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DESCRIPTION OF A NEW SPECIES, *PROZERCON MAHUNKAIANA* N. SP., AND REDESCRIPTION OF *PROZERCON ARISTATUS* ATHIAS-HENRIOT, 1961 FROM PORTUGAL

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ABSTRACT — While elaborating the unsorted Berlese samples collected in Portugal at the Hungarian Natural History Museum, two *Prozercon* Sellnick, 1943 species were found. One of them, *Prozercon mahunkaiana* n. sp., is new to science. The other species, *Prozercon aristatus* Athias-Henriot, 1961 is redescribed, and a description of the unknown male species is provided.

KEYWORDS — Zerconidae; *Prozercon*; new species; Iberian Peninsula; Portugal

INTRODUCTION

Zerconidae belongs to one of the most important and abundant soil inhabiting mesostigmatid mite groups on the Northern Hemisphere. First records of zerconid mite species from the Iberian Peninsula were presented by Sellnick (1958), later Miheľič (1960, 1962, 1963a, 1963b) and Athias-Henriot (1961) described several species from the region. In the past twenty years, due to the prominent work of Moraza (1989, 1990, 1991, 2006a, 2006b) our knowledge on the Zerconidae fauna of Spain has been greatly improved. According to the key of Moraza (2006b), currently 29 species are known from Spain (including the Balearic and Canary Islands), of which nine belong to the genus *Prozercon* Sellnick, 1943, however the presence of *P. aristatus* Athias-Henriot, 1961 is ignored.

The present paper provides new records and a detailed re-description of the latter species and also

the description of a new species for Science.

MATERIALS AND METHODS

Specimens of the Collection of Soil Zoology of the Hungarian Natural History Museum (HNHM) were extracted using Berlese-funnels, then cleared with lactic acid and mounted in glycerine. Preparations were examined using a light microscope, drawings were made with the aid of a drawing tube. Specimens are deposited in the Collection of Soil Zoology of HNHM, Budapest. 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 both Johnston and Moraza (1991) and Athias-Henriot (1969). All measurements including scale bars of the figures are given in micrometers.

RESULTS

Genus *Prozercon* Sellnick, 1943

Type species: *Zercon fimbriatus* C. L. Koch, 1839 by original designation.

Prozercon mahunkaiana n. sp.

Diagnosis — Posterolateral tips of peritrematal shields reaching level of R3 in female, fused to ventrianal shield in male. Most central and submarginal setae of podonotum smooth, j3 extraordinarily long, plumose. Marginal setae of opisthonotum smooth, thorn-like. Setae J1, Z1 and S2 short, pointed, pilose. Setae J4 situated on line connecting J3 and J5. Glands gdZ3 (Po3) situated lateral to Z3. Central pair of posterodorsal cavities strongly sclerotized, two times larger than lateral pairs, with axes converging posteriorly.

Description of female (n = 9) — Length of idiosoma: 312 – 323 µm (317 µm); width: 242 – 247 µm (246 µm). Holotype: length: 317 µm; width: 242 µm.

Dorsal side (Figures 1A, 2, 8D) — Podonotum with 20 pairs of setae, j1-6, z2-6, s1-6, r2 and r4-5 inserted dorsally, r1 and r3 inserted ventrally, on peritrematal shields. Podonotal setae j1 plumose, j2 and s1 finely pilose, j3 remarkably longer than the rest of central podonotal setae, plumose. Marginal setae z3, s2-3, r2, r4-5 and s6 plumose, other setae on the shield short, smooth and needle-like. Glands gds1 (po1) situated posterior to insertions of s1; gdj4 (po2) situated on line connecting j4 and z4, near z4; gds4 (po3) on line connecting s4 and s5. Podonotal shield covered by tile-like and reticulate pattern, with irregular pits in the crossing points on its central and posterior surface.

Opisthonotum with 22 pairs of setae, J1-5, Z1-5, S1-5 and R1-7. Setae J1, Z1 and S2 similar in shape and length, short, pointed and finely pilose. Setae J2 pilose, and J3-5 densely pilose (Figure 8B). Each J-setae short, none of them reaching bases of the following one in the series. Setae Z2-3 short and pilose, Z4 remarkably longer than former setae, plumose.

