

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

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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 (sc_1 : 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) : v_1 : 15-20, sc_2 : 38-52, c_2 : 9-12, c_1 : 12-14, d : 14-15, f : 15-16, h : 15-18, e : 14-17.

Distances between setae (μm) : v_1-v_1 : 17-21, sc_2-sc_2 : 49-54, c_1-c_1 : 50-80, c_2-c_2 : 126-136, $d-d$: 50-56, $f-f$: 33-38, $h-h$: 38-48, v_1-v_2 : 30-33, c_1-c_2 : 34-40.

Setae sc_2 , c_2 smooth, slender, finely tapered. Setae v_1 , c_1 , d , e , f , h stout, coarse with bluntly pointed ends. Setae v_1 placed almost on the level of stigmata. Setae c_1 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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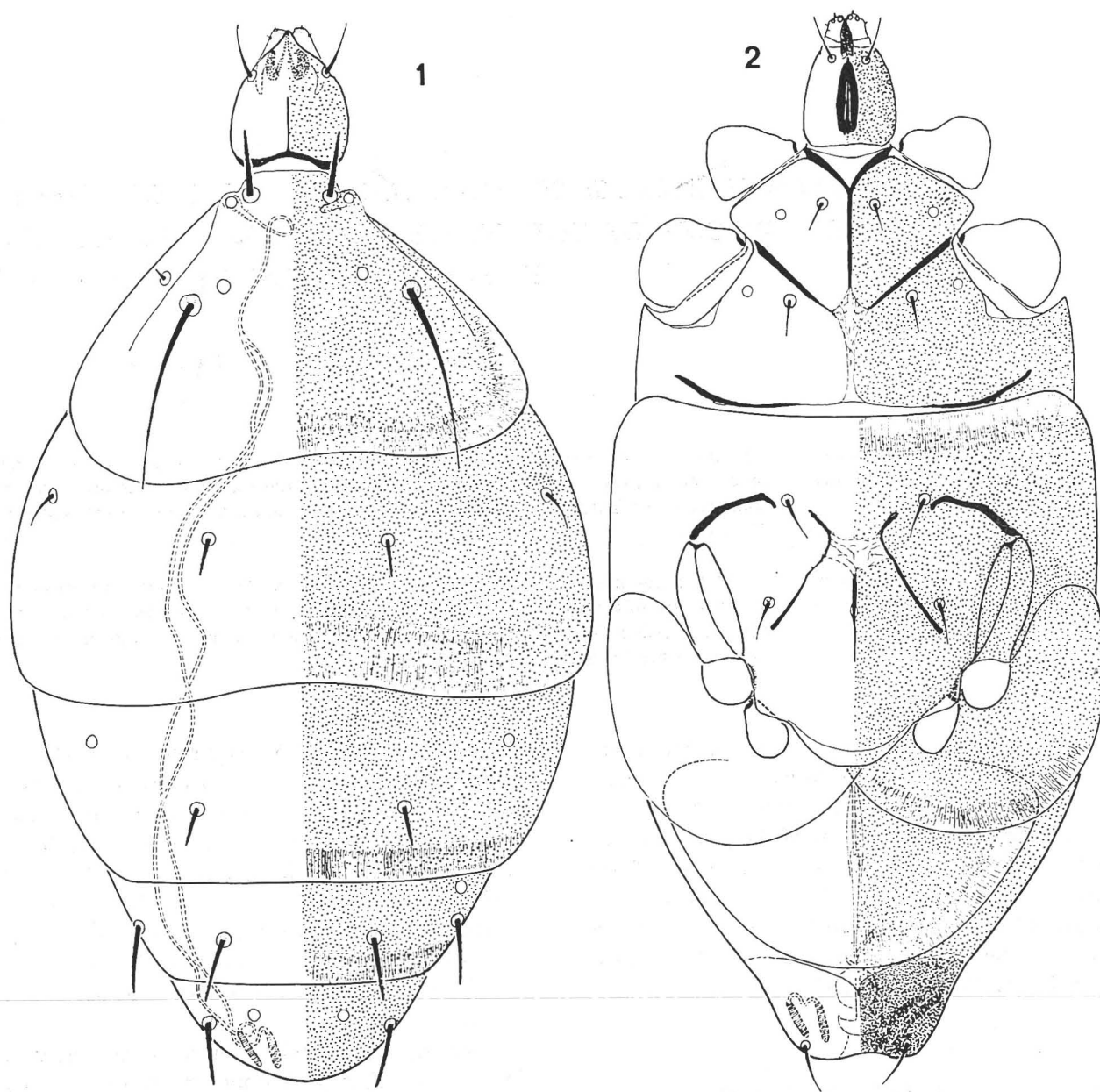


FIG. 1-2 : *Tarsonemus elbrusi* n. sp., female. 1. — Dorsum ; 2. — Venter.

outline. 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 ($18-20\ \mu\text{m}$ long, $5-6\ \mu\text{m}$ 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) ($72-77\ \mu\text{m}$ long, $125-126\ \mu\text{m}$ 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-

