

Histeridae and Staphylinidae (Coleoptera) from state of Acre, Brazil

Histeridae e Staphylinidae (Coleoptera) do estado do Acre, Brasil

Fernando Willyan Trevisan Leivas^{*}

Edilson Caron²

Rodrigo Souza Santos³

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Abstract

Histeridae and Staphylinidae are related families that share habitats and can be sampled by the same collection methods. However, there is a lack of regional lists of these families in several regions from Brazil. This study aims to present the first list of Histeridae and Staphylinidae from the state of Acre, Brazil. The list of species was elaborated based on the literature and study of some entomological collections. In total, 16 species and six genera of Histeridae, and 13 species and eight genera of Staphylinidae were recorded. Of all these, one species of Histeridae is recorded for the first time in Brazil. Ten species of Histeridae and five species of Staphylinidae are recorded for the first time in the state of Acre. In addition, information about known geographic distribution and ecology of these species are provided. We hope that our data can contribute to updating the Taxonomic Catalog of Brazilian Fauna (TCBF).

Keywords: Amazon, Biodiversity, Clown beetles, Rove beetles, Staphyliniformia

Resumo

Histeridae e Staphylinidae são famílias relacionadas que compartilham habitats e podem ser amostradas pelos mesmos métodos de coleta. No entanto, há carência de listas regionais dessas famílias no Brasil. O objetivo deste estudo é apresentar a primeira lista de Histeridae e Staphylinidae do estado do Acre, Brasil. A lista de espécies foi elaborada com base na literatura e no estudo de coleções entomológicas. No total, foram registradas 16 espécies e seis gêneros de Histeridae, e 13 espécies e oito gêneros de Staphylinidae. Destas, uma espécie de Histeridae é registrada pela primeira vez no Brasil. Dez espécies de Histeridae e cinco espécies de Staphylinidae são registrados pela primeira vez no estado do Acre. Além disso, são fornecidas informações sobre a distribuição geográfica

1. Departamento de Biodiversidade, Universidade Federal do Paraná, Rua Pioneiro, 2153, Jardim Dallas, Palotina, PR, 85950-000, Brazil. E-mail: fernando.leivas@ufpr.br; ORCID: <https://orcid.org/0000-0002-7586-5645>, * corresponding author. 2. Departamento de Biodiversidade, Universidade Federal do Paraná, Rua Pioneiro, 2153, Jardim Dallas, Palotina, PR, 85950-000, Brazil. E-mail: edilsoncaron@gmail.com. ORCID: <https://orcid.org/0000-0001-7136-2218>. 3. Laboratório de Entomologia, Embrapa Acre, Rodovia BR 364, km 14, CP 321, Rio Branco, AC, 69900-970, Brazil. E-mail: rodrigo.s.santos@embrapa.br. ORCID: <https://orcid.org/0000-0002-0879-0049>

conhecida e a ecologia dessas espécies. Esperamos que nossos dados contribuam para o Catálogo Taxonômico da Fauna Brasileira (CTFB)

Palavras-chave: Amazônia, Biodiversidade, estaflinídeos, histerídeos, Staphyliniformia

Introduction

Staphyliniformia is one of the largest lineages of the suborder Polyphaga, containing almost 20% of all described species of Coleoptera, which represents about 4% of living organisms (Newton & Thayer, 1992; Caterino et al., 2005; Mckenna et al., 2014). Staphylinidae Latreille, 1802 and Histeridae Gyllenhal, 1808 represent the two largest groups of Staphyliniformia, with approximately 65,000 and 4,000 described species, respectively (Newton, 2022; Mazur, 2011).

Species of Staphylinidae and Histeridae share similar habitats, such as decaying organic matter (vegetable or animal), along with fungi and associated with ant and termite nests (Kovarik & Caterino, 2016; Newton et al., 2000). In these habitats, almost all Histeridae are predatory carnivores (Kovarik & Caterino, 2016), while Staphylinidae feed on all possible resources (Newton et al., 2000), but most species are carnivores (predators and parasites), frugivores and detritivores, respectively (Marinoni et al., 2003).

In Brazil, 2,823 species are registered in 474 genera of Staphylinidae (Newton & Caron, 2023) and 600 species in 130 genera of Histeridae (Bicho et al., 2023). However, to the northern region there is a lack of regional lists of these families, which often makes it difficult to understand their geographic distribution and their ecological affinities (e.g. Biomes, types of vegetation, and association with substrates or other animals). This contribution aims to present the first list of Histeridae and Staphylinidae from the state of Acre, Brazil. In addition, information on the known geographic distribution and ecology of each species is presented.

Material and methods

Firstly, the list of species for the state of Acre was carried out based on the bibliographic review of the database of the two first authors (FWTL-7,935 and EC-38,053 bibliographies) and consulting the

Taxonomic Catalog of the Brazilian Fauna (Bicho et al., 2023; Newton & Caron, 2023). The useful literatures are cited throughout the results in the corresponding species.

Subsequently, the list of species occurring in the state of Acre was complemented by the study of material deposited in the following collections: Coleção Entomológica do Setor Palotina (CESP, complete specimen label data is available on SiBBR - Trevisan Leivas [2023]), Universidade Federal do Paraná, Paraná, Brazil, and Coleção do Laboratório de Entomologia da Embrapa Acre, Rio Branco, Acre, Brazil).

In the results, the list of species is presented in alphabetical order in each taxonomic category.

Results

Fifteen species of Histeridae and Staphylinidae had already been reported in the literature for the state of Acre (Bicho et al., 2023; Newton & Caron, 2023; Caron & Santos, 2023; Buss & Caron, 2023). In total, 425 specimens and 21 species of Histeridae and Staphylinidae belonging to biological collections were studied. Of all these, one species is recorded for the first time in Brazil and fifteen are recorded for the first time in the state of Acre. The taxa list is presented below, as well as their known geographic distribution and ecological information.

Histeridae

A total of 16 species and six genera of Histeridae are recorded for the state of Acre (Table 1). Six species of Histeridae had already been reported in the literature for the state [*Operclipygus arnaudi* Dégallier, *Phelister geminus* Caterino & Tishechkin, *Phelister striatinotum* Wenzel & Dybas, *Omalodes (Omalodes) bifoveolatus* Marseul, *Omalodes (Omalodes) foveola* Erichson, and *Omalodes (Omalodes) lucidus* Erichson.] (Caterino &

Tishechkin, 2013; Caterino & Tishechkin, 2020; Bicho et al., 2023).

A sum of 163 specimens from the biological collections were studied, resulting in 13 species, six genera, and two subfamilies. Here we recorded one species for the first time in Brazil [*Operclipygus lama* Mazur], and ten species for state of Acre [*Hister cavifrons* Marseul; *Operclipygus florifaunensis* Caterino & Tishechkin; *Operclipygus kerga* Marseul; *Operclipygus lama* Mazur; *Phelister haemorrhous* Marseul; *Scapomegas auritus* Marseul; *Euspilotus (Hesperosaprinus) alvarengai* Arriagada; *Euspilotus (Hesperosaprinus) azureus* (Sahlberg); *Euspilotus (Hesperosaprinus) blandus* (Erichson); *Euspilotus (Hesperosaprinus) innubus* (Erichson)].

Histerinae: Histerini

Hister cavifrons Marseul, 1854

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously found in Pará, Piauí, Pernambuco, Bahia, Minas Gerais, Brasília, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (Caterino, 1999; Celli et al., 2015; Costa-Silva et al., 2017; Gonçalves & Leivas, 2017; Vieira et al., 2018). It has known geographic distribution throughout Central and South America (Mazur, 2011) registered from Mexico to Uruguay (for details of geographic distribution, see Caterino, 1999; Dégallier & Touroult, 2015; Aguilar-Sosa et al., 2020).

