

## New records of zerconid mites (Acari: Mesostigmata) from Mts. Papuk, Croatia, with description of *Zercon kotschani* sp. n.

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**Abstract.** Nine zerconid mite species belonging to the genera *Prozercon* Sellnick, 1944 and *Zercon* C. L. Koch, 1839 were collected from Papuk Mts., North Croatia. Eight of them – *Prozercon fimbriatus* (C. L. Koch, 1839); *Prozercon rafalskii* Błaszak, 1971; *Prozercon sellnicki* Halašková, 1963; *Prozercon tragardhi* (Halbert, 1923); *Zercon gurensis* Mihelčič, 1962; *Zercon hungaricus* Sellnick, 1958; *Zercon peltatus* C. L. Koch, 1836; *Zercon spatulatus* C. L. Koch, 1839 – are new to the fauna of Croatia, and one, *Zercon kotschani* sp. nov., proved to be new to science as well.

### INTRODUCTION

Members of the family Zerconidae (Acari: Mesostigmata) are soil-inhabiting predatory mites. Representatives of this important component of the soil fauna occur mainly in moss and leaf-litter. The group is represented by 35 genera and more than 300 species worldwide.

Our knowledge on the zerconid mites of the Balkan and especially of the former Yugoslavia is scarce. The first data on mesostigmatid mites of Yugoslavia mentioning one species of Zerconidae (*Zercon triangularis* C. L. Koch, 1836) was published in the middle of the last century (Willman, 1941). Later Košir (1974) reported two new species (*Zercon primus* Košir, 1974 and *Prozercon tuberculatus* Košir, 1974) and mentioned one species (*Zercon plumatopilus* Athias-Henriot, 1961) new to the fauna of the country (from the territory of present-day Macedonia and Slovenia). Recently, Kotschán (2006) described a new species from Kosovo, *Zercon kosovina* Kotschán, 2006, and listed some known ones from Serbia-Montenegro.

The Zerconidae fauna of Croatia has not been studied so far. Herewith I report the occurrence of nine species in several locations of Papuk Mts. One of them represents a new species to science and eight are new to the fauna of Croatia.

### MATERIALS AND METHODS

Specimens were cleared in lactic acid and impregnated with glycerin. Preparations were examined using a light microscope; drawings were made with camera lucida. Photos were taken by an Olympus Color View I. digital camera. Mites are stored in alcohol and deposited in the Soil Zoology Collections of the Hungarian Natural History Museum. Specimens were identified according to Błaszak (1974) and Mašan & Fend'a (2004). In the description of the new species, terminology of setae follows Sellnick (1958). Measurements were taken – on the basis of microscopic photos – by Adobe Photoshop CS 8.0, and given in micrometers (µm), presented as mean.

### TAXONOMIC RESULTS

#### *Prozercon fimbriatus* (C. L. Koch, 1839) (Fig. 1)

*Material examined.* E-1860: Croatia, Papuk, Drenovac, streamside, near a small wooden bridge, 21.04.2004. leg. Kotschán, J. (5 ♀); E-1861: Croatia, Papuk, Strmac, from humid forest, 21.04.2004. leg. Kotschán, J. (6 ♀, 1 ♂, 2 deutonymphs); E-1862: Croatia, Papuk, Novo Zvecevo, streamside, near the village, 22.04.2004. leg. Kotschán, J. (2 ♀); E-1863: Croatia, Papuk, Novo Zvecevo, under the pass, 22.04.2004. leg. Kotschán, J. (1 ♀, 1 deutonymph); E-1864: Croatia, Papuk, Drenovac, streamside, near a small

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wooden bridge, 21.04.2004. leg. Kontschán, J. (3 ♀); E-1867: Croatia, Papuk, 7 kms north Kutjevo, streamside, 20.04.2004. leg. Kontschán, J. (4 ♀); E-1878: Croatia, Papuk, Drenovac, near Velikai road, beech forest, 20.04.2004. leg. Kontschán, J. (3 ♀, 3 ♂); E-1881: Croatia, Papuk, 1 km north of Kutjevo, streamside, 20.04.2004. leg. Kontschán, J. (1 ♀); E-1882: Croatia, Papuk, 7 kms north Kutjevo, streamside, 20.04.2004. leg. Kontschán, J. (3 ♀, 1 ♂).