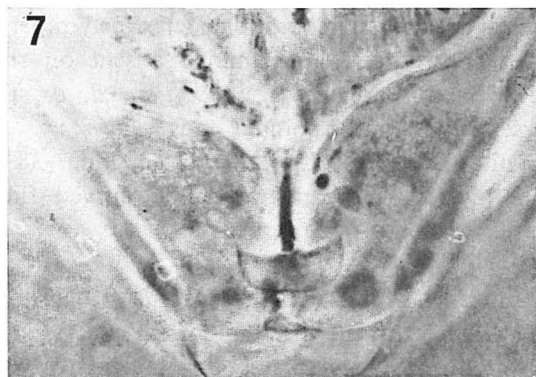
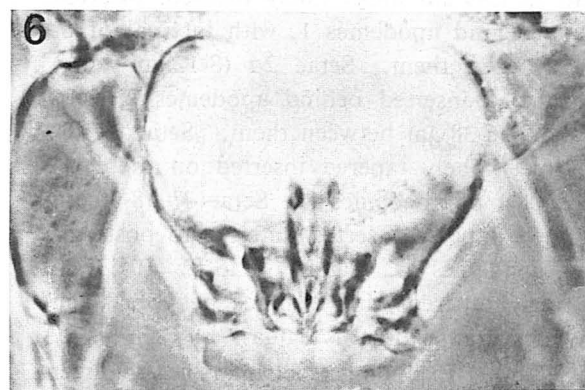
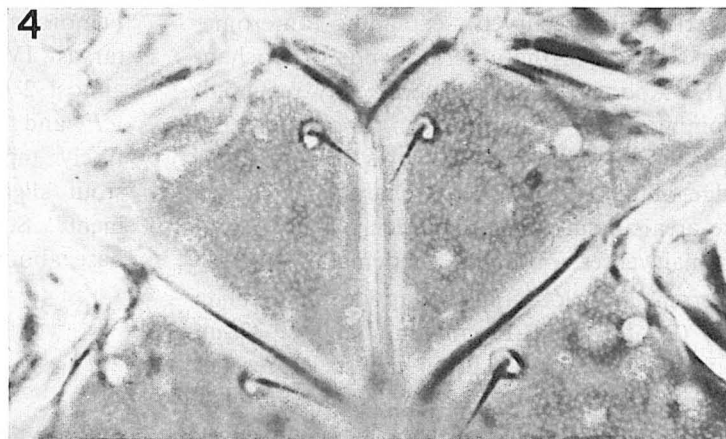
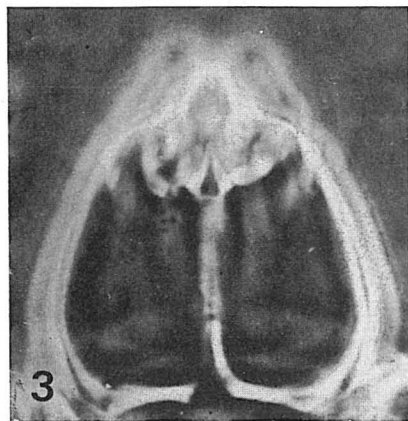
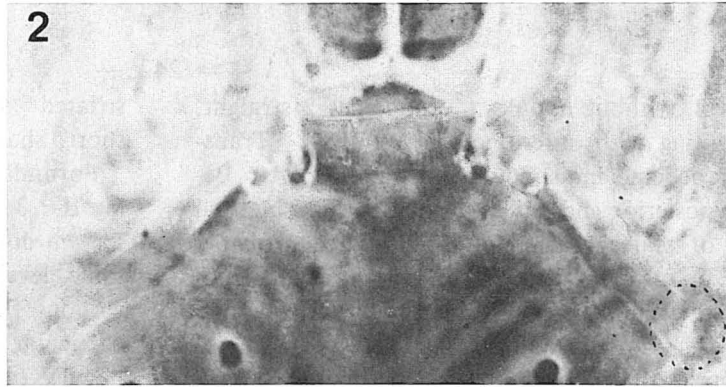
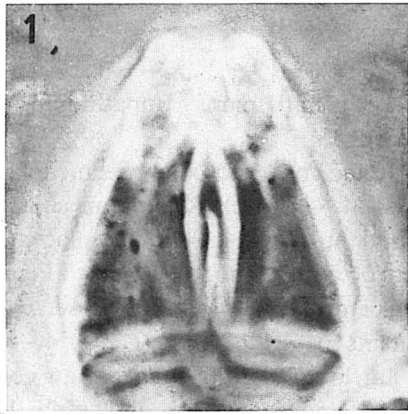


PHOTO. 1-8 : *Tarsonemus elbrusi* n. sp.

Female : gnathosoma, dorsal (1) ; prodorsal shield, details with pseudostigmatic organ (2) ; gnathosoma, ventral (3) ; prodorsal 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 apodematal vestiges. Posteromedian apodeme thickening, not bifurcated posteriorly and anteriorly, not extending to the level of anterior extremities of trochanters III but extending posteriorly beyond ends of apodemes 4. Apodemes 3 characteristically recurved, extending anteromedially in relation to the anterior ends of trochanters III. Apodemes 4 characteristically recurved, not joining with posteromedian 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 apodematal 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 p' , p'' and tc' placed on the top of tibiotarsus.

Solenidion φ_1 (3-4 μm long). Solenidion φ_2 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) : v_1 : 16, v_2 : 15-16, sc_1 : 38, sc_2 : 20-22, C_2 : 12-13, C_1 17-18, d : 18-19, e : 15-16.

Distances between setae (μm) : v_1-v_1 : 18, v_2-v_2 : 29, sc_2-sc_2 : 52, c_2-c_2 : 97, c_1-c_1 : 80, $d-d$: 49, $e-e$: 33, v_1-v_2 : 14, v_2-sc_1 : 15, sc_1-sc_2 : 12, c_1-c_2 : 36-44, c_1-d : 14-25.

