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ON TWO NEW CAVE SPECIES OF PSEUDOSCORPIONS (NEOBISIIDAE, PSEUDOSCORPIONES) FROM HERZEGOVINA AND DALMATIA

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Abstract — A careful analysis of samples of pseudoscorpions (Neobisiidae, Pseudoscorpiones) from two underground habitats, one near Trebinje (Herzegovina) and the other from the National Park Paklenica (Croatia), has yielded two species of the genus *Roncus* L. Koch new to science, *Roncus tribunus* n. sp. and *R. argyrunti* n. sp. Both new species are described thoroughly, illustrated, and diagnosed. Some biogeographical and evolutionary characteristics of the two taxa are briefly discussed.

Key words: Pseudoscorpions, Neobisiidae, *Roncus tribunus* n. sp., *R. argyrunti* n. sp., caves, Herzegovina, Croatia.

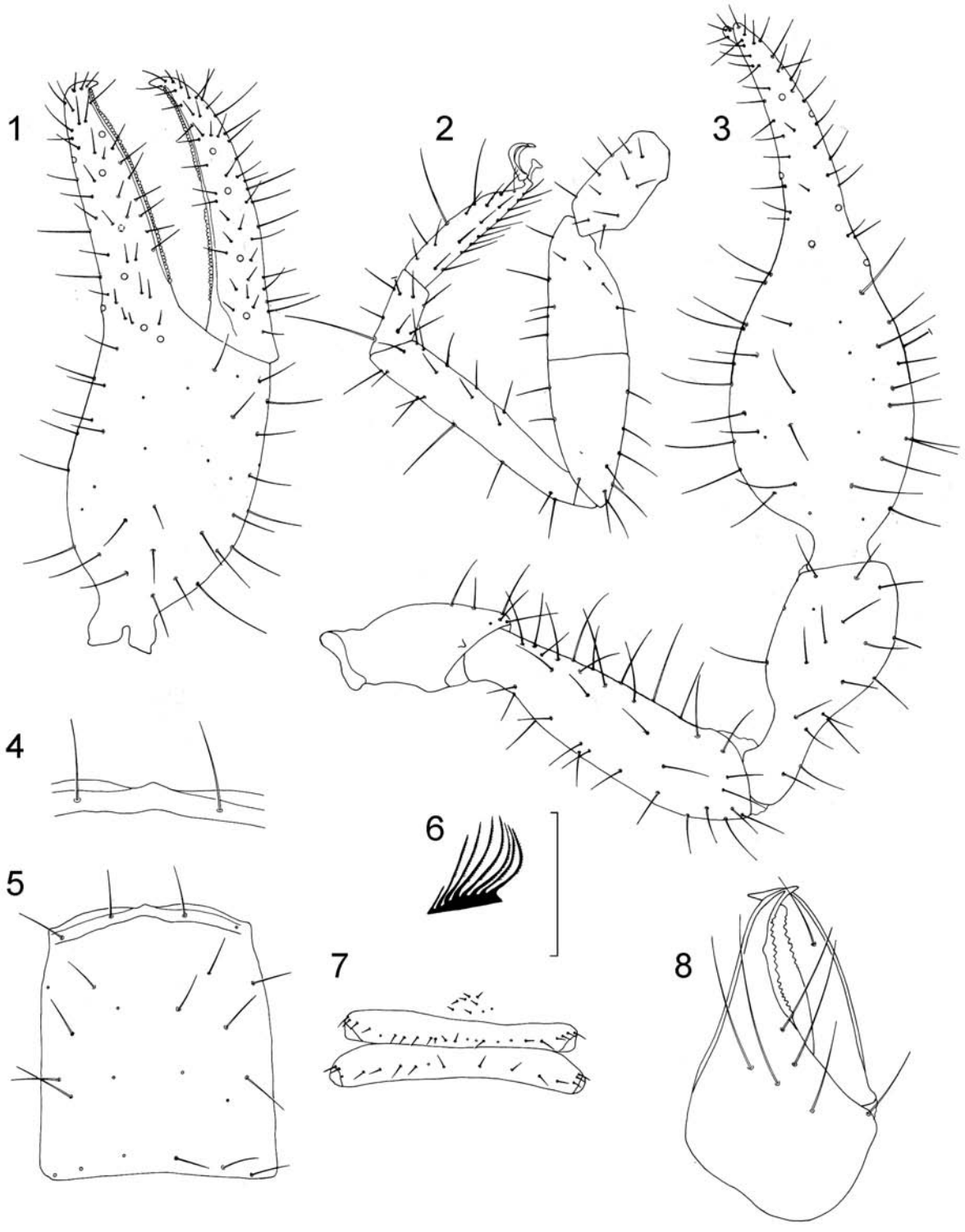
INTRODUCTION

There exists no deeper karst than that situated in Dalmatia, Herzegovina and Montenegro. Not a drop of water remains long on the surface; all water sinks through various subterranean passages — potholes, ponors, fissures and crevices. Most water drains towards the Neretva River, while some drains towards the Zeta and Morača Rivers and Lake Skadar (Cvijić, 