

Typification of *Synedra longissima* W.Smith and its transfer to the genus *Ulnaria* (*Ulnariaceae*, *Bacillariophyta*)

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The Reverend William Smith (1808–1857) described in the first volume of his *A synopsis of the British Diatomaceae* *Synedra longissima* W.Smith (1853: 72, pl. 12: fig. 95), based on a sample Dr G. Dickie provided him in 1850 from a pond in the Botanic Garden of Belfast (now known as the Botanic Gardens, Belfast, Northern Ireland, UK). Smith illustrated his new species with a single line drawing (Smith 1853: pl. 12: fig. 95) showing an elongated ‘araphid’ specimen (Fig. 1). Grunow (1862: 390) discussed the use of the name *Synedra biceps* but concluded that “...so mehr als *Synedra biceps* Kg. eine ganz andere Kützing'sche Art (freilich wohl nur Varietät von *Synedra splendens*) vorstellt, welche Smith wieder in einer besonders grossen Form als *Synedra longissima* beschreibt und abbildet...” (... even more because *Synedra biceps* Kützing represents a totally different Kützing species (most likely even only a variety of *Synedra splendens*), which Smith in his turn describes and illustrates as a very large form as *Synedra longissima*, ...). Subsequently, Grunow (1862: 395) transferred both *S. biceps* and *S. longissima* as synonyms to his new variety *Synedra splendens* [var.] α *longissima* (W.Smith) Grunow (Grunow 1862, Williams & Van de Vijver 2021). Rabenhorst (1864: 130) also listed the species in his *Flora europaeae algarum aquae dulcis et submarinae* considering it more a longer, slightly undulating form of *S. biceps* (“*Forma elongata leniter undulata Synedrae bicipitis mihi videtur*”: It looks to me as an elongated, slightly undulated form of *Synedra biceps*) than being related to *S. splendens* Kützing as Grunow thought. Brun (1880: 126) transferred the species to *Synedra ulna* (Nitzsch) Ehrenberg as a variety indicating that the valve is quite similar to the nominate variety being only narrower and more elongated (“*mais plus étroite et très allongée*”) and often with curved or undulating valves (“*et souvent courbée ou ondulée*”). Van Heurck (1881: pl. XXXVIII: fig. 2) illustrated one valve based on Kützing sample 73 in Decas VIII (Kützing 1833), as *Synedra* [*ulna* var.] *longissima* W.Sm. *forma area media laevi destituta*. Williams & Van de Vijver (2021) analysed the original material for Kützing 73 and concluded that this population is in fact the type of *Ulnaria* (*Synedra*) *splendens* (Kützing) D.M.Williams & Van de Vijver, different from *Synedra longissima* W.Smith, although the original material of the latter was not analysed. A final transfer was suggested by Schönfeld in 1907 as *Synedra* (*Ctenophora*) *pulchella* var. *longissima* (W.Smith) Schönfeld (1907: 104). Abshagen (1908: 84) mentions the taxon in his dissertation as *Synedra ulna* f. *longissima* Sm., although this combination was never made by William Smith. There is a reference to both Smith (1853) and Van Heurck (1881). The validity of this combination should therefore be treated with caution.

When Compère (2001) named the genus *Ulnaria* to include all taxa related to *Synedra ulna*, he transferred *Synedra biceps* to *Ulnaria* as *U. biceps* (Kützing) Compère but did not add a list of possible synonyms, neither did he transfer *Synedra longissima* to the new genus, the latter most likely following the generally accepted idea that *S. longissima* should be considered a synonym of *U. biceps* making a transfer of *S. longissima* to the genus *Ulnaria* superfluous.

The type materials of both *Synedra biceps* and *Synedra longissima* have, however, not been analysed (Williams & Van de Vijver, unpubl.), indicating that the synonymy of both taxa was based on the assumptions found in Grunow (1862) and Rabenhorst (1864). Krammer & Lange-Bertalot (1991: 146) included *S. longissima* in the synonym list of *Fragilaria biceps* (Kützing) Lange-Bertalot but raised some doubts by adding “(?)” before the name.