*Distribution.* Europe.

***Prozercon rafalskii* Blaszak, 1971**  
(Fig. 2)

*Material examined.* E-1860: Croatia, Papuk, Drenovac, streamside, near a small wooden bridge, 21.04.2004. leg. Kontschán, J. (1 ♀); E-1862: Croatia, Papuk, Novo Zvecevo, streamside, near the village, 22.04.2004. leg. Kontschán, J. (1 ♀).

*Distribution.* Poland, Slovakia, Turkey.

*Remarks.* Setae S1 with (postero)lateral position to Z1, in this way the mites collected in Croatia differ from the type described from Poland (S1 with anterolateral position to Z1). On the figure of Mašan & Fend'a (2004) S4 1.5 times longer than S3. At the Croatian species S3 and S4 equal in length.

***Prozercon sellnicki* Halašková, 1963**  
(Fig. 3.)

*Material examined.* E-1860: Croatia, Papuk, Drenovac, streamside, near a small wooden bridge, 21.04.2004. leg. Kontschán, J. (1 ♀).

*Distribution.* Central Europe.

***Prozercon tragardhi* (Halbert, 1923)**  
(Fig. 4)

*Material examined.* E-1863: Croatia, Papuk, Novo Zvecevo, under the pass, 22.04.2004. leg. Kontschán, J. (1 ♀).

*Distribution.* From Europe to Turkey.

***Zercon gurensis* Mihelčič, 1962**  
(Fig. 5.)

*Material examined.* E-1860: Croatia, Papuk, Drenovac, streamside, near a small wooden bridge, 21.04.2004. leg. Kontschán, J. (9 ♀ 2 ♂ 10 deutonymphs); E-1880: Croatia, Papuk, Kokocak, alder forest, 20.04.2004. leg. Kontschán, J. (1 ♀ 1 deutonymph)

*Distribution.* Central Europe.

