

Diversity of Phengodidae (Coleoptera, Elateroidea) in the Cordillera Central's high Andean ecosystems in the Antioquia department

Diversidad de Phengodidae (Coleoptera, Elateroidea) en ecosistemas altoandinos de la Cordillera Central en el departamento de Antioquia

Diego Uchima-Taborda ^{1*}, Juan Pablo Botero ², Marta Wolff ^{1*}

- Received: 09/Feb/2023
- Accepted: 22/Ago/2024
- Online Publishing: 04/04/2025

Citation: Uchima-Taborda D, Botero J, Wolff M. 2025. Diversity of Phengodidae (Coleoptera, Elateroidea) in the Cordillera Central's high Andean ecosystems in the Antioquia department. *Caldasia* 47:e106517b. doi: <https://doi.org/10.15446/caldasia.v47.106517>

ABSTRACT

As a result of sampling carried out in the páramo complexes of Santa Inés and Sonsón and two forests in the municipalities of Envigado and Yarumal, the Phengodidae genera *Pseudophengodes*, *Microphengodes*, *Euryopa*, *Cephalophrixothrix*, *Halffterus*, *Howdenia*, *Ptorthodius*, *Pseudomastinocerus*, *Stenophrixothrix*, *Taximastinocerus* and *Penicillophorus* are recorded. *Halffterus* is a new record from Colombia and all the genera are recorded for the first time from the Department of Antioquia. The ecosystem where the greatest abundance was found was the forest and the most effective trap for their capture was the Malaise ground trap. Finally, a key to the genera known from Colombia is provided.

Keywords: Bioluminescent coleoptera, Forest, Glowworm beetle, Grassland, Páramo.

RESUMEN

Como resultado de muestreos realizados en los complejos de páramo de Santa Inés y Sonsón y dos bosques en los municipios de Envigado y Yarumal se registran los siguientes géneros de Phengodidae, *Pseudophengodes*, *Microphengodes*, *Euryopa*, *Cephalophrixothrix*, *Halffterus*, *Howdenia*, *Ptorthodius*, *Pseudomastinocerus*, *Stenophrixothrix*, *Taximastinocerus* y *Penicillophorus*. *Halffterus* es un nuevo registro para Colombia y todos los géneros son primeros registros para el departamento de Antioquia. El ecosistema donde se presentó una mayor abundancia fue el bosque y la trampa más efectiva para su captura fue la trampa Malaise de suelo. Finalmente, se proporciona una clave para los géneros conocidos de Colombia.

Palabras clave: Bosque, Coleopteros bioluminiscentes, Páramo, Pastizal, Trenecitos.

¹ Grupo de Entomología Universidad de Antioquia (GEUA), Universidad de Antioquia, Medellín, Colombia. diegouchima@gmail.com, martha.wolff@udea.edu.co.

² Universidad Nacional de Colombia - Sede Bogotá - Facultad de Ciencias - Instituto de Ciencias Naturales - Cra 30 45-02, Ciudad Universitaria, Bogotá, 111321 - Colombia. juboteror@unal.edu.co

* Corresponding author



INTRODUCTION

Phengodidae (Coleoptera: Elateroidea) is mainly an American group of bioluminescent beetles that are distributed from south Canada to northern Argentina (Vega-Badillo *et al.* 2020a). Phengodids are nocturnal and can be found from coastal ecosystems to high Andean ecosystems such as paramos. Family members are highly abundant in zones with high vegetation cover, such as forests, although they can also be found in grasslands. In general, they inhabit leaf litter and ground-level structures, being predators of millipedes and soft-bodied insects. (Wittmer 1976, Viviani and Bechara 1997, Sánchez-Echeverría *et al.* 2014).

Females are neotenic while males are soft-bodied, usually with bilabellate antennae with ten to twelve antennomeres (filiform in Penicillophorinae), exposed head, and short acuminate elytra below which the slightly folded hind wings protrude; the aedeagus is trilobed and its central lobe support a conspicuous flagellum (absent in Cydistinae) (Kundrata *et al.* 2019, Ferreira *et al.* 2024). Larvae and females are recognized by a pair of luminescent organs on each corporal segment and some species also have a pair of bioluminescent organs in the head capsule. The produced light can be green, yellow, orange or red, depending upon the species (Viviani and Bechara 1997).

Phengodidae is composed of five subfamilies Cenophenginae Roza, Vega-Badillo, Zaragoza-Caballero, Kundrata and Mermudes, 2024, Cydistinae Paulus, 1972, Mastinocerinae LeConte, 1881, Penicillophorinae Paulus, 1975, and Phengodinae LeConte, 1861; and have approximately 300 species distributed in 43 genera (Zaragoza-Caballero and Zurita-García 2015, Kundrata *et al.* 2019, Vega-Badillo and Zaragoza-Caballero 2019, Roza and Mermudes 2019, 2020, Vega-Badillo *et al.* 2020b, 2021, 2023, Roza 2023, Coelho *et al.* 2024, Ferreira *et al.* 2024). Of these, 25 species in thirteen genera have been recorded from Colombia, usually only from their type-localities (Uchima-Taborda 2021).

This study aims to provide an inventory of its generic diversity in the high Andean ecosystems of the Central Andes, in the department of Antioquia, Colombia. Additionally, the study seeks to provide information on the plant cover used by this family within these ecosystems and provide a key for the genus recorded from Colombia.

METHODS

Specimens were collected in the Central Cordillera in the department of Antioquia, between the years 2016-2019, in the paramo complexes of Santa Inés and Sonsón, and in the municipalities of Envigado and Yarumal (Fig. 1a-f, see supplementary material for collection site coordinates and altitudes). The Santa Inés paramo complex, also called Belmira paramo, is located in north central Antioquia, where covers around 90.85 km² and is composed of mountain rainforest and super humid páramo (IAvH 2012, Vásquez-Cerón 2012). The Sonsón páramo complex is located in southwestern Antioquia, where it covers an estimated 33.89 Km², and is composed of a series of high Andean forest, subparamo, and paramo patches (IAvH 2012, Alzate-Guarín *et al.* 2016).

The locality in the municipality of Envigado is a closed canopy peri-urban forest whose higher part is considered as a high humid forest (Delgado-Vélez 2007). The locality sampled in Yarumal, is part of the Santa Rosa de Osos high plateau, and corresponds to a mountain forest with heights between 2000-2600 m and near the Ventanas alto and the Llanos de Cuivá (the Cuivá planes).

In each paramo complex bimonthly samplings were conducted over one year, each sampling with a length of ten days. For the Santa Inés complex sampling was between December of 2016 and December of 2017, and for the Sonsón complex, between March of 2018 and June of 2019. For each complex, three localities were selected, and three types of vegetation cover were sampled: Grassland, Forest, and Paramo. For each plant cover the following traps were installed: ground Malaise, canopy Malaise, emergence Malaise, and colored plates, as well as capture transects with an entomological net. Additionally, for the Sonsón complex, an unbaited pitfall trap was used. For the samplings carried out in Envigado and Yarumal, Malaise ground traps were used in a forest cover, in Yarumal between November 2016 and June 2017, while for Envigado between September 2016 and August 2018.

Collected specimens were preserved in 96 % alcohol, identified, and deposited in the Colección Entomológica Universidad de Antioquia (CEUA). Occurrence maps were made with QGIS (QGIS Development Team 2018), and for

each map, the records with specific locations available in the literature were included. Images were taken with a Moti-cam 5MP attached to a stereomicroscope Olympus SZx7, stacked with Helicon Focus (Helicon Soft [c2020](#)), and edited with Adobe Photoshop CS6.

Taxonomic identifications were made following available keys (e.g., Zaragoza-Caballero and Pérez-Hernández [2014](#), Vega-Badillo et al. [2023](#)), original descriptions, and comparisons with deposited material in reference collections. Morphologic terminology follows Wittmer ([1976](#)), Zaragoza-Caballero and Pérez-Hernández ([2014](#)), and Vega-Badillo et al. ([2023](#)).

Specific information on sampled localities and examined material for each genus can be found in the supplementary material. All the records generated in this study are included in ([Table 1](#)), additionally, a key for the known

Colombian Phengodidae genera is presented. Barplots were made with R software and its packages and ggplot (R Development Core Team [c2011](#), Wickham [c2016](#)).

RESULTS

A total of 389 individuals were identified, belonging to the following genera *Pseudophengodes* Pic, 1930, *Microphengodes* Wittmer, 1976, *Euryopa* Gorham, 1881, *Cephalophrixothrix* Wittmer, 1976, *Halffterus* Vega-Badillo et al., 2023, *Howdenia* Wittmer, 1976, *Ptorthodius* Gorham, 1881, *Pseudomastinocerus* Wittmer, 1963, *Stenophrixothrix* Wittmer, 1963, *Taximastinocerus* Wittmer, 1963, and *Penicillophorus* Paulus, 1973. Specimens were present in all the types of vegetal cover ([Fig. 2](#)). *Halffterus* is a new record from Colombia, and all the other genera represent new records for the Department of Antioquia ([Table 1](#)).

Table 1 Phengodidae genera recorded for Colombia, and their presence in other countries (Zaragoza-Caballero and Pérez-Hernández [2014](#), Chaboo et al. [2015](#), Vega-Badillo et al. [2020b](#), [2023](#))

Genus	Recorded locality for Colombia	American distribution (species number)
Phengodinae		
<i>Microphengodes</i> Wittmer, 1976	**Antioquia (Envigado, Sonsón), Valle del Cauca (Buenaventura)	Ecu (1), Col (1), Pan (1)
<i>Phengodes</i> (<i>Phengodella</i>) Wittmer, 1975	Cundinamarca (Bogotá)	Bol (1), Bra (1), Col (2), CR (3), Ecu (2), Gua (2), Hon (1), Mex (11), Nic (1), Pan (2), TT (1), US (3), Ven (3)
<i>Pseudophengodes</i> Pic, 1930	**Antioquia (Belmira, Envigado, Sonsón), Cundinamarca (Bogotá, Monterredondo)	Arg (1), Bol (2), Bra (3), Chi (1), CR (1), Col (6), Ecu (6), GF (2), Per (4), Ven (8)
Mastinocerinae		
<i>Cephalophrixothrix</i> Wittmer, 1976	**Antioquia (Belmira, Envigado, Sonsón, Yarumal)	Col (1), Ecu (2)
<i>Cleicosta</i> Vega-Badillo et. al, 2020	Cundinamarca (Bogotá)	Col (2)
<i>Eurymastinocerus</i> Wittmer, 1963	Valle del Cauca (Dagua)	Ecu (1), Col (1), Gua (1), Pan (1), PR (1), Tri (1), Ven (2)
<i>Euryopa</i> Gorham, 1881	**Antioquia (Envigado), Cauca (Silvia)	Arg (1), Bra (4), Col (1), CR (1), Ecu (1), Gua (1), Mex (1), Par (1)
* <i>Halffterus</i> Vega-Badillo et al. 2023	**Antioquia (Belmira, Envigado, San José de la Montaña, Sonsón, Yarumal)	*Col (0), Per (1)
<i>Howdenia</i> Wittmer, 1976	**Antioquia (Belmira, Envigado, Sonsón, Yarumal), Cundinamarca (Monterredondo)	Arg (1), Bol (1), Bra (2), Ecu (1), GF (2), TT (1), Ven (3)

