SISTEMÁTICA DE PHILEURINI (COLEOPTERA, SCARABAEOIDEA, MELOLONTHIDAE, DYNASTINAE)

por

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(Sob Orientação do Professor Paschoal Coelho Grossi - UFRPE)

RESUMO

Phileurini é a terceira tribo em diversidade dentro de Dynastinae, compreendendo 35 gêneros e 265 espécies, com maior predominância no hemisfério sul, nas regiões biogeográficas Neotropical e Afrotropical com maior diversidade, mas também pode ser encontrada ao Sul da região Neártica, Oriental e Australiana. As relações filogenéticas dos gêneros da tribo não são conhecidas, as análises morfológicas e biogeográficas realizadas por Endrödi em 1985 para as tribos de Dynastinae são conhecidas, e em Ide 1998 para a tribo Phileurini, somente os gêneros Neotropicais. As suas relações são desconhecidas com os demais integrantes da tribo, da mesma forma ocorre nas subtribos e a relação entre os gêneros. Uma análise através de filogenia morfológica moderna para a tribo é necessária, uma vez que a tribo passou por inclusões, exclusões e modificações de gêneros e espécies. O objetivo deste trabalho foi testar a monofilia tribal, subtribal e genérica por meio de uma análise filogenética baseada nos caracteres morfológicos dos membros da tribo Phileurini e estabelecer as relações filogenéticas entre eles, e também da tribo em relação às demais que fazem parte de Dynastinae.

PALAVRAS-CHAVE: Besouro Rinoceronte, Morfologia, Taxonomia, Cladograma

SYSTEMATICS OF PHILEURINI KOLBE (COLEOPTERA, SCARABAEOIDEA, MELOLONTHIDAE, DYNASTINAE)

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ABSTRACT

The Phileurini tribe is the third in diversity within Dynastinae, comprising 36 genera and 311 species, with greater predominance in the southern hemisphere, in the Neotropical and Afrotropical biogeographic regions with greater diversity, but it can also be found in the Nearctic (only close to Mexico), Eastern and Australia. The phylogenetic relationships of the tribe's genera are unknown, the morphological and biogeographic analyzes carried out by Endrödi in 1985 for the Dynastinae tribes are known, and in Ide 1998 for the Phileurini tribe, only the Neotropical genera. Their relationships are unknown with the other members of the tribe, the same occurs in subtribes and the relationship between genders. An analysis through modern morphological phylogeny for the tribe is necessary, as the tribe has gone through inclusions, exclusions and modifications of genera and species. The objective of this work is to test the tribal, subtribal and generic monophyly through a phylogenetic analysis based on the morphological characters of the members of the Phileurini tribe and to establish the phylogenetic relationships between them, and also of the tribe in relation to the others that are part of Dynastinae.

KEY WORDS: Rhinoceros beetle, Morphology, Taxonomy, Cladogram

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Tese apresentada ao Programa de Pós-Graduação em Entomologia Agrícola, da Universidade Federal Rural de Pernambuco, como parte dos requisitos para obtenção do grau de Doutor em Entomologia Agrícola.

RECIFE - PE

Julho – 2023

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Dados Internacionais de Catalogação na Publicação
Universidade Federal Rural de Pernambuco
Sistema Integrado de Bibliotecas
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M488s Medeiros, Rone Andrews Freitas
SISTEMÁTICA DE PHILEURINI (COLEOPTERA, SCARABAEOIDEA, MELOLONTHIDAE, DYNASTINAE) / Rone Andrews Freitas Medeiros. - 2023.
265 f. : il.

Orientador: Paschoal Coelho Grossi.
Inclui referências.

Tese (Doutorado) - Universidade Federal Rural de Pernambuco, Programa de Pós-Graduação em Entomologia Agrícola, Recife, 2023.

1. Besouro Rinoceronte. 2. Morfologia. 3. Taxonomia. 4. Cladograma. I. Grossi, Paschoal Coelho, orient. II. Título

CDD 632.7

DEDICATÓRIA

Aos meus pais e meus irmãos, que não mediram esforços para que eu chegasse até esta etapa da minha vida, agradeço por todo apoio e carinho.

AGRADECIMENTOS

À Universidade Federal Rural de Pernambuco e ao programa de Pós-Graduação em Entomologia pelo aprendizado e oportunidade de realizar o Doutorado em um dos melhores programas em Entomologia no Brasil, e o melhor do nordeste.

À CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) pela concessão da bolsa.

Ao meu orientador Professor Paschoal Coelho Grossi pela paciência, dedicação, orientações e conhecimentos transmitidos.

Ao Professor Fernando Zagury Vaz-de-Mello pelo empréstimo de material da CEMT.

A todos os curadores de museus nacionais, internacionais e coleções privadas, e funcionários pelos empréstimos das imagens utilizadas, e pela colaboração.

A todos os integrantes da banca examinadora e suplentes, por terem aceitado o convite, pelas contribuições e correções para melhoria desta Tese.

A todos os Professores do Programa de Pós-Graduação em Entomologia da UFRPE por todos os conhecimentos transmitidos, dedicação e incentivo.

À minha família, essencial em todos os momentos.

Aos colegas do LabTaxIn, em especial Sebastian, Paulo, André e Mateus Bento, além de colegas vindos de outras instituições, pelos conhecimentos taxonômicos trocados.

REJECTION FOR PURPOSES OF ZOOLOGICAL NOMENCLATURE

This work, in the form in which it is presented (Ph.D. thesis), should not be considered for publication valid for the purposes of zoological nomenclature. This is the disclaim and dénégation mentioned in the International Code of Zoological Nomenclature (1999 edition), chapter three, articles 8.2 and 8.3.

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INTRODUÇÃO

1.1 SCARABAEOIDEA

Scarabaeoidea é dividida em 14 famílias sensu Lawrence & Newton (1995), and Lawrence *et al*. (1999): Coprinisphaeridae Genise, 2004 (fóssil); Pallichnidae Genise, 2004 (fóssil); Lucanidae Latreille, 1804; Passalidae Leach, 1815; Trogidae MacLeay, 1819; Glaresidae Kolbe, 1905; Pleocomidae LeConte, 1861; Diphyllostomatidae Holloway, 1972; Geotrupidae Latreille, 1802; Belohinidae Paulian, 1959; Ochodaeidae Mulsant & Rey, 1871; Hybosoridae Erichson, 1847; Glaphyridae MacLeay, 1819 e Scarabaeidae Latreille, 1802.

O sistema de classificação deste grupo encontra-se atualmente com três principais literaturas adotadas para a divisão destes quanto ao número de famílias que o compõe, os dois mais utilizados são o de Browne & Scholtz (1995, 1999) e Lawrence & Newton (1995), muito utilizado pela escola Norte-Americana; o segundo, de Morón (1984) (este último adotando Melolonthinae como família), validado por Cherman & Morón (2014) com um artigo que reuniu as evidências de vários trabalhos realizados por diversos autores, onde ilustra a diferenciação entre os Pleurosticti com a lígula e mento fusionados e os espiráculos abdominais localizados na parte superior dos esternitos, enquanto os Laparosticti apresenta espiráculos abdominais entre os esternitos e os tergitos, e o último sistema de classificação é o de Brownie & Scholtz (1995, 1999), que é representada por 14 famílias. Este trabalho seguirá a classificação proposta de classificação por Cherman & Morón (2014) que foi confirmada a hipótese em Dietz *et al*. (2023), onde os grupos são divididos em Pleurosticti e Laparosticti.

Melolonthidae Leach, 1819 é um grupo bastante diverso em formas, cores, e hábitos alimentares, quando larvas ou adultos podem se alimentar de fungos, vegetação, pólen, frutos ou raízes, alguns são pragas de culturas agrícolas, grãos e produtos armazenados, livros etc (Casari &

Ide 2012). Possuem nichos diversos, muitos são herbívoros, outros são polinizadores, predadores, e alguns vivem em associação com seus hospedeiros, dentro de ninhos de formigas ou cupins (Ratcliffe *et al*. 2002).

Algumas espécies são diurnas, sendo facilmente observadas como os indivíduos polinizadores (Cyclocephalini) ou na vegetação, como em bromélias (Cetoniinae) (Howden 2010, Moore *et al*. 2018a). Mas a sua grande maioria é noturna, sendo facilmente coletados em armadilhas luminosas como alguns indivíduos de Dynastinae, Rutelinae e Melolonthinae (Ratcliffe *et al*. 2002).

Melolonthidae Leach, 1819 é dividida em 6 subfamílias, segundo Cherman & Morón (2004): Melolonthinae MacLeay, 1819; Sericinae Kirby, 1837; Hopliinae Latreille, 1829; Euchirinae Hope, 1840; Rutelinae MacLeay, 1819; Dynastinae MacLeay, 1819 .

1.2 DYNASTINAE

Na subfamília Dynastinae muitas larvas utilizam-se de frutos ou madeira em decomposição como fonte de alimento, dependendo do seu estádio de desenvolvimento (Ritcher 1958, Casari & Ide 2012), prestando um grande serviço ecológico ao ecossistema, realizando a decomposição da matéria orgânica e a ciclagem de nutrientes. O gênero *Cyclocephala* Dejean é encontrado em campo associado com plantas Anonáceas, devido ser um importante polinizador para esta família de plantas (Gottsberger 1999), mas também pode ser praga agrícola associada ao sistema radicular de vários cultivos (Bran *et al*. 2006). Outro exemplo de praga agrícola é *Aegopsis bolboceridus* (Thomson, 1860) encontrado em cultivos de milho e tomate no Distrito Federal e em Goiás (Oliveira & Frizzas 2013). Outro exemplo de hábitat e forma de nutrição é a espécie *Phileurus carinatus declivis* Prell, 1914, que foi encontrada em associação a ninhos de formigas *Azteca* cf.

chartifex Forel, 1896, que provavelmente alimentavam-se de larvas de formigas (Alves-Oliveira *et al*. 2016).

Dynastinae é distribuída em uma grande variedade de regiões biogeográficas e elevações, com exceção da região antártica, presente em maior abundância nas florestas tropicais (Ratcliffe 2003b), cerca de 220 gêneros e 2000 espécies descritas (Gasca-Álvarez & Amat-García 2010, Schoolmeesters 2019). Estes estão compreendidos em oito tribos: Agaocephalini Burmeister, 1847; Cyclocephalini Laporte, 1840; Dynastini MacLeay, 1819; Hexodontini Lacordaire, 1856; Oryctini Mulsant, 1842; Oryctoderini Endrödi, 1926; Pentodontini Mulsant, 1842 e Phileurini Burmeister, 1847. Hexodontini e Oryctoderini não ocorrem na região Neotropical, sendo encontrados somente nas regiões biogeográficas de Madagascar, Austrália e Oriental, respectivamente.

É importante conhecer os caracteres morfológicos principais que determinam as demais tribos de Dynastinae, além disto também é fundamental conhecer seus aspectos biológicos e sua distribuição.

1.2.1 AGAOCEPHALINI

Agaocephalini é uma tribo composta por 12 gêneros e 46 espécies (Neita-Moreno *et al*. 2014, Milani 2017, Sobral *et al*. 2018). As características principais desta tribo são: cabeça e pronoto com chifres ou tubérculos; clava antenal geralmente pequena; mandíbulas largas, com ou sem dentes; élitros irregularmente pontuados, sem fileiras de pontuações duplas distintas; propigídio sem área de estridulação (Endrödi 1985b).

1.2.2 CYCLOCEPHALINI

Cyclocephalini contém 16 gêneros e cerca de 500 espécies (Smith 2006, Paucar-Cabrera & Moore 2018). Os indivíduos adultos de Cyclocephalini são associados à flores, atuando como

polinizadores de muitas espécies das famílias Anonaceae (Gottsberger 1999) e Araceae (Jameson & Wada 2009).

Suas características principais são: cabeça e pronoto sem tubérculos, chifres, carenas ou fóveas em ambos os sexos (exceto em *Pucaya* Ohaus, 1910 e *Parapucaya* Prell, 1934 que podem apresentar pequenos chifres ou tubérculos na cabeça e tubérculos no pronoto (Paucar-Cabrera & Moore 2018); mandíbulas com dentes ou lóbulos na borda lateral; gálea das maxilas com quatro dentes na margem interna; pernas com todos os tarsos cilíndricos; tarsos anteriores mais largos nos machos e simples nas fêmeas; processo prosternal curto a moderadamente longo; e onychium com duas cerdas no ápice (Endrödi 1985b, Smith 2006, Clark 2011 [dados não publicados], Moore *et al*. 2018, Paucar-Cabrera & Moore 2018).

1.2.3 DYNASTINI

Dynastini possui 13 gêneros e cerca de 60 espécies conhecidas (Endrödi 1985b, Ratcliffe 2002, Gasca-Álvarez & Amat-García 2010). Insetos desta tribo são conhecidos popularmente como besouro-rinoceronte, besouro-elefante, são besouros de maior comprimento em Melolonthidae.

A tribo tem como características principais: forte dimorfismo sexual evidenciado pela cabeça e pronoto com chifre ou cabeça com tubérculo na maioria das espécies; processo prosternal de tamanho e formato variável; élitros lisos nos machos e visivelmente esculpidos nas fêmeas; propigídio com ou sem área estridulatória; ápice do onychium com muitas cerdas (Endrödi 1985b; Ratcliffe 2002).

1.2.4 HEXODONTINI

Hexodontini é representada apenas pelo gênero *Hexodon* Olivier com 10 espécies descritas, restritas a Madagascar (Le Tirant & Limoges 2016, Scholtz & Grebennikov 2016). Os

representantes desta tribo ocorrem em áreas abertas com presença de dunas e, apresentam hábitos diurnos, este conjunto de características os diferenciam das demais tribos de Dynastinae (Ratcliffe *et al*. 2013).

As principais características dessa tribo são: formato do corpo quase circular ou amplamente oval, superfície moderadamente côncava; única base da junção dos palpos cobertos por um amplo mento; mandíbulas amplas e arredondadas, lado externo simples; canthus oculares muito curtos; antenas compostas por escapo, pedicelo e oito flagelômeros; clava antenal curta; fronte e pronoto lisos; processo do prosterno curto, estreito e triangular; propigídio sem área estridulatória; pigídio coberto parcialmente pelos élitros; pernas delgadas; tíbias anteriores tridentadas; tarsos tão longos ou mais longos que a tíbia; tarso anterior dos machos mais ou menos fracamente dilatado; garra anterior em forma de gancho; tíbias posteriores sem carena, ápice truncado mais ou menos com presença de cerdas (Endrödi 1985b).

1.2.5 ORYCTINI

Oryctini atualmente apresenta 26 gêneros e cerca de 230 espécies (Ratcliffe 2003b, Gasca & Fonseca 2009), e é uma das tribos mais diversas e numerosas de Dynastinae, mais da metade está presente na região Neotropical (Ratcliffe & Cave 2006). Suas principais caracteríscas morfológicas são: cabeça e pronoto com tubérculos ou chifres (especialmente machos), e pronoto usualmente com fóvea (especialmente fêmeas); clava antenal pequena; mandíbulas com lobos laterais ou dentes; ápice da tíbia posterior fortemente crenulada ou com dentes (incluindo dente apical, exceto as espécies de Coelosis Hope, 1837 (Gasca-Álvarez & Amat-García 2010)); processo prosternal proeminente, colunar; onychium com três ou mais cerdas no ápice (Endrödi 1985b). As larvas de Oryctini se alimentam de matéria orgânica em decomposição ou em troncos podres, e os adultos tem hábito noturno, geralmente se escondendo durante o dia, estes se

alimentam de frutos e vegetação em decomposição ou de raízes de plantas, como, por exemplo, a cana-de-açúcar (Ratcliffe 2003b).

1.2.6 ORYCTODERINI

Oryctoderini é representada por 10 gêneros e 24 espécies, destes, *Hemicyrthus* Reiche, 1860, tem um relacionamento taxonômico não resolvido, uma vez que apresenta características que se assemelham à Hexodontini, sendo proposta a sua remoção de Oryctoderini (Paulian 1991). Mesmo após a proposta de ser um Hexodontini, este gênero e suas espécies ainda foram catalogadas posteriormente em Oryctoderini (Endrödi 1985b, Krajcik 2005). Além deste, *Chalcocrates* Arrow, 1937 tem características semelhantes à Rutelinae (formato das garras que se dividem) (Jameson & Ratcliffe 2009), evidenciando que esta tribo necessita de revisão e encontra-se com os caracteres morfológicos que podem ser melhor definidos (Jameson & Ratcliffe 2009, Krell & Theuerkauf 2015).

Os caracteres que definem esta tribo são: mandíbulas em vista dorsal escondidas pelo clípeo ou mandíbulas projetando-se além do clípeo (não escondidas pelo clípeo); processo prosternal bem desenvolvido ou pouco desenvolvido; propigídio com região estridulatória presente ou não; e tíbia posterior com o ápice truncado ou com um a quatro dentes obtusos, triangulares (Jameson & Ratcliffe 2009).

1.2.7 PENTODONTINI

A tribo Pentodontini é a tribo mais diversa em número de espécies em Dynastinae, representada por cerca de 100 gêneros e 500 espécies (Ratcliffe 2003b, Ratcliffe & Cave 2015, Neita-Moreno & Ratcliffe 2017), são pragas de culturas agrícolas como, por exemplo, *Tomarus* Erichson, 1847 (Piedrahíta *et al*. 2007). As larvas desta tribo se alimentam de folhas e madeira em

decomposição, e humus (Ratcliffe & Cave 2015), e os adultos se alimentam de matéria orgânica do solo, húmus, folhas ou troncos em decomposição (Ratcliffe & Cave 2006).

Tem como características principais: dimorfismo sexual mínimo; corpo alongado, nunca arredondado; cabeça com carenas ou tubérculos; mento não muito prolongado, não cobrindo a base dos palpos labiais; clava antenal pequena na maioria das espécies; pronoto às vezes com um tubérculo subapical e uma pequena fóvea; protíbias não tão alongadas nos machos quanto nas fêmeas; e processo do prosterno variável (López-García *et al*. 2016).

1.2.8 PHILEURINI

Phileurini é representada por duas subtribos reconhecidas (Carne, 1957b), Cryptodontina que está presente apenas na região biogeográfica da Austrália, sendo encontrada nos seguintes países: Austrália, Indonésia e Nova Caledônia, e Phileurina que compreende todos os gêneros presentes no restante do mundo, exceto nas regiões Paleártica e Antártica. A tribo tem predominância no hemisfério sul, nas regiões biogeográficas Neotropical (20 gêneros e 142 espécies), Afrotropical (13 gêneros e 30 espécies) e Australiana (1 gênero e 22 espécies), e no hemisfério norte, nas regiões Oriental (1 gênero e 29 espécies) e Neártica (3 gêneros e 5 espécies) , sendo a região que apresenta a menor diversidade de gêneros e espécies para a tribo (Endrödi 1985b, Ide 1998 [dados não publicados]) (Tabela 01).

Atualmente apresenta 36 gêneros e 265 espécies (Ide 1998 [dados não publicados], Krajcik 2005, Abadie *et al*. 2008, Penco & Zubarán 2013, Albertoni *et al*. 2014, Ratcliffe *et al*. 2021), tendo os seus dois últimos gêneros descritos recentemente por Ratcliffe & Cave (2010) e Penco & Zubarán (2013) .

As principais características desta tribo são: mento muito amplo, cobrindo a base dos palpos labiais; clípeo na maioria das vezes acuminado, raramente truncado ou arredondado; lado

externo das mandíbulas simplesmente curvado, ou com dois ou dentes ou lobos; antenas compostas por escapo, pedicelo e oito flagelômeros, muito raramente sete; fronte com um ou dois tubérculos ou chifres, muito raramente desarmada; pronoto na maioria das vezes com uma cavidade pós-apical, com ou sem tubérculo e na maioria das vezes com um sulco longitudinal na região média; élitros na maioria das vezes planos ou achatados; fêmures fortemente aumentados; tíbias anteriores com três ou quatro dentes; carena transversal das tíbias médias e posteriores na maioria das vezes bem desenvolvidas, raramente reduzida em dois dentes, margem apical truncada, com um a três dentes; tarsos anteriores nos machos simples ou mais ou menos fortemente alargado (Endrödi 1978, 1985b).

1.3 RELEVÂNCIA DO ESTUDO

Ide (1998) (dados não publicados), fez uma filogenia com os gêneros de Phileurini existentes, examinando os gêneros neotropicais. Desta maneira torna-se necessário testar a sua monofilia utilizando todos os gêneros descritos para a tribo e testar a relação destes com outras tribos presentes na subfamília, desta forma podendo saber o atual estado da sistemática de Phileurini.

A sistemática da tribo ainda encontra-se sem estabelecimento, e consequentemente sua monofilia, desta forma faz-se necessária uma análise cladística através de dados morfológicos, onde sejam incluídos todos os gêneros. A classificação e sistemática permanecem confusas, devido alguns gêneros e espécies que anteriormente compunham a tribo e foram propostas sinonímias como, *Chiliphileurus* Endrödi, 1977 por Ratcliffe *et al*. (2021), ou removidos em suas últimas revisões, como por exemplo, o gênero *Platyphileurus* Ohaus, 1910 por Ide (1998, dados não publicados) e Albertoni *et al*. (2014), e ainda com a possibilidade de existir problemas

nomenclaturais, como por exemplo, *Kirprellius* Allsopp por Allsopp (2022), recentemente proposto a nova combinação por existir gênero com o nome *Syrictes* (Prell, 1936).

1.4 HIPÓTESES

- Phileurini pode ser, dentre as tribos de Dynastinae, uma linhagem monofilética;

- os gêneros de Phileurini, podem constituir linhagens monofiléticas, uma vez que, existem duas sinapomorfias evidenciadas por Ide (1998, dados não publicados) para os gêneros Neotropicais.

1.5 OBJETIVO PRINCIPAL

Testar a monofilia da tribo, e dos gêneros de Phileurini, além de suas relações, através de uma filogenia com base em caracteres morfológicos externos de adultos, e propor hipóteses filogenéticas a partir destas análises morfológicas.

1.6 OBJETIVOS ESPECÍFICOS

- Testar a monofilia de Phileurini;

- testar a relação dos gêneros de Phileurini com as demais tribos de Dynastinae;

- rever o posicionamento cladístico de alguns gêneros de Phileurini;

- propor sinonímias;

- descrever novas espécies.

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Tabela 1. Regiões biogeográficas e distribuição dos gêneros e espécies de Phileurini.

Região biogeográfica	N° de gêneros	Número de espécies
Neotropical	20	142
Afrotropical	13	30
Austrália	1	22
Oriental	1	29
Neártica	3	5

CAPÍTULO 2

Sistemática de Phileurini (Coleoptera, Scarabaeoidea, Melolonthidae, Dynastinae) [1]

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[1]Medeiros, R.A.F. & P.C. Grossi. Sistemática de Phileurini (Coleoptera, Scarabaeoidea, Melolonthidae, Dynastinae) [1]. Journal of Natural History (a ser submetido).

RESUMO - A tribo Phileurini tem registros em todas as regiões biogeográficas com exceção dos polos. Esta difere das demais por apresentar como característica principal o mento cobrindo a base dos palpômeros labiais. A matriz foi construída com base nos caracteres e estados de caracteres, observados da morfologia externa de adultos, objetivando a análise cladistica envolvendo todos os gêneros tipos das tribos de Dynastinae e as espécies tipo que compõem Phileurini, sendo utilizadas duas espécies por gênero, quando disponíveis. A matriz de 83 terminais e 91 caracteres a análise foi rodada no programa TNT, usando pesagem automática e implícita (1, 3, 5 e 10), encontrando 160 árvores igualmente parcimoniosas para todos os k, e com o script para calcular o valor k, resultou de apenas uma árvore. As tribos de Dynastinae recuperadas como monofiléticas foram: Agaocephalini, Cyclocephalini, Dynastini e Hexodontini; Oryctini, Oryctoderini e Pentodontini foram recuperadas como parafiléticas. Phileurini foi recuperada como monifilética, tendo como principal estado de caráter suportando esta monofilia, a sinapomorfia que é o mento cobrindo a base dos palpos labiais. Dentre os gêneros analisados, o gênero monotípico *Ceratophileurus* Ohaus foi proposto como sinônimo júnior para o gênero *Homophileurus* Kolbe, uma vez que os caracteres observados ambos, são muito similares, e *Ceratophileurus* foi recuperado no clado formado pelas espécies de *Homophileurus* de acordo com a análise morfológica, o mesmo ocorreu com os gêneros *Oryctophileurus* e *Pseudosyrichthus*, sendo propostos como sinônimos juniores de *Amblyodus* e *Syrichthodonthus*. A subtribo Cryptodontina foi proposta com dois novos gêneros juntos a *Cryptodus* Macleay, 1819, Actinobolus Westwood, 1842, e Cnemidophileurus Kolbe, 1910.

PALAVRAS-CHAVE: morfologia, taxonomia, sistemática, mirmecófilo, termitófilo.

Systematics of Phileurini (Coleoptera, Scarabaeoidea, Melolonthidae, Dynastinae)

ABSTRACT – The Phileurini tribe has records in all biogeographical regions with the exception of the poles. This tribe differs from the others with main characteristic the mentum covering the base of the labial palpomeres. The matrix was built based on the characters and character states, observed from the external morphology of adults, aiming at the cladistic analysis involving all the type genera of the tribes of Dynastinae and the type species that make up Phileurini, using two species per genus, when available. The matrix of 83 terminals and 91 characters the analysis was run in the TNT program, using automatic and implicit weighing (1, 3, 5 and 10), finding 160 equally parsimonious trees for all k, and with the script to calculate the k value, resulted from only one tree. The tribes of Dynastinae recovered as monophyletic were: Agaocephalini, Cyclocephalini, Dynastini and Hexodontini; Oryctini, Oryctoderini and Pentodontini were recovered as paraphyletic. Phileurini was recovered as monophyletic, having as the main character state supporting this monophyly, the synapomorphy that is the mentum covering the base of the labial palps. Among the analyzed genera, the monotypic genus *Ceratophileurus* Ohaus was proposed as a junior synonym for the genus *Homophileurus* Kolbe, since the characters observed in both are very similar, and *Ceratophileurus* was recovered in the clade formed by the species of *Homophileurus* according to the morphological analysis , the same occurred with the genera *Oryctophileurus* and *Pseudosyrichthus*, being proposed as junior synonyms of *Amblyodus* and *Syrichthodonthus*. The subtribe Cryptodontina was proposed with two new genera together with *Cryptodus* Macleay, 1819, *Actinobolus* Westwood, 1842, and *Cnemidophileurus* Kolbe, 1910.

KEY WORDS: morphology, taxonomy, tribe, genera, myrmecophilous, termitophilous

Introduction

The Phileurini is currently represented by 36 genera and contains more than 265 species (Endrödi 1985b, Ide 1998 [unpublished data], Gasca-Álvarez & Amat-García 2010, Krajcik 2005, Penco & Zubarán 2013, Albertoni *et al*. 2014, Ratcliffe *et al*. 2021), which comprise two subtribes, Cryptodontina which comprises only the genus *Cryptodus* Macleay, 1819, and Phileurina which currently has 35 genera (*Actinobolus* Westwood, 1842; *Allophileurinus* Dupuis & Dechambre, 2001; *Amblyodus* Westwood, 1878; *Amblyoproctus* Kolbe, 1910; *Archophanes* Kolbe, 1905; *Archophileurus* Kolbe 1910; *Argentophileurus* Penco & Zubarán, 2013; *Caymania* Ratcliffe & Cave, 2010; *Ceratophileurus* Ohaus, 1911; *Cnemidophileurus* Kolbe, 1910; *Eophileurus* Arrow, 1908; *Goniophileurus* Kolbe, 1910; *Haplophileurus* Kolbe, 1910; *Hemiphileurus* Kolbe 1910; *Homophileurus* Kolbe, 1910; *Hovophileurus* Arrow, 1911; *Kirprellius* Allsopp 2022; *Macrocyphonistes* Ohaus, 1910; *Metaphileurus* Kolbe, 1910; *Microphileurus* Kolbe, 1910; *Mictophileurus* Ohaus, 1911; *Oryctophileurus* Kolbe, 1910; *Palaeophileurus* Kolbe, 1910; *Paraphileurus* Endrödi, 1978; *Phileucourtus* Dechambre, 2008; *Phileurus* Latreille 1807; *Planophileurus* Chapin, 1932; *Prosphileurus* Kolbe, 1905; *Pseudosyrichthus* Peringuey, 1901; *Rhizoplatodes* Péringuey, 1901; *Rhizoplatys* Westwood, 1842; *Syrichthodontus* Péringuey, 1901; *Syrichthomorphus* Péringuey, 1901; *Syrichthoschema* Janssens, 1942; e *Trioplus* Burmeister, 1847).

Five genera currently present 55% of the species already described for the tribe: *Hemiphileurus* (59 spp. [+ 1 sp. under description]), *Eophileurus* (53 spp.), *Archophileurus* (32 spp. [+ 1 sp. under description]), *Phileurus* (28 spp. [+1 under description]), *Cryptodus* (25 spp.), and few genera have about ten species: *Amblyoproctus* Kolbe, 1910 (13 spp.), *Homophileurus*

Kolbe, 1910, (10 spp. [+1 under description]) and there are still 10 genera that are monotypic (Table 01).

Many authors published catalogs where they assigned genera and species to the tribe that were described at that time, as in the case of Arrow (1937b), Blackwelder (1944), Endrödi (1985b) and Krajcik (2005). Here, only with the aim of illustrating and updating the number of genera and species that currently belong to the tribe, a table was created with the data from these authors and the current situation of the tribe. (Table 01).

Taxonomic history of Phileurini

In 1847, Burmeister studying and writing his book, describe some genera to separate morphologically from others Dynastinae and brought together these in groups. The group Phileuridae: *Trionychus* Dejean, *Cryptodus* MacLeay, *Actinobolus* Westwood, *Trioplus* Burmeister, *Phileurus* Latreille e *Syrichthus* Burmeister. These genera were grouped using as main characteristic the shape of the mentum (narrow or wide); and the shape and size of the tarsomeres.

Lacordaire (1856), propose the establishment of subtribes for the tribe Dynastides, among these Phileurides, which was established according to the mandibles with an internal fringe and labial palp inserted on the internal surface of the mentum, a characteristic that continued to be used as the main feature for the tribe until the present day.

In the same way, LeConte and Horn (1883) proposed the Dynastini tribe, composed of four subtribes, Cyclocephalini, Oryctini, Dynastini and Phileurini, also proposed as a main feature for the latter, the labial palps inserted behind the mentum, in the same way as Lacordaire (1856), all of these categories was proposed by them, used here as they wrote. At this time the tribe was composed of the genera *Actinobolus* Westwood, *Cryptodus* MacLeay, *Phileurus* Latreille, *Syrichthus* Kirby, *Trionychus* Dejean, *Trioplus* Burmeister, and still under incertae sedis

Semanotus Hope was included by the author, later synonymized with *Semanopterus* Hope, 1847 (Pentodontini).

Kolbe (1910) proposed the separation of the genera of the Phileurinae subfamily, subdividing them into groupings, in the first Trihoplini, it contained the genera *Trioplus* Burmeister, *Microphileurus* Kolbe, *Goniophileurus* Kolbe, *Amblyodus* Westwood, *Metaphileurus* Kolbe and *Oryctophileurus* Kolbe. While the second grouping, Phileurini genuini, was composed of the genera *Archophileurus* Kolbe, *Amblyphileurus* Kolbe, *Periphileurus* Kolbe, *Amblyoproctus* Kolbe, *Haplophileurus* Kolbe, *Palaeophileurus* Kolbe, *Cnemidophileurus* Kolbe, *Actinobolus* Westwood, *Hemiphileurus* Kolbe, *Homophileurus* Kolbe, *Epiphileurus* Kolbe and *Phileurus* Latreille.

Kolbe divided the genera mainly according to what he observed in the mandibles, in Trihoplini they have externally three teeth, small body with a cylindrical shape, while Phileurini genuini had simple mandibles, large and convex body.

After Kolbe, there is currently no updates for the tribe, without proposals for its division or testing its monophyly against the other tribes of Dynastinae, only a phylogeny carried out by Ide (1998, unpublished data), where he used the Neotropical genera. Since itthen, the tribe has been added with three more described new genera and one excluded, totaling 23 Neotropical genera.

Taxonomic history of Phileurini genera

Phileurini was proposed for the type genus *Phileurus* Latreille, 1807 which was originally described by Linnaeus (1758) as *Scarabaeus didymus* Linnaeus 1758. Fabricius (1801) transferred *Scarabeus* to *Geotrupes* Fabricius, 1792, but Latreille (1807) because he could not find characters that were similar then proposed the new genus, and moved *Scarabaeus didymus* Linnaeus to *Phileurus didymus* (L.).

Phileurus Latreille is a genus found in the Nearctic and Neotropical biogeographic regions, ranging from the southern and southeastern United States, Central America and the West Indies to Argentina (Ratcliffe 2003b). This genus presents two groups differentiated from each other by the number of teeth in the protibia (Ratcliffe 2011b). Its main features are: forehead with two tubercles, clypeal frontal carina usually absent or indistinct, apex of the metatibia obtusely triangular and with a thorn in the superior angle (Endrödi 1985b).

MacLeay (1819) described the second genus of the tribe, *Cryptodus* MacLeay, 1819, found in Australia (most species have been described from this country), Tasmania, Lord Howe Island, Indonesia and New Caledonia. This genus has a triangular funicle-shaped scape, a rather flat body, a broad clypeus with a truncated apex, and a very broad mentum.

Westwood (1842) proposed the genera *Actinobolus* Westwood e *Rhizoplatys* Westwood, *Amblyodus* Westwood. *Actinobolus* is found on South America (Brazil, Guyana and Paraguay) (Westwood 1842, Endrödi 1978, Dupuis & Dechambre 1998, Dupuis 2019), and *Amblyodus* in South America (Brazil, Bolivia, French Guyana, Peru) and Central America (Costa Rica, Mexico [?], Nicaragua, Panama) (Westwood 1878, Endrödi 1985b, Ratcliffe 2003a, Gasca-Alvarez & Aquilar 2008, Grossi & Grossi 2011, Vaz-de-Mello & Grossi 2022), *Amblyodus* has a wider distribution than *Actinobolus*, being present in the western Amazon region and part of Central America, while *Rhizoplatys* is a genus found in the Afrotropical and Madagascar biogeographic regions.

Actinobolus has as main characters: clypeus margin elevated with lobes or teeth; frons without tubercles; and protibia with four teeth. *Amblyodus* is characterized by the presence of frons with two large horns or tubercles; mandibles with three external teeth; flattened pronotum; and metatibia apex with six teeth. *Rhizoplatys* is characterized by the external region of the angled

mandible and tooth-shaped apex, protibia with thick inner claw, metatibia apex presenting two teeth (Endrödi 1985b).

Péringuey (1901) described *Pseudosyrichthus* Péringuey, 1901; *Rhizoplatodes* Péringuey, 1901; *Syrichthodontus* Péringuey, 1901 and *Syrichthomorphus* Péringuey, 1901 (the only monotypic), all these genera proposed by him are Afrotropical. *Pseudosyrichthus* is characterized by frons with only one tubercle; almost straight mandibles; and two stridulatory bands on the propygidium. *Rhizoplatodes* has the apex of mentum moderately emarginated; mandibles not angled; and propygidium without stridulatory area. *Syrichthodontus* has the margin of the pronotum slightly and superficially excavated; and propygidium with two stridulatory bands. *Syrichthomorphus* has the pronotum extensively excavated; and stridulatory area marked only with moderate transverse punctures.

Archophanes Kolbe, 1905 was the first genus of the tribe described by Kolbe (1905), the second was *Prosphileurus* Kolbe, 1905, both monotypic and found in the Afrotropical region. *Archophanes* is characterized by a broad mentum with a non-emarginate apex; pronotum widely and deeply excavated; wide punctures in the pronotum and elytra; basal edge of the pronotum interrupted in the central part; and propygidium with two stridulatory bands. *Prosphileurus* has a broad mentum with an emarginate apex; small to moderate punctures on the pronotum and elytra; apical margin of the propygidium pronounced in males and females; short pygidium; and a single stridulatory band on the propygidium.

The second genus with the highest number of species, *Eophileurus* Arrow (1908), is found in Australia, Eastern and Palearctic regions. This is characterized by the frons with a tubercle or horn, in males, and a tubercle in females; pronotum with a frontomedial depression; all margins of the pronotum with borders; and propygidium without stridulatory area. Species of this genus are

hardly diagnosed by external morphological characteristics, with the greatest potential for taxonomic identification being the aedeagus.

Kolbe (1910), in one of the most expressive works for the tribe, proposed a subdivision of the Neotropical Phileurini based mainly on mandible characters, body shape and cephalic horns, delimiting them into two groups. The first "Trihoplini" group was composed of genera with a cylindrical body and of shorter length, while the second "Phileurini genuini" had as main characteristics simple mandibles, rarely angled or toothed, head with two tubercles or horns and, in addition to having flattened or weakly convex body (Kolbe 1910).

In Kolbe work, the author also described and proposed the establishment of 15 new genera for the tribe, these previously belonged to *Phileurus* Latreille, and were described to divide the different genera and species based on their morphological characters, these are: *Amblyoproctus* Kolbe, 1910; *Amblyphileurus* Kolbe, 1910; *Anisophileurus* Kolbe, 1910; *Archophileurus* Kolbe, 1910; *Cnemidophileurus* Kolbe, 1910; *Epiphileurus* Kolbe, 1910; *Goniophileurus* Kolbe, 1910; *Haplophileurus* Kolbe1910; *Hemiphileurus* Kolbe, 1910; *Homophileurus* Kolbe, 1910; *Metaphileurus* Kolbe, 1910; *Microphileurus* Kolbe, 1910; *Oryctophileurus* Kolbe, 1910; *Paleophileurus* Kolbe, 1910; and *Periphileurus* Kolbe, 1910.

In the same year, Ohaus (1910) described the monotypic genera *Macrocyphonistes* Ohaus, 1910 and *Platyphileurus* Ohaus, 1910. Of these genera described in this year, only *Macrocyphonistes* is Afrotropical, and the other is Neotropical.

Amblyoproctus Kolbe have as main characteristcs: body with small length; right mandibles with external margin without teeth; and apex of metatibia tuncate. *Cnemidophileurus*, monotypic genus, is a genus underrepresented in collections, can be found in Brazil, French Guyana and Peru (Ide 1998 [unpublished data], Ponchel 2011), is easily diagnosed by the lobed clypeus; antenna pedicel wider than long, covering the antennomers similar to that found in *Cryptodus* MacLeay;

and pronotum without lateral fovea. *Goniophileurus* is characterized by the mandibles with three external teeth; non rugose elytra; and metatibia margin with four non-aligned teeth (Endrödi 1985b).

Haplophileurus is a genus with only three species, actually, present in Colombia and Ecuador, characterized by the pronotum with depression at the apex; pronotum with moderately excavated longitudinal midline; protibia with four teeth; truncated hind tibiae; and propygidium without stridulatory bands (Dupuis 2011).

Homophileurus Kolbe has a head with horns projecting spiniformly; pronotum with two to four tubercles; protibia with four teeth. *Metaphileurus* Kolbe is characterized by a frons with two tubercles; mandibles with two external teeth; pronotum with longitudinal midline moderately excavated; and distal margin of metatibia with four non-aligned teeth (Endrödi 1985b).

Microphileurus Kolbe have as main characteristics: mandibles with three external teeth; pronotum without fovea; longitudinal sulcus complete; protibia with three teeth, metatibia with truncate apex. *Palaeophileurus* Kolbe is easily diagnosed by pronotum strongly punctate in some regions, withou tubercles, without longitudinal midline; and elytra almost smooth.

Oryctophileurus Kolbe presentes three external teeth in mandibles; strongly flattened pronotum; protibiae with four teeth; and apex of metatibia with five or six apical teeth (Endrödi 1985b, Perger & Grossi 2013).

Macrocyphonistes Ohaus has apex of clypeus rounded; frons with short horn and bifurcate at apex; pronotum with declivity on males; and propygidium without stridulatory bands (Ohaus 1910). *Platyphileurus* Ohaus has as main characteristics: body strongly flattened; apex of clypeus truncate or rounded; pronotum width narrow than elytra; and flattened tarsomeres with small and dense setae on dorsal region (Endrödi 1985b).

Ohaus (1911) describes two more monotypic genera for Phileurini: *Mictophileurus* Ohaus, 1911 e *Ceratophileurus* Ohaus, 1911, both are Neotropical from Brazil and French Guyana. In the same year Arrow (1911) describes *Hovophileurus* Arrow, 1911 from Madagascar. *Mictophileurus* has mandibles broad, strongly angled and emarginate after the apex. *Ceratophileurus* has, among its main features, a horn extending at the apex of the clypeus, reaching 8 mm or more; and declivous pronotum with two horns. *Hovophileurus* has a well-developed transverse carina on the metatibia; and apical margin of the metatibia with several teeth. Prell (1914) established the genus *Anisophileurus* Prell and describes three species for the genus.

Chapin (1932) describes *Planophileurus* Chapin, 1932, and currently the genus consists of three species from the Antilles. Prell (1936) and Janssens (1942) describe *Syrictes* Prell, 1936 and *Syrichthoschema* Janssens, 1942, both Afrotropical (South and East Africa). *Planophileurus* has a hemispherical prosternal process; and enlarged anterior tarsi with uneven claws. *Syrictes* is the only genus that has a large number of bristles in the dorsal region, and *Syrichthoschema* has a frons without a fovea; and the narrow mandibles (Ferreira 1965g, Endrödi 1985b).

Arrow (1937b) make a propose for a new classification for Dynastinae, with Phileurini composed by the genera *Cryptodus* MacLeay, 1819; *Pseudopimelopus* Blackburn, 1888; *Pimelopus* Erichson, 1842; *Hyphoryctes* Blackburn, 1895; *Trissodon* Burmeister, 1847; *Novapus* Sharp, 1875; *Neocavonus* Blackburn, 1888; *Semanopterus* Hope 1847 and *Eophileurus* Arrow, 1908. After a observation of the morphological characters and a systematic revision of some Australian Dynastinae genera, Carne (1957b) proposed a new classificaction of the tribes. He proposed that *Pseudopimelopus* was synonymized with *Pimelopus*, and transferred to Oryctini, the same occur with *Neocavonus* synonymized with *Cavonus* Sharp. The genera *Hyphoryctes*, *Trissodon*, *Novapus*, *Semanopterus* were transferred to Oryctini in different subtribes. Carne

created two subtribes for Phileurini and moved *Eophileurus* and the formers genera to the subtribe Phileurina and *Cryptodus* to Cryptodontina.

Ferreira (1965d) described the genus *Neosyrichthoschema*, it was found with a label which mentioned Senegambia, a strip that historically divided Senegal and Gambia, as the location of the type material, deposited in the NHM.

Endrödi (1977c, 1978) describes two Amazonian genera and one African, *Chiliphileurus* Endrödi, 1977 (monotypic), *Paraphileurus* Endrödi, 1978, and *Syrictoides* Endrödi, 1977. *Chiliphileurus* has a strongly flattened anterior tarsus, forehead with a cephalic horn, metatibia with a short spiniform process. *Paraphileurus* has triangularly pronounced prosternal process, simple external border of mandibles, posterior border of pronotum absent. *Syrictoides* which has strongly externally curved mandibles, pronotum without longitudinal midline and anterior tarsi of dilated anterior tarsi in males Endrödi, 1978.

From the works of Kolbe (1910) the classification of Neotropical Phileurini underwent some new combinations and synonyms at the genus level, such as *Amblyphileurus* Kolbe, *Periphileurus* Kolbe, *Amblyphileurus* Kolbe, *Anisophileurus* Kolbe, 1910, were synonymized with *Archophileurus* Kolbe (Endrödi 1977c), and the genus *Epiphileurus* Kolbe, was synonymized with *Hemiphileurus* Kolbe (Endrödi 1978).

Hemiphileurus is found in the Neotropical and Neartic regions (south-west of United States [Arizona, California, Nevada, New Mexico, Texas] and north of Mexico), this is the genus with the largest number of species in the tribe (60). *Archophileurus* has mandiblles with rounded or angulated external margin; frons with two horns or tubercles; and protibia with three teeth and apex of metatibia without teeth. *Hemiphileurus* frons with two horns or tubercles distant from the lateral margins of the head; and longitudinal midline of the pronotum extending from base to the central region (Endrödi, 1985b, Ratcliffe & Cave 2006).

Endrödi (1975b, 1985b) moved *Macrocyphonistes* Ohaus to Oryctini, present in the Ethiopian region, later Evans & Nel (1989) after observing another member of the Oryctini tribe, proposed its move to Phileurini, due to the main characteristics of the tribe: broad mentum, covering the basal segments of the labial palps and the galea dentition.

Dechambre (1995) synonymizes the species, of the monotypic genus, *Neosyrichthoschema popei* Ferreira with *Hemiphileurus illatus* (Leconte, 1854). This species is found only in the southwestern United States and northern Mexico, and a subspecies also occurs in Mexico. (Casey 1915, Endrödi 1985b).

Dupuis & Dechambre (2001) describe two species of a Neotropical new genus, *Allophileurinus* Dupuis & Dechambre, 2001, which has as main characteristics: the external border of the mandibles with two teeth; absence of a longitudinal midline in the pronotum; and apex of the metatibia with a projection in thorn shape.

Syrictoides tarsalis Endrödi, 1977 was synonymized by Harrison (2009b) with a monotypic genus described by Péringuey (1901), *Callistemonus intrusus* Péringuey, 1901, which is a member of Pentodontini, which was already present in the catalog of Krajcik (2005) in this tribe, for not presenting characters similar to those of Phileurini.

Dechambre (2008b) describes *Moraguesia* Dechambre, 2008 and *Phileucourtus* Dechambre, 2008, from Guyana and Peru, and two years later Ratcliffe & Cave (2010) describe *Caymania* Ratcliffe & Cave, 2010 from the Cayman Islands, all these genera monotypic, and can be found in Neotropical region. *Phileucourtus* has an internal tarsal claw with a strongly curved bifurcation in a ventral direction, and *Caymania* has a pronotum and elytra almost smooth, the punctures present in both structures are very superficial.

Moraguesia has as main characteristics: well-marked clypeofrontal carina; pronotum with moderate anterior depression; and propygidium without stridulatory área. *Phileucourtus* has

mandibles with acuminate apex; pronotum with longitudinal midline; and apex of meso and metatibia with an extended tooth. *Caymania* presents oblique frontoclypeal carina extending obliquely with interrupted median region; arched mandibles with acute apex; and meso and metatibia with two transverse carinae.

The last genus, described by Penco & Zubarán (2013), was *Argentophileurus* Penco & Zubarán, 2013, found in Argentina, province of Corrientes, the same was found among other specimens of the tribe while the authors were preparing another article, notably illustrating the real need to know the material that has not yet been analyzed by experts. This genus is characterized by rounded protibial teeth; densely punctate elytra; and apex of the metatibia with three rounded teeth.

Phileurini currently has few changes regarding its internal classification, the monotypic genus, *Moraguesia champenoisi* Dechambre, 2008 was transferred by Dupuis (2016c) to *Oxyligyrus champenoisi* (Dechambre, 2008), Pentodontini. After comparisons with the type of *Oxyligyrus peruanus* Endrödi, 1969 the author verified that the species described by Dechambre had similar characters such as truncated posterior tibiae; weak cavity in the superior border of the pronotum in males; and weak sexual dimorphism, in addition to dilated anterior tarsi.

Another monotypic genus, *Platyphileurus felscheanus* Ohaus, 1910, had a species previously belonging to Cyclocephalini, *Surutu jelineki* Endrödi, 1975, synonymized by Grossi *et al*. (2010) after observing several specimens from the South, Southeast and Northeast brazilian regions, and east of the state of Bahia. Later, after studies with larvae, pupae and adults compared with other tribes of Dynastinae, it was proposed to transfer it to Oryctini by Albertoni *et al*. (2014).

Some morphological characters of larva and pupa did not correspond to the same ones shared in Phileurini in the work cited above. Characters from the cephalic region of the larvae (sensilas and left mandible), positioning of bristles in pupae, in addition to the shape of the mentum in adults, established this change, the exclusion of *Platyphileurus* had already been proposed in the

thesis of Ide (1998), where verified that it did not present the synapomorphy present in the Phileurini genera of the Neotropical region, the gray literature mentioned here informs the real need for this genus to be studied to solve its tribal establishment.

The monotypic genus *Chiliphileurus* Endrödi, 1977, type species *Chiliphileurus tuberculatus* Endrödi, 1977, was recently synonymized with *Eophileurus cingalensis* Arrow, 1908, after similar characteristics were observed between the two species (Ratcliffe *et al*. 2021), thus evidencing the identification of error in the origin label.

Allsopp (2022a) proposed a name change in *Syrictes* Prell, 1936, after a review, was observed that the name of this genus already existed in another taxon, thus the new name for this genus was proposed, *Kirprellius* Allsopp, 2022. All species that belonged to the later name were taken to the new genus.

The Phileurini tribe has as its main characteristic, as already proposed in the key to the Dynastinae tribes by Burmeister (1847), later used by several authors, the broad mentum covering the first labial palpomere; clypeus usually acuminate, rarely truncated or rounded (Endrödi 1977e, Endrödi 1985b).

The Neotropical genera of the tribe have two synapomorphies, which are the excavated mentum at the base and striated elytra (Ide 1998, unpublished data). Afrotropical genera have features such as clypeus acuminate, more or less abruptly folded at the apex (Carne 1957b), broad mentum, not completely or nearly covering the oral cavity, external carina of the metatibiae, and metatibiae not transformed into spinous projections (Janssens 1942). On the other hand, the genus *Cryptodus*, subtribe Cryptodontina, has as its main characteristic the basal antennal scape, most often in a triangular shape, covering more or less completely the antennomeres of the funicle (Endrödi 1985b, Dupuis 2018b), differing from the other genera of the group for these

morphological characteristics, in addition to not having any tubercle on the head and the clypeus being extremely rounded.

Relevance of the study

There is no exist phylogeny for Phileurini through morphological characters, relating all genera of the tribe with others tribes belonging to Dynastinae. Consequently, there was no test of the monophyly of the tribe, nor subtribes, but Ide (1998, unpublished) obtained with his work two synapomorphies for the Neotropical Phileurini, which are the elytra presenting roughness, or with distinct striations, and the mentum with depression at the base, in addition to proposed the exclusion of a genus, *Platyphileurus* Ohaus, moved to Pentodontini.

Hypotheses

The genera present in Phileurini characterize monophyletic lineages, based on studies by Kolbe (1910), Janssens (1942), Carne (1957b), Endrödi (1977c, 1978, 1985b), Ide (1998, unpublished data), which point to morphological characters that can infer their monophyly.

General objective

- Test the monophyly of Phileurini, and among the species of its genus as well. We expected that: I) Phileurini is a monophyletic group; II) The subtribes Cryptodontina and Phileurina are placed in Phileurini.

Specific objectives

- Test the monophyly of the Phileurini tribe and the genera that comprise it, provide cladistic and classification hypotheses;

- make a new proposal for the organization of the group;

- describe new taxa;

- make a identification a key to Phileurini genera;

- review the characters that compose the tribe, relating it to the other tribes of Dynastinae.

Material and Methods

Museums and information about the collections

A total of 373 specimens were examined, in addition to type material, from various national, international and private collections. Of these, material from zoological collections and digital material from public collections of the museums listed below.

The acronyms of the respective collections will follow Evenhuis (2019), when they do not exist, they will be mentioned with the appropriate acronym, museum location and curator name..

CEMT (Coleção Zoológica da Universidade Federal de Mato Grosso), Cuiabá, Mato Grosso, Brazil (Fernando Z. Vaz-de-Mello);

CERPE (Coleção Entomológica da Universidade Federal Rural de Pernambuco), Recife, Pernambuco, Brazil (Paschoal C. Grossi);

CEUFPE (Coleção Entomológica da Universidade Federal de Pernambuco), Recife, Pernambuco, Brazil (Luciana Iannuzzi);

CHAFC (Council of Heads of Australian Faunal Collections), Australia (Matthew Shaw);

CMN (Canadian Museum of Nature), Ottawa, Ontario, Canada (François Génier);

CNC (Canadian National Collection of Insects, Arachnids and Nematodes) Ottawa, Ontario, Canada (Patrice Bouchard);

EPGC (Everardo and Paschoal Grossi Collection), Nova Friburgo, Rio de Janeiro, Brazil (Everardo J. Grossi);

IBSP (Coleção Entomológica Adolph Hempel, Instituto Biológico de São Paulo), São Paulo, São Paulo, Brazil (Sergio Ide);

IEXA (Colección Entomológica del Instituto de Ecología), Xalapa, Mexico (Daniel Reynoso Velasco);

INPA (Instituto Nacional de Pesquisas da Amazônia), Coleção Sistemática de Entomologia, Manaus, Brazil (A. Henriques);

ISAM (Iziko Museum of Capetown, previously SAMC - South African Museum of Coleoptera), Cape Town, South Africa, (Simon van Noort);

MLUH (Martin-Luther-Universität, Zoologisches Institut), Saale, Haale, Germany (Hendrick Müller);

MNHN (Muséum National d'Histoire Naturelle), Paris, France (Olivier Montreuil);

MNRJ (Museu Nacional da Universidade Federal do Rio de Janeiro), Rio de Janeiro, Rio de Janeiro, Brazil (Marcella L. Monné);

MZFS (Museu de Zoologia da Universidade Estadual de Feira de Santana), Feira de Santana, Bahia, Brazil (Freddy Bravo);

MZUSP (Museu de Zoologia da Universidade de São Paulo), São Paulo, Brazil (Sônia A. Casari);

NHM (Natural History Museum), London, United Kingdom, (Max Barclay);

MACN (Museo Argentino de Ciencias Naturales "Bernardino Rivadavia"), Buenos Aires, Argentina (Arturo Roig Alsina);

MCZH (Museum of Comparative Zoology Harvard), Cambridge, Massachusetts, USA (Brian D. Farrell);

NHM (Natural History Museum of Denmark at the University of Copenhagen), Copenhagen, Dinamarca (Alexey Solodonikov);

OZCAM (Online Zoological Collections of Australian Museums), North Terrace, Adelaide, Austrália;

USNM (Smithsonian National Museum of Natural History), Washington, USA (T. Erwin);

UNSM (University of Nebraska State Museum), Lincoln, NE, USA (Bret Ratcliffe);

ZMHB (Museum für Naturkunde der Humboldt Universität zu Berlin), Berlin, Germany (Johannes Frisch);

ZMUK (Zoologisches Museum Universität Kiel), Kiel, Germany (Michael Kuhlmann);

All material examined was identified from keys, and original descriptions, in addition to the following revisions: Endrödi 1985b, Dupuis & Dechambre 2001, Ratcliffe 2003b, Ratcliffe & Cave 2006, Yamaya & Muramoto 2008b, Dechambre 2008a, 2008b, Grossi & Grossi 2011, Perger & Grossi 2013, Neita-Moreno & Ratcliffe 2017b, Dupuis 2019.

To describe the material examined, in the transcription of the labels of the type material, the following pattern was used: quotation marks – “ beginning, and ” end of the information present in the label(s) of the examined specimen; / line change in the same label; \ back of the label; // label change on the examined specimen; [ ] additional information about the label. The type material will be accessed through loans from the respective curators, when possible, and through photos from the museums already listed above.

Dissection of specimens

Aspects of the external morphology and genitalia of adults were observed, in major part by males. The insects were placed in a recipient with water and detergent on a thermal plate, within a time determined by the state of conservation and ease of removing or moving their

appendages. Subsequently, the dissected parts, mouthparts, genitalia and hind wings that will be glued on cardboard and taken to a kiln at 40 ºC and pinned just below the specimen following a model adapted from Ohaus (1934a), the dissected specimens and their parts will be placed in tubes with 70% alcohol to preserve them. Specialized literature will also be used such as descriptions, redescriptions, reviews, and phylogenetic analyzes.

Images and editing

The images will be obtained with the aid of digital cameras (Nikon® D-90 and D-5300) with a 40 mm macro lens, coupled to a Zeiss 508 DOC stereomicroscope, with LED lighting and a computer with the freeware CombineZP (www.hadleyweb.pwp.blueyonder.co.uk), to stack the photos. The photos will be edited, and the images will be assembled using the freeware GIMP 2.0.

Specimen measurements

The measurements of the specimens were obtained through a digital caliper calibrated with a scale up to 0.01 mm. The distance between the apex of the clypeus and the apex of the elytra will be measured for maximum length; maximum elytra width between the outer edges of the elytra; interocular width, between compound eyes.

Elaboration of the characters

The characters were observed from the external morphology of adult individuals, where the male genitalia was also studied. Characters were also observed and compared in specimens through literature (Burmeister 1847, Kolbe 1910, Carne 1957b, Ferreira 1965b, Endrödi 1985, Dupuis & Dechambre 1998, Ide 1998 [unpublished]). Characters from adult male specimens were listed, which were used in the cladistic analysis.

Phylogeny

Characters construction

For the construction of the matrix, a survey of ordered characters in the type species and additional material of each genus of Phileurini, previously identified, described until the present moment, and also of the outgroup was carried out. These characters were observed according to the morphological similarity of the studied specimens, considering their homology, and with aid of specialized literature for each genus was also used (collection data with their distribution, descriptions, redescriptions, reviews, phylogenetic analysis, when available).

Characters codification and Terminology

The characters were constructed observing adult male and female specimens, when available, or in images according to Sereno (2007). The matrix was created after collecting the characters, with a numerical symbol being assigned in ascending order for their respective character states, being binary or multistate. For characters whose status could not be determined, they were represented by a hyphen (-); and those that could not be evaluated due to problems that some specimens may present, or even specimens that were evaluated by photos and/or specific literature, were determined as “missing data”, a question mark (?).

The terminology used are: Jameson 1990 (punctures measures, size and density of punctures, interocular width); Dupuis 2005 (for characters of female genitalia, when its possible to extract); Ratcliffe & Cave 2006 (length and width measures); Lawrence *et al*. 2011 for external morphology and male genitalia.

Outgroup

The subfamily Rutelinae and the other tribes of Dynastinae (Agaocephalini, Cyclocephalini, Dynastini, Hexodontini, Oryctini, Oryctoderini, and Pentodontini) were used for the outgroup, which is closer morphologically and phylogenetically, as seen and analyzed previously by Endrödi (1985b) and Gunter *et al*. (2016). This subfamily was used for rooting, because of the similarity of some characters as showed in Endrödi (1985b), there are other recent phylogenetic studies that shows Rutelinae as sister group of Dynastinae relations (Dietz *et al*. 2023).

Rutelinae

Rutela lineola (Linnaeus, 1767)

Dynastinae

For the Dynastinae seven tribes (Agaocephalini, Cyclocephalini, Dynastini, Hexodontini, Oryctini, Oryctoderini and Pentodontini), it was used the genus type of the tribe, when available, and other genera of the tribe but from another biogeographic region, when it is possible, to test the monophyly and relationship with the seven tribes (Table 2).

Ingroup

From the terminal taxa used in the cladistic analysis were all type species that compose the Phileurini tribe. Some genera used in phylogeny were collected data from literature and analysis through images (when available), when it was not possible to loan. From the genera utilized that there are more than 2 or two species, depending of the availability of loan or literature information, were used to test the monophyly of all genera included (Table 2).

Tools for analysis and editing

The matrix was made using the program Asado (WinClada version 1.89) after observe the morphology of the specimens used in this work, carrying out the survey of characters and the codification of the states of character.

The program TNT version 1.5 (Goloboff *et al*. 2008) was used with the tradicional search to find the most parsimonious trees, with 100 replication and 1000 trees to save per replication for automatic weight, and implied weights (k = 1, 3, 5, and 10) to test which k have the minor number of trees and which is most parcimonious, and with calculated weight with the script K_automatico.run (Goloboff *et al*. 2008a), after this was searched the consensus tree, Jack Knife and Bremer supports (Bremer 1994) for node supports for all cases. Bremer supports were calculated with these parameters: with support bellow to 10, relative supports, TBR with retain trees suboptimal by 10, and relative fit difference 1, and Jack knife was calculated with support bellow to 10, combine supports emulating Jack Knife with P(del) 36, TBR with retain trees suboptimal by 10, and relative fit difference 1. Synapomorphies are represented in cladograms by full circles (black), and apomorphies by empty circles (white).

Branch support

The most parsimonious tree was obtained so that the characters are evaluated through the retention index (RI) and consistency index (CI) (Goloboff 1993) in Asado.

For the support of the clades, the Bremer support or decay index was used, where the higher the index, the greater the support of the characters for that clade (Bremer 1994).

Results and Discussion

Tribe Phileurini

Phileurini. LeConte & Horn 1883: 260-261 (commentary, description); Ohaus 1990: 215 (biology); Arrow 1937b: 79-93 (catalogue).

Phileuridae. Burmeister 1847: 138 (commentary).

Phileurides. Lacordaire 1856: 391, 454-455 (commentary, key to genera).

Phileurinae. Bates 1888: 338 (commentary); Kolbe 1910: 333-336 (description, key to genera).

Characters construction

Four characters were used for the body, 29 characters related to the head of them 9 characters were related to the mouthparts, 5 characters related to the antennae; 18 characters for prothorax and 14 for pterothorax, from the total were used 17 characters for the legs, 16 characters to the pronotum (dorsal and ventral); 11 characters for abdomen, 9 characters related to the elytra; and 6 were observed and utilized for the male genitalia. In the matrix construction it was utilized 85 binaries, 8 multistate, and 124 were missing, some characters are particionated.

BODY

0. Body, sexual dimorphism: (0) not distinct, (1) distinct (Figs. 1D-G) (L = 4, CI = 25, RI = 62);

This character has been considerated as sexual dimorphism the difference between the head and pronotum armature (horns or tubercles) of males and females.

1. Body, tegument color: (0) uniform (Figs. 1F), (1) variable (Figs. 1D) (L = 5, CI = 20, RI = 55);

The color of the tegument is uniform, thorax and abdomen with the same color without variation (1), and thorax and abdomen can be in different colours (2).

2. Body, shape: (0) wider than longer (Fig. 1A), (1) longer than wider (Fig. 1D-G) (L = 1, CI = 100, RI = 100);

3. Body, convexity: (0) flattened (Fig. 1B), (1) convex (Fig. 1C) (L = 7, CI = 14, RI = 53);

The body flattened is when the dorsal surface is linear comparing the pronotum and elytra, and convex when they are curved and the pronotum is not aligned with elytra.

HEAD

4. Clypeus, horn: (0) absent (Fig. 2A), (1) present (Fig. 2B-C) (L = 7, CI = 14, RI = 80);

5. Clypeus, origin, clypeal horn: (0) apex (Fig. 2C), (1) disc (Fig. 3D) (L = 1, CI = 100, RI = 100);

6. Clypeus, horn, view from lateral: (0) not extending toward the body (Fig. 2C), (1) extending toward the body (L = 2, CI = 50, RI = 0);

7. Clypeus, shape: (0) triangular (Fig. 2A), (1) variable (Fig. 2C-D) (rounded, parabolic, trapezoidal, etc) (L = 3, CI = 33, RI = 91);

8. Clypeus, apex: (0) acute (Fig. 2F), (1) notched (Fig. 2A) (L = 4, CI = 25, RI = 66);

9. Clypeus, punctures: (0) smooth (Fig. 2F), (1) punctate (Fig. 2A-B) (L = 3, CI = 33, RI = 33);

10. Clypeus, punctures shape: (0) point (Fig. 1G), (1) circular (Fig. 3A), (2) striate (Fig. 2A) (L = 23, CI = 8, RI = 36);

11. Clypeus, clypeal carena: (0) absent (Fig. 2C), (1) present (Fig. 2B) (L = 8, CI = 12, RI = 73);

This carena come from the clypeal horn and reaches the frontal horns.