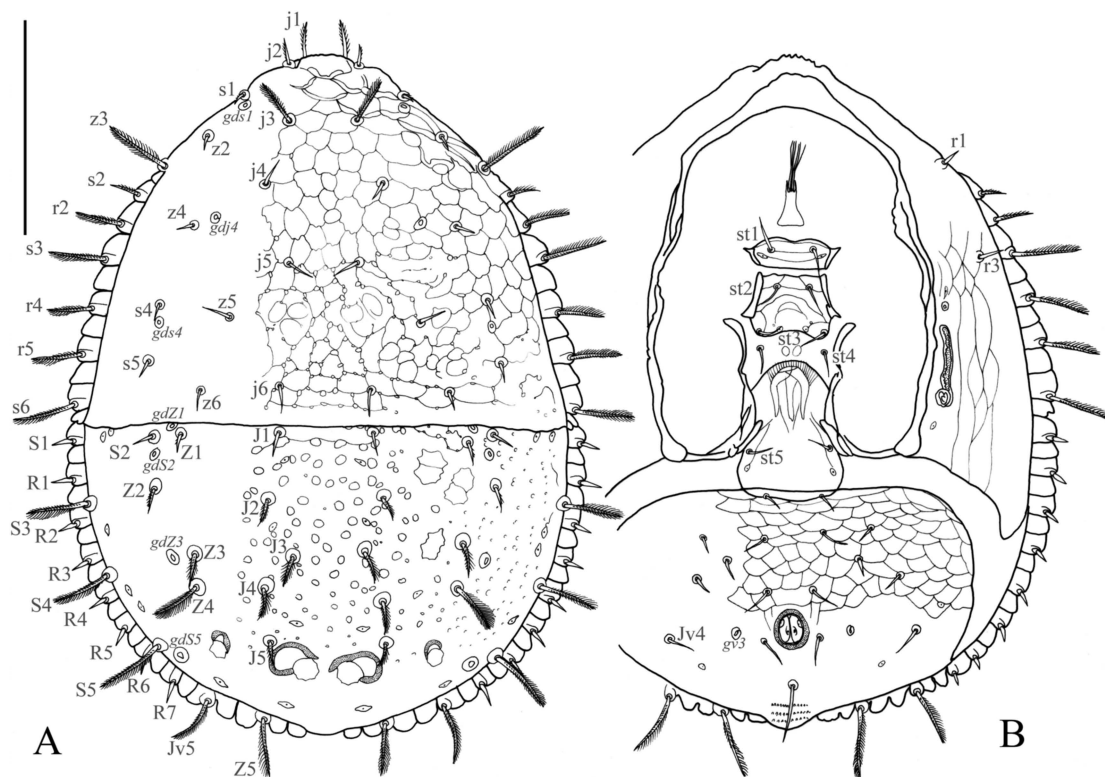


FIGURE 1: *Prozercon mahunkaiana* n. sp. female: A – dorsal view; B – ventral view. (Scale = 100 µm)

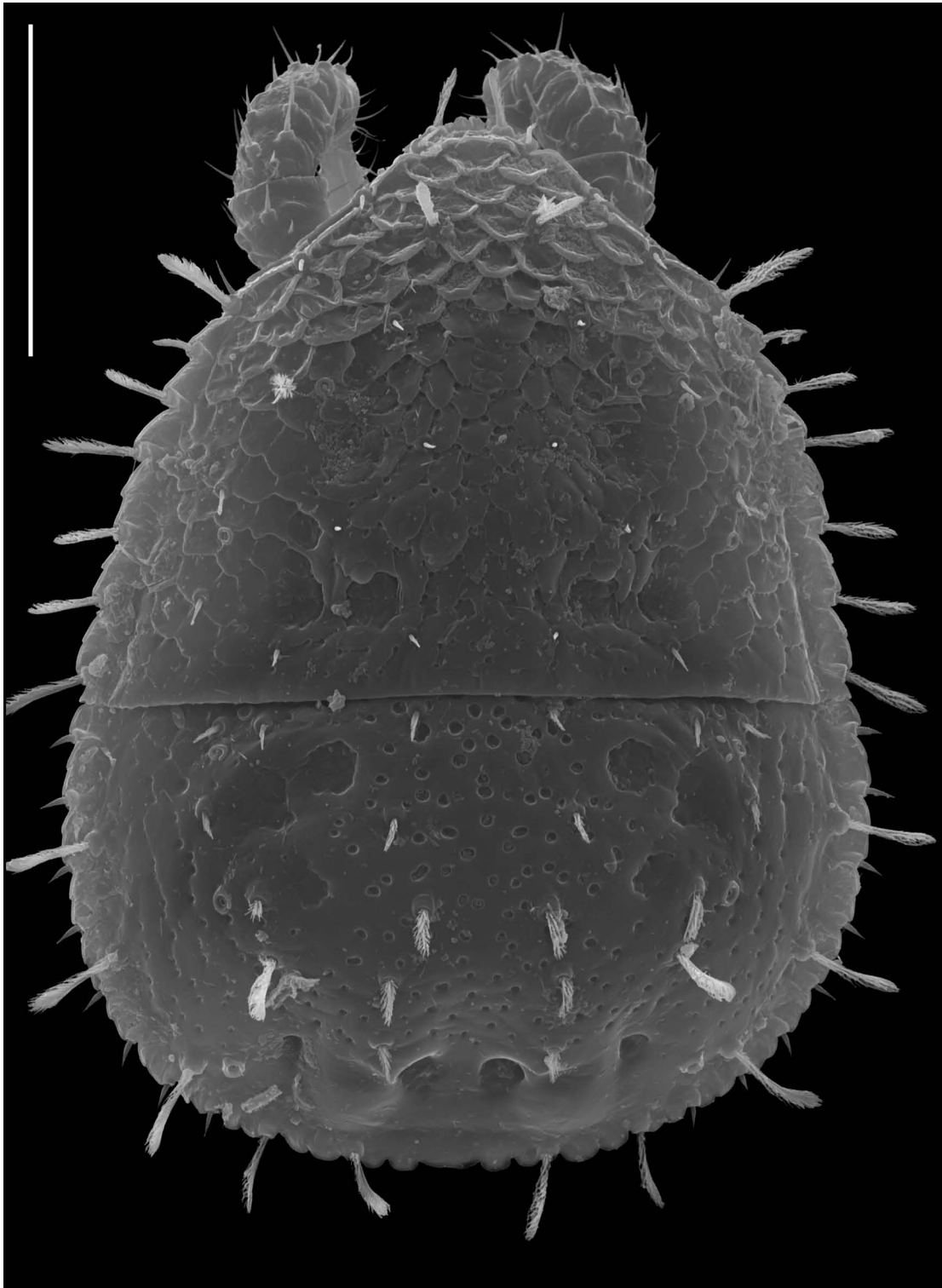


FIGURE 2: *Prozercon mahunkaiana* n. sp. female, dorsal view (SEM photo). (Scale = 100 μ m)

Setae Z5 and S3-5 similar in appearance, expanding beyond margins of idiosoma, plumose. Marginal setae S1 and all the R-setae short, smooth and thorn-like. Setae S2 situated on line connecting S1 and Z1, near Z1. Length of opisthonotal setae and distances between their insertions as in the Table 1. Glands gdZ1 (Po1) situated anterolateral to insertions of Z1; gdS2 (Po2) situated on line connecting S2 and Z2, closer to S2; gdZ3 (Po3) lateral to Z3; gdS5 (Po4) near S5, in posteromedial position. Central surface of opisthonotal shield covered by relatively large, alveolar pits, lateral surface with small, alveolar pits. Posterodorsal cavities well-developed, central pair strongly sclerotised, twice as large as the lateral pair, with axes converging posteriorly.

