Zootaxa 3779 (2): 288–296
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3779.2.9
http://zoobank.org/urn:lsid:zoobank.org:pub:A36B2224-882F-4EF1-9EDF-CFB1C7FA655C

A new troglobitic species of *Coarazuphium* Gnaspini, Vanin & Godoy (Coleoptera, Carabidae, Zuphiini) from a cave in Paraná State, Southern Brazil

DANIELA DE CASSIA BENÁ & SERGIO ANTONIO VANIN
Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, Travessa 14, 101, 05508-900 São Paulo, SP, Brasil. E-mails: danicoleoptera@gmail.com; savanin@ib.usp.br.

Abstract

A new troglobitic species of the Zuphiini genus *Coarazuphium, C. ricardoi* new species, is described on the basis of specimens collected inside the "Gruta do Varzeão" cave, in Paraná State. This is the first species of *Coarazuphium* described from Southern Brazil. The new species is compared with three other troglobitic species of the genus that are microphthalmous and have the elytral apical margins truncate (*C. pains* Álvares & Ferreira, *C. tapiguassu* Pellegrini & Ferreira and *C. whiteheadi* Ball & Shpeley). The most recent published keys for species identification of *Coarazuphium* are updated to include the new species.

Key words: cave beetles, morphology, Neotropics, taxonomy, troglobitic beetles

Introduction

In the summer of 2012, Sergio Antônio Vanin was asked by the colleague Ricardo Pinto-da-Rocha to identify some specimens of a carabid beetle collected by himself in the "Gruta do Varzeão", during his researches on the cave fauna of the state of Paraná. Upon a closer examination, the specimens were recognized to represent a new species of C*oarazuphium* Gnaspini, Vanin & Godoy, 1998. The genus *Coarazuphium* currently includes eight species, seven of which are troglobitic, occurring in caves of Central and Eastern Brazil (Godoy & Vanin 1990, Gnaspini, Vanin & Godoy 1998, Álvares & Ferreira 2002, Pellegrini & Ferreira 2011a, 2011b, and 2014) and one is probably troglophilic, from the mountains of Oaxaca, Mexico (Ball & Shpeley 2013).

Methods and material

Methods. The specimens used in this study were maintained in 70% ethanol and afterwards dried out and mounted on cards fixed on entomological pins. To study the male and female genitalia, the specimens were dissected in water, under a stereomicroscope (Wild M5A). The dissected structures were stored in capped microvials with a few drops of glycerin and pinned beneath the same specimen from which they were removed. Temporary slides were mounted in 100% glycerin medium. A stereomicroscope Wild SM-Lux with drawing tube was used for drawings and measurements were taken from these drawings. Photographs of adult structures were taken in a stereomicroscope Leica M125 with a magnifier coupled in DV camera Leica DFC. Terminology follows Liebherr & Will (1998) and Ball & Shpeley (2013). Abbreviations used in the text: **bc**, bursa copulatrix; **bs**, bursal saculus; **co**, common oviduct; **gc1**, gonocoxite 1; **gc2**, gonocoxite 2; **lp**, left paramere; **Lt**, latero tergite; OS, ostial membrane; PL, phallus length; PW, phallus width; **pg**, spermathecal gland; **rp**, right paramere; **spgd**, spermathecal gland duct. The label data for types is reported exactly as was originally printed; each line in the label is separated by one slash.

Materials. The types of *C. tessai* Godoy & Vanin, 1990, *C. cessaima* Gnaspini, Vanin & Godoy, 1998 and *C. bezerra* Gnaspini, Vanin & Godoy, 1998, housed in the Museu de Zoologia da Universidade de São Paulo, São Paulo (MZSP), were examined. The type material of the new species is deposited in the collection of the MZSP.

