

Zerconella (Zerconella) balkanica sp. nov., a new species of Zerconidae (Acari: Mesostigmata) from central Albania

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Abstract: One new species, *Zerconella (Zerconella) balkanica* sp. nov., is described as the second species of the subgenus *Zerconella (Zerconella)* Willmann, 1953 on the basis of 5 specimens collected in the Dejë Mountains in central Albania. The new species shows a close morphological relationship to *Zerconella (Zerconella) leitnerae* Willmann, 1953, but can be distinguished from the latter by the absence of setae J4, the position of setae J5, and the size of the dorsal cavities. Geographic distribution of the subgenus *Zerconella (Zerconella)* is presented.

Key words: Mesostigmata, Zerconidae, *Zerconella*, new species, Balkan Peninsula, Albania

1. Introduction

Zerconidae belongs to one of the most abundant soil-inhabiting mesostigmatid mite groups of the northern hemisphere, represented by more than 400 species of 37 genera. Most of the taxonomic and faunistic studies concerning the family were carried out in Europe, but several species are known from Asia, the Americas, and Africa, as well. Although Europe has been the most intensively studied continent, the mite fauna of many areas, like the Balkan Peninsula, are currently very sparsely explored.

The Hungarian Natural History Museum obtained a huge collection of unsorted soil samples due to several zoological expeditions (e.g., Fehér et al., 2004; Murányi et al., 2011) organized within the confines of an extended Balkan research project. Regarding Albania, there is only a single paper reporting 11 *Zercon* C. L. Koch, 1836 species from the country (Ujvári 2010a), of which 3 species, *Zercon albanicus* Ujvári, 2010, *Zercon cavatus* Ujvári, 2010, and *Zercon elongatus* Ujvári, 2010, were proven to be new to science and so far are exclusively known from Albania.

Zerconella Willmann, 1953 was recently the subject of an extensive study presented by Ujvári (2010b). Until that time, the genus was considered to be a subgenus of *Zercon* C. L. Koch, 1836, with a single species distributed predominantly in the alpine range of central Europe. Ujvári's recent study demonstrated that *Zerconella* possesses many unique characters compared to *Zercon*, and further shows an interesting and strong morphological relationship to an

East Asian taxon defined earlier. Therefore, these taxa were united in a single genus, *Zerconella*, preserving the original distinction on the level of subgenera *Zerconella (Zerconella)* Willmann, 1953 and *Zerconella (Metazercon)* Błaszak, 1975. The present study contributes to the knowledge of *Zerconella (Zerconella)* with the description of a new species from the Dejë Mountains in central Albania.

2. Materials and methods

The Berlese samples of the Hungarian Natural History Museum (HNHM) were examined. Specimens were cleared with lactic acid, mounted in glycerin, and examined using light microscopy; drawings were made with the aid of a drawing tube. Type specimens in 70% ethanol are deposited in the Collection of Soil Zoology of HNHM, and in the Canadian National Collection of Insects, Arachnids, and Nematodes (CNC). The terminology of setae follows Lindquist and Evans (1965), with modifications for the caudal region as given by Lindquist and Moraza (1998). The system of notation for dermal glands and lyrifissures is based on Johnston and Moraza (1991). All measurements, including the scale bars of the figures, are given in micrometers.

3. Taxonomy

Family Zerconidae Canestrini, 1891

Genus *Zerconella* Willmann, 1953

Type species. *Zerconella (Zerconella) leitnerae* Willmann, 1953

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Zerconella (Zerconella) balkanica sp. nov.

Type material. Holotype: female: E-2705 – Albania, Mat district, Dejë Mountains, sidestream of the Varoshit stream along the road to Lurë area, leaf litter from beech patch, 1215 m a.s.l., 41°39.824'N, 20°11.720'E, 19.05.2010, leg. Fehér, Z., Murányi, D., & Ujvári, Zs. (deposited in HNHM). Paratypes: 1 female and 3 males, locality and date as for the holotype (1 female and 1 male deposited in CNC; 2 males deposited in HNHM).

