

**CONTRIBUTION TO THE MESOSTIGMATA FAUNA OF SLOVENIA  
(ACARI: MESOSTIGMATA: ZERCONIDAE ET MACROCHELIDAE)**

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**Abstract** – From the material collected on several locations in Slovenia, 7 species of zerconid and 4 species of macrochelid mites were identified. All of the Zerconidae and 2 of the Macrochelidae species are newly recorded for the country. Description of male *Zerconella leitnerae* Willmann, 1953, morphological notes on *Prozercon tragardhi* Halbert, 1923, original drawings of some newly recorded species and maps are given.

**KEY WORDS:** Acari, Mesostigmata, Zerconidae, Macrochelidae, fauna, Slovenia

**Izveček** – PRISPEVEK K FAVNI REDA MESOSTIGMATA SLOVENIJE  
(ACARI: MESOSTIGMATA: ZERCONIDAE ET MACROCHELIDAE)

V materialu zbranem na več krajih v Sloveniji smo določili 7 vrst pršic iz družine Zerconidae in 4 vrste družine Macrochelidae. Vse vrste družine Zerconidae in 2 družine Macrochelidae so prvič zabeležene v državi. Dodani so opis samca vrste *Zerconella leitnerae* Willmann, 1953, morfološke značilnosti vrste *Prozercon tragardhi* Halbert, 1923, izvirne risbe nekaterih novo najdenih vrst in karte.

**KLJUČNE BESEDE:** Acari, Mesostigmata, Zerconidae, Macrochelidae, favna, Slovenija

**Introduction**

Zerconid mites are widely distributed in the holarctic region, represented by over 350 species of 36 genera. They are soil-inhabitant predators, occurring in moss, leaf-litter and other organic detritus, feeding mostly on nematodes. Regarding the family Macrochelidae, these predatory mites are distributed world-wide, they can be found in different edaphic habitats, decomposed organic materials, dung, nests of birds and

small mammals or decayed animal tissues, many of them have phoretic association with insects. Our knowledge on distribution of species is scarce, however the Zerconidae and Macrochelidae fauna of numerous Central-European countries is well-investigated, several papers – observing the fauna of different countries – were published recently (e.g. Kontschán 2006a, 2006b, Kontschán & Ujvári 2008, Ujvári 2008a, 2008b). Regarding to Slovenia, only one study has been published so far contributing to the Zerconidae fauna, but mentioning only two species new to science [*Zercon primus* Košir, 1974, *Carpathozercon tuberculatus* (Košir, 1974)] and new data of a rare species (*Zercon plumatopilus* Athias-Henriot, 1961) (Košir, 1974). Latter paper contains only some hints in addition, mentioning that the species-richness of the group is high in the country, especially in mountainous regions, but no references or faunistical data are given. In this paper many new data of members of the two families, and maps with their occurrences (Fig. 16) are presented.

### Material and methods

Soil samples were taken from several localities in Slovenia. Members of the mesofauna were extracted using Berlese funnels. Specimens were separated under a stereo-microscope, cleared in lactic acid and impregnated with glycerin. Preparations were examined using a light microscope, drawings were made with a camera lucida. Mites are stored in alcohol and deposited in the Collections of Soil Zoology of the Hungarian Natural History Museum. Specimens were identified according to Błaszak (1974) and Mašán & Fend'a (2004). Measurements are given as mean, in micrometers, DN stands for deutonymphs.

