

Male genitalia of eutroglobiotic pseudoscorpions
***Neobisium slovacum*, *Neobisium leruthi*,**
and *Neobisium aueri*
(Pseudoscorpiones: Neobisiidae)

Václav DUCHÁČ

Abstract: Male genitalia and chaetotaxy of genital opercula are described for three eutroglobiotic *Blothrus*-pseudoscorpions, viz. *Neobisium slovacum* Gulička, 1977, *Neobisium leruthi* Beier, 1939, and *Neobisium aueri* Beir, 1962. The importance of morphology of male genitalia in the identification of potential evolutionary relationships within the genus *Neobisium* is discussed.

Key words: Male genitalia, chaetotaxy, *Neobisium*, *Blothrus*

Introduction

The pseudoscorpion *Neobisium* (*Blothrus*) *slovacum* Gulička, 1977 is the sole eutroglobiotic species of the genus *Neobisium* known so far to inhabit Western Carpathians (DUCHÁČ 1999, DUCHÁČ & MLEJNEK 2000). Within a monographic treatment of its morphology, a comparison was carried out with the geographically closest eutroglobiotic *Neobisium* pseudoscorpions, viz. the Carpathian species *Neobisium* (*Blothrus*) *leruthi* Beier, 1939 and the East-Alpine species *Neobisium* (*Blothrus*) *aueri* Beier, 1962. This short communication describes their male genitalia and chaetotaxy of the genital opercula. No description of those organs in the species in question has been presented in chernetological literature so far.

Material and Methods

The pseudoscorpion material studied has been described in detail previously (DUCHÁČ 1999, DUCHÁČ & MLEJNEK 2000).

For the description of their male genitalia, the bodies of the pseudoscorpions were clarified by boiling in 10% KOH for 7–10 minutes prior to the slide mounting. This allowed us to examine the chaetotaxy of the posterior genital opercula (= 2nd sternite), anterior genital opercula (= 3rd sternite), and internal organs of the reproductive system. The organs atrium canalis ejaculatorii (ace), apodema lateralis (al) and the genital sacs – the paired sacci genitales laterales (sgl) and the unpaired saccus genitales medialis (sgm) – could be observed from the dorsal (and/or ventral) view.

The ace width and the sgl to sgm length ratio appeared to be convenient parameters for the description of the male genitalia. Although the genital sacs are sometimes twisted and may be deformed during the slide preparation procedure, their relative size can have a significant explanatory power, particularly for interspecies comparison (DUCHÁČ 2003, LEGG 1975).

Results

Neobisium (Blothrhus) slovacum Gulička, 1977

Specimen from the locus typicus (Stará Brzotínská jaskyňa cave)

Chaetotaxy of the genital opercula: The posterior genital operculum with 7–8 setae, anterior genital operculum with a group of cca 20 setae and with 4–6 setae along the rear edge (Fig. 1).

Male genitalia: Atrium canalis ejaculatorii are broad oval, 0.12 mm broad. Sacci genitales laterales rather slim, get neither broader nor narrower towards the ends, approximately 0.35 mm long. Saccus genitales medialis saccular, relatively short, approximately 0.15 mm long (Fig. 3). The sgl to sgm length ratio is about 2.4.

Specimens from other sites

Chaetotaxy of the genital opercula: The chaetotaxy on the genital opercula is similar to that in the specimens from the locus typicus. Variable are the number of setae on the posterior operculum (up to 12)

and the number of setae growing on the rear edge of the anterior genital operculum (up to 11) (Fig. 2).

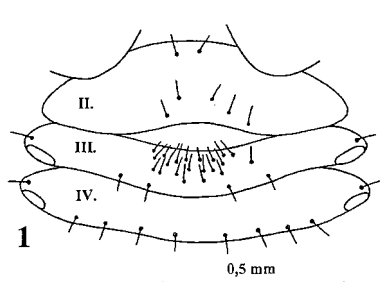


Fig. 1: *Neobisium slovacum* from Stará Brzotinská jaskyňa cave. Male genitals opercula.

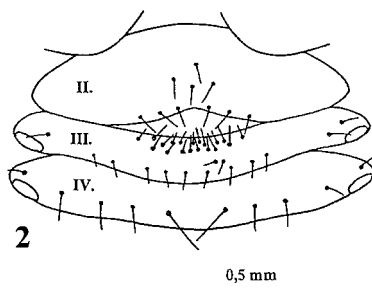


Fig. 2: *Neobisium slovacum* from Čikova diera cave. Male genitals opercula.

Male genitalia: In some specimens, Atrium canalis ejaculatorii is more circular in shape than it is in the specimens from the locus typicus, and is 0.10–0.12 mm broad. Sacci genitales laterales are rather slim, get neither broader nor narrower towards the ends, 0.38–0.40 mm long. Saccus genitales medialis is saccular, somewhat elongated, 0.21–0.23 mm long. The sgl to sgm length ratio lies within the range of 1.7–2.0 (Fig. 4). Apodema dorsalis is bifurcated into 2 rather long and slim branches, each with a lobate side outshot. Atrium genitale with 3 pairs of setae inside (Fig. 4).

