not been considered for analyses because those characters are very plastic in the group studied (including in the same species, in some cases) and amongst almost all well-defined groups in the family Scarabaeidae; that is, it was considered that those characters are very strongly adaptative ones, with poor retention amongst old lineages.

As can be seen in Appendix 1, characters 0, 1, 3, 7, 11, 36, 60, 62, 64, 66, 67, 72, 80, 82, 87 and 92 are autapomorphies. Characters 2, 4, 5, 7, 9, 12, 14-16, 19, 27, 28, 36-42, 46, 47, 49-51, 55, 58-60, 62, 63, 68, 69, 71, 82, 84, 85,

87, 89, 90 and 96-98 are polymorphic for some genera. Other characters where fully informative for analyses.

5.2 Results of cladistic analyses

Analysis with NoNa resulted in only one tree 253 steps long (FIGURE 1). Analysis with PIWe resulted in 4 trees of fit=349.8 for k=1 (FIGURES 2-6), and only one tree for other k values (k=2, fit=442.6, FIGURE 3; k=3, fit=499.1, FIGURE 7; k=4, fit=539.9, FIGURE 3; k=5, fit = 568.5, FIGURE 8; and k=6, fit=591.4, FIGURE 8). Trees found with k=2 and k=4 were identical to one of the trees found with k=1; trees found with k=5 and k=6 were also identical. A consensus tree resulting from analysis with PIWe, that is identical to a consensus including also the tree from NoNa, is showed in FIGURE 9. All trees showed *Scatimus bicarinatus* included in a monophyletic group formed by species studied, and two trees (derived from analysis with PIWe using k=1) showed that genus included in the in-group, resulting that the monophyly of the group considered could not be confirmed.

Aphengium sordidum is placed as the sister-group of the group formed by the in-group and *Scatimus bicarinatus*. That is due to a number of coincident features with the in-group, such as fusionated abdominal sternites and presence of setae dorsally. However, this is also due to the exclusion of autapomorphic and synapomorphic characters of the out-groups in the analyses. So, characters synapomorphic to *Aphengium sordidum* and *Ateuchus squalidus* have not been considered as that was not the objective of the analyses to see relations within those species. Those characters grouping *Aphengium* with the in-group plus *Scatimus* are also present in a number of other Ateuchini genera (for instance *Pedaria* Laporte, 1832 and *Demarziella* Balthasar, 1961), and can be either characters very subjected to homoplasies, or plesiomorphies of a larger group including all those cited genera, that will be the subject of further research.

Apart of that, personnal observations show enormous similarity of genitalic characters between *Aphengium sordidum* and species in the genus *Ateuchus* Weber, 1801.

5.3 New generical rearrangement for the *Trichillum-Pedaridium* group

The species previously included in *Trichillum* and *Pedaridium*, and some new species that would fall in those genera if considered before this work, were divided in twenty-one genera, including *Trichillum*, *Pedaridium* and *Eutrichillum* Martínez, 1968 **new status**, and eighteen new names proposed and discussed below.

Pedaridium Harold, 1868

Diagnosis: Body large, elongated. Elytra completely tentiform (suture elevated in relation to disc, and disk forming a feeble fold at apex); males and females without differences in fore claws. Setae present by all dorsum, and scattered longer setae present in sides of pronotum and elytral apex. Phallobase long, flagellum unusually thin and accessory lamellae very reduced. Coxites very small and spermatheca simply C-shaped. (FIGURES 31., 54., 69., see also Chapter 7).

Type species: *Pedaria hirsuta* Harold, 1859 (monotypy)

Distribution: Brazil (Minas Gerais, São Paulo, Rio de Janeiro and Paraná) (FIGURE 10.).

Remarks: Found in horse dung and attracted to light, in the interface forest-savanna in higher altitude localities (up to 1300 m). This genus shares many external characters with *Genieridium* **n. g.**, but those are considered to be either simplesiomorphies or homoplasies, as genitallic characters (in both male and female) are very distinct, as can be seen in spermatheca, almost completely

plesiomorphic in this genus, and that in *Genieridium* shares a number of apomorphies with other genera.

Trichillum (Trichillum) Harold, 1868

Diagnosis: Black, shinig, with setae lacking or rare in pronotal disc and sparse in elytral disc. Clypeal teeth variable, but always two (or indicated by anterior sinuosity) and always in continuation with clypeal border. Elytra are characterized by two strong epipleural angles. Aedeagus with short subrectangular paramera and phallobase very short (about twice as long as wide); spermatheca typically spiral-shaped, spermathecal duct not forming pseudoinfundibulum in vagina, coxites large and asymmetrical. Males and females without differences in fore claws. (FIGURE 32., see also Chapters 3 and 7).

Type species: *Trichillum heydeni* Harold, 1868 (monotypy)

Other described species: *Trichillum externepunctatum* Borre, 1880; *T. arrowi* Saylor, 1935; *T. depilatum* Balthasar, 1942; *T. halffteri* Martínez, 1968; *T. morellii* Verdú & Galante, 1998.

Distribution: Brazil, Argentina, Bolivia, Paraguay and Uruguay, always eastern of the Andes (FIGURE 11.).

Remarks: Most species occur in open habitats; few species (mostly new) are from Amazonian, Atlantic or Riparian forests. This subgenus is closely related to the following one, and both share important spermathecal apomorphies with *Gillidium*, *Horridotrichillum* and *Besourenga*.

Trichillum (Paratrichillum) **new subgenus**

Diagnosis: Similar to *Trichillum (Trichillum)* except by color that is gray and opaque, setae can be present in pronotal disc, pseudoflagelum is typically strongly folded in acute angle in the middle, and spermathecal duct forms a

pseudoinfundibulum in the vagina (that is, is sclerotized). Males and females without differences in fore claws. (FIGURES 33., 55., 70.).

Type species: *Trichillum adjunctum* Martínez, 1968 (present designation).

Other described species: *Trichillum pauliani* Balthasar, 1939 (=*T. arrowi* Paulian, 1936, nec Saylor, 1935, = *T. homonymum* Blackwelder, 1944).

Etymology: Para: beside, near; *Trichillum*, genus name.

Distribution: French Guiana and Brazil (From Pará and Amapá to São Paulo) (FIGURE 12.).

Remarks: One species is from eastern Amazonian forests (*T. pauliani*), and the other occurs in the Cerrado (*T. adjunctum*). Both are coprophagous and *T. adjunctum* is rarely attracted to lights. See remarks under *T. (Trichillum)*.

Eutrichillum Martínez, 1968 **new status**

Diagnosis: Head with clypeo-genal margin incised and clypeo-genal suture marked, in some cases joining the clypeo-frontal suture and forming a very feeble acute pseudocarina, mostly effaced in the middle. Paramera with apex strongly deflexed, and pseudoflagellum elongated and helicoidal, triangular flat accessory lamella present and with spines in smaller basis; spermatheca sinuate and with very elongated, thin, and spiral apex and basis. (FIGURE 34., see also Chapters 2, 3 and 7).

Type species: *Trichillum boucomonti* Saylor, 1935 = *T. hirsutum* Boucomont, 1928 (original designation).

Other described species: *Trichillum hystrix* Arrow, 1931, *T. arcus* Solís & Kohlmann, 2003.

Distribution: South American lowlands eastern and southern of the Andes down to Buenos Aires in Argentina, one species in Costa Rica (FIGURE 13.).

Remarks: Mostly necrophagous species easily attracted to lights.

Silvia **new genus**

Diagnosis: 3.5-3.8 mm. Dark brown to black, shining, with sparse setae only on sides and apex of elytra (no setae on elytral disc), clypeal teeth acute, emerging below clypeal margin that is only sinuate. Apex of elytral striae only feebly differentiated from disc, epipleuron with one sharp angle near metacoxal apex. Aedeagus with externo-apical region of paramera expanded, and curved inwards; spermatheca simple (C-shaped) and coxites simply triangular. (FIGURES 35., 56., 72.).

Type species: *Silvia unica* **new species** (monotypy).

Etymology: After my wife, Silvia Altoé Falqueto.

Silvia unica **new species**

Type series: Holotype ♂: BRAZIL: **Rio de Janeiro:** Nova Friburgo, VII-1994, P Grossi (IBSP ex-FVMC).

Paratypes: BRAZIL: **Minas Gerais:** Viçosa, X-1998, FZ Vaz-de-Mello (2 FVMC); II-1995, FZ Vaz-de-Mello (1 FVMC); **Rio de Janeiro:** Nova Friburgo, VII-1994, P Grossi (1 FVMC); 1000 m, XII-1996, P&E Grossi (2 FVMC); **São Paulo:** Serra do Japi, 1050 m, floresta, 1998, MIM Hernández, armadilha pitfall com fezes (5 FVMC).

Diagnosis: As for the genus, as this is the only species known.

Etymology: *unica*: unique, only one, referring to only one species known in the genus. The name is feminine in gender.

Distribution: Known only from three localities of Atlantic Rainforest in southeastern Brazil, from 650 to about 1100 m high (FIGURE 14.).

Remarks: Collected at light, and on carrion, human and dog faeces. This genus is externally very similar to *Trichillum*, but lacks a number of important genitalic apomorphies and has a distinct epipleuron.

Pereiraidium **new genus**

Diagnosis: Large species, sides of head sinuate (but clypeo-genal margin not incised). Male with two long frontal horns, females with two poorly defined tubercles. (FIGURES 36., 37., 73.).

Type species: *Pedaridium almeidai* Pereira, 1946 (monotypy)

Etymology: The name is after Pe. Francisco Silvério Pereira (1912-1992), Brazilian scarabeidologist who described the only species up to now in this genus, the suffix *idium* refers to the genus *Pedaridium.*

Distribution: Rio Grande do Sul, Paraná and São Paulo in Brazil (FIGURE 15.).

Remarks: Specimens from São Paulo have been caught on tapir feces in Atlantic Rainforest. The unusual frontal armadure and lack of most genitalic apomorphies places this genus in a very isolated position in the group.

Onoreidium **new genus**

Diagnosis: Medium sized-species, clypeal sides of head sinuate, clypeo-frontal suture at least feebly elevated (generally forming carina). (FIGURES 38., 57., 74., see also Chapters 2 and 7).

Type species: *Trichillum cristatum* Arrow, 1931 (present designation)

Other described species: *T. ohausi* Arrow, 1931 and *Pedaridium howdeni* Ferreira & Galileo, 1993.

Etymology: After Giovanni Onore (PUCE, Ecuador), who kindly sent me PUCE specimens for study and conducts several students to the study of Scarabaeoids.

Distribution: Ecuador (Loja, Guayas, Chimborazo and Manabí) (FIGURE 16.).

Trichillidium **new genus**

Diagnosis: Clypeus with four strong teeth, body short oval, hairs very thin, size small. Paramera typically shaped, with internal indentation. (FIGURE 39., see also Chapters 2 and 7).

Type species: *Pedaridium quadridens* Arrow, 1932 (present designation)

Other described species: *Pedaridium caingua* Martínez, 1951.

Etymology: An agglutination of the genera names *Trichillum* and *Pedaridium.* That name was found in some of Antonio Martínez' handwritten identification labels.

Distribution: Northern and Northeastern Argentina, Southern Bolivia, Paraguay, Southwestern and Southern Brazil (FIGURE 17.).

Remarks: Species from Chaco and Pantanal (*T. quadridens*) and Atlantic forest (*T. caingua*).

Horridotrichillum **new genus**

Diagnosis: Size small, setae claviform, most punctures granulated internally. Clypeo-genal margin strongly toothed, discal interstriae elevated in carinae, spermatheca spiral-shaped. (FIGURES 40., 58., 75.).

Type species: *Trichillum horacioi* Martínez, 1968 (monotypy)

Etymology: *Horridus*: of wild aspect; *Trichillum*: genus name.

Distribution: Southern Amazonia, from Peru and Bolivia to Pará in Brazil (FIGURE 18.).

Remarks: Species from Amazonian forest.

Besourenga **new genus**

Diagnosis: 2.2-3.3 mm. Size small, clypeo-genal margin angulated or toothed, spermatheca spiral-shaped. (FIGURES 41., 42., 59., 71., 76., see also Chapter 7).

Type species: *Trichillum minutum* Saylor, 1935 (present designation)

Other described species: *Trichillum vejdovskyi* Balthasar, 1939 and *Pedaridium amarillai* Aguilar, 2001.

Etymology: Aglutination of *Besouro*: Brazilian Portuguese word for "beetle", and *Alvarenga*, proper name. An homage to Moacyr Alvarenga, Brazilian amateur coleopterist responsible by capture of many specimens dealt here, specialist in the taxonomy of the family Erotylidae, now retired. *Besourenga* was his nickname in the Brazilian Airforce, where his passion for collecting beetles was very much known. The name is male in gender.

Distribution: Bolivia, eastern of the Andes, Paraguay and Central Brazil east to São Paulo, Minas Gerais and Bahia (FIGURE 19.).

Remarks: All species seem to be associated with open habitats.

Bradypodidium **new genus**

Diagnosis: 2.3-3.7 mm. Small elongated species, hairs very thin, clypeus with none, two or four teeth, elytral striae deeper and wider at apex, males with fore claws strongly modified, and paramera elongated, flat and wider at apex. (FIGURES 43., 60., 61., 77., see also Chapter 7).

Type species: *Trichillum bradyporum* Boucomont, 1928 (present designation).

Other described species: *Trichillum adisi* Ratcliffe, 1980, *Pedaridium venezuelense* Ferreira & Galileo, 1993.

Etymology: Aglutination of *Bradypus*, the genus name of the most common sloths (Mammalia: Edentata), with which specimens of that genus are foretic, and *Pedaridium*, genus name.

Distribution: Costa Rica, western Ecuador, northern Venezuela, Amazonian Hylaea, Bolivia and eastern Brazil (FIGURE 20.).

Remarks: All species seem to be associated with sloths, as indicated by collecting data consisting only of direct collections in sloths or collecting at light.

Howdenidium **new genus**

Diagnosis: Shinning black, oval. Head parabolic, with clypeus typically shaped, with two teeth very short and widely separated. At least males with a fronto-clypeal carina. (FIGURES 44., 62., 78.).

Type species: *Pedaridium bottimeri* Howden & Young, 1981 (monotypy).

Etymology: After Henry and Anne Howden, collector many specimens dealt here, the former also tireless contributor to Scarab taxonomy.

Distribution: Panama (Canal Zone) (FIGURE 21.), cited from Venezuela by Ferreira & Galileo (1993).

Remarks: A probable female of the type species presents no clypeo-frontal carina.

Youngidium **new genus**

Diagnosis: Body oval, shinning black. Head trapezoidal. Clypeus with four teeth. Elytral striae very strongly impressed apically. Paramera conical and very elongated, typically shaped. (FIGURES 45., 63., 79.).

Type species: *Pedaridium brevisetosum* Howden & Young, 1981 (monotypy)

Etymology: After O. P. Young, who described the type species and reviewed Panamanian scarabaeines with Henry Howden.

Distribution: Panama (Canal Zone) (FIGURE 22.).

Remarks: Only the holotype is known for the only species in this genus.

Boreotrichillum **new genus**

Diagnosis: Externally very similar to both *Trichillidium* and *Youngidium*, but paramera simple, not curved and idented, nor conical elongated. (FIGURES 46., 64., 80.).

Type species: *Trichillum pilosum* Robinson, 1948 (monotypy).

Etymology: *Boreo*: northern; *Trichillum*: genus name.

Distribution: Western Ecuador, Chocó in Colombia, up to Panama, Costa Rica and Nicaragua (FIGURE 23.).

Remarks: Although this genus has been grouped with *Bradypodidium* in the consensus cladogram, this grouping is completely based on homoplastic characters and must be verified carefully. Paramera are very similar to those of *Onoreidium*, and distribution is at least also coincident, but head form and pilosity are very different.

Boreopedaridium **new genus**

Diagnosis: Clypeus with two teeth, elytral interstriae convex (stronger in the posterior half), sparse dorsal setae and conical paramera will separate this genus from all others. (FIGURE 47., see also Chapter 4).

Type species: *Pedaridium maya* Vaz-de-Mello, Halffter & Halffter, in pess (monotypy).

Etymology: *Boreo*: northern; *Pedaridium*: genus name.

Distribution: Mexico (Quintana-Roo, Chiapas, Campeche), Guatemala (Petén) (FIGURE 24.). probably will also occur in nearest countries, such as Belize.

Remarks: See Chapter 4.

Martinezidium **new genus**

Diagnosis: Elongated, brown species with copper shine. Clypeus with none, two or four teeth, in one species gena toothed. Paramera cylindrical, asymmetrical. (FIGURE 48, see also Chapters 2 and 7).

Type species: *Pedaridium fulgens* Arrow, 1932 (present designation)

Other described species: *Pedaridium martinsi* Ferreira & Galileo, 1993, *Pedaridium galileoae* Génier & Vaz-de-Mello, 2002.

Etymology: After Antonio Martínez, from whose collection a great part of the examined material came, and that worked hard on both *Trichillum* and *Pedaridium* from the 50's to just before his death.

Distribution: Southern Bolivia (Santa Cruz), Paraguay, from Jujuy to Chubut in Argentina (FIGURE 25.).

Remarks: It seems difficult to relate this genus to others, but in a primary analysis the closer group seems to be *Boreopedaridium.*

Leotrichillum **new genus**

Diagnosis: Small elongated species, color brown, clypeus with two teeth and simply rounded laterally. Paramera with an apico-external invagination. (FIGURES 49., 65., 81., see also Chapter 7.)

Type species: *Pedaridium louzadaorum* Vaz-de-Mello & Canhedo, 1998 (monotypy).

Etymology: After my son, Léo Falqueto Vaz de Mello.

Distribution: Chaco in northern Argentina and southern Paraguay, central and northeastern Brazil (FIGURE 26.).

Remarks: It is important to point out here that the divided pygidial sulcus described by Vaz-de-Mello & Canhedo (1998) for *L. louzadaorum* resulted from a mistake based on poor optical equipment and dust in the pygidial sulcus, that is in reality entire. This genus appears closely related to *Degallieridium* **n. g.**, but has a more elongated body and very different paramera.

Genieridium **new genus**

Diagnosis: Moderate to large species (only rare specimens of *G. cryptops*can have measured less than 3.7 mm), clypeal teeth lacking or with two. Eyes always very small, males of all species with internal apical teeth in tibiae, and in all but two with modified anterior claws. Paramera very simple, elongated and flat. (FIGURES 50., 82., see also Chapters 2, 3, 5 and 7)

Type species: *Pedaridium cryptops* Arrow, 1913 (present designation)

Other described species: *Pedaridium argentinum* Arrow, 1913; *P. paranense* Arrow, 1932; *P. bidens* Balthasar, 1942; *P. bordoni* Martínez, 1992; *P. zanunciorum* Vaz-de-Mello & Canhedo, 1998; *P. margareteae* Génier & Vaz-de-Mello, 2002; *P. medinae* Gill & Vaz-de-Mello, in press.

Etymology: After François Génier, a good friend and scarabeidologist, who supervised me extra-officially in the beginning of this work.

Distribution: Northeastern Argentina, Paraguay, Brazil (except northwest) (FIGURE 27.).

Remarks: *G. argentinum* appears to be very isolated from others, have slightly larger eyes, and lacking modified anterior claws in males. *G. bordoni* can be related with both *G. medinae*, sharing similar modification in apical posterior tibia tooth, or with *G. paranense*, sharing lack of clypeal teeth and head form.

Gillidium **new genus**

Diagnosis: Small (2.6-2.7 mm), elongated species. Body flat, two kinds of setae on elytral interstriae, one unorganized and very small and the other large and organized in rows. Clypeus with two teeth and simply rounded laterally. Spermatheca spiral-shaped. (FIGURES 51., 66.).

Type species: *Gillidium gilli* **new species** (monotypy)

Etymology: After Bruce Gill, Canadian scarabaeidologist.

Gillidium gilli **new species**

Type series: Holotype ♀: VENEZUELA: **Aragua:** Rancho Grande, 12-30-XII-1987, B Gill & M Sanborne, FIT (BDGC).

Paratype: VENEZUELA: **Miranda:** San Antonio de los Altos, 1400 m, 15-VI-1964, C Bordón (1 CMNC).

Diagnosis: As for the genus, as this is the only species known.

Etymology: After Bruce Gill, who loaned me the only complete specimen of that species.

Distribution: Northern Venezuela (FIGURE 28.).

Remarks: This genus, although probably related to others with spiral spermathecae, is externally reliable only to *Leotrichillum*, *Degallieridium* and *Feeridium*, by the shape of epipleuron and large eyes.

Degallieridium **new genus**

Diagnosis: Color brown. Body rounded and very small (1.9-2.0 mm), clypeus with two teeth, simply rounded. Paramera strongly divergent. (FIGURES 52., 67., 83.).

Type species: *Degallieridium liliputanum* **new species** (monotypy)

Etymology: After Nicolas Degallier, friend, histeridologist and collector of most of the type-series of the species described below.

Degallieridium liliputanum **new species**

Type series: Holotype ♂: BRAZIL: **Distrito Federal:** Brasilia, 1100 m, XI-2001, N. Degallier (IBSP ex-FVMC).

Paratypes: BRAZIL: **Distrito Federal:** Brasilia, 1100 m, XI-1999 (1 CMNC); X-2000, N Degallier (1 FVMC); **Minas Gerais:** Paracatu, XII-1996, S Lourenço (2 FVMC).

Diagnosis: As for the genus, as this is the only species known.

Etymology: A patronymic for Liliput, the island of small people in Swift's Gulliver's Travels.

Distribution: Central Brazil (northwestern Minas Gerais and Distrito Federal) (FIGURE 29.).

Remarks: See under *Leotrichillum* and *Feeridium.*

Feeridium **new genus**

Diagnosis: Body large (4.5-5.2 mm), very elongated. Middle and posterior femora very strong and rounded, eyes extremely large dorsally. Paramera very elongated and divergent in apex. (FIGURES 53., 68., 84.).

Type species: *Feeridium woodruffi* **new species** (monotypy)

Etymology: After François Feer, who collected and sent me the first specimens I saw of that genus.

Feeridium woodruffi **new species**

Type series: Holotype ♂: BRAZIL: **Amazonas:** Tabatinga, XI-1956, FM Oliveira (BRBA).

Paratypes: BRAZIL: **Amazonas:** 70 km N Manaus, Fazenda Esteio, 07-VI-1986, B Klein, human dung, nature forest, AM (1 BRBA); Tabatinga, XI-1956, FM Oliveira (1 BRBA); FRENCH GUYANA: **Cayenne:** Nourages, III-1997, F Feer (1 FVMC); V-1995 (1 FVMC).

Diagnosis: As for the genus, as this is the only species known.

Etymology: After Dr. Robert Woodruff, scarabeidologist. Although that name was already *i. litt.* in Martínez' material in BRBA, I extend my own homage to Dr. Woodruff.

Distribution: French Guyana and Brazil (Amazonas) (FIGURE 30.).

Remarks: Paramera and epipleuron relate this genus to *Degallieridium.*

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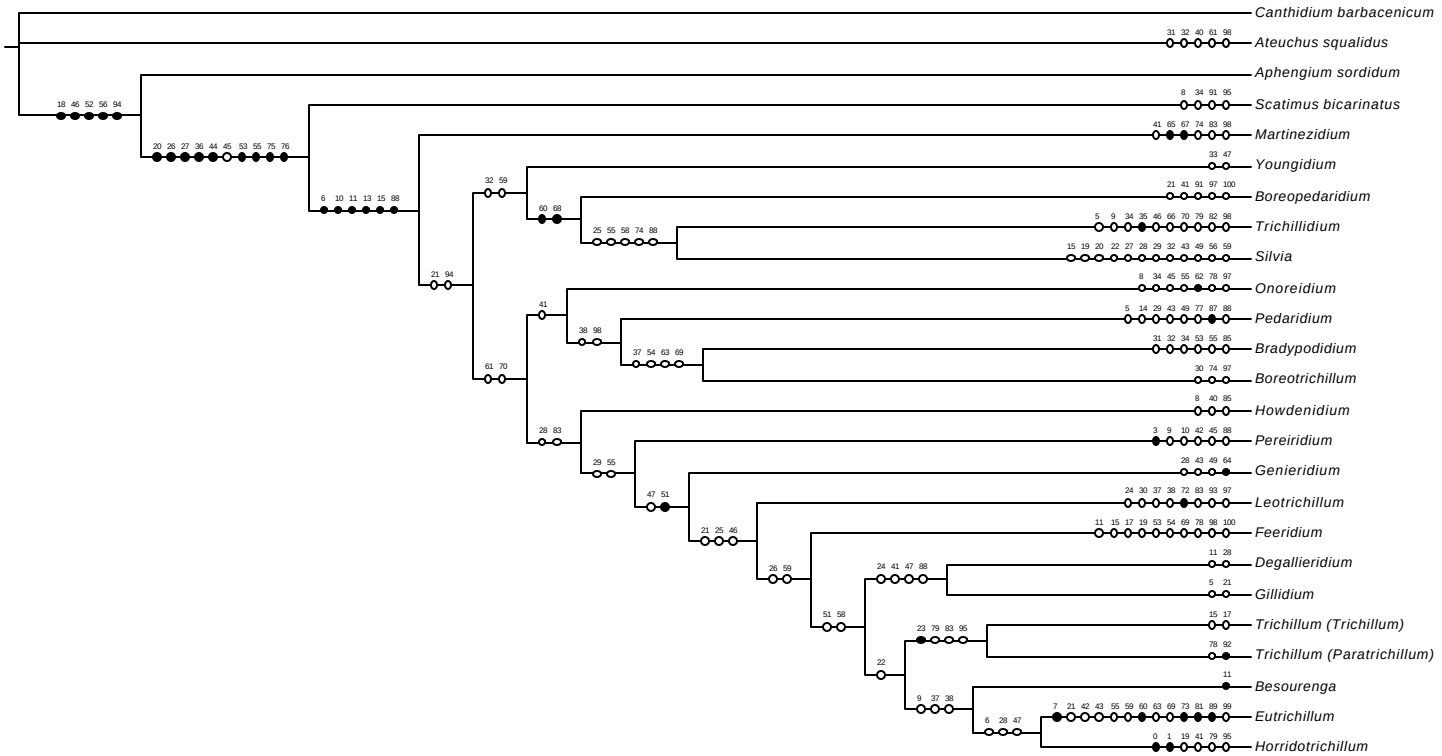


FIGURE 1. Cladogram obtained with NoNa. Length = 253, CI=38, RI=50, 1 of 1.

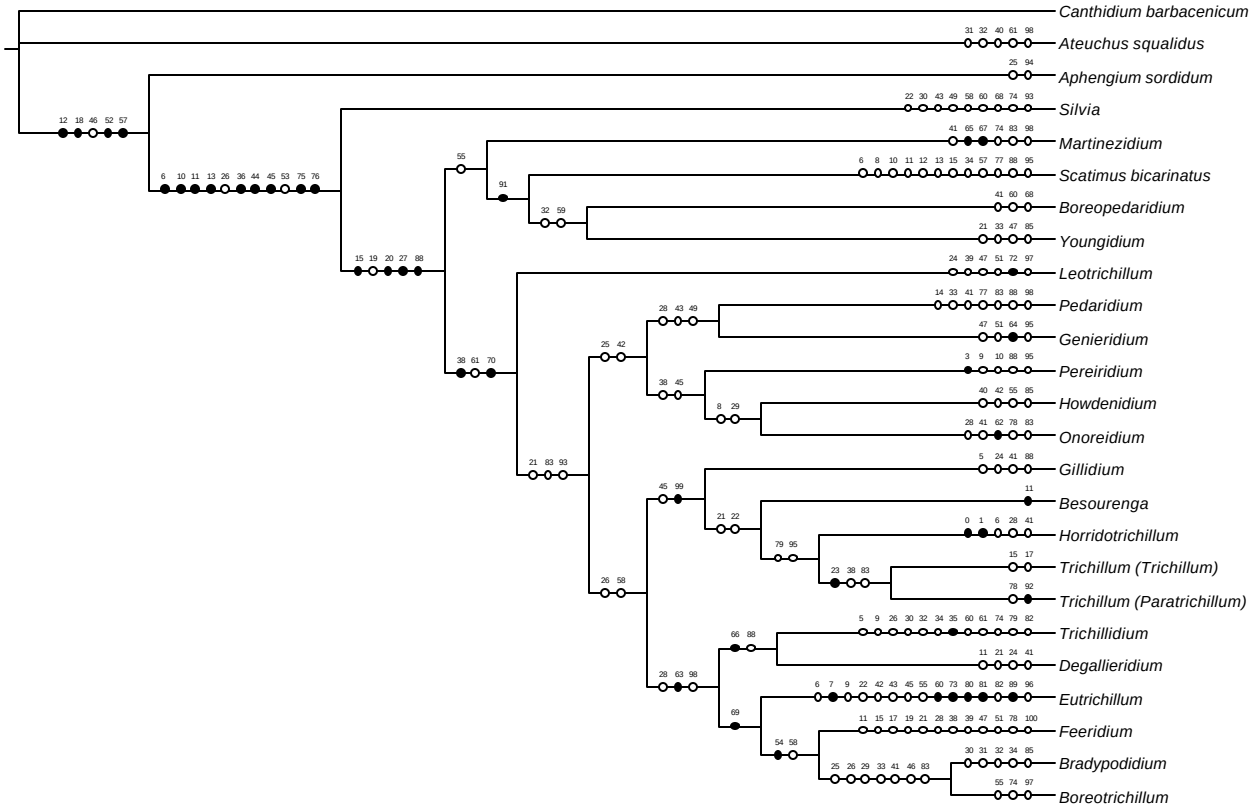


FIGURE 2. Cladogram obtained with PiWe. k=1, fit=349.8, 1 of 4.

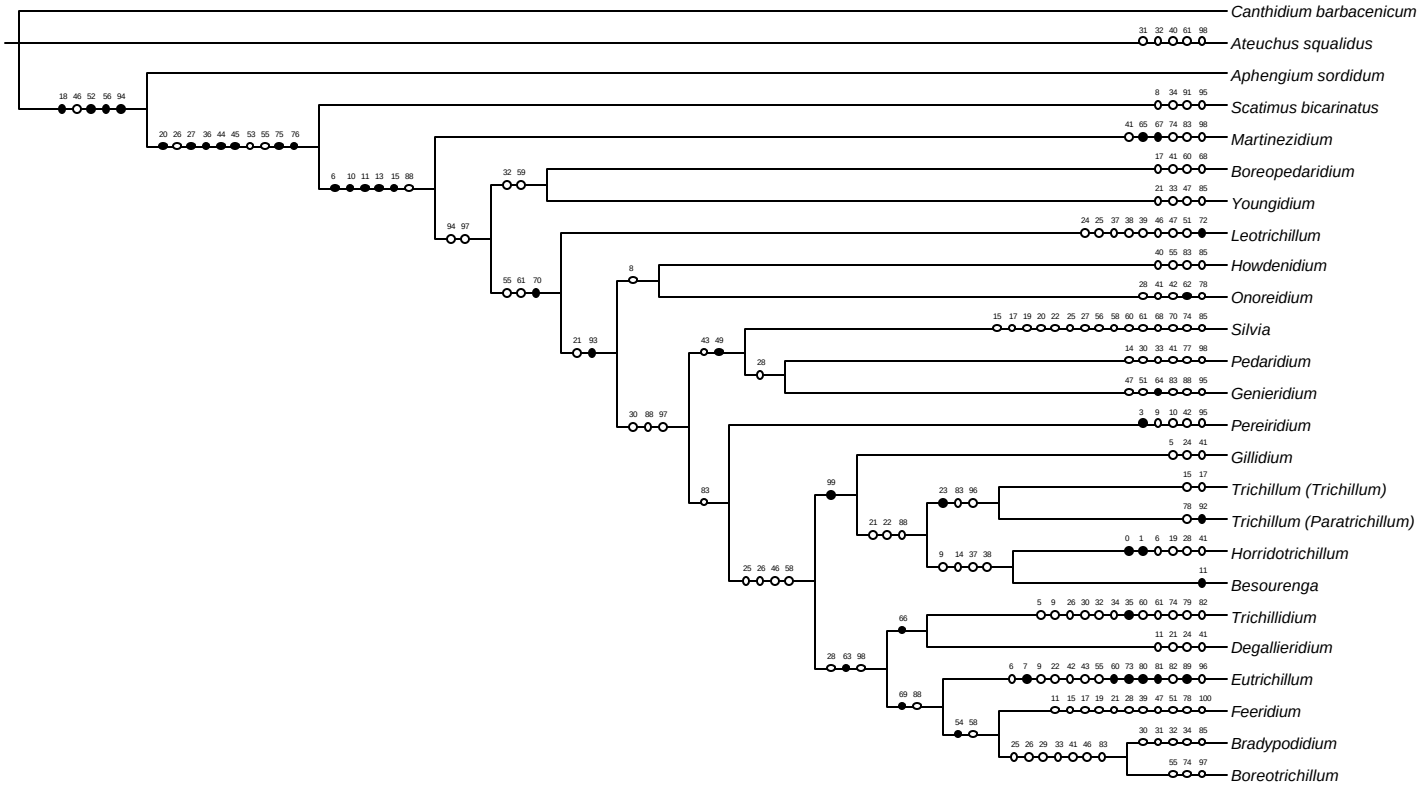


FIGURE 3. Cladogram obtained with PiWe. k=1, fit=349.8, 2 of 4; k=2, fit=442.6, 1 of 1; k=4, fit=539.9, 1 of 1.

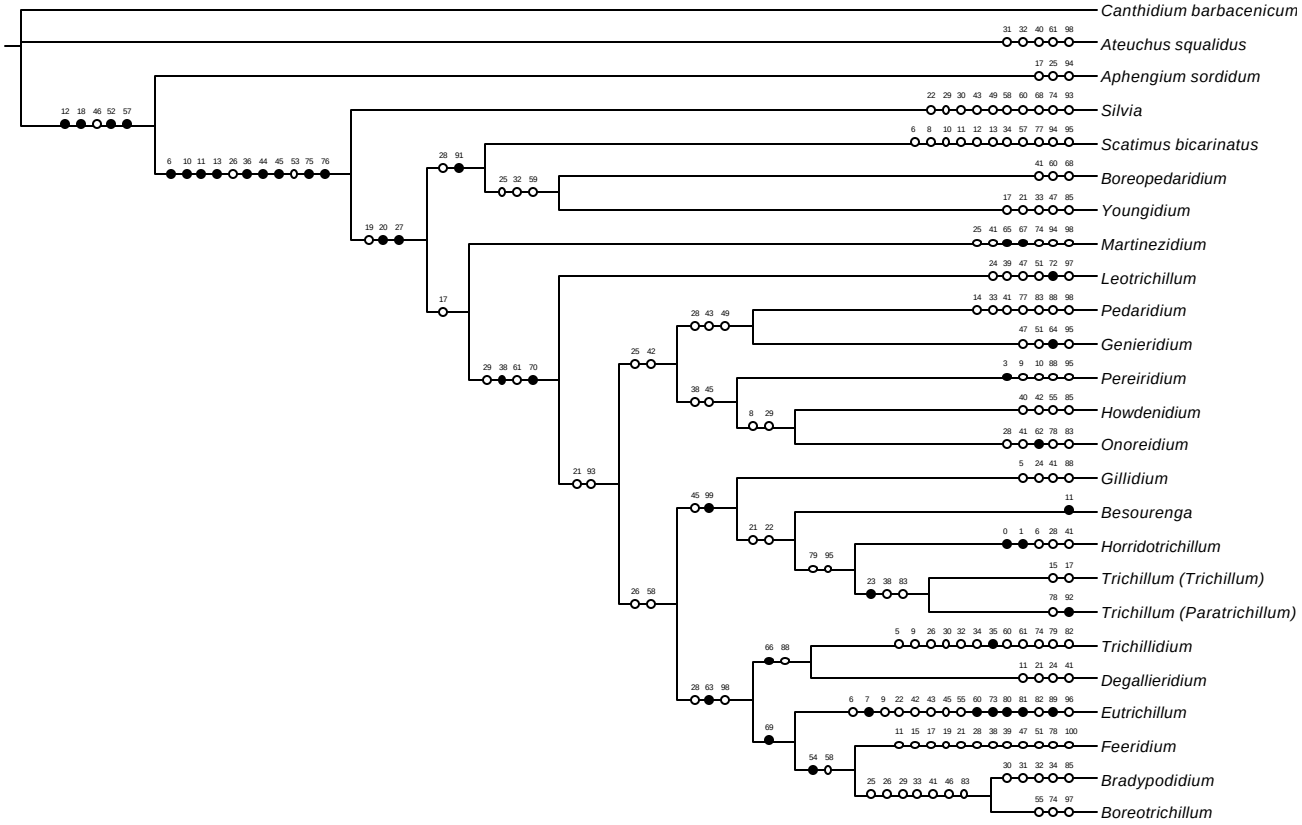


FIGURE 4. Cladogram obtained with PiWe. k=1, fit=349.8, 3 of 4.

