

TRICHEREMAEUS TRAVEI N. SP. A NEW ORIBATID MITE FROM EAST SLOVAKIA

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ORIBATEI
TRICHEREMAEUS
EAST SLOVAKIA

SUMMARY : *Tricheremaeus travei* n. sp., a new eupherederm oribatid mite, is described from mixed forests of East Slovakia. Relationships to other species are discussed, as well as geographical distribution of the genus representatives.

ORIBATES
TRICHEREMAEUS
SLOVAQUIE
ORIENTALE

RÉSUMÉ : Un nouvel oribate euphéréderme des forêts mixtes de Slovaquie Orientale est décrit sous le nom de *Tricheremaeus travei* n. sp. Les rapports avec les autres représentants du genre aussi bien que la distribution géographique des espèces, sont discutés.

A large number of representatives of the genus *Tricheremaeus*, hitherto unknown in Czechoslovakia have been collected from two localities of East Slovakia (Slanské vrchy mountains, Pieniny). The genus *Tricheremaeus* is known only from south and west Europe. *T. serratus* (Michael, 1885), type species of the genus, is described from north and central England and north Wales. Berlese's *T. conspicuus*, another classical species, was not sufficiently described nor illustrated (BERLESE, 1916), but BERNINI (1970, in his description of *T. grandjeani* from the Apuan Alps) presented a quite comprehensive review of the type of them. At present we have a detailed description only in the case of the species *T. nemossensis* (Grandjean, 1963). The Czechoslovak material represents a new species, similar in some characters to *T. grandjeani* Bernini, 1970.

The authors of this paper is deeply indebted to Prof. J. TRAVÉ for his advice and for allowing access to his own and to GRANDJEAN's material during the author's stay at Laboratoire Arago. Without his kind help, the present work would not have been possible.

Tricheremaeus travei n. sp.

Diagnosis :

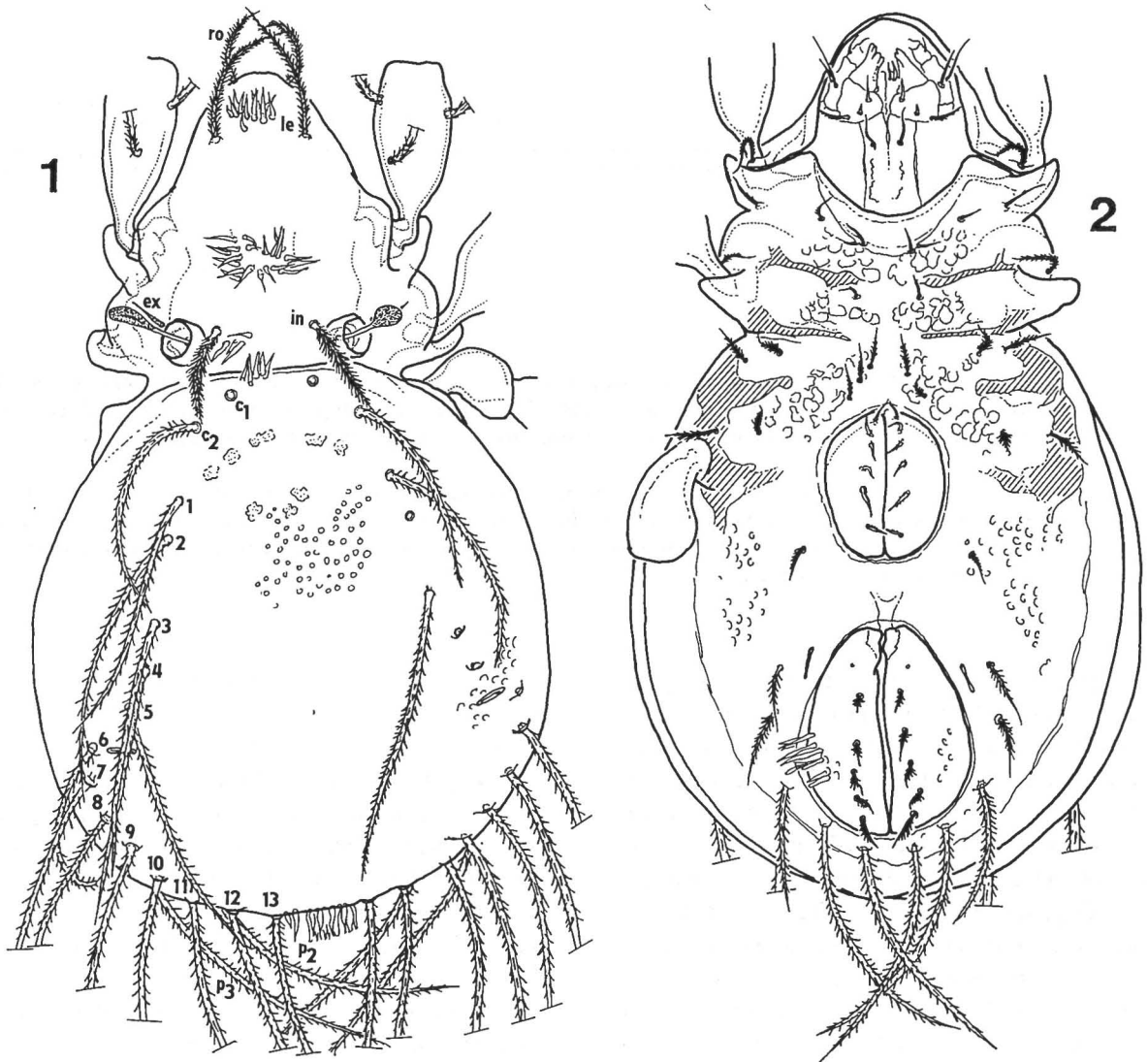
Notogaster surface with circular concavities of diameter smaller than diameter of notogastral setae. These concavities are mutually separated. Notogastral setae are organized roughly in two longitudinal rows. Seta c_3 is missing, the number of setae "b" (after GRANDJEAN, 1963) is usually 13; they are clustered into three groups (2-3-8). Larva with three pairs of centrodorsal setae, deutonymph with two setae p on each side.