12. Clypeus, frontoclypeal suture: (0) absent (Fig. 2C), (1) present (Fig. 3A,E) (L = 13, CI = 7, RI = 58);

The frontoclypeal suture that delimitate the position of the horn and its position.

13. Clypeus, frontoclypeal horn: (0) absent (Figs. 3A), (1) present (Figs. 2A-F) (L = 5, CI = 20, RI = 60);

14. Frons, number of horns: (0) one (Fig. 3A), (1) more than one (Figs. 2A-F) (L = 6, CI = 16, RI = 77);

15. Frons, horns position: (0) central (Fig. 3D), (1) lateral (Fig. 3E), (2) marginal (Fig. 2B) (L = 7, CI = 28, RI = 85);

Here the horns have the position in the middle for central position, lateral for those that are not in the marginal area, and marginal for those that are in the distal margins of the frons.

16. Frons, surface: (0) flattened (Fig. 3A), (1) concave (Fig. 1B) (L = 11, CI = 9, RI = 74);

17. Frons, sculpturation: (0) puncate (Fig. 2A), (1) striate (Fig. 3C,F) (L = 19, CI = 10, RI = 52);

18. Labrum, anteriorly: (0) visible (Fig. 2G), (1) not visible (Fig. 2H) (L = 7, CI = 14, RI = 45);

When the labium can be observed with the insect in frontal view (0), not covered by clypeus.

19. Oculars canthus, development: (0) not developed (Fig. 3E), (1) developed (Fig. 3B) (L = 7, CI = 14, RI = 33);

When ocular canthus don't reach the mid of the compose eyes is considered not developed, when reach is considered developed.

20. Mentum, base of labial palps: (0) visible (Fig. 3H-I), (1) concealed by the sides of mentum (Fig. 3H-I) (L = 1, CI = 100, RI = 100);

This is the sinapomorphy of the Phileurini, according to Burmeister (1847), the base of labial palpi are covered by the sides of mentum.

21. Mentum, shape: (0) anteriorly convergent to apex (Fig. 3G-H), (1) anterior divergent to apex (Fig. 3I) (L = 11, CI = 9, RI = 44);

The character state (0) has rounded sides and a narrow apex; while (1) decreases in size as approaches the base.

22. Mentum, apex, emargination: (0) absent (Fig. 3H-I), (1) present (Fig. 3G) (L = 11, CI = 9, RI = 33);

23. Mentum, excavation: (0) absent (Fig. 3I), (1) present (Fig. 3G) (L = 8, CI = 12 RI = 41);

24. Mentum, relation width/length: (0) wider than longer or subequal (Fig. 3I), (1) longer than wider (Fig. 3 G-H) (L = 5, CI = 20, RI = 63);

25. Mandible, external teeth: (0) absent (Fig. 3F), (1) present (Fig. 4A-C) (L = 8, CI = 12, RI = 72);

26. Mandible, number of external teeth: (0) one (Fig. 4A), (1) two (Fig. 4B), (2) three (Fig. 4C) (L = 4, CI = 50, RI = 77);

27. Mandibles, dorsal view: (0) covered by clypeus (Fig. 3C), (1) not covered by clypeus (Fig. 4A-C) (L = 12, CI = 8, RI = 63);

28. Antennae, club shape: (0) antennomers 8-10 decreasing to apex (Fig. 3H), (1) antennomers 8-10 with same size (L = 3, CI = 33, RI = 0);

29. Antennae, scape shape: (0) claviform (Fig. 4D), (1) not claviform (Fig. 4E) (L = 6, CI = 16, RI = 50);

The shape not claviform are that different, for example the scape in *Cryptodus* or *Cnemidophileurus* (Fig.).

30. Antennae, scape apex, (0) expanded (Fig. 4D), (1) laminar (Fig. 4E) (L = 4, CI = 25, RI = 40);

31. Antennae, pedicel ventral insertion: (0) not visible (Fig. 3I), (1) visible (Fig. 3H) (L = 1, CI = 100, RI = 100);

32. Antennae, size of antennal club compared to segments II-VII: (0) shorter or subequal, (1) longer (L = 3, CI = 33, RI = 33);

PROTHORAX

33. Pronotum, large projection in the mid region: (0) absent (Fig. 1F-G), (1) present (Fig. 1D) (L = 3, CI = 33, RI = 33);

The projection is longer than the length of pronotum.

34. Pronotum, longitudinal furrow: (0) absent (Fig. 4F), (1) present (Fig. 4G) (L = 9, CI = 11, RI = 78);

35. Pronotum, width of longitudinal furrow: (0) narrow (Fig. 1F), (1) large (Fig. 4G) (L = 9, CI = 11, RI = 52);

36. Pronotum, depth of longitudinal furrow: (0) superficial (Fig. 1G), (1) deep (Fig. 4G) (L = 8, CI = 12, RI = 65);

37. Pronotum, disc, setae: (0) absent (Fig. 1F), (1) present (Fig. 5A) (L = 6, CI = 16, RI = 16);

38. Pronotum, tubercles: (0) absent (Fig. 1F), (1) present (Fig. 5B-E) (L = 14, CI = 7, RI = 58);

39. Pronotum, number of tubercles (or process): (0) one (Fig. 5B), (1), more than one (two, three, four) (Fig. 5B-E) (L = 6, CI = 16, RI = 66);

40. Pronotum, tubercles position: (0) near apical border (Fig. 5C), (1) not at apical border (Fig. 5D-E) (L = 5, CI = 20, RI = 73);

41. Pronotum, sides, foveae: (0) absent (Fig. 1F), (1) present (Fig. 5F) (L = 9, CI = 11, RI = 55);

42. Pronotum, lateral carinae: (0) absents (Fig. 5F-G), (1) presents (Fig. 5E) (L = 3, CI = 33, RI = 66);

43. Pronotum, posterior angles: (0) angulated (Fig. 4F), (1) rounded (Fig. 5A,C) (L = 17, CI = 5, RI = 54);

44. Pronotum, longitudinal midline: (0) absent (Fig. 5A), (1) present (Fig. 5F) (L = 17, CI = 5, RI = 44);

45. Pronotum, longitudinal midline: (0) incomplete (Fig. 5D), (1) complete (Fig. 5F) (Fig. 5F) (L = 2, CI = 50, RI = 50);

46. Pronotum, concavity or median chanfer: (0) absent (Fig. 1D-G), (1) present (Fig. 5D-E) (L = 8, CI = 12, RI = 70);

47. Pronotum, sculpturation: (0) rounded (Fig. 5G), (1) striated (Fig. 5E) (L = 12, CI = 8, RI = 50);

48. Pronotum, borders: (0) incomplete [usually at the base] (Fig. 5E, G), (1) complete (Fig. 4G) (L = 14, CI = 7, RI = 55);

49. Prosternal process, size related to procoxae: (0) not reaching the profemur, (1) reaching the profemur (L = 17, CI = 5, RI = 54);

50. Discrimen, (0) absent, (1) present (L = 3, CI = 33, RI = 0);

PTEROTHORAX

51. Scutellar shield, density of punctures: (0) smooth, (1) punctate (L = 5, CI = 20, RI = 0);

52. Scutellar shield, shape: (0) subtriangular, (1) subpentagonal (L = 17, CI = 5, RI = 54);

53. Scutellar shield, relation length/width: (0) longer than wider, (1) subequal, (2) wider than longer (L = 13, CI = 15, RI = 8);

It was designated longer than wider when the length was greater than the width; subequal when the two measures were similar; and wider when the width was greater than the length.

54. Ventrite VI: (0) same size as visible ventrites III, IV or V (Fig. 5H); (1) visible longer than ventrites as III, IV or V (Fig. 5I) (L = 16, CI = 6, RI = 28);

55. Metaepisternum, small sclerotinized apical projection: (0) absent (Fig. 6A), (1) present (Fig. 6B) (L = 5, CI = 20, RI = 78);

56. Elytra, length: (0) wider than longer or subequal (Fig. 1A), (1) longer than wider (Fig. 1D-G) (L = 1, CI = 100, RI = 100);

57. Elytra, striae: (0) absent (Fig. 6C), (1) present (Fig. 1F-G) (L = 6, CI = 16, RI = 50);

58. Elytra, number of striae: (0) less than five (Fig. 1D-E), (1) five, more than five (Fig. 1F-G) (L = 3, CI = 33, RI = 81);

59. Elytra, striae: (0) superficials (Fig. 1D-E), (1) not superficials (Fig. 1F-G) (L = 11, CI = 9, RI = 75);

The not superficial striae are those that are higher than elytra surface.

60. Elytra, punctures: (0) misaligned, (1) aligned (Fig. 1F) (L = 10, CI = 10, RI = 40);

61. Elytra, punctures, arrangement: (0) not coalescent, (1) coalescent (L = 12, CI = 8, RI = 31);

62. Elytra, borders: (0) covering the tergite VII (Fig. 1D-G), (1) not covering (Fig. 1A) (L = 13, CI = 7, RI = 40);

63. Elytra, punctures shape: (0) punctate (Fig. 1F-G), (1) variable (rounded, ocellated, oval, striated) (L = 5, CI = 20, RI = 55);

64. Elytra, setae: (0) absent, (1) present (L = 5, CI = 20, RI = 42);

ABDOMEN

65. Tergite VII, stridulatory apparatus: (0) one row, (1) two rows (L = 1, CI = 100, RI = 100);

66. Tergite VIII, punctures: (0) smooth, (1) not superficial, (2) deep (L = 3, CI = 33, RI = 33);

67. Tergite VIII, punctures, deepth: (0) superficial, (1) deep (L = 9, CI = 11, RI = 38);

68. Tergite VIII, sulcus, base: (0) absent, (1) present (L = 6, CI = 16, RI = 44);

69. Tergite VIII, setae: (0) absent, (1) present (L = 8, CI = 12, RI = 30);

LEGS

70. Protibia, shape: (0) longitudinal, (1) transversal (L = 5, CI = 20, RI = 20);

71. Protibia, teeth: (0) two, (1) three, (2) four (L = 7, CI = 28, RI = 76);

72. Protibia, distance between teeth (0) subequal or equal, (1) different (L = 16, CI = 6, RI = 61);

The distance measured from apical tooth to medial tooth, and the distance of the medial tooth and basal tooth, the state different it is used when the distance can be shorter or longer.

73. Protarsomeres I-VI, width/length: (0) short, (1) subequal, (2) long (L = 11, CI = 18, RI = 40);

For the tarsomere length were considereted (0) for short and wide tarsomeres, (1) for equal length and width, and (2) for long and narrow tarsomeres.

74. Protibia, protibial claw: (0) elongated, (1) not elongated or not small , (2) small (L = 16, CI = 12, RI = 54);

It was used the (0) for claws longer than the tarsomere V (near claw), (1) equal or subequal measure, and (2) for claws shorter than tarsomere V.

75. Legs, inner protibial claw: (0) not dilated, (1) dilated (L = 7, CI = 14, RI = 72);

76. Protibia, apex intern claw bifid: (0) absent, (1) present (L = 8, CI = 12, RI = 61);

77. Protibia, spur: (0) not reaching, (1) reaching second tarsomere (L = 15, CI = 6, RI = 50);

78. Protibia, dorsal, carena: (0) absent, (1) present (L = 4, CI = 25, RI = 0);

79. Protibia, dorsal, number of carena: (0) one, (1) two (L = 15, CI = 6, RI = 36);

80. Profemur sulcus (ventral view): (0) absent, (1) present (L = 8, CI = 12, RI = 50);

81. Metatibia, spur on first metatarsomere: (0) absent (Fig. 6C), (1) present (Fig. 6D) (L = 12, CI = 8, RI = 52);

82. Metatibia, apex: (0) truncate (Fig. 6D), (1) toothed (Fig. 6C) (L = 16, CI = 6, RI = 51);

83. Metatibia, number of teeth: (0) one, (1) two, (2) more than one (L = 11, CI = 18, RI = 75);

84. Metatibia, first metatarsomere, row of setae: (0) absent (Fig. 6C), (1) present (Fig. 6D) (L = 7, CI = 14, RI = 33);

85. Meso e metatibia, carena: (0) without spine-like projections (Fig. 6C), (1) with spine-like projections (L = 12, CI = 8, RI = 62);

86. Meso e metatibiae carinae (ventral): (0) absent, (1) present (L = 11, CI = 9, RI = 65);

AEDEAGUS

87. Aedeagus, parameres, symmetry: (0) asymmetric (Fig. 6F), (1) symmetric (Fig. 6E) (L = 7, CI = 14, RI = 40);

This characteristic was tested in the same parameters observed by Breeschoten *et al*. (2013), observed in several groups, reviewed by Huber *et al*. (2007). Some genera of Phileurini have asymmetrical aedeagus.

88. Aedeagus, parameres: (0) non-overlapping (Fig. 6E), (1) overlapping (Fig. 6F) (L = 10, CI = 10, RI = 25);

89. Aedeagus, parameres length in comparison to falobasis: (0) short or subequal, (1) elongated (L = 17, CI = 5, RI = 55);

Were used for (0) parameres with the same or shorter than falobasis, and (1) for parameres longer than the phalobase.

90. Aedeagus, paramere seate: (0) absent (Fig. 6E,G), (1) present (Fig. 6F,H) (L = 6, CI = 16, RI = 16);

91. Aedeagus, shape of parameres in caudal view: (0) straight, (1) curved (L = 23, CI = 4, RI = 31);

92. Aedeagus, paramere lateral view: (0) right (Fig. 6G), (1) curved (Fig. 6H) (L = 2, CI = 50, RI = 50);

Were elaborated 93 characters for the cladistics analysis, observed from 81 different taxa from all tribes of Dynastinae and rooted in Rutelinae. From the heuristic analysis using no weights, implied weights and k calculate, it was chosen the most parsimonious tree and with lowest number of steps, resulted by 1 parsimonious cladograms, with 776 steps length (ci= 0,13; ri= 0,57). With the k calculated (k=12.392578), the cladistics analysis have generated 1 tree.

The consensus tree calculated in TNT have in the cladogram one branch that can be observed near the root with the seven tribes of Dynastinae utilized as intern group. The cladogram obtained of the k calculated shows a little similarity with Endrödi (1966), recovering the monophily of some tribes as Agaocephalini, Cyclocephalini, Dynastini, and Hexodontini. Oryctini, Oryctoderini, and Pentodontini were recovered as paraphyletic. Meanwhile Dynastini clade have *Augossoma centaurus* recovered as Dynastini, this species have a new proposal in a paper with chromosome and DNA analyses by Dutrillaux *et al*. (2022) as a Oryctini member, but they proposed a larger genetic analyses to verify the relationships between Dynastini and Oryctini.

The genus *Platyphileurus* here has not recovered its position in Oryctini as Ide (1998, unpublished data) and Albertoni *et al*. (2014) have purposed or in another tribe, so we put the genera in Pentodontini, therefore a phylogeny covering the main neotropical genera of Oryctini and Pentodontini is necessary to clearly elucidate its position among the tribes of Dynastinae.

The tribe Phileurini that was recovered as monophyletic with the main character supported by the synapomorphy: mentum covering the basis of labial palpi (Endrödi 1985b). Another two characters that are synapomorphy for Phileurini: pronotum with longitudinal midline, and metaepisternum with a small sclerotinized apical projection. The two subtribe has been recovered here, Cryptodontina now have also two genera with *Cryptodus* MacLeay, 1819, *Actinobolus* Westwood, 1841, and *Cnemidophileurus* Kolbe, 1910; and Phileurina with all other genera that compose the tribe.

This clade of Cryptodontina, ((*Cnemidophileurus* + (*Cryptodus*)) + (*Actinobolus*)), is formed by five apomorphies: (21:0) mentum diverging to apex; (24:0) mentum larger than longer; (29:1) antennal scape not claviform; (49:0) prosternal process not reaching the procoxae; and (59:1) elytral striae not superficial. From this, one subclade with *Cnemidophileurus* and *Cryptodus* have one synapomorphy recovered for the genera, and three apomorphies, respectively: (30:1) antennal scape laminar; (62:1) elytra setose; and (86:0) meso and metatibiae without carinae on ventral view.

The genus *Actinobolus* was recovered as a monophyletic clade, from the three species used for cladistic analyses, the genus have obtained as results three apomorphies: (10:2) clypeus with striate tubercles; lobed clypeus; clypeus without tubercles; frons without depression; frons without tubercles; (13:0) frontoclypeal carina without horns or tubercles; and (71:2) protibiae with 4 teeth. The species described in the genus *Actinobolus* are commom to have species with two tubercles in the apex of pronotum but they can be absent as occurs with *Actinobolus alvarengai* and *Actinobolus suskyi*.

Cryptodus has been recovered as monophyletic genus with the combination of these characters: (3:0) flattened body; (10:1) clypeus with rounded punctures; (22:0, 23:0) apex of

mentum not emarginated and not excavated; (43:0) acute posterior angles of pronotum; and (55:0) metaepisternum with small sclerotinized apical projection.

Cnemidophileurus, the monotypic south American Phileurini that presents nine apomorphies, supporting well the genus: (19:0) not developed canthus ocular; (41:1) pronotum with fovea; (48:0) incomplete border of pronotum; (61:1) variable elytral punctures; (69:0) tergite VIII without setae; (73:1) protarsomeres subequal length/width; (78:0) protibia without dorsal carina; (83) metatibia with one apical tooth; and (84:0) first metatarsomere without row of setae.

The clade of Phileurina is based in one synapomorphy and two apomorphies, these characters, recovered by the cladistics analysis: (7:0) clypeus triangular shape; (52:1) scutellar shield subpentagonal shape; and (72:0) protibia with equal distance between teeth.

The first subclade of Phileurina is formed by the genera: *Metaphileurus*, *Microphileurus*, *Mictophileurus*, *Argentophileurus*, *Amblyoproctus*, *Paraphileurus*, *Palaeophileurus*, *Syrichthoschema*, *Phileucourtus*, *Hemiphileurus*, *Phileurus*, *Archophileurus*, *Planophileurus*, *Allophileurhinus*, and *Caymania*. (*Caymania* + ((*Allophileurhinus*) + ((*Planophileurus* + (*Archophileurus*)) + (((*Phileurus*) + (*Hemiphileurus*)) + ((*Phileucourtus* + ((*Syrichthoschema*) + (*Palaeophileurus*))) + (*Amblyoproctus* + (*Paraphileurus* + (*Argentophileurus*))) + (*Mictophileurus* + (*Mictophileurus* + ((*Microphileurus*) + (*Metaphileurus*))))))))).

The genus *Metaphileurus* was recovered as monophyletic with two apomorphies: (3:0) flattened body; and (85:1) meso and metatibia with spine-like projections. This genus have two more species described by Medeiros & Grossi. *Microphileurus*, a monophyletic genus, well supported with seven apomorphies: (53:0) scutellar shield longer than wider; (54:0) Ventrite VI with same size of anteriors; (73:1) protarsomeres subequals length/width; (75:1) protibiae dilated; (82:0) apex of metatibiae truncate; and (86:1) meso and metatibiae with carinae in ventral view.

Mictophileurus, the monotypic genus was recovered as monophyletic with these characteristcs: (10:1) clypeus with rounded punctures; (35:0) pronotum with longitudinal furrow narrow; (42:1) pronotum with lateral carina; and (77:1) protibiae with spur reaching the apex of the second tarsomere. This genus make a clade with *Microphileurus* and *Metaphileurus*, with three apomorphies: (27:1) mandibulae not covered by clypeus; (41:1) pronotum with lateral foveae; and (83:2) apex of metatibiae with more than two teeth.

Argentophileurus is found only on Argentina, it is a monotypic genus, and have as result seven apomorphies that support well its monophyly. The apomorphies are: (4:0) clypeus without horn; (7:1) clypeus not triangular; (8:1) notched apex of clypeus; (29:1) antennae scape not claviform; (43:0) pronotum with acute posterior angles; (72:1) protibiae with different distance between teeth; and (77:1) protibial spur not reaching the apex of the second tarsomere. *Microphileurus*, *Argentophileurus*, and *Metaphileurus* have a small length of the body. All of them are found in neotropical region, *Metaphileurus* and *Microphileurus* are found in the southeast and south of Brazil.

Amblyoproctus have recovered as paraphyletic genus with these apomorphies: (4:0) clypeal horn absent; (10:1) clypeus with rounded punctures; (37:1, 62:1) pronotum and elytra setose; (91:0) and aedeagus with parallels parameres. The sister genera of *Amblyoproctus* is *Paraphileurus* recovered with 13 apomorphies: (11:0) clypeal carinae absent; (22:0) apex of mentum without emargination; (24:0) mentum wider than longer; (30:1) antennal scape not expanded; (40:1) pronotum without tubercle near apical border; (47:1) pronotum with elongate punctures; (49:1) prosternal process reaching the procoxae; (51:0) scutellar shield smooth; (53:1) scutellar shield with subequal length:width; (54:0) ventrite VI with the same size of anteriors; (74:1) protibia with no short and no elongate claws; (79:0) protibia without carina; and (85:1) meso and metatibiae with spine-like projections.

Palaeophileurus is monophyletic, recovered with seven apomorphies: (34:0) pronotum without longitudinal sulcus; (43:0) pronotum posterior angles acute; (47:1) pronotum with longitudinal midline; (48:0) pronotum with incomplete borders; (81:0) metatibiae without spur in first metatarsomere; and (83:0) aedeagus with elongate parameres.

Syrichthoschema is a African genus with three species, the last described species was *Syrichthoschema vingerhoedti* Bouyer, 2014. Bouyer (2014) have wrote about the biology of the species, can be found in forests living in association with bees. This genus have recovered its monophyly with four apomorphies: (21:1) mentum diverging to apex; (59:0) superficial elytral striae; (87:0) aedeagus with asymmetric parameres; and (88:1) aedeagus with overlapping parameres.

Phileucortus is a monotypic genus that has recovered its monophyly with these apomorphies: (3:0) flattened body; (12:0) absent frontoclypeal carina; (41:1) pronotum with lateral foveae; (75:1) protibia with intern claw dilated; (76:1) protibiae with bifid intern claw; (79:0) prontibiae with one dorsal carina; and (81:0) metatibiae first metatarsomere without spur. All these genera have one apomorphy: meso and metatibiae without carina in ventral view, with exception of the genus *Microphileurus*.

Hemiphileurus was recovered as a monophyletic genus, having support of two apomorphies: (48:0) pronotum borders incomplete; and (61:1) elytra punctures variable shape. This is the first genus in number of species and it is required a revision with all species described to better differentiate them, the last one was made by Endrödi (1978, 1985b) furthermore it has a distribution that goes from south of EUA, and can be found in major countries of Central America and South America.

Phileurus was recovered in the results of the cladistics analysis as monophyletic with six apomorphies: (10:2) clypeus with striate punctures; (12:0) frontoclypeal carina absent; (18:0)

labrum not visible anteriorly; (38:1) pronotum with tubercles; (43:0) pronotum with posterior angles acute; and (71:2) protibia with four teeth. This genera have a large number of species, and have to be studied in the future with a genus revision with all species observing the morphological characters that compose the genera, some are easily separated with a key for the genera, but others are quite similar and have to be dissected for make the differences more easily to observe. In *Phileurus* we have two groups, one with three teeth on protibiae and other with four teeth, but they can be more easily separated with morphological keys for their identification.

Archophileurus has been recovered as monophyletic in the cladistics analysis with two apomorphy: (16:0) frons with flattened surface; and (82:0) apex of metatibiae truncate. This genera is the third in number of species (32), and some of them have different characters in the claws of protarse, presence or absence of longitudinal midline; difference in the frontal horns, some have one suture with both horns of frons fused, and others have mid size rounded or conic horns. A revision of the genus with all species can be made for designate the taxonomic range of its characters, clarifying the classification of the species and genera, once in Kolbe (1910) they are classified in four different genera based on morphology of the mouthpieces, pronotum and elytra.

Planophileurus is a monotypic genus, the results of the cladistics analysis put the genus near *Archophileurus*. These genera have three apomorphies: (48:0) pronotum with incomplete borders; (53:1) scutellar shield subequal in length/width; and (90:1) aedeagus with setae. *Planophileurus* and *Archophileurus* are very much similar with the genus *Hemiphileurus* as Chapin (1932b) has wrote in the description of this genera.

Allophileurhinus has been compared with *Palaeophileurus* and *Paraphileurus* by Dupuis & Dechambre (2001), and few specimens of this genera are known. *Allophileurhinus* has been recovered its monophyly with four apomorphy: (25:1) mandibulae with external teeth; (27:1) mandibulae with two teeth; (86:0) meso and metatibiae without carinae in ventral view; and (89:1)

aedeagus with elongate parameres. Caymania, monotypic genus, has been recovered as sister genera of *Allophileurhinus*, with these main characteristcs: (44:0) pronotum without longitudinal midline; (63:0) elytral calli indistinct; (79:0) protibiae with one carina; and (88:1) aedeagus with parameres overlapping.

The second subclade of Phileurina is formed by the genera: *Syrichthodonthus*, *Pseudosyrichthus*, *Syrichthomorphus*, *Prosphileurus*, *Archophanes*, *Homophileurus*, *Ceratophileurus*, *Trioplus*, Goniophileurus, *Amblyodus*, *Oryctophileurus*, *Haplophileurus*, *Rhizoplatys*, *Hovophileurus*, Eophileurus, *Rhizoplatodes*, *Macrocyphonistes*, and *Kirprellius*.

((((*Kirprellius*) + ((*Rhizoplatodes*) + *Macrocyphonistes*)) + (*Eophileurus*)))) + ((*Hovophileurus*) + ((*Rhizoplatys*) + ((*Haplophileurus*) + (((*Oryctophileurus*) + (*Amblyodus*)) + ((*Goniophileurus* + *Trioplus*) + (((*Homophileurus*) + (*Ceratophileurus*)) + (*Archophanes* + (*Prosphileurus* + (*Syrichthomorphus* + ((*Syrichthodonthus*) + *Pseudosyrichthus*)))))))))))

Péringuey (1901) have described two genera *Syrichthodonthus*, *Pseudosyrichthus*, and *Syrichthomorphus*, all these in the same characteristics, labial palpi inserted in inner part of mentum, as all Phileurini genera have, and he have scribed too that all of them have intermediate and posterior tibiae non-digate at apex, meso and metatibia with two lateral carinae, and males with inner claws not thickened; and these characteristics are confirmed in Endrödi (1985b), also with apex of metatibiae truncate and propygidium with two stridulatory bands, differing only in the number of teeth in protibiae. The results of the cladistics analysis put the genera *Syrichthodonthus* and *Pseudosyrichthus* in the same branch, both genera have two apomorphies: (15:0) frontoclypeal carina with one horn; and (54:1) ventrite VI longer than anteriors. All of these confirm that both genera are the same, with *Syrichthodonthus* being described first by the author, with the results *Pseudosyrichthus* is proposed to be synonym junior of *Syrichthodonthus*, with this the genus have now six species described, and their new combination are: *Syrichthodonthus clathratus*

(Gerstaecker, 1867); *Syrichthodontus cribratus* (Boheman, 1857); *Syrichthodonthus gerstaeckeri* (Prell, 1934); *Syrichthodontus lydenburgi* Endrödi, 1977; *Syrichthodonthus senegalensis* (Castelnau, 1840); *Syrichthodontus spurius* (Burmeister, 1847).

Syrichthomorphus termitophilus has been recovered as monophyletic with six apomorphies: (21:1) mentum diverging to apex; (37:1) pronotum with setae; (55:0) metaepisternum with small sclerotinized apical projection; (59:1) elytral striae not superficial; (64:0) tergite VII with stridulatory apparatus; and (72:1) protibiae with equal distance between teeth.

The monotypic genus *Prosphileurus liberianus* was recovered as monophyletic with two synapomorphies: (13:0) frontoclypeal carena without horns, and (48:1) pronotum completely bordered. This genus have as sister genera *Archophanes cratericollis*, this genus has been recovered as monophyletic with six apomorphies: (18:0) labrum visible anteriorly; (22:0) mentum not emarginated; (28:1) antennae with antennomeres 8-10 with the same size compared with the club; (60:0) elytra with punctures misaligned; (61:1) elytra with variable punctures; and (72:1) protibiae with equal distance between teeth.

Homophileurus clade have only two apomorphies, and put the genus *Ceratophileurus* together with *Homophileurus*: (11:1) clypeal carina present; and (36:0) pronotum with longitudinal furrow superficial. These two genera are quite similar in very charaters in the cladistics analysis, only differing in the size of the clypeal horns, we here propose the species *Ceratophileurus lemoulti* Ohaus as synonym junior of *Homophileurus*, and the new combination results on *Homophileurus lemoulti* (Ohaus, 1911), the genera have now 11 species decribed for the Mexico, Central America, West Indies and South America.

Trioplus, monotypic genus, have recovered its monophyly with nine apomorphies, among its main characters the unique genera of Phileurini with emarginated clypeus, as *Argentophileurus* too; have three teeth in madibulae like *Amblyodus* and *Oryctophileurus*; four tubercles in the

pronotum and different distance between teeth of protibiae. The apomorphies follows: (8:1) clypeus with notched apex; (12:1) frontoclypeal carina present; (15:1) frontoclypeal carinae horns in the larerals; (19:0) ocular canthus undeveloped; (53:1) scutellar shield with subequal length/width; (66:0) tergite VIII without punctures; (68:1) tergite VIII base with sulcus; (69:0) tergite VIII setose; and (79:0) protibiae with two carina in dorsal view.

Goniophileurus is a monotypic genus as *Trioplus*, and have recovered its monophyly by the follow characteristcs: (10:0) clypeus with dotted punctures; (35:0) pronotum with longitudinal sulcus narrow; (38:0, 41:0) pronotum without tubercles, and without lateral foveae; and (48:1) pronotum completely bordered. These two genera are together as sister genera by characters as the number of teeth in protibiae; distance between teeth of protibiae; shape of protibial claws; and the shape of the aedeagus parameres in lateral view.The subclade that have *Amblyodus* and *Oryctophileurus* as syster genera has been recovered with three apomorphies:.

Amblyodus and *Oryctophileurus* are put together in the results of the cladistics analysis, elucidade Grossi & Grossi (2011), and Perger & Grossi (2013), the review and description of the new species for both genera brings the shared characters to show their similarity. *Amblyodus* and *Oryctophileurus* have some characters that put them in the same clade like absence of sexual dimorfism; big frontal horn; lateral pronotal carina; incomplete border of pronotum; shape of prosternal process; and shape of parameres as Grossi and Grossi (2011) have inferred, and Kolbe (1910) have put them in the same group “Trihoplini” differing only in the number of frontal horns. The distribution of both genera is from Mexico to Peru, being found in the brazilian Amazon biome region.

Here we propose the synonym of the genus *Oryctophileurus* with *Amblyodus*, *Oryctophileurus* now is synonym junior of *Amblyodus*, and the genus have now six species: *Amblyodus armicollis* (Prell, 1911); *Amblyodus castroi* Grossi & Grossi, 2011; *Amblyodus guerrai*

(Perger & Grossi, 2013); *Amblyodus nasicornis* (Burmeister, 1847); *Amblyodus taurus* Westwood, 1878; and *Amblyodus varicosus* (Prell, 1934). *Amblyodus* was recovered as a monophyletic genus with two apomorphies: (42:1) pronotum with lateral carina; and (49:1) prosternal process reaching the procoxae.

Haplophileurus is a genus with only three species, found in Colombia and Ecuador, was have recovered as paraphyletic with by the combination of these characters: (22:1, 23:1) apex of mentum emarginated and excavated; (71:2) protibia with four teeth; and (89:1) aedeagus with short parameres; besides that one apomorphy was recovered for the genus: (26:0) mandibles with one tooth.

Rhizoplatys has its last species described by Silvestre (1999) and Dechambre (2005b), its last revision was made by Ferreira (1965g) that illustrates the aedeagus of all species decribed, making easier the identification of the species. The genus have recovered its monophyly with nine apomorphies that are: (10:0) clypeus with rounded punctures; (21:1) mentum diverging to apex; (24:0) mentum longer tan wider; (34:0) pronotum without longitudinal sulcus; (38:1) pronotum with tubercles; (72:1) protibial teeth with different distance; (82:1) apex of metatibiae with teeth; (83:1) metatibiae apex with two teeth; and (85:1) meso and metatibiae carina with spine-like projections.

Hovophileurus has been recovered as a paraphyletic genus with six apomorphies: (10:2) striate punctures on clypeus; (21:0) mentum converging to apex; (22:0, 23:0) mentum not emarginated and not excavated; (25:1) mandibles with external tooth; (27:1) mandibles not covered by clypeus, and (34:1) pronotum with longitudinal furrow.

This clade, (((*Kirprellius*) + ((*Rhizoplatodes*) + *Macrocyphonistes*)) + (*Eophileurus*))), have two apomorphies: (43:1) pronotum with acute posterior angles; and (76:1) protibiae with intern claw bifid. *Eophileurus* is the second biggest genus of Phileurini in number of species, the

characters of aedeagus are very important to identify due the great number of species described, as pronotum and punctation of elytra. Yamaya & Muramoto (2008b) have made a important revision of the genus, and have utilized 25 characters to better separate the genus in groups of species, making the identification easier, and in this work they have illustrate 23 species, some of them are synonymyzed in Yang & Pathomwattananurak (2022). A major review of the genus is required with all 53 species that can characterize better the taxonomic range of its diagnostic characters, some species are known only by females like *Eophileurus platypterus* (Wiedemann, 1823) difficulting the identification. *Eophileurus* has been recovered as monophyletic with these mains apomorphies: (46:1) pronotum with chanfer; and (74:1) protibiae with not elongate or short claws.

Rhizoplatodes have two genera described and have recovered its monophyly with six apomorphies: (57:0) elytral striae absent; (77:0) protibial spur not reaching the second tarsomere; (82:1) apex of metatibiae toothed; (85:1) meso and metatibiae with spine-like projections; (89:1) aedeagus with elongate parameres; and (91:0) aedeagus with parallels parameres in caudal view.

Macrocyphonistes have 15 apomorphies: (0:1) distinct sexual dimorfismo; (4:0) body convex; (21:1) mentum diverging to apex; (22:0) mentum apex not emarginated; (24:0) mentum wider than longer; (25:1) mandibles with teeth; (27:1) mandibles not covered by clypeus; (28:1) antennal club segments with same size; (29:1) antennal scape not claviform; (38:1) pronotum with tubercles; (46:1) pronotum with median chanfer; (73:1) protarsomeres with subequal size; (74:1) protibiae with claws not elongate or short; (78:0) protibiae without carina on dorsal view; and (90:1) aedeagus with paramere setose. The results of the cladistic analysis showed this genus have recovered its status of Phileurini, once Ferreira (1965g) and Endrödi (1985b) classified this genera on an Oryctini member.

Kirprellius, genus recently revised by Allsopp (2022), have recovered the monophyly with these five apomorphies: (4:1) metaepisternum with a small sclerotinized apical projection; (62:1)

elytra setose; (74:0) protibial claw elongate; (80:1) profemur with sulcus in ventral view; (81:0) metatibiae without spur in first tarsomere.

This genus have a similarity with *Eophileurus* that can be found in some characters like: long horn on clypeus; absence of tubercles in pronotum; shape of the claws of protibia; shape of pronotum; diverging on apex of meso and metatibia, notched on *Eophileurus* and truncate on *Kirprellius*.

Identification key for Phileurini genera

1. Clypeus triangular shape, notched;……..…….……4 (Phileurina)

1’. Clypeus rounded, parabolic, trapezoidal...…….....….2 (Cryptodontina)

2. Head with two tubercles; body flattened…….....3

2’. Head without tubercles; body convex…….. *Actinobolus* Westwood, 1841

3. Clypeus trapezoidal shape; elytral striae superficial……..… *Cnemidophileurus* Kolbe, 1910

3’. Clypeus parabolic shape; elytral striae not superficial……..*Cryptodus* MacLeay, 1819

4. Body with distinct sexual dimosphism……...…….5

4’. Body with indistinct sexual dimorphism……..…….6

5. Clypeal carina with two horns or tubercles; apex of metatibiae without tooth…..... *Syrichthodonthus* Péringuey, 1901

5’. Clypeal carina with one horn (bifid); apex of metatibia with tooth……...*Macrocyphonistes* Ohaus, 1910

6. Clypeus with notched shape.....……7

6’. Clypeus with triangular shape…….....8

7. Frontoclypeal carina with two horns, flattened; pronotum with four tubercles……..*Trioplus* Burmeister, 1847

7’. Frontoclypeal carinae with two horns like a carina; pronotum with one tubercle.....*Argentophileurus* Penco & Zubarán, 2013

8. Apex of metatibiae truncate.....9

8’. Apex of metatibiae toothed.....17

9. Protibiae intern claw thickened.....10

9’. Protibiae intern claw not thickened.....13

10. Mandibles with external tooth; clypeal horn origin, disc.....11

10’. Mandibles without external tooth; clypeal horn origin, apex.....12

11. Pronotum with concavity; pronotum and elytra glabrous.....*Eophileurus* Arrow, 1908

11’Pronotum without concavity; pronotum and elytra setose.....*Kirprellius* Allsopp, 2022

12. Clypeal carina absent; frontoclypeal carina with one horn or tubercle.....*Hovophileurus* Arrow, 1911

12’. Clypeal carina present; frontoclypeal carina with two horns or tubercles..... *Microphileurus* Kolbe, 1910

13. Mentum anteriorly converging to apex.....14

13’. Mentum anteriorly diverging to apex.....16

14. Frontoclypeal carina with one horn or tubercle; mandibles with external tooth.....*Haplophileurus* Kolbe, 1910

14’. Frontoclypeal carina with more than one horn or tubercle; mandibles without external tooth.....15

15. Apex of mentum not emarginated; pronotum without tubercles.....*Archophileurus* Kolbe, 1910

15’. Apex of mentum emarginated; pronotum with tubercles.....*Archophanes* Kolbe, 1905

16. Frons flattened; pronotum with median chanfre.....*Syrichthomorphus* Péringuey, 1901

16’. Frons concave; pronotum without median chanfre.....*Syrichthoschema* Janssens, 1942

17. Mandibles with external tooth.....18

17’. Mandibles without external tooth.....22

18. Pronotum without tubercles; pronotum without median chanfre.....19

18. Pronotum with tubercles; pronotum with median chanfer.....21

19. Scutellar shield subtriangular; meso and metatibiae with carina on ventral view.....*Goniophileurus* Kolbe, 1910

19’. Scutellar shield subpentagonal; meso and metatibiae without carina on ventral view.....20

20. Clypeus with rounded and striate punctures; elytral striae misaligned.....*Metaphileurus* Kolbe, 1910

20’. Clypeus finely puntate; elytral striae aligned.....*Allophileurinus* Dupuis & Dechambre, 2001

21. Clypeal carina present; apex of metatibiae with more than two teeth.....*Amblyodus* Westwood, 1878

21’. Clypeal carina absent; apex of metatibiae with two teeth.....*Rhizoplatys* Westwood, 1842

22. Pronotum with incomplete borders.....23

22’. Pronotum with complete borders.....25

23. Frontoclypeal suture with marginal horns.....*Homophileurus* Kolbe, 1910

23’. Frontoclypeal suture with lateral horns or tubercles.....24

24. Apex of mentum not emarginated; elytral striae superficial.....*Paraphileurus* Endrödi, 1978

24’. Apex of mentum emarginated; elytral striae not superficial.....*Amblyoproctus* Kolbe, 1910

25. Pronotum without longitudinal sulcus.....26

25’. Pronotum with longitudinal sulcus.....28

26. Elytral apical calli distinct; aedeagus with asymmetric parameres.....*Palaeophileurus* Kolbe, 1910

26’. Elytral apical calli indistinct; aedeagus with symmetric parameres.....27

27. Aedeagus with overlapping parameres; aedeagus with setose parameres.....*Caymania* Ratcliffe & Cave, 2010

27’. Aedeagus without overlapping parameres; aedeagus with glabrous parameres.....*Planophileurus* Chapin, 1932

28. Apex of metatibiae with one tooth.....29

28’. Apex of metatibiae with more than two teeth.....31

29. Pronotum with tubercles; pronotum with wide longitudinal furrow.....*Phileurus* Latreille, 1807

29’. Pronotum without tubercles; pronotum with narrow longitudinal furrow.....30

30. Scutellar shield subpentagonal; protibiae with intern claws not thickened.....*Hemiphileurus* Kolbe, 1910

30’. Scutellar shield subtriangular; protibiae with intern claws thickened.....*Phileucourtus* Dechambre, 2008

31. Pronotum with longitudinal sulcus narrow; pronotum without tubercle.....32

31’. Pronotum with longitudinal sulcus wide; pronotum with tubercle.....*Prosphileurus* Kolbe, 1905

32. Frontoclypeal carina with one horn or tubercle; pronotum wihout lateral foveae.....*Rhizoplatodes* Péringuey, 1901

32. Frontoclypeal carina with more than one horn or tubercle; pronotum wihout lateral foveae.....*Mictophileurus* Ohaus, 1911

Acknowledgments

All the curators of the listed collections are thanked for the and images of the specimens studied here. RAFM received grants from CAPES/Proex 88887.333488/2019-00 during Ph.D. studies. PCG is a CNPq fellow, and parts of this work were funded by CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brazil, process numbers 449366/2014-6, 424048/2018-3 and 309786/2019-3). This work is part of the Ph.D. degree project of the first author.

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Suplementar material

Material examinated

***Actinobolus* Westwood, 1841**

Brazil. *Bahia*. a) "Encruzilhada / Bahia 11.74 Brésil", b) "Coll. / R.-P.Dechambre", c) "Actinobolus pilosus ♂ / HOLOTYPE / det. F. Dupuis 1997", d) "HOLOTYPE", e) "MNHN / EC3925" (1 male dissected, examinated through images, Actinobolus pilosus Dupuis).

Goiás. "Brasil: Goiás, Mineiros. / PNEmas. 18°00'51"S, 52°58'17" / W. 888 mosl. Hum. Dung. 15-III- / 2011. M.F. Souza.", "Actinobolus spiniformis Dupuis & Dechambre / P.C. Grossi det. 2012", (1 male dissected); a) "Campinacu Goias / Bresil / x.1992 (G. Lachaume)", b) "Coll. / R.-P.Dechambre", c) "Actinobolus spiniformis / HOLOTYPE / det. F.Dupuis 1997", d) "HOLOTYPE", e) "MNHN / EC3926" (1 male dissected, examinated through images, *Actinobolus*

spiniformis Dupuis). *Maranhão*. “Brasil (MA), Mirador / Parque Est. Mirador / Base da Geraldina”, “Armadilha luminosa / 11-15.xi.2007, / J. / C. Silva, cols.”, “Actinobolus spiniformis Dupuis & Dechambre / P.C. Grossi det. 2016”, (1 specimen); “Brasil, Maranhão, Mirador / P.E. Mirador, Posto Mel / 06°43’50”S/44°58’59”W / 25.ix.2014, luminosa, / Limeira-de-Oliveira e equipe”, (1 specimen); “Brasil (MA), Mirador / Parque Est. Mirador / Base da Geraldina”, “Armadilha Luminosa / 21 – 25.viii.2006, F. / Limeira-de-Oliveira”, “Actinobolus pilosus / Dupuis & Dechambre / P.C. Grossi det. 2016”, (1 female with everted genitalia); “CZMA / Brasil (MA), Caxias / 25 – 26.xi.2011, M.K.A. / Santos, C.M.S. Silva & A.A. Santos, cols.”, “Actinobolus pilosus / Dupuis & Dechambre / P.C. Grossi det. 2016”, (1 ? no dissected); “Brasil (MA), Mirador / Parque Est. Mirador / Base dos Cágados / 06°46’29”S/45°06’84”W”, “Armadilha Luminosa / 27 . ix – 02 . x . 2011, F. / Limeira-de-Oliveira; A.A. / Santos & T. M. A. Lima”, “ Actinobolus pilosus / Dupuis & Dechambre / P.C. Grossi det. 2016”, (1 ? no dissected); “CZMA / Brasil (MA), Mirador / Parque Est. Mirador / Base dos Cágados / 06°46’29”S/45°06’28”W”, “CZMA / Armadilha de Malaise / 26 . xi – 03 . xii . 2011, F. / Limeira-de-Oliveira & / D.W.A Marques, cols”, “ Actinobolus trilobus / Lüderwaldt / P.C. Grossi det. 2016”, (1 ? no dissected); “Brasil (MA), Mirador / Parque Est. Mirador / Base da Geraldina”, “Armadilha Luminosa / 07-14.V. 2010 / N. B. Silva; D. S. Silva”, “ Actinobolus trilobus / Lüderwaldt / P.C. Grossi det. 2016”, (1 ? no dissected); “Brasil (MA), Mirador / Parque Est. Mirador / Base da Geraldina / Armadilha Luminosa”, “22.ii-01.iii. 2009. / M. B. Aguiar-Neto & / M.J.A. Holanda, cols.”, “ Actinobolus trilobus / Lüderwaldt / P.C. Grossi det. 2016”, (1 ? no dissected). *Mato Grosso*. “Brasil, Mato Grosso, / Diamantino, Fazenda Vale / da Solidão, 01.xi.2015, / E. Furtado leg.”. – ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET, MEDEIROS, R.A.F. det. 2021; - “Brasil, MG, Três marias, x-1999”, (5 specimens no dissected); “Mato Grosso, Diamantino, Faz. Vale da Solidão” 1 [VS 25-x-2014], “ACTINOBOLUS SPINIFORMIS DUPUIS &

DECHAMBRE MEDEIROS det. 2021", (1 female no dissected); "Mato Grosso, Diamantino, Faz. Vale da Solidão", 1 [VS 29-ix-2014], "ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET MEDEIROS det. 2021", (1 female no dissected); "Mato Grosso, Diamantino, Faz. Vale da Solidão", 1 [VS 21-x-2014], "ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET MEDEIROS det. 2021", (1 female no dissected); "MT – Cuiabá, Faz. Mutuca, 09.VIII.09, Cerradinho, C. Gabriel", "ACTINOBOLUS BARBATUS ENDRÖDI R.A.F. MEDEIROS det. 2021, (2 female no dissected); "MT – Nova Xavantina / 19.ix.2014 / C.S. Rosa col. / em cupim", "ACTINOBOLUS SPINOSUS DUPUIS & DECHAMBRE", CAIXA 6 - (2 males dissected); "MT – Nova Xavantina / 19.ix.2014 / C.S. Rosa col. / em cupim", "ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET", (1 male dissected, 1 female with everted genitalia).

***Actinobolus alvarengai* Dupuis & Dechambre, 1998**

Brazil. *Mato Grosso*. a) "Sinop. M. Grosso / 10.74 Alvarenga", b) "Actinobolus n.sp. / R.-P. Dechambre", c) "Actinobolus alvarengai / HOLOTYPE / det. F. Dupuis 1997", d) "HOLOTYPE", e) "MUSÉUM PARIS / coll. GÉNÉRALE", f) "MNHN / EC3918" (1 male dissected, examinated through images) *Actinobolus alvarengai* Dupuis.

***Actinobolus radians* Westwood, 1841**

Brazil. *São Paulo*. "56381 // SYN- / TYPE // TYPE // ♂ // S. Paulo // Fry Coll. // Lectotypus / Actinibolus / angustus Arr. / type // Actinobolus / angustus / type Arrow // Actinobolus / radians W / det. dr. Endrödi 1970 // NHMUK 013649720" (1 male dissected, examinated through images).

***Actinobolus spiniformis* Dupuis & Dechambre, 1998**

Brazil. *Minas Gerais*. "Brasil, Minas Gerais, Ingaí, / Próx. Poço Bonito, 21.x.2016, / 1140m, -21.339"S, -44.979"W, / Grossi, Vaz-de-Mello, Frieiro, / Silva, Fuhrman, Mariano legs." – ACTINOBOLUS SPINIFORMIS DUPUIS & DECHAMBRE, MEDEIROS, R.A.F.det 2020, (4

specimens); “Brasil, Minas Gerais, Ingaí, / Próx. Poço Bonito, 21.x.2016, / 1140m, -21.339”S, -44.979”W, / Grossi, Vaz-de-Mello, Frieiro, / Silva, Fuhrman, Mariano legs.”. – ACTINOBOLUS SPINIFORMIS DUPUIS & DECHAMBRE, MEDEIROS, R.A.F.det 2020, (1 female e 2 males with everted genitalia); “Brasil, Minas Gerais, São / Gonçalo do Rio Preto, P.E. do Rio Preto, / 23.xii.2012, Luz Negra, / Oliveira & Ferreira.” – ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET, MEDEIROS, R.A.F. det. 2020, (1 specimen); “Brasil, Minas Gerais, São / Gonçalo do Rio Preto, P.E. do Rio Preto, / 24.i.2012, Luz Negra, / Oliveira & Ferreira.” – ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET, MEDEIROS, R.A.F. det. 2020, (1 specimen); “Brasil, Minas Gerais, São / Gonçalo do Rio Preto, P.E. do Rio Preto, / 22.xii.2012, Luz Negra, / Oliveira & Ferreira.” – ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET, MEDEIROS, R.A.F. det. 2020, (1 specimen); “Brasil, MG, Três Marias, x-1989”, “ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET, MEDEIROS det. 2021”, (8 specimens no dissected [6 female and 2 males [?]); “Brasil, MG, Três Marias, x-1989”, “ACTINOBOLUS RADIANS WESTWOOD MEDEIROS det. 2021”, (1 ? dissected); “Brasil, MG, Três Marias, x-1989”, “ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET MEDEIROS det. 2021”, (1 ? no dissected); “Per Preto / Miranda / 22.xii.11 / ? & Ferreira”, “ACTINOBOLUS SPINIFORMIS DUPUIS & DECHAMBRE”, “R.A.F. MEDEIROS det. 2021”, (1 Exemplar ? aparentemente dissecado). *Pará*. a) “Serra dos Carajas / 700m. / Pará. Brasil”, b) “24.I.1984 / N. Degallier / ds Termitère”, c) “figure / R,-P. Dechambre”, d) “♂”, e) “Actinobolus ♂ / degallieri n. sp. Milei / PARATYPE / R.-P. DECHAMBRE DET. 1986”, f) “PARATYPE”, g) “MNHN / EC3919”, (1 male dissected, examinated trhough images, *Actinobolus degallieri* Dechambre); a) “Carajas – Serra Norte / Pará. Brasil / 19.X.1984”, b) “N. Degallier leg / dans Termitère á / Nasutitermes minutus”, c) “♂”, d) “Actinobolus ♂ / degallieri n. sp. Milei / PARATYPE / R.-P. DECHAMBRE DET. 1986”, e) “PARATYPE”, f) “MNHN / EC3920” (1

male no dissected, examinated trhough images, *Actinobolus degallieri* Dechambre); a) “Serra dos Carajas / 700m / Pará. Brasil”, b) “14.I.1984 / N. Degallier / ds termitère”, c) “♂”, d) “Actinobolus ♂ / degallieri n. sp. milei / PARATYPE / R.-P. DECHAMBRE DET. 1986”, e) “PARATYPE”, f) “MNHN / EC3921” (1 male no dissected, examinated trhough images, *Actinobolus degallieri* Dechambre); a) “Carajas – Serra Norte / Pará. Brésil / 20.III.1983”, b) “N. Degallier / dans termitère”, c) “♀”, d) “Actinobolus ♀ / degallieri n. sp. milei / PARATYPE / R.-P. DECHAMBRE DET. 1986”, e) “011114, f) “PARATYPE”, g) “MNHN / EC3922”, (1 female no dissected, examinated trhough images, *Actinobolus degallieri* Dechambre); a) “Carajas – Serra Norte / Pará. Brésil / 20.III.1983”, b) “N. Degallier / dans termitère”, c) “figure / R.-P. Dechambre” d) “♀”, e) “Actinobolus ♀ / degallieri n. sp. milei / PARATYPE / R.-P. DECHAMBRE DET. 1986”, f) “PARATYPE”, g) “MNHN / EC3923”, (1 female no dissected, examinated trhough images, *Actinobolus degallieri* Dechambre); a) “Carajas. Serra Norte / Para. Bresil / 19.X.1984”, b) “N. Degallier leg / dans termitère à / Nasutitermes minutus”, c) “♀”, d) “figuré / R.-P. Dechambre”, e) “Actinobolus ♀ / degallieri n. sp. milei / PARATYPE / R.-P. DECHAMBRE DET. 1986”, f) “PARATYPE”, g) “MNHN / EC3924” (1 female no dissected, examinated trhough images, *Actinobolus degallieri* Dechambre). *Paraná*. “Guartelá / I.2012. Breed”, “ACTINOBOLUS SPINIFORMIS DUPUIS & DECHAMBRE R.A.F. MEDEIROS det. 2021”, (1 male dissected); “Guartelá / I.2012. Breed”, “ACTINOBOLUS DUPUIS & DECHAMBRE R.A.F. MEDEIROS det. 2021”, CAIXA 12 - (6 specimens no dissected); “Piraquara / Área de campo / em Cornitermes cumulans / 11.XII.2011”, “ACTINOBOLUS EMARGINATUS ENDRÖDI R.A.F. MEDEIROS det. 2021”, CAIXA 14 - (1 male with aedeagus everted); “Em ninho de / Cornitermes sp. / em área de / banhado”, “Piraquara / Área de campo / banhado / 18.x.2011”, “ACTINOBOLUS RADIANS WESTWOOD R.A.F. MEDEIROS det. 2021”, CAIXA 14 - (3 specimens, 1 male with everted aedeagus, 2 female no dissected [?]). *Piauí*. “Local: UFPI / Data: 19/08/2013 / Coletor: Luzia”, (1?

no dissected). *São Paulo*. “Pederneiras, SP. BR. / Manual diurna / 09.x.2015 / M.Bento (col).”, (2 specimens). *Tocantins*. “BRASIL: Porto Nacional. / Tocantins. / 10°31’08.55”S, 48°17’35,988”W / Armad Lumin. 10-IX-2015. / A. Specht”, (1 ? no dissected); “BRASIL: Porto Nacional. / Tocantins. / 10°31’08.55”S, 48°17’35,988”W / Armad Lumin. 8-IX-2015. / A. Specht”, “Actinobolus spi / niformis Dupuis / & Dechambre / Medeiros, R.A.F. det. / 2020”, (1 ? no dissected).

Brazil. *No data*. “X-1993”, (4 specimens no dissected); “Mirante / 02.xii.11 ”, “ACTINOBOLUS RADIANS WESTWOOD”, (1 male dissected); “Mirante / 02.xii.11 ”, “ACTINOBOLUS DEGALLIERI DECHAMBRE & LUMARET”, (1 male dissected, 2 female with everted genitalia).

Allophileurinus Dupuis & Dechambre, 2001

Allophileurinus cavifrons Dupuis & Dechambre, 2001

Santo Domingo. a) “Sto Domingo IX 82 / Equat. G. Onoré”, b) “Col. F. DUPUIS / Allophileurinus cavifrons”, c) “HOLOTYPE”, d) “Muséum Paris”, e) “MNHN / EC3934” (1 male dissected, examinated through images, *Allophileurinus cavifrons* Dupuis).

Allophileurinus mediopunctatus Dupuis & Dechambre, 2001

Equateur. a) “Lita. Esmeraldas / EQUATEUR / x-xii.1998”, b) “Col. F. DUPUIS / Allophileurinus mediopunctatus / HOLOTYPE / det. F. DUPUIS - 2000”, c) “HOLOTYPE”, d) “Muséum Paris”, e) “MNHN / EC3935” (1 male dissected, examinated through images, *Allophileurinus mediopunctatus* Dupuis).

Amblyodus Westwood, 1878

Amblyodus taurus Westwood, 1878

Panamá. “Santa Rita, Colón / Rep. do Panamá / 23 de junio – 1989 / col. Roberto Cambra” “Amblyodus / taurus ♂ / Westwood, 1878 / det. R.A. Cunningham ‘04”, (1 male dissected).

Amblyodus castroi Grossi & Grossi, 2011

Brazil. *Amazonas*. a) “BRASIL, Amazonas , Coari, / Duto Urucu/ PortoTerminal. / 04°50’16”S/65°20’36”W. / 16/VI/1996, Bürhrnheim, / P.F. & Aguiar, N.O. col.”, b) “em tronco caído”, c) “*Amblyodus castroi* sp. nov. / PARATYPE macho símbolo / P. Grossi & E. Grossi det. 2010”, (1 male dissected).

Peru. a) “PERU, Junin, Puerto / Ocopa, I-2007, 600m, / 11°07’50”S/74°17’46”W / S. Castro col.”, b) “COLEÇÃO / E. & P. Grossi”, c) “*Amblyodus castroi* sp. nov. / PARATYPE fêmea símbolo / P. Grossi & E. Grossi det. 2010”, d) “símbolo fêmea”, (1 female no dissected).

Amblyoproctus Kolbe, 1910

Brazil. *Amazonas*. “BRASIL – AMAZONAS – RIO / PURUS – LAGO DO IPIRAN / GA – 26/I/1987 - / N.O. Aguiar, col.”, (1 ? no dissected); “BR, AMAZONAS, Novo / Airão, ramal do Olímpio / 2°39’23”S/ 60°55’44”W / 16-21.I.1998 P.F. / Bührnheim & Aguiar NO”, “à luz mista / de mercúrio”, (1 ? no dissected); “BRASIL, Amazonas, Coari / rio urucu, RUC – 36 / 4°55’53”S/65°18’13”, / 25.III-10/III/1995 P. / Bührnheim et al col.”; “BRASIL, Amazonas, Coari / rio Uruçu, próx. IMT-1 / 17-29/IX/1995 P.F. / Bürhnheim & N.O. Aguiar”, “Dentro de / tronco”, (1 ? no dissected). *Mato Grosso*. “MT. Cotriguaçu / Faz. São Nicolau / XI.2009. Luz”, “Amblyoproctus / chalumeaui Endrödi / P. Grossi det. 2015”, (1 male dissected); “273”, “BRASIL, RO, Jirau / Rio Madeira / Margem Esquerda Interior / Novembro/2003 / Luminosa 273”, “CEMT”, (1 ? no dissected); “BRASIL: Mato Grosso, Cotri / guaçu, Faz. São Nicolau, / PPBio1. 09°49’17”S, 58°15’ / 32”W. manual, 01.xi.2007, / VazdeMello *et al*.”, “CEMT”, Amblyoproctus amazonicus Medeiros R.A.F. det. 2022, (1 male no dissected). *Rondônia*. “273 // BRASIL, RO,

Jirau / Rio Madeira / Margem Esquerda Interior / Novembro/2003 / Luminosa 273 // CEMT // Amblyoproctus amazonicus Medeiros R.A.F. det. 2022", (1 male no dissected).

Peru. "Pucalpa / Mesa F. 250m / 16.xii.70 / Cali Z. Garcia", "Amblyoproctus sp / det. Felipe Meza V. 2008", (1 ? no dissected); "PERÚ: UC. Coronel Portillo, / Calleria 73°42'50.03"W/ / 08°19'44.99"S 220m / 16.x.2012 P.Sanchez", *Amblyoproctus torulosus* Kolbe, 1910 (1 male dissected).

Guiana Francesa. a) "GUYANE FRANCAISE / KOUROU RN1 Pk 84 / cryldé 28 II 2002 / M. DURANTON Coll.", b) "Amblyoproctus ♂ / arianarum n. sp. Milei / HOLOTYPE / R.-P. DECHAMBRE det. 2007", c) "HOLOTYPE", d) "MNHN / EC8308" (1 male dissected, examinated through images, *Amblyoproctus arianarum* Dechambre); a) "GUYANE FRANÇAISE / Barrage de Petit-Saut / I.1997", b) "Amblyoproctus ♂ / bituberculatus n. sp. milei / HOLOTYPE / R.-P. DECHAMBRE det. 2007", c) "HOLOTYPE", d) "MNHN / EC8309" (1 male dissected, examinated through images, *Amblyoproctus bituberculatus* Dechambre); a) "GUYANE FRANCAISE / KOUROU RN1 Pk71 / cryldé XI 2001 / M. DURANTON Coll.", b) "Amblyoproctus ♂ / cornutus n. sp. milei / HOLOTYPE / R.-P. DECHAMBRE det. 2007", c) "HOLOTYPE", d) "MNHN / EC8770" (1 male dissected, examinated through images, *Amblyoproctus cornutus* Dechambre); a) "GUYANE FRANCAISE / Piste de BELIZON / Pk. 23 – Chgt Pk4 / 1/2.IX.1997 / D. CAMUS leg.", b) "Amblyoproctus ♂ / squamosus n. sp. milei / HOLOTYPE / R.-P. DECHAMBRE det. 2007", c) "HOLOTYPE", d) "MNHN / EC8310" (1 male dissected, examinated through images, *Amblyoproctus bituberculatus* Dechambre).

Archophanes Kolbe, 1905

Archophanes cratericollis (Fairmaire, 1894)

Guiné. a) “Guiner”, b) “Oryctes / cratericollis / Fairm – 1894 / Guinea”, c) “MUSÉUM PARIS / 1906 / Coll. Léon FAIRMAIRE”, d) “HOLOTYPE”, e) “MNHN / EC3936” (1 male no dissected, examinated through images).

Gabon. "Gabão, / Kingala / 20.xii.2005", (1 male no dissected).

Ivory Coast. “IVORY COAST, 174m, / Taï NP, Taï Research Station / (STRET), / 05°50’00”N, 07°20’32.0”W, / 25.III -17.IV.2017, MV light, / Aristophanous, A., / Aristophanous, M., / Geiser, M., Moretto, O., leg., / BMNH€ 2017-93 // NHMUK 010843866 // ARCHOPHANES / cratericollis (Fairm) / det. H Takano 2018” (1 male not dissected, examinated through images).

