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Cryptops (*Cryptops*) *spelaeoraptor* n. sp. a remarkable troglobitic species (Chilopoda: Scolopendromorpha) from Brazil

LUDSON NEVES DE ÁZARA[1] & RODRIGO LOPES FERREIRA[2]

[1]Programa de Pós-graduação em Ecologia Aplicada, Departamento de Biologia, Universidade Federal de Lavras, Minas Gerais, Brazil. E-mail: ludsonazara@yahoo.com.br
[2]Centro de Estudos em Biologia Subterrânea, Setor de Zoologia Geral, Departamento de Biologia, Universidade Federal de Lavras, Minas Gerais, Brazil. E-mail: drops@dbi.ufla.br

Abstract

Cryptops (*Cryptops*) *spelaeoraptor* is here described from Toca do Gonçalo cave, Bahia state, Brazil. This species presents highly troglomorphic traits and can be separated from all other species of *Cryptops* by possessing a unique trait in Scolopendromorpha: the ultimate pair of legs presents saw teeth on each of the prefemur to tarsus 2 (rather than being concentrated on the tibia and tarsus 1) numbering 28+30+14+17+17.

Key words: Neotropics, Caatinga, Cryptopidae, taxonomy, caves

Introduction

The northeastern region of Brazil, dominated by the Caatinga (the only semi-arid biome in the country), has revealed, in recent years, several new troglobitic species (Volkmer-Ribeiro *et al*. 2010; Machado *et al.* 2011; Pellegrini & Ferreira 2011; Prevorcnik *et al*. 2012; Ratton *et al*. 2012; Simone 2012; Fiser *et al*. 2013; Hock & Ferreira 2013; Pellegrini & Ferreira 2014). Many caves located in this biome probably represent hotspots of subterranean biodiversity and new inventories will certainly improve the knowledge of the subterranean fauna of the region.

Recently, a new troglobitic species, *Cryptops* (*Trigonocryptops*) *iporangensis* Ázara & Ferreira, 2013 was described from Ressurgência da Areias Cave, Iporanga, São Paulo, Brazil. This species comprised the seventh troglobitic species described for the genus in the world. The other troglobitic species are: *C*. (*T.*) *longicornis* Ribaut, 1915, from mainland Spain; *C*. (*T.*) *cavernicolus* Matic, Negrea and Fundora Martinez, 1977, and *C*. (*T.*) *troglobius* Matic, Negrea and Fundora Martinez, 1977, from Cuba; *C*. (*Cryptops*) *vulcanicus* Zapparoli, 1990, from the Canary Islands; *C*. (*T.*) *roeplainsensis* Edgecombe, 2005, and *C*. (*T.*) *camoowealensis* Edgecombe, 2006, from Australia (Ribaut 1915; Matic *et al*. 1977; Serra 1981; Zapparoli 1990; Edgecombe 2005, 2006; Ázara & Ferreira 2013).

Eight species of *Cryptops* occur in Brazil: *C*. (*Trigonocryptops*) *galatheae* Meinert, 1886; *C*. (*T.*) *iheringi* Brölemann, 1902; *C*. (*Cryptops*) *heathi* Chamberlin, 1914; *C*. (*C.*) *dubiotarsalis* Bücherl, 1946; *C*. (*C.*) *schubarti* Bücherl, 1953; *C*. (*C.*) *goiasus* Chamberlin, 1958; *C*. (*T.*) *hephaestus* Ázara & Ferreira, 2013 and *C*. (*T.*) *iporangensis* Ázara & Ferreira, 2013 (Bücherl 1940, 1942; Minelli 2006; Ázara & Ferreira 2013).

With this study, the number of troglobitic species in the world rises to eight, and Brazilian species of *Cryptops* rises to nine.

Material and methods

The single known specimen was collected by hand and fixed in 70% ethanol. The stereoscopic images were acquired using a Leica M205, with the software Leica Application Suite auto montage to combine the images. The morphological measurements were made using a stereomicroscope (Zeiss Stemi 2000-c) with a millimetric lens.

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Ecological remarks

Caves are characterized by absence of light, and stable temperature and humidity (Culver 1982). These conditions limit drastically the primary productivity by photosynthesis, making the largest pool of resources allochthonous in origin (Culver 1982; Souza-Silva 2003; Simon *et al.* 2007; Souza-Silva *et al.* 2007).

Under these conditions of low resource availability, a predatory species needs to be very efficient. Although Lewis (2010) had theorized that the saw teeth in *Cryptops* might not have a primary function of predation, we can hypothesize that this new morphology can be advantageous for this purpose. Accordingly, the saw teeth on all segments of the last pair of legs could hold potential prey more efficiently, improving the capture and thus, the feeding. Considering the food scarcity observed in caves (Gonçalo cave is a typical oligotrophic system), any improvement in capture ability would be selectively advantageous. Potential preys include crickets (including an undescribed troglomorphic species), cockroaches and especially silverfishes (Zygentoma: Nicoletiidae), these also troglomorphic. However, such legs can eventually be useful in defense against predators, since there is a relatively big population of a troglobitic species of Prodidomidae spiders (undescribed) in the cave which inhabits the same area where the single specimen of *C.* (*C.*) *spelaeoraptor* was found.

The Toca do Gonçalo cave is developed in limestones from the Caatinga group (of Quaternary age) (Figure 4A–C). The cavity is approximately 500 meters long, and is divided into two interconnected levels: a dry upper level, and a lower rather humid level, with several flooded passages (in contact with the phreatic level).

This cave comprises one of the richest caves regarding troglobitic species in Brazil, and also one of the most threatened by human activities. Its entrance is located in a small village and the water table (accessible only through the cave) constitutes the only water source for the locals (Figure 5A). Water has been extracted from the cave by a diesel pump, which has considerably polluted the cave. In 2010, a farmer from another village installed an additional pump (electric) in the cave. This pump was removing water throughout the day. This action resulted in a considerable lowering of the base level, which, allied with the great drought that occurred in the area in recent years (considered the most intense in the last 50 years), has led to the exposure of conduits that were always formerly submerged (Figure 5B). The single specimen of *C. (C.) spelaeoraptor* n. sp. was found in one of these conduits previously submerged. The specimen was observed under a rock on the muddy floor (Figure 5C–D). It is important to mention that our team has visited the cave several times (since 1998) and only one specimen was found, which suggests its extreme rarity.

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