Two new species of zerconid mites (Acari, Mesostigmata) from Honaz Mountain National Park (Turkey)

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Abstract: Two new species of zerconid mites, Zercon denizliensis sp.n. and Z. alattini sp.n., collected from Honaz Mountain National Park in Turkey are described and illustrated. Additionally, a key to the species of the genus Zercon known from Turkey is given.

Key words: Acari, Zerconidae, Zercon, taxonomy, new species, Turkey

Honaz Dağı Millî Parkı (Türkiye)'ndan iki yeni zerkonid akar (Acari, Mesostigmata) türü

Özet: Türkiye’dede Honaz Dağı Millî Parkı’ndan iki yeni zerkonid akar türünün, Zercon denizliensis sp.n. ve Z. alattini sp.n., tanımları yapıldı ve şekilleri çizildi. Ayrıca, Türkiye’den bilinen Zercon türleri için bir teşhis anahtarı verildi.

Anahtar sözcükler: Acari, Zerconidae, Zercon, taksonomi, yeni tür, Türkiye

Introduction

The genus Zercon, based on number of species in Turkey and worldwide, is the richest in the family Zerconidae. It is estimated to include around 300 species all over the world. So far, 50 species of the genus Zercon have been recorded from Turkey (Blaszak, 1979; Urhan, 2008a, 2008b, 2008c, 2009a, 2009b). Zerconid mites are important members of soil fauna. Species of this family are free-living and generally associated with humus and soil, decomposed litter, leaf mould, plant parts, and among mosses. Compared to other families of mesostigmatic mites, zerconid mites are well known in Europe, some parts of Asia, and North America (Maşan and Fenda, 2004).

In this paper, 2 new species of Zercon, Z. denizliensis and Z. alattini, are described on the basis of material collected in Honaz Mountain National Park (Turkey) during a survey on the systematic of zerconid mites, which constituted a contribution to the knowledge about the acarine faunal richness of Turkey.

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Materials and methods

Soil and litter samples were collected from Honaz Mountain National Park and its near environment, Denizli, Turkey. They were labeled and transported in plastic bags to the laboratory. Samples were placed into Berlese funnels, and mites were extracted for 5-7 days according to their moisture content. At the end of this process, the contents of the funnels’ collecting bottles were transferred into petri dishes and mites were selected under a stereo-microscope. They were placed in 60% lactic acid for clearing and mounted onto permanent microscope slides using a glycerin medium. The examinations and drawings of mites were done using an Olympus BX50 microscope. Morphological terminology used in the description follows that of Sellnick (1958), Halašková (1969), Błaszak (1974), and Mašán and Fenda (2004).

Results and discussion

Family: ZERCONIDAE Berlese, 1892
Genus: Zercon C.L. Koch, 1836
Type-species: Zercon triangularis C.L. Koch, 1836

Zercon denizliensis sp. n.
(Figures 1A-F)

Type material: Holotype ♀. Turkey, Denizli, Honaz Mountain National Park, mixed forest, 37°39.571 N, 29°15.256 E, 1350 m, 26 June 2009, collected by R. Urhan. Sample of litter and soil under Pinus nigra. Paratypes: 28♀♀, 13♂♂, 8 deutonymphs and 5 protonymphs, same data as holotype. Type deposition: Holotype and other paratypes are deposited at the Department of Biology, Pamukkale University, Denizli, Turkey.

Diagnosis: Anterior margin of ventri-anal shield with 2 pairs of setae. Dorsal cavities are distinct, saddle-like and with smooth anterior margin. Pores P0 situated between setal rows J and Z, on the line connecting setae ZJ2. Setae J1, J2, Z1, and Z2 are short and smooth. Setae Z2 reaching the base of setae Z1. Setae J3-J6, Z3, Z4, S3, and S4 thickened, prolonged, apically pilose, and with hyaline tip. Setae Z5, S1, S2, and R1-R7 are delicately barbed. Dorsal cavities are distinct, saddle-like and with smooth anterior margin.

Description: Female

Dorsum (Figure 1A). Length of idiosoma in holotype 480 μm, width 335 μm. Measurement of 28 paratypes; length 458-490 μm, width 308-350 μm. Ornamentation of the dorsal shields is shown in Figure 1A. Dorsal cavities are distinct, saddle-like and with smooth anterior margin.

