Scientific Note

Phoresy of *Americhernes oblongus* (Say) (Pseudoscorpiones: Chernetidae) in a species of the genus *Scipopus* Enderlein (Diptera: Micropezidae)

Foresis de *Americhernes oblongus* (Say) (Pseudoscorpiones: Chernetidae) en una especie del género *Scipopus* Enderlein (Diptera: Micropezidae)

Ramy Jhasser Martínez[1*], Gabriel A. Villegas-Guzmán[3, 4], Dora Isabel Quirós[1, 2] and Daniel Emmen[1, 2]

[1]*Laboratorio de Estudios Biológicos de Artrópodos, Vicerrectoría de Investigación y Postgrado, Universidad de Panamá. Author correspondence: ramymartonez1009@gmail.com**
[2]*Departamento de Zoología, Facultad de Ciencias Naturales y Tecnologías, Universidad de Panamá.*
[3]*Laboratorio de Acarología, Departamento de Zoología Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, Prolongación de Carpio y Plan de Ayala, S/N. Col. Santo Tomás, C.P. 11340 Ciudad de México, México.*
[4]*Laboratorio de Conservación de Fauna Silvestre, Universidad Autónoma Metropolitana Iztapalapa, San Rafael Atlixco No. 186, Col. Vicentina, C.P. 09340, Alcaldía Iztapalapa, Ciudad de México, México.*

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Abstract. Some species of pseudoscorpions perform a mechanism known as phoresy, attach themselves to other organisms for transportation. In this work, *Americhernes oblongus* (Pseudoscorpiones: Chernetidae) is reported as a phoront on a species of fly belonging to the genus *Scipopus* (Diptera: Micropezidae). *A. oblongus* is a new record for Panama and was collected in the town of Pirre, Province of Darien. The pseudoscorpion was found attached to the coxa of the right hind leg of the fly. To our knowledge, there are no previous reports of phoresy between *A. oblongus* and *Scipopus* sp. as a dispersal method.

Key words: Association, dipterans, dispersion, Panama, pseudoscorpions.

Resumen. Algunas especies de pseudoescorpiones realizan un mecanismo conocido como foresis, se unen a otros organismos para su transporte. En este trabajo, se reporta a *Americhernes oblongus* (Pseudoscorpiones: Chernetidae) como foronte de una especie de mosca perteneciente al género *Scipopus* (Diptera: Micropezidae). *A. oblongus* es un nuevo registro para Panamá, recolectado en la ciudad de Pirre, provincia de Darién. El pseudoescorpión se encontró unido a la coxa de la pata trasera derecha de la mosca. Hasta donde sabemos, no hay reportes previos de la foresis entre *A. oblongus* y *Scipopus* sp. como método de dispersión.

Palabras claves: Asociación, dípteros, dispersión, Panamá, pseudoescorpiones.

Phoresy is a non-parasitic transport mechanism where the phoront, generally a small organism, takes advantage of the host (a larger organism) to move long distances. Two types of phoresy are known: active when phoront is attached to any part of the host's body such legs, and setae; passive when phoront travels in cavities or grooves of the host´s body

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such as to the under elytra (Athias-Biche 1994; Vachon 1940). The most common hosts for pseudoscorpions are insects, but there are other organisms (*e.g.* mammals, birds, arachnids) commonly used for transport and the initial contact occurs in their nests (Vachon 1940; Beier 1948; Muchmore 1971; Poinar *et al.* 1998; Turienzo *et al.* 2010). Pseudoscorpions are cosmopolitan organisms that usually live in leaf litter, under barks, under rocks, in caves, in nests of insects, mammals and birds, and have also been reported in a varied number of microhabitats around the world. Due to their small size and lack of wings, they possibly use larger animals as transport (Weygoldt 1969; Aguiar and Bührnheim 2003; Muchmore 1971; Poinar *et al.* 1998).

Thirteen families of phoretic pseudoscorpions have been reported worldwide (Poinar *et al.* 1998; Judson 2003). The Chernetidae family has the highest number of cases registered in literature. Forty-seven families of arthropods have been registered as "hosts". Some orders such as Diptera, Coleoptera and Lepidoptera can be mentioned (Beier 1948; Reyes-Castillo and Hendrichs 1975; Aguiar and Bührnheim 1992, 1998; Poinar *et al.* 1998; Villegas-Guzmán 2004; Villegas-Guzmán y Reyes-Castillo 2012; Villegas-Guzmán *et al.* 2016).

According to Poinar *et al.* (1998), the genus *Americhernes* has been reported five times in literature as phoronts. *Americhernes oblongus* (Say, 1821) on one species of Elateridae (Coleoptera): *Alaus oculatus* (Linnaeus, 1758). Also *A.* aff. *incertus* (Mahnert, 1979) on three species of Passalidae (Coleoptera): *Passalus convexus* (Dalman, 1917), *P. elfriedae* (Luederwaldt, 1931) and *P. unicornis* (Lepeletier and Servillei, 1825). In Diptera *A.* aff. *incertus* associated with *Fannia canicularis* (Linnaeus, 1761) (Fanniidae) (Aguiar and Bührnheim 1992, 1998; Lira *et al.* 2014).

