

Korotnevella diskophora n.sp. (Gymnamoebia, Paramoebidae) - small freshwater amoeba with peculiar scales

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Summary

A new freshwater amoeba species, *Korotnevella diskophora*, is described. This species is the smallest representative of the genus; it had most probably been already noted by researchers (as an unidentified isolate) due to its peculiar, disk-shaped scales. All known freshwater scale-bearing amoebae differ in the scale structure, while marine species have similar scales.

Key words: amoebae, Lobosea, Gymnamoebia, morphology, systematics, scales

Introduction

The genus *Korotnevella* (Schaeffer, 1926) Goodkov, 1988, formerly known as "*Dactylamoeba* Korotneff, 1880" (Page, 1982; 1988; 1991) and renamed in 1988 (Goodkov, 1988; Smirnov, 1996), includes scale-bearing gymnamoebae without a parasome. Two freshwater and one marine species are known within this genus (Page, 1991; Smirnov, 1996), and it is highly probable that more species exist and even had been observed by researchers (Bovee, 1953; Pennick & Goodfellow, 1975; Page, 1983), but remain undescribed or had not been studied electron-microscopically. It was noted (Smirnov, 1996) that in two known marine species of scale-bearing amoebae (*Korotnevella nivo* and *Paramoeba eilhardi*), the structure of scales is similar, while the two known freshwater species (*Korotnevella stella* and *K. bulla*) have different scales. One more freshwater species reported here also have a peculiar scale structure.

Samples of the bottom sediments containing amoebae were collected from freshwater lake Leshevoe (Valamo Island, the Lake Ladoga, North-Western Russia) at a depth of 0.5 m. Amoebae were cloned and supported on NN agar (Page, 1988), with the overlay of PJ (Prescott & James, 1955) mineral medium. For EM study amoebae were fixed using three different fixation procedures, described earlier in detail (Smirnov & Goodkov, 1997).

Results and discussion

The amoeba is of dactylopodial morphotype (definition in: Smirnov & Goodkov, 1999) and in locomotion (Figs. 1) frequently resembles an irregular triangle with the basis situated anteriorly. A moving cell usually has a wide anterior hyaline zone, from which it produces a finger-shaped subpseudopodia (dactylopodia) (Figs. 1-2). Sometimes, the moving cell elongates in antero-posterior direction and forms one or two long, thin, anteriorly directed subpseudopodia (Fig. 3). However, cells of this sort do not seem to be pre-floating, and are able to keep this type of organisation and to move with these pseudopodia for a long time. Some specimens have bulbous uroid (Fig. 1), but most lack differentiated uroidal structures (Fig. 4). The average length of the locomotive form is 23 μm (16-34 μm), breadth, 9 μm (6-14 μm); L/B 2-2.5.

When not moving, the amoebae are rounded, sometimes with small dactylopodia. The floating form has 1-4 very long, thin, tapering hyaline pseudopodia (Fig. 9). The cell has one vesicular nucleus 1-2 μm in diameter, with rounded central endosome (Fig. 8). One contractile vacuole is present. There is no cytoplasmic cristals. Cyst were not found in our cultures.

Electron microscopy show that the amoeba is covered with disk-shaped scales (Figs. 5-7). Each scale has conical projection in the middle, resembling a specific sort

of hat (Fig. 7). The diameter of the scale is about 350 nm, and the central projection is about 80 nm high. Cytoplasmic organelles were never well preserved. Based on the material available, we can only state that the cell has mitochondria with dense matrix and tubular, probably anastomosing cristae (Fig. 6). The nucleus has a dense, nearly compact central nucleolus and numerous patches of electron-dense material (probably chromatin), situated throughout between the nucleolus and nuclear envelope (Fig. 8). A single large dycytosome is situated near the

nucleus. This species seems to be bacteriophageous, with single bacteria enclosed in the phagosomes visible in the cytoplasm (Fig. 5).

This species undoubtedly belongs to the class Lobosea, subclass Gymnamoebia, family Paramoebidae, genus *Korotnevella* (due to the morphotype, pseudopodial pattern, and the presence of scales) and obviously represents a new species, because of the small size and peculiar shape of its scales. We named it *Korotnevella discophora*, according to the disk-like basis of its scales.

