

ITALO SALVATORE DE CASTRO PECCI MADDALENA

**TAXONOMIA E FILOGENIA DA TRIBO TRITOMINI CURTIS, COM ÊNFASE NO
GÊNERO *Mycotretus* LACORDAIRE, 1842 (COLEOPTERA: EROTYLIDAE)**



**VIÇOSA
MINAS GERAIS – BRASIL
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Tese apresentada à Universidade Federal de Viçosa, como parte das exigências do Programa de Pós-Graduação em Ecologia, para obtenção do título de *Doctor Scientiae*.

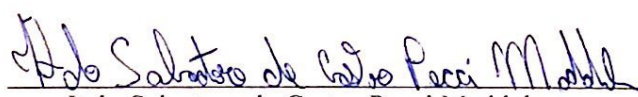
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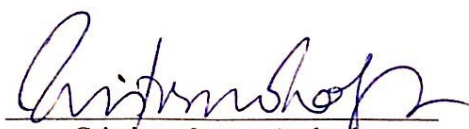
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Italo Salvatore de Castro Pecci Maddalena
Autor



Cristiano Lopes Andrade
Orientador

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“Todo ser se desenvolve
(ou se transforma) dentro de si mesmo,
no jogo de suas contradições.”

Paulo Freire

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RESUMO

MADDALENA, Italo Salvatore de Castro Pecci, D.Sc., Universidade Federal de Viçosa, julho de 2019. **Taxonomia e filogenia da tribo Tritomini Curtis, com ênfase no gênero *Mycotretus* Lacordaire, 1842 (Coleoptera: Erotylidae)**. Orientador: Cristiano Lopes Andrade.

Erotylidae (Coleoptera: Cucujoidea) é uma das vinte famílias mais diversas de Coleoptera, com mais de 3.500 espécies conhecidas, distribuídas globalmente. Na classificação taxonômica atual, são reconhecidas seis subfamílias e dez tribos em Erotylidae. Tritomini (Erotylinae) é a tribo mais diversa de Erotylidae e, *Mycotretus* Lacordaire, 1842, é o gênero mais diverso de Tritomini, com mais de 200 espécies descritas. Entretanto, estudos taxonômicos sobre *Mycotretus* e Tritomini são escassos e, ambos, são considerados grupos artificiais, com base em estudos morfológicos e moleculares. Porém, como tais estudos focaram mais em outros aspectos da sistemática de Erotylidae, até hoje, pouco se sabe sobre as relações filogenéticas de Tritomini e *Mycotretus*. O objetivo desta tese foi elucidar aspectos taxonômicos, morfológicos e filogenéticos em Tritomini e *Mycotretus*, principalmente, para verificar se, com base em uma ampla amostragem taxonômica, esses táxons são ou não grupos naturais (monofiléticos). Como resultado, foram feitos: descrições e redescritões de espécies, novos registros de distribuição geográfica e fungos hospedeiros, estudos morfológicos e comparativos (capítulos I–IV); propostos vários atos taxonômicos em *Mycotretus*, com base no estudo do material histórico pertencente a coleções entomológicas nacionais e estrangeiras (capítulo V); um estudo morfológico-comparativo do metendosternito e do flagelo peniano em Erotylidae, com ênfase em Tritomini (capítulo VI); um estudo filogenético de Tritomini, com ênfase em *Mycotretus* (capítulo VII). Desta forma, geramos estabilidade nomenclatural em *Mycotretus*, descrevemos caracteres que serão úteis em estudos filogenéticos de Erotylidae e propusemos um cenário evolutivo para Tritomini e *Mycotretus*.

ABSTRACT

MADDALENA, Italo Salvatore de Castro Pecci, D.Sc., Universidade Federal de Viçosa, July, 2019. **Taxonomy and phylogeny of the tribe Tritomini Curtis, with emphasis on *Mycotretus* Lacordaire, 1842 (Coleoptera: Erotylidae)**. Adviser: Cristiano Lopes Andrade.

Erotylidae (Coleoptera: Cucujoidea) is one of the twenty most diverse families of Coleoptera, with more than 3500 species, distributed globally. In the current taxonomic classification, six subfamilies and ten tribes are recognized in Erotylidae. Tritomini (Erotylinae) is the most diverse tribe of Erotylidae and, *Mycotretus* Lacordaire, 1842, is the most diverse genus of Tritomini, with more than 200 species. However, taxonomic studies on *Mycotretus* and Tritomini are scarce and both are considered artificial groups, based on morphological and molecular studies. However, as such studies have focused more on other aspects of the Erotylidae systematics, to date, little is known about the phylogenetic relationships of Tritomini and *Mycotretus*. My objective in this thesis was to elucidate taxonomic, morphological and phylogenetic aspects in Tritomini and *Mycotretus*, mainly to verify whether, based on a broad taxonomic sampling, these taxa are or are not natural groups (monophyletic). The following results were provided: species descriptions and redescriptions, new geographical records and host fungi, morphological and comparative studies (chapters I–IV); several taxonomic acts in *Mycotretus*, based on the study of the historical material housed in Brazilian and foreign entomological collections (chapter V); a morphological-comparative study of metendosternite and penile flagellum in Erotylidae, with an emphasis on Tritomini (chapter VI); a phylogenetic study of Tritomini, with emphasis on *Mycotretus* (chapter VII). A nomenclatural stability for *Mycotretus* was generated, as well as descriptions of characters that will be useful in forthcoming phylogenetic studies on Erotylidae. I proposed an evolutionary scenario for Tritomini and *Mycotretus*.

INTRODUÇÃO GERAL

A família Erotylidae¹ Latreille, 1802 (Coleoptera: Cucujoidea)

Os erotilídeos são besouros de porte médio (2–20 milímetros de comprimento), que apresentam uma ampla gama de coloração, com espécies que possuem somente uma cor (monocromia) até os mais belos e variados padrões de coloração (policromia). O corpo pode ser oval, mais ou menos convexo, subsférico ou alongado (Costa-Lima, 1953; Marshall, 2018). Há mais de 3.500 espécies conhecidas de besouros Erotylidae, organizadas em cerca de 260 gêneros, distribuídas globalmente. Porém, os erotilídeos são mais comuns em áreas florestais e, com poucas exceções, ausentes em ilhas oceânicas (Lawrence & Ślipiński 2013). Nos ambientes florestais, esses besouros vivem em madeiras em decomposição, sobre os cogumelos e sob as cascas de árvores (Guérin, 1953). Na classificação taxonômica atual, são reconhecidas seis subfamílias e dez tribos (entre parênteses): (i) Xenoscelinae (ii) Pharaxonothinae (iii) Loberinae (iv) Languriinae (Hapalipini, Languriini, Thalissellini) (v) Cryptophilinae (Empocryptini, Cryptophilini, Toramini) e (vi) Erotylinae (Dacnini, Encaustini, Megalodacnini, Tritomini e Erotylini) (Leschen 2003; Leschen *et al.* 2010).

Os besouros erotilídeos se alimentam principalmente das partes reprodutivas (basidiomas) de fungos do filo Basidiomycota, conhecidos como “cogumelos” e “orelhas-de-pau”. A maioria dos Languriinae (e alguns Xenoscelinae) se alimenta de diferentes partes de plantas, embora haja registros de Languriinae se alimentando de leveduras (um tipo de fungo), no interior de bambus. Há registros da espécie *Loberus impressus* (LeConte) (Loberinae) associada a fungos que crescem em flores, enquanto que alguns Languriinae, Xenoscelinae e Cryptophilinae vivem associados a tecidos vegetais em decomposição ou podem se alimentar de pólen. *Pharaxonotha kirschii* Reitter (Pharaxonothinae) é considerada praga de produtos armazenados, enquanto outros membros de Pharaxonothinae se alimentam de plantas cicadófitas (Cycadaceae) (Van Zandt *et al.* 2003; Leschen *et al.* 2010; Toki *et al.* 2013; Xu *et al.* 2015; Marshall, 2018). Erotylinae engloba a maior parte dos gêneros e espécies de Erotylidae (172 e 2563, respectivamente, de acordo com Leschen *et al.* 2010) e é altamente diversa na região Neotropical, região biogeográfica que se estende de áreas próximas a Flórida (EUA) até o sul da América do Sul (Costa, 2000; Morrone, 2014).

¹ De ἐρωτύλος (*erotylus*), amoroso.

Importância econômica

Estudos antigos afirmam que Erotylidae tem pouca ou nenhuma importância econômica (Costa Lima, 1953; Costa *et al.*, 1988). De acordo com Costa *et al.* (1988) apud Hinton (1945): “*Pharaxonotha kirschii* Reitter, 1875, é uma das poucas espécies da família considerada de importância econômica. Larvas e adultos foram observados danificando grãos armazenados (milho, trigo, feijão) e farinha de trigo.”. No entanto, trabalhos mais recentes têm reportado importância econômica direta ou indireta de erotilídeos. Por exemplo, alguns autores verificaram que erotilídeos do gênero *Pharaxonotha* Reitter são os polinizadores efetivos de *Zamia incognita* A. Lindstr. & Idárraga (Zamiaceae), uma planta de importância ornamental (Valencia-Montoya *et al.* 2017). Em outro estudo, Moreira *et al.* (2009) verificaram que a espécie *Mycotretus apicalis* Lacordaire (Erotylinae: Tritomini) se alimenta de *Pleurotus sajor-caju* (Agaricales: Pleurotaceae), uma espécie de fungo muito usada na alimentação humana.

Relações evolutivas (filogenéticas) de Erotylidae

Atualmente existem três hipóteses filogenéticas para Erotylidae: a de Robertson *et al.* (2004), baseada em dados moleculares; e as de Węgrzynowicz (2002) e de Leschen (2003) baseadas em caracteres morfológicos de adultos (Drilling *et al.* 2013). A classificação atual da família (em seis subfamílias e dez tribos) é baseada principalmente em Leschen (2003), embora este autor tenha priorizado as relações dentro de Languriinae e dado pouco ênfase à Erotylinae. É importante notar que os autores mencionados acima estavam interessados, sobretudo, em propor hipóteses (ausentes até o início do século XXI) para a classificação supragenérica de Erotylidae. Naquele contexto, um dos principais objetivos era verificar se as famílias “Languriidae” (hoje sinônimo de Erotylidae) e “Erotylidae” (equivalente aos atuais Erotylinae, *sensu lato*) eram agrupamentos artificiais (i.e. baseados meramente em semelhanças morfológicas, sem suporte filogenético) ou grupos naturais (descendentes de um único ancestral, ou população ancestral, sustentados por novidades evolutivas). A principal razão para que “Languriidae” e “Erotylidae” fossem consideradas famílias separadas era o hábito alimentar: os primeiros seriam fitófagos (que se alimentam de plantas) e os segundos seriam fungívoros (que se alimentam de fungos) (ver discussão em Leschen *et al.* 2010). Conforme verificado nas três hipóteses filogenéticas supracitadas (Węgrzynowicz, 2002; Leschen, 2003 e Robertson *et al.*, 2004), “Erotylidae” e “Languriidae” devem ser tratadas juntamente, ambas correspondendo ao mesmo grupo natural. De acordo com Leschen *et al.*

(2010), algumas das sinapomorfias desses dois táxons são: presença de ductos glandulares suboculares, presença de linha supraocular, cavidades mesocoxais lateralmente fechadas pelo metaventrilo, aedeagus lateralmente achatado e com um par de projeções fundidas (“struts”), relativamente longas, no pênis. Embora haja consenso quanto à classificação atual de Erotylidae, vários problemas existem entre as relações filogenéticas dentro da família (Leschen *et al.* 2010). A presente tese tratará exclusivamente daqueles relacionados à tribo Tritomini Curtis, discutida mais adiante.

O estudo de Erotylidae no Brasil

No Brasil, dois especialistas se dedicaram por mais tempo ao estudo dos besouros erotilídeos neotropicais e, principalmente, das espécies brasileiras: Jacintho Guérin e Moacyr Alvarenga. Jacintho Guérin (1898–1960), nascido na Itália, foi um entomólogo amador que, trabalhando em uma companhia geradora e distribuidora de eletricidade em São Paulo, se dedicou aos estudos de besouros (Coleoptera). Descreveu várias espécies de Erotylidae (e.g. 1946a,b; 1949a,b; 1952 e 1956) e, em 1953, publicou seu célebre livro “Coleópteros do Brasil” (Marinoni & Marinoni, 2012). Atualmente, sua coleção particular (incluindo a maior parte dos tipos primários) pertence ao Museu de Zoologia da Universidade de São Paulo (MZSP).

Moacyr Alvarenga (1915–2010) foi um oficial da aeronáutica brasileira que, em razão desta atividade, pode viajar pelo Brasil e coletar insetos em numerosas localidades, muitas delas amostradas pela primeira vez (Fonte: <http://unsm-ento.unl.edu/workers/MAlvarenga.htm>). Alvarenga publicou trabalhos importantes sobre Erotylidae, incluindo descrições de espécies (1962; 1971a,b,c; 1983; 1989), atos taxonômicos (1965; 1970; 1976; 1977) e, principalmente, o “Catálogo dos Erotylidae neotropicais (1994)”, sua mais importante contribuição (Pecci-Maddalena & Lopes-Andrade, 2018). Ao longo dos mais de trinta anos de estudo dos Erotylidae, Alvarenga organizou uma enorme coleção entomológica de referência, incluindo, além da região Neotropical, exemplares de praticamente todas as regiões biogeográficas do mundo. Ainda em vida, sua coleção foi dividida entre duas instituições brasileiras: a Coleção Entomológica Padre Jesus Santiago Moure, da Universidade Federal do Paraná (Curitiba); e a coleção de besouros do Museu Nacional, da Universidade Federal do Rio de Janeiro (Rio de Janeiro), infelizmente, a última foi destruída por um incêndio em 2018. Posteriormente, houve pouquíssimos trabalhos sobre os Erotylidae brasileiros (e.g. Teixeira & Casari 1998; Lopes 2006), e nenhum especialista se consolidou no estudo taxonômico da família no Brasil.

A tribo Tritomini Curtis, 1834 e o gênero *Mycotretus* Lacordaire, 1842

Tritomini, a tribo que inclui o maior número de gêneros (91) e espécies (~1000) de Erotylidae, apresenta distribuição global (Leschen *et al.* 2010) e é considerada artificial, com base em dados moleculares e morfológicos de adultos e larvas (Węgrzynowicz, 2002; Robertson *et al.*, 2004; McHugh, dados não publicados). A distribuição das espécies nos gêneros de Tritomini é extremamente assimétrica, com seis gêneros concentrando cerca de metade do total de espécies desta tribo (número de espécies entre parênteses): *Mycotretus* Lacordaire (217), *Tritoma* Fabricius (129 species), *Triplax* Herbst (93 species), *Ischyryus* Lacordaire (75 species), *Laurenticola* Philipp (48 species) e *Megischyryus* Crotch (35 species). Por outro lado, pelo menos 60 gêneros incluem menos de vinte espécies cada um (Boyle, 1956; Delkeskamp, 1981; Chûjô, 1990; Alvarenga, 1994; Goodrich & Springer, 1999; Pecci-Maddalena *et al.*, 2019). Com exceção de *Ischyryus*, nenhum grande gênero de Tritomini foi revisado e poucas revisões foram feitas para gêneros menores (Skelley *et al.* 1997; Skelley, 1998; Lopes, 2006). Além disso, o estudo filogenético de Robertson *et al.* (2004) revelou que pelo menos alguns dos maiores gêneros de Tritomini (e.g. *Mycotretus* e *Tritoma*) são artificiais. Nenhum estudo filogenético com foco em Tritomini ou em algum de seus gêneros foi realizado até o momento. Portanto, as relações filogenéticas internas e externas dos gêneros de Tritomini permanecem desconhecidas.

Mycotretus Lacordaire é um gênero cujas espécies podem ser encontradas em fungos que formam basidiomas (Basidiomycota: e.g. Polyporales e Agaricales) (Pecci-Maddalena & Lopes-Andrade 2017). Todas as espécies do gênero ocorrem na região Neotropical; a única exceção, *M. nigromaniscatus* Boyle, 1954, ocorre no Arizona, EUA (Boyle, 1956). É o segundo gênero com mais espécies descritas dentro de Erotylidae (217 espécies), atrás apenas de *Iphiclus* Chevrolat (com 284) (Alvarenga 1994). O epíteto genérico “*Mycotretus*” foi proposto originalmente por Dejean (1836) e sua autoria foi atribuída a Chevrolat. Neste trabalho estão incluídos 49 epítetos específicos de *Mycotretus*, mas nenhuma descrição ou diagnose foi feita para o gênero e suas espécies. Posteriormente, Lacordaire (1842), em sua famosa obra “*Monographie des Erotyliens, Famille de L'ordre Des Coleopteres*”, descreveu muitas das espécies mencionadas no catálogo de Dejean e, atualmente, a autoria de *Mycotretus* é atribuída a Lacordaire (ver Skelley & Goodrich 1994).

Lacordaire foi o primeiro autor a fazer descrições mais detalhadas e a propor uma classificação subgenérica para as espécies de *Mycotretus*, baseada principalmente no número de antenômeros da clava antenal. Após o trabalho de Lacordaire, vários autores incluíram

espécies no gênero (e.g. Crotch 1876; Gorham 1888; Boyle 1956; Guérin 1956 e Alvarenga 1983, 1989). No entanto, na maioria destes trabalhos as descrições são vagas e nenhuma delas (exceção de Boyle 1956, que descreve o aedeagus de *M. nigromaniscatus*) leva em consideração o exame dos escleritos da terminália abdominal masculina e feminina (que nunca foi descrita para o gênero), ou de outras características morfológicas que possam ter valor taxonômico. Esta questão faz de *Mycotretus* um gênero taxonomicamente problemático, situação que se agrava com os resultados recentes de análises filogenéticas de Erotylidae, em que *Mycotretus* aparece como um táxon parafilético (Robertson *et al.* 2004) ou de posição filogenética incerta (Węgrzynowicz 2002).

JUSTIFICATIVA

Erotylidae é uma das vinte famílias mais diversas de Coleoptera (Ślipiński *et al.* 2011). Apesar da relevância dos autores que trabalharam com a fauna Neotropical, à exceção do “Catálogo dos Erotylidae neotropicais” (Alvarenga, 1994), nenhum trabalho taxonômico amplo foi publicado sobre Erotylidae neotropicais e as descrições fornecidas na literatura não levam em conta a morfologia da genitália de machos e fêmeas (atualmente um aspecto importante dentro do estudo taxonômico de Coleoptera), bem como outros aspectos morfológicos em um contexto evolutivo. Quanto aos estudos filogenéticos é importante notar que, até o presente momento, não existem publicações, com a participação de autores brasileiros, sobre a fauna Neotropical de Erotylidae, uma das mais diversas do mundo. A fim de se compreender as relações filogenéticas de Tritomini, a maior tribo de Erotylidae, e seu maior gênero, *Mycotretus*, fez-se necessário a realização da presente tese.

OBJETIVOS

Os meus objetivos foram:

- (i) Descrever caracteres morfológicos até então não descritos para *Mycotretus* e outros gêneros de Tritomini;
- (ii) Descrever e redescrever espécies pertencentes às coleções científicas examinadas;
- (iii) Gerar estabilidade nomenclatural (taxonômica) para o gênero *Mycotretus*;
- (iv) Realizar um estudo morfológico-comparativo de dois sistemas de caracteres em Erotylidae: o metendosternito e o flagelo peniano, com ênfase em Tritomini;
- (v) Responder à pergunta: Tritomini e *Mycotretus* são táxons artificiais ou representam grupos naturais?

RESULTADOS

Contém a presente tese sete capítulos, cada um deles sob a forma de artigos científicos publicados (capítulos I–IV) ou manuscritos (capítulos V–VII). Abaixo é apresentado uma breve descrição de cada capítulo:

Capítulo I: “Redescription of two species and proposal of a new synonym in the genus *Mycotretus* Lacordaire, 1842 (Coleoptera: Erotylidae: Tritomini)”. **Explicação:** Neste trabalho duas espécies de *Mycotretus* foram redescritas: *Mycotretus chilensis* Crotch, 1876 e *Mycotretus trifasciatus* Guérin, 1956. O lectótipo de *M. chilensis* foi designado com base em um único espécime pertencente à coleção Crotch em Cambridge (Reino Unido). *Mycotretus bicinctus* Guérin, 1949 foi proposta como novo sinônimo júnior de *M. chilensis*. Foram feitos ainda: (i) um estudo comparativo da variação intraespecífica para cada espécie, *M. chilensis* e *M. trifasciatus*; (ii) a descrição detalhada de caracteres morfológicos (e.g. aparelho bucal, metendosternito, genitália masculina e feminina) até então não disponível para *Mycotretus*; (iii) novos registros de fungos hospedeiros para *M. chilensis* e *M. trifasciatus*. Neste tópico, também foi discutido que essas duas espécies, além de simpátricas (ocorrem na mesma localidade), são também sintópicas (ocupam no mesmo macro-habitat dentro da mesma localidade). **Importância:** Este trabalho marca o início dos nossos estudos sobre Erotylidae, o reconhecimento de variações morfológicas importantes com potencial filogenético (e.g. flagelo peniano e metendosternito) e de variações regionais quanto à coloração das espécies. O trabalho traz ainda o primeiro resultado da viagem que realizei ao exterior para estudo das coleções históricas de Erotylidae: acreditávamos que *Mycotretus bicinctus* Guérin, 1949 era uma espécie separada até verificar, na coleção Crotch, que se tratava de um sinônimo de uma espécie anteriormente descrita.

Capítulo II: “Redescriptions, Lectotype Designations, New Synonyms and New Geographic Records for the “Tiger” Species of *Mycotretus* Lacordaire, 1842 (Coleoptera: Erotylidae: Tritomini)”. **Explicação:** Neste estudo, definimos os limites morfológicos de um grupo de espécies de *Mycotretus*, todos com um padrão de coloração semelhante, ou seja, amarelos / avermelhados com inúmeras manchas pretas. O nome “tiger” se refere a tal padrão de coloração e alude também à espécie *Mycotretus tigrinus* (Olivier). Novos registros de distribuição geográfica, diagnoses, redescritões e designações de lectótipo foram apresentados. **Importância:** Segue a linha do artigo anterior (Pecci-Maddalena & Lopes-Andrade, 2017) com uma importante verificação: a ocorrência de espécies com ampla

distribuição geográfica (por exemplo, *M. tigrinus* que ocorre em toda a região Neotropical) ou distribuição disjunta (e.g. *M. centralis* Arrow e *M. tigripennis* Mader) parece ser comum dentro de *Mycotretus*, assim como diferenças locais de coloração.

Capítulo III: “*Mycotretus alvarengai* sp. nov. (Coleoptera: Erotylidae: Tritomini) from the amazon biome”. **Explicação:** Este trabalho descreve uma nova espécie, com base em um único exemplar encontrado na coleção Alvarenga, pertencente ao Museu Nacional do Rio de Janeiro. **Importância:** O nome é uma homenagem a Moacyr Alvarenga, por uma vida inteira dedicada ao estudo dos Erotylidae. O exemplar havia sido etiquetado por ele como “*Mycotretus multinotatus* sp. n., Holótipo, M. Alvarenga det. 1999”, porém, nunca foi descrito. Nós preferimos alterar esse nome e fazer uma homenagem ao Alvarenga.

Capítulo IV: “*Xalpirta mauryi* sp. nov. (Coleoptera: Erotylidae: Tritomini) from Southeast Brazil”. **Explicação:** Neste trabalho descrevemos uma espécie nova do gênero *Xalpirta* Skelley & Cekalovic, um gênero com poucas espécies, a maior parte delas do Chile e apenas uma, *Xalpirta maderi* (Delkeskamp), do sul do Brasil. Portanto, *Xalpirta mauryi* sp. nov. foi a segunda a espécie do gênero descrita para o Brasil e sua distribuição é muito próxima de algumas áreas de ocorrência de *X. maderi*. *Xalpirta mauryi*, assim como outras espécies de *Xalpirta*, apresenta uma coloração metálica raramente observada em outros Tritomini. Semelhanças e diferenças morfológicas entre os gêneros *Xalpirta*, *Mycotretus*, *Tritommapara* Alvarenga e *Triplax* são discutidas. **Importância:** Este é nosso primeiro trabalho taxonômico publicado sobre um gênero de Tritomini diferente de *Mycotretus*. O artigo ainda representa o nosso primeiro estudo publicado com a colaboração com o Ph.D. Paul E. Skelley (Florida State Collection of Arthropods, Florida, USA). Skelley tem sido um dos nossos mais importantes colaboradores, fornecendo bibliografia, exemplares e sugestões importantes para o desenvolvimento dos trabalhos.

Capítulo V: “An annotated and illustrated catalogue of the genus *Mycotretus* Lacordaire, 1842 (Coleoptera: Erotylidae: Erotylinae: Tritomini)”. **Explicação:** Este é o capítulo mais extenso e que, atualmente, está sendo revisado pelo terceiro autor (Paul E. Skelley) para publicação. Este catálogo é o resultado de mais de três anos de estudos morfológicos, cuidadosas comparações de espécimes, visitas e consultas a coleções científicas na América e na Europa, procura por espécimes identificados ou não e tipos primários de *Mycotretus*. Como resultados: (i) examinamos os tipos primários de 216 nomes antigos dentro de *Mycotretus*, incluindo 73 tipos não localizados por Alvarenga (1994); (ii) designamos lectótipos para 156

nomes disponíveis; (iii) propomos 53 novos sinônimos e uma nova combinação; (iv) reduzimos o número de espécies válidas de 217 para 177; (v) disponibilizamos imagens de espécimes representando 232 nomes em *Mycotretus* (210 fotos de tipos primários e etiquetas históricas) do total de 245 nomes incluídos atualmente em *Mycotretus*. **Importância:** Geramos estabilidade nomenclatural para o segundo maior gênero de Erotylidae e o maior de Tritomini. Desta forma, trabalhos ecológicos e evolutivos podem ser planejados para *Mycotretus*. Fornecemos uma série de imagens que podem ser úteis, como um guia de campo, para o reconhecimento das espécies do gênero.

Capítulo VI: “Metendosternite and penile flagellum: Two unexplored character systems of pleasing fungus beetles (Coleoptera: Erotylidae), with emphasis on Tritomini”. **Explicação:** Este o capítulo está sendo revisado pelo terceiro autor (Paul E. Skelley) para publicação. Realizamos, pela primeira vez em Erotylidae, um estudo morfológico-comparativo do metendosternito e do flagelo peniano, com ênfase em Tritomini. Sabia-se que ambas as estruturas eram bastante variáveis, no entanto, um estudo morfológico com o objetivo de verificar seu potencial uso em análises filogenéticas de Erotylidae ainda não havia sido conduzido. Representantes de 55 espécies pertencentes a cinco das seis famílias de Erotylidae foram examinados. Um total de 18 gêneros e 45 espécies de Tritomini (21 espécies de *Mycotretus*) foi selecionado. Dezessete caracteres (oito do metendosternito e nove do flagelo peniano) foram reconhecidos, muitos deles pela primeira vez. **Importância:** Verificou-se que o caractere “presença ou ausência de lâmina” no metendosternito pode ter sinal filogenético em Tritomini. Já o flagelo peniano, conforme verificado em *Mycotretus*, pode ser mais informativo abaixo do nível genérico para o reconhecimento de prováveis grupos de espécies. Outros caracteres do metendosternito foram autapomorfias ou sinapomorfias de táxons fora de Tritomini e, portanto, podem ser informativos em futuras análises filogenéticas de Erotylidae.

Capítulo VII: “Phylogenetic relationships of Tritomini Curtis (Coleoptera: Erotylidae: Erotylinae) with emphasis on *Mycotretus* Lacordaire”. **Explicação/importância:** Uma análise filogenética de Tritomini, com ênfase em *Mycotretus*, é conduzida com 73 táxon terminais pertencentes às quatro subfamílias mais diversas de Erotylidae. O estudo incluiu 20 gêneros e 60 espécies de Tritomini (32 de *Mycotretus*). Um total de 44 caracteres morfológicos foi examinado, muitos do metendosternito e do flagelo peniano (observados no capítulo anterior), outros revisitados dos trabalhos de Węgrzynowicz (2002) e Leschen (2003) e, outros, descritos pela primeira vez. Nós demonstramos que Tritomini e *Mycotretus*, indubitavelmente, não são monofiléticos. Um clado compreendendo Erotylini + parte dos

Tritomini foi recuperado como monofilético e poderá receber status de subfamília. *Tritoma* Fabricius, *Triplax* Herbst and *Xalpirta* Skelley & Cekalovic não foram recuperados como monofiléticos; um táxon nomeado como “Tritomini sp.” corresponde a um gênero ainda não descrito e formou um clado com o gênero *Myceporthus* Skelley & Powell. Dentro de *Mycotretus*, dois clados foram recuperados com bom suporte e merecerão o status de gênero. No entanto, vários táxons formaram uma grande politomia dentro de Tritomini. Com base nos resultados encontrados e na literatura de Erotylidae é provável que uma recente irradiação adaptativa, associada à ausência de grandes competidores ecológicos, seja uma hipótese plausível para explicar a politomia encontrada.

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Capítulo I

Redescription of two species and proposal of a new synonym in the genus *Mycotretus* Lacordaire, 1842 (Coleoptera: Erotylidae: Tritomini)

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Abstract

Mycotretus Lacordaire, 1842 is a Neotropical genus of beetles, being the second most speciose genus within Erotylidae. The older descriptions of *Mycotretus* species are anecdotal and none include information on male and female genitalia, which can have great taxonomic value. Our objective in the present work is to redescribe *Mycotretus chilensis* Crotch, 1876 and *Mycotretus trifasciatus* Guérin, 1956 providing the first descriptions of their mouthparts, metendosternite, male and female terminalia, as well as new data on their geographic distribution and host fungi. Additionally, the lectotype of *M. chilensis* is designated and *Mycotretus bicinctus* Guérin, 1949 is proposed as a **new junior synonym** of *M. chilensis*. Both *M. chilensis* and *M. trifasciatus* have great intraspecific variation and are sympatric or syntopic in a few localities. We conclude that morphological differences of the penial flagellum and the metendosternite can be used to diagnose species and may also have phylogenetic signal for *Mycotretus* species. The present work is our first step in an ongoing taxonomic revision of the genus *Mycotretus*.

Key words: pleasing fungus beetles, Neotropical region, taxonomy, intraspecific variation, sympatry, syntopy, morphology

Introduction

Erotylidae occur worldwide and contain about 260 genera and 3500 species (Leschen *et al.* 2010). They are more common in forested areas and, with a few exceptions, are absent from oceanic islands (Lawrence & Ślipiński 2013). The family is composed mainly of phytophagous, mycophagous and saprophagous species but other habits and life histories have been observed, e.g. individuals found in the nests of social insects or as endoparasites of insects (Leschen 1997; Skelley 1999; Leschen & Buckley 2007; Leschen *et al.* 2010; Toki *et al.* 2013). The taxon is divided into six subfamilies, three of which are further subdivided into tribes (Leschen *et al.* 2010). Among these, the greatest number of species belong to the basidiomycete fungus-feeding Erotylinae (approximately 2563 species) and the mainly plant-feeding Languriinae (approximately 849 species; Leschen *et al.* 2010), whereas other subfamilies tend to have fewer species with mixed diets (Leschen & Buckley 2007; Leschen *et al.* 2010). Within Erotylinae, Tritomini encompass the greatest number of genera (91) and species (1165) (see Leschen *et al.* 2010) and is considered a non-natural taxon in the available phylogenetic studies (Węgrzynowicz 2002; Leschen 2003; Robertson *et al.* 2004).

Mycotretus Lacordaire, 1842 is a Neotropical genus of Tritomini usually found on mushrooms and other basidiomycete fungi. It is the second most speciose genus within Erotylidae with 218 described species (Alvarenga 1994), surpassed only by *Iphiclus* Chevrolat, 1836 with 284 species (Alvarenga 1994). The name *Mycotretus* was originally proposed by Dejean (1836) and their authorship was attributed to Chevrolat. In that work there are 49 specific names of *Mycotretus* but without descriptions or diagnoses for the genus and its species. Many of these species were posteriorly described by Lacordaire (1842) and today the authorship of *Mycotretus* is attributed to him (see Skelley & Goodrich 1994; ICZN 1996). *Mycotretus* is a taxonomically problematic genus and it has appeared

as paraphyletic in a recent molecular phylogenetic analysis of Erotylidae (Robertson *et al.* 2004). Aside from the morphological and evolutionary aspects, information on feeding habitats and life history are scarce for *Mycotretus* species (see examples in Robertson *et al.* 2004 and Moreira *et al.* 2009).

Jacinto Guérin was one of the most important enthusiast coleopterists that worked in Brazil in the first half of the 20th century. One of the most relevant of his contributions to the study and knowledge of Brazilian beetles was the book *Coleópteros do Brasil* (Guérin 1953). Guérin also described several Neotropical species of Erotylidae and most of their types are currently housed in the Museu de Zoologia da Universidade de São Paulo (MZUSP), Brazil. Four species of *Mycotretus* were described by Guérin (1949a,b, 1956): *M. bicinctus* Guérin, 1949 and *M. trifasciatus* Guérin, 1956 (from Brazil) and *M. anchoralis* Guérin, 1956 and *M. monrosi* Guérin, 1949 (from Argentina). The first two species were recently collected by us but individuals showed intraspecific variation not reported or not discussed before.

We are currently revising the genus *Mycotretus* and, as a first step, we want to clarify the morphological limits between two very similar South American species and explore new character sets for the study of *Mycotretus*. Our objective in the present work is to redescribe *Mycotretus chilensis* Crotch, 1876 and *Mycotretus trifasciatus* Guérin, 1956, providing the first descriptions of their mouthparts, metendosternite, male and female terminalia, as well as new data on their geographic distribution and host fungi. Additionally, the lectotype of *M. chilensis* is designated and *Mycotretus bicinctus* Guérin, 1949 is proposed as a junior synonym of *M. chilensis*. We also discuss implications of our results in clarifying the systematics of *Mycotretus*.

Materials and Methods

The specimens examined for this work belong to the following institutions:

CAMB	Coleção Ayr de Moura Bello (Rio de Janeiro, RJ, Brazil)
CELC	Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera da UFV (Viçosa, MG, Brazil)
CEMT	Seção de Entomologia da Coleção Zoológica, Departamento de Biologia e Zoologia, Instituto de Biociências, Universidade Federal de Mato Grosso (Cuiabá, MT, Brazil)
CERPE	Coleção Entomológica da Universidade Federal Rural de Pernambuco (Recife, PE, Brazil)
MCNZ	Fundação Zoobotânica do Rio Grande do Sul (Porto Alegre, RS, Brazil)
MZUSP	Museu de Zoologia da Universidade de São Paulo (São Paulo, SP, Brazil)
RBINS	Royal Belgian Institute of Natural Sciences (Brussels, Belgium)
UFPR	Universidade Federal do Paraná (Curitiba, PR, Brazil)
UMZC	University Museum of Zoology (Cambridge, United Kingdom)

Terms for external morphology are based on Lawrence *et al.* (2011) and Lawrence & Ślipiński (2013). Terms for color pattern follow Skelley (1998), and descriptions of mouthparts and abdominal terminalia were based on Węgrzynowicz (2002). The term “flagellum” (in male genitalia, see Węgrzynowicz 2002) herein used is equivalent to the “endophallic armature” (see Lawrence *et al.* 2011). Descriptions of the metendosternite follow the terms used by Lawrence *et al.* 2011. Range, mean and standard deviation values for measurements (in millimeters) and ratios are provided in the redescrptions, following mainly Lopes-Andrade & Lawrence (2005) and the following abbreviations are used: **BW**, basal width of the scutellar shield; **CL**, length of the antennal club (measured from base of the eighth to apex of the eleventh antennomere); **EL**, elytral length (at midline, from base of scutellar shield to elytral apex); **EW**, greatest elytral width; **FL**, length of the antennal funicle (here measured from the scape and the antennomere before club). The term “funicle” as used here includes the pedicel, following Lawrence & Ślipiński (2013); **GD**, greatest depth of the body (from elytra to metaventrte); **GW**, greatest diameter of the eye; **PL**, pronotal length along midline; **PW**, greatest pronotal width; **TL**, total length (= EL+PL; head not included). The ratio **GD/EW** was recorded as an indication of degree of convexity; **TL/EW** indicates degree of body elongation. Definitions of the terms sympatry and syntopy follow Ribas (1964).

Examination and measurement of specimens, as well as most photographs (Figs. 1D–F, 2D–I; 3; 4A–C, E–G; 6B and 7A–B), were made under a Zeiss Discovery V20 equipped with a Zeiss AxioCam 506 digital camera.

Dissections and the remaining photographs (Figs. 4D, H–I; 5; 6A, C–I) were made under a Zeiss Stemi 2000C stereomicroscope equipped with a Canon EOS 1000D. Sinuate structures (e.g. male genitalia, coxal lines and other body parts) were measured using the function Curve (Spline) of the software ZEN Pro 2012. Images of the holotypes of *M. bicinctus* and *M. trifasciatus* were provided by the curator of the MZUSP (see Acknowledgements).

After dissections, all examined structures were put in genitalia vials containing bidistilled glycerin, the vial being pinned under the specimen. In the case of male and female terminalia, some preparations were stained with Chlorazol Black-E for optimal contrasting. The dissection protocol was the following: (i) the specimen was relaxed in a solution of warm water with detergent (100:1); (ii) the whole specimen or its parts (abdomen, head or mouthparts) were left in a saturated solution of KOH (5 pastilles of KOH diluted in 50 ml of water with 2 ml of detergent) for 24–48 hours; (iii) these were removed from the KOH solution and cleaned in water, then placed in a solution of water and acetic acid (10:1) for about one minute and again cleaned in water; (iv) final dissections were made in water or glycerin on a microscope slide bearing concavities. For staining, the structures were removed and immersed in a water droplet, then pushed to the other concavity containing a drop of alcoholic solution of Chlorazol Black-E (0.5% in 70% alcohol). After acquiring adequate staining, the parts were cleaned in water, photographed and put in genitalia vials.

Identification of host fungi was based mostly in Wright & Albertó (2002) and names were updated consulting the online database Index Fungorum (2017). The distribution map was created using latitude and longitude coordinates estimated by tracking localities in the online database GeoNames (Wick 2012) and plotted in a map in the freeware QGIS 2.12.2. The distribution maps mostly include records only of specimens directly examined by us.

Results

We have located only one specimen of *M. chilensis* in Crotch's collection. In the description (Crotch 1876), it is not clear whether the author had seen one or more specimens. Therefore, we prefer not to consider this single specimen of *M. chilensis* as the holotype. For nomenclatural stability, the lectotype of *M. chilensis* is designated. Based on external morphology and coloration pattern of adults, we propose *M. bicinctus* Guérin, 1949 as a junior synonym of *M. chilensis* Crotch, 1876. The redescrptions of *M. chilensis* and *M. trifasciatus* are provided below.

Mycotretus chilensis Crotch, 1876

Figs. 1, 3A–D, 4A–D, 5 and 7D.

Mycotretus chilensis Crotch 1876: 454. Type locality: Chile (possibly mislabeled); Gemminger & Harold 1876: 3692 [distribution]; Kuhnt 1909: 75 [distribution]; Blackwelder 1945: 466 [distribution]; Guérin 1952: 182 [description by Crotch (1876) and distribution]; Alvarenga 1994: 22 [information on type series and distribution]; Skelley & Cekalovic 2001: 221 [comments on distribution].

Mycotretus bicinctus Guérin 1949: 236, fig. 9, **new synonym**. Type locality: Brasil, São Paulo, Parque da Cantareira; Alvarenga 1994: 21 [information on type series and distribution]; Campaner *et al.* 2008: 242 [list of Erotylidae types deposited at MZUSP].

Adult diagnosis. There are two distinct color patterns in *M. chilensis*, a sexual dimorphism which works for most individuals. In the first pattern, observed in the lectotype and in most males, the pronotum usually has a small black band anteriorly (Figs. 1A and 1D, red arrow) instead of circular spots, and four circular free black spots on disc; the first transverse elytral black band reaches the anterior elytral edge (Figs. 1A and 1D); the second black band is more elongated and the posterior outline is less sinuate (Figs. 1A and 1D) in comparison to females; both the first and second transverse bands begin at mesal sutural edge but do not reach the elytral outer edges (Figs. 1B and 1E); the ventral coloration in fully pigmented males can be reddish-brown to blackish, mainly in the meso- and metaventrite (Fig. 1F). In the second color pattern, observed in most females, the pronotum usually has two circular black spots on the anterior portion and four circular free black spots on disc (Figs. 1G, 4A), which is similar to the pronotal color pattern of *M. trifasciatus* (Figs. 2A,D, 4E). The elytra have two wide and sinuate transverse black



FIGURE 1. Adult *Mycotretus chilensis* Crotch, 1876: **A–C** lectotype from Chile (doubtful record), **(A)** dorsal view, with arrow showing anterior pronotal band; **(B)** lateral view; **(C)** labels. **D–F** male *M. chilensis* Crotch, 1876 from Viçosa (MG, Brazil), **(D)** dorsal view, with arrow showing anterior pronotal band; **(E)** lateral view; **(F)** white arrow showing discrimen. **G–I** holotype of *M. bicinctus* (syn. n. of *M. chilensis*) from Cantareira (SP, Brazil). This color pattern was observed in most females, **(G)** dorsal view, with arrow showing the first black band reaching the anterior edge of elytra close to scutellar shield; **(H)** lateral view; **(I)** labels. Scale bars: A = 1 mm, D–F, G–H = 0.5 mm.

bands: the first on the anterior half, which reaches the anterior elytral edge close to scutellar shield (Fig. 1G, white arrow) and does not reach the outer elytral edges (Fig. 1H); the second transverse black band extends from the mesal sutural edge to the outer edges (Figs. 1G–H); the ventral coloration is homogeneously yellowish-brown even in fully pigmented females. Penis (Fig. 5A) with flagellum (in internal sac) well-developed and sinuate (length mean: 1.65 mm, $n = 2$, from the beginning of virga to the end of its head) with a median membranous portion containing a slight sinuosity (length mean: 0.15 mm, $n = 2$; Fig. 5A, black arrow). Both flagellum and sinuosity are shorter compared to those of *M. trifasciatus* (compare to Fig. 6A, sinuosity shown by black arrow).

Redescription. Length (in mm) = 3.73–5.71 (4.83 ± 0.53 , $n = 21$). Body elongate, widest at the anterior third of elytra, TL/EW = 1.67–2.03 (1.77 ± 0.073), GD/EW = 0.63–0.82 (0.69 ± 0.04), glabrous and glossy, dorsal coloration whitish, yellowish or reddish-brown with transverse black bands. Ventral coloration homogeneously yellowish-brown (usually females) or blackish on the meso- and metaventricle (usually males) in fully pigmented individuals; head with the same background color of the remainder body but without black spots or marks; mouthparts usually yellowish to reddish-brown, mentum plate with an almost black outline; antennae yellowish to reddish-brown, antennomeres VI to XI blackish.

Head. Glabrous; punctation single, fine and sparse; frontoclypeal suture present but interrupted at middle. **Clypeus.** Shallowly and arcuately emarginated. **Antennae.** Left antenna measured in one individual: FL 0.65 mm, CL 0.5 mm, CL/FL 0.77; length of antennomeres (in mm), from antennomere one to eleven, as follows: 0.18, 0.1, 0.18, 0.1, 0.1, 0.07, 0.07, 0.11, 0.12, 0.16. **Eyes.** Glabrous (GW 0.36 mm), finely granulate. **Mouthparts.** (Figs. 3A–D) Labrum free, highly sclerotized, pubescent, slightly emarginated at middle. Mandibles short and broad, outer apical edge with a distinct depression containing setae; apex with two teeth; mandibular base emarginated, with an additional outgrowth above mola; mola well-developed, horseshoe-shaped, naked and distinctly costate; there is a soft and pubescent prostheca above mola with an additional tuft of setae. Maxillae with cardo subtriangular and stipes elongated; galea shorter but wider than lacinia, somewhat widened towards apex, which is densely pubescent; lacinia much longer and narrower than galea, densely pubescent at apex, with a highly sclerotized but barely visible hook; basal maxillary palpomeres almost as long as the next two together, apical palpomere semicircular and approximately 2.4× wider than long. Labium with apical palpomere of labial palps club-shaped (asymmetrical); mentum pentagonal, strongly sclerotized and bearing setae at middle; paraglossae slightly sclerotized and pubescent; glossa strongly sclerotized.

Thorax. Pronotum. (Fig. 4A) Subtrapezoidal with edges bordered and sides moderately arcuate, convergent anteriorly. PW/PL = 2.08–2.76 (2.31 ± 0.16), widest anteriorly in both sexes; shiny, punctation single and interspaces microreticulate; punctures separated by a distance of about 3–6 puncture-widths at disc, each puncture bearing a very short minute seta (barely visible even at a magnification of 150×); anterior edge slightly convex at middle and anterior angles sharp; color pattern: with a small and narrow anterior black band instead of circular spots (Figs. 1A and 1D) ($n = 15$; seven individuals were dissected, six being males and one a female) or with two circular anterior black spots and four circular free black spots on disc (Figs. 1G and 4A) ($n = 9$; four individuals were dissected and were females). **Scutellar shield.** (BW 0.29 mm), subpentagonal, glabrous, bearing a few punctures. **Elytra.** EL/EW = 1.27–1.60 (1.38 ± 0.07), EL/PL = 3.18–4.06 (3.66 ± 0.28); strongly margined anteriorly, moderately convex, with seven conspicuous longitudinal rows of punctures (Fig. 4B, counted from the elytral suture toward elytral outer edges); punctures separated by about 2–4 puncture-widths; interspaces between rows microreticulate and with fine and sparse punctures, each puncture bearing a minute seta (barely visible at magnification of 150×); color pattern of males and females as in the diagnosis. **Hind wings.** Developed, apparently functional. **Prosternum.** Convex; anterior margin smooth and pubescent; notosternal sutures distinct and entire; procoxal cavities ovate; prosternal process abruptly expanded apically, shallowly emarginated at apex; procoxal lines shorter and nearly straight; there is a pair of secretory pores on the prosternal process (Fig. 4C). **Mesoventrite.** Small, convex, mesocoxal lines straight to slightly arched; anterior edge sinuate, medially lobed. **Metaventricle.** Convex, glabrous, finely punctate, interspaces of punctures microreticulate; approximately 2.32× as long as mesoventrite; metacoxal lines conspicuous, approximately 0.73× as long as metaventricle; discrimen (Fig. 1F, arrow) approximately 0.79× as long as metaventricle. **Metendosternite** well-developed (Fig. 4D), hardened but still translucent, convex; central sclerotization of the anterior processes (Fig. 4D, red arrow) approximately 0.21× as long as the central sclerotization of the stalk (Fig. 4D, big black arrow); inner outline of laminae with a conspicuous ear-shaped extension (Fig. 4D, small black arrows). **Legs.** Procoxae oval, mesocoxae almost globular and metacoxae transverse, cigarette-shaped. Femora elongated, smooth, without spines or other outgrowths. Tibiae long, somewhat widened apically; apex with a crown of wide flat setulae, two apical spurs on meso- and metatibiae and one reduced apical spur on protibiae. Tarsi densely pubescent.

Abdomen. Elongated; punctation coarse, shallow; interspaces, granulate; vestiture of sparse, slender setae. Coxal lines conspicuous and not continuous around coxae (approximately 0.75× the length of the first abdominal ventrite). Length of ventrites one to five as follows (in mm, from base to apex of each ventrite at the longitudinal midline): 0.72, 0.42, 0.26, 0.28, 0.42. **Male terminalia.** (Figs. 5A–C) Penis elongate, slightly curved (Fig. 5A, pen); basal portion with a short sclerotized projection that is linked to the apophyses; internal sac with a well-developed flagellum (Fig. 5A, “fla”) (length mean: 1.65 mm, n = 2, from beginning of virga to end of head), with a short sinuosity at middle that is accompanied by a membranous enlargement (Fig. 5A, black arrow; length mean: 0.15 mm, n = 2); the flagellum and sinuosity are shorter than those of *M. trifasciatus* (compare to Fig. 6 A–B). Apophyses (Fig. 5A, “apo”) approximately 1.5× longer than penis (n = 2). Tegmen (Fig. 5B) strongly sclerotized, with a membranous portion on its dorsum; parameres reduced and strongly sclerotized, with densely pubescent outgrowths, dilated and then acute at apex (Fig. 5B, arrows). Tergite IX and segment X well sclerotized (Fig. 5C); anteroventral edge of segment IX with a truncate subgenital plate (Fig. 5C, black arrow). **Female terminalia.** (Figs. 5D–F) Resembles that of *M. trifasciatus*. Gonostyli and gonocoxites strongly sclerotized (Fig. 5D, black and red arrow, respectively). Spermatheca (Fig. 5E) oval, membranous to strongly sclerotized; bursa copulatrix developed. Tergite VIII sclerotized and sternite VIII with a conspicuous median strut (Fig. 5F, arrow; displaced to the right during dissection).

Lectotype, here designated (UMZC). (Figs. 1A–C) “TYPE [blue label, printed] \ TYPE [printed], chilensis Reiche [handwritten] \ LECTOTYPE [red label, printed], *Mycotretus chilensis* Crotch, 1876 [handwritten]”.

Other examined specimens. 1 specimen (MZUSP) “HOLOTIPO [red label, printed] \ Cantareira., S. Paulo. [printed], 1938 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 18336 [handwritten] \ *Mycotretus bicinctus* J. Guer [handwritten], J. Guerin det. [printed] 1949 [handwritten]”; 3 specimens (MZUSP, on the same pin, including two dissected female) “PARATIPO [red label, printed] \ Cantareira. S. Paulo [printed], 1938 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 17030 [handwritten] \ Cantareira, S. Paulo, 4.I.38, Coll. Zellibor-Hauff [printed] \ *Mycotretus bicinctus* J. Guer [handwritten], J. Guerin det. [printed] 1949 [handwritten]”; 2 specimens (MZUSP) “PARATIPO [red label, printed] \ Cantareira. S. Paulo [printed], 11937 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 17198 [handwritten] \ Cantareira, S. Paulo, 30.11.37, Coll. Zellibor-Hauff [printed] \ *Mycotretus bicinctus* J. Guer [handwritten], J. Guerin det. [printed] 1949 [handwritten]”; 1 specimen (MZUSP) “PARATIPO [red label, printed] \ Cantareira. S. Paulo [printed], 10936 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 0526 [handwritten] \ *Mycotretus bicinctus* J. Guer [handwritten], J. Guerin det. [printed] 1949 [handwritten] \ 33 [orange label, handwritten]”; 1 specimen (MZUSP) “PARATIPO [red label, printed] \ Hansa. S. Catarina. [printed], 11943 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 16338 [handwritten] \ *Mycotretus bicinctus* J. Guer [handwritten], J. Guerin det. [printed] 1949 [handwritten]”; 1 specimen (MZUSP) “Jabaquara., S. Paulo. [printed], 4949 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 18433 [handwritten] \ *Mycotretus bicinctus* J. Guer [handwritten], J. Guerin det. [printed] 1949 [handwritten]”; 1 male (MZUSP, dissected) “CANTAREIRA [handwritten], S. Paulo – SP, Brasil [printed], 31-viii-1960 [handwritten], Col: E. Amante [printed]”; 1 specimen (MZUSP) “Est. biol. Boraceia, Salesópolis SP, 14-18.XI.1973, Exp. Mus. Zool.”; 1 specimen (MZUSP) “BRASIL, Rio Vermelho, Est° Sta. Catar., Col.: DIRINGS [printed], DEZ 1950 [date printed on label back]”; 1 specimen (MZUSP) “BRASIL, Itatiaia, Est° R. Janeiro., Col.: DIRINGS [printed], JAN 1960 [date printed on label back]” 1 specimen (MCNZ) “Tenente, Portela, RS, 11/IX/1990 [handwritten], leg. [printed] \ Col. MCN [printed], 155021 [handwritten]”; 1 male (UFPR, dissected) “Coleção M. Alvarenga [printed] \ BRASIL, Rio de Janeiro, D.F. CORCOVADO [printed], 12.XII.1955 [handwritten], D. Zajclw leg. [printed] / *Mycotretus bicinctus* [handwritten] C. Lopes-Andrade det. [printed] / DZUP 279313 [printed]”; 1 specimen (UFPR) “Coleção M. Alvarenga [printed] \ REPRESA RIO GRANDE, Guanabara Brasil [printed], X.1965 [handwritten], F.M. Oliveira [printed] / DZUP 279318 [printed]”; 1 female (UFPR, dissected) “Coleção M. Alvarenga [printed] \ Amparo, S. Paulo, P. Rech [handwritten] / DZUP 235894 [printed]”; 1 female (UFPR, dissected) “Coleção M. Alvarenga [printed] \ REPRESA RIO GRANDE, Guanabara Brasil [printed], X.1966 [handwritten], F.M. Oliveira [printed] / DZUP 279320 [printed]”; 2 specimens (CELC, including one dissected male) “Brasil: MG, Viçosa, “Mata do Paraíso”, 26.xi.2014, leg Pecci-Maddalena, Í.S.C. [printed] \ ex *Lentinus brumalis*”; 6 specimens (CELC, including one dissected male) “Brasil: MG, Viçosa, “Mata do Paraíso”, 02.xii.2014, leg. Pecci-Maddalena, Í.S.C. [printed] \ Fungo 1 Bicho 1 [printed] \ ex *Lentinus brumalis*”; 2 males (CELC, both dissected) “Brasil: MG, Viçosa, “Mata do Paraíso”; xii.1999, leg. C. Lopes-Andrade & FZ Vaz-de-Mello”; 2 females (CELC, both dissected) “Brasil: MG, Viçosa, “Mata do Paraíso”, 08.xii.2014, leg. Pecci-Maddalena, Í.S.C & Lopes-Andrade, C. \ Bicho 9 Fungo 9 \ ex *Mycena* sp.”.

Ecology. *Mycotretus chilensis* has been collected in basidiomes of *Lentinus brumalis* (Pers.) Zmitr. (Fig. 7A–D; Polyporaceae) and *Mycena* sp. (Fig. 7F; Mycenaceae). *Mycotretus chilensis* and *M. trifasciatus* are sympatric in Cantareira and Jabaquara, in the state of São Paulo; Rio Vermelho, in Santa Catarina; and Viçosa, in Minas Gerais. They were also found to be syntopic in Viçosa, where they were caught together on the same fungi in two field collections (see examined material). Like *M. trifasciatus*, *M. chilensis* has usually been collected during summer (see examined material).

Distribution. Southern and southeastern Brazil and a doubtful record from Chile (Fig. 8, green diamonds and black question mark).

Remarks. The lectotype was not dissected but we think it is probably a male, because its color pattern was observed in mostly males with gender confirmed by dissection. Likewise, the holotype of *M. bicinctus* (junior synonym of *M. chilensis*) was not dissected but we think it is a female. It is worth mentioning that one paratype of *M. bicinctus* with the same color pattern as the holotype was dissected and it is a female. The body of the lectotype is slightly more elongated than that of other specimens examined by us. The visibility of elytral rows of punctures on different specimens studied depends on the degree of pigmentation of specimens and the exact number of rows may be hard to establish. As we discuss below, the record of *M. chilensis* for Chile is probably a case of a mislabeled specimen.

***Mycotretus trifasciatus* Guérin, 1956**

Figs. 2, 3E–H, 4E–I, 6 and 7E.

Mycotretus trifasciatus Guérin 1956: 63, fig. 26. Type locality: Brasil, Santa Catarina, Nova Teutonia; Alvarenga 1994: 37 [information on type series and distribution]; Campaner *et al.* 2008: 242 [list of Erotylidae types deposited at MZUSP].

Adult diagnosis. There are two distinct color patterns in *M. trifasciatus* that seem to be geographic variations: **(i)** in the specimens like the holotype (Figs. 2A–B), the pronotum has two circular black spots on the anterior portion and four circular free black spots on disc (Figs. 2A, D, G, 4E). Each elytron has a bilobed scutellar black mark (Fig. 2A, big white arrow) and a black spot close to the humerus (the spots reach the anterior elytral edge) (Fig. 2A, small white arrow); each elytron has three transverse black bands, extending from the mesal suture to the outer edges (Figs. 2A–B), each band being very sinuate and bearing a prominent peak at middle (Fig. 2A, red arrow); along the mesal suture there is a black stripe which is narrowest between scutellar shield and first transverse band and between the second and third transverse bands, expanded at elytral apex; **(ii)** in specimens from Viçosa (MG) (Figs. 2D–F and 2H) and Obidos (PA) (Fig. 2G), the anteriormost spots in each elytron are separated into three spots (only the scutellar spots reach the anterior edge of elytra, Fig. 2D, white arrow); the second transverse marking is a fascia, formed by an outer elongate spot and an inner bilobed spot (Fig. 2D); the third transverse marking is also a fascia (Fig. 2D), formed by an outer elongate spot (close to the second transverse marking) and an inner bilobed spot (sometimes completely separated into two spots on each elytron), shorter than the previous fascia; the transverse markings are devoid of conspicuous peaks and do not reach the mesal suture; there is no longitudinal black stripe close to the mesal suture (Fig. 2D) and no apical black spot (Figs. 2D–E). Penial flagellum (in the internal sac) well-developed and sinuate (Fig. 6A; length mean: 2.17 mm, n = 3, from the beginning of virga to the end of its head) with a median membranous portion bearing a comparatively broader sinuosity (Fig. 6A, black arrow) and a sclerotization (Fig. 6B, black arrow), the latter not observed in *M. chilensis* (compare to Fig. 5A).

Redescription. Length (in mm) = 3.55–6.24 (4.65 ± 0.51 , n = 32). Body elongate, widest at the anterior one-third of elytra, TL/EW = 1.66–1.82 (1.73 ± 0.04), GD/EW = 0.59–0.73 (0.68 ± 0.03), glabrous and glossy, dorsal coloration yellowish to reddish-brown with black marks (bands and/or fasciae). Ventral coloration as the dorsal, without black marks; coxae, base and apex of femora, base of tibiae and apical portion of prosternal process blackish; head with a small circular black spot on frons (most prominent in individuals with the first color pattern); mentum plate bearing an almost black outline; antennae yellowish to reddish-brown with antennomeres VI to XI blackish. In individuals from Viçosa (MG) the ventral coloration (including legs) is homogeneously yellowish-brown. Pronotum with six circular black spots, except for one malformed individual (Fig. 2I).



FIGURE 2. Adult *Mycotretus trifasciatus* Guérin, 1956: **(A–C)** holotype of *M. trifasciatus* from Nova Teutônia (SC, Brazil), **(A)** dorsal view, with black arrows showing yellowish-brown coloration, big white arrow showing a scutellar bilobed and elongate black spot, small white arrow showing a spot close to the humerus, red arrow showing a prominent “pick” at middle of the first band; **(B)** lateral view; **(C)** labels. **D–F** *M. trifasciatus* from Viçosa (MG, Brazil), **(D)** dorsal view, with arrow showing the scutellar spots reaching the anterior edge of elytra; **(E)** lateral view; **(F)** ventral view, with white arrow showing discrimen. **(G)** female *M. trifasciatus* from Obidos (PA, Brazil), arrow showing yellowish-brown coloration. **(H)** female *M. trifasciatus* from Viçosa (MG, Brazil). **(I)** male paratype of *M. trifasciatus* from Nova Teutônia (SC, Brazil). Scale bars: A–B, D–F, H–I = 0.5 mm, G = 1 mm.

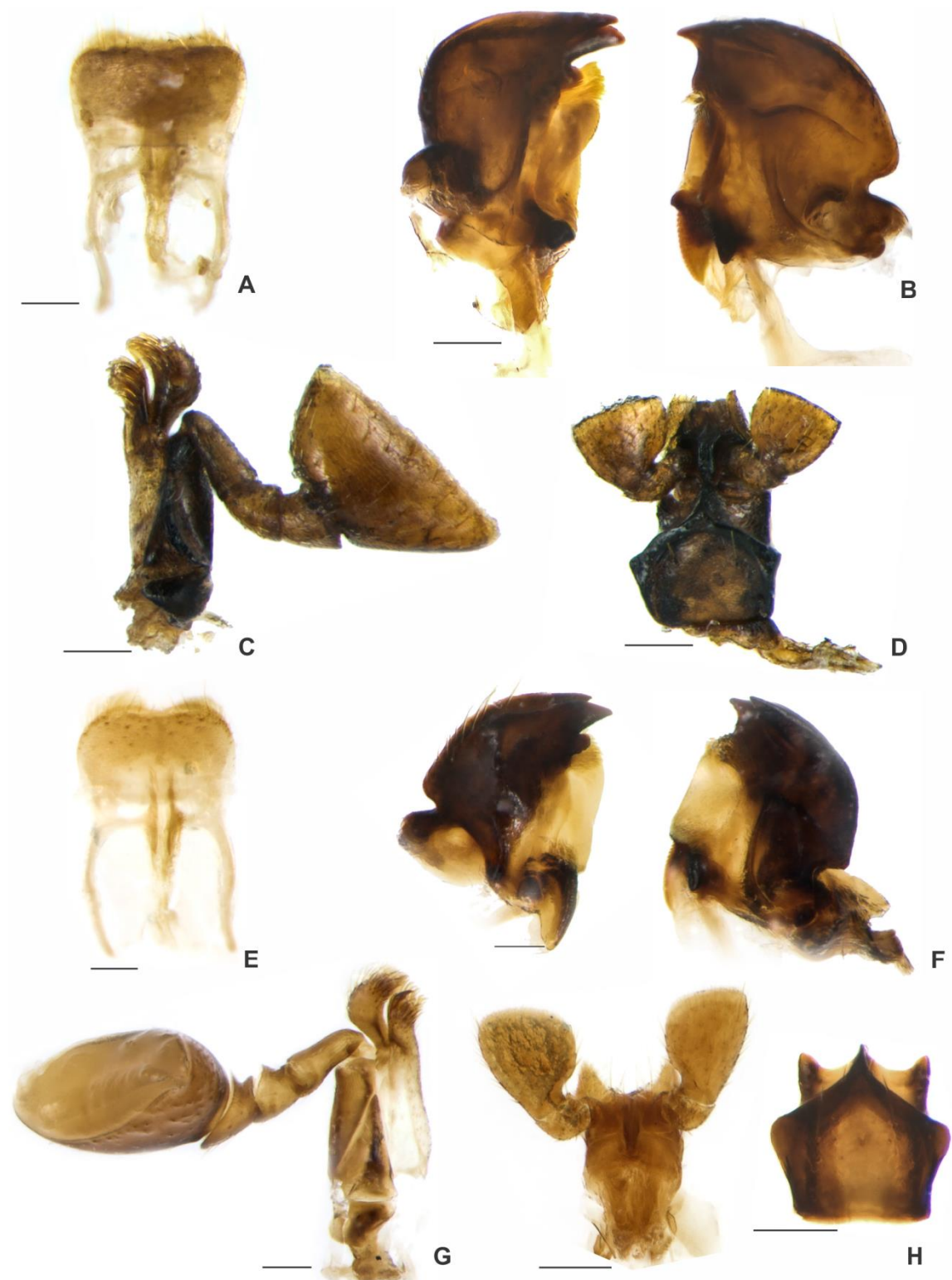


FIGURE 3. (A–D) Mouthparts of a male *Mycotretus chilensis* Crotch, 1876 from Viçosa (MG, Brazil) (A) labrum; (B) mandibles; (C) right maxilla; (D) labium. (E–G) Mouthparts of a male *M. trifasciatus* from Viçosa (MG, Brazil), (E) labrum; (F) mandibles; (G) left maxilla. (H) labium of a male *M. trifasciatus* from Canela (RS, Brazil), with separated mentum plate. Scale bars: A–H = 0.1 mm.

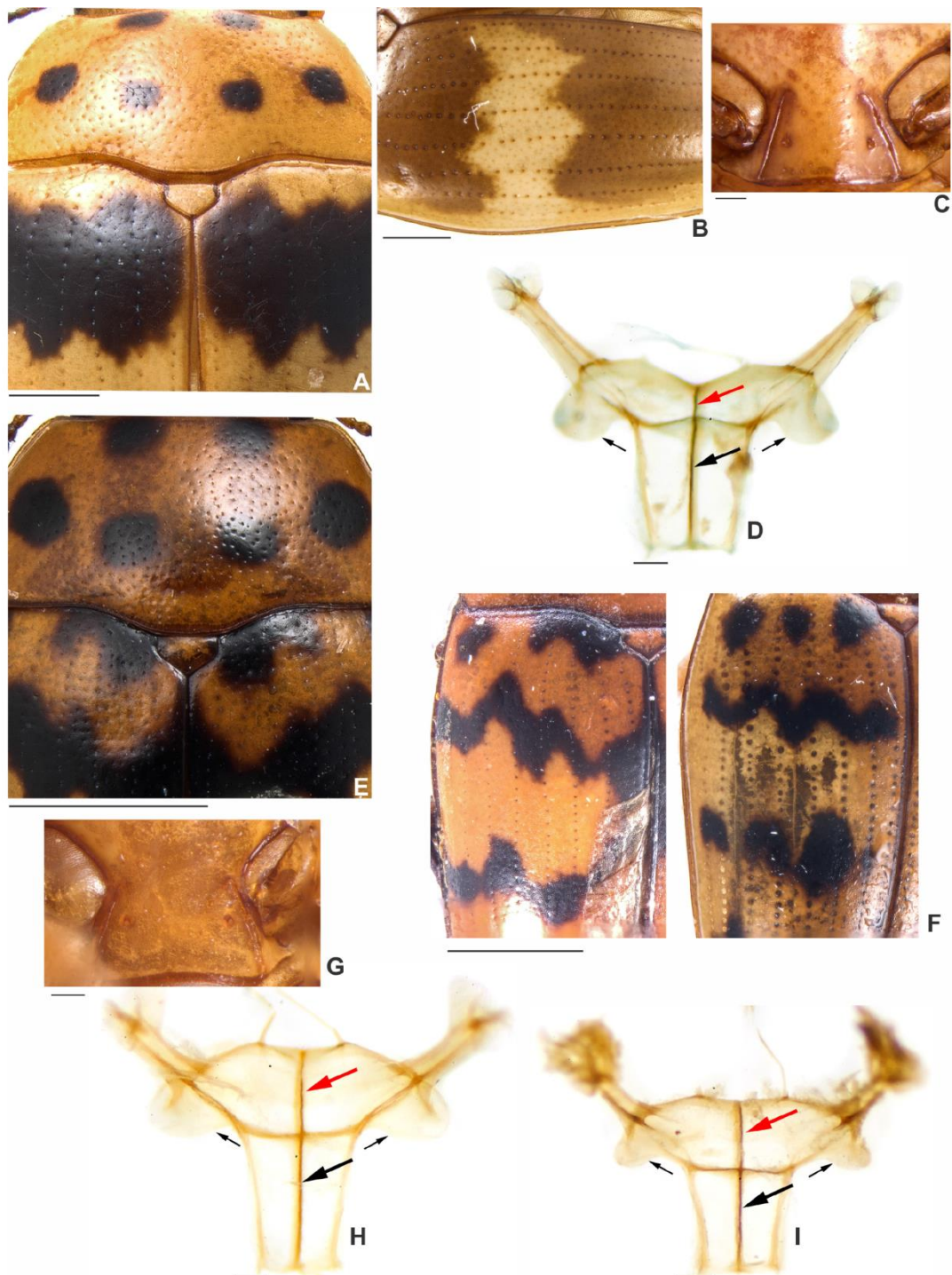


FIGURE 4. (A–D) Parts of thorax of *Mycotretus chilensis* Crotch, 1876 from different localities, (A) female, pronotum showing punctation; (B) male, longitudinal elytral striae; (C) pair of secretory pores on prosternal process; (D) metendosternite, red arrow showing central sclerotization of the anterior processes, big black arrow showing central sclerotization of the stalk, small black arrows showing inner outline of laminae. (E–I) parts of thorax of *M. trifasciatus* from different localities, (E) male, pronotum showing punctation; (F) longitudinal elytral striae in two specimens; (G) pair of secretory pores on prosternal process; (H) and (I) metendosternites of two specimens, red arrow showing central sclerotization of the anterior processes, big black arrow showing central sclerotization of the stalk, small black arrows showing inner outline of laminae. Scale bars: A–B and F = 0.5 mm, C–D and G–I = 0.1 mm, E = 1 mm.

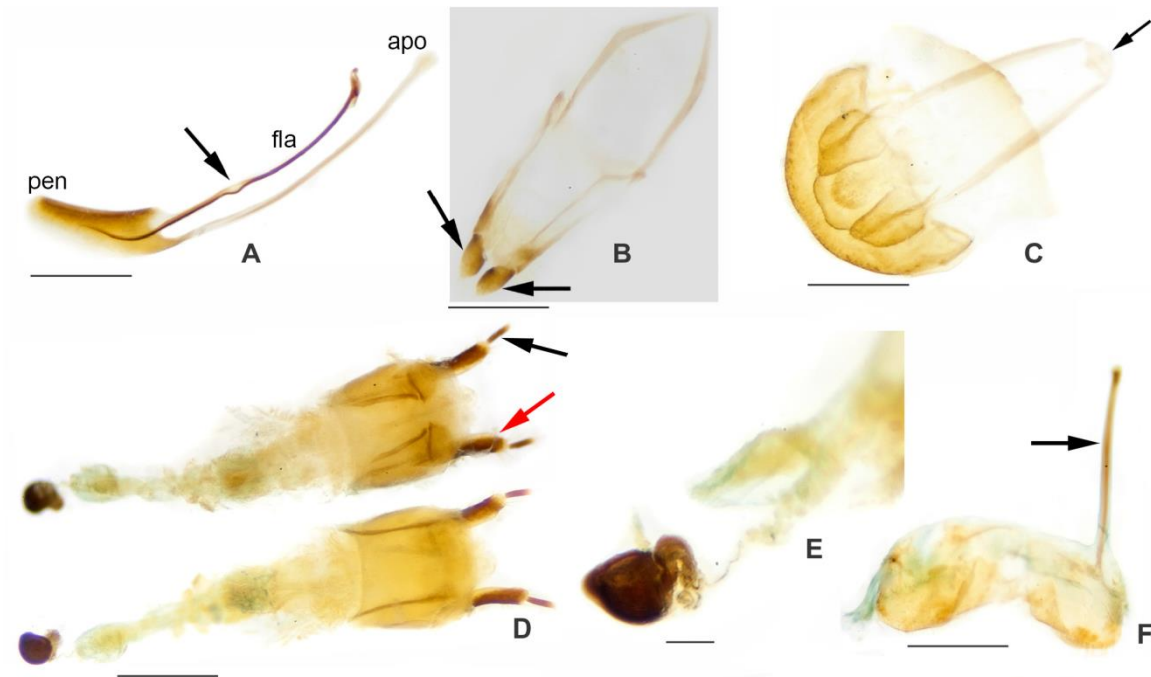


FIGURE 5. (A–C) Male terminalia of a *Mycotretus chilensis* Crotch, 1876 from Cantareira (SP, Brazil), (A) penis (pen), flagellum (fla), apophyses (apo), arrow showing the median sinuosity in flagellum; (B) tegmen, arrows showing the parameres; (C) tergite IX and segment X, with arrow showing anteroventral edge of segment IX. (D–F) female abdominal terminalia of a paratype of *M. chilensis* from Cantareira (SP, Brazil), (D) genitalia in two views, with black arrow showing a gonostylus and red arrow showing a gonocoxite; (E) spermatheca (hardened structure at left) and part of the bursa copulatrix; (F) sternite VIII with a median strut (arrow; the strut was displaced to the right during dissection). Scale bars: A–D and F = 0.5 mm, E = 0.1 mm.

Head. Glabrous; punctation single, fine and sparse; frontoclypeal suture present but interrupted at middle. **Clypeus.** Shallowly and arcuately emarginated. **Antennae.** Right antenna measured in one individual: FL 0.56 mm, CL 0.32 mm, CL/FL 0.58; length of antennomeres (in mm), from antennomere one to eleven, as follows: 0.12, 0.07, 0.11, 0.08, 0.06, 0.05, 0.04, 0.07, 0.07, 0.12. **Eyes.** Glabrous (GW 0.30 mm), finely granulate. **Mouthparts.** (Figs. 3E–H) Labrum free, sclerotized, pubescent, slightly emarginated at middle. Mandibles short and broad, distal portion with a distinct depression containing setae; apex with two teeth; mandibular base emarginated, with an additional outgrowth above mola; mola well developed, horseshoe-shaped, naked and distinctly costate; above mola there is a soft and pubescent prosthema with an additional tuft of setae. Maxillae with cardo subtriangular and stipes elongated; galea shorter but wider than lacinia, somewhat widened towards apex and there densely pubescent; lacinia much longer and narrower, apically covered with dense pubescence, with a highly sclerotized but barely visible hook; maxillary palpomere I about as long as II and III combined, II and III short, IV semicircular and approximately 3× as wide as long. Labium with apical palpomere of club-shaped; mentum pentagonal, strongly sclerotized, with depressions and setae at middle; paraglossae slightly sclerotized and pubescent; glossa strongly sclerotized.

Thorax. Pronotum. (Fig. 4E) Subtrapezoidal with edges bordered and sides moderately arcuate, convergent anteriorly. PW/PL = 1.92–2.37 (2.11 ± 0.11), widest close to base in both sexes; shiny, punctation single and interspaces microreticulate; punctures separated by about 6 puncture-widths at disc and each puncture bearing a very short minute seta (barely visible even at a magnification of 110×); anterior edge slightly convex at middle and anterior angles sharp; color pattern: anterior portion bearing two circular black spots, disc with four circular free spots (Figs. 2A and 2D). **Scutellar shield.** (BW 0.3 mm), subpentagonal, glabrous, bearing few punctures. **Elytra.** EL/EW = 1.25–1.43 (1.32 ± 0.05), EL/PL = 2.84–4.02 (3.21 ± 0.26); strongly margined basally, elongate, moderately convex, with six or seven longitudinal rows of punctures (Fig. 4F, counted from the elytral suture to the outer edge of each elytron); punctures separated by about 4 puncture-widths; interspaces of rows microreticulate

and with fine and sparse punctures, each bearing a minute seta (more discernible at the anterior one-third and barely visible even at magnification of 150 \times); elytral color patterns as in the diagnosis. **Hind wings.** Developed, apparently functional. **Prosternum.** Convex; anterior edge smooth and pubescent; notosternal sutures distinct and entire; procoxal cavities ovate; prosternal process abruptly expanded apically, shallowly emarginated at apex; procoxal lines shorter and nearly straight; on the prosternal process, there is a pair of secretory pores (Fig. 4G; barely visible at a magnification of 130 \times and indistinguishable in a few individuals). **Mesoventrite.** Small, convex, mesocoxal lines straight to slightly arched; base sinuate, medially lobed. **Metaventrte.** Convex, glabrous, finely punctate, microreticulate between punctures; approximately 2.11 \times as long as mesoventrite; metacoxal lines conspicuous, approximately 0.69 \times as long as metaventrte; discrimen (Figs. 2F, arrow) long, approximately 0.69 \times as long as metaventrte. **Metendosternite** well developed (Figs. 4H and 4I), sclerotized and convex; central sclerotization of the anterior processes (Figs. 4H and 4I, red arrow) approximately 0.39 \times as long as mesoventrite; laminae with the inner outline without abrupt inflexion (Fig. 4H and 4I, small black arrows). **Legs.** Pro- and mesocoxae almost globular, metacoxae transverse, cigarette-shaped. Femora elongated, smooth, without spines or other outgrowths. Tibiae long, somewhat widened apically. Apex of tibiae with a crown of wide flat setulae, two spurs on meso- and metatibiae and one reduced spur on protibia; tarsi densely pubescent.

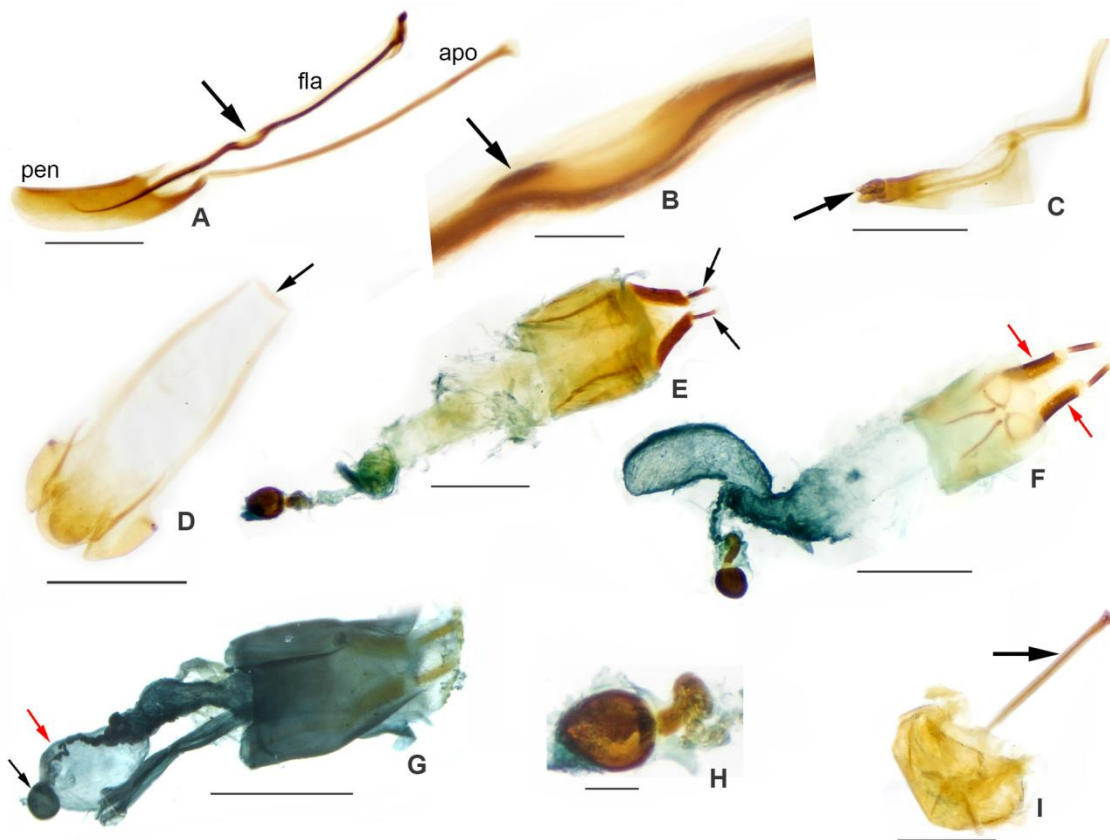


FIGURE 6. (A–D) male terminalia of a paratype of *Mycotretus trifasciatus* Guérin, 1956 from Cerro Azul (PR, Brazil), (A) penis (pen), flagellum (fla), apophyses (apo), with arrow showing the median sinuosity of flagellum; (B) detail of the sinuosity, with arrow showing a sclerotization not observed in *M. chilensis*; (C) tegmen, with arrow showing parameres; (D) tergite IX and segment X, with arrow showing anteroventral edge of segment IX. (E) female genitalia of a paratype of *M. trifasciatus* from Rio Vermelho (SC, Brazil), with arrows showing the gonostyli; (F) female genitalia of a *M. trifasciatus* from Obidos (PA, Brazil), with red arrows showing gonocoxites; (G) female genitalia of a *M. trifasciatus* from Viçosa (MG, Brazil), with black arrow showing the spermatheca and red arrow showing an expanded portion of the bursa copulatrix; (H) spermatheca of a paratype of *M. trifasciatus* from Rio Vermelho; (I) sternite VIII with a median strut (arrow) of a paratype of *M. trifasciatus* from Rio Vermelho. Scale bars: A–G and I = 0.5 mm, H = 0.1 mm.

Abdomen. Elongated; with coarse, shallow punctation; interspaces of punctures granulate; vestiture of sparse, slender setae. Coxal lines conspicuous and not continuous around coxae (approximately 0.92× the length of the first abdominal ventrite). Length of the ventrites one to five as follows (in mm, from base to apex of each ventrite at the longitudinal midline): 0.68, 0.34, 0.28, 0.26, 0.39. **Male terminalia.** (Figs. 6A–D) Penis elongate, slightly curved (Fig. 6A, pen); basal portion with a prominent and sclerotized projection linked to the apophyses; internal sac with a well-developed flagellum (Fig. 6A, fla), sinuate (length mean: 2.17 mm, n = 3, from the beginning of virga to the end of head) with median portion accompanied by a membranous enlargement with a broad sinuosity (Fig. 6A, arrow; length mean: 0.46 mm, n = 3) and a sclerotization not present in *M. chilensis* (Fig. 6B, arrow). Apophyses (Fig. 6A, apo) approximately 1.5× longer than penis (n = 3). Tegmen strongly sclerotized, with a membranous portion on dorsum; parameres reduced and strongly sclerotized, with densely pubescent outgrowths, dilated and pointed at apex (Fig. 6C, arrow). Tergite IX and segment X well sclerotized; anteroventral edge of the segment IX with a truncate subgenital plate (Fig. 6D, arrow). **Female abdominal terminalia.** (Figs. 6E–I) Gonostyli (Fig. 6E, black arrows) and gonocoxites (Fig. 6F, red arrows) strongly sclerotized. Spermatheca ovate (Figs. 6G, black arrow and 6H), very membranous in the dissected individuals from Viçosa (MG) (Fig. 6G) to strongly sclerotized in dissected individuals from the remaining localities (Fig. 6H); bursa copulatrix developed (Fig. 6G, red arrow). Tergite VIII sclerotized and sternite VIII with a conspicuous median strut (Fig. 6I, black arrow).

Holotype (MZUSP). (Figs. 2A–C) “TIPO [red label, printed] \ N. Teutonia., S. Catarina. [printed], 12.948 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 18407 [handwritten] \ 194, Brasilien, Nova Teutonia, 27° 11 B, 52° 23’ L, Fritz Plaumann, 3500 m [printed] \ *Mycotretus trifasciatus* J. Guer [handwritten], J. Guerin det. [printed] 1954 [handwritten]”.

Other examined specimens. 1 male (MZUSP, dissected) “COTIPO [red label, printed] \ N. Teutonia., S. Catarina. [printed], 12.949 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 18490 [handwritten] \ 194, Brasilien, Nova Teutonia, 27° 11 B, 52° 23’ L, Fritz Plaumann, 3500 m [printed] \ *Mycotretus trifasciatus* J. Guer [handwritten], J. Guerin det. [printed] 1954 [handwritten]”; 1 male (MZUSP, dissected) “COTIPO [red label, printed] \ Serro Azul, Rio Gr. do sul., S. Catarina., 8.939 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 18870 [handwritten] \ Serro Azul [printed], 8.39 [handwritten] \ *Mycotretus trifasciatus* J. Guer [handwritten], J. Guerin det. [printed] 1954 [handwritten]”; 1 specimen (MZUSP) “COTIPO [red label, printed] \ Cantareira. S. Paulo [printed], 12.929 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 17373 [handwritten] \ *Mycotretus trifasciatus* J. Guer [handwritten], J. Guerin det. [printed] 1954 [handwritten]”; 1 specimen (MZUSP) “COTIPO [pink label, handwritten] \ Morumbi [handwritten], Jabaquara., S. Paulo. [printed], 11.942 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 18164 [handwritten] \ MORUMBI, Sao Paulo – Capital, Dr. Nick. [printed], 29.11.42. [handwritten] \ *Mycotretus trifasciatus* J. Guer [handwritten], J. Guerin det. [printed] 1954 [handwritten]”; 1 specimen (MZUSP) “Brasilien, Nova Teutonia, Santa Catharina [printed], 2.1936 [handwritten], B. Pohl [printed] \ *Mycotretus trifasciatus* J. Guer [handwritten], J. Guerin det. [printed] 1954 [handwritten]”; 1 specimen (MZUSP) “BRASIL, S. Bento do Sul, Sta. Catarina, Dirings [printed] \ *Mycotretus trifasciatus* J. Guer [handwritten]”; 1 female (MZUSP, dissected) “BRASIL, Rio Vermelho, Sta. Catarina, Dirings [printed], MAR 1952 [date printed on label back]”; 1 male (MZUSP, dissected) “BRASIL, Rio Vermelho, Sta. Catarina, Dirings [printed], MAR 1952 [date printed on label back]”; 1 specimen female (MZUSP, dissected) “BRASIL, Canta Galo (Obidos), PARÁ, Dirings [printed], JAN 1957 [date printed on label back]”; 1 male (MCNZ, dissected) “Canela, RS, 06/I/1984, M.Hoffmann [handwritten] \ Col. MCN, 238429 [printed]”; 1 specimen (MCNZ) “Tapes, RS, (Faz. São Miguel), 17.XII.2003, Equipe Probio col. \ Col. MCN, 224774 [printed]”; 1 specimen (CAMB) “Brasil: MG, Viçosa, “Mata do Paraíso”, 08.xii.2014, leg. Pecci-Maddalena, Í.S.C & Lopes-Andrade, C. [printed] \ Bicho 9 Fungo 9 [printed] \ ex *Mycena* sp.”; 1 specimen (CERPE) “Brasil: MG, Viçosa, “Mata do Paraíso”, 08.xii.2014, leg. Pecci-Maddalena, Í.S.C & Lopes-Andrade, C. [printed] \ Bicho 9 Fungo 9 [printed] \ ex *Mycena* sp.”; 1 specimen (CEMT) “Brasil: MG, Viçosa, “Mata do Paraíso”, 08.xii.2014, leg. Pecci-Maddalena, Í.S.C & Lopes-Andrade, C. [printed] \ Bicho 9 Fungo 9 [printed] \ ex *Mycena* sp.”; 13 specimens (CELC, including two females and one male dissected) “Brasil: MG, Viçosa, “Mata do Paraíso”, 08.xii.2014, leg. Pecci-Maddalena, Í.S.C & Lopes-Andrade, C. [printed] \ Bicho 9 Fungo 9 [printed] \ ex *Mycena* sp.”; 3 specimens (CELC, including one dissected male) “Brasil: MG, Viçosa, “Mata do Paraíso”, 02.xii.2014, leg. Pecci-Maddalena, Í.S.C. [printed] \ Fungo 1 Bicho 1 \ ex *Lentinus brumalis* [printed]”; 4 specimens (CELC) “Brasil: MG, Viçosa, “Mata do Paraíso”, 03.xi.2014; leg. A. Orsetti, S. Aloquio, I. Maddalena, A. Komonen & C. Lopes-Andrade [printed] \ Trilha do

Pesquisador [printed], *Polyporus brumalis* Polyporaceae [handwritten]"; 1 specimen (CELC) "Brasil: MG, Viçosa, "Mata do Paraíso", 05.xi.2014; leg. A. Orsetti, S. Aloquio, I. Maddalena, A. Komonen & C. Lopes-Andrade [printed] \ Trilha do Pesquisador [printed], *Polyporus brumalis* Polyporaceae [handwritten]"; 1 specimen female (CELC, dissected) "Brasil: MG, Viçosa, "Mata da Biologia", 03.v.2014, leg. Lopes-Andrade *et al.* \ Fungo 2. *Polyporus tricholoma* [SIC]"; 1 specimen (CELC) "Brasil: MG, Viçosa, Mata do Paraíso, 13.ii.2015, armadilha intercept. de voo, leg. S. Aloquio, A. Orsetti, C. Lopes-Andrade & M. Bento [printed]"; 1 specimen (RBINS) "Coll. R.I.Sc.N.B., Brazil: Mendes, Le Moulit Vendit [printed] \ *Mycotretus* spp. [handwritten], det. P.E.Skelley [printed]".

Ecology. *Mycotretus trifasciatus* has been collected in basidiomes of Polyporaceae (Polyporales): *Lentinus brumalis* (Pers.) Zmitr. (Fig. 7A–C), *Lentinus tricholoma* (Mont.) Zmitr. (Fig. 7E) and in Mycenaceae (Agaricales): *Mycena* sp. (Fig. 7F). Specimens collected by us were found in two forest remnants in Viçosa (state of Minas Gerais, Southeast Brazil) in the beginning of summer, except for one collection on 03 May 2014.



FIGURE 7. Host fungi, (A–C) *Lentinus brumalis*, basidiomes from Viçosa (MG, Brazil); (D) Two male specimens of *M. chilensis* on a basidiome of *Lentinus brumalis* from Viçosa (MG, Brazil); (E) One female *M. trifasciatus* on a basidiome of *Lentinus tricholoma* from Viçosa (MG, Brazil); (F) *Mycena* sp. basidiomes from Viçosa (MG, Brazil). Scale bars: A–B = 5 mm.



FIGURE 8. Distribution map for *Mycotretus chilensis* Crotch, 1876 (green diamonds) and *M. trifasciatus* Guérin, 1956 (red circles). The blue question mark indicates the doubtful record of *M. trifasciatus* from northern Brazil. The black question mark indicates the doubtful record of *M. chilensis* from Chile.

Distribution. Southern and southeastern Brazil, with one doubtful record in Obidos (in the state of Pará, North Brazil) (Fig. 8, question mark blue).

Remarks. Specimens from Viçosa have free spots on elytral disc instead of bands or fasciae. The longitudinal elytral striae also vary between specimens, the punctures being coarser in part of the individuals of a single locality. In the latter case a seventh stria can be easily distinguished after the sixth in each elytron. In most cases, the coloration between the first and second transverse marking and between the third transverse marking and the end of the elytra is remarkably yellowish-brown (Figs. 2A and 2G, black arrows). In live specimens we observed that this coloration can be whitish (Fig. 2H). As observed by Guérin (1956) in the original description, in one paratype the anterior sides of pronotum are deformed and there are only five circular pronotal spots instead of six (Fig. 2I).

Discussion

Lacordaire (1842) was the first author to provide detailed descriptions and to propose a subgeneric classification for *Mycotretus*, which was based mainly on the number of antennomeres of the antennal club. After Lacordaire, other authors (e.g. Crotch 1876; Gorham 1888; Boyle 1956; Guérin 1949a,b, 1956; Alvarenga 1983, 1989) have described species in the genus. However, in most of these works the descriptions are anecdotal and none of them included information on the morphology of male and female terminalia or other structures that may have great taxonomic value. The morphology of head and its mouthparts in *M. chilensis* and *M. trifasciatus* are very similar to those of other *Mycotretus* (Lacordaire 1842) or even other Erotylidae (see Węgrzynowicz 2002). In species of *Mycotretus*, the apical maxillary palpomere is also expanded (see Lacordaire 1842; Alvarenga 1983, 1989). The mandibles of *M. chilensis* are like those of *M. trifasciatus* but their outer edges are less elongated than in those of

M. scitulus Lacordaire, 1842 although very similar to those of *M. fallax* Guérin-Méneville, 1841 (the latter two species were also examined and compared by us and are sympatric with *M. chilensis* and *M. trifasciatus*). The mentum in *M. chilensis* and *M. trifasciatus* has the anterior outline more expanded in comparison to that of *M. scitulus* and *M. fallax*. Except for these few differences in mandibles and mentum, we have not observed good diagnostic features in mouthparts of the examined *Mycotretus*. However, it is important to note we have not extensively examined these in the genus yet.

The discrimen of *M. chilensis* and *M. trifasciatus* has approximately the same length, being longer than that of *M. scitulus* and *M. fallax*. In all these latter cases, the discrimen does not reach the anterior margin of the metaventrite as occurs in species of *Erotylus* Fabricius (see Węgrzynowicz 1997, 2002). The metendosternite has been rarely considered in taxonomic works on Erotylidae. McHugh *et al.* (1997) illustrated and described the metendosternite of *Megalodace heros* (Say, 1823) and Węgrzynowicz (2002), in his phylogenetic study on Erotylidae, described two basic types of metendosternite in the family: those with lateral plates and those without lateral plates, which are here called laminae. The metendosternite of *M. chilensis* and *M. trifasciatus*, as well as that of *M. scitulus* and *M. fallax* (pers. obs.), bears laminae. However, we observed variation in the shape and ratios between parts of this structure between the examined species (see redescrptions). Recently, the study of the metendosternite has been given more attention in taxonomic and phylogenetic works on Coleoptera (e.g. Gerstmeier & Eberle 2011; Hübler & Klass 2013; Gimmel & Leschen 2014) and we think it is important to include this structure in taxonomic and phylogenetic studies on Erotylidae. We think that it is even possible that some lineages within *Mycotretus* can be recognized based on features of the metendosternite and may help to clarify internal relationships of this genus.

Before our study, the only available information on male genitalia of *Mycotretus* was that provided by Boyle (1956) for *M. nigromanicatus* Boyle, 1954. Based on Boyle's illustrations for that species, the male genitalia share great similarities with those of *M. chilensis* and *M. trifasciatus*. The morphology of the penial flagellum has important taxonomic features and we suggest it must be included as a diagnostic character in descriptions of Erotylidae species henceforth. The penial flagellum is an extremely "plastic" structure evolutionarily and its morphology also varies between species of other Erotylidae genera, such as *Ischyryus* Lacordaire, 1842 (see Skelley 1998), *Altisessor* Skelley, 2009 and *Notaepytyus* Skelley, 2009. Other sclerites of male and female terminalia of *M. chilensis* and *M. trifasciatus* have the basic morphology as described for other erotylids (Węgrzynowicz 2002).

Intraspecific variation of color pattern is common in *Mycotretus*, and it has given rise to descriptions of species varieties (Lacordaire 1842; Gorham 1888). Within *Mycotretus*, there are cases in which two or more described species seem to be color and size variations of a single entity, for instance *M. nigroterminatus* Lacordaire, 1842 and *M. apicalis* Lacordaire, 1842 (pers. obs.; compare the original descriptions in Lacordaire 1842; pers. comm. P. Skelley 2017). Additional questions on color pattern variations are abundant in the genus (see note in Crotch 1876: 450; pers. comm. P. Skelley 2017). We think that some of the currently valid names in *Mycotretus* will be synonymized after careful examination of types and comparison of male and female terminalia, metendosternite and other structures with taxonomic value. Color pattern must be interpreted with care, and variation may even be sexual dimorphism as we demonstrated here with *M. chilensis*.

The single record of *M. chilensis* from Chile is that made by Crotch (1876) in the original description. The species is also cited in catalogs, but these all refer to Crotch's description (Gemminger & Harold 1876; Kuhnt 1909; Blackwelder 1945) and the work of Guérin (1952) covering the Chilean fauna of Erotylidae. The latter author cited he had not examined any specimen of *M. chilensis* from Chile and, therefore, he could only transcribe the original description by Crotch (see Guérin 1952). According to Skelley & Cekalovic (2001): "Specimens with strikingly similar morphology and color patterns to *M. chilensis* have been seen from Brasil (...). The Chilean records of these species may represent mis-labeled specimens, or the rare straying individual". We agree with these authors and emphasize that there is no recent record of *M. chilensis* from Chile and the citations in literature subsequent to the original description all refer to the specimen examined by Crotch. It is important to note that the geographic features of Chile have conditioned the genesis of a characteristic fauna, with high degree of endemism (Elgueta 2000) and it is unlikely that *M. chilensis* (apparently a species restricted to southern and southeastern Brazil) actually occurs there.

Data on host fungi of *Mycotretus* species are scarce. Robertson *et al.* (2004) included three *Mycotretus* species in their study: *M. scitulus* Lacordaire, the only one identified to species level; and the remaining two named "*Mycotretus* sp.1" and "*Mycotretus* sp.2". *Mycotretus* sp.1 was associated with an unidentified Aphyllophorales.

This order of fungi is considered polyphyletic and includes, for example, the Polyporaceae (Kirk *et al.* 2008), commonly known as polypore or bracket fungi. *Mycotretus* sp.2 and *M. scitulus* were found in unidentified Agaricales, an order that includes the gill fungi. There are records of *M. apicalis* causing injuries in cultivations of *Pleurotus sajor-caju* (Pleurotaceae), an edible fungus species (Moreira *et al.* 2009). We have collected *M. chilensis* and *M. trifasciatus* together in basidiomes of *Lentinus brumalis* (Polyporaceae) and *Mycena* sp. (Mycenaceae), and *M. trifasciatus* alone in *Lentinus tricholoma* (Polyporaceae). These records are too few to discuss host fungus specialization of these species. Sympatry seems to be common between *Mycotretus* species (examples in Lacordaire 1842; Alvarenga 1983) but there are no previous records of *Mycotretus* species in syntopy. Syntopy is a case of sympatry in which two or more related species occupy the same macrohabitat in the same locality, are observably in close proximity and could even interbreed (Rivas 1964). Here we report two cases of syntopy of *M. chilensis* and *M. trifasciatus*, which are morphologically closely related species (pers. obs.) found co-occurring in the fungi *Mycena* sp. and *Lentinus brumalis*. Further studies shall evaluate whether such habitat and temporal overlap of *M. chilensis* and *M. trifasciatus* occurs in other localities within their distributional range.

Acknowledgments

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Capítulo II

Article

Redescriptions, Lectotype Designations, New Synonyms and New Geographic Records for the “Tiger” Species of *Mycotretus* Lacordaire, 1842 (Coleoptera: Erotylidae: Tritomini)

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Abstract: The Neotropical *Mycotretus* Lacordaire, 1842 is one of the largest and most widespread genera of the Erotylidae, encompassing more than 200 described species. Among the species with a similar body coloration, there is a “group” of six valid species—called here the “tiger” *Mycotretus*—that possess several pronotal and elytral black spots, as follows: *M. tigrinus* (Olivier, 1792); *M. multimaculatus* Taschenberg, 1870; *M. centralis* Arrow, 1909; *M. tigrinoides* Mader, 1942; *M. tigripennis* Mader, 1942; and *M. prioteloides* Mader, 1942. Different from any other *Mycotretus* with spots, the spots of the “tiger” *Mycotretus* are numerous and are not bilaterally symmetrical in pattern. Here, new geographical records, diagnoses and redescrptions are provided for *M. tigrinus*, *M. centralis*, *M. tigrinoides*, *M. tigripennis* and *M. prioteloides*, including the first descriptions of their male and female terminalia. Lectotypes are designated for *M. multimaculatus*, *M. centralis*, and *M. leopardus*. *Mycotretus multimaculatus* and *M. tigrinus pardalis* Crotch, 1876 are proposed as new junior synonyms of *M. tigrinus*. Additionally, the authorship of the name *M. leopardus* is attributed to Crotch, 1876, because he was the first author to provide a description for that taxon, and the synonymy of *M. leopardus* and *M. conspersus* (Germar, 1824) with *M. tigrinus* (Olivier, 1792) is confirmed.

Keywords: pleasing fungus beetles; Neotropical region; taxonomy; intraspecific variation; morphology

1. Introduction

The Neotropical *Mycotretus* Lacordaire, 1842 is one of the largest genera in the family Erotylidae, encompassing more than 200 described species widespread in the Neotropical region [1–3]. The genus is taxonomically problematic as most species are known only from older descriptions [1,4,5], information about male and female terminalia is scarce [3,6,7], and no taxonomic revision has been provided to date. Data on host fungi of *Mycotretus* are scarce and records are too few to discuss host fungus specialization. Most other Erotylinae species of *Mycotretus* feed on basidiomycete fungi, with host records in the families Pleurotaceae, Polyporaceae and Mycenaceae [3]. There are records of two different species of *Mycotretus* co-occurring in the same host fungus, for instance in the case of *M. chilensis* Crotch, 1876 and *M. trifasciatus* Guérin, 1956 co-occurring in the fungi *Mycena* sp. (Mycenaceae) and *Lentinus brumalis* (Polyporaceae) [3].

Dorsal color patterns are extremely variable in *Mycotretus*, ranging from completely monochromic to species with several spots, bands or stripes, especially on the pronotum and elytra [1,3]. Among *Mycotretus* there is an assemblage of six valid species—called the “tiger” *Mycotretus* from

now on in the text—recognized by the presence of many pronotal and elytral black spots, usually sparsely distributed in no discernable pattern, as follows: *M. tigrinus* (Olivier, 1792); *M. multimaculatus* Taschenberg, 1870; *M. centralis* Arrow, 1909; *M. tigrinoides* Mader, 1942; *M. tigripennis* Mader, 1942; and *M. prioteloides* Mader, 1942. The first one, *M. tigrinus*, was described from Suriname and is common and widespread in the Neotropical region [2]. Lacordaire [4] synonymized *M. conspersus* (Germar, 1824) with *M. tigrinus*, and Crotch [5], described *M. tigrinus pardalis* Crotch, 1876, originally as a new “variety”. Later, Kuhnt [8] proposed *M. leopardus* Gorham, 1888 as a synonym of *M. tigrinus* (see Alvarenga [2]).

Two other “tiger” *Mycotretus*, *M. multimaculatus* from Colombia and *M. centralis* from Central America, resemble *M. tigrinus* in coloration and body shape. *Mycotretus centralis* was described based on individuals first identified by Gorham [1] as simple variations of *M. tigrinus*. It is worth noting that Arrow [9] considered such specimens as distinct from *M. tigrinus*, but did not provide a satisfactory description, mentioning only that “Besides the differences noted by Mr. Gorham, it is a rather more massive species and the metasternum, which is well punctured in *M. tigrinus* is very smooth”. Therefore, the limits between *M. centralis* and *M. tigrinus* remained unclear to date. The other three *Mycotretus* species treated here were described by Mader [10]: *M. tigrinoides* from Ocobamba (Peru), *M. tigripennis* from Santa Inéz (Ecuador) and *M. prioteloides* from Coroico (Bolivia) and Calango (Peru). The former two descriptions (*M. tigrinoides*, *M. tigripennis*) were based only on their respective holotype, while the latter one (*M. prioteloides*) was based on two individuals.

Here, five species are redescribed, *M. tigrinus*, *M. centralis*, *M. tigrinoides*, *M. tigripennis* and *M. prioteloides*, including the first descriptions of their male and female terminalia, and new geographical records are presented. Lectotypes are designated for *M. multimaculatus*, *M. centralis* and *M. leopardus*. *Mycotretus multimaculatus* and *M. tigrinus pardalis* are proposed as junior synonyms of *M. tigrinus*. We also discuss minor taxonomic results and the morphological affinities of the species treated here with other species in the genus. Additionally, the authorship of the name *Mycotretus leopardus* is attributed to Crotch [5] and the synonymies of *M. leopardus* and *M. conspersus* with *M. tigrinus* are confirmed.

2. Material and Methods

Dissection, photography and measurement of specimens followed the methods provided by Pecci-Maddalena and Lopes-Andrade [3]. Transcription of labels followed Pecci-Maddalena and Lopes-Andrade [11]. The distribution map was created using latitude and longitude coordinates estimated by tracking localities in the online database GeoNames [12] and plotted on a map in the freeware Q Geographic Information System (QGIS 2.12.2). Localities in the maps were represented by an Arabic numeral using an image editing program.

Terms for external morphology follow Lawrence et al. [13] and McHugh et al. [14], and those for color pattern follow Skelley [15]. Descriptions of mouthparts and abdominal terminalia were based on Węgrzynowicz [16]. The term “flagellum” refers to a male genitalia structure with two interconnected elements: “head” and “virga” [16]. The following abbreviations are used: TL, total length (= elytral length + pronotal length along midline; head not included); EW, greatest elytral width. The ratio TL/EW indicates the degree of body elongation. The heading of each species redescribed below includes only a bibliographic citation of the original description and type locality, as far as new combinations and synonyms when applicable. Complete bibliographic citations are available in Alvarenga [2] and are not repeated here. A scale bar was not included in Figure 1H (lectotype of *M. multimaculatus*, here designated) because the number of examined specimens used to determine species length (6 mm) mentioned in the original description [17] is unknown. Due to the great length variation in *M. tigrinus*, and in order to make it clear for readers, the other specimens shown in Figure 1 are all in the same scale.

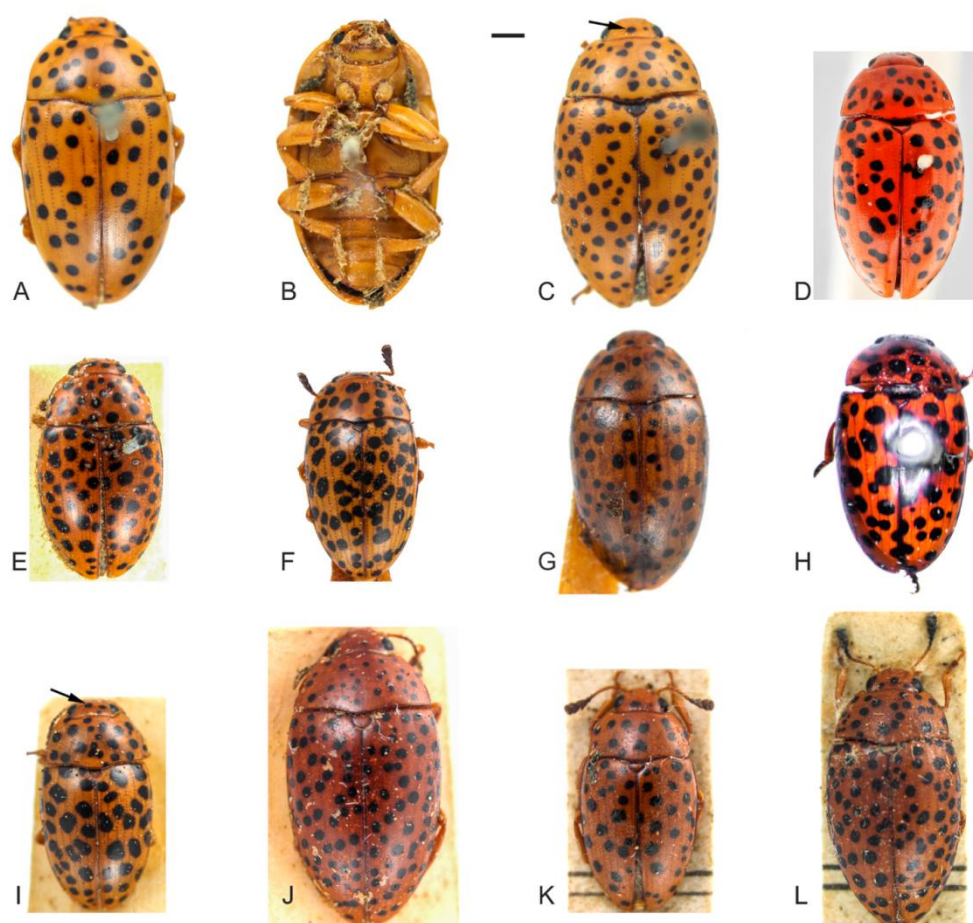


Figure 1. (A–L) Specimens of *Mycotretus tigrinus* Olivier, 1792 from different localities: (A–B) male, dorsal and ventral view, respectively (Corupá, Santa Catarina (SC)). (C–L) dorsal view: (C) female, arrow showing a spot on the head (Corupá, SC); (D) a “topotype” deposited in the Royal Belgian Institute of Natural Sciences (RBINS) (Suriname); (E) male (Tefé, Amazonas (AM), Brazil); (F) male (Linhares, Espírito Santo (ES), Brazil); (G) female (Parque Nacional do Xingu, Mato Grosso (MT), Brazil); (H) lectotype of *M. multimaculatus* Taschenberg, 1870 (Colombia); (I) male, arrow showing spots on the head (Buena Vista, Bolivia); (J) female (Buena Vista, Bolivia); (K) male (Chapare, Bolivia); (L) female (Chapare, Bolivia). Scale bars: A–G, I–L = 1 mm; H, see Section 2.

The following federal states of Brazil (official abbreviations in parentheses) are cited in the text: Amazonas (AM); Distrito Federal (DF); Espírito Santo (ES); Goiás (GO); Mato Grosso (MT); Minas Gerais (MG); Pará (PA); Paraná (PR); Rio de Janeiro (RJ); Rio Grande do Sul (RS); Santa Catarina (SC); São Paulo (SP). The denomination “Reprêsa Rio Grande” (present on the labels of several specimens studied here) was given to only one of several streams dammed at the time. Currently, it is part of the set of reservoirs of the “Ribeirão das Lajes” dam and its whole area is an ecological reserve. The reservoir comprises areas in Pirai (RJ) and Rio Claro (RJ). Moacyr Alvarenga collected beetles in the former (personal communication by Ayr de Moura Bello, 2018).

The specimens studied here belong to the following collections:

- BMNH The Natural History Museum (London, UK)
- CAMB Coleção Ayr de Moura Bello (Rio de Janeiro, RJ, Brazil)
- CELC Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera (Viçosa, MG, Brazil)

DZUP	Coleção Entomológica Padre Jesus Santiago Moure, Universidade Federal do Paraná (Curitiba, PR, Brazil)
MCNZ	Fundação Zoobotânica do Rio Grande do Sul (Porto Alegre, RS, Brazil)
MNHN	Muséum National d'Histoire Naturelle (Paris, France)
MNRJ	Museu Nacional (Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil)
MRSN	Museo Regionale di Scienze Naturali (Torino, Italy)
MZSP	Museu de Zoologia, Universidade de São Paulo (São Paulo, SP, Brazil)
NMBS	Naturhistorisches Museum Basel (Basel, Switzerland)
RBINS	Royal Belgian Institute of Natural Sciences (Brussels, Belgium)
SDEI	Senckenberg Deutsches Entomologisches Institut (Müncheberg, Germany)
UMZC	University Museum of Zoology Cambridge (Cambridge, UK)
ZNS	Zentralmagazin Naturwissenschaftlicher Sammlungen (Halle, Germany)

3. Results

For nomenclatural stability, the lectotype of *M. centralis*, *M. leopardus* and *M. multimaculatus* are designated below. Based on original descriptions, historical material examined, external morphology and coloration pattern of adults, we: (i) propose *M. multimaculatus* and *M. tigrinus pardalis* as junior synonyms of *M. tigrinus*; (ii) attribute the authorship of the name *M. leopardus* to Crotch [5], because he was the first author to provide a description for that taxon; and (iii) confirm the synonymy of *M. leopardus* and *M. conspersus* with *M. tigrinus*. The redescriptions of *M. tigrinus*, *M. centralis*, *M. tigrinoides*, *M. tigrispennis* and *M. prioteloides* are provided below in chronological order.

3.1. *Mycotretus tigrinus* (Olivier, 1792)

Figures 1–3.

Erotylus tigrinus Olivier 1792: 437 [18]. Type locality: Suriname.

Mycotretus tigrinus (Olivier, 1792). Lacordaire 1842: 145 [4] (new combination).

Mycotretus leopardus Crotch 1876 [5]. Type locality: Peru. Crotch 1876: 451 (junior synonym).

Mycotretus multimaculatus Taschenberg 1870: 197 [17]. Type locality: Colombia, **new synonym**.

Mycotretus tigrinus pardalis Crotch 1876: 451 [5] (as a variety). Type locality: Ecuador, **new synonym**.

Diagnosis. Dorsal coloration with several circular and subcircular black spots, extremely variable in size and number and asymmetrically distributed. Penile flagellum slightly elongated (approximately $0.7 \times$ the length of penis), slightly sinuous and with a membranous portion between its virga and head. Head of flagellum sclerotized and elongated, with an arcuate sclerotization posteriorly and an inflection at the basal half of the lateral edges. Inner contours slightly separated; anterior edge with outer sclerotization, more or less prominent and, sometimes, forming two outer, narrowed and lateral tips.

Redescription. Length (in mm) = 4.71–8.26 (6.87 ± 0.94 , $n = 23$). Body elongate, slightly oval, widest at the anterior third of elytra, TL/EW = 1.57–1.80 (1.70 ± 0.05), glabrous and glossy, dorsal and ventral coloration homogeneously yellowish or reddish-brown (Figure 1A–L). Mouthparts with same background color as body, mandibles apex blackish and with two teeth; mentum plate pentagonal, with strongly sclerotized margin; antennae yellowish or reddish-brown, last antennomeres blackish. Scutellar shield yellowish, reddish-brown or blackish, glabrous and bearing few punctures. Dorsal coloration: head lacking or, usually, with one to four asymmetrical subcircular black spots (Figure 1C,I, arrow); pronotum with several circular and subcircular black spots (Figure 1A,C–L), extremely variable in size and number (usually more than ten), and asymmetrically distributed in all examined specimens (except for the specimen from Río Toro, Peru with more symmetrical pronotal spots). Elytral coloration similar to that of pronotum, with several circular and, usually, free and sparsely distributed spots (Figure 1A,C–L).

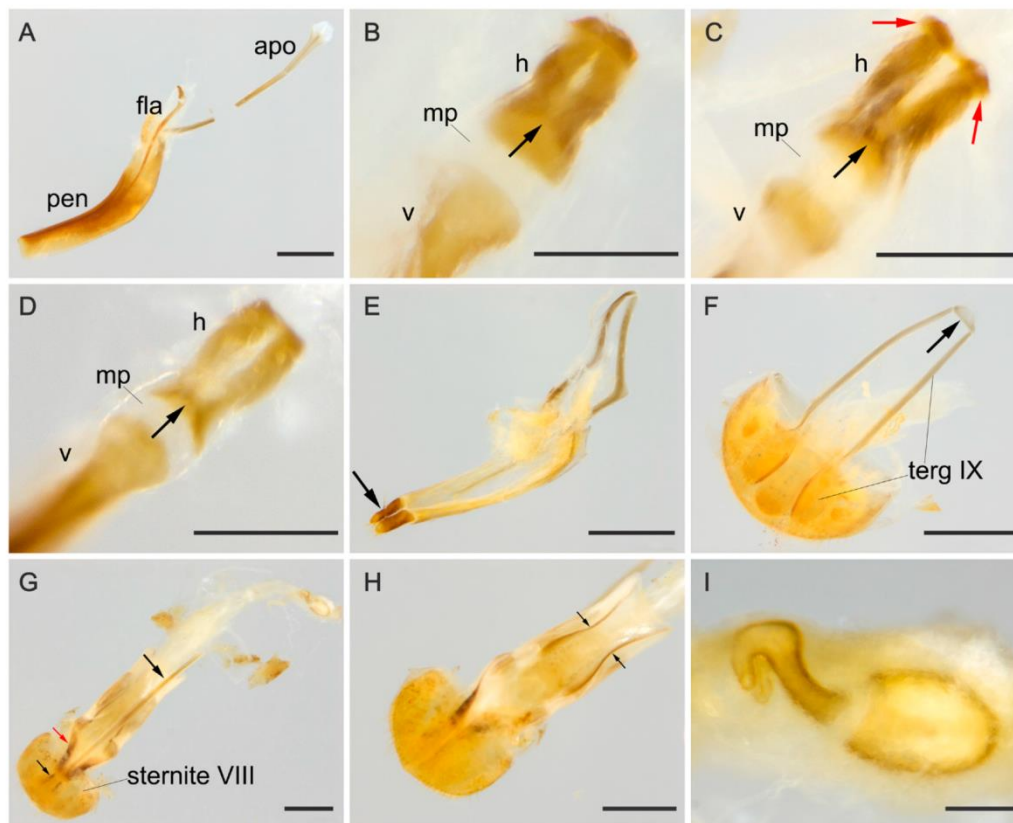


Figure 2. (A–F) Male abdominal terminalia of *Mycotretus tigrinus* Oliver, 1792 from different localities: (A–B,E–F) Tefé, AM, Brazil; (C) Linhares, ES, Brazil; (D) Rio Toro, Peru. (A) lateral view of the aedeagus, showing apophyses (apo), flagellum (fla) and penis (pen). (B–D) Dorsal view of flagellum showing: head (h), anterior tip of virga (v) and the membranous portion (mp); black arrows showing a posterior arcuate sclerotization and red arrows (in C) showing an anterior outer sclerotization, forming two narrowed tips. (E) Tegmen, arrow showing parameres; (F) abdominal segments VIII–X: laterotergite IX (terg IX), arrow showing the sclerite at the anteroventral edge of segment IX. (G–I) Female abdominal terminalia of a specimen from Parque Nacional do Xingu, MT, Brazil: (G) dorsal view, with small black and red arrows showing a gonostylus and a gonocoxite, respectively; big black arrow showing the median strut of sternite VIII; (H) ventral view, arrows showing baculi of paraprocts; (I) spermatheca. Scale bars: A, E–H = 0.5 mm; B–D, I = 0.1 mm.

Male terminalia. (Figure 2A–F). Penis (Figure 2A, pen) slightly elongate and curved; basal portion with a short sclerotized projection linked to apophyses; internal sac with well-developed and slightly elongated flagellum (Figure 2A, fla), $0.7 \times$ the length of penis ($n = 3$), with slight sinuosity and a membranous portion between the virga and the head of the flagellum (Figure 2B–D, mp), head of flagellum (Figure 2B–D) sclerotized and elongated, with arcuate sclerotization posteriorly (Figure 2B–D, black arrow) and inflection at the basal half of the lateral edges. Inner contours slightly separated; anterior edge with outer sclerotization, more or less prominent and, in some individuals, forming two outer, narrowed and lateral tips (Figure 2C, red arrows). Apophyses (Figure 2A, apo) $1.12 \times$ as long as penis ($n = 2$). Tegmen sclerotized (Figure 2E); parameres reduced and sclerotized, with densely pubescent outgrowths, slightly dilated, narrowed and acute at apex (Figure 2E, arrow). Tergite VIII, sclerotized with sparsely distributed bristles and sternite VIII slightly sclerotized. Laterotergite IX sclerotized, posteriorly elongated and pubescent, outer contours angulated (Figure 2F, terg IX); anteroventral edge with paired and subparallel lateral struts, connected at its anterior tip by small

transverse, slightly sclerotized sclerite (Figure 2F, arrow). Posterior edge of sternite IX, sclerotized, undivided, outer contour rounded; anteriorly membranous. Tergite X, sclerotized, anterior edge with sparsely distributed bristles.

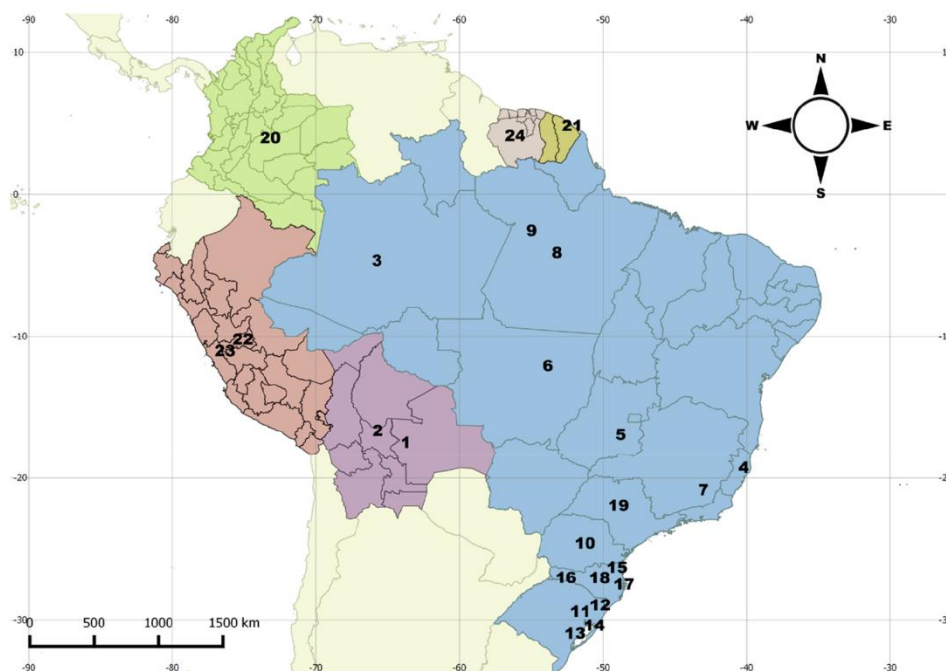


Figure 3. Distribution map for *Mycotretus tigrinus* (Olivier, 1792). Bolivia (1–2): 1—Buena Vista, 2—Chapare. Brazil (3–19): 3—Tefé (AM); 4—Linhares (ES); 5—Vianópolis (GO); 6—Parque Nacional do Xingu (MT); 7—Viçosa (MG); 8—State of Pará (undetermined locality), 9—Santarém (PA); 10—Reserva (PR); 11—Novo Hamburgo, 12—São Francisco de Paula, 13—Tapes, 14—Viamão (RS); 15—Corupá, 16—Nova Teutônia, 17—São Pedro de Alcântara, Santa Catarina (undetermined locality) (SC); 19—São Paulo (SP). Colombia: 20 (undetermined locality). French Guiana: 21—Cayena. Peru: 22 (undetermined locality), 23—Río Toro. Suriname: 24 (undetermined locality).

Female terminalia. (Figure 2G–I). Gonostyli and gonocoxites strongly sclerotized (Figure 2G, black and red arrows, respectively, under sternite VIII), baculi of paraprocts sclerotized and sinuous (Figure 2H, arrows); spermatheca oval and sclerotized (Figure 2I). Tergite VIII sclerotized and sternite VIII with a conspicuous median strut (Figure 2G, sternite VIII, big black arrow).

Distribution. Northern to southern Neotropical region (Figure 3).

Remarks. (1) As occurs for other Olivier primary types [15,19], the repository of the type of *M. tigrinus* is unknown. We identified this species based on the original description, early redescription [1,20], a series of specimens from several museums, and images of two “topotypes” from the RBINS (Figure 1D, dorsal view of one specimen). (2) Alvarenga [2] stated that the repository of the type of *M. multimaculatus* was unknown. However, according to Horn et al. [21], Taschenberg specimens would be housed in the ZNS. The specimens are indeed in the ZNS and images were sent to us by the curator (Figure 1H, lectotype). The Taschenberg specimen clearly shows the same color pattern of the other *M. tigrinus* examined by us and we synonymize it with *M. tigrinus*. (3) Another examined specimen from Peru, the “type of *M. leopardus*”, is kept in the UMZC. The authorship of *M. leopardus* had been attributed to Gorham [1] by previous authors [2,8,22], although Gorham attributed it to Kirsch (see Gorham [1]). However, we verified that the first author to provide a

diagnosis for *M. leopardus* (and “in litteris” by Kirsh) was Crotch [5], who also published the new name as a synonym of *M. tigrinus*. In this case, according to the International Code of Zoological Nomenclature (ICZN, Article 50.7, p. 53 [23]), the authorship of names first published as junior synonyms is attributed to “the person who published it as a synonym, even if some other originator is cited, and is not the person who subsequently adopted it as a valid name”. It is no coincidence that the type specimen of *M. leopardus* is in UMZC, where the remaining Crotch types are kept. Therefore, here we attribute the name *M. leopardus* to Crotch [5] and confirm the synonymy of *M. leopardus* with *M. tigrinus* proposed by him. (4) We have not located the type specimen of *M. tigrinus pardalis* in the UMZC, or in other European museums visited or consulted by us, and there is a great chance that the type is lost. Based on the original description and historical material examined, we conclude that *M. tigrinus pardalis*, originally described as a variety, is merely an intraspecific variation of *M. tigrinus*. (5) The type of *M. conspersus* was also not located, but based on the historical material examined, especially on an old specimen from MNHN identified as *M. conspersus* (see Material examined below), aside from the comments provided by Lacordaire [4], we confirm the synonymy of *M. conspersus* with *M. tigrinus*.