(Continued)

Genus	Recorded locality for Colombia	American distribution (species number)
Phengodinae		
<i>Mastinomorphus</i> Wittmer, 1976	Valle del Cauca (Buenaventura)	Arg (4), Bol (3), Bra (1), Chi (4), Col (1), Ecu (1), Gua (1)
<i>Pseudomastinocerus</i> Wittmer, 1963	**Antioquia (Envigado, Yarumal), Cundinamarca (Bogotá)	Col (1), CR (2), Ecu (2), GF (1), Pan (2), Ven (1)
<i>Ptorthodius</i> Gorham, 1881	**Antioquia (San José de la Montaña, Sonsón, Yarumal), Magdalena (Aracataca)	Bra (0), Col (1), Pan (1), TT (1), Ven (2)
<i>Stenophrixothrix</i> Wittmer, 1976	**Antioquia (Belmira, Envigado, San José de la Montaña, Sonsón, Yarumal), Cauca (Puracé), Cundinamarca (Bogotá), Magdalena (Santa Marta)	Arg (2), Bel (1), Bol (1), Bra (4), Col (4), CR (2), Ecu (5), EU (1), GF (2), Mex (1), Pan (3), Per (1), TT (1), Uru (1)
<i>Taximastinocerus</i> Wittmer, 1976	**Antioquia (Envigado), Cesar (Pueblo Bello)	Bol (1), Bra (3), Col (3), Gua (1), GF (4), Mex (1), Pan (1), Par (1), Per (0), Ven (6)
Penicillophorinae		
<i>Penicillophorus</i> Paulus, 1973	**Antioquia (Envigado, Yarumal), Magdalena (Ciénaga)	Col (1), Per (0)

* New record from Colombia, **New records from Antioquia. Abbreviations of countries: Arg: Argentina, Bel: Belize, Bol: Bolivia, Bra: Brazil, Chi: Chile, Col: Colombia, CR: Costa Rica, Ecu: Ecuador, Gua: Guatemala, GF: French Guyana, Per: Peru, Mex: Mexico, PR: Puerto Rico, Pan: Panama, Par: Paraguay, TT: Trinidad y Tobago, Uru: Uruguay, US: United States, Ven: Venezuela. Species number 0 indicates a generic record without identified species.

1. Key to Phengodidae genera present in Colombia (adapted from Zaragoza-Caballero and Pérez-Hernández 2014, Roza and Mermudes 2020, Vega-Badillo *et. al.* 2020a, Ferreira *et. al.* 2024)

- 1 Antennae with ten antennomeres, serrated not biflabellated, presence of a tuft of setae on each side of ventrites I and II, wing venation reduced, RP absent, radial cell open and anal cell absent (Fig. 3m), labial palps with just one segment (Penicillophorinae) ... *Penicillophorus* Paulus
 - Antennae with ten-twelve antennomeres, biflabellated (Fig. 3a, 5c). Ventrites without tuft of setae, wing venation not reduced, RP present, radial cell variable and anal cell present, labial palps with variable number ... 2
- 2(1) Maxillary palps long and thin, last palpomere guttiform, similar in longitude and wide as third (Fig. 4a-d), labial palps three-segmented, one tentorial fossa, one gular suture (Phengodinae). ... 3
 - Maxillary palps short, last palpomere securiform, longer and wider than third (Fig. 4e-f, 4o), labial palps with one to three segments, one or two tentorial fossae, one or two gular sutures (Mastinocerinae) ... 5
- 3(2) Antennal tubercles separated, with a deep transverse sulcus behind, abdomen without light organ ... *Phengodes* (*Phengodella*) Wittmer

- Antennal tubercles prominent and close to each other, transversal sulcus barely visible (Fig. 4a-d), abdomen with or without light organ ... 4
- 4(3) Light organ present in ventrites VI and VII (Fig. 3b), lengths from 8 to 18 mm ... *Pseudophengodes* Pic
 - Light organ in ventrites VI and VII absent, lengths from 4 to 7 mm ... *Microphengodes* Wittmer
 - 5(2) Head with two separated tentorial fossae, gular sutures separated (by about the mentum width) and parallel anteriorly; elytra short, last seven tergites exposed; lateral lobes of aedeagus narrowed medially to toothless apex *Cleicosta* Vega-Vadillo, Zaragoza-Caballero, and Ivie
 - Head with just one tentorial fossa (Fig. 4f, 4h), in some cases two fossae can be present but contiguous and inside the same depression. Gular sutures fused or subparallel and closely approximate (separated by less than half of the mentum width); elytra and aedeagus variable ... 6
 - 6(5) Antennae with eleven antennomeres (Fig. 5c) ... 7
 - Antennae with twelve antennomeres ... 8
 - 7(6) Interantennal distance longer than scape length (Fig. 4g-h), antennomeres IV-X with lanceolated flabellae (Fig. 4c), mandible simple, tarsal comb present in pro and mesotarsomere I ... *Euryopa* Gorham

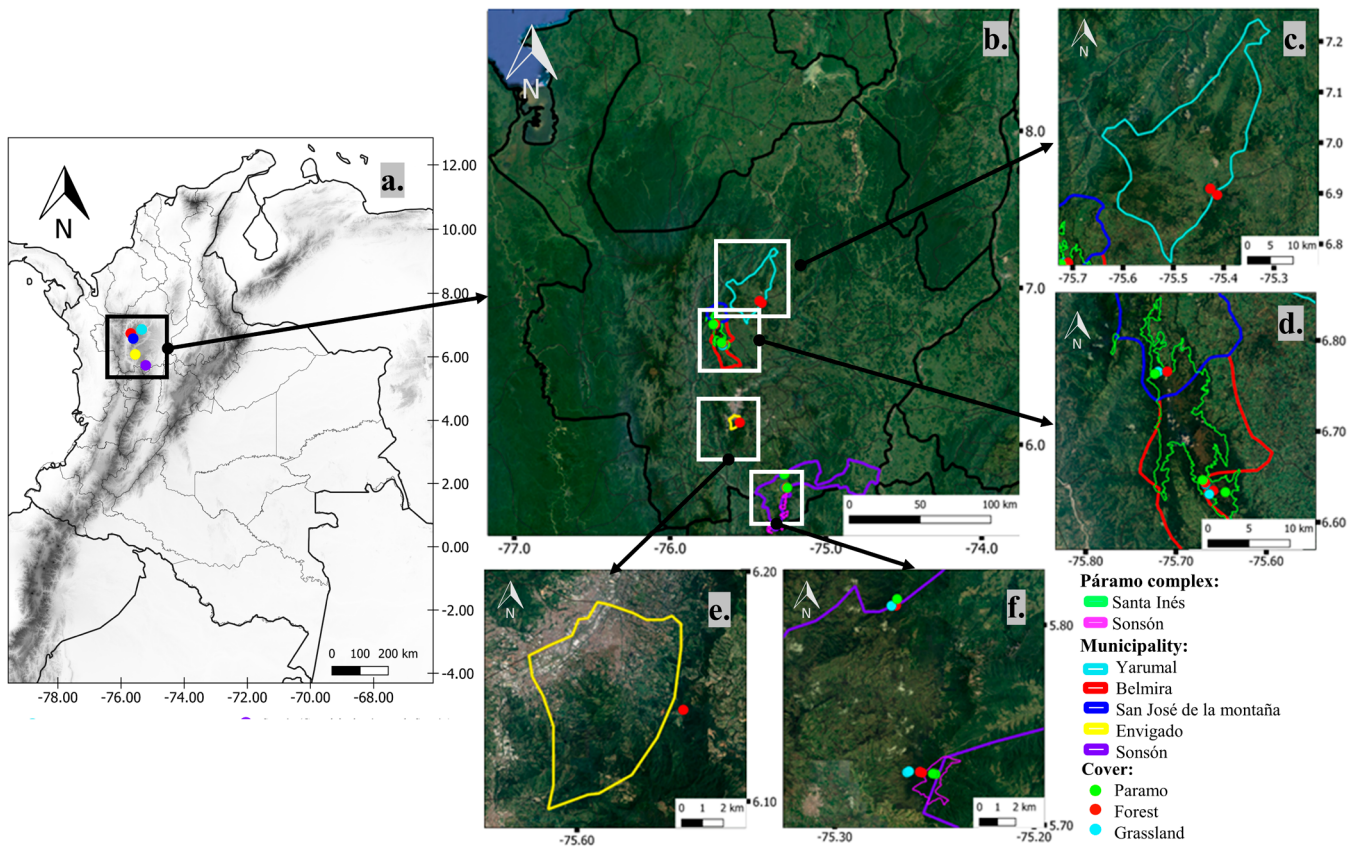


Figure 1. a-b Sampled localities. **a.** General map of Colombian territory, **b.** Paramo complexes in the high Andean ecosystems of the central cordillera of Antioquia. **c-f.** Sampled localities, **c.** Yarumal, **d.** Belmira and San José de la Montaña, **e.** Envigado, **f.** Sonsón.

- Interantennal distance similar or slightly smaller than scape length (Fig. 4i-j), mandible simple, these overlapping, ventral comb present in only protarsomere I ... *Halffterus* Vega-Badillo, Ramírez-Ponce, and Zaragoza-Caballero
- 8(6) Tarsal combs absent in all tarsomeres, dentated claws (Fig. 5g), interantennal space shorter than scape length (Fig. 4p) ... *Stenophrixothrix* Wittmer
 - Tarsal combs present (Fig. 5e-f), claws and interantennal space variable ... 9
- 9(8) Tarsal comb presents only in protarsomere I ... 10
 - Tarsal comb presents in pro and mesotarsomere I ... 11
- 10(9) Front narrow, interantennal distance shorter than scape length (Fig. 4k), metepisterna with long and dense comb of hairs (reduced in some specimens) (Fig. 5d) ... *Howdenia* Wittmer
 - Front wide, interantennal distance longer than scape length (Fig. 5a-b), metepisternal comb absent ... *Taximastinocerus* Wittmer
- 11(9) Mandible toothed, posterior border of pronotum discontinuous (Fig. 4l-m) *Pseudomastinocerus* Wittmer
 - Mandible simple, posterior border of pronotum variable ... 12
- 12(11) Antennomeres IV-X with flabellae, XI wide and without flabellae ... *Eurymastinocerus* Wittmer
 - Antennomeres IV-XI with flabellae ... 14
- 13(12) Tarsal comb occupies only the apical half of the protarsomere I, protarsomeres I and II subequal (Fig. 5e), posterior border of pronotum with a central depression (Fig. 4e) ... *Cephalophrixothrix* Wittmer