Known ecological information. Two specimens were collected during the dry season (July) using pitfall traps baited with decaying bovine heart beef and fermented banana (CESP). This species is primarily a dung associate, most commonly with cow dung, and preferably in moister and montane habitats (Caterino, 1999). However, it has been recorded during initial and median decomposition stages of carcass (Celli et al., 2015) and recorded as abundant in collections using human feces (Dégallier et al., 2021), omnivore dung bait (mixture of human and pig dung) and bovine carcass bait (Vieira et al., 2018). It is registered for the Amazon (Dégallier et al., 2012; Dégallier & Touroult, 2015; Dégallier et al., 2021), Atlantic Forest (Mise et al., 2007 [cited as *Hister* sp.]; Costa-Silva et al., 2017; Vieira et al., 2018), Rupestrian Field, Pasture (Vieira

et al., 2018), Cerrado (Vieira et al., 2018) and Cerrado areas strongly influenced by Caatinga (Rafael et al., 2017). This species is generally abundant in forest and open habitats, but it is useful for distinguishing habitat groups of open areas, such as Cerrado-rupestrian field and Cerrado-introduced pasture (Vieira et al., 2018). In French Guiana, this species is present throughout the year, but more predominant in December to February (Dégallier & Touroult, 2015). In South Brazil, this species seems to occur in the four seasons of the year (spring, summer, autumn and winter), but with less abundance in autumn (Costa-Silva et al., 2017).

Histerinae: Exosternini

Operclipygus arnaudi Dégallier, 1982

Known geographic distribution. The species was previously recorded in Acre by Caterino & Tishechkin (2013) in Cruzeiro do Sul. In Brazil, it was previously found in Amazonas, Pará and Mato Grosso (Caterino & Tishechkin, 2013). It has known geographic distribution throughout South America registered to Colombia, Ecuador, French Guiana, Guyana, Peru and Suriname (Caterino & Tishechkin, 2013).

Known ecological information. We know little about this species because it has been collected with Flight Interception Trap (FIT) (Caterino & Tishechkin, 2013).

Operclipygus florifaunensis Caterino & Tishechkin, 2013

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously found in Mato Grosso, and known also for Bolivia (Caterino & Tishechkin, 2013).

Known ecological information. One specimen was collected during the dry season (July) using pitfall trap baited with decaying beef heart (CESP). We know little about this species because it has been collected with Flight Interception Trap (FIT) and recorded inside gallery forest (Caterino & Tishechkin, 2013).

Operclipygus kerga (Marseul, 1870)

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously

found in Pará, and known also for French Guiana, Bolivia, Peru, and Venezuela (Caterino & Tishechkin, 2013; Dégallier et al., 2021).

Known ecological information. One specimen was collected during the dry season (July) using pitfall trap baited with decaying beef heart (CESP). This species has been collected with Flight Interception Trap (FIT), beating dead branches, pitfall in bamboo forest, malaise trap, forest over coffee crop, and associated with rotten palm (Caterino & Tishechkin, 2013) and under decaying plants (Dégallier et al., 2021).

Operclipygus lama Mazur, 1988

Known geographic distribution. This is the first record of the species for Brazil (Experimental Field of Embrapa Acre, Rio Branco). It has been registered to Bolivia and Ecuador (Caterino & Tishechkin, 2013).

Known ecological information. One specimen was collected during the end of the dry season (August) using pitfall trap baited with decaying beef heart (CESP). This species has been collected with Flight Interception Trap (FIT) in lowland rain forest and primary forest, and associated with rotting logs, *Buchenavia* fruit fall, Agaricales, and flat ascomycete (Caterino & Tishechkin, 2013).

Phelister haemorrhous Marseul, 1854

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously found in Pará, Amazonas, Maranhão, Ceará, Tocantins, Rondônia, Mato Grosso, Goiás, Minas Gerais, Mato Grosso do Sul, São Paulo, Paraná, Rio Grande do Sul and Santa Catarina (Caterino & Tishechkin, 2019). It has known geographic distribution to North America (southern United States of America and Mexico), throughout Central America (Cuba, Haiti, Dominican Republic, Jamaica, Belize, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Saint Vincent & Granadines, Grenada and Trinidad & Tobago) and South America (Venezuela, Colombia, Suriname, French Guiana, Ecuador, Peru, Bolivia, Paraguay, Argentina and Uruguay), and introduced into Europe (Caterino & Tishechkin, 2019).

Known ecological information. Two specimens were collected during the dry season (July) using

pitfall traps baited with decaying beef heart (CESP). This species has been commonly encountered in cattle dung, but it has also been collected in pitfall traps baited with human and pig dung. Also, there is a record associated with rotting vegetation (compost) and under the bark of rotten trees (Caterino & Tishechkin, 2019).

Phelister geminus Caterino & Tishechkin, 2020

Known geographic distribution. The species was previously recorded in Acre by Caterino & Tishechkin (2020) in Cruzeiro do Sul. In Brazil, it is also found in Amapá, Pará, Maranhão, Mato Grosso and Mato Grosso do Sul (Caterino & Tishechkin, 2020). It has known geographic distribution registered to Ecuador, Colombia, Peru, French Guiana and Suriname (Caterino & Tishechkin, 2020).

Known ecological information. It has been collected with Flight Interception Trap (FIT); Berlese forest litter with *Eciton burchelli* refuse deposits; in recently abandoned *E. burchelli* bivouac; next to entrance into *E. burchelli* statary bivouac in a hollow tree; and with pitfall trap (Caterino & Tishechkin, 2013).

Phelister striatinotum Wenzel & Dybas, 1941

Known geographic distribution. The species was previously recorded in Acre by Caterino & Tishechkin (2020) in Cruzeiro do Sul. In Brazil, it is also found Mato Grosso (Caterino & Tishechkin, 2020). It has known geographic distribution throughout South America registered to Bolivia, Ecuador, French Guiana, Guyana, Peru, Argentina and Paraguay (Caterino & Tishechkin, 2020).

Known ecological information. We know little about this species, but it has been collected with Flight Interception Trap (FIT) in lowland rain forest and montane rainforest near logging area, and possibly associated with *Atta* "leafcutter ants" (Caterino & Tishechkin, 2020).

Histerinae: Omalodini

Omalodes (Omalodes) bifoveolatus Marseul, 1853

Known geographic distribution. Collected in Experimental Field of Embrapa Acre, Rio Branco. The species was previously recorded in Acre (Moura, 2014). In Brazil, it was previously found in Amazonas,

Amapá, Pará, Rondônia, and Mato Grosso (Almeida & Mise, 2009; Mise et al., 2010; Mazur, 2011; Moura 2014; Almeida et al., 2015). It has known geographic distribution to Central America (Trinidad & Tobago) and South America (Suriname, Ecuador, French Guiana, Peru, Bolivia and Paraguay) (Moura, 2014; Dégallier et al., 2012; Dégallier et al., 2021).

Known ecological information. Thirty-one specimens were collected during the transition period between the rainy-dry seasons (May) and throughout the dry season (until August) using pitfall traps baited with human feces and decaying beef heart (CESP). This species has been recorded during initial, median, and final decomposition stages of carcass (Celli et al. 2015) and collected with fermented banana bait (Dégallier et al., 2012; Moura, 2014) and feces bait (Dégallier et al., 2021). In North Brazil the species showed diurnal activity (Mise et al., 2010).

Omalodes (Omalodes) foveola Erichson, 1834

Known geographic distribution. Collected in Experimental Field of Embrapa Acre, Rio Branco. The species was previously recorded in Acre (Celli et al., 2015). In Brazil, it was previously found in Amapá, Amazonas, Pará, Acre, Piauí, Distrito Federal, Mato Grosso, Ceará, Pernambuco, Bahia, Goiás, Mato Grosso do Sul, Espírito Santo, Minas Gerais, Rondônia, Rio de Janeiro, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul (Mayer & Vasconcelos, 2013; Moura, 2014; Almeida et al., 2015; Celli et al., 2015; Costa-Silva et al., 2017; Gonçalves & Leivas, 2017; Krüger et al., 2017). It has known geographic distribution throughout Central and South America registered to Trinidad & Tobago, Panamá, Colombia, Venezuela, French Guiana, Peru, Bolivia, Paraguay and Argentina (Mazur, 2011; Dégallier et al., 2012; Moura, 2014; Dégallier et al., 2021).