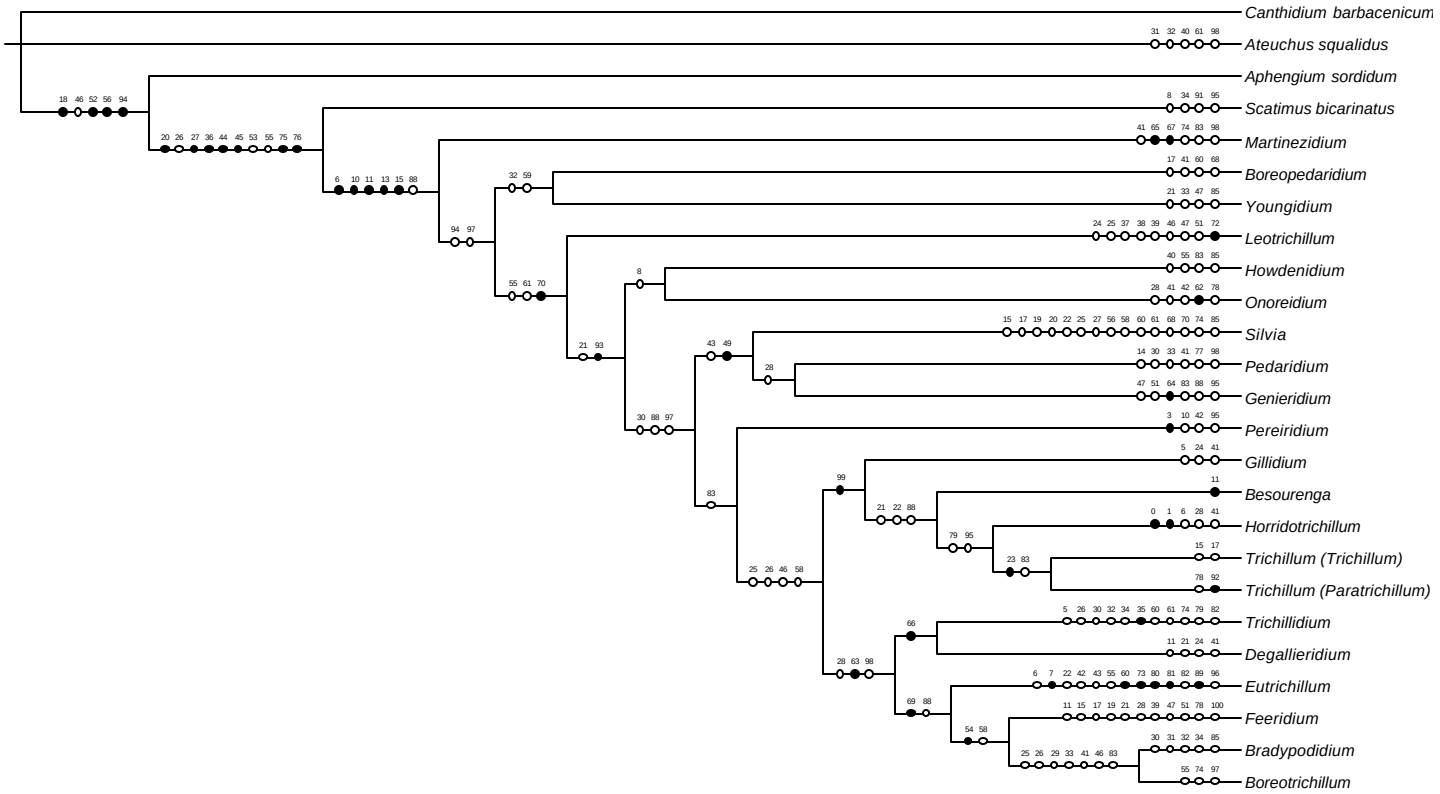


FIGURE 5. Cladogram obtained with PiWe. k=1, fit=349.8, 4 of 4.

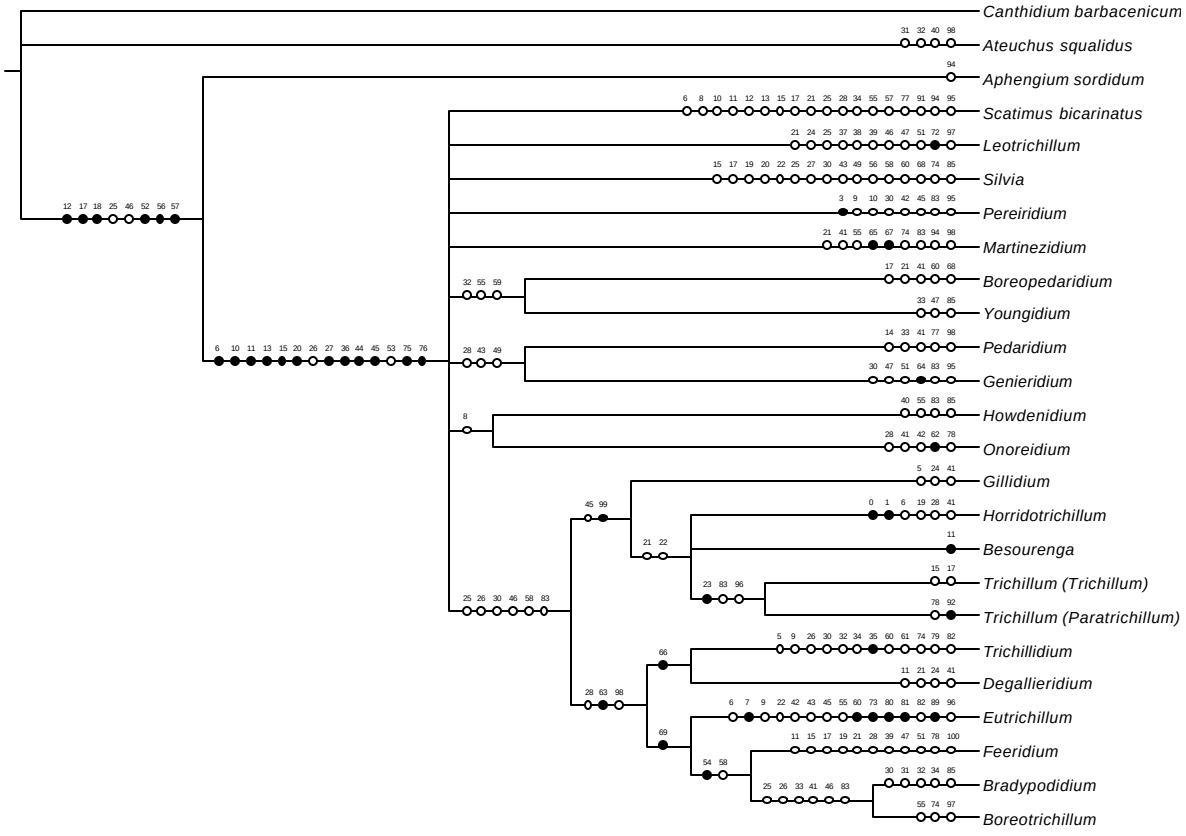


FIGURE 6. Consensus of four trees of maximum fit (349.8) using PiWe with k=1.

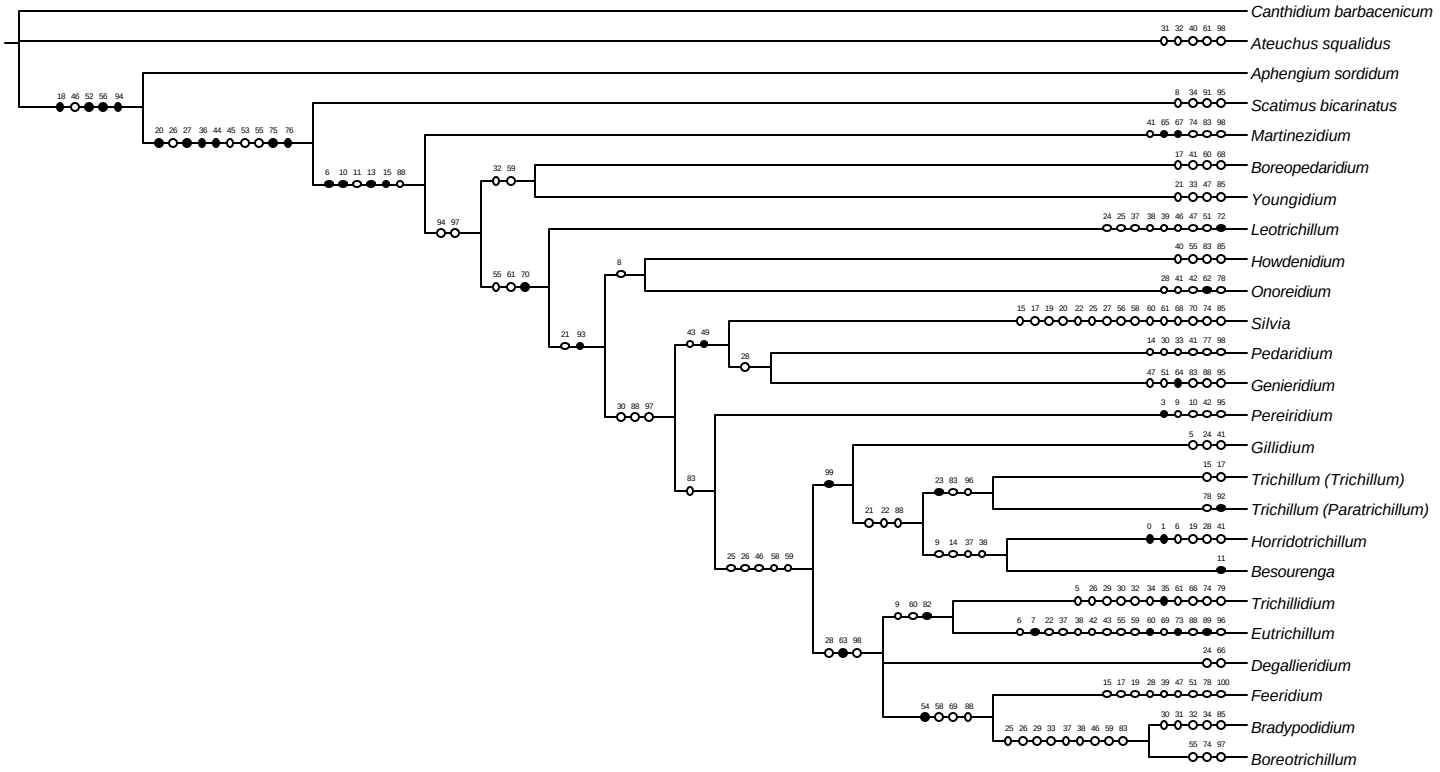


FIGURE 7. Cladogram obtained with PiWe. k=3, fit=499.9, 1 of 1.

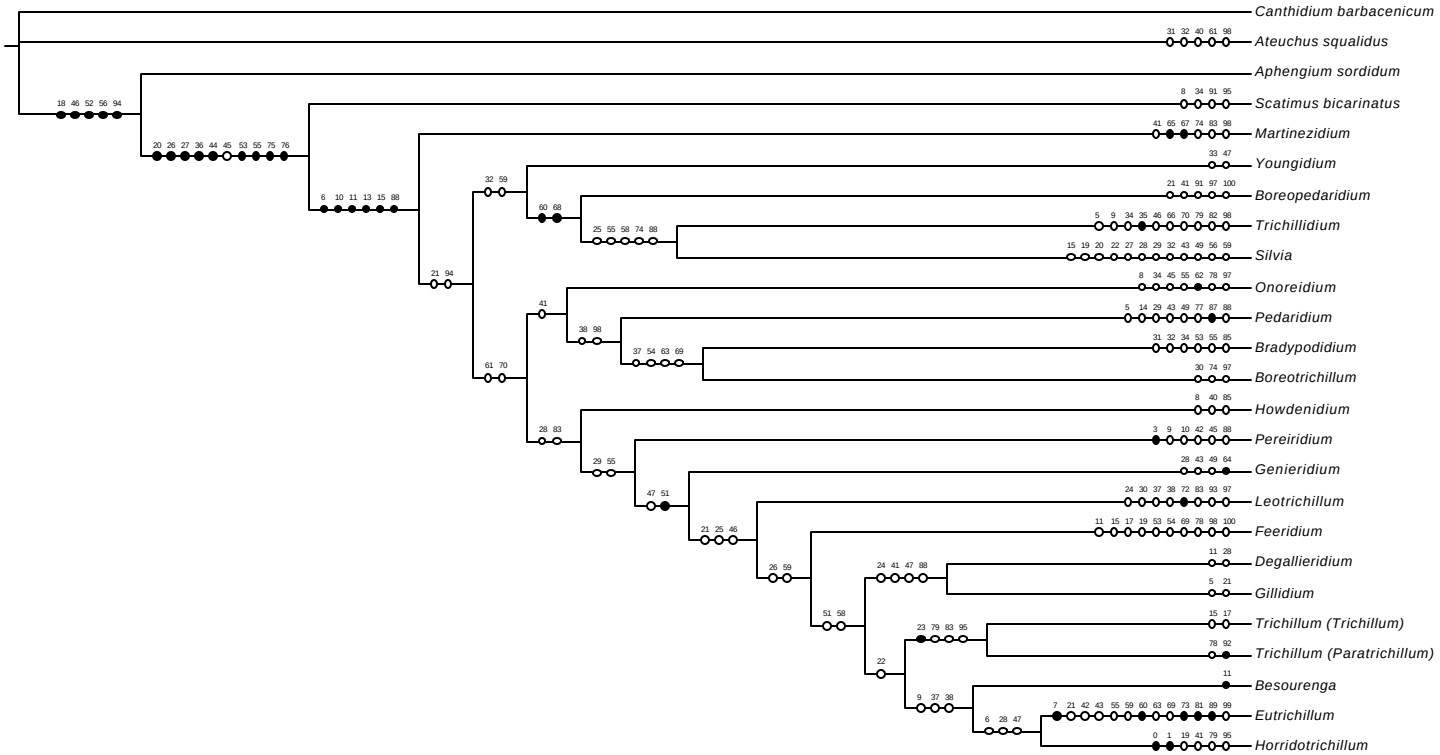


FIGURE 8. Cladogram obtained with PiWe. k=5, fit=568.5, 1 of 1; k=6, fit=591.4, 1 of 1.

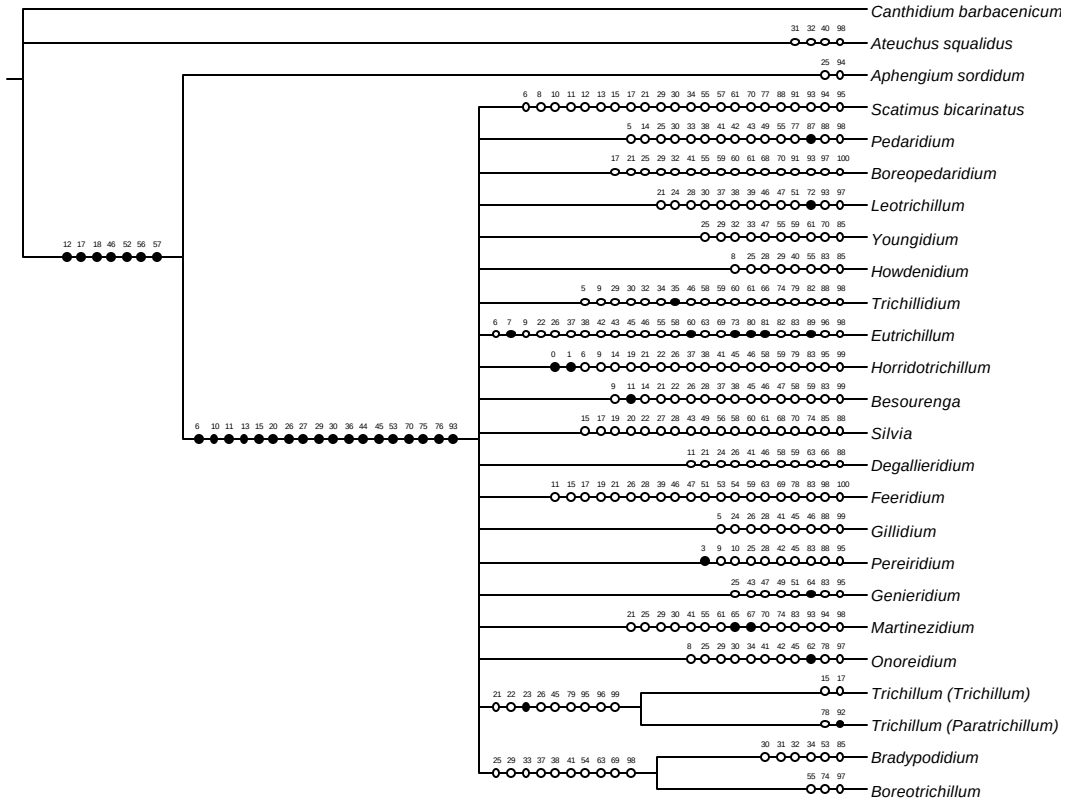
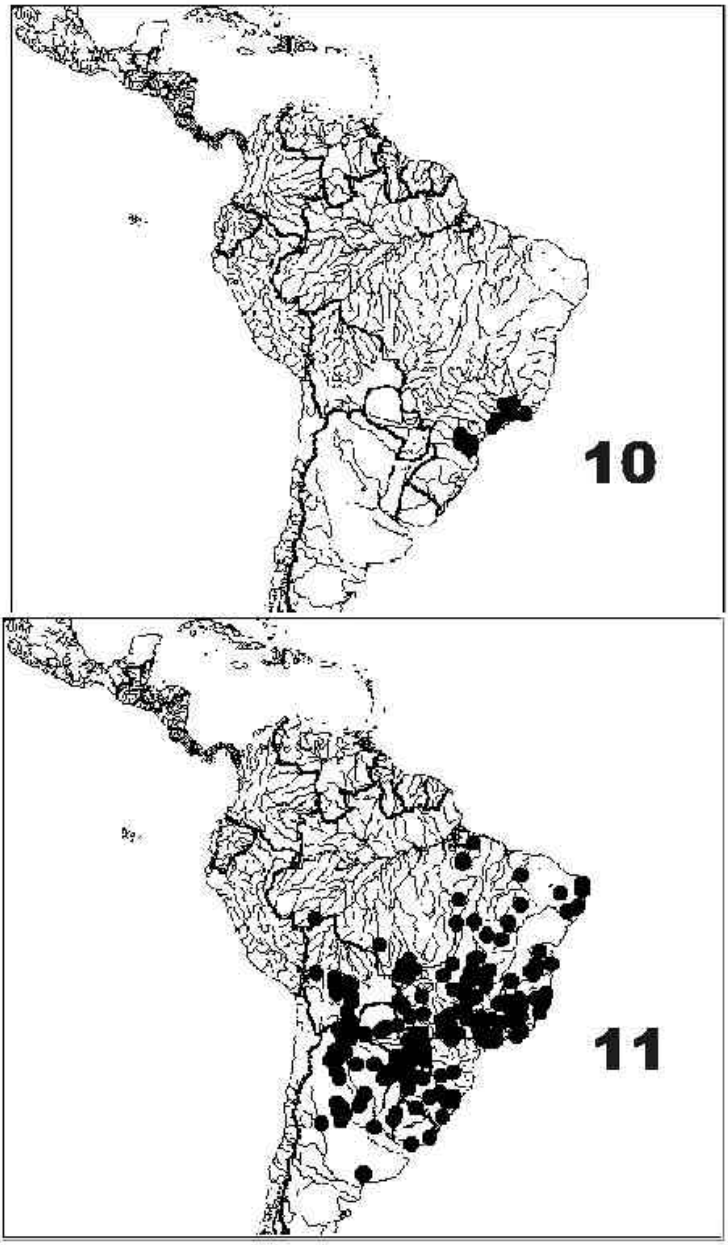
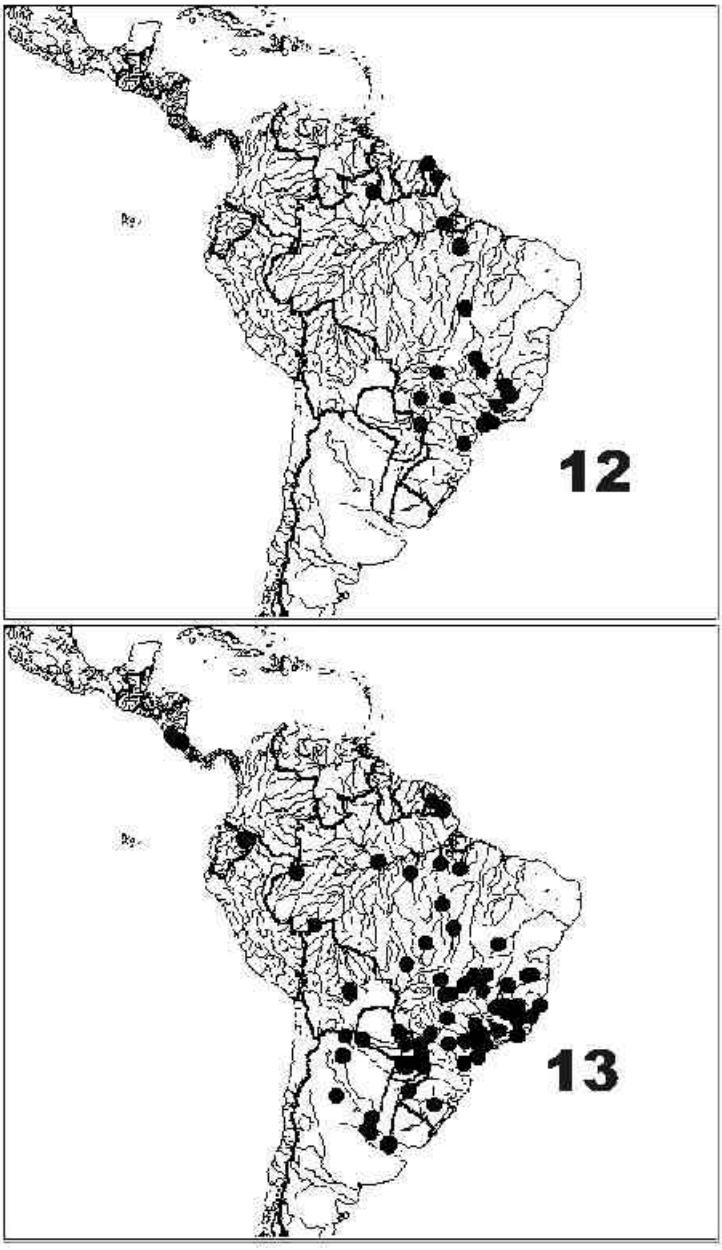


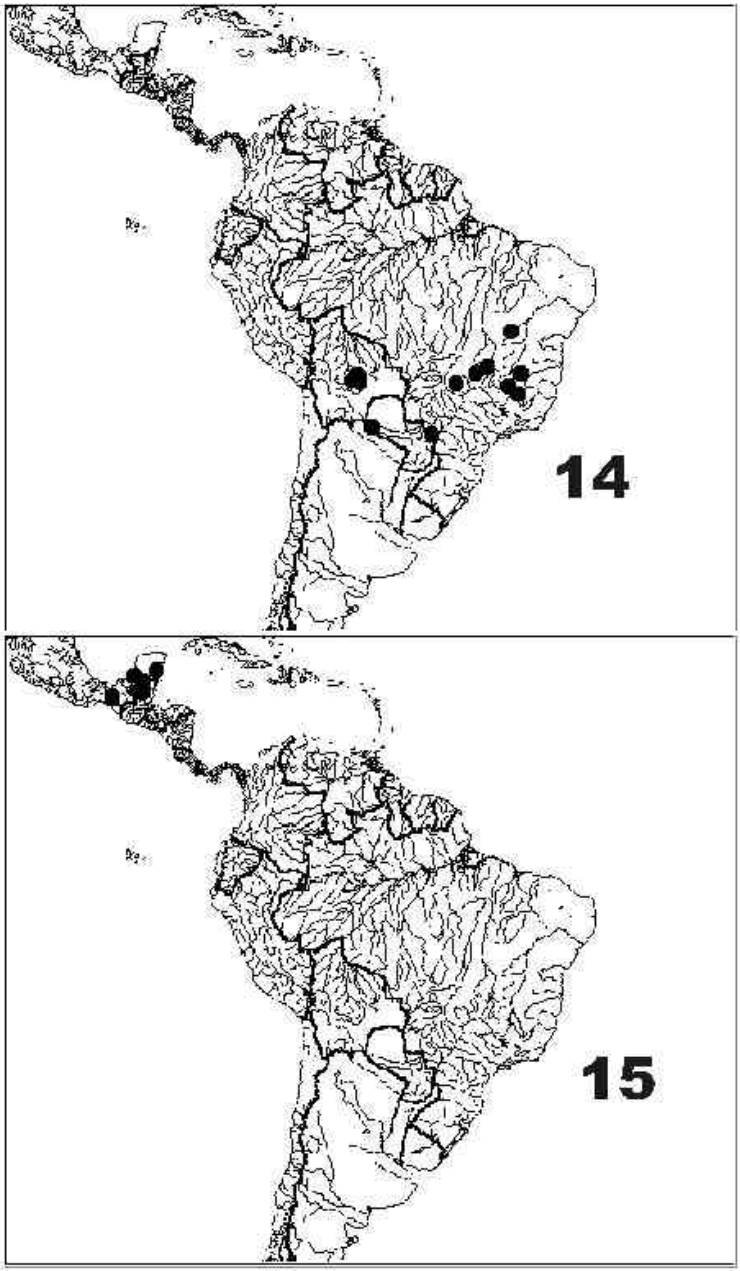
FIGURE 9. Consensus tree obtained from both trees from PiWe only or trees from PiWe and NoNa.



FIGURES 10-11. Distribution maps. 10. *Pedaridium*; 11. *Trichillum (Trichillum)*.



FIGURES 12-13. Distribution maps. 12. *Trichillum (Paratrichillum)*; 13. *Eutrichillum.*



FIGURES 14-15. Distribution maps. 14. *Besourenga*; 15. *Boreopedaridium.*

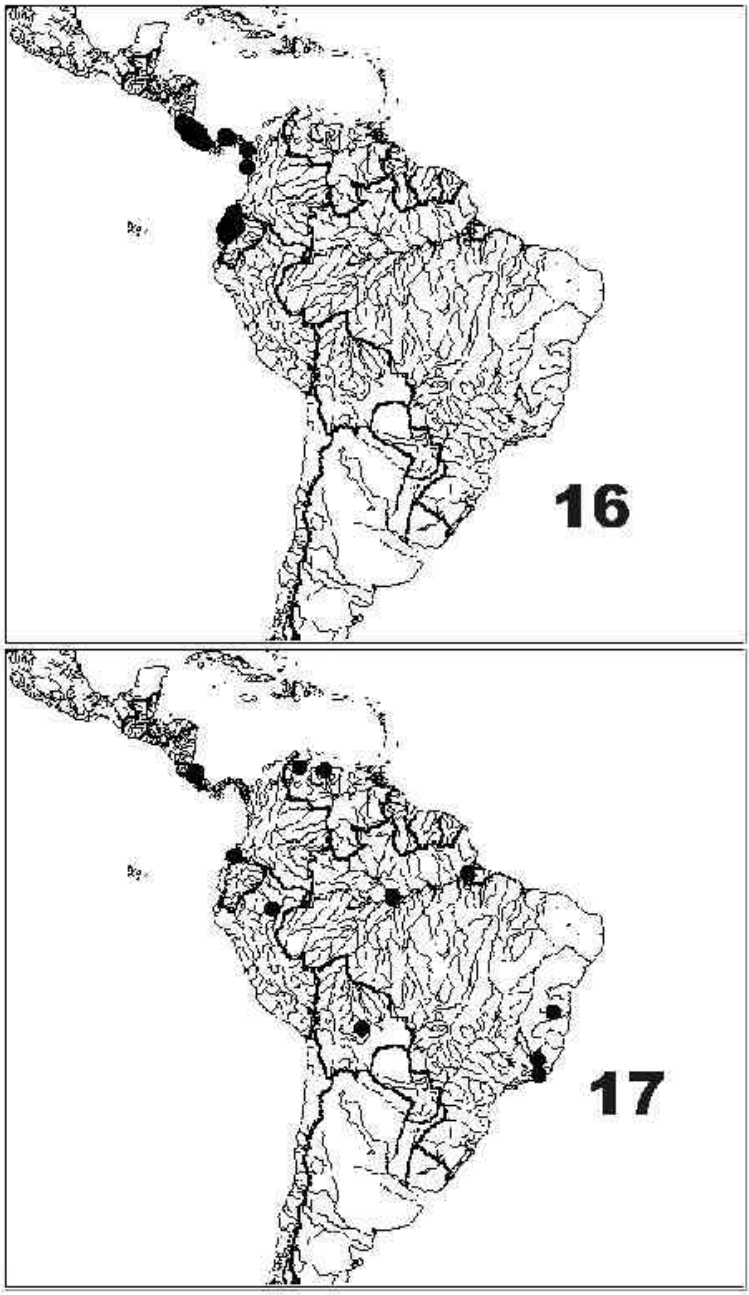
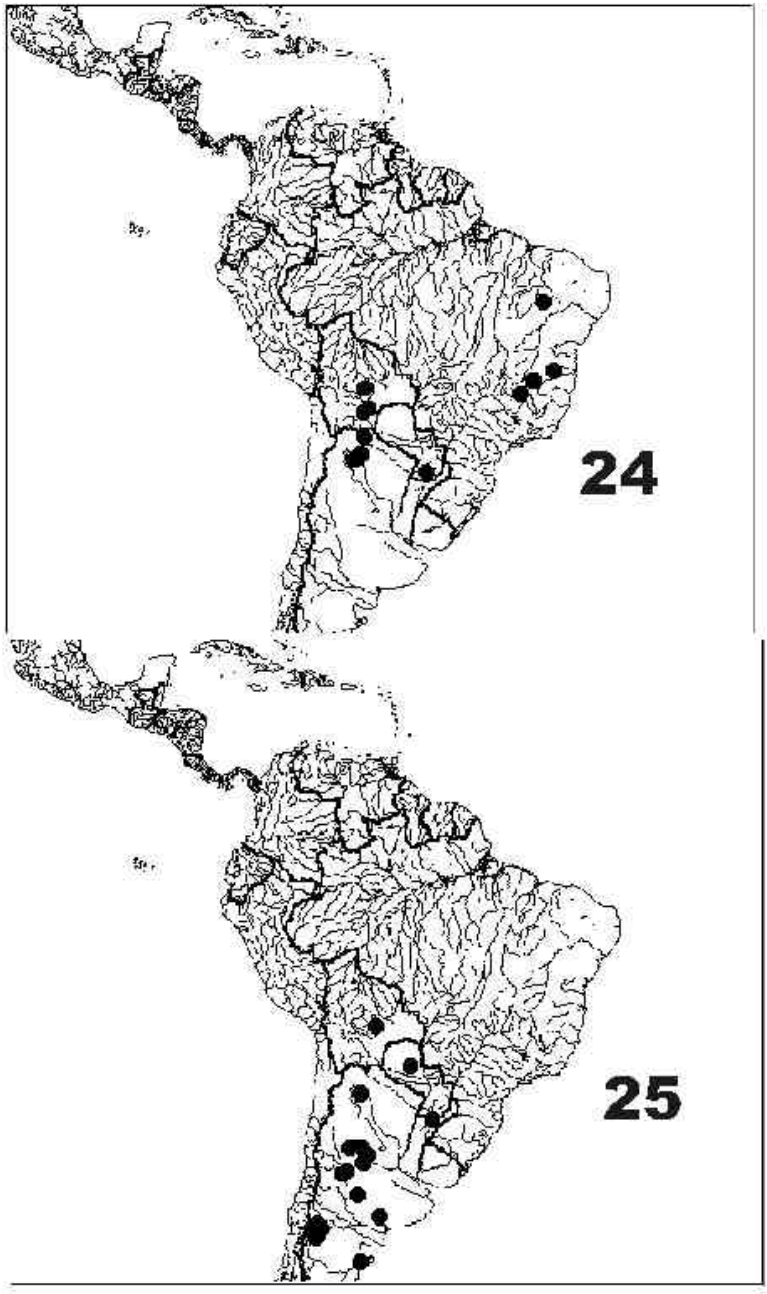


FIGURE 16-17. Distribution maps. 16. *Boreotrichillum*; 17. *Bradypodidium.*

FIGURES 18-19. Distribution maps. 18. *Degallieridium*; 19. *Feeridium.*

FIGURES 20-21. Distribution maps. 20. *Genieridium*; 21. *Gillidium.*

FIGURES 22-23. Distribution maps. 22. *Horridotrichillum*; 23. *Howdenidium.*



FIGURES 24-25. Distribution maps. 24. *Leotrichillum*; 25. *Martinezidium.*

FIGURES 26-27. Distribution maps. 26. *Onoreidium*; 27. *Pereiraidium.*

FIGURES 28-29. Distribution maps. 28. *Silvia*; 29. *Trichillidium.*

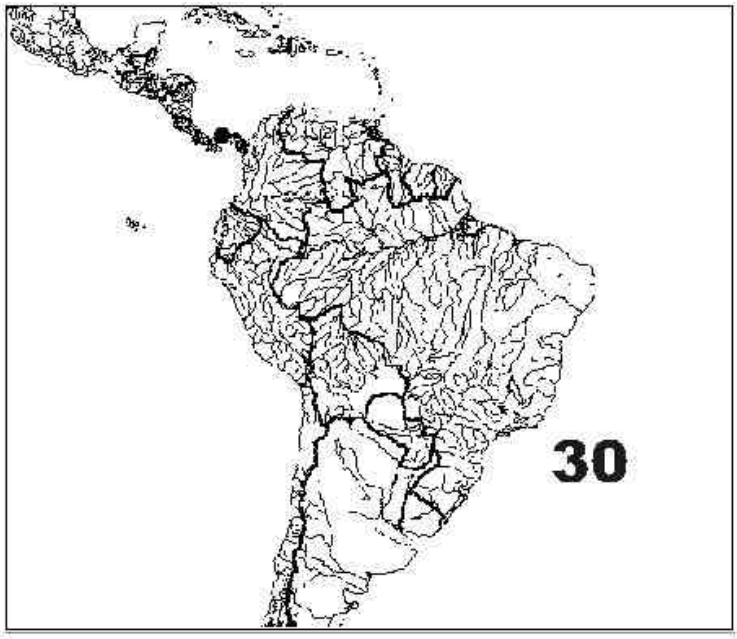
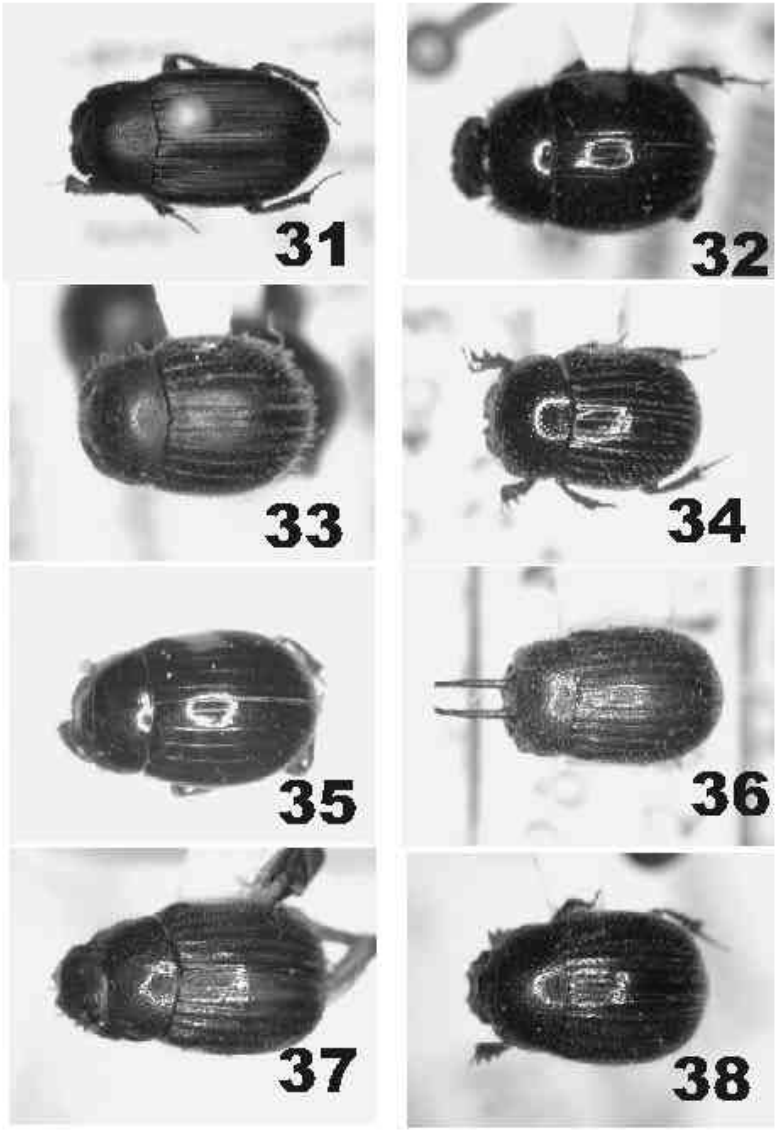
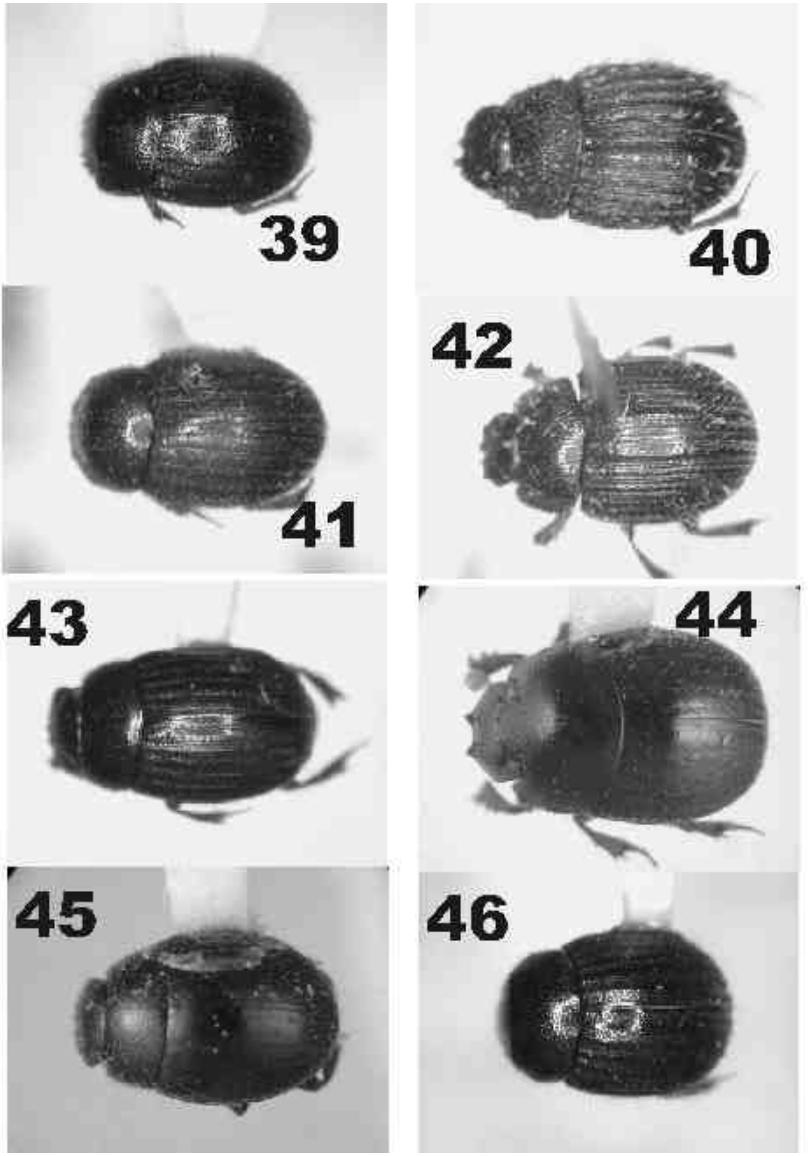


