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Two new stygobiotic species of *Elaphoidella* (Crustacea: Copepoda: Harpacticoida) with comments on geographical distribution and ecology of harpacticoids from caves in Thailand

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Abstract

Elaphoidella thailandensis **sp. nov.** and *E. jaesornensis* **sp. nov.**, collected during an investigation of cave-dwelling copepod fauna in the northern part of Thailand, are described and figured herein. The new species were collected from pools filled by percolating water from the unsaturated zone of a karstic aquifer in Phitsanulok and Lampang Provinces, respectively. *Elaphoidella thailandensis*, from Tham Khun cave, is distinguished from its congeners by the two-segmented endopod of pediger 1, the absence of endopod on pediger 4, and the setal formula 4, 5, 6 for the distal exopodal segment of pedigers 2–4. *Elaphoidella jaesornensis*, from Tham Phar Ngam cave, is distinguished from its most closely related species, *E. namnaoensis* Brancelj, Watiroyram & Sanoamuang, 2010, by the armature formula of the endopod of pedigers 2–5. The geographical distribution and ecology of Harpacticoida from Thai caves is also presented.

Key words: karstic caves, zoogeography, Southeast Asia, stygobiont, subterranean

Introduction

The genus *Elaphoidella* Chappuis, 1929 is distributed worldwide, with more than 200 known species (for a complete list see Wells 2007). They inhabit various habitats in both epigean and hypogean environments throughout different zoogeographic regions. The genus is characterized by a large number of stygobiotic taxa (Boxshall & Defaye 2008; Mori & Brancelj 2008; Galassi *et al*. 2009). Many of them are common in percolating water from unsaturated karstic habitats (i.e. epikarst) in the temperate zone (Brancelj 2009).

In the past, information on the species of *Elaphoidella* from Southeast Asia was limited and sporadic. Chappuis (1928) reported three new species from Java: *E. bromeliacola* (Chappuis, 1928) collected from phytotelmata (water bodies held by plants) of *Colocasia glabra* Banks ex Gaertn, *Pandanus* sp. (Pandanaceae); *E. malayica* (Chappuis, 1928) from phytotelmata of *Billbergia pyramidalis* (Sims) Lindl (Bromeliaceae); and *E. javaensis* (Chappuis, 1928) from moist moss. Three years later, Chappuis (1931) reported eight *Elaphoidella* species from phytotelmata of *C. glabra* and from a thermal spring in Java and Sumatra: *E. grandidieri* (Guerne & Richard, 1893), *E. bidens* (Schmeil, 1894), *E. longipedis* Chappuis, 1931, *E. thienemanni* Chappuis, 1931, *E. similis* Chappuis, 1931, *E. cornuta* Chappuis, 1931, *E. elegans* Chappuis, 1931 and *E. intermedia* Chappuis, 1931. Considering their ecology, only *E. intermedia* could be considered as a potentially subterranean species, while the rest of the species are epigean, living in phytotelmata or in surface water. However, during recent investigations of caves in Thailand it appears that they are frequently found in epikarst, where they have viable populations (Watiroyram, pers. observ.). From this point of view they can be considered as stygophilic taxa with very wide ecological tolerance (pers. observ. of the authors). Apart from the already listed species from the Indonesian islands, there are more records from research expeditions to Vietnam and Thailand. Borutzky (1967) described a second subterranean species, *E. vietnamica* Borutzky, 1967, from a cavern water reservoir in Vietnam. A third

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