

A new species of springtails from Mexico, *Dicranorchesella*
occulta sp. n. and a redescription of *D. boneti* (Collembola;
Entomobryidae)

by

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Abstract: The new Mexican species *Dicranorchesella occulta* is described and a supplementary description of the type species *D. boneti* is presented. The validity of scale morphology and dental spination as taxonomic characters in this genus is discussed. The manubrial organ of males, previously known to occur only in the genus *Orchesella*, was found in *Dicranorchesella boneti*.

The genus *Dicranorchesella* Mari Mutt 1977 was erected for the Mexican species *D. boneti*. After that paper went into press more specimens became available and a revision of the type material revealed among the latter a new species. A continuing study of other genera of the tribe Orchesellini has made it necessary to study a series of characters not noted in the original description of *D. boneti*. For this reason I also include here a supplementary description of the latter species,

Dicranorchesella boneti Mari Mutt 1977: 381.

Habitus as in figures 1 & 2. Length excluding antennae and furcula up to 3.5 mm. Background color of head, body, and appendages light yellow to light brown. Distribution of light purple pigment as follows (see also Figs. 1 & 2). Antennae heavily pigmented throughout. Anterior portion of head with some pigment which projects downwards surrounding the mouth cone. Diffuse pigment present between eyes and antennal bases but not forming a distinct band. Coloration of thoracic and abdominal segments very variable. In some specimens only the limits of the segments bear pigment. Other individuals have some pigment

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diffused throughout each segment in which case the limits of the segments are very darkly colored. In some cases specimens are evenly blue. Legs pigmented throughout. Manubrium pigmented, at times proximal portion of dentes with some pigment. Collophore diffusely pigmented.

Head, body, and furcula clothed with setae and scales; the latter are absent from antennae, legs, and collophore. Fully developed scales are fusiform, similar in size, and conspicuously striated (Fig. 11). Scales which are not fully developed vary much in size and shape. It is possible to find in the same animal all intergrades between fully developed scales and ciliated setae (Mari Mutt 1977 p. 378, Fig. 3).

Antennae six-segmented due to subdivision of first two segments (Ants. 1 & 2). Antennae about half as long as head and body combined. Ants. 1 & 3 very well developed, especially the latter which is about half as long as Ant. 4. Ants. 5 & 6 subequal in length, annulated, their setae arranged in circular whorls. Ant. 6 apically without papillae or pin setae.

Eight eyes on each side of the head (Fig. 3), A & B largest, G & H smallest. The latter pair is poorly developed and very frequently appears to be absent.

Prelabral setae four, smooth. Labral chaetotaxy following formula 5,5,4; all setae smooth. Setae of second labral row unequal in length (Fig. 5). Labral papillae spine like (Fig. 6). Labial chaetotaxy as in figure 4. The top row (A-C) is always present and the setae are invariably smooth. The bottom row (1-9) is variable both in number of setae and as to whether these are smooth or ciliated. Second row of immature specimens may have as few as four setae. Setae 5 & 7 are always present and smooth. Differentiated seta of the outer labial papilla not reaching apex of its papilla (Fig. 7). Maxillary palp (Fig. 8) with a pair of setae. Venter of head with scales and smooth and ciliated setae.

Inner face of tibiotarsi with two rows of smooth setae amid numerous ciliated setae. Number of smooth setae per row varies with size of specimen and with particular pair of legs. Metathoracic legs of adult specimens generally with about 15 setae per row. Outer face of tibiotarsi with a single row of smooth setae, the numbers in which are very variable and at times only a single seta is present slightly above the tenent hair. A smooth seta is always present opposite the tenent hair of metathoracic legs. Structure of claws as in Mari Mutt 1977 p. 378, Fig. 2. Pretarsal seta present.

Fourth abdominal segment not over 1.5 times longer than third segment. Rami of tenaculum quadridentate, corpus with a median smooth seta.