Material examined. Lectotype of *M. multimaculatus* Taschenberg, 1870, here designated (ZNS) “multimaculatus, Zeitschr. 1870. Colomb. Wallis [green label, handwritten, box label] \ LECTOTYPE *Mycotretus multimaculatus* Taschenberg, 1870 det. I. Pecci-Maddalena 2017 [red label, printed]”; 1 specimen (ZNS) “multimaculatus, Zeitschr. 1870. Colomb. Wallis [green label, handwritten, box label]”; 1 specimen (UMZC) “Cayen [green label, handwritten] \ TYPE [printed, crossed out] tigrinus, coll Reiche [handwritten]”; 1 specimen (UMZC) “So Pau [handwritten, São Paulo?]”; 2 specimens (UMZC) “Chevr. [printed]”; 2 specimens (UMZC) “green label \ Bates [printed]”; **lectotype of *M. leopardus* Crotch, 1876, here designated** (UMZC) “TYPE [blue label, printed] \ TYPE [printed] leopardus Peru [handwritten]”; 1 male (BMNH, dissected) “Ega [handwritten], 57, 125 [handwritten on label back] \ *M. tigrinus* Oliv. [handwritten]”; 1 specimen (BMNH) “Santarem [front] 53, 92 [back] [handwritten, disc-shaped label]”; 1 specimen (BMNH) “Demarara [handwritten, Demarara?] \ 1419 [printed] \ *tigrinus* Ol., 1419. S Am [handwritten]”; 1 specimen (BMNH) “W Burnett, Brasil [? handwritten] \ Ent. Club. 44-12. [printed]”; 1 specimen (BMNH) “Rio Grande, 84 a 8 [handwritten]”; 1 specimen (BMNH) “Rio Grande, 86-9. [handwritten]” 1 specimen (BMNH) “Cayenne [front] 58, 74 [back] [handwritten]”; 1 specimen (BMNH) “Para [handwritten, disc-shaped label] \ *Mycotretus tigrinus* Ol [handwritten] \ Pascoe Coll. 93–60 [printed]”; 1 specimen (BMNH) “Buenavista, BOLIVIA, II-IV, 1925 [printed] \ Provincia, d’SARA, 1700 ft. [printed] \ ex coll. F. Mason. B.M.1926–296. [printed]”; 1 specimen (MRSN) “latreille [handwritten]”; 1 specimen (MRSN) “Lacordaire [handwritten]”; 1 specimen (MRSN) “Brasilia Truqui [printed]”; 1 specimen (SDEI) “Chaucham [? Chauchamayo? handwritten] \ Schenkling det. [printed]”; 1 specimen (RBINS) “*Mycotretus tigrinus*, Surinam Oliv [handwritten] \ Coll. R. I. Sc. N. B., Surinam, Coll. Chapuis [printed]”; 1 specimen (RBINS) “det, MYCOTRETUS [printed] *tigrinus* Ol. [handwritten] \ Coll. R. I. Sc. N. B., Surinam, Coll. Chapuis [printed]”; 1 specimen (MNHN) “4125, 33T [? disc-shaped label]”; 1 specimen (MNHN) “prov. De S^{ta} Catherin, bords dela mer, 1820 [handwritten, disc-shaped label] \ *Micotretus conspersus* Ger [handwritten] \ tigrinus [handwritten]”; 1 specimen (MNHN) “7151, 34. [?, handwritten, disc-shaped label] \ 2192 [?, handwritten]”; 1 specimen (MNHN) “6546, 34. [handwritten, disc-shaped label] \ 1947 [?, handwritten]”; 1 specimen (MNHN) “tigrinus, Cayenne [handwritten]”; 1 specimen (MZSP) “III. 1930 [handwritten], Goyaz [printed], Viannopolis, Coll R Stitr [handwritten] \ *Mycotretus tigrinus* Ol. [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Peru Rio Toro [printed] \ *Mycotretus multimaculatus* Tasch., 1870 [handwritten] M. Alvarenga det. 1971 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Buenavista, Bolivia, iii/viii. 1950 [handwritten] \ DZUP 371251 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Buenavista, Bolivia, iii/viii. 1950 [handwritten] \ DZUP 371252 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Chapare 400 m, Bolivia [printed], viii. 1954 [handwritten], R. Zischka [printed] \ DZUP 371231”; 1 female (DZUP, dissected)

“Coleção M. Alvarenga [printed] \ Chapare 400 m, Bolivia [printed], *viii*. 1954 [handwritten], R. Zischka [printed] \ DZUP 371232”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Chapare 400 m, Bolivia [printed], *viii*. 1954 [handwritten], R. Zischka [printed] \ DZUP 371237”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Jacaré P.N. Xingu, M. Grosso Brasil, XI-1961, Alvarenga e Werner [printed] \ DZUP 371247 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Parque Sooretama, LINHARES E. Santo, Brasil X-1962, M. Alvarenga leg. [printed] \ DZUP 371259 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Buenavista, Bolivia, 1956, A. Martinez [handwritten] \ DZUP 371254 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Jacaré P.N. Xingu, M. Grosso Brasil, XI-1961, Alvarenga e Werner [printed] \ DZUP 371246 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Parque Sooretama, LINHARES E. Santo, Brasil X-1962, M. Alvarenga leg. [printed] \ DZUP 371258 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ COLEÇÃO CAMPOS SEABRA [printed] \ *Mycotretus tigrinus* Ol. [handwritten] J. Guerin det. 19[printed]53 [handwritten] \ CORUPA, Santa Catarina BRASIL [printed] X-1951 [handwritten] ANTON MALLER [printed] \ DZUP 371286 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ COLEÇÃO CAMPOS SEABRA [printed] \ *Mycotretus tigrinus* Ol. [handwritten] J. Guerin det. 19[printed]53 [handwritten] \ CORUPA, S. Catarina BRASIL [printed] I [handwritten] A. MALLER [printed] \ DZUP 371285 [printed]”; 1 female (DZUP, dissected) “II. [handwritten] 196[printed]5[handwritten], Brasilien, Nova Teutonia, 27°11'B, 52°23'L, Fritz Plaumann, 300.500 m [printed] \ DZUP 125458 [printed]”; 1 female (CELC) “Viçosa/MG/Brasil, 21/06/99, M.D. MOREIRA [printed] \ Erotylidae [printed]”; 1 male (MCNZ, dissected) “Nova Hamburgo, RS, 28/VII/1986 [handwritten], C.J. Becker leg. [printed] \ Col. MCN 238428 [printed]”; 1 female (MCNZ, dissected) “Viamão, RS, Beco do Pesqueiro, AR-Mata Ripária, 30°09'S, 50°58'W, 31.V.2000, A. Bonaldo col. [printed] \ Col. MCN. [printed] 217998 [handwritten]”; 1 female (MCNZ, dissected) “S.F.de Paula, RS (B. dos Bugres), 14.XII.1999, Franceschini, Bonaldo & Silva [printed] \ Col. MCN [printed] 168.713 [handwritten] \ *M. tigrinus* [handwritten]”; 1 female (MCNZ, dissected) “Tapes, RS (Faz. São Miguel), 17.XII.2003, Equipe Probio col. [printed] \ Col. MCN 225615 [printed]”; 1 female (MCNZ, dissected) “Col. São Pedro de Alcantara, RS, 08/XI/1977 [handwritten], R. Balesteim [handwritten] \ Col. MCN 238427 [printed]”; 1 female (DZUP, dissected) “Brasil-Paraná, Reserva, 23/III/2007 [printed] \ DZUP 469238 [printed]”; 1 male (MCNZ, dissected) “S.F.de Paula, RS (B. dos Bugres), 14.XII.1999, Franceschini, Bonaldo & Silva [printed] \ Col. MCN [printed] 168.714 [handwritten]”.

Doubtful identification. 1 female (MCNZ, dissected, pronotum not in good conditions) “Tapes, RS (Faz. São Miguel), 14. V.2003, R.S.de Araujo col. [printed] \ Col. MCN 221798 [printed]”.

3.2. *Mycotretus centralis* Arrow, 1909

Figures 4–6.

Mycotretus centralis Arrow 1909: 196 [9]. Type-locality: San Jerónimo, Guatemala.

Diagnosis. Pronotum with black, free and subcircular spots, symmetrically and transversely arranged. Penile flagellum well-developed and slightly elongated, approximately $0.95 \times$ the length of the penis, with a shallow sinuosity and without a membranous portion between the virga and head; in dorsal view, flagellum medially enlarged and slightly sclerotized and, posteriorly, at flagellum head and virga connection, strongly sclerotized. Head of flagellum sclerotized, U-shaped, each branch ending in a blunt and narrowed tip, or forming a shallow, small and narrow denticle at the outer apical edge.

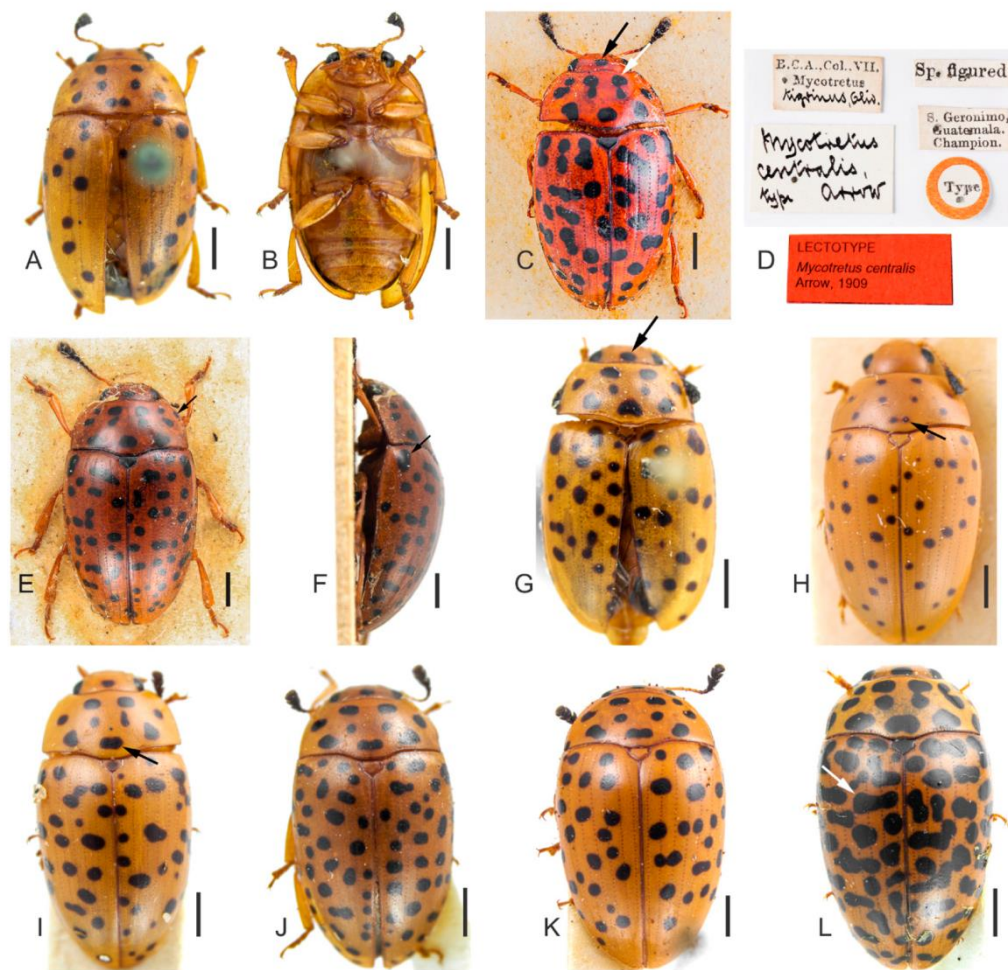


Figure 4. (A–L) Specimens of *Mycotretus centralis* Arrow, 1909 from different localities: (A–B) male, dorsal and ventral view, respectively (Carazinho, RS, Brazil). (C–D) Lectotype (San Jerónimo, Guatemala): (C) dorsal view, black arrow showing the major black spot on the disc of head, white arrow showing the two anterior medial spots. (D) Labels. (E–F) A male paralectotype (San Jerónimo, Guatemala): (E) dorsal view, arrow showing a spot connected to the lateral pronotal edge, (F) lateral view, arrow showing a spot on the humeral angle. (G–L) Specimens in dorsal view: (G) male, arrow showing the major black spot on the disc of head (Campo Bom, RS, Brazil); (H) female, arrow showing the medial spots not completely fused (Pitanga, PR, Brazil); (I) female, arrow showing the medial spot on the pronotal base (Nova Teutônia, SC, Brazil); (J) female (Piraí, Reprêsa Rio Grande, RJ, Brazil); (K) female (Piraí, Reprêsa Rio Grande, RJ, Brazil); (L) female, arrow showing an elongated spot on the disc of elytra (Pedra Azul, MG, Brazil). Scale bars: A–C, E–L = 1 mm.

Redescription. Length (in mm) = 5.07–6.89 (6.13 ± 0.60 , $n = 9$). Body elongate, slightly oval, widest at anterior third of elytra, TL/EW = 1.60–1.77 (1.69 ± 0.06), glabrous and glossy, dorsal and ventral coloration homogeneously yellowish or reddish-brown (Figure 4A–L). Mouthparts of same background color as body, mandible apices blackish and with two teeth; mentum plate pentagonal, with strongly sclerotized margin; antennae yellowish or reddish-brown, last antennomeres blackish. Scutellar shield yellowish, reddish-brown or blackish, glabrous and bearing few punctures. Dorsal coloration: head with one large and subcircular black spot on disc, Figure 4C,G, arrow (specimens from Guatemala with one or two black spots, small, free and close to major spot on disc); pronotum with black, free and subcircular spots (Figure 4) symmetrically and transversely arranged, as follows:

three large basal spots (medial one resembling the fusion of the two smallest spots, e.g., Figure 4I, arrow) or with four apparent spots (in this case, medial spots not completely fused, e.g., Figure 4H, arrow); four spots on disc; two or four anterior spots (in the last case, two medial spots bigger than outer ones, Figure 4C, white arrow). In some individuals, spots connected to lateral pronotal edges (Figure 4E, arrow). Elytral coloration with several black, circular and free spots, sparsely distributed. In some individuals, there are elongated spots on each elytron, resembling the fusion of two or three spots, especially on humeral angles. On the disc, somewhat transverse spots can be present (Figure 4L, arrow).

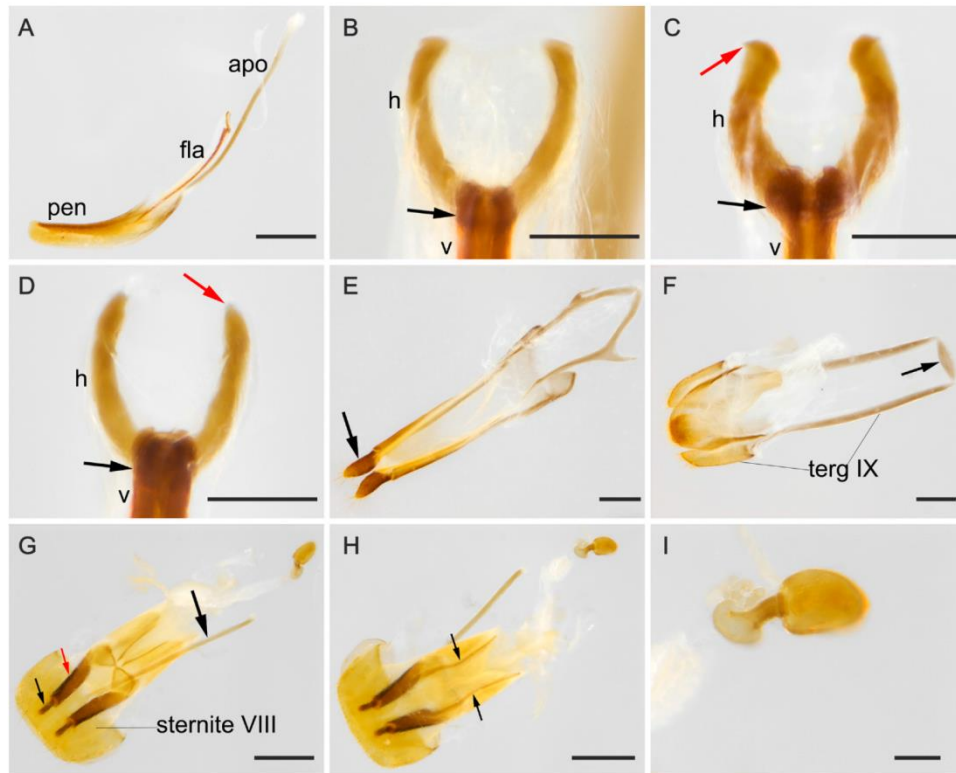


Figure 5. (A–F) Male abdominal terminalia of *Mycotretus centralis* Arrow, 1909 from different localities: (A–B, E–F) Paralectotype from San Jerónimo, Guatemala; (C) Campo Bom, RS, Brazil; (D) Carazinho, RS, Brazil. (A) Lateral view of the aedeagus, showing apophyses (apo), flagellum (fla) and penis (pen). (B–D) Dorsal view of flagellum showing its head (h) and anterior tip of virga (v); black arrows showing the strongly sclerotized connection between virga and head; red arrow (in C) showing the small and narrow denticle at the outer apical edge of head and (in D) showing the blunt and narrowed tip. (E) Tegmen, arrow showing parameres; (F) abdominal segments IX–X: laterotergite IX (terg IX), arrow showing the sclerite at the anteroventral edge of segment IX. (G–I) Female abdominal terminalia of a specimen from Piraiá, RJ, Brazil: (G) dorsal view, with small black and red arrows showing a gonostylus and a gonocoxite, respectively; big black arrow showing the median strut of sternite VIII; (H) ventral view, arrows showing baculi of paraprocts; (I) spermatheca. Scale bars: A, G–H = 0.5 mm; B–D, I = 0.1 mm; E–F = 0.2 mm.

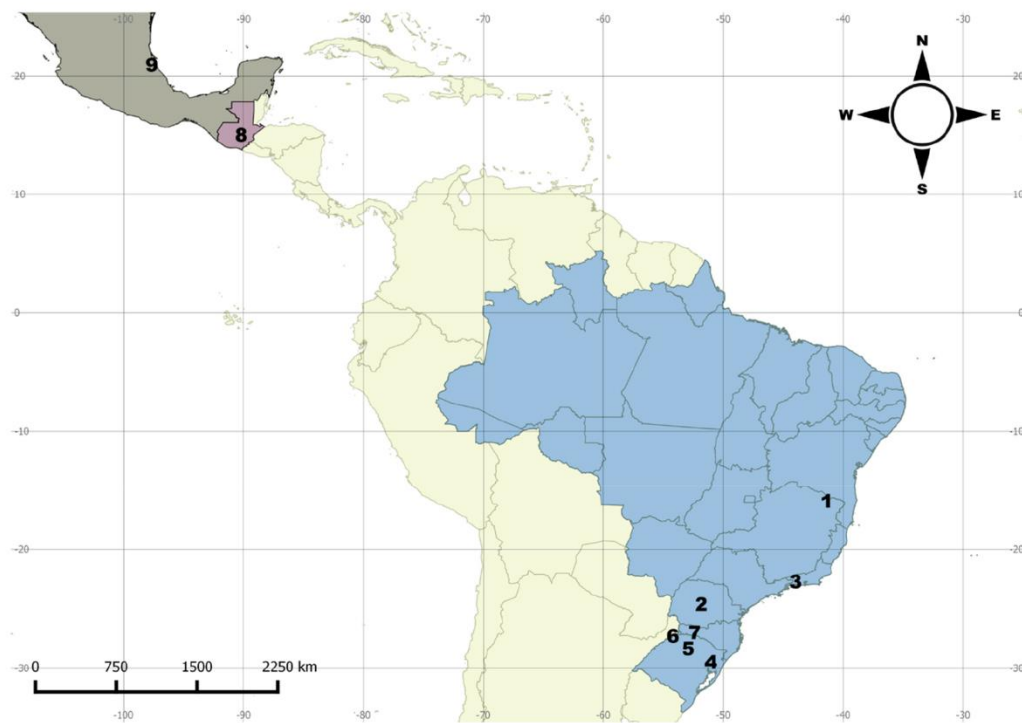


Figure 6. Distribution map for *Mycotretus centralis* Arrow, 1909 species. Brazil (1–7): 1—Pedra Azul (MG); 2—Pitanga (PR); 3—Piraí (RJ); 4—Campo Bom, 5—Carazinho, 6—Derrubadas (RS); 7—Nova Teutônia (SC). Guatemala: 8—San Jerónimo. Mexico: 9—Tuxpan, Vera Cruz.

Male terminalia. (Figure 5A–F). Penis (Figure 5A, pen) slightly elongate and curved; basal portion with short sclerotized projection linked to apophyses; internal sac with a well-developed and slightly elongated flagellum (Figure 5A, fla), $0.95 \times$ the length of penis ($n = 3$), with a shallow sinuosity and without a membranous portion between the virga and flagellum head; in dorsal view, flagellum medially enlarged and slightly sclerotized and, posteriorly, at flagellum head and virga connection, strongly sclerotized (Figure 5B–D, black arrow), flagellum head sclerotized (Figure 5B–D), U-shaped, with each branch ending in a blunt and narrowed tip (Figure 5D, red arrow) or, forming a shallow, small and narrow denticle at the outer apical edge (Figure 5C, red arrow). Apophyses (Figure 5A, apo) $1.2 \times$ as long as penis ($n = 3$). Tegmen sclerotized (Figure 5E); parameres reduced and sclerotized, with densely pubescent outgrowths, slightly dilated, narrowed and acute at apex (Figure 5E, arrow). Tergite VIII, sclerotized with sparsely distributed bristles and sternite VIII, slightly sclerotized. Laterotergite IX sclerotized (Figure 5F, terg IX), posteriorly elongated and pubescent, outer contours angulated; anteroventral edge with paired and subparallel lateral struts, connected at its anterior tip, by a small, transverse and slightly sclerotized sclerite (Figure 5F, arrow). Posterior edge of sternite IX, sclerotized, undivided, outer contour rounded; anteriorly membranous. Tergite X, sclerotized, anterior edge with sparsely distributed bristles.

Female terminalia. (Figure 5G–I). Gonostyli and gonocoxites strongly sclerotized (Figure 5G, black and red arrows, respectively, under sternite VIII), baculi of paraprocts sclerotized and sinuous (Figure 5H, arrows); spermatheca oval and sclerotized (Figure 5I). Tergite VIII sclerotized and sternite VIII with conspicuous median strut (Figure 5G, sternite VIII, big black arrow).

Distribution. North and Central America, South and Southeast Brazil (Figure 6).

Remarks. (1) *Mycotretus centralis* has a disjunct geographical distribution (Figure 6). See Discussion. (2) The flagellum head of the dissected Brazilian *M. centralis* (Figure 5C–D) is more sclerotized and thicker than a specimen from Guatemala (Figure 5B). (3) Interestingly, based on the

pronotal color pattern of *M. centralis* described here, the specimen figured by Gorham as an example of *M. tigrinus* (see Gorham [1], Tab. III. Figure 9) is probably *M. centralis*. (4) A female from Derrubadas (RS, Brazil) seems to have the usual pronotal coloration of *M. centralis*. However, as the specimen may be a teneral, we considered it a doubtful identification.

Material examined. **Lectotype of *M. centralis* Arrow, 1909, here designated** (BMNH) (Figure 4C–D) “B.C.A., Col., VII. Mycotretus [printed] tigrinus, Oliv. [handwritten] \ Mycotretus centralis type arrow [handwritten] \ Sp. figured. [printed] \ S. Geronimo, Guatemala. Champion. [printed] \ Type [printed, disc-shaped label with red contour] \ LECTOTYPE *Mycotretus centralis* Arrow, 1909 [printed, red label]”; 1 male (BMNH, dissected) “S. Geronimo, Guatemala. Champion. [printed] \ B.C.A., Col., VII. Mycotretus [printed] tigrinus, Oliv. [handwritten] \ PARALECTOTYPE *Mycotretus centralis* Arrow, 1909 [printed, yellow label]”; 2 specimens (BMNH, on the same card) “S. Geronimo, Guatemala. Champion. [printed] \ B.C.A., Col., VII. Mycotretus [printed] tigrinus, Oliv. [handwritten] \ PARALECTOTYPE *Mycotretus centralis* Arrow, 1909 [printed, yellow label]”; 1 specimen (BMNH) “Toxpam [printed] \ Mexico. Salle coll. [printed] \ 2398 [printed] \ B.C.A., Col., VII. Mycotretus [printed] tigrinus, Oliv. [handwritten] \ PARALECTOTYPE *Mycotretus centralis* Arrow, 1909 [printed, yellow label]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] IX. 1964 [handwritten], F.M. Oliveira [printed] \ DZUP 371269 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] X. 1967 [handwritten], F.M. Oliveira [printed] \ DZUP 371268 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ PEDRA AZUL, 700M, M. Gerais, Brasil, XI.1972, Seabra & Oliveira [printed] \ DZUP 371277 [printed]”; 1 female (DZUP, dissected) “4 X [handwritten] 194 [printed] 7 [handwritten], Brasilien, Nova Teutonia, 27°11' B, 52°23' L, Fritz Plaumann, 300 b[?] 500 m [printed] \ DZUP 125457 [printed]”; 1 male (MCNZ, dissected) “Campo Bom, RS, 29/ IV / [handwritten] 19 [printed] 88 [handwritten], C.J. Becker leg. [printed] \ Col. MCN [printed] 150.874 [handwritten]”; 1 male (MCNZ, dissected) “Carazinha, RS, 10/XI/ [handwritten] 19 [printed] 79 [handwritten], A. Lise leg. [printed] \ Col. MCN 28.682 [handwritten]”; 1 female (DZUP, dissected) “PITANGA, 24°41, 51°46, 700 m [printed] \ MAERZ 1963, F. Plaumann [printed] \ DZUP 125578 [printed]”;

Doubtful identification. 1 female (MCNZ, dissected) “27°14'14.7" S, 53°58'46.0" W [printed] \ Derrubadas, RS (Pq. Est. Turvo), 30.X.2003, L. Heydrich col. [printed] \ Col. MCN 227465 [printed]”.

3.3. *Mycotretus tigrinoides* Mader, 1942

Figure 7A–F, Figure 8 and Figure 10 (localities 1–5, map).

Mycotretus tigrinoides Mader 1842: 174, 196 [10]. Type locality: Ocobamba, Peru.

Diagnosis. Pronotum with sparsely, black, free, subcircular elongated spots, asymmetrically arranged. In most specimens, there are three spots with no definite shape close to basal pronotal edge; lateral spots more elongated than inner ones. Elytral spots somewhat transverse, forming true transverse spots in some specimens. Penile flagellum well-developed, sclerotized and slightly elongated, approximately $0.97 \times$ the length of the penis, shallowly sinuous, with prominent medial desclerotization (absent in *M. tigrispennis*). Anterior tip of virga with prominent and strong sclerotization (absent in *M. tigrispennis*). The flagellum of *M. tigrinoides* is narrower dorsally than that of *M. tigrispennis*. Head of flagellum sclerotized and subpentagonal, outer anterior contours forming a right angle.

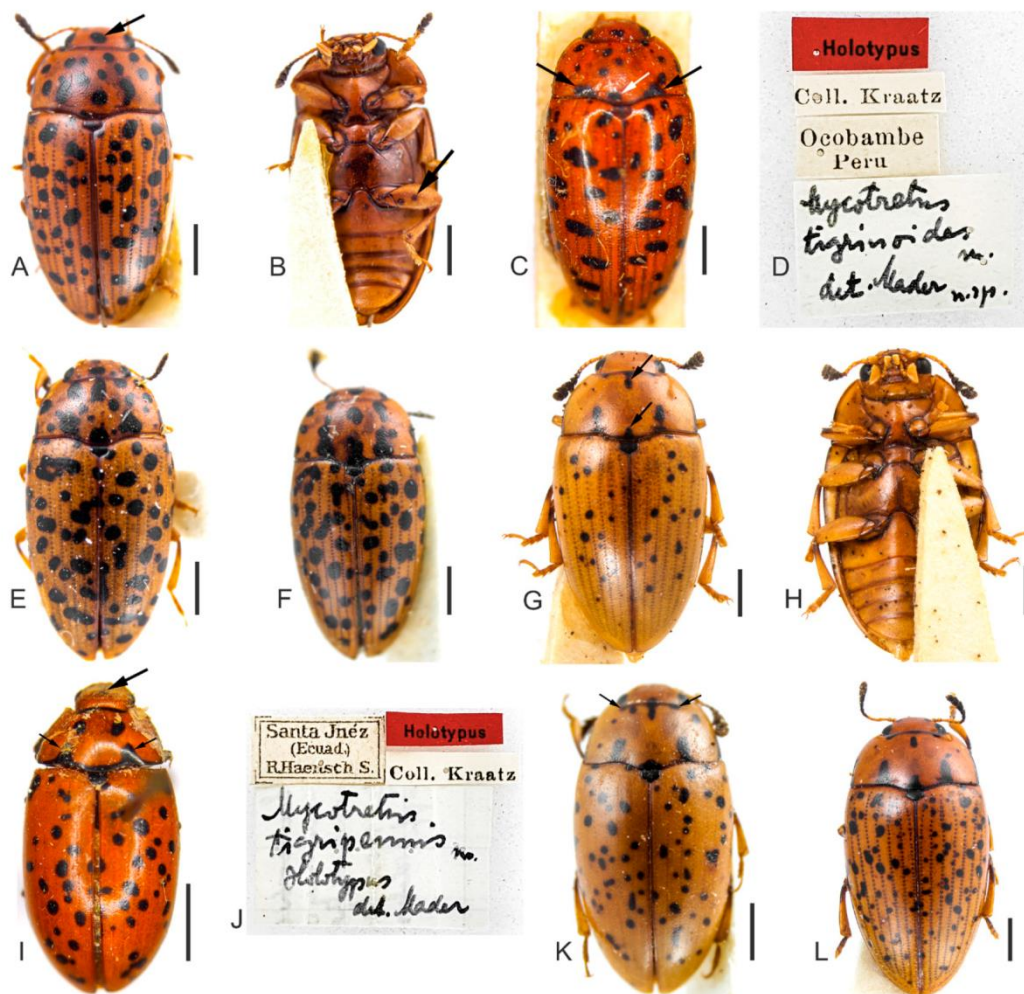


Figure 7. (A–F) Specimens of *Mycotretus tigrinoides* Mader, 1942 from different localities: (A–B) male, dorsal and ventral view, respectively (Tucuruí, PA, Brazil): (A) arrow showing the major black spot on the disc of head, (B) arrow showing a subcircular spot on metafemur. (C–D) Holotype (Ocobamba, Peru): (C) dorsal view, black arrows showing the two lateral spots on the basal pronotal edge and white arrow showing the inner spot. (D) Labels. (E) Female (Brasília, DF, Brazil); (F) male (Sinop, MT, Brazil). (G–L) Specimens of *Mycotretus tigripennis* Mader, 1942 from different localities: (G–H) male, dorsal and ventral view, respectively (Piraí, Reprêsa Rio Grande, RJ, Brazil): (G) arrows showing elongated and medial spots between two lateral tooth-like spots on pronotum. (I–J) Holotype (Santa Inéz, Ecuador): (I) big arrow showing one black spot on the disc of head, small arrows showing two lateral tooth-like spots on basal pronotal edge. (J) Labels. (K) Female (Piraí, Reprêsa Rio Grande, RJ, Brazil), arrows showing two lateral tooth-like spots on anterior pronotal edge. (L) Female (Piraí, Reprêsa Rio Grande, RJ, Brazil). Scale bars: A–C, E–H, K–L = 1 mm; I = 2 mm.

Redescription. Length (in mm) = 3.95–5.46 (4.85 ± 0.51 , $n = 13$). Very similar to *M. tigripennis*. Body elongate, subparallel-sided, widest at the anterior third of elytra, TL/EW = 1.80–1.91 (1.86 ± 0.03), glabrous and glossy; dorsal and ventral coloration (Figure 7A–F) reddish-brown, with mouthparts and first antennomeres yellowish to reddish-brown; legs yellowish to reddish-brown with coxae and tibiae partially blackish in some individuals; mandible apices and last antennomeres blackish; mentum plate pentagonal, with strongly sclerotized margin. Venter usually with black and subcircular spots on prosternum, meso- and meta-ventrite, abdomen and legs (Figure 7B, arrow). Scutellar shield

reddish-brown or blackish, glabrous and bearing few punctures. Dorsal coloration: head with one large and subcircular black spot on disc, Figure 7A, arrow, (specimen from Brasília, DF, Brazil with three black, small and free spots close to major spot on disc); pronotum with sparsely, black, free, subcircular and elongated spots, asymmetrically arranged. In most specimens, three spots with no definite shape close to basal edge, lateral spots more elongated (Figure 7C, black arrows) than inner ones (Figure 7C, white arrow). Elytral coloration with several black, free and subcircular spots, sparsely and asymmetrically distributed. Elytral spots somewhat transverse, forming true transverse spots in some specimens (Figure 7C,E).

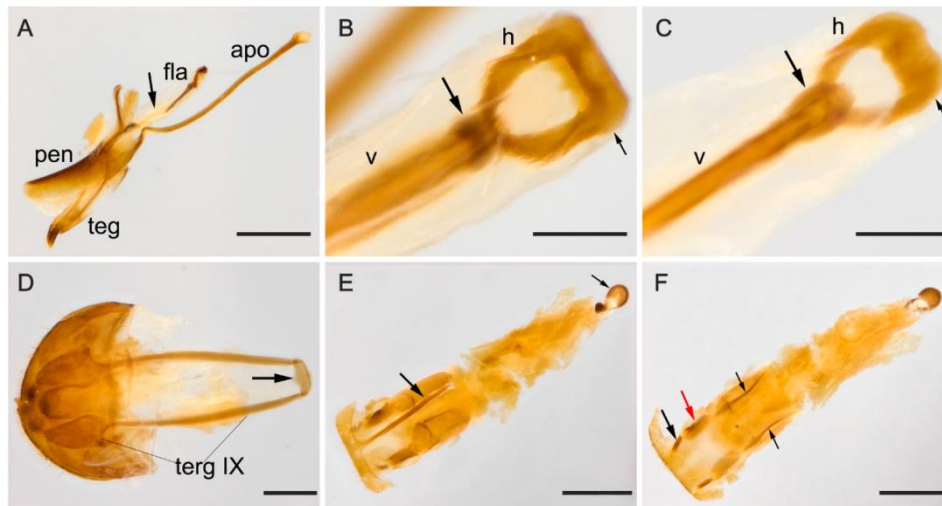


Figure 8. (A–D) Male abdominal terminalia of *Mycotretus tigrinoides* Mader, 1942 from two localities: (A–B,D) Sinop, MT, Brazil; (C) Tucuruí, PA, Brazil. (A) Lateral view of the aedeagus, showing apophyses (apo), flagellum (fla), penis (pen) and tegmen (teg); arrow showing a medial desclerotization in flagellum. (B–C) Flagellum dorsal view, showing: head (h) and anterior tip of virga (v); black arrow showing the sclerotization between virga and head, small arrow showing the outer anterior contour forming a right angle. (D) Abdominal segments VIII–X: laterotergite IX (terg IX), arrow showing the sclerite at the anteroventral edge of segment IX. (E–F) Female abdominal terminalia of a specimen from Brasília, DF, Brazil: (E) dorsal view, big arrow showing the median strut of sternite VIII, small arrow showing the spermatheca; (F) ventral view, small black and red arrows showing a gonostylus and a gonocoxite, respectively; small arrows showing baculi of paraprocts. Scale bars: A, E–F = 0.5 mm; B–C = 0.1 mm; D = 0.2 mm.

Male terminalia. (Figure 8A–D). Penis (Figure 8A, pen) slightly elongated and curved; basal portion with short sclerotized projection linked to apophyses; internal sac with well-developed, sclerotized and slightly elongated flagellum (Figure 8A, fla), $0.97 \times$ the length of penis ($n = 2$), shallowly sinuous, with prominent medial desclerotization (Figure 8A, arrow, absent in *M. tigripennis*). Anterior tip of virga with prominent and strong sclerotization (Figure 8B,C, arrow) absent in *M. tigripennis*. Flagellum of *M. tigrinoides* narrowed dorsally compared to that of *M. tigripennis* (Figure 8B,C). Head of flagellum (Figure 8B,C) sclerotized and subpentagonal, outer anterior contours forming a right angle (Figure 8B,C, small arrow) and anterior edge enlarged, compared to posterior one. Apophyses (Figure 8A, apo) $1.58 \times$ as long as penis ($n = 2$). Tegmen sclerotized (Figure 8A, teg); parameres reduced and sclerotized, with densely pubescent outgrowths, slightly dilated and acute at apex. Tergite VIII, sclerotized with sparsely distributed bristles. Sternite VIII slightly sclerotized. Laterotergite IX sclerotized (Figure 8D, terg IX), posteriorly elongated and pubescent, outer contours angulated; anteroventral edge with paired and subparallel lateral struts, connected at its anterior tip by small,

transverse, slightly sclerotized sclerite (Figure 8D, arrow). Posterior edge of sternite IX sclerotized, undivided, outer contour rounded; anteriorly membranous. Tergite X sclerotized; anterior edge truncate, with sparsely distributed bristles.

Female terminalia. (Figure 8E,F). Gonostyli and gonocoxites strongly sclerotized (Figure 8F, black and red arrows, respectively), baculi of paraprocts sclerotized and slightly arcuate (Figure 8F, black small arrows); spermatheca oval and sclerotized (Figure 8E, black small arrow). Tergite VIII sclerotized and sternite VIII with conspicuous median strut (Figure 8E, big arrow).

Distribution. Peru, North and Central Brazil (Figure 10, localities 1–5, black numerals).

Remarks. Both *M. tigrinoides* and *M. tigripennis* (redescribed below) were described based only on their primary types (Figure 7C,D,I,J, respectively), which were not dissected here. However, based on the original descriptions and images of holotypes, we identified the specimens examined by us as intraspecific variations.

Material examined. 1 specimen (SDEI) “Holotypus [printed, Red label] \ Coll. Kraatz [printed] \ Ocobambe Peru [printed] \ Mycotretus tigrinoides [handwritten] Ma. [?] det. Mader n.sp. [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ SINOP, M. Grosso, Brasil, X. 1974, M. Alvarenga [printed] \ Lat 12° 31' S, Lon 55° 37' W [printed] \ DZUP 126115 [printed]”; 1 female (CAMB, dissected) “Brasília, DF – BRASIL [printed] XI [handwritten] 2000, Col. N. Degallier [printed] \ Coleção A.M. BELLO [printed]”; 1 male (MNR), dissected) “Coleção M. Alvarenga [printed] \ Tucuruí, Pará, Brasil, XI-1985, N. Degallier [handwritten] \ AI [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ SINOP, M. Grosso, Brasil, X. 1974, M. Alvarenga [printed] \ Lat 12° 31' S, Lon 55° 37' W [printed] \ DZUP 126110 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ SINOP, M. Grosso, Brasil, X. 1974, M. Alvarenga [printed] \ Lat 12° 31' S, Lon 55° 37' W [printed] \ DZUP 126111 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ SINOP, M. Grosso, Brasil, X. 1974, M. Alvarenga [printed] \ Lat 12° 31' S, Lon 55° 37' W [printed] \ DZUP 126112 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ SINOP, M. Grosso, Brasil, X. 1974, M. Alvarenga [printed] \ Lat 12° 31' S, Lon 55° 37' W [printed] \ DZUP 126113 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ V. VERA, M. Grosso, Brasil, X. 1973, M. Alvarenga [printed] \ Lon 55° 36' W, Lat 12° 46' S [printed] \ DZUP 126117 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ SINOP, M. Grosso, Brasil, X. 1974, M. Alvarenga [printed] \ Lat 12° 31' S, Lon 55° 37' W [printed] \ DZUP 126114 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ V. VERA, M. Grosso, Brasil, X. 1973, M. Alvarenga [printed] \ Lon 55° 36' W, Lat 12° 46' S [printed] \ DZUP 126118 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ SINOP, M. Grosso, Brasil, X. 1974, M. Alvarenga [printed] \ Lat 12° 31' S, Lon 55° 37' W [printed] \ DZUP 126119 [printed]”.

3.4. *Mycotretus tigripennis* Mader, 1942

Figure 7G–L, Figures 9 and 10 (localities 6–8, map).

Mycotretus tigripennis Mader 1942: 174, 197 [10]. Type locality: Santa Inéz, Ecuador.

Diagnosis. Posterior and anterior edge of pronotum with a black, shallow and transverse mark, from which two lateral tooth-like spots arise, sometimes with a medial elongated spot; subcircular pronotal spots can be present laterally or on the disc. Elytral coloration with several black, free, subcircular or longitudinal spots, sparsely distributed (some of which are apparently fused). Penile flagellum well-developed and slightly elongated, approximately $1.34 \times$ the length of the penis, anteriorly arcuate and with a shallow desclerotization posteriorly (absent in *M. tigrinoides*). Flagellum of *M. tigripennis* dorsally broader than that of *M. tigrinoides*. Head of flagellum sclerotized and subpentagonal, with outer anterior contours forming an acute angle.

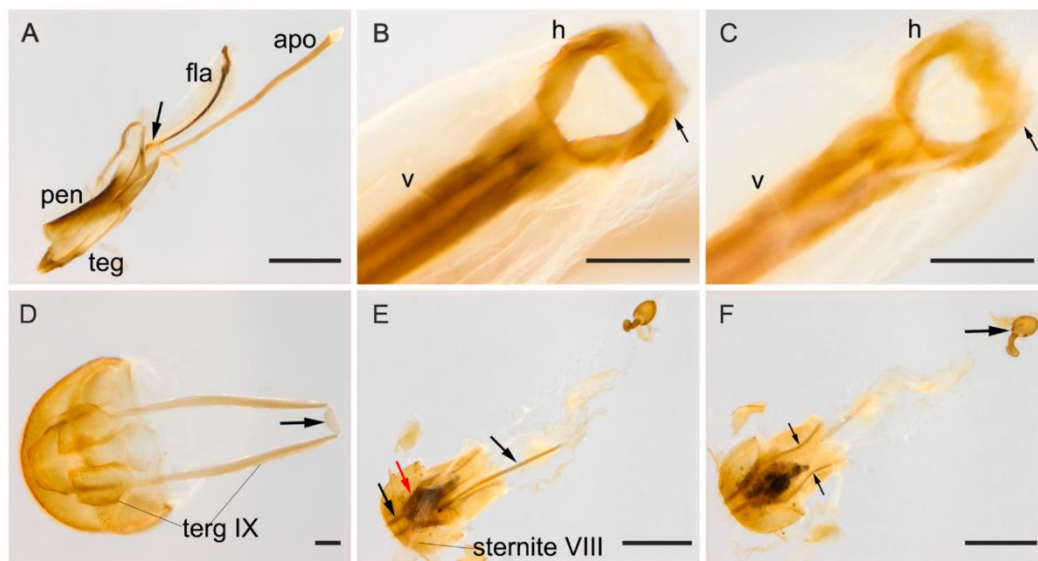


Figure 9. (A–D) Male abdominal terminalia of two specimens of *Mycotretus tigrispennis* Mader, 1942 from Pirai, RJ, Brazil: (A) lateral view of the aedeagus, showing apophyses (apo), flagellum (fla), penis (pen) and tegmen (teg); arrow showing a shallow desclerotization posteriorly. (B–C) Flagellum dorsal view, showing: head (h) and anterior tip of virga (v); arrow showing the outer anterior contour with an acute angle. (D) Abdominal segments VIII–X: laterotergite IX (terg IX), arrow showing the sclerite at the anteroventral edge of segment IX. (E–F) Female abdominal terminalia of a specimen from Pirai, RJ, Brazil: (E) dorsal view, big arrow showing the median strut of sternite VIII, small black and red arrows showing a gonostylus and a gonocoxite, respectively; (F) ventral view, small arrows showing baculi of paraprocts and big arrow showing the spermatheca. Scale bars: A, E–F = 0.5 mm; B–D = 0.1 mm.

Redescription. Length (in mm) = 4.52–6.25 (5.52 ± 0.49 , $n = 17$). Body elongate, widest at the anterior third of elytra, TL/EW = 1.76–1.86 (1.81 ± 0.02), glabrous and glossy; dorsal and ventral coloration (Figure 7G–L) homogeneously yellowish or reddish-brown; mouthparts and first antennomeres yellowish to reddish-brown; legs yellowish to reddish-brown, with coxae and tibiae partially blackish in some individuals; mandible apices partially black and last antennomeres blackish; mentum plate pentagonal, with a strongly sclerotized margin. Venter usually black with subcircular spots. Scutellar shield blackish, glabrous and bearing few punctures. Dorsal coloration: head with no spots or with one large and subcircular black spot on the disc (Figure 7I, arrow); posterior and anterior edge of pronotum with black, shallow and transverse marks, from which two lateral tooth-like spots arise (Figure 7I,K, small arrows), sometimes with in between elongated and medial spots (Figure 7G, arrow); sometimes with subcircular pronotal spots laterally or on the disc. Elytral coloration with several black, free, subcircular or longitudinal spots, sparsely distributed (some apparently fused).

Male terminalia. (Figure 9A–D). Penis (Figure 9A, pen) slightly elongated and curved; basal portion with short sclerotized projection linked to apophyses; internal sac with well-developed and slightly elongated flagellum (Figure 9A, fla), $1.34 \times$ the length of penis ($n = 2$), anteriorly arcuate and with shallow desclerotization posteriorly (Figure 9A, arrow, absent in *M. tigrinoides*). Flagellum of *M. tigrispennis* dorsally broader than that of *M. tigrinoides* (Figure 9B,C). Head of flagellum (Figure 9B,C) sclerotized and subpentagonal; outer anterior contours forming an acute angle (Figure 9B,C, arrow), anterior edge enlarged compared to posterior edge. Apophyses (Figure 9A, apo) $1.51 \times$ as long as penis ($n = 2$). Tegmen sclerotized (Figure 9A, teg); parameres reduced and sclerotized, with densely pubescent outgrowths, slightly dilated, narrowed and acute at apex. Tergite VIII, sclerotized with sparsely distributed bristles. Sternite VIII slightly sclerotized. Laterotergite IX sclerotized (Figure 9D, terg IX), posteriorly elongated and pubescent; outer contours angulated; anteroventral edge with paired

and subparallel lateral struts, connected at its anterior tip by small, transverse, slightly sclerotized sclerite (Figure 9D, arrow). Posterior edge of sternite IX sclerotized, undivided; outer contour rounded; anteriorly membranous. Tergite X sclerotized; anterior edge truncate, with sparsely distributed bristles.

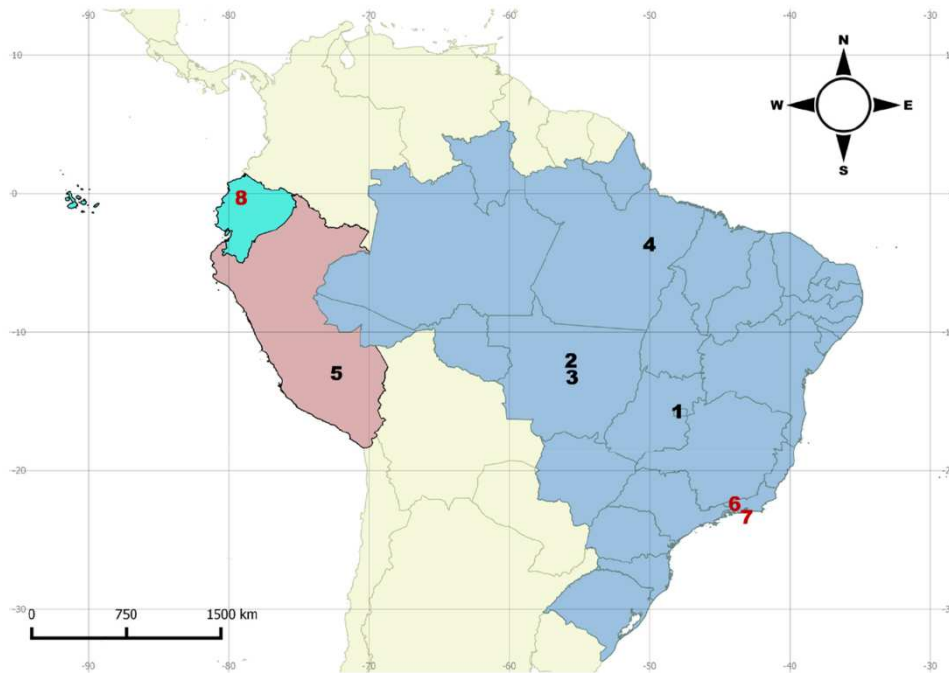


Figure 10. Distribution map for *Mycotretus tigrinoides* Mader, 1942 and *Mycotretus tigrispennis* Mader, 1942 species. *Mycotretus tigrinoides* (1–5, black numerals): Brazil (1–4): 1—Brasília (DF); 2—Sinop (MT); 3—Vera (MT); 4—Tucuruí (PA). Peru: 5—Ocobamba. *Mycotretus tigrispennis* (6–8, reddish numerals): Brazil (6–7): 6—Pirai (RJ); 7—Rio de Janeiro, Floresta da Tijuca (RJ). Ecuador: 8—Santa Inés (Ecuador).

Female terminalia. (Figure 9E,F). Gonostyli and gonocoxites strongly sclerotized (Figure 9E, black and red arrows, respectively, under sternite VIII); baculi of paraprocts sclerotized and arcuate (Figure 9F, black small arrows); spermatheca oval and sclerotized (Figure 9F, big black arrow). Tergite VIII sclerotized and sternite VIII with conspicuous median strut (Figure 9E, big arrow).

Distribution. Ecuador (Santa Inés) and Southeast Brazil (Figure 10, localities 6–8, reddish numerals).

Remarks. See the above remarks of *M. tigrinoides* concerning the identification of examined specimens of *M. tigrispennis*. The specimens identified here as *M. tigrispennis* (from Rio de Janeiro, Brazil) are far away from the type locality (Santa Inés, Ecuador) and we thought that it would be a new species at first. Although that remains a possibility, until other populations are studied, we prefer to consider these Brazilian specimens as intraspecific variation of *M. tigrispennis*.

Material examined. 1 specimen (SDEI) “Holotypus [printed, red label] \ Santa Inés (Ecuad.) R. Haensch S. [printed] \ Coll. Kraatz [printed] \ *Mycotretus tigrispennis* [handwritten] Ma. [?] Holotypus det. Mader [handwritten]”; 1 male (DZUP, dissected) “REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] XII. 1960 [handwritten], F.M. Oliveira [printed] \ DZUP 127806 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] II. 1967 [handwritten], F.M. Oliveira [printed] \ DZUP 127795 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] III. 1967 [handwritten], F.M. Oliveira [printed] \ DZUP 127804 [printed]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] III. 1964

[handwritten], F.M. Oliveira [printed]"; 1 female (DZUP, dissected) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] XII. 1960 [handwritten], F.M. Oliveira [printed] \ DZUP 127808 [printed]"; 1 female (DZUP, dissected) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] III. 1967 [handwritten], F.M. Oliveira [printed] \ DZUP 127789 [printed]"; 1 male (DZUP, dissected) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] III. 1967 [handwritten], F.M. Oliveira [printed] \ DZUP 127805 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] VIII. 1969 [handwritten], F.M. Oliveira [printed] \ DZUP 127824 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] IX. 1964 [handwritten], F.M. Oliveira [printed] \ DZUP 127796 [printed]"; 1 specimen (DZUP) "REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] II. 1967 [handwritten], F.M. Oliveira [printed] \ DZUP 127797 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] III. 1968 [handwritten], F.M. Oliveira [printed] \ DZUP 127801 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] II. 1967 [handwritten], F.M. Oliveira [printed] \ DZUP 127794 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] XII. 1960 [handwritten], F.M. Oliveira [printed] \ DZUP 127809 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ FLORESTA da TIJUCA, D. Federal, Brasil [printed] I. 1961 [handwritten], C.A.C. Seabra \ DZUP 127830 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ FLORESTA da TIJUCA, D. Federal, Brasil [printed] I. 1961 [handwritten], C.A.C. Seabra \ DZUP 127828 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ FLORESTA da TIJUCA, D. Federal, Brasil [printed] I. 1961 [handwritten], C.A.C. Seabra \ DZUP 127829 [printed]"; 1 specimen (DZUP) "Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] IX. 1969 [handwritten], F.M. Oliveira [printed] \ DZUP 126096 [printed]".

3.5. *Mycotretus prioteloides* Mader, 1942

Figures 11 and 12.

Mycotretus prioteloides Mader 1942: 174, 196 [10]. Type locality: Coroico, Bolivia.

Diagnosis. Pronotal edges black, with a shallow and transverse black mark at posterior or anterior edges; pronotal portion with two transverse or subcircular black spots on the disc. Outer edges of pronotum and mesal sutural edge of elytra with black outline. Elytral coloration with several black, subcircular and transverse free spots. Penile flagellum well-developed and slightly elongated, approximately $0.8 \times$ the length of penis, slightly sinuous, with a membranous portion between its virga and head. Head of flagellum sclerotized, slightly elongated and, unlike in *M. tigrinus*, conspicuously convex anteriorly; inner outline somewhat more separated than in *M. tigrinus*.

Redescription. Length (in mm) = 5.75–7 (6.29 ± 0.63 , $n = 3$). Body elongate, widest at anterior third of elytra, TL/EW = 1.75–1.91 (1.83 ± 0.08) (measurements based on examined specimen and in Mader's original description based on holotype and one paratype), glabrous and glossy, dorsal and ventral coloration homogeneously yellowish or reddish-brown (Figure 11A,C,D). Mouthparts reddish-brown with outer contour of last maxillary and labial palpomeres yellowish; mentum plate pentagonal, with strongly sclerotized margin; mandible apices and antennomeres 2–11 blackish (scape reddish-brown). Trochanters, apical portion of femora, tibiae and dorsum of tarsi blackish; tarsi (ventrally) and claws yellowish to reddish-brown. Elytral epipleuron partially black and yellowish (Figure 11D, arrows). Scutellar shield blackish, glabrous and bearing few punctures. Dorsal coloration: head without spots; pronotal edges black, with a shallow and transverse black mark on the anterior (Figure 11A, arrow) and posterior edge (Figure 11C, arrow); disc of pronotum with two transverse (Figure 11A) or subcircular (Figure 11C) black spots. Outer edges of pronotum and mesal sutural edge of elytra with black outline. Elytral coloration with several black, subcircular and transverse free spots.

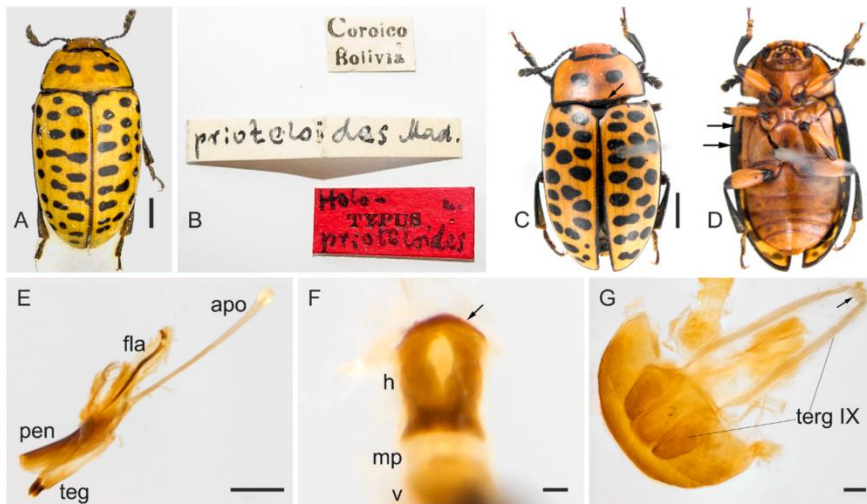


Figure 11. (A–D) Specimens of *Mycotretus prioteloides* Mader, 1942: (A–B) holotype (Coroico, Bolivia): (A) dorsal view, black arrow showing the transverse black mark at the anterior pronotal edge. (B) Labels. (C–G) Male (Torentoy Canyon, Base Machu Picchu, Peru): (C–D) dorsal and ventral view, respectively, (E–G) genitalia. (C) Arrow showing the black mark at the posterior pronotal edge; (D) arrows showing the elytral epipleuron partially black and yellowish; (E) lateral view of the aedeagus, showing apophyses (apo), flagellum (fla), penis (pen) and tegmen (teg); (F) dorsal view of the flagellum, showing head (h), anterior tip of virga (v) and the membranous portion (mp), arrow showing conspicuously convex anterior edge; (G) abdominal segments VIII–X: laterotergite IX (terg IX), arrow showing the sclerite at the anteroventral edge of segment IX. Scale bars: A, C–D = 1 mm; E = 0.5 mm; F–G = 0.1 mm.

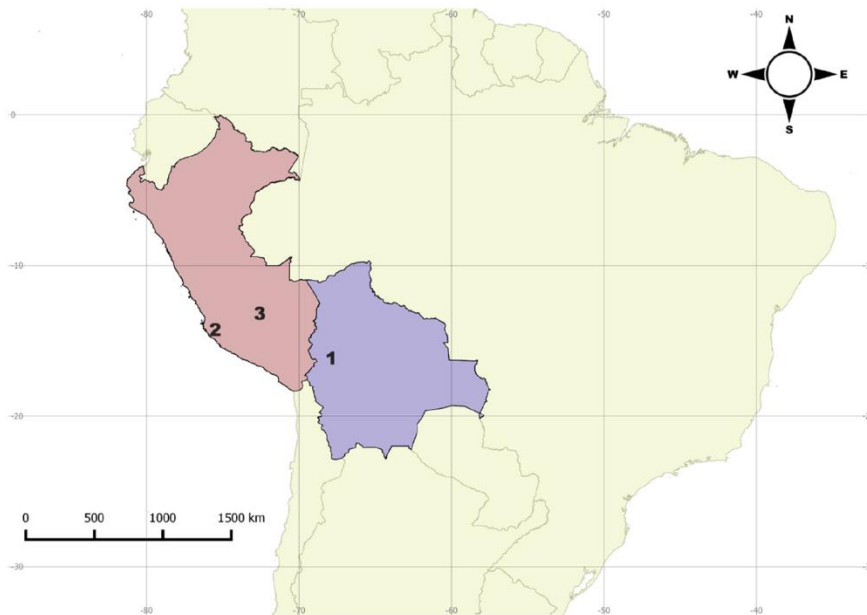


Figure 12. Distribution map for *Mycotretus prioteloides* Mader, 1942. Bolivia: 1—Coroico. Peru: 2—Calango; 3—Machu Picchu.

Male terminalia. (Figure 11E–G). Penis (Figure 11E, pen) slightly elongated and curved; basal portion with short sclerotized projection linked to apophyses; internal sac with well-developed and slightly elongated flagellum (Figure 11E, fla), $0.8 \times$ the length of penis ($n = 1$), slightly sinuous, with a membranous portion between the virga and head (Figure 11F, arrow). Head of flagellum (Figure 11F) sclerotized, slightly elongated, and unlike in *M. tigrinus*, conspicuously convex anteriorly (Figure 11E, small arrow); inner outline somewhat more separated than in *M. tigrinus*. Apophyses (Figure 11E, apo) $1.3 \times$ as long as penis. Tegmen sclerotized (Figure 11A, teg); parameres reduced and sclerotized, with densely pubescent outgrowths, slightly dilated, narrowed and acute at apex. Tergite VIII, sclerotized with sparsely distributed bristles. Sternite VIII slightly sclerotized. Laterotergite IX sclerotized (Figure 11G, terg IX), posteriorly elongated and pubescent, outer contours angulated; anteroventral edge with paired and subparallel lateral struts connected at its anterior tip by small, transverse, slightly sclerotized sclerite (Figure 11G, arrow). Posterior edge of sternite IX sclerotized, undivided; anteriorly membranous. Tergite X sclerotized, anterior edge with sparsely distributed bristles.

Female terminalia. Unknown.

Distribution. Bolivia (Coroico), Peru (Calango, Machu Picchu) (Figure 12).

Remarks. Although *M. prioteloides* is remarkably distinct from the other *Mycotretus* studied here, its male genitalia resembles that of *M. tigrinus* and, apparently, both species are closely related.

Material examined. 1 specimen (NMBS) “Coroico Bolivia [printed] \ prioteloides Mad. [handwritten] \ holo- [handwritten], TYPUS [printed], prioteloides [handwritten] [red label]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed, red label] \ Torentoy Canyon (Base Machu – Pichu), 2000–2000 m—PERU, VI–VII. 964 B. Malkin [printed] \ Comparado com tipo [printed], *Mycotretus prioteloides* Mader, 1942 [handwritten], *M. alvarenga* det. 1971 [printed] \ 1747 [printed]”.

4. Discussion

The disjunct geographical distribution of *M. centralis* and *M. tigrispennis* are not exceptions in the genus. For instance, such a distribution was also observed in *M. chilensis* Crotch, 1876 and *M. trifasciatus* Guérin, 1956 [3]. In the latter two cases, the majority of records are from the Atlantic Forest biome and a single outlier for each species (considered by the authors as doubtful records) leads their distribution to be interpreted as disjunct. Here we point out two other species with disjunct distributions: *M. centralis* and *M. tigrispennis*. In *M. centralis*, there are two records from North and Central America (Figure 6) and the others are from the Atlantic Forest in Brazil. In *M. tigrispennis*, there is a record from northwestern South America and the others are from the Brazilian Atlantic Forest (Figure 10, localities 6–8). Other examples of disjunct distribution in *Mycotretus* are mentioned by Alvarenga [2], e.g., *M. nigroterminatus* Lacordaire, 1842 (Colombia and Southeast Brazil), *M. coccineus* Lacordaire, 1842 (north Neotropical region and Southeast Brazil) and *M. sanguineus* (Duponchel, 1825) (Colombia and Southeast Brazil). The cases of disjunct distribution of *Mycotretus* species have been accumulating and now we cannot simply attribute these to collection gaps a priori. It is important to gather host fungi data and compare host use of these species between occurrence areas separated by great gaps, which would be a sign of isolation of well separated populations. On the other hand, recently acquired or compiled data have shown that some *Mycotretus* species are broadly distributed and extend almost continuously along extensive areas, from the southern to the northern Neotropical region, as in the case of *M. tigrinus*, in which the accumulation of records revealed areas where the species is less frequently collected, breaking the disjunct distribution pattern. Neotropical erotylids have been barely collected and studied, especially those from the southern neotropics, and thousands of unidentified specimens housed in scientific collections remain to be studied.

Three species studied here are recorded for the first time from Brazil: *M. centralis*, *M. tigrinoides* and *M. tigrispennis*. The former, *M. centralis*, is sympatric with *M. tigrinus* in Nova Teutônia (SC) and with *M. tigrispennis* in Pirai (RJ). Sympatry is an event already verified in *Mycotretus* [3,4,24] and “syntopy”,

a particular case of sympatry in which two or more related species occupy the same microhabitat in the same locality, was already reported for two species, *M. chilensis* Crotch, 1876 and *M. trifasciatus* Guérin, 1956 [3]. In this context, further ecological studies shall evaluate whether *M. centralis*, *M. tigrinus* and *M. tigrispennis* share the same microhabitats (i.e., the same host fungi) or not.

The morphology of the penile flagellum of *M. tigrinus* and *M. prioteloides*, with a membranous portion between its head and virga and an elongated head with the inner contours slightly separated, resembles that of other species dissected by us for forthcoming work, e.g., *M. sallei* Crotch, 1876, *M. lesueuri* (Chevrolat, 1835), *M. sobrinus* (Guérin-Ménéville, 1841), *M. spadiceus* Gorham, 1888 and *M. savignyi* Lacordaire, 1842 (personal observation). Considering these morphological similarities, ongoing work will evaluate whether these species are phylogenetically closely related or are additional synonyms of *M. tigrinus*. However, the coloration of the aforementioned species differs greatly from that of *M. tigrinus*. The coloration of *M. lesueuri*, *M. sobrinus* and *M. savignyi* is homogeneously red, with black legs and lacking any sort of elytral and pronotal spots as seen in *M. tigrinus*. On the other hand, *M. sallei* and *M. spadiceus* have three black pronotal spots and a band or a spot on each elytron, respectively. Although color pattern seems to be plastic in some Erotylidae lineages [25], the biological mechanism (e.g., feeding habits, polymorphism or polyphenism) underlying color determination is unknown for the family. More sampling, information on host fungi and detailed geographical distribution, combined with molecular data, are required to determine the relationships of the aforementioned species with *M. tigrinus* and make further taxonomic decisions.

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Capítulo III

***Mycotretus alvarengai* sp. nov. (Coleoptera: Erotylidae: Tritomini) from the Amazon Biome**

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MYCOTRETUS ALVARENGAI SP. NOV. (COLEOPTERA: EROTYLIDAE: TRITOMINI) FROM THE AMAZON BIOME

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Abstract.— *Mycotretus alvarengai* sp. nov. is described from Maués, in the state of Amazonas, North Brazil. The description is based on a single adult male originally from the private collection of the late Moacyr Alvarenga, part of which is now housed in the Museu Nacional do Rio de Janeiro (MNRJ, Brazil). Information on the morphology of male terminalia is provided, together with comments on the morphological affinities of *M. alvarengai* sp. nov. with other species of the genus.



Key words.— pleasing fungus beetles, Erotylinae, Neotropical region, Brazil, taxonomy, morphology

INTRODUCTION

Mycotretus Lacordaire, 1842 (Erotylidae: Erotylinae: Tritomini) is the second most speciose genus within Erotylidae with 218 described species (Alvarenga 1994, Pecci-Maddalena and Lopes-Andrade 2017, Skelley and Powell 2018), surpassed only by *Iphiclus* Chevrolat, 1836 with 284 species (Alvarenga 1994). Although *Mycotretus* species are frequently collected in forests of the Neotropical region, the last species described in the genus was *M. lopesi* Alvarenga, 1989, known from a single specimen collected at Jacareacanga, in the state of Pará, North Brazil. The taxonomy of *Mycotretus* is unclear and the genus may not be monophyletic (Robertson *et al.* 2004). Recently, *M. chilensis* Crotch, 1876 and *M. trifasciatus* Guérin, 1956 were redescribed, including information on the morphology of male and female abdominal terminalia, metendosternite, mouthparts and other structures usually not available for *Mycotretus* species, but that may have taxonomic and phylogenetic importance (Pecci-Maddalena and Lopes-Andrade 2017).

The objective of the present work is to describe *Mycotretus alvarengai* sp. nov. from Maués, in the state of Amazonas, North Brazil, a locality within the Amazon biome. The morphological affinities of *M. alvarengai* sp. nov. with other species in the genus are discussed.

MATERIAL AND METHODS

The specimen described here belongs to the following institution:

MNRJ – Museu Nacional, Universidade Federal do Rio de Janeiro (Rio de Janeiro, RJ, Brazil).

Dissection, photography and measurement of specimens followed the methods provided by Pecci-Maddalena and Lopes-Andrade (2017). Transcription of labels followed Araujo and Lopes-Andrade (2016). Because only the holotype is known and in order to preserve its integrity, mouthparts, metendosternite and other structures that demand invasive dissection were not extracted. The genitalia was extracted, with care to

do the least possible damage to the specimen. The distribution map was created using latitude and longitude coordinates estimated by tracking localities in the online database GeoNames (Wick 2012) and plotted in a map in the freeware QGIS 2.12.2.

Terms for external morphology are based on Lawrence *et al.* (2011) and McHugh *et al.* (1997). Terms for color pattern follow Skelley (1998), and descriptions of mouthparts and abdominal terminalia were based on Węgrzynowicz (2002). The term “flagellum” refers to a male genitalia structure with two interconnected elements: head and virga (see Węgrzynowicz 2002). The following abbreviations are used:

BW – basal width of the scutellar shield;

CL – length of the antennal club (measured from base of the eighth to apex of the eleventh antennomere);

EL – elytral length (at midline, from base of scutellar shield to elytral apex);

EW – greatest elytral width;

FL – length of the antennal funicle;

GD – greatest depth of the body (from elytra to metaventricle);

GW – greatest diameter of the eye;

PL – pronotal length along midline;

PW – greatest pronotal width;

TL – total length (= EL+PL; head not included).

The ratio GD/EW was recorded as an indication of degree of convexity;

TL/EW – indicates degree of body elongation.

TAXONOMY

Mycotretus alvarengai sp. nov.

(Fig. 1A–I, Fig. 2)

Type locality. Maués, in the state of Amazonas, North Brazil (Fig. 2). Estimated coordinates: 5°3'47"S, 58°18'10"W.

Etymology. The new species is named in honour of Moacyr Alvarenga (1915–2010). He studied Neotropical Erotylidae and published several papers on these beetles, especially the “Catalogue of Neotropical Erotylidae (1994)”, his most important contribution.

Differential diagnosis. *Mycotretus alvarengai* can be differentiated from the described species of the genus by the elytral coloration, which is composed by transverse, subrectangular and symmetrical spots. The penile flagellum differs greatly from other species dissected by us ($n = 40$), especially in its prominent sclerotization at the anterior tip of virga, head Y-shaped, strongly sclerotized, with each branch ending in a blunt, narrowed and slightly bent tip. *Mycotretus* species that possess five pronotal spots, as

M. dorsofasciatus Lacordaire, 1842 and *M. nugator* Lacordaire, 1842, have a short penile flagellum (approximately the length of penis) and the head of flagellum is ring-shaped, while *M. alvarengai* has an elongate flagellum (more than twice the length of penis) and the head of flagellum is Y-shaped. The bilateral symmetry of elytral spots and body coloration of *M. leprosus* Lacordaire, 1842 resembles those of *M. alvarengai* at a first glance. However, the body of *M. leprosus* is broadly oval, the elytral spots are comparatively more numerous and subseriate, the penile flagellum is reduced and its head subtriangular, being remarkably different from those of *M. alvarengai*. The male genitalia of *M. chilensis*, *M. trifasciatus* and *M. nigromaniscatus* Boyle, 1954 are described in the literature (Boyle 1954, 1956; Pecci-Maddalena and Lopes-Andrade 2017) and in all these cases the penile flagellum, body shape and coloration clearly separate them from *M. alvarengai*.

Description. Length (in mm) = 4.87. Body elongate, widest at the anterior third of elytra, TL/EW = 1.75, GD/EW = 0.62, glabrous and glossy, dorsal coloration reddish-brown on prothorax and yellowish-brown on elytra, with subcircular and subrectangular black spots, symmetrically disposed between the two sides. Ventral coloration homogeneously reddish-brown (Fig. 1C); mouthparts yellowish to reddish-brown, mentum plate with a strongly sclerotized margin; antennae reddish-brown, last antennomeres (including club) almost blackish.

Head. Glabrous; punctation single, fine and homogeneously distributed; frontoclypeal suture present but interrupted at middle. Clypeus shallowly and arcuately emarginate. Antennae: FL 0.6 mm, CL 0.42 mm, CL/FL 0.7; length of antennomeres (in mm), from antennomere one to eleven, as follows: 0.17, 0.13, 0.17, 0.12, 0.09, 0.07, 0.09, 0.09, 0.12, 0.09, 0.17. Eyes glabrous (GW 0.34 mm), finely granulate. Mouthparts with labrum apparently free and sclerotized. Mandibles short and strongly sclerotized; apical maxillary palpomere semi-circular and 2.2× as wide as long. Labium with apical palpomere of labial palps club-shaped (asymmetrical); mentum subpentagonal, with outline slightly rounded and strongly sclerotized (Fig. 1D, arrow).

Thorax. Pronotum. Subtrapezoidal; edges bordered and sides moderately arcuate, convergent anteriorly; PW/PL = 2.14, widest anteriorly; shiny, punctation, single; interspaces, microreticulate; punctures separated by distance of about 4–7 puncture-widths at disc, each puncture with very short minute seta (barely visible even at magnification of 150×); anterior edge slightly convex at middle and anterior angles sharp. Color pattern: with five black spots (Fig. 1A): two anterior subcircular spots, symmetrically disposed, not connected to anterior edge and separated from each other by distance of about 1.8 spot-widths; three

posterior spots, not connected to posterior edge, symmetrically disposed, subcircular (outer ones) and transverse (inner one). **Scutellar shield.** (BW 0.33 mm), subpentagonal, glabrous, bearing few punctures. **Elytra.** EL/EW = 1.35, EL/PL = 3.33; strongly margined anteriorly, moderately convex, with seven conspicuous longitudinal rows of punctures, counted from suture toward outer edges (Fig. 1E); punctures

separated by about 2–3 puncture-widths; interspaces of rows microreticulate, with fine and sparse punctures; each puncture bearing minute seta (barely visible at magnification of 150 \times). Spots of left and right elytra symmetrically disposed. Each elytron with twelve transverse black spots (Fig. 1A–B), disposed as follows: two free subrectangular spots close to anterior edge; two transverse medial spots, the discal one fused

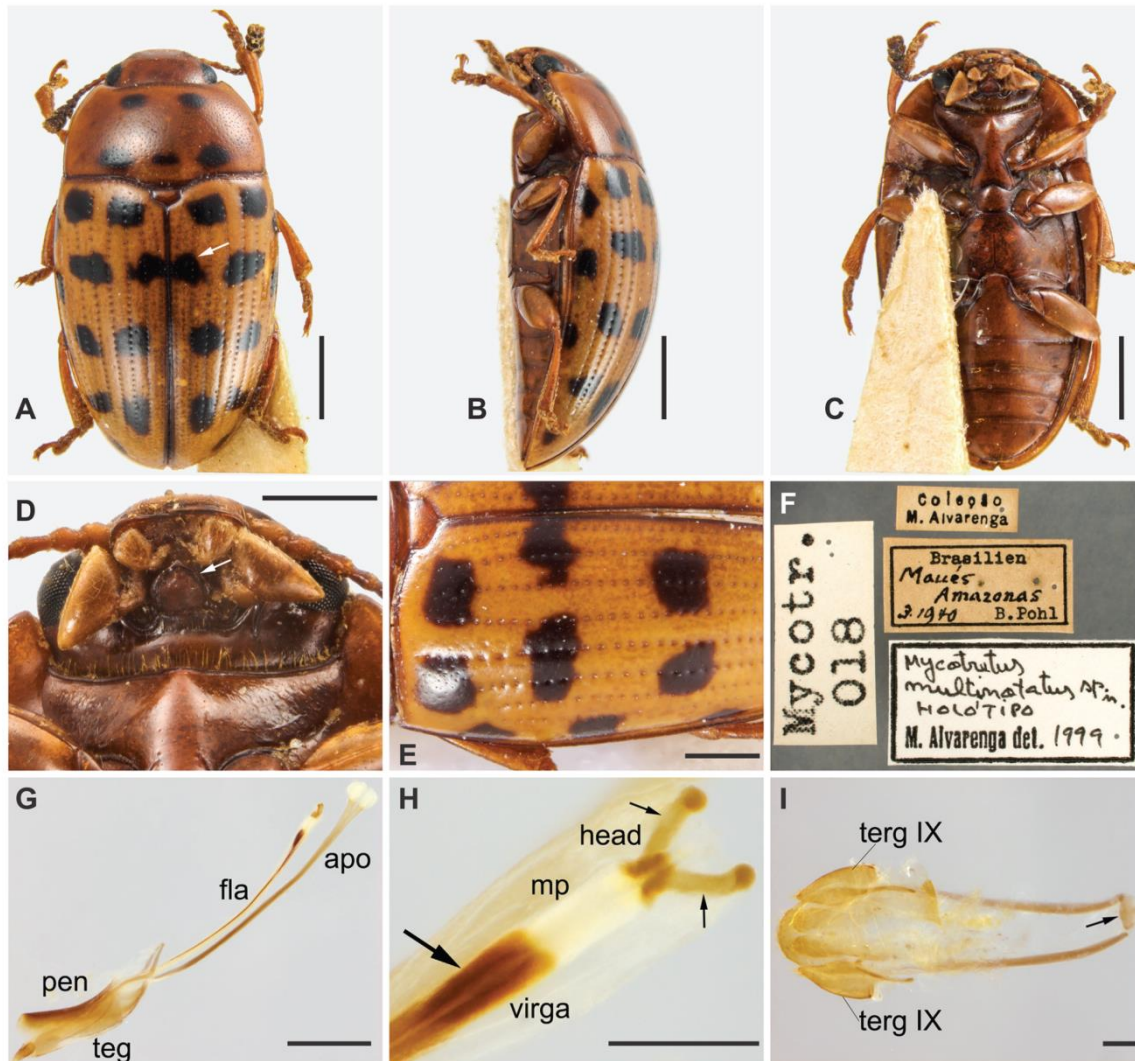


Figure 1. (A–I) *Mycotretus alvarengai* sp. nov.: (A) dorsal view, arrow showing spots fused at disc; (B) lateral view; (C) ventral view; (D) mouthparts, arrow showing the mentum; (E) longitudinal elytral rows of punctures; (F) labels. (G–I) Male abdominal terminalia: (G) apophyses (apo), flagellum (fla), penis (pen), tegmen (teg); (H) dorsal view of anterior portion of flagellum, big arrow showing a prominent sclerotization at the anterior tip of virga, small arrows showing the branched flagellum head. Head of penile flagellum (head), membranous portion between virga and head segments (mp), virga of penile flagellum (virga); (I) abdominal segments IX–X: laterotergite IX (terg IX), arrow showing the sclerite at the anteroventral edge of IX segment. Scale bars: A–C = 1 mm, D–E, G = 0.5 mm, H–I = 0.1 mm.

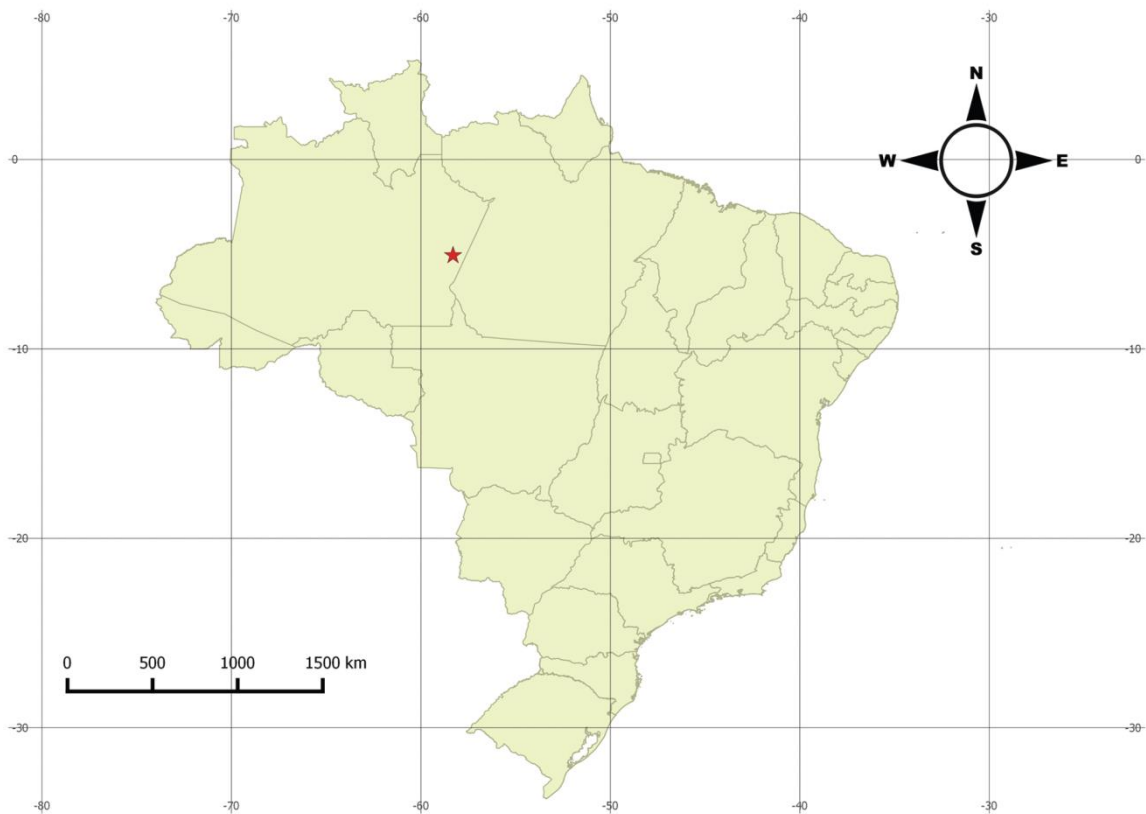


Figure 2. Map for *Mycotretus alvarengai* sp. nov. showing the type locality Maués, in the state of Amazonas, North Brazil.

to the mesal suture (Fig. 1A, arrow); two subrectangular spots at the apical two-thirds; two spots at the apical third, the inner one longitudinally elongated and the outer transverse; four outer spots, the basal three connected to the outer elytral edge and the apical spot free (Fig. 1B). **Prosternum.** Convex; anterior margin smooth and pubescent; notosternal sutures distinct and entire; procoxal cavities ovate; prosternal process abruptly expanded and conspicuously emarginate at apex; procoxal lines short, barely surpassing coxae and nearly straight; prosternal process with pair of secretory pores. **Mesoventrite.** Small, convex, mesocoxal lines, short. **Metaventrite.** Convex, glabrous; finely punctate, interspaces of punctures microreticulate; $2.14\times$ as long as mesoventrite; metacoxal lines conspicuous, $0.68\times$ as long as metaventrite; discrimen $0.64\times$ as long as metaventrite. **Legs.** Procoxae oval, mesocoxae almost globular and metacoxae transverse. Femora elongate, smooth, without spines or other outgrowths. Tibiae long, somewhat widened apically; apex with crown of wide flat setulae. Tarsi densely pubescent.

Abdomen. Elongate; punctation coarse, shallow; interspaces, granulate; vestiture of sparse, slender setae. Coxal lines conspicuous and not continuous around coxae ($0.69\times$ length of first abdominal ventrite). Length of ventrites 1 to 5 as follows (in mm, from base to apex of each ventrite at longitudinal midline): 0.8, 0.37, 0.27, 0.29, 0.45. **Male terminalia** (Fig. 1G–I). Penis (Fig. 1G, pen) slightly elongate and curved; basal portion with short sclerotized projection that is linked to apophyses; internal sac with well-developed and elongate flagellum (Fig. 1G, fla), $2.27\times$ the length of penis, with prominent sclerotization at anterior tip of virga (Fig. 1H, big arrow) and membranous portion between virga and head segments (Fig. 1H, mp); head Y-shaped (Fig. 1H, head), strongly sclerotized posteriorly, with each branch ending in a blunt, weakly narrowed and slightly bent, sclerotized tip (Fig. 1H, small arrows). Apophyses (Fig. 1G, apo) $1.99\times$ as long as penis. Tegmen sclerotized (Fig. 1G, teg); parameres reduced and sclerotized, with densely pubescent outgrowths, dilated and then shallowly acute at apex. Tergite VIII sclerotized, with sparsely distributed bristles.

Sternite VIII sclerotized. Laterotergite IX sclerotized (Fig. 1I, terg IX), subtriangular in lateral view and, dorsally, posteriorly elongate, pubescent and with outer contours angulated; anteriorly with paired and subparallel lateral struts, connected at its anterior tip, by small, transversely elongate and slightly sclerotized sclerite (Fig. 1I, black arrow). Posterior edge of sternite IX, sclerotized, medially emarginate (damaged?) outer contour rounded with sparsely distributed bristles; anteriorly membranous. Tergite X sclerotized, anterior edge with sparsely distributed bristles.

Female. Unknown.

Type material. Holotype (MNRJ), (Fig. 1A–I) “Coleção M. Alvarenga [printed] \ Brasilien [printed], Maués, Amazonas, 3.1940 [handwritten], B. Pohl [printed] \ Mycotretus multinotatus sp.n. holótipo [handwritten], M. Alvarenga det. 1999 [printed] \ Mycotr. 018 [printed] \ HOLOTYPUS *Mycotretus alvarengai* Pecci-Maddalena & Lopes-Andrade [printed, red paper]”.

Distribution. Known only from the type locality (Fig. 2).

Comment. Alvarenga was the first to note the specimen here described as *M. alvarengai* belonged to a new species and labeled it “*Mycotretus multinotatus*”, a name never published. We decided to pay a tribute to him rather than using the name he chose.

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Capítulo IV

Xalpirta mauryi sp. nov. (Coleoptera: Erotylidae: Tritomini) from Southeast Brazil

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Abstract

Xalpirta mauryi sp. nov. (Erotylidae: Tritomini) is described from Parque Nacional do Itatiaia (in the state of Rio de Janeiro) and Campos do Jordão (in the state of São Paulo), Southeast Brazil. *Xalpirta mauryi* differs from other described *Xalpirta* in the uniformly green dorsal coloration, with a metallic sheen, and pronotum without spots or black marks. The pore on the posterior 1/3 of each pronotal edge (present in the other *Xalpirta*) is apparently absent in *X. mauryi*. We provide a detailed description of adults, including morphology of mouthparts, and male and female terminalia. Additionally, we discuss the morphological affinities of *X. mauryi* with other species in the genus and with species of other closely related genera within Tritomini, and provide a new geographical record for *X. maderi* in Southeast Brazil.

Key words: pleasing fungus beetles, Erotylinae, Cucujoidea, Neotropical region, taxonomy, morphology

Introduction

The Neotropical genus *Xalpirta* Skelley & Cekalovic (Erotylidae: Tritomini) includes eight species, as follows: *Xalpirta arnetti* Skelley & Cekalovic; *Xalpirta azureipennis* (Guérin); *Xalpirta elsa* Skelley & Cekalovic; *Xalpirta guerini* Skelley & Cekalovic; *Xalpirta maderi* (Delkeskamp); *Xalpirta peckorum* Skelley & Cekalovic; *Xalpirta stellaris* Skelley & Cekalovic and *Xalpirta valdiviana* (Philippi & Philippi). These species are distributed in southern South America and there are many records in altitudes over 1000 meters (Skelley & Cekalovic 2001). The only described Brazilian *Xalpirta* is *X. maderi* recorded from Nova Teutônia (in the state of Santa Catarina), Nova Friburgo and Petrópolis (Rio de Janeiro) and Monte Verde (Minas Gerais). *Xalpirta peckorum* occurs in the Province of Salta (Argentina) and the remaining species are restricted to Chile, except for *X. valdiviana*, which extends its distribution to the frontier between Chile and Argentina.

The described species of *Xalpirta* share the following features: an elongate parallel-sided body, lack of “umbilicate” pores at pronotal angles (present in *Triplax* Herbst), pore of each lateral pronotal edge at posterior 1/4 to 1/3 (sometimes minute), lack of brush on terminal maxillary palpomere (present in *Triplax*), small antennomere VIII and antennal club distinctly 3-segmented (Skelley & Cekalovic 2001). Aside from that, members of *Xalpirta* have the head black to orange, prothorax yellow to orange (with or without black spots on pronotum), elytra usually with metallic sheen (purple, blue or green) and mentum plate pentagonal to triangular (Skelley & Cekalovic 2001). The phylogenetic relationships of *Xalpirta* with *Triplax*, *Mycotretus* Lacordaire and other Tritomini genera is unknown (Skelley & Cekalovic 2001). There is no available description of male and female genitalia for species currently placed in the genus. Biological information is scarce, with a few records on gilled mushrooms (Agaricales). Larvae are unknown (Skelley & Cekalovic 2001).

Here we describe *Xalpirta mauryi* sp. nov. from Southeast Brazil, provide descriptions of its mouthparts, met-

endosternite, male and female terminalia and other structures. The morphological affinities of *X. mauryi* **sp. nov.** with other species in the genus as well with other Tritomini are discussed. Additionally, we provide a new geographical record for *X. maderi* in Southeast Brazil.

Material and methods

The specimens studied here belong to the following institutions:

- CELC** Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera (Viçosa, MG, Brazil)
DZUP Coleção Entomológica Padre Jesus Santiago Moure, Universidade Federal do Paraná (Curitiba, PR, Brazil)
MNRJ Museu Nacional (Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil)

Dissection, photography, measurement of specimens and transcription of labels followed the methods provided by Pecci-Maddalena & Lopes-Andrade (2017, 2018a,b). In order to facilitate morphological examination, structures shown in Figures 6–10 and 24–32 were decolorized with hydrogen peroxide (H₂O₂). The distribution map was created using latitude and longitude coordinates estimated by tracking localities in the online database GeoNames (Wick 2012) and plotted on a map using the freeware QGIS 2.12.2. Geographical data of non-Chilean *Xalpirta* (extracted from Skelley & Cekalovic 2001) is also included in the map. Terms for external morphology follow Lawrence *et al.* (2011) and McHugh *et al.* (1997). Descriptions of mouthparts and abdominal terminalia were based on Węgrzynowicz (2002). The term “flagellum” refers to a male genitalic structure with two interconnected elements: “head” and “virga”. The following abbreviations are used: BW—anterior width of the scutellar shield; CL—length of the antennal club (measured from base of the eighth to apex of the eleventh antennomere); EL—elytral length (at midline, from base of scutellar shield to elytral apex); EW—greatest elytral width (across both elytra); FL—length of the antennal funicle; GD—greatest depth of the body (from elytra to metaventricle); GW—greatest diameter of the eye; PL—pronotal length along midline; PW—greatest pronotal width; TL—total length (= EL+PL; head not included). The ratio GD/EW was recorded as an indication of degree of convexity; TL/EW—indicates degree of body elongation.

Taxonomy

Xalpirta mauryi **sp. nov.**

Figs. 1–25, 33

Type locality. Parque Nacional do Itatiaia, 1200 m, in the state of Rio de Janeiro, Southeast Brazil (Figs. 4 and 33). Estimated coordinates: 22° 29' 45" S, 44° 33' 46" W.

Etymology. The new species is named in honor of Prof. Maury Pinto de Oliveira (1914–2004). He was a major Brazilian malacologist of the last century, building a large collection of mollusks and shells from Brazil and the world. His collection is housed in the Museum of Malacology “Prof. Maury Pinto de Oliveira” at the “Universidade Federal de Juiz de Fora (UFJF)”, Southeast Brazil. In 2002, Professor Maury (88 years old) first introduced the senior author (then 12 years old) to the study of Coleoptera. Interestingly, beetles were the first interest of Prof. Maury, who lost that focus when his entomological collection was seriously damaged due to the use of non-entomological pins. Nevertheless, throughout his life he built an important library, including many books on Coleoptera, entomology, and natural history.

Diagnosis. *Xalpirta mauryi* differs from other described *Xalpirta* in the uniformly green dorsal coloration, with a metallic sheen, and pronotum without spots or black marks (Fig. 1). The pore on the posterior 1/3 of each pronotal edge is apparently absent in *X. mauryi* (Figs. 24–25; compared to that of *X. maderi* in Fig. 28, with small arrow showing the corresponding glandular duct).

Description. Length (in mm) = 2.48–3.6 (3.14 ± 0.44, n = 5). Body elongate (Figs. 1–3), parallel-sided, TL/EW = 2.01–2.16 (2.11 ± 0.05), GD/EW = 0.67–0.75 (0.72 ± 0.03), glabrous and glossy, dorsal coloration homogeneous-

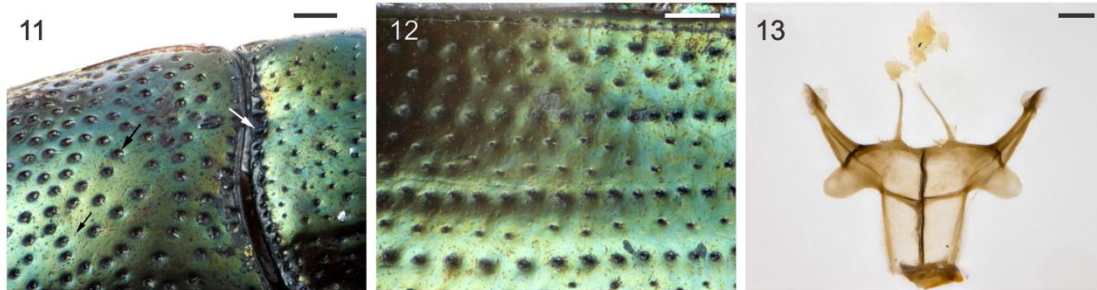
ly green, with green metallic sheen. Ventral coloration as dorsal, except for abdominal ventrites, legs, maxillary and labial palps, and antennomeres 1–8 yellowish-brown, and antennomeres 9–11 reddish-brown.



FIGURES 1–10. *Xalpirta mauryi* sp. nov.: 1–5 holotype from Parque Nacional do Itatiaia (Rio de Janeiro, Brazil). 1–3 habitus; (4) labels; (5) mouthparts, arrow showing the mentum. 6–10 male paratype of *X. mauryi* sp. nov., from Parque Nacional do Itatiaia. (6) mouthparts, arrow showing the mentum; (7) frontal view of head, right mandible (m), white arrow showing frontoclypeal suture, black arrow showing labrum; (8) left mandible, arrow showing tuft of setae on prosthema; (9) maxilla; (10) apical maxillary palpomere, arrow showing pubescence. Scale bars: 1–3 = 1 mm; 5 = 0.5 mm; 6–10 = 0.1 mm.

Head. Glabrous; punctation coarse (Fig. 7), somewhat dense compared to other Tritomini (for instance, *Mycotretus*); ocular striae fine, nearly reaching lateral angle of epistome; frontoclypeal suture present, short and interrupted at middle (Fig. 7, white arrow). Clypeus arcuately emarginate (Fig. 7). Left antenna measured in one individual: FL 0.6 mm, CL 0.37 mm, CL/FL 0.61; length of antennomeres 1–11 (in mm): 0.16, 0.09, 0.17, 0.11, 0.10, 0.07, 0.07, 0.06, 0.10, 0.09, 0.14; antennal club loose, 3-segmented, abrupt. Eyes glabrous (GW 0.26 mm), finely granulate. Mouthparts (Figs. 5–10) with free, sclerotized, pubescent labrum, slightly emarginate at middle and with two very thin tufts of slender bristles on each side (Fig. 7, black arrow). Mandibles short and broad; apex with two teeth (Fig. 7, m, Fig. 8); mandibular base emarginate; mola well-developed, naked and distinctly transversely costate; prosthema distal to mola, soft with additional tuft of setae (Fig. 8, arrow). Maxillae (Fig. 9) with cardo subtrian-

gular and stipes elongate; galea shorter but wider than lacinia, somewhat widened towards densely pubescent apex; lacinia much longer and narrower than galea, densely pubescent at apex, with highly sclerotized but barely visible hook; four maxillary palpomeres on each palp, palpomere 1 almost as long as palpomeres 2–3 combined; apical palpomere semicircular, approximately 3× wider than long, pubescent (Fig. 10, arrow) but lacking distinct terminal brush (present in *Triplax*, Fig. 30, arrow). Three labial palpomeres on each palp, palpomere 3 club-shaped (asymmetrical). Mentum (Figs. 5–6, arrow) an elongate, delineated plate, pentagonal with angulate contours, strongly sclerotized and bearing setae at middle.

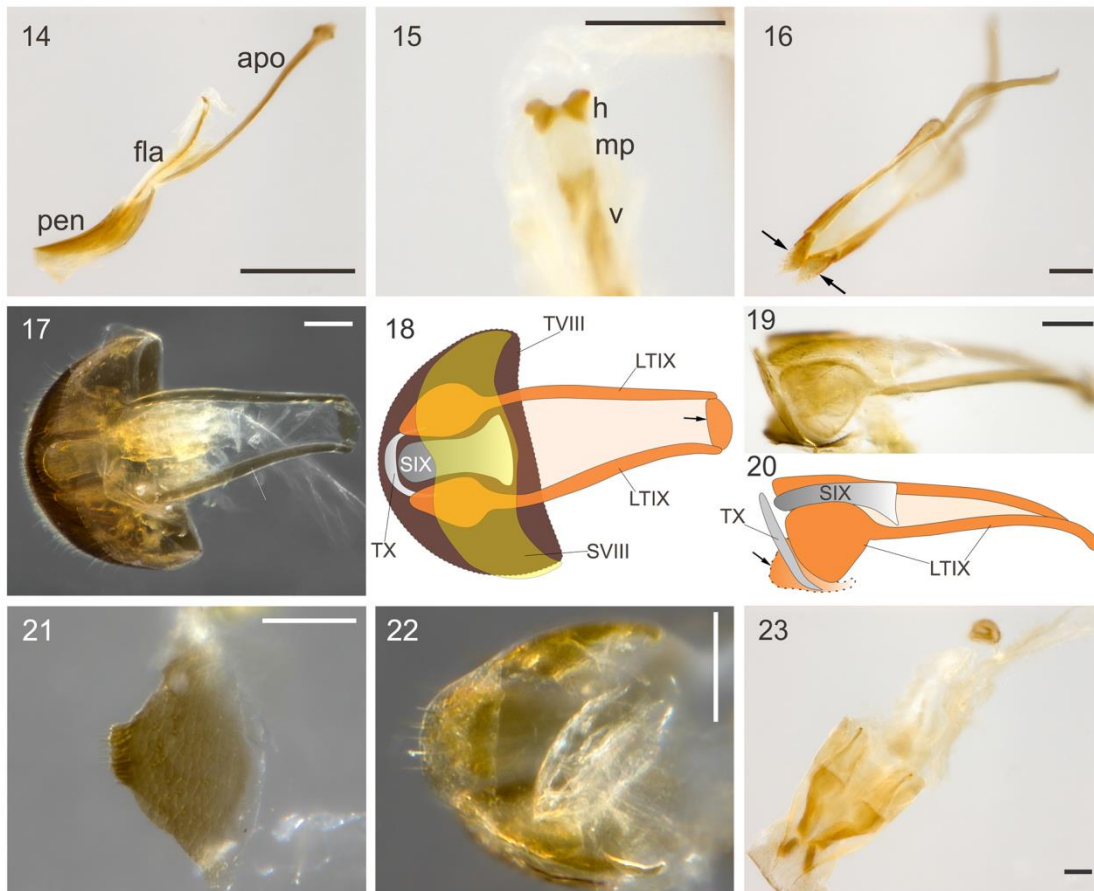


FIGURES 11–13. *Xalpirta mauryi* sp. nov., thorax: (11) pronotum and anterior elytral edge, small black arrow showing a small puncture, big black arrow showing a large puncture, white arrow showing anterior elytral edge, strongly margined and coarsely punctate (12) elytra with longitudinal rows of coarse punctures; (13) metendosternite. Scale bars: 11–13 = 0.1 mm.

Thorax. Pronotum transverse, parallel-sided, weakly converging anteriorly; PL/PW = 0.55–0.62 (0.58 ± 0.02); shiny, punctation coarse, with coarse and fine punctation (Fig. 11, black arrows); coarse punctures separated by distance of about 0.77–2.58 puncture-widths at disc, each puncture bearing one short, minute seta (barely visible even at a magnification of 150×); lateral edge with one glandular pore on the anterior angle and one on the posterior angle (Fig. 24, arrows, Fig. 25, arrows showing glandular ducts), weakly angulate around pores (Figs. 24–25) as in *X. maderi* (Figs. 27–28); pore at posterior 1/3 of lateral edges apparently absent (Figs. 24–25) (present in *X. maderi*, Fig. 28, arrow). Scutellar shield (BW 0.25 mm) subpentagonal, glabrous, bearing few punctures. Elytra with strong anterior marginal bead; EL/EW = 1.49–1.64 (1.58 ± 0.06), EL/PL = 2.82–3.2 (2.97 ± 0.18); coarsely punctate (Fig. 11, white arrow); striae with rows of coarse punctures, intervals with fine punctures (Fig. 12); coarse punctures separated by about 1.25× puncture-widths. Hind wings developed, apparently functional. Prosternum lacking keel (present in *Mycotretus*), convex and coarsely punctate; anterior edge pubescent; notosternal sutures conspicuous and entire; procoxal cavities subcircular; prosternal process abruptly expanded apically, shallowly emarginate at apex; procoxal lines not extending in front of procoxae. Mesoventrite small, coarsely punctate; mesocoxal lines barely discernible; posterior edge slightly emarginate; mesocoxal cavities suboval. Metaventrite convex, glabrous, coarsely punctate; anterior edge sinuate, strongly margined medially; metacoxal lines apparently absent; discrimen approximately 0.6× as long as metaventrite. Metendosternite (Fig. 13) well-developed, sclerotized, similar to that of other examined Tritomini (e.g. *Mycotretus*, *Triplax*, *Tritomapara* Alvarenga); laminae present, plate-like; anterior tendons thin, moderately separated. Procoxae suboval, mesocoxae almost globular and metacoxae transverse, cylindrical. Femora elongate, smooth, without spines or other outgrowths. Tibiae long, somewhat widened apically; apex with fringe of wide flat spinules. Tarsi densely pubescent beneath.

Abdomen. Elongate; punctation coarse; interspaces of punctures granulate; vestiture of sparse, slender setae. Coxal lines feeble. Length of ventrites 1–5 (in mm, from base to apex of each ventrite at the longitudinal midline): 0.39, 0.25, 0.23, 0.23, 0.32. **Male terminalia** (Figs. 14–22). Penis (Fig. 14, pen) slightly elongate and curved; basal portion with short sclerotized projection linked to apophyses; internal sac with well-developed and slightly elongate flagellum (Fig. 14, fla) that is 1.18× as long as penis, slightly sinuous, with membranous portion between virga and head of flagellum (Fig. 15, mp); head of flagellum (Fig. 15, head) sclerotized, short, with two small lobes (resembling those of *Xalpirta maderi*). Apophyses (Fig. 14, apo) 1.61× as long as penis. Tegmen sclerotized (Fig. 16); parameres reduced and sclerotized, with densely pubescent outgrowths, slightly dilated (Fig. 16, arrows). Tergite VIII (Figs. 17–18, TVIII) sclerotized, with sparsely distributed bristles. Sternite VIII (Figs. 17–18, SVIII) slightly sclerotized. Sclerite at posterior edge of tergite IX (Figs. 19–20, arrow, Fig. 21) sclerotized, narrowed and with bristles. Laterotergite IX (Figs. 17–20, LTIX) sclerotized, posteriorly elongate and pubescent; outer contours

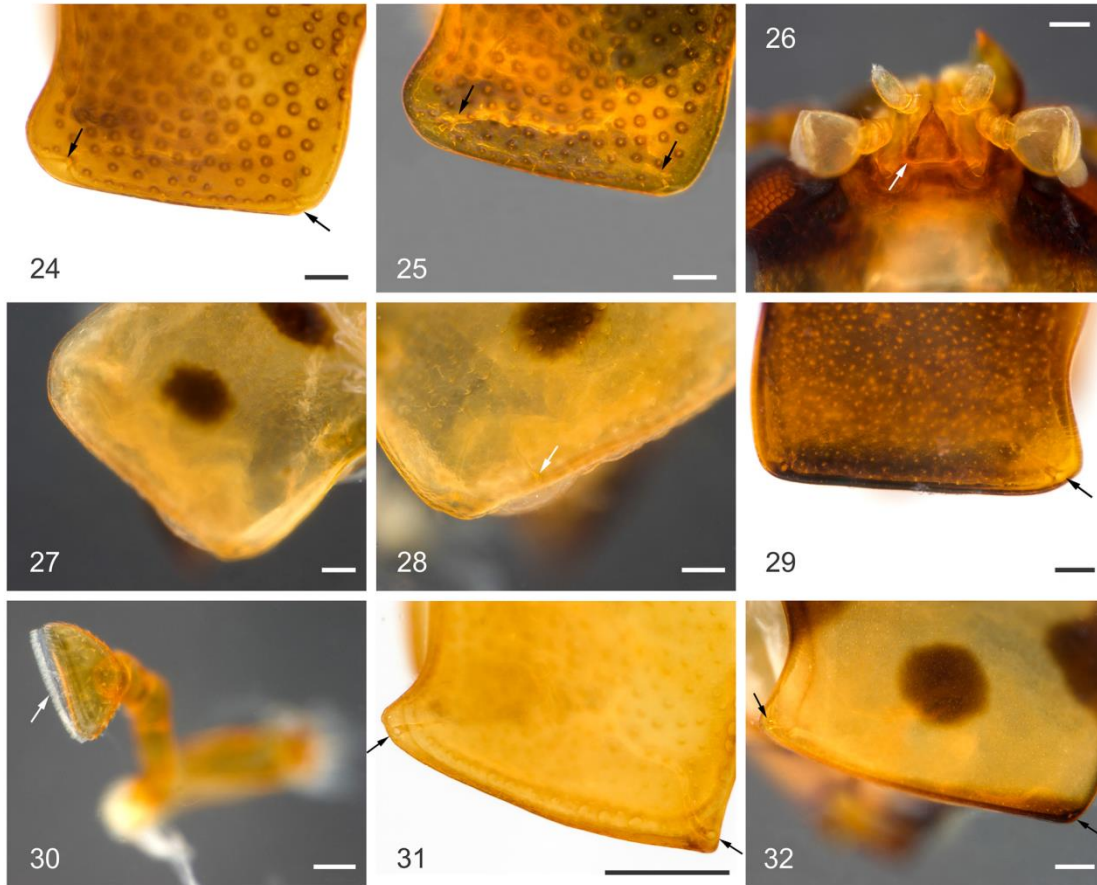
angulate; anteroventral edge with paired and subparallel lateral struts, connected at their anterior tips by small transverse, slightly sclerotized sclerite (Figs. 17–18, arrow). Posterior edge of sternite IX sclerotized; outer contour rounded (Figs. 17–20, SIX); anteriorly membranous. Tergite X (Figs. 17–20, TX, Fig. 22) sclerotized; posterior edge with sparsely distributed bristles. **Female terminalia.** Genitalia (Fig. 23) with gonostyli and gonocoxites strongly sclerotized; baculi of paraprocts sclerotized and slightly arcuate; spermatheca oval and sclerotized. Tergite VIII sclerotized, with sparsely distributed bristles. Sternite VIII with conspicuous median strut.



FIGURES 14–23. *Xalpirta mauryi* sp. nov., male and female terminalia: **14–22** male paratype *X. mauryi* sp. nov., from Parque Nacional do Itatiaia. **(14)** apophyses (apo), flagellum (fla), penis (pen); **(15)** dorsal view of anterior portion of flagellum, head of penile flagellum (h), membranous portion between virga and head segments (mp), virga of penile flagellum (v); **(16)** tegmen, arrows showing parameres. **17–22** sternite VIII, tergite VIII and genital capsule. **17–20** laterotergite IX (LTIX), sternite VIII (SVIII), sternite IX (SIX), tergite VIII (TVIII), tergite X (TX); arrow in Figure 18 showing the sclerite at the anteroventral edge of segment IX and arrow in Figure 20 showing sclerite at the posterior edge of tergite IX; **(21)** sclerite at the posterior edge of tergite IX; **(22)** tergite X. **(23)** female genitalia of a paratype from Campos do Jordão. Scale bars: 14 = 0.5 mm; 15–17, 19, 21–23 = 0.1 mm.

Type material. *Xalpirta mauryi* holotype (DZUP), (Figs. 1–5) “Coleção M. Alvarenga [printed] \ P. N. ITATIAIA 1200 m, E. Rio Janeiro Brasil [printed], 17. VII. 1962 [handwritten], H. Schubart [printed] \ DZUP 125338 [printed] \ HOLOTYPUS *Xalpirta mauryi* Pecci-Maddalena, Lopes-Andrade & Skelley [printed, red paper]”. Paratypes: 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ P. N. ITATIAIA 1200 m, E. Rio Janeiro Brasil [printed], 17. VII. 1962 [handwritten], H. Schubart [printed] \ DZUP 125337 [printed] \ PARATYPUS *Xalpirta mauryi* Pecci-Maddalena, Lopes-Andrade & Skelley [printed, yellow paper]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo Brasil, I–1969, W. Bokermann [printed] \ DZUP 125339 [printed] \ PARATYPUS *Xalpirta mauryi* Pecci-Maddalena, Lopes-Andrade & Skelley [printed, yellow paper]”; 1

female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo Brasil, V, II [handwritten]-1957 [printed], K. Lenko leg. [printed] \ 2064-C [handwritten] \ Haematoch. 006 [handwritten] \ DZUP 125343 [printed] \ PARATYPUS *Xalpirita mauryi* Pecci-Maddalena, Lopes-Andrade & Skelley [printed, yellow paper]”; 1 specimen sex undetermined (DZUP) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo Brasil, V, II [handwritten]-1957 [printed], K. Lenko leg. [printed] \ DZUP 125340 [printed] \ PARATYPUS *Xalpirita mauryi* Pecci-Maddalena, Lopes-Andrade & Skelley [printed, yellow paper]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo Brasil, V, II [handwritten]-1957 [printed], K. Lenko leg. [printed] \ 2064-B [handwritten] \ Haematoch. 006 [handwritten] \ DZUP 125344 [printed] \ PARATYPUS *Xalpirita mauryi* Pecci-Maddalena, Lopes-Andrade & Skelley [printed, yellow paper]”.



FIGURES 24–32. Morphological details of *Xalpirita mauryi* sp. nov., *Xalpirita maderi* (Delkeskamp), *Mycotretus* Lacordaire, *Triplax* Herbst and *Tritomapara* Alvarenga. **24–25** *X. mauryi* sp. nov., paratype from Parque Nacional do Itatiaia, pronotum; arrows in Figure 24 showing pores of pronotal angles and arrows in Figure 25 showing glandular ducts. **26–28** *Xalpirita maderi*, specimen from Nova Teutônia (MNRJ, see Other materials examined), **(26)** mouthparts, arrow showing the mentum; **(27)** pronotum; **(28)** pronotum, arrow showing the glandular duct of the pore at posterior 1/4 of pronotal edge. **(29)** *Tritomapara brasiliensis* (Guérin) (CELC, see Other materials examined), pronotum; arrow showing pore of anterior pronotal angle. **30–31** *Triplax russica* Herbst (MNRJ, see Other materials examined), **(30)** apical maxillary palpomere, arrow showing the “brush”; **(31)** pronotum, arrows showing pores of pronotal angles. **(32)** *Mycotretus ornatus* (Duponchel) (MNRJ, see Other materials examined), pronotum; arrows showing pores of pronotal angles. Scale bars: 24–30 = 0.1 mm; 31 = 0.5 mm; 32 = 0.2 mm.

Other materials examined. For *Xalpirita maderi*: 1 male (DZUP, dissected) “IX [handwritten] 195[printed]7[handwritten], Brasilien, Nova Teutonia, 27° 11’B . 52°23’L, Fritz Plaumann, 300–500 m [printed] \ DZUP 135130 [printed]” \ *Xalpirita maderi* (Delkeskamp, 1957) det. Pecci-Maddalena, I.S.C. 2019”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ Teodoro Sampaio, S. Paulo Brasil [printed], VIII. 1973 [handwritten], F.M. Oliveira [print-

ed] \ DZUP 125688 [printed]" \ *Xalpirta maderi* (Delkeskamp, 1957) det. Pecci-Maddalena, I.S.C. 2019" [new geographical record].

For *Tritomapara brasiliensis* (Guérin): 1 male (CELC, dissected) "Brasil: MG, Juiz de Fora "Campus UFJF; Entre FAEFID e ICB, ciclovía e caminhada"; 07.xii.2014, leg. Pecci-Maddalena, Í.S.C. & Maddalena [printed]" \ *Tritomapara brasiliensis* Guérin, 1946 det. Pecci-Maddalena, I.S.C. 2019".

For *Triplax russica* Herbst: 1 male (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Tisvilde [?] 23.5.1948 [handwritten] \ A. Sørensen, Nat. Mus. Aarh [printed]".

For *Mycotretus ornatus* (Duponchel): 1 male (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Brasil Rio de Janeiro, D.F. Corcovado [printed] 21.XI. 1957 [handwritten] Alvarenga e Seabra [printed] \ 2310 [printed] \ M. ornatus [handwritten]".

Distribution. *Xalpirta mauryi* is known from the type locality, Parque Nacional do Itatiaia (state of Rio de Janeiro, Southeast Brazil), and Campos do Jordão (state of São Paulo, Southeast Brazil) (Fig. 33).

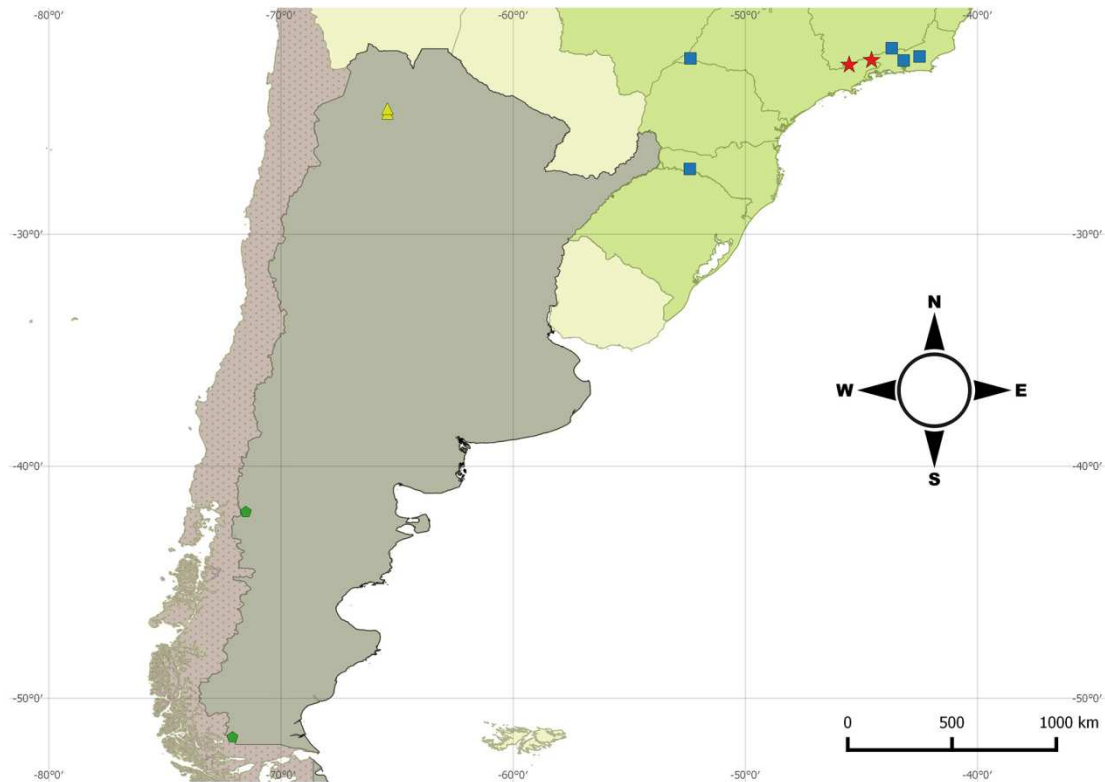


FIGURE 33. Distribution map for *Xalpirta mauryi* sp. nov. (star), *Xalpirta maderi* (Delkeskamp) (square), *Xalpirta peckorum* Skelley & Cevalovic (triangle) and *Xalpirta valdiviana* (Philippi & Philippi) (pentagon). Remaining species of *Xalpirta* occur only in Chile (dotted fill).

Discussion

Only two species of *Xalpirta* are recorded from Southeast Brazil: *X. mauryi* and *X. maderi* (Fig. 33) and, as is true for other species of the genus, *X. mauryi* occurs only in areas of high altitudes (1200 m.a.s.l.). *Xalpirta mauryi* has homogeneously green dorsal coloration, a pentagonal mentum plate, a semicircular apical maxillary palpomere and the apical labial palpomere club-shaped, and yellowish-brown legs, while in *X. maderi* the pronotum is yellowish-brown with six sub-circular black spots, the mentum plate is acutely triangular (Fig. 26, arrow), the apical maxillary and labial palpomeres are subtriangular and subcylindrical, respectively (Fig. 26), and the legs are black. However, the morphology of male genitalia, even of the penile flagellum, are very similar in *X. mauryi* and *X. maderi*. The

non-Chilean *Xalpirta* (*X. maderi* and *X. peckorum*) are similar in their body shape (with posterior portion of pronotum enlarged, and lateral edges arcuate and converging anteriorly), color pattern (pronotum yellowish-brown with free black spots, elytra black and lacking metallic luster) and mentum shape (acutely triangular), whereas *X. mauryi* most resembles the Chilean *Xalpirta* (e.g. *X. azureipennis*, *X. elsa*) in the more elongate body, conspicuous metallic elytral sheen and pentagonal mentum plate. The fully green dorsal coloration and lack of pore at posterior 1/3 of pronotal edges are diagnostic features of *X. mauryi*, not observed in other members of *Xalpirta*.

The presence of a metendosternal laminae in *X. mauryi* (Fig. 13) and *X. maderi* is similar to that observed in species of *Triplax*, *Mycotretus* (Pecci-Maddalena & Lopes-Andrade 2017) and *Tritomapara*, but it does not occur in species of *Tritoma* Fabricius (pers. obs. ISCP-M). *Mycotretus*, *Tritomapara* and some members of *Xalpirta* share a pentagonal mentum plate, but *X. maderi* and *X. peckorum*, and even other Tritomini, such as species of *Ischyryus* (Skelley 1998), have a triangular mentum. *Xalpirta* also differs from *Triplax*, *Mycotretus* and *Tritomapara* in the strongly coarse punctation, lateral pronotal edges weakly angulate around pores and angle pores “funnel-shaped”, which seem to be formed by a “retraction” of the pronotum edge (Fig. 24). The latter feature was also observed in *Tritomapara* (Fig. 29, arrow) and is conspicuously different from what is observed in *Triplax* (Fig. 31, arrows) and *Mycotretus* (Fig. 32, arrows), in which pronotal angle pores are usually located on the pronotal edge.

It is necessary to perform phylogenetic studies to solve internal relationships of *Xalpirta*, and also to understand the evolution of characters of mouthparts and other structures. A comprehensive phylogenetic study of Tritomini is also required to shed light on the relationships of *Xalpirta* and other genera in the tribe. Tritomini is the most speciose tribe within Erotylidae (Leschen *et al.* 2010) and the available phylogenetic studies of the family (Węgrzynowicz 2002; Leschen 2003; Robertson *et al.* 2004) suggest that the tribe is not monophyletic.

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Capítulo V

**An annotated and illustrated catalogue of the genus *Mycotretus* Lacordaire, 1842
(Coleoptera: Erotylidae: Erotylinae: Tritomini)¹**

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Este manuscrito não deve ser considerado como publicação válida para fins de nomenclatura zoológica, em acordo com as normas do Código Internacional de Nomenclatura Zoológica de 1999 (Capítulo 3, Artigos 8.2 e 8.3).

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ITALO SALVATORE DE CASTRO PECCI-MADDALENA^{1,2,4}, CRISTIANO LOPES-ANDRADE², PAUL SKELLEY³

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Abstract

Mycotretus Lacordaire, 1842 (Erotylidae: Erotylinae: Tritomini) is the second most speciose genus within Erotylidae and is widespread mainly in the Neotropical region. There are 246 available names in *Mycotretus*, but a number of previous taxonomic acts left it currently with 217 valid species. The accurate recognition of these species is hampered by the lack of any taxonomic revision, identification key or illustrated catalogue for *Mycotretus*. In order to circumvent this problem, and to allow further scientific studies on the genus, our main objective in this paper is to provide an illustrated catalogue for *Mycotretus* and propose the most urgent acts for promoting taxonomic stability within the genus. The present catalogue is the result of more than three years of morphological studies, careful comparisons of specimens, as well as visits and consults of scientific collections in America and Europe, searching for named specimens and types of available names of *Mycotretus*. All available names listed in the catalogue of Blackwelder (1945) are included here, together with updated information from the catalogue of Alvarenga (1994). Our main results are: (i) examination of types of 216 former available names within *Mycotretus*, including 73 types previously not located by Alvarenga (1994); (ii) lectotype designations for 156 available names of *Mycotretus* and for *Tritomapara triplacoides* (Crotch, 1876), a species originally included within *Mycotretus*; (iii) proposition of 53 new synonyms and one new combination, the latter for *M. virgatus* Kuhnt, 1910, which is transferred to *Iphiclus* Chevrolat; (iv) valid species of *Mycotretus* reduced from 217 to 177; (v) plates providing images of specimens representing 232 currently available names (210 of them being types) of the total of 245 available names (excluding *M. virgatus*) within *Mycotretus*.

Key words: pleasing fungus beetles, species inventory, Neotropical region.

Introduction

The genus *Mycotretus* Lacordaire, 1842 (Erotylidae: Erotylinae: Tritomini) currently includes 246 available names and, among these, 217 valid species, mostly from the Neotropical region (Gorham 1888; Blackwelder 1945; Alvarenga 1994; Strohecker 1997; Pecci-Maddalena & Lopes-Andrade 2017, 2018ab). It is the second most speciose genus within Erotylidae, after *Iphiclus* Chevrolat, 1836 with 284 valid species (Alvarenga 1994). Both larva and adult individuals of *Mycotretus* species feed on basidiomycete fungi, although data on their host fungi are scarce and records are too few to discuss host fungus specialization (Pecci-Maddalena & Lopes-Andrade 2018b). The taxonomy of *Mycotretus* is unclear, there is no available taxonomic revision for the genus (Pecci-Maddalena & Lopes-Andrade 2018a) and it is probably not monophyletic (Robertson *et al.* 2004).

The present catalogue is the result of more than three years of studies, as well visits and consults to scientific institutions in order to find the primary types of *Mycotretus*. Any scientific study on *Mycotretus* is hard due to its high diversity and unclear taxonomy, and this is the first major necessary step for generating nomenclatural stability and allowing the conduction of further studies on the genus. All available names listed in the catalogues of Blackwelder (1945) and Alvarenga (1994) are included here, and information on the latter is updated. The main achievements of the present catalogue are: (i) examination of types of 216 former available names within *Mycotretus*, including 73 types previously not located by Alvarenga (1994); (ii) lectotype designations for 156 available names of *Mycotretus* and for *Tritomapara triplacoides* (Crotch, 1876) a species originally included within *Mycotretus*; (iii) proposition of 53 new synonyms and one new combination, the latter for *M. virgatus* Kuhnt, 1910, which is transferred to *Iphiclus* Chevrolat; (iv) valid species of *Mycotretus* reduced from 217 to 177; (v) plates providing images of specimens representing 232 available names (210 of them being types) of the total of 245 available names within *Mycotretus*.

Taxonomic history of the genus *Mycotretus* Lacordaire, 1842

The first described members of *Mycotretus* were originally placed under *Erotylus* Fabricius, 1775, as follows: *Erotylus maculatus* Olivier, 1792 and *E. tigrinus* Olivier, 1792, from Suriname; and *E. Conspersus* Germar, 1824, *E. humeralis* Germar, 1824 and *E. ocellatus* Germar, 1824, from Brazil. After these works, Duponchel (1825) published the “monographie du genre Erotyle”, containing almost all Erotylinae as presently interpreted (Węgrzynowicz

2002), and described ten *Erotylus* species (currently *Mycotretus*). Ten years after Duponchel's work, Chevrolat (1835) described *Erotylus lesueuri* from Mexico. The name *Mycotretus* was originally proposed by Dejean (1836) and its authorship was attributed to Chevrolat. In that work, 49 species names of *Mycotretus* are cited, but without descriptions or diagnoses for the genus and its species. Dejean's catalogue were simply checklists of his collection in which many generic and specific names were presented. Because Dejean names lacked descriptions, they were often disregarded as valid names by early taxonomists (Skelley 1998a). In 1841, Guérin-Méneville described *Erotylus (Brachymerus) cinctellus*, *Erotylus (Brachymerus) sobrinus* and *Erotylus (Mycotretus Chevr.) fallax*, the latter case using the name *Mycotretus* as a subgroup of *Erotylus*.

Jean Théodore Lacordaire (1801–1870) – on his historical monograph of the Erotylidae world fauna (1842) – was the first author to provide a description for *Mycotretus*, describing and including within this genus about half of the *Mycotretus* mentioned by Dejean (1836), most of its *Lybas* Chevrolat and a few *Brachymerus* Chevrolat listed by him. However, it is worth to note that Lacordaire did not designate any type species for *Mycotretus*, which was made posteriorly by Boyle (1956) that designated *Mycotretus lesueuri* (Chevrolat, 1835) as generotype. Today, the authorship of *Mycotretus* is attributed to Lacordaire and the validity of *M. lesueuri* as the type species of the genus is supported by the International Code of Zoological Nomenclature (see Skelley & Goodrich 1994; ICZN 1996; Pecci-Maddalena & Lopes-Andrade 2017). Lacordaire (1842) also described several new species, originally pertaining to many early collections (e.g. those from Buquet, Dejean, Dupont, Reiche etc). Aside from that, Lacordaire moved many previously described species into *Mycotretus* (for instance, the aforementioned “*Erotylus*”) and, in total, he recognizes 90 species of *Mycotretus*, 32 from Brazil, 22 from Cayenne (French Guiana), one from Bolivia, 27 from Colombia and eight from Mexico (Lacordaire 1842: 133).

