

BIOLOGY, MORPHOLOGY,
AND SYSTEMATICS OF HYDROBIONTS

Cocconeis nanoburyatica sp. nov.—a New Monoraphid Diatom
Species from Lake Baikal¹

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Abstract—The new monoraphid diatom species *C. nanoburyatica* sp. nov. is described from Lake Baikal. This taxon differs from closely related taxa *C. neodiminuta* Krammer, *C. neothumensis* Krammer, and *C. pseudothumensis* Reichard by less developed striae, a very large axial area, and broader rounded ends.

Keywords: diatoms, *Cocconeis nanoburyatica* sp. nov., morphology, new species, Lake Baikal

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INTRODUCTION

The genus *Cocconeis* Ehrenberg is a monoraphid taxon in which one valve has raphe and second is raphless [2, 10]. At the same time, raphe and raphless valves are different in morphology and number of striae.

Monoraphid genera like *Achnanthes* Bory sensu lato or *Cocconeis* are poorly studied in Lake Baikal. Previously we described two new genera *Trifonovia* Kulikovskiy and Lange-Bertalot and *Gliwizhia* Kulikovskiy, Lange-Bertalot and Witkowski. These new data show that monoraphid diatoms need investigation in ancient lakes [5, 6]. Our early studies have shown that Lake Baikal includes large number of species comparable with diversity in Central Europe [1, 3–9, 11].

During our investigation of Lake Baikal diatom flora, we have found a new monoraphid species. The aim of this study is LM and SEM investigations of *Cocconeis nanoburyatica* sp. nov. as a new species for science from Lake Baikal.

MATERIALS AND METHODS

For this study, samples collected by A.P. Skabitschewsky on July 20, 1965, from the bottom sediments surrounding Ushkan'i Islands were used for analysis. The sample, composed of sand collected on July 20, 1965, from Bolshoi Ushkaniy Island, 42 m depth (SZCZ 15645), turned out to include *Cocconeis* taxa. Samples were boiled in con-

centrated hydrogen peroxide (~37%) to mineralize the organic matter. They were washed again with deionized water four times at 12 h intervals. After decantation and filling with deionized water up to 100 mL, the suspension was spread onto cover slips and left to dry at room temperature. Permanent diatom preparations were mounted in Naphrax[®]. Light microscopic (LM) observations were performed with a Zeiss Axio Scope microscope equipped with oil immersion objective (×100/n.a.1.4, DIC). Valve ultrastructure was examined using a Hitachi S4500 field emission scanning electron microscope.

RESULTS AND DISCUSSION

Cocconeis nanoburyatica Kulikovskiy and Lange-Bertalot sp. nov. (Figs. 1 and 2).

Description: Valves broadly elliptical to almost circular, ends without tendency to become cuneately rounded. Length 7.0–12.5 μm, breadth 5–9 μm.

Raphe valves (Figs. 1a–1l): Fimbriate valvocopula (hyaline rim) very close to the valve margin. The tender raphe is filiform, straight, with very densely spaced central ends. Axial area extremely narrow, linear. Central area lacking or appearing as a small central nodule. Striae hard to discern, 33–38 in 10 μm (see SEM view).

Raphless valves (Figs. 1o–1w): Axial and central area not separated, appearing as a large hyaline area when focusing on the inside of the valve and indistinctly punctuated on the valve outside with diffuse puncta that continue the more or less short marginal

¹ The article was translated by the authors.