Diagnosis. J setal row only with 3 pairs of setae. Setae J5 elongate, situated in the central area of opisthonotum, directly next to each other. Lateral pair of dorsal cavities twice as large as central cavities. Podonotal setae z3, s5, and r3 and opisthonotal setae Z4–5 and S3–5 stronger and markedly longer than other dorsal setae.

Description of female. Length of idiosoma: 323–328 µm; width: 204 µm (n = 2).

Dorsal side (Figure 1a). Podonotum with 22 pairs of setae (j1–6, z2–6, s1–6, and r1–5). Each podonotal seta smooth and needle-like. Setae z3, s5, and r3 elongate, expanding beyond margins of idiosoma, other setae of the shield short. Podonotal gland openings not conspicuous. Surface of podonotum with weakly developed reticulate pattern and muscle scars.

Opisthonotum with 19 pairs of setae, J2–3, J5, Z1–5, S1–5, and R1–6. Setae J1 and J4 absent. Setae J2–3, Z1–3, and S1–2 similar in appearance, short, smooth, and needle-like, none of them reaching the base of the following one in the series. Setae J5 3–4 times longer than short opisthonotal setae, situated in the central area of opisthonotum, directly next to each other, not reaching the line of dorsal cavities. Setae Z4 and S3–4 strong, markedly elongate, each reaching beyond margins of idiosoma. Setae Z5 similar in appearance to J5, situated 110 µm apart. Marginal R-setae short, smooth and needle-like. Length of opisthonotal setae and distances between their insertions as in the Table. Glands *gdJ4* (Po3) situated on line connecting J5 and Z4, other opisthonotal glands not conspicuous. Anterior half of opisthonotal surface covered by weakly developed reticulate pattern, posterior half smooth. Posterodorsal cavities strongly sclerotized, ring-like, with undulate margins, lateral pair twice as large as central pair (Figure 1b).

Ventral side (Figure 1c). Tritosternal laciniae divided into 2 branches, both of these subdivided distally into 2–3 marginally serrate branches. Peritrematal shields posteriorly truncate at level of setae S1, posteriorly separated from podonotal shield by a triangular, weakly sclerotized slit. Ornamentation of peritrematal shields weakly developed, a fine reticulation of longitudinal lines visible. Peritremes (Figure 2a) short, stigmata situated at level of central area of the fourth coxae, distal end reaching only the posterior part of the third coxae. Chaetotaxy of ventral shields typical for genus *Zerconella*. Sternal shield

70 µm long and 51 µm wide at the level of setae st2, with nearly straight posterior margin and weakly developed reticulate ornamentation. Adgenital platelets with 2–2 openings of *gv2*, postgenital sclerites present. Ventrianal shield with short, smooth, needle-like preanal and adanal setae, setae Zv1 present. Postanal seta (pa) and setae Jv5 uniform, smooth and needle-like, 1.5–2 times longer than preanal and adanal setae (ad). Anal valves with vestigial euanal setae. Glands *gv3* situated posterolateral to adanal setae, on line connecting setae Jv4 and postanal seta. Anterior surface of ventrianal shield covered by tile-like pattern to level of Jv3–Zv3–Zv4.

Gnathosoma (Figure 2b). Situation of hypostomal and subcapitular setae typical for the family. Setae h1–2 elongate, smooth. Setae h3 shorter than h1, smooth, h4 as long as h1–2, marginally serrate. Corniculi horn-like, internal malae with a pair of bifurcate anterocentral branches and with smooth margins. Chelicerae relatively slender, fixed digit with 6 teeth, movable digit with 4 teeth. Epistome of *Parazercon*-type (Figures 2c and 2d).