Setae sc_2 and c_2 smooth, slender, finely tapered. Setae sc_2 in specimen examined absent on right side of body. Setae v_1 , v_2 , sc_1 , c_1 , 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-

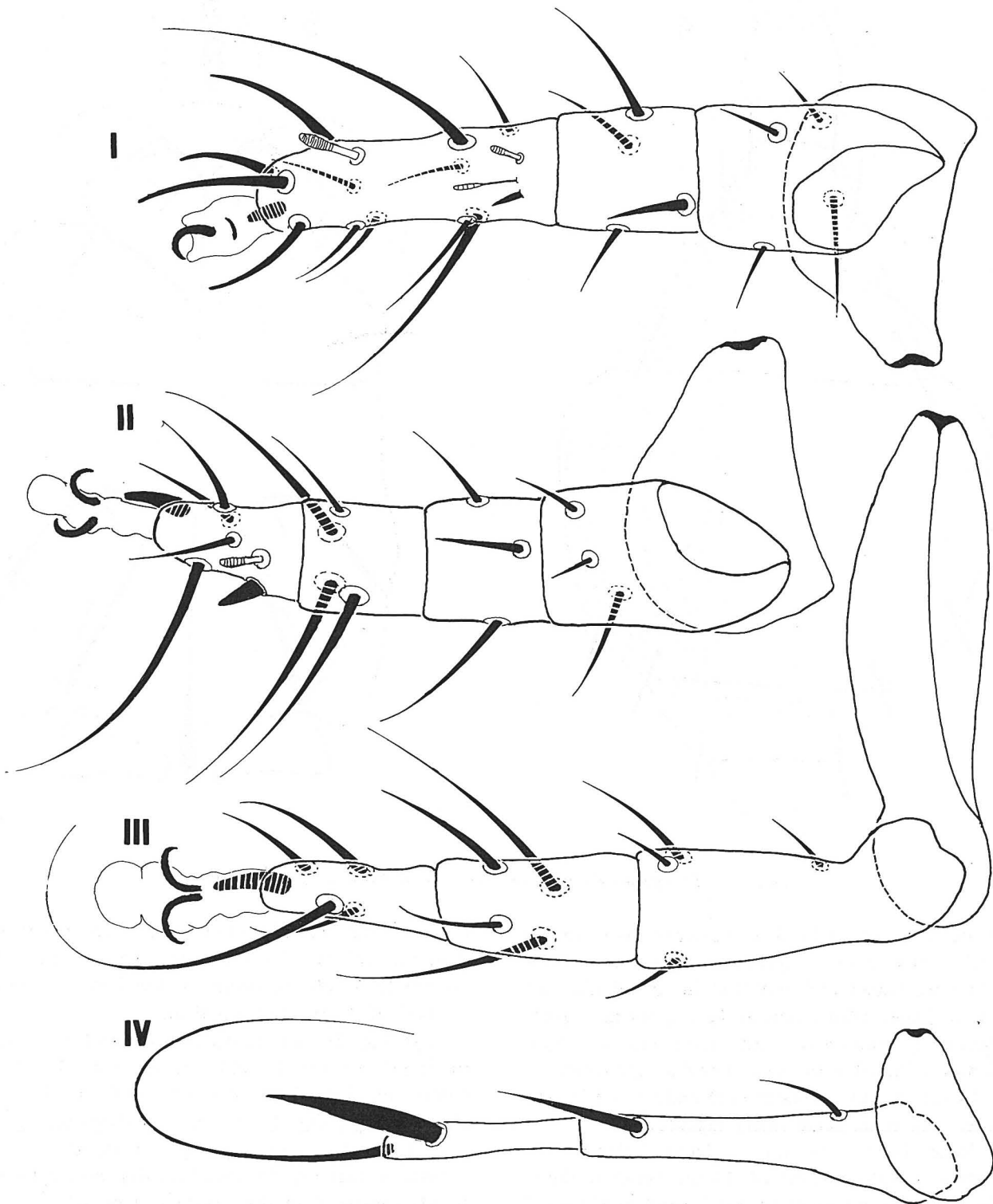


FIG. 3 : *Tarsonemus elbrusi* n. sp., legs I-IV of female.

