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Four new troglolithic species of the genus *Megalothorax* Willem, 1900 (Collembola: Neelipleona) from the Carpathian Mountains (Slovakia, Romania)

VLADIMÍR PAPÁČ¹ & LUBOMÍR KOVÁČ²

¹ State Nature Conservancy, Slovak Caves Administration, Železničná 31, 979 01 Rimavská Sobota, Slovak Republic.

E-mail: papac@ssj.sk

² Institute of Biology and Ecology, Faculty of Science, P. J. Šafárik University, Moyzesova 11, 040 01 Košice, Slovak Republic.

E-mail: lubomir.kovac@upjs.sk

Abstract

Four new species of *Megalothorax* Willem, 1900 are described and illustrated: *M. tatrensis* sp. nov., *M. carpaticus* sp. nov., *M. hipmani* sp. nov. from caves in Slovakia and *M. draco* sp. nov. from the Drăcoia Cave in western Romania. The species represent troglolithic forms exhibiting different level of troglomorphy involving such features as larger body, elongated foot complex, antennae, mucro and body chaetae. The most pronounced troglomorphy is observed in *M. hipmani* sp. nov. and *M. draco* sp. nov. Species descriptions are completed with comparative tables of chaetotaxy of antennae and legs. Diagnostic table for all congeners and dichotomous identification key to the world species are provided. Distribution records of other *Megalothorax* species in Slovakia are added.

Key words: cave fauna, troglomorphy, endemism, identification key

Introduction

Family Neelidae, established by Folsom in 1896, represents one of the less diverse collembolan taxon with 33 species distributed in five genera (Janssens & Christiansen 2011). The richest is genus *Megalothorax* Willem, 1900 with 24 species, including five new species described recently by Schneider and D'Haese (2013). It is probably a cosmopolitan genus with two widespread species, *M. minimus* Willem, 1900 and *M. incertus* Börner, 1903, whereas other species have often disjunctive or even endemic distribution. The morphology of *Megalothorax* resembles that of the closely related genera *Neelus* and *Neelides*, differing basically in fusion of antennal segments III and IV, presence of 2+2 neosminthuroid chaetae on hind part of abdomen and five marginal chaetae around abdominal sensory field (Bretfeld 1999).

The first important studies devoted to the genus *Megalothorax* were those of Börner (1906), Bonet (1947) and Stach (1957). Structure of unguis and mucro were the first diagnostic characters used to distinguish between the species. Massoud and Vannier (1965, 1967) applied additional morphological characters, i.e. arrangement of labrum and antennae. Later, Massoud and Delamare-Deboutteville (1969) stressed the importance of size and shape of sensilla on antennal segments III and IV based on SEM microphotographs of *M. minimus* and *M. incertus*. Deharveng (1978) and Deharveng and Beruete (1993) introduced another important characters, namely chaetotaxy of ventral side of antennal segment IV, and provided complete chaetotaxy of legs. Palaearctic species of the genus were summarized in monograph of Bretfeld (1999), and Fjellberg (2007) added morphology of mouthparts for *M. minimus* from Scandinavia. Recently, the genus has been redefined by Schneider and D'Haese (2013). The authors established new diagnostic characters for the genus, redescribed nominal species *M. minimus* and described five new species from Belgium, France, Svalbard and Patagonia.

In the present paper we describe four new *Megalothorax* species from the caves of the Carpathian Mountains (Slovakia, Romania). We followed modern taxonomic characters and added some new morphological features (position of chaeta p4 to wr2 on Th. III, length of chaetae a6 and a5 on Th. III) useful for identification on infrageneric level. According to literature data *M. minimus* is the most widespread and frequent representative of

- 14 Flame-shaped sensillum on sensory field of abdomen (s.f. 6) enlarged; maxillary outer lobe with 1 sublobal hair; unguia short
 *M. willemi* Schneider & D'Haese, 2013 (Belgium)
 - Flame-shaped sensillum on s.f. 6 small; maxillary outer lobe with 2 sublobal hairs; unguia elongated
 *M. carpaticus* sp. nov. (Slovakia, cave)
- 15 Chaeta a0 on head dorsum substituted by oval integumentary structure; maxillary outer lobe with 2 sublobal hairs; unguia not
 elongated *M. sanctistephani* Christian, 1998 (Austria, France)
 - Chaeta a0 on head dorsum present; chaeta x on Ant. IV substituted by triangular tubercle; unguia elongated
 *M. tuberculatus* Deharveng & Beruete, 1993 (Pyrenees, cave)

The following species are not included in the key (*species inquirenda*):

- M. albus* Maynard, 1951 (U.S.A.)
M. australis Delamare & Massoud, 1963 (Argentina)
M. boneti Stach, 1960 (Afghanistan, cave)
M. incertus Börner, 1903 (Cosmopolitan?)
M. laevis Denis, 1948 (Vietnam)
M. piloli Christiansen & Bellinger, 1992 (Hawaii)
M. poki Christiansen & Bellinger, 1992 (Hawaii)
M. rapoportii Salmon, 1964 (Argentina, Mexico)
M. rubidus Salmon, 1946 *sensu* Bonet (1947) (New Zealand)
M. spinotricosus Palacios-Vargas & Sánchez, 1999 (Mexico, cave)
M. tonoius Palacios-Vargas & Sánchez, 1999 (Mexico, cave)
M. tristani Denis, 1933 *sensu* Bonet (1947) (USA, Mexico, Costa Rica)
M. subtristani Delamare Debutteville, 1950 (Ivory Coast) is *nomen nudum* since missing description.

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