Description of male (Figures 3a and 3b). Length of idiosoma: 247–258 µm; width: 150–156 µm (n = 3). Chaetotaxy, poroidotaxy, and sculptural pattern of dorsal, ventrianal, and peritrematal shields similar to those of female. Length of opisthonotal setae and distances between their insertions as in the Table. Sternigenital shield entire, 5 pairs of sternigenital setae present. Postgenital sclerites not visible. The triangular slit separating posterior ends of peritrematal shields from podonotal shield less expressed than in female. The slit between lateral parts of ventral shield and opisthonotal shield narrower than in female. Each character of gnathosoma (epistome of males shown in Figures 3c–3e) similar to those of female, but terminal part of fixed digit of chelicerae bifurcate.

Etymology. The name of the new species refers to the Balkan Peninsula, the geographic area where the specimens were collected.

Differential diagnosis. The new species belongs to the subgenus *Zerconella (Zerconella)* by the following characters: caudodorsal region without elevations; surface of dorsal shields smooth; some dorsal setae and all marginal setae short. *Zerconella (Zerconella) balkanica* sp. nov. is very similar in appearance to the other species of the subgenus *Zerconella (Zerconella) leitnerae* Willmann, 1953. The new species, however, can easily be distinguished from the latter by the absence of setae J4, the position of setae J5 [situated in the posterior half of opisthonotum, reaching beyond the line of dorsal cavities in *Z. (Z.) leitnerae*, located in the central area of opisthonotum, not reaching the line of dorsal cavities in *Z. (Z.) balkanica* sp. nov.], and the size of dorsal cavities [approximately uniform in *Z. (Z.) leitnerae*, lateral cavities twice as large as central cavities in *Z. (Z.) balkanica* sp. nov.].