Lacordaire also proposed a subgeneric classification for *Mycotretus* and split the genus into two, as follows: (i) the first division (containing 89 species), of species with antennal club of four antennomeres, subdivided into the groups “A” (“Menton coupé plus ou moins obliquement de chaque côté de son bord antérieur.”, Lacordaire (1842: 134)) and “B” (“Menton arrondi à son bord antérieur.”, Lacordaire (1842: 163)). Each of these groups was, in turn, split into two other ones based on the expansion of the apical maxillary palpomere (i.e. very expanded or slightly expanded); (ii) the second division included just one species (*Mycotretus tesserarius* Lacordaire, 1842) with antennal club of three antennomeres. Despite his purpose, Lacordaire stated that the inclusion of this latter species in *Mycotretus* was controversial: “(...) Dans une seule espèce (*M. tesserarius*), que je n'ai pas cru devoir pour

cela rejeter du genre, la massue ne se compose que de trois articles transversaux, et ressemble par conséquent à celle des *Ischyurus*. Cette différence ne m'a pas paru suffire pour la création d'un genre. (...)”. Lacordaire’s divisions would be noteworthy as being the first attempt of classifying *Mycotretus* species, although his idea was not followed by any posterior author. For instance, according to Crotch (1876: 145): “Lacordaire has divided this genus into two sections according to the shape of the mentum, but I find this very difficult to ascertain: he is certainly in error in many cases.”.

Soon after Lacordaire’s monograph had been published, the following authors included species in *Mycotretus*: Guérin-Ménéville (1844), Fauvel (1860), Kirsch (1865), each one describing a single species; Taschenberg (1870), six new species; Crotch (1873), one species; and Kirsch (1876), three species. Chevrolat (1843) transferred *Tritoma fasciatus* Fabricius, 1801 to *Mycotretus*, and due to that act, Alvarenga (1994) listed that species under *Mycotretus* on his catalogue. However, it belongs to the genus *Epopteris* Chevrolat, 1844 (Coleoptera: Endomychidae) and, therefore, should not be accounted in the number of available names within *Mycotretus* (see Blackwelder 1945; Alvarenga 1994; Strohecker 1997).

After Lacordaire, the two authors who described more species of *Mycotretus* were George Robert Crotch (1841–1874) and Henry Stephen Gorham (1839–1920). The former built his Erotylidae collection by donation, exchange, or purchase, but in 1874 (due to a tuberculosis contracted in the United States) he died before seeing his major manuscript “A Revision of the Coleopterous Family Erotylidae” published. Therefore, in 1876, the Crotch’s work was posthumously published by E. W. Janson (Skelley 1998b). In that work – in fact a catalogue of all species known by that time, with descriptions of new taxa (Węgrzynowicz 2002) – several new species of *Mycotretus* were described, making Crotch the second author to describe the greatest number of *Mycotretus* in a single work (surpassed only by Lacordaire). Few years after Crotch’s revision, Gorham (1888) publishes his seventh volume of “Biologia Centrali-Americana”, which was the third study to describe a great number of *Mycotretus* and one of the major contributions for the knowledge of the Central American erotylids.

Through the 20th century, few *Mycotretus* descriptions were made by the following authors: Arrow (1909), Kuhnt (1909, 1910, 1911), Casey (1916), Deelder (1942), Mader (1940, 1942, 1955), Guérin (1949ab, 1956), Boyle (1954), Delkeskamp (1939, 1957) and Alvarenga (1983, 1989). After Alvarenga (1989), no species was included in the genus until recently, when *Mycotretus alvarengai* Pecci-Maddalena & Lopes-Andrade, 2018 was described from North Brazil. That description was based on a single adult male, originally from the private collection of the late Moacyr Alvarenga (1915–2010), and the species name

was a tribute to his important contributions to the knowledge on Neotropical Erotylidae, including the “Catalogue of Neotropical Erotylidae” (Alvarenga 1994), as well a valuable collection of hundreds of worldwide erotylids, spread in Brazilian museums after his death (Pecci-Maddalena & Lopes-Andrade 2018a).

Material and Methods

Acronyms of scientific collections

ANSP	Academy of Natural Sciences (Philadelphia, USA)
BMNH	The Natural History Museum (London, United Kingdom)
CAMB	Coleção Ayr de Moura Bello (Rio de Janeiro, Brazil)
CELC	Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera (Viçosa, Brazil)
DZUP	Coleção Entomológica Padre Jesus Santiago Moure, Universidade Federal do Paraná (Curitiba, Brazil)
IFML	Fundacion Miguel Lillo (Tucuman, Argentina)
MACN	Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” (Buenos Aires, Argentina)
MCNZ	Fundação Zoobotânica do Rio Grande do Sul (Porto Alegre, Brazil)
MFN	Museum für Naturkunde Berlin (Berlin, Germany)
MIZ	Museum and Institute of Zoology Polish Academy of Sciences (Warsaw, Poland)
MNHN	Muséum National d’Histoire Naturelle (Paris, France)
MNRJ	Museu Nacional (Universidade Federal do Rio de Janeiro, Brazil)
MRSN	Museo Regionale di Scienze Naturali (Torino, Italy)
MZSP	Museu de Zoologia, Universidade de São Paulo (São Paulo, Brazil)
NMBS	Naturhistorisches Museum Basel (Basel, Switzerland)
NMNH	National Museum of Natural History (Washington, USA)
RBINS	Royal Belgian Institute of Natural Sciences (Brussels, Belgium)
RMNH	Naturalis Nationaal Natuurhistorische Museum (Leiden, Netherlands)
SDEI	Senckenberg Deutsches Entomologisches Institut (Müncheberg, Germany)
SNSD	Staatliche Naturhistorische Sammlungen (Dresden, Germany)
UMZC	University Museum of Zoology Cambridge (Cambridge, UK)

ZMUC	Zoological Museum, University of Copenhagen (Copenhagen, Denmark)
ZNS	Zentralmagazin Naturwissenschaftlicher Sammlungen (Halle, Germany)
ZSBS	Zoologische Sammlung des Bayerischen Staates (München, Germany)

Format of the catalogue

Text and figures are organized in alphabetical order first by author surname (preceded by roman algarisms) and then by the name of valid species (preceded by arabic algarisms). Whenever possible, a specimen of the type series representing each available name was photographed and shown in plates (Figs. 2–40). When the type was not located, or the available image was not in a resolution suitable for publication, an image of another named specimen was used. Each plate contains six or seven images of specimens in dorsal view, marked with letters (A–F or A–G), and under those their respective labels marked with letters followed by an apostrophe (e.g. Fig. 1A'–F'). Such a format was chosen to facilitate our work and make easier any search by author name.

Transcription of labels and dissection of specimens followed Pecci-Maddalena and Lopes-Andrade (2017). Terms for external morphology follow Lawrence *et al.* (2011) and McHugh *et al.* (1997), and those for color pattern follow Skelley (1998a). The “penile flagellum” refers to a male genitalia structure with two interconnected elements: “head” and “virga” (Węgrzynowicz 2002; Pecci-Maddalena & Lopes-Andrade 2018ab). In the present work, the penile flagellum was an important morphological feature used to separate species and, whenever possible, it was used for supporting propositions of new synonyms. Only three primary types (the holotypes of *M. tucuruensis* Alvarenga, 1983, *M. bistrioculatus* Alvarenga 1983 and *M. lopesi* Alvarenga, 1989) had to be dissected. All other primary types were left intact, and paratypes, paralectotypes and other named specimens compared with types were dissected. The majority of dissected specimens belong to the collection of the late Moacyr Alvarenga, housed in the MNRJ and DZUP.

Photography methods for Figures 2, 3A, 13A, 13E, 26C, 26E, 28A, 29B, 30B, 31E, 32D, 33F–G, 36A, 39E, 39G, 40A, 40E followed Pecci-Maddalena & Lopes-Andrade (2017). Other specimens were photographed in the institutions where they are housed, under the available conditions, which were not always ideal. For instance, the MRSN was closed to the public, due to an accidental explosion in 2013 (Andreone *et al.* 2014), by the time the senior author visited it and he had only a few hours there for locating, photographing and labeling specimens. It was not possible to visit the institutions ANSP, IFML, MCNZ, MFN, MIZ,

NMBS, NMNH, RBINS, RMNH, SDEI, SNSD, ZNS and ZSBS and, in these cases, their curators generously made available images of specimens or sent borrowed specimens to us (MCNZ). Therefore, it was not possible to standardize photographic techniques, equipments and conditions, and thus image quality in plates are very variable and, unfortunately, in some cases it was not possible to include a scale bar (e.g. Fig. 25).

All available names of *Mycotretus* mentioned in the catalogues of Alvarenga (1994) and Blackwelder (1945) are listed here, including valid names and synonyms. Exceptions to this rule are the following: (i) *Mycotretus fasciatus* (Fabricius, 1801), which was incorrectly listed in *Mycotretus* by Alvarenga (1994: 25) but is indeed an Endomychidae (Strohecker 1997: 166), type in ZMUC (images made available by curator); (ii) the invalid names “*Mycotretus bruchi* Bruch, 1915” and “*M. unguicularis* Bruch, 1915” listed under *Mycotretus* by Blackwelder (1945). Bruch (1915) has mentioned those names followed by the statement “Kuhnt, in litteris”, without description or diagnosis. Kuhnt has never formally described these species and, therefore, *M. bruchi* and *M. unguicularis* are considered to be *nomen nudum*. Images of specimens of the Kuhnt collection housed in the MFN and the Bruch collection in MACN identified as “*M. bruchi* Kuhnt” there, were made available to us. Those specimens are, indeed, *M. trifasciatus* Guérin, 1956.

A lectotype is designated for species clearly based on syntypes, but also in the cases when a single specimen was located, and the author of the species name did not state whether there was one or more specimens in the type series. A specimen was considered to be the holotype only when the author clearly stated the description was based on a single specimen. In most cases, a red label was placed on the specimen chosen to be the lectotype. Most specimens were labeled by us, but in a few cases we had to ask for curators to label the specimens. Species originally described in *Mycotretus* but currently included in other genera were not listed in the present catalogue, except for *Tritomapara triplacoides* (Crotch, 1876), for which the lectotype is designated here for nomenclatural stability.

In the present work all species originally treated as “varieties” by early authors (Blackwelder 1945; Alvarenga 1994) were considered to be “subspecies” according to the International Code of Zoological Nomenclature (ICZN) (Article 45.6.4) “(...) it is subspecific if first published before 1961 and its author expressly used one of the terms “variety” or “form” (including use of the terms “var.”, “forma”, “v.” and “f.”), unless its author also expressly gave it infrasubspecific rank, or the content of the work unambiguously reveals that the name was proposed for an infrasubspecific entity, in which case it is infrasubspecific [see also Art. 45.6.1]”. Two species shown on the plates here were originally treated as “aberrations” (or “ab”) by Mader (1942): ab. *luteobifasciatus* (aberration of *M.*

quadripunctatus Crotch, 1876, Fig. 38C) and ab. *posticenigrum* Mader, 1942 (aberration of *M. opalizans* Mader, 1942, Fig. 38F). According to the ICZN (Article 45.6.2) “(...) it is deemed to be infrasubspecific if its author used one of the terms "aberration", "ab." or "morph", but also see the ICZN Glossary “**aberration**, *n.* (...) A name which explicitly refers to an aberration unequivocally treated as an infrasubspecific entity (*q.v.*) is unavailable”. Images of those two specimens are included here just to illustrate their phenotypic variation.

Format of Species Accounts

Heading: contains the species name considered to be available in the catalogue of Alvarenga (1994).

Subheading: Includes bibliographic citation of the original description and type locality, previous or new synonyms and combinations when applicable. The page of the catalogue of Alvarenga (1994) is also included, where the species name is mentioned and, when applicable, works published posteriorly to his catalogue were also cited. Complete bibliographic citations are available in Alvarenga (1994) and are not repeated here.

Type: The acronym of the type depository is indicated, followed by its figure number and label data. When the type was not located, we clearly state it and, whenever possible, provide an image of a non-type specimen. These “non-type” specimens were identified based on their original descriptions, early redescriptions or comparisons with series of specimens from several museums. In a few cases, when the available images of primary types were in a poor resolution, we have preferred to show images of “non-type” specimens (e.g. Figs. 40A and 40E). When neither primary type nor any other named specimen was available (for instance, some of Lacordaire’s types, see below) we just repeated the information provided by Alvarenga (1994).

Other examined specimens. Label data of type series, historical material and dissected specimens are listed. Label data of lectotypes or holotypes of previous or new synonyms are also included, as well as their figure numbers here and acronyms of depositories. We have not included label data of all individuals examined by us, because that would exceed the scope of this work.

Distribution. Distribution data follows mostly Alvarenga (1994), but information is added or updated based on label data of specimens.

Remarks. Comments on morphological affinities of species within *Mycotretus*, historical information and general taxonomic notes.

Locating types

The works of Horn *et al.* (1990, volumes 1–2), Alvarenga (1994) and Skelley (1998ab, 2009) were consulted for locating type material. Type specimens of the majority of American Erotylidae are located in four scientific institutions: MNHN; the Crotch Erotylidae Collection housed in UMZC; BMNH; and MRSN (Skelley 1998a, 2009). A minor number of type specimens are deposited in other museums (see above the list of depositories of type material).

Many erotylids studied by Duponchel (1825) and Lacordaire (1842) came from the Dejean collection and, currently, most of those specimens are housed in the MNHN, MRSN and UMCZ. In fact, we found syntypes of almost all species studied by Duponchel and Lacordaire in those institutions, except for a few specimens, like those originally from the Buquet collection (see Lacordaire 1842), which were not located by us. Many of Lacordaire's species were also from the Dupont collection. Skelley (1994) pointed out: “Horn & Kahle indicate that the Dupont collection was divided with some of the material being deposited in the collections of G. V. Mniszech and R. Oberthur” (MNHN). In fact, specimens of *Mycotretus* labeled “Type” were found on those latter two collections and their morphology and label data matched information cited in the original descriptions, supporting they belong to the type series.

Results

Comparisons with the Catalogue of Alvarenga (1994)

Since the publication of Alvarenga's catalogue until the present work, the number of valid species included in *Mycotretus* has remained the same, despite recent additions or exclusions of species from the genus, as follows: *Mycotretus bicinctus* Guérin, 1949 was synonymized with *M. chilensis* Crotch, 1876 and *M. multimaculatus* Taschenberg, 1870 with *M. tigrinus* (Olivier, 1792) (Pecci-Maddalena & Lopes-Andrade 2017, 2018b); *M. peruvianus* (Kirsch, 1876) was included in the genus (Skelley & Powell 2018); and *M. alvarengai* Pecci-Maddalena & Lopes-Andrade, 2018 was described recently (Pecci-Maddalena & Lopes-

Andrade 2018b). Except for the aforementioned “*Mycotretus fasciatus*” (Fabricius, 1801), two Mader “aberrations” and three homonyms (*M. dimidiatus* Crotch, 1876; *M. parallelus* (Kuhnt, 1909); *M. bicolor* Kirsch, 1876), Alvarenga (1994) lists a total of 244 available names under *Mycotretus* (Table 1). Taking into account the species exclusion proposed here (*Mycotretus virgatus* Kuhnt, 1910) and recent additions to the genus (see Skelley & Powell 2018; Pecci-Maddalena & Lopes-Andrade 2018a), there are currently 245 available names in *Mycotretus*. Among these, representatives of 232 were located by us and their images are shown on plates. Representatives of 12 species names were not examined by us, but are cited below. The type of the name *M. leopardus* Crotch, 1876 (junior synonym of *M. tigrinus* (Olivier, 1792), see below) was examined by us (UMZC) but images are not available.

Alvarenga (1994) lists 217 valid names and 27 names under these species (synonyms or “varieties”), while here the number of valid names was reduced to 177 due to 53 new junior synonyms and one species excluded from the genus (Table 1). We examined 216 types (Table 1), 73 more than Alvarenga (1994), who indicated that the repositories of most of Duponchel and Lacordaire types are unknown. We believe Alvarenga has not examined the Brême collection in the MRSN, where several Dejean specimens described by Duponchel and Lacordaire are housed, and although he has studied the MNHN collections, he has probably not identified most of the Lacordaire specimens housed in the Oberthur collection of the MNHN. Other types not examined by Alvarenga, and located by us, are those from Taschenberg (1870) (Fig. 40) housed in the ZNS (Horn *et al.* 1990). Alvarenga (1994) has not designated lectotypes, but he has probably labeled a few specimens from the MNHN as “lectotype” (see below). Before the present work, there were only four lectotype designations for *Mycotretus* species: *M. chilensis* Crotch, 1876, *M. centralis* Arrow, 1909, *M. multimaculatus* Taschenberg, 1870, *M. leopardus* Crotch, 1876 (Pecci-Maddalena & Lopes-Andrade 2017, 2018b). Here we designated lectotypes for 156 species names (Table 1).

Taxonomic synopsis

Order Coleoptera

Series CUCUJIFORMIA

Superfamily Cucujoidea Latreille, 1802

Family Erotylidae Latreille, 1802

Subfamily Erotylinae Latreille, 1802

Tribe Tritomini Curtis, 1834

Genus *Mycotretus* Lacordaire, 1842

Mycotretus adalioides Crotch, 1876 (Fig. 4A, VI. 13)

Mycotretus aegrotus Gorham, 1888 (Fig. 14E, XII. 81)

Mycotretus alvarengai Pecci-Maddalena & Lopes-Andrade, 2018 (Fig. 39G, XXI. 239)

Mycotretus ambulator Lacordaire, 1842 (Fig. 26D, XVIII. 153)

Mycotretus anchoralis Guérin, 1956 (Fig. 21D, XIII. 122)

Mycotretus antesignatus Mader, 1942 (Fig. 38A, XIX. 229)

Mycotretus apicalis Lacordaire, 1842 (Fig. 26E, XVIII. 154)

Mycotretus gemmula Lacordaire, 1842 **syn. n.**

Mycotretus gentilis Lacordaire, 1842 **syn. n.**

Mycotretus nigroterminatus Lacordaire, 1842 **syn. n.**

Mycotretus pulicarius Lacordaire, 1842 **syn. n.**

Mycotretus coccinelloides Taschenberg, 1870 **syn. n.**

Mycotretus arcuatus Lacordaire, 1842 (XVIII. 155)

Mycotretus argus Lacordaire, 1842 (Fig. 26F, XVIII. 156)

Mycotretus atricaudatus Gorham, 1888 (Fig. 15A, XII. 83)

Mycotretus badius Gorham, 1888 (Fig. 15B, XII. 84)

Mycotretus balteatus Crotch, 1876 (Fig. 4B, VI. 14)

Mycotretus bicolor Taschenberg, 1870 (Fig. 40A, XXII. 240)

Mycotretus monrosi Guérin, 1949 **syn. n.**

Mycotretus bicoloratus Kuhnt, 1911 (Fig. 23E, XVII. 136)

Mycotretus bipunctatus Gorham, 1888 (Fig. 15C, XII. 85)

Mycotretus bistrigatus Lacordaire, 1842 (Fig. 27A, XVIII. 157)

Mycotretus bistrioculatus Alvarenga, 1983 (Fig. 2A, I. 1)

Mycotretus brasiliensis Crotch, 1876 (Fig. 4E, VI. 17)

Mycotretus brevis Gorham, 1888 (Fig. 15D, XII. 86)

Mycotretus centralis Arrow, 1909 (Fig. 3B, II. 8)

Mycotretus cercyonoides Gorham, 1888 (Fig. 15E, XII. 87)

Mycotretus chilensis Crotch, 1876 (Fig. 4F, VI. 18)

Mycotretus bicinctus Guérin, 1949a

Mycotretus cinctiger Crotch, 1876 (Fig. 5B, VI. 20)

Mycotretus luizi Alvarenga, 1983 **syn. n.**

Mycotretus tucuruensis Alvarenga, 1983 **syn. n.**

Mycotretus clitelliger Lacordaire, 1842 (Fig. 27B, XVIII. 158)

Mycotretus coccidulinus Gorham, 1888 (Fig. 15F, XII. 88)

Mycotretus coccineus (Lacordaire, 1842) (Fig. 27C, XVIII. 159)

Mycotretus unicolor Fauvel, 1860 **syn. n.**

Mycotretus sanguinosus Crotch, 1876 **syn. n.**

Mycotretus coelestinus Lacordaire, 1842 (Fig. 27D, XVIII. 160)

Mycotretus consanguineus Gorham, 1888 (Fig. 16A, XII. 89)

Mycotretus corallipennis Crotch, 1876 (Fig. 5C, VI. 21)

Mycotretus cordiger Crotch, 1876 (Fig. 5D, VI. 22)

Mycotretus zischkai Delkeskamp, 1957 **syn. n.**

Mycotretus cribratus Gorham, 1888 (Fig. 16B, XII. 90)

Mycotretus cruciger Crotch, 1876 (Fig. 5E, VI. 23)

Mycotretus crudus Gorham, 1888 (Fig. 16C, XII. 91)

Mycotretus cruentus Gorham, 1888 (Fig. 16D, XII. 92)

Mycotretus cunctans Mader, 1942 (Fig. 38B, XIX. 230)

Mycotretus cyanopterus Lacordaire, 1842 (Fig. 27F, XVIII. 162)

Mycotretus decoratus (Duponchel, 1825) (Fig. 13B, IX. 69)

Mycotretus decorus Crotch, 1876 (Fig. 5F, VI. 24)

Mycotretus deyrollei Crotch, 1876 (Fig. 6A, VI. 25)

Mycotretus discipennis discipennis Kuhnt, 1910 **syn. n.**

Mycotretus discipennis conductus Kuhnt, 1910 **syn. n.**

Mycotretus sexlineatus Kuhnt, 1910 **syn. n.**

Mycotretus dichrous Kirsch, 1876 (Fig. 22F, XVI. 131)

Mycotretus dimidiatus Taschenberg, 1870 (Fig. 40C, XXII. 242)

Mycotretus distigma Lacordaire, 1842 (Fig. 28B, XVIII. 164)

Mycotretus distinguendus Arrow, 1909 (Fig. 3C, II. 9)

Mycotretus dorsofasciatus Lacordaire, 1842 (Fig. 28C, XVIII. 165)

Mycotretus nugator Lacordaire, 1842 **syn. n.**

Mycotretus dorsonotatus Lacordaire, 1842 (Fig. 28D, XVIII. 166)

Mycotretus alternans Gorham, 1888 **syn. n.**

Mycotretus quadristriolatus Kuhnt, 1910 **syn. n.**

Mycotretus durius Lacordaire, 1842 (Fig. 28F, XVIII. 168)

Mycotretus dytiscoides Lacordaire, 1842 (Fig. 29A, XVIII. 169)

Mycotretus egae Crotch, 1876 (Fig. 6C, VI. 26)

Mycotretus basalis Crotch, 1876 **syn. n.**

Mycotretus elegans Gorham, 1888 (Fig. 16E, XII. 93)
Mycotretus episcaphoides Crotch, 1876 (Fig. 6D, VI. 27)
Mycotretus episcopalis Lacordaire, 1842 (Fig. 29B, XVIII. 170)
Mycotretus eopterus Gorham, 1888 (Fig. 16F, XII. 94)
Mycotretus erraticus Gorham, 1898 (Fig. 17A, XII. 95)
Mycotretus expressus Kuhnt, 1910 (Fig. 24C, XVII. 140)
Mycotretus fallax (Guérin-Méneville, 1841) (Fig. 22C, XIV. 127)
Mycotretus fasciolatus Lacordaire, 1842 (Fig. 29C, XVIII. 171)
Mycotretus fascipennis Kuhnt, 1910 (Fig. 24D, XVII. 141)
Mycotretus fidelis Delkeskamp, 1939 (Fig. 12C, VIII. 64)
Mycotretus flavomarginatus Lacordaire, 1842 (Fig. 29E, XVIII. 173)
 Mycotretus major Mader, 1955 **syn. n.**
Mycotretus floriger Lacordaire, 1842 (Fig. 29F, XVIII. 174)
Mycotretus fulviceps Crotch, 1876 (Fig. 6E, VI. 28)
Mycotretus fulvilabris Crotch, 1876 (Fig. 6F, VI. 29)
 Mycotretus rastratus Crotch, 1876 **syn. n.**
Mycotretus fuscitarsis Lacordaire, 1842 (Fig. 30A, XVIII. 175)
Mycotretus geminus Gorham, 1888 (Fig. 17B, XII. 96)
Mycotretus guatemalae Crotch, 1876 (Fig. 7A, VI. 30)
Mycotretus haemapterus Gorham, 1888 (Fig. 17C, XII. 97)
Mycotretus haematicus Gorham, 1888 (Fig. 17D, XII. 98)
Mycotretus hepaticus Lacordaire, 1842 (Fig. 31A, XVIII. 181)
Mycotretus hilaris Lacordaire, 1842 (Fig. 31B, XVIII. 182)
 Mycotretus aestuans Lacordaire, 1842 **syn. n.**
Mycotretus hirudo Gorham, 1888 (Fig. 17E, XII. 99)
Mycotretus humeralis (Germar, 1824) (XI. 79)
Mycotretus humilis Lacordaire, 1842 (XVIII. 183)
Mycotretus illustris Crotch, 1876 (Fig. 7B, VI. 31)
Mycotretus incarnatus Gorham, 1888 (Fig. 17F, XII. 100)
Mycotretus interstictus Gorham, 1888 (Fig. 18A, XII. 101)
 Mycotretus interstitialis Kuhnt, 1910 **syn. n.**
Mycotretus jocosus Lacordaire, 1842 (Fig. 31D, XVIII. 185)
Mycotretus laccophilinus Gorham, 1888 (Fig. 18B, XII. 102)
Mycotretus lacertosus Lacordaire, 1842 (Fig. 31E, XVIII. 186)
Mycotretus laeviventris Crotch, 1876 (Fig. 7C, VI. 32)

Mycotretus lepidus Lacordaire, 1842 (Fig. 31F, XVIII. 187)
Mycotretus graniformis Lacordaire, 1842 **syn. n.**
Mycotretus chontalesi Crotch, 1873 **syn. n.**
Mycotretus leprosus Lacordaire, 1842 (Fig. 32A, XVIII. 188)
Mycotretus lesueuri (Chevrolat, 1835) (Fig. 3F, V. 12)
Mycotretus savignyi Lacordaire, 1842 **syn. n.**
Mycotretus limbatus (Lacordaire, 1842) (Fig. 32B, XVIII. 189)
Mycotretus lissomoides Crotch, 1876 (Fig. 7D, VI. 34)
Mycotretus luteipes Lacordaire, 1842 (Fig. 32C, XVIII. 190)
Mycotretus luteolus Gorham, 1888 (Fig. 18C, XII. 103)
Mycotretus maculatus (Olivier, 1792) (Fig. 39E, XX. 237)
Mycotretus figuratus Lacordaire, 1842
Mycotretus mutabilis Crotch, 1876 **syn. n.**
Mycotretus magus Lacordaire, 1842 (Fig. 32D, XVIII. 191)
Mycotretus marginicollis Lacordaire, 1842 (Fig. 32E, XVIII. 192)
Mycotretus melanophthalmus (Duponchel, 1825) (Fig. 13D, IX. 71)
Erotylus (Brachymerus) cinctellus Guérin-Méneville, 1841 **syn. n.**
Mycotretus discoidalis Taschenberg, 1870 **syn. n.**
Mycotretus melanopterus Lacordaire, 1842 (Fig. 32F, XVIII. 193)
Mycotretus xanthosomus Lacordaire, 1842
Mycotretus melanotus Gorham, 1888 (Fig. 18D, XII. 104)
Mycotretus miniatus Lacordaire, 1842 (Fig. 33B, XVIII. 195)
Mycotretus minutus (Duponchel, 1825) (Fig. 13E, IX. 72)
Mycotretus quadrinus Lacordaire, 1842
Mycotretus misellus Lacordaire, 1842 (Fig. 33C, XVIII. 196)
Mycotretus mycetophagoides mycetophagoides Crotch, 1876 (Fig. 7F, VI. 36)
Mycotretus mycetophagoides erythrocerus Crotch, 1876 (Fig. 8A, VI. 37)
Mycotretus mycetophiloides mycetophiloides Crotch, 1876 (Fig. 8B, VI. 38)
Mycotretus mycetophiloides careus Crotch, 1876 (Fig. 8C, VI. 39)
Mycotretus nigricollis Gorham, 1888 (Fig. 18E, XII. 105)
Mycotretus nigripes Gorham, 1888 (Fig. 18F, XII. 106)
Mycotretus nigrivittis Lacordaire, 1842 (Fig. 33D, XVIII. 197)
Mycotretus nigromaniscatus Boyle, 1954 (Fig. 3D, III. 10)
Mycotretus nitescens Crotch, 1876 (Fig. 8E, VI. 41)
Mycotretus normalis Gorham, 1888 (Fig. 19A, XII. 107)

Mycotretus noterinus Gorham, 1888 (Fig. 19B, XII. 108)
Mycotretus ocellatus ocellatus (Germar, 1824) (XI. 80)
 Erotylus duodecimguttatus Duponchel, 1825
Mycotretus ocellatus consociatus Kuhnt, 1910 (XVII. 146)
Mycotretus octoculatus Alvarenga, 1983 (Fig. 2E, I. 5)
Mycotretus opalescens Crotch, 1876 (Fig. 8F, VI. 42)
 Mycotretus pelliciens Kirsch, 1876 **syn. n.**
Mycotretus opalizans Mader, 1942 (Fig. 38E, XIX. 232)
Mycotretus oppositipunctum Gorham, 1888 (Fig. 19C, XII. 109)
Mycotretus ornatus (Duponchel, 1825) (Fig. 14A, IX. 74)
 Mycotretus cognatus Lacordaire, 1842 **syn. n.**
 Erotylus coronatus Duponchel, 1825 **syn. n.**
 Mycotretus difficilis Lacordaire, 1842 **syn. n.**
 Mycotretus dispar Taschenberg, 1870 **syn. n.**
 Mycotretus dubius Lacordaire, 1842 **syn. n.**
 Mycotretus godarti Lacordaire, 1842
 Mycotretus graphoderus Lacordaire, 1842 **syn. n.**
 Mycotretus graphoderus strigipennis Kuhnt, 1910 **syn. n.**
 Mycotretus graphoderus thoracicus Kuhnt, 1910 **syn. n.**
 Mycotretus intermedius Lacordaire, 1842 **syn. n.**
 Erotylus maculosus Duponchel, 1825
 Mycotretus melanostictus Lacordaire, 1842
 Erotylus nigropunctatus Duponchel, 1825 **syn. n.**
 Mycotretus ornatus partialis Deelder, 1942 **syn. n.**
 Mycotretus partialis Mader, 1940 **syn. n.**
 Mycotretus posticus Lacordaire, 1842 **syn. n.**
 Erotylus puncticolis Duponchel, 1825 **syn. n.**
 Mycotretus terminalis Lacordaire, 1842
Mycotretus pallidior (Crotch, 1876) (Fig. 9A, VI. 43)
 Mycotretus nigrotinctus Crotch, 1876
Mycotretus palmiphilus Lacordaire, 1842 (Fig. 34A, XVIII. 201)
Mycotretus panamanus Gorham, 1888 (Fig. 19D, XII. 110)
Mycotretus parallelus Crotch, 1876 (Fig. 9B, VI. 44)
Mycotretus partitus Lacordaire, 1842 (Fig. 34B, XVIII. 202)
Mycotretus pebasensis Crotch, 1876 (Fig. 9C, VI. 45)

Mycotretus pecari Lacordaire, 1842 (Fig. 34C, XVIII. 203)

Mycotretus bisseptemguttatus Crotch, 1876 **syn. n.**

Mycotretus quattuordecimguttatus quattuordecimguttatus Lacordaire, 1842 **syn. n.**

Mycotretus quattuordecimguttatus conjunctus Crotch, 1876 **syn. n.**

Mycotretus peruae Crotch, 1876 (Fig. 9D, VI. 46)

Mycotretus peruvianus (Kirsch, 1876) (Fig. 23B, XVI. 133)

Mycotretus pictopiceus Gorham, 1888 (Fig. 19E, XII. 111)

Mycotretus planus Gorham, 1888 (Fig. 19F, XII. 112)

Mycotretus polyophthalmus Lacordaire, 1842 (Fig. 34D, XVIII. 204)

Mycotretus prioteloides Mader, 1942 (Fig. 39B, XIX. 234)

Mycotretus psittacus Lacordaire, 1842 (Fig. 34E, XVIII. 206)

Mycotretus psylloboroides Crotch, 1876 (Fig. 9E, VI. 47)

Mycotretus pulchellus Lacordaire, 1842 (Fig. 34F, XVIII. 207)

Mycotretus puncticeps Kirsch, 1865 (Fig. 23C, XVI. 134)

Mycotretus pusillus Lacordaire, 1842 (Fig. 35B, XVIII. 209)

Mycotretus pygmaeus Lacordaire, 1842 (Fig. 35C, XVIII. 210)

Mycotretus quadrioculatus Alvarenga, 1983 (Fig. 2F, I. 6)

Mycotretus quadripunctatus Crotch, 1876 (Fig. 9F, VI. 48)

Mycotretus reticulatus Crotch, 1876 (Fig. 10C, VI. 51)

Mycotretus lopesi Alvarenga, 1989 **syn. n.**

Mycotretus rhodosomus Lacordaire, 1842 (Fig. 35F, XVIII. 213)

Brachysphaenus (Iphiclus) nigromaculatus Kuhnt, 1909 **syn. n.**

Mycotretus rubidus Gorham, 1888 (Fig. 20A, XII. 113)

Mycotretus rufilabris (Lacordaire, 1842) (Fig. 36A, XVIII. 214)

Mycotretus rufipennis Gorham, 1888 (Fig. 20B, XII. 114)

Mycotretus sallei Crotch, 1876 (Fig. 10D, VI. 52)

Mycotretus sandicatus Gorham, 1888 (Fig. 20C, XII. 115)

Mycotretus sanguineus (Duponchel, 1825) (Fig. 14C, IX. 76)

Mycotretus sannio Lacordaire, 1842 (Fig. 36B, XVIII. 215)

Mycotretus scalaris Lacordaire, 1842 (Fig. 36D, XVIII. 217)

Mycotretus scitulus Lacordaire, 1842 (Fig. 36E, XVIII. 218)

Mycotretus derasofasciatus Kuhnt, 1910 **syn. n.**

Mycotretus nubifer Casey, 1916 **syn. n.**

Mycotretus sedecimguttatus (Guérin-Méneville, 1844) (Fig. 22D, XIV. 128)

Mycotretus seminiger Harold, 1876 (Fig. 6B, XV. 130)
Mycotretus separandus Crotch, 1876 (Fig. 10F, VI. 54)
Mycotretus sericeonitens sericeonitens Crotch, 1876 (Fig. 11A, VI. 55)
Mycotretus sericeonitens monticola Crotch, 1876 (VI. 56)
Mycotretus sexoculatus chaparensis Delkeskamp, 1957 (Fig. 12D, VIII. 65)
Mycotretus sexoculatus sexoculatus Lacordaire, 1842 (Fig. 36F, XVIII. 219)
Mycotretus sexpunctatus Gorham, 1888 (Fig. 20D, XII. 116)
Mycotretus signatellus Crotch, 1876 (Fig. 11B, VI. 57)
 Mycotretus signatellus imperfectus Crotch, 1876 **syn. n.**
 Mycotretus fragosoi Alvarenga, 1983 **syn. n.**
Mycotretus singularis Lacordaire, 1842 (Fig. 37B, XVIII. 221)
Mycotretus sobrinus (Guérin-Ménéville, 1841) (Fig. 22E, XIV. 129)
 Mycotretus silaceus Lacordaire, 1842
Mycotretus spadiceus Gorham, 1888 (Fig. 20E, XII. 117)
Mycotretus sticticollis Lacordaire, 1842 (XVIII. 222)
Mycotretus stillatus Kuhnt, 1910 (Fig. 25E, XVII. 149)
Mycotretus stramineus Gorham, 1888 (Fig. 20F, XII. 118)
Mycotretus succinctus Crotch, 1876 (Fig. 11D, VI. 59)
Mycotretus suturalis Kirsch, 1876 (Fig. 23D, XVI. 135)
Mycotretus ternotatus Gorham, 1888 (Fig. 21A, XII. 119)
Mycotretus tesserarius Lacordaire, 1842 (XVIII. 224)
Mycotretus thoracicus Kuhnt, 1910 (Fig. 25F, XVII. 150)
Mycotretus tibialis Gorham, 1888 (Fig. 21B, XII. 120)
Mycotretus tigratus Lacordaire, 1842 (Fig. 37D, XVIII. 225)
 Mycotretus nigrocinctus Lacordaire, 1842
 Mycotretus trabeatus Lacordaire, 1842 **syn. n.**
Mycotretus tigrinoides Mader, 1942 (Fig. 39C, XIX. 235)
Mycotretus tigrinus (Olivier, 1792) (Fig. 39F, XX. 238)
 Erotylus conspersus Germar 1824
 Mycotretus multimaculatus Taschenberg, 1870
 Mycotretus leopardus Crotch 1876
 Mycotretus tigrinus pardalis Crotch 1876
Mycotretus tigripennis Mader, 1942 (Fig. 39D, XIX. 236)
Mycotretus tricolor Crotch, 1876 (Fig. 11E, VI. 61)
Mycotretus trifasciatus Guérin, 1956 (Fig. 22A, XIII. 125)

Mycotretus vilis Lacordaire, 1842 (XVIII. 227)

Mycotretus vittatus Gorham, 1888 (Fig. 21C, XII. 121)

Mycotretus xanthomelas Crotch, 1876 (Fig. 12A, VI. 62)

Mycotretus ziczac serenus Delkeskamp, 1957 (Fig. 12E, VIII. 66)

Mycotretus ziczac ziczac Kuhnt, 1910 (Fig. 26B, XVII. 151)

Excluded species

Iphiclus virgatus (Kuhnt, 1910) **comb. n.**

Catalogue

I. Alvarenga, M.

(Figs. 2A–F, 3A)

1. *Mycotretus bistrioculatus* Alvarenga, 1983

Mycotretus bistrioculatus Alvarenga 1983: 583. Type locality: “BRASIL, Amazonas, Estirão do Equador (coordenadas aproximadas, long 71°38’W e lat 4°33’S)” [Rio Javari, Estirão do Equador, in the state of Amazon, North Brazil]. Alvarenga 1994: 21.

Holotype (male, dissected, MNRJ; Fig. 2A). “Coleção M. Alvarenga [printed] \ HOLOTIPO [red label, printed] \ Estirão do Equador, Amazonas, Brasil X.1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus bistrioculatus* m. [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Paratipo [red label, printed] \ Estirão do Equador, Amazonas, Brasil X.1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus bistrioculatus* m. [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”.

Distribution. North Brazil.

Remarks. Penile flagellum elongated, thin, sclerotized at the anterior third of virga and with a desclerotized portion (approximately 2× the length of head) connecting virga and head. Head V-shaped, each arm separating from each other anteriorly and ending in two outer tips slightly bent laterally. *Mycotretus bistrioculatus* is morphologically closely related to *M. argus* (Fig. 26F), *M. sexoculatus chaparensis* (Fig. 12D) and *M. pulchellus* (Fig. 34F). In all

these cases, there are only a few morphological differences in the flagellum head (e.g. arms more or less elongated, sclerotized). These species may be synonyms, a decision that is not possible to be taken before examining more specimens and determining whether is diagnostic for keeping species separated or constitutes intraspecific variation of a single species.

2. *Mycotretus fragosoi* Alvarenga, 1983

Mycotretus fragosoi Alvarenga 1983:587. Type locality: “BRASIL, Amazonas, Estirão do Equador (coordenadas aproximadas, long 71°38’W e lat 4°33’S)” [Rio Javari, Estirão do Equador, in the state of Amazon, North Brazil]. Alvarenga 1994: 26.

Holotype (MNRJ; Fig. 2B). New junior synonym of *M. signatellus* Crotch, 1876 (Fig. 11B, see below).

3. *Mycotretus lopesi* Alvarenga, 1989

Mycotretus lopesi Alvarenga 1989: 35. Type locality: “BRASIL, Pará: Jacareacanga” [Jacareacanga, in the state of Pará, North Brazil]. Alvarenga 1994: 28.

Holotype (female, dissected, MNRJ; Fig. 2C). New junior synonym of *M. reticulatus* Crotch, 1876 (Fig. 10C, see below).

4. *Mycotretus luizi* Alvarenga, 1983

Mycotretus luizi Alvarenga 1983: 588. Type locality: “BRASIL, Amazonas, Estirão do Equador (coordenadas aproximadas, long 71°38’W e lat 4°33’S)” [Rio Javari, Estirão do Equador, in the state of Amazon, North Brazil]. Alvarenga 1994: 28.

Holotype (MNRJ; Fig. 2D). New junior synonym of *M. cinctiger* Crotch, 1876 (Fig. 5B, see below).

5. *Mycotretus octoculatus* Alvarenga, 1983

Mycotretus octoculatus Alvarenga 1983:585. Type locality: “BRASIL, Pará, Tucuruí” [Tucuruí, in the state of Pará, North Brazil]. Alvarenga 1994: 31.

Holotype (MNRJ; Fig. 2E). “Coleção M. Alvarenga [printed] \ HOLOTIPO [red label, printed] \ Tucuruí Pará, Brasil, I.1979, M. Alvarenga [printed] \ *Mycotretus octoculatus* m. [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Paratipo [red label, printed] \ Estirão do Equador, Amazonas, Brasil X.1979, M.

Alvarenga [printed] \ M [printed] \ *Mycotretus octoculatus m.* [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Brasil M. Gerais, Aguas Vermelhas, XII. 1983, M. Alvarenga [printed] \ *Mycotretus octoculatus Alv. 1983* [handwritten] M. Alvarenga det. [printed] 1985 [handwritten]”.

Distribution. North and Southeast Brazil.

Remarks. Flagellum head U-shaped. *Mycotretus octoculatus* is morphologically closely related to *M. alvarengai* (Fig. 39G), but with a desclerotization on virga approximately 3× as long as that in *M. alvarengai*. Aside from that, body length and genitalia of *M. octoculatus* are bigger than in *M. alvarengai*, color patten is remarkably distinct on both species (Figs. 2E and 39G).

6. *Mycotretus quadrioculatus* Alvarenga, 1983

Mycotretus quadrioculatus Alvarenga 1983: 585. Type locality: “BRASIL, Pará, Tucuuruí” [Tucuuruí, in the state of Pará, North Brazil]. Alvarenga 1994: 33.

Holotype (MNRJ; Fig. 2F). “Coleção M. Alvarenga [printed] \ HOLOTIPO [red label, printed] \ Tucuuruí Pará, Brasil, I.1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus quadrioculatus m.* [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Paratipo [red label, printed] \ Tucuuruí Pará, Brasil, I.1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus quadrioculatus m.* [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Paratipo [red label, printed] \ Tucuuruí Pará, Brasil, I.1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus quadrioculatus m.* [handwritten] M. Alvarenga det. [printed] 1983 [handwritten].

Distribution. North Brazil (Alvarenga 1994).

7. *Mycotretus tucuruensis* Alvarenga, 1983

Mycotretus tucuruensis Alvarenga 1983: 586. Type locality: “BRASIL, Pará, Tucuuruí” [Tucuuruí, in the state of Pará, North Brazil]. Alvarenga 1994: 37.

Holotype (male, dissected, MNRJ; Fig. 3A). New junior synonym of *M. cinctiger* Crotch, 1876 (Fig. 5B, see below).

II. Arrow, G. J.

(Fig. 3B–C)

8. *Mycotretus centralis* Arrow, 1909

Mycotretus centralis Arrow 1909: 196. Type locality: “Guatemala, San Gerónimo”. Alvarenga 1994: 21; Pecci-Maddalena & Lopes-Andrade 2018b: 8 [junior synonym].

Lectotype (BMNH; Fig. 3B). “Type [disc-shaped label, red/orange border, printed] \ S. Geronimo, Guatemala., Champion. [printed] \ Sp. figured. [printed] \ B.C.A., Col., VII. Mycotretus [printed], tigrinus, Oliv. [handwritten] \ Mycotretus centralis, type, arrow [handwritten] \ LECTOTYPE, *Mycotretus centralis* Arrow, 1909 [red label, printed]”.

Other examined specimens. See Pecci-Maddalena & Lopes-Andrade (2018b).

Distribution. Mexico, Guatemala, southern and southeastern Brazil.

Remarks. See Pecci-Maddalena & Lopes-Andrade (2018b).

9. *Mycotretus distinguendus* Arrow, 1909

Mycotretus distinguendus Arrow 1909: 196. Type locality: “Mexico, Toxpam” [apud Gorham 1888: 60] “. Alvarenga 1994: 24.

Lectotype, here designated (BMNH; Fig. 3C). “Type [disc-shaped label, red/orange border, printed] \ Mycotretus distinguendus, type, arrow [handwritten] \ sobrinus, Lac. [handwritten] \ B.C.A., Col., VII. Mycotretus [printed] \ Toxpam [printed] \ Mexico., Salle, Coll. \ LECTOTYPE, *Mycotretus distinguendus* Arrow, 1909 [red label, printed]”.

Other examined specimens. 1 specimen (BMNH) “Toxpam [handwritten], Mexico., Salle, Coll. [printed] \ Mycotretus sobrinus Guer, apud Sallé [handwritten] \ B.C.A., Col., VII. Mycotretus [printed] \ PARALECTOTYPE, *Mycotretus distinguendus* Arrow, 1909 [yellow label, printed]”; 1 specimen (BMNH) “Toxpam [handwritten], Mexico., Salle, Coll. [printed] \ 2409 [printed] \ Mycotretus sobrinus Guer, apud Sallé [handwritten] \ B.C.A., Col., VII. Mycotretus [printed] \ PARALECTOTYPE, *Mycotretus distinguendus* Arrow, 1909 [yellow label, printed]”; 1 female (BMNH, dissected) “Mexico., Salle, Coll. [printed] \ Toxpam [printed] \ Mycotretus sobrinus Guer, apud Sallé [handwritten] \ B.C.A., Col., VII. Mycotretus [printed] \ PARALECTOTYPE, *Mycotretus distinguendus* Arrow, 1909 [yellow label, printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ mex. [front] 56, 143 [back] [handwritten] \ 1680 [printed] \ Comparado com

tipo [printed] *Mycotretus distinguendus* [sic] Arrow, 1909 [handwritten] M. Alvarenga det. 1971 [printed]”.

Distribution. Mexico.

Remarks. *Mycotretus distinguendus* was described by Arrow (1909) based on individuals firstly identified by Gorham (1888) as *M. sobrinus* Guérin-Méneville (Fig. 22F). According to Arrow (1909: 196) “The Mexican form recorded as *Mycotretus sobrinus*, Guer., by Mr. Gorham in the same work must similarly be distinguished from that Brazilian species. It is much smaller, relatively shorter, the knees blacker, and the abdominal lines more marked. It may be called *M. distinguendus*”. We compared the male genitalia of both *M. distinguendus* and *M. sobrinus* and observed that they are clearly separated species. We also noted that *M. distinguendus* differs from other *Mycotretus* in the first antennomere of antennal-club conspicuously wider than succeeding antennomeres.

III. Boyle, W.W.

10. *Mycotretus nigromaniscatus* Boyle, 1954

Mycotretus nigromaniscatus Boyle 1954: 48. Type locality: “Pinery Canyon (6000 ft.), Chiricahua Mts., Cochise County, Arizona” [Arizona, USA]. Alvarenga 1994: 30.

Holotype (ANSP; Fig. 3D). “HOLOTYPE, *Mycotretus nigromaniscatus* Boyle [red label, printed \ 10701, *Mycotretus nigromaniscatus* Boyle [handwritten] TYPE [printed] \ Cochise Co., Ariz [printed] VII-19-[handwritten] 1919 [printed] Witmer Stone [printed] \ Pinery Canyon 6000 feet Chiricahua Mts.”.

Distribution. Southwest USA and Mexico.

Remarks. *Mycotretus nigromaniscatus* resembles *M. bistrigatus* Lacordaire (Fig. 27A) in body shape and color. It is possible these two species are closely related or even synonymous, but we had no named *M. nigromaniscatus* at hand for comparison.

IV. Casey, T.L.

11. *Mycotretus nubifer* Casey, 1916

Mycotretus nubifer Casey 1916: 158. Type locality: “Guatemala (Quitché)” [=Department of Quiché, Guatemala]. Alvarenga 1994: 31.

Lectotype, here designated (NMNH; Fig. 3E). New junior synonym of *M. scitulus* Lacordaire, 1842 (Fig. 36E, see below).

V. Chevrolat, L.A.A.

12. *Mycotretus lesueuri* (Chevrolat, 1835)

Erotylus lesueuri Chevrolat 1835: 175, fasc. 8. Type locality: “Bocadelmonte” [Boca del Monte, in the state of Veracruz, Mexico]; Lacordaire 1842: 155 (*Mycotretus*); Alvarenga 1994: 28; Skelley & Goodrich 1994: 129; Pecci-Maddalena & Lopes-Andrade 2018b: 21.

Mycotretus savignyi Lacordaire, 1842 **new synonym** (Fig. 36C); Lacordaire 1842: 156. Type locality: “Colombie”. Alvarenga 1994: 34.

Lectotype, here designated (UMZC; Fig. 3F). “TYPE [blue label, printed] \ TYPE. [printed], lesueuri Ch [handwritten] \ LECTOTYPE [printed], *Erotylus lesueuri* Chevrolat, 1835 [red label, handwritten] \ *Mycotretus lesueuri* (Chevrolat) [handwritten], det. I. Pecci-Maddalena 2017 [printed]”.

Other examined specimens. 1 specimen (UMZC) “Chevr. [printed] \ PARATYPE [blue label, printed] \ PARALECTOTYPE [printed], *Erotylus lesueuri* Chevrolat, 1835 [yellow label, handwritten] \ *Mycotretus lesueuri* (Chevrolat) [handwritten], det. I. Pecci-Maddalena 2017 [printed]”; 1 specimen (UMZC) “mex. [handwritten]”; 1 specimen (UMZC) “Braz [handwritten]”; 1 female (BMNH, dissected) “Toxpam [handwritten] Mexico. Salle Coll. [printed] \ 2405 [printed] \ B.C.A., Col.,VII. *Mycotretus lesueuri*. [printed] \ *Mycotretus lesueuri* Chev apud Sallé [handwritten]”; 1 female (BMNH, dissected) “Mexico. Salle Coll. [printed] \ Toxpam [printed] \ B.C.A., Col.,VII. *Mycotretus lesueuri*. [printed] \ *Mycotretus lesueuri* Chev apud Sallé [handwritten]”; 1 male (MNHN, dissected) “red label [unwritten] \ *M. lesueuri* Chev [handwritten] \ MUSEUM PARIS AMÉRIQUE CENTRALE (Coll du [?] Biol Central Amer) Godman 1908 [printed] \ Jalapa, Mexico. Hoege. [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Coatepec, Ver. [handwritten] \ *Mycotretus lesueuri* Chevr. [handwritten] \ 1655 [printed] \ Comparado com tipo [printed] *Erotylus lesueuri* Chevr., 1835 [handwritten] M. Alvarenga det. 1971 [printed] \ *Mycotretus lesueuri* Coat. Chev. [handwritten] \ DZUP 132756 [printed]”; 1 male (DZUP, dissected) “Apaneco, Ahuachapau, El Salvador, 16.VII. 1959, J. Bechyné [handwritten] \ DZUP 132757 [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ I. [?] *San Vicente Finca Lapaz, El Salvador 3.VIII. 1959* [?] *J. Bechyné* [handwritten] \ 1653 [printed] \ *lesueuri* [?] Chevr. [handwritten] \ Homeotipo [red label,

printed] \ lesueuri Chevr. 1835 [handwritten]”. *Mycotretus savignyi* Lacordaire, 1842. **Lectotype, here designated (MNHN; Fig. 36C).** “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Savignyi Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [red label, printed] Mycotretus savignyi Lacordaire, 1842 [handwritten]”; 1 male (MNHN, dissected) “[red label, unwritten] \ M. savignyi [handwritten] \ MUSEUM PARIS AMÉRIQUE CENTRALE (Coll du [?] Biol Central Amer) Godman 1908 [printed] \ V. de Chiriqui, 25–4000 ft. Champion [printed]”; 1 male (MNHN, dissected) “292, 39 [disc-shaped label, handwritten]”; 1 specimen (MRSN) “D. Lebas. [green label, handwritten]”.

Distribution. Mexico, El Salvador, Colombia, North Brazil.

Remarks. The unique clear-cut difference between *M. lesueuri* and *M. savignyi* is the color of legs, which is black in the former and reddish-brown in the latter. There is no detectable difference in the morphology of their male genitalia.

VI. Crotch, G.R.

(Figs. 4–11, 12A)

13. *Mycotretus adalioides* Crotch, 1876

Mycotretus adalioides Crotch 1876: 448. Type locality: “Peru”. Alvarenga 1994: 20.

Lectotype, here designated (UMZC; Fig. 4A). “TYPE [blue label, printed] \ TYPE [printed], adalioides Peru. Jans. [handwritten] \ LECTOTYPE [printed], Mycotretus adalioides Crotch, 1876 [red label, handwritten]”.

Distribution. Unknown locality in Peru.

Remarks. *Mycotretus adalioides* resembles *M. apicalis* (Fig. 26E) in body color and shape.

14. *Mycotretus balteatus* Crotch, 1876

Mycotretus balteatus Crotch 1876: 445. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 21.

Lectotype, here designated (UMZC; Fig. 4B). “TYPE [blue label, printed] \ TYPE [printed], balteatus Ega Bates [handwritten] \ LECTOTYPE [printed], Mycotretus balteatus Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Homeotipo [red label, printed] \ Rio Cauaburi, Amazon, Brasil, 7-8.XII.1962, J. Bechyné col. [printed] \ Convênio

DZSP-Goeldi [printed] \ Comparado com tipo [printed] *Mycotretus balteatus* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1823-A [handwritten]”.

Distribution. North Brazil.

Remarks. Similar to *M. fulvilabris* (Fig. 6F), but differing in the black apical band of elytra. Although we have dissected specimens similar in coloration with *M. fulvilabris*, we have at hand only one female of *M. balteatus* and, we prefer not to propose a new synonym here. The locality “Ega” mentioned by Crotch (1876) currently corresponds to “Tefê”, in the state of Amazon, North Brazil (Alvarenga 1994), and we use the name Tefê, rather than Ega, throughout the text.

15. *Mycotretus basalis* Crotch, 1876

Mycotretus basalis Crotch 1876: 438. Type locality: “Ega” [=Tefê, in the state of Amazon, North Brazil]. Alvarenga 1994: 21.

Lectotype, here designated (UMZC; Fig. 4C). New junior synonym of *M. egae* Crotch, 1876 (Fig. 6C, see below).

16. *Mycotretus bisseptemguttatus* Crotch, 1876

Mycotretus bisseptemguttatus Crotch 1876: 441. Type locality: “Cayenne” [Cayenne, French Guiana]. Alvarenga 1994: 21.

Lectotype, here designated (UMZC; Fig. 4D). New junior synonym of *M. pecari* Lacordaire, 1842 (Fig. 34C, see below).

17. *Mycotretus brasilianus* Crotch, 1876

Mycotretus brasilianus Crotch 1876: 442. Type locality: “Brazil”. Alvarenga 1994: 21.

Lectotype, here designated (UMZC; Fig. 4E). “TYPE [blue label, printed] \ TYPE [printed], brasilianus Bras. Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus brasilianus* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] XI. 1966 [handwritten] F.M. Oliveira [printed] \ Comparado com tipo [printed] *Mycotretus brasilianus* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1934 [printed] \ DZUP 136225 [printed]”; 1 female (MCNZ, dissected) “Montenegro, RS, II/VIII/77, A. Lise [handwritten], leg. [printed] \ Col MCN 23349 [?] [handwritten] \ M.

brasilianus [handwritten]”; 1 female (MCNZ, dissected) “Triunfo, RS (Copesul), 6.I.2005, L. Schimdt col. [printed] \ Col. MCN 232833 [printed]”; 1 female (MCNZ, dissected) “S Fco de Assis, RS, 25.IV.2009, I.Heydrich [printed] \ Col. MCN 238433 [printed]”.

Distribution. Southeast Brazil (Alvarenga 1994), South Brazil.

Remarks. *Mycotretus brasilianus* resembles *M. magus* (Fig. 32D) in the color pattern of pronotum, serrate elytral bands and a hexagonal black spot on head, but *M. magus* is slightly more elongated than *M. brasilianus*. It is possible these species are closely related or even conspecific. However, we had at hand only females and, therefore, we prefer not to synonymize them at this moment. The body coloration of *M. brasilianus* also resembles that of *M. chilensis* (Fig. 4F), but there is no cephalic spot or mark in the latter.

18. *Mycotretus chilensis* Crotch, 1876

Mycotretus chilensis Crotch 1876: 454. Type locality: “Chili” [=Chile, possibly mislabeled, see Pecci-Maddalena & Lopes-Andrade 2017:147]. Alvarenga 1994: 22.

Mycotretus bicinctus Guérin, 1949a (Fig. 21E). Guérin 1949a: 236. Type locality: “Parque da Cantareira, São Paulo” [Parque da Cantareira, São Paulo, Southeast Brazil]. Alvarenga 1994: 21; Pecci-Maddalena & Lopes-Andrade 2017:147 [junior synonym].

Lectotype (UMZC; Fig. 4F). “TYPE [blue label, printed] \ TYPE [printed], chilensis Reiche [handwritten] \ LECTOTYPE [red label, printed], *Mycotretus chilensis* Crotch, 1876 [handwritten]”.

Other examined specimens. See Pecci-Maddalena & Lopes-Andrade (2017).

Distribution. Southern and southeastern Brazil and a doubtful record from an unknown locality in Chile (Pecci-Maddalena & Lopes-Andrade 2017).

19. *Mycotretus chontalesi* Crotch, 1873

Mycotretus chontalesi Crotch 1873: 145. Type locality: “Santo Domingo, Chontales, Nicaragua” [Department of Chontales, Nicaragua]. Alvarenga 1994: 22.

Lectotype, here designated (BMNH; Fig. 5A). New junior synonym of *M. lepidus* Lacordaire, 1842 (Fig. 31F, see below).

20. *Mycotretus cinctiger* Crotch, 1876

Mycotretus cinctiger Crotch 1876: 438. Type locality: “Santarém” [in the state of Pará, North Brazil]. Alvarenga 1994: 22.

Mycotretus luizi Alvarenga, 1983 **new synonym** (Fig. 2D); Alvarenga 1983: 588. Type locality: “BRASIL, Rio Javari, Estirão do Equador (coordenadas aproximadas: long 71°38’W e lat 4°33’S)”, [Amazon, Brazil]. Alvarenga 1994: 28.

Mycotretus tucuruensis, 1983 **new synonym** (Fig. 3A); Alvarenga 1983: 586. Type locality: “BRASIL, Pará, Tucuruí” [Amazon, Brazil]. Alvarenga 1994: 37.

Lectotype, here designated (UMZC; Fig. 5B). “TYPE [blue label, printed] \ TYPE [printed], cinctellus Santar. B [handwritten] \ LECTOTYPE [printed], *Mycotretus cinctiger* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Jacareacanga, Pará, Brasil [printed] X. 1969 [handwritten] F. R. Barbosa [printed] \ Comparado com tipo [printed] *Mycotretus cinctiger* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1993 [printed] \ DZUP 136197 [printed]”; 1 specimen (MNRJ) “Coleção M. Alvarenga [printed] \ HOLOTIPO [red label, printed] \ Estirão do Equador, Amazonas, Brasil X.1979, M. Alvarenga [printed] \ *Mycotretus luizi m.* [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”; 1 female (MNRJ, dissected) “Paratipo [red label, printed] \ bôca do Cuminá-Miri, Oriximiná, PA, 16-26.I.1968, Exp. Perm. Amaz. [printed] \ *Mycotretus luizi m.* [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”; 1 male (CELC, dissected) “Brasil: MS, Coxim, Próximo Rio Taquari: 18° 21’ 45’’S/54° 36’56’’W/ 309m”; 12–14.vi.2015, leg. Chamorro, J. [printed]”; 6 specimens (CELC) ““Brasil: MS, Coxim, Próximo Rio Taquari: 18° 21’ 45’’S/54° 36’56’’W/ 309m”; 12–14.vi.2015, leg. Chamorro, J. [printed]”; 1 specimen (MCNZ) “Ilha de Maracá RR, 4–12 / 12[handwritten] / 19 [printed] 87 [handwritten], E. H. Backup leg. [printed] \ Col. MCN 238456 [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ HOLOTIPO [red label, printed] \ Tucuruí Pará, Brasil, I.1979, M. Alvarenga [printed] \ *Mycotretus tucuruensis m.* [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”.

Distribution. North and Central-West Brazil.

Remarks. The lectotype of *M. cinctiger* seems to be a teneral, and differs from *M. luizi* and *M. tucuruensis* in the pronotal spots not completely pigmented and the central elytral spot absent. *Mycotretus tucuruensis* differs from *M. luizi* in the two elytral black bands being conspicuously “serrate” and in possessing a large black mark on head. Aside from these color variations, there was no detectable difference in the morphology of male genitalia.

21. *Mycotretus corallipennis* Crotch, 1876

Mycotretus corallipennis Crotch 1876: 448. Type locality: “Venezuela, N. Granada.” [The old Viceroyalty of New Granada, in which the Venezuela’s territory had been part]. Alvarenga 1994: 22.

Lectotype, here designated (UMZC; Fig. 5C). “Nova Gr [green label, handwritten] \ LECTOTYPE [printed], *Mycotretus corallipennis* Crotch, 1876 [red label, handwritten]”.

Distribution. Unknown locality in Venezuela.

Remarks. There were two unlabeled specimens, apparently conspecific with *M. corallipennis*, close to the lectotype in the UMZC collection. However, we are not sure whether they are syntypes. A examined male specimen from “Santa Luzia do Itanhy, Sergipe, Brazil” (MCNZ) as well two females from Jacareacanga, Pará, Brazil (DZUP) resemble *M. corallipennis*. However, our identification is doubtful because we do not have any other specimen for comparison. Apparently, *M. corallipennis* is morphologically closely related to *M. apicalis* (Fig. 26E).

22. *Mycotretus cordiger* Crotch, 1876

Mycotretus cordiger Crotch 1876: 455. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 23.

Mycotretus zischkai Delkeskamp, 1957 **new synonym** (Fig. 12F); Delkeskamp 1957: 98, 112. Type locality: “Bolivien, Chapare-Gebiet, Oberer Rio Chipiriri, 400 m” [Río Chipiriri, Province of Chapare, Cochabamba, Bolivia]. Alvarenga 1994: 38.

Lectotype, here designated (UMZC; Fig. 5D). “TYPE [blue label, printed] \ TYPE. [printed], *cordiger* Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus cordiger* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 specimen (UMZC) “PARATYPE [blue label, printed] \ green square [unwritten] \ Bates [printed] \ PARALECTOTYPE [printed], *Mycotretus cordiger* Crotch, 1876 [yellow label, handwritten]”; 2 males (MNRJ, dissected) “BRASIL–Rondônia, Pimenta Bueno, X.1986 O. Roppa, P. Magno & J. Becker [printed]”; 1 specimen (ZSM) “Chapare – Gebiet, Oberer Rio Chipiriri, 400 m [printed], 31.10.53 [handwritten] \ Bolivia 1954, leg. W. Forster [printed] \ Holotypus Nr. [red label, printed] \ *Mycotretus zischkai* m. [handwritten], det. Delkeskamp 19 [printed] 57 [handwritten]”; 1 specimen (BMNH) “Paratype [disc-shaped label, printed] \ Paratypus Nr. [red label, printed] \ Bolivia trop. Region Chapare, 400 m zischka, 10.VIII. 1954 [green label, handwritten] \ Brit. Mus. [printed] 195[printed]8[?, handwritten]–272 [handwritten] \ *Mycotretus zischkai* m. [handwritten] det. Delkeskamp 19[printed]57 [handwritten]”; 1 female (MZSP, dissected) “MAI 1951 [printed] \ Bolivia-Region, Chapare-400m-leg. Zischka [printed] 2. V. 51 [handwritten] \ PARATYPUS [red label, printed]”; 1 female (MZSP, dissected) “BOLIVIA tropica, Region CHAPARÉ (400 Mtr.) DIRINGS [PRINTED] \ Bolivia tropica, Region

Chapara, 400 M.–Zischka [printed] \ Paratypus Nr. [red label, printed] \ *Mycotretus zischkai* m. [handwritten] det. Delkeskamp 19 [printed] 57 [handwritten]”.

Distribution. North Brazil, Bolivia.

Remarks. There is no morphological difference between *M. cordiger* and *M. zischkai*. *Mycotretus cruciger* (Fig. 5E) seems to be morphologically closely related to *M. cordiger*, but their lectotypes show phenotypic differences, as the comparatively larger pronotal and elytral spots in *M. cruciger*. Nevertheless, as we do not have males of *M. cruciger* at hand, we prefer not to synonymize it with *M. cordiger* at this moment.

23. *Mycotretus cruciger* Crotch, 1876

Mycotretus cruciger Crotch 1876: 452. Type locality: Unknown. Alvarenga 1994: 22.

Lectotype, here designated (UMZC; Fig. 5E). “TYPE [blue label, printed] \ TYPE. [printed], *cruciger* [?, handwritten] \ LECTOTYPE [printed], *Mycotretus cruciger* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Maturaca, AM, alto Rio Cauaburi, 12–17.XII.1962, J. Bechyné col. [printed] \ Comparado com tipo [printed] *Mycotretus cruciger* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1750-A [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Maturacá Rio Negro [printed] 14.12 [handwritten] -196[printed]2[handwritten] \ Brasil, A M, J.&B. Bechyne [printed] \ *Mycotretus cruciger* Crotch, 1876 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. Northern Brazil.

24. *Mycotretus decorus* Crotch, 1876

Mycotretus decorus Crotch 1876: 442. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 23.

Lectotype, here designated (UMZC; Fig. 5F). “TYPE [blue label, printed] \ TYPE. [printed], *decorus* Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus decorus* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 specimen (UMZC) “Bates [printed] \ yellow square [unwritten] \ PARATYPE [blue label, printed] \ PARALECTOTYPE [printed], *Mycotretus decorus* Crotch, 1876 [yellow label, handwritten]”.

Distribution. Northern Brazil.

25. *Mycotretus deyrollei* Crotch, 1876

Mycotretus deyrollei Crotch 1876: 451. Type locality: “St Catharina” [state of Santa Catarina, South Brazil]. Alvarenga 1994: 23.

Mycotretus discipennis Kuhnt, 1910 **new synonym** (Fig. 24A); Kuhnt 1910: 240. Type locality: “St. Catharina” [state of Santa Catarina, South Brazil]. Alvarenga 1994: 24.

Mycotretus discipennis conductus Kuhnt, 1910 [as a variety] **new synonym** (Fig. 24B); Kuhnt 1910: 240. Type locality: “St. Catharina (Colonia Hansa)” [in the state of Santa Catarina, South Brazil]. Alvarenga 1994: 24.

Mycotretus sexlineatus Kuhnt, 1910 **new synonym** (Fig. 25D); Kuhnt 1910: 241. Type locality: “Brasilien” [Brazil]. Alvarenga 1994: 35.

Lectotype, here designated (UMZC; Fig. 6A). “TYPE [blue label, printed] \ TYPE [printed], Deyrollii, St. Cath. [handwritten] \ LECTOTYPE [printed], *Mycotretus deyrollii* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. *Mycotretus discipennis* Kuhnt, 1910. Lectotype, here designated (MFN; Fig. 24A). “104379 [printed] \ Colonia Hansa, St Catharina, H.Rolle, Berlin SW1L [printed] \ *Mycotretus discipennis* Kuhnt [handwritten] \ Typus [printed] \ Type [red label, printed] \ LECTOTYPE *Mycotretus discipennis* Kuhnt, 1910, det. I. Pecci-Maddalena 2017 [red label printed]”; 2 females (MZSP, dissected) “Porto Alegre [handwritten], R.G. do Sul. [printed], 10949 [handwritten] \ Coll. J. Guerin. S. Paulo. Brasil. [printed] 18197 [handwritten] \ *Mycotretus discipennis* Kuhnt [handwritten], J. Guerin. det. 19[printed]54[handwritten]”. ***Mycotretus discipennis conductus* Kuhnt, 1910. Lectotype, here designated (MFN; Fig. 24B).** “Colonia Hansa, St Catharina, H.Rolle, Berlin SW1L [printed] \ 104381 [printed] \ Typus [printed] \ *Mycotretus discipennis* Kunht var. *conductus* [handwritten] \ Type [red label, printed] \ LECTOTYPE *Mycotretus discipennis conductus* Kuhnt, 1910, det. I. Pecci-Maddalena 2017 [red label printed]”; 1 female (MZSP, dissected) “BRASIL, Timbó, Sta. Catarina, Dirings [front, printed] out 1958 [printed]”; 1 male (MZSP, dissected) “BRASIL, Timbó, Estº. Sta. Catar. Col.: DIRINGS [front, printed] out 1958 [printed]”; 1 specimen (MZSP) “BRASIL, Timbó, Sta. Catarina, Dirings [front, printed] out 1958 [printed]”. ***Mycotretus sexlineatus* Kuhnt, 1910. Lectotype, here designated (MFN; Fig. 25D).** “21348 [printed] \ Brasilien [printed] \ *6 lineatus* Nub. [?], *Brasil. Sells.* [?] [handwritten] \ Type [red label, printed] \ det. P. Kuhnt [printed] *Mycotretus 6-lineatus* Kuhnt. [handwritten] \ Kuhnt det. [printed] \ LECTOTYPE *Mycotretus sexlineatus* Kuhnt, 1910, det. I. Pecci-Maddalena 2017 [red label printed]”; 1 male (MCNZ, dissected) “Rancho Queimado,

SC, 8-11 / X [handwritten] /19[printed]94[handwritten] L. Moura [handwritten] leg. [printed] \ Col. MCN 232961 [printed]”; 1 female (MCNZ, dissected) “Triunfo, RS (Copersul), 25/XI [handwritten]19[printed]94[handwritten], A. Franceschini [handwritten] \ Col. MCN 232960 [printed] \ *M. sexlineatus* [handwritten]”; 2 specimens (MZSP) “Curitibá, Paraná [printed] 10942 [handwritten] \ Coll J. Guerin. S. Paulo. Brasil. [printed] 4180 [handwritten] \ *Mycotretus sexlineatus* Kuhnt. [handwritten] J. Guerin. det. 194[printed]5[handwritten]”.

Distribution. South Brazil.

Remarks. There was one unlabeled specimen close to the lectotype in the UMZC collection. However, we do not know whether it is a syntype. The unique (and very small) difference between the lectotypes of *M. discipennis* and *M. sexlineatus* is the length of elytral stripes, which is shorter in the former than in the latter. Similarly, the central elytral spot of the lectotype of *M. deyrollei* is shorter than that of *M. discipennis conductus*. Aside from color variation, there is no other morphological difference in the examined specimens and the morphological pattern of their male genitalia is the same.

***Mycotretus dimidiatus* Crotch, 1876**

Mycotretus dimidiatus Crotch 1876: 444. Type locality: “Ega” [=Tefé, in the state of Amazon, Brazil]. **Nec** Taschenberg 1870. Alvarenga 1994: 35.

Remarks. *Mycotretus dimidiatus* Crotch, 1876 is a junior homonym of *M. dimidiatus* Taschenberg, 1870. Harold (1876: 174) proposed *M. seminiger* as a replacement name (see below).

26. *Mycotretus egae* Crotch, 1876

Mycotretus egae Crotch 1876: 442. Type locality: “Ega” [Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 25.

Mycotretus basalis Crotch, 1876 **new synonym** (Fig. 4C). Crotch 1876: 438. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 21.

Lectotype, here designated (UMZC; Fig. 6C). “TYPE. [printed], Egae Bates Ega [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed], *Mycotretus egae* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. Lectotype, here designated (UMZC; Fig. 4C). “TYPE [blue label, printed] \ TYPE [printed], *basalis* Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus basalis* Crotch, 1876 [red label, handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ TEFÉ,

Amazonas, Brasil, XII-1961, F.M. Oliveira [printed] \ Comparado com tipo [printed] *Mycotretus basalis* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed]”; 1 female (MZSP, dissected) “Borba. Amazonas. [printed] 3.943 [handwritten] \ Coll. J. Guerin. S. Paulo. Brasil. [printed] 18974 [handwritten] \ BORBA, Amazonas, BRASIL [printed] III-1943 [handwritten] Alexandre PARKO [printed] \ *Mycotretus basalis* Crotch [handwritten] J. Guerin det. 19[printed] 53 [handwritten]”.

Distribution. North Brazil (Alvarenga 1994).

Remarks. *Mycotretus egae* differs from *M. basalis* in the more elongated elytral band. However, such a small difference in body coloration is expected to occur in conspecific *Mycotretus* within the same locality.

27. *Mycotretus episcaphoides* Crotch, 1876

Mycotretus episcaphoides Crotch 1876: 456. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil].
Alvarenga 1994: 25.

Lectotype, here designated (UMZC; Fig. 6D). “TYPE [blue label, printed] \ TYPE. [printed], Episcaphoides Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus episcaphoides* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 male (MNRJ, dissected) “ECUADOR [printed] Napo-cuyabeno, 230 m, nov 17/85 [?] [handwritten], Legit [printed] E. cotyiozo [?] [handwritten] \ *Callischyrus* n. sp. [handwritten]”.

Distribution. North Brazil (Alvarenga 1994).

Remarks. *Mycotretus episcaphoides* resembles *M. floriger* (Fig. 29F) in body shape and morphology of male genitalia. The penile flagellum of *M. episcaphoides* is less sclerotized than that of *M. floriger*. Male genitalia of both species have a sinuosity at the anterior one-third of the flagellum virga. That sinuosity is strongly sclerotized in *M. floriger* and desclerotized in the examined *M. episcaphoides*. Such morphology of the penile flagellum resembles that observed in *M. chilensis* Crotch (Fig. 4F) and *M. trifasciatus* Guérin (Fig. 22A) (Pecci-Maddalena & Lopes-Andrade 2017).

28. *Mycotretus fulviceps* Crotch, 1876

Mycotretus fulviceps Crotch 1876: 447. Type locality: “Santarem” [Santarém, in the state of Pará, North Brazil].
Alvarenga 1994: 26.

Lectotype, here designated (UMZC; Fig. 6E). “TYPE [blue label, printed] \ TYPE [printed], fulviceps Santar. Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus fulviceps* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Estirão do Equador, Amazonas, Brasil X. 1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus* [handwritten]”.

Distribution. North Brazil.

29. *Mycotretus fulvilabris* Crotch, 1876

Mycotretus fulvilabris Crotch 1876: 447. Type locality: “S. Paulo” [São Paulo de Olivença, in the state of Amazon, North Brazil]. Alvarenga 1994: 26.

Mycotretus rastratus Crotch, 1876 **new synonym** (Fig. 10B). Crotch 1876: 445. Type locality: “S. Paulo” [São Paulo de Olivença, in the state of Amazon, North Brazil]. Alvarenga 1994: 34.

Lectotype, here designated (UMZC; Fig. 6F). “TYPE. [printed], fulvilabris S. Paulo Bates [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed], *Mycotretus fulvilabris* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Estirão do Equador, Amazonas, Brasil X.1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus* ? *Haemetichytus* [?] [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Jacareacanga, Pará Brasil, XII-1968, M. Alvarenga [printed] \ 2040 [printed] \ *Mycotretus* 164 [handwritten] \ n. sp [handwritten]”. **Lectotype, here designated (UMZC).** (Fig. 10B). “TYPE [blue label, printed] \ TYPE. [printed], rastratus, S. Paulo B. [handwritten] \ LECTOTYPE [printed], *Mycotretus rastratus* Crotch, 1876 [red label, handwritten]”.

Distribution. North Brazil (Alvarenga 1994).

Remarks. The locality “S. Paulo” mentioned in the labels of the lectotypes of *M. fulvilabris* and *M. rastratus* (Figs. 6F’ and 10B’) refers to “São Paulo de Olivença” (in the state of Amazon, North Brazil), where Henry Walter Bates collected specimens few years before Crotch published his revision (Crotch 1876; Papavero 1973; Alvarenga 1994). We examined the lectotype of *M. rastratus* in the Crotch collection and, excepted for its resemblance with a teneral (Fig. 10B), there is no morphological variation between it and the lectotype of *M. fulvilabris*. It is worth to note the coloration observed in the lectotype of *M. rastratus* is typical of tenerals or not fully pigmented adults of Erotylidae.

30. *Mycotretus guatemalae* Crotch, 1876

Mycotretus guatemalae Crotch 1876: 441. Type locality: "Guatemala". Alvarenga 1994: 27.

Lectotype, here designated (UMZC; Fig. 7A). "TYPE. [printed], guatemala Shepp. [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed], *Mycotretus guatemalae* Crotch, 1876 [red label, handwritten]".

Other examined specimens. 1 female (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ S. Salvador, El Salvador, 24.vi.1960, J. Bechyné [handwritten] \ *Mycotretus elegans* Gorham, 1888 [handwritten, misidentification] M. Alvarenga det. [printed] 1971 [handwritten] \ 1835-A [handwritten]"; 1 female (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Rio Caurimare, Caracas, 900m, 8. ix. 1963, Boroon [handwritten] \ 1826 [printed] \ *Mycotretus* 203 [handwritten] \ *M. guatemalae* ? [handwritten]"; 1 female (DZUP, dissected) "Coleção M. Alvarenga [printed] \ S. Salvador, El Salvador, 24.vi.1960, J. Bechyné [handwritten] \ DZUP 132850 [printed]".

Distribution. Guatemala, El Salvador, Venezuela.

31. *Mycotretus illustris* Crotch, 1876

Mycotretus illustris Crotch 1876: 440. Type locality: "Mexico". Alvarenga 1994: 27.

Lectotype, here designated (UMZC; Fig. 7B). "TYPE. [printed], *illustris* mex. Sallé [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed], *Mycotretus illustris* Crotch, 1876 [red label, handwritten]".

Other examined specimens. 1 female (BMNH, dissected) "Toxpam [printed] \ Mexico. Salle Coll. [printed] \ *Mycotretus illustris* Crotch = *confluens* Thom [?] apud Sallé [handwritten] \ B.C.A., Col., VII. *Mycotretus* [printed]";

Distribution. Mexico.

Remarks. According to Gorham (1888) it is "One of the largest and most beautiful species of this genus".

32. *Mycotretus laeviventris* Crotch, 1876

Mycotretus laeviventris Crotch 1876: 454. Type locality: "Mexico". Alvarenga 1994: 28.

Lectotype, here designated (UMZC; Fig. 7C). "TYPE [blue label, printed] \ TYPE [printed], *laeviventris* Mex. [handwritten] \ LECTOTYPE [printed], *Mycotretus laeviventris* Crotch, 1876 [red label, handwritten]".

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Volcán Sn. Martín, Ver. 29/v/51, Alfredo Barrera [handwritten] \ Volcán Sn. Martín, VER. 29–V–51, A. Barrera. [printed] \ Comparado com tipo [printed] *Mycotretus laeiventris* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1766 [printed]”.

Distribution. Mexico.

33. *Mycotretus leopardus* Crotch, 1876

Mycotretus leopardus Crotch 1876: 451. Type locality: “Peru”. Alvarenga 1994: 37; Pecci-Maddalena & Lopes-Andrade 2018b: 4.

Lectotype (UMZC). Junior synonym of *M. tigrinus* Olivier, 1792 (see below). See discussion on the authorship of *M. leopardus* in Pecci-Maddalena & Lopes-Andrade (2018b).

34. *Mycotretus lissomoides* Crotch, 1876

Mycotretus lissomoides Crotch 1876: 455. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 28.

Lectotype, here designated (UMZC; Fig. 7D). “TYPE [blue label, printed] \ TYPE. [printed], lissomoides Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus lissomoides* Crotch, 1876 [red label, handwritten]”.

Distribution. North Brazil.

35. *Mycotretus mutabilis* Crotch, 1876

Mycotretus mutabilis Crotch 1876: 438. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 30.

Lectotype, here designated (UMZC; Fig. 7E). New junior synonym of *M. maculatus* Olivier, 1792 (Fig. 39E, see below).

36. *Mycotretus mycetophagoides mycetophagoides* Crotch, 1876

Mycotretus mycetophagoides Crotch 1876: 457. Type locality: “Para” [State of Pará, Brazil]. Alvarenga 1994: 30.

Lectotype, here designated (UMZC; Fig. 7F). “TYPE [blue label, printed] \ TYPE. [printed], mycetophagoides Para B. [handwritten] \ LECTOTYPE [printed], *Mycotretus mycetophagoides* Crotch, 1876 [red label, handwritten]”.

Distribution. North Brazil (Alvarenga 1994).

Remarks. Resembles *M. pulchellus* Lacordaire (Fig. 34F), but differs in having an entire yellow spot at the basal third of elytra, rather than a divided yellow spot. We have no specimen of *M. mycetophagoides* at hand, but comparison of their descriptions has shown they may be conspecific.

37. *Mycotretus mycetophagoides erythrocerus* Crotch, 1876

Mycotretus mycetophagoides erythrocerus Crotch 1876: 457 [as a variety]. Type locality: “Tapagos” [=Tapajós, in the state of Pará, North Brazil]. Alvarenga 1994: 30.

Lectotype, here designated (UMZC; Fig. 8A). “TYPE [blue label, printed] \ TYPE. [printed], erythrocerus Tapajos B [handwritten] \ LECTOTYPE [printed], *Mycotretus mycetophagoides erythrocerus* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Estirão do Equador, Amazonas, Brasil X. 1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus mycetophagoides* v. *erythrocerus* CR, 1876 [handwritten] M. Alvarenga det. [printed] 1989 [handwritten]”.

Distribution. North Brazil.

Remarks. We had no specimen of *M. mycetophagoides erythrocerus* for comparison with *M. mycetophagoides mycetophagoides*. The former may be an intraspecific variation of the latter, but we prefer not to synonymize it at this moment.

38. *Mycotretus mycetophiloides* Crotch, 1876

Mycotretus mycetophiloides Crotch 1876: 458. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 30.

Lectotype, here designated (UMZC; Fig. 8B). “TYPE [blue label, printed] \ TYPE. [printed], mycetophiloides Ega B [handwritten] \ LECTOTYPE [printed], *Mycotretus mycetophiloides* Crotch, 1876 [red label, handwritten]”.

Distribution. North Brazil.

39. *Mycotretus mycetophiloides careus* Crotch, 1876

Mycotretus mycetophiloides careus Crotch 1876: 458 [as a variety]. Type locality: “Ega” [=Tefé, Amazon, Brazil, type locality mentioned just on the type label]. Alvarenga 1994: 30.

Lectotype, here designated (UMZC; Fig. 8C). “TYPE [blue label, printed] \ TYPE. [printed], careus Ega B [handwritten] \ LECTOTYPE [printed], *Mycotretus mycetophiloides careus* Crotch, 1876 [red label, handwritten]”.

Distribution. North Brazil.

Remarks. We have no specimen of *M. mycetophiloides careus* at hand, but it is probably only an intraspecific variation of *M. mycetophiloides*.

40. *Mycotretus nigrotinctus* Crotch, 1876

Mycotretus nigrotinctus Crotch 1876: 454. Type locality: “Teapa” [state of Tabasco, Southeast Mexico]. Alvarenga 1994: 32.

Lectotype, here designated (UMZC; Fig. 8D). Junior synonym of *M. pallidior* (Crotch, 1876), (Fig. 9A, see below).

41. *Mycotretus nitescens* Crotch, 1876

Mycotretus nitescens Crotch 1876: 445. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 30.

Lectotype, here designated (UMZC; Fig. 8E). “TYPE [blue label, printed] \ TYPE. [printed], nitescens Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus nitescens* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ mex. [front] 56. 143 [back] [disc-shaped label, handwritten] \ Comparado com tipo [printed] *Mycotretus nitescens* Crotch, 1876 [handwritten] [handwritten] M. Alvarenga det. 1971 [printed] \ 1851 [printed] \ DZUP 132860 [printed]”.

Distribution. Mexico, Guatemala, Panama, North Brazil.

42. *Mycotretus opalescens* Crotch, 1876

Mycotretus opalescens Crotch 1876: 444. Type locality: “Santarem” [Santarém, in the state of Pará, North Brazil. Type locality not clearly separated from other localities in the original description, although it is unequivocally mentioned on the type label]. Alvarenga 1994: 31.

Mycotretus pelliciens Kirsch, 1876 **new synonym (Fig. 23A).** Kirsch 1876: 100. Type locality: “Peru”. Alvarenga 1994: 32.

Lectotype, here designated (UMZC; Fig. 8F). “TYPE [blue label, printed] \ TYPE. [printed], opalescens Santar. B. [handwritten] \ LECTOTYPE [printed], *Mycotretus opalescens* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 2 specimens (UMZC) “blue square [unwritten] \ Bates [printed] \ PARATYPE [blue label, printed] \ PARALECTOTYPE [printed], *Mycotretus opalescens* Crotch, 1876 [yellow label, handwritten]; 1 specimen (UMZC) “PARATYPE [blue label, printed] \ green square [unwritten] \ Bates [printed] \ PARALECTOTYPE [printed], *Mycotretus opalescens* Crotch, 1876 [yellow label, handwritten]; 1 specimen (UMZC) “PARATYPE [blue label, printed] \ Bates [printed] \ PARALECTOTYPE [printed], *Mycotretus opalescens* Crotch, 1876 [yellow label, handwritten]; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ TEFE, Amazonas BRASIL, 27 a 31-VII-1956, M. Alvarenga legit [printed] \ Comparado com tipo [printed] *Mycotretus opalescens* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1964 [printed] \ DZUP 136194 [printed]”; 1 specimen (MNRJ) “Coleção M. Alvarenga [printed] \ Estirão do Equador, Amazonas, Brasil X.1979, M. Alvarenga [printed] \ M [printed] \ mycotr. 723 [handwritten] \ peliciens ? [handwritten]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ TEFE, Amazonas BRASIL, 27 a 31-VII-1956, M. Alvarenga legit [printed] \ DZUP 136195 [printed]”; 1 specimen (MZSP) “BOLIVIA, tropica Region CHAPARÉ (400 mtr.) DIRINGS [front] JUN 1954 [back] [printed] \ *Mycotretus opalescens* Crotch [printed] \ *Mycotretus opalescens* [handwritten]”; 1 specimen (MZSP) “BOLIVIA, tropica Region CHAPARÉ (400 mtr.) DIRINGS [front] JUN 1954 [back] [printed] \ *Mycotretus opalescens* Crotch [printed]”. **Lectotype, here designated (SNSD; Fig. 23A).** “Pozuzu, M. Kirsch [printed] \ Typus [red label, printed] \ *Mycotretus peliciens* Kirsch Typus [handwritten] \ HOLOTYPUS [red label, printed] \ Staatl. Museum für Tierkunde Dresden [printed]”.

Distribution. Bolivia, North Brazil, Peru.

Remarks. *Mycotretus opalescens* differs from *M. peliciens* especially in the two central and elongated, barely separated pronotal spots and the basal elytral band with a small yellowish area close to the humeral angle. Aside from these small difference in coloration, which is expected to occur in conspecific *Mycotretus* from different localities, there is no morphological difference between these species to consider them separated entities.

43. *Mycotretus pallidior* (Crotch, 1876)

Ischyryus pallidior Crotch 1876: 428. Type locality: “Mexico”. Gorham 1888: 52 (*Mycotretus*); Alvarenga 1994:

Mycotretus nigrotinctus Crotch, 1876 (Fig. 8D); Crotch 1876: 454. Type locality: “Teapa” [in the state of Tabasco, Mexico]. Gorham 1888: 52 [junior synonym].

Lectotype, here designated (UMZC; Fig. 9A). “TYPE [blue label, printed] \ Mexico, Salle [green label, handwritten] \ Chevr. [printed] \ TYPE. [printed], pallidior [handwritten] \ LECTOTYPE [printed], Ischyryus pallidior Crotch, 1876 [red label, handwritten] \ *Mycotretus pallidior* (Crotch) [handwritten], det. I. Pecci-Maddalena 2017 [printed]”.

Other examined specimens. Lectotype, here designated (UMZC; Fig. 8D). “TYPE [blue label, printed] \ TYPE. [printed], nigrotinctus Teapa Chev [handwritten] \ = *Ischyryus pallidior* Cr H (?). S. G.10. 87 [handwritten] \ LECTOTYPE [printed], *Mycotretus nigrotinctus* Crotch, 1876 [red label, handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Mexico: Plan de Las Hayas, Edo. de Veracruz. 26–VI.1972, P. Reyes cols. [handwritten] \ Cafetal: Alt.-650-680 m. [handwritten] \ *Mycotretus pallidior* (Crotch, 1876) [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”; 1 specimen (MNRJ) “Coleção M. Alvarenga [printed] \ HONDURAS, Sta. B., 13 Km. SE. El Mochito, July 22, 1977 CW&L. O’Brien & Marchall [printed] \ mycotr. 715 [handwritten] \ *M. sexpunctatus* ? [handwritten] \ verificar o desenho na bca [handwritten]”.

Distribution. Mexico.

44. *Mycotretus parallelus* Crotch, 1876

Mycotretus parallelus Crotch 1876: 453. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 32.

Lectotype, here designated (UMZC; Fig. 9B). “TYPE [blue label, printed] \ TYPE. [printed], parallelus Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus parallelus* Crotch, 1876 [red label, handwritten]”.

Distribution. North Brazil.

45. *Mycotretus pebasensis* Crotch, 1876

Mycotretus pebasensis Crotch 1876: 439. Type locality: “Pebas” [Peru]. Alvarenga 1994: 32.

Lectotype, here designated (UMZC; Fig. 9C). “TYPE [blue label, printed] \ TYPE. [printed], Pebasensis Pebas [handwritten] \ LECTOTYPE [printed], *Mycotretus pebasensis* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Comparado com tipo [printed] *Mycotretus*

pebasensis Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ TABATINGA [printed], Amazonas Brasil [printed] iv. 1958 [handwritten] E. S. Lima [printed] \ 2029 [printed] \ DZUP 136162 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ TABATINGA [printed], Amazonas Brasil [printed] v. 1957 [handwritten] E. Sousa Lima [printed] \ 2030 [printed] \ Mycotretus 033 [handwritten] \ DZUP 136164 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ TABATINGA [printed], Amazonas Brasil [printed] v. 1957 [handwritten] E. Sousa Lima [printed] \ 2031 [printed] \ Mycotretus 033 [handwritten] \ DZUP 136163 [printed]”.

Distribution. Peru, North Brazil.

Remarks. The dissected female *M. pebasensis* has the pronotal black spot slightly “split”, resembling that of *M. separandus* (Fig. 10F). In fact, *M. pebasensis*, *M. separandus*, *M. egae* (Fig. 6C), *M. decoratus* (Fig. 13B) and *M. hilaris* (Fig. 31B) are morphologically similar, based on their color pattern, body shape and morphology of male genitalia. However, we noted a few differences on the sclerotization of the penile flagellum and its head morphology. These species may be synonyms, a decision that is not possible to be taken before examining more specimens and determining whether their variations are diagnostic for keeping species separated or constitutes intraspecific variation of a single species.

46. *Mycotretus peruae* Crotch, 1876

Mycotretus peruae Crotch 1876: 446. Type locality: “Peru”. Alvarenga 1994: 32.

Lectotype, here designated (UMZC; Fig. 9D). “TYPE [blue label, printed] \ TYPE. [printed], Peruae Peru Jans [handwritten] \ LECTOTYPE [printed], *Mycotretus peruae* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 specimen (UMZC) “PARATYPE [blue label, printed] \ PARALECTOTYPE [printed] ?”, *Mycotretus peruae* Crotch, 1876 [yellow label, handwritten]”.

Distribution. Unknown locality in Peru.

Remarks. One specimen placed close to the lectotype in the museum drawer has a single label in which it is written “PARATYPE”. In the Crotch collection, most specimens which appear to be types have an additional blue “TYPE” or “PARATYPE” label of unknown origin (Skelley 1998b). We considered this specimen a paralectotype of *M. peruae*, but included a question mark on its label. *Mycotretus peruae* is morphologically related to *M. bicolor* (Fig. 40A).

47. *Mycotretus psylloboroides* Crotch, 1876

Mycotretus psylloboroides Crotch 1876: 443. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil].
Alvarenga 1994: 33.

Lectotype, here designated (UMZC; Fig. 9E). “TYPE [blue label, printed] \ TYPE. [printed], psylloboroid. Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus psylloboroides* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ TEFÉ, Amazonas BRASIL, 27 a 31–VII–1956, M. Alvarenga legit [printed] \ Comparado com tipo [printed] *Mycotretus psylloboroides* Crotch., 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1838 [printed]”; 1 male (MNRJ, dissected) “BRASIL Pará, Serra dos Carajas, II. 1988, Roppa & Magro [printed]”.

Distribution. North Brazil.

Remarks. The dissected male specimen has the central elytral spot split into two elongated spots, whereas in the dissected female the spot is undivided (as in the lectotype). It would be important to better compare additional males and females of the species and evaluate whether that is a sexual dimorphism.

48. *Mycotretus quadripunctatus* Crotch, 1876

Mycotretus quadripunctatus Crotch 1876: 450. Type locality: “N. Peru” [Northern Peru, *apud* Alvarenga 1994].
Alvarenga 1994: 33.

Lectotype, here designated (UMZC; Fig. 9F). “TYPE [blue label, printed] \ TYPE. [printed], 4-punctatus N. Peru. Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus quadripunctatus* Crotch, 1876 [red label, handwritten]”.

Distribution. Colombia, Ecuador, Peru.

Remarks. As pointed out by Skelley (1998b), and confirmed here, the lectotype lacks prothorax and head.

49. *Mycotretus quattuordecimguttatus conjunctus* Crotch, 1876

Mycotretus quattuordecimguttatus conjunctus Crotch 1876: 440 [as a variety]. Type locality: unknown.
Alvarenga 1994: 34.

Lectotype, here designated (UMZC; Fig. 10A). New junior synonym of *M. pecari* Lacordaire, 1842 (Fig. 34C, see below).

50. *Mycotretus rastratus* Crotch, 1876

Mycotretus rastratus Crotch 1876: 445. Type locality: “S. Paulo” [São Paulo de Olivença, in the state of Amazon, North Brazil]. Alvarenga 1994: 34.

Lectotype, here designated (UMZC; Fig. 10B). New junior synonym of *M. fulvilabris* Crotch, 1876 (Fig. 6F, see above).

Distribution. North Brazil.

51. *Mycotretus reticulatus* Crotch, 1876

Mycotretus reticulatus Crotch 1876: 443. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 34.

Mycotretus lopesi Alvarenga, 1989 **new synonym** (Fig. 2C). Alvarenga 1989: 35. Type locality: “BRASIL, Pará: Jacareacanga” [Jacareacanga, in the state of Pará, North Brazil]. Alvarenga 1994: 28.

Lectotype, here designated (UMZC; Fig. 10C). “TYPE [blue label, printed] \ TYPE. [printed], reticulatus Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus reticulatus* Crotch, 1876 [red label, handwritten]”.

Other examined species. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ HOLOTIPO [red label, printed] \ Jacareacanga, Pará, Brasil, XII–1968, M. Alvarenga [printed] \ *Mycotretus lopesi* M. Alvarenga, 19 [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Rio Branco, Terr. do Acre BRASIL [printed], I. 1963, M. Alvarenga [handwritten] \ DZUP 132806 [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ CRUZEIRO do SUL, Acre Brasil, II–1963, M. Alvarenga leg. [printed] \ 1832 [printed] \ *Mycotretus reticulatus* Crotch, 1876 [handwritten] M. Alvarenga det. [printed] 1971 [handwritten]”.

Distribution. North Brazil.

Remarks. The examined specimens of *M. reticulatus* differ from the holotype of *M. lopesi* (Fig. 1C) only in the basal elytral fascia interrupted and the body length slightly bigger. Two dissected individuals have body color similar to that of *M. reticulatus* and are males, whereas the holotype of *M. lopesi* is a female. It shall be evaluate whether such small variation in color is a sexual dimorphism.

52. *Mycotretus sallei* Crotch, 1876

Mycotretus sallei Crotch 1876: 452. Type locality: “Mexico”. Alvarenga 1994: 34.

Lectotype, here designated (UMZC; Fig. 10D). “TYPE [blue label, printed] \ TYPE. [printed], Sallei Mexico Sallé [handwritten] \ LECTOTYPE [printed], *Mycotretus sallaei* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 male (BMNH, dissected) “Sp. figured [printed] \ Mexico. Salle Coll. [printed] \ Toxpam [printed] \ B.C.A., Col., VII. *Mycotretus* [printed] \ *Mycotretus sallaei* Crotch, apud Sallé [handwritten]”.

Distribution. Mexico.

53. *Mycotretus sanguinosus* Crotch, 1876

Mycotretus sanguinosus Crotch 1876: 458. Type locality: “N. Granada” [The old Viceroyalty of New Granada; without details in which country]. Alvarenga 1994: 34.

Lectotype, here designated (UMZC; Fig. 10E). New junior synonym of *M. coccineus* Lacordaire, 1842 (Fig. 27C, see below).

54. *Mycotretus separandus* Crotch, 1876

Mycotretus separandus Crotch 1876: 442. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 35.

Lectotype, here designated (UMZC; Fig. 10F). “TYPE [blue label, printed] \ TYPE. separandus Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus separandus* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Estirão do Equador, Amazonas, Brasil X. 1979, M. Alvarenga [printed] \ *Mycotretus separandus* Crotch, 1876 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten] \ M [printed]”.

Distribution. North Brazil.

55. *Mycotretus sericeonitens* Crotch, 1876

Mycotretus sericeonitens Crotch 1876: 445. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 35.

Lectotype, here designated (UMZC; Fig. 11A). “TYPE [blue label, printed] \ TYPE. [printed], sericeonitens Ega B [handwritten] \ LECTOTYPE [printed], *Mycotretus sericeonitens* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 specimen (UMZC) “PARATYPE [blue label, printed] \ green square [unwritten] \ Bates [printed] \ PARALECTOTYPE [printed], *Mycotretus sericeonitens* Crotch, 1876 [yellow label, handwritten].

Distribution. Ecuador, Peru, Bolivia, North Brazil.

Remarks. *Mycotretus sericeonitens* resembles *M. signatellus* (Fig. 11B) in body color and shape, and these species are morphologically closely related.

56. *Mycotretus sericeonitens monticola* Crotch, 1876

Mycotretus sericeonitens monticola Crotch 1876: 445 [as a variety]. Type locality: “Ecuador”. Alvarenga 1994: 35.

Type specimen. Not located.

Distribution. Unknown locality in Ecuador.

Remarks. As mentioned by Skelley (1998b), there is no *M. sericeonitens monticola* labeled in the Crotch collection. Recently, the senior author also examined that collection and did not find any *M. sericeonitens monticola* there.

57. *Mycotretus signatellus* Crotch, 1876

Mycotretus signatellus Crotch 1876: 443. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil]. Alvarenga 1994: 35.

Mycotretus signatellus imperfectus Crotch, 1876 [as a variety] **new synonym** (Fig. 11C). Crotch 1876: 443. Type locality: “Para” [State of Pará, North Brazil]. Alvarenga 1994: 35.

Mycotretus fragosoi Alvarenga, 1983 **new synonym** (Fig. 2B). Alvarenga 1983: 587. Type locality: “BRASIL, Amazonas, Estirão do Equador (coordenadas aproximadas, long 71°38’W e lat 4°33’S)” [Rio Javari, Estirão do Equador, in the state of Amazon, North Brazil]. Alvarenga 1994: 26.

Lectotype, here designated (UMZC; Fig. 11B). “TYPE [blue label, printed] \ TYPE [printed], signatellus Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus signatellus* Crotch, 1876 [red label, handwritten]”.

Other examined species. 1 specimen (UMZC) “Bates [printed] \ PARATYPE [blue label, printed] \ PARALECTOTYPE [printed], *Mycotretus signatellus* Crotch, 1876 [yellow label, handwritten]; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ TEFÉ, Amazonas BRASIL, 27 a 31-VII-1956, M. Alvarenga legit [printed] \ signatellus Crotch [handwritten] \ 1779 [printed]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ TEFÉ, Amazonas BRASIL, 27 a 31-VII-1956, M. Alvarenga legit [printed] \ Comparado com tipo

[printed] *Mycotretus signatellus* v. *imperfectus* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1778 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ TEFE, Amazonas BRASIL, 27 a 31-VII-1956, M. Alvarenga legit [printed] \ Comparado com tipo [printed] *Mycotretus signatellus* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ DZUP 132790 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ TEFE, Amazonas BRASIL, 27 a 31-VII-1956, M. Alvarenga legit [printed] \ DZUP 132792 [printed]”; 1 specimen (MNRJ) “Coleção M. Alvarenga [printed] \ HOLOTIPO [red label, printed] \ Estirão do Equador, Amazonas, Brasil X.1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus fragosoi* m. [handwritten] M. Alvarenga det. [printed] 1983 [handwritten]”. **Lectotype, here designated (UMZC; Fig. 11C).** “TYPE [blue label, printed] \ TYPE [printed], Var imperfecta Para Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus signatellus imperfecta* Crotch, 1876 [red label, handwritten]”; 1 male (MNRJ, dissected) “Marituba [printed] 24.10 [handwritten] -196 [printed] 1 [handwritten] \ Brasil, P A, J. & B. Bechyné [printed] \ MG [printed] \ 1772 [printed] \ *Mycotretus* 186 [handwritten]”.

Distribution. North Brazil.

Remarks. There is no morphological difference between the holotype of *M. fragosoi* (Fig. 2B) and the lectotype of *M. signatellus* (Fig. 11B). Despite small differences in body color between *M. signatellus* and *M. signatellus imperfectus*, there is no conspicuous difference in the morphology of their male genitalia. We have also observed that *M. signatellus* is morphologically closely related to *M. lacertosus* (Fig. 31E) based on similarities of their penille flagellum and body color.

58. *Mycotretus signatellus imperfectus* Crotch, 1876

Mycotretus signatellus imperfectus Crotch 1876: 443 [as a variety]. Type locality: “Para” [State of Pará, North Brazil]. Alvarenga 1994: 35.

Lectotype, here designated (UMZC; Fig. 11C). New junior synonym of *Mycotretus signatellus* Crotch, 1876 (Fig. 11B, see above).

Distribution. North Brazil.

59. *Mycotretus succinctus* Crotch, 1876

Mycotretus succinctus Crotch 1876: 452. Type locality: “N. Granada” [The old Viceroyalty of New Granada; without details in which country] . Alvarenga 1994: 36.

Lectotype, here designated (UMZC; Fig. 11D). “TYPE [blue label, printed] \ TYPE. succinctus, N. Gran Reiche. [handwritten] \ LECTOTYPE [printed], *Mycotretus succinctus* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 specimen (UMZC) “Col. [handwritten]”.

Distribution. Colombia.

Remarks. In the UMZC drawer, there is one specimen placed close to the lectotype and labeled “Col.” (handwritten), but we do not know whether it is a syntype and prefer not to label it as a paralectotype.

60. *Mycotretus tigrinus pardalis* Crotch, 1876

Mycotretus tigrinus pardalis Crotch 1876: 451 [as a variety]. Type locality: “Ecuador” [apud Alvarenga 1994].
Alvarenga 1994: 37; Pecci-Maddalena & Lopes-Andrade 2018b: 4.

Type specimen. Not located.

Distribution. Peru, Ecuador, North Brazil.

Remarks. Junior synonym of *M. tigrinus* Olivier, 1792 (Fig. 39F, see below). The type of *M. tigrinus pardalis* was not located in the Crotch collection.

61. *Mycotretus tricolor* Crotch, 1876

Mycotretus tricolor Crotch 1876: 444. Type locality: “Ega” [=Tefé, in the state Amazon, North Brazil].
Alvarenga 1994: 37.

Lectotype, here designated (UMZC; Fig. 11E). “TYPE [blue label, printed] \ TYPE. tricolor Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus tricolor* Crotch, 1876 [red label, handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ TABATINGA, Amazonas BRASIL [printed] X. 1958 [handwritten] F.M. Oliveira [printed] \ *Mycotretus tricolor* Crotch., 1876 [handwritten], M. Alvarenga det. [printed] 1971 [handwritten] \ PMMA [handwritten]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ TEFÉ, Amazonas Brasil [printed] VIII.1957 [handwritten] R. Carvalho [printed] \ Comparado com tipo [printed] *Mycotretus tricolor* Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1840 [printed] \ DZUP 132801 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ TABATINGA, Amazonas BRASIL [printed] Out. [handwritten]-1956 [printed], F.M.Oliveira [printed] \ 1839 [printed] \ DZUP 132802 [printed]”.

Distribution. Peru, North Brazil.

***Tritomapara triplacoides* (Crotch, 1876)**

Mycotretus triplacoides Crotch 1876: 447. Type locality: “Santarem” [=Santarém, in the state of Pará, North Brazil]. Gorham 1888: 72 (*Paratritoma*); Alvarenga 1994: 38 (*Tritomapara*).

Lectotype, here designated (UMZC; Fig. 11F) “TYPE [blue label, printed] \ TYPE. triplacoides Santar. Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus triplacoides* Crotch, 1876 [red label, handwritten]”.

Distribution. North Brazil.

Remarks. Although the scope of this study concerns only the genus *Mycotretus*, here we designate the lectotype of *T. triplacoides* (originally described in *Mycotretus*), see Material and Methods.

62. *Mycotretus xanthomelas* Crotch, 1876

Mycotretus xanthomelas Crotch 1876: 458. Type locality: “Para” [State of Pará, Brazil]. Alvarenga 1994: 37.

Lectotype, here designated (UMZC; Fig. 12A). “TYPE [blue label, printed] \ TYPE. xanthomelas Para Chev [handwritten] \ LECTOTYPE [printed], *Mycotretus xanthomelas* Crotch, 1876 [red label, handwritten]”.

Distribution. North Brazil.

Remarks. That’s one of the largest *Mycotretus* examined by us.

VII. Deelder, C.L.

63. *Mycotretus ornatus partialis* Deelder, 1942

Mycotretus ornatus partialis Deelder 1942: 88 [as a variety]. Type locality: “Cauca, Colombia” [Department of Cauca, Colombia]. Alvarenga 1994: 32.

Holotype (RMNH; Fig. 12B). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see below).

VIII. Delkeskamp, K.

(Fig. 12C–F)

64. *Mycotretus fidelis* Delkeskamp, 1939

Brachysphaenus (Barytopus) parallelus Kuhnt, 1909; Kuhnt 1909, nec Crotch, 1876; Kuhnt 1909:30 (*Brachysphaenus*). Type locality: “Peru”. Alvarenga 1994: 25.
Mycotretus fidelis Delkeskamp, 1939. Delkeskamp 1939: 27 [replacement name].

Holotype (MFN; Fig. 12C). “79163 [printed] \ Perum [?] Khimia [?] [green label, handwritten] \ Coll. Thieme [printed] \ Type [red label, printed] \ Barytopus parallelus Kuhnt [handwritten] \ HOLOTYPE, *Brachysphaenus (Barytopus) parallelus* Kuhnt, 1909, labelled by I. Pecci-Maddalena 2017 [printed] \ *Mycotretus fidelis* Delkeskamp, 1939, det. I. Pecci-Maddalena, 2017 [printed]”.

Distribution. Unknown locality in Peru.

Remarks. *Mycotretus fidelis* was described in *Brachysphaenus* Lacordaire (currently *Iphiclus* Chevrolat, *apud* Alvarenga 1994). Delkeskamp (1939) noted it belonged to *Mycotretus* and proposed the replacement name *M. fidelis* to solve the homonymy with *M. paralellus* Crotch (Fig. 9B).

65. *Mycotretus sexoculatus chaparensis* Delkeskamp, 1957

Mycotretus sexoculatus chaparensis Delkeskamp 1957: 98, 111. Type locality: “Bolivien, Chapare Gebiet, Oberer Rio Chipiriri, 400m” [Río Chipiriri, Province of Chapare, Cochabamba, Bolivia]. Alvarenga 1994: 35.

Holotype (ZSBS; Fig. 12D). “Chapare – Gebiet, Oberer Rio Chipiriri, 400 m [printed], 31.10.53 [handwritten] \ Bolivia 1954, leg. W. Forster [printed] \ Holotypus Nr.[red label, printed] \ *Mycotretus sexoculatus chaparensis* m. [handwritten], det. Delkeskamp 19 [printed] 57 [handwritten]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Chapare – Gebiet, Oberer Rio Chipiriri, 400 m [printed] 31.10.53 [handwritten] \ *Mycotretus sexoculatus chaparensis* m. [handwritten] det. Delkeskamp 19 [printed] 57 [handwritten] \ Paratypus [red label, printed] \ Bolivia 1954, leg. W. Forster [printed] 1694-A [handwritten]”.

Distribution. Bolivia.

Remarks. Information on paratypes is available in the original description by (Delkeskamp 1957) and are not repeated here.

66. *Mycotretus ziczac serenus* Delkeskamp, 1957

Mycotretus ziczac serenus Delkeskamp 1957: 99, 110. Type locality: “Bolivien, Rio Yacuma, Santa Rosa, 250 m” [village of Santa Rosa, Department of Beni, Bolivia]. Alvarenga 1994: 38.

Holotype (ZSBS; Fig. 12E). “Rio Yacuma, Santa Rosa, 250 m [printed], 13.7. [handwritten] \ BOLIVIA, 1950, leg. W. Forster [printed] \ Type [red label, printed] \ *Mycotretus ziczac* Kuhnt, ssp. *serenus* n. [?] [handwritten], det. Delkeskamp 19 [printed] 52 [handwritten]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ ACRE, Tarauacá, Werner col., XI-1956 [printed] \ *Mycotretus ziczac serenus* Delk. 1957 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. Bolivia.

67. *Mycotretus zischkai* Delkeskamp, 1957

Mycotretus zischkai Delkeskamp 1957: 98, 112. Type locality: “Bolivien, Chapare-Gebiet, Oberer Rio Chipiriri, 400 m” [Río Chipiriri, Province of Chapare, Cochabamba, Bolivia]. Alvarenga 1994: 38.

Holotype (ZSBS; Fig. 12F). New junior synonym of *M. cordiger* Crotch, 1876 (Fig. 5D, see above).

IX. Duponchel, P.A.J.

(Figs. 13, 14A–C)

68. *Mycotretus coronatus* (Duponchel, 1825)

Erotylus ornatus Duponchel 1825: 50. Type locality: “Brésil”. Lacordaire 1842: 141 (*Mycotretus*); Alvarenga 1994: 23.

Lectotype, here designated (MNHN; Fig. 13A). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see below).

69. *Mycotretus decoratus* (Duponchel, 1825)

Erotylus decoratus Duponchel 1825: 50. Type locality: “Brésil”. Lacordaire 1842: 172 (*Mycotretus*); Alvarenga 1994: 23.

Lectotype, here designated (MRSN; Fig. 13B). “D. Latreille [handwritten] \ LECTOTYPE [printed], *Erotylus decoratus* Duponchel, 1825 [handwritten] \ *Mycotretus decoratus* Duponchel [handwritten], det. I. Pecci-Maddalena 2017 [printed]”.

Other examined specimens. 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ OBIDOS, Pará BRASIL [printed], I. 1962 [handwritten], F.M. Oliveira [printed] \ *Mycotretus decoratus* (Dup.) [handwritten] \ M. Alvarenga det. [printed] 1964 [handwritten] \ DZUP 136175 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ TABATINGA, Amazonas BRASIL [printed], Out. [handwritten] -1956 [printed], F.M. Oliveira [printed] \ DZUP 136177 [printed]”.

Distribution. North Brazil.

Remarks. The lectotype is kept in the Collection of M. le marquis de Brême (MRSN) and has a green label “D. Latreille”. As pointed out by Duponchel (1825) “Cette espèce, qui n'avoit pas encore été décrite, fait partie de la collection de M. Latreille”.

70. *Mycotretus duodecimguttatus* (Duponchel, 1825)

Erotylus duodecimguttatus Duponchel 1825: 53. Type locality: “Brésil”. Lacordaire 1842: 164 (*Mycotretus*); Alvarenga 1994: 24.

Lectotype, here designated (MRSN; Fig. 13C). Junior synonym of *M. ocellatus* Germar, 1824 (see below).

71. *Mycotretus melanophthalmus* (Duponchel, 1825)

Erotylus melanophthalmus Duponchel 1825: 160. Type locality: “Brésil”. Lacordaire 1842: 179 (*Mycotretus*); Alvarenga 1994: 29.

Erotylus cinctellus Guérin-Méneville, 1841 **new synonym** (Fig. 22B). Guérin-Méneville 1841: 153–154. Type locality: “Bolivie”. Lacordaire 1842: 178 (*Mycotretus*); Alvarenga 1994: 22.

Mycotretus discoidalis Taschenberg, 1870 **new synonym** (Fig. 40D). Taschenberg 1870: 199. Type locality: “Colombia”. Alvarenga 1994: 24.

Lectotype, here designated (MRSN; Fig. 13D). “LECTOTYPE [printed] *Erotylus melanophthalmus* Duponchel, 1825 [handwritten] \ *Mycotretus melanophthalmus* (Duponchel, 1825) [handwritten] det. I. Pecci-Maddalena 2017 [printed]”.

Other examined specimens. Lectotype, here designated (MNHN; Collection Maurice Sedillot; Fig. 22B). “*Mycotretus cinctellus* [handwritten] \ *Coll. Thoms.* [printed] \ Brésil [printed] \ Type [printed]”. **Lectotype, here designated (ZNS; Fig. 40D).** LECTOTYPE, *Mycotretus discoidalis* TASCHENBERG, 1870, det. I. Pecci-Maddalena 2017 [printed] \ *discoidalis*, *Zeitschr. 1870. Colomb. Wallis* [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Chapare, Bolivia IV. 1953, A. Martinez [printed] \ *Mycotretus cinctellus* Guerin. 1841 [handwritten] \ M. Alvarenga det. [printed]”.

1984 [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Museo La Plata [printed] \ 11-1941 [handwritten] VILLA P. MONTI BURRUYACU, PROV. TUCUMAN [printed] \ *Mycotretus cinctellus* Guérin, 1841 [handwritten], M. Alvarenga det. [printed] 1971 [handwritten] \ *Mycolybas cinctellus* Guér-Comp. Col. Bruch [handwritten] \ 2018 [printed] \ PMFD [?] [handwritten]”; 1 female (MCNZ, dissected) “Derrubadas, RS, Parque Est. do Turvo, 12-17.I.2002, R. Ott col. [printed] \ Col. MCN. [printed] 218001 [handwritten]”; 1 female (MCNZ, dissected) “Tapes, RS (Faz. São Miguel), 17.XII.2003, Equipe Probio col. [printed] \ Col. MCN 225664 [printed]”; 1 male (MCNZ, dissected) “Tapes, RS (Faz. São Miguel), 17.XII.2003, Equipe Probio col. [printed] \ Col. MCN 225721 [printed]”; 1 male (MCNZ, dissected) “Triunfo, RS (COPEsul), 14-15.I.1997, L. Moura col. [printed] \ Col. MCN [printed] 215755 [handwritten] \ *M. melanophthalmus* [handwritten]”.

Distribution. From Central America to Argentina.

Remarks. *Mycotretus cinctellus* and *M. discoidalis* have almost identical black elytra, the unique difference being the scutellar shield that is black in *M. discoidalis* and yellowish-brown in *M. cinctellus*. On the other hand, *M. melanophthalmus* scutellar shield and elytra are completely yellowish-brown. We dissected specimens with these two phenotypes (black and yellowish-brown scutellar shield) and noted their male genitalia have the same morphology. That, together with similar body shape and congruent geographic distributions, support their synonymization here. The type-locality of *M. cinctellus* is Bolivia (Guérin-Méneville 1841: 154). However the specimen studied by us from MNHN is labeled “Type” and “Brésil”, which were very likely added posteriorly. We believe that was an inadvertent mistake, probably a “B.” in the original label erroneously read as “Brésil”.

72. *Mycotretus minutus* (Duponchel, 1825)

Erotylus minutus Duponchel 1825: 54. Type locality: “Brésil”. Lacordaire 1842: 154 (*Mycotretus*); Alvarenga 1994: 29.

Mycotretus quadrinus Lacordaire, 1842 (Fig. 35D). Lacordaire 1842: 155. Type locality: “Brésil”. Crotch 1876: 455 [junior synonym]; Alvarenga 1994: 29.

Type specimen. Not located.

Other examined specimens. 1 male specimen (DZUP, dissected; Fig. 13E) “IX [handwritten] 195 [printed] 2 [handwritten] \ Brasilien, Nova Teutonia, 27°11'B [?].52°23'L, Fritz Plaumann, 300 – 500 m [printed] \ DZUP 135192 [printed]”; 1 female (MCNZ, dissected) “Canela, RS, Barragem dos Bugres, 23.XI.1998, Franceschini col [printed] \ Col.

MCN [printed] 163.038 [handwritten] \ M. minutus [handwritten]”. **Lectotype, here designated (UMZC; Fig. 35D)**. TYPE. [printed] quadrinus Ch [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed] Mycotretus quadrinus Lacordaire, 1842 [red label, handwritten]”.

Distribution. Southern and southeastern Brazil.

Remarks. *Mycotretus minutus* resembles *M. pygmaeus* (Fig. 35C) in body shape and morphology of male genitalia. In the absence of larger series of named specimens for comparison, we prefer not to synonymize these species. Duponchel (1825) stated that *M. minutus* “(...) fait partie de la collection de M. le comte Dejean, qui l’a nommée *minutus*”. In the Brême collection (MRSN), there is one specimen labeled “D. Gyssele”, a name that sometimes appears in Dejean’s catalogue (although not close to the name “*minutus*”). We are still in doubt whether that specimen would be the primary type or not, therefore we prefer not to assign type status to it.

73. *Mycotretus nigropunctatus* (Duponchel, 1825)

Erotylus nigropunctatus Duponchel 1825: 51. Type locality: “Brésil”. Lacordaire 1842: 142 (*Mycotretus*); Alvarenga 1994: 30.

Lectotype, here designated (MRSN; Fig. 13F). New junior synonym of *M. ornatus* (Duponchel, 1825) (Fig. 14A, see below).

74. *Mycotretus ornatus* (Duponchel, 1825)

Erotylus ornatus Duponchel 1825: 49. Type locality: “Brésil”. Lacordaire 1842: 137 (*Mycotretus*); Alvarenga 1994: 31.

Mycotretus cognatus Lacordaire, 1842 **new synonym** (Fig. 27E). Lacordaire 1842: 145. Type locality: “Rio-janeiro” [=Rio de Janeiro, state? locality?, Southeast Brazil]. Alvarenga 1994: 22.

Mycotretus coronatus (Duponchel, 1825) **new synonym** (Fig. 13A). Duponchel 1825: 50 (*Erotylus*). Type locality: “Brésil”. Lacordaire 1842: 141 (*Mycotretus*) [error in type-locality]; Alvarenga 1994: 23 [error in type-locality].

Mycotretus difficilis Lacordaire, 1842 **new synonym** (Fig. 28A). Lacordaire 1842: 136. Type locality: “Brésil”. Alvarenga 1994: 24.

Mycotretus dispar Taschenberg, 1870 **new synonym** (Fig. 40E). Taschenberg 1870: 197. Type locality: “Colombia”. Alvarenga 1994: 24.

Mycotretus dubius Lacordaire, 1842 **new synonym** (Fig. 28E). Lacordaire 1842: 141. Type locality: “Brésil”. Alvarenga 1994: 24.

Mycotretus godarti Lacordaire, 1842 (Fig. 30D). Lacordaire 1842: 146. Type locality: “Colombie”. Gorham 1888: 47 [junior synonym of *M. ornatus*]; Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 31.

- Mycotretus graphoderus* Lacordaire, 1842 **new synonym** (Fig. 30F). Lacordaire 1842: 144. Type locality: “Brésil”. Alvarenga 1994: 26.
- Mycotretus graphoderus strigipennis* Kuhnt, 1910 [as a variety] **new synonym** (Fig. 24E). Kuhnt 1910: 244. Type locality: not mentioned [based on type label = “Brasilien”]. Alvarenga 1994: 26.
- Mycotretus graphoderus thoracicus* Kuhnt, 1910 [as a variety] **new synonym** (Fig. 24F). Kuhnt 1910: 244. Type locality: not mentioned [based on type label = “Brasilien”]. Alvarenga 1994: 27.
- Mycotretus intermedius* Lacordaire, 1842 **new synonym** (Fig. 31C). Lacordaire 1842: 135. Type locality: “Rio-Janeiro” [=Rio de Janeiro, state? locality?, Southeast Brazil]. Alvarenga 1994: 27.
- Mycotretus maculosus* (Duponchel, 1825) (Fig. 14B). Duponchel 1825: 52 (*Erotylus*). Type locality: “Brésil”. Lacordaire 1842: 140 (*Mycotretus*); Gorham 1888: 47 [junior synonym of *M. ornatus*]; Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 31.
- Mycotretus melanostictus* Lacordaire, 1842 (Fig. 33A). Lacordaire 1842: 139. Type locality: “Colombie”. Gorham 1888: 47 [junior synonym of *M. ornatus*]; Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 31.
- Mycotretus nigropunctatus* (Duponchel, 1825) **new synonym** (Fig. 13F). Duponchel 1825: 51 (*Erotylus*). Type locality: “Brésil”. Lacordaire 1842: 142 (*Mycotretus*). Alvarenga 1994: 30.
- Mycotretus ornatus partialis* Deelder, 1942 [as a variety] **new synonym** (Fig. 12B). Deelder 1942: 88. Type locality: “Cauca, Colombia” [Department of Cauca, Colombia]. Alvarenga 1994: 32.
- Mycotretus partialis* Mader, 1940 **new synonym** (Fig. 39A). Mader 1940: 12. Type locality: “Cauca in Colombien” [Department of Cauca, Colombia]. Alvarenga 1994: 32.
- Mycotretus posticus* Lacordaire, 1842 **new synonym**. Lacordaire 1842: 147. Type locality: “Colombie”. Crotch 1876: 450 [junior synonym of *M. godarti* Lacordaire]; Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 31.
- Mycotretus puncticolis* (Duponchel, 1825) **new synonym**. Duponchel 1825: 54 (*Erotylus*). Type locality: “Brésil”. Lacordaire 1842: 142 (*Mycotretus*) [junior synonym of *M. ornatus*]; Alvarenga 1994: 30.
- Mycotretus terminalis* Lacordaire, 1842 (Fig. 37C). Lacordaire 1842: 134. Type locality: “Rio-Janeiro” [=Rio de Janeiro, state? locality?, Southeast Brazil]. Gorham 1888: 47 [junior synonym of *M. ornatus*]. Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 32.

Lectotype, here designated (MRSN; Fig. 14A). “Myc. Ornatus. Type [handwritten]” \ LECTOTYPE [printed] *Erotylus ornatus* Duponchel, 1825 [handwritten] \ *Mycotretus ornatus* (Duponchel) [handwritten] det. I Pecci-Maddalena 2017 [printed]”.