Neobisium (Blothrus) leruthi Beier, 1939

Chaetotaxy of the genital opercula: The chaetotaxy of the genital opercula is similar to that in *N. slovacum* but the number of setae growing on the rear edge of the anterior genital operculum is larger (Fig. 5).

Male genitalia: Atrium canalis ejaculatorii of a broad triangular shape, 0.16 mm broad. Sacci genitales laterales rather slim, roughly 10 times longer than as broad in the middle, get neither broader nor narrower towards the ends, about 0.46 mm long. Saccus genitales medialis elongated, saccular, approximately 0.33 mm long. The sgl to sgm length ratio is 1.4. Four pairs of setae inside the atrium genitale (Fig. 7).

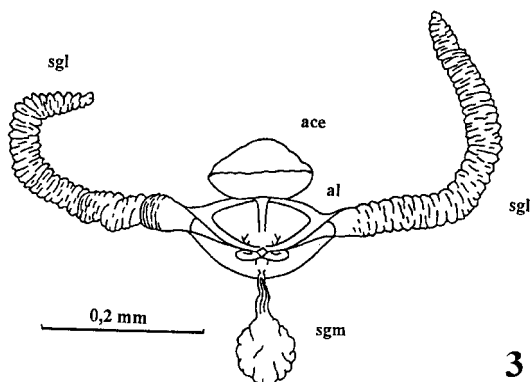


Fig. 3: *Neobisium slovacum* from Stará Brzotínská jaskyňa cave. Male genitalia.

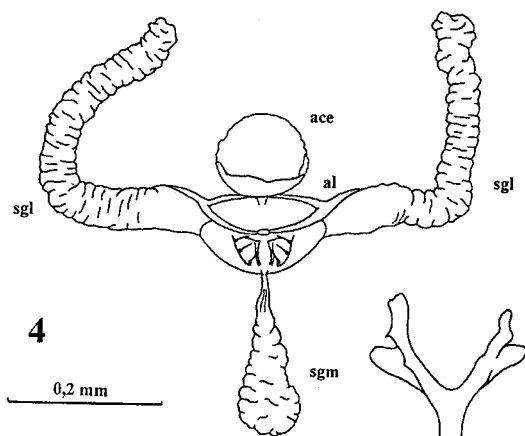


Fig. 4: *Neobisium slovacum* from Čikova diera cave. Male genitalia.

Neobisium (Blothrur) aueri Beier, 1962

Chaetotaxy of the genital opercula: The chaetotaxy of the genital opercula of this species resembles closely that of the species *N. leruthi* (Fig. 6).

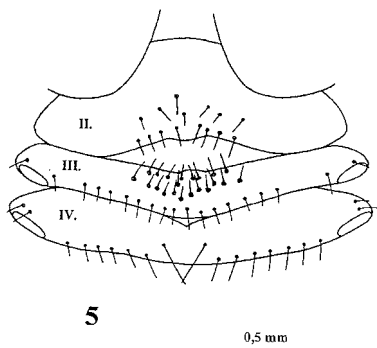


Fig. 5: *Neobisium leruthi*, male genital opercula.

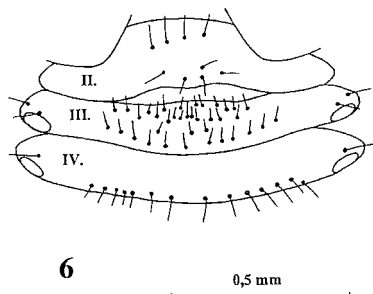


Fig. 6: *Neobisium aeuri*, male genital opercula.

Male genitalia: Atrium canalis ejaculatorii somewhat elongated forwards, 0.17 mm long. Sacci genitales laterales rather slim, although thicker than in the two preceding species, get neither broader nor narrower towards the ends, about 0.55 mm long. Saccus genitales medialis elongated saccular, approximately 0.52 mm long. The sgl to sgm length ratio is 1.1. Three pairs of setae inside the atrium genitale (Fig. 8).

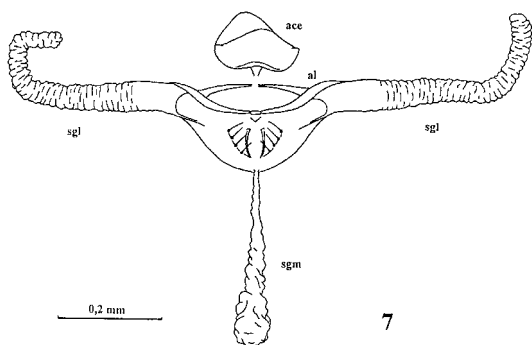
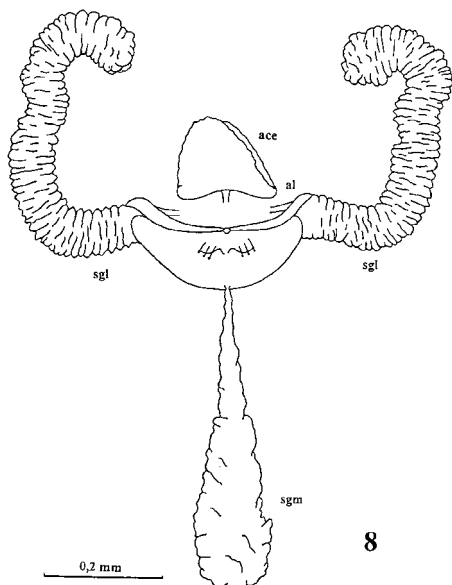


Fig. 7: *Neobisium leruthi*, male genitalia.