Ventral side (Figure 1B) — Slit between peritrematal shields and dorsal shields inconspicuous. Peritrematal shields with posterolateral tips reaching level of R3, covered by fine reticulation. Peritremes straight, without remarkable dilatation near

the stigmata. Chaetotaxy and poroidotaxy of ventral shields typical for genus *Prozercon*. Sternal shield 47 μm long and 34 μm wide at the level of setae st2, with arcuate posterior margin and reticulate ornamentation. A weakly sclerotised slit between level of setae st1 and st2 can often be observed. Ventrianal shield with short, smooth and needle-like preanal and adanal setae, setae Zv1 absent. Postanal seta two times longer than preanal and adanal setae, setae Jv5 plumose. Anal valves with vestigial euanal setae. Glands gv3 situated anterolateral to adanal setae. Anterior surface of ventrianal shield covered by squamous pattern to level of Jv3-Zv4-Jv4.

Gnathosoma — Situation of hypostomal and subcapitular setae typical for the family. Setae h1 elongate, smooth. Setae h2-3 shorter than h1, smooth, h4 longer than previous setae, serrate. Corniculi horn-like, internal malae with a pair of bifurcate anterocentral branches and with serrate mar-

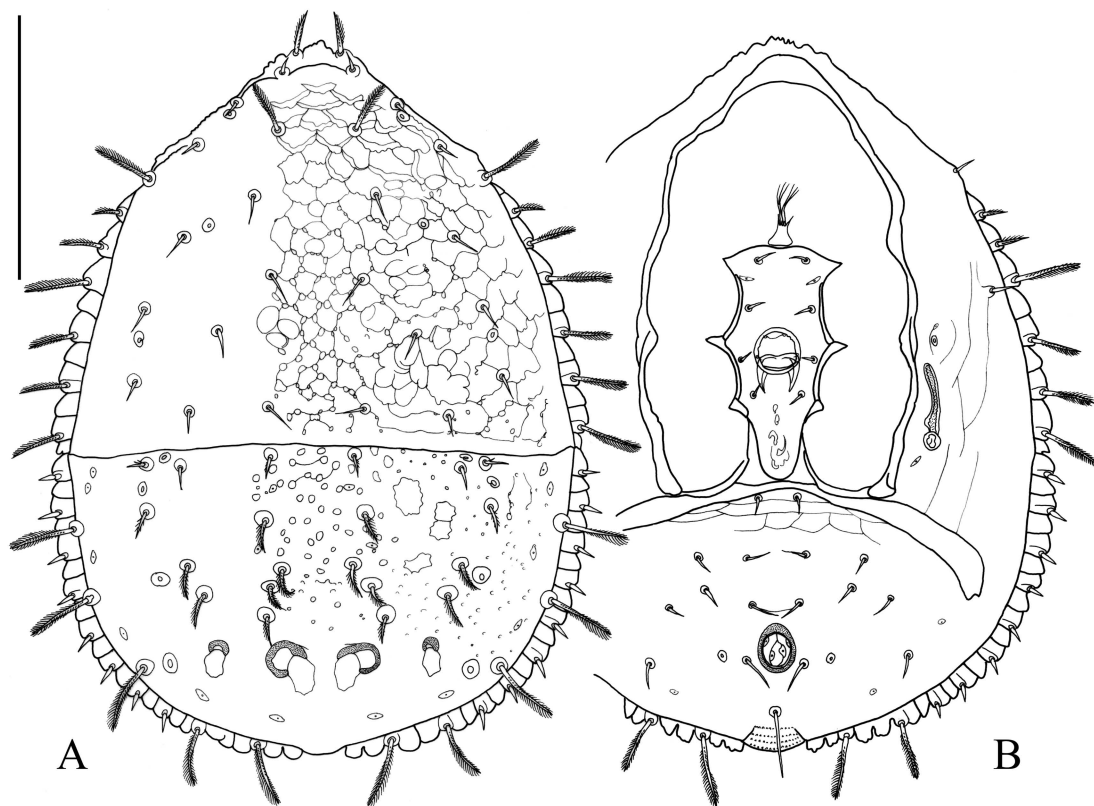


FIGURE 3: *Prozercon mahunkaiana* n. sp. male: A – dorsal view; B – ventral view. (Scale = 100 μm)