Other examined specimens. *Mycotretus cognatus* Lacordaire, 1842. Lectotype, here designated (RBINS; Fig. 27E). “Coll. R.I.Sc.N.B., Brazil, Coll. Chapuis [printed], Rio Jan. [handwritten] \ *Mycotretus cognatus*, Rio Jan. Lac. [handwritten]”. ***Mycotretus coronatus* (Duponchel, 1825). Lectotype, here designated (MNHN; Fig. 13A).** “Campos geraés [handwritten] \ *coronatus* [handwritten] \ *Mycotretus coronatus* Duponch [handwritten] \ Lectotipo [red label, printed] \ *Mycotretus coronatus* (Duponchel) [handwritten] det. I. Pecci-Maddalena 2017 [printed]”. ***Mycotretus dispar* Taschenberg, 1870. Lectotype, here**

designated (ZNS). (image not available). LECTOTYPE, *Mycotretus dispar* TASCHENBERG, 1870, det. I. Pecci-Maddalena 2017 [printed] \ *dispar**, *Zeitschr. 1870. Colomb. Wallis* [handwritten]”. ***Mycotretus dubius* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 28E).** “*Brésil* [handwritten] \ *Dubius Lac* [handwritten] \ *Type* [handwritten] \ Ex-Musaeo Mniszech [printed] \ LECOTYPE [printed] *Mycotretus dubius* Lacordaire, 1842 [handwritten]”. ***Mycotretus godarti* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 30D).** “Ex-Musaeo Mniszech [printed] \ *Type* [handwritten] \ *Godartii Lac* [handwritten] \ *Colombie* [handwritten] \ LECOTYPE [printed] *Mycotretus godartii* Lacordaire, 1842 [handwritten]”. ***Mycotretus graphoderus* Lacordaire, 1842. Lectotype, here designated (UMZC; Fig. 30F).** “TYPE. [printed] *graphoderus Ch* [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed] *Mycotretus graphoderus* Lacordaire, 1842 [handwritten]”. ***Mycotretus graphoderus strigipennis* Kuhnt, 1910. Lectotype, here designated (MFN; Fig. 24E).** “21308 [printed] \ var. *peitore pedibusque nigris*. *Brasil Sello* [handwritten] \ *Brasilien* [printed] \ det. P. Kuhnt [printed] *Mycotretus graphoderus* var. *strigipennis* Kuhnt [handwritten] \ *Type* [red label, printed] \ Kuhnt det. [printed] \ LECTOTYPE *Mycotretus graphoderus strigipennis* Kuhnt, 1910 det. I. Pecci-Maddalena 2017 [red label, printed]. ***Mycotretus graphoderus thoracicus* Kuhnt, 1910. Lectotype, here designated (MFN; Fig. 24F).** “90399 [printed] \ *Brasilien* [printed] \ *Type* [red label, printed] \ det. P. Kuhnt [printed] *Mycotretus graphoderus* var. *thoracicus* Kuhnt [handwritten] \ Kuhnt det. [printed] \ LECTOTYPE *Mycotretus graphoderus thoracicus* Kuhnt, 1910 det. I. Pecci-Maddalena [red label, printed]. ***Mycotretus intermedius* Lacordaire, 1842. Lectotype, here designated (MRSN; Fig. 31C).** “*Lacordaire* [handwritten] \ LECTOTYPE [printed] *Mycotretus intermedius* Lacordaire, 1842 [handwritten]”. ***Mycotretus maculosus* (Duponchel, 1825). Lectotype, here designated (MRSN; Fig. 14B).** “*maculifrons* Chevrolat. [handwritten] \ *femoratus* Chevrolat. [handwritten]”. ***Mycotretus melanostictus* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 33A).** “Ex-Musaeo Mniszech [printed] \ *Type* [handwritten] \ *Melanostictus Lac* [handwritten] \ *Colombie* [handwritten] \ LECOTYPE [printed] *Mycotretus godartii* Lacordaire, 1842 [handwritten]”. ***Mycotretus ornatus partialis* Deelder, 1942. Holotype (RMNH; Fig. 12B).** “*Cauca, Columb.* [printed] \ *Holotypus* [printed] \ *Staudinger* 1917 [printed] \ *Mycotretus partialis* [handwritten] \ MUSEUM LEIDEN [printed] *Mycotretus ornatus* Dup. [handwritten] *Det. C. Deelder* 1942 [printed] \ MUSEUM LEIDEN [printed] *Var. partialis. Dldr.* [handwritten] *Det. C. Deelder* 1942 [printed]”. ***Mycotretus partialis* Mader, 1940. Holotype (NMBS; Fig. 39A).** “*Cauca, Columb.* [printed] \ *Holo-*[handwritten] *TYPUS.* [printed] *partialis M.* [handwritten] \ *M. partialis* Kuhnt [handwritten]”. ***Mycotretus terminalis* Lacordaire, 1842. Holotype**

(MRSN; Fig. 37C). “Lacordaire [handwritten] \ Holotype, *Mycotretus terminalis* Lacordaire, 1842 [handwritten]”; 1 specimen (MZSP; Fig. 28A) “Brasilien, Nova Teutonia, Santa Catharina [printed], 3.1935 [handwritten], B.Pohl [printed] \ *Mycotretus difficilis* lac. [handwritten]”; 1 male (MNRJ, dissected; Fig. 40E) “Santa Jnéz, (Ecuad.), R.Haensch S. [printed] \ *Mycotretus dispar* Tasch., 1870 [handwritten] M. Alvarenga det. 1971 [printed] \ Coleção M. Alvarenga [printed]”; 1 specimen, *Mycotretus nigropunctatus* (Duponchel, 1825) (MRSN; Fig. 13F) “Lacordaire [handwritten]”; 1 male (MCNZ, dissected) “Rio Grande, RS, 17/X/76, ey. Becker. [handwritten] leg. [printed] \ Col MCN 26.759 [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ CORCOVADO, Guanabara BRASIL [printed], XII. 1967 [handwritten], Alvarenga & Seabra [printed] \ DZUP 135988 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ CORCOVADO, Guanabara BRASIL [printed], X. 1969 [handwritten], Alvarenga & Seabra [printed] \ DZUP 135987 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo, Brasil, I-1969, W. Bokermann [printed] \ 2345 [printed] \ *nigropunctatus* Dup. [handwritten] \ DZUP 136014 [printed]”; 1 male (CELC, dissected) “Erotylidae [printed] \ BRASIL-MG, Viçosa-UFV [printed], 16/III/98 [handwritten], MARIANO, CSF [printed]”; 1 male (MCNZ, dissected) “Col MCN 26.760 [handwritten] \ Rio Grande, 17/X/76, ey. Becker. [handwritten] leg. [printed]”; 1 male (MCNZ, dissected) “Triunfo/RS (Copesul), 03/V/2000, R. Araujo col. [printed] \ Col. MCN [printed] 167.259 [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Inst. M. Lillo [printed] \ Cotomayo. Salta. R.A. 22.II.1960, R. Golbach [printed] \ 2274 [printed] \ DZUP 136349 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Bra de Riquête [?], 1500 m P. Moreira, MG. XII. 1957 [handwritten] \ DZUP 136023 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ CAMPOS do JORDÃO, S. Paulo BRASIL, XI-1957, K. Lenko leg. [printed] \ DZUP 136094 [printed]”; 1 male (MCNZ, dissected) “Cambará do Sul, RS, 19-21/XII/ 1994, A. Franceschini [handwritten] \ Col. MCN 238412 [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ PARATYPUS [printed] \ Cauca, Columb. [printed] \ *Mycotretus partialis* Mader, 1940 [handwritten]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ CAMPOS do JORDÃO, S. Paulo BRASIL, XI-1957, K. Lenko leg. [printed] \ Comparado com tipo [printed] *Mycotretus graphoderes* Lac., 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ 2257 [printed] \ DZUP 136064 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ CAMPOS do JORDÃO, S. Paulo BRASIL, XI-1957, K. Lenko leg. [printed] \ Comparado com tipo [printed] *Mycotretus graphoderes* v. *strigipennis* Kuhnt., 1910 [handwritten] M. Alvarenga det. 1971 [printed] \ 2251 [printed] \

DZUP 136065 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ PARATYPUS [printed] \ Cauca, Columb. [printed] \ *Mycotretus partialis* Mader, 1940 [handwritten] \ DZUP 311170 [printed]”;

Distribution. Neotropical region.

Remarks. **1)** As already pointed out by Gorham (1888), *M. ornatus* (Duponchel) “is one of the most variable species of the Erotylidae, hence descriptions founded upon colour alone are of little value”. Gorham (1888) synonymized five species under *M. ornatus* (see heading above) mentioning that “species cited as synonymous present absolutely no structural difference and probably several others described by Lacordaire are in the same position”. In fact, we dissected several male individuals phenotypically close to the species synonymized here, as well specimens showing other color variations, and their genitalia have exactly the same morphological pattern. Therefore, eighteen synonyms are here included under *M. ornatus*. **2)** We observed, based on color pattern and morphology of male genitalia, that *M. ornatus* is morphologically closely related to *M. scitulus* Lacordaire (Fig. 36E), *M. expressus* Kuhnt (Fig. 24C), *M. dorsonotatus* Lacordaire (Fig. 28D), *M. fallax* (Guérin-Ménéville) (Fig. 22C) and *M. fasciolatus* Lacordaire (Fig. 29C). **3)** The labels of the lectotype of *M. coronatus* (Duponchel) (Fig. 13A’, new synonym of *M. ornatus*) seems to preserve its full story: (i) the disc-shaped label has the name “Campos geraés” (Campos Gerais) that is one of the places in which Augustin F. C. P de Saint-Hilaire (who collected that specimen (Duponchel 1825: 51)) visited in his expedition through Brazil from 1816 to 1822 (see Papavero 1971). The region of Campos Gerais corresponds to a place close to Curitiba, the capital of the state of Paraná in South Brazil (Pereira & Iegelski 2004) and the specimen may have been collected in 1820, the year in which Saint-Hilaire visited there (see Papavero 1971); (ii) The letter of the label “coronatus” resembles that of Saint-Hilaire who, probably, may have also suggested that name to Duponchel, the latter describing the species as “*Erotylus coronatus*” in 1825; (iii) The letter of the label “*Mycotretus coronatus* Duponchel” resembles a lot that of Lacordaire (see Horn *et al.* 1990: 507, an example of Lacordaire lettering). Lacordaire, transferred that species from *Erotylus* to *Mycotretus* (Lacordaire 1842: 141) and it is worth to note that he makes a mistake mentioning that the examined *M. coronatus* would have been collected in “Minas Geraes” (Minas Gerais), a state from Southeast Brazil; (iv) The printed label “Lectotipo” (in Portuguese) follows the pattern used by Moacyr Alvarenga, who visited some European Natural History Museums in the 60s. However, although Alvarenga may have labeled this specimen, he never published any lectotype designation; (v) The last label was recently added by the senior author and includes the current identification of the species. **4)** Lacordaire (1842:137) synonymized *Mycotretus pectoralis*, a name that appears in the Dejean

Catalogue (1836), with *M. ornatus*. However, the former species has never been described and was mentioned in literature few times (e.g. Gemminger & Harold 1876; Gorham 1888), being absent in the two main catalogues containing Neotropical Erotylidae (i.e. Blackwelder 1945; Alvarenga 1994). Furthermore, we did not locate its type in any of the examined collections. Therefore, here we considered the name *Mycotretus pectoralis* a *nomen nudum*.

75. *Mycotretus puncticolis* (Duponchel, 1825)

Erotylus puncticolis Duponchel 1825: 54. Type locality: “Brésil”. Lacordaire 1842: 142 (*Mycotretus*) [junior synonym of *M. ornatus*]; Alvarenga 1994: 30.

Type specimen. Not located. New junior synonym of *M. ornatus* (Duponchel, 1825), (Fig. 14A, see above).

Remarks. Lacordaire (1842) synonymized *M. puncticollis* under *M. nigropunctatus* (one of the new junior synonyms of *M. ornatus* proposed here, see above). Based on the description and redescription of *M. puncticollis* (Duponchel 1825: 54 and Lacordaire 1842: 142), we’ve noted that this species is just another variation of *M. ornatus* and, therefore.

76. *Mycotretus sanguineus* (Duponchel, 1825)

Erotylus sanguineus Duponchel 1825: 54. Type locality: “Brésil”. Lacordaire 1842: 187 (*Mycotretus*); Alvarenga 1994: 34.

Lectotype, here designated (MRSN; Fig. 14C). “ruidulus Chevrolat [handwritten] \ LECTOTYPE [printed] *Erotylus sanguineus* Duponchel, 1825 [handwritten] \ *Mycotretus sanguineus* (Duponchel) [handwritten] det. I. Pecci-Maddalena 2017 [printed]”.

Other examined specimens. 1 female (MCNZ, dissected) “Viamão, RS, 08/X/1997, L. Moura [handwritten] leg. [printed] \ Col. MCN 238468 [printed]”; 1 male (DZUP, dissected) “Corcovado [handwritten], Rio de Janeiro [printed], 21.10. [handwritten]1945[printed], WYGODZINSKY L. [printed] \ *Mycotretus sanguineus* Dup. [handwritten] J. Guerin. det. 194 [printed]8[handwritten] \ DZUP 132947 [printed]”.

Distribution. Colombia. Southeast Brazil.

X. Fauvel, C.A.A.

77. *Mycotretus unicolor* Fauvel, 1860

Mycotretus unicolor Fauvel 1860: 326. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 37.

Type specimen. Not located.

Remarks. New junior synonym of *M. coccineus* Lacordaire, 1842 (Fig. 27C, see below). Part of the Fauvel's collection is now in the Royal Belgian Institute of Natural Sciences, RBINS (Horn *et al.* 1990) and the specimen shown in Fig. 14D belongs to that collection. Although it is a "topotype", we believe that this specimen is not that used by Fauvel on his description. According to Fauvel (1860: 326): "(...) Palpes, épistome et base des antennes tescés (...)" and after: "L'exemplaire unique que j'ai sous les yeux perdu ses antennes moins deux articles de chaque côté". We did not examine the individual shown in plate (Fig. 14D; image sent by the RBINS curator); however, it is possible to note that its right antennal club is present and, therefore, that specimen may not be Fauvel's type.

XI. Germar, E.F.

78. *Mycotretus conspersus* (Germar, 1824)

Erotylus conspersus Germar 1824: 614. Type locality: "Brasilia". Lacordaire 1842: 145 [junior synonym of *M. tigrinus* Olivier, 1792, Fig. 39F, see below]

Type specimen. Not located.

79. *Mycotretus humeralis* (Germar, 1824)

Erotylus humeralis Germar 1824: 614. Type locality: "Brasilia". Lacordaire 1842: 189 (*Mycotretus*); Alvarenga 1994: 27.

Type specimen. Not located.

Distribution. Unknown locality in Brazil.

80. *Mycotretus ocellatus* (Germar, 1824)

Erotylus ocellatus Germar 1824: 613. Type locality: "Brasilia". Lacordaire 1842: 164 (*Mycotretus*) [invalid junior synonym of *M. duodecimguttatus* (Duponchel, 1825)]; Crotch 1876: 441 [followed the Principle of Priority and included *M. duodecimguttatus* (Duponchel, 1825) under *M. ocellatus* (Germar, 1824); Alvarenga 1994: 24.

Mycotretus duodecimguttatus (Duponchel, 1825) (Fig. 13C). Duponchel 1825: 53 (*Erotylus*). Type locality: "Brésil". Lacordaire 1842: 164 (*Mycotretus*); Crotch 1876: 441 [junior synonym of *M. ocellatus* Germar, 1824]; Alvarenga 1994: 24.

Type specimen. Not located.

Other examined specimens. *Mycotretus duodecimguttatus* (Duponchel, 1825). **Lectotype, here designated** (MRSN; Fig. 13C). “polyomatus chevrolat [green label, handwritten] \ LECTOTYPE [printed], *Erotylus duodecimguttatus* Duponchel, 1825 [handwritten] \ *Mycotretus duodecimguttatus* (Duponchel) [handwritten], det. I. Pecci-Maddalena 2017 [printed]”; 1 female (MNRJ, dissected) “Rondônia – BRASIL [printed], Ouro Preto do Oeste, X. 1983-Roppa e Silva [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed], II. 1967 [handwritten], F.M. Oliveira [printed] \ *Mycotretus duodecimguttatus* (Dup. 1826) [handwritten], M. Alvarenga det. [printed] 1984 [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed], XI. 1960 [handwritten], F.M. Oliveira [printed] \ DZUP 371288 [printed]”.

Distribution. Colombia, Peru, South, North and Southeast Brazil.

Remarks. We did not locate the type repository for any of the Germar species cited here. The lectotype of *M. duodecimguttatus* (Duponchel) is kept in the Collection of M. le marquis de Brême (MRSN). Dejean (1836) indicated the synonymy of the specific name “*polyomatus chevrolat*” listed under the name “*Duodecimgutattus*. Dej.”, by placing both names within a single bracket. The name “*polyomatus*” is a *nomen nudum*, and appears only in the catalogue of Gemminger & Harold (1876) under the name “12-guttatus Duponch”, both names being synonyms of *M. ocellatus* Germar. We have located only that “*polyomatus*” specimen, among the Dejean specimens in the Brême collection. Duponchel (1825) has not mentioned the name of Chevrolat on his description of *M. duodecimguttatus*. However, it is known that Chevrolat exchanged specimens with notable entomologists throughout his life (Latreille, Duméril, Dejean, and Guérin) (Reiche 1884). We considered that this “*polyomatus* specimen” was already kept in the Brême collection, together with many of Dejean’s specimens, by the time Duponchel (1825) made his descriptions and, therefore, we selected the “*polyomatus*” as the lectotype of *M. duodecimguttatus*.

XII. Gorham, H.S.

(Figs. 14E–F, 15–20, 21A–C)

81. *Mycotretus aegrotus* Gorham, 1888

Mycotretus aegrotus Gorham 1888: 60. Type locality: “Costa Rica, Volcan de Irazu” [province of Cartago, Costa Rica]. Alvarenga 1994: 20.

Lectotype, here designated (BMNH; Fig. 14E). “B.C.A.,Col.,VII. Mycotretus [printed] \ Irazu, 6, 7000 ft., H. Rogers. [printed] \ aegrotus G. [handwritten] \ Type [disc-shaped label, printed] \ LECTOTYPE [printed] *Mycotretus aegrotus* Gorham, 1888 [printed]”.

Other examined specimens. 1 specimen (BMNH) “Irazu, Costa Rica, Rogers [handwritten] \ aegrotus, G. [handwritten] \ B.C.A.,Col.,VII, Mycotretus [printed] \ PARALECTOTYPE *Mycotretus aegrotus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Irazu, Costa Rica, Rogers [handwritten] \ M. aegrotus, G. [handwritten] \ B.C.A.,Col.,VII, Mycotretus [printed] \ PARALECTOTYPE *Mycotretus aegrotus* Gorham, 1888 [printed]”.

Distribution. Costa Rica.

Remarks. According to Gorham (1888): “Of six examples obtained, three are rather immature”. We have located only three syntypes in BMNH, including the one considered by us as the lectotype, which indeed also resembles a teneral.

82. *Mycotretus alternans* Gorham, 1888

Mycotretus alternans Gorham 1888: 57. Type locality: “Panama, Bugaba”. Alvarenga 1994: 20.

Lectotype, here designated (BMNH; Fig. 14F). New junior synonym of *M. dorsonotatus* Lacordaire, 1842 (Fig. 28D, see below).

83. *Mycotretus atricaudatus* Gorham, 1888

Mycotretus atricaudatus Gorham 1888: 66. Type locality: “Panama, Volcan de Chiriqui, 300 feet”. [province of Chiriquí, Panama]. Alvarenga 1994: 21.

Holotype (BMNH; Fig. 15A). “B.C.A.,Col.,VII. Mycotretus [printed] \ Mycotretus atricaudatus [handwritten] \ V. de Chiriqui, below 4,000 ft, Champion [printed] \ Type. Sp. figured. [printed] \ Type [disc-shaped label, printed] \ HOLOTYPE *Mycotretus atricaudatus* Gorham, 1888 [printed]”.

Distribution. Panamá.

84. *Mycotretus badius* Gorham, 1888

Mycotretus badius Gorham 1888: 70. Type locality: “Guatemala, San Juan in Vera Paz”. Alvarenga 1994: 21.

Lectotype, here designated (BMNH; Fig. 15B). “B.C.A.,Col.,VII. Mycotretus [printed] \ Mycotretus badius, G. [handwritten] \ San Juan, Vera Paz. Champion. [printed] \ Type [disc-shaped label, printed] \ LECTOTYPE *Mycotretus badius* Gorham, 1888 [printed]”.

Distribution. Guatemala.

85. *Mycotretus bipunctatus* Gorham, 1888

Mycotretus bipunctatus Gorham 1888: 58. Type locality: “Panama, Bugaba”. Alvarenga 1994: 21.

Lectotype, here designated (BMNH; Fig. 15C). “Bugaba, 800–1,500 ft. Champion. [printed] \ B.C.A.,Col.,VII. Mycotretus [printed] \ Mycotretus bipunctatus, Gor. [handwritten] \ Type [disc-shaped label, printed] \ LECTOTYPE *Mycotretus bipunctatus* Gorham, 1888 [printed]”.

Other examined specimens. 1 male (BMNH, dissected) “Bugaba, 800–1,500 ft. Champion. [printed] \ B.C.A.,Col.,VII. Mycotretus [printed] stramineus [handwritten] \ PARALECTOTYPE, *Mycotretus bipunctatus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Bugaba, Panama. Champion. [printed] \ B.C.A.,Col.,VII. Mycotretus [printed] stramineus [handwritten] \ PARALECTOTYPE, *Mycotretus bipunctatus* Gorham, 1888 [printed]”.

Distribution. Panama.

Remarks. The lectotype is probably a teneral.

86. *Mycotretus brevis* Gorham, 1888

Mycotretus brevis Gorham 1888: 67. Type locality: “Panama, Bugaba”. Alvarenga 1994: 21.

Holotype (BMNH; Fig. 15D). “B.C.A.,Col.,VII. Mycotretus [printed] \ Mycotretus brevis Gr [handwritten] \ Bugaba, Panama. Champion. [printed] \ Type [disc-shaped label, printed] \ HOLOTYPE *Mycotretus brevis* Gorham, 1888 [printed]”.

Distribution. Panama.

87. *Mycotretus cercyonoides* Gorham, 1888

Mycotretus cercyonoides Gorham 1888: 67. Type locality: “Panama, David” [province of Chiriquí, Panama]. Alvarenga 1994: 22.

Lectotype, here designated (BMNH; Fig. 15E). “B.C.A.,Col.,VII. Mycotretus [printed] \ Mycotretus cercyonides [handwritten] \ David, Panama. Champion. [printed] \ Type [disc-shaped label, printed] \ LECTOTYPE *Mycotretus cercyonoides* Gorham, 1888 [printed] (left) [handwritten]”.

Other examined specimens. 1 specimen (BMNH) “B.C.A.,Col.,VII. Mycotretus [printed] \ Mycotretus cercyonides [handwritten] \ David, Panama. Champion. [printed] \

Type [disc-shaped label, printed] \ PARALECTOTYPE *Mycotretus cercyonoides* Gorham, 1888 [printed] (right) [handwritten]”.

Distribution. Panama.

Remarks. The lectotype and paralectotype are mounted on the same card and, therefore, we included their type labels on that same pin. The lectotype is on the left and the paralectotype is on the right side of the card. Only the lectotype is shown here (Fig. 15E).

88. *Mycotretus coccidulinus* Gorham, 1888

Mycotretus coccidulinus Gorham 1888: 63. Type locality: “British Honduras, Belize, R. Hondo” [Hondo river, Belize]. Alvarenga 1994: 22.

Lectotype, here designated (BMNH; Fig. 15F). “B.C.A.,Col.,VII. *Mycotretus* [printed] \ *M. coccidulinus* [handwritten] \ Rio Hondo, B Honduras., Blancaneau. [printed] \ Type. Sp. figured. [printed] \ Type [disc-shaped label, printed] \ LECTOTYPE *Mycotretus coccidulinus* Gorham, 1888 [printed]”.

Other examined specimens. 1 specimen (BMNH) “Chiacaman, Vera Paz. Champion [printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] *coccidulinus* [handwritten] \ PARALECTOTYPE *Mycotretus coccidulinus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Capetillo, Guatemala. C. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] *coccidulinus* [handwritten] \ PARALECTOTYPE *Mycotretus coccidulinus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Belize. Blancaneaux. [printed] \ *coccidulinus* [handwritten] \ B.C.A., Col., VII. *Mycotretus* [printed]”;

Distribution. Belize, Guatemala.

89. *Mycotretus consanguineus* Gorham, 1888

Mycotretus consanguineus Gorham 1888: 61. Type locality: “Guatemala, Cubilguitz”. Alvarenga 1994: 22.

Lectotype, here designated (BMNH; Fig. 16A). “B.C.A.,Col.,VII. *Mycotretus* [printed] \ *M. consanguineus* Gorham [handwritten] \ Cubilguitz, Vera Paz. Champion. [printed] \ Type. Sp. figured. [printed] \ Type [disc-shaped label, printed] \ LECTOTYPE *Mycotretus consanguineus* Gorham, 1888 [printed]”.

Other examined specimens. 1 male (BMNH, dissected) “Bugaba, Panama. Champion. [printed] \ *M. consanguineus* [handwritten] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ PARALECTOTYPE *Mycotretus consanguineus* Gorham, 1888 [printed]”.

Distribution. Guatemala, Panama.

90. *Mycotretus cribratus* Gorham, 1888

Mycotretus cribratus Gorham 1888: 64. Type locality: “Panama, Bugaba”. Alvarenga 1994: 23.

Lectotype, here designated (BMNH; Fig. 16B). “Bugaba, Panama. Champion. [printed] \ *Mycotretus cribratus* Gorh. [handwritten] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ Type [disc-shaped label, printed] \ LECTOTYPE *Mycotretus cribratus* Gorham, 1888 [printed]”.

Other examined specimens. 1 specimen (BMNH, on left, on the same card of lectotype) “Bugaba, Panama. Champion. [printed] \ *Mycotretus cribratus* Gorh. [handwritten] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ Type [disc-shaped label, printed] \ PARALECTOTYPE *Mycotretus cribratus* Gorham, 1888 [printed]”; 8 specimens (BMNH, two on each card) “Bugaba, Panama. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ PARALECTOTYPE *Mycotretus cribratus* Gorham, 1888 [printed]”.

Distribution. Guatemala, Panama.

Remarks. We observed individuals from Guatemala close to the ones from Panama, but we did not consider them as syntypes. According to Gorham (1888: 64): “The Guatemalan specimens are apparently referable to the same species; but I regard the Bugaba examples as typical, it being from them that the description is made”. The lectotype and one paralectotype are mounted on the same card and we considered the right one (apparently better preserved, with its intact six legs) as being the lectotype. Only the lectotype is shown here (Fig. 16B).

91. *Mycotretus crudus* Gorham, 1888

Mycotretus crudus Gorham 1888: 63. Type locality: “Mexico, Atlisco in Puebla” [=Atlixco, in the state of Puebla]. Alvarenga 1994: 23.

Holotype (BMNH; Fig. 16C). “[?, Handwritten] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ *M. crudus* G. [handwritten] \ Atlisco, Puebla. Höge. [printed] \ Type [disc-shaped label, printed] \ HOLOTYPE *Mycotretus crudus* Gorham, 1888 [printed]”.

Distribution. Mexico.

92. *Mycotretus cruentus* Gorham, 1888

Mycotretus cruentus Gorham 1888: 59. Type locality: “Guatemala, Zapote, San Juan in Vera Paz, Senahu”. Alvarenga 1994: 23.

Lectotype, here designated (BMNH; Fig. 16D). “B.C.A.,Col.,VII. Mycotretus [printed] \ M. cruentus [handwritten] \ Senahu, Vera Paz. Champion. [printed] \ Type. Sp. figured. [printed] \ Type [disc-shaped label] \ LECTOTYPE *Mycotretus cruentus* Gorham, 1888 [printed]”.

Other examined specimens. 1 specimen (BMNH) “San Juan, Vera Paz. Champion. [printed] \ *Mycotretus cruentus* G. [handwritten] \ B.C.A.,Col.,VII. Mycotretus [printed] \ PARALECTOTYPE *Mycotretus cruentus* Gorham, 1888 [printed]”.

Distribution. Guatemala.

93. *Mycotretus elegans* Gorham, 1888

Mycotretus elegans Gorham 1888: 55. Type locality: “Guatemala, San Gerónimo”. Alvarenga 1994: 25.

Lectotype, here designated (BMNH; Fig. 16E). “*Mycotretus elegans*, Gorch [handwritten] \ S. Geronimo, Guatemala. Champion. [printed] \ Type. Sp. figured. [printed] \ Type [dis-shaped label, printed] \ LECTOTYPE *Mycotretus elegans* Gorham, 1888 [printed]”.

Other examined specimens. 1 female (BMNH, dissected) “S. Geronimo, Guatemala. Champion. [printed] \ B.C.A.,Col.,VII. Mycotretus [printed] *elegans* Gorch. [handwritten] \ PARALECTOTYPE *Mycotretus elegans* Gorham, 1888 [printed]”; 1 specimen (BMNH) “San Geronimo, Vera Paz. Champion. [printed] \ B.C.A.,Col.,VII. Mycotretus [printed] *elegans* Gorch. [handwritten] \ PARALECTOTYPE *Mycotretus elegans* Gorham, 1888 [printed]”;

Distribution. Guatemala.

94. *Mycotretus eopterus* Gorham, 1888

Mycotretus eopterus Gorham 1888: 69. Type locality: “Mexico, Toxpam”. Alvarenga 1994: 25.

Holotype (BMNH; Fig. 16F). “Toxpam [handwritten] Mexico. Salle Coll. [printed] \ Sp. figured. [printed] \ 2388 [printed] \ *Mycotretus eopterus*, Gorch. [handwritten] \ B.C.A.,Col.,VII. Mycotretus [printed] \ HOLOTYPE *Mycotretus eopterus* Gorham, 1888 [printed]”;

Distribution. Mexico.

95. *Mycotretus erraticus* Gorham, 1898

Mycotretus erraticus Gorham 1888: 254. Type locality: “Mexico, Chilpancingo in Guerrero 4600 feet” [state of Guerrero, Mexico]. Alvarenga 1994: 25.

Lectotype, here designated (BMNH; Fig. 17A). “B.C.A.,Col.,VII. *Mycotretus* [printed] \ *Mycotretus erraticus*, Gorh. [handwritten] \ Chilpancingo, Guerrero, 4600 ft. July. H.H. Smith. [printed] \ Type [disc-shaped label, printed] \ LECTOTYPE *Mycotretus erraticus* Gorham, 1888 [printed] (left) [handwritten]”.

Other examined specimens. “B.C.A.,Col.,VII. *Mycotretus* [printed] \ *Mycotretus erraticus*, Gorh. [handwritten] \ Chilpancingo, Guerrero, 4600 ft. July. H.H. Smith. [printed] \ Type [disc-shaped label, printed] \ PARALECTOTYPE *Mycotretus erraticus* Gorham, 1888 [printed] (right) [handwritten]”.

Distribution. Mexico.

Remarks. The lectotype and paralectotype are mounted on the same card on left and right side, respectively. Only the lectotype is shown here (Fig. 17A).

96. *Mycotretus geminus* Gorham, 1888

Mycotretus geminus Gorham 1888: 50. Type locality: “Panama, Bugaba, David” [province of Chiriquí, Panama]. Alvarenga 1994: 26.

Lectotype, here designated (BMNH; Fig. 17B). “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ Bugaba, Panama. Champion [printed] \ Type. Sp. figured. [printed] \ [?, handwritten] \ *Mycotretus geminus*, Gorh [handwritten] \ LECTOTYPE *Mycotretus geminus* Gorham, 1888 [printed]”.

Other examined specimens. 1 male (BMNH, dissected) “David, Chiriqui. Champion. [printed] \ *geminus* Gorh. [handwritten] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ PARALECTOTYPE *Mycotretus geminus* Gorham, 1888 [printed]”.

Distribution. Panama.

97. *Mycotretus haemapterus* Gorham, 1888

Mycotretus haemapterus Gorham 1888: 68. Type locality: “Panama, Bugaba”. Alvarenga 1994: 27.

Lectotype, here designated (BMNH; Fig. 17C). “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ Bugaba, Panama. Champion [printed] \ Type. Sp. figured. [printed] \ *Mycotretus haemapterus*, Gorh [handwritten] \ LECTOTYPE *Mycotretus haemapterus* Gorham, 1888 [printed]”.

Other examined specimens. 1 specimen (BMNH) “Bugaba, Panama. Champion [printed] \ B.C.A., Col., VII. [printed] Mycotr. haemapterus, Gor. [handwritten] \ PARALECTOTYPE *Mycotretus haemapterus* Gorham, 1888 [printed]”.

Distribution. Panama, North Brazil.

98. *Mycotretus haematicus* Gorham, 1888

Mycotretus haematicus Gorham 1888: 61. Type locality: “Costa Rica”. Alvarenga 1994: 27.

Holotype (BMNH; Fig. 17D). “Type [disc-shaped label, printed] \ B.C.A., Col., VII. *Mycotretus* [printed] \ *haematicus* Gorham [handwritten] \ Costa Rica. H. Rogers. [printed] \ HOLOTYPE *Mycotretus haematicus* Gorham, 1888 [printed]”.

Distribution. Unknown locality in Costa Rica.

99. *Mycotretus hirudo* Gorham, 1888

Mycotretus hirudo Gorham 1888: 59. Type locality: “Guatemala, San Gerónimo”. Alvarenga 1994: 27.

Holotype (BMNH; Fig. 17E). “Type [disc-shaped label, printed] \ B.C.A., Col., VII. *Mycotretus* [printed] \ *Mycotretus hirudo*, Gor. [handwritten] \ S. Geronimo, 3000 ft. Champion. [printed] \ HOLOTYPE *Mycotretus hirudo* Gorham, 1888 [printed]”.

Distribution. Guatemala.

100. *Mycotretus incarnatus* Gorham, 1888

Mycotretus incarnatus Gorham 1888: 62. Type locality: “Panama, Bugaba, Volcan de Chiriquí” [province of Chiriquí, Panama]. Alvarenga 1994: 27.

Lectotype, here designated (BMNH; Fig. 17F). “Type [disc-shaped label, printed] \ Type. Sp. figured. [printed] \ Bugaba, 800–1,500 ft. Champion. [printed] \ Bugaba, Panama. Champion. [printed] \ *Mycotretus incarnatus* Gorh. [handwritten] \ B.C.A., Col., VII *Mycotretus* [printed] \ LECTOTYPE *Mycotretus incarnatus* Gorham, 1888 [printed] left [handwritten]”.

Other examined specimens. 1 specimen (BMNH) “Type [disc-shaped label, printed] \ Type. Sp. figured. [printed] \ Bugaba, 800–1,500 ft. Champion. [printed] \ Bugaba, Panama. Champion. [printed] \ *Mycotretus incarnatus* Gorh. [handwritten] \ B.C.A., Col., VII *Mycotretus* [printed] \ PARALECTOTYPE *Mycotretus incarnatus* Gorham, 1888, right [handwritten]”; 1 male (BMNH, dissected) “Jalapa, Mexico. Hoege. [printed] \ *incarnatus*

[handwritten] \ B.C.A.,Col.,VII *Mycotretus* [printed] \ PARALECTOTYPE *Mycotretus incarnatus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Jalapa, Mexico. Hoega.\ B.C.A.,Col.,VII *Mycotretus* [printed] *incarnatus* [handwritten] \ PARALECTOTYPE *Mycotretus incarnatus* Gorham, 1888 [printed]; 1 specimen (BMNH) “Chontales. Nicaragua. T. Belt [printed] \ B.C.A.,Col.,VII *Mycotretus* [printed] *incarnatus* [handwritten] \ PARALECTOTYPE *Mycotretus incarnatus* Gorham, 1888 [printed]; 2 specimens (BMNH) “V. de Chiriqui, 25–4000 ft., Champion [printed] \ B.C.A.,Col.,VII *Mycotretus* [printed] *incarnatus* [handwritten] \ PARALECTOTYPE *Mycotretus incarnatus* Gorham, 1888 [printed]; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Bugaba, Panama. Champion. [printed] \ B.C.A.,Col.,VII *Mycotretus* [printed] *incarnatus* [handwritten] \ 1660 [printed] \ PARALECTOTYPE *Mycotretus incarnatus* Gorham, 1888 [printed]; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \ Panama [handwritten] \ B.C.A.,Col.,VII *Mycotretus* [printed] \ *incarnatus* [handwritten] \ 1659 [printed] \ DZUP 132761 [printed] \ PARALECTOTYPE *Mycotretus incarnatus* Gorham, 1888 [printed]”.

Distribution. Mexico and Central America.

Remarks. The lectotype and one paralectotype are mounted on the same card and we considered the left one as being the lectotype. Only the lectotype is shown here (Fig. 17F).

101. *Mycotretus interstictus* Gorham, 1888

Mycotretus interstictus Gorham 1888: 50. Type locality: “Nicaragua, Chontales” [Department of Chontales, Nicaragua]. Alvarenga 1994: 27.

Mycotretus interstitialis Kuhnt, 1910 **new synonym** (Fig. 25A); Kuhnt 1910: 239. Type locality: “Panama, Isthmus Mataschin”. Alvarenga 1994: 27.

Holotype (BMNH; Fig. 18A). “Type [disc-shaped label, printed] \ *Mycotretus interstictus* Gorham. [handwritten] \ Chontales. Nicaragua. T. Belt. [printed] \ B.C.A.,Col.,VII *Mycotretus* [printed] \ HOLOTYPE *Mycotretus interstictus* Gorham, 1888 [printed]”.

Other examined specimens. *Mycotretus interstitialis* Kuhnt, 1910. Lectotype, here designated (MFN; Fig. 25A). “Panamá, Isthmus Mataschin, O. Thieme S. [printed] \ Coll. Thieme [printed] \ * Matachin [handwritten] \ det. P. Kuhnt [printed] *Mycotretus interstitialis* Kuhnt. [handwritten] \ Type [red label, printed] \ Kuhnt det. [printed] \ LECTOTYPE *Mycotretus interstitialis* Kuhnt, 1910 det. I. Pecci-Maddalena 2017 [red label, printed]”.

Distribution. Nicaragua and Panama.

Remarks. *Mycotretus interstitialis* Kuhnt, 1910 is similar to *M. interstictus* Gorham 1888, but the latter has a black cephalic spot apparently absent on the former. Based on

general similarities and the proximity of their type localities, we synonymize *M. interstitialis* under *M. interstictus*.

102. *Mycotretus laccophilinus* Gorham, 1888

Mycotretus laccophilinus Gorham 1888: 57. Type locality: “Panama, Bugaba”. Alvarenga 1994: 28.

Holotype (BMNH; Fig. 18B). “Type [disc-shaped label, printed] \ Bugaba, 800–1,500 ft. Champion. [printed] \ Sp. figured. [printed] \ B.C.A.,Col.,VII *Mycotretus* [printed] \ *Mycotretus laccophilinus* Gorh [hanswritten] \ HOLOTYPE *Mycotretus laccophilinus* Gorham, 1888 [printed]”.

Distribution. Panama.

103. *Mycotretus luteolus* Gorham, 1888

Mycotretus luteolus Gorham 1888: 58. Type locality: “Panama, Volcan de Chiriquí” [province of Chiriquí, Panama]. Alvarenga 1994: Panama.

Lectotype, here designated (BMNH; Fig. 18C). “Type [disc-shaped label, printed] \ V. de Chiriqui, 25–4000 ft. Champion. [printed] \ *M. luteolus* G [handwritten] \ B.C.A.,Col.,VII *Mycotretus* [printed] \ LECTOTYPE *Mycotretus luteolus* Gorham, 1888 [printed]”.

Distribution. Panama.

104. *Mycotretus melanotus* Gorham, 1888

Mycotretus melanotus Gorham 1888: 66. Type locality: “Panama, La Caldera in Chiriqui” [province of Chiriquí, Panama]. Alvarenga 1994: 29.

Lectotype, here designated (BMNH; Fig. 18D). “Type [disc-shaped label, printed] \ Caldera, 1200 ft. Champion [printed] \ *Mycotretus melanotus*, G. [handwritten] \ B.C.A.,Col.,VII *Mycotretus* [printed] \ LECTOTYPE *Mycotretus melanotus* Gorham, 1888 [printed]”.

Distribution. Panama.

105. *Mycotretus nigricollis* Gorham, 1888

Mycotretus nigricollis Gorham 1888: 70. Type locality: “Mexico, Toxpam”. Alvarenga 1994: 30.

Holotype (BMNH; Fig. 18E). “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII Mycotretus [printed] \ Mycotretus nigricollis [handwritten] \ 2421 [printed] \ Toxpan [printed] \ Mexico. Salle Coll. [printed] \ HOLOTYPE *Mycotretus nigricollis* Gorham, 1888 [printe]”.

Distribution. Mexico.

106. *Mycotretus nigripes* Gorham, 1888

Mycotretus nigripes Gorham 1888: 64. Type locality: “Guatemala, Cerro Zunil” [=Volcán Santo Tomás, Guatemala]. Alvarenga 1994: 30.

Holotype (BMNH; Fig. 18F). “Type [disc-shaped label, printed] \ Cerro Zunil, 4–5000 ft. Champion. [printed] \ Mycotretus nigripes, Gorh [handwritten] \ black legs –coarse punct. - ? Palpi [handwritten] \ B.C.A.,Col.,VII Mycotretus [printed] \ HOLOTYPE *Mycotretus nigripes* Gorham, 1888 [printe]”.

Distribution. Guatemala.

107. *Mycotretus normalis* Gorham, 1888

Mycotretus normalis Gorham 1888: 51. Type locality: “Mexico, Cordova”. Alvarenga 1994: 31.

Holotype (BMNH; Fig. 19A). “Type [disc-shaped label, printed] \ Mycotretus normalis, G. [handwritten] \ B.C.A.,Col.,VII Mycotretus [printed] \ Cordova, Mexico. Hoega. [printed] \ HOLOTYPE *Mycotretus normalis* Gorham 1888 [printed]”.

Distribution. Mexico.

108. *Mycotretus noterinus* Gorham, 1888

Mycotretus noterinus Gorham 1888: 65. Type locality: “Panama, Volcan de Chiriqui” [province of Chiriquí, Panama]. Alvarenga 1994: 31.

Lectotype, here designated (BMNH; Fig. 19B). “Type [disc-shaped label, printed] \ ♂ [handwritten] \ V. de Chiriqui, 25–4000 ft. Champion. [printed] \ noterinus [handwritten] \ B.C.A.,Col.,VII Mycotretus [printed] \ LECTOTYPE *Mycotretus noterinus* Gorham, 1888 [printed]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ V. de Chiriqui, 25–4000 ft. Champion. [printed] \ B.C.A.,Col.,VII. [printed] *Mycotretus noterinus*, Gor. [handwritten] \ 1850 [printed] \ PARALECTOTYPE *Mycotretus noterinus* Gorham, 1888 [printed]”; 1 specimen (DZUP) “Coleção M. Alvarenga [printed] \

V. de Chiriqui, 25–4000 ft. Champion. [printed] \ B.C.A.,Col.,VII. [printed] *Mycotretus noterinus*, Gor. [handwritten] \ 1849 [printed] \ DZUP 132686 [printed] \ PARALECTOTYPE *Mycotretus noterinus* Gorham, 1888 [printed]”;

4 specimens (BMNH) “V. de Chiriqui, 25–4000 ft. Champion. [printed] \ B.C.A.,Col.,VII. [printed] *Mycotretus noterinus*, Gor. [handwritten] \ PARALECTOTYPE *Mycotretus noterinus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “V. de Chiriqui, 25–4000 ft. Champion. [printed] \ *Mycotretus noterinus* [handwritten] \ PARALECTOTYPE *Mycotretus noterinus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “V. de Chiriqui, 25–4000 ft. Champion. [printed] \ B.C.A.,Col.,VII. [printed] *M. noterinus*, Gor. [handwritten] \ PARALECTOTYPE *Mycotretus noterinus* Gorham, 1888 [printed]”.

Distribution. Panama.

109. *Mycotretus oppositipunctum* Gorham, 1888

Mycotretus oppositipunctum Gorham 1888: 69. Type locality: “Guatemala, San Gerónimo”. Alvarenga 1994: 31.

Holotype (BMNH; Fig. 19C). “Type [disc-shaped label, printed] \ Sp. figured. Type. [printed] \ *Mycotretus* ? *oppositipunctum* Gorham. [handwritten] \ B.C.A.,Col.,VII *Mycotretus* [printed] \ S. Geronimo, 3000 ft. Champion. [printed] \ HOLOTYPE *Mycotretus oppositipunctum* Gorham, 1888 [printed]”.

Distribution. Guatemala.

Remarks. This species is known only from the holotype (not dissected) and is doubtfully included in *Mycotretus*. As pointed out by Gorham (1888: 70): “There is only a single specimen of this insect, which has very much the appearance of a *Triplax*, but the club of the antennae is more like that of *Mycotretus*; it bears some resemblance to *M. peruae*, Crotch. The mentum is inconspicuous, and the genus is doubtful”. We agree that it is possible that *M. peruae* Crotch and *M. oppositipunctum* are morphologically closely related. However, their male genitalia have not been examined, and the morphological limits among Tritomini taxa would have to be clarified before giving further taxonomic opinions on those species.

110. *Mycotretus panamanus* Gorham, 1888

Mycotretus panamanus Gorham 1888: 54. Type locality: “Panama, Bugaba”. Alvarenga 1994: 32.

Lectotype, here designated (BMNH; Fig. 19D). “Type [disc-shaped label, printed] \ Bugaba, 800–1500 ft. Champion. [printed] \ Type. Sp. figured. [printed] \ B.C.A.,Col.,VII

Mycotretus [printed] \ Mycotretus panamanus Gorham. [handwritten] \ LECTOTYPE *Mycotretus panamanus* Gorham, 1888 [printed]”.

Distribution. Panama.

Remarks. *Mycotretus panamanus* resembles *M. sallei* Crotch (Fig. 10D) in color and shape.

111. *Mycotretus pictopiceus* Gorham, 1888

Mycotretus pictopiceus Gorham 1888: 56. Type locality: “Panama, Bugaba”. Alvarenga 1994: 33.

Holotype (BMNH; Fig. 19E). “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII Mycotretus [printed] \ Bugaba, 900–1,500 ft. Champion. [printed] \ *M. pictopiceus* Gorham [handwritten] \ HOLOTYPE *Mycotretus pictopiceus* Gorham, 1888 [printed]”.

Distribution. Panama.

112. *Mycotretus planus* Gorham, 1888

Mycotretus planus Gorham 1888: 66. Type locality: “Panama, Bugaba”. Alvarenga 1994: 33.

Holotype (BMNH; Fig. 19F). “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII Mycotretus [printed] \ Bugaba, Panama. Champion. [printed] \ *Mycotretus planus*, G. [handwritten] \ HOLOTYPE *Mycotretus planus* Gorham, 1888 [printed]”.

Distribution. Panama.

113. *Mycotretus rubidus* Gorham, 1888

Mycotretus rubidus Gorham 1888: 62. Type locality: “Guatemala, Chacoj, Panzos” [locality of Panzós in the department of Alta Verapaz]. Alvarenga 1994: 34.

Lectotype, here designated (BMNH; Fig. 20A). “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII Mycotretus [printed] \ *Mycotretus rubidus* [handwritten] \ Panzos, Vera Paz, Champion. [printed] \ LECTOTYPE *Mycotretus rubidus* Gorham, 1888 [printed]”.

Other examined specimens. 1 specimen (BMNH) “Chacoj, Guatemala, Champion [handwritten] \ *Mycotretus rubidus* Gorch. Pale var. [handwritten] \ B.C.A.,Col.,VII Mycotretus [printed] \ PARALECTOTYPE *Mycotretus rubidus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Chacoj, Vera paz. Champion. [printed] \ *Mycotretus rubidus* [handwritten] \ B.C.A.,Col.,VII Mycotretus [printed] \ PARALECTOTYPE *Mycotretus rubidus* Gorham, 1888 [printed]”.

Distribution. Guatemala.

114. *Mycotretus rufipennis* Gorham, 1888

Mycotretus rufipennis Gorham 1888: 69. Type locality: "Mexico, Cerro de Plumas". Alvarenga 1994: 34.

Holotype (BMNH; Fig. 20B). "Type [disc-shaped label, printed] \ B.C.A.,Col.,VII [printed] \ *Mycotretus rufipennis* Goh. [handwritten] \ Cerro de Plumas, Mexico. Hoega. [printed] \ [Prost-? handwritten] \ HOLOTYPE *Mycotretus rufipennis* Gorham, 1888 [printed]".

Distribution. Mexico.

115. *Mycotretus sandicatus* Gorham, 1888

Mycotretus sandicatus Gorham 1888: 54. Type locality: "Guatemala, Purula, San Gerónimo". Alvarenga 1994: 34.

Lectotype, here designated (BMNH; Fig. 20C). "Type [disc-shaped label, printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ Purula, Vera Paz. Champion. [printed] \ *Mycotretus sandicatus* Gorham [handwritten] \ LECTOTYPE *Mycotretus sandicatus* Gorham, 1888 [printed]".

Other examined specimens. 1 female (BMNH, dissected) "Purula, Vera Paz. Champion. [printed] \ B.C.A.,Col.,VII. [printed] *sandicatus* [handwritten] \ PARALECTOTYPE *Mycotretus sandicatus* Gorham, 1888 [printed]"; 1 specimen (BMNH) "S. Geronimo, Guatemala. Champion. [printed] \ B.C.A.,Col.,VII. [printed] *sandicatus* [handwritten]".

Distribution. Guatemala.

116. *Mycotretus sexpunctatus* Gorham, 1888

Mycotretus sexpunctatus Gorham 1888: 50. Type locality: "Panama, Bugaba, Volcan de Chiriquí" [province of Chiriquí, Panama]. Alvarenga 1994: 35.

Lectotype, here designated (BMNH; Fig. 20D). "Type [disc-shaped label, printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ Type. Sp. figured. [printed] \ Bugaba, Panama. Champion. [printed] \ *M. sexpunctatus* Gorham [handwritten] \ LECTOTYPE *Mycotretus sexpunctatus* Gorham, 1888 [printed]".

Other examined specimens. 2 specimens (BMNH) on the same card: 1 male (dissected) and 1 specimen "Bugaba, Panama. Champion. [printed] \ *Mycotretus sexpunctatus*

Gorham [handwritten] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ PARALECTOTYPE *Mycotretus sexpunctatus* Gorham, 1888 [printed]”; 2 specimens (BMNH) on the same card “Bugaba, Panama. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] 6-punctatus [handwritten]” \ PARALECTOTYPE *Mycotretus sexpunctatus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Bugaba, 800–1500 ft. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] 6-punctatus [handwritten]” \ PARALECTOTYPE *Mycotretus sexpunctatus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Bugaba, Panama. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] 6-punctatus [handwritten] \ PARALECTOTYPE *Mycotretus sexpunctatus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “V. de Chiriqui, 2–3000 ft. Champion. [printed] \ near M. Lepidus [handwritten] \ B.C.A.,Col.,VII. *Mycotretus* [printed] 6-punctatus [handwritten] \ PARALECTOTYPE *Mycotretus sexpunctatus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “V. de Chiriqui, 25–4000 ft. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] 6-punctatus [handwritten] \ PARALECTOTYPE *Mycotretus sexpunctatus* Gorham, 1888 [printed]”.

Distribution. Panama.

117. *Mycotretus spadiceus* Gorham, 1888

Mycotretus spadiceus Gorham 1888: 53. Type locality: “Panama, Bugaba”. Alvarenga 1994: 36.

Lectotype, here designated (BMNH; Fig. 20E). “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII. *Mycotretus spadiceus* [printed] \ Type. Sp. figured. [printed] \ Bugaba, Panama. Champion. [printed] \ M. spadiceus Gorh. [handwritten] \ LECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”.

Other examined specimens. 2 specimens mounted on the same card (BMNH) “Bugaba, Panama. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus spadiceus* [printed] \ PARALECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”; 2 specimens mounted on the same card (BMNH) “Bugaba, 800–1,500 ft. Champion. [printed] \ *Mycotretus spadiceus* Gorh. [handwritten] \ PARALECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”; 2 specimens mounted on the same card (BMNH) “Bugaba, 800–1,500 ft. Champion. [printed] \ *spadiceus* Gorham [handwritten] \ B.C.A.,Col.,VII. *Mycotretus spadiceus* [printed] \ PARALECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”; 4 specimens (BMNH) “Bugaba, Panama. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus spadiceus* [printed] \ PARALECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Bugaba, Panama. Champion. [printed] \ Sp. figured. [printed] \ *spadiceus* Var. α [handwritten] \ B.C.A.,Col.,VII. *Mycotretus spadiceus* [printed] \ PARALECTOTYPE

Mycotretus spadiceus Gorham, 1888 [printed]”; 2 specimens (BMNH) “Chontales. Nicaragua, T. Belt. [printed] \ B.C.A.,Col.,VII. *Mycotretus spadiceus*. [printed] \ PARALECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Belize. Blancaneaux. [printed] \ B.C.A.,Col.,VII. *Mycotretus spadiceus*. [printed] \ PARALECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Bugaba, 800–1,500 ft. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus spadiceus*. [printed] \ 1746 [printed] \ PARALECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Bugaba, 800–1,500 ft. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus spadiceus*. [printed] \ *Mycotretus spadiceus* Var. B. [handwritten] \ Comparado com tipo [printed] *Mycotretus spadiceus* Gorham, 1888 [handwritten] M. Alvarenga det. 1971 [printed] \ 1744 [printed] \ DZUP 132893 [printed] \ PARALECTOTYPE *Mycotretus spadiceus* Gorham, 1888 [printed]”;

Distribution. Central America, Colombia.

118. *Mycotretus stramineus* Gorham, 1888

Mycotretus stramineus Gorham 1888: 58. Type locality: “Panama, Bugaba”. Alvarenga 1994: 36.

Lectotype, here designated (BMNH; Fig. 20F). “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ Bugaba, 800–1,500 ft. Champion. [printed] \ *Mycotretus stramineus* G. [handwritten] \ ment. subent. [handwritten] \ LECTOTYPE *Mycotretus stramineus* Gorham, 1888 [printed] (left) [handwritten]”.

Other examined specimens. 1 specimen (BMNH) “Type [disc-shaped label, printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] \ Bugaba, 800–1,500 ft. Champion. [printed] \ *Mycotretus stramineus* G. [handwritten] \ ment. subent. [handwritten] \ PARALECTOTYPE *Mycotretus stramineus* Gorham, 1888 (right) [handwritten]”; 2 specimens (BMNH) “Bugaba, Panama. Champion. [printed] \ B.C.A.,Col.,VII. *Mycotretus* [printed] *bipunctatus* [handwritten] \ PARALECTOTYPE *Mycotretus stramineus* Gorham, 1888 [printed]”.

Distribution. Panama.

119. *Mycotretus ternotatus* Gorham, 1888

Mycotretus ternotatus Gorham 1888: 51. Type locality: “Mexico, Jalapa”. Alvarenga 1994: 36.

Holotype (BMNH; Fig. 21A). “Type [disc-shaped label, printed] \ Jalapa, Vera Cruz. Höge. [printed] \ Type. Sp. figured. [printed] \ *Mycotretus ternotatus* [handwritten] \ ?

[handwritten] signatellus [handwritten] \ B.C.A.,Col.,VII. Mycotretus [printed] \ HOLOTYPE *Mycotretus ternotatus* Gorham, 1888 [printed]”.

Distribution. Mexico.

Remarks. *Mycotretus ternotatus* resembles *M. signatellus* Crotch (Fig. 11B) in color and body shape.

120. *Mycotretus tibialis* Gorham, 1888

Mycotretus tibialis Gorham 1888: 56. Type locality: “Nicaragua, Chontales” [Department of Chontales, Nicaragua]. Alvarenga 1994: 36.

Holotype (BMNH; Fig. 21B). “Type [disc-shaped label, printed] \ Chontales, Nicaragua, T. Belt. [printed] \ *M. tibialis* Gorham. [handwritten] \ B.C.A.,Col.,VII. Mycotretus [printed] \ HOLOTYPE *Mycotretus tibialis* Gorham, 1888 [printed]”.

Distribution. Nicaragua.

121. *Mycotretus vittatus* Gorham, 1888

Mycotretus vittatus Gorham 1888: 57. Type locality: “Guatemala, Pantaleon, Zapote”. Alvarenga 1994: 37.

Lectotype, here designated (BMNH; Fig. 21C). “Type [disc-shaped label, printed] \ *Mycotretus vittatus*. Gorham [handwritten] \ Type. Sp. figured. [printed] \ B.C.A.,Col.,VII. Mycotretus [printed] \ Zapote, Guatemala, C. Champion. [printed] \ LECTOTYPE *Mycotretus vittatus* Gorham, 1888. [printed]”.

Other examined specimens. 1 specimen (BMNH) “Temax, N. Yucatan. Gaumer. [printed] \ *Mycotretus vittatus*, Gorh [handwritten] \ B.C.A.,Col.,VII. Mycotretus [printed]; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ V. S. Vicente, Finca Lapaz, El Salvador, 3. VIII. 1959, J. Bechyné [handwritten] \ Comparado com tipo [printed] *Mycotretus vittatus* Gorham, 1888 [handwritten] M. Alvarenga det. 1971 [printed] \ 1756 [printed]”.

Distribution. Mexico, Guatemala.

XIII. Guérin, J.

(Figs. 21D–F, 22A)

122. *Mycotretus anchoralis* Guérin, 1956

Mycotretus anchoralis Guérin 1956: 62. Type locality: “Jujuy, Reyes, Argentina”. Alvarenga 1994: 20.

Holotype (MZSP; Fig. 21D). “Tipo [printed] \ Jujuy, Reyes, argentina, 4.950 [handwritten] \ Coll. J Guerin. S. Paulo. Brasil. [printed] 18476 [handwritten] \ Mycotretus anchoralis J. Guer [handwritten] J. Guerin. det. 19[printed]54[handwritten]”.

Other examined specimens. 1 specimen (MZSP) “PARATIPO [handwritten] \ Yungas de Palmar Bolivia, 1.949 [handwritten] \ Coll. J Guerin. S. Paulo. Brasil. [printed] 18592 [handwritten] \ BOLIVIA, Yungas de Palmar, 2000 M. – Zischka [printed] \ Mycotretus anchoralis J. Guér [handwritten] J. Guerin. det. 19[printed]54[handwritten]”.

Distribution. Bolivia, Argentina.

123. *Mycotretus bicinctus* Guérin, 1949

Mycotretus bicinctus Guérin 1949a: 236. Type locality: “Parque da Cantareira, São Paulo” [state of São Paulo, Brazil]. Alvarenga 1994: 21.

Holotype (MZSP; Fig. 21E). Junior synonym of *M. chilensis* Crotch, 1876 (Fig. 4F, see above).

124. *Mycotretus monrosi* Guérin, 1949

Mycotretus monrosi Guérin 1949b: 589. Type locality: “Piletas, Salta” [Department of Salta, Argentina]. Alvarenga 1994: 29.

Holotype (MZSP; Fig. 21F). New junior synonym of *M. bicolor* Taschenberg, 1870, (Fig. 40A, see below).

125. *Mycotretus trifasciatus* Guérin, 1956

Mycotretus trifasciatus Guérin 1956: 63. Type locality: “Nova Teutonia, Estado de Santa Catarina” [state of Santa Catarina, Brazil]. Alvarenga 1994: 37; Pecci-Maddalena & Lopes-Andrade 2017: 153.

Holotype (MZSP; Fig. 22A). “TIPO [red label, printed] \ N. Teutonia., S. Catarina. [printed], 12.948 [handwritten] \ Coll. J. Guérin., S. Paulo., Brasil. [printed], 18407 [handwritten] \ 194, Brasilien, Nova Teutonia, 27° 11 B, 52° 23' L, Fritz Plaumann, 3500 m [printed] \ Mycotretus trifasciatus J. Guer [handwritten], J. Guerin det. 19[printed]54 [handwritten]”.

Other examined specimens. See Pecci-Maddalena & Lopes-Andrade (2017).

Distribution. South and Southeast Brazil, with one doubtful record in Obidos (in the state of Pará, North Brazil) (Pecci-Maddalena & Lopes-Andrade 2017).

XIV. Guérin-Méneville, F.E.

(Fig. 22B–E)

126. *Mycotretus cinctellus* (Guérin-Méneville, 1841)

Erotylus cinctellus Guérin-Méneville, 1841 **new synonym** (Fig. 22B). Guérin-Méneville 1841: 153–154. Type locality: “Bolivie”. Lacordaire 1842: 178 (*Mycotretus*); Alvarenga 1994: 22.

Lectotype, here designated (MNHN; Fig. 22B). New junior synonym of *M. melanophthalmus* (Fig. 13D, see above).

127. *Mycotretus fallax* Guérin-Méneville, 1841

Erotylus fallax Guérin-Méneville 1841: 155. Type locality: “Brésil”. Lacordaire 1842: 153 (*Mycotretus*). Alvarenga 1994: 25.

Lectotype, here designated (MNHN; Fig. 22C). “*Mycotretus fallax*. guer. Rev. Type, zool. Brésil. [handwritten] \ Type [printed] \ Lectotipo [printed]”.

Other examined specimens. 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ BARUERI, S. Paulo BRASIL [printed] 7.II.1960 [handwritten] K. Lenko leg. [printed] \ DZUP 235139 [printed]”; 1 male (CELC, dissected) “BRASIL: MG, Viçosa; “Mata do Paraíso, trilha do pesquisador”, 11.X. 2016; I Souza-Gonçalves, P Borlini, C Lopes-Andrade leg [printed] \ ex *Pleurotus ostreatus* [printed]”; 1 female (CELC, dissected) “BRASIL: MG, Ingaí: “Boqueirão próx. Poço Bonito” xi. 2002 leg. R.J.Silva [printed]”.

Distribution. Southeast and South Brazil.

128. *Mycotretus sedecimguttatus* (Guérin-Méneville, 1844)

Ischyryus sedecimguttatus Guérin-Méneville 1844: 310. Type locality: “Colombie”. Crotch 1876: 440 (*Mycotretus*). Alvarenga 1994: 35.

Type specimen. Not found.

Other examined specimens. 1 specimen (UMZC; Fig. 22D) “TYPE. [printed, crossed out], 16-guttatus, ex descr. [handwritten] \ L [printed] \ *N gran* [handwritten]”.

Distribution. Unknown locality in Colombia.

Remarks. The unique individual examined by us has a label “ex descr”, which means “ex description”, and it was probably identified by Crotch based on the original description by

Guérin-Méneville. Labels with the word “Type.” crossed out by Crotch indicate that the specimen is probably not the type (Skelley 1998b).

129. *Mycotretus sobrinus* (Guérin-Méneville, 1841)

Erotylus sobrinus Guérin-Méneville 1841: 154. Type locality: “Brésil”. Lacordaire 1842: 186 (*Mycotretus*). Alvarenga 1994: 36.

Mycotretus silaceus Lacordaire, 1842 (Fig. 37A); Lacordaire 1842: 187. Type locality: “Brésil”. Gorham 1888: 60 [junior synonym] \ Alvarenga 1994: 36.

Lectotype, here designated (UMZC; Fig. 22E). “TYPE [printed, blue label] \ TYPE. [printed] sobrinus Guér [handwritten] \ LECTOTYPE [printed] *Erotylus* (*Brachymerus*) sobrinus Guérin-Méneville, 1841 [handwritten] \ *Mycotretus sobrinus* (Guérin-Méneville) [handwritten] det. I. Pecci-Maddalena 2017 [printed]”.

Other examined specimens. 1 specimen (UMZC) “TYPE [printed, blue label] \ TYPE. [printed] simplex Guéri. [handwritten] \ PARALECTOTYPE [printed] ? *Erotylus* (*Brachymerus*) sobrinus Guérin-Méneville, 1841 [handwritten] \ *Mycotretus sobrinus* (Guérin-Méneville) [handwritten] det. I. Pecci-Maddalena 2017 [printed]”; 2 specimens (UMZC) “K [printed]”; 1 specimen (UMZC) “S Paul [handwritten]”; 1 specimen (UMZC) “Chevr. [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ *Mycotretus sobrinus* Guérin, 1841 [handwritten] M. Alvarenga det. [printed] 1971 [handwritten] \ CORCOVADO, Guanabara BRASIL [printed] X. 1966 [handwritten] Alvarenga & Seabra [printed] \ 1678 [printed]”; 1 female (CELC) “Brasil: MG, Piau, 13.xii.2014, Pecci-Maddalena, I.S.C. leg. [printed]”. ***Mycotretus silaceus* Lacordaire, 1842. Lectotype, here designated (UMZC; Fig. 37A).** “TYPE. [printed] silaceus Ch [handwritten] \ TYPE [printed, blue label] \ LECTOTYPE [printed] *Mycotretus silaceus* Lacordaire, 1842 [handwritten]”.

Distribution. The type is from an unknown locality in Brazil, but other specimens are from Southeast Brazil.

Remarks. As pointed out by Skelley (1998b) the name *Mycotretus simplex* is probably a *nomen nudum*. However, based on its label “TYPE” we considered that specimen a paralectotype of *M. sobrinus* and we included a question mark (?) indicating doubt.

XV. Harold, E.

(Fig. 6B)

130. *Mycotretus seminiger* Harold, 1876

Mycotretus dimidiatus Crotch 1876: 444. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil].

Nec Taschenberg 1870. Alvarenga 1994: 35.

Mycotretus seminiger Harold 1876: 174. Type locality: “Ega” [=Tefé, in the state of Amazon, North Brazil].

Alvarenga 1994: 35.

Lectotype, here designated (UMZC; Fig. 6B). “TYPE [blue label, printed] \ TYPE. Dimidiatus Ega Bates, handwritten] \ LECTOTYPE [printed], *Mycotretus dimidiatus* Crotch, 1876 [red label, handwritten]”.

Remarks. Harold (1876) proposed the new specific name *Mycotretus seminiger* Harold, 1876 to replace *Mycotretus dimidiatus* Crotch, 1876. Taschenberg (1870) has described a species called *M. dimidiatus*, therefore the name proposed by Crotch (1876) is a junior homonym. Present combination: replacement name *Mycotretus seminiger* Harold, 1876, not *Mycotretus dimidiatus* Taschenberg, 1870, *vide* Alvarenga (1994) and Skelley (1998b).

XVI. Kirsch, T.F.W.

(Figs. 22F, 23A–D)

Mycotretus bicolor Kirsch, 1876

Mycotretus bicolor Kirsch 1876: 101. Type locality: “Peru” [based on type label = “Pozuzu” (= locality of Pozuzo), in the department of Pasco, Peru]. Nec Taschenberg, 1870; Alvarenga 1994: 21.

Remarks. *Mycotretus bicolor* Kirsch, 1876 is a junior homonym of *M. bicolor* Taschenberg, 1870. Kuhnt (1911: 48) proposed *M. bicoloratus* as a replacement name (see below).

131. *Mycotretus dichrous* Kirsch, 1876

Mycotretus dichrous Kirsch 1876: 100. Type locality: “Peru” [based on type label = “Pozuzu” (= locality of Pozuzo), in the department of Pasco, Peru]. Alvarenga 1994: 23.

Lectotype, here designated (SNSD; Fig. 22F). “Pozuzu M. Kirsch [printed] \ Typus [printed] \ *Mycotretus dichrous* Kirsch Typus ! [handwritten] \ HOLOTYPUS [printed] \ Staatl. Museum für Tierkunde Dresden [printed]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ SINOP 12°31’S, 55°37’W, BR 163 km 500 a 600 Mato Grosso, BRASIL 350 m [printed] X. 1975 [handwritten] Roppa & Alvarenga col. [printed] \ *Mycotretus dichrous*

Kirsch, 1876 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten] \ PMMD [handwritten]”.

Distribution. Peru, Central-West and North Brazil.

132. *Mycotretus pelliciens* Kirsch, 1876

Mycotretus pelliciens Kirsch 1876: 100. Type locality: “Peru” [based on type label = “Pozuzu” (= locality of Pozuzo), in the department of Pasco, Peru]. Alvarenga 1994: 32.

Lectotype, here designated (SNSD; Fig. 23A). New junior synonym of *M. opalescens* Crotch, 1876 (Fig. 8F, see above).

133. *Mycotretus peruvianus* (Kirsch, 1876)

Mycophthorus peruvianus Kirsch 1876: 101–102. Type locality: “Peru” [based on type label = “Pozuzu” (= locality of Pozuzo), in the department of Pasco, Peru]. Skelley & Powell 2018: 311 (*Mycotretus*).

Type specimen (Fig. 23B). “Pozuzu, M. Kirsch [pale green paper] / Typus [red paper] / Mycophthorus peruvianus Kirsch Typus! [white paper, handwritten] / Staatl. Museum für Tierkunde Dresden [white paper] / HOLOTYPUS [red paper] / Mycotretus peruvianus (Kirsch), det. P. Skelley 2012 [white paper]” (*apud* Skelley & Powell 2018).

Distribution. Peru (Alvarenga 1994; Skelley & Powell 2018).

134. *Mycotretus puncticeps* Kirsch, 1865

Mycotretus puncticeps Kirsch 1865: 97. Type locality: “Bogotá” [=Bogotá, Colombia]. Alvarenga 1994: 33.

Lectotype, here designated (SNSD; Fig. 23C). “Bogota, Coll. Kirsch. [printed] \ Typus [printed] \ SYNTYPUS [printed] \ Staatl. Museum für Tierkunde Dresden [printed]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Pichilinge, Quevedo, Los Rios, Ecuador, II. 1977, A. Martinez [handwritten] \ Mycotretus puncticeps Kirsch, 1865 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. Colombia, Ecuador.

135. *Mycotretus suturalis* Kirsch, 1876

Mycotretus suturalis Kirsch 1876: 99. Type locality: “Peru” [based on type label = “Pozuzu” (= locality of Pozuzo), in the department of Pasco, Peru]. Alvarenga 1994: 36.

Lectotype, here designated (SNSD; Fig. 23D). “Pozuzu M. Kirsch [printed] \ Typus [printed] \ *Mycotretus suturalis* Kirsch Typus [handwritten] \ HOLOTYPUS [printed] \ Staatl. Museum für Tierkunde Dresden [printed]”.

Other examined specimens. 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Comparado com tipo [printed] *Mycotretus suturalis* Kirsch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ BENJAMIN CONSTANT, Amazonas BRASIL [printed], IX. 1955 [handwritten], I. C. Lima [printed] \ 1791 [printed] \ DZUP 132797 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ JATAI, Goiás Brasil, X 1972, F M. Oliveira [printed] \ DZUP 127781 [printed]”.

Distribution. Peru, Bolivia, Central-West and North Brazil.

XVII. Kuhnt, P.

(Figs. 23E–F, 24–25, 26A–B)

136. *Mycotretus bicoloratus* Kuhnt, 1911

Mycotretus bicolor Kirsch 1976: 101. Type locality: “Peru” [based on type label = “Pozuzu” (= locality of Pozuzo), in the department of Pasco, Peru]. **Nec** Taschenberg, 1870; Alvarenga 1994: 21.

Mycotretus bicoloratus Kuhnt 1911: 48 [replacement name]; Alvarenga 1994: 21.

Lectotype, here designated (SNSD; Fig. 23E). “Pozuzu M. Kirsch [printed] \ *Mycotretus* ? [handwritten] \ HOLOTYPUS [printed] *bicolor* Kirsch [handwritten] \ Staatl. Museum für Tierkunde Dresden [printed]”.

Distribution. Peru.

Remarks. Kuhnt (1911) proposed the new specific name *Mycotretus bicoloratus* to replace *Mycotretus bicolor* Kirsch, 1876. Taschenberg (1870) has described a species called *M. bicolor*, therefore the name proposed by Kirsch (1876) is a junior homonym.

137. *Mycotretus derasofasciatus* Kuhnt, 1910

Mycotretus derasofasciatus Kuhnt 1910: 237. Type locality: “Chanchamayo, Peru”. Alvarenga 1994: 23.

Lectotype, here designated (MFN; Fig. 23F). New junior synonym of *M. scitulus* Lacordaire, 1842 (Fig. 36E, see below).

138. *Mycotretus discipennis* Kuhnt, 1910

Mycotretus discipennis Kuhnt, 1910 **new synonym** (Fig. 24A); Kuhnt 1910: 240. Type locality: “St. Catharina” [state of Santa Catarina, South Brazil]. Alvarenga 1994: 24.

Lectotype, here designated (MFN; Fig. 24A). New junior synonym of *M. deyrollei* Crotch, 1876 (Fig. 6A, see above).

139. *Mycotretus discipennis conductus* Kuhnt, 1910

Mycotretus discipennis conductus Kuhnt, 1910 [as a variety] **new synonym** (Fig. 24B); Kuhnt 1910: 240. Type locality: “St. Catharina (Colonia Hansa)” [in the state of Santa Catarina, South Brazil]. Alvarenga 1994: 24.

Lectotype, here designated (MFN; Fig. 24B). New junior synonym of *M. deyrollei* Crotch, 1876 (Fig. 6A, see above).

140. *Mycotretus expressus* Kuhnt, 1910

Mycotretus expressus Kuhnt 1910: 237. Type locality: “Jatahy, Provinz Goyaz” [=Jatai, state of Goiás, Central-West Brasil]. Alvarenga 1994: 25.

Lectotype, here designated (MFN; Fig. 24C). “104384 [printed] \ Jatahy GOYAZ [printed] \ *Mycotretus expressus* Kuhnt [handwritten] \ *Mycotretus expressus* Kuhnt [handwritten] \ LECTOTYPE *Mycotretus expressus* Kuhnt, 1910 det. I. Pecci-Maddalena 2017”.

Other examined specimens. 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ homeotipo [printed] \ V. Rondônia, Rondônia Brasil, I-1961, A. Machado [printed] \ Comparado com tipo [printed] *Mycotretus expressus* Kuhnt, 1910 [handwritten] M. Alvarenga det. 1971 [printed] \ 1706 [printed] \ DZUP 132677 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ V. Rondônia, Rondônia Brasil, I-1961, A. Machado [printed] \ DZUP 132683 [printed]”.

Distribution. Central-West and North Brazil.

141. *Mycotretus fascipennis* Kuhnt, 1910

Mycotretus fascipennis Kuhnt 1910: 244. Type locality: “Surinam”. Alvarenga 1994: 25.

Holotype (MFN; Fig. 24D). “21323 [printed] \ Surinam [handwritten] \ var. *Surinam*. ? [handwritten] \ Type [red label, printed] \ det. P. Kuhnt [printed] *Mycotretus fascipennis*

Kuhnt. [handwritten] \ Kuhnt det. [printed] \ HOLOTYPE *Mycotretus fascipennis* Kuhnt, 1910 labelled by I. Pecci-Maddalena 2017”.

Distribution. Unknown locality in Suriname.

142. *Mycotretus graphoderus strigipennis* Kuhnt, 1910

Mycotretus graphoderus strigipennis Kuhnt 1910: 244 [as a variety]. Type locality: not mentioned [based on type label = “Brasilien”]. Alvarenga 1994: 26.

Lectotype, here designated (MFN; Fig. 24E). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

143. *Mycotretus graphoderus thoracicus* Kuhnt, 1910

Mycotretus graphoderus thoracicus Kuhnt 1910: 244 [as a variety]. Type locality: not mentioned [based on type label = “Brasilien”]. Alvarenga 1994: 27.

Lectotype, here designated (MFN; Fig. 24F). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

144. *Mycotretus interstitialis* Kuhnt, 1910

Mycotretus interstitialis Kuhnt 1910: 239. Type locality: “Panama, Isthmus Mataschin”. Alvarenga 1994: 27.

Lectotype, here designated (MFN; Fig. 25A). New junior synonym of *M. interstictus* Gorham 1888 (Fig. 18A, see above).

145. *Mycotretus nigromaculatus* (Kuhnt, 1909)

Brachysphaenus (Iphiclus) nigromaculatus Kuhnt, 1909: 27. Type locality: “Mexico”. Delkeskamp 1939: 27 [*Mycotretus*]; Alvarenga 1994: 30.

Holotype (MFN; Fig. 25B). New junior synonym of *M. rhodosomus* Lacordaire, 1842 (Fig. 35F, see below).

146. *Mycotretus ocellatus consociatus* Kuhnt, 1910

Mycotretus ocellatus consociatus Kuhnt 1910: 238 [as a variety]. Type locality: “Bogota”, [Bogotá, Colombia]. Alvarenga 1994: 24.

Type specimen. Not located.

***Mycotretus parallelus* (Kuhnt, 1909)**

Brachysphaenus (*Barytopus*) *parallelus* Kuhnt, 1909; Kuhnt 1909, nec Crotch, 1876; Kuhnt 1909:30 (*Brachysphaenus*). Type locality: “Peru”. Alvarenga 1994: 25.

Remarks. *Mycotretus parallelus* (Kuhnt, 1909) is a junior homonym of *M. parallelus* Crotch, 1876. Delkeskamp (1939: 27) transferred that species to *Mycotretus* and proposed *M. fidelis* as a replacement name (see above).

147. *Mycotretus quadristriolatus* Kuhnt, 1910

Mycotretus quadristriolatus Kuhnt 1910: 242. Type locality. “Chanchamayo, Peru”. Alvarenga 1994: 33.

Holotype (MFN; Fig. 25C). New junior synonym of *M. dorsonotatus* Lacordaire, 1842 (Fig. 28D, see below).

148. *Mycotretus sexlineatus* Kuhnt, 1910

Mycotretus sexlineatus Kuhnt 1910: 241. Type locality: “Brasilien”. Alvarenga 1994: 35.

Lectotype, here designated (MFN; Fig. 25D). New junior synonym of *M. deyrollei* Crotch, 1876 (Fig. 6A, see above).

149. *Mycotretus stillatus* Kuhnt, 1910

Mycotretus stillatus Kuhnt 1910: 239. Type locality: “Caracas”[Venezuela]. Alvarenga 1994: 36.

Holotype (MFN; Fig. 25E). “57784 [printed] \ Carácas [printed] \ Caracas, Rothe. [handwritten] \ Type [red label, printed] \ *Mycotretus stillatus* Kuhnt. [handwritten] det. P. Kuhnt [printed] \ Kuhnt det. [printed] \ HOLOTYPE *Mycotretus stillatus* Kuhnt, 1910 labelled by I. Pecci-Maddalena 2017 [red label, printed]”.

Distribution. Venezuela.

Remarks. Two specimens dissected by us, from the states of Rondônia and Paraíba (Brazil), are phenotypically similar to the holotype of *M. stillatus* differing from the latter only by slight variations of color pattern on pronotum and elytra. However, as we have no more specimens for comparison, we did not consider those specimens as conspecific with *M. stillatus*.

150. *Mycotretus thoracicus* Kuhnt, 1910

Mycotretus thoracicus Kuhnt 1910: 242. Type locality: “Chanchamayo, Peru”. Alvarenga 1994: 36.

Holotype (MFN; Fig. 25F). “Chanchamayo, Ober-Peru [printed] \ Chanchamayo [handwritten] \ Coll. Thieme [printed] \ Type [red label, printed] \ det. P. Kuhnt [printed] *Mycotretus thoracicus* Kuhnt. [handwritten] \ Kuhnt det. [printed] \ LECTOTYPE *Mycotretus thoracicus* Kuhnt, 1910 det. I. Pecci-Maddalena 2017 [red label, printed]”.

Distribution. Peru.

***Iphiclus virgatus* Kuhnt, 1910 new combination**

Mycotretus virgatus Kuhnt 1910: 243. Type locality: “Brasilien”. Alvarenga 1994: 37.

Lectotype, here designated (MFN; Fig. 26A). “21324 [printed] \ Brasilien [printed] \ *Brasil. Sello.* [handwritten] \ det. P. Kuhnt [printed] *Mycotretus virgatus* Kuhnt. [handwritten] \ Type [red label, printed] \ Kuhnt det. [printed] \ LECTOTYPE *Mycotretus virgatus* Kuhnt, 1910 det. I. Pecci-Maddalena 2017 [red label, printed]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Pedra Azul, M. Gerais Brasil, XII-1970, F.M. Oliveira [printed] \ *Mycotretus virgatus* Kuhnt, 1910 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten] \ *Iphiclus* ? [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Jacaré P. N. XINGU, M. Grosso Brasil, XI-1961, Alvarenga e Werner [printed] \ Comparado c/ tipo *Mycotretus virgatus* Kuhnt, 1910 [handwritten] M. Alvarenga det. 1971 [printed] \ 1757 [printed]”.

Distribution. Southeast and South Brazil.

Remarks. The triangular structure of the mentum, terminal maxillary palpomere triangularly dilated, penis with a posterior and narrowed lobe and metendosternite without laminae and with a narrowed stalk clearly remove *I. virgatus* from *Mycotretus* and place it in *Iphiclus* Chevrolat, 1837.

151. *Mycotretus ziczac ziczac* Kuhnt, 1910

Mycotretus ziczac ziczac Kuhnt 1910: 241–242. Type locality: “Columbien, Muzo” [western Boyacá Province, in the department of Boyacá, Colombia]. Alvarenga 1994: 38.

Holotype (MFN; Fig. 26B). “Colambien, Muzo, Terra cal. O. Thieme S [printed] \ * Muzo. [handwritten] \ Coll. Thieme [printed] \ det. P. Kuhnt [printed] *Mycotretus ziczac*

Kuhnt. [handwritten] \ Type [red label, printed] \ HOLOTYPE *Mycotretus ziczac ziczac*
Kuhnt, 1910 labelled by I. Pecci-Maddalena 2017 [red label, printed]”.

Distribution. Colombia.

XVIII. Lacordaire, J.T.

(Figs. 26C–F, 27–37)

152. *Mycotretus aestuans* Lacordaire, 1842

Mycotretus aestuans Lacordaire 1842: 170. Type locality: “Brésil”. Alvarenga 1994: 20.

Type specimen. Not located.

Distribution. Brazil.

Remarks. The specimen shown in Fig. 26C was collected in Brazil. New junior synonym of *M. hilaris* Lacordaire, 1842 (Fig. 31B, see below).

153. *Mycotretus ambulator* Lacordaire, 1842

Mycotretus ambulator Lacordaire 1842: 175. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 20.

Lectotype, here designated (MRSN; Fig. 26D). “D. Lacordaire [handwritten] \ LECTOTYPE [printed] *Mycotretus ambulator* Lacordaire, 1842 [handwritten]”

Distribution. French Guiana.

154. *Mycotretus apicalis* Lacordaire, 1842

Mycotretus gemmula Lacordaire, 1842 **new synonym** (Fig. 30B). Lacordaire 1842: 181. Type locality: “Colombie”. Alvarenga 1994: 26.

Mycotretus gentilis Lacordaire, 1842 **new synonym** (Fig. 30C). Lacordaire 1842: 182. Type locality: “Colombie”. Crotch 1876: 448 [synonymous of *M. gemmula*]; Alvarenga 1994: 26.

Mycotretus nigroterminatus Lacordaire, 1842 **new synonym** (Fig. 33F). Lacordaire 1842: 180. Type locality: “Colombie”. Alvarenga 1994: 30.

Mycotretus pulicarius Lacordaire, 1842 **new synonym** (Fig. 35A). Lacordaire 1842: 182. Type locality: “Colombie”. Crotch 1876: 448 [synonymous of *M. gemmula*]; Alvarenga 1994: 26.

Mycotretus coccinelloides Taschenberg, 1870 **new synonym** (Fig. 40B). Taschenberg 1870: 198. Type locality: not mentioned in the description [based on type label = Colombia]. Alvarenga 1994: 22.

Lectotype, here designated (MNHN; Fig. 26E). “Colombie [handwritten] \ Apicalis Lac [handwritten] \ Type [handwritten] \ Ex-Musaeo Mniszech [printed] \ LECTOTYPE [printed] Mycotretus apicalis Lacordaire, 1842 [handwritten]”.

Other examined specimens. *Mycotretus gemmula* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 30B). “Colombie [handwritten] \ Gemmula Lac [handwritten] \ Type [handwritten] \ Ex-Musaeo Mniszech [printed] \ HOLOTYPE Mycotretus gemmula Lacordaire, 1842 [handwritten]”. ***Mycotretus gentilis* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 30C).** “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Gentilis Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] Mycotretus gentilis Lacordaire, 1842 [handwritten]”. ***Mycotretus nigroterminatus* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 33F).** “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Nigroterminatus Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] Mycotretus nigroterminatus Lacordaire, 1842 [handwritten]”. ***Mycotretus pulicarius* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 35A).** “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Pulicarius Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] Mycotretus pulicarius Lacordaire, 1842 [handwritten]”. ***Mycotretus coccinelloides* Taschenberg, 1870. Lectotype, here designated (ZNS; Fig. 40B).** LECTOTYPE, *Mycotretus coccinelloides* TASCHENBERG, 1870, det. I. Pecci-Maddalena 2017 [printed] \ *coccinelloides*, *Zeitschr. 1870. Colomb. Wallis* [handwritten]”. 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo Brasil, I–1969, W. Bokermann [printed] \ DZUP 242523 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo Brasil, I–1969, W. Bokermann [printed] \ DZUP 242737 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo Brasil, I–1969, W. Bokermann [printed] \ DZUP 242750 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S. Paulo Brasil, I–1969, W. Bokermann [printed] \ DZUP 242448 [printed]”; 1 male (MZSP, dissected) “BRASIL, Itatiáia, Estº R. Janeiro, Col.: DIRINGS [front] FEV 1960 [back] [printed]”.

Distribution. Colombia, Southeast and South Brazil.

Remarks. 1) The species synonymized here under *M. apicalis* are very similar in color and body shape. We observed that the pronotal color pattern as well as the black elytral apical spot appear to vary according with degree of body pigmentation. Despite these differences, the male genitalia of the dissected specimens have exactly the same morphological pattern; **2)** Lacordaire (1942) described *M. pulicarius* as a *bonna* species and did not define it as a “variety” of *M. gemmula* (which was described by him in the same work). Crotch (1876)

included *M. pulicarius* under *M. gemmula* and only stated that *M. pulicarius* “has the disc of the thorax black”. After that, possibly based on Crotch’s comments, authors have considered *M. pulicarius* as a “variety” of *M. gemmula* (see Mader 1942; Blackwelder 1945; Alvarenga 1994). However, it is not clear whether Crotch considered *M. pulicarius* as a variety or not.

155. *Mycotretus arcuatus* Lacordaire, 1842

Mycotretus arcuatus Lacordaire 1842: 158. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 20.

Type specimen. Not located.

Distribution. French Guiana.

156. *Mycotretus argus* Lacordaire, 1842

Mycotretus argus Lacordaire 1842: 161. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 21.

Lectotype, here designated (MRSN; Fig. 26F). “D. Lacordaire. [printed]”.

Other examined specimen. 1 female (MNRJ, dissected) “Vilhena [printed] 20 [handwritten]-2-1961 [printed] \ Brasil, R O, J. & B. Bechyné [printed] \ MG [printed] \ argus [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Jacareacanga, Pará, Brasil [printed] V. 1969 [handwritten] F.R. Barbosa [printed] \ DZUP 136039 [printed]”;

Distribution. French Guiana, North Brazil.

157. *Mycotretus bistrigatus* Lacordaire, 1842

Mycotretus bistrigatus Lacordaire 1842: 188. Type locality: “Mexique”. Alvarenga 1994: 21.

Lectotype, here designated (MNHN; Fig. 27A). “Mexique [handwritten] \ Bistrigatus Lac. [handwritten] \ Type [printed] \ Ex-Musaeo Mniszech [printed] \ LECTOTYPE [printed] *Mycotretus bistrigatus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Omilteme, Guerrero, 8000 ft. Aug. H.H. Smith. [printed] \ B.C.A., Col.,VII. *Mycotretus* [printed] *bistrigatus* [handwritten] \ 1718 [printed]”.

Distribution. Mexico.

158. *Mycotretus clitelliger* Lacordaire, 1842

Mycotretus clitelliger Lacordaire 1842: 149. Type locality: “Colombie”. Alvarenga 1994: 22.

Lectotype, here designated (MNHN; Fig. 27B). “Ex-Musaeo Mniszech [printed] \ Type [printed] \ Clitelliger Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] Mycotretus clitelliger Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Colombia.

159. *Mycotretus coccineus* (Lacordaire, 1842)

Lybas coccineus Lacordaire 1842: 239. Type locality: “Rio-Janeiro” [=Rio de Janeiro, state? locality?, Southeast Brazil]. Crotch 1876: 458 (*Mycotretus*); Alvarenga 1994: 22.

Mycotretus unicolor Fauvel, 1860 **new synonym** (Fig. 14D). Fauvel 1860: 326. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 37.

Mycotretus sanguinosus Crotch, 1876 **new synonym** (Fig. 10E). Crotch 1876: 458. Type locality: “N. Granada” [The old Viceroyalty of New Granada; without details in which country]. Alvarenga 1994: 34.

Type specimen. Not located (MRSN ?).

Other examined specimen. 1 specimen (UMZC; Fig. 27C) “Bras [handwritten] \ TYPE. [printed, crossed out] coccineus Bras Reiche [handwritten]”; 1 specimen (RBINS; Fig. 14D) “Coll. R. I. Sc. N. B. Guyane Française, Cayenne. Coll. Chapuis [printed] \ Mycotretus unicolor, Cayenne, Fauvel [handwritten]”. ***Mycotretus sanguinosus* Crotch, 1876.** **Lectotype, here designated (UMZC; Fig. 10E).** “TYPE [blue label, printed] \ TYPE. [printed] sanguineus N Gran R. [handwritten] \ LECTOTYPE [printed] Mycotretus sanguinosus Crotch, 1876 [handwritten]”; 2 females (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Chiriqui, Panamá, Ribbe [handwritten] \ B.C.A., Col., VII. Mycotretus sanguinosus. [printed] \ 1874 [printed]”; 1 male (MNRJ, dissected) “Benjamin Constant, Amazonas, Brasil 18–28.IX.1962, K. Lenko – col. [printed] \ Mycotret. 500 [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ TABATINGA, Amazonas BRASIL, 22 a 24–VII–1956, M. Alvarenga legit. [printed] \ 1885–A [handwritten] \ *Mycotretus* 509 [handwritten] \ Ápice tibias, dilatadas, ápice prosterno comprimido. [handwritten]”; 1 male (MNRJ, dissected) “Hansa Humboldt, Sta. Catharina, Brasilien Reitter [printed] \ 1B [handwritten] \ mycotretus 217 [handwritten] \ Cr [?] 89. H. 5. [handwritten] \ Mycotretus sanguinosus Crotch [handwritten] \ Det. Oscar Monte [printed]”.

Distribution. Franch Guiana, Costa Rica, Panama, Colombia, Southeast and North Brazil.

Remarks. 1) The specimens synonymized here under *M. coccineus* (*M. unicolor* Fauvel and *M. sanguinosus* Crotch) are fully yellowish to reddish in color, and are oval (almost circular) in body shape. We dissected specimens from North and Southeast Brazil and

observed no morphological difference in their penile flagellum; 2) The primary type of *M. coccineus* is probably housed in the Brême collection, MRSN (Torino). We photographed that collection and the specimen mentioned here is labelled “Lacordaire [handwritten]” and is kept in the drawer “15” where is handwritten “Erotyliens – Engidiformes 1H–16”. Unfortunately, that information was observed after visiting the museum. As we did not have dorsal and ventral images of the specimen, we did not designate the lectotype of *M. coccineus* here.

160. *Mycotretus coelestinus* Lacordaire, 1842

Mycotretus coelestinus Lacordaire 1842: 170. Type locality: “Colombie”. Alvarenga 1994: 22.

Lectotype, here designated (MNHN; Fig. 27D). “Colombie [handwritten] \ Coelestinus Lac [handwritten] \ Type [handwritten] \ Ex-Musaeo Mniszech [printed] \ LECTOTYPE [printed] *Mycotretus coelestinus* Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Colombia.

161. *Mycotretus cognatus* Lacordaire, 1842

Mycotretus cognatus Lacordaire, 1842 **new synonym** (Fig. 27E). Lacordaire 1842: 145. Type locality: “Rio-janeiro” [=Rio de Janeiro, state? locality?, Southeast Brazil]. Alvarenga 1994: 22.

Lectotype, here designated (RBINS; Fig. 27E). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

162. *Mycotretus cyanopterus* Lacordaire, 1842

Mycotretus cyanopterus Lacordaire 1842: 179. Type locality: “Colombie”. Alvarenga 1994: 23.

Lectotype, here designated (MNHN; Fig. 27F). “Colombie [handwritten] \ Cyanopterus Lac [handwritten] \ Type [handwritten] \ Ex-Musaeo Mniszech [printed] \ LECTOTYPE [printed] *Mycotretus cyanopterus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 specimen (UMZC) “TYPE [blue label, printed] \ Colomb [handwritten] \ TYPE. [printed] *Cyanopterus* R [handwritten] \ PARALECTOTYPE [printed] *Mycotretus cyanopterus* Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Colombia.

163. *Mycotretus difficilis* Lacordaire, 1842

Mycotretus difficilis Lacordaire, 1842 **new synonym** (Fig. 28A). Lacordaire 1842: 136. Type locality: “Brésil”. Alvarenga 1994: 24.

Type specimen. Not located.

Remarks. New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

164. *Mycotretus distigma* Lacordaire, 1842

Mycotretus distigma Lacordaire 1842: 190. Type locality: “Colombie”. Alvarenga 1994: 24.

Lectotype, here designated (MNHN; Fig. 28B). “Colombie [handwritten] \ Distigma Lac [handwritten] \ Type [handwritten] \ Ex-Musaeo Mniszech [printed] \ LECTOTYPE [printed] *Mycotretus distigma* Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Colombia.

165. *Mycotretus dorsofasciatus* Lacordaire, 1842

Mycotretus dorsofasciatus Lacordaire 1842: 173. Type locality: “Brésil”. Alvarenga 1994: 24.

Mycotretus nugator Lacordaire, 1842 **new synonym** (Fig. 33G). Lacordaire 1842: 174. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 31.

Type specimen. The primary type of *M. dorsofasciatus* Lacordaire, 1842 and *M. nugator* Lacordaire, 1842 were not found.

Other examined specimens. 1 specimen (UMZC; Fig. 28C) “Bras [handwritten] \ TYPE. [printed, crossed out] dorsofasciat Reiche [handwritten]”; 2 males (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed], XII. 1977 [handwritten], F.M. Oliveira [printed] \ *Mycotretus dorsofasciatus* Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Tiriós, Pará Brasil, I–1963, A. Machado [printed] \ *Mycotretus nugator* Lac, 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”; 1 female (MNRJ, dissected; Fig. 33G) “Coleção M. Alvarenga [printed] \ SERRA do NAVIO, Terr. Amapá BRASIL, IX–1957, K. Lenko leg. [printed] \ *Mycotretus nugator* Lac, 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. French Guiana, Southeast and North Brazil.

Remarks. *M. dorsofasciatus* and *M. nugator* differ mainly in the width of elytral bands, which are wide on the former and narrow on the latter. The male genitalia of both species are very similar.

166. *Mycotretus dorsonotatus* Lacordaire, 1842

Mycotretus alternans Gorham, 1888 **new synonym** (Fig. 14F). Gorham 1888: 57. Type locality: “Panama, Bugaba”. Alvarenga 1994: 20.

Mycotretus quadristriolatus Kuhnt, 1910 **new synonym** (Fig. 25C). Kuhnt 1910: 242. Type locality: “Chanchamayo, Peru”. Alvarenga 1994: 33.

Holotype (MRSN; Fig. 28D). “Holotype, *Mycotretus dorsonotatus* Lacordaire, 1842 [red label, handwritten]”.

Other examined specimens. *Mycotretus alternans* Gorham, 1888 **Lectotype, here designated (BMNH; Fig. 14F).** B.C.A., Col., VII. *Mycotretus* [printed] \ *Mycotretus alternans*, Gr. [handwritten] \ Bugaba, Panama. Champion. [printed] \ Type [disc-shaped label, printed] \ LECTOTYPE *Mycotretus alternans* Gorham, 1888 [printed]”; 1 male (BMNH, dissected) “Bugaba, Panama. Champion. [printed] \ *Mycotretus alternans* [handwritten] \ B.C.A., Col., VII, *Mycotretus* [printed] \ PARALECTOTYPE *Mycotretus alternans* Gorham, 1888 [printed]”; 1 specimen (BMNH) “Bugaba, 800–1500 ft. Champion. [printed] \ *Mycotretus alternans* [handwritten] \ B.C.A., Col., VII, *Mycotretus* [printed] \ PARALECTOTYPE *Mycotretus alternans* Gorham, 1888 [printed]”. *Mycotretus quadristriolatus* Kuhnt, 1910. **Holotype (MFN; Fig. 25C).** “Chanchamayo, Ober-Peru [printed] \ Coll. Thieme [printed] \ Chanchamayo [handwritten] \ Type [red label, printed] \ det. P. Kuhnt [printed] *Mycotretus quadristriolatus* Kuhnt. [handwritten] \ Kuhnt det. [printed] \ HOLOTYPE *Mycotretus quadristriolatus* Kuhnt, 1910 labelled by I. Pecci-Maddalena 2017 [red label, printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Diamantino 400 m, M. Grosso Brasil, XI. 1983, A. Cerutti [printed]”.

Distribution. Guiana, French Guiana, Peru, Panama, North and Central-West Brazil.

Remarks. *Mycotretus dorsonotatus* Lacordaire and *M. quadristriolatus* Kuhnt are phenotypically almost identical and we consider them conspecifics. The medial elytral spots present on *M. dorsonotatus* are absent in *M. alternans* Gorham, but we dissected individuals possessing both colorations and observed that their male genitalia are identical.

167. *Mycotretus dubius* Lacordaire, 1842

Mycotretus dubius Lacordaire, 1842 **new synonym** (Fig. 28E). Lacordaire 1842: 141. Type locality: “Brésil”. Alvarenga 1994: 24.

Lectotype, here designated (MNHN; Fig. 28E). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

168. *Mycotretus durius* Lacordaire, 1842

Mycotretus durius Lacordaire 1842: 161. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 25.

Lectotype, here designated (MNHN; Fig. 28F). “D. Lacordaire [handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ SERRA do NAVIO, Terr. Amapá BRASIL, IX–1957, K. Lenko leg. [printed] \ *Mycotretus durius* Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. French Guiana, North Brazil.

169. *Mycotretus dytiscoides* Lacordaire, 1842

Mycotretus dytiscoides Lacordaire 1842: 184. Type locality: “Mexique”. Alvarenga 1994: 25.

Lectotype, here designated (UMZC; Fig. 29A). “TYPE [blue label, printed] \ TYPE. [printed] dytiscoides Ch [handwritten] \ LECTOTYPE [printed] *Mycotretus dytiscoides* Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Mexico.

170. *Mycotretus episcopalis* Lacordaire, 1842

Mycotretus episcopalis Lacordaire 1842: 152. Type locality: “Brésil”. Alvarenga 1994: 25.

Type specimen. Not located.

Other examined specimens. 1 female (MNRJ, dissected; Fig. 29B) “Coleção M. Alvarenga [printed] \ FLORESTA da TIJUCA, Guanabara Brasil [printed], I. 1967 [handwritten], C.A. Campos Seabra [printed] \ *Mycotretus episcopalis* Lac, 1842 [handwritten] M. Alvarenga det. [printed] 1989 [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Brasil M. Gerais, Aguas Vermelhas, XII. 1983, M. Alvarenga [printed] \ M [printed]”.

Distribution. French Guiana, North Brazil.

171. *Mycotretus fasciolatus* Lacordaire, 1842

Mycotretus fasciolatus Lacordaire 1842: 150. Type locality: “Mexique”. Alvarenga 1994: 25.

Type specimen. Not located.

Other examined specimens. 1 specimen (UMZC; Fig. 29C) “Mex [handwritten] \ TYPE. [printed] fasciolatus R [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed] *Mycotretus fasciolatus* Lacordaire, 1842 [handwritten]”; 1 male (DZUP, dissected)

“Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Hdo. [?] S. Diego, La Libertad El Salvador, 22.X.1959, J. Bechyné [handwritten] \ Comparado com tipo [printed] *Mycotretus fasciolatus* Lac., 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ 1733 [printed] \ DZUP 132906 [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Bugaba, 800–1,500 ft, Champion [printed] \ Comparado c/ tipo *Mycotretus fasciolatus* Lac. 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ B.C.A., Col., VII. *Mycotretus fasciolatus*. [printed]”.

Distribution. Mexico, Guatemala, Panama, El Salvador.

172. *Mycotretus figuratus* Lacordaire, 1842

Mycotretus figuratus Lacordaire 1842: 159. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 29.

Lectotype, here designated (MRSN; Fig. 29D). Junior synonym of *M. maculatus* Olivier, 1792 (Fig. 39E, see below).

173. *Mycotretus flavomarginatus* Lacordaire, 1842

Mycotretus flavomarginatus Lacordaire 1842: 157. Type locality: “province de Rio-Janeiro” [=Rio de Janeiro, state? locality?, Southeast Brazil]. Alvarenga 1994: 26.

Mycotretus major Mader, 1955 **new synonym** (Fig. 38D). Mader 1955: 477. Type locality: “Paraguay: Villarica”. Alvarenga 1994: 29.

Lectotype, here designated (MRSN; Fig. 29E). “LECTOTYPE [printed] *Mycotretus flavomarginatus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 female (MNHN, dissected) “Brésil [handwritten] \ Flavomarginatus Lac [handwritten] \ Type [handwritten] \ Ex-Musaeo Mniszech [printed] \ PARALECTOTYPE [printed] *Mycotretus flavomarginatus* Lacordaire, 1842 [handwritten]”; 1 female (CELC, dissected) “Brasil: MG, Ipatinga, “Ponte 13”, 05.i.2010, leg. Nolasco & C.L.A [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ CAMPINAS-SP, 18/X/1979, C.A. Klink [handwritten] \ *Mycotretus flavomarginatus* Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”. ***Mycotretus major* Mader, 1955. Holotype (NMBS; Fig. 38D).** “Villarica, Paraguay, XI, 1951 [handwritten] \ Holotype major m. [handwritten]”. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Colatina, E. Santo Brasil [printed] XI. 1970 [handwritten] A. Silva [printed] \ 1899 [printed] \ *Mycotretus* 183 [handwritten] \ n. sp. [handwritten] \ Tibia posterior fortemente curvada. ♂? [handwritten]”.

Distribution. Paraguai, Southeast Brazil.

Remarks. We dissected specimens of *M. flavomarginatus* and *M. major* and their male genitalia morphology is exactly the same. We believe that the holotype of *M. major* is just a barely pigmented individual of *M. flavomarginatus*.

174. *Mycotretus floriger* Lacordaire, 1842

Mycotretus floriger Lacordaire 1842: 185. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 26.

Holotype (MRSN; Fig. 29F). “D. Lacordaire [handwritten] \ Holotype *Mycotretus floriger* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 specimen (UMZC) “Cayen [handwritten] \ TYPE. [printed, crossed out] \ floriger C. Reiche [handwritten]”; 1 specimen (UMZC) “Cayen [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ SINOP 12° 31’S, 55°37’W, BR 163 Km 500 a 600, Mato Grosso, BRASIL, 350 m X. 1974, Alvarenga & Roppa col. [printed] \ DZUP 126040 [printed]”.

Distribution. French Guiana, Central-West and North Brazil.

175. *Mycotretus fuscitarsis* Lacordaire, 1842

Mycotretus fuscitarsis Lacordaire 1842: 180. Type locality: “Mexique”. Alvarenga 1994: 26.

Lectotype, here designated (MRSN; Fig. 30A). “Orizaba [handwritten] \ LECTOTYPE [printed] *Mycotretus fuscitarsis* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Cerro de Plumas, Mexico. Hoege. [printed] \ B.C.A., Col., VII. *Mycotretus fuscitarsis*. [printed] \ 1884 [printed]”.

Distribution. Mexico.

176. *Mycotretus gemmula* Lacordaire, 1842

Mycotretus gemmula Lacordaire, 1842 **new synonym** (Fig. 30B). Lacordaire 1842: 181. Type locality: “Colombie”. Alvarenga 1994: 26.

Holotype (MNHN; Fig. 30B). New junior synonym of *M. apicalis* Lacordaire, 1842 (Fig. 26E, see above).

177. *Mycotretus gentilis* Lacordaire, 1842

Mycotretus gentilis Lacordaire, 1842 **new synonym** (Fig. 30C). Lacordaire 1842: 182. Type locality: “Colombie”. Crotch 1876: 448 [synonymous of *M. gemmula*]; Alvarenga 1994: 26.

Lectotype, here designated (MNHN; Fig. 30C). New junior synonym of *M. apicalis* Lacordaire, 1842 (Fig. 26E, see above).

178. *Mycotretus godarti* Lacordaire, 1842

Mycotretus godarti Lacordaire, 1842 (Fig. 30D). Lacordaire 1842: 146. Type locality: “Colombie”. Gorham 1888: 47 [junior synonym of *M. ornatus*]; Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 31.

Lectotype, here designated (MNHN; Fig. 30D). Junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

179. *Mycotretus graniformis* Lacordaire, 1842

Mycotretus graniformis Lacordaire 1842: 152. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 26.

Lectotype, here designated (MRSN; Fig. 30E). New junior synonym of *M. lepidus* Lacordaire, 1842 (Fig. 31F, see below).

180. *Mycotretus graphoderus* Lacordaire, 1842

Mycotretus graphoderus Lacordaire, 1842 **new synonym** (Fig. 30F). Lacordaire 1842: 144. Type locality: “Brésil”. Alvarenga 1994: 26.

Lectotype, here designated (UMZC; Fig. 30F). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

181. *Mycotretus hepaticus* Lacordaire, 1842

Mycotretus hepaticus Lacordaire 1842: 190. Type locality: “Colombie”. Alvarenga 1994:

Lectotype, here designated (MNHN; Fig. 31A). “Ex-Musaeo Mniszech [printed] \ *Type* [printed] \ *Hepaticus* Lac [handwritten] \ *Colombie* [handwritten] \ **LECTOTYPE** [printed] *Mycotretus hepaticus* Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Colombia.

Remarks. The present species was not dissected and must be examined again for verifying whether it actually belongs to *Mycotretus* or to another genus in Erotylidae (e.g. *Cyclomorpha* Hope, 1841). Presently, we have no specimens for dissection and, therefore, we prefer to keep it in *Mycotretus*.

182. *Mycotretus hilaris* Lacordaire, 1842

Mycotretus hilaris Lacordaire, 1842 **new synonym** (Fig. 26C). Lacordaire 1842: 171. Type locality: “Brésil”.
Alvarenga 1994: 27.

Holotype (UMZC; Fig. 31B). “TYPE. [printed] hilaris Ch [handwritten] \ TYPE [blue label, printed] \ Holotype *Mycotretus hilaris* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 male (MZSP, dissected) “Coll. J. Guerin. S. Paulo. Brasil. [printed] 18681 [handwritten] \ Itatiaya. Rio. [printed] 11.936 [handwritten] \ *Mycotretus hilaris* Lac. [handwritten] J. Guerin det. 19 [printed]54[handwritten]”.

Distribution. Southeast Brazil.

183. *Mycotretus humilis* Lacordaire, 1842

Mycotretus humilis Lacordaire 1842: 189. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 27.

Type specimen. Not located.

Distribution. French Guiana.

184. *Mycotretus intermedius* Lacordaire, 1842

Mycotretus intermedius Lacordaire, 1842 **new synonym** (Fig. 31C). Lacordaire 1842: 135. Type locality: “Rio-Janeiro” [=Rio de Janeiro, state? locality?, Southeast Brazil]. Alvarenga 1994: 27.

Lectotype, here designated (MRSN; Fig. 31C). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

185. *Mycotretus jocosus* Lacordaire, 1842

Mycotretus jocosus Lacordaire 1842: 173. Type locality: “Brésil?” Alvarenga 1994: 28.

Lectotype, here designated (MNHN; Fig. 31D). “2247. 22. [?] [handwritten] \ *Mycotretus jocosus*. [handwritten] \ Lectotipo [red label, printed]”.

Other examined specimens. 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ CORCOVADO, Guanabara BRASIL [printed] IX. 1969 [handwritten] Alvarenga & Seabra [printed] \ 1944 [printed] \ *Mycotretus* 013 [handwritten] \ DZUP 136236 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Comparado com tipo [printed] *Mycotretus jocosus* Lac. 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ REPRESA RIO GRANDE, Guanabara Brasil [printed] X.1965 [handwritten] F.M.Oliveira [printed] \ DZUP 136233 [printed]”.

Distribution. Southeast Brazil.

Remarks. As well as the case of *M. coronatus* (Duponchel, 1825) (Fig. 13A), the printed label “Lectotipo” of the *M. jocosus* lectotype has also the style used by Moacyr Alvarenga.

186. *Mycotretus lacertosus* Lacordaire, 1842

Mycotretus lacertosus Lacordaire 1842: 176. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 28.

Type specimen. Not located.

Other examined specimens. 1 specimen (MNRJ, dissected; Fig. 31E) “OIAPOQUE, Amapá, Brasil V–1959, M. Alvarenga [printed] \ 1942 [printed] \ Coleção M. Alvarenga [printed] \ *Mycotretus lacertosus* Lac, 1842 [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ SINOP, M. Grosso, Brasil, X. 1974, M. Alvarenga [printed] \ Lat 12° 31’ S, Lon 55° 37’ W [printed] \ DZUP 126123 [printed]”;

Distribution. French Guiana, North and Central-West Brazil.

187. *Mycotretus lepidus* Lacordaire, 1842

Mycotretus graniformis Lacordaire, 1842, **new synonym** (Fig. 30E). Lacordaire 1842: 152. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 26.

Mycotretus chontalesi Crotch, 1873, **new synonym** (Fig. 5A). Type locality: “Santo Domingo, Chontales, Nicaragua” [Department of Chontales, Nicaragua]. Alvarenga 1994: 22.

Lectotype, here designated (MRSN; Fig. 31F). “D. Lacordaire [handwritten] \ LECTOTYPE [printed] *Mycotretus Lepidus* Lacordaire, 1842 [handwritten]”;

Other examined specimens. *Mycotretus chontalesi* Crotch, 1873. Lectotype, here designated (BMNH; Fig. 5A). “Type [disc-shaped label, red/orange border, printed] \ *Mycotretus chontalesi*, Type. Crotch [handwritten] \ CHONTALES, E.M. Janson [printed] \ TYPE [printed], *chontalesi* [handwritten] \ LECTOTYPE, *Mycotretus chontalesi* Crotch, 1873 [red label, printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ 1790 [printed] \ Jacareacanga, Pará, Brasil, XII-1968, M. Alvarenga [printed] \ Homeotipo [red label, printed] \ *suturalis* [handwritten] \ não confere com a descrição [handwritten]”; 1 male (MZSP, dissected) “Chaparé, Bolivia, 10948 [handwritten] \ Coll. J. Guerin. S. Paulo. Brasil. [printed] 18173 [handwritten] \ *Mycotretus derasofasciatus* Kuhnt. [handwritten] J Guerin det. 19 [printed] 50 [handwritten]”. ***Mycotretus graniformis* Lacordaire, 1842. Lectotype, here designated (MRSN; Fig. 30E).** LECTOTYPE [printed] *Mycotretus graniformis* Lacordaire, 1842 [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \

MANAUS, Amazonas Brasil [printed] XI. 1966, S.J. Oliveira [handwritten] \ 1784 [printed] \ DZUP 127837 [printed] \ malaise [handwritten] \ *Mycotretus* 023 [handwritten]”; 1 female (MCNZ, dissected) “PERU: Loreto Pr.:nr. Jct. Rio Marañon & Ucayali, 73.5°W 4.8°S, 6–20–VIII–1994, P. Skelley, day catch [printed] \ *Mycotretus* *Lepidus* Lac. [handwritten] det. P.E. Skelley 1996 [printed] \ Col. MCN 238413 [printed]”.

Distribution. Nicaragua, North Brazil, Bolivia, French Guiana, Suriname, Ecuador, Peru.

Remarks. The dorsal color pattern of *Mycotretus lepidus*, *M. chontalesi*, *M. graniformis* are almost identical. Those species differ only by spots, close to basal elytral edge, which can be completely “divided” or “entire” depending on the individuals. Aside from these small differences, we dissected individuals showing those phenotypes and observed that their male genitalia have the same morphology.

188. *Mycotretus leprosus* Lacordaire, 1842

Mycotretus leprosus Lacordaire 1842: 160. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 28.

Lectotype, here designated (MNHN; Fig. 32A). “Cayenne [handwritten] \ *Leprosus* Lac [handwritten] \ Ex-Musaeo Mniszech [printed] \ *Type* [handwritten] \ LECTOTYPE [printed] *Mycotretus leprosus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 male (MZSP, dissected) “BRASIL, OBIDOS (Traíra), Estº Pará, DIRINGS [front] JUN 1961 [back] [printed]”.

Distribution. French Guiana, North Brazil.

189. *Mycotretus limbatus* (Lacordaire, 1842)

Tritoma limbata Lacordaire 1842: 223. Type locality: “Brésil”. Crotch 1876: 458 [*Mycotretus limbatus*]; Alvarenga 1994: 28.

Type specimen. Not located.

Other examined specimens. 1 specimen (UMZC; Fig. 32B). “TYPE. [printed, crossed out] \ *Limbata* c. typ. Turin, Ega Bates [handwritten]”; 1 specimen (UMZC) “Bates”; 1 male (DZUP, dissected) “Brasilien, Nova Teutonia, 27°11’B, 52°23’L, Fritz Plaumann [printed], 20. 12. [handwritten] 193[printed]7[handwritten] \ DZUP 135158 [printed]”.

Distribution. Brazil.

Remarks. The label data of the specimen from the UMZC, shown in Fig. 32B’, supports the primary type of *M. limbatus*, as well many of the Lacordaire types, was already

in the MRSN by the time Crotch was alive. In fact, we observed one unlabeled specimen of *M. limbatus* kept in the MRSN, but it must be examined again for confirming whether it would be the specimen used by Lacordaire.

190. *Mycotretus luteipes* Lacordaire, 1842

Mycotretus luteipes Lacordaire 1842: 189. Type locality: “Mexique”. Alvarenga 1994: 28.

Lectotype, here designated (UMZC; Fig. 32C). “TYPE. [printed] luteipes Ch [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed] *Mycotretus luteipes* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Teapa, Tabasco. March. H.H.S. [printed] \ B.C.A., Col., VII. *Mycotretus luteipes*. [printed] \ Comparado com tipo [printed] *Mycotretus luteipes* Lac., 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ 1635 [printed] \ DZUP 132948 [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Mexico. Salle Coll. [printed] \ Toxпам [printed] \ *Mycotretus luteipes* Lac apud Sallé [handwritten] \ B.C.A., Col., VII. *Mycotretus luteipes*. [printed] \ Homeotipo [printed]”.

Distribution. Mexico, Guatemala.

191. *Mycotretus magus* Lacordaire, 1842

Mycotretus magus Lacordaire 1842: 184. Type locality: “Brésil”. Alvarenga 1994: 29.

Lectotype, here designated (MNHN; Fig. 32D). “Brésil [handwritten] \ *Magus* Lac [handwritten] \ Type [handwritten] \ Ex-Musaeo Mniszech [printed] \ LECTOTYPE [printed] *Mycotretus magus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Itapetinga, Bahia Brasil, XI–1969, F.M. Oliveira [printed] \ *Mycotretus magus* Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE Guanabara BRASIL [printed] XI. 1970 [handwritten] F.M.Oliveira [printed] \ *Mycotretus magus* Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. Northeast and South Brazil.

192. *Mycotretus marginicollis* Lacordaire, 1842

Mycotretus marginicollis Lacordaire 1842: 159. Type locality: “province de Rio-Grande” [state of Rio Grande do Sul, South Brazil]. Alvarenga 1994: 29.

Lectotype, here designated (UMZC; Fig. 32E). “TYPE [blue label, printed] \ TYPE. [printed] marginicollis R. [handwritten] \ Rio Gde [handwritten] \ Bras [handwritten] \ Holotype *Mycotretus marginicollis* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 female (MCNZ) “CAXIAS DO SUL, RS (FAZ. SOUZA), 19–20 /XI/1993, L. Moura [handwritten] leg. [printed] \ Col. MCN 238416 [printed]”; 1 female (MCNZ) “S.F. de Paula, RS (Passo do Inferno), 16–19.XII.1999, Franceschini, Bonaldo & Silva [printed] \ Col. MCN [printed] 168.750 [handwritten] \ *M. marginicollis* [handwritten]”; 1 male (MZSP, dissected) “Brasilien, Nova Teutonia, Santa Catharina [printed] 3.1935 [handwritten] B. Pohl [printed] \ *Mycotretus marginicollis* Lac. [handwritten]”.

Distribution. Southeast and South Brazil.

193. *Mycotretus melanopterus* Lacordaire, 1842

Mycotretus melanopterus Lacordaire 1842: 162. Type locality: “Colombie”. Alvarenga 1994: 29.

Mycotretus xanthosomus Lacordaire, 1842. (Fig. 37F). Lacordaire 1842: 162. Type locality: “Colombie”. Crotch 1876: 439 [synonym of *M. melanopterus* Lacordaire, 1842]; Alvarenga 1994: 29.

Lectotype, here designated (UMZC; Fig. 32F). “TYPE [blue label, printed] \ TYPE. [printed] melanopterus R [handwritten] \ Nova Gr [handwritten] \ LECTOTYPE [printed] *Mycotretus melanopterus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. *Mycotretus xanthosomus* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 37F). “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Xanthosomus Lac. [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] *Mycotretus xanthosomus* Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Colombia.

194. *Mycotretus melanostictus* Lacordaire, 1842

Mycotretus melanostictus Lacordaire, 1842 (Fig. 33A). Lacordaire 1842: 139. Type locality: “Colombie”. Gorham 1888: 47 [junior synonym of *M. ornatus*]; Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 31.

Lectotype, here designated (MNHN; Fig. 33A). Junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

195. *Mycotretus miniatus* Lacordaire, 1842

Mycotretus miniatus Lacordaire 1842: 183. Type locality: "Mexique". Alvarenga 1994: 29.

Lectotype, here designated (MRSN; Fig. 33B). "Orizaba [handwritten] \ LECTOTYPE [printed] *Mycotretus miniatus* Lacordaire, 1842 [handwritten]".

Distribution. Mexico, Guatemala.

Remarks. Based on label information of the lectotype (Fig. 33B'), the type locality of *M. miniatus* is Orizaba, Mexico.

196. *Mycotretus misellus* Lacordaire, 1842

Mycotretus misellus Lacordaire 1842: 183. Type locality: "Cayenne?" [French Guiana]. Alvarenga 1994: 29.

Type specimen. Not located.

Other examined specimens. 1 specimen (UMZC; Fig. 33C) "Nova Gr [handwritten] \ TYPE. [printed, crossed out] *misellus* C. Reiche [handwritten]".

Distribution. Colombia, French Guiana, Southeast Brazil.

197. *Mycotretus nigrivittis* Lacordaire, 1842

Mycotretus nigrivittis Lacordaire 1842: 157. Type locality: "Cayenne" [French Guiana]. Alvarenga 1994: 30.

Type specimen. Not located.

Other examined specimens. 1 specimen (MZSP; Fig. 33D) "Maués. Amazonas. [printed] 4,940 [handwritten] \ Coll. J. Guerin. S. Paulo. Brasil. [printed] 6220 [handwritten] \ *Mycotretus nigrivittis* Lac. [handwritten] J. Guerin. det. 194[printed]9[handwritten]".

Distribution. French Guiana, (North Brazil?).

Remarks. The specimen examined by us was tentatively identified as *M. nigrivittis*. Therefore, the northern Brazilian record is doubtful.

198. *Mycotretus nigrocinctus* Lacordaire, 1842

Mycotretus nigrocinctus Lacordaire 1842: 151. Type locality: "Colombie". Crotch 1876: 451 [synonym of *M. nigrocinctus*]; Alvarenga 1994: 36.

Lectotype, here designated (MNHN; Fig. 33E). Junior synonym of *M. tigratus* Lacordaire, 1842 (Fig. 37D, see below).

199. *Mycotretus nigroterminatus* Lacordaire, 1842

Mycotretus nigroterminatus Lacordaire, 1842 **new synonym** (Fig. 33F). Lacordaire 1842: 180. Type locality: “Colombie”. Alvarenga 1994: 30.

Lectotype, here designated (MNHN; Fig. 33F). New junior synonym of *M. apicalis* Lacordaire, 1842 (Fig. 26E, see above).

200. *Mycotretus nugator* Lacordaire, 1842

Mycotretus nugator Lacordaire, 1842 **new synonym** (Fig. 33G). Lacordaire 1842: 174. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 31.

Type specimen. Not located.

Remarks. New junior synonym of *M. dorsofasciatus* Lacordaire, 1842 (Fig. 28C, see above).

201. *Mycotretus palmiphilus* Lacordaire, 1842

Mycotretus palmiphilus Lacordaire 1842: 165. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 32.

Lectotype, here designated (MRSN; Fig. 34A). “D. Lacordaire [handwritten] \ LECTOTYPE [printed] *Mycotretus palmiphilus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 specimen (MNHN) “Cayenne [handwritten] \ *Palmiphilus* Lac. [handwritten] \ *Type* [handwritten] \ Ex-Musaeo Mniszech [printed]”; 1 specimen (UMCZ) “Cayen [handwritten] \ TYPE. [printed, crossed out] *palmiphilus* coll Reiche [handwritten] \ PARALECTOTYPE [printed] *Mycotretus palmiphilus* Lacordaire, 1842 [handwritten]”.

Distribution. French Guiana, North Brazil.

Remarks. The examined *M. palmiphilus* specimen, deposited in the MNHN, was mistakenly labelled as “lectotype” by us. The specimen from MRSN (Fig. 34A) is probably the “true” lectotype. Lacordaire (1842) did not mention the Dupont collection in his description (see Material and Methods, comments about type depositories). In such cases, the species used by Lacordaire presumably belong to the Brême collection (MRSN). *Mycotretus palmiphilus* resembles *M. argus* Lacordaire, 1842 (Fig. 26F), but we did not have a good number of specimens of both species in hand for comparison, and we prefer not to propose a new synonym here.

202. *Mycotretus partitus* Lacordaire, 1842

Mycotretus partitus Lacordaire 1842: 176. Type locality: “Colombie”. Alvarenga 1994: 32.

Lectotype, here designated (RBINS; Fig. 34B). “Coll. R.I.Sc.N.B., Colombie, Coll. Chapuis [printed] \ *Mycotretus partitus* Colombie Lac [handwritten]”.

Distribution. Unknown locality in Colombia.

203. *Mycotretus pecari* Lacordaire, 1842

Mycotretus pecari Lacordaire 1842: 167. Type locality: Colombia. Alvarenga 1994: 32.

Mycotretus bisseptemguttatus Crotch, 1876 **new synonym** (Fig. 4D). Crotch 1876: 441. Type locality: Cayenne, French Guiana. Alvarenga 1994: 21.

Mycotretus quattuordecimguttatus Lacordaire, 1842 **new synonym** (Fig. 35E). Lacordaire 1842: 163. Type locality: Colombia. Alvarenga 1994: 33.

Mycotretus quattuordecimguttatus conjunctus Crotch 1876 **new synonym** (Fig. 10A). Crotch 440 [as a variety]. Type locality: unknown. Alvarenga 1994: 34.

Lectotype, here designated (MRSN; Fig. 34C). “maracay. [handwritten]”.