ADULT

Size and body surface. The size of adult individuals differs according to the sex. Males are smaller, with an average length of 590 μm (565-610, 10 ex.) Females are larger, usually more robust, with average body length of 635 μm (620-680 μm , 5 ex.).

Colour does not differ from other genus and family representatives, being different shades of brown. The surface of the whole body is covered by marked cerotegument, shaped by variously long, bluntly sharpened thorny formations (Fig. 1), which can protrude to different sides or can be grouped

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FIGS. 1-2 : *Tricheremaeus travei* n. sp. dorsal (1) and ventral (2) views.

densely side by side, so creating a relatively thick compact layer. The cerotegument does not differ markedly from that of *T. nemossensis* and *T. grandjeani*. After boiling in lactic acid only round protuberances of cerotegument on the rostral region of the prodorsum and laterally to the bothridium were preserved.

The cuticle is translucent, weakened in spots at the usual sites where muscles are attached (on prodorsum sites, between bothridia, on the notogaster sides); in the epimeral region these spots

create a net structure without any additional microsculpture typical for the rest of the body.

Cuticular microsculpture is relatively pronounced, created by small, separated, circular or slightly oval concavities, readily visible in transmitted light, mainly on the notogaster and in ano-genital region. The diameter of notogastral concavities is apparently smaller ($3-5,5 \mu\text{m}$) than the diameter of notogastral setae insertions ($6-8 \mu\text{m}$). Their mutual distance (mainly in central part of notogaster) corresponding to almost twofold value of their

diameter (Fig. 5) (as in *T. conspicuus*). The size of the ventral concavities roughly corresponds to the diameter of adanal and aggenital setae insertions.

Prodorsum. In shape, the prodorsum does not differ from other species. The rostrum is widely curved. Pedotectum I is somewhat larger (in dorsal view) than pedotectum II. In addition to the microsculpture described above, there are crossing, irregular and moderately waved lines behind setae *le*. Lamellae or lamellar ribs are not developed — in transmitted light on boiled specimens we can see instead a rounded ridge in this region, where the prodorsal cuticle turns downwards and creates a wide and shallow furrow. The dorsosejugal furrow is deep. The bothridia are relatively large, high and circular. Their mutual distance is larger than sensillus length, which is about 92-98 μm . The sensillus capitulum is blunt, 35-40 μm long, 15-20 μm wide, and covered by very fine dark spinulae. On the undissected individual it seems to be almost globular, in fact it is apparently prolonged and slightly flattened.

Prodorsal setae *in*, *le* and *ro* are distributed as in other species of the genus; they are densely and regularly barbed. The interlamellar setae (*in*) project, are curved and only slightly shorter than the notogastral setae (120 μm). The lamellar and rostral setae cling to the prodorsum and project forwards. The lamellar setae are longer than the rostrals. The exobothridial setae are stout, straight, with sparse thorny spinulae and end in a short, sharpened tip.

Notogaster. Adult individuals never carry exuviae of nymphal stages, but remnants of detritus, inorganic particles and also fungal hyphae often persist within the long notogastral hairs. The notogaster is broadly oval, with a straight front edge. On complete individuals it is more narrow and less circular than in GRANDJEAN's drawing of *T. nemossensis*.

The notogastral setae are long (to 220-280 μm), dark in colour and spinulate. The spinuli are outwardly projected, spinoid. On the front edge of the notogaster two pairs of setae *c* (*c*₁, *c*₂) are present, seta *c*₃ is normally absent. In the sample of 15 individuals, *c*₃ was present on the left side in three, and on the right side once (never on both

sides at once), usually laterally and somewhat forwardly localized to seta *c*₂. Setae *p*₂ and *p*₃ are present at the usual place and without variations.

The number and location of other notogastral setae (*b*) are rather variable (fig. 4). Their usual number is 13, thus the ideal total setal number (*Ng*) is 34, usually aligned into three groups on each side, where the first two (2 + 3 setae) constitute, together with setae *c*₂ and *c*₃, almost on line and sometimes merge into one group. Displacement of the first two pairs of setae *b* medially is very unusual. The third group, formed usually by 8 setae, starts practically always behind the end of first setal line, but more laterally, and follows the notogastral edge in a curve. The symmetrical alignment of the notogastral setae, corresponding to the basic diagram (*c*₁-*c*₂-2-3-8-*p*₂-*p*₃), is less frequent (only in 6 of 15 cases studied) than the different, prevailing non-symmetrical variations. An increase in the *Ng* number was observed more often than a decrease, which was found only in two cases, always only on one side of the notogaster (1-1-1-8 and 2-2-8). The highest number on one side was 16 (3-4-9). The total number of notogastral setae was maximally 43, minimally 33.

