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New species and a new genus of the Orthoseirales from Patagonia, Argentina, with comments on systematic affinities within the Order

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Abstract

The presence of ‘carinoportulae’ was suggested to be diagnostic for the Order Orthoseirales and Family Orthoseiraceae. Members of this group have been assigned to a single genus, *Orthoseira* Thwaites, which was diagnosed by also lacking rimoportulae. The genus *Cavernosa* Stidolph is chain-forming, may have marginal spines, lacks carinoportulae and possesses rimoportulae. Its placement among other members of melosiroid diatoms has not been settled, though its lack of carinoportulae precludes its placement within the Orthoseirales. Species of both genera were described from aerophilous habitats.

Recently *Orthoseira limnopolarensis* Van de Vijver and Crawford was described from the South Shetland Islands (maritime region of Antarctica) with a unique combination of features, as it possesses carinoportulae and rimoportulae, the first species of the genus with this suite of characters. *Cyclotella stipata* Frenguelli, described from Neuquén Province, Argentina, is a species that according to the original illustrations shows characters similar to *Orthoseira*. Light and electron microscope observations of Frenguelli’s type material and more recent collections from Patagonia offer specimens with an elongated mantle, chain-forming frustules with thick marginal spines and presence of carinoportulae (like *Orthoseira*) and rimoportulae (like *Cavernosa* and *O. limnopolarensis*). Considering this unique combination of characters, we propose the new genus *Guarreraea* to encompass *Cyclotella stipata* and *Orthoseira limnopolarensis*. Its systematic placement relative to other genera assigned to the Order Orthoseirales is discussed.

The examination of additional materials from Neuquén deposited at the Frenguelli Collection revealed the presence of two other taxa with carinoportulae that are described as the new species, *Orthoseira frenguelli* and *O. ferrarioana*.

Key words: diatoms, *Guarreraea*, morphology, new genus, new taxa, *Orthoseira*, South America

Introduction

The Orthoseirales Crawford in Round *et al.* 1990 was described for radially-symmetrical diatoms with elongated valve mantles, having an unusual set of processes in or near the center of the valve, mostly heavily silicified and quite distinct from the areolae. These processes were named ‘carinoportulae’ and were suggested to be diagnostic for the Order Orthoseirales and Family Orthoseiraceae (Round *et al.* 1990: 655). Members of this group have been assigned to a single genus, *Orthoseira* Thwaites (1848: 167), which when considered by Round *et al.* (1990) was diagnosed by lacking rimoportulae although in some species there are internal slits in the valve center close to the carinoportulae (see e.g. Crawford 1981, Spaulding & Edlund 2008, Van de Vijver & Kopalová 2008). Species of the genus have coarse areolae and usually thick marginal spines that serve in the formation of straight-chain colonies (Spaulding & Kociolek 1998, Van de Vijver & Kopalová 2008). Some species possess undulations of the valve interior called caverns (Spaulding & Kociolek 1998) whereas others produce internal plate-like structures or “internal valves” (Van de Vijver & Kopalová 2008). In addition to these studies, *Orthoseira* taxa have been documented with electron microscopy, as listed in Gaul *et al.* (1993, taxa under the genus *Melosira*) and Henderson and Reimer (2003, taxa listed under *Melosira* and *Orthoseira*). Fine morphology of several *Orthoseira* taxa is also described in detail in more recent studies such as Metzeltin & Lange-Bertalot (2007) and Lowe *et al.* (2013).