Known ecological information. Five specimens were collected during the transition period between the rainy-dry seasons (May) and throughout the dry season (until August) using pitfall traps baited with fermented banana, human feces and decaying beef heart. (CESP). This species has been recorded during initial, median, and final of decomposition stages of carcass (Celli et al., 2015), and collected with fermented banana bait (Dégallier et al., 2012; Moura, 2014), cow dung, organic trash (Leivas et al., 2012), human feces bait, alpha-pinene+ethanol bait in *Eucalyptus grandis*

W. Hill ex Maiden stand, fish carrion, on fungus, pyrethrum fogging split tree branch, fermenting tree wound, under bark (Moura, 2014), and under decaying plants (Dégallier et al., 2021). It is registered for the Amazon (Mise et al., 2010; Dégallier et al., 2012), Cerrado (Leivas et al., 2013; Vieira et al., 2018), Cerrado areas strongly influenced by Caatinga (Rafael et al., 2017), Caatinga (Santos et al., 2014) and forest areas influenced by Caatinga (Rafael et al., 2017), Atlantic Forest (Gonçalves & Leivas, 2017), and Rupestrian Field (Vieira et al., 2018).

Recently, this species *O. foveola* was reported as beehive symbiont, inside *Apis mellifera* Linnaeus (Hymenoptera: Apidae) colonies in a commercial apiary from Southeast Brazil (Krüger et al., 2017). In addition, this species is considered potentially effective in controlling the weevil *Cosmopolites sordidus* Germar (Coleoptera: Curculionidae), one of the main pests in banana cultivation, despite its low specificity and difficult access to the plant's rhizome (Mesquita, 2003). In North Brazil, the species showed diurnal activity (Mise et al., 2010). In South Brazil, this species seems to occur only during spring and summer (Costa-Silva et al., 2017), while in Northeastern Brazil, this species seems to occur only during rainy season (Santos et al., 2014).

Omalodes (Omalodes) lucidus Erichson, 1834

Known geographic distribution. Collected in Experimental Field of Embrapa Acre, Rio Branco. The species was previously recorded in Acre (Moura, 2014; Celli et al., 2015). In Brazil, it was previously found in Amazonas, Acre, Rondônia, Amapá, Maranhão, Pará, Ceará e Espírito Santo (Mise et al., 2010; Moura, 2014; Almeida et al., 2015). It has known geographic distribution throughout Central and South America, registered to Peru, Ecuador, French Guiana, Suriname, Guiana, Bolivia and Uruguay (Mazur, 2011; Moura, 2014; Dégallier et al., 2012; Dégallier et al., 2021).

Known ecological information. Six specimens were collected during the dry season (June-August) using pitfall traps baited with human feces and decaying beef heart (CESP). This species has been recorded during the initial decomposition stage of carcass (Celli et al., 2015) and collected with fermented banana bait (Moura, 2014; Dégallier et al., 2012), fish carcass bait (Dégallier et al., 2012), pitfall with carcass of *Dichotomius boreus* (Olivier) [cited as

Dichotomius borius] (Dégallier et al., 2012) and under bark (Dégallier et al., 2021). In Guiana, this species was recorded associated with *Acromyrmex hystrix* (Latreille) (Hymenoptera: Formicidae) refuse pile (Moura, 2014). In North Brazil, the species showed diurnal activity (Mise et al., 2010).

Histerinae: incertae sedis

Scapomegas auritus Marseul, 1855

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously found in Pará and Amazonas (Mazur, 2011; Mise et al., 2010; Leivas et al., 2012; Almeida et al., 2015; Celli et al., 2015). Also, it has been registered to the Amazon region from French Guiana, Suriname, Ecuador, Peru and Venezuela (Mazur, 2011; Dégallier et al., 2012; Leivas et al., 2012; Dégallier et al., 2021).

Known ecological information. One specimen was collected during the dry season (June) using pitfall trap baited with decaying beef heart (CESP). This species has been recorded during final decomposition stage of carcass (Celli et al., 2015) and collected associated on mushrooms (Leivas et al., 2012), on trunk of *Eschweilera apiculata* (Miers) and *Vouacapoua americana* Aubl. freshly cut, pitfall trap baited with fish, and Flight Interception Trap (FIT) (Dégallier et al., 2012). In North Brazil the species showed diurnal activity (Mise et al., 2010).

Saprininae: Euspilotini

Euspilotus (Hesperosaprinus) alvarengai Arriagada, 2012

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously found in Pará, Maranhão, Rondônia, Mato Grosso, Espírito Santo, Rio de Janeiro, Minas Gerais, and Paraná (Dégallier et al., 2012; Gonçalves & Leivas, 2017; Vieira et al., 2018). It has known geographic distribution to the South America (Surinam and French Guyana) (Dégallier et al., 2012; Dégallier et al., 2021).

Known ecological information. One specimen was collected during the dry season (July) using pitfall

trap baited with fermented banana (CESP). This species is registered for the Amazon (Dégallier et al., 2012), Cerrado, Rupestrian Field and Pasture (Vieira et al., 2018). In Brazil, this species was collected in a termite nest of *Nasutitermes peruanus* (Holmgren) (Blattodea: Isoptera: Termitidae) (Dégallier et al., 2012) and recorded as abundant in collections using omnivore dung bait (mixture of human and pig dung) and bovine dung bait (Vieira et al., 2018). In addition, it is useful for distinguishing habitat groups of open areas (Cerrado-rupestrian) and as indicator of Cerrado habitat (Vieira et al., 2018).

Euspilotus (Hesperosaprinus) azureus (Sahlberg, 1823)

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously found in Amazonas, Paraíba, Minas Gerais, São Paulo, Paraná and Rio Grande do Sul (Souza & Linhares, 1997 [cited as *Saprinus azureus* (Sahlberg)]; Mise et al., 2007 [cited as *Euspilotus* “group” *azureus* sp.]; Souza et al., 2008 [cited as *Euspilotus* “group” *azureus* sp.]; Mise et al., 2010; Silva & Santos, 2012 [cited as *Euspilotus* “group” *azureus* sp.]; Mise et al., 2013 [cited as *Euspilotus nigrita* (Blanchard)]; Santos et al., 2014; Almeida et al., 2015; Celli et al., 2015; Costa-Silva et al., 2017; Gonçalves & Leivas, 2017; Vieira et al., 2018). Also, this species has known geographic distribution throughout South America, registered to Venezuela, Ecuador, French Guyana, Peru, Argentina and Uruguay (Mazur, 2011; Dégallier et al., 2012; Aballay et al., 2013; Aguirre-Carrera, 2014 [cited as *Euspilotus nigrita* (Blanchard)]; Arriagada, 2015; Remedios-De León et al., 2017; Castro et al., 2019; Aguilar-Sosa et al., 2020; Dégallier et al., 2021; Giraldo-Mendoza, 2021).