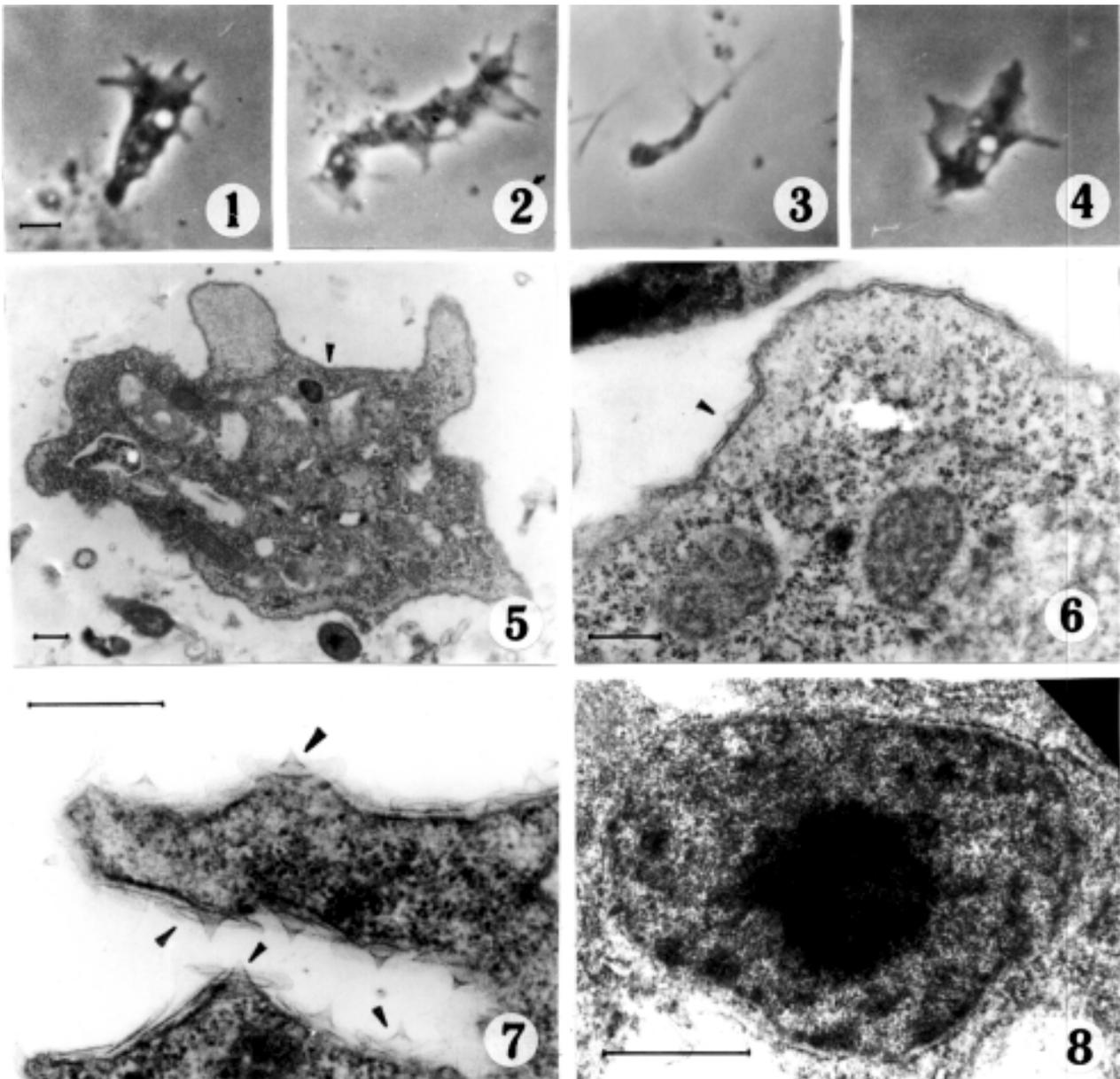


Fig. 1-8.

1-4: Different locomotive forms of *Korotnevella discophora*. 5: Overview of the cell covered with scales (arrowed). 6: Mitochondria and scales (arrowed). 7: Scales (arrowed) under higher magnification. 8: Nucleus. Scale bar is 5 μm for 1-4 and 0.5 μm for 5-8.

Diagnosis

Class Lobosea Carpenter, 1861
 Subclass Gymnamoebia Haeckel, 1862
 Family Paramoebidae (Poche, 1913) Page, 1987
 Genus *Korotnevella* (Schaeffer, 1926) Goodkov, 1988

Korotnevella discophora n. sp.