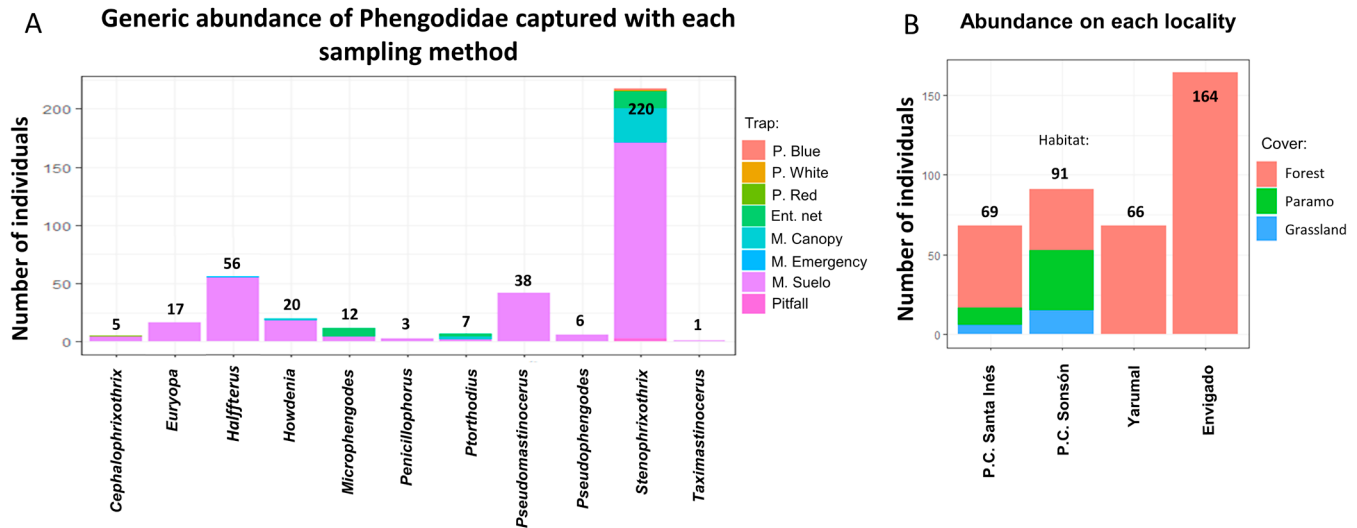


Figure 2 a-b. a. Phengodidae genera and sampling method used. b. Abundance per plant cover.

- Tarsal comb as long as tarsomere length (Fig. 5f), protarsomere II shorter than I ... 15
- 14(13) Interantennal distance wide, labial palpi three-segmented (Fig. 4n-o), claw base dentated ... *Ptorthodius* Gorham
- Interantennal distance narrow, labial palpi two-segmented and claws simple ... *Mastinomorphus* Wittmer

2. Subfamily Phengodinae

Pseudophengodes Pic, 1930 (Figs. 3a-b, 4a-b)

Remarks. The genus has been recorded from altitudes between 120 to 4000 m elevation (Wittmer 1976, Constantin 2014). In Colombia, there are records from Bogotá, Popayán, Tunja, Leticia, and “Cordillera central” (Wittmer 1976, Zaragoza-Caballero and Pérez-Hernández 2014, Martínez and Morales 2020). Herein, the genus is recorded for the municipalities of Belmira, Envigado, and Sonsón (Fig. 6a), in closed canopy forests and grasslands, between 2000 and 3020 m.

Examined material: COLOMBIA. **Antioquia:** Belmira (one male), Envigado (one male), Sonsón (four males) (Fig. 6a).

Microphengodes Wittmer, 1976 (Figs. 3c, 4c-d)

Remarks: For Colombia, only the type-specimen of *M. howdeni* Wittmer, 1976 has been recorded, which was collected at 365.76 m in Valle del Cauca (Wittmer 1976).

In this work the genus was found in the municipalities of Sonsón and Envigado (Fig. 6a), between 2000 and 3045 m, in forest and paramo. This is the second record of the genus for Colombia, and the first for paramo ecosystems.

Examined material: COLOMBIA. Antioquia: Envigado (two males), Sonsón (ten males) (Fig. 6a).

3. Subfamily Mastinocerinae

Cephalophrixothrix Wittmer, 1976 (Figs. 3d, 4e-f, 5e)

Remarks: In Colombia, there is only one recorded species, *C. columbianus* Wittmer, 1976, whose type-locality is “Nov. Granada” (Wittmer 1976). The records of this study are the first with specific localities of the genus for Colombia. Herein, it was collected in the municipalities of Belmira, Envigado, Sonsón, and Yarumal, in forests and grasslands, between 2000 and 2789 m (Fig. 6b).

Examined material: COLOMBIA: **Antioquia:** Belmira (one male), Envigado (two male), Sonsón (one male), Yarumal (two males) (Fig. 6b).

Euryopa Gorham, 1881 (Figs. 3e, 4g-h, 5c)

Remarks: *Euryopa* has been previously recorded for altitudes between 250 and 1800 m (Wittmer 1976, 1996). In Colombia, only *E. caucaensis* Wittmer, 1976 is recorded from Cauca (Wittmer 1976). In this work it is recorded in forest cover in the municipality of Envigado, at 2000 m (Fig. 6b). This is the second record of the genus *Euryopa* for the country.

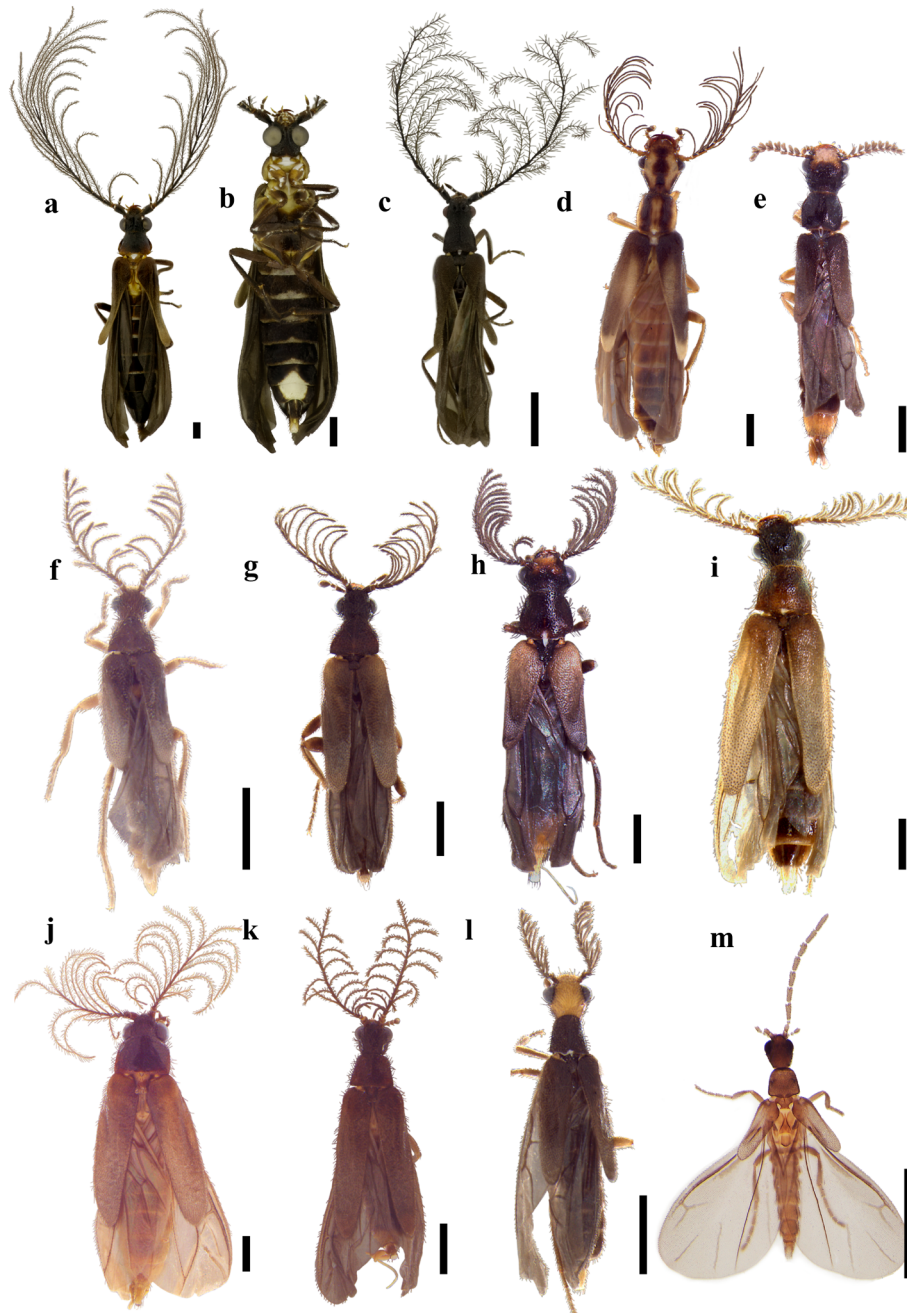


Figure 3. a-i. Habitus of Phengodidae genera in high Andean ecosystems in the central cordillera of Antioquia. Dorsal view. Males. **a-b.** *Pseudophengodes*, **a.** Dorsal view, **b.** Ventral view, **c.** *Microphengodes*, **d.** *Cephalophrixothrix*, **e.** *Euryopa*, **f.** *Halffterus*, **g.** *Howdenia*, **h.** *Pseudomastinocerus*, **i.** *Ptorthodius*, **j-k.** *Stenophrixothrix*, **l.** *Taximastinocerus*, **m.** *Penicillophorus*. Scale bar: 1 mm.

Examined material: COLOMBIA: **Antioquia:** Envigado (17 males) (Fig. 6b).

Halffterus Vega-Badillo *et al.*, 2023 (Figs. 3f, 4i-j)

Remarks: This is the first record for Colombia and the Andean region. In this work it is recorded in the munic-

ipalities of Belmira, Envigado, San José de la Montaña, Sonsón, and Yarumal (Fig. 6b), between 2000 and 3364 m, in grassland, forest, and páramo covers.

Examined material: Colombia: **Antioquia:** Belmira (twelve males), Envigado (31 males), Sonsón (two males), Yarumal (eleven males) (Fig. 6b).



Figure 4. a-o. Head of Phengodidae genera in high Andean ecosystems in the central cordillera of Antioquia. Dorsal and ventral view. Males. a-b *Pseudophengodes* sp. a. Dorsal, b. lateral. c-d. *Microphengodes* sp. c. Dorsal, d. lateral. e-f. *Cephalophrixothrix* sp. e. Dorsal, f. Ventral. g-h. *Euryopa* sp. g. Dorsal, h. Ventral. i-j. *Halffterus* sp. i. Dorsal, j. lateral. k. *Howdenia* sp. Dorsal, l-m. *Ptorthodius* sp. l. Dorsal, m. Ventral. n-o. *Pseudomastinocerus* sp. n. Dorsal, o. Clypeus and mandible Dorsal, p. *Stenophrixohrix* sp. Dorsal. Scale bar: 1 mm.

