

# New records of eight species of ground beetles (Coleoptera, Carabidae) from Colombia

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## Abstract

We report new records of eight species of ground beetles (Coleoptera, Carabidae) from Colombia originated from recent field trips and from museum specimens: *Amblygnathus suturalis* Putzeys, 1845 (Atlántico), *Bembidion chimborazonum* Bates, 1891 (Valle del Cauca), *Homopterus subcordatus* Darlington, 1950 (Caquetá), *Hyboptera auxiliadora* Erwin, 2004 (Bolívar), *Neoaualacoryssus cupripennis* (Gory, 1833) (Tolima), *Notiobia disparilis* Bates, 1878 (Caquetá), *Notiobia glabrata* Arndt, 1998 (Caquetá), and *Trichopselaphus magnificus* Ball, 1978 (Valle del Cauca). These records belong to species expected to be found in Colombia, because previous studies have shown their presence in nearby countries, but whose presence in the country was not confirmed so far.

## Keywords

Bembidiini, Harpalini, Lebiini, Neotropics, Paussini, South America.

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## Introduction

Carabidae is the third largest family within Coleoptera, with about 40,000 extant species distributed on all continents, except for Antarctica (Erwin et al. 2015). From these, about 8,000 belong to the Neotropical region (Martínez and Ball 2003). According to Martínez (2005), 642 species have been recorded in Colombia, of which 54% (347) are endemic. Martínez (2005) suggested that the country could harbor about 1500 species.

After Martínez's (2005) compilation, few studies provide new records or descriptions from Colombia: Camero (2006) described a new species of *Blennidus* Motschulsky, 1865 from Sierra Nevada de Santa Marta; Toldano (2008) described four new species of *Bembidion*

from the Colombian Andes; Erwin (2011) described a new species of *Mizotrechus* Bates, 1872 from Gorgona island; Erwin and Zamorano (2014) described a new species of *Asklepia* Liebke, 1938 from Amazonas; Arenas (2017) first recorded *Notiobia* (*Notiobia*) *umbrifera* Bates, 1884 and rediscovered *Notiobia* (*Anisotarsus*) *praeclara* Putzeys, 1878, 115 years after its description, from specimens collected at Caldono-Cauca, and Moret (2019) described two species of *Dyscolus* Dejean, 1831: *Dyscolus* (*Stenocnemion*) *arenasi* Moret, 2019 and *D.* (*S.*) *martinezae* Moret, 2019, both from Valle del Cauca. The lack of exploration of the ground beetle fauna is evident: only six studies in the last 15 years described nine

new species of ground beetles from Colombia, hindering detailed ecological studies.

Due to the slow increase of knowledge about ground beetles from Colombia, the Wallacean and Linnean shortfalls persist (Hortal et al. 2015), resulting in a poor development of taxonomic treatment of species in ecological studies (e.g., Arenas et al. 2013; Uribe and Vallejo 2013; Arenas et al. 2015; Arenas and Chacón 2016). This study presents new records for eight species of Carabidae (Coleoptera) from Colombia and provides morphological and zoogeographic information on them.

## Methods

This study is based on specimens deposited at the Entomological Museum of Universidad del Valle (MUSENUV, Cali, Colombia). Individuals were collected in various field trips between 1987 and 2019. Identifications were made following the taxonomic keys proposed by Arndt (1998), Martínez (2005), Hoover (2016), Erwin and Henry (2017), and Shpeley et al. (2017), and by identification/confirmation by specialists in the family: Terry Erwin (Smithsonian Museum of Natural History, Washington, USA), Danny Shpeley (Strickland Museum, University of Alberta, Edmonton, Canada) and Pierre Moret (Université Toulouse II, France). In addition, some records were confirmed by comparison with high quality images of type material deposited in the Natural History Museum (NHM, London, United Kingdom) and the Museum of Zoology of the University of Sao Paulo (MZUSP, São Paulo, Brazil).

We measured the apparent body length (ABL) and the standardized body length (SBL) based on Ball (1972), using a filar micrometer inserted in the eyepiece (10×) of a trinocular stereoscope Nikon SMZ-745 (Nikon Instruments Inc.). Picture stacks were taken using a stereoscope Nikon SMZ-1000 coupled to a Nikon DS-Ri 1 camera and compiled with NIS-Elements at Imagery lab from the Postgraduate School at Universidad del Valle (LABIM-UV). Finally, a distribution map including new and previous nearest records was made using QGIS v. 3.6.3 (<https://qgis.org/es/site/>).

