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Aulacoseira veraluciae sp. nov. (Coscinodiscophyceae, Aulacoseiraceae): a common freshwater diatom from Brazil

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Abstract

Examination of samples from different aquatic environments from Brazil revealed the presence of a new *Aulacoseira* species. *Aulacoseira veraluciae* Tremarin, Torgan & T. Ludwig is described and illustrated with light and scanning electron microscopy, and its morphology compared with that of similar species, such as *A. muzzanensis* (Meister) Krammer, *A. granulata* (Ehrenberg) Simonsen and *A. agassizii* (Ostenfeld) Simonsen. The new species is characterized mainly by the straight pervalvar rows of areolae, morphology of the linking spines, shape and position of the rimoportulae on the valve mantle, deepness and thickness of the ringleiste.

Key words: *Aulacoseira veraluciae*, centric diatom, new species, plankton, ultrastructure

Introduction

Aulacoseira Thwaites (1848: 167) is widely distributed in continental aquatic environments and constitutes an important part of diatom assemblages. This genus has been extensively studied with material from different regions of the world (e.g. Krammer 1991a, b, Krammer & Lange-Bertalot 1991, Siver & Kling 1997, Houk 2003, Houk & Klee 2007, Usoltseva & Likhoshway 2007, Potapova *et al.* 2008, Genkal & Kharitonov 2009, Manoylov *et al.* 2009, Buczkó *et al.* 2010). In the last decades, several new species have been proposed for *Aulacoseira* from North of America, Europe, Japan, Russia and subantartic (e.g. Camburn & Charles 2000, Houk *et al.* 2007, Genkal & Kulikovskiy 2008, English & Potapova 2009, Pearce *et al.* 2010, Tanaka *et al.* 2010, Usoltseva & Tsoy 2010, Siver & Hamilton 2011, Van de Vijver 2012, Kociolek *et al.* 2014).

In Brazil, *Aulacoseira* species were commonly identified based on international research, especially of temperate regions. However, a recent review of the species that occur in the country was made by Tremarin *et al.* (2011, 2012, 2013a, b, 2014), revealing six new *Aulacoseira* species and, rectifying some mistaken identifications realized only using LM. This fact emphasizes the importance of a more accurate analysis of the diatom species from tropical and subtropical regions, especially under scanning electron microscopy, to perform a more precise identification.

This study aims to propose a new *Aulacoseira* species that was found in samples from different regions of Brazil and it also describes and compares its morphology with that of similar species.

Material and methods

The new *Aulacoseira* species was found in 77 samples of the 286 analyzed materials collected in rivers, lakes, ponds and reservoirs of Brazil (Table 1, Figure 1). The samples were obtained with a plankton net (25 µm mesh size) and fixed with Transeau solution (Bicudo & Menezes 2006) or with polyethylene bottom and fixed by acetic Lugol (1%) (Bicudo & Menezes 2006). The organic material was removed with $KMnO_4$ and HCl according to the method of

in paleoecological study from a lacustrine system, State of Rio Grande do Sul. Other records of *A. muzzanensis*, *A. agassizii* and *A. agassizii* var. *malayensis* from Brazil belong to *A. brasiliensis* Tremarin, Torgan & Ludwig (2012: 172–173) or were not illustrated (e.g. Nogueira & Leandro-Rodrigues 1999, Torgan *et al.* 1999, Nogueira *et al.* 2008), making it difficult to identify these materials.

Aulacoseira veraluciae occurred in oligotrophic to eutrophic environments, such as Chavantes and Salto Grande reservoirs, respectively (Pagioro *et al.* 2005, Nogueira *et al.* 2006). Wide morphological and metric variation of the new species, including formation of auxospore and initial cells, was found in the samples of the Patos lagoon during the summer of 1988.

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