***Howdenia* Wittmer, 1976** (Figs. 3g, 4k, 5d)

Remarks: For Colombia, only *H. columbiana* (Wittmer, 1963) has been recorded, for the Department of Cundinamarca (Wittmer, 1963). This is the first record in paramo ecosystems of the Cordillera Central, in the municipalities

of Belmira, Envigado, Sonsón and Yarumal, in forest and grassland, between 2000 and 3364 m (Fig. 6c).

Examined material: COLOMBIA: **Antioquia:** Belmira (six males), Envigado (eleven males), Sonsón (two males), **Yarumal** (one male) (Fig. 6c).

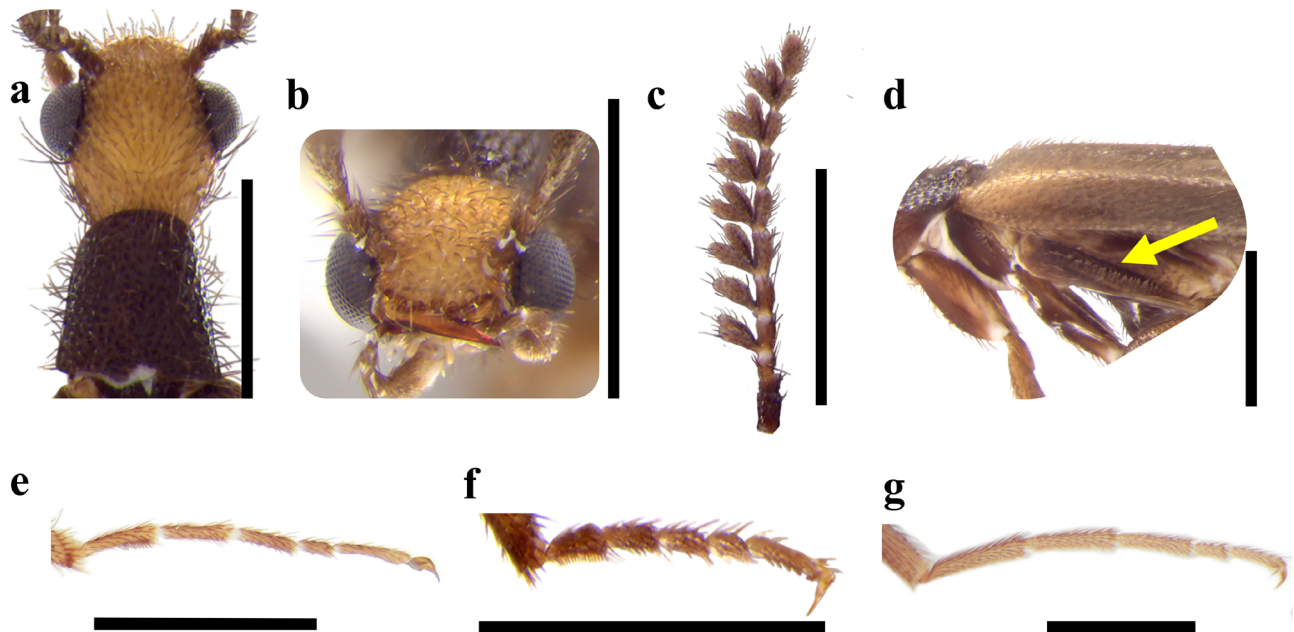


Figure 5. a-b. *Taximastinocerus* sp. head a. Dorsal view, b. Frontal view. c. *Euryopa* sp. antenna. d. *Howdenia* sp. Metepisterna, yellow arrow indicates the pilose region, e-g. Protarsi. e. *Cephalophrixothrix* sp. f. *Ptorthodius* sp. g. *Stenophrixothrix* sp. Scale bar: 1 mm.

***Pseudomastinocerus* Wittmer, 1963 (Fig. 3h, 4 l-m)**

Remarks: The genus has been previously recorded between 300 and 2400 m, in Colombia, *P. ruficeps* (Pic, 1925) is recorded for Cundinamarca (Wittmer 1976, Constantin 2016). In this study, it is recorded for forests, in the municipalities of Envigado and Yarumal, between 2000 and 2600 m (Fig. 6c). This is the second record of the genus in the country.

Examined material: COLOMBIA: **Antioquia:** Envigado (17 males), Yarumal (26 males) (Fig. 6c).

***Ptorthodius* Gorham, 1881 (Figs. 3i, 4n-o)**

Remarks: In Colombia it has been recorded for the department of Córdoba. Herein, it is recorded for the municipalities of Sonsón, San José de la Montaña and Yarumal (Fig. 6c), in forest and páramo covers, between 2970 and 3207m.

Examined material: COLOMBIA: **Antioquia:** San José de La Montaña (one male), Sonsón (five males) (Fig. 6c).

***Stenophrixothrix* Wittmer, 1963 (Figs. 3j-k, 4p)**

Remarks: For Colombia it has been recorded in the departments of Cauca, Cundinamarca and Santa Marta

(Wittmer 1976). Herein, it is recorded in the municipalities of Belmira, Envigado, San José de la Montaña, Sonsón and Yarumal, in grasslands, forests, and paramos, between 2000 and 3364 m (Fig. 6c). The genus shows a great morphological variability, and among the collected specimens it is possible to distinguish two groups, a first one with big specimens (>7 mm), with stout body, and with the interantennal distance shorter than scape (Fig. 3j, 4p), and the second one with smaller specimens (<7 mm), with slender body, and the interantennal distance not evidently shorter than scape (Fig. 3k).

Examined material: COLOMBIA: **Antioquia:** Belmira (39 males), Envigado (81 males), San José de La Montaña (eight males), Sonsón (67 males), Yarumal (24 males) (Fig. 6d).

***Taximastinocerus* Wittmer, 1963 (Figs. 3 l, 5a-b)**

Remarks: The genus has been recorded between 120 and 1450 m (Wittmer 1976, 1988, Constantin 2014). Herein, a specimen is recorded in forest at 2000 m in the municipality of Envigado (Fig. 6d).

Examined material: COLOMBIA: **Antioquia:** Envigado (one male) (Fig. 6d).

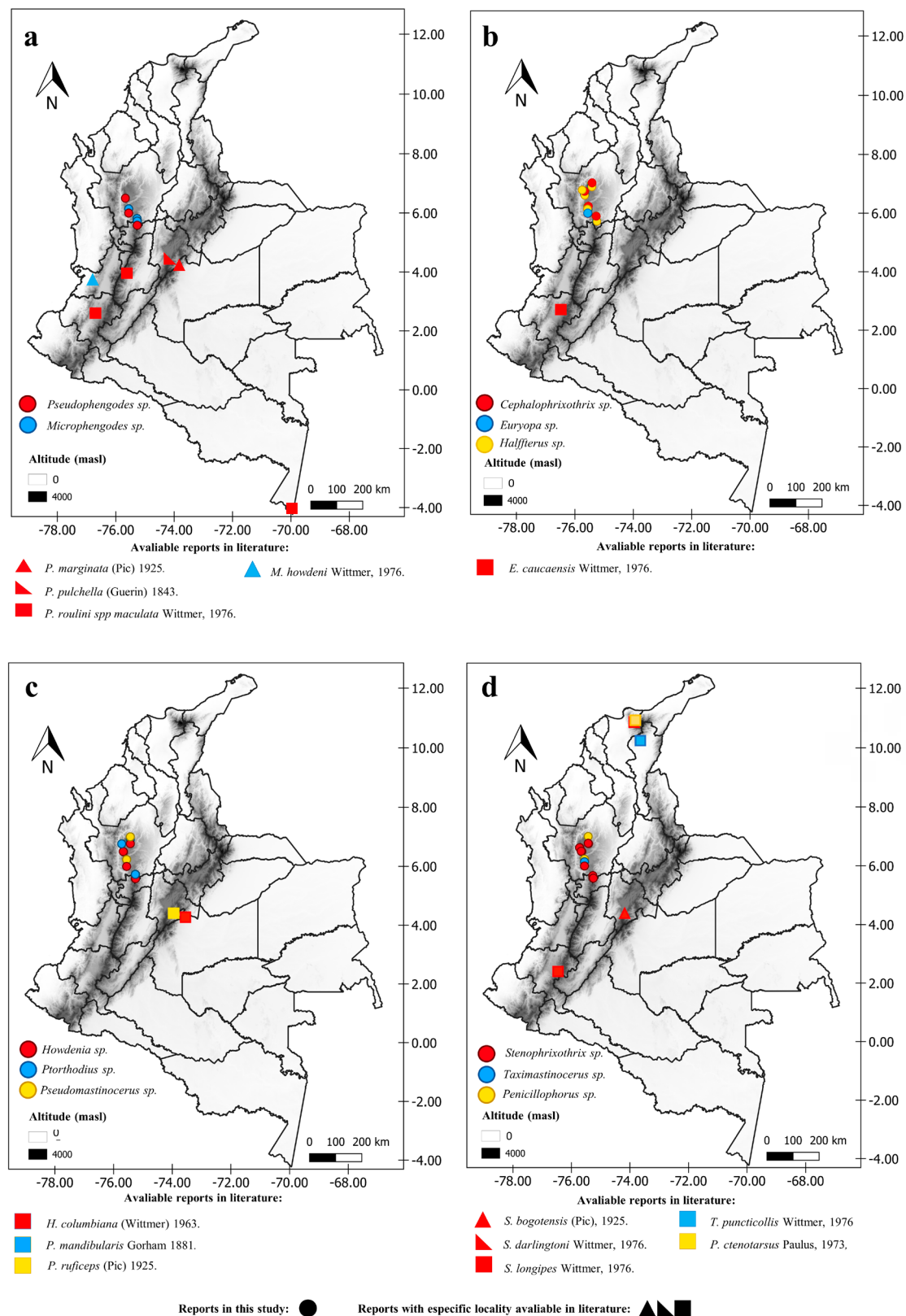


Figure 6 a-d. Occurrence map for the genera found in this study, with additional records found in the literature. **a.** *Pseudophengodes* and *Microphengodes*, **b.** *Euryopa*, *Cephalophrixothrix*, and *Halffterus*, **c.** *Howdenia*, *Ptorthodius*, and *Pseudomastinocerus*, **d.** *Stenophrixothrix*, *Taximastinocerus*, and *Penicillophorus*.

4. Subfamily Penicillophorinae.

Penicillophorus Paulus, 1973 (Fig. 3m)

Remarks: In Colombia *P. ctenotarsus* Paulus, 1973 has been recorded for the department of Magdalena, collected between 1400 and 1600 m (Paulus 1973). In the present study it was collected in forest, in the municipalities of Envigado and Yarumal (Fig. 6d). This is the second record of the genus for the country and the first one at a height greater than 1600 m.

Examined material: COLOMBIA: **Antioquia:** Envigado (two males), Yarumal (two males) (Fig. 6d).