## Results

### Tribe Harpalini

#### *Amblygnathus suturalis* Putzeys, 1845

Figure 1A

**Distribution.** Venezuela (Putzeys 1845) and Colombia (new record).

**New record.** COLOMBIA • 1 ♀; Atlántico, Usiacurí, Reserva Campesina La Montaña; 10.769°N, 075.040°W; 190 m a.s.l.; 14 May 2018; J. Sarmiento leg.; tropical dry forest; UV-light trap; MUSENUV 29232.

**Identification.** ABL: 7.6 mm, SBL: 6.4 mm. This specimen presents the diagnostic character to be included

within the genus *Amblygnathus* Dejean, 1829: clypeus strongly concave. Regarding the species, it presents a bi-colored dorsal surface, with a dark stain along the inner margin of elytra, as described by Ball and Maddison (1987). In concordance with previous knowledge, the female we report herein (6.4 mm) is within the size limits (6.24–7.17 mm) reported by Ball and Maddison (1987). Our identification was confirmed by Danny Shpeley.

#### *Neoaulacoryssus cupripennis* (Gory, 1833)

Figure 1B

**Distribution.** Lesser Antilles (Grenada, Dutch Antilles, Santa Lucia and Mustique), French Guiana (Cayenne) (Shpeley et al. 2017), and Colombia (new record).

**New record.** COLOMBIA • 1 ♀; Tolima, Natagaima; 03.646°N, 074.999°W; 350 m a.s.l.; 19–21 Apr. 2015; E. Jiménez leg.; Yaví river-left margin; Winkler bag; MUSENUV 28815.

**Identification.** ABL: 15.7 mm, SBL: 14.1 mm. This specimen presents a coppery metallic dorsal surface, pronotum and elytra with slight greenish reflections anterolaterally, and very short pubescence on elytral disc. Our specimen matches with the diagnosis provided by Shpeley et al. (2017), including an interconnected row of punctures on elytra and a bigger size, if compared with other species of the Selenophori group. Females size reported by Shpeley et al. (2017) ranges between 12.5–13.2 mm (SBL), while our single individual—also female—is 14.1 mm SBL. The identification was confirmed by Danny Shpeley.

#### *Notiobia disparilis* Bates, 1878

Figure 1C

**Distribution.** Brazil, Bolivia, French Guiana, Nicaragua, Panama, Peru, Suriname (Arndt 1998), and Colombia (new record).