In the Van Heurck collection, (Meise Botanic Garden, Belgium, **BR**), where most of the William Smith type collection is conserved (Hoover 1976), one slide prepared by William Smith's nephew, Charles Coppock, of the original material of *Synedra longissima* is conserved (**BR** VI-46-B11). The Smith collection also contains unmounted material used by Smith to make his *Synopsis of the British Diatoms* (Smith 1853, 1856). Analysis of this material showed the presence of a small population of a very long (up to 400 µm) 'araphid' diatom that, based on its morphological features, (structure of the apical pore field, presence of two rimoportulae, structure of the striae) should be transferred to the genus *Ulnaria* as *Ulnaria longissima* (W.Smith) Van de Vijver & D.M. Williams *comb. nov.* The first comparisons with the unpublished type material of *Synedra biceps* Kützing (Williams & Van de Vijver, unpubl.) showed that both populations present some morphological differences that might suggest keeping both separate. Further analysis of all material, including several other historic *S. biceps* populations, will be necessary to confirm or reject any conspecificity.

The original Smith sample from a pond in the Botanical Gardens, Belfast collected by Dr Dickie, is here designated as lectotype for *Ulnaria longissima*.

Ulnaria longissima (W.Smith) Van de Vijver & D.M. Williams, *comb. nov.* (Figs 1–14)

Basionym: *Synedra longissima* W.Smith, *A synopsis of the British Diatomaceae*: p. 72, pl. 12: fig. 95, 1853.

Lectotype (**here designated**): slide **BR** VI-46-B11, Pond in the Botanic Gardens, Belfast, Dr Dickie, 1850 (**BR**, Meise Botanic Garden, Belgium). Figure 2 illustrates the lectotype.

Isolectotypes (**here designated**): slides BM 23758-60 (3 slides made from the original William Smith sample), **BM** 25314 (Dickie slide, type material); **BM** 51314 (Rylands collection, Smith material) (**BM**, Natural History Museum, London)

Registration for the new combination: <http://phycobank.org/103332>

Registration for the typification: <http://phycobank.org/103334>

Synonyms: *Synedra splendens* [var.] *α longissima* (W.Smith) Grunow (1862), *Synedra ulna* var. *longissima* (W.Smith) Brun (1880), *Synedra (Ctenophora) pulchella* var. *longissima* (W.Smith) Schönfeld (1907)

Description: Valves long, usually undulating or curved, narrow, with parallel margins. Apices weakly protracted, slightly inflated. Constriction in valve width not apparent near the apices. Apices surrounded by stepped ridge. Valve dimensions (n=15): length 400–425 µm, width 5.5–6.5 µm. Valve face flat, virgae not raised. Sternum narrow, linear. Central area variable from non-existing to almost forming a squarish, small fascia, always bordered by shortened marginal striae. Two rimoportula located almost at each apex, separated by a few striae from the actual apices. Rimoportulae elliptical, weakly oblique, depressed. Apical pore field of the ocellulimbus type, very large, composed of at least 10 long rows of small pores, depressed at apices. Two projecting spines present at above pore field at each apex. Striae parallel throughout, uniseriate, composed of rounded cribrate areolae, 9–11 in 10 µm. Girdle bands probably closed with robust valvocopula. One row of large, cribrate areolae present on the valvocopula.

