

SCANNING ELECTRON MICROSCOPY OF ACARUS SCABIEI

Lennart Juhlin, Ulf Brunk and Bengt Arne Fredriksson

From the Departments of Dermatology and Pathology, Uppsala University, Uppsala Sweden

Abstract. Details in the anatomy of *Sarcoptes scabiei* var. *hominis* are described. Scanning electron microscopy is of help in illustrating this parasite which is commonly seen in clinical practice. The technique also provides the possibility to differentiate between various types of mite.

Key words: Electron microscopy; Scanning; *Acarus scabies*; Scabies

The anatomy of *acarus scabiei* (itch mite) has been carefully studied by Heilesen, who also reviewed the slightly conflicting literature (1). The drawings then made have here been compared with scanning electron micrographs (SEM).

Technique. Skin with burrows was removed with a knife and individual mites were taken out with a needle. The specimens were rapidly transferred to a chilled solution (4°C) of 2% glutaraldehyde on 0.1 M Na-cacodylate-HCl with 0.1 M sucrose (pH 7.4, ~ 500 mOsm) for one week. They were then dehydrated in graded ethanols and brought to acetone and subsequently critical-point dried using a Polaron E 3000 apparatus. After mounting on stubs with silver conductive paint, the specimens were vacuum-coated with a 100-200 Å thick layer of carbon and a 200-400 Å layer of gold. During the evaporation, in an Edward E12 E2 Evaporation unit, the specimens were rotated and tilted by means of a home-made, motor-driven apparatus to allow evaporation of carbon and gold from all angles.

The specimens were examined in a Jcol JSM-SI scanning microscope at 4 kV with the specimens tilted between 0° and 90°.

RESULTS

Fig. 1 shows a mite coming out of the skin. Its back is hidden by corneal cells. The forelegs and head are stretching out. The fifth joint on the forelegs bears the Ambulacrum (Figs. 1 and 4) which consists of a stem and a disc (3, 4).¹ They help the mite to hold on to the surface while walking.

A dorsal view of the anterior part can be seen in

Fig. 3. The plastron in the centre (17) behind the head is not pitted, thus indicating a young female. Figs. 2 and 5 show the posterior part with several dorsal spines. Above the anus is the copulatory papilla (24) which opens upwards and from which the copulatory duct goes under the skin to the receptaculum seminis. The spermatozoa then pass to the ovaries and the fertilized egg passes to the vagina and birth opening on the ventral side. The ventral side has a gliding-like plate between the epimers of the forelegs. On the lip, the right hair has been broken off but the left is clearly seen in Fig. 4 (11), as are the legs (5, 6). A detail of the head with cheeks and jaws and antennas is seen in Fig. 6.

REFERENCES

1. Heilesen, B.: Studies on *Acarus scabiei* and scabies. Acta Dermatovener (Stockholm) 26: Suppl. 15, 1946.

Received May 14, 1974

L. Juhlin, M.D.
Department of Dermatology
University Hospital
S-750 14 Uppsala
Sweden

¹ Anatomical structures given according to numbers shown in photographs: 1, epimere of medial foreleg; 2, margin of camerostome; 3, ambulacral disc; 4, ambulacral stem; 5, right lateral foreleg; 6, right medial foreleg; 7, mouth; 8, hair on the tip of the pulp; 9, hair on dorsal aspect of the pulp; 10, cheeks; 11, hair on lip; 12, epimers of the lateral foreleg; 13, long dorsal bristle; 14, left medial foreleg; 15, left lateral foreleg; 16, normal skin; 17, plastron. 18, squamous dorsal thorns; 19, nuchal thorns; 20, dorsal spines; 21, thorn on the cheek; 22, left jaw; 23, anus; 24, copulatory papilla; 25, anal bristles; 26, long bristles of hindleg; 27, tongue.