DISCUSSION

Andean and high Andean ecosystems from the north of Los Andes cordillera, exhibit a great richness of taxa. Of the eleven genera found (Fig. 2a), one is a new record from Colombia (Table 1). Envigado is the richest and most diverse sampled locality (Fig. 2b). The most diverse and richest plant cover was forest, where all genera were present. Specifically, *Euryopa*, *Penicillophorus*, *Pseudomastinocerus*, and *Taximastinocerus* were exclusive to this cover in heights below 2600 m. In grasslands *Cephalophrixothrix*, *Halffterus*, *Microphengodes*, *Pseudophengodes*, and *Stenophrixothrix* were present. Finally, in páramo *Halffterus*, *Howdenia*, *Microphengodes*, *Ptorthodius* and *Stenophrixothrix* were observed, where only *Stenophrixothrix* was previously recorded for high Andean páramo (Wittmer 1976). The great abundance of *Stenophrixothrix* specimens suggests that the genus is very representative of mountain ecosystems, which has also been previously noted by Colares *et al.* (2021) in mountain ecosystems in southern Brazil.

Regarding to páramo complexes, forest had the highest specimen abundance and genera richness, this can be related to the fact that some morphological aspects of the group (i.e. short elytra and soft tegument) are possibly an adaptation to habitats that do not present sudden temperature changes and few direct wind exposition (Viviani and Bechara 1997). This high abundance in forest can be related to the family predatory behavior, in which they are predators of groups that are especially abundant in leaf litter and rotten logs (*e. g.* milipedes and softbodied insects), resources that are abundant in habitats with great vegetal cover (Viviani *et al.*

2010). Phengodidae abundance in paramo complexes shows that the less disturbed covers, forest, and paramo, have a greater number of taxa when compared with more disturbed and altered covers as grasslands, this result is consistent with the use of bioluminescent beetles as environmental bioindicators (Viviani *et al.* 2010). Our results suggest that high Andean forests in the central cordillera are important centers of Phengodidae diversity. In this study the sampling method with the most captures was the Malaise ground trap, followed by the Malaise canopy trap (Fig. 2a). This can be directly related to aspects of their biology such as being predominantly low-flying individuals, because the ground is where there are greater food resources and females (Viviani and Bechara 1997, Viviani *et al.* 2010).

This study is the first approach to Phengodidae diversity in high Andean ecosystems, and provides ecological information about the plant cover use and altitudinal distribution for these taxa. It is important to mention that in the case of the localities in Envigado and Yarumal, both forests were totally or partially cut down, this is a consequence of urban expansion and soil-use change in the area, phenomena that lead to fragmentation and connectivity lost in forest patches (Arias-Alzate *et al.* 2016).

CONCLUSIONS

The ecosystems of the northern Andes cordillera are home to a great diversity of Phengodidae, being *Stenophrixothrix* the most abundant genus. In these ecosystems the more preserved plant cover the ones that support the greatest abundance and diversity of phengodids. Although their role as bioindicators has not been studied yet, our findings in the north of Los Andes cordillera add evidence to the study of bioluminescent beetles as potential bioindicators.

ACKNOWLEDGMENTS

Our grateful thanks are due to the members to the Group of Entomology of the University of Antioquia (GEUA), to Minciencias “Convocatoria 1030-2021, Fortalecimiento de Colecciones Biológicas”, code 88829: “Sistematización y Digitalización de la Colección Entomológica Universidad de Antioquia-CEUA” and to the “Jovenes Investigadores” program of the University of Antioquia agreement 2018-23418. Lastly to Santiago Zaragoza-Caballero (UNAM)

and Viridiana Vega-Badillo (INECOL) for their commentaries about identifications and the bibliography provided, and to the reviewers whose commentaries greatly improved this work.

In memory of professor Germán Amat García (1960–2021), for his invaluable contributions to the study of Coleoptera in Colombia and the Neotropical region.

AUTHORS PARTICIPATION

DUT: Conception, writing, photographic material and data analysis; MW: Conception, writing, data analysis, funding acquisition and orientation; JPB: Writing, photographic material, data analysis and orientation. The three authors have no conflict of interest.

LITERATURE CITED

- Alzate-Guarín F, Jiménez-Montoya J, Sarrazola-Yepes H. 2016. Sonsón, un nuevo Complejo de Páramos en Colombia. In: Quijano-Abril MA, editores. *Flora del Oriente Antioqueño: Biodiversidad, Ecología y Estrategias de conservación*. Academia Colombiana de Ciencias Exactas, Físicas y Naturales, Fondo editorial universidad católica de oriente. Bogotá, p. 19–40.
- Arias-Alzate A, Londoño-Trujillo A, Zamudio N, Obando JM, Botero C, Piedrahita M, Martínez-Galvis S, Montoya K, Largo R. 2016. Informe final del convenio para el fortalecimiento y gestión del Sistema de Áreas Protegidas del Municipio de Envigado (Proyecto # 275) Proceso contractual no. 15-00-09-31-025-16. doi: <https://doi.org/10.13140/RG.2.2.18415.74402>
- Chaboo CS, Gimmel ML, Bocakova M. 2015. Beetles (Coleoptera) of Peru: A Survey of the Families. Phengodidae LeConte, 1861. *J. Kans. Entomol. Soc.* 88(2): 240–242. doi: <https://doi.org/10.2317/kent-88-02-240-242.1>
- Coelho MAF, Mermudes JRM, Roza AS. 2024. Synopsis of *Akamboja* (Coleoptera: Phengodidae): new species, synonym, new records and remarks on abdominal morphology for the genus. *Zootaxa*. 5501(1): 131–159. doi: <https://doi.org/10.11646/zootaxa.5501.1.6>
- Colares C, Roza AS, Mermudes JRM, Silveira LFL, Khatrar G, Mayhew PJ, Monteiro RF, Nunes MFSQC, Macedo MV. 2021. Elevational specialization and the monitoring of the effects of climate change in insects: Beetles in a Brazilian rainforest mountain. *Ecol. Indic.* 120(2021): 106888. doi: <https://doi.org/10.1016/j.ecolind.2020.106888>
- Constantin R. 2014. Contribution à la connaissance des Phengodidae de Guyane et description de huit espèces nouvelles (Coleoptera, Elatroidae). *ACOREP-France : Coléoptères de Guyane*, 8: 86–104.
- Constantin R. 2016. Deux nouveaux Phengodidae de Guyane et du Guyana (Coleoptera, Elatroidae). *Le Coléoptériste* 19(3): 158–162.
- Delgado-Vélez CA. 2007. Muerte de mamíferos por vehículos en la vía del Escobero, Envigado (Antioquia), Colombia. *Actu. Biol.* 29(87): 235–239. doi: <https://doi.org/10.17533/udea.acbi.329342>
- Ferreira VS, Roza AS, Barbosa FF, Vega-Badillo V, Zaragoza-Caballero S, Mermudes JRM, Ivie MA, Hansen AK, Brunke AJ, Douglas HB, Solodovnikov A, Kundrata R. (2024). Phylogenomics of Phengodidae (Coleoptera: Elatroidae): towards a natural classification of a bioluminescent and paedomorphic beetle lineage, with recognition of a new subfamily. *Zool. J. Linn. Soc.* 201(4), zlae093. doi: <https://doi.org/10.1093/zoolinnean/zlae093>
- Helicon Soft. c2020. Helicon Focus - Helicon Soft. [Software] [Last accessed: 15 Jan 2020]. <https://www.heliconsoft.com/heliconsoft-products/helicon-focus/>
- [IAvH] Instituto de Investigación de Recursos Biológicos Alexander von Humboldt. 2012. Proyecto: Actualización del Atlas de Páramos de Colombia. Convenio Interadministrativo de Asociación 11-103 Esc 1:100.000. Bogotá – Colombia.
- Kundrata R, Blank SM, Prosvirov AS, Sormova E, Gimmel ML, Vondráček D, Kramp K 2019. One less mystery in Coleoptera systematics: The position of Cydistinae (Elatroidae *incertae sedis*) resolved by multigene phylogenetic analysis. *Zool. J. Linn. Soc.* 187(4): 1259–1277. doi: <https://doi.org/10.1093/zoolinnean/zlz104>
- Martínez DC, Morales I. 2020. Annotated list of beetles (Insecta, Coleoptera) in an urban area of the eastern Andes of Colombia. *Check List*. 16(6): 1679–1693. doi: <https://doi.org/10.15560/16.6.1679>
- Paulus VHF. 1973. *Penicillophorus ctenotarsus* n. gen. et n. sp. aus Kolumbien, mit einer Beschreibung einer neuen Tribus Penicillophorini der Phengodidae. (Col., Polyphaga, Cantharoidea). *Z. Arb.gem. österr. Entomol.* 25(3/4) (1973): 69–80.
- QGIS Development Team. c2018. QGIS 3.4. [Software] [Last accessed: 2 May 2020] <http://www.qgis.org>
- R Development Core Team R. c2011. R: A Language and Environment for Statistical Computing. In: R Foundation for Statistical Computing. Vienna. QGIS 3.4. [Software] [Last accessed: 2 May 2020] <https://www.R-project.org/>
- Roza AS. 2023. A new genus and a new species of railroad-worm beetle from Peru (Coleoptera, Phengodidae, Mastinocerinae). *Eur. J. Taxon.* 864: 64–76. doi: <https://doi.org/10.5852/ejt.2023.864.2087>
- Roza AS, Mermudes JRM. 2019. New genus and two new species of railroad-worm beetles from Brazil, with a discussion on asymmetry of aedeagus in the family (Coleoptera: Phengodidae). *Annal. Zool.* 69(4): 805–816. doi: <https://doi.org/10.3161/00034541anz2019.69.4.012>