There are 5 pairs of notogastral pores, localized approximately in their usual places. Lyrifissures *im* and *ia* are visible in dorsal view, *ih* and *ips* are displaced closely towards one on other and the position of *ip* is variable, between the last seta *b* and setae *p*₂-*p*₃.

Latero-opisthosomatic glands open laterally to the second line of setae, somewhat posteriorly of lyrifissures *im* (usually laterally between the first and second setae of the second line of *b*). The gland aperture is small, readily visible only on dissected individuals.

Gnathosoma. The gnathosoma and palps are of the usual structure. The infracapitulum is diarthric, setae *m* longer than other, hirsute and pointed. Seta *a* smooth, tapering to a blunt point. There are two pairs of adoral setae (inserted as in *T. nemossensis*) in a transversal line. Chelicerae are of the usual shape, setae *cha* longer than *chb*, both with fine setulae.

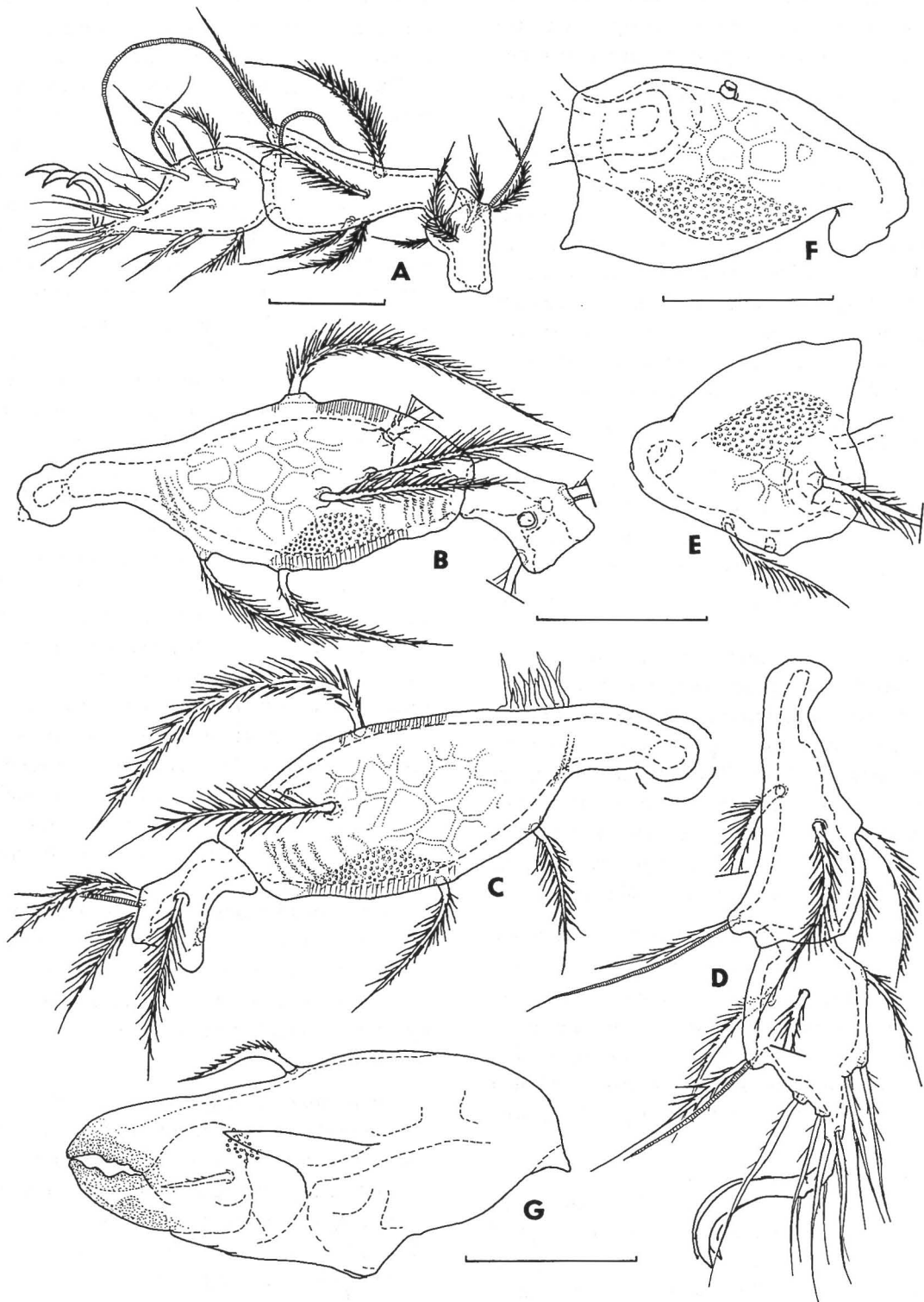


FIG. 3 : *Tricheremaeus travei* n. sp.

A. — Distal part of the leg I. B. — Leg II, femur with doubled antiaxial lateral seta. C. — Leg II, femur from the same specimen, without doubling of the seta 1'. D. — Tibia II and tarsus II. E. — Trochanter III. F. — Trochanter IV. G. — Chelicera. (scale = 50 μ m).