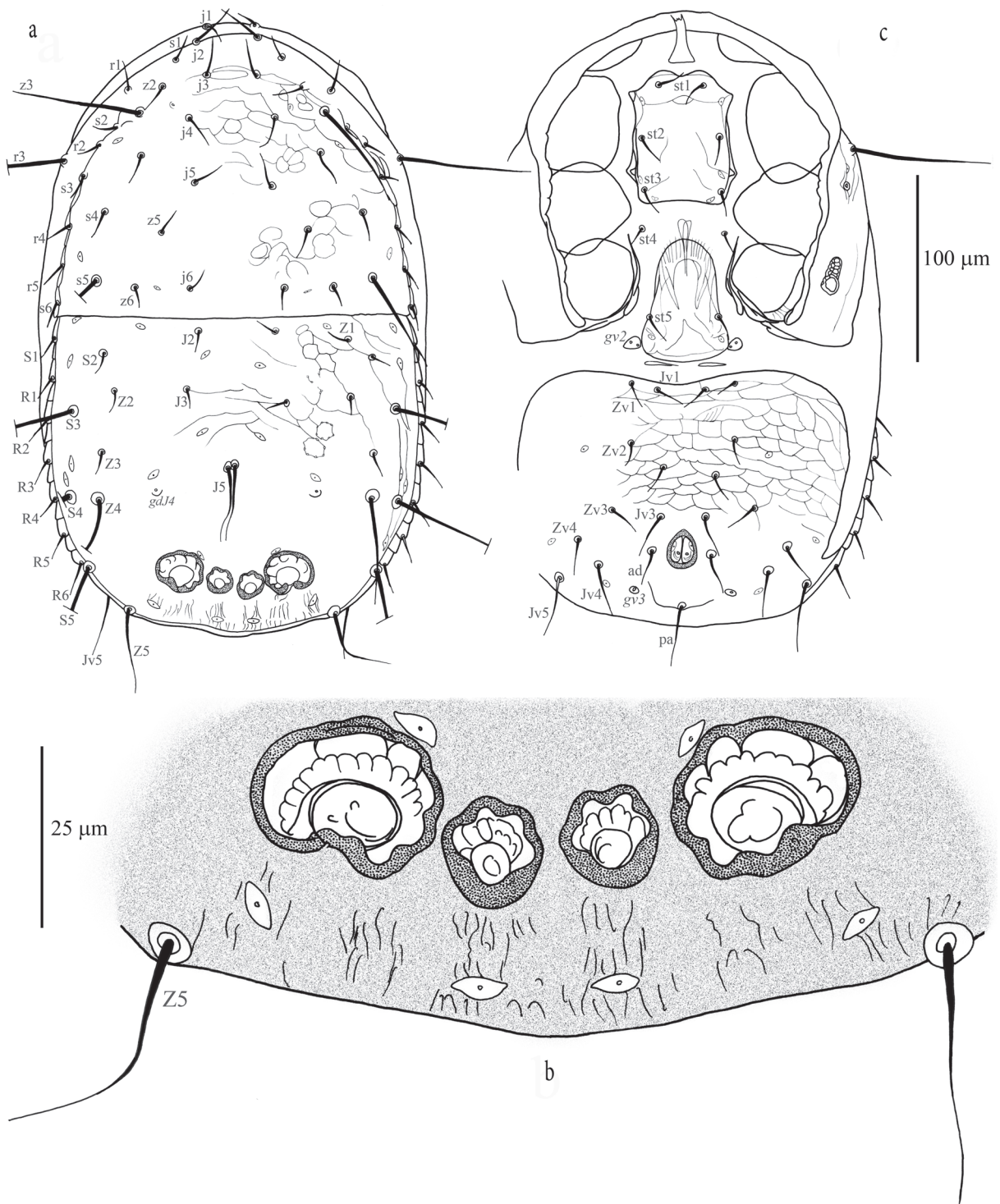


Figure 1. *Zerconella (Zerconella) balkanica* sp. nov. female: a) dorsal view of idiosoma; b) dorsal view of posterior region of opisthonotum, with the posterodorsal cavities; c) ventral view of idiosoma.

Table. Length of opisthonotal setae and distance between their bases in *Zerconella* (*Zerconella*) *balkanica* sp. nov.

	F	M		F	M		F	M
			Z1	11–12	9–10	S1	14	11–12
			Z1–Z2	29–30	22–24	S1–S2	23–25	18–20
J2	11–12	8–10	Z2	10–12	9–10	S2	11–12	11
J2–J3	31–37	24–25	Z2–Z3	32–33	21–23	S2–S3	30–35	21–22
J3	10–12	9–11	Z3	12–13	11–12	S3	55–56	61–63
J3–J5	43–47	32–33	Z3–Z4	24–25	16–17	S3–S4	45–49	31–35
J5	40–41	34–36	Z4	57–58	34–36	S4	65–68	50–53
			Z4–Z5	61–65	48–51	S4–S5	39–40	31–32
			Z5	45–47	19–20	S5	66–67	49–50

