Phytotaxa 217 (3): 201–248
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.217.3.1

The genus *Diploneis* Ehrenberg *ex* Cleve (Bacillariophyta) from Lake Hövsgöl, Mongolia

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Abstract

Lake Hövsgöl is an ancient lake situated in north-central Mongolia at the southern end of the Baikal Rift Zone. Throughout its limnological history, Lake Hövsgöl has developed an extraordinary diversity in different groups of organisms, such as fish and invertebrates. However, the one group that presumably holds the largest taxonomic diversity in the lake—the diatoms—has been largely overlooked.

This study presents a detailed taxonomic overview of the genus *Diploneis* from Lake Hövsgöl as well as a few localities from the neighboring Arkhangai province. A total of 25 taxa were identified, five of which are new and potentially endemic. Alongside the endemic species, this study confirms the presence of several taxa recently described from other Mongolian lakes (e.g., *Diploneis linearielliptica, Diploneis* aff. *heteromorphiforma* and *Diploneis* cf. *eximia*), presumably peculiar for this mid-Asian region. A relatively high number of widespread species were identified in Lake Hövsgöl, commonly reported from Europe and elsewhere. Interestingly, a population of *Diploneis praeclara* that is morphologically closely related to populations from Neogene fossil deposits in Romania was also observed in Lake Hövsgöl. Detailed LM and SEM observations are provided, together with species descriptions and comparisons to morphologically related species.

Greater knowledge of the genus *Diploneis* opens and guides the way towards better and more comprehensive approaches of uncovering biological diversity and biogeographical patterns on the Eurasian continent and among the ancient lakes.

Key words: ancient lakes, *Diploneis*, diversity, Lake Hövsgöl, taxonomy, new species

Introduction

Lake Hövsgöl is an ancient graben lake located in north-central Mongolia at the southern end of the Baikal Rift Zone (Goulden *et al*. 2006). With an estimated age of approximately 2 million years, Lake Hövsgöl is considered to be one of the oldest lakes in the world (Goulden *et al*. 2006). Throughout its history Lake Hövsgöl has provided a stable habitat for continuous processes of speciation; and at the same time served as an evolutionary refugia preserving relict species lineages (Goulden *et al*. 2006). Such a combination of processes has resulted in interesting and unique morphological diversity in some groups of organisms (e.g. crane flies, diatoms), but not nearly the level of diversity and endemism as seen in nearby Lake Baikal (Kozhov 1963). While other ancient lakes such as lakes Ohrid, Baikal and Tanganyika were subjects of intense scientific studies that resulted in improved species databases of the respective lakes, Lake Hövsgöl remains relatively understudied (e.g. Kozhov 1963). In the last century most of the studies in Lake Hövsgöl were focused on fish and invertebrates (Kozhova *et al*. 1994). Even though some of these aquatic organisms were intensely studied from both taxonomic and morphological standpoints, our knowledge of the presumably most diverse taxa in the lake—the diatoms—is largely restricted to a few studies (Østrup 1908; Edlund *et al*. 2006a,b; Levkov 2009; Pavlov *et al*. 2013).

The first work on diatoms revealed 32 species and two unknowns for the lake (Dorogostaïsky 1904). Later, Ostenfeld (1907) reported 21 planktonic diatoms, while Østrup (1908) identified 179 species, including 16 new for the lake (Edlund *et al*. 2006b). Patterns of diatom diversity in Lake Hövsgöl include endemics, cryptic species groups, low

Accepted by David Williams: 18 May 2015; published: 26 Jun. 2015