SISTEMÁTICA DO GÊNERO *Metadorcinus* KRIESCHE, 1922 (COLEOPTERA: LUCANIDAE: SCLEROSTOMINI)

por

ANTONIO WESLEY ARAUJO SOARES

(Sob Orientação do Professor Paschoal Coelho Grossi – UFRPE)

RESUMO

Metadorcinus Kriesche, 1922, é um gênero de Sclerostomini (Coleoptera, Lucanidae) exclusivamente sul-americano. Sua relação com os demais gêneros ainda é duvidosa, devido aos poucos estudos taxonômicos realizados com lucanídeos na América do Sul e nenhum de filogenia com ênfase nesses grupos. Sua história taxonômica é bastante complexa em decorrência da pouca precisão na classificação tribal de Lucanidae, sendo potencialmente um gênero parafilético. Este trabalho então buscou definir o status taxonômico do grupo a partir de uma revisão com base em uma análise filogenética, utilizando caracteres morfológicos. A análise revelou que o gênero é polifilético, mostrando a necessidade de mudanças na classificação atual do táxon. Desta forma, *Metadorcinus* foi redefinido, incluindo agora oito espécies, sendo uma nova. Quatro espécies foram transferidas para *Sclerostomus* Burmeister, 1847, sendo uma delas revalidada. Um novo gênero é descrito para o Brasil e três novos gêneros monotípicos são descritos para a região Andina. É também oferecida uma chave de identificação para as espécies de *Metadorcinus* e um mapa de distribuição para as espécies do gênero, estando o mesmo restrito ao Brasil.

PALAVRAS-CHAVE: [América do sul, besouro cervo, filogenia, novos táxons, taxonomia]

SYSTEMATICS OF THE GENUS *Metadorcinus* KRIESCHE, 1922 (COLEOPTERA: LUCANIDAE: SCLEROSTOMINI)

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ABSTRACT

Metadorcinus Kriesche, 1922, is a Sclerostomini genus (Coleoptera, Lucanidae) exclusively from South America. Its relationship with other genera is still uncertain, due to the few taxonomic studies carried out with lucanids in South America. Also, there's no phylogeny studies with emphasis on these groups. Its taxonomic history is quite complex due to the lack of precision in the tribal classification of Lucanidae, being potentially a paraphyletic genus. This work then sought to define the taxonomic status of the group from a revision based on a phylogenetic analysis, using morphological characters. An analysis revealed that the genus is polyphyletic, showing the need for changes in the current classification of the taxon. Thus, *Metadorcinus* was redefined, now including eight species, with a new one among them. Four species were transferred to *Sclerostomus* Burmeister, 1847, one of which was revalidated. A new genus is described for Brazil and three new monotypic genera were described for the Andean region. An identification key for the species of *Metadorcinus* and a distribution map are also provided, showing that the genus represents a taxon restricted to Brazil.

KEY WORDS: [South America, stag beetle, phylogeny, New taxa, taxonomy].

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Este trabalho, na forma em que se apresenta (dissertação de mestrado), não deve ser considerado como publicação válida para fins de nomenclatura zoológica. Este é o *disclaim* e *dénégation* mencionado no Código Internacional de Nomenclatura Zoológica (edição 1999), capítulo três, artigos 8.2 e 8.3.

SUMÁRIO

Página

CAPÍTULO 1

INTRODUÇÃO

Coleoptera é a linhagem mais diversificada de seres vivos do planeta, com mais de 380.000 espécies descritas (Stork 2018). Este número pode ser aumentado de forma exponencial levando em consideração a estimativa de espécies ainda não descritas, que gira em torno de 1.700.000 (Garcia-Robledo 2020). Tamanha variedade está diretamente relacionada com as numerosas funções ecológicas que desempenham. Entre elas, está a sua relação com plantas e fungos, que serve como um facilitador da reprodução e decomposição destes, além de serem consumidores diretos de tecidos vegetais e fúngicos (Mckenna & Farrell 2009).

A origem de Coleoptera é mais antiga do que as estimativas apontavam, pensando durante muito tempo que os primeiros besouros pertenciam à Tshekardocoleidae Rohdendorf, 1944, originados no Permiano Inferior, e que provavelmente tinham hábito de viver em madeira em decomposição (Ponomarenko 2003). Porém, um estudo molecular recente (Cai et al. 2022) demonstrou que sua origem é ainda mais antiga, sendo proveniente do Carbonífero, o que implica em uma lacuna temporal de 55 a 134 milhões de anos.

Atualmente as espécies de Coleoptera estão classificadas em quatro subordens, Adephaga, Archostemata, Myxophaga e Polyphaga, esta última com a maior diversidade, e dividida em 23 superfamílias (Beutel & Haas 2000). A diversificação de Polyphaga se deu a partir da relação estabelecida com diferentes substratos e hábitos alimentares, como fungos e madeira, mas especialmente após o surgimento das angiospermas (Yan & Strelnikova 2022).

Uma das linhagens mais interessantes de Polyphaga é Scarabaeoidea Latreille, 1802. Poucos grupos de insetos estão associados com a cultura humana quanto estes besouros. Ratcliffe

(2006) compilou vários registros a respeito de seus usos para várias sociedades em todos os continentes ao longo da história, e as principais utilizações estão associadas com religião, folclore, medicina popular, alimentação e ornamentação de vestimentas.

Scarabaeoidea possui aproximadamente 3.000 gêneros e 41.000 espécies identificadas (Schoolmeesters, 2023). Podem ser identificados pelos seguintes caracteres: antenas lameladas; protórax escavado, modificado com procoxas grandes e tíbias anteriores geralmente dentadas com apenas um esporão terminal; não possui placas metacoxais; as asas posteriores possuem nervuras reduzidas, o tergito VIII que forma um pigídio não ocultado pelo tergito VII. As larvas possuem o formato em "C", característico do tipo escarabeiforme (Král & Batelka, 2017).

Não obstante, um grupo com morfologia bastante conspícua se destaca dentre os escaravelhos, os besouros-cervo pertencentes a família Lucanidae Latreille, 1804. Este grupo pode ser caracterizado por apresentar cabeça prognata, antenas em geral geniculadas, com até 10 artículos, sendo o escapo usualmente mais longo do que os demais antenômeros, possuindo de três até sete lamelas, tarsos em configuração 5-5-5 com garras iguais em tamanho e empódio presente, palpos maxilares com quatro palpômeros e palpos labiais com três palpômeros, abdômen com cinco esternitos visíveis, machos geralmente com mandíbulas bem desenvolvidas e dimorfismo sexual acentuado (Ratcliffe, 2003).

Sua história evolutiva é bastante antiga, sendo uma das primeiras linhagens de Scarabaeoidea a surgir, estando relacionado com Trogidae e Glaresidae (Dietz et al., 2023). O fóssil mais antigo encontrado atualmente remonta ao período Jurássico Médio há aproximadamente 170 milhões de anos e foi encontrado na Mongólia Interior, território que atualmente pertence à China (Qi et al., 2022). A espécie em questão é *Juraesalus atavus* Nikolaev, Wang, Liu & Zhang., 2011, e foi alocada em Aesalinae MacLeay, 1819, fazendo desta

a subfamília mais antiga de Lucanidae, o que vem sendo confirmado através de análises filogenéticas.

Juntamente com Aesalinae, outras três subfamílias compõem a família Lucanidae: Syndesinae MacLeay, 1819, Lampriminae MacLeay, 1819, e Lucaninae Latreille, 1804, a mais diversa e com mais de 90% das espécies (Kim & Farrell, 2015). Essa classificação é amplamente aceita graças aos trabalhos de Holloway (1960, 1968, 1969, 1997, 1998), destacando as estruturas das genitálias masculinas, canto ocular, antenas e processo prosternal.

O mesmo não pode ser dito sobre a classificação tribal, que por diversas vezes foi estabelecida de maneira informal ao longo da história da família, especialmente para os lucanídeos da América do Sul (Grossi, 2011). A maioria dos nomes válidos utilizados para classificação tribal podem ser consultados no guia online de Lucanidae do Novo Mundo elaborado por Paulsen (2019).

Uma dessas tribos é Sclerostomini, e foi proposta por Benesh (1955) para alocar os gêneros *Pycnosiphorus* Solier, 1851 e *Sclerostomus* Burmeister, 1847. No mesmo trabalho o autor também propôs *Scortizini* Benesh, 1955, para outros cinco gêneros sul-americanos *Scortizus* Westwood 1834, *Leptinopterus* Hope, 1838, *Charagmophorus* Waterhouse, 1895, *Auxicerus* Waterhouse, 1883 e *Apterodorcus* Arrow, 1943. O gênero *Dorculus* Didier, 1930, também foi incluído em Scortizini, sendo o único com distribuição do leste da Indonésia ao Norte da Austrália (Reid, 2019). Scortizini foi posteriormente sinonimizada com Sclerostomini por Maes (1992) que alocou parte dos gêneros de Scortizini de Benesh em Sclerostomini, enquanto outros gêneros como *Leptinopterus* Hope, 1838, em uma tribo, inválida desde a sua proposição, Neoprosopocoilini Maes, 1992. O nome, no entanto, foi proposto de maneira inválida sem designação de gênero-tipo, tornando-o um *nomen nudum* (Bouchard et al. 2011).

Até então, Sclerostomini não possuía caracteres significativos para a sua definição como tribo, além dos gêneros incluídos não estarem completamente alinhados com a diagnose proposta por Benesh (1955). Paulsen (2010) em uma revisão dos lucaníneos do sul da América do Sul, propõe limites para definição tribal em Sclerostomini. No trabalho o autor incluiu vários gêneros sul-americanos de Lucaninae em Sclerostomini, com exceção de *Brasilucanus* (Brasilucanini Nikolajev, 1999), *Casignetus* (Casignetini Reid, 1999) e *Chiasognathus* e *Sphaenognathus* (Chiasognathini Burmeister, 1847). Além destes, outros gêneros da região Australiana também foram incluídos em Sclerostomini, como *Lissotes* Westwood, *Paralissotes* Holloway, *Geodorcus* Holloway e *Hoplogonus* Parry.

Sclerostomini foi historicamente composta por gêneros de tamanho pequeno, coloração escura, além da distribuição, geralmente na América do Sul. Embora seja um grupo pouco diverso, a falta de caracteres que os identifique prontamente, gerou algumas confusões ao longo da história sobre os limites genéricos, muitas espécies alocadas de forma pouco criteriosa em um ou outro destes gêneros (Grossi & Paulsen 2009). Dois dos gêneros que hoje compõem Sclerostomini possuem um histórico taxonômico extenso, *Sclerostomus* Burmeister, 1847 e *Metadorcinus* Kriesche, 1922, este último, o objeto de estudo desta dissertação.

Burmeister (1847) propôs *Sclerostomus* como nome de substituição para *Sclerognathus* Westwood, 1845, homônimo júnior de *Sclerognathus* Valenciennes, 1844, (Pisces: Cypriniformes). *Sclerostomus costatus* (Westwood, 1845) é a espécie-tipo do gênero por monotipia, e Burmeister (1847) acrescentou mais quatro espécies ao gênero: *Sclerostomus darwinii* (Hope, 1841) e *Sclerostomus rubripes* (Hope, 1845), ambas atualmente em *Erichius* Maes, 1992, além de duas novas espécies *Sclerostomus cruentus* Burmeister, 1847 e *Sclerostomus plagiatus* Burmeister, 1847, que hoje estão em *Metadorcinus*.

A partir disso, diversas espécies foram sendo incorporadas em *Sclerostomus* ao longo do tempo, a maioria de maneira imprecisa, tendo como referência caracteres como tamanho diminuto, coloração enegrecida e distribuição sul-americana, tornando-o um táxon bastante problemático do ponto de vista taxonômico (Paulsen, 2005).

Kriesche (1922) propôs o gênero *Metadorcinus*, incluindo somente uma espécie do sul do Brasil, *Metadorcinus auritus* Kriesche, 1922. Kriesche (1922) aponta que sua espécie deve ser próxima de *S. cruentus* devido a coloração e tamanho, mas que de acordo com a descrição de Burmeister se diferenciaria de *M. auritus* devido a protuberâncias occipitais da cabeça que seriam bem mais desenvolvidas. A partir deste ponto de vista, o autor alegou que *Metadorcinus* estaria relacionado de forma morfológica e geográfica com os gêneros *Sclerostomus* e *Scortizus* Westwood, 1834, e com a espécie *Metadorcus rotundatus* (Parry, 1862). Em trabalho póstumo, Luederwaldt (1935) aponta *Metadorcinus* como um gênero válido, citando exatamente os mesmos apontamentos feitos por Kriesche (1922), pois não possuía nenhum exemplar em mãos que permitisse um estudo mais detalhado, repetindo apenas as informações da sua descrição original.

Durante a década de 1960 houve uma mudança neste cenário, quando Weinreich (1960), em seu trabalho de revisão das espécies de lucanídeos sul-americanos, propôs uma reorganização taxonômica e nomenclatural em parte dos Sclerostomini. Uma das contribuições taxonômicas realizadas no trabalho foi a separação de *Sclerostomus* em seis subgêneros, devido à vasta diversidade presente no gênero, onde as espécies tinham poucos caracteres em comum, além do tamanho diminuto e conformação das antenas. Esta classificação foi seguida por autores posteriores, e Grossi & Paulsen, (2009) elevaram três destes ao nível de gênero.

No mesmo trabalho, Weinreich (1960) descreveu o gênero *Beneshius* Weinreich, 1960, alocando neste, parte das espécies de *Sclerostomus* e *Scortizus*, e sinonimizou *Metadorcinus* com *Beneshius*. Tal decisão foi justificada pelo autor por não ter encontrado o holótipo de *M. auritus*,

alegando que teria sido provavelmente destruído durante a Segunda Guerra Mundial. Além disso, o autor alega que pelo fato de Kriesche não ter tido acesso ao material tipo de Burmeister, poderia ter interpretado errado a descrição de Burmeister, tendo em mãos na verdade, exemplares de *S. cruentus* (Weinreich 1960).

Contudo, este ato nomenclatural foi completamente equivocado, sendo que o nome *Metadorcinus* Kriesche encontra-se disponível de acordo com o ICZN Se ele realmente considerou que *M. auritus* era sinônimo de *S. cruentus*, deveria ter mantido *Metadorcinus*, como já havia proposto Kriesche, em 1922. *Beneshius* foi um nome que perdurou por cerca de 30 anos na literatura, e Weinreich (1963) ainda incluiu mais quatro espécies no gênero, que foram citadas por outros autores em trabalhos e catálogos subsequentes (Bomans 1990; Krajcik 2001, 2003).

Trinta anos após a descrição de *Beneshius*, Bomans (1990) encontrou o holótipo de *Metadorcinus auritus* no Museu Estadual de Zoologia, em Dresden (MSTD), na Alemanha. Após analisar o exemplar, apontou que era uma espécie diferente de *Beneshius cruentus*, removendo a sinonímia proposta por Weinreich, e assim, revalidando o gênero *Metadorcinus*, e novamente colocando-o próximo a *Metadorcus* Parry, 1970, devido principalmente à coloração avermelhada e mandíbulas dos machos arqueadas para dentro e com um dente médio interno e dorsal. Maes (1992), embora em desacordo com Bomans (1990) sobre a validade de *M. auritus*, propôs *Metadorcinus* como gênero válido e tornou *Beneshius* seu sinônimo-júnior, de acordo com o Princípio da Prioridade, como devia ter sido feito por Weinreich (1960). Subsequentemente, todas as outras 11 espécies que estavam em *Beneshius* foram transferidas para *Metadorcinus* (Maes, 1992).

O último trabalho publicado que trata do gênero *Metadorcinus* é o de Grossi & Vaz-de-Mello (2007), que traz delimitações importantes para o gênero, além da descrição de uma nova espécie, *Metadorcinus ranki* Grossi & Vaz-de-Mello, 2007. Os autores confirmam a proposta de

Maes (1992) sobre a similaridade de *M. auritus* e as espécies de *Beneshius*, concordando com a sinonímia proposta após estudo do holótipo de *M. auritus*. Os autores atestam que não há proximidade do gênero com *Metadorcus* por diferenças na genitália, e que *Metadorcinus* compartilha caracteres com *Sclerostomus* e *Scortizus*.

Dados não publicados apresentados na revisão de Sclerostomini realizada por Grossi (2011), indicam que *Metadorcinus* é polifilético, Sclerostomini foi recuperado como monofilética, embora em um novo senso. Grossi & Bartolozzi (2011) propuseram a remoção de parte das espécies descritas erroneamente em *Metadorcinus* e *Sclerostomus* para um gênero novo encontrado nos Andes peruanos, *Arnaudius* Grossi & Bartolozzi, 2011.

Metadorcinus hoje possui 17 espécies, 10 do Brasil, duas do Peru, duas da Bolívia , duas da Argentina e uma do Equador (Paulsen, 2019). Destas espécies, nenhuma foi incluída em trabalhos de filogenia que foram publicados. Kim & Farrell (2015) utilizaram apenas uma espécie de Sclerostomini do gênero *Leptinopterus* Hope, 1838, em sua filogenia, porém existem outras que não foram mencionadas pois os autores utilizaram um sistema de classificação inválido.

O objetivo desta dissertação foi realizar uma revisão do gênero *Metadorcinus*, a partir do estudo de caracteres morfológicos de adultos, usando uma análise cladística para testar a mononfilia do gênero. Todas as espécies do gênero foram redescritas, ilustradas pela primeira vez através de imagens e uma nova espécie é incluída; o material tipo foi estudado através de imagens dos museus onde se encontram depositados. Os dados de distribuição geográfica foram atualizados, além da verificação dos status de nomes disponíveis. Uma chave de identificação das espécies de *Metadorcinus* foi confeccionada e as espécies não pertencentes a *Metadorcinus* foram ou realocadas em *Sclerostomus* (quatro espécies) ou incluídas em gêneros novos descritos neste trabalho.

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CHAPTER 2

SPLITTING UP THE SOUTH AMERICA STAG BEETLES: PHYLOGENY AND TAXONOMIC REVISION OF *Metadorcinus* KRIESCHE, 1922 (COLEOPTERA, LUCANIDAE, SCLEROSTOMINI) WITH THE DESCRIPTION OF FOUR NEW GENERA

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SOARES, AWA. & P.C. GROSSI. Splitting up the South America stag beetles: Phylogeny and taxonomic revision of *Metadorcinus* Kriesche, 1922 (Coleoptera: Lucanidae: Sclerostomini), with the description of four new genera. A ser submetido.

ABSTRACT - *Metadorcinus* Kriesche, 1922, is a South American Sclerostomini genus (Coleoptera, Lucanidae), with uncertain relationship with other genera, due to the few taxonomic studies carried out with Neotropical lucanids. There are also no phylogenetic studies encompassing this genus. Its taxonomic history is confuse, and lacks precision in generic and tribal delimitation, being potentially a paraphyletic genus. This work aims to define the taxonomic status of *Metadorcinus* based on a morphological phylogenetic analysis. The analysis revealed that the genus is polyphyletic instead of paraphyletic as though, and *Metadorcinus* is here redefined in a new sense, now including eight species, with a new one described here. Four species were transferred or relocated to *Sclerostomus* Burmeister, 1847, and *Sclerostomus hastatus* Westwood, 1855 is revalidated. Additionally, four new genera are described from South America, and an identification key for the species of *Metadorcinus* and a distribution map are also provided.

KEY WORDS: Andean region, Brazil, neotropical region, New taxa, taxonomic status

[DIVIDINDO OS BESOUROS-CERVO DA AMÉRICA DO SUL: FILOGENIA E REVISÃO TAXONÔMICA DE *Metadorcinus* KRIESCHE, 1922 (COLEOPTERA, LUCANIDAE, SCLEROSTOMINI) COM A DESCRIÇÃO DE QUATRO NOVOS GÊNEROS]

RESUMO – *Metadorcinus* Kriesche, 1922, é um gênero sul-americano de Sclerostomini (Coleoptera, Lucanidae), com relação incerta com outros gêneros, devido aos poucos estudos taxonômicos realizados com lucanídeos neotropicais. Também não há estudos filogenéticos abrangendo este gênero. Sua história taxonômica é confusa e carece de precisão na delimitação genérica e tribal, sendo potencialmente um gênero parafilético. Este trabalho visa definir o status taxonômico de Metadorcinus com base em uma análise filogenética morfológica. A análise revelou que o gênero é polifilético em vez de parafilético, e Metadorcinus é aqui redefinido em um novo sentido, agora incluindo oito espécies, com uma nova descrita aqui. Quatro espécies foram transferidas ou realocadas para Sclerostomus Burmeister, 1847, e Sclerostomus hastatus Westwood, 1855 é revalidado. Além disso, quatro novos gêneros são descritos da América do Sul, e uma chave de identificação para as espécies de Metadorcinus e um mapa de distribuição também são fornecidos.

PALAVRAS-CHAVE: Andes, Brasil, região neotropical, novos táxons, status taxonômico.

Introduction

Metadorcinus Kriesche, 1922, is a South American genus of Sclerostomini Benesh, 1955, with a very wide distribution range, occurring in Argentina, Brazil, Ecuador, Peru, and Bolivia (Grossi & Vaz-de-Mello, 2007). Currently, it comprises 17 valid species (Paulsen, 2019). The genus has been characterized by tegument with sparse punctures in males, more pronounced in females, glabrous dorsal surface, the presence of a pronotal process/ tubercle in both sexes, ventral setose groove on male mandibles.

The taxonomic history of *Metadorcinus* is full of misinterpretations of generic characters and began with the description of the genus *Sclerostomus*. Both taxa had been imprecisely used to include small and somewhat dark South American Lucaninae species. They also share until now almost the same distribution range, with species from Argentina, Brazil, Ecuador, Peru, and Bolivia. Since the description of *Sclerostomus* it was splitted in six subgenera (Weinreich, 1960). Kriesche (1922) than proposed the genus *Metadorcinus*, initially including only one species from South Brazil, *Metadorcinus auritus* Kriesche, 1922 and associated it at that time with *Sclerostomus cruentus* Burmeister, 1847, with which there is some sharing features.

Weinreich (1960) proposed the genus *Beneshius* Weinreich, 1960, to accommodate some of the species of *Sclerostomus*, which were considered different for the author, synonymizing *Metadorcinus* with *Beneshius*. The author claimed that the holotype of *Metadorcinus auritus* Kriesche, 1922, would have been destroyed during the Second World War, and Kriesche was not familiar with *S. cruentus*, knowing only the descriptions by Burmeister (1847), which would have led him to interpret the two taxa differently.

Later, Bomans (1990) found the holotype of *Metadorcinus auritus* in the State Museum of Zoology, in Dresden, Germany, revalidating *Metadorcinus auritus*. Maes (1992), in his catalog, considered *Metadorcinus* as a valid genus, and applying the principle of priority of the Code,

Beneshius became a junior synonym, placing all species of *Beneshius* within *Metadorcinus*. Grossi & Vaz-de-Mello (2007), after studying the holotype of *M. auritus*, attested to the morphological similarity of *M. auritus* and *Beneshius* species.

Grossi & Paulsen (2009) defined the generic limits of South American stag beetle species, removing several taxa with simple genital capsule that were included in *Sclerostomus*, confirming that the genus is closer to *Metadorcinus* and *Scortizus* Westwood, 1834, with which it shares characters such as the complex genital capsule.

This work provides a revision of the genus *Metadorcinus*. The new data presented here includes: i) a phylogenetic analysis using all species of the genus according to Paulsen (2019); ii) redescription of *Metadorcinus* species; iii) description of four new genera and two new species; iv) provide a new identification key for *Metadorcinus* species; v) a known distribution map with new collection data including all the *Metadorcinus* species *sensu novo*.

Material and methods

Material examined

The studied material was obtained from institutional and private collections. The collection acronyms follow Evenhuis (2020), when available. The collections are listed below.

CCLG - Coleção Celso Luiz Godinho Júnior, Rio de Janeiro, Rio de Janeiro, Brazil (C. L. Godinho Júnior).

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

CMNC – Canadian Museum of Nature, Ottawa, Canada (F. Génier).

CPFA – Collection Patrick F. Arnaud, Saintry-sur-Seine, France (Patrick Arnaud).

DZUP – Coleção Entomológica Padre. Jesus Santiago Moure, UFPR, Curitiba, Brazil (L. M. Almeida).

FIOC – Fundação Instituto Oswaldo Cruz, Rio de Janeiro, Rio de Janeiro, Brazil (M. Felix).

IFML – Instituto Fundación Miguel Lillo, Tucumán, Argentina (A. Chalup).

MNHN – Muséum National d'Histoire Naturelle, Paris, França (S. Boucher)

MNRJ – Museu Nacional do Rio de Janeiro. Rio de Janeiro, Brazil (M. L. Monné)

MZSP – Museu de Zoologia da Universidade de São Paulo, São Paulo, Brasil (S. Casari).

NHMUK – The Natural History Museum, London, United Kingdom (M. Barclay).

SMF – Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt-am-Main, Germany (V. Ferreira).

SMTD – Staatliches Museum für Naturkunde in Dresden, Alemanha (Olaf Jäger)

UNSM – University of Nebraska State Museum, Lincoln, Nebraska, USA (M. J. Paulsen).

ZSM – Zoologische Staatssammlung, München, Germany **(**M. Balke).

Taxon sampling

The terminal taxa used in the analysis were chosen based on previous phylogenetic studies, especially Kim & Farrell (2015), focusing on Sclerostomini *sensu* Paulsen (2019). All taxa used in this work belong to the subfamily Lucaninae and are South American species (Table 1).