### Results

family **Zerconidae** G. Canestrini, 1891  
genus ***Prozercon*** Sellnick, 1943

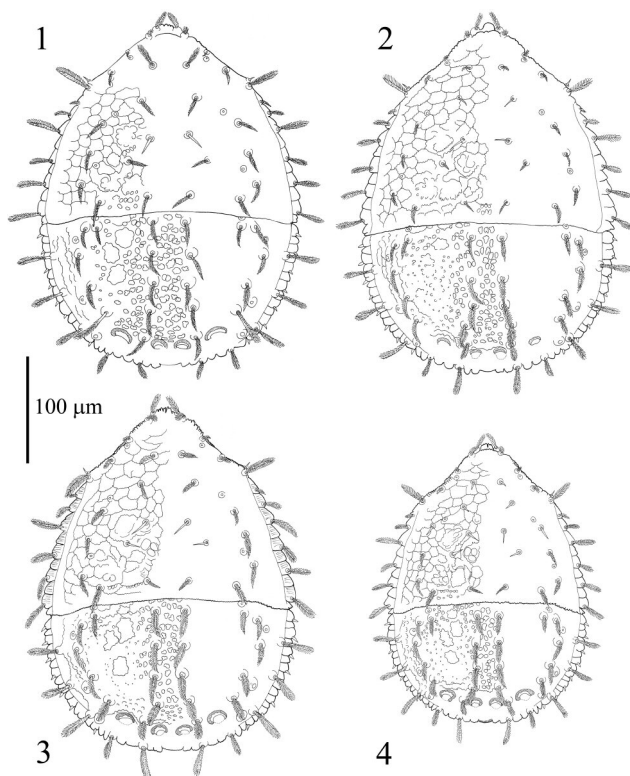
***Prozercon fimbriatus*** (C. L. Koch, 1839)

**New data:** Triglav National Park, Koča pri Peričniku, near to the Peričnik waterfall, N 46°26'20.07"; E 13°53'39.39", 787 m, mixed forest, moss from stones, 02.08.2008 leg. Dányi, L. (10 ♀, 2 ♂, 1 DN); Triglav National Park, Koča pri Peričniku, Triglavska stream (Bistrica), N 46°25.681' E 13° 52.548', 1046 m, beech forest, leaf litter, 02.08.2008 leg. Dányi, L. (17 ♀, 9 ♂, 2 DN); Triglav National Park, Koča pri Peričniku, near to the Peričnik waterfall, N 46°26'22.91"; E 13°53'37.28", 843 m, beech forest, leaf litter, 02.08.2008 leg. Dányi, L. (8 ♀); Predjama, leaf litter, 04.09.2008., leg. Kontschán, J. (19 ♀, 7 ♂, 4 DN); Bohinjska Bistrica, leaf litter, 04.09.2008., leg. Kontschán, J. (9 ♀, 12 ♂, 4 DN); Ribčev Laz, leaf litter near the lake Bohinjsko jezero, 03.09.2008., leg. Kontschán, J. (7 ♀, 5 ♂); Ribčev Laz, moss from the beach of lake Bohinjsko jezero, 03.09.2008., leg. Kontschán, J. (3 ♀, 1 ♂); Slovenske Gorice, Grabšinci, beech forest, N40°32.878'; E 15°59.005', 284 m,

25.06.2008., leg. Dányi, L., Kontschán, J., Murányi, D. (1 ♂); Piran, Fiesa, soil from laurel forest, 25.06.2008., leg. Sziráki, Gy. (1 ♀); Goreljek, leaf litter, 02.09.2008., leg. Kontschán, J. (1 ♀); Mts. Pohorje, litter and soil from beech forest above Oplotnica, 09.08.2005., leg. Murányi, D. (6 ♀, 1 ♂); Golnik, leaf litter from mixed beech forest, 460 m, 14.04.2006., leg. Dányi, L., Kontschán, J. (4 ♀); Golnik, moss from mixed beech forest, 460 m, 14.04.2006., leg. Dányi, L., Kontschán, J. (1 ♀); Belca, streamside, leaf litter from beech forest, 695 m, 13.04.2006., leg. Dányi, L., Kontschán, J. (14 ♀, 2 ♂); over Begunje na Gorenjskem, leaf litter, 788 m, 14.04.2006., leg. Dányi, L., Kontschán, J. (4 ♀); Moste, dry-rotten tree from mixed beech forest on a lake shore, 630 m, 13.04.2006., leg. Dányi, L., Kontschán, J. (1 ♀); Potoče, leaf litter from riverbank of Kokra, 13.04.2006., leg. Dányi, L., Kontschán, J. (1 ♀, 1 ♂).

**Remarks:** Most of specimens bear an additional seta between setae  $I_2$ . This is the first record in Slovenia.

*Prozercon tragardhi* (Halbert, 1923) (Figs 1-4.)