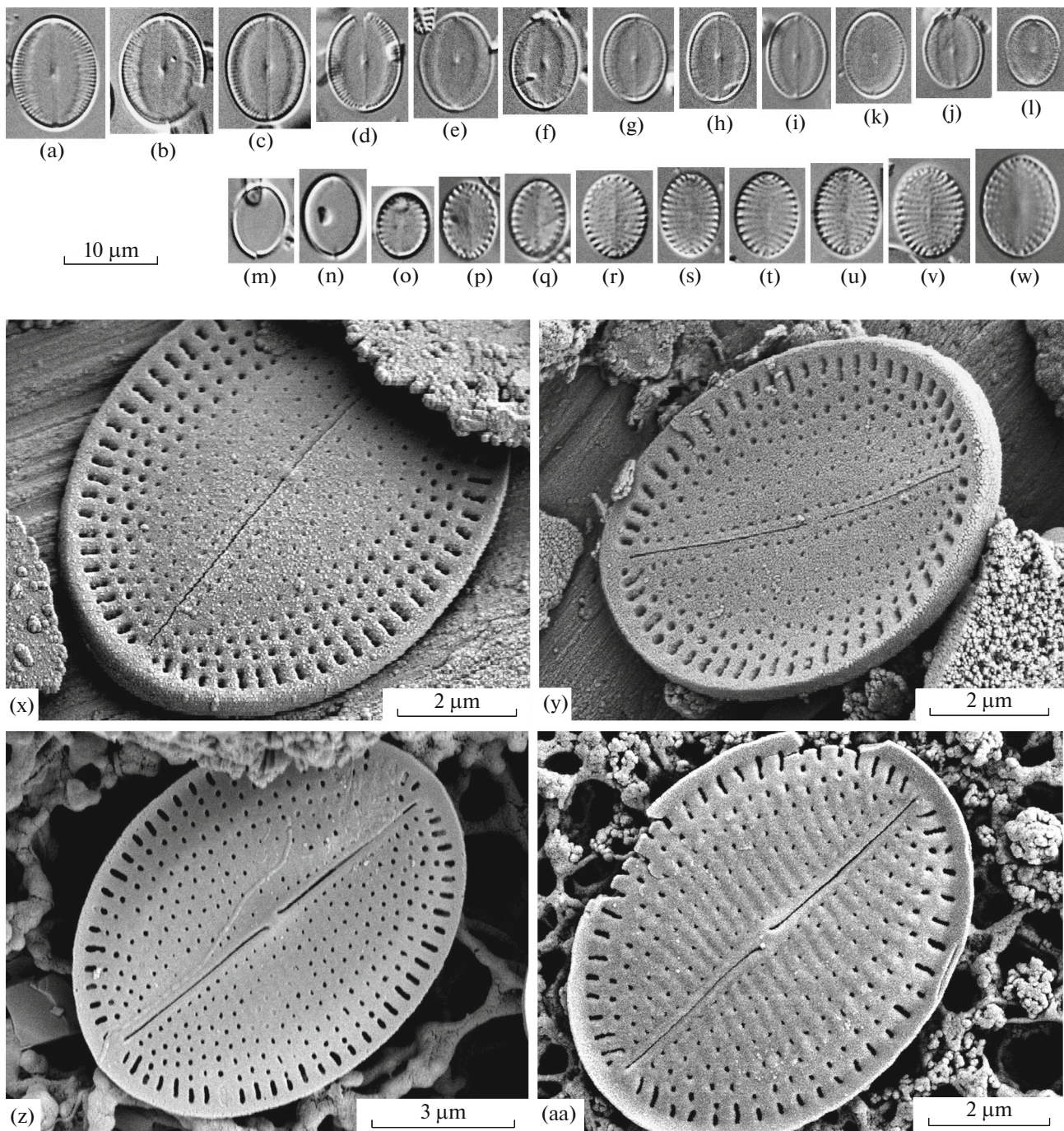


Fig. 1. *Cocconeis nanoburyatica* sp. nov.: (a–l) valve view (LM), (m, n) open valve bands (LM), (o–w) rapheless valve view, (x, y) outside view of raphe valves (SEM), and (z, aa) inside view of raphe valves (SEM).

striae or are irregularly distributed in the central part. Number of striae is 15–16 in 10 μm.

SEM, raphe valve, external view (Figs. 1x and 1y): Valve face concave. The straight raphe slit branches have unexpanded central and distal ends. The apical series of areolae on either side of the raphe sternum is distinctly separate from the other, rather irregularly

spaced areolae of the central part. Striae density is 33–38 in 10 μm. Areola foramina become larger towards the valve margin and transversally elongated at the junction to the shallow mantle.

SEM, raphe valve, internal view (Figs. 1z and 1aa): Raphe central endings noncoaxial deflected to opposite sides; distal endings with weakly developed helic-