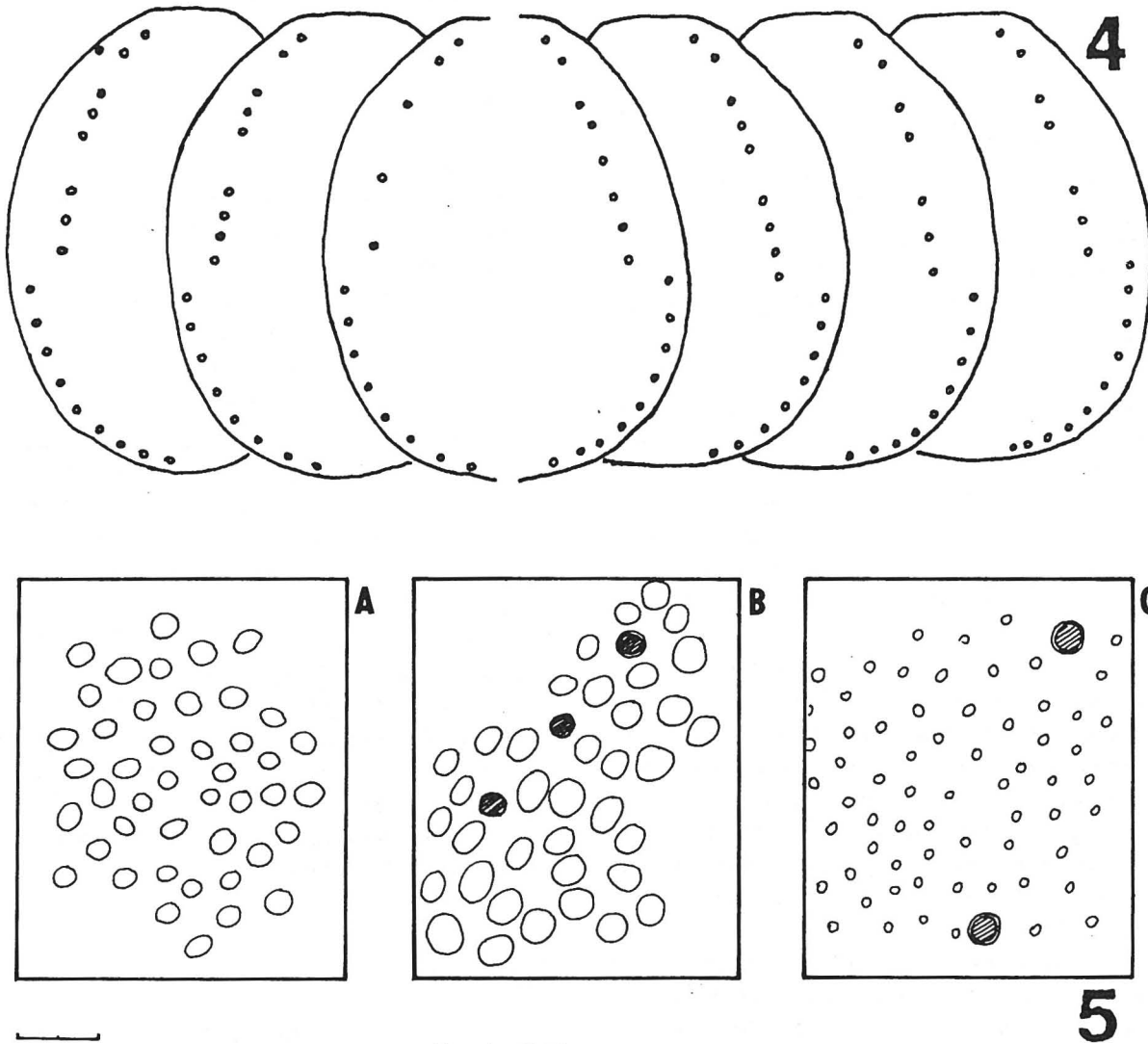


FIG. 4 : *Tricheremaeus travei* n. sp.

Variability of the notogastral setae numbers and position.

FIG. 5 : Microsculpture of the notogaster (concavities) : A : *T. nemossensis*, B : *T. serratus*, C : *T. travei*. (scale = 20 μ m).

Podosoma. The podosomal structure does not differ from that of *T. nemossensis*. In ventral view (fig. 2) typical microsculpture is visible, comprising circular concavities on the front half of first epimera (around the gnathosoma and pedotectum I) and in the lateral part of epimera IV. Most of the rest of the ventral area lacks microsculpture, but has a reticulum created by fields of muscle attachments. Epimeral chaetotaxy corresponds to the formula 3-1-3-3 (in one case there was an extra seta between setae 3a and 4b). The epimeral setae are fine and

setose, setae 1a, 1b and 2b, are somewhat shorter and finer than the others. Epimeral furrows, mainly sejugal, are deep. Apodeme 1 is only slightly pronounced, apodemata 2 and sj are long, interrupted in the middle, apodeme 3 is forshortened to only half the length of the others, and apodeme 4 is indistinct.