**Figs 1-4:** *Prozercon tragardhi* – 1: female from Triglav National Park; 2: female from Bohinjska Bistrica; 3: female from Oplotnica; 4: male from Oplotnica.

**New data:** Triglav National Park, Koča pri Peričniku, near to the Peričnik waterfall, N 46°26'22.91"; E 13°53'37.28", 843 m, beech forest, leaf litter, 02.08.2008 leg. Dányi, L. (1 ♀); Bohinjska Bistrica, leaf litter, 04.09.2008., leg. Kontschán, J. (2 ♀, 1 ♂, 1 DN); Mts. Pohorje, litter and soil from beech forest above Oplotnica, 09.08.2005., leg. Murányi, D. (14 ♀, 5 ♂).

**Remarks:** The only specimen found in the Triglav National Park (Fig. 1.) has strikingly long S4 setae, reaching beyond the margin of opisthotum, and setae  $i_3$  are elongated and brush-like, differing in shape and length from other podonotal  $i$ -,  $z$ - and  $s$ -setae. However the mentioned characters are atypical for *P. tragardhi*, no other remarkable difference can be observed.

Regarding the specimens found in Bohinjska Bistrica and Oplotnica, they differ more strikingly from any other *P. tragardhi* specimens found in different Central-European countries, also in more important characters. Female specimens of *P. tragardhi* have only one pair of smooth setae ( $i_3$ ) on podonotum, while females from latter two localities have two pairs of smooth podonotal setae –  $i_3$  and  $i_4$  on the ones from Bohinjska Bistrica (Fig. 2.),  $i_4$  and  $z_1$  on specimens from Oplotnica (Fig. 3.). Most interesting that males (Fig. 4.) from the two localities are similar in the pilosity of podonotal setae. 3-6 pairs of setae ( $i_{3-6}$ ,  $z_1$ ,  $s_3$ ) smooth,  $i_2$ ,  $i_6$  and  $s_3$  often slightly pilose. Nevertheless the male of *P. tragardhi* – similarly to the female – has only one pair of smooth podonotal setae ( $i_3$ ) normally. Apart from the mentioned podonotal differences, no other opisthonotal or ventral characters (including morphology of shields, chaeto- and poroidotaxy) can be observed, by which these specimens could be distinguished from *Prozercon tragardhi*. In my opinion – considering the intraspecific variation in number of smooth opisthonotal setae – these characters are insufficient for establishing a new taxon, however it is important to note that no such variation of *P. tragardhi* has been recorded before.

This is the first record of the species in Slovenia.

genus *Zercon* C. L. Koch, 1836

*Zercon baloghi* Sellnick, 1958 (Fig. 5.)

**New data:** Piran, Fiesa, seashore meadow, from dry-rotten wood, 25.06.2008., leg. Sziráki, Gy. (1 ♀).

**Remarks:** This is the first record in Slovenia.

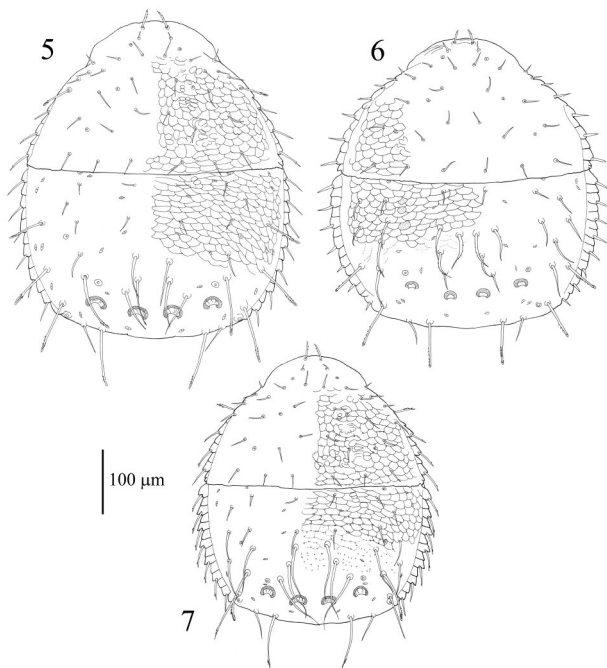
*Zercon latissimus* Sellnick, 1944 (Fig. 6.)