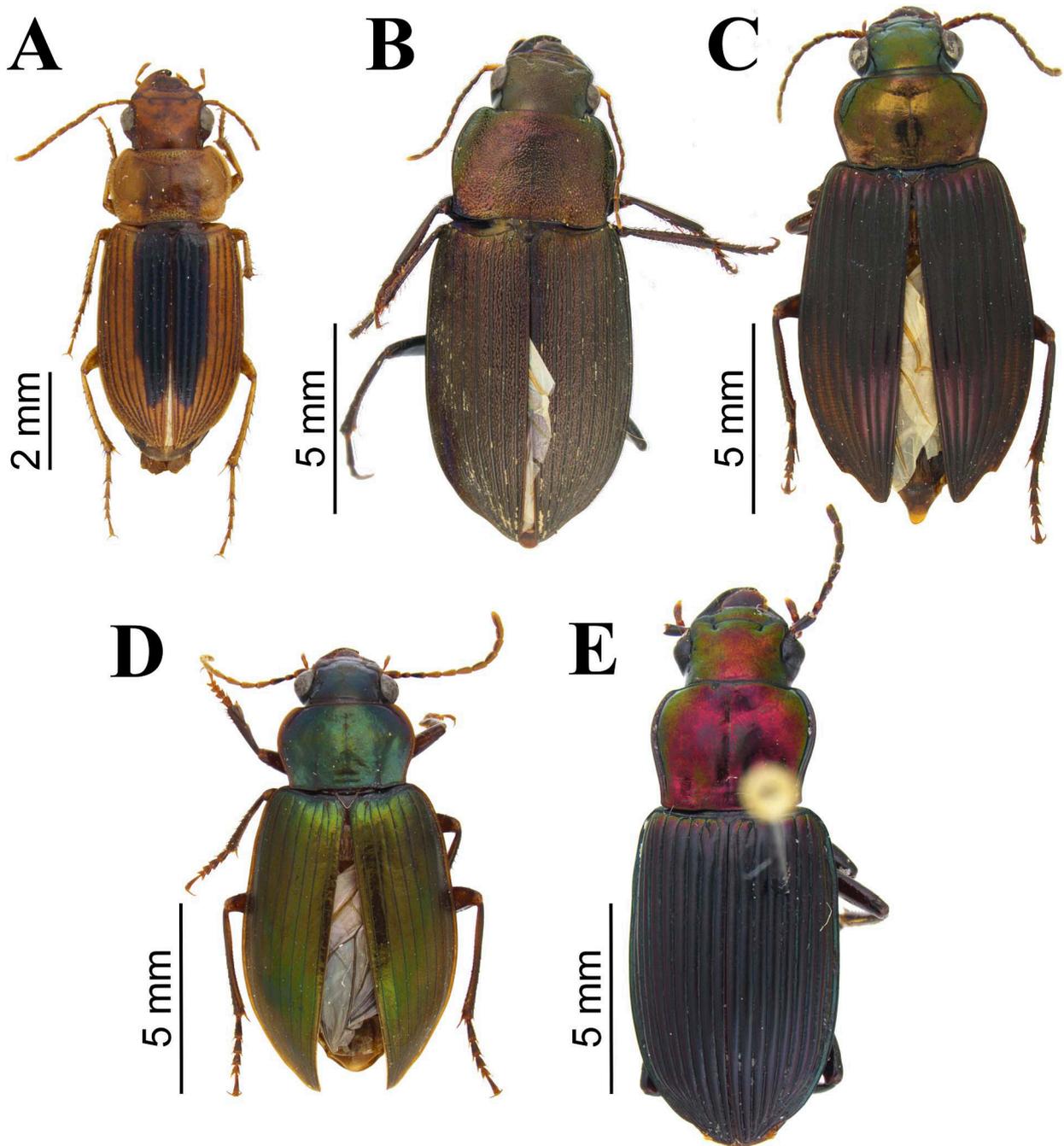
**New records.** COLOMBIA • 3 ♀; Caquetá, San Vicente del Caguán, Resguardo Indígena Altamira; 02.464°N, 074.917°W; 917 m a.s.l.; 15 Feb. 2017; J. Panche leg.; White-light trap; MUSENUV 28803, 28796, 28802. • 3 ♂; same collection data; MUSENUV 28804, 28797, 28798.

**Identification.** ABL: 11.0–13.0 mm, SBL: 9.75–12.6 mm (♀); ABL: 10.7–13.8 mm, SBL: 10.3–12.7 mm (♂). According to Arndt (1998), males of this species present a bi-colored dorsal habitus with head and pronotum with metallic golden color and green-cupreous reflections, and dark elytra with purple reflection, while the females have a darker habitus. Both, males and females herein reported coincide with diagnostic characters provided by Arndt (1998). Furthermore, we compared our specimens with photographs of a paratype (NHM).

#### *Notiobia glabrata* Arndt, 1998

Figure 1D

**Distribution.** Brazil, Bolivia, Guyana, Peru (Arndt 1998), and Colombia (new record).



**Figure 1.** Habitus, dorsal aspect. **A.** *Amblygnathus suturalis* (female). **B.** *Neoaulacoryssus cupripennis* (female). **C.** *Notiobia disparilis* (male). **D.** *Notiobia glabrata* (female). **E.** *Trichopselaphus magnificus* (female).

**New records.** COLOMBIA • 1 ♀, 1 ♂; Caquetá, San Vicente del Caguán; Resguardo Indígena Altamira; 02.464°N, 074.917°W; 917 m a.s.l.; 15 Feb. 2017; J. Panche leg.; White-light trap; MUSENUV 28800–28801. • 1 ♀; Caquetá, Belén de los Andaquíes; 01.608°N, 075.953°W; 980 m a.s.l.; 27 Mar. 2017; J. Panche leg.; White-light trap; MUSENUV 28799.

