

## *Echiniscus rackae* sp. n., a New Species of Tardigrada from the Himalayas

HIERONIM DASTYCH

(With 9 figures)

### Abstract

From mosses and lichens collected in the Annapurna Range (Nepal) a new species of Heterotardigrada belonging to the genus *Echiniscus* (SCHULTZE) is described.

*Echiniscus rackae* sp. n.

(Figs. 1-9)

Description. The body and eye spots red, the body is 220-258 (225)<sup>1)</sup>  $\mu\text{m}$  long. Dorsal plates, including third median one, well developed (Figs. 1, 9), ventral plates absent. Terminal plate with long incisions.

Dorsum covered with small, roundish thickenings (1-2  $\mu\text{m}$  in diameter) linked by delicate, longitudinal striae (crests) which form a characteristic network pattern (Figs. 1-3, 8, 9). The network is composed of variable polygonal meshes, arranged rather irregularly. Where the striae join together, small roundish dots are present. The meshes are largest on shoulder and terminal plate, up to 8  $\mu\text{m}$  in size; on other plates they are usually smaller (3-5  $\mu\text{m}$ ). The network is poorly developed or is absent on the head plate, the sides of the body and particularly along plate edges. Here its place is taken by granulation. Small granules occur also at incisions of the terminal plate.

Apart from the head appendages, only the lateral appendages A are developed. Cirrus internus is 16-24 (24)  $\mu\text{m}$  long, the cirrus externus 26-42 (42)  $\mu\text{m}$ . The papilla cephalica is 6.5-9.0 (8.0)  $\mu\text{m}$  long, its base which lies very close to cirrus externus (Fig. 4) is 4.5-8.5 (5.9)  $\mu\text{m}$  wide. The appendages A are 90-120 (110 and 105)  $\mu\text{m}$  long, which is 35-50 % of the body length. The clava is small, 5.0-6.5 (6.0)  $\mu\text{m}$  long and 4.5-5.0  $\mu\text{m}$  wide. The first pair of legs carries a small spine (5  $\mu\text{m}$  long), the last pair a small papilla (4  $\mu\text{m}$ ). Outer claws are smooth, the inner ones having a spine which is bent downwards (Fig. 5). In one specimen there was

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1) Holotype measurements in brackets.