Discussion

Neither the male genitalia nor the chaetotaxy of the genital opercula of the species in question have been described so far, so there is no published data to compare our observations with. However, comparison

can be made with other species of the genus *Neobisium*, whose morphology of the male genitalia is known.



8

Fig. 8: *Neobisium aueri*, male genitalia.

Based on investigation of our own material (DUCHÁČ 2003, 2004) in conjunction with published data (see references in the papers cited) we suggest that two basic evolutionary lines at least (but probably more) can be distinguished within the genus *Neobisium* based on their male genitalia.

We regard the situation plesiomorphic in the species *Protoneobisium biocovense* (Müller, 1931), whose sgl are mighty, thick, sgm is rather small (sgl to sgm length ratio about 2.5) (DUCHÁČ 2004). The slimming of the sgl and – in one of the evolutionary lines – gradual lengthening of the sgl and relative shortening of the sgm appears to be apomorphy. In the other evolutionary line, by contrast, apomorphic changes consist in a lengthening of the sgm and diminishing of the sgl (in some species, sgm is multiply longer than sgl). We refer to the former line as carcinoid (with reference to *N. carcinoides* s. l.) and to the latter as allodontoid (with reference to *N. allodontatum*).

We suggest that the species *N. slovacum* approaches the situation within the carcinoid line. In the species *N. leruthi* the sgl are rather slim, the sgm is also rather slim and somewhat elongated. Such features can be seen in the genital sacs of other Carpathian species, such as *N. polonicum*, *N. maxbeieri*, and *N. closanicum* (DUMITRESCO & ORGHIDAN 1970, KRUMPÁL 1979). It is not clear as yet, though, whether those species belong to the one or other evolutionary line or if they represent a separate line. As to the species *N. aueri*, the rather thick sgl may be regarded as evidence of a higher evolutionary age, and the sgl to sgm length ratio, which is 1.1, as evidence of a close relationship to the allodentoid line.

Better founded hypotheses regarding the evolutionary trends within the genus *Neobisium* can only be set up after a better insight is gained into the genitalia of the majority of species belonging to this genus.

References

- DUCHÁČ, V. (1999): Merkmale zur Bestimmung der Art *Neobisium (Blothrus) slovacum* (Arachnida: Pseudoscorpiones). – Entomol. Zeitschrift **109**:175–180.
- DUCHÁČ, V. (2003): Die männlichen Genitalstrukturen der *Neobisium*-Arten der Tschechischen Republik (Pseudoscorpiones: Arachnida). – Entomol. Zeitschrift (Stuttgart) **113**:2–6.
- DUCHÁČ, V. (2004): Male genitalia of *Protoneobisium biocovense* (Pseudoscorpiones, Neobisiidae). – Biologia (Bratislava) **59**:289–291.
- DUCHÁČ, V. & Mlejnek, R. (2000): Records of the pseudoscorpion *Neobisium (Blothrus) slovacum* in caves and chasms of the Slovak Karst. In: MOCK, A. et KOVÁČ, L. (eds.): Fauna jaskýň (Cave Fauna), Košice **2000**:15–20.
- DUMITRESCO, M. & ORGHIDAN, T. (1970): Contribution a la connaissance des Pseudoscorpions souterrains de Roumanie. – Trav. Inst. Spéol. „Emile Racovitza“ **IX**:97–111.
- LEGG, G. (1975): The genitalia and associated glands of five British species belonging to the family Neobisiidae (Pseudoscorpiones: Arachnida). – J. Zool. (London) **177**:123–151.
- KRUMPÁL, M. (1979): *Neobisium polonicum* Rafalski, 1937 (Pseudoscorpionidea) nový druh pre faunu ČSSR. – Biologia (Bratislava) **34**:429–435.

Author:

Václav DUCHÁČ, Department of Biology, Faculty of Education, Hradec Králové University, V. Nejedlého 573, CZ-500 03 Hradec Králové, Czech Republic.

e-mail: vaclav.duchac@uhk.cz

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Mitteilungen des Internationalen Entomologischen Vereins](#)

Jahr/Year: 2004

Band/Volume: [29 2004](#)

Autor(en)/Author(s): Duchac Vaclav

Artikel/Article: [Male genitalia of eutroglobiotic pseudoscorpions *Neobisium slovacum*, *Neobisium leruthi*, and *Neobisium aueri* \(Pseudoscorpiones: Neobisiidae\) 51-57](#)