In lateral view, pedotecta I and II are visible, with slightly jagged edges. Acetabula I-IV are approximately in one plane; above acetabulum II there is a circular gland aperture and behind it, in

the region of the sejugal furrow, brachytracheae open by oval apertures.

Anogenital area. Anal and genital plates, and the whole anogenital area, have a similar microstructure to the notogaster.

The genital aperture is widely oval, widest in its first third or first quarter. The usual number of genital setae is 6 pairs, but in one case on both sides and in two cases on one side, 7 were found. The genital setae are relatively fine, and scarcely setose. These is invariably one pair of aggenital setae. They are relatively short (approximately the same length as the epimeral setae), protruding and densely setose. Their position is usually posterior to the last genital seta, *i.e.* more posteriorly than GRANDJEAN (1963, Fig. 4) or BERNINI (1970, Fig. 36) show.

The space between genital and anal plates is wide, only just smaller than the width of the genital plate; *i.e.* it is wider than in BERNINI's description of *T. grandjeani*.

The anal plates are longer and wider than the genital, and widest posteriorly. The number of anal setae is normally 5, however it can be quite variable (4-7) in both sexes. The anal setae protrude and are densely setose. Setulae are longest proximally, shortening markedly distally. Usually they are longer and more protruding on one side than on the other. Lyrifissures *ian* are visible anteriorly on the anal plates.

The number and length of adanal setae are variable. Their number is usually 5, of which the anterior two are the shortest, the third pair is moderately long and the last two pairs are very long, markedly extended over the notogastral edge. In the case of variation (4 or 6 setae, respectively) the number of shorter setae changes, but the two pairs of longest setae remain without change. The adanal pores (*iad*) are in the usual position, usually displaced somewhat anteriorly or at the level of first adanal setae. The shape and pilosity of the adanal setae, in particular the posterior two pairs, are similar to the notogastral setae. The projection between the adanal setae, behind the anal plates, which is drawn by GRANDJEAN and BERNINI, was not apparent in *T. travei*.

Legs. Leg characteristics are very similar to GRANDJEAN's data for the species *T. nemossensis*.

The leg segments are covered by a thick layer of cerotegument, setae are long, deeply coloured and markedly pilose. The distribution of areae porosae corresponds to GRANDJEAN's description, as does solenidiotaxy. The apophysis carrying complex $d_1\delta$ (*I*) is relatively pronounced.

The chaetotaxy of legs is similar to that of *T. nemossensis*, with differences only in femoral setation in legs I and II:

I : 1-(5 or 6)-4-5-19-3

II : 1-(6 or 5)-4-5-16-3

III : 3-3-3-4-15-3

IV : 1-3-2-4-12-3

Femora II (18 cases out of 30) and, to a smaller extent femora I (13 cases out of 30) displayed doubling of the antiaxial setae (Fig. 3). The presence of the second seta is variable and unsymmetrical but, in the majority of cases, leg II has a higher, or at least equal setal number as I (in 15 cases 6x more, 7x equal, 2x less). Only in two individuals did doubling not occurs. In two cases occurs the doubling on both femora I and II. The position of the second setae is also variable, with the exception of one case it lies near hair l_1'' (creating complex $l_1''-l_2''$), mostly in one level in lateral view. Doubled setae are usually distinct even on undissected individuals.

LARVA AND NYMPHS

The material did not contain larvae, and the following data refer to exuviae and 2 proto-, 1 deuto- and 2 tritonymphs.

The larval exuvia (fig. 8) markedly differs from that of *T. nemossensis* by the presence of 6 centro-dorsal setae in the normal position (*da*, *dm*, *dp*). The number of setae *b* varies (10-13), usually being 10 (compared with 13 in nymphs and adults). On the larva drawn by GRANDJEAN (1963, Fig. 1B) it is not possible to distinguish the distribution of notogastral setae into groups; it is possible, however, for *T. travei*; the highest frequency was found for distribution 2-3-5. In addition to this usual distribution we found the number 2-3-6 three times and the numbers 3-3-5 and 3-4-6 three times and the numbers 3-3-5 and 3-4-6, once each.