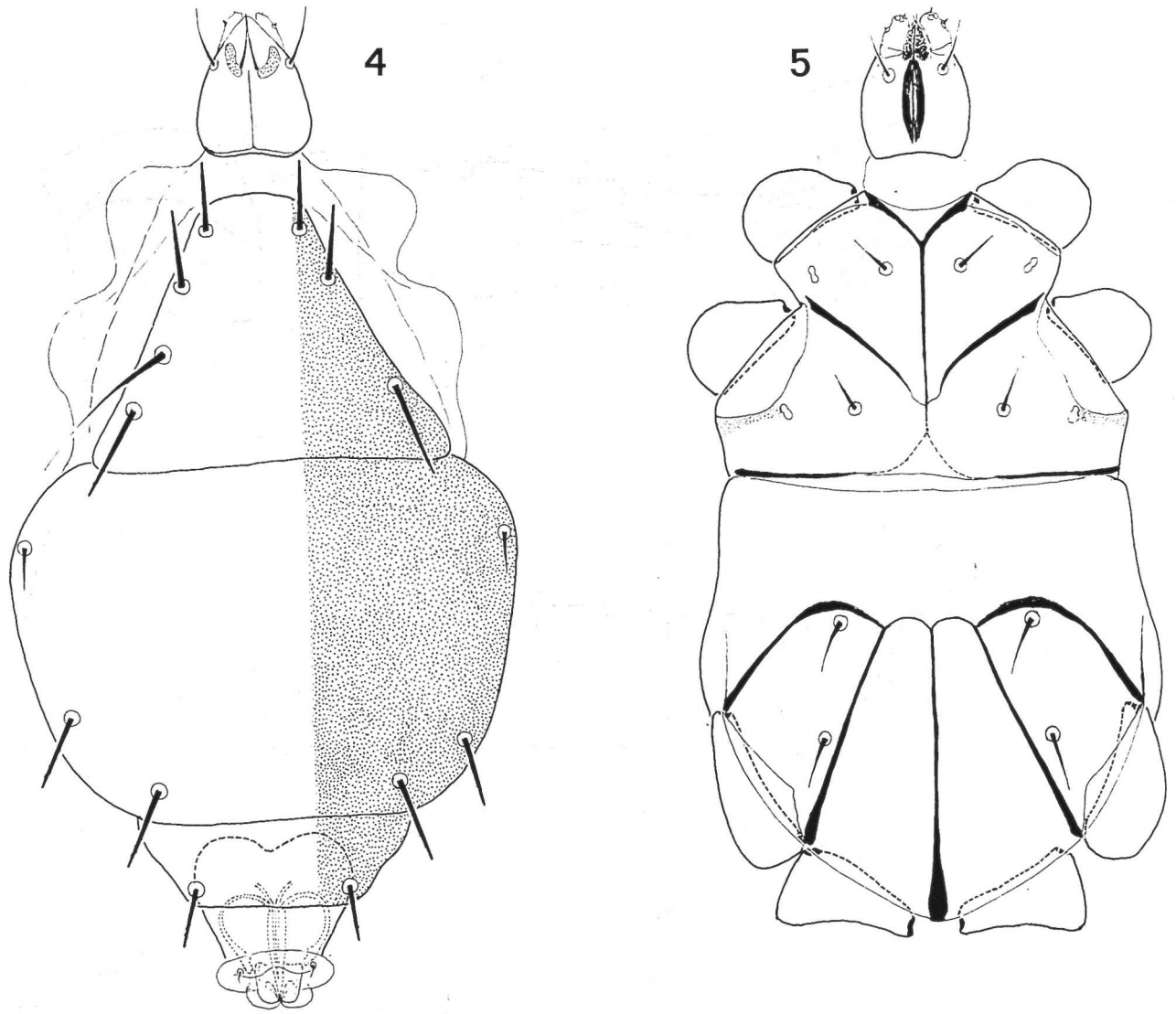


FIG. 4-5 : *Tarsonemus elbrusi* n. sp., male. 4. — Dorsum ; 5. — Venter.

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 μ m long) placed behind apodemes 1 with interval of 14 μ m between them. Setae *2a* (11 μ m long) placed behind apodemes 2 with interval of 32 μ m between them. Setae *3a*

(11 μ m long) placed closely behind apodemes 3, with interval of 38 μ m between them. Setae *3b* (11 μ m long) placed lateral to apodemes 4, with interval of 47 μ 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 *u'* 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