**Identification.** ABL: 12.0–12.5 mm, SBL: 10.9–11.0 mm. Studied specimens present a glossy dorsal body surface, head and pronotum with darker green metallic color on and slightly lighter green-cuprous on elytra. In addition, we compared the specimen with a high-resolution picture of one of the paratypes (MZUSP). These

features are largely consistent with the original description of the species (Arndt 1998).

***Trichopselaphus magnificus* Ball, 1978**

Figure 1E

**Distribution.** Amazon Basin of Brazil, Peru, Venezuela (Ball 1978, 1986), and Colombia (new record).

**New record.** COLOMBIA • 1 ♀; Valle del Cauca, Buenaventura, Bajo Anchicayá; 03.613°N, 076.920°W; 430 m a.s.l.; Feb. 1986; Marta L. Baena leg.; MUSENUV 3141.

**Identification.** ABL: 14.6 mm, SBL: 13.3 mm. According with the description provided by Ball (1978), individuals

of this species present dorsal surface bicolored, head and pronotum bright green and elytra dull metallic green. The specimen reported herein has the body bicolored, as in the original description, but with coppery/violaceous reflections. The specimen general characteristics (characters in key) and standardized body length also match with the range previously reported (12.48–14.00 mm) (Ball 1986). Furthermore, the specimen identification was confirmed by Danny Shpeley.

Tribe Bembidiini

***Bembidion (Ecuadion) chimborazonum* Bates, 1891**

Figure 2A

**Distribution.** Ecuadorian Andes (Moret and Toledano 2002, Moret 2005), and Colombia (new record).

**New record.** COLOMBIA • 1 ♀; Valle del Cauca, PNN Farallones de Cali; 03.340°N, 076.724°W; 3,700 m a.s.l.; 9 Dec. 1995; A. Morales leg.; direct capture, on ground; MUSENUV 3085.

**Identification.** ABL: 4.1 mm, SBL: 3.7 mm. According to Moret (2005), individuals of this species can have habitus metallic or dark-colored, with a slightly metallic reflection. The specimen examined by us is completely dark, without metallic reflections. However, the two apical antennomeres extend beyond the base of elytra and according to Moret (2005), this is one of the characters that allows to differentiate the species *B. (E.) chimborazonum* and *B. (E.) sanctaemarthae* Darlington, 1934 (= *B. (E.) giselae* Moret & Toledano, 2002). On the other hand, the body length of the specimen herein reported matches with the range provided by Moret (2005). Furthermore, the specimen identification was confirmed by Moret himself.

Tribe Lebiini

***Hyboptera auxiliadora* Erwin, 2004**

Figure 2B

**Distribution.** Costa Rica, Honduras, Mexico, Panama, USA (Erwin and Henry 2017), and Colombia (new record).

**New record.** COLOMBIA • 1 ♀; Bolívar, San Jacinto, Reserva La Flecha; 09.852°N, 075.175°W; 320 m a.s.l.; 18 Feb. 2018; J. Sarmiento leg.; tropical dry forest; White-light trap; MUSENUV 29275.

**Identification.** ABL: 4.8 mm, SBL: 4.25 mm. According to the original description of *H. auxiliadora* (Erwin 2004), this species has a light-colored V-shaped area on base of the elytra—just below the scutellum—contrasting with the rest of elytra, and tubercles arranged in elytral intervals 5 and 6. The female has 10 unisetiferous tubercles in the elytral interval 3, and eight in the elytral interval 5. Our specimen presents a smaller size compared to size range provided by Erwin and Henry (2017) (ABL: 5.06–5.93 mm; SBL: 4.39–4.98 mm). In addition to diagnostic characters, our identification was confirmed by Terry L. Erwin.