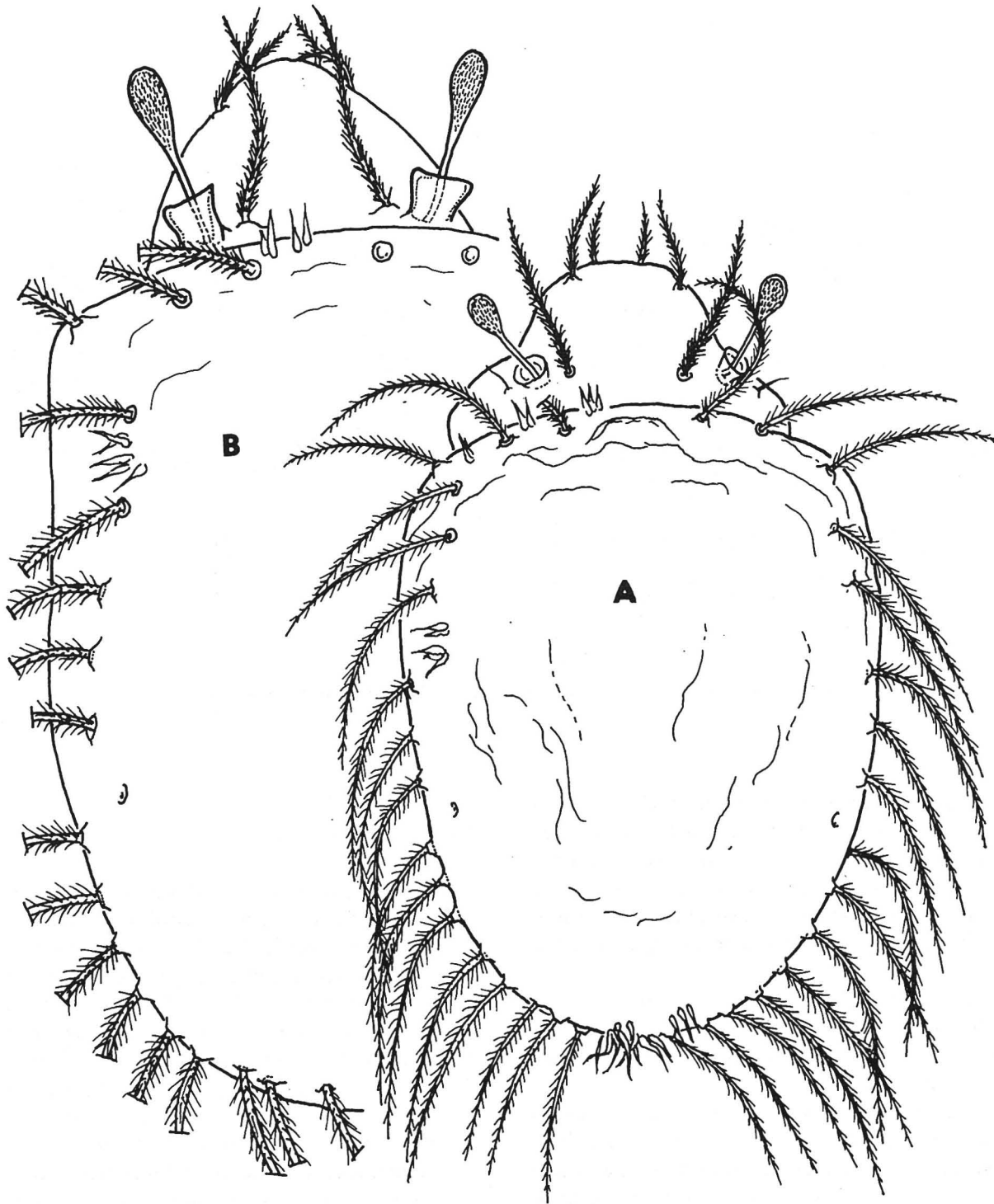
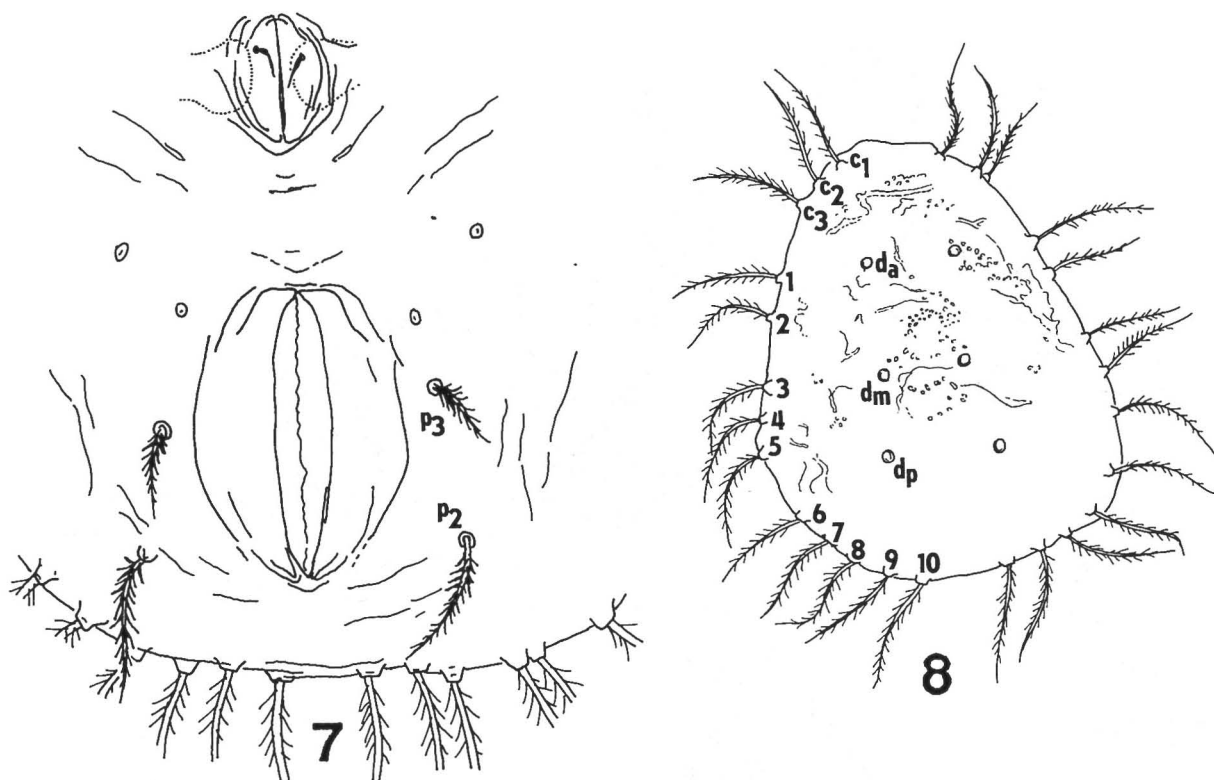


FIG. 6 : *Tricheremaeus travei* n. sp., protonymph dorsal view (A), tritonymph dorsal view (B).



