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