

## Scientific Note

**First record of phoretic association between *Cordylochernes scorpioides* (Linnaeus) (Pseudoscorpiones: Chernetidae) and *Hylettus coenobita* (Erichson) (Coleoptera: Cerambycidae) in central Amazon**

Primer registro de foresis entre *Cordylochernes scorpioides* (Linnaeus) (Pseudoscorpiones: Chernetidae) y *Hylettus coenobita* (Erichson) (Coleoptera: Cerambycidae) en la Amazonía Central

Marcus Bevilaqua<sup>1</sup> , Matheus M.M. Soares<sup>2</sup>  and Fabián García<sup>3,4</sup> 

<sup>1</sup>Coordenação de Biodiversidade, Laboratório de Sistemática e Ecologia de Coleoptera, Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil.

<sup>2</sup>Coordenação de Biodiversidade, Laboratório de Díptera, Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil.

<sup>3</sup>Coordenação de Zoologia, Laboratório de Aracnologia, Museu Paraense Emílio Goeldi, Belém, Pará, Brazil

<sup>4</sup>Programa de Pós-Graduação em Biodiversidade e Evolução, Museu Paraense Emílio Goeldi, Belém, Pará, Brazil

<sup>1,2</sup>Instituto Nacional de Pesquisas da Amazônia, Coordenação de Biodiversidade, Av. André Araújo, N° 2223, CEP 69067-375, Petrópolis, Manaus, Amazonas, Brazil.

<sup>3,4</sup>Museu Paraense Emílio Goeldi, Av. Perimetral, 1901, CEP 66077-830, Terra Firme, Belém, Pará, Brazil.

 e-mail: marcusbevilaqua@gmail.com

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**Abstract.** We herein report for the first time the phoretic association between the pseudoscorpion *Cordylochernes scorpioides* (Linnaeus, 1758) (Chernetidae) and the longhorn beetle *Hylettus coenobita* (Erichson, 1847) (Cerambycidae) in the central Amazon. In addition, this is the first record of pseudoscorpion phoresy for the genus *Hylettus* Bates, 1864.

**Key words:** Dispersion, longhorn beetles, Neotropical, phoresis, pseudoscorpions, South America.

**Resumen.** Se reporta por primera vez la foresis entre el pseudoescorpión *Cordylochernes scorpioides* (Linnaeus, 1758) (Chernetidae) y el escarabajo de cuernos largos *Hylettus coenobita* (Erichson, 1847) (Cerambycidae) en la Amazonía central, siendo además el primer registro de foresis con un pseudoescorpión para el género *Hylettus* Bates, 1864.

**Palabras clave:** Dispersión, foresis, escarabajos longicornios, Neotrópico, pseudoescorpiones, Sudamérica.

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Phoresy or phoresis is a non-permanent commensalism-type interaction, where an organism (phoretic individual or phoront) attaches itself to another (host) for dispersion (Houck and O'Connor 1991). There are numerous records, in which arthropods act as phoronts, mites and pseudoscorpions being the most common examples. Pseudoscorpions are an arachnid group with approximately 3,700 described species (Benavides *et al.* 2019), with length ranging from 1 mm to 2 cm. Tizo-Pedroso and Del-Claro (2007) consider that

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the reduced size is a limiting factor in dispersal, making phoresy an effective mechanism for the colonization of new habitats.

Poinar *et al.* (1998) list different cases of phoretic associations involving pseudoscorpions and other arthropods, particularly with insects, where two families of beetles (order Coleoptera) stand out: Cerambycidae and Passalidae. The phoretic behavior is important for gene flow, as evidenced by males monopolizing the beetle's abdomen, among other parts, as a strategic site for inseminating dispersant females (Zeh and Zeh 1992).

Cerambycidae and Passalidae represent most of the studies dealing with phoretic pseudoscorpions in the Brazilian Amazon, initiated by Ellingsen (1905) and several decades later by Beck (1968). These authors reported *Cordylochernes scorpioides* (Linnaeus, 1758) (Chernetidae) being transported under the elytra of the harlequin beetle *Acrocinus longimanus* (Linnaeus, 1758) (Cerambycidae). Most studies on interactions of pseudoscorpions with cerambycid beetles are by Aguiar and Bührnheim (1992, 1998, 2010), who reported the occurrence of a phoretic relationship involving the following pseudoscorpion families: Atemnidae, Cheiridiidae, Cheliferidae, Chernetidae, Chthoniidae (including two families that are now being treated as subfamilies, viz. Lechytiinae and Tridenchthoniinae, see Benavides *et al.* 2019), Geogarypidae and Withiidae.