The outgroup includes one species of Casignetini Reid, 1999, *Casignetus spixi* (Perty 1830). In order to represent closer relationships with *Metadorcinus* species, other Sclerostomini genera were included: *Leptinopterus femoratus* (Olivier, 1789); *Arnaudius digennaroi* (Arnaud et al. 2008) which was included in *Metadorcinus* before; *Sclerostomus costatus* (Westwood, 1845); *Sclerostomus wendyae* Arnaud & Bomans, 2006; and *Scortizus maculatus* (Klug, 1825).

The ingroup included all species currently classified under *Metadorcinus*, *sensu* Grossi & Vaz-de-Mello (2007), Arnaud et al. (2008) and Simoens (2010). The only species that were not included were *Metadorcinus lineatus* (Deyrolle, 1864) due to the absence of material for examination, with only a drawing made by the author of the female holotype available; *Metadorcinus amuelleri* was also used, but later excluded as it did not provide much information, since only the female holotype was examined through photographs, but is clearly a Metadorcinus species.

Morphology and terminology

All the specimens studied were pinned or double-card-mounted. For the study of genitalia, dissections were performed according to the methodology proposed by Grossi & Aguiar (2014).

Most of the material was studied using a Zeiss® Stemi 305 stereomicroscope. The photographs were taken with different equipments: Leica® DFC 500 digital camera attached to a Leica® MZ 16 stereomicroscope; Nikon® D5300 digital camera attached to a Zeiss® Stemi 508 stereomicroscope; and finally, Nikon® D7500 with a Sigma DG Macro AF 70 300 lens. The images were taken using Helicon Remote 3.8.1 software. Image stacking was performed using CombineZP software 1.0. Some specimens, such as type material from other countries, were only accessible through images sent by the responsible institution.

The terminology used here follows Holloway (1960, 1968, 1969, 1997, 1998, 2007), which are the main works that established the most commonly used terms related to general morphology for Lucanidae. For genitalia and other characters this work followed Paulsen (2005), Grossi & Vaz-de-Mello (2007), Grossi & Paulsen (2009), and Lawrence et al. (2011).

Characters and cladistic analysis

The morphological characters construction followed Sereno (2007) when possible. All analyzed specimens were adults, and most characters were obtained from males. All characters were listed respectively indicated in the list of results, followed by the number of steps (L), consistency index (ci), and retention index (ri). Uninformative characters were excluded from the analysis.

All characters were considered unordered, with most being binary and some multistate, to be used in Fitch parsimony. The program chosen for constructing the character matrix was the software Mesquite version 3.6 (Maddison & Maddison, 2018). The symbol (-) was used to represent a character state inapplicable to the taxon, and (?) for the absence of information.

For the cladistic analysis, the program TNT version 1.6 (Goloboff & Morales, 2023) was used. Heuristic searches were conducted in two ways: with equal weights and implied weighting. In the equal weights analysis, all characters are treated with the same weight, while implied weighting is used to reduce the interference of homoplasies by assigning weights to certain characters (Goloboff, 1993). To calculate the concavity constant value (*k*) used in the implied weights analysis, the function ‘choose *k* to 10’ was used.

The heuristic search was the chosen method to perform the analysis. The parameters were the same for both methods. The 'traditional search' analysis included the command 'hold = 1.000.000' for the maximum number of trees; 'random seed' = 1; 'number of additional sequences' = 10.000; 'trees to save per replication' = 100; and finally, the tree bisection and reconnection (TBR) algorithm.

To measure the stability of the clades, confidence tests from the program were used. The support of the branches was measured using the bootstrap method (number of replications = 5000), with values of 50 or more being considered as good support values. All the trees were

subjected to the same support calculation method. The parameters used in the execution of the tests were the same as those used in the searches.

The obtained trees were edited using the program Winclada version 1.00.08 (Nixon, 2002). The final editing was done using Canva software. Transformational characters were represented by black circles and homoplastic characters by white circles.

Taxonomy section

The identification and confirmation of the examined material were based on the original description of the taxon, comparison with the type material whenever available. The species of *Metadorcinus* wereredescribed pointing out the diagnostic characters that allow separation from other species of the genus.

The labels of type material were transcribed, organized from top to bottom, with the species names in double quotes (“ ”). A backslash (/) was used to separate the lines label, and additional information was enclosed in brackets ([ ]). The same was followed for all specimens from labels of additional material, whenever possible.

For the elaboration of the distribution map, the data from the labels were used. When coordinates were not provided, the specific locality was used, and the geographic data were collected using Google Earth Pro 7.3.6 through approximate location. Specimens that have no specific locations were not plotted on the map. The map was created using QGIS version 3.28.15. The editing of the map, trees, and plates was done using Canva.

Results and Discussion

Morphological characters

A total of 55 morphological characters were obtained, 44 from males, and 11 from females. The data matrix of these characters is represented in Table II. Values of length (L), consistency index (ci) and retention index (ri) are presented after each character description. The characters and their respective states are listed below.

Male characters

1. Head, cephalic disc, shape [L = 2, ci = 50, ri = 66]
    0 flat to slightly concave
    1 convex

2. Head, cephalic disc, punctation [L = 5, ci = 40, ri = 50]
    0 weak
    1 moderate
    2 strong

3. Head, mandibles, ventral surface of male mandibles [L = 1, ci = 100, ri = 100]
    0 pilosity absent
    1 pilosity present

4. Head, mandibles, ventral hairiness of male mandibles [L = 1, ci = 100, ri = 100]
    0 random
    1 restricted to a groove

5. Head, mandibles, ventral groove of mandibles [L = 2, ci = 100, ri = 100]
    0 beginning in base
    1 beginning after base
    2 present in all mandible area

6. Head, mandibles, setae direction [L = 1, ci = 100, ri = 100]
    0 ventral
    1 lateral

7. Head, male mandibles [*Leptinopterus femoratus* autapomorphy]
    0 asymmetrical
    1 symmetrical

8. Head, mandibles, basal tooth [L = 4, ci = 50, ri = 66]
    0 rounded
    1 bilobed
    2 oblong

9. Head, mandibles, position of internal tooth on the upper margin [L = 5, ci = 40, ri = 0]
    0 proximal
    1 medial
    2 distal

10. Head, mandibles, direction of internal tooth [L = 5, ci = 20, ri = 33]
    0 central
    1 dorsal

11. Head, mandibles, apex of the mandible [L = 1, ci = 100, ri = 100]
    0 simple
    1 bifurcate

12. Head, ventral, punctation of the mentum disc [L = 4, ci = 50, ri = 33]
    0 sparse
    1 moderate
    2 strong

13. Head, ventral, lateral margin of the mentum [L = 1, ci = 100, ri = 100]
    0 without elevation
    1 with elevation on the margin

14. Head, temporal process [L = 3, ci = 33, ri = 33]
    0 absent
    1 present

15. Head, ocular canthus, protruding [L = 7, ci = 28, ri = 28]
    0 less than halfway
    1 halfway
    2 more than halfway

16. Head, ocular canthus, shape [L = 5, ci = 40, ri = 62]
    0 rounded
    1 subtriangular
    2 truncate

17. Pronotum, anterior angles [L = 6, ci = 16, ri = 37]
    0 acute
    1 rounded

18. Pronotum, posterior angles [L = 4, ci = 50, ri = 71]
    0 rounded
    1 obtuse
    2 acute

19. Pronotum, medial anterior margin [L = 2, ci = 50, ri = 66]
    0 simple
    1 projected forward

20. Pronotum, anterior margin, projection [L = 5, ci = 20, ri = 33]
    0 absent
    1 present

21. Pronotum, anterior margin, projection , shape [L = 5, ci = 40, ri = 40]
    0 truncate
    1 conic or cylindrical
    2 a pair of tubercles

22. Pronotum, lateral margin [L = 2, ci = 25, ri = 62]
    0 parallel
    1 sinuous

23. Pronotum, lateral depression [L = 2, ci = 50, ri = 75]
    0 absent
    1 present

24. Pronotum, hairiness [L = 2, ci = 50, ri = 80]
    0 absent
    1 present

25. Pronotum, hairiness areas [L = 2, ci = 100, ri = 100]
    0 restricted to the lateral
    1 restricted to the lateral and center
    2 across the entire surface

26. Pronotum, anterior border [L = 4, ci = 25, ri = 50]
    0 incomplete

1 complete

27. Scutellum, hairiness [L = 1, ci = 100, ri = 100]
    0 absent
    1 present

28. Elytra, striae [L = 1, ci = 100, ri = 100]
    0 absent
    1 present

29. Elytra, interstriae [L = 6, ci = 33, ri = 50]
    0 simple
    1 sub-costate
    2 costate

30. Elytra, interstriae, costa [L = 1, ci = 100, ri = 100]
    0 interrupted
    1 continuous

31. Elytra, margin [L = 1, ci = 100, ri = 100]
    0 glabrous or weakly random
    1 with concentrate bristles

32. Elytra, hairiness of the elytral disc [L = 1, ci = 100, ri = 100]
    0 absent
    1 present

33. Venter, abdominal sternites, punctation [L = 2, ci = 50, ri = 87]
    0 similar in all sternites
    1 more intense in the fifth sternite

34. Legs, anterior tibiae, external margin [L = 1, ci = 100, ri = 100]
    0 teeth up to its base
    1 teeth up before its base

35. Legs, anterior tibiae, anterior tibial spur [L = 2, ci = 50, ri = 0]
    0 glabrous
    1 presence of bristles

36. Legs, medial tibiae, external margin [L = 1, ci = 100, ri = 100]
    0 teeth absent

1 teeth present

37. Dorsal spur of the of the medial tibiae [L = 1, ci = 100, ri = 100]
0 smaller than the first tarsomere
1 longer than the first tarsomere

38. External margin of the posterior tibiae [L = 2, ci = 100, ri = 100]
0 teeth absent
1 only one spine
2 more than one spine

39. Genitalia, shape [L = 2, ci = 100, ri = 100]
0 simple
1 complex

40. Genitalia, base of parameres [L = 1, ci = 100, ri = 100]
0 teeth absent
1 teeth present
(A pair of spinous processes pointing posteriorly at base of parameres.)

41. Genital capsule, ventral plate, narrowing [L = 2, ci = 66, ri = 0]
0 slightly
1 intermediate
2 abrupt
(Enlargement from anterior to posterior margin in ventral view of genital capsule)

42. Genital capsule, ventral plate, anterior projection [L = 2, ci = 33, ri = 0]
0 parallel sides after narrowing
1 no parallel sides after narrowing

43. Dorsal plate, posterior concavity [L = 1, ci = 100, ri = 100]
0 divergent
1 parallel

44. Parameres, internal distal margin [L = 2, ci = 50, ri = 75]
0 bristles equally distributed
1 long bristles concentrated

Female characters

45. Mandibles, longitudinal dorsal groove [L = 2, ci = 25, ri = 25]

0 absent
1 present

46. Mandibles, basal dorsal tooth [L = 2, ci = 50, ri = 0]
0 absent
1 present

47. Head, temporal process [L = 3, ci = 33, ri = 71]
0 absent
1 present

48. Head, temporal process, shape [L = 2, ci = 50, ri = 0]
0 rounded
1 acute

49. Head, cephalic depression [L = 1, ci = 100, ri = 100]
0 absent
1 present

50. Pronotum tubercles [L = 3, ci = 33, ri = 50]
0 absent
1 present

51. Pronotum, anterior angles [L = 4, ci = 25, ri = 0]
0 roundish
1 acute

52. Pronotum, posterior angles [L = 2, ci = 50, ri = 0]
0 absent
1 present

53. Median tibiae, teeth [L = 2, ci = 50, ri = 0]
0 one
1 more than one

54. Posterior tibiae, apex [L = 2, ci = 50, ri = 50]
0 simple
1 longer than the first tarsomere

55. Genitalia, base of spermatheca [L = 1, ci = 100, ri = 100]
0 glands absent

1 glands present

Cladistic analysis

The analysis using equal weights obtained two equally parsimonious trees, the strict consensus tree (fig. 18) had L=141, ci=48, ri=63. The analysis with implied weights the program calculates a *k* value from 3.24 and resulted in a single tree (fig. 19) with L=141, ci=48, ri=63. Due to the large number of homoplastic characters, the analysis using implied weights was chosen to discuss the phylogenetic relationships between studied taxa.

S. maculatus was recovered as the basal lineage among the tested Sclerostomini taxa, sharing with the other genera a complex genital capsule C39(0) (Fig. 19). Below it, a monophyletic clade was formed comprising the species **New genus 1** *signatipennis* (= *Metadorcinus signatipennis*) and a new species. The next branch comprises two clades, one of the true *Metadorcinus s.n.*, with the type species of the genus, and the other composed by species of *Metadorcinus* and *Sclerostomus*, now in new proposed genera, or transferred to *Sclerostomus*.

The "*signatipennis*" clade

This clade was recovered through the anterior pronotum angles acute C17(1), the lateral depressions of the pronotum at four points (23 (1)) and the long setae concentrated on the internal margin of the parameres (C44 (1)). The two species are distinguished by the absence of the temporal process (C18 (0)) in the new species, and by the transformational character in New genus 1 *signatipennis* **n. comb**., the pilosity on the pronotum being restricted to the lateral and central areas (C25 (1)).

The two species that compose this clade will be included in a new genus described here. The description of this new genus is provided in the "Taxonomy" section of this work, along with the other taxa that will be reclassified according to our analysis.

New genus 1 shares characters with *Scortizus*, such as the ventral groove of the mandibles beginning in the base (5 (0)), the direction of the setae in the groove pointing laterally (6 (1)), and the tufted vestiture on body dorsal surface.

The *Metadorcinus sensu n*. clade

The *Metadorcinus* clade shows what will be redefined here as *Metadorcinus*. The type species, *M. auritus*, shares some features with *M. cruentus*, and a new species described here, sharing even closer morphology with this latter due to the shape and projection of the ocular canthus C15(2), C16 (0). These three species, here called "*cruentus* group", are characterized by the pair of tubercles on the anterior margin of the male pronotum C21(2) and the presence of only one spine on the external margin of the metatibiae C38(1).

The branch that shares close relations with the "*cruentus* group" includes *M. securiformis*, *M. neotragus* and *M. ranki*. This group can be differentiated of the "*cruentus* group" by the projection of the anterior margin of male pronotum, which is truncate C24(0) in *M. ranki* and conical C24(1) in the other two species, and by the concavity present in the cephalic region C1(0), while in the "*cruentus* group" has a convex shape C1(1).

Now *Metadorcinus* is characterized by genitalia characters, in males the spiniform process at parameres base C40(1), and in females the presence of spermathecal glands at base C55(1). Other characters include the overall shagreened integument, the temporal process present in both sexes, males C14(1) and females C47(1).

The remaining species that were included in *Metadorcinus* until this analysis and are not part of this genus will be included to new genera or reallocated in *Sclerostomus*. With the exception of the "*signatipennis*" clade, the genus *Sclerostomus* and the other genera with complex genital capsule were recovered in a sister clade to *Metadorcinus*.

The new genera clade + *Sclerostomus*

The clade is composed of several distinct lineages and appears as a sister group to *Metadorcinus*. This group consists of species that were previously allocated to *Metadorcinus* and *Sclerostomus* and were found to share closer relationships with genera that were part of the outgroup used in the analysis than with the genus they previously belonged to. Based on the results, it was necessary to propose new taxonomic combinations for each species. Some of these were reassigned to described genera, while others, whose characters did not fit the generic descriptions, were proposed as new genera.

Three of the species that were in *Metadorcinus* will be transferred to *Sclerostomus*: *Sclerostomus beneshi* stat. rev. and *Sclerostomus plagiatus* stat. rev. These taxa were retrieved as being closely related to *Sclerostomus costatus*, the type species of *Sclerostomus*, sharing some transformational character states as elevated lateral margins of mentum C13(1), providing good support for this genus, along with two homoplasies related to the mandible C10 (0), C12 (0) and one for the male genitalia C44 (1).

The remaining lineages recovered in this large clade are quite distinct from each other and from the genera that composed the outgroup. Therefore, they will be allocated to new genera described here. The clade of New genus 2 *buckleyi* is sister group to *Sclerostomus* + ((New genus 4) + ((New genus 3) + ((New genus 5 + *Arnaudius*)))), and is supported by a several number of characters that distinguish it significantly from the other species, and it does not fit into any

described genus. Besides the distinct shiny black-greenish tegument, the main difference lies in the male genitalia, with the dorsal genital capsule in lateral view lacking a posterior bifurcation, and the ventral plate gradually tapering with non-parallel sides C41(1). This species will be allocated to the New genus 2.

The last clade in the tree appears as a sister group of *Sclerostomus* and is composed of four distinct genera. Two genera that were used in the outgroup, *Arnaudius* (*A. diggenaroi*) and a Peruvian *Sclerostomus* (*S. wendyae*) were recovered as monophyletic sister groups.*Metadorcinus sylviae* and *Metadorcinus tucumanus* also were recovered as monophyletic clades with one species each, that will be described as other two new genera, New genus 3 and New genus 4 respectively. Both clades have unique character states among the genera studied here.

Thus, two other new genera are being proposed here to accommodate the two species mentioned above. New genus 3, with New genus 3 *sylviae* comb. nov. (= *M. sylviae*), characterized by the basal tooth oblong C8(2), and the singular shape of the male genital capsule, with an anteriorly concave dorsal plate and ventral plate posteriorly convex. Finally, New genus 4 gen. nov. is proposed to accommodate New genus 4 *tucumanus* comb. nov. (=*M. tucumanus*) by the presence of setae on the apical spur of the protibia C35(1) and a posteriorly flat ventral plate of male genital capsule with no emargination.

Following the established systematics, the section below will address the taxonomic issues of the mentioned clades. The species of *Metadorcinus*, as redefined here, will receive updated redescriptions, as well as the newly proposed taxa. That section also includes the designation of type material, synonymies, distribution information, and general comments.

Taxonomy Section

Metadorcinus Kriesche, 1922: 126 sensu n.

syn. *Beneshius* Weinreich, 1960: 52

Type species. *Metadorcinus auritus* Kriesche, 1922, by monotypy

Diagnosis. Body color in tones of reddish brown to black. Dull tegument. When illuminated, it displays a silky appearance. Male mandibles is slightly to strongly curved, directed upwards, apically with one or more bifurcations. Ventral groove of mandibles located medially, entirely coverd by conspicuous hair-like setae, projected ventrally. Ocular canthus laterally projected in major males, protruding halfway or more into eye. Temporal process present in both sexes, but not surpassing in width the ocular canthus. Males pronotum with a conical or truncated anterior projection, in minor males, usually with a pair of tubercles. In females, a pair of evident tubercles, and coarsely punctured. Elytral striae formed by uninterrupted scales and elytral interstriae in general without costae, at most, subcostate. Anterior tibial spur glabrous. Posterior tibial spur acute.

Description. ***Size*****:** *Total length*: 9–14mm. *Total width*: 4–5mm. ***Color*****:** Reddish-brown tones to entirely black.; shagreened vestiture dorsally, ventrally shiny. ***Head*****:** Shape transverse, cephalic disc glabrous, frons with a depression slightly concave, or slightly convex in some species; supraocular protuberances present; surface moderately punctate, becoming coarser on the lateral and posterior margins; ocular canthus laterally projected laterally, in major males, dividing the eye almost in half, less developed in minor males but still dividing the eye at least halfway; temporal process present in both sexes, subconical shape. ***Pronotum*****:** Shape transverse and slightly convex; disc with a small depression; glabrous; surface with fine to moderate punctures in males, coarse in females; anterior angles rounded in males, somewhat acuminate in females; posterior angles prominent and obtuse; anterior margin of the disc with a pair of tubercles in minor males; major males with anterior projection truncated or conical; in females a pair of

evident tubercles; ***Elytra*****:** Shape elongate, longer than head and pronotum together, sometimes including the mandibles, usually in the females; elytral striae simple formed by a row of scales after the elytral base; elytral base more rough with misaligned punctures; elytral interstriae subcostate finely punctate; elytral humeri present and projected anteriorly. ***Legs*****:** External margins serrate; anterior tibial spur glabrous; dorsal spur of the of the medial tibiae smaller than first tarsomere; medial and posterior tibiae with more than two external teeth; apex of posterior tibiae truncated or acute, in females longer than the first tarsomere. ***Venter*****:** mesoventrite convex, slightly projected; fifth abdominal ventrite more punctate than other ventrites. ***Male genitalia*****:** Genital capsule complex; dorsal plate with bifurcate apex, two or more projections laterally; ventral plate wider posteriorly; two lateral projections less sclerotized; anterior projection cylindrical shape, giving it a funnel aspect; parameres semicircular with a spine process curved inside at base; medium lobe slight emargination anteriorly; phallobase sclerotized and sub rectangular, ***Female genitalia*****:** Bursa copulatrix with elongate sac aspect, rough, with apex slightly sclerotized; spermatheca gland inserted into a small cylindrical projection at base of spermatheca.

Distribution. After redefinition, the genus now is exclusively Brazilian, distributed in the states of Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (fig. 20). Most species are present in Parana dominion (Morrone, 2022).

Remarks. *Metadorcinus* is redefined here, being reduced to only eight species: *M. amuelleri, M. auritus, M. cruentus, M. neotragus, M. ranki, M. securiformis, M. tristis* and the newly described species **M. sp.1 sp. nov.** With the removal of other species, the genus is now exclusively Brazilian in distribution, predominantly occurring in the Southeast and South of Brazil. The genus shares the presence of a temporal process in both sexes with **New genus 2** and ***Scortizus***. The

parameres have the ventral inner margin extended into a spine, and the base of the spermatheca has an expansion where the spermathecal gland inserts.

Key to species of *Metadorcinus* Kriesche, 1922

1 Cephalic disc concave or slightly depressed (fig. 6C); male pronotum with truncate or conical projection (fig. 6A) ……..... **2**

– Cephalic disc convex (fig. 5B), male pronotum with small elevation or a pair of tubercles (fig. 5A) ……...……...……...……...…… **4**

2 Elytral interstriae subcareniform (fig. 8A); male pronotum with long conical protuberance, projected anteriorly covering posterior portion of head (fig. 8E); mandibles bifurcate, with distal internal tooth (fig. 8C) ……..... ***M. securiformis*** (Luederwaldt, 1934)

– Elytral interstriae simple (fig. 7A), male pronotum with truncate projection (fig. 7E), mandibles with slight bifurcation, internal tooth acuminate or oblong fig. 7C) ……..… **3**

3 Ocular canthus truncate, as projected as temporal process (fig. 6C), projection of anterior margin of male pronotum slightly bilobed (fig. 6A), internal tooth of male mandibles obtuse and wide (fig. 6C), females with 3 distinct longitudinal interstriae (fig. 6B)……. ***M. neotragus*** (Westwood, 1855).

– Ocular canthus subtriangular, projected externally beyond the temporal process (fig. 7C); anterior margin of male pronotum wide, similar to a lobe (fig. 7A); internal tooth of male mandibles acute (fig. 7C); females with incomplete and variable number of longitudinal interstriae (fig. 7B) ……...……. ***M. ranki*** Grossi & Vaz-de-Mello, 2007.

4 Mandibles almost straight (fig. 10E); scattered moderate punctures in cephalic disc, coarse at posterior lateral margins (fig. 10C)……..… ***M. tristis*** (Luederwadt, 1934).

– Mandibles slightly or abruptly turned upwards (fig. 9E); cephalic disc with fine and sparse punctures (fig. 4C) or moderate (fig. 9C)…… **5**

5 Male mandibles reduced, or as long as head (fig. 5D); ocular canthus subtriangular, protruding halfway into eye (fig. 5C) ……. ***M. cruentus*** (Burmeister, 1847).

– Male mandibles large, longer than head (fig. 4E); ocular canthus semicircular or rounded, protruding almost or two-thirds into eye (fig. 4C)……...……... **6**

6 Internal tooth with acuminate apex and pointing centrally (fig. 4C) .... ***M. auritus*** Kriesche, 1922.

– Internal tooth with rounded apex and pointing dorsally (fig. 9C) ...…. *M.* sp. 1 **sp. nov.**

Metadorcinus amuelleri **(Weinreich, 1963)**

Metadorcinus amuelleri; Maes 1992: 54 [catalog]; Grossi & Vaz-de-Mello 2007: 57 [list and identification key].

Beneshius amuelleri Weinreich, 1963 [original description]: Krajcick, 2001 [catalog]; Krajcick, 2003 [catalog].

Beneshius [?] *dentifer* [?] (Mollemkamp, 1912: 301): Weinreich, 1963, pl. 10, fig. 47 [wrong identification].

Type material. Holotype examined (by photographs): ♀ is located in SMF collection (SMF C 11800). Label information: F. OHAUS leg. (*dentifer* Det. NAGEL 1929).

