

A NEW GENUS AND SPECIES OF THE FAMILY ANTHROLEUCOSOMATIDAE FROM SERBIA (MYRIAPODA, DIPLOPODA, CHORDEUMATIDA)

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Abstract. – A new genus and species of Anthroleucosomatidae is described from Serbia. *Dazbogosoma naissi* n. g. n. sp. is characterized by the presence of few ocellae, apically bifurcated syncoxite, and the presence of complex lateral parts of anterior gonopods with truncated process. The new genus belongs to the *Bulgarosoma* complex of genera that probably deserve a suprageneric level.

Key words: Diplopoda, Anthroleucosomatidae, new genus, taxonomy, biogeography, Serbia.

INTRODUCTION

One of the least understood chordeumatids are representatives of the family Anthroleucosomatidae Verhoeff, 1899 (Shear and Leonard, 2004). Ćurčić et al. (2008), in a recent review of the members of this family, distinguished six complexes of genera based on the structure of the anterior and posterior gonopods: *Bulgarosoma*, *Anamastigona*, *Anthroleucosoma*, *Alloiopus*, *Caucaseuma*, and *Leschius* complexes. Biogeographically, these groups of genera belong to Carpatho-Balkan, Rhodopian, Mediterranean, South-Carpathian, East-Mediterranean and Altai elements. One of the most diverse centers of differentiation and radiation of anthroleucosomatids is the Balkan Peninsula.

In this paper, we describe a new genus and species from the Balkan Peninsula collected in the Cerjanska Propast Cave, village Cerje, near Niš, Serbia. The new species appears to be more closely related to

the *Bulgarosoma* complex of genera than to the any other anthroleucosomatids.

Descriptions of the new genus and new species follow a pattern recently proposed for Chordeumatida by Spelda (2001) and Golovatch and Wytwer (2003) and for Anthroleucosomatidae by Makarov et al. (2003).

RESULTS

Taxonomy

DAZBOGOSOMA, MAKAROV AND ĆURČIĆ, NEW GENUS

Type species: *Dazbogosoma naissi* Makarov and Ćurčić, new species

Etymology: In Slav mythology Dažbog is the god who gives life to the Earth, and also the god of sun and rain.

Diagnosis: Small anthroleucosomatid (13.57-14.32 mm) with 29 pleurotergites and ocellae. Anterior gonopods with apically bifurcated syncoxite and a spinulose and denticulated unpaired central process. Lateral parts of anterior gonopods massive and consist of numerous processes. Posterior gonopods with angiocoxites and colpocoxites with similar 'ground-plan' to other relatives. Differing from all other anthroleucosomatid genera in the shape of syncoxite and structure of lateral parts of anterior gonopods.

A single species, *Dazbogosoma naissi* Makarov and Ćurčić, new species

Material examined: Holotype male from the Cersjanska Propast Cave, village Cerje, near Niš, Serbia; collected on October 17, 2010 by Iva Njunjić; two paratype males and one juvenile; same locality, collector and data as in the holotype. Type material is deposited in the collection of the Institute of Zoology, Faculty of Biology, University of Belgrade (IZB 1110-1113).

Etymology: *Naissus* is Latin name for Niš.

Description: Body with 29 pleurotergites + telson. Color almost white. Body length 13.57-14.32 mm. Vertical diameter of the largest pleurotergites 0.68-0.81 mm.

Head with seven ocellae arranged in two rows. Frontal side concave, with small tubercle on dorsal side. Surface of head covered with minute setae. Labrum with 12 labral and four supralabral setae. Gnathochilarium: promentum triangular, without setae; stipites each with eight long apical and subapical setae, two shorter median setae and eight basal microsetae. Lingual plates with one row of three long setae and three shorter basal setae.

Antennal length 1.59-1.86 mm; antennomeres II and IV-VII with one, three, one, three and one long sensillum, respectively.

Collum narrower than head, with six macrochaetae.