Tribe Paussini

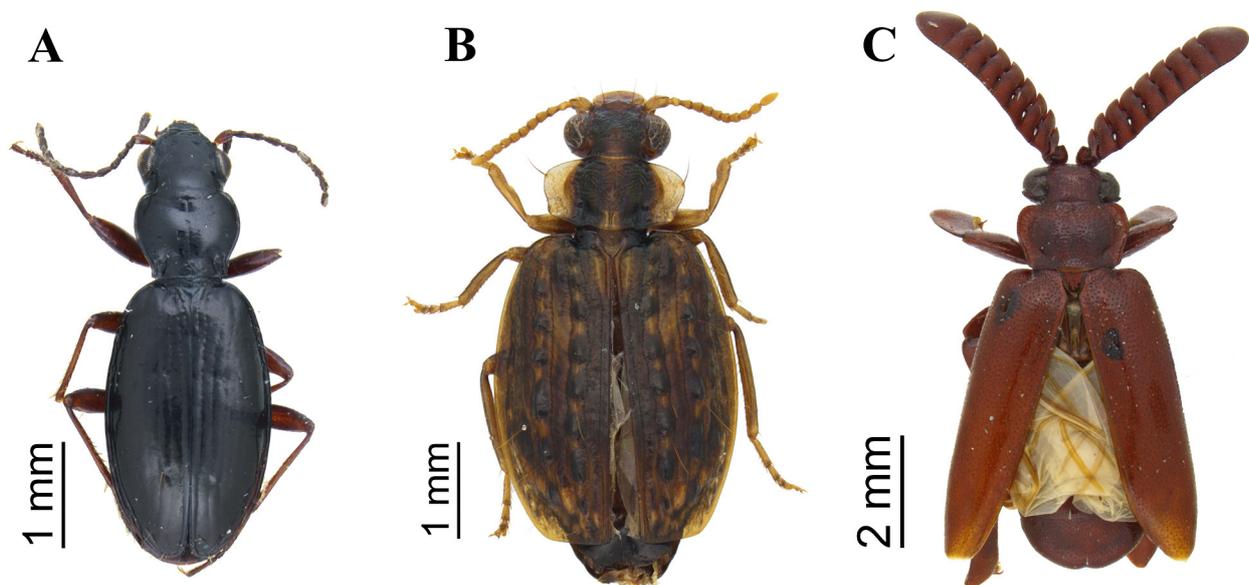
***Homopterus subcordatus* Darlington, 1950**

Figure 2C

**Distribution.** French Guiana, Panama (Hoover 2016), and Colombia (new record).

**New record.** COLOMBIA • 1 ♂; Caquetá, Belén de los Andaquíes, Resguardo Indígena La Esperanza; 01.608°N, 075.953°W; 980 m a.s.l.; 27 Feb. 2017; J. Panche leg.; White-light trap; MUSENUV 29850.

**Identification.** ABL: 7.1 mm, SBL: 6.6 mm. Our



**Figure 2.** Habitus, dorsal aspect. **A.** *Bembidion chimborazonum* (female). **B.** *Hyboptera auxiliadora* (female). **C.** *Homopterus subcordatus* (male).

specimen fits with the features provided by Darlington (1950) and on the key in Hoover (2016): Antennal club compact with flagellomeres overlapping or touching between them, outer lateral margin of first flagellomere asymmetrical to inner lateral margin, inner proximal margin of flagellomeres 2–8 widely rounded, lateral margins of pronotum explanate, temple protruding over half its width from eye margin when viewed dorsally (cornice-shaped portion of the integument, located behind posterior margin of the eyes). Our specimen size is smaller than that described in Darlington (1950) (about 8 mm).