Description. Transcripted from Weinreich (1963): Holotype ♀: ***Color*****:** Reddish brown with small scattered black spots in dorsal view, dull aspect. Ventrally reddish brown shiny. ***Head*****:** Shape transverse, shorter than wide, with a small depression in center; punctures coalescent and rough, more pronounced laterally; frons excavate, forming a slight arc at mandibles base; two supraocular protuberances bellow arc apices; ocular canthus small and subrectangular, projecting laterally, protruding less than hallway into eye; temporal process semicircular, protruding as far as ocular canthus; mandibles shorter than head, with sharp tip, each with a right-angled triangular tooth on the inside; medial tooth bilobed and obtuse; mentum subtrapezoidal, coarsely punctate; gena with rough aspect, strongly punctate; gula anteriorly with fine punctures and posteriorly smooth. ***Pronotum*****:** Shape transverse, longer than head, convex, disc superficial groove; anterior angles acute projected anteriorly, and posterior angles pronounced and obtuse; lateral margins almost parallel; strongly punctate, punctures equal in all pronotum; anterior margin excavate, sinuous aspect, medially with a pair of tubercles; posterior margin plan; longitudinal groove very evident. ***Elytra*****:** Shape elongate, longer than pronotum, head and mandibles together; elytral base with misaligned scattered punctures; striae formed by rows of aligned scales; interstriae simple, without elevation, finely and sparsely punctate; humeral callus acute and pronounced; hypomerus

punctures more evident anteriorly; longitudinal suture shiny and smooth. ***Legs*****:** Protibiae with 6 external teeth increasing in size from base to apex; mesotibiae with 1 strong tooth, above it 5 sharp pointed teeth; metatibiae with 1 pointed external tooth. ***Venter*****:** Prosternum convex, with strong punctures in center, becoming sparse laterally; prosternum projection conical and smooth between legs; mesosternum convex, with a small projection between legs, sparsely punctate in center and coarser at lateral margins; metasternum punctures equal in all ventrites, except in fifth, which in stronger.

Remarks. The holotype is the only known specimen deposited in collections for this species, and its study was only possible by photographs, thus it could not be included in the phylogeny. Weinreich (1963) described it from a specimen erroneously identified by Nagel (1929) from the series of *M. dentifer* and commented on its proximity to *M. cruentus* and *M. securiformis*. After studying the holotype, we concluded that the female exhibits characters of *Metadorcinus* and belongs to the '*cruentus*' group.

Metadorcinus auritus Kriesche, 1922

(Figure 4 A–H)

Metadorcinus auritus Kriesche 1922: 126 [original description]: Luederwaldt 1935: 522 [monography]; Blackwelder, 1944: 196 [catalog]; Didier & Séguy 1953: 168 [catalog]; Weinreich 1960: 53 [review, as a synonym of *Beneshius cruentus* (Burmeister, 1847)]; Bomans 1990: 173-174 [catalog]; Maes 1992: 54 [catalog]; Krajcik 2003: 111 [catalog]; Grossi & Vaz-de-Mello 2007: 56-57 [figs. 30-31, list and identification key].

Sclerostomus auritus: Benesh 1960: 35 [catalog]

Type material. Holotype ♂ examined (by photographs): Süd-Brasilien, Prov. Santa Catharina (STD).

Additional material. BRAZIL. **Paraná**. Piraquara, Mananciais da Serra: 1♂, 10.IX.2005; 1♂, X.2005; 1♀, XI.2005; 1♂, 4.XII.2005; 2♂1♀, X.2006; 1♂, 23.XI.2006; 1♂, 17.X.2007; 2♂, XI.2008; 1♀, VII.2009; 1♀, XI.2009; 3♀, 18.X.2010; 13♂5♀, 11-12.XII.2010; 1♂, XI.2011, P. Grossi leg (CERPE). **Santa Catarina**: São Bento do Sul: 1♂, XI-1963, Dirings (MZSP).

Redescription – male. ***Size*****:** *Total length*: 10,1–14mm. *Total width*: 4–5mm. ***Color*****:** Entirely black matte or partially, with the sides of the pronotum and elytra gradually transitioning to reddish-brown, dull aspect in dorsal view, ventrally shiny with reddish brown tones. ***Head*****:** Shape transverse, shorter than wide, convex, more pronounced in posterior margins; frons slightly depressed and forming a broad arc, intermandibular process faintly evident; surface finely and sparsely punctate, with coarser punctures laterally. Ocular canthus rounded, projecting laterally, and protruding two-thirds into eye. Supraocular protuberances present. Temporal process evident in acute shape. Mandibles gradually turned upwards, longer than head; symmetric mandibles, apices weakly bifurcate with a inferior excavated process more distinct on the left mandible than the right; ventral groove of the mandible with a row of setae pointing downward, starting after the base of the mandible, and ending before the apex; basal tooth large and bilobed, projecting slightly inward at the apex; internal tooth acute and pointing centrally. Gena with coarse punctures, covered by small setae. Mentum subtrapezoidal and finely punctate. Gula slightly depressed with punctures at anterior margin and posteriorly smooth. ***Pronotum*****:** Shape transverse, rectangular, as wide as head; surface glabrous, covered by small and scattered punctures; anterior margin with median elevated non-projected protuberance, shiny and smooth; anterior angles rounded and posterior angles obtuse, lateral margins parallel turning rounded at posterior angles; disc with a longitudinal depression. ***Elytra*****:** As long as pronotum and head together; disc convex; surface glabrous with small setae at lateral margins; elytral base with scattered and misaligned punctures. Striae formed by rows of scales longitudinally aligned extending to posterior margins;

interstriae simple, with small and fine scattered punctures; humeral callus acute. Lateral margins parallel in basal half. Epipleuron punctures moderate becoming more dense posteriorly. ***Legs*:** Protibiae dentate, variable number of external teeth increasing in size distally with two large distal ones. Mesotibiae with four external teeth, distal margin branched in four teeth. Metatibiae with two external teeth, distal margin almost exceeding the first tarsomere; apical spurs glabrous and rounded, the dorsal one longer. ***Venter*:** Prosternum punctures rough, covered by small setae; prosternal projection conical, finely punctate, smooth, and shiny apically; hypomerus almost glabrous with micro setae laterally, sparsely, and finely punctate. Mesosternum convex with setose punctures, becoming coarser laterally; conical process after mesosternal groove. Metasternum punctures small, metasternal suture evident. First abdominal ventrite projecting between posterior coxae; punctation similar in ventrites, except in the pygidium which is more dense; pygidium with scattered golden setae. ***Genitalia*:** Genital capsule complex, symmetrical, base wider than apex; dorsal plate apex with a central invagination forming two subtriangular external lobes; base sinuous and slightly concave in the middle; ventral plate with a trapezoidal-shaped medial projection and two sharped lateral projections. Aedeagus almost symmetrical; parameres apically acute with small setae laterally and a sharp spine-shaped process curved inside. Medium lobe sclerotized laterally, apex strongly bifurcate, and base laterally rounded with slight central invagination. Phallobase laterally sinuous, apex wider than base.

Description – female. *Size*: *Total length*: 8,9–11,4mm *Total width*: 3,9–4,7mm ***Color*:** Same as in males, but more blackened. ***Head*:** Shape transverse, smaller than males; disc convex, frons slightly depressed; surface strongly punctate, punctures coalescent in lateral-posterior margins; mandibles smaller than head, slightly turned upwards; internal tooth subtrapezoidal, wider in left mandible with a small concavity; apex acute and sharped, with a superior dentiform process more evident in right mandible; mentum subtrapezoidal, slightly concave, covered by long setae and

scattered punctures; gena glabrous; gula finely punctate and posteriorly with small setae. ***Pronotum*:** Shape transverse, wider than head; convex, with a small depression in disc; rough aspect, punctures coalescent; anterior angles acute and posterior angles obtuse; anterior margin with a pair of shiny tubercles. ***Elytra*:** As in males, but more elongate. ***Legs***: Protibiae with 5 large distinct external teeth increasing in size distally and displaying smaller teeth between; anterior apical spur glabrous; mesotibiae with 3 or more external teeth; apex of mesotibiae branched in sharped processes; metatibiae with 2 or more external teeth; apex of metatibiae truncate, longer than first tarsomore. ***Venter*:** Prosternum convex, punctures strong; prosternal projection conical, larger than males, smooth and shiny; mesosternum covered by small setae in disc; conical projection larger than males; metasternum slightly convex, with fine and sparse punctures; ventrites with small setose punctures, fifth ventrite more punctate.

Remarks. For a long time, this was the only species included in *Metadorcinus* until it was synonymized with *M. cruentus* by Weinreich (1960) when the author described *Beneshius*, making it the type species of the genus. The synonymy was later undone by Bomans (1990), who revalidated the genus and its type species. *M. auritus* has the largest known specimens in the '*cruentus*' group in terms of body size.

Metadorcinus cruentus (Burmeister, 1847)

(Figure 5 A–G)

Metadorcinus cruentus: Maes 1992: 54 [catalog]; Grossi & Vaz-de-Mello 2007: 56-57 [figs. 26-27, list and identification key].

Sclerostomus cruentus Burmeister 1847: 425 [original description]; Parry 1864: 46, 108 [catalog]; Parry 1870: 113 [catalog]; Boileau 1913: 259; Luederwaldt 1935: 577 [monography]; Benesh 1955: 103; Bomans 1990: 173; Mizunuma & Nagai 1994: 280 [plate 197, fig. 493].

Scortizus cruentus: Didier & Séguy 1953: 167 [catalog]; Benesh 1960: 42 [catalog].

Beneshius cruentus Weinreich 1960: 53-54, pl. 15, figs. 15-16 [new combination]; Krajcik 2001: 23 [catalog]; Krajcik 2003: 35 [catalog].

syn. nov. *Scortizus cribratus* Thompson 1862: 429; Parry 1863: 450 [catalog]; Luederwaldt 1935: 561 [monography].

syn. nov. *Metadorcinus ditomoides*: Maes 1992: 54 [catalog]; Grossi & Vaz-de-Mello 2007: 57 [Figs 24-25, list and identification key].

Scortizus ditomoides Westwood 1855: 208 [plate 11, fig. 4]; Thomson 1862: 400 [catalog]; Boileau 1913: 259; Didier & Séguy 1953: 167 [catalog]; Benesh 1960: 42 [catalog].

Sclerostomus ditomoides; Parry 1864: 96 [catalog]; Parry 1870: 450 [catalog]; Luederwaldt 1935: 560 [monography, plate 3]; Bomans 1990: 174.

Beneshius cruentus ditomoides: Weinreich 1960: 54, fig. 46 [new combination]; Krajcik 2001: 23 [catalog]; Krajcik 2003: 36 [catalog].

nom. nud. Sclerognathus ditomoides: Roon 1910: 44 [catalog]; Blackwelder 1944: 196 [catalog].

nom. nud. *Sclerognathus cruentus*: Roon 1910: 44 [catalog]; Blackwelder 1944: 196 [catalog].

Type material. Holotype ♂ not examined, probably lost or in Martin-Luther-Universität, Halle, Germany.

Additional material. BRAZIL. **Rio de Janeiro**. 1♂, Type "*Sclerostomus ditomoides*" Westwood / coll. Hope / "*Scortizus ditomoides*" H. Bomans det. 1984 (OXUM). Nova Friburgo: 2♂1♀, XII.1970, F. M. Oliveira leg (CERPE). Petrópolis: 1♂1♀, 21.XII.1996; 1♂, XI.1995; 1♀, 16.I.1986 (CCLG). Alto da Serra: 1♂1♀, X-2000; 1♂, VIII.2001; 2♀, IX.2001; 1♀, 18.X.2001, 1200m, P. Grossi leg (CERPE). Itatiaia: 1♀, II.1959, W. Zikán leg (CERPE). **Santa Catarina.** Mafra: 1♂, coll. Haberacker / Weinreich det. 1960; 1♀, coll. Haberacker / "*Scortizus cruentus tristis*" Weinreich det. 1960 [wrong identification] (ZSM).

Diagnosis.

Description male. ***Size*****:** *Total length* 8–12mm. *Total width:* 3–4,5mm. ***Color*****:** Dorsal **s**urface reddish brown with black spots, or entirely black matte, dull aspect in dorsal view. Ventrally shiny and displaying coppery tones. ***Head*****:** Shape transverse, longer than wide, convex with anterior margin slightly depressed; punctures moderate to coarse, strong laterally and sparse at center, with a small spot with smooth surface; frons forming a broad arc at mandibles base; two supraocular protuberances bellow arc apices; ocular canthus subtriangular, projecting laterally and protruding two-thirds into eye; temporal process subconical, less projected than canthus; mandibles as long as head, gradually turned upwards; basal tooth obtuse, slightly bilobed in apex; superior medial tooth conical with rounded apex; inferior dorsal margin with sinuous continuous tooth; mandible apices weakly bifurcate in a superior rounded tooth and a sharp acute tip projected forward; inferior serrated dentiform process bellow tip; ventral groove beginning after base and ending before apex, filled with yellow setae pointing downwards; mentum subtrapezoidal, slightly concave, fine and sparsely punctate; gena glabrous with scattered punctures; gula with small punctures, smooth posteriorly. ***Pronotum*****:** Shape transverse, rectangular, shorter than wide; convex, with a small depression in disc; anterior angles rounded and posterior angles obtuse; surface glabrous, with small scattered punctures, equal in all areas; anterior margin excavate in two arcs from disc to lateral margins; centrally a small truncate protuberance non projected; posterior margin flat; pronotal groove dividing all pronotum longitudinally. ***Elytra*****:** Shape elongate, as long as pronotum, head and mandibles together; surface glabrous in disc, laterally with small and sparse setae; elytral base with scattered moderate punctures; striae formed by rows of aligned scales longitudinally; interstriae simple, without elevation, finely punctate; humeral callus pronounced and acute; epipleuron punctures small to moderate becoming more evident posteriorly. ***Legs*****:** Covered by golden sharped setae; protibiae

with 5 external teeth increasing in size distally, two distal ones distinct, longer than others; variable small teeth between 5 largest; anterior apical spur smooth and sharped; mesotibiae displaying 2 external teeth, distal margin ramificate in three branches; metatibiae with 1 external teeth, distal margin no surpassing first tarsomere. ***Venter*****:** Prosternum with small setae, punctures strong, rough aspect; prosternal projection conical shape, smooth and shiny; hypomerus almost glabrous with micro setae laterally, mesosternum with small setae in disc and glabrous laterally; process conical and smooth between legs; metasternum wide, convex, glabrous and finely punctate; abdominal ventrites setose, punctures equal in all ventrites, except in fifth which is more dense; first ventrite imagine between posterior legs. ***Genitalia*****:** Genital capsule complex; dorsal capsule semicircular shape, wider anteriorly; apex bifurcate in two rounded lobes; bellow it, two lateral posterior projections; ventral plate wider anteriorly; apex with one subrectangular projection; lateral margins with one posterior acute projection; parameres elongate and sinuous, posteriorly covered by long setae; one spinous process curved inside at base of each paramere; medium lobe sclerotized, apex weakly emarginate in two acute lobes; internal sac with long basal sclerite.

Description – female. ***Size*****:** *Total length* 8–12,5mm. *Total width:* 3,2–5mm. ***Head*****:** Shape transverse, less than male; rough aspect with strong coalescent punctures; ocular canthus subtriangular, protruding halfway into eye, less projected externally than in males; temporal process rounded, less projected than canthus; mandibles smaller than head, slightly curved upwards; basal tooth wide; internal tooth subrectangular, apex slightly marginate, wider in left mandible; apex acute and sharped, with small superior dorsal dentiform process in right mandible. ***Pronotum*****:** Shape transverse, wider than head; rough aspect, punctures coarse and coalescent in all pronotum; anterior angles more pronounced and acute; anterior margin with a central pair of tubercles, shiny and smooth, not projected; lateral margins convex externally. ***Elytra*****:** Shape more

elongate, longer than pronotum, head and mandibles together; punctures moderate; interstriae almost subcostate. ***Legs*:** Apex of metatibiae truncate and elongate, surpassing first tarsomere. ***Venter*:** Surface more punctate; mesosternum less projected.

Remarks. The species with the oldest description in the genus. It was previously the type species of *Beneshius* before it was synonymized under *Metadorcinus*. In Grossi's thesis (2011), specimens of *M. auritus* were treated as *M. cruentus*. However, after receiving images of the material studied by Weinreich (1960) from the Munich Museum, it was confirmed that they were not the same species. The received material is actually similar to what was treated as *M. ditomoides* **syn. nov**, Westwood knew only a single specimen when described the species**.** So, we propose the synonymy of these names, with *M. cruentus* being the valid species based on the principle of priority.

Metadorcinus neotragus (Westwood, 1855)

(Figure 6 A–H)

Metadorcinus neotragus: Bomans 1973: 277 [female description]; Maes 1992: 54 [catalog]; Grossi & Vaz-de-Mello 2007: 57, figs 28-29 [list and identification key].

Sclerostomus neotragus Westwood 1855: 207, pl. 11, fig. 3 [original description]; Parry 1864: 108 [catalog]; Parry 1870: 113 [catalog]; Mizunuma & Nagai 1994: 313 pl. 151, fig. 158.

Scortizus neotragus: Didier & Séguy 1953: 167 [catalog]; Benesh 1960: 42 [catalog].

Sclerostomus cruentus var. *neotragus*: Luederwaldt 1935: 559, pl. 3, fig. 44 [monography].

Beneshius neotragus: Weinreich 1960: 58 [new combination]; Krajcik 2001: 23 [catalog]; Krajcik 2003: 36 [catalog].

nom. nud. Sclerognathus cruentus: Roon 1910: 44 [catalog]; Blackwelder 1944: 196 [catalog].

Type material. Holotype not examined, probably in Muséum national d'Histoire naturelle (MNHN).

Additional material. BRAZIL. Paraná. Curitiba: 1♂, 21.X.2013, R. A. L. da Silva leg (CERPE); Parque Baragui: 1♂3♀, 27.XII.2021, P. Grossi leg. (CERPE); Parque Passaúna: 1♂, 29.III.2018, 914m, P. Grossi leg. (CERPE); Tibagi, Fazenda Pinheirinho: 1♂3♀, XI.2009, Grossi & Parizotto leg; 1♂ I.2012, in cambuci, P. Grossi leg. (CERPE); Campina Grande do Sul, Fazenda Pico Paraná: 1♂1♀, 03.XII.2008, in *Bacharis* sp. P. Grossi leg. (CERPE); Colombo: 1♂3♀, XI.2014, P. Grossi leg; 1♀, XII.2014, meia com banana, M. Savansi leg (CERPE); S. J. dos Pinhais: 1♂, 06.XI.2013, 880m, A. C. Domahovski leg. (CERPE); Carambeí: 1♂1♀, X.1945, A. Loss leg. (CERPE); Ponta Grossa: 1♂, XI.1942, (CERPE); Telêmaco Borba: 1♂, 10.XI.2003, in *Pinus taeda,* C. A. H. Fletchmann leg (EPGC); **São Paulo.** Piracicaba: 1♂, col. alunos, P. Grossi det. 2006 (ESALQ). **ARGENTINA.** Puerto Iguazú: 1♀, XII.1987 (CERPE).

Description – male. ***Size*****:** *Total length ??–?? Total width: ??–??* ***Color*****:** Dull aspect. Head entirely black, pronotum and elytra reddish-brown with black tones in disc. Although, most specimens are entirely full matte black. Venter shiny, black or in copper tones. ***Head*****:** Shape transverse with a central concavity in triangular shape; a pair of supraocular protuberances in anterior lateral margin of concavity; punctation sparse and fine in the middle, coarse and strong laterally; frons wide, forming a small arc, almost straight in some specimes; anterior margin with scattered small setae; intermandibular process with long setae. Ocular canthus subrectangular, projecting laterally and protruding halfway into eye. Temporal process present in conical shape. Mandibles gradually upwards, as long as head or even longer; base showing golden distinct setae; ventral groove with a row of setae; basal tooth large and obtuse; medial tooth very notable in large males, subtriangular and elongated; apex bifurcate with a proeminet dentiform process curved inside. Antennae small with ten antennomeres, antennal club lamellate, formed by three

antennomeres. Gena glabrous with scattered regular punctures. Mentum subtrapezoidal, strongly punctate. Gula slightly depressed with setose finely punctures. ***Pronotum*:** Shape transverse, convex, slightly concave in disc, parallel laterally; anterior angles acute and posterior angles obtuse; anterior margin depressed, with a medial projection in conical shape, slightly bilobed at apex; punctures fine and sparse, more evident on disc; anterior and posterior margins with presence of golden setae. ***Elytra*:** Shape elongate, as long as head, pronotum and mandibles together. Elytral base with coarse and misaligned punctures; punctures turning into a row of scales after the elytral base, forming aligned striae; interstriae simple without ledge, finely punctate. Humeral callus acute. Epipleuron punctures moderate becoming more dense posteriorly. Lateral margins with small and sparse setae. ***Legs*:** Covered by golden sharped setae. Profemur excavate; protibiae with six to seven external teeth increasing in size distally and small protuberances between; two distal ones larger; apical spur glabrous and rounded. Mesotibiae with four external teeth; apical spur acute. Metatibiae with one external spine and apex branched in three teeth, not surpassing first tarsomere. ***Venter*:** Shiny, entirely black at most, more rarely in rusty brown tones. Prosternum glabrous, punctures coarse in disc; hypomerus finely punctate becoming less yet lateraly; cylindrical to subtriangular protuberance between anterior legs, covered by small setae. Mesosternum convex, almost glabrous, punctures fine and setose, sparse in disc and coalescent laterally; mesosternum process conical between legs. Metasternum covered by small setae; punctures fine, equal in all ventrites, except in pygidium, which is stronger. ***Genitalia*:** Genital capsule complex. Dorsal plate semicircular; apex bifurcate, displaying two lateral conical protuberances; lateral margins with small excavate process medially; posterior margin flat. Ventral plate funnel shaped, apex with subtrapezoidal projection. Aedeagus with long parameres, almost half size; parameres covered by small setae; spinous process curved internally in each paramere; medial lobe slightly bifurcate; internal sac with one basal sclerite.

Description – female. ***Size*****:** *Total length ??–?? Total width: ??–??* Similar to male, except for the following characters: ***Head*****:** Punctures stronger, coalescent anteriorly and in lateral margins; ocular canthus not projected laterally, protruding less than halfway into eye; temporal process rounded, less projected than canthus; mandibles as long as head or less, smaller than in males; internal tooth wide and slightly concave, wider in left mandible; ventral face without groove, strongly emarginate and glabrous. ***Pronotum*****:** Rough aspect, strong punctures in all areas; lateral margins more convex, not parallel; anterior angles more pronounced and acute; anterior margin not projected, only with a small pair of shiny tubercles. ***Elytra*****:** Punctation more evident at base, moderate punctures; interstriae more pronounced, almost subcostate. ***Legs*****:** Apex of metatibiae truncate and elongate, surpassing first tarsomere. ***Venter*****:** Surface more punctate; mesosternum less projected. ***Genitalia*****:**

Remarks. Westwood (1855) also described this species based on a single specimen from the Deyrolle collection and approximate it to *Chileistomus cucullatus* (Blanchard, 1842). This taxon has all the characters that classify it within *Metadorcinus*, in addition to the analysis results demonstrating close relationships with *M. ranki*. Immature stages of *M. neotragus* have already been collected in the south region of Brazil, in dead woods of Cambuí, a type of Myrtaceae.

Metadorcinus ranki Grossi & Vaz-de-Mello, 2007

(Figure 7 A–E)

Metadorcinus ranki Grossi & Vaz-de-Mello 2007: 50, figs. 1-15, 20-23 [original description].

Type material. Holotype and allotype examined. **Holotype** ♂: BRAZIL. **Santa Catarina**, São Bento do Sul, Estação Rio Vermelho, XI.2002, 850 m., I. Rank leg. (DZUP). **Allotype** ♀: same data as holotype (DZUP). **Paratypes**. 2♀, same as holotype, except "XII.2003" (CERPE); 1♀, same, except "XI.2004" (CERPE); 3♂1♀, same, except "I.2006" (CERPE); 5♂, same, except

"I.2007" (CERPE). All paratypes printed with yellow labels "*Metadorcinus ranki* sp./ PARATYPE/ Grossi & Vaz-de-Mello det. 2007".

Additional material. BRAZIL. **Santa Catarina**. São Bento do Sul, Rio Natal: 3♂1♀, 03.XII.2007, 600m, I. Rank leg. (CERPE). **São Paulo**. Arujá: 1♂1♀, II.2006; 2♀, XI.2006; 1♀, 15.XI.2007; 1♂1♀, 12.XI.2010, 800m, em frutas, R. Koike leg. (CERPE). Bairro São Domingos: 1♂, 09.I.2007; 2♂2♀, 25.XI.2007; 1♂1♀, 29.XI.2007; 1♂, 03.XII.2007; 2♂3♀, 13.XII.2007; 1♂3♀, 20.XII.2007; 1♀, 21.XII.2007, 770m, em frutas, R. Koike leg. (CERPE).