In Panama have been recorded 19 species of pseudoscorpions (Martínez *et al.* 2019), two of them involve a phoretic relationship *Lamprochernes loewi* (Hagen) on dipteran (Muchmore 1971) and *Cryptocheiridium* sp. on hemipteran (Martínez *et al.* 2018). In this work, *A. oblongus* (Say, 1821) is reported for the first time in Panama and is also registered as a phoront for the first time on an indeterminated fly of the genus *Scipopus* Enderlein, 1922 (Diptera: Micropezidae).

One specimen of Micropezidae with a phoretic pseudoscorpion was collected in a Malaise trap in the town of Pirre (7°55'41´´N, 77°42´10´W) at 1454 ma in the Province of Darien, Panama in January 2001 (Fig. 1). From about 1200 m to the top of Cerro Pirre the forest is continually affected by dense fog. Most of Cerro Pirre is covered by a cloudy forest with much lower vegetation with many vines, mosses and epiphytes. The forest floor is always humid; the most abundant species are tree ferns.

The mounted fly specimen is located in the reference collection at the LEBA-UP (Laboratorio de Estudios Biológicos de Artrópodos, Universidad de Panamá). The pseudoscorpion was processed using the Hoff technique (1949) with modifications of Wirth and Marston (1968). The taxonomic key of Chamberlin (1931) and Muchmore (1976) were used for the identification of the pseudoscorpion.

The host was identified as belonging to genus *Scipopus* (Diptera: Micropezidae) and the pseudoscorpion was identified as a female of *A. oblongus* (Say) (Chernetidae). Members of genus *Americhernes* are of elongated form, acuminate tactile setae. Cheliceral hand with five setae; flagellum of three setae, galea with 5-6 rami; tibia of leg IV with a prominent tactile seta near middle of outer margin in addition to tactile seta near distal end.

Americhernes oblongus has surface of carapace entirely smooth and shiny, eyespot weak. Male with anterior genital operculum bearing 4 long heavy setae surrounded by about 14 smaller ones; posterior operculum with 2 pairs of smalls setae just inside anterior margin and about 8 setae on face. Hand with 5 setae, flagellum of 3 setae; palps relatively short and heavy, femur about 0.75 and chela about 1.2 as long as carapace.

The arachnid remained fixed to the fly even after collection and preservation in 70% alcohol and had to be carefully removed in order to identify it. The pseudoscorpion was

found attached to the coxa of the right hind leg (Figs. 1A, 1B).

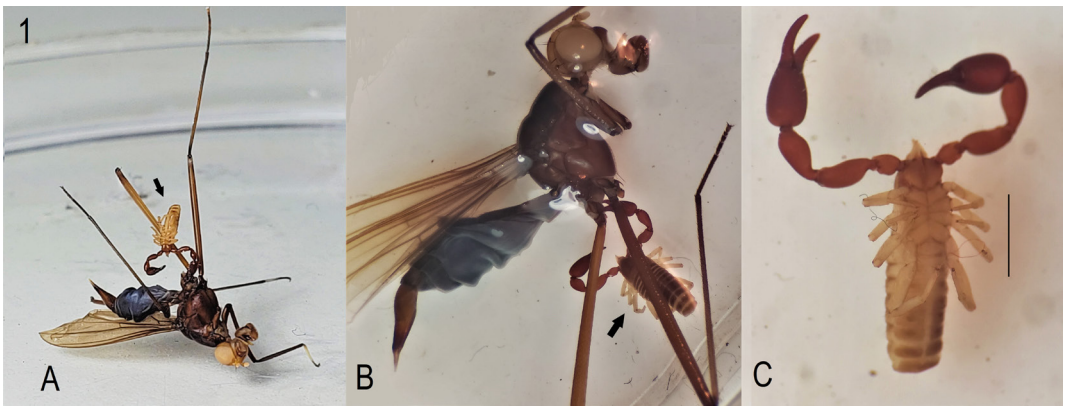

Figure 1. A-B. Pseudoscorpion *Americhernes oblongus* on the coxa of the hind leg of *Scipopus* sp. C. Ventral habitus of *A. oblongus*. Scale= 0.5 mm

Discussion

We report here for the first time the presence of *Americhernes oblongus* in Panama and its phoretic relationship with a female dipteran of genus *Scipopus* (Diptera: Micropezidae). Micropezidae are a family of acalyptratae flies, mostly distributed in the neotropical region. Many adult micropezid species are attracted to dung and decomposing fruit and some species appear to feed on insect feces and other debris on the leaf surfaces. Some micropezid adults feed on living or dead insects (Marshall 2010). Possibly both species were found in the decaying trunk and here was where they established the phoretic relationship.

In the present study only one pseudoscorpion was found on the female fly. Phoretic pseudoscorpions frequently attach to arthropod appendages, such as legs, antennae or wings (Poinar *et al.* 1998). In the present study, the pseudoscorpion was observed attached to the vector in a typical manner, to a fly's leg (Christophoryová *et al.* 2011; Santos *et al.* 2005).

The observations presented in this study show an extension of the distribution of *A. oblongus* and document a new phoretic host used by this species. Additional research is needed to obtain information on the biology of pseudoscorpions and in particular on the phoresy between pseudoscorpions and their different hosts in Panamanian forests.

Author contributions

RJM, DIQ, and DE wrote the first draft and identified the collected material. GAVG collaborated in writing the manuscript and corroborating the identification of the pseudoscorpion. RJM, DIQ, DE, GAVG all authors contributed to the writing of this manuscript.

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