***Zercon hungaricus* Sellnick, 1958**  
(Fig. 6)

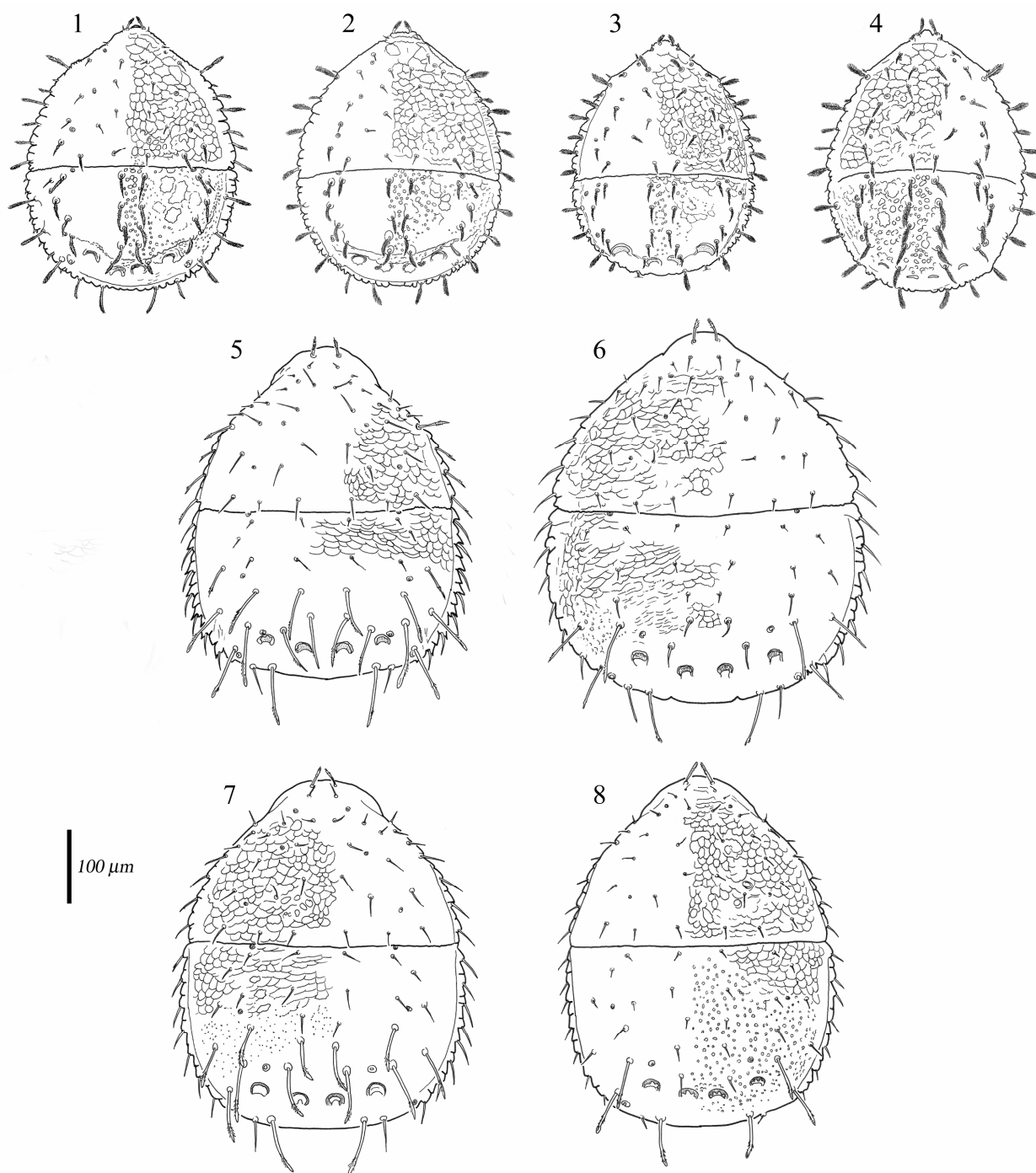
*Material examined.* E-1863: Croatia, Papuk, Novo Zvecevo, under the pass, 22.04.2004. leg. Kontschán, J. (4 ♀, 3 ♂); E-1864: Croatia, Papuk, Drenovac, streamside, near a small wooden bridge, 21.04.2004. leg. Kontschán, J. (1 deutonymph).

*Distribution.* Poland, Czech Republic, Austria, Slovakia, Hungary, Romania, Bulgaria, Ukraine.

***Zercon peltatus* C. L. Koch, 1836**  
(Fig. 7)

*Material examined.* E-1861: Croatia, Papuk, Strmac, from humid forest, 21.04.2004. leg. Kontschán, J. (1 ♀); 1864: Croatia, Papuk, Drenovac, streamside, near a small wooden bridge, 21.04.2004. leg. Kontschán, J. (4 ♀, 10 ♂, 3 deutonymphs); E-1867: Croatia, Papuk, 7 kms north Kutjevo, streamside, 20.04.2004. leg. Kontschán, J. (1 ♀); E-1879: Croatia, Papuk, Strmac, humid forest, 21.04.2004. leg. Kontschán, J. (3 ♀, 5 ♂); E-1881: Croatia, Papuk, 1 kms north Kutjevo, streamside, 20.04.2004. leg. Kontschán, J. (3 ♀, 9 ♂, 1 deutonymph).

*Distribution.* British Isles, Spain, Germany, Poland, Czech Republic, Austria, Slovakia, Ukraine, Hungary, Romania, Bulgaria.