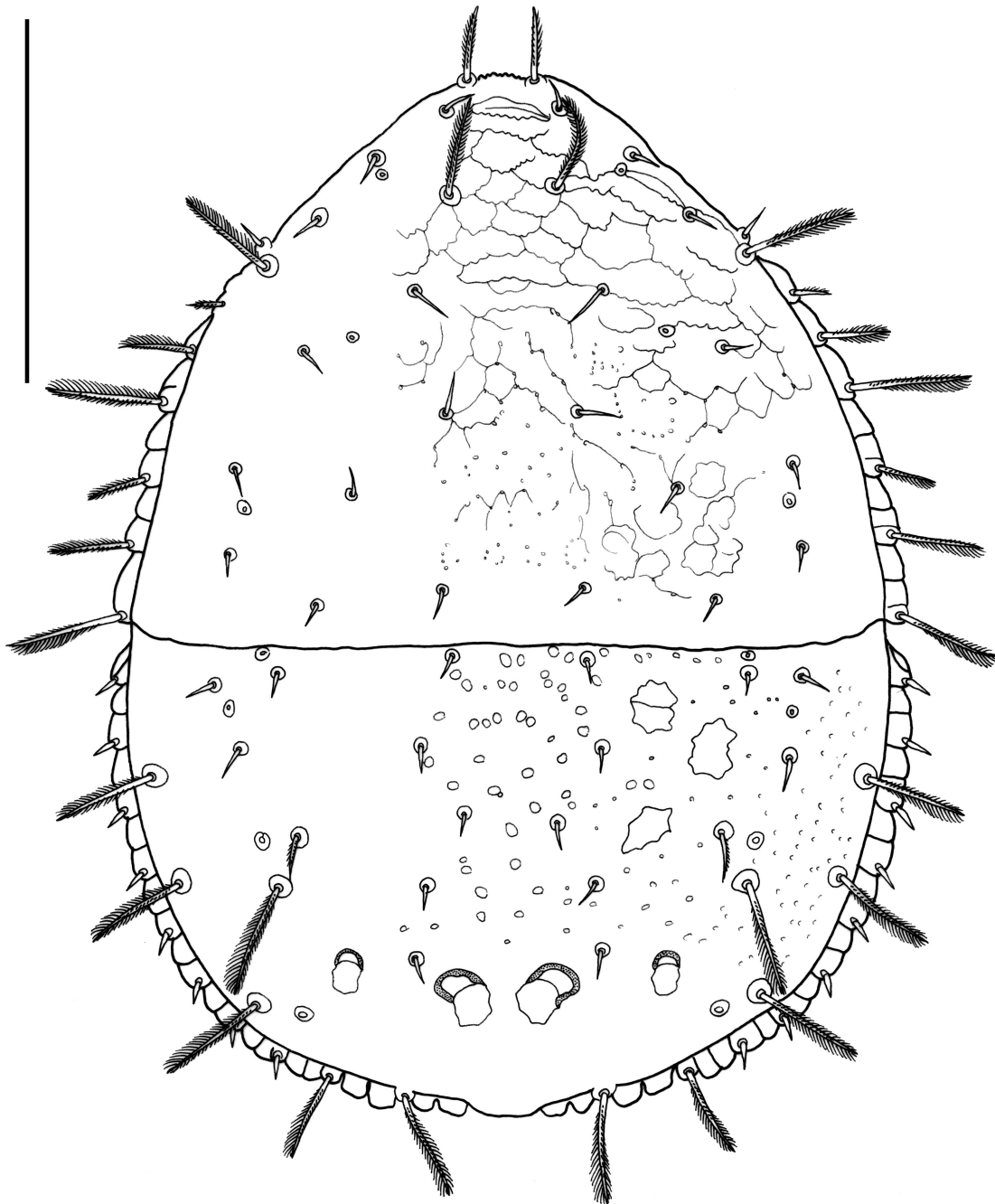


FIGURE 4: *Prozercon mahunkaiana* n. sp. deutonymph, dorsal view. (Scale = 100 μ m)

gins. Chelicerae relatively slender, fixed digit with 6 teeth, movable digit with 4 – 5 teeth. Epistome typical for the genus *Prozercon*, of *Prozercon*-type (see Ujvári, 2011b).

Description of male (n = 1) (Figures 3A, B) — Length of idiosoma: 269 μm ; width: 204 μm . Chaetotaxy, poroidotaxy and sculptural pattern of dorsal, ventrianal and peritrematal shields similar to those of female, except setae j2, s1, which smooth, and Z4 which similar in appearance to Z3 in male. Length of opisthonotal setae and distances between their insertions as in the Table 1. Sternigenital shield entire in the single specimen, bearing four pairs of

setae, setae st5 absent. Posterolateral tips of peritrematal shields fused to ventrianal shield at level of setae R3. Each characters of gnathosoma similar to that of female, but terminal part of fixed digit of chelicerae bifurcate.

Description of deutonymph (n = 1) (Figure 4) — Length of idiosoma: 285 μm ; width: 220 μm . Podonotal setae j1, j3, z3, s3 and s6 markedly elongate, plumose. Marginal setae s2, r2 and r4-5 somewhat shorter, plumose. Other podonotal setae short, smooth and needle-like. On opisthonotum, setae J1 5, Z1 2 and S2 similar in appearance, short, smooth and needle-like. The shape and po-

TABLE 1: Length of opisthonotal setae and longitudinal distances between their bases in *Prozercon mahunkaiana* n. sp. (values as mean, in micrometers) (F: female, M: male, DN: deutonymph)

Seta	F	M	DN	Seta	F	M	DN	Seta	F	M	DN
J1	12	8	7	Z1	10	9	7	S1	9	7	7
J1-J2	31	23	25	Z1-Z2	26	20	24	S1-S2	39	36	27
J2	13	12	7	Z2	12	11	9	S2	11	8	9
J2-J3	28	19	23	Z2-Z3	33	25	28	S2-S3	45	38	31
J3	15	13	7	Z3	16	13	13	S3	28	25	29
J3-J4	22	9	21	Z3-Z4	18	13	15	S3-S4	37	28	29
J4	16	10	7	Z4	24	13	32	S4	28	26	29
J4-J5	22	12	19	Z4-Z5	70	59	68	S4-5	39	32	39
J5	12	11	8	Z5	27	26	30	S5	33	27	31

TABLE 2: Differential characters of *P. mahunkaiana* n. sp., *P. aristatus* Athias-Henriot, 1961, *P. katae* Ujvári and Călugăr, 2010 and *P. neorafalskii* Balan and Sergienko, 1991