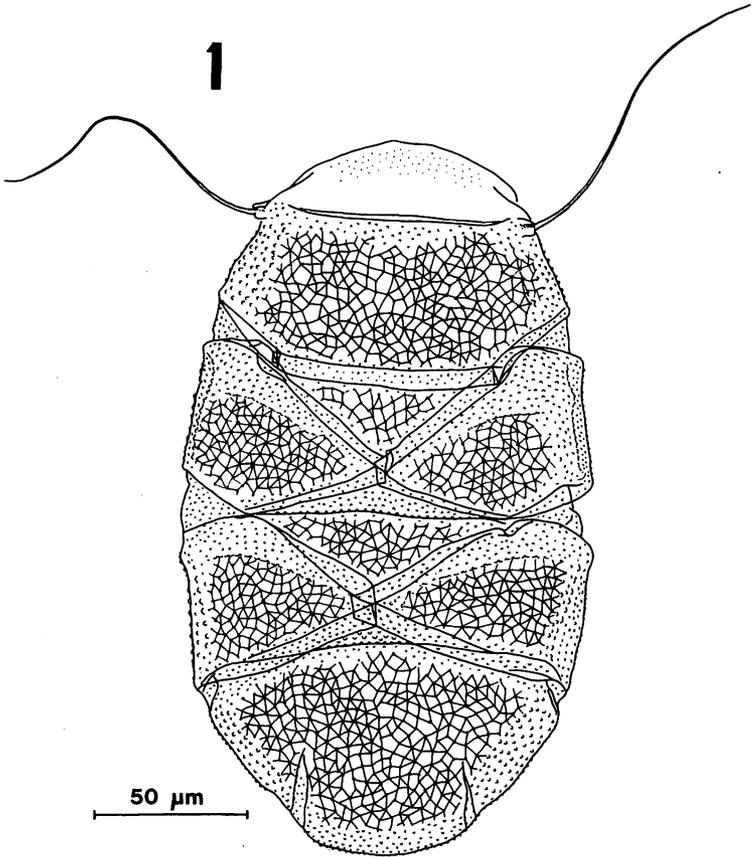
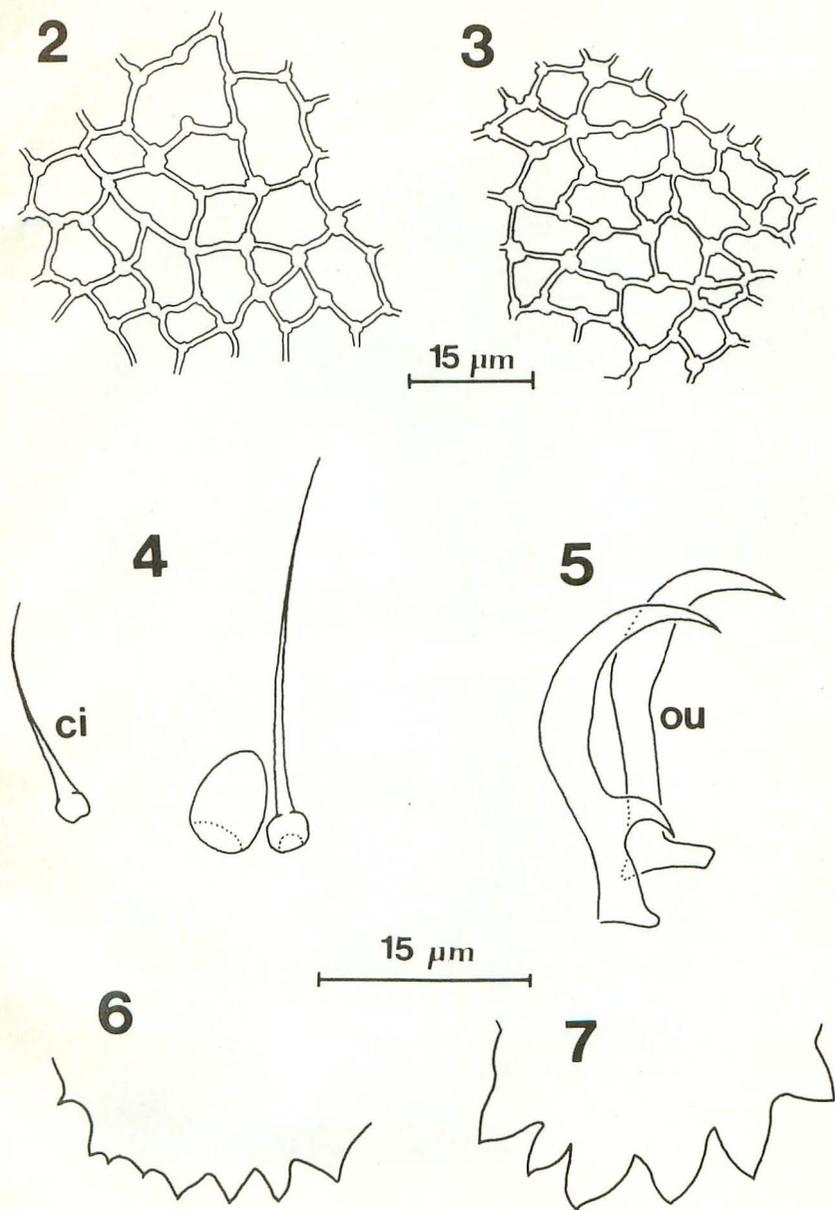
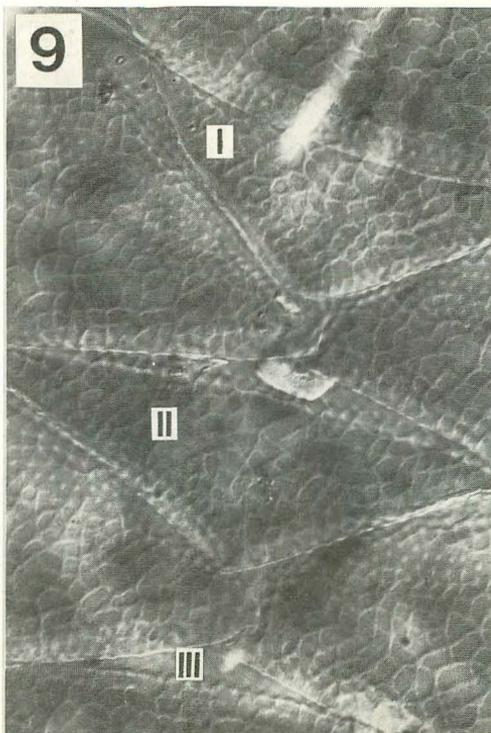
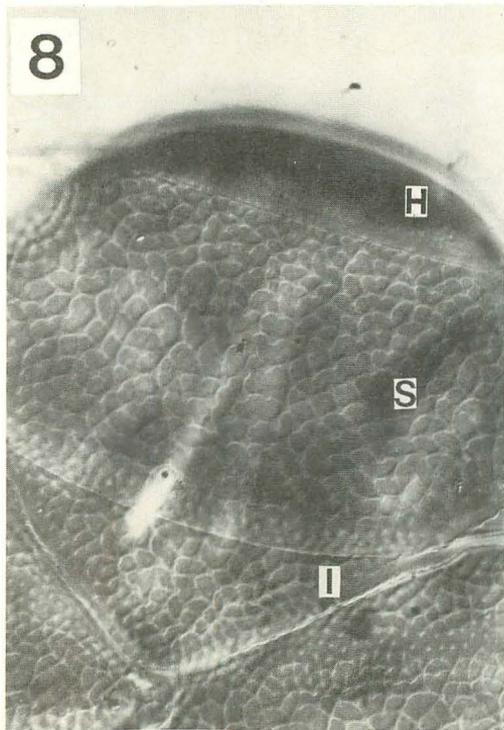


