

A NEW EPIGEAN FALSE SCORPION: *RONCUS SUMADIJAE* N. SP. (NEOBISIIDAE, PSEUDOSCORPIONES) FROM THE BALKAN PENINSULA (WESTERN SERBIA)

B. P. M. ĆURČIĆ¹, R. N. DIMITRIJEVIĆ¹, V. T. TOMIĆ¹, M. PECELJ²,
B. S. ILIĆ¹, S. E. MAKAROV¹, NINA B. ĆURČIĆ³ and SNEŽANA PEŠIĆ⁴

¹ Institute of Zoology, Faculty of Biology, University of Belgrade, 11000 Belgrade, Serbia

² Faculty of Geography, University of Belgrade, 11000 Belgrade, Serbia

³ Geographical Institute "Jovan Cvijić" SASA, 11000 Belgrade, Serbia

⁴ Faculty of Science, University of Kragujevac, 34000 Kragujevac, Serbia

Abstract. — A new endemic epigeal species from the village of Adžina Livada, nr. Kragujevac, Mts. Gledičke Planine, western Serbia, is erected, described and thoroughly illustrated. Its main morphometric characters and important diagnostic features are analyzed and compared to the two closest congeners, *Roncus ivanjicae* B. Ćurčić, and *R. golijae* B. Ćurčić from western Serbia, respectively.

Key words: Pseudoscorpiones, Neobisiidae, endemism, *Roncus sumadijae* n. sp., Mts. Gledičke Planine, Serbia.

INTRODUCTION

A major breakthrough in the study of both epigeal and cavernicolous species of the genus *Roncus* L. Koch, 1873 in Serbia has been carried out during the past years by Ćurčić (1992a, b), Ćurčić and Dimitrijević (2009), Ćurčić et al. (1993, 2004, 2006, 2010c), and Dimitrijević (2000). The known number of taxa assigned to this genus in Serbia has risen from seven in 1993 to the present 32. Of these, 21 species are cave dwelling and 11 inhabit leaf-litter and humus. The majority of these species are relict and endemic forms for Serbia, i.e. for the Balkan Peninsula.

In this study, careful examination of collected material from the village Adžina Livada, near Kragujevac, west Serbia, resulted in establishing a new pseudoscorpion species, *Roncus sumadijae* n. sp., probably an endemic and relict form inhabiting the studied area.

Setal designations follow Beier (1963).