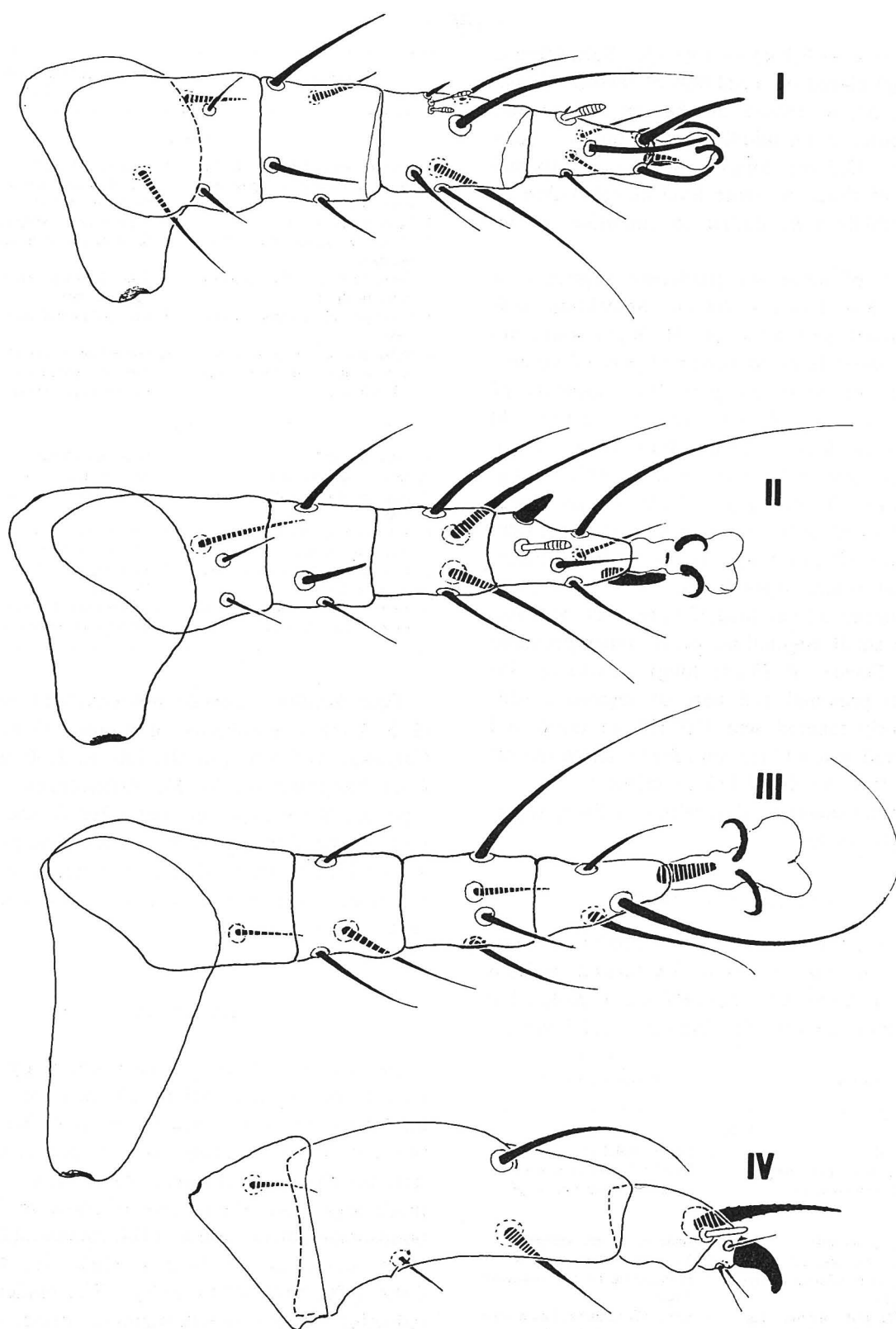


FIG. 6 : *Tarsonemus elbrusi* n. sp., legs I-IV of male.

leg I : 4 — 4 — 8(2 φ) — 10(1 φ). Solenidion ω (5 μ m long) placed on basal half of tarsus. Eupathidia p' , p'' , tc' placed on the top of segment. Seta tc'' inserted on middle part of tarsus. Solenidion φ_1 (3,5 μ m long) placed on proximal 1/3 part of tibia, on same level as solenidion φ_2 and eupathidium k , similar to condition on female.

Formula of setae on particular segments of leg II : 3 — 3 — 4 — 7(1 ω). Solenidion ω II (4,5 μ m long) and spine pl'' II (4 μ m long) are placed at same level on proximal part of tarsus.

Formula of setae on particular segments of leg III : 1 — 3 — 4 — 4. Leg IV (Photo. 8) stout, 70 μ m long. Tarsus short (3 μ m long), with three needlelike setae, ending with strong, curved claw (9 μ m long). Tibia (11 μ m long, 7 μ m wide) with stiff, coarse, poorly tapered, relatively short (25 μ m long) sera $v''Ti$ and slender, rodlike solenidion (6 μ m long).

Femorogenu 34 μ m long, 21 μ m wide at base, with two small angulations on its inner proximal surface. Setae $v'F$ (8 μ m long) needlelike, inserted on proximal 1/3 part of segment; whiplike, finely tapered seta $l''G$ (17 μ m long) and stiff tapered seta $v'G$ (13 μ m long) inserted almost on same level on distal 1/3 of segment.

Trochanter quadrangular, with one finely tapered seta (11 μ m long).

SYSTEMATIC POSITION

Tarsonemus elbrusi n. sp. is similar in some details of the gnathosoma to *Tarsonemus pallidus* Banks and *Tarsonemus boczeki* Kropczyńska, but differs from them by the features listed below.

<i>T. elbrusi</i> n. sp.	<i>T. pallidus</i> Banks
Female	
1. Seta v_1 stiff	1. Seta v_1 whiplike
2. Setae c_2 shorter than setae e	2. Setae c_2 longer than setae e
3. Tarsus II with spine pl''	3. Tarsus II without spine pl''
Male	
1. Setae v_1 , v_2 , sc_2 stiff	1. Setae v_1 , v_2 , sc_2 whiplike
2. Tarsus II with spine pl''	2. Tarsus II without spine pl''
3. Femorogenu IV without flange-like process	3. Femorogenu IV with flangelike process
4. Setae $v'Ti$ stiff, shorter than femorogenu IV length	4. Setae $v'Ti$ whiplike, longer than femorogenu IV length

<i>T. elbrusi</i> n. sp.	<i>T. boczeki</i> Kropczyńska (Fig. 7-12)
Female	
1. Seta c_1 shorter than 1/2 distance between it and posterior edge of tergite C	1. Seta c_1 whiplike longer than 1/2 distance between it and posterior edge of tergite C
2. Setae d and f stiff	2. Setae d and f whiplike
3. Setae $2a$ placed posterior to apodemes 2	3. Setae $2a$ placed on apodemes 2
4. Setae $3a$ shorter than distance between them	4. Setae $3a$ longer than distance between them
5. Setae pl'' on tibiotarsus I present	5. Setae pl'' on tibiotarsus I absent
6. Solenidion φ_2 on tibiotarsus I with swollen end, longer than solenidion φ_1	6. Solenidion φ_2 on tibiotarsus I without swollen end, spinelike shorter than solenidion φ_1
Male	
1. Setae sc_2 stiff	1. Setae sc_2 whiplike
2. Setae c_2 shorter than c_1	2. Setae c_2 longer than setae c_1
3. Seta pl'' on tibiotarsus I present	3. Seta pl'' on tibiotarsus I absent
4. Solenidion φ_2 on tibiotarsus I with swollen end	4. Solenidion φ_2 on tibiotarsus I without swollen end
5. Femorogenu IV without flange-like process	5. Femorogenu IV with flange-like process
6. Femorogenu IV with setae $v'G$ shorter than setae $l'G$	6. Femorogenu IV with setae $v'G$ longer than setae $l'G$