**Figures 1-8.** Known species collected in Mts. Papuk (females, dorsal view): 1 = *Prozercon fimbriatus* (C. L. Koch, 1839), 2 = *Prozercon rafalskii* Błazsak, 1971, 3 = *Prozercon sellnicki* Halašková, 1963, 4 = *Prozercon tragardhi* (Halbert, 1923), 5 = *Zercon gurensis* Mihelčič, 1962, 6 = *Zercon hungaricus* Sellnick, 1958, 7 = *Zercon peltatus* C. L. Koch, 1836, 8 = *Zercon spatulatus* C. L. Koch, 1839

***Zercon spatulatus* C. L. Koch, 1839**

(Fig. 8)

*Material examined.* E-1881: Croatia, Papuk, 1 kms north Kutjevo, streamside, 20.04.2004. leg. Kontschán, J. (1 ♀, 2 ♂, 2 deutonymphs).

*Distribution.* Europe.

***Zercon kontschani* sp. n.**

(Figs 9-16)

*Material examined.* Holotype: female, E-1861: Croatia, Papuk, Strmac, from humid forest, 21.04.2004. leg. Kontschán, J. Paratypes: 9 ♀, 10 ♂, 2 deutonymphs, locality same that of the holotype. Other localities: 1862: Croatia, Papuk, Novo Zvecevo, streamside, near the village, 22.04.2004. leg. Kontschán, J. (8 ♀, 5 ♂, 1 deutonymph); E-1865: Croatia, Papuk, Novo Zvecevo, streamside near village, 22.04.2004. leg. Kontschán, J. (8 ♀, 5 ♂, 1 deutonymph); E-1867: Croatia, Papuk, 7 kms north Kutjevo, streamside, 20.04.2004. leg. Kontschán, J. (1 ♀, 2 ♂); E-1878: Croatia, Papuk, Drenovac, near Velikai road, beech forest, 20.04.2004. leg. Kontschán, J. (6 ♀, 5 ♂); E-1881: Croatia, Papuk, 1 kms north Kutjevo, streamside, 20.04.2004. leg. Kontschán, J. (1, ♀).

