

SCANNING ELECTRON MICROSCOPY OF DEMODEX BREVIS (FOLLICULORUM)

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Abstract. Scanning electron micrographs of *Demodex brevis* (*folliculorum*) illustrating the superficial details of the common but usually poorly known partner of man are presented, with comments on anatomical details.

Key words: Electron microscopy; Scanning; Mites; *Demodex folliculorum*

Scanning electron microscopy has lately been used to illustrate the microdetails of some human ectoparasites, for example crab louse (4) and scabies mite (3, 4, 6). *Demodex folliculorum* is usually considered to be a normal inhabitant of the human skin, but there is another opinion, that in some cases it may be connected with Acne rosacea-like conditions and possibly also with some types of blepharitis (*Blepharitis acarica*) (5).

The subject was reviewed by Grosshans et al. in 1974 (2), who also suggested, furthermore, that the granulomatous types of Acne rosacea are caused by the Demodex mites acting possibly as antigens. Desch & Nutting (1) have described nicely the two types of the human Demodex mite, *Demodex folliculorum* and *Demodex brevis*. The latter species is the one presented in the present study.

METHODS

Sebum samples containing mites were collected by squeezing a nose affected with some seborrheic dermatitis. The sebum was then spread on a glass slide and the mites picked up with an injection needle under low power microscopy and transferred to a round, glass cover slip. The first washing was done with methanol to remove the excess of sebum and cellular debris. Formaldehyde-ethanol solution was used for fixation, and acetone for dehydration.

The specimens were vacuum-coated with a 10-20 nm

thick layer of carbon and a 30-40 nm layer of gold after being mounted on stubs with silver, conductive paint. To allow evaporation of carbon and gold from all angles, the specimens were rotated and tilted during the evaporation (Jeol JEE 4 B Evaporation unit).

The specimens were examined in a Jeol JSM 35 scanning microscope at 15 kV with the specimens tilted between 0° and 45°.

RESULTS

The removal of the sebum and cellular debris was found to be rather difficult, many of the mites collected being lost during the washing or fixing. The results of the cleaning procedures could not be checked adequately under the light microscope. Two of the mites collected, originally numbering about 20, were used for microphotography, one for the details of the ventral parts and the other for the dorsal parts. Both mites were female. Fig. 1 shows the ventral aspect of a female mite, the main parts are clearly visible: The gnathosoma consists of the mouth parts (Fig. 4). The podosoma, formed by propodosoma and metapodosoma, contains the extremities. Together the gnathosoma and podosoma constitute the prosoma (Figs. 2 and 3). The long, striated posterior part is called the opisthosoma. Fig. 2 shows the relationship of the gnathosoma, podosoma, legs with their epimeral plates meeting in the midline and tarsal claws (Fig. 6), and vulva behind the epimeral plates (Fig. 5). The dorsal surface of the prosoma is shown in Fig. 3; no podosomal tubercles are seen. Fig. 4 illustrates a part of the gnathosomal structures. The micrograph does not reveal all the details equally well, however. The pedipalps are dislocated laterally from the position usually seen in living mites, and the details of chelicerae and hypostomal structures are obscure. In

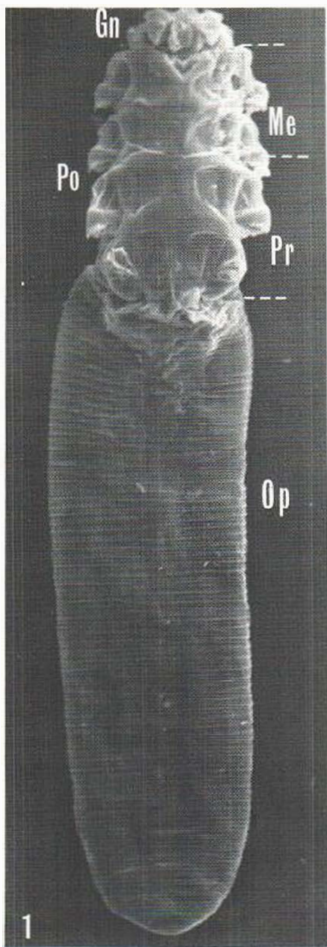


Fig. 1. Ventral surface of a female *Demodex brevis*. Magnification ca. $\times 180$.