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. ZIERHOFFER. Holotype and 3 paratypes are deposited in the collection of the Department of Animal Morphology, A. Mickiewicz University, in Poznań, 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, SCHAARSCHMIDT 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-

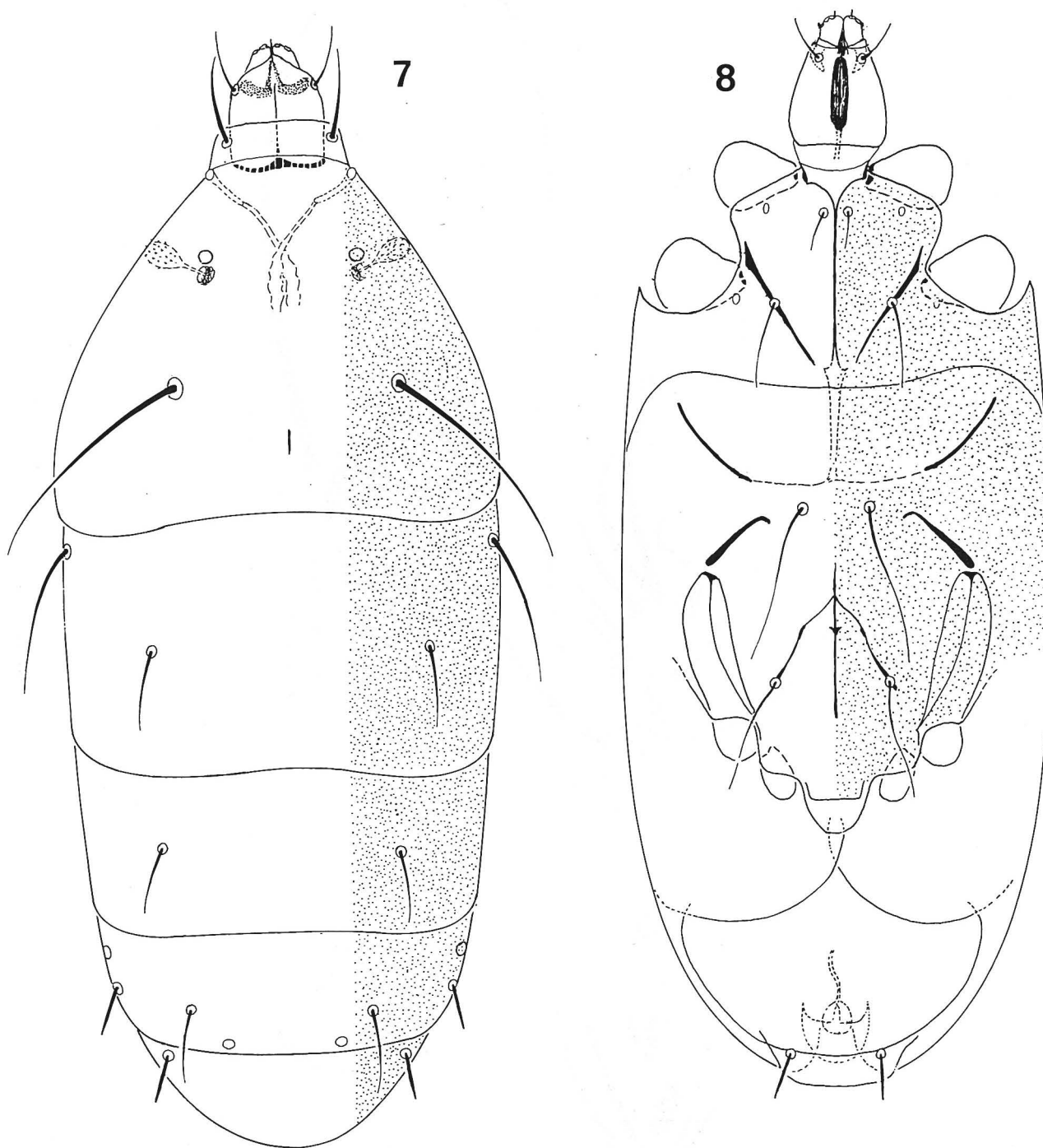


FIG. 7-8 : *Tarsonemus boczeki* Kropczyńska, female. 7. — Dorsum ; 8. — Venter.