Pleurotergites: lateral keels of metazonites relatively small, rounded, gradually disappearing from somites 23, and absent on somites 28 and 29. Macrochaetae relatively short, on midbody somites 0.22-0.25 mm long.

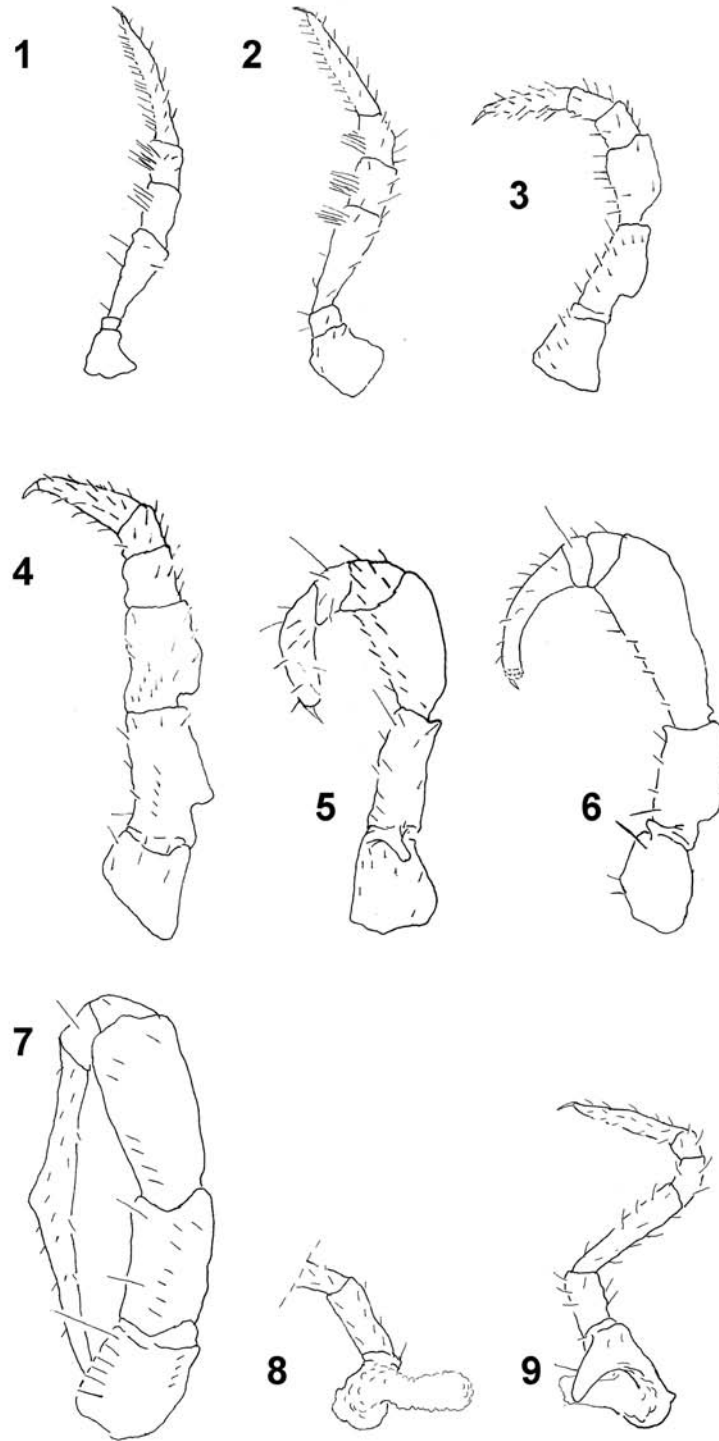
Macrochaetal index CIX (on pleurotergite 15), i.e., (distance between exterior and median macrochaetae) / (distance between interior and median macrochaetae) = 0.49. Median index MIX (on pleurotergite 15), i.e., (distance between interior macrochaetae and axial suture) / (distance between interior and median macrochaetae) = 0.405. The macrochaetal angle between the arm created by the median and exterior macrochaetae and the arm formed by the median and interior macrochaetae, MA (on pleurotergite 15) $\approx 99^\circ$.