Setae (Figure 1A). On podonotum, 20 pairs of differently formed setae present: j-setal row with 6 pairs of setae, z-setal row with 2 pairs, s-setal row with 6 pairs and r-setal row 6 pairs. Podonotal setae j1 and marginal setae r1-r6 distinctly barbed, all other podonotal setae short and smooth. On opisthonotum, 22 pairs of setae present: J-setal row with 6 pairs of setae, Z-setal row with 5 pairs, S-setal row with 4 pairs, R-setal row with 7 pairs. Opisthonotal setae J1, J2, Z1, and Z2 are short and smooth. Setae J3-J6, Z3, Z4, S3, and S4 thickened, prolonged, apically pilose, and with hyaline tip. Setae Z5, S1, S2, and R1-R7 are delicately barbed. Setae J2 not reaching the base of setae J3. Setae J4 reaching the base of setae J3. Setae J5 reaching posterior margin of opisthonotum. Distance between setae Z2 and J6 106 (100-110) μm apart. Setae Z4 reaching the base of setae Z5. Setae J4 reaching posterior margin of opisthonotum. Distance between setae Z5 and J6 33 (28-38) μm. Setae S4 not reaching lateral margin of opisthonotum. Setae S4 reaching with tips lateral margin of opisthonotum. Lengths of opisthonotal setae and distances between setae within rows are shown in Table 1.

Pores. Pores po1 lie on a line connecting setae s1-j3. Pores po2 on slightly posterior line connecting setae s4-j4. Pores po3 lie on a line connecting setae s5-z2 closer to s5. Pores Po located anteroparaaxially to bases of setae Zs. Pores Po lie posterior to the line connecting setae Zs-Ss. Po3 situated between setal rows J and Zs on the line connecting setae Zs-J6 closer to Zs. Pores Po lie on a line connecting setae S4-Zs.

Venter (Figure 1B). Chaetotaxy and shape of the peritrematal shield are typical for the genus. Adgenital shields present with 3 pores. Anterior margin of the ventri-anal shield with 4 setae.

Allotype - Male (Figures 1C, D). Idiosoma length 358-393 μm, width 263-300 μm. Setae, pores, and sculpture of the podonotum and opisthonotum as
Table 1. Lengths of opisthonotal setae and distances between them in females and males of Zercon denizliensis sp. n. (measurements in μm).

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<td>33-38</td>
<td>25-38</td>
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<td>50-55</td>
<td>35-38</td>
<td>↓</td>
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<tr>
<td>S₃</td>
<td>50-58</td>
<td>38-43</td>
<td>Z₃</td>
<td>45-50</td>
<td>33-38</td>
<td>J₃</td>
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<td>S₄</td>
<td>60-63</td>
<td>50-58</td>
<td>Z₄</td>
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<td>45-50</td>
<td>33-58</td>
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<td></td>
<td>J₆</td>
<td>60-65</td>
<td>53-58</td>
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</tbody>
</table>

in female. Distance between setae J₆ and J₆ 93 (88-100) μm. The distance between setae Z₅ and J₆ 23 (20-25) μm. Lengths of opisthonotal setae and distances between setae within rows are shown in Table 1.

**Deutonymph** (Figure 1E). Length of idiosoma in 8 paratypes 340-355 μm, width 245-260 μm. Podonotal setae j₁ and r₃-r₆ distinctly barbed, all other podonotal setae short and smooth. Opisthonotal setae J₁-J₅, Z₁-Z₅, and R₁-R₅ short and smooth, setae J₆, Z₆, and S₆ thickened, prolonged, apically pilose, and with hyaline tip. Setae S₁, S₂, Z₅, and R₁-R₅, apically pilose. Distance between setae J₆ and J₆ 88 (85-90) μm. Setae S₅ reaching the lateral margin of opisthonotum. Setae Z₄ exceeds the posterior margin of opisthonotum by 1/3 of its length. The distance between setae Z₅ and J₆ 20 (18-23) μm. Pores Po₁ paraxially on the line connecting setae S₁-S₂ closer to S₂. Pores Po₃ lie on the line connecting setae Z₄-J₄ closer to setae Z₄. Lengths of opisthonotal setae and distances between setae within rows are shown in Table 2.