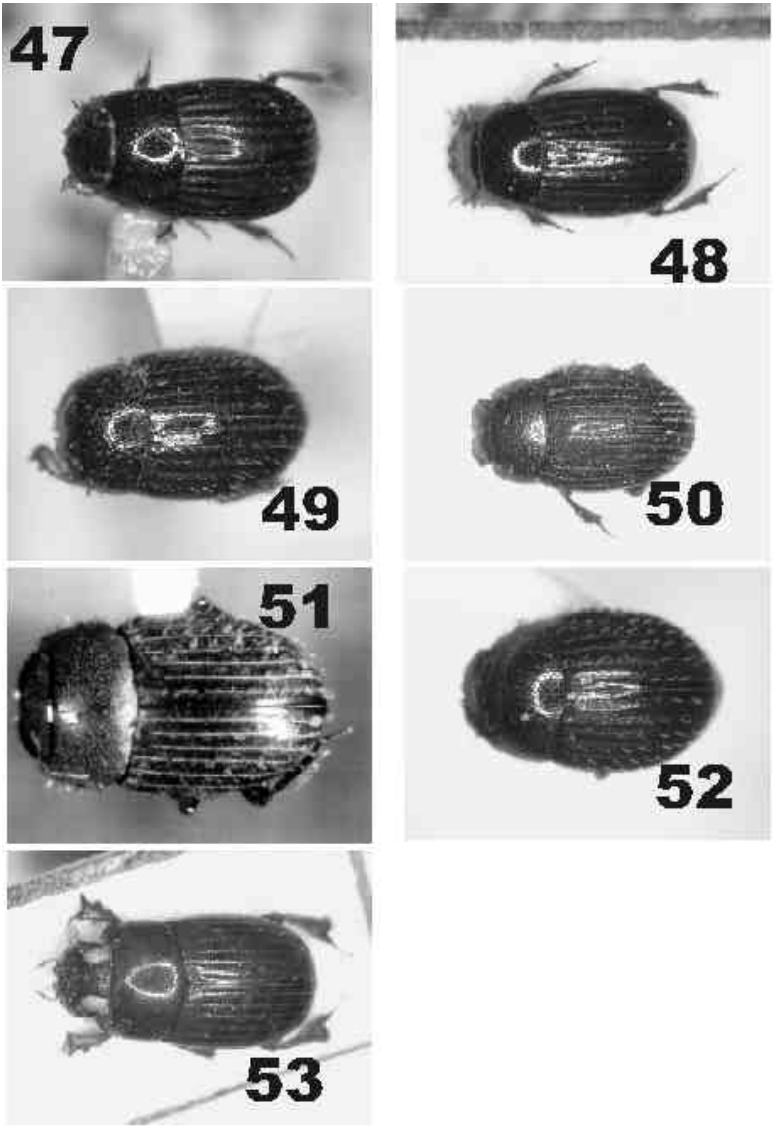
FIGURE 30. Distribution map for *Youngidium.*



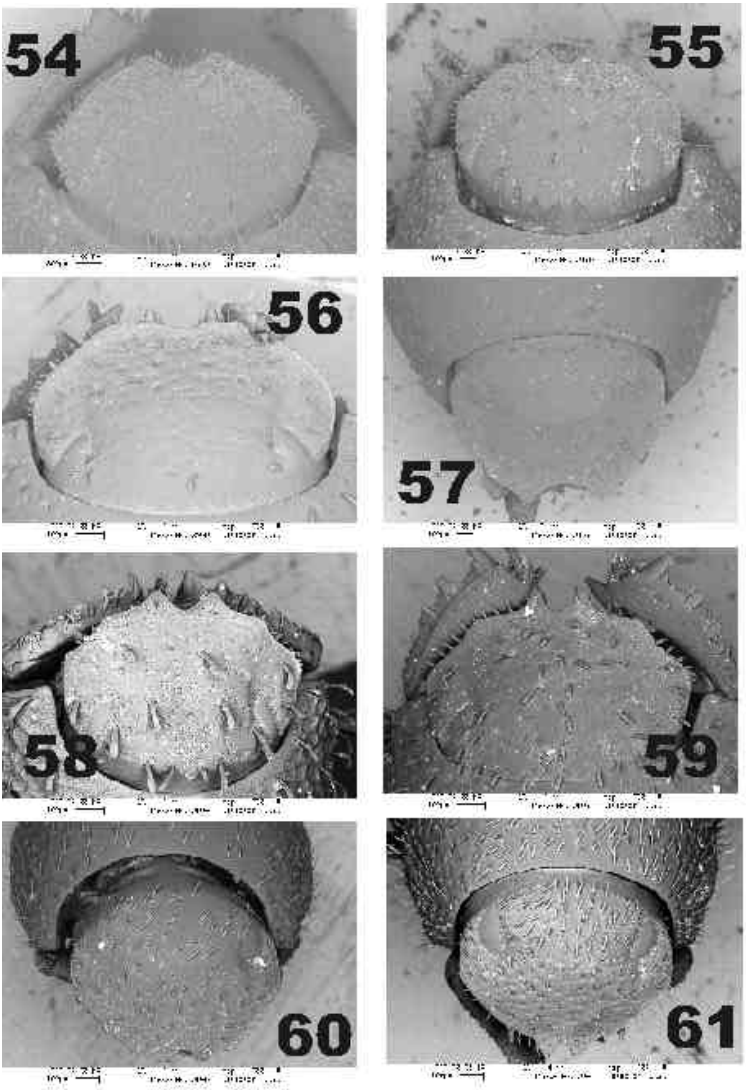
FIGURES 31-38. Dorsal view. 31. *Pedaridium hirsutum*; 32. *Trichillum (Trichillum) heydeni;* 33. *T. (Paratrichillum) pauliani*; 34. *Eutrichillum onorei*; 35. *Silvia unica*; 36-37. *Pereiraidium almeidai* (36. ♂; 37. ♀); 38. *Onoreidium ohausi*.



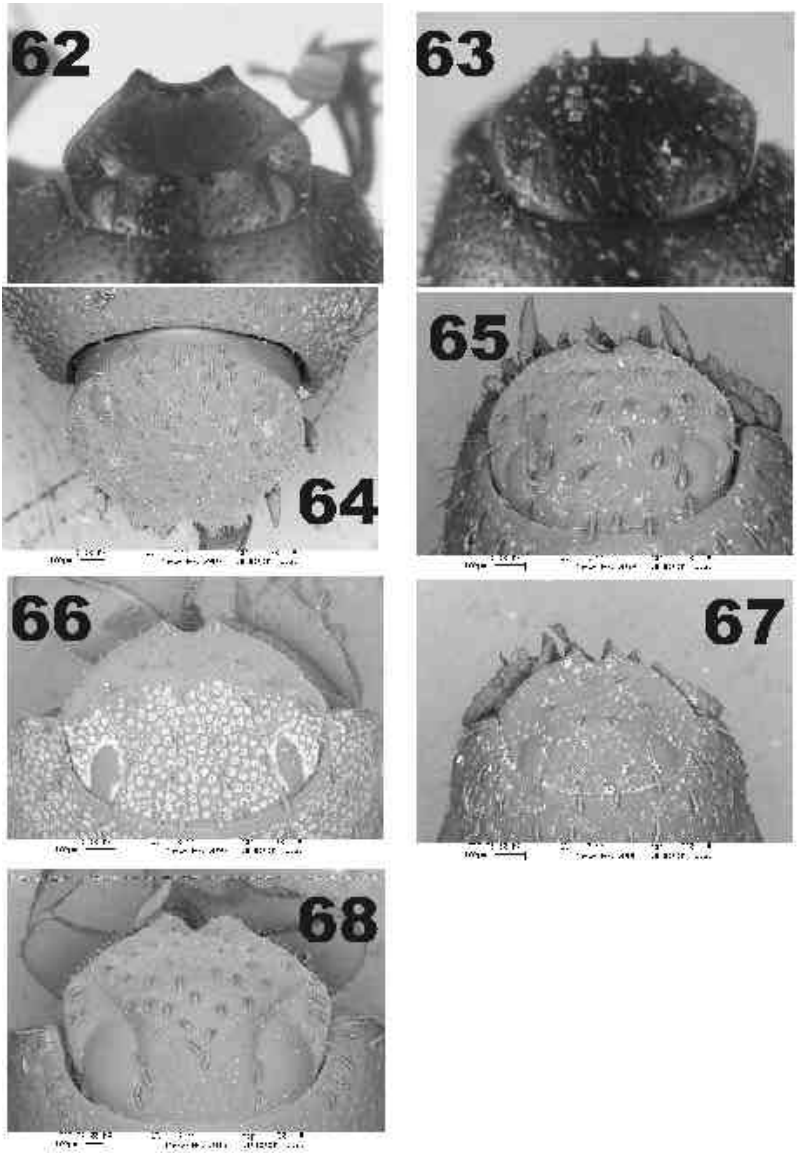
FIGURES 39-46. Dorsal view. 39. *Trichillidium quadridens*; 40. *Horridotrichillum horacioi;* 41. *Besourenga michelleae*; 42. *B. sprecherae*; 43. *Bradypodidium bustamantei*; 44. *Howdenidium bottimeri*; 45. *Youngidium brevisetosum*; 46. *Boreotrichillum pilosum.*



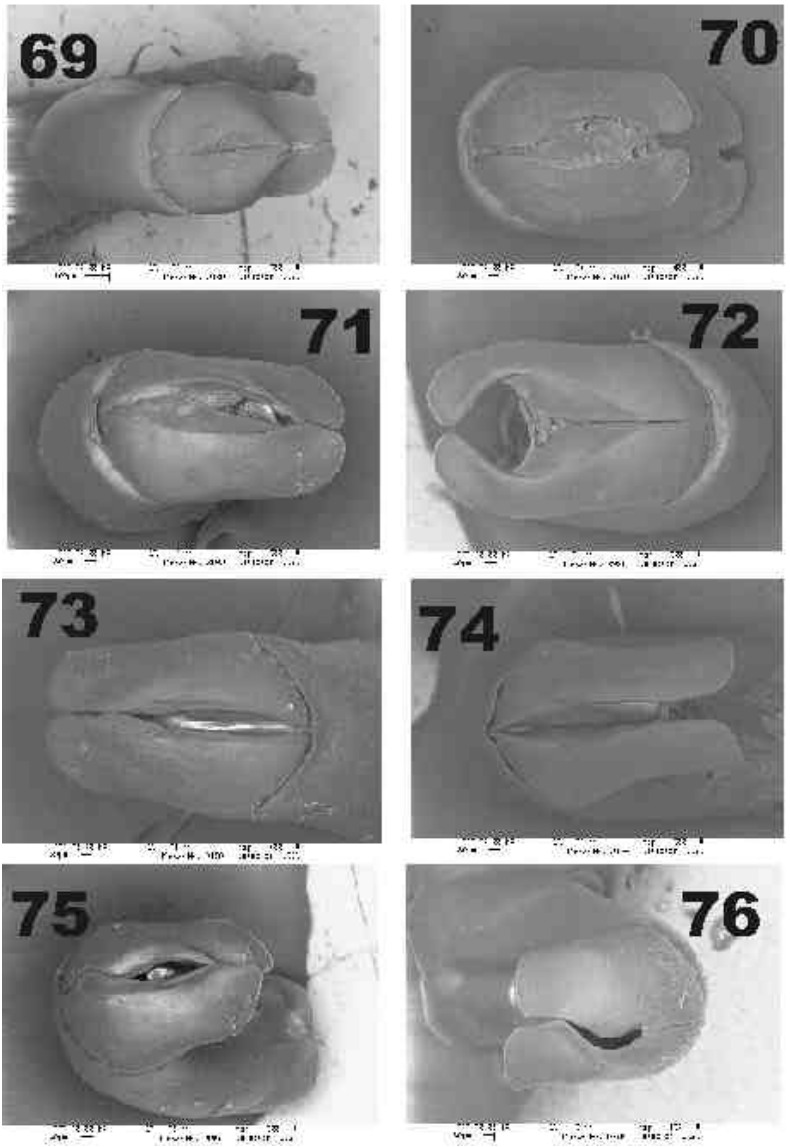
FIGURES 47-53. Dorsal view. 47. *Boreopedaridium maya*; 48. *Martinezidium fulgens;* 49. *Leotrichillum louzadaorum*; 50. *Genieridium cryptops*; 51. *Gillidium gilli*; 52. *Degallieridium liliputanum*; 53. *Feeridium woodruffi.*



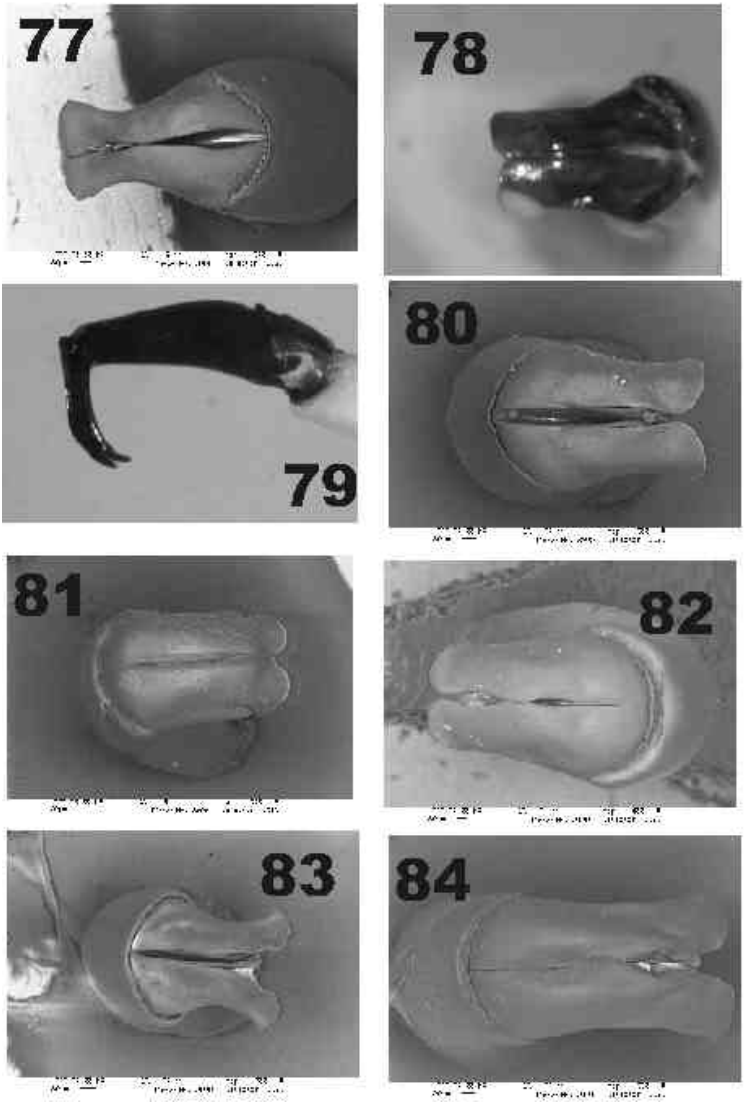
FIGURES 54-61. Dorsal view of head. 54. *Pedaridium hirsutum*; 55. *Trichillum (Paratrichillum) pauliani;* 56. *Silvia unica*; 57. *Onoreidium ohausi*; 58. *Horridotrichillum horacioi*; 59. *Besourenga ubirajarai*; 60. *Bradypodidium adisi*; 61. *B. bradyporum.*



FIGURES 62-68. Dorsal view of head. 62. *Howdenidium bottimeri*; 63. *Youngidium brevisetosum;* 64. *Boreotrichillum pilosum*; 65. *Leotrichillum louzadaorum*; 66. *Gillidium gilli*; 67. *Degallieridium liliputanum*; 68. *Feeridium woodruffi*.



FIGURES 69-76. Dorsal view of paramera. 69. *Pedaridium hirsutum*; 70. *Trichillum (Paratrichillum) pauliani;* 71. *Besourenga michelleae*; 72. *Silvia unica*; 73. *Pereiraidium almeidai*; 74. *Onoreidium ohausi*; 75. *Horridotrichillum horacioi*; 76. *Besourenga ubirajarai.*



FIGURES 77-78, 80-84. Dorsal view of paramera; 79. lateral view od aedeagus. 77. *Bradypodidium adisi*; 78. *Howdenidium bottimeri;* 79. *Youngidium brevisetosum*; 80. *Boreotrichillum pilosum*; 81. *Leotrichillum louzadaorum*; 82. *Genieridium cryptops*; 83. *Degallieridium liliputanum*; 84. *Feeridium woodruffi.*

CHAPTER 7

Taxonomic Synopsys of the Group *Trichillum-Pedaridium*

1 Resumo

VAZ DE MELLO, Fernando Zagury. Sinopse taxonômica do grupo *Trichillum-Pedaridium.* In: _____. **Espécies originalmente nos gêneros *Trichillum* Harold, 1868 e *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Cap. 7, p. 160-263. Dissertação (Mestrado em Entomologia)-Universidade Federal de Lavras, Lavras.*

Este capítulo apresenta uma revisão taxonômica em nível específico do grupo tratado na presente dissertação. Inclui uma chave de identificação para os gêneros tratados e chaves para as espécies de todos os gêneros tratados, exceto o subgênero *Trichillum (Trichillum)* e os gêneros *Besourenga, Eutrichillum* e *Bradypodidium.* Todas as espécies são citadas, com listagem do material examinado, diagnoses, distribuição geográfica e comentários. Descrevem-se nove espécies novas de *Besourenga*, duas de *Bradypodidium*, três de *Eutrichillum*, uma de *Leotrichillum*, quatro de *Martinezidium*, uma de *Onoreidium*, uma de *Pedaridium* e trinta e uma de *Trichillum (Trichillum)*.

* Comitê Orientador: Dr. Júlio Neil Cassa Louzada - UFLA (Orientador), Dr. Gonzalo Halffter Salas - IEcol, Dr. Sergio Ide - IB-SP e Dr. Mario Zunino – UniUrb.

2 Abstract

VAZ DE MELLO, Fernando Zagury. Taxonomic synopsis of the group *Trichillum-Pedaridium.* In: _____. **Species formerly in the genera *Trichillum* Harold, 1868 and *Pedaridium* Harold, 1868 (Coleoptera: Scarabaeidae).** 2003. Chap. 7. p. 160-263. Dissertation (Master Program in Entomology)- Universidade Federal de Lavras, Lavras.*

This chapter presents a taxonomic revision at specifical level of the grout treated in this dissertation. It includes a key for identification of treated genera, and keys for species of all genera except the subgenus *Trichillum (Trichillum)*, and the genera *Besourenga*, *Eutrichillum* and *Bradypodidium.* All species are cited, listing examined material, diagnosis, geographical distribution and remarks. Nine new species are described in the genus *Besourenga*, two in *Bradypodidium*, three in *Eutrichillum*, one in *Leotrichillum*, four in *Martinezidium*, one in *Onoreidium*, one in *Pedaridium* and 31 in *Trichillum (Trichillum)*.

* Guidance Committee: Júlio Neil Cassa Louzada - UFLA (Main Advisor), Gonzalo Halffter Salas - IEcol, Sergio Ide - IB-SP and Mario Zunino –UniUrb.

3 Introduction

The intent of this chapter is to provide keys for identification and diagnoses of the species of the group studied, including diagnoses of new species examined.

4 Material and Methods

A list of collections whose material has been examined, including acronyms ad curators, is in Chapter 6.

New names and status are referred also to Chapter 6.

5 Results and Discussion

5.1 Key to the American Scarabaeidae genera and subgenera with fusionated abdominal sternites and setae at elytral apex.

1. Elytron laterally with strong carina in its apical four-fifths, forming a pseudoepipleuron.....*Aphengium* Harold, 1868 (not treated here)

1'. Elytron without lateral carina nor pseudoepipleuron……...……2

2(1'). Epipleuron with one or two sharp angles near metacoxa (FIGURES 3. and 4.).....3

2'. Epipleuron at most with horizontal fold just posterior to metacoxa (FIGURES 1. and 2.).....8

3(2). Epipleuron with only one sharp angle near metacoxa (FIGURE 3.).....4

3'. Epipleuron with a second anterior angle near metacoxa (FIGURE 4.)....7

4(3). Clypeal teeth not in continuation with clypeal margin, but arising below clypeal margin.....…….....*Silvia*, **gen. n.**

4' Clypeal teeth in continuation with clypeal margin.....…….....5

5(4). Clypeo-genal margin incised, with clypeus and gena separately rounded.....…...*Eutrichillum* Martínez, 1968, **status n.**

5'. Clypeo-genal margin not incised, straight or angled...…….....6

6(5). Elytral discal interstriae cariniform.....*Horridotrichillum*, **gen. n.**

6' Elytral discal interstriae not cariniform.....*Besourenga*, **gen. n.**

7(3). Body surface black, shining.....*Trichillum (Trichillum)* Harold, 1868

7'. Body surface gray, opaque.....*Trichillum (Paratrichillum)*, **subgen. n.**

8(2). Epipleuron with horizontal fold posterior to metacoxa (FIGURE 2.).....9

8'. Epipleuron without horizontal fold (FIGURE 1.)...……...12

9(8). Hipomeral longitudinal carina absent.....*Degallieridium*, **gen. n.**

9'. Hipomeral longitudinal carina present.....…….....10

10(9). Eyes very large, interocular space smaller than two eye widths, size greater than 4 mm, interstriae uniseriately punctate.....*Feeridium*, **gen. n.**

10'. Eyes smaller, interocular space wider than three eye widths, size less than 3.5 mm...…….11

11(10)..Interstriae with unorganized setose punctures.....*Gillidium*, **gen. n.**

11'. Interstriae with setose punctures organized in one row…….....*Leotrichillum*, **gen. n.**

12(8). Head with two horns or two feeble tubercles on frontoclypeal suture, anterior margin of pronotum present.....*Pereiraidium*, **gen. n.**

12'. Head without horns or tubercles on frontoclypeal suture, anterior margin of pronotum absent or feebly marked…….....13

13(12). Elytral suture elevated along all elytron, elytral disc completely flat, eyes dorsally present.....…….*Pedaridium* Harold, 1868

13'. Elytral suture not elevated and elytral disc not flat, or if flat anteriorly then eyes absent dorsally.....……..14

14(13). Color red-brown with metallic sheen, body very elongated, setae sparse on pronotal and elytral discs. Head always without clypeo-frontal carina, and clypeal sides usually angulated or toothed. Southern Bolivia, Argentina and Western Paraguay…….....*Martinezidium*, **gen. n.**

14'. Color variable, but not red-brown. If metallic sheen present, then body oval and with dense hair covering in pronotal and elytral discs, or with clypeo-frontal carinna.……15

15(14). Males with apical internal tooth in both middle and hind tibiae. Color grey-brown or black, body elongated, always lacking clypeo-frontal carina. Clypeus with two teeth, clypeal sides straight or curved, if clypeo-genal margin sinuated then color always grey-brown. Colombian Andes, Southern Venezuela, Bolivia, Paraguay, Brazil and Argentina…….....*Genieridium*, **gen. n.**

15’. Males without apical internal tooth in middle or hind tibiae..……16

16(15). Clypeo-genal margin sinuated, endemic to Ecuador (Guayas, Manabí and Loja).....…….....*Onoreidium*, **gen. n.**

16'. Clypeo-genal margin straight or simply rounded..…….....……...17

17(16). Body elongated, striae apically strongly impressed, with dense hair covering, males with modified fore claws..……..*Bradypodidium*, **gen. n.**

17'. Males without modified fore claws, not with all other characters together.....18

18(17). Clypeus with four teeth, paramera strongly arcuate and internally dentate. Species from Southern South America (East of the Andes), from Southern Bolivia to Paraguay, Argentina and Southern Brazil……..……..*Trichillidium*, **gen. n.**

18'. Differing from above, at least paramera never strongly arcuate and internally dentate. Species from Western Ecuador, Chocó, Northern Venezuela, Central America and Southern Mexico.....19

19(18). Clypeus with two teeth.....…….....20

19'. Clypeus with four teeth.....……21

20(19). Head rounded, clypeus normally curved laterally. Southern Mexico and Guatemala.....….....*Boreopedaridium*, **gen. n.**

20'. Head elongated, clypeal sides almost straight, teeth very separated from each other.....…….*Howdenidium*, **gen. n.**

21(19). Central clypeal teeth similar to lateral ones in form, just longer. Paramera apically flat and rounded.....*Boreotrichillum*, **gen. n.**

21'. Central clypeal teeth much more acute than lateral ones, paramera long and apically acute and subconical.....*Youngidium* , **gen. n.**

SYSTEMATICS

5.2 *BESOURENGA* VAZ-DE-MELLO, **N. GEN.**

Type species: *Trichillum minutum* Saylor, 1935 (original designation, see Chapter 6).

5.2.1 Species included:

1. *Besourenga minutus* (Saylor, 1935)

Trichillum minutum Saylor, 1935: 207

Trichillum minutum; Balthasar, 1939: 13, 20, 24

Trichillum minutum; Blackwelder, 1944: 204

Trichillum (Eutrichillum) minutum; Martínez, 1968: 120-121

Trichillum (Eutrichillum) minutum; Ratcliffe, 1980: 341

Type series: Holotype ♀: PARAGUAY: **Concepción:** Horquetá (USNM).

Non-type material examined: BOLIVIA: **Santa Cruz:** Ichilo, Buenavista, Tacu, III-1951, Martínez (1 CMNC); PARAGUAY: **Concepción:** Horquetá, IV-1934, Schultze (3 CMNC), Horquetá, 4-XII-1934 (1 CMNC).

Diagnosis: 2.2-2.5 mm. Clypeo-genal angle obtuse, quite rounded. Elytra shining, not microgranulated. Striae simple and interstriae with sparse punctures. (FIGURES 5., 6.).

Distribution: Bolivia (Santa Cruz) and Paraguay (Concepción).

2. *Besourenga vejdovskyi* (Balthasar, 1939)

Trichillum vejdovskyi Balthasar, 1939: 20, 23-24

Trichillum vejdovskyi; Martínez, 1947: 110

Trichillum (Eutrichillum) vejdovskyi; Martínez, 1968: 120-121

Trichillum (Eutrichillum) vejdovskyi; Ratcliffe, 1980: 341

Type series: Holotype ♂: BOLIVIA: **Santa Cruz:** Umg. Buenavista, 450 m, Steinbach (NMP).

Non-type material examined: BOLIVIA: **Santa Cruz:** Gutiérrez, Portachuelo, II-1950, Martínez (1 CMNC); Río Piray, XI-1950, Martínez (1 CMNC); Santa Cruz, XI-1955, Zischka (1 CMNC).

Diagnosis: 2.9-3.0 mm. Clypeo-genal angles obtuse but defined. Elytra microsculptured, opaque. Striae simple and interstriae with sparse punctures. (FIGURES 7., 8.).

Distribution: Bolivia (Santa Cruz).

3. *Besourenga amarillai* (Aguilar, 2001)

Pedaridium amarillai Aguilar, 2001: 1-3

Type series: Holotype ♀ not seen (Museo de História Natural del Paraguay, Asunción).

Diagnosis: Approximatelly 3 mm. Clypeo-genal angles acute. Elytral striae punctate and carinulate, interstriae convex, with one to two rows of yellow setae (based on original description).

Distribution: Known only from the type locality, Cerro Corá, Amambay, Paraguay.

Remarks: No specimens of this species could be seen. It appears to be closely related to *B. sprecherae*.

4. *Besourenga bachmanni* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Bahia:** Barreiras, XII-1991 (holotype IBSP ex-FVMC).

Paratypes: same data as holotype (2 FVMC).

Diagnosis: 2.6-2.9 mm. Clypeo-genal angle obtuse but very conspicuous. Elytral discal striae feebly punctured, interstriae flat with unorganized punctures separated by about 3-4 diameters, shining and not microsculptured. (FIGURE 9.).

Etymology: This species in named after A. Bachmann (Museo Argentino de Ciencias Naturales).

Distribution: Known only from the type locality, in western Bahia (Brazil).

Remarks: Only females known

5. *Besourenga brucei* **n. sp.**

Type series: Holotype ♂: BOLIVIA: **Santa Cruz:** PNNKM Los Fierros, 20-30-I-1997, B Gill & A. Forsyth. (BDGC).

Paratypes: BOLIVIA: **Sara.** Steinbach. (2 MZSP); **Santa Cruz:** PNNKM Los Fierros, 20-30-I-1997, B Gill & A. Forsyth. (1 BDGC).

Diagnosis: 2.5-2.8 mm Externally very similar to *B. minutus*, differing by larger size, and latero-apical conspicuous angle in left paramere. (FIGURES 10., 11.).

Etymology: This species in named after Bruce D. Gill.

Distribution: Known only from Santa Cruz and Sara, Bolivia.

6. *Besourenga campaneri* **n. sp.**

Type series: Holotype ♀: BRAZIL: **Bahia:** Barreiras, XII-1991 (IBSP ex-FVMC).

Paratype: same data as holotype (FVMC).

Diagnosis: 2.8-3.0 mm. Clypeo-genal angle acute and very distinct, but not dentiform. Striae simply punctures. Discal interstiae flat, microsculptured, opaque, bearing two rows of punctures, one of them with setae. (FIGURE 12.).

Etymology: This species in named after Carlos Campaner (Museu de Zoologia da Universidade de São Paulo).

Distribution: Known only from the type locality, the same as for *B. bachmanni.*

Remarks: Males not known.

7. *Besourenga guimaraesrosai* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Cordisburgo, Faz Pontinha, XII-1993, FZ Vaz-de-Mello (IBSP ex-AMBC).

Paratypes: BRAZIL: **Distrito Federal:** Est. Florestal Cabeça do Veado, 1100 m, 17-18-X-1971, EG, I & EA Munroe (3 CNIC).

Diagnosis: 2.9-3.1 mm. Clypeo-genal angles quite rounded. Elytral surface opaque, strongly microscultured, elytral striae without punctures. Interstriae flat and with dense punctures. (FIGURES 13., 14.).

Etymology: This species in named after João Guimarães Rosa (1908-1967), excellent Brazilian writer born in the type locality.

Distribution: Known only from two localities in the Cerrado of Minas Gerais and Distritro Federal, Brazil.

8. *Besourenga michelleae* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Distrito Federal:** RECOR-IBGE, XII-1999, M Milhomem, campo sujo (IBSP ex-FVMC).

Paratypes: BRAZIL: **Distrito Federal:** Est. Florestal Cabeça do Veado, 1100 m, 17-X-1971, EG, I & EA Munroe (2 CNIC); 23-27-X-1971 (1 CNIC); RECOR-IBGE, X-1999, M Milhomem, campo sujo (4 FVMC); XI-1999 (3 FVMC); XII-1999 (25 FVMC); X-1999, cerrado (16 FVMC); XI-1997, I Diniz (1 FVMC); **Mato Grosso do Sul:** Costa Rica, 17-XII-1993, S Ide (4 MZSP).

Diagnosis: 2.5-2.8 mm. Clypeo-genal angle obtuse and conspicuous. Elytral striae not punctured. Discal interstriae flat, without microsculpture, shining, bearing a row of large punctures (one of them with setae) adjacent to striae. (FIGURES 15., 16.).

Etymology: This species in named after Michelle Milhomem, collector of most of the type series.

Distribution: Known from two far localities in the Cerrado area, Brazil.

Remarks: This species appears closely related to *B. brucei* and *B. minutus*.

9. *Besourenga renaudpauliani* **n. sp.**

Type series: Holotype ♀: BRAZIL: **Distrito Federal:** RECOR-IBGE, XI-1999, M Milhomem, campo sujo (IBSP ex-FVMC).

Diagnosis: 2.8 mm. Clypeal emargination unusually deep. Clypeo-genal angle nearly rounded. Elytra with striae feebly punctured. Discal interstriae with small unorganized punctures and not microsculptured. (FIGURE 17.).

Etymology: This species in named after Renaud Paulian.

Distribution: Known only from the type locality.

Remarks: Male unknown.

10. *Besourenga sergioidei* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Distrito Federal:** RECOR-IBGE, XII-1999, M Milhomem, campo sujo (IBSP ex-FVMC).

Paratypes: BRAZIL: **Distrito Federal:** RECOR-IBGE, XI-1999, M Milhomem, campo sujo (2 FVMC); XII-1999 (8 FVMC); XII-1999 (19 FVMC); XII-1999, cerrado (1 FVMC); 22-XII-1997, I Diniz (2 FVMC); XII-1997; (3 FVMC); **Goiás:** Jataí, Faz Nova Orlândia, I-1964, Martins, Morgante & Silva (1 MZSP).

Diagnosis: 2.3-2.7 mm. Clypeo-genal angle obtuse and conspicuous. Elytral striae clearly punctured, interstriae microsculptured and with very large ocellate punctures (larger than those in striae), separated by less than one diameter, and one row of setose punctures.

Etymology: This species in named after Sergio Ide, who improved very much this work.

Distribution: Known from western Goiás and Distrito Federal (Brazil).

11. *Besourenga sprecherae* **n. sp.**

Type series: Holotype ♀: BRAZIL: **Distrito Federal:** RECOR-IBGE, XII-1999, M Milhomem, campo sujo (IBSP ex-FVMC).

Paratypes: BRAZIL: **Distrito Federal:** RECOR-IBGE, XII-1999, M Milhomem, campo sujo (1 FVMC); **Goiás:** Goiânia, 21-XII-1984, MJ Ferreira (2 FVMC); Jataí, Faz. Nova Orlândia, I-1964, Martins, Morgante & Silva (1 IBSP).

Diagnosis: 2.7-3.3 mm. Clypeo-genal angle dentiform. Elytras striae carinulate with small punctures. Discal interstriae very elevated (cariniform) with a row of setose punctures on the ridge.

Etymology: This species in named after Eva Sprecher (Naturhistorisches Museum, Basel, Switzerland).

Distribution: Western Goiás and Distrito Federal (Brazil).

Remarks: This is the biggest species in the genus, and the most easily recognizable by its unique discal interstriae, that can be related only with those of *B. amarillai*. Male unknown.

12. *Besourenga ubirajarai* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Montes Claros, I-2000, JNC Louzada (IBSP ex-FVMC).

Paratypes: BRAZIL: **Minas Gerais:** Montes Claros, I-1991 (1 FVMC); I-2000, JNC Louzada (1 FVMC); Três Marias, XII-1993, arm luminosa (1 FVMC); XI-1993 (1 FVMC); XII-1990 (1 FVMC).

Diagnosis: 2.8-3.0 mm. Clypeo-genal angle acute and very conspicuous. Elytral striae with feeble punctures, discal interstriae flat, strongly microsculptures, and with two rows of punctures. (See Chapter 6 for FIGURES).

Etymology: This species in named after Ubirajara R. Martins (Museu de Zoologia, Universidade de São Paulo).

Distribution: Northern and nortwestern Minas Gerais (Brazil).

5.3 *BOREOPEDARIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Pedaridium maya* Vaz-de-Mello, Halffter & Halffter, in press (monotypy).

5.3.1 Species included:

1. *Boreopedaridium maya* (Vaz-de-Mello, Halffter & Halffter, in press)

Pedaridium maya; (*nomen nudum*) Martínez, 1992: 21

Pedaridium maya Vaz-de-Mello, Halffter & Halffter, in press

Type series: See Chapter 4.

Diagnosis: See Chapter 4.

Distribution: See Chapter 4.

Remarks: See Chapter 4.

5.4 *BOREOTRICHILLUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Trichillum pilosum* Robinson, 1948 (monotypy)

5.4.1 Species included:

1. *Boreotrichillum pilosum* (Robinson, 1948)

Trichillum pilosum Robinson, 1948: 149

Pedaridium pilosum; Howden & Young, 1981: 43

Pedaridium pilosum; Barbero, 2001: 20

Type series: Holotype not seen (USNM).

Non-type material examined: COLOMBIA: **Chocó:** PNN Ensenada de Utría, 18-VI-1997, Llanos-Jurado, pitfall exr. humanos selva, día (1 FVMC); COSTA RICA: **Alanjuela:** Penas Blancas River Valley, 500-1000 m, 15-IV-1985, B Lyon (1 CMNC); San Ramón, Río San Lorencito, 800 m, 28-II-1987, A Solís (1 CMNC); **Cartago:** Turrialba, 650 m, II-1980, H&A Howden (22 CMNC);

Guanacaste: above Tilaran, 18-VII-1966, S Peck, in litter wet forest (1 CMNC; 1 CNIC); Monteverde 1400 m, II-1980, RS Anderson, MegaDung Trap (3 CMNC); Monteverde Reserve 1400 m, 24-V-1979 H&A Howden (2 CMNC); 1500 m, 23-V-1979, H&A Howden (1 CMNC); 27-V-1979, H&A Howden, (2 CMNC); Parque Nac Monteverde, 13-VIII-1999, Moreno & Mestre, trampa excr. humano (1 FVMC); **Heredia:** 10 km W Puerto Viejo, 170 m, 2-5-III-1991, H&A Howden, dung traps (5 CMNC); flight intercept traps (2 CMNC, 1 FVMC); **Limón:** 4 km E Puerto Viejo, 10-30 m, 28-30-XI-1996, Génier & Barret (3 CMNC); Valle de la Estrella, Pandora, 17-20-II-1984, H&A Howden (3 CMNC); **Península de Osa:** Est. Fund. Neot. Aguas Buenas, 7 km W Rincón de Osa, 80 m, VI-1997, S&J Peck (1 CMNC); **Puntarenas:** PN Manuel Antonio, 8-14-XII-1987, Génier & Bertrand (9 CMNC); San Vito, Las Cruces, 1200 m, 22-II-3-III-1983, B Gill (7 CMNC); Coto Brus, Est. Biol. Las Cruces, 31-III-01-IV-2002, A Cline & A Tishechkin, FIT (1 FVMC); San Vito, Las Cruces, 1200 m, 22-II-3-III-1983, BD Gill (1 FVMC); **San José:** 2 km S Colón, 1100 m, 1-16-II-1984, H&A Howden (4 CMNC); ECUADOR: **Esmeraldas:** La Chiquita, 5 m, 11 km SE San Lorenzo, VI-1975, S Peck (8 CMNC); **Guayas:** 27 km S Pto. Lopez, 76 km N Santa Elena, VII-1976, S Peck (1 CMNC); **Los Ríos:** Quevedo, Pichilingue, VIII-1972, Martínez (25 CMNC); IX-1972 (8 CMNC); VI-1976 (1 FVMC); Quevedo, V-1976, Martínez (50 FMLT); **Manabí:** 73 km NE Chone, 90 km W Sto Domingo, 300 m, VI-1976, S Peck (3 CMNC); **Pichincha:** 113 km NW Quito, en Puerto Quito Rd, 2600 m, VIII-1976, J Cohen (1 CMNC); 16 km E Sto Domingo, Tinalandia, 680 m, 4V-25-VII-1985, S Peck, dung trap (11 CMNC); 47 km S Sto Domingo, II-1976, Howden & Nealis (3 CMNC); Rio Palenque Station, 18-30-V-1975, L Ling (3 CMNC); 230 m, 19-25-V-1975, S Peck, dung trap (10 CMNC); 28-31-VII-1976, S Peck, dung trap (6 CMNC); Pachijal Rd 104 km NW Quito, VIII-1976, J Cohen (1 CMNC); Río Palenque, 28-29-VII-1976, S Peck (1 CMNC); 16 km SE Santo Domingo,

Tinalandia, 680 m, 22-28-VI-1975, S & J Peck (3 CNIC); no date (1 CNIC); 16-28-VI-1975, S Peck, for. dung traps (1 FVMC); PANAMA: **Canal Zone:** Gamboa, VI-1983, B Gill (1 BDGC); Barro Colorado Island, 13-I-1959 (4 CMNC); Madden Forest, 10-VI-1977, H&A Howden (2 CMNC); Barro Colorado Island, Gatun L., V-1981, BD Gill (1 FVMC); **Chiriqui:** 4 km N Santa Clara, Hartmann's Finca, 1500 m, 27-VI-3-VII-1981, B Gill (3 BDGC); Cerro Hornito, 15 km NE Gualaca, 1200 m, VI-1982, B Gill (7 BDGC, 2 FVMC); 15 km NW H Volcán, 1200 m, Hartmann Finca, 3-V-1977, S Peck (1 CMNC); 20-31-V-1977, S Peck (2 CMNC); **Colón:** 10 mi SE Colón, Santa Rita Ridge, 270 m, 10-12-VI-1977, S Peck (2 CMNC); **Darién:** Est. Ambiental Cana, 500 m, 04-VI-1996, RS Anderson, human dung trap (1 CMNC).