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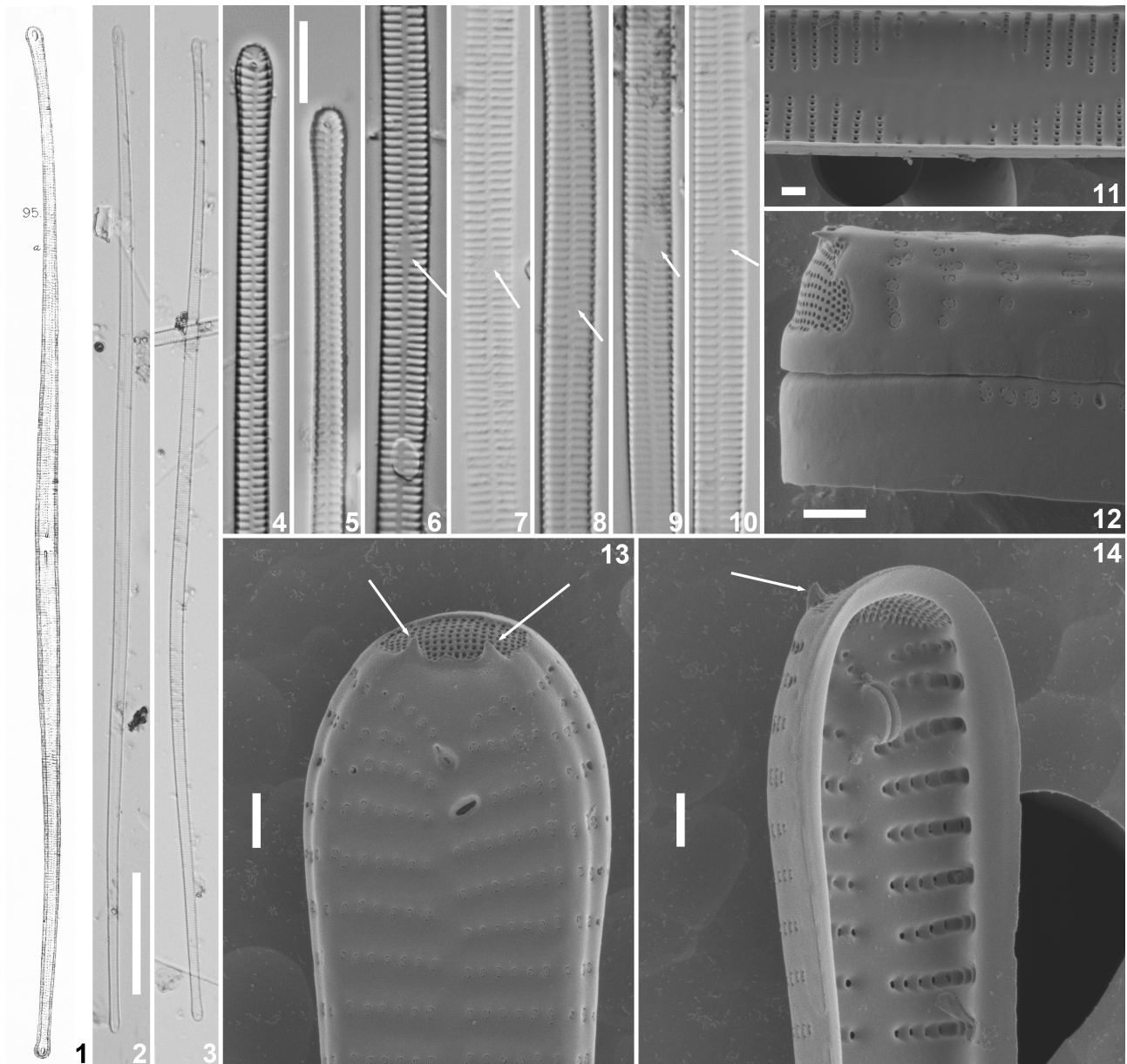
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Figs 1–14. Light and scanning electron microscopy observations of *Ulnaria longissima* (W.Smith) Van de Vijver & D.M.Williams, *comb. nov.* taken from the lectotype (**BR** VI-46-B11, Pond in Belfast Botanic Gardens) and prepared original W.Smith material, kept in the Smith collection, part of the Van Heurck collection, **BR**. **Fig. 1.** Original drawing in Smith (1853) of *Synedra longissima*. **Figs 2–3.** Two entire valves in LM at low magnification. **Figs 4–5.** Two LM observations of valve apices at high magnification. **Figs 6–10.** Several LM observations showing the variability of the central area (indicated by the white arrows). **Fig. 11.** SEM internal view of the central area. **Fig. 12.** SEM side view of a valve apex with a good view on the apical pore field and the protruding spines on the apex. **Fig. 13.** SEM external detail of the valve apex with the apical pore field, the protruding spines (white arrows) and the rimoportula. **Fig. 14.** SEM internal view of a valve apex with the large rimoportula and one of the apical spines (white arrow). Scale bar = 50 µm (Figs 2–3), 10 µm (Figs 4–10) and 1 µm (Figs 11–14).