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Three new species of Cymbellales (Bacillariophyceae) from Réunion Island

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Abstract

Recent surveys of the epilithic diatoms of Réunion Island led to the discovery of three new species: *Crucicostulifera bebourensis, Encyonopsis cilaosensis*, *Encyonopsis palmeti. Crucicostulifera bebourensis* is the second species to be included in this recently described genus typified by *Crucicostulifera areolata* (Hustedt) Taylor & Lange-Bertalot. Both species share the main diagnostic features of the genus. However, *Crucicostulifera bebourensis* differs from *Crucicostulifera areolata* (Hustedt) Taylor & Lange-Bertalot in the cingulum composed of at least three open bands whereas the latter species has a single valvocopula on each valve. *Encyonopsis cilaosensis* and *Encyonopsis palmeti* can be differentiated from other *Encyonopsis* species by a combination of characters including valve outline, number of striae in l0 µm, maximum length/breadth ratio, areolae structure and presence or absence of intermissio. Both new species show a particular organization of the cingulum. *Crucicostulifera bebourensis* occurs in acidic waters with very low conductivity and nutrient concentration. *Encyonopsis cilaosensis* is found in alkaline waters with high conductivity whereas *Encyonopsis palmeti* is reported from slighty alkaline waters with low conductivity.

Key words: diatoms, *Crucicostulifera*, *Encyonopsis*, Réunion Island, new species

Introduction

Réunion is the youngest of the volcanic islands of the Mascarene Archipelago (Mauritius, Rodrigues and Réunion) and is located 800 km to the East of Madagascar in the southwest Indian Ocean. The island is characterized by a humid tropical climate with a hot, wet summer (December to April) and a cool, dry winter (May to November). The river network is composed of 13 perennial rivers mainly located in the eastern rainy part of the island. In order to implement a diatom index to assess the biological quality of the running waters, six sampling campaigns (November 2008–2009–2010–2011 and May 2009–2010) were carried out on 31 rivers and 58 sampling sites were prospected. The freshwater diatoms of Réunion Island are only known through scarce articles with the description of new species (Reichardt 1997, Reichardt 2001, Klee *et al.* 2000, Metzeltin *et al.* 2005, Le Cohu *et al.* 2009, Le Cohu *et al.* 2012, Gassiole *et al.* 2013). Three new species were discovered. Two of them belong to the well-known genus *Encyonopsis* K. Krammer (1997: 156). The third species is placed in the genus *Crucicostulifera* J. Taylor & H. Lange-Bertalot (2010: 44). This genus, recently established, is based on *Navicula areolata* Hustedt (1952: 405), a species with plastid structure rather similar to that found in the cymbelloid genera and thus justifying its preliminary placement in the Cymbellales D.G Mann in F.E. Round *et al.* (1990: 653) (Taylor & Lange-Bertalot 2010). Till now, the genus *Crucicostulifera* was strictly limited in distribution to the Magaliesburg Mountains near Rustenburg (South Africa). The purpose of this article is to provide a detailed morphological description of *Crucicostulifera bebourensis sp. nov.*, *Encyonopsis cilaosensis sp. nov.* and *Encyonopsis palmeti sp. nov.* based on both light and scanning electron microscopy and give information on their ecology and distribution.

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