Aguiar and Bührnheim (2010) observed a certain degree of specificity between the species of longhorn beetle and the species of phoretic pseudoscorpion, making these interactions important as they can be useful in taxonomic, behavioral, evolutionary, and ecological studies. These authors also predicted that new associations will be discovered in the future, considering the paucity of biological studies involving pseudoscorpions in the Neotropical region. The present study is the first record of a phoretic interaction of *Cordylochernes scorpioides* with the longhorn beetle *Hylettus coenobita* (Erichson, 1847) in the Brazilian Amazon. The specimens were collected at the Reserva Florestal Adolpho Ducke, near Manaus, Amazonas, Brazil (3°0'27.00" S - 59°56'22.92" W). After *in situ* photographs were made, the specimens were transported to the Laboratório de Sistemática e Ecologia de Coleoptera (LASEC) of the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, where they remained alive for one week for behavioral observations. Finally, the pseudoscorpion was preserved in 70% ethanol and the beetle was anaesthetized, pinned and dried. Both specimens were deposited in the INPA's invertebrate collection. The beetle was identified with the taxonomic keys of Monné (1982, 1988), whilst the pseudoscorpion was identified using the study of van den Tooren (2004).

Photographs *in situ* were taken with a Nikon D7000 digital camera, equipped with a Nikon 18-105 mm lens, Raynox DCR-250 macro filter and Nikon Sb-700 flash. The images were edited in Adobe Lightroom software version CC 2020 for light and contrast correction; the plates were made using Adobe Photoshop software version CC 2020, according to the guide proposed by Bevilaqua (2020).

A single female specimen of *C. scorpioides* was found attached to the right antenna of *H. coenobita* (Fig. 1), demonstrating an active phoretic behavior, according to Vachon (1940) and Athias-Biche (1994). In the field, the pseudoscorpion / longhorn beetle relationship was observed for approximately 1 hour, during which neither of them showed any movement. During transportation to the laboratory, some movement was noticed, the beetle felt uncomfortable with the presence of the pseudoscorpion and often tried to remove it from the antenna with one of its forelegs, however, without success.

The host of *C. scorpioides* in this study, *H. coenobita*, is a wood-boring flat-face longhorn beetle, associated with several species of trees, including *Couma guianensis* Aubl. (Apocynaceae), *Conceveiba guianensis* Aubl. (Euphorbiaceae), *Artocarpus altilis* (Parkinson) Fosberg, *Brosimum acutifolium acutifolium* Huber, *B. guianense* Huber ex Ducke, *B. rubescens* Taub., *B. utile* (Kunth) Pittier, *Ficus guianensis* Desv. ex Ham. and *Perebea mollis* (Poepp. & Endl.) Huber (Moraceae) (Monné 2018). The presence of *H. coenobita* in these trees could

indicate a possible habitat also for *C. scorpioides*, since the habitat of this pseudoscorpion species is spaces under bark or under trunks of decaying trees in the families Moraceae and Apocynaceae (Beier 1948; Zeh and Zeh 1992; van den Tooren 2004; Moura *et al.* 2018). Previous studies indicate that *C. scorpioides* is a species commonly associated with longhorn beetles of the subfamilies Lamiinae and Prioninae, and in all cases, were found on the abdomen under the elytra (passive phoretic behavior), particularly in *Acrocinus longimanus* (Ellingsen 1905; Beier 1948; Beck 1968; Muchmore 1971; Mahnert 1979; Zeh and Zeh 1992; Aguiar and Bührnheim 1992; van den Tooren 2004; Aguiar and Bührnheim 2010), *Macrodonia cervicornis* (Linnaeus, 1758) (Aguiar and Bührnheim 1992; Aguiar and Bührnheim 2010) and *Titanus giganteus* (Linnaeus, 1771) (Aguiar and Bührnheim 1998).



**Figure 1.** A. Longhorn beetle *Hylletus coenobita* (Erichson, 1847) with a female of *Cordylochernes scorpioides* (Linnaeus) attached to its right antenna. B. Same, close-up of the pseudoscorpion.

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