Manubrial organ (Figs. 13 & 14) present upon dorsal median portion of manubrium in males. This discovery is of significance because the only other Collembola that possess this organ are males of the genus *Orchesella*. See Mari Mutt (1977) for a discussion of the relationship between the latter genus, *Dicranorchesella*, and *Dicranocentrus*. Dorsal portion of manubrium with numerous smooth erect setae, a pair of which is present upon dorsal proximal portion of dentes. Inner face of dentes with a single row of spines (Mari Mutt 1977 p. 378, Fig. 1). In some specimens the transition between these spines and large ciliated setae which continue down the dens is clearly visible (Fig. 9). Number of dental spines per row varies considerably, adult specimens range between 7-12 spines per row. Mucro with two teeth and a basal spine (Fig. 15).

Dorsal head and body macrochaetotaxy as in Mari Mutt 1977 p. 379, 380, Figs. 5d, 6d. For a diagnosis of this species see the discussion under *D. occulta*.

Material examined: 1) México, Hidalgo, Chapulhuacán, 3 km from town at km 339.800 on the road from Mexico City to Laredo, 910 m, April 15, 1942, very moist leaf litter and rotten wood in rain forest, F. Bonet, col. *Holotype* (♀), 20 paratypes, and 8 immatures. 2) As preceding but collected May 26, 1944, 3 paratypes and 5 immatures. 3) San Luis Potosi, Tamazunchale, March 15, 1948, debris from banana plantation, C. H. Seevers, col. 1 paratype. 4) San Luis Potosi, north of Huichiguayán, November 22, 1975, leaf litter in high jungle, J. G. Palacios Vargas, col. 3 specimens.

Repository of specimens: Illinois Natural History Survey has holotype, 14 paratypes, and all immatures from locality no. 1 and all material from localities 2 & 3. F. Bonet collection (Instituto Mexicano del Petróleo, Mexico 14, D.F.) has five paratypes from locality no. 1. Field Museum of Natural History (Chicago, Illinois, U.S.A.) has a paratype from locality no. 1. The specimens from locality no. 4 are in the collection of Dr. José G. Palacios Vargas (Prol. Moctezuma 100B, Col. Romero de Terreros, México 21, D.F.).

Dicranorchesella occulta sp. n.

This species is in most respects similar to *D. boneti*. Below I detail aspects in which both species differ.

Length excluding antennae and furcula up to 3.0 mm. Ants. 5 & 6 missing in specimens at hand. Fully developed scales (Fig. 12) more rounded, not as fusi-form as in *boneti* (Fig. 11). Dentes each with a double row of spines (Figs. 10 & 16), one row is evidently homologous with single row present in *boneti*, second row composed of much shorter spines. All specimens females and received mounted on slides so chaetotaxic pattern could not be worked out.

Diagnosis and discussion: Both species under discussion are very closely related but may be separated by the shape of fully developed scales and by the presence of a second row of dental spines in *occulta*.

It may be argued that scale morphology is not a reliable character for the separation of species given the variability of scale shape in a single specimen (Mari Mutt 1977). If one considers any and all of the scales present upon the animal, the difference with respect to this character between both species breaks down. However, if we restrict ourselves to fully developed scales of adult specimens, the difference between both species is quite evident. The largest fully developed scales are to be found on the dorsum of body segments.

With respect to the number of dental spines as a specific character, it may be argued that this is a variable character as evidenced by other Collembolan species with dental spines. In the case of *Dicranorchesella boneti*, none of the 32 specimens, either males or females, have the second row of dental spines which is present in *occulta*. The distinction between both species holds true for medium sized and older immatures in addition to adults. Very small immatures (first instar?) lack scales and dental spines. *D. boneti* and *occulta* are yet to be found sympatrically.

Material examined and repository. 1) México, Veracruz, Fortín, along road from Fortín to Córdoba, 900 m, January 15, 1942, coffee and plantain leaf litter, F. Bonet, col. *Holotype* (♀) and 5 paratypes. 2) Veracruz, Coscomatepec de Bravo, October 12, 1943, leaf litter, M. Cárdenas, col. 1 immature. All specimens are deposited in the Illinois Natural History Survey.

ACKNOWLEDGEMENTS

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RESUMEN

Se describe la nueva especie mexicana *Dicranorchesella occulta* y se incluye una descripción suplementaria de la especie tipo *D. boneti*. Se discute la validez de la morfología de escamas y del arreglo de las espinas dentales como caracteres taxonómicos en este género. El órgano manubrial, previamente conocido solamente en ejemplares machos del género *Orchesella* fue encontrado en machos de *Dicranorchesella boneti*.