Other examined specimens. 1 paralectotype (UMCZ) “TYPE. [printed, crossed out] *pecari* Co Reiche [handwritten] \ Valencia [handwritten] \ Colombia [handwritten] \ Paratype *Mycotretus pecari* Lacordaire, 1842 [handwritten]”; 1 female (MCNZ) “S. Antônio da Patrulha, RS Arroio Miraguaia, BPN-Mata Ripária, 29°54’S, 50°42’W, 19.VII.2000, A. Bonaldo col. [printed] \ Col. MCN. [printed] 217995 [handwritten]”; 1 female (MCNZ) “Porto Alegre, RS (I. Gr. Dos Marinh.), 06.VII.1999, A. Bonaldo col. (em barba de pau) [printed] \ Col. MCN. [printed] 163981 [handwritten]”; 1 female (MCNZ) “Triunfo, RS (COPEsul), 28.XI.2000, J. Soledar Col. [printed] \ Col. MCN. [printed] 217986 [handwritten]”; 1 male (MCNZ) “Triunfo, RS (I. do Cravo), 29.VII.1999, A. Franceschini [printed] \ Col. MCN. [printed] 163978 [handwritten]”. ***Mycotretus bisseptemguttatus* Crotch, 1876. Lectotype, here designated (UMZC; Fig. 4D).** “TYPE [blue label, printed] \ Cayenne [handwritten] \ L [printed] \ TYPE [printed], bis 7 guttata Cay. [handwritten] \ LECTOTYPE [printed], *Mycotretus bisseptemguttatus* Crotch, 1876 [red label, handwritten]”. ***Mycotretus quattuordecimguttatus* Lacordaire, 1842. Lectotype, here designated (UMZC; Fig. 35E).** “TYPE [blue label, printed] \ TYPE. [printed] 14-guttatus R [handwritten] \ Colomb [handwritten] \ LECTOTYPE [printed] *Mycotretus quattuordecimguttatus* Lacordaire, 1842 [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ XI-60, Ter. Amapá, Serra do Navio, R. Bicelli col. [handwritten] \ Comparado com tipo [printed] *Mycotretus quattuordecimguttatus*; Lac, 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ Comparado com tipo [printed] *Mycotretus*

bisseptemguttatus Crotch, 1876 [handwritten] M. Alvarenga det. 1971 [printed] \ 1827 [printed]”. *Mycotretus quattuordecimguttatus conjunctus* Crotch, 1876. **Lectotype, here designated (UMZC; Fig. 10A).** “TYPE [printed], conjunctus Sheppard [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed], *Mycotretus quattuordecimguttatus conjunctus* Crotch, 1876 [red label, handwritten]”.

Distribution. French Guiana, Colombia (*apud* Alvarenga 1994), North Brazil.

Remarks. *Mycotretus bisseptemguttatus* Crotch differs from *M. quattuordecimguttatus* Lacordaire only in the circular elytral spots, which are comparatively larger in the former species. Such color pattern, black elytra with yellowish circular spots arranged almost symmetrically, differs from that of *M. pecari*, on which the circular spots seems to have “fused” originating symmetrical, narrowed and yellowish bands on elytra. Aside from these differences, we observed no morphological differences on the male genitalia of the dissected specimens. Although any specimen of *M. quattuordecimguttatus conjunctus* was dissected, we observed that its color pattern and body shape (Fig. 10A) are very similar to those of *M. pecari*, and therefore these two species are probably conspecifics. Crotch (1876) did not mention the type locality of *M. quattuordecimguttatus conjunctus* and there is no locality information on type labels. This species and *M. guatemalae* were collected by the same person, “Sheppard”, a contemporary of Crotch (Skelley 1998b), so there is a chance these species were collected in the same locality in Guatemala.

204. *Mycotretus polyophthalmus* Lacordaire, 1842

Mycotretus polyophthalmus Lacordaire 1842: 163. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 33.

Lectotype, here designated (MRSN; Fig. 34D). “D. Lacordaire [handwritten]”.

Other examined specimens. 1 specimen (MNHN) “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Cayenne [handwritten] \ Polyophthalmus Lac. [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Porto Platon [printed] 24 [handwritten]-7-1961 [printed] \ Brasil, A P, J. & B. Bechyné [printed] \ *Mycotretus polyophthalmus* Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. French Guiana, Venezuela, North Brazil.

Remarks. The examined specimen (MNHN) was mistakenly labelled as “lectotype”. The specimen from MRSN (Fig. 34D) is the correct lectotype (see the case of *M. palmiphilus* lectotype above, Fig. 34A).

205. *Mycotretus posticus* Lacordaire, 1842

Mycotretus posticus Lacordaire, 1842. Lacordaire 1842: 147. Type locality: “Colombie”. Crotch 1876: 450 [junior synonym of *M. godarti* Lacordaire]; Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 31.

Type specimen. Not located.

Remarks. New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

206. *Mycotretus psittacus* Lacordaire, 1842

Mycotretus psittacus Lacordaire 1842: 167. Type locality: “Mexique” [?]. Alvarenga 1994: 33.

Lectotype, here designated (MRSN; Fig. 34E). “LECTOTYPE [printed] *Mycotretus psittacus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 male (MNHN, dissected) “Cayenne [handwritten] \ *Psittacus* Lac [handwritten] \ *Type* [handwritten] \ Ex-Musaeo Mniszech [printed] \ PARALECTOTYPE [printed] *Mycotretus psittacus* Lacordaire, 1842 [handwritten]”; 1 specimen (UMCZ) “Bahia [handwritten] \ Chevr. [printed] \ TYPE. [printed, crossed out] *psittacus* Ex descr. [handwritten]”.

Distribution. Mexico [?], French Guiana, unknown locality in Brazil.

Remarks. According to Lacordaire (1842: 167), on his description of *M. psittacus*, the individuals used by him belonged to the “Collections de M. Dupont et de M. le marquis de Brème”. We have chosen the specimen from the Brème collection (MRSN) as the lectotype and considered the Dupont specimen (MNHN) as a paralectotype. Gorham (1888) stated that he has not examined any specimen of *M. psittacus* from Mexico, and suggested that the correct locality for *M. psittacus* would be “perhaps Bahia” (Gorham commentary is based on a specimen from the Crotch collection, the same examined by us, see above). Alvarenga (1994) also pointed out that the type locality mentioned by Lacordaire would be wrong and mentioned that *M. psittacus* occurs in the Southeast Brazil. We cannot confirm the exact distribution of *M. psittacus* in Brazil, although it is possible that this species occurs in the Northeast and Southeast regions.

207. *Mycotretus pulchellus* Lacordaire, 1842

Mycotretus pulchellus Lacordaire 1842: 177. Type locality: “Rio-Janeiro” [=Rio de Janeiro, state? locality?, Southeast Brazil]. Alvarenga 1994: 33.

Holotype (MRSN; Fig. 34F). “D. Lacordaire [handwritten] \ Holotype *Mycotretus pulchellus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 specimen (MNHN) “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Pulchellus Lac [handwritten] \ Brésil [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ CORCOVADO, Guanabara BRASIL [printed] X. 1970 [handwritten], Alvarenga & Seabra [printed] \ Mycotretus pulchellus Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. Southeast Brazil.

Remarks. The examined specimen (MNHN) was mistakenly labelled as “lectotype”, but the specimen from MRSN (Fig. 34F) is the true lectotype (see above the case of lectotype of *M. palmiphilus* Lacordaire Fig. 34A and *M. polyophthalmus* Lacordaire Fig. 34D).

208. *Mycotretus pulicarius* Lacordaire, 1842

Mycotretus pulicarius Lacordaire, 1842 **new synonym** (Fig. 35A). Lacordaire 1842: 182. Type locality: “Colombie”. Crotch 1876: 448 [synonymous of *M. gemmula*]; Alvarenga 1994: 26.

Lectotype, here designated (MNHN; Fig. 35A). New junior synonym of *M. apicalis* Lacordaire, 1842 (Fig. 26E, see above).

209. *Mycotretus pusillus* Lacordaire, 1842

Mycotretus pusillus Lacordaire 1842: 188. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 33.

Lectotype, here designated (UMZC; Fig. 35B). “Cayen [handwritten] \ TYPE. [printed] pusillus R [handwritten] \ TYPE [blue label, printed] \ LECTOTYPE [printed] Mycotretus pusillus Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Jacareacanga, Pará Brasil, XII–1968, M. Alvarenga [printed] \ Malaise [handwritten] \ 1622 [printed] \ Mycotretus 184 [handwritten] \ pusillus Lac., 1842 [handwritten]”.

Distribution. French Guiana, North Brazil.

Remarks. *Mycotretus pusillus* resembles *M. pygmaeus* Lacordaire (Fig. 35C) in body shape, coloration and morphology of male genitalia, but differs from the latter in the more elongated penile flagellum.

210. *Mycotretus pygmaeus* Lacordaire, 1842

Mycotretus pygmaeus Lacordaire 1842: 156. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 33.

Lectotype, here designated (MNHN; Fig. 35C). “Cayenne [handwritten] \ Pygmaeus Lac [handwritten] \ Type [handwritten] \ Ex-Musaeo Mniszech [printed] \ LECTOTYPE [printed] Mycotretus pygmaeus Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 specimen (MRSN) “D. Guerin. [handwritten]”; 1 specimen (UMZC) “Cayenne Lacordaire. [handwritten] \ TYPE. [printed, crossed out] pygmaeus coll. Reiche. [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Jacaré P.N.XINGU, M. Grosso Brasil, XI–1961, Alvarenga e Werner [printed] \ DZUP 371368 [printed]”; 1 female (DZUP) “Coleção M. Alvarenga [printed] \ SERRA do NAVIO, Terr. Amapá BRASIL, IX–1957, K. Lenko leg. [printed] \ DZUP 371396 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ CHAPADA GUIMARÃES, Mato Grosso Brasil, XI–1963, Alvarenga e Werner [printed] \ DZUP 371440 [printed]”.

Distribution. From Mexico to Argentina.

211. *Mycotretus quadrinus* Lacordaire, 1842

Mycotretus quadrinus Lacordaire, 1842 (Fig. 35D). Lacordaire 1842: 155. Type locality: “Brésil”. Crotch 1876: 455 [junior synonym]; Alvarenga 1994: 29.

Lectotype, here designated (UMCZ; Fig. 35D). Junior synonym of *M. minutus* Duponchel, 1825 (Fig. 13E, see above).

212. *Mycotretus quattuordecimguttatus* Lacordaire, 1842

Mycotretus quattuordecimguttatus Lacordaire, 1842 **new synonym** (Fig. 35E). Lacordaire 1842: 163. Type locality: “Colombie”. Alvarenga 1994: 33.

Lectotype, here designated (UMZC; Fig. 35E). New junior synonym of *M. pecari* Lacordaire, 1842 (Fig. 34C, see above).

213. *Mycotretus rhodosomus* Lacordaire, 1842

Mycotretus rhodosomus Lacordaire 1842: 166. Type locality: “Brésil”. Alvarenga 1994: 34.

Brachysphaenus (Iphiclus) nigromaculatus Kuhnt, 1909 **new synonym** (Fig. 25B). Type locality: “Mexico”. Delkeskamp 1939: 27 [*Mycotretus*]; Alvarenga 1994: 30.

Lectotype, here designated (UMZC; Fig. 35F). “TYPE [blue label, printed] \ TYPE. [printed] rhodosomus Ch [handwritten] \ LECTOTYPE [printed] Mycotretus rhodosomus Lacordaire, 1842 [handwritten]”.

Other examined specimens. *Mycotretus nigromaculatus* Kuhnt, 1909. **Holotype** (MFN; Fig. 25B). “21583 [printed] \ Mexico. (...) ? [handwritten] \ Iphiclus nigromaculatus Kuhnt [handwritten] \ 1. [handwritten] \ Type [red label, printed] \ HOLOTYPE *Brachysphaenus (Iphiclus) nigromaculatus* Kuhnt, 1909 labelled by I. Pecci-Maddalena 2017”; 1 male (MNRJ, dissected) “Rio de janeiro, 2/1944, O. Braga [handwritten] \ *Mycotretus rhodosomus* Lac [handwritten] J. Guerin. det. 194[printed]8[handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ Rio de janeiro, 2/1944, O. Braga [handwritten] \ 1825 [printed] \ *Mycotretus rhodosomus* Lac [handwritten] J. Guerin. det. 194 [printed]8[handwritten] \ Comparado com tipo [printed] *Mycotretus rhodosomus* Lac, 1842 [handwritten] M. Alvarenga det. 1971 [printed]”.

Distribution. Mexico [?], Southeast Brazil.

Remarks. 1) Although the lectotype of *M. nigromaculatus* (Kuhnt) was not dissected, its general morphology and color pattern is identical to the lectotype of *M. rhodosomus* Lacordaire. Therefore, here we synonymize *M. nigromaculatus* (Kuhnt) under *M. rhodosomus* Lacordaire; 2) We observed that the type locality Mexico of *M. nigromaculatus* cited by Kuhnt (1909) is wrong. Lacordaire (1842) mentioned that the type locality of *M. rhodosomus* is “Brazil” and all individuals examined by us are from Southeast Brazil. Aside from that, there is no mention to the name “*M. rhodosomus*” in *Biologia Centrali Ameriana* (see Gorham 1888), the work on which hundreds of erotylids from Central America and Mexico were studied.

214. *Mycotretus rufilabris* (Lacordaire, 1842)

Tritoma rufilabris Lacordaire 1842: 222. Type locality: “Brésil”. Crotch 1876: 458 (*Mycotretus*); Alvarenga 1994: 34.

Type specimen. Not located.

Other examined specimens. 1 specimen (MNRJ; Fig. 36A) “Coleção M. Alvarenga [printed] \ CORCOVADO Rio Guanabara Brasil [printed] XI. 1958 [handwritten] Alvarenga e Seabra [printed] \ *Mycotretus rufilabris* (Lac. 1842) [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. Brazil.

Remarks. There is an unlabeled specimen kept in the Brême collection (box “EROTYLIENS–Engidiformes, 1H–16 [handwritten]”) which can be the type specimen of *M. rufilabris*, but it has not been examined by us.

215. *Mycotretus sannio* Lacordaire, 1842

Mycotretus sannio Lacordaire 1842: 169. Type locality: “Brésil”. Alvarenga 1994: 34.

Type specimen. Not located.

Other examined specimens. 1 specimen (UMCZ; Fig. 36B) “TYPE. [printed. Crossed out], Sannio ex. Descr [?] [handwritten]”.

Distribution. Unknown locality in Brazil.

216. *Mycotretus savignyi* Lacordaire, 1842

Mycotretus savignyi Lacordaire, 1842 **new synonym** (Fig. 36C); Lacordaire 1842: 156. Type locality: “Colombie”. Alvarenga 1994: 34.

Lectotype, here designated (MNHN; Fig. 36C). New junior synonym of *M. lesueuri* Chevrolat, 1835 (Fig. 3F, see above).

217. *Mycotretus scalaris* Lacordaire, 1842

Mycotretus scalaris Lacordaire 1842: 168. Type locality: “Colombie”. Alvarenga 1994: 35.

Lectotype, here designated (MNHN; Fig. 36D). “Ex-Musaeo, Mniszech [printed] \ Type [handwritten] \ Scalaris Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] Mycotretus scalaris Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Colombia.

218. *Mycotretus scitulus* Lacordaire, 1842

Mycotretus scitulus Lacordaire 1842:154. Type locality: Rio-Janeiro [=Rio de Janeiro, state? locality?, Southeast Brazil]. Alvarenga 1994: 35.

Mycotretus derasofasciatus Kuhnt, 1910, **new synonym** (Fig. 23F). Kuhnt 1910: 237. Type locality: “Chanchamayo, Peru”. Alvarenga 1994: 23.

Mycotretus nubifer Casey, 1916, **new synonym** (Fig. 3E). Casey 1916: 158. Type locality: “Guatemala (Quitché)” [=Department of Quiché, Guatemala]. Alvarenga 1994: 31.

Lectotype, here designated (MRSN; Fig. 36E). “Lacordaire [handwritten] \ LECTOTYPE [printed] Mycotretus scitulus Lacordaire, 1842 [handwritten]”.

Other examined specimens. *Mycotretus nubifer* Casey, 1916. **Lectotype, here designated (NMNH; Fig. 3E).** “Joyabaj, Quitché, Guatemala [handwritten] \ nubifer [handwritten], Csy. [name?, handwritten] \ CASEY, bequest, 1925 [printed] \ TYPE USNM [printed], 48793 [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \

Toxipam [handwritten] Mexico. Salle Coll. [printed] \ 2404 [printed] \ B.C.A., Col.,VII. Mycotretus [printed] \ Mycotretus scitulus Lac apud Sallé [handwritten] \ DZUP 132673 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ mex. [handwritten] \ Mycotretus scitulus Lac. [printed] \ DZUP 132675 [printed]”. ***Mycotretus derasofasciatus* Kuhnt, 1910. Lectotype, here designated (MFN; Fig. 23F).** “Coll. Thieme [printed] \ Chanchamayo, Ober-Peru [printed] \ Mycotretus derasofasciatus Kuhnt. [handwritten] det. P. Kuhnt [printed] \ Type [red label, printed] \ Chanchamayo [handwritten] \ LECTOTYPE *Mycotretus derasofasciatus* Kuhnt, 1910 det. I. Pecci-Maddalena 2017 [red label, printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Rio Caurimare, CARACAS [printed] \ 24–4–60, BORDON LEG [printed] \ DZUP, 371162 [printed]”; 1 male (CELC, dissected) “BRASIL: MG, Viçosa; “Mata do Paraíso, trilha do pesquisador” 11.X.2016; I Souza-Gonçalves, P Borlini, C Lopes-Andrade leg [printed]”.

Distribution. Guatemala, Venezuela, Mexico, Brazil.

Remarks. The lectotype of *Mycotretus derasofasciatus* Kuhnt is morphologically identical to the lectotype of *M. scitulus*. The lectotype of *M. nubifer* Casey is slightly widest and has the contour of the elytral medial band not serrated compared to those two former species. We dissected male individuals showing those distinct phenotypes (and from widely separated localities, see above), and observed no morphological difference in their male genitalia.

219. *Mycotretus sexoculatus sexoculatus* Lacordaire, 1842

Mycotretus sexoculatus sexoculatus Lacordaire 1842: 165. Type locality: “Colombie”. Alvarenga 1994: 35.

Lectotype, here designated (UMCZ; Fig. 36F). “TYPE [blue label, printed] \ TYPE. [printed] 6-oculatus R [handwritten] \ Nova Gr [handwritten] \ LECTOTYPE [printed] *Mycotretus sexoculatus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed] \ CORCOVADO, Guanabara BRASIL [printed] XI. 1967 [handwritten], Alvarenga & Seabra [printed] \ Comparado c/ tipo, *Mycotretus sexoculatus* Lac. 1842 [handwritten] M. alvarenga det. 1971 [printed]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL [printed] XII. 1977 [handwritten] F.M. Oliveira [printed] \ *Mycotretus sexoculatus sexoculatus* Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ REPRÊSA RIO GRANDE, Guanabara BRASIL

[printed] IV. 1966 [handwritten] F.M. Oliveira [printed] \ MALAISE [handwritten] \ mycotretus 020 [handwritten]”.

Distribution. Colombia, Southeast Brazil.

220. *Mycotretus silaceus* Lacordaire, 1842

Mycotretus silaceus Lacordaire, 1842 (Fig. 37A); Lacordaire 1842: 187. Type locality: “Brésil”. Gorham 1888: 60 [junior synonym] \ Alvarenga 1994: 36.

Lectotype, here designated (UMCZ; Fig. 37A). Junior synonym of *M. sobrinus* (Guérin-Méneville, 1841) (Fig. 22E, see above).

221. *Mycotretus singularis* Lacordaire, 1842

Mycotretus singularis Lacordaire 1842: 148. Type locality: “Colombie”. Alvarenga 1994: 35.

Lectotype, here designated (UMCZ; Fig. 37B). “Nova Gr [handwritten] \ TYPE [blue label, printed] \ TYPE. [printed] Singularis R [handwritten] \ LECTOTYPE [printed] *Mycotretus singularis* Lacordaire, 1842 [handwritten]”

Distribution. Unknown locality in Colombia.

222. *Mycotretus sticticollis* Lacordaire, 1842

Mycotretus sticticollis Lacordaire 1842: 174. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 36.

Type specimen. Not located.

Distribution. Unknown locality in French Guiana.

223. *Mycotretus terminalis* Lacordaire, 1842

Mycotretus terminalis Lacordaire, 1842 (Fig. 37C). Lacordaire 1842: 134. Type locality: Rio-Janeiro [=Rio de Janeiro, state? locality?, Southeast Brazil]. Gorham 1888: 47 [junior synonym of *M. ornatus*]. Kuhnt 1909: 76 [variety of *M. ornatus*]; Alvarenga 1994: 32.

Lectotype, here designated (MRSN; Fig. 37C). Junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

224. *Mycotretus tesseraeus* Lacordaire, 1842

Mycotretus tesseraeus Lacordaire 1842: 191. Type locality: “Colombie”. Alvarenga 1994: 36.

Type specimen. Not located.

Distribution. Unknown locality in Colombia.

225. *Mycotretus tigratus* Lacordaire, 1842

Mycotretus tigratus Lacordaire 1842: 150. Type locality: “Colombie”. Alvarenga 1994: 36.

Mycotretus nigrocinctus Lacordaire, 1842 (Fig. 33E). Lacordaire 1842: 151. Type locality: “Colombie”. Crotch 1876 (synonym of *M. tigratus* Lacordaire, 1842); Alvarenga 1994: 36.

Mycotretus trabeatus Lacordaire, 1842 **new synonym** (Fig. 37E). Lacordaire 1842: 148. Type locality: “Colombie”. Alvarenga 1994: 37.

Lectotype, here designated (MNHN; Fig. 37D). “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Tigratus Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] *Mycotretus tigratus* Lacordaire, 1842 [handwritten]”.

Other examined specimens. *Mycotretus nigrocinctus* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 33E). “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Nigrocinctus Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] *Mycotretus nigrocinctus* Lacordaire, 1842 [handwritten]”. ***Mycotretus trabeatus* Lacordaire, 1842. Lectotype, here designated (MNHN; Fig. 37E).** “Ex-Musaeo Mniszech [printed] \ Type [handwritten] \ Trabeatus Lac [handwritten] \ Colombie [handwritten] \ LECTOTYPE [printed] *Mycotretus trabeatus* Lacordaire, 1842 [handwritten]”.

Distribution. Unknown locality in Colombia.

Remarks. The small differences in coloration of *Mycotretus nigrocinctus* Lacordaire, *M. trabeatus* Lacordaire and *M. tigratus* Lacordaire are expected to occur in *Mycotretus* species of a single locality and, in spite of that, we observed that these species have the same general color pattern. Therefore, here we synonymized *M. trabeatus* Lacordaire under *M. tigratus* Lacordaire.

226. *Mycotretus trabeatus* Lacordaire, 1842

Mycotretus trabeatus Lacordaire, 1842 **new synonym** (Fig. 37E). Lacordaire 1842: 148. Type locality: “Colombie”. Alvarenga 1994: 37.

Lectotype, here designated (MNHN; Fig. 37E). New junior synonym of *M. tigratus* Lacordaire, 1842 (Fig. 37D, see above).

227. *Mycotretus vilis* Lacordaire, 1842

Mycotretus vilis Lacordaire 1842: 175. Type locality: “Cayenne” [French Guiana]. Alvarenga 1994: 37.

Type specimen. Not located.

Distribution. Unknown locality in French Guiana.

228. *Mycotretus xanthosomus* Lacordaire, 1842

Mycotretus xanthosomus Lacordaire, 1842. (Fig. 37F). Lacordaire 1842: 162. Type locality: “Colombie”. Crotch 1876: 439 [synonym of *M. melanopterus* Lacordaire, 1842]; Alvarenga 1994: 29.

Lectotype, here designated (MNHN; Fig. 37F). Junior synonym of *M. melanopterus* Lacordaire, 1842 (Fig. 32F, see above).

XIX. Mader, L.

(Figs. 38, 39A–D)

229. *Mycotretus antesignatus* Mader, 1942

Mycotretus antesignatus Mader 1942: 174, 198. Type locality: “Peru”. Alvarenga 1994: 20.

Holotype (MNRJ; Fig. 38A). “Holotypus [red label, printed] \ Typus [printed] \ Peru [handwritten] \ Mus. Zool. Polonicum, Warszawa, 12/45 [printed] \ 147 [printed] \ *Mycotretus antesignatus* Holotype m. det. Mader [handwritten] \ ? [handwritten]”.

Other examined specimens. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ V. Rondônia, Rondônia Brasil, I–1961, A. Machado [printed] \ 2178 [printed] \ I. Sedis 043 [handwritten] \ PMMD. Linhas prosternais junto as cavidades coxais, linhas metasternais e abdominais ausentes. Tibias [?] fortemente dilatadas apicalmente. [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Chapada dos Guimarães [printed] 2–2–[handwritten]-1961[printed] \ Brasil, MT, J.&B. Bechyné [printed] \ *Mycotretus antesignatus* Mader, 1942 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”.

Distribution. Peru, North and Central-West Brazil.

230. *Mycotretus cunctans* Mader, 1942

Mycotretus cunctans Mader 1942: 174, 198. Type locality: “Peru: Chanchamayo”. Alvarenga 1994: 23.

Holotype (SNSD; Fig. 38B). “Dr. Bässler Chanchomayo [printed] \ 12/84 [handwritten] \ Holotypus [printed] \ Priotelus [handwritten] opee [? Handwritten] \

Mycotretus cunctans m. det. Mader [handwritten] \ HOLOTYPUS [printed] \ *Mycotretus cunctans* Mader [handwritten] \ Staatl. Museum für Tierkunde Dresden [printed]”.

Other examined specimens. 1 specimen (MZSP) “BOLIVIA, tropica Region CHAPARÉ (400 Mtr.) DIRINGS [front, printed] MAI 1954 [back, printed] \ *Mycotretus cunctans* Mader [printed]”; 1 specimen (MZSP) “BOLIVIA, tropica Region CHAPARÉ (400 Mtr.) DIRINGS [front, printed] MAI 1954 [back, printed] \ *Mycotretus cunctans* Mader [printed] \ *Mycotretus cunctans* MADER [printed]”.

Distribution. Peru, Bolivia.

231. *Mycotretus major* Mader, 1955

Mycotretus major Mader, 1955 **new synonym** (Fig. 38D). Mader 1955: 477. Type locality: “Paraguay: Villarica”. Alvarenga 1994: 29.

Holotype (NMBS; Fig. 38D). New junior synonym of *M. flavomarginatus* Lacordaire, 1842 (Fig. 29E, see above).

232. *Mycotretus opalizans* Mader, 1942

Mycotretus opalizans Mader 1942: 175, 200. Type locality: “Peru: Chanchamayo”. Alvarenga 1994: 31.

Holotype (SDEI; Fig. 38E). “Holotypus [printed] \ Schenkling det. [printed] \ Coll. Kraatz [printed] \ Peru [handwritten] \ pellicens [handwritten] \ Keine Rede ? *M. pelliciens*. Type is ? ganz anders. [handwritten] \ *Mycotretus opalizans* sp. nov. Det. Mader [handwritten]”.

Distribution. Peru.

Remarks. *Mycotretus opalizans* Mader, 1942 is morphologically closely related to *M. opalescens* Crotch (Fig. 8F) and it’s possible that the former may be synonymized under the latter in the future. However, at this moment we do not have any specimen phenotypically similar to *M. opalizans*, and therefore we prefer do not make any taxonomic act.

233. *Mycotretus partialis* Mader, 1940

Mycotretus partialis Mader, 1940 **new synonym** (Fig. 39A). Mader 1940: 12. Type locality: “Cauca in Colombien” [Department of Cauca, Colombia]. Alvarenga 1994: 32.

Holotype (NMBS; Fig. 39A). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

234. *Mycotretus prioteloides* Mader, 1942

Mycotretus prioteloides Mader 1942: 174, 196. Type locality: “Bolivien: Coroico”. Alvarenga 1994: 33.

Holotype (NMBS; Fig. 39B). “Coroico Bolivia [printed] \ prioteloides Mad. [handwritten] \ holo- [handwritten], TYPUS [printed], prioteloides [handwritten] [red label]”.

Other examined specimens. See Pecci-Maddalena & Lopes-Andrade (2018b).

Distribution. Bolivia (Coroico), Peru (Calango, Machu Picchu).

Remarks. See Pecci-Maddalena & Lopes-Andrade (2018b).

235. *Mycotretus tigrinoides* Mader, 1942

Mycotretus tigrinoides Mader 1942: 174, 196. Type locality: “Peru: Ocobambe”. Alvarenga 1994: 37.

Holotype (SDEI; Fig. 39C). “Holotypus [printed, Red label] \ Coll. Kraatz [printed] \ Ocobambe Peru [printed] \ *Mycotretus tigrinoides* [handwritten] Ma. [?] det. Mader n.sp. [handwritten]”;

Other examined specimens. See Pecci-Maddalena & Lopes-Andrade (2018b).

Distribution. Peru, North and Central-West Brazil.

Remarks. See Pecci-Maddalena & Lopes-Andrade (2018b).

236. *Mycotretus tigripennis* Mader, 1942

Mycotretus tigripennis Mader 1942: 174, 197. Type locality: “Ecuador: Santa Inéz”. Alvarenga 1994: 37.

Holotype (SDEI; Fig. 39D). “Holotypus [printed, red label] \ Santa Jnéz (Ecuad.) R. Haensch S. [printed] \ Coll. Kraatz [printed] \ *Mycotretus tigripennis* [handwritten] Ma. [?] Holotypus det. Mader [handwritten]”;

Other examined specimens. See Pecci-Maddalena & Lopes-Andrade (2018b).

Distribution. Ecuador (Santa Inéz) and Southeast Brazil.

Remarks. See Pecci-Maddalena & Lopes-Andrade (2018b).

XX. Olivier, A.G.

(Figs. 39E–F)

237. *Mycotretus maculatus* (Olivier, 1792)

Erotylus maculatus Olivier 1792: 436. Type locality: “Surinam”. Crotch 1876: 438 (*Mycotretus*); Alvarenga 1994: 28.

Mycotretus figuratus Lacordaire, 1842 (Fig. 29D). Lacordaire 1842: 159. Type locality: “Cayenne” [French Guiana]. Chevrolat 1843: 79 [synonym of *M. maculatus* (Olivier, 1792)]; Alvarenga 1994: 29.

Mycotretus mutabilis Crotch, 1876 **new synonym** (Fig. 7E). Crotch 1876: 438. Type locality: “Ega” [=Tefê, in the state of Amazon, North Brazil]. Alvarenga 1994: 30.

Type specimen. Not located.

Other examined specimens. 1 female (Fig. 39E) (BMNH, dissected) “Bugaba, 800–1,500 ft. Champion. [printed] \ Sp. figured. [printed] \ *Mycotretus maculatus* [handwritten] \ B.C.A., Vol., VII. *Mycotretus* [printed]”. ***Mycotretus figuratus* Lacordaire, 1842. Lectotype, here designated (MRSN; Fig. 29D).** “D. Lacordaire [handwritten]”. ***Mycotretus mutabilis* Crotch, 1876. Lectotype, here designated (UMZC; Fig. 7E).** “TYPE [blue label, printed] \ TYPE. [printed], mutabilis Ega Bates [handwritten] \ LECTOTYPE [printed], *Mycotretus mutabilis* Crotch, 1876 [red label, handwritten]”. 3 specimens (UMZC) “PARATYPE [blue label, printed] \ label unwritten \ Bates [printed] \ PARALECTOTYPE [printed], *Mycotretus mutabilis* Crotch, 1876 [yellow label, handwritten]; 1 specimen (UMZC) “TYPE [blue label, printed] \ TYPE. [printed], tricinctus Ega Bates [handwritten] \ PARALECTOTYPE [printed] ?”, *Mycotretus mutabilis* Crotch [yellow label, handwritten]. 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ SINOP 12°31’S, 55°37’W, BR 163 km 500 a 600, Mato Grosso, BRASIL, 350 m [printed] X. 1975 [handwritten], Roppa & Alvarenga col. [printed] \ *Mycotretus mutabilis* Crotch, 1876 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”; 1 male (MZSP, dissected) “Hansa. S. Catarina. [printed] 11. 941 ? [handwritten] \ Coll. J. Guerin. S. Paulo. Brasil. [printed] 18709 [handwritten] \ *Mycotretus maculatus* Ol. [handwritten] J. Guerin. det. 19 [printed] 54 [handwritten]”.

Distribution. Neotropical region.

Remarks. **1)** There are no morphological and color pattern differences between *M. maculatus* Olivier and *M. figuratus* Lacordaire, and we confirm the synonym first proposed by Chevrolat (1843); **2)** In spite of small color differences between *M. maculatus* Olivier and *M. mutabilis* Crotch, the male genitalia of both species have the same morphology, and therefore we synonymized *M. mutabilis* under *M. maculatus*; **3)** Crotch (1876: 438) mentioned one specimen named “*M. tricinctus*” in the description of *M. mutabilis*, however it is not clear whether it would be a variety of *M. mutabilis* or any other specimen examined. In such a case, we considered that “*M. tricinctus* specimen” as a paralectotype of *M. mutabilis*, but we included a question mark on its label.

238. *Mycotretus tigrinus* (Olivier, 1792)

Erotylus tigrinus Olivier 1792: 437. Type locality: “Surinam”. Lacordaire 1842: 145 (*Mycotretus*); Alvarenga 1994: 37.

Erotylus conspersus Germar 1824: 614. Type locality: “Brasilia”. Lacordaire: 145 [*Mycotretus*; synonym of *M. tigrinus* (Olivier)]; Alvarenga 1994: 37.

Mycotretus multimaculatus Taschenberg, 1870 (Fig. 40F). Taschenberg 1870: 197. Type locality: “Colombia”. Alvarenga 1994: 29; Pecci-Maddalena & Lopes-Andrade 2018b: 4 [synonym of *M. tigrinus* (Olivier)].

Mycotretus leopardus Crotch 1876: 451. Type locality: “Peru”. Crotch 1876: 451 [synonym of *M. tigrinus* (Olivier)]; Alvarenga 1994: 37; Pecci-Maddalena & Lopes-Andrade 2018b: 4 [attribution of the genus authorship to Crotch].

Mycotretus tigrinus pardalis Crotch 1876: 451 [as a variety]. Type locality: “Ecuador” [apud Alvarenga 1994]. Alvarenga 1994: 37; Pecci-Maddalena & Lopes-Andrade 2018b: 4 [synonym of *M. tigrinus* (Olivier)].

Type specimen. Not located.

Other examined specimens. 1 specimen (RBINS; Fig. 39F) “*Mycotretus tigrinus*, Surinam Oliv [handwritten] \ Coll. R. I. Sc. N. B., Surinam, Coll. Chapuis [printed]”; See Pecci-Maddalena & Lopes-Andrade (2018b).

Distribution. Northern to southern Neotropical region.

Remarks. See Pecci-Maddalena & Lopes-Andrade (2018b).

XXI. Pecci-Maddalena, I.S.C. & Lopes-Andrade, C.

239. *Mycotretus alvarengai* Pecci-Maddalena & Lopes-Andrade, 2018

Mycotretus alvarengai Pecci-Maddalena & Lopes-Andrade 2018a: 1. Type locality: “Maués, in the state of Amazonas, North Brazil. Estimated coordinates: 5°3’47’’S, 58°18’10’’W”.

Holotype (MNRJ; Fig. 39G). “Coleção M. Alvarenga [printed] \ Brasilien [printed], Maués, Amazonas, 3.1940 [handwritten], B. Pohl [printed] \ *Mycotretus multinotatus* sp.n. holótipo [handwritten], M. Alvarenga det. 1999 [printed] \ Mycotr. 018 [printed] \ HOLOTYPUS *Mycotretus alvarengai* Pecci-Maddalena & Lopes-Andrade [printed, red paper]”.

Distribution. Known only from the type locality Maués in Amazon, North Brazil.

Remarks. See Pecci-Maddalena & Lopes-Andrade (2018a).

XXII. Taschenberg, E.L.

(Fig. 40)

240. *Mycotretus bicolor* Taschenberg, 1870

Mycotretus bicolor Taschenberg 1870: 198. Type locality: “Colombia”. Alvarenga 1994: 21.

Mycotretus monrosi Guérin, 1949 **new synonym** (Fig. 21F). Guérin 1949b: 589. Type locality: “Piletas, Salta” [Department of Salta, Argentina]. Alvarenga 1994: 29.

Lectotype, here designated (ZNS). (image not available). “bicolor*, Zeitschr. 1870. Colomb. Wallis [green label, handwritten, box label] \ LECTOTYPE *Mycotretus bicolor* Taschenberg, 1870 det. I. Pecci-Maddalena 2017 [red label, printed]”;

Other examined specimens. 1 female (MNRJ, dissected; Fig. 40A) “Chapare, Bolivia, iv. 1953, A. Martinez [handwritten] \ Coleção M. Alvarenga [printed] \ *Mycotretus bicolor* Tasch. 1870 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”. ***Mycotretus monrosi* Guérin, 1949. Holotype (IFML; Fig. 21F).** “Piletas–Salta, 26 JUL–3AG. 944, R. Colbach. [handwritten] \ HOLOTIPO [printed] \ *Mycotretus monrosi* J. Guérin, J. Guerin det. 949 [handwritten] \ *Mycotretus monrosi* J. Guerin [handwritten] J. Guerin. det. 194[printed]9[handwritten] \ COLECCION, INST – FUND. M. LILLO (4000) – S.M. TUCUMAN, TUCUMAN – ARGENTINA [printed] \ TCOL190 [printed]”; 1 male (MZSP, dissected) “PARATIPO [printed] \ Coll. J. Guerin. S. Paulo. Brasil. [printed] 18410 [handwritten] \ Piletas, Prov. Salta, Argentina, 8.944 [handwritten] \ *Mycotretus monrosi* J. Guer [handwritten] J. Guerin. det. 194[printed]9[handwritten]”.

Distribution. Colombia, Ecuador, Peru, Bolivia, Argentina.

Remarks. *Mycotretus monrosi* Guérin is identical to *Mycotretus bicolor* Taschenberg.

241. *Mycotretus coccinelloides* Taschenberg, 1870

Mycotretus coccinelloides Taschenberg, 1870 **new synonym** (Fig. 40B). Taschenberg 1870: 198. Type locality: not mentioned in the description [based on type label = Colombia]. Alvarenga 1994: 22.

Lectotype, here designated (ZNS; Fig. 40B). New junior synonym of *M. apicalis* Lacordaire, 1842 (Fig. 26E, see above).

242. *Mycotretus dimidiatus* Taschenberg, 1870

Mycotretus dimidiatus Taschenberg 1870: 198. Type locality: “Colombia”. Alvarenga 1994: 24.

Lectotype, here designated (ZNS; Fig. 40C). “dimidiatus*, Zeitschr. 1870. Colomb. Wallis [green label, handwritten, box label] \ LECTOTYPE *Mycotretus dimidiatus* Taschenberg, 1870 det. I. Pecci-Maddalena 2017 [red label, printed]”;

Distribution. Unknown locality in Colombia.

243. *Mycotretus discoidalis* Taschenberg, 1870

Mycotretus discoidalis Taschenberg, 1870 **new synonym** (Fig. 40D). Taschenberg 1870: 199. Type locality: “Colombia”. Alvarenga 1994: 24.

Lectotype, here designated (ZNS; Fig. 40D). New junior synonym of *M. melanophthalmus* Duponchel, 1825 (Fig. 13D, see above).

244. *Mycotretus dispar* Taschenberg, 1870

Mycotretus dispar Taschenberg, 1870 **new synonym** (Fig. 40E). Taschenberg 1870: 197. Type locality: “Colombia”. Alvarenga 1994: 24.

Lectotype, here designated (ZNS; image not available). New junior synonym of *M. ornatus* Duponchel, 1825 (Fig. 14A, see above).

245. *Mycotretus multimaculatus* Taschenberg, 1870

Mycotretus multimaculatus Taschenberg, 1870 (Fig. 40F). Taschenberg 1870: 197. Type locality: “Colombia”. Alvarenga 1994: 29; Pecci-Maddalena & Lopes-Andrade 2018b: 4 [synonym of *M. tigrinus* (Olivier)].

Lectotype, here designated (ZNS; Fig. 40F). Junior synonym of *M. tigrinus* Olivier, 1792 (Fig. 39F, see above).

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Legends of Tables and Figures.

Table 1. A comparisons of the Catalogue of Alvarenga (1994) and the present work.

<i>Mycotretus</i> Lacordaire, 1842	Catalogue of Alvarenga (1994)	Present work
Species listed (available names)	244	245
Primary types examined	143	216
Names under valid species (synonyms and "varieties")	27	53 syn. n.
Valid species	217	177
Lectotype designations	0	156



Figure 1. The largest historical collections of Neotropical Erotylidae: A–C, Museum National d'Histoire Naturelle (MNHN, Paris, France): (A) Part of the MNHN Erotylidae collection; (B–C) drawer from Oberthur collection containing several *Mycotretus* primary types. D–E, Natural History Museum (BMNH, London, U.K): (D) drawer containing part of the Gorham collection including several *Mycotretus* described in the *Biologia Centrali-Americana*, (E) the type specimen of *Mycotretus hirudo* Gorham, 1888. F, cabinet of the Crotch Erotylidae Collection from University Museum of Zoology (UMZC, Cambridge, U.K), one of the most representative Erotylidae collection of the world. G, drawer of the Brême collection from Museo Regionale di Scienze Naturali (MRSN, Torino, Italy) containing specially Duponchel and Lacordaire primary types.

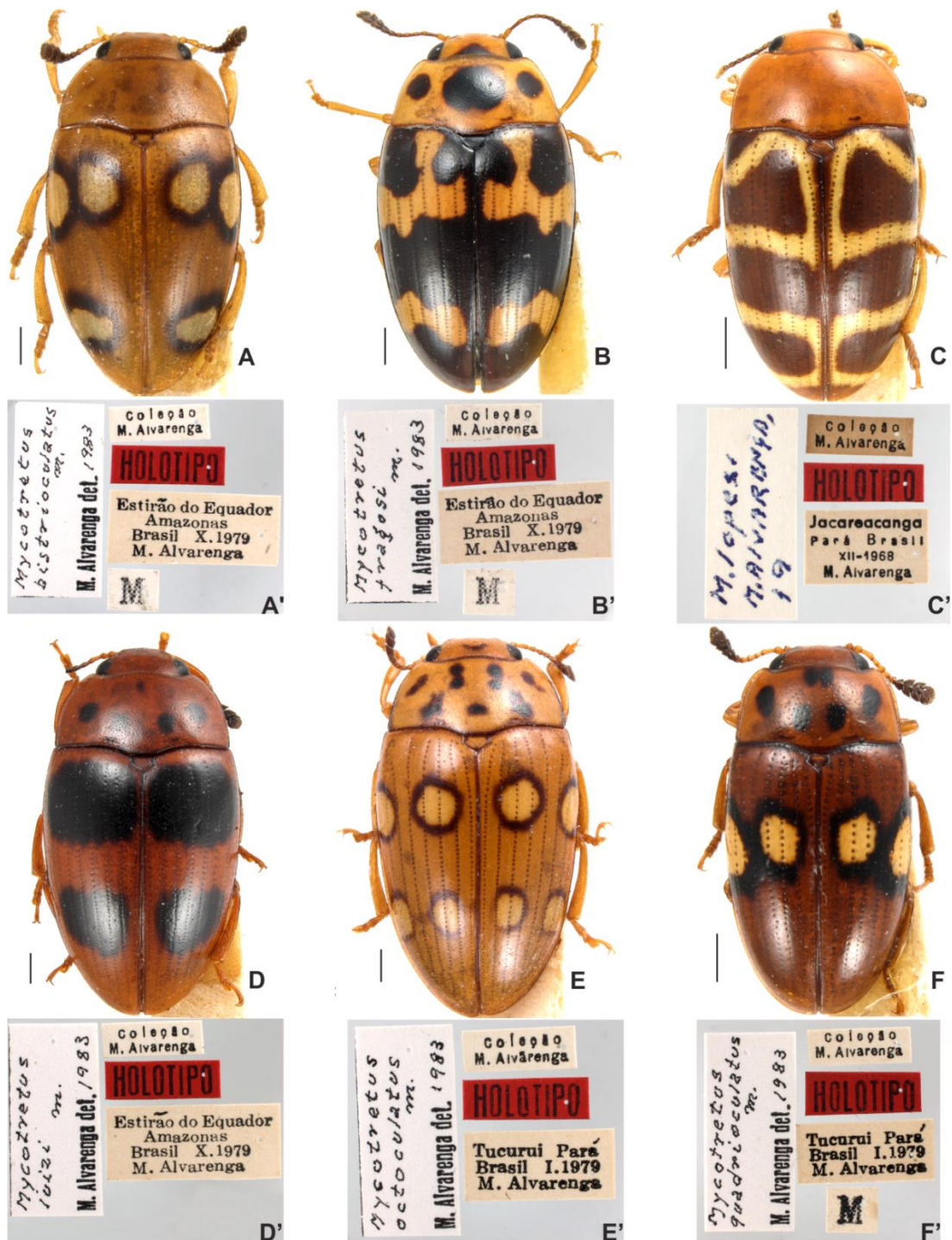


Figure 2. Alvarenga holotypes (dorsal, labels). (A–A') *Mycotretus bistriloculatus* Alvarenga, 1983; (B–B') *Mycotretus fragosoi* Alvarenga, 1983; (C–C') *Mycotretus lopesi* Alvarenga, 1989; (D–D') *Mycotretus luizi* Alvarenga, 1983; (E–E') *Mycotretus octoculatus* Alvarenga, 1983; (F–F') *Mycotretus quadrioculatus* Alvarenga, 1983. Scale bars: A–B, D–F = 0.5 mm; C = 1 mm.



Figure 3. Primary types (dorsal, labels). (A–A') holotype of *Mycotretus tucuriensis* Alvarenga, 1983; (B–B') lectotype of *Mycotretus centralis* Arrow, 1909; (C–C') lectotype of *Mycotretus distinguendus* Arrow, 1909; (D–D') holotype of *Mycotretus nigromanicanus* Boyle, 1954; (E–E') lectotype of *Mycotretus nubifer* Casey, 1916; (F–F') lectotype of *Mycotretus lesueuri* (Chevrolat, 1835). Scale bars: A–F = 1 mm.

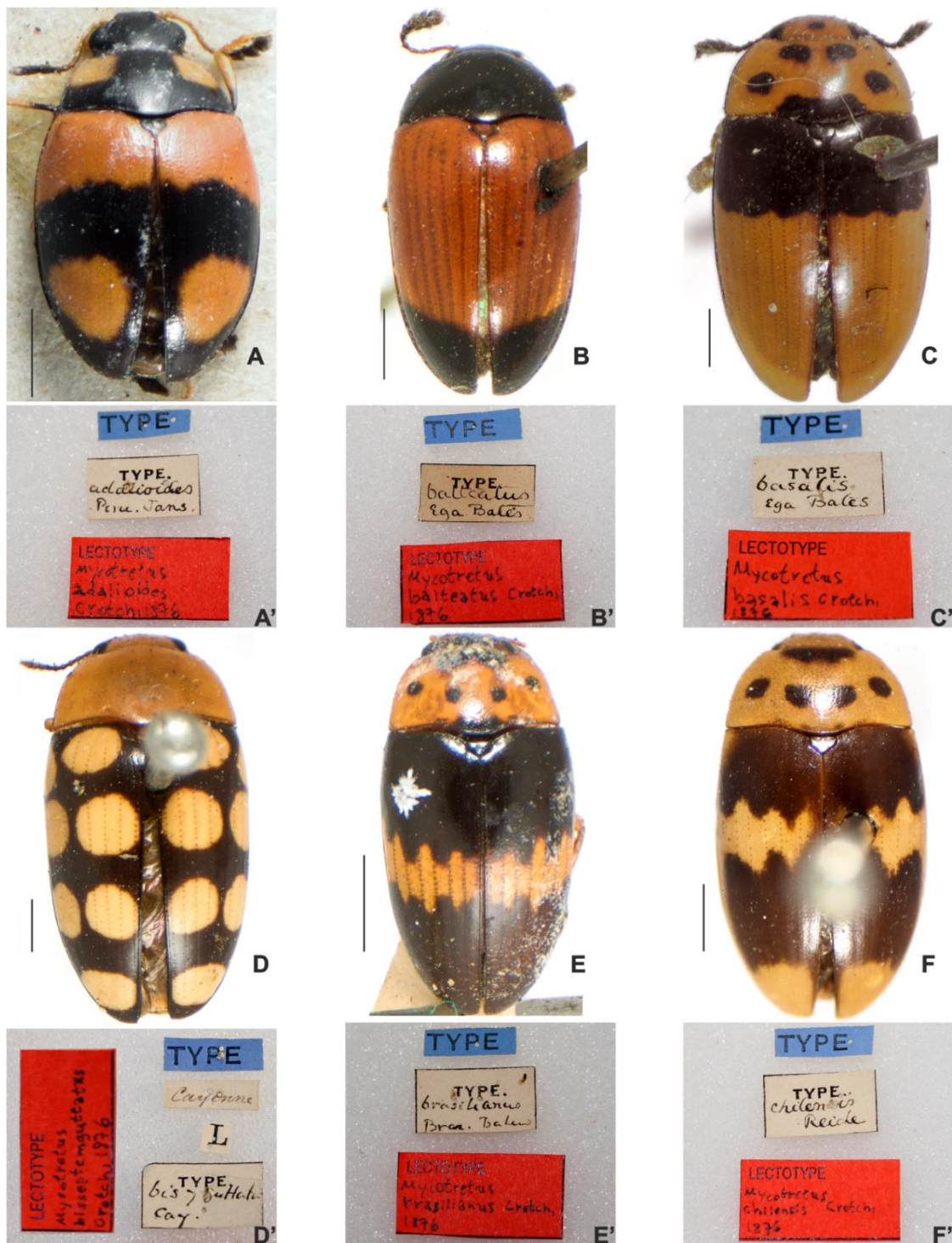


Figure 4. Crotch primary types (dorsal, labels). (A–A') lectotype of *Mycotretus adalioides* Crotch, 1876; (B–B') lectotype of *Mycotretus balteatus* Crotch, 1876; (C–C') lectotype of *Mycotretus basalis* Crotch, 1876; (D–D') lectotype of *Mycotretus bisseptemguttatus* Crotch, 1876; (E–E') lectotype of *Mycotretus brasilianus* Crotch, 1876; (F–F') lectotype of *Mycotretus chilensis* Crotch, 1876. Scale bars: A–F = 1 mm.

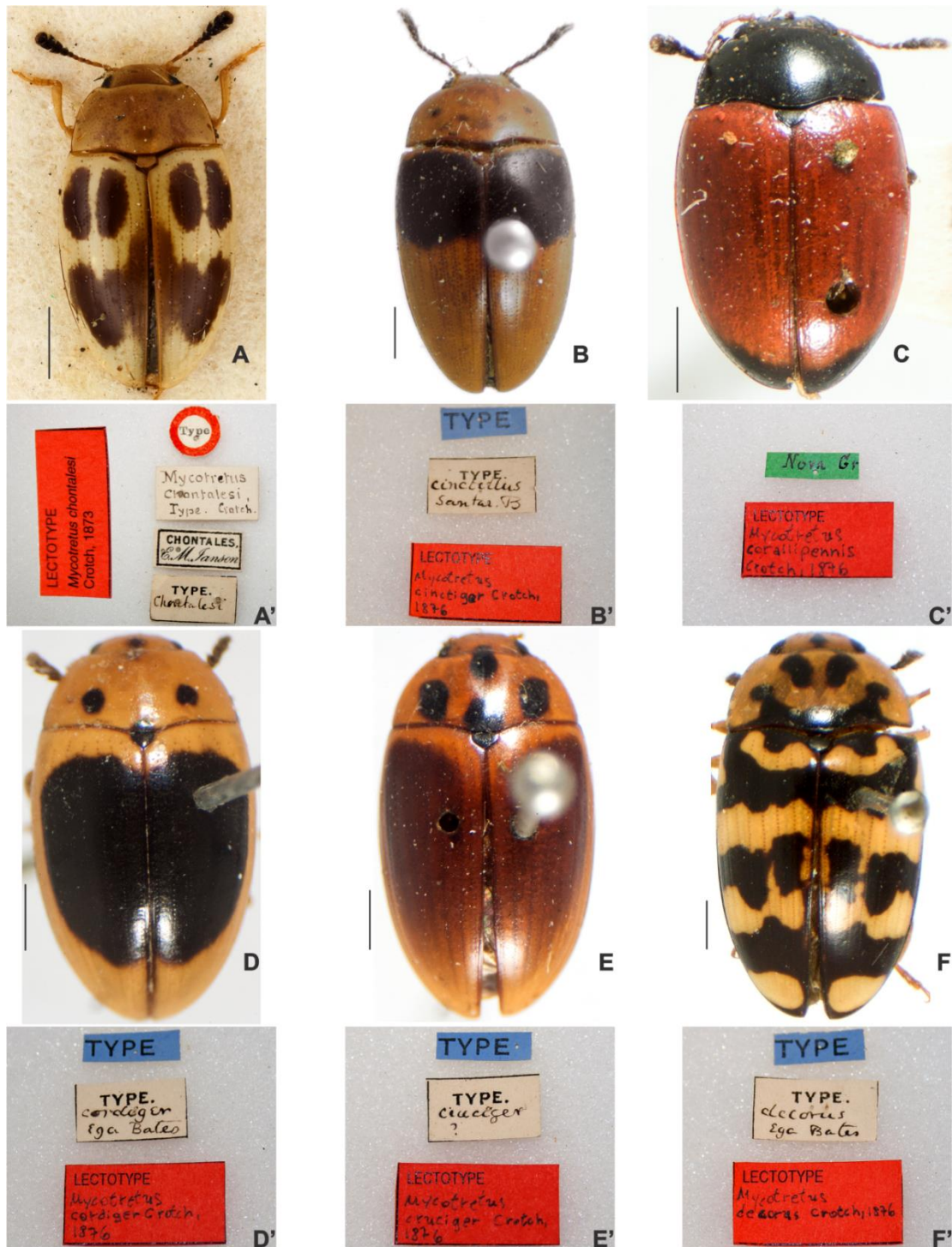


Figure 5. Crotch primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus chontalesi* Crotch, 1873; (B–B') lectotype of *Mycotretus cinctiger* Crotch, 1876; (C–C') lectotype of *Mycotretus corallipennis* Crotch, 1876; (D–D') lectotype of *Mycotretus cordiger* Crotch, 1876; (E–E') lectotype of *Mycotretus cruciger* Crotch, 1876; (F–F') lectotype of *Mycotretus decorus* Crotch, 1876. Scale bars: A–F = 1 mm.

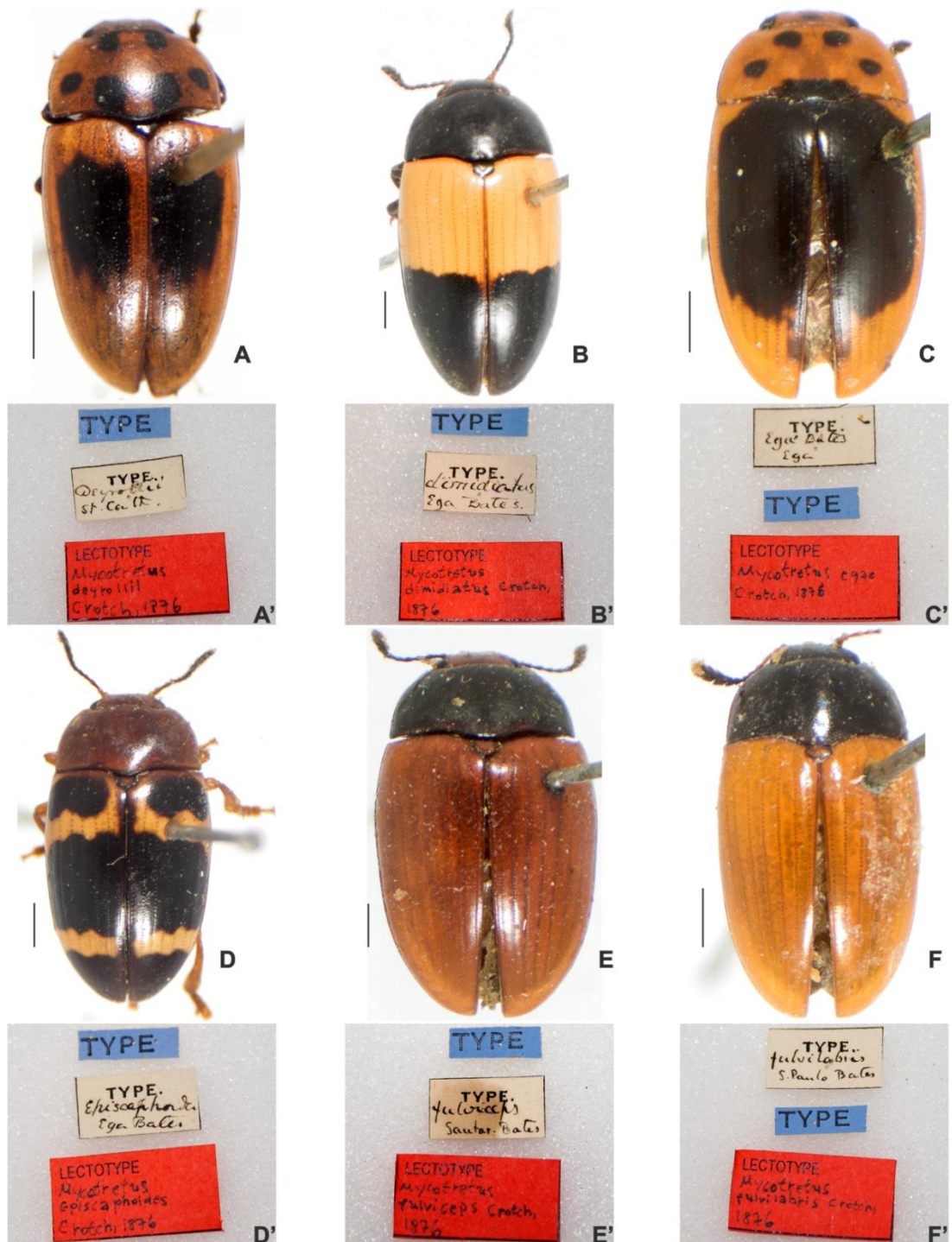


Figure 6. Crotch primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus deyrollei* Crotch, 1876; (B–B') lectotype of *Mycotretus dimidiatus* Crotch, 1876 [= *Mycotretus seminiger* Harold, 1876]; (C–C') lectotype of *Mycotretus egae* Crotch, 1876; (D–D') lectotype of *Mycotretus episcaphoides* Crotch, 1876; (E–E') lectotype of *Mycotretus fulviceps* Crotch, 1876; (F–F') lectotype of *Mycotretus fulvilabris* Crotch, 1876. Scale bars: A–F = 1 mm.

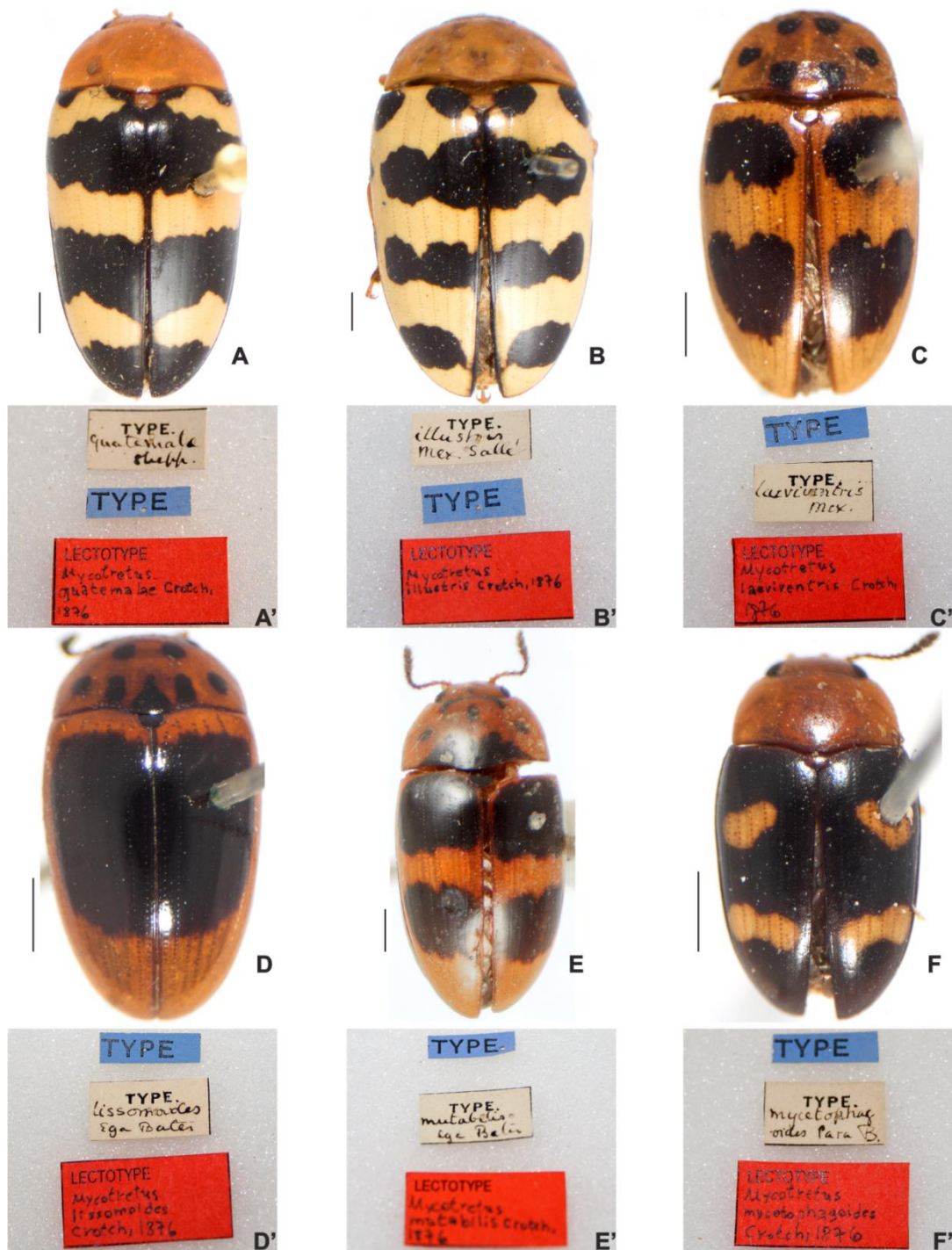


Figure 7. Crotch primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus guatemalae* Crotch, 1876; (B–B') lectotype of *Mycotretus illustris* Crotch, 1876; (C–C') lectotype of *Mycotretus laeviventris* Crotch, 1876; (D–D') lectotype of *Mycotretus lissomoides* Crotch, 1876; (E–E') lectotype of *Mycotretus mutabilis* Crotch, 1876; (F–F') lectotype of *Mycotretus mycetophagoides* Crotch, 1876. Scale bars: A–F = 1 mm.

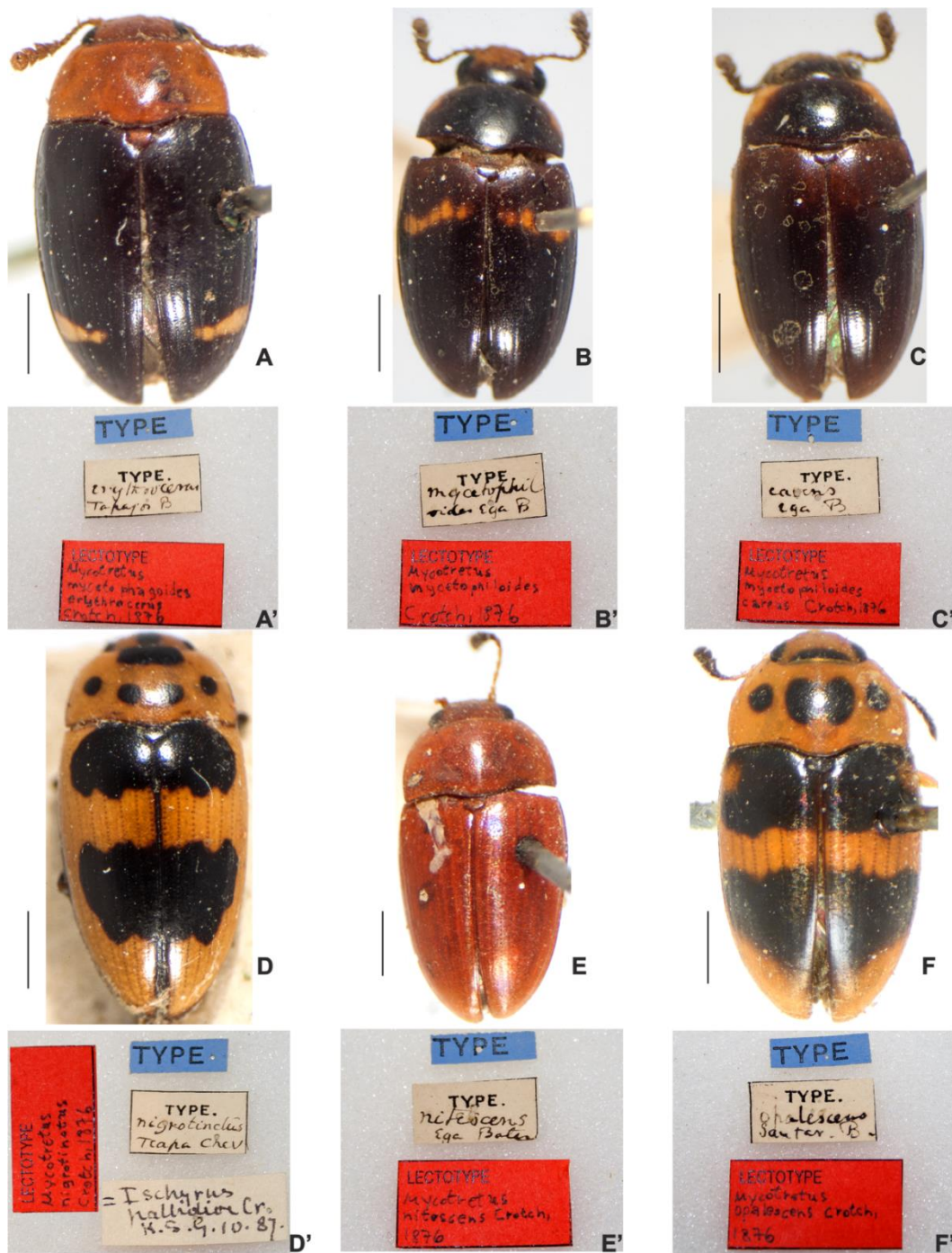


Figure 8. Crotch primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus mycetophagoides erythrocerus* Crotch, 1876; (B–B') lectotype of *Mycotretus mycetophiloides* Crotch, 1876; (C–C') lectotype of *Mycotretus mycetophiloides careus* Crotch, 1876; (D–D') lectotype of *Mycotretus nigrotinctus* Crotch, 1876; (E–E') lectotype of *Mycotretus nitescens* Crotch, 1876; (F–F') lectotype of *Mycotretus opalescens* Crotch, 1876. Scale bars: A–F = 1 mm.



Figure 9. Crotch primary types (dorsal, labels) cont. (A–A’) lectotype of *Ischyryus pallidior* Crotch, 1876 [currently *M. pallidior* (Crotch)]; (B–B’) lectotype of *Mycotretus parallelus* Crotch, 1876; (C–C’) lectotype of *Mycotretus pebasensis* Crotch, 1876; (D–D’) lectotype of *Mycotretus peruae* Crotch, 1876; (E–E’) lectotype of *Mycotretus psylloroides* Crotch, 1876; (F–F’) lectotype of *Mycotretus quadripunctatus* Crotch, 1876. Scale bars: A–F = 1 mm.

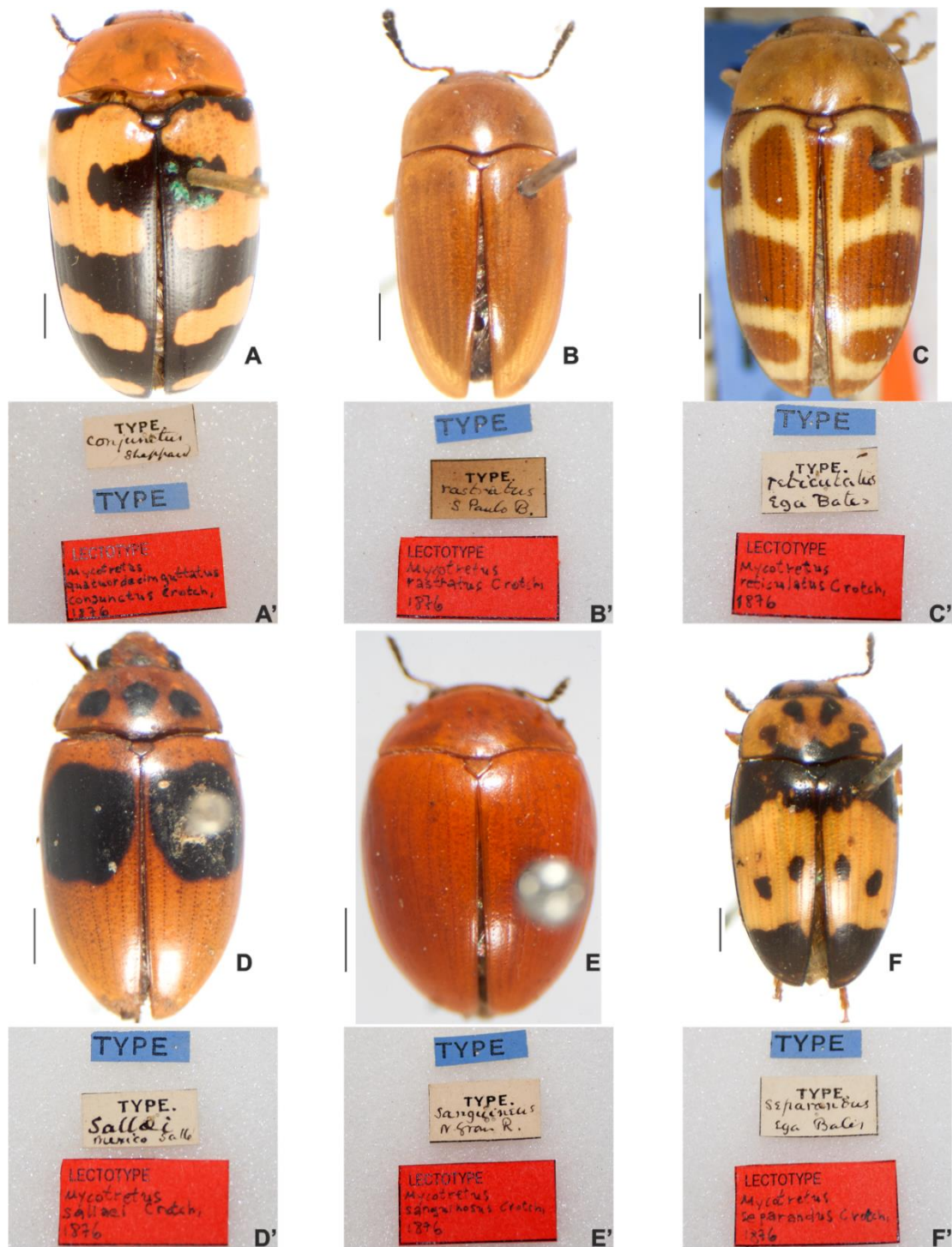


Figure 10. Crotch primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus quatuordecimguttatus conjunctus* Crotch, 1876; (B–B') lectotype of *Mycotretus rastratus* Crotch, 1876; (C–C') lectotype of *Mycotretus reticulatus* Crotch, 1876; (D–D') lectotype of *Mycotretus sallei* Crotch, 1876; (E–E') lectotype of *Mycotretus sanguineus* Crotch, 1876; (F–F') lectotype of *Mycotretus separandus* Crotch, 1876. Scale bars: A–F = 1 mm.

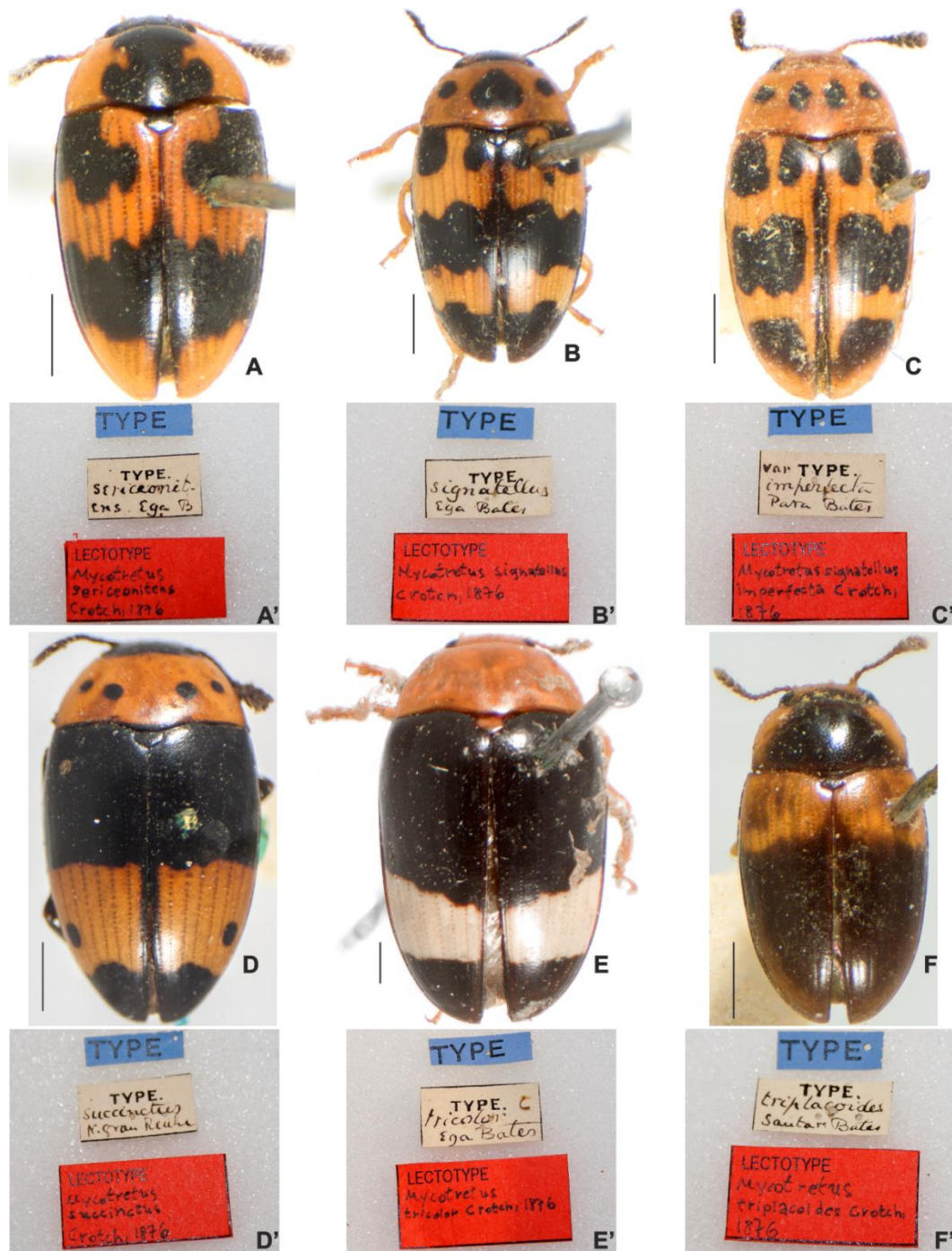


Figure 11. Crotch primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus sericeonitens* Crotch, 1876; (B–B') lectotype of *Mycotretus signatellus* Crotch, 1876; (C–C') lectotype of *Mycotretus signatellus imperfecta* Crotch, 1876; (D–D') lectotype of *Mycotretus succinctus* Crotch, 1876; (E–E') lectotype of *Mycotretus tricolor* Crotch, 1876; (F–F') lectotype of *Mycotretus triplacoides* Crotch, 1876 [currently *Tritomapara triplacoides* (Crotch)]. Scale bars: A–F = 1 mm.

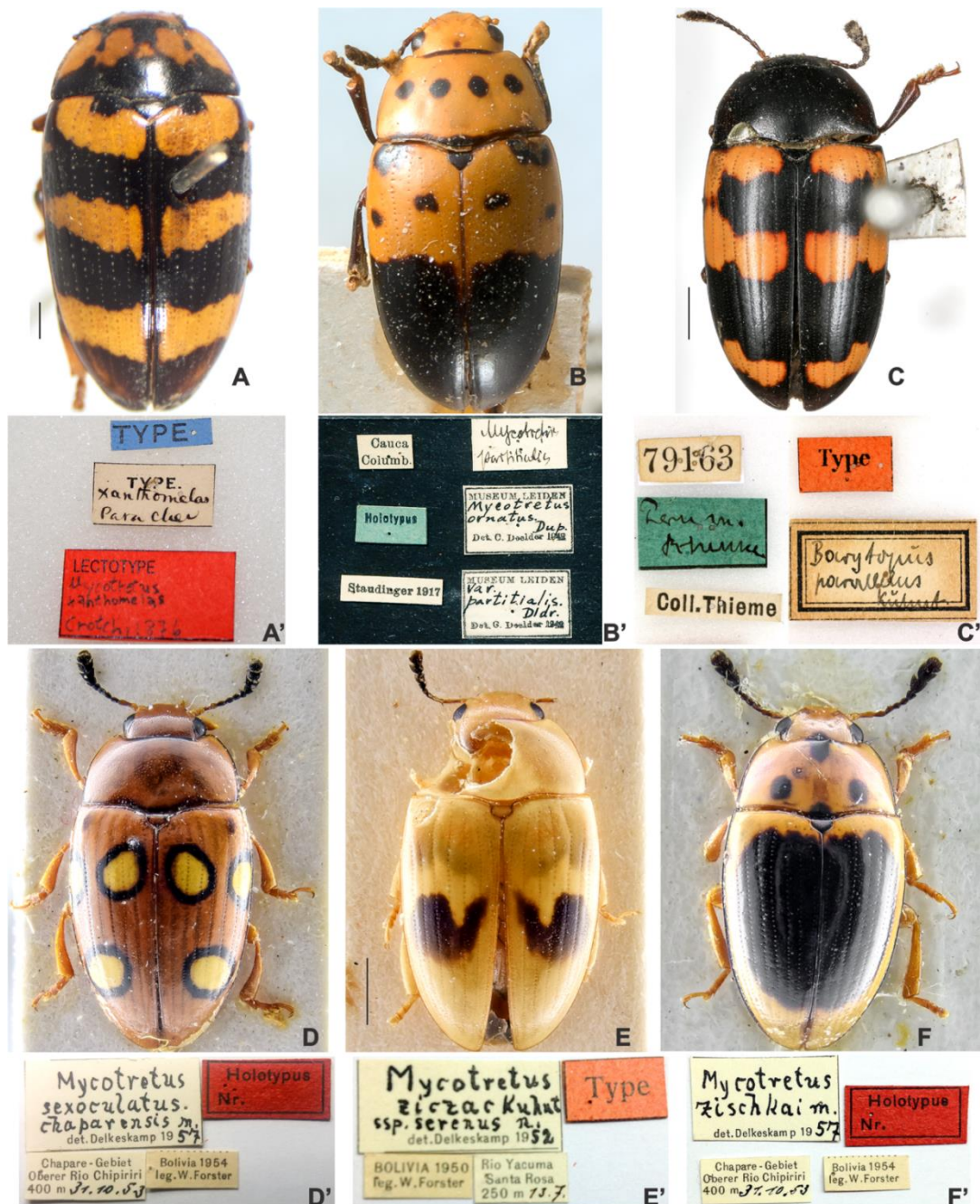


Figure 12. Primary types (dorsal, labels). (A–A') lectotype of *Mycotretus xanthomelas* Crotch, 1876; (B–B') holotype of *Mycotretus ornatus partialis* Deelder, 1942; (C–C') holotype of *Mycotretus fidelis* Deskeskamp, 1939 [= *Brachysphaenus (Barytopus) parallelus* Kuhnt, 1909]; (D–D') holotype of *Mycotretus sexoculatus chaparensis* Delkeskamp, 1957; (E–E') holotype of *Mycotretus ziczac serenus* Delkeskamp, 1957; (F–F') holotype of *Mycotretus zischkai* Delkeskamp, 1957. Scale Bars: A, C and E = 1 mm; B, D and F (see Remarks).

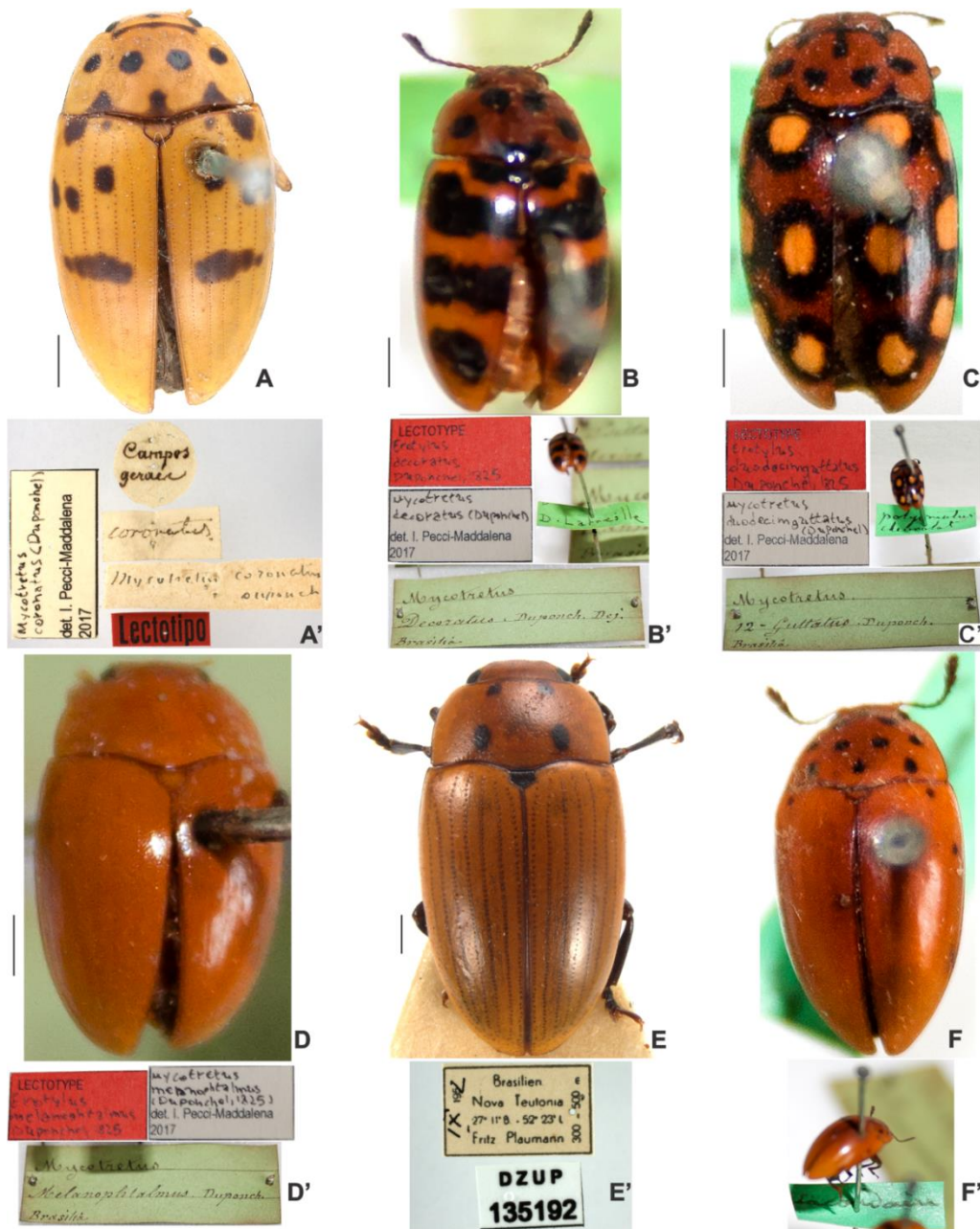


Figure 13. Duponchel primary types A–D (dorsal, labels). (A–A’) lectotype of *Erotylus coronatus* Duponchel, 1825 [currently *Mycotretus coronatus* (Duponchel)]; (B–B’) lectotype of *Erotylus decoratus* Duponchel, 1825 [currently *Mycotretus decoratus* (Duponchel)]; (C–C’) lectotype of *Erotylus duodecimguttatus* Duponchel, 1825 [currently *Mycotretus duodecimguttatus* (Duponchel)]; (D–D’) lectotype of *Erotylus melanophthalmus* Duponchel 1825 [currently *Mycotretus melanophthalmus* (Duponchel)]; (E–E’) specimen of *Mycotretus minutus* (Duponchel, 1825) from DZUP collection (Brazil); (F–F’) specimen of *Mycotretus nigropunctatus* (Duponchel, 1825) from Brême collection (MRSN, Italy). Scale Bars: A–D = 1 mm; E = 0.5 mm; F (see Material and Methods).



Figure 14. Primary types A–C, E–F (dorsal, labels). (A–A’) lectotype of *Erotylus ornatus* Duponchel [currently *Mycotretus ornatus* (Duponchel)]; (B–B’) lectotype of *Erotylus maculosus* Duponchel, 1825 [currently *Mycotretus maculosus* (Duponchel)]; (C–C’) lectotype of *Erotylus sanguineus* Duponchel, 1825 [currently *Mycotretus sanguineus* (Duponchel)]; (D–D’) topotype of *Mycotretus unicolor* Fauvel, 1860 from RBINS (Belgium); (E–E’) lectotype of *Mycotretus aegrotus* Gorham, 1888; (F–F’) lectotype of *Mycotretus alternans* Gorham, 1888. Scale bars: A–F= 1 mm.

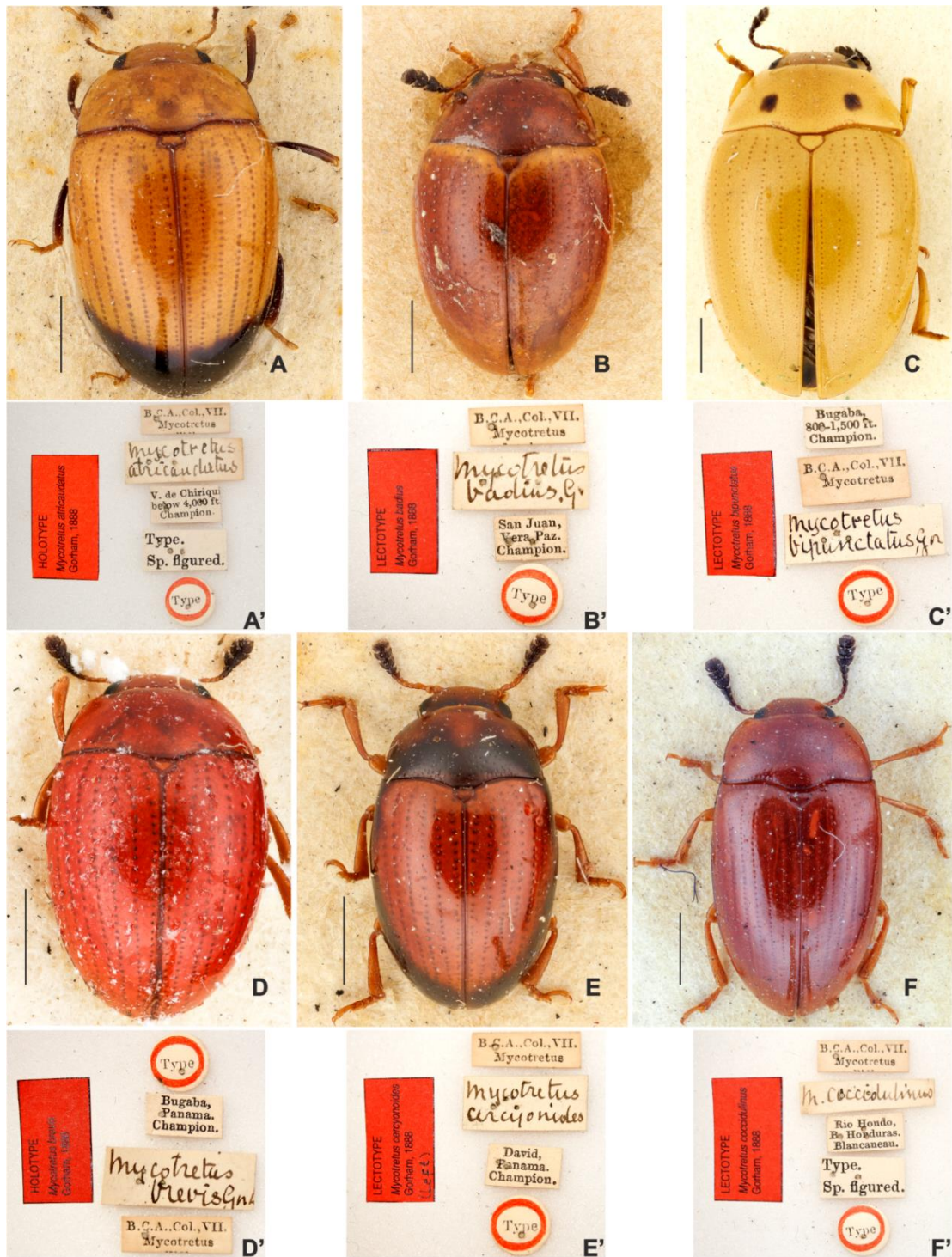


Figure 15. Gorham primary types (dorsal, labels). (A–A') holotype of *Mycotretus atricaudatus* Gorham, 1888; (B–B') lectotype of *Mycotretus badius* Gorham, 1888; (C–C') lectotype of *Mycotretus bipunctatus* Gorham, 1888; (D–D') holotype of *Mycotretus brevis* Gorham, 1888; (E–E') lectotype of *Mycotretus cercyonoides* Gorham, 1888; (F–F') lectotype of *Mycotretus coccidulinus* Gorham, 1888. Scale bars: A–F= 1 mm.

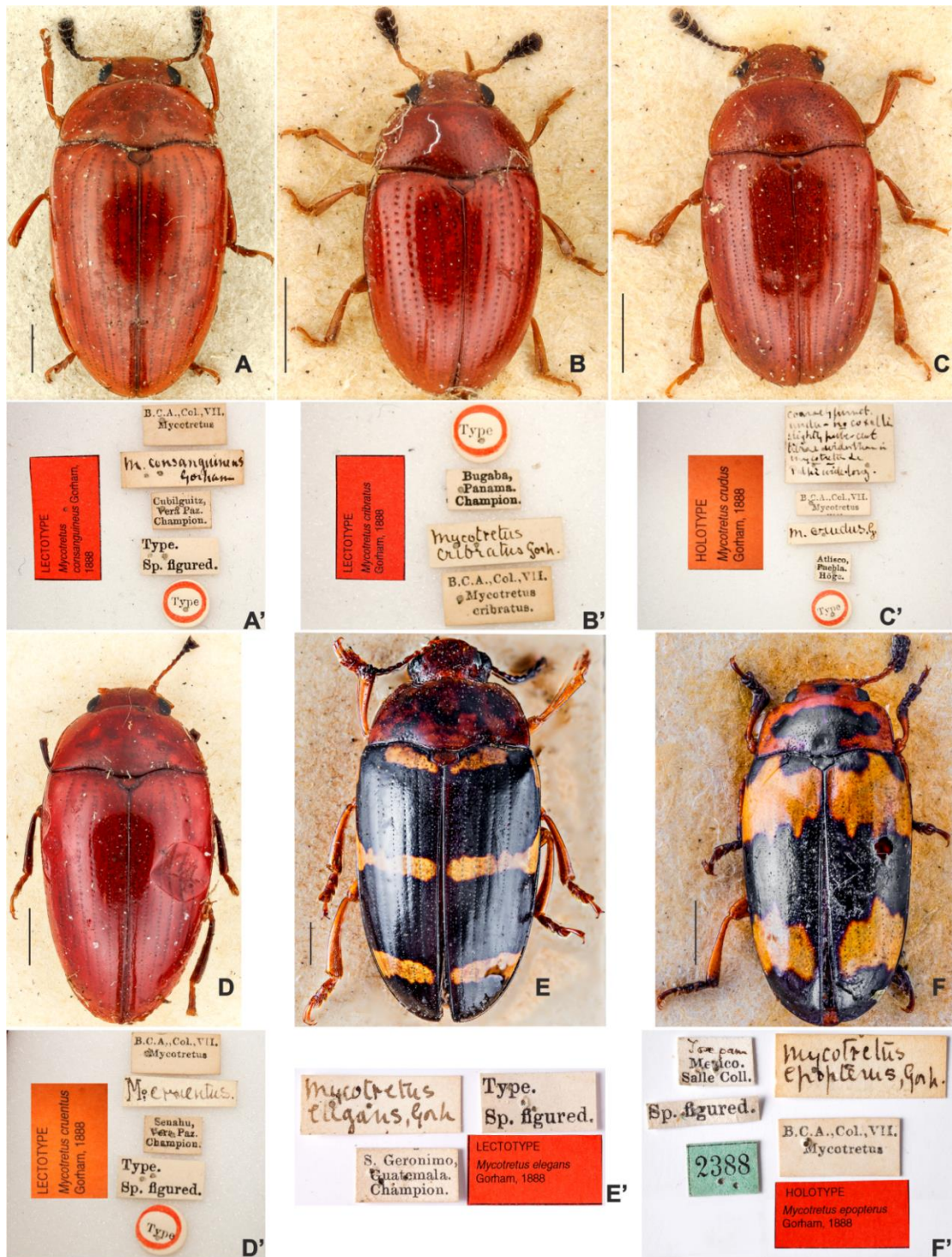


Figure 16. Gorham primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus consanguineus* Gorham, 1888; (B–B') lectotype of *Mycotretus cribratus* Gorham, 1888; (C–C') holotype of *Mycotretus crudus* Gorham, 1888; (D–D') lectotype of *Mycotretus cruentus* Gorham, 1888; (E–E') lectotype of *Mycotretus elegans* Gorham, 1888; (F–F') holotype of *Mycotretus epipterus* Gorham, 1888. Scale bars: A–F= 1 mm.

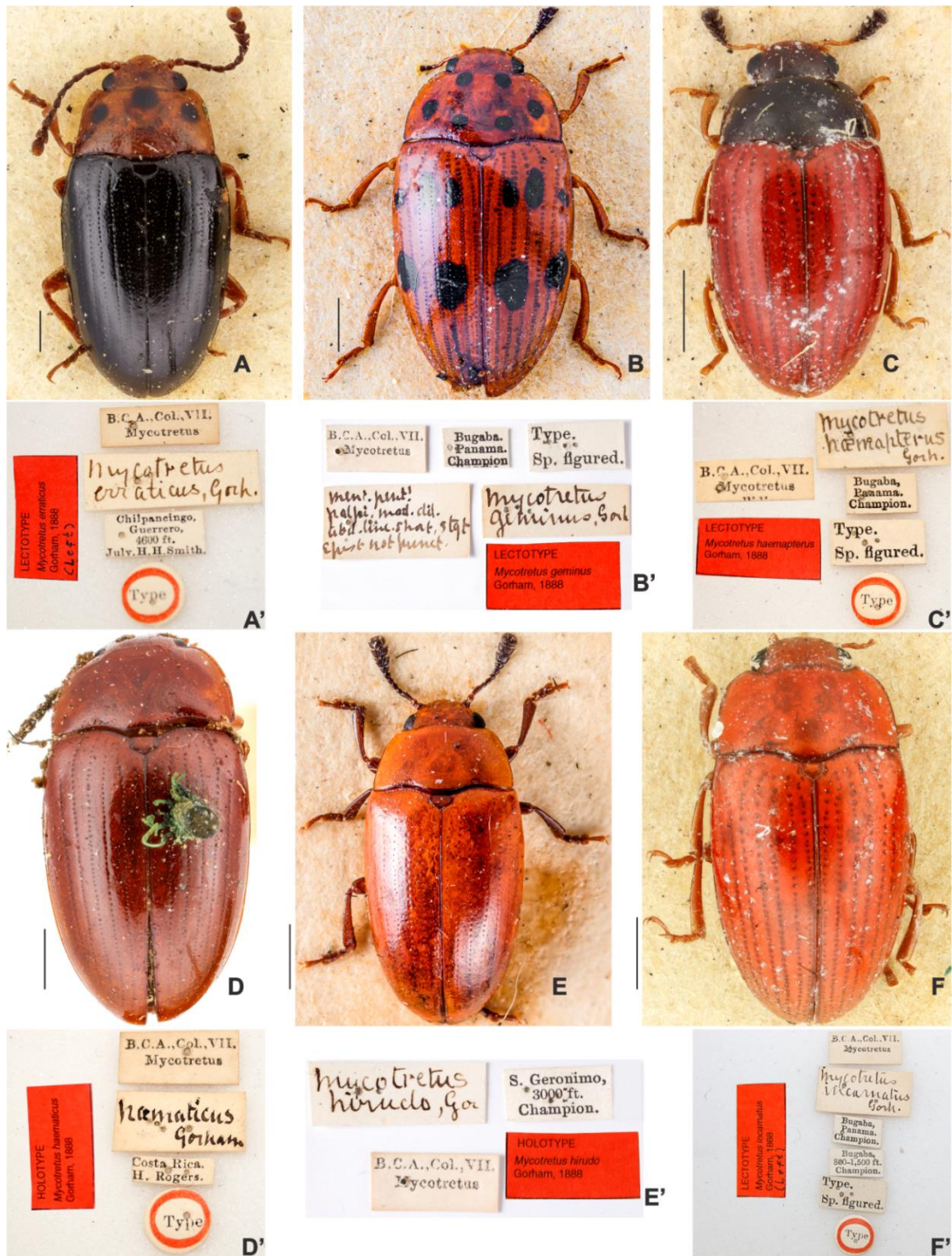


Figure 17. Gorham primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus erraticus* Gorham, 1888; (B–B') lectotype of *Mycotretus geminus* Gorham, 1888; (C–C') lectotype of *Mycotretus haemapterus* Gorham, 1888; (D–D') holotype of *Mycotretus haematicus* Gorham, 1888; (E–E') holotype of *Mycotretus hirudo* Gorham, 1888; (F–F') lectotype of *Mycotretus incarnatus* Gorham, 1888. Scale bars: A–F= 1 mm.

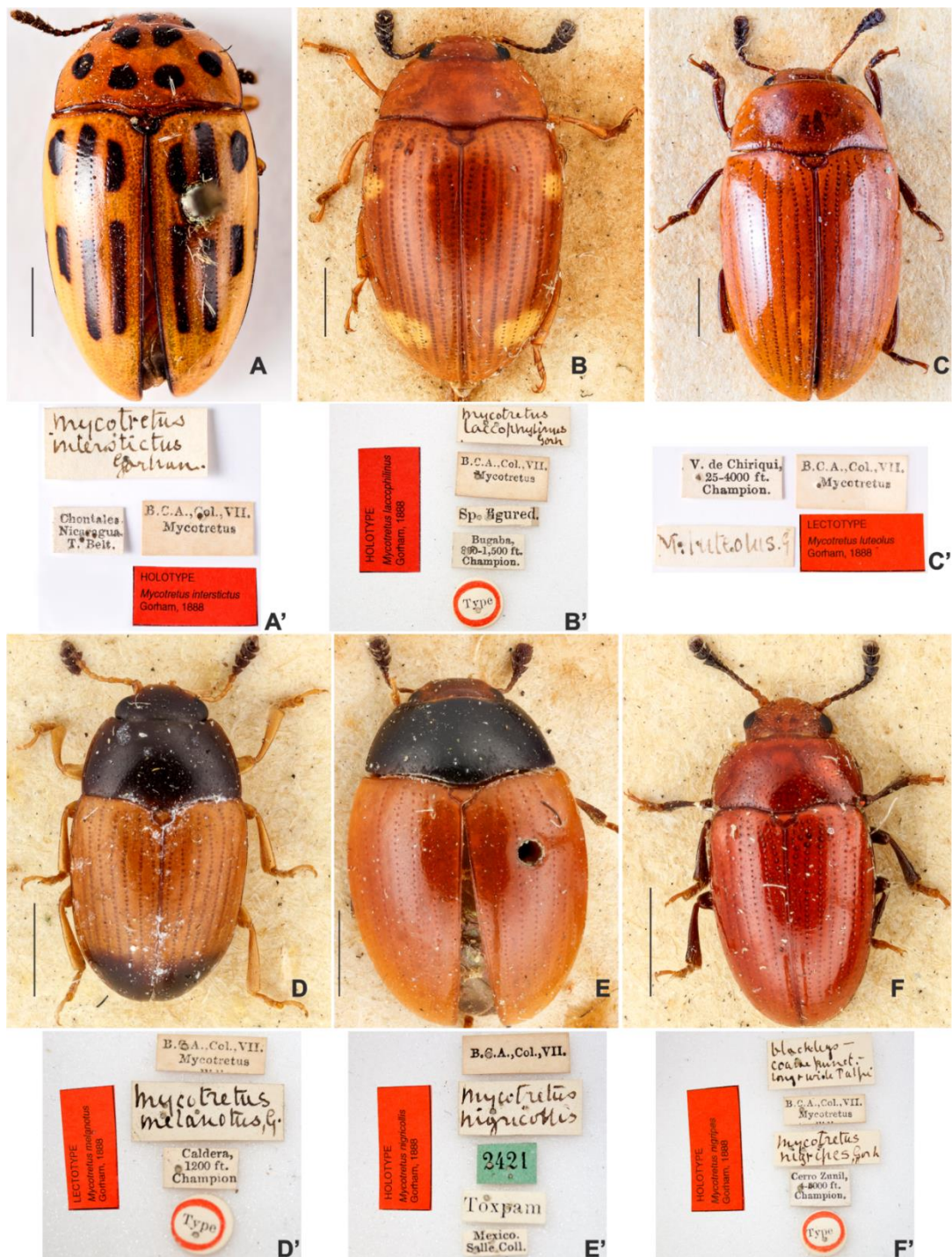


Figure 18. Gorham primary types (dorsal, labels) cont. (A–A') holotype of *Mycotretus interstictus* Gorham, 1888; (B–B') holotype of *Mycotretus laccophilinus* Gorham, 1888; (C–C') lectotype of *Mycotretus luteolus* Gorham, 1888; (D–D') lectotype of *Mycotretus melanotus* Gorham, 1888; (E–E') holotype of *Mycotretus nigricollis* Gorham, 1888; (F–F') holotype of *Mycotretus nigripes* Gorham, 1888. Scale bars: A–F= 1 mm.

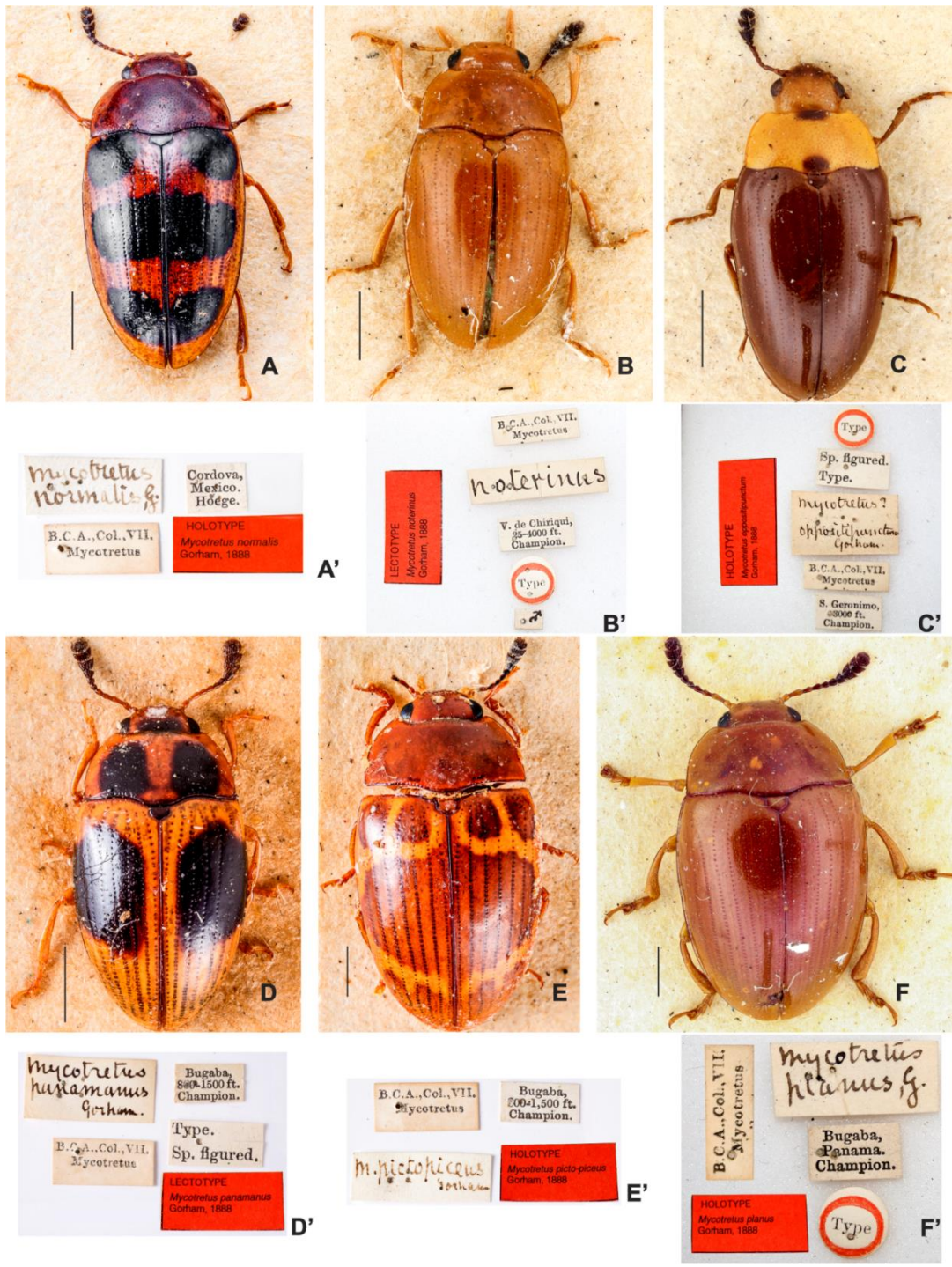


Figure 19. Gorham primary types (dorsal, labels) cont. (A–A’) holotype of *Mycotretus normalis* Gorham, 1888; (B–B’) lectotype of *Mycotretus noterus* Gorham, 1888; (C–C’) holotype of *Mycotretus oppositipunctum* Gorham, 1888; (D–D’) lectotype of *Mycotretus panamanus* Gorham, 1888; (E–E’) holotype of *Mycotretus pictopiceus* Gorham, 1888; (F–F’) holotype of *Mycotretus planus* Gorham, 1888. Scale bars: A–F= 1 mm.

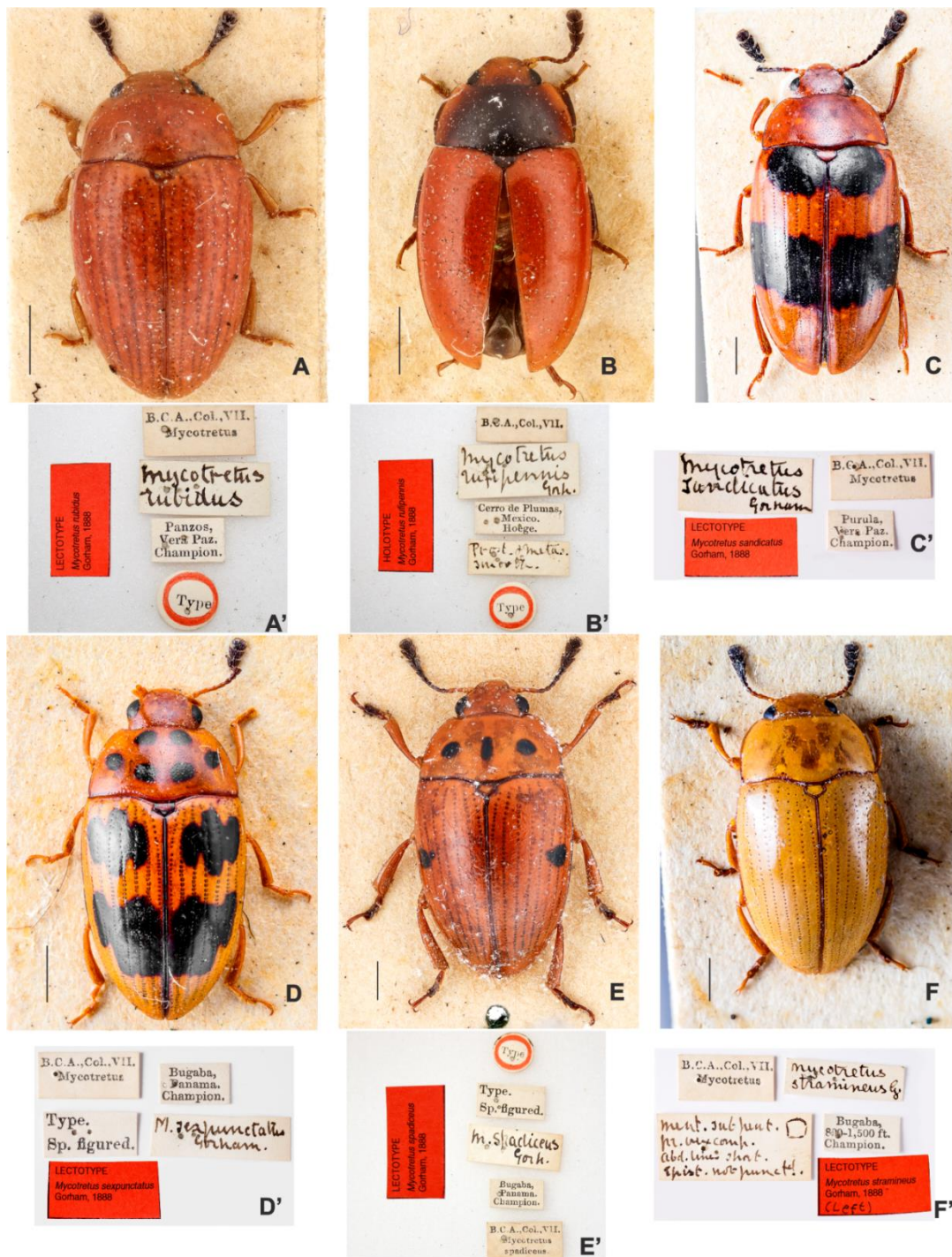


Figure 20. Gorham primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus rubidus* Gorham, 1888; (B–B') holotype of *Mycotretus rufipennis* Gorham, 1888; (C–C') lectotype of *Mycotretus sandicatus* Gorham, 1888; (D–D') lectotype of *Mycotretus sexpunctatus* Gorham, 1888; (E–E') lectotype of *Mycotretus spadiceus* Gorham, 1888; (F–F') lectotype of *Mycotretus stramineus* Gorham, 1888. Scale bars: A–F= 1 mm.



Figure 21. Primary types (dorsal, labels). (A–A’) holotype of *Mycotretus ternotatus* Gorham, 1888; (B–B’) holotype of *Mycotretus tibialis* Gorham, 1888; (C–C’) lectotype of *Mycotretus vittatus* Gorham, 1888; (D–D’) holotype of *Mycotretus anchoralis* Guérin, 1956; (E–E’) holotype of *Mycotretus bicinctus* Guérin, 1949; (F–F’) holotype of *Mycotretus monrosi* Guérin, 1949. Scale bars: A–C, F = 1 mm; D–E = 0.5 mm.



Figure 22. Primary types A–C, E–F (dorsal, labels). (A–A’) holotype of *Mycotretus trifasciatus* Guérin, 1956; (B–B’) lectotype of *Mycotretus cinctellus* Guérin-Ménéville, 1841; (C–C’) lectotype of *Mycotretus fallax* Guérin-Ménéville, 1841; (D–D’) a specimen of *Mycotretus sedecimguttatus* (Guérin-Ménéville, 1844) from UMZC collection; (E–E’) lectotype of *Erotylus* (*Brachymerus*) *sobrinus* Guérin-Ménéville, 1841 [currently *Mycotretus sobrinus* (Guérin-Ménéville)]; (F–F’) lectotype of *Mycotretus dichrous* Kirsch, 1876. Scale bars: A = 0.5 mm; B–F = 1 mm.

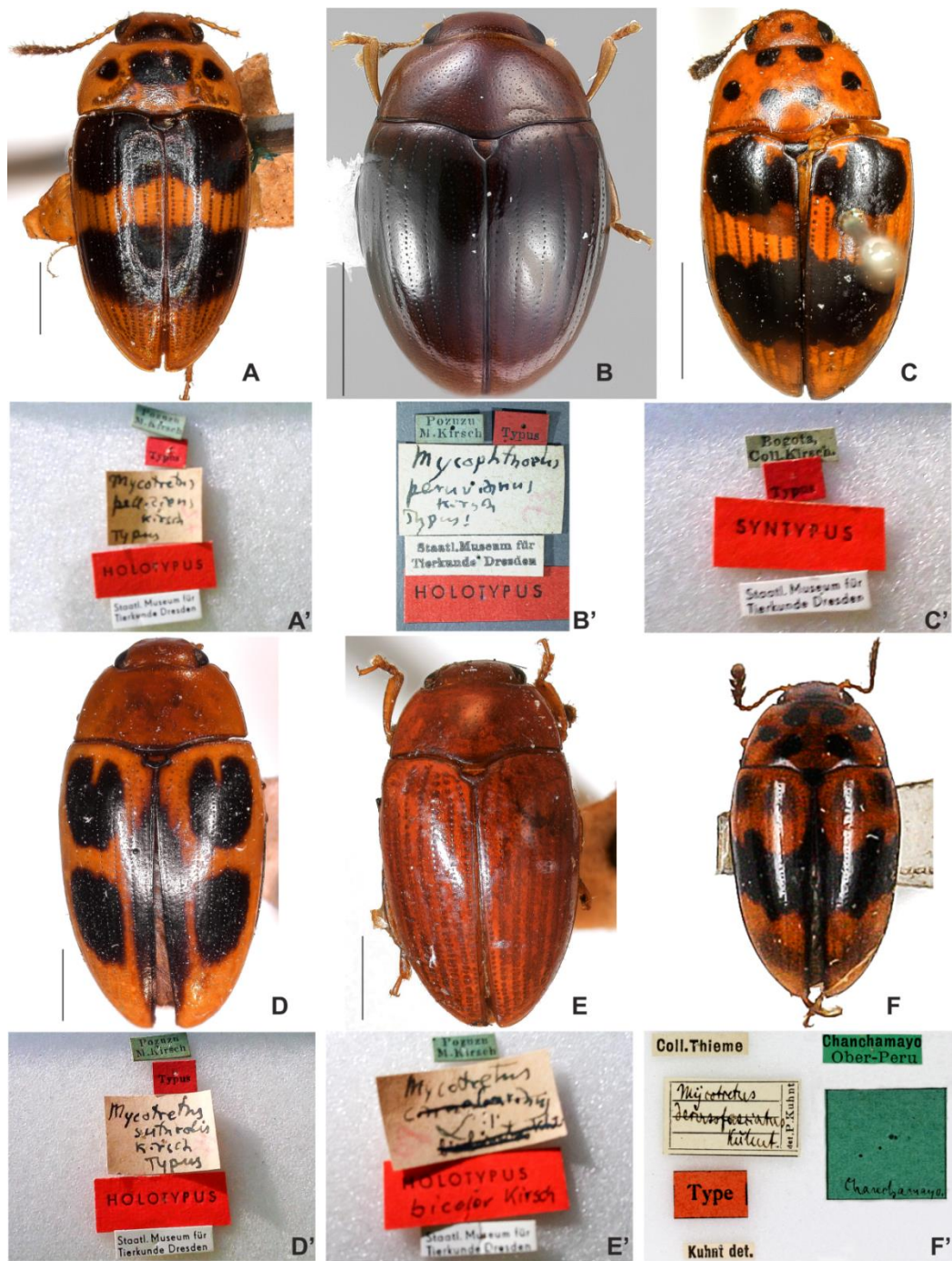


Figure 23. Primary types (dorsal, labels). (A–A') lectotype of *Mycotretus pelliciens* Kirsch, 1876; (B–B') lectotype of *Mycotretus peruvianus* (Kirsch, 1876); (C–C') lectotype of *Mycotretus puncticeps* Kirsch, 1865; (D–D') lectotype of *Mycotretus suturalis* Kirsch, 1876; (E–E') lectotype of *Mycotretus bicoloratus* Kuhnt, 1911 [=*Mycotretus bicolor* Kirsch, 1876 (invalid name)]; (F–F') lectotype of *Mycotretus derasofasciatus* Kuhnt, 1910. Scale bars: A–E = 1 mm; F (see Material and Methods).

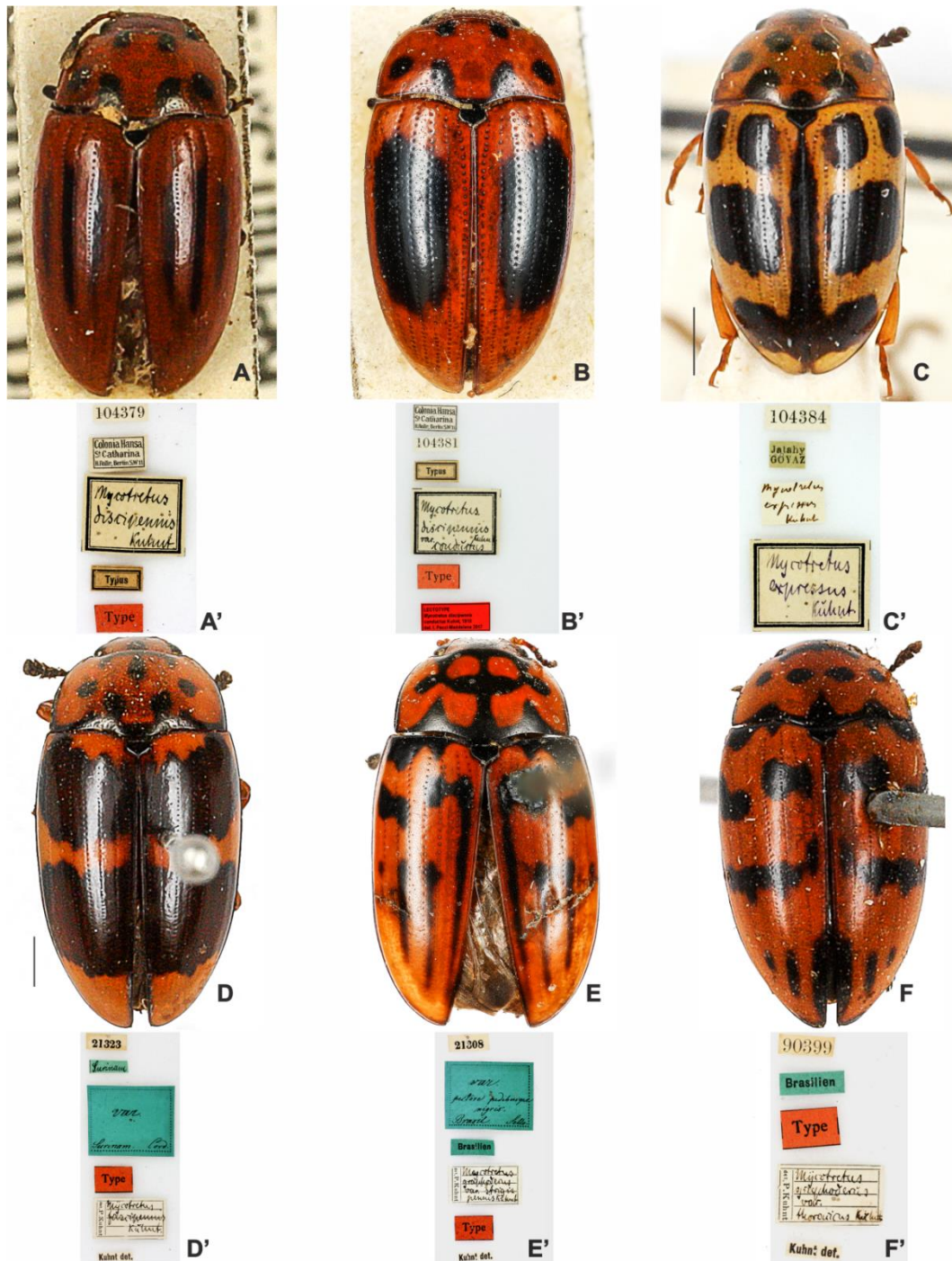


Figure 24. Kuhnt primary types (dorsal, labels). (A–A') lectotype of *Mycotretus discipennis* Kuhnt, 1910; (B–B') lectotype of *Mycotretus discipennis conductus* Kuhnt, 1910; (C–C') lectotype of *Mycotretus expressus* Kuhnt, 1910; (D–D') holotype of *Mycotretus fascipennis* Kuhnt, 1910; (E–E') lectotype of *Mycotretus graphoderus strigipennis* Kuhnt, 1910; (F–F') lectotype of *Mycotretus graphoderus thoracicus* Kuhnt, 1910. Scale bars: C–D = 1 mm; A–B, E–F (see Material and Methods).

