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The genus *Luticola* D.G.Mann (Bacillariophyta) from the McMurdo Sound Region, Antarctica, with the description of four new species

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Abstract

A revision of the freshwater diatom genus *Luticola* from the McMurdo Sound Region, including the McMurdo Dry Valleys and Cape Royds, Antarctica, was made to contribute to a consistent flora for the entire Antarctic Region. Detailed light and scanning electron microscopic observations, review of pertinent literature, and examination of historical and type material lead to the identification of 12 *Luticola* species. Four new species and one new combination are proposed, including *L. bradyi sp. nov*., *L. spainiae*, *sp. nov*., *L. macknightiae*, *sp. nov*., *L. transantarctica*, *sp. nov*., and *L. elegans*, *comb. nov. stat. nov*. Several of these taxa were previously identified as part of the *L. muticopsis* (Van Heurck) D.G.Mann complex; *Navicula muticopsis* f. *evoluta* W. & G.S. West, *L. muticopsis* f. *reducta* (W. & G.S. West) Spaulding, and *N. muticopsis* f. *capitata* Carlson, or mistaken for the similar *L. mutica* (Kützing) D.G.Mann and *L. cohnii* (Hilse) D.G.Mann. Morphological features of all new species were compared to the closest morphologically similar taxa, and their ecology and biogeography are discussed. All *Luticola* species considered here show restricted Antarctic distributions, and 8 of the 12 reported species are known only from the Antarctic continent.

Key words: biogeography, Cape Royds, diatom taxonomy, Dry Valleys, microbial mats, Ross Island

Introduction

Species of the genus *Luticola* D.G.Mann in Round *et al*. (1990: 670) are typical for terrestrial ecosystems in the Antarctic Region (Kopalová *et al*. 2011, Van de Vijver *et al*. 2011). The genus is characterized by uniseriate striae composed of rounded to transapically elongate areolae covered internally by perforated hymens, an isolated pore in the central area, a longitudinal canal positioned within the valve wall, and a simple filiform raphe with variable raphe endings (Round *et al*. 1990). A book volume for the genus was recently published by Levkov *et al*. (2013), which included 34 Antarctic Region taxa. A large number of new *Luticola* taxa have been described from Antarctica in recent years (Esposito *et al*. 2008, Kopalová *et al*. 2011, Van de Vijver *et al*. 2012, Zidarova *et al*. 2014), making the genus one of the most species-rich in the area. The *Luticola* species of Maritime Antarctica and the sub-Antarctic Islands have been recently revised (Van de Vijver & Mataloni 2008, Kopalová *et al*. 2011, Van de Vijver *et al*. 2011, Zidarova *et al*. 2014), showing that the genus *Luticola* is particularly widespread in the former region with more than 25 taxa compared to the sub-Antarctic islands where only 8 taxa were found. However, focused taxonomic work on the genus from the Antarctic continent is lacking, making a complete biogeographical analysis of the Antarctic Region not possible at present.

The pioneering paper by West & West (1911) gave the world a first look into the phycological diversity of the Antarctic continent and became the taxonomic foundation for the entire region. From collections taken from Shackleton's 1907–9 expedition, two species, one variety, and two forms of *Luticola* alone were described (West & West 1911). These taxa have since become staples in Antarctic species lists (Prescott 1979, Kellogg & Kellogg 2002), making Cape Royds an important type locality for Antarctic diatoms. Numerous investigations into the algal diversity of the McMurdo Sound Region have taken place since West & West (1911), such as Fritch (1912), Fukushima (1964),

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