SYSTEMATIC PART

NEOBISIIDAE J. C. CHAMBERLIN, 1930

RONCUS L. KOCH, 1873

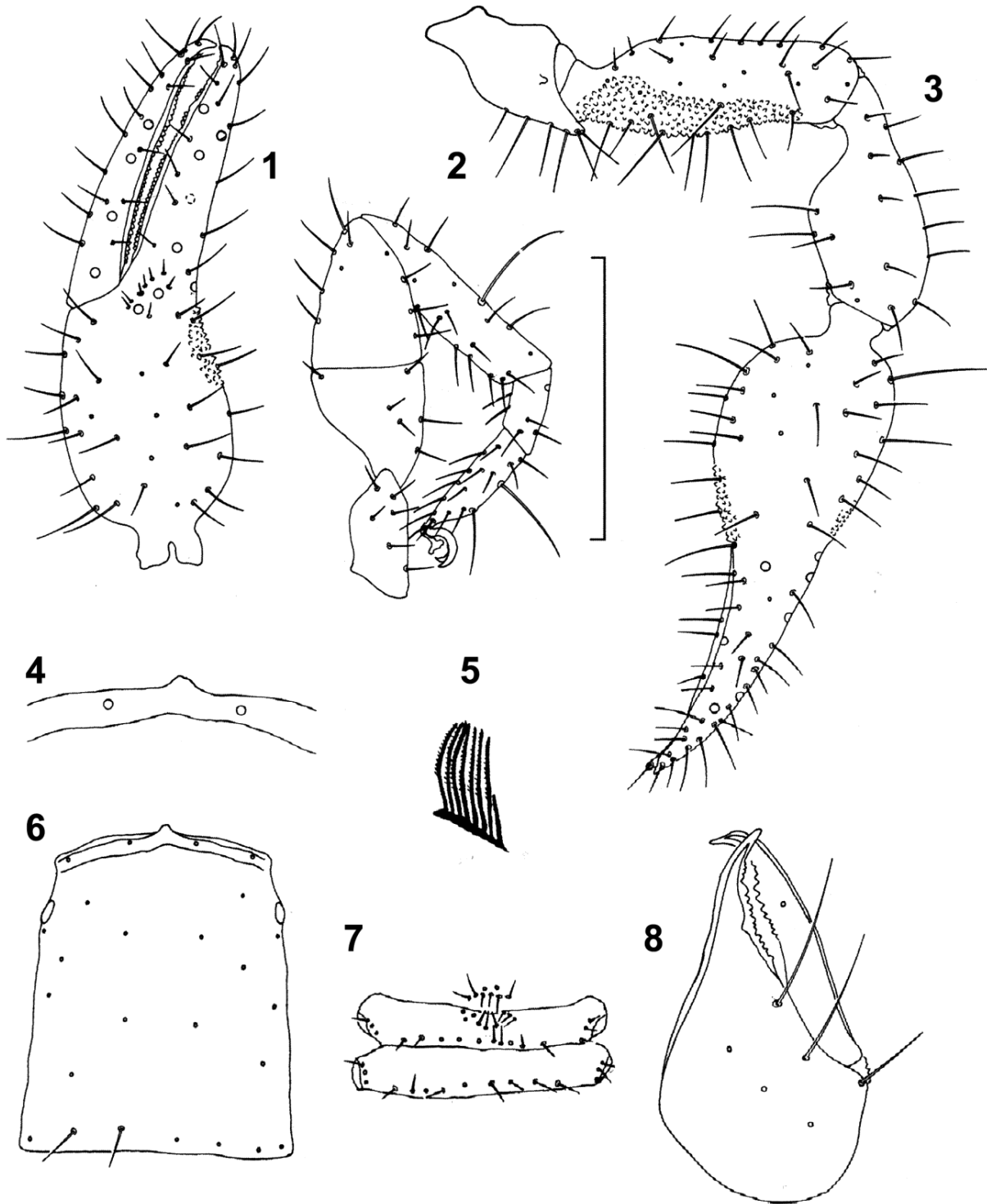
RONCUS SUMADIJAE B. ĆURČIĆ

NEW SPECIES

(Figs. 1-8; Table 1, Map 1)

Etymology — The new species is named after Šumadija, or Central Serbia, i.e. its wider type locality.

Material examined — Holotype male and paratype male, from the village Adžina Livada, nr. Kragujevac, Mts. Gledičke Planine, Western Serbia (region of Šumadija); collected on 22 May 2005 by Dr. Snežana Pešić (Kragujevac).



Figs. 1 – 8. *Roncus sumadijæ* n. sp., holotype male from western Serbia; 1 – pedipalpal chela, 2 – leg IV, 3 – pedipalp, 4 – epistome, 5 – flagellum, 6 – carapace, 7 – male genital area, 8 – chelicera. Scale lines = 0.50 mm (Figs. 1, 2, 3, 6, and 7) and 0.25 mm (Figs. 4, 5, and 8).

Description — Carapace longer than broad (Fig. 6). Anterior border narrower than the posterior border (Fig. 6). Two pairs of eyes present (Fig. 6). Anterior border with differentiated knob-like epistome, although there are some minute denticulations, particularly between the two median setae. The carapace bears 24-25 setae: 4 anterior, 6 ocular, 8 median and intermediary, and 7 or 8 posterior setae (Fig. 6). Pre-ocular microsetae seem to be absent. Carapace reticulate throughout.

Tergites and sternites IV – X smooth, uniseriate and entire. Tergal setation: 8 – 11 – 11 – 11 – 12 – 11 – 11 – 11 – 9 – 9 (holotype) and 8 – 10 – 11 – 11 – 11 – 11 – 11 – 10 – 9 – 9 (paratype).

Female genital area: unknown.

Male genital area: sternite II with 7 or 8 median and posterior setae (Fig. 7), sternite III with 8 or 9 anterior setae, 10 posterior setae (18 or 19 in total) with 3 microsetae anterior to each stigma. Sternite IV has 9 posterior setae and 3 suprastigmatic microsetae on either side, and sternites V – X carry: 14 – 13 – 13 – 13 – 13 – 10 and 15 – 13 – 13 – 13 – 12 – 10 setae. Twelfth abdominal segment with two pairs of small setae. Plural membranes granulostriate.