Known ecological information. Seventy-nine specimens were collected during the transition period between the rainy-dry seasons (May) and throughout the dry season (until August) using pitfall traps baited with human feces, decaying beef heart and fermented banana (CESP). This species has been recorded during initial, median, and final decomposition stages of carcass (Celli et al., 2015), associated with decaying plants (Dégallier et al., 2021), and recorded as abundant in collections using bovine carcass bait

Table 1. Species of Histeridae and Staphylinidae recorded in state of Acre

Species	Municipality	Date	Latitude/Longitude	Reference
HISTERIDAE				
<i>Hister cavifrons</i> Marseul	Rio Branco	iii-iv/2016, 11/vii/2016, 29/vii/2016	-10.030500/-67683333	CESP and Embrapa collections
<i>Operclipygus arnaudi</i> Dégallier	Cruzeiro do Sul	15-23/ix/2007	Not informed	Caterino & Tishechkin (2013)
<i>Operclipygus florifaunensis</i> Caterino & Tishechkin	Rio Branco	22/vii/2016	-10.030500/-67683333	CESP collection
<i>Operclipygus kerga</i> (Marseul)	Rio Branco	04/vii/2016	-10.030500/-67683333	CESP collection
<i>Operclipygus lama</i> Mazur	Rio Branco	19/viii/2016	-10.030500/-67683333	CESP collection
<i>Phelister haemorrhous</i> Marseul	Rio Branco	06/vi/2016, 22/vii/2016	-10.030500/-67683333	CESP collection
<i>Phelister geminus</i> Caterino & Tishechkin	Cruzeiro do Sul	i-ii/1988	-7.6333/-72.6	Caterino & Tishechkin (2020)
<i>Phelister striatinotum</i> Wenzel & Dybas	Cruzeiro do Sul	i-ii/1988	-7.6333/-72.6	Caterino & Tishechkin (2020)
<i>Omalodes (Omalodes) bifoveolatus</i> Marseul	Rio Branco	iii-iv/2016, 09/v/2016, 06/vi/2016, 13/vi/2016, 22/vi/2016, 24/vi/2016, 01/vii/2016, 04/vii/2016, 11/vii/2016, 15/vii/2016, 18/vii/2016, 25/vii/2016, 27/vii/2016, 01/viii/2016, 08/viii/2016, 12/viii/2016, 15/viii/2016, 19/viii/2016	-10.030500/-67683472	CESP and Embrapa collections
<i>Omalodes (Omalodes) foveola</i> Erichson	Rio Branco	iii-iv/2016, 06/v/2016, 07/v/2016, 06/vi/2016, 29/vii/2016, 01/viii/2016	-10.030500/-67683472	CESP and Embrapa collections
<i>Omalodes (Omalodes) lucidus</i> Erichson	Rio Branco	iii-iv/2016, 17/vi/2016, 20/vi/2016, 29/vii/2016, 01/viii/2016, 08/viii/2016	-10.030500/-67683472	CESP and Embrapa collections
<i>Scapomegas auritus</i> Marseul	Rio Branco	13/vi/2016	-10.030500/-67683333	CESP collection
<i>Euspilotus (Hesperosaprinus) alvarengai</i> Arriagada	Rio Branco	29/vii/2016	-10.030500/-67683472	CESP collection
<i>Euspilotus (Hesperosaprinus) azureus</i> (Sahlberg)	Rio Branco	03/iv/2016, 02/v/2016, 06/v/2016, 09/v/2016, 17/vi/2016, 20/vi/2016, 24/vi/2016, 27/vi/2016, 01/vii/2016, 08/vii/2016, 11/vii/2016, 15/vii/2016, 18/vii/2016, 27/vii/2016, 01/viii/2016, 05/viii/2016, 08/viii/2016, 12/viii/2016, 15/viii/2016, 19/viii/2016	-10.030500/-67683472	CESP and Embrapa collections
<i>Euspilotus (Hesperosaprinus) blandus</i> (Erichson)	Rio Branco	08/vii/2016, 29/vii/2016, 01/viii/2016, 05/viii/2016, 12/viii/2016, 15/viii/2016, 19/viii/2016	-10.030500/-67683472	CESP and Embrapa collections
<i>Euspilotus (Hesperosaprinus) innubus</i> (Erichson)	Rio Branco	06/vi/2016, 05/viii/2016, 08/viii/2016, 12/viii/2016, 15/viii/2016, 19/viii/2016	-10.030500/-67683472	CESP and Embrapa collections

Table 1. Species of Histeridae and Staphylinidae recorded in state of Acre (cont.)

Species	Municipality	Date	Latitude/Longitude	Reference
STAPHYLINIDAE				
<i>Aleochara (Aleochara) auricoma</i> Sharp	Senador Guiomard, Porto Acre, Rio Branco	06-07/x/2006, 28-30/i/2009, 03/iv/2016, 02/v/2016, 06/v/2016, 08/v/2016, 09/v/2016, 17/vi/2016, 20.vi.2016, 01/vii/2016, 08/vii/2016, 12/viii/2016	-09.73/-67.68, -10.030500/-67683472	CESP and Embrapa collections
<i>Aleochara (Aleochara) lustrica</i> Say	Rio Branco	02/v/2016, 06/v/2016, 09/v/2016, 06/vi/2016, 17/vi/2016, 20/vi/2016, 01/vii/2016, 04/vii/2016, 08/vii/2016, 09/vii/2016, 11/vii/2016, 12/vii/2016, 15/vii/2016, 18/vii/2016, 20/vii/2016, 29/vii/2016, 05/viii/2016, 08/viii/2016, 12/viii/2016, 15/viii/2016, 19/viii/2016, 29/vii/2017	-10.030500/-67.683472/	CESP and Embrapa collections
<i>Aleochara (Aleochara) prisca</i> Sharp	Rio Branco	02/v/2016, 06/v/2016, 09/v/2016, 27/vi/2016, 08/vii/2016 15/vii/2016,	-10.030500/-67683472	CESP and Embrapa collections
<i>Aleochara (Aleochara) verecunda</i> Sharp	Rio Branco	06/v/2016, 13/vi/2016, 20/vi/2016, 04/vii/2016, 05/viii/2016	-10.030500/-67683472	CESP and Embrapa collections
<i>Aleochara (Xenochara) capitinigra</i> Buss & Caron	Rio Branco	27/vi/2016, 01/vii/2016, 11/vii/2016, 19/viii/2016, 29/viii/2017	-10.030500/-67683472	CESP and Embrapa collections
<i>Aleochara (Xenochara) simulatrix</i> Sharp	Rio Branco	06/vii/2016, 08/vii/2016, 27/vii/2016, 01/viii/2016, 05/viii/2016, 29/viii/2017	-10.030500/-67683472	CESP and Embrapa collections
<i>Lathropinus ater</i> (Sharp)	Rio Branco	Not informed	-10.030500/-67683472	Asenjo et al. (2013)
<i>Piestus bicornis</i> (Olivier)	Iquiri	viii/1951	-9.8/-67.28333	Caron et al. (2012)
<i>Belonuchus rufipennis</i> (Fabricius)	Rio Branco	06/vi/2016, 22/vii/2016, 29/vii/2016, 01/viii/2016, 05/viii/2016, 08/viii/2016, 12/viii/2016, 29/viii/2017	-10.030500/-67683472	CESP and Embrapa collections
<i>Diochus nanus</i> Erichson	Rio Branco	24/vi/2016	-10.030500/-67683472	CESP collection
<i>Eulissus chalybaeus</i> Mannerheim	Rio Branco	06/v/2016, 17/vi/2016, 20/vi/2016, 24/vi/2016, 27/vi/2016, 04/vii/2016, 08/viii/2016	-10.030500/-67683472	CESP and Embrapa collections
<i>Glenus vestitus</i> Sharp	Rio Branco	Not informed	-10.030500/-67683472	Asenjo et al. (2013)
<i>Leistotrophus versicolor</i> (Gravenhorst)	Rio Branco, Reserva Catuaba	Not informed	-10.072759/-67.624202	Asenjo et al. (2013)

(Vieira et al., 2018). It is registered for the Amazon (Mise et al., 2010; Dégallier et al., 2012), Atlantic Forest (Mise et al., 2007; Silva & Santos, 2012; Mise et al., 2013; Vieira et al., 2018), Cerrado, Rupestrian Field, Pasture (Vieira et al., 2018) and Caatinga (Santos et al., 2014). In addition, it has been shown to be useful as an indicator of forest habitat (Vieira et al., 2018). In South Brazil, this species seems to occur only during three seasons of the year (spring,

summer and winter) (Costa-Silva et al., 2017), while, in Northeastern Brazil this species seems to occur just in the rainy season (Santos et al., 2014).

Euspilotus (Hesperosaprinus) blandus (Erichson, 1834)

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously

found in Pará (cited as Paraná, probably a mistake), Ceará, Piauí and Mato Grosso (Arriagada, 1987; Rafael et al., 2017). It has known geographic distribution throughout Central and South America registered to Costa Rica, Guatemala, Panamá, Colombia, French Guyana, Suriname, Bolivia, Argentina and Paraguay (Arriagada, 1987; Mazur, 2011; Dégallier et al., 2012; Arriagada, 2015; Dégallier et al., 2021).