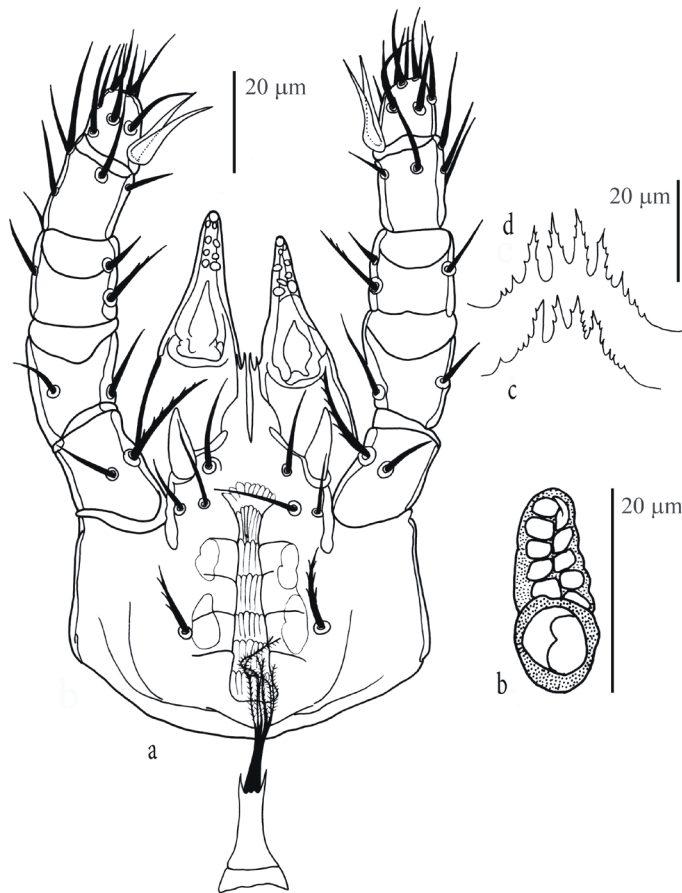


Figure 2. Different structures of *Zerconella* (*Zerconella*) *balkanica* sp. nov. female: a) peritreme; b) ventral view of gnathosoma; c and d) epistome.

Remarks. *Zerconella* (*Zerconella*) *balkanica* sp. nov. obviously lacks 2 pairs of J-setae, but the question arises: which are the missing pairs? As Zerconidae generally have 5 pairs of J-setae, and absence of any of these pairs is quite rare within the family (it can serve as a basis for classification,

as well), it is very important to find out which of the 5 pairs do not develop in this species. According to Lindquist and Moraza (1998), those setae that appear in the larval stage are the most conservative (they are most likely to appear), while setae appearing in the protonymphal stage have a

