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Notes on the distribution and colouration in life of *Stenomacra tungurahuana* Brailovsky & Mayorga, 1997 (Hemiptera: Largidae)

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Notas sobre la distribución y coloración en vida de *Stenomacra tungurahuana* Brailovsky & Mayorga, 1997 (Hemiptera, Largidae)

Abstract

The hemipteran *Stenomacra tungurahuana* Brailovsky & Mayorga, 1997 (Hemiptera, Heteroptera, Largidae) is known from just two localities in the inter-Andean valley of Ecuador. No ecological information nor description of its colouration in life has been reported. In this contribution, I provide the first record of *S. tungurahuana* on the northeastern slopes of the Eastern Cordillera of the Andes and the first description of its colouration in life, including photographs, based on a specimen from San Isidro Lodge, province of Napo, ca. 108 km from the species' type locality.

Keywords: Andes, Heteroptera, iNaturalist, Larginae, Napo, new records, Pyrrhocoroidea

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Resumen

El hemíptero *Stenomacra tungurahuana* Brailovsky & Mayorga, 1997 (Hemiptera, Heteroptera, Largidae) es conocido de tan solo dos localidades en el valle interandino de Ecuador. No se ha reportado información sobre su ecología o coloración en vida. En esta contribución presento un nuevo registro de *S. tungurahuana* de la vertiente nororiental de la cordillera Oriental de los Andes de Ecuador y la primera descripción de su coloración en vida, incluyendo fotografías, basado en un espécimen de las Cabañas San Isidro, provincia de Napo, aproximadamente a 108 km de la localidad tipo de la especie.

Palabras clave: Andes, Heteroptera, iNaturalist, Larginae, Napo, nuevos registros, Pyrrhocoroidea

Heteroptera is the most diverse suborder of hemipterans, comprising more than 45000 described species with broad trophic preferences, from phytophagous to hematophagous [1]. Many heteropterans are economically important due to their role as agricultural pests, biological controls, and disease vectors [2,3]. Among members of the heteropteran superfamily Pyrrhocoroidea (including Largidae and Pyrrhocoridae),

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species of the genus *Dysdercus* (Pyrrhocoridae) are regarded as the most important pests due to the damage to cotton crops [4,5]. However, knowledge about the natural history of most species of Pyrrhocoroidea is limited [2,4-6], and other species may also be of economic significance. For example, several species of *Largus* (Largidae) have been reported as minor pests of different crops in some localities across the Western Hemisphere [4,7,8], and *Stenomacra marginella* (Largidae) causes damage to a broad array of host trees and is considered a nuisance pest in Mexico [9-12].

The few species of Largidae from the Western Hemisphere for which data are available are phytophagous, and very little is known about their distribution and natural history [5]. Fourteen genera of Larginae occur from the USA to Argentina: *Acinocoris*, *Arhaphe*, *Armilargulus*, *Fibrenus*, *Largulus*, *Largus*, *Neolargulus*, *Pararhaphe*, *Paralargulus*, *Rosaphe*, *Stenomacra*, *Thaumastaneis*, *Theraneis*, and *Vasarhelyecoris* [2]. The genus *Stenomacra* currently includes eight species: *S. atra*, *S. dissimilis*, *S. limbatipennis*, *S. magna*, *S. marginella*, *S. scapha*, *S. tungurahuana*, and *S. turrialbana* [13,14], with most species known from a few localities in restricted geographic ranges. *Stenomacra marginella* is the most widespread species within the genus (inhabiting from USA to Brazil) and is the only one with published life history and ecology information [9,15-17]. *Stenomacra tungurahuana* Brailovsky & Mayorga, 1997 is the only species of this genus currently reported in Ecuador, and ecological information is yet to be reported. This contribution aims to provide new information on *S. tungurahuana* based on a recent observation that considerably expands its geographic range to the eastern Andes.

Between 4-7 March, 2021, entomological opportunistic observations were conducted while exploring the cloud forests of San Isidro Lodge (Cabañas San Isidro, -0.5911, -77.8794), county of Quijos, province of Napo, Republic of Ecuador. San Isidro is a private reserve, ca. 2 km SE of the town of Cosanga, encompassing old-growth and disturbed Montane Evergreen Forest (ecosystemic classification follows 18), between 2000-2500 m elevation. Climatic data from Cosanga (ca. 2 km away straight-line) and Baeza (ca. 13 km away straight-line) show that the area receives on average 3000 mm of precipitation per year (range 2300–3500 mm/year), with a drier season from October to February, and mean monthly temperatures ranging between 15-17 ºC [19]. I posted two photographs of the specimen taken with an iPhone 12Pro to iNaturalist (https://www.inaturalist.org, by the California Academy of Sciences and National Geographic), a participative science web-based application designed for reporting and identifying photo-based biodiversity observations. The initial identification was provided by iNaturalist curators WonGun Kim and Michael Pirrello and confirmed using morphological data from the original description of the species by Brailovsky and Mayorga [13]. The iNaturalist research-grade observation of *S. tungurahuana*, including photographs, is available in GBIF [20].