Fig. 1: *Echiniscus rackae* sp. n.: dorsal view (drawn from the holotype).



Figs. 2-7: *Echiniscus rackae* sp. n.: 2 and 3 = network pattern on terminal (3) and shoulder (2) plate; 4 = head appendages (ci-cirrus internus); 5 = inner and outer (ou) claw of the IVth pair of leg; 6, 7 = spine fringe (drawn from paratypes).



Figs. 8, 9: *Echiniscus rackae* sp. n.: 8 = front of the body, dorsal view (H = head plate; S = shoulder plate; I = 1st median plate); 9 = dorsal plates (I-III: median plates) (paratype, Nomarski contrast. Phot. Prof. Dr. H. SCHLIEMANN).

RICHTERS, 1903 and *E. reticulatus* MURRAY, 1905, respectively.

Etymology. I take great pleasure in dedicating this species in honour of Dr. GISELA RACK, of Zoological Institute and Zoological Museum of the University of Hamburg.

Type repositories. Holotype and paratype deposited in the Zoological Museum of the University of Hamburg. One paratype in the collection of the National Museum of Natural History, Smithsonian Institution, Washington (USNM 99541), an other in the Zoological Museum at the University of Copenhagen. The remaining paratypes are in the collection of the author.

### Zusammenfassung

Es wird eine neue *Echiniscus*-Art (Heterotardigrada) aus Moos- und Flechtenproben vom Annapurna-Massiv (Nepal) beschrieben. Die neue Art gehört in den *arctomys*-Komplex und steht den Arten *E. elegans* RICHTERS, 1906 und *E. reticulatus* MURRAY, 1905 am nächsten.

### Acknowledgements

I am very indebted to Doz. Dr. GERD ALBERTI of the Zoological Institute of the University Heidelberg for the hospitality and kind provision of laboratory space and facilities, and to Prof. Dr. HARALD SCHLIEMANN, Zoological Institute of the University of Hamburg for the micrographs.