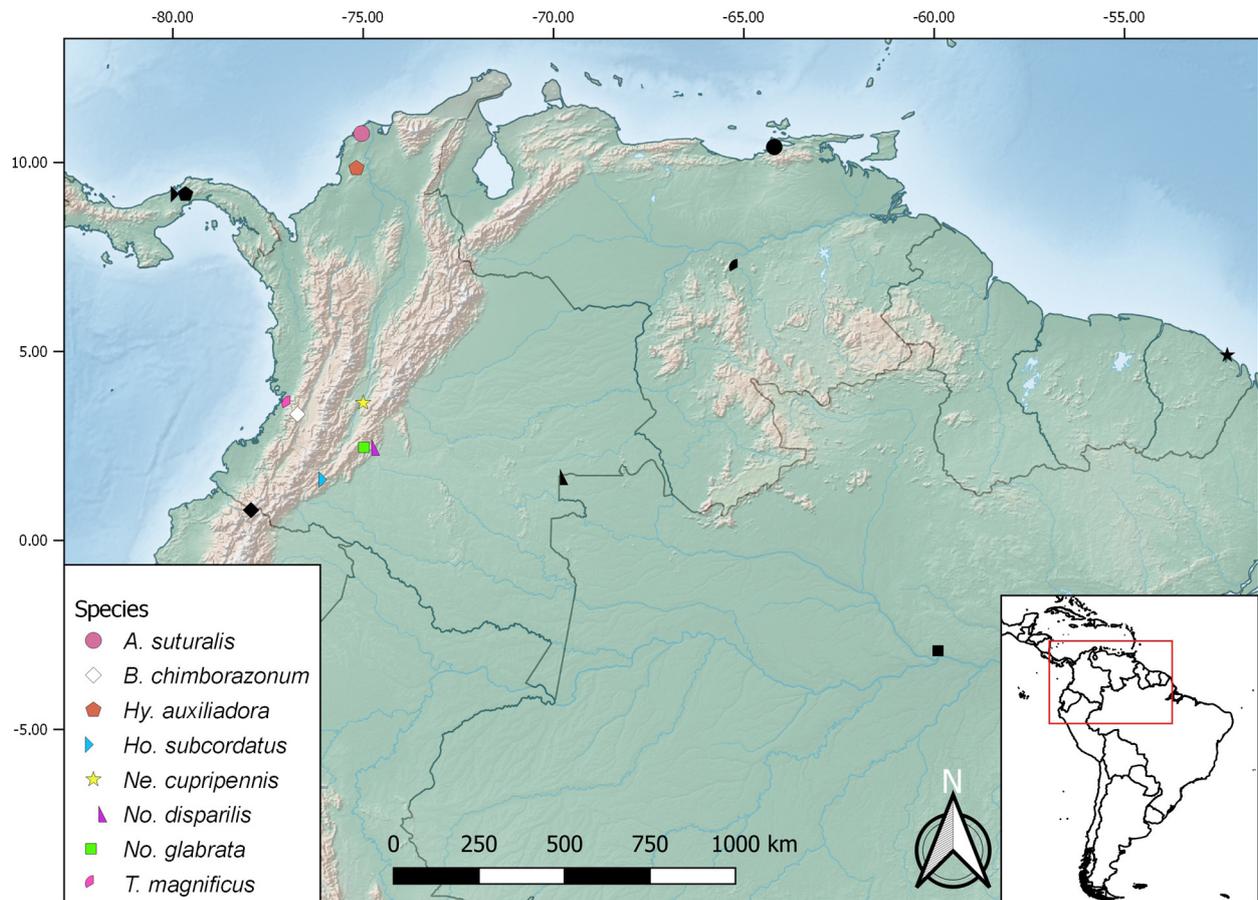
## Discussion

This study adds eight species to the list of Colombian Carabidae. These species were expected to be found in Colombian territory because previous studies have shown their distribution in nearby countries (Putzeys 1845; Ball 1986; Arndt 1998; Moret and Toledano 2002; Moret 2005; Hoover 2016; Erwin and Henry 2017) (Fig. 3).

Our records of two of these species, *Amblygnathus suturalis* Putzeys, 1845 and *Neoaulacoryssus cupripennis* Gory, 1833, are remarkable, given the current knowledge context of northern South America ground beetles. Ball and Maddison (1987) pointed out that *A. suturalis* is confined to the Cis-Andean region and eastern South

America, concluding that this species would be represented in southern Central America only by arrivals of individuals from South America. We consider that our record of this species in northern Colombia represents the unstudied distribution of the species and not the advance or colonization of individuals coming from the species' previously known distribution. On the other hand, our finding of *N. cupripennis* extends its range in at least 2,500 km from Cayenne (French Guiana), and it represents the second record in continental South America. Furthermore, this is the first mention of the genus *Neoaulacoryssus* in Colombia.