STENOMACRA TUNGURAHUANA BRAILOVSKY & MAYORGA, 1997

New record. ECUADOR – **Province of Napo** · County of Quijos, San Isidro Lodge (Cabañas San Isidro, ca. 2 km SE from the town of Cosanga; -0.5911, -77.8794; 2050 m elev.; 06.III.2021; Diego F. Cisneros-Heredia; found in old-growth montane evergreen forest, on the leaves of an Asteraceae, ca. 20 cm over the ground; 1 adult, photographed, iNaturalist observation 71343078.

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On 06 March 2021 at 12h00, I observed an adult *S. tungurahuana* (Fig. 1) at San Isidro Lodge. This new record represents the first report of the species in the Eastern Cordillera of the Andes. It extends the geographic range of the species to the northeastern slopes of the Andes in Ecuador, ca. 108 km NE from the type locality of the species, and increases its altitudinal range by 250 m uphill (Figure 2). While *S. tungurahuana* is the only species of the genus currently reported in Ecuador, *S. marginella* has been recorded in southern Colombia, ca. 25 km from the Ecuadorian border [13], suggesting its potential presence in the country.

FIGURE 1. First photographs of *Stenomacra tungurahuana* Brailovsky and Mayorga, 1997 showing its colouration in life; San Isidro Lodge, province of Napo, Republic of Ecuador.

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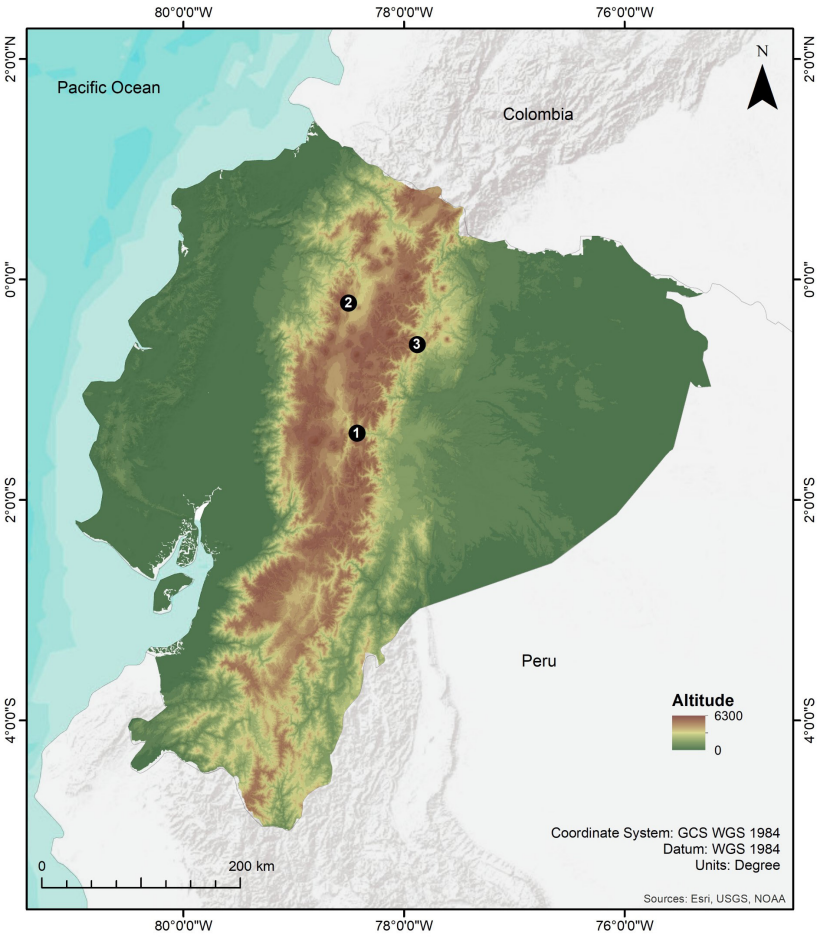

FIGURE 2. Map of the Republic of Ecuador showing the known localities of *Stenomacra tungurahuana*. **1:** Baños, type locality; **2:** Quito; **3:** San Isidro Lodge, new locality reported herein.