 Accepted by J. Serrano: 17 Feb. 2014; published: 14 Mar. 2014

6'. Head dorsally with one or two pairs of setae posteriad the anterior supraorbital setae 8
7 (6'). Slight apical sinuosity of elytron (Pellegrini & Ferreira 2014, figs. 12A and 12C) . . . . . *C. formoso* Pellegrini & Ferreira
7'. Pronounced apical sinuosity of elytron (Pelegrinni & Ferreira 2014, figs. 12B and 12D) . . . *C. caatinga* Pellegrini & Ferreira
8(6') Head dorsally with two pairs of setae (posterior suopraorbitals and occipitals) at posterior border of head capsule (Gnaspini *et al*. 1998: 304, fig. 1.) Male left paramere broad, conchoid (Gnaspini *et al*. 1998: 305, fig. 3) . . . . . *C. bezerra* Gnaspini, Vanin & Godoy
8'. Single pair of setae (posterior supraorbitals) at posterior border of head capsule (Godoy & Vanin 1990: 796, fig. 1). Male left paramere styliform (Godoy & Vanin 1990: 798, fig. 2) . . . . . *C. tessai* (Godoy & Vanin)

Acknowledgments

We are grateful to Dr. Ricardo Pinto-da-Rocha (Instituto de Biociências, Universidade de São Paulo) for donating the specimens collected by himself, for providing information about the habits of the new species, and for allowing the use of his photo equipment (FAPESP 2008/06604-7). Dr. Gisela Sessegolo (Ecossistema Consultoria Ambiental, Curitiba) kinfly provided us the photographs of the Gruta do Varzeão. Dr. Guilherme Ide and Dr. Pedro Gnaspini Neto (Museu de Zoologia USP and Instituto de Biociências USP, respectively) and Dr. José Serrano (Zootaxa editor) made valuable suggestions. The "Fundação Botícario de Proteção à Natuteza", generously provided financial support to "Grupo de Estudos Espeleológicos do Paraná, GEEP-Açungui).

References

Álvares, E.S.S. & Ferreira, R.L. (2002) *Coarazuphium pains*, a new species of troglobitic beetle from Brazil (Coleoptera: Carabidae: Zuphiini). *Lundiana*, 3, 41–43.

Ball, G.E. & Shpeley, D. (2013) Western Hemisphere Zuphiini: descriptions of *Coarazuphium whiteheadi*, new species, and *Zuphioides*, new genus, and classification of the genera (Coleoptera, Carabidae). *ZooKeys*, 315, 17–54. http://dx.doi.org/10.3897/zookeys.315.5293

Gnaspini, P., Vanin, S.A. & Godoy, N.M. (1998) A new genus of troglobitic carabid beetle from Brazil (Coleoptera, Carabidae, Zuphiini). *Papéis Avulsos de Zoologia*, 40, 297–309.

Godoy, N.M. & Vanin, S.A. (1990) *Parazuphium tessai*, sp. n., a new cavernicolous beetle from Bahia, Brazil (Coleoptera, Carabidae, Zuphiini). *Revista Brasileira de Entomologia*, 34, 795–799.

Liebherr, J.K. & Will, K.M. (1998) Inferring phylogenetic relationships within Carabidae (Insecta, Coleoptera) from characters of the female reproductive tract, *In*: Ball, G.E., Casale, A. & Vigna Taglianti, A. (Eds.), Phylogeny and Classification of Caraboidea (Coleoptera: Adephaga), XX International Congress of Entomology (1996, Firenze, Italy). *Atti Museo Regionale di Scienze Naturali di Torino*, pp. 107–170.

Pellegrini, T.G. & Ferreira, R.L. (2011a) Ultrastructural analysis of *Coarazuphium formoso* (Coleoptera: Carabidae Zuphiini), a new Brazilian troglobitic beetle. *Zootaxa*, 2866, 39–49.

Pellegrini, T.G. & Ferreira, R.L. (2011b) *Coarazuphium tapiaguassu* (Coleoptera: Carabidae Zuphiini), a new Brazilian troglobitic beetle.with ultrastructural analysis and ecological considerations. *Zootaxa*, 3116, 47–58.

Pellegrini, T.G. & Ferreira, R.L. (2014) Ultrastructural analysis in *Coarazuphium caatinga* (Coleoptera: Carabidae Zuphiini), a new Brazilian troglobitic beetle. *Zootaxa,* 3765 (6), 526–540. http://dx.doi.org/10.11646/zootaxa.3765.6.2

Sessegolo, G.C., da Rocha, L.F.S. & de Lima, F.F. (2006) *Conhecendo Cavernas*: *Região Metropolitana de Curitiba*. Grupo de Estudos Espeleológicos do Paraná Açungui, Curitiba, vii +106 pp.