**Protonymph** (Figure 1F). Length of idiosoma in 5 paratypes 330-345 μm, width 205-215 μm. Podonotal setae j₁ distinctly barbed, r₃ apically pilose, all other podonotal setae short and smooth. Opisthonotal setae J₁, J₃, Z₁, Z₃, S₃, and Z₃ short and smooth, S₂ apically pilose, setae J₅, Z₅-Z₆, and S₃-S₄ thickened, prolonged, apically pilose, and terminated with hyaline ending. Distance between setae J₆ and J₆ 73 (70-75) μm. The distance between setae Z₅ and J₆ 20 (18-23) μm. Pores Po₁ lie on the line connecting setae Z₄-J₄. Lengths of opisthonotal setae and distances between setae within rows are shown in Table 2.

**Remarks.** Zercon denizliensis sp. n. is closely related to Z. turcicus Urhan & Ayyıldız, 1994 and Z. gregalis Mašán and Fenďa, 2004. They may be distinguished according to the features given in Table 3. Z. turcicus: The species is known to occur in Turkey. It was found in litter and soil in mixed forest, at altitudes of 2000-2300 m a.s.l. (Urhan and Ayyıldız, 1994). Z. gregalis: It is only known from Slovakia. Records are restricted to Slovakia so far. It inhabits primarily warmer and relatively dry stands in woods, foot-hills, and low highlands at altitudes of 160-650 m a.s.l. This species was recorded in leaf litter and soil detritus of steppes, forest steppes, and mixed forest (especially oak and pine). It probably represents a Sub-Mediterranean or Mediterranean faunistic element (Mašán and Fenďa, 2004). Z. denizliensis sp. n.: The species was found in litter and soil in mixed forest (mostly Pinus nigra) in Honaz Mountain National Park (Turkey) at 1000-1500 m a.s.l.
**Etymology.** The specific name *denizliensis* reflects the name of the city Denizli (Turkey) where the new species was collected.

*Zercon alattini* sp. n.

(Figures 2A-E)

**Type material:** Holotype ♀. Turkey, Denizli, Yatagan town, Honaz Mountain National Park, mixed forest, 37°35.412 N, 29°23.090 E, 1046 m, 03 March 2009, collected by R. Urhan. Sample of litter and soil under *Quercus* sp. and *Astragalus* sp. Paratypes: 37 ♀♀, 21 ♂♂, 9 deutonymphs same data as holotype. Type deposition: Holotype and other paratypes are deposited at the Department of Biology, Pamukkale University, Denizli, Turkey.

**Diagnosis**


**Description: Female**

**Dorsum** (Figure 2A). Length of idiosoma in holotype 413 μm, width 295 μm; mean length and width of 37 paratypes 412 (395-425) and 270 (258-285) μm, respectively. The ornamentation of the dorsal fossae is shown in Figure 2A. Dorsal fossae of general size and appearance, saddle-like and with undulated anterior margin.

**Setae** (Figure 2A). On podonotum, 20 pairs of differently formed setae present: j-setal row with 6 pairs of setae, z-setal row with 2 pairs, s-setal row with 6 pairs and r-setal row 6 pairs. Podonotal setae j₁, j₂, and r1-r3 distinctly barbed, and all the other setae of the podonotum short and smooth. On opisthonotum, 21 pairs of setae present: J-setal row with 6 pairs of setae, Z-setal row with 5 pairs, S-setal row with 3 pairs, R-setal row with 7 pairs. Opisthonotal setae J₁, J₂, Z₁, Z₂, and R₇-R₉ short and smooth. Setae J₃-J₅ apically pilose. Setae S₃ absent. Setae J₆-Z₆-Z₇, S₄, S₅, and S₆ barbed, with hyaline ending. Setae J₆ the longest opisthonotal setae (43-50 μm). The insertions of setae J₁-J₅ 103 (95-108) μm apart. Setae Z₄ reaching posterior margin of

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Table 2. Lengths of opisthonotal setae and distances between them in deutonymphs (DN) and protonymphs (PN) of *Zercon denizliensis* sp. n. (measurements in μm).