Description. Transcripted from Grossi & Vaz-de-Mello (2007): **Holotype** ♂. Length 13 mm (including mandibles), width at elytra 4 mm. ***Color***: Body completely black, dull, with mandibles, antennae, legs, scutellum, pronotal process, and ventral part of the body shiny; base of mandibles reddish-brown. ***Head***: Shorter than wide, weakly depressed, with scattered punctures; punctures more dense and coalescent laterally; frons wide and smooth. Canthus triangular, projecting laterally; posterior margin rounded, protruding halfway into eye. Mandibles gradually upturned, as long as head; ventrally with row of yellow setae; apices weakly bifurcated, with a dorsal excavate projection; bent inside, with a flat inner bifurcated process; basal tooth horizontal and obtuse. Labrum trilobate, central lobe larger with small punctures and long setae. Gena with large scattered punctures and short setae. Gula weakly depressed with small, non-contiguous punctures. Labium oblong, laterally rounded, with large separated punctures. Mentum trapezoidal with small, separated punctures. Antennae small with ten antennomeres; all antennomeres with short setae; scape curved, wider apically; club segments distally tomentose. ***Prothorax***: Pronotum transverse, subrectangular, as wide as head, with complete border; surface with small, distinct punctures; anterior angles sharply pointed, posterior angles rounded; an elevated bituberculate median process is presented anteriorly; process smooth and shiny, medially with a longitudinal rhomboidal depression. Scutellum: Scutellum glabrous, anteriorly concave, with sparse scattered

punctures. ***Elytra***: Striae indicated by parallel lines of punctures; interstriae with many much smaller, scattered punctures (mainly anteriorly); humeri acute; elytral margins almost parallel in basal half. ***Legs***: Protibiae with 8–9 external, well developed teeth increasing in size distally; serrate between teeth. Protibiae with inner margin basally sinuate, distally bearing many setae. Mesotibiae with a strong median tooth and a smaller proximal one on the outer margin; three smaller apical teeth, one dorsal and two ventral; small scattered teeth are also present. Metatibiae with a submedial acute tooth and 2 distal teeth with dorsal spine bifurcated. Base of all tarsomeres densely setose. ***Venter***: Epipleuron with scattered setose punctures, punctures more dense posteriorly. Prosternum with elongate punctures and short setae; prosternal apophysis conical and obtuse with scattered setae, smooth and shiny apically. Mesosternum punctate, punctures small and setose; mesepisternum granulate with large punctures. Metasternum with small punctures and metasternal suture visible along the whole disk, posteriorly with some small punctures; metaepisternum with large punctures medially. All abdominal ventrites with small irregular setose punctures; pygidium semicircular, densely granulose, with dense yellow setae, mainly laterally and medially. ***Genitalia***: Genital capsule (Figs. 6–8) symmetric and complex, dorsal sclerite glabrous and wider basally. Apex of ventral sclerite with many long setae and a medial rectangular process, process whose length is 1/5 of its width; narrowed basally. Aedeagus (Figs. 3–5) almost symmetrical. Phallobase laterally lobed and narrowed basally. Parameres apically rounded with minute lateral setae and a sharp spine shaped basal process, curved inside. Median lobe sclerotized medially; apically widened, membranous with many small lateral and ventral spiculae.

Allotype ♀. Length 12 mm, maximum width 4 mm. As male except for the following characters. Head: Mandibles short with one tooth on the inner side, the tooth on the left mandible larger than the one of the right mandible. Head strongly punctate with many irregular non-contiguous

punctures, coalescent at sides and near weak anteromedian depression; vertex concave; gena depressed with large punctures. Canthus dividing the eye for one third. Labrum concave with sparse, setose punctures, ventrally with dense setae. Labium with large punctures, setose anteriorly and laterally. Gula anteriorly smooth. Prothorax: Pronotum convex with weak longitudinal depression; anteriorly with smooth, medial, slightly bilobed process. Surface strongly punctate, sides rugose; pronotal borders setose anteriorly and posteriorly. Scutellum: Scutellum depressed anteriorly with few isolated punctures, basally smooth. Elytra: Elytra strongly punctate anteriorly, each elytron with rows of punctures and 5 smooth longitudinal lines in interstriae, (the third one is the largest), laterally with scattered short setae. Legs: Protibiae with 5–7 large external teeth, serrate elsewhere; dorsally with two longitudinal setose ridges, setae denser distally. Mesotibiae bifurcate apically with 6 external teeth decreasing in size distally; 3 ventral teeth are also present, with the medial one being the smallest. Metatibiae with 1 large external tooth and many smaller teeth both dorsally and laterally, apically with a rectangular process and 3 teeth. Venter: Mesoepisternum weakly granulate with few scattered punctures. Metasternum with not contiguous setose punctures; metaepisternum with two rows of punctures. Genitalia: (Fig. 11) Form symmetrical. Dorsal plate smooth with two rounded basal lobes, styli enlarged apically, ventral plate setose and less sclerotized apically and internally.

Remarks. In addition to the type species, this is the only *Metadorcinus* species that has been part of the genus since its description. As previously mentioned, this taxon is closely related to *M. neotragus*. It can be differentiated by its more intense punctuation in the cephalic disc, the shape of the mandibles, triangular ocular canthus, anterior pronotal margin less projected, and differences in the genitalia. Both species are sympatric, occurring from São Paulo to the southern region of Brazil.

Metadorcinus securiformis (Luederwaldt, 1934)

(Figure 8 A–H)

Metadorcinus securiformis: Maes 1992: 54 [catalog]; Grossi & Vaz-de-Mello 2007: 57 [list and identification key].

Sclerostomus securiformis Luederwaldt 1934: 389-390 [original description]; Luederwaldt 1935: 545, pl. 4, figs. 58-59 [monography]; Nagel 1936: 300-302, figs. 8-9 [redescription]; Martinez 1953: 47; Weinreich 1958: 285; Benesh 1960: 36 [catalog]; Mizunuma & Nagai 1994: 280, pl. 117, fig. 492.

Beneshius securiformis: Weinreich 1960: 59-60 [new combination]; Krajcik 2001: 23 [catalog]; Krajcik 2003: 36 [catalog].

Pycnosiphorus securiformis: Didier & Séguy 1953: 166 [catalog].

nom. nud. Sclerognathus securiformis: Blackwelder 1944: 196 [catalog].

Type material. Nine sintypus examined. Labels: **Lectotype** ♂ a) printed white label, "BRAZIL. **Minas Gerais.** Virgínia. Fazenda dos Campos: 10-VII-1919, F. J. Zikán leg." b) printed red label "*Sclerostomus securiformis* Luederwaldt, 1934/ LECTOTYPE/ P. C. Grossi det. 2010" (MZSP). **Lectotype here designated**. **Paralectotype** 1♀ same as lectotype (MZSP); others paralectotypes labeled, "Passa Quatro: 01-VII-1933" (MZSP). "**Rio de Janeiro.** Itatiaia: 2? II-1922, D. Mendes leg" (MNRJ); 2? same, except "IX-1929" (MNRJ); 1? same, except "23-VII-1933" (MNRJ); 1? same, except "11-XI-1933" (MNRJ). All paralectotypes with yellow labels, "*Sclerostomus securiformis* Luederwaldt, 1934/ PARALECTOTYPE/ P. C. Grossi det. 2010". **Paralectotypes here designated.**

Additional material. BRAZIL. **Rio de Janeiro**. Nova Friburgo. Pico da Caledônia: 2♂, 05-I-2002, 1800m; 1♂, 10-I-2001, 2219m; 2♂, II-2003, 2219m; 1♂, I-1999, 2219m; 1♂, 20-X-2001, 1500m; 1♂, 1-II-2001, 2219; 2♂, 20-X-2001, 1500m; 1♂, 02-I-2001, 2219m; 2♂, I-2003; 1♀,

XII-2002; 3♀, II-2005; 1♀, 09-I-1999, 2219m; 1♀, 2-II-2000; 1♀, II-2003; 1♀, 9-I-1999, 2219m; 1♀, 9-II-1999; all collected by E. & P. Grossi (CERPE). Itatiaia: 1♂, 1-VII-1933, J. F. Zikan leg (CERPE). **São Paulo.** São José do Barreiro, S. Bocaina: 1♂, XI-1965, 1600m, Alvarenga & Seabra leg (CERPE). **Minas Gerais**. Araponga, Pico do Boné: 1♂, II-1999, 1600m, S. Falcheto leg (CERPE).

Description. Male. ***Size*****:** *Total length ??–?? Total width: ??–??* ***Color*****:** Body entirely black matte or reddish brown with black tones in dorsal view, dull aspect, except in protuberances and projections. Shiny ventrally, ranging from completely black to a coppery tone. ***Head*****:** Shape transverse, anterior edge excavate, with a medial concave depression little pronounced; supraocular protuberances in anterior lateral margins of cephalic depression. Punctation fine and sparse, stronger laterally forming a row around eyes. Frons almost plan or forming a slight arc, covered by small setae. Ocular canthus sub rectangular, projecting laterally and protruding to halfway into eye. Temporal process conical shape, less projected than canthus. Mandibles longer than head, suddenly curved upwards; base apparently glabrous, obtuse, with basal tooth bilobed; apex strongly bifurcate, inferior margin with a continuous tooth ending in a sharped point, and superior margin with a large dentiform process slightly bilobed; ventral groove filled with long yellow setae pointing downwards, turning laterally at base. Mentum subtrapezoidal, with scattered punctures and golden setae at margins. Gena glabrous, punctures regular and sparse. Gula convex, covered by small setae, smooth in posterior margin, finely and sparsely punctate. ***Pronotum*****:** Glabrous, shape transverse, wider than head; convex, disc slightly depressed; lateral margins almost parallel with sinuosity in half; anterior angles acute and posterior angles obtuse; anterior margin excavate, presenting a medial conical protuberance, in large males projecting to halfway above head; two lateral tubercles arranged beside the medial protuberance. Punctation small and sparse, more evident in disc and in medial protuberance. Anterior and posterior margins with

golden setae, longer posteriorly. ***Elytra*****:** Shape elongate, longer than pronotum and head together, excluding the mandibles. Striae formed by rows of aligned scales; interstriae subcareniform, giving it a rough aspect, finely punctate; base with scattered misaligned punctures. Humeral callus acute. Epipleuron punctures small to moderate. Lateral margins covered by small and sparse yellow setae. ***Legs*****:** Profemur with a ventral plan projection, increasing in size posteriorly; protibiae displaying six or seven external teeth, increasing in size at apex, two distal ones larger than others; small teeth between teeth, giving it a serrated appearance; apical spur smooth and sharp. Mesotibiae with four external distinct teeth and a variable number of small ones; apical spur bifid and smooth. Metatibiae with one or two teeth; posterior projection no surpassing first tarsomere. ***Venter*****:** Prosternum with setose punctures, displaying a rounded smooth process between legs; hypomerus almost glabrous, sparse small setae and slightly punctate. Mesosternum convex, disc with fine punctures becoming coarser laterally. Metasternum with setose punctures, fine in all ventrites, except in fifth which is more dense; first ventrite forming a triangular shape between metafemur. ***Genitalia*****:** Genital capsule complex; dorsal plate sub-trapezoidal shape; base wider than apex; apex strongly bifurcate in two rounded sclerotized lobes; two rounded lateral processes bellow lobes; lateral margins excavate in acute processes; base convex, giving it a semicircular shape. Ventral plate in cross shape; apex wide, transverse, with a strong medial sub quadrangular projection; laterally two shiny smooth processes; inferior half with a sudden narrowing, giving it a funnel aspect. Aedeagus cylindrical shape; phallobase wider posteriorly and anteriorly acute; parameres covered by series of long setae with two inferior rounded processes curved inside; medial lobe sclerotized invaginated basally; internal sac insertion forming a concavity in apex of medial lobe.

Description. Female. *Size***:** *Total length ??–?? Total width: ??–??* Similar to male, except for the following characters: ***Head*****:** Punctures stronger and coalescent in all head; ocular canthus

triangular, not projected laterally, protruding less than halfway into eye; temporal process more projected than canthus; mandibles smaller than head; internal tooth subtrapezoidal, wider in left mandible with a slight concavity; apex acute and sharped; ventral face without groove, slightly depressed and glabrous. ***Pronotum*:** Rough aspect, with strong and coalescent punctures in all areas; anterior angles acute and more pronounced than in males; anterior margin with a central small shiny truncate emargination. ***Elytra*:** Interstriae slightly more pronounced and shiny. ***Legs*:** Metatibiae with 2 or more teeth; apex of metatibiae truncate, as long as first tarsomere orf longer. ***Venter*:** Surface more punctate; mesosternum less projected. ***Genitalia*:**

Remarks. This species can be considered the most different from *Metadorcinus*, being the only one that has subcareniform elytral interstrias and a very unique shape of the male mandibles, but still exhibits general characters that make it belong to the genus. Adults and immatures stages have already been collected from a species of Melastomataceae in Nova Friburgo, Rio de Janeiro.

Metadorcinus tristis (Luederwaldt, 1935) comb. nov.

(Figure 10 A–H)

Sclerostomus tristis: Grossi & Vaz-de-Mello 2007: 57 [as a synonym of *Metadorcinus ditomoides* (Westwood, 1855)].

nom. nud. Sclerostomus cruentus var. *tristis* Luederwaldt 1935: 558 [original description]; Weinreich 1960: 54 [as a synonym of "*Beneshius cruentus ditomoides*" (Westwood, 1855)].

nom. nud. Scortizus cruentus var. *tristis*: Didier & Séguy 1953: 167 [catalog];

nom. nud. Scortizus cruentus ab. *tristis*: Benesh 1960: 42 [catalog].

Type material. Four sintypus examined. Labels: **Lectotype** ♂ a) printed white label "BRAZIL. **Rio de Janeiro.** Itatiaia. Maromba: 09-I-1925, 1100m, F. J. Zikán leg" b) printed red label, "*Sclerostomus cruentus*/ *tristis* Luederwaldt/ 1935 LECTOTYPE/ P. C. Grossi det. 2010" (IOC).

Lectotye here designated. **Paralectotypes.** 1♀ "BRAZIL. **Rio de Janeiro.** Itatiaia: 28-X-1932, 1300m, F. J. Zikán leg" (IOC); 1♀ "BRAZIL. **Minas Gerais.** Passo Quatro: 915m, F. J. Zikán leg" (MZSP); 1♀ a) white label with black border "Porto Alegre/ 1930, b) white label written by hand "Sclerostomus ♀/ cruentus Burm./ var. tristis/ Lueder.", c) white label printed "*Metadorcinus/ cruentus* Burm./ var. *tristis*/ Lueder.". All paralectotypes printed with yellow label, "*Sclerostomus cruentus*/ *tristis* Luederwaldt/ 1935, PARALECTOTYPE/ P. C. Grossi det. 2010". **Paralectotypes here designated.**

Additional material. BRAZIL. **Rio de Janeiro**. Nova Friburgo. Alto da Serra: 1♀, X-2000; 1♂, VIII-2001, ex larva; 1♀, 18-X-2001, 1200m, P. Grossi leg (CERPE). Debossan: 1♂3♀, X-2002, P. Grossi leg (CERPE).

Description male. *Size*: *Total length ??–?? Total width: ??–??* ***Color*:** Surface entirely black matte or reddish brown with black spots in disc; dull aspect in dorsal view, except in protuberances. Ventrally shiny, completely coppery tone. ***Head*:** Shape transverse, shorter than wider, disc convex, anterior edge slightly depressed; frons excavate forming a broad arc at mandibles base. Punctures fine, becoming agglomerated and coarser laterally. Ocular canthus rounded to subtriangular, projecting laterally, protruding hallway into eye. Two supraocular protuberances above canthus. Temporal process conical sharped shape. Mandibles same size as head or slightly larger than head, apparently straight or slightly curved upwards; base with small yellow setae, basal tooth obtuse and slightly bilobed; medial tooth acute; apex weakly bifurcate, displaying inferior dorsal excavate dentiform process, more pronounced in left mandible; ventral groove filled with setae pointing downwards. Mentum subtrapezoidal, with scattered small punctures and anterior margin covered by golden setae. Gena with small setae, coarse punctures medially, fine laterally. Gula concave, smooth, and finely punctate. ***Pronotum*:** Shape transverse, convex with a slight concavity in disc, wider than head, surface glabrous; anterior angles rounded

and posterior angles obtuse; laterals almost parallel with little sinuosity posteriorly; punctation regular and small, equal in all pronotum areas; anterior margin excavate with sinuous aspect; medial anterior margin with a small elevation similar a pair of tubercles, no projected. Anterior and posterior margins with golden setae, longer posteriorly. ***Elytra*****:** Shape elongate, as long as pronotum and head together; disc convex and glabrous; small and sparse setae at lateral margins; elytral base with scattered misaligned punctures; striae formed by rows of scales well aligned longitudinally; interstriae simple, no elevate, punctures fine than elytral base; humeral callus acute and projected forward; epipleuron punctures moderate becoming more dense posteriorly. ***Legs*****:** Covered by golden sharped setae; protibiae dentate, 4–6 external teeth increasing in size distally with two large distal ones. Mesotibiae with four external teeth, distal margin branched in four teeth. Metatibiae with two external teeth, distal margin almost exceeding the first tarsomere; apical spurs glabrous and rounded, the dorsal one longer. ***Venter*****:** Prosternum punctures rough, covered by small setae; prosternal projection conical, finely punctate, smooth, and shiny apically; hypomerus almost glabrous with micro setae laterally, sparsely, and finely punctate. Mesosternum convex with setose punctures, becoming coarser laterally; conical process after mesosternal groove. Metasternum punctures small, metasternal suture evident. First abdominal ventrite projecting between posterior coxae; punctation similar in ventrites, except in the fifth, which is more dense; fifth ventrite with scattered yellow setae. ***Genitalia*****:** Genital capsule complex; dorsal plate semicircular shape; apex with a wide invagination, not much deep, dividing posterior margin in two acute lobes; bellow, one lateral process; ventral plate wider posteriorly; apex with a central subrectangular projection; laterally two acute posterior projections; parameres elongate, covered by long setae posteriorly and displaying a sharped process curved inside at base; medium lobe slightly concave in apex.

Description female. *Size*: *Total length ??–?? Total width: ??–??* Similar to male, except for the following characters: ***Head*:** Punctures coalescent and strong in all head, except for a small smooth area posteriorly; ocular canthus smaller, protruding less than halfway into eye; temporal process rounded, more projected as canthus; mandibles smaller than head; internal tooth subtrapezoidal, wider in left mandible and displaying evident concavity; apex acute and sharped; ventral groove absent, only with a slight depression, glabrous. ***Pronotum*:** Rough aspect, with strong and coalescent punctures in all areas, except for a pair of smooth shiny tubercles in anterior margin; lateral margins almost parallel, slightly convex; anterior angles more pronounced and acute. ***Elytra*:** Shape more elongate than in males; punctures at base more evident; interstriae almost subcostate, slightly more evident than in males. ***Legs*:** Metatibiae with 2 or more teeth; apex of metatibiae truncate, surpassing first tarsomere. ***Venter*:** Surface more punctate; mesosternum less projected.

Remarks. Luederwaldt (1935) described this taxon as a variation of *M. cruentus*, due to its black color, while the other species has reddish brown tones. After studying the type and additional material, it was found that Metadorcinus is a genus that has melanism as a very common characteristic. However, even with melanism and sympatry, characters such as the shape of the male mandibles, ocular canthus, punctation of cephalic disc, and male genitalia, allow the separation of these species. For this, we decided to elevate *M. tristis* as a valid species.

Metadorcinus sp. 1 sp. nov.

(Figure 9 A–H)

Type material. Holotype ♂: a) printed white label "BRASIL. **Paraná**. Guaratuba/ Morro dos Perdidos/ III.2005, 1500m/ P. Grossi col." b) printed white label "*Metadorcinus*/ sp. nov/ P. Grossi det. 2010. **Paratypes:** BRASIL. **Paraná**. Guaratuba. Pontal do Itararé: 2♂1♀, XI.2005,

900-1400m, P. Grossi col; 1♀, same except “VIII.2005”. **Santa Catarina.** Rio Vermelho: 1♂, XII-1955, Dirings col.; 1♀, same, except “III.1957”; Urubici. RPPN. Capão do Leão da Montanha: 1♀, 23.XI.2012, P. G. Silva col. **Rio Grande do Sul.** São Francisco de Paula. Pró-Mata: 1♀, 18-21.X.2001, Proj Araucaria.

Description. Holotype ♂: ***Size*****:** *Total length ??–?? Total width: ??–??* ***Color*****:** Surface entirely black matte, dull aspect. Ventrally shiny and displaying coppery tones. ***Head*****:** Shape transverse, wider than longer, slightly convex posteriorly with a small depression anteriorly; frons excavate, forming a moderate arc at mandibles base; punctures sparse to moderate in disc, coalescent in laterally; ocular canthus rounded to subtriangular, projected externally and protruding halfway into eye; two pronounced supraocular protuberances in canthus base; temporal process conical shape, apex acute, less projected than canthus; mandibles as long as head, slightly curved upwards; mandibles base with small sparse yellow setae; basal tooth wide and slightly bilobed in two rounded margins; internal tooth cylindrical, medially positioned and pointing dorsally; apex bifurcate, more pronounced in right mandible, inferior tip acute and superior tip rounded; inferior margin with a smooth dentiform process; antennae with 10 antennomere, escape elongate, apex with 3 last antennomere distinctly largest; mentum subtrapezoidal, moderate punctures with sparse setae; gena glabrous, with coarse punctures; gula slightly depressed with fine punctures, posteriorly smooth. ***Pronotum*****:** Shape transverse, wider than head; convex, with a small longitudinal depression in disc; punctures fine and sparse; surface apparently glabrous; anterior angles no pronounced, rounded, posterior angles obtuse; lateral margins almost parallel; anterior margin not projected, only with small elevation similar to a pair of shiny tubercles; anterior and posterior margin with yellow setae bellow pronotum. ***Elytra***: Shape elongate, as long as pronotum, head and mandibles together; disc convex and glabrous; punctures moderate and scattered at elytral base; striae formed by small rows of scales longitudinally; interstriae simple,

no elevate, with fine and sparse punctures; lateral margins with small yellow setae; humeral callus pronounced; epipleuron punctures moderate becoming more dense posteriorly. ***Legs***: Covered by yellow setae; protibiae with five acute external teeth increasing in size distally; anterior apical spur smooth; mesotibiae with three small external teeth; apex of mesotibiae branched in acute tips; metatibiae with one distinct external teeth; apex of metatibiae truncate and not surpassing first tarsomere. ***Venter***: Prosternum with rough aspect, strong and coalescent punctures; disc covered by scattered setae; hypomerus almost glabrous, finely punctate, silky aspect; prosternal projection smooth, shiny, and conical; mesosternum convex with small and sparse punctures; anteriorly with a small projection between legs; metasternum punctures fine; first abdominal ventrite projecting between posterior coxae; punctation similar in all ventrites, except in fifth, which is more dense; setose punctures. ***Genitalia***:

Description – female. *Size*: *Total length ??–?? Total width: ??–??* Similar to male, except for the following characters: ***Head***: Punctures coarse and coalescent in all head, posterior lateral margins stronger; frons less excavate than in males, almost flat; ocular canthus triangular to subtriangular, less projected laterally than in males, and protruding less than hallway into eye; temporal process rounded, less projected than ocular canthus; mandibles smaller than head, slightly turned upwards; internal tooth subrectangular, wider in left mandible; apex acute and sharped, with a superior dentiform process, more pronounced in left mandible. ***Pronotum***: Rough aspect, with strong punctures in all pronotum areas; anterior margin with a central pair of shiny tubercles, not projected; lateral margins convex externally; anterior angles pronounced and acute. ***Elytra***: Shape more elongate, longer than pronotum, head and mandibles together; striae more visible, larger scales; interstriae more pronounced, almost subcostate. ***Legs***: Mesotibiae with 3 or more teeth; apex of metatibiae truncate and longer than in males, surpassing first tarsomere. *Venter*: Surface more punctate in general; mesosternum less projected.

Distribution. This new species was collected in Brazilian South Region, in the states of Paraná, Santa Catarina and Rio Grande do Sul.

Remarks. This species is close to *M. auritus* and differs from it for the direction of the internal tooth that points dorsally.

Species removed from *Metadorcinus* Kriesche, 1922

Sclerostomus beneshi Martínez, 1953 rev. stat.

(Figure 11 A–H)

Sclerostomus beneshi Martínez, 1953: 43 [figs. 1–2, original description]; Benesh, 1960 [catalog].

Beneshius beneshi: Weinreich, 1960 [pl. 6, fig. 21, revision]; Krajcik, 2001: 23 [catalog]; Krajcik, 2003: 35 [catalog].

Metadorcinus beneshi: Maes, 1992: 54 [catalog]; Grossi & Vaz-de-Mello, 2007: 56–57 [list and identification key]; Simoens, 2010: 1, 4, 7, [figs. 2, 4, 6, citation and list].

syn. nov. *Metadorcinus aku* Simoes, 2010 [figs. 1–4, original description].

Type material of *Sclerostomus beneshi*. Holotype ♂ examined only by photographs from original description. Labeled: Argentina, Provincia de Jujuy, Trementinal X-1946 (J. P. Duret-leg.).

Additional material. BOLIVIA. **Santa Cruz.** Amboro National Park Los Volcanes, c: 3♂2♀, 20.XI/12.XII.2004, 1000 m, 18°06'S, 63°36'W., MV light sheet on stream beach, Barclay, M.V.L. & Mendel, H. leg (4 BMNH) (1MJPC); Florida Prov., Achira Resort, 7 km N Samaipata: 1♂, 22-25.I.2007, 18°09'S, 63°49'W, 1350 m, S.W. Lingafelter leg (NEWC); Florida Prov., Vicoquin área above Achira Road to Amboró: 1♂, 18°07'S, 63°47'W, 1730 m, 22-25.I.2007, S.W. Lingafelter leg (NEWC); 1♂, same, except "24-25.I.2007, 2000m, Wappes & Lingafelter

leg (CERPE); 1♂, 4k N Bermejo 11-17.XII.2012, Wappes & Skillman leg; 1♂, N Bermejo Ref. los Volcanes, 08-11.XII.2011, 1350m, Wappes, Lingafelter, Morris & Woodley leg. **Caranavi**. N. Yungas: XI-XII.1950, 1500m, H. Bomans leg.

Remarks. This taxon was described in *Sclerostomus* and has the main characters that define the genus, as well as being related to *S. costatus* in the phylogeny, has led to its status being revised in this work. Although we did not have access to the type material, the proposed synonymy for *S. aku* syn. nov. is justified by the absence of characters that would allow its separation from *S. beneshi* comb. nov. The original description points out the difference in the shape of the basal tooth and distribution (Simoens, 2010). Specimens from Bolivia and Argentina exhibit the same variation in this character.