Archophileurus Kolbe, 1910

Brazil. *Ceará*. “Coleção didática / - UFC – Fortaleza”, “Archophileurus sp.”, (1 ? no dissected); *Goiás*. “BRASIL: Goiás, Mineiros. / PNEmas. 17°54’30”S; 52°59’03” / W. 888 mosl. Hum. Dung. 15-III- / 2011. M.F. Souza.”, (1 ? no dissected). *Mato Grosso*. “BRASIL: Mato Grosso / Chapada dos Guimarães / PNCG-Módulo-A1L2 / 15°19’57”S, 55°51’58”W / 320m. 23.III.2012. pitfall / Taina Rodrigues”, “3455”, (1 ? no dissected); “UFMT / MT. Nª Sª LIVRAMENTO / 30-VIII-1989 / JOÃO DE SOUZA”, “Archophileurus / peruanus Endrödi / P.C. Grossi det. 2015”, (1 male dissected); “BRASIL: Mato Grosso, / Jaciara, 29-30.xii.2017, / SM Jacobina.”, “CEMT”, (1 ? no dissected); “BRASIL, Mato Grosso, / Chapada dos Guimarães, / Casa do Mel, 15°22’53”S, / 55°50’35”W, 520m, light, / xii.2015, RV Nunes, A Frolov / & LG Nunes”, (1 ? no dissected); “BRASIL: Mato Grosso. / Manso. / 10-II-2014. Manual. / BY Carmo”, “Coleoptera, Scarabaeidae, Dynastinae”, “CEMT”, (1 ? no dissected); “BRASIL: Mato Grosso. / Porto Estrela. ESEC / Serra das Araras. Cerradão. 23-X-2011. / FIT. FZ Vaz-de-Mello”, “CEMT”, (1 ? no dissected); “BRASIL: Mato Grosso, / Chapada dos Guimarães, / Água Fria, Pitfall, 07.vi.2015, / CA Vitorino & M Oliveira”, “CEMT”, (1 ? no dissected). *Minas Gerais*. “BRASIL: MG, Viçosa / Mata do

Paraíso, 19.ii.2015 / luz mista / leg. C. Lopes-Andrade", (1 ? no dissected); "Carrancas-MG-Brasil / 8/IX/2006 / Chaves C.", (1 ? no dissected); "BRASIL: MG, Viçosa / Campus UFV CCBIII / 25.ix.2015 / S. Aloquio leg.". "Archophileurus tmetoplus (Prell), Medeiros, R.A.F. det. 2020", (1 ? no dissected); "BR-MG-Jeputaí 30/I/2015 / Lapas da Lagoinha / WGS84: W-17.090244/N-44.564849 / Rabelo, L.M. (ISLA 20456)", (1 ? no dissected); "Brasil-MG-Lima Duarte / P.E. Ibitipoca / Gruta da Bromélia / 19/IX/2013 / Sul de Minas", "ISLA 21124", "Dynastinae sp4", "Archophileurus fim / briatus (Burmeister) / Medeiros, R.A.F. det. 2020", (1 ? no dissected); "Pedra do Barão, Poços de Caldas – MG, 20.xi.2014". "ARCHOPHILEURUS CHACONUS (Kolbe) R.A.F. MEDEIROS det. 2021", (1 female no dissected). *Paraná*. "Brasil / S.J. DOS PINHAIS – PR / 13.XI.2020 / Cardozo, C. col.", "Archophileurus / ovis (Burmeister) / P. Grossi det. 2011", (1 male dissected); "Brasil, Paraná, São José / dos Pinhais, Estrada do Taquaral, / 24.ix.2016, 897m, manual em / tronco, A.C.G. Silva & A. Domahovski legs.", "Archophileurus foveicollis Burmeister, Medeiros, R.A.F. det. 2020.", (1 female with everted genitalia); "Brasil, Paraná, / Palmas, RESIDENCIA / -26°49'83"S, -51°98'73"W / 13/05/2013, Manual / F. Q. Santos, col.", "Archophileurus / ovis (Burmeister) / Medeiros, R.A.F. / det. 2020" [manuscrita], (1? no dissected); "LOCAL: Brasil, PR, / São José dos / Pinhais / DATA: 25-IX-2012 / COLETOR: Mieira, C.", (1 ? no dissected); "BRASIL: Paraná. / Morretes Casa Sebastião. / 25°21'18,5"S; 48°52'44,5" / W. 300m Armad. Luminosa / 03-I-2012. A. Specht", "CEMT", (1 ? no dissected); "Piraquara / XII.2011", "ARCHOPHILEURUS KOLBEANUS (OHAUS) R.A.F. MEDEIROS det. 2021", (1 male dissected). *Pernambuco*. "Buíque – PE / Vale do Catimbau / 02.V.2006 / Liberal, C.N. col / (antropizada 1a)." (CERPE). ARCHOPHILEURUS SP. N. 1, (1 ? no dissected); "BRASIL: Pernambuco. / Petrolina. 30-V-2011. MSM / Barbosa" (CERPE). ARCHOPHILEURUS SP. N. 1, (1 female no dissected); "BRASIL. PE. Caruarú / Coleta manual. 09-II. 2015. / Col. Fernando Silva" (CEMT). ARCHOPHILEURUS SP. N. 1, (1 male no

dissected); “Brasil, Pernambuco, Buíque, / PARNA Catimbau, / alojamento, luz, vi.2019 / C.H.C. da Silva leg.” (CERPE). ARCHOPHILEURUS SP. N. 1, (1 female no dissected); “PE. Camaragibe / 21.III.1999 / R. M. Primo” (CERPE). ARCHOPHILEURUS SP. N. 1, (1 male dissected). *Piauí*. “Ordem: Coleoptera / Família: / Local: 13/09/13 CT-UFPI / Coletor: Ivan”, (1 ? no dissected). *Rio de Janeiro*. - “Coleoptera”, “Seropedica, RJ, Brasil / 13/XI/2016 / Machado, E. col.”, “Archophileurus / tmetoplus (Prell) / Medeiros, R.A.F. det. / 2020” [manuscrita], (1 ? no dissected); “G. DE ENTOM. / ESC. SUP. AGRI. / NICTHERoY- E RIO / N. 4427”, (1 ? no dissected); “Brasil, GB, Rio de Janeiro / Paineiras / 19.xii.1954 / J. Becker leg”, “Archophileurus / latipennis (Burm.) / P. Grossi det. 2015”, (1 ? no dissected); “Brasil, GB, Rio de Janeiro, / Paineiras / 27.iii.1955 / J. Becker leg.”, (1 ? no dissected); “Brasil, GB, Rio de Janeiro, / Floresta da Tijuca / 4.iii.1956 / J. Becker leg.”, “Archophileurus / opacostriatus / Ohaus, 1911 / R.A.F. Medeiros. Det. / 2020”, (1 ? no dissected); “RJ. Itatiaia. Ent. Parque / II.2018 / Paulo Duarte leg.”, “ARCHOPHILEURUS PETROPOLITANUS OHAUS R.A.F. MEDEIROS det. 2020”, (1 female no dissected). *Rio Grande do Sul*. “BRASIL – RS. / Arroio Teixeira / 02.iii.1997 / F.C. Quadros col.”, “Archophileurus fodiens (Kolbe) Medeiros, R.A.F. det. 2020.” REVER IDENTIFICAÇÃO, (1? no dissected). *Santa Catarina*. “Córrego Grande / Florianópolis, SC, Brazil / 5.XII.2014 / Josefina Steiner leg.”, (1 ? no dissected); “Brasil-SC FPOLIS- / IL. CAMPECHE / Data: 18/IV/88 / Coletor: J.C. / Voltolini”, (1 ? no dissected); “Brasil-SC-Gov. Celso Ramos / 27°25’S; 48°34’O; 24.i.2013 ; Armadilha pitfall isca / Col: P.G. Silva (MCorda-A2)”, “Archophileurus / ovis Burm. ♂ / P. Grossi det. 2018” [manuscrita], (1? dissected); “Coleção / UFSC”, (1 ? no dissected). *São Paulo*. “BRASIL: São Paulo, Cara- / guatatuba, Est. FABESP, 23°35’29”S, 45°23’39”W, / 95m, pitfall human feces, / 19.ix.2012, A.Diaz-Rojas”, (1 ? no dissected); “Def. San. Veg. \\ [verso] Brotas. São / Paulo: 13.VIII / 932. Fazenda Gomes”, (1 ? no dissected); “Def. San. Veg. \\ [verso] Brotas. São / Paulo. 29. / VIII.932 / D.S. Mello” [manuscrita], “Archophileurus / foveicollis (Bur /

meister)" / Medeiros, R.A.F. det. / 2020", (1 ? no dissected); "Lageado. Bocaína. SP / 9-10.II.2016 1540m / Col. C.G. MIELKE", "ARCHOPHILEURUS KOLBEANUS (OHAUS) R.A.F. MEDEIROS det. 2020", (1 male dissected).

Brazil. *No data*. a) "Fimbriatus / Bresil Cay Brm", b) "Ex-Musaeo / Mniszech", c) "MUSÉUM PARIS / 1952 / coll. R. OBERTHÜR", d) "Phileurus fimbriatus B. / LECTOTYPE / F. DUPUIS 2013", e) "LECTOTYPE", f) "LECTOTYPE / Archophileurus / fimbriatus (Burmeister, 1847)", g) "MNHN / EC4028"; "ARCHOPHILEURUS FOVEICOLLIS (Burmeister, 1847) R.A.F. MEDEIROS det. 2021", (1 male no dissected); "ARCHOPHILEURUS OVIS (Burmeister) R.A.F. MEDEIROS det. 2020", (1 female no dissected).

Argentina. "Córdoba. El Sauce / Augustino – XII-938 / M. Viana" (manuscrita), "R. Lange / No. 1979", "EX-COLEÇÃO / R.B. LANGE", "Phileurus / pullus / Burm.", "DZUP 311484", (1 ? no dissected); "Córdoba. El Sauce / Augustino – XII-938 / M. Viana" (manuscrita), "R. Lange / No. 1980", "EX-COLEÇÃO / R.B. LANGE", "DZUP 311485", (1 ? no dissected); "Córdoba. El Sauce / Augustino – XII-938 / M. Viana" (manuscrita), "R. Lange / No. 1981", "EX-COLEÇÃO / R.B. LANGE", "DZUP 311486", (1 ? no dissected); "ARGENTINA: Chaco, Rio / Muerto, Chaco seco, / 26°07'13"S, 61°40'39"W, / 31.x.2016, C. Guerra / Alonso leg.", "CEMT", (3 ? no dissected); a) "Abr. 972 / ARGENTINA / CORDOBA / Dº Cruz del Eje / Pozo Nuevo / Coll. Martinez", b) "Archophileurus / sp. n. grupo vervex", c) "HOLOTYPE", d) "Archophileurus clypeatus n. sp. / HOLOTYPE / F. Dupuis 2018", e) "MNHN / EC9988" (1 male dissected, examinated through images, *Archophileurus clypeatus* Dupuis); a) "Abr. 977 / ARGENTINA / CORDOBA / Dº Cruz del Eje / Guanaco Muerto / Coll. Martinez", b) "Archophileurus / sp. n. grupo / vervex", c) "PARATYPE", d) "Archophileurus clypeatus n. sp. / PARATYPE / F. Dupuis 2018", e) "MNHN / EC9989" (1 female no dissected, examinated through images, *Archophileurus clypeatus* Dupuis).

Estados Unidos. “Starr Co Tx / 10mi N Rio / Grande City / 4 Jun 87”, “Archophileurus cribosus”, (1 ? no dissected);

Martinica. a) “MARTINIQUE: Mt Pelée / Morne Macouba/Morne Rouge / 1246-1286m, 16-V-2015 / dead on trail, E. Dumbardon coll.”, b) “ARCHOPHILEURUS / MIRABILIS ♂ / RATCLIFFE + CAVE / PARATYPE”, c) “PARATYPE”, d) “MUSÉUM PARIS / don J. Touroult (2015) / coll. GÉNÉRALE”, d) “MNHN / EC6979” (1 male no dissected, examinated trhough images, *Archophileurus mirabilis* Ratcliffe & Cave).

Peru. “Peru, Madre de Dios, / Mazuko, 18/19.viii.2012, / (yellow trap) 13°02.85’S / 70°20.78’W, 380m / R.R. Cavichioli leg.”, (1 male dissected).

Uruguai. “9398 / Def. San. Veg. / Phileurus / vervex \\ [verso] Montevideo / Uruguai / I-945 / Baratttini”, “Phileurus vervex / 9.398 \\ [verso] Montevideo / I-1945 / Barattini” [manuscrita], “Archophileurus / vervex (Burmeis / ter)”, (1 ? no dissected).

Caymania Ratcliffe & Cave, 2010

Caymania nitidissima Ratcliffe & Cave, 2010

Cayman Islands. a) “Roy Soc-CIG Expdn. / Little Cayman, BWI / Central Forest / 22-7- 1975. R. R. Askew”, b) “BM 1981/342” (1 male dissected, examinated through images, Caymania nitidíssima Ratcliffe & Cave).

Cryptodus Macleay, 1819

Cryptodus caviceps Westwood, 1856

Austrália. “Australia, WA06/43 / 65 km e. Yalgoo / 28.26510S, 117.24094E / 302m, 10.1.2006, M. Baehr // ZSM // Cryptodus caviceps Westwood”, (1 ?).

Cryptodus paradoxus MacLeay, 1819

Australia. “1104b. // Cryptodus / creberrimus / fairm. / Australia // MUSÉUM PARIS / 1906 / Coll. Léon FAIRMAIRE // TYPE [red label] // Cryptodus / paradoxus Macl. / P. B. Carne det. 1953 // Kaine Type! / vgl. Patria / u. Grosse mit / der Diagnose / det. dr. Endrödi 1975 // Cryptodus creberrimus Fairm. / PARALECTOTYPE / F. DUPUIS 2014 // MNHN / EC4506” (1 female not dissected); “11048 // F. // Cryptodus / creberrimus / Fairm. / Sydney // MUSÉUM PARIS / 1906 / Coll. Léon FAIRMAIRE // Cryptodus / paradoxus Macl. / P.B. Carne det. 1953 // LECTOTYPE // Cryptodus creberrimus Fairm. / LECTOTYPE / F. DUPUIS 2014 // MNHN / EC4507” (1 male dissected); “Ex-Musaeo / Mniszech // Australia // Cryptodus diffinis Fairm. // LECTOTYPE // Cryptodus difinnis Fairm. / LECTOTYPE / F. DUPUIS 2014 // MNHN / EC4508” (1 male dissected); “Ex-Musaeo / Mniszech // Australia // Cryptodus / diffinis / Fairmaire // MUSÉUM PARIS / 1952 / coll. R. OBERTHÜR /// PARALECTOTYPE // Cryptodus diffinis Fairm. / PARALECTOTYPE / F. DUPUIS 2014 // MNHN EC4509” (?); “Clarence // diffinis / Fairm. // MUSÉUM PARIS / 1906 / Coll. Léon FAIRMAIRE // Cryptodus / paradoxus Macl. / P.B. Carne det. 1953 // PARALECTOTYPE // Cryptodus diffinis Fairm. / PARALECTOTYPE / F. DUPUIS 2014 // MNHN / EC4510” (1 male dissected).

Ceratophileurus **Ohaus, 1911**

Ceratophileurus lemoulti **Ohaus, 1911**

French Guiana. “Bourg de Cacao / G. F. / 05/2004 P. lumineux”, (1 male dissected).

Cnemidophileurus **Kolbe, 1910**

Cnemidophileurus personatus **Kolbe, 1910**

Brazil. *Pará*. “Brasil Pará / Serra Norte / Rio Salobo / 14.IX.1983 // Brasil Pará / M. F. Torres // CNEMIDOPHILEURUS / PERSONATUS / KOLBE / det. B.C. Ratcliffe 2006 // QR Code /

MPEG 01037931” (1 male no dissected); “Brasil Pará / Serra Norte / SERRARIA / COL.: Noturna / 29-X-1985 // Brasil Pará / W França // QR Code / MPEG 01037932” (1 male no dissected).

Eophileurus Arrow, 1908

Bengal. “Mus. / Westerm. // Bengal / Juni 1810 / Planatus / Wied. // TYPE // zmuc / 00027789” (1 female not dissected); “Bengala / Westermann / Planatus / Wied. // TYPE // zmuc / 00027790”; “Mus. / Westerm. // TYPE // zmuc / 00027791”; “Bengal / Juni 1810 / Platypte / rus Wied. // TYPE // Mus. Westerm. // zmuc / 00027792” (1 male not dissected); “TYPE // Mus. Westerm. // zmuc / 00027793” (1 female not dissected).

India. “India” [manuscrito], “Collection / E. CANDÈZE”, “Eoph. cingalensis / An. / det. Arrow 1908”, (1 male dissected); "India // Collection / E. CANDÈZE // Eoph. cingalensis / det. Arrow 1908", (1 male dissected);

Japan. "Sehi, Gifú / Japan / 22.VI.54 // chinensis", (1 male no dissected) Eophileurus chinensis; "JAPÃO, Sariyin, / Nagaoka City, Niigata / Pref. 22.VIII.1972 / S. Katagiri Leg. // COLEÇÃO E. / & P. GROSSI", (1 male no dissected) E. ?; "JAPÃO C, Gifu Pref. / Ibiko. Fujiboshi Vill. / Mt. Tokuyama / 19.VI.2002 // COLEÇÃO E. / & P. GROSSI", (1 female no dissected).

Vietnam. “Vietnam // Trionychus / Poteli / Fairm. / Chin boy // MUSÉUM PARIS / 1906 / Coll. Léon FAIRMAIRE // SYNTYPE // SYNTYPE / Trionychus / poteli Fairmaire, 1898 // Eophileurus chinensis / (Faldermann, 1835) / det. F. DUPUIS 2014 // MNHN / EC4457” (1 male dissected, examined through images).

Goniophileurus Kolbe, 1910

Goniophileurus femoratus (Burmeister, 1847)

Brazil. Amazonas. “BR, AMAZONAS, Novo / Airão, ramal do Olímpio / 2°39’23”S/60°55’44”W / 16-21.I.1998 P.F. / Bührheim & Aguiar NO // “à luz mista / de mercúrio” (1 female not dissected). *Brasília.* “Brasil, DF, Brasília, Fazenda / Água Limpa, -15.9576011 S / -47.9328443 W, 28/i-4/ii/2017, / Excursão Entomológica UnB.” (CEMT, 1 female not dissected); BRASIL: Distrito Federal / Planaltina, Embrapa Cerrados. / Fragmento Cerrado 15°36’ / 20”S 47°42’26”W. 02-XII-2005. / light C. Oliveira” (1 female not dissected). *Mato Grosso*. “BRASIL: Mato Grosso, Cotriguaçu, / Faz. São Nicolau, flor. prim. 250m / 9°49’17”S, 58°16’09”W. Col. Man. / 08-XII-2009. Vaz-de-Mello” (1 female not dissected). *Mato Grosso do Sul.* “Brasil, Mato Grosso do Sul, Cassilândia, 23.ii.2015, / Madeira em decomposição, / J.G.E. Navarro leg” *Minas Gerais*. “Lavras, MG / Codemin / 13.XI.93”. GONIOPHILEURUS FEMORATUS, (1 male dissected); “BRASIL: MG, Viçosa / “Mata da Biologia” / 03.v.2014 / C. Lopes-Andrade *et al*.” (1 male dissected and 1 female not dissected). *Minas Gerais*. “Lavras, MG / Codemin / 13.XI.93”. GONIOPHILEURUS FEMORATUS, (1 male dissected); “BRASIL: MG, Viçosa / “Mata da Biologia” / 03.v.2014 / C. Lopes-Andrade *et al*.” (1 female not dissected). *Pernambuco*. “Brasil, Pernambuco, / Camaragibe, PE 027 km 14, / 01-30.ix.2018, -7.929ºS, / 35.038°W, 140m. P. Grossi.

Bolívia. “Route Coroico à / Caranavi (at light) / 12/2008 (Bolivia)”, “Goniophileurus / femoratus / (Burmeister, 1847) / Det. Y. Ponchel 2009”, (1 male dissected).

Colombia. a) “Explanatus / Colomb B. / Dept Type”, b) “Ex-Musaeo / Mnizech”, c) “MUSÉUM PARIS / 1952 / coll. R. OBERTHÜR”, d) “Phileurus explanatus B. / LECTOTYPE / F. DUPUIS 2013”, e) “LECTOTYPE / Goniophileurus / explanatus (Burmeister, 1847)”, f) “LECTOTYPE”, g) “MNHN / EC4025” (1 female no dissected, examinated trhough images, *Goniophileurus explanatus* (Burmeister)).

Guiana Francesa. a) “Type C. Dupont / Femoratus / Cay. Burm.”, b) “Ex-Musaeo / Mnizech”, c) “MUSÉUM PARIS / 1952 / coll. R. OBERTHÜR”, d) “Phileurus femoratus B. / LECTOTYPE / F.

DUPUIS 2013", e) "LECTOTYPE", f) "LECTOTYPE / Goniophileurus / femoratus (Burmeister, 1847)", g) "MNHN / EC4024" (1 male dissected, examinated trhough images, *Goniophileurus femoratus* (Burmeister)).

Haplophileurus **Kolbe, 1910**

Haplophileurus caudipenis **Dupuis, 2011**

Peru. "PERU, / Satipo, Paraíso / Tuncana, III.2009 / Ex-col. R.M. Koike // Coleção E. / & P. Grossi" (1 male dissected); "Equateur, Cañar, La Troncal, 500 m, 29 XII 1994" (holotype male dissected, examinated through images).

Haplophileurus dechambrei **Dupuis, 2011**

Colombia. "Colombie, Valle del Cauca, Calima, Alto de la Virgen, 27VI-01VII 1992", (holotype male dissected, examinated through images).

Hemiphileurus **Kolbe, 1910**

Brazil. Amazonas. "BR, AMAZONAS, NOVO AIRÃO / NOVA ESPERANÇA, QUADRA E / 10-11.VII.1997, P. Bührnheim, NO. / Aguiar, NF Fé & FA Fé col." HEMIPHILEURUS KAHNI, (1 male dissected); "BRASIL, Amazonas, Novo / Airão, ramal do Olímpio / 02°39'23"S/60°55'44"W / 03-15/vii/1997, Bührnheim / PF, Aguiar NO, Fé NF col.", "Em bainha de / Inajazeiro". HEMIPHILEURUS KAHNI, (1 female no dissected). *Piauí*. "Local: CCS – UFPI / Data: 03/04/12 / Coletor Oliveira A.A.", "Ordem: Coleoptera / Família: Scarabaeidae" HEMIPHILEURUS KAHNI, (1 male dissected); "Local: UFPI – CCA / Data: 14/06/12 / Coletor: Reis, L.H.C.", "Ordem: Coleoptera / Família: Scarabaeidae". HEMIPHILEURUS KAHNI, (1 female no dissected); "Local: UFPI – CCA / Data: 27/08/17 / Coletor: Marcos". HEMIPHILEURUS KAHNI; "Local: UFPI – CCA / Data: 21/01/14 / Coletor: Biamires, J.A.". HEMIPHILEURUS KAHNI, (1 female no dissected). *Maranhão*. "Brasil (MA), Mirador / Parque Est. Mirador / Povoado Pindaíba

(Mel) / 06°39’44”S/45°01’37”W”, “Armadilha Luminosa / 01-05.vi.2011 F. Limei- / ra-de-Oliveira, A.A. Santos / & T.T.A. Silva, cols”, “Hemiphileurus kahni” (handscript), (1 female no dissected). *Mato Grosso*. “BRASIL: Mato Grosso, / Paranaíta. UHE Teles / Pires 09°10’29”S 56°47’ / 38”W 195m. 23m-X-2011. APBenelli”. HEMIPHILEURUS SP. N. 2, (1 female no dissected). *Goiás*. “BRASIL: Goiás, São / Jorge. PN Chapada / Veadeiros. Campo / rupestre. 14°10’18”S / 47°49’35”W. humanfaec. / I.2011. RV Nunes“ (CEMT). HEMIPHILEURUS SP. N. 2, (1 male dissected).

Cuba. “Cuba: Pinar / Rio, Sierra / Rosario, 400 m / 5-15.vi.1990 / V.O. Becker” (1 male and 1 female no dissected), *Hemiphileurus parvus*. “Cuba // MUS. LAFERT. É. / 1145 // Ex-Musaeo / D. Sharp 1890 // MUSÉUM PARIS / 1952 / coll. R. Oberthür // Hemiphileurus parvus n. sp. / HOLOTYPE / det. F. DUPUIS 2000 // HOLOTYPE // MNHN / EC3928” (1 male dissected).

***Homophileurus* Kolbe, 1910**

Brazil. *Amazonas*. “BRASIL, Amazônia, / Presidente Figueiredo / AM 240, km 24, 14-17-ix- / 2009, luz, Leivas, Paladini/ Pires & Xavier legs”; HOMOPHILEURUS WALDENFELSI, (1 male no dissected). *Bahia*. “Brasil, Bahia, Antônio / Gonçalvez, Fazenda / Lajinha, iv.2017, R. / Barros leg.”; HOMOPHILEURUS TRICUSPIS PRELL, (1 male no dissected). *Ceará*. “Ordem: Coleoptera / Família: Passalidae / Det: Silva, J.F.S.F. / Manual”, “Itapipoca, CE, Brasil / 17/12/2016 / Col: Silva, J.F.S.F. / Localidade Mel”, “Homophileurus quadrituberculatus R.A.F. Medeiros det. 2021”, (1 male no dissected); “Homophileurus quadrituberculatus R.A.F. Medeiros det. 2021” [Coleção didática da UFC], No collect data (1 female ?). *Distrito Federal*. “Brasil, DF, Fazenda / Água Limpa, -15.9576011S, / -47.9328443W, 28/i-4/ii/2017, / Excursão Entomologia UnB.” “CEMT”, (1 ?). *Goiás*. “Brasil, GO / Chapada dos Veadeiros / São Jorge. II.2020 / Paulo

Duarte Leg.", (1 ?). *Maranhão*. "MA – Carolina, 22.x.2009, luz, 18.04020?", "HOMOPHILEURUS QUADRITUBERCULATUS (PALISOT) R.A.F. MEDEIROS det. 2021", (1 female no dissected). "MA – Carolina, 22.x.2009, luz, 18.04020?", "HOMOPHILEURUS INTEGER (BURMEISTER) R.A.F. MEDEIROS det. 2021", (1 female no dissected). *Mato Grosso*. "Brasil, Mato Grosso. / Cuiabá, Faz. Mutuca. 13-xii- / 2008, 300m, 15°18'17"S/ / 55°58'03"W, FIT, FZ Vaz- / de-Mello e equipe legs.". HOMOPHILEURUS AMAZONICUS, (1 male dissected); "Mato Grosso, Diamantino, Faz. Vale da Solidão" 1 [VS III-2016]. "HOMOPHILEURUS QUADRITUBERCULATUS (PALISOT) R.A.F. MEDEIROS det. 2021", (1 ? no dissected). *Minas Gerais*. "Brasil, Minas Gerais, Ingai, / Próx. Poço Bonito, 21.x.2016. / 1140m, -21.339°S, -44.970°W. / Grossi, Vaz-de-Mello, Frieiro, / Silva, Fuhrman, Mariano legs." HOMOPHILEURUS LUEDERWALDTI OHAUS, (3 females and 2 males) (1 male and 1 female with everted genitalia, 1 male dissected); "MG, Itumirim / Faz. Júlio Louzada / 31.iii.2012 / Vaneska col." HOMOPHILEURUS LUEDERWALDTI OHAUS, (1 female with everted genitalia); - "Lavras, MG / Codemin / 15.XI.93", (1 male dissected). *Pará*. "Brasil, Pará, Belém, / Campus UFRPA, 05- / 15.i.2015, P.R.M. Duarte / leg." (1 male dissected). *Paraíba*. "Patos, PB, BRA / 18-IV-2012 / Carvalho, I.", "Coleoptera", "HOMOPHILEURUS QUADRITUBERCULATUS (PALISOT) R.A.F. MEDEIROS det. 2020", (1 female no dissected). *Pernambuco*. "Brasil, Pernambuco, / Camaragibe, Aldeia, / PE-027, km 14, / viii.2019, P. Grossi leg." HOMOPHILEURUS QUADRITUBERCULATUS, (1 female no dissected); "Brasil, Pernambuco, Recife, / UFRPE, Horta, Rede / entomológica, 21-ix-2014, C.S. Silva. 2014", "HOMOPHILEURUS QUADRITUBERCULATUS", (1 male no dissected); "Aldeia / 28.i.2015", "HOMOPHILEURUS QUADRITUBERCULATUS", (1 male with everted genitala).

***Hovophileurus* Arrow, 1911**

Hovophileurus sulcicollis (Fairmaire, 1899)

Madagascar. “Madag / Terr? // Trionychus / sulcicollis / Fairm in ? // MUSÉUM PARIS / 1906 / Coll. Léon FAIRMAIRE // TYPE // Hovophileurus ♀ / sulcicollis Fairmaire / LECTOTYPE / R.-P. Dechambre det. 1975 // LECTOTYPE // MNHN / EC3988” (1 female no dissected, examinated through images).

Hovophileurus latus Dechambre, 1976

Madagascar. “MADAGASCAR / Prov. Andovorante / Forêt de Analamazaotra / H. Humbert 1912. // MUSÉUM PARIS / 1952 / COLL R OBERTHÜR // M 595 // ? / R.-P. Dechambre // Hovophileurus / latus n. sp. milei / HOLOTYPE / R.-P. Dechambre det. 1975 // HOLOTYPE // MNHN / EC3985” (1 male dissected, examinated through images); “Madagascar / forêts d’Antsianaka / L. Humblot 1888 // Museum Paris / ex Coll. / R. Oberthur // Hovoplhileurus latus milei ♀ / PARATYPE / R.-P. Dechambre det. 1975 // PARATYPE // MNHN / EC3423” (1 female dissected, examinated through images); “MADAGASCAR / Prov. Andovorante / Forêt de Analamazaotra / H. Humbert 1912 / MUSÉUM PARIS / 1952 / COLL R OBERTHUR // Interstries plans . 1er strie / alscute ou reduite à II furiets / teufes aub ? / 1.1.76 // Hovophileurus / latus n. sp. milei / ALLOTYPE / R.-P. Dechambre det. 1975 // PARATYPE // MNHN / EC3422” (1 female dissected, examinated through images).

Kirprellius Allsopp, 2022

Kirprellius syrichtus (Fabricius, 1775)

South Africa. "ÁFRICA DO SUL, / Província do Cape, / Cape, VI.1961 / Ex-coleção G. Pross // Syrictes syrichtus / (Fabricius, 1775) / E.J. Grossi / Det. 2009 // COLEÇÃO E. / & P. GROSSI", (1 male dissected); "S. AFRICA / Graham ? [ilegível] / (CAPE) \ GUINEA / Tofolui // Syrictes / syrichtus (F.) ♀ / J. Decelle det. 1985", (1 female no dissected).

***Kirprellis rugulosus* Dupuis, 2013**

South Africa. “SOUTH AFRICA // EX COLL. H.W. BATES // MUSÉUM PARIS / 1952 / coll. R. OBERTHÜR // Syrictes rugulosus n. sp. / HOLOTYPE / F. DUPUIS / 2013 // HOLOTYPE // MNHN / EC4029” (1 male dissected, examinated through images”.

***Kirprellis curvicornis* Endrödi, 1977**

Tanzania. “TANZANIA Tulawaka / xi.02 Bucket pitfall / Brachystegia woodland / University of DSM coll. // BMNH{E} / 2010-91 // BMNH{E} / 1193713 // Syrctes / curvicornis Endrodi / det. H Takano 2012”. (1 male dissected, examinated through images).

***Macrocyphonistes* Ohaus, 1910**

***Macrocyphonistes kolbeanus* Ohaus, 1910**

Tanzania. “TANZANIA 1759m / Maskati, Nguru Mountains / S06°03’29” E 37°29’08” / 6-9.xii.2010 Light trap / leg Smith, R & Takano, H // Macrocyphonistes / kolbeanus Ohaus / S. Pokorný det. 2012 // BMNH{E} / 2010-91 / 1026909” (BMNH, 1 male dissected, examinated through images).

***Metaphileurus* Kolbe, 1910**

***Metaphileurus lacunosus* (Burmeister, 1847)**

Brazil. Minas Gerais. “Pitangui / 22.II.2003 / A. Campagnani col” (CERPE), (1 male); “Vale das Borboletas / São Thomé das Letras, MG, / Brasil / 22.XI.2005 / L.C. Rocha-filho col.” (CERPE), (1 male); “Itutinga, MG, BR / 27.09.2014 / Caputo, A. L. C.” (EPGC) (1 male dissected). *Rio de Janeiro*. Neótipo macho etiquetado (examinated by photos) “Rio.d.Janeiro / Petrópolis / Ohs.23.II.98” (ZMB); “BRASIL, RJ, Petropólis, / Morrim, Morro da / Bandeira, 1600 m / Torres da PETROBRÁS, / 02-10.II.2010” (1 ? dissected) (CERPE); “BRASIL, RJ, Nova / Friburgo, Macaé de /Cima – 1600 m / 1-15.II.1997 ♀/ E. & P. Grossi col.”, “COLEÇÃO E. / & P. GROSSI”

(EPGC), (1 female); “BRASIL, RJ, Nova / Friburgo, Macaé de / Cima – 1600 m / 1-15.II.2000 ♀ / E. & P. Grossi Leg.” , “COLEÇÃO E. / & P. GROSSI” (EPGC), (1 female?); “BRASIL, RJ, Nova / Friburgo, Macaé de / Cima – 1600 m / 1-15.II.2003 / E. & P. Grossi Leg.”, “COLEÇÃO E. / & P. GROSSI” (EPGC), (1 male?); “BRASIL, RJ, Nova / Friburgo, Macaé de / Cima – 1600 m / 1-15.II. 2005♀ / E. & P. Grossi Leg.”, “COLEÇÃO E. / & P. GROSSI” (EPGC), (1 female ?); “BRASIL, RJ, Nova / Friburgo, Sítio / Catumara – 1100 m / 1-15.II.1999 ♀ / E. & P. Grossi Leg.”, “COLEÇÃO E. / & P. GROSSI” (EPGC), (1 female?); “BRASIL, RJ, Nova / Friburgo, Sítio / Catumara – 1100 m / 1-15.II.2003 ♀/ E. & P. Grossi Leg.”, “COLEÇÃO E. / & P. GROSSI” (EPGC), (1 female); “BRASIL, RJ, Nova / Friburgo, Sítio / Catumara – 1100 m / 1-15.II.2004 ♂/ E. & P. Grossi Leg // [verso] Genitalia / is lost.” , “COLEÇÃO E. / & P. GROSSI” (EPGC), (1 male?); “BRASIL, RJ, Nova / Friburgo, Sítio / Catumara – 110 m / 1-15.II.2005 ♀ / E. & P. Grossi Leg.”, “COLEÇÃO E. / & P. GROSSI” (EPGC), (1 female); “Campo do Coelho / N. Friburgo - RJ / Penna Fº / I-95” (EPGC), (1 male ?); “Campo do Coelho / N. Friburgo - RJ / Penna Fº / III-95.” (EPGC), (1 male?); “BRASIL, RJ , Visconde / de Mauá – 1300 m / 15.I.1997 / E. & P. Grossi Leg.”, “COLEÇÃO E. / & P. GROSSI”. (1 female).

Metaphileurus nitidicollis Kolbe, 1910

Brazil. *Santa Catarina*. “Brasilien / St. Catharina / Theresopolis / Fruhstorfer S.”, “Metaphil. nitidicollis n.sp.”, “Holotypus / Metaphileurus / nitidicollis / Kolbe” (ZMB), (Examinado por fotos), (1 male dissected). *Paraná*. “Paraná / Curitiba / 1938 / J. Leprevost Leg” (EPGC), (1 male dissected); “BRASIL, PR / Piraquara, Mananciais / da Serra, 1100 m / 10.XI.2005 / P. C. Grossi Leg.”, “COLEÇÃO E. / & P. GROSSI” (EPGC), (1 female); “BRASIL, Paraná, Campina / Grande do Sul, PE Pico / Paraná, Caratuva, 15-X- / 2008, 1800m, C. M. Maia.” (EPGC), (1 female); “Coleção / didática / UFPR” (EPGC), (1 female). *Rio Grande do Sul*. “São Fco. Paula-RS-BR /

Pró-Mata / Proj.-Araucária / 15-18.XI.2001 / MCTP" (EPGC), (1 female); "São Fco. Paula-RS-BR / Pró Mata / 15-18.I.2002 / Proj. Araucária / MCTP" (EPGC), (1 male dissected); "São Fco. Paula-RS-BR / Pró-Mata / 15-18.II.2002 / Proj. Araucária / MCTP." (EPGC), (1 female).

Metaphileurus acoensis new species Medeiros & Grossi, 2023

Brazil. *Minas Gerais*. "BRASIL., MG, / Ipatinga – 200 m / 15-31.XII.1990 / E & P Grossi Leg.", "COLEÇÃO E. / & P. GROSSI" (EPCG > CERPE), (1 male and 1 female – Holotype and Paratype); "J. F. Zikán / Faz. Dos Campos 1500 m / Virgínia – E. de Minas / 3-XII-1920", "Metaphileurus / lacunosus / Burm." [manuscrita], "Coleção / J. F. Zikan", "cf." (1 male dissected and 1 female).

Metaphileurus bacchus new species Medeiros & Grossi, 2023

Brazil. *Minas Gerais*. "MG Extrema / Torre da Embratel / 09.XII.2012 / em tronco. 1600m / Paschoal C. Grossi col", (CERPE), (1 male dissected). *Rio de Janeiro*. "BRASIL, RJ, Nova / Friburgo, Macaé de / Cima – 1600 m / 1-20.XII.2001/ E. & P. Grossi cols" , "COLEÇÃO E. / & P. GROSSI" (EPGC > CERPE), (1 male dissected, Holotype); "BRASIL., RJ, Nova / Friburgo, Macaé de / Cima – 1600 m / 1-15.XI.2004 / E. & P. Grossi Leg." , "COLEÇÃO E. / & P. GROSSI" (EPGC), (2 females no dissected, Paratypes); "BRASIL., RJ, Nova / Friburgo, Macaé de / Cima – 1600 m / 1-15.XI.2006 / E. & P. Grossi Leg.", "COLEÇÃO E. / & P. GROSSI" (EPGC), (1 female); "BRASIL., RJ, Visconde / de Mauá – 1300 m / 15.I.1997 / E. & P. Grossi Leg.", "COLEÇÃO E. / & P. GROSSI" (EPGC), (1 female no dissected).

Microphileurus Kolbe, 1910

Microphileurus caviceps Kolbe, 1910

Microphileurus subulo Prell, 1912

Brazil. Mato Grosso. “MT. FZVM / 2016 ? , “Microphileurus / subulo Prell, 1912 / Medeiros, R.A.F. det. 2020.”, (1 male dissected and 1 female no dissected). *Goiás*. “BRASIL, GO, / Mineiros X.89 / C. Godinho Leg.” , (1 male dissected).

Peru. “PERU: JU. Satipo, / Pisigranja bellow / Mariposa, 74.7677°W/ / 11.40756S, 1275 m / 20.x.2011; beating; / E. Nearns & S. Carbonel”, “Microphileurus / subulo Prell, 1912 / Medeiros, R.A.F. det. 2020, (1 female no dissected).

Bolívia. “Bolívia- / Santa Cruz- 500m / NOV.1960 - Zischka"(1 female no dissected).

Mictophileurus Ohaus, 1911

Mictophileurus punctulatus Ohaus, 1911

Brazil. *Rio Grande do Sul*. “BRASIL: Rio Grande do Sul. / São Francisco de Paula. / Pró-Mata. 29°29’20”S, / 50°11’38”W 20.II-19.III.2002. / Pitfall, Mata Primária. R Ott”, “Mictophileurus / punctulatus Ohaus / P. Grossi det 2017”, (1 male dissected). *Santa Catarina*. SC – Flo / rianópolis / 24.III.2014 / P.G. Silva col.”, (1 female no dissected).

Oryctophileurus Kolbe, 1910

Oryctophileurus nasicornis (Burmeister, 1847)

Colombia. “Nasicornis / Colomb B / Type // MUSÉUM PARIS / 1952 / coll. R. OBERTHÜR // Phileurus nasicornis B. / LECTOTYPE / F. DUPUIS 2013 // LECTOTYPE // LECTOTYPE / Oryctophileurus / nasicornis (Burmeister, 1847) // MNHN / EC4027” (1 male dissected, examinated through images).

Oryctophileurus varicosus Prell, 1934

Bolivia. “BOLÍVIA / La Paz region / Caravani – Jan.2003” (1 male dissected); “BOLÍVIA / La Paz region / Caravani – Jan.2003” (1 female no dissected).

Oryctophileurus guerrai **Perger & Grossi, 2013**

Brazil. *Amazonas*. a) “male symbol label”; b) “Brasil, Amazonas, Uarini,/ 03°02'57"S, 65°41'42"W,/ 22/VII-03/VIII/1995, P./ Bührnhein, N.Aguiar & al.”; c) handwritten label “NO ALBURNO DE/ TRONCO CAÍDO/ 01/VIII/1995” (UFAM, 1 male dissected, examinated through images); a) “Brasil, Amazonas, Coari,/ Duto Urucu/Porto Terminal,/ 04°50'16"S, 65°20'36"W,/ 16/VI/1996, Bühmheim (sic),/ P.F. & Aguiar, N.O. col.”; b) handwritten label “Em tronco/ caído” (EPGC, 1 male).

Palaeophileurus **Kolbe, 1910**

Brazil. *Mato Grosso*. “BRASIL: Mato Grosso /Diamantino. Manual / 16-XII-2011 / M. Muriano”, (1 ? no dissected); “BRASIL: Mato Grosso, / Cotriguaçu, Faz. São / Nicolau, 20.viii.2018, / R Stofel.”, “CEMT”, (1 ? no dissected); “BRASIL: Mato Grosso, / Comodoro. Morro do Sem / Bonéi. 13°43’54”S.60°18’40”W. / manual X-2012 M.F. Souza”, “CEMT”, (1 ? no dissected). *Pará*. “Brasil. Pará. Belém / I.2015 Col manual.”, “Dynastinae / Oryctini / Marcelv Valois det.”, “CEMT”, (1 ? no dissected).

Equador. “ECUADOR: Orellana. PNYasuni. Bloque16.8- / IX-2000. PAraujo. Luz”, “lote G17 / Scarabaeidae”, “CEMT”, (1 ? no dissected); “Ecuador: Pastaza B.P. / Oglan Alto / 8 de julio 2007 / 9853757N; 209286E / 600 m.s.m. B???? [apagado] / Col: 2A trampa de luz”, “CEMT”, (1 ? no dissected); “15.02.00 / S. Matapalo / Trampa de luz / Ocampo, Araujo”, “ECUADOR: Orellana. Tiputini Biol. Sta. 15-II- / 2000. COcampo, / PAraujo. Manual, tierra / firme”, “CEMT”, (1? no dissected).

Guiana. “Brit. / Guiana // Phileurus / sclateri / Bates // Ex-Musaeo / H.W. Bates / 1892 // Museum Paris / ex. Coll. / R. Oberthur // Palaeophileurus / sclateri (Bates) / LECTOTYPE / R.-P. Dechambre det. 1996 ♀ // LECTOTYPE // MNHN / EC3990” (1 female with everted genitalia).

Guiana Francesa. “Guiana Francesa, / Savane Match, Fôret de / Wayabo, xi.2012, / cryldé, FZ Vaz-de- / Mello”, “Palaeophileurus fallax”, (3 ? no dissected).

Paraphileurus Endrödi, 1978

Paraphileurus ventricosus (Burmeister, 1847)

Colombia. “Cauca dep., Cauca Valley” (1 male dissected) (ZMHB), examinated through images.

Brazil. *Amazonas*. “BRASIL, AM, Manaus, ZF2, / km-14, estrada, 15-18.vi / 2004 lençol: luz mista, J.A.” “Rafael, C.S. Motta, F. Godoi, S. Trovisco & A. Silva F°.” “Paraphileurus / ventricosus / Medeiros det. 2020”, (1 male dissected).

Phileucourtus Dechambre, 2008

Brazil. *Rondônia*. “TROMB RIVER RONDONIA / 07/2008 (BRESIL) // Phileucourtus / bicornutus / Dechambre, 2008 / Det. Y. Ponchel 2009”, (1 female no dissected).

Peru. “PERU, Satipo, / Paraíso, Tuncana / 8.XII.2008-R. Koike / H. Rojas Leg.”, “Phileucourtus / bicornutus / Dechambre, 2008 / Det. E. J. Grossi 2009”, “COLEÇÃO E & P GROSSI.”, (1 male dissected); “PERU, Huanuco, / Tingo Maria, III-2009 / 1200 m, R. Foerster // COLEÇÃO E. / & P. GROSSI”, (1 male dissected).

Phileurus Latreille, 1807

Brazil. *Amazonas*. “Brasil, AM, Presidente Figueiredo, / Am-240, Km 24 / 02°35’21”S/60°06’55” W / 13-17/VII/2009”, F.F. Xavier F; R Machado / S. Oliveira; C. Schwerther / R.A.P. Freitas

Silva", "Armadilha de Luz / Mista de Mercúrio / Lençol", (1 ? no dissected); "BR, AM, Coari, rio Urucu / 4°51'56.5"S/65°0.4'56,6"W / 11-18/V/1991, P. Buhrnheim / N.O. Aguiar & F.A. Fé col.", "à luz mista / de mercúrio", (1 ? no dissected); "BRASIL, Amazonas, Coari, / rio Urucu, próx. IMT-1 / 4°49'33"S/ 65°01'49"W, / 17-29/IX/1995, P. F. / Bührnheim & N.O. Aguiar", "à luz mista / de mercúrio", (1 ? no dissected); "BRASIL, Amazonas, Coari, / rio Urucu, RUC – 36 / 4°55'53"S/65°18'13"W, / Bührnheim et al col.", "à luz mista / de mercúrio", (1 ? no dissected); "BRASIL, Amazonas, Juruá, / Mineruazinho, 03°34'85"S/ / 66°59'15"W, 13-25/I/1996 / P. Buhrnheim, N.O. Aguiar / et. al. col.", "à luz mista / de mercúrio", "Phileurus sp." [manuscrita], (1? no dissected); "BRASIL, Amazonas, Tefé, / locação, São Mateus, / 4°43'24"S/65°40'06"W, / 07-16/IX/1994, P.F. / Bührnheim et al col.", "à luz mista / de mercúrio", (1 ? no dissected); "Brasil, Amazonas, Manaus, / R. Florestal Adolpho Ducke, / 16-20.ix.2010, arm. Malaise, Cordeiro, Grisales, Guedes / & Haseyama legs.", (1 ? no dissected). *Bahia*. "BA. EUCLIDES DA CUNHA // MASSALARÁ, TERRA INDÍGENA // 26.III.2018 // ANTÔNIO DIAS LEG.", (1 female ?). *Ceará*. "Fortaleza, CE, Brasil, / 10/06/2017 / Col: Costa, A.M. / NEEF – UFC", "Ordem: Coleoptera / Família: Scarabaeidae / Det: Costa, A. M. / Manual", "PHILEURUS VALGUS R.A.F. MEDEIROS det. 2021", (1 ? no dissected); "PHILEURUS VALGUS R.A.F. MEDEIROS det. 2021" [COLEÇÃO DIDÁTICA DA UFC], No data (1 ?); "BR, CE, Fortaleza, / Col. Didática UFC", "Phileurus didymus / (Linnaeus) ♀ Medeiros, R.A.F. det. 2020", "01", (1 female dissected [?]); "BR, CE, Forta / leza, Col. / Didática UFC", "Phileurus valgus / Medeiros, R.A.F. / det. / 2020", (1 male dissected); "BR, CE, Fortaleza, / Col. Didática UFC", "Phileurus valgus / (Olivier) / Medeiros, R.A.F. / det. / 2020", (1? no dissected). *Maranhão*. "CZMA / Brasil (PI), Piracuruca / P.N. de Sete cidades / Posto do ICMBio / 04°05'57"S/41°42'34"W" "CZMA / Armadlha Luminosa / 18-20.iv.2012, J.T. / Câmara, J.S. Pinto Junior, cols." "Phileurus sp. nov. 1 / P.C. Grossi det 2015", (1 male dissected). *Mato Grosso*. "Brasil, Mato Grosso, / Diamantino,

Fazenda Vale / da Solidão, 01.xi.2015, / E. Furtado leg.", (1? no dissected); "Mirador (MA) / 07-14.iii.2013 / Luminosa / Limeira cols." "Phileurus sp. nov. 1/ P.C. Grossi det. 2015", NEW SPECIES (1 male dissected); "MA – Carolina, 22.x.2009, luz, 18.04020?", PHILEURUS SP. NOVA (2 specimens no dissected – 1 female e 1 male [???]); "MA – Carolina, 22.x.2009, luz, 18.04020?", (1 ? no dissected); "Mato Grosso, Diamantino, Faz. Vale da Solidão" 1[VS 21-x-2014], 1 [VS III.2016]", (2 ? no dissected). *Mato Grosso do Sul*. "BRASIL: Chapadão do / Sul. Mato Grosso do Sul. / 18°46'30,09"S; 52°31'04,98"W / Armad Lumin. 4-IV-2016. / A. Specht.", "CEMT", (1 ? no dissected). *Minas Gerais*. "Brasil, Minas Gerais, / Berizal, Fazenda Veredão, / -15.6649°S, -41.6655°W, / 885m, 13-18.xii.2012, / pitfall, E. & P. Grossi, J.Á. Rafael, G.A.R. Mello legs.", (1 ? no dissected); "BRASIL: Minas Gerais / Rio Pardo de Minas. / Vereda Funda / 15°55'00"S; 42°29'00"W / 3.XII.2010 A.J.A. Camargo", "CEMT", (1 ? no dissected); "Brasil, Minas Gerais, / Águas Vermelhas, Faz. / Faceiro. 14.xii.2012 / G.A.R. Melo leg.", (1? no dissected); "MG, Águas Vermelhas, Faz. Faceiro, 16-XII-12, E. & P. Grossi, luz", (1 ? no dissected). *Pará.* "Brasil Pará / São João de Pirabas / Japerica / 18.XII.1992 // Brasil Pará / J Dias // Armadilha / de Luz // Phileurus [handscript] // QR Code / MPEG 010337937", (1 female no dissected). *Paraíba*. "BRA, PB, Itaporanga / 12-IV-2014 / Silva, R.P.S.", "Coleoptera", "PHILEURUS AFFINIS BURMEISTER R.A.F. MEDEIROS det. 2020", (1 female no dissected). *Paraná*. "Piraquara / II.2012. breed.", (1 male no dissected); "PALMAS-PR / 17-III-2011 / SANTOS, K. Col.", (1? no dissected); "BR, Paraná, Palotina, 2014-2015", (5 ? no dissected); "Paraná, Guaratuba, Portal do Itararé, 09.ii.2008, 900m, O.H. Mielke", (1 ? no dissected); "Foz do Iguaçu – PR, Parque Nacional do Iguaçu, 15-XII-2015, Light trap Luiz de Queiroz, leg: J.P.B. Pine & R.C. Barros", (2 ? no dissected). *Pernambuco*. "Brasil, Pernambuco / Camaragibe, PE 027 km14 / 01-31.iii.2018, 140 m, luz / -7.929°S, -35.038°W / Grossi & Parizotto legs.", (1 male with everted aedeagus); "Brasil, Pernambuco, / Camaragibe, PE 027, km 14, / 01-28.ii.2018, 140m, -7.929°S / -

35.038°W, luz, P.C. Grossi", (2 females and 1 male with everted genitalia). *Piauí*. "SCARABAEIDAE / Phileurus sp. 2", "Brasil, Pi, Teresina / 29/04/2007 / Domingos Loura", (1 ? no dissected); "Ordem: Coleoptera / Família: Scarabaeidae", "Local: St. C. Milagres PI / Data: 28/7/14 / Coletor: Moura, A.M.A.", (1? no dissected); "Local: BARRAS / Data: 05/3 / Coletor: Jorge.", (1? no dissected). *Rio de Janeiro*. - "C.E.C.L. / Seropédica.RJ / 13-VIII-2002 / Esteves, D.V.", (1 ? no dissected). *Roraima*. "BRASIL, RR, / Pacaraima, Ramal do / Miangue, Cachoeira, 4°29'32"N- 61°04'55"W" "27.iii.2016 J.A. Rafael, / A.P.M. Santos, C.C. / Gonçalves, A. Ferreira, / C. Maldaner, Arm. Luz.", (1 male no dissected); "BRASIL, RR, Caracaraí, / PARNA Viruá, 01°29'3°N - / 61°00'08.7"W, 61-20.iv.2015, / Arm. Luminosa, J.A. Rafael, / R. Heleodoro, D.M.M. Mendes, / D.W.A. Marques & C. Maldaner", (1 male dissected); "BRASIL, RR, Caracaraí, PARNA Viruá, 01°29'23.3"N - / 61°00'08.7"W, 16-20.iv.2015, / Arm. Luminosa, J.A. Rafael, / R. Heleodoro, D.M.M. Mendes / D.W.A. Marques & C. Maldaner", "PHILEURUS VALGUS (OLIVIER) R.A.F. MEDEIROS det. 2020", (1 female no dissected). *São Paulo*. "BRASIL. SP / Porto Feliz / 28.abril.2016 / Siqueira. PB col", (1? no dissected). *Tocantins*. "BRASIL: Porto Nacional. / Tocantins. / 10°31'08,55"S; 48°17'35,988"W / Armad lumin. 10-X-2015. / A. Specht", "Phileurus excava / tus Prell / Medeiros, R.A.F. det. / 2020", "CEMT", (1 ? no dissected).

Argentina. "Argentina, Chaco / Charata, i.2008 / -27.2167S/ -61.2W, / 100m, local collector.", (2 males dissected, 1 ? no dissected).

México. "México, / Hidalgo / 18.VII.2007 / Santos Leg." "COLEÇÃO E & P GROSSI", (1 male dissected).

Paraguai. "Paraguay, Boquerón, Pinzal, / Vicariato Apostólico, Del / Pilcomayo, 10-12.xii.2003, / -22.900°S, -60.716°W, 148m, B. Garcete leg.", (1 male dissected).

Brazil. *No data*. "PHILEURUS VALGUS R.A.F. MEDEIROS det. 2020", (1 female no dissected).

***Prosphileurus* Kolbe, 1905**

***Prosphileurus liberianus* (Dohrn, 1875)**

Zaire. "Dr. V ALLARD / Kanzuzi 10-80 / W-Katanga / Zaire // liberianus", (1 female no dissected).

Togo. "TOGO, Western Africa, / Kloto, Plateau Region, / 10-15.V.2000 / J. Touroult Leg. // Prosphileurus / liberianus / (Dohm, 1875) / Det. E.J. Grossi 2009 // COLEÇÃO E. / & P. GROSSI", (1 male dissected).

***Pseudosyrichthus* Peringuey, 1901**

***Pseudosyrichthus clathratus* (Gerstaecker, 1867)**

Benin. "BENIN, Africa, / Tanguieta, / 01-10.V.2000 / J. Touroult Leg. // Pseudosyrichthus clathratus / Gerstäcker, 1866 / E.J. Grossi / Det. 2009 // COLEÇÃO E. / & P. GROSSI", (1 male dissected).

South Africa."RODESIA, Africa, / Salisbury / VI.1959 / Ex-coleção G.Pross // Pseudosyrichthus clathratus / Gerstäcker, 1866 / E.J. Grossi / Det. 2009 // COLEÇÃO E. / & P. GROSSI", (1 male no dissected).

***Rhizoplatodes* Péringuey, 1901**

***Rhizoplatodes castaneipennis* (Fairmaire, 1893)**

Grande Comore / L. Humblot. / 1884. // Trionychus / foveiceps / Fairm // LECTOTYPE // LECTOTYPE / Rhizoplatodes / castaneipennis / foveiceps (Fairmaire, 1893) // MNHN / EC4005" (1 male dissected).

***Rhizoplatodes cherlonneixi* Dechambre, 1997**

Gabon. “Léconi xi.1995 / GABON / E. Cherlonneix // Rhizoplatodes / cherlonneixi n. sp. Milei / HOLOTYPE / R.-P. DECHAMBRE det. 1997 / ♂ // HOLOTYPE // MNHN / EC4004” (1 male dissected).

Rhizoplatys Westwood, 1842

Gabon. "GABON / Sindara / 1985 / J.L. MORENO - T. MESTRE LEG", (1 male no dissected).

Benin. "Bénin (Atlantique) / Attogon, 28-V-2000 / (P.L.) Touroult leg", (1 female no dissected).

Rhizoplatys arabicus Dechambre, 2005

Oman. “Oman, Dzhophar Province, djebel Samhan, 23-25.IX.2003, 900-1150m Euphorbia roots, S Jákl leg.” (1 male dissected, examinated through images).

Syrichthodontus Péringuey, 1901

South Africa. "RSA Randburg / Lanseria / 30.10.88 A. Poll", (1 female no dissected); "Claubel [?] / 10-89 / NATAL / RSA // spurius", (1 male no dissected).

Syrichthoschema Janssens, 1942

Syrichthoschema burgeoni Janssens, 1942

Democratic Republic of the Congo. a) “A. Janssens det., 1941; / Syrichthoschemma / Burgeoni type / n. gen. n. sp. ♂ [manuscript]”, b) “TYPE [red label]”, c) “MUSÉE DU CONGO / Kivu ; Tshibinda / 1-XII-1932 / L. Burgeon”, d) “R. DÉT / S / 4347”, e) “S. TYPE ♂ / Burgeoni [red label manuscript]” (holotype male dissected, examinated through images).

Syrichthoschema vingerhoedti Bouyer, 2014

Kenya. “Kenya Mt Meru (>2000m), 28/29-XI-2005, E. VINGERHOEDT” (holotype male dissected, examinated through images).

Trioplus Burmeister, 1847

Trioplus cylindricus (Mannerheim, 1829)

Brazil. *Bahia*. “Brasil, BA, Conceição do / Almeida, Intersecção da / BR 101 c. o Rio Jaguaripe / 21.VIII.79, J. Becker. leg.” (1 female not dissected). *Minas Gerais*. “BRASIL, MG, Berizal, Faz. / veredão 15-XII-2007 850m, / 15°39’53”S41°39’56”W / Grossi, Rafael & Parizotto / Coleta Manual // COLEÇÃO E. & / P. GROSSI”, (1 male dissected); “Brasil, Minas Gerais, Ouro / Preto, Est. Ecol. Tripui / Macacos -20.39583 S / -43.57583 W, 02.xii.2014 / M.A.A. Carneiro leg.” (1 female not dissected). *Paraná*. “Foz do Iguaçu – PR, Parque Nacional do Iguaçu, X-XI-2015, Light trap Luiz de Queiroz, leg: J.P.B. Pine & R.C. Barros”, (1 male dissected, 1 female no dissected); “Céu Azu – PR / Parque Nacional do Iguaçu, 14-x-2015 / Light trap Luiz de Queiroz leg: J.P.B. Pine & R.C. Barros”, (1 male no dissected); “Brasil, Paraná, Foz do / Iguaçú, P.N. de Foz do / Iguaçú, Céu Azul, luminosa, / 15.x.2015, J.I.B. Pine & R.C. / Barros legs.” (1 male and 1 female no dissected); “Brasil, PR, Jaguanaiva / Parque E. do Cerrado / 19-19-XI-2009, 850 m / P.C. Grossi col. manual // COLEÇÃO / E. & P. Grossi”, (1 female no dissected); “BRASIL, PR, Piraquara, / Mananciais da Serra / 17.X.2007 – 1000 m / Grossi & Parizotto cols.”, (1 male dissected); “COLEÇÃO / E. & P. Grossi // PR, Castro, Parque / Est. Caxambu / 1000 m, 23.x.2005 / Grossi & Parizotto” (1 female no dissected). *Rio de Janeiro*. “Macaé de Cima XII-I-II-2008-10”, (1male no dissected); “BRASIL, RJ, / Teresópolis, 600m / 01 a 31.XII.2006 / E.J. Grossi Leg. // COLEÇÃO / E. & P. Grossi”, (1 female no dissected).

Brazil. *No data*. “sp 22”, “macaco / 02-12-10”, (1 ? no dissected).

Agaocephalini

Agaocephala cornigera Le Peletier & Serville, 1828

Brazil. *Distrito Federal*. "DF, Brasília / D. Luz manual" (1 male not dissected); "Brasília Área 01 / Pt001. 12.xi.12", (1 male not dissected); “Barbacena // Coll. C. v. Volxem / Det. O // Coll. Camiiie / Van Volxem // 10146 // Agaocephala / cornigera / Mann. / det.” (1 male not dissected). *Minas Gerais*. "Barbacena // Coll. C. Vollicem Det. // Coll. Camiiie / Van Voixem // 10146 // Agaocephala / cornigera / Mann. / det.", (4 males no dissected); “Brasil, Minas Gerais, / Poço de Caldas, Morro / do Cristo, xi.2020, / R. Kolbe leg.” (3 males, 1 dissected and 2 not dissected).

***Aegopsis bolboceridus cornigera* Le Peletier & Serville, 1828**

Brazil. *Distrito Federal*. “BRASIL: Planaltina,/DF / Fazenda Riedi / Armadilha luminosa / 22.x.2010 // EMBRAPA” (5 males and 3 females not dissected); “DF. Brasília / 23.xii.1983 / E. & P. Grossi” (5 males dissected). *Goiás*. “GO. Cristalina / Fazenda Várzea Grande / Sorgatto 03-07x2016 / Luz N. Magalhães col.” (12 males not dissected); *Mato Grosso*. “BRASIL, Barra do Garças, MATO GROSSO / Campus Universitário / 10.VIII.2016 – COLETA MANUAL / FRAGA, P.I. & LIMA, M.C. col.” (1 male not dissected).

Cyclocephalini

***Cyclocephala amazona* (Linnaeus, 1767)**

Colombia. "Colômbia, Casanare, Recetor. / Bosque el Palmar. ix.2015, / 926m, 05°14'55"N/72°41'40" / W, em Cyclanthus bipartitus / L.A. Nuñez // C. amazona / c.f ♂ / P.C.Grossi det. 2016", (1 male dissected) CERPE; same, but, ♀, (1 female no dissected) CERPE.

Mimeoma maculata

Dynastini

***Dynastes hercules* Linnaeus, 1758**

Brazil. *Bahia*. “Serra da Jiboia, BA / 19.V.2001 / Lg: Loyana Pedreira // MZUEFS / #4557 // Dynastes hercules / R. Vieira, 2002” (1 male dissected).

***Megasoma typhon* (Olivier, 1789)**

Brazil. *Bahia.* “Brasil, Bahia, Itabuna, / CEPLAC, IV.2015, / R. Ferreira leg.” (4 males [1 dissected] and 1 female).

Hexodontini

***Hexodon reticulatum* Olivier, 1789**

Madagascar. "MADAGASCAR, / Fort Dauphine / 1-15.X.1999 / P.Arnaud Leg. // Hexodon / latissimum / Arrow, 1912 / E. Grossi Det 2008 // COLEÇÃO E. / & P. GROSSI", (1 male and 1 female no dissected).

Hexodon latissimum

Oryctini

***Oryctes nasicornis* (Linnaeus, 1758)**

***Augosoma centaurus* (Fabricius, 1775)**

Belgian Congo. “Donateur 1211b / Ed. Luja, / Luxbg. V.1907 // Ed Buja / Kondué / Congo Belge // MNHNL89490” (1 male not dissected, examinated through images).

Oryctoderini

***Oryctoderus latitarsis* Boisduval, 1835**

No data. “Ex-Musaeo / Mniszech // obtusilobus / ?. F // Lectotypus / Oryctoderus / obtusilobus / ? Fairm // MUSÉUM PARIS / 1952 / coll. R. OBERTHÜR // MNHN / EC9954” (1 male dissected, examinated through images).

***Neohyphus semivelutinus* (Fairmaire, 1863)**

Philipines. "FILIPINAS, / Sierra Madre, Aurora, / Eastern Luzon, IV.2009 / I. Lumawig Leg. // Neohyphus / semivelutinus / (Fairmaire, 1863) / Det. E. J. Grossi 2009 // COLEÇÃO E. / & P. GROSSI", (1 male dissected and 1 female no dissected).

Pentodontini

***Euetheola bidentata* (Burmeister, 1847)**

Argentina. “Podalgus / globosus Burm. / det. Burmeister // Globosus / B. / Tucuman c.p. // Type // Collection / E. CANDÈZE // Tucuman / auf coll. / C.D.” (typus I.R.S.N.B. Collection, examinated through images).

***Pentodon quadridens* (Gebler, 1845)**

“Pentodon truncatus, / Type D.S. / Kagyar, 3/1st. May - 2nd – June 1874 / Stoliczka // SYNTYPE / Pentodon / truncatum Sharp, 1878 // MNHN / EC8371” (1 male dissected, examinated through images”.