Known ecological information. Eleven specimens were collected during the dry season (July-August) using pitfall traps baited with human feces, decaying beef heart and fermented banana (CESP). It is registered for the Amazon (Arriagada, 1987; Dégallier et al., 2012), Cerrado areas strongly influenced by Caatinga (Rafael et al., 2017) and forest areas influenced by Caatinga (Rafael et al., 2017). In Peru this species was collected under human feces, and in Suriname associated with cow dung (Arriagada, 2015).

Euspilotus (Hesperosaprinus) innubus
(Erichson, 1834)

Known geographic distribution. This is the first record of the species for Acre (Experimental Field of Embrapa Acre, Rio Branco). In Brazil, it was previously found in Pará and Piauí (Marseul, 1855; Arriagada, 1987; 2015; Rafael et al., 2017). It has been registered to Honduras, Peru, Ecuador, Surinam, French Guyana and Bolivia (Marseul, 1855; Marseul, 1862; Mazur, 2011; Dégallier et al., 2012; Arriagada, 2015; Dégallier et al., 2021). The species is also registered in Chile (Concepcion, Araucania), but probably it is a mistake (see Marseul, 1855:464 and Arriagada, 2015).

Known ecological information. Twenty-two specimens were collected during the dry season (June-August) using pitfall traps baited with human feces, decaying beef heart, and fermented banana (CESP). This species is registered for the Amazon (Dégallier et al., 2012; Arriagada, 2015) and Cerrado areas strongly influenced by Caatinga (Rafael et al., 2017). In Peru this species was collected with Winkler extractor (Arriagada, 2015).

Staphylinidae

A total of 13 species and eight genera of Staphylinidae are recorded for the state of Acre (Table 1). Eight species of Staphylinidae had already been reported in the literature for the state [*Aleochara*

(*Aleochara auricoma* Sharp, *Aleochara (Xenochara) verecunda* Sharp, *Aleochara (Xenochara) capitinigra* Buss & Caron, *Aleochara (Xenochara) simulatrix* Sharp, *Lathropinus ater* (Sharp), *Piestus bicornis* (Olivier), *Glenus vestitus* Sharp, *Leistotrophus versicolor* (Gravenhorst)] (Newton & Caron, 2023; Caron & Santos, 2023; Buss & Caron, 2023).

As a result, we are adding five species and three genera for the first time in Acre [*Aleochara (Aleochara) prisca* Sharp, *Aleochara (Aleochara) lustrica* Say, *Diochus nanus* Erichson; *Eulissus chalybaeus* Mannerheim; *Belonuchus rufipennis* (Fabricius)].

Aleocharinae

Aleochara (Aleochara) auricoma Sharp, 1876

Known geographic distribution. The species was previously recorded in Acre (Porto Acre, Rio Branco and Senador Guimard), and it is also known from Amazonas and Pará (both in Brazil) and British Guiana (Caron et al., 2019).

Known ecological information. Fifty-two specimens were collected during the transition period between the rainy-dry seasons (May) and throughout the dry season (until August) using pitfall traps baited with fermented banana, human feces and decaying beef heart (CESP). According to the literature, *A. (A.) auricoma* was collected with decayed pig, fish, beef, fruits, and human feces, using pitfall or Shannon traps (Caron et al., 2019).

Aleochara (Aleochara) lustrica Say, 1832

Known geographic distribution. This is the earliest record of the species at Acre (Experimental Field of Embrapa Acre, Rio Branco, deposited in CESP). It had already been recorded in Brazil for Pará, Paraíba, Bahia, Mato Grosso, Minas Gerais, São Paulo and Paraná. The species is also known from the USA, Mexico, Trinidad & Tobago (Tobago), Ecuador and Chile (Caron et al., 2019).

Known ecological information. A total of 91 specimens were collected during the transition period between the rainy-dry seasons (May) and throughout the dry season (until August) using pitfall traps baited with fermented banana, human feces and decaying beef heart (CESP). The species is associated with decomposition of animal carcasses and feces (Caron et al., 2019).

Aleochara (Aleochara) prisca Sharp, 1876

Known geographic distribution. This is the first mention of the species at Acre (Experimental Field of Embrapa Acre, Rio Branco, deposited in CESP). Before, it is recorded just in Amazonas (Brazil) (Caron et al., 2019).

Known ecological information. Twenty-eight specimens were collected during the transition period between the rainy-dry seasons (May) and throughout the dry season (until August) using pitfall traps baited with decaying beef heart and fermented banana (CESP). The species have been recorded in association with the decomposition of the pig carcass (Caron et al., 2019).

Aleochara (Aleochara) verecunda Sharp, 1876

Known geographic distribution. Specimens were collected in Acre (Rio Branco) and Pará (Caron & Santos, 2023).

Known ecological information. Eight specimens were collected during the transition period between the rainy-dry seasons (May) and throughout the dry season (until August) using pitfall traps baited with fermented banana, human feces and decaying beef heart (CESP).

Aleochara (Xenochara) capitinigra Buss & Caron, 2023

Known geographic distribution. This species is only recorded in Acre (Rio Branco) (Buss & Caron, 2023).

Known ecological information. Ten specimens were collected during the dry season (July) using pitfall traps baited with fermented banana, human feces and decaying beef heart (CESP).

Aleochara (Xenochara) simulatrix Sharp, 1883

Known geographic distribution. The species occurs in Brazil, Acre (Rio Branco) and Pará, beyond Grenada, Guatemala, and Panama (Buss & Caron, 2023).

Known ecological information. Forty-seven specimens were collected during the transition period between the rainy-dry seasons (May) and throughout the dry season (until August) using pitfall traps baited with fermented banana, human feces, and decaying beef heart (CESP).

Paederinae

Lathropinus ater (Sharp, 1876)

Known geographic distribution. The species is endemic to Brazil: Acre (Rio Branco), Amazonas, Pará and Mato Grosso (Asenjo et al., 2013).

Known ecological information. Biology unknown. Some specimens of the same tribe, Pinophilini, are litter inhabitants (Newton et al., 2000).

Piestinae

Piestus bicornis (Olivier, 1811)

Known geographic distribution. In Brazil the species was recorded in the states of Acre (Iquiri), Amazonas, Pará, Goiás, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, and Santa Catarina. The species has also wide distribution in Central and South America, which occurs in Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Suriname, Guyana, French Guiana, Ecuador, Peru, Bolivia, Paraguay, and Argentina (Caron et al., 2012).

Known ecological information. *Piestus bicornis* was found under bark and collected in leaf litter and Malaise trap. Specimens with reddish brown pronotum and elytra have been found from Costa Rica to Paraguay, while specimens with black pronotum and elytra have been found only in Brazil. In Acre, just the first pattern of color was observed (Caron et al., 2012).

Staphylininae

Belonuchus rufipennis (Fabricius, 1801)

Known geographic distribution. This is the first mention of the species at Acre (Experimental Field of Embrapa Acre, Rio Branco, deposited in CESP). In Brazil, it was previously found in Amazonas, Ceará, Bahia, Rio de Janeiro, and São Paulo (Asenjo et al., 2013). It is widely distributed between Canada and Argentina (Newton & Caron, 2022).

Known ecological information. Twelve specimens were collected during the dry season (July and August) (CESP) using pitfall traps baited with fermented banana, human feces, and decaying beef heart. The species is present in various decomposing organic materials (Smetana, 1995).

Diochus nanus Erichson, 1839

(following Cai et al., 2019, Diochini as tribe of Staphylininae)

Known geographic distribution. It's Acre's first record (Experimental Field of Embrapa Acre, Rio Branco, deposited in CESP). In Brazil, the species was already recorded at Amazonas, Roraima, Pará, and Bahia (Asenjo et al., 2013). The species has been also registered in Mexico, Saint Thomas, Nicaragua, Guatemala, Costa Rica, Panama, Venezuela, Colombia, French Guiana, Suriname and Argentina (Asenjo et al., 2013, Irmiler, 2017).