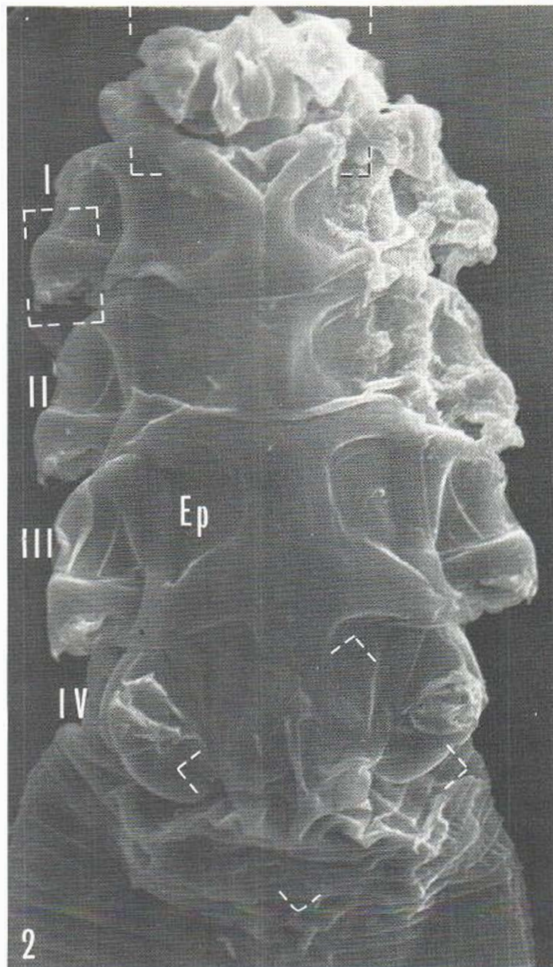


Fig. 2. Ventral side of the prosoma. The squares indicate Figs. 4, 5, 6. Magnification ca. $\times 480$.

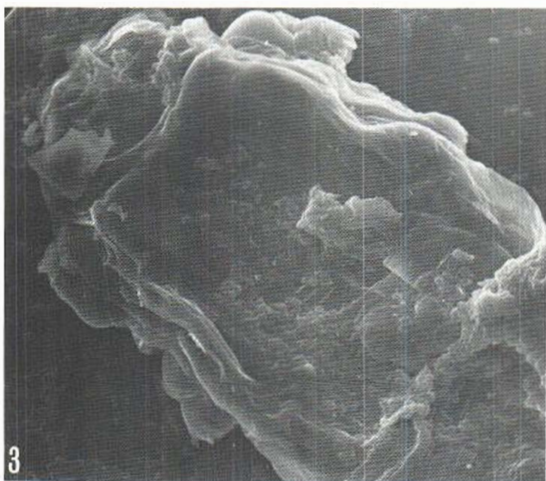


Fig. 3. Dorsal side of the prosoma of a female *Demodex brevis*. Magnification ca. $\times 570$.

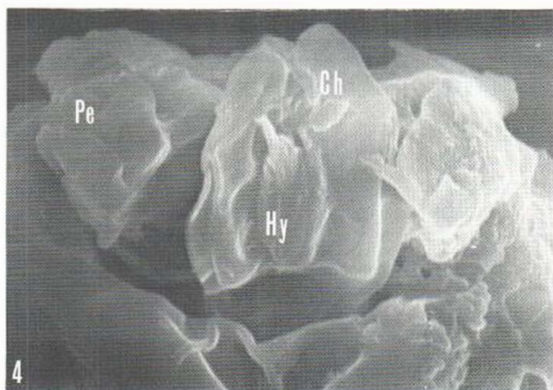


Fig. 4. Ventral side of the gnathosoma.

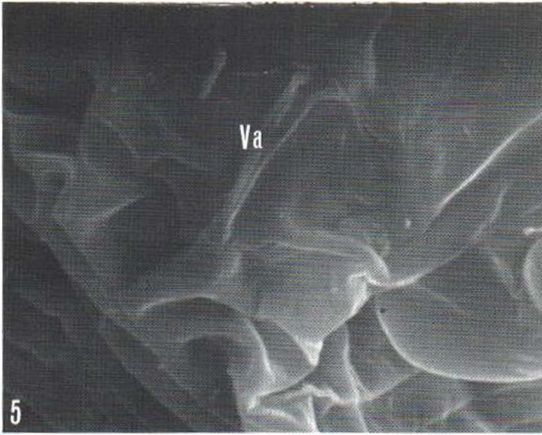


Fig. 5. The genital region of a female *Demodex brevis*. Magnification ca. $\times 1600$.



Fig. 6. Distal parts of the leg I. Magnification ca. $\times 8000$.

Fig. 6 the distal part and the claws of the leg I are from the right side.

Typical of the *Demodex* mites is the lack of hair, which is so abundant in many other acari.

Abbreviations of the anatomical structures shown in the photographs: I-IV=legs, Ch=chelicerae, Cl=claws, EP=epimeral plate III, Gn=gnathosoma, Hy=hypostoma, Me=metapodosoma, Op=opisthosoma, Pe=pedipalps, Po=podosoma, Pr=propodosoma, Ta=tarsus, Va=vagina.

REFERENCES

1. Desch, C. & Nutting, W. B.: *Demodex folliculorum* (Simon) and *D. brevis* Akbulatova of man: redescription and reevaluation. *J Parasitol* 58: 169, 1972.
2. Grosshans, E. M., Kramer, M. & Maleville, J.: *De-*

- modex folliculorum und die Histogenese der Granulomatösen Rosacea. *Hautarzt* 25: 166, 1974.
3. Juhlin, L., Brunk, U. & Fredriksson, B. A.: Scanning electron microscopy of *Acarus scabiei*. *Acta Dermatovener (Stockholm)* 55: 35, 1975.
4. Marchescu, S. & Wolff, H. H.: Untersuchungsverfahren in Dermatologie und Venereologie. 170 pp. J. F. Bergmann-Verlag, München, 1975.
5. Post, C. F. & Juhlin, E.: *Demodex folliculorum* and blepharitis. *Arch Dermatol* 88: 298, 1963.
6. Rower, J. M.: Scabies: scanning electron photomicrograph. *Arch Dermatol* 111: 1535, 1975.

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