Martínez (2005) highlighted the need of sampling in protected and/or relatively inaccessible areas to reduce taxonomic bias towards knowledge of Colombian Carabidae. Given the geographical origin of our samples, these findings are thus helping to overcome the Wallacean shortfall (Hortal et al. 2015) and they complement the ground beetles inventory for the country. According to Arenas and Posso (2017), the largest number taxonomic description of Colombian Carabidae species have been made with specimens deposited in foreign collections. Specimens reported herein show that local collections might also harbor fauna known from nearby countries and very probably, unknown species. In general, these new records will be helpful in future research involving ground beetles, such as biodiversity, taxonomy, pest



**Figure 3.** Distribution map of the new records of Carabidae from Colombia. Colored symbols represent new records and black symbols show the nearest previous records.

management control, among others.

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## Authors' Contributions

JDSR collected some specimens and elaborated the manuscript; AAC identified specimens, and revised, conceptualized and contributed to the preparation of the manuscript; NJMH reviewed and edited whole text.

## References

- Arenas A (2017) First record of *Notiobia* (*Notiobia*) *umbriifera* Bates and rediscovery of *Notiobia* (*Anisotarsus*) *praeclara* Putzeys (Coleoptera: Carabidae) in Colombia. *Boletín Científico, Centro de Museos, Museo de Historia Natural de la Universidad de Caldas* 21 (1): 226–233. <http://dx.doi.org/10.17151/bccm.2017.21.1.19>
- Arenas A, Chacón P (2016) Escarabajos terrestres (Coleoptera: Carabidae) de fragmentos de bosque seco en el Valle geográfico del Río Cauca, Colombia. *Boletín Museo de Entomología de la Universidad del Valle* 16 (2): 18–25.
- Arenas A, Posso C (2017) Carábidos (Coleoptera: Carabidae) del Museo de Entomología de la Universidad del Valle (Cali, Colombia). *Biota Colombiana* 18 (2): 267–273.
- Arenas A, Armbrecht I, Chacón P (2013) Soil Carabids and Ants in Two Farming Areas of Yellow Passion Fruit (*Passiflora edulis*) at Valle del Cauca, Colombia. *Acta Biológica Colombiana* 18 (3): 439–448.
- Arenas A, Corredor G, Armbrecht I (2015) Hormigas y carábidos en cuatro ambientes del piedemonte del Parque Nacional Natural Farallones de Cali, Colombia. *Revista Colombiana de Entomología* 41 (1): 120–125.
- Arndt E (1998) The species of *Notiobia* Perty (Coleoptera: Carabidae: Harpalini) from Brazil. *Acta Amazonica* 28 (3): 285–299. <https://doi.org/10.1590/1809-43921998283299>
- Ball GE (1972) Classification of the Species of the *Harpalus* subgenus *Glanodes* Casey (Carabidae: Coleoptera). *The Coleopterists Bulletin* 26 (4): 179–204.
- Ball GE (1978) The species of the Neotropical genus *Trichopselaphus* Chaudoir (Coleoptera: Carabidae: Harpalini): classification, phylogeny and zoogeography. *Quaestiones Entomologicae* 14: 447–489.
- Ball GE (1986) The Neotropical Genus *Trichopselaphus* Chaudoir (Coleoptera: Carabidae: Harpalini): New Species and a review of Taxonomic and Evolutionary aspects. *Transactions of the Entomological Society* 112 (4): 249–287.
- Ball GE, Maddison DR (1987) Classification and evolutionary aspects of the species of the New World genus *Amblygnathus* Dejean, with description of *Platymetopsis*, New Genus, and notes about selected species of *Selenophorus* Dejean (Coleoptera: Carabidae: Harpalini). *Transactions of the American Entomological Society* 113 (3): 189–307.
- Camero E (2006) A new species of *Blennidus* (*Agraphoderus*) (Coleoptera: Carabidae: Pterostichini) from high altitude forest from Colombia. *Elytron* 20: 15–18.