LITERATURE CITED

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1977. *Dicranorchesella*, a new genus of springtails from Mexico (Collembola: Entomobryidae). *Proc. Ent. Soc. Wash.*, 79(3): 377-382.

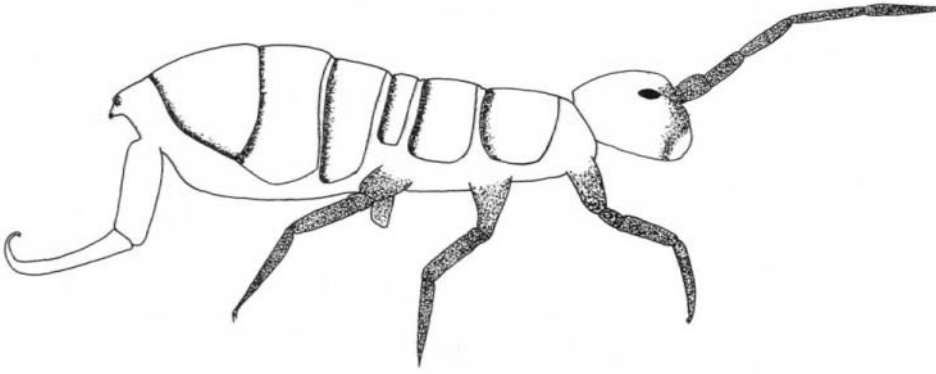
All figures *Dicranorchesella boneti* except as noted

Figs. 1 & 2. Habitus and pigmentation extremes.

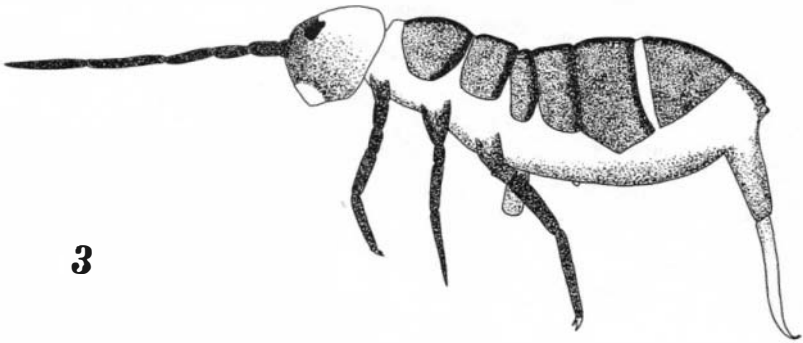
Fig. 3. Left eye patch.

Fig. 4. Chaetotaxy of base of labium.

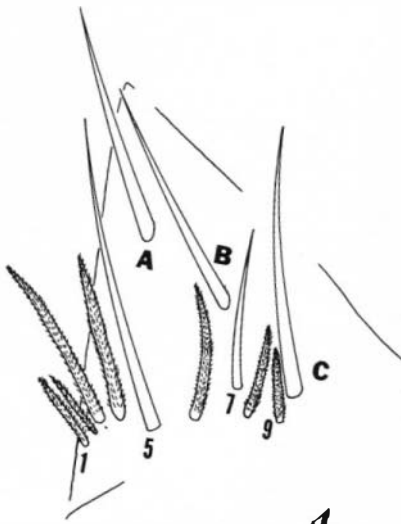
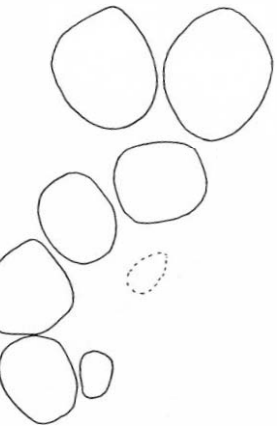
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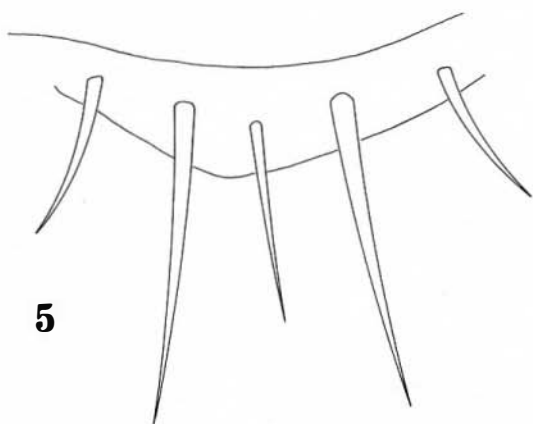
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- Fig. 5.** Second row of labral setae.
- Fig. 6a.** Lateral view of one labral papilla.
- Fig. 6b.** Dorsal view of the four labral papillae.
- Fig. 7.** Outer labial papilla and its differentiated seta.
- Fig. 8.** Left maxillary palp.
- Fig. 9.** Intergradation of smooth spines and ciliated setae on inner face of dentes.
- Fig. 10.** *Dicranorchesella occulta*- Dental spination.



