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Male genitalia of *Protoneobisium biocovense* (Pseudoscorpiones, Neobisiidae)

Václav DUCHÁČ

Department of Biology, University of Hradec Králové, V. Nejedlého 573, CZ-50003 Hradec Králové, Czech Republic; e-mail: vaclav.duchac@uhk.cz

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The male genitalia of the cave-dwelling pseudoscorpion *Protoneobisium biocovense* from Croatia are described. Their importance for deepening our insight into the evolution affinity within the genus *Neobisium* is discussed. Three possible evolutionary lines of anamorphic changes of male genitalia within the genus *Neobisium* are considered.

Key words: *Pseudoscorpiones*, *Protoneobisium*, *Neobisium*, male genitalia.

Introduction

The species *Protoneobisium biocovense* has been known from caves of Mt. Biokovo near Makarska, Croatia. It was described by Müller in 1931 under the generic name *Obisium*. Based on Müller's description, BEIER (1939, 1963) included the species in his monographs on European pseudoscorpions under the name *Neobisium biocovense*.

The morphology of this species has been studied in detail by ČURČIČ (1988), who established a new separate genus *Protoneobisium*. In his description, however, the author failed to pay sufficient attention to the morphology of the genitalia (he only described the chaetotaxy of the genital area). Since this species is thought to be a relict of pre-Tertiary origin (ČURČIČ, 1988), knowledge on the formation of the genitalia of this pseudoscorpion can contribute to the discussion regarding the evolution relationships within the genus *Neobisium* (including *Protoneobisium*).

Some times ago, we obtained a not very ample material of cave pseudoscorpions from Mt. Biokovo. When processing the material, the genitalia of a male pseudoscorpion of the species *Protoneobisium biocovense* were studied in detail and the data obtained are presented herein.

Material and methods

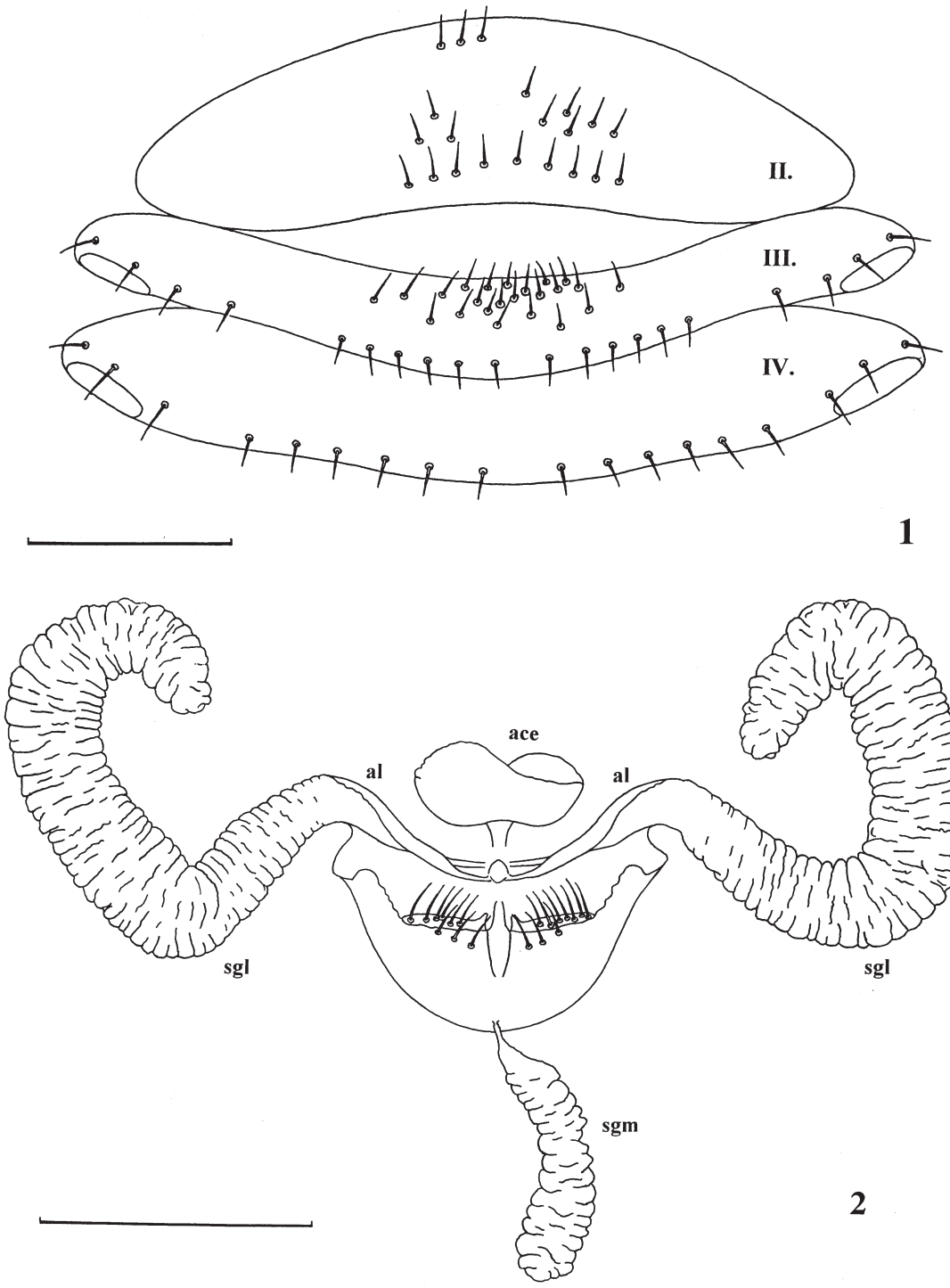
Material examined: *Protoneobisium biocovense* (Müller, 1931), Sv. Jure env., Mt. Biokovo, Croatia (17°05′ E, 44°41′ N), 1.X.1998, 1 male, leg. R. Mlejnek, det. et coll. V. Ducháč (Department of Biology, University of Hradec Králové).

