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Taxonomy, frustular morphology and systematics of *Platichthys*, a new genus of canal raphe bearing diatoms within the Entomoneidaceae

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Abstract

Platichthys, a new genus of canal raphe bearing diatoms, is formally described following analysis of the frustule morphology using LM and EM examination. The genus type originates from a thermal spring in the temperate climate zone of Chile, and an example of the second member of this new genus is observed from a coastal lagoon on the Galápagos Islands (Isabela Island). Taken together, the morphological features of these two newly described taxa demonstrate a unique set of characteristics observed within Thalassiophysaceae, Bacillariaceae and Entomoneidaceae. *Platichthys gen. nov.* contains both a canal raphe and fibulae, and the compressed valve face, absence of distinct valve mantle and numerous open porous copulae found in *Platichthys gen. nov.* are typical of Entomoneidaceae. However, unlike species belonging to *Entomoneis*, the valves of the new genus do not show frustule twisting and the striae are composed of single simple areolae instead of double rows. The most characteristic feature of the new genus is raphe positioned on an elevated keel, robust tubular fibulae, the strongly developed, steep valve face and an indistinct valve mantle in a form of a narrow structureless strip. The relationships of *Platichthys gen. nov.* to *Nitzschia* subgenus *Nitzschia* and to other sections of *Nitzschia* sensu lato, *Entomoneis* and to *Hamatusia* are discussed.

Key words: diatoms, new genus, frustule morphology, South America, Galápagos archipelago, Chile

Introduction

Despite their taxonomic, ecological and evolutionary significance, the canal raphe bearing diatoms have received less attention from diatomologists compared to other groups of diatoms (*e.g.* Naviculaceae, Lange-Bertalot 2001). Recent taxonomic changes within canal raphe bearing diatoms have resulted in the re-establishment or creation of several new genera including *Tryblionella* W. Smith (1835: 35), *Psammodictyon* D.G. Mann in Round *et al.* (1990: 675), *Petrodictyon* D.G. Mann in Round *et al.* (1990: 674), *Giffenia* Round & Basson (1997: 348), *Archibaldia* Witkowski & Kociolek in Witkowski *et al.* (2011: 172) and *Nagumoea* Kociolek & Witkowski in Witkowski *et al.* (2011: 172) (*e.g.* Round *et al.* 1990, Round & Basson 1997, Krammer & Lange-Bertalot 2004, Witkowski *et al.* 2011). Furthermore, taxa within the large and heterogenous genus *Nitzschia* Hassall (1845: 435) remain very difficult to classify and their taxonomy has practically been left unattended. In this group, most studies are dedicated to the identity and biology of taxa with bioindication potential, mainly belonging to *Nitzschia* subgenus *Nitzschia* D.G. Mann and other sections of *Nitzschia* (*e.g.* Trobajo *et al.* 2006, 2013, Rimet *et al.* 2011).

The phylogeny of the canal raphe bearing diatoms has also recently been addressed, with a particular focus on the Bacillariales, Rhopalodiales and Surirellales (*e.g.* Medlin & Kaczmarska 2004, Sorhannus 2004, Ruck & Kociolek 2004, Sims *et al.* 2006; Ruck & Theriot 2011). These studies show that the canal raphe bearing diatoms do not form a monophyletic group, but that instead the canal raphe evolved independently on two separate occasions. However, whilst molecular work continues to address relationships at higher levels of classification, the full scope of biodiversity of canal raphe bearing diatoms remains poorly understood. Therefore, work that expands our knowledge of the range of morphological diversity within the canal raphe diatoms can make important foundational contributions.

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