Irregularly triangular or elongate in locomotion, usually with several short dactylopodia, but sometimes with 1-2 very long, thin, tapering hyaline pseudopodia. Bulbous uroid may be present. Average length of the locomotive form, 23 µm (16-34 µm); breadth, 9 µm (6-14 µm); L/B 2-2.5. Floating form irregular, with 1-4 very long, thin, tapering pseudopodia. One vesicular nucleus, 1-2 µm in diameter, with compact central endosome and patches of dense material throughout the caryoplasm. Cyst unknown. Cell covered with disk-shaped scales; each scale has conical projection in the middle, resembling a specific sort of hat. Diameter of the scales about 350 nm, and height of central projection, about 80 nm. Bacteriophagous, freshwater.

Type location: bottom sediments of the lake Leshevoe (Valamo Archipelago, the Lake Ladoga, North-Western Russia), from a depth of 0.5 m.

Type material: Holotype No 919; paratype No 920. Type slides are deposited with the collection of preparations of the Biological Research Institute, St. Petersburg State University.

Differential diagnosis the present species is smaller than both other known freshwater species of *Korotnevella* and has a peculiar floating form, which does not resemble those of *K. bulla* and *K. stella*. It can well be distinguished from any known species with the use of EM, due to its peculiar scales.

It is interesting to note that the present species most probably represents "*Mayorella* sp. 3", noted by Pennick and Goodfellow (1975). These authors presented EM of the surface of this isolate, having the same characteristic scales. However, this EM picture was the only data on this isolate in their paper.

Smirnov (1996) noted that all three studied isolates of marine *Korotnevella* (including the only named species, *K. nivo*) (Grell & Benwitz, 1970; Anderson, 1977; Smirnov, 1996) have similar scales, resembling that of *P. eilhardi*. In contrast, both previously known freshwater species of *Korotnevella* have different, peculiar scale pattern. The present isolate resembles none of known species, and adds one more pattern of the scale organisation among Gymnamoebia. However, all members of the genus *Korotnevella* belong to the same morphotype and have similar ultrastructure (excluding the scale structure).

Sometimes, the form of *Korotnevella discophora* trophozoites (see Fig.3) resembles the amoebae described by Bovee (1953, 1953a, 1970) as members of the genera *Oscilloignum*, *Subulamoeba* and *Flagellipodium*. Members of these genera were not studied with EM, and their systematic position is unclear. However, they may be po-

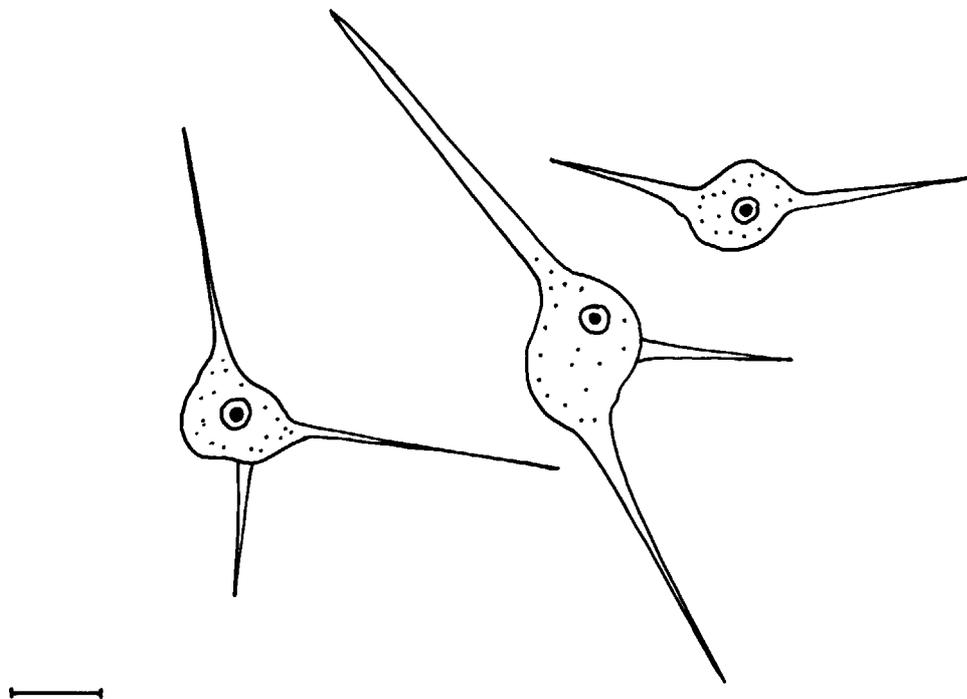


Fig. 9 - floating forms of *Korotnevella discophora*, scale bar is 5 µm

tential candidates for inclusion into the genus *Korotnevella* in its current status, provided they are reliably re-isolated and studied.

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