**New data:** Triglav National Park, Koča pri Peričniku, near to the Peričnik waterfall, N 46°26'20.07"; E 13°53'39.39", 787 m, mixed forest, moss from stones, 02.08.2008 leg. Dányi, L. (12 ♀, 2 ♂); Triglav National Park, Koča pri Peričniku, Triglavská stream (Bistrica), N 46°25,681' E 13° 52,548', 1046 m, beech forest, leaf litter, 02.08.2008 leg. Dányi, L. (4 ♀, 3 ♂); Triglav National Park, Koča pri Peričniku, near to the Peričnik waterfall, N 46°26'22.91"; E 13°53'37.28", 843 m, beech forest, leaf litter, 02.08.2008 leg. Dányi, L. (4 ♀); Bohinjska Bistrica, leaf litter, 04.09.2008., leg. Kotschán, J. (17 ♀, 4 ♂, 1 PN); Ribčev Laz, leaf litter near the lake Bohinjsko jezero, 03.09.2008., leg. Kotschán, J. (7 ♀); Goreljek, leaf litter, 02.09.2008., leg. Kotschán, J. (1 ♀).

**Remarks:** This is the first record in Slovenia.

*Zercon triangularis* C. L. Koch, 1836

**New data:** Predjama, leaf litter, 04.09.2008., leg. Kotschán, J. (24 ♀); Ribčev Laz, moss from the beach of lake Bohinjsko jezero, 03.09.2008., leg. Kotschán, J.



**Figs 5-7:** females of *Zercon* species new to the fauna of Slovenia – 5: *Zercon baloghi*; 6: *Zercon latissimus*; 7: *Zercon tematinensis*.

**New data:** Slovenske Gorice, Grabšinci, beech forest, N40°32.878'; E 15°59.005', 284 m, 25.06.2008., leg. Dányi, L., Kontschán, J., Murányi, D. (2 ♀); Mura Plain, litter and dead wood from forest near Gornja Radgona along the road 3, 09.08.2005., leg. Murányi, D. (2 ♀); Mts. Pohorje, litter and soil from beech forest above Oplotnica, 09.08.2005., leg. Murányi, D. (7 ♀).

**Remarks:** Ornamentation on posterior half of opisthonotum varies intraspecifically: usually punctuated, rarely smooth. This is the first record in Slovenia.

genus *Zerconella* Willmann, 1953

*Zerconella leitnerae* Willmann, 1953 (Figs 8-11.)

**New data:** Bohinjska Bistrica, leaf litter, 04.09.2008., leg. Kontschán, J. (4 ♀, 1 ♂).

**Remarks:** This is the first record in Slovenia.

**Description of male:** Length of idiosoma: 273 μm, width: 142 μm.

**Dorsal side** (Fig. 10.): Chaeto- and porotaxy as in female. On podonotum, 22 pairs of simple setae: i-row with 6 pairs, z-row with 2 pairs, s-row with 6 pairs, r-row with 6 pairs and p-row with 2 pairs. Setae  $i_1$  medium-sized,  $s_3$ ,  $s_6$  and  $p_2$  strikingly elongated (6-10 times longer than any other podonotal setae, reaching beyond the margin of idiosoma), others short, smooth and needle-like. Setae  $p_1$  and  $p_2$  can be observed dor-

(19 ♀, 2 ♂); Slovenske Gorice, Grabšinci, beech forest, N40°32.878'; E 15°59.005', 284 m, 25.06.2008., leg. Dányi, L., Kontschán, J., Murányi, D. (8 ♀); Goreljek, leaf litter, 02.09.2008., leg. Kontschán, J. (1 ♀); Golnik, moss from mixed beech forest, 460 m, 14.04.2006., leg. Dányi, L., Kontschán, J. (1 ♀); Belca, streamside, leaf litter from beech forest, 695 m, 13.04.2006., leg. Dányi, L., Kontschán, J. (1 ♀, 3 ♂).

**Remarks:** This is the first record in Slovenia.

*Zercon tematinensis*  
Mašán & Fend'a, 2004 (Fig. 7.)