***Platyphileurus* Ohaus, 1910**

Brazil. *Minas Gerais*. “3-10-XII-16 / Serra Bonita”, “PLATYPHILEURUS SP NOV??”. > Minas Gerais?, (1 male dissected). *Paraíba*. “Gomes, L. Coletor / Mata do Buraqui / nho, João Pessoa, / Paraíba, Brasil, 09.II.1995”, (1 ? no dissected); “Coleoptera / Passalidae”, “Areia – CCA / 08/02/99 / DHILTON”, (1 ? no dissected); “Paraíba, J. Pessoa/ / Mata do Buraquinho / Arm. Luminosa / 22.IV.1996 / Gomes, L. coletor”, “104”, (1 ? no dissected); “Paraíba, J. Pessoa/ / Mata do Buraquinho / Arm. Luminosa / 05.II.1996 / Gomes, L. coletor”, (1 ? no dissected). *Paraná*. “Brasil,

Paraná, / Paranaguá, Ilha do Mel / 22-24-x-2010, 0m / F.W.T. Leivas leg", (1 ? no dissected).

Pernambuco. "Olinda / 03-04-99 / M.M. Almeida", (1 ? no dissected).

No data. (1 ? no dissected).

Table 1. Number of genera and species described and catalogued on Phileurini.

Number of species described by genera in books, catalogues or articles					
Genus	**Arrow 1937**	**Blackwelder 1944**	**Endrödi 1985**	**Krajcik 2005**	**Tese 2023**
Actinobolus Westwood	4	4	5	8	9+1
Allophileurinus Dupuis & Dechambre	-	-	-	2	2
Amblyodus Westwood	4	3	1	1	6
Amblyoproctus Kolbe	3	3	5	8	13
Archophanes Kolbe	2	-	1	1	1
Archophileurus Kolbe	26	25	24	27	32+1
Argentophileurus Penco & Zubarán	-	-	-	-	1
Caymania Ratcliffe & Cave	-	-	-	-	1
Ceratophileurus Ohaus	1	1	1	1	-
Chiliphileurus Endrödi	-	-	1	1	-
Cnemidophileurus Kolbe	1	1	1	1	1
Cryptodus Macleay	33	-	22	23	25
Eophileurus Arrow	21	-	27	41	53

Goniophileurus Kolbe	1	1	1	1	1
Haplophileurus Kolbe	1	1	1	1	3
Hemiphileurus Kolbe	9	10	24	53	59+1
Homophileurus Kolbe	9	9	9	10	11+1
Hovophileurus Arrow	-	-	6	6	5
Kirprellius Allsopp	2	-	3	3	5
Macrocyphonistes Ohaus	-	-	-	-	1
Metaphileurus Kolbe	3	3	3	3	2+2
Microphileurus Kolbe	2	2	2	2	2
Mictophileurus Ohaus	1	1	1	1	1
Oryctophileurus Kolbe	-	-	3	3	-
Palaeophileurus Kolbe	1	1	1	8	10
Paraphileurus Endrödi	-	-	3	3	3
Phileucourtus Dechambre	-	-	-	-	1
Phileurus Latreille	27	20	17	30	28+1
Planophileurus Chapin	1	1	1	1	3
Prosphileurus Kolbe	1	-	1	1	1
Pseudosyrichthus Péringuey	4	-	3	4	-
Rhizoplatodes Péringuey	3	-	1	4	2
Rhizoplatys Westwood	9	-	5	9	8
Syrichthodontus Péringuey	2	-	3	3	6
Syrichthomorphus Péringuey	-	-	1	1	1
Syrichthoschema Janssens	-	-	2	2	3

Trioplus Burmeister	1	1	1	1	1
TOTAL	**172**	**87**	**180**	**264**	**308**

Table 2. Genera and species used in cladistics analysis.

Outgroup genera and species
Rutelinae
Rutela lineola (Linnaeus, 1767)
Agaocephalini
Agaocephala cornigera Le Peletier & Serville, 1828
Aegopsis bolboceridus (Thomson, 1860)
Cyclocephalini
Cyclocephala amazon (Linnaeus, 1767)
Mimeoma maculata (Burmeister, 1847)
Dynastini
Dynastes hercules (Linnaeus, 1758)
Megasoma typhon Olivier, 1789
Hexodontini
Hexodon reticulatum Olivier, 1789
Hexodon latissimum Arrow, 1912
Oryctini

Oryctes nasicornis (Linnaeus, 1758)
Augossoma centaurus (Fabricius, 1775)
Platyphileurus felscheanus Ohaus, 1910
Oryctoderini
Oryctoderus latitarsis Boisduval, 1835
Neohyphus semivelutinus (Fairmaire, 1883)
Pentodontini
Pentodon bidens (Pallas, 1771)
Euetheola bidentata (Burmeister, 1847)
Phileurini – ingroup, genera and species
Actinobolus alvarengai Dupuis & Dechambre, 1998
Actinobolus radians Westwood, 1841
Actinobolus suskyi Dupuis, 2019
Allophileurinus cavifrons Dupuis & Dechambre, 2001
Allophileurinus mediopunctatus Dupuis & Dechambre, 2001
Amblyodus castroi Grossi & Grossi, 2011
Amblyodus taurus Westwood, 1878
Amblyoproctus cornutus Dechambre, 2008
Amblyoproctus rugosus (Erichson, 1847)
Archophanes cratericollis Kolbe, 1905
Archophileurus cribrosus Kolbe, 1910
Archophileurus fimbriatus (Burmeister, 1847)
Archophileurus cribrosus Kolbe, 1910

Archophileurus fimbriatus (Burmeister, 1847)

Archophileurus ovis (Burmeister, 1847)

Archophileurus **n. sp.** Medeiros & Grossi, 2023

Argentophileurus litoralensis Penco & Zubarán, 2013

Caymania nitidissima Ratcliffe & Cave, 2010

Ceratophileurus lemoulti Ohaus, 1911

Cnemidophileurus personatus Kolbe, 1910

Cryptodus caviceps Westwood, 1856

Cryptodus paradoxus MacLeay, 1819

Eophileurus chinensis (Faldermann, 1835)

Eophileurus howdeni Yamaya & Muramoto, 2008

Eophileurus malyi Endrödi, 1978

Eophileurus planatus (Wiedemann, 1823)

Eophileurus platypterus (Wiedemann, 1823)

Goniophileurus femoratus (Burmeister, 1847)

Haplophileurus caudipennis (Burmeister, 1847)

Haplophileurus uninodis Kolbe, 1910

Hemiphileurus dispar (Kolbe, 1910)

Hemiphileurus variolosus (Burmeister, 1847)

Hemiphileurus **n. sp.** Medeiros & Grossi, 2023

Homophileurus integer (Burmeister, 1847)

Homophileurus quadrituberculatus Kolbe, 1910

Hovophileurus latus Dechambre, 1976

Hovophileurus sulcicollis Arrow, 1911

Kirprellius rugulosus (Dupuis, 2013)

Kirprellius syrichthus (Fabricius, 1775)

Macrocyphonistes kolbeanus Ohaus, 1910

Metaphileurus acoensis **n. sp.** Medeiros & Grossi, 2023

Metaphileurus bacchus **n. sp.** Medeiros & Grossi, 2023

Metaphileurus lacunosus (Burmeister, 1847)

Metaphileurus nitidicollis Kolbe, 1910

Microphileurus caviceps Kolbe, 1910

Microphileurus subulo Prell, 1912

Mictophileurus punctulatus Ohaus, 1911

Oryctophileurus guerrai Perger & Grossi, 2013

Oryctophileurus nasicornis (Burmeister, 1847)

Oryctophileurus varicosus Prell, 1914

Palaeophileurus sclateri Kolbe, 1910

Palaeophileurus silvestris Neita & Moreno, 2017

Paraphileurus ventricosus Endrödi, 1978

Phileucourtus bicornutus Dechambre, 2008

Phileurus didymus (Linnaeus, 1758)

Phileurus valgus (Linnaeus, 1758)

Planophileurus planicollis Chapin, 1932

Prosphileurus liberianus Kolbe, 1905

Pseudosyrichthus clathratus Péringuey, 1901

Rhizoplatodes castaneipennis Péringuey, 1901
Rhizoplatodes cherlonneixi Dechambre, 1997
Rhizoplatys arabicus Dechambre, 2005
Rhizoplatys cribarius Westwood, 1841
Syrichthodontus cribratus (Boheman, 1857)
Syrichthodontus spurius Péringuey, 1901
Syrichthomorphus termitophilus Péringuey, 1901
Syrichthoschema burgeoni Janssens, 1942
Syrichthoschema vingerhoedti Bouyer, 2014
Trioplus cylindricus (Mannerheim, 1828)

Table 3. Matrix of cladistic analysis with characters, states of characters and terminal taxa.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Rutela lineola	0	1	1	1	0	-	-	1	1	1	1	0	1	-	-	-	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	0	0
Agaocephala cornigera	1	1	1	1	0	-	-	1	1	1	0	0	0	1	1	1	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0
Aegopsis bolboceridus	1	0	1	1	0	-	-	1	1	1	0	0	1	1	1	1	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	0
Cyclocephala amazona	0	1	1	0	0	-	-	1	-	1	0	0	1	-	-	-	0	0	1	1	0	0	1	1	1	0	-	0	0	0	0	1	1	0	0
Mimeoma maculata	0	1	1	0	0	-	-	1	-	1	0	0	1	0	-	-	0	0	?	1	0	0	1	1	1	0	-	0	0	0	0	1	1	0	0
Dynastes hercules	1	1	1	1	0	-	-	1	1	1	0	0	1	1	0	0	0	0	1	1	0	0	0	0	1	0	-	0	0	1	0	1	1	1	1
Megasoma typhon	1	1	1	1	1	-	0	1	1	1	0	0	1	1	0	0	1	0	0	1	0	0	0	0	1	0	-	1	0	0	0	1	1	0	0
Hexodon reticulatum	0	1	0	0	0	-	-	1	0	1	0	0	1	0	-	-	0	0	1	0	0	0	1	1	0	0	-	0	0	0	0	1	0	0	0
Hexodon latissimum	0	1	0	0	0	-	-	1	0	1	0	0	1	0	-	-	0	0	1	0	0	0	1	1	0	0	-	0	0	0	0	1	0	0	0
Oryctes nasicornis	1	0	1	1	0	-	-	1	1	1	2	0	1	1	0	0	0	1	0	1	0	0	1	1	1	0	-	1	0	0	1	1	1	1	0
Augosoma centaurus	1	1	1	1	0	-	-	1	1	1	2	0	0	1	0	0	0	1	1	1	0	0	1	0	1	0	-	0	0	1	0	1	1	1	0
Oryctoderus latitarsis	0	0	1	1	0	-	-	1	0	1	0	0	1	1	0	0	0	0	1	1	0	?	?	?	?	0	-	0	0	0	0	1	1	0	0
Neohyphus semivelutinus	0	0	1	1	0	-	-	1	0	1	0	0	1	0	-	-	0	0	1	1	0	0	1	1	1	0	-	0	0	0	0	1	1	0	0
Pentodon bidens	0	0	1	1	0	-	0	1	0	1	0	0	1	1	1	0	0	0	1	1	0	0	1	0	1	1	2	1	0	0	0	1	1	0	0
Euetheola bidentata	0	0	1	1	0	-	-	1	1	1	0	0	1	0	-	-	0	0	0	0	0	0	0	0	1	0	-	0	0	1	0	1	0	0	0
Platyphileurus felcheanus	0	0	1	0	0	-	-	1	0	1	0	0	1	0	-	-	0	0	0	1	0	0	0	1	1	0	-	1	0	0	0	1	1	0	0
Actinobolus alvarengai	0	0	1	1	0	-	-	1	0	1	2	0	0	0	-	-	0	1	1	1	1	1	1	1	0	0	-	0	0	1	0	1	1	0	0
Actinobolus radians	0	0	1	1	0	-	-	1	0	1	2	1	0	0	-	-	0	1	1	1	1	1	1	1	0	0	-	0	0	1	0	1	1	0	0
Actinobolus suskyi	0	0	1	1	0	-	-	1	0	0	2	1	0	0	-	-	0	1	1	1	1	1	1	1	0	0	-	0	0	1	0	1	1	0	0
Allophileurinus cavifrons	0	0	1	1	1	0	0	0	0	0	-	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0
Allophileurinus mediopunctatus	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	0	0
Amblyodus castroi	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	0	0	1	1	0	1	1	1	1	2	1	0	0	0	1	1	0	1
Amblyodus taurus	0	0	1	1	1	0	0	0	0	1	0	0	0	1	1	1	1	0	0	1	1	0	1	1	1	1	2	1	0	0	0	1	1	0	0
Amblyoproctus cornutus	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Amblyoproctus rugosus	0	0	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	-	0	0	0	0	1	1	0	1
Archophanes cratericollis	0	0	1	1	1	0	0	0	0	1	2	0	1	1	1	2	0	1	0	1	1	0	0	1	1	0	-	0	1	0	0	1	1	0	1
Archophileurus cribrosus	0	0	1	1	1	0	0	0	0	1	0	1	1	1	1	0	0	0	1	0	1	0	1	1	1	0	-	0	0	0	0	1	1	0	0
Archophileurus fimbriatus	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	-	1	0	0	0	1	1	0	0
Argentophileurus litoralensis	?	0	1	1	0	-	-	1	1	0	0	1	1	1	1	1	1	0	?	1	1	1	1	1	1	0	-	0	0	1	0	1	1	0	1
Caymania nitidissima	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	0	1	0	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	0
Ceratophileurus lemoulti	0	0	1	1	1	0	1	0	0	1	0	1	0	1	1	2	1	1	1	0	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Cnemidophileurus personatus	0	0	1	1	0	-	-	1	0	1	0	0	0	1	1	0	1	0	1	0	1	1	1	1	1	0	0	-	0	0	1	1	0	1	0	1
Cryptodus foveatus	0	0	1	0	0	-	0	1	0	1	1	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	-	0	0	1	1	0	1	0	1
Cryptodus paradoxus	0	0	1	0	0	-	0	1	0	1	1	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0	-	0	0	1	1	0	1	0	0

Table 3. Continuation.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Eophileurus chinensis	0	0	1	1	0	0	-	0	0	1	0	0	0	1	0	0	1	0	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	0
Eophileurus howdeni	0	0	1	0	0	0	-	0	0	1	0	0	0	1	0	0	1	0	1	1	1	0	?	?	1	0	-	0	0	0	0	1	1	0	0
Eophileurus malyi	0	0	1	1	0	0	-	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	0
Eophileurus planatus	0	0	1	1	0	0	-	0	0	1	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1	0	-	0	0	0	0	1	1	0	0
Eophileurus platypterus	0	0	1	1	0	0	-	0	0	1	0	0	0	1	0	0	1	0	1	1	1	0	1	1	1	0	-	1	0	0	1	1	1	0	0
Goniophileurus femoratus	0	0	1	1	1	0	0	1	0	1	0	0	0	1	1	2	1	1	1	1	1	0	1	1	1	1	2	1	0	0	0	1	1	0	1
Haplophileurus caudipenis	0	0	1	1	1	0	0	0	0	1	2	0	0	1	0	0	0	1	1	1	1	0	1	1	1	1	0	1	0	0	0	1	1	0	1
Haplophileurus uninodis	0	0	1	1	1	0	0	0	0	1	2	0	0	1	0	0	0	1	1	1	1	0	1	1	1	1	0	1	0	0	0	1	1	0	1
Hemiphileurus dispar	0	0	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Hemiphileurus variolosus	0	0	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	-	0	0	0	0	1	1	0	1
***Hemiphileurus* sp. n.**	0	0	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Homophileurus integer	0	0	1	1	1	0	0	0	0	1	2	1	0	1	1	2	1	1	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Homophileurus quadrituberculatus	0	0	1	1	1	0	0	0	0	1	2	1	0	1	1	2	1	1	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Hovophileurus latus	0	0	1	1	0	0	0	0	0	1	2	0	0	1	0	0	0	1	1	1	1	0	0	0	1	1	1	1	0	0	0	1	1	0	1
Hovophileurus sulcicollis	0	0	1	1	0	0	0	0	0	1	2	0	0	1	0	0	0	1	1	1	1	0	0	0	1	1	1	1	0	0	0	1	1	0	1
Kirprellius rugulosus	0	0	1	1	1	1	0	0	0	1	0	0	0	1	0	0	1	0	1	1	1	0	1	0	1	0	-	0	0	0	0	1	1	0	0
Kirprellius syrichtus	0	0	1	1	1	1	1	0	0	1	2	0	0	0	-	-	1	0	0	1	1	0	1	1	1	0	-	1	0	0	0	1	0	0	0
Macrocyphonistes kolbeanus	1	0	1	1	0	1	0	0	0	-	-	0	-	-	-	-	1	-	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1	0	-
***Metaphileurus acoensis* n. sp.**	0	0	1	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	0	1
***Metaphileurus bacchus* n. sp.**	0	0	1	0	1	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	0	1
Metaphileurus lacunosus	0	0	1	0	1	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	0	1
Metaphileurus nitidicollis	0	0	1	0	1	0	0	0	0	1	0	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	0	1
Microphileurus caviceps	0	0	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	0	1
Microphileurus subulo	0	0	1	1	1	0	0	0	0	1	0	0	0	1	1	1	1	0	1	1	1	0	1	1	1	1	2	1	0	0	0	1	1	0	1
Mictophileurus punctulatus	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	-	1	0	0	0	1	1	0	1
Oryctophileurus guerrai	0	0	1	1	1	0	0	0	0	1	1	0	1	1	0	0	0	1	1	1	1	0	1	1	1	1	2	1	0	0	0	1	1	0	1
Oryctophileurus nasicornis	0	0	1	1	1	0	0	0	0	1	2	0	1	1	0	0	0	1	1	1	1	0	1	1	1	1	2	1	0	0	0	1	1	0	1
Oryctophileurus varicosus	0	0	1	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	0	1	1	1	1	2	1	0	0	0	1	1	0	1
Palaeophileurus sclateri	0	0	1	1	1	0	0	0	0	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	1	0	-	0	0	0	0	1	1	0	0
Paleophileurus silvestris	0	0	1	1	1	0	0	0	0	1	0	1	1	1	1	1	0	0	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	0
Paraphileurus ventricosus	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	0	1	1	1	0	0	1	0	0	-	0	0	0	1	1	1	0	-
Phileucourtus bicornutus	0	0	1	0	1	0	0	0	0	1	0	1	0	1	1	1	1	0	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Phileurus didymus	0	0	1	1	1	0	0	0	0	1	2	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	-	0	0	0	0	1	1	0	1
Phileurus valgus	0	0	1	0	1	0	0	0	0	1	2	1	0	1	1	1	1	1	0	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Planophileurus planicollis	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	?	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	0

Table 3. Continuation.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Prosphileurus liberianus	0	0	1	1	1	0	0	0	0	1	2	0	1	0	-	-	0	1	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Pseudosyrichthus clathratus	0	0	1	1	1	0	0	0	0	1	1	0	1	1	0	0	0	1	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Rhizoplatodes castaneipennis	0	1	1	1	1	1	0	0	0	1	0	0	1	1	0	0	1	0	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Rhizoplatodes cherlonneixi	0	0	1	1	1	1	0	0	0	1	2	0	0	1	0	0	1	1	1	1	1	0	1	0	1	0	-	0	0	0	0	1	1	0	0
Rhizoplatys arabicus	0	0	1	1	1	0	0	0	0	1	1	0	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	0	0	1	1	0	0
Rhizoplatys cribarius	0	0	1	1	1	0	0	0	0	1	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	0	0	1	1	0	0
Syrichthodontus cribratus	1	0	1	1	1	0	0	0	0	1	2	0	1	1	1	0	0	1	1	1	1	0	1	1	1	0	-	0	0	0	0	1	1	0	1
Syrichthodontus spurius	1	0	1	1	1	0	0	0	0	1	0	0	1	1	1	0	0	0	1	1	1	0	1	?	?	0	-	0	0	0	0	1	1	0	1
Syrichthomorphus termitophilus	0	0	1	1	1	0	0	0	0	1	1	0	1	1	1	2	0	1	1	1	1	1	1	1	1	0	-	0	0	0	0	1	1	0	1
Syrichthoschema burgeoni	0	0	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	0	?	1	1	1	1	1	1	0	-	0	0	0	0	1	1	0	1
Syrichthoschema vingerhoedti	?	0	1	1	1	0	0	0	0	1	0	1	1	1	1	1	0	0	?	1	1	1	?	?	?	0	-	0	0	0	0	1	1	0	1
Trioplus cylindricus	0	0	1	1	1	-	-	1	1	1	2	0	1	1	1	1	1	1	1	0	1	0	1	1	1	1	2	1	0	0	0	1	1	0	1

Table 3. Continuation.

	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
Rutela lineola	-	-	0	0	-	-	0	0	0	0	-	0	0	0	1	1	1	1	0	1	0	1	1	1	0	1	0	0	1	0	-	1	0	0
Agaocephala cornigera	-	-	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	2	1	0	1	1	0	0	1	0	0	1	0	-	1	0	0
Aegopsis bolboceridus	-	-	0	1	0	0	0	0	0	0	-	0	1	1	0	1	1	0	2	1	0	1	0	0	0	0	0	0	0	0	-	1	0	0
Cyclocephala amazona	-	-	0	0	-	-	0	0	1	0	-	0	0	1	1	1	1	0	0	1	0	1	1	1	0	1	0	1	0	0	-	1	0	0
Mimeoma maculata	-	-	0	0	-	-	0	0	1	0	-	0	0	1	?	?	1	0	2	1	0	1	?	?	0	1	0	1	0	0	-	1	0	?
Dynastes hercules	0	0	1	1	0	1	0	0	1	0	-	0	0	1	1	1	1	0	2	1	0	1	0	0	0	1	0	1	1	0	-	1	0	0
Megasoma typhon	-	-	1	1	1	0	0	0	1	1	0	0	0	1	0	1	1	0	2	1	0	1	0	0	0	0	0	1	1	0	-	1	0	0
Hexodon reticulatum	-	-	0	0	-	-	0	0	1	0	-	0	0	1	0	1	1	0	2	1	0	0	0	0	0	1	0	1	0	0	-	0	-	0
Hexodon latissimum	-	-	1	0	-	-	0	0	1	0	-	0	0	1	0	1	1	0	2	1	0	0	0	0	0	1	0	1	0	0	-	0	-	0
Oryctes nasicornis	-	-	0	1	1	1	1	1	1	0	-	1	1	0	0	1	1	0	2	1	1	1	1	0	0	1	1	0	1	0	-	1	0	0
Augosoma centaurus	-	-	0	1	1	1	0	0	1	0	-	0	0	1	1	1	1	0	2	1	0	1	0	0	0	0	0	0	1	1	0	1	0	0
Oryctoderus latitarsis	-	-	0	0	-	-	0	0	1	0	-	0	0	1	1	?	1	1	2	1	0	1	0	0	0	1	0	0	0	0	-	0	-	0
Neohyphus semivelutinus	-	-	0	0	-	-	0	0	0	0	-	0	0	1	1	1	1	0	2	1	0	1	1	0	0	1	0	0	1	0	-	1	0	0
Pentodon bidens	-	-	0	0	-	-	0	0	0	0	-	0	0	0	1	1	1	0	2	0	0	1	1	1	0	1	1	0	1	1	0	1	1	0
Euetheola bidentata	-	-	0	0	-	-	0	0	1	0	-	0	0	0	1	?	1	0	2	?	0	1	1	1	0	1	1	0	1	0	-	?	?	?
Platyphileurus felcheanus	-	-	0	0	-	-	0	0	0	0	-	0	0	1	1	1	1	0	2	0	0	1	1	1	0	1	0	0	1	0	-	1	0	0
Actinobolus alvarengai	-	-	0	0	-	-	0	0	1	0	-	0	1	1	0	1	1	0	2	?	1	1	1	1	1	1	0	0	1	0	-	?	?	?
Actinobolus radians	-	-	0	1	1	0	0	0	1	1	0	0	1	1	0	1	1	0	2	0	1	1	1	1	1	1	0	0	1	0	-	?	?	0
Actinobolus suskyi	-	-	0	0	-	-	0	0	1	1	0	0	0	1	0	?	1	0	2	?	1	1	1	1	1	1	0	0	1	0	-	?	?	?
Allophileurinus cavifrons	-	-	0	1	1	0	0	0	1	0	-	0	0	1	1	1	1	1	2	1	1	1	1	1	1	1	0	0	1	0	-	1	0	0
Allophileurinus mediopunctatus	-	-	0	0	-	-	0	0	1	1	0	0	0	1	1	1	1	1	2	1	1	1	1	1	1	1	0	0	1	0	-	1	1	0
Amblyodus castroi	1	1	0	1	1	1	1	1	0	1	0	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1	0	0	1	0	-	1	0	1
Amblyodus taurus	-	-	0	0	-	-	1	1	0	0	-	1	1	0	1	1	1	0	2	0	1	1	1	1	1	1	0	0	1	0	-	1	0	1
Amblyoproctus cornutus	1	0	1	1	0	0	0	0	1	1	1	0	0	0	0	1	1	0	2	1	1	1	1	1	0	1	0	1	1	0	-	1	0	0
Amblyoproctus rugosus	1	1	0	1	0	0	0	0	1	1	1	0	0	0	1	1	1	1	2	0	1	1	1	1	1	0	1	1	1	0	-	1	0	0
Archophanes cratericollis	1	1	0	1	1	1	1	0	0	0	-	1	1	0	0	1	1	1	2	0	1	1	1	1	0	0	1	1	1	1	1	1	0	0
Archophileurus cribrosus	-	-	0	0	-	-	0	0	1	1	0	0	0	1	0	0	1	0	2	1	1	1	1	1	1	1	0	0	0	0	-	1	0	0
Archophileurus fimbriatus	-	-	1	0	-	-	0	0	0	1	0	0	0	1	0	1	1	0	2	0	1	1	1	1	1	1	1	0	0	0	-	1	0	1
Argentophileurus litoralensis	1	1	0	1	0	0	0	0	0	1	1	0	0	1	0	?	1	1	2	?	?	1	1	1	1	1	0	0	1	0	-	1	0	?
Caymania nitidissima	-	-	0	0	-	-	0	0	1	0	-	0	0	1	?	1	1	1	2	?	?	1	1	1	0	1	0	0	0	0	-	?	?	?
Ceratophileurus lemoulti	1	0	0	1	1	1	1	0	0	1	0	1	1	0	1	1	1	0	2	1	1	1	1	1	1	1	0	0	1	0	-	1	0	0
Cnemidophileurus personatus	0	0	0	0	-	-	1	0	1	1	0	0	0	0	0	1	1	0	2	1	1	1	1	1	1	1	1	1	1	0	-	1	1	0
Cryptodus foveatus	1	0	1	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	2	1	0	1	1	1	1	1	0	1	1	0	-	1	1	0
Cryptodus paradoxus	-	-	0	0	-	-	0	0	0	0	-	0	0	1	0	1	1	0	2	1	0	1	1	1	0	0	0	1	1	0	0	1	1	0

Table 3. Continuation.

	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
Eophileurus chinensis	-	-	0	0	-	-	0	0	0	0	-	1	0	1	1	1	1	1	2	1	1	1	1	1	0	1	0	0	1	0	-	1	0	0
Eophileurus howdeni	-	-	0	0	-	-	0	0	0	1	0	1	1	1	1	1	1	1	2	1	1	1	1	1	0	1	0	0	1	0	-	1	0	0
Eophileurus malyi	-	-	0	0	-	-	0	0	0	1	0	1	0	1	1	?	0	1	2	1	1	1	1	1	0	1	0	0	1	0	-	?	?	?
Eophileurus planatus	-	-	0	0	-	-	0	0	0	1	0	1	0	1	1	1	1	1	2	1	1	1	1	1	0	1	0	0	1	0	-	1	0	0
Eophileurus platypterus	-	-	0	0	-	-	0	0	0	0	-	1	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0	1	1	0	-	1	1	0
Goniophileurus femoratus	0	1	0	0	-	-	0	0	1	1	0	0	0	1	0	1	1	0	2	0	1	1	1	1	1	0	0	1	0	-	1	0	0
Haplophileurus caudipenis	1	1	0	0	-	-	1	0	1	1	0	1	0	1	0	1	1	0	2	0	1	1	1	1	1	1	0	1	0	-	1	0	0
Haplophileurus uninodis	1	1	0	0	-	-	0	0	1	1	0	1	0	1	0	1	1	0	2	0	1	1	1	1	1	1	0	0	1	0	-	1	0	0
Hemiphileurus dispar	0	0	0	0	-	-	0	0	1	1	0	0	0	0	0	1	1	0	2	1	1	1	1	1	1	1	1	1	1	0	-	1	1	1
Hemiphileurus variolosus	0	0	0	0	-	-	0	0	0	1	0	0	1	0	0	1	1	1	2	1	1	1	1	1	1	0	1	0	1	0	-	1	1	0
***Hemiphileurus* sp. n.**	0	0	0	0	-	-	0	0	1	1	0	0	1	0	1	1	0	1	2	1	1	1	1	1	1	1	1	0	1	0	-	1	1	1
Homophileurus integer	1	0	0	0	-	-	1	0	0	1	0	0	1	0	0	1	1	1	2	0	1	1	1	1	1	1	0	1	1	0	-	1	0	0
Homophileurus quadrituberculatus	1	0	0	1	1	1	0	0	1	1	0	1	1	0	1	1	1	0	2	1	1	1	1	1	0	1	0	0	1	0	-	1	0	0
Hovophileurus latus	1	1	0	0	-	-	0	0	0	1	1	0	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0	0	1	0	-	1	0	0
Hovophileurus sulcicollis	0	0	0	0	-	-	0	0	1	1	0	0	0	1	1	1	1	1	2	1	1	1	1	1	0	1	0	0	1	0	-	1	1	0
Kirprellius rugulosus	-	-	0	0	-	-	0	0	0	1	0	0	0	1	1	0	0	0	2	1	0	1	1	1	0	0	0	1	1	0	0	1	0	0
Kirprellius syrichtus	-	-	0	0	-	-	0	0	0	0	-	0	0	1	1	1	1	0	2	1	0	1	1	1	0	0	0	1	1	0	-	1	0	0
Macrocyphonistes kolbeanus	0	0	0	1	0	1	0	0	0	1	0	1	0	1	0	?	1	0	2	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0
***Metaphileurus acoensis* n. sp.**	1	1	0	0	-	-	1	0	1	1	1	0	0	1	0	1	1	1	2	1	1	1	1	1	1	0	1	0	1	0	-	1	0	0
***Metaphileurus bacchus* n. sp.**	1	1	0	0	-	-	1	0	1	1	1	0	0	1	0	1	1	1	2	1	1	1	1	1	1	0	1	0	1	0	-	1	0	0
Metaphileurus lacunosus	0	0	0	0	-	-	1	0	1	1	1	0	0	1	0	1	1	1	2	1	1	1	1	1	1	0	1	0	1	0	-	1	0	0
Metaphileurus nitidicollis	1	1	0	0	-	-	1	0	1	1	1	0	0	1	0	1	1	1	2	1	1	1	1	1	1	1	1	0	1	0	-	1	0	0
Microphileurus caviceps	1	1	0	0	-	-	0	0	1	1	1	0	0	1	0	1	1	1	0	0	1	1	1	1	1	1	0	0	1	0	-	1	0	0
Microphileurus subulo	1	1	0	0	-	-	1	0	1	1	1	0	0	1	0	1	1	1	0	0	1	1	1	1	1	1	1	0	1	0	-	1	0	0
Mictophileurus punctulatus	0	1	0	0	0	0	1	1	1	1	1	0	0	1	0	1	1	0	2	1	1	1	1	1	1	1	0	0	1	0	-	1	0	0
Oryctophileurus guerrai	1	1	0	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	2	0	1	1	1	1	1	1	0	0	1	0	-	1	1	0
Oryctophileurus nasicornis	1	1	0	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1	2	1	1	1	1	1	1	1	0	0	1	0	-	1	1	0
Oryctophileurus varicosus	0	0	0	1	1	1	1	1	1	0	-	1	1	0	1	1	1	0	2	1	1	1	1	1	1	1	0	0	1	0	-	1	0	1
Palaeophileurus sclateri	-	-	0	0	-	-	0	0	0	0	-	0	1	0	0	1	1	1	2	0	1	1	1	1	0	1	0	0	1	0	-	1	0	0
Paleophileurus silvestris	-	-	0	0	-	-	0	0	0	0	-	0	1	0	1	1	0	1	1	1	1	1	1	1	0	1	0	0	1	0	-	1	1	0
Paraphileurus ventricosus	1	0	0	1	0	1	0	0	1	1	1	0	1	0	1	1	0	0	1	0	1	1	1	1	0	1	0	0	1	0	0	1	0	?
Phileucourtus bicornutus	0	0	0	0	-	-	1	0	1	1	0	0	0	1	0	1	1	0	2	1	1	1	1	1	1	1	0	0	1	0	-	1	0	0
Phileurus didymus	1	1	0	1	0	0	0	0	0	1	0	1	0	1	0	1	1	0	2	1	1	1	1	1	1	1	0	0	1	0	-	1	0	1
Phileurus valgus	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	-	1	1	1
Planophileurus planicollis	-	-	0	0	-	-	0	0	1	1	0	0	0	0	?	?	1	0	1	?	?	1	1	1	1	1	0	0	0	0	-	?	?	?

Table 3. Continuation.

	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
Prosphileurus liberianus	1	1	0	1	1	1	0	0	0	0	-	1	1	1	1	1	1	1	2	0	1	1	1	1	0	1	0	1	1	1	1	1	0	0
Pseudosyrichthus clathratus	0	0	0	1	0	0	0	0	0	0	-	0	1	0	1	1	1	0	2	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0
Rhizoplatodes castaneipennis	0	0	0	0	-	-	0	0	0	1	0	0	0	1	1	1	1	0	1	0	1	1	0	0	0	0	0	0	1	0	-	1	0	0
Rhizoplatodes cherlonneixi	-	-	0	0	-	-	0	0	0	0	-	0	0	0	0	1	1	0	2	0	1	1	0	1	0	0	0	0	1	0	-	1	0	1
Rhizoplatys arabicus	-	-	0	1	1	1	0	0	1	1	0	1	0	1	?	?	1	1	2	?	1	1	0	1	0	1	1	0	1	0	-	?	?	?
Rhizoplatys cribarius	-	-	0	1	1	1	0	0	1	1	0	1	0	1	0	?	1	0	2	0	1	1	1	1	0	1	0	0	1	0	-	1	0	0
Syrichthodontus cribratus	0	0	0	1	0	0	0	0	0	0	-	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	1	1	?	?	0
Syrichthodontus spurius	1	1	0	1	0	0	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	?	?	?
Syrichthomorphus termitophilus	1	1	1	1	0	0	0	0	0	1	0	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	0	1	1	0	-	1	0	0
Syrichthoschema burgeoni	0	1	0	1	0	0	0	0	1	1	0	0	0	1	?	?	1	0	2	?	?	1	1	1	0	1	0	0	1	1	0	1	0	0
Syrichthoschema vingerhoedti	0	0	0	0	-	-	0	0	1	1	0	0	0	1	?	?	1	1	2	?	?	1	1	1	0	1	0	0	1	?	?	?	?	?
Trioplus cylindricus	1	1	0	1	1	1	1	0	1	1	0	1	0	0	0	1	1	1	1	0	1	1	1	1	1	1	0	0	1	0	-	0	0	1

Table 3. Continuation.

	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
Rutela lineola	1	0	1	1	0	1	0	0	0	1	0	0	0	1	2	0	0	1	1	0	0	0	0	1
Agaocephala cornigera	0	1	1	1	0	1	0	0	0	1	0	0	0	0	-	1	0	0	0	1	0	0	0	1
Aegopsis bolboceridus	1	1	1	0	2	1	0	0	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0	1
Cyclocephala amazona	1	0	0	0	0	1	1	0	0	1	0	0	0	0	-	1	0	1	0	0	0	0	1	0
Mimeoma maculata	1	0	0	0	0	0	1	1	0	1	0	?	0	0	-	0	0	0	1	0	0	1	0	1
Dynastes hercules	1	0	1	1	2	2	0	0	0	1	1	1	0	0	-	0	0	0	1	0	1	1	0	1
Megasoma typhon	1	1	1	1	2	2	0	0	0	0	-	0	1	1	1	0	1	0	1	0	1	1	0	1
Hexodon reticulatum	1	1	1	0	2	0	1	1	0	1	0	0	0	0	-	0	0	0	0	0	1	0	0	1
Hexodon latissimum	1	1	1	0	2	0	1	1	0	1	0	0	0	0	-	0	0	0	0	0	1	0	0	1
Oryctes nasicornis	1	1	1	1	2	2	0	0	0	1	0	1	1	1	1	1	0	1	1	0	0	0	0	1
Augosoma centaurus	1	0	1	1	2	1	0	0	0	0	-	?	1	1	1	1	0	0	1	0	1	0	0	1
Oryctoderus latitarsis	1	1	1	0	0	2	1	1	1	1	1	?	1	1	-	1	0	0	1	0	0	0	1	1
Neohyphus semivelutinus	1	1	1	1	0	0	1	0	0	1	1	?	0	1	1	0	0	0	1	0	1	0	0	1
Pentodon bidens	1	1	2	1	2	2	0	0	0	1	0	0	0	0	-	1	0	1	1	0	0	0	1	1
Euetheola bidentata	?	1	1	1	0	1	1	1	0	1	0	?	0	0	-	1	0	1	1	0	1	0	1	1
Platyphileurus felcheanus	1	0	1	1	2	2	0	0	0	1	1	0	0	0	-	0	0	0	1	0	0	0	0	1
Actinobolus alvarengai	0	1	2	1	2	1	0	0	0	1	1	0	1	1	2	1	0	1	1	1	1	0	0	1
Actinobolus radians	1	1	2	1	2	1	0	0	0	1	1	?	1	1	2	1	1	1	1	0	1	0	0	1
Actinobolus suskyi	?	1	2	1	2	2	0	0	0	1	1	?	1	1	2	1	0	1	1	1	1	0	0	1
Allophileurinus cavifrons	1	1	1	0	1	1	0	0	0	1	1	0	1	1	0	1	0	0	1	0	1	0	1	1
Allophileurinus mediopunctatus	1	1	1	0	?	?	?	?	1	1	1	0	1	1	0	1	0	0	1	0	1	0	1	1
Amblyodus castroi	0	1	2	0	1	1	0	0	0	1	1	0	1	1	2	1	1	1	1	0	1	0	0	1
Amblyodus taurus	0	1	2	0	1	1	0	0	0	1	1	0	1	1	2	1	1	1	1	0	1	0	0	1
Amblyoproctus cornutus	1	1	1	0	2	2	0	0	0	1	1	0	1	1	0	1	0	0	1	0	1	0	0	1
Amblyoproctus rugosus	1	1	1	0	2	2	0	0	0	1	1	0	0	1	0	1	0	0	1	0	0	0	0	1
Archophanes cratericollis	1	1	2	1	2	2	0	0	1	1	1	1	1	0	-	1	0	1	1	0	?	0	0	?
Archophileurus cribrosus	1	1	1	0	2	1	0	0	1	1	1	0	1	0	-	0	0	1	1	0	0	0	1	1
Archophileurus fimbriatus	1	1	1	0	2	2	0	0	1	1	1	0	1	0	-	1	0	1	1	0	1	0	0	1
Argentophileurus litoralensis	1	1	1	1	2	?	?	?	1	1	1	?	1	1	1	1	0	?	1	0	0	0	1	1
Caymania nitidissima	?	1	1	0	2	2	0	0	0	1	0	?	1	1	0	1	0	?	1	1	0	0	1	1
Ceratophileurus lemoulti	1	1	2	0	2	2	0	0	1	1	1	0	1	1	2	1	1	1	1	0	1	0	0	1
Cnemidophileurus personatus	0	1	1	1	1	2	0	0	0	0	-	0	1	1	0	0	1	0	1	0	?	0	1	?
Cryptodus foveatus	1	1	1	1	2	2	1	1	0	1	0	0	1	1	2	1	0	0	1	0	0	0	1	1
Cryptodus paradoxus	1	1	1	1	2	2	0	0	0	1	0	0	1	1	2	1	1	0	1	0	1	0	0	1

Table 3. Continuation.

	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
Eophileurus chinensis	0	1	1	0	2	1	1	1	1	1	1	1	0	0	-	1	0	1	1	0	1	0	1	1
Eophileurus howdeni	0	1	1	0	2	1	1	1	1	1	1	0	1	0	-	1	0	0	1	0	0	0	0	1
Eophileurus malyi	?	1	1	0	2	1	1	1	1	1	1	0	1	0	-	1	0	1	1	1	0	0	1	1
Eophileurus planatus	1	1	1	0	2	1	1	1	1	1	1	0	1	0	-	1	0	1	1	1	?	0	0	1
Eophileurus platypterus	1	1	1	0	2	1	1	1	1	1	1	0	0	0	-	1	0	1	1	1	1	0	0	1
Goniophileurus femoratus	1	1	1	1	2	1	0	0	0	1	1	0	1	1	2	1	1	1	1	0	1	0	1	0
Haplophileurus caudipenis	1	1	2	0	2	2	0	0	0	1	0	0	1	0	-	1	0	1	0	1	1	0	1	1
Haplophileurus uninodis	1	1	2	0	2	2	0	0	0	1	0	0	1	0	-	1	0	1	1	0	1	0	0	1
Hemiphileurus dispar	1	1	1	1	2	?	?	?	0	1	1	0	1	1	0	1	1	1	0	1	0	1	1	1
Hemiphileurus variolosus	1	1	1	1	2	2	0	0	1	1	0	1	1	1	0	1	1	1	1	0	0	0	1	1
***Hemiphileurus* sp. n.**	1	1	1	1	2	2	0	0	1	1	1	1	1	1	0	1	1	1	1	0	1	1	0	1
Homophileurus integer	1	1	2	0	2	2	0	0	1	1	1	0	1	1	2	1	1	1	1	0	1	0	0	1
Homophileurus quadrituberculatus	1	1	2	1	2	2	0	0	1	1	1	0	1	1	2	1	1	1	1	0	1	0	0	1
Hovophileurus latus	1	1	1	0	2	2	1	0	1	1	0	0	1	0	-	1	0	1	1	0	0	0	1	1
Hovophileurus sulcicollis	1	1	1	0	2	2	1	0	1	1	1	0	1	0	-	1	0	0	1	0	0	0	1	1
Kirprellius rugulosus	1	1	1	0	0	0	1	1	1	1	1	1	0	0	-	1	0	1	1	0	0	0	1	1
Kirprellius syrichtus	1	1	1	0	1	0	1	1	1	1	1	1	0	0	-	1	0	1	1	0	0	0	1	1
Macrocyphonistes kolbeanus	1	1	1	1	1	1	1	1	0	0	-	?	1	1	-	1	1	1	1	0	?	1	0	?
***Metaphileurus acoensis* n. sp.**	0	1	1	1	2	1	0	0	0	1	1	0	1	1	2	1	1	0	1	0	0	0	0	1
***Metaphileurus bacchus* n. sp.**	1	1	1	1	2	1	0	0	0	1	1	0	1	1	2	1	1	0	1	0	0	0	0	1
Metaphileurus lacunosus	1	1	1	1	2	1	0	0	0	1	1	0	1	1	2	1	1	0	1	0	0	0	0	1
Metaphileurus nitidicollis	1	1	1	1	2	1	0	0	0	1	1	0	1	1	2	1	1	0	1	0	0	0	0	1
Microphileurus caviceps	1	1	1	1	1	2	1	1	1	1	1	?	1	0	-	1	0	1	1	0	?	0	0	1
Microphileurus subulo	0	1	1	1	1	2	1	1	0	1	0	0	0	0	-	1	0	1	1	0	0	0	0	1
Mictophileurus punctulatus	1	1	1	0	2	1	0	0	1	1	1	0	1	1	2	1	0	0	1	0	0	0	1	1
Oryctophileurus guerrai	1	1	2	1	2	2	0	0	0	1	1	0	1	1	2	1	1	1	1	0	0	0	1	1
Oryctophileurus nasicornis	1	1	2	1	2	2	0	0	0	1	1	1	1	1	2	1	1	0	1	0	1	0	0	1
Oryctophileurus varicosus	0	1	2	0	1	1	0	0	0	1	1	0	1	1	2	1	1	1	1	0	1	0	0	1
Palaeophileurus sclateri	1	1	1	0	2	2	0	0	0	1	1	0	0	1	0	1	0	0	0	1	1	0	0	1
Paleophileurus silvestris	1	1	1	0	2	2	0	0	0	1	1	0	0	1	0	1	0	0	0	0	1	0	1	1
Paraphileurus ventricosus	1	1	1	0	2	1	0	0	0	1	0	?	1	1	-	1	1	0	1	0	1	0	1	1
Phileucourtus bicornutus	1	1	1	0	2	2	1	1	0	1	0	0	0	1	0	1	0	0	1	0	0	0	1	1
Phileurus didymus	1	1	2	1	2	2	0	0	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	1
Phileurus valgus	1	1	2	1	2	2	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1
Planophileurus planicollis	1	1	1	0	2	2	0	0	1	1	1	?	1	1	0	1	0	?	1	0	0	1	0	1

Table 3. Continuation.

	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
Prosphileurus liberianus	1	1	2	0	2	2	0	0	1	1	1	1	1	1	2	1	0	1	1	0	1	0	0	1
Pseudosyrichthus clathratus	1	1	1	0	2	2	0	0	0	1	1	1	0	0	-	1	0	1	1	0	0	0	1	1
Rhizoplatodes castaneipennis	1	1	1	0	2	2	1	1	0	1	1	0	1	1	2	1	1	1	1	0	1	0	0	1
Rhizoplatodes cherlonneixi	1	1	1	1	2	2	1	1	0	1	1	0	1	1	2	1	1	1	1	0	1	0	0	1
Rhizoplatys arabicus	1	1	1	1	2	2	0	0	0	1	0	?	1	1	1	1	1	?	1	0	0	0	1	1
Rhizoplatys cribarius	1	1	1	1	2	2	0	?	0	1	0	?	1	1	1	1	1	?	1	0	0	0	1	1
Syrichthodontus cribratus	1	1	2	1	2	2	0	0	0	1	1	?	0	0	-	1	0	1	1	0	1	0	0	1
Syrichthodontus spurius	?	1	2	0	2	2	0	0	1	1	0	1	0	0	-	1	0	?	1	0	1	0	0	1
Syrichthomorphus termitophilus	1	1	2	1	2	2	0	0	1	1	1	1	0	0	-	1	0	1	1	0	?	0	0	1
Syrichthoschema burgeoni	1	1	1	0	2	2	0	0	0	1	1	?	1	0	-	1	0	?	0	1	0	0	1	1
Syrichthoschema vingerhoedti	1	1	1	0	2	2	0	0	0	1	1	?	1	0	-	1	0	?	0	1	0	0	1	1
Trioplus cylindricus	0	1	1	1	2	1	0	0	1	1	0	0	1	0	-	1	1	1	1	0	1	0	1	0

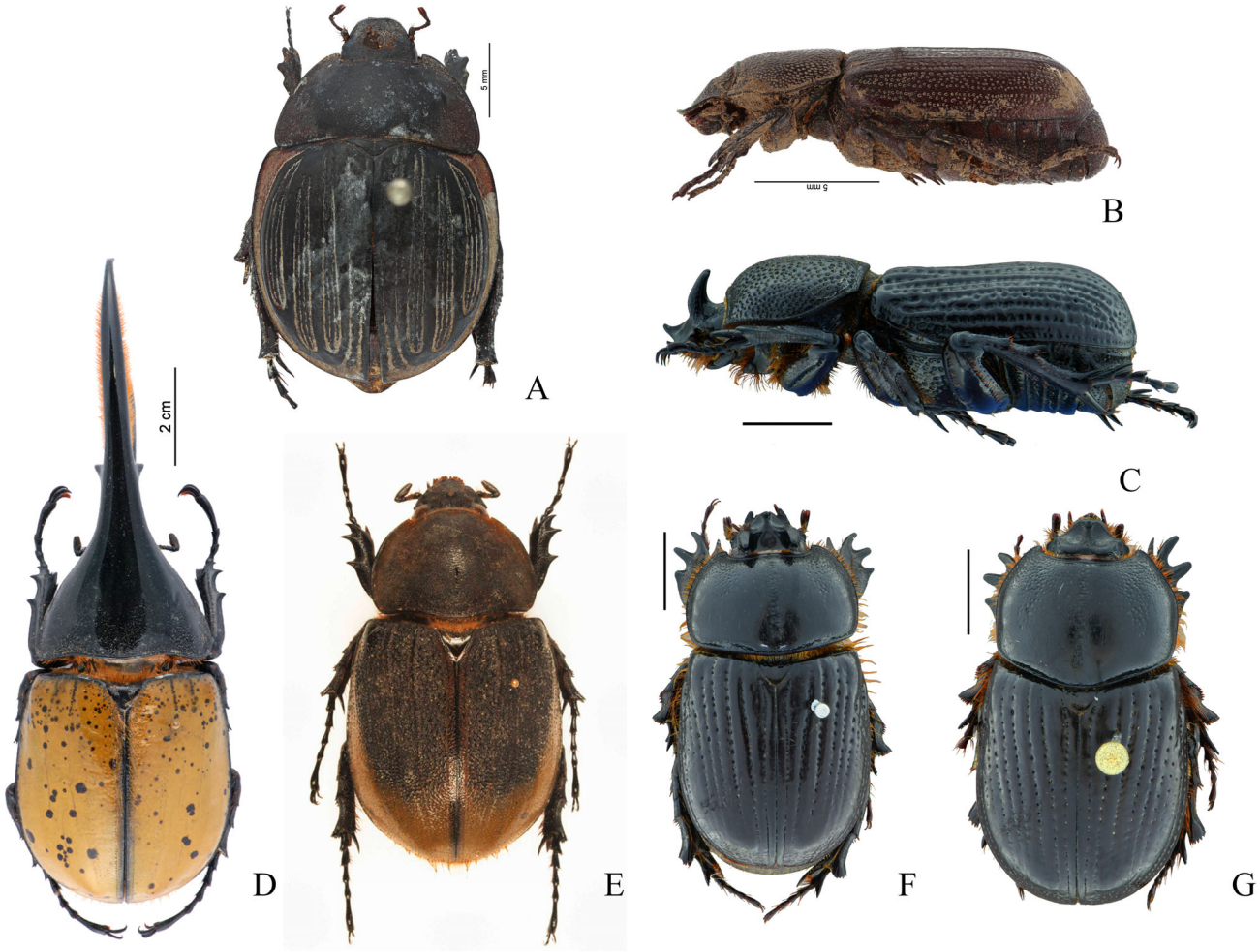

Figure 1. Dynastinae body shape characters. (A) rounded; (D-G) elongate; (B) flattened, (C) convex. (D-E, F-G) sexual dimorphism, distinct. (A) *Hexodon reticulatum* Olivier, 1789; (B) *Cryptodus obscurus* Macleay, 1871; (C) *Hemiphileurus* sp. nov.; (D-E) – *Dynastes hercules paschoali* Grossi & Arnaud, 1993 male and female; (F-G) *Archophileurus* sp. nov male and female.

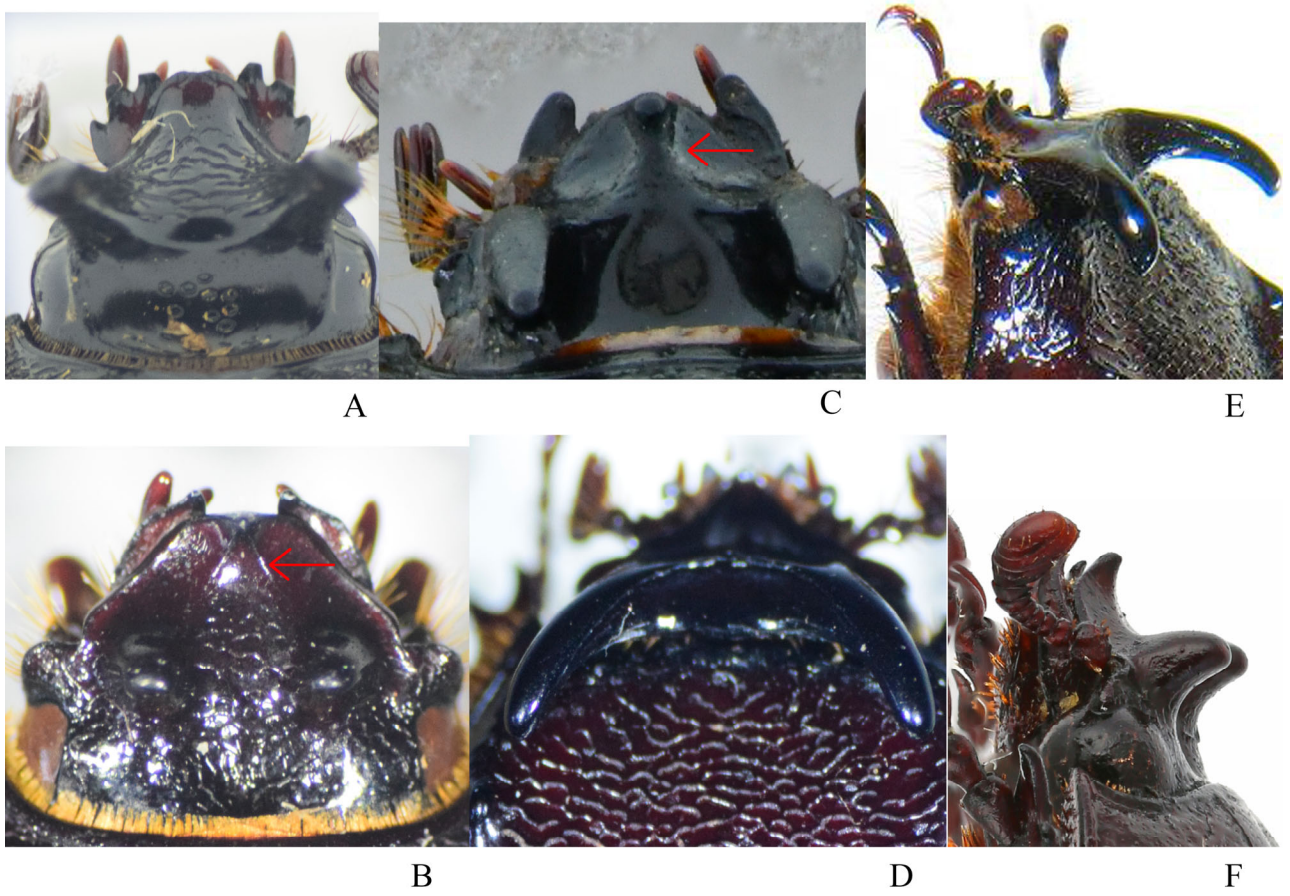

Figure 2. Phileurini specimens showing head characters. Clypeal suture, (B) present, (C) absent; horns extending backwards head, (E) present, (F) absent; horns, (A) flattened, B (rounded). (A) *Trioplus cylindricus* (Mannerheim, 1829); (B) *Mictophileurus punctulatus* Ohaus, 1911; (C) *Archophileurus* sp. nov. (D, E) *Amblyodus taurus* Westwood, 1878; (F) *Phileucourtus bicornutus* Dechambre, 2008.

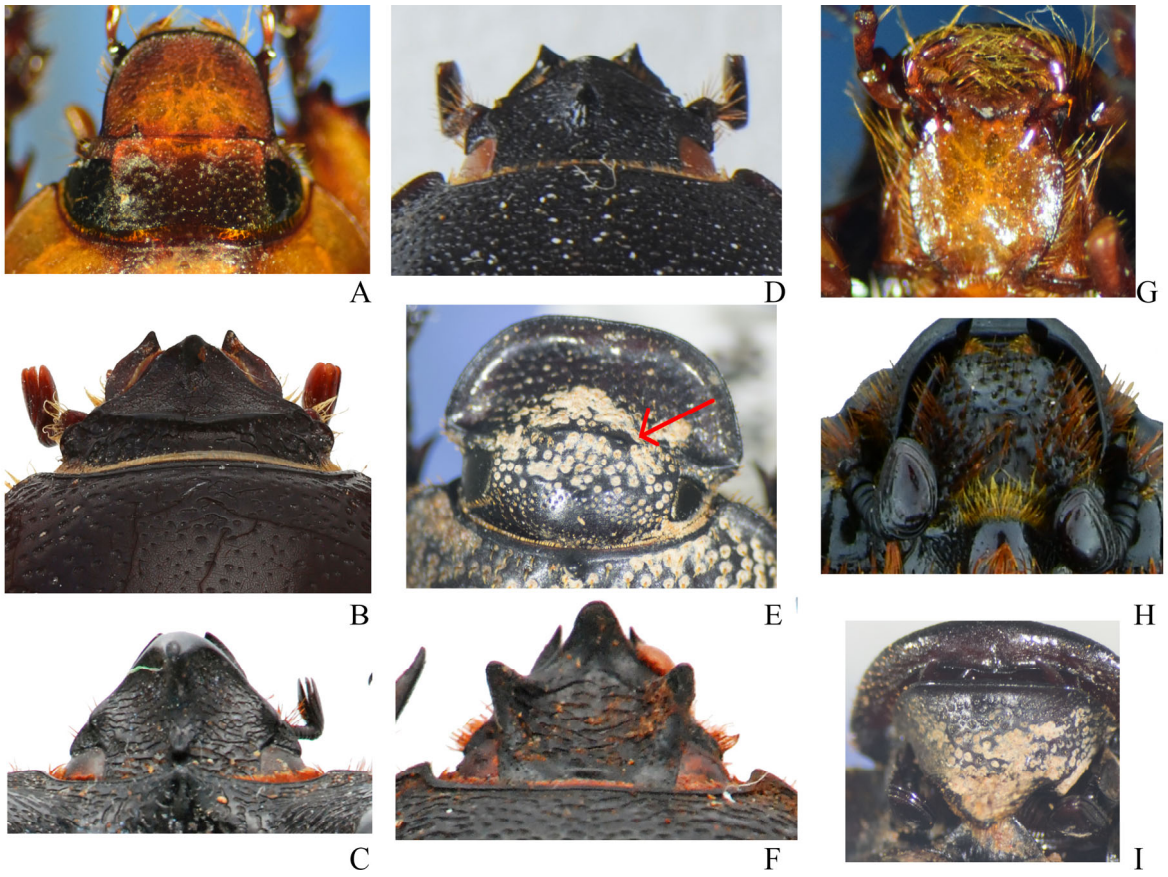

Figure 3. Dynastinae specimens head, dorsal and ventral characters. (A,G) *Cyclocephala amazona* (Linnaeus, 1767); (B) *Archophileurus clypeatus* Dupuis, 2018; (C) *Archophanes cratericollis* (Fairmaire, 1894); (D) *Eophileurus chinensis* (Falderman, 1835); (E, I) *Cryptodus caviceps* Westwood, 1856, setae pointing to suture and horns; (F) *Homophileurus integer* (Burmeister, 1847); (H) *Hemiphileurus* sp. nov. Number of horns (A) absent, (D) one, (E,F) two; mentum shape, (G-H) converging to apex, (I) diverging to apex; frons horns position, (D) central, (E) lateral, (F) marginal.

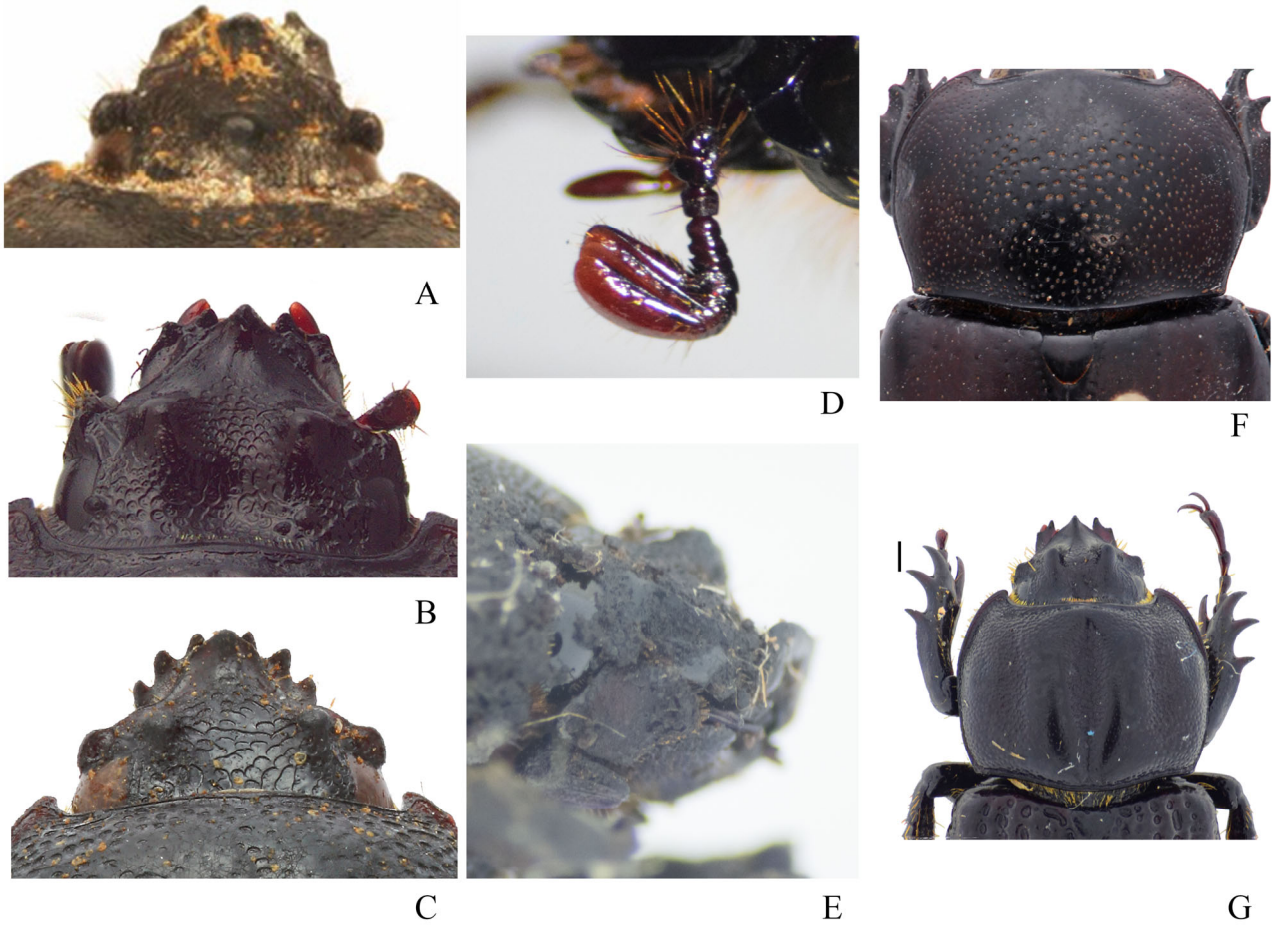

Figure 4. Phileurini specimens for head and pronotum characters. Number of teeth on madibulae, (A) one, (B) two, (C) three; antenal shape/apex, (D) claviform/expanded, (E) not claviform/laminar; pronotum longitudinal furrow, (F) absent, (G) present. (A) *Haplophileurus uninodis* (Burmeister, 1847); (B, D) *Metaphileurus lacunosus* (Burmeister, 1847); (E) *Cnemidophileurus personatus* Kolbe, 1910; (F) *Palaeophileurus sclateri* (Bates, 1887); (G) *Metaphileurus bacchus* Medeiros & Grossi sp. nov.