1926; Gavrilović, 1974). The study of pseudoscorpions in such underground habitats, a fauna whose composition is the result of a long and complicated history, enables us to evaluate the importance of the influence of long geomorphological isolation on the development of cave biota. Because of the age of these caves, different groups of pseudoscorpions have enjoyed the possibility of uninterrupted development and autochthonous differentiation. Such long isolation must have directed evolution towards greater ecological differentiation within the framework of the cave system (Ćurčić, 1988).

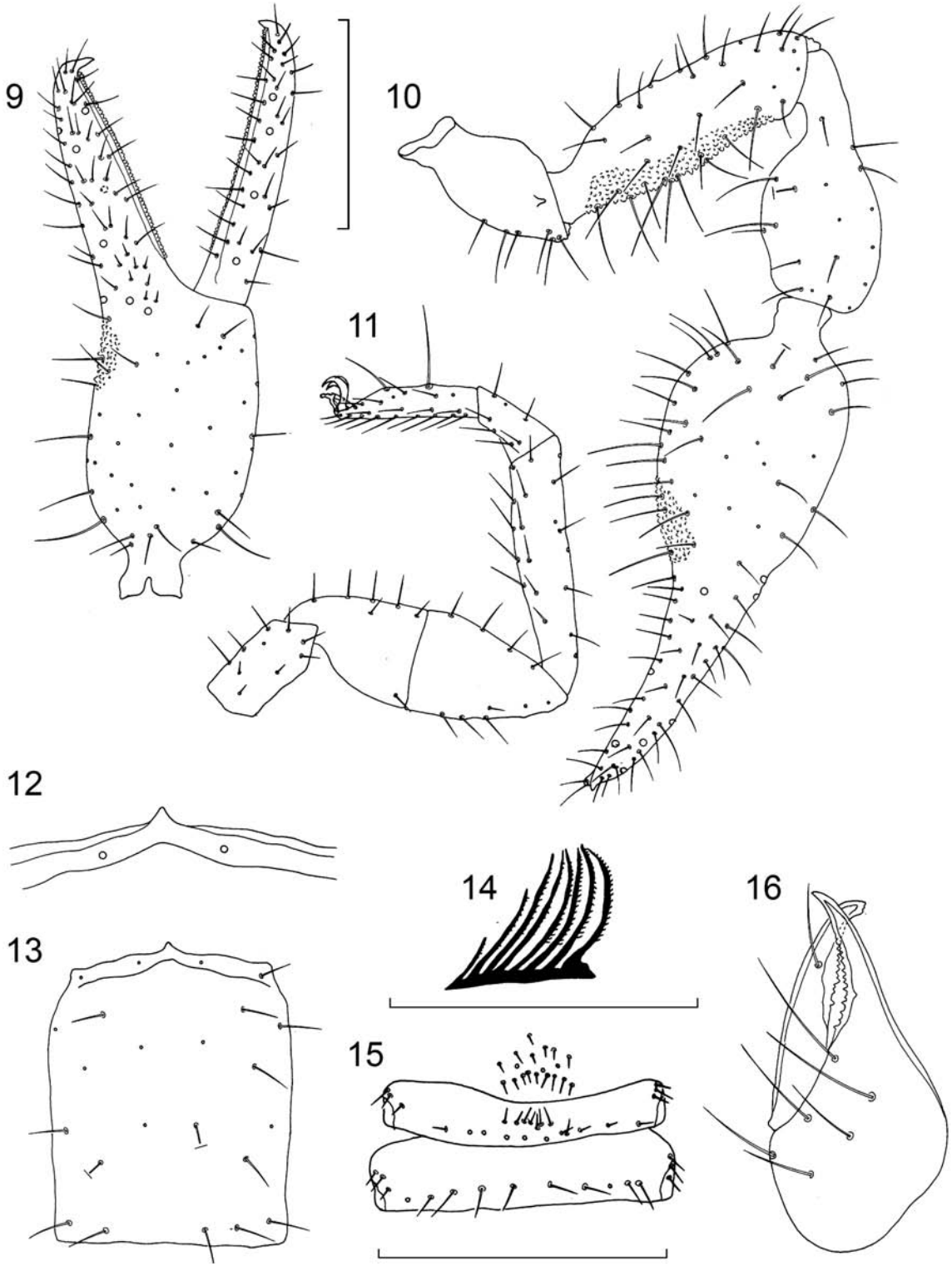
In studying some Balkan pseudoscorpions from two small collections, we concentrated on two species belonging to the genus *Roncus* L. Koch (Neobisiidae). The former was represented by two females and one female, the latter by a single male. The specimens of *Roncus* from Herzegovina turned out to be a new species, *Roncus tribunus* n. sp., and a specimen of the genus from Croatia represents another new species — *Roncus argyrunti* n. sp. In this paper, both species are thoroughly described, diagnosed, and illustrated. In addition, some taxonomic, biogeographical, and evolutionary traits are briefly discussed.

