

Heterophrynus armiger Pocock, 1902 (Amblypygi: Phrynidae): First record from Colombia, with notes on its historic distribution records and natural history

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ABSTRACT: The phrynid whip spider *Heterophrynus armiger* is herein cited for the first time from a precise locality in Colombia. Additional data on its natural history are provided. This species has been found in disturbed and preserved forest areas of Isla Gorgona, an island located at the northwest coast of Colombia.

In Colombia, 10 species of Amblypygids are well known: five species are members of the subfamily Phryninae Wood, 1863, including four from the genus *Phrynus* Lamarck, 1801 (*Phrynus araya* Colmenares & Villarreal, 2008, *Phrynus gervaisii* (Pocock, 1894), *Phrynus panche* Armas & Angarita, 2008 and *Phrynus pulchripes* (Pocock, 1894)), and one species is from the genus *Paraphrynus* (*Paraphrynus laevifrons* (Pocock, 1894) Chirivi and Armas 2012); and six species are from the subfamily Heterophryninae Pocock, 1902, genus *Heterophrynus* Pocock, 1894, including *Heterophrynus armiger* Pocock, 1902, (Giupponi and Kury 2013, cited without locality data or references, here we add new records with precise localities), *Heterophrynus batesii* (Butler, 1873), *Heterophrynus boterorum* Giupponi & Kury 2013, *Heterophrynus cervinus* Pocock, 1894, *Heterophrynus cheiracanthus* (Gervais, 1842) (Giupponi and Kury 2013, cited without a precise locality or references) and *Heterophrynus silviae* Giupponi & Kury, 2013. The genus *Heterophrynus* is restricted to the Amazon region and adjacent areas of South America and currently includes 12 described species worldwide (Giupponi and Kury 2013). In addition, there are records of the family Charinidae from at least five departments within Colombia without specific determination (Armas *et al.* 2012).

The individuals of *H. armiger* found in the Colombian collections represent the first records of this species of amblypygid in the country for which exact data on collections and localities exist. Additionally, new data on the distribution and natural history of *H. armiger* is presented here.

During the Workshop of Biological Collections 3.0 organized by the Global Biodiversity Information Facility (GBIF) and Infraestructura Iberoamericana de Información sobre Biodiversidad (I3B) in October 2012 and sponsored by the “Claustro de San Agustín, Instituto Humboldt, Villa de Leyva, Colombia”, the first author had the opportunity to review several specimens of Amblypygi preserved in alcohol deposited at the Arthropod Collection, Instituto

Alexander von Humboldt (IAvH) (<http://biocol.org/urn:lsid:biocol.org:col:1022>), third author reviewed the Collection of the Entomological Museum of Universidad del Valle, Cali, Valle del Cauca department, Colombia. (Museo de Entomología de la Universidad del Valle-MUSENUV). At collection of Arthropod Collection, Instituto Alexander von Humboldt (IAvH), all specimens found were identified to species level. There we found one specimen of *Phrynus gervaisii* and seven specimens of undetermined *Heterophrynus* spp., identified as *H. armiger* and *H. batesii*. Additionally, the collection of the Entomological Museum (MUSENUV) of the Universidad del Valle, Cali, Valle del Cauca, Colombia was revised, and additional specimens of *H. armiger* collected from Isla Gorgona (Gorgona Island), Guapi municipality, Cauca department, Colombia was added to the research.

The general terminology and morphology follow Quintero (1981) and Weygoldt (2000); measurements were recorded in millimeters (mm) using calipers of unknown brand, while images were recorded with an Olympus EM-5 digital camera and a Canon Powershot A3100 IS.

Map images were retrieved from www.maps.google.com/maps (Google 2013) and edited using image software.