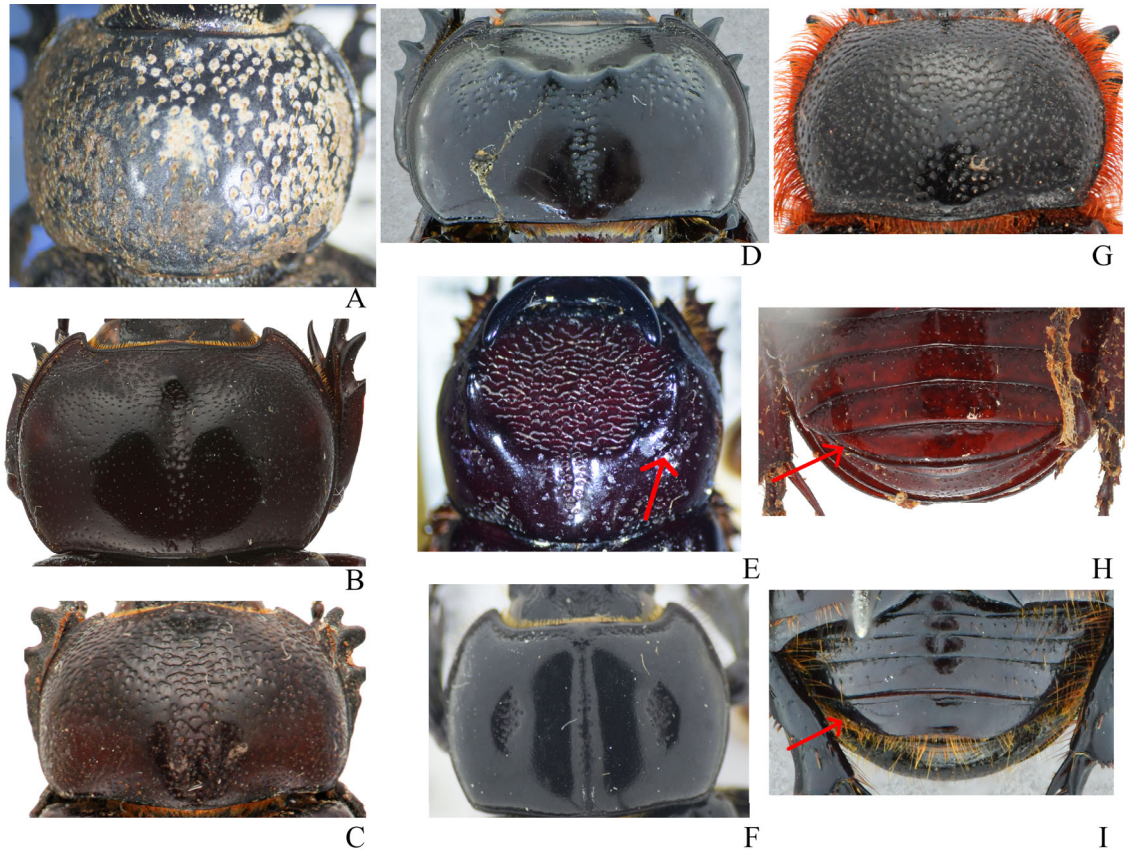

Figure 5. Phileurini pronotum characters. (A) *Cryptodus caviceps* Westwood, 1856; (B) *Phileurus angustatus* Kolbe, 1910; (C) *Actinobolus degallieri* Dechambre & Lumaret, 1986; (D) *Homophileurus quadrituberculatus* (Beauvois, 1805); (E) *Amblyodus taurus* Westwood, 1878; (F) *Mictophileurus punctulatus* Ohaus, 1911; (G) *Syrictes rugulosus* Dupuis 2013; (H) *Goniophileurus femoratus* (Burmeister, 1847); (I) *Archophileurus* sp. nov. Number of tubercles, (A) absent, (B) one, (C, D) more than one; ventrite VI, red arrow, (H) same size, (I) bigger than anteriors.

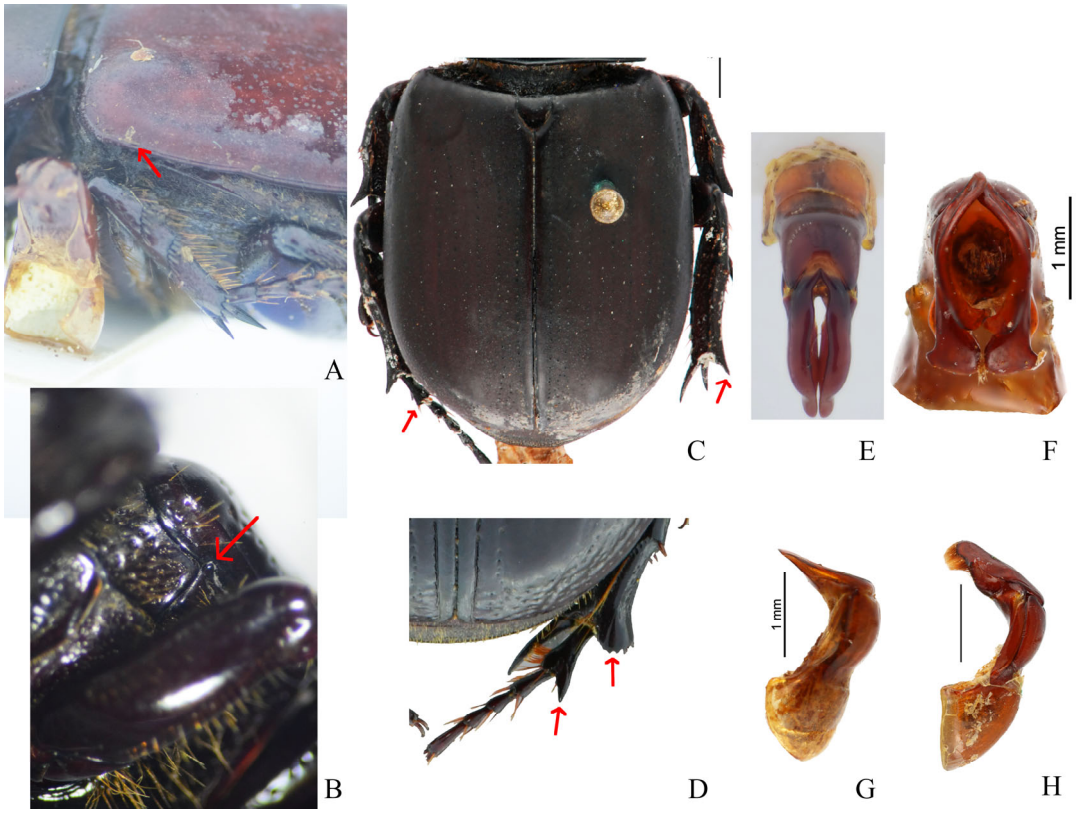

Figure 6. Dynastinae body and aedeagus characters. (A) *Neohyphus semivelutinus* (Fairmaire, 1883); (B) *Mictophileurus punctulatus* Ohaus, 1911; (C) *Palaeophileurus sclateri* (Bates, 1887); (D) *Archophileurus* sp. nov.; (E) *Homophileurus integer* (Burmeister, 1847); (F) *Hemiphileurus dispar* (Kolbe, 1910); (G) *Goniophileurus femoratus* (Burmeister, 1847); (H) *Hemiphileurus similis* Dupuis & Dechambre, 2000. Metaepisternum, small sclerotinized apical projection, red arrows (A) absent, (B) present; apex of metatibia, (C) toothed, (D) truncate; first metatarsomere, row of setae and spur, (C) absent, (D) present; aedeagus, (E-F) setae, and (G-H) shape.

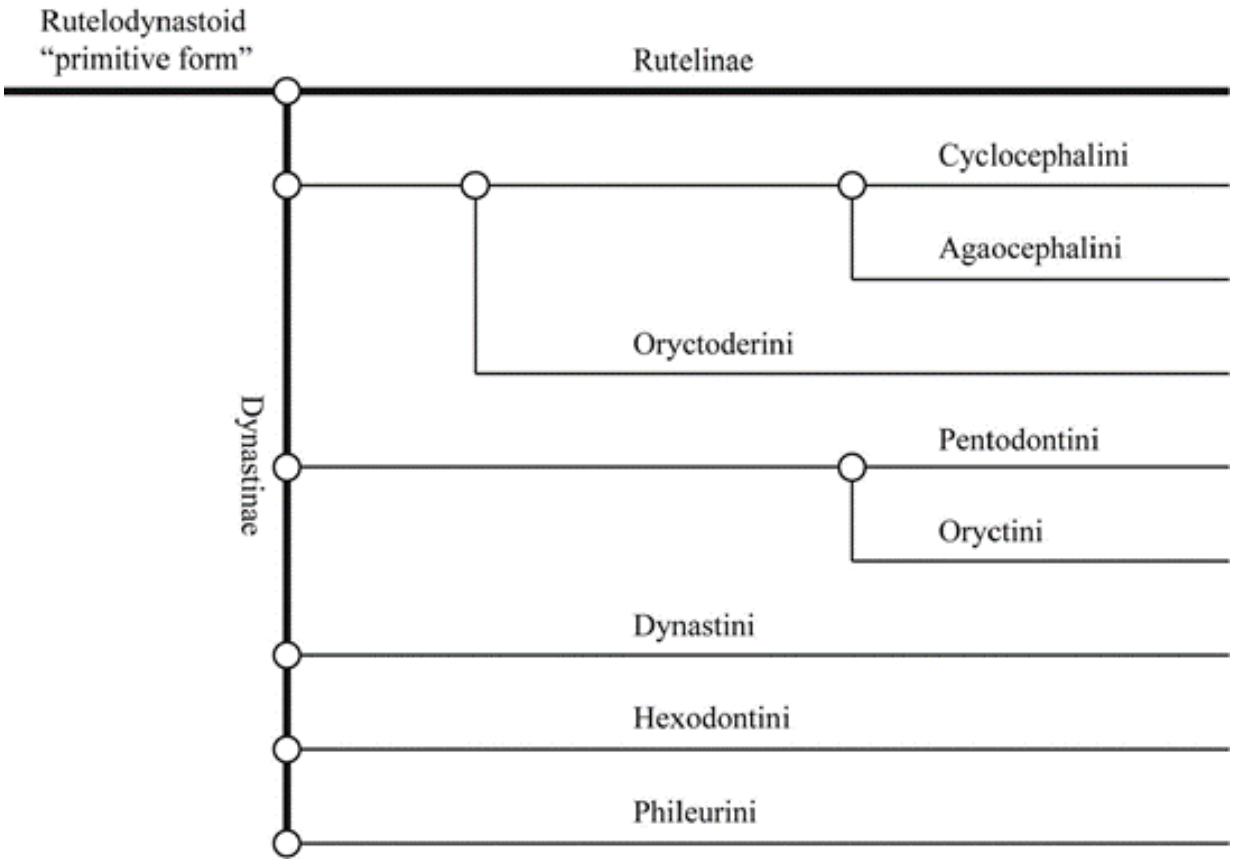

Figure 7. Relationships among the tribes of Dynastinae Endrödi (1966).

Figure 8. Cladogram of strict consensus of no weigths and implied weigths (k =1, 3, 5 and 10) from 160 equally parcimonious trees.

Figure 9. Bremer supports with no weigths and implied weigths (k =1, 3, 5 and 10) from 160 equally parcimonious trees.

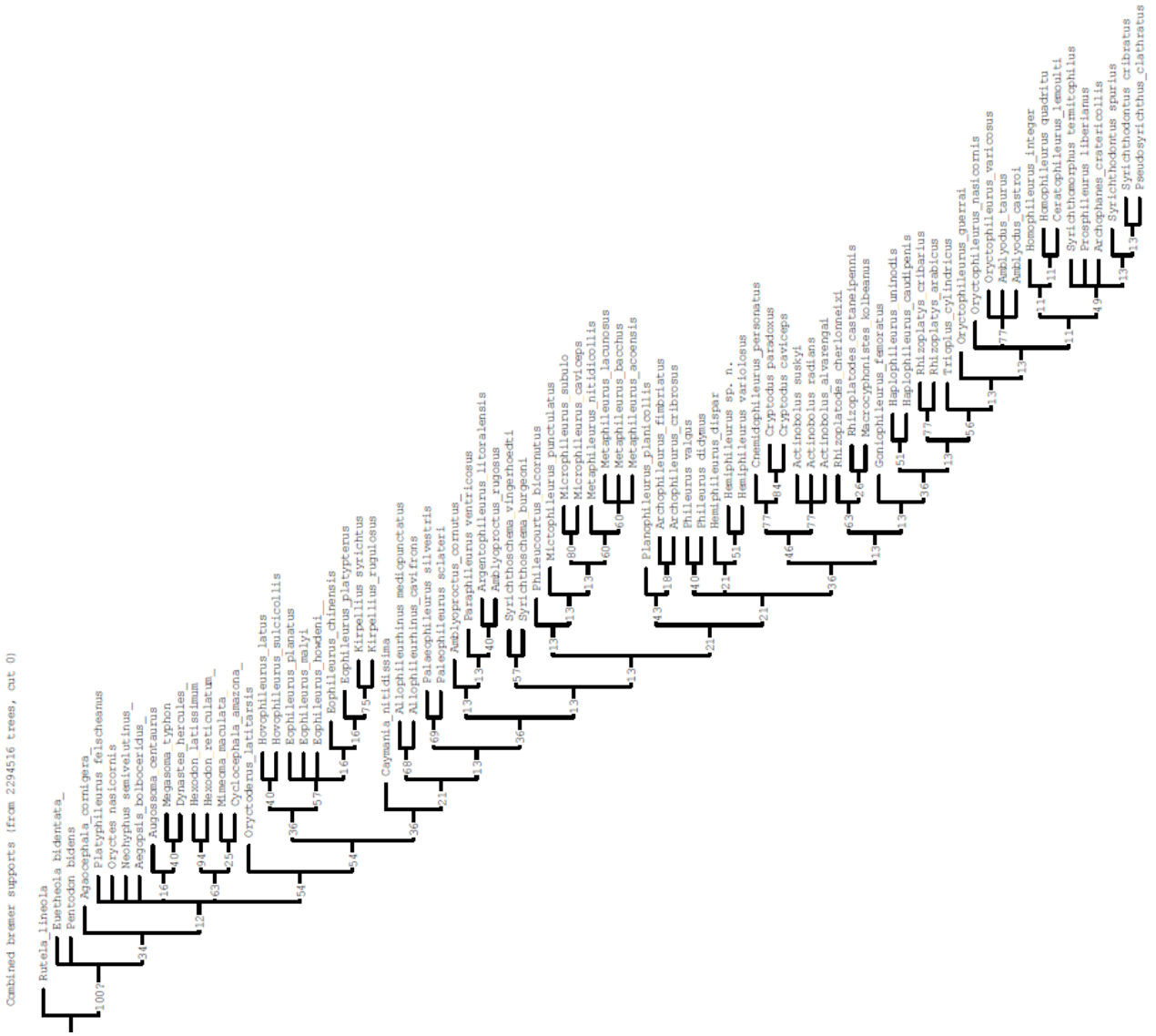

Figure 10. Jack knife support with no weigths and implied weigths (k =1, 3, 5 and 10) from 160 equally parcimonious trees.

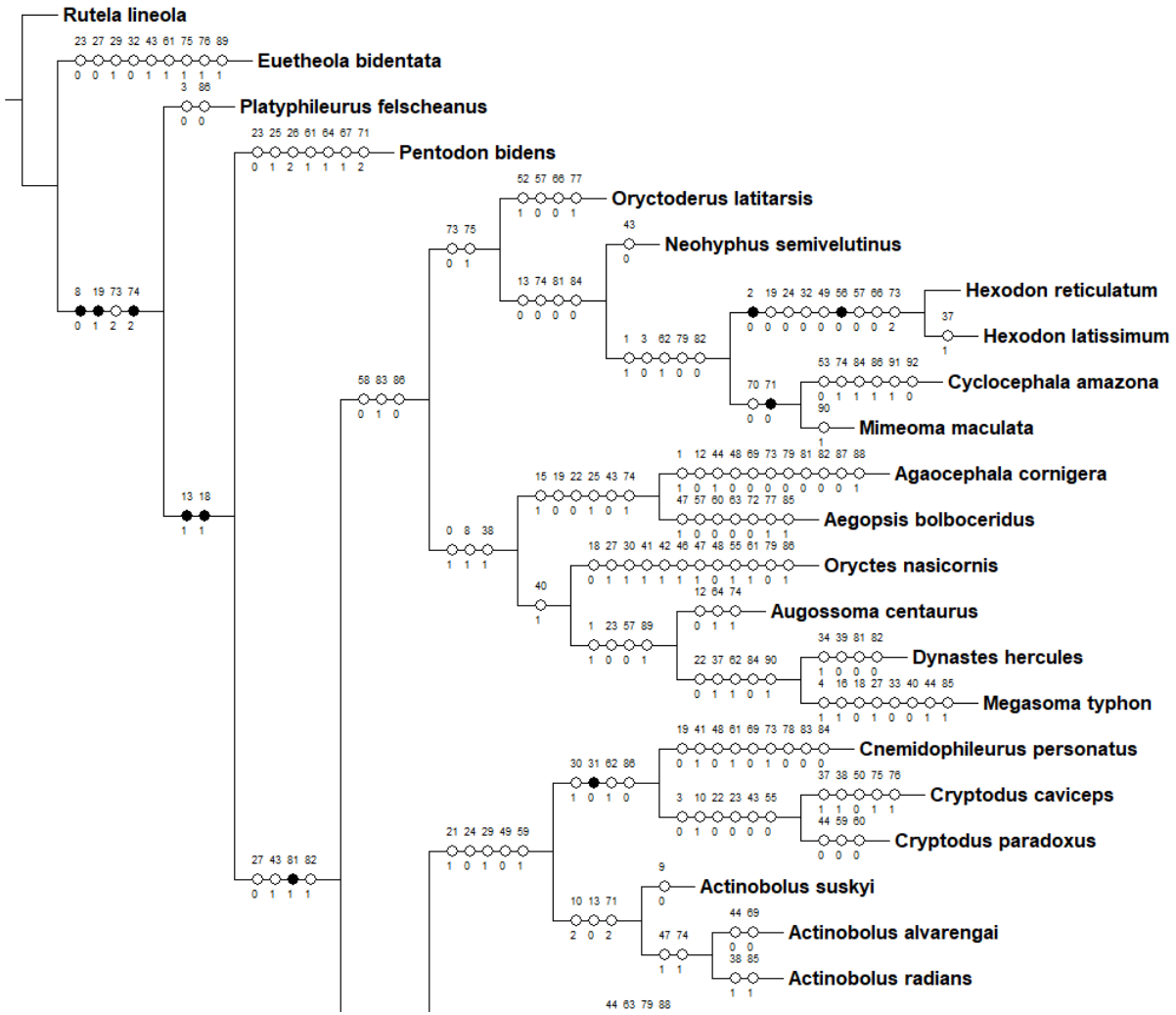

Figure 11. Cladogram of strict consensus with calculated k and synapomorphies (full circles) and apomorphies (empty circles), Dynastinae tribes and Phileurini (Cryptodontina).

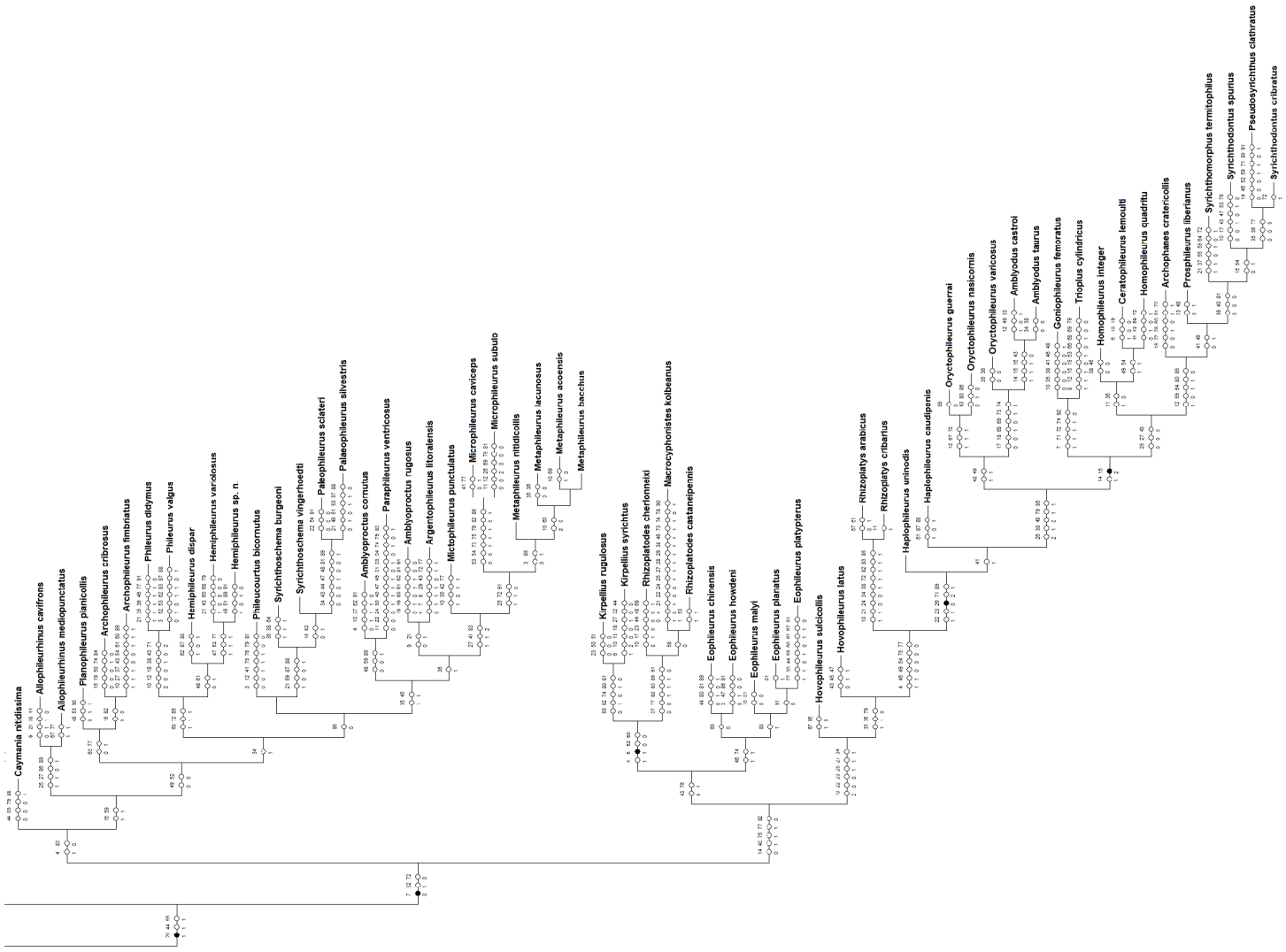

Figure 12. Cladogram of strict consensus with calculated k, synapomorphies (full circles) and apomorphies (empty circles) of Phileurini (Phileurina).

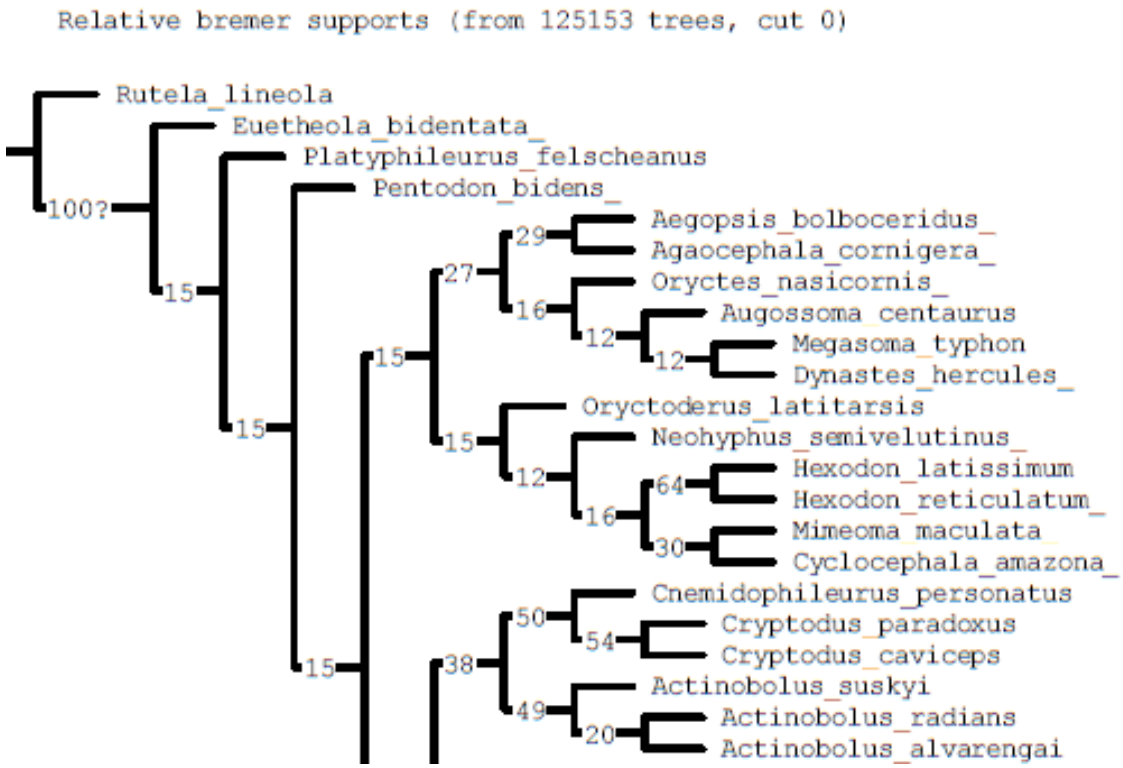

Figure 13. Bremer supports with k calculated for Dynastinae tribes and Phileurini, Cryptodontina.

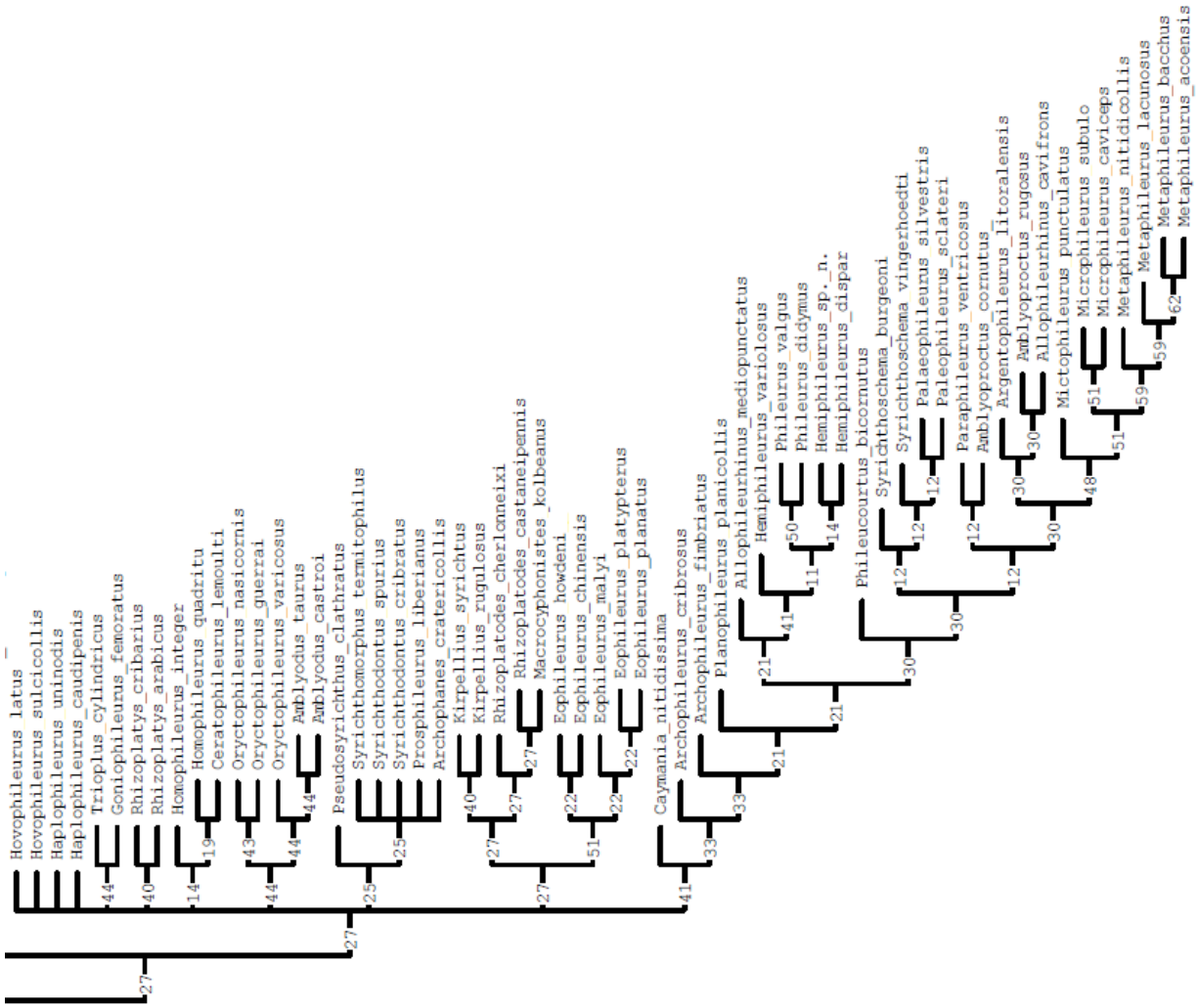

Figure 14. Bremer supports with k calculated for Phileurini, Phileurina.

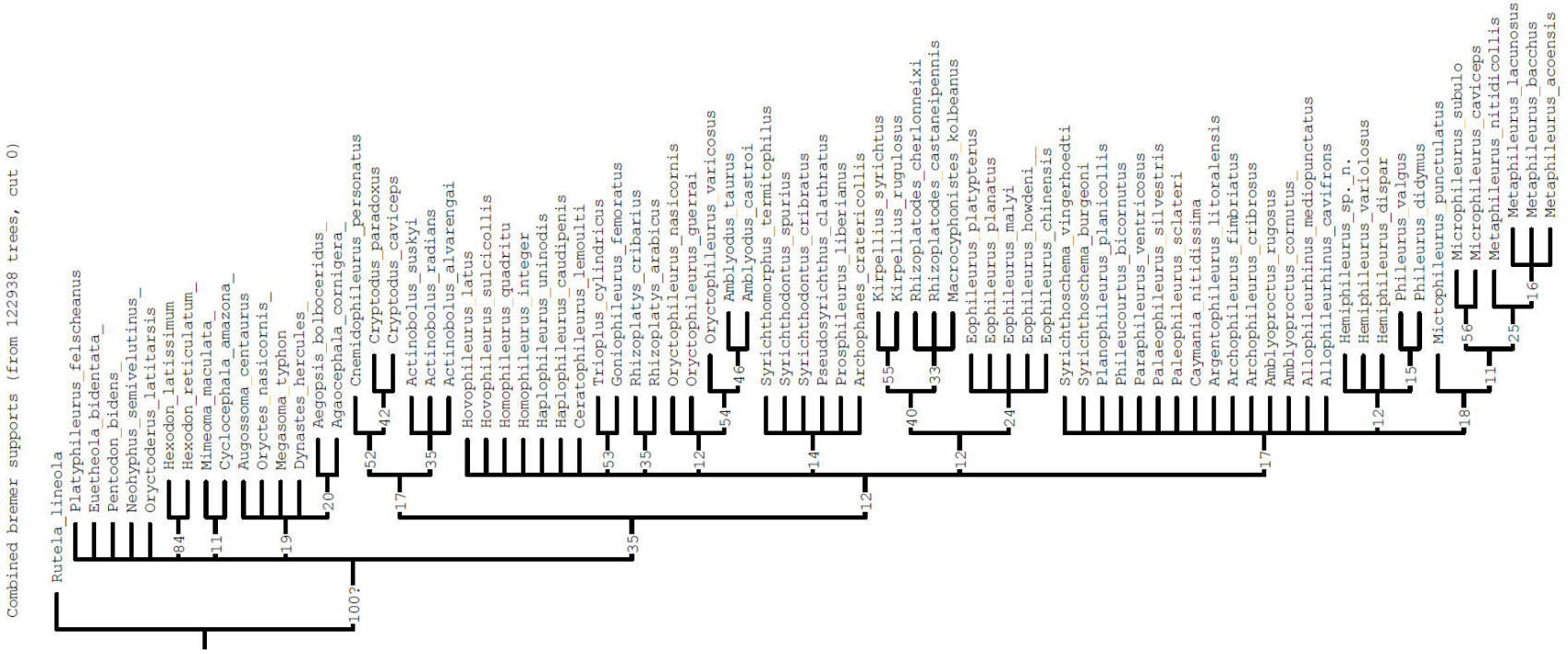

Figure 15. Jack knife support of k calculated.

CAPÍTULO 3

Filogenia dos gêneros com dentes nas mandíbulas e revisão do gênero *Metaphileurus* Kolbe (Coleoptera, Melolonthidae, Dynastinae) com descrição de duas novas espécies do Brasil [1]

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[1][Medeiros, R.A.F. & P.C. Grossi. Filogenia dos gêneros mandibulas com dente e revisão do gênero *Metaphileurus* Kolbe (Coleoptera, Melolonthidae, Dynastinae) com descrição de duas novas espécies do Brasil. Journal of Natural History (a ser submetido).

RESUMO - [*Metaphileurus Kolbe*, 1910, foi revisado com base no material tipo de *Metaphileurus lacunosus* (Burmeister, 1847) e *Metaphileurus nitidicollis* Kolbe, 1910, adicionalmente, foram descritas duas novas espécies, *Metaphileurus acoensis* **sp. nov.** (Brasil, Minas Gerais [Ipatinga]) e *Metaphileurus bacchus* **sp. nov.** (Brasil, Rio de Janeiro [Nova Friburgo e Resende] e Minas Gerais [Extrema]). O edeago de *M. nitidicollis* é ilustrado aqui pela primeira vez, assim como o holótipo de *M. nitidicollis* e o neótipo de *M. lacunosus* são aqui ilustrados, além de fornecidas uma chave de identificação e um mapa de distribuição conhecido das espécies. Uma análise morfológica dos gêneros com dentes na mandíbula doi realizada na tribo, para então testar os caracteres morfológicos dos gêneros de Phileurini com mandíbula dentada e estabelecer as relações filogenéticas entre eles, principalmente com o foco das mandíbulas com dente. A monofilia de *Metaphileurus* Kolbe foi recuperada com a utilização de um script para calcular o valor de k, e o caractere de dentes na mandíbula é considerado na análise cladística como um diferencial ao distinguir gêneros de Phileurini com o de outras tribos de Dynastinae, embora também seja observado em Agaocephalini e Pentonontini].

PALAVRAS-CHAVE: [Mata Atlântica, Região Neotropical, Scarabaeoidea, taxonomia, morfologia].

Phylogeny of the dentate mandibula genera and revision of the genus *Metaphileurus* Kolbe (Coleoptera, Melolonthidae, Dynastinae) with a description of two new species from Brazil

ABSTRACT – *Metaphileurus* Kolbe, 1910, was revised based on type material from *Metaphileurus lacunosus* (Burmeister, 1847) and *Metaphileurus nitidicollis* Kolbe, 1910, additionally, two new species were described, *Metaphileurus acoensis* sp. nov. (Brazil, Minas Gerais [Ipatinga]) and *Metaphileurus bacchus* sp. nov. (Brazil, Rio de Janeiro [Nova Friburgo and Resende] and Minas Gerais [Extrema]). The aedeagus of *M. nitidicollis* is illustrated here for the first time, as well as the holotype of *M. nitidicollis* and the neotype of *M. lacunosus* are illustrated here, in addition to providing an identification key and a known distribution map of the species. A morphological analysis of the genera with teeth in the mandible was carried out in the tribe, in order to test the morphological characters of the Phileurini genera with dentate mandible and establish the phylogenetic relationships between them, mainly with a focus on the mandibles with teeth. The monophyly of *Metaphileurus* Kolbe was recovered with the use of a script to calculate the value of k, and the character of teeth in the mandible is considered in the cladistic analysis as a differential to distinguish Phileurini genera from other tribes of Dynastinae, although also be observed in Agaocephalini and Pentonontini.

KEY WORDS: Atlantic Forest, Neotropical Region, Scarabaeoidea, taxonomy, morphology

Introduction

Phileurini is a very distinguished tribe within Dynastinae, the only that have large mentum that covers the basis of the labial palpi, with 36 known genera and 306 species, distributed specially in the Neotropical region (23 genera found). The another biogeographic regions can be found Afrotropical (11 gen.), Australian (1 gen), Neartic (3 gen.), Paleartic (2 gen.) and Oriental (2 gen.). From 36 genera, 16 occur in Brazil (Endrödi 1985; Ratcliffe & Paulsen 2008; Abadie *et al*. 2008; Ratcliffe & Cave 2010; Ratcliffe 2011; Grossi & Grossi 2011; Ratcliffe *et al*. 2013; Albertoni *et al*. 2014, and Vaz-de-Mello & Grossi 2022), of which two are found exclusively in Brazil: *Metaphileurus* Kolbe, 1910 and *Mictophileurus* Ohaus, 1911 (Grossi *et al*. 2010; Vaz-de-Mello & Grossi 2022).

Metaphileurus was established by Kolbe (1910) contains two species formerly in the genus *Phileurus* Latreille, 1807; *Phileurus lacunosus* Burmeister, 1847, and *Phileurus explanatus* Burmeister, 1847, which are from Brazil (Rio de Janeiro and Santa Catarina) and Colombia (without specific locality), respectively. A third species, *Metaphileurus nitidicollis* Kolbe, 1910, was also described from Brazil, Minas Gerais and Santa Catarina states. The species of this genus were subsequently revised in works of Endrödi (1977, 1985b) and included before on catalogs, after by Endrödi (e.g., Arrow 1937b, Blackwelder 1944; Krajcik 2005).

In a recent contribution, Dupuis and Mantilleri (2013) studied the type material of *Metaphileurus explanatus* (Burmeister) and transferred it to the genus *Goniophileurus* Kolbe. Subsequently Dupuis (2014) synonymized this species with *Goniophileurus femoratus* (Burmeister, 1847).

Currently, the genus includes two species, *Metaphileurus lacunosus* (Burmeister, 1847) and *M. nitidicollis* Kolbe, 1910, that were recorded in the Brazilian states of Minas Gerais, São Paulo, Rio de Janeiro, Paraná and Santa Catarina (Kolbe 1910; Endrödi 1977; 1985b; Ide 1998

[unpublished data]; Abadie *et al*. 2008). This genus is distinguished from the others of the tribe by the presence of an extremely flattened body; acuminated clypeus; head with two frontal tubercles; mandibles with two teeth; pronotum with a long and deep longitudinal furrow, lateral foveae; elytra with deep and large punctures; protibiae tridentate; protibia with simple tarsi in both sexes; and sharply elongated first metatarsomere (Endrödi 1985b).

The genera *Amblyodus* Westwood, 1878, *Goniophileurus* Kolbe, 1910, *Metaphileurus* Kolbe, *Oryctophileurus* Kolbe, 1910 and *Trioplus* Burmeister, 1847, are closely related, sharing the presence of a small tuberiform on clypeal apex, similar ocular canthus shape, and the mandibles with teeth (Endrödi 1977; Endrödi 1985b; Ide 1998 [unpublished data]).

The genus *Metaphileurus* Kolbe have mandibles with teeth, in this way this work aims to analyze the phylogeny based on morphological characteristics, the relationships with the other genera that present this characteristic, redescribe, describe taxa, illustrate, review *Metaphileurus* Kolbe, making an identification key of the species, known distribution map and describe two new species from Brazil. In addition, to analise through cladistics analysis if *Metaphileurus* is a monophyletic genus, comparing with another genera of Phileurini tribe, to test your relationship with the neotropical genera of the tribe, and make a revision of the genus and know its morphology. For this we use mandibulate genera of the tribe and genera without this character for external group, and the subfamily Rutelinae for the root of the cladogram.

Materials and Methods

Were examined 33 specimens, including the type material of *M. lacunosus* (Burmeister) and *M. nitidicollis* Kolbe for the revision and to delimit the taxonomic range of the genus.
The acronyms of the respective collections, when disponible, will follow Evenhuis (2020):

CEMT – Sessão de Entomologia da Coleção Zoológica da Universidade Federal do Mato Grosso, Cuiabá, Brazil (Fernando Z. Vaz-de-Mello);

CERPE – Coleção Entomológica da Universidade Federal Rural de Pernambuco, Recife, Pernambuco, Brazil (Paschoal C. Grossi);

DZUP – Coleção Entomológica Padre Jesus Santiago Moure, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brazil (Lúcia M. de Almeida);

EPGC – Everardo and Paschoal Grossi Collection, Nova Friburgo, Rio de Janeiro, Brazil (Everardo J. Grossi);

MZUSP – Museu de Zoologia da Universidade de São Paulo, São Paulo, Brasil (Sonia A. Casari);

ZMB – Zoologisches Museum Berlin, Berlin, Germany (Joachin Willers).

Labels information and terminilogy

Transcription of the labels as follows: quotation marks – " beginning and " end of the information present on the label(s) of the specimen examined; / change of line on the same label; \ back of the label; // change of label in the specimen examined; [] note or additional information about the label; also for the type specimens each label is separated by a different letter. Terminologies follow Endrödi (1977; 1985b) and Ratcliffe (2003b). The size and density of punctures follow (Jameson *et al*. 2002); the size of the setae was considered as "small" if the length were near the body, "moderate" if the length and were at least the measure of the antenna segment and "long" if the length of the setae were bigger than an antenna segment. The size of prosternal process were "small" to confined bellow coxae; "moderate" reaching the basis of coxae; and "long" if produced between coxae.

Measure and dissection details

The measurements of the specimens were obtained through a calibrated digital caliper with scale up to 0.01 mm. The distance between the apex of the clypeus and the apex of the elytra were measured for maximum length and maximum elytral width for greater width for greater width of elytra.

For the study of the morphology of the genitalia, the specimens were put in a recipient with water in a thermal plate at 100 ºC for approximately 10 min or more for dissection, depending on it conservation status. The male genitalia were removed through a perforation located at the dorsal base of the abdomen. The genitalia then was mounted on a card and pinned below the specimens.

Images and edition

Photographs were taken with a Leica® DFC 500 digital camera coupled with a Leica® MZ 16 stereomicroscope, and a Nikon D5300 attached to a Zeiss 508 DOC stereomicroscope. The images were processed with CombineZP freeware. The images were processed with CombineZP freeware (www.hadleyweb.pwp.blueyonder.co.uk).

Map

The software Google Earth Pro® was used for map construction; all Global Positioning System (GPS) points were obtained through label data and literature records, then exported to the website simplemappr.net (Shorthouse 2010), and the generated map was edited in GIMP 2.10.10 (The GIMP Team 2019).

Phylogeny

Characters codification

The characters were constructed observing adult male and female specimens, when available, or in images according to Sereno (2007). The matrix was created after collecting the characters, with a numerical symbol being assigned in ascending order for their respective character states, being binary or multistate. For characters whose status could not be determined, they were represented by a hyphen (-); and those that could not be evaluated due to problems that some specimens may present, or even specimens that were evaluated by photos and/or specific literature, were determined as "missing data", a question mark (?).

External group

The outgroup used was the subfamily Rutelinae, the closest subfamily morphologically and phylogenetically to the Dynastinae, as seen and analyzed previously by Endrödi (1985b) and Gunter *et al*. (2016).

Rutelinae

Rutela lineola (Linnaeus, 1758)

Dynastinae

Agaocephalini

Agaocephala cornigera Le Peletier & Serville, 1828

Cyclocephalini

Cyclocephala amazona (Linnaeus, 1767)

Dynastini

Dynastes hercules (Linnaeus, 1758)

Hexodontini

Hexodon reticulatum Olivier, 1789

Oryctini

Oryctes nasicornis (Linnaeus, 1758)

Oryctoredini

Oryctoderus latitarsis Boisduval, 1835

Pentodontini

Pentodon bidens (Pallas, 1771)

Internal group

All neotropical Phileurini type species of genera with toothed mandibulae were used as terminals in the cladistic analysis.

Dynastinae

Phileurini

Allophileurinus cavifrons Dupuis & Dechambre, 2001

Allophileurinus mediopunctatus Dupuis & Dechambre, 2001

Amblyodus taurus Westwood, 1878

Amblyodus castroi Grossi & Grossi, 2011

Goniophileurus femoratus (Burmeister, 1847)

Metaphileurus lacunosus (Burmeister, 1847)

Metaphileurus nitidicollis Kolbe, 1910

Metaphileurus acoensis **new species** Medeiros & Grossi, 2023

Metaphileurus bacchus **new species** Medeiros & Grossi, 2023

Microphileurus caviceps Kolbe, 1910

Microphileurus subulo Kolbe, 1910

Mictophileurus punctulatus Ohaus, 1911

Oryctophileurus nasicornis (Burmeister, 1847)

Oryctophileurus guerrai Perger & Grossi, 2013

Phileurus didymus (Linnaeus, 1758)

Trioplus cylindricus (Mannerheim 1829)

Tools for analysis and editing

The matrix was made with program Asado (WinClada version 1.89) after observe the morphology of the specimens used in this work, carrying out the survey of characters and the codification of the states of character.

The program TNT version 1.5 (Goloboff *et al*. 2008a) was used with the tradicional search to find the most parsimonious trees, with 100 replication and 1000 trees to save per replication based on prior weights only, utilized in all analysis. It was used with no weights, implied weights (k = 1, 3, 5, 10 and 15) to search the least number of parcimonious trees, and with calculated weigh, after this the search for the consensus tree was made for both results.

Branch support

The most parsimonious tree was obtained and compared, the characters are evaluated through the retention index (RI) and consistency index (CI) (Goloboff 1993) in Asado (WinClada version 1.89).

The trees were verified by the support of the clades, the Jack knife support and Bremer support or decay index were used, where the higher the index, the greater the support of the characters for that clade (Bremer 1994).

Results and Discussion

Results

Taxonomy

Phylum Arthropoda Latreille, 1829

Class Insecta Linnaeus, 1758

Order Coleoptera Linnaeus, 1758

Superfamily Scarabaeoidea Latreille, 1802

Family Melolonthidae Leach, 1819

Dynastinae MacLeay, 1819

Phileurini Burmeister, 1847

Metaphileurus Kolbe, 1910

Genus *Metaphileurus* Kolbe, 1910

Metaphileurus Kolbe, 1910: 334, 337, 344-345 (original description); Arrow, 1937b: 91 (catalog); Blackwelder, 1944: 259 (catalog); Endrödi, 1977c: 8, 15-17 (key, revision); 1985b: 659, 693-694, plate XLV (key, revision, photo); Lachaume, 1992: 55 (citation); Ide 1998: 41, 58-60, 111, 118, 125, 153 (key, description, biology, phylogeny, illustration, map); Krajcik 2005: 66 (catalog); Abadie *et al*., 2008: 100-101, 111 (checklist); Gasca-Álvarez & Amat-García 2010: 169 (key); Dupuis & Mantilleri 2013: 546, 547 (citation); Perger & Grossi 2013: 4 (citation); Dupuis 2014: 345 (citation); Vaz-de-Mello & Grossi 2022 (checklist).

Phileurus Latreille, 1807 (pars): 103 (description); Burmeister, 1847: 150-151 (revision).

Type species: *Metaphileurus lacunosus* (Burmeister, 1847) (original designation) (Fig. 1).

Gender. Masculine.

Diagnosis. Body black to darkish brown; strongly flattened dorso-ventrally; dorsal surface of elytra flattened; clypeus subtriangular, acuminate; frons with two conical to cylindrical tubercles; frons with vertex deep concave; mandibles with external margin bidentate; pronotum with a longitudinal furrow and two lateral foveae, both more strongly punctate than pronotal surface; elytra with striae not uniformly punctate, bearing punctures bigger than pronotal ones, usually coalescent; protibiae tridentate with acute and curved teeth; apical margin of metatibia with four teeth.

Redescription:

Body. Elongated and flattened. Length. 12.65 – 17.20 mm. Width. 5.50 – 7.20 mm. **Color.** Reddish-brown to black. **Head.** Subtriangular clypeus with acute angles, apex moderately to a strongly truncated small tubercles, moderately acuminate, anteriorly curved; apex weakly to moderately punctate; basis moderately to strongly punctate near clypeus and frons carinae; rounded or striate punctures, confluent, moderate size, glabrous; frons with two short tubercles, rounded apex, right, tubercles with small punctures, weakly to moderately distributed, glabrous; frons moderately to strongly punctate; punctures small to large, rounded, transverse and elongate transversely, moderately deep; concavity weak to moderate, glabrous; distinct carina between clypeus and frons. **Mouthparts.** Mandibles with two teeth, rounded teeth, apical tooth weakly pronounced; mentum apex moderately to strongly emarginated and excavated, mentum base with strong punctures, moderate to large setae, moderately deep, moderately distributed; mentum trapezoidal, mentum base weakly to moderate concave. **Antennae.** Provided of 10 articles, claviform scape, setae moderate to large on scape and antennomere II, setae small to moderate on antennomeres VIII–X; segment II two times longer than segment III; segment II subrectangular, segments III–IV subcylindrical, segments V–VII subconical. **Thorax.** Pronotum flattened dorsoventrally; tubercles absent; each side with a fovea; complete basal border, lateral borders

weakly rounded; pronotal posterior corners with nearly 90º degree; distinct longitudinal midline, incomplete apex (not reaching apex), moderately to strongly excavated; punctures on longitudinal midline large, rounded, moderately to densely distributed, no confluent; disc glabrous, moderately to densely covered with rounded, no confluent and shallow punctures; borders moderately to densely punctate, punctures small, sparsely to moderately distributed; prosternal process moderate, conical or triangular, rounded at basis, moderately punctate; minute setae on punctures of longitudinal furrow; scutellar shield subpentagonal, longer than wide, glabrous; apex weakly to moderate punctate, punctures small to moderate, smooth on base and laterals. **Legs.** Protibiae with three teeth, differently spaced; surface bearing two carina with small and moderate setae; protarsal claws subequals, with no dilatation or incision; mesotibial apex with 3–4 teeth; metatibial apex with 3–5 teeth; meso and metatibiae with two carinae bearing small and moderate spiniform projections; first metatarsomere with spiniform projection, setose laterally; inner border with a row of setae. **Abdomen.** Elytral disc with five rows of punctures; punctures rounded to oval, moderate to large sized, confluent or not; apical cali with small to moderate punctures, sparsely distributed; elytral striae convex, intervals with small and shallow punctures mixed, sparsely to moderately distributed; ventrite IV-V with sinuosities. **Pygidium.** Weakly convex, covered by the apex of the elytra, base laterals weakly concave; base weakly to moderately punctate, weakly concave; disc moderately to strongly punctate, punctures with small to moderate setae, moderately distributed; apical borders weakly concave, moderately to densely punctate; propygidium without stridulatory area. **Aedeagus.** Parameres symmetrical, parallels, parameres longer than wide; parameres length bigger than phallobasis, wide at basis, non-overlapping, glabrous; basis moderately expanded, bearing sides, moderately rounded, with a weak to moderate constriction at middle; transversal carina with weak to moderate base, narrow to wide. Phallobasis subequal to parameres in lenght, with a wide and long basal carina on sides in the middle, from basis to apex.

Female. Similar to male, with sexual dimorphism indistinct; ventrite VI sinuous in males, and subtriangular in females; VI ventrite more convex in males.

Remarks. Adults of *Metaphileurus* spp. were found inside dead logs, probably to search larvae for predation. The larvae of *M. nitidicollis* Kolbe were found feeding on bromeliads, specimens were collected in Campos de Jordão, São Paulo state (Ide 1998 [unpublished data]). Adults and larvae can also be collected together inside of decaying wood (this study). Some adults were collected with aid of light traps. *Metaphileurus* have mandible with teeth, character found in another genera from the tribe, but the other genus with two teeth is only *Allophileurhinus* Dupuis & Dechambre, 2001.

Distribution. *Metaphileurus* Kolbe species are restricted to Atlantic Forest biome from Minas Gerais, Paraná, Santa Catarina, Rio de Janeiro and Rio Grande do Sul. The genus can be found mainly between 200–1500 m of elevation (Fig. 3).

Metaphileurus lacunosus (Burmeister, 1847)

Metaphileurus Kolbe, 1910: 334, 337, 344-345 (original description); Arrow, 1937b: 91 (catalog); Blackwelder, 1944: 259 (catalog); Endrödi, 1977c: 8, 15-17 (key, revision); 1985b: 659, 693-694, plate XLV (key, revision, photo); Krajcik 2005: 66 (catalog); Dupuis & Mantilleri 2013: 547 (citation); Vaz-de-Mello & Grossi 2022 (checklist).

Phileurus lacunosus Burmeister 1847: 150–151 (original combination).

Type material. Neotype male, here designated: a) "Rio.d.Janeiro / Petrópolis / Ohs.23.II.98" [white label] (ZMB, examined by images) (Figs. 1a, 1b).

Additional material. [15 specimens, 7 males and 8 females]. *Brazil*, *Minas Gerais*: "Pitangui / 22.II.2003 / A. Campagnani col." (1 male, CERPE); "Vale das Borboletas / São Thomé das Letras / 22.XI.2005 / L.C. Rocha-filho col." (1 male, CERPE); "Itutinga / 27.IX.2014 / Caputo / A. L. C.

col." (1 female, EPGC). *Rio de Janeiro*: "Rio de Janeiro: Nova Friburgo, Macaé de Cima / 1-15.II.1997 / E. & P. Grossi col." (1 female, EPGC); same but, "1-15.II.2000 / E. & P. Grossi col." (1 female, EPGC); same but, "1-15.II.2003 / E. & P. Grossi col." (1 male and 1 female, EPGC); same but, "01-15.II.2005 / E. & P. Grossi col." (1 female, EPGC); same but, "Sítio Catumara, 1-15.II.1999" (1 female, EPGC); "1-15.ii.2004" (1 male, EPGC); same but, "1-15.ii.2005" (1 female, EPGC); same but, "Campo do Coelho / iii.1995 / Penna col." (1 male, EPGC); same but, "i.1995 / Penna col." (1 male, EPGC); "[Resende], Visconde de Mauá / 15.I.1997 / E. & P. Grossi col." (1 female, EPGC). Santa Catarina: "Corupá, i.1958, 60m, Maller" (1 male, DZUP).

Diagnosis. Head with two small and conical horns; apex of clypeus weakly and sparsely punctate, basis with large and dense punctures; area between horns and close to eyes bearing aureolated punctures; antennal scape with moderate to long and thick setae; pedicel with long setae; pronotum densely punctate; longitudinal furrow wide and shallow, bearing ocellate punctures; elytral suture with large punctures, rounded, coalescent; prosternal process moderately elevated, high at middle, with depressed margins; inner margins of parameres contiguous at apex.

Redescription:

Body. Elongated and flattened. Body length. 17.00 mm. Width. 6.70 mm. **Color.** Black color; intensely bright. **Head.** Apex of clypeus very acuminated; apex with small and sparse punctures; surface of disc and basis with large and aureolated punctures, densely punctate between horns, and near eyes (Fig. 2b); clypeus margins with large and ocellate punctures; frons with small and conical horns; frons with vertex deep concave (Fig. 2b). **Mouthparts.** Apex of mentum weakly emarginated and excavated; mentum with large, dense and deep punctures; sides with long setae. **Antennae.** Antennal scape and segment II with moderate to long setae; segment II with long setae;

segment II subrectangular, segments III-IV subcylindrical, segments V-VII subconical. Pedicel with moderate setae (Fig. 2b). **Thorax.** Pronotum with large and ocellate punctures, surface uniformly and densely punctate; longitudinal furrow long, wide and shallow; longitudinal furrow with ocellate punctures, with minute setae; lateral foveae distinct, shallow, with large and dense punctures; anterior margin with a row of moderate setae; pronotum anterior angles right, sides rounded (Fig. 2b); prosternal process moderately elevated, high at mid, depressed on margins, medial region concave; scutellar shield subpentagonal, sides rounded, apex strongly punctate. **Legs.** Apex of metatibiae with four teeth; metatibia with two carinae, eight lateral small setae on larger carina. **Abdomen.** Elytra with broad and rounded, coalescent punctures near elytral suture, moderate punctures; sparsely to moderately punctate on remaining elytral surface aligned, with some coalescent; ventrites with rounded and shallow punctures; basis of ventrite VI with large, dense and coalescent punctures, apex smooth with a row of short setae. **Pygidium.** Weakly convex; disc with moderate and dense punctures, setose; apex weakly and sparsely punctate. **Aedeagus.** Parameres 1.45 times longer than larger, external surface weakly dilated at apex, slightly concave at middle; inner margins subparallel, weakly concave, touching at apex; ventral teeth almost indistinct from above, located at middle (Figs. 2c, 2d).

Variation. Length. 13.40 – 17.00 mm. Width. 5.80 – 7.20 mm.

Female. Differs from males with following characteristics: Frons with small and weak horns; frons with vertex weak concave; Apex of metatibiae with five teeth; mentum sparsely to moderately punctate.

Remarks. *Metaphileurus lacunosus* differs to the other species of the genus based on the following combination of characters: ocellated punctures of the head present between the horns and close to the eyes; antennae bristles thickened on scape, longer on pedicel; pronotum with ocellated punctures on its surface, and wide longitudinal groove similar to *Metaphileurus acoensis* **new species**, the morphologically closest species, differing only in depth. *M. lacunosus* have the longitudinal furrow deep (Fig. 2b), while for *Metaphileurus acoensis* **new species** the longitudinal furrow is shallow (Fig. 2j). Others characteristics that can differs include the number of coalescing punctures present on elytra, little and quite dispersed; prosternal process depressed at the margins; metatarsomere with 15 bristles on the internal margin, in dorsal and ventral views; parameres with margins touching inner apex, while outer apical margins are divergent (Fig. 2c); central elliptic concavity between parameres oriented longitudinally (Fig. 2c).

Distribution. Brazil: Minas Gerais (Pitangui, São Thomé das Letras, Itutinga), Rio de Janeiro (Petrópolis, Nova Friburgo), Santa Catarina (Corupá).

Metaphileurus nitidicollis Kolbe, 1910

Metaphileurus nitidicollis Kolbe 1910: 345 (original description); Arrow 1937: 91 (catalog); Blackwelder 1944: 259 (catalog); Endrödi 1977c: 17 (description); 1985b: 694 (revision); Krajcik 2005: 66 (catalog); Abadie *et al*. 2008: 101, 111, plate 39 (citation, photo); Dupuis & Mantilleri 2013: 547 (citation); Vaz-de-Mello & Grossi 2022 (checklist).

Type material. Holotype male. a) “Brasilien / St. Catharina / Theresopolis / Fruhstorfer S.” [green label] b) “Metaphil. nitidicollis n.sp.” [white handwritten label] c) “Holotypus / Metaphileurus / nitidicollis / Kolbe” [orange bordered white label] (ZMB, examinated by photos) (Figs. 1c, 1d).

Additional material. [8 specimens, 3 males and 5 females]. Brazil, Paraná. “Curitiba / 1938 / J. Leprevost leg.” (1 male, EPGC); “Piraquara / Mananciais da Serra / 10.XI.2005 / P. C. Grossi leg.” (1 female, EPGC); “Campina Grande do Sul / Pico Paraná / Caratuva / 15.X.2008 - 1800m / C. M. Maia col.” (1 female, EPGC); “Coleção didática / UFPR (1 female, EPGC)”. Rio Grande do Sul. “São Fco. Paula / Pro Mata / 15-18.XI.2001 / Proj. Araucária col.” (1 female, EPGC); “São Fco. Paula / Pró Mata / 15-18.I.2002 / Proj. Araucária col.” (1 male, EPGC); “São Fco. Paula / Pró Mata / 15-18.II.2002 / Proj. Araucária col.” (1 female, EPGC). Santa Catarina. “Corupá, iii.1958, 60 m, Maller.” (1 male, DZUP).

Diagnosis. Head with small and conical horns; apex of clypeus weakly and sparsely punctate; basis of clypeus with aureolated punctures, moderately punctate; antennal scape with moderate to long setae; pedicel with small to moderate setae; disc of pronotum moderately to strongly punctate, weakly close to longitudinal furrow; longitudinal furrow narrow and deep; punctures ocellated on furrow and sides of pronotum; elytral suture with longitudinally large, ocellated, coalescent punctures; prosternal process moderately elevated, depressed on base; parameres with inner margins touching on apex and basis.

Redescription:

Body. Elongated and flattened dorsoventrally. Body length. 15.00 mm. Width. 6.80 mm. **Color.** Reddish-brown to black, intensely bright.

Head. Clypeus densely punctate; lateral margins elevated; apex of clypeus with small punctures, sparsely punctate, disc and basis with coalescent and transversally long punctures, moderately to strongly punctate; frons with small and conical horns; long and ocellated punctures on disc, longitudinally coalescent, densely puncate; area around horns basis with small punctures,

moderately punctate, glabrous; frons vertex deeply concave (Fig. 2f). **Mouthparts.** Apex of mentum weakly emarginate and excavated; mentum strongly punctate, deep punctures; basis and sides with long setae. **Antennae.** Antennal scape and segment II with moderate and long setae; segment II subrectangular, segments III-IV subcylindrical, segments V-VII subconical. Pedicel with moderate setae (Fig. 2f). **Thorax.** Pronotum with large, coalescent and ocellated punctures on foveae; disc with large punctures, densely punctate; longitudinal furrow narrow and deep; area between longitudinal furrow and lateral foveae with small to moderate punctures, moderately punctate; pronotum anterior angles right, sides rounded (Fig. 2f). Prosternal process moderately elevated; high at apex, depressed at mid, base with some depressions; scutellar shield subpentagonal, rounded sides and acuminate basis; apex with few moderate punctures, moderately punctate. **Legs.** Apex of metatibiae with four teeth; metatibiae with two carinae, with a row of 6 lateral setae on larger carinae. **Abdomen.** Elytra with longitudinally long, large, ocellated and misaligned punctures; eight or more coalescent in a long striae, or large depressions near elytral suture, densely punctate. All ventrites with two rows of rounded and shallow punctures, mid region without punctures, setose; ventrites I and II marked by longitudinal linear depression; basis of ventrite V with coalescent and striated punctures, extending horizontally near sides. **Pygidium.** Weakly convex; disc moderately to strongly punctate, apex weakly and sparsely punctate.

Aedeagus. Parameres 1.20 times longer than wide, convex at middle, with two longitudinal depressions near parameres opening; outer margins parallel; ventral teeth located medially in lateral view (Figs. 2g, 2h).

Variation. Length 12.50–16.70 mm; elytral width 5.30–6.80 mm (Fig. 2e).

Female. Differs from males with following characteristcs: horns small and weak (character of sexual dimorphism); frons vertex weakly concave; apex of pygidium moderatey punctate.

Remarks. *Metaphileurus nitidicollis* have conical horns like *M. lacunosus* but differs by the presence of larger points on the head surface, except at the base of the tubercles, which are only found in the former species (Figs. 2a, 2e). *Metaphileurus bacchus* is the morphologically closest species, sharing the following characteristics: antennae with long bristles on the pedicel, pronotum with deep longitudinal furrow, pronotum punctures aureolated on depressions (longitudinal furrow and lateral foveae) (Figs. 2m, 2n). *M. bacchus* also have elliptical coalescent punctures, prosternal process high and depressed at the base, aedeagus with parallel outer margins, internal margins touch apex and base, central concavity ellipsoidal (Figs. 2o, 2p). Differences include the coalescent punctures of *M. nitidicollis* being located close to elytral suture and the metathoracic legs having 16 setae in the metatarsomere.

Distribution. Rio de Janeiro (Teresópolis), Curitiba (Campina Grande do Sul, Piraquara), Rio Grande do Sul (São Francisco de Paula), Santa Catarina (Corupá).

Metaphileurus acoensis Medeiros & Grossi new species

Type material. Holotype male, here designated, dissected, labeled: a) "Brasil, Minas Gerais, Ipatinga 15-31.XII.1990, E. & P. Grossi legs" [white typed label]. Female paratype with same data as holotype. Holotype and paratype ex. EPGC deposited in CERPE.

