

A NEW TROGLOBITIC PSEUDOSCORPION (PSEUDOSCORPIONES, NEOBISIIDAE) FROM ISTRIA, CROATIA

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Abstract - A new endemic and relict species of the genus *Neobisium* Chamberlin, *N. mirkaci* n. sp., from the Majhavlje Pit, Ćićarija (Istria), Croatia, has been described. From its phenetically close congeners, *N. spelaeum* Schiødte and *N. stygium* Beier, it is distinguished in many important respects. This new taxon is illustrated, diagnosed, and thoroughly described.

Key words: Pseudoscorpions, *Neobisium*, *N. mirkaci* n. sp., caves, endemism, biospeleology, Istria, Croatia

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INTRODUCTION

In 2009, a sample of two cave-dwelling pseudoscorpions was collected by Matej Mirkac in the Majhavlje Pit, E-NE to the village of Gornja Nugla, Province of Ćićarija (Istria), 701 m a.s.l., Croatia.

Here are the results of the study of *N. mirkaci* n. sp.

SYSTEMATIC PART

NEOBISIUM CHAMBERLIN, 1930

NEOBISIUM MIRKACI B. ĆURČIĆ & RADJA, NEW SPECIES

(Figs. 1-17; Table 1)

Etymology. - Named after its collector, Matej Mirkac, the Croatian speleologist.

Specimens examined. - Holotype male, from the Majhavlje Pit, near the village of Gornja Nugla,

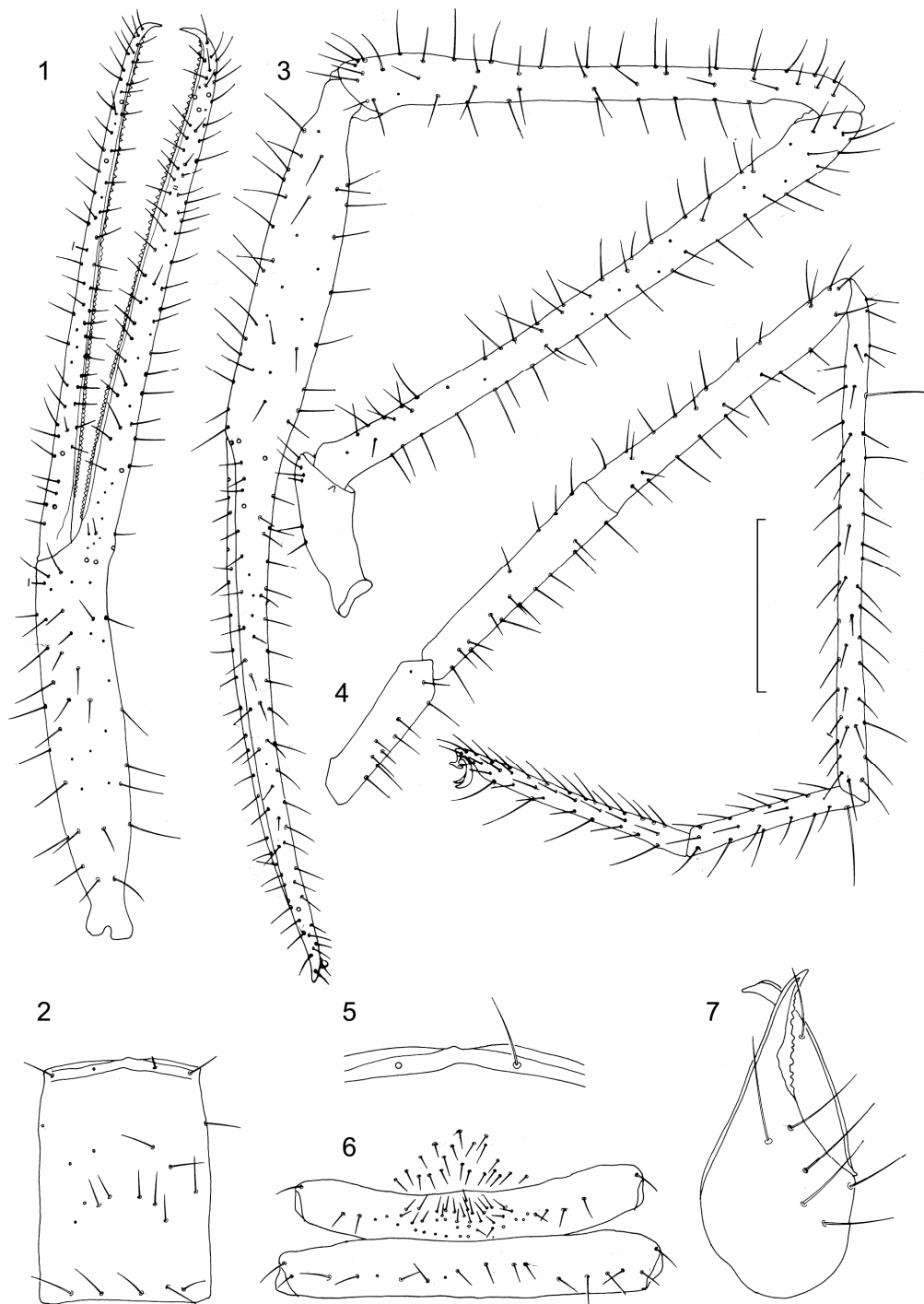
Province of Ćićarija (Istria), Croatia; July 2009, collected by Matej Mirkac (locality coordinates: X = 5 030 704, Y = 5 425 658, H = 700 m a.s.l.); and allotype female, same collecting data.

