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TARSONEMUS ELBRUSI SP. NOV. (ACARI : HETEROSTIGMAE), A NEW SPECIES OF THE GENUS TARSONEMUS CANESTRINI ET FANZAGO FROM THE CAUCASUS

BY Marek KALISZEWSKI and Danuta SELL *

TAXONOMY
MORPHOLOGY
ABSTRACT: This paper presents the description of a new species of tarsonemid mite, Tarsonemus elbrusi, and a discussion of the questionable systematic value of some reductive features. T. boczeki Kropczyńska is reillustrated for comparison with T. elbrusi.

TAXONOMIE
MORPHOLOGIE
RÉSUMÉ: Les auteurs décrivent une nouvelle espèce de la famille Tarsonemidae, Tarsonemus elbrusi et donnent une discussion de la valeur douteuse de quelques caractères réductifs. Pour faire une comparaison avec la nouvelle espèce, T. boczeki Kropczyńska a été illustrée.

During our studies of mites of the family Tarsonemidae (Acari : Heterostigmae), we found a new species, Tarsonemus elbrusi, which shows notable variation in features of the genus and species level. In the following description of this species, the notation used for structures on the body is based on LINDQUIST (1971, 1978) and that for leg structures is based on LINDQUIST (in press) and KALISZEWSKI (in press).

Tarsonemus elbrusi n. sp.

Adult female

Body length 259-282 μm, body width 126-136 μm (dimensions among four specimens).

Dorsal side (Fig. 1): Idiosoma 223-245 μm long with regular granulation Pseudostigmatic organ (Photo. 2) short (sc₁ : 5-6 μm) spinelike or absent. Trachea almost equally narrowly divided into two trunks, ending in striated glands. Prodorsal shield truncated anteriorly (Photo 2). Lengths of setae (μm): v₁: 15-20, sc₂ : 38-52, c₂ : 9-12, c₁ : 12-14, d : 14-15, f : 15-16, h : 15-18, e : 14-17.


Setae sc₂, c₂ smooth, slender, finely tapered. Setae v₁, c₁, d, e, f, h stout, coarse with bluntly pointed ends. Setae v₁ placed almost on the level of stigmata. Setae c₁ placed 12 μm from posterior edge of tergite C. Distance between pits on tergite H distinctly shorter than distance between setae f.

Ventral side (Fig. 2): Gnathosoma (Photo. 1, 3) 34-38 μm long, 30-36 μm wide, subtriangular in

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 FIG. 1-2 : Tarsonemus elbrusi n. sp., female. 1. — Dorsum ; 2. — Venter.

Palpi cylindrical, approximate, directed anteriorly with distinct internal levers basally. Cheliceral stylets inconspicuous, fully retractable; cheliceral levers well developed almost equal to 1/5 of gnathosomal width. Pharynx (18-20 μm long, 5-6 μm wide) with somewhat sclerotized muscular walls, with a pair of small glandular structures near its posterior extremity. Dorsal setae of gnathosoma longer than ventral ones. Postpalpal setae absent.

Propodosomal ventral plate (Photo. 4) (72-77 μm long, 125-126 μm wide) with regular granulation, its lateral edges with characteristic angularity between ends of apodemes 1 and 2. Apodemes distinct. Anteromedian apodeme not quite extending to level of posterior ends of apo-
PHOTO. 1-8: *Tarsonemus elbrusi* n. sp.

Female: gnathosoma, dorsal (1); prodorsal shield, details with pseudostigmatic organ (2); gnathosoma, ventral (3); prodosomal plate, ventral (4); tegula (5). — Male: details of genital capsule (6). — Female: bursa copulatrix (7). — Male: leg IV (8).
demes 2, without nodules. Apodemes 2 straight, not uniting with anteromedian apodeme. Transverse apodeme indistinct in its middle part. Between posterior ends of coxal plates I and internal edges of plates II there is diffuse area probably being apodematernal vestiges. Posterior median apodeme thickening, not bifurcated posteriorly and anteriorly, not extending to the level of anterior extremities of trochanthers III but extending posteriorly beyond ends of apodemes 4. Apodemes 3 characteristically recurved, extending anteromedially in relation to the anterior ends of trochanthers III. Apodemes 4 characteristically recurved, not joining with posterior median apodeme. Between anterior ends of coxal plates IV and internal edge of plates III there is characteristically a diffuse area similar to that between plates on propodosomal venter, probably apodematernal vestiges.