Diagnosis. Head with two small and trapezoidal horns; disc of clypeus moderately to strongly punctate, apex with small and sparse punctures; area between horn with large areolate and dense

punctures and striae; antennal scape, segment II and pedicel with moderate to long setae; pronotum densely punctate, moderately near longitudinal furrow; longitudinal furrow wide and shallow, with shallow lateral foveae, densely punctate; elytral suture with large punctures, ocellated, coalescent; prosternal process moderately elevated, depressed on basis; inner margins of parameres touching on apex and basis.

Description of Holotype.

Body. Elongated and flattened. Body length 15.50 mm. Elytral width. 6.70 mm. **Color.** Black color; intensely bright. **Head.** Apex of clypeus weakly punctate with small and sparse punctures; surface of disc and basis with large, dense and aureolated punctures; frons with short and trapezoidal horns (Fig. 2j); frons surface disc, surface between horns and near eyes with large, aureolated and dense punctures (Fig. 2j); frons with vertex moderately concave; glabrous (Fig. 2j). **Mouthparts.** Apex of mentum weakly emarginate and excavated; mentum with large, dense and deep puntures; sides and basis with long setae. **Antennae.** Antennal scape, segment II and club with moderate to long setae; segment II subrectangular; segments III-VI subcylindrical; segments V-VII subconical. **Thorax.** Pronotum with large and dense ocellated punctures; longitudinal furrow wide and shallow; longitudinal furrow punctures with minute setae; lateral foveae almost indistinct, shallow with large and dense punctures; pronotum anterior angles with right angles; sides rounded; prosternal process moderately elevated, depressed at center; scutellar shield subpentagonal, sides rounded; apex with moderate and dense punctures. **Legs.** Apex of metatibia with four teeth; metatibiae with 6 small setae on larger carinae. **Abdomen.** Elytra with large, ocellated, deep and disarranged rows of punctures; two or more ocellated punctures coalescent (Fig. 2j). Ventrites with moderate, ocellated and punctures; basis of ventrite VI with large, dense and striate punctures, apex smooth; glabrous. **Pygidium.** Weakly convex; disc with moderate and

dense punctures, setose; apex with moderate punctures and moderately punctate. **Aedeagus.** Parameres elongated, 1.25 times longer than wide; sides slightly concave, thickened; parameres with rounded apex; one ventral tooth on middle; external margins divergent (Figs. 2k, 2l).

Variaton. Paratype Female. Body length 15.00 mm. Elytral width. 6.60 mm (Fig. 2i). Paratype total length: 15.40 mm; elytral width: 7.20 mm. Differing from male in the following aspects: frontal horns on head less pronounced, half the length as the same structure on males; depression between horns in females less pronounced and almost flat; pronotum is flatter dorsoventrally and broader horizontally, lateral aspect similar to the elytra; lateral foveae on pronotum less distinct; elytra wider, up to 2mm larger in females; abdomen with ventrites convex in the middle; large number of bristles between abdomen and elytra.

Etymology. This species was found in the Steel Valley, termed "Vale do Aço" in Portuguese, in the Ipatinga municipality.

Remarks. This species is morphologically similar to *M. lacunosus*, with respect to uniformly punctate pronotum and width of the longitudinal pronotal furrow (Fig. 2b, 2j). This species has distinct punctures on head, simple on margins, antennal scape and pedicel with short bristles, deep longitudinal furrow; and parameres with divergent external margins; *M. lacunosus* have clypeus with small and sparse punctures; antennal scape with moderate to long bristles; shallow longitudinal furrow; and parameres with almost right external margin.

Metaphileurus bacchus Medeiros & Grossi new species

Type material. Holotype male, here designated, dissected, labeled: a) "Brasil, Rio de Janeiro, Nova / Friburgo, Macaé de / Cima 1600 m / 1-20.XII.2001/ E. & P. Grossi Legs." (ex EPGC deposited at CERPE). Paratypes. [5 specimens, 1 male and 4 females): *Brasil*, *Minas Gerais*. "Brasil, Minas Gerais, Extrema, Torre da Embratel, 09.xii.2012, em tronco, 1600m, Grossi, Parizotto & Melo legs." (1 male CERPE). *Rio de Janeiro*: "BRASIL, RJ, Nova / Friburgo, Macaé de / Cima – 1600 m / 1-15.XI.2004 / E. & P. Grossi Leg." (1 female EPGC); same, except "1-15.XI.2006" (1 female CERPE); "Brasil, Rio de Janeiro, Resende, Visconde de Mauá, 15.i.1997, E. & P. Grossi legs." (1 female EPGC); "J.F. Zikán / Fazenda dos Campos 1500 m / Virgínia – E. de Minas / 3.-XII.-1920", "Metaphileurus / lacunosus / Burm.", "Coleção / J. F. Zikan" 1 macho; "J.F. Zikán / Fazenda dos Campos 1500 m / Virgínia – E. de Minas / 3.-XII.-1920" "Coleção / J. F. Zikan" (1 fêmea).

Diagnosis. Head with small trapezoidal tubercles; apex of clypeus weakly and sparsely punctate, basis with large, dense and coalescent punctures; area between horns and near eyes with elongate striae and punctures; antennal scape and segment II with long and thick setae; pedicel with moderate to long setae; pronotum densely punctate at disc and foveae, with small punctures near longitudinal furrow; longitudinal furrow wide and deep, with moderate, coalescent and ocellate punctures; elytral suture with large punctures, rounded, coalescent; prosternal process moderately high with two depressions, base entirely impressed; parameres with inner margins tounching at middle and apex, with centralized ellipsoidal opening; ventral tooth at baseline.

Description of Holotype.

Body. Elongated and flattened. Body length 17.20 mm. Elytral width. 6.75 mm. **Color.** Black; intensely bright. **Head.** Apex of clypeus very acuminated; apex with small and sparse punctures;

basis with large, dense and ocellated punctures; frons with strong trapezoidal horns, small and ocellated punctures on horns; frons disc, area between horns and near eyes with large, coalescent, dense punctures (Fig. 2n); frons with vertex deep concave. *Mouthparts*. Apex of mentum weakly emarginated and excavated; mentum with large and deep punctures, moderately distributed; sides and basis with long setae. **Antenna.** Antennal scape and segment II with long setae; pedicel with moderate setae. **Thorax.** Pronotum with moderate, ocellate and coalescent punctures at disc, inside foveae and longitudinal furrow; longitudinal furrow wide, long and deep, moderate and densely punctate; lateral foveae with moderate, deep and dense punctures; punctures near longitudinal furrow small and sparsely punctate; anterior angles right; sides rounded (Fig. 2n); scutellar shield subpentagonal with rounded sides and acuminate basis; apex with few moderate and sparse punctures; prosternal process high and strong, depressed around base. **Legs.** Protibiae with three teeth, dotted and ribbed; short bristles pointing to tibial margin; metatarsomeres with row of 6 setae lateral bristles. **Abdomen.** Elytral suture with two or more aureolate coalescent punctures in long striae or in depressions on median region; points misaligned near elytral suture. Sternites with ocellated and shallow punctures on sides, moderately absent from sternite I to III. **Aedeagus**. Parameres 1.40 times longer than larger, narrow and long, laterally concave, rounded apex, dilated and few thick; inner margins with centralized ellipsoidal opening; ventral tooth at baseline (Figs. 2o, 2p).

Variation. Paratypes. Female total length: 15.80 mm; total width: 6.50 mm. Differs from males in these characteristics: frons horns smaller; frons less hollowed; scutellar shield basis rounded.

Etymology. Most specimens were collected from a protected area in Nova Friburgo Municipality called "Reserva Particular do Patrimônio Natural Bacchus.".

Key to the species of the genus *Metaphileurus* Kolbe (modified from Endrödi 1985)

1 Pronotal surface uniformly and equally dense and strongly punctate; longitudinal furrow wide; surface of pronotum with ocellated punctures; elytral suture with misaligned furrow formed by three and two coalescent punctures....**2** (Figs. 3a-b, 5a-b)

1' Pronotal surface with sides of longitudinal furrow very finely punctate to smooth; longitudinal furrow shallow; ocellated punctures on depressions only, sometimes at apex of pronotum; elytral suture with furrow aligned formed by three or more coalescent punctures....**3** (Figs. 4a-b, and 6a-b)

2 Antennae with thick setae on scape, and long setae on pedicel; head strongly punctate between frontal horns; conic horns; pronotum with a broad and shallow longitudinal furrow; prosternal process depressed at sides; metatarsomeres with 18 lateral internal setae..... ***M. lacunosus* (Burmeister, 1847)** (Figs. 1a-d, and 3a-d)

2' Antennal scape and pedicel with thin and short bristles; head punctures larger between horns, smaller at margins; trapezoidal horns; pronotum with long and deep longitudinal furrow; prosternal process depressed at mid; metatarsomeres with 15 lateral inner setae..... ***M. acoensis* Medeiros & Grossi new species** (Fig. 5a-d)

3 Antennal scape with short bristles; base of frons to base of clypeus with larger punctures, absent around horns; conic tubercles; pronotum with narrow and deep longitudinal furrow; prosternal process high at middle, base impressed; metatarsomeres with 16 lateral inner setae..... ***M. nitidicollis* Kolbe, 1910** (Figs. 2a-d, 4a-d)

3' Antennal scape with long bristles; frons densely punctate, except around horns; trapezoidal tubercles; pronotum with long and deep longitudinal furrow; prosternal process moderately high,

base entirely impressed; metatarsomeres with 17 lateral inner setae... ***Metaphileurus bacchus*** **Medeiros & Grossi new species** (Fig. 6a-d)

Phylogeny of *Metaphileurus* Kolbe, 1910 and toothed mandibula

BODY

0. Body, sexual dimorphism: (0) not distinct, (1) distinct (Figs. 1D-G) (L = 1, CI = 100, RI = 100);

This character has been considerated as sexual dimorphism the difference between the head and pronotum armature (horns or tubercles) of males and females.

1. Body, tegument color: (0) uniform (Figs. 1F), (1) variable (Figs. 1D) (L = 3, CI = 33, RI = 50);

The color of the tegument is uniform, thorax and abdomen with the same color without variation (1), and thorax and abdomen can be in different colours (2).

2. Body, convexity: (0) flattened (Fig.), (1) convex (Fig. 1B, 1C) (L = 3, CI = 33, RI = 60);

The body flattened is when the dorsal surface is linear comparing the pronotum and elytra, and convex when they are curved and the pronotum is not aligned with elytra.

HEAD

3. Clypeus, horn: (0) absent (Fig. 2A), (1) present (Fig. 2B) (L = 1, CI = 100, RI = 100);

4. Clypeus, shape: (0) triangular (Fig. 2A), (1) variable (Fig. 2C-D) (rounded, parabolic, trapezoidal, etc) (L = 3, CI = 33, RI = 77);

5. Clypeus, apex: (0) acute (Fig. 2F), (1) notched (Fig. 2A) (L = 2, CI = 50, RI = 75);

6. Clypeus, punctures shape: (0) punctate (Fig. 1G), (1) circular (Fig. 2B), (2) striate (Fig. 2A) (L = 8, CI = 25, RI = 25);

7. Clypeus, clypeal carena: (0) absent (Fig. 2C), (1) present (Fig. 2B) (L = 3, CI = 33, RI = 66);

This carena come from the clypeal horn and reaches the frontal horns.

8. Clypeus, frontoclypeal suture: (0) absent (Fig. 1A,F), (1) present (Fig. 1B) (L = 5, CI = 20, RI = 0);

The frontoclypeal suture that delimitate the position of the horn and its position.

9. Clypeus, number of horns: (0) one (Fig. 3C), (1) more than one (Figs. 2A-F) (L = 3, CI = 33, RI = 50);

10. Frons, surface: (0) flattened (Fig. 3A), (1) concave (Fig. 1B) (L = 2, CI = 50, RI = 88);

11. Frons, sculpturation: (0) puncate (Fig. 3A), (1) striate (Fig. 3C,F) (L = 6, CI = 16, RI = 50);

12. Labrum, anteriorly: (0) visible, (1) not visible (L = 4, CI = 25, RI = 25);

When the labium can be observed with the insect in frontal view (0), not covered by clypeus.

13. Oculars canthus, development: (0) not developed, (1) developed (L = 4, CI = 25, RI = 0);

When ocular canthus don't reach the mid of the compose eyes is considered not developed, when reach is considered developed.

14. Mentum, base of labial palps: (0) visible (Fig. 3G), (1) concealed by the sides of mentum (Fig. 3H-I) (L = 1, CI = 100, RI = 100);

This is the sinapomorphy of the Phileurini, according to Burmeister (1847), the base of labial palpi are covered by the sides of mentum.

15. Mentum, shape: (0) anteriorly convergent to apex (Fig. 3G-H), (1) anterior divergent to apex (Fig. 3I) (L = 2, CI = 50, RI = 0);

The character state (0) has rounded sides and a narrow apex; while (1) decreases in size as approaches the base.

16. Mentum, apex, emargination: (0) absent (Fig. 3H-I), (1) present (Fig. 3G) (L = 2, CI = 50, RI = 0);

17. Mentum, excavation: (0) absent (Fig. 3I), (1) present (Fig. 3G) (L = 2, CI = 50 RI = 0);

18. Mandible, external teeth: (0) absent, (1) present (L = 4, CI = 25, RI = 50);

19. Mandible, number of external teeth: (0) one (Fig. 4A), (1) two (Fig. 4B), (2) three (Fig. 4C) (L = 3, CI = 33, RI = 71);

20. Mandibles, dorsal view: (0) covered by clypeus, (1) not covered by clypeus (L = 4, CI = 25, RI = 40);

PROTHORAX

21. Pronotum, large projection in the mid region: (0) absent (Fig. 1E-G), (1) present (Fig. 1D) (L = 1, CI = 100, RI = 100);

The projection is longer than the length of pronotum.

22. Pronotum, longitudinal furrow: (0) absent (Fig. 4F), (1) present (Fig. 4G) (L = 3, CI = 33, RI = 77);

23. Pronotum, width of longitudinal furrow: (0) narrow (Fig. 1F), (1) large (Fig. 4G) (L = 3, CI = 33, RI = 33);

24. Pronotum, depth of longitudinal furrow: (0) superficial (Fig. 1G), (1) deep (Fig. 4G) (L = 2, CI = 50, RI = 0);

25. Pronotum, tubercles: (0) absent (Fig. 1F), (1) present (Fig. 5B-E) (L = 4, CI = 25, RI = 62);

26. Pronotum, number of tubercles (or process): (0) one (Fig. 5B), (1), more than one (two, three, four) (Fig. 5B-E) (L = 3, CI = 33, RI = 33);

27. Pronotum, tubercles position: (0) near apical border (Fig. 5C), (1) not at apical border (Fig. 5D-E) (L = 2, CI = 50, RI = 66);

28. Pronotum, sides, foveae: (0) absent (Fig. 1F), (1) present (Fig. 5F) (L = 4, CI = 25, RI = 72);

29. Pronotum, lateral carinae: (0) absents (Fig. 5F-G), (1) presents (Fig. 5E) (L = 3, CI = 33, RI = 60);

30. Pronotum, posterior angles: (0) angulated (Fig. 4F), (1) rounded (Fig. 5A,C) (L = 6, CI = 16, RI = 16);

31. Pronotum, longitudinal midline: (0) absent (Fig. 5F), (1) present (Fig. 5D-E) (L = 4, CI = 25, RI = 62);

32. Pronotum, longitudinal midline: (0) incomplete , (1) complete (Fig. 5D-E) (Fig. 5F) (L = 1, CI = 100, RI = 100);

33. Pronotum, concavity or median chanfer: (0) absent (Fig. 1D-G), (1) present (Fig. 5D-E) (L = 2, CI = 50 RI = 83);

34. Pronotum, sculpturation: (0) rounded (Fig. 5G), (1) striated (Fig. 5E) (L = 3, CI = 33, RI = 33);

35. Pronotum, borders: (0) incomplete [usually at the base] (Fig. 5E, G), (1) complete (Fig. 4G) (L = 4, CI = 25, RI = 62);

36. Prosternal process, size related to procoxae: (0) not reaching the profemur, (1) reaching the profemur (L = 6, CI = 16, RI = 44);

PTEROTHORAX

37. Scutellar shield, shape: (0) subtriangular, (1) subpentagonal (L = 6, CI = 16, RI = 50);

38. Scutellar shield, relation length/width: (0) longer than wider, (1) subequal, (2) wider than longer (L = 5, CI = 40, RI = 25);

It was designated longer than wider when the length was greater than the width; subequal when the two measures were similar; and wider when the width was greater than the length.

39. Ventrite VI: (0) same size as visible ventrites III, IV or V ; (1) visible longer than ventrites as III, IV or V (L = 6, CI = 16, RI = 16);

40. Metaepisternum, small sclerotinized apical projection: (0) absent (Fig. 6A), (1) present (Fig. 6B) (L = 2, CI = 50, RI = 83);

41. Elytra, length/width: (0) wider than longer or subequal (Fig. 1A), (1) longer than wider (Fig. 1D-G) (L = 2, CI = 50, RI = 50);

42. Elytra, number of striae: (0) less than five (Fig. 1D-E), (1) five, more than five (Fig. 1F-G) (L = 2, CI = 50, RI = 75);

43. Elytra, striae: (0) superficials (Fig. 1D-E), (1) not superficials (Fig. 1F-G) (L = 1, CI = 100, RI = 100);

The not superficial striae are those that are higher than elytra surface.

44. Elytra, punctures: (0) misaligned, (1) aligned (L = 1, CI = 100, RI = 100);

45. Elytra, punctures, arrangement: (0) not coalescent, (1) coalescent (L = 4, CI = 25, RI = 50);

46. Elytra, setae: (0) absent, (1) present (L = 3, CI = 33, RI = 0);

47. Elytra, apical calli: (0) indistinct, (1) distinct (L = 1, CI = 100, RI = 100);

ABDOMEN

48. Tergite VIII, punctures: (0) smooth, (1) not superficial, (2) deep (L = 2, CI = 50, RI = 50);

49. Tergite VIII, punctures depth: (0) superficial, (1) deep (L = 3, CI = 33, RI = 33);

50. Tergite VIII, sulcus, base: (0) absent, (1) present (L = 2, CI = 50, RI = 66);

51. Tergite VIII, setae: (0) absent, (1) present (L = 5, CI = 20, RI = 20);

LEGS

52. Protibia, shape: (0) longitudinal, (1) transversal (L = 3, CI = 33, RI = 0);

53. Protibia, teeth: (0) two, (1) three, (2) four (L = 4, CI = 50, RI = 60);

54. Protibia, distance between teeth (0) subequal or equal, (1) different (L = 4, CI = 25, RI = 57);

The distance measured from apical tooth to medial tooth, and the distance of the medial tooth and basal tooth, the state different it is used when the distance can be shorter or longer.

55. Protarsomeres I-VI, width/length: (0) short, (1) subequal, (2) long (L = 6, CI = 33, RI = 42);

For the tarsomere length were considereted (0) for short and wide tarsomeres, (1) for equal length and width, and (2) for long and narrow tarsomeres.

56. Protibia, protibial claw: (0) elongated, (1) not elongated or not small , (2) small (L = 7, CI = 28, RI = 37);

It was used the (0) for claws longer than the tarsomere V (near claw), (1) equal or subequal measure, and (2) for claws shorter than tarsomere V.

57. Legs, inner protibial claw: (0) not thickened, (1) thickened (L = 2, CI = 50, RI = 75);

58. Protibia, apex intern claw bifid: (0) absent, (1) present (L = 2, CI = 50, RI = 66);

59. Protibia, spur: (0) not reaching, (1) reaching second tarsomere (L = 6, CI = 16, RI = 0);

60. Protibia, dorsal, number of carena: (0) one, (1) two (L = 5, CI = 20, RI = 42);

61. Profemur sulcus (ventral view): (0) absent, (1) present (L = 3, CI = 33, RI = 33);

62. Metatibia, spur on first metatarsomere: (0) absent (Fig. 6C), (1) present (Fig. 6D) (L = 4, CI = 25, RI = 50);

63. Metatibia, apex: (0) truncate (Fig. 6D), (1) toothed (Fig. 6C) (L = 6, CI = 16, RI = 28);

64. Metatibia, number of teeth: (0) one, (1) two, (2) more than one (L = 5, CI = 40, RI = 40);

65. Metatibia, first metatarsomere, row of setae: (0) absent, (1) present (L = 3, CI = 33, RI = 0);

66. Meso e metatibia, carena: (0) without spine-like projections, (1) with spine-like projections (L = 2, CI = 50, RI = 90);

67. Meso e metatibiae carinae (ventral): (0) absent, (1) present (L = 7, CI = 14, RI = 45);

AEDEAGUS

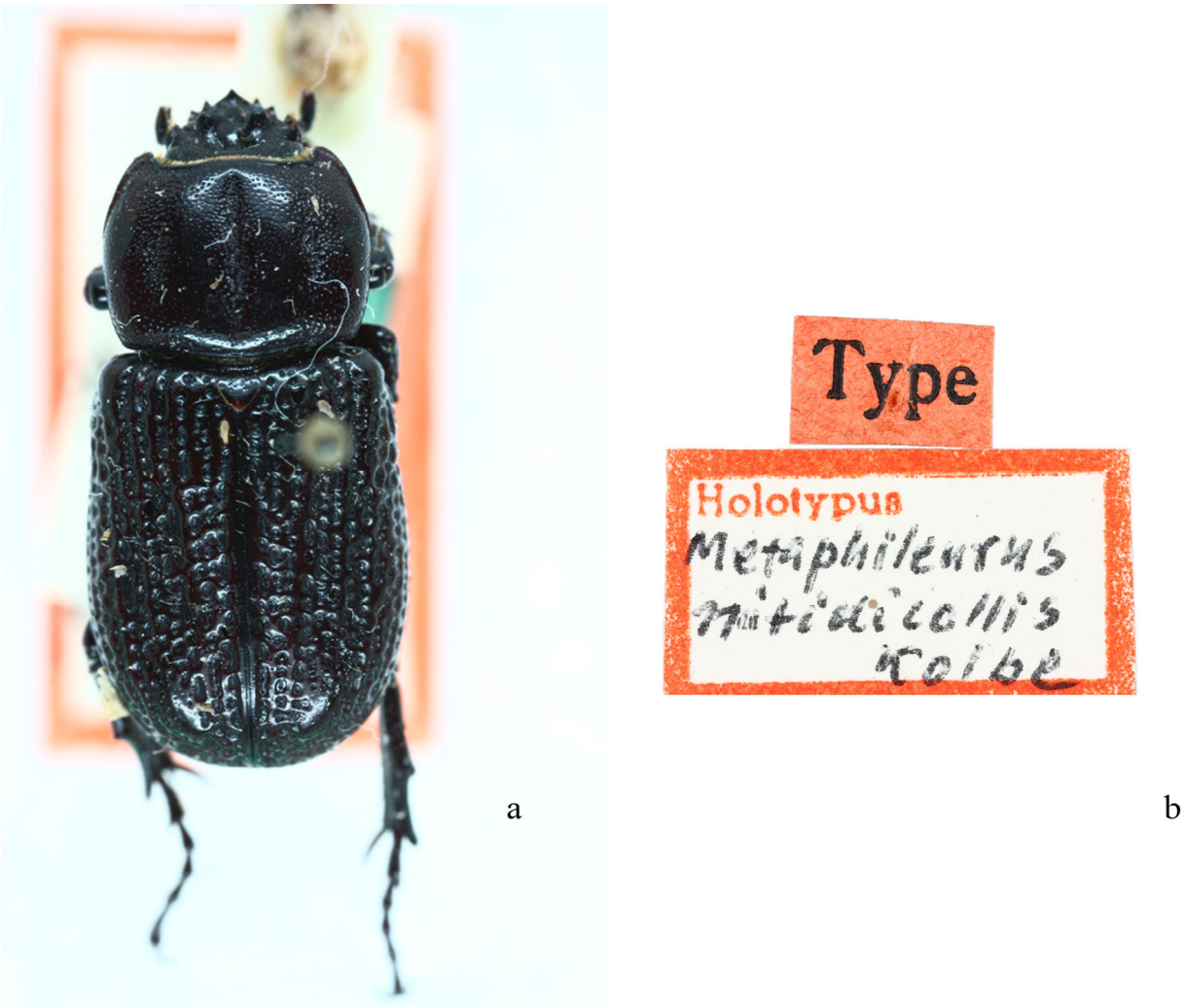
68. Aedeagus, parameres, symmetry: (0) asymmetric (Fig. 6F), (1) symmetric (Fig. 6E) (L = 3, CI = 33, RI = 0);

This characteristic was tested in the same parameters observed by Breeschoten *et al*. (2013), observed in several groups, reviewed by Huber *et al*. (2007). Some genera of Phileurini have asymmetrical aedeagus.

69. Aedeagus, shape of parameres in caudal view: (0) straight, (1) curved (L = 6, CI = 16, RI = 37);

70. Aedeagus, paramere lateral view: (0) right (Fig. 6G), (1) curved (Fig. 6H) (L = 3, CI = 33, RI = 0);

Figure 1. *Metaphileurus lacunosus* (Burmeister) neotype male in dorsal view (a), ventral view of right maxilla (b), aedeagus (c) and labels attached (d) (*Photos* by Karla Schneider).



a b

Figure 2. *Metaphileurus nitidicollis* Kolbe, 1910 holotype dorsal habitus (a) and labels attached (b) (Photos by Karla Schneider).

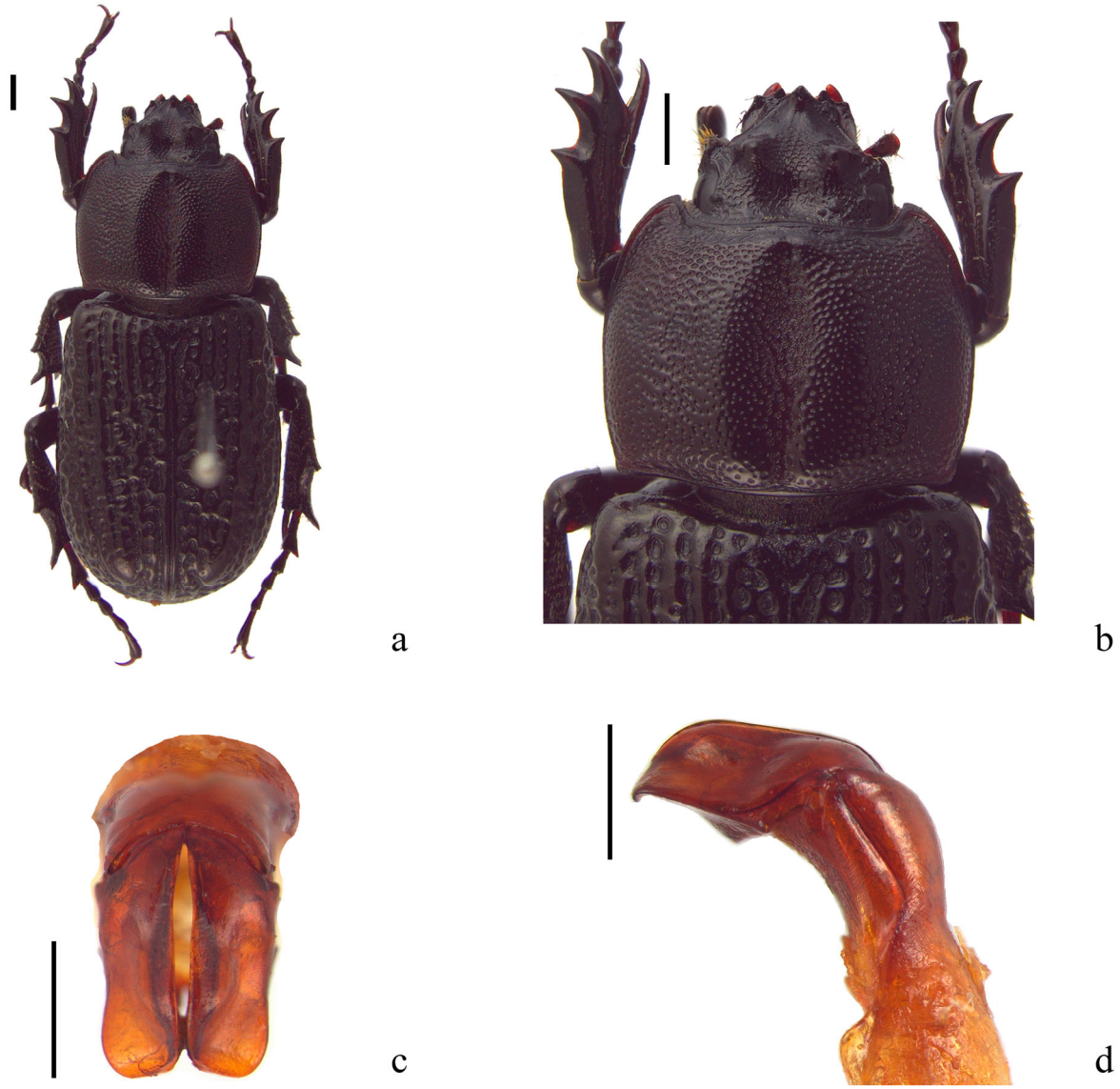


Figure 3. *Metaphileurus lacunosus* (Burmeister) dorsal habitus (a), head and pronotum details (b), and parameres in caudal (c) and lateral views (d). Scale bars 1 mm.

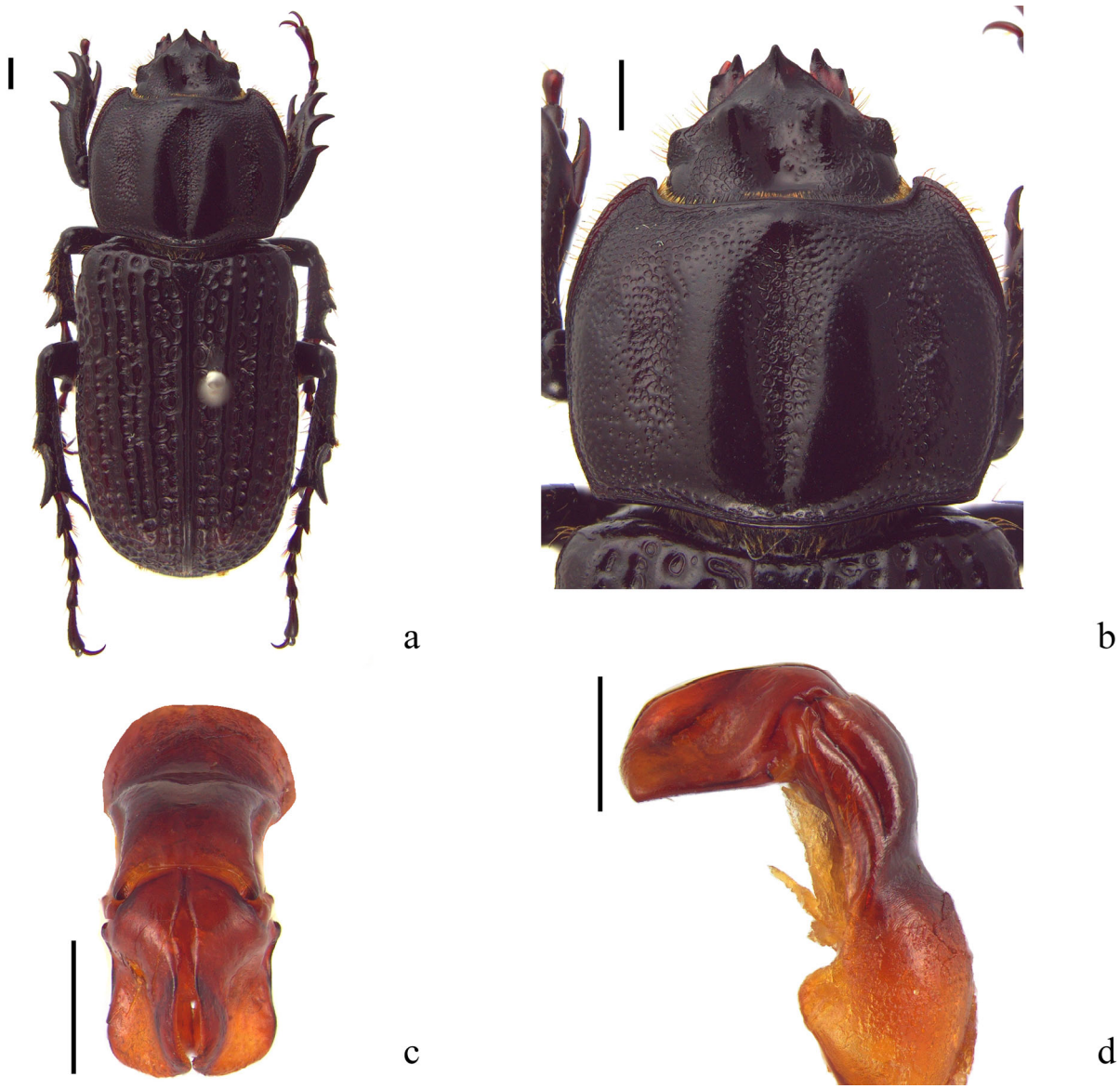


Figure 4. *Metaphileurus nitidicollis* Kolbe, 1910 dorsal habitus (a), head and pronotum details (b), and parameres in caudal (c) and lateral view (d). Scale bars 1 mm.

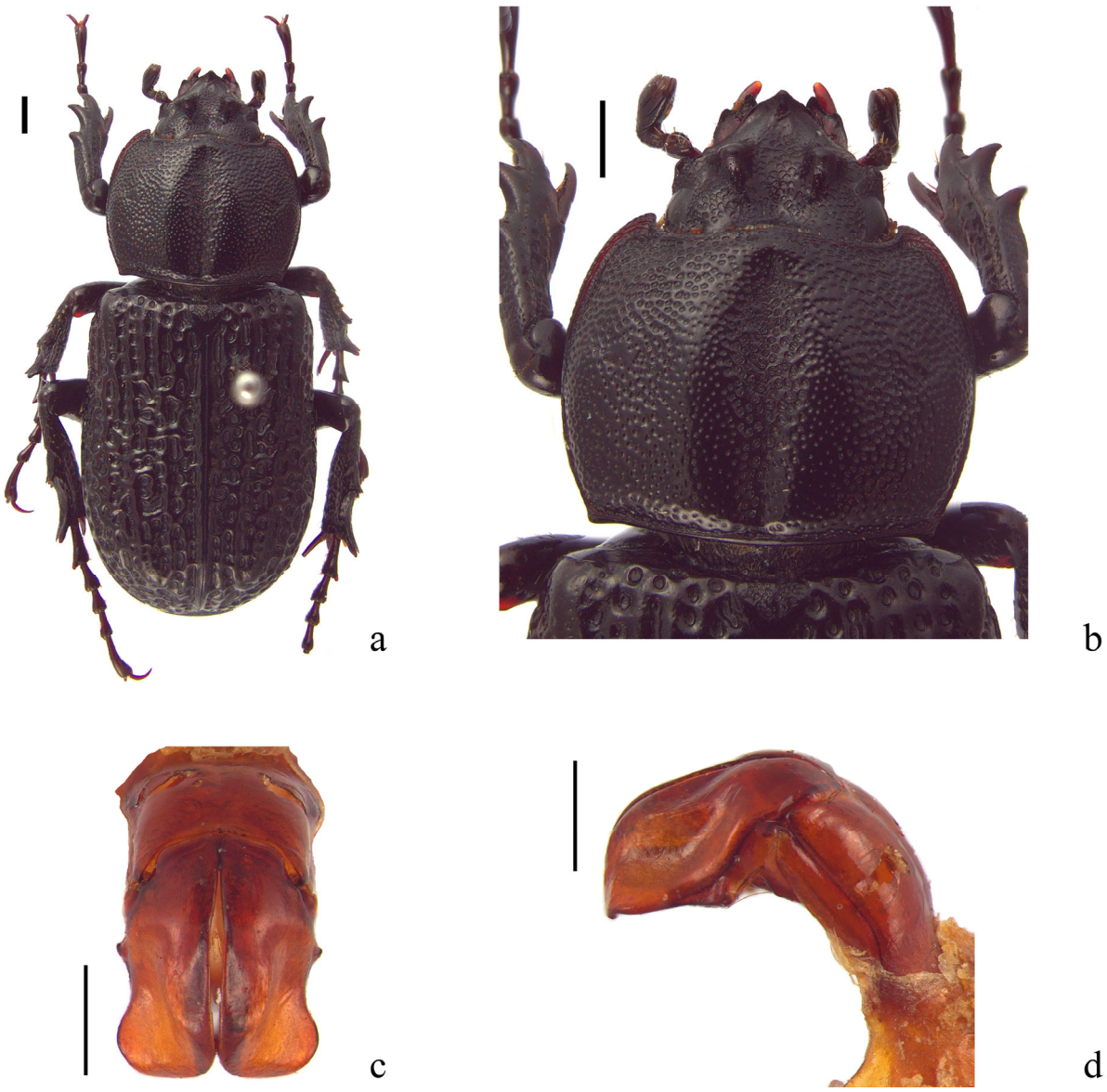


Figure 5. *Metaphileurus acoensis* Medeiros & Grossi **new species** dorsal habitus (a), head and pronotum details (b), and parameres in caudal (c) and lateral view (d). Scale bars 1 mm.

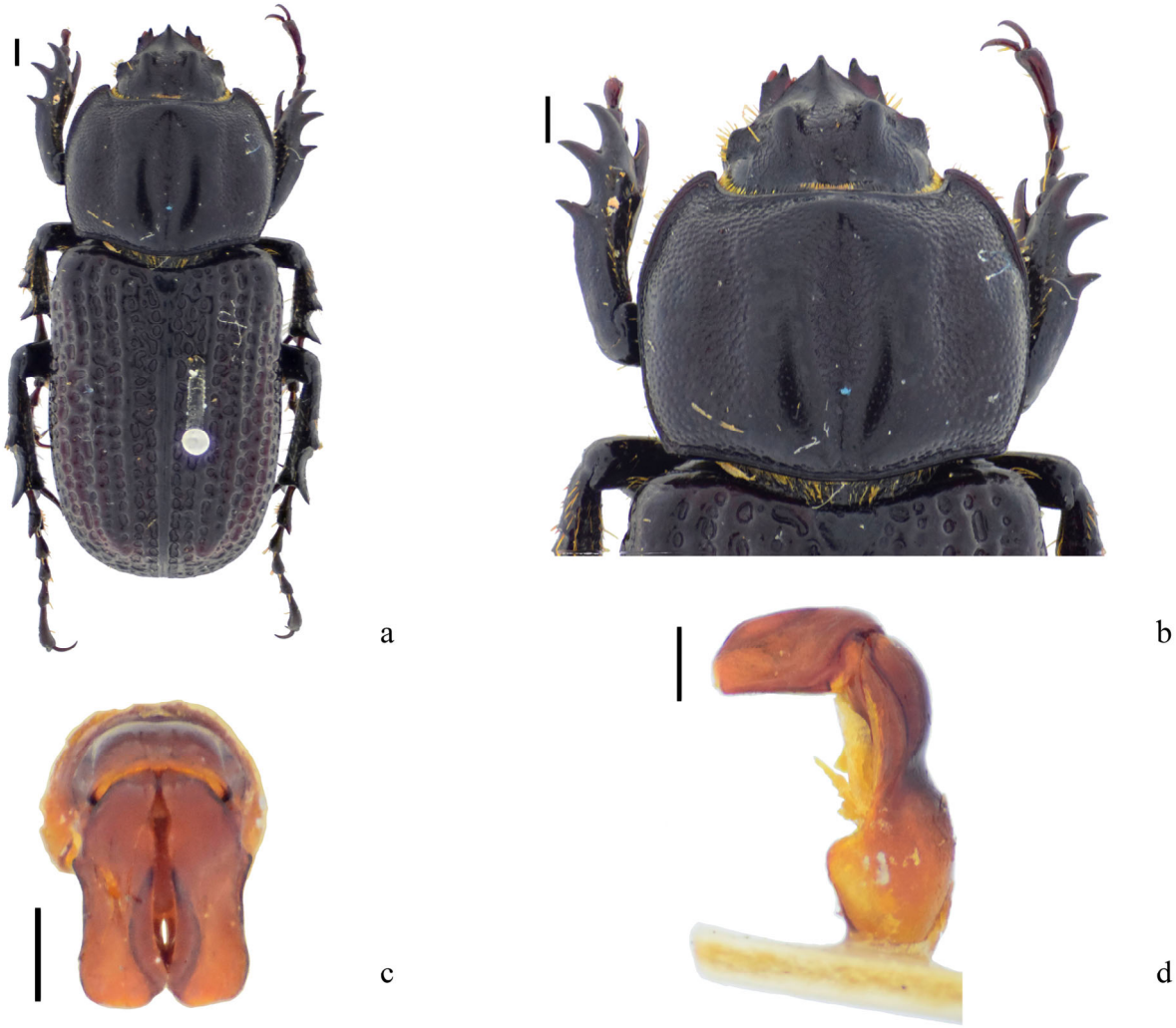


Figure 6. *Metaphileurus bacchus* Medeiros & Grossi **new species** dorsal habitus (a), head and pronotum details (b), and parameres in caudal (c) and lateral view (d). Scale bars 1 mm.

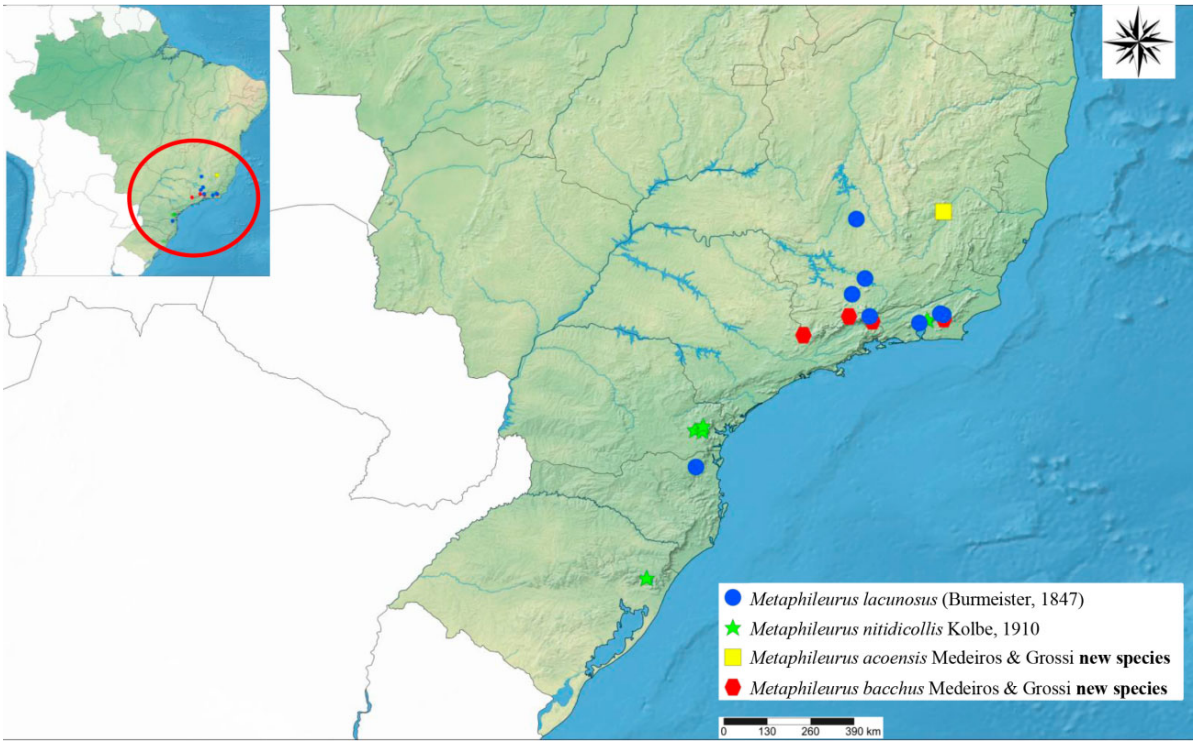


Figure 7. Map of the known distribution of the *Metaphileurus* species.

Table 1. Matrix of cladistic analysis with characters, states of characters and terminal taxa.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Rutela lineola	0	1	1	0	1	1	1	0	1	-	0	0	0	0	0	0	1	1	1	1	1	0	0	-	-	0	-	-	0	0	0	0	-	0	0	0
Agaocephala cornigera	1	1	1	0	1	1	0	0	0	1	0	0	1	0	0	0	0	1	1	1	0	0	0	-	-	1	0	0	0	0	0	1	0	0	0	0
Cyclocephala amazona	0	1	0	0	1	-	0	0	1	-	0	0	1	1	0	0	1	1	0	-	0	0	0	-	-	0	-	-	0	0	1	0	-	0	0	1
Dynastes hercules	1	1	1	0	1	1	0	0	1	0	0	0	1	1	0	0	0	0	0	-	0	1	1	0	0	1	0	1	0	0	1	0	-	0	0	1
Hexodon reticulatum	0	1	0	0	1	0	0	0	1	-	0	0	1	0	0	0	1	1	0	-	0	0	0	-	-	0	-	-	0	0	1	0	-	0	0	1
Oryctes nasicornis	1	0	1	0	1	1	2	0	1	0	0	1	0	1	0	0	1	1	0	-	1	1	0	-	-	1	1	1	1	1	1	0	-	1	1	0
Oryctoderus latitarsis	0	0	1	0	1	0	0	0	1	0	0	0	1	1	0	?	?	?	0	-	0	0	0	-	-	0	-	-	0	0	1	0	-	0	0	1
Pentodon bidens	0	0	1	0	1	0	0	0	1	1	0	0	1	1	0	0	1	0	1	2	1	0	0	-	-	0	-	-	0	0	0	0	-	0	0	0
Allophileurinus cavifrons	0	0	1	1	0	0	-	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	-	-	1	1	0	0	0	1	0	-	0	0	1
Allophileurinus mediopunctatus	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	-	-	0	-	-	0	0	1	1	0	0	0	1
Amblyodus taurus	0	0	1	1	0	0	0	0	0	1	1	0	0	1	1	0	1	1	1	2	1	0	0	-	-	0	-	-	1	1	0	0	-	1	1	0
Amblyodus castroi	0	0	1	1	0	0	0	0	1	1	1	0	0	1	1	0	1	1	1	2	1	0	1	1	1	1	1	1	1	1	0	1	0	1	1	0
Goniophileurus femoratus	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	0	1	1	1	2	1	0	1	0	1	0	-	-	0	0	1	1	0	0	0	1
Metaphileurus lacunosus	0	0	0	1	0	0	2	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	0	0	-	-	1	0	1	1	1	0	0	1
Metaphileurus nitidicollis	0	0	0	1	0	0	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	0	1	1	1	0	-	-	1	0	1	1	1	0	0	1
***Metaphileurus acoensis* n. sp.**	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	-	-	1	0	1	1	1	0	0	1
***Metaphileurus bacchus* n. sp.**	0	0	0	1	0	0	2	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	-	-	1	0	1	1	1	0	0	1
Microphileurus caviceps	0	0	1	1	0	0	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	0	1	1	1	0	-	-	0	0	1	1	1	0	0	1
Microphileurus subulo	0	0	1	1	0	0	0	0	0	1	1	0	1	1	1	0	1	1	1	2	1	0	1	1	1	0	-	-	1	0	1	1	1	0	0	1
Mictophileurus punctulatus	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	-	1	0	1	0	1	0	0	0	1	1	1	1	1	0	0	1
Oryctophileurus nasicornis	0	0	1	1	0	0	2	0	1	0	0	1	1	1	1	0	1	1	1	2	1	0	1	1	1	1	1	1	1	1	0	1	0	1	1	0
Oryctophileurus guerrai	0	0	1	1	0	0	1	0	1	0	0	1	1	1	1	0	1	1	1	2	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0
Phileurus didymus	0	0	1	1	0	0	2	1	0	1	1	1	0	1	1	1	1	1	0	-	0	0	1	1	1	1	0	0	0	0	0	1	0	1	0	1
Trioplus cylindricus	0	0	1	1	1	1	2	0	1	1	1	1	1	0	1	0	1	1	1	2	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0

Table 1. Continuation.

	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
Rutela lineola	1	1	0	1	0	1	1	0	1	0	0	1	1	0	0	1	0	1	1	0	1	0	0	0	0	0	0	1	2	0	0	1	1	0	1
Agaocephala cornigera	0	0	2	1	0	1	0	0	1	0	0	1	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	-	1	0	0	0	0	1
Cyclocephala amazona	1	0	0	1	0	1	1	0	1	0	1	0	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	-	1	0	1	0	1	0
Dynastes hercules	1	0	2	1	0	0	0	0	1	0	1	1	1	0	0	1	0	1	1	2	2	0	0	0	1	1	0	0	-	0	0	0	1	0	1
Hexodon reticulatum	0	0	2	1	0	0	0	0	1	0	1	0	0	-	0	1	1	1	0	2	0	1	1	0	0	0	0	0	-	0	0	0	0	0	1
Oryctes nasicornis	0	0	2	1	1	1	0	0	1	1	0	1	1	0	0	1	1	1	1	2	2	0	0	0	0	1	1	1	1	1	0	1	1	0	1
Oryctoderus latitarsis	1	1	2	1	0	0	0	0	1	0	0	0	0	-	0	1	1	1	0	0	2	1	1	1	1	?	1	1	-	1	0	0	1	1	1
Pentodon bidens	1	0	2	0	0	1	1	0	1	1	0	1	1	1	0	1	1	2	1	2	2	0	0	0	0	0	0	0	-	1	0	1	1	1	1
Allophileurinus cavifrons	1	1	2	1	1	1	1	1	1	0	0	1	1	0	0	1	1	1	0	1	1	0	0	0	1	0	1	1	0	1	0	0	1	1	1
Allophileurinus mediopunctatus	1	1	2	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	0	?	?	?	?	1	1	0	1	1	0	1	0	0	1	1	1
Amblyodus taurus	1	0	2	0	1	1	1	1	1	0	0	1	1	0	1	0	1	2	0	1	1	0	0	0	1	0	1	1	2	1	1	1	1	0	1
Amblyodus castroi	0	0	1	1	1	1	1	1	1	0	0	1	1	0	1	0	1	2	0	1	1	0	0	0	1	0	1	1	2	1	1	1	1	0	1
Goniophileurus femoratus	0	0	2	0	1	1	1	1	1	0	0	1	1	0	0	1	1	1	1	2	1	0	0	0	1	0	1	1	2	1	1	1	1	1	0
Metaphileurus lacunosus	0	1	2	1	1	1	1	1	0	1	0	1	1	0	0	1	1	1	1	2	1	0	0	0	1	0	1	1	2	1	1	0	1	0	1
Metaphileurus nitidicollis	0	1	2	1	1	1	1	1	1	1	0	1	1	0	0	1	1	1	1	2	1	0	0	0	1	0	1	1	2	1	1	0	1	0	1
***Metaphileurus acoensis* n. sp.**	0	1	2	1	1	1	1	1	0	1	0	1	1	0	0	0	1	1	1	2	1	0	0	0	1	0	1	1	2	1	1	0	1	0	1
***Metaphileurus bacchus* n. sp.**	0	1	2	1	1	1	1	1	0	1	0	1	1	0	0	1	1	1	1	2	1	0	0	0	1	0	1	1	2	1	1	0	1	0	1
Microphileurus caviceps	0	1	0	0	1	1	1	1	1	0	0	1	1	0	0	1	1	1	1	1	2	1	1	1	1	?	1	0	-	1	0	1	1	0	1
Microphileurus subulo	0	1	0	0	1	1	1	1	1	1	0	1	1	0	0	0	1	1	1	1	2	1	1	0	0	0	0	0	-	1	0	1	1	0	1
Mictophileurus punctulatus	0	0	2	1	1	1	1	1	1	0	0	1	1	0	0	1	1	1	0	2	1	0	0	1	1	0	1	1	2	1	0	0	1	1	1
Oryctophileurus nasicornis	1	1	2	1	1	1	1	1	1	0	0	1	1	1	0	1	1	2	1	2	2	0	0	0	1	1	1	1	2	1	1	0	1	0	1
Oryctophileurus guerrai	1	1	2	0	1	1	1	1	1	0	0	1	1	1	0	1	1	2	1	2	2	0	0	0	1	0	1	1	2	1	1	1	1	1	1
Phileurus didymus	0	0	2	1	1	1	1	1	1	0	0	1	1	0	1	1	1	2	1	2	2	0	0	1	1	1	1	1	0	1	1	1	1	0	1
Trioplus cylindricus	0	1	1	0	1	1	1	1	1	0	0	1	0	0	1	0	1	1	1	2	1	0	0	1	0	0	1	0	-	1	1	1	1	1	0

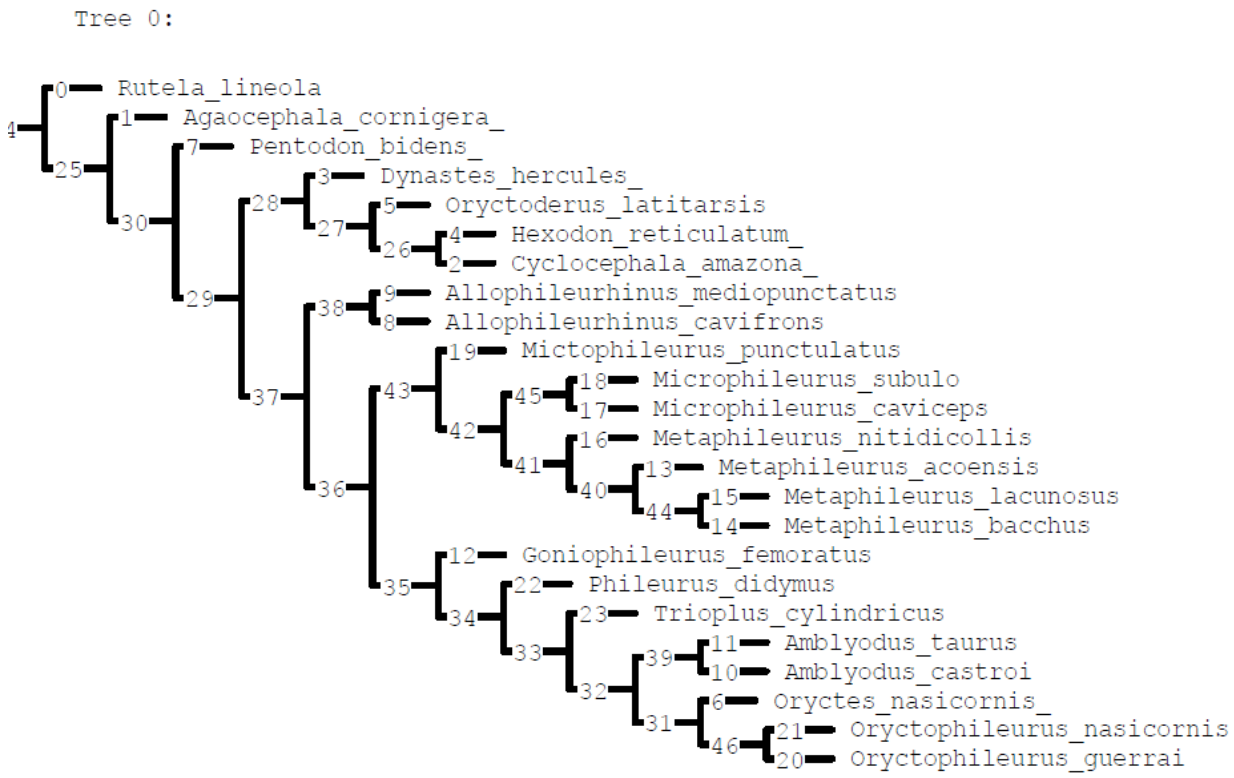


Figure 8. Consensus tree of cladistic relationship between the terminals used in the analysis with no weights and implied weights of k (1, 3, 5, 10 and 15). Numbers shows the number of nodes.

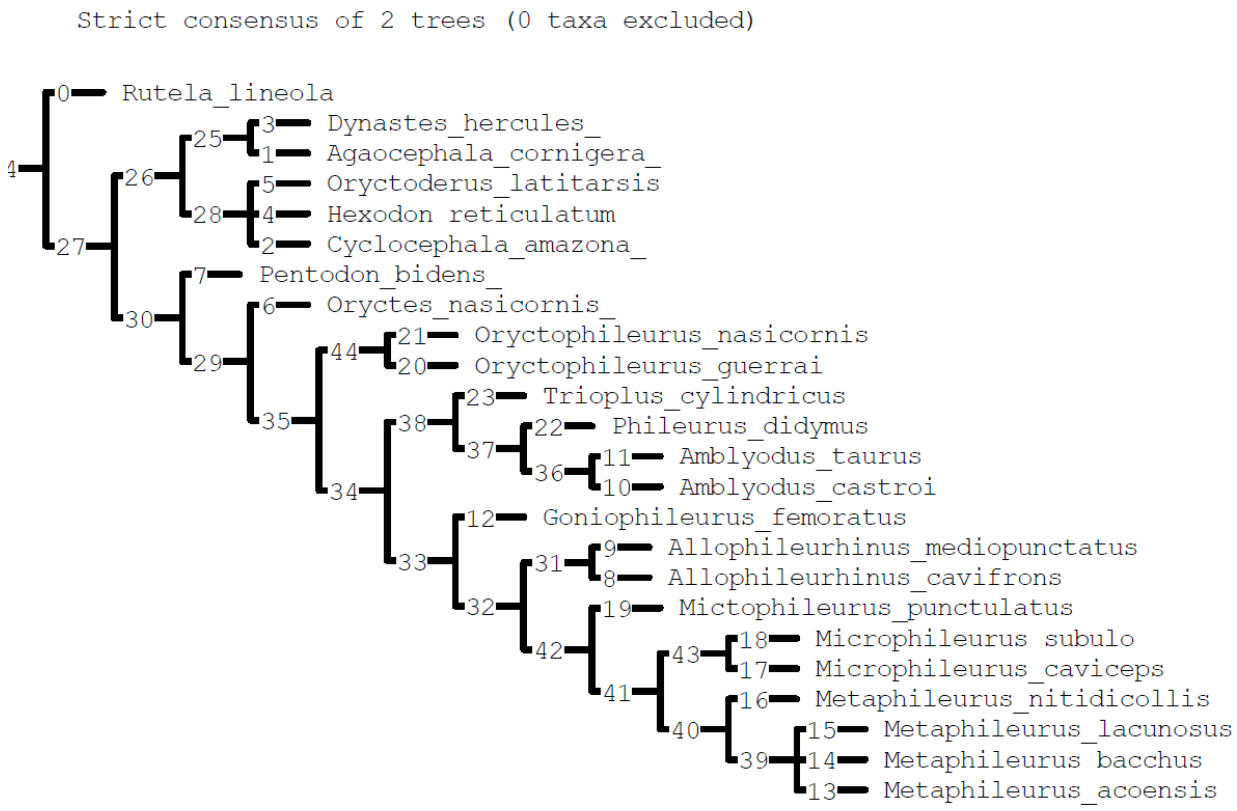


Figure 9. Consensus tree of cladistic relationship between the terminals used in the analysis with calculated k. Numbers shows the number of nodes.

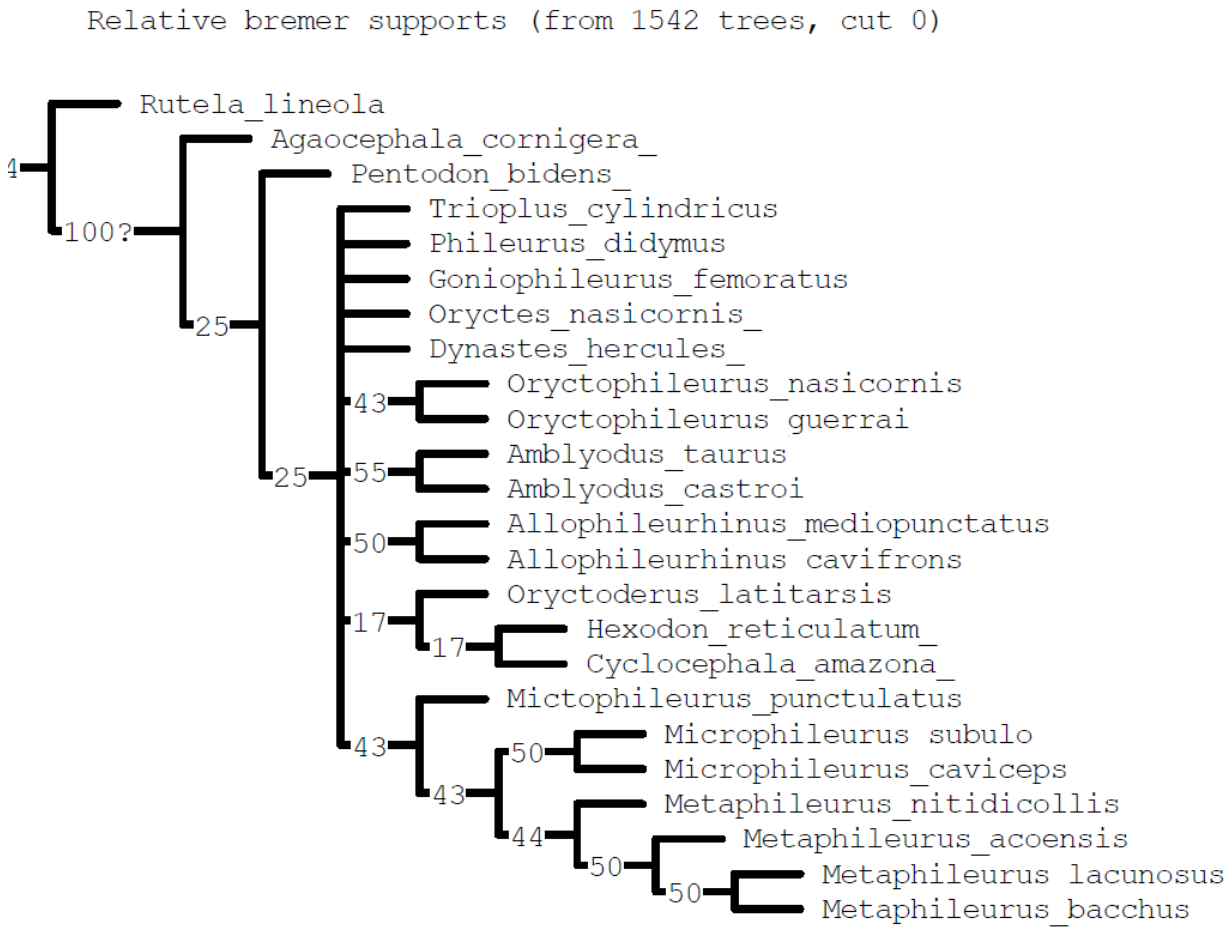


Figure 10. Bremer support values of cladistic relationship between the terminals used in the analysis with no weights and implied weights of k (1, 3, 5, 10 and 15). Numbers shows the value of the Bremer support.