Cheliceral galea in the form of a small and low hyaline tubercle (Fig. 8). Cheliceral palm bears 6 long setae, movable finger with one seta. Both cheliceral fingers with small close-set and apically rounded denticles, which diminish proximally and are eventually replaced with rounded teeth. Movable chelal finger with 2 or 3 distal larger teeth and a series of 12 teeth which diminish in size proximally; fixed finger with a row of 13 or 14 close-set and triangular, but apically rounded denticles which diminish proximally. Galeal seta inserted, basal to larger teeth on the movable finger (Fig. 8). The flagellum has eight blades, one small blade proximally and seven blades twice this length, more or less in pairs, distally. The most distal member of the series are curved but all, to some extent, are pinnate on two sides (Fig. 5).

Apex of pedipalpal coxa bears five long and acuminate setae. Trochanter and tibia are short, other pedipalpal articles are smooth and elongate (Fig. 3). Pedipalpal femur with interior and lateral granulations, tibia smooth, and pedipalpal chela and pedipalpal chelal palm with some interior and lateral tubercles (Fig. 3). There are no small setae proximal to **eb** and **esb**; instead, 5 or 8 such setae exist dorsal to the two trichobothria (Fig. 1). Chelal fingers of almost equal size. Fixed chelal finger with 47-50 close-set teeth; movable finger teeth with 42-44 such teeth. Chelal fingers longer than chelal palm; fixed chelal finger of nearly equal length as pedipalpal femur, pedipalpal femur shorter or longer than carapace (Table 1).

Trichobothriotaxy: **ib** and **isb** on the palm of the chela; the fixed finger carries a further 6 trichobothria (**et**, **est**, **esb**, **eb**, **it**, and **ist**); the movable finger bears 4 trichobothria (**t**, **st**, **sb**, and **b**) (Fig. 1).

Pedal coxae II and III bear some coxal spines.

Tibia IV, basitarsus IV, and telotarsus IV each with a single tactile seta.

The claws are sickle-shaped, smooth and slender (Fig. 2).

Measurements and morphometric ratios are presented in Table 1.

Differential diagnosis — *Roncus sumadijae* n. sp. is easily distinguished from *R. ivanjicae* B. Ćurčić, and *R. golijae* B. Ćurčić in the form of appendages, setation of tergites and sternites, body size, linear measurements and ratio of different characters, as well as in the type locality (Table 1; Ćurčić, 1988).

Distribution — Since the distribution center of the genus *Roncus* is found in southern Europe, it is probable that it evolved there. This assumption is further supported by the discovery of several *Roncus*-related genera in the caves of southwestern Europe and by the discovery of new living genera from the Dinaric karst and Maritime Alps, both of which have

Table 1. Linear measurements (in millimeters) and morphometric ratios in *Roncus sumadijæ* n. sp., *R. ivanjicæ* B. Ćurčić and S. Ćurčić, and *R. golijæ* B. Ćurčić and S. Ćurčić from western Serbia. The distinctive traits of *Roncus sumadijæ* n. sp. are in bold numbers. Abbreviations: MM = males.