Description. - Anterior carapacal margin only slightly convex, epistome minute and tubercular (Figs. 2, 5, 12, and 13). Neither eyes nor eyespots are present. Preocular microsetae absent (male) or two or three on each carapacal side (female) (Figs. 2 and 13). Setal carapacal formula: 4 + 6 + 8 + 5 = 23 (male) and 4 + 7 + 6 + 4 = 21 (female). Setal disposition irregular (Figs. 2 and 13).

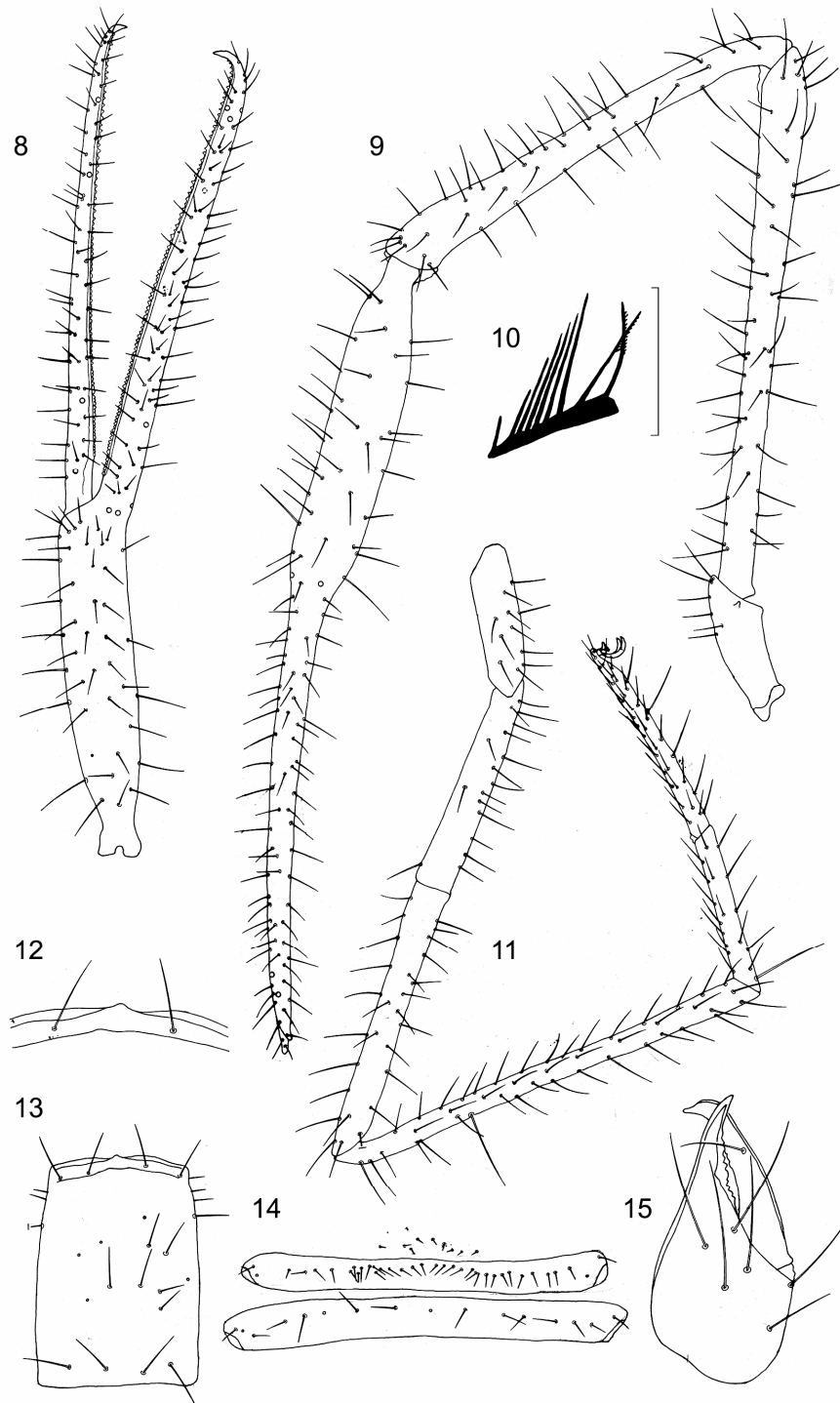
Tergite setation: 5-4-4-4-4-6-6-7-6-9 (male) and 5-4-3-4-4-5-5-7-7-8 (female). Male genital area: sternite II with 21 posterior and median setae (Fig. 6); sternite III with 26 anterior setae, 21 posterior setae, and a single microseta along each stigma (Fig. 6); sternite IV with 14 posterior setae and two suprastigmatic microsetae on either side (Fig. 6); sternites V-X with 16-15-13-14-15-14 setae. Twelfth abdominal segment with two pairs of small setae. Pleural membranes granulo-striate.

Table 1. Linear measurements (in millimeters) and morphometric ratios in *Neobisium mirkaci* n. sp., *N. spelaeum*, and *N. stygium* from some caves in the Balkan Peninsula. Abbreviations: ♂(♂) = male(s), ♀(♀) = female(s). Distinct characters are marked in bold.

