



Two new *Navicula* species (Bacillariophyceae) from Western Europe

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Abstract

During a survey of some springs in the French Central Massif, a new *Navicula* species (Bacillariophyceae) was found: *Navicula sanctamargaritae* Beauger *sp. nov.* A second new *Navicula* species was observed during a routine biomonitoring project in Flanders: *Navicula flandriae* Van de Vijver & A.Mertens *sp. nov.* The new species are formally described using light and scanning electron microscopy. Both species present a unique set of morphological characters including the structure of the central raphe endings, the striation pattern, the valve dimensions and outline, which allows their separation from similar *Navicula* taxa such as *N. korzeniewskii*, *N. recens* or *N. cincta*. The ecological preferences of each species are briefly discussed.

Key words: *Navicula*, new species, taxonomy, thermal springs, rivers, France, Flanders

Introduction

The genus *Navicula* Bory (1822: 128) *sensu stricto* was described in 1822 for a group of species showing a narrowly to broadly lanceolate naviculoid valve outline with capitate, rostrate or bluntly rounded apices. The central sternum is thickened in a more or less asymmetric way. The raphe branches are straight and filiform with unilaterally slightly deflected proximal and strongly hooked distal raphe endings. The striae are uniseriate and composed of apically elongate areolae, hence called ‘lineolae’ (Round *et al.* 1990).

The initial rather broad species concept was modified several times (Patrick 1959, Cox 1979, Round *et al.* 1990). Based on the neotypus generis *Navicula tripunctata* (O.F. Müller 1786: 52) Bory (1827: 563), only members of the section *Lineolatae* Cleve (1895: 10), were included within *Navicula sensu stricto* (Cox 1979). To date, more than 130 described taxa (including subspecies and varieties) of *Navicula sensu stricto* have been recorded from freshwater (excluding brackish-water) habitats of Europe (Lange-Bertalot 2001, Werum & Lange-Bertalot 2004, Levkov *et al.* 2007, Van de Vijver & Lange-Bertalot 2009, Van de Vijver *et al.* 2010, Mertens *et al.* 2014). The genus is a dominant constituent of the temperate and tropical river diatom flora forming often important and highly diverse populations and hence plays a major role in the European biomonitoring of rivers (Werum & Lange-Bertalot 2004, Metzeltin & Lange-Bertalot 2007).

During a survey of the diatom flora in France and Belgium, two *Navicula* species were found that could not be identified using the currently available literature. Following detailed light (LM) and scanning electron microscopy (SEM) observations and comparisons with previously described species, both unknown taxa are described as new to science. A first new species, *Navicula sanctamargaritae* Beauger, *sp. nov.*, was found in the thermal Tennis spring of Sainte-Marguerite (France) and in other thermal springs of the same area of the French Massif Central, influenced by the occurrence of deep CO₂ sources. A second species, *N. flandriae* Van de Vijver & A.Mertens, *sp. nov.* was found in several Flemish rivers (Belgium). A comparison is made with the most similar taxa to facilitate the distinction of these two species. The ecology of both species is also addressed.