Posteromedian lobe of metapodosomal plate (tegula) (Photo. 5) 13-17 μm long, and 29-32 μm wide, broadly rounded. From the structures defined by LINDQUIST (1978) as a bursa copulatrix (Photo. 7) issues a duct to beneath the tegula.

Setae 1a (5-9 μm long) finely tapered, inserted distinctly behind apodemes 1, with interval of 8-12 μm between them. Setae 2a (8-12 μm long) finely tapered inserted behind apodemes 2, with interval of 26-38 μm between them. Setae 3a (8-12 μm long) finely tapered inserted on the level anterior part of apodemes 3. Setae 3b (8-10 μm long) finely tapered inserted anterior to posterior ends of apodemes 4. Caudal setae ps (10-13 μm long) finely tapered with distance between them slightly less than width of tegula.

Legs (Fig. 3) Excluding trochanters leg I longer than leg II and slightly shorter than leg III. Claws on legs I-III almost equal in size, hooked, well developed. Setae u' of legs I to III spinelike, that on leg I distinctly shorter than that on legs II or III.

Formula of setae on particular segments of leg I : 4 — 4 — 8(2 ϕ) + 9(1 ω). Solenidion ω (5-6 μm long) placed on distal 1/3 of tibiotarsus. Eupathidium tc" placed on distal 1/4 of segment. Eupathidia ρ', ρ" and tc' placed on the top of tibiotarsus.

Solenidion ϕ,(3-4 μm long). Solenidion ϕ, with striated swollen distal part. Eupathidium k short, sharply ended.

Formula of setae on particular segments of leg II : 3 — 4 — 4 — 7(1 ω). Solenidion ω II (5-5,5 μm long) and strong spine pl" II placed at same level on proximal part of tarsus. Femur without flangelike process. Formula of setae on particular segments of leg III : 1 + 3 — 4 — 5. Leg IV (46-52 μm long) slightly longer than combined length of femorogenu III and tibia III. Femorogenu of leg IV 2 times longer than tibiotarsus IV. Seta v'F (8-10 μm long) whiplike, almost 2 times longer than distance between setae v'F and v'G. Seta v'G (12-14 μm long) stiff finely tapered. Seta tc" (16-18 μm long) stiff, stout slightly shorter than length of apical segment. Seta v'Ti (50-58 μm long) whiplike, at base about half as thick as seta tc".

ADULT MALE

Body length 192 μm, body width 98 μm (one specimen).

Dorsal side (Fig. 4) : Idiosoma (158 μm long) with regular granulation. Lengths of setae (μm) :

<table>
<thead>
<tr>
<th>Segment</th>
<th>Setae</th>
</tr>
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<tbody>
<tr>
<td>v₁</td>
<td>16</td>
</tr>
<tr>
<td>v₂</td>
<td>15-16</td>
</tr>
<tr>
<td>sc₁</td>
<td>38</td>
</tr>
<tr>
<td>sc₂</td>
<td>20-22</td>
</tr>
<tr>
<td>C₁</td>
<td>12-13</td>
</tr>
<tr>
<td>C₂</td>
<td>17-18</td>
</tr>
<tr>
<td>d</td>
<td>18-19</td>
</tr>
<tr>
<td>e</td>
<td>15-16</td>
</tr>
</tbody>
</table>

Distances between setae (μm) :