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
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<tbody>
<tr>
<td>S₁</td>
<td>18-23</td>
<td>20</td>
<td>Z₁</td>
<td>13-15</td>
<td>8</td>
</tr>
<tr>
<td>† †</td>
<td>30-35</td>
<td>23-28</td>
<td>† †</td>
<td>38-40</td>
<td>30-33</td>
</tr>
<tr>
<td>S₂</td>
<td>28-33</td>
<td>30-35</td>
<td>Z₂</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>† †</td>
<td>38-43</td>
<td>40-48</td>
<td>† †</td>
<td>23-28</td>
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<tr>
<td>† †</td>
<td>35-40</td>
<td>40-45</td>
<td>† †</td>
<td>38-40</td>
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<tr>
<td>S₄</td>
<td>55-60</td>
<td>58-60</td>
<td>Z₄</td>
<td>55-60</td>
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<td>† †</td>
<td>35-40</td>
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<td>15-33</td>
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<tr>
<td>Z₅</td>
<td>20-25</td>
<td>23-28</td>
<td>J₅</td>
<td>15-18</td>
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<td>† †</td>
<td>25-38</td>
<td>23-28</td>
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<tr>
<td>J₆</td>
<td>55-63</td>
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</table>
opisthonotum. The distance between setae $Z_5$ and $J_6$ 20 (18-23) μm. Setae $S_2$ not reaching margin of opisthonotum. Length of opisthonotal setae and distances between setae within longitudinal rows are as in Table 4.

Pores (Figure 2A): Pores po1 on posterior line connecting setae s1-j3. Pores po2 on posterior line connecting setae s4-j4. Pores po3 on a line connecting setae z1-s6. Pores Po1 located anteroparaxially to the insertion of setae $S_1$. Pores Po2 paraxially on the line.

Table 3. Comparison of features of Zercon denizliensis sp. n. with those of Z. turcicus and Z. gregalis.

<table>
<thead>
<tr>
<th></th>
<th>Z. turcicus</th>
<th>Z. gregalis</th>
<th>Z. denizliensis sp. n.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Setae j2</strong></td>
<td>Pilose</td>
<td>Smooth</td>
<td>Smooth</td>
</tr>
<tr>
<td><strong>Setae J4</strong></td>
<td>Reaching beyond the medial dorsal fossae</td>
<td>Not reaching beyond the medial dorsal fossae</td>
<td>Reaching beyond the medial dorsal fossae</td>
</tr>
<tr>
<td><strong>Setae Z2</strong></td>
<td>Not reaching the base of setae Z3</td>
<td>Not reaching the base of setae Z3</td>
<td>Reaching the base of setae Z3</td>
</tr>
<tr>
<td><strong>Setae Z3</strong></td>
<td>Delicately barbed</td>
<td>Short and needle-like</td>
<td>Delicately barbed</td>
</tr>
<tr>
<td><strong>Setae S1</strong></td>
<td>Delicately barbed</td>
<td>Thickened, prolonged, apically pilose and with hyaline tip</td>
<td>Delicately barbed</td>
</tr>
<tr>
<td><strong>Setae S2</strong></td>
<td>Long, barbed with hyaline ending</td>
<td>Thickened, prolonged, apically pilose and with hyaline tip</td>
<td>Delicately barbed</td>
</tr>
<tr>
<td><strong>The longest opisthonotal setae</strong></td>
<td>J6 (56 μm), Z5 (53 μm), and S4 (48 μm)</td>
<td>J6 (64-73 μm), Z5 (62-71 μm), and S4 (58-67 μm)</td>
<td>J6 (53-58 μm), Z5 (50-60 μm), and S4 (60-63 μm)</td>
</tr>
<tr>
<td><strong>Pores Po3</strong></td>
<td>On the line connecting setae Z4-J5 closer setae Z4</td>
<td>Slightly anterior to the line connecting setae Z4-J5 closer to setae J5</td>
<td>On the line connecting setae Z4-J5 and considerably adjacent to outer dorsal fossae</td>
</tr>
<tr>
<td><strong>Pores Po4</strong></td>
<td>Posterior insertions of setae S4</td>
<td>Posterior insertions of setae S4</td>
<td>Lie on the line connecting setae S4-Z4</td>
</tr>
</tbody>
</table>

Venter (Figure 2B): The peritremal shield with 2 setae: p1 short and smooth, p2 relatively long and plumose as the most common characters of the genus Zercon. Adgenital shields present. With 4 setae on the anterior margin of the ventri-anal shield.