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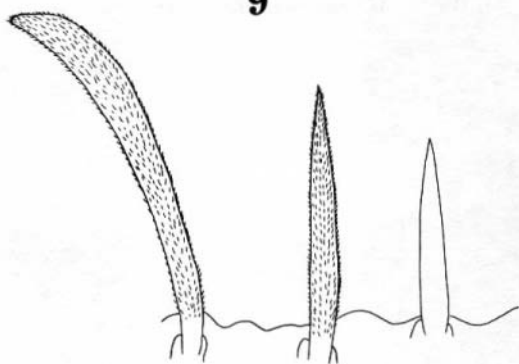
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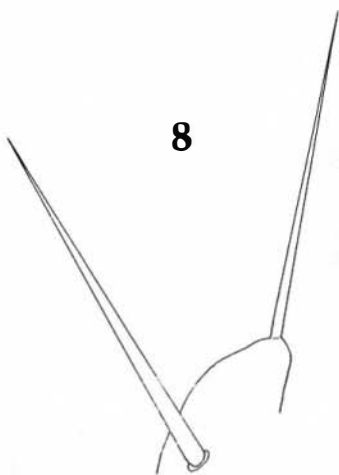
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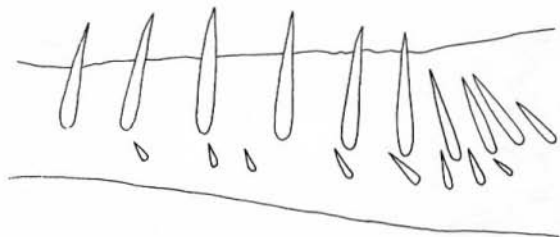
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Discussion: Smith (1951) and Moravec (1954) emphasize the fact that in this species the exoperidium is retained until maturity, giving the fructification an acorn-like appearance. In all Florida specimens examined, with the exception of collection FLAS 10378, the exoperidium is represented in mature specimens only by a small disc opposite the mouth.

According to Coker and Couch (1928), this is also the situation in Denver and South Carolina collections of this species.

Both Coker and Couch (1928) and Smith (1951) use the name *Disciseda subterranea* (Peck) Coker and Couch for this species, but as Moravec (1954) points out, the correct combination is *D. bovista* (Kl.) Henn. He also mentions that it should not be confused with *Disciseda cervina* (Berk.) Hollós, as Cunningham (1944) erroneously does.

Calvatia Fries

Fructifications medium to very large, globose, depressed or pyriform, with or without a thick stalk-like base; exoperidium a thin membranous layer or a very thick layer, becoming rimose; endoperidium usually thin, fragile, at or after maturity breaking up into fragments and gradually falling away; sterile base with upper surface concave or convex above, long-persistent, sometimes poorly developed or absent; capillitium attached to inner peridium or diaphragm or sterile base, of long, much branched threads, which at maturity in most species break into fragments; spores globose to subglobose, small, smooth to punctate, verruculose or echinulate, rarely reticulate (Zeller and Smith, 1964).

The oldest valid name for this genus is *Langermannia* Rostk., but since it has never been in general use, Perdeck (1950) proposed to consider *Calvatia* a *nomen conservandum*. Afterwards, Kreisel (1962) proposed the rejected name *Langermannia* as a synonym for both *Lanopila* Fries and *Lasiosphaera* Reichardt.

Calvatia is distinguished from *Lycoperdon*, with which it intergrades, by the manner in which the thin endoperidium dehisces to expose the gleba. In *Lycoperdon* this inner wall is less fragile and the spores are liberated through an apical pore or slit.