Character	<i>P. mahunkaiana</i> n. sp.	<i>P. aristatus</i>	<i>P. katae</i>	<i>P. neorafalskii</i>
setae j2	finely pilose	smooth	smooth	smooth
setae j3	elongate, plumose	short, smooth	short, smooth	short, smooth
shape of J3-5	densely pilose	finely pilose	densely pilose	pilose
position of J4	on line connecting J3 and J5	lateral to line connecting J3 and J5	on line connecting J3 and J5	on line connecting J3 and J5
length of S3-5	28-33 μm	38-41 μm	27-28 μm	29-32 μm
setae Z4	twice as long as Z3	twice as long as Z3	shorter than Z3	twice as long as Z3
length of peritrematal shield	reaching level of R3	reaching level of R4-5	reaching level of R5-6	reaching level of R7
dimensions of idosoma	width: 312-323 μm length: 242-247 μm	width: 360-376 μm length: 290-306 μm	width: 382-404 μm length: 285-314 μm	width: 360-376 μm length: 290-306 μm
posterodorsal cavities	central cavities strongly sclerotized, twice larger than lateral cavities	uniform, weakly developed	uniform, small, well developed	uniform, well developed

sition of other setae, the situation of gland poroids and sculptural pattern similar to that of female (latter however less expressed). Length of opisthonotal setae and distances between their insertions as in the Table 1. Each characters of gnathosoma similar to that of the adults.

Type material — Holotype (female): Portugal, Vilago Gerês, National Park Peneda Gerês, from leaf litter, leg. T. Szűts, 12 Jun. 2005 (E-1647). Paratypes: 8 females, 1 male and 1 deutonymph, locality and date as for the holotype. Type specimens are deposited in HHNM.

Etymology — The species is dedicated in honour of the worldwide known, prominent acarologist, former head of the Systematic Zoology Research Group of Hungarian Academy of Sciences, Prof. Dr. Sándor Mahunka.

Differential diagnosis — Based on the latest key to the genus *Prozercon* (Ujvári 2011a), *P. mahunkai* n. sp. belongs to the group of species possessing 7 pairs of R-setae, smooth S1, uniform, short,

pointed and smooth or very finely pilose J1, Z1 and S2. Following the key, the species possesses elongate S3 setae, and by the small setal bases it is most similar to *P. aristatus* Athias-Henriot, 1961, *P. katae* Ujvári and Călugăr, 2010 and *P. neorafalskii* Balan and Sergienko, 1991. Differential characters of the four species are listed in the Table 2.

Prozercon aristatus Athias-Henriot, 1961

Prozercon aristatus Athias-Henriot, 1961: 410, Figures 145-148; Petrova, 1977: 587, Figure 464 (3); Kontschán and Ujvári, 2008: 350. Misidentification of *Prozercon neorafalskii* Balan and Sergienko, 1990.

Diagnosis — Posterolateral tips of peritrematal shields reaching level of R4-5 in female, fused to ventrianal shield in male. Central and submarginal setae of podonotum, including j2-3 smooth. Marginal setae of opisthonotum smooth, thorn-like. Setae J1-2, Z1-2 and S2 short, pointed and smooth or very finely pilose. Setae J4 situated lateral to line connecting J3 and J5. Glands gdZ3

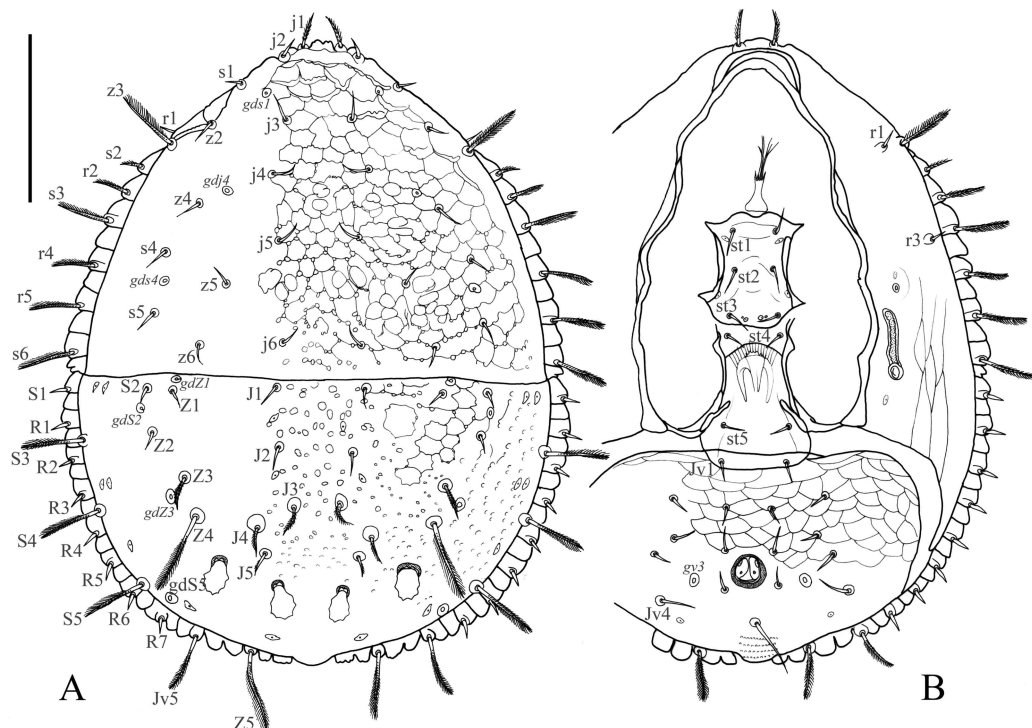


FIGURE 5: *Prozercon aristatus* female: A – dorsal view; B – ventral view. (Scale = 100 μm)