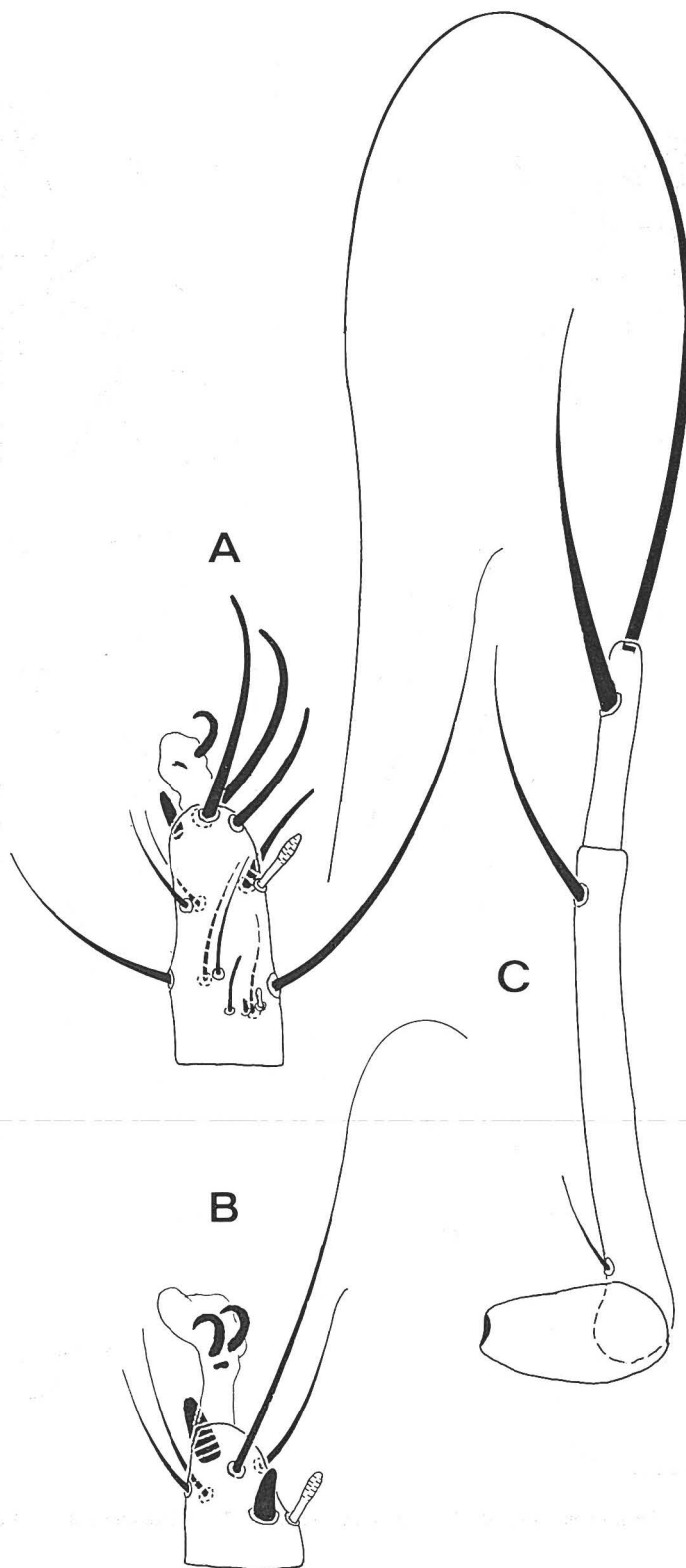


FIG. 9 : *Tarsonemus boczeki* Kropczyńska, female.
Tibiotarsus of leg I (A), tarsus of leg II (B), and leg IV (C).