Known ecological information. Only one specimen was collected during the dry season (July) using pitfall traps baited with decaying beef heart (CESP). Species of the genus are usually associated with forest floor litter. Specifically, for *D. nanus*, the specimens were found in composted grass on the beach, in the litter, and using a car net (Irmiler, 2017).

Eulissus chalybaeus Mannerheim, 1830

Known geographic distribution. It's Acre's first record. In Brazil (Experimental Field of Embrapa Acre, Rio Branco, deposited in CESP), the species was already recorded at Minas Gerais, Rio de Janeiro, São Paulo, and Paraná (Asenjo et al., 2013). The species is also found in Austria (an introduced species), Mexico, Guatemala, Nicaragua, Costa Rica, Panama, Colombia, Peru, Bolivia, Paraguay, and Argentina (Márquez & Asiain, 2002).

Known ecological information. Thirteen specimens were collected between during transition period between the rainy-dry seasons (May) and during the dry season (July) using pitfall traps baited with fermented banana, human feces, and decaying beef heart (CESP). *Eulissus chalybaeus* is associated with carcasses (Almeida & Mise, 2009; Aballay et al., 2014; Almeida et al., 2015) and traps baited with human feces, or the detritus of ants (Márquez & Asiain, 2002). It is an active predator of Diptera larvae but has also been reported as a predator of dung beetles (Noriega & Navarrete-Heredia, 2013).

Glenus vestitus Sharp, 1876

Known geographic distribution. In Brazil, the species occur in Acre (Rio Branco), Amazonas, and Pará (Asenjo et al. 2013). The species has been collected in Bolivia and Peru (Newton & Caron, 2023).

Known ecological information. Predator behavior and some species of the genus were associated with *Atta* spp. (Marquez-Luna & Navarrete-Heredia, 1995; Navarrete-Heredia et al., 2001).

Leistotrophus versicolor (Gravenhorst, 1806)

Known geographic distribution. In Brazil, the species occur in Acre (Rio Branco), Amazonas, Pará, and Rio de Janeiro. However, it has wide distribution in Central and South America: Mexico, Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Venezuela, Suriname, Guyana, French Guiana, Colombia, Brazil, Ecuador, Peru, Bolivia, Paraguay and Argentina (Asenjo et al., 2013).

Known ecological information. The species is a specialized predator of adult flies (Diptera), and it has been found together with vertebrate dung or carrion (Forsyth & Alcock, 1990).

Discussion

This represents the most complete compilation of species recorded for the state of Acre, including clown beetles (Histeridae) and rove beetles (Staphylinidae). For Histeridae, the taxa listed here represent 4.32% of the genera and 1.53% of the species known from the Neotropical region (Costa 2000), and 4.62% of the genera and 2.67% of the species of Brazilian histerid beetles (Bicho et al., 2023). For Staphylinidae, the taxa listed here represent 0.74% of the genera, 0.11% of the species known from the Neotropical region (Asenjo et al., 2019), 1.69% of the genera and 0.46% of the species of Brazilian rove beetles (Newton & Caron, 2023). Thus, the richness obtained certainly represents only a small portion of the species that potentially inhabiting the territory of the state of Acre, as well as the Amazon Biome.

Furthermore, our data increase the Histerid beetle fauna from Acre in one more subfamily (100% gain), 1 tribe (50% gain), 3 genera (100% gain) and 13 species (217% gain) (Bicho et al., 2023). For the rove beetle fauna from Acre our data increase in 3 more genera (60% gain) and 5 species (70% gain) (Caron et al., 2019; Newton & Caron, 2023; Caron & Santos, 2023; Buss & Caron, 2023).

Finally, we expect that our data will contribute to the Taxonomic Catalog of the Brazilian Fauna, and that these lists can gradually improve the knowledge

of the biodiversity of these families in Brazil, as well as fill some sampling gaps in biomes and regions of the country.

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Conflicts of interests

The authors declares no conflicts of interests.

References

- Aballay, F. H., Arriagada, G., Flores, G. E., & Centeno, N. D. (2013). An illustrated key to and diagnoses of the species of Histeridae (Coleoptera) associated with decaying carcasses in Argentina. *ZooKeys*, 261, 61-84. <https://doi.org/10.3897/zookeys.261.4226>
- Aballay, F. H., Chani-Posse, M. R., Ayón, M. R., Maldonado, M. B., & Centeno N. D. (2014). An illustrated key to and diagnoses of the species of Staphylinidae (Coleoptera) associated with decaying carcasses in Argentina. *Zootaxa*, 3860(2), 101-124. <https://doi.org/10.11646/zootaxa.3860.2.1>
- Aguilar-Sosa, A. B., Morales-Díaz, G., Roibal, L. B. R., & González-Vainer, P. (2020). Histeridae (Coleoptera) de Uruguay: lista preliminar de especies, nuevos registros y distribución potencial. *Boletín de la Sociedad Zoológica del Uruguay*, 29(2), 86-98. <https://doi.org/10.26462/29.2.5>
- Aguirre-Carrera, S. J. (2014). *Línea base de insectos de importancia forense en diferentes zonas climáticas de Pichincha, Ecuador*. Tesis de Licenciatura, Pontificia Universidad Católica del Ecuador, Quito, 1-66.
- Almeida, L. M., & Mise, K. M. (2009). Diagnosis and key of the main families and species of South American Coleoptera of forensic importance. *Revista Brasileira de Entomologia*, 53, 227-244.
- Almeida, L. M., Corrêa, R. C., & Grossi, P. C. (2015). Coleoptera species of forensic importance from Brazil: an updated list. *Revista Brasileira de Entomologia*, 59(4), 274-284. <https://doi.org/10.1016/j.rbe.2015.07.008>
- Arriagada, G. (1987). Notas sinonímicas y datos distribucionales de Sapriniinae Neotropicales (Coleoptera: Histeridae). *Revista Chilena de Entomología*, 15, 61-70.
- Arriagada, G. (2015). Nueva especie de Sapriniinae de Perú, Chile y Argentina, nuevos registros y sinonimias (Coleoptera: Histeridae). *Boletín del Museo Nacional de Historia Natural*, 64, 181-197. <https://doi.org/10.54830/bmnhn.v64.2015.119>
- Asenjo, A., Irmeler, U., Klimaszewski, J., Herman, L. H., & Chandler, D. S. (2013). A complete checklist with new records and geographical distribution of the rove beetles (Coleoptera, Staphylinidae) of Brazil. *Insecta Mundi*, 277, 1-419.
- Asenjo, A., Irmeler, U., Klimaszewski, J., Chandler, D. S., Fierro-López, H. E., & Vieira, J. S. (2019). Staphylinidae (Insecta: Coleoptera) in Latin America: synopsis, annotated catalog, diversity and distribution. *Zootaxa*, 4621(1), 1-406. <https://doi.org/10.11646/zootaxa.4621.1.1>
- Bicho, C. L., Leivas, F. W. T., & Dégallier, N. (2023). *Histeridae*. In: Catálogo Taxonômico da Fauna do Brasil. PNUD. (<http://fauna.jbrj.gov.br/fauna/faunadobrasil/122847>). Accessed on 21/08/2023.
- Buss, B. B., & Caron, E. (2023). Revision of Brazilian species of *Aleochara* Gravenhorst of the subgenus *Xenochara* Mulsant & Rey (Coleoptera: Staphylinidae: Aleocharinae). *Zootaxa*, 5330(4), 509-534. <https://doi.org/10.11646/zootaxa.5330.4.3>
- Cai, C.-Y., Wang, Y.-L., Liang, L., Yin, Z.-W., Thayer, M. K., Newton, A. F., & Zhou, Y.-L. (2019). Congruence of morphological and molecular phylogenies of the rove beetle subfamily Staphylininae (Coleoptera: Staphylinidae). *Scientific Reports*, 9, 1-11. <https://doi.org/10.1038/s41598-019-51408-1>