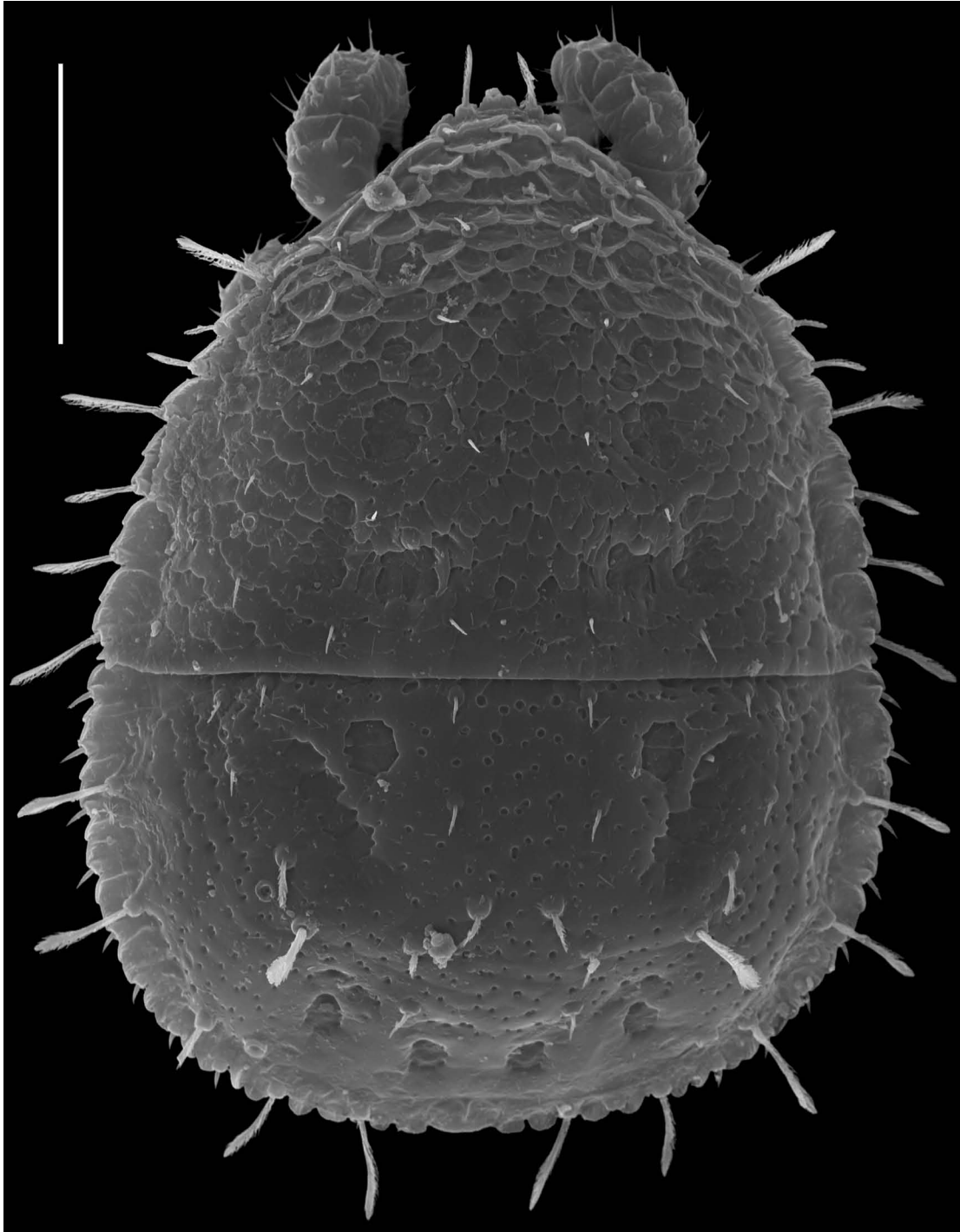


FIGURE 6: *Prozercon aristatus* female, dorsal view (SEM photo). (Scale = 100 μm)

(Po3) situated lateral to line connecting Z3 and Z4. Posterodorsal cavities uniform, weakly developed.

Redescription of female (n = 14) — Length of idiosoma: 360 – 376 μm (370 μm); width: 290 – 306 μm (297 μm).

Dorsal side (Figures 5A, 6, 8C) — Podonotum with 20 pairs of setae, j1-6, z2-6, s1-6, r2 and r4-5 inserted dorsally, r1 and r3 inserted ventrally, on peritrematal shields. Podonotal setae j1 plumose, j2-6, z2, z4-6, s1 and s4-5 short, smooth and needle-like. Marginal setae z3, s2-3, r2, r4-5 and s6 plumose. Glands gds1 (po1) situated on line connecting s1 and j3, closer to s1; gdj4 (po2) situated on line connecting j4 and z4, closer to z4; gds4 (po3) on line connecting s4 and s5. Podonotal shield covered by tile-like and reticulate pattern, with irregular pits in the crossing points on its central and posterior surface.