Allotype: Male (Figures 2C, D): Idiosoma mean length 355 (350-360) μm, mean width 220 (215-225) μm. Setae, pores, and sculpture pattern on the podonotal and opisthonotal shields as in female. The distance between setae J6-J6 and Z6-J6 88 (85-93) μm and 13 (10-15) μm, respectively. Length of opisthonotal setae and distances between setae within longitudinal rows are shown in Table 4.

Deutonymph (Figure 2E): Length of idiosoma in 9 paratypes 355 (338-370) μm, width 213 (205-218) μm. Podonotal setae j1, j2 delicately barbed, r1-r3, r6, and s4-s6 barbed with hyaline ending and all the
other setae of the podonotum short and smooth. Opisthonotal setae J₁-J₅, Z₁, and Z₂ short and smooth. Setae S₁ absent. Setae Z₃, Z₄, S₁, S₂, and S₄ long and barbed with hyaline ending. Setae J₆, the longest opisthonotal setae (80 μm), thickened, prolonged with thread-like apical part. The insertions of setae J₆-J₆ 88 μm apart. The distance between setae Z₅ and J₆ 13 μm. All marginal setae of opisthonotum short and smooth. Pores Po₃ anterior of the outer fossae and distinctly larger, on the line connecting setae Z₄-J₅.

Table 4. Lengths of opisthonotal setae and distances between them in females, males and deutonymphs (DN) of Zercon alattini sp. n. (measurements in μm).

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<td>S₁</td>
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<td>Z₁</td>
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<td>J₁</td>
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<td>J₂</td>
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<td>13-15</td>
<td>18-23</td>
<td>J₃</td>
<td>13-20</td>
<td>13-15</td>
<td>8</td>
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<td></td>
</tr>
<tr>
<td>J₆</td>
<td>43-50</td>
<td>38-43</td>
<td>75-80</td>
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</table>

Remarks. Zercon alattini sp. n. is closely related to Z. honazicus Urhan, 2009b and Z. rafaljanus Blaszak & Laniecka, 2007. They may be distinguished according to the features given in Table 5. Z. honazicus: The species is known to occur in Turkey. It was found in litter and soil in mixed forest, at altitudes of 1750-2500 m a.s.l. (Urhan, 2009b). Z. rafaljanus: The occurrence is as yet restricted to the USA. It was found in mixed deciduous forest near a nature trail under Aruncus sp., Polygonatum sp., ferns litter moist and very moist (Blaszak & Laniecka, 2007).

Key to the species of the genus Zercon known from Turkey

1 (33) Anterior margin of ventro-anal shield with 1 pair of setae.
2 (25) The long setae of opisthonotum with hyaline tips.
3 (10) Setae J₄ and J₅ smooth.
4 (5) Setae S₂ with hyaline tips .......... solenites Haarlov, 1942
5 (4) Setae S₃ smooth.
6 (7) Setae Z₃ with hyaline tips .......... inonunensis Urhan, 2007
7 (6) Setae Z₄ smooth.
Table 5. Comparison of features of *Zercon alattini* sp. n. with those of *Z. honazicus*, *Z. rafaljanus*, and *Z. uludagicus*.

<table>
<thead>
<tr>
<th>Setae r3</th>
<th><em>Z. honazicus</em></th>
<th><em>Z. rafaljanus</em></th>
<th><em>Z. uludagicus</em></th>
<th><em>Z. alattini</em> sp. n.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thicken, prolonged, apically pilose, and with hyaline tip</td>
<td>Long and feathered with hyaline tip</td>
<td>Smooth</td>
<td>Delicately barbed</td>
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<thead>
<tr>
<th>Setae r4-r6</th>
<th>Apically pilose</th>
<th>Long and feathered with hyaline tip</th>
<th>Smooth</th>
<th>Short and smooth</th>
</tr>
</thead>
</table>

| Setae Js | Short and smooth | Short and finely barbed | Slightly pilose | Apically pilose |

| Setae Js | Thicken, prolonged, pilose on middle and thread-like in apical part | Long and feathered with hyaline tip | Long and barbed with hyaline tip | Barbed with hyaline tip |

| Setae Zs | Short and smooth | Short and finely barbed | Slightly pilose | Barbed with hyaline tip |

| Setae Zs | Thicken, prolonged, apically pilose, and with hyaline tip | Short and smooth | Short and smooth | Barbed with hyaline tip |