Epipect, hypoplect, and paraplect same as in other related genera.

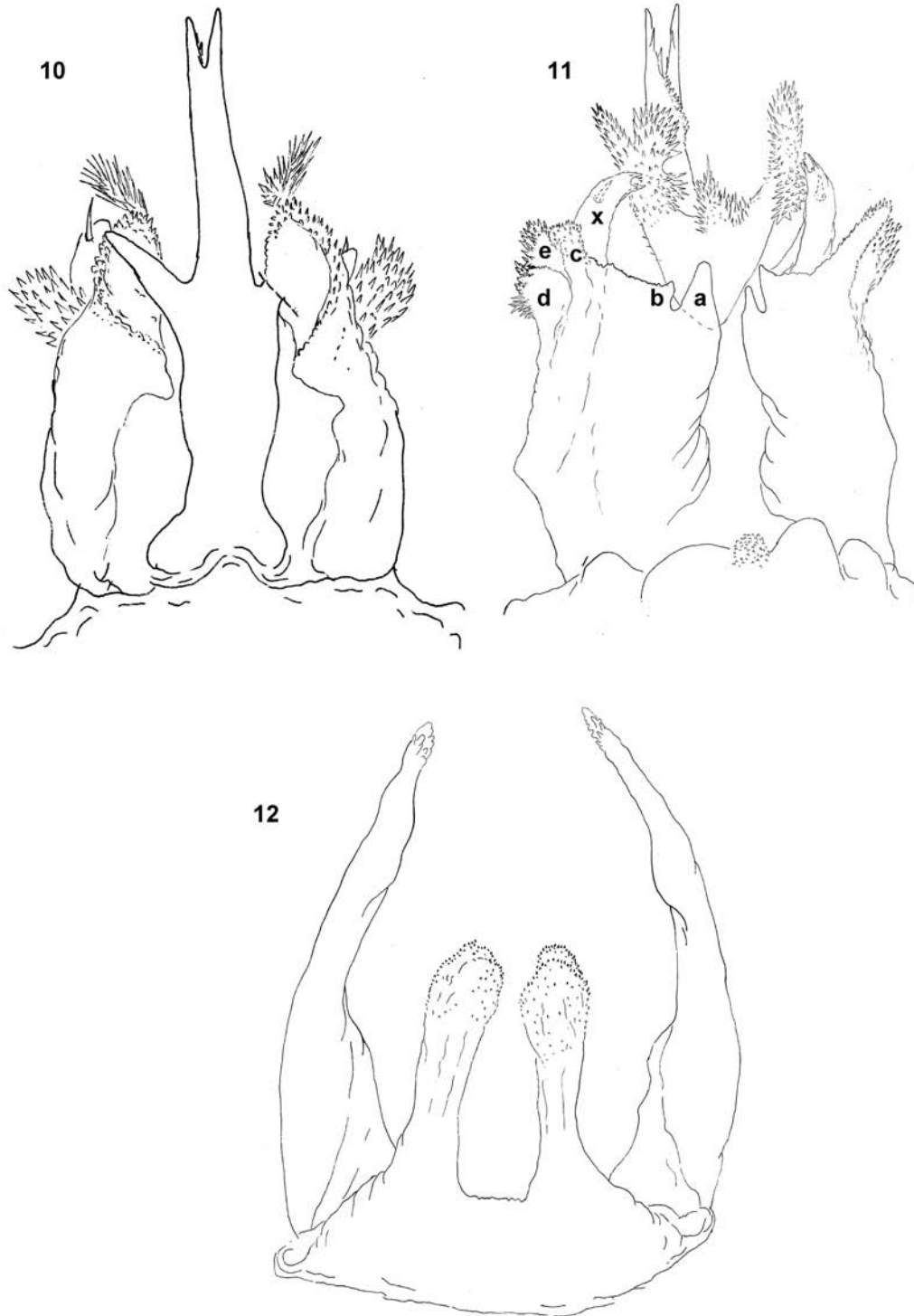
Maximal length of midbody legs 0.85-0.95 mm. First and second leg-pairs with tarsal combs (Figs. 1-2).