- Caron, E., & Santos, R. S. (2023). *Aleochara verecunda* Sharp, 1876 rediscovered from the Brazilian amazon (Coleoptera: Staphylinidae: Aleocharinae). *The Coleopterists Bulletin*, 77(1), 153-158. <https://doi.org/10.1649/0010-065X-77.1.153>
- Caron, E., Mise, K. M., & Klimaszewski, J. (2008). *Aleochara pseudochrysochorrea*, a new species from southern Brazil (Coleoptera: Staphylinidae: Aleocharinae), with a complete checklist of Neotropical species of the genus. *Revista Brasileira de Zoologia*, 25(4), 827-842. <https://doi.org/10.1590/S0101-81752008000400022>
- Caron, E., Ribeiro-Costa, C. S., & Newton, A. F. (2012). Cladistic analysis and revision of *Piestus* Gravenhorst with remarks on related genera (Coleoptera: Staphylinidae: Piestinae). *Invertebrate Systematics*, 25, 490-585. <https://doi.org/10.1071/IS10016>
- Caron, E., Moussallem, M., & Bortoluzzi, S. (2019). Revision of Brazilian species of *Aleochara* of the subgenus *Aleochara* (Coleoptera: Staphylinidae: Aleocharinae). *Zootaxa*, 4712(1), 1-33. <https://doi.org/10.11646/zootaxa.4712.1.1>
- Castro, M., Centeno N., & González-Vainer, P. (2019). An initial study of insect succession on pig carcasses in open pastures in the northwest of Uruguay. *Forensic Science International*, 302, 109837. <https://doi.org/10.1016/j.forsciint.2019.05.053>
- Caterino, M. S. (1999). Taxonomy and phylogenetics of the *Coenosus* group of Hister. *University of California Publications in Entomology*, 119, 1-93.
- Caterino, M. S., Hunt, T. & Vogler, A. P. (2005) On the constitution and phylogeny of Staphyliniformia (Insecta: Coleoptera). *Molecular Phylogenetics and Evolution*, 34, 655-672.
- Caterino, M. S., & Tishechkin, A. K. (2013). A systematic revision of the genus *Operclipygus* Marseul. *ZooKeys*, 271, 1-401. <https://doi.org/10.3897/zookeys.271.4062>
- Caterino, M. S., & Tishechkin, A. K. (2019). A revision of the *Phelister haemorrhous* species group (Coleoptera, Histeridae, Exosternini). *ZooKeys*, 854, 41-88. <https://doi.org/10.3897/zookeys.854.35133>
- Caterino, M.S., & Tishechkin, A. K. (2020). Recognition and revision of the *Phelister blairi* group (Histeridae, Histerinae, Exosternini). *ZooKeys*, 1001, 1-154. <https://doi.org/10.3897/zookeys.1001.58447>
- Celli, N. G. R., Leivas, F. W. T., Caneparo, M. F. C., & Almeida, L. M. (2015). Chave de identificação e diagnose dos Histeridae (Insecta: Coleoptera) de interesse forense do Brasil. *Iheringia, Série Zoológica*, 105(4), 461-473. <https://doi.org/10.1590/1678-476620151054461473>
- Costa, C. (2000). Estado de conocimiento de los Coleoptera neotropicales. *Boletín Sociedad Entomológica Aragonesa Versión Electronica*, 32: 99-114.
- Costa-Silva, V., Thyssen, P. J., & Di Mare, R. A. (2017). Levantamento da fauna de Coleoptera (Insecta) associada à carcaça de roedores na região Sul do Brasil. *Entomobrasilia*, 10(3), 162-169. <https://doi.org/10.12741/ebrasilis.v10i3.733>
- Dégallier, N., & Touroult, J. (2015). Coleoptera Histeridae de Guyane. VIII. Le genre *Hister* L., 1758. In: Contribution à l'étude des coléoptères de Guyane: tome 9. Le Coléoptériste, suppl., 117-124.
- Dégallier, N., Kovarik, P. W., Tishechkin, A. K. & Caterino, M. S. (2021). Coleoptera Histeridae de Guyane: XIII. Nouvelles additions au catalogue et description de 4 genres nouveaux et 19 espèces nouvelles (Haeteriinae et Tribalinae). In: Touroult J. (Ed.). Contribution à l'étude des coléoptères de Guyane: tome 13. Le Coléoptériste, (Suppl. au Tome XIII), 99-147.
- Dégallier, N., Arriagada, G., Caterino, M. S., Kanaar, P., Moura, D. P., Tishechkin, A. K., & Warner, W. B. (2012). Coleoptera Histeridae de Guyane. VII. Compléments au catalogue avec des données sur la faune du Surinam et une contribution à la connaissance des Sapriniinae. In: Touroult J. (Ed.), Contribution à l'étude des Coléoptères de Guyane. Le Coléoptériste, suppl. 6, 33-52.
- Forsyth, A., & Alcock, J. (1990). Ambushing and prey-luring as alternative foraging tactics of the fly-catching rove beetle *Leistotrophus versicolor* (Coleoptera: Staphylinidae). *Journal of Insect Behavior*, 3, 703-718.
- Giraldo-Mendoza, A. E. A. (2021). Preliminary list of beetles (Insecta: Coleoptera) of forensic importance from Peru. *Dugesiana* 28(2), 61-74. <https://doi.org/10.32870/dugesiana.v28i2.7148>
- Gonçalves, G. M., & Leivas, F. W. T. (2017). Checklist

