



Achnantheidium petuniabuktianum sp. nov. (Achnanthidiaceae, Bacillariophyta), a new representative of the *A. pyrenaicum* group from Spitsbergen (Svalbard Archipelago, High Arctic)

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Abstract

During a survey of the freshwater littoral diatom flora from lakes and ponds in the region of Petuniabukta on Spitsbergen (Svalbard Archipelago, High Arctic region), a new *Achnantheidium* species, *A. petuniabuktianum* sp. nov., has been recorded. *Achnantheidium petuniabuktianum* is a new representative of the *A. pyrenaicum* group as evidenced by its curved distal raphe fissures. The present paper describes in detail the morphology of *A. petuniabuktianum* based on light and scanning electron microscopy. The new taxon is characterized in having linear valves with parallel margins and broadly rounded, never protracted apices and a characteristic—in light microscopy hardly discernible—striation pattern consisting of very short striae composed of one or two small, always slit-like areolae. Based on current results, *Achnantheidium petuniabuktianum* is a benthic taxon occurring in epilithic and epiphytic habitats in the littoral zones of freshwater lakes and ponds.

Key words: Svalbard, Arctic Region, *Achnantheidium*, diatoms, taxonomy, morphology, new species

Introduction

Since the middle of the 20th century, the Arctic has been the subject of several large diatom (Bacillariophyta) studies addressing the Arctic freshwater diatom diversity (Douglas & Smol 2010 and references therein). Many of these studies however applied a broad morphospecies concept (Mann 1999), lumping together taxa that may represent separate species. Moreover, a large number of Arctic diatom taxa has been force-fitted (Tyler 1996) into a West-European or North-American framework, which may have led to a biased view of the diversity and biogeography of Arctic diatoms. In their study on the freshwater diatom diversity in the Canadian Arctic Archipelago, Antoniadou *et al.* (2008, 2009) used a narrower species concept which resulted in the description of seven new taxa, apart from a high number of at present unidentified valves in need of more thorough taxonomic analysis. This underestimation of diatom diversity is especially relevant for the High Arctic archipelago of Svalbard (76.50°–80.50° N and 10–35° E). In the past, only Foged (1964), listing 572 taxa, described a large number of new taxa whereas later authors such as Van de Vijver *et al.* (1999) applied a broad morphospecies concept focusing only on ecology and community structure rather than diatom taxonomy. Incorrect assessments of species distributions might be especially relevant for diatom genera containing small-celled species such as *Achnantheidium* Kützing (1844: 75), a widespread genus in various types of freshwater habitats comprising two distinct groups of species (Round & Bukhtiyarova 1996). The *A. minutissimum* (Kützing 1833: 578) Czarnecki (1994: 157) complex is characterized by straight distal raphe endings whereas the *A. pyrenaicum* (Hustedt 1939: 554) Kobayasi (1997: 148) group possesses distal raphe fissures that are unilaterally deflected or even hooked (Round & Bukhtiyarova 1996, Kobayasi 1997). The *A. pyrenaicum* group is a rather diverse group with several