FIGS. 7-8 : *T. travei* n. sp.
Protonymph ventral, the anogenital region. 8. — The larval exuvia (notogaster).

Nymphal stages do not differ from GRANDJEAN's description, except that the notogastral setae number (basic number for *T. travei* is equal for proto-, deuto- and trito- nymphs; that is c_1 - c_2 - c_3 -10- h_2 - h_3 - p_1), setae *b* are apparently distributed into groups as in larva, only the total number is higher by 3 (h_2 , h_3 , p_1).

The cerotegument is similar to that of *T. nemossensis*, but its separate terminally pointed fibres are not so robust in *T. travei* (mainly on the prodorsum and the notogaster).

The number of genital, aggenital and epimeral setae, and the leg chaetotaxy, do not differ from those of *T. nemossensis*. Doubling of the lateral antiaxial setae of femora I and II did not occur in material of tritonymphs (2 specimens).

Protonymph lengths were 408 and 360 μ m, deutonymph 472 μ m and tritonymph 584 and 616 μ m.

MATERIAL EXAMINED

1. Czechoslovakia, East Slovakia, Slanské vrchy mountains. State nature reservation "Zamutovské skaly" — 9 males, 3 females, 1 tritonymph from moss and lichen growths on ground and on rock slopes (north aspect); 30.7.1987 (MIKO, 1988).

2. Czechoslovakia, North Slovakia, Pieniny National Park, Klášťorná hora — 1 male, 2 females, 2 proto-, 1 deuto- and 2 tritonymphs from wet moss growths on rock on the north slope (at the bend of the Dunajec river); 15.9.1987.

The holotype (type locality "Zamutovské skaly") and serie of paratypes (6 adults + nymph from "Zamutovské skaly", 2 adults + nymphs from Pieniny Nat. Park) are deposited in the author's collection. 1 paratype ("Zamutovské skaly") is in

The Canadian National Collection, Biosystematics Research Centre, Ottawa, Ontario, 2 paratypes (1 from "Zamutovské skaly, 1 from Pieniny Nat. Park) are in collection of Natural History Museum, London.

I dedicate this species to Prof. Joseph TRAVÉ (France), who is an outstanding world expert in the field of oribatids.