**New data:** Slovenske Gorice, Grabšinci, beech forest, N40°32.878'; E 15°59.005', 284 m, 25.06.2008., leg. Dányi, L., Kontschán, J., Murányi, D. (2 ♀); Mura Plain, litter and dead wood from forest near Gornja Radgona along the road 3, 09.08.2005., leg. Murányi, D. (2 ♀); Mts. Pohorje, litter and soil from beech forest above Oplotnica, 09.08.2005., leg. Murányi, D. (7 ♀).

**Remarks:** Ornamentation on posterior half of opisthonotum varies intraspecifically: usually punctuated, rarely smooth. This is the first record in Slovenia.

genus *Zerconella* Willmann, 1953

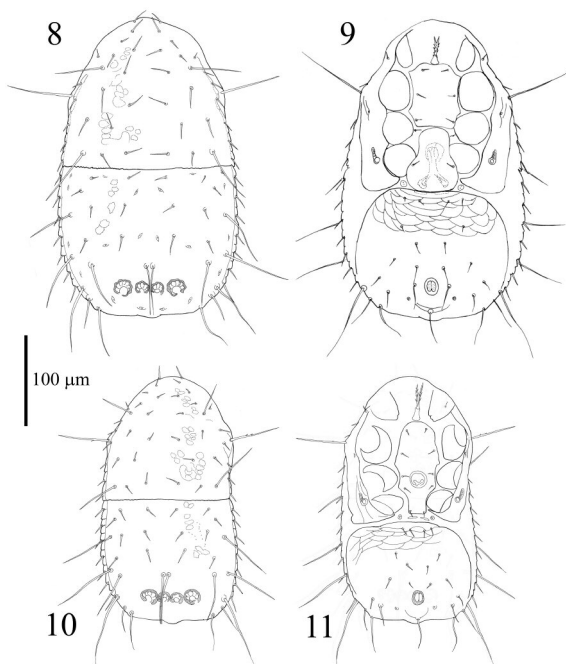
*Zerconella leitnerae* Willmann, 1953 (Figs 8-11.)

**New data:** Bohinjska Bistrica, leaf litter, 04.09.2008., leg. Kontschán, J. (4 ♀, 1 ♂).

**Remarks:** This is the first record in Slovenia.

**Description of male:** Length of idiosoma: 273 μm, width: 142 μm.

**Dorsal side** (Fig. 10.): Chaeto- and porotaxy as in female. On podonotum, 22 pairs of simple setae: i-row with 6 pairs, z-row with 2 pairs, s-row with 6 pairs, r-row with 6 pairs and p-row with 2 pairs. Setae  $i_1$  medium-sized,  $s_3$ ,  $s_6$  and  $p_2$  strikingly elongated (6-10 times longer than any other podonotal setae, reaching beyond the margin of idiosoma), others short, smooth and needle-like. Setae  $p_1$  and  $p_2$  can be observed dor-



**Figs 8-11:** *Zerconella leitnerae* – 8: female, dorsal view; 9: female, ventral view; 10: male, dorsal view; 11: male, ventral view.

sally on the overcurved peritremal shield,  $p_2$  can have short hairs medially. On opisthonotum, 21 pairs of smooth setae: I-row with 5 pairs, Z-row with 5 pairs, S-row with 4 pairs, R-row with 7 pairs. Setae  $I_5$  absent. Setae  $I_4$ ,  $I_6$ ,  $Z_{4-5}$  and  $S_{2-4}$  differently elongated, tapering, reaching beyond the margin of opisthonotum. Setae  $S_4$  – as the longest opisthonotal setae – 7 times longer than short setae (e. g.  $I_1$ ). Setae  $I_4$  situated very close to each other, at the same time the distance between insertions of setae  $I_6$  quite long and can reach 90  $\mu\text{m}$ . None of I-setae reaching the followings bases. Dorsal cavities situated in a row tightly close to each other, strongly sclerotized, with smooth anterior- and lobed posterior margin, the lateral pair slightly bigger than the medial pair. Dorsal shields very slightly sclerotized, bearing some small, irregular pits.

Measurements of setae and longitudinal distances between their bases as in Table 1.