The specimen was made transparent with 10% KOH and mounted into a permanent microscopic preparation by using Liquid de Swan as medium. In this manner the genitalia could be examined from the dorsal (and ventral) view.

Results

Operculum genitalis anterior (= sternite II) with 21 setae (Fig. 1); among these 9 setae form a row on the rear edge. Operculum genitalis posterior (= sternite III) with 43 setae; in these 20 setae on the rear edge (12 in the middle part) and 23 setae form a group in the middle part of the front edge.

Atrium canalis ejaculatorii has a broad triangular shape and is 0.23 mm broad. Sacci genitales



Figs 1, 2. *Protoneobisium biocovense*: 1 – chaetotaxy of the male genital area; 2 – male genitalia: ace – atrium canalis ejaculatorii, al – apodemae laterales, sgl – sacci genitales laterales, sgm – saccus genitalis medialis. Scales 0.4 mm.

laterales are relatively robust, broad, dominate optically the whole habitus of the genitalia (Fig. 2); they are about 0.95 mm long and 0.14 mm broad (in the middle). Saccus genitalis medialis has the form of an oblong sac, is comparatively short and reaches the 5^{th} segment of the opisthosoma (about 0.37 mm long, about 0.08 mm broad). The span of the branches of the apodema lateralis is 0.46 mm. Apodema dorsalis is not visible in the preparate. In the atrium genitalis area there is a paired group of setae comprising 9 and 10 setae, respectively.

Discussion and conclusions

The chaetotaxy of the genital area (sternite II and III) of the examined male agrees with data of Čurčič (1988). If *Protoneobisium biocovense* is a relict form of pre-Tertiary origin, its genitalia can be regarded as a model of the original plesiomorphic stage of genitalia from the range of the genus *Neobisium*.

When compared with published data concerning male genitalia of various species of the genus *Neobisium* (references in Ducháč, 2001, 2003), and with our observations (Ducháč, 2003), two or three evolutionary lines of anamorphic changes can be traced within the genus *Neobisium*.

In the first line, sacci genitales laterales have undergone gradual shortening and diminishing while saccus genitalis medialis has been conspicuously (or even extremely) elongated. In the second line, on the contrary, sacci genitales laterales have become longer and relatively slimmer while saccus genitalis medialis has diminished. A third evolution line is also conceivable; in this line no apparent change has taken place in the size of sacci genitales laterales as compared to saccus genitalis medialis, or vice versa.

It should be stressed that the above interpretation is a preliminary suggestion. More accurate conclusions can only be drawn after the genitalia of a higher number of species of the genus *Neobisium* and higher number of specimens of the species *Protoneobisium biocovense* have been studied.

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