| Setae Ss | Thicken, prolonged, apically pilose, and with hyaline tip | Long, pilose with hyaline tip | Absent | Absent |

| Longest opisthonotal setae | J6 (125-130 μm) | S4, Z4 and J6 (54 μm) | S4 (40-43 μm) and J4 (43-45 μm) | J6 (43-50 μm) |

| Pores Po | On the line connecting setae Z1-J1, or paraxially the line connecting setae Z2-Zs | Paraxially on the line connecting setae Z2-J3, located closer to the setae Z3 | On the line connecting setae Z3, located closer to the setae Z3, located closer to the setae Z3 | Anterior of the outer fossae, and distinctly larger, lie on the line connecting setae Z3, located closer to the setae Z3 |

8 (9) Setae Ss smooth ........... *lepurus* Błaszak, 1979
9 (8) Setae Ss with hyaline tips ........... *separatus* Urhan, 2001
10 (3) Setae J4 and J5 delicately barbed or with hyaline tips.
11 (16) Setae J4 and J5 delicately barbed.
12 (13) Setae Zs delicately barbed and setae J2 reach the base of setae J3 ........... *longisetus* Urhan, 2008
13 (12) Setae Zs with hyaline tips and setae J2 not reaching the base of setae J3
14 (15) Setae Zs without hyaline tips ........... *fragilis* Urhan, 2001
15 (14) Setae Ss with hyaline tips ........... *nemoralis* Urhan, 2001
16 (11) Setae J4 and J5 with hyaline tips.
17 (20) Setae Ss not reach margin of opisthonotum.
18 (19) Setae J1, J3, Zs, and Z2 smooth ........... *colligans* Berlese, 1920
Two new species of zeronid mites (Acari, Mesostigmata) from Honaz Mountain National Park (Turkey)

19 (18) Setae J₁ and Z, delicately barbed, setae J₁ and Z, with hyaline tips ................. osmanelinensis Urhan, 2008
20 (17) Setae S, reach margin of opisthonotum.
21 (22) Setae J₁, with hyalinetips ................. plumatopilus Athias-Henriot, 1961
22 (21) Setae J₁ smooth.
23 (24) Pores Po₃, between setal rows Z and J ................. insperatus Błaszak, 1979
24 (23) Pores Po₁, between setal rows Z and S ................. huseyini Urhan, 2008
25 (2) The long setae of opisthonotum without hyaline tips
26 (30) Pores Po₃ on the line connecting setae Z₄-J₅.
27 (28) Setae Z₄ not reaching posterior margin of opisthonotum, setae r₃-r₆ and R₁-R₄ short and smooth, ................. ignobilis Błaszak, 1979
28 (29) Setae Z₄ reaching posterior margin of opisthonotum, setae r₃-r₆ and R₁-R₄ delicately barbed... hungaricus Sellnick, 1958
30 (26) Pores Po₅ anterior to the line connecting setae Z₄-J₅.
31 (32) Setae j₂ short and smooth .............. adoxyphes Błaszak, 1979
32 (31) Setae j₂ long and barbed ................. caucasicus Błaszak, 1979
33 (1) Anterior margin of ventro-anal shield with 2 pairs of setae.
34 (35) Between the setal rows J-J and J-Z 8 extra setae ................. trabzonensis Urhan, 1997
35 (34) Between the setal rows J-J and J-Z no extra setae.
36 (61) Setae J₄-J₅ smooth.
37 (40) Setae S, absent.
38 (39) Setae J₆, barbed with hyaline endin .................................. beleviensis Urhan, 2002
39 (38) Setae J₆ thickened, prolonged, pilose on middle and thread-like in apical part ................................ honazicus Urhan, 2009
40 (37) Setae S, present.
41 (42) Setae S, delicately barbed ................. serratus Urhan, 2001
42 (41) Setae S, smooth or with hyaline tips.
43 (52) Setae S, long, barbed with hyaline tips.
44 (45) Setae Z₃ short and smooth ................. ozkani Urhan and Ayyuldiz, 1993
45 (44) Setae Z₃ long and with hyaline tips.
46 (47) Setae S₃ long and with hyaline tips ...... andrei Sellnick, 1958
47 (46) Setae S₃ short and smooth.
48 (49) Setae S₃ long and with hyaline tips ................. pinicola Halašková, 1969
49 (48) Setae S₃ short and smooth.
50 (51) Dorsal cavities saddle-like and with smooth anterior margin, Setae S₃ reach margin of opisthonotum...... carpathicus Sellnick, 1958
51 (50) Dorsal cavities star-like with undulated and weakly sclerotized on their anterior margin, setae S₃ not reaching margin of opisthonotum ...... anatolicus Urhan, 2008
52 (43) Setae S, smooth.
53 (54) Long setae of opisthonotum thick and terminally broad .......... berlesei Sellnick, 1958
54 (53) Long setae of opisthonotum thin and smooth.
55 (56) Setae S, not reaching margin of opisthonotum ......................... perforatus Berlese, 1904
56 (55) Setae S₃ exceeding the margin of opisthonotum.
57 (58) Pores Po₂ between setal rows Z-S and the dorsal cavities equal in size ................. montanus Willmann, 1943
58 (57) Pores Po₃ between setal rows J-Z and the outer dorsal cavities twice bigger than inner cavities.
59 (60) Setae J₃ not reach the bases of seta J₄ ................. cabylus Athias-Henriot, 1961
60 (59) Setae J₃ reach the bases of seta J₄ ................. bulgaricus Balogh, 1961
61 (36) Setae J₄-J₅ delicately barbed or with hyaline tips.
62 (63) Pores Po₂ between setal rows Z and S ........................ notabilis Błaszak, 1979
63 (62) Pores Po₃ between setal rows J and Z.
64 (73) Setae J₁-J₅ delicately barbed.
65 (68) Setae S₂ absent.
66 (67) Setae Z₁ and S₂ delicately barbed