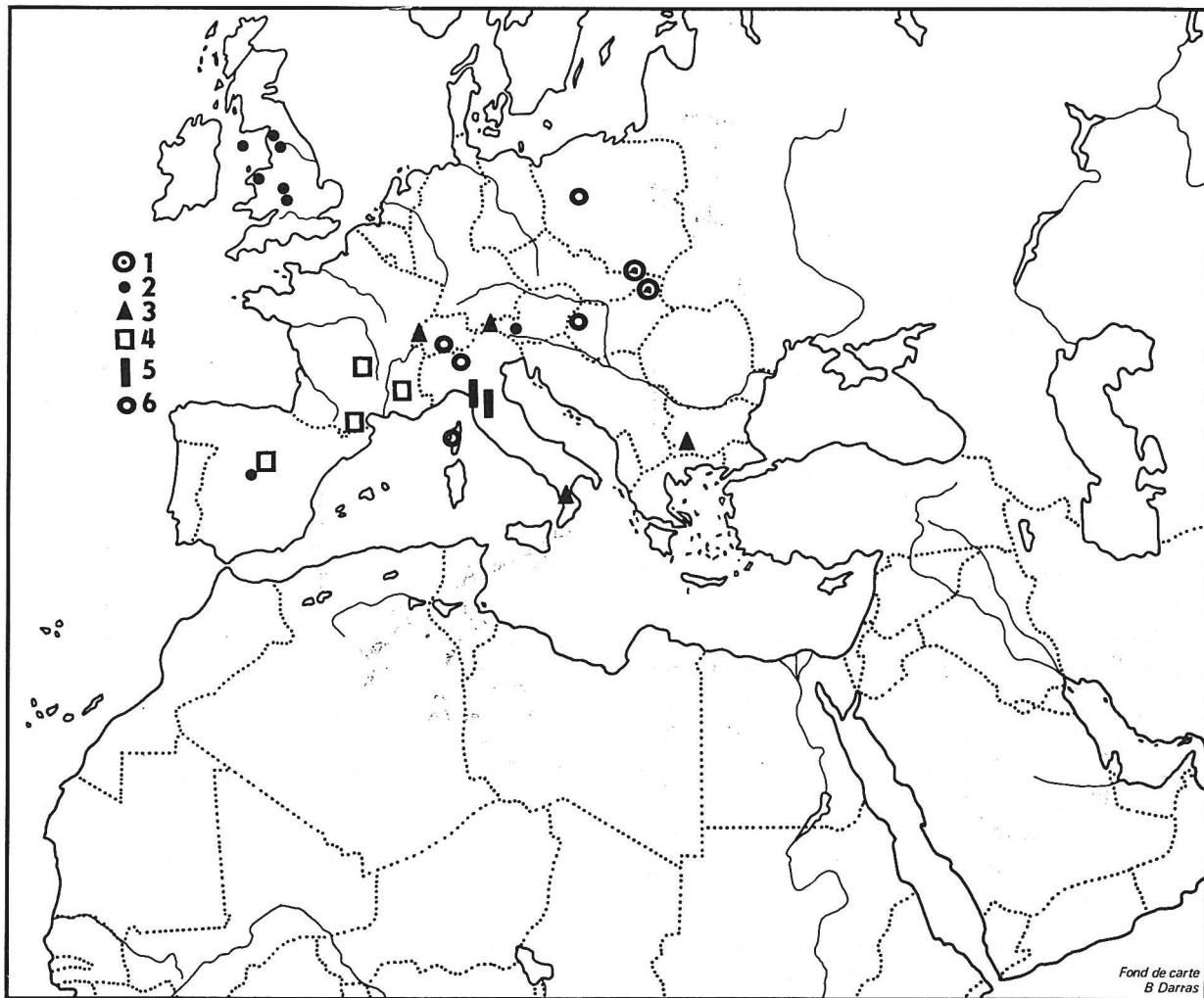
REMARKS

Tricheremaeus travei n. sp. differs from all of the hitherto known *Tricheremaeus* species by its unusual notogastral setae distribution in two lines,

without a marked insertion of setae into notogaster centrum (designated by GRANDJEAN as "poils rentrés"). In contrast, the first seta of the line b, following setae c_1 and c_2 , usually localized on notogastral edge, are incorporated between seta c_2 and the following setae.

Summing up the characteristics of known species of the genus *Tricheremaeus* they can be divided into three relatively well defined groups :

I. microsculpture with large concavities (7-12 μ m in diameter, distance between the concavities 2-6 μ m), c_3 present, larvae with 4 pairs of centro-dorsal setae — *T. nemossensis*, *T. serratus*.



FIGS. 9. — Distribution of the genus *Tricheremaeus* in Europe : 1. — *T. travei*. 2. — *T. serratus*. 3. — *T. conspicuus*. 4. — *T. nemossensis*, 5. — *T. grandjeani*. 6. Other remarks of the genus.

II. microsculpture with small concavities (2,5-6 μm , distance between the concavities 3-14 μm), c_3 present — *T. conspicuus*, *Tricheremaneus* sp. from Andermatt.

GRANDJEAN's material from Andermatt, designated as *T. conspicuus*, is probably not conspecific with this species. Although BERNINI's redescription (1970) of *T. conspicuus* is based on the sole typical specimen, GRANDJEAN's individuals are smaller, have lower number and different notogastral setal distribution, mainly "poils rentrés" (3 setae, never 4 as in BERNINI's redescription). In connection with analogy to other species one can expect a difference in the number of centrodorsal setae on larvae (GRANDJEAN's species has 3 pairs of these setae). In both species only cuticular microsculpture with small concavities and presence of seta c_3 shows evident similarities.

Records of *T. conspicuus* from Europe are separated from the type locality of this species in south Italia (Fig. 9). It is possible that published data refer to the other species with small concavities. Probably, many records refer to GRANDJEAN's species from Andermatt, considering its proximity to the Alps and adjoining mountains.

III. microsculpture with small concavities, c_3 missing, larvae with 3 pairs of centrodorsal setae — *T. grandjeani*, *T. travei* n. sp.

Other material examined during this study comprised specimens which GRANDJEAN (1963) designated as "species de la Verna". BERNINI (1970) has called attention to the fact that this GRANDJEAN's material is similar to his new species *T. grandjeani*. More comprehensive analysis showed that practically the only difference was in size (however BERNINI presented only average size, while GRANDJEAN gave the range of values), which is probably the reason for finding somewhat larger notogastral concavities in BERNINI's material. The number and distribution of notogastral setae, and the ventral characteristics, are equivalent, so that we consider these taxa to be conspecific.

Variability of specific characters (with the exception of microsculpture) is great enough, so the question arises whether some of the species may not be only marginal forms of one or several major species, among which continual transitions can

exist. To solve this question it will be necessary to study diverse material from the whole of Europe, including typical or new topotypical material of the classical species *T. conspicuus* and *T. serratus*.

DISTRIBUTION

According to the known published data, the genus *Tricheremaneus* is limited to south, west and central Europe (Fig. 9). *Tricheremaneus travei* n. sp. was found on the north-east boundary of known area of the genus. It is not possible to exclude, at least in some cases, that some known records may be conspecific with *T. travei*. The imperfect illustration in BALOGH (1943) suggests that his individuals had notogastral setae aligned in two lines, as it is in *T. travei*. It is possible also that RAFALSKI's citation from Poland (1966), where the author states that his species is different both from *T. serratus* and *T. conspicuus*, refers to *T. travei*.

In general all published records were made in mountains, in wet or dry moss growths, usually on rocky ground. TRAVÉ's, unpublished findings from Corsica, as with material of the species *T. nemossensis* from Albères (Pyrénées Orientales), indicate that the genus *Tricheremaneus* is to be found in near sea-level elevations with a mediterranean climate.

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