- Roza AS, Mermudes JRM. 2020. A new genus of railroad-worm beetles from the Atlantic Rainforest from Brazil (Coleoptera: Phengodidae, Mastinocerinae). *Pap. Avulsos Zool.* 60(special). e202060(s.i.).10. doi: <https://doi.org/10.11606/1807-0205/2020.60.special-issue.10>
- Sánchez-Echeverría K, Castellanos I, Zaragoza-Caballero S, Bueno-Villegas J. 2014. Decapitación de milpiés Xystodesmidae (Polydesmida) por escarabajos Phengodidae. *Rev. Mex. Biodivers.* 85(4): 1273-1276. doi: <https://doi.org/10.7550/rmb.43660>
- Uchima-Taborda D. c2021. Listado de las especies de Phengodidae (Coleoptera: Elateroidea) de Colombia. v1.2. Grupo de Coleopterólogos de Colombia. Dataset/Checklist. [Last accessed: 27 Mar 2022]. doi: <https://doi.org/10.15472/1bxorj>
- Vásquez-Cerón A. 2012. Biodiversidad, agua y cultura en el Páramo de Santa Inés. In: A. Vásquez-Cerón, Editor. Bogotá: Instituto De Investigación De Recursos Biológicos Alexander Von Humboldt-Corantioquia. p. 8-22.
- Vega-Badillo V, Torrén J, Zaragoza-Caballero S. 2020a. Nuevos registros, distribución biogeográfica y clave para la identificación de géneros de Phengodidae (Coleoptera) de Argentina. *Rev. Soc. Entomol. Argent.* 79(3): 1-7. doi: <https://doi.org/10.25085/rsea.790301>
- Vega-Badillo V, Zaragoza-Caballero S. 2019. Especie nueva del género *Phengodes* (*Phengodella*) (Coleoptera: Phengodidae) y una clave para los fengódidos de Belice. *Rev. Mex. Biodivers.* 90(3): 1-7. doi: <https://doi.org/10.22201/ib.20078706e.2019.90.2863>
- Vega-Badillo V, Zaragoza-Caballero S, Ivie MA. 2020b. A new genus of Phengodidae (Coleoptera) from the neotropical region. *Pap. Avulsos Zool.* 60(special): e202060(s.i.).06. doi: <https://doi.org/10.11606/1807-0205/2020.60.special-issue.06>
- Vega-Badillo V, Zaragoza-Caballero S, Ríos-Ibarra JJ. 2021. New species of the genus *Cenophengus* LeConte, 1881 (Coleoptera: Phengodidae) from Mexico and Guatemala. *Zootaxa.* 5023(2): 223-238. doi: <https://doi.org/10.11646/zootaxa.5023.2.3>
- Vega-Badillo V, Ramírez-Ponce A, Zaragoza-Caballero S. 2023. *Halffterus*, a new genus (Coleoptera: Phengodidae, Mastinocerinae) from Peru. *Stud. Neotrop. Fauna. Environ.* 59(3):1-8. doi: <https://doi.org/10.1080/01650521.2023.2240443>
- Viviani VR, Rocha M, Hagen O. 2010. Fauna de besouros bioluminescentes (Coleoptera: Elateroidea: Lampyridae, Phengodidae, Elateridae) nos municípios de Campinas, Sorocaba-Votorantim e Rio Claro-Limeira (SP, Brasil): biodiversidade e influência da urbanização. *Biota Neotrop.* 10(2): 103-116. doi: <https://doi.org/10.1590/S1676-06032010000200013>
- Viviani VR, Bechara EJJH. 1997. Bioluminescence and biological aspects of Brazilian railroad-worms (Coleoptera: Phengodidae). *Ann. Entomol. Soc. Am.* 90(3): 389-398. doi: <https://doi.org/10.1093/aesa/90.3.389>
- Wickham H. c2016. *ggplot2: Elegant Graphics for Data Analysis*. New York: Springer-Verlag. [Last accessed: 31 Jul 2022] <https://ggplot2.tidyverse.org>
- Wittmer W. 1963. Zur Kenntnis der Phengodidae (Coleoptera) (25. Beitrag zur Kenntnis der neotropischen Malacodermata). *Mitt. Schweiz. entomol. Ges.* 36: 73-99.
- Wittmer W. 1976. Arbeiten zu einer Revision der Familie Phengodidae (Coleoptera). *Entomol. Arb. Mus. G. Frey Tützing bei Münch* 27: 415-525.
- Wittmer W. 1996. Ein weiterer Beitrag zur Kenntnis der Phengodidae (Coleoptera). *Rev. Bras. Entomol.* 40(1): 125-129. doi: <https://doi.org/10.1159/000187744>
- Zaragoza-Caballero S, Pérez-Hernández CX, Editores. 2014. Sinopsis de la familia Phengodidae (Coleoptera): Trenecitos, bigotudos, glow-worms, railroad-worms o besouros trem de ferro. 1 ed. Distrito Federal-México: Universidad Nacional Autónoma de México. p 128.
- Zaragoza-Caballero S, Zurita-García ML. 2015. A preliminary study on the phylogeny of the family Phengodidae (Insecta: Coleoptera). *Zootaxa.* 3947(4): 527-542. doi: <https://doi.org/10.11646/zootaxa.3947.4.4>

SUPPLEMENTARY MATERIAL, SAMPLED LOCALITIES:

Páramo complex	Municipality	Locality	Latitude	Longitude	Vegetal cover	Altitudinal range(masl)
Sonsón	Sonsón	Vereda Norí, Cerro Norí	5,812861	-75,2684	Páramo	3010-3055
			5,809667	-75,269	Bosque	2860-2940
			5,809517	-75,2712	Pastizal	2720-2770
		Vereda San Francisco, Cerro Las Palomas (A)	5,725972	-75,2493	Páramo	3240-3310
			5,727096	-75,257	Bosque	2900-2955
			5,726901	-75,2634	Pastizal	2720-2745
		Vereda San Francisco, Cerro Las Palomas (B)	5,726238	-75,2505	Páramo	3170-3260
			5,726718	-75,256	Bosque	2955-3000
			5,727384	-75,2626	Pastizal	2745-2765
		Santa Inés	San José de La Montaña	Vereda El Congo, Páramo El Congo	6,762229	-75,7231
6,764901	-75,7095				Bosque	2980-3045
6,764743	-75,7194				Pastizal	3080-3120
Belmira	Vereda La Candelaria, El Morro		6,645901	-75,6704	Páramo	3185-3200
			6,642983	-75,6676	Bosque	3005-3080
			6,641399	-75,6672	Pastizal	2970-3020
	Vereda Río Arriba, Sector Laguna de Sabanas		6,632639	-75,6453	Páramo	3190-3205
			6,634233	-75,6587	Bosque	2980-3050
			6,630476	-75,6631	Pastizal	2915-2945
	Envigado			6,139736	-75,5538545	Bosque
Yarumal		6,91069	-75,42792	Bosque	2000-2600	

SUPPLEMENTARY MATERIAL, COLLECTION DETAILS OF THE EXAMINED SPECIMENS:

Pseudophengodes Pic, 1930

Examined material: COLOMBIA. **Antioquia:** One male, **Belmira**, Vereda La Candelaria, El Morro, 6.642983, -75.667603, 3005-3080m, Bosque, trampa Malaise suelo, 21-30-vi-2017, A.L. Montoya, C. Rodriguez (CEUA:115442). One male, **Envigado**, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 24-viii-16-ix-2018, M. Wolff and C. Henao-Sepúlveda (CEUA:115528). One male, Sonsón, Vereda San Francisco, Cerro Las Palomas (A), 5.727096, -75.257001, 2900-2955m, Bosque, trampa Malaise suelo, 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115478); one male, same data except: 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I. Salinas, J. Saucedo (CEUA:115452); one male, same data except: Cerro Las Palomas (B), 5.727384, -75.262556, 2745-2765m, Pastizal, trampa Malaise suelo, 01-12-ix-2018, M.I. Salinas, A.M. Echeverry, A.L. Montoya

(CEUA:115447); one male, same data except: 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115516).

Microphengodes Wittmer, 1976

Examined material: COLOMBIA. **Antioquia:** **Envigado**, One male, **Envigado**, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 07-20-v-2017, M. Wolff and C. Henao-Sepúlveda (CEUA:116085); one male, same data except: 17-vi-01-vii-2017 (CEUA:116132). One male, **Sonsón**, Vereda Norí, Cerro Norí, 5.809517, -75.271225, 2720-2770 Pastizal, red entomológica, 01-12-ix-2018, M.I. Salinas, A.M. Echeverry, A.L. Montoya (CEUA:115448); one male, same data except: 5.809667, -75.269028, 2860-2940m, Bosque, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I. Salinas, J. Saucedo (CEUA:115459); one male, same data except: (CEUA:115466); one male, same data except: 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115476); one male, same data except: (CEUA:115488); one male, same data

except: 5.812861, -75.268444, 3010-3055m, Páramo, red entomológica (CEUA:115491); one male, Vereda San Francisco, Cerro Las Palomas (A), 5.727096, -75.257001, 2900-2955m Bosque, trampa Malaise suelo, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I Salinas, J. Saucedo (CEUA:115453); one male, same data except: 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115501); one male, same data except: 5.726901, -75.263412, 2720-2745 Pastizal, red entomológica, 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115502); one male, Cerro Las Palomas (B), 5.726718, -75.256032, 2955-3000m Bosque, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I Salinas, J. Saucedo (CEUA:115473).

Euryopa Gorham, 1881

Examined material: COLOMBIA. **Antioquia:** One male, **Envigado**, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 12-25-iii-2017, M. Wolff and C. Henao-Sepúlveda, (CEUA:116115), two males, same data except: 25-iii-10-iv-2017, (CEUA:116123), two males, same data except: 10-22-iv-2017, (CEUA:116107), one male, same data except: 29-iv-07-v-2017, (CEUA:116101), three males, same data except: 27-v-10-vi-2017, (CEUA:116128), five males, same data except: 15-30-vii-2017, (CEUA:116078), one male, same data except: 12-23-viii-2017, (CEUA:116091), one male, same data except: 20-v-03-vi-2018, (CEUA:116131), one male, same data except: 07-24-viii-2018, (CEUA:116158).

***Cephalophrixothrix* Wittmer, 1976**

Examined material: COLOMBIA: **Antioquia: Belmira**, One male, Belmira, Laguna, 6.630476, -75.663106, 2915-2945m, Pastizal, trampa Malaise suelo, 02-12-xii-2017, J. Torres-Toro; J.P. Carmona, (CEUA:115446). One male, **Envigado**, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 04-18-iii-2018, M. Wolff and C. Henao-Sepúlveda, (CEUA:116099). One male, **Sonsón**, Vereda Norí, Cerro Norí, 5.809517, -75.271225, 2720-2770m, Pastizal, Platos Color Rojo, 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia, (CEUA:115497). One male, **Yarumal**, Vereda El Respaldo, Finca La Maruja, Sector Santa Isabel, 6.91069, -75.42792, 2200-2600m, Bosque, trampa Malaise suelo, 04-19-iii-2017, C. H. Sepúlveda and M. Wolff (CEUA:91875), one male, same data except: 15-xii-2016-26-i-2017, (CEUA:91864).