$I_1$	12	$Z_1$	11	$S_1$	13
$I_1$ - $I_2$	26	$Z_1$ - $Z_2$	26	$S_1$ - $S_2$	21
$I_2$	12	$Z_2$	12	$S_2$	62
$I_2$ - $I_3$	20	$Z_2$ - $Z_3$	28	$S_2$ - $S_3$	38
$I_3$	15	$Z_3$	15	$S_3$	65
$I_3$ - $I_4$	32	$Z_3$ - $Z_4$	19	$S_3$ - $S_4$	29
$I_4$	55	$Z_4$	52	$S_4$	79
$I_4$ - $I_6$	61	$Z_4$ - $Z_5$	36		
$I_6$	41	$Z_5$	30		

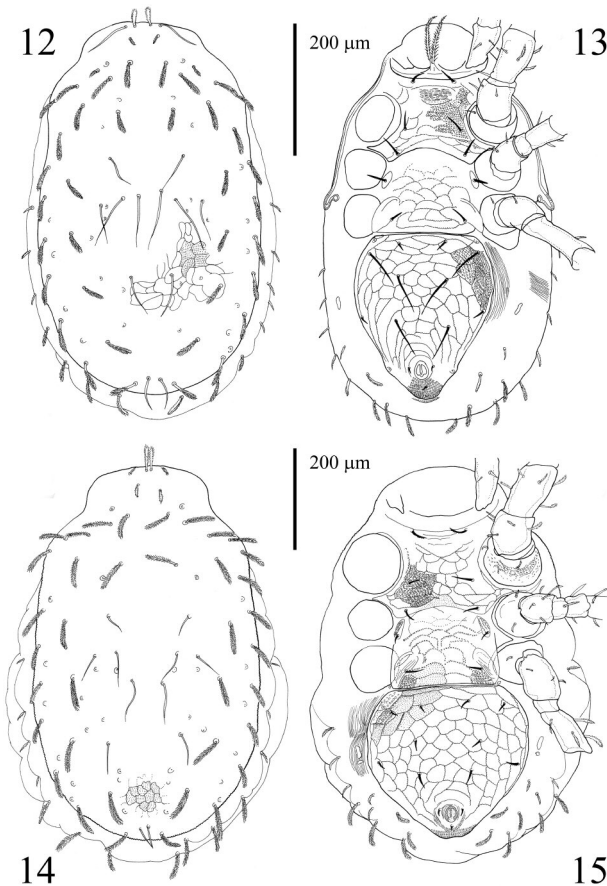
**Table 1:** Length of opisthonotal setae and longitudinal distances between their bases in *Zerconella leitnerae* male (values in  $\mu\text{m}$ ).

**Ventral side** (Fig. 11.): Peritremes short, peritremal shield with a pair of small fissures over the posterolateral tips. Tritosternum bifurcate, with elongated, margi-

nally serrated lacinae. Sternogenital shield with 5 pairs of setae. One pair of adgenital shields with two pores and one pair of postgenital sclerites present. Anterior margin of ventroanal shield with two pairs of setae.

family **Macrochelidae** Vitzthum, 1930  
genus ***Geholaspis*** Berlese, 1918  
subgenus ***Geholaspis*** Berlese, 1918

***Geholaspis berlesei*** Valle, 1953 (Figs 12-13.)



**Figs 12-15:** females of *Geholaspis* species new to the fauna of Slovenia – 12: *Geholaspis berlesei*, dorsal view; 13: *Geholaspis berlesei*, ventral view; 14: *Geholaspis mandibularis*, dorsal view; 15: *Geholaspis mandibularis* ventral view.

**New data:** Triglav National Park, Koča pri Peričniku, near to the Peričnik waterfall, N 46°26'20.07"; E 13°53'39.39", 787 m, mixed forest, moss from stones, 02.08.-2008 leg. Dányi, L. (3 ♀); Triglav National Park, Koča pri Peričniku, near to the Peričnik waterfall, N 46°26'22.91"; E 13°53'37.28", 843 m, beech forest, leaf litter, 02.08.2008 leg. Dányi, L. (2 ♀, 1 DN); Triglav National Park, Koča pri Peričniku, Triglavská stream (Bistrica), N 46°25,681' E 13° 52,548', 1046 m, beech forest, leaf litter, 02.08.2008 leg. Dányi, L. (4 ♀); Predjama, leaf litter, 04.09.2008., leg. Kotschán, J. (1 ♀); Bohinjska Bistrica, leaf litter, 04.09.2008., leg. Kotschán, J. (1 ♀); Gorenjska, leaf litter, 02.09.-2008., leg. Kotschán, J. (4 ♀); Mts. Pohorje, litter and soil from beech forest above Oplotnica, 09.08.2005., leg. Murányi, D. (2 ♀); Gozd Martuljek, soil from beech forest, 13.04.2006., leg.