	<i>R. sumadijæ</i> n. sp.	<i>R. ivanjicæ</i>	<i>R. golijæ</i>
	MM	MM	MM
Character			
Body			
Length (1)	1.845-1.905	2.38-2.985	1.95-2.25
Cephalothorax			
Length (2)	0.49-0.56	0.66-0.79	0.58-0.60
Breadth (2a)	0.44	0.535-0.63	0.48-0.51
Ratio 2/2a	1.11-1.27	1.23-1.25	1.18-1.21
Abdomen			
Length	1.345-1.355	1.65-2.195	1.37-1.65
Chelicerae			
Length (3)	0.33	0.39-0.47	0.35-0.36
Breadth (4)	0.17-0.18	0.20-0.25	0.18-0.195
Length of movable finger (5)	0.20-0.21	0.25-0.33	0.23-0.26
Ratio 3/5	1.57-1.65	1.33-1.57	1.38-1.565
Ratio 3/4	1.83-1.94	1.77-2.07	1.85-1.94
Pedipalps			
Length with coxa (6)	2.575-2.66	3.31-4.155	2.855-3.00
Ratio 6/1	1.395-1.40	1.39	1.33-1.46
Length of coxa	0.41-0.45	0.52-0.69	0.435-0.47
Length of trochanter	0.305-0.33	0.31-0.46	0.34-0.35
Length of femur (7)	0.51-0.54	0.665-0.88	0.56-0.61
Breadth of femur (8)	0.12-0.16	0.20-0.23	0.17-0.185
Ratio 7/8	3.375-4.25	3.17-3.90	3.11-3.53
Ratio 7/2	0.91-1.10	0.93-1.11	0.965-1.03
Length of patella (tibia) (9)	0.42-0.43	0.535-0.69	0.48-0.50
Breadth of patella (tibia) (10)	0.20	0.24-0.30	0.21-0.22
Ratio 9/10	2.10-2.15	2.11-2.52	2.23-2.27
Length of chela (11)	0.90-0.94	1.18-1.52	1.02-1.07
Breadth of chela (12)	0.275-0.285	0.32-0.41	0.28-0.29
Ratio 11/12	3.27-3.30	3.305-3.89	3.52-3.69
Length of chelal palm (13)	0.43-0.44	0.52-0.70	0.47-0.49
Ratio 13/12	1.54-1.56	1.46-1.85	1.62-1.71
Length of chelal finger (14)	0.47-0.50	0.63-0.82	0.55-0.58
Ratio 14/13	1.09-1.14	1.06-1.27	1.145-1.18
Leg IV			
Total length	1.745-1.835	2.345-2.79	1.87-1.91
Length of coxa	0.285-0.305	0.31-0.45	0.29-0.32
Length of trochanter (15)	0.21-0.22	0.26-0.35	0.23-0.24
Breadth of trochanter (16)	0.10	0.14-0.17	0.11-0.13
Ratio 15/16	2.10-2.20	1.73-2.43	1.85-2.18
Length of femur + patella (17)	0.47-0.48	0.62-0.74	0.50-0.51
Breadth of femur + patella (18)	0.19	0.22-0.27	0.18-0.20
Ratio 17/18	2.47-2.53	2.30-3.09	2.50-2.83
Length of tibia (19)	0.42-0.43	0.535-0.68	0.41-0.44
Breadth of tibia (20)	0.10-0.14	0.10-0.13	0.10
Ratio 19/20	3.91-4.20	4.46-5.64	4.10-4.40
Length of metatarsus (21)	0.14-0.16	0.20-0.25	0.16-0.17
Breadth of metatarsus (22)	0.07	0.07-0.10	0.07
Ratio 21/22	2.00-2.285	2.20-2.93	2.285-2.43
Length of tarsus (23)	0.22-0.24	0.31-0.38	0.25-0.26
Breadth of tarsus (24)	0.06	0.07-0.08	0.065
Ratio 23/24	3.67-4.00	3.85-5.14	3.85-4.00
TS ratio - tibia IV	0.585-0.595	0.53-0.64	0.51-0.62
TS ratio - metatarsus IV	0.25-0.285	0.11-0.28	0.21-0.24
TS ratio - tarsus IV	0.27-0.33	0.31-0.40	0.22-0.27



Map 1. Distribution of *Roncus sumadijae* n. sp. in Serbia.

more primitive characteristics compared to *Roncus* (Ćurčić, in preparation). The discovery of these “proton roncids” justifies the assumption regarding the great age and autochthonous origin of the *Roncus* stock in the Dinaric region, as well as in the Mediterranean area as whole (Ćurčić, 1972, 1984, 1988, 1992a, b; Ćurčić and Beron, 1981; Ćurčić et al., 1993, 2004, 2010a, b, c, d, e, f, g; 2011a, b, c, d, e, f, g, h; Hadži, 1937). It seems probable that the ancestral population was broadly distributed over the ancient continent of Laurasia. Subsequently, with a break up of this supercontinent, North American and Eurasian genera and species evolved differently. As already mentioned, on the Balkan Peninsula some ancient taxa have survived; however, the majority of *Roncus* species probably originated during the Tertiary period. Finally, the *Roncus*-related taxa then, are of different age, integrating the species of Laurasian, Paleo-Mediterranean and Proto-Balkan origin (Ćurčić, 1986; Ćurčić et al., 2004).

Acknowledgment — This study is financially supported by the Serbian Ministry of Education and Science (Grant No. 173038).