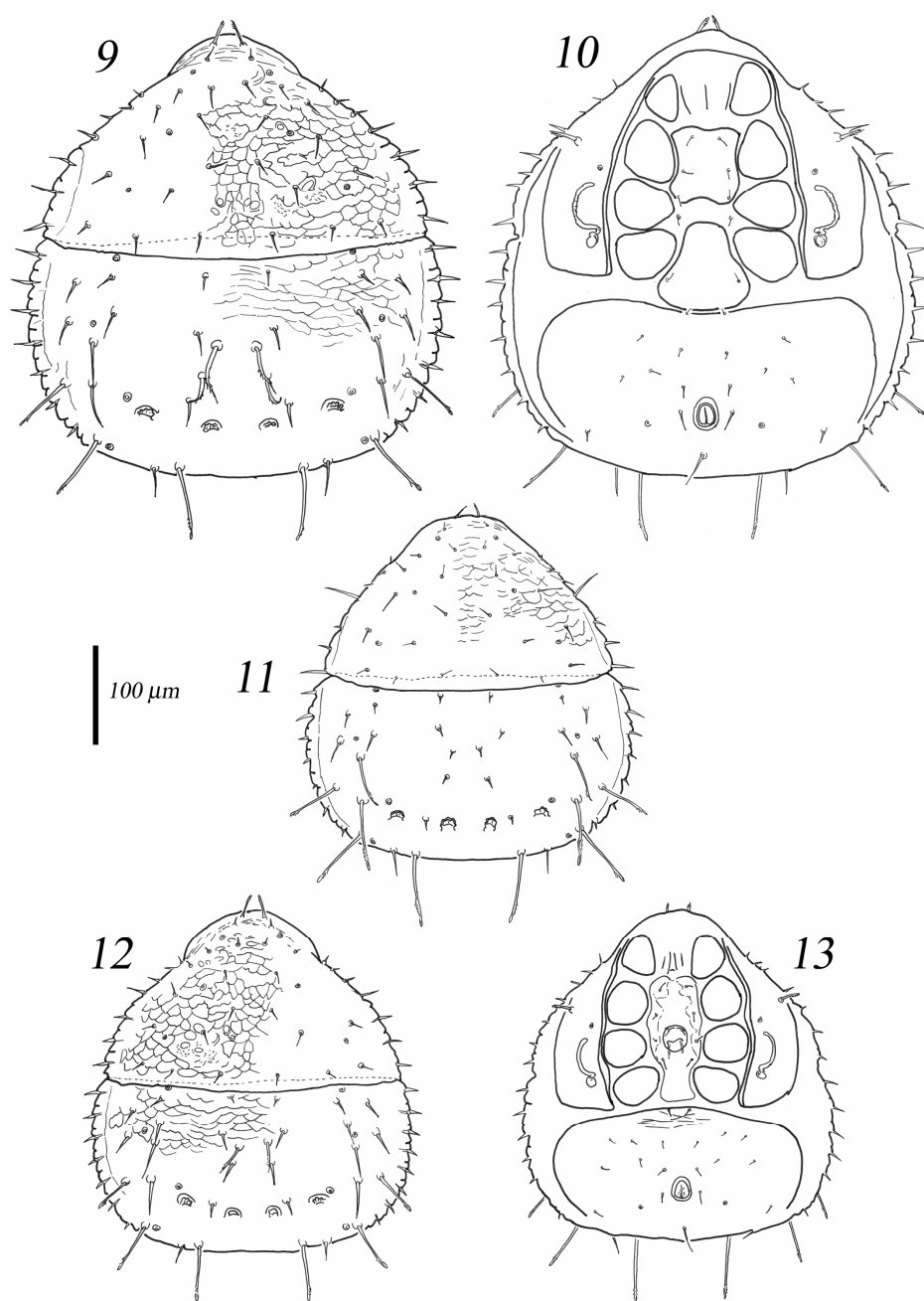
*Diagnosis.* Podonotal setae short and smooth, except  $i_1$ , which barbed. On opisthonotum, setae  $I_2$  with lateral or anterolateral position to  $I_3$ , short, smooth.  $I_{3-4}$  thickened, elongated, slightly pilose, reaching the following's bases.  $I_3$  3-4 times longer than  $I_2$  (size of these two setae varies, but  $I_3$  always much longer) Setae  $I_6$ ,  $S_{3-4}$  of almost equal size and appearance, long, apically barbed, with hyaline ending.  $Z_{3-4}$  medium-sized, smooth. Other opisthonotal setae short, smooth. Marginal R setae thickened, pointed. Dorsal fossae of general size and appearance. Podonotum with irregular pattern; anterior part of opisthonotum with tile-like pattern (disappearing on posterior part).

*Description.* Female. Length of idiosoma: 450  $\mu\text{m}$ ; width: 430  $\mu\text{m}$ .