Sclerostomus dentifer (Mollemkamp, 1912) rev. stat.

(Figure 13 B)

Sclerostomus dentifer: Luederwaldt, 1935: 550 [monography]; Benesh, 1960: 36 [catalog].

Scortizus dentifer Möllemkamp, 1912: 301 [original description]; Blackwelder, 1944: 196 [catalog].

Beneshius dentifer: Weinreich, 1960: 66–68 [pl. 10, fig. 47, misidentified female of *Metadorcinus amuelleri*]; Weinreich, 1963: 209–211 [pl. 16, figs. 22–23, revision]; Krajick, 2001: 19 [catalog]; Krajick, 2003: 36 [catalog].

Metadorcinus dentifer: Maes, 1992: 54 [catalog]; Grossi & Vaz-de-Mello, 2007: 56–57 [list and identification key].

nom. nud. Pycnosiphorus dentifer: Didier & Séguy, 1953: 165 [catalog].

Type material. Holotype ♂ and allotype ♀ not examined. Probably lost, not found at MNHN.

Additional material. BRAZIL. **Espírito Santo.** Santa Teresa: 1♀, 19.XII.1966, C. & C. T. Elias leg (DZUP 486179).

Remarks. Weinreich (1960) transferred this species from *Sclerostomus* to *Beneshius*, a genus proposed by the same author in the same work. Later, the genus was synonymized with *Metadorcinus* by Grossi & Vaz-de-Mello (2007), and this species was conventionally included in that. In this study, we were not able to analyze a male specimen, but the drawing provided by Weinreich (1963) is very well illustrated and shows the elevated external margin of the ocular corner, a common characteristic of *Sclerostomus*. Due to this, we propose that this taxon be reclassified into the genus in which it was originally described.

Sclerostomus hastatus Westwood, 1855 rev. stat.

(Figure 13 A)

Sclerostomus hastatus Westwood, 1855: 205–206 [pl. 11, fig. 2, original description].

Sclerostomus plagiatus: Luederwaldt, 1935: 543 [fig. 47, monography].

Beneshius plagiatus: Weinreich, 1960: 55 [revision]; Krajick, 2001: 19 [catalog].

Metadorcinus plagiatus: Maes, 1992: 54 [catalog]; Grossi & Vaz-de-Mello, 2007: 57 [list and identification key].

Scortizus hastatus: Thomson, 1862: 400 [catalog]; Room, 1910: 46 [catalog]; Dider & Séguy, 1953: 167 [catalog].

nom. nud. Scortizus ab. plagiatus: Benesh, 1960: 42 [catalog].

nom. nud. Sclerognathus plagiatus: Gemminger & Harold, 1868: 962 [catalog].

Type material. Holotype ♂ not examined.

Additional material. BRAZIL. **Rio de Janeiro.** Petropólis: 1♂, 07.X.1940, F. Ohaus leg (MZSP); Teresópolis, Granja Comari: 1♂, 28.I.1975, A. M. Bello leg (CERPE). **Paraná.** São José

dos Pinhais, Estrada dos Castelhanos: 1♀, 27.I.2007, 345m, luz, Grossi, Rafael & Bizarro leg (CERPE). **Santa Catarina.** São Bento do Sul, km 26: 1♂, 18.XI.2002, luz, I. Rank leg (CERPE).

Remarks. Right after the description by Westwood (1855), this species was historically cited as a synonym of *Sclerostomus plagiatus* **rev. stat.** Here, we propose the revalidation of this taxon based on the original descriptions and illustrations of the *S. plagiatus* holotype by Weinreich (1960). It was possible to observe that they are two different species due to differences in the shape of the mandible, body size, tegument, and punctuation, as well as the study of the genitalia in the available physical specimens.

Sclerostomus plagiatus Burmeister, 1847 stat. rev.

(Figure 12 A–G)

Sclerostomus plagiatus Burmeister, 1847: 425–426 [original description]; Westwood, 1855: 206 [citation]; Parry, 1864: 95 [catalog]; Parry, 1970: 113 [catalog]; Luederwaldt, 1935: 543 [monography. Fig. 47 actually is a *Sclerostomus hastatus*]; Mizunuma & Nagai, 1994: 313 [pl. 151, fig. 157, male and female misidentified as *Sclerostomus costatus*].

Beneshius plagiatus: Weinreich, 1960: 55–56 [pl. 5, figs. 13–14, revision and identification key]; Krajick, 2001: 23 [catalog]; Krajick, 2003: 36 [catalog].

Metadorcinus plagiatus: Maes, 1992: 45 [catalog]; Grossi & Vaz-de-Mello, 2007: 56–57 [list and identification key].

Scortizus hastatus: Thomson, 1862: 400 [catalog].

nom. nud. Sclerognathus plagiatus: Gemminger & Harold, 1868: 962 [catalog].

Type material. Holotype not examined, probably in MLUH.

Additional material. BRAZIL. **Paraná.** Piraquara. Mananciais da Serra: 1♂2♀, XI.2008, breed, Grossi & Parizotto legs. (CERPE); 1♂, 01.I.2007, 252946°S 485854°W, 1000m, breed Grossi &

Correa da Rocha legs (CERPE); 2♀, same, except "16.17.XII.2006, Arm. Luminosa lençol, Rafael & Melo legs. (CERPE); 1♀, same, except "16.X.2006, sob casca de madeira" (CERPE); 1♀, 28.X.2010, em *Tibouchina* sp. (CERPE); 1♀, 10.IV.2009, riacho (CERPE); 1♂, XI-2011, breed (CERPE); 1♀, I.2012, breed (CERPE); Guaratuba, Pontal do Itararé: 2♂3♀, VII-IX.2005, 900-1500m, P. Grossi leg (CERPE). **São Paulo.** Salesópolis, Estação Biológica da Boracéia: 1♂, I.2009, 850m, P. Grossi & D. Parizotto legs (CERPE); 1♀, same, except "23-29.XI.2008" (CERPE). **Santa Catarina.** São Bento do Sul, Rio Vermelho: 1♂, I.1957, A. Muller (CMNC).

Remarks. Another specie that was originally described in *Sclerostomus* and was transferred to *Metadorcinus* due to the historically poor taxonomic delimitation that has always existed among South American stag beetles species. In addition to what was demonstrated in the phylogeny, the morphological characters present in the species are covered by the description of *Sclerostomus*. Therefore, we designate it back to its original genus.

Andinolucanus lineatus (Deyrolle, 1864) comb. nov.

Sclerostomus lineatus Deyrolle, 1864: 319–320 [original description]; Parry, 1864: 108 [catalog].

syn. *Metadorcinus lineatus*: Maes, 1992: 54 [catalog]; Grossi & Vaz-de-Mello, 2007: 56–57 [list and identification key].

nom. nud. Sclerognathus lineatus: Room, 1910: 45 [catalog].

nom. nud. Pycnosiphorus lineatus: Didier & Séguy, 1953: 165 [catalog].

Type material. Holotype ♀ not examined.

Remarks. The examination of this taxon was difficult, as there is no material available in collections, neither was it possible to examine the type material. Therefore, it was only possible to analyze the drawing of the female holotype made by Deyrolle (1864) in the original description. Grossi & Vaz-de-Mello (2007) had already pointed out that the iridescent pubescence of the

pronotum and elytra were similar to the genus *Andinolucanus* Arnaud & Bomans, 2006. However, without the analysis of material, they opted not to decide. In this work, we decided to definitively transfer the species to *Andinolucanus*, as it is the genus that best fits the description of this species, given that it is not possible to determine if this species belongs to a new genus.

New genus 1 gen. nov.

Type species. *Sclerostomus signatipennis* Deyrolle, 1864. Here designated.

Diagnosis. Small specimens, with coloration ranging from copper-red to matte black. Male mandibles are slightly curved upwards, with a ventral groove starting at the base and setae pointing laterally. Temporal process may or may not be present in males and is absent in females. Surface of the pronotum and elytra is covered with tufts of sparse, branched setae. Pronotal disc has four small depressions, two on each side. The anterior margin of the pronotum is weakly projected to slightly truncate.

Description. *Size*: *Total length* 9,5–13 mm *Total width:* 4,0–4,7 mm. ***Color***: Surface in general gray or dark brown with reddish tones; dorsally dull aspect in males, females slightly shiny; ventrally displaying shiny dark brown distinct tones. ***Head***: Shape transverse, shorter than wide, with a V-shape depression in center; punctures moderate to coarse, stronger in females, males fine in center and coalescent in lateral posterior margins; two pronounced supraocular protuberances; ocular canthus rounded to subrectangular, projecting laterally and protruding halfway into eye, less projected in females; temporal process present or not in males, in females totally absent; mandibles same size as head, slightly curved upwards; ventral groove beginning in mandibles base and ending before apex, filled with setae pointing laterally at base. ***Pronotum***: Shape transverse, shorter than wide, but longer than head; convex with a slight diamond shape concavity in disc, laterally a pair of small square depressions; punctures moderate to rough, stronger in

longitudinal groove; lateral margins filled with clumped yellow setae; anterior angles projected and acute, posterior angles obtuse or rounded in females; anterior margin with a pair of shiny tubercles or conical protuberance, projected forwards or truncate. ***Scutellum***: Subtriangular, depressed anteriorly and convex posteriorly, filled with strong setae in tuff. ***Elytra***: Shape elongate, as long as pronotum and head together; rough aspect with strong punctures; striae formed by pronounced scales; interstriae simple to subcareniform, more pronounced in females; covered by yellow setae in tuff, sparse in disc and more concentrate in posterior margin; humeral callus pronounced and acute. ***Legs***: Protibiae displaying 5–6 external teeth, increasing in size distally, variable number of small teeth between the large ones; anterior apical spur smooth; mesotibiae and metatibiae with two or more external teeth; metatibiae apex sharped in males, in females branched and truncate, same size as first tarsomere. ***Venter***: Mesosternum slightly convex, not projected, with strong punctures. ***Male genitalia***: Genital capsule complex; dorsal plate weakly sclerotized in disc, displaying small spicules; anterior margin flat or concave and posterior margin strongly bifurcate in two acute apices; lateral projections surpassing posterior margin in size; ventral plate with posterior rectangular projection in center, laterally two membranous acute posterior projections; lateral margins with anterior projections; parameres very elongate, displaying long setae internally; medium lobe apex wider than base. ***Female genitalia***:

Etymology. The name of this genus is derived from *Scortizus*, as it shares closer relationships with this taxon. "*Scortizin*" is the prefix and "*us"* the suffix.

Distribution. To date, the genus is restricted to the states of Minas Gerais and São Paulo, in the Brazilian Atlantic Forest domain.

Remarks. This genus shares close relationships with *Scortizus*. The characters that approximate these two taxa are the tufts of setae on the pronotum, scutellum, and elytra, but it can be differentiated by the bifurcated form of the males mandibles and the four-shaped pronotal

depressions. Additionally, it shares the setae on the inner margin of the parameres with *Sclerostomus*.

New genus 1 *signatipennis* (Deyrolle, 1864) comb. nov.

(Figure 13 C–F)

Sclerostomus signatipennis Deyrolle 1864: 319 [original description]; Parry 1864: 96 [pl. 3, fig. 2, catalog and illustration]; Luederwaldt 1935: 553: 555 [fig. 41, monograph]; Weinreich 1958: 285 [list]; Benesh 1960: 36 [catalog].

Pycnosiphorus signatipennis: Didier & Séguy 1953: 166 [catalog]

Beneshius signatipennis: Weinreich 1960: 65-66 [pl. 8, fig. 34, revision and illustrations]; Weinreich 1963: 208-209 [catalog]; Krajcik 2001: 23 [catalog]; Krajcik 2003: 36 [catalog].

nom. nud. Sclerognathus signatipennis: Roon 1910: 45 [catalog]; Blackwelder 1944: 196 [catalog].

Type material. Holotype ♂ not examined, probably at MNHM.

Additional material. BRAZIL. **São Paulo.** Salesópolis. Estação Biológica Boracéia: 1♂, 10.I.1963, A. Rabello leg (MZSP). **Minas Gerais.** Fazenda dos Campos: 1♂, 17.XII.1921, 1500m, F. J. Zikán leg (FIOC).

Remarks. The female of this species is still unknown, so there is not possible to attest it has a temporal process as the male.

New genus 1 sp A sp. nov.

(Figure 14 A–H)

Type material. Holotype ♂ labeled:

Diagnosis. Small specimens, color black to coppery tones. Mandibles with a wide subtriangular internal tooth. Ocular canthus subrectangular, temporal process absent in both sexes. Head and pronotum finely punctate. Anterior margin of pronotum with truncate projection, less apparent in minor males, females only a pair of tubercles. Elytra with scattered punctures and covered by sparse tufts of setae.

Description. Holotype ♂: ***Size*****:** *Total length*: 13mm. *Total width*: 4,7mm. ***Color*****:** Surface black matte, dark brown in legs, lateral margins of pronotum, mandibles base and antennae; slightly shiny aspect; ventrally black and shiny. ***Head*****:** Shape transverse, wider than longer, with a slight central concavity in V-shape; puncture fine to moderate, sparse in disc and posteriorly coalescent at laterals; frons slightly depressed and excavate in mandibles base, giving it a sinuous aspect; ocular canthus subrectangular, projected externally, laterals slightly emarginate, protruding less than halfway into eye; two smooth supraocular protuberances above canthus; temporal process absent; mandibles as long as head, gradually curved upwards; basal tooth small and rounded; superior medial tooth obtuse; apex bifurcate, superior margin rounded and inferior margin acute, serrate aspect bellow, and displaying a sharped medial inferior dentiform process; ventral groove turning internally after mandibles base, filled with yellow setae pointing laterally; mentum subtrapezoidal, slightly concave and moderate punctures; gena with scattered rough punctures and small setae in lateral margins; gula finely punctate, small setae anteriorly, smooth posteriorly. ***Pronotum*****:** Shape transverse, wider than head; convex, with a small longitudinal depression in disc and a pair of lateral smaller semicircular declivities; punctures moderate, more pronounced in longitudinal suture; anterior angles projected and acute, posterior angles rounded; anterior margin with a central projection, truncate, and shiny, weakly projected; lateral margins covered by sparse setae in tuff. ***Scutellum*****:** Subtriangular, slightly depressed anteriorly and convex posteriorly, apparently glabrous and strongly punctate. ***Elytra*****:** Shape elongate, as long as pronotum, head and

mandibles together; punctures strong and coalescent, giving it a rough aspect; striae formed by pronounced scales, often misaligned; interestriae subcareniform and longitudinally interrupted; humeral callus present; covered by sparse setae in tuff, more pronounced in lateral margins. ***Legs*****:** Protibiae entirely covered by teeth, six distinct large external teeth increasing in size distally and smaller ones between them, giving it a serrate aspect; anterior apical spur smooth and acute; mesotibiae displaying four external teeth increasing in size distally; apex of mesotibiae branched in spinous processes; metatibiae with two external teeth; apex of metatibiae branched in sharp teeth, no surpassing first tarsomere. ***Venter*****:** Prosternum rough, strongly punctate, with presence of small setae; prosternal projection smooth and shiny; mesosternum convex, weakly projected, with strong setose punctures; punctation equal in all abdominal ventrites, covered by sparse yellow setae. ***Genitalia*****:** Genital capsule complex; dorsal plate subtriangular; posterior margin with strong emargination, dividing in two acute lobes; at laterals, one posterior projection longer than posterior margin; anterior margin flat, no emarginate; disc membranous with scattered spicules; ventral plate posteriorly wider; apex with a wide rectangular projection, laterally one acute projection, bellow it one anterior projection; aedeagus with large parameres, covered by long setae; medium lobe elongate, apex slightly emarginate; internal sac with a pair of basal sclerites.

Paratype female. *Size***:** *Total length*: 9,5mm. *Total width*: 4mm. Similar to male, except for the following characters: ***Head*****:** Punctures strong and coalescent in all head; ocular canthus smaller, subtriangular, protruding less than halfway into eye, and not projected laterally; mandibles smaller than head; internal tooth emarginate, wider in left mandible; apex not bifurcate, acute and sharped; ventral groove absent, glabrous, only with a slight depression. ***Pronotum***: Slightly more punctate than in males, punctures moderate to strong; lateral margins not parallel, convex; anterior

margin with central small elevation, not projected; longitudinal groove edge shiny. ***Elytra***: Shape more elongate than in males. ***Legs***: Apex of metatibiae truncate and surpassing first tarsomere.

Distribution. To date, this species has been recorded in the states of Minas Gerais and São Paulo.

Remarks. There were specimens of this new species present in the *S. signatipennis* comb. nov. series, and it clearly differs from this series due to the absence of a temporal process in males.

New genus 2 gen. nov.

Type species. *Sclerostomus buckleyi* Waterhouse, 1886. Here designated.

Diagnosis. Small specimens, generally larger for Sclerostomini. Tegument distinctly lustrous, black coloration with a greenish sheen. Male mandibles bifurcated and strongly curved upwards. Ventral groove of mandibles very reduced, almost imperceptible, with pilosity present. Temporal process present in both sexes, quite prominent in males, surpassing the ocular angle. Pronotum surface sparsely punctuated. Anterior margin of the male pronotum with a rectangular projection, females with only a pair of tubercles. Elytral interstriae careniform.

Description. *Size*: *Total length* 10,7–16 mm *Total width:* 4,1–6 mm. ***Color***: Surface lustrous, entirely shiny greenish black, eventually with a red spot in pronotum disc; dull aspect only in head; ventrally shiny dark brown to black. ***Head***: Shape transverse, shorter than wide, with slight V-shape concavity in center; punctures fine and sparse in males, females with stronger punctures, more pronounced in depression; frons excavate, forming a small arc at mandibles base; ocular canthus subtriangular slightly sinuous, projecting laterally and protruding halfway into eye; temporal process in both sexes conical shape, projecting longer than canthus; mandibles longer than head in males, smaller in females, curved suddenly upwards; ventral groove restricted to small middle area of mandible, with small setae pointing downwards. ***Pronotum***: Shape transverse, as wide as head in males, wider in females; convex, with a small depression in

longitudinal groove; anterior angles truncate in males, rounded in females; posterior angles absent in both sexes; punctures sparse and fine. *Scutellum*: Subtriangular, wider anteriorly, glabrous, shiny, and small punctate. ***Elytra***: Shape elongate, as long as pronotum and head, longer in females; striae formed by rows of small scales; interstriae careniform, no interrupted, from anterior to posterior margin, finely and sparsely punctate; humeral callus little projected, almost rounded; covered by small setae in disc, more evident in lateral margins. ***Legs***: Protibiae with 6–7 external teeth increasing in size distally; anterior apical spur smooth; mesotibiae and metatibiae displaying two or more external teeth; apex of metatibiae no surpassing first tarsomere, truncate aspect. ***Venter***: Mesosternum slightly convex with a small flat area in longitudinal suture. *Male genitalia*: Genital capsule complex; dorsal plate posteriorly acute, strongly sclerotized; lateral margins with only one posterior sharped projection; ventral plate posteriorly wide, with a distal concavity; anterior extension gradually tapered; parameres elongate, with a rounded projection curved internally; medium lobe with a triangular invagination posteriorly; internal sac with one basal sclerite, small sclerotized. ***Female genitalia***: Hemisternites with membranous internal margin, external margin expanded, subrectangular; styli only with external expansion; base of spermatheca with cylindrical projection.

Distribution. This genus is restricted to Ecuador.

Remarks. For now, this is the only genus of Sclerostomini from Ecuador, and appears to be closely related to *Sclerostomus*, sharing characters related to the pronotal margin. This genus is characterized by a lustrous black integument with a metallic green sheen, the presence of a temporal process in both sexes, a highly reduced ventral mandibular groove, and females with a rounded basal tooth. Lastly, the elytral interstriae are careniform and uninterrupted.

New genus 2 *buckleyi* (Waterhouse, 1886) comb. nov.

(Figure 15 A–F)

Sclerostomus buckleyi Waterhouse 1886: 497 [original description]; Boileau 1913: 259; Benesh 1960: 35 [catalog]; Mizunuma & Nagai 1994: 280 [pl. 117, catalog].

Scortizus buckleyi: Didier & Séguy 1953: 167 [catalog].

Beneshius buckleyi: Weinreich 1960: 63–65 [fig. 1, revision]; Weinreich 1963: 209 [pl. 17, fig. 29, revision]; Bartolozzi, Bomans & Onore 1992: 152; Krajcik 2001: 23 [catalog]; Krajcik 2003: 35 [catalog].

Metadorcinus buckleyi: Maes 1992: 54 [catalog]; Grossi & Vaz-de-Mello 2007: 57 [key & list].

nom. nud. Sclerognathus buckleyi: Roon 1910: 44 [catalog]; Blackwelder 1944: 196 [catalog].

Type material. Holotype ♂ examined by images (NHMUK), labeled: "*Sclerostomus*/ *buckeyi* ♂/ (Type Waterh.)" "*Beneshius buckeyi*/ (Waterhouse) Holotypus ♂/ det. L. Bartolozzi 1988" "BMNH(E)/ #606682".

Additional material. ECUADOR. **Azuay.** Girón: 1♂, IV.2001, 2800m, Ismael Aldáz leg (CERPE); 1♂, XI.2002 (CERPE). **Imbabura.** Lita: 1♂, XII.2002, 1000m, P. Arnaud leg (CERPE). **Loja.** Loja: 1♂2♀, XII.1999, 2500m (CERPE).

New genus 3 gen. nov.

Type species. *Beneshius sylviae* Boucher, 1993. Here designated.

Diagnosis. Small specimens. Tegument very lustrous, shiny black. Male mandibles strongly curved upwards and directed inward. Ventral groove of mandibles extending to the apex and completely filled with setae. Temporal process present only in males. Anterior margin of the pronotum with a triangular projection in males and a pair of small tubercles in females. Elytral interstriae simple, without elevation, and finely punctate.

Description. ***Size*****:** *Total length* 10,5–12,8 mm. *Total width:* 3,7–4 mm ***Color***: Surface entirely dark brown to metallic black, tegument distinct lustrous and shiny; ventrally shiny and dark brown to coppery tones. ***Head***: Shape transverse, wider than longer, centrally with a slight concavity; punctation moderate to strong, sparse centrally and coalescent laterally in males, females same punctures in all head areas; ocular canthus small projected externally, protruding hallway into eye or less; temporal process present in males and absent in females; mandibles longer than head in males, shorter in females, suddenly curved upwards. ***Pronotum***: Shape transverse, wider than head; convex, with a small depression in disc; punctures fine to moderate, more dense in longitudinal groove; anterior angles projected forward and acute, posterior angles obtuse; anterior margin with conical projection, projected one quarter over head in males, in females only a pair of small tubercles no projected. ***Scutellum***: Subtriangular, wider anteriorly, apparently glabrous, and sparsely punctate. ***Elytra***: Shape elongate, as long as pronotum, head and mandibles together, longer in females; surface lustrous, shiny, and apparently glabrous in disc, only small setae in lateral margins; striae formed by rows of moderate scales; interstriae simple, finely, and sparsely punctate; humeral callus evident and externally projected. *Legs*: Protibiae with large 6–7 external teeth increasing in size distally, serrated aspect with small teeth between largest ones; anterior apical spur smooth; mesotibiae and metatibiae displaying two or more external teeth; apex of metatibiae acute in males and truncate in females, no surpassing first tarsomere. ***Venter***: Mesosternum convex, no projected, sparsely punctate in disc and strongly in lateral margins. ***Male genitalia*****:** Genital capsule complex; dorsal plate elongate posteriorly, apex with narrow invagination centrally, dividing in two rounded lobes; lateral margins with smaller posterior projection; base with a strong concavity; ventral plate semicircular with anterior and posterior margins elongate; disc displaying pilosity in semicircular aspect; parameres tapered,

apex rounded with distinct setae; medium lobe divided in two parallel parts; internal sac with a pair of internal sclerites.

Distribution. This genus is currently restricted to only the type locality in Bolivia, in the Yungas province.

Remarks. This genus appears close to *Sclerodorcinus* and *Arnaudius*, sharing the character of the posterior concavity on the dorsal face of the male genital capsule. It can be separated from other genera by the distinct tegument lustrous and shiny metallic black integument, surface finely punctate, ventral mandibular groove of male mandibles ending at the apex, while in females the dorsal longitudinal groove is absent. Additionally, the male genitalia has a unique shape within Sclerostomini, with a posteriorly convex dorsal capsule.

New genus 3 *sylviae* (Boucher, 1993) comb. nov.

(Figure 16 A–E)

Beneshius sylviae Boucher, 1993: 420 [figs. 1–5, original description]; Krajcik, 2001: 23 [catalog]; Krajcik, 2003: 32 [catalog].

Metadorcinus sylviae, Grossi & Vaz-de-Mello, 2007: 57 [list and identification key].

Sclerostomus sp., Mizunuma & Nagai, 1994: 280–281 [catalog, wrong identification, pl. 117].

Type material. Holotype examined by images. **Holotype** ♂: BOLIVIA**. Nor Yungas.** Incahaura. Route de Caranavi env.: XI.1991, 1500m, S. Colas & G. Leucort (MNHN). **Allotype** ♀ not examined. **Paratypes:** 1♂, same as holotype (MNHN).

Additional material. BOLIVIA**. Nor Yungas**. Incahaura. Caranavi-Coroico: 1♂1♀, XI.2009, 1800m, B. Cavelius leg (CERPE).

New genus 4 gen. nov.

Type species. *Sclerostomus tucumanus* Nagel, 1932. Here designated.

