



Four new *Luticola* taxa (Bacillariophyta) from Maritime Antarctica

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Abstract

The paper describes four new *Luticola* taxa from the South Shetland Archipelago, Antarctica: *Luticola neglecta* sp. nov., *L. bogaertsiana* sp. nov., *L. contii* sp. nov. and *L. olegsakharovii* sp. nov. All new taxa are studied using both light and scanning electron microscopy and compared to other morphologically similar species from (sub-)Antarctica and elsewhere in the world. Data on their ecology and biogeography are added.

Key words: Antarctic Region, Bacillariophyta, *Luticola*, new species, morphology, taxonomy

Introduction

Species of the genus *Luticola* D.G.Mann in Round *et al.* (1990: 670) are substantial constituents of the Antarctic non-marine diatom communities and the genus often dominates Antarctic terrestrial habitats (Kopalová *et al.* 2011, Van de Vijver *et al.* 2011). Recent studies in the Antarctic region clearly showed that as for many other genera such as *Stauroneis* Ehrenberg (1843: 45) [Van de Vijver *et al.* 2005], *Muelleria* (Frenguelli) Frenguelli (1945: 172) [Van de Vijver *et al.* 2010], *Hantzschia* Grunow (1877: 174) [Zidarova *et al.* 2010], *Pinnularia* Ehrenberg (1843: 45) [Van de Vijver & Zidarova 2011, Zidarova *et al.* 2012] and *Eunotia* Ehrenberg (1837: 44) [Van de Vijver *et al. in press*], the diversity of the genus *Luticola* in Antarctica has been greatly underestimated in the past, mostly due to the lack of appropriate literature for the identification of the Antarctic diatoms that inevitably led to “force-fitting” (Tyler 1996) the Antarctic *Luticola* taxa into infra-specific taxa of the “well-known” *Luticola muticopsis* (Van Heurck) D.G.Mann in Round *et al.* (1990: 671), *L. mutica* (Kützing) D.G.Mann in Round *et al.* (1990: 671) and/or *L. cohnii* (Hilse) D.G.Mann in Round *et al.* (1990: 670). During the past decade the scientists working in Antarctica begun to adopt and apply a more refined taxonomy that allowed the recognition and description of many new *Luticola* species from the region (i.e. Van de Vijver *et al.* 2006, 2011, Esposito *et al.* 2008, Van de Vijver & Mataloni 2008, Kopalová *et al.* 2009, 2011, Levkov *et al.* 2013). At present, almost 40 *Luticola* species are known from the entire sub-Antarctic region, and 26 of these are present in and even unique for the Maritime Antarctic, making it one of the most diverse and species rich diatom genera in these latitudes.

This paper describes four new *Luticola* taxa observed on the islands of the South Shetland Archipelago. During a survey of limno-terrestrial diatoms on several islands, one *Luticola* species could not be identified using the currently available literature and it is described here as new: *L. neglecta* sp. nov. New and more complete studies of the morphology of another taxon, earlier identified and reported as *L. binodis* (Hustedt) M.B.Edlund in Edlund *et al.* (2001: 85) by Van de Vijver *et al.* (2011: 149, figs 46–48), showed that it is not conspecific with the latter and has to be separated as an independent taxon: *Luticola bogaertsiana* sp. nov. Finally, an extensive and detailed morphological analysis was done on several populations of *Luticola nivalis* (Ehrenberg) D.G.Mann in Round *et al.* (1990: 671) on the South Shetland Islands. As a result, it became clear that what was previously identified as *L. nivalis* on these islands (i.e. Van de Vijver & Mataloni 2008, Zidarova 2008) represented actually two taxa: *L. contii* sp. nov. and *L. olegsakharovii* sp. nov. For all new taxa detailed morphological descriptions are provided and their ecology, biogeography and separation from similar taxa are discussed.

Similar species:—*Luticola olegsakharovii* is most similar to *L. contii* (see above) but can be separated by the slightly larger valve width, the rounded, subcapitate apices and the completely different raphe structure with shortly bent opposite to the pore-bearing side distal and central raphe endings, contrary to *L. contii* where both the central and distal raphe endings are hooked toward the pore-bearing side (Table 3). Likewise *L. contii*, *L. olegsakharovii* has also been reported from Antarctica as *L. nivalis*. All similar taxa in the *L. nivalis* group can be easily differentiated from *L. olegsakharovii* based on the distal raphe fissures, which are strongly hooked and not shortly bent as in *L. olegsakharovii*. Moreover, the distal raphe endings in the similar taxa of *L. nivalis* group are hooked to the pore-bearing side and not to the side opposite the isolated pore (Table 3). *Luticola nivalis* has also a smaller valve width and a finer striation pattern (Table 3). Other similar taxa, such as *L. pulchra*, *L. cocquytiae* and *L. pseudonivalis*, apart of hooked distal raphe fissures, also have a finer striation pattern (Table 3). *Luticola cocquytiae* and *L. pseudonivalis* both have much smaller valve dimensions (Table 3). *Luticola pseudonivalis* and *L. pulchra* also have much smaller valve apices compared to *L. olegsakharovii*. Other *Luticola* taxa with triundulate margins are sufficiently different in valve outline and raphe structure to be confused with *L. olegsakharovii*.

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