Diagnosis: 3.0-4.1 mm. As for the genus, see Chapter 6.

Distribution: See Chapter 6.

Remarks: See Chapter 6.

5.5 *BRADYPODIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Trichillum bradyporum* Boucomont, 1928 (original designation)

5.5.1 Species included:

1. *Bradypodidium bradyporum* (Boucomont, 1928)

Trichillum bradyporum Boucomont, 1928: 188

Trichillum bradyporum; Balthasar, 1939: 15-17, 26

Trichillum bradyporum; Blackwelder, 1944: 204

Pedaridium bradyporum; Martínez, 1968: 119

Pedaridium bradyporum; Ferreira & Galileo, 1993: 36

Pedaridium bradyporum; Solís & Kohlmann, 2003: 9-11

Type series: Holotype not sexed: COSTA RICA: **Limón:** Hamburgfarm, Reventazón, Ebene Limón, 21-VIII-1925, F Nevermann, am Affer im Pelz von 3 zeilig Faulfier (MNHN).

Non-type material examined: COSTA RICA: **Cartago:** Catie, 3 km SE Turrialba, 600 m, 13-16-V-1985, J Doyen (1 BDGC); Turrialba, Catie, 600 m, 16-V-1979, H&A Howden (1 CMNC); Turrialba, III-1952, A Trejos, on Bradypus griseus (1 CNIC); **Limón:** Hamburgfarm, Reventazón, Ebene Limón, 27-X-1931, Nevermann, am anus von Bradypus infuscatus (1 BDGC, 1 CMNC, 1 MZSP, 10 NHMB); 1936 (1 CMNC); 1936-39 (1 CNIC); ECUADOR: **Esmeraldas:** La Chiquita, 5 m, 11 km SE San Lorenzo, 3-16-VI-1975, S&J Peck (1 CMNC).

Diagnosis: 2.4-3.1 mm. Clypeus always with four teeth. Left paramere slightly longer than the right one. (FIGURE 21, see also Chapter 6).

Distribution: Pacific and Atlantic slopes of Costa Rica, Ecuatorian Chocó. Probably distributed by all Biogeographical Chocó.

2. *Bradypodidium adisi* (Ratcliffe, 1980)

Trichillum (Eutrichillum) adisi Ratcliffe, 1980: 337-341

Pedaridium adissi; (*sic*) Ferreira & Galileo, 1993: 28-29

Pedaridium adisi; Vaz-de-Mello & Canhedo, 1998: 100

Pedaridium adisi; Vaz-de-Mello, 2000: 194

Pedaridium adisi; Verdú & galante, 2001

Type series: Holotype not seen (Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil).

Paratypes:

BRAZIL: **Amazonas:** Ilha do Curari, 25-I-1978, R Best, Br tridactylus (8 CMNC, 2 CNIC); Manaus, 2-VI-1977, J Adis, B. tridactylus (1 BDGC, 1 CMNC, 1 CNIC, 3 FVMC).

Non-type material examined: BRAZIL: **Amazonas:** Ilha do Curari, 2-VI-1977, J Adis, Sloth (3 CMNC); **Pará:** Ilha de Marajó, distr. Caldeirão, II-1924, Wilh. Ehrhardt ("Typus" *Pedaridium setulosum* Balthasar *i. litt.* NMP); PERU: **Loreto:** R Yaropa, Puerto Miguel, 200 m, 16-23-XII-1994, T Hácz & G Holzinger (2 HMNH); Río Ucayali, Yarinacocha, 27-V-1945, J Schunke, pele de preguiça (2 CMNC).

Diagnosis: 2.3-3.2 mm. Clypeus with none, two or four teeth. Paramera slightly asymmetrical. (See Chapter 6 for FIGURES).

Distribution: Amazonian hylaea.

Remarks: This is the most variable species in the genus. Although clypeal teeth are in some respect related to sex (males tend to have none or two, females four), there are exception to this rule.

3. *Bradypodidium venezuelense* (Ferreira & Galileo, 1993)

Pedaridium venezuelensis Ferreira & Galileo, 1993: 27-28

Type series: Holotype not seen.

Paratype: VENEZUELA: **Carabobo:** San Esteban, 100 m, 01-VII-1975, Martínez (1 FZRS).

Non-type material examined: VENEZUELA: **Aragua:** Rancho Grande 1100 m, 16-V-1967, H&A Howden (1 CMNC); 18-19-II-1971, H&A Howden (1 CMNC); 800 m (1 CMNC).

Diagnosis: 3.0-3.5 mm. Clypeus with two feeble teeth, emargination in wide V. Form more flat than previous species, and eyes larger. Paramera not expanded in the apex as in other species of the genus, simply convergent.

Distribution: Northern Venezuela.

Remarks: This is the most isolated species in the genus.

4. *Bradypodidium alvarengai* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Bahia:** Encruzilhada, XI-1972, Alvarenga (CMNC).

Paratypes: BRAZIL: **Bahia:** Encruzilhada, XI-1972, Alvarenga (1 CMNC); XI-1974 (2 CMNC); XII-1980, Alvarenga & Martínez (1 CMNC).

Diagnosis: 3.2-3.7 mm. Body more rounded than other species. Clypeus with two or four teeth. Paramera completely symmetrical. (FIGURES 22., 23.).

Etymology: This species in named after Moacyr Alvarenga, collector of the type series and many other specimens important for this study.

Distribution: Eastern Minas Gerais-Bahia border, in Brazil.

Remarks: This is the largest species of the genus.

5. *Bradypodidium bustamantei* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Viçosa, XI-1999, Bello (IBSP ex-AMBC).

Paratypes: BRAZIL: **Minas Gerais:** Viçosa, XI-1999, Bello (3 AMBC); XI-1996, Vaz-de-Mello, Hardy & Harrison (2 FVMC); **Rio de Janeiro:** Nova Friburgo, I-2001, E Grossi (1 AMBC); XI-1998, P Grossi (1 FVMC); 1000 m, I-2002, P&E Grossi (2 FVMC).

Diagnosis: 2.9-3.5 mm. Clypeus with four teeth. Paramera slightly asymmetrical. (FIGURES 24., 25.).

Etymology: This species in named after Pedro Bustamante, recently deceased ornythologist whose principal working site was the type locality.

Distribution: Atlantic forest 650-1000 m in southwestern Brazil.

Remarks: Captured only with light traps.

5.6 *DEGALLIERIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Degallieridium liliputanum* Vaz-de-Mello (monotypy)

5.6.1 Species included:

1. *Degallieridium liliputanum* Vaz-de-Mello

Type series: See Chapter 6.

Diagnosis: See Chapter 6.

Distribution: See Chapter 6.

Remarks: See Chapter 6.

5.7 *EUTRICHILLUM* MARTÍNEZ, 1968, **N. STATUS**

Type species: *Trichillum boucomonti* Saylor, 1935 = *T. hirsutum* Boucomont, 1928 (original designation)

5.7.1 Species included:

1. *Eutrichillum hirsutum* (Boucomont, 1928)

Trichillum hirsutum Boucomont, 1928: 187

Trichillum hirsutum; Arrow, 1932: 226

Trichillum boucomonti Saylor, 1935

Trichillum hirsutum; Paulian, 1936: 206-207

Trichillum boucomonti; Balthasar, 1939: 13, 18, 22

Trichillum hirsutum; Balthasar, 1939: 13, 19, 22-23

Trichillum hirsutum; Pessôa & Lane, 1941: 447

Trichillum boucomonti; Blackwelder, 1944: 204

Trichillum hirsutum; Blackwelder, 1944: 204

Trichillum (Eutrichillum) boucomonti; Martínez, 1968: 120-121

Trichillum hirsutum; Martínez, 1968: 119

Trichillum (Eutrichillum) boucomonti; Ratcliffe, 1980: 341

Trichillum (Eutrichillum) hirsutum; Ratcliffe, 1980: 341

Trichillum (Eutrichillum) boucomonti; (*pars*) Ratcliffe, 1981: 185

Trichillum (Eutrichillum) hirsutum; (*pars*) Ratcliffe, 1981: 183-184

Trichillum (Eutrichillum) boucomonti; Martínez, 1987: 60

Trichillum (Eutrichillum) boucomonti; Monteresino *et al*., 1996: 107

Trichillum (Eutrichillum) boucomonti; Vaz-de-Mello, 2000: 195

Trichillum (Eutrichillum) hirsutum; Vaz-de-Mello, 2000: 195

Trichillum (Eutrichillum) boucomonti; Génier & Vaz-de-Mello, 2002: 189

Type series:

Trichillum hirsutum Boucomont, 1928: Holotype ♀: BRAZIL: **São Paulo:** no locality (MNHN).

Trichillum boucomonti Saylor, 1935: Holotype ♀: PARAGUAY: **Concepción:** Horquetá (USNM).

Non-type material examined: ARGENTINA: **Corrientes:** Sto Tomé, XI-1945, Martínez (2 CMNC); **Misiones:** PN Iguazu, 180 m, XII-1990-I-1991, S Peck (2 CMNC); BOLIVIA: **Santa Cruz:** Gutiérrez, Portachuelo, II-1950, Martínez (2 CMNC); Santa Cruz, XI-1955, Zischka (5 CMNC); BRAZIL: **Bahia:** Barreiras, XII-1991 (1 FVMC); Encruzilhada, XII-1980, Alvarenga & Martínez (2 CMNC, 1 FVMC); Encruzilhada, 980 m, XI-1972, Alvarenga (3 MZSP); **Distrito Federal:** Brasília 1100 m, II-2001, N Degallier (2 FVMC); X-2000 (4 FVMC); XI-1999 (1 CMNC); XII-1997, P. Grossi (1 FVMC); Est. Florestal Cabeça do Veado, 1100 m, 27-X-1971, EG, I & EA Munroe (1 CNIC); RECOR-IBGE, 27-V-1997, I Diniz (1 FVMC); XI-1999, M Milhomem, campo sujo (1 FVMC); XII-1999 (1 FVMC); **Espírito Santo:** Pque Sooretama, Linhares, 12-27-X-1962, FS Pereira (1 MZSP); Venda Nova do Imigrante, X-1998, Falqueto & Vaz-de-Mello (2 FVMC); **Goiás:** Bom Jardim de Goiás, II-1997, FZ Vaz-de-Mello (2 FVMC); Goiânia, 03-XII-2001, SS Silva (3 FVMC); Jataí, Faz Nova Orlândia, I-1964, Martins, Morgante & Silva (2 MZSP, 1 IBSP); Jataí, I-1955 (2 CMNC, 10 MZSP); Rio Verde, II-1998, J Carlos (1 AMBC); **Mato Grosso do Sul:** Costa Rica, 17-XII-1993, S Ide (5 MZSP); Nova Andradina, II-1996, Louzada & Vaz-de-Mello (1 FVMC); Selvíria, UNESP farm:01-IV-1999, CAH

Flechtmann, ex black light, Brachiaria decumbens pasture (1 FEIS); 20-I-1999 (1 FEIS); **Mato Grosso:** Barra do Tapirapé, 2-16-I-1966, B Malkin (1 IBSP); XI-1964, Malkin (1 CMNC); Diamantino, Alto Rio Arinos, XI-1998, E Furtado (1 FVMC); Pq Nac. Xingu, Jacaré, XI-1961, Alvarenga & Bokermann (116 MZSP); Xingu:XI-1947 (1 MNRJ); XI-1961 Alvarenga & Werner (89 MZSP); XI-1961, Alvarenga (3 CMNC); **Minas Gerais:** Açucena, II-1952, Pereira (1 CMNC); Águas Vermelhas, XII-1998, Bello & Vaz-de-Mello (1 FVMC); Belo Horizonte, X-1950 (1 MZSP); Buritis (Rib. Confins), X-1964, Exp. Dep. Zool. (1 CMNC); Caxambu, 02-XII-1990, Bello (1 FVMC); Cordisburgo, Faz Pontinha, I-1992, FZ Vaz-de-Mello (1 FVMC); Ipatinga, XI-1994, E Grossi (1 FVMC); Martinho Campos, X-1991(1 FVMC); Montes Claros, I-2000, JNC Louzada (3 FVMC); Nova Era, I-1993 (1FVMC); Paracatu, II-1997, S Lourenço (2 FVMC); XII-1996 (3 FVMC); Vespasiano, I-1952, Pe. Pereira (1 BDGC, 6 CMNC); XII-1945, Pereira (4 CMNC); XII-1951 (1 MZSP); Viçosa, mata do Paraíso, I-1995, JNC Louzada (1 FVMC); I-1996, Louzada, Sperber & Vaz-de-Mello (2 FVMC); Viçosa, 02-II-1994, JNC Louzada (1 FVMC); 03-II-1994 (4 FVMC); 04-I-1994 (3 FVMC); 07-I-1994 (2 FVMC); 10-I-1992, Lopes & Louzada (1 FVMC); 10-I-1994, JNC Louzada (2 FVMC); 12-I-1992, Lopes & Louzada (1 FVMC); 21-XI-1991, Lopes & Louzada (1 FVMC); 25-I-1994, JNC Louzada (1 FVMC); **Paraná:** Curitiba, II-1944, Hatsbach (1 MZSP); Londrina, :XI-1998, J Lopes (3 AMBC); XI-XII-1998, IM Medri (1 FVMC); Vila Velha, II-1945 (1 MZSP); **Rio de Janeiro:** 17 km E Nova Friburgo, 750 m, 21-I-2000, Génier & Ide (1 CMNC); Itatiaia, 20-I-1993, CL Godinho Jr (1 FVMC); Nova Friburgo, 1000 m, I-2002, P&E Grossi (2 FVMC); I-2001 (1 AMBC); III-1998, P Grossi (1 FVMC); XI-1996, FZ Vaz-de-Mello (1 FVMC); **Rio Grande do Sul:** Near Cachoeira, Henninger (1 CMNC); **São Paulo:** no locality, Mráz leg. (2 NHMB); Aclimação, XII-1958 (1 CMNC); Barueri, 22-II-1956, K. Lenko (1 MZSP); XII-1955 (1 CMNC); Botucatu, 22-II-1955, Werner (3 MZSP);

Cerqueira César, XII-1999, J Carlos (1 AMBC); Cidade, Ipiranga, XII-1958, A Martínez (3 BDGC, 5 CMNC); XII-1962, Martínez (2 CMNC); Itu, Faz. Pau d' Alho, 12-15-XI-1960, Martins (1 MZSP); II-1969, Martins (1 MZSP); Mogi Guaçu, Faz. Campininhas, I-8-I-1970, JM & BA Campbell (2 CNIC); Pirassununga, Usina – luz, 9-XI-1945, Schubart (2 MZSP); XI-1952 (2 MZSP); Pirassununga, XI-1952 (1 CMNC); XI-1956, Martínez (3 CMNC); Ribeirão Preto (Fac. Medicina), I-1955, Barretto (1 MZSP); Rio Claro, XII-1942, Claretiano (17 MZSP); São Paulo, Ipiranga (1 MZSP); Ypiranga, XI-1929, Spitz (1 MZSP); PARAGUAY: **Do.?:** Chaco, XII-1934, Schultze (1 CMNC); **Alto Paraná:** Limoy, XI-1990, G Arriágada (3 FVMC); RB Itabo, X-1989, G Arriágada (2 FVMC); **Canindeyú:** Est. Pozuelo, XII-1990, G Arriágada (3 FVMC); **Central:** Asunción, IX-1944 (5 MZSP); XI-1944 (1 CMNC); **Concepción?:** Mariscal Estigarribia, I-1990, G Arriágada (1 FVMC); **Concepción:** Horquetá, I-1934, Schultze (1 CMNC); I-1943 (1 CMNC); IV-1934 (1 CMNC); **Guayrá:** Villarrica, X-1934, Köller (1 MNHU); XI-1955, Schade (2 CMNC); **Paraguary:** Naranjo, 09-14-XII-1998 (1 FVMC); Sapucay, 05-XI-1991, U Drechsel (12 ABC); **San Pedro:** Río Ypané, Cororó, XI-1979, Martínez (17 CMNC); **San Pedro?:** Peribebuy, XI-1946 (1 CMNC).

Diagnosis: 3.2-4.0 mm. Color dark gray, sometimes with feeble metallic sheen. Very simmilar to *E. hystrix*, see comments in Chapter 2 under that species. See also Chapter 3.

Distribution: Probably all central South America south of the Amazon hylaea and eastern of the Andes, southern limits in Northenr and Central Argentina.

Remarks: This species occurs in Cerrado and Atlantic forest habitats. This species forms a complex group with *E. hystrix* and *E. ratcliffei*, with consistent differences only in the internal part of male genitalis.

2. *Eutrichillum hystrix* (Arrow, 1931)

Trichillum hystrix; Arrow, 1931: 609-610

Trichillum hystrix; Arrow, 1932: 226

Trichillum hystrix; Paulian, 1936: 206, 207

Trichillum hystrix; Balthasar, 1939: 13, 21, 25

Trichillum hystrix; Blackwelder, 1944: 204

Trichillum hystrix; Martínez, 1959: 64

Trichillum (Eutrichillum) hystrix; Martínez, 1968: 120-121

Trichillum (Eutrichillum) hystrix; Ratcliffe, 1980: 341

Trichillum (Eutrichillum) hystrix; Martínez, 1987: 60

Trichillum (Eutrichillum) hystrix; Génier & Vaz-de-Mello, 2002: 188-190

Type series: Lectotype (BMNH) and paralectotypes (BMNH, CMNC), see Chapter 2.

Non-type material examined: ARGENTINA: **Buenos Aires:** Belgrano, XII-1941 (1 CMNC); Capital Federal, Villa Devoto, XII-1925, Bridarolli (2 CMNC); Gral. Sarmiento, JC Paz, I-1952, Martínez (5 CMNC); San Isidro, Casa, I-1960, Martínez (2 CMNC); Tigre, V-1945, MJ Viana (3 CMNC); Buenos Aires, Richter (3 IRSN); **Córdoba:** Cruz Alta; II-1946; JP Duret (4 CMNC); **Santa Fé:** Do. Capital, Piquete; I-1942; Martínez (2 CMNC); Estancia La Noria, Río San Javier, 23-XII-1911, GE Bryant (1 NHMB); **Santa Fé?:** Carcarana (14 UNSM); PARAGUAY: **Alto Paraná:** Puerto Stroessner; 6-I-1966; Hungarian Soil-Zool. Exp. (1 HMNH); **San Pedro?:** Peribebuy:V-1946, Williener (1 CMNC); NO DATA (4 FMLT).

Diagnosis: 3.1-4.0 mm. See Chapter 2.

Distribution: Central and northern Argentina.

Remarks: See Chapter 2 and remarks under *E. hirsutum.*

3. *Eutrichillum arcus* Solís & Kohlmann, 2003

Trichillum (Eutrichillum) arcus Solís & Kohlmann, 2003: 10, 12-14

Type series: Holotype not seen (Instituto Nacional de Biodiversidad, San José, Costa Rica).

Paratypes: COSTA RICA: **Alanjuela:** Sect. San Ramón de los Ríos, 1.5 km NO Hda. Nueva Zelandia, 620 m, 12-21-VI-1996, FA Quesada (3 FVMC); **Guanacaste:** Est. Pitilla, 9 km S Sta. Cecilia, P.N. Guanacaste, 700 m, V-1994, C Moraga (2 FVMC); **Heredia:** Est. Biol. La Sielva, 21-VI-1998, C Carlton & A Tishechkin (1 FVMC).

Diagnosis: 3.3-4.0 mm. Body dorsally with conspicuous copper to green sheen. Clypeo-genal emargination inconspicuous. (FIGURES 26., 27.).

Distribution: Known only from Costa Rica.

Remarks: This is the most isolated species in the genus, morphologically or geographically.

4. *Eutrichillum ayri* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Distrito Federal:** Brasília 1100 m, III-2001, N Degallier (IBSP ex-FVMC)

Paratypes: BRAZIL: **Distrito Federal:** Brasília 1100 m, X-2000, N Degallier (1 FVMC); II-2001 (2 FVMC); III-2001 (4 FVMC); XII-2000 (1 FVMC); RECOR-IBGE, XII-1999, M Milhomem, campo sujo (3 FVMC); XI-1999 (9 FVMC); XII-1999, cerrado (1 FVMC); X-1999, cerrado (2 FVMC); 27-V-1997, I Diniz (1 FVMC); **Goiás:** Rio Verde, XI-1993, J Carlos (1 AMBC); **Minas Gerais:** Cordisburgo, Faz Pontinha, XII-1993, FZ Vaz-de-Mello (2 AMBC); XII-1998 (1 FVMC); I-1999, FZ Vaz-de-Mello (1 AMBC); I-1999, Falqueto & Vaz-de-Mello (1 FVMC); Águas Vermelhas, XII-1998, Bello & Vaz-de-Mello (1 FVMC); Paracatu, XII-1996, S Lourenço (1 FVMC).

Diagnosis: 2.7-3.1 mm. Color dark gray as in *E. hirsutum*. Very similar to that species, but smaller and slightly more rounded. (FIGURES 28., 29.).

Etymology: This species in named after Ayr de Moura Bello, great friend who collected many specimens used in this study.

Distribution: Brazilian Cerrado.

Remarks: This species occupies the central part of *E. hirsutum* distribution, being very related to that species, but seemingly less than *E. hystrix* or *E. ratcliffei.*

5. *Eutrichillum onorei* **n. sp.**

Trichillum (Eutrichillum) boucomonti; (*pars*) Ratcliffe, 1981: 185

Type series: Holotype ♂: ECUADOR: **Napo:** Yasuní Res., Stn. on mid Río Tiputini, 23-VII-04-VIII-1999, A Tishechkin, FIT (PUCE ex-FVMC).

Paratypes: BRASIL: **Amazonas**: Res. Ducke, XI-1977, B Ratcliffe (1 BDGC); II-1978 (1 BDGC); COLOMBIA: **Amazonas**: Leticia, 700', II-1972, Peck & Howden (3 CMN); ECUADOR: **Napo:** Limoncocha, 250 m, 21-28-VI-1976, S Peck, carrion traps forest (9 CMNC); Yasuní Res., Stn. on mid Río Tiputini, 23-VII-04-VIII-1999, A Tishechkin, FIT (3 FVMC); 5-12-VIII-1999, A Tishechkin, FIT (1 FVMC); 04-VIII-1999, A Tishechkin, FIT (1 FVMC); 28-VI-5-VII-1999, Carlton & Tishechkin, FIT (1 FVMC); Yampuna, 25-I-1989, Ponce, bosque, pitfall (1 PUCE).

Diagnosis: 2.8-3.3 mm. Color black, shinning. Clypeo-genal emargination inconspicuous. (FIGURES 30., 31.).

Etymology: This species in named after Giovanni Onore (Pontifícia Universidad Católica del Ecuador).

Distribution: Werstern Amazon.

Remarks: This species is easily recognizable by small size, black color and clypeo-genal border.

6. *Eutrichillum ratcliffei* **n. sp.**

Trichillum (Eutrichillum) hirsutum; (*pars*) Ratcliffe, 1981: 185

Type series: Holotype ♂: BRAZIL: **Pará:** Tucuruí, XII-1985 (CMNC).

Paratypes: BRAZIL: **Acre:** Rio Branco, Fazenda Catuaba, II-1997, FZ Vaz-de-Mello, primary forest (2 FVMC); **Amapá:** Serra Lombard, VIII-1961, Bechyné (1 CMNC); **Amazonas:** Manaus, I-1978, B Ratcliffe (1 BDGC); Res. Ducke, BR 010 km 26, I-1978, B Ratcliffe (1 BDGC); **Pará:** Altamira, V-1985 (4 CMNC); Itaituba, VII-1938, Pereira (1 CMNC); Tucuruí, IV-1985 (3 CMNC); IV-1988 (1 CMNC); XII-1985 (8 CMNC); IV-1985 (1 CMNC); IV-1988 (4 CMNC); I-1979, Alvarenga (1 CMNC); FRENCH GUYANA: **Saint Laurent du Maroni:** Saül (7 km N), 1 km NW Les Eaux Claires, along Rue de Belizon trail, 280 m, 4-8-VI-1997, J Ashe & R Brooks (1 CMNC).

Diagnosis: 3.5-4.6 mm. Very similar to *E. hirsutum*, differing by size and tridented flagellum basis, instead of bidented. (FIGURES 32., 33.).

Etymology: This species in named after Brett Ratcliffe (University of Nebraska State Museum).

Distribution: Amazonian hylaea.

Remarks: Species from Amazonian rainforest. See remarks under *E. hirsutum*

5.8 *FEERIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Feeridium woodruffi* Vaz-de-Mello (monotypy)

5.8.1 Species included:

1. *Feeridium woodruffi* Vaz-de-Mello

Type series: See Chapter 6.

Diagnosis: See Chapter 6.

Distribution: See Chapter 6.

Remarks: See Chapter 6.

5.9 *GENIERIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Pedaridium criptops* Arrow, 1913 (present designation)

5.9.1 Key to the species of *Genieridium*

1. Eyes absent dorsally……..….*G. medinae* (Gill & Vaz-de-Mello, in press)
1'. Eyes present dorsally, usually very small.....……2
2(1'). Clypeal teeth lacking..…….3
2'. Clypeal teeth present..…….4
3(2). Elytral striae without evident punctures. Venezuela…….
…….*G. bordoni* (Martínez, 1992)
3'. Elytral striae with ocellated punctures. Southern Brazil…….....
…….…….....*G. paranense* (Arrow, 1932)
4(2'). Eyes dorsally very small and narrow.……5
4'. Eyes dorsally large, about twice as long as wide.....
.....*G. argentinum* (Arrow, 1913)
5(4). Clypeal teeth very acute .……6
5'. Clypeal teeth short, equilaterous ...……..7
6(5). Clypeal teeth arising below clypeal margin…….
……*G. cryptops* (Arrow, 1913)
6'. Clypeal teeth in continuation with clypeal margin……
……*G. zanunciorum* (Vaz-de-Mello & Canhedo, 1998)
7(5'). Elytral striae straight, without punctures.…….*G. bidens* (Balthasar, 1938)
7'. Elytral striae marked by inconspicuous punctures that make striae appear sinuated.....……..*G. margareteae* (Génier & Vaz-de-Mello, 2002)

5.9.2 Species included:

1. *Genieridium cryptops* (Arrow, 1913)

Pedaridium cryptops Arrow, 1913: 458

Pedaridium cryptops; Arrow, 1932: 226

Pedaridium cryptops; Balthasar, 1938: 220

Pedaridium cryptops; Blackwelder, 1944: 203

Pedaridium mansosotoi Martínez, 1951: 35-40

Pedaridium mansosotoi; Martínez, 1959: 62

Pedaridium bidens; Ferreira & Galileo, 1993: 7, 15-16

Pedaridium mansosotoi; Ferreira & Galileo, 1993: 7, 18-20

Pedaridium bidens; Vaz-de-Mello, 2000: 194

Pedaridium mansosotoi; Vaz-de-Mello, 2000: 194

Pedaridium cryptops; Génier & Vaz-de-Mello, 2002: 186-187

Type series:

Pedaridium cryptops Arrow, 1913: See Chapter 2.

Pedaridium mansosotoi Martínez, 1951: Holotype ♂: ARGENTINA: **Formosa:** Clorinda, 12-XII-1950, A Martínez (BRBA); allotype ♀: PARAGUAY: **Do.?:** km 50 de Río Paraguay entre Asunción y B. Negal, 30-XI-1950, A Martínez (BRBA).

Non-type material examined: BRAZIL: **Bahia:** Barreiras, X-1991 (1 FVMC); XII-1991, luz (3 FVMC); Encruzilhada, 980 m, XI-1972, Alvarenga (11 MZSP, 3 IBSP, 2 FVMC); XI-1974, Alvarenga (1 CMNC); XII-1980, Martínez & Alvarenga (2 CMNC); **Distrito Federal:** Brasília – Aeroporto, I-1964, Martínez (1 CMNC); Brasília 1100 m, III-2001, N Degallier (1 FVMC); XI-2000 (5 FVMC); XII-2000, luz (2 FVMC); XI-1999 (1 CMNC); Est. Florestal Cabeça do Veado, 1100 m, 27-X-1971, EG, I & EA Munroe (11 CNIC); X-1971, EG, I & EA Munroe (5 CNIC); RECOR-IBGE, 09-XII-1997, I Diniz (2 FVMC); XI-1999, M Milhomem, campo sujo (1 FVMC); **Goiás:** no data, Fry, 1905-100 (lectotype BMNH); Aruanã, Rio Araguaia, II-1961, Dirings (1 MZSP); Bom Jardim de Goiás, II-1997, FZ Vaz-de-Mello (1 FVMC); Campinas, XII-1925,

Borgmeier & Lopes (1 MZSP); Goiatuba, I-1953, J Guérin (1 IBSP); Jataí, Faz. Nova Orlândia, I-1964, Martins, Morgante & Silva (1 MZSP); Rio Verde, XI-1993, J Carlos (1 AMBC); **Mato Grosso do Sul:** Costa Rica, 17-XII-1993, S Ide (10 MZSP); Selvíria, UNESP farm, 02-II-1993, CAH Flechtmann, ex Guzerá bovine dropping, Brachiaria decumbens pasture (1 FEIS); 09-XI-1994 (1 FEIS); Três Lagoas, margem esq. Rio Sucuriú, Faz. Canaã, I-1967, Lane (1 MZSP); **Mato Grosso:** Barra do Tapirapé, XI-1964, B. Malkin (4 MZSP); Chapada dos Guimarães, XI-1963, Alvarenga (1 MZSP); Macaúba, XII-1966, R Schmitz (1 CMNC); Virapuru (*sic*) 160 km S, 8-10-III-1979, CR Owen (2 HMNH); **Minas Gerais:** Águas Vermelhas, XII-1997, Bello (2 AMBC); XII-1998, Bello & Vaz-de-Mello (3 FVMC); Cordisburgo, Faz Pontinha, I-1994, FZ Vaz-de-Mello (5 FVMC); I-1999 (1 FVMC); XII-1993 (6 AMBC, 5 FVMC); Ibitira, XI-1988, luz (1 FVMC); Montes Claros, I-2000, JNC Louzada (30 FVMC); XII-1999 (2 FVMC); Paracatu, II-1997, S Lourenço (3 FVMC); XII-1996, S Lourenço (190 FVMC); Paraopeba, 03-XI-1992, UV (1 FVMC); Serra do Caraça, 27-XI-05-XII-1972, Exp. Mus. Zool. (1 MZSP); Três Marias, III-1990 (1 FVMC); X-1989 (3 FVMC); XII-1993 (1 FVMC); Unaí, Faz. Bolívia, 22-24-X-1964, Exp. Dep. Zool. (1 MZSP); **Piauí:** São Raimundo Nonato - PN Serra da Capivara, I-1999, CA Matrangolo (2 FVMC); **São Paulo:** Agudos, Duraflora SA, 07-XII-1993, CAH Flechtmann, P car. v. bahamensis log-baited tent trap, P oocarpa stand (1 FEIS); Bálsamo, 10-XII-1987, EC Bergmann, seringueira (1 IBSP); Boa Esperança do Sul, Faz. Itaquerê, 27-I-1964, K. Lenko (3 MZSP); Botucatu, 17-XI-1963, Mantovani (2 IBSP); Itu, Faz. Pau d' Alho, 1-5-I-1961, Martins (1 MZSP); Itu, II-1959, Martins (1 MZSP); Osasco, Fca Fósforos, XII-1962 (2 CMNC); Pirassununga, 03-XI-1996, MA Ruiz Díaz (2 ESAP); Teodoro Sampaio, Morro do Diabo State Reservation, 03-III-1993, CAH Flechtmann, ex bovine dropping baited pitfall trap (1 FEIS); 16-II-1993 (1 FEIS); 29-IX-1993 (1 FEIS); **Tocantins:** Pium, XI-1971, J da Silva (2 CMNC); PARAGUAY:

Amambay: Srra. Amambay, I-1960, Schultz (2 CMNC); **Caaguazú:** Caaguazú, XII-1977, Martínez (1 CMNC); **Concepción:** Horquetá, XI-1950, Martínez (2 CMNC); **San Pedro:** Cororó, Rio Ypane, II-1979, A Martínez (2 BDGC, 12 CMNC); II-1974 (1 CMNC); III-1979 (4 CMNC); XI-1979 (1 CMNC); XI-1979 (11 CMNC); Cororó, XI-1999, G Arriágada (1 FVMC).

Diagnosis: See Chapter 2. (FIGURES 59., 60.).

Distribution: Brazilian Cerrado and Argentinean and Paraguayan Chaco.

Remarks: This species has the particularity of having either one or two rows of punctures in the discal interstriae, and is the most variable in size within the group. Seems to be related to *G. zanunciorum.*

2. *Genieridium bidens* (Balthasar, 1938)

Pedaridium bidens Balthasar, 1938: 218-220

Pedaridium hirsutum; Pessôa & Lane, 1941: 437

Pedaridium bidens; Blackwelder, 1944: 203

Pedaridium brasiliensis Ferreira & Galileo, 1993

Pedaridium brasiliensis; Vaz-de-Mello, 2000: 194

Pedaridium brasiliensis; Vaerdú & Galante, 2001

Type series:

Pedaridium bidens Balthasar, 1938: See Chapter 3.

Pedaridium brasiliensis Ferreira & Galileo, 1993: Holotype: See Chapter 3.

Paratypes: BRAZIL: **Bahia:** Encruzilhada, 980 m, XI-1972, Alvarenga (8 MZSP); **Mato Grosso do Sul:** Murtinho (luz), I-1930, R Spitz (2 MZSP); Três Lagoas, Faz. Dr. José Mendes, 15-30-V-1964, Exp. Dep. Zool. (1 MZSP); Faz. Retiro das Telhas, 15-30-V-1964, Exp. Dep. Zool. (2 CMNC, 11 MZSP); **Mato Grosso:** Chapada dos Guimarães, XI-1963, Alvarenga (3 MZSP); **Minas Gerais:** Arinos, 06-08-XI-1964, Exp. Dep. Zool. (2 MZSP); **Paraná:** Vila Velha, XI-1944, Hatsbach (1 CMNC, 1 MZSP); **São Paulo:** Castilho, marg. esq.

Rio Paraná, X-1964, Exp. Dep. Zool. (1 MZSP); Franca, VIII-1910, Garbe (2 MZSP); Itu, Faz Pau d'Alho, 28-29-X-1965, Martins & Biasi (1 CMNC); Itú, 27-XII-1957, U. Martins (4 MZSP); XI-1958, U. Martins (2 MZSP); Pirassununga, 09-X-1945, Schubart (1 MZSP).