Diagnosis. Small specimens, generally black or slightly coppery at the body margins. Tegument glossy and smooth. Male mandibles slightly curved upwards. Ventral groove extending to the apex of the mandibles, filled with small setae. Longitudinal dorsal groove of female mandibles present, with asymmetric internal teeth. Temporal process present only in males. Anterior margin of the pronotum centrally convex, without projections in both sexes. Elytral interstriae subcareniform and finely punctate.

Description. ***Size*****:** *Total length* 8,7–13 mm *Total width:* 3,8–5,1 mm. ***Color***: Surface dark brown to black, antennae, mandibles, legs, and other border in reddish tones, lustrous and shiny; venter shiny, coppery tones to dark brown. ***Head***: Shape transverse, wider than longer, disc slightly concave; punctures sparse centrally and coarse laterally in males, coalescent in females; frons excavate forming a broad arc at mandibles base, in females almost less evident; ocular canthus small projected laterally, protruding halfway into eye; temporal process present in males, absent in females; mandibles slightly curved upwards, ventral groove beginning after mandibles base and ending close to apex. ***Pronotum***: Shape transverse, wider than head; slightly convex, with small depression in disc; punctures moderate, equal in all pronotum; longitudinal groove very evident; anterior angles rounded to acute, posterior angles absent. ***Scutellum***: Subtriangular, anteriorly wide, and depressed, moderate punctures. ***Elytra***: Shape elongate, as long as pronotum, head and mandibles in males, longer in females; striae formed by rows of small scales; interstriae subcareniform, sparsely punctate; humeral callus no projected to rounded; surface apparently glabrous. ***Legs***: Protibiae with 4–6 large external teeth, increasing in size distally, displaying variable number of small teeth between largest ones; anterior apical spur with elongate setae; mesotibiae with 1–2 external teeth and metatibiae with only one spine in males, females with two or more teeth in mesotibiae and metatibiae; apex of metatibiae acute in males, truncate or

branched in females, surpassing first tarsomere. ***Venter***: Mesosternum slightly convex, no projected, punctures moderate to coarse. ***Male genitalia***: Genital capsule complex; dorsal plate posteriorly bifurcate in two acute lobes, bellow, two lateral membranous projections; base with a slight concavity; ventral plate wider posteriorly; posterior margin flat; subrectangular projection in disc, at base two lateral sclerotized transverse filaments; parameres rounded, with small setae in apex; medium lobe semicircular; internal sac with small basal sclerite.

Distribution. To date, this genus has only been collected in the Tucuman province in Argentina.

Remarks. This genus is closely related to *Sclerostominus* (Grossi, 2011), which is not included in this analysis, and shares with it the character of the anterior tibial spur with setae, as well as the subcarinate elytral interstriae that characterize the genus. The difference lies in the genitalia, which have unique characteristics for each genus. Due to the limited sampling in the Yungas region, it is presumed that more new species of this genus may occur.

New genus 4 *tucumanus* (Nagel, 1932) comb. nov.

(Figure 17 A–F)

Sclerostomus tucumanus Nagel, 1932: 119 [original description]; Bruch, 1939: 197 [catalog, pl. 1, figs. 3–4]; Martinez, 1953: 47 [fig. 3]; Benesh, 1955: 99; Weinreich, 1958b: 285; Benesh, 1960: 37 [catalog]

Pycnosiphorus tucumanus, Didier & Séguy, 1953: 166 [catalog]

nom. nud. Sclerognathus tucumanus, Blackwelder, 1944: 196 [catalog]

Type material. Holotype ♂ ex coll. Nagel, it was destroyed (Weinreich, 1960). **Neotype** ♂ labels: a) white label printed, "ARGENTINA. **Tucumán.** Horco Molle. Sierras San Javier: 20.I.1974, 700 m L. Stange leg." b) red label printed, "*Sclerostomus tucumanus*/ Nagel, 1932/ NEÓTIPO/ P.C. Grossi det. 2010" (IFML). **Neotype here designated.**

Additional material. ARGENTINA. **Tucumán.** Horco Molle. Sierras San Javier: 1♂2♀, I.1974, 700m, L. Stange leg (IFML); San Javier: 1♀, III.1950, R. Golbach leg (IFML); 1♀, same, except "IV.1974" (IFML); Chicligasta. Cochuna: 1♀, 06.XII.2004, 1200m, light, F. Penco leg (CERPE); 1♂, same, except "RP 365, 30.XII.2007" (CERPE).

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Table I. Taxa employed in the phylogenetic analysis.

OUTGROUP	INGROUP
	Metadorcinus auritus Kriesche, 1922
	Metadorcinus auritus aff.
	Metadorcinus beneshi (Martínez, 1953)
	Metadorcinus buckeyi (Waterhouse, 1886)
Casignetus spixi (Perty, 1830)	*Metadorcinus cruentus* (Burmeister, 1847)
Leptinopterus femoratus (Olivier, 1789)	*Metadorcinus neotragus* (Westwood, 1855)
Scortizus maculatus (Klug, 1825)	*Metadorcinus plagiatus* (Burmeister, 1847)
Sclerostomus costatus (Westwood, 1845)	*Metadorcinus ranki* Grossi & Vaz-de-Mello, 2007
Arnaudius digennaroi (Arnaud et al., 2008)	*Metadorcinus securiformis* (Luederwaldt, 1934)
Scortizinus wendyae (Arnaud & Bomans, 2006)	*Metadorcinus signatipennis* (Deyrolle, 1864)
	Metadorcinus signatipennis aff.
	Metadorcinus sylviae (Boucher, 1993)
	Metadorcinus tucumanus (Nagel, 1932)

Table II. Data matrix with 19 taxa and 55 morphological characters.

	0	**1**	**2**	**3**	**4**	**5**
Casignetus spixi	010---1---	0201221100	-00121101-	1101100000	????000-00	01100
Leptinopterus_femoratus	000---0---	0000020200	-00120100-	1101000000	01-0000-00	11100
Sclerodorcinus wendyae	0010-01110	1100110000	-100-0011-	0010011210	1110100-10	11110
Arnaudius digennaroi	0010-01-11	1100111011	0100-1011-	0010011210	2010010-11	11010
Scortizus maculatus	0011011-00	0101020000	-001201021	0100000010	2000101000	01010
Sclerostomus costatus	0111101010	1111111011	0111010120	0000011210	2001100-11	11110
Metadorcinus auritus	1111101110	1101200111	2000-0010-	0010010111	2000101001	11111
Metadorcinus sp. nov. 1	1111101111	1101200111	2000-0010-	0010010111	2000101001	11111
Metadorcinus cruentus	1111101111	1101110111	2000-0010-	0010010111	2000101001	11111
New genus 2 *buckleyi*	0111101121	1001110011	1100-10121	0000010210	11-0011111	00100
Metadorcinus neotragus	0111101010	1101121111	1100-0010-	0010010211	2000101001	01111
Metadorcinus ranki	0111101021	1101121111	0100-0010-	0010010211	2000101001	11111
Metadorcinus securiformis	011110112-	1101111111	1100-00111	0010010211	2000101101	11111
New genus 1 *signatipennis*	0211011011	1201101010	-01110110-	0100010210	2001100001	11110
New genus 1 sp. nov.	0211011011	1200001011	001100110-	0100010210	2001100-01	11110
New genus 3 *sylviae*	0211201221	1101001111	1100-1010-	0010011210	2010000-11	11110
New genus 4 *tucumanus*	1211101111	1101010010	-000-1011-	0010111210	2000100-10	10110
Sclerostomus beneshi	0111101010	1111210011	1110-10120	0000011210	2001100-11	11110
Sclerostomus plagiatus	0111101010	1111111010	-010-00120	0000011210	2001100-11	11110

Figure 1A–F: Head and pronotum. A) *M. auritus*, B) *M. ranki*, C) *Metadorcinus* sp. nov. 1, D) New genus 3 *silvyae* comb. nov., E) *M. securiformis*, F) *S. maculatus*

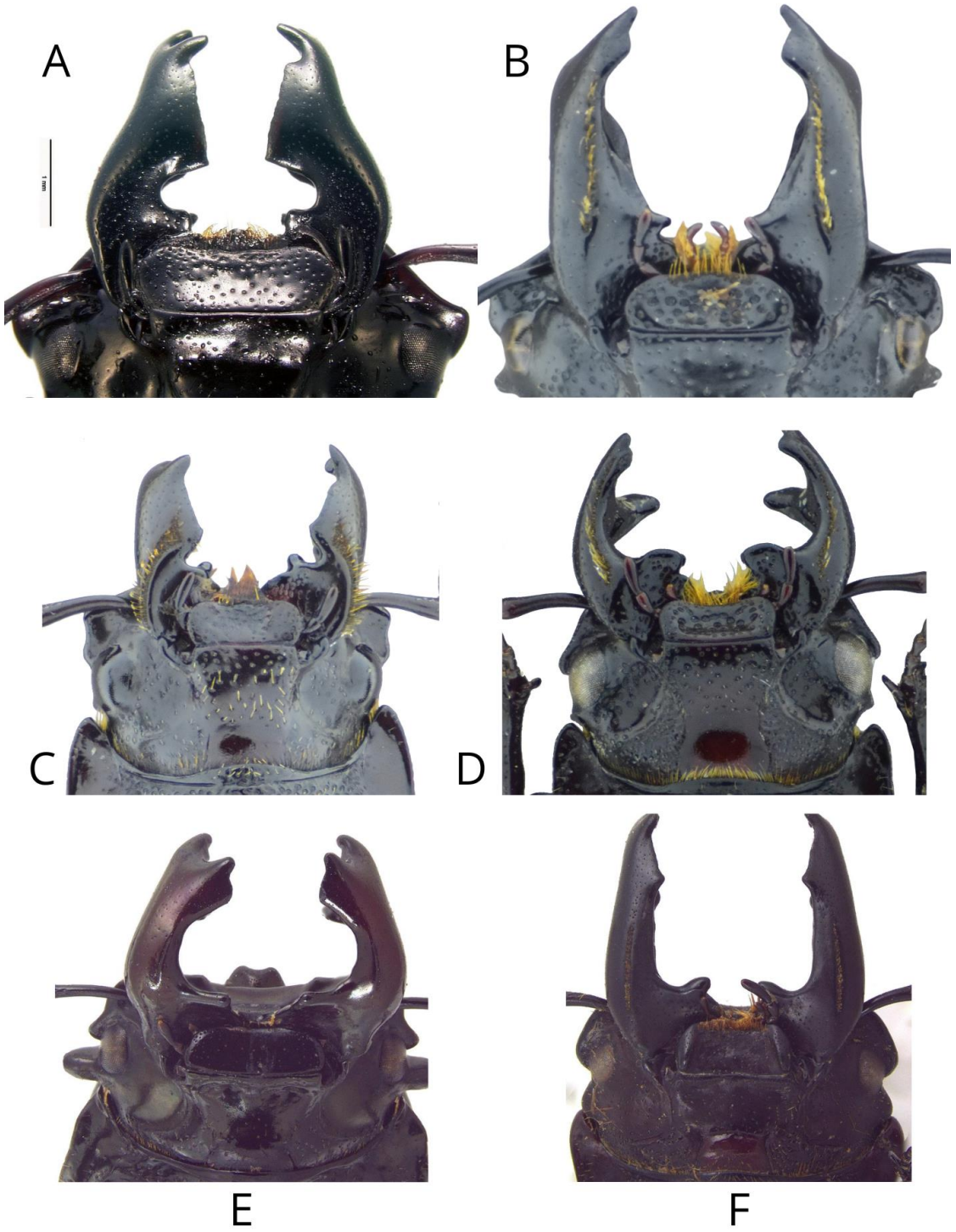

Figure 2A–F: Ventral view. A) *S. wendyae*, B) *M. neotragus*, C) New genus 1 sp. nov., D) New genus 3 *silvyae* comb. nov., E) New genus 2 *Bucleyi* comb. nov., F) *S. hastatus*.

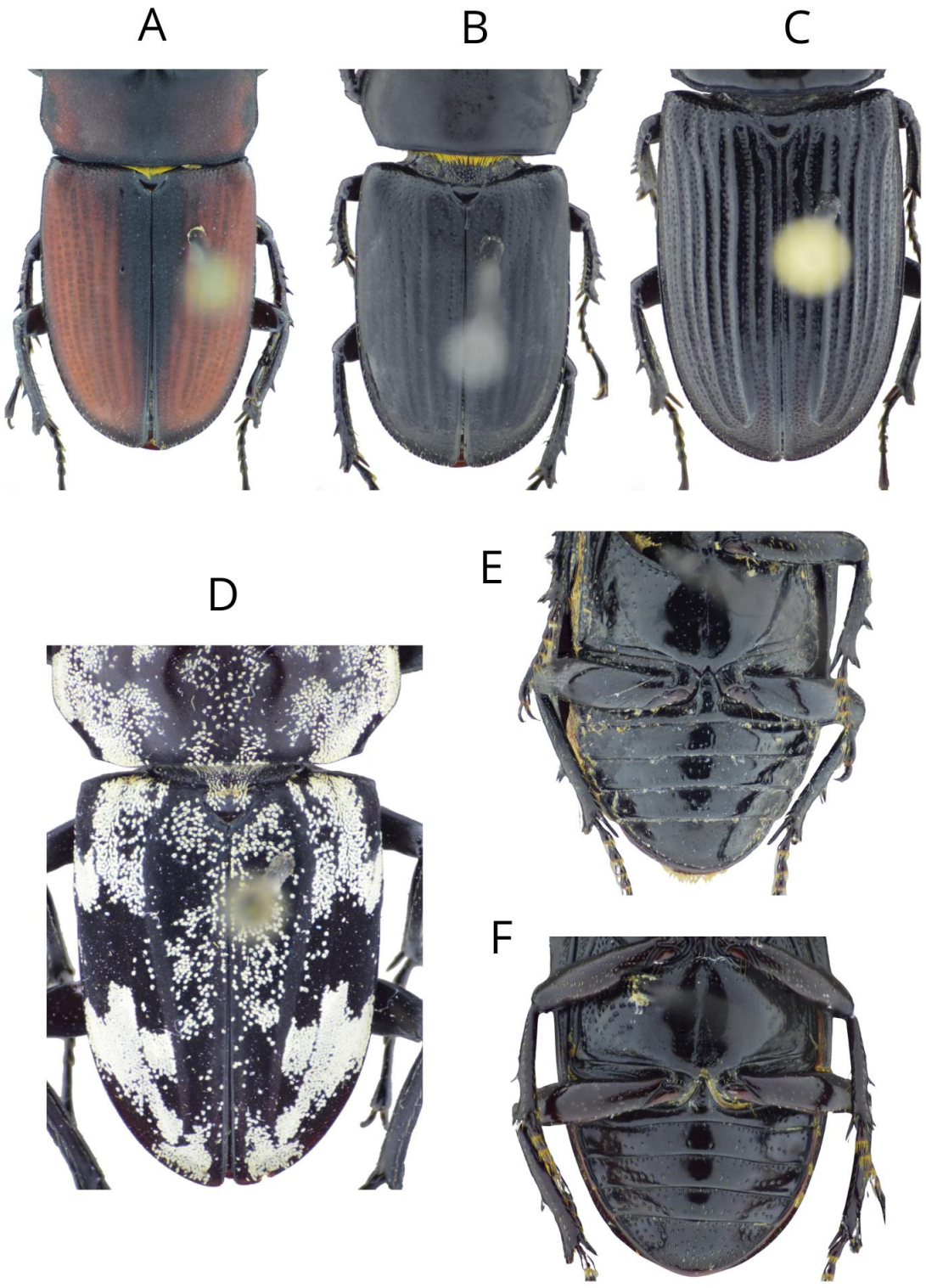

Figure 3A–F: Elytra and venter. A) *M. auritus*, B) *M. securiformis*, C) New genus 2. *bucleyi*, D) *S. maculatus*, E) New genus 3 *sylviae*, F) *M. neotragus*.

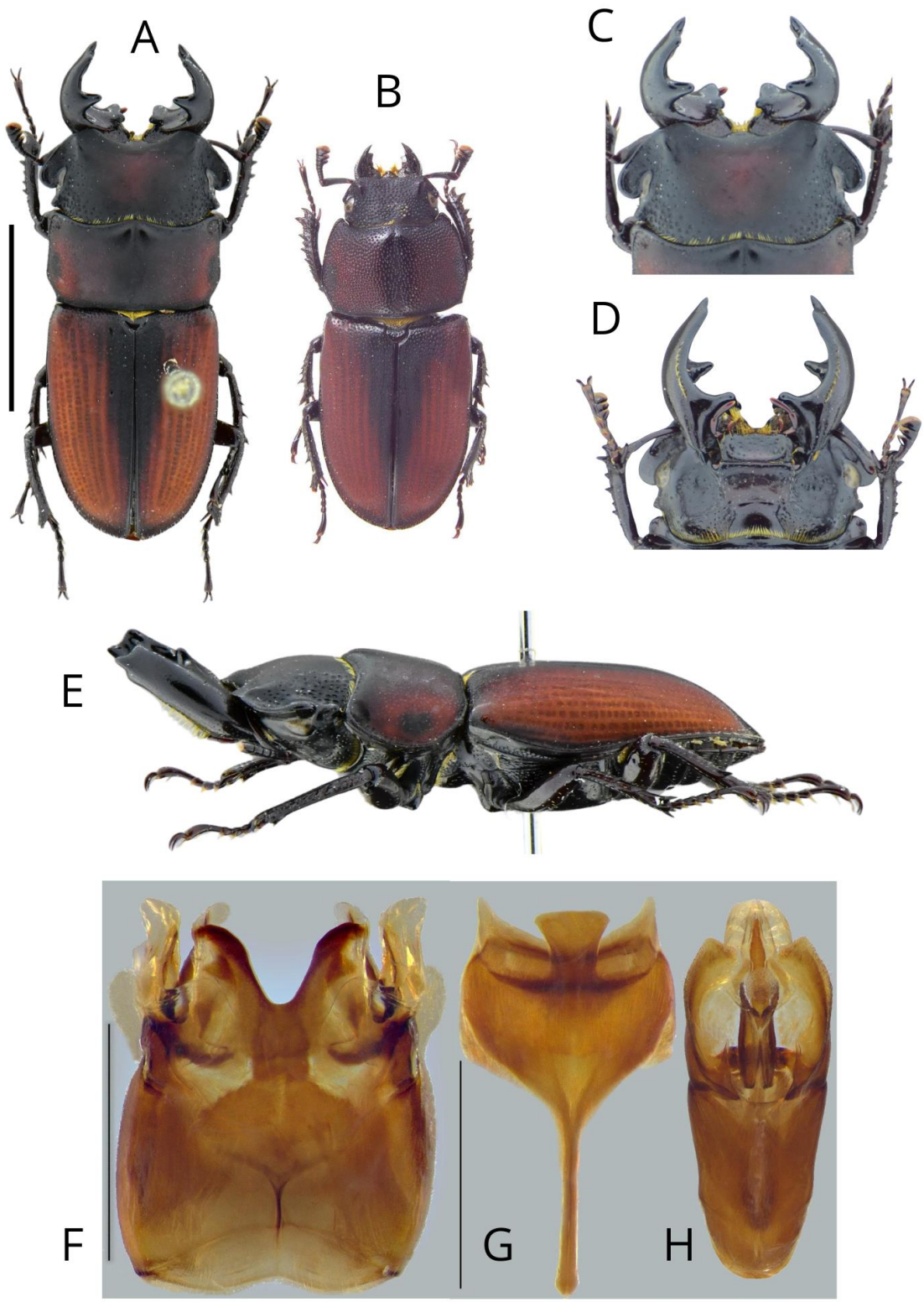

Figure 4A–H: *M. auritus*. A) male, (scale bars: 5mm) B) female, C) head dorsal, D) head ventral, E) male lateral view, F–H) male genitalia. (scale bars: 1mm)

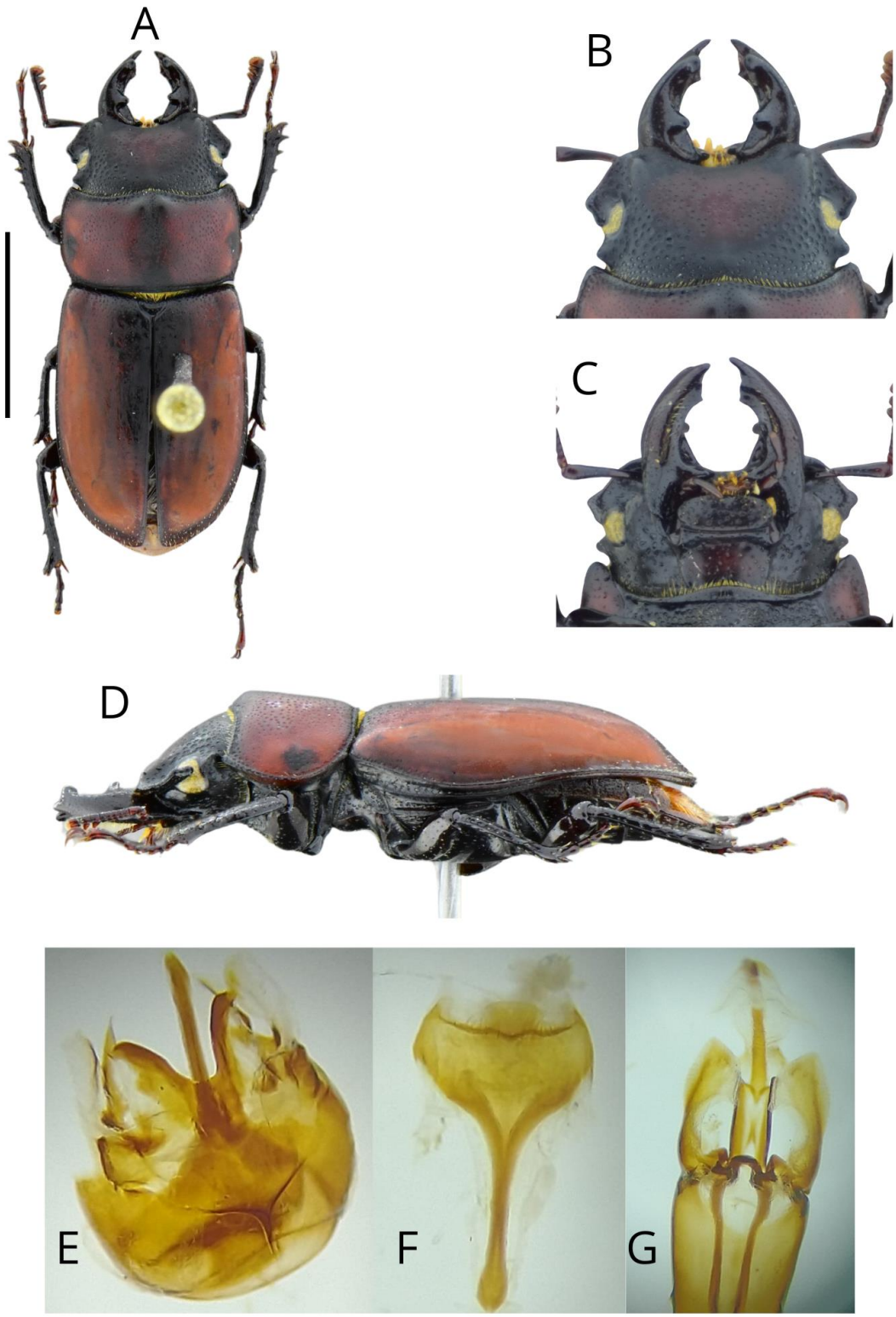

Figure 5A–G: *M. cruentus*. A) male, B) head dorsal, C) head ventral, D) male lateral view, E–G) male genitalia.