................................. uludagicus Urhan, 2008
67 (66) Setae Z₃ and S₂ barbed with hyaline ending

........................................ alattini sp.n.
68 (65) Setae S₁ present.
69 (70) Setae S₁ smooth ......................... foveolatus Halašková, 1969
70 (69) Setae S₂ delicately barbed or with hyaline tips.
71 (72) Setae S₁ and S₃ delicately barbed

................................. kackaricus Urhan and Ekiz, 2002
72 (71) Setae S₁ and S₃ with hyaline tips... septemporus Urhan, 2001
73 (64) Setae J₁-J₅ with hyaline tips.
74 (77) Setae J₁ short and smooth.
75 (76) Setae S₁ short and smooth ...... burdurensis Urhan, 2001
76 (75) Setae S₁ with hyaline tips ...... kezbaniremae Urhan, 2007
77 (74) Setae J₁ long and with hyaline tips.
78 (81) Setae S₁ smooth.
79 (80) Setae S₁ present... quadracavum Urhan, 2001
80 (79) Setae S₁ absent ...... cokelezicus Urhan, 2009
81 (84) Setae S₁ delicately barbed.
82 (83) Setae S₁ barbed with hyaline ending, setae Z₁ not reaching the base of setae Z₃ ... turcicus Urhan and Ayyıldız, 1994
83 (82) Setae S₁ delicately barbed, setae Z₁ reaching the base of setae Z₃ ......... denizliensis sp.n.
84 (81) Setae S₁ with hyaline tips.
85 (88) Setae R₁-R₇ smooth.
86 (87) Setae Z₁ smooth ........... delicatus Urhan and Ekiz, 2002
87 (86) Setae Z₂ with hyaline tips ...... mehmeturhani Urhan, 2009
88 (85) Setae R₁-R₅ delicately barbed or with hyaline tips.
89 (94) Setae R₁-R₅ delicately barbed.
90 (91) Setae J₂ short and smooth ......... encarpatus Athias-Henriot, 1961
91 (90) Setae J₂ delicately barbed or with hyaline tips.
92 (93) Setae J₂ delicately barbed .......... apladellus Błaszak, 1979
93 (92) Setae J₂ with hyaline tips ........... kallimcii Urhan, 2009
94 (89) Setae R₁-R₇ with hyaline tips.
95 (96) Setae J₁ and Z₁ with hyaline tips ...... ayyildizi Urhan, 1997
96 (95) Setae J₁ and Z₁ smooth.
97 (98) Setae J₁ and Z₁ not reach posterior margin of opisthonotum ............... agnostus Błaszak, 1979
98 (97) Setae J₁ and Z₁ reach posterior margin of opisthonotum.............. salmani Urhan, 2002

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