



## Three new species of *Navicula* (Bacillariophyta) from lakes in Yunnan Plateau (China)

ZHIJUN GONG<sup>1</sup>, DITMAR METZELTIN<sup>2</sup>, YANLING LI<sup>1\*</sup> & MARK B. EDLUND<sup>3</sup>

<sup>1</sup> State Key Laboratory of Lake Science and Environment, Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, Nanjing 210008, P. R. China.

<sup>2</sup> Am Stegskreuz 3b, D-65719 Hofheim, Germany.

<sup>3</sup> St. Croix Watershed Research Station, Science Museum of Minnesota, 16910-152<sup>nd</sup> St N, Marine on St. Croix, MN 55047 USA.

\*Corresponding author (e-mail: [ylli@niglas.ac.cn](mailto:ylli@niglas.ac.cn))

### Abstract

Three new freshwater diatoms are described from China's Yunnan Plateau region in sediments from Lakes Fuxian, Erhai, and Lugu. *Navicula craticuloides*, nov. sp., *N. gongii*, nov. sp. and *N. yunnanensis*, nov. sp. were identified from light and scanning electron micrographs. The main features of *N. craticuloides* are its valve outline with rounded ends, a narrow-lateral raphe, hooked terminal fissures, a linear axial area, a rectangular central area, and wavy striae towards the margins. The main features of *N. gongii* are narrowly lanceolate valves with long-protracted ends, a lateral raphe, a slightly curved axial area, and a rhombic or transversely expanded central area. The main features of *N. yunnanensis* are lanceolate valves with triundulate margins and cuneate ends and a lateral raphe. The new species have so far been found mainly in surficial sediment.

**Key words:** China, diatom, new species, *Navicula*, ancient lakes

### Introduction

The Yunnan Plateau, located in southwestern China, has a range of elevation from the 6740 m in the northwest to 76 m in the southeast; its average elevation is about 2000 m above sea level. It has a distinctive monsoon climate with an annual mean temperature of about 15 °C and an annual mean precipitation about 1000 mm (Nanjing Institute of Geography and Limnology 1990). This unique combination of topographic complexity and favorable moisture conditions in the region supports enormous richness of biological diversity and high degrees of endemism (Zhang 1999). For example, among the many lakes in the Yunnan plateau, Lake Fuxian, an ancient fault lake formed in the Pliocene (3–4 Ma), is known to have a unique fauna, including 14 endemic species described to date (Yang & Chen 1995, Sket 2000, Cui & Wang 2005).

There have been a few studies on the diatoms from the Yunnan Plateau. Skuja (1937) reported 281 taxa of diatoms from Hengduan Mountains, Yunnan and Sichuan Provinces including descriptions of six new taxa. Zhu & Chen (1994) reported 18 taxa in 1957 and 49 taxa in 1989 from Lake Fuxian. These studies hint at the diatom diversity of this region, but these taxonomies are dated because in the past 30 years there has been an explosion of taxonomic and nomenclatural revisions among the diatoms (Edlund *et al.* 2001), with “unnatural” genera being split into, presumably, more natural groupings (Cox 1987, Mann 1989, Round *et al.* 1990, Lange-Bertalot 2001, Kingston 2003). In more recent studies in this region, new evidence of undiscovered diatom diversity has been reported including the description of three new *Sellaphora* Mereschkowsky (1902: 186) species (*S. fuxianensis* Li Li in Li *et al.* (2010a: 65), *S. yunnanensis* Li & Metzeltin in Li *et al.* (2010b: 1161), *S. sinensis* Li & Metzeltin in Li *et al.* (2010b: 1162)) and one new *Cymbella* species (*Cymbella fuxianensis* Li & Gong in Gong & Li (2011: 552)) (Li *et al.* 2010a, b, Gong & Li 2011). In this paper, we continue to document the diatom diversity in this region of and report three new *Navicula* species based on analyses of surficial sediments from several lakes using light and scanning electron microscopy.