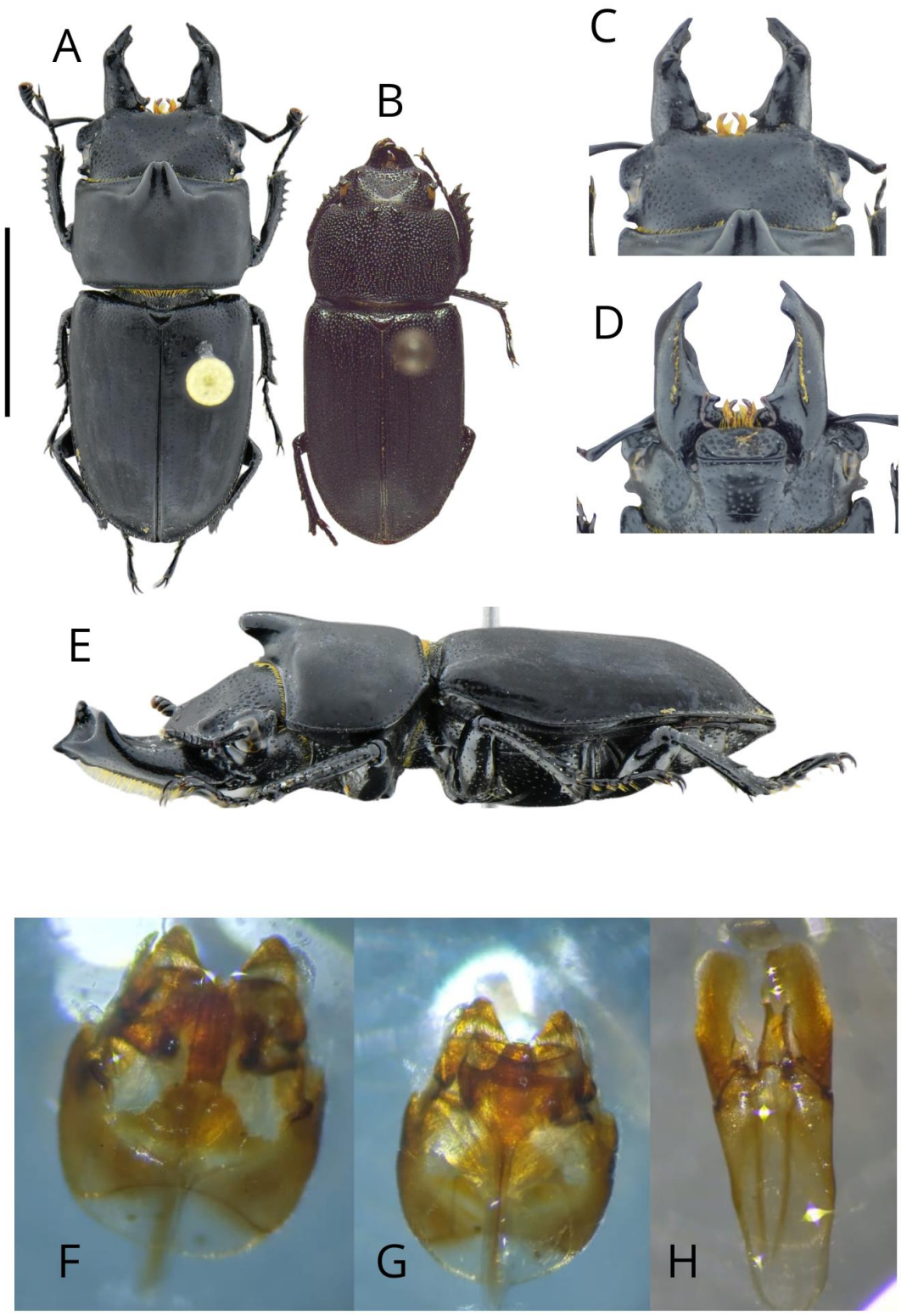

Figure 6A–H: *M. neotragus*. A) male, B) female, C) head dorsal, D) head ventral, E) male lateral view, F–H) male genitalia.

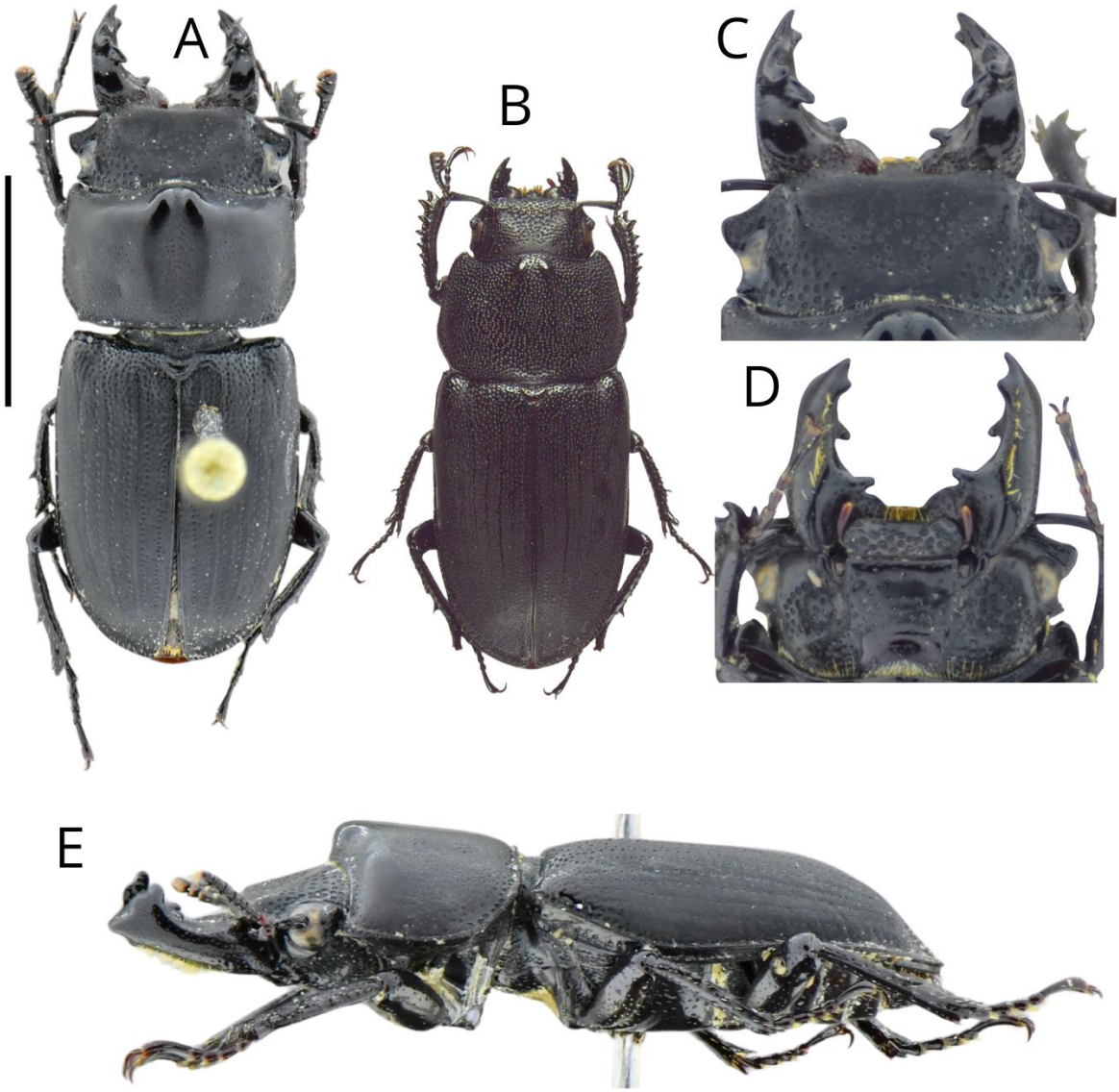

Figure 7A–E: *M. auritus*. A) male, B) female, C) head dorsal, D) head ventral, E) male lateral view.

Figure 8A–H: *M. securiformis*. A) male, B) female, C) head dorsal, D) head ventral, E) male lateral view, F–H) male genitalia.

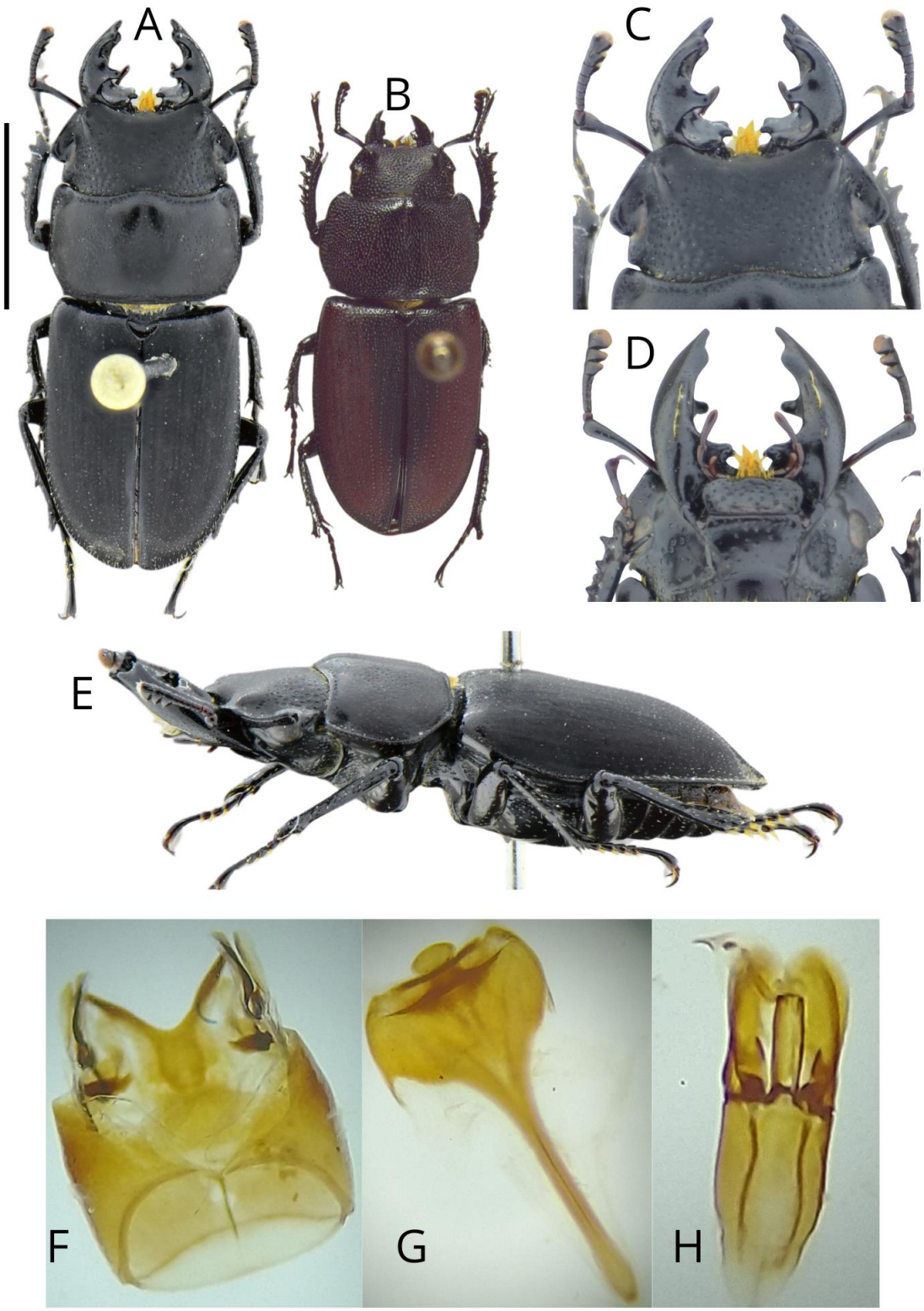

Figure 9A–H: *Metadorcinus* sp. nov. A) male, B) female, C) head dorsal, D) head ventral, E) male lateral view, F–H) male genitalia.

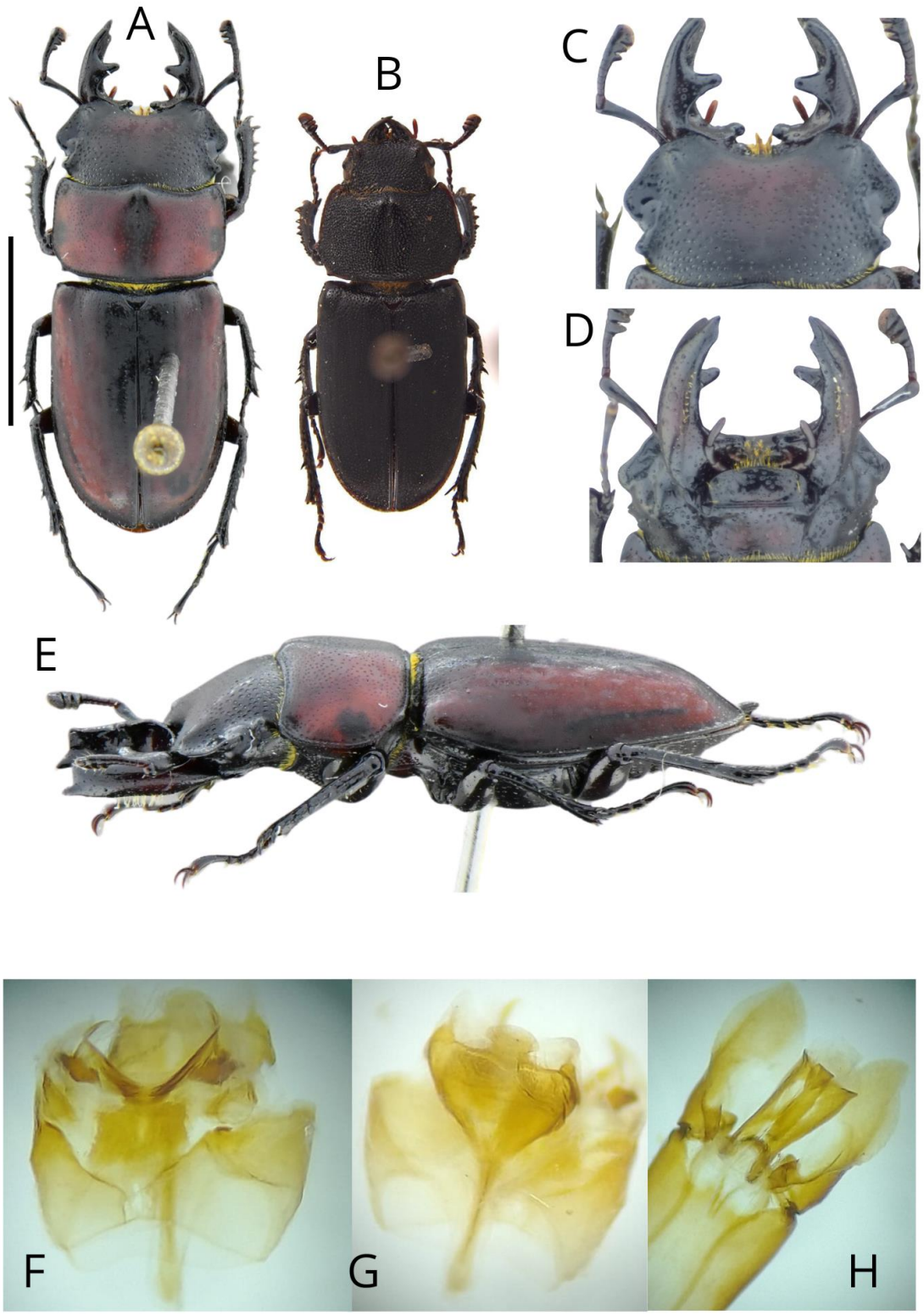

Figure 10A–H: *M. tristis*. A) male, B) female, C) head dorsal, D) head ventral, E) male lateral view, F–H) male genitalia.

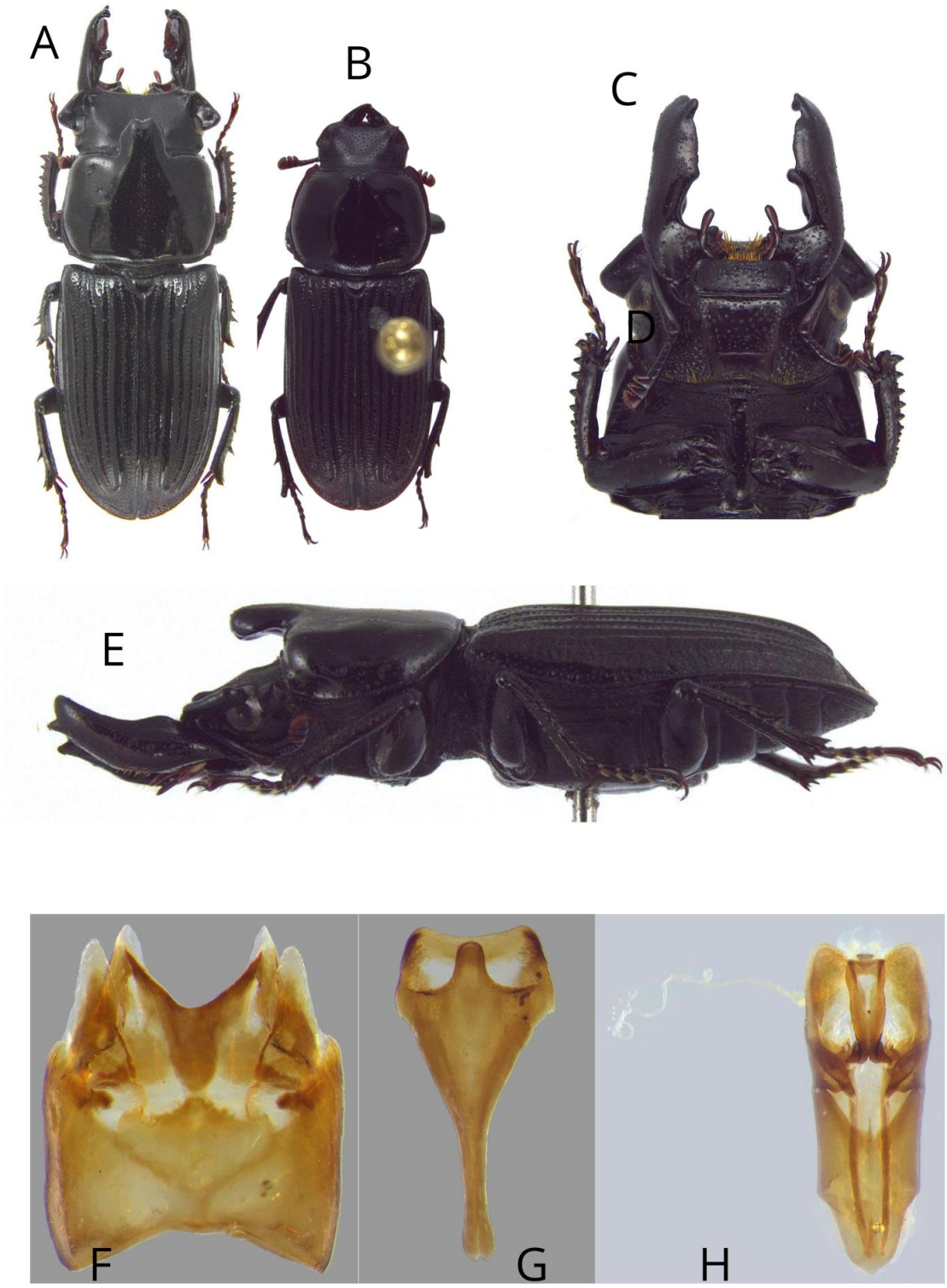

Figure 11A–H: *S. beneshi*. A) male, B) female, C) head dorsal, D) head ventral, E) male lateral view, F–H) male genitalia.

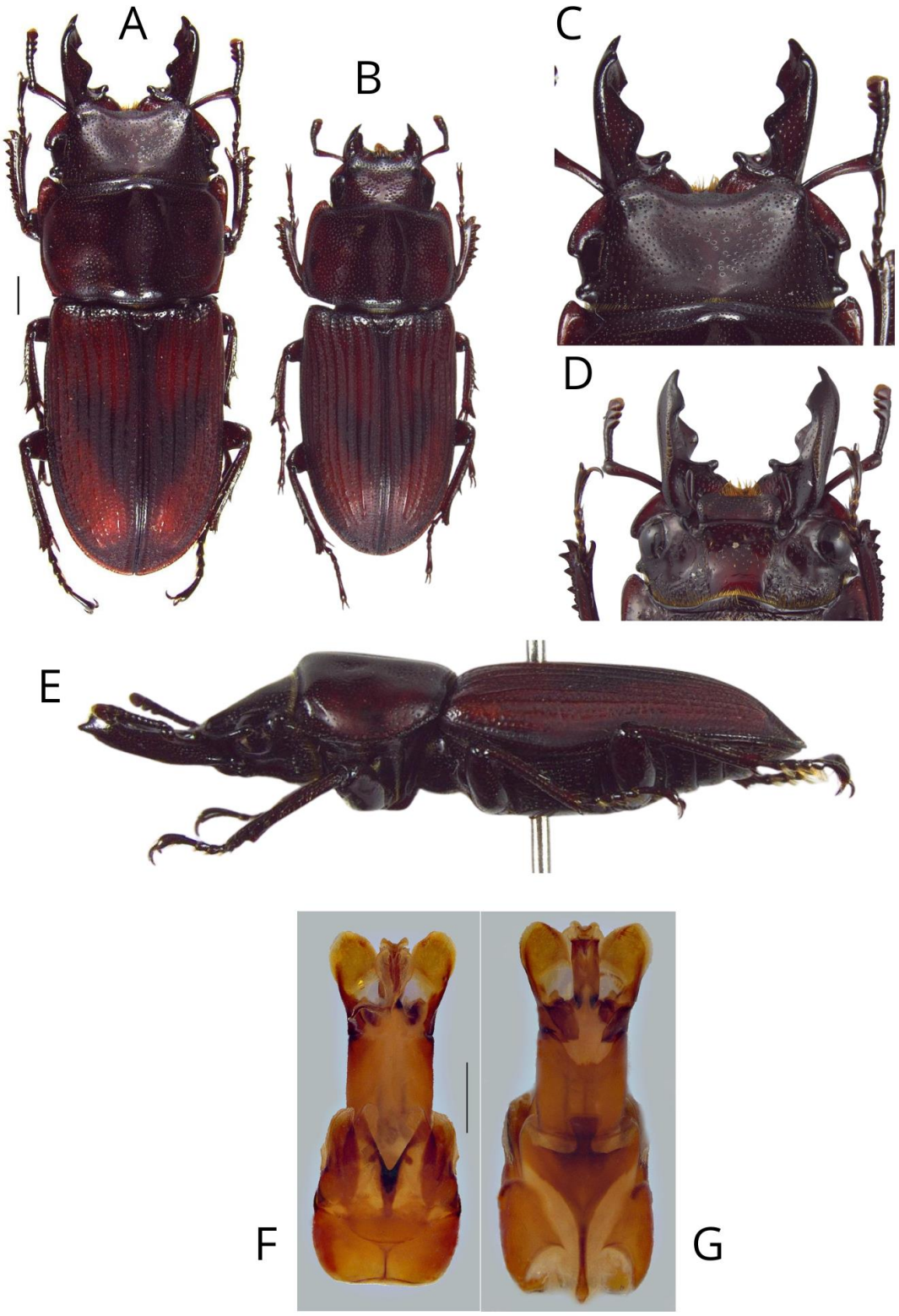

Figure 12A–H: *S. plagiatus*. A) male (scale bars: 1mm), B) female, C) head dorsal, D) head ventral, E) male lateral view, F–G) male genitalia.

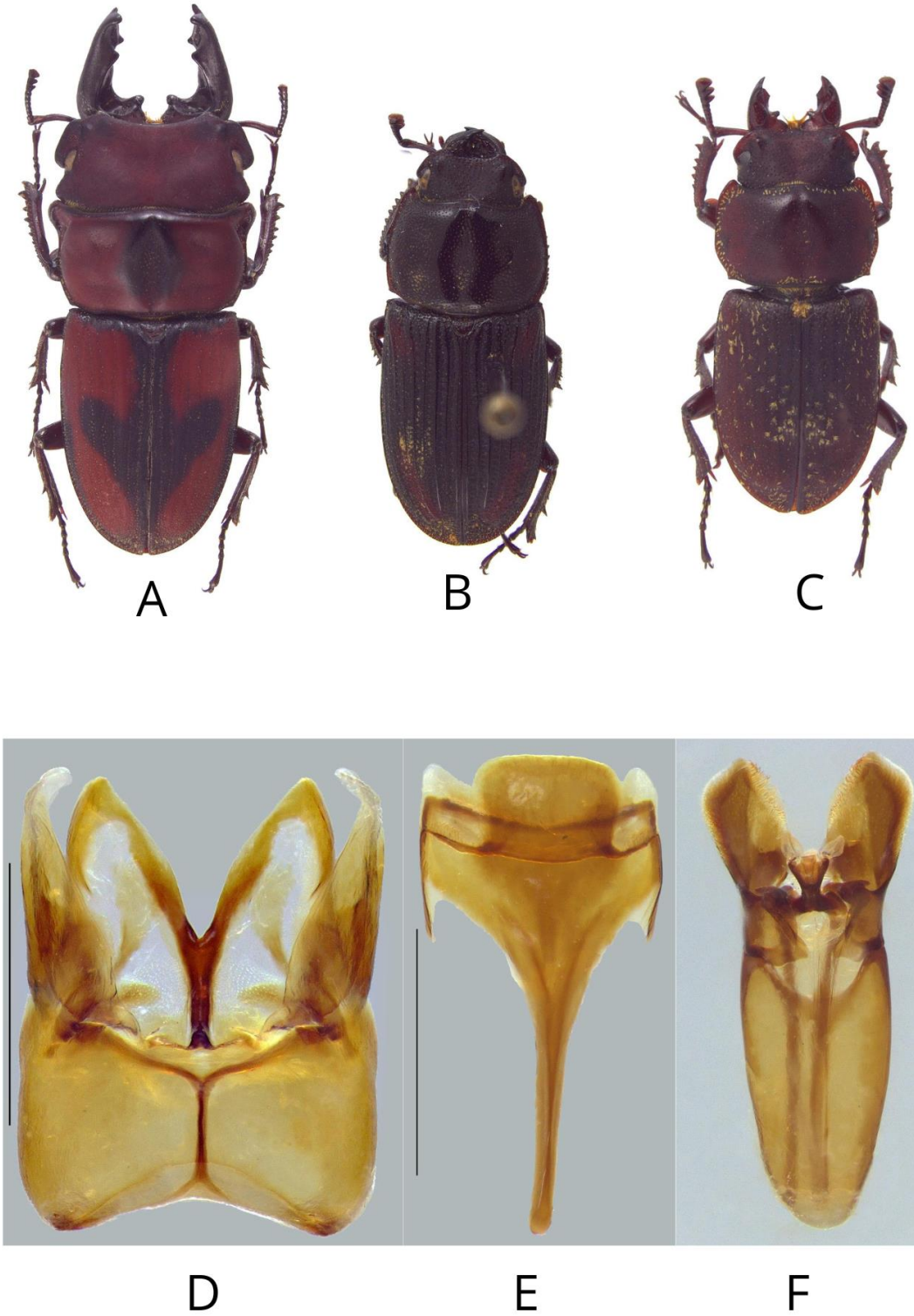

Figure 13. A) *S. hastatus* male, B) *S. dentifer* female, C) *S. scortizinus* comb. nov., D–F) *S. scortizinus* male genitalia.