Character	<i>N. mirkaci</i>		<i>N. spelaeum</i>		<i>N. stygium</i>	
	♂	♀	♂	♀	♂♂	♀♀
Body						
Length (1)	4.75	5.29	5.83	4.285	3.89-5.41	4.565-6.24
Cephalothorax						
Length (2)	1.43	1.50	1.37	1.37	1.29-1.43	1.37-1.51
Breadth (2a)	1.02	1.18	1.01	1.06	0.94-1.04	1.015-1.20
Ratio 2/2a	1.40	1.27	1.36	1.29	1.37	1.26-1.48
Abdomen						
Length	3.32	3.79	4.46	2.915	2.40-3.98	3.155-4.80
Chelicerae						
Length (3)	0.92	0.98	0.98	0.88	0.84-0.93	0.93-1.06
Breadth (4)	0.42	0.47	0.46	0.435	0.41-0.445	0.44-0.48
Length of movable finger (5)	0.62	0.62	0.64	0.60	0.545-0.60	0.55-0.67
Ratio 3/5	1.48	1.58	1.53	1.47	1.45-1.61	1.515-1.69
Ratio 3/4	2.19	2.085	2.13	2.02	2.05-2.15	1.89-2.23
Pedipalps						
Length with coxa (6)	14.37	14.85	13.96	13.30	12.33-13.685	13.31-14.905
Ratio 6/1	3.025	2.81	2.39	3.10	2.53-3.34	2.24-2.93
Length of coxa	1.13	1.18	1.15	1.21	0.97-1.30	1.10-1.29
Length of trochanter	0.96	1.15	1.01	1.07	0.88-1.03	1.015-1.13
Length of femur (7)	3.58	3.78	3.57	3.25	3.03-3.48	3.395-3.64
Breadth of femur (8)	0.275	0.315	0.35	0.33	0.28-0.31	0.33-0.37
Ratio 7/8	13.02	12.00	10.20	9.85	10.10-11.32	9.67-10.95
Ratio 7/2	2.50	2.52	2.605	2.37	2.24-2.58	2.41-2.55
Length of patella (tibia) (9)	3.26	3.08	2.89	2.74	2.53-2.88	2.70-3.22
Breadth of patella (tibia) (10)	0.315	0.35	0.38	0.35	0.32-0.37	0.35-0.40
Ratio 9/10	10.35	8.80	7.605	7.83	6.945-8.47	6.75-8.83
Length of chela (11)	5.44	5.66	5.34	5.03	4.54-5.145	4.935-5.625
Breadth of chela (12)	0.44	0.48	0.56	0.55	0.44-0.54	0.54-0.63
Ratio 11/12	12.36	11.79	9.535	9.145	8.84-10.91	8.36-10.29
Length of chelal palm (13)	2.30	2.36	2.10	1.99	1.80-1.99	1.955-2.195