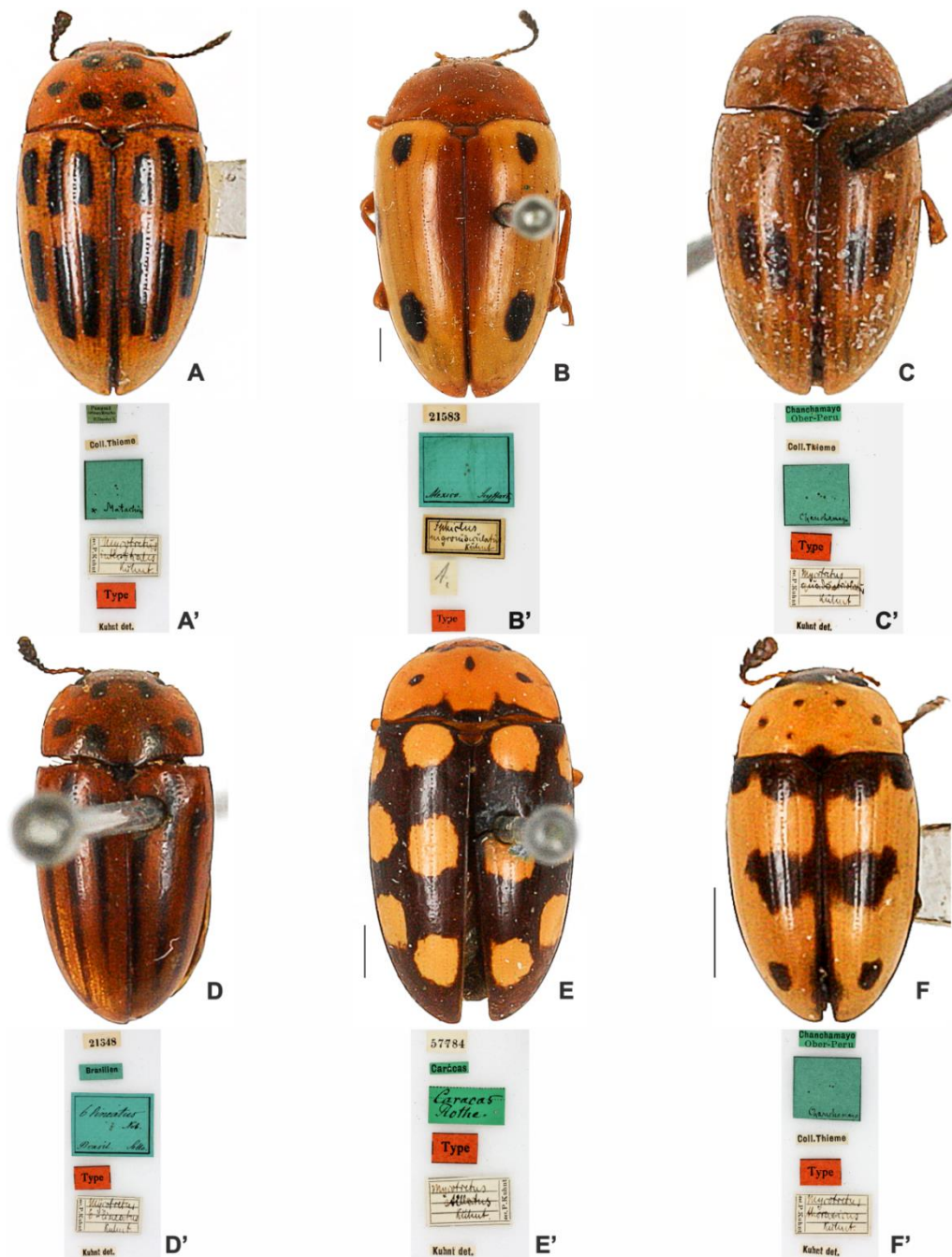


Figure 25. Kuhnt primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus interstitialis* Kuhnt, 1910; (B–B') holotype of *Brachysphaenus (Iphiclus) nigromaculatus* Kuhnt, 1909 [currently *Mycotretus nigromaculatus* (Kuhnt)]; (C–C') holotype of *Mycotretus quadristriolatus* Kuhnt, 1910; (D–D') lectotype of *Mycotretus sexlineatus* Kuhnt, 1910; (E–E') holotype of *Mycotretus stillatus* Kuhnt, 1910; (F–F') holotype of *Mycotretus thoracicus* Kuhnt, 1910. Scale bars: B, E–F = 1 mm; A, C–D (see Material and Methods).



Figure 26. Primary types A–B, D–F (dorsal, labels). (A–A’) lectotype of *Mycotretus virgatus* Kuhnt, 1910 [= *Iphiclus virgatus* (Kuhnt) new combination]; (B–B’) holotype of *Mycotretus ziczac ziczac* Kuhnt, 1910; (C–C’) specimen of *Mycotretus aestuans* Lacordaire, 1842 from Alvarenga collection (MNRJ, Brazil); (D–D’) lectotype of *Mycotretus ambulator* Lacordaire, 1842; (E–E’) lectotype of *Mycotretus apicalis* Lacordaire, 1842; (F–F’) lectotype of *Mycotretus argus* Lacordaire, 1842. Scale bars: B–F = 1 mm; A (see Material and Methods).



Figure 27. Lacordaire specimens. Primary types A–B, D–F (dorsal, labels). (A–A') lectotype of *Mycotretus bistrigatus* Lacordaire, 1842; (B–B') lectotype of *Mycotretus clitelliger* Lacordaire, 1842; (C–C') specimen of *Mycotretus coccineus* (Lacordaire, 1842) from Crotch collection (UMZC, United Kingdom); (D–D') lectotype of *Mycotretus coelestinus* Lacordaire, 1842; (E–E') lectotype of *Mycotretus cognatus* Lacordaire, 1842; (F–F') lectotype of *Mycotretus cyanopterus* Lacordaire, 1842. Scale bars: A–F = 1 mm.



Figure 28. Lacordaire specimens cont. Primary types B, D-F (dorsal, labels). (A-A') specimen of *Mycotretus difficilis* Lacordaire, 1842 from MZSP collection (Brazil); (B-B') lectotype of *Mycotretus distigma* Lacordaire, 1842; (C-C') specimen of *Mycotretus dorsofasciatus* Lacordaire, 1842 from Crotch collection (UMZC, United Kingdom); (D-D') holotype of *Mycotretus dorsonotatus* Lacordaire, 1842; (E-E') lectotype of *Mycotretus dubius* Lacordaire, 1842; (F-F') lectotype of *Mycotretus durius* Lacordaire, 1842. Scale bars: A-F = 1 mm.

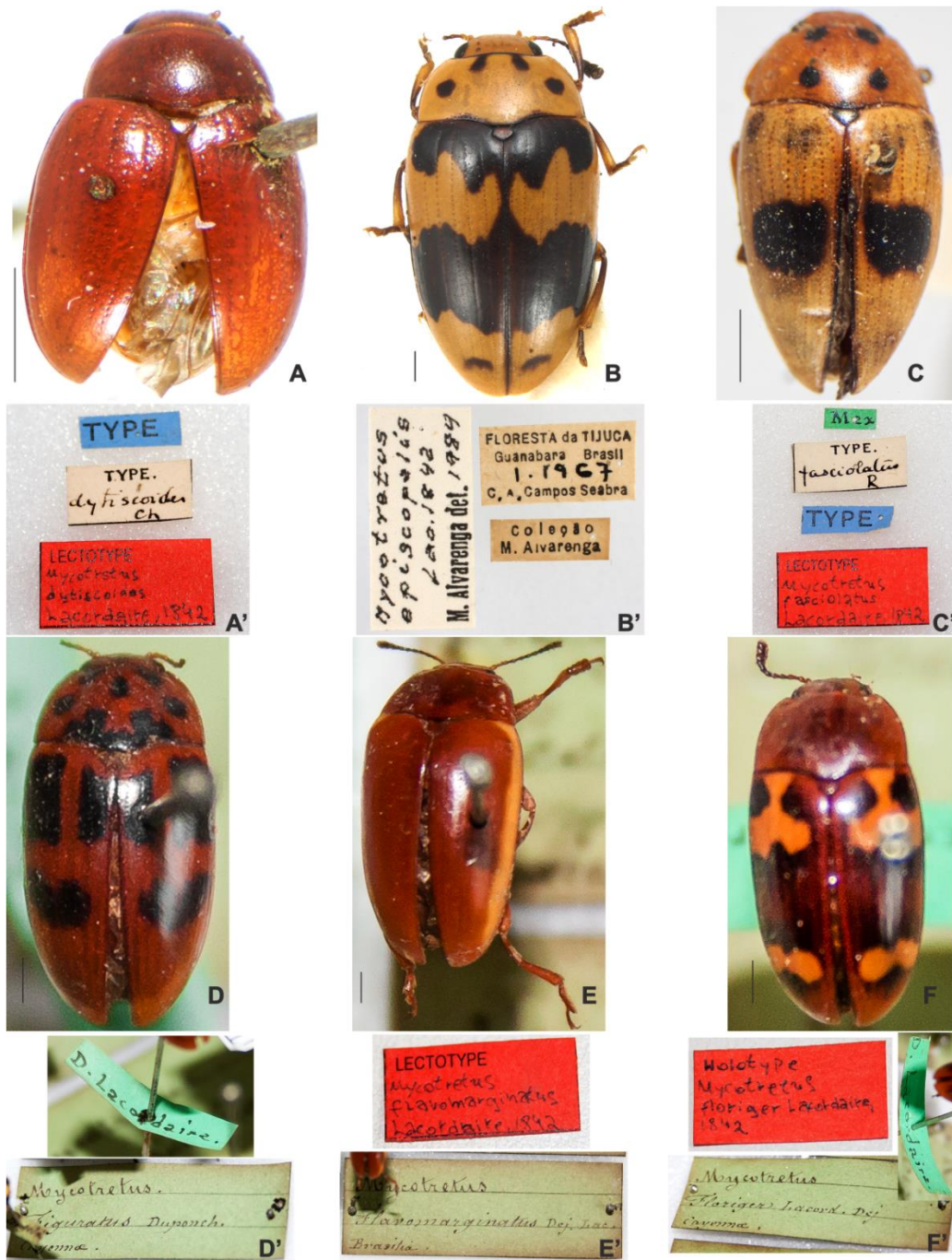


Figure 29. Lacordaire specimens cont. Primary types A, C, D-F (dorsal, labels). (A-A') lectotype of *Mycotretus dytiscoides* Lacordaire, 1842; (B-B') specimen of *Mycotretus episcopalis* Lacordaire, 1842 from Alvarenga collection (MNRJ, Brazil); (C-C') lectotype of *Mycotretus fasciolatus* Lacordaire, 1842; (D-D') lectotype of *Mycotretus figuratus* Lacordaire, 1842; (E-E') lectotype of *Mycotretus flavomarginatus* Lacordaire, 1842; (F-F') holotype of *Mycotretus floriger* Lacordaire, 1842. Scale bars: A, C, D-F = 1 mm; B = 0.5 mm.



Figure 30. Lacordaire primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus fuscitarsis* Lacordaire, 1842; (B–B') holotype of *Mycotretus gemmula* Lacordaire, 1842; (C–C') lectotype of *Mycotretus gentilis* Lacordaire, 1842; (D–D') lectotype of *Mycotretus godarti* Lacordaire, 1842; (E–E') lectotype of *Mycotretus graniformis* Lacordaire, 1842; (F–F') lectotype of *Mycotretus graphoderus* Lacordaire, 1842. Scale bars: A–F = 1 mm.

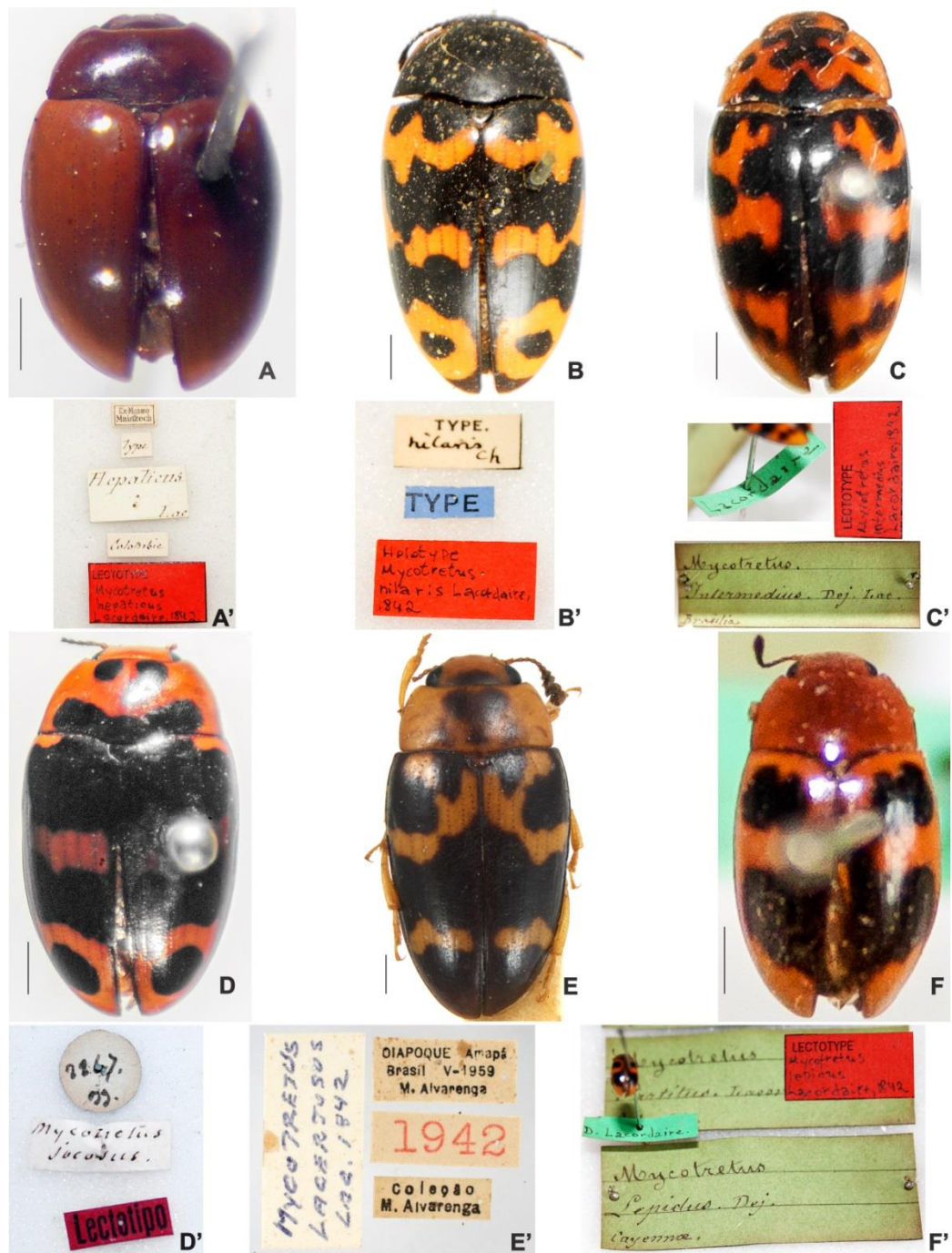


Figure 31. Lacordaire specimens cont. Primary types A–D, F (dorsal, labels). (A–A') lectotype of *Mycotretus hepaticus* Lacordaire, 1842; (B–B') holotype of *Mycotretus hilaris* Lacordaire, 1842; (C–C') lectotype of *Mycotretus intermedius* Lacordaire, 1842; (D–D') lectotype of *Mycotretus jocosus* Lacordaire, 1842; (E–E') a specimen of *Mycotretus lacertosus* Lacordaire, 1842 from Alvarenga collection (MNRJ, Brazil); (F–F') lectotype of *Mycotretus lepidus* Lacordaire, 1842. Scale bars: A–D, F = 1 mm; E = 0.5 mm.



Figure 32. Lacordaire specimens cont. Primary types A, C–F (dorsal, labels). (A–A’) lectotype of *Mycotretus leprosus* Lacordaire, 1842; (B–B’) specimen of *Mycotretus limbatus* (Lacordaire, 1842) from Crotch collection (UMZC, United Kingdom); (C–C’) lectotype of *Mycotretus luteipes* Lacordaire, 1842; (D–D’) lectotype of *Mycotretus magus* Lacordaire, 1842; (E–E’) holotype of *Mycotretus marginicollis* Lacordaire, 1842; (F–F’) lectotype of *Mycotretus melanopterus* Lacordaire, 1842. Scale bars: A–F = 1 mm.



Figure 33. Lacordaire specimens cont. Primary types A–B, E–F (dorsal, labels). (A–A') lectotype of *Mycotretus melanostictus* Lacordaire, 1842; (B–B') lectotype of *Mycotretus miniatus* Lacordaire, 1842; (C–C') specimen of *Mycotretus misellus* Lacordaire, 1842 from Crotch collection (UMZC, United Kingdom); (D–D') specimen of *Mycotretus nigrivittis* Lacordaire, 1842 from MZSP (Brazil); (E–E') lectotype of *Mycotretus nigrocinctus* Lacordaire, 1842 from MZSP (Brazil); (F–F') lectotype of *Mycotretus nigroterminatus* Lacordaire, 1842; (G–G') specimen of *Mycotretus nugator* Lacordaire, 1842 from Alvarenga collection (MNRJ, Brazil). Scale bars: A–F = 1 mm; G = 0.5 mm.



Figure 34. Lacordaire primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus palmiphilus* Lacordaire, 1842; (B–B') lectotype of *Mycotretus partitus* Lacordaire, 1842; (C–C') lectotype of *Mycotretus pecari* Lacordaire, 1842; (D–D') lectotype of *Mycotretus polyophthalmus* Lacordaire, 1842; (E–E') lectotype of *Mycotretus psittacus* Lacordaire, 1842; (F–F') holotype of *Mycotretus pulchellus* Lacordaire, 1842. Scale bars: A–B, E–F = 1 mm; C–D (see Material and Methods).

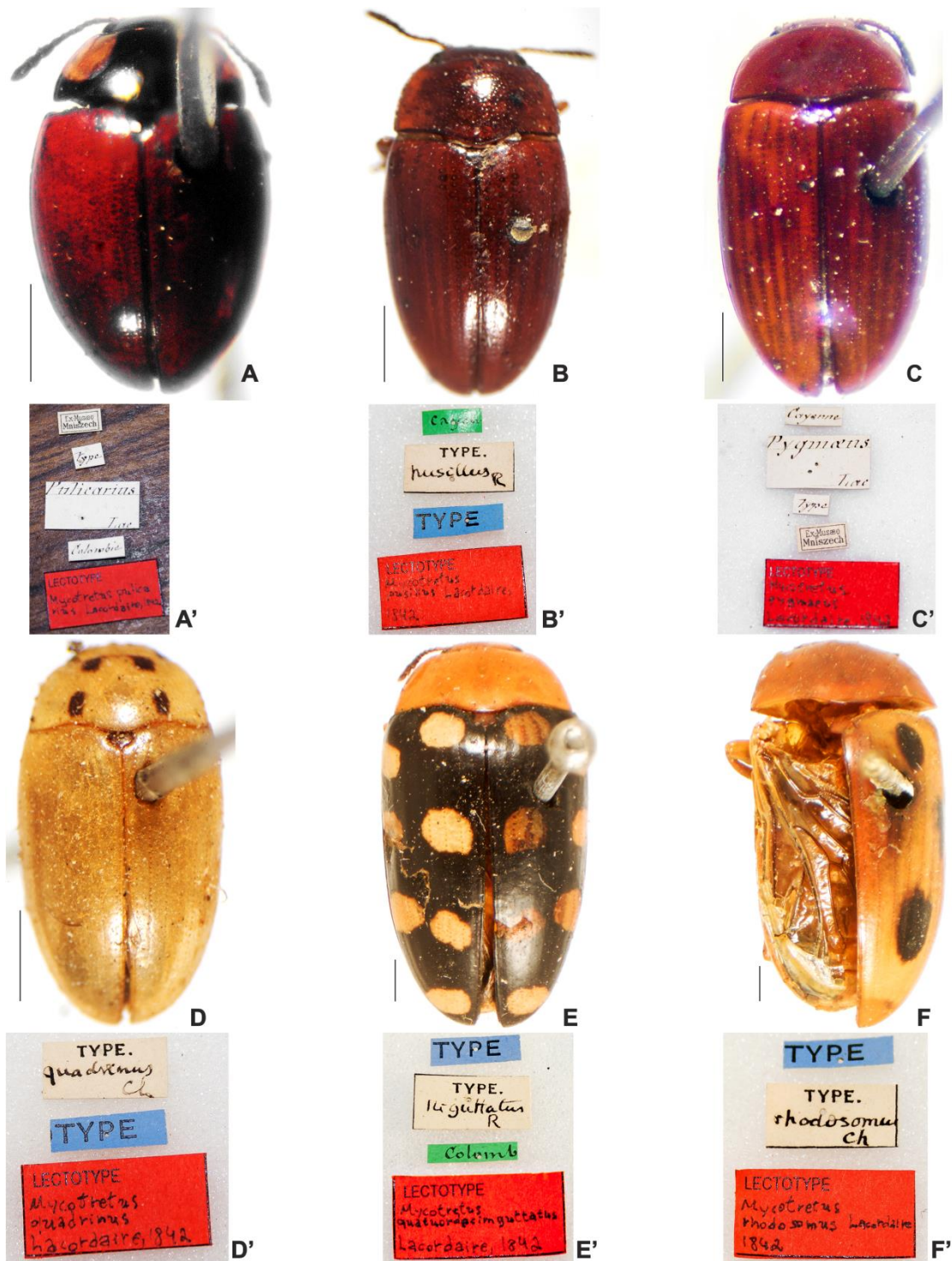


Figure 35. Lacordaire primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus pulicarius* Lacordaire, 1842; (B–B') lectotype of *Mycotretus pusillus* Lacordaire, 1842; (C–C') lectotype of *Mycotretus pygmaeus* Lacordaire, 1842; (D–D') lectotype of *Mycotretus quadrinus* Lacordaire, 1842; (E–E') lectotype of *Mycotretus quatuordecimguttatus* Lacordaire, 1842; (F–F') lectotype of *Mycotretus rhodosomus* Lacordaire, 1842. Scale bars: A–F = 1 mm.

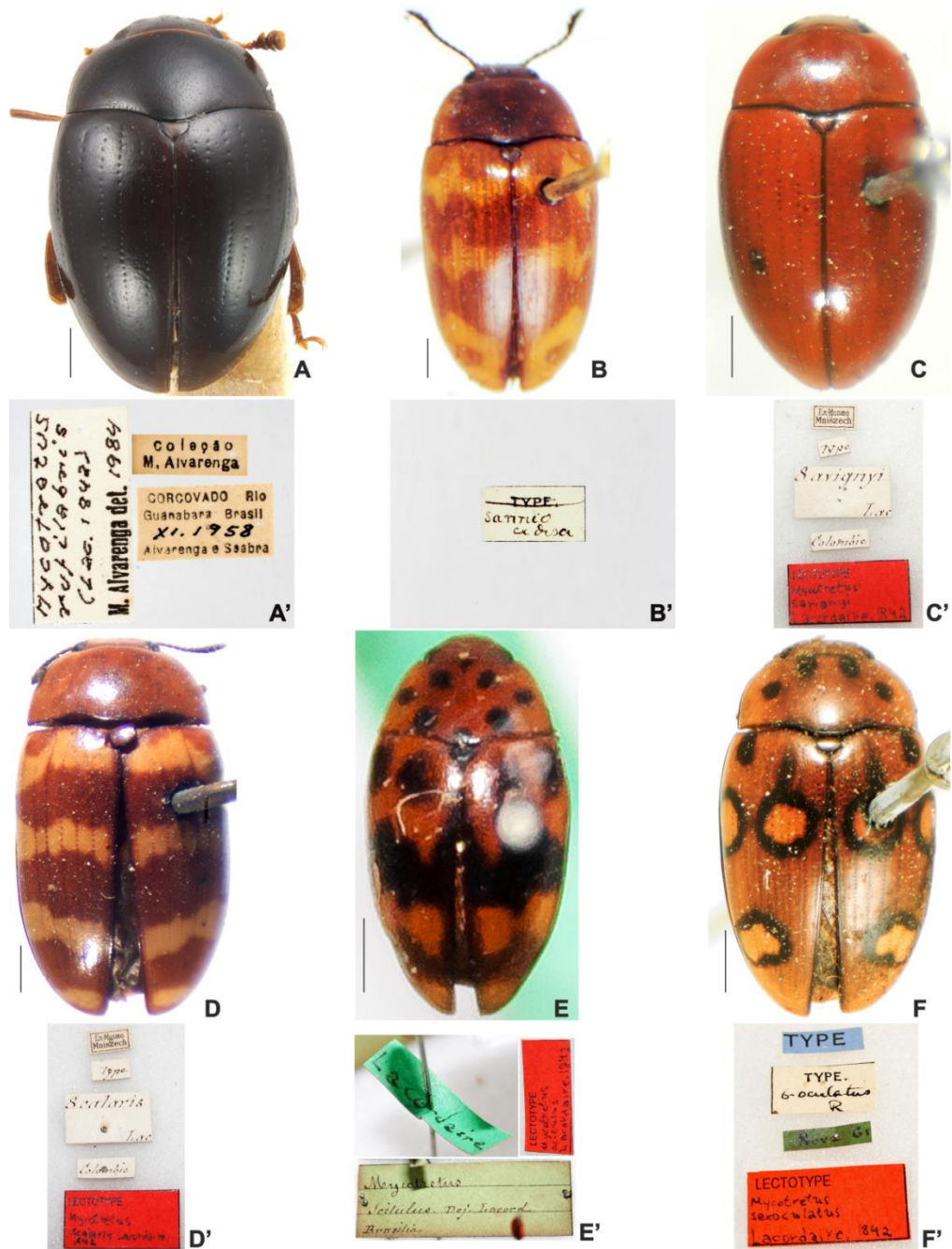


Figure 36. Lacordaire specimens cont. Primary types C–F (dorsal, labels). (A–A') specimen of *Mycotretus rufilabris* (Lacordaire, 1842) from Alvarenga collection (MNRJ, Brazil); (B–B') specimen of *Mycotretus sannio* Lacordaire, 1842 from Crotch collection (UMZC, United Kingdom); (C–C') lectotype of *Mycotretus savignyi* Lacordaire, 1842; (D–D') lectotype of *Mycotretus scalaris* Lacordaire, 1842; (E–E') lectotype of *Mycotretus scitulus* Lacordaire, 1842; (F–F') lectotype of *Mycotretus sexoculatus sexoculatus* Lacordaire, 1842. Scale bars: A = 0.5 mm; B–F = 1 mm.

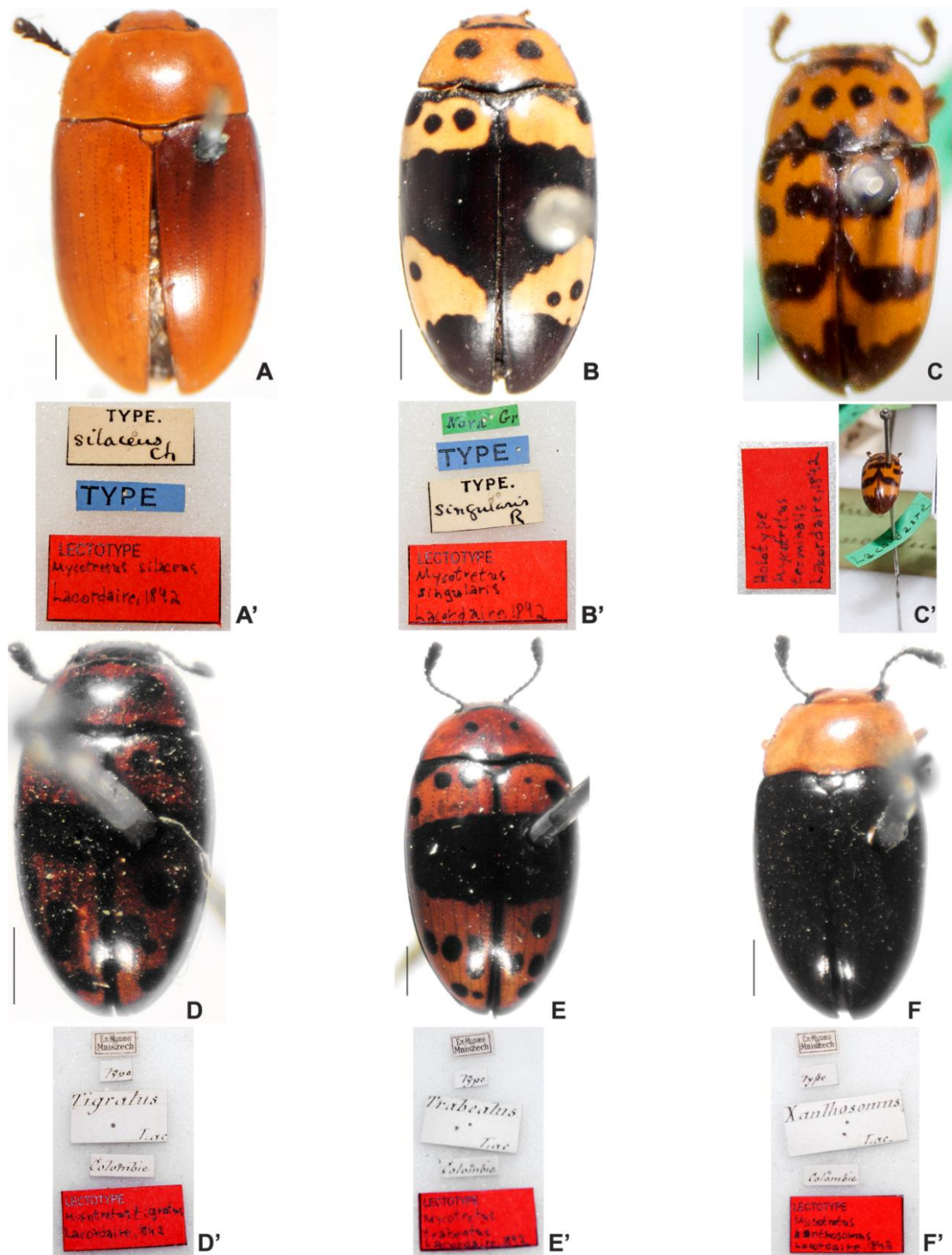


Figure 37. Lacordaire primary types (dorsal, labels) cont. (A–A') lectotype of *Mycotretus silaceus* (Lacordaire, 1842); (B–B') lectotype of *Mycotretus singularis* Lacordaire, 1842; (C–C') Holotype of *Mycotretus terminalis* Lacordaire, 1842; (D–D') lectotype of *Mycotretus tigratus* Lacordaire, 1842; (E–E') lectotype of *Mycotretus trabeatus* Lacordaire, 1842; (F–F') lectotype of *Mycotretus xanthosomus* Lacordaire, 1842. Scale bars: A–F = 1 mm.

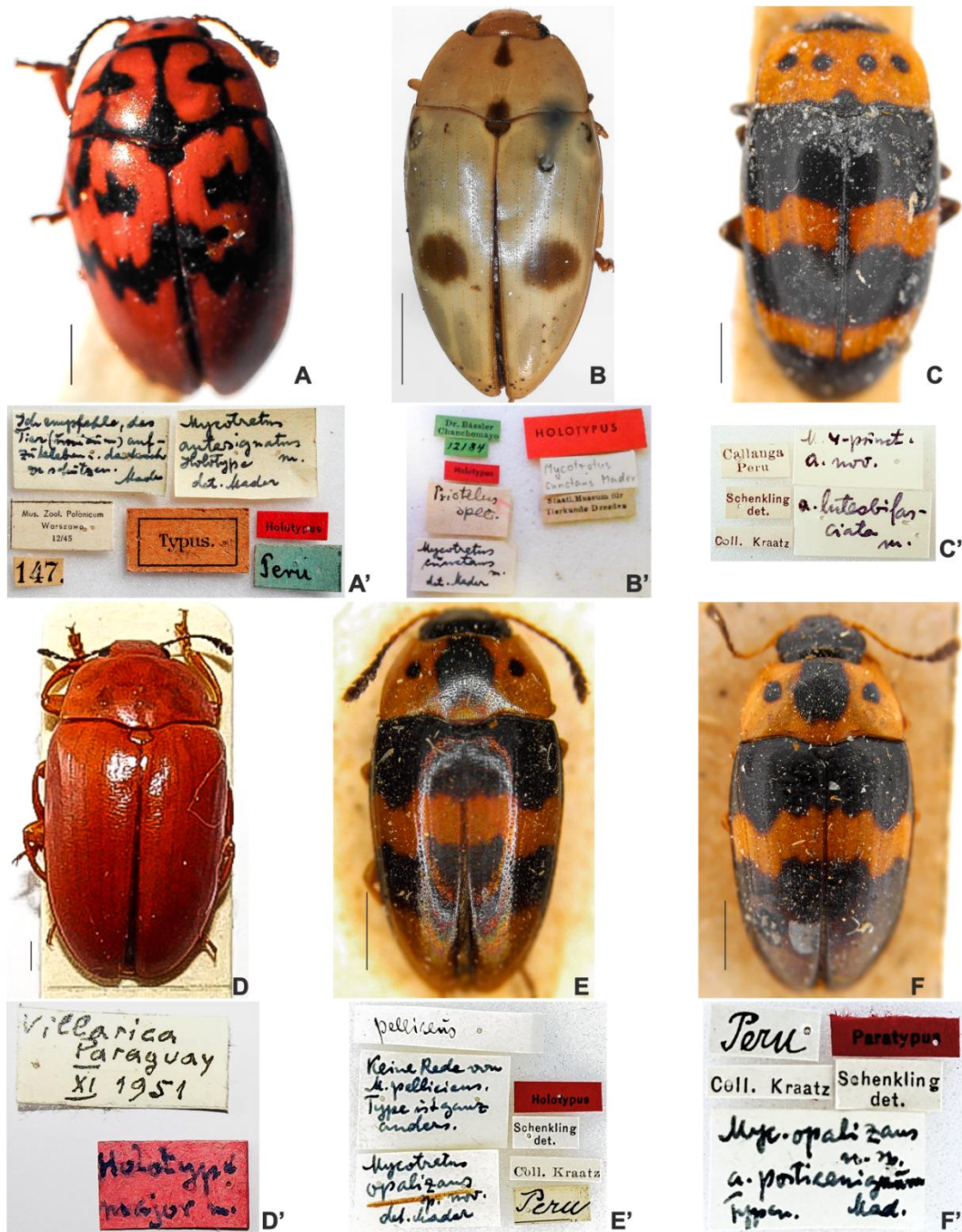


Figure 38. Mader primary types A–B, D–E (dorsal, labels). (A–A') holotype of *Mycotretus antesignatus* Mader, 1942; (B–B') holotype of *Mycotretus cunctans* Mader, 1942; (C–C') *Mycotretus quadripunctatus* ab. *luteobifasciatus* Mader, 1942 (invalid name); (D–D') holotype of *Mycotretus major* Mader, 1955; (E–E') holotype of *Mycotretus opalizans* Mader, 1942; (F–F') *Mycotretus opalizans* ab. *posticenigrum* Mader, 1942 (invalid name). Scale bars: A, C–F = 1 mm; B = 2 mm.



Figure 39. Primary types A–D (dorsal, labels). (A–A') holotype of *Mycotretus partialis* Mader, 1940; (B–B') holotype of *Mycotretus prioteloides* Mader, 1942; (C–C') holotype of *Mycotretus tigrinoides* Mader, 1942; (D–D') holotype of *Mycotretus tigripennis* Mader, 1942; (E–E') specimen of *Mycotretus maculatus* (Olivier, 1791) from BMNH collection (United Kingdom); (F–F') topotype of *Mycotretus tigrinus* (Olivier, 1791) from RBINS (Belgium); (G–G') holotype of *Mycotretus alvarengai* Pecci-Maddalena & Lopes-Andrade, 2018. Scale bars: A–C, E–G = 1 mm; D = 2 mm.

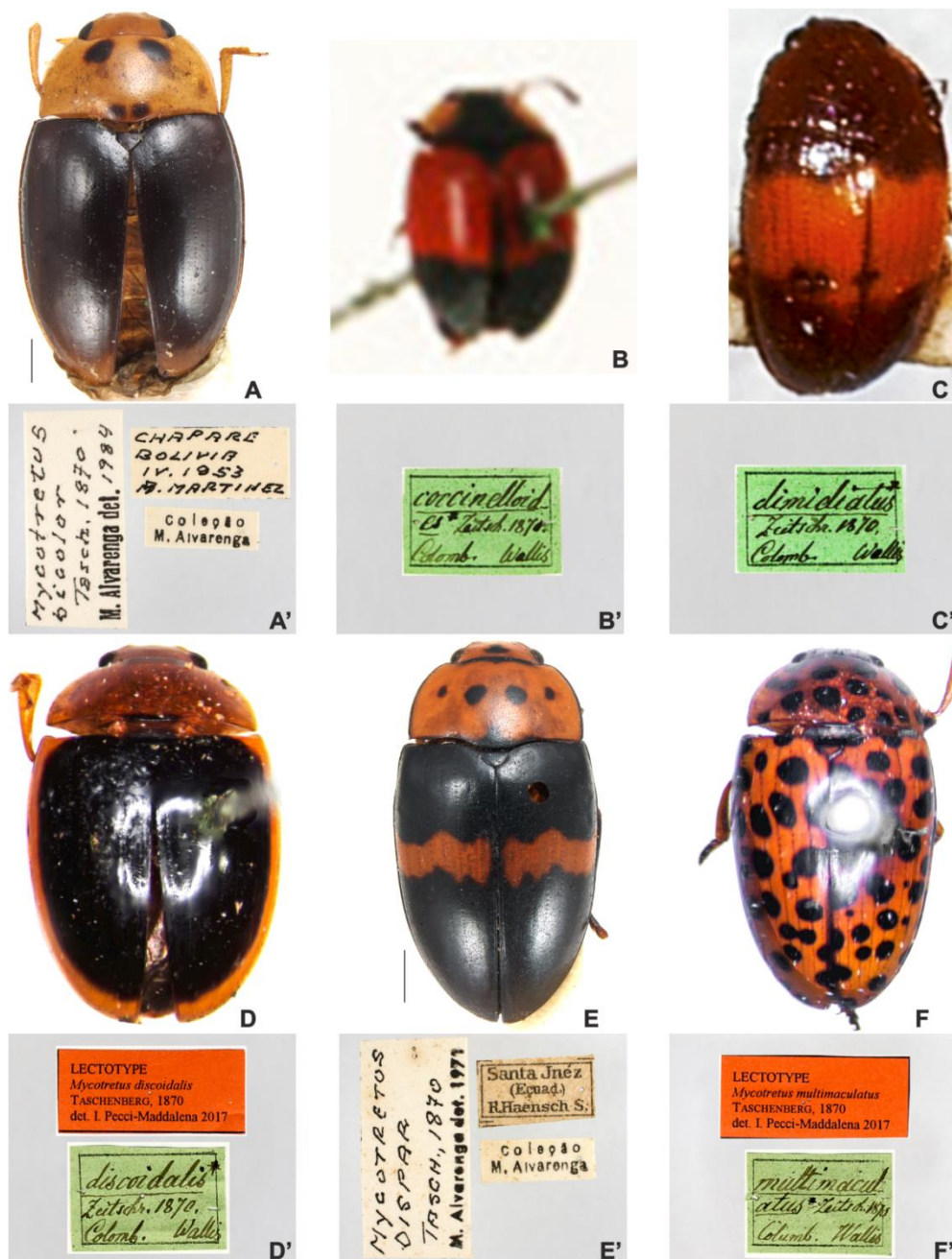


Figure 40. Taschenberg specimens. Primary types B–D (dorsal, labels). (A–A’) specimen of *Mycotretus bicolor* Taschenberg, 1870 from Alvarenga collection (MNRJ, Brazil); (B–B’) lectotype of *Mycotretus coccinelloides* Taschenberg, 1870; (C–C’) lectotype of *Mycotretus dimidiatus* Taschenberg, 1870; (D–D’) lectotype of *Mycotretus discoidalis* Taschenberg, 1870; (E–E’) specimen of *Mycotretus dispar* Taschenberg, 1870 from Alvarenga collection (MNRJ, Brazil); (F–F’) lectotype of *Mycotretus multimaculatus* Taschenberg, 1870. Scale bars: A = 0.5 mm; E = 1 mm; B–D, F (see Material and Methods).

Capítulo VI

Metendosternite and penile flagellum: Two unexplored character systems of pleasing fungus beetles (Coleoptera: Erotylidae), with emphasis on Tritomini¹

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Abstract. The metendosternite and penile flagellum are two unrelated structures of Coleoptera, the first of which is an internal and morphologically variable structure known to occur in most beetles, and the second is part of the male genitalia present in species of a few beetle families. Characters of these structures are seldom used in phylogenetic works on beetles, especially below the family level. Erotylidae (Coleoptera) is a cosmopolitan family currently divided into six subfamilies. Aside from the general agreement among overall evolutionary scenarios proposed for Erotylidae, there are doubts regarding the monophyly of certain suprageneric and generic taxa within this family, for instance its most diverse tribe Tritomini and its second most diverse genus *Mycotretus* Lacordaire. Only a few features of the metendosternite and flagellum have been considered in previous morphological studies of Erotylidae. Here, we conduct a comparative morphological study of the metendosternite and the flagellum of Erotylidae, with emphasis on Tritomini and *Mycotretus*. The present work was motivated by the need to improve the character matrix of Erotylidae for forthcoming phylogenetic analyses of taxa within this family. Representatives of 55 species belonging to five of the six most diverse subfamilies of Erotylidae were analyzed. A total of 18 genera and 45 species of Tritomini were selected; among these, 21 are species of *Mycotretus*. Taxa were chosen based on their range of morphological variation and geographical distribution. A total of 17 characters with potential phylogenetic value were recognized of the metendosternite and of the flagellum, most for the first time. Seven morphological characters of metendosternite seem to add information to the internal relationships of Erotylidae: the presence and absence of laminae, the morphology of laminae, the vertical or horizontal orientation of laminae, the morphology of anterior tendons, the presence of an anterior process on anterior portion of metendosternite, the development of the central sclerotization of anterior portion of metendosternite, the degree of approximation of anterior tendons. Within Tritomini there is evidence of phylogenetic signal for the presence or absence of metendosternal laminae. On the other hand, we argue that the penile flagellum may be more informative under generic levels of classification. The presence and absence of flagellum and morphological elements of its “head” seems to have phylogenetic signal for morphologically closely related species and at least seven probable clades of *Mycotretus* were identified based on this structure.

Introduction

There is no available work on the comparative morphology of the metendosternite and the penile flagellum of Erotylidae beetles. A metendosternite occurs in members of all Coleopteran families, while a penile flagellum is restricted to species of a few families, as Erotylidae, Helotidae and Phalacridae. The term “metendosternite,” as coined by Crowson (1938, 1944), is comparable to the “metafurca” of other holometabolous insects. It is formed by invagination of the true metasternum and serves as an attachment point for several muscles (Lawrence *et al.*, 2011). Since Crowson’s works, the metendosternite has received special attention as a variable or phylogenetically important structure (e.g. Crowson, 1938, 1944; Balfour-Browne, 1961; Doyen, 1966; Tomaszewska, 2000; Lawrence *et al.*, 2011). The penile flagellum (or simply “flagellum”) is a sclerotized terminal prolongation of the ejaculatory duct, usually concealed within the internal sac when in repose (Torre-Bueno, 1989). A possible function of the flagellum is to prevent accidental constrictions of the sperm channel when the internal sac is everted during copulation (Boyle, 1956). In addition to this, recent works on cassidine beetles (Chrysomelidae: Cassidinae) have verified that differences in stiffness of the flagellum facilitate its propulsion into the conspecific female spermathecal duct, with penetration by the flagellum occurring by means of elaborate mechanical adaptations (Filippov *et al.*, 2016; Matsumura *et al.*, 2017).

Detailed morphological studies on the metendosternite and penile flagellum of Coleoptera are scarce in the scientific literature. The importance of the metendosternite in higher-level taxonomic classification was previously verified (e.g., Crowson, 1938, 1944; Lawrence *et al.*, 2011), but, in spite of this, it has not been properly considered in phylogenetic analyses below the family level within the order. The most (and perhaps only) detailed study to do this was that by Hübler & Klass (2013) concerning Chrysomelinae (Chrysomelidae). With respect to the penile flagellum, information is also scarce and restricted to taxonomic descriptions or citation of its presence or absence in particular taxa (e.g. see Węgrzynowicz, 2002; Skelley, 2009; Gimmel, 2013). The lack of studies may be due to technical difficulties: the metendosternite is an internal and sclerotized structure, and complete dissection of the specimen is required to observe it; while the penile flagellum is a small component of the male aedeagus, which can be examined only by removing the entire genitalic apparatus. Moreover, some researchers may avoid the inclusion of genital characters in phylogenetic analyses because of the preconceived notion of rapid genital evolution (Song & Bucheli, 2010). On the other hand, cucujiform beetles show much plasticity and homoplasy

in characters of the metendosternite (Hübler & Klass 2013), which may justify the lack of studies on this structure.

Erotylidae (pleasing fungus beetles) is a cosmopolitan family, containing about 3500 species in 260 genera (Lawrence & Ślipiński, 2013). The family is divided into six subfamilies, three of which are further subdivided into ten tribes (Leschen *et al.*, 2010). Currently, there are three proposed phylogenetic scenarios for Erotylidae: that of Robertson *et al.* (2004) based on molecular data, and those of Węgrzynowicz (2002) and Leschen (2003) based on morphology. Erotylidae is monophyletic, but doubts rely on phylogenetic relationships of several taxa within the family (Leschen *et al.*, 2010). Among the most problematic taxa is Tritomini, the tribe encompassing the greatest number of genera (91) and species (1165) within Erotylidae, which is not considered to be monophyletic (Węgrzynowicz, 2002; Robertson *et al.*, 2004; Leschen *et al.*, 2010). The most speciose genus of Tritomini (and the second-most speciose genus of Erotylidae, surpassed only by *Iphiclus* Chevrolat) is *Mycotretus* Lacordaire, with 177 species (Pecci-Maddalena *et al.*, 2019b). *Mycotretus* is taxonomically problematic (there is no taxonomic revision) and appears to be paraphyletic in the phylogenetic analysis of Robertson *et al.* (2004). In spite of its importance to understanding the phylogenetic relationships within Tritomini, no phylogenetic study of *Mycotretus* has been conducted. Only one species of *Mycotretus* were included in the work of Węgrzynowicz (2002) and only three in that by Robertson *et al.* (2004), and no species of *Mycotretus* was included in the phylogenetic study of Leschen (2003).

Only a few metendosternite features, such as presence of laminae, stalk development, and separation of anterior tendons, have been used in phylogenetic studies of Erotylidae (Węgrzynowicz, 2002; Leschen, 2003; Leschen *et al.*, 2005). The taxonomic value of the penile flagellum is already recognized (e.g. see Boyle, 1956; McHugh *et al.*, 1997; Skelley, 1998; Pecci-Maddalena & Lopes-Andrade, 2017; Pecci-Maddalena *et al.* 2019a). However, no comparative morphological study of the penile flagellum taking into account its phylogenetic implications in Erotylidae has been carried out. Recently, *Mycotretus* have been studied and differences in the morphology of their metendosternite and penile flagellum have been found (Pecci-Maddalena & Lopes-Andrade, 2017; Pecci-Maddalena & Lopes-Andrade, 2018a,b). Aside from that, there are groups of species based on color pattern, body shape and morphological similarities of their penile flagellum (Pecci-Maddalena *et al.* 2019b).

The objective of this study was to examine and compare the morphology of the metendosternite and the penile flagellum in Erotylidae, focusing especially on Tritomini and the genus *Mycotretus*. The present work was motivated by the need to improve the character matrix of Erotylidae for forthcoming phylogenetic analyses of taxa within this family.

Material and methods

Taxa studied

Representatives of 55 species belonging to the five most diverse subfamilies of Erotylidae were examined (Fig. 1 and Fig. 2, Table 1). The only Erotylidae subfamily not included was Xenoscelinae, because no specimen from this taxon were available to us. All species used in this study, as well the number, sex, and provenance of the specimens examined, are listed in Table 1. Following the practice of published phylogenetic studies of Erotylidae (e.g. Węgrzynowicz, 2002; Leschen, 2003), the examined type species of all subfamilies and tribes included here were treated as being representative of their respective taxon. Whenever possible, additional species of each suprageneric and generic taxon were examined. A total of 18 genera and 45 species of Tritomini were selected and among these 21 species of *Mycotretus* (Fig. 1 and Fig. 2). Species were selected based on their availability, representativeness of morphological variation and geographical distribution (Table 1). Most specimens studied were identified by direct comparison with primary types, historical material housed in several museums and by consulting the taxonomic literature (e.g. Pecci-Maddalena *et al.*, 2019b). Full structures descriptions for each of the studied species are provided in Table S1. Images of the described structures of most examined species are provided in Figures S1–S12. The studied material and its depositories are listed in Appendix². Authors and year of species names are listed in Table 1 and are not repeated throughout the text. The term “ground pattern” is used here to designate those characters which are assumed to be present in the last common stem population of a monophylum (Wägele, 2005). The term is synonymous of “ground plan”, however the latter is avoided because it suggests the existence of some planning authority; a ground pattern is always an incomplete and hypothetical reconstruction (Wägele, 2005).

The suprageneric classification of Erotylidae used herein is based on Węgrzynowicz (2002), Leschen (2003), Robertson *et al.* (2004), Leschen *et al.* (2010) and Bouchard *et al.* (2011). As was done by Drilling *et al.* (2013), species-level systematics follow the catalogs of Chûjô & Chûjô (1988, 1989, 1990: Palearctic, Oriental, and Australian faunas, respectively), Alvarenga (1994: Neotropical fauna), Delkeskamp (1981: Ethiopian fauna), Boyle (1956: Nearctic fauna), and Leschen & Węgrzynowicz (1998, Languriinae). For *Ischyryus* Lacordaire, 1842 we followed the work of Skelley (1998).

² Este apêndice e o do capítulo VII incluem basicamente os mesmo espécimes examinados, apenas com algumas adições no capítulo VII. Por essa razão, um único arquivo denominado “Appendix” foi anexado ao final da tese.

Morphological study and images

Dissection followed mostly Pecci-Maddalena & Lopes-Andrade (2017; 2018a,b). Dissected parts were kept in genitalia vials or in glass microtubes, both containing glycerin to avoid dehydration. Examination and measurement of specimens, as well as most photographs, were made under a Zeiss Discovery V20 microscope equipped with a Zeiss AxioCam 506 digital camera. Dissections and a few photographs were made under a Zeiss Stemi 2000C stereomicroscope equipped with a Canon EOS 1000D camera. Photographs of the smallest specimens were performed under a Zeiss AxioLab compound microscope equipped with a Zeiss AxioCam MRc digital camera. Measurements of the penile flagellum were made using the function Curve (Spline) of the software ZEN Pro 2012.

Terminology

The term “lamina (**la**)” (plural: “laminae”) is used here following the definition provided by Lawrence *et al.* (2011): “(...) flattened projections arising near the bases of the lateral arms [= furcal arms]”. The term “crux” was proposed by Crowson (1944) and defined as “(...) the crossing-point of the two ventral flanges of the metendosternite”. The term “central sclerotization of the stalk (**css**)” was proposed by Pecci-Maddalena & Lopes-Andrade (2017) and refers only to the dorsal sclerotized portion of the ventral longitudinal flange of the metendosternite (see Crowson, 1944, for a definition of metendosternite). The term “anterior portion of metendosternite (**apm**)” is proposed here to designate the whole area above the “crux.” The term “anterior lamina (**anla**)” was proposed by Hübler & Klass (2013) and refers to a distinct laminar expansion formed by the furcal arms (**fa**). The term “anterior process” follows the definition provided by Lawrence *et al.* (2011): “the anterior process extends forward from the bases of the frontal arms and may be short and broad to long and narrow; in some groups it is deeply emarginate anteriorly and more or less divided into two lobes; the two anterior tendons usually arise from this process.”. The remaining terminology for parts of the metendosternite follows Hübler & Klass (2013). The “penile flagellum” of Erotylidae is an elongate structure with two interconnected elements, the “head” and the “virga” (Węgrzynowicz, 2002; Pecci-Maddalena-Lopes-Andrade, 2017; Pecci-Maddalena & Lopes-Andrade, 2018a,b). A provisional terminology for the description of the penile flagellum in Erotylidae is proposed in the section on Results.

Character polarization and comparison with previous studies

Hypotheses on character polarity were based mostly on Węgrzynowicz (2002), but other phylogenetic studies were consulted (Leschen, 2003; Leschen *et al.*, 2005; Lawrence *et al.*, 2011). Characters and character states of the metendosternite and flagellum were mapped on a phylogenetic tree of the Erotylidae based on 85 morphological characters (after Węgrzynowicz, 2002) which was graphically modified to include Xenoscelinae and Loberinae, in order to reflect the current classification of Erotylidae proposed by Leschen (2003). The following families of Coleoptera were selected as outgroups: Helotidae, following the previous phylogenetic studies on Erotylidae and Cucujoidea (Węgrzynowicz, 2002; Robertson *et al.*, 2015); Biphyllidae, currently included within Cleroidea (Robertson *et al.*, 2015), but historically considered to be a sister taxon of Erotylidae (Węgrzynowicz, 2002; Leschen, 2003; Drilling *et al.*, 2013); and Sphindidae, which is phylogenetically closely related to Erotylidae (Robertson *et al.*, 2015). Representatives of Sphindidae were not available and information on the metendosternite of *Genisphindus roxanneae* McHugh provided by McHugh (1993) was used for comparison.

Cladistic analysis

A cladistic analysis was performed using the 45 species of Tritomini as terminal taxa and rooting in *Dacne bipustulata* (Dacnini). The resulting topologies were compared with the tree obtained by Węgrzynowicz (2002). The data matrix was compiled using MESQUITE 3.10 (Maddison & Maddison, 2016) and analyzed under parsimony with TNT v1.1 (Goloboff *et al.*, 2008a). In the cases when only females were examined, characters of the penile flagellum were coded as ‘?’ and those characters not applicable were coded as ‘–’. Heuristic searches were performed under both equal and implied weighting (Goloboff, 1993; Goloboff *et al.*, 2008b) using the New Technology algorithms with the following parameters: sectorial search in default mode, 20 iterations of ratchet, 20 cycles of drift, 10 rounds of tree fusing, Driven Search > ‘Find. min length’ = 100 times, ‘Random seed’ = 0, ‘Collapse trees after search’. The TNT setk script, developed by Salvador Arias, was used to identify the most appropriate K value through the formula proposed by Goloboff *et al.* (2008b). A value of 3.046875 was returned and subsequently used in the implied weighting scheme. Nodes were evaluated with Bremer supports (Bremer, 1994) with the Bremer.run script supplied by TNT. Optimizations were performed with Winclada-ASADO 1.62 (Nixon, 2002) and only unambiguous changes were mapped on the tree.

Results

General morphology of the metendosternite and the penile flagellum of Erotylidae (Fig. 3)

The study of the metendosternite is difficult due to its three-dimensional shape, to the fact that it is sometimes translucent, and because it demands invasive dissection. The penile flagellum is also difficult to be examined, because it is small and enveloped within the penile internal sac. In the Erotylidae, the metendosternite (Fig. 3A arrow, 3B–C) usually has a basally, narrowed and apically widened stalk (**stk**), and a slightly widened anterior portion (**apm**) (Fig. 3B–D). Dorsally, a central sclerotization of each of these parts can be easily recognized: the central sclerotization of the anterior portion of the metendosternite (**csap**) and central sclerotization of the stalk (**css**) (Fig. 3D). The crossing-point of these two sclerotizations is the “crux,” which is useful for determining the beginning and end points of the **csap** and **css** (Fig. 3D).

From the anterior portion of the metendosternite (**apm**), two distinct and narrowed furcal arms (**fa**) arise, composed of the following features: the internal tip of the furcal arm (**if**), which is generally divided into an anterior lobe (**if-a**) and a posterior lobe (**if-p**); a dorsal ridge (**if-dr**), which is slightly prominent, on the dorsal wall of these internal tips (usually on **if-p**); and a laminar expansion, the ventral lamina (**vela**), extending along the ventral face of the furcal arm. A flattened projection arising near the base of each furcal arm, the lamina (**la**), is generally present and vary in shape between taxa (Fig. 3D). The anterior tendons (**ante**) are usually thin and originate medially, close to the anterior edge of the anterior portion of the metendosternite (e.g. Fig. 3B), or close to the internal tip (**if**) (Fig. 4C). Another laminar expansion, the anterior lamina (**anla**), is observed only in a few cases (see Table S1, descriptions of *Iphiclus trifasciatus* and *Erotylus giganteus*).

The penile flagellum of Erotylidae (e.g. Figs. 3E–H) is an elongate and somewhat sclerotized structure composed of a proximal portion (**head**) (Fig. 3F, h) and a distal portion (**virga**) (Fig. 3F, v). In some cases, a membranous portion (**mp**) between the head and virga is present (Fig. 3G arrow, Fig. 3H “mp”), along with an inner membranous duct that is an inner extension of the ejaculatory duct inside the flagellum. The morphology of the head of flagellum varied greatly between the studied taxa (Table S1, Figures S1–12), but it is usually a dilated piece, wider than the virga of the penile flagellum. The posterior borders of the head of flagellum (**pbh**) can be fused (or not) medially, as well as the anterior border (**abh**) (Fig.

3H). The lateral borders of the head of flagellum (**lbh**) can be convergent, parallel, or assume other aspects (Fig. 3H). The inner outlines of the head of flagellum (arrow, Fig. 3H) can be widely or narrowed separated.

Cladistic analysis of Tritomini taxa

The heuristic search using equal weights (EW) returned 682 most parsimonious trees with 20 steps and the analysis attributing implied weights (IW) generated 734 trees. The strict consensus tree generated in the WE analysis was completely collapsed, with no Bremer support, and in the IW analysis the strict consensus tree showed a support of ‘0’ for a collapsed clade including all Tritomini with metendosternal laminae, ‘0.49’ for a collapsed clade including taxa without metendosternal laminae, and ‘0.1’ for the clade *Tritoma senegalensis tenella* + *Palaeolybas nigripennis apicalis*. Due to these low nodal supports, we prefer to use a consensus tree obtained with the parameter ‘Combinable components’ that was generated for each analysis (EW and IW). The tree obtained in the IW analysis (Fig. 6B, consistency index of 0.45 and retention index of 0.58) was selected for discussion once it suggested some clades (see Discussion below).

List of proposed characters and their states

All characters evaluated by us that may have phylogenetic value are coded with Arabic numerals and listed below. A list of problematic characters (taxonomic diagnostic features, continuous character states etc) is provided in the File S3. The character states more prone to be plesiomorphic are coded with a 0, and presumably derived character states are coded as 1, 2 up to 3 (see Material and Methods for information on character polarization). Except for cases in which the character authorship is mentioned, all remaining characters are new and described here for the first time for Erotylidae. The character matrix is provided in Table 2.

Metendosternite:

- 1** Anterior tendons (**ante**), separation: (0) narrowed separated on **apm**; (1) moderately separated on **apm**; (2) widely separated, located on furcal arms (**fa**) and close to the tip (**if**). Character state 0 was observed only in *Encaustes verticalis* (Erotylinae: Encaustini) (Fig. 4A, 1:0); character state 1 is present in most studied erotylids and in *Diplocoelus* sp. (Biphyllidae) (e.g. (Fig. 4B, 1:1); and character state 2 is present in the outgroup

Helota fulviventris and in the ingroup *Cryptophilus integer* (Cryptophilinae) (Fig. 4C, 1:2). Anterior tendons (**ante**) on anterior portion (**apm**) and narrowly to moderately separated seems to be a plesiomorphic condition in Coleoptera when compared to **ante** widely separated and on furcal arms (**fa**) (for instance, see Lawrence *et al.*, 2011, polarization of character 207). Although character 1 was not used in the phylogenetic studies of Węgrzynowicz (2002) and Leschen (2003), it was used by Leschen *et al.* (2005) (probably with the same meaning as presented here). Those authors proposed two character states, as follows: “(1) [**ante**] narrowly separated; (2) [**ante**] widely separated”. Here we proposed only a small semantic modification of this statement based on our metendosternite diagram (Fig. 3D) and following Lawrence *et al.* (2011).

- 2 Anterior tendons (**ante**), morphology: (0) thin (e.g. Fig. 4B, 2:0); (1) wide (Fig. 4D, 2:1). Although the character states 0 and 1 are categorically distinct, it was difficult to assess the morphology of **ante** in females of *Mycotretus coccineus* (Lacordaire, 1842) and the examined species of *Tritoma* Fabricius, 1775, in which **ante** are somewhat widened basally and narrowed apically. Despite of that, character state 0 is present in most studied Erotylinae, Pharaxonothinae, Loberinae, Languriinae and in the outgroups *Diplocoelus* (Biphyllidae), *Helota fulviventris* (Helotidae) and *Eurysphindus* (Sphindidae). Character state 1 was observed only in males of the following species: *Mycotretus coccineus*, *Lybasia barbata*, and *Palaeolybas nigripennis apicalis* (Erotylinae: Tritomini). It is possible that this character state is sex-dependent, however a more complete taxon sampling is required for further considerations.
- 3 Anterior portion (**apm**), presence: (0) present (e.g. Fig. 4A–B, Fig. 4E–I); (1) absent (Fig. 4C). The presence of the **apm** is a common feature of all the examined Erotylidae and occurs also in *Diplocoelus* (Biphyllidae), *Helota fulviventris* (Helotidae) and *Eurysphindus* (Sphindidae). In the present work, character state 1 was observed only in *C. integer* (Cryptophilinae) (Fig. 4C), however we have noted that the presumed reduction of the metendosternite and its parts are probably not apomorphies of *C. integer*, as it has rather occurred in unrelated lineages within Erotylidae, as recently observed in an undescribed wingless taxon of Tritomini (pers. obs. ISCP-M).
- 4 Anterior portion (**apm**), presence of an anterior process: (0) absent (e.g. Fig. 4B); (1) present (Fig. 4E, 4:1). In Coleoptera the anterior process extends forward from the bases of the frontal arms and may be short and broad to long and narrow (Lawrence *et al.* 2011). An elongate anterior process is found in a number of Archostemata, Adephaga and Scarabaeoidea, and is particularly common in Elateriformia (Lawrence *et al.* 2011).

However its presence seems to be uncommon within Erotylidae; here it is verified only in *Palaeolybas nigripennis apicalis* and *Tritoma senegalensis tenella* (Tritomini).

- 5 Anterior portion (**apm**), central sclerotization of anterior portion (**csap**), development: (0) developed (e.g. Fig. 4B); (1) undeveloped (Fig. 4F, 5:1). Character state 0 is observed in most studied erotylids and in the outgroup *Diplocoelus* (Biphyllidae), *Helota fulviventris* (Helotidae) and *Eurysphindus* (Sphindidae). Character state 1 is unique to *Dacne bipustulata* (Erotylinae: Dacnini).
- 6 Anterior portion (**apm**), laminae (**la**), presence: (0) present (e.g. Fig. 4A–B); (1) absent (e.g., Fig. 4C, 4E and 4G). Laminae are absent in *Helota fulviventris* (Helotidae) and that condition appears independently several times in Erotylidae, for instance in a group of species within Tritomini, *Iphiclus trifasciatus* and *Erotylus giganteus* (Erotylinae: Erotylini) (Fig. 4G) and *C. integer* (Cryptophilinae) (Fig. 4C). Laminae occur in *Pharaxonotha kirschii* (Fig. 4H), *Cycadophila debaonica* (Pharaxonothinae), in most other erotylids as well in the outgroups *Diplocoelus* (Biphyllidae) and *Eurysphindus* (Sphindidae). The presence/absence of laminae has been used in phylogenetic studies of higher level classification of Erotylidae and Coleoptera in general (e.g. Węgrzynowicz, 2002; Leschen, 2003; Leschen *et al.*, 2005 and Lawrence *et al.*, 2011).
- 7 Anterior portion (**apm**), laminae (**la**), morphology: (0) conspicuously elongate and strongly narrowed, sometimes almost as long as furcal arm (**fa**) and with a narrowed apical outline (Fig. 4H, 7:0); (1) plate-like (e.g. Fig. 4A–B, 4F, 4I). The laminae of *Loberus impressus* (Loberinae) are slightly elongate, with the inner contour conspicuously constricted at base, however that condition seem to grade into one state to another and we also did not consider it as a distinct character state. The character state 0 occurs in *Pharaxonotha. kirschii* and *Cycadophila debaonica* (Pharaxonothinae) (Fig. 4H), *Diplocoelus* (Biphyllidae) and *Eurysphindus* (Sphindidae). The plate-like lamina was verified here in *Languria bicolor* (Languriinae), as well in all examined Erotylinae (except for members of Tritomini and Erotylini, in which laminae are absent).
- 8 Anterior portion (**apm**), laminae (**la**), orientation: (0) horizontal (Fig. 4B, 4H); (1) vertical (Fig. 4I, 8:1). There are two distinct orientation patterns of metendosternal laminae in Erotylidae, and although some intermediate states may occur, it is usually possible to interpret these as state 0 or 1. Vertical laminae were verified in *Ischyryus quadripunctatus quadripunctatus*, *Ischyryus scriptus*, *Megischyryus* sp., *Megischyryus brasiliensis*, *Lybas thoracicus*, *Mycophthorus palpalis*, *Triplax amoena* (Erotylinae: Tritomini) and *Megalodacne fasciata* (Megalodacnini).

Penile flagellum:

- 9 Penile flagellum, presence: (0) absent (Fig. 5A); (1) present (Fig. 5L). The presence of a flagellum in the internal sac of the penis is very common within Erotylidae. The penile flagellum of *Helota* (Helotidae) is made of small sclerites (Węgrzynowicz, 2002; also verified here), however it is not known whether the penile flagellum in Erotylidae and Helotidae is homologous. In the Erotylidae, a penile flagellum occurs in Pharaxonothinae, Loberinae, Cryptophilinae, Languriinae and in most of the studied Erotylinae. The penile flagellum is absent in a five examined species of Tritomini (Erotylinae), in the outgroups *Diplocoelus* (Biphyllidae) and *Eurysphindus* (Sphindidae). The presence/absence of a penile flagellum was used as a character in the phylogenetic analyses of Erotylidae by Węgrzynowicz (2002) and Leschen (2003).
- 10 Membranous portion (**mp**) between head and virga: (0) absent (e.g. Fig. 5D); (1) present (e.g. Fig. 5B–C, 10:1). The **mp** was observed in Languriinae and Erotylinae (Erotylini and many Tritomini).
- 11 Head, with posterior borders (**pbh**) under anterior edge of virga and forming an apparent articulation with it: (0) absent (e.g. 5B, 5G); (1) present (e.g. Figs. 5D, 11:1). Character state 1 is shared by some Tritomini (*Mycotretus pygmaeus*, *M. minutus*, *M. floriger* and *Tritomapara brasiliensis*).
- 12 Head, posterior borders (**pbh**), outer edge with two parallel, narrowed, and sclerotized tips: (0) absent (e.g. Fig. 5B–D); (1) present (Fig. 5E, 12:1). Character state 1 is probably a synapomorphy of *Mycotretus jocosus* and *M. marginicollis* (Erotylinae: Tritomini).
- 13 Head, lateral borders (**lbh**), shape: (0) rounded and converging anteriorly (Fig. 5D, 13:0); (1) elongate, angulated anteriorly, and fusing (Fig. 5B–C, 13:1); (2) elongate, subparallel, angulated anteriorly, and not fusing (Fig. 5F, 13:2); (3) arched posteriorly and angulated anteriorly (Fig. 5G, 13:3). A rounded **lbh** that converges anteriorly is present, for instance, in *Triplax russica*, *Mycotretus cordiger*, *M. minutus*, *M. marginicollis*. Character states 1 occurs in *Mycotretus apicalis* and *M. melanophthalmus*, character state 2 occurs in *Tritomapara brasiliensis* and *M. floriger*, and character state 3 is shared by *Mycotretus trifasciatus* and *M. quadrioculatus*.
- 14 Head, lateral borders (**lbh**), inner contour: (0) separated (e.g. Fig. 5B–D); (1) almost contiguous (Fig. 5H, 14:1). Character state 1 is shared by *Mycotretus lesueuri* and *M. sobrinus* (Tritomini).

- 15** Head, anterior borders, “head-piece” structure: (0) absent (e.g. Fig. 5B–D); (1) present (Fig. 5I–J, 15:1). Character state 1 occurs in *Mycotretus rhodosomus*, *M. reticulatus* and *M. flavomarginatus* (Tritomini).
- 16** Head, anterior borders, outer edge with a pair of lobes: (0) absent (e.g. Fig. 5B–D); (1) present (Fig. 5K, 16:1). Character state 1 is shared by *Mycotretus fallax*, *M. ornatus*, and *M. scitulus* (Tritomini).
- 17** Virga with a median membranous portion containing a slight sinuosity: (0) absent; (1) present (Fig. 5L, 17:1). Character state 1 is shared by *Mycotretus trifasciatus* and *Mycotretus floriger* (Erotylinae: Tritomini).

Discussion

Our work shows that the morphology of the metendosternite and the penile flagellum is taxonomically important and may provide phylogenetically informative characters for Erotylidae. Below we discuss the ground pattern and evolution of these structures within the family, impacts on the current knowledge on phylogenetic relationships within Tritomini and on our final goal on understanding the evolution of the speciose genus *Mycotretus*.

The ground pattern and evolution of the metendosternite and the penile flagellum of Erotylidae

The morphology of the metendosternite is very homoplastic within Erotylidae, whereby conclusions on the polarity of characters are very limited, results similar to those of Hübler & Klass (2013) for Chrysomelidae. However, it was found that some characters described here (for instance, characters 2–5 and 7) and others used in previous phylogenetic studies are probably phylogenetically informative. As examples of such characters in previous works: character 1, used by Leschen *et al.* (2005) and Lawrence *et al.* (2011); character 6, used by Węgrzynowicz (2002), Leschen (2003), Leschen *et al.* (2005) and Lawrence *et al.* (2011).

Based on our results, we can interpret that the ground pattern for the metendosternite in Erotylidae, observable in Pharaxonothinae, Loberinae, Languriinae and most Erotylinae, is as follows: (i) internal tip (**if**) with **if-a** and **if-p** clearly separated; (ii) presence of dorsal ridge **if-dr** on **if-p**, **if-a** or both; (iii) ventral lamina (**vela**) slightly developed; (iv) anterior portion of metendosternite (**apm**) present; (v) central sclerotization of the anterior portion (**csap**) developed; (vi) anterior tendons (**ante**) thin, moderately separated and originating medially, close to the anterior edge of anterior portion (**apm**), and (vii) presence of laminae (**la**). The undeveloped **csap** (present in *Dacne*, Fig. 4E, Fig. 6A, character 4:1), the narrowed separation

of **ante** (verified in *Encaustes*, Fig. 4A, Fig. 6A, character 1:0), the absence of **apm** (verified in *C. integer*, Fig. 4C, Fig. 6A character 3:1) are unique to these taxa based on our results. The character state “**ante** widely separated and located on furcal arms (**fa**)” (Character 1:2, Fig. 4C), although present in the outgroup *Helota*, was observed only in *C. integer* in Erotylidae. The conspicuously elongate and strongly narrowed lamina (**la**), similar to that of *Eurysphindus* sp. (Sphindidae) and *Diplocoelus* (Biphyllidae), was observed only in *Pharaxonotha* and *Cycadophila* (Pharaxonothinae) in Erotylidae.

The undeveloped **csap**, unique to *Dacne*, supports the hypothesis of Węgrzynowicz (2002) in which Dacnini appears separated of the remaining Erotylinae (Fig. 6A) and, Leschen (2003), in which Dacnini is the sister clade of the remaining Erotylinae. The character state anterior tendons (**ante**) “more or less approximate” already used by Lawrence *et al.* (2011) for Coleoptera, was verified only in *Encaustes* and corroborates the monophyly of Encaustini (Węgrzynowicz, 2002; Leschen, 2003). The absence of **apm**, verified in *C. integer*, may be related with its wing venation reduction (see Węgrzynowicz, 2002), once reduction of metendosternite occurs in functionally (wings rudimental) or entirely wingless species (Węgrzynowicz, 2002). The condition “**ante** widely separated and located on furcal arms (**fa**)” (character 1:2) is present in Helotidae and *Cryptophilus* (Erotylidae: Cryptophilinae). It is known that Helotidae retains a number of plesiomorphies for Cucujiformia (Robertson *et al.* 2015), which suggests that character 1:2 may be a reversion to a previous character state.

A conspicuously elongate and strongly narrowed lamina (**la**) is shared by *Pharaxonotha* and *Cycadophila* (Pharaxonothinae) (character 7:0, Fig. 4H), and occurs in the outgroups *Diplocoelus* (Biphyllidae) and *Eurysphindus* (Sphindidae). We did not observe that condition in the remaining examined Erotylidae, and possibly it is an apomorphy of Pharaxonothinae. On the other hand, a plate-like lamina appears as a condition shared by many taxa of Erotylinae, Loberinae and Langurinae (e.g. Figures 4A–B, 4F, S1D, S1J, S4K, S5A) being probably an apomorphy of the clade comprising these subfamilies (Fig. 6A, character 7:1). Although the character “presence/absence” of laminae has been used in phylogenetic studies of Erotylidae and other Cucujoidea families (Węgrzynowicz, 2002; Leschen, 2003; Leschen *et al.*, 2005), to our knowledge the present study is the first to suggest the use of the morphology of laminae as a character in Erotylidae. We note that Leschen (2003) coded laminae as polymorphic in Dacnini, Tritomini and some taxa of Languriinae, however the morphology of laminae of Pharaxonothinae described here is categorically distinct of that verified in the other studied Erotylidae. Within Coleoptera, the morphology of laminae was already used in the broad phylogenetic study of Lawrence *et al.* (2011). Therefore, we suggest

the inclusion of this character in forthcoming phylogenetic works on higher-level classification of Erotylidae.

The absence of metendosternal laminae (character 6:1) occurs in various erotyloid species, as previously observed by authors (Węgrzynowicz, 2002; Leschen, 2003). For instance, laminae is lost at least in some species of Tritomini, Erotylini (Erotylinae) and also in *Cryptophilus* (Cryptophilinae), and this condition probably belongs to the ground pattern of Erotylini (Fig. 6A). Aside from that, absence of laminae is shared by species pertaining to a clade within Tritomini (see Discussion below). Laminae are almost entirely restricted to Cucujiformia (Lawrence *et al.*, 2011), and as pointed out by Węgrzynowicz (2002) in Erotylidae laminae reduction is not directly related to loss of flight ability, frequently occurring in the examined beetles and apparently correlated with other characters.

A usually elongate penile flagellum, somewhat sclerotized and composed of a proximal portion (**head**) and a distal portion (**virga**), is arguably a ground pattern of Erotylidae (e.g. Figures 3F–H, 5L, S2F, S2B, S9E). However, the high morphological variation of the penile flagellum in the studied taxa (e.g. Figures S7K, S9E, S12T) makes this structure useless in testing monophyly of suprageneric taxa, because homologies of this structure are hardly identified in these rankings. The observed variation of the penile flagellum in Erotylidae may be a consequence of sexual selection. Due to the composed nature of the insect male genitalia, it is expected that its morphological components evolve both slowly and rapidly, due to the direct or indirect effect of sexual selection (Song & Bucheli, 2010; Krogmann & Song, 2013). Fast evolving characters are suited for phylogenetic analyses considering short periods of time, for example, for the comparison of populations or sister species. However, such characters also get noisy rapidly and do not carry any phylogenetic information after longer periods of time (Wägele, 2005). In this context, the study of the penile flagellum of Erotylidae is most appropriate for testing monophyly of generic and infrageneric taxa, as discussed below for *Mycotretus*.

Phylogenetic relationships within Tritomini

Tritomini is an unnatural tribe based on morphological and molecular evidence (Węgrzynowicz, 2002; Robertson *et al.*, 2004). In the present study two groups of genera were categorically separated based on the presence or absence of metendosternal laminae (character 6:0 and 6:1, respectively). In the analysis of Węgrzynowicz (2002), based on 85 morphological characters, the absence of laminae (“character 54:1” of Węgrzynowicz, 2002)

was a ground pattern feature of the clade “*Tritoma* + (*Amblyscelis* (*Amblyopus* + *Zythonia*))” (Fig. 6A, framed) and the remaining Tritomini (except for “*Lybas*”) have metendosternal laminae. The genera *Amblyscelis* and *Zythonia* were not examined by us, although *Tritoma*, *Amblyopus* and five other genera (without laminae), absent in the study of Węgrzynowicz (2002), were included here (Fig. 6B, arrow showing the clade). This finding suggest that the character “presence or absence of laminae” may have phylogenetic signal and its congruence with other characters (for instance, the character “clypeus anteriorly bordered” (Węgrzynowicz, 2002), which may be a synapomorphy of *Triplacidea*, *Tritoma*, *Amblyscelis*, *Amblyopus* and *Zythonia*) shall be evaluated in order to reconstruct the phylogenetic history of taxa currently included in Tritomini.

Among those genera without metendosternal laminae, *Tritoma* (type genus of Tritomini) was not recovered as monophyletic in the molecular study of Robertson *et al.* (2004). These authors suggested that a taxonomic hypothesis proposed by Boyle (1956), that two species-groups exist within *Tritoma*, is correct and that these groups should be recognized as independent genera. We noted there is a group of *Tritoma* in which species lack the penile flagellum (e.g. *T. bipustulata* and *T. sanguinipennis*) and another in which species have a penile flagellum (e.g., *Tritoma pulchra* Say, 1826 according to description provided by Boyle (1956)). It is worth mentioning that Boyle described the aedeagus of *T. pulchra* as “distinctly aberrant in this form and has much in common with that of *Triplax* species.”. In the phylogeny of Robertson *et al.* (2004), *T. pulchra* was grouped with *Mycotretus* (“*Mycotretus* sp.1”), whereas the other two *Tritoma* examined by them formed a distinct clade (“*Tritoma erythrocephala* Lacordaire, 1842 + *T. unicolor* Say, 1826”). Here we find another important evidence of the non-monophyly of *Tritoma* that is the presence of an anterior process on **apm** shared by *Palaeolybas nigripennis apicalis* and *Tritoma senegalensis tenella* (Fig. 4E and 6B, character 4:1). That is probably a synapomorphy of these African species, not observed in the remaining studied erotylids.

The characters “wide **ante**” (character 2:1) and “vertical laminae” (character 8:1) appear as homoplasies in the present study. As far as we know, a wide **ante** (Fig. 4D) has not been described to Erotylidae and all examples of metendosternite, illustrated in the literature, have a thin **ante** (e.g. Crowson, 1938; McHugh *et al.*, 1997; Franz & Skelley, 2008; Pecci-Maddalena & Lopes-Andrade, 2017). A wide **ante** was described by Hübler & Klass (2013) for Chrysomelidae, showing it possibly had independent origins within Cucujiformia, but it may be also an apomorphy of subgroups of lower rank within Erotylidae and other families of Coleoptera. That uncommon feature of the metendosternite is present in *Mycotretus coccineus*, a species with metendosternal laminae and an uncommon rounded body (Fig. 1E),

rarely observed in other species of this genus (e.g. *Mycotretus peruvianus* (Kirsch, 1876), see Skelley & Powell, 2018). A wide **ante** also occurs in *Lybasia barbata* and *Palaeolybas nigripennis apicalis*, two taxa without metendosternal laminae (Fig. 6B, arrow showing the clade). Further studies shall evaluate whether the character state “wide **ante**” is a homoplasy as suggested in our analysis (Fig. 6B. character 2:1) or a synapomorphy of a clade comprising the aforementioned Tritomini species. *Mycotretus coccineus* (and its relatives, for instance *M. fuscitarsis*, Fig. 1F and *M. peruvianus*) would better be placed in a separate genus.

The character “vertical laminae” (character 8:1) appears to be a homoplasy occurring in *Megalodacne* (Megalodacnini) and a group of species within Tritomini. Although the tree generated in our analysis was entire collapsed concerning the genera with the presence of metendosternal laminae (Fig. 6B), in the analysis of Węgrzynowicz (2002) some of these genera (*Lybas*, *Megischyryus* and *Ischyryus*) form a clade (Fig. 6A). These genera have vertical laminae, suggesting this character may be phylogenetically informative.

Towards a phylogeny of *Mycotretus*

Mycotretus (sensu lato) is a large conglomerate of species, and possibly comprises several definable clades (Skelley & Powell, 2018). As discussed above, the inclusion of *M. coccineus* and its relatives within *Mycotretus* is questionable due the presence of a wide **ante**. Aside from that, in the present work at least seven possible clades of *Mycotretus* were grouped based on the morphology of penile flagellum (Figs. 5 and 6B). These clades, although barely sustained by few apomorphies, are as follows:

(1) *Mycotretus trifasciatus* + *M. quadrioculatus* (character 13:3; Fig. 5G, Fig. 6B) “head arched posteriorly and angulated anteriorly”. It is worth to note that another homoplastic feature in our analysis (character 17:1, “virga with a median membranous portion containing a slight sinuosity”, Figs. 5L and 6B) verified in *M. trifasciatus* and *M. floriger* may be, actually, an apomorphy of these taxa. The latter feature was already observed by us in other studied *Mycotretus*, for instance *M. chilensis* (Crotch, 1876) (Pecci-Maddalena & Lopes-Andrade, 2017) and *M. episcaphoides* Crotch, 1876 (Pecci-Maddalena *et al.*, 2019b). The addition of other characters may reveal whether the states of both characters (13:3 and 17:1) are apomorphies or, on the other hand, one of them is a homoplasy.

(2) *Mycotretus lesueuri* + *M. sobrinus* (character 14:1; Fig. 5H, Fig. 6B) “inner contour of lateral borders of flagellum head almost contiguous”. That feature was already observed by us in other studied *Mycotretus*, for instance *M. tigrinus* (Olivier, 1791), *M. prioteloides* Mader, 1942 (Pecci-Maddalena & Lopes-Andrade, 2018a), *M. sallei* Crotch, 1876, *M.*

spadiceus Gorham, 1888 and *M. bipunctatus* Gorham, 1888 (Pecci-Maddalena *et al.*, 2019b). Except for *M. bipunctatus*, which has a somewhat widened body, the remaining species have an elongate body and are slightly oval. Once *M. lesueuri* is the type species of *Mycotretus*, its morphology and that of its relatives may be regarded as typical.

(3) *Mycotretus jocosus* + *M. marginicollis* (character 12:1; Fig. 5E, Fig. 6B) “outer edge of posterior borders of flagellum head with two parallel, narrowed, and sclerotized tips”. The flagellum of these species is similar to that of other *Mycotretus* species, as *M. pebasensis* Crotch, 1876, *M. separandus* Crotch, 1876 and *M. egae* Crotch, 1876 (Pecci-Maddalena *et al.*, 2019b), although it is not clear to us if “character 12:1”, as described here, is also present on those species.

(4) *Mycotretus floriger* + *Tritomapara brasiliensis* (character 13:2; Fig. 5F, Fig. 6B) “head elongate, subparallel, angulated anteriorly, and not fusing”. See comments above about clade “(1)”. The reliability of clade “(4)” is controversial once species of *Tritomapara* are usually black and small, while *M. floriger* is comparatively larger, elongate, and its color pattern resembles more that of some *Mycotretus*.

(5) *Mycotretus apicalis* + *M. melanophthalmus* (character 13:1; Fig. 5B–C, Fig. 6B) “elongate, angulated anteriorly, and fusing”. The penile flagellum of both species is very similar, indicating they are probably phylogenetically closely related.

(6) *Mycotretus rhodosomus* + *M. reticulatus* + *M. flavomarginatus* (character 15:1; Fig. 5I–J, Fig. 6B) “anterior borders of flagellum head with a ‘head-piece’ structure”. That feature was already observed by us in other *Mycotretus*, as *M. pecari* Lacordaire, 1842, *M. psittacus* Lacordaire, 1842 and *M. tricolor* Lacordaire, 1842 (Pecci-Maddalena *et al.*, 2019b). All these species are larger than other *Mycotretus* and the larger males have arched metatibiae.

(7) *Mycotretus scitulus* + *M. ornatus* + *M. fallax* (character 16:1 Fig. 5K, Fig. 6B) “outer edge of the anterior borders of head with a pair of lobes”. That feature was already observed by us in other *Mycotretus*, as *M. expressus* Kuhnt, 1910, *M. dorsonotatus* Lacordaire and *M. fasciolatus* Lacordaire (Pecci-Maddalena *et al.*, 2019b).

Conclusion

Seven morphological characters of metendosternite seem to add information to the internal relationships of Erotylidae: the presence and absence of laminae, the morphology of laminae, the vertical or horizontal orientation of laminae, the morphology of anterior tendons, the presence of an anterior process on anterior portion of metendosternite, the development of the central sclerotization of anterior portion of metendosternite, and the more or less

approximation of anterior tendons. Within Tritomini, there is evidence of phylogenetic signal for “presence and absence” of metendosternal laminae. On the other hand, the penile flagellum may be more informative for generic and infrageneric levels of classification. The presence and absence of the penile flagellum and morphological elements of its “head” seem to have phylogenetic signal for closely related species, and at least seven probable clades of *Mycotretus* were recovered based on this structure. Future studies integrating characters of the metendosternite and penile flagellum with other character sets, in order to conduct a formal phylogenetic analysis of Tritomini, will shed light on this issue.

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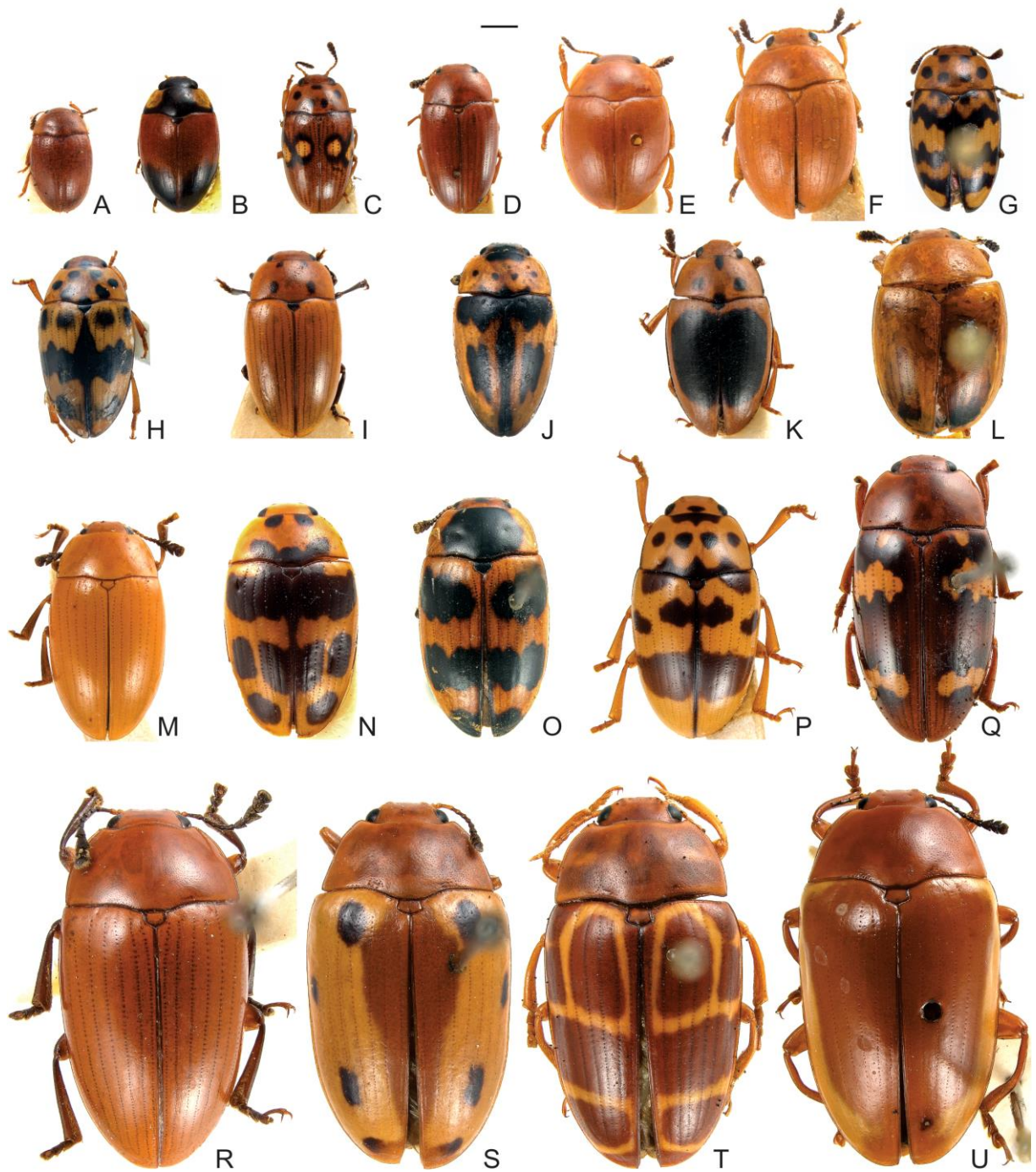


Figure 1. Species of *Mycotretus* examined. (A) *M. cribratus*; (B) *M. apicalis*; (C) *M. quadrioculatus*; (D) *M. pygmaeus*; (E) *M. coccineus*; (F) *M. fuscitarsis*; (G) *M. trifasciatus*; (H) *M. scitulus* (I) *M. minutus*; (J) *M. fallax*; (K) *M. cordiger*; (L) *M. melanophthalmus*; (M) *M. lesueuri*; (N) *M. jocosus*; (O) *M. marginicollis*; (P) *M. ornatus*; (Q) *M. floriger*; (R) *M. sobrinus*; (S) *M. rhodosomus*; (T) *M. reticulatus*; (U) *M. flavomarginatus*. Scale bar: A–U = 1.5 mm.



Figure 2. Other Erotylidae examined: (A) *Loberus impressus*; (B) *Cryptophilus integer*; (C) *Pharaxonotha kirschii*; (D) *Languria bicolor*. E–N (Tritomini part): (E) *Tritomapara brasiliensis*; (F) *Tritoma bipustulata*; (G) *Tritoma senegalensis tenella*; (H) *Tritoma sanguinipennis*; (I) *Myceporthus* sp; (J) *Lybas thoracicus*; (K) *Triplax russica*; (L) *Ischyrys quadripunctatus quadripunctatus*; (M) *Megischyrys brasiliensis*; (N) *Pselaphacus nigropunctatus*; (O) *Dacne bipustulata*; (P) *Megalodacne fasciata*; (Q) *Iphiclus trifasciatus*; (R) *Erotylus giganteus*; (S) *Encaustes verticalis*. Scale bar: A–S = 2 mm.

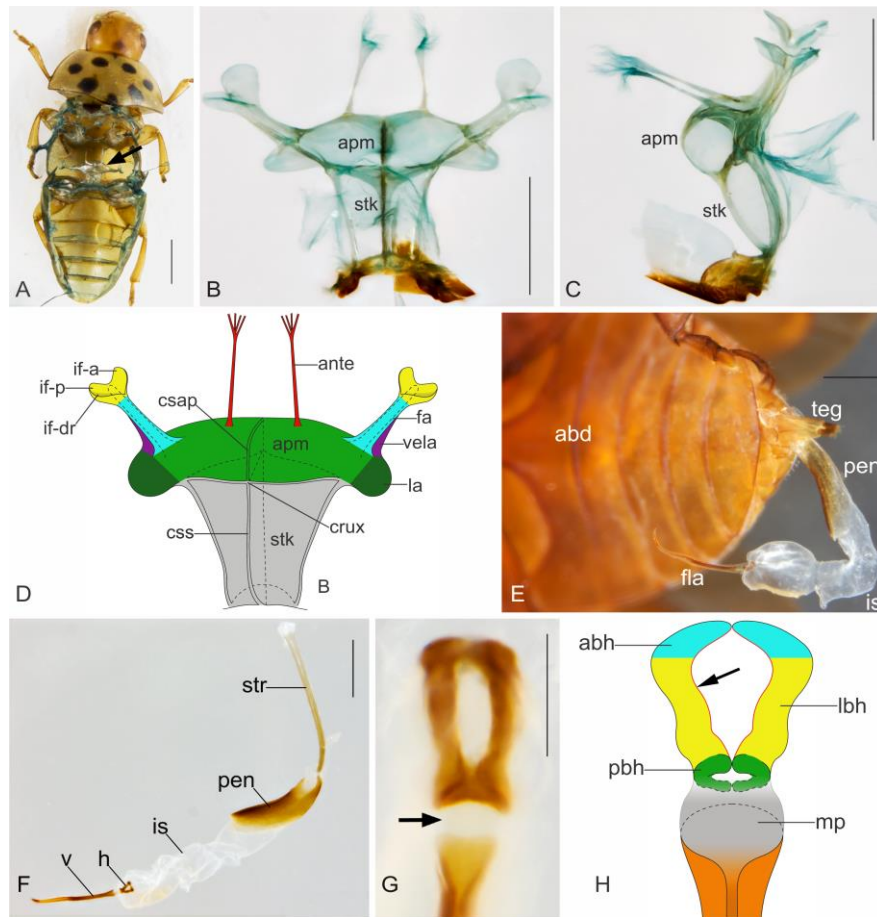


Figure 3. The metendosternite and the flagellum in Erotylidae. (A) Arrow showing the metendosternite of *Mycotretus scitulus* (Erotylinae: Tritomini). (B–C) Dorsal and lateral view of the metendosternite of *M. scitulus*, respectively: apm, anterior portion of metendosternite; stk, stalk of metendosternite. (D) Diagram of metendosternite: ante, anterior tendons (red); apm, anterior portion of metendosternite (green); csap, central sclerotization of the anterior portion; css, central sclerotization of the stalk; fa, furcal arms (blue); if-a, anterior lobe of the internal tip (if) (yellow); if-dr, dorsal ridge of the internal tip (if); if-p, posterior lobe of the internal tip (if) (yellow); la, laminae (dark green); stk, stalk (grey); vela, ventral lamina (purple). (E) An everted internal sac of *Mycotretus melanophthalmus* (Tritomini): abd, abdomen; fla, flagellum; is, internal sac; pen, penis; teg, tegmen. (F) Detail of the genitalia of *M. melanophthalmus*: h, head; v, virga; is, internal sac; pen, penis; str, penile struts. (G) The flagellum head of *Mycotretus apicalis* (Tritomini), arrow showing membranous portion (mp). (H) Diagram of the flagellum head: abh, anterior border of head (blue); lbh, lateral borders of head (yellow); mp, membranous portion between head and virga (grey); pbh, posterior borders of head (green); arrow, inner outline of the head. Scale bars: A = 1 mm, B–C = 0.5 mm, E–F = 0.5 mm, G = 0.1 mm.

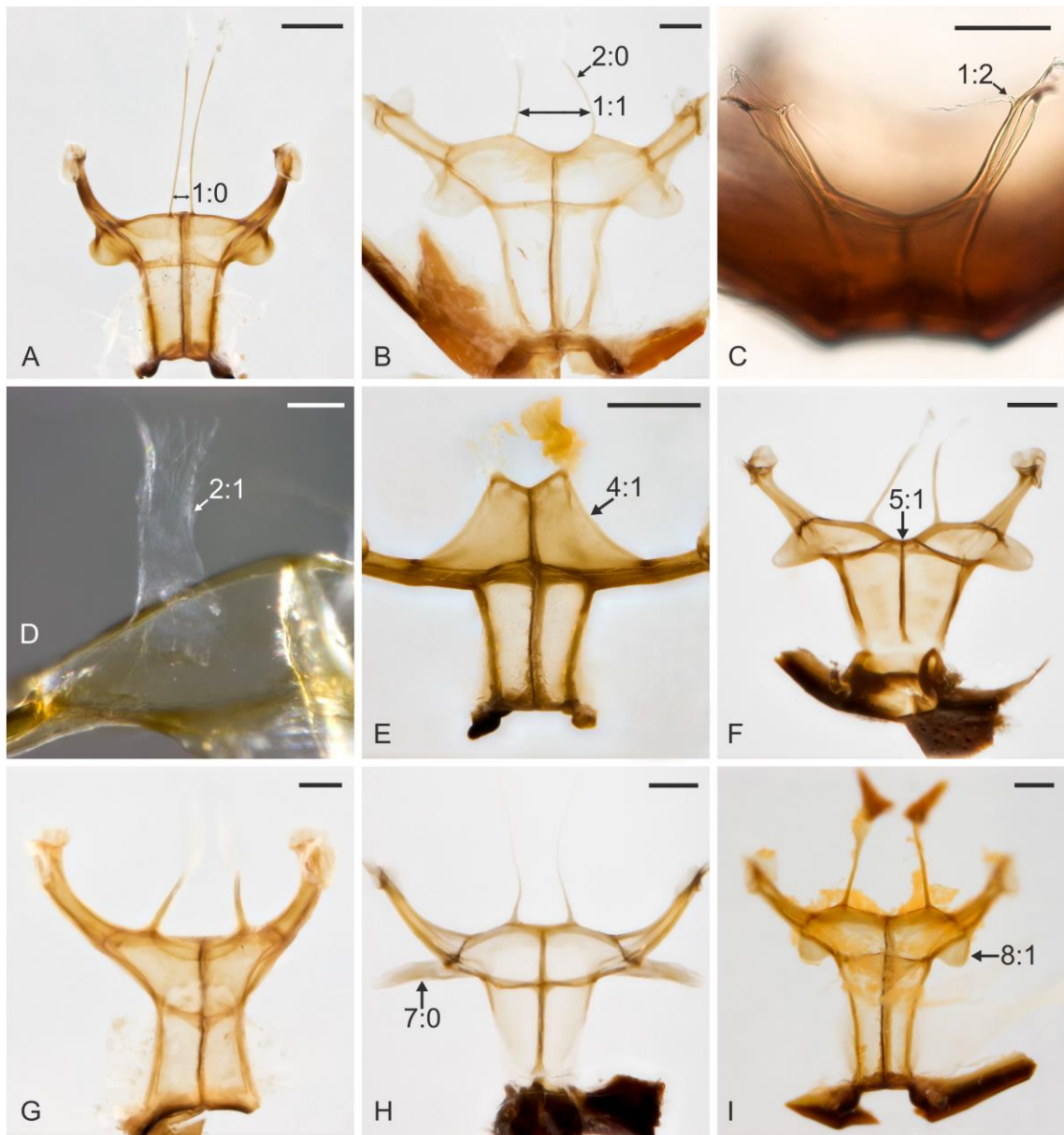


Figure 4. (A–I) Characters and character states of the metendosternite (see text for a definition of each character statement). (A) *Encaustes verticalis* (Erotylinae: Encaustini); (B) *Mycotretus quadrioculatus* (Erotylinae: Tritomini); (C) *Cryptophilus integer* (Cryptophilinae); (D) *Mycotretus coccineus* (Erotylinae: Tritomini); (E) *Palaeolybas nigripennis apicalis*; (F) *Dacne bipustulata* (Erotylinae: Dacnini); (G) *Erotylus giganteus* (Erotylinae: Erotylini); (H) *Pharaxonotha kirschii* (Pharaxonothinae); (I) *Ischyryus scriptus* (Erotylinae: Tritomini). Scale bars: A = 1 mm; B–D, F–H = 0.1 mm; E–G = 0.5 mm; I = 0.2.

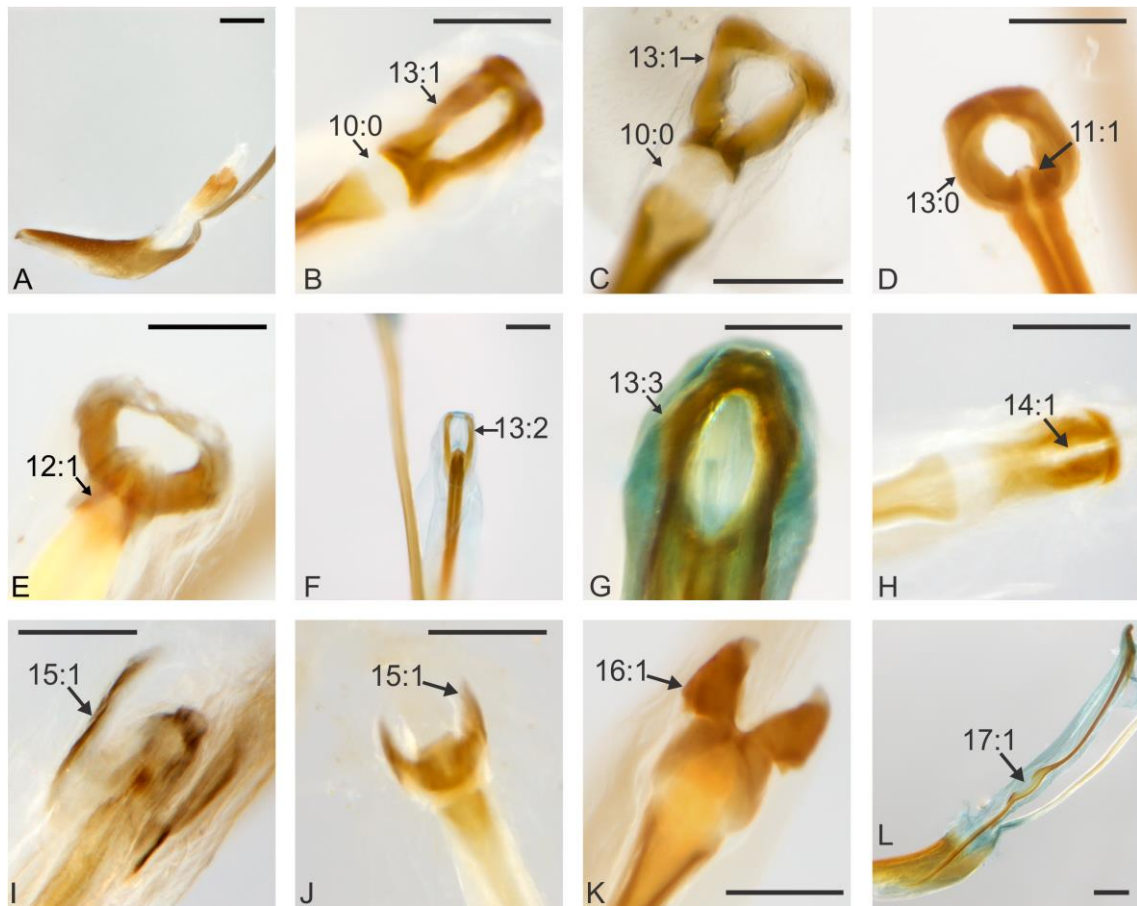


Figure 5. (A–L) Characters and character states of the penile flagellum (see text for a definition of each character statement). (A) *Tritoma bipustulata* (Erotylinae: Tritomini); (B) *Mycotretus apicalis* (Erotylinae: Tritomini); (C) *Mycotretus melanophthalmus* (Erotylinae: Tritomini); (D) *Mycotretus pygameus* (Erotylinae: Tritomini); (E) *Mycotretus marginicollis* (Erotylinae: Tritomini); (F) *Tritomapara brasiliensis* (Erotylinae: Tritomini); (G) *Mycotretus trifasciatus* (Erotylinae: Tritomini); (H) *Mycotretus lesueuri* (Erotylinae: Tritomini); (I) *Mycotretus flavomarginatus* (Erotylinae: Tritomini); (J) *Mycotretus reticulatus* (Erotylinae: Tritomini); (K) *Mycotretus fallax* (Erotylinae: Tritomini); (L) *Mycotretus trifasciatus* (Erotylinae: Tritomini). Scale bars: A, L = 0.2 mm; B–K = 0.1 mm.

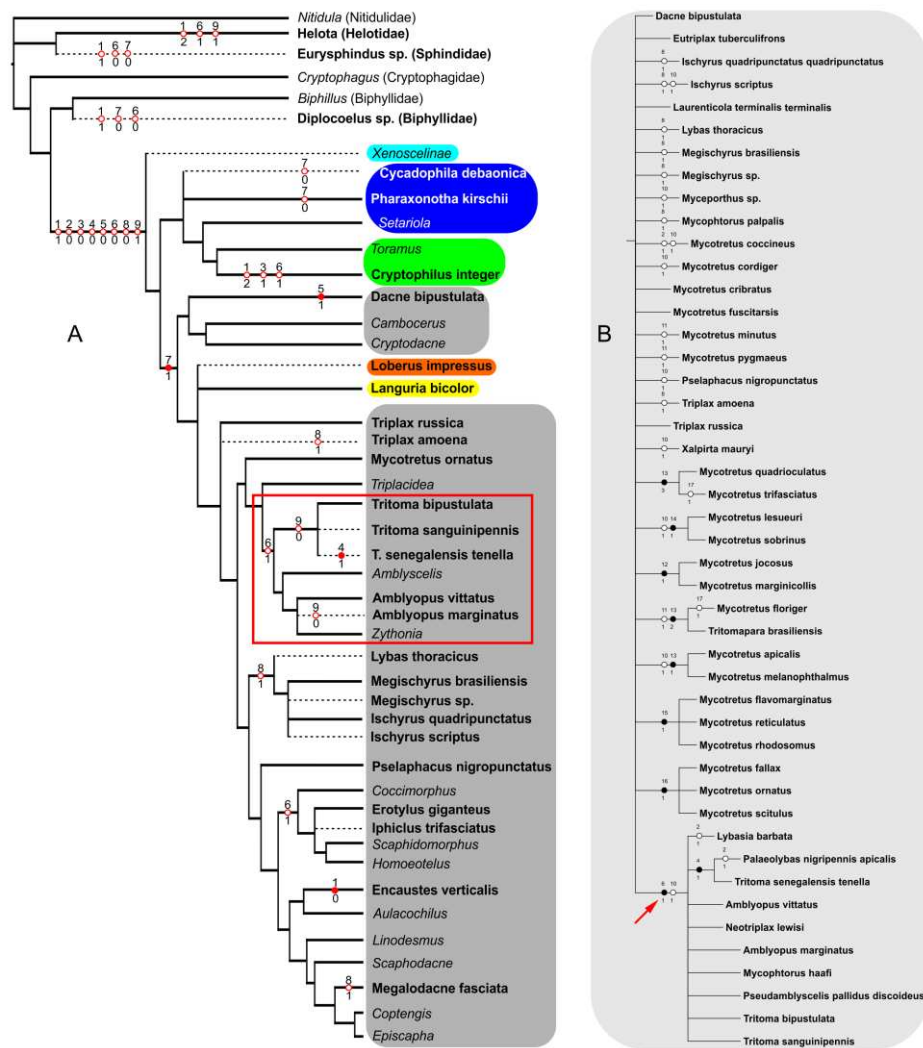


Figure 6. (A) Erotylidae phylogeny by Węgrzynowicz (2002) modified and updated from Leschen (2003) and Robertson *et al* (2015). Frame showing the Tritomini clade without metendosternal laminae. Broken lines indicate species added herein. Taxa presented in italics were not examined in this study and those genera presented in bold were examined by us and Węgrzynowicz (2002). Light blue: Xenoscelinae. Dark blue: Pharaxonothisinae. Green: Cryptophilinae. Dark grey: Erotylinae. Orange: Loberinae. Yellow: Languriinae. Red circles indicate potential apomorphies or synapomorphies and open circle indicate potential homoplasies. (B) Consensus tree derived from the parsimony analysis with implied weights showing the phylogenetic relationships of Tritomini based only on metendosternite and penile flagellum characters. Absence of metendosternal laminae (character 6:1) appears as an apomorphy of the clade indicated by red arrow. Numbers above the circle indicate the character and under the circle the character state.

Table 1. List of studied taxa with systematic assignment. N, number of studied specimens; F, female; M, male. **Information on *Eurysphindus* sp. is based on the literature.

Systematic assignment		Species	N	Sex	Provenance
Erotylidae					
Erotylinae	Tritomini	<i>Amblyopus marginatus</i> (Quedenfeldt, 1888)	1	M	Kapanga (Democratic Republic of the Congo)
		<i>Amblyopus vittatus</i> (Olivier, 1807)	1	F	Tonkin (Vietnam)
		<i>Eutriplax tuberculifrons</i> (Lewis, 1887)	1	M	Nagano (Japan)
		<i>Ischyryus quadripunctatus quadripunctatus</i> (Olivier, 1792)	1	F	Chontales (Nicaragua)
		<i>Ischyryus scriptus</i> (Olivier, 1807)	1	M	Minas Gerais (Brazil)
		<i>Laurenticola terminalisternalis</i> (Farmaire, 1898)	1	F	Diana (Madagascar)
		<i>Lybas thoracicus</i> (Olivier, 1807)	1	F	Pará (Brazil)
		<i>Lybasia barbata</i> Delkeskamp, 1965	1	M	Tanganyika (Democratic Republic of the Congo)
		<i>Megischyryus brasiliensis</i> Lacordaire, 1842	1	F	Rio de Janeiro, Minas Gerais (Brazil)
		<i>Megischyryus</i> sp.	1	F	Mato Grosso (Brazil)
		<i>Myceporthus</i> sp.	1	M	Amazonas (Brazil)
		<i>Mycophthorus haafi</i> (Delkeskamp, 1965)	1	M	Kapanga (Democratic Republic of the Congo)
		<i>Mycophthorus palpalis</i> (Delkeskamp, 1965)	1	F	Sandoa (Democratic Republic of the Congo)
		<i>Mycotretus apicalis</i> Lacordaire, 1842	2	1M, 1F	Rio de Janeiro, São Paulo (Brazil)
		<i>Mycotretus coccineus</i> Lacordaire, 1842	5	2M, 3F	Chiriqui (Panama); Amazonas, Santa Catarina (Brazil)
		<i>Mycotretus cordiger</i> Crotch, 1876	2	M	Rondônia (Brazil)
		<i>Mycotretus cribratus</i> Gorham, 1888	1	F	Bugaba (Panama)
		<i>Mycotretus fallax</i> (Guérin-Méneville, 1841)	2	1M, 1F	São Paulo, Minas Gerais (Brazil)
		<i>Mycotretus flavomarginatus</i> Lacordaire, 1842	2	2M, 2F	São Paulo, Minas Gerais, Espírito Santo (Brazil)
		<i>Mycotretus floriger</i> Lacordaire, 1842	2	1M, 1F	Amapá, Mato Grosso (Brazil)
		<i>Mycotretus fuscitarsis</i> Lacordaire, 1842	1	F	Cerro de Plumas (Mexico)
		<i>Mycotretus jocosus</i> Lacordaire, 1842	2	1M, 1F	Rio de Janeiro (Brazil)

Systematic assignment	Species	N	Sex	Provenance
	<i>Mycotretus lesueuri</i> (Chevrolat, 1835)	2	1M, 1F	Ahuachapán (El Salvador); Veracruz (Mexico)
	<i>Mycotretus marginicollis</i> Lacordaire, 1842	2	1M, 1F	Santa Catarina, Rio Grande do Sul (Brazil)
	<i>Mycotretus melanophthalmus</i> (Duponchel, 1825)	4	3M, 1F	Rio Grande do Sul (Brazil); Chapare (Bolivia); Tucuman (Argentina)
	<i>Mycotretus minutus</i> (Duponchel, 1825)	2	1M, 1F	Santa Catarina, Rio Grande do Sul (Brazil)
	<i>Mycotretus ornatus</i> (Duponchel, 1825)	2	M	Rio de Janeiro, Rio Grande do Sul (Brazil)
	<i>Mycotretus pygmaeus</i> Lacordaire, 1842	2	1M, 1F	Mato Grosso, Amapá (Brazil)
	<i>Mycotretus quadrioculatus</i> Alvarenga, 1983	2	1M, 1F	Pará (Brazil)
	<i>Mycotretus reticulatus</i> Crotch, 1876	2	M	Acre (Brazil)
	<i>Mycotretus rhodosomus</i> Lacordaire, 1842	2	1M, 1F	Rio de Janeiro (Brazil)
	<i>Mycotretus scitulus</i> Lacordaire, 1842	2	1M, 1F	Minas Gerais (Brazil)
	<i>Mycotretus sobrinus</i> (Guérin-Ménéville, 1841)	2	1M, 1F	Rio de Janeiro, Minas Gerais (Brazil)
	<i>Mycotretus trifasciatus</i> Guérin, 1956	3	2M, 1F	Minas Gerais, Rio Grande do Sul (Brazil)
	<i>Neotriplax lewisi</i> (Crotch, 1873)	1	F	Yamanashi (Japan)
	<i>Palaeolybas nigripennis apicalis</i> Arrow, 1917	1	M	Eala (Democratic Republic of the Congo)
	<i>Pselaphacus nigropunctatus</i> Percheron, 1835	1	M	Mato Grosso (Brazil)
	<i>Pseudamblyscelis pallidus discoideus</i> Philipp, 1959	1	M	Moto (Democratic Republic of the Congo)
	<i>Triplax amoena</i> Solsky, 1871	1	M	Oze (Japan)
	<i>Triplax russica</i> (Linnaeus, 1758)	2	1M, 1F	Tisvilde (Denmark); Sveti Rok (Croatia)
	<i>Tritoma bipustulata</i> Fabricius, 1775	2	M	Austria
	<i>Tritoma sanguinipennis</i> (Say, 1825)	2	1M, 1F	Washington, Indiana (United States of America)
	<i>Tritoma senegalensis tenella</i> Delkeskamp, 1962	1	F	Mayumbe (Congo)
	<i>Tritomapara brasiliensis</i> (Guérin, 1946)	1	M	Minas Gerais (Brazil)
	<i>Xalpirta mauryi</i> Pecci-Maddalena <i>et al.</i> 2019	1	M	Rio de Janeiro (Brazil)
Dacnini	<i>Dacne bipustulata</i> (Thunberg, 1781)	3	2M,	"Sweden or Germany?" [doubtful record]

Systematic assignment		Species	N	Sex	Provenance
	Megalodacnini	<i>Megalodacne fasciata</i> (Fabricius, 1777)	2	1F	Georgia, Delaware (United States of America)
	Erotyliini	<i>Erotylus giganteus</i> (Linnaeus, 1758)	2	1M, 1F	Amapá, Pará (Brazil)
	Encaustini	<i>Iphiclus trifasciatus</i> (Olivier, 1807)	1	F	Minas Gerais (Brazil)
	Encaustini	<i>Encaustes verticalis</i> Macleay, 1825	1	M	Sabah (Malaysia)
Cryptophilinae	Cryptophilini	<i>Cryptophilus integer</i> (Heer, 1841)	2	1M, 1F	Oklahoma (United States of America)
Loberinae		<i>Loberus impressus</i> LeConte, 1861	2	1M, 1F	Oklahoma (United States of America)
Pharaxonothisinae		<i>Pharaxonotha kirschii</i> Heer, 1875	2	M	Texas (United States of America)
		<i>Cycadophila debaonica</i> Xu <i>et al.</i> 2015	1	F	Guangxi (China)
Languriinae	Languriini	<i>Languria bicolor</i> Fabricius, 1789	2	M	Oklahoma (United States of America)
Biphyllidae		<i>Diplocoelus</i> sp.	2	1M, 1F	Minas Gerais (Brazil)
Helotidae		<i>Helota fulviventris</i> Kolbe, 1886	1	M	St. Petersburg (Russia)
Sphindidae		<i>Genisphindus roxanneae</i> McHugh, 1993	**	**	**McHugh (1993)

Table 2. Matrix of character and character states from metendosternite and flagellum in the studied taxa. “?” refers to character not applicable; “*” refers to those taxa represented only by females.

Taxa	Characters																
	Metendosternite								Penile flagellum								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Amblyopus marginatus</i>	1	0	0	0	0	1	-	-	0	-	-	-	-	-	-	-	-
<i>Amblyopus vittatus</i>	1	0	0	0	0	1	-	-	?	?	?	?	?	?	?	?	?
<i>Eutriplax tuberculifrons</i>	1	0	0	0	0	0	1	0	1	?	?	?	?	?	?	?	0
<i>Ischyryus quadripunctatus quadripunctatus</i>	1	0	0	0	0	0	1	1	?	?	?	?	?	?	?	?	?
<i>Ischyryus scriptus</i>	1	0	0	0	0	0	1	1	1	1	0	-	-	-	0	0	0
<i>Laurenticola terminalis terminalis</i>	1	0	0	0	0	0	1	0	?	?	?	?	?	?	?	?	?
<i>Lybas thoracicus</i>	1	0	0	0	0	0	1	1	?	?	?	?	?	?	?	?	?
<i>Lybasia barbata</i>	1	1	0	0	0	1	-	-	1	1	0	-	-	-	0	0	0
<i>Megischyryus brasiliensis</i>	1	0	0	0	0	0	1	1	?	?	?	?	?	?	?	?	?
<i>Megischyryus sp.</i>	1	0	0	0	0	0	1	1	?	?	?	?	?	?	?	?	?
<i>Myceporthus sp.</i>	1	0	0	0	0	0	1	0	1	1	0	-	-	-	0	0	0
<i>Mycophtorus haafi</i>	1	0	0	0	0	1	-	-	0	-	-	-	-	-	-	-	-
<i>Mycophtorus palpalis</i>	1	0	0	0	0	0	1	1	?	?	?	?	?	?	?	?	?
<i>Mycotretus apicalis</i>	1	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0
<i>Mycotretus coccineus</i>	1	1	0	0	0	0	1	0	1	1	0	0	-	0	0	0	0
<i>Mycotretus cordiger</i>	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0
<i>Mycotretus cribratus</i>	1	0	0	0	0	0	1	0	?	?	?	?	?	?	?	?	?
<i>Mycotretus fallax</i>	1	0	0	0	0	0	1	0	1	0	0	0	-	-	0	1	0
<i>Mycotretus flavomarginatus</i>	1	0	0	0	0	0	1	0	1	0	0	0	-	-	1	0	0
<i>Mycotretus floriger</i>	1	0	0	0	0	0	1	0	1	0	1	0	2	0	0	0	1
<i>Mycotretus fuscitarsis</i>	1	0	0	0	0	0	1	0	?	?	?	?	?	?	?	?	?
<i>Mycotretus jocosus</i>	1	0	0	0	0	0	1	0	1	-	0	1	-	0	0	0	0
<i>Mycotretus lesueuri</i>	1	0	0	0	0	0	1	0	1	1	0	0	-	1	0	0	0

Taxa	Characters																
	Metendosternite								Penile flagellum								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Mycotretus marginicollis</i>	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0
<i>Mycotretus melanophthalmus</i>	1	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0
<i>Mycotretus minutus</i>	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0
<i>Mycotretus ornatus</i>	1	0	0	0	0	0	1	0	1	0	0	0	-	-	0	1	0
<i>Mycotretus pygmaeus</i>	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0
<i>Mycotretus quadrioculatus</i>	1	0	0	0	0	0	1	0	1	0	0	0	3	0	0	0	0
<i>Mycotretus reticulatus</i>	1	0	0	0	0	0	1	0	1	0	0	0	-	-	1	0	0
<i>Mycotretus rhodosomus</i>	1	0	0	0	0	0	1	0	1	0	0	0	-	-	1	0	0
<i>Mycotretus scitulus</i>	1	0	0	0	0	0	1	0	1	0	0	0	-	-	0	1	0
<i>Mycotretus sobrinus</i>	1	0	0	0	0	0	1	0	1	1	0	0	-	1	0	0	0
<i>Mycotretus trifasciatus</i>	1	0	0	0	0	0	1	0	1	0	0	0	3	0	0	0	1
<i>Neotriplax lewisi</i>	1	0	0	0	0	1	-	-	?	?	?	?	?	?	?	?	?
<i>Palaeolybas nigripennis apicalis</i>	1	1	0	1	0	1	-	-	1	1	0	0	-	-	0	0	0
<i>Pselaphacus nigropunctatus</i>	1	0	0	0	0	0	1	0	1	1	0	0	-	-	0	0	0
<i>Pseudamblyscelis pallidus discoideus</i>	1	0	0	0	0	1	-	-	0	-	-	-	-	-	-	-	-
<i>Triplax amoena</i>	1	0	0	0	0	0	1	1	1	0	0	0	-	-	0	0	0
<i>Triplax russica</i>	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
<i>Tritoma bipustulata</i>	1	0	0	0	0	1	-	-	0	-	-	-	-	-	-	-	-
<i>Tritoma sanguinipennis</i>	1	0	0	0	0	1	-	-	0	-	-	-	-	-	-	-	-
<i>Tritoma senegalensis tenella</i>	1	0	0	1	0	1	-	-	?	?	?	?	?	?	?	?	?
<i>Tritomapara brasiliensis</i>	1	0	0	0	0	0	1	0	1	0	1	0	2	0	0	0	0
<i>Xalpirta mauryi</i>	1	0	0	0	0	0	1	0	1	1	0	0	-	-	0	0	0
<i>Dacne bipustulata</i>	1	0	0	0	1	0	1	0	1	0	-	-	-	-	-	-	-
<i>Megalodacne fasciata</i>	1	0	0	0	0	0	1	1	1	0	-	-	-	-	-	-	-
<i>Erotylus giganteus</i>	1	0	0	0	0	1	-	-	1	1	-	-	-	-	-	-	-
<i>Iphiclus trifasciatus</i>	1	0	0	0	0	1	-	-	?	?	?	?	?	?	?	?	?

Taxa	Characters																
	Metendosternite								Penile flagellum								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Encaustes verticalis</i>	0	0	0	0	0	0	1	0	1	0	-	-	-	-	-	-	-
<i>Cryptophilus integer</i>	2	0	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
<i>Loberus impressus</i>	1	0	0	0	0	0	1	0	1	0	0	-	-	-	-	-	-
<i>Pharaxonotha kirschii</i>	1	0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	-
<i>Cycadophila debaonica</i>	1	0	0	0	0	0	0	0	?	?	?	?	?	?	?	?	?
<i>Languria bicolor</i>	1	0	0	0	0	0	1	0	1	1	-	-	-	-	-	-	-
<i>Diplocoelus sp.</i>	1	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-
<i>Eurysphindus sp.</i>	1	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-
<i>Helota fulviventris</i>	2	0	0	0	0	1	-	-	1	-	-	-	-	-	-	-	-

Supplementary material

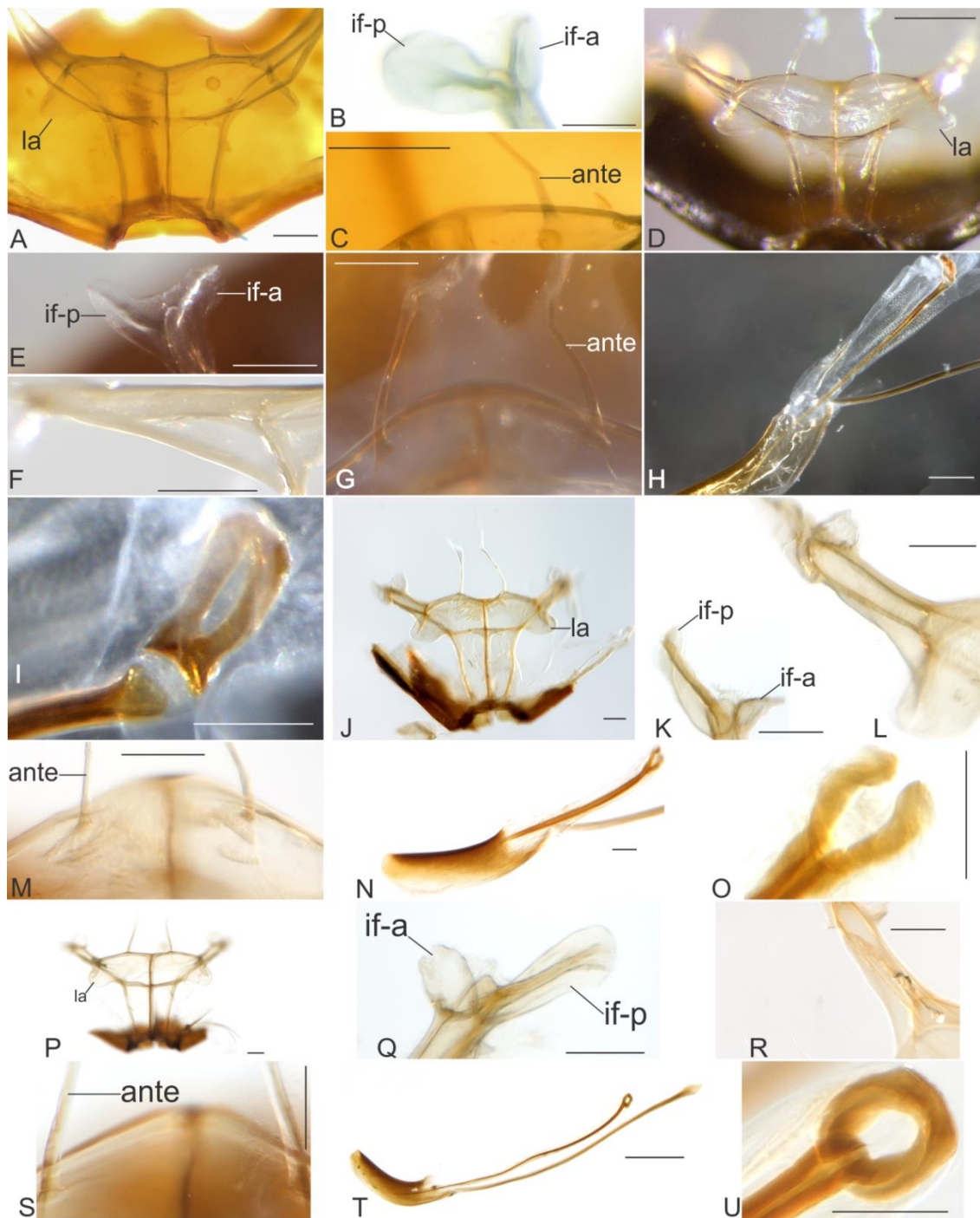


Figure S1. Metendosternite of *Mycotretus cribratus* (A–C) and metendosternite and flagellum of *M. apicalis* (D–I), *M. quadrioculatus* (J–O) and *M. pygmaeus* (P–U). Scale bars: A–C, E–G, I–S, U = 0.1 mm; D, T = 0.5 mm; H = 0.2 mm.

