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## The species of the *Chthonius heterodactylus* group (Arachnida, Pseudoscorpiones, Chthoniidae) from the eastern Alps and the Carpathians

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### Abstract

The species of the subgenus *Chthonius* (*Chthonius*) C.L. Koch, 1843 displaying a sigmoid fixed chelal finger from the Eastern Alps and the Carpathians, assigned to the informal *heterodactylus* species-group, are revised and a key given for their identification. The following species are present in this area: *Chthonius cavernarum* Ellingsen, 1909 (Italy, Romania, Slovenia), *C. heterodactylus* Tömösváry, 1882 (Czech Republic, Hungary, Germany, Poland, Romania, Slovakia, Ukraine), *C. hungaricus* Mahnert, 1981 (Hungary, Romania, Slovakia), *C. lessiniensis* Schawaller, 1982 (Italy), *C. pusillus* Beier, 1947 (Austria, Slovenia) and *C. raridentatus* Hadži, 1930 (Austria, Croatia, Italy, Slovenia). The following synonymies are proposed: *Chthonius diophthalmus* Daday, 1889, *C. (C.) orthodactylus gracilis* Beier, 1935, *C. (C.) ksenemani* Hadži, 1939 and *C. (C.) leruthi* Beier, 1939 are junior subjective synonyms of *C. heterodactylus* Tömösváry, 1882 (**n. syn.**); *C. (C.) pivai* Gardini, 1991 is a junior subjective synonym of *C. (C.) lessiniensis* Schawaller, 1982 (**n. syn.**); *C. (C.) ellingseni* Beier, 1939, *C. (C.) brandmayri* Callaini, 1986 and *C. (C.) jalzici* Čurčić, 1988 are junior subjective synonyms of *C. (C.) raridentatus* Hadži, 1930 (**n. syn.**). Lectotypes are designated for *C. cavernarum* Ellingsen, 1909 and *C. (C.) ellingseni* Beier, 1939. *Chthonius (C.) pusillus* is newly recorded from Slovenia, *C. (C.) hungaricus* and *Mundochthonius carpaticus* Rafalski, 1948 are newly recorded from Romania, and the presence of *C. (C.) cavernarum* in Italy is confirmed.

**Key words:** Europe, taxonomy, lectotypes, new synonymies, new records

### Introduction

The subgenus *Chthonius* (*Chthonius*) C.L. Koch, 1843 includes slightly over 120 living epigeal and hypogean species in the Euro-Mediterranean area, extending eastward (with few species) to the Caucasus, Iran, Turkmenistan and Tajikistan; three species are known from the U.S.A. (Harvey 2013). The eastern and southeastern European faunas contain a number of species—chiefly in the Dinaric region—with a more or less marked sigmoid curvature of the fixed chelal finger and a visibly shorter movable chelal finger. Some of these were placed in the subgenus *Chthonius* (*Sigmodactylus*) Hadži (1930), which was created for a heterogeneous group of species (now referred to four different genera of Chthoniidae and Pseudotyranochthoniidae), displaying a sigmoid fixed chelal finger. *Sigmodactylus* was later synonymized with the genus *Pseudochthonius* Balzan, 1892 by Judson (1992). However, *Sigmodactylus* was generally ignored in the literature and the species of *Chthonius* with a sigmoid fixed chelal finger were generally assigned to the informal *heterodactylus* species-group, which is probably not monophyletic. The present work deals with the species of this group found in the Eastern Alps of Italy, Austria and Slovenia and in the Carpathian range, comprising Sudetes and Transylvania, belonging to Germany, Poland, the Czech Republic, Slovakia, Hungary and Romania.

### Material and methods

#### *Specimens examined and depositories*

This study is based on the examination of 924 adults and 194 nymphs of *Chthonius* (*Chthonius*), stored in the collection of the author (those without acronym in the text) and in the following institutions or private collections (acronyms mostly follow Evenhuis, 2012).

Most na Soči (Slovenia): length of pedipalpal chela 1.01–1.38 (♂) 1.02–1.64 (♀) mm, length of movable chelal finger 0.61–0.825 (♂) 0.62–0.94 (♀) mm (Figs 65–66, 73–74). The following synonymies are therefore proposed: *Chthonius* (*C.*) *ellingseni* Beier, 1939, *C.* (*C.*) *brandmayri* Callaini, 1986 and *C.* (*C.*) *jalzici* Čurčić, 1988 are all junior subjective synonyms of *C. raridentatus* Hadži, 1930 (**n. syn.**).

*Chthonius raridentatus* is a troglophilic species known from the eastern Venetian pre-Alps to southern Austria (Carinthia), Slovenia and northern Croatia (Fig. 90). Among the species of *Chthonius* of the *C. heterodactylus* group, *C. raridentatus* seems to be most closely related to the sympatric (rarely syntopic) *C. cavernarum*. Differences between *C. raridentatus* and *C. cavernarum* are given in the above key.

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