Male sexual characters: Leg-pair III with enlarged prefemur and femur (Fig. 3); leg-pair IV with enlarged podomeres (Fig. 4), especially massive prefemur and femur; leg-pair V with prefemoral basal lobe (Fig. 5); leg-pair VI with small prefemoral basal lobe, femur VI strongly elongated, almost two-fold in comparison with femur on other legs, tarsus VI C-shaped with numerous nipples on the top (Fig. 6). Leg-pair VII is the most elongated; length of tarsus VII is almost the same as the length of all other podomeres VII, length/breadth of tarsus VII is 7.25 (Fig. 7). Leg-pairs X and XI with massive coxal glands (Figs. 8-9); coxa XI with prominent horn.

Anterior gonopods (Figs. 10-11): consist of two large elements: (1) syncoxite and unpaired central



Figures 1–9. *Dazbogosoma naissi* n. gen., n. sp., holotype male from the Cerjanska Propast Cave, village Cerje, near Niš, Serbia; 1 – leg I, 2 – leg II, 3 – leg III, 4 – leg IV, 5 – leg V, 6 – leg VI, 7 – leg VII, 8 – coxa X, 9 – leg XI.



Figures 10–12. *Dazbogosome naissi* n. gen., n. sp., holotype male from the Cerjanska Propast Cave, village Cerje, near Niš, Serbia; 10 – anterior gonopods, caudal view, 11 – anterior gonopods, oral view, 12 – posterior gonopods, oral view.

process (which is connecting), and (2) two lateral parts with numerous processes or lamellas. Basal part of syncoxite is bottle-like; middle part carries two lateral triangular processes. Apical part of syncoxite is bifurcate, both parts on the anterior side with two spines. Subapically syncoxite carries long denticulated lamella. Unpaired central process triangular with two lateral parts almost parallel-sided and covered with numerous spines and tubercles. On oral side, lateral parts almost touch each other in middle line and apically consist of five more or less denticulated and spinulated branches (assigned as a, b, c, d, and e in Fig. 11). On caudal side both lateral parts are apically spatulated, margins are supplied with numerous nipples and spines. Between branches and spatulated process of lateral part of anterior gonopods appears an elongated truncated process, subapically with prominent spine (x, Fig. 11).

Posterior gonopods (Fig. 12): colpocoxites parallel-sided, apically pilose and hyaline, with something like the trace of a canal, but without a visible opening. Angiocoxites in basal part massive, gradually pointed toward the apex. Apical part covered with numerous papillae; subapically with inner lamellae.

Female: unknown.

DISCUSSION

Based on the structure of the anterior and posterior gonopods, the new genus belongs to the *Bulgarosoma* complex of genera. Ćurčić et al. (2008) includes the following genera in this complex: *Bulgarosoma* Verhoeff, 1926 (two species), *Banatosoma* Ćurčić and Makarov, 2000 (one species), *Belbogosoma* Ćurčić and Makarov, 2008 (one species), *Perunosoma* Ćurčić and Makarov, 2007 (one species), *Rhodoposoma* Ćurčić and Makarov, 2000 (one species), *Serbosoma* Ćurčić and Makarov, 2000 (five species), *Svarogosoma* Makarov, 2003 (one species), and *Troglodicus* Gulička, 1967 (two species).