***Halfiterus* Vega-Badillo et al., 2023**

Examined material: Colombia: **Antioquia:** One male, **Belmira**, Laguna, 6.634233, -75.658654, 3075-3105m, Bosque, trampa Malaise suelo, 04-14-xii-2016, A.L. Montoya; J. Torres-Toro; J.P. Carmona (CEUA:115382); one male, same data except: (CEUA:115400); one male, same data except: (CEUA:115401); one male, same data except: (CEUA:115410); one male, same data except: (CEUA:115424); one male, same data except: (CEUA:115425); one male, same data except: (CEUA:115426); one male, same data except: (CEUA:115427); one male, same data except: (CEUA:115435); one male, same data except: 6.630476, -75.663106, 2915-2945m, Pastizal, 04-14-ii-2017 (CEUA:115403); one male, same data except: Vereda La Candelaria, El Morro, 6.645901, -75.670441, 3185-3200m, Páramo, trampa Malaise suelo, 02-12-xii-2017, C. Rodriguez, A. Echeverry (CEUA:115523). One male, **Envigado**, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 30-xii-2016-12-i-2017, M. Wolff & C. Henao-Sepúlveda (CEUA:116068); three males, same data except: 29-iv-07-v-2017 (CEUA:116102); two males, same data except: 29-i-11-ii-2017 (CEUA:116064); four males, same data except: 26-ii-12-iii-2017 (CEUA:115536); six males, same data except: 25-iii-10-iv-2017 (CEUA:116119); one male, same data except: 24-viii-16-ix-2018 (CEUA:115531); one male, same data except: 20-i-03-ii-2018 (CEUA:116110); two males, same data except: (CEUA:116111); one male, same data except: 17-vi-01-vii-2017 (CEUA:116133); one male, same data except: 15-30-vii-2017 (CEUA:116081); one male, same data except: 12-29-i-2017 (CEUA:116072); one male, same data except: 12-25-iii-2017 (CEUA:116113); one male, same data except: 12-23-viii-2017 (CEUA:116090); three males, same data except: 10-22-iv-2017 (CEUA:116105); one male, same data except: 07-20-v-2017 (CEUA:116083); two males, same data except: 01-07-x-2016 (CEUA:116096). One male, San José de La Montaña, Vereda El Congo, Páramo El Congo, 6.764743, -75.719372, 3080-3120m, Pastizal, trampa Malaise Emergencia, 25-iii-05-iv-2017, C. Henao-Sepúlveda, M. Wolff, A. Sepúlveda (CEUA:115384). one male, **Sonsón**, Vereda San Francisco, Cerro Las Palomas (A), 5.725972, -75.24925, 3240-3310m, Páramo, trampa Malaise suelo, 01-06-iv-2018, M.I. Salinas, A.M. Echeverry, A.L. Montoya (CEUA:115436); one male, same data except: A.L. Montoya; J. Torres-Toro; J.P. Carmona (CEUA:115438). One male, **Yarumal**, Vereda El Respaldo,

Finca La Maruja, Sector Santa Isabel, 6,91069, -75,42792, 2200-2600m, Bosque, trampa Malaise suelo, 6-20-v-2017, A. L. Montoya (CEUA:118374); four males, same data except: 26-i-04-iii-2017, C. H. Sepulveda; M.Wolff (CEUA:91872); one male, same data except: 10-24-vi-2017, C. H. Sepulveda (CEUA:91867); one male, same data except: 04-19-iii-2017 (CEUA:91876); four males, same data except: 01-22-iv-2017 (CEUA:91878).

***Howdenia* Wittmer, 1976**

One male, Belmira, Vereda Río Arriba, Laguna, 6.634233, -75.658654, 3075-3105m, Bosque, trampa Malaise suelo, 04-14-xii-2016, A.L. Montoya, J. Torres-Toro, J.P. Carmona, (CEUA:115423); one male, same data except: 04-14-xii-2016, (CEUA:115411); one male, 2980-3050m, 04-14-ii-2017, (CEUA:115391); one male, same data except: (CEUA:115412); one male, same data except: (CEUA:115414). One male, Belmira, Vereda La Candelaria, El Morro, 6.645901, -75.670441, 3185-3200m, Páramo, trampa Malaise Dosel, 01-06-iv-2018, A.L. Montoya, C. Rodriguez, (CEUA:115441). Two males, Envigado, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 30-xii-2016-12-i-2017, M. Wolff and C. Henao-Sepúlveda, (CEUA:116067); one male, same data except: 29-i-11-ii-2017, M. Wolff and C. Henao-Sepúlveda, (CEUA:116063); two males, same data except: 26-ii-12-iii-2017, (CEUA:115537); one male, same data except: 25-iii-10-iv-2017, (CEUA:116118); one male, same data except: 10-22-iv-2017, (CEUA:116104); one male, same data except: 15-30-vii-2017, (CEUA:116080); one male, same data except: 18-iii-01-iv-2018, (CEUA:115525); one male, same data except: 05-14-v-2018, (CEUA:116124); one male, same data except: 07-24-viii-2018, (CEUA:116159). One male, Sonsón, Vereda San Francisco, Cerro Las Palomas (A), 5.727096, -75.257001, 2900-2955m, trampa Malaise suelo, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I Salinas, J. Saucedo, (CEUA:115455); one male, 5.725972, -75.24925, 3240-3310m, Páramo, trampa Malaise Dosel, 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejía, (CEUA:115496). One male, Yarumal, Vereda El Respaldo, Finca La Maruja, Sector Santa Isabel, 6.91069, -75.42792, 2200-2600m, Bosque, trampa Malaise suelo, 26-i-04-iii-2017, C. H. Sepulveda, M.Wolff (CEUA:91871),

***Pseudomastinocerus* Wittmer, 1963**

Examined material: One male, Envigado, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 01-07-x-2016, M. Wolff and C. Henao-Sepúlveda, (CEUA:116088); one male, same data except: (CEUA:116097); one male, same data except: 29-i-11-ii-2017, (CEUA:116065); one male, same data except: 11-26-ii-2017, (CEUA:116076); one male, same data except: 26-ii-12-iii-2017, (CEUA:115534); one male, same data except: 12-25-iii-2017, (CEUA:116112); one male, same data except: 25-iii-10-iv-2017, (CEUA:116121); one male, same data except: 07-20-v-2017, (CEUA:116086); one male, same data except: 17-vi-01-vii-2017, (CEUA:116093); one male, same data except: 20-v-03-vi-2018, (CEUA:116129); one male, same data except: 03-17-vi-2018, (CEUA:115370); one male, same data except: 04-19-iii-2017, J. Toro, J. D. Medina, (CEUA:91861); one male, same data except: (CEUA:91862); two males, same data except: 12-29-i-2017, M. Wolff and C. Henao-Sepúlveda, (CEUA:116073); two males, same data except: 01-22-iv-2017, C. H. Sepulveda, (CEUA:91879); two males, same data except: A. L. Montoya, (CEUA:118372); two males, same data except: 10-24-vi-2017, C. H. Sepulveda, (CEUA:91868); three males, same data except: 6-20-v-2017, A. L. Montoya, Y. Correa, (CEUA:91873); four males, same data except: 27-v-10-vi-2017, M. Wolff and C. Henao-Sepúlveda, (CEUA:116126). five males, Yarumal, Vereda El Respaldo, Finca La Maruja, Sector Santa Isabel, 6.91069, -75.42792, 2200-2600m, trampa Malaise suelo, 15-xii-2016-26-i-2017, J. Toro, J. D. Medina, (CEUA:91863)., five males, same data except: 26-i-04-iii-2017, C. H. Sepulveda, M.Wolff (CEUA:91870); five males, same data except: 27-v-10-vi-2017, J. Toro, J. D. Medina, (CEUA:118376).

***Ptorthodius* Gorham, 1881**

Examined material: COLOMBIA: **Antioquia:** One male, **San José de La Montaña**, Vereda El Congo, Páramo El Congo, 6.762229, -75.723144, 3165-3190m, Páramo, trampa Malaise Dosel, 21-30-vi-2017, A.L. Montoya, C. Rodriguez, J.P. Carmona, (CEUA:116161). One male, **Sonsón**, Vereda San Francisco, Cerro Las Palomas (A), 5.727096, -75.257001, 2900-2955m, Bosque, red entomológica, 23-vi-02-vii-2018, J.P Carmona, J. Saucedo, J Vallejo, (CEUA:115371); one male, same data except: trampa Malaise suelo, 25-xi-05-xii-2018, J. Vallejo, A.M.

Echeverry, M.I Salinas, J. Saucedo, (CEUA:115456); one male, same data except: red entomológica, 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J.Vallejo, D. Uchima, M.Posada, (CEUA:115507); one male, same data except: Cerro Las Palomas (B), 5.726718, -75.256032, 2955-3000m, Bosque, red entomológica, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I Salinas, J. Saucedo, (CEUA:115474); one male, same data except: 5.726238, -75.250544, 3170-3260m, Páramo, trampa Malaise Dosel, 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J.Vallejo, D. Uchima, M.Posada, (CEUA:115505). One male, **Yarumal**, Vereda El Respaldo, Finca La Maruja, Sector Santa Isabel, 6.91069, -75.42792, 2200-2600m, Bosque, trampa Malaise suelo, 26-i-04-iii-2017, C. H. Sepulveda, M.Wolff (CEUA:91869).

***Stenophrixothrix* Wittmer, 1963**

Examined material: COLOMBIA: **Antioquia:** One male, Belmira, Vereda La Candelaria, El Morro, 6.642983, -75.667603, 3005-3080m, Bosque, trampa Malaise Dosel, 04-14-xii-2016, A.L. Montoya, J. Torres-Toro, J.P. Carmona, (CEUA:115484); one male, same data except: trampa Malaise suelo, 25-iii-05-iv-2017, (CEUA:115392); one male, same data except: red entomológica, 02-12-xii-2017, C. Rodriguez, A. Echeverry, (CEUA:115518); one male, same data except: 6.645901, -75.670441, 3185-3200m, Páramo, trampa Malaise suelo, 04-14-xii-2016, A.L. Montoya, J. Torres-Toro, J.P. Carmona, (CEUA:96070); one male, same data except: 6.641399, -75.667205, 2970-3020m, Pastizal, 04-14-ii-2017, (CEUA:115404); one male, same data except: Pastizal, Plato color Blanco, 25-iii-05-iv-2017, A.L. Montoya, C. Rodriguez, J.P. Carmona, (CEUA:115395); one male, same data except: Vereda Río Arriba, Laguna, 6.634233, -75.658654, 2980-3050m, Bosque, trampa Malaise Dosel, 16-27-ix-2017, A. L. Montoya, Y. Correa, (CEUA:115480); one male, same data except: 2980-3050m, 25-iii-05-iv-2017, A.L. Montoya, C. Rodriguez, J.P. Carmona, (CEUA:115409); one male, same data except: 20-30-iv-2017, A.L. Montoya, J. Torres-Toro, J.P. Carmona, (CEUA:115387); one male, same data except: (CEUA:115385); one male, same data except: 6.634233, -75.658654, 3075-3105m, trampa Malaise suelo, 04-14-xii-2016, (CEUA:115377); one male, same data except: (CEUA:115383); one male, same data except: (CEUA:115398); one male, same data except: (CEUA:115399); one male, same data except: (CEUA:97453); one male, same data except: (CEUA:115417); one male, same data except: (CEUA:115461); one male, same data except: (CEUA:115462);