Ratio 13/12	5.23	4.92	3.75	3.62	3.46-4.20	3.31-4.06
Length of chelal finger (14)	3.14	3.30	3.24	3.04	2.74-3.155	2.98-3.43
Ratio 14/13	1.365	1.40	1.54	1.53	1.31-1.59	1.52-1.62
Leg IV						
Total length	10.85	10.86	9.30	9.61	8.885-10.355	9.42-10.79
Length of coxa	0.69	0.79	0.82	0.82	0.69-1.03	0.73-1.10
Length of trochanter (15)	1.02	1.05	0.75	0.93	0.48-0.94	0.48-1.00
Breadth of trochanter (16)	0.285	0.26	0.28	0.28	0.25-0.29	0.27-0.29
Ratio 15/16	3.58	4.04	2.68	3.32	2.94-3.76	3.38-3.57
Length of femur + patella (17)	3.42	3.39	2.95	2.95	2.69-3.135	2.98-3.39
Breadth of femur + patella (18)	0.36	0.285	0.23	0.26	0.23-0.28	0.25-0.28
Ratio 17/18	9.50	11.89	12.83	11.35	10.50-12.54	11.04-13.08
Length of tibia (19)	3.09	3.01	2.50	2.57	2.37-2.73	2.52-2.87
Breadth of tibia (20)	0.18	0.19	0.19	0.18	0.18-0.195	0.18-0.205
Ratio 19/20	17.17	15.84	13.16	14.28	12.59-14.37	13.62-15.51
Length of metatarsus (21)	1.18	1.16	0.98	1.08	0.95-1.06	0.98-1.17
Breadth of metatarsus (22)	0.14	0.14	0.16	0.15	0.14-0.16	0.14-0.16
Ratio 21/22	8.43	8.285	6.125	7.20	6.33-7.07	6.125-7.43
Length of tarsus (23)	1.45	1.46	1.30	1.26	1.26-1.45	1.26-1.56
Breadth of tarsus (24)	0.13	0.12	0.14	0.12	0.13-0.16	0.12-0.14
Ratio 23/24	11.15	12.17	9.285	10.50	8.75-10.69	9.00-13.10
TS ratio - tibia IV	0.22	0.24	0.31	0.31	0.24-0.31	0.29-0.315
TS ratio - metatarsus IV	0.16	0.15	0.14	0.14	0.10-0.15	0.11-0.25
	0.43	0.44	0.44	0.44	0.38-0.45	0.40-0.46
	0.67	0.70	0.68	0.68	0.60-0.68	0.70-0.74
			0.89	0.85	0.81-0.87	0.80-0.90
TS ratio - tarsus IV	0.16	0.16	0.18	0.09	0.14-0.16	0.16-0.18
	0.35	0.37	0.34	0.28	0.34-0.38	0.33-0.425
	0.66	0.68	0.50	0.47	0.65-0.68	0.64-0.71
			0.66	0.635		