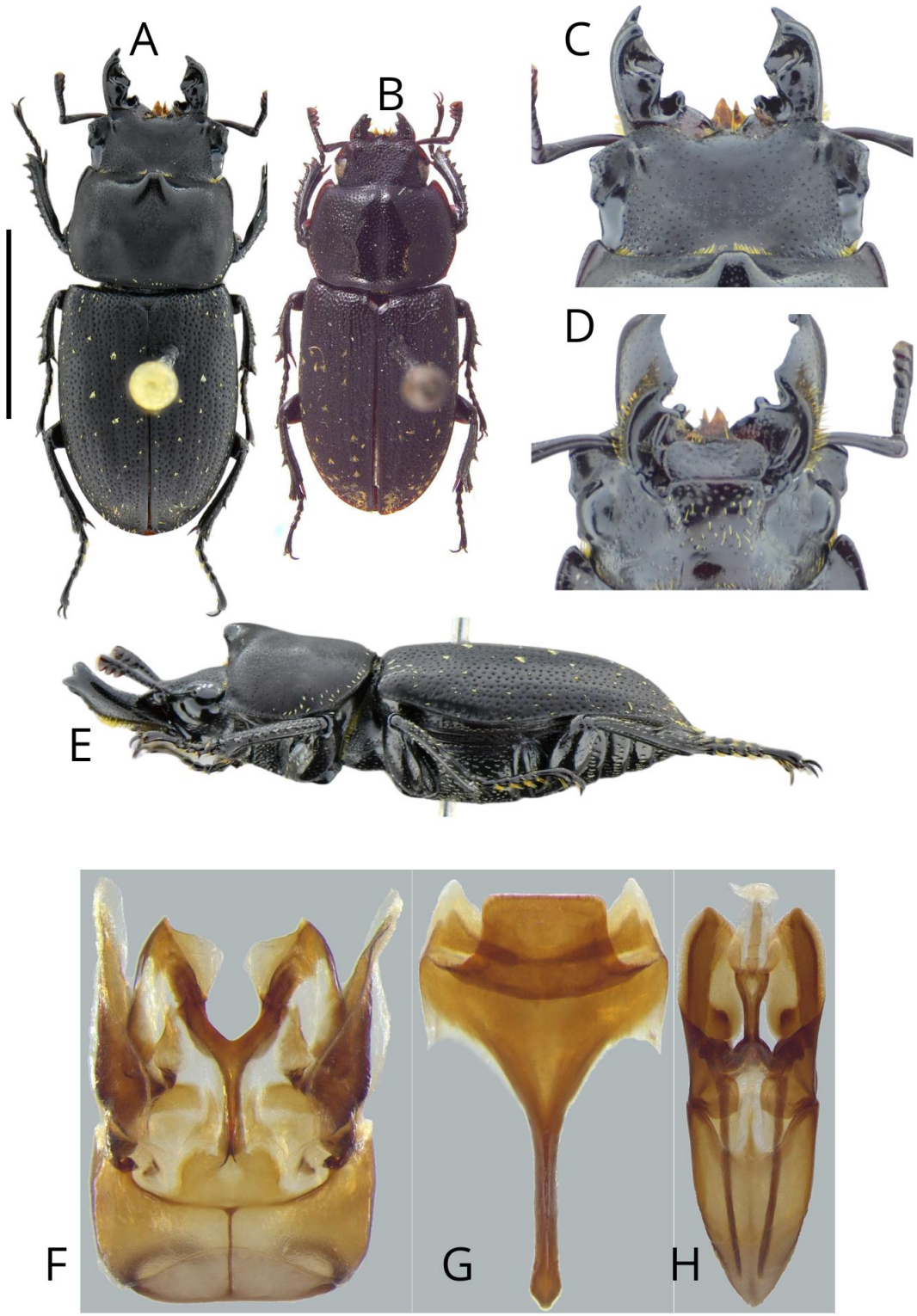

Figure 14A–H: *Scortizinus* sp. nov. A) male, B) female, C) head dorsal, D) head ventral, E) male lateral view, F–H) male genitalia.

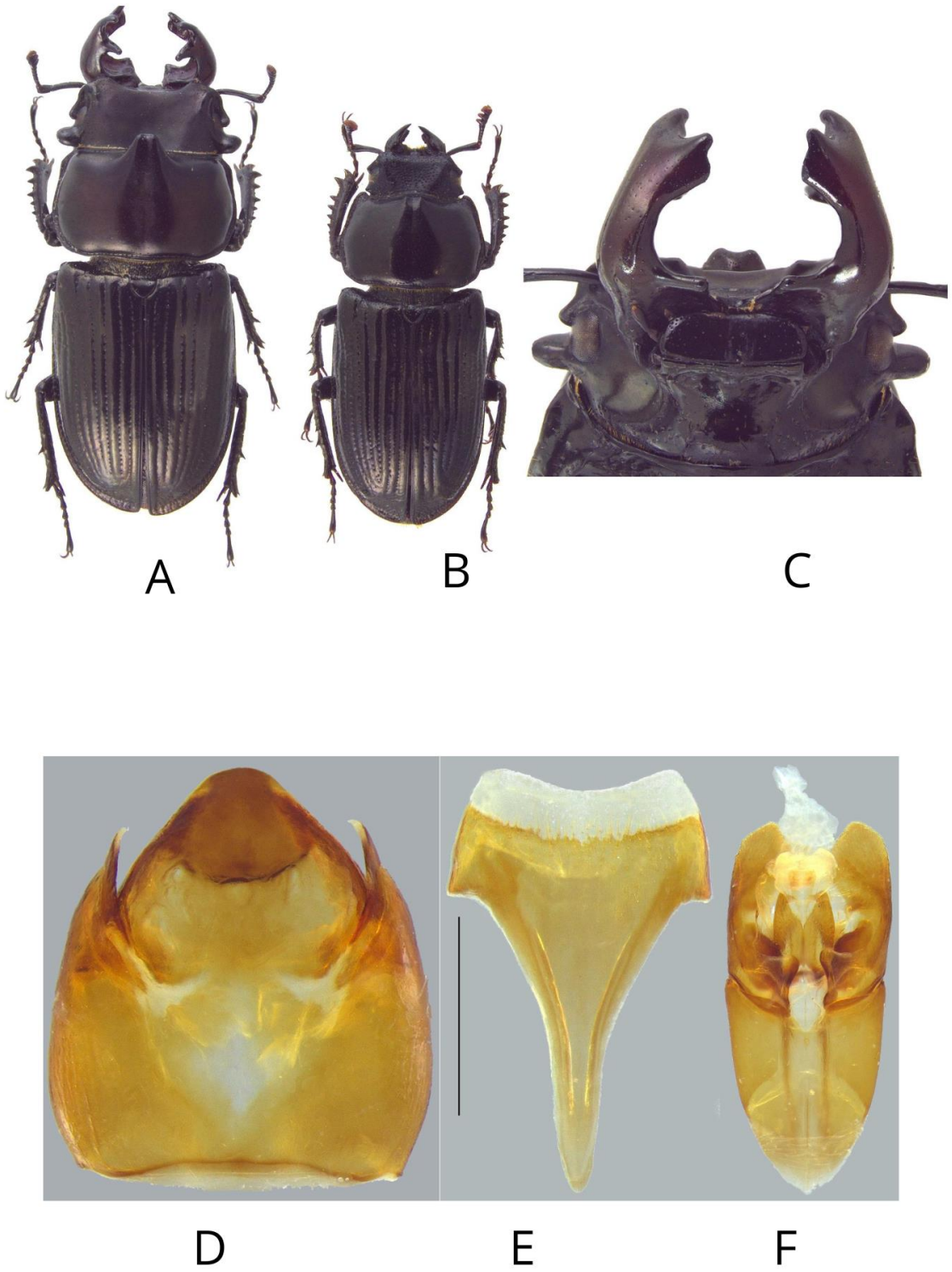

Figure 15A–F: New genus 2. *buckeyi*. A) male, B) female, C) head ventral, D–F) male genitalia.

Figure 16A–E: New genus 3 *sylviae*. A) male, B) female, C–E) male genitalia.

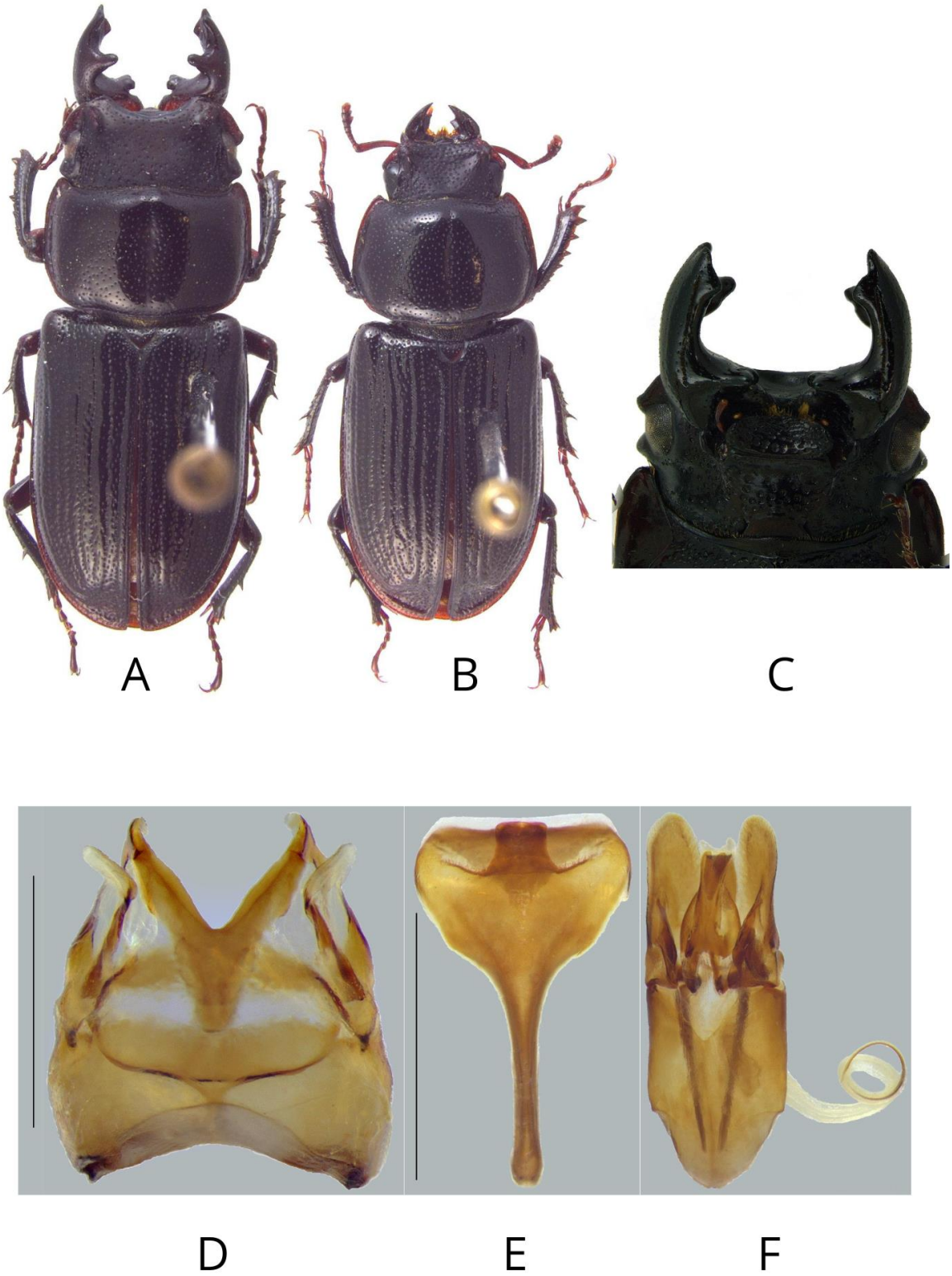

Figure 17A–F: New genus 4 *tucumanus*. A) male, B) female, C) head ventral, D–F) male genitalia.

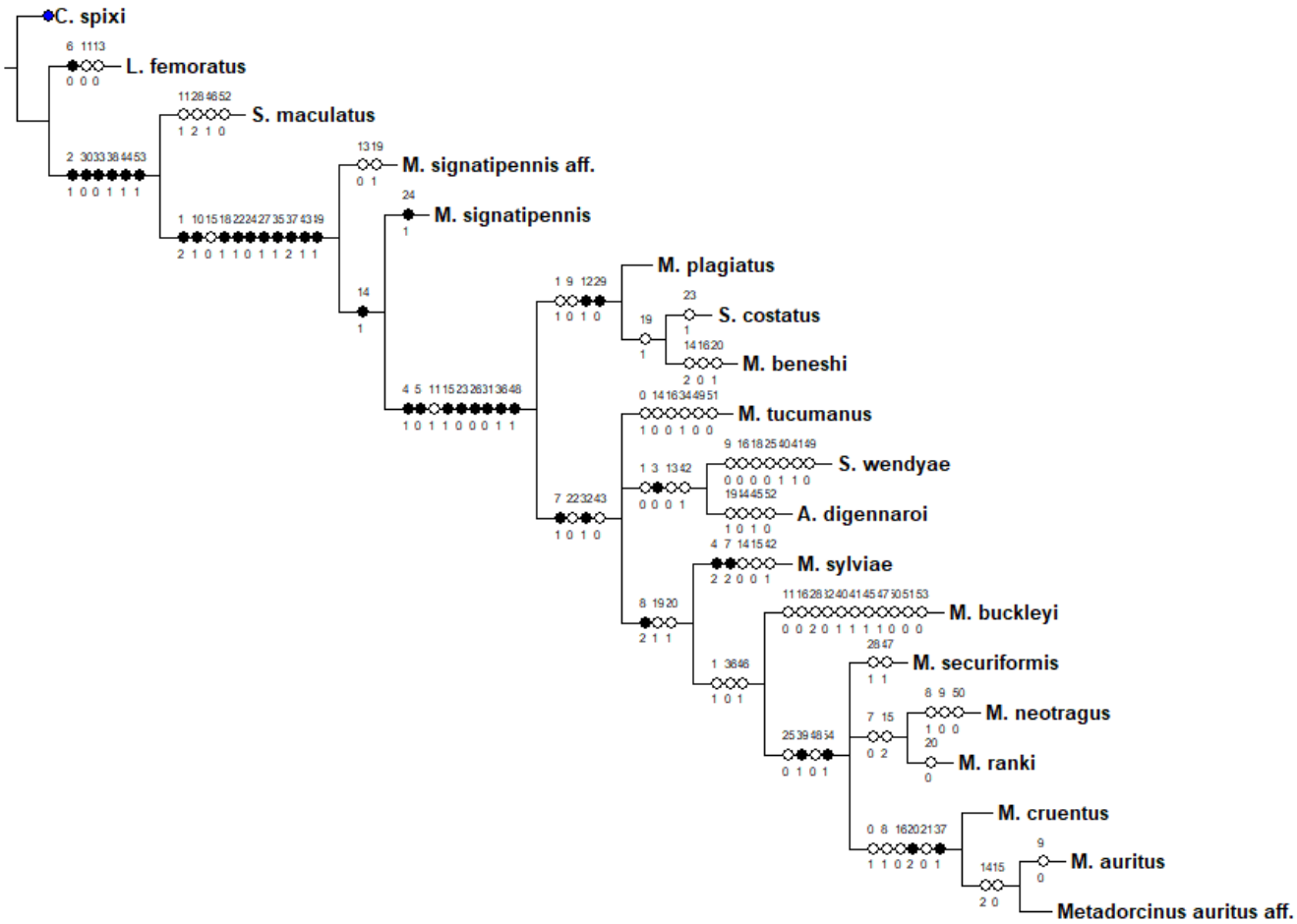

Figure 18: Strict consensus tree from two equally parsimonious trees from equal wights analysis.

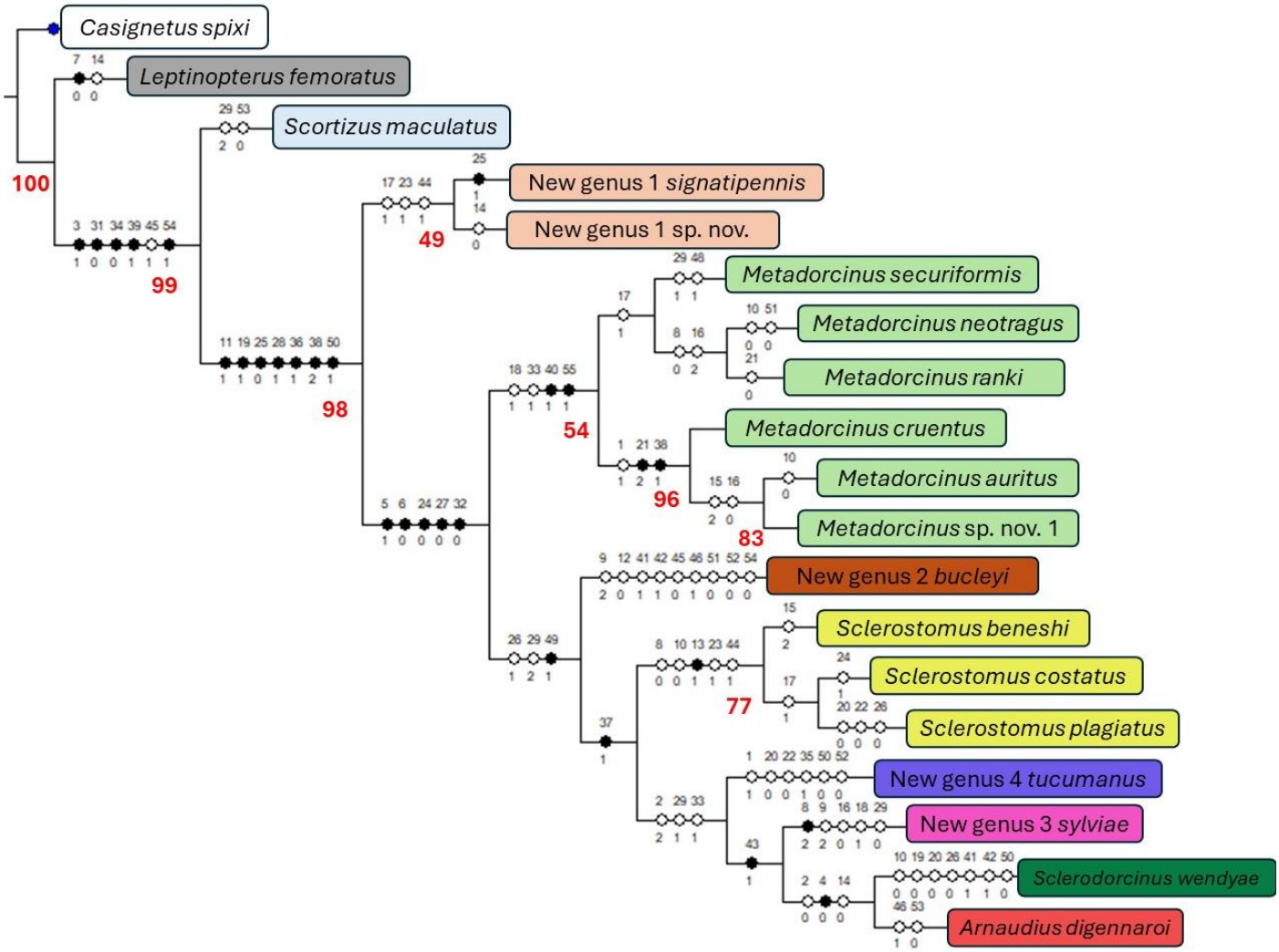

Figure 19: Topology of the only tree obtained in the analysis with implicit weighting. GC values (>50) in red.

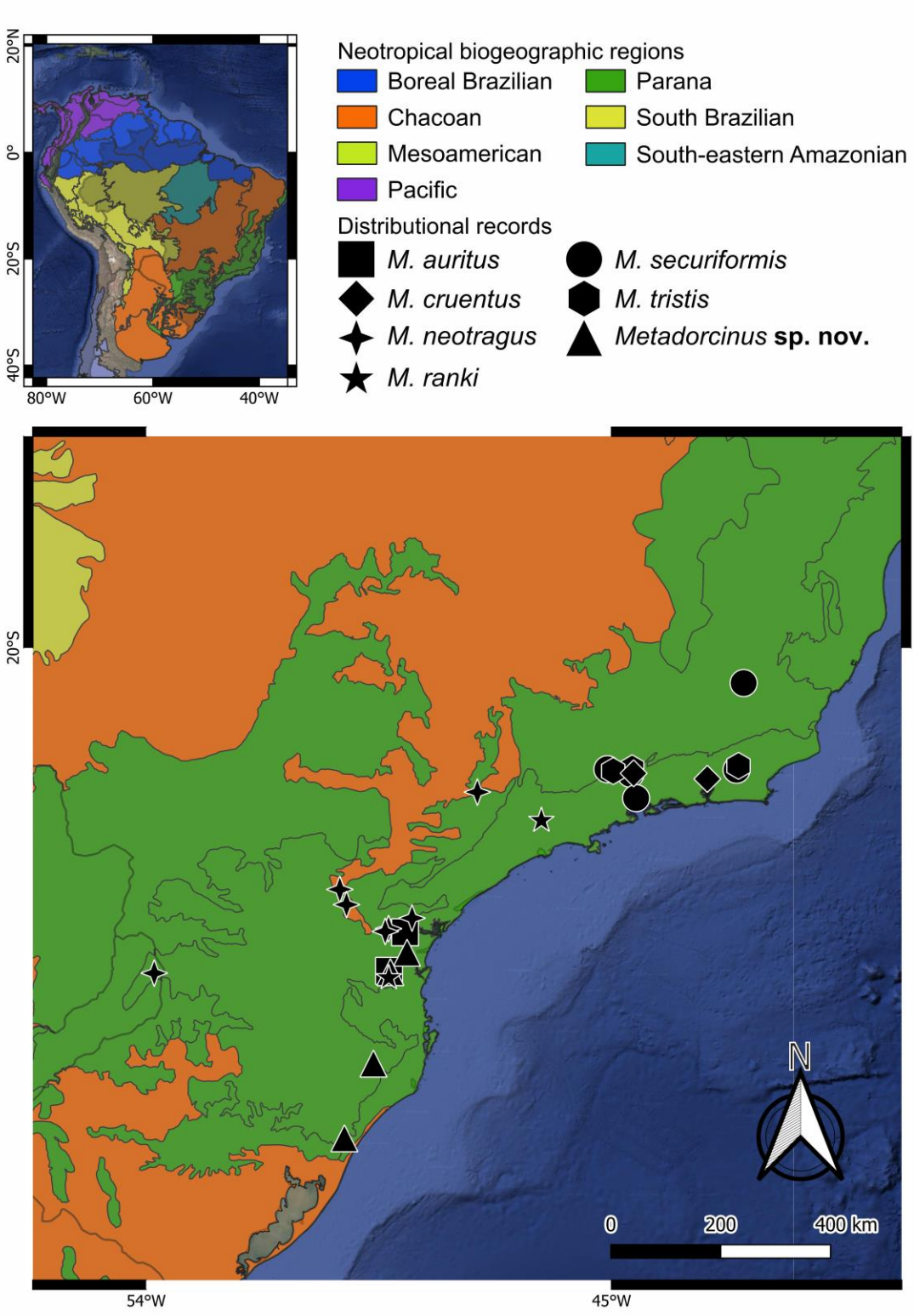

Figure 20: Distribution map for *Metadorcinus* species.

CAPÍTULO 3

CONSIDERAÇÕES FINAIS

Mesmo sendo um dos grupos de besouros que é conhecido desde a antiguidade, Lucanidae tem uma escassez relativa de trabalhos utilizando análises filogenéticas acerca de sua classificação geral, embora as relações entre as espécies e a diversidade da família estejam sendo mais bem estudadas aos poucos. Este trabalho fornece novos dados sobre os lucanídeos da América do Sul, dando um enfoque especial no gênero *Metadorciunus*, através de um trabalho de revisão taxonômica e a proposta de uma hipótese filogenética.

Os dados obtidos neste estudo revelam que *Metadorcinus* é um gênero polifilético. Isso se deu pela histórica imprecisão taxonômica envolvendo espécies de coloração escura e tamanho diminuto. A partir disso, a nova proposta filogenética apresenta *Metadorcinus* como um grupo monofilético, removendo espécies que não estavam de acordo com sua descrição genérica. Apenas sete espécies, incluindo uma nova descrita neste trabalho compõem o gênero a partir de agora, passando a ser exclusivamente brasileiro, ocorrendo com prevalência na sub-região de floresta do Paraná.

O restante das espécies foi transferido para novos gêneros ou para novas combinações. Quatro espécies foram transferidas para *Sclerostomus*, sendo uma delas sinonimizada e outra revalidada. Assim como a nova espécie de *Metadorcinus*, os novos táxons aqui descritos também receberam uma descrição adequada e comentários gerais.

Este trabalho demonstra o quanto é necessário a realização de trabalhos com ênfase nos lucanídeos sul-americanos. Além disso, os graus de parentesco podem ser reforçados ou confirmados através de estudos envolvendo molecular ou modelagem, já que a morfologia pode

não responder tudo devido a grande presença de homoplasia nesses grupos, além da falta de clareza em traçar homologias, sendo assim, aberta uma nova possibilidade de trabalhos.