The new specimen of *S. tungurahuana* was identified based on the following diagnostic characteristics described by Brailovsky and Mayorga [13]: slender body, nearly parallel-sided; head in dorsal view and between eyes flat; eyes small and barely pedunculate, ocelli absent; antennal segment I uniformly slender; rostrum just reaching posterior margin of mesothorax; pronotum with anterior lobe not globose and humeral angles rounded; clavus and corium red-orange; hemelytral membrane whitish; antennal segments I–III, callar region and tibiae black (Fig. 1). *Stenomacra tungurahuana* is most similar to *S. scapha*, but the latter differs by its hemelytra reaching the posterior margin of abdominal segment VI (reaching the apex of the last abdominal segment in *S. tungurahuana*), antennal segments I to III red-orange to pale orange (black in *S. tungurahuana*), callar region and the tibiae red-orange to pale orange (black in *S. tungurahuana*) [13]. *Stenomacra marginella* differs from *S. tungurahuana* by having the

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hemelytral membrane brown (white in *S. tungurahuana*), coxae and trochanters bright orange-yellow (velvet red in *S. tungurahuana*), clavus and corium dark with orange borders (red-orange in *S. tungurahuana*) [13].

The newly observed specimen of *S. tungurahuana* (Figure 1) showed the following colouration in life (colours in preservative reported in the original description in square brackets): head, including antennal and rostral segments, light to dark grey [black], basal joint of antennal segments I brownish-grey [red orange]; pronotum red with callar region grey [callar region black]; scutellum grey [black]; hemelytral membrane cream [white]. Colouration of legs was not described in detail in the original description by Brailovsky and Mayorga [13], which only mentioned black tibiae. The new specimen showed trochanters, coxae and basal third of femora velvet red, with the remaining femora, tibiae, and tarsi dark grey due to abundant silvery setae (Figure 1). The original description of *S. tungurahuana* reported only colours of preserved specimens and did not include details about its colouration in life. Documenting colouration in life and its variation in preservative is important for species' field identification, conceding that colour variation between living and preserved specimens may arise from intraspecific and ontogenic variation, preservation effects, or differences in observer's colour perception.

Brailovsky and Mayorga [13] reported *S. tungurahuana* from Baños (type locality) and Quito. The ecosystem at San Isidro Lodge (Montane Evergreen Forest) differs notably from those of Baños and Quito. These are located in inter-Andean valleys (Figure 2) that enclose Montane Semideciduous or Evergreen Shrubland and Forest and received an average annual precipitation between 500-1500 mm, much lower than that of San Isidro. The type locality, Baños (= Baños de Agua Santa, -1.3961, -78.4248, 1800 m elevation), is a renowned collecting station at the entrance of the mountain pass between the Tungurahua volcano and the Los Llanganates massif that connects the semi-arid inter-Andean valley of Patate with the humid eastern slopes of the Andes in central Ecuador [21-23]. Montane evergreen forests are present on the mountain pass just a few hundred meters from the city of Baños, suggesting the possibility that the specimens of *S. tungurahuana* from Baños were collected in this ecosystem. On the other hand, Quito (-0,2149, -78,5025, 2800 m) is on a highland plateau in the inter-Andean valley of Quito, adjacent to the Pichincha massif [21-24]. The specimens of *S. tungurahuana* from Quito were collected in 1930 by Raymond Benoist (1881–1970), a French botanist who made plant collections across the country [25-28]. Between 1930 and 1932, he explored the valley of Quito and the eastern Andean slopes near Pichincha, Napo, and Baños [25,26,29,30].

The lack of information regarding species distributions (i.e., the Wallacean shortfall) is one of the most significant impediments to the large-scale understading and conservation of invertebrates [31,32]. Over 40 years ago, Froeschner [33] presented the most recent attempt to catalogue the heteropteran fauna of mainland Ecuador. Subsequent works have focused on reviewing genera, describing new species, and documenting new records (e.g., 34–42). Many Ecuadorian heteropterans, like *S. tungurahuana*, remain known from only a single or few localities. Concurrently, there is little funding and support for conducting local and national inventories, strengthening scientific biological collections, and enhancing national taxonomic expertise. Participative science tools like iNaturalist have emerged as substantial

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sources of biological observations. They play an important role in facilitating global taxonomic knowledge exchange, fostering inclusivity and equity, and contributing to the decolonisation of biological taxonomy (e.g., 42–46)

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