Non-type material examined: BRAZIL: **Bahia:** no data, Bondar (1 MNRJ); Encruzilhada, 980 m, XI-1972, Alvarenga (1 IBSP); XI-1974, Alvarenga (1 CMNC); XII-1980, Alvarenga & Martínez (8 CMNC); Vitória da Conquista, I-1993 (2 MZSP); **Distrito Federal:** Est. Florestal Cabeça do Veado, 1100 m, X-1971, EG, I & EA Munroe (1 CNIC); **Goiás:** Bom Jesus, X-1996, J Carlos (1 FVMC); Niquelândia, X-1993, arm luminosa (1 FVMC); Rio Verde, 17-XI-1984, Bello (1 FVMC); X-1992, J Carlos (2 AMBC); XI-1993 (1 AMBC); XI-1995 (2 AMBC); **Mato Grosso do Sul:** Costa Rica, 17-XII-1993, S Ide (2 MZSP); Murtinho, XII-1929, Malkin (1 MNRJ); Selvíria, UNESP farm, 01-V-1990, CAH Flechtmann, ex Guzerá bovine dropping, Brachiaria decumbens pasture (1 FEIS); 01-VI-1991 (2 FEIS); 06-VII-1991 (1 FEIS); 06-VIII-1991 (1 FEIS); 13-XII-1992 (1 FEIS); 15-VI-1991 (2 FEIS); 16-II-1991 (1 FEIS); 18-III-1999, ex black light (2 FEIS); 18-V-1991, ex Guzerá bovine dropping (1 FEIS); 20-I-1999, ex black light (24 FEIS); 20-VIII-1991, ex Guzerá bovine dropping (1 FEIS); 20-X-1991 (3 FEIS); 22-IV-1992 (2 FEIS); 23-II-1991 (3 FEIS); 23-II-1992 (1 FEIS); 27-IV-1991 (1 FEIS); 31-X-1993 (1 FEIS); Terenos, 01-IV-1994, WW Koller (1 FVMC); **Mato Grosso:** Chapada dos Guimarães, XI-1963, Alvarenga (1 MZSP); **Minas Gerais:** Águas Vermelhas, XII-1997, Bello (3 AMBC); XII-1998, Bello & Vaz-de-Mello (1 FVMC); Cordisburgo, Faz Pontinha, X-1993, FZ Vaz-de-Mello (1 CMNC, 2 BDGC); Ipatinga, XI-1992, E Grossi (1 FVMC); Montes Claros, I-2000, JNC Louzada (1 FVMC); Três Marias, X-1989 (2 FVMC); **Pará:** Belém, IX-1964, E Dente (1 MZSP); Canindé (Rio Gurupi), X-1964, Malkin (1 CMNC); **São Paulo:** Bálsamo, 12-XI-1987, C Bergmann, seringueira (1 IBSP); 12-XII-1987 (1

IBSP); 13-X-1988 (1 IBSP); 19-II-1987 (1 IBSP); 29-X-1987 (1 IBSP); Castilho, marg. esq. Rio Paraná, 15-22-IX-1962, Exp. Dep. Zool. (1 IBSP); Itirapina, 15-IX-1996, JR Verdú (2 FVMC); Itu, Faz Pau d'Alho, I-1959, Martins (1 CMNC); Mirante do Paranapanema, 09-X-1991, J Rodrigues, black light, pasture area (2 FEIS); 13-XI-1991 (2 FEIS); Pradópois, XII-1976, PM Botelho (1 FVMC, 4 ESAP); São Carlos, 02-XII-1993, J Mendes (1 FVMC); 11-XI-1993 (1 FVMC); PARAGUAY**: no data:** (1 HMNH); (lectotype NMP); Anisits (1 HMNH); **Boquerón:** Pto Casado, XI-1950, Martínez (2 CMNC); **Caaguazú:** Caaguazú, Piscicultura, II-1986, A Martínez (1 BDGC, 6 CMNC); **Central:** Asunción, 10-X-1904, Vezényi (1 HMNH); 28-IX-1904 (1 HMNH); **Concepción:** Horquetá, XII-1950, Martínez, a la luz (6 CMNC); **Paraguary:** Sapucay, 05-XI-1991, U Drechsel (9 ABC); **San Pedro:** Cororó, XI-1999, G Arriágada (1 FVMC); Rio Ypane, Cororó, XI-1979, A Martínez (1 BDGC, 19 CMNC).

Diagnosis: 3.8-5.3 mm. Very similar to *G. margareteae*, but laking punctures in striae, and anterior clypeal carina. See Chapter 3.

Distribution: Same as the precedent species.

Remarks: This is a common pastureland species in Brazil. Might be related to *G. margareteae*.

3. *Genieridium argentinum* (Arrow, 1913)

Pedaridium rugiceps; (*lapsus*) Arrow, 1913: 458

Pedaridium argentinum Arrow, 1913: 459

Pedaridium argentinum; Arrow, 1932: 226

Pedaridium argentinum; Balthasar, 1938: 220

Trichillum elongatum Balthasar, 1939: 24

Pedaridium argentinum; Blackwelder, 1944: 203

Pedaridium argentinum; Martínez, 1959: 62

Trichillum elongatum; Martínez, 1959: 63

Pedaridium elongatum; Martínez, 1968: 119

Pedaridium argentinum; Martínez, 1987: 60

Pedaridium argentinum; Ferreira & Galileo, 1993: 8, 24-26

Pedaridium argentinum; Monteresino et al., 1996: 107

Type series: See Chapter 2 and Chapter 3.

Non-type material examined: ARGENTINA: **Chaco:** Gancedo, XII-1939, Biraben-Bezzi (1 CMNC); **Córdoba:** San Vincente, J. Franzel S. (3 MNHU); 4 km NE Cruz del Eje, 20-II-1982, H&A Howden (7 CMNC); Cruz del Eje, I-1977, Martínez (4 CMNC); Do. Santa Maria, Diquecito, XII-1965, Martínez (2 CMNC); La Falda, I-1945, Martínez (2 CMNC); **Formosa:** Ing. Juarez, XII-1953, Martínez (1 CMNC); **Mendoza** (1 MZSP); **Salta:** Do. San Martín, Hickmann, II-1949, Martínez (1 CMNC); **San Luis:** Do. Capital, San Gerónimo, II-1980, A Martínez (1 BDGC, 1 CMNC, 1 FVMC); Do. Ayacucho, El Milagro, XI-1966, Martínez (1 CMNC); San Geronimo, XII-1972, GJ Williner (4 CMNC); Bruch (1 CMNC); 18 km S Arizona, 250 m, 18-23-I-1982, H&A Howden (1 FVMC); **Santa Fé?:** Carcarana (1 UNSM); **Santiago del Estero:** Ojo de Agua, II-1974, A Martínez (1 BDGC, 4 CMNC); no data (13 MNHU, 1 FVMC); Ciudad, XI-1947, A Amigo (1 CMNC); Frías, I-1949, Martínez (1 CMNC); Ojo de Agua, XI-1944, Maldonado (1 CMNC); Río Salado, Wagner (2 CMNC); Santiago del Estero, Wagner (3 CMNC); 11-XII-1939, Biraben-Bezzi (1 CMNC); Chaco de Santiago, Wagner (1 MZSP); no locality, 1936, Wagner (2 NHMB); **Tucumán:** Do. Capital, Rio Sali, XI-1950, Martínez (1 CMNC); **Province?:** Between Santa Fe and Reconquista, 23-XII-1965, Hungarian Soil-Zool. Exp (1 HMNH).

Diagnosis: See Chapters 2 and 3.

Distribution: Central and northern Agentina.

Remarks: This species appears isolated in the genus, having larger eyes, different clypeal emargination and stronger secondary sexual characters.

4. *Genieridium bordoni* (Martínez, 1992)

Pedaridium bordoni Martínez, 1992: 22-23

Pedaridium bordoni; Vaz-de-Mello & Canhedo, 1998: 100

Type series: Holotype ♂ and allotype ♀: VENEZUELA: **Barinas:** Santa Bárbara, IV-1981, G&H Martínez (BRBA).

Paratypes: VENEZUELA: **Anzoátegui:** Pariaguán, 09-VIII-1967, J&B Bechyné (1 CMNC); 12-VIII-1967 (1 CMNC); **Barinas:** Santa Bárbara, IV-1981, G&H Martínez (1 BDGC, 9 CMNC); **Guárico:** Calabozo, VI-1963, Bordón & Martínez, (1 CMNC); 15-VII-1962, Estación Biol. leg. (2 CMNC); **Monagas:** Jusepín, IX-1965, F.Fernandez & CJ Rosales (1 BDGC); 500 m, 08-VIII-1966, CJ Rosales & F Fernández Y (1 CMNC); 17-IX-1965 (1 CMNC); 21-IX-1965 (1 CMNC); 04-X-1965 (1 CMNC); 07-VIII-1966 (2 CMNC).

Non-type material examined: VENEZUELA: **Anzoátegui:** Aramina (Santa Clara), I-195, R Lichy (1 BDGC); **Bolívar:** 15 km E Caicara, 12-VI-1996, B Gill (20 BDGC); 12-13-VI-1996, H&A Howden (40 CMNC, 2 FVMC); 20 km SW Ciudad Bolívar, 19-VI-1987, S&J Peck, woodland on sand UV (1 CMNC); 25 km SW Pto. Ordaz, 21-VI-1987, S&J Peck, sandy woodland UV (1 CMNC); 8 km SW Caicara, 16-VI-1987, S&J Peck, woodland UV (2 CMNC); **Delta Amacuro:** 15 km E Los Castillos, 4.5 km NE Ciudad Guyana, 26-IV-1987, MA Ivie, at light (1 BDGC, 11 CMNC); **Guárico:** Hato Masajuaral (44 km S Calabozo), 3-10-V-1985, Menko & Carpenter (3 BDGC).

Diagnosis: 4.7-5.5 mm. Clypeal teeth lacking. Elytral striae not punctured. Male apical tooth of metatibia flattened. (FIGURES 53., 54.).

Distribution: Central Venezuela.

Remarks: This species is probably related to *G. medinae* due to secondary sexual characters, but shares with *G. paranense* the lack of clypeal teeth.

5. *Genieridium paranense* (Arrow, 1932)

Pedaridium paranense Arrow, 1932: 224-226

Pedaridium paranense; Balthasar, 1938: 219

Pedaridium paranense; Blackwelder, 1944: 203

Pedaridium paranensis; Ferreira & Galileo, 1993: 9

Pedaridium paranensis; Vaz-de-Mello & Canhedo, 1998: 100

Pedaridium paranensis; Vaz-de-Mello, 2000: 194

Pedaridium paranense; Génier & Vaz-de-Mello, 2002: 191-192

Type series: See Chapter 2.

Non-type material examined: BRAZIL: **Minas Gerais:** Belo Horizonte, XI-1950, A Machado (1 MZSP); **Paraná:** Curityba, XI-1941, Claretiano (1 CMNC); Ponta Grossa, VIII-1942, F Justus (5 CMNC); Castro (6 MZSP); 1907, E Garbe (4 MZSP); Londrina, XII-1935, B Pohl (1 MZSP); **Rio de Janeiro:** Estr Rio-São Paulo km 47, XI-1944, Wygod (1 MNRJ); **São Paulo:** Cerqueira César, 12-X-1992, J Carlos (1 AMBC).

Diagnosis: See Chapter 2. (FIGURES 55., 56.).

Distribution: Southeastern Brazil.

Remarks: This species seems to be related to the cluster formed by *G. bidens-margareteae*.

6. *Genieridium zanunciorum* (Vaz-de-Mello & Canhedo, 1998)

Pedaridium zanunciorum Vaz-de-Mello & Canhedo, 1998: 98-100

Pedaridium zanunciorum; Vaz-de-Mello, 2000: 194

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Santa Bárbara, 17-XI-1994, armadilha UV, Zanúncio (MZSP).

Paratype: BRAZIL: **Minas Gerais:** Santa Bárbara, 22-X-1993, JC Zanúncio (FVMC).

Non-type material examined: BRAZIL: **Goiás:** Goiatuba, 1941, J Guérin (1 IBSP); **Minas Gerais:** Araguari, II-1970, H Martínez (1 CMNC); **São Paulo:** Ypiranga, F. Ohaus (1 MNHU); Ipiranga, II-1927, Spitz (1 CMNC).

Diagnosis: 5.3-6.3 mm. Dorsally black, shining. Clypeal teeth very acute, arising in continuation with clypeal margin and separated by clypeal sides by wide feeble emarginations. (FIGURES 57., 58.).

Distribution: Scattered localities in Central and Southeastern Brazil.

Remarks: This species appears to be associated with some special habitat, as only specimens collected at light are known. Appears to be related to *G. cryptops*.

7. *Genieridium margareteae* (Génier & Vaz-de-Mello, 2002)

Pedaridium cryptops; Ferreira & Galileo, 1993: 7, 20-21

Pedaridium cryptops; Vaz-de-Mello, 2000: 194

Pedaridium margareteae Génier & Vaz-de-Mello, 2002: 192-193

Type series: See Chapter 2.

Diagnosis: See Chapter 2.

Distribution: See Chapter 2.

Remarks: See Chapter 2.

8. *Genieridium medinae* (Gill & Vaz-de-Mello)

Pedaridium medinae Gill & Vaz-de-Mello, in press

Type series: See Chapter 5.

Diagnosis: See Chapter 5.

Distribution: See Chapter 5.

Remarks: See Chapter 5.

5.10 *GILLIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Gillidium gilli* Vaz-de-Mello (monotypy)

5.10.1 Species included:

1. *Gillidium gilli* Vaz-de-Mello, **n. sp.**

Type series: See Chapter 6.

Diagnosis: See Chapter 6.

Distribution: See Chapter 6.

Remarks: See Chapter 6.

5.11 *HORRIDOTRICHILLUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Trichillum horacioi* Martínez, 1968 (monotypy)

5.11.1 Species included:

1. *Horridotrichillum horacioi* (Martínez, 1968)

Trichillum (?) *horacioi* Martínez, 1968: 142-145

Type series: Holotype ♀: BOLIVIA: **Santa Cruz:** Sara, Nueva Moka, XII-1960, A Martínez (BRBA).

Non-type material examined: BRAZIL: **Pará:** Serra Norte, Piste N1 km 22, 1-XI-1984 (2 CMNC); Redenção, XI-1999, P Scheffler (2 FVMC); X-1998, P&T Scheffler (10 FVMC); **Rondônia:** 62 km SW Ariquemes, nr Faz. Rancho Grande, 8-20-XI-1994, J Eger, C O'Brien, black light (4 BDGC); PERU: **Madre de Dios:** Río Palma Real Grande, Limon Camp, 220 m, X-1999, T Larsen (10 CMNC).

Diagnosis: 2.2-2.7 mm. As for the genus, see Chapter 6.

Distribution: Southern Amazonian hylaea.

Remarks: See Chapter 6.

5.12 *HOWDENIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Pedaridium bottimeri* Howden & Young, 1981 (monotypy) .

5.12.1 Species included:

1. *Howdenidium bottimeri* (Howden & Young, 1981)

Pedaridium bottimeri Howden & Young, 1981: 45

Pedaridium bottimeri; Ferreira & Galileo, 1993: 6, 11-12

Type series: Holotype ♂: PANAMA: **Canal Zone:** Barro Colorado Island, 13-VI-1963, LJ Bottimer (CNIC).

Non-type material examined: PANAMA: **Panamá:** Aeropuerto de Panamá, VII-1975, Martínez (unknown female? CMNC, doubtful).

Diagnosis: 3.5 mm. As for the genus, see Chapter 6.

Distribution: Panama. Cited from Venezuela by Ferreira & Galileo (1993).

Remarks: The Venezuelan specimen seen by Ferreira & Galileo (1993) could not be traced. The dubious female specimen lacks clypeo-frontal carina.

5.13 *LEOTRICHILLUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Pedaridium louzadaorum* Vaz-de-Mello & Canhedo, 1998 (monotypy)

5.13.1 Key to the species of *Leotrichillum*

1. Apico-lateral incision of paramera simple. Occuring in Central and Northeastern Brazil (Goiás and Minas Gerais to Piauí)…….. ……*L. louzadaorum* (Vaz-de-Mello & Canhedo, 1998)

1'. Apico-lateral incision of paramera amplied internally. Occuring in Paraguay (San Pedro), Bolívia (Cordillera and Ichilo) and Argentina (Salta).....……..*L. leoi* **n. sp.**

5.13.2 Species included:

1. *Leotrichillum louzadaorum* (Vaz-de-Mello & Canhedo, 1998)

Pedaridium louzadaorum Vaz-de-Mello & Canhedo, 1998: 96-97, 100

Pedaridium louzadaorum; Vaz-de-Mello, 2000: 194

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Três Marias, XII-1993, Zanuncio (MZSP)

Paratypes: BRAZIL: **Minas Gerais:** Três Marias, X-1989 (1 BDGC); XII-1990, Zanúncio (1 CMNC); XII-1990, Zanuncio (3 FVMC); XII-1993 (1 FVMC); IX-1994 (1 FVMC).

Non-type material examined: BRAZIL: **Minas Gerais:** Três Marias, X-1989 (1 FVMC); X-1994 (1 AMBC); XII-1990, Zanuncio (2 FVMC); XI-1993 (2 FVMC); Águas Vermelhas, XII-1997, Bello (1 AMBC), Montes Claros, XII-1992, Zanuncio (1 FVMC); I-2000, JNC Louzada (2 FVMC); XII-1990 (1 FVMC); **Piauí:** São Raimundo Nonato - PN Serra da Capivara, I-1999, CA Matrangolo (1 FVMC).

Diagnosis: 2.4-3.0 mm. See description for genus and FIGURES in Chapter 6. Paramera with apical incision not amplied internally.

Distribution: Brazilian northern Cerrado and Caatinga.

Remarks: Very closely related to the following species.

2. *Leotrichillum leoi* **n. sp.**

Type series: Holotype ♂: ARGENTINA: **Tucumán:** Do. Cruz Alta, Las Cejas, 8-14-I-1978, R. Golbach (FMLT).

Paratypes: ARGENTINA: **Salta:** Do. Anta, Las Lajitas, XI-1952 (1 CMNC); XII-1982, A Martínez (5 BDGC, 4 CMNC); Do. Anta, XI-1958, JV González (1 CMNC); I-1959 (1 CMNC); Do. Anta, Lumbreras, XI-1952 (1 CMNC); Do. San Martín, Hickmann, II-1959, Martínez (1 CMNC); BOLIVIA: **Santa Cruz:** Cordillera, Charagua, I-1977, Martínez (1 CMNC); Parapetí, I-1960, Martínez (1 CMNC); I-1959 (1 CMNC); Ichilo, Buenavista, Tacu, III-1951, Martínez (1 CMNC); **Tucumán:** Do. Cruz Alta, Las Cejas, 8-14-I-1978, R. Golbach (3 FMLT); Do. Burruyacu, Chilgas, 10-25-XI-1979, R. Golbach (2 FMLT); Siete de Abril, 14-27-I-1981, R. Golbach (2 FMLT); PARAGUAY: **San Pedro:** Río Ypané, Cororó, II-1981, Martínez (2 CMNC, 1 FVMC); MJ Viana (2 CMNC).

Diagnosis: 2.4-2.8 mm. Externally very similar to previous species, differing only by feebly stronger dorsal setae and genital character in key. (FIGURES 34., 35.).

Etymology: This species in named after my son, Léo Falqueto Vaz de Mello.

Distribution: Northern Argentina and Paraguay.

5.14 *MARTINEZIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Pedaridium fulgens* Arrow, 1932 (present designation)

5.14.1 Key to the species of *Martinezidium*

1. Clypeus with no teeth at all…….....*M. howdenorum* **n. sp.**

1'. Clypeus with at least two central teeth.....……..…2

2(1'). Clypeus with sharp lateral angles, forming at least one pair of lateral teeth……..*M. fulgens* (Arrow, 1932)

2'. Clypeus with sides at most rounded, not sharply angulated..……..3

3(2'). Clypeus with sides completely rounded in continuation with genae, only central teeth visible…….....*M. francoisi* **n. sp.**

3’. Clypeus with a sharp sinuation at each side, differentiated from genae.…4

4(3’). Paramera strongly curved outwards and then inwards, forming an arch. Right paramere with a tooth in the basis of that arch……
……*M. martinsi* (Ferreira & Galileo, 1993)

4’. Paramera less strongly arched.……5

5(4’). Paramera gradually narrowed in the middle….....…….*M. cristianoi* **n. sp.**

5’. Paramera strongly narrowed in the middle.…….6

6(5’). Right paramere with a simple internal lobe in the apical third……..……*M. galileoae* (Génier & Vaz-de-Mello)

6’. Right paramere with a double lobe in the apical third….....*M. tatai* **n. sp.**

5.14.2 Species included:

1. *Martinezidium fulgens* (Arrow, 1932)

Pedaridium fulgens Arrow, 1913: 458

Pedaridium fulgens; Arrow, 1932: 226

Pedaridium fulgens; Blackwelder, 1944: 203

Pedaridium martinezi Ferreira & Galileo, 1993: 30

Pedaridium fulgens; Génier & Vaz-de-Mello, 2002: 187-188

Type series:

Pedaridium fulgens Arrow, 1932: See Chapter 3.

Pedaridium martinezi Ferreira & Galileo, 1993.

Holotype not seen.

Paratypes: ARGENTINA: **Córdoba:** Do. Santa Maria, Diquecito, XII-1965, Martínez (1 CMNC); **La Rioja:** Olta, II-1934, González (1 CMNC).

Non-type material examined: PARAGUAY: **Boquerón:** km 145 a Puerto Casado, XI-1950, Martínez (1 CMNC).

Diagnosis: See Chapter 2. (FIGURE 36.).

Distribution: Northern Argentina and Paraguay.

Remarks: See Chapter 2.

2. *Martinezidium martinsi* (Ferreira & Galileo, 1993)

Pedaridium martinsi Ferreira & Galileo, 1993: 7, 23-24

Type series: Holotype and paratypes not seen.

Non-type material examined: ARGENTINA: **Córdoba:** Do. Santa Maria, Diquecito, XII-1965, Martínez (1 CMNC); **Neuquén:** Ag. Florencio, Ruta 40, XII-1967, A Martínez (2 BDGC, 5 CMNC); Bajada Marucho, XII-1966, Gentili (1 CMNC); XII-1966, Martínez (4 CMNC); C Cura - Buitres - 650 m, X-1968, Gentili (1 CMNC); Covunco, II-1976, Martínez (3 CMNC); La Pintada, XI-1957, Schajovskoy (2 CMNC, 1 FVMC); Lotena-Granito, 800 m, X-1971, Gentili (1 CMNC); P del Águila, X-1961, Grai (1 CMNC); Pampa del Saldo, III-1964, Gentili (1 CMNC).

Diagnosis: 4.0-4.5 mm. Clypeus with two teeth. Pronotal disc with mixed large and small oval punctures, separated by about four to five diameters. Genital characters as in key. (FIGURES 37., 38.).

Distribution: Neuquén in Argentina. The specimen from Cordoba needs confirmation, and could be a female of *M. tatai*, not *M. martinsi*, but Cordoba specimens are cited in the type series of this latter.

Remarks: This species appears to for a group with *M. francoisi*, *M. cristianoi* and *M. tatai.*

3. *Martinezidium galileoae* (Génier & Vaz-de-Mello, 2002)

Pedaridium fulgens; Balthasar, 1938: 458

Pedaridium fulgens; Martínez 1959: 62

Pedaridium fulgens; Ferreira & Galileo 1993: 37

Pedaridium fulgens; Monteresino et al., 1996: 107

Pedaridium galileoae Génier & Vaz-de-Mello, 2002: 195-196

Type series: See Chapter 2.

Diagnosis: See Chapter 2.

Distribution: See Chapter 2.

Remarks: See Chapter 2.

4. *Martinezidium francoisi* **n. sp.**

Type series: Holotype ♂: ARGENTINA: **Salta:** El Naranjo (R de la F), I-1944, Martínez (CMNC).

Diagnosis: 4.0 mm. Clypeus with two feeble teeth. Pronotal disc with large scattered punctures. Genitalia as in key. (FIGURES 41., 42.).

Etymology: This species in named after François Génier (Canadian Museum of Nature), in many aspects co-responsible by this work.

Distribution: Known for sure only from Salta.

Remarks: Female unknown.

5. *Martinezidium tatai* **n. sp.**

Type series: Holotype ♂: ARGENTINA: **Córdoba:** Do. Santa Maria, Diquecito, XII-1965, Martínez (CMNC).

Paratypes: ARGENTINA: **Buenos Aires:** Partido Puan, Felipe Sola, XII-1944 (2 CMNC); **Córdoba:** Do. Calamuchita, El Sauce, XII-1938, MJ Viana (1 CMNC); Do. Santa Maria, Diquecito, XII-1965, Martínez (3 CMNC).

Diagnosis: 3.3-3.7 mm. Clypeal and pronotal characters as in *M. martinsi*, but clypeal emargination wider. Genitalia asin key. (FIGURES 45., 46.).

Etymology: This species in named after Gustavo (Tatá) Schiffler, Scarab ecologist.

Distribution: Córdoba and Buenos Aires in Argentina.

Remarks: See under *M. martinsi*.

7. *Martinezidium cristianoi* **n. sp.**

Type series: Holotype ♂: ARGENTINA: **Neuquén:** Sa. Vaca Muerta, 950 m, 14-XII-1974, M Gentili (CMNC).

ARGENTINA: **Chubut:** Puerto Madryn, 20 m, 11-X-1974, M Gentili (1 CMNC); **Neuquén:** Sa. Vaca Muerta, 950 m, 14-XII-1974, M Gentili (3 CMNC).

Diagnosis: 3.8-4.5 mm. Clypeus with two teeth and a lateral small obtuse indentation. Pronotal disc with small punctures with strong setae. Paramera very long. (FIGURES 39., 40.).

Etymology: This species in named after Cristiano Lopes-Andrade, Ciidologist.

Distribution: Chubut and Neuquén in southern Argentina.

Remarks: See under *M. martinsi*.

8. *Martinezidium howdenorum* **n. sp.**

Type series: Holotype ♂: BOLIVIA: **Santa Cruz:** 12 km E Santa Cruz, 24-III-1998, H&A Howden (CMNC).

Diagnosis: 3.1 mm. Very distinct from other species by the complete lack of clypeal teeth, northern distribution and paramera. (FIGURES 43., 44.).

Etymology: This species in named after Henry and Ann Howden, collectors of the holotype.

Distribution: Known only from the type locality.

Remarks: Appears to be an isolated species within the genus.

5.15 *ONOREIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Trichillum cristatum* Arrow, 1931 (original designation)

5.15.1 Key to the species of *Onoreidium*

1. Clypeo-frontal carina absent, or inconspicuously indicated.....
.....*O. howdeni* (Ferreira & Galileo, 1993)

1'. Clypeo-frontal carina conspicuous.……2

2(1'). Clypeo-frontal carina straight or feeble angled hindwards, and interrupted in the middle and very low.....*O. carpioi* **n. sp.**

2'. Clypeo-frontal carina curved forwards, high and not interrupted.....3

3(2'). Body dorsally metallic, with green or cupreous shining…….
……..*O. cristatum* (Arrow, 1931).

3'. Body black, lacking metallic shining……*O. ohausi* (Arrow, 1931).

5.15.2 Species included:

1. *Onoreidium cristatum* (Arrow, 1931)

Trichillum cristatum Arrow, 1931: 610

Trichillum cristatum; Paulian, 1936: 206

Trichillum cristatum; Balthasar, 1939: 22

Trichillum cristatum; Blackwelder, 1944: 204

Trichillum cristatum; Martínez 1968: 119

Pedaridium equatoriensis Ferreira & Galileo 1993: 14

Pedaridium cristatum; Génier & Vaz-de-Mello, 2002: 191

Type series: See Chapter 2.

Non-type material examined: ECUADOR: **Loja:** Maracá/Catacocha, 1100 m, 14-VIII-1977, L Peña (1 BDGC, 4 CMNC); Río Catamayo, 29-VIII-1997, C Carpio (1 FVMC, 1 PUCE).

Diagnosis: 4.2-5.3 mm. See Chapter 2.

Distribution: Loja in Ecuador

Remarks: See Chapter 2.

2. *Onoreidium ohausi* (Arrow, 1931)

Trichillum ohausi Arrow, 1931: 610

Trichillum ohausi; Paulian, 1936: 206

Trichillum ohausi; Balthasar, 1939: 22

Trichillum ohausi; Blackwelder, 1944: 204

Pedaridium ohausi; Martínez, 1968: 119

Pedaridium ohausi; Ferreira & Galileo, 1993: 12

Pedaridium ohausi; Génier & Vaz-de-Mello, 2002: 190-191

Type series: See Chapter 2.

Non-type material examined: ECUADOR: **Loja:** Loja, Ohaus (3 NHMB); III-1965, L Peña (1 BDGC, 6 CMNC, 1 NHMB); XII-1984, P. Ponce (1 FVMC); Abé Gaujon (2 NHMB).

Diagnosis: 3.6-4.5 mm. See Chapters 2 and 6.

Distribution: As previous species.

Remarks: See Chapter 2.

3. *Onoreidium howdeni* (Ferreira & Galileo, 1993)

Pedaridium howdeni Ferreira & Galileo, 1993: 8, 26-27

Type series: Holotype ♀: ECUADOR: **Guayas:** 40 km SW Guayaquil, 50 m, 21-22-II-1981, HF Howden (CMNC).

Paratypes: ECUADOR: **Guayas:** 40 km SW Guayaquil, 50 m, 21-22-II-1981, HF Howden (1 MZSP); 45 km W Guayaque, 22-II-1981, HF Howden (3 CMNC).

Non-type material examined: ECUADOR: **Guayas:** 40 km SW Guayaquil, 50 m, 21-22-II-1981, B Gill (8 BDGC); HF Howden (3 CMNC); 45 km W Guayaque, 22-II-1981, HF Howden (2 CMNC); 22-II-1981(40 CMNC, 1 FVMC); Guayaquil, 50 m, 21-22-II-1981, HF Howden (9 CMNC, 2 FVMC).

Diagnosis: 3.5-4.2 mm. Completely black, with no trace of metallic sheen. head completely lacking clypeo-frontal carina, elevated in the clypeo-frontal junction. Pronotal anterior angles feebly expanded in males. (FIGURES 47., 48.).

Distribution: Guayas in Ecuador.

Remarks: This species appears to be closely related to the following.

4. *Onoreidium carpioi* **n. sp.**

Type series: Holotype ♂: ECUADOR: **Manabí**: Cabo Pasado 0 m, 3-VIII-1996, C Carpio (PUCE).

Paratypes: ECUADOR: **Chimborazo**: Huigra, 185 m, 31-XII-1997, G Onore (1 FVMC, 1 PUCE); **Guayas**: Manglaralto, 8-IX-1981, GV Manley (1 CMNC); **Manabí**: Cabo Pasado 0 m, 3-VIII-1996, C Carpio (1 FVMC, 1 PUCE).

Diagnosis: 3.6-4.4 mm. As the precedent species, but lacking secondary sexual characters, with head strongly punctured, clypeo-frontal carinna present and interrupted in the middle, and dorsally with feeble metallic sheen. (FIGURES 49., 50.).

Etymology: This species in named after Carlos Carpio, scarab enthousiast and collector of part of the type series.

Distribution: Guayas, Chimborazo and Manabí, in Ecuador.

Remarks: See under previous species.

5.16 *PEDARIDIUM* HAROLD, 1868

Type species: *Pedaria hirsuta* Harold, 1859 (monotypy).

5.16.1 Key to species of *Pedaridium*

1. Clypeus with equilaterous triangular teeth.....*P. hirsutum* (Harold, 1859)

1'. Clypeus with very long and acute teeth.....*P. julioi* **n. sp.**

5.16.2 Species included:

1. *Pedaridium hirsutum* (Harold, 1859)

Pedaria hirsuta; Harold, 1859: 194-195

Pedaridium hirsutum; Gemminger & Harold, 1869: 1001

Pedaridium hirsutum; Gillet, 1911: 48

Pedaridium hirsutum; Arrow, 1913: 458

Pedaridium hirsutum; Arrow, 1932: 224, 226

Pedaridium hirsutum; Balthasar, 1938: 219

Pedaridium hirsutum; Blackwelder, 1944: 203

Pedaridium hirsutum; Ferreira & Galileo, 1993: 7, 16-18, 48-51

Pedaridium hirsutum; Vaz-de-Mello & Canhedo, 1998: 100

Pedaridium hirsutum; Vaz-de-Mello, 2000: 194

Type series:

LECTOTYPE **here designated**: ♂, pinned, in MNHU. Labels: [1.] 26438 / [2.] *São João del Rey, Sellow* / [3. green label] *hirsutum Harold* / [4.] Zool. Mus. Berlin / [5. red label] LECTOTYPE / [6.] *Pedaria hirsuta Har. LECTOTYPE,* Vaz-de-Mello det. 200*1*

PARALECTOTYPE **here designated**: ♂, pinned, in MNHU. Labels: [1. green label] *St Joao d R, Sello, Nr 26438* / [2.] Zool. Mus. Berlin / [3. yellow label] PARALECTOTYPE / [4.] *Pedaria hirsuta Har. PARALECTOTYPE,* Vaz-de-Mello det. 200*1*.

Non-type material examined: BRAZIL: **Minas Gerais:** Vila Monte Verde, 20-IV-1966, J. Halik (4 MZSP); **Paraná:** Campo Largo da Roseira, VII-1942, Hatsbach (1 CMNC); Curitiba, V-1942, Hatsbach (1 CMNC); no date (1 MNRJ); IV-1942 (1 IBSP, 3 MZSP); Deodoro, 1943, Hatsbach (2 CMNC); VI-1942 (1 CMNC, 3 MZSP); Florestal (Deodoro), X-1943, Hatsbach (1 CMNC);

Florestal (Piraquara), XII-1942, B. Pohl (2 MZSP); Guaraúna, VI-1937, Pinheiro Machado (1 MZSP); VI-1947 (1 MNRJ); Penha, VI-1940, Hatsbach (1 MZSP); Purunã, V-1942, Hatsbach (1 MZSP); Rincão, IV-1942, Hatsbach (1 CMNC); Xaxim, V-1942 (1 IBSP, 1 MZSP); **Rio de Janeiro:** Itatiaia, 19-IV-1992, CL Godinho Jr (2 FVMC); I-1992 (1 FVMC); IV-1995 (2 FVMC); Nova Friburgo, Três Picos, Salinas, X-2000, P Grossi (4 FVMC); Nova Friburgo, VI-2000, P Grossi (1 FVMC); **Santa Catarina:** São Bento, II-1989, Pereira (1 CMNC); **São Paulo:** São Bernardo, VIII-1934, Guérin (2 IBSP); **No data:** (2 IRSN, 1 NMHB); Candèze (2 IRSN).

Diagnosis: 6.4-8.6 mm. Distinguishable from *P. julioi* by shorter clypeal teeth, larger size, lack of pronotal differentiation in males and paramera form. (See Chapter 6).

Distribution: Southeastern Brazil (Southern Minas Gerais to Santa Catarina).

Remarks: The lectotype designation is necessary in order to stablish the species concept, as there is possibility of the presence of specimens of *P. julioi* between specimens originally seen by Harold and not examined for this study.

2. *Pedaridium julioi* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Lavras, V-1997, JNC Louzada (IBSP ex-FVMC).

Paratypes: BRAZIL: **Rio de Janeiro:** Nova Friburgo, 1000 m, II-2001, E Grossi (2 FVMC); Macaé de Cima, X-2000, P Grossi (1 FVMC).

Diagnosis: 5.2-5.7 mm. Very close to *P. hirsutum*. Clypeal teeth very long and acute. Anterior angles of pronotum expanded in males. Paramera slightly more elongate. (FIGURES 51., 52.).

Etymology: This species in named after Júlio N. C. Louzada, who collected the holotype and first specimen seen.

Distribution: Known only from two localities, in southern Minas Gerais and northern Rio de Janeiro, in Brazil.

Remarks: Specimens have been found at light and in pitfall traps baited with human faeces, in forests about 1000-1100 m high.

5.17 *PEREIRAIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Pedaridium almeidai* Pereira, 1946 (monotypy)

5.17.1 Species included:

1. *Pereiraidium almeidai* (Pereira, 1946)

Pedaridium almeidai Pereira, 1946: 289

Pedaridium almeidai; Ferreira & Galileo, 1993: 6, 10-11

Pedaridium almeidai; Vaz-de-Mello, 2000: 194

Pedaridium almeidai; Verdú & Galante, 2001

Type series: Holotype ♂ and allotype ♀: BRAZIL: **Paraná:** Deodoro, V-1942, Hatsbach (MZSP).

Paratypes: BRAZIL: **Paraná:** Guaraúna, V-1937, J. Pinheiro Machado (1 CMNC); XII-1937 (1 CMNC); Deodoro, V-1942, Hatsbach (2 MZSP); **Rio Grande do Sul:** Glória, 1927, P. Buck (1 IRSN).

Non-type material examined: BRAZIL: **Rio Grande do Sul:** Glória, 06-VI-1927, P. Buck (2 CMNC); 20-IX-1927 (1 CMNC); X-1927 (1 NMHB); 26-VII-1928, P Buck (1 FVMC); **São Paulo:** Est Biol. Boracéia, 24-VIII-1996, JR Verdú (2 FVMC).

Diagnosis: 5.5-6.1 mm (without horns). As for the genus. See Chapter 6.

Distribution: See Chapter 6.

Remarks: See Chapter 6.

5.18 *SILVIA* VAZ-DE-MELLO, **N. GEN.**

Type species: *Silvia unica* Vaz-de-Mello (monotypy)

5.18.1 Species included:

1. *Silvia unica* Vaz-de-Mello, **n. sp.**

Type series: Holotype ♂: BRAZIL: **Rio de Janeiro:** Nova Friburgo, VII-1994, P Grossi (IBSP ex-FVMC).

Paratypes: BRAZIL: **Minas Gerais:** Viçosa, X-1998, FZ Vaz-de-Mello (2 FVMC); II-1995, FZ Vaz-de-Mello (1 FVMC); **Rio de Janeiro:** Nova Friburgo, VII-1994, P Grossi (1 FVMC); 1000 m, XII-1996, P&E Grossi (2 FVMC); **São Paulo:** Serra do Japi, 1050 m, floresta, 1998, MIM Hernández, armadilha pitfall com fezes (5 FVMC).

Diagnosis: 3.5-3.8 mm. See Chapter 6.

Distribution: See Chapter 6.

Remarks: See Chapter 6.

5.19 *TRICHILLIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Pedaridium quadridens* Arrow, 1932 (original designation)

5.19.1 Key to the species of *Trichillidium*

1. Fore tibiae with two external teeth….....*T. caingua* (Martínez, 1974)

1'. Fore tibiae with three external teeth……..*T. quadridens* (Arrow, 1932)

5.19.2 Species included:

1. *Trichillidium quadridens* (Arrow, 1932)

Pedaridium quadridens Arrow, 1932: 225

Pedaridium quadridens; Balthasar, 1938: 220

Pedaridium quadridens; Blackwelder, 1944: 203

Pedaridium quadridens; Martínez, 1959: 62

Pedaridium quadridens; Martínez, 1987: 60

Pedaridium quadridens; Ferreira & Galileo, 1993: 33

Pedaridium quadridens; Monteresino et al., 1996: 107

Pedaridium quadridens; Génier & Vaz-de-Mello, 2002: 192

Type series: Holotype, see Chapter 2 (BMNH).