MATERIALS AND METHODS

The pseudoscorpion specimens studied were mount-



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



Figs. 9 – 16. *Roncus argyrunti* n. sp., holotype male from Croatia. 9 – pedipalpal chela, 10 – pedipalp, 11 – leg IV, 12 – epistome, 13 – carapace, 14 – flagellum, 15 – male genital area, 16 – chelicera. Scale lines = 0.25 mm (Figs. 9–11, and 13) and 0.50 mm (Figs. 12, 14–16).

ed on slides in gum chloral medium (Swan's fluid); they are deposited in the collections of the Institute of Zoology, Faculty of Biology, University of Belgrade, Belgrade, Serbia, and the Natural History Museum in Split, Croatia.

Setal designations follow Beier (1963).

SYSTEMATIC PART

NEOBISIIDAE J. C. CHAMBERLIN

RONCUS L. KOCH

RONCUS TRIBUNUS B. ĆURČIĆ, NEW SPECIES (Figs. 1-8; Table 1)

Etymology – After the Latin noun *Tribunus*, the primordial Roman name of Trebinje.

Material examined – Holotype female and paratype female from Kremni Do, Jama Bezdan Pit, nr. Trebinje, Herzegovina; 26 September 2008, collected by MP.

Description – Carapace considerably longer than broad (Fig. 5, Table 1). Neither eyes nor eyespots are developed (Fig. 5). Epistome small and low (Figs. 4 and 5). Carapacal setal formulae: 4 + 6 + 8 + 6 = 24. Tergal formulae: 5 – 9 – 10 – 11 – 12 – 11 – 12 – 12 – 10 – 9 and 6 – 7 – 9 – 11 – 10 – 12 – 12 – 12 – 10 – 9. Female genital area: sternite II with 9-12 median posterior setae, sternite III with 14 or 15 posterior setae and four suprastigmatic microsetae on either side, sternite IV with 10 posterior setae and three or four small setae along each stigma (Fig. 7). Sternites V–X with 14 – 14 – 13 – 13 – 12 – 10 and 14 – 14 – 13 – 15 – 14 – 11 posterior setae. Twelfth abdominal segment with two pairs of small setae. Pleural membranes granulostriate.

Galea low and rounded (Fig. 8). Cheliceral palm with six setae, movable finger with one seta only (Fig. 8). Flagellum with one short proximal blade and six or seven longer blades distally, as is characteristic of the genus *Roncus*. Dentition of cheliceral fingers as in Fig. 8.

Apex of pedipalpal coxa with five long acuminate setae. Small exterolateral tubercle present on pedipalpal trochanter. Trochanter, femur and chelal palm with no granulations (Figs. 1 and 3). Fixed chelal finger with 61-69 teeth; movable chelal finger with 68-73 teeth. Chelal finger as long as chelal palm (Table 1). Disposition of trichobothria as illustrated in Fig. 1.

Tibia IV, metatarsus IV and tarsus IV each with a long sensitive seta (Fig. 2, Table 1).

Morphometric ratios and linear measurements (in mm) are presented in Table 1.

Distribution — Nr. Trebinje, Herzegovina, probably endemic (living in caves).

RONCUS ARGYRUNTI B. ĆURČIĆ & RAĐA, NEW SPECIES (Figs. 9-16; Table 1)

Etymology – After *Argyruntum*, an old Roman settlement near Starigrad, National Park Paklenica, Croatia.

Material examined – Holotype male from the Špilja Devnjača Cave, National Park Paklenica, Dalmatia, Croatia; 30 April 2001, collected by one of us (TR).

Description — Epistome small, low, triangular and apically rounded (Figs. 12 and 13). Neither eyes nor eyespots are developed (Figs. 12 and 13). Carapacal setal formula: 4 + 8 + 6 + 5 = 23 setae. Tergite I – X setation: 6 – 9 – 10 – 11 – 12 – 11 – 11 – 11 – 10 – 10. Male genital area: sternite II with 19 setae; sternite III with 7 anterior, 11 posterior and 3 suprastigmatic microsetae on either side; sternite IV with 10 posterior setae and 3 microsetae on either side; and sternites V–X each with 14 – 15 – 13 – 13 – 12 – 11 posterior setae. Twelfth abdominal segment with two pairs of microsetae. Pleural membranes granulostriate.