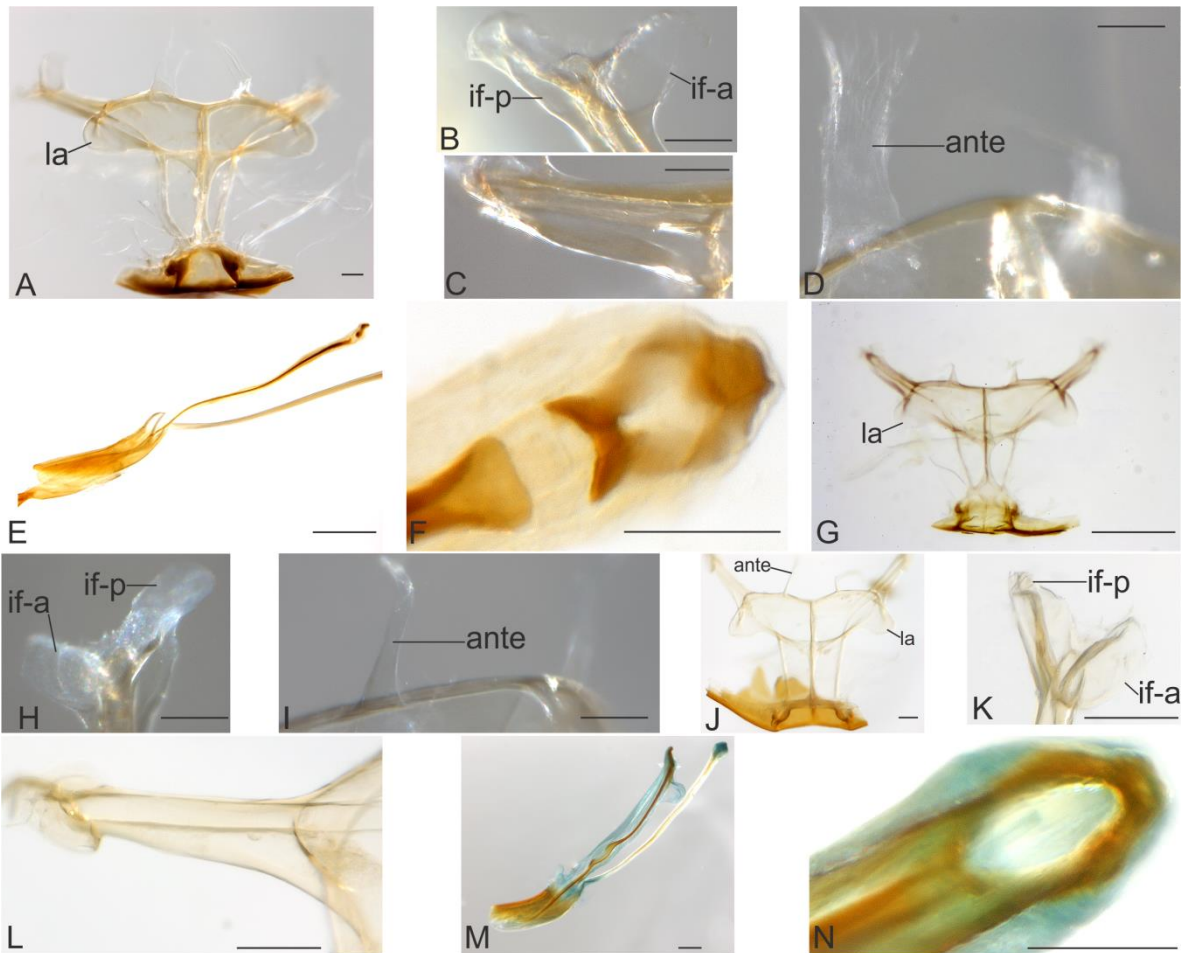


Figure S2. Metendosternite and flagellum of *Mycotretus coccineus* (A–F) and *M. trifasciatus* (J–N). Metendosternite of *M. fuscitarsis* (G–I). Scale bars: A–D, F, H–L, N = 0.1 mm; E, G = 0.5 mm; M = 0.2 mm.

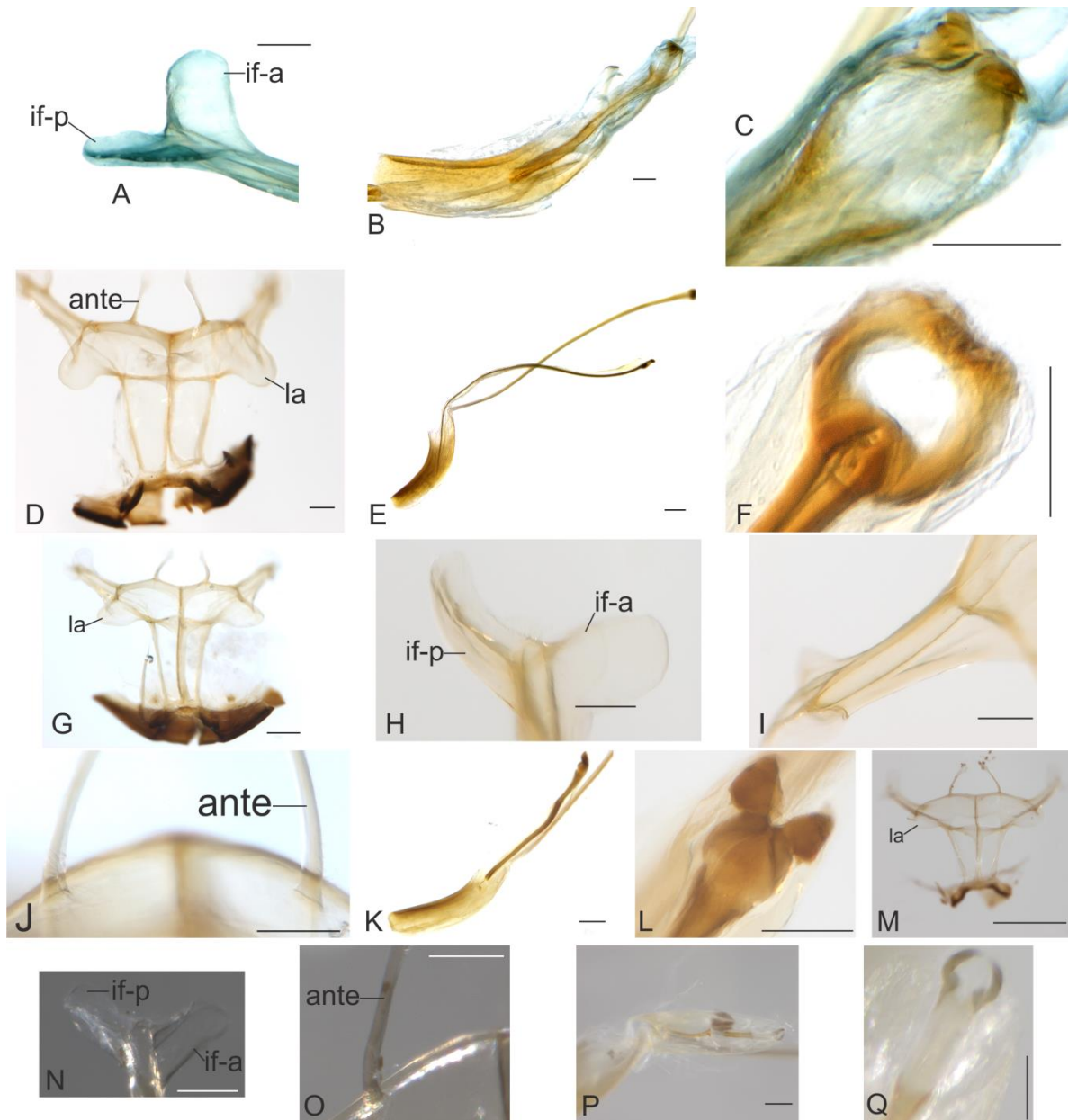


Figure S3. Metendosternite and flagellum in *Mycotretus scitulus* (A–C), *M. minutus* (D–F), *M. fallax* (G–L) and *M. cordiger* (M–Q). Scale bars: A–F, H–K, L, N–P = 0.1 mm; G, K = 0.2 mm; M = 0.5 mm; Q = 0.05 mm.

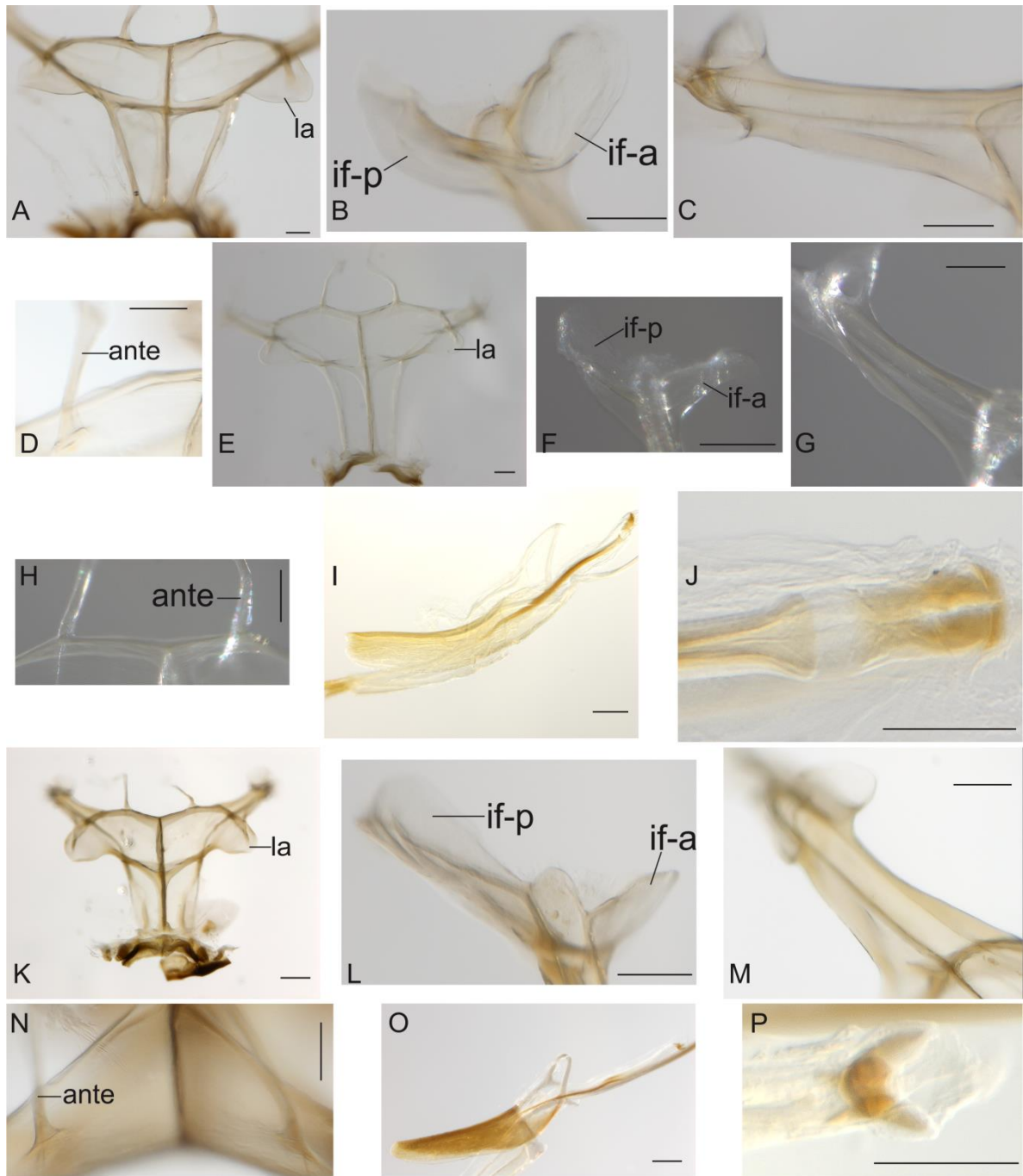


Figure S4. Metendosternite of *Mycotretus melanophthalmus* (A–D) and metendosternite and flagellum of *M. lesueuri* (E–J), *M. jocosus* (K–P). Scale bars: A–H, I, L–N, P = 0.1 mm; I, K, O = 0.2 mm.

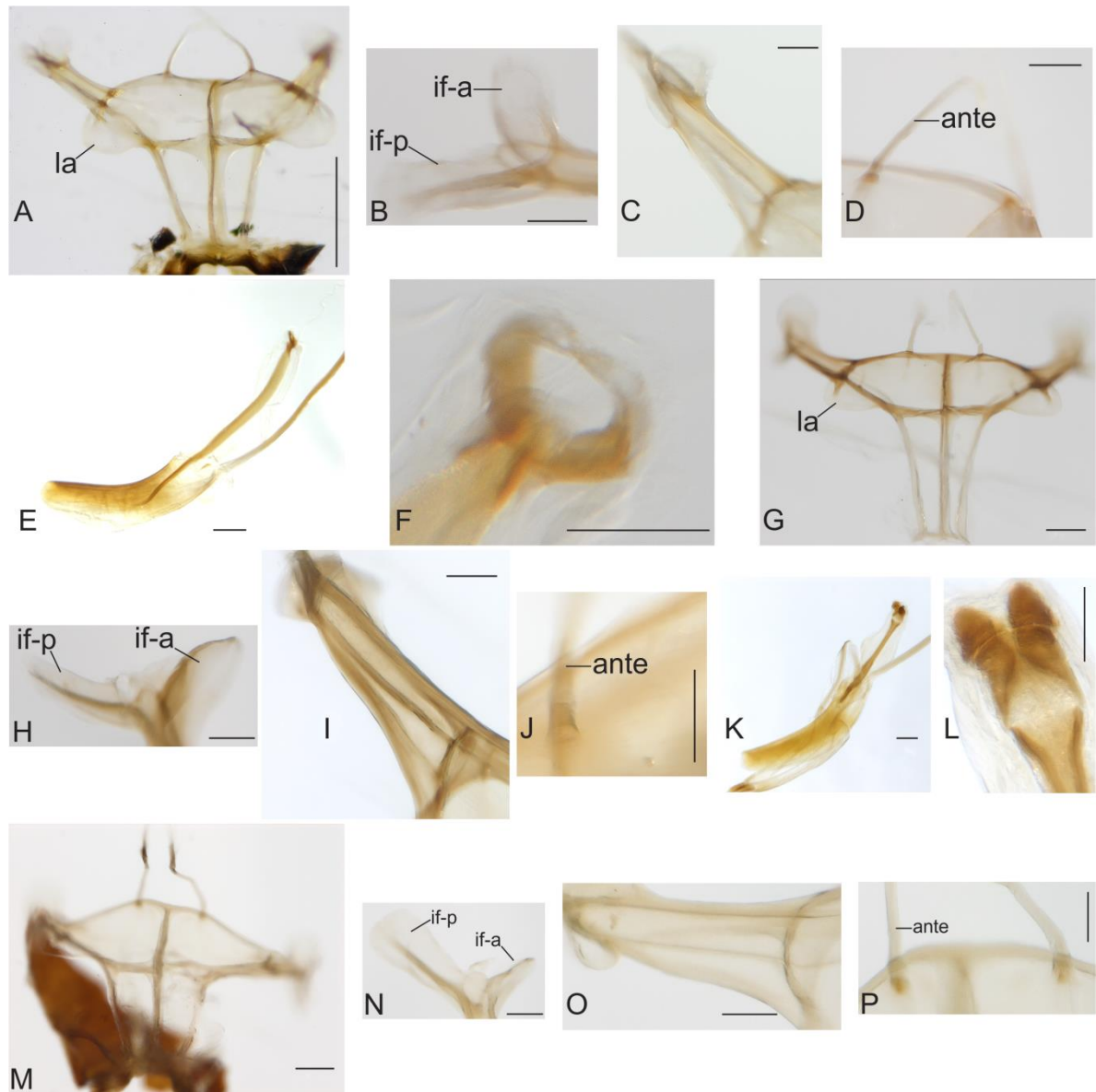


Figure S5. Metendosternite and flagellum of *Mycotretus marginicollis* (A–F), *M. ornatus* (G–L) and metendosternite of *M. floriger* (M–P). Scale bars: A = 0.5 mm; B–D, F, H–J, L, N–P = 0.1 mm; E, G, K, M = 0.2 mm.

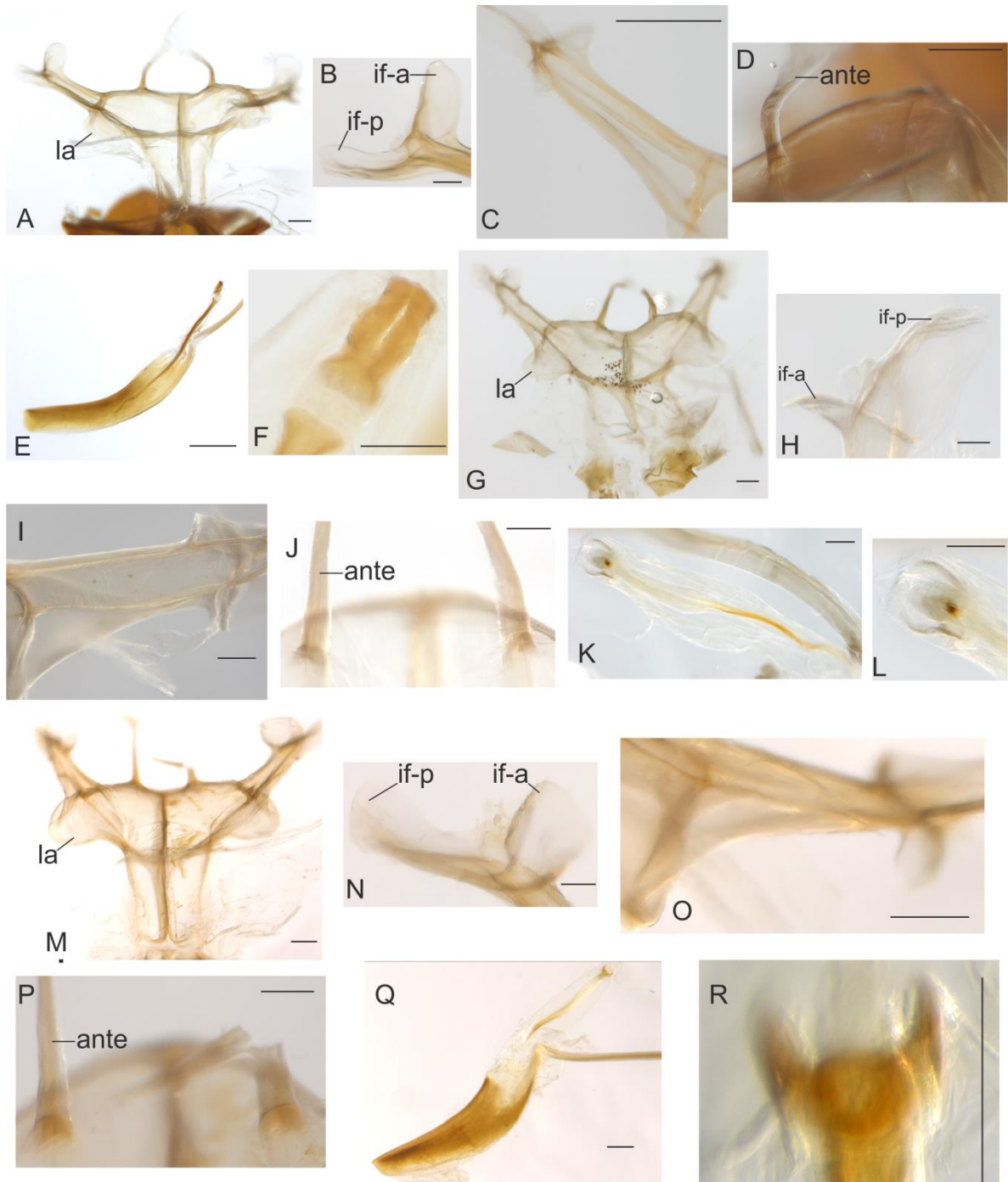


Figure S6. Metendosternite and flagellum of *Mycotretus sobrinus* (A–F), *M. rhodosomus* (G–L), *M. reticulatus* (M–R). Scale bars: A, D, G, M, O, Q = 0.2 mm; B–C, F, H–L, N, P, R = 0.1 mm; E = 0.5 mm.

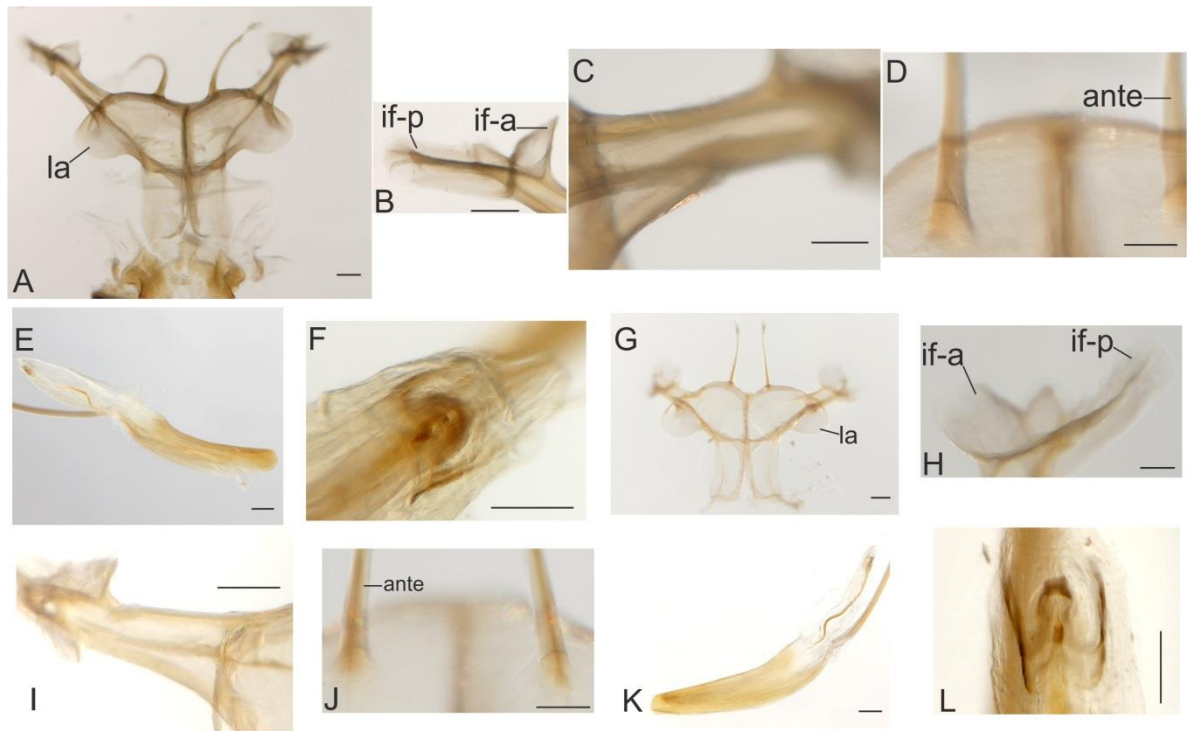


Figure S7. Metendosternite and flagellum of *M. flavomarginatus* (A–L). Scale bars: A–B, E, G, J, K = 0.2 mm; C–D, F, H, J, L = 0.1 mm.

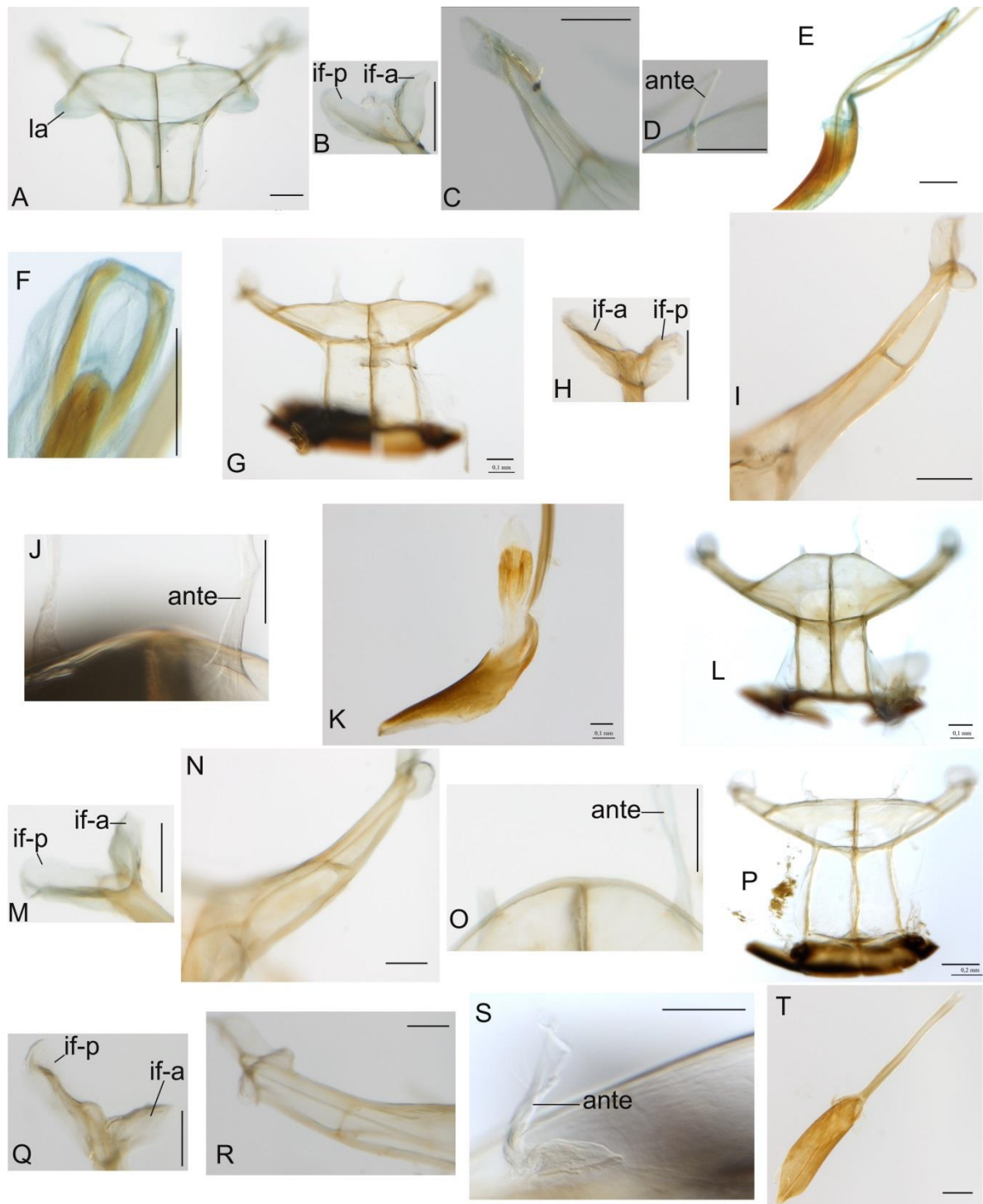


Figure S8. Metendosternite and flagellum of *Tritomapara brasiliensis* (A–F), metendosternite and male genitalia of *Tritoma bipustulata* (G–K) and *Tritoma sanguinipennis* (P–T), metendosternite of *Tritoma senegalensis tenella* (L–O). Scale bars: A–D, F–O, Q–S = 0.1 mm; E, P, T = 0.2 mm.

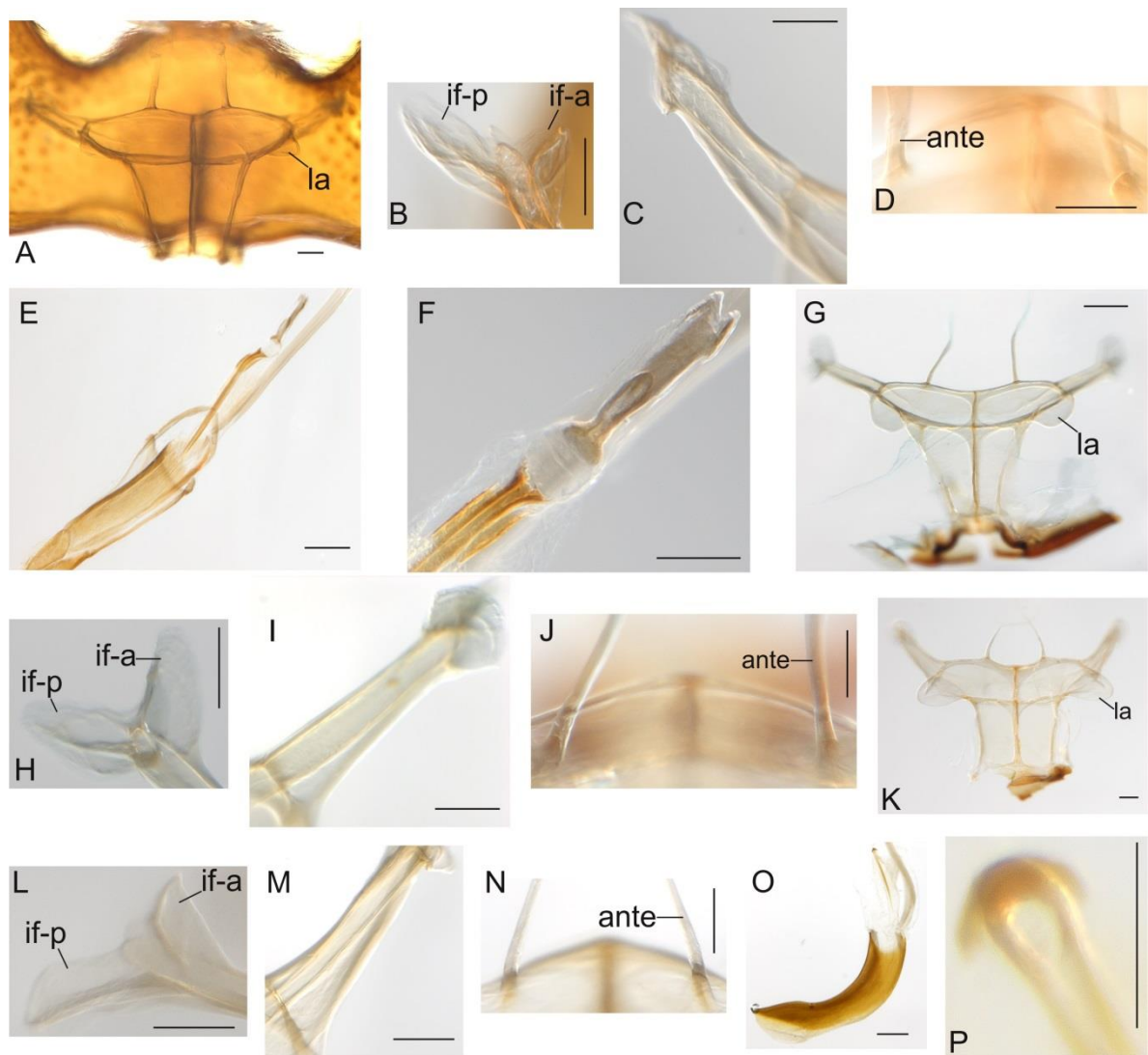


Figure S9. Metendosternite and flagellum of *Myceporthus* sp. (A–F) and *Triplax russica* (K–P), metendosternite of *Lybas thoracicus* (G–J). Scale bars: A–D, F, H–N = 0.1 mm; E, G, O = 0.2 mm; P = 0.05 mm.

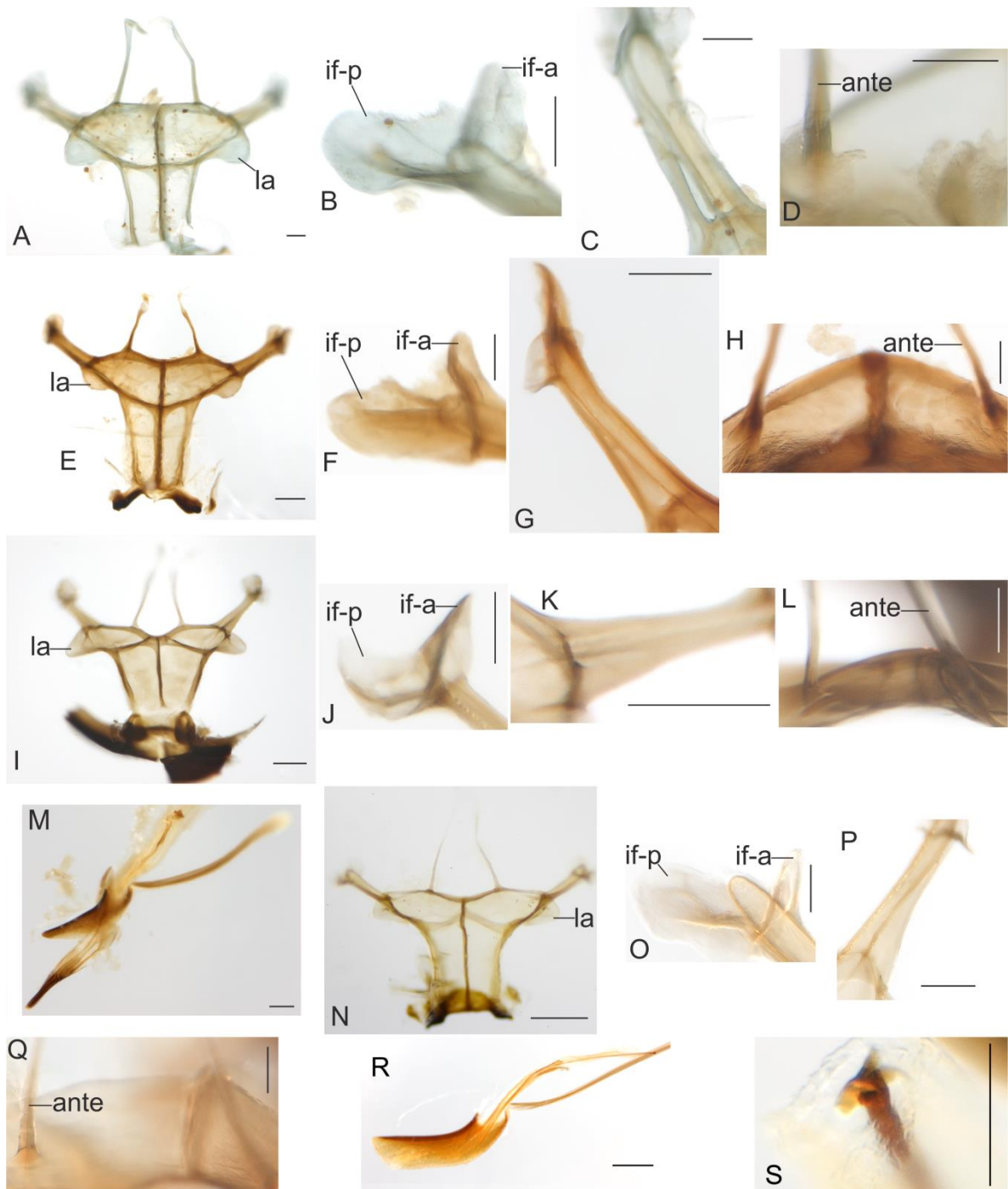


Figure S10. Metendosternite of *Ischyryus quadripunctatus quadripunctatus* (A–D) and *Megischyrus brasiliensis* (E–H), metendosternite and flagellum of *Dacne bipustulata* (I–M) and *Megalodacne fasciata* (N–S). Scale bars: A–D, I, K, M, O, Q, S = 0.1 mm; F, H, P = 0.2 mm; E, G, N, R = 0.5 mm; J, L = 0.05 mm.

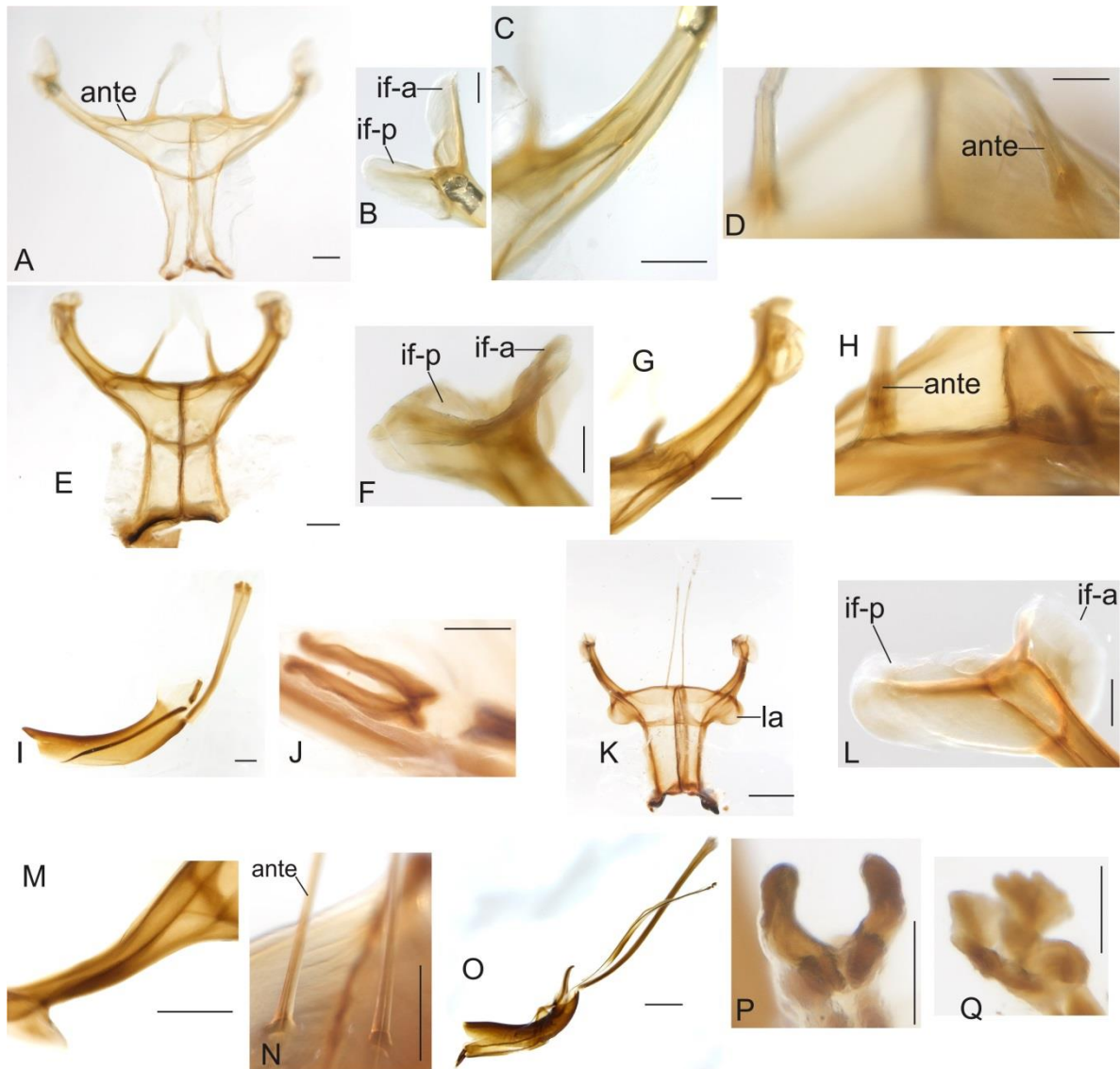


Figure S11. Metendosternite of *Iphilus trifasciatus* (A–D), metendosternite and flagellum of *Erotylus giganteus* (E–J) and *Encaustes verticalis* (K–Q). Scale bars: A, C, F–H, J, L = 0.2 mm; B, D, N, P–Q = 0.1 mm; E, I, M = 0.5 mm; K, O = 1 mm.

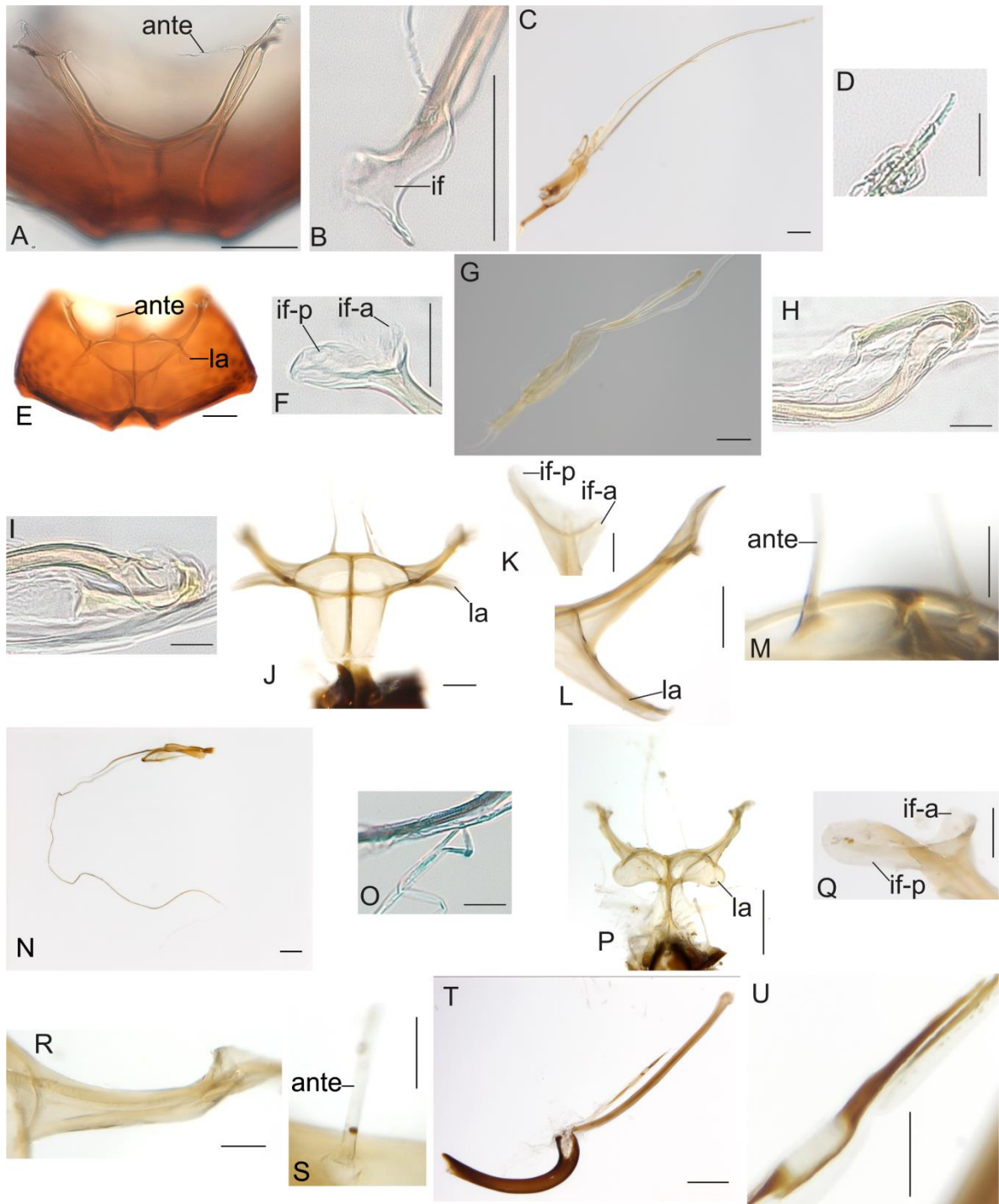


Figure S12. Metendosternite and flagellum of *Cryptophilus integer* (A–D), *Loberus impressus* (E–I), *Pharaxonotha kirschii* (J–O), *Languria bicolor* (P–U). Scale bars: A–C, E, G, J, L, Q–R, U = 0.1 mm; N = 0.2 mm; P, T = 0.5 mm; F, K, M, S = 0.05 mm; D, H–I, O = 0.025 mm.

File S3

Problematic characters

Metendosternite:

- * Internal tip (**if**), posterior lobe (**if-p**), and anterior lobe (**if-a**), separation: (i) clearly separated by a “notch”, with if-p and if-a easily recognized (e.g. Fig. S1Q); (ii) not clearly separated, apparently in the form of a single, flattened and elongated membranous plate, with a sinuous outline (Fig. S12B). Condition “ii” is unique to *Cryptophilus integer* (Cryptophilinae). In the remaining studied erotylids and in the outgroup *Diplocoelus* (Biphyllidae), the internal tips if-p and if-a are discernible. This character is problematic because the character states seem to grade into one another along a continuous scale.
- * Internal tip (**if**), posterior lobe (**if-p**), and anterior lobe (**if-a**), comparative size: (i) with similar size (e.g. Figures. S9H, S11F); (ii) slightly asymmetrical (e.g. Fig. S5H); (iii) strongly asymmetrical (e.g. S1Q). Most examined specimens with **if-a** and if-p clearly separated show some degree of asymmetry between these lobes, such that **if-p** > **if-a**. This character is problematic because the character states seem to grade into one another along a continuous scale.
- * Internal tip (**if**), dorsal ridge (**if-dr**), presence: (i) present (e.g. Fig. S2K); (ii) absent (Fig. S12B). The dorsal ridge (**if-dr**) was observed in all studied Erotylidae and in the outgroup *Diplocoelus* (Biphyllidae). Condition “ii” is unique to *C. integer* (Cryptophilinae). This character is problematic because the character states seem to grade into one another along a continuous scale.
- * Ventral lamina (vela), development: (i) slightly or weakly developed (e.g. Fig. S4C); (ii) well developed (Fig. S2C). Condition “ii” seems to be shared by *Mycotretus coccineus* and *M. fuscitarsis* Lacordaire, 1842 (Erotylinae: Tritomini). In the remaining studied erotylids and in the outgroup *Diplocoelus* (Biphyllidae), the vela is slightly or weakly developed. Character problematic due the character states seem to grade into one another along a continuous scale.
- * Stalk (**stk**), shape: (i) narrowed basally and widened at apex (e.g. Figures S3G, S4A); (ii) base and apex of similar sizes (e.g. Fig. S8L); (iii) widened basally and narrowed apically (e.g. Fig. S11E). Character problematic due to fluent transition between states.

Penile flagellum:

- * Approximate length relative to apophyses: (i) conspicuously elongated (Fig. S12N); (ii) elongated (Fig. S1T); (iii) short (Fig. S7K). This character is problematic because the character states seem to grade into one another along a continuous scale. Although we have verified a conspicuously elongated flagellum in *Pharaxonotha kirschii*, based on other examples in literature (e.g. Tang *et al.*, 2018), that condition is not an autapomorphy of Pharaxonothinae and seems to occur only in some taxa within this subfamily.
- * Membranous portion (**mp**) between head and virga, extension: (i) short (e.g. Fig. S6F); (ii) slightly elongated (e.g. Fig. S3Q). Character problematic due to fluent transition between states.
- * Head, anterior borders: (i) completely or almost completely fused (e.g. Fig. S3F); (ii) not fused (e.g. Fig. S8F). Condition “ii” is a probable plesiomorphy shared by members of three tribes of Erotylinae: Tritomini (e.g. a few *Mycotretus* and *Tritomapara brasiliensis*), Erotylini (*Erotylus giganteus*) and Encaustini (*Encaustes verticalis*). Character problematic due to fluent transition between states.
- * Head, dorsal and ventral surface of disk: (i) uncovered (Fig. S12O); (ii) sclerotized or membranous and confluent with posterior border of head and anterior portion of virga (Fig. S5L). Condition “i” is verified to occur in, for example, *Pharaxonotha kirschii* (Pharaxonothinae) and apparently in *Triplax russica* (Erotylinae: Tritomini). Condition “ii” occurs in *Mycotretus fallax*, *M. ornatus*, and *M. scitulus* (Erotylinae: Tritomini). Character problematic due to fluent transition between states.
- * Head, posterior borders (**pbh**): (i) fused (Fig. S1D); (ii) unfused (Fig. S3Q). The condition “i” was observed especially in some *Mycotretus* species. Character problematic due to fluent transition between states.

The following 13 characteristics are taxonomic diagnosable features at species level, but useless in a phylogenetic approach, within our sample, due to their lower levels of generality:

- * Head conspicuously elongated, straight, shallowly sclerotized, and almost membranous. Dorsal surface with an excavation from posterior to medial portion: (i) absent; (ii) present (Fig. S9F). Condition “ii” is unique to *Myceporthus* sp. (Erotylinae: Tritomini).
- * Head with outer edge fused with a small, sclerotized, flattened, and subrectangular sclerite: (i) absent; (ii) present (Fig. S9P). Condition “ii” is unique to *Triplax russica*. (Erotylinae: Tritomini).

- * Head resembling a “horse face,” divided into three slightly sclerotized lobes: (i) absent; (ii) present (Fig. S10S). Condition “ii” is unique to *Megalodacne fasciata* (Fabricius, 1777) (Erotylinae: Megalodacnini).
- * Head elongated, with a prominent margin, running dorsally and longitudinally, from posterior to anterior tips: (i) absent; (ii) present (Fig. S11J). Condition “ii” was observed only in *Erotylus giganteus* (Erotylinae: Erotylini).
- * Head in the form of a simple, reduced, subcylindrical, and elongated structure: (i) absent; (ii) present (Fig. S12D). Condition “ii” was observed only in *Cryptophilus integer* (Cryptophilinae).
- * Head very small, not sclerotized, and triangular: (i) present (Fig. S12O); (ii) absent. Condition “ii” was observed only in *Pharaxonotha kirschii* (Pharaxonothinae).
- * Head with an elongate, flattened, and slightly sclerotized structure outlining the head from anterior to posterior portion: (i) absent; (ii) present (Fig. S12H). Condition “ii” was observed only in *Loberus impressus* (Loberinae).
- * Head without a differentiated enlargement, conspicuously elongated, sclerotized, and narrowed, with the anterior tip pointed: (i) absent; (ii) present (Fig. S12U). Condition “ii” was observed only in *Languria bicolor* (Languriinae).
- * Head, posterior borders (**pbh**), outer edge: (i) slightly emarginate medially (Fig. S11); (ii) strongly emarginate medially (e.g., *M. coccineus*) (Fig. S2F). Condition “i” is present in *Mycotretus apicalis* and *M. melanophthalmus* (Duponchel, 1825) and condition “ii” occurs in *Mycotretus coccineus* (Erotylinae: Tritomini) and *Erotylus giganteus* (Erotylinae: Erotylini). The remaining studied erotylids have condition “i”. Character problematic due to fluent transition between states.
- * Head, lateral borders (**lbh**) bent ventrally, forming a fringed sclerotized extension of three lobes: (i) absent; (ii) present (Fig. S11Q). Condition “ii” was verified only in *Encaustes verticalis* (Erotylinae: Encaustini).
- * Head, anterior borders, outer edge with a rounded, compacted and prominent sclerotization: (i) absent; (ii) present (Fig. S2F). Condition “ii” was observed only in *Mycotretus coccineus* (Erotylinae: Tritomini).
- * Virga with two membranous portions resembling two separated segments: (i) absent; (ii) present (Fig. S3P). Condition “ii” was verified only in *Mycotretus cordiger* (Erotylinae: Tritomini).
- * Lateral borders of flagellum head, subtriangular, strongly sclerotized and thickened: (i) absent; (ii) present (Fig. 3F). Condition “ii” was verified only in *Mycotretus melanophthalmus* (Erotylinae: Tritomini).

Table S1

Taxa (figs)			Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
Erotylidae	Tritomini	<i>Amblyopus marginatus</i> (Quedenfeldt, 1888)	if-p and if-a slightly asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p ; vela present and slightly developed, gradually expanding medially until the base of fa	Present with continuous areas, csap approximately 0.26× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Absent	Long and slightly narrowed basally and widened apically	Absent
		<i>Amblyopus vittatus</i> (Olivier, 1807)	if-p and if-a slightly asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p ; vela present and slightly developed, gradually expanding medially until the base of fa	Present with continuous areas, csap approximately 0.34× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Absent	Base and apex approximately with the same size	Male specimen not available
Erotylinae		<i>Eutriplax tuberculifrons</i> (Lewis, 1887)	if-p and if-a slightly asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p ; vela present and slightly developed, gradually expanding medially until the base of fa	Present with continuous areas, csap approximately 0.39× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Slightly narrowed basally and widened apically	Present, elongate, approximately 2× the length of penis. Head poorly preserved in the examined specimen. Virga slightly sclerotized and thin. Genitalia resembling that of <i>Triplax amoena</i> Solsky, 1871
		<i>Ischyrus quadripunctatus quadripunctatus</i> (Olivier, 1792) Figure S10A–D	if-p and if-a asymmetrical, if-p > if-a ; if-dr developed along the if-p ; vela present and weakly developed	Present with continuous areas, csap approximately 0.76× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like and slightly longitudinally oriented in relation to the csap	Slightly narrowed basally and widened apically	According to Skelley (1998, 2009): flagellum long and narrow, flattened and ribbon-like at basal half, “sclerite at base” (i.e., “head”) claw-shaped
		<i>Ischyrus</i> sp.	if-p and if-a slightly asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p ; vela present and slightly developed, gradually expanding medially until the base of fa	Present with continuous areas, csap approximately 0.28× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like and slightly longitudinally oriented in relation to the csap	Slightly narrowed basally and widened apically	Present, elongate, approximately 1.44× the length of penis. Membranous portion between head and virga present. Head: transverse, sclerotized, subrectangular, anteriorly and laterally emarginated. Virga sclerotized with a few slight sinuosities

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<i>Laurenticola terminalisternalis</i> (Farmaire, 1898)	if-p and if-a slightly asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p ; vela present and slightly developed, gradually expanding medially until the base of fa	Present with continuous areas, csap approximately 0.51× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Slightly narrowed basally and widened apically	Male specimen not available
<i>Lybas thoracicus</i> (Olivier, 1807) Figure S9G–J	if-p and if-a of similar size; if-dr developed along the if-p ; vela present, shallowly developed	Present with continuous areas, csap approximately 0.37× as long as the css ; ante originating medially, close to the anterior edge of the apm ; widely separated and thin	Present, plate-like. Longitudinally oriented in relation to the central sclerotization of anterior portion (csap)	Strongly narrowed at base and widened at apex	Male specimen not available
<i>Lybasia barbata</i> Delkeskamp, 1965	if-p and if-a of similar size; if-dr well visible and developed along the if-p and if-a ; vela slightly developed	Present with continuous areas, csap approximately 0.24× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and wide	Absent	Base and apex approximately with the same size	Present, approximately 0.68× the length of penis. Membranous portion between head and virga present. Head: resembling that of <i>Ischyryus</i> sp: sclerotized and laterally emarginated; abh flattened and lbh ending in two outer and narrowed tips. Virga strongly sclerotized anteriorly and with a few slight sinuities
<i>Megischyrus brasiliensis</i> Lacordaire, 1842 Figure S10E–H	if-p and if-a asymmetrical, if-p > if-a , and if-a short and wild; if-dr developed along the if-p ; vela present and weakly developed	Present with continuous areas, csap approximately 0.54× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like and longitudinally oriented in relation to the csap	Narrowed basally and widened apically	Male specimen not available
<i>Megischyrus</i> sp.	if-p and if-a asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p and if-a ; vela present and slightly developed, gradually expanding medially until the base of fa	Present with continuous areas, csap approximately 0.72× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Base and apex approximately with the same size	Male specimen not available

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<i>Myceporthus</i> sp. Figure S9A–F	if-p and if-a strongly asymmetrical, if-p > if-a ; if-dr developed along the if-p and if-a ; vela present, weakly developed; slightly narrowed close to if , wide medially and close to the base of fa	Present with continuous areas, csap approximately 0.49× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like and slightly reduced	Narrowed basally and widened apically	Present and approximately 1.19× the length of penis; Membranous portion between head and virga present, rounded and conspicuously widened compared to head and flagellum. Head: in the shape of a slightly flattened piece; conspicuously elongate, straight, shallowly sclerotized and almost membranous; dorsal surface with an excavation from posterior to medial portion. Borders: (i) pbh : wide (ii) lbh : close to posterior edge conspicuously narrowed, with an outer slight inflexion (iii) abh : with two narrowed, prominent and separated lobes. Virga: slightly curved close to membranous portion and almost straight from anterior to posterior portion; posterior tip desclerotized and blunt
<i>Mycophthorus haafi</i> (Delkeskamp, 1965)	if-p and if-a of similar size; if-dr well visible and developed along the if-p and if-a ; vela slightly developed	Present with continuous areas, csap approximately 0.56× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Absent	Base and apex approximately with the same size	Absent
<i>Mycophthorus palpalis</i> (Delkeskamp, 1965)	if-p and if-a of similar size; if-dr well visible and developed along the if-p	Present with continuous areas, csap approximately 0.38× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like and poorly developed	Base and apex approximately with the same size	Male specimen not available

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<i>Mycotretus apicalis</i> Lacordaire, 1842 Figure S1D–I	if-p and if-a slightly asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p ; vela present and slightly developed, gradually expanding medially until the base of fa	Present with continuous areas, csap approximately 0.6× and 0.82× as long as the css , in male and female specimen, respectively; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Slightly narrowed basally and widened apically	Present, slightly elongate, approximately 1.48× the length of penis; flattened and strongly sclerotized until basal 1/4 and gradually desclerotized and narrowed until apex. Membranous portion between head and virga present. Head: elongate, subrectangular, inner contours widely separated; disc empty, neither sclerotized nor membranous. Borders: thickened and sclerotized. (i) pbh : fused, outer side slightly emarginate at middle (ii) lbh : close to posterior edge narrowed, with a slight outer inflexion, subparallel from posterior to anterior edge, the fusion with anterior border angulated (iii) abh : completely fused medially. Virga almost straight with a few slight sinuosities
<i>Mycotretus coccineus</i> (Lacordaire, 1842) Figure S2A–F	if-p and if-a asymmetrical, if-p > if-a ; if-dr membranous and developed along the if-p ; vela present, well developed, expanding close to if until the base of fa	Present with continuous areas, csap approximately 0.57× and 0.76× as long as the css , in male and female, respectively; ante originating medially, close to the anterior edge of the apm , widely separated and wide (males) or wide basally and gradually narrowed apically (females)	Present, plate-like	Slightly narrowed at base and widened apically	Present, elongate, approximately 2.09× the length of penis. Membranous portion between head and virga present. Head: Resembling a “fish-like” structure, inner contours widely separated; disc empty, neither sclerotized nor membranous. Borders: thickened, sclerotized. (i) pbh : fused, strongly sclerotized and emarginate medially (ii) lbh : close to posterior edge narrowed and with an outer inflexion; gradually expanding from posterior to anterior edge, close to this latter, rounded and converging anteriorly (iii) abh : completely fused medially, forming a rounded, compacted and prominent sclerotization. Virga: Slightly sinuous, gradually desclerotized and narrowed from anterior to posterior portion

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Mycotretus cordiger</i> Crotch, 1876 Figure S3M–Q</p>	<p>if-p and if-a of similar size; if-dr well developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.55× as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed basally and widened apically</p>	<p>Present and short, slightly sinuous and sclerotized (apart from two membranous portions on virga); gradually desclerotized and narrowed until apex and approximately 0.37× the length of penis. Membranous portion between head and virga present and elongate compared to other <i>Mycotretus</i> species. Head: inner contours widely separated. Borders: strongly sclerotized, except medially on the posterior and anterior edge of the head, which are membranous. (i) pbh: not fused (ii) lbb: rounded, diverging posteriorly and converging anteriorly; (iii) abh: not fused, rounded, border tips narrowed and desclerotized medially. Virga. Additionally to the membranous portion between head and virga, this latter has another membranous portion medially, leaving the flagellum with the appearance of two separated segments: the first, proximal, with the posterior edge blunt and the second, distal, with the anterior edge sclerotized and strongly emarginate at middle</p>
<p><i>Mycotretus cribratus</i> Gorham, 1888 Figure S1A–C</p>	<p>if-p and if-a of similar size; if-dr well visible and developed along the if-p and if-a; vela present and slightly developed, gradually expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.54× as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Slightly narrowed basally and widened apically</p>	<p>Male specimen not available</p>

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Mycotretus fallax</i> (Guérin-Méneville, 1841) Figure S3G–L</p>	<p>if-p and if-a slightly asymmetrical, if-p > if-a; if-dr well developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.32× and 0.6× as long as the css, in male and female, respectively; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed (male) and slightly narrowed (female) basally and widened apically</p>	<p>Present, approximately 1.16× the length of penis. Head and virga continuously sclerotized, without membranous portion. Head: inner contours widely separated; dorsal and ventral surface strongly sclerotized. Borders: strongly sclerotized, except laterally, close to posterior portion, where it is desclerotized, narrowed and interrupted, apparently forming an articulation with anterior portion. (i) pbh: confluent with virga (ii) lbh: rounded, diverging posteriorly and converging anteriorly, with a pair of inner lines, widely separated at middle and gradually converging anteriorly (iii) abh: fused and rounded; outer edge with two long, wide and strongly sclerotized lobes at middle, subtriangular in shape, with anterior tips narrowed. Virga. Slightly sinuous and curved medially Present and sinuous, approximately 0.61× the length of penis; narrowed and desclerotized from anterior to medially; sclerotized from middle until close to apex and slightly narrowed and desclerotized apically. Head: with a sclerotized “head-piece”, similar to <i>M. rhodosomus</i>. Virga: convex with disrupted undulations until approximately 2/3 of its length where it become strongly concave; from the end of this concavity, virga is slightly sinuous until its posterior tip.</p>
<p><i>Mycotretus flavomarginatus</i> Lacordaire, 1842 Figure S7A–L (two male specimens)</p>	<p>if-p and if-a strongly asymmetrical, if-p > if-a; if-dr well visible and developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.75× as long as the css (both sexes with the same value for csap/css ratio); ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Apparently with base and apex with a similar size (base of stalk in male specimen not in good conditions)</p>	<p>Present, approximately 3× the length of penis. Head and virga continuously sclerotized. Head U-shaped. Borders: sclerotized, with pbh: fused, under the anterior edge of virga and apparently forming an “articulation”. Virga: slightly sinuous, with its 2/3 basal portion accompanied by a membranous enlargement with a broad sinuosity</p>
<p><i>Mycotretus floriger</i> Lacordaire, 1842 Figure S5M–P</p>	<p>if-p and if-a strongly asymmetrical, if-p > if-a; if-dr well visible and developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.61× as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed basally and widened apically</p>	<p>Present, approximately 3× the length of penis. Head and virga continuously sclerotized. Head U-shaped. Borders: sclerotized, with pbh: fused, under the anterior edge of virga and apparently forming an “articulation”. Virga: slightly sinuous, with its 2/3 basal portion accompanied by a membranous enlargement with a broad sinuosity</p>

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<i>Mycotretus fuscitarsis</i> Lacordaire, 1842 Figure S2G–I	if-p and if-a asymmetrical, if-p > if-a ; if-dr membranous and well developed along the if-p ; vela present and well developed, expanding close to if until the base of fa	Present with continuous areas, csap approximately 1.2× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated, thin but slightly wide basally	Present, plate-like	Narrowed basally and widened apically	Male specimen not available
<i>Mycotretus jocosus</i> Lacordaire, 1842 Figure S4K–P	if-p and if-a strongly asymmetrical, if-p > if-a ; if-dr well developed along the if-p ; vela present and slightly developed, gradually expanding from if until the base of fa	Present with continuous areas, csap approximately 0.78× and 1.05× as long as the css , in male and female, respectively; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Narrowed (male) and slightly narrowed (female) basally and widened apically	Present, slightly sinuous and elongate, approximately 0.99× the length of penis; gradually narrowed from base to apex. Membranous portion between head and virga absent, although virga is conspicuously desclerotized. Head: Borders: (i) pbh : fused and with a strong and wide sclerotization; outer edge with two parallel, narrowed and desclerotized tips (ii) lbh : in the form of two elongate and narrowed lobes, diverging from posterior to anterior portion of the head and not converging anteriorly to form an “anterior border”. Virga: slightly sclerotized, but accompanied by a membranous portion, that extends from the anterior portion (close to head) until approximately medially

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Mycotretus lesueuri</i> (Chevrolat, 1835)</p> <p>Figure S4E–J</p>	<p>if-p and if-a of similar size (if-a slightly smallest); if-dr well developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.41× and 0.48× as long as the css, in male and female, respectively; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed (male) and slightly narrowed (female) basally and widened apically</p>	<p>Present, sclerotized and slightly sinuous; gradually narrowed from base to apex and approximately 0.76× the length of penis. Membranous portion between head and virga present. Head: elongate, inner contours slightly separated, almost contiguous; disc apparently empty, neither sclerotized nor membranous. Borders: (i) pbh: apparently shallowly fused, desclerotized (ii) lbh: subparallel, close to posterior portion desclerotized and with an outer and shallow inflexion; slightly curved and sclerotized from medially to anterior portion; outer tips conspicuously narrowed and surpassing the head outline (iii) abh: sclerotized and slightly separated medially. Virga Similar to that of <i>M. sobrinus</i>, but with a slight sinuosity posteriorly and the posterior portion wide</p>
<p><i>Mycotretus marginicollis</i> Lacordaire, 1842</p> <p>Figure S5A–F</p>	<p>if-p and if-a asymmetrical, if-p > if-a; if-dr well developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.5× and 0.92× as long as the css, in male and female, respectively; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed (male) and slightly narrowed (female) basally and widened apically</p>	<p>Present and elongate, approximately 1.27× the length of penis. Head and virga apparently confluent, and although not membranous, virga is conspicuously desclerotized from anteriorly until posterior one-third. Head: sclerotized, rounded, inner contours widely separated; disc empty, neither sclerotized nor membranous. Borders: (i) pbh: fused and with a sclerotization similar to that of <i>M. jocosus</i>; outer edge with two parallel, narrowed and sclerotized tips (ii) lbh: rounded, diverging posteriorly and converging anteriorly (as occurs with <i>M. pygameus</i> and <i>M. minutus</i>) (iii) abh: apparently fused, rounded, slightly emarginate at middle; inner border tips slightly narrowed and desclerotized. Virga: Slightly sinuous and conspicuously narrowed at its 1/3 posterior until posterior edge</p>

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Mycotretus melanophthalmus</i> (Duponchel, 1825)</p> <p>Figure 3E–F Figure S4A–D</p>	<p>if-p and if-a of similar size in male and asymmetrical in female; if-dr well developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>continuous areas, csap approximately 0.6× and 0.84× as long as the css, in male and female, respectively; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed (male) and slightly narrowed (female) basally and widened apically</p>	<p>Present, sclerotized and slightly sinuous; gradually narrowed until apex and approximately 0.95× the length of penis. Membranous portion between head and virga present. Head: subtriangular, inner contours slightly separated posteriorly and widely separated anteriorly; disc empty, neither sclerotized nor membranous. Borders: thickened, sclerotized. (i) pbh: fused, with a strong sclerotization (ii) lbh: narrowed posteriorly and widely diverging from posterior to anterior edge; fusion between lateral and anterior borders conspicuously angulated and sclerotized (iii) abh: straight, border tips slightly narrowed, desclerotized and shallowly fused medially. Virga: Similar to that of <i>M. cinctellus</i>, but slightly more sclerotized</p>
<p><i>Mycotretus minutus</i> (Duponchel, 1825)</p> <p>Figure S3D–F</p>	<p>if-p and if-a asymmetrical, if-p > if-a; if-dr sclerotized and well developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.42× and 0.61× as long as the css, in male and female, respectively; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed (male) and slightly narrowed (female) basally and widened apically</p>	<p>Present, elongate, approximately 2.34× the length of penis. Head and virga continuously sclerotized, without membranous portion. Head: “ring-shaped”, inner contours widely separated; disc empty, neither sclerotized nor membranous. Borders: thickened, sclerotized, but slightly desclerotized laterally, close to anterior portion of head. (i) pbh: fused, rounded, under anterior edge of virga, and apparently forming an “articulation” with anterior portion of virga (ii) lbh: rounded and converging anteriorly (iii) abh: fused, shallowly emarginate at middle and with a conspicuous sclerotization. Virga: curved and slightly sinuous, sclerotized and gradually narrowed from anterior to posterior portion</p>

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Mycotretus ornatus</i> (Duponchel, 1825)</p> <p>Figure S5G–L</p>	<p>if-p and if-a slightly asymmetrical, if-p > if-a; if-dr well visible and developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.42× as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed basally and widened apically</p>	<p>Present, approximately 0.62× the length of penis. Head and virga continuously sclerotized, without membranous portion. Head: inner contours widely separated; dorsal and ventral surface strongly sclerotized anteriorly and laterally, discal and posteriorly desclerotized. Borders: strongly sclerotized, except laterally, close to posterior portion, where it is desclerotized, narrowed and interrupted, apparently forming an articulation with anterior portion (as occurs with <i>M. fallax</i>). (i) pbh: confluent with virga (ii) lbh: diverging posteriorly and converging anteriorly, with a pair of inner lines, narrowed separated at middle (compared to that of <i>M. fallax</i>) and gradually converging anteriorly (iii) abh: fused and rounded; outer edge with two long, wide and strongly sclerotized lobes at middle, subtriangular in shape, but with anterior tip rounded compared to that of <i>M. fallax</i>. Virga. slightly sinuous and curved close to the apex</p>
<p><i>Mycotretus pygmaeus</i> Lacordaire, 1842</p> <p>Figure S1P–U</p>	<p>if-p and if-a strongly asymmetrical, if-p > if-a; if-dr sclerotized, prominent and developed along the if-p; vela present and slightly expanded, gradually expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.57× and 0.7× as long as the css, in male and female, respectively; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed (male) and slightly narrowed (female) at base and widened apically</p>	<p>Present and elongate, approximately 2.12× the length of penis. Head and virga continuously sclerotized, without membranous portion. Head: “ring-shaped”, inner contours widely separated; disc empty, neither sclerotized nor membranous. Borders: thickened and sclerotized. (i) pbh: fused, rounded, under the anterior edge of virga and apparently forming an “articulation” (ii) lbh: rounded and converging anteriorly (iii) abh: fused and rounded, without emargination at middle. Virga: Slightly sinuous and gradually narrowed from anterior to posterior portion</p>

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Mycotretus quadrioculatus</i> Alvarenga, 1983 Figure S1J–O</p>	<p>if-p and if-a strongly asymmetrical, if-p > if-a; if-dr sclerotized, prominent and developed along the if-p; vela present and slightly developed, gradually expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.38× and 0.76× as long as the css, in male and female specimen, respectively; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed (male) and slightly narrowed (female) at base and widened apically</p>	<p>Present, 1.11× the length of penis; strongly sclerotized and flattened along almost its entire extension and gradually desclerotized close to the apex, narrowed and apparently soft. Head and virga continuously sclerotized, without membranous portion. Head: Borders: thickened and sclerotized, firstly diverging from posterior to anterior edge and secondly converging anteriorly, but not fusing medially and, therefore, not forming an “anterior border”. (i) pbh: fused (ii) lbh: narrowed close to posterior border and slightly arched anteriorly, with a slight notch on its outer contour, ending in two narrowed and separated lobes. Virga: shallowly curved anteriorly and almost straight from anterior to posterior portion.</p>
<p><i>Mycotretus reticulatus</i> Crotch, 1876 Figure S6M–R</p>	<p>if-p and if-a strongly asymmetrical, if-p > if-a; if-dr visible and developed along the if-p; vela present, weakly developed, shallowly expanding anteriorly until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.72× as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed basally and widened apically</p>	<p>Present, slightly sinuous, approximately 0.47× the length of penis; membranous from anterior portion until medially and, slightly sclerotized from middle to apex. Head: sclerotized, apparently with the same type of <i>M. rhodosomus</i>, <i>M. major</i> and <i>M. flavomarginatus</i>, but slightly different: This species also has a sclerotized “head-piece”, but it is laterally wide and anterior tips are less narrowed, compared to its allied species. Virga: membranous and slightly concave from anterior portion to medially; slightly convex, shallowly sclerotized and gradually narrowed from middle until posterior tip. Anterior membranous portion with a series of small depressions and undulations</p>

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Mycotretus rhodosomus</i> Lacordaire, 1842</p> <p>Figure S6G–L</p>	<p>if-p and if-a asymmetrical, if-p > if-a; if-dr well visible and developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap in female, approximately 0.92× as long as the css; in male specimen the ratio csap/css was not measured, due the bad conditions of metendosternite; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Apparently narrowed (male) and slightly narrowed (female) at base, and widened apically in both sexes (stalk of male specimen not in good conditions)</p>	<p>Present, slightly sinuous, approximately 0.57× the length of penis; membranous from anterior portion until medially and slightly sclerotized from middle to apex. Head: Similar to <i>M. major</i> and <i>M. flavomarginatu</i>; narrowed and sclerotized, with a sclerotized “head-piece”, that is laterally sinuous and narrowed, with narrowed anterior tips. Virga: curved, concave, flattened and membranous from anterior portion to medially; slightly convex, sclerotized and gradually narrowed from middle until posterior 1/3, and slightly desclerotized and narrowed until the posterior tip</p>
<p><i>Mycotretus scitulus</i> Lacordaire, 1842</p> <p>Figure 3A–C Figure S3A–C</p>	<p>if-p and if-a of similar size (if-a slightly smallest); if-dr well developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.56× as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed basally and widened apically</p>	<p>Present, approximately 0.82× the length of penis, slightly sinuous and wide. Head and virga continuously sclerotized, without membranous portion. Head: dorsal and ventral surface almost entirely membranous; inner contours widely separated. Borders: thin, strongly sclerotized anteriorly and laterally close to posterior portion, and slightly desclerotized at middle. (i) pbh: confluent with virga (ii) lbh: slightly rounded, diverging posteriorly and converging anteriorly (iii) anteriorly: fused, rounded, outer edge with two small and sclerotized lobes. Virga: slightly narrowed and sclerotized from anterior to medially, and slightly widened and sclerotized from middle to posterior portion. Posterior edge divided in two narrowed and sclerotized lobes</p>

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<i>Mycotretus sobrinus</i> (Guérin-Méneville, 1841) Figure S6A–F	if-p and if-a of similar size (if-a slightly smallest); if-dr well visible and developed along the if-p ; vela present, weakly developed, slightly expanding medially until the base of fa	Present with continuous areas, csap approximately 0.53× and 0.5× as long as the css , in male and female, respectively; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Narrowed (male) and slightly narrowed (female) basally and widened apically	Present, sclerotized and slightly sinuous; gradually narrowed from base to apex and approximately 0.82× the length of penis. Membranous portion between head and virga present. Head: elongate, inner contours slightly separated, almost contiguous; disc apparently empty, neither sclerotized nor membranous. Borders: (i) pbh : fused, sclerotized (ii) lbh : subparallel, close to posterior portion with an outer and prominent inflexion; slightly curved and sclerotized from posterior to anterior portion and, close to this latter, with another shallow outer inflexion; outer tips rounded (iii) abh : sclerotized, slightly separated. Virga: Similar to that of <i>M. lesueuri</i> , but with a prominent sinuosity posteriorly and the posterior portion narrow
<i>Mycotretus trifasciatus</i> Guérin, 1956 Figure S2J–N	if-p and if-a of similar size (if-a slightly smallest); if-dr sclerotized and well developed along the if-p in both sexes, in female specimen examined, if-dr was also observed along to if-a ; vela present and slightly developed, gradually expanding from if until the base of fa	Present with continuous areas, csap approximately 0.63× and 0.74× as long as the css , in male and female, respectively; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Narrowed (male) and slightly narrowed (female) at base and widened apically	Present, elongate, approximately 2.07× the length of penis; strongly sclerotized basally, medially membranous and apically sclerotized and narrowed. Head and virga continuously sclerotized, without membranous portion. Head: inner contours widely separated; disc empty, neither sclerotized nor membranous. Borders: thickened, sclerotized. (i) pbh : fused and rounded (ii) lbh : arched, conspicuously angulated at middle and converging anteriorly (iii) abh : straight and fused. Virga: slightly sinuous, almost straight, with its mesal portion accompanied by a membranous enlargement with a broad sinuosity and a small, but conspicuous, sclerotization

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<i>Neotriplax lewisi</i> (Crotch, 1873)	if-p and if-a asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p ; vela present and slightly developed	Present with continuous areas, csap approximately 0.68× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Absent	Base and apex approximately with the same size	Male specimen not available
<i>Palaeolybas nigripennis apicalis</i> Arrow, 1917	if-p and if-a of similar size; if-dr well visible and developed along the if-p and if-a ; vela slightly developed	Present with continuous areas, csap approximately 0.51× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated, short and wide. Anterior process present.	Absent	Slightly narrowed basally and widened apically	Present, approximately 0.83× the length of penis. Membranous portion between head and virga present. Head: "claw-shaped", sclerotized and ending in two outer and blunt tips. Virga sclerotized and slightly sinuous
<i>Pselaphacus nigropunctatus</i> Percheron, 1835	if-p and if-a asymmetrical, if-p > if-a , and if-a short and wild; if-dr developed along the if-p ; vela present and weakly developed	Present with continuous areas; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Slightly narrowed basally and somewhat widened apically	Present, approximately 2× the length of penis. Membranous portion between head and virga present. Head. Sclerotized and "T-shaped" in the dorsal view. Virga: sclerotized
<i>Pseudamblyscelis pallidus discoideus</i> Philipp, 1959	if-p and if-a asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p and if-a ; vela present and slightly developed	Present with continuous areas, csap approximately 0.28× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Absent	Slightly narrowed basally and widened apically	Absent

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<i>Triplax amoena</i> Solsky, 1871	if-p and if-a asymmetrical, if-p > if-a ; if-dr well visible and developed along the if-p and if-a ; vela present and slightly developed	Present with continuous areas, csap approximately 0.55× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like	Slightly narrowed basally and widened apically	Present, elongate, 4.92× the length of penis. Membranous portion between head and virga absent. Head: "lamp-shaped", sclerotized and oval. Virga sclerotized, sinuous and thin
<i>Triplax russica</i> (Linnaeus, 1758) Figure S9K–P	if-p and if-a asymmetrical, if-p > if-a ; if-dr developed along the if-p and observed on the if-a in male; vela present, weakly developed; gradually and slightly expanding from if until the base of fa	Present with continuous areas, csap approximately 0.55× and 0.67× as long as the css , in male and female, respectively; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like (inner outline rounded in male and angulated in female specimen)	Base and apex approximately with the same size (shallowly narrowed basally and widened apically)	Present, small and approximately 0.31× the length of penis. Membranous portion between head and virga absent. Head: sclerotized, inner contours widely separated. Borders: (i) pbh : not fused medially (ii) lbh : rounded, diverging posteriorly and converging anteriorly; (iii) abh : fused at middle; outer edge fused with a small, sclerotized, flattened and subrectangular sclerite. Virga: almost straight and narrowed apically
<i>Tritoma bipustulata</i> Fabricius, 1775 Figure S8G–K	if-p and if-a asymmetrical, if-p > if-a ; if-dr developed along the if-p ; vela present, weakly and narrowed developed close to if and the base of fa , and expanding medially between them	Present with continuous areas, csap approximately 0.41× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated, membranous, slightly wide basally and apically narrowed (similar to that of females of <i>Mycotretus sanguinosus</i>)	Absent	Slightly widened basally and narrow apically	Flagellum absent. As mentioned by Boyle (1956) for this species and <i>Tritoma sanguinipennis</i> (Say, 1825), both have the anterior end of internal sac bearing several short and longitudinal sclerotized areas

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Tritoma sanguinipennis</i> (Say, 1825)</p> <p>Figure S8P–T</p>	<p>if-p and if-a asymmetrical, if-p > if-a; if-dr developed along the if-p; vela present, similar to that of <i>T. bipustulata</i> but weakly developed; slightly expanding from if until medially and narrowed at the base of fa</p>	<p>Present with continuous areas, csap approximately 0.57× and 0.61× as long as the css, in male and female, respectively. ante originating medially, close to the anterior edge of the apm, widely separated and membranous; widest basally in male than female specimen and apically narrowed in both sexes</p>	Absent	Slightly widened basally and narrow apically	Flagellum absent. Anterior end of internal sac bearing several short and sclerotized areas
<p><i>Tritoma senegalensis tenella</i> Delkeskamp, 1962</p> <p>Figure S8L–O</p>	<p>if-p and if-a slightly asymmetrical, if-p > if-a; if-dr developed along the if-p; vela present, weakly and narrowed developed close to if and gradually expanding until the base of fa, where vela is wide</p>	<p>Present with continuous areas, csap approximately 0.85× as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated, membranous, slightly wide basally and apically narrowed</p>	Absent	Base and apex with a similar size	Male specimen not available

Table S1

Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
<p><i>Tritomapara brasiliensis</i> (Guérin, 1946)</p> <p>Figure S8A–F</p>	<p>if-p and if-a of similar size (if-a slightly smallest); if-dr well visible and developed along the if-p; vela present, weakly developed, slightly expanding medially until the base of fa</p>	<p>Present with continuous areas, csap approximately 0.6× as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Narrowed basally and widened apically</p>	<p>Present, sinuous and sclerotized, approximately 1.59× the length of penis. Head and virga continuously sclerotized, without membranous portion; anterior portion of virga involving head and apparently forming an articulation. Head: sclerotized, forming an elongate and flattened piece articulating with virga approximately medially (best observed in lateral view of the head). Inner contours widely separated and disc empty, neither sclerotized nor membranous. Borders: thickened and sclerotized. (i) pbh: under the anterior edge of virga, apparently fused (ii) lbh: subparallel and shallowly converging anteriorly in two narrowed tips, which are widely separated and, therefore, not forming an “anterior border”. Virga: sclerotized and gradually narrowed from anterior to posterior portion</p>
<p><i>Xalpirta mauryi</i> Pecci-Maddalena <i>et al.</i> 2019</p>	<p>if-p and if-a asymmetrical, if-p > if-a; if-dr well visible and developed along the if-p; vela present and slightly developed</p>	<p>Present with continuous areas, csap approximately 0.69 as long as the css; ante originating medially, close to the anterior edge of the apm, widely separated and thin</p>	<p>Present, plate-like</p>	<p>Slightly narrowed basally and widened apically</p>	<p>Present, 1.18× the length of penis. Membranous portion between head and virga present. Head: sclerotized, short, with two small lobes weakly sharp. Virga sclerotized and sinuous</p>

Table S1

	Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
Dacnini	<i>Dacne bipustulata</i> (Thunberg, 1781) Figure S10I–M	if-p and if-a with similar size (if-a slightly smallest); if-dr developed along the if-p ; vela present and abruptly expanding medially until the base of fa	Present with completely separated areas, anterior edge medially emarginated and csap absent; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present and plate-like. Asymmetrical with outline of the left laminae angulated and slightly biggest compared to right laminae (feature more prominent in male specimen)	Narrowed basally and widened apically	Present, approximately with the same length of penis. Head and virga continuously sclerotized, without membranous portion. Head. Sclerotized, in frontal view subtriangular, with rounded contours. Virga: sclerotized, with a narrowed sinuosity close to flagellum head.
Megalodacnini	<i>Megalodacne fasciata</i> (Fabricius, 1777) Figure S10N–S	if-p and if-a strongly asymmetrical (if-p > if-a); if-dr developed along the if-p ; vela present and abruptly expanding medially until the base of fa	Present with continuous areas. csap reduced and approximately 0.13× and 0.3× as long as css , in male and female, respectively; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, plate-like with outline conspicuously angulated; longitudinally oriented in relation to the csap	Slightly narrowed basally and widened apically	Present, approximately 1.04× the length of penis. Head and virga continuously sclerotized, without membranous portion. Head: sclerotized, in frontal view resembling a “horse face”, divided in three slightly sclerotized lobes: the first one (dorsal), with the outline rounded; the others two (ventral) originating from the same base, widely diverge apically and have narrow tips. Virga: thin and sclerotized. Remarks. Apart from flagellum, internal sac has another inner structure, which is sclerotized, flattened, elongate and bilobed and extends from medially to posterior portion

Table S1

	Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
Erotylini	<i>Iphilus trifasciatus</i> (Olivier, 1807) Figure S11A–D	if-p and if-a with similar size; if-dr developed along the if-p ; vela weakly developed and almost vestigial	Present with continuous areas, csap approximately 0.64× as long as the css ; anla can be distinguished and extends dorsally, almost until the medial portion of the fa ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Absent	Slightly narrowed basally and widened apically	Male specimen not available
	<i>Erotylus giganteus</i> (Linnaeus, 1758) Figure S11E–J	if-p and if-a of similar size and wide, slightly elongate; if-dr developed along the if-p ; vela weakly developed, almost vestigial	Present with continuous areas. csap approximately 0.77× and 1.44× as long as the css , in male and female, respectively. A shallowly developed anla , can also be distinguished, but extends only until the base of fa ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Absent	Slightly widened basally and narrowed apically	Present, strongly sclerotized, approximately 0.87× the length of penis. Membranous portion between head and virga present. Head: sclerotized and elongate, with a prominent margin, running dorsally and longitudinally, from posterior to anterior tips; inner contours slightly separated. Borders: (i) pbh : fused medially (ii) lbh : parallel, slightly sinuous, ending in two rounded and divergent tips, slightly separated and, therefore, not forming an “anterior border”. Outline with two inflexions: medially and close to anterior tip. Virga: flattened and almost straight, posterior tip narrowed

Table S1

Taxa (figs)		Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
Encaustini	<i>Encaustes verticalis</i> Macleay, 1825 Figure S11K–Q	if-p and if-a strongly asymmetrical (if-p > if-a ; if-dr prominent, developed and confluent along the if-p and if-a ; vela slightly developed close to the base of fa	Present with continuous areas; csap approximately 0.5× as long as the css ; ante originating medially, close to the anterior edge of the apm , narrowed separated and thin	Present and plate-like	Slightly narrowed basally and widened apically	Present, sclerotized and thin, approximately 1.26× the length of penis. Membranous portion between head and virga absent. Head: sclerotized; inner contours widely separated, diverging posteriorly and almost parallel at middle and anteriorly. Borders: (i) pbh : fused medially (ii) lbh : angulated close to posterior portion and almost parallel anteriorly, ending in two rounded and sclerotized tips, widely separated and, therefore, not forming an “anterior border”. Lateral borders are bent ventrally, forming a fringe sclerotized extension of three lobes (best observed in lateral view of head). Virga: Anteriorly, close to head, with a deep inner emargination; posterior tip narrowed
Cryptophilinae	Cryptophili ni <i>Cryptophilus integer</i> (Heer, 1841) Figure S12A–D	Reduced and modified. if with if-p and if-a not clearly separated compared to the other Erotylidae studied; apparently in the form of a unique, flattened and elongate membranous plate, with a sinuous outline; if-dr not observed; vela slightly wide and developed close to the base of if and, narrowed medially and close to the base of fa ; ante originating close to the tip region (if), slender, membranous and seated upon a small and sclerotized bulge	Absent	Absent	Short and slightly narrowed basally and widened apically	Present, elongate, approximately 2.47× the length of penis. Head and virga separated by a small and shallow membranous portion, barely visible even at a microscope exam. Head: in the form of a simple, reduced, subcylindrical and elongate structure, distinguished from virga only due the presence of a membranous portion between them. Virga: slightly sclerotized and thin

Table S1

	Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
Loberinae	<i>Loberus impressus</i> LeConte, 1861 Figure S12E–I	if-p and if-a strongly asymmetrical (if-p > if-a); if-dr , developed along the if-p ; vela present and slightly expanding medially until the base of fa	Present with continuous areas; csap approximately 1.15× and 0.87× as long as the css , in male and female, respectively; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, slightly elongate, with the inner outline conspicuously constricted at base	Base and apex of similar size	Present, shallowly sclerotized, approximately 1.07× the length of penis. Membranous portion between head and virga absent. Head: rounded; inner contours widely separated, discal portion apparently empty, neither sclerotized nor membranous. Borders: thickened. (i) pbh : apparently fused medially (ii) lbh : rounded and converging anteriorly (iii) abh : apparently fused, with an elongate, flattened and slightly sclerotized structure outlining the head from anterior to posterior portion
Pharaxonothinae	<i>Cycadophila debaonica</i> Xu <i>et al.</i> 2015	Metendosternite very similar to that of <i>Pharaxonotha kirschii</i> . if-p and if-a strongly asymmetrical (if-p > if-a); if-dr , developed and confluent along the if-p and if-a ; vela present and abruptly expanding medially until the base of fa	Present with continuous areas; csap approximately 0.31× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, conspicuously elongate and strongly narrowed, almost with the length of the fa and with a narrowed apical outline	Narrowed basally and widened apically	Male specimen not available
	<i>Pharaxonotha kirschii</i> Heer, 1875 Figure S12J–O	if-p and if-a strongly asymmetrical (if-p > if-a); if-dr , developed and confluent along the if-p and if-a ; vela present and abruptly expanding medially until the base of fa	Present with continuous areas; csap approximately 0.62× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, conspicuously elongate and strongly narrowed, almost with the length of the fa and with a narrowed apical outline	Narrowed basally and widened apically	Present, thin and conspicuously elongate, approximately 7.42× the length of penis. Membranous portion between head and virga absent. Head: very small and triangular; inner contours widely separated, diverging posteriorly and fusing anterior and laterally to the inner contour of anterior border; disc apparently empty, neither sclerotized nor membranous. Borders: (i) pbh : apparently fused medially (ii) lbh : straight; fusion point with anterior border conspicuously angulated (iii) anteriorly: fused. Virga: Sinuous

Table S1

Taxa (figs)		Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
Languriinae	Languriini <i>Languria bicolor</i> Fabricius, 1789 Figure S12P–U	if-p and if-a strongly asymmetrical (if-p > if-a); if-dr , developed and confluent along the if-p and if-a ; vela slightly expanding medially until the base of fa	Present with continuous areas; csap approximately 0.51× as long as the css ; ante originating medially, close to the anterior edge of the apm , widely separated and conspicuously thin and membranous	Present and plate-like	css thickened and strongly sclerotized, compared to the laterals sclerotizations of stk , which are desclerotized and confluent with the membrane of abdominal segment I. For this reason, basal portion of stk could not be distinguished in the studied specimen	Present, flattened and partially sclerotized; approximately 0.42× the length of penis. Membranous portion between head and virga present and slightly wide. Head: without a differentiated enlargement common in the other studied Erotlylidae, instead of this the head of <i>L. bicolor</i> is conspicuously elongate, sclerotized and narrowed, with the anterior tip pointed. Virga: anteriorly desclerotized, with a conspicuous constriction at middle and posteriorly slightly sclerotized and narrowed
Biphyllidae	<i>Diplocoelus</i> sp. Figure 4I	if-p developed and if-a vestigial; if-dr , prominent and well developed along the if-p ; vela slightly developed	Present with continuous areas; csap approximately 0.52× and 0.38× as long as the css , in male and female, respectively. Anterior edge with a deep and conspicuous emargination medially; ante originating medially, close to the anterior edge of the apm , widely separated and thin	Present, elongate and narrowed, similar to those of <i>Pharaxonotha kirschii</i> but shorter and with a rounded apical outline	Slightly narrowed basally and widened apically	Absent

Table S1

	Taxa (figs)	Furcal arm	Anterior portion of metendosternite	Laminae	Stalk	flagellum
Helotidae	<i>Helota fulviventris</i> Kolbe, 1886	if-p and if-a almost confluent, if-p slightly narrowed and if-a slightly rounded; if-dr , well developed along the if-p ; vela well developed	Present; csap approximately 0.19× as long as the css ; ante originating close to the tip region (if), slender, membranous and seated upon a small and sclerotized bulge (similar to that of <i>Cryptophilus integer</i>)	Absent	Narrowed apically and widened basally (metenosternite T-shaped)	Absent. Inner to the internal sac there are some small sclerites but not the typical flagellum verified in the Erotylidae

Capítulo VII

Phylogenetic relationships of Tritomini Curtis (Coleoptera: Erotylidae: Erotylinae) with emphasis on *Mycotretus* Lacordaire

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¹ Os pesquisadores Dr. Paul E. Skelley (Florida State Collection of Arthropods, USA) e Dr. Joseph V. Mchugh (University of Georgia, USA) foram convidados para coautoria, mas ainda não leram essa versão do manuscrito. Ambos estão cientes da realização deste artigo.

Abstract. Erotylidae (Coleoptera: Cucujoidea) occurs worldwide and is especially diverse in the Neotropical region. Although there are three phylogenetic hypotheses for the higher classification of Erotylidae, little is known about the phylogenetic relationships below the subfamily level. Tritomini, the most speciose tribe of Erotylidae, includes more than one thousand species within almost one hundred genera and was not recovered as monophyletic in the previous phylogenetic studies on Erotylidae. The same occurred with *Mycotretus* Lacordaire, the most speciose genus of Tritomini, with morphological and molecular suggesting it is not natural. Up to date there is no phylogenetic study for any Tritomini genus and, therefore, the internal and external phylogenetic relationships of its genera remain unknown. Recently, we have moved our efforts to shed light on the morphological limits of species of the Neotropical genus *Mycotretus* and other Tritomini taxa. In order to understand the phylogenetic relationships of Tritomini and *Mycotretus*, the objective of the present study was twofold: to test the monophyly of Tritomini and to test the monophyly of *Mycotretus*. A phylogenetic analysis was carried out, based on the broadest taxonomic sampling ever conducted for these taxa. The analyses were performed with representatives of 73 species belonging to the four most diverse subfamilies of Erotylidae, including 20 genera and 60 species of Tritomini (32 species of *Mycotretus*). Species were selected based on their availability, representativeness of morphological variation and geographical distribution, including type-species of genera type-genus of suprageneric taxa whenever possible. A total of 44 morphological characters were examined and coded. We demonstrate that Tritomini and *Mycotretus* are not monophyletic. A clade comprising Erotylini + part of Tritomini, including the type-species of the type-genera of Erotylini and Tritomini, was recovered as monophyletic and would deserve subfamily status. The genera *Tritoma* Fabricius, *Triplax* Herbst and *Xalpirta* Skelley & Cekalovic were not recovered as monophyletic. The terminal taxon named "Tritomini sp.", of a genus yet undescribed, was recovered as related to *Myceporthus*. Within *Mycotretus*, two well-supported clades were recovered and deserve genus-status: (i) the clade *Mycotretus flavomarginatus* + *M. reticulatus* + *M. rhodosomus* + *M. tricolor* and (ii) the clade *Mycotretus apicalis* + *M. coccineus* + *M. fuscitarsis* + *M. melanophthalmus*. However, many species of *Mycotretus* and other taxa within Tritomini formed a gross polytomy, for which we discuss probable historical and ecological explanations.

Introduction

Erotylidae is worldwidely distributed, with about 260 genera, more than 3500 species and a high diversity on the Neotropical region (Costa, 2000; Leschen *et al.*, 2010; Lawrence & Ślipiński, 2013). Erotylids are more common in forested areas (Lawrence & Ślipiński, 2013) where most species feed on macro-Basidiomycetes fungi (Skelley *et al.*, 1991), although other feeding habits as phytophagy and saprophagy have been observed for some taxa (Leschen *et al.*, 2010). The current classification of Erotylidae is based mostly on Leschen (2003) and includes six subfamilies (Cryptophilinae, Erotylinae, Languriinae, Loberinae, Pharaxonothinae, and Xenoscelinae). However, this higher classification is under dispute and needs further study (Lyubarsky & Perkovsky, 2018; Keller & Skelley, 2019).

Currently the most robust phylogenetic scenarios for Erotylidae are those of Robertson *et al.* (2004) based on DNA-sequences, and Węgrzynowicz (2002) and Leschen (2003) based on morphology; the latter treat mainly the former languriid subfamilies (Drilling *et al.*, 2013). Tritomini, the most speciose tribe of Erotylidae with 91 genera, more than 1000 species and a worldwide distribution (Leschen *et al.*, 2010), is not considered monophyletic, based on molecular and morphological data of adults and larvae (Węgrzynowicz, 2002; Robertson *et al.*, 2004; McHugh, unpublished data). Aside from these evidences, it is worth to note that those authors were more interested in proposing hypotheses (absent at the beginning of the 21st century) for the higher level classification of Erotylidae. Therefore, a phylogenetic study of Tritomini has not yet been performed.

There is a strong asymmetrical distribution of species across the genera of Tritomini, with six genera encompassing about one half of the total species of the tribe: *Mycotretus* Lacordaire (177 species), *Tritoma* Fabricius (129 species), *Triplax* Herbst (93 species), *Ischyryus* Lacordaire (75 species), *Laurenticola* Philipp (48 species), *Megischyryus* Crotch (35 species). On the other hand, at least 60 genera include less than 20 species each one (Boyle, 1956; Delkeskamp, 1981; Chûjô, 1990; Alvarenga, 1994; Goodrich & Springer, 1999; Pecci-Maddalena *et al.*, 2019a,b). Except for *Ischyryus*, all major genera of Tritomini lack taxonomic revision, and few of the minor genera have been revised (Skelley, 1998; Lopes, 2006). Aside from that, the phylogenetic study of Erotylidae by Robertson *et al.* (2004) reveal that at least some of the largest genera of Tritomini (e.g. *Mycotretus* and *Tritoma*) are not monophyletic. However, no phylogenetic study focusing on Tritomini as a whole or on any of its genera was performed until now, so the internal and external phylogenetic relationships of its genera remain mostly unknown.

Recently, we have moved our efforts to shed light on the morphological limits of species of the Neotropical genus, *Mycotretus*, but also on other Tritomini taxa (Pecci-Maddalena & Lopes-Andrade, 2017; Pecci-Maddalena & Lopes-Andrade, 2018ab; Pecci-Maddalena *et al.*, 2019a,b,c). Regarding *Mycotretus*, fifty-three new synonyms and one new combination were recently proposed, and valid names were reduced from 217 to 177 (Pecci-Maddalena *et al.*, 2019b). Aside from that, our comparative morphological study of the metendosternite and penile flagellum in Erotylidae (Pecci-Maddalena *et al.*, 2019c) revealed characters prone to have phylogenetic signal within Tritomini, especially within *Mycotretus*. However, a phylogenetic study including a broad taxonomic sampling of Tritomini and different character sets has not yet been conducted. In order to understand the phylogenetic relationships of Tritomini and its most speciose genus, *Mycotretus*, the objective of the present study was twofold: to test the monophyly of Tritomini and to test the monophyly of *Mycotretus*. A phylogenetic analysis was carried out, based on the broadest taxonomic sampling ever conducted for these taxa. We propose a phylogenetic scenario for Tritomini genera and for the species under *Mycotretus*.

Material and Methods

Taxa studied

Representatives of 73 species belonging to the four most diverse subfamilies of Erotylidae were examined (Table 1). Only two Erotylidae subfamilies were not included: Xenoscelinae, because no specimen of this taxon was available to us; and Loberinae, because *Loberus*, the taxon we have in hands, has a high variation in their characters and character states (see Leschen, 2003). All species used in this study, as well as the number, sex, and provenance of the examined specimens, are listed in Table 1. Following the practice of published phylogenetic studies on Erotylidae (e.g. Węgrzynowicz, 2002; Leschen, 2003), the examined type species of all subfamilies and tribes included here were treated as being representative of their respective taxon. Whenever possible, additional species of each suprageneric and generic taxon were examined. A total of 20 genera and 60 species of Tritomini were selected, including 32 species of *Mycotretus* (Table 1). Species were selected based on their availability, representativeness of morphological variation and geographical distribution (Table 1). Most studied specimens were identified by direct comparison with primary types, historical material housed in museums and by consulting the taxonomic literature (e.g. Lacordaire, 1842; Pecci-Maddalena *et al.*, 2019b). Images of character states

are provided in Figures 1–8. Authors and year of species names are listed in Table 1 and are not repeated in the text.

The material studied (Appendix) belongs to the following collections:

Coleção Ayr de Moura Bello, Rio de Janeiro, Brazil (**CAMB**); Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera, Viçosa, Brazil (**CELC**); Seção de Entomologia da Coleção Zoológica, Departamento de Biologia e Zoologia, Instituto de Biociências, Universidade Federal de Mato Grosso, Cuiabá, Brazil (**CEMT**); Coleção Entomológica da Universidade Federal Rural de Pernambuco, Recife, Brazil (**CERPE**); Coleção Entomológica Padre Jesus Santiago Moure, Universidade Federal do Paraná Curitiba, Brazil (**DZUP**); Florida State Collection of Arthropods, Gainesville, USA (**FSCA**); Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Brazil (**MCNZ**); Museu Nacional, Universidade Federal do Rio de Janeiro, Brazil (**MNRJ**); Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil (**MZSP**).

Terminology and character polarization

The suprageneric classification of Erotylidae used herein is based on Węgrzynowicz (2002), Leschen (2003), Robertson *et al.* (2004), Leschen *et al.* (2010) and Bouchard *et al.* (2011). As was done by Drilling *et al.* (2013), species-level systematics follow the catalogs of Chûjô & Chûjô (1988, 1989, 1990: Palearctic, Oriental, and Australian faunas, respectively), Alvarenga (1994: Neotropical fauna), Delkeskamp (1981: Ethiopian fauna), Boyle (1956: Nearctic fauna), and Leschen & Węgrzynowicz (1998, Languriinae). For *Ischyryus* Lacordaire, 1842 we followed the work of Skelley (1998). Terms for external morphology follow McHugh *et al.* (1997), Węgrzynowicz (2002), Leschen (2003), Lawrence *et al.* (2011) and Pecci-Maddalena *et al.* (2019c). Hypotheses on character polarity were based on Węgrzynowicz (2002), Leschen (2003), Leschen *et al.* (2005) and Lawrence *et al.* (2011).

Morphological study and images

Dissection followed mostly Pecci-Maddalena & Lopes-Andrade (2017; 2018a,b). Dissected parts were kept in genitalia vials or in glass microtubes, both containing glycerin to avoid dehydration. Examination and measurement of specimens, as well as most photographs, were made under a Zeiss Discovery V20 microscope equipped with a Zeiss AxioCam 506 digital camera. Dissections and a few photographs were made under a Zeiss Stemi 2000C stereomicroscope equipped with a Canon EOS 1000D camera. Photographs of the smallest

specimens were performed under a Zeiss AxioLab compound microscope equipped with a Zeiss AxioCam MRc digital camera.

Cladistic analysis

The matrix comprised 73 terminal taxa, 60 belonging to the ingroup (60 species of 19 genera of Tritomini, including 32 species of *Mycotretus*) and 13 to the outgroup (Table 2). The outgroup includes representatives of the tribes Dacnini, Encaustini, Erotylini and Megalodacnini (Erotylinae) and taxa of the subfamilies Pharaconothinae, Cryptophilinae and Languriinae. Helotidae, a sister family of Erotylidae, was included following previous phylogenetic studies by Węgrzynowicz (2002) and Robertson *et al.* (2015).

The data matrix was compiled using MESQUITE 3.10 (Maddison & Maddison, 2016) and analyzed under parsimony with TNT v1.5 (Goloboff & Catalano, 2016). In the cases when only females were examined, characters of the penile flagellum were coded as '?' and those characters not applicable were coded as '-'. Other characters not observed were coded as '?'. All analyses were performed under equal weights (EW) and implied weights (IW) (Goloboff, 1993; Goloboff *et al.*, 2008b) using the New Technology algorithms with the following parameters: sectorial search in default mode, 200 iterations of ratchet, 20 cycles of drift, 10 rounds of tree fusing, Driven Search > 'Find. min length' = 100 times, 'Random seed' = 0, 'Collapse trees after search'. For the implied weighting scheme, a TNT script (setk.run) written by Salvador Arias was used to calculate the appropriate value for the constant *k* (details in Goloboff *et al.*, 2008a). The script returned a value of *k* = 10 for our data set, which was then employed.

For the equal weighting analysis, nodes were evaluated with Bremer supports (Bremer, 1994) with the Bremer.run script supplied by TNT. For the implied weighting analysis, symmetric resampling were used (Goloboff *et al.*, 2003), expressed as the difference in the GC (frequency differences), number of replicates (1000 replications). A strict consensus tree for both analyses (implied weights (IW) and equal weights (EW)) was generated and, additionally, a majority consensus tree was obtained for the implied weight analysis. The consistency (CI) and retention (RI) indices were recovered for both analyses. Optimizations were performed with Winclada-ASADO 1.62 (Nixon, 2002), and except for character state 14:0 (see below, character remarks), only unambiguous changes were mapped on the tree. We coded most characters as binary and treated the multi-state characters as unordered.

Results

A total of 44 characters were examined and coded, most from the phylogenetic studies of Erotylidae by Węgrzynowicz (2002) and Leschen (2003) and from the morphological comparative study of the metendosternite and penile flagellum of Erotylidae by Pecci-Maddalena *et al.* (2019c). The data set comprises 15 characters of the head, four of the prothorax, one of the mesothorax/metathorax, nine of the metathorax (seven of the metendosternite), one of the abdomen, two of the legs, ten of the male terminalia (eight of the penile flagellum), and two of the female terminalia. Except for cases in which the character authorship is mentioned, all remaining characters are new and proposed here for the first time for Erotylidae. The character matrix is provided in Table 2.

List of characters

Head

1. Clypeus, complete marginal bead: (0) absent (Fig. 1A); (1) present (Fig. 1B, 1:1). A complete clypeal marginal bead is present in the following taxa: *Mycophtorus palpalis*, *Lybasia barbata*, *Palaeolybas nigripennis apicalis*, *Amblyopus marginatus*, *Amblyopus vittatus*, *Pseudamblyscelis pallidus discoideus*, *Tritoma bipustulata*, *Tritoma sanguinipennis*, *Mycophtorus haafi* and *Tritoma senegalensis tenella*. Węgrzynowicz (2002) treated this feature as two separate ones: “clypeus, anterior bordering” and “clypeus, lateral bordering” stating that the former occurred only in a clade within Tritomini on his study. However, here the character “clypeus, anterior bordering” was also observed in *Cycadophila debaonica* (Pharaxonothinae) and character “clypeus, lateral bordering” occurred in different taxa (e.g. *Triplax amoena*, *Tritoma*). Treated as separate, the conditions “anterior” and “lateral” bordering seems to be continuous across the studied taxa whereas a complete marginal bead may be present or not.

2. Clypeus, with a V-shaped emargination: (0) absent; (1) present (Fig. 1C). Character state 1 was observed only in species of *Mycepothus* (Tritomini).

3. Frontoclypeal suture, presence: (0) absent (Fig. 1D); (1) present (Fig. 1B, 3:1). Character used by Węgrzynowicz (2002) and Leschen (2003). In the present study character state 0 was observed only in *Cryptophilus integer* (Cryptophilinae).

4. Frontoclypeal suture, extension: (0) entire (Fig. 1E, 4:0); (1) interrupted at middle (e.g. Figs. 1A–B). Character used by Węgrzynowicz (2002). An entire frontoclypeal suture is present in *Neotriplax lewisi*, *Palaeolybas nigripennis apicallis*, *Tritoma sanguinipennis* (Erotylinae: Tritomini), *Dacne bipustulata* (Erotylinae: Dacnini), *Encaustes verticalis* (Erotylinae: Encaustini) and *Aegithus clavicornis*, *Erotylus giganteus*, *Iphiclus trifasciatus* (Erotylinae: Erotylini). The remaining examined erotylids (except *Cryptophilus*) have the frontoclypeal suture interrupted at middle.

5. Subgenal braces, inner edge: (0) with a conspicuous laminar process (Figs. 1F–I e Fig. 2A–B); (1) with a feeble laminar process (Figs. 2C–H). In character state 1, mandibular condyle and mola are usually well visible (Fig. 2C, E, G–H, arrows). This condition occurs in *Aegithus clavicornis*, *Erotylus giganteus*, *Iphiclus trifasciatus* and *I. virgatus* (Erotylinae: Erotylini) and in the following Tritomini: *Neotriplax lewisi*, *Lybasia barbata*, *Palaeolybas nigripennis apicalis*, *Amblyopus marginatus*, *Amblyopus vittatus*, *Pseudamblyscelis pallidus discoideus*, *Tritoma bipustulata*, *Tritoma sanguinipennis*, *Mycophtorus haafi* and *Tritoma senegalensis tenella*. A conspicuous laminar process covering completely (or almost completely) the mandibular condyle and mola is present in the remaining studied erotylids and varies from a shallow lamina (e.g. *Haematochiton*, *Mycophtorus palpalis*, to a strongly projected lobe or teeth (e.g. *Mycotretus*, *Eutriplax tuberculifrons*).

6. Subgenal braces, shape: (0) triangular and shorter than mandibular (Fig. 2I, 6:0); (1) triangular and as long as mandibular (Fig. 3A, 6:1); (2) tooth-shaped, rectangular or blunt (Figs. 1F–I e 2A–H). Character state 0 is present in *Helota fulviventris* (Helotidae), *Languria bicolor* (Languriinae) and character state 1 was observed only in *Encaustes verticalis* (Erotylinae: Encaustini). The remaining studied taxa have character state 2.

7. Stridulatory files on the vertex of head, presence: (0) absent (Fig. 3B); (1) present (Figs. 3C–D). Character used by Leschen (2003). About 2/3 of the studied erotylids have stridulatory files on vertex .

8. Stridulatory files on the vertex of head, number: (0) one (Fig. 3C, 8:1); (1) two (Fig. 3D, 8:2). Character used by Leschen (2003) and applicable only for taxa coded as 6:1. In the present work, character state 0 was observed only in *Cryptophilus integer* (Cryptophilinae).

9. Mouthparts, maxillae, hooks on lacinia: (0) absent (Fig. 3E); (1) present (Fig. 3F, 9:1). Character used by Węgrzynowicz (2002) and Leschen (2003). Lacinial hooks are absent in *Pharaxonotha kirschii*, *Cycadophila debaonica* (Pharaxonothinae), *Episcaphula australis*, *Megalodacne fasciata* (Erotylinae: Megalodacnini), *Neotriplax lewisi*, *Amblyopus marginatus*, *Amblyopus vittatus*, *Pseudamblyscelis pallidus discoideus*, *Tritoma bipustulata*, *Tritoma sanguinipennis*, *Mycophthorus haafi*, *Tritoma senegalensis tenella* (Erotylinae: Tritomini). In the remaining studied erotylids (except for *Cryptophilus integer*, in which this character is coded as doubtful) lacinial hooks are present.

10. Mouthparts, maxillae, shape of apical joint of maxillary palpi: (0) fusiform (Fig. 3G, 10:0); (1) symmetrically triangular (Fig. 3H, 10:1); (2) asymmetrically triangular (Fig. 3I, 10:2). Character proposed by Węgrzynowicz (2002).

11. Mouthparts, mentum scutum, shape: (0) rectangular (Fig. 2I, 11:0); (1) trapezoidal (Fig. 4A); (2) pentagonal (Fig. 4B); (3) triangular (Fig. 4C); (4) nearly circular (Fig. 4D). In the present study, character state 0 was observed only in *Helota fulviventris* (Helotidae). A trapezoidal mentum was observed in *Pharaxonotha kirschii*, *Cycadophila debaonica* (Pharaxonothinae), *Cryptophilus integer* (Cryptophilinae), *Languria bicolor* (Languriinae) and *Encaustes verticalis* (Erotylinae: Encaustini). Within Erotylidae, the pentagonal mentum shape is the most common, followed by the triangular. Definition of these two states are as follows: a “pentagonal mentum” has its anterior contours angulate, arising at middle of the edge of the mentum plate and converging anteriorly; a “triangular mentum” has its anterior contours arising close to base of the mentum plate and do not form anterior angles; a “nearly circular” mentum is similar to the pentagonal, however it is anteriorly rounded, lacking angulation. The latter feature is present in *Mycotretus apicalis*, *M. coccineus*, *M. fuscitarsis* and *M. melanophthalmus*.

12. Mouthparts, mentum pores, presence: (0) absent; (1) present (Fig. 4E, 12:1). Character proposed by Węgrzynowicz (2002) and supported by Drilling *et al.* (2013). In the present study, only the genera *Lybas*, *Megischyrus* and *Ischyris* have character state 1.

13. Submentum, separation by a sulcus: (0) absent; (1) present (Fig. 4F, 13:1). Character used by Węgrzynowicz (2002). Character state 1 is present in *Episcaphula australis*, *Megalodacne fasciata* (Erotylinae: Megalodacnini), *Encaustes verticalis* (Erotylinae: Encaustini) and *Languria bicolor* (Languriinae).

14. Mouthparts, labium, shape of apical joint of labial palps: (0) cylindrical, conical or fusiform (Fig. 4G); (1) ovate (Fig. 4H); (2) securiform (Fig. 4I). Character used by Węgrzynowicz (2002), Leschen (2003) and Lawrence *et al.* (2011) with distinct character states definitions. Here, we adopt the character statements of Lawrence *et al.* (2011) joining the character states “clavate” and “securiform, asymmetric”, proposed by Węgrzynowicz (2002) into a single state “securiform”, because differences across the examined taxa seems to be continuous. Definition of character states 0, 1 and 2 are the following: (0) cylindrical (narrowed at both ends or narrowed apically); a cylindrical apical labial palp is apically rounded, with an arched row of slender setae or a single tuft of setae at apex; (1) ovate shape is similar to cylindrical, however the ovate is horizontal in relation to palpomere 2, which is conspicuously enlarged compared to palpomere 1; (2) securiform is squarely to obliquely truncate apically with the row of setae not arched and commonly thicker than the ones present on cylindrical palpomeres. Character state 14:0 at the stem lineage of the clade Erotylini + part of Tritomini was optimized using accelerated transformation (ACCTRAN), because, based on its morphology, we considered a transformation from state 0 (cylindrical) to 1 (ovate) more plausible than from the state 2 (securiform) to 1.

15. Mouthparts, lateral pockets of mentum: (0) absent; (1) present (Fig. 4A, 15:1). Character proposed by Leschen (2003). In the present study, only present in *Pharaxonotha kirschii* and *Cycadophila debaonica* (Pharaxonothinae).

Prothorax

16. Lateral margins of pronotum: (0) smooth (Fig. 5A, 16:0); (1) slightly denticulate (Fig. 5B, 16:1); (2) strongly denticulate (Fig. 5C, 16:2). Character used by Węgrzynowicz (2002). In the present study, character state 1 is present only in *Cryptophilus integer* (Cryptophilinae) and character state 2 in *Helota fulviventris* (Helotidae), the remaining examined taxa have the lateral margins of pronotum smooth.

17. Pores on pronotal sides, presence: (0) absent; (1) present (Figs. 5D–E, arrows). Character used by Węgrzynowicz (2002). Pores are absent on pronotal sides only in *Dacne bipustulata* (Erotylinae: Dacnini), and in the examined *Pharaxonotha kirschii*, *Cycadophila debaonica* (Pharaxonothinae) and *Cryptophilus integer* (Cryptophilinae) presence of this character is coded as doubtful.

18. Pores on pronotal sides, arrangement: (0) one by one in each angle (Fig. 5A, arrows); (1) a single pore in each anterior and posterior angle plus a single one at the lateral margin (Figs. 5D, arrows showing pores at lateral margin and at posterior margin); (2) numerous all-along the lateral margins (Fig. 5E, arrows). Character used by Węgrzynowicz (2002) and here modified to include character state 1 described by Drilling *et al.* (2013). Character state 0 occurs in most studied erotylids; character state 1 is present in *Pselaphacus nigropunctatus* and *Megischyrus* (Erotylinae: Tritomini); character state 2 occurs in *Encaustes verticalis* (Erotylinae: Encaustini) and *Aegithus clavicornis*, *Erotylus giganteus*, *Iphiclus trifascitaus* (Erotylinae: Erotylini).

19. Anterior margin of prosternum: (0) smooth; (1) denticulate (Fig. 5F, arrow). Character used by Węgrzynowicz (2002) and Leschen (2003). In this study, an anterior prosternal margin denticulate was observed only in *Pharaxonotha kirschii*, *Cycadophila debaonica* (Pharaxonothinae), *Cryptophilus integer* (Cryptophilinae), *Dacne bipustulata* (Erotylinae: Dacnini) and *Helota fulviventris* (Helotidae).

Mesothorax/Metathorax

20. Mesometaventral articulation: (0) monocondylic (Fig. 5G); (1) dicondylic (Fig. 5H); (2) flat (Fig. 5I). Character used by Węgrzynowicz (2002) and Leschen (2003). We adopt the same character statement of Leschen (2003). A monocondylic mesometaventral articulation is present in *Pharaxonotha kirschii*, *Cycadophila debaonica* (Pharaxonothinae). Character state 1 occurs in most studied erotylids and character state 2 was observed in a few taxa within Tritomini. In *Helota fulviventris* (Helotidae) the anterior edge of metaventrite are conspicuously developed and inserted into the mesoventrite and, therefore, the articulation of mesothorax and metathorax seems be different of that present in the Erotylidae.

Metathorax

21. Outer margin of metascutellum: (0) touching posterior margin of metascutum (Fig. 5J); (1) not touching posterior margin of metascutum (Fig. 5K). Character proposed by Węgrzynowicz (2002). Character state 1 is present in *Aegithus clavicornis*, *Erotylus giganteus*, *Iphiclus trifascitaus*, *I. virgatus* (Erotylinae: Erotylini). All remaining examined erotylids have the outer margin of metascutellum touching posterior margin of metascutum.

22. Metathoracic wings: (0) present; (1) absent (Fig. 5L). In the Erotylidae, hind wings are relatively long and narrow, although sometimes reduced or even absent (Leschen, 2003). In the present study, the unique apterous taxon is “Tritomini sp.” and it probably belongs to a new genus.

23. Metendosternite, anterior tendons, separation: (0) narrowed separated on anterior portion of metendosternite (Fig. 6A, 23:0); (1) moderately separated on anterior portion of metendosternite (Fig. 6B, 23:1); (2) widely separated, located close to the tip of furcal arms (Fig. 6C, 23:2). Character used by Leschen *et al.* (2005) for Cucujoidea and updated by Pecci-Maddalena *et al.* (2019c) for Erotylidae. Character state 0 was observed in *Encaustes verticalis* (Erotylinae: Encaustini); character state 1 is present in most studied erotylids and character state 2 is present in *Cryptophilus integer* (Cryptophilinae) and *Helota fulviventris* (Helotidae).

24. Metendosternite, anterior tendons, morphology: (0) thin (Fig. 6B, 24:0); (1) wide (Fig. 6D, 24:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). Character state 1 is present in *Mycotretus coccineus*, *Lybasia barbata*, and *Palaeolybas nigripennis apicalis* (Erotylinae: Tritomini).

25. Metendosternite, anterior portion, presence of an anterior process: (0) absent; (1) present (Fig. 6E, 25:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). In Coleoptera the anterior process extends forward from the bases of the frontal arms and may be short and broad to long and narrow (Lawrence *et al.*, 2011). An elongate anterior process is found in a number of Archostemata, Adephaga and Scarabaeoidea, and is particularly common in Elateriformia (Lawrence *et al.*, 2011). However its presence seems to be uncommon within Erotylidae; here it is verified only in *Palaeolybas nigripennis apicalis* and *Tritoma senegalensis tenella* (Tritomini).

26. Metendosternite, anterior portion, central sclerotization of anterior portion, extension: (0) entire; (1) inconspicuous (Fig. 6F, 26:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). In the present study, character state 1 is unique to *Dacne bipustulata* (Erotylinae: Dacnini).

27. Metendosternite, anterior portion, laminae, presence: (0) present (Fig. 6F, 27:0); (1) absent (Figs. 6E e 6G). The presence/absence of laminae has been used in phylogenetic studies of higher level classification of Erotylidae and Coleoptera in general (e.g. Węgrzynowicz, 2002; Leschen, 2003; Leschen *et al.*, 2005 and Lawrence *et al.*, 2011).

28. Metendosternite, anterior portion, laminae, morphology: (0) conspicuously elongate and strongly narrowed, sometimes almost as long as furcal arm and with a narrowed apical outline (Fig. 6H, 28:0); (1) plate-like (Figs. 6A–B, 6F, 6I). Character described and documented by Pecci-Maddalena *et al.* (2019c). The character state 0 occurs in *Pharaxonotha kirschii* and *Cycadophila debaonica* (Pharaxonothinae). The plate-like lamina was verified here in *Languria bicolor* (Languriinae), as well in all examined Erotylinae (except for members of Tritomini and Erotylini, in which laminae are absent).

29. Metendosternite, anterior portion, laminae orientation: (0) horizontal (Figs. 6A–B e 6F); (1) vertical (Fig. 6I, 29:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). There are two distinct orientation patterns of metendosternal laminae in Erotylidae, and although some intermediate states may occur, it is usually possible to interpret these as state 0 or 1. Vertical laminae were verified in *Ischyryus quadripunctatus quadripunctatus*, *Ischyryus scriptus*, *Megischyryus* sp., *Megischyryus brasiliensis*, *Lybas thoracicus*, *Mycophtorus palpalis*, *Triplax amoena* (Erotylinae: Tritomini), *Megalodacne fasciata* and *Episcaphula australis* (Megalodacnini).

Abdomen

30. Intercoxal process: (0) broad (Fig. 7A, 30:0); (1) narrow (Fig. 7B, 30:1). Character used by Leschen. (2003). A narrow intercoxal abdominal process is present in *Pharaxonotha kirschii*, *Cycadophila debaonica* (Pharaxonothinae) and *Languria bicolor* (Languriinae).

Legs

31. Tarsi: (0) basal four joints cylindrical, 4. shorter than 1–3 and not deeply hidden in emargination of 3 (Fig. 7C–D, arrows); (1) three basal joints widely triangular, fourth minute, deeply hidden in emargination of 3 (Fig. 7E, arrow). Here we modified the character statement proposed by Węgrzynowicz (2002) and joined character “0” and “1”, described by him, once these differences are continuous across the taxa examined by us. Character state 0 is present in *Dacne bipustulata* (Erotylinae: Dacnini), *Episcaphula australis*, *Megalodacne*

fasciata (Erotylinae: Megalodacnini), *Helota fulviventris* (Helotidae), *Pharaxonotha kirschii*, *Cycadophila debaonica* (Pharaxonothinae) and *Cryptophilus integer* (Cryptophilinae) and character state 2 is present in the remaining examined erotylids.

32. Metatibiae, shape: (0) straight (Fig. 7F, arrow); (1) flexed (Fig. 7G, arrow). Character 1 is present in *Mycotretus flavomarginatus*, *M. reticulatus*, *M. rhodosomus* and *M. tricolor* (Erotylinae: Tritomini).

Male terminalia

33. Penis posteriorly: (0) blunt (Fig. 7H); (1) pointed (Fig. 7I, arrow). Character state 1 was observed in *Aegithus clavicornis*, *Erotylus giganteus* and *Iphiclus virgatus* (Erotylinae: Erotylini).

34. Penis, penile flagellum, presence: (0) absent (Fig. 8A); (1) present (Fig. 8H). The flagellum was absent only in a few species of Tritomini. In the remaining studied taxa (coded as unknown in species in which only females were examined) the flagellum is present. The presence/absence of a penile flagellum was used as a character in the phylogenetic analyses of Erotylidae by Węgrzynowicz (2002) and Leschen (2003) and this character was already examined by us in a previous study (see Pecci-Maddalena *et al.*, 2019c).