- Darlington PJ (1950) Two new paussid beetles from the Panama Canal zone and the Philippines. *Psyche* 57 (2): 68–71. <https://doi.org/10.1155/1950/45969>
- Erwin TL (2004) The beetle family Carabidae of Costa Rica: The genera of the Cryptobatida group of subtribe Agrina, tribe Lebiini, with new species and notes on their way of life (Insecta: Coleoptera). *Zootaxa* 662: 1–54. <https://doi.org/10.11646/zootaxa.662.1.1>
- Erwin TL (2011) Rainforest understory beetles of the Neotropics, *Mizotrechus* Bates 1872, a generic synopsis with descriptions of new species from Central America and northern South America (Coleoptera, Carabidae, Perigonini). *ZooKeys* 145: 79–128. <https://doi.org/10.3897/zookeys.145.2274>
- Erwin TL, Henry SC (2017) *Hyboptera* Chaudoir, 1872 of the Cryptobatida group of subtribe Agrina: A taxonomic revision with notes on their ways of life (Insecta, Coleoptera, Carabidae, Lebiini). *ZooKeys* 714: 61–127. <https://doi.org/10.3897/zookeys.714.15113>
- Erwin TL, Zamorano LS (2014) A synopsis of the tribe Lachnophorini, with a new genus of Neotropical distribution and a revision of the Neotropical genus *Asklepia* Liebke, 1938 (Insecta, Coleoptera, Carabidae). *ZooKeys* 430: 1–108. <https://doi.org/10.3897/zookeys.430.8094>
- Erwin TL, Micheli C, Chaboo CS (2015) Beetles (Coleoptera) of Peru: A survey of the Families. Carabidae. *Journal of the Kansas Entomological Society* 88 (2): 151–162. <https://doi.org/10.2317/kent-88-02-151-162.1>
- Hoover AM (2016) When Ground Beetles Fly: A taxonomic review of the Arboreal, Myrmecophilous Neotropical genus, *Homopterus* (Coleoptera: Carabidae: Paussinae) with a new Species Description, Species Diagnoses, and Insights into Species Distributions. Master Thesis, The University of Arizona, Tucson, 44 pp.
- Hortal J, de Bello F, Diniz-Filho JAF, Lewinsohn TM, Lobo JM, Ladle RJ (2015) Seven Shortfalls that Beset Large-Scale Knowledge of Biodiversity. *Annual Review of Ecology, Evolution and Systematics* 46: 523–549. <https://doi.org/10.1146/annurev-ecolsys-112414-054400>
- Martínez C (2005) Introducción a los escarabajos Carabidae (Coleoptera) de Colombia. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Bogotá DC, 546 pp.
- Martínez C, Ball GE (2003) Los Platynini (Coleoptera: Carabidae) de Colombia. *Biota Colombiana* 4 (2): 175–186.
- Moret P (2005) Los coleópteros Carabidae del Páramo en los Andes del Ecuador. Sistemática, ecología y biogeografía. Pontificia Universidad Católica del Ecuador, Centro de Biodiversidad y Ambiente, Monografía 2, Quito, 306 pp.
- Moret P (2019) Quatre nouvelles espèces de *Dyscolus* (*Stenocnemion*) de la Colombie et du Panama (Coleoptera, Carabidae, Platynini). *Coléoptères* 25 (6): 103–114.
- Moret P, Toledano L (2002) *Ecuadorion*, nouveau sous-genre de *Bembidion* Latreille, 1802 du páramo équatorien (Coleoptera, Carabidae, Bembidiini). *Bolletino del Museo Civico di Storia Naturale di Venezia* 53: 155–205.
- Putzeys J (1845) *Prémices entomologiques*. *Mémoires de la Société Royale des Sciences de Liège* 2: 353–417. Shpeley D, Hunting W, Ball GE (2017) A taxonomic review of the *Selenophori* group (Coleoptera, Carabidae, Harpalini) in the West Indies, with descriptions of new species and notes about classification and biogeography. *Zookeys* 690: 1–195. <https://doi.org/10.3897/zookeys.690.13751>
- Toledano L (2008) Systematic notes on the Bembidiina of the North-

ern Andes with particular reference to the fauna of Ecuador (Coleoptera, Carabidae). In: Giachino PM (Ed.) Biodiversity of South America I. Memoirs on Biodiversity. World Biodiversity Association onlus, Verona, 81–130.

Uribe M, Vallejo LF (2013) Diversidad de escarabajos Carabidae y Scarabaeidae de un bosque tropical en el Magdalena medio colombiano. Boletín Científico, Centro de Museos, Museo de Historia Natural de la Universidad de Caldas 17 (2): 174–196.