one male, same data except: (CEUA:115463); one male, same data except: (CEUA:115464); one male, same data except: (CEUA:115465); one male, same data except: (CEUA:115467); one male, same data except: 6.634233, -75.658654, 2980-3050m, 04-14-ii-2017, (CEUA:115386); one male, same data except: (CEUA:115405); one male, same data except: (CEUA:115406); one male, same data except: (CEUA:115407); one male, same data except: (CEUA:115413); one male, same data except: (CEUA:115416); one male, same data except: 6.634233, -75.658654, 2980-3050m, 25-iii-05-iv-2017, (CEUA:115393); one male, same data except: (CEUA:115396); one male, same data except: (CEUA:99556); one male, same data except: (CEUA:99560); one male, same data except: (CEUA:115450); one male, same data except: 6.634233, -75.658654, 2980-3050m, 02-12-xii-2017, A.L. Montoya, J. Torres-Toro, J.P. Carmona, (CEUA:115408); one male, same data except: 6.632639, -75.645267, 3190-3205m, Páramo, trampa Malaise Dosel, 25-iii-05-iv-2017, (CEUA:115394); one male, same data except: 20-30-iv-2017, A.L. Montoya, J.P. Carmona, (CEUA:115443); one male, same data except: 04-14-ii-2017, (CEUA:115402); one male, same data except: 16-27-ix-2017, A. L. Montoya, Y. Correa, (CEUA:115437); one male, same data except: 6.630476, -75.663106, 2915-2945m, Pastizal, trampa Malaise suelo, (CEUA:115458). Three males, Envigado, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 30-xii-2016-12-i-2017, M. Wolff and C. Henao-Sepúlveda, (CEUA:116071); one male, same data except: (CEUA:116069); five males, same data except: 12-29-i-2017, (CEUA:116070); six males, same data except: 29-i-11-ii-2017, (CEUA:116062); seven males, same data except: 11-26-ii-2017, (CEUA:116075); one male, same data except: (CEUA:116074); one male, same data except: (CEUA:116077); three males, same data except: 26-ii-12-iii-2017, (CEUA:115535); one male, same data except: (CEUA:115533); three males, same data except: (CEUA:116061); one male, same data except: 12-25-iii-2017, (CEUA:116114); one male, same data except: (CEUA:116117); six males, same data except: 25-iii-10-iv-2017, (CEUA:116122); two males, same data except: (CEUA:116120); one male, same data except: 10-22-iv-2017, (CEUA:116106); one male, same data except: (CEUA:116108); two males, same data except: 29-iv-07-v-2017, (CEUA:116100); two males, same data except: (CEUA:116103); one male, same data except: 07-20-v-2017, (CEUA:116082); one male, same data except: (CEUA:116084); three males, same data except: 27-v-10-vi-2017, (CEUA:116127); two males, same data except:

17-vi-01-vii-2017, (CEUA:116092); one male, same data except: (CEUA:116094); one male, same data except: 15-30-vii-2017, (CEUA:116079). One male, San José de La Montaña, Vereda El Congo, Páramo El Congo, 6.764901, -75.70946, 2980-3045m, Bosque, trampa Malaise suelo, 04-15-xii-2016, A. Sepulveda, C. Henao-Sepúlveda, (CEUA:115397); one male, same data except: 04-15-xii-2016, (CEUA:95782); one male, same data except: 04-14-ii-2018, C. Henao-Sepúlveda, (CEUA:97451); one male, same data except: 25-iii-05-iv-2017, C. Henao-Sepúlveda, M. Wolff, A. Sepulveda, (CEUA:115388); one male, same data except: (CEUA:99609); one male, same data except: 6.762229, -75.723144, 3165-3190 Páramo, 04-15-xii-2016, A. Sepulveda, C. Henao-Sepúlveda, (CEUA:95689); one male, same data except: 20-30-iv-2017, A.L. Montoya, J. Torres-Toro, J.P. Carmona, (CEUA:115389); one male, same data except: (CEUA:115390). One male, Sonsón, Vereda Norí, Cerro Norí, 5.809667, -75.269028, 2860-2940m, Bosque, trampa Malaise suelo, 31-iii-07-iv-2018, A.L. Montoya, J.P. Carmona (CEUA:115444); one male, same data except: 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I. Salinas, J. Saucedo (CEUA:115460); one male, same data except: 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115477); one male, same data except: 5.812861, -75.268444, 3010-3055m, Páramo, trampa Malaise suelo, 31-iii-07-iv-2018, A.L. Montoya, J.P. Carmona (CEUA:115428); one male, same data except: trampa Malaise Dosel, 31-iii-07-iv-2018 (CEUA:115429); one male, same data except: 31-iii-07-iv-2018 (CEUA:115430); one male, same data except: 31-iii-07-iv-2018 (CEUA:115434); one male, same data except: trampa Malaise suelo, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I. Salinas, J. Saucedo (CEUA:115468); one male, same data except: red entomológica, 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115481); one male, same data except: 09-19-ii-2019 (CEUA:115492); one male, same data except: trampa Malaise suelo, 09-19-ii-2019 (CEUA:115494); one male, same data except: 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115520); one male, same data except: 5.809517, -75.271225, 2720-2770m, Pastizal, trampa Malaise Dosel, 31-iii-07-iv-2018, A.L. Montoya, J.P. Carmona (CEUA:115421); one male, same data except: red entomológica, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I. Salinas, J. Saucedo (CEUA:115472); one male, same data except: trampa Malaise suelo, 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115475); one male, same data except: 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115510); one male, same data except: Vereda San Francisco, Cerro Las Palomas (A), 5.727096, -75.257001, 2900-2955m, Bosque, trampa Malaise suelo, 01-06-iv-2018, A.L. Montoya, J.P. Carmona (CEUA:115419); one male, same data except: red entomológica, 01-06-iv-2018 (CEUA:115422); one male, same data except: trampa Malaise suelo (CEUA:115532); one male, same data except: red entomológica, 23-vi-02-vii-2018, J.P. Carmona, J. Saucedo, J. Vallejo (CEUA:115369); one male, same data except: trampa Malaise (CEUA:115374); one male, same data except: trampa Malaise Dosel (CEUA:115381); one male, same data except: trampa Malaise suelo, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I. Salinas, J. Saucedo (CEUA:115454); one male, same data except: (CEUA:115457); one male, same data except: trampa Malaise Dosel (CEUA:115479); one male, same data except: 01-12-ix-2018, M.I. Salinas, A.M. Echeverry, A.L. Montoya (CEUA:115449); one male, same data except: 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115489); one male, same data except: (CEUA:115490); one male, same data except: 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115509); one male, same data except: (CEUA:115521); one male, same data except: 5.725972, -75.24925, 3240-3310m, Páramo, trampa Malaise suelo, 01-06-iv-2018, A.L. Montoya, J.P. Carmona (CEUA:115440); one male, same data except: (CEUA:115445); one male, same data except: red entomológica, 23-vi-02-vii-2018, J.P. Carmona, J. Saucedo, J. Vallejo (CEUA:115372); one male, same data except: (CEUA:115373); one male, same data except: trampa Malaise Dosel (CEUA:115378); one male, same data except: trampa Malaise suelo, 01-12-ix-2018, M.I. Salinas, A.M. Echeverry, A.L. Montoya (CEUA:115420); one male, same data except: trampa Malaise Dosel, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I. Salinas, J. Saucedo (CEUA:115469); one male, same data except: (CEUA:115470); one male, same data except: 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115495); one male, same data except: trampa Pitfall (CEUA:115504); one male, same data except: (CEUA:115519); one male, same data except: (CEUA:115524); one male, same data except: 5.726901, -75.263412, 2720-2745m, Pastizal, red entomológica, 01-06-iv-2018, A.L. Montoya, J.P. Carmona (CEUA:115439); one male, same data except: trampa Malaise Dosel, 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115512); one male, same data except: Vereda San Francisco, Cerro Las Palomas (B), 5.726718,

-75.256032, 2955-3000m, Bosque, trampa Malaise suelo, 23-vi-02-vii-2018, J.P Carmona, J. Saucedo, J. Vallejo (CEUA:115517); one male, same data except: trampa Malaise Dosel, J. Vallejo, A.M. Echeverry, M.I Salinas, J. Saucedo (CEUA:115483); one male, same data except: red entomológica (CEUA:115498); one male, same data except: trampa Malaise suelo, 01-12-ix-2018, M.I. Salinas, A.M. Echeverry, A.L Montoya (CEUA:115415); one male, same data except: 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115486); one male, same data except: (CEUA:115485); one male, same data except: 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115511); one male, same data except: 5.726238, -75.250544, 3170-3260m, Páramo, trampa Malaise, 23-vi-02-vii-2018, J.P Carmona, J. Saucedo, J. Vallejo (CEUA:115375); one male, same data except: trampa Malaise suelo, 01-12-ix-2018, M.I. Salinas, A.M. Echeverry, A.L Montoya (CEUA:115431); one male, same data except: (CEUA:115432); one male, same data except: (CEUA:115433); one male, same data except: (CEUA:115503); one male, same data except: trampa Malaise Dosel, 25-xi-05-xii-2018, J. Vallejo, A.M. Echeverry, M.I Salinas, J. Saucedo (CEUA:115451); one male, same data except: red entomológica (CEUA:115471); one male, same data except: (CEUA:115482); one male, same data except: (CEUA:115493); one male, same data except: trampa Malaise Dosel, 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115500); one male, same data except: 24-v-04-vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115506); one male, same data except: trampa Malaise suelo (CEUA:115522); one male, same data except: 5.727384, -75.262556, 2745-2765m, Pastizal, Plato Color Azul, 23-vi-02-vii-2018, J.P Carmona, J. Saucedo, J. Vallejo (CEUA:115376); one male, same data except: trampa Malaise suelo, 09-19-ii-2019, M.I. Salinas, J. Saucedo, I. Ceballos, D. Uchima, A. Mejia (CEUA:115487); one male, same data except: trampa Malaise Dosel (CEUA:115499); one male, same data except: 24-v-04-

vi-2019, J. Saucedo, M.I. Salinas, J. Vallejo, D. Uchima, M. Posada (CEUA:115508). One male, Yarumal, Vereda El Respaldo, Finca La Maruja, Sector Santa Isabel, 6.8983333, -75.41425, 2200-2600m, Bosque, trampa Malaise suelo, 20-xi-01-xii-2016, J. D. Medina, C. H. Sepulveda (CEUA:91881); one male, same data except: 6.61069, -75.42792, 15-xii-2016-26-i-2017, C. H. Sepulveda, M. Wolff (CEUA:91865); one male, same data except: (CEUA:118373); eight males, same data except: 26-i-04-iii-2017 (CEUA:91866); four males, same data except: 04-19-iii-2017, J. Toro, J. D. Medina (CEUA:86099); one male, same data except: C. H. Sepulveda, M. Wolff (CEUA:91874); one male, same data except: 01-22-iv-2017, C. H. Sepulveda (CEUA:91880); four males, same data except: 6-20-v-2017, A. L. Montoya (CEUA:91882); one male, same data except: (CEUA:118375); two males, same data except: 27-v-10-vi-2017, J. Toro, J. D. Medina (CEUA:118377).

***Taximastinocerus* Wittmer, 1963**

Examined material: COLOMBIA: **Antioquia:** one male, Envigado, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 18-iii-01-iv-2019, M. Wolff and C. Henao-Sepúlveda, (CEUA:115526).

***Penicillophorus* Paulus, 1973**

Examined material: COLOMBIA: **Antioquia:** One male, Envigado, Loma del Escobero, Parcelación Nubarrones, 6.139736, -75.5538545, 2000m, Bosque, trampa Malaise suelo, 01-07-x-2016, M. Wolff and C. Henao-Sepúlveda, (CEUA:116087); one male, same data except: 12-25-iii-2017, (CEUA:116116). One male, Yarumal, Vereda El Respaldo, Finca La Maruja, Sector Santa Isabel, 6.91069, -75.42792, 2200-2600m, Bosque, trampa Malaise suelo, 04-19-iii-2017, C. H. Sepulveda, M. Wolff (CEUA:91877).