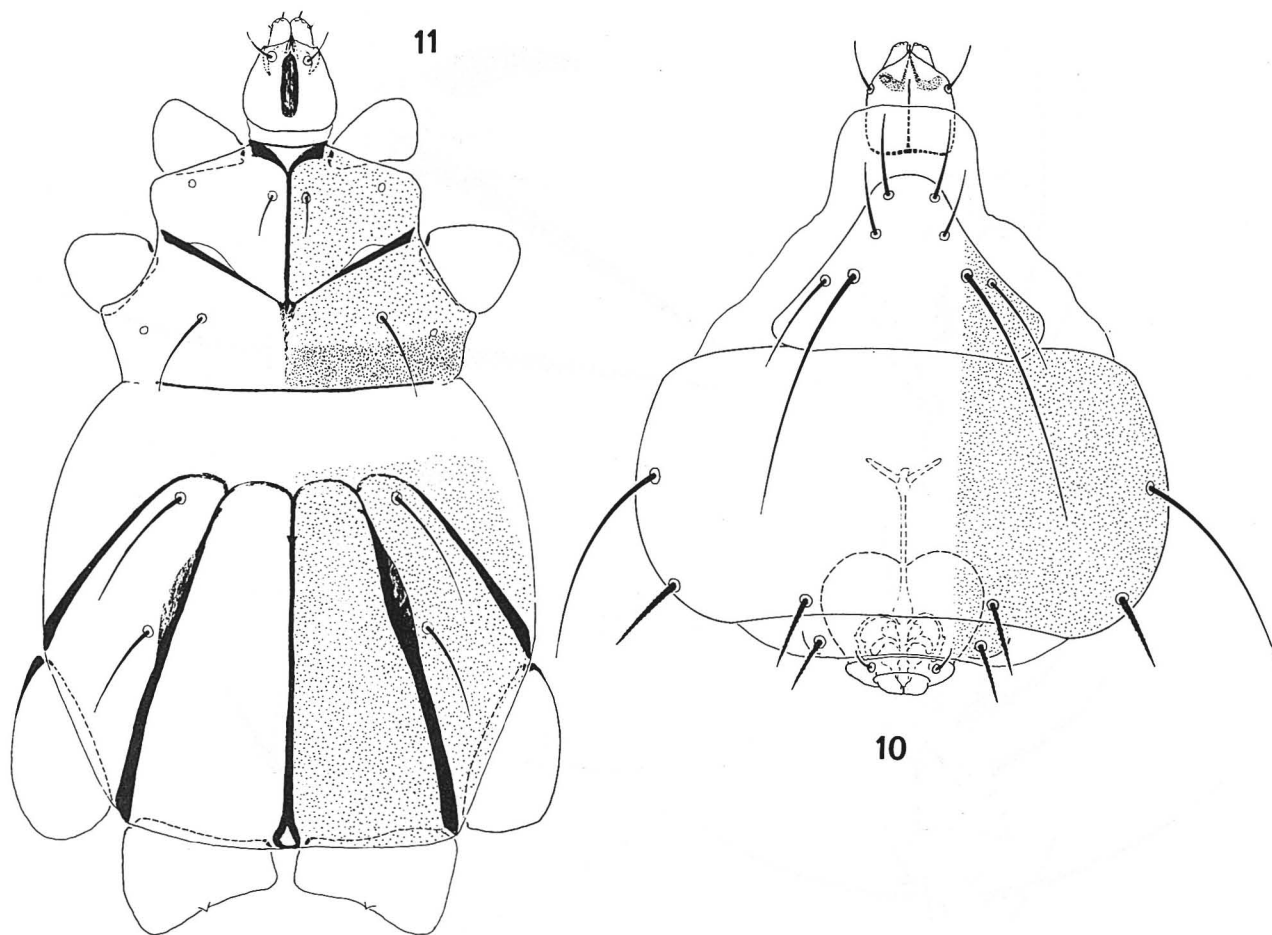


FIG. 10 : *Tarsonemus boczeki* Kropczyńska, venter of male.

FIG. 11 : *Tarsonemus boczeki* Kropczyńska, dorsum of male.

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 *Stenotarsonemus 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 pseu-

dostigmatic 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 *Parastenotarsonemus* BEER was distinguished with 3 pairs of setae on the propodosomal shield.

The one male specimen examined of *T. elbrusii*

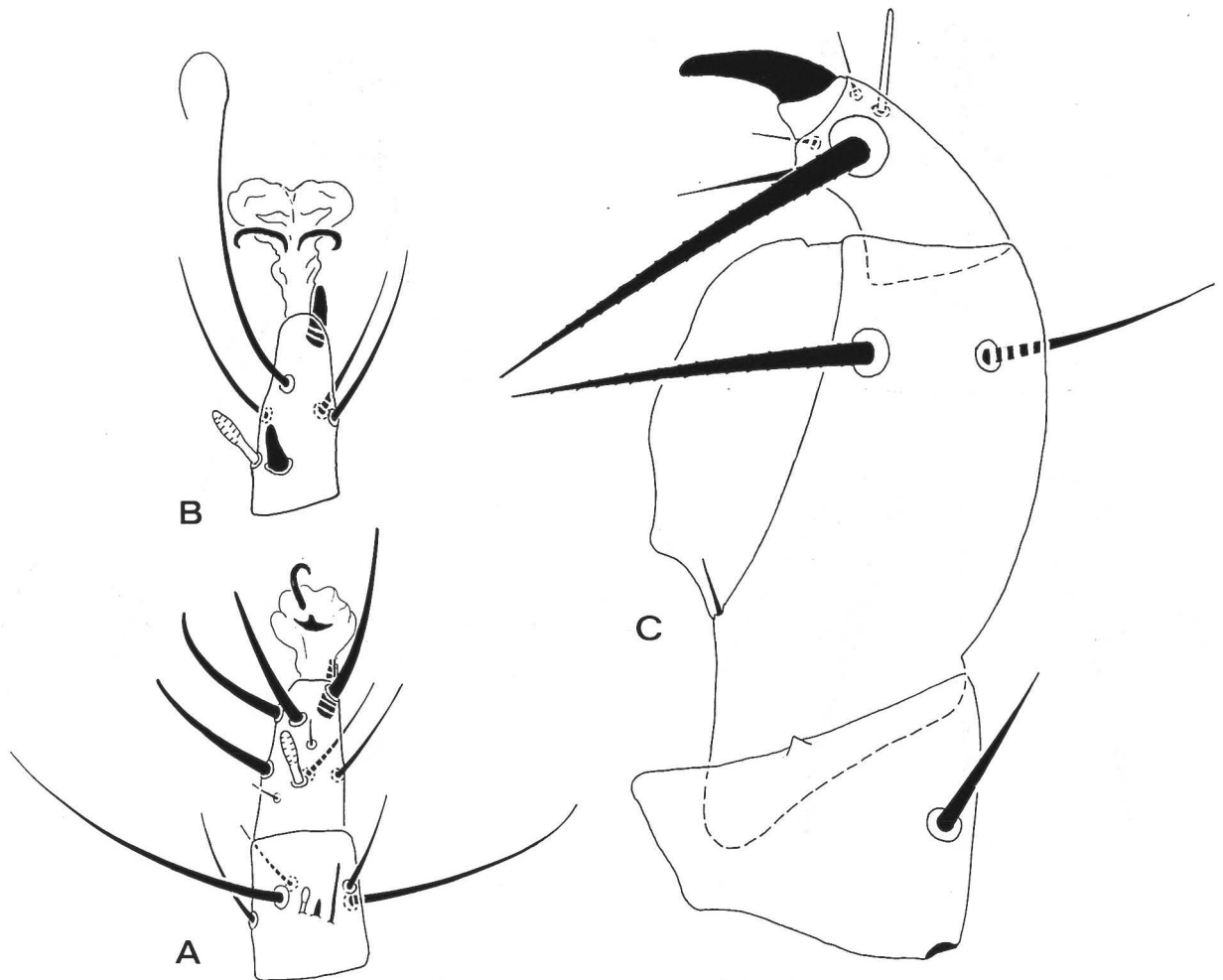


FIG. 12 : *Tarsonemus boczeki* Kropczyńska, male.
Tibia and tarsus of leg I (A), tarsus of leg II (B), and leg IV (C).

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.

ACKNOWLEDGEMENTS

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