Non-type material examined: ARGENTINA: **Buenos Aires:** Tigre, V-1945, MJ Viana (2 CMNC); **Córdoba:** Cruz del Eje, Guanaco Muerto, II-1980, Martínez (2 CMNC); Do. Santa Rosa, Diquecito, XII-1965 (1 CMNC); Río Primero, 12-X-1905, F. Schulz (1 FMLT); **Corrientes:** Ituzaingó, Apipé Grande, XI-1945, Martínez (1 CMNC); **Formosa:** 50 km NW Clorinda, PN Río Pilcomayo, 17-XII-1990, S&J Peck, UV (1 CMNC); **Jujuy:** 1 km N Pampa Blanca, 700 m, 7-II-1982, H&A Howden (3 CMNC); 12 km S Ledesma, 500 m, Río Ledesma, 27-XII-1987, S Peck, substr. seas. forest (1 CMNC); **Salta:** Do. Anta, Las Lajitas, XII-1984, Martínez (2 CMNC); XII-1982 (2 CMNC); Viñaco, 15 km S El Carril, 12-II-1982, H&A Howden (1 CMNC); **San Luis:** Do. Belgrano, Las Quijadas, II-1969, Hernández (1 CMNC); **Santiago del Estero:** no locality, Wagner (1 CMNC); Río Salado, Icaño, Bosq (1 CMNC); Wagner (1 CMNC); Villa Unión, X-1943, Prosen (1 CMNC); **Tucumán:** Ciudad, Pte. Río Salí (2 CMNC); Ciudad, Río Sali – Puente, XI-1950, Martínez (1 MZSP); Do. Burruyacu, B Ataoz, III-1946, Martínez (1 CMNC); Do. La Cocha, Dique los Pizarros, 10-13-XII-1982, R. Golbach (1 FMLT); BOLIVIA: **Santa Cruz:** Pampa Grande 1360 m, 26-29-I-1999, F Génier, dry cactus scrub, dung (2 CMNC); 28-29-III-1998, H&A Howden (1 CMNC); El Refugio Res., X-1994, A Forsyth (1 BDGC); BRAZIL: **Mato Grosso do Sul:** Corumbá, Passo do Lontra, II-1996, Louzada & Vaz-de-Mello (5 AMBC, 12 FVMC); VIII-1998, J Raiser (1

AMBC); **Mato Grosso:** Poconé, Pousada Araras, 3-XII-1998, Moreno & Mestre (1 FVMC); PARAGUAY: **Boquerón:** Guarn. Oruro, XI-1950, Martínez (1 CMNC); Loma Plata, XII-1993 (1 BDGC); **Caaguazú?:** Ybicui, 15-19-XII-1990, G Arriágada (3 CMNC); **Caazapá:** Caazapá, II-1993, G Arriágada (3 CMNC).

Diagnosis: 2.7-3.8 mm. See Chapter 2. Clypeal teeth vary as in figures. (FIGURES 61., 62., 63.).

Distribution: Chaco and Brazilian Pantanal.

Remarks: A closely related form, not treated here by lack of sufficient data, occurs in the northern part of the distribution of this species, in Santa Cruz, Bolivia.

2. *Trichillidium caingua* (Martínez, 1974)

Pedaridium (?) *caingua* Martínez, 1974: 65

Pedaridium caingua; Ferreira & Galileo, 1993: 8, 31-32

Type series: Holotype ♀: ARGENTINA: **Misiones:** P.N. Iguazú, Pto. Iguazú, XII-1958, Martínez (BRBA).

Paratype: ARGENTINA: **Misiones:** Do. Frontera, San Antonio, IX-1957, Martínez (1 CMNC).

Non-type material examined: BRAZIL: **Rio de Janeiro:** Miguel Pereira, XI-1997, J Carlos (1 AMBC); **Santa Catarina:** Nova Teutônia, XI-1975, F Plaumann (1 CMNC); XI-1976 (1 CMNC); XII-1970 (1 IBSP).

Diagnosis: 3.1-3.5 mm. Similar to previous species, except in the lack of basal teeth of protibia and in the great devellopment of lateral clypeal denticles.

Distribution: Brazilian-Argentinean border near Iguazú, and Rio de Janeiro in Brazil.

Remarks: The distance between localities is probably due to some unusual habits of that species, that makes its capture difficult. Only females have been seen. Relations to *T. quadridens* will be solved only where males are known.

5.20 *TRICHILLUM (PARATRICHILLUM)* VAZ-DE-MELLO, **N. SUBGEN.**

Type species: *Trichillum adjunctum* Martínez, 1968.

5.20.1 Key to the species of *Trichillum (Paratrichillum)*

1. Pronotum with large punctures bearing settae in all disk……..... .....……..……..……*T.(P.) pauliani* Balthasar, 1939.

1'. Pronotum without large punctures nor settae in the middle of the disk…..... .....……*T. (P.) adjunctum* Martínez, 1968.

5.20.2 Species included:

1. *Trichillum (Paratrichillum) adjunctum* Martínez, 1968

Trichillum (Trichillum) adjunctum Martínez, 1968: 123, 129-133

Trichillum (Trichillum) adjunctum; Vaz-de-Mello, 2000: 195

Type series: Holotype ♂ not seen (BRBA?), allotype ♀: BRAZIL: **São Paulo:** São Paulo, Aclimação, XII-1958, A Martínez (BRBA).

Paratypes: **Paraná:** Curitiba, II-1942, Hatsbach (1 CMNC); **São Paulo:** Capital, XI-1929, J Lane (1 CMNC); Ipiranga, XII-1956 (1 CMNC); M. Parnaíba, Três Pedras, XII-1958, Martínez (1 CMNC).

Non-type material examined: BRAZIL: **Distrito Federal:** Est. Florestal Cabeça do Veado, 1100 m, 27-X-1971, EG, I & EA Munroe (1 CNIC); **Goiás:** Mineiros, X-1989, CL Godinho Jr (1 FVMC); **Mato Grosso do Sul:** Selvíria, UNESP farm, 05-VI-1990, CAH Flechtmann, ex Guzerá bovine dropping, Brachiaria decumbens pasture (5 FEIS); Campo Grande, 1990-1992, I Bianchin (1 FVMC);

Costa Rica, 17-XII-1993, S Ide (7 MZSP); **Minas Gerais:** Cordisburgo, Faz Pontinha, I-1994, FZ Vaz-de-Mello (1 CMNC, 1 FVMC); XII-2000 (1 FVMC); Lavras, 18-I-1999, JNC Louzada (1 FVMC); 29-I-1999 1 FVMC); Paracatu, II-1997, S Lourenço (33 FVMC); XII-1996, S Lourenço (350 FVMC); Serra do Caraça, 24-II-03-III-1972, Exp. MZUSP (1 MZSP); Vespasiano, XI-1952, A Machado (1 FVMC); **São Paulo:** Bragança Paulista, D Vaglio (1 CMNC); Ipiranga, I-1963, Martínez (1 CMNC); XII-1956 (1 CMNC); São José dos Campos, XII-1934, HS Lopes (2 MNRJ); São Paulo, Ypiranga, I-1963, A Martínez (1 BDGC); **Tocantins:** Pium, XI-1971, J da Silva (1 CMNC).

Diagnosis: 2.9-4.5 mm. Eyes small (more than twice as long as wide). Discal pronotal punctures lacking or very small and scattered. Elytral central discal setae lacking.

Distribution: Brazilian Cerrado.

2. *Trichillum (Paratrichillum) pauliani* Balthasar, 1939

Trichillum arrowi Paulian, 1936: 205-206

Trichillum pauliani Balthasar, 1939: 21, 25

Trichillum homonymum Blackwelder, 1944: 204

Trichillum pauliani; Martínez,1947: 113

Trichillum (Eutrichillum) pauliani; Martínez, 1968: 120-121

Trichillum (Eutrichillum) pauliani; Ratcliffe, 1980: 341

Trichillum (Eutrichillum) pauliani; Vaz-de-Mello, 2000: 195

Type series: holotype not seen (MNHN, as *T. arrowi* Paulian (A. Ballerio pers. comm.).

Non-type material examined: BRAZIL: **Amapá:** Serra do Navio, Cava Urucum-Amapari, IX-2000, R Ribon (5 FVMC); **Pará:** Tucuruí, VI-1985 (3 CMNC); IV-1988 (2 CMNC); **Roraima:** Cantá - Serra Negra, IX-1996, Ribeiro & Vaz-de-Mello, primary forest (166 FVMC); FRENCH GUYANA: **Cayenne:**

Nourages, 21-XI-1998, F Feer (3 FVMC); **Saint Laurent du Maroni:** L'Acarouany, 6-XI-1975, P Arnaud (4 BDGC).

Diagnosis: 3.8-4.5 mm. Eyes large (much less than twice as long as wide), pronotal punctures and setae distinct, elytral setae present also in the center of disc.

Distribution: Eastern Amazonia.

5.21 *TRICHILLUM (TRICHILLUM)* HAROLD, 1868

Type species: *Trichillum heydeni* Harold, 1868 (monotypy)

5.21.1 Species included:

1. *Trichillum (Trichillum) heydeni* Harold, 1868

Trichillum heydeni Harold, 1868: 53-54

Trichillum heydeni; Gemminger & Harold, 1869: 1003

Trichillum heydeni; Borre, 1880: xxvii

Trichillum heydeni; Gillet, 1911: 52

Trichillum heydeni; Arrow, 1931: 609-610

Trichillum heydeni; Paulian, 1936: 206, 207

Trichillum heydeni; Pessôa & Lane, 1941: 446-447

Trichillum heydeni; Blackwelder, 1944: 204

Trichillum (Trichillum) pereirai Martínez, 1968: 123, 133-137

Trichillum (Trichillum) pereirai; Verdú & Galante, 1997: 96

Trichillum (Trichillum) pereirai; Vaz-de-Mello, 2000: 195

Type series: *Trichillum heydeni*: lectotype (MNHN) and 2 paralectotypes (MNHU) examined, see Chapter 3.

Trichillum pereirai Martínez, 1968: holotype and allotype (BRBA) examined, see chapter 3. Paratypes: BRASIL: **São Paulo:** Campos do Jordão,

Eug. Lefevre, 1800 m, 13-20-XI-1952, d'Almeida & Pereira (1 CMNC); São Paulo - Aclimação, XII-1962, Martínez (1 CMNC).

Non-type material examined: BRAZIL**: Bahia:** Barreiras, XII-1991, arm luminosa (1 FVMC); Encruzilhada, 980 m, XI-1972, M Alvarenga (74 MZSP); XI-1974 (6 CMNC); XII-1980, Alvarenga & Martínez (6 CMNC); Vitória da Conquista, I-1993 (1 MZSP); **Distrito Federal:** Est. Florestal Cabeça do Veado, 1100 m, X-1971, EG, I & EA Munroe (16 CNIC); **Espírito Santo:** Linhares, Pq Nac Sooretama, XI-1962, Martínez (2 CMNC); **Goiás:** Goiânia, Faz. Dione, 1-V-1993, J. Sár, at light (2 HMNH); Goiatuba, X-1931 (1 MZSP); Niquelândia, X-1993, arm luminosa (5 FVMC); Pirineus, 02-II-1962, Bechyné (1 IBSP); **Mato Grosso:** Barra do Tapirapé, 2-16-I-1966, B Malkin (1 MZSP); Chapada dos Guimarães, XI-1963, Alvarenga (1 CMNC); **Minas Gerais:** Águas Vermelhas, XII-1997, Bello (3 AMBC); Araguari, 17-II-1970, H Martínez (2 CMNC); Barbacena, Van Volxem (3 IRSN); Buritis (Rib. Vermelho), 29-31-X-1964, Exp. Dep. Zool. (1 MZSP); Cordisburgo, Faz Pontinha, X-1993, FZ Vaz-de-Mello (1 CMNC); XII-1993 (3 AMBC); Guanhães, 07-XII-1993 (1 FVMC); Lavras, UFLA, 04-X-1997 (3 FVMC); 15-XI-1997 (3 FVMC); Martinho Campos, X-1991 (1 FVMC); Monte Alegre, Faz. Sta. Maria 1100 m, 24-30-XI-1942, :Zoppe & D'Amico (1 MZSP); Montes Claros, I-2000, JNC Louzada (53 FVMC); XII-1999 (1 FVMC); Paracatu, II-1997, S Lourenço (8 FVMC); XII-1996 (900 FVMC); Pedra Azul, 700 m, XI-1972, Seabra & Oliveira (1 MZSP); Santa Bárbara, 17-XI-1994 (2 FVMC); 25-XI-1993, JC Zanúncio (1 FVMC); Serra do Caraça, 27-XI - 05-XII-1972, Exp. Mus. Zool. (2 MZSP); Unaí, Faz Bolivia, 22-24-X-1964, Exp Dep Zool. (1 CMNC); Vespasiano, XII-1952, A Machado (2 FVMC); **São Paulo:** Assis, XI-1942, B. Pohl (1 MZSP); Atibaia, 18-XI-1969, J. Halik (1 MZSP); Barueri, 18-XI-1963, K. Lenko (1 MZSP); XII-1965, Martínez (1 CMNC); Itu, Faz Pau d'Alho, 28-29-X-1965, Martins & Biasi (1 CMNC, 7 MZSP); XII-1963, Martins (1 MZSP); 06-XI-1960 (1 MZSP); 29-

X-1965, U. Martins (4 MZSP); X-1965 (3 MZSP); Osasco, Fca Fósforos, XII-1962, Martínez (2 CMNC); Parnaíba, Três Pedras, XII-1962, Martínez (1 CMNC); Pradópolis, VIII-1976, PSM Botelho (2 ESAP); Salesópolis, Est. Biol. Boracéia, XI-1966, E.X.Rabello (5 MZSP); São Paulo - Aclimação, XII-1962, Martínez (1 CMNC); X-1929, Spitz (1 MZSP); XI-1937, F. Lane (1 MZSP); São Paulo, Ipiranga (1 MZSP); **Tocantins:** Palmas, XI-1992, MHM Galileo (1 FZRS).

Diagnosis: See Chapters 3 and 6.

Distribution: Brazilian Cerrado and pasturelands.

Remarks: This species is very islolated in the genus due to its unique externally idented paramera.

2. *Trichillum (Trichillum) externepuctatum* Borre, 1880

Trichillum externepunctatum Borre, 1880: xxvii-xxviii

Uroxys hirta Guérin *in litt.*; Borre, 1880: xxvii

Trichillum externepunctatum; Gillet, 1911: 52

Trichillum externepunctatum; Arrow, 1931: 609

Trichillum externepunctatum; Paulian, 1936: 206-207

Trichillum externepunctatum; Balthasar, 1939: 17, 21

Trichillum externepunctatum; Pessôa & Lane, 1941: 447

Trichillum externepunctatum; Blackwelder, 1944: 204

Trichillum (Trichillum) externepunctatum; Martínez, 1959: 63

Trichillum (Trichillum) externepunctatum; Martínez, 1968: 123-126

Trichillum (Trichillum) externepunctatum; Martínez, 1987: 60

Trichillum (Trichillum) externepunctatum; Monteresino et al., 1996: 107

Trichillum (Trichillum) externepunctatum; Verdú & Galante, 1997: 96

Trichillum (Trichillum) externepunctatum; Vaz-de-Mello, 2000: 195

Trichillum externepunctatum; Verdú & Galante, 2001

Type series: Holotype not sexed: COLOMBIA: **No locality** (IRSN).

Non-type material examined: About 5000 specimens seen, only localities listed. NO DATA (ESAP, IBSP); ARGENTINA: **Province?:** Between Rosario and Santa Fe (HMNH); S. Ignacio (IRSN); **Chaco:** 100 km NW Resistencia (CMNC); Colonia JJ Castelli (CMNC); Resistencia (CMNC); Río Tapenagá (IRSN); **Córdoba:** Cabana (CMNC); Capilla del Monte (FVMC); Ciudad (CMNC); Cruz del Eje (CMNC, FVMC); Diquecito (1 MZSP); Do. Santa Maria, Diquecito (CMNC); La Peca (FVMC); San Vincente (FVMC); **Corrientes:** Alto Paraná (CMNC); Ituzaingó, Villa Olivari (CMNC); **Entre Ríos:** Do. Concórdia, Concórdia (CMNC); Liebig (FVMC); **Formosa:** 50 km NW Clorinda (CMNC); Ciudad (MZSP); **Jujuy:** Dique La Ciénaga 14 MZSP); Do. Santa Barbara, Termas del Palmar (CMNC); Pampa Blanca (CMNC); **Misiones:** Do. Concepción, Santa Maria (CMNC); Iguazú (CMNC); Loreto (CMNC); **Salta:** Aguaray (MZSP); Carapari (CMNC); Diquecito (CMNC); Do. Anta, Las Lajitas (CMNC, BDGC); Lumbreras (CMNC); Do. San Martín, Hickmann (CMNC); Guemes (CMNC); Pocitos (MZSP); Rosario de la Frontera, El Naranjo (CMNC); S. Victoria (CMNC); Tartagal (CMNC, MZSP); Urundel (CMNC); Viñaco, 15 km S El Carril (BDGC, CNIC, CMNC); **San Luis:** Do. Belgrano, Las Quijadas (CMNC); **Santa Fé:** no locality (IRSN); Tostado (CMNC); **Santiago del Estero:** no locality (CNIC); Do. Copo (CMNC); Río Dulce (IRSN); Río Salado (IRSN); Termas del Río Honda (CMNC); **Tucumán:** Ciudad (MZSP, FMLT); Do. Cruz Alta, Las Cejas (FMLT); BOLIVIA: **Chuquisaca?:** Villa Monte am Pilcomayo (MNHU); **Cochabamba:** Chapare, Agrigento (CMNC); Yungas del Palmar (MZSP); **Ichilo:** Buenavista (MZSP, CMNC); **Nor Yungas:** Caranavi (CMNC); **Santa Cruz:** Sara, Gutiérrez, Portachuelo (MZSP); Cordillera, Parapetí (CMNC, MZSP); Cordillera, Quebr. de Caracara (CMNC); Cordillera, Río Seco (MZSP); Cordillera, Tunalito (CMNC); El Cidral (FMLT); Pampa Grande 1360 m (CMNC); Pampa Grande,

Ciudad (CMNC); Sara (FVMC); Sara, Santa Rosa (CMNC, FVMC); **Tarija:** Gran Chaco, Villamontes (CMNC); Ing. Bermejo (FMLT); BRAZIL: **State?:** no data (IRSN); **Acre:** Rio Branco, PZ-UFAC (1 FVMC); **Bahia:** Bonfim (CMNC, MZSP); Encruzilhada (CMNC); Ilhéus (Pontal) (MZSP); Maracás (MZSP); Mucuri (1 FVMC); **Distrito Federal:** Brasília 1100 m (FVMC, CMNC); **Espírito Santo:** Córrego Itá (MNRJ); Linhares, Faz Lagoa do Macuco, 10 m (14 CMNC); Linhares (CMNC, MZSP); Vitória - Pque do Tabuazeiro (FVMC); **Goiás:** Aruanã, Rio Araguaya (MZSP); Bom Jardim de Goiás (FVMC); Bom Jesus (FVMC); Corumbá de Goiás (IBSP); Goiatuba (MZSP, MNRJ); Jataí, Faz. Cachoeirinha (MZSP); Jataí, Faz. Nova Orlândia (MZSP); Jataí (MZSP); Leopoldo Bulhões (MNRJ); Luziânia (FVMC); Rio Verde (CMNC, MZSP, AMBC, FVMC); **Mato Grosso do Sul:** Brasilândia, Faz. Barma (MZSP); Campo Gande (MZSP, FVMC); Corumbá, Passo do Lontra (FVMC); Corumbá (CMNC, IRSN, HMNH, CNIC); Costa Rica (MZSP); Coxim, Olímpia e Terra ForteFarm (FEIS); Murtinho (CMNC, MZSP, MNRJ); Rio Caraguatá (MZSP); Rio Paraná - Riacho do Herval (MZSP); Santa Luzia (ex Juí), Mun. Caarapó (MZSP); Selvíria, UNESP farm (ESAP, FEIS); Três Lagoas, Faz. Beija Flor (MZSP); Três Lagoas, Faz. Retiro de Telha (MZSP); Três Lagoas, marg. esq. Rio Sucuriu, Faz. Canaã (MZSP); **Mato Grosso:** Barra do Bugres (FVMC); Barra do Tapirapé (MZSP); Cáceres (MNRJ, MZSP, NHMB); Chapada dos Guimarães (MZSP); Diamantino, Alto Rio Arinos (AMBC, FVMC); Poconé (MZSP); Rio Tapirapé (MZSP); Rosário d'Oeste (MZSP); **Minas Gerais:** no locality (IRSN); Açucena (FVMC); Águas Vermelhas (AMBC, FVMC); Buritis (Rib. Confins) (MZSP); Carmo do Rio Claro (MNRJ); Centralina (MZSP); Cordisburgo, Faz Pontinha (FVMC, AMBC); Ipatinga (FVMC, AMBC); Lavras - Poço Bonito (1 FVMC); Lavras (FVMC); Montes Claros (FVMC); Nova Era (FVMC); Paracatu (FVMC); Pedra Azul 700 m (MZSP); Sete Lagoas (MZSP); Viçosa (FVMC); **Pará:** Belém, Utinga (CMNC); Belém (MZSP); **Paraíba:**

Coremas (MZSP); Mamanguape (MZSP); **Paraná:** Londrina (MZSP, FVMC); Rio Caraguatá (CNIC); **Pernambuco:** no locality (MNHU, IRSN); Bonito (CMNC); Pery-Pery (MNHU); Serra de Communaty (MNHU); **Piauí:** São Raimundo Nonato, Pq Nac. Serra da Capivara (FVMC); Teresina (MZSP); **Rio de Janeiro:** km 47, Itaguaí (MZSP, MNRJ); Santa Cruz (FVMC); **Rio Grande do Norte:** Canguaretama (MZSP); Natal (NHMB); Parnamirim (CMNC, MZSP, MNRJ); **Rio Grande do Sul:** Eldorado do Sul (FZRS, FVMC); General Câmara (FZRS); Gravataí (MZSP); Guaíba (FZRS); Livramento (FZRS); Pelotas, Passo da Michaela (FZRS); Porto Alegre (CMNC); Santa Maria (FZRS); São Jerônimo (FVMC, FZRS); São Leopoldo (CMNC, MZSP, CNIC); Viamão (FZRS); **Rondônia:** Vilhena (FVMC); **Santa Catarina:** Nova Teutônia (IBSP); **São Paulo:** Assis (MZSP); Bálsamo (IBSP); Batatais (MZSP); Campinas – Souza (CMNC); Campinas (MZSP); Castilho, marg esq. Rio Paraná (MZSP); Fátima Paulista (FEIS); Flora Rica (FEIS); Ibiré (Termas) (CMNC, MZSP); Ilha Solteira (FEIS); Indiana (MZSP); Itu, Faz. Pau d' Alho (MZSP); Itu (MZSP); Mirante do Paranapanema (FEIS); Piracicaba (CMNC); Pirassununga (ESAP); Rib. Preto (Fac. Medicina) (MZSP); Rio Claro (MZSP); São Carlos (FVMC); São Paulo, Villa Marianna (MZSP); Teodoro Sampaio, Morro do Diabo State Reservation (FEIS); **Tocantins:** Dianópolis (IBSP); Palmas (FZRS); PARAGUAY: **Do.?:** no locality (HMNH); Mbovevo bei Villarrica (MNHU); **Alto Paraná:** Limoy (FVMC); Puerto Stroessner (HMNH); RB Itabo (FVMC); **Amambay:** Pedro Juan Caballero (ESAP, FVMC, FMLT); **Boquerón:** Col. Ferheim (CMNC); Cruce Loma Plata (FVMC); Gran Chaco, km 145 de Pto. Casado (BDGC); **Caaguazú:** Ybicui (CMNC); Mandijhé (FMLT); **Caazapá:** Est. Cristal (FVMC); **Central:** Asunción, Est. Mburicao (FVMC); Asunción (CMNC, FMLT); Mburicá (CMNC); Trinidad (CMNC); Univ. Nal. Agric. San Lorenzo (BDGC); **Concepción:** Horquetá (CMNC); **Guayrá:** Villarrica (CMNC, IRSN, MNHU); **Itapua:** Est. Los Belgas (FVMC); **Misiones:** Ayolas

(CMNC); Iguazú (CMNC); Pto. Iguazú (CMNC); **Paraguary:** Sapucay (ABC); **Presidente Hayes?:** Río Tebicuarí (CMNC); **San Pedro:** Altos (MZSP); Cororó (FVMC, CMNC); San Lorenzo (MZSP), Carumbé (FMLT); **San Pedro?:** Capiata, Río Paraguay (IRSN); Peribebuy (CMNC); San Estanislao (CMNC); URUGUAY: **Montevideo:** Montevideo (IRSN).

Diagnosis: 2.8-4.0 mm. Clypeal teeth short, emargination widely U-shaped. Clypeus laterally with feeble rounded expansion near teeth, separated by wide inconspicous emargination. Two divergent rows of setae in the frons, without smaller punctures laterally. Clypeous with mixed small and larger non-anastomosed punctures. (FIGURES 65., 66.).

Distribution: Open habitats southern of the Amazon and Eastern of the Andes, as south as Uruguay.

Remarks: This is the most distributed species in the genus, and its distribution coincides geographically with all other species.

3. *Trichillum (Trichillum) arrowi* Saylor, 1935

Trichillum arrowi Saylor, 1935: 208

Trichillum arrowi; Balthasar, 1939: 19, 22

Trichillum arrowi; Blackwelder, 1944: 204

Type series: Holotype ♂: PARAGUAY: **Concepción:** Horquetá (USNM).

Non-type material examined:

BRAZIL: **Distrito Federal:** Est. Florestal Cabeça do Veado, 1100 m, 17-X-1971, EG, I & EA Munroe (1 CNIC); 23-27-X-1971 (1 CNIC).

Diagnosis: 3.2-3.4 mm. Clypeal teeth acute, head uniformly covered by dense non-anostomosed punctures. (FIGURES 67., 68.).

Distribution: Known from the type locality and from Distrito Federal in Brazil.

Remarks: Head punctation is very characteristic in this species. *T.pseudoarrowi* has been misidentified under this name by some authors. See also remarks under that species in Chapter 3.

4. *Trichillum (Trichillum) depilatum* Balthasar, 1942

Trichillum depilatum Balthasar, 1942: 40-41

Trichillum depilatum; Martínez, 1947: 110

Trichillum (Trichillum) depilatum; (*pars*) Martínez, 1968: 123, 128-129

Trichillum (Trichillum) depilatum; (*pars*) Verdú & Galante, 1997: 96

Trichillum (Trichillum) depilatum; Vaz-de-Mello, 2000: 195

Type series: Holotype ♀: BRAZIL: **São Paulo:** no locality, Mráz (NMP).

Non-type material examined:

BRAZIL: **Mato Grosso:** Diamantino, XI-1967, A Maller (1 CMNC); **Santa Catarina:** Rio Natal, X-1945 (1 CMNC); **São Paulo:** Barueri, XII-1955, K Lenko (2 CMNC); I-1956 (1 CMNC).

Diagnosis: 3.2-3.6 mm. Body elongate, with poor hair covering (in elytra setae present only at apex). Head minutely and sparsely punctate, with scattered setae. Clypeal form as for *T. externepunctatum.* (FIGURES 69., 70.).

Distribution: Southeastern Brazil and a doubtfull locality in Mato Grosso.

Remarks: *T. cordobense* has been misidentified as that species by some authors. See also remarks under that species in Chapter 3.

5. *Trichillum (Trichillum) halffteri* Martínez, 1968

Trichillum (Trichillum) halffteri Martínez, 1968: 124, 137-141

Trichillum (Trichillum) halffteri; Verdú & Galante, 1997: 96

Trichillum (Trichillum) halffteri; Vaz-de-Mello, 2000: 195

Type series: Holotype ♂ and allotype ♀: ARGENTINA: **Misiones:** Alba Posse, Puerto, X-1966, A Martínez (BRBA).

Paratypes: BRAZIL: **Rio Grande do Sul:** Estrela, XII-1964, Partridge (2 CMNC); **Santa Catarina:** Barros-Casal, IX-1960, F Plaumann (2 CMNC); Nova Teutonia, X-1969, F Plaumann (1 CMNC).

Non-type material examined: BRAZIL: **Rio de Janeiro:** Nova Friburgo, Macaé de Cima, XII-1998, Grossi, Moreno & Vaz-de-Mello (1 FVMC); **Santa Catarina:** Barros-Casal, 700 m, IX-1960, F Plaumann (2 CNIC); no date (2 CNIC); Nova Teutonia, X-1967, F Plaumann (1 CNIC); XII-1976 (1 CMNC); **São Paulo:** Campos do Jordão, Pq Estadual, 15-19-X-1992, Exp. MZSP (1 MZSP).

Diagnosis: 3.2-3.8 mm. Body flattened, head wide, with large eyes. Clypeal teeth equilaterous but very acute. Anterior pronotal angles of male expanded. Basitarsomere of metatibia very long (more than twice the second tarsomere). Paramera typically shaped, apically expanded. (FIGURES 71., 72.).

Distribution: Atlantic rainforest in Southern Brazil.

Remarks: This is a very distinct species that can be related only with *T. schoerederi* and *T. paschoali*.

5. *Trichillum (Trichillum) morellii* Verdú & Galante, 1997

Trichillum (Trichillum) morellii Verdú & Galante, 1997: 94-96

Type series: holotype in MEUA, not seen.

Paratype: URUGUAY: **Rocha:** Cerro de Lechiguana, Castillos, 24-IX-1995, JR Verdú (1 MEUA).

Diagnosis: 2.6-2.7 mm. Clypeus and body form as for *T. externepunctatum.* Frons punctation uniform punctures separated by about 2-3 diameters. Clypeal punctation transversally rugose. Paramera short, apically upturned.

Distribution: Known only from the type locality.

Remarks: The only other species that is known to occur in Uruguay is *T. externepunctatum*, wich has different head punctation, paramera and metasternal sulcus.

6. *Trichillum (Trichillum) pseudoarrowi* Vaz-de-Mello & Génier, **n. sp.**

Trichillum arrowi; Pereira & Martínez, 1959: 453-458

Trichillum (Trichillum) arrowi; Martínez, 1968: 123, 127

Trichillum (Trichillum) arrowi; Verdú & Galante, 1997: 96

Type series: See Chapter 3.

Diagnosis: See Chapter 3.

Distribution: See Chapter 3.

Remarks: See Chapter 3.

7. *Trichillum (Trichillum) cordobense* Vaz-de-Mello & Génier, **n. sp.**

Trichillum (Trichillum) depilatum; (*pars*) Martínez, 1968: 123, 128-129

Trichillum (Trichillum) depilatum; (*pars*) Verdú & Galante, 1997: 96

Type series: See Chapter 3.

Diagnosis: See Chapter 3.

Distribution: See Chapter 3.

Remarks: See Chapter 3.

8. *Trichillum (Trichillum) tishechkini* Vaz-de-Mello & Génier, **n. sp.**

Trichillum (Trichillum) heydeni; Martínez, 1959: 64

Trichillum (Trichillum) heydeni; Martínez, 1968: 122-124

Trichillum (Trichillum) heydeni; Monteresino et al., 1996: 107

Trichillum (Trichillum) heydeni; Verdú & Galante, 1997: 96

Type series: See Chapter 3.

Diagnosis: See Chapter 3.

Distribution: See Chapter 3.

Remarks: See Chapter 3.

9. *Trichillum (Trichillum) andersoni* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Unaí, Faz. Bolivia, 22-24-X-1964, Exp. Dep. Zool. (CMNC).

Paratype: PARAGUAY: **Guayrá:** Villarrica, XI-1941, F Schade (1 CMNC).

Diagnosis: 3.1-3.3 mm. Body elongated. Clypeal teeth equilaterous, clypeus laterally simply rounded. Head punctation sparse and uniform, clypeal punctures slightly larger and bearing setae. (FIGURES 73., 74.).

Etymology: This species in named after Robert Anderson (Canadian Museum of Nature).

Distribution: Known from two localities, in Paraguay and Brazil (Minas Gerais).

10. *Trichillum (Trichillum) arriagadai* **n. sp.**

Type series: Holotype ♂: PARAGUAY: **Boquerón:** Cruce Loma Plata, XII-1993, G Arriágada (IBSP ex-FVMC).

Paratypes: PARAGUAY: **Boquerón:** Cruce Loma Plata, XII-1993, G Arriágada (3 FVMC); **Guayrá:** Villarrica, IV-1934, Köller (2 MNHU).

Diagnosis: 2.5-3.1 mm. Body elongated. Head form similar to *T. depilatum.* Head punctation close to that of *T. externepunctatum*, but lacking frontal rows of setae. (FIGURES 75., 76.).

Etymology: This species in named after Gerardo Arriágada, who collected most of the type series.

Distribution: Guayrá and Boquerón, in Paraguay.

11. *Trichillum (Trichillum) ballerioi* **n. sp.**

Type series: Holotype ♂: ARGENTINA: **San Luis:** Do. Belgrano, Las Quijadas, II-1969, Hernández (CMNC).

Paratype: same data as holotype (1 CMNC).

Diagnosis: 3.1-3.3 mm. Head form and punctation very similar to that of *T. tishechkini*, but size much smaller and paramera different. (FIGURES 77., 78.).

Etymology: This species in named after Alberto Ballerio, italian scarabaeoidologist.

Distribution: Known only from the type locality.

Remarks: This species is closely related to *T. tishechkini*, *T. silviae* and *T. idei.*

12. *Trichillum (Trichillum) belloi* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Rio de Janeiro:** Itatiaia, XII-1989, Bello (IBSP ex-AMBC).

Diagnosis: 2.2 mm. Very distinctive species chracterized by very small size and elytral interstriae that are so flat that striae appear to be external folds. Head and pronotum uniformly punctate, Clypeus rounded, with two acute teeth separated by U-shaped emargination. (FIGURES 79., 80.).

Etymology: This species in named after Ayr de Moura Bello.

Distribution: Known only from the Itatiaia range.

Remarks: The only species that could be related are *T. martinezi* or *T. genieri*. As the holotype seems to be a teneral specimen, it is not possible to know if it will either also have the characteristic color of that species, or be simply black.

13. *Trichillum (Trichillum) bellorum* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Cordisburgo, Faz Pontinha, XII-1993, FZ Vaz-de-Mello (IBSP ex-AMBC).

Paratypes: BRAZIL: **Minas Gerais:** Cordisburgo, Faz Pontinha, I-1998, FZ Vaz-de-Mello (1 AMBC); Martinho Campos, X-1991 (1 FVMC); IX-1991 (1

FVMC); Monjolinho, I-1991, Zanuncio (1 FVMC); Montes Claros, I-2000, JNC Louzada (2 FVMC).

Diagnosis: 3.4-4.0 mm. Body elongated. Very similar to *T. depilatum*, except for denser hair covering, and uniform head punctation, with sparse setigerous punctures. (FIGURES 81., 82.).

Etymology: This species in named after Claudia and Ayr Bello.

Distribution: Known from Cerrado areas in central and northern Minas Gerais in Brazil.

Remarks: Collected at light in all localities.

14. *Trichillum (Trichillum) borrei* **n. sp.**

Type series: Holotype ♀: BRAZIL: **São Paulo:** Piracicaba - ESALQ, 540 m, 11-X-1965, Neto & Wiendl (IBSP ex-FVMC).

Diagnosis: 3.3 mm. Body elongated, black. Head wide, clypeus laterally to teeth simply rounded. Frons punctation very small and sparse, punctures larger and sparse on clypeus, bearing setae. (FIGURE 83.).

Etymology: This species in named after Charles François Paul Alfred Preudhomme de Borre (1833-1905).

Distribution: Known only from the type locality, the campus of the University of São Paulo in the town of Piracicaba.

Remarks: Male unknown.

15. *Trichillum (Trichillum) canhedoae* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Bahia:** Barreiras, XII-1991, arm luminosa (IBSP ex-FVMC).

Paratypes: BRAZIL: **Bahia:** Barreiras, XII-1991, arm luminosa (7 FVMC); X-1991 (2 FVMC).

Diagnosis: 3.1-3.3 mm. Body elongated, similarly to *T. depilatum.* Head form also similar, but punctation very uniform, punctures large. Paramera elongated and externally parallel, feebly expanded apically. (FIGURES 84., 85.).

Etymology: This species in named after Virgínia L. Canhedo.

Distribution: Know only from the type locality, in western Bahia.

16. *Trichillum (Trichillum) cleidecostae* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Montes Claros, I-2000, JNC Louzada (holotype IBSP ex-FVMC).

Paratypes: BRAZIL: **Distrito Federal:** RECOR-IBGE, XII-1999, M Milhomem, campo sujo (2 FVMC); **Minas Gerais:** Montes Claros, I-2000, JNC Louzada (7 FVMC).

Diagnosis: 3.1-3.8 mm. Body form similar to that of *T. depilatum.* Head form similar to that of *T. halffteri*. Head punctation sparse on clypeus, with two poorly defined rows of setae in frons. Paramera characteristically arched internally. (FIGURES 86., 87.).

Etymology: This species in named after Cleide Costa (Museu de Zoologia da Universidade de São Paulo).

Distribution: Known from Cerrado areas in Northern Minas Gerais and Distrito Federal.

17. *Trichillum (Trichillum) furtadoi* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Mato Grosso:** Diamantino, Alto Rio Arinos, XI-1998, E Furtado (IBSP ex-FVMC).

Diagnosis: 3.5 mm. Very similar in body form and head punctation to *T. depilatum*, but head form completely different, rounded, and clypeal emargination deeper. Paramera gradually expanded apically. (FIGURES 88., 89.).

Etymology: This species in named after Eurides Furtado, Brazilian lepidopterologist and collector of the holotype.

Distribution: Known only from the type locality, a Cerrado area in Northern Mato Grosso.

Remarks: Female unknown. Collected at light.

18. *Trichillum (Trichillum) genieri* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Espírito Santo:** Linhares, Faz Lagoa do Macuco, 10 m, 27-I-2000, Génier & Ide (CMNC).

Paratypes: same data as holotype (3 CMNC).

Diagnosis: 2.5-2.8 mm. Body oval, color black. Head very similar to *T. belloi*, bearing smaller punctures. Paramera very elongated, parallel. (FIGURES 90., 91.).

Etymology: This species in named after François Génier (Canadian Museum of Nature).

Distribution: Known only from the type locality.

Remarks: See under *T. belloi.*

19. *Trichillum (Trichillum) halffterorum* **n. sp.**

Type series: Holotype ♀: BRAZIL: **Minas Gerais:** Montes Claros, I-2000, JNC Louzada (IBSP ex-FVMC).

Diagnosis: 3.1 mm. Very similar to *T. cleidecostae*, but clypeal punctures smaller and more sparse,and lacking setae rows in front, that bears only few scattered punctures.

Etymology: This species in named after Violeta and Gonzalo Halffter (Instituto de Ecología, Xalapa, Mexico).

Distribution: Known only from the type locality.

Remarks: Male unknown.

20. *Trichillum (Trichillum) haroldi* **n. sp.**

Type series: Holotype ♀: BRAZIL: **Minas Gerais:** Montes Claros, I-1991 (IBSP ex-FVMC).

Diagnosis: 3.9 mm. Body very elongated. Head anteriorly semicircular, without clypeal emargination and with two equilaterous acute teeth. Head punctation uniform, very dense and bearing setae. (FIGURE 93.).