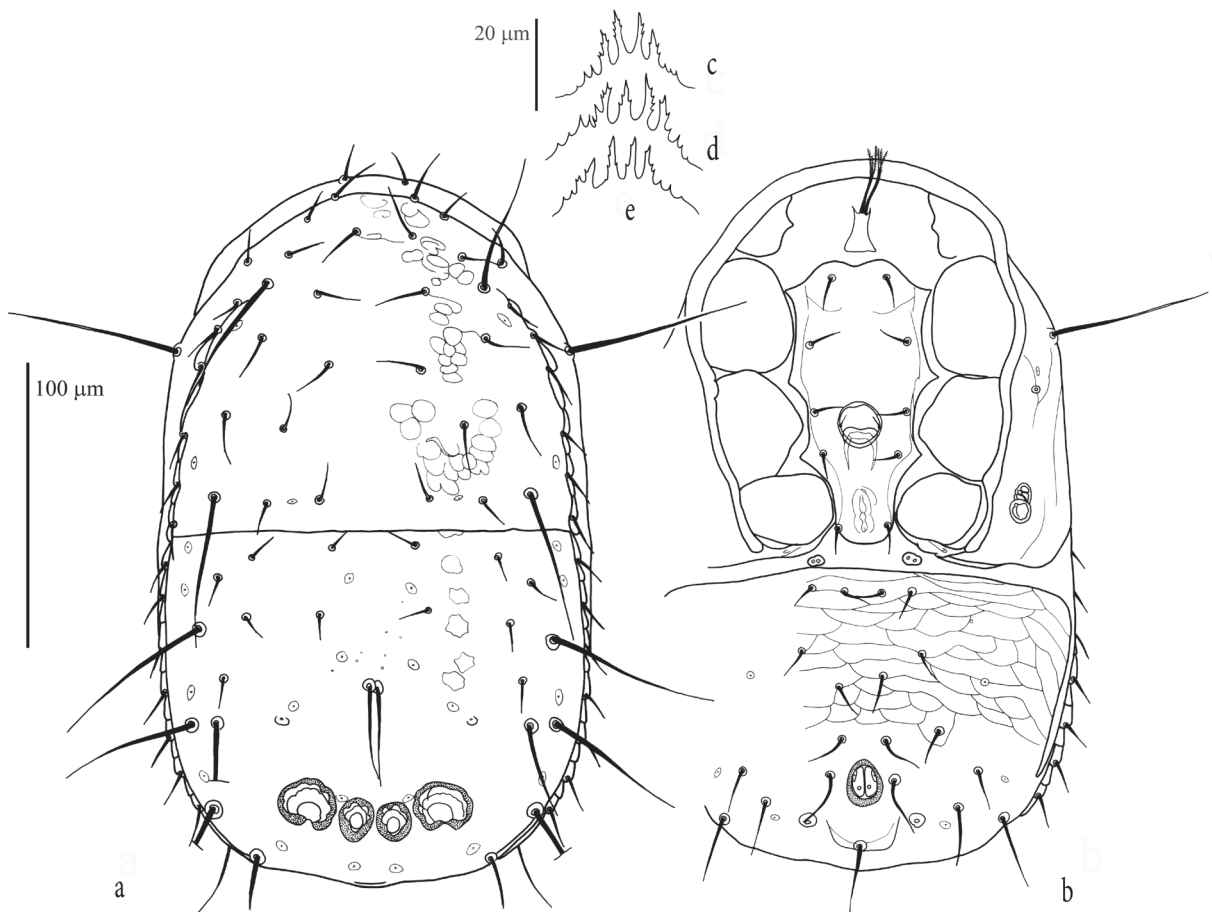


Figure 3. *Zerconella (Zerconella) balkanica* sp. nov. male: a) dorsal view of idiosoma; b) ventral view of idiosoma; c, d, and e) epistome.

higher chance of not developing, and setae appearing in the deutonymphal stage are those that are absent in most of the species with incomplete chaetotaxy. On the basis of the chaetotaxy system of Lindquist and Moraza (1998), setae J2–5 are larval setae, while the J1 pair appears in the protonymphal stage; therefore, the latter has the greatest chance to be absent on adult specimens in each *Zerconella* species [as was indicated in the case of other *Zerconella* species, as well (Ujvári, 2010b)]. The appearance of J-setae of *Zerconella (Zerconella) leitnerae* is very similar to that of J-setae of *Z. (Z.) balkanica* sp. nov. As a conclusion of the previous facts, both species lack setae J1, but *Z. (Z.) balkanica* sp. nov. also lacks one pair of J2–5. Setae J2–3 of the new species seem to be identical to those of *Z. (Z.) leitnerae* by their similar position; therefore, the missing pair must be J4 or J5. While the last pair of the J-series of *Z. (Z.) balkanica* sp. nov. is similar in appearance to J5 of *Z. (Z.) leitnerae*, most probably these setae are also identical regarding their origin, even if these elongate setae are shifted to the central part of the opisthonotum in the new species. Hence, setae J4 must be the other absent pair.

4. Discussion

The genus *Zerconella* is a well-defined unit of Zerconidae with an appropriate morphological basis, and its subgenera are easily distinguishable (Ujvári, 2010b). Distinctive morphological characters are supported by the geographic separation of these groups, as well. The 5 East Asian species belonging to *Zerconella (Metazercon)* Błaszak, 1975 [*Z. (M.) athiasae* (Błaszak, 1975), *Z. (M.) mahunkai* (Halašková, 1979), *Z. (M.) rafalskii* (Błaszak, Kaczmarek & Lee 1997), *Z. (M.) lobata* Ujvári, 2010, and *Zerconella (Metazercon) biconcava* Ma, Ho & Wang, 2011] constitute a separate evolutionary lineage supported by their special posterodorsal lobes in association with glands *gdJ4* (Po3) and the well-developed opisthonotal ornamentation, while characteristics of the European group are confirmed by the discovery of *Zerconella (Zerconella) balkanica* sp. nov. (lack of posterodorsal lobes and opisthonotal ornamentation). The geographic distribution of the species of subgenus *Zerconella (Zerconella)* are shown in Figure 4.

Since the fauna of most areas of the Balkan Peninsula and other mountains connected to the Alps has not yet



Figure 4. Geographic distribution of *Zerconella (Zerconella)* species. Records of *Z. (Z.) leitnerae* are the following: Lahngangkogel, Austria (Willmann, 1953); Gorce National Park, Poland (Szymkowiak, 2001); Andreis, Italy (Plumari, 2003); Bohinjjska Bistrica, Slovenia (Ujvári, 2009); Veternička, Croatia (Ujvári, 2010c).

been explored, it can be presumed that these high-altitude territories still hide some undiscovered species of the subgenus *Zerconella (Zerconella)*. Hence, further studies are required to understand the distribution pattern of this group.

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