<table>
<thead>
<tr>
<th>Distance</th>
<th>Between Setae</th>
</tr>
</thead>
<tbody>
<tr>
<td>v₁-v₁</td>
<td>18</td>
</tr>
<tr>
<td>v₂-v₂</td>
<td>29</td>
</tr>
<tr>
<td>sc₁-sc₂</td>
<td>52</td>
</tr>
<tr>
<td>c₁-c₁</td>
<td>97</td>
</tr>
<tr>
<td>c₂-c₂</td>
<td>80</td>
</tr>
<tr>
<td>d-d</td>
<td>49</td>
</tr>
<tr>
<td>e-e</td>
<td>33</td>
</tr>
<tr>
<td>v₁-v₂</td>
<td>14</td>
</tr>
<tr>
<td>v₂-sc₁</td>
<td>15</td>
</tr>
<tr>
<td>sc₁-sc₂</td>
<td>12</td>
</tr>
<tr>
<td>c₁-c₂</td>
<td>36-44</td>
</tr>
<tr>
<td>c₁-d</td>
<td>14-25</td>
</tr>
</tbody>
</table>

Setae sc₁ and c₁ smooth, slender, finely tapered. Setae sc₂ in specimen examined absent on right side of body. Setae v₁, v₂, sc₁, c₁, d, e, stiff, coarse, with bluntly pointed ends.

Genital capsule (Photo. 6) (42 μm long, 38 μm wide) hyaline rim and two small, curved finely tapered setae.

Ventral side (Fig. 5) : Gnathosoma (30 μm long, 29 μm wide) formed like that of female.

Propodosomal and metapodosomal plates without distinctive granulation. Apodemes distinct. Anteromedian apodeme continuous, extending beyond posterior ends of apodemes 2. Apo-
FIG. 3: *Tarsonemus elbrusi* n. sp., legs I-IV of female.
demes 2 recurved in their posterior part, joined with anteromedian apodeme. Transverse apodeme weakened and indented in its middle part where joined with anteromedian apodeme. Apodemes 3 connected with apodemes 4. Apodemes 4 joined with posteromedian apodeme.

Coxal pits on propodosomal plate 8-like in outline. All coxal setae finely tapered.

Setae 1a (11 \( \mu \text{m} \) long) placed behind apodemes 1 with interval of 14 \( \mu \text{m} \) between them. Setae 2a (11 \( \mu \text{m} \) long) placed behind apodemes 2 with interval of 32 \( \mu \text{m} \) between them. Setae 3a (11 \( \mu \text{m} \) long) placed closely behind apodemes 3, with interval of 38 \( \mu \text{m} \) between them. Setae 3b (11 \( \mu \text{m} \) long) placed lateral to apodemes 4, with interval of 47 \( \mu \text{m} \) between them.

Legs (Fig. 6). Excluding trochanters leg I equal in length to leg II and shorter than leg III. Claws on legs I-III hooked, well developed. Claw on leg I slightly smaller than claws on leg II and III. Ambulacra very well developed.

Setae \( \nu' \) legs I to III spinelike, that on leg I distinctly shorter than that on legs II or III.

Formula of setae on particular segments of

FIG. 4-5: Tarsonemus elbrusi n. sp., male. 4. — Dorsum; 5. — Venter.
Fig. 6: Tarsonemus elbrusi n. sp., legs I-IV of male.
T. elbrusi n. sp.  

Female  
1. Seta c₁ shorter than 1/2 distance between it and posterior edge of tergite C  
2. Setae d and f stiff  
3. Setae e₂ placed posterior to apodemes 2  
4. Setae 3α shorter than distance between them  
5. Setae p₁" on tibiotarsus I present  
6. Solenidion ϕ₁ on tibiotarsus I with swollen end, longer than solenidion ϕ₁  
7. Setae c₁, ϕ₁, ϕ₂ whiplike longer than setae ϕ₁, ϕ₂  
8. Setae 3α longer than distance between them  
9. Setae p₁" on tibiotarsus I absent  
10. Solenidion ϕ₁ on tibiotarsus I without swollen end, spindelike shorter than solenidion ϕ₁  
11. Setae ϕ₁, ϕ₂ longer than setae 1G  
12. Setae 1G without swollen end  
13. Femorogenu IV without flange-like process  
14. Femorogenu II with setae ϕ₁'G shorter than setae IG  