REFERENCES

- Beier, M. (1963). Ordnung Pseudoscorpionidea (Afterskorpione). In : *Bestimmungsbücher zur Bodenfauna Europas*, Vol. 1. - Akademie Verlag, Berlin, 1-313.
- Ćurčić, B. P. M. (1972). Nouveaux pseudoscorpions cavernicoles de la Serbie et de la Macédoine. *Acta Mus. Mac. Sc. Nat. Skopje* **12**, 141-161.
- Ćurčić, B. P. M. (1984). On two new species of *Roncus* L. Koch, 1873, from Macedonia (Arachnida: Pseudoscorpiones: Neobisiidae). *Senckenbergiana biol.*, **65**, 97-104.
- Ćurčić, B. P. M. (1986). On the origin and biogeography of some pseudoscorpions of the Balkan Peninsula. *Biol. Gallo-Hellenica, Athens*, **12**, 85-92.
- Ćurčić, B. P. M. (1988). *Cave-Dwelling Pseudoscorpions of the Dinaric Karst*. - Acad. Sci. Art. Slov., Cl. IV, Hist. Nat., Opera 26, Inst. Biol. Ioannis Hadži, 8, Ljubljana, 1-192.
- Ćurčić, B. P. M. (1992a). New and little-known pseudoscorpions of the genus *Roncus* L. Koch (Neobisiidae, Pseudoscorpiones) from Serbia, Yugoslavia. *Bijdr. Dierk.*, **61** (4), 237-249.
- Ćurčić, B. P. M. (1992b). A new and species of *Roncus* L. Koch, 1873, from southeastern Europe (Pseudoscorpiones: Neobisiidae). *Proc. Entomol. Soc. Wash.*, **94** (4), 447-453.
- Ćurčić, B. P. M., and P. Beron (1981). New and little-known cavernicole pseudoscorpions in Bulgaria (Neobisiidae, Pseudoscorpiones, Arachnida). *Glasn. Srpsk. Akad. Nauka, Beograd*, 329; Cl. Sci. Nat.-Math., **48**, 63-85.
- Ćurčić, B. P. M., and R. N. Dimitrijević (2009). *Roncus jelsniccae*, a new epigeal pseudoscorpion of the genus *Roncus* L. Koch, 1873, from East Serbia. *Arch. Biol. Sci., Belgrade*, **61** (4), 751-755.
- Ćurčić, B. P. M., Ćurčić, S. B., Ćurčić, N. B., and S. E. Makarov (1993). Three new epigeal representatives of *Roncus* L. Koch, 1873 (Neobisiidae, Pseudoscorpiones), from the Balkan Peninsula. *Bijdr. Dierk.*, **62** (4), 237-248.
- Ćurčić, B. P. M., Dimitrijević, R. N., and A. Legakis (2004). The Pseudoscorpions of Serbia, Montenegro, and the Republic of Macedonia. Monographs, 8. - Institute of Zoology – Faculty of Biology – University of Belgrade, Hellenic Zoological Society, Committee for Karst and Speleology – Serbian Academy of Sciences and Arts, Institute of Nature Conservation of the Republic of Serbia, Belgrade-Athens, 1-400.
- Ćurčić, B. P. M., Dimitrijević, R. N., Giurginca, A., Ilie, V., Rađa, T., Ćurčić, S. B., and V. T. Tomić (2006). Four new and endemic species of *Roncus* L. Koch (Neobisiidae, Pseu-