Of the described anthroleucosomatid genera, the new genus seems closer in gonopod design to the *Bulgarosoma* complex of the genera. In each of

these genera, the presence of syncoxite represents a clear apomorphy, separating them from all other representatives of this family. Makarov et al. (2003) supposed that the syncoxite is responsible for initial recognition between sexes, and that in some taxa correlation in the structure of the vulvae and syncoxite exists. Unfortunately, the absence of a female does not allow us to validate this opinion.

The shape and structure of the unpaired central process in the new forms is similar to the same structure in representatives of the genera *Serbosoma* and *Bulgarosoma*. *D. naissi* n. sp. shares the shape of the basal and medial parts (with two lateral processes) of the syncoxite with *Serbosoma* species. We supposed that the bifurcate shape of the apical part may be a step in evolution toward the splitting of the syncoxite into two branches just appearing in the genus *Belbogosoma*. The new forms share the complex structure of the lateral parts of the anterior gonopods with representatives of the genera *Perunosoma* and *Belbogosoma*. Interestingly, the presence of a truncated process on the anterior gonopods in new genus may be homologous with the sigmoid process in the genus *Perunosoma* or flagelliform process in the genus *Belbogosoma*.

Dazbogosoma naissi n. gen. n. sp. shows few adaptations to cave life, such as elongated appendages or depigmentation. However, the presence of few ocellae implies recent isolation in the cave system comparable with the group of *Serbosoma* species, but on the other hand, possibly closest relationship is with the *Belbogosoma* species (also with ocellae).

Biogeographically, anthroleucosomatids in the Balkan Peninsula are very limited in distribution and mainly restricted to one or few cave systems in different mountain regions (*Serbosoma* species have been found in a few caves on the Mts. Kučajske Planine and Homoljske Planine, *Belbogosoma* has been found in a cave on Mt. Tupižnica, *Perunosoma* inhabits Mt. Svrlijske Planine, while *Svarogosoma* inhabits only Mt. Suva Planina). The discovery of the new genus and species in the Cerjanska Propast Cave nicely completes the hitherto somewhat disjunct distribu-

tion of the family in east and southeastern Serbia (e.g. between Mts. Devica, Ozren and Tupiznica in the north, and Mts. Svrljiske Planine and Suva Planina in the south). Finally, the finding of a new genus confirms the hypothesis of Makarov et al. (2003) that the karst zone in eastern Serbia represents the main center of the divergent differentiation and radiation of bulgarosomids to the south, east and north (migration to the west has probably been limited by the presence of the Morava-Vardar tectonic depression).

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REFERENCES

- Ćurčić, B. P. M., Makarov, S. E., Tomić, V. T., Mitić, B. M., Ćurčić, S. B., Dudić, B. D., Lučić, L. R., and Jasnić, N. (2008) On a new genus of endemic millipedes (Diplopoda: Chordeumatida: Anthroleucosomatidae) from the Balkan Peninsula. *Zootaxa* **1743**, 1–16.
- Golovatch, S. and Wytwer, J. (2003) A new genus and species of the millipede family Altajellidae from eastern Kazakhstan, Central Asia (Diplopoda: Chordeumatida). *Annales Zoologici*, Warszawa **53**, 579–584.
- Makarov, S. E., Mitić, B. M., and Ćurčić, S.B. (2003) *Svarogosoma bozidarcurcici* n. g., n. sp., (Diplopoda, Anthroleucosomatidae) from the Balkan Peninsula, with notes on its phylogeny. *Periodicum Biologorum* **105**, 465–472.
- Shear, W. A. and Leonard, W. P. (2004) The millipede family Anthroleucosomatidae, new to North America: *Leschius mcallisteri*, n. gen., n. sp. (Diplopoda: Chordeumatida: Anthroleucosomatoidea). *Zootaxa* **609**, 1–7.
- Spelda, J. (2001) Review of the millipede genus *Pterygophorosoma* Verhoeff, 1897 (Diplopoda, Chordeumatida, Craspedosomatidae). *Andrias* **15**, 29–48.