- de Histeridae do sul do Brasil (Insecta: Coleoptera: Staphyliniformia). *EntomoBrasilis*, 10(3), 194-213. <https://doi.org/10.12741/ebrasilis.v10i3.700>
- Irmiler, U. (2017). A review of the Neotropical genus *Diochus* Erichson, 1840 (Coleoptera: Staphylinidae: Staphylininae). *Contributions to Entomology: Beiträge zur Entomologie*, 67(1), 1-62. <https://doi.org/10.21248/contr.entomol.67.1.1-62>
- Kovarik, P. W., & Caterino, M. S. (2016). Histeridae. In R. G. Beutel, & N. P. Kristensen (Eds.), *Handbook of Zoology, Arthropoda: Insecta, Coleoptera, Beetles: Morphology and Systematics (Archostemata, Adephaga, Myxophaga, Polyphaga partim)* (pp. 281-314), 2nd edition. Walter de Gruyter.
- Krüger, E., Kahlow, C., Leivas, F. W. T., & Schühli, G. S. (2017). Scientific note: the histerid beetle *Omalodes foveola* (Coleoptera: Histeridae) found as a Melittophile, co-inhabiting Africanized honeybee hives in Brazil. *Apidologie*, 48, 572-574.
- Leivas, F. W. T., Bicho, C. L., Dégallier, N., & Moura, D. P. (2012). Revision of the genus *Scapomegas* Lacordaire, 1854 (Coleoptera: Histeridae: Omalodini). *Zootaxa*, 3482, 33-46.
- Leivas, F. W. T., Grossi, P. C., & Almeida, L. M. (2013). Histerídeos (Staphyliniformia: Coleoptera: Histeridae) dos Campos Gerais, Paraná, Brasil. *Biota Neotropica*, 13(2), 196-204. <https://doi.org/10.1590/S1676-06032013000200019>
- Leivas, F. W. (2023). Coleção Entomológica do Setor Palotina, Universidade Federal do Paraná. Version 1.8. Universidade Federal do Paraná. https://ipt.sibbr.gov.br/taxonline/resource?r=cesp_ufrpr_01&v=1.8 Accessed on 21/08/2023.
- Marinoni, R. C., & Ganho, N. (2003). Fauna de Coleoptera no Parque Estadual de Vila Velha, Ponta Grossa, Paraná, Brasil. Abundância e riqueza das famílias capturadas através de armadilhas de solo. *Revista Brasileira de Zoologia*, 20(4), 737-744. <https://doi.org/10.1590/S0101-81752003000400029>
- McKenna, D. D., Farrell, B. D., Caterino, M. S., Farnum, C. W., Hawks, D. C., Maddison, D. R., Seago, A. E., Short, A. E. Z., Newton, A. F. & Thayer, M. K. 2014 (Online) 2015 (Print). Phylogeny and evolution of Staphyliniformia and Scarabaeiformia: forest litter as a stepping stone for diversification of nonphytophagous beetles. *Systematic Entomology* 40(1), 35-60. <https://doi.org/10.1111/syen.12093>
- Marquez-Luna, J., & Navarrete-Heredia, J. L. (1994). Especies de Staphylinidae (Insecta: Coleoptera) asociadas a detritos de *Atta mexicana* (F. Smith) (Hymenoptera: Formicidae) em dos localidades de Morelos, Mexico. *Folia Entomologica Mexicana*, 91, 31-46.
- Márquez, J., & Asiain, J. (2002). *Eulissus chalybaeus* Mannerheim, 1830. Coleoptera; Staphylinidae, Xantholinini. *Dugesiana*, 9(2), 67-68.
- Marseul, S. A. (1855). Essai monographique sur la famille des histerides (Suite). *Annales de la Société Entomologique de France*, 3, 131-160.
- Marseul, S. A. (1862). Supplément a la monographie des histerides (Suite). *Annales de la Société Entomologique de France*, (4)2, 669-720.
- Mayer, A. C. G., & Vasconcelos, S. D. (2013). Necrophagous beetles associated with carcasses in a semi-arid environment in Northeastern Brazil: implications for forensic entomology. *Forensic Science International*, 226(1-3), 41-45. <https://doi.org/10.1016/j.forsciint.2012.11.019>
- Mazur, S. (2011). *A concise catalogue of the Histeridae (Insecta: Coleoptera)*. Warsaw University of Science–SGGW Press, Warsaw, 332p.
- Mesquita, A. L. M. (2003). Importância e métodos de controle do “moléque” ou broca-do-rizoma-da-bananeira. Fortaleza: *Embrapa, Circular Técnica online*, 17: 1-5.
- Mise, K. M., Corrêa, R. C., & Almeida, L. M. (2013). Coleoptero-fauna found on fresh and frozen rabbit carcasses in Curitiba, Paraná, Brazil. *Brazilian Journal of Biology*, 73(3), 543-548. <https://doi.org/10.1590/S1519-69842013000300012>
- Mise, K. M., Souza, A. S. B., Campos, C. M., Keppler, R. L. F., & Almeida, L. M. (2010). Coleoptera associated with pig carcass exposed in a forest reserve, Manaus, Amazonas, Brazil. *Biota Neotropica*, 10(1), 321-324. <https://doi.org/10.1590/S1676-06032010000100027>
- Mise, K. M., Almeida, L. M., Moura, M. O. (2007). Levantamento da fauna de Coleoptera que habita a carcaça de *Sus scrofa* L., em Curitiba, Paraná. *Revista Brasileira de Entomologia*, 51(3), 358-368. <https://doi.org/10.1590/S0085-56262007000300014>
- Moura, D. P. (2014). Análise cladística de *Omalodes* e revisão de *Omalodes* (*Omalodes*) Dejean,

- 1833 (Coleoptera, Histeridae, Histerinae). Tese (Doutorado em Ciências Biológicas: Entomologia) - Universidade Federal do Paraná, Curitiba, 1-303.
- Navarrete-Heredia, J. L., Newton, A. F., Thayer, M. K., Ashe, J. S., & Chandler, D. S. (2002). *Guía ilustrada para los géneros de Staphylinidae (Coleoptera) de México. Illustrated guide to the genera of Staphylinidae (Coleoptera) of México*. Universidad de Guadalajara y Conabio, México, 401p.
- Newton, A. F. (2022). Staphbase: Staphyliniformia world catalog database. Catalogue of life. (<https://www.catalogueoflife.org/data/taxon/8VRLF>). Accessed on 25/05/2022.
- Newton, A. F., & Caron, E. (2023). Staphylinidae in Catálogo Taxonômico da Fauna do Brasil. PNUD. (<http://fauna.jbrj.gov.br/fauna/faunadobrasil/167545>). Accessed on 21/08/2023.
- Newton, A. F., & Thayer, M. K. (1992). Current classification and family group names in Staphyliniformia. *Fieldiana, Zoology*, 67: 1-92. <https://doi.org/10.5962/bhl.title.3544>
- Newton, A. F., Thayer, M. K., Ashe, J. S. & Chandler, D. S. (2000). Family 22. Staphylinidae Latreille, 1802. pp. 272-418. In *American Beetles*, vol. 1, Archostemata, Myxophaga, Adephaga, Polyphaga. CRC Press, Boca Raton, Florida, 464p.
- Noriega, J. A., & Navarrete-Heredia, J. L. (2013). Quantification of predation on the dung-beetle *Canthidium cupreum* (Blanchard) (Coleoptera: Scarabaeidae: Scarabaeinae) by *Leistotrophus versicolor* (Gravenhorst) (Coleoptera: Staphylinidae). *The Coleopterists Bulletin*, 67(2), 190-193. <https://doi.org/10.1649/0010-065X-67.2.190>
- Rafael, J. A., Oliveira, M. L., Souza, U. R. M., Galileo, M. H. M., Silva, A. S., Mello, F. V., Leivas, F. W. T., Arriagada, G., Grossi, P. C., Ale-Rocha, R. & Limeira-de-Oliveira, F. (2017). Insetos dos parques nacionais de sete cidades e de Ubajara. In: *Pesquisas em unidades de conservação no domínio da Caatinga: subsídios a gestão*. Edições UFC, 12, 301-387.
- Remedios-De León, M., Castro, M., & Morelli, E. (2017). Artropodofauna cadavérica sobre modelos experimentales porcinos *Sus scrofa* Linnaeus, 1758 (Mammalia: Artiodactyla) en cuatro periodos estacionales. *Entomología Mexicana*, 4, 550-559.
- Santos, W. E., Alves, A. C. F., & Creão-Duarte, A. J. (2014). Beetles (Insecta, Coleoptera) associated with pig carcasses exposed in a Caatinga area, Northeastern Brazil. *Brazilian Journal of Biology*, 74, 649-655. <https://doi.org/10.1590/bjb.2014.0072>
- Silva, R. C., & Santos, W. E. (2012). Fauna de Coleoptera associada a carcaças de coelhos expostas em uma área urbana no Sul do Brasil. *EntomoBrasilis*, 5(3), 185-189. <https://doi.org/10.12741/ebrasilis.v5i3.245>
- Silva, S. B., & Caron, E. (2014). The unique Brazilian species of *Polylobus* Solier (Coleoptera: Staphylinidae: Aleocharinae) with a checklist of all species of the genus. *Zootaxa*, 3811(2), 226-238. <https://doi.org/10.11646/zootaxa.3811.2.4>
- Smetana, A. (1982). Revision of the subfamily Xantholininae of America north of Mexico (Coleoptera: Staphylinidae). *Memoirs of the Entomological Society of Canada*, 12, 1-389. <https://doi.org/10.4039/entm114120fv>
- Smetana, A. (1995). Rove beetles of the subtribe Philonthina of America north of Mexico (Coleoptera: Staphylinidae). Classification, phylogeny and taxonomic revision. *Memoirs on Entomology*, 3, 1-946.
- Souza, A. M., & Linhares, A. X. (1997). Diptera and Coleoptera of potential forensic importance in southeastern Brazil: relative abundance and seasonality. *Medical and Veterinary Entomology*, 11(1), 8-12. <https://doi.org/10.1111/j.1365-2915.1997.tb00284.x>
- Souza, A. S. B., Kirst, F. D., & Krüger, R. F. (2008). Insects of forensic importance from Rio Grande do Sul state in southern Brazil. *Revista Brasileira de Entomologia*, 52(4), 641-646. <https://doi.org/10.1590/S0085-56262008000400016>
- Vieira, L., Nascimento, P. K. S., & Leivas, F. W. T. (2018). Habitat association promotes diversity of Histerid Beetles (Coleoptera: Histeridae) in Neotropical Ecosystems. *The Coleopterists Bulletin*, 72(3), 541-549. <https://doi.org/10.1649/0010-065X-72.3.541>