



## The diatom genus *Gomphoneis* Cleve (Bacillariophyceae) from Lake Baikal, Russia

JOHN P. KOCIOLEK<sup>1,2</sup>, MAXIM S. KULIKOVSKIY<sup>3</sup> & CÜNEYT N. SOLAK<sup>4</sup>

<sup>1</sup>Museum of Natural History and <sup>2</sup>Department of Ecology and Evolutionary Biology

<sup>3</sup>University of Colorado, Boulder, Colorado, 80309 USA

<sup>3</sup>I.D. Papanin Institute for Biology of Inland Waters Russian Academy of Sciences,  
152742, Borok, Nekouz, Yaroslavl, Russia

<sup>4</sup>Dumlupınar University, Department of Biology, Art & Science Faculty, Kütahya, 431000, Turkey

### Abstract

We describe 22 new species of *Gomphoneis*, and report several previously described taxa, from historical and recently made collections from Lake Baikal, Russia. We use light microscopy to document all taxa, and scanning electron microscopy to illustrate several of the species from the lake. All of the species present in Lake Baikal are part of the *Elegans* subgroup of the genus. Despite previous reports, we could find no representatives of the *Herculeana* subgroup in Baikal. We provide comparisons between the taxa, and document variability in the features found in the species. Two groups within the *Elegans* subgroup are present; most have 4 (or more) stigmoids, while a minority of the species lack stigmoids. We suggest that the species in Lake Baikal have two origins; one from the West, where an arc of related species spans Mongolia, NW China to Macedonia, and the second from western North America. Radiation of the two groups has resulted in species flocks. The number of *Gomphoneis* species in Lake Baikal is the largest number of species of the genus anywhere in the world.

**Key words:** Bacillariophyceae, biogeography, species flocks, new species, *Gomphoneis*, Lake Baikal, systematics, taxonomy, scanning electron microscopy

### Introduction

The diatom genus *Gomphoneis* was described by Cleve (1894: 73) for the species previously assigned to the genus *Gomphonema*, but with longitudinal lines and doubly-punctate striae. Initially, the genus was comprised mostly of fossil taxa and those from western North America as well as “Kamtschatka” (Cleve 1894, pp. 73–4; Grunow in Van Heurck 1880). Boyer (1927) designated the generitype of *Gomphoneis* as *G. elegans* (Grunow) Cleve (1894: 73). Originally it was a small genus, with 3 taxa, and it remained relatively small for nearly 100 years. Perspectives on the genus changed in the 1970’s as observations of some species of “typical” or well-known *Gomphonema* Ehrenberg (1832: 87) species (such as *G. olivaceum* (Hornemann) Ehrenberg 1838: 218) showed them with doubly-punctate striae and they were transferred to *Gomphoneis* (Dawson 1974; Ross & Sims 1978). Krammer (in Krammer & Lange-Bertalot 1985), for example, noted *Gomphonema transylvanicum* Pantocsek (1892: pl. 14, figs 219, 220), a species with doubly-punctate striae, typical porelli, and marginal laminae and assigned this species to *Gomphoneis*. Kociolek and Stoermer reviewed the genus, and contributed many new species (e.g. Kociolek & Stoermer 1986, 1988a, b) as well as described their systematic relationships (Kociolek & Stoermer 1989). They indicated the genus had doubly-punctate striae and in larger, more primitive species marginal laminae, which have been secondarily lost in smaller, more derived species, a concept not well understood in the diatom taxonomy community (see, for example, the paper by Reichardt 2007). They organized the genus into two subgroups. The first one has a stigma, doubly-punctate

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