Examined specimens. *Heterophrynus armiger*. COLOMBIA: One adult male (IAvH without number), Cauca department, Guapi municipality, Natural National Park (N.N.P.) Gorgona, Isla Gorgona, Village 5m, March 5, 1990, inside a house. M. L. Baena, one adult male (IAvH 100861), in a house, April 23 of 1991, active manual search, Javier Portilla, two adult males (IAvH 100860, 100862), October 20, 1991, between bricks and construction material, Manual collection, Ever Solis, all specimens were geo-located to approximately 2°57'53" N, -78°10'30" W, at 13 m.a.s.l.; one adult female (MUSENUV- 24303), Sendero Cerro Los Micos (Path hill Los Micos), 2°58'20.5" N, -78°10'38.8" W, 162 m.a.s.l, October 21, 2010, manual collection, Equipo de Zoología UV; one adult male and one juvenile (MUSENUV-

24304), Playa palmeras (Palms beach), 2°56'28.6" N, -78°12'21.4" W, 28 m.a.s.l., February 24, 2011, nocturnal sampling, manual search, Julian Mendivil; one adult male (MUSENUV- 24307), El Poblado (The Village), 2°57'15.8" N, -78°10'6.6" W, 8 m.a.s.l., December 2, 1989, found dying, Grupo de Insectos "Color Verde Pasto"; one adult female (MUSENUV- 24306), El Poblado (The Village), 2°57'15.8" N, -78°10'6.6" W, 8 m.a.s.l., September of 1989, M. Baena. Almost all material held by MUSENUV was obtained during the investigation project: "Assessing the Current State of Wildlife Conservation in Gorgona Island: A Holistic Approach to Ecological Assessment of the NNP Gorgona," with financial support from the Fund for Environmental Action and Childhood, International Conservation Colombia, Universidad del Valle, and the SQUALUS Foundation, Cali, Columbia. This project was covered by a study permit on biological research: PIDB-DTSO-0111-10.

Additionally, we reviewed specimens of the species *Heterophrynus batesii* (Butler, 1873): one adult female and two adult males (IAVH without collection number), Huila Department, S.O. Acevedo. P.N.N. Cueva de los Guácharos, Cedros sector, Indio Cave, manual collection, December 5, 2001; D. Campos y E. González. 1850 m.a.s.l. (1°36'59" N, 76°06'15" W).

Heterophrynus armiger Pocock, 1902
(Figures. 1 A-C, 2, 3, 4, 5 A-B, Table 1)

General morphology. The specimen examined at the IAVH collections is congruent with Pocock (1902) and Weygoldt (2002) in terms of characteristics and description; in particular, this specimen has reddish-brown coloration and shows a granular cuticle (Figures 1–3), the ocular tubercle and lateral eyes are very high, and the pedipalp femur ventrally shows a smaller spine (FIII) between the 2nd and 3rd long spines (Figure 1). Male genitalia and female gonopods and claw-like sclerites correspond with descriptions by Weygoldt (2002) (Figure 5).

Specimen distribution. ECUADOR: This specimen was originally cited to occur in "Pambelar" (Pocock 1902). Apparently, "Pambelar" is a typographical mistake; this citation may possibly refers to Pambilar or the Forest of Pambilar, located near the town of Malimpia, in the province of Esmeraldas, Ecuador; geo-located at approximately 97 m.a.s.l. (0°24'59" N, 79°26'36" W). Pocock (1903) cited, and adds under this species name, two more specimens from Butim, northern Ecuador (locality name not found on a map) and another from Durango River, NW Ecuador, Esmeraldas Province, at approximately 61 m.a.s.l. (1°05'09"N, 78°41'45"W). A photo accessible on-line at <http://www.flickr.com/photos/primevalnature/6051525033/in/set->

72157627512443268/, by © James A. Christensen shows an additional specimen from Mindo, Pichincha Province, Ecuador (0°03'07"N, 78°46'29"W). COLOMBIA: Cauca Department, N.N.P. Isla Gorgona (New record), (Figure 4).

Natural History. During the periods February to April and September, October and December, 1989 through 2011, six adult males, 2 females and one juvenile specimen were collected in different materials and localities in "El Poblado" (The Village) on Isla Gorgona. Some specimens were found within a house or among bricks or other construction materials; apparently the species is well adapted to disturbed environments. However, some individuals were observed on or among leaf litter at the base of trees inside the forest (J. Mendivil, pers. comm.). Previously, only information concerning a specimen's description and morphology was known.