35. Penile flagellum, membranous portion between head and virga: (0) absent (Fig. 8C); (1) present (Fig. 8B, 35:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). The membranous portion was observed in taxa of Erotylini and many Tritomini (Erotylinae).

36. Penile flagellum, head with posterior borders under anterior edge of virga and forming an articulation with it: (0) absent; (1) present (Fig. 8C, 36:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). Character state 1 is present in *Mycotretus pygmaeus*, *M. floriger* and *Tritomapara brasiliensis* (Erotylinae: Tritomini).

37. Penile flagellum, head posterior borders, outer edge with two parallel, narrowed, and sclerotized tips: (0) absent; (1) present (Fig. 8D, 37:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). Character state 1 is present in *Mycotretus jocosus*, *M. marginicollis* and *M. ocellatus* (Erotylinae: Tritomini).

38. Penile flagellum, head lateral borders, inner contour: (0) separated (e.g. Figs. 8B–D); (1) almost contiguous (Fig. 8E, 38:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). Character state 1 is present in *Mycotretus lesueuri*, *M. sobrinus* and *M. tigrinus* (Tritomini).

39. Penile flagellum, head anterior borders, “head-piece” structure: (0) absent; (1) present (Fig. 8F, 39:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). Character state 1 occurs in *Mycotretus rhodosomus*, *M. reticulatus*, *M. flavomarginatus* and *M. tricolor* (Tritomini).

40. Penile flagellum, head anterior borders, outer edge with a pair of lobes: (0) absent; (1) present (Fig. 8G, 40:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). Character state 1 is present in *Mycotretus fallax*, *M. ornatus*, and *M. fasciolatus* (Tritomini).

41. Penile flagellum, virga with a median membranous portion containing a slight sinuosity: (0) absent; (1) present (Fig. 8H, 41:1). Character described and documented by Pecci-Maddalena *et al.* (2019c). Character state 1 is present in *Mycotretus trifasciatus* and *Mycotretus floriger* (Tritomini).

42. Anteroventral edge of segment IX: (0) narrow (Fig. 8I, arrows); (1) broad (Fig. 8J, arrows). Character used by Leschen (2003) and Lawrence *et al.* (2011). A narrow anteroventral edge of segment IX is present in *Dacne bipustulata* (Erotylinae: Dacnini), *Encaustes verticalis* (Erotylinae: Encaustini), *Myceporthus* sp., *Tritomini* sp., (Tritomini), *Aegithus clavicornis*, *Erotylus giganteus* (Erotylinae: Erotylini), *Helota fulviventris* (Helotidae) and *Languria bicolor* (Languriinae).

Female terminalia

43. Spiculum ventrale, length in relation to sternite VIII: (0) approximately 2× or more the length of sternite VIII (Fig. 8K, arrow); (1) approximately 1× the length of sternite VIII (Fig. 8L, arrow). In the present study, character state 1 was observed only in *Neotriplax lewisi* (Tritomini).

44. Spermatheca, shape: (0) round (Fig. 8M); (1) elongate (Fig. 8N). Character used by Leschen (2003). An elongate spermatheca is present in *Aegithus clavicornis*, *Erotylus giganteus*, *Iphiclus trifasciatus* (Erotylinae: Erotylini), *Cycadophila debaonica* (Pharaxonothinae) and *Cryptophilus integer* (Cryptophilinae).

Cladistic analysis

The parsimony analysis with equal weights of characters resulted in 358 most parsimonious trees of 102 steps (consistency index, CI=0.52; retention index, RI=0.81). The strict consensus tree (CI=0.4, RI=0.68) with Bremer support values for each branch is shown in Figure 9. Most nodes received low nodal support. Tritomini and *Mycotretus* were not recovered as monophyletic (Fig. 9). The clades *Mycophthorus haafi* + *Mycophthorus palpalis* (Fig. 9, arrow) and *Dacne bipustulata* + (*Encaustes verticalis* + *Languria bicolor*) were collapsed in the same branch and appear as sisters to a polytomy with most part of the assemblage of Tritomini terminal taxa (Fig. 9). In this polytomy, the following clades were recovered and supported by apomorphies (character and state codes between parentheses): (i) *Myceporthus* sp. + *Myceporthus* sp2, supported by the apomorphy “clypeus with a V-shaped emargination” (2:1); (ii) *Mycotretus rhodosomus* + *M. reticulatus* + *M. flavomarginatus* + *M. tricolor* (Fig. 9, “*Mycotretus*, clade 1”), supported by apomorphies “metatibiae flexed” (32:1) and “head of penile flagellum modified in a ‘head-piece’ structure” (39:1); (iii) *Mycotretus apicalis* + *M. coccineus* + *M. fuscitarsis* + *M. melanophthalmus* (Fig. 9, “*Mycotretus*, clade 2”), “mentum scutum nearly circular character” (11:4). The clade *Lybas thoracicus* + (*Megischyrus brasiliensis* + *Megischyrus* sp.) + (*Ischyryus quadripunctatus* + *Ischyryus scriptus*) is supported by the apomorphy “presence of pores on mentum” (12:1) and the following homoplastic characters: “absence of stridulatory files on vertex of head” (7:0); “mentum scutum triangular” (11:3) and “metendosternal laminae vertical” (29:1).

In the EW analysis, the taxon “Tritomini sp.” was placed between the broad Tritomini polytomy and a clade comprising Erotylini + part of Tritomini (Fig. 9). The clade Tritomini sp. + Erotylini + part of Tritomini was supported by the following characters: “mentum scutum triangular” (11:3), “absence of metendosternal laminae” (27:1) and “penile flagellum, presence of a membranous portion between head and virga” (35:1). The clade Erotylini + part of Tritomini was supported by two homoplastic apomorphies: “subgenal braces with a feeble laminar process” (5:1) and “apical labial palpomere cylindrical” (14:0; with a transformation to 14:1 in Erotylini). A clade comprising (*Lybasia barbata* + *Palaeolybas nigripennis apicalis*) + (*Amblyopus*, *Pseudamblyscelis*, *Tritoma* and *Neotriplax*) was supported by the

character “complete clypeal marginal bead” (1:1), and a clade comprising the genera *Amblyopus*, *Pseudamblyscelis*, *Tritoma* and *Neotriplax* was supported by the characters “absence of hooks on lacinia” (9:0) and “absence of penile flagellum” (34:0). Erotylini was recovered as monophyletic and supported by tree unambiguous synapomorphies: “apical labial palpomere ovate” (14:1), “outer margin of metascutellum not touching posterior margin of metascutum” (21:1) and “penis posteriorly pointed” (33:1).

The implied weighting analysis resulted in 252 most parsimonious trees. The strict consensus tree (Fig. 10) is most compatible to that generated with equal weighting (Fig. 9). The major topological difference regards the placement of the clade *Mycophthorus haafi* + *Mycophthorus palpalis*, which appeared within the clade Erotylini + part of Tritomini (Fig. 10). This change makes the clade Erotylini + part of Tritomini monophyletic and supported by the unambiguous apomorphy “subgenal braces with a feeble laminar process” (5:1). The clade *Lybasia barbata* + *Palaeolybas nigripennis apicalis* + (*Mycophthorus haafi* + *Mycophthorus palpalis*) + ((*Amblyopus* + *Pseudamblyscelis* + *Tritoma* + (*Neotriplax* + *Tritoma sanguinipennis*)) was also recovered as monophyletic and supported by the apomorphy “complete clypeal marginal bead” (1:1) as well the clade comprising *Mycophthorus haafi* + *Mycophthorus palpalis* ((*Amblyopus* + *Pseudamblyscelis* + *Tritoma* + (*Neotriplax* + *Tritoma sanguinipennis*)), supported by the apomorphy “absence of penile flagellum” (34:0). Other differences of IW analysis in relation to EW analysis were the position of the taxon “Tritomini sp.”, placed in the polytomy of Tritomini, and *Triplax amoena*, placed between the polytomy of Tritomini and the clade *Lybas thoracicus* + (*Megischyrus brasiliensis* + *Megischyrus* sp.) + (*Ischyrus quadripunctatus* + *Ischyrus scriptus*) (Fig. 10).

The majority consensus tree generated with IW analysis (Fig. 11) is most compatible to the strict consensus tree of IW analysis (Fig. 10). However, the former reveals the following clades within the polytomy of Tritomini: (i) *Mycotretus sobrinus* + *Pselaphacus nigropunctatus*, supported by characters “absence of stridulatory files on vertex of head” (7:0) and “penile flagellum, presence of a membranous portion between head and virga” (35:1); (ii) *Mycotretus pygmaeus* + *Tritomapara brasiliensis*, supported by character “posterior border of penile flagellum head under anterior edge of virga forming an articulation” (36:1); (iii) *Mycotretus jocosus* + *M. marginicollis* + *M. ocellatus*, supported by the unambiguous apomorphy “penile flagellum, posterior edge of head with two sclerotized tips” (37:1); (iv) *Mycotretus fallax*, *M. fasciolatus* and *M. ornatus*, supported by the apomorphy “penile flagellum, anterior edge of head with a pair of lobes” (40:1). The greatest difference between the strict consensus and the majority consensus tree of the IW analysis was the character “mentum scutum triangular” (11:3), which is a synapomorphy of: (i) a clade comprising some

taxa of Tritomini, grouped in the polytomy showed in the strict consensus trees of EW and IW analyses; (ii) a clade comprising *Triplax amoena*, *Lybas thoracicus*, *Megischyrus brasiliensis*, *Megischyrus* sp., *Ischyrus quadripunctatus*, *Ischyrus scriptus*; and (iii) the clade Erotylini + part of Tritomini (Fig. 11). In this analysis, Tritomini sp. was sister to *Myceporthus* sp. (Fig. 11) supported by “penile flagellum, presence of a membranous portion between head and virga” (35:0) and “anteroventral edge of segment IX in males narrow” (42:0).

In both EW and IW analyses, *Cryptophilus integer* (Cryptophilinae) was placed close to *Helota fulviventris* (Helotidae); *Pharaxonotha kirschii* and *Cycadophila debaonica* (Pharaxonothinae) form a clade supported by the apomorphy: “presence of lateral pockets of mentum” (15:1). The condition “metendosternal laminae narrowed” (28:0, proposed by Pecci-Maddalena *et al.*, 2019c) was not mapped on the trees probably due to an artifact of analysis, however it was an unambiguous apomorphy of Pharaxonothinae. *Episcaphula* and *Megalodacne fasciata* form a clade supported by “presence of a sulcus separating the submentum from rest of head” (13:1) and “metendosternal laminae vertical” (29:1); *Dacne bipustulata* + (*Encaustes verticalis* + *Languria bicolor*) formed a clade supported by “frontoclypeal suture entire” (4:0) and “anteroventral edge of segment IX narrow” (42:0).

Discussion

Our analyses revealed that Tritomini and *Mycotretus* are not monophyletic and, therefore, must be rearranged to conform classification and phylogenetic knowledge. These findings agree to previously proposed phylogenetic scenarios for Erotylidae based on molecular data, morphology of adults and larvae (Węgrzynowicz, 2002; Robertson *et al.*, 2004; McHugh, unpublished data). The first phylogenetic scheme for erotylids illustrated in the scientific literature was that of Boyle (1956) using non-cladistics methods. Boyle’s diagram is rooted in “Dacninae”, which appears in a single branch together with “Megalodacninae”; this branch is splitted into two: “Triplacinae” (including only taxa currently under Tritomini) and “Erotylinae” (with a single genus, *Cypherotylus* Crotch, currently placed in Erotylini). Interestingly, the classification proposed by Boyle is similar to the topological relationships of Erotylidae provided by Węgrzynowicz (2002) and Robertson *et al.* (2004). These latter studies recovered Erotylini as a monophyletic taxon arising from one of the lineages within Tritomini, showing that these taxa are closely related. However, as no phylogenetic study of Erotylidae has focused on Tritomini, relationships of this tribe with Erotylini and other erotylids were unclear. The same occurred with *Mycotretus*. Although Robertson *et al.* (2004) have suggested this genus is not monophyletic and previous studies have revealed

conspicuous morphological differences across its species (Pecci-Maddalena *et al.*, 2019b,c), no phylogenetic hypothesis based on a satisfactory assemblage of *Mycotretus* was performed to date. In this context, our main findings are discussed below. Except in the cases we refer to a specific tree generated in our analyses, the topology illustrated in the strict consensus tree of implied weighting (IW) was preferred for discussion (Fig. 10).

Phylogenetic relationships of Tritomini

Erotylini + part of Tritomini

As already suggested by other authors (Węgrzynowicz, 2002; Robertson *et al.*, 2004), Tritomini is an artificial taxon, which is also corroborated by our results. The major differences between previous studies and the present one are the following: in the IW analysis performed here, Erotylini appears as sister to a clade comprising part of the genera under Tritomini (Fig. 10), and both clades form a monophyletic group supported by one unambiguous apomorphy, revealed here for the first time: “inner edge of subgenal braces with a feeble laminar process” (5:1). Aside from that, other characters supporting the clade Erotylini + part of Tritomini are the following: “absence of metendosternal laminae” (27:1) and apical labial palpomere cylindrical (14:0). These results support the conclusion by Pecci-Maddalena *et al.* (2019c) that absence of metendosternal laminae has phylogenetic signal within Tritomini, although this character is related to hind-wings reduction or absence (as shown here for the taxon “Tritomini sp.”). The “apical labial palpomere cylindrical” (14:0) appears as a reversion in the clade Erotylini + part of Tritomini (Fig. 10), and the condition “Oval” (14:1) as a probable transformation from the state 0 to 1 exclusive to Erotylini (Fig. 10). These findings suggest that Erotylini + part of Tritomini must be placed in a separate subfamily, in order to achieve a natural classification.

Due to its anatomical position, it is plausible to suppose that morphological modifications of the subgenal braces (character 5) may be related with changes in the movement of mandibles. However, the morphology of mandibles was very conservative across the studied taxa, and although a correlation with feeding habits is tempting, currently it would be speculative due to the lack of studies on host fungi, natural history and behavior in Erotylidae (for instance, see Skelley *et al.*, 1991; Goodrich & Skelley, 1994). There are many records of species associated with Aphyllophorales fungi (Basidiomycota), and aside from that, erotylids included in “Tritominae” (sensu Robertson *et al.*, 2004) have switched from Aphyllophorales to Euagarics (Basidiomycota) at least twice (Robertson *et al.* 2004).

However, this proposition is limited by the fact this fungi classification is no longer satisfactory, because neither taxon is thought to be monophyletic (Robertson *et al.*, 2004).

Nevertheless, the presence of character state 5:1 as a synapomorphy of Erotylini + part of Tritomini remains an important aspect to be evaluated. A good insight for reconstruction of the phylogeny of this clade may be related with pupation or other immature stages during the development. Pupae of members under Erotylini are exposed and hanging from the host log (Graves, 1965; Skelley *et al.*, 1991; Teixeira & Casari, 1998), while in *Tritoma* (a member of the clade “part of Tritomini”) pupation may occur in the ground, and in some *Triplax* (a genus placed in the polytomy of Tritomini, Figs. 9–10), in rotten wood (Skelley *et al.*, 1991). Interestingly, in the present study these taxa were recovered within different clades (Fig. 10), and therefore they probably have distinct evolutionary histories. We hypothesize that Erotylini and part of Tritomini had a common ancestor who inhabited close to the ground and possessed character state 5:1, as an adaptation to this environment. That ancestor lineage would have splitted into two : (i) an Erotylini lineage, in which pupation occurs on the logs; and (ii) part of Tritomini, in which pupation occurs in the ground or close to it. Interestingly, members of Erotylini are commonly founded on log woods, while species of Tritomini are observed living under basidiomycetes fungi growing close to the ground (see discussion below).

Another important aspect of the clade Erotylini + part of Tritomini is the geographic distribution of its species. Erotylini is predominantly Neotropical and rarely reported to the Nearctic region. On the other hand, except for one record of *Tritoma* to Panama (Alvarenga, 1994), no taxon in the clade “part of Tritomini” (Fig. 10) is Neotropical: *Lybasia*, *Palaeolybas*, *Mycophtorus*, *Pseudamblyscelis* and *Tritoma senegalensis tenella* are Afrotropical; *Amblyopus* occurs across the Oriental and Afrotropical regions; *Tritoma bipustullata* is Palaearctic; *Tritoma sanguinipennis* is Nearctic and *Neotriplax* is Oriental (Boyle, 1956; Delkeskamp, 1981; Chûjô, 1990; Skelley & Powell, 2018). Hunt *et al.* (2007) revealed that numerous modern lineages of Coleoptera (including Erotylidae and other Cucujoidea) have a Jurassic origin, a high lineage survival and a relatively recent diversification. Following their hypothesis, the geographic distribution of species in the clade Erotylini + part of Tritomini may probably reflect a Gondwanan (Jurassic) origin and a recent diversification. Other factors, as the ecological competition with some Neotropical and speciose genera of Tritominae (e.g. *Mycotretus* and *Ischyryus*) may explain the low diversity of species under the clade “part of Tritomini” in this biogeographic region (see forward discussion).

The clade “part of Tritomini” (Fig. 10) is supported by the apomorphy “complete clypeal marginal bead” (1:1). Among the examined taxa, some have a conspicuous “bead” (e.g. *Tritoma* and *Amblyopus*), but in *Neotriplax lewisi* it is very thin. *Neotriplax lewisi* seems to be a modified taxon with a distinct autapomorphy: “spiculum ventrale short and approximately 1× the length of sternite VIII” (43:1). The clade *Lybasia barbata* + *Palaeolybas nigripennis apicalis* is supported by a homoplastic apomorphy (also present in *Mycotretus coccineus*): “anterior tendons of metendosternite wide” (24:1). This finding agrees in part with our previous study (Pecci-Maddalena *et al.*, 2019c), with the following differences: here, the condition “presence of an anterior process in the metendosternite (25: 1, corresponding to character 4:1 in Pecci-Maddalena *et al.*, 2019c) appears as a homoplasy present in *Palaeolybas nigripennis apicalis* and *Tritoma senegalensis tenella* and, therefore, these taxa were not grouped in the same clade. On the other hand, character state 24:1 appears as a shared feature of *Lybasia barbata* and *Palaeolybas nigripennis apicalis*. We have also noted that these taxa are similar in body shape, male genitalia (especially morphology of penile flagellum), showing that their proximity in the trees is not spurious.

Within the clade “part of Tritomini”, species of *Mycophthorus*, *Amblyopus*, *Pseudamblyscelis*, *Tritoma* and *Neotriplax* form a clade supported by the apomorphy “absence of penile flagellum” (34:0). However, this character has to be considered with much care, as males of several terminal taxa within this clade were not examined. Aside from this, our analyses provide evidence that the character state 34:0 may have phylogenetic signal, at least for part of the taxa included in Tritomini. The clade *Mycophthorus haafi* + *Mycophthorus palpalis* is supported only by homoplastic characters as shown in Figure 10. The features “inner edge of subgenal braces with a conspicuous laminar process” and “presence of metendosternal laminae” (5:0 and 27:0, respectively) are inconspicuous in the examined specimen of *Mycophthorus palpalis*, however, as they were observed we read them as probable reversions. Character state “absence of a complete clypeal marginal bead (1:0) appears as a reversion in *Mycophthorus haafi* (Fig. 10). These two African species, although included in the same genus, are morphologically distinct: *Mycophthorus palpalis* is elongate, resembling a *Triplax*; and *Mycophthorus haafi* is oval, resembling a *Tritoma*.

Recently, *Mycophthorus* was taxonomically redefined resulting into new nomenclatural combinations and species transferences (Skelley & Powell, 2018). However, a taxonomic revision is necessary and the monophyly of *Mycophthorus* remains controversial. Interestingly, in the EW analysis the clade *Mycophthorus haafi* + *Mycophthorus palpalis* was placed outside the clade Erotylini + part of Tritomini (Fig. 9, arrow). This change makes character states 5:1, 1:1 and 34:0 homoplastic for the clades “Erotylini + part of Tritomini”, “part of Tritomini”

and “*Amblyopus*, *Pseudamblyscelis*, *Tritoma* and *Neotriplax*”(Fig. 9). Probably, this topological difference occurs because the EW analysis attributes the same weight to homoplasies and apomorphies and do not take into account the cladistics congruence between character scoring and the maximum parsimonious trees obtained. *Mycophthorus palpalis* had two reversions and *Mycophthorus haafi* had one reversion in our analysis, although their morphological differences suggest that they pertain to different genera or *Mycophthorus* and may constitute a genus including species with character states variation. A full taxonomic revision is necessary for *Mycophthorus* and many taxa within Tritomini. However, based on the morphology of *Mycophthorus* in relation to other Tritomini and the principle of parsimony, the placement of *Mycophthorus haafi* + *Mycophthorus palpalis* inside the clade Erotylini + part of Tritomini is a plausible hypothesis (Fig. 10).

The clade comprising the genera *Amblyopus*, *Pseudamblyscelis*, *Tritoma* and *Neotriplax* is a polytomy supported exclusively by homoplastic characters (Fig. 10). Węgrzynowicz (2002) verified that *Amblyopus* and *Tritoma* were phylogenetically closely related forming, together with the genera *Triplacidea* Gorham, *Amblyscelis* Gorham and *Zynthonia* Westwood (not included in the present work), a monophyletic clade supported by the character “clypeus anteriorly bordering” (Węgrzynowicz, 2002). Here, we fuse this character with “clypeus laterally bordering” (see above, comments on character 1). Interestingly, based on Węgrzynowicz analyses, *Triplacidea*, *Amblyscelis* and *Zynthonia* have both characters “clypeus anteriorly bordering” and “clypeus laterally bordering”, and probably have to be included in the higher clade “part of Tritomini” proposed here.

In accordance with the molecular study of Robertson *et al.* (2004), *Tritoma*, the type genus of Tritomini, was not recovered as monophyletic in the present work. Boyle (1956), proposed two species-groups for *Tritoma* “*humeralis*” and “*sanguinipennis*”. Here, *Tritoma bipustulata*, with a triangular mentum, agreed with the diagnosis of the *humeralis* group, while *T. senegalensis tenella* and *T. sanguinipennis*, with a pentagonal mentum, were better placed in the *sanguinipennis* group. In our analyses, *T. bipustulata* was placed in the same polytomy close to *T. senegalensis tenella*, and *T. sanguinipennis* formed a clade with *Neotriplax lewisi* supported by the homoplasy “frontoclypeal suture entire” (4:0). In the study of Robertson *et al.* (2004), *Tritoma pulchra* Say (a member of the Boyle “*sanguinipennis*” species-group, not included here), was grouped with one *Mycotretus* (“*Mycotretus* sp.1” from Robertson *et al.*, 2004), whereas the other two *Tritoma* examined by them formed the clade “*Tritoma erythrocephala* Lacordaire + *T. unicolor* Say” (both members of Boyle’s “*humeralis*” species-group, not included in the present work). For this reason, Robertson *et al.* suggested that these species-groups should be recognized as independent genera.

Although the hypothesized phylogenetic proximity between *Tritoma pulchra* and *Mycotretus* by Robertson *et al.* (2004), based on the description of *T. pulchra* provided by Boyle (1956), this species probably does not belong to the clade “part of Tritomini” (proposed here), and, consequently, does not pertain to *Tritoma*. According to Boyle, *T. pulchra* has the “postmandibular lobes (=subgenal braces, character 5, described here) extremely large, as long as the eyes, their lateral edges overlapping inner edges of eyes in ventral view of head and broadly, evenly arcuate, somewhat convergent anteriorly, visible around the entire apex of the terminal segment of maxillary palpus when this in normal position upon the lobe”. Boyle (1956) further comments: “postmandibular lobes are similar to those of *Triplax festiva* but are rather longer, their lateral edges more broadly rounded and convergent anteriorly”. This description provides strong evidences that *T. pulchra* has the character state 5:0 (“inner edge of subgenal braces with a conspicuous laminar process”) as described here. Posteriorly, Boyle (1956) comments: “the aedeagus of *T. pulchra* is distinctly aberrant in this form and has much in common with that of *Triplax* species.”. These observations suggest that *T. pulchra* have to be transferred to *Triplax*, *Eutriplax* or any closely related genus. On the other hand, the examined species, *T. sanguinipennis*, may remain within *Tritoma* until a taxonomic revision, or a complete phylogenetic study, is conducted for this genus.

Clades within Mycotretus

Our analyses corroborate that *Mycotretus* is not monophyletic (Robertson *et al.*, 2004; Skelley & Powell, 2018; Pecci-Maddalena *et al.*, 2019c). The following clades were recovered as monophyletic (in both IW and EW analyses) and deserve genus status:

(i) Clade *Mycotretus flavomarginatus* + *M. reticulatus* + *M. rhodosomus* + *M. tricolor* (Figs. 9–10, “*Mycotretus*, clade 1”) supported by the following apomorphies: “metatibiae flexed” (32:1) and “penile flagellum, anteriorly forming a head-piece structure” (39:1). This clade was already suggested by Pecci-Maddalena *et al.* (2019c) and recovered in the phylogenetic analyses presented here. All these species are larger than other *Mycotretus* and the larger males have arched metatibiae (not observed in any other studied erotyloid). Species of this clade have a slightly angulate humeri and handsome color patterns. They are all from the Neotropical region, each with a broad geographic distribution (Pecci-Maddalena *et al.*, 2019b). Information on host fungi is unknown. This clade shall include other species (not included as terminal taxa in the analyses presented here): *Mycotretus pecari* Lacordaire, *M. illustris* Crotch, *M. aestuans* Lacordaire, *M. psittacus* Lacordaire, *M. xanthomelas* Crotch (see Pecci-Maddalena *et al.*, 2019b).

(ii) Clade *Mycotretus apicalis* + *M. coccineus* + *M. fuscitarsis* + *M. melanophthalmus* (Figs. 9–10, “*Mycotretus*, clade 2”) supported by the apomorphy “mentum scutum nearly circular” (11:4). This clade was already suggested by Pecci-Maddalena *et al.* (2019c) and recovered in the analyses presented here. It comprises oval to almost circular species. *Mycotretus apicalis* is the unique *Mycotretus* with economic importance causing injuries in cultivations of *Pleurotus sajor-caju* (Basidiomycota: Pleurotaceae), an edible fungus species (Moreira *et al.*, 2009). Recently, five new synonyms were proposed for this species (Pecci-Maddalena *et al.*, 2019b). Species of the clade *Mycotretus apicalis* + *M. coccineus* + *M. fuscitarsis* + *M. melanophthalmus* are Neotropical and each has a broad geographic distribution (Pecci-Maddalena *et al.*, 2019b). Information on host fungi is known only for *M. apicalis*. This clade shall include other species (not included as terminal taxa in the analyses presented here): *Mycotretus adalioides* Crotch, *M. corallipennis* Crotch, *M. peruvianus* (Kirsch, 1876) (see Pecci-Maddalena *et al.*, 2019b).

Some clades of *Mycotretus* appear only in the majority consensus tree of the IW analysis (Fig. 11). They correspond to monophyletic groups inside *Mycotretus*, previously suggested by Pecci-Maddalena *et al.* (2019c), and supported only by characters of the penile flagellum. Due to the lack of more robust support, not directly affected by sexual selection, it is early to discuss taxonomic status of these clades:

(iii) Clade *Mycotretus jocosus*, *M. marginicollis* and *M. ocellatus* (Fig. 11) supported by the apomorphy “penile flagellum, head posteriorly with two sclerotized tips” (37:1). These species are slightly oval and similar to most *Mycotretus*. *Mycotretus jocosus* is recorded from Southeast Brazil, *M. marginicollis* from Southeast and South Brazil, and *M. ocellatus* from Colombia, Peru, South, North and Southeast Brazil (Pecci-Maddalena *et al.*, 2019b). Information on host fungi is unknown.

(iv) Clade *Mycotretus fallax*, *M. ornatus*, and *M. fasciolatus* (Fig. 11) supported by the apomorphy “penile flagellum, outer edge of head with a pair of lobes” (40:1). These species are morphologically similar to those of the clade “*Mycotretus jocosus*, *M. marginicollis* and *M. ocellatus*”, but slightly smaller. *Mycotretus fallax* is recorded from Southeast and South Brazil, *M. ornatus* is broadly distributed across the Neotropical region and *M. fasciolatus* is recorded from Mexico, Guatemala, Panama and El Salvador (Pecci-Maddalena *et al.*, 2019b). Recently, several synonyms were proposed to *M. ornatus*, a species with great color variation (Pecci-Maddalena *et al.*, 2019b). Host fungi are unknown for the majority of species, but there are records of *M. fallax* in *Pleurotus ostreatus* (Basidiomycota) (Pecci-Maddalena *et al.*, 2019b). This clade shall include other species (not included as terminal taxa in the analyses

presented here): *Mycotretus scitulus* Lacordaire, *M. expressus* Kuhnt and *M. dorsonotatus* Lacordaire (Pecci-Maddalena *et al.*, 2019b).

Polytomy of Tritomini (recovered clades)

The broadest assemblage of the examined Tritomini formed a gross polytomy supported by the apomorphy “apical labial palpomere securiform” (14:2, Figs. 9–10). Some clades were recovered within this polytomy. As occurred in the analysis of Węgrzynowicz (2002), here the Neotropical genera *Lybas*, *Megischyryrus* and *Ischyryrus* formed a clade supported by the apomorphy “presence of pores on the mentum” (12:1, Figs. 9–10). The phylogenetic value of character 12:1, as being unique to *Lybas*, *Megischyryrus* and *Ischyryrus*, was also discussed on a study on the exocrine glands of Erotylinae by Drilling *et al.* (2013) and is confirmed here.

The genus *Myceporthus* was recovered as monophyletic supported by the character “presence of a V-shaped clypeal emargination” (2:1). *Myceporthus* is unique to the Neotropical region, and according to Skelley & Powell (2018), it is morphologically similar to *Lybas* and *Pseudolybas* Gorham (a taxon not included in the present analyses). The position of the taxon “Tritomini sp.” varied among the generated trees (Figs. 9–11). Possibly, the placement of Tritomini sp. as sister to *Myceporthus* sp. in the tree of IW analysis, is correct, as these taxa share similar male genitalia, a nearly rounded body and a compact antennal club. Aside from these similarities, based on our morphological comparisons, Tritomini sp. would be best placed into a new genus. Another taxon with different topological positions was *Triplax amoena*. In the IW analyses, it was closely related to *Lybas*, *Megischyryrus* and *Ischyryrus* (Fig. 10); while in the EW analysis it was placed close to the genera in the unresolved polytomy of Tritomini (Fig. 9). On the other hand, *T. amoena* has not grouped with *Triplax russica*, the other examined member of *Triplax* in our study. Interestingly, in the analysis of Robertson *et al.* (2004), *Triplax* was sister to *Toramus* Grouvelle (a genus currently included in Cryptophilinae). *Triplax* is not a natural genus and would have to be split in separate taxa.

In the majority consensus tree of the IW analysis, the clade Erotylini + part of Tritomini, together with other Tritomini, was recovered as monophyletic (Fig. 11) by the apomorphy “mentum shape triangular” (11:3). The same tree reveals that *Xalpirta* is probably not monophyletic: *Xalpirta maderi* was more closely related to *Haematochiton* and *Triplax* (Fig. 11), while *X. mauryi* was placed in the polytomy together with *Mycotretus*, *Eutriplax* and *Laurenticola* (Fig. 11). *Mycotretus sobrinus* and *Pselaphacus nigropunctatus* form a clade (Fig. 11) supported by two homoplastic characters “absence of stridulatory files on

vertex o head” (7:0) and “penile flagellum, presence of a membranous portion between head and virga” (35:1). This result agrees with that by Robertson *et al.* (2004), in which *Pselaphacus* was sister to a group of *Mycotretus* suggesting that these taxa are phylogenetically related. Another clade recovered in our analysis was *Mycotretus pygmaeus* + *Tritomapara brasiliensis* (Fig. 11), supported by “penile flagellum, posterior borders of head under anterior edge of virga forming an articulation” (36:1). *Tritomapara* is a small Neotropical genus, whose species are very similar to many *Mycotretus*, and our finding suggests that at least some species of these genera may belong to a single natural lineage.

Polytomy of Tritomini, unresolved relationships

As discussed above for the clade Erotylini + part of Tritomini, the polytomy depicted in Figs. 9–11 probably reflects a recent adaptive radiation of the remaining studied Tritomini. Interestingly, most described fossils of Erotylidae correspond to modern genera (Keller & Skelley, 2019) and fossil species are morphologically very similar to modern taxa. The oldest described Erotylidae fossils date from the Late Eocene and belong to Xenoscelinae (not examined by us); the earliest records date from Miocene to Upper Eocene and correspond to species of *Triplax* (Keller & Skelley, 2019). For Erotylinae there are only other two described fossils: a species of *Tritoma* from the Eocene and a *Dacne* from the Miocene (Keller & Skelley, 2019). As shown here, the morphological limits between *Mycotretus*, *Triplax* and other genera within Tritomini are not well established and these taxa lack phylogenetic support (Fig. 10). The absence of *Mycotretus* (and other Tritomini placed in the same polytomy) in the fossil record, alongside with the recent appearance of *Triplax* on it, suggest that these clades are closely related and their diversification is a very recent event.

An important ecological issue, related to the habitat and feeding habits of members under Tritomini and Erotylini, shall be highlighted. As discussed above, Erotylini is monophyletic and strongly supported by morphological and molecular data (Robertson *et al.*, 2004; Węgrzynowicz, 2002 and the present study), and species in this tribe have a distinct mechanism of pupation (Graves, 1965). Moreover, Erotylini larvae feed on the surface of fungi, are usually very pigmented and have well developed scoli, while larvae of Dacnini and Triplacini (=Tritomini) feed inside fungi, are usually little pigmented and do have small scoli (Costa *et al.*, 1988). In our field work, we have observed adults and larvae of different species of *Iphiclus* (Erotylini) on logs and feeding on basidiomes of Hymenochaetaceae (Basidiomycota), while a number of *Mycotretus* and *Tritomapara* (Tritomini) have been founded under basidiomes of Polyporaceae, Marasmiaceae, and Pleurotaceae

(Basidiomycota), fungi that usually grow on the ground or close to it (Pecci-Maddalena & Lopes-Andrade, 2017; Pecci-Maddalena, pers. obs.). These evidences suggest that Erotylini and Tritomini occupy different ecological niches within forests, and thus may be subject to distinct evolutionary pressures.

Regarding Tritomini, another interesting factor should be related with the ecological competition among species. *Tritoma*, the second most speciose genus of Tritomini (surpassed only by *Mycotretus*) is almost absent in the Neotropical region, as far as *Triplax*, the third most speciose genus of the tribe. The absence of these genera leave a range of resources (fungi) to be explored by *Mycotretus* and its Neotropical relatives which, in turn, have low diversity (e.g. *Tritomapara*, *Xalpirta*, *Pselaphacus* and others). Absence of larger competitors should be also an explanation of why some species of *Mycotretus* have a broad and disjunct geographic distribution across the Neotropical region (examples in Pecci-Maddalena & Lopes-Andrade, 2018a; Pecci-Maddalena *et al.*, 2019b). Therefore, a recent adaptive radiation of *Mycotretus*, together with absence of major ecological competitors, may explain two remarkable results of the present study: the absence of phylogenetic signal of morphological characters to join most terminal taxa of *Mycotretus* and the high diversity of the genus. Interestingly, some clades of this genus were supported only by similarities of the penile flagellum, a male genitalia structure prone to fast evolution (Pecci-Maddalena *et al.*, 2019c).

Conclusion

The present study is the most comprehensive contribution for understanding the phylogenetic relationships of the diverse Tritomini, and its most speciose genus *Mycotretus* Lacordaire. We demonstrated, undoubtedly, that these taxa are not monophyletic and deserve rearrangement to conform to a natural classification. A clade comprising Erotylini + part of Tritomini, including the type species of Erotylini and Tritomini, was recovered as monophyletic and deserves separate subfamily status. The clades Erotylini and “part of Tritomini” are both monophyletic and deserve tribe status. The genera *Tritoma*, *Triplax* and *Xalpirta* were not recovered as monophyletic and further studies shall evaluate whether they need to be divided into two or more taxa. The taxon here called “Tritomini sp.” is a new genus related to *Myceporthus*, currently under description. Within *Mycotretus*, different clades were recovered and, among these, two well supported clades deserve genus status: (i) the clade *Mycotretus flavomarginatus* + *M. reticulatus* + *M. rhodosomus* + *M. tricolor*; and (ii) the clade *Mycotretus apicalis* + *M. coccineus* + *M. fuscitarsis* + *M. melanophthalmus*. However, many species of *Mycotretus*, and other taxa within Tritomini, formed a gross polytomy with no

monophyletic support. We hypothesized that a recent adaptive radiation of *Mycotretus*, together with absence of major ecological competitors may explain the absence of phylogenetic signal of morphological characters and the high diversity of this genus.

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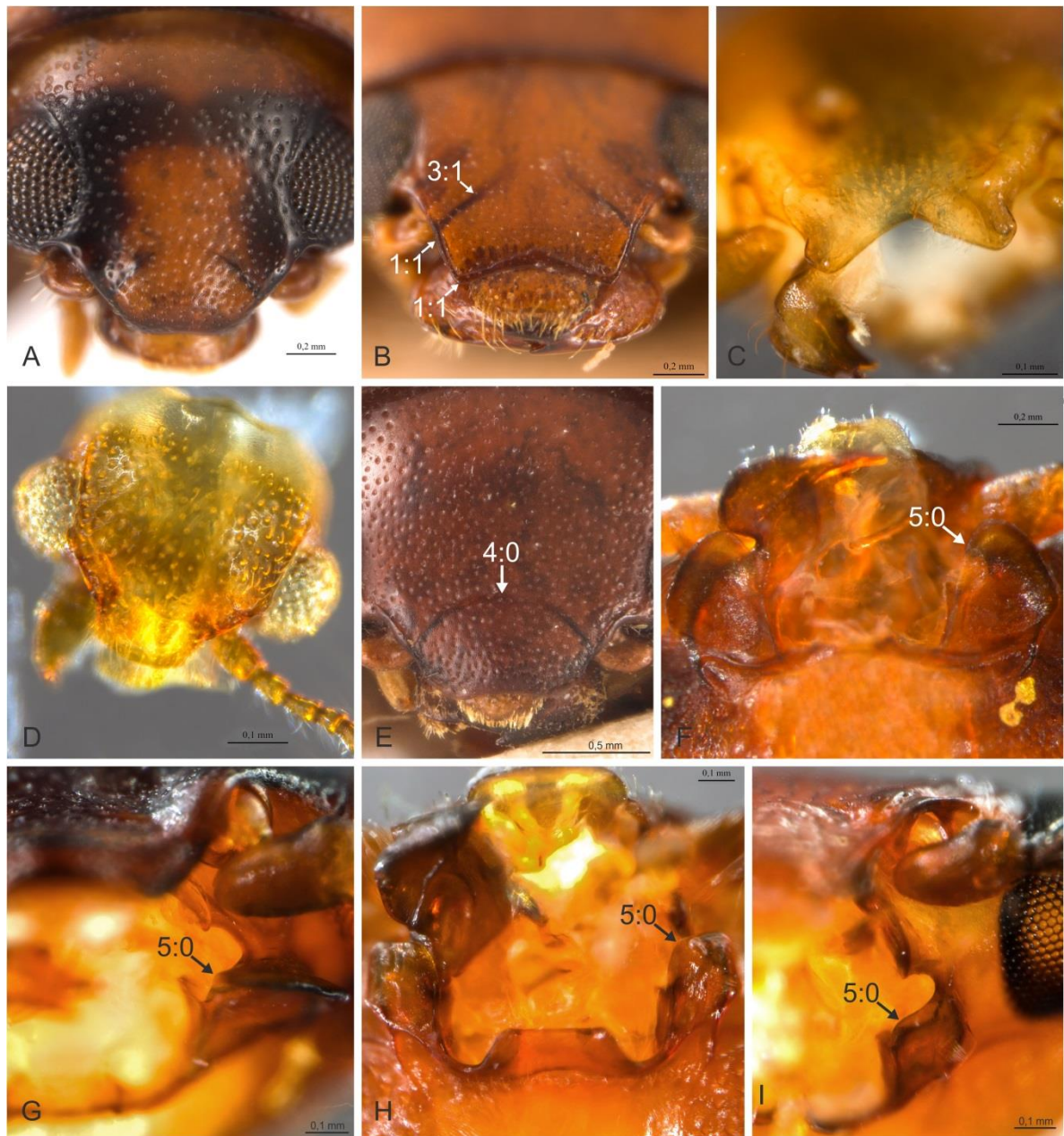


Figure 1. Characters and character states of the head (see text for a definition of each character statement). (A) *Ischyryus scriptus* (Tritomini); (B) *Amblyopus marginatus* (Tritomini); (C) *Myceporthus* sp. (Tritomini); (D) *Cryptophilus integer* (Cryptophilinae); (E) *Palaeolybas nigripennis apicalis* (Tritomini); (F–G) *Eutriplax tuberculifrons* (Tritomini), dorsal and frontal view; (H–I) *Laurenticola terminalis* (Tritomini).

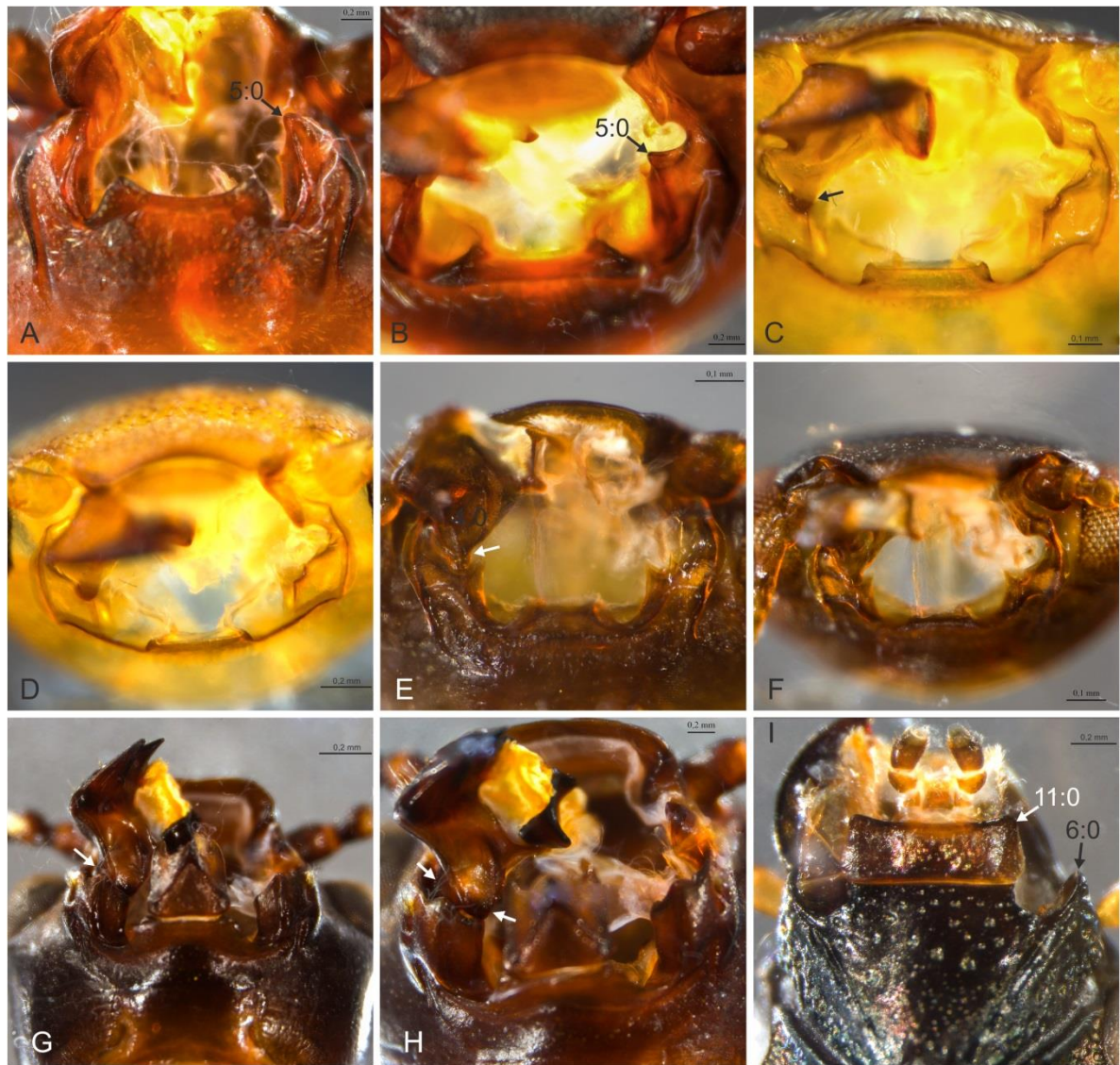


Figure 2. Characters and character states of the head (see text for a definition of each character statement). (A–B) *Megischyrus brasiliensis* (Tritomini), dorsal and frontal view; (C–D) *Lybasia barbata* (Tritomini), dorsal and frontal view; (E–F) *Tritoma bipustulata* (Tritomini), dorsal and frontal view; (G–H) *Erotylus giganteus* (Erotylinae: Erotylini), dorsal view; (I) *Helota fulviventris* (Helotidae).

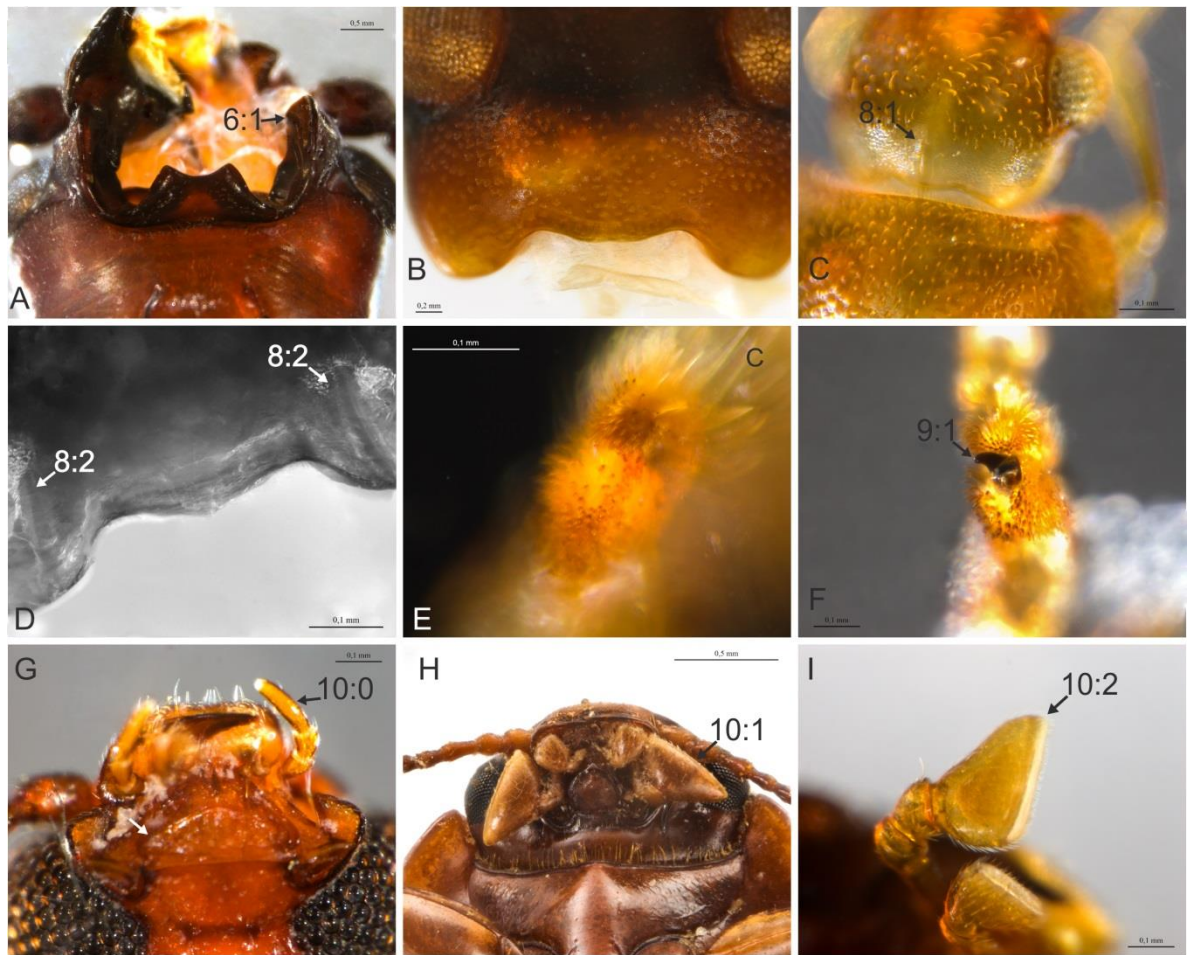


Figure 3. Characters and character states of the head (see text for a definition of each character statement). (A) *Encaustes verticalis* (Erotylinae: Encaustini); (B) *Megischyrus brasiliensis* (Tritomini); (C) *Cryptophilus integer* (Cryptophilinae); (D) *Mycotretus quadrioculatus* (Tritomini); (E) *Amblyopus marginatus* (Tritomini); (F) *Aegithus clavicornis* (Erotylinae: Erotylini); (G) *Cycadophila debaonica* (Pharaxonothinae); (H) *Mycotretus alvarengai* (Tritomini); (I) *Ischyrus scriptus* (Tritomini).

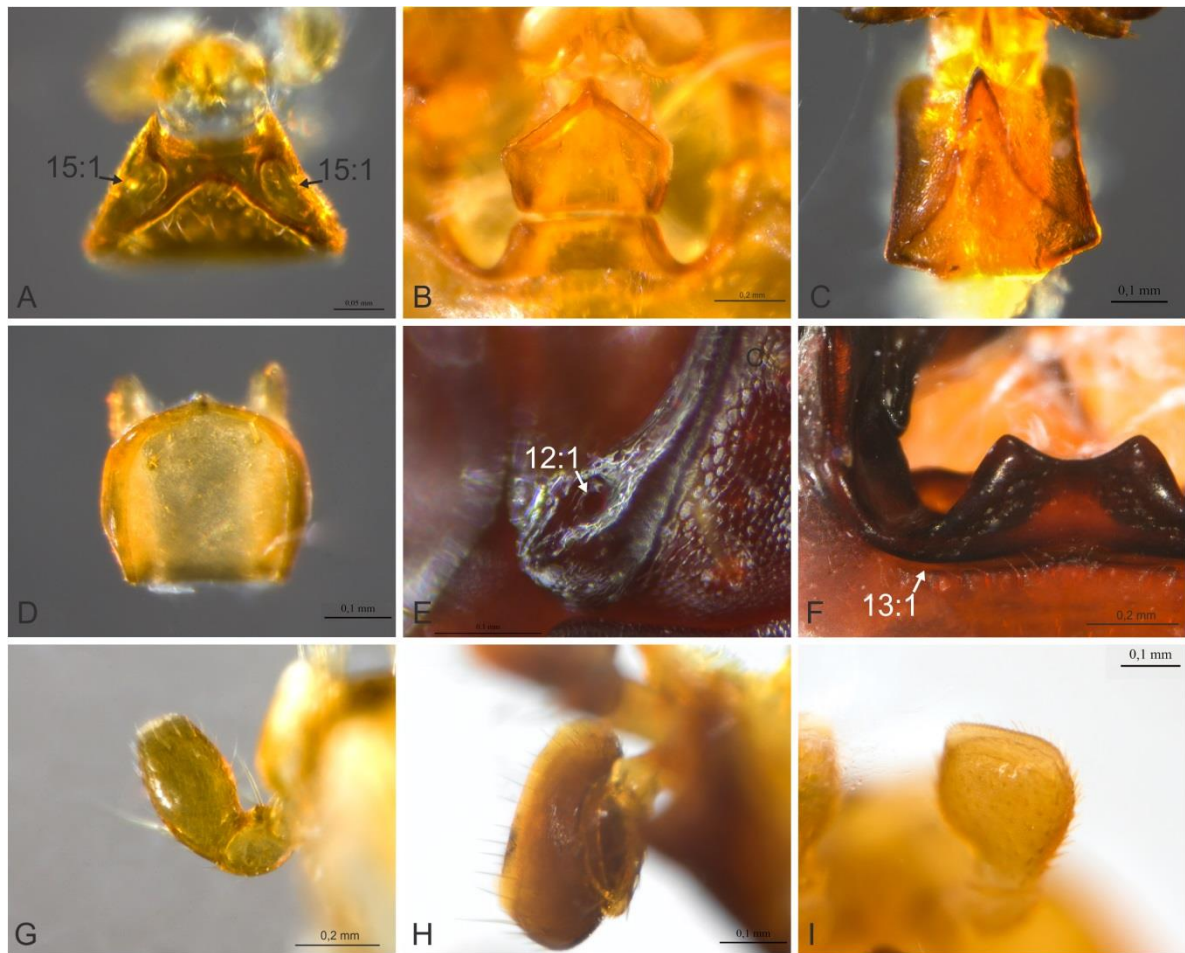


Figure 4. Characters and character states of the head (see text for a definition of each character statement). (A) *Pharaxonotha kirschii* Pharaxonothinae); (B) *Mycotretus flavomarginatus* (Tritomini); (C) *Aegithus clavicornis* (Erotylinae: Erotylini); (D) *Mycotretus coccineus* (Tritomini); (E) *Megischyrus* sp. (Tritomini); (F) *Encaustes verticalis* (Erotylinae: Encaustini); (G) *Lybasia barbata* (Tritomini); (H) *Aegithus clavicornis* (Erotylinae: Erotylini); (I) *Mycotretus flavomarginatus* (Tritomini).

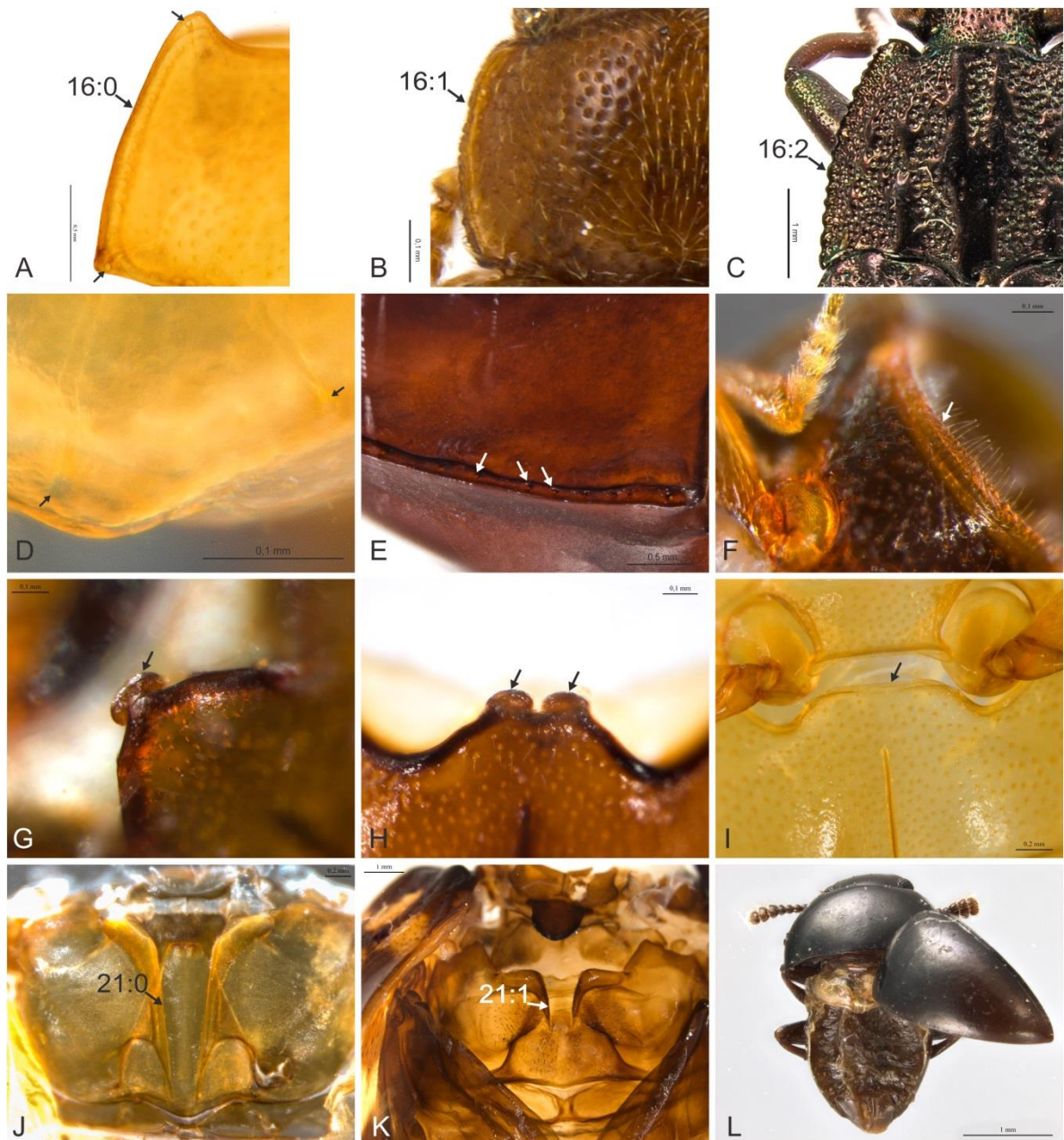


Figure 5. Characters and character states of the prothorax, mesothorax and metathorax (see text for a definition of each character statement). (A) *Triplax russica* (Tritomini); (B) *Cryptophilus integer* (Cryptophilinae); (C) *Helota fulviventris* (Helotidae); (D) *Xalpirta maderi* (Tritomini); (E) *Erotylus giganteus* (Erotylinae: Erotylini); (F) *Pharaxonotha kirschii* (Pharaxonothinae); (G) *Languria bicolor* (Languriinae); (H) *Triplax russica* (Tritomini); (I) *Lybasia barbata* (Tritomini); (J) *Helota fulviventris* (Helotidae); (K) *Erotylus giganteus* (Erotylinae: Erotylini); (L) Tritomini sp. (Tritomini).

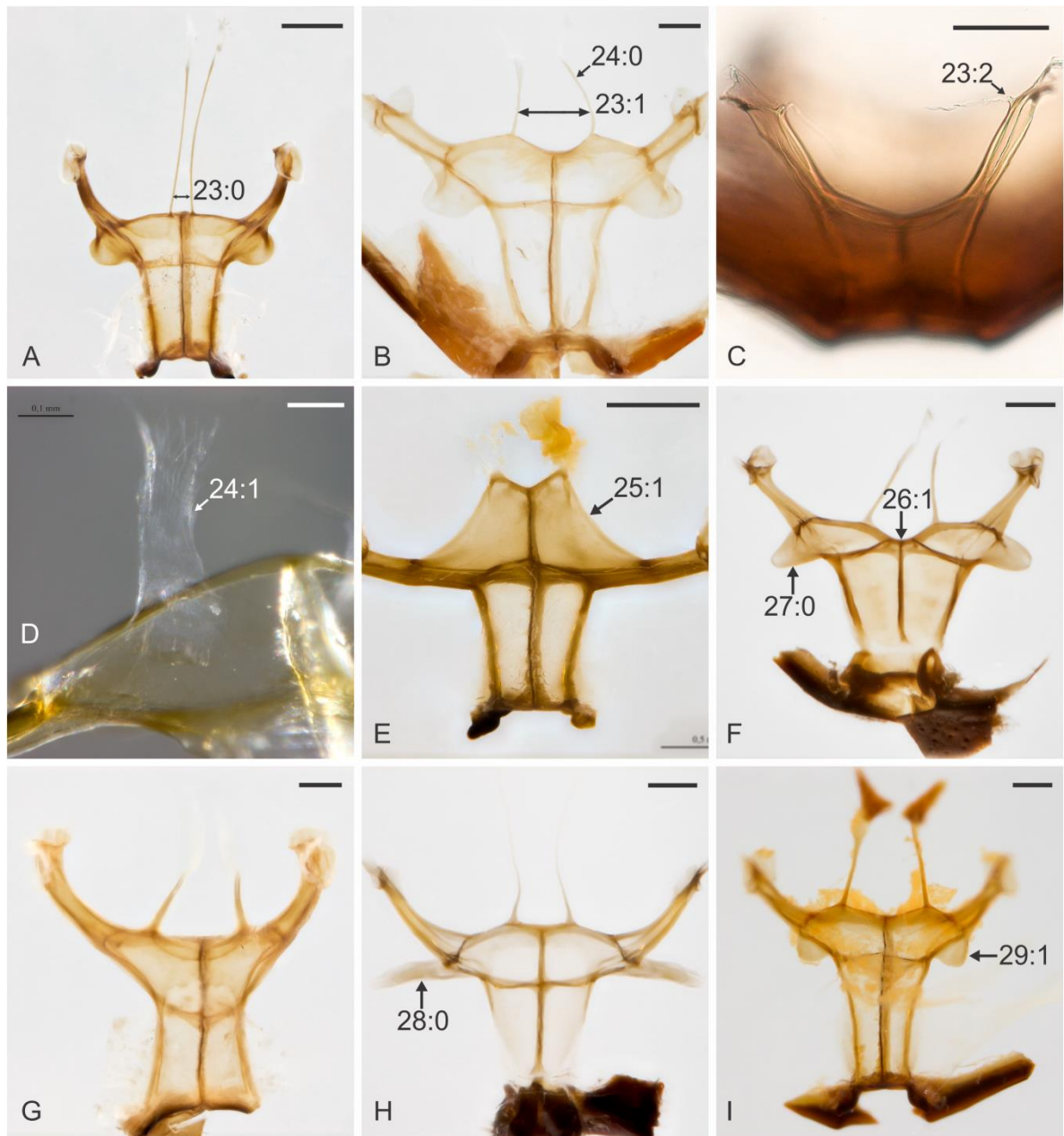


Figure 6. Characters and character states of the metendosternite (metathorax) (see text for a definition of each character statement). (A) *Encaustes verticalis* (Erotylinae: Encaustini); (B) *Mycotretus quadrioculatus* (Erotylinae: Tritomini); (C) *Cryptophilus integer* (Cryptophilinae); (D) *Mycotretus coccineus* (Erotylinae: Tritomini); (E) *Palaeolybas nigripennis apicalis*; (F) *Dacne bipustulata* (Erotylinae: Dacnini); (G) *Erotylus giganteus* (Erotylinae: Erotylini); (H) *Pharaxonotha kirschii* (Pharaxonothinae); (I) *Ischyryus scriptus* (Erotylinae: Tritomini). Scale bars: A = 1 mm; B–D, F–H = 0.1 mm; E–G = 0.5 mm; I = 0.2.



Figure 7. Characters and character states of the abdomen, legs and par of male genitalia (see text for a definition of each character statement). (A) *Xalpirita mauryi* (Tritomini); (B–C) *Pharaxonotha kirschii* (Pharaxonothinae); (D) *Dacne bipustulata* (Erotylinae: Dacnini); (E) *Languria bicolor* Fabricius (Languriinae); (F) *Mycotretus sobrinus* (Guérin-Méneville) (Tritomini); (G) *Mycotretus flavomarginatus* Lacordaire (Tritomini); (H) *Mycotretus lesueuri* (Chevrolat) (Tritomini); (I) *Erotylus giganteus* (Linnaeus) (Erotylinae: Erotylini)

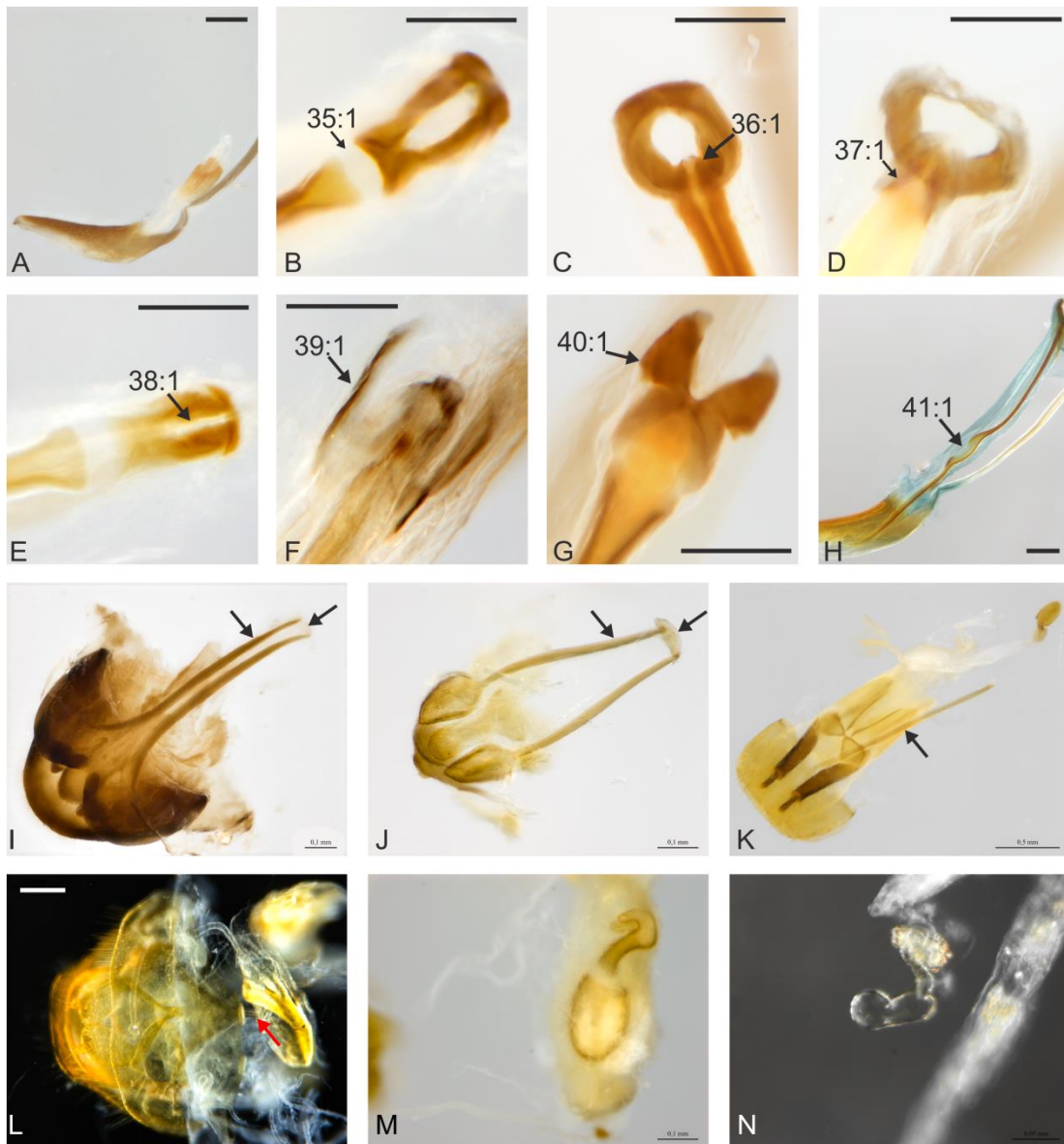


Figure 8. Characters and character states of the male and female genitalia (see text for a definition of each character statement). (A) *Tritoma bipustulata* (Erotylinae: Tritomini); (B) *Mycotretus apicalis* (Erotylinae: Tritomini); (C) *Mycotretus pygmaeus* (Erotylinae: Tritomini); (D) *Mycotretus marginicollis* (Erotylinae: Tritomini); (E) *Mycotretus lesueuri* (Erotylinae: Tritomini); (F) *Mycotretus flavomarginatus* (Erotylinae: Tritomini); (G) *Mycotretus fallax* (Erotylinae: Tritomini); (H) *Mycotretus trifasciatus* (Erotylinae: Tritomini); (I) Tritomini sp. (Tritomini); (J) *Xalpirta mauryi* (Tritomini); (K) *Mycotretus centralis* (Tritomini); (L) *Neotriplax lewisi* (Tritomini); (M) *Mycotretus tigrinus* (Tritomini); (N) *Cryptophilus integer* (Cryptophilinae). Scale bars (A–H): A = 0.2; B–H = 0.1.

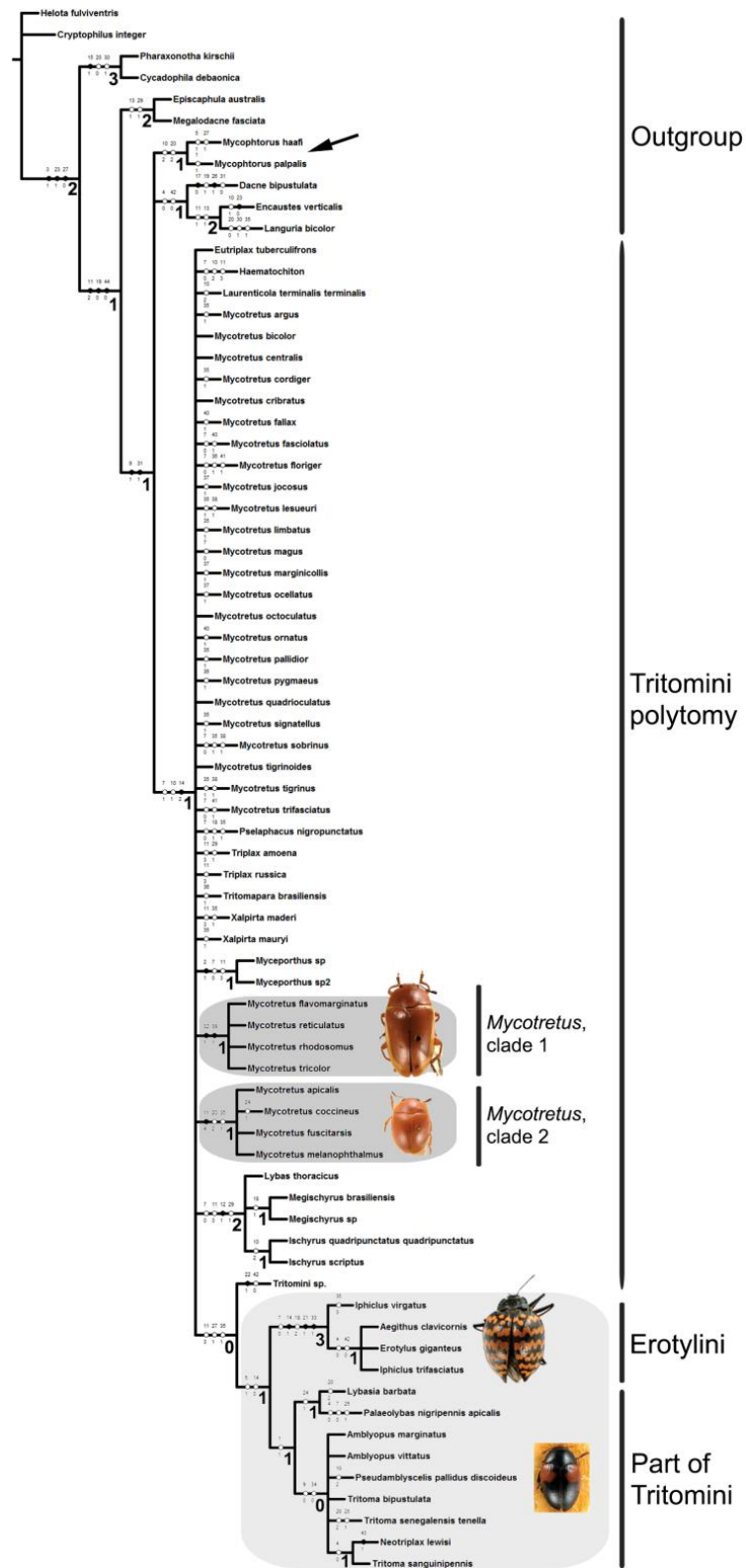


Figure 9. Strict consensus tree derived from the parsimony analysis with equal weights (EW). Node values represent Bremer support. Black circles indicate synapomorphic transformations and white circles indicate homoplastic transformations.

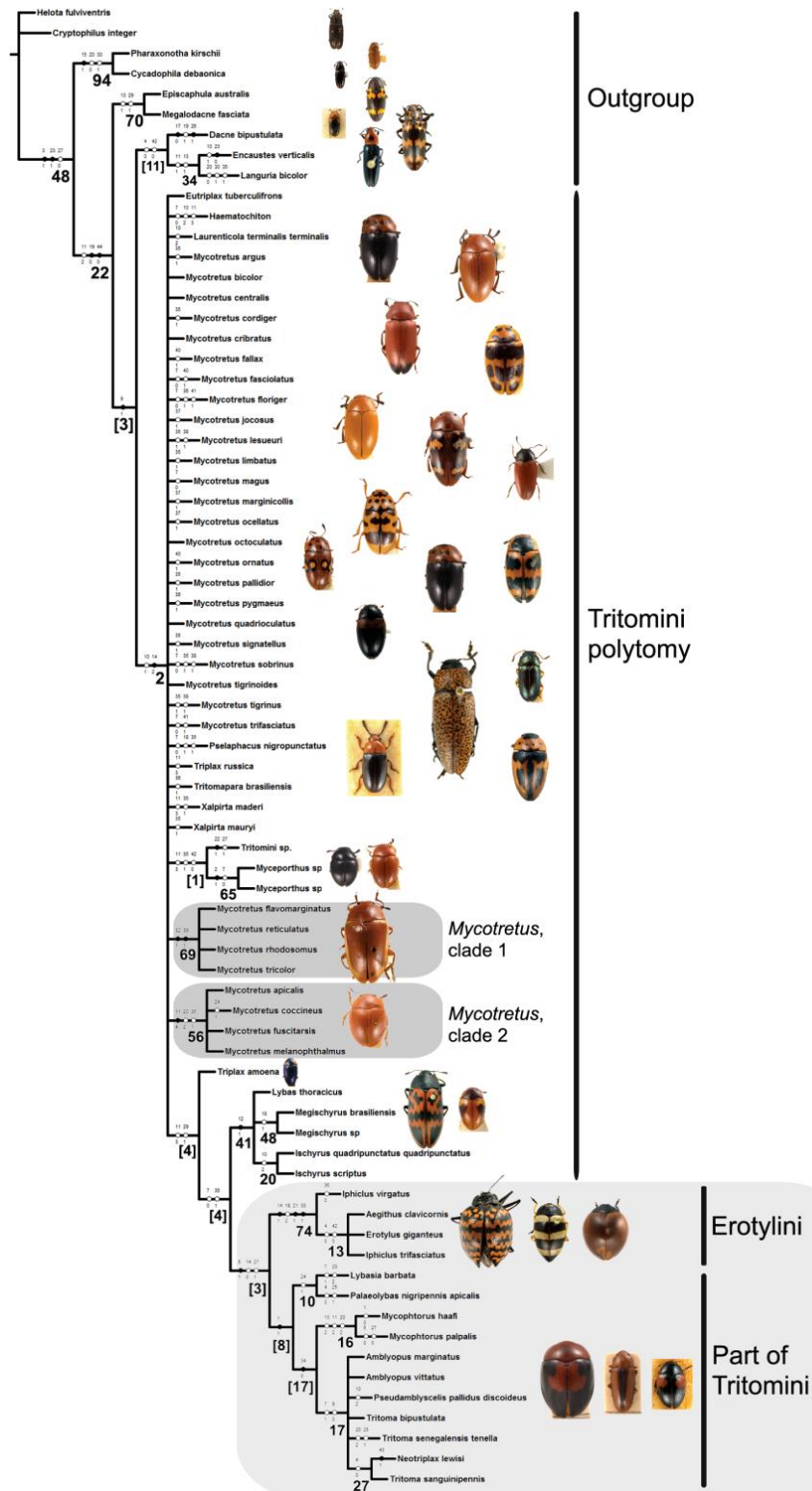


Figure 10. Strict consensus tree derived from the parsimony analysis with implied weights (IW). Node values indicate the frequency of GC groups derived from symmetric resampling. Black circles indicate synapomorphic transformations and white circles indicate homoplastic transformations.

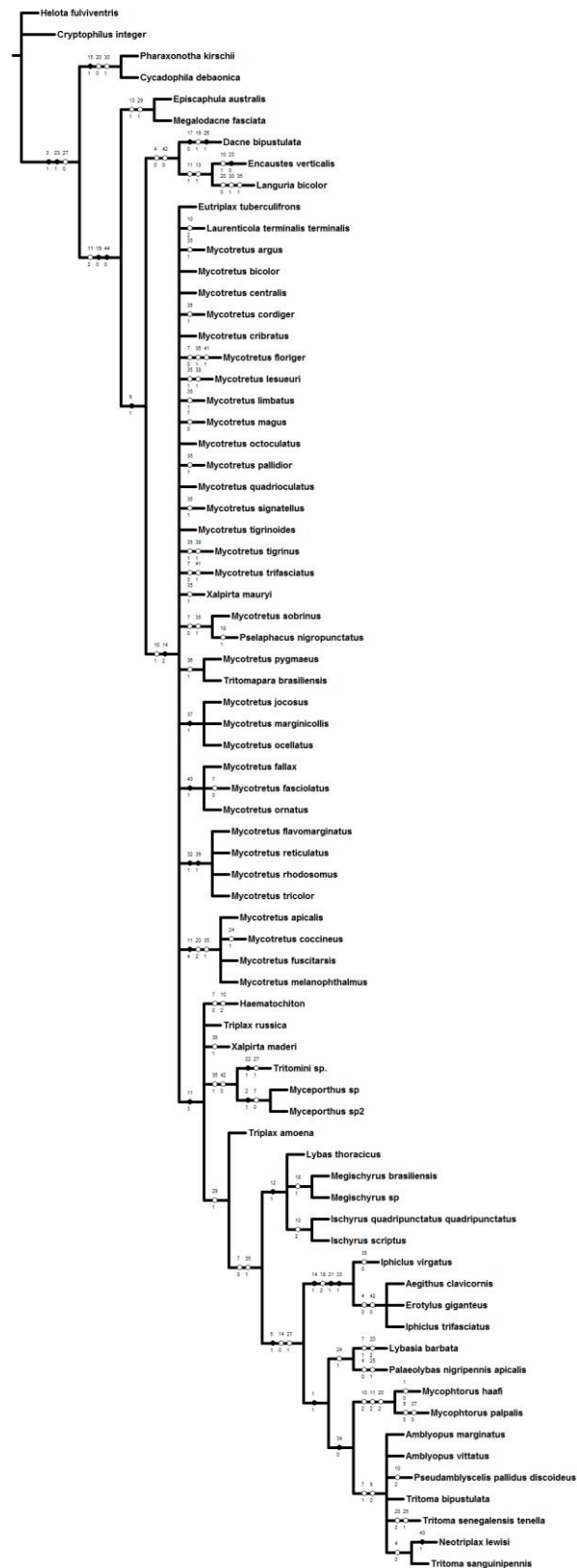


Figure 11. Majority consensus topology derived from the parsimony analysis with implied weights (IW). Black circles indicate synapomorphic transformations and white circles indicate homoplastic transformations.

Table 1. List of studied taxa with systematic assignment. N, number of studied specimens; F, female; M, male.

Systematic assignment		Species	N	Sex	Provenance
Erotylidae					
Erotylinae	Tritomini	<i>Amblyopus marginatus</i> (Quedenfeldt, 1888)	1	M	Kapanga (Democratic Republic of the Congo)
		<i>Amblyopus vittatus</i> (Olivier, 1807)	1	F	Tonkin (Vietnam)
		<i>Eutriplax tuberculifrons</i> (Lewis, 1887)	1	M	Nagano (Japan)
		<i>Haematochiton</i> sp.	1	M	Minas Gerais (Brazil)
		<i>Ischyryus quadripunctatus quadripunctatus</i> (Olivier, 1792)	1	F	Chontales (Nicaragua)
		<i>Ischyryus scriptus</i> (Olivier, 1807)	1	M	Minas Gerais (Brazil)
		<i>Laurenticola terminalisternalis</i> (Farmaire, 1898)	1	F	Diana (Madagascar)
		<i>Lybas thoracicus</i> (Olivier, 1807)	1	F	Pará (Brazil)
		<i>Lybasia barbata</i> Delkeskamp, 1965	1	M	Tanganyika (Democratic Republic of the Congo)
		<i>Megischyryus brasiliensis</i> Lacordaire, 1842	1	F	Rio de Janeiro, Minas Gerais (Brazil)
		<i>Megischyryus</i> sp.	1	F	Mato Grosso (Brazil)
		<i>Myceporthus</i> sp.	1	M	Amazonas (Brazil)
		<i>Myceporthus</i> sp2	1	F	Amapá (Brazil)
		<i>Mycophthorus haafi</i> (Delkeskamp, 1965)	1	M	Kapanga (Democratic Republic of the Congo)
		<i>Mycophthorus palpalis</i> (Delkeskamp, 1965)	1	F	Sandoa (Democratic Republic of the Congo)
		<i>Mycotretus apicalis</i> Lacordaire, 1842	2	1M, 1F	Rio de Janeiro, São Paulo (Brazil)
		<i>Mycotretus argus</i> Lacordaire, 1842	2	1M, 1F	Rondônia; Pará (Brazil)
		<i>Mycotretus bicolor</i> Taschenberg, 1870	2	1M, 1F	Chapare (Bolivia); Salta (Argentina)
		<i>Mycotretus centralis</i> Arrow, 1909	2	1M, 1F	Rio de Janeiro, Rio Grande do Sul (Brazil)
		<i>Mycotretus coccineus</i> Lacordaire, 1842	5	2M, 3F	Chiriqui (Panama); Amazonas, Santa Catarina (Brazil)
		<i>Mycotretus cordiger</i> Crotch, 1876	2	M	Rondônia (Brazil)
		<i>Mycotretus cribratus</i> Gorham, 1888	1	F	Bugaba (Panama)
		<i>Mycotretus fallax</i> (Guérin-Méneville, 1841)	2	1M, 1F	São Paulo, Minas Gerais (Brazil)
		<i>Mycotretus fasciolatus</i> Lacordaire, 1842	1	M	La Libertad (El Salvador)
		<i>Mycotretus flavomarginatus</i> Lacordaire, 1842	2	2M, 2F	São Paulo, Minas Gerais, Espírito Santo (Brazil)
		<i>Mycotretus floriger</i> Lacordaire, 1842	2	1M, 1F	Amapá, Mato Grosso (Brazil)
		<i>Mycotretus fuscitarsis</i> Lacordaire, 1842	1	F	Cerro de Plumas (Mexico)

Systematic assignment		Species	N	Sex	Provenance
Erotylinae	Tritomini	<i>Mycotretus jocosus</i> Lacordaire, 1842	2	1M, 1F	Rio de Janeiro (Brazil)
		<i>Mycotretus lesueuri</i> (Chevrolat, 1835)	2	1M, 1F	Ahuachapán (El Salvador); Veracruz (Mexico)
		<i>Mycotretus limbatus</i> (Lacordaire, 1842)	1	M	Santa Catarina (Brazil)
		<i>Mycotretus magus</i> Lacordaire, 1842	2	F	Bahia, Rio de Janeiro (Brazil)
		<i>Mycotretus marginicollis</i> Lacordaire, 1842	2	1M, 1F	Santa Catarina, Rio Grande do Sul (Brazil)
		<i>Mycotretus melanophthalmus</i> (Duponchel, 1825)	4	3M, 1F	Rio Grande do Sul (Brazil); Chapare (Bolivia); Tucuman (Argentina)
		<i>Mycotretus ocellatus</i> (Germar, 1824)	1	M	Rio de Janeiro (Brazil)
		<i>Mycotretus octoculatus</i> Alvarenga, 1983	1	M	Minas Geras (Brazil)
		<i>Mycotretus ornatus</i> (Duponchel, 1825)	2	M	Rio de Janeiro, Rio Grande do Sul (Brazil)
		<i>Mycotretus pallidior</i> (Crotch, 1876)	1	M	Veracruz (Mexico)
		<i>Mycotretus pygmaeus</i> Lacordaire, 1842	2	1M, 1F	Mato Grosso, Amapá (Brazil)
		<i>Mycotretus quadrioculatus</i> Alvarenga, 1983	2	1M, 1F	Pará (Brazil)
		<i>Mycotretus reticulatus</i> Crotch, 1876	2	M	Acre (Brazil)
		<i>Mycotretus rhodosomus</i> Lacordaire, 1842	2	1M, 1F	Rio de Janeiro (Brazil)
		<i>Mycotretus signatellus</i> Crotch, 1876	1	M	Amazonas (Brazil)
		<i>Mycotretus sobrinus</i> (Guérin-Méneville, 1841)	2	1M, 1F	Rio de Janeiro, Minas Gerais (Brazil)
		<i>Mycotretus tigrinoides</i> Mader, 1942	2	1M,1F	Mato Grosso (Brazil)
		<i>Mycotretus tigrinus</i> (Olivier, 1792)	2	1M,1F	Chapare (Bolivia); Mato Grosso (Brazil)
		<i>Mycotretus tricolor</i> Crotch, 1876	1	M	Amazonas (Brazil)
		<i>Mycotretus trifasciatus</i> Guérin, 1956	3	2M, 1F	Minas Gerais, Rio Grande do Sul (Brazil)
		<i>Neotriplax lewisi</i> (Crotch, 1873)	1	F	Yamanashi (Japan)
		<i>Palaeolybas nigripennis apicalis</i> Arrow, 1917	1	M	Eala (Democratic Republic of the Congo)
		<i>Pselaphacus nigropunctatus</i> Percheron, 1835	1	M	Mato Grosso (Brazil)
<i>Pseudamblyscelis pallidus discoideus</i> Philipp, 1959	1	M	Moto (Democratic Republic of the Congo)		
<i>Triplax amoena</i> Solsky, 1871	1	M	Oze (Japan)		
<i>Triplax russica</i> (Linnaeus, 1758)	2	1M,1F	Tisvilde (Denmark); Sveti Rok (Croatia)		

Systematic assignment		Species	N	Sex	Provenance
		<i>Tritoma bipustulata</i> Fabricius, 1775	2	M	Austria
		<i>Tritoma sanguinipennis</i> (Say, 1825)	2	1M, 1F	Washington, Indiana (United States of America)
		<i>Tritoma senegalensis tenella</i> Delkeskamp, 1962	1	F	Mayumbe (Congo)
		<i>Tritomapara brasiliensis</i> (Guérin, 1946)	1	M	Minas Gerais (Brazil)
		<i>Xalpirta maderi</i> (Delkeskamp, 1957)	1	M	Santa Catarina (Brazil)
		<i>Xalpirta mauryi</i> Pecci-Maddalena <i>et al.</i> 2019	1	M	Rio de Janeiro (Brazil)
		Tritomini sp.	1	M	Rio de Janeiro (Brazil)
	Dacnini	<i>Dacne bipustulata</i> (Thunberg, 1781)	3	2M, 1F	"Sweden or Germany?" [doubtful record]
		<i>Episcaphula australis</i> (Boisduval, 1835)	1	F	Australian Capital Territory, ACT (Australia)
	Megalodacnini	<i>Megalodacne fasciata</i> (Fabricius, 1777)	2	1M, 1F	Georgia, Delaware (United States of America)
		<i>Aegithus clavicornis</i> Linnaeus 1758	1	M	Mato Grosso (Brazil)
	Erotylini	<i>Erotylus giganteus</i> (Linnaeus, 1758)	2	1M, 1F	Amapá, Pará (Brazil)
		<i>Iphiclus trifasciatus</i> (Olivier, 1807)	1	F	Minas Gerais (Brazil)
		<i>Iphiclus virgatus</i> (Kuhnt, 1910)	1	F	Minas Gerais (Brazil)
	Encaustini	<i>Encaustes verticalis</i> Macleay, 1825	1	M	Sabah (Malaysia)
	Cryptophilinae	Cryptophilini			
		<i>Cryptophilus integer</i> (Heer, 1841)	2	1M, 1F	Oklahoma (United States of America)
		<i>Pharaxonotha kirschii</i> Heer, 1875	2	M	Texas (United States of America)
	Pharaxonothinae	<i>Cycadophila debaonica</i> Xu <i>et al.</i> 2015	1	F	Guangxi (China)
	Languriinae	Languriini			
		<i>Languria bicolor</i> Fabricius, 1789	2	M	Oklahoma (United States of America)
	Helotidae	<i>Helota fulviventris</i> Kolbe, 1886	1	M	St. Petersburg (Russia)

Table 2. Matrix of character and character states. “?” refers to doubtful scores; “-” refers to not applicable characters.

Taxa/character	10	20	30	40
<i>Helota fulviventris</i>	0 0 0 - - 0 0 - 0 0	0 0 0 0 0 2 ? ? 1 ?	0 0 2 0 0 0 1 - - 0	0 0 0 1 - - - - - - - 0 ? ?
<i>Amblyopus marginatus</i>	1 0 1 1 1 2 1 1 0 1	3 0 0 0 0 0 1 0 0 1	0 0 1 0 0 0 1 - - 0	1 0 0 0 - - - - - - - 1 ? ?
<i>Amblyopus vittatus</i>	1 0 1 1 1 2 1 1 0 1	3 0 0 0 0 0 1 0 0 1	0 0 1 0 0 0 1 - - 0	1 0 ? ? ? ? ? ? ? ? ? ? 0 0
<i>Eutriplax tuberculifrons</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 ? ? ? ? ? ? ? ? 0 1 ? ?
<i>Haematochiton</i>	0 0 1 1 0 2 0 - 1 2	3 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 - - - - - 0 1 ? ?
<i>Ischyryus quadripunctatus</i>	0 0 1 1 0 2 0 - 1 2	3 1 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 1 0	1 0 0 1 ? ? ? ? ? ? ? ? ? ? 0 0
<i>Ischyryus scriptus</i>	0 0 1 1 0 2 0 - 1 2	3 1 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 1 0	1 0 0 1 1 0 - - 0 0 0 0 1 ? 0
<i>Laurenticola terminalis</i>	0 0 1 1 0 2 1 1 1 2	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 ? ? ? ? ? ? ? ? ? ? 0 0
<i>Lybas thoracicus</i>	0 0 1 1 0 2 0 - 1 1	3 1 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 1 0	1 0 ? ? ? ? ? ? ? ? ? ? ? ? 0 0
<i>Lybasia barbata</i>	1 0 1 1 1 2 1 1 1 1	3 0 0 0 0 0 1 0 0 2	0 0 1 1 0 0 1 - - 0	1 0 0 1 1 0 - - 0 0 0 0 1 ? ?
<i>Megischyryus brasiliensis</i>	0 0 1 1 0 2 0 - 1 1	3 1 0 2 0 0 1 1 0 1	0 0 1 0 0 0 0 1 1 0	1 0 ? ? ? ? ? ? ? ? ? ? ? ? 0 0
<i>Megischyryus sp</i>	0 0 1 1 0 2 0 - 1 1	3 1 0 2 0 0 1 1 0 1	0 0 1 0 0 0 0 1 1 0	1 0 ? ? ? ? ? ? ? ? ? ? ? ? 0 0
<i>Myceporthus sp</i>	0 1 1 1 0 2 0 - 1 1	3 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 - - 0 0 0 0 0 ? ?
<i>Myceporthus sp2</i>	0 1 1 1 0 2 0 - 1 1	3 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 ? ? ? ? ? ? ? ? ? ? ? ? 0 0
<i>Mycophorus haafi</i>	0 0 1 1 1 2 0 - 1 2	2 0 0 0 0 0 1 0 0 2	0 0 1 0 0 0 1 - - 0	1 0 0 0 - - - - - - - 1 ? ?
<i>Mycophorus palpalis</i>	1 0 1 1 0 2 0 - 1 2	2 0 0 0 0 0 1 0 0 2	0 0 1 0 0 0 0 1 1 0	1 0 ? ? ? ? ? ? ? ? ? ? ? ? 0 0
<i>Mycotretus apicalis</i>	0 0 1 1 0 2 1 1 1 1	4 0 0 2 0 0 1 0 0 2	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 0 0 0 0 0 0 1 0 0
<i>Mycotretus argus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 0 0 0 0 0 0 1 0 0
<i>Mycotretus bicolor</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 ?
<i>Mycotretus centralis</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 0 0 0 0 0 0 1 0 0
<i>Mycotretus coccineus</i>	0 0 1 1 0 2 1 1 1 1	4 0 0 2 0 0 1 0 0 2	0 0 1 1 0 0 0 1 0 0	1 0 0 1 1 0 0 0 0 0 0 0 0 1 0 0
<i>Mycotretus cordiger</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 0 0 0 0 0 0 1 ? ?
<i>Mycotretus cribratus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 ? ? ? ? ? ? ? ? ? ? ? ? 0 ?
<i>Mycotretus fallax</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 - 0 1 0 1 0 0
<i>Mycotretus fasciolatus</i>	0 0 1 1 0 2 0 - 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 ? 1 0 0 0 - 0 1 0 1 ? ?
<i>Mycotretus flavomarginatus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 1 0 1 0 0 0 - 1 0 0 1 0 0
<i>Mycotretus floriger</i>	0 0 1 1 0 2 0 - 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 1 0 0 0 0 0 1 1 0 0
<i>Mycotretus fuscitarsis</i>	0 0 1 1 0 2 1 1 1 1	4 0 0 2 0 0 1 0 0 2	0 0 1 0 0 0 0 1 0 0	1 0 ? ? ? ? ? ? ? ? ? ? ? ? 0 0
<i>Mycotretus jocosus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 - 0 1 0 0 0 0 0 1 0 0

Taxa/character	10	20	30	40
<i>Mycotretus lesueuri</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 1 0 0
<i>Mycotretus limbatus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 0 0 0
<i>Mycotretus magus</i>	0 0 1 1 0 2 0 - 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 ? ? ? ? ? ? ? ?
<i>Mycotretus marginicollis</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 1 0 0 0
<i>Mycotretus melanophthalmus</i>	0 0 1 1 0 2 1 1 1 1	4 0 0 2 0 0 1 0 0 2	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 0 0 0
<i>Mycotretus ocellatus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 1 - 0 0
<i>Mycotretus octoculatus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 0 0 0
<i>Mycotretus ornatus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 - 0 1
<i>Mycotretus pallidior</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 0 0 0
<i>Mycotretus pygmaeus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 1 0 0 0 0
<i>Mycotretus quadrioculatus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 0 0 0
<i>Mycotretus reticulatus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 1 0 1 0 0 0 - 1 0
<i>Mycotretus rhodosomus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 1 0 1 0 0 0 - 1 0
<i>Mycotretus signatellus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 - 0 0
<i>Mycotretus sobrinus</i>	0 0 1 1 0 2 0 - 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 1 0 0
<i>Mycotretus tigrinoides</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 0 0 0
<i>Mycotretus tigrinus</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 1 0 0
<i>Mycotretus tricolor</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 1 0 1 0 0 0 - 1 0
<i>Mycotretus trifasciatus</i>	0 0 1 1 0 2 0 - 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 0 0 0
<i>Neotriplax lewisi</i>	1 0 1 0 1 2 1 1 0 1	3 0 0 ? 0 0 1 0 0 1	0 0 1 0 0 0 1 - - 0	1 0 ? ? ? ? ? ? ? ?
<i>Palaeolybas nigripennis apicalis</i>	1 0 1 0 1 2 0 - 1 1	3 0 0 0 0 0 1 0 0 1	0 0 1 1 1 0 1 - - 0	1 0 0 1 1 0 0 - 0 0
<i>Pselaphacus nigropunctatus</i>	0 0 1 1 0 2 0 - 1 1	2 0 0 2 0 0 1 1 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 1 0 0 - 0 0
<i>Pseudamblyscelis pallidus discoideus</i>	1 0 1 1 1 2 1 1 0 2	3 0 0 0 0 0 1 0 0 1	0 0 1 0 0 0 1 - - 0	1 0 0 0 - - - - - -
<i>Triplax amoena</i>	0 0 1 1 0 2 1 1 1 1	3 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 1 0	1 0 0 1 0 0 0 - 0 0
<i>Triplax russica</i>	0 0 1 1 0 2 1 1 1 1	3 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 0 0 0 0 0
<i>Tritoma bipustulata</i>	1 0 1 1 1 2 1 1 0 1	3 0 0 0 0 0 1 0 0 1	0 0 1 0 0 0 1 - - 0	1 0 0 0 - - - - - -
<i>Tritoma sanguinipennis</i>	1 0 1 0 1 2 1 1 0 1	3 0 0 0 0 0 1 0 0 1	0 0 1 0 0 0 1 - - 0	1 0 0 0 - - - - - -
<i>Tritoma senegalensis tenella</i>	1 0 1 1 1 2 1 1 0 1	3 0 0 0 0 0 1 0 0 2	0 0 1 0 1 0 1 - - 0	1 0 ? ? ? ? ? ? ? ?
<i>Tritomapara brasiliensis</i>	0 0 1 1 0 2 1 1 1 1	2 0 0 2 0 0 1 0 0 1	0 0 1 0 0 0 0 1 0 0	1 0 0 1 0 1 0 0 0 0

Taxa/character	10										20										30										40													
<i>Xalpirta maderi</i>	0	0	1	1	0	2	1	1	1	1	3	0	0	2	0	0	1	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1	0	0	-	0	0	0	1	0	0
<i>Xalpirta mauryi</i>	0	0	1	1	0	2	1	1	1	1	2	0	0	2	0	0	1	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1	0	0	-	0	0	0	1	0	0
<i>Tritomini sp.</i>	0	0	1	1	0	2	1	1	1	1	3	0	0	2	0	0	1	0	0	1	0	1	?	?	0	?	1	-	-	0	1	0	0	1	1	0	0	-	0	-	0	0	?	?
<i>Dacne bipustulata</i>	0	0	1	0	0	2	?	?	1	0	2	0	0	0	0	0	0	-	1	1	0	0	1	0	0	1	0	1	0	0	0	0	0	1	0	-	-	-	-	-	-	0	?	?
<i>Episcaphula australis</i>	0	0	1	1	0	2	0	-	0	0	2	0	1	0	0	0	1	0	0	?	0	0	1	0	0	0	0	1	1	0	0	0	?	?	?	?	?	?	?	?	?	?	0	?
<i>Megalodacne fasciata</i>	0	0	1	1	0	2	0	-	0	0	2	0	1	0	0	0	1	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	-	-	-	-	-	-	1	0	0
<i>Aegithus clavicornis</i>	0	0	1	0	1	2	0	-	1	1	3	0	0	1	0	0	1	2	0	1	1	0	1	0	0	0	1	-	-	0	1	0	1	1	?	?	?	?	?	?	?	0	0	1
<i>Erotylus giganteus</i>	0	0	1	0	1	2	0	-	1	1	3	0	0	1	0	0	1	2	0	1	1	0	1	0	0	0	1	-	-	0	1	0	1	1	1	-	-	-	-	-	-	0	0	1
<i>Iphiclus trifasciatus</i>	0	0	1	0	1	2	0	-	1	1	3	0	0	1	0	0	1	2	0	1	1	0	1	0	0	0	1	-	-	0	1	0	?	?	?	?	?	?	?	?	?	?	0	1
<i>Iphiclus virgatus</i>	0	0	1	1	1	2	0	-	1	1	3	0	0	1	0	0	1	2	0	1	1	0	1	0	0	0	1	-	-	0	1	0	1	1	0	-	-	-	-	-	-	1	?	?
<i>Encaustes verticalis</i>	0	0	1	0	0	1	0	-	1	1	1	0	1	0	0	0	1	2	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	-	-	-	-	-	-	0	?	?
<i>Cryptophilus integer</i>	0	0	0	-	0	2	1	0	?	0	1	0	0	0	0	1	?	?	1	1	0	0	2	0	0	-	1	-	-	0	0	0	0	1	-	-	-	-	-	-	-	1	0	1
<i>Pharaxonotha kirschii</i>	0	0	1	1	0	2	1	1	0	0	1	0	0	0	1	0	?	?	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	-	-	-	-	-	-	-	1	?	?
<i>Cycadophila debaonica</i>	0	0	1	1	0	2	1	1	0	0	1	0	0	0	1	0	?	?	1	0	0	0	1	0	0	0	0	0	0	1	0	0	?	?	?	?	?	?	?	?	?	?	0	1
<i>Languria bicolor</i>	0	0	1	0	-	0	0	-	1	0	1	0	1	0	0	0	?	?	0	0	0	0	1	0	0	0	0	1	0	1	1	0	0	1	1	-	-	-	-	-	-	0	?	?

Appendix

The specimens examined in chapters 6 and 7 belong to the following institutions:

CELC	Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera da UFV (Viçosa, MG, Brazil)
CEMT	Seção de Entomologia da Coleção Zoológica, Departamento de Biologia e Zoologia, Instituto de Biociências, Universidade Federal de Mato Grosso (Cuiabá, MT, Brazil)
CERPE	Coleção Entomológica da Universidade Federal Rural de Pernambuco (Recife, PE, Brazil)
DZUP	Coleção Entomológica Pe. J.S. Moure, Universidade Federal do Paraná (Curitiba, PR, Brazil)
FSCA	Florida State Collection of Arthropods (Gainesville, Florida, USA)
MCNZ	Fundação Zoobotânica do Rio Grande do Sul (Porto Alegre, RS, Brazil)
MNRJ	Museu Nacional do Rio de Janeiro (Rio de Janeiro, RJ, Brazil)
MZSP	Museu de Zoologia da Universidade de São Paulo (São Paulo, SP, Brazil)

Material examined. 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Bugaba, 800-1,500 ft. Champion. [printed] \ B.C.A., Col., VII. *Mycotretus cribratus*. [printed] \ 1846 [printed]”; 1 male (MZSP, dissected) “BRASIL, Itatiaia (1.100 Mtr.) Est do Rio, Dirings [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Campos do Jordão, S.Paulo Brasil, 1-1969, W. Bokermann [printed] \ DZUP 242446 [printed]”; 1 male and 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Paratipo [red label, printed] \ Tucuruí Pará, Brasil I. 1979, M. Alvarenga [printed] \ M [printed] \ *Mycotretus quadrioculatus* m. [handwritten], M. Alvarenga det. [printed], 1983 [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Chapada Guimarães, Mato Grosso Brasil, XI-1963, Alvarenga e Werner [printed] \ DZUP 371440 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Serra do Navio, Terr. Amapá Brasil, IX-1957, K. Lenko leg. [printed] \ DZUP 371396 [printed]”; 2 females (MNRJ, dissected) “Coleção M.

Alvarenga [printed] \ Chiriqui Panamá Ribbe [handwritten] \ B.C.A., Col., VII. *Mycotretus sanguinosus*. [printed] \ 1874 [printed]”; 1 male (MNRJ, dissected) “Benjamin Constant, Amazonas, Brasil, 18-28.IX.1962, K. Lenko-col. [printed] \ *Mycotret* 500 [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Tabatinga, Amazonas Brasil, 22 a 24-vii-1956, M. Alvarenga leglt [printed] \ 1885-A [handwritten] \ *Mycotretus* 509 [handwritten] \ Ápice tíbias dilatadas, ápice prosterno comprimido. [handwritten]”; 1 male (MNRJ, dissected) “Hansa Humboldt, Sta. Catharina, Brasilien Reitter [printed] \ 1B [handwritten] \ *Mycotretus* [?] 217 [handwritten] \ *Mycotretus sanguinosus* Crotch [handwritten] Det. Oscar Monte [printed] \ lr [?] 89. H. 5. [handwritten] \ Prosterno um pouco diferente. 2 tíbias com ápice dilatado, 3 tíbias faltando [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Cerro de Plumas, Mexico. Hoega. [printed] \ B.C.A., Col., VII. *Mycotretus fuscitarsis*. [printed] \ 1884 [printed]”; 1 male (CELC, dissected) “BRASIL: MG, Viçosa, Mata do Paraíso, 02.xii.2014, Pecci-Maddalena, I.S.C. leg. [printed]”; 1 male (MCNZ, dissected) “Canela, RS, 06.I.1984, Dr. Hoffmann [handwritten] \ Col. MCN, 238429 \ *M. trifasciatus* [handwritten]”; 1 female (CELC, dissected) “Brasil: MG, Viçosa, Mata do Paraíso, 08.xii.2014, Pecci-Maddalena, I.S.C. & Lopes-Andrade, C. leg. [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Chapare, Bolivia IV. 1959, A. Martinez [printed] \ *Mycotretus cinctellus* Guerin, 1841 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [printed, red label] \ Museo La Plata [printed] \ 11-1941 [handwritten] Villa P. Monti, Burruyacú, Prov. Tucuman [printed] \ *Mycotretus cinctellus* Guérin, 1841 [handwritten] M. Alvarenga det. [printed] 1971 [handwritten] \ *Mycolybas cinctellus* Guér. Comp. Col. Bruch [handwritten] \ 2018 [printed] \ PMFD [? handwritten]”; 1 male and 1 female (CELC, dissected) “BRASIL: MG, Viçosa, Mata do Paraíso, trilha do pesquisador, 11.x.2016; I. Souza-Gonçalves, P. Borlini, C Lopes-Andrade leg \ ex *Pleurotus ostreatus*”; 1 female (MCNZ, dissected) “Canela, RS, Barragem dos Bugres, 23.XI.1998, Franceschini col [printed] \ Col. MCN [printed] 163.038 [handwritten] \ *M. minutus* [handwritten]”; 1 male (DZUP, dissected) “Brasilien, Nova Teutonia, 27°11’ 8[?]. 52°23’L, Fritz Plaumann [printed], IX [handwritten], 195[printed] 2 [handwritten], 300-500 m [printed] \ DZUP 135192 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Barueri, S. Paulo, Brasil [printed], 7. II. 1960 [handwritten], K. Lenko leg. [printed] \ DZUP 235139 [printed]”; 1 female (CELC, dissected) “Brasil, MG, Ingaí, Boqueirão próx. Poço Bonito, xi.2002 leg. R.J. Silva”; 2 males (MNRJ, dissected) “Brasil-Rondônia, Pimenta Bueno, X.1986 O. Roppa, P. Magno & J. Becker [printed]”; 1 female (MCNZ, dissected) “Derrubadas, RS, Parque Est. do Turvo, 12-

17.I.2002, R. Ott col. [printed] \ Col. MCN. [printed] 218001 [handwritten]”; 1 male (MCNZ, dissected) “Triunfo, Rs, (COPELUL), 14-15.I.1997, L. Moura col. [printed] \ Col. MCN [printed] 215755 [handwritten] \ M. melanophthalmus [handwritten]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Coatepec, Ver. [handwritten] \ Mycotretus lesueuri Chevr. [handwritten] \ 1655 [printed] \ Comparado com tipo [printed] Erotylus lesueri Chevr., 1835 [handwritten] M. Alvarenga det. 1971 [printed] \ Mycotretus lesueuri Coat. Chevr. [handwritten] \ DZUP 132756 [printed]”; 1 male (DZUP, dissected) “Apaneco, Ahuachapahu [?], El Salvador, 16.VII. 1959, J. Bechyné [handwritten] \ DZUP 132757 [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Corcovado, Guanabara Brasil [printed] ix. 1969 [handwritten] Alvarenga & Seabra [printed] \ 1944 [printed] \ Mycotretus 013 [? handwritten] \ DZUP 136236 [printed]”; 1 female (DZUP, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Represa Rio Grande, Guanabara Brasil [printed] X. 1965 [handwritten] F.M. Oliveira [handwritten] \ Comparado com tipo [printed] Mycotretus jocosus Lac. 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ DZUP 136233 [printed]”; 1 female (MCNZ, dissected) “Caxias do Sul, RS, (Faz. Souza), 18-20/XI/1993, L. Moura [handwritten] leg. [printed] \ Col. MCN 238416 [printed]”; 1 male (MZSP, dissected) “Brasilien, Nova Teutonia, Santa Catharina, J. [?]1935, B. Pohl [printed] \ Mycotretus marginicollis Lac. [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Brasil Rio de Janeiro, D.F. Corcovado [printed] 21.XI. 1957 [handwritten] Alvarenga e Seabra [printed] \ 2310 [printed] \ M. ornatus [handwritten]”; 1 male (MCNZ, dissected) “Palmares do Sul, RS, (Fazenda das Almas), 13.XI.2003, Equipe Probio col. [printed] \ Col. MCN 238435 [printed]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Brasil, AP, J. & B. Bechyné [printed] \ Serra Lombard, Olemarque [printed] 10 [handwritten]-8-1961 [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Corcovado, Guanabara Brasil [printed] X. 1966 [handwritten] Alvarenga e Seabra [printed] \ 1678 [printed] \ Mycotretus sobrinus Guèrin, 1841 [handwritten] M. Alvarenga det. [printed] 1971 [handwritten]”; 1 male (CELC, dissected) “Brasil: MG, Piau, 13.xii.2014, Pecci-Maddalena, I.S.C. leg. [printed]”; 1 male (MNRJ, dissected) “Rio de Janeiro, 2/1944 [?] O. Braga [handwritten] \ Mycotretus rhodosomus Lac [handwritten] J. Guerin. det. 194[printed]8[handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ 1825 [printed] \ Comparado com tipo [printed] Mycotretus rhodosomus Lac, 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ Rio de Janeiro, 2/1944, O. Braga [handwritten] \ Mycotretus rhodosomus Lac [handwritten] J. Guerin. det. 194[printed]8[handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Cruzeiro do

Sul, Acre Brasil, II-1963, M. Alvarenga leg. [printed] \ 1832 [printed] \ *Mycotretus reticulatus* Crotch, 1876 [handwritten] M. Alvarenga det. [printed] 1971 [handwritten]"; 1 male (DZUP, dissected) "Coleção M. Alvarenga [printed] \ Rio Branco, Terr. Do Acre Brasil [printed] I. 1963, M. Alvarenga [handwritten] \ DZUP 132806 [printed]"; 1 male (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Colatina, E. Santo Brasil [printed] XI. 1970 [handwritten] A. Silva [printed] \ 1899 [printed] \ *Mycotretus* 183 [handwritten] \ n. sp. [handwritten] \ Tibia posterior fortemente [?] ♂ ? [handwritten]"; 1 female (DZUP, dissected) "Coleção M. Alvarenga [printed] \ XII.57 (?), S. Paulo, Magda, J. Lane col. [handwritten] \ DZUP 132833 [printed] \ *Mycotretus major* [handwritten] C. Lopes-Andrade det [printed]"; 1 female (CELC, dissected) "Brasil: MG, Ipatinga, "Ponte 13", 05.i.2010, leg. Nolasco & C.L.A [printed]"; 1 male (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Campinas-SP, 18/X/1979, C.A. Klink [?] [handwritten] \ *Mycotretus flavomarginatus* Lac. 1842 [handwritten] M. Alvarenga det. [printed] 1984 [handwritten]"; 1 male (CELC, dissected) "Brasil: MG, Juiz de Fora, Campus UFJF; Entre FAEFID e ICB, ciclovias e caminhada; 07.xii.2014, leg. Pecci-Maddalena, Í.S.C & Maddalena"; 2 males (CELC, dissected) "*Tritoma bipustulata* [handwritten] \ Austr.inf.v.29.56 Rekawinkel [handwritten]"; 1 female (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ *Paratypus* [printed] \ Coll. Mus. Congo, Tshiobo/N'Goy (Mayumbe), -I-1925, A. Collart [printed] \ *Paratypus* Nr. [printed] \ *Tritoma senegalis* Cr. ssp. *tenella* m. [handwritten] det. Delkeskamp 19 [printed] 61 [handwritten]"; 1 male (MZSP, dissected) "*Tritoma sanguinipennis* Say [handwritten] Det. M.W.Sanderson [printed] 49 [handwritten] \ *Mycotretus sanguinipennis* Say [handwritten] J. Guerin. det. 194[printed] 9[handwritten] \ Washington Co. Arkansas U.S.A, 9938 [handwritten] \ Coll. J. Guerin., S. Paulo. Brasil [printed] 18447 [handwritten] \ M.W.Sanderson, Collector [printed] \ Washington Co. Ark. [printed] 4-9-38 [handwritten]"; 1 female (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Tippecanoe Co., Ind. [printed] [?] -14 [handwritten] 19[printed] 58 [handwritten] N.M. Downie [printed] \ *Tritoma sanguinipennis* Say, det WW Boyle [printed] \ *Tritoma sanguinipennis* (Say) [handwritten]"; 1 male (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Estirão do Equador, Amazonas, Brasil X. 1979, M. Alvarenga [printed] \ M [printed] \ I. Sedis 527 [handwritten]"; 1 female (MZSP, dissected) "Brasil, Obidos-Pará, bx/Amazonas, Dirings [front, printed] DEZ 1959 [back, printed]"; 1 male (MNRJ, dissected) "Coleção M. Alvarenga [printed] \ Tisvilde [?] 23.5.1948 [handwritten] \ A. Sørensen, Nat. Mus. Aarh [printed]"; 1 female (MNRJ, dissected) "Sv. Roch [?] [handwritten] Croation [printed] \ *Triplax russica* L. [handwritten]"; 1 female (DZUP, dissected) "Coleção M. Alvarenga [printed] \ Homeotipo [red label, printed] \ Chontales, Nicaragua, T. Belt [printed] \ B.C.A., Col.,VII. *Ischyrus graphicus*. [printed] \ 1476 [printed] \ Comparado com tipo

[printed] *Ischyryus graphicus* Lac. 1842 [handwritten] M. Alvarenga det. 1971 [printed] \ DZUP 132822”; 1 female (CERPE, dissected) “Coleção E. & P. Grossi [printed] \ Brasil, RJ, Teresópolis, 600m, 01 a 31.XII.2006, E. J. Grossi Leg. [printed]”; 2 males and 1 female (CELC, dissected) “B. Hamfelt coll, Sweden or Germany ?, Brooklyn Museum, Coll 1929 [printed] \ *Dacne bipustulata* [handwritten] det. P.E.Skelley [printed]”; 1 female (CELC, dissected) “Penna: Delaware Co., Wallingford, 27-VI-1963, F. W. Skillman Jr., under maple bark [printed]”; 1 male (CELC, dissected) “Georgia, Dougherty Co., Albany, about 4 miles N.E., February 21, 1969, Col. Lloyd R. Davis, Jr. [printed]”; 1 female (CELC, dissected) “BRASIL: MG, Viçosa, "Mata do Paraíso, 05.iv.2015, Araújo, L., Borlini, P., Orsetti, A., Souza, I. leg. em tronco”; 1 female (MNRJ, dissected) “Óbidos Pará [front, handwritten] Er 128, 12.68 [back, handwritten]”; 1 male (MNRJ, dissected) “Mazagão - entre Jari e Vila Nova, Amapá-II-961-7/61, J.C.M. Carvalho col. [printed] \ *Erotylus giganteus* (?) [handwritten]”; 1 male (FSCA, dissected) “Malaysia: Sabah, [Borneo Island], Crocker Range, Sipitang; 22-II-2002 [printed] \ *Encaustes* ♂ *veritcalis* [handwritten] det. P.E. Skelley [printed]”; 1 female and 1 male (CELC, dissected) “Oklahoma: Latimer, Co., Red Oak, 3-X-76, K. Stephan [printed] \ *Cryptophilus integer* [handwritten] det. P.E. Skelley [printed]”; 1 male (CELC, dissected) “Oklahoma: Latimer Co, VII-1987, Karl Stephan [printed]”; 1 female (CELC, dissected) “Oklahoma: Latimer Co., -VI-83, Karl Stephan [printed]”; 2 males (CELC, dissected) “Texas, Bexar Co, 3mi N Leon Springs, 21-25 April, 2015, Coll. J. Wappes [printed] \ 1,315 Ft @ MV/UV, Scenic Oaks SD, 29°41 N 98°39 W [printed] \ *Pharaxonotha kirschii* Reitter, det. P. Skelley ‘ 17 [printed]”; 1 male (CELC, dissected) “Oklahoma: Latimer Co., -V-1991, Karl Stephan [printed]”; 1 male (CELC, dissected) “Oklahoma: Latimer Co., 5mi. W. Red Oak, 7-V-77, K. Stephan [printed]”; 1 male and 1 female (CELC, dissected) “BR: MG, Viçosa, “Saída do Campus UFV; Cristais; em árvore de Macaúba” 09.xii.2016, Campos, L.A.O *et al.* leg. [printed]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ SINOP 12° 31’S, 55°37’W, BR 163 Km 500 a 600, Mato Grosso, BRASIL, 350 m X. 1974, Alvarenga & Roppa col. [printed] \ DZUP 126040 [printed]”; 1 male (CEMT, dissected) “MT. CHAP. GUIMARÃES, CHÁCARA FERRE, 21-V-1984, MÁRIO FRIEDLANDER [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ MUSÉE DU CONGO, Kapanga -X-1933, F.G. Overlaet [printed] \ *Amylyopus marginatus* Qd. det. Delkeskamp [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed]” \ Tonkin: Hoabinh. Aug. 1918. R.V. de Salvaza. [printed] \ Indo-China. R.V.de Salvaza. 1920–47 [printed] \ *Amblyopus vittatus* Oliv. [handwritten]”; 1 male (MNRJ, dissected) “ *Eutriplax tuberculifrons* Lewis [handwritten] \ Hoppo, Nagano, July 18, 1948, N. Hagashi leg. [handwritten]”; 1 male (CELC, dissected) “BRASIL: MG, Viçosa; “Mata do

Paraíso”; xii.1999, leg. C. Lopes-Andrade & FZ Vaz-de-Mello”; 1 male (MNRJ, dissected) “Cap d’ Ambre Madagascar, COLL. F. SCHNEIDE [printed \ *Triplax terminalis* [printed] \ *Triplax terminalis* Far [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ COLL. MUS CONGO, Tanganyika Terr.: Ngorongoro, Rest Camp, 2400–2500 m. 6/19-VI-1957 \ PARATYPUS [brown label, printed] \ Mission Zoolog. I.R.S.A.C. en Afrique orientale (P. Basilewsky et N. Leleup) [printed] \ *Paratypus* [red label, printed] \ [♂] \ *Lybasia barbata* m. [handwritten] det. Delkeskamp 196[printed]4[handwritten]”; 1 female (CELC, dissected) “Brasil: MT, Cuiabá “Chapada dos Guimarães” 29.i.2015, leg. Pecci-Maddalena, Í.S.C; Aloquio, S & Nunes, R. [printed] \ “Coletados na trilha, sem informação sobre fungo hospedeiro” [printed]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ PARATYPUS [orange label, printed] \ MUSÉE DU CONGO, Lulua: Kapanga, XI-1932, G. F. Overlaet [printed] \ *Paratypus* [red label, printed] \ [♂] \ *N. haafi* m [handwritten] det. Delkeskamp 196[printed]4 [handwritten]”; 1 female (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ PARATYPUS [orange label, printed] \ MUSÉE DU CONGO, Lulua: Kapanga, XI-1931, G. F. Overlaet [printed] \ *Paratypus* Nr. [red label, printed] \ *Neomycotretus palpalis* m. [handwritten] det. Delkeskamp 196[printed]”; 1 female (MNRJ, dissected) “Daibosatsu-Pass, Yamanashi-pref. May-20th 1961, Coll. K. Mizusawa [printed] \ *Neotriplax lewisii* Crotch [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ MUSÉE DU CONGO Eala [printed] VI [handwritten] -1935[printed], J. Ghesquière [printed] \ *Palaeolybas* ssp. *apicalis* Arrow [handwritten] det. Delkeskamp 19[printed]54[handwritten] \ sp. *nigripennis* [handwritten]”; 1 male (MNRJ, dissected) “Coleção M. Alvarenga [printed] \ PARATYPUS [orange label, printed] \ MUSÉE DU CONGO, Haut Uelé: Moto, 1920, L. Burgeon [printed] \ *Paratypus* Nr. [red label, printed] \ *Pseudamblyscelis pallidus discoideus* m. [handwritten] det. Philipp 19[printed]57[handwritten]”; 1 male (MNRJ, dissected) “Sampei-pass, Ôze, Japan, June 2, 1956, N. Hayashi leg. [handwritten]” \ *Triplax amoena* Solsky [handwritten]”; 1 male (DZUP, dissected) “Coleção M. Alvarenga [printed] \ P.N. ITATIAIA 1200 m, E. Rio Janeiro Brasil [printed], 17.VII.1962 [handwritten], H. Schubart [printed] \ DZUP 125337 [printed]”; 1 female (CELC, dissected) “PARATYPE, *Cycadophila debaonica* G. Xu, W. Tang & P. Skelley 2015 [yellow label, printed] \ CHINA, Guangxi, Fuping, ex ♂ cone *Cycas debaoensis*, N23°29.643’, E106°12.915’, 26-V-2006, W.Tang, #1 [printed]”; 1 male (CEMT, dissected) “Zoological Institute Russian Academy of Sciences St. Petersburg [printed] ex [handwritten] \ Басс. р. Уссури, Вяземский р-н, 11. 6. 1950 г., Кабаков” [handwritten]”; 1 male (CAMB, dissected) “Lavras, MG–BRASIL, IX–2002, Col.I.Zacchia [printed] \ Coleção A.M.BELLO [printed]”; 1 female (MNRJ, dissected) “Brasil, AP, J.&B. Bechyné [printed] \

Serra Lombard, Limão [printed], 2.8 [handwritten]-1961[printed] \ mesoterno com fortes puntures. Linhas paracoxais meta [?] e abdominal ausentes [handwritten]”; 1 male (CAMB, dissected) “Pq. Nac. Serra dos Órgãos, Teresópolis, RJ – BRASIL, I-2014, Col: R. Monteiro [printed] \ Coleção A.M.BELLO [printed]”; 1 female (CELC, dissected) “AU: ACT. Pierce Mount Taylor, Nat. Res.; 1.i.2017; In fungi hymenochaetaceae? V.E. Sandoval & L.M.Fernandes [printed] \ *Episcaphula australis* (Boisduval) det. Italo Pecci-Maddalena. [printed]”; 1 male (CEMT, dissected) “MT. Cuiabá, 11 – IX – 1981, Hudson Ribeiro [handwritten]”.

CONCLUSÕES

Esta tese representa o maior esforço já realizado para se compreender as relações filogenéticas da tribo Tritomini (Erotylidae) e, principalmente, de seu maior gênero, *Mycotretus* Lacordaire, 1842. Após longo hiato nos trabalhos sobre a fauna Neotropical de Erotylidae, do ano de 2017 até agora, quatro manuscritos taxonômicos já foram publicados, incluindo contribuições inéditas quanto à morfologia, distribuição geográfica e fungos hospedeiros dos espécimes estudados (capítulos I–IV). Além destes, a presente tese inclui um catálogo taxonômico de *Mycotretus* (capítulo V) que, dentre outros resultados, reduziu o número de espécies válidas de 217 para 177, além de ilustrar a maior parte dos tipos primários de espécies atualmente incluídas em *Mycotretus*. No estudo morfológico-comparativo do metendosternito e do flagelo peniano em Erotylidae (capítulo VI), 17 caracteres com potencial filogenético foram identificados: os do mentedosternito podem ser informativos em níveis supragenéricos (por exemplo, o caractere “presença/ ausência” de lâmina em Tritomini) enquanto os caracteres do flagelo podem ter sinal filogenético em grupos de espécies, por exemplo como verificado para espécies de *Mycotretus*. No estudo filogenético (capítulo VII) verificou-se que Tritomini e *Mycotretus* são, indubitavelmente, grupos artificiais. Uma parte dos Tritomini é grupo irmão da tribo Erotylini e, juntos, Erotylini + parte de Tritomini, formam um clado monofilético que deverá ter status de subfamília. Dois clados dentro de *Mycotretus* foram recuperados e serão descritos como gêneros separados. No entanto, uma grande politomia dentro de Tritomini foi encontrada. Baseado em nossos resultados e na literatura sugerimos a hipótese de que, dois fatores, uma irradiação adaptativa recente e, a ausência de grandes competidores ecológicos, podem explicar a ausência de sinal filogenético em caracteres morfológicos e a alta diversidade de *Mycotretus*.