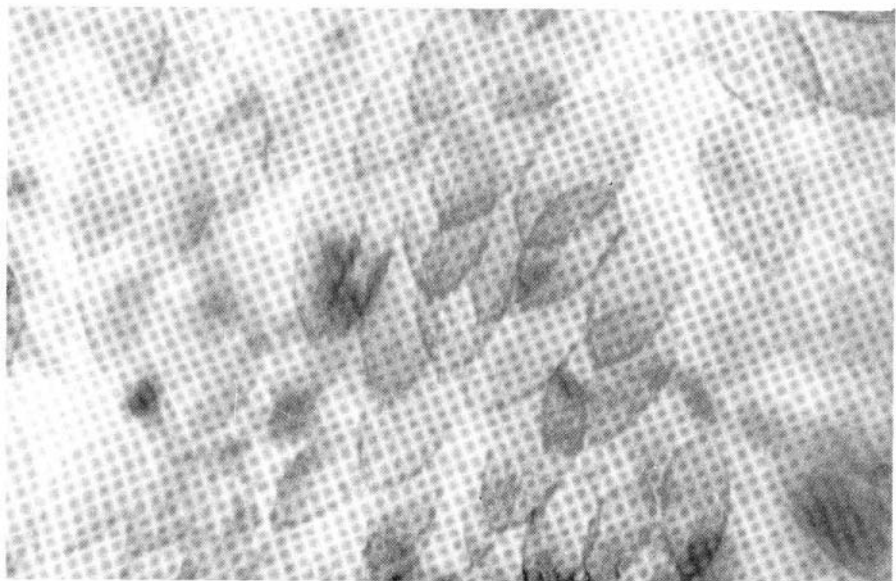
Only one species has been collected in Florida, *Calvatia cyathiformis* (Bosc.) Morgan f. *cyathiformis* Zeller & Smith.

Calvatia cyathiformis (Bosc.) Morgan f. *cyathiformis* Zeller & Smith (Figs. 7 and 8)

Basidiocarps up to 13 cm diameter and 13 cm high, globose to turbinate or subpyriform, tapering abruptly into a large, well-developed, thick, stout rooting base, often sulcate to deeply wrinkled from the base upward to the broadest dimension; exoperidium smooth or floccose, slightly scaly, very thin and fragile, the upper part often craking into broad, flat areas, white, becoming pale brownish, often purplish from the spores; endoperidium thin and delicate, deep brownish drab or gray brown to dusky drab (R), at maturity scaling away with the exoperidium gradually from the apex to expose the gleba; sterile base chambered, remaining intact as a persistent dark cup-like structure; gleba at first white, then changing



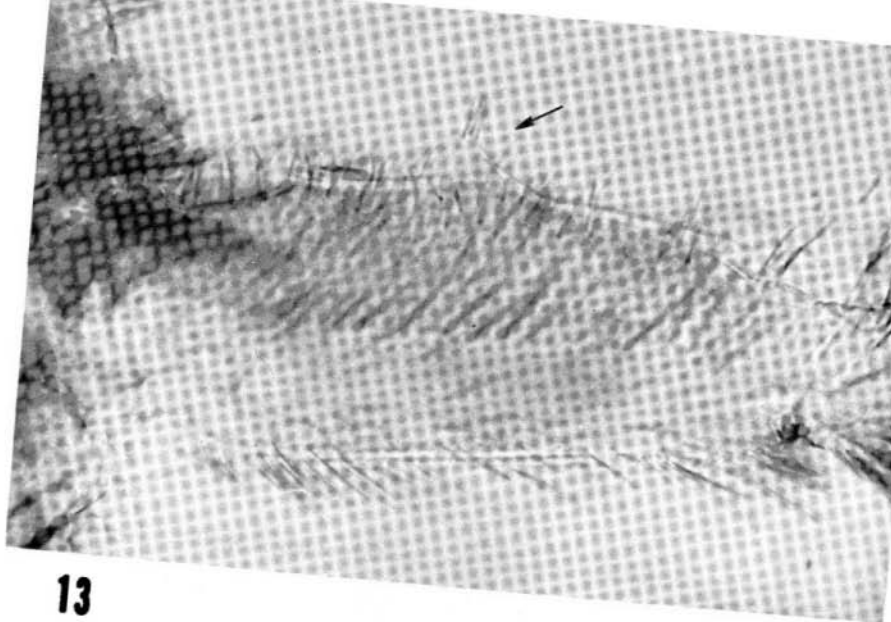
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Fig. 13. Manubrium of male in lateral view showing the position of the manubrial organ (arrow), 230x.