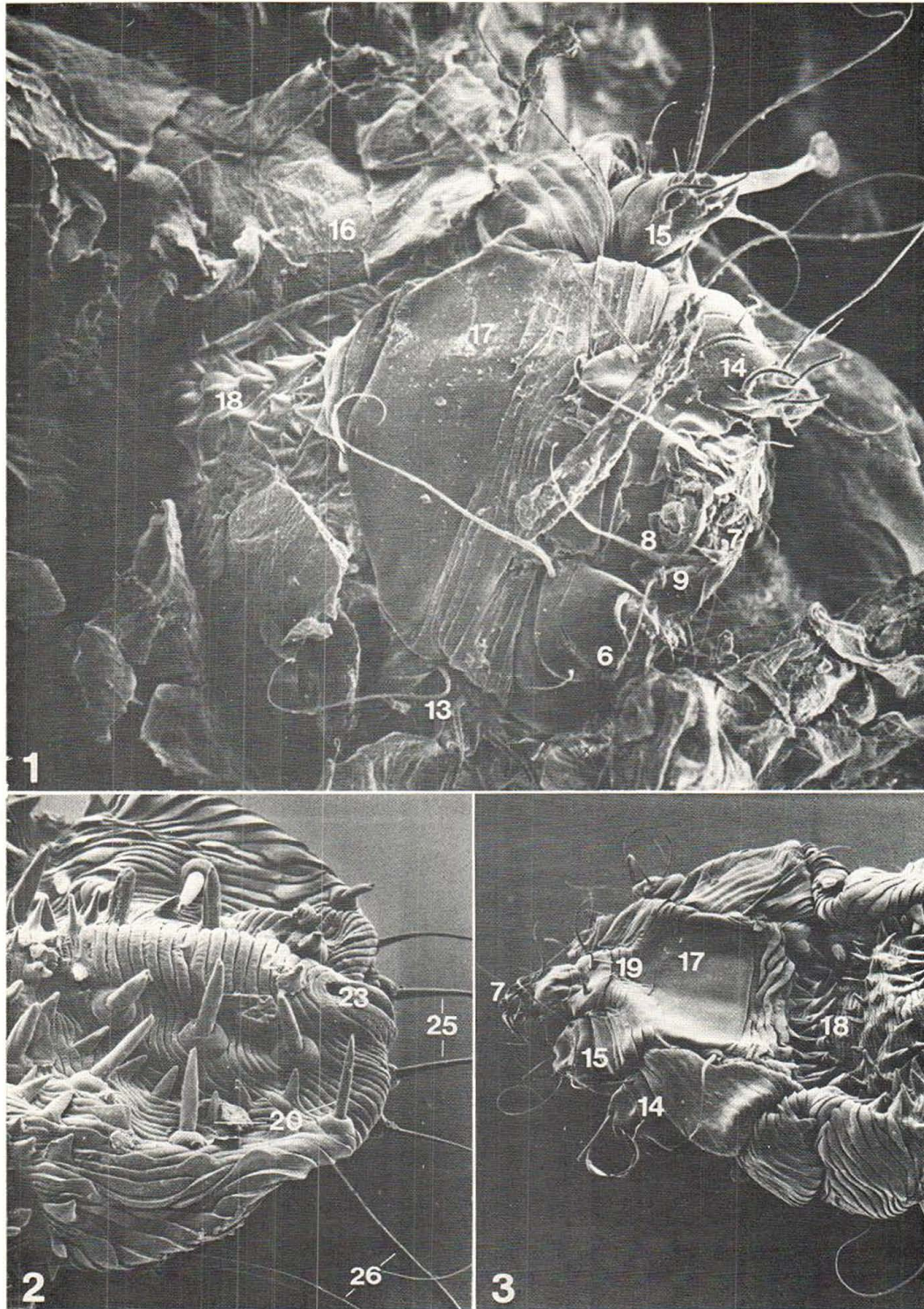


Fig. 1. Itch mite in situ in the skin. Dorsal view. Magnification about $\times 500$. The specimen is tilted 40° towards the detector.

Fig. 2. Dorsal aspect of the posterior part of the mite. Magnification about $\times 500$ and tilted 45° .

Fig. 3. Dorsal aspect of the anterior part. Magnification about $\times 250$ and tilted 30° .