Figs. 1-7. *Neobisium mirkaci* n. sp., holotype male, from the Majhahlje Pit, village of Gornja Nugla, Province of Ćićarija (Istria, Croatia). 1 - pedipalpal chela; 2 - carapace; 3 - pedipalp; 4 - leg IV; 5 - epistome; 6 - male genital area; 7 - chelicera. Scales = 0.50 mm (Figs. 1-4) and 0.25 mm (Figs. 5-7).



Figs. 8-15. *Neobisium mirkaci* n. sp., allotype female, from the Majhahlje Pit, village of Gornja Nugla, Province of Ćićarija (Istria, Croatia). 8 - pedipalpal chela; 9 - pedipalp; 10 - flagellum; 11 - leg IV; 12 - epistome; 13 - carapace; 14 - female genital area; 15 - chelicera. Scales = 0.50 mm (Figs. 8, 9, 11, and 13) and 0.25 mm (Figs. 10, 12, 14, and 15).



Figs. 16-17. *Neobisium mirkaci* n. sp. in its type locality.

Female genital area: sternite II with nine small posterior and median setae; sternite III with 32 posterior setae and two small suprastigmatic setae along each of the stigma; sternite IV with 12 posterior setae and two small setae along each of the stigma (Fig. 14); sternites V-X with 17-16-16-15-13-13 posterior setae. Twelfth abdominal segment with two pairs of small setae. Pleural membranes granulostriate.

Cheliceral galea rounded and barely visible (Figs. 7 and 15). Fixed cheliceral finger with six setae, movable finger with a single seta (Figs. 7 and 15). Flagellum of eight (male) or nine blades (female; Fig. 10), only two distal blades pinnate anteriorly; other flagellar setae smooth and acuminate, diminishing in size from distal to proximal. Dentition of cheliceral finger as in Figs. 7 and 15.

Manducatory process (apex of pedipalpal coxa) with five long and acuminate setae. Pedipalpal trochanter with no interior tubercle, elongated. Pedipalpal femur and tibia somewhat dilated distally; pedipalpal chelal palm widest at its mid-line (Figs. 3 and 11; dorsal view). Pedipalpal fingers much longer than chelal palm (Table 1). Fixed chelal fingers with 96 (male) or 93 asymmetrical, small, and contiguous teeth; movable chelal finger with 84 (male) and 82 (female) small and close-set teeth, which eventually become rounded, low, and small. Fixed chelal finger with eight trichobothria, and movable finger with four such setae. Trichobothriotaxy as in Figs. 1 and 8.

Tibia IV with a single seta, basitarsus IV with three setae, and tarsus IV with three long setae (Figs. 4 and 11; Table 1). The disposition of these setae is subject to some variation.

Morphometric ratios and linear measurements are presented in Table 1.

Differential diagnosis. - The new species is easily distinguished from its phenetically close congeners, *N. spelaeum* Schiødte and *N. stygium* Beier (from Slovenia and Croatia), in many important respects. In Table 1, distinctive characters of *N. mirkaci* n. sp. are marked by bold numbers.

Since the distribution center of the genus *Neobisium* is in Southern Europe, it is likely that it evolved there. This assumption is supported by the discovery of some Northern Mediterranean *Neobisium*-related genera which have primitive characteristics if compared to *Neobisium*. This fact therefore justifies the assumption of the great age and autochthonous origin of the proto-neobisiid stock and its species complexes in the Dinaric region. The most intensive radiation of these archaic forms took place either during the Alpine orogeny, or even before the Tertiary (Vachrameev, 1960; Čurčić, 1988).

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