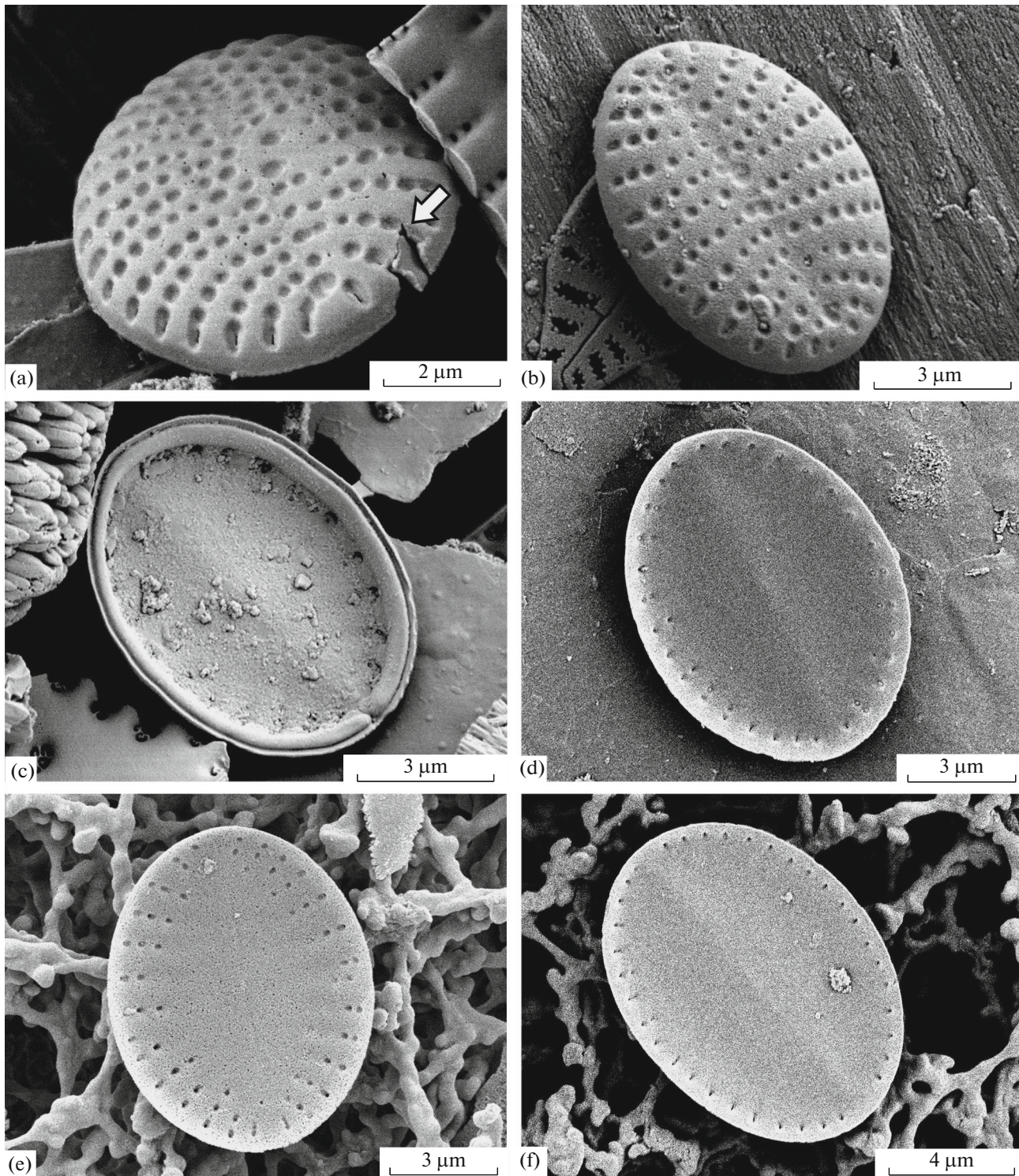


Fig. 2. *Cocconeis nanoburyatica* sp. nov.: (a, b) rapheless valves, outside view; note valve demolition with areola closed by silica membrane and about 2 areolae are fully developed. (c) Rapheless valve with open valve band (inside view); and (d–f) rapheless valves with developed areolae near margins (inside view).

toglossae. Raphe slit in a weakly elevated sternum. Areola apertures small, circular, lying in very shallow depressions.

Valvocopula (Figs. 1m, 1n, and 2c): open at one pole.

SEM, raphless valve, external view (Fig. 2a and 2b): Valve face convex, depressed along the apical axis. Marginal areolae with a transapical slit, whereas areolae of the central part of the valve may have small lip-like microstructures but do not penetrate the cell wall (see internal view).

SEM, raphless valve, internal view (Figs. 2c–2f): Only 1–3 areolae of each stria are fully developed. If intact, the slitlike apertures—as seen from the outside—are occluded by membranes (see cross in Fig. 2a).

H o l o t y p e: slide no. 15645 (holotypus here designated see Fig. 1r) in collection Maxim Kulikovskiy, Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences (IBIW), 20.07.1965, leg. A.P. Skabitschewsky.

T y p e l o c a l i t y: Bolshoi Ushkaniy Island, Lake Baikal.

E t y m o l o g y: *nano* means small and *buryatica* refers to land surrounding Lake Baikal.

D i s t r i b u t i o n: as of yet found only in Lake Baikal.

The most closed species are *Cocconeis neodiminuta* Krammer, *C. neothumensis* Krammer and *C. pseudothumensis* Reichard [2]. *Cocconeis neodiminuta* Krammer differs mainly in the coarser areolated longer striae on the raphless valve and has a higher length-to-breadth ratio. The first feature and more cuneately rounded ends distinguish *Cocconeis neothumensis* Krammer. *Cocconeis pseudothumensis* Reichard has a broader central area than the aforementioned two small taxa, but also coarser areolae of the raphless valve than *C. nanoburyatica* sp. nov. [2].

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