Opisthonotum with 22 pairs of setae, J1-5, Z1-

5, S1-5 and R1-7. Setae J1-2, Z1-2 and S2 similar in shape and length, short, pointed and smooth or barely pilose. Setae J3-4 somewhat longer than former setae, distinctly pilose, J5 shorter, finely pilose (Figure 8A). Setae J4 situated lateral to line connecting J3 and J5. Setae Z3 similar in shape and length to J3-4, Z4 remarkably longer than former setae, plumose. Setae Z5 and S3-5 similar in appearance, expanding beyond margins of idiosoma, plumose. Marginal setae S1 and all the R-setae short, smooth and thorn-like. Setae S2 situated on line connecting S1 and Z1, near Z1. Length of opisthonotal setae and distances between their insertions as in Table 3. Glands gdZ1 (Po1) situated anterior to insertions of Z1; gdS2 (Po2) situated on line connecting S2 and Z2; gdZ3 (Po3) lateral to line connecting Z3 and Z4; gdS5 (Po4) near S5, in posteromedial position. Central surface of opisthonotal shield covered by alveolar pits, lateral surface with small, alveolar pits. Posterodorsal cavities uniform, weakly devel-

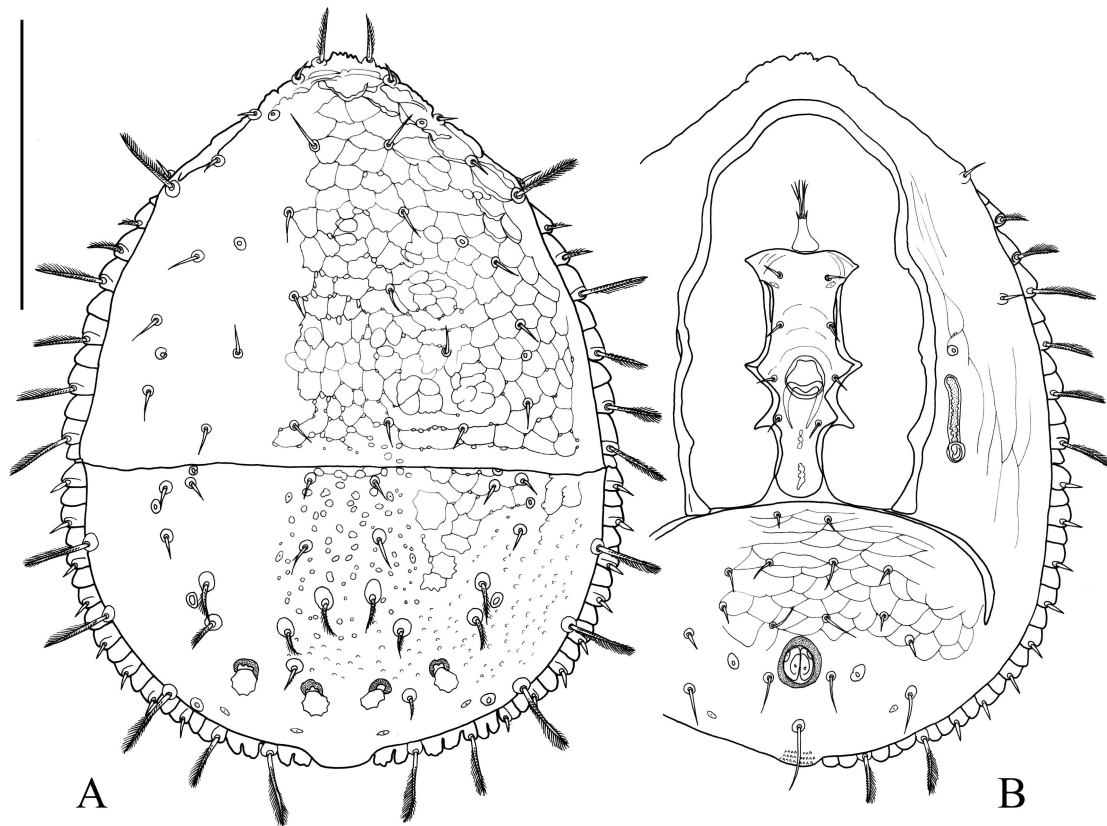


FIGURE 7: *Prozercon aristatus* male: A – dorsal view; B – ventral view. (Scale = 100 μm)