Isla Gorgona is a small (26 km²) volcanic island located about 35 km off the coast of Colombia. Precipitation averages almost 7,000 mm annually, with the most intense rainfall occurring in September and October. The average relative humidity is 90% and the average annual temperature is 27°C. Topography is steep as would be expected of a volcanic island with elevations ranging from sea level to 338 m. The island housed a penal colony that was closed in 1984. Today, the island is a national park and the tropical forest vegetation that had been highly disturbed is in the process of early secondary forest succession (Rangel 1995; Giraldo 2012).

The new record from Isla Gorgona could be accounted for by the fact that during the Pleistocene, sea level was about 120 meters lower than present, which would have placed the island much closer to, but not connected to, the continent (Alberico 1986). This proximity could explain the similarity between flora and fauna between the coastal region and the island. However, any such similarity appears to be stronger between island-mainland biota further to the south (*e.g.*, Ecuador; and Nariño department, Colombia) rather than in the northern pacific region (*e.g.*, Chocó department, Colombia) (Alberico 1986; Lourenço and Flórez 1989).

The *Heterophrynus* specimen pictured in Figures 2 and 3 was found in the nature preserve of the Hacienda San Vicente (The Yellow House), Mindo, Pichincha, Ecuador at an elevation of approximately 1450 m.a.s.l. This area is covered by both primary and old secondary cloud forest; the immediate vicinity of the site was old secondary forest. The specimen was found along the embankment of the 'main trail' through the reserve, essentially a jeep track, within a few centimeters of an un-occupied rodent burrow. The photos were taken after dark on 26 March 2011.



FIGURE 1. *Heterophrynus armiger* (Male), specimen from Colombia. A, Ventral aspect of pedipal tibia; B, General aspect of carapace and abdomen, dorsal view; C, Ventral aspect of pedipal femur.

TABLE 1. Measurements (mm) of *Heterophrynus armiger*. H, height; L, length.

	Colombia (Male without number)	Colombia (Female MUSENUV-24303)	Ecuador (Record from Pocock 1902)
Carapace, H/L	14.13/11	16.2/10.2	16.5/11.5
Abdomen, H/L	10.5/17.4	11.7/19.2	--/--
Total length	28.4	29.4	34
Pedipalp, L:			
Femur	13.3	14.3	17.5
Tibia	14.1	17.2	20
Basitarsus	6.6	8.2	8 (hand)
Distitarsus	5	5.8	--
Femur of leg I, L	35.3	35	54
Femur of leg IV, L	23	25	28



FIGURE 2. *Heterophrynus armiger* (Male) specimen from Ecuador. Frontal view of live specimen. By James A. Christensen/Minden Pictures/Foto Natura.



FIGURE 3. *Heterophrynus armiger* (Male) specimen from Ecuador. Dorsal view of live specimen. By James A. Christensen/Minden Pictures/Foto Natura.



FIGURE 4. Geographic distribution of *Heterophrynus armiger*; red circles show new records from Colombia and Ecuador; blue stars show registered records from Ecuador (Pocock 1902, 1903).

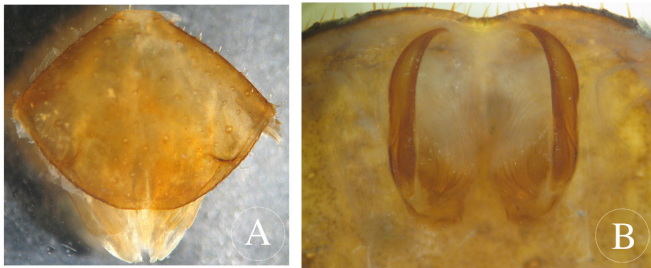


FIGURE 5. Genitalia of *Heterophrynus armiger* specimens from Colombia (MUSENUV-24303, 24304). A, male ventral view; B, female, dorsal view.

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