### References

- RICHTERS, F., 1906: Zwei neue *Echiniscus*-Arten. - Zool.Anz., 31: 197-202, Leipzig.
- MORIKAWA, K., 1951: Notes on four interesting *Echiniscus* (Tardigrada) from Japan. - Ann. Zool.Jap., 24: 108-110, Tokyo.

Anschrift des Verfassers:

Dr. HIERONIM DASTYCH, Kruppenackerstr. 8, D-7300 Esslingen.

also a small spine directed upward at the base of outer claw. The length of the claws of the IVth pair of legs is 16-27 (27)  $\mu\text{m}$ . The spine fringe is well developed and has 5-9 (5 and 6) teeth which vary in size and shape (Figs. 6, 7).

Locus typicus. Central Nepal, the Annapurna Sanctuary, the Annapurna South Face Base Camp. Scree at Raski Mt, near Hiunchuli Mt, N slope. Shaded and wet mosses between non-calciferous stones (holotype) and from stones with slight alkaline reaction (paratype); 4450 m above sea-level. Other localities: 1. Annapurna South Face Base Camp, meadow on E slope of Raski Mt. Mosses from non-calciferous stones, 4150 and 4100 m above sea-level (2 paratypes). 2. As above, lateral moraine of Raski Mt and Hiunchuli Mt, mosses and lichens from calciferous stones, 4000 m above sea-level (3 paratypes). All specimens (??) collected by author on September 8th, 1981.

### Discussion

*Echiniscus rackae* sp. n. belongs to the group of species known as the *arctomys*-complex which has generated considerable taxonomical confusion. This group which is represented by 45 species constitutes one-fourth of all known taxa of the genus *Echiniscus*, the richest genus in the phylum Tardigrada.

The new species bears the greatest resemblance to the two species, *Echiniscus elegans* RICHTERS, 1906 and *Echiniscus reticulatus* MURRAY, 1905 of the *arctomys*-complex. The former taxon was described by RICHTERS (1906) from one specimen collected at Nagasaki and was found again by MORIKAWA (1951). However, in spite of an incomplete description of the species, MORIKAWA did not supplement it. The available characters (RICHTERS 1906) and drawing (MORIKAWA 1951: Fig. 2A) suggest an affiliation of this taxon with the genus *Pseudoechiniscus* THULIN.

*Echiniscus elegans* RICHTERS differs distinctly from *E. rackae* sp. n. in the lack of the spine fringe, different shape of ornamentation and the presence of black (?) eyes (RICHTERS 1906: Fig. 2, 3).

*Echiniscus reticulatus* MURRAY has a differently developed dorsal network pattern which is composed of large, regularly distributed, roundish and flat-convex thickenings of 5-7  $\mu\text{m}$  diameter, not linked by longitudinal striae as in *E. rackae* sp. n. Another important difference between the two species is the very fine granulation (about 0.2  $\mu\text{m}$  diameter) present in the cuticle of *E. reticulatus*, but absent from *E. rackae* sp. n. It is useful to note that both species have a very similar arrangement of papilla cephalica, i.e. the papilla is placed very close to the cirrus externus, an arrangement not observed among other species of the *arctomys*-complex studied (*E. wendti* RICHTERS, *E. capillatus* RAMAZZOTTI, *E. bigranulatus* RICHTERS, *E. pseudowendti* DASTYCH, *E. jenningsi* DASTYCH, *E. maucci* RAMAZZOTTI, *E. bisculptus* MAUCCI, *E. viridis* MURRAY, *E. per-viridis* RAMAZZOTTI). This applies also to *E. szaboi* IHAROS, 1973 and *E. mihelcici* IHAROS, 1973<sup>2)</sup>, which have proved to be synonyms of *E. wendti*

<sup>2)</sup> The type-material of these two species was kindly lent by Dr. S. MAHUNKA, the Hungarian Natural History Museum in Budapest.