Male  
1. Setae c₁, ϕ₁, ϕ₂ whiplike  
2. Setae c₁, ϕ₁, ϕ₂ longer than setae 1G  
3. Setae p₁" on tibiotarsus I absent  
4. Setae 3α longer than distance between them  
5. Femorogenu IV with flange-like process  
6. Femorogenu IV with setae ϕ₁'G longer than setae IG  

T. boczeki Kropczyńska (Fig. 7-12)  

Female  
1. Seta ϕ₁, ϕ₂ whiplike longer than setae ϕ₁, ϕ₂  
2. Setae d and f whiplike  
3. Setae e₂ placed posterior to apodemes 2  
4. Setae 3α longer than distance between them  
5. Setae p₁" on tibiotarsus I absent  
6. Solenidion ϕ₁ on tibiotarsus I without swollen end, spindelike shorter than solenidion ϕ₁  
7. Setae ϕ₁, ϕ₂ longer than setae 1G  
8. Setae 1G without swollen end  
9. Femorogenu IV without flange-like process  
10. Femorogenu II with setae ϕ₁'G shorter than setae IG  

Type locality: Female holotype and paratype (3 ♂, 1 ♀) were collected in August, 1978, in the Caucasus, U.S.S.R. (on Mt. Elbrus, 3550 m.a.s.l.) from Saxifraga sp. by M. Zierhoffe. Holotype and 3 paratypes are deposited in the collection of the Department of Animal Morphology, A. Mickiewicz University, in Poznan, 1 paratype (♀) is deposited in Canadian National Collection, Ottawa, Canada.

DISCUSSION  

Tarsonemus elbrusi is a very interesting species with regard to the various characteristics which until now have been regarded as good features at the level of genus, subgenus and species, particularly the shape and the presence of the pseudostigmatic organs and the number of setae on the propodosomal shield (Beer 1954, Schaaarschmidt 1959, Beer and Nucifora 1965, Suski 1970, Fain 1970, Wainstein 1979). The tendency for reduction of the pseudostigmatic organ can be noted in several phylogenetic lines of Tarsonemi-
FIG. 7-8: *Tarsonemus boczeki* Kropczyńska, female. 7. — Dorsum; 8. — Venter.
Fig. 9: Tarsonemus boczeki Kropczyńska, female. Tibiotarsus of leg I (A), tarsus of leg II (B), and leg IV (C).
dae (LINDQUIST (in press), KALISZEWSKI (in press). In many cases, transformation of the pseudostigmatic organ from a club to a spine is the first stage of its reduction. An evident example of this transformation is found in *Ste­neotarsonemus typhe* (Oudemans). I have found that the female of this species may have either no pseudostigmatic organ (with indistinct trace of its insertion), or have this organ formed on one side of the body only, or finally have the spine on both sides of the body. Dr. Z. W. SUSKI has also examined specimens of this species with the pseudostigmatic organs formed either as clubs or spines (personal communication). The holotype of *T. elbrusi* n. sp., has a distinct spinelike pseudostigmatic organ on the left side of the body but this organ is completely reduced on the right side. These organs are symmetrically developed, spinelike, on the paratypes.

Structures such as these which tend to be reduced, should be examined with great care before being used in classification of species and higher taxa.

The number of setae on the propodosomal shield of tarsonemid males has been regarded as a feature of the generic level by BEER 1954, BEER and NUCIFORA 1965. On this basis the genus *Parasteneotarsonemus* BEER was distinguished with 3 pairs of setae on the propodosomal shield.

The one male specimen examined of *T. elbrusii*
n. sp. has 4 setae on the right side of the propodosomal shield but only 3 setae on the left side. Distances between setae and their relative lengths in males and females showed variation and even differed between the left and right side of the body. At present it is difficult to say whether the observed variation found among the few specimens of *T. elbrusii* n. sp. at hand represents normal diversity or is caused by a special mutagenic factor in a local population. Problems connected with the taxonomic usefulness and reliability of Tarsonemid features requires detailed investigations based on larger numbers of specimens and species.

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