*Dorsal side* (Fig. 9). On podonotum, 22 pairs of different setae: i-row with 6, z-row with 2, s-row with 5, p-row with 2, and marginal r-row with 7 pairs of setae.  $i_1$  apically barbed, others short and smooth. Members of r-row thickened, thorn-like. Pores  $po_1$  situated on the line connecting the bases of  $i_2$  and  $s_2$ ,  $po_2$  between  $i_4$  and  $s_4$ , in mid-position,  $po_3$  under the line connecting the insertions of setae  $z_1$  and  $s_5$ , closer to  $s_5$ . On opisthonotum, 22 pairs of different setae (Figs. 14-16): I-row with 6, Z-row with 5, S-row with 4, R-row with 7 pairs of setae.  $I_1$  short and smooth.  $I_2$  short, smooth and needle like, situated very close to  $I_3$  with (antero)lateral position to it, and far from  $I_1$ .  $I_2$  may vary in length but never thickened or pilose.  $I_3$  elongated, thickened, rarely, finely pilose and reaching far beyond the following's bases.  $I_4$  similar in appearance to  $I_3$ , but always shorter and reaching the following's bases.  $I_5$  short (in general longer than  $I_2$ ) but thickened.  $I_6$  long, apically barbed and terminated with hyaline ending.  $Z_{1-4}$  smooth,  $Z_{1-2}$  shorter,  $Z_2$  never reaching the following's insertion,  $Z_{3-4}$  longer,  $Z_3$  reaching the bases of  $Z_4$ .  $Z_5$  short and smooth.  $S_{1-2}$  similar to  $Z_{1-2}$ .  $S_{3-4}$  similar to  $I_6$ , but shorter and reaching beyond the margin of idiosoma. Setae of R-row thickened, pointed.  $Po_1$  with anterior position to the insertions of  $Z_1$ ,  $Po_2$  just under the line connecting  $Z_2$  and  $S_2$  (usually closer to  $Z_2$ ),  $Po_3$  between  $I_5$  and  $Z_4$  (closer to setae  $Z_5$ ),  $Po_4$  next to the insertions of  $S_4$  (medially). Dorsal fossae of general size and appearance. Lateral margins of opisthonotum with normal serration. On podonotum, irregular, tile-like pattern. Anterior part of opisthonotum covered with tile-like pattern, posterior 70 % smooth.

The size of setae and the distances between their insertions as in Table 2 (measurements are given as mean, in micrometers).

*Ventral side* (Fig. 10.). The shape and chaetotaxy of the ventroanal shield is typical for the genus *Zercon*. Anterior margin of ventroanal shield with one pair of setae.



**Figures 9-13.** *Zercon kotschani* sp. n.: 9 = female, dorsal view, 10 = female, ventral view, 11 = deutonymph, dorsal view, 12 = male, dorsal view, 13 = male, ventral view

*Male.* Length of idiosoma: 345 µm; width: 320 µm.

*Dorsal side* (Fig. 12). Chaetotaxy, dorsal cavities, situation of pores and pattern as in female, but  $I_3$

$I_4$  shorter,  $I_4$  smooth and reaching only half the distance to the insertions of setae  $I_5$ .

The size of setae and the distances between their insertions as in table 3 (measurements are given as mean, in micrometers).

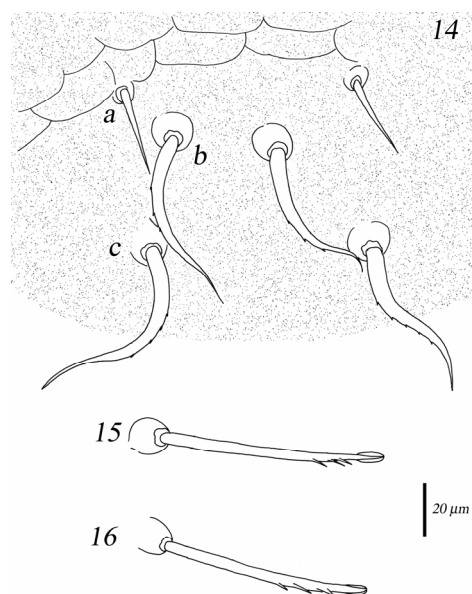
*Ventral side* (Fig. 12). Typical for the genus *Zercon*, as in female *Deutonymph* (Fig. 11). Podonotum as in adult stage. On opisthonotum,  $I_{1-5}$  short, smooth, needle like.  $I_2$  at equal distance from  $I_1$  and  $I_3$ .  $I_5$  situated far from  $I_4$ , between medial and lateral dorsal fossae. Setae  $Z_{3-4}$  long, apically barbed, with hyaline tips, just as  $I_6$ ,  $S_3$  and  $S_4$ . Other setae, pores and cavities as in adult stage. Podonotum with indistinct irregular pattern, opisthonotum smooth. The size of setae and the distances between their insertions as in table 4 (measurements are given as mean, in micrometers).

*Remarks.* Setae  $I_2$ ,  $I_3$  and  $I_4$  variable in length. The following minimum and maximum values have been measured:

$I_2$ : 23-34  $\mu\text{m}$ ;  $I_3$ : 47-74  $\mu\text{m}$ ;  $I_4$ : 32- 50  $\mu\text{m}$

The new species is most similar to *Zercon latissimus* Sellnick, 1944 and *Zercon kosovina* Kontschán, 2006. The females of the three species can be distinguished according to table 1.

*Etymology.* The new species is dedicated to Dr. Jenő Kontschán, acarologist, who kindly helped me in every aspect of my work.



**Figures 14-16.** Opisthonotal setae of *Zercon kotschani* sp. n.: 14 = central part of opisthonotum with setae  $I_{2-4}$  (a: setae  $I_2$ , b: setae  $I_3$ , c: setae  $I_4$ ), 15 = seta  $I_6$ , 16 = seta  $S_4$

**Table 1.** Distinguishing characters of *Z. kotschani* sp. n., *Z. latissimus* and *Z. kosovina*

<i>Zercon kotschani</i> sp. n.	<i>Zercon latissimus</i> Sellnick, 1944	<i>Zercon kosovina</i> Kontschán, 2006
$I_2$ short, thin and smooth	$I_2$ long, thickened, slightly pilose	$I_2$ short, thin and smooth
$I_3$ 2-3 times longer than $I_2$	$I_2$ and $I_3$ equal in length	$I_3$ 4 times longer than $I_2$
$I_3$ 1.5 times longer than $I_4$	$I_3$ and $I_4$ equal in length	$I_3$ and $I_4$ equal in length
$I_5$ short, smooth, close to dorsal fossae	$I_5$ short, slightly pilose, close to dorsal fossae	$I_5$ long, thickened, smooth, situated laterally to $I_4$ , far from dorsal fossae
$S_3$ long, apically barbed, reaching beyond the margin of opisthonotum	$S_3$ long, apically barbed, reaching beyond the margin of opisthonotum	$S_3$ medium-sized, smooth, not reaching the margin of opisthonotum
$Z_2$ not reaching the insertions of $Z_3$	$Z_2$ reaching beyond the insertions of $Z_3$	$Z_2$ not reaching the insertions of $Z_3$
Setae $s_1$ absent	Setae $s_1$ absent	Setae $s_1$ present

**Table 2.** Length of opisthonotal setae and longitudinal distances between their bases in *Zercon kotschani* sp. n., female (values in  $\mu\text{m}$ )

Setae and intersetal distances	Length or distance	Setae and intersetal distances	Length or distance	Setae and intersetal distances	Length or distance
<b>I<sub>1</sub></b>	14	<b>Z<sub>1</sub></b>	19	<b>S<sub>1</sub></b>	23
<b>I<sub>1</sub>-I<sub>2</sub></b>	56	<b>Z<sub>1</sub>-Z<sub>2</sub></b>	36	<b>S<sub>1</sub>-S<sub>2</sub></b>	40
<b>I<sub>2</sub></b>	24	<b>Z<sub>2</sub></b>	27	<b>S<sub>2</sub></b>	27
<b>I<sub>2</sub>-I<sub>3</sub></b>	25	<b>Z<sub>2</sub>-Z<sub>3</sub></b>	35	<b>S<sub>2</sub>-S<sub>3</sub></b>	62
<b>I<sub>3</sub></b>	59	<b>Z<sub>3</sub></b>	46	<b>S<sub>3</sub></b>	63
<b>I<sub>3</sub>-I<sub>4</sub></b>	35	<b>Z<sub>3</sub>-Z<sub>4</sub></b>	45	<b>S<sub>3</sub>-S<sub>4</sub></b>	70
<b>I<sub>4</sub></b>	33	<b>Z<sub>4</sub></b>	43	<b>S<sub>4</sub></b>	69
<b>I<sub>4</sub>-I<sub>5</sub></b>	31	<b>Z<sub>4</sub>-Z<sub>5</sub></b>	100		
<b>I<sub>5</sub></b>	26	<b>Z<sub>5</sub></b>	33		
<b>I<sub>5</sub>-I<sub>6</sub></b>	67				
<b>I<sub>6</sub></b>	74				