Etymology: This species in named after Edgar von Harold (1803-1886).

Distribution: Known only from the type locality.

Remarks: Male unknown.

21. *Trichillum (Trichillum) henryi* **n. sp.**

Type series: Holotype ♀: ARGENTINA: **Catamarca:** La Viña, 26-I-1982, H&A Howden (CMNC).

Diagnosis: 3.3 mm. Body very elongated, head semicircular, bearing two very sharp clypeal teeth and a U-shaped emargination. Frons punctation sparse and sparsely pilose, clypeal punctation much denser and regular, punctures separated by less than one diameter.

Etymology: This species in named after Henry Howden (Canadian Museum of Nature).

Distribution: Known only from the type locality.

Remarks: Male unknown.

22. *Trichillum (Trichillum) idei* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Santa Catarina:** Nova Teutonia, XII-1970, F Plaumann (IBSP).

Paratypes: ARGENTINA: **Misiones:** Do. Frontera, San Antonio, XI-1953, Martínez (1 CMNC); BRAZIL: **Santa Catarina:** Nova Teutonia, X-1957, F

Plaumann (1 CMNC); X-1967 (1 CMNC); X-1970 (3 CMNC); XI-1961 (1 CNIC); XII-1970 (2 IBSP); XII-1971 (1 CMNC).

Diagnosis: 2.2-2.7 mm. Body oval, black. Head semicircular, clypeal teeth almost lacking, very obtuse and emargination inconspicous. Head punctation dense, denser in clypeus where punctures do anastomose. (FIGURES 95., 96.).

Etymology: This species in named after Sergio Ide (Instituto Biológico, São Paulo).

Distribution: Atlantic forest in the Argentinean-Brazilian border.

Remarks: The closer species seems to be *T. tishechkini*, that is much bigger in size and has denser head punctation.

23. *Trichillum (Trichillum) lopesandradei* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Espírito Santo:** Parque Estadual da Pedra Azul, 1500 m, I-2000, Lopes-Andrade & Vaz-de-Mello (IBSP ex-FVMC).

Paratypes: BRAZIL: **Espírito Santo:** Parque Estadual da Pedra Azul, 1500 m, I-2000, Lopes-Andrade & Vaz-de-Mello (7 FVMC); **Minas Gerais:** Araponga, Pico do Boné, XII-2000, E Stehling (3 FVMC); Poços de Caldas, XI-1994, CL Godinho Jr (1 FVMC); Viçosa, XII-1998, Vaz-de-Mello, FIT (1 FVMC); II-1995, JNC Louzada, forest (1 FVMC); XI-1998, Vaz-de-Mello (1 FVMC); **Rio de Janeiro:** 17 km E Nova Friburgo, 750 m, 21-I-2000, Génier & Ide (12 CMNC); **São Paulo:** São Sebastião da Grama, Fazenda Fartura 1200 m, 13-II-2000, Lopes-Andrade & Lopes Reis (1 FVMC).

Diagnosis: 2.2-2.6 mm. Body oval. Clypeal emargination very deep and U shaped, clypeal teeth acute and clypeus semicircular. Head and pronotal punctures dense and uniform, larger on pronotal disk than in head. Striae with very large characteristic ocellate punctures, interstriae with dense small punctures. (FIGURES 97., 98.).

Etymology: This species in named after Cristiano Lopes-Andrade (Universidade Federal de Viçosa).

Distribution: Atlantic rainforest from 650 to 1500 m in southeastern Brazil.

Remarks: Most specimens have been caught perching on leaves in the afternoon.

24. *Trichillum (Trichillum) louzadai* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Montes Claros, I-2000, JNC Louzada (IBSP ex-FVMC).

Paratype: same data as holotype (1 FVMC).

Diagnosis: 3.6-3.9 mm. Body oval-elongated. Head wide, with an wide V-shaped emargination and two obtuse teeth. Clypeal sides feebly expanded near teeth, and straight to gena. Frons punctation very sparse, clypeal punctation denser. Paramera elongated. (FIGURES 99., 100.).

Etymology: This species in named after Júlio N. C. Louzada (Universidade Federal de Lavras).

Distribution: Known only from the type locality.

Remarks: Taken with dung-baited pitfall traps.

25. *Trichillum (Trichillum) martinezi* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Viçosa, Mata do Paraíso, I-1996, Louzada, Lopes, Sperber & Vaz-de-Mello (IBSP ex-FVMC).

Paratypes: BRAZIL: **Minas Gerais:** Viçosa, Mata do Paraíso, I-1994, Louzada, Lopes & Sperber (40 FVMC); I-1995, JNC Louzada (182 FVMC); I-1995, Louzada, Lopes & Sperber (70 FVMC); I-1996, Louzada, Lopes, Sperber & Vaz-de-Mello (134 FVMC); I-1996, Louzada, Sperber & Vaz-de-Mello (3 FVMC); Viçosa, 12-II-1994, JNC Louzada (2 FVMC); 13-II-1994 (5 FVMC); 14-XII-1993 (48 FVMC); 16-XII-1993 (3 FVMC); 20-I-1994 (7 FVMC); 20-

XII-1993 (8 FVMC); 21-XI-1991, Lopes & Louzada (1 FVMC); XII-1998, Vaz-de-Mello, FIT (1 FVMC).

Diagnosis: 2.2-2.6 mm. Head and pronotum bright purple-red in color, elytra quite black. Head and pronotum similar in form and sculpture to *T. lopesandradei*, but punctures smaller. Elytra with small punctures in striae, and sparse small punctures in interstriae. (FIGURES 101., 102.).

Etymology: This species in named after Antonio Martínez (1922-1993).

Distribution: Known only from the type locality.

Remarks: That is a very common species taken in pitfall and flight intercept traps in the type locality. The lack of specimens from other localities prospected in the same way may indicate some degree of endemism.

26. *Trichillum (Trichillum) martinpierai* **n. sp.**

Type series: Holotype ♀: BRAZIL: **Santa Catarina:** Nova Teutônia, I-1971, F Plaumann (IBSP).

Diagnosis: 3.4 mm. Very similar to *T. depilatum*, except that head is almost semicircular in form. (FIGURE 103.).

Etymology: This species in named after Fermín Martín-Piera (1954-2001).

Distribution: Known only from the type-locality.

Remarks: Male unknown.

27. *Trichillum (Trichillum) merkli* **n. sp.**

Type series: Holotype ♂: PARAGUAY: **Alto Paraná:** Puerto Stroessner, 26-29-XII-1965, Hungarian Soil-Zool. Exp. (HMNH).

Diagnosis: 3.0mm. Very close to *T. arriagadai*, but head semicircular and paramera convergent apically. (FIGURES 104., 105.).

Etymology: This species in named after Otto Merkl (Hungarian Museum of Natural History).

Distribution: Known only from the type locality.

28. *Trichillum (Trichillum) milhomemae* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Distrito Federal:** Brasília 1100 m, II-2001, N Degallier (IBSP ex-FVMC).

Paratypes: BRAZIL: **Distrito Federal:** Brasilia, I-1999 (1 AMBC); Brasília 1100 m, II-2001, N Degallier (3 FVMC); III-2001 (2 FVMC); Est. Florestal Cabeça do Veado, 1100 m, 23-27-X-1971, EG, I & EA Munroe (2 CNIC); 27-X-1971 (1 CNIC); 17-X-1971 (2 CNIC); RECOR-IBGE, XII-1999, M Milhomem, campo sujo (1 FVMC); **Mato Grosso:** Chapada dos Guimarães, 21-I-1961, J&B Bechyné (1 CMNC); Chapada, acc. no. 2966 (1 CMNC); **São Paulo:** Batatais, XII-1945, col. do Ginásio São José (1 CMNC).

Diagnosis: 3.0-4.0 mm. Body elongated, head semicircular with two small and obtuse clypeal teeth and a small V-shaped emargination. Head punctation sparse on frons and very denseon clypeus. Paramera very elongated.

Etymology: This species in named after Michelle Milhomem, collector of a great part of the type series.

Distribution: From scattered Cerrado localities in Central Brazil.

Remarks: The very distinctive combination of head and body form are characteristic for that species.

29. *Trichillum (Trichillum) moacyri* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Águas Vermelhas, XII-1998, Bello & Vaz-de-Mello (IBSP ex-FVMC).

Paratypes: BRAZIL: **Bahia:** Encruzilhada, XII-1980, Alvarenga & Martínez (14 CMNC); **Minas Gerais:** Águas Vermelhas, XII-1998, Bello & Vaz-de-Mello (3 FVMC).

Diagnosis: 2.9-3.6 mm. Species very closely related to *T. externepunctatum*, size smaller, clypeus rounded external to teeth, and paramera more uniform (less sinuated) dorsally. (FIGURES 108., 109.).

Etymology: This species in named after Moacyr Alvarenga.

Distribution: From an small region in the eastern Bahia-Minas Gerais border.

30. *Trichillum (Trichillum) paschoali* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Rio de Janeiro:** Nova Friburgo, I-1999, P Grossi (IBSP ex-FVMC).

Paratypes: BRAZIL: **Rio de Janeiro:** Nova Friburgo, I-1999, P Grossi (4 FVMC); I-2002, P&E Grossi (1 FVMC); IX-1996 (1 FVMC); XI-1998 (2 FVMC).

Diagnosis: 3.2-3.5 mm. Body similar to that of *T. halffteri*, except by the lack of secondary sexual characters in pronotum. Head punctation small, dense and uniform, with larger scattered punctures on clypeus. Clypeus externally not expanded, simply rounded. Interocular space about 5-6 ocular widths. Paramera short and rectangular. (FIGURES 110., 111.).

Etymology: This species in named after Paschoal Grossi, Lucanidologist and scarab enthusiast.

Distribution: Known only from the type locality.

Remarks: Caught with flight intercept traps in high altitude (1500 m) Atlantic rainforest.

31. *Trichillum (Trichillum) peckorum* **n. sp.**

Type series: Holotype ♂: ARGENTINA: **Salta:** El Rey Nat. Park, 1000 m, Pozo Verde Trail km 7, 05-15-XII-1987, S&J Peck, yunga forest (CMNC).

Paratypes: same data as holotype (2 CMNC).

Diagnosis: 3.3-3.6 mm. Body very elongated, head wide. Head punctures similar to *T. externepunctatum*, but clypeus almost semicircular (with an small expansion near each tooth), with two very sharp teeth. Paramera elongated. (FIGURES 112., 113.).

Etymology: This species in named after Jarmila and Stewart Peck, collectors of the type series.

Distribution: Known only from the type locality.

32. *Trichillum (Trichillum) schefflerorum* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Pará:** Redenção, X-1998, P&T Scheffler (holotype IBSP ex-FVMC).

Paratypes: BRAZIL: **Pará:** Redenção, X-1998, P&T Scheffler (36 FVMC); Tucuruí:IV-1988 (3 CMNC); VI-1985 (9 CMNC); XII-1986 (1 CMNC).

Diagnosis: 2.9-3.7 mm. Very close to *T. externepunctatum* and *T. moacyri*, but lacking small punctures in head – only large sparse punctures present. Paramera longer than in related species. (FIGURES 114., 115.).

Etymology: This species in named after Kalani, Pamela and Timothy Scheffler.

Distribution: Known only from southermn Pará, in Brazil.

Remarks: Caght in Amazonian forest, with dung baited traps.

33. *Trichillum (Trichillum) schoerederi* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Viçosa, II-1995, JNC Louzada (IBSP ex-FVMC).

Paratypes: BRAZIL: **Minas Gerais:** Viçosa, mata do Paraíso, I-1995, Louzada, Sperber & Vaz-de-Mello (1 FVMC); Viçosa, 04-I-1994, JNC Louzada (2 FVMC); 25-I-1994 (1 FVMC); I-1996 (1 FVMC); II-1995 (4 FVMC); XI-1994 (2 FVMC); X-1998, FZ Vaz-de-Mello, FIT (2 FVMC); XI-1998 (4 FVMC).

Diagnosis: 3.5-3.8 mm. Very close to *T. paschoali*, but eyes much larger (interocular width 3-4 eye widths). Paramera with an upturned apical fold. (FIGURES 116., 117.).

Etymology: This species in named after José Henrique Schoereder.

Distribution: Known only from the type locality.

Remarks: Caught with human old dung baited traps and flight intercept traps in Atlantic forest.

34. *Trichillum (Trichillum) silviae* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Minas Gerais:** Cordisburgo, Faz Pontinha, XII-2000, FZ Vaz-de-Mello (IBSP ex-FVMC).

Diagnosis: 4.8 mm. Very close to *T, tishechkini*, but head punctures sparse and paramera elongate. (FIGURES 118., 119.).

Etymology: This species in named after my wife, Silvia.

Distribution: Known only from the type locality.

Remarks: Caught at light.

35. *Trichillum (Trichillum) wendtae* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Bahia:** Barreiras, XII-1991, arm luminosa (IBSP ex-FVMC).

Paratypes: BRAZIL: **Bahia:** Barreiras, XII-1991, arm luminosa (5 FVMC); X-1991 (5 FVMC).

Diagnosis: 3.1-3.2 mm. Head and body form as for *T. depilatum.* Head punctures lacking in middle of front, clypeal punctation as in *T. externepunctatum.* Paramera elongate and slightly expanded apically. (FIGURES 120., 121.).

Etymology: This species in named after Hella Wendt (Museum für Naturkunde der Humboldt-Univesität, Berlin).

Distribution: Known only from the type locality.

Remarks: Collected at light.

36. *Trichillum (Trichillum) zuninoi* **n. sp.**

Type series: Holotype ♂: BRAZIL: **Distrito Federal:** RECOR-IBGE, XI-1999, M Milhomem, campo sujo (IBSP ex-FVMC).

Paratypes: BRAZIL: **Distrito Federal:** RECOR-IBGE, XI-1999, M Milhomem, campo sujo (1 FVMC); **Minas Gerais:** Montes Claros, I-2000, JNC Louzada (1 FVMC).

Diagnosis: 3.7-3.9 mm. Very close to previous species, but head wider and frons with scattered large setose punctures. (FIGURES 122., 123.).

Etymology: This species in named after Mario Zunino (Università di Urbino).

Distribution: From Cerrado localities in Central Brazil.

5.22 *YOUNGIDIUM* VAZ-DE-MELLO, **N. GEN.**

Type species: *Pedaridium brevisetosum* Howden & Young, 1981 (monotypy).

5.22.1 Species included:

1. *Youngidium brevisetosum* (Howden & Young, 1981)

Pedaridium brevisetosum Howden & Young, 1981: 44

Pedaridium brevisetosum; Ferreira & Galileo, 1993: 8, 32

Type series: Holotype ♂: PANAMA: **Canal Zone:** Barro Colorado Island, 16-VI-1977, HA Hespenheide (CMNC).

Diagnosis: 3.3 mm. As for the genus, see Chapter 6.

Distribution: Known only from the type locality.

Remarks: Only the holotype is known.

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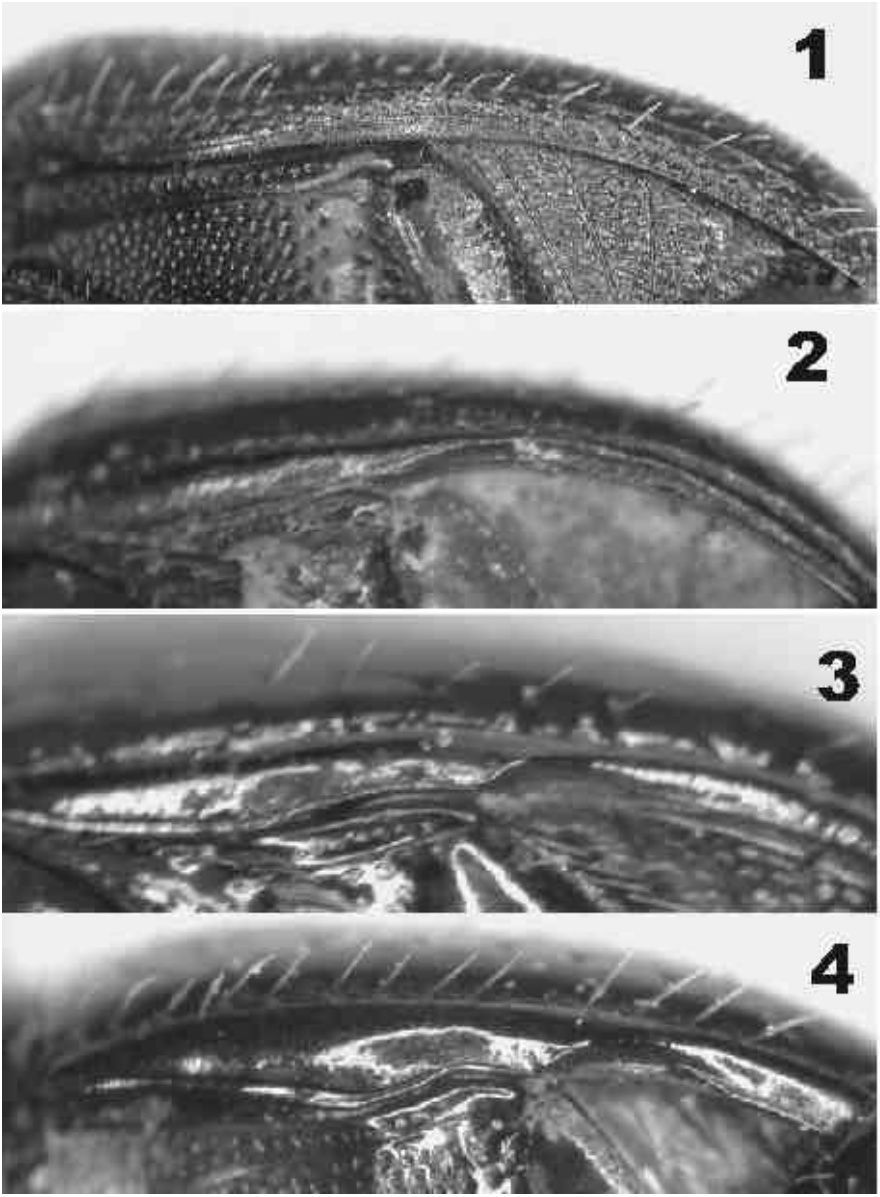
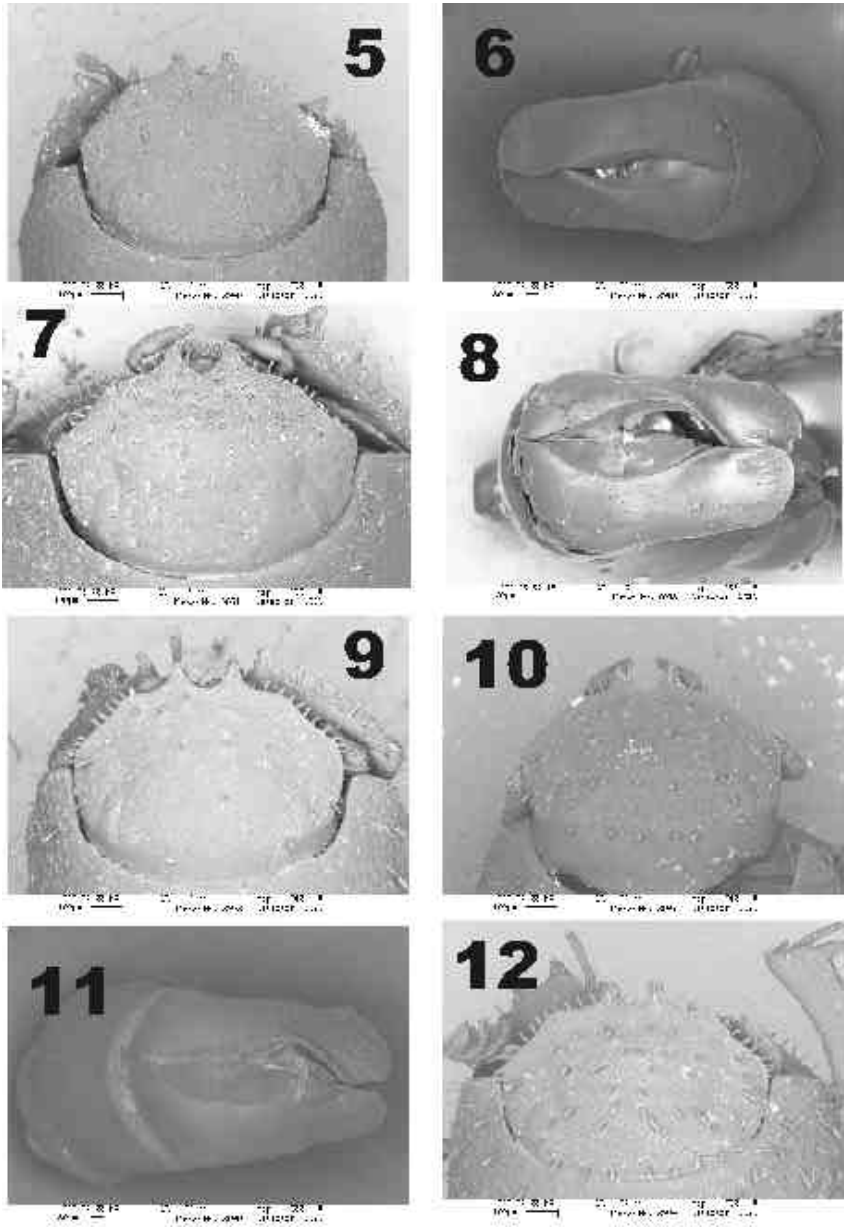
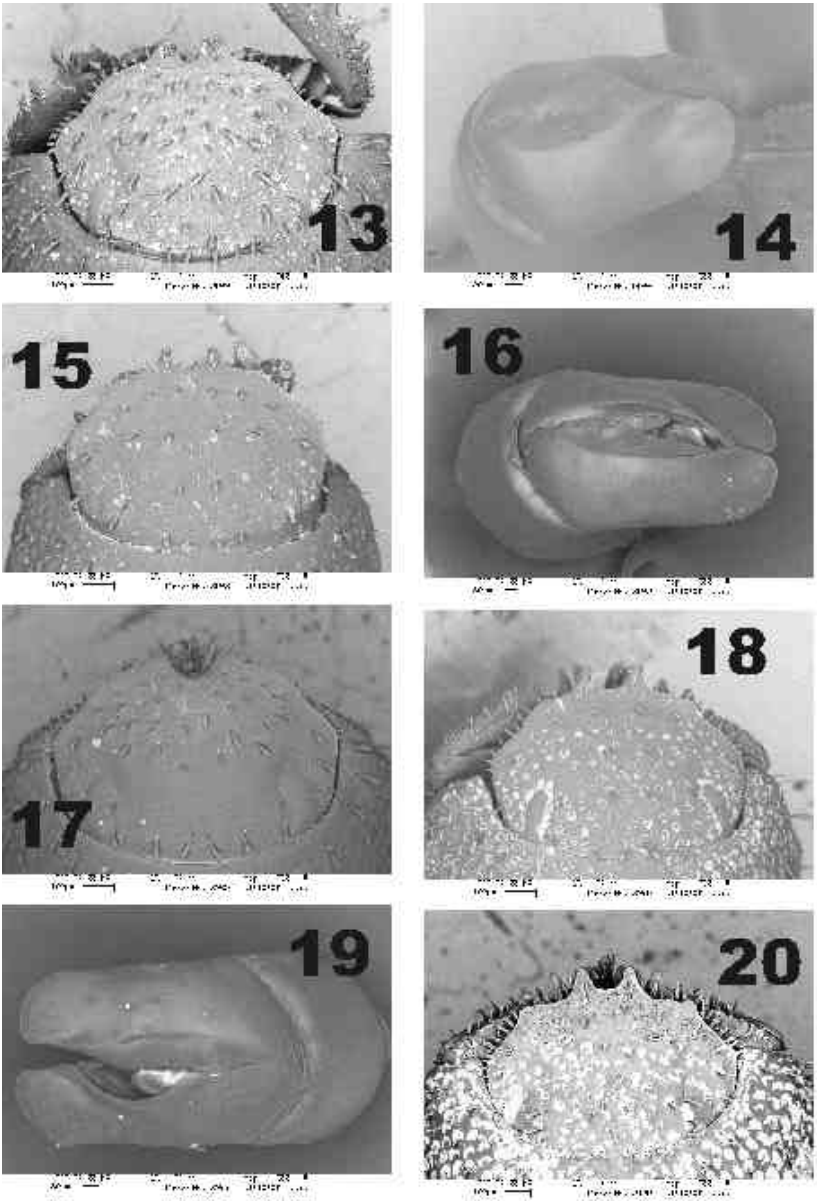


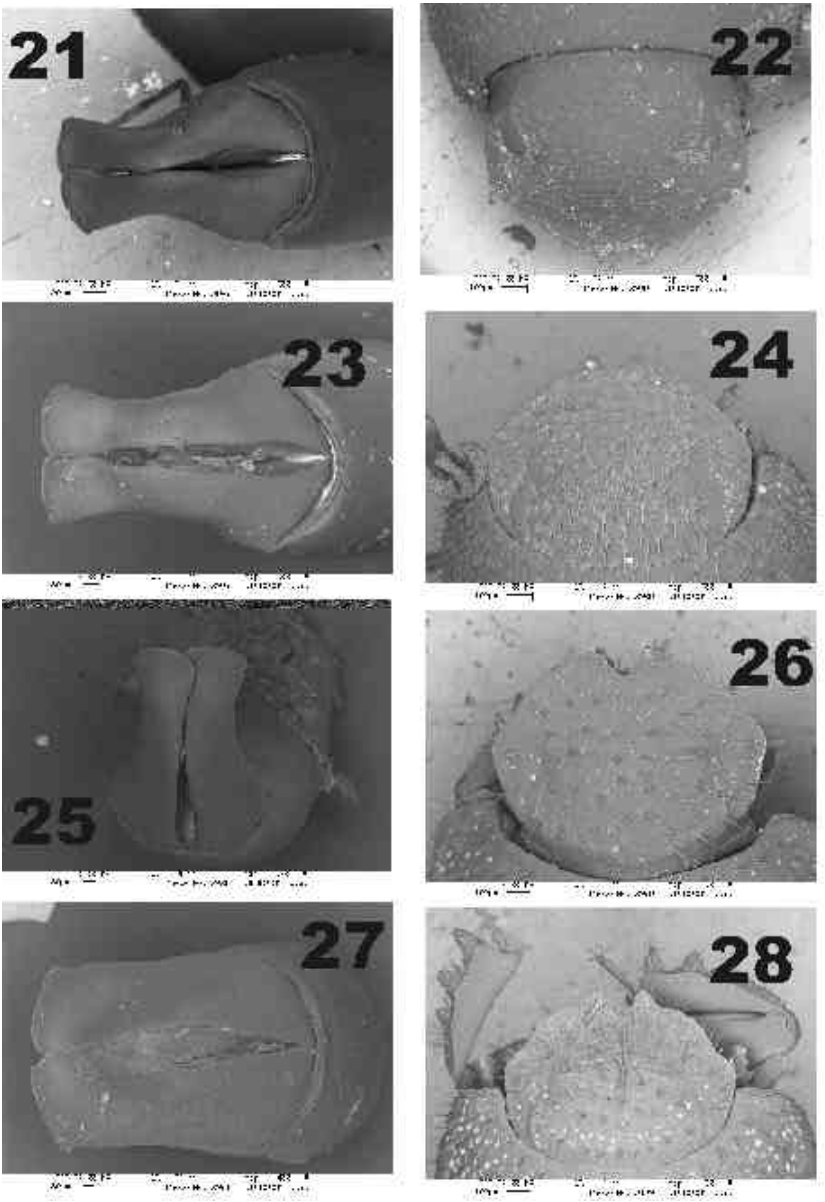
FIGURES 1-4. Epipleuron. 1. *Pedaridium hirsutum*; 2. *Leotrichillum louzadaorum*; 3. *Silvia unica*; 4. *Trichillum heydeni.*



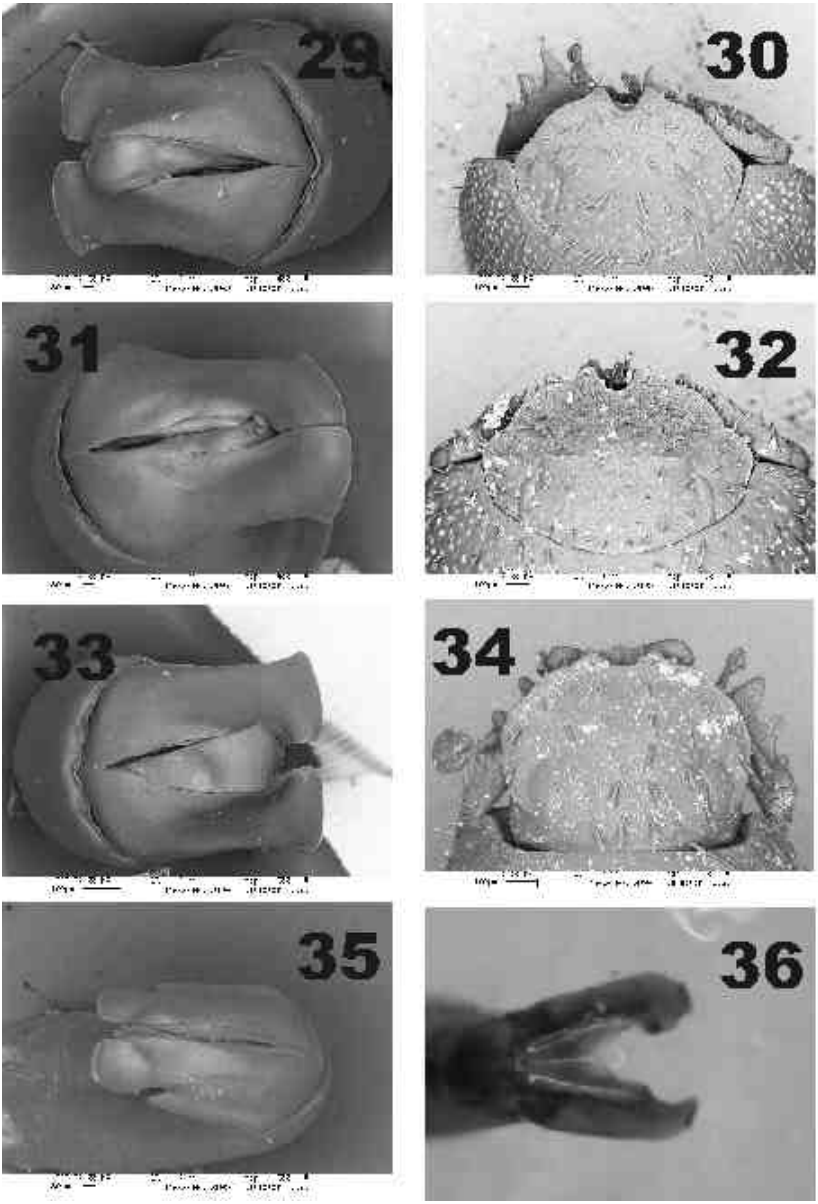
FIGURES 5-12. Dorsal view of head and paramera. 5-6. *Besourenga minutus*; 7-8. *B. vejdovskyi*; 9. *B. bachmanni*; 10-11. *B. brucei*; 12. *B. campaneri*.



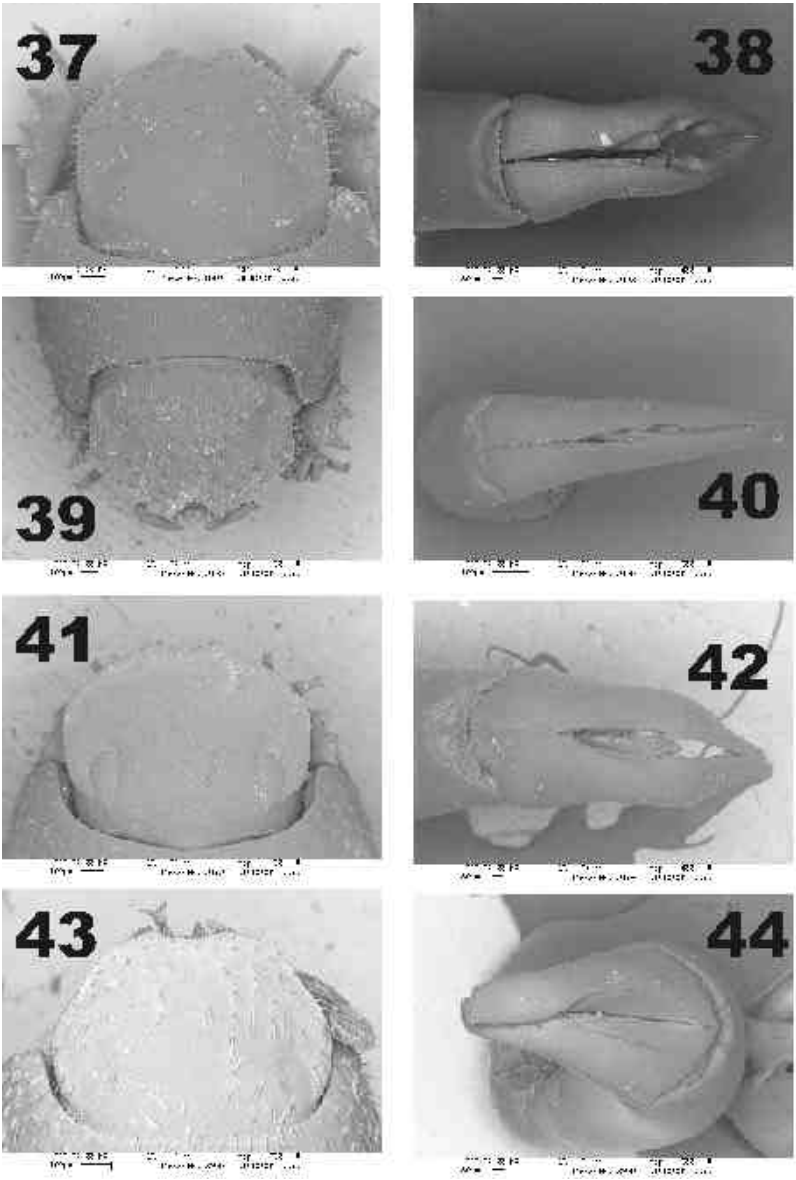
FIGURES 13-20. Dorsal view of head and paramera. 13-14. *Besourenga guimaraesrosai*; 15-16. *B. michelleae*; 17. *B. renaudpauliani*; 18-19. *B. sergioidei*; 20. *B. sprecherae*.



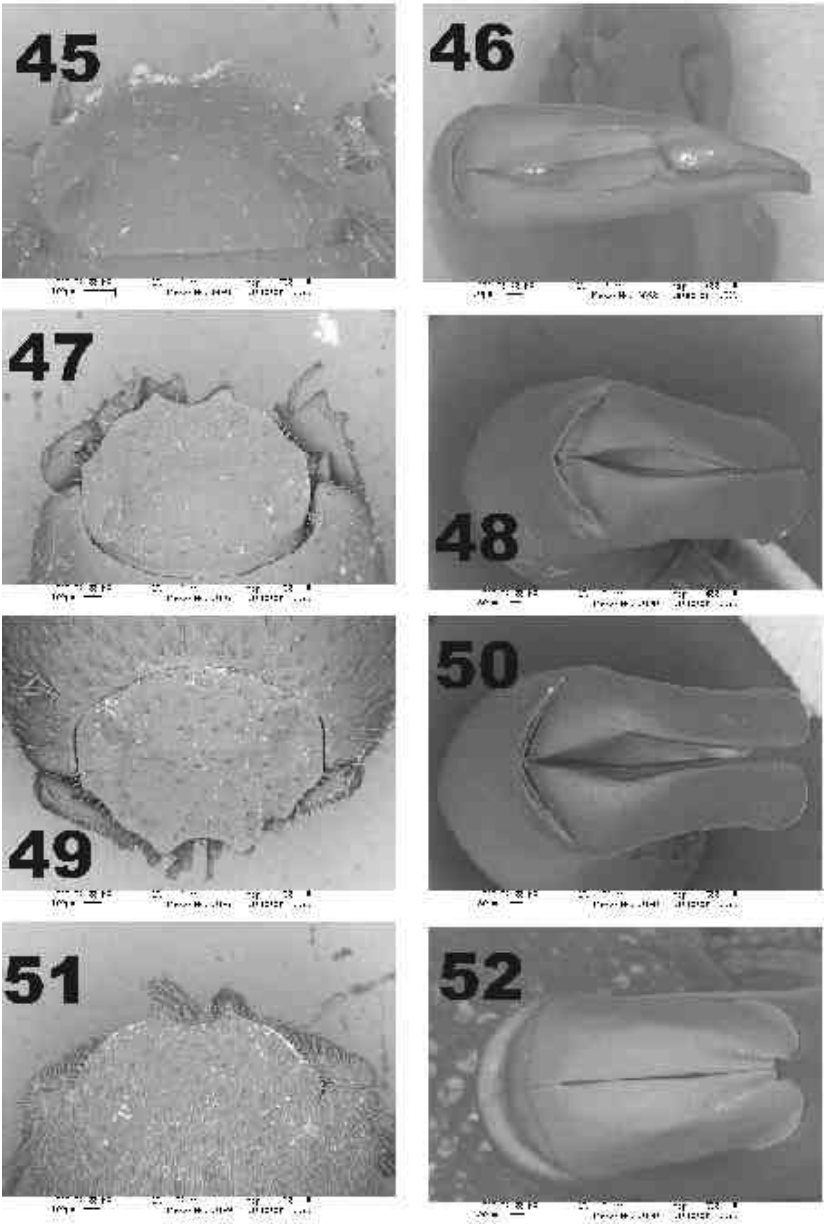
FIGURES 21-28. Dorsal view of head and paramera. 21. *Bradypodidium bradyporum*; 22-23. *B. alvarengai*; 24-25. *B. bustamantei*; 26-27. *Eutrichillum arcus*; 28. *E. ayri*.