Dányi, L., Kontschán, J. (1 ♀); Potoče, leaf litter from riverbank of Kokra, 13.04.2006., leg. Dányi, L., Kontschán, J. (1 ♀).

**Remarks:** This is the first record in Slovenia.

*Geholaspis longispinosus* Kramer, 1876

**New data:** Piran, Fiesa, seashore meadow, from dry-rotten wood, 25.06.2008., leg. Sziráki, Gy. (1 ♀).

subgenus *Longicheles* Valle, 1953

*Geholaspis mandibularis* Berlese, 1904 (Figs 13-14.)

**New data:** Triglav National Park, Koča pri Peričniku, Triglavška stream (Bistrica), N 46°25,681' E 13° 52,548', 1046 m, beech forest, leaf litter, 02.08.2008 leg. Dányi, L. (1 ♀); Bohinjska Bistrica, leaf litter, 04.09.2008., leg. Kontschán, J. (4 ♀); Ribčev Laz, leaf litter near the lake Bohinjsko jezero, 03.09.2008., leg. Kontschán, J. (2 ♀); Mts. Pohorje, litter and soil from beech forest above Oplotnica, 09.08.2005., leg. Murányi, D. (10 ♀); Gozd Martuljek, soil from beech forest, 13.04.2006., leg. Dányi, L., Kontschán, J. (1 ♀); Golnik, leaf litter from mixed beech forest, 460 m, 14.04.2006., leg. Dányi, L., Kontschán, J. (1 ♀); Potoče, leaf litter from riverbank of Kokra, 13.04.2006., leg. Dányi, L., Kontschán, J. (2 ♀).

**Remarks:** This is the first record in Slovenia.

genus *Macrocheles* Latreille, 1829

subgenus *Macrocheles* Latreille, 1829

*Macrocheles glaber* (Müller, 1860)

**New data:** 1. Slovenske Gorice, Slavšina, beech forest, 284 m, collected from *Geotrupes vernalis* (phoresis) N46°31.996' E15°57.631' 25.06.2008., leg. Dányi, L., Kontschán, J., Murányi, D. (1 ♀).

## Discussion

New data of the rare *Zerconella leitnerae* seems to consider the fact that the species is distributed in the whole Alps, presumably as an alpine element. In the case of *Z. tematinensis* [previously recorded only from Slovakia (Mašán & Fend'a 2004) and Hungary (Ujvári 2008)] the new occurrences show that this species can be characterized by an East Alpine distribution. Regarding *Z. latissimus* its turnout was expected by its presence in the neighbouring countries (Hungary, Croatia and Italy), it seems that the species has a wide Mediterranean distribution from the Iberian Peninsula to the Balkan. Two of the species found (*Z. baloghi*, *G. berlesei*) are abundant and prevalent in Central Europe, both inhabiting different forest habitats of low and moderate mountains, occurring in moss and leaf-litter. Accordingly the finding



