

Original material of *Fragilaria gloiophila* (Grunow) Van de Vijver, Ector, T.M.Schuster & J.Walter (*Fragilariaceae*, *Bacillariophyta*) rediscovered in the Grunow collection

Bart Van de Vijver, *Meise Botanic Garden, Research Department, Nieuwelaan 38, 1860 Meise, Belgium & University of Antwerp, Department of Biology – ECOBE, Universiteitsplein 1, B-2610 Wilrijk, Belgium* (correspondence: bart.vandevijver@plantentuinmeise.be)

Wolf-Henning Kusber, *Botanischer Garten und Botanisches Museum Berlin, Freie Universität Berlin, Königin-Luise-Str. 6-8, 14195 Berlin, Germany*

Luc Ector, *Luxembourg Institute of Science and Technology (LIST), Environmental Research & Innovation (ERIN) Department, 41 rue du Brill, L-4422 Belvaux, Luxembourg*

Tanja M. Schuster, *Natural History Museum, Department of Botany, Herbarium, Burgring 7, 1010 Vienna, Austria*

Johannes Walter, