*Phytotaxa* 52: 33–42 (2012)
www.mapress.com/phytotaxa/


Article

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

# *Aulacoseira principissa* sp. nov., a new 'centric' diatom species from the sub-Antarctic region

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## Abstract

A new centric diatom, *Aulacoseira principissa* sp. nov., is described from the sub-Antarctic region. The morphology of the species is illustrated using detailed light and scanning electron microscopy observations. Its main discriminating features include the presence of typical bifurcating spines, a single rimoportula, a typical valve heterovalvy with spineless separation valves and a variable striation pattern on the discus. The new species is compared to related species belonging to the complex of *Aulacoseira distans*. *Aulacoseira principissa* has a broad geographical distribution ranging from the sub-Antarctic islands in the southern Indian Ocean to South Georgia in the southern Atlantic Ocean. It is commonly found in slightly acidic, oligotrophic pools with low specific conductance values.

**Key words**: aquatic habitat, morphology, sub-Antarctic Region, ultrastructure

## Introduction

The number of centric diatoms in the sub-Antarctic Region is rather low. Typical northern hemisphere genera such as *Stephanodiscus* and *Cyclostephanos* are completely absent (Kellogg & Kellogg 2002) despite some Antarctic records that can usually be refuted due to sample contamination or incorrect identifications. The genus *Cyclotella* (Kütz.) Bréb. s.l. (including *Discostella* Houk & Klee and *Puncticulata* Håkansson), widely distributed across the entire world in the (tycho)plankton of lakes and larger rivers (Håkansson 2002) is represented only by a few species such as *Cyclotella meneghiniana* Kützing (1844: 50) and *Discostella pseudostelligera* (Hustedt 1939: 581) Houk & Klee (2004: 223) (Van de Vijver & Beyens 1996, Van de Vijver *et al.* 2002). The total lack of diatom plankton in the aquatic habitats of the (sub-)Antarctic Region is one of the major causes of their absence, although it is still unclear why diatom plankton is lacking in this region (Le Cohu & Maillard 1996, Jones 1996, Van de Vijver & Beyens 1999a). The most distributed centric diatoms in the sub-Antarctic Region belong to the Melosiraceae and Aulacoseiraceae family such as *Melosira dickiei* (Thwaites 1848: 168) Kützing 1849: 889, *Orthoseira roeseana* (Rabenhorst 1848–1860: 383) O'Meara (1876: 255) and the recently described *O. biportulata* Van de Vijver & Beyens in Van de Vijver *et al.* (2002: 75) and *O. gremmenii* Van de Vijver & Kopalová (2008: 108) (Van de Vijver *et al.* 2002, Van de Vijver & Kopalová 2008). One of the most widespread sub-Antarctic species in this group is an unknown *Aulacoseira* species that was previously identified as *A. alpigena* (Grunow in Van Heurck 1882: 86) Krammer (1991: 93), *A. granulata* (Ehrenb. 1843: 415) Simonsen (1979: 58) or *A. distans* (Ehrenb. 1837: plate 1; fig. 20) Simonsen (1979: 57) (Bourrelly & Manguin 1954, Le Cohu & Maillard 1986, Van de Vijver & Beyens 1996, 1999b, Van de Vijver *et al.* 2001, 2002, 2004, 2008). Morphological comparison between both above-named species and the sub-Antarctic populations indicated that the previous identifications were a clear example of force-fitting the species into European or North American species (Tyler 1996).

The freshwater genus *Aulacoseira* was established by Thwaites in 1848 (Round *et al.* 1990) and comprises a large number of species, mostly transferred from the genus *Melosira* to *Aulacoseira* in 1979 by

*Accepted by David Williams: 23 Apr. 2012; published online in PDF: 3 May 2012*