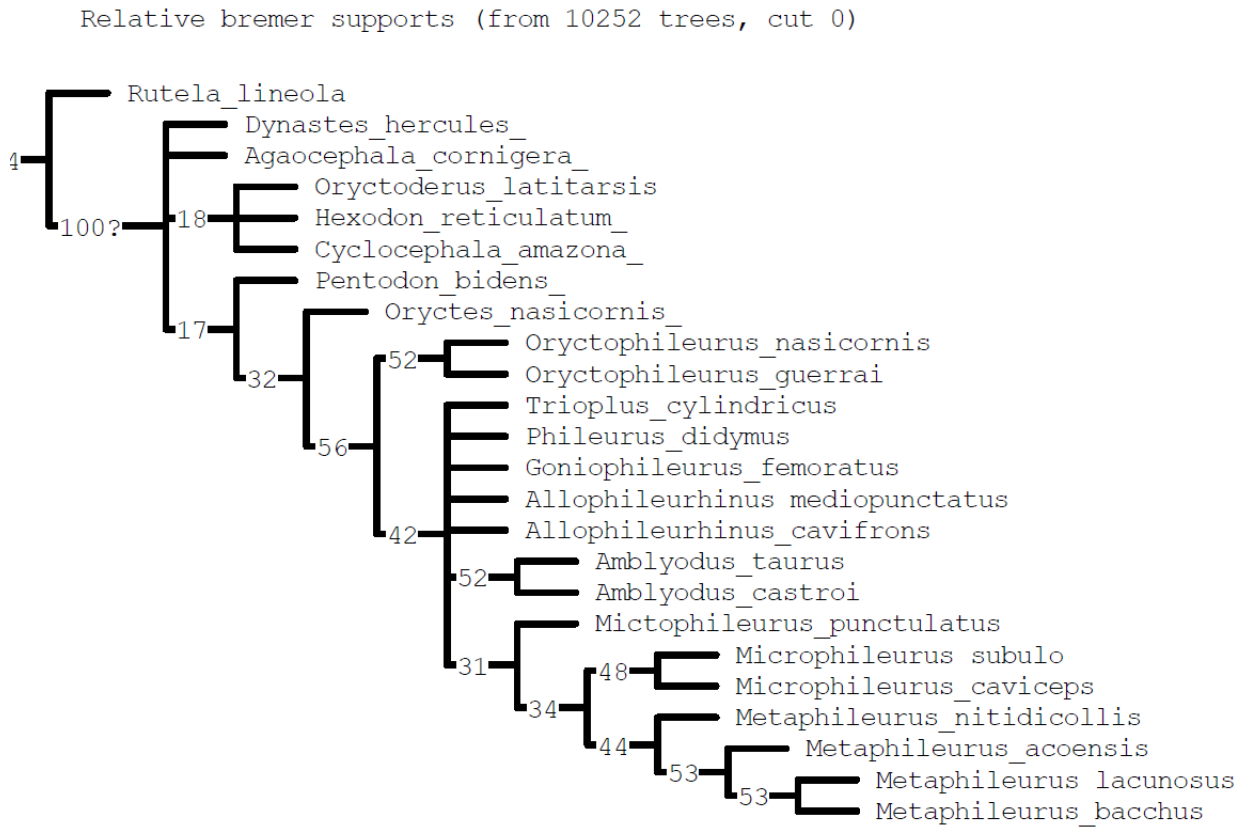


Figure 11. Bremer support values of cladistic relationship between the terminals used in the analysis with calculated k. Numbers shows the value of the Bremer support.

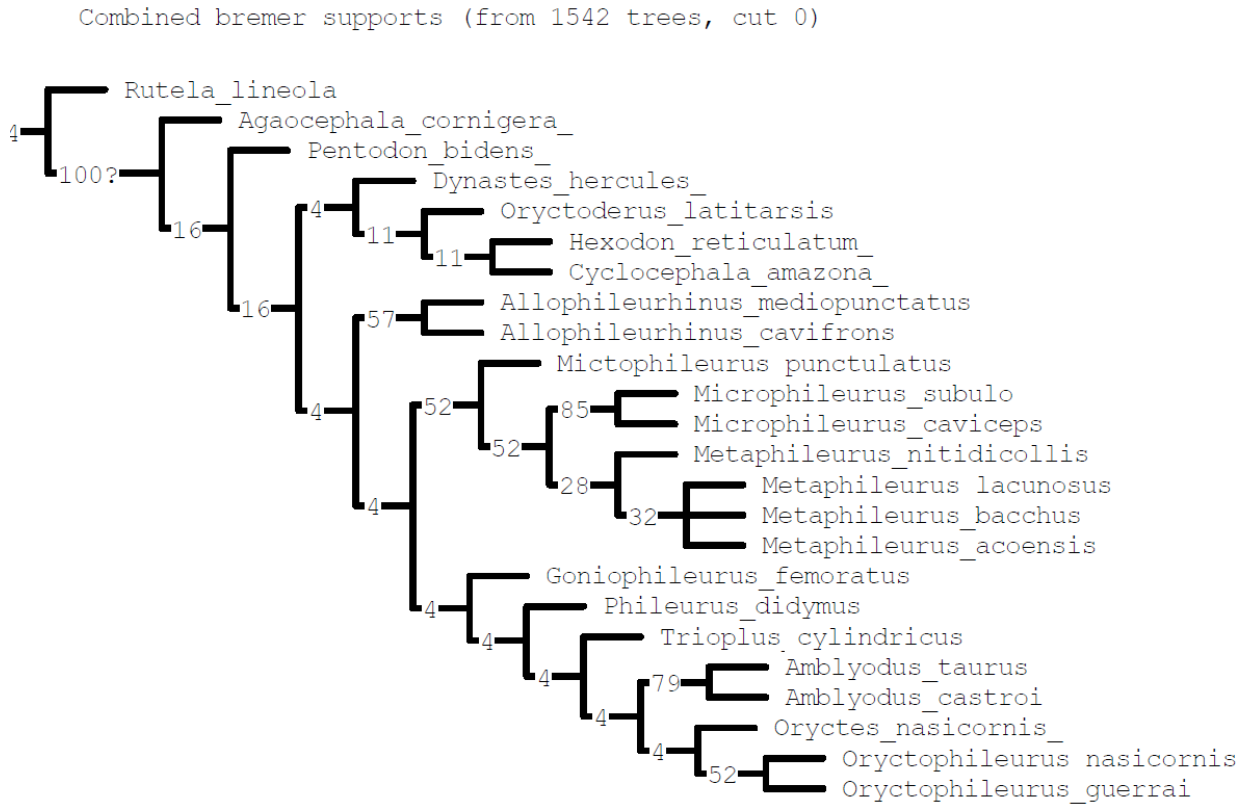


Figure 12. Jack knife support, values of cladistic relationship between the terminals, with no weights and implied weights of k (1, 3, 5, 10 and 15). Numbers shows the value of the Jack Knife support.

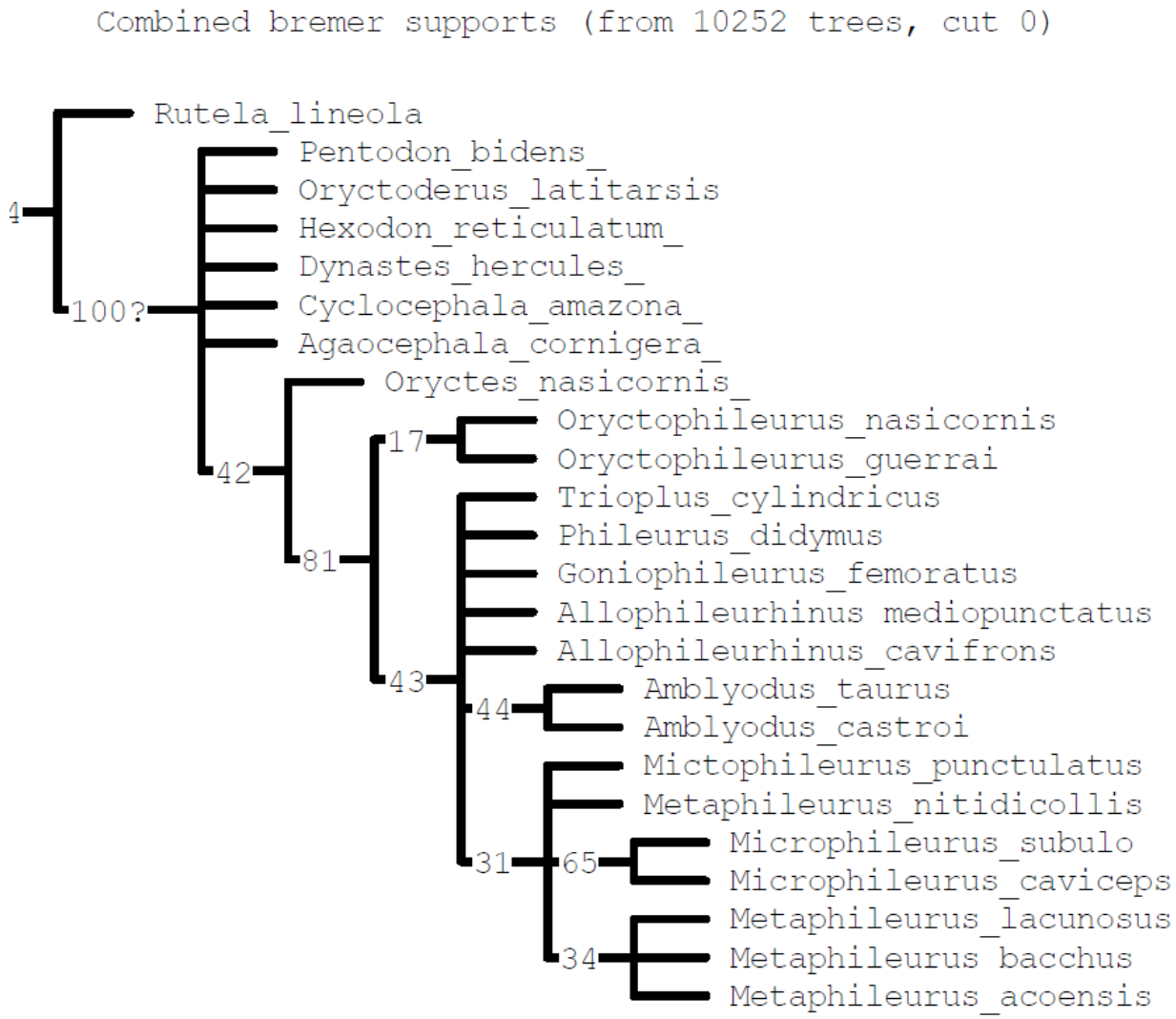


Figure 13. Jack knife support, values of cladistic relationship between the terminals, with calculated k. Numbers shows the value of the Jack Knife support.

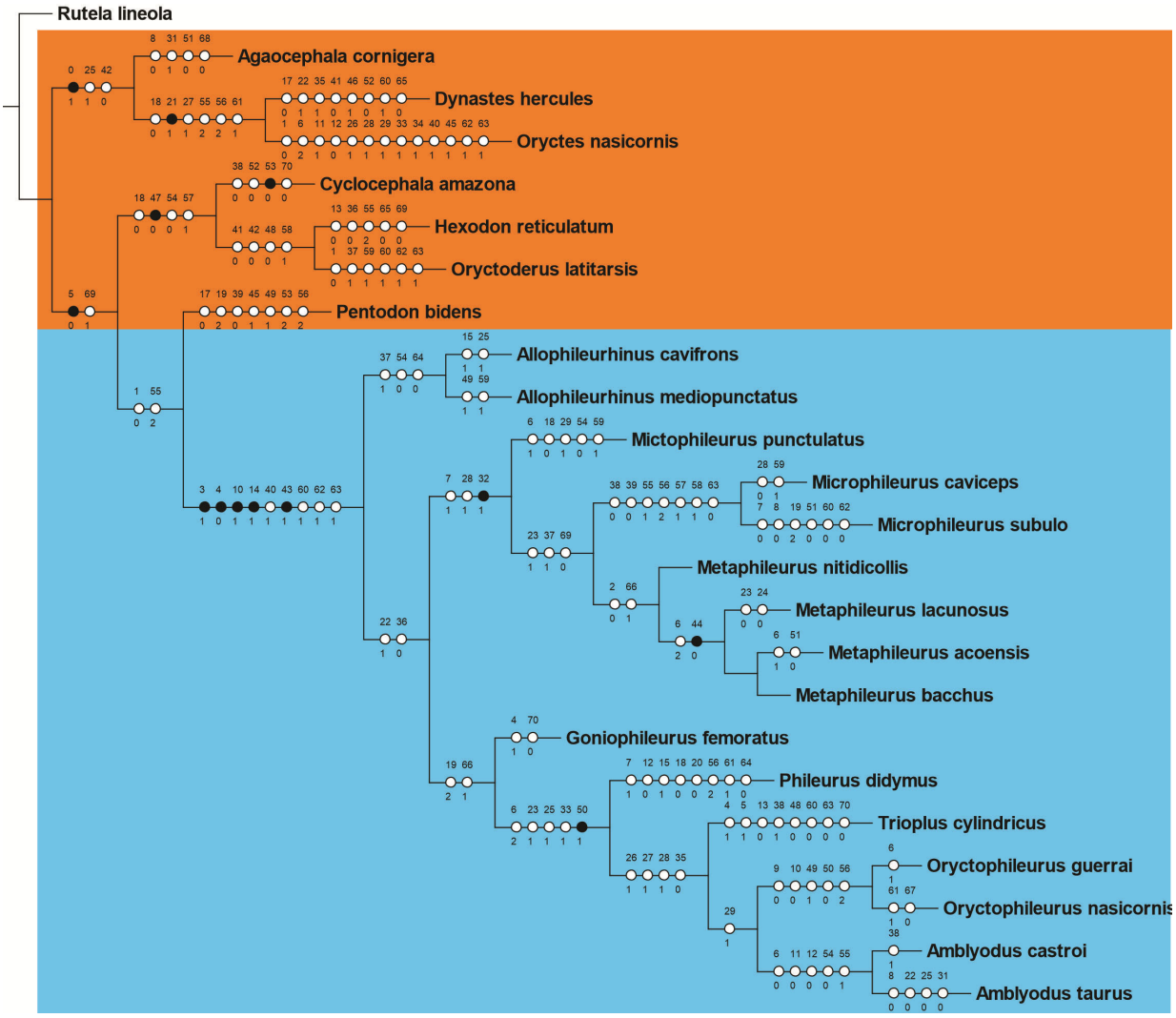


Figure 14. Result of the cladistics analisys with mandibulae with teeth Phileurini (blue) and Dynastinae (orange), its synapomorphies (empty circles) and apomorphies (full circles).

Discussion

Taxonomy

Metaphileurus Kolbe have a short distribution in comparison with another Phileurini genera, found only in southeast and south of Brazil. Some genera of Phileurini have strict distribution like *Allophileurhinus* Dupuis & Dechambre (Ecuador [Santo Domingo, Esmeraldas]), *Cnemidophileurus* Kolbe (Peru [Junín], Brazil [Pará]), *Haplophileurus* Kolbe (Colombia [Valle del Cauca], Ecuador [Tunguhara]), *Microphileurus* Kolbe (Brazil [Amazonas, São Paulo]), *Oryctophileurus* Kolbe (Bolívia, Peru, Colombia), *Paraphileurus* Endrödi (Colombia [Caucatal], Venezuela [Mérida]), *Mictophileurus* Ohaus (Bolivia [Chaparé], Brazil [São Paulo, Santa Catarina, Rio Grande do Sul]) and *Planophileurus* Chapin (Cuba [Pinar del Río, La Habana, Santiago de las Vegas]).

Some characteristics found in *Metaphileurus* like the mandible with teeth is found in other Phileurini genera and other characters are exclusive like: body strongly flattened; body with striate (head), aureolate (pronotum), ocellate punctures (elytra); pronotum with long longitudinal midline, sometimes deep and wide, without tubercles, one pair of foveae; metatibiae apex with 4 teeth not aligned; elytra with large punctures, sometimes coalescent; small body size.

Only two genera in the neotropical Phileurini have two teeth on mandibles *Metaphileurus* Kolbe and *Allophileurinus* Dupuis and Dechambre. Another characteristics are shared in these two genera: deep hollow in frons; frons with two horns; mentum trapezoidal shape; apex of metatibia with teeth are characteristics.

The genus *Metaphileurus* it was recovered as monophyletic, the genera with more similar morphological characteristcs is the genus *Allophileurhinus* as seen in the cladistics analysis.

Goniophileurus share some characters with *Allophileurhinus* and *Metaphileurus* as toothed mandibles; frons with depression on vertex; pronotum without tubercles; pronotum without setae; pronotum without lateral carinae; flattened pronotum on lateral view; protibia with three teeth; paramere not overlapping; and parameres without setae. *Allophileurinus* have a indistinct longitudinal midline with shallow and small punctutes;.

The males of *Allophileurhinus* have smooth scutellar shield; protibial claws thicker and curved, different of *Goniophileurus* that are thin; pronotum without foveae; pronotum with incomplete longitudinal midline; and elytra without coalescent punctures. *Metaphileurus* have pronotum with fovea and elytra with coalescent punctures.

They are found in different countries and are very distant from each other. Their biology is still little known, *Metaphileurus* have saproxylophage and bromeliad feed habit, the biology and feed habitat and of *Allophileurinus* species are unknown. The immature stage for these two genera are unknown too.

Phylogeny

The program TNT, version 1.5 (2023), was utilized with traditional search and the results with 100 number of replications are the same, and 1000 trees to save per replication utilized with TBR, and with k=1, k=3, k=5, k=10, k=15 and k calculated (2.656250) with aid of the script "K_automatico.run" (Goloboff *et al*. 2008a). For the multiple k utilized the answer was the same in all cases, verified by the Bremer support all trees found have the same result, as the analysis without weight and with k calculated. In the matrix construction it was utilized 63 binaries characters, 7 multistate, and 9 were missing.

The consensus tree obtained have 243 of length, consistency index 31 and retention index 54. As result of the cladistics analysis we have 1 parsimonious tree, and the clade of the genus *Metaphileurus* was recovered as monophyletic, supported with Bremer support (44) and Jack Knife support (34).

Sublade A – (***Metaphileurus*)**

The genus *Metaphileurus* Kolbe have one apomorphies and one synapomprphy: (2:0) flattened body, and (66:1) carina of meso and metatibiae with spine-like projections. This combination of characters support the monophiletism of the genus, the character diagnostic (27) in Burmeister (1847), and in Endrödi (1985b) (59 and 62). As obtained result in Ide (1998), confirmed here with the description of two new species, this genus have recovered your monophyletism.

As results of the cladistics analysis we have obtained two sister terminals: *Metaphileurus nitidicollis*, with one synapomorphy and one apomorphy as mentioned above, and the second *M. lacunosus*, *M. acoensis*, and *Metaphileurus bacchus* with one apomorphy and one synapomorphy, (6:2) clypeus and (44:0).

Sublade B – ((*Mictophileurus*) + ((*Microphileurus* + (*Metaphileurus*)))

Mictophileurus has recovered its monophyly with seven apomorphies: (38:0) scutellar shield longer than wider; (39:0) ventrite VI with same length of anteriors; (55:1) protarsomere subequals in length/width; (56:2) protibiae with short claws; (57:1) protibiae intern claw thickened; (58:1) protibiae with inter claw bifid; and (63:0) apex of metatibiae toothed. The presence of characters obtained in the cladistics analysis have recovered the monophyletism of the genus according to Endrödi (1985b) and as observed by Ide (1998).

The subclade that *Microphileurus* and *Metaphileurus* are sister genera, supported by three apomorphies: (23:1) pronotum with longitudinal sulcus wide; (37:1) scutellar shield

subpentagonal; and (69:0) aedeagus with parameres parallels in caudal view. Mictophileurus its a monotypic genus and was recovered its monophyly with five apomorphies: (6:1) clypeus with rounded punctures; (18:0) mandibles with external tooth; (29:1) pronotum with lateral carinae; (54:0) protibiae with subequal distance between teeth; and (59:1) protibiae with spur reaching the second protarsomere. The three genera are supported by two apomorhies and one synapomorphy: (7:1) clypeal carena present; (28:1) pronotum with foveae; and (32:1) pronotum with longitudinal midline complete.

Sublade C – (*Goniophileurus* + (*Phileurus* + (*Trioplus* + ((*Oryctophileurus*) + (*Amblyodus*)))))

Amblyodus, sister genera of *Oryctophileurus*, was recovered its monophyly with five apomorphies: (6:0, 11:0) clypeus and frons with dotted punctures; (12:0) labrum anteriorly not visible; (54:0) protibiae distance between teeth equal; and (55:1) protarsomeres subequal in length/width. *Oryctophileurus* have five apomorphies: (9:0) frontoclypeal carina with one horn; (10:0) frons with surface flattened; (49:1) tergite VIII with deep punctures; (50:0) tergite VIII without sulcus on base; and (56:2) protibial claws short. *Trioplus* have eigth apomorphies, some of these characters are described in Mannerheim (1829), and reviewed in Endrödi (1985b) and Ide (1998): (4:1) frons with variable shape; (5:1) frons with apex notched; (13:0) ocular canthus undeveloped; (38:1) scutellar shield subequal in length/width; (48:0) tergite VIII smooth; (60:0) protibiae with one carina; (63:0) metatibiae with truncate apex; and (70:0) aedeagus with parameres right in lateral view.

Phileurus is a well supported genus with eight apomorphies: (7:1) clypeal carina present; (12:0) labrum anteriorly not visible; (15:0) mentum converging to apex; (18:0) mandibles without external teeth; (20:0) mandibles covered by clypeus; (56:2) protibiae with short claws; (61:1) profemur with sulcus in ventral view; and (64:0) metatibiae with one tooth on apex. This genus was used here to observe how the character of tooth in mandibles evolved on the neotropical

Phileurini, this state of character is found too in *Mictophileurus*, a small genus compared to *Phileurus*. *Goniophileurus*, monotypic genus, was recovered its monophyly with two apomorphies(4:1) clypeus with triangular shape; and (70:0) aedeagus with parameres right in lateral view.

Sublade D – Phileurini clade

(((*Allophileurhinus*) + (((*Mictophileurus*) + ((*Microphileurus* + (*Metaphileurus*))) + (*Goniophileurus* + (*Phileurus* + (*Trioplus* + ((*Oryctophileurus*) + (*Amblyodus*)))))))

The tribe here have recovered the monophyletism as results of the cladistics analysis, the clade of the Phileurini tribe have four apomorphies and five synapomorphies, respectively: (40) metaepisternum with a small sclerotinized apical projection; (60:1) protibia with two carinae on dorsal view; (62:1) first metatarsomere with spur; (63:1) metatibiae apex with tooth; (3:1) clypeus with horn; (4:0) clypeus with triangular shape; (10:1) frons surface concave; (14:1) mentum concealing the base of labial palpi; and (43:1) elytra with striae not superficial.

Allophileurhinus have recovered its monophyly with three apomorphies: (37:1) scutellar shield subpentagonal; (54:0) protibiae distance between teeth subequal; and (64:0) metatibiae apex with one tooth.

Sublade E – ((*Hexodon reticulatum* + ((*Cyclocephala amazona)* + (*Oryctoderus latitarsis*)))

This clade have three apomorphies and one synapomorphy, respectively: (18:0) mandibles withut external teeth; (54:0) protibiae distance between teeth subequal; (57:1) protibiae with intern claw thickened; and (47) distinct elytral calli. Hexodontini have five apomorphies, Cyclocephalini have three apomorphies and one synapomorphy, and Oryctoderini have six apomorphies.

Sublade F – ((*Agaocephala cornigera*) + ((*Dynastes hercules*) + ((*Oryctes nasicornis*)))

Agaocephalini have four apomorphies, Dynastinae eight apomorphies, and Oryctini have 13 apomorphies. Dynastinae and Oryctini were recovered as sister tribes with five apomorphies

and one synapomorphy: (18:0) mandibles without external teeth; (27:1) pronotum with tubercles not near of apical border; (55:2) protarsomeres elongate; (56:2) protibiae claws short; (61:1) profemur with sulcus in ventral view; and (21:1) pronotum with large projection in the mid region.

The results of the cladistics analysis have the Pentodontini the as sister group of with Phileurini, these two tribes make a clade with two apomorphies: (1:0) . The synapomorphies are: (41) pronotum with lateral carinae; and (54) metaepistern with a sclerotinized projection. The sister groups of the Pentodontini + Phileurini are divided into two clades: Agaocephalini + Dynastini + Oryctini; and Cyclocephalini + Hexodontini + Oryctoderini.

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgments

Taxonline from Universidade Federal do Paraná is thanked for providing most of the pictures used to illustrate this paper. All curators are thanked for providing the material available to us. This study was funded in part by the Coordenação de Aperfeiçoamento Pessoal de Nível Superior (CAPES) – PROEX, process number 88887.334388/2019-00. PCG received financial support from Conselho Nacional de Ciência e Tecnologia, process number 449366/2014-6.

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CAPÍTULO 4

Sinópse das espécies brasileiras de *Hemiphileurus* Kolbe (Coleoptera: Melolonthidae: Dyasntinae) e descrição de uma nova espécie [1]

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[1]Medeiros, R.A.F. & P.C. Grossi. Synopsis of the brazilian species of *Hemiphileurus* Kolbe (Coleoptera: Melolonthidae: Dyasntinae) and description of a new species. Zootaxa (a ser submetido).

RESUMO - *Hemiphileurus* Kolbe é o gênero com maior número de espécies em Phileurini, 29 delas estão presentes na América do Sul, dentre estas, sete podem ser encontradas no Brasil. *Hemiphileurus* foi proposto por Kolbe para separar várias espécies descritas em *Phileurus* Latreille. A última revisão do gênero foi feita por Endrödi, 1985b, e desde seu trabalho várias espécies foram descritas, aumentando o número para 59 espécies descritas. Aqui descrevemos a nova espécie *Hemiphileurus* sp. n. de Goiás, comparando com as espécies anterioremente descritas e coletadas no Brasil. As espécies com registro no Brasil são: *Hemiphileurus agnus* (Burmeister, 1847), *Hemiphileurus brasiliensis* Ratcliffe, 1978, *Hemiphileurus bispinosus* Ratcliffe, 2001, *Hemiphileurus dejeani* (Bates, 1888), *Hemiphileurus insularis* Ratcliffe, 1988, *Hemiphileurus kahni* Dupuis & Dechambre, 2000 e *Hemiphileurus vicarius* Prell, 1936 foram redescritas para melhor identificação das espécies. Foram realizadas imagens de quatro espécies descritas para o território brasileiro e uma chave com todas as espécies são fornecidas, além disso, um checklist de todas as espécies de *Hemiphileurus* com os seus respectivos sinônimos e os museus onde as espécies tipo foram depositadas.

PALAVRAS-CHAVE: Centro-Oeste, Região Neotropical, Phileurini, Scarabaeoidea, Taxonomia.

Synopsis of the brazilian species of *Hemiphileurus* Kolbe (Coleoptera: Melolonthidae: Dyasntinae) and description of a new species

ABSTRACT – *Hemiphileurus* Kolbe is the genus with the highest number of species in Phileurini, 29 of them are present in South America, among these, seven can be found in Brazil. *Hemiphileurus* was proposed by Kolbe to separate several species described in *Phileurus* Latreille. The last revision of the genus was made by Endrödi, 1985b, and since his work several species have been described, increasing the number to 59 described species. Here we describe the new species *Hemiphileurus* sp. n. from Goiás, comparing with previously described species collected in Brazil. The species recorded for Brazil are: *Hemiphileurus agnus* (Burmeister, 1847), *Hemiphileurus brasiliensis* Ratcliffe, 1978, *Hemiphileurus bispinosus* Ratcliffe, 2001, *Hemiphileurus dejeani* (Bates, 1888), *Hemiphileurus insularis* Ratcliffe, 1988, *Hemiphileurus kahni* Dupuis & Dechambre, 2000 and *Hemiphileurus vicarius* Prell, 1936 were redescribed for better species identification. Images of four species described for the Brazilian territory were taken and a key with all species is provided, in addition, a checklist of all species of *Hemiphileurus* with their respective synonyms and the museums where the type species were deposited.

KEY WORDS: Midwest, Neotropical Region, Phileurini, Scarabaeoidea, Taxonomy.

Introduction

Hemiphileurus Kolbe, 1910 is a genus that can be found on both Neotropical and Neartic regions, and actually have 59 species mainly distributed on South America (29), Central America (18), West Indies (14), Mexico (9), and North America (1) (Ratcliffe, 2001), some of these species have occurrence in more than one region. Among the species found in South America, seven was described for the Brazilian territory *Hemiphileurus brasiliensis* Ratcliffe, 1978; *Hemiphileurus dejeani* (Bates, 1888); *Hemiphileurus vicarius* Prell, 1936 three of them are exclusive, *Hemiphileurus agnus* (Burmeister, 1847); *Hemiphileurus bispinosus* Ratcliffe, 2001 and *Hemiphileurus insularis* Ratcliffe, 1988; the last *Hemiphileurus kahni* Dupuis & Dechambre, 2000 was described for Peru but can be found in Brazilian Amazonia. Specimens of the new species of *Hemiphileurus*, were collected in the municipality of São Jorge in Chapada dos Veadeiros, Goiás and compared with species that are found in Brazil.

Hemiphileurus, genus that have been described by Kolbe (1910), was proposed by the author to separate very similar genera included in *Phileurus* Latreille 1807, and *Epiphileurus* was proposed too for separate *Phileurus* species now is synonym of *Hemiphileurus*, that genera were inserted in his work in the group “Phileurini genuini” that have simple mandibles.

Reviewed by Endrödi (1978), *Hemiphileurus* is characterized by the body convex; clypeus sharply acuminated; frons with two tubercles or horns; pronotum with variable longitudinal furrow, but not reaching apex and/or base; protibia tridentate, rarely quadridentate; prosternal process variable; propygidium without stridulatory area (Endrödi 1978, 1985b). Since this review a large amount of species has been described for the genus: *Hemiphileurus insularis* Ratcliffe, 1988; *Hemiphileurus blandinae* Dupuis, 1996; *Hemiphileurus phratrius* Ratcliffe & Ivie, 1998; *Hemiphileurus ryani* Ratcliffe & Ivie, 1998; *Hemiphileurus carinatipennis* Dupuis & Dechambre, 2000; *Hemiphileurus curvicornis* Dupuis & Dechambre, 2000; *Hemiphileurus elongatus* Dupuis &

Dechambre, 2000; *Hemiphileurus gibbosus* Dupuis & Dechambre, 2000; *Hemiphileurus kahni* Dupuis & Dechambre, 2000; *Hemiphileurus parvus* Dupuis & Dechambre, 2000; *Hemiphileurus similis* Dupuis & Dechambre, 2000; *Hemiphileurus unilobus* Dupuis & Dechambre, 2000; *Hemiphileurus vulgatus* Dupuis & Dechambre, 2000; *Hemiphileurus bispinosus* Ratcliffe, 2001; *Hemiphileurus deslislesi* Ratcliffe, 2001; *Hemiphileurus quadridentatus* Ratcliffe, 2001; *Hemiphileurus warneri* Ratcliffe, 2001; *Hemiphileurus cavei* Ratcliffe, 2003; *Hemiphileurus curoei* Ratcliffe, 2003; *Hemiphileurus dechambrei* Ratcliffe, 2003; *Hemiphileurus dyscritus* Ratcliffe, 2003; *Hemiphileurus nebulohylaeus* Ratcliffe, 2003; *Hemiphileurus pygidiopunctissimus* Ratcliffe, 2003; *Hemiphileurus isabellae* Dupuis, 2004; *Hemiphileurus euniceae* Ratcliffe & Cave, 2006; *Hemiphileurus gloriae* Ponchel, 2009; *Hemiphileurus elbitae* Neita & Ratcliffe, 2010; *Hemiphileurus panamanius* Ratcliffe & Curoe, 2011; *Hemiphileurus cornutus* Ratcliffe, 2014; *Hemiphileurus tainorum* Ratcliffe & Cave, 2015; *Hemiphileurus ratcliffei* Dupuis, 2016; *Hemiphileurus chantali* Hardy & Dupuis, 2016.

These species were described for the south neotropical region for Belize, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, French Guiana, Guatemala, Guiana, Haiti, Honduras, Mexico, Nicaragua, Panama, Peru, and Venezuela. This shows the great number of species that still are unknown in all central and south america. The last species described for Brazil is *Hemiphileurus bispinosus* Ratcliffe, 2001 for the southeast region, in Minas Gerais state.

We here describe here the new species of *Hemiphileurus* with photos from male, a key of the species that occur in Brazil, and a checklist of all species and their synonyms (actualized from Ratcliffe 2001) was made, and the location of its holotypes or lectotypes when possible to find on museums or literature. Morphological keys of *Hemiphileurus*, images and literature data of the descriptions were used to compare existing species for the description of the new species, and a key to the Brazilian species will be produced. This is the first *Hemiphileurus* species that can be

collected in the brazilian midwest region, was collected in Goiás state, with cerrado biome in Chapada dos Veadeiros.

Materials and Methods

Were examined nineteen specimens of *Hemiphileurus* Kolbe from national and international collections of the museums, acronyms follows Evenhuis (2020):

CEMT (Coleção Entomológica da Universidade Federal de Mato Grosso), Cuiabá, Mato Grosso, Brazil (Fernando Z. Vaz-de-Mello);

CERPE (Coleção Entomológica da Universidade Federal Rural de Pernambuco), Recife, Pernambuco, Brazil (Paschoal C. Grossi);

CMN (Canadian Museum of Nature), Ottawa, Ontario, Canada (François Génier);

CNC (Canadian National Collection of Insects, Arachnids and Nematodes) Ottawa, Ontario, Canada (Patrice Bouchard);

CVCP (Collection Colette Voirin), Le Luc;

EPGC (Everardo and Paschoal Grossi Collection), Nova Friburgo, Rio de Janeiro, Brazil (Everardo J. Grossi);

FEIS (Faculdade de Engenharia de Ilha Solteira, Universidade Estadual Paulista), Ilha Solteira (C.A.H. Flechtmann);

HNHM, (Hungarian Natural History Museum), Budapest, Hungary (Viktória Gabriella Szőke);

IBSP (Coleção Entomológica Adolph Hempel, Instituto Biológico de São Paulo), São Paulo, São Paulo, Brazil (Sergio Ide);

INBIO (Instituto Nacional de Biodiversidad), Santo Domingo, Heredia, Costa Rica (Manuel Vargas);

MCZH (Museum of Comparative Zoology Harvard), Cambridge, Massachusetts, USA (Brian D. Farrell);

MLUH (Martin-Luther-Universität, Zoologisches Institut), Saale, Haale, Germany (Karla Schneider);

MNHN (Muséum National d'Histoire Naturelle), Paris, France (Thierry Deuve);

MZUSP (Museu de Zoologia da Universidade de São Paulo), São Paulo, Brazil (Sônia A. Casari).

NHM (Natural History Museum), London, United Kingdom, (Max Barclay);

UNSM (University of Nebraska State Museum), Lincoln, NE, USA (Bret Ratcliffe);

USNM (Smithsonian National Museum of Natural History), Washington, USA (T. Erwin);

ZMHB (Museum für Naturkunde der Humboldt Universität zu Berlin), Berlin, Germany (Johannes Frisch);

ZMUC (Zoological Museum of University of Copenhagen), Copenhagen, Denmark (Nikolaj Scharff);

ZMUK (Zoologisches Museum Universität Kiel), Kiel, Germany (Michael Kuhlmann).

Checklist

A checklist of all species of *Hemiphileurus* Kolbe and their synonyms (actualized from Ratcliffe 2001) was made, and the location of its holotypes or lectotypes when possible to find on museums or literature (Table 01).

Terminology

The terminology used are: Endrödi 1985b (body and appendices); Jameson 1990, Ratcliffe 2006 (punctures measures, size and density of punctures, interocular width); Ratcliffe & Cave 2006

(length and width measures); Lawrence *et al*. 2011; Ahrens 2006a (appendices details, external morphology and male genitalia).

Labels information and terminilogy

To describe the material examined, in the transcription of the labels of the type material, the following pattern was used: quotation marks – " beginning, and " end of the information present in the label(s) of the examined specimen; / line change in the same label; \ back of the label; // label change on the examined specimen; [ ] additional information about the label. The type material will be accessed through loans from the respective curators, when possible, and through photos from the museums already listed above.

Measure and dissection details

The measurements of the specimens were obtained through a calibrated digital caliper with scale up to 0.01 mm. The distance between the apex of the clypeus and the apex of the elytra were measured for maximum length; maximum humeral width between the humerus and maximum elytral width for greater width of the elytra.

For the study of the morphology of the genitalia, the specimens were put in a recipient with water in a thermal plate at 100 ºC for approximately 10 min or more for dissection, depending on it conservation status. The male genitalia were removed through a perforation located at the dorsal base of the abdomen. The genitalia then was mounted on a card and pinned below the specimens.

Images and edition

The images will be obtained with the aid of digital cameras (Nikon® D-90 and D-5300) with a 40 mm macro lens, coupled to a Zeiss 508 DOC stereomicroscope, with LED lighting and

a computer with the freeware CombineZP (www.hadleyweb.pwp.blueyonder.co.uk), to stack the photos. The photos will be edited, and the images will be assembled using the freeware GIMP 2.0 (The GIMP Team. 2019).

Results

Hemiphileurus Kolbe, 1910

Taxonomy

Hemiphileurus agnus (Burmeister, 1847) (Fig. 2)

Hemiphileurus agnus (Burmeister, 1847): Arrow, 1937b: 88 (catalogue); Blackwelder, 1944: 258 (catalogue); Dupuis & Mantilleri, 2013: 548 (revalidation).

Phileurus agnus Burmeister, 1847: Kolbe, 1910: 341.

Type material. Lectotype female, no dissected: a) "Agnus / Bahia Burm", b) "Muséum Paris / 1952 / coll. R. Oberthür", c) "Ex-Musaeo / Mniszech", d) "Phileurus agnus B. / LECTOTYPE / F. Dupuis 2013", e) "LECTOTYPE", f) "LECTOTYPE / Hemiphileurus / agnus (Burmeister, 1847)", g) "MNHN / EC4026" (1♀ MNHN, specimen examined through images).

Diagnosis. Clypeus moderately punctate; apex of pre-mentum moderately emarginated; prosternal process flattened anterior-posteriorly, not extended beyond procoxae, moderate size.

Redescription. Total length: 11,5 mm. **Body.** Oval elongated, reddish-black color, shine body. **Head:** Clypeus moderately punctate, superficial punctures, moderately distributed; clypeus weakly concave with a small erect horn, horn with apex rounded; frons strongly punctate near eyes; suture between frons and clypeus with a weak and straight horn, middle region of suture emarginated; outer region of elevation with moderate to strong punctures, frons disc strongly punctate; frons with weak concavity; weak carina between horns of the clypeus and frons;

interocular width about 4.2 transverse eye diameters; antenna formed by scape, pedicel and 7 antennomeres; antennal club about 1.4 times longer than segments II-VII combined; segment I with large setae, II with small setae, III-VII glabrous; segment VIII with small setae in ventral view; mandibles arcuate externally, untoothed; outer region of mandibles with small punctures, moderately distributed, and with setae moderate size on base; apex of pre-mentum moderately emarginated; mentum with moderate to long setae, weakly distributed on apex, moderate to densely distributed on base and sides. **Thorax: Pronotum.** Surface strongly punctate on apex and sides, disc moderately punctate, moderate to large punctures on apex, densely distributed, discoid shaped; longitudinal furrow with moderate to large, and deep punctures; apical region near longitudinal furrow with small to moderate, and superficial punctures; borders with minute setae. Prosternal process flattened anterior-posteriorly, not extended beyond procoxae, medium size; apex rounded, semioval shape; moderately punctate; abdominal ventrite with large and dense punctures on borders; glabrous; sternite II-V with a row of deep punctures, with a row of small setae, near borders; base of ventrite VI with small to moderate, superficial and moderately distributed punctures, with small and sparse setae; scutellar shield about 1.20 times larger than long; few strong and deep punctures on apex, smooth base, glabrous. **Legs.** Foretibiae tridentate; equidistant teeth; hindtibiae with one tooth and eight setae. **Abdomen. Elytra.** Surface with deep punctures, rounded to ovals; interstriae with superficial large and deep punctures, slightly moderate posteriorly; elytral interestriae without confluent punctures; minute setae on elytral interstriae. Pygidium strongly and deeply punctate on base and sides, weakly on apex with small to moderate punctures, moderately deep; base moderately convex in lateral view; with small to moderate setae, densely setose on base.

Male. unknown.

Remarks. This species was revalidate by Dupuis & Mantilleri (2013) after observing characters like the pronotal midline, the authors have compared this species with *Hemiphileurus cribratus* (Chevrolat, 1844) but they differs in some characters of pronotum, and elytra. *H. agnus* differ from the new species from interstriae double near to scutellar shield; strong and deep punctures in the pronotum and elytra; anterior margin of the pronotum and posterior of the elytra densely punctate, strongly punctate; apex of protibia teeth angulate; ventrally hirsute. The new species have: head with flat, long and curvate horns; pronotum moderate and small punctures, deeply and densely punctate, disc with elongate punctures; pronotum with microsetae; elytral interstriae high; apex of protibia teeth rounded (Figs. 1 and 5).

***Hemiphileurus brasiliensis* Endrödi, 1978 (Fig. 5G)**

Hemiphileurus brasiliensis Endrödi, 1978: 82, 89 (chave, descrição); 1985b: 714 (chave, revisão, ilustração); Ratcliffe, 2001: 441 (checklist)

Diagnosis. Clypeus weakly punctate; apex of pre-mentum weakly emarginated; prosternal process not extended beyond procoxae, moderate.

Redescription. Total length: 22,0 mm. **Body.** Oval elongated, black to reddish-black color, shine body. **Head.** Clypeus weakly punctate, superficial and isolated punctures; outer region of horns strongly punctate, frons intern region strongly punctate; small and rounded tubercules; frons with weak concavity; frons strongly punctate, large, coalescent and dense punctures; weak carinae between horns of the clypeus and frons; antenna with 10 segments; segment I with large punctures, setose near segment II; segment II with moderate punctures and a row of setae; segments III-VII glabrous; segment X with large punctures at disc; mandibles externally untoothed; outer region of mandibles rounded, hirsute on basal half, setae with moderate size; apex of pre-mentum weakly emarginated, apex deeply excavated. **Thorax: Pronotum.** Angulate basal

angles; surface weakly punctate on base, strongly on apex; apex with large, coalescent and dense punctures; longitudinal midline short, superficial, narrow, and with deep punctures; disc moderately punctate, coalescent and deep punctures; glabrous. Prosternal process not extended beyond procoxae, moderate; apex and base triangular; apex without setae, small, superficial and sparse punctures; base with setae, large, deep and dense punctures; abdominal ventrite with large and confluent punctures; moderate setae on punctures; glabrous. **Legs.** Foretibiae tridentate; equidistant teeth, apex rounded; hindtibiae with one tooth. **Abdomen.** Ventrite II-V with two rows of punctures; apex with large and dense oval punctures; base with punctures small to moderate, sparsely punctate; VI tergite strongly punctate at base and weakly at base, moderate to large punctures; border with moderate setae. **Elytra.** Surface with double rows of punctures, deeply punctate, punctures rounded to ovals; elytral apex strongly puncate, deep, moderate to large punctures; elytral interestriae with coalescent punctures, weakly elevated between double rows; elytra without constriction on external border; scutellar shield strongly punctate, deep and moderate punctures on apex, smooth base. Pygidium strongly punctate; moderate, deep and dense punctures; base moderately convex in lateral view. **Aedeagus.** Parameres subequal length to phalobase, parallels; apex of parameres with two extern rounded lobes; superficials punctures, small and sparse; apex of parameres rounded, without elevated carinae; almost right in the middle; base of parameres with two curved internally lobes, extending in the middle to apex, elevated; laterals with wide and large carina; laterals of phalobase with moderate central carina, strongly excavated at lateral view; setose at base of parameres.

Remarks. The aedeagus of *Hemiphileurus brasiliensis* its different from all species found in Brasil, the absence of setae is the main difference, beside this the sculpture of the elytra very similar with *Hemiphileurus dejeani* as mentioned by Endrödi (1985b). This species can be

collected as *Hemiphileurus insularis*, and *Hemiphileurus kahni* in the north region of the country, in Amazonian region.

***Hemiphileurus dejeani* (Bates, 1888) (Fig. 4)**

Hemiphileurus dejeani (Bates, 1888): 340 (description); Kolbe, 1910: 341 (redescription, revision); Arrow 1937b: 88 (catalogue); Blackwelder 1944: 258 (catalogue); Richter, 1966: (larvae description); Endrödi, 1978: 82, 88 (key, revision, redescription); 1985b: 712, 714 (illustration, key, revision); Ratcliffe, 2001: 441 (checklist); 2003b: 366-368 (redescription, illustration, distribution, biology); Dupuis & Mantilleri, 2013: 548-549 (commentary).

Phileurus dejeani Bates, 1888: (description).

Diagnosis. Clypeus weakly punctate; apex of pre-mentum strongly emarginated; prosternal process not extended beyond procoxae, moderate size.

Redescription. Total length: 18-23,0 mm. **Body.** Oval elongated, black to reddish-black color, shine body. **Head.** Clypeus weakly punctate, small, superficial and sparse punctures; weak clypeal suture; outer region of horns strongly punctate, large and deep punctures; small and flattened tubercules; frons with strong concavity; frons strongly punctate, large, coalescent and dense punctures; strong carinae between horns; interocular width about 7.1 transverse eye diameters; antennal club about 1.7 times longer than segments II-VII combined; antenna with 10 segments; segment I with large punctures, setose near segment II; segments III-VII glabrous; segment X with large punctures at disc; mandibles externally untoothed; outer region of mandibles angulate; apex of mandibles elevated; apex of pre-mentum strongly emarginated, apex weakly excavated. **Thorax: Pronotum.** Rounded basal angles; surface strongly punctate on base, strongly on apex; apex with large, coalescent and dense rounded punctures; longitudinal midline long, but ot reaching the apex, deep, wide, and with deep punctures; disc moderately punctate, large,

coalescent and deep punctures; glabrous; scutellar shield with strong, deep and moderate punctures on apex, smooth base, glabrous. Prosternal process not extended beyond procoxae, moderate; apex triangular; apex setose, small, deep and dense punctures; metaventrite with rounded, large, dense and confluent punctures at base; moderate setae on disc. **Legs.** Foretibiae tridentate; equidistant teeth, apex subtriangular; hindtibiae with one tooth and eight setae. **Abdomen.** Ventrite II-V with two rows of punctures, base with large and oval punctures, apex with small and sparse punctures; VI ventrite strongly punctate at base and weakly at base, moderate to large punctures; border with moderate setae; scutellar shield about 1.25 times larger than long; few strong and deep punctures on apex, smooth base, glabrous. **Elytra.** Surface with double rows of punctures, deeply punctate, punctures large, rounded to ovals, some coalescent; elytral apex strongly puncate, deep, moderate to large punctures; elytral interestriae with small and sparse punctures, strongly elevated between double rows. Pygidium strongly punctate; moderate, deep and dense punctures at disc; base moderately convex in lateral view. **Aedeagus.** Parameres longer than phalobase, parallels, diverging toward apex; apex of parameres with two extern rounded lobes; superficials punctures, small and sparse; apex of parameres angulate; laterals with wide and large carina, not reaching the apex; laterals of phalobase with moderate central carina, strongly excavated at lateral view; apex of parameres setose.

Female. Similar to male, but with small horns; frons less excavated, strongly punctate; pronotum disc with large and moderately punctate.

Remarks. *H. dejeani* is the species that have wide distribution on Brazilian territory, Ide (1998, unpublished) have identified in diverse collections its occurrence, it can be found in many municipalities on north region of Brazil (Amazonas, Pará, Rondônia, Maranhão states). *H. dejeani*

have parameres not overlapping as all species collected in Brazil, except by *H. vicarius*, and have flattened horns in the frontoclypeal suture differing from *H. agnus* (like a suture), *H. insularis* (rounded), *H. kahni* and *H.* sp. nov.

***Hemiphileurus kahni* Dupuis & Dechambre, 2000 (Fig. 3)**

Hemiphileurus kahni Dupuis & Dechambre, 2000: 26-28 (description, illustration); Ratcliffe, 2001: 434-436, 441 (redescription, illustration, checklist).

Diagnosis. Clypeus weakly punctate; apex of pre-mentum strongly not emarginated; prosternal process reaching the procoxae, high.

Redescription. Total length: 21,0 mm. **Body.** Oval elongated, black, shine body. **Head.** Clypeus weakly punctate, small, superficial and sparse punctures; weak clypeal suture; outer region of horns strongly punctate, large and deep punctures; small and rounded tubercules; frons with strong concavity; frons strongly punctate, large, coalescent and dense punctures; absent carinae between horns; antenna with 10 segments; segment I with large punctures, setose near segment II; segments III-VII with small setae; segment X with large punctures at disc; mandibles externally untoothed; outer region of mandibles rounded; apex of mandibles not elevated; apex of pre-mentum strongly not emarginated, apex excavated. **Thorax: Pronotum.** Rounded basal angles; surface moderately punctate on base, strongly on apex; apex with large, coalescent and dense rounded punctures; longitudinal midline narrow and superficial, not reaching the apex; large, and deeply punctate; disc moderately punctate, large, not coalescent and deep punctures; glabrous; scutellar shield weakly punctate, superficial and moderate punctures on apex and base, glabrous. Prosternal process reaching the procoxae, high; rounded apex; glabrous; small, deep and moderately punctate; metaventrite with rounded, large, and dense punctures, almost smooth near discrimen; glabrous. **Legs.** Foretibiae tridentate; different distance between teeth, apex subtriangular; hindtibiae with one tooth. **Abdomen.** Ventrite II-V with two rows of punctures, base

with large and rounded punctures, apex with small and sparse punctures; VI ventrite strongly punctate, moderate to large punctures; punctures with moderate setae. **Elytra.** Surface with double rows of punctures, deeply punctate, punctures large, rounded to ovals, some coalescent; elytral apex strongly puncate, deep, moderate to large punctures; elytral interestriae with small and moderately distributed punctures, strongly elevated between double rows. Pygidium strongly punctate; moderate, deep and dense punctures; rounded in lateral view. **Aedeagus.** Parameres longer than phalobase, parallels; small sparse, and superficials punctures at phalobase; apex diverging from inside to outside of parameres; apex of parameres rounded; laterals of parameres with weak and small carina, not reaching the apex; laterals of phalobase without carina; apex of parameres setose at ventral view.

Remarks. Ratcliffe have redescribed this species, described by Dupuis & Dechambre (2000), providing more characters, due to the description of the main authors have a brief description, they could only describe the male because there is only one specimen for the description of the type, but Ratcliffe (2001) redescribed the male and described the female, both found in the state of Amazonas close to the Taruma rivers Mirim and Igapó. *H. kahni* and *H. insularis* have distinct clypeal suture; small and rounded horns as the new species. *H. kahni* have the pronotum moderately punctate, and the longitudinal midline very distinct, formed by rows of punctures as the *Hemiphileurus* species collected in Brasil, but differs in the scutellar shield that is longer than wider.

***Hemiphileurus* sp. nov. A Medeiros & Grossi, 2023 (Fig.1)**

Type locality: Brazil, Goiás, São Jorge.

Type material: Holotype male, dissected. a) "BRASIL: Goiás, São / Jorge. PN Chapada / Veadeiros. Campo / rupestre. 14°10'18"S / 47°49'35"W. humanfaec. / I.2011. RV Nunes"

(CEMT). Paratypes. 1 female. Lenght 22.2 mm, width 10.1 mm; a) “BRASIL: Mato Grosso. / Paranaíta. UHE Teles / Pires 09°19’29”S 56°47’ / 38”W 195 m. 23-x-2011.APBenelli” (CEMT).

Diagnosis. Clypeus weakly punctate; apex of pre-mentum weakly emarginated; prosternal process columnar, not extended beyond procoxae, moderate size.

Description of holotype, here designated: Holotype male dissected, here designated, labeled (CEMT). Lenght 22.3 mm, width 9.2 mm. **Head.** Clypeus weakly punctate, superficial and sparse punctures; clypeus moderately punctate near eyes; outer region of horns moderately punctate; horns strongly punctate; small punctures concavity of frons weakly punctate; horn with moderately recurved posteriorly; frons with moderate concavity; distinct carina between horns of the clypeus and frons; elliptic apex of clypeus horn, parallels, slightly divergent; antenna with 10 segments; interocular width about 11 transverse eye diameters; antennal club with 1.25 times longer than segments II-VII combined; segment I with large punctures and moderate setae, moderately distributed; segment II with a row with punctures and short setae; segments III-VII glabrous; segment VIII-X with short and sparse setae; mandibles externally untoothed; outer region of mandibles arcuate, hirsute on basal half, setae sparse and moderate, apical half moderately punctate, glabrous; apex of pre-mentum weakly emarginate. **Thorax: Pronotum.** Surface with strong and deep punctures on disc, apex and sides, moderately on base; longitudinal midline with arcuate, large, and deep punctures on basal region; lateral borders with strong and moderate punctures, basal border with small and sparse punctures; basal border with an obtuse angle, glabrous. Prosternal process columnar, not extended beyond procoxae, moderate, flat on lateral view; apex rounded with small, superficial and sparse punctures, glabrous; base parabolic with deep punctures, long setae moderately distributed; apex and base with abdominal ventrite with large, deep and confluent punctures, with moderate setae, middle sparsely punctate and setose. **Legs.** Foretibiae tridentate; equidistant teeth, apex rounded. **Abdomen.** Base of ventrite III-V with

two rows of large punctures and sparse setae on each side, midline and apical without setae, only small and superficial punctures; ventrite VI with moderate and deep punctures, moderately distributed; apex with a complete row of testaceous setae; moderately concave. **Elytra.** Surface with deep rounded and oval and punctures; elytral apex with deep and large punctures, with diminute setae; interestriae moderately convex, with confluent punctures; elytra with slight constriction on external border, near apex; scutellar shield with few small, superficial and sparse punctures on apex, disc and base smooth; apical margin with. Pygidium strongly punctate on base and sides; disc and apex moderately punctate; moderate punctures and deep punctures, with small setae; moderately convex in lateral view. **Aedeagus.** Parameres moderate and curved outward, parallels; with a strong carinae in middle; apex of paramere with two teeth and external border with two lobes on middle; superficials punctures, small and sparse; apex of paramere with short and sparse setae; phallobase with moderate transversal carina on lateral view.

Female. Similar to male, but differing in these characteristics: clypeus with short and flat horn; frons with smaller and flat horns, with distinct carina between frons and clypeus; frons with weak fovea; tarsomeres shorter; pygidial plate slightly convex; prosternal process with few sparse setae; ventrite II-V with few setae, apex of VI with short setae.

Remarks. The description of the new species of *Hemiphileurus* makes the genus within 60 species, the first described for Goiás state, differing by anothers species collected in Brazil by the frontoclypeal horns elongate and curved, pronotum with large, deep, and dense punctateon the borders.

KEY TO *Hemiphileurus* BRAZILIAN SPECIES

1. Elytral interstriae elevated……..……**4** (Figs. 5A, 5D)

- Elytral interstriae not too elevated…….…….....…..…..……**2** (Fig. 1A, 3A)

2. Small species, about 17 mm; prosternal process short…….…….....……..***Hemiphileurus agnus*** (Burmeister, 1847) (Fig. 1A-D)

- Small species about 20 mm; prosternal process medium to high…….**3**

3. Frons with horns conic, strongly pronounced; pronotal sulcus wide with large punctures.....…….....***Hemiphileurus dejeani*** (Bates, 1888) (Figs. 2A, 2C, 2G-H)

- Frons with horns truncate, moderately pronounced; pronotal sulcus narrow with small puntcures…….....***Hemiphileurus kahni*** Dupuis & Dechambre, 2000 (Fig. 3A, 3E)

4. Prosternal process with apex in right angle on lateral view……...……...***Hemiphileurus insularis*** Ratcliffe, 1988

- Prosternal process flattened dorso-ventraly.....……..**5**

5. Prosternal process short; parameres without lobes…….…….....…..……....***Hemiphileurus bispinosus*** **Ratcliffe, 2001** (Fig. 4E-F)

- Prosternal process long; parameres with lobes.....……...**6** (Figs. 4A, 4C, 4G, 5C)

6. Parameres apex divergent; sides of parameres without intern central lobe, with apical lobe; posterior pronotal punctures moderately large……..…….……..……..…...**7** (Fig. 4G)

- Parameres apex paralell; dorsal side of right paramere with an intern central lobe bent over left side, with apical lobe; posterior pronotal punctures small…….....….***Hemiphileurus vicarius*** **Prell, 1936** (Fig. 4C-D)

7. Prosternal process long, triangular, apex sharply produced behind; pygidium regularly convex, small punctures, densely punctate…….…..***Hemiphileurus brasiliensis*** Endrödi, 1978

- Prosternal process long and setose, oval apex, setose; pygidium moderately convex, moderate punctures, strongly punctate.....***Hemiphileurus*** **sp. nov. A Medeiros & Grossi** (Fig. 5A-C)

Table 1. Checklist of the species of *Hemiphileurus* Kolbe, 1910 (modified from Ratcliffe, 2001)

Species name	synonym	deposited museum
Hemiphileurus agnus (Burmeister, 1847) — Brazil (Bahia)	*Phileurus agnus* Burmeister, 1847	MNHN (Lectotype male)
Hemiphileurus beckeri (Kolbe 1910) — Mexico (Durango)	*Epiphileurus beckeri* Kolbe, 1910; *Epiphileurus beckeri parumstriatus* Kolbe, 1910	ZMHB (Lectotype male)
Hemiphileurus bispinosus Ratcliffe, 2001 — Brazil (Minas Gerais)		MZUSP (Holotype male)
Hemiphileurus blandinae Dupuis, 1996 — Colombia (Gigante Huila), Ecuador		MNHN (Holotype male)
Hemiphileurus brasiliensis Endrödi 1978 — Brazil (Pernambuco, Pará), Peru (Pucalpa, Lorenta)		ZMHB (Holotype male)
Hemiphileurus caliensis Endrödi, 1985 — Colombia		CVCP (Holotype male)
Hemiphileurus carinatipenis Dupuis and Dechambre 2000 — Ecuador (Santo Domingo, Sucumbios)		MNHN (Holotype male)
Hemiphileurus cavei Ratcliffe, 2003 — Honduras (El Paraiso), Belize, Guatemala, Mexico (Chiapas, Veracruz)		USNM (Holotype male)
Hemiphileurus cayennensis Endrödi, 1985 — French Guiana		CVCP (Holotype male)
Hemiphileurus chantali Hardy & Dupuis, 2016 — Peru (Oxapampa)		CMN (Holotype male)
Hemiphileurus complanatus (Palisot de Beauvois, 1811) — Cuba (Habana, Pinar del Rio, Trinidad Mountains), Argentina (Buenos Aires, Loma del Gato, Cobre Range), Dominican Republic, Haiti	*Scarabaeus complanatus* Palisot de Beauvois, 1805; *Phileurus cribratus* Chevrolat, 1844; *Hemiphileurus cribratus* (Chevrolat, 1844)	?
Hemiphileurus cornutus Ratcliffe, 2014 —		UNSM (Holotype male)

Colombia (Cundinamarca)		
Hemiphileurus costatus Endrödi, 1978 — Paraguay (Horqueta)		HNHM (Holotype male)
Hemiphileurus cubaensis (Chalumeau, 1981) — Cuba	*Epiphileurus cubensis* Chalumeau, 1981	MNHN (Holotype male)
Hemiphileurus curoei Ratcliffe, 2003 — Panama (Coclé)		UNSM (Holotype male)
Hemiphileurus curvicornis Dupuis and Dechambre, 2000 — Colombia (Valle del Cauca, Buga, Calima Valle)		MNHN (Holotype male)
Hemiphileurus cylindroides (Bates, 1889) — Guatemala (Tumbador), Belize, Costa Rica (Cartago, Heredia, Puntarenas, San José, Turrialba), Panama	*Phileurus cylindroides* Bates, 1889; *Hemiphileurus costaricensis* Endrödi, 1978; *Hemiphileurus jamesonae* Ratcliffe, 1988	NHM (Lectotype male)
Hemiphileurus dechambrei Ratcliffe, 2003 — Guatemala (Chimaltenango, Yepocapa, San Marcos)		INBIO (Holotype male)
Hemiphileurus dejeani (Bates, 1888) — Brazil (Pará), Costa Rica (Guanacaste, Limón), French Guiana, Guatemala, Honduras, Mexico (Chiapas, Hidalgo, Oaxaca, Puebla, Veracruz), Nicaragua	*Phileurus dejeani* Bates, 1888	MNHN (Lectotype male)
Hemiphileurus depressus (Fabricius, 1801) — Colombia (Bogota, Ibagua, Muzo, Villavicencio, Kanon del Tolima), Ecuador, French Guiana, Guyana, Peru	*Geotrupes depressus* Fabricius, 1801; *Hemiphileurus deplanatus* Endrödi, 1978	ZMUK (Lectotype male)
Hemiphileurus deslislesi Ratcliffe, 2000 — Colombia (Valle del Cauca)		CMN (Holotype male)
Hemiphileurus dispar (Kolbe, 1910) — Cuba, Dominican Republic (Puerto Plata), Haiti (Port Prince)	*Epiphileurus dispar* Kolbe, 1910; *Hemiphileurus consimilis* Ratcliffe & Cave, 2015	ZMHB (Lectotype male)
Hemiphileurus dyscritus Ratcliffe, 2003 — Costa Rica		INBio (Holotype male)

(Guanacaste, Alajuela, Heredia, Puntarenas), Nicaragua, Panama (Barro Colorado)		
Hemiphileurus elbitae Neita & Ratcliffe, 2010 — Colombia (Chocó		UNSM (Holotype male)
Hemiphileurus elongatus Dupuis and Dechambre, 2000 — Peru (Chanchamayo), Bolivia (Nord Yungas)		MNHN (Holotype male)
Hemiphileurus euniceae Ratcliffe & Cave, 2006 — El Salvador, Guatemala		?
Hemiphileurus flohri (Kolbe, 1910) — Mexico (Guerrero, Jalisco, Oaxaca, Veracruz)	*Phileurus flohri* Kolbe, 1910	?
Hemiphileurus gibbosus Dupuis and Dechambre, 2000 — Colombia (Valle del Cauca)		MNHN (Holotype male)
Hemiphileurus gloriae Ponchel, 2009 — French Guiana (Kourou, Cacao)		Collection Ponchel (Holotype male)
Hemiphileurus hiekei Chalumeau, 1988 — Colombia (Bogota), Ecuador (Baños)		ZMHB (Holotype male)
Hemiphileurus howdeni Endrödi, 1978 — Peru (Cusco)		CNC (Holotype male)
Hemiphileurus illatus (LeConte, 1854)	*Phileurus femoratus* Burmeister, 1847; *Phileurus vitulus* LeConte, 1863; *Phileurus phoenicus* Casey, 1915; *Phileurus puncticollis* Casey, 1915; *Hemiphileurus illatus mexicanus* Endrödi, 1978	MCZH (Holotype male)
Hemiphileurus insularis Ratcliffe, 1988 — Brazil (Amazonas)		UNSM (Holotype male)
Hemiphileurus isabellae Dupuis, 2004 —		MNHN (Holotype male)

Peru (Huánuco)		
Hemiphileurus jamaicensis (Howden, 1970) — Jamaica (St. Thomas)	*Epiphileurus jamaicensis* Howden, 1970	CNC (Holotype female)
Hemiphileurus kahni Dupuis & Dechambre, 2000 — Peru (Loreto), Brazil (Amazonas)		MNHN (Holotype male)
Hemiphileurus laevicauda (Bates, 1888) — Mexico (Chiapas), Guatemala, El Salvador, Costa Rica (Heredia, Guanacaste), Panama (Chiriqui)	*Phileurus laevicauda* Bates, 1889	NHM (Lectotype male)
Hemiphileurus laeviceps (Arrow, 1947) — Dominica (Laudat)	*Epiphileurus laeviceps* Arrow, 1947	NHM (Lectotype male)
Hemiphileurus laticollis (Burmeister, 1847) — Colombia	*Phileurus laticollis* Burmeister, 1847	ZMHB (Lectotype male)
Hemiphileurus microps (Burmeister, 1847) — Mexico, Guatemala	*Phileurus microps* Burmeister, 1847	MLHU (Holotype male)
Hemiphileurus nebulohylaeus Ratcliffe, 2003 — Costa Rica (Puntarenas, Cartago), Panama (Bocas del Toro, Chiriqui)		UNSM (Holotype male)
Hemiphileurus parvus Dupuis and Dechambre, 2000 — Cuba (Guantanamo)	*Hemiphileurus laminicornis* Dupuis and Dechambre, 2000	MNHN (Holotype male)
Hemiphileurus phratrius Ratcliffe and Ivie, 1998— Dominican Republic (Pedernales, Barahona)		CMN (Holotype male)
Hemiphileurus puertoricensis (Chapin, 1935) — Puerto Rico (Barranquitas)	*Epiphileurus puertoricensis* Chapin, 1935	USNM (Holotype male)
Hemiphileurus punctatostriatus (Prell, 1914) — Mexico, Belize, Panama	*Epiphileurus punctatostriatus* Prell, 1914	ZMHB (Holotype male)
Hemiphileurus pygidiopunctissimus Ratcliffe , 2003 — Panama (Barro Colorado		UNSM (Holotype male)
Hemiphileurus		UNSM (Holotype male)

quadridentatus Ratcliffe, 2001 — Guatemala (Izabal)		
Hemiphileurus ratcliffei Dupuis, 2006 — Dominican Republic (Constanza)		CMN (Holotype male)
Hemiphileurus rugulosus Endrödi, 1978 — Venezuela (Caracas, Avila Gebirge), Colombia (Bogota, Santa Fé de Bogota)		ZMHB (Holotype male)
Hemiphileurus ryani Ratcliffe and Ivie, 1998 — Dominican Republic (Hato Mayor, La Vega)		MCZH (Holotype male)
Hemiphileurus scutellatus Howden and Endrödi, 1978 — Dominican Republic (Bani, Valle Nuevo)		Coll. Howden (Holotype male)
Hemiphileurus similis Dupuis and Dechambre, 2000 — Ecuador (Napo, Cotopaxi)		MNHN (Holotype male)
Hemiphileurus simplex Prell, 1914 — Guatemala, Costa Rica (Alajuela, Heredia, Puntarenas, San José), Panama (Chiriqui)	*Phileurus cylindroides* Bates, 1888 (in part); *Hemiphileurus cylindroides* (Bates, 1888); *Epiphileurus cylindroides* Prell, 1914; *Hemiphileurus fraternus* Arrow, 1937; *Hemiphileurus costaricensis* Endrödi, 1978; *Hemiphileurus jamesonae* Ratcliffe, 1988	ZMHB (Lectotype male)
Hemiphileurus tainorum Ratcliffe & Cave, 2015 — Cuba		?
Hemiphileurus unilobus Dupuis and Dechambre, 2000 — Venezuela		MNHN (Holotype male)
Hemiphileurus variolosus (Burmeister, 1847) — Costa Rica (Cartago, Guanacaste, Limón, Puntarenas), Panama (Chiriqui, Darien), Colombia (Bogota), Venezuela, French Guiana, Ecuador, Trinidad	*Phileurus variolosus* Burmeister, 1847; *Epiphileurus irregularis* Prell, 1914; *Hemiphileurus variolosus striatus* Endrödi, 1978	ZMHB (Lectotype male)
Hemiphileurus vicarius Prell,	*Phileurus depressus*	MLHU (Lectotype male)

1937 — Costa Rica (Cartago), Panama (Chiriqui), Colombia (Muzo), French Guiana (Caricabo), Ecuador (Banos), Brazil (Bahia)	Burmeister, 1847	
Hemiphileurus vulgatus Dupuis & Dechambre, 2000 — Ecuador (Loja)		MNHN (Holotype male)
Hemiphileurus warneri Ratcliffe, 2001 — Mexico (Nayarit)		UNSM (Holotype male)

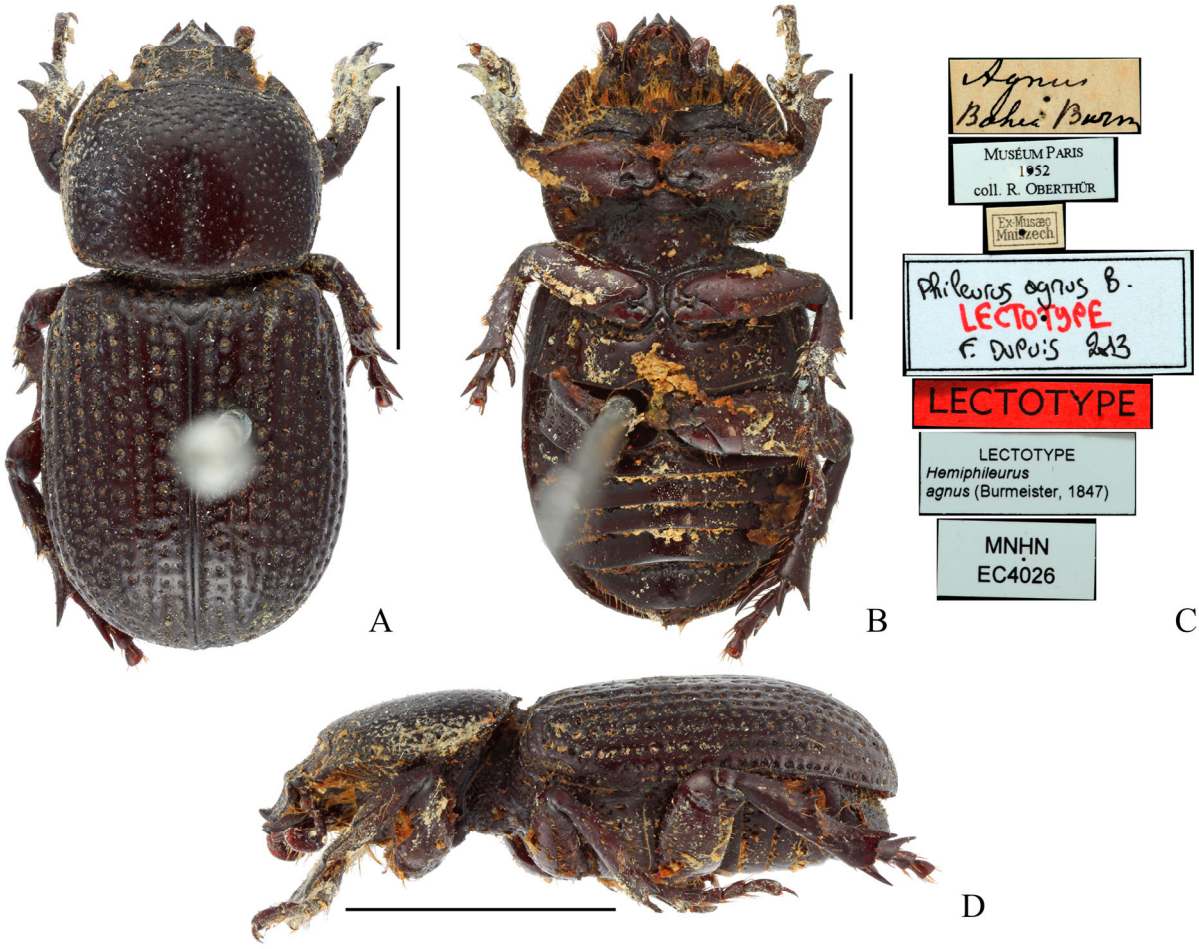

Figure 1. *Hemiphileurus agnus* (Burmeister, 1847) female (Lectotype, MNHN EC4026) dorsal (A), ventral (B) and lateral view habitus (D), labels attached (C). Scale bars 5 mm.

