



Typification and taxonomy of *Gyrosigma tenuissimum* (W. Sm.) J.W. Griffith & Henfr., comparison with *Gyrosigma coelophilum* N. Okamoto & Nagumo and description of two new taxa: *Gyrosigma tenuissimum* var. *gundulae* var. nov. and *Gyrosigma baculum* sp. nov. (Pleurosigmataceae, Bacillariophyta)

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Abstract

Gyrosigma tenuissimum (W.Sm.) J.W.Griffith & Henfr. was examined in the original material and an emended description is presented. Its protologue contains an error of taxonomic significance: in the type material, the valve and raphe sternum do not show the considerable flexure described and illustrated in Smith (1853). A comparison with *Gyrosigma coelophilum* N. Okamoto & Nagumo revealed that the latter, although similar in several characters, differs sufficiently in others to warrant separate specific status. Descriptions of two new taxa are given: *Gyrosigma tenuissimum* var. *gundulae* var. nov. and *Gyrosigma baculum* sp. nov. Both show very fine longitudinal striae at or beyond the limit of ordinary light microscopy and are practically non-sigmoid.

Key words: *Gyrosigma tenuissimum*, *Gyrosigma coelophilum*, *Gyrosigma tenuissimum* var. *gundulae*, *Gyrosigma baculum*, typification

Introduction

Gyrosigma tenuissimum (W. Sm) J.W. Griffith & Henfr. (Griffith & Henfrey 1856: 303, pl. 11, fig. 24) was originally described as *Pleurosigma tenuissimum* W. Sm. (Smith 1853: 67, pl. 22, fig. 213), a species with a long and very narrow valve, with delicate structure consisting of two perpendicular stria systems, the transverse being much coarser than the longitudinal. Smith specifically mentions that the valve and raphe sternum are markedly sigmoid (“flexure considerable”, Smith 1853: 67) and the illustration provided clearly bears this out (Smith 1853: pl. 22, fig. 213, reproduced here as Fig. 1).

In Höbel and Sterrenburg (2011) it was pointed out that in the literature, specimens labelled as *G. tenuissimum* (and varieties thereof) have been presented that are indeed narrow and have coarser transverse than longitudinal striae, but lack the “flexure considerable” specified by Smith (1853: 67). Instead, their valve outline and raphe sternum course are completely straight for about 80% of their length, with only the most apical portions of the valve and raphe sternum showing the curvature in opposite directions seen in all species of *Gyrosigma*. Examples of such records are Giffen (1963: 232, Pl. III, fig. 52), Hendeby (1964: 249, where the valve is described as “linear-lanceolate”) and Stidolph (1980: Pl. 13, figs 7a, b, c). The specimen of *Gyrosigma tenuissimum* illustrated in Peragallo (1891: Pl. VIII, fig. 13) is slightly sigmoid, however, as is the specimen illustrated in van Heurck (Pl. 28, fig. 798).

The degree of curvature of the raphe sternum in species of *Gyrosigma* can be quantified as the “raphe angle” (Sterrenburg 1991: 376). This is defined as the intersection angle between two lines drawn through the central node, one coinciding with the central portion of the raphe sternum, the other connecting its apical ends. In all species of *Gyrosigma* examined so far, the degree of curvature of the raphe sternum was found to vary only slightly. The raphe angle of Smith’s drawing of *G. tenuissimum* is c. 10°; the raphe angle of the non-sigmoid specimens labelled as *G. tenuissimum* in the publications cited above typically amounts to c. 2–3°, which is incompatible with the value for Smith’s drawing.

Secondly, the V-shaped fusing of external areolar fissures of adjacent rows described here also occurs in other species of *Gyrosigma*, including *G. kuetzingii* (Grunow) Cleve (1894: 115; basionym: *Pleurosigma kuetzingii* Grunow 1860: 561; see Sterrenburg 1997) and *G. limosum* Sterrenburg & Underwood (1997: 148).

As regards the varieties of *G. tenuissimum* described in the literature, *G. tenuissimum* var. *hyperborea* Grunow in Cleve & Grunow (1880: 58), *G. tenuissimum* var. *subtilissima* Grunow in Cleve & Grunow (1880: 58) and *G. tenuissimum* var. *angustissima* Simonsen 1959: 83, all have much coarser longitudinal striation—easily resolved in ordinary LM—than the taxa described here.

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