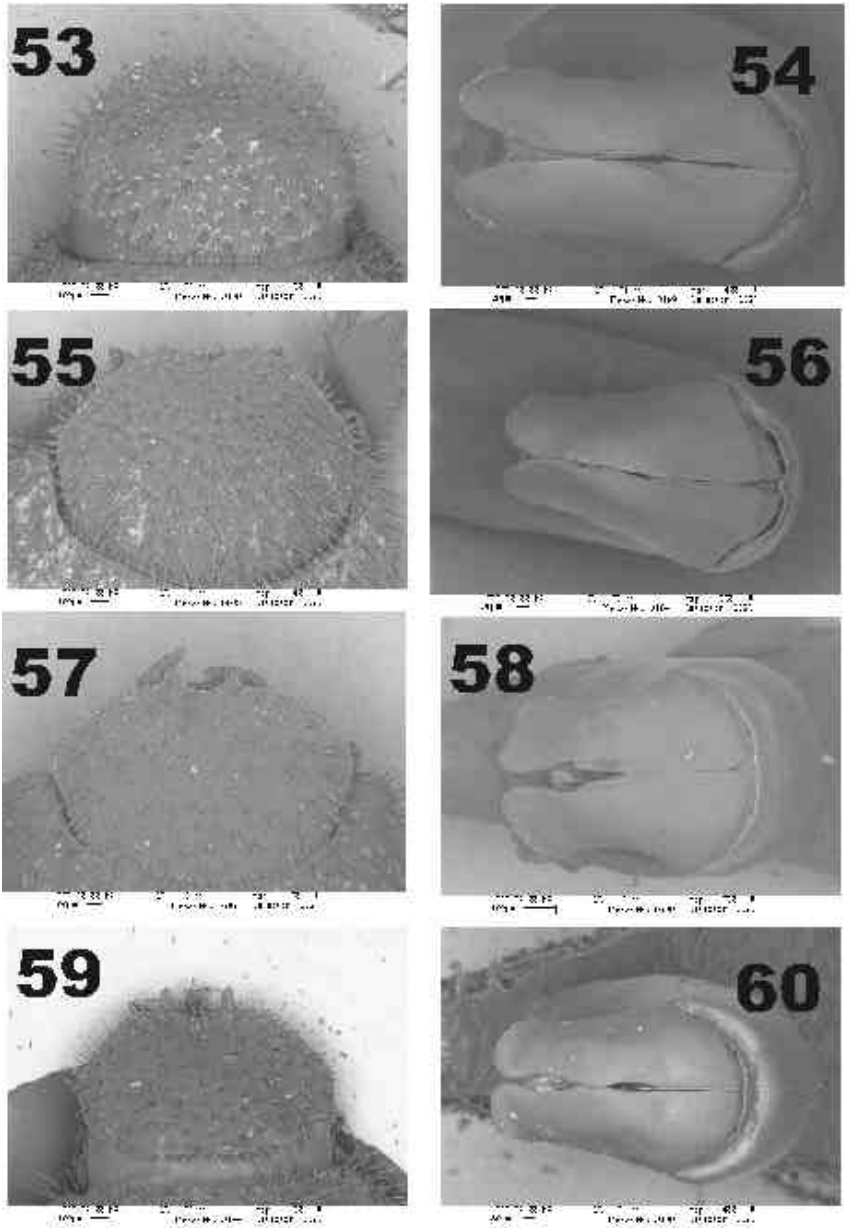
FIGURES 29-36. Dorsal view of head and paramera. 29. *Eutrichillum ayri*; 30-31. *E. onorei*; 32-33. *E. ratcliffei*; 34-35. *Leotrichillum leioi*; 36. *Martinezidium fulgens*.



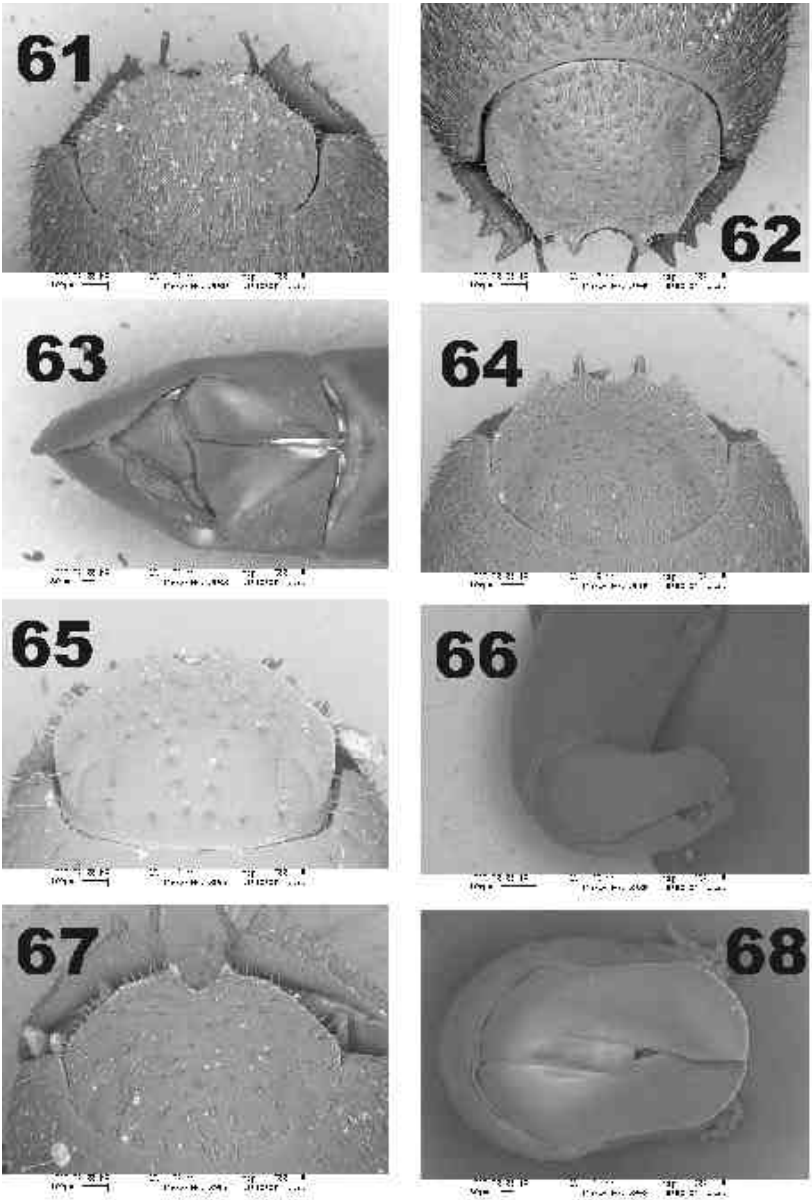
FIGURES 37-44. Dorsal view of head and paramera. 37-38. *Martinezidium martinsi*; 39-40. *M. cristianoi*; 41-42. *M. francoisi*; 43-44. *M. howdenorum.*



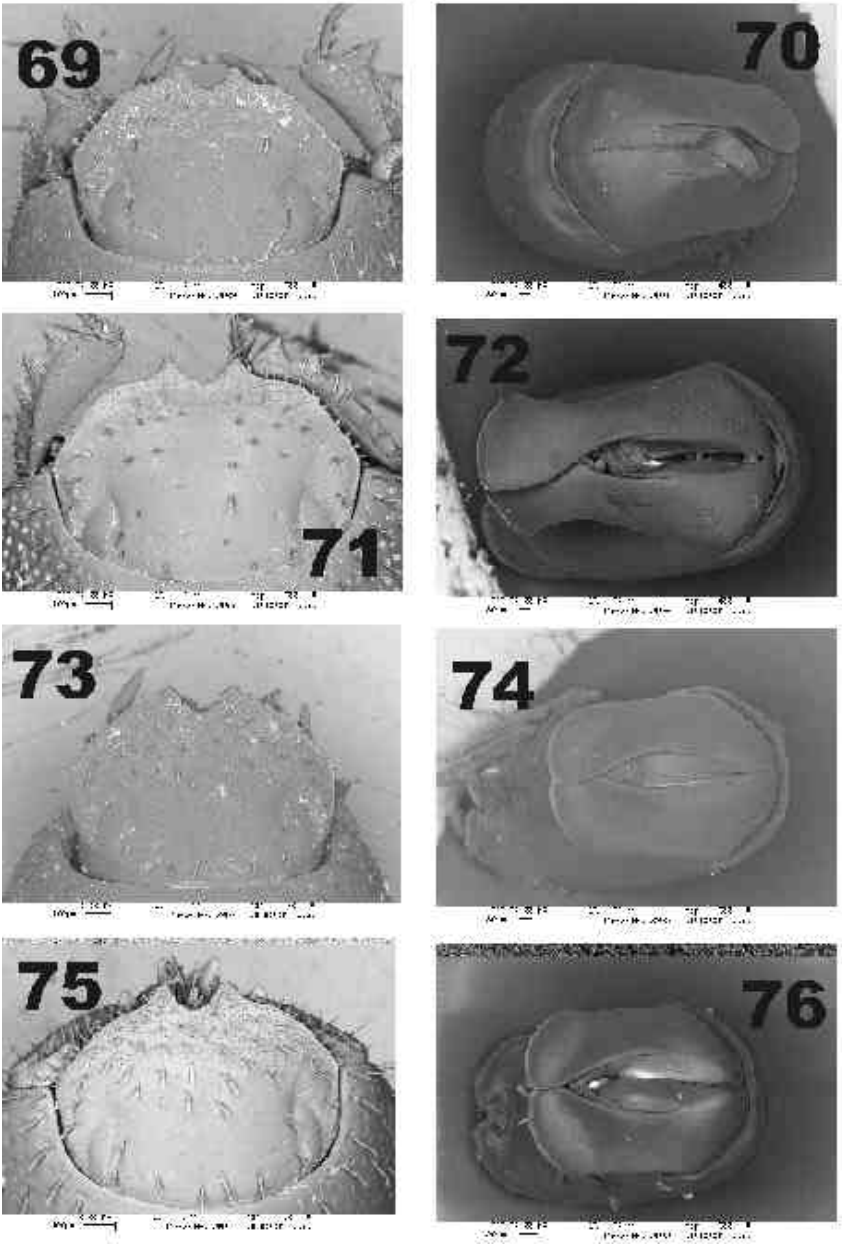
FIGURES 45-52. Dorsal view of head and paramera. 45-46. *Martinezidium tatai*; 47-48. *Onoreidium howdeni*; 49-50. *O. carpioi*; 51-52. *Pedaridium julioi.*



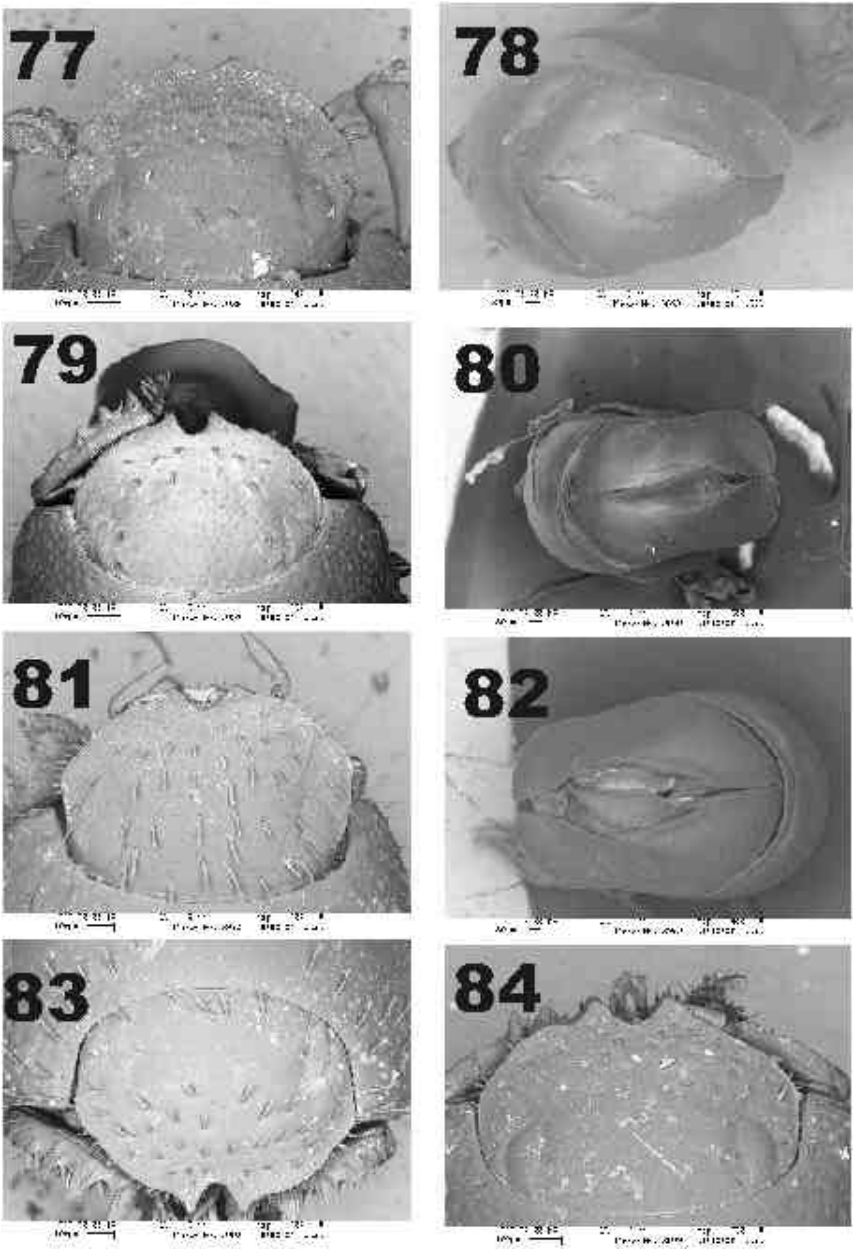
FIGURES 53-60. Dorsal view of head and paramera. 53-54. *Genieridium bordoni*; 55-56. *G. paranense*; 57-58. *G. zanunciorum*; 59-60. *G. cryptops*.



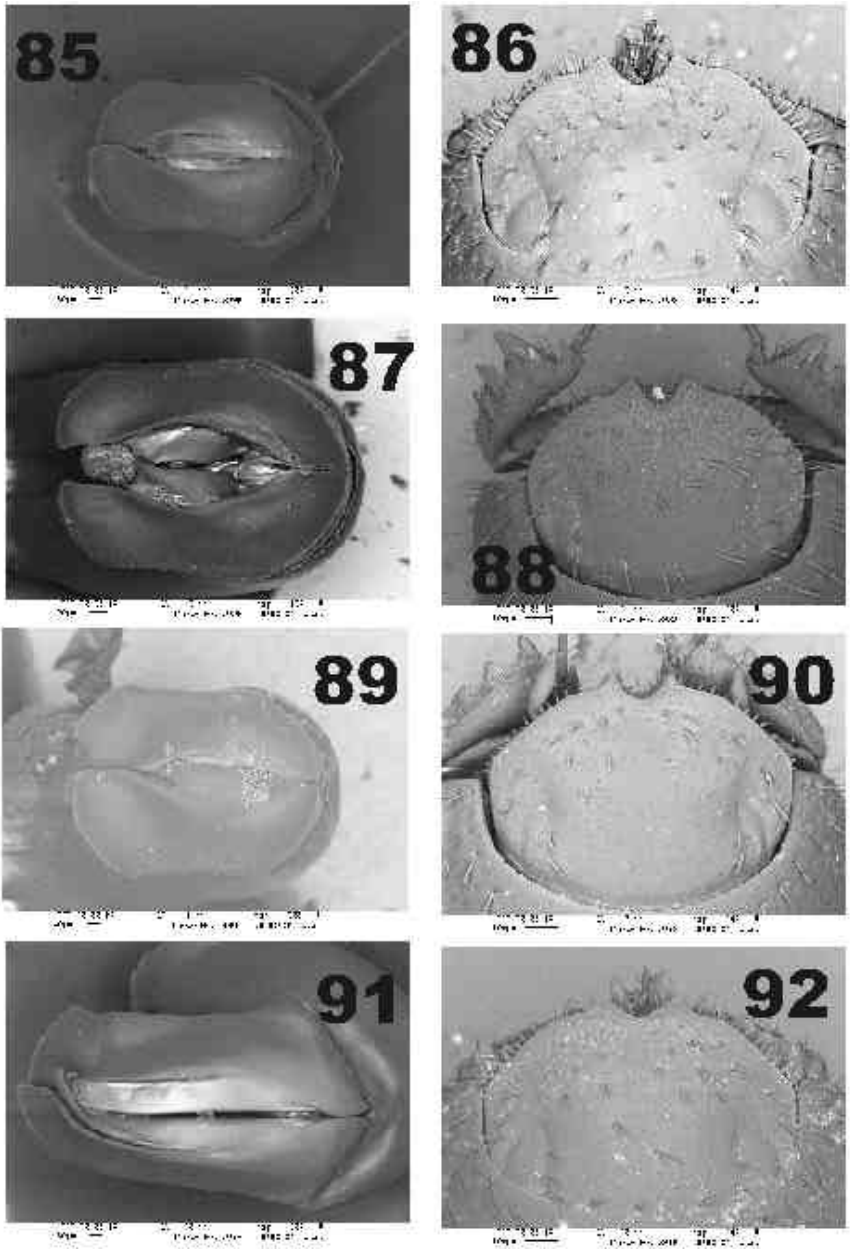
FIGURES 61-68. Dorsal view of head and paramera. 61-63. *Trichillidium quadridens*; 64. *T. caingua*; 65-66. *Trichillum externepunctatum*; 67-68. *T. arrowi*.



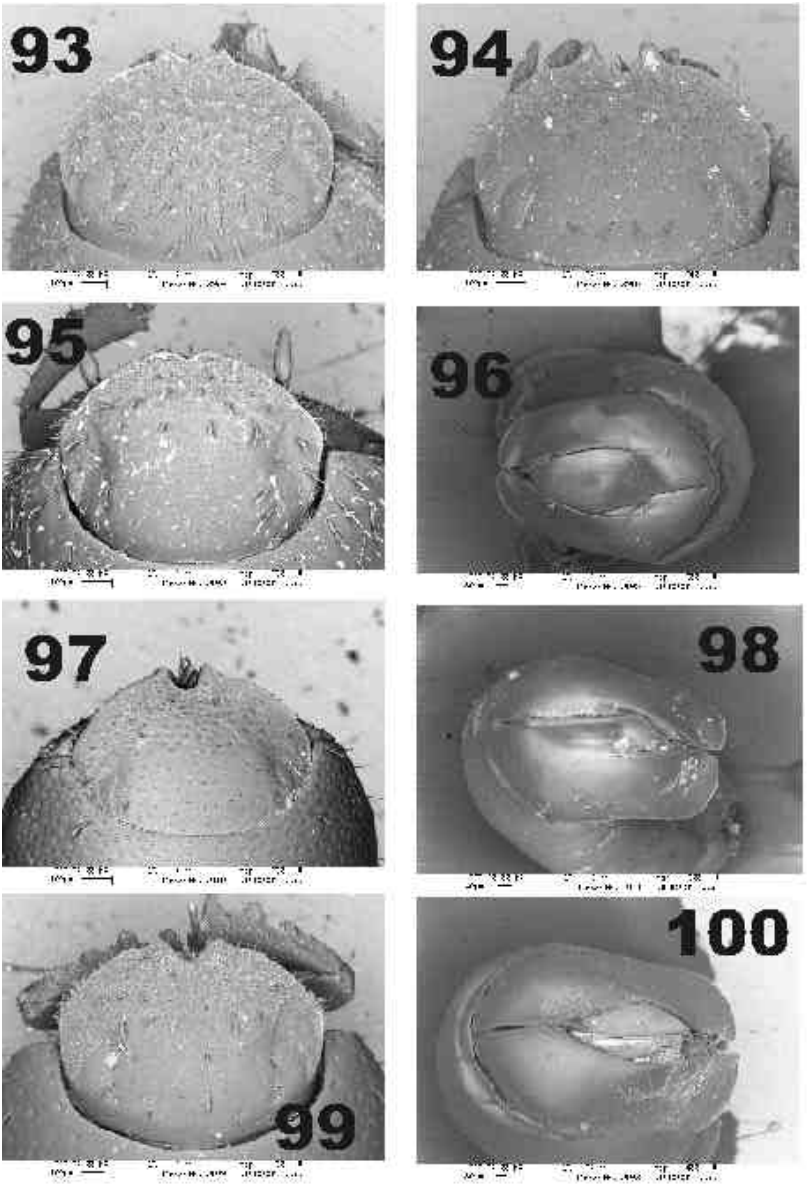
FIGURES 69-76. Dorsal view of head and paramera. 69-70. *Trichillum depilatum*; 71-72. *T. halffteri*; 73-74. *T. andersoni*; 75-76. *T. arriagadai*.



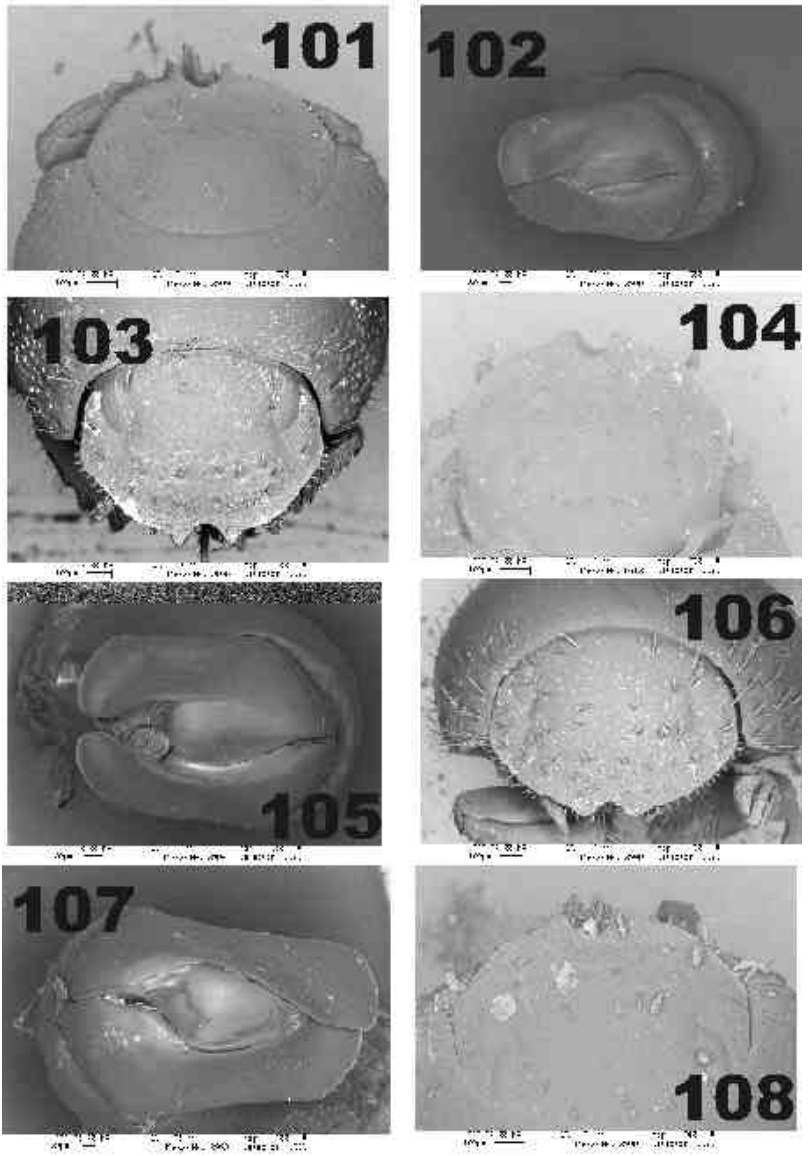
FIGURES 77-84. Dorsal view of head and paramera. 77-78. *Trichillum ballerioi*; 79-80. *T. belloi*; 81-82. *T. bellorum*; 83. *T. borrei*; 84. *T. canhedoae*.



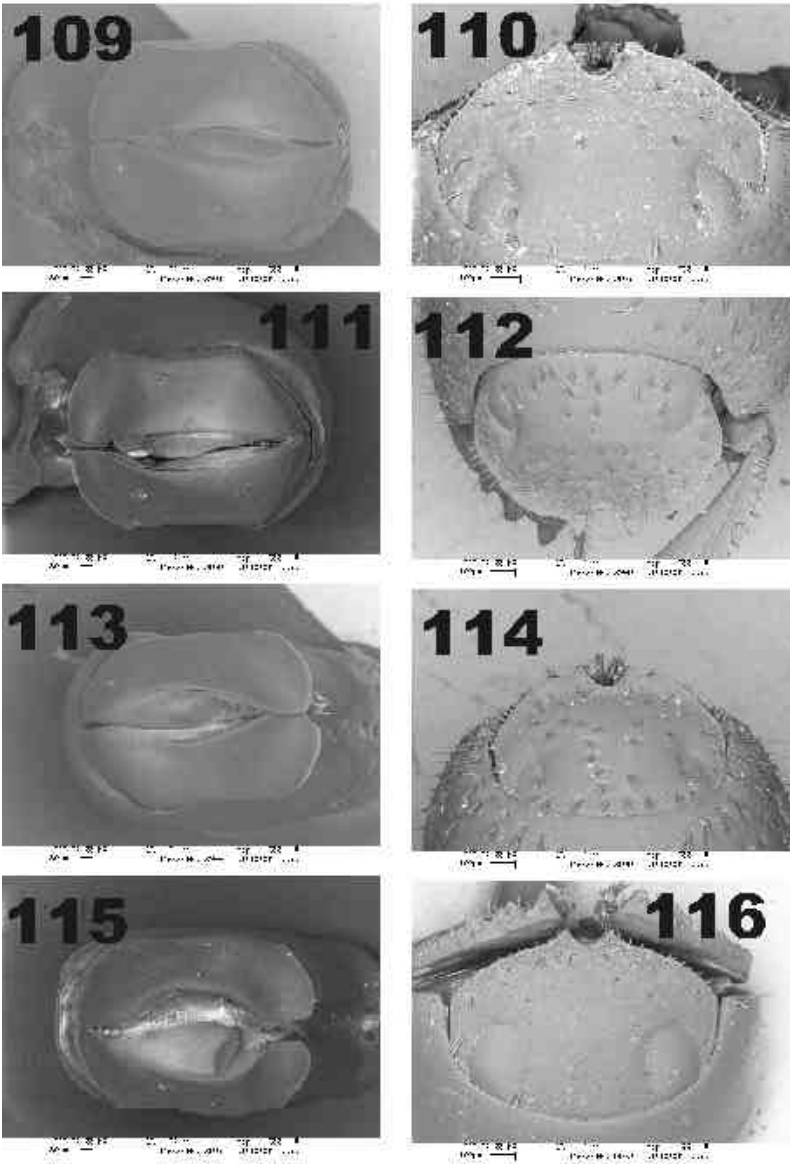
FIGURES 85-92. Dorsal view of head and paramera. 85. *Trichillum canhedoae*; 86-87. *T. cleidecostae*; 88-89. *T. furtadoi*; 90-91. *T. genieri*; 92. *T. halffterorum*.



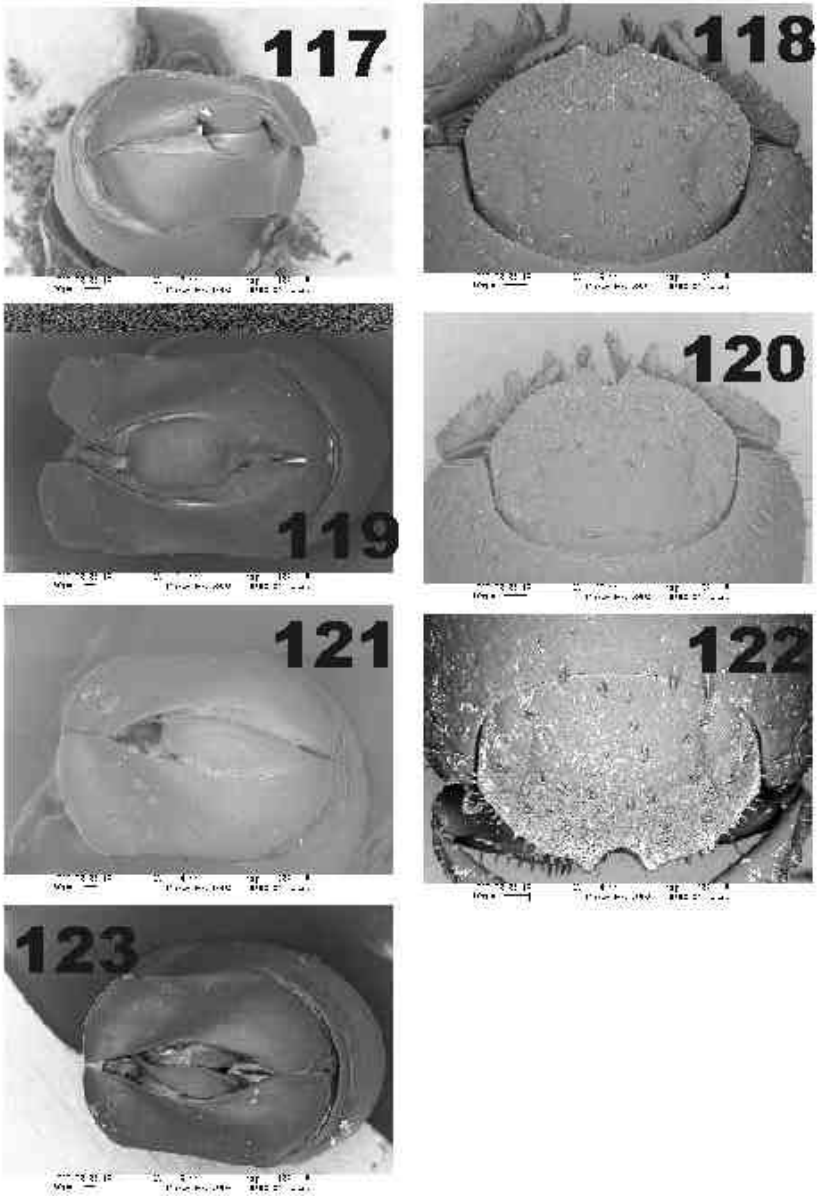
FIGURES 93-100. Dorsal view of head and paramera. 93. *Trichillum haroldi*; 94. *T. henryi*; 95-96. *T. idei*; 97-98. *T. lopesandradei*; 99-100. *T. louzadai.*



FIGURES 101-108. Dorsal view of head and paramera. 101-102. *Trichillum martinezi*; 103. *T. martinpierai*; 104-105. *T. merkli*; 106-107. *T. milhomemae*; 108. *T. moacyri*.



FIGURES 109-116. Dorsal view of head and paramera. 109. *Trichillum moacyri*; 110-111. *T. paschoali*; 112-113. *T.peckorum*; 114-115. *T. schefflerorum*; 116. *T. schoerederi*.



FIGURES 117-123. Dorsal view of head and paramera. 117. *Trichillum schoerederi*; 118-119. *T. silviae*; 120-121. *T. wendtae*; 122-123. *T. zuninoi*.

APPENDIX.

Matrix Used for Phylogenetic Analysis

	0										1										2										3										4										5
Taxon	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
Canthidium barbacenicum	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scatimus bicarinatus	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	1	0	0
Aphengium sordidum	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	1	1	1	0	-	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0
Ateuchus squalidus	0	0	0	0	0	-	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	-	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0
Pedaridium	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	0	0	0	1	1	1	0	1	0	0	0	1	1	0	1	0	1	0	0	1	1	1	1	1	1	0	1	1	0
Boreopedaridium	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	0	1	0	1	0	0	0	0	1	1	1	0	0	1	0	1	0	1	0	1	0	0	0	0	1	0	0	1	1	0	1	0	0	0
Leotrichillum	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	1	1	0	1	0	0	0	1	0	1	1	1	1	0	0	0	0	1	0	1	1	1	1	0	0	0	0	1	1	0	1	1	0	0
Bradypodidium	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	1	1	1	0	0	1	0	0	1	1	0	1	0	0	0
Boreotrichillum	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	0	0	0	1	1	1	0	0	1	0	0	1	1	0	1	1	1	0	0	1	0	0	1	1	0	1	0	0	0
Youngidium	0	0	0	0	0	0	1	0	0	0	1	?	1	?	?	1	0	1	1	?	1	1	0	0	0	1	?	1	?	0	?	0	1	1	?	0	1	0	0	0	0	0	?	0	1	1	1	1	1	0	0
Howdenidium	0	0	0	0	0	0	1	0	1	0	1	?	1	?	?	1	0	1	1	0	1	1	0	0	0	1	?	1	1	0	?	0	0	0	?	0	1	0	0	0	1	0	0	0	1	?	1	0	1	0	0	0
Trichillidium	0	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	0	0	0	0	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0
Eutrichillum	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	0	0	0	1	0	1	1	0	0	0	1	0	1	1	1	0	0	0	1	1	1	0	0	0	1	0	0
Horridotrichillum	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	1	0	1	1	1	0	0	1	0	0	1	0	0	0	1	0	0
Besourenga	0	0	0	0	0	0	1	0	0	1	1	2	1	1	0	1	0	1	1	0	1	0	1	0	0	0	0	1	1	1	1	0	0	0	1	0	1	1	1	0	0	0	0	1	0	0	1	1	0	0	0
Silvia	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	0	-	1	0	0	0	1	0	1	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	0
Degallieridium	0	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1	0	1	1	0	1	0	1	0	0	0	1	0	0	1	0	?	1	0	0	0	1	0	1	0	?	0	0	1	0	?	1	1	0	0	1	?	0
Feeridium	0	0	0	0	0	0	1	0	0	0	1	0	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	1	0	0	1	0	0	0	0	1	1	0	1	1	0	0
Gillidium	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	?	1	1	0	1	1	0	0	1	0	0	1	1	?	1	?	?	0	?	?	?	?	?	0	0	1	0	?	1	0	0	0	1	?	?
Pereiridium	0	0	0	1	0	0	1	0	0	1	0	1	1	1	1	1	0	1	1	0	1	1	0	0	0	1	1	1	1	1	1	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	1	0	1	0	0
Martinezidium	0	0	*	0	0	0	1	0	0	0	1	1	1	1	*	1	0	1	1	0	1	0	0	0	0	1	1	1	*	0	0	0	0	0	1	0	1	0	0	0	0	1	*	0	1	1	*	0	1	0	0
Genieridium	0	0	0	0	*	*	1	*	0	*	1	1	*	1	1	*	0	1	1	0	1	1	0	0	0	1	1	1	0	1	1	0	0	0	1	0	1	*	*	*	0	0	*	1	1	1	1	1	1	*
Trichillum (Trichillum)	0	0	0	0	0	0	1	0	0	0	1	$	1	1	*	0	*	0	1	*	1	0	1	1	0	0	0	*	*	1	1	0	0	0	1	0	1	0	0	*	*	*	*	*	1	0	*	*	1	*	0
Trichillum (Paratrichillum)	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	1	1	*	1	0	1	1	0	0	0	1	1	1	1	0	0	0	1	0	1	0	*	0	0	0	0	0	0	0	1	0	0	1	1	0	0
Onoreidium	0	0	0	0	0	0	1	0	1	0	1	1	1	1	1	1	*	1	1	0	1	1	0	0	0	1	1	1	0	0	0	*	*	*	0	0	1	0	0	0	0	1	1	0	1	0	1	0	1	0	0

0. plesiomorphic; 1, 2, etc. – apomorphic; ? – unknown; *, $ – polymorphic; - – inaplicable.

	5					6										7										8										9										10
Taxon	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
Canthidium barbacenicum	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	-	-	-	0	0	-	0	-	-	-	-	0	0	0	1	0	0	0	0	0	0
Scatimus bicarinatus	0	1	1	0	2	1	0	1	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Aphengium sordidum	0	1	0	0	1	1	1	1	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	-	-	-	0	0	-	0	-	-	-	-	0	0	0	0	0	0	0	0	0	0
Ateuchus squalidus	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	-	-	-	0	0	-	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Pedaridium	0	1	1	0	2	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	-	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	1	0	0
Boreopedaridium	0	1	1	0	2	1	1	1	1	1	0	-	-	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	-	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
Leotrichillum	1	1	1	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0	0	-	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0
Bradypodidium	0	1	0	1	1	1	1	1	0	0	1	0	1	-	0	0	0	0	1	1	0	0	0	0	1	1	1	0	0	0	-	0	0	0	1	1	0	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0
Boreotrichillum	0	1	1	1	2	1	1	1	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	0	0	-	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	1	1	0	0	0
Youngidium	?	?	1	0	2	1	1	1	1	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	?	0	0	-	0	0	0	1	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Howdenidium	?	1	1	0	2	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Trichillidium	0	1	1	0	1	1	1	0	1	1	0	-	-	0	0	1	0	-	0	1	0	0	0	1	1	1	1	?	1	-	?	1	?	0	?	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0
Eutrichillum	0	1	1	0	0	1	1	0	0	2	1	0	1	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0	0	1	1	1	1	0	0	1	0	1	1	0	0	0	1	1	0	1	0	1	0	0
Horridotrichillum	0	1	1	0	1	1	1	0	1	0	1	0	0	-	0	0	0	0	0	1	0	0	0	0	1	1	1	?	1	-	0	?	1	0	0	1	0	1	0	0	0	0	1	1	1	?	0	?	1	0
Besourenga	0	1	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	?	?	0	1	?	?	1	0	1	0	0	0	0	1	1	0	0	0	0	1	0
Silvia	0	1	1	0	1	0	1	0	0	1	0	-	-	-	0	0	0	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Degallieridium	0	1	1	0	1	1	1	0	1	0	1	0	1	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	0	?	?	0	?	?	?	1	0	0	0	0	0	0	1	1	0	0	0	?	0	0
Feeridium	1	1	0	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	1	1	0	0	0	1	0	1
Gillidium	0	1	1	0	1	1	1	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0
Pereiridium	0	1	1	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0
Martinezidium	0	1	1	0	2	1	1	1	*	0	0	?	?	0	1	0	1	*	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Genieridium	1	1	1	0	$	1	1	1	*	$	1	*	0	1	0	0	0	*	0	1	0	0	0	0	1	1	1	0	0	0	0	*	1	0	0	1	*	1	0	0	0	0	1	1	1	*	*	0	0	0
Trichillum (Trichillum)	*	1	1	0	$	1	1	*	*	0	1	*	*	0	0	0	0	0	0	1	*	0	0	0	1	1	1	0	1	0	?	0	0	*	*	1	0	1	0	1	0	0	1	1	1	1	0	*	1	0
Trichillum (Paratrichillum)	*	1	1	0	1	1	1	0	1	0	1	*	0	0	0	0	0	0	*	1	0	0	0	0	1	1	1	1	1	0	?	0	0	0	0	1	0	1	*	*	0	1	1	1	1	1	0	0	1	0
Onoreidium	0	1	1	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0

0. plesiomorphic; 1, 2, etc. – apomorphic; ? – unknown; *, $ – polymorphic; - – inaplicable.