**Table 3.** Length of opisthonotal setae and longitudinal distances between their bases in *Zercon kotschani* sp. n., male (values in  $\mu\text{m}$ )

Setae and intersetal distances	Length or distance	Setae and intersetal distances	Length or distance	Setae and intersetal distances	Length or distance
<b>I<sub>1</sub></b>	9	<b>Z<sub>1</sub></b>	15	<b>S<sub>1</sub></b>	18
<b>I<sub>1</sub>-I<sub>2</sub></b>	37	<b>Z<sub>1</sub>-Z<sub>2</sub></b>	25	<b>S<sub>1</sub>-S<sub>2</sub></b>	31
<b>I<sub>2</sub></b>	19	<b>Z<sub>2</sub></b>	22	<b>S<sub>2</sub></b>	22
<b>I<sub>2</sub>-I<sub>3</sub></b>	20	<b>Z<sub>2</sub>-Z<sub>3</sub></b>	24	<b>S<sub>2</sub>-S<sub>3</sub></b>	44
<b>I<sub>3</sub></b>	31	<b>Z<sub>3</sub></b>	34	<b>S<sub>3</sub></b>	43
<b>I<sub>3</sub>-I<sub>4</sub></b>	19	<b>Z<sub>3</sub>-Z<sub>4</sub></b>	36	<b>S<sub>3</sub>-S<sub>4</sub></b>	52
<b>I<sub>4</sub></b>	22	<b>Z<sub>4</sub></b>	36	<b>S<sub>4</sub></b>	52
<b>I<sub>4</sub>-I<sub>5</sub></b>	43	<b>Z<sub>4</sub>-Z<sub>5</sub></b>	71		
<b>I<sub>5</sub></b>	15	<b>Z<sub>5</sub></b>	18		
<b>I<sub>5</sub>-I<sub>6</sub></b>	46				
<b>I<sub>6</sub></b>	57				

**Table 4.** Length of opisthonotal setae and longitudinal distances between their bases in *Zercon kotschani* sp. n., deutonymph (values in  $\mu\text{m}$ )

Setae and intersetal distances	Length or distance	Setae and intersetal distances	Length or distance	Setae and intersetal distances	Length or distance
<b>I<sub>1</sub></b>	9	<b>Z<sub>1</sub></b>	9	<b>S<sub>1</sub></b>	15
<b>I<sub>1</sub>-I<sub>2</sub></b>	35	<b>Z<sub>1</sub>-Z<sub>2</sub></b>	33	<b>S<sub>1</sub>-S<sub>2</sub></b>	30
<b>I<sub>2</sub></b>	9	<b>Z<sub>2</sub></b>	18	<b>S<sub>2</sub></b>	25
<b>I<sub>2</sub>-I<sub>3</sub></b>	28	<b>Z<sub>2</sub>-Z<sub>3</sub></b>	27	<b>S<sub>2</sub>-S<sub>3</sub></b>	49
<b>I<sub>3</sub></b>	10	<b>Z<sub>3</sub></b>	52	<b>S<sub>3</sub></b>	54
<b>I<sub>3</sub>-I<sub>4</sub></b>	29	<b>Z<sub>3</sub>-Z<sub>4</sub></b>	44	<b>S<sub>3</sub>-S<sub>4</sub></b>	52
<b>I<sub>4</sub></b>	11	<b>Z<sub>4</sub></b>	70	<b>S<sub>4</sub></b>	66
<b>I<sub>4</sub>-I<sub>5</sub></b>	48	<b>Z<sub>4</sub>-Z<sub>5</sub></b>	59		
<b>I<sub>5</sub></b>	10	<b>Z<sub>5</sub></b>	26		
<b>I<sub>5</sub>-I<sub>6</sub></b>	37				
<b>I<sub>6</sub></b>	73				

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