Table 1. Linear measurements (in millimeters) and morphometric ratios in *Roncus tribunus* n. sp., and *R. argyrunti* n. sp. Abbreviations: FF = females, M = male.

Character	*R. tribunus* n. sp. FF	*R. argyrunti* n. sp. M
Body		
Length (1)	3.375-3.55	2.59
Cephalothorax		
Length (2)	0.93-0.94	0.72
Breadth (2a)	0.78-0.845	0.59
Ratio 2/2a	1.11-1.12	1.22
Abdomen		
Length	2.435-2.62	1.86
Chelicerae		
Length (3)	0.64-0.65	0.44
Breadth (4)	0.32-0.33	0.22
Length of movable finger (5)	0.46-0.47	0.295
Ratio 3/5	1.38-1.39	1.49
Ratio 3/4	1.94-2.03	2.00
Pedipalps		
Length with coxa (6)	5.50-5.835	3.61
Ratio 6/1	1.55-1.73	1.39
Length of coxa	0.77-0.78	0.56
Length of trochanter	0.61-0.64	0.45
Length of femur (7)	1.07-1.11	0.71
Breadth of femur (8)	0.295-0.305	0.22
Ratio 7/8	3.63-3.64	3.23
Ratio 7/2	1.14-1.19	0.99
Length of patella (tibia) (9)	0.94-0.95	0.61
Breadth of patella (tibia) (10)	0.39-0.40	0.275
Ratio 9/10	2.35-2.435	2.22
Length of chela (11)	2.03-2.05	1.28
Breadth of chela (12)	0.62	0.41
Ratio 11/12	3.31-3.33	3.12
Length of chelal palm (13)	1.01-1.05	0.63
Ratio 13/12	1.63-1.69	1.54
Length of chelal finger (14)	1.00-1.02	0.65
Ratio 14/13	0.95-1.01	1.03
Leg IV		
Total length	3.69-3.72	2.455
Length of coxa	0.51-0.52	0.37
Length of trochanter (15)	0.43-0.45	0.285
Breadth of trochanter (16)	0.19-0.20	0.13
Ratio 15/16	2.25-2.26	2.19
Length of femur + patella (17)	1.00-1.01	0.67
Breadth of femur + patella (18)	0.25-0.275	0.24
Ratio 17/18	3.67-4.00	2.77
Length of tibia (19)	0.91-0.93	0.58
Breadth of tibia (20)	0.14-0.15	0.13
Ratio 19/20	6.07-6.64	4.46
Length of metatarsus (21)	0.33-0.34	0.21
Breadth of metatarsus (22)	0.11	0.08
Ratio 21/22	3.00-3.09	2.625
Length of tarsus (23)	0.48-0.50	0.34
Breadth of tarsus (24)	0.10	0.07
Ratio 23/24	4.80-5.00	4.86
TS ratio - tibia IV	0.55-0.595	0.585
TS ratio - metatarsus IV	0.11-0.18	0.19
TS ratio - tarsus IV	0.36-0.37	0.36

Galea a low hyaline convexity (Fig. 16). Chelicer-al palm with six setae, movable finger with one seta (Fig. 16). Flagellum with one short proximal blade and seven longer blades distally, characteristic of the genus (Fig. 14). Dentition of cheliceral fingers as in Fig. 16.

Manducatory process with four long setae. Small interior lateral tubercle present on pedipalpal trochanter (Fig. 10), femur and chelal palm with distinct interior granulations (Fig. 10), patella smooth. Group of microsetae proximal to trichobothria *eb* and *esb* not developed (Fig. 9); instead, four or five small setae distal to *eb* and *esb* present (Fig. 9). Fixed chelal finger with 56 teeth; movable chelal finger with 57 teeth. Chelal finger only slightly longer than chelal palm and shorter than pedipalpal femur (Table 1).

Trichobothriotaxy as illustrated in Figs. 9 and 10.

Tibia IV, metatarsus IV and tarsus IV each with a long sensitive seta (Fig. 11). Morphometric ratios and linear measurements (in mm) are presented in Table 1.

Distribution — Špilja Devnjača Cave, National Park Paklenica, Dalmatia, Croatia; probably an endemic and cave-dwelling form.

⋆⋆⋆

This study of pseudoscorpions inhabiting the Dinaric Karst offers further proofs of their great age and probably different origin. These species, or their stem forms, inhabited both leaf litter and humus of Dinaric forests during or even before the Tertiary. Finally, such forms represent the last vestiges of an old thermophilous and hygrophilous fauna, vestiges which found shelter in the underground domain (humus, soil, caves) of the Balkans and elsewhere (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; 2012a, b, c, d, e, f; 2013a, b, c, d; Hadži, 1937).

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