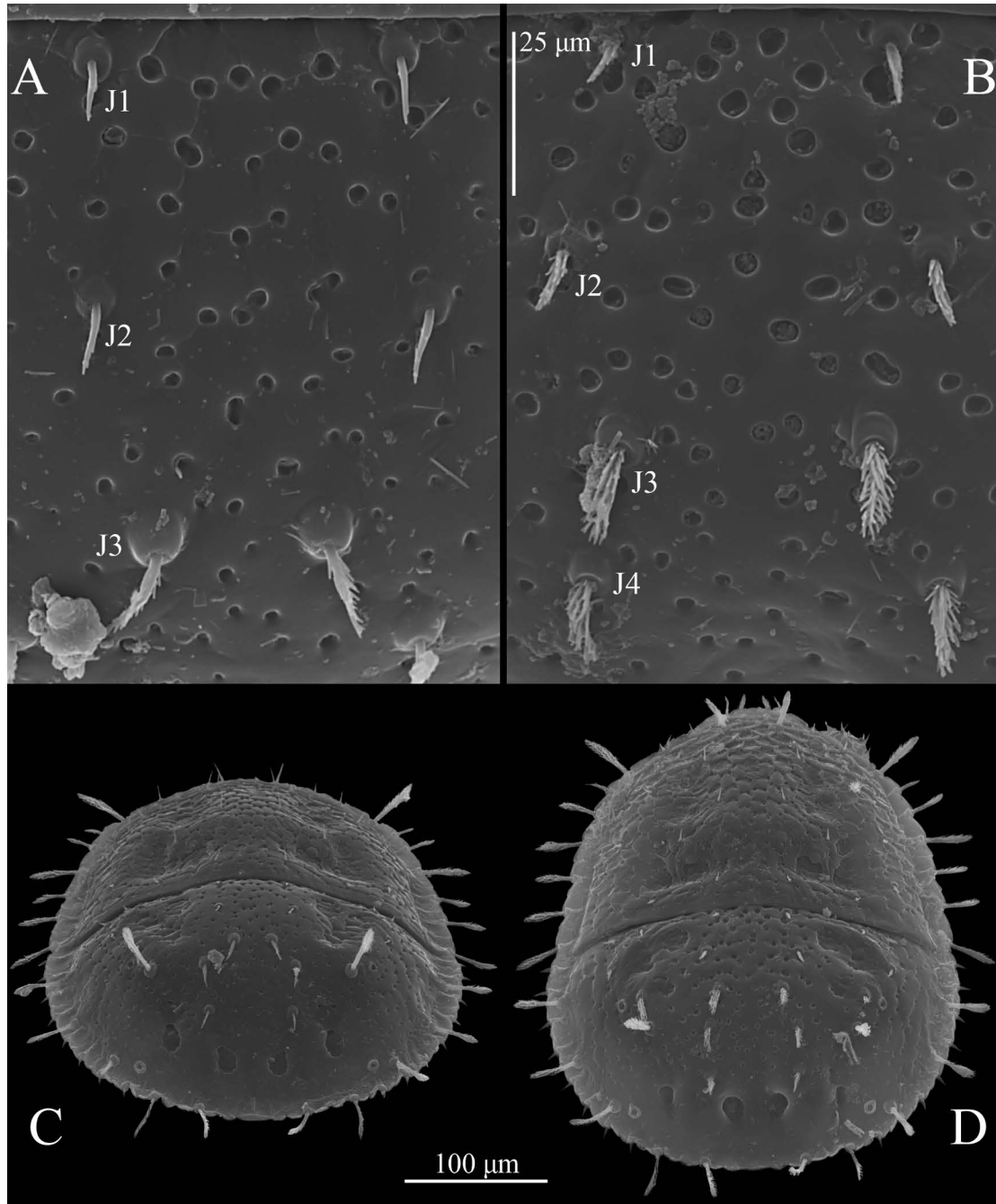


FIGURE 8: SEM photos of *Prozercon* species of Portugal. A – *P. aristatus*, central surface of opisthonotum; B – *P. mahunkaiana* n. sp., central surface of opisthonotum; C – *P. aristatus*, caudodorsal view; D – *P. mahunkaiana* n. sp., caudodorsal view. (Scale = 100 µm)

TABLE 3: Length of opisthonotal setae and longitudinal distances between their bases in *Prozercon aristatus* Athias-Henriot, 1961 (values as mean, in micrometers) (F: female, M: male)

Seta	F	M	Seta	F	M	Seta	F	M
J1	13	9	Z1	11	9	S1	11	8
J1-J2	37	27	Z1-Z2	30	24	S1-S2	46	42
J2	14	14	Z2	11	10	S2	10	9
J2-J3	33	26	Z2-Z3	34	28	S2-S3	49	42
J3	17	15	Z3	21	17	S3	38	29
J3-J4	26	20	Z3-Z4	24	16	S3-S4	42	34
J4	17	12	Z4	48	14	S4	38	30
J4-J5	15	17	Z4-Z5	85	62	S4-5	50	38
J5	14	10	Z5	44	32	S5	41	32

oped.

Ventral side (Figure 5B) — Slit between peritrematal shields and dorsal shields inconspicuous. Peritrematal shields with posterolateral tips reaching level of R4-5, covered by fine reticulation. Peritremes straight, without remarkable dilatation near the stigmata. Chaetotaxy and poroidotaxy of ventral shields typical for genus *Prozercon*. Sternal shield 68 μm long and 40 μm wide at the level of setae st2, with straight posterior margin and reticulate ornamentation. Ventrianal shield with short, smooth and needle-like preanal and adanal setae, setae Zv1 absent. Postanal seta 2-3 times longer than preanal and adanal setae, setae Jv5 plumose. Anal valves with vestigial euanal setae. Glands gv3 situated anterolateral to adanal setae. Anterior surface of ventrianal shield covered by squamous pattern to level of Jv3-Zv4-Jv4.

Gnathosoma — Situation of hypostomal and subcapitular setae typical for the family. Setae h1 elongate, smooth. Setae h2-3 shorter than h1, smooth, h4 longer than previous setae, serrate. Corniculi horn-like, internal malae with a pair of bifurcate anterocentral branches and with serrate margins. Chelicerae relatively slender, fixed digit with 6 teeth, movable digit with 4 – 5 teeth. Epistome typical for the genus *Prozercon*, of *Prozercon*-type (see Ujvári, 2011b).

Description of male (n = 5) (Figures 7A, B) — Length of idiosoma: 306 – 311 μm (309 μm); width: 241 – 252 μm (247 μm). Chaetotaxy, poroidotaxy

and sculptural pattern of dorsal, ventrianal and peritrematal shields similar to those of female, except setae Z4 which similar in appearance to Z3 in male. Length of opisthonotal setae and distances between their insertions as in the Table 3. Sternigenital shield entire, bearing four pairs of setae, setae st5 absent. Posterolateral tips of peritrematal shields fused to ventrianal shield at level of setae R4. Each characters of gnathosoma similar to that of female, but terminal part of fixed digit of chelicerae bifurcate.

Material examined — 14 females and 4 males from Portugal, Vilago Gerês, National Park Peneda Gerês, from leaf litter, leg. T. Szűts, 12 Jun. 2005 (E-1647), 1 male from Portugal, Vilago Gerês, National Park Peneda Gerês, from rotten tree log, leg. T. Szűts, 12 Jun. 2005 (E-1647).

Distribution — Southern Galicia, Gerês Mts. (Spain and Portugal).

Remarks — The species is illustrated erroneously in Petrova (1977) as setae J5 are lacking from the figure.

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