Fig. 14. Detail of the manubrial organ, 470x.



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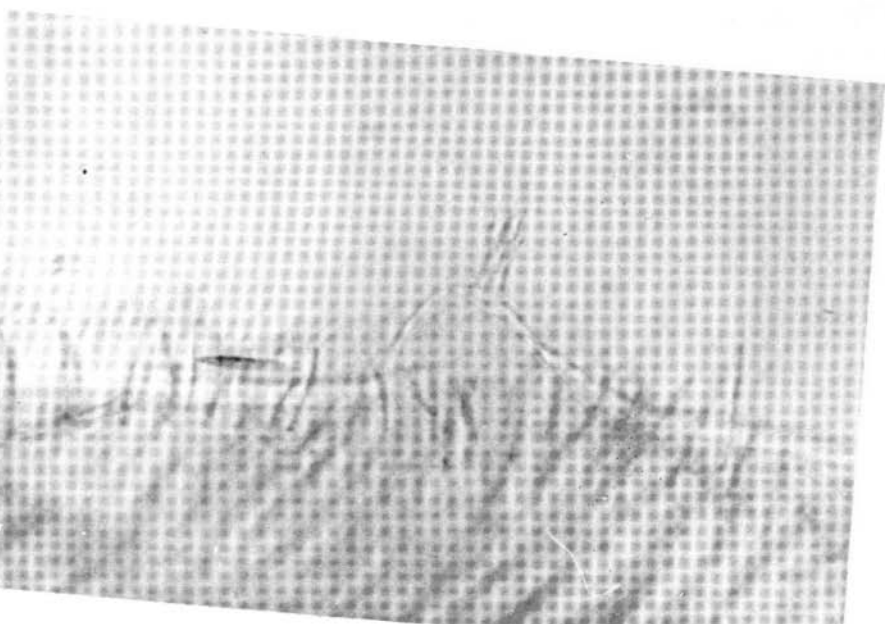
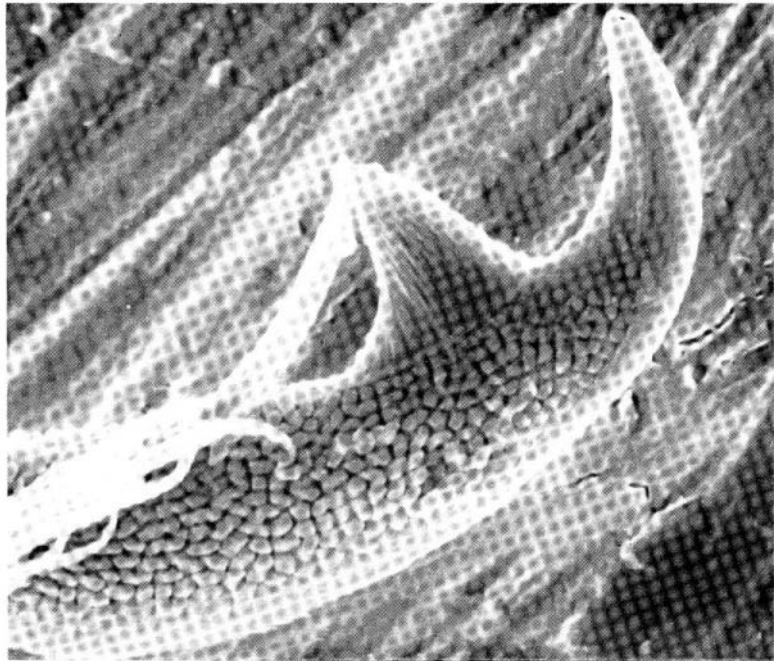


Fig. 15. Scanning electron micrograph showing structure of mucro, 4,600x.

Fig. 16. *Dicranorchesella occulta*- Dental spination; asterisks (*) denote some of the spines forming the inner row, 440x.



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