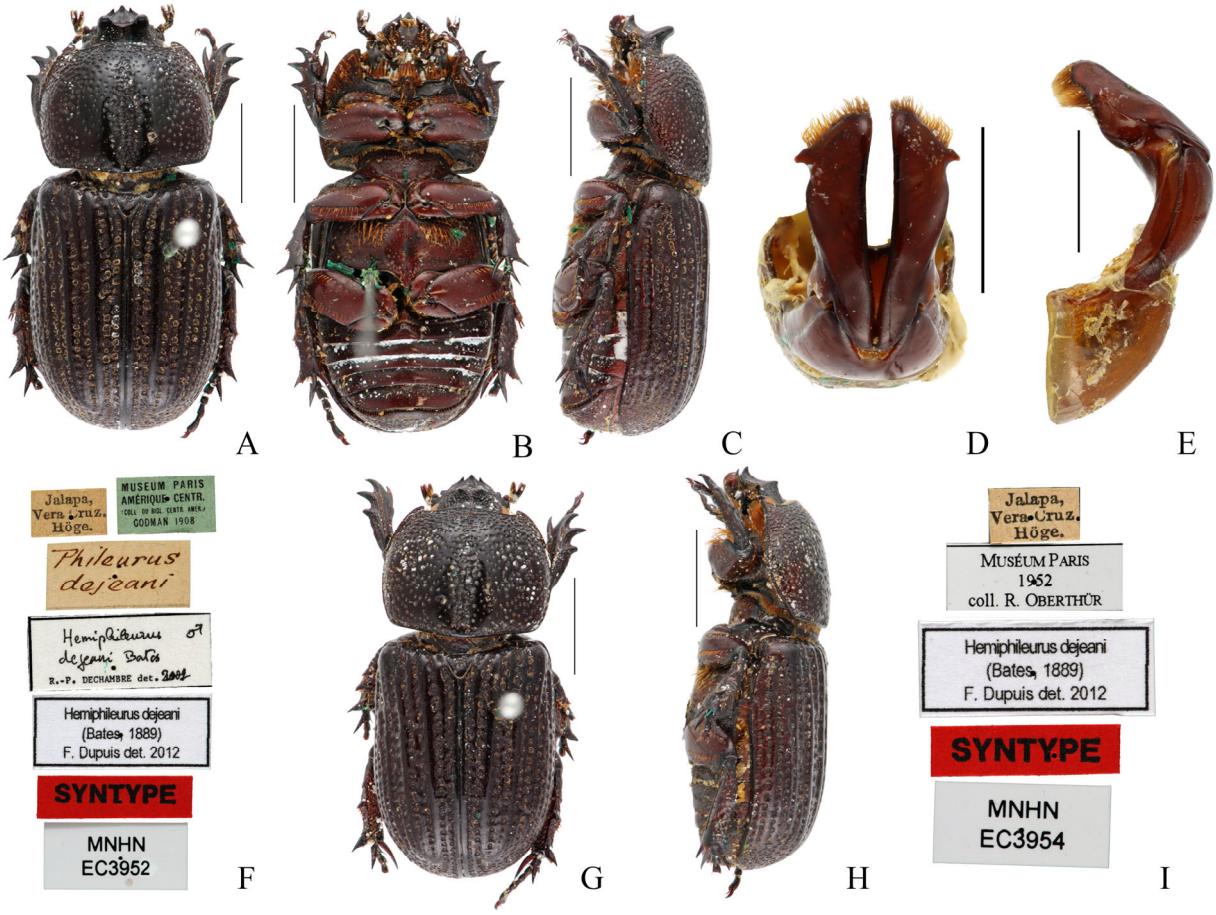

Figure 2. *Hemiphileurus dejeani* (Bates, 1888) male (Lectotype, MNHN EC3954) dorsal (A), lateral (B) and ventral view habitus (C), female dorsal (G) and lateral view (H); aedeagus caudal (D) and lateral view (E), labels attached male (F) and female (I). Scale bars A-C,G-H 5 mm; D-E 1 mm.

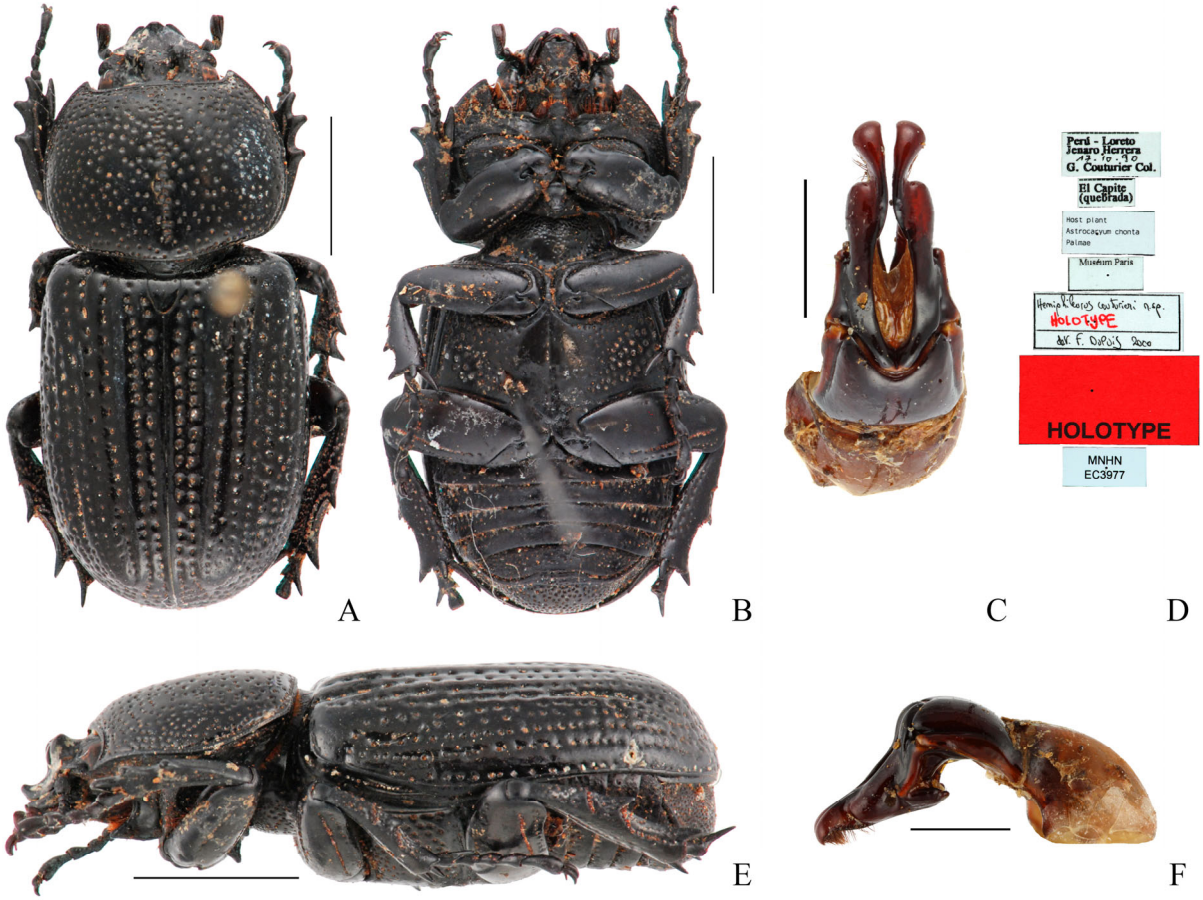

Figure 3. *Hemiphileurus kahni* Dupuis & Dechambre, 2000 male (Lectotype, MNHN EC3977) dorsal (A), lateral (B) and ventral view habitus (E); aedeagus caudal (C) and lateral view (F), labels attached (E). Scale bars A-B, E 5 mm; C, F 1 mm.

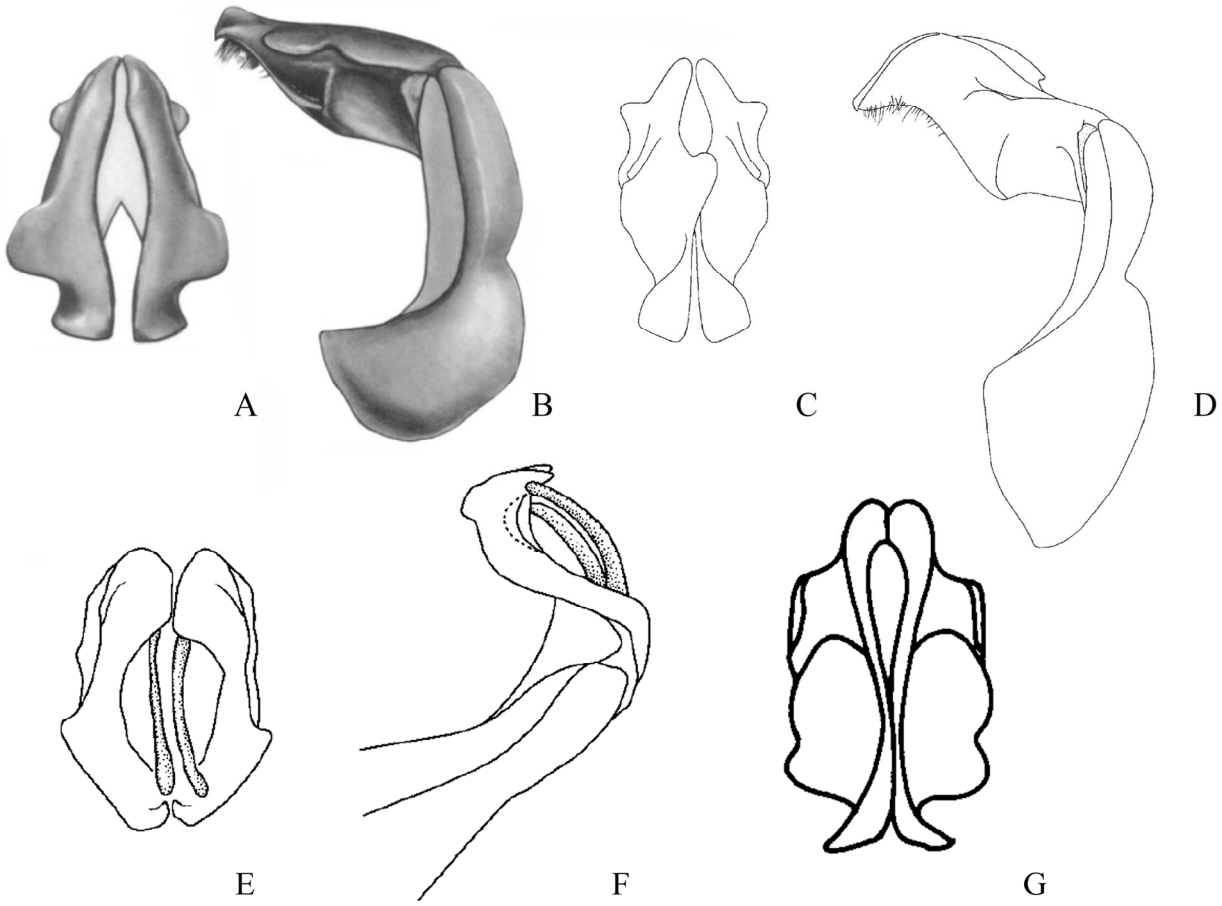

Figure 4. *Hemiphileurus* spp. aedeagus. *Hemiphileurus insularis* Ratcliffe, 1988, caudal (A) and lateral view (B) (illustration by Ratcliffe 1988a); *Hemiphileurus vicarius* Prell, 1936, caudal (C) and lateral view (D) (illustration by Ratcliffe & Curoe, 2011); *Hemiphileurus bispinosus* Ratcliffe, 2001, caudal (E), and lateral view (F) (illustration by Ratcliife 2001); *Hemiphileurus brasiliensis* Endrödi, 1978, caudal view (G) (illustration by Endrödi 1985b).

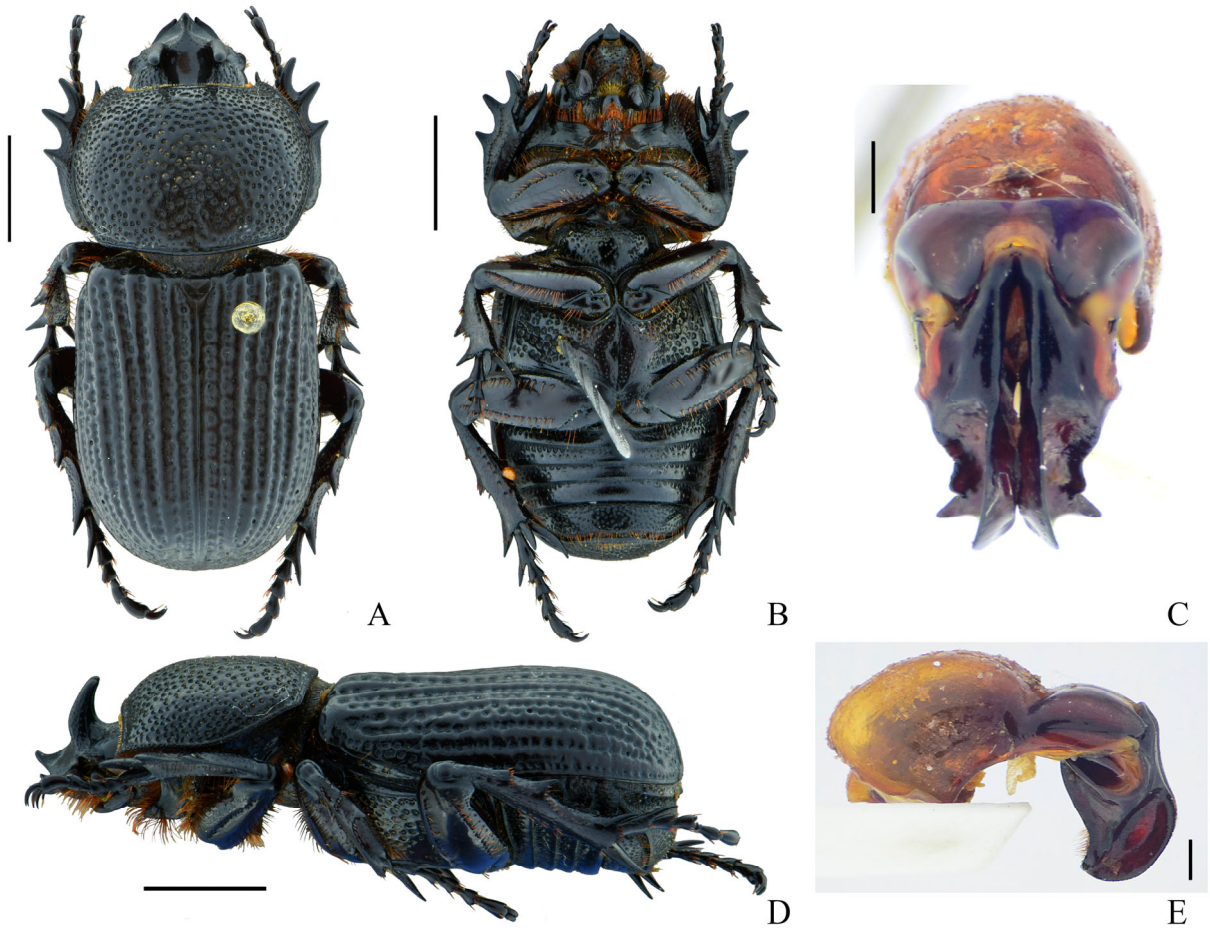

Figure 5. *Hemiphileurus* sp. nov. A male dorsal (A), ventral (B) and lateral habitus (D) male; aedeagus caudal view (C) and lateral view (E). Scale bars A-B, C 5 mm; C, E 1 mm.

DISCUSSION

Some species of the genus has been synonymized in some articles like *Hemiphileurus complanatus* (Palisot de Beauvois, 1805) synonym of *Hemiphileurus cribratus* (Chevrolat, 1844); *Hemiphileurus costaricensis* Endrödi, 1978 and *Hemiphileurus jamesonae* Ratcliffe, 1988 are synonyms of *Hemiphileurus cylindroides* (Bates 1888), it show that this genus have some problems with the nomenclature and possibly some species have to be reviewed to give a nomenclatural change, when possible.

The large number of species is increasing as the unexplored collections are receiving researchers from all parts of the world (Ratcliffe & Cave, 2006), since Endrödi (1985b) the genus comprises 24 species known. Neita-Moreno & Ratcliffe (2010) described the third larvae known from all *Hemiphileurus* species, and the last species described was *Hemiphileurus chantali* Hardy & Dupuis, 2016 (Hardy & Dupuis 2016) now with the new species from the Goiás state the number of species increase for 61.

The genus *Hemiphileurus* now with the new species have now 61 species, eight species occuring on Brazil, one exclusive from southeast region *H. bispinosus* Ratcliffe, 2001, three from north region *H. dejeani* (Bates, 1888), *H. insularis* Ratciffe, 1988, and *H. kahni* Dupuis & Dechambre 2000; two from northeast *H. agnus* Burmeister, 1847, and *H. vicarius* Endrödi, 1978; and one from midwest *H.* sp. n. Medeiros & Grossi, 2023. The only species that occur on two different regions, North e Northeast is *H. brasiliensis* Endrödi, 1978. Only four species are exclusive from Brazil *H. agnus*, *H. bispinosus*, *H. insularis*, and *H.* sp. nov., the latter is exclusive from the midwest.

The last four species that has been described were *H. cornutus* Ratcliffe (2014d) from Colombia, *H. tainorum* Ratcliffe & Cave (2015) from Cuba, *H. ratcliffei* Dupuis (2016) from

Dominican Republic and *H. chantali* Hardy & Dupuis (2016) from Peru, showing that the major part of the species are found in different countries that are not known their entomofauna.

Due to the scarce quantity of specimens, some of them were studied through images from MNHN, making possible this work, comparing with some literature data of all species that are found in Brazil as well as the dichotomic key.

Hemiphileurus agnus is considered here as a species folowing Dupuis & Mantilleri (2013), this species is the smaller one found on Brazil, and can be easily differentiated by the mainly characteristics: smaller body than another species; pronotum with horseshoe punctures on anterior margin, densely punctate on lateral margins; prosternal ventrite with ovoid punctures, large and deep, moderately punctate on margins; scutellar shield longer than large with few moderate punctures on anterior margin; large and deep punctures on elytra; metatibia with one carina with 9 moderate setae.

Once the new species was found in midwest of Brazil, it was compared with *H. agnus* to find out if it was not the species described by Burmeister, but after analyze, the two species differ in many characteristics, as mention in the manuscript remarks of *H. agnus*.

H. brasiliensis, *H. bispinosus, H. kahni*, *H. insularis*, have a small distribution in south America, this way they can be easily separated by the locality and by morphological characters like: *H. kanhi* have apex of pre-mentum weakly emarginated, and *H. insularis* have the apex of pre-mentum moderately emarginated. These four species have different shapes in the parameres making easier your identification. The only species that have the parameres overlapping is *H. vicarius*; *H. insularis* have two lobes near apex, diverging from the mid region of parameres; *H. bispinosus* have two spine-like and long projections from the apex of phalobase (Fig. 4).

Acknowledgments

The authors thank the following organizations for financial support: CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - process number CAPES/Proex 88887.333488/2019-00), Ministério da Ciência, Tecnologia e Inovação (MCTI/CNPq/Universal 2014, process number 449366/2014-6), and curators of national, international and private collections for the loans of the specimens.

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Cuba. “Cuba: Pinar / Rio, Sierra / Rosario, 400 m / 5-15.vi.1990 / V.O. Becker” (1 male and 1 female no dissected), Hemiphileurus parvus. “Cuba // MUS. LAFERT. É. / 1145 // Ex-Musaeo / D. Sharp 1890 // MUSÉUM PARIS / 1952 / coll. R. Oberthür // Hemiphileurus parvus n. sp. / HOLOTYPE / det. F. DUPUIS 2000 // HOLOTYPE // MNHN / EC3928” (1 male dissected).

CAPÍTULO 5

Sinópse das espécies brasileiras de *Archophileurus* Kolbe (Coleoptera: Melolonthidae: Dynastinae) e descrição de uma nova espécie do bioma caatinga de Pernambuco [1]

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[1]Medeiros, R.A.F. & P.C. Grossi. Synopsis of brazilian species of *Archophileurus* Kolbe (Coleoptera: Melolonthidae: Dynastinae) and description of a new species for the caatinga biome of Pernambuco. Zootaxa.

RESUMO - O gênero *Archophileurus* Kolbe é o terceiro em número de espécies em Phileurini. Este gênero possui cabeça com dois chifres ou carena elevada na sutura frontoclipeal e ápice da metatíbia sem dente. Este gênero foi proposto por Kolbe para separar espécies que estavam descritas em *Phileurus* Latreille. Na América do Sul, o gênero possui um grande número de espécies descritas, a maior parte das espécies são encontradas no Brasil, com 19 espécies descritas, algumas delas também encontradas na Argentina. A nova espécie de *Archophileurus* foi coletada no estado de Pernambuco e comparada com exemplares de coleções internacionais e nacionais, além de literatura especializada, o Parque Nacional do Catimbáu abrange os municípios de Buíque, Ibimirim e Tupanatinga, no bioma caatinga. Fornecemos a descrição da nova espécie, uma lista de todas as espécies que foram descritas na América do Sul e território brasileiro com o respectivo museu depositado, fotos do macho e da fêmea da nova espécie.

PALAVRAS-CHAVE: Agreste, Neotropical, Northeast, Phileurini, Scarabaeoidea, Taxonomy.

Synopsis of brazilian species of *Archophileurus* Kolbe (Coleoptera: Melolonthidae: Dynastinae) and description of a new species for the caatinga biome of Pernambuco [1]

ABSTRACT – The genus *Archophileurus* Kolbe is the third in number of species in Phileurini. This genus have the head with two horns or a elevated carinae on frontoclypeal suture and the apex of the metatibia without tooth. This genus was proposed by Kolbe for separate species that are in Phileurus Latreille. In South America, the genus have a large number of species described, the major part of the species are found in Brazil, with 19 species described, some of them are found too in Argentina. The new species of *Archophileurus* was collected in Pernambuco state and compared with specimens of international and national collections, and specialized literature, the Parque Nacional do Catimbáu covers the municipalities of Buíque, Ibimirim and Tupanatinga, in caatinga biome. We provide the description of the new species, a list of all species that was described on South America and brazilian territory with the respective museum deposited, photos of male ad female for the new species.

KEY WORDS: Caatinga, Neotropical, Northeast, Phileurini, Scarabaeoidea, Taxonomy

INTRODUCTION

Archophileurus Kolbe (1910) is a genus that can be found in Neotropical and in the South of Neartic regions, this genus and another three, *Amblyphileurus* Kolbe, *Anisophileurus* Prell and *Periphileurus* Kolbe, has been described and proposed in "Phileurini genuini" by the author to separate very similar genera included in *Phileurus* Latreille 1807, they are synonyms of *Archophileurus* by Arrow (1937a).

Archophileurus is the third genus in number of species (32) from Phileurini that are distinguished from others of the tribe by the combination of the following characters by Endrödi (1985b): mandibles externally curved or angulate; frons with two horns or tubercles, some species can have the horns fused seeming a elevated carinae (for example, *Archophileurus cribrosus*, LeConte, 1854); anterior tibia with three or four teeth; and apex of metatibia without teeth.

This genus have a review of the from Argentina and adjacent countries species made by Di Iorio *et al*. (2017), and Uruguay by Sáenz & Morelli (1983), some species has been described from west indies, central and south America (Ratcliffe & Ivie 1998; Dupuis & Dechambre 2000; Ratcliffe 2001, 2003, 2014; Dupuis 2004, 2016; Ratcliffe & Cave 2006, 2015; Ponchel 2009; Neita & Ratcliffe 2010; Hardy & Dupuis 2016).

Archophileurus spinosus Dechambre, 2006 was recorded introduced in Italy, explained in Ruzzier *et al*. (2020), probably some specimens have been brought from Paraguay and created by some biopirates, and now this species probably has found substrate and reproduction sites in the climate of the region.

In Brazil, 19 species can be found: *Archophileurus alternans* Endrödi, 1977 (Bahia), *Archophileurus aper* Endrödi, 1977 (Espírito Santo, Rio de Janeiro, Santa Catarina, São Paulo), *Archophileurus bifoveatus* Endrödi, 1977 (São Paulo, Paraná, Santa Catarina), *Archophileurus burmeisteri* (Arrow, 1908) (Santa Catarina), *Archophileurus chaconus* (Kolbe, 1910) (Minas

Gerais, Rio de Janeiro, São Paulo, Paraná, Santa Catarina), *Archophileurus elatus* (Prell, 1914), *Archophileurus fimbriatus* (Burmeister, 1847), *Archophileurus fodiens* (Kolbe, 1910), *Archophileurus foveicollis* (Burmeister, 1847) (Espírito Santo, Minas Gerais, Rio de Janeiro, Rio Grande do Sul, São Paulo, Santa Catarina), *Archophileurus kolbeanus* Ohaus, 1910 (Rio Grande do Sul, Santa Catarina), *Archophileurus latipennis* (Burmeister, 1847) (Rio de Janeiro, Santa Catarina), *Archophileurus opacostriatus* (Ohaus, 1911) (Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina), *Archophileurus ovis* (Burmeister, 1847) (Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo), *Archophileurus passaloides* (Prell, 1914), *Archophileurus petropolitanus* (Ohaus, 1910) (Espírito Santo, Rio de Janeiro, Santa Catarina), *Archophileurus quadrivii* Dechambre, 2006 (Bahia), *Archophileurus tmetoplus* (Prell, 1912) (Minas Gerais, Rio de Janeiro, São Paulo, Santa Catarina), *Archophileurus trituberculatus* Endrödi, 1977 (Paraná), and *Archophileurus vervex* (Burmeister, 1847) (Minas Gerais, Pará, Paraná, Santa Catarina). With the description of the new species we have two thirds of the species occuring from Northeast to South of the brazilian territory (Ide 1998 [unpublished data], Endrödi 1978, 1985b).

A new species of *Archophileurus* was collected in the Parque Nacional do Catimbau, which covers the municipalities of Buíque (PE), Ibimirim (PE), and Tupanatinga (PE) (ICMBio 2020), on Agreste of Pernambuco state and is described here, all specimens were collected in caatinga biome on Buíque, Caruaru, Floresta and Petrolina municipalities, the specimens collected with Camaragibe municipality probably are from errors of localitization from the collector.

The genus is not recorded in Caatinga biome, this is the first species collected in caatinga vegetation, the great part of the collected specimens are from Amazon and Pampa biome, that have been in countries near Brazil, like Argentina. Others genera of Phileurini also don't have records in this biome, great part of collected specimens are from Amazon, Atlantic Florest and Pampa biomes.

We here describe the new species of *Archophileurus* with base on the collected specimens, analyzing the external morphology, and comparing with the species that occur in Brazil; photos from male and female, a key of the species that occur in Brazil, a checklist of all species, their synonyms, and the location of its holotypes or lectotypes, when possible to find on museums or literature, are available in this work.

Materials and Methods

Were examined 56 specimens of different collections in the external morphology and in literature, descriptions, reviews, and books from private or public museums, acronyms, follows Evenhuis (2020):

CEMT (Coleção Zoológica da Universidade Federal de Mato Grosso), Cuiabá, Mato Grosso, Brazil (Fernando Z. Vaz-de-Mello);

CERPE (Coleção Entomológica da Universidade Federal Rural de Pernambuco), Recife, Pernambuco, Brazil (Paschoal C. Grossi);

DZUP (Coleção de Entomologia "Pe. J. S. Moure", Departamento de Zoologia, Setor de Ciências Biológicas, Universidade Federal do Paraná), Curitiba, Paraná, Brazil (D.S. Naap);

EPGC (Everardo and Paschoal Grossi Collection), Nova Friburgo, Rio de Janeiro, Brazil (Everardo J. Grossi);

FEIS (Faculdade de Engenharia de Ilha Solteira, Universidade Estadual Paulista), Ilha Solteira (C.A.H. Flechtmann);

HNHM, (Hungarian Natural History Museum), Budapest, Hungary (Viktória Gabriella Szőke);

IBSP (Coleção Entomológica Adolph Hempel, Instituto Biológico de São Paulo), São Paulo, São Paulo, Brazil (Sergio Ide);

MLUH (Museum der Martin Lüther Universität), Halle, Allemagne (Karla Schinider);

MNHN (Muséum National d'Histoire Naturelle), Paris, France (Thierry Deuve);

MPEG (Coleção Entomológica, Museu Paraense "Emílio Goeldi"), Belém, Pará, Brazil (T. de J.P. Chaves);

MZUSP (Museu de Zoologia da Universidade de São Paulo), São Paulo, Brazil (Sônia A. Casari).

NHM (Natural History Museum), London, United Kingdom, (Max Barclay);

USNM (United States National Museum), Washington, USA (T. Erwin);

UNSM (University of Nebraska State Museum), Lincoln, NE, USA (Bret Ratcliffe);

ZMHB (Museum für Naturkunde der Humboldt Universität zu Berlin), Berlin, Germany (Johannes Frisch).

Distribution map

The software Google Earth Pro® was used for map construction, all GPS points were obtained through label data and literature records, then exported to the website simplemappr.net (Shorthouse, 2010), and the generated map was edited in GIMP 2.10.10 (The GIMP Team 2019).

Terminology

The terminology used are: Jameson 1990, Ratcliffe 2006 (punctures measures, size and density of punctures, interocular width); Ratcliffe & Cave 2006 (length and width measures); Lawrence *et al*. 2011 (appendices details, external morphology and male genitalia).

Labels information and terminilogy

To describe the material examined, in the transcription of the labels of the type material, the following pattern was used: quotation marks – " beginning, and " end of the information present

in the label(s) of the examined specimen; / line change in the same label; \ back of the label; // label change on the examined specimen; [ ] additional information about the label. The type material was accessed through loans from the respective curators, when possible, and through photos from the museums already listed above.

Measure and dissection details

The measurements of the specimens were obtained through a calibrated digital caliper with scale up to 0.01 mm. The distance between the apex of the clypeus and the apex of the elytra were measured for maximum length; maximum humeral width between the humerus and maximum elytral width for greater width of the elytra.

For the study of the morphology of the genitalia, the specimens were put in a recipient with water in a thermal plate at 100 ºC for approximately 10 min or more for dissection, depending on it conservation status. The male genitalia were removed through a perforation located at the dorsal base of the abdomen. The genitalia then was mounted on a card and pinned below the specimens.

Images and edition

The images will be obtained with the aid of digital cameras (Nikon® D-90 and D-5300) with a 40 mm macro lens, coupled to a Zeiss 508 DOC stereomicroscope, with LED lighting and a computer with the freeware CombineZP (www.hadleyweb.pwp.blueyonder.co.uk), to stack the photos. The photos will be edited, and the images will be assembled using the freeware GIMP 2.0.

Results

Taxonomy

Archophileurus A **Medeiros & Grossi, new species** (Figures 1-10).

Type locality. Brazil, Pernambuco, Buíque.

Type material. Holotype male, dissected. a) "BRASIL, Pernambuco, / Buíque, Vale do / Catimbau, 02.V.2008 / C. Liberal Leg." // b) "350" (CERPE). Paratypes. 6 specimens. 4 males not dissected; 1 m "PE. Camaragibe / 21.III.1999 / R. M. Primo"; 1 m, "Buíque – PE / Vale do Catimbau / 02.V.2006 / Liberal, C.N. col / (antropizada1a)"; 1 m, "BRASIL. PE. Caruarú / Coleta manual. 09.II.2015. / Col. FernandoSilva. // CEMT"; 1 m, "Brasil, PE, Floresta / 589613, 9041500 24L / PML03, Sem data, *Pitfall* / Sem coletor. // Archophileurus Kolbe, / 1910 / Brito, L. C. det. 20 // MFCE / 000015"; 2 females; 1 f, "BRASIL: Pernambuco. / Petrolina. 30-V-2011. MSM / Barbosa"; 1 f, "Brasil, Pernambuco, Buíque, / PARNA Catimbau, / alojamento, luz, vi.2019 / C.H.C. da Silva leg.".

Diagnosis. Clypeus weakly punctate; outer region of horns strongly punctate; pronotum surface weakly punctate on base, strongly on apex; apex of pre-mentum moderately emarginated.

Description of holotype, here designated: Holotype male dissected, here designated, labeled (CERPE). Lenght 19.4 mm, width 10.3 mm. **Body:** Oval elongated, black to reddish-black color, shine body. **Head:** Clypeus weakly punctate, superficial and isolated punctures; clypeus strongly punctate near eyes; outer region of horns strongly punctate, frons intern region weakly punctate; horn with moderately recurved posteriorly; frons with moderate concavity; strong carina between horns of the clypeus and frons; rounded apex of clypeus horn, parallels, almost straight; antenna with 10 segments; interocular width equals 2.3 transverse eye diameters; antennal club with 1.6 times longer than segments II-VII combined; segments I-II with large punctures, hirsute, III-VII glabrous; segment X with agglomerate setae near apex on proximal face, near segment IX; mandibles externally untoothed; outer region of mandibles hirsute, setae moderate size; apex of pre-mentum moderately emarginate. **Thorax: Pronotum:** Surface weakly punctate on base, strongly on apex; longitudinal midline with strong, large, and deep punctures, on basal region;

apical region with small, moderate, and superficial punctures; base with minute setae, near border. **Elytra:** Surface with deep punctures, rounded to ovals; elytral apex with superficial and small punctures; elytral interestriae without confluent punctures; elytra with moderate constriction on external border, near apex; scutellar shield with few strong and deep punctures on apex, smooth base (on apical humeri). **Abdomen:** Prosternal process not extended beyond procoxae, long; apex with long setae, apex oval; moderate and deep punctures; mesoventrite with large and confluent punctures; long setae on punctures. Ventrite IV with a row of setae, ventrite II-V with a row of setae on each side, mid region without setae; ventrite VI mid region without setae. **Pygidium:** Strongly punctate on base and sides; apex moderately punctate; moderate punctures, moderately deep; base moderately convex in lateral view. **Legs:** Foretibiae tridentate; equidistant teeth, subtriangular, apex rounded. **Aedeagus.** Paramere elongated, parallels; narrow in the middle; apex of paramere with lobes moderately wide on middle; superficials punctures, small and sparse; apex of paramere flattened; base wider than apex, with small and sparse punctures; laterals with wide and large carina; laterals of phalobase with moderate central carina.

Variation. Lenght 15.7-19.4 mm, width 8.1-10.4 mm. Differs mainly on the frontal horns length, the minors males have smaller horns.

Female. Lenght 19.8-20.2 mm, width 10.2-10.4 mm. Similar to male (Figure 2). Clypeus with smaller horn; small and sparse punctures; frons with smaller horns, without carina between frons and clypeus; frons with weak fovea; pygidial plate strongly convex; prosternal process more setose; sternite V-VI less hirsute, VII with 1-2 setae near to middle.

Remarks. This is the first species from the Pernambuco state, collected in the caatinga biome on the National Park of Catimbau. The new species is known by four different municipalities on Pernambuco state, on Buíque (on the National Park of Catimbau Vale), Caruaru, Floresta and

Petrolina (this is far away from the first specimen collected), the municipality of Camaragibe is considered a label error from the collector of a didactic collection.

Table 1. Checklist of the Brazilian species of *Archophileurus* Kolbe, 1910

Species name and descriptor	synonym	deposited museum
Archophileurus alternans Endrödi, 1977		HNHM
Archophileurus aper Endrödi, 1977		ZMHB (Holotype)
Archophileurus bifoveatus Endrödi, 1977		ZMHB (Holotype)
Archophileurus burmeisteri (Arrow, 1908)	*Phileurus burmeisteri* Arrow, 1908; *Amblyphileurus gracilis* Prell, 1914	BMNH (Holotype)
Archophileurus chaconus (Kolbe, 1910)	*Amblyphileurus vervex chaconus* Kolbe, 1910; *Archophileurus santafeanus* Arrow, 1937	ZMHB
Archophileurus elatus (Prell, 1914)	*Amblyphileurus elatus* Prell, 1914	ZMHB (Holotype male)
Archophileurus fimbriatus (Burmeister, 1847)	*Phileurus fimbriatus* Burmeister, 1847	MNHN (Holotype male)
Archophileurus fodiens (Kolbe, 1910)	*Amblyphileurus fodiens* Kolbe, 1910; *Amblyphileurus pumilio* Kolbe, 1910; *Archophileurus darwini* Arrow, 1937; *Oxyligyrus larssoni* Endrödi, 1969	MLUH (Lectotype male)
Archophileurus foveicollis (Burmeister, 1847)	*Phileurus foveicollis* Burmeister, 1847	MLHU (Holotype male)
Archophileurus kolbeanus Ohaus, 1910		ZMHB (Lectotype)
Archophileurus latipennis (Burmeister, 1847)	*Phileurus latipennis* Burmeister, 1847	MLHU (Lectotype)
Archophileurus opacostriatus (Ohaus, 1911)	*Periphileurus opacostriatus* Ohaus, 1911	ZMHB (Lectotype)
Archophileurus ovis (Burmeister, 1847)	*Phileurus ovis* Burmeister, 1847	MLHU (Lectotype)
Archophileurus passaloides (Prell, 1914)	*Anisophileurus passaloides* Prell, 1914	ZMHB (Lectotype)

Archophileurus petropolitanus (Ohaus, 1910)	*Phileurus petropolitanus* Ohaus, 1910; *Phileurus petropolitanus esperitosantensis* Ohaus, 1910	ZMHB (Lectotype)
Archophileurus quadrivii Dechambre, 2006		Coll. Dechambre (Holotype)
Archophileurus tmetoplus (Prell, 1912)	*Amblyphileurus tmetoplus* Prell, 1912	ZMHB (Lectotype)
Archophileurus trituberculatus Endrödi, 1977		HNHM (Holotype)
Archophileurus vervex (Burmeister, 1847)	*Phileurus vervex* Burmeister, 1847; *Phileurus bubalus* Ohaus, 1910	MLHU (Lectotype)

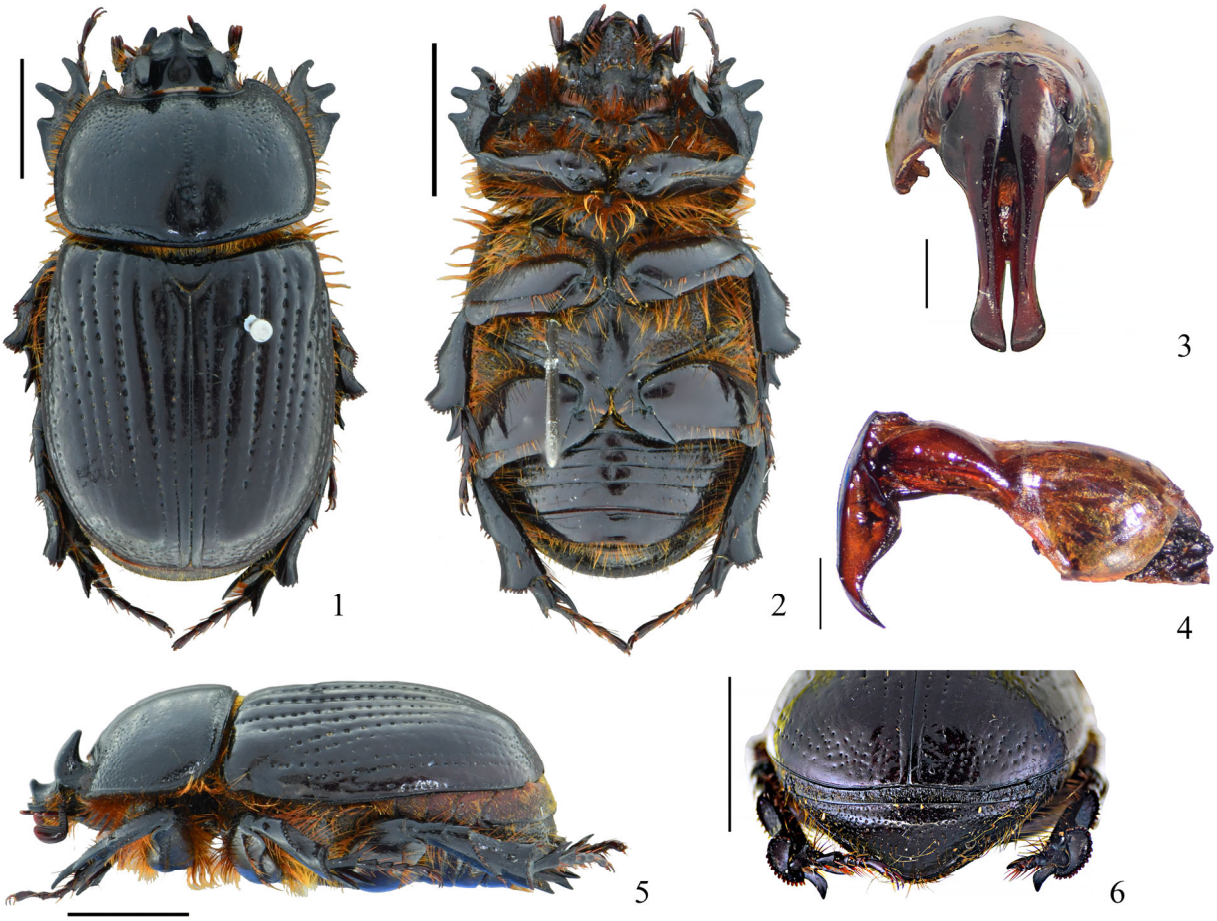

Figure 1–6. ***Archophileurus A*** **Medeiros & Grossi new species** male dorsal (1), ventral (2) and lateral habitus (5), back view (6); aedeagus caudal (3) and lateral view (4). Scale bars of the figures 1–2, 5–6 = 5 mm; 3–4 = 1 mm.

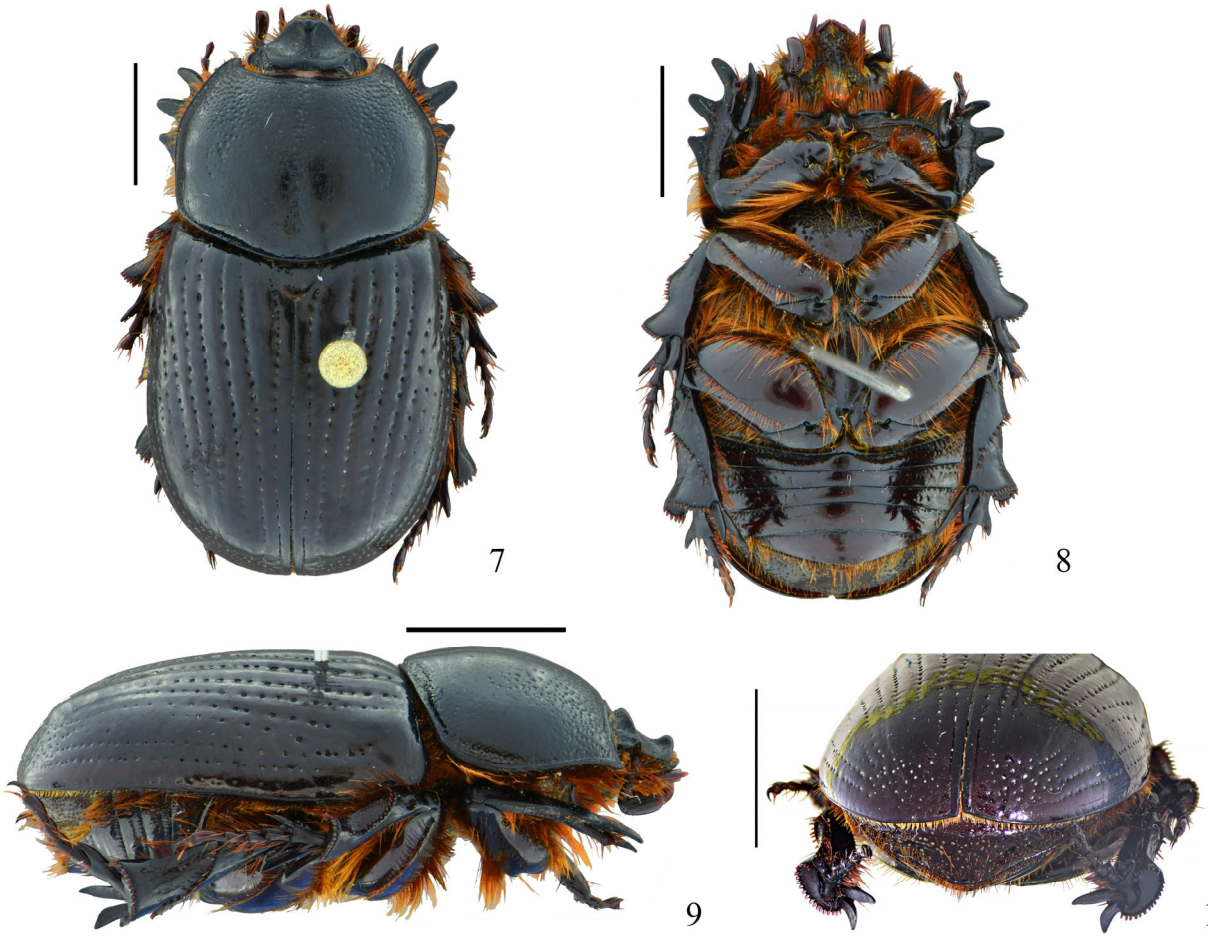

Figure 7–10. ***Archophileurus*** **A Medeiros & Grossi new species** female dorsal (7), ventral (8) and caudal habitus (9), back view (10). Scale bars of the figures 7–10 = 5 mm.

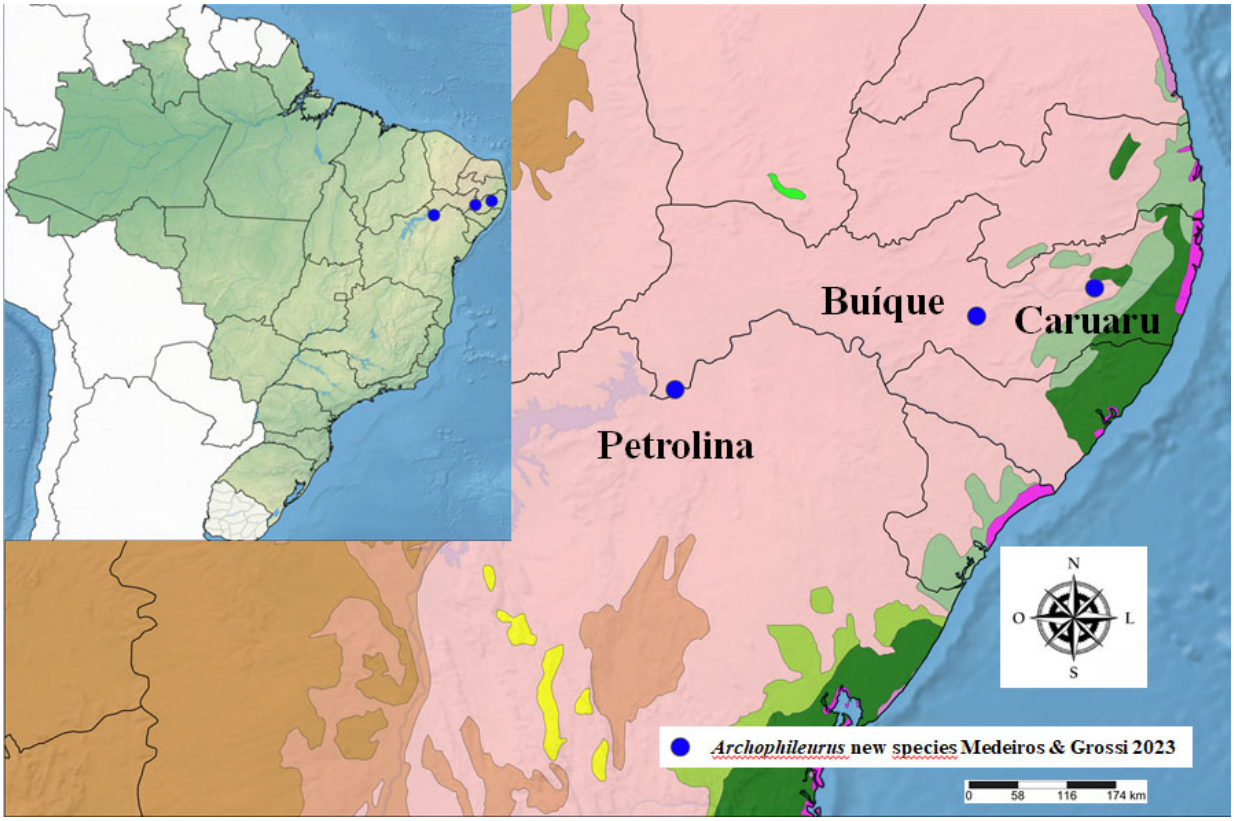

Figure 11. Map of the collected municipalities of *Archophileurus* A Medeiros & Grossi new species. Caatinga biome = pink colour.

Discussion

Archophileurus Kolbe have now 20 species in the Brazilian territory (Di Iorio *et al*. 2017), distributed from south of North America to South America, two of them described for northweast region, the species *Archophileurus A* new species is only the third one found in the region, showing that we have to known better the biome caatinga, furthermore know the specimens collected, stored and pinned in the collections.

The genus *Argentophileurus* Penco & Zubarán (2013) was discovered in the collection when they are preparing material for another paper. In the collections around the world several specimens collected can be studied by the new generation of entomologists all around the world.

The female of the new species resembles with *Archophileurus clypeatus* Dupuis, 2016, this species have the character of the horns present in the frontoclypeal suture become flattened; the apex of pronotum densely puctate, the disc is sparsely punctate, this last character occurs too in *Archophileurus fimbriatus* (Burmeister, 1847), but differs in the body lenght, the new species is longer than *A. clypeatus* and *A. fimbriatus*.

The new species was collected in caatinga biome in the months of minor temperature (may and june) in the northeast region, and it is the season of major quantity of rain. For the genus few are know, about the larvae and its biology, some species of the genus are saproxylophagus feeding on decaying wood.

Acknowledgments

The authors thank the following organizations for financial support: CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - process number CAPES/Proex 88887.333488/2019-00), Ministério da Ciência, Tecnologia e Inovação (MCTI/CNPq/Universal

2014, process number 449366/2014-6), and curators of national, international and private collections for the loans of the specimens.

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Supplemantary material

***Archophileurus* Kolbe, 1910**

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Brazil. *No data*. a) "Fimbriatus / Bresil Cay Brm", b) "Ex-Musaeo / Mniszech", c) "MUSÉUM PARIS / 1952 / coll. R. OBERTHÜR", d) "Phileurus fimbriatus B. / LECTOTYPE / F. DUPUIS 2013", e) "LECTOTYPE", f) "LECTOTYPE / Archophileurus / fimbriatus (Burmeister, 1847)", g) "MNHN / EC4028"; "ARCHOPHILEURUS FOVEICOLLIS (Burmeister, 1847) R.A.F.

MEDEIROS det. 2021", (1 male no dissected); "ARCHOPHILEURUS OVIS (Burmeister) R.A.F. MEDEIROS det. 2020", (1 female no dissected).

Argentina. "Córdoba. El Sauce / Augustino – XII-938 / M. Viana" (manuscrita), "R. Lange / No. 1979", "EX-COLEÇÃO / R.B. LANGE", "Phileurus / pullus / Burm.", "DZUP 311484", (1 ? no dissected); "Córdoba. El Sauce / Augustino – XII-938 / M. Viana" (manuscrita), "R. Lange / No. 1980", "EX-COLEÇÃO / R.B. LANGE", "DZUP 311485", (1 ? no dissected); "Córdoba. El Sauce / Augustino – XII-938 / M. Viana" (manuscrita), "R. Lange / No. 1981", "EX-COLEÇÃO / R.B. LANGE", "DZUP 311486", (1 ? no dissected); "ARGENTINA: Chaco, Rio / Muerto, Chaco seco, / 26°07'13"S, 61°40'39"W, / 31.x.2016, C. Guerra / Alonso leg.", "CEMT", (3 ? no dissected); a) "Abr. 972 / ARGENTINA / CORDOBA / Do Cruz del Eje / Pozo Nuevo / Coll. Martinez", b) "Archophileurus / sp. n. grupo vervex", c) "HOLOTYPE", d) "Archophileurus clypeatus n. sp. / HOLOTYPE / F. Dupuis 2018", e) "MNHN / EC9988" (1 male dissected, examinated through images, Archophileurus clypeatus Dupuis); a) "Abr. 977 / ARGENTINA / CORDOBA / Do Cruz del Eje / Guanaco Muerto / Coll. Martinez", b) "Archophileurus / sp. n. grupo / vervex", c) "PARATYPE", d) "Archophileurus clypeatus n. sp. / PARATYPE / F. Dupuis 2018", e) "MNHN / EC9989" (1 female no dissected, examinated through images, Archophileurus clypeatus Dupuis).

Estados Unidos. "Starr Co Tx / 10mi N Rio / Grande City / 4 Jun 87", "Archophileurus cribosus", (1 ? no dissected);

Martinica. a) "MARTINIQUE: Mt Pelée / Morne Macouba/Morne Rouge / 1246-1286m, 16-V-2015 / dead on trail, E. Dumbardon coll.", b) "ARCHOPHILEURUS / MIRABILIS ♂ / RATCLIFFE + CAVE / PARATYPE", c) "PARATYPE", d) "MUSÉUM PARIS / don J. Touroult (2015) / coll. GÉNÉRALE", d) "MNHN / EC6979" (1 male no dissected, examinated trhough images, Archophileurus mirabilis Ratcliffe & Cave).

Peru. “Peru, Madre de Dios, / Mazuko, 18/19.viii.2012, / (yellow trap) 13°02.85’S / 70°20.78’W, 380m / R.R. Cavichioli leg.”, (1 male dissected).

Uruguai. “9398 / Def. San. Veg. / Phileurus / vervex \\ [verso] Montevideo / Uruguai / I-945 / Baratttini”, “Phileurus vervex / 9.398 \\ [verso] Montevideo / I-1945 / Barattini” [manuscrita], “Archophileurus / vervex (Burmeis / ter)”, (1 ? no dissected).

FINAL CONSIDERATIONS

With the results of the cladistics analysis Phileurini remais as a monophyletic clade as the main character supported by anothers authors since Burmeister, basis of labial palpi covered by mentum. Others Dynastinae tribes have showed in the results being monophyletic, but some of them need a phylogeny to clarify the position of them and their respectives genera and theirs relations in the subfamily. Phileurini now have 35 genera and 308 species described, and with the new propose that exist only one subtribe Phileurina, that comprise all of the genera described before this work. *Ceratophileurus* have a new proposition and combination to move this genera and you only species to *Homophileurus*, clarified its position with the results of the analysis, the same has occur with the propose of the genus *Oryctophileurus*, synonym junior of *Amblyodus*, and *Pseudosyrichthus*, synonym junior of *Strichthdonthus*.

With the results of the cladistics analysis, were recovered both subtribe, Cryptodontina and Phileurina, and with the new combinations proposed for Phileurini, now the tribe have 33 genera and 308 species described. Cryptodontina now have 3 genera composing the subtribe: *Actinobolus*, *Cnemidophileurus* and *Cryptodus*.

Some anothers specimens in the CERPE have new species of the tribe to be studied and described. This is a large and complete collection of Phileurini in the world.

The neotropical mandibulate taxa is a clade unique in Phileurini and the relation between the genera are clarified in the results of the cladistics analysis.

In the Coleoptera collections around the world exist a amount of insects collected, and preserved in humid or dry conditions, need to be studied by taxonomists to know the fauna of this group that is the most interesting of all insects.

With the study of the Phileurini genera in the CERPE we have five new species of three known genera described (*Archophileurus*, *Homophileurus*, and *Hemiphileurus*), one for

Colombia, this shows that the insects preserved in these collections present in the neotropical fauna are still to be know, showing the great diversity of Coleoptera in the South America fauna.