- doscrapiones) from Romania, Serbia, and Montenegro. *Periodicum biologorum*, **108** (2), 213-221.
- Čurčić, B. P. M., Dimitrijević, R. N., and N. B. Čurčić (2010a). *Neobisium deltshevi* (Neobisiidae, Pseudoscorpiones), a new endemic cave-dwelling pseudoscorpion from East Serbia. *Arch. Biol. Sci., Belgrade*, **62** (1), 191-198.
- Čurčić, B. P. M., Dimitrijević, R. N., Rađa, T., Čurčić, N. B., and M. Milinčić (2010b). *Chthonius* (*Chthonius*) *onaei* n. sp. (Chthoniidae, Pseudoscorpiones), a new epigeal species from Croatia. *Arch. Biol. Sci., Belgrade*, **62** (2), 494-499.
- Čurčić, B. P. M., Rađa, T., Čurčić, S. B. and N. B. Čurčić (2010c). On *Roncus almissae* n. sp., *R. krupanjensis* n. sp., and *R. radji* n. sp., three new pseudoscorpions (Pseudoscorpiones, Neobisiidae) from Croatia and Serbia, respectively. *Arch. Biol. Sci., Belgrade*, **62** (2), 503-513.
- Čurčić, B. P. M., Makarov, S. E., Rađa, T., Čurčić, S. B., Čurčić, N. B., and M. Pecelj (2010d). On three new cave pseudoscorpions (Pseudoscorpiones, Neobisiidae) from Mt. Mosor, Dalmatia (Croatia). *Arch. Biol. Sci., Belgrade*, **62** (3), 813-828.
- Čurčić, B. P. M., Lemaire, J.-M., Čurčić, S. B., Dimitrijević, R. N., Milinčić, M., and M. Pecelj (2010e). Two new epigeal pseudoscorpions (Neobisiidae, Pseudoscorpiones) from the Maritime Alps, France. *Arch. Biol. Sci., Belgrade*, **62** (3), 829-834.
- Čurčić, B. P. M., Rađa, T., Dimitrijević, R. N., Tomić, V. T., Pecelj, M., and S. B. Čurčić (2010f). *Chthonius* (*Chthonius*) *torakensis* and *Chthonius* (*Ephippiochthonius*) *cikolae*, two new species of pseudoscorpions (Chthoniidae) from Croatia. *Arch. Biol. Sci., Belgrade*, **62** (4), 1223-1229.
- Čurčić, B. P. M., Rađa, T., Dimitrijević, R. N., Čurčić, S. B., and M. Milinčić (2010g). A new troglobiotic pseudoscorpion (Pseudoscorpiones, Neobisiidae) from Istria, Croatia. *Arch. Biol. Sci., Belgrade*, **62** (4), 1245-1250.
- Čurčić, B. P. M., Dimitrijević, R. N., Makarov, S. E., Milinčić, M., Pecelj, M., and T. Rađa (2011a). Two new pseudoscorpions from the UN Administered Province of Kosovo and Croatia. *Arch. Biol. Sci., Belgrade*, **63** (1), 235-244.
- Čurčić, B. P. M., Čurčić, S. B., Čurčić, N. B., and B. S. Ilić (2011b). *Chthonius* (*Globochthonius*) *medeonis* n. sp., a new cave false scorpion from Montenegro. *Arch. Biol. Sci., Belgrade*, **63** (1), 245-250.
- Čurčić, B. P. M., Rađa, T., Makarov, S. E., Čurčić, S. B., Ilić, B. S., and R. N. Dimitrijević (2011c). A cavernicolous pseudoscorpion of the genus *Chthonius* (*Chthonius*) C. L. Koch from Dalmatia. *Arch. Biol. Sci., Belgrade*, **63** (2), 493-498.
- Čurčić, B. P. M., Dimitrijević, R. N., and N. B. Čurčić (2011d). A new cave pseudoscorpion (Pseudoscorpiones: Chthoniidae): *Chthonius* (*Chthonius*) *lupinus* n. sp. from Bosnia-Herzegovina. *Arch. Biol. Sci., Belgrade*, **63** (2), 499-506.
- Čurčić, B. P. M., Ilić, B. S., Makarov S. E., and V. T. Tomić (2011e). On two new cave-dwelling and relict pseudoscorpions of the genus *Chthonius* C. L. Koch (Chthoniidae, Pseudoscorpiones) from Bosnia. *Arch. Biol. Sci., Belgrade*, **63** (3), 847-854.
- Čurčić B. P. M., Čurčić S. B., Čurčić, N. B., Rađa, T., and R. N. Dimitrijević (2011f). On two new pseudoscorpions from Herzegovina. *Arch. Biol. Sci., Belgrade*, **63** (3), 855-865.
- Čurčić, B. P. M., Rađa, T., Dimitrijević, R. N., Čurčić, N. B., Ilić, B. S., and J. M. Pecelj (2011g). *Chthonius* (*Ephippiochthonius*) *lagadini* n. sp. (Chthoniidae, Pseudoscorpiones), a new endemic epigeal pseudoscorpion from Macedonia. *Arch. Biol. Sci., Belgrade*, **63** (4), 1251-1256.
- Čurčić, B. P. M., Rađa, T., Dimitrijević, R. N., Makarov, S. E., and M. Milinčić (2011h). A new cave pseudoscorpion from Serbia (Pseudoscorpiones, Chthoniidae). *Arch. Biol. Sci., Belgrade*, **63** (4), 1257-1263.
- Dimitrijević, R. N. (2000). A check list of cave-dwelling pseudoscorpions (Pseudoscorpiones, Arachnida) from Yugoslavia (Serbia and Montenegro). *Mémoires de biospéologie*, **27**, 37-40.
- Hadži, J. (1937). Pseudoskorpioniden aus Südserbien. *Glasnik Skopskog naučnog društva, Skopje*, **18**, 13-38.