Z. Ujvári: Contribution to the Mesostigmata fauna of Slovenia (Acari: Mesostigmata: Zerconidae et Macrochelidae)

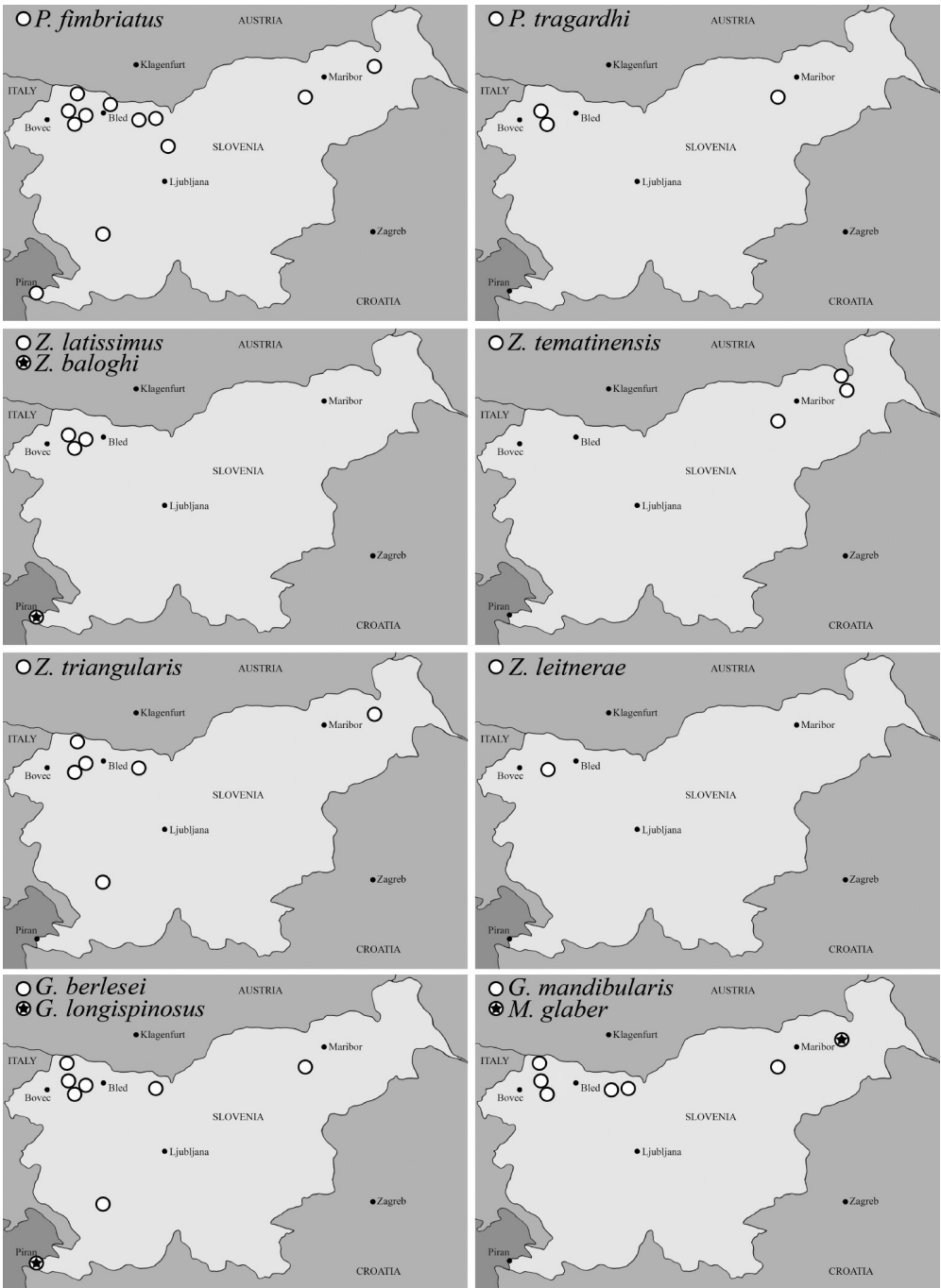


Fig. 16: New occurrences of Zerconidae and Macrochelidae species in Slovenia.

of *Z. baloghi* on a seashore grassland is fairly curious, nevertheless the only specimen recorded from a meadow habitat also shows that these mite species are principally associated with forests and can rarely be collected in treeless vegetation. The remaining six species (*P. fimbriatus*, *P. tragardhi*, *Z. triangularis*, *G. mandibularis*, *G. longispinosus*, *M. glaber*) are widely distributed in Europe (*Macrocheles glaber* can be considered as cosmopolitan), they constituted the largest part of the observed material. The mentioned species can be characterized by wide ecological plasticity, occurring in various forest habitats, on a broad scale of altitudes from plains to mountains.

### Acknowledgements

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