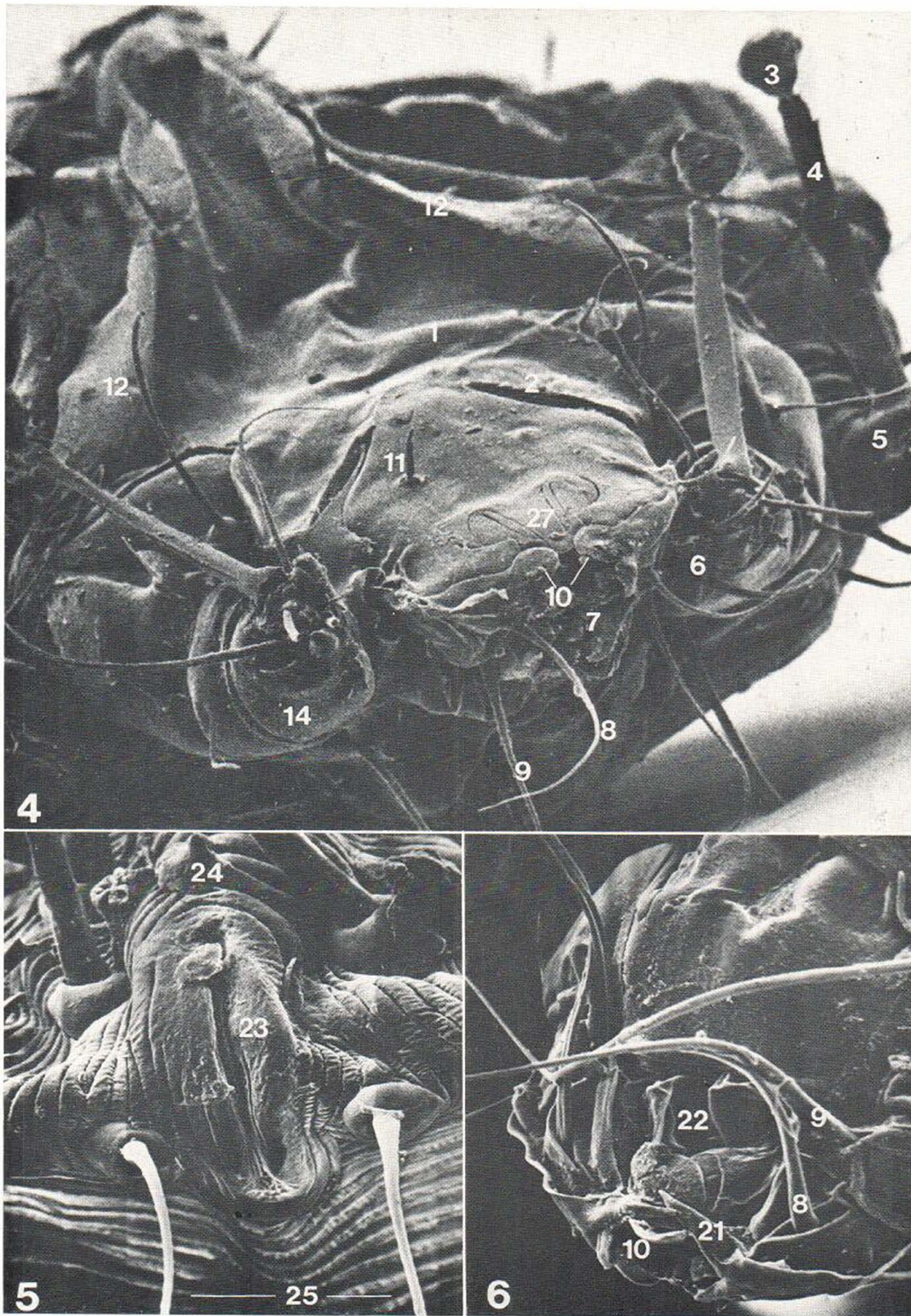


Fig. 4. Ventral side of the itch mite. Frontal view. Magnification about $\times 900$ with specimen tilted 90° towards the detector.

Fig. 5. Details from the posterior ventral part. Magnification about $\times 1\,200$ and tilted 90° .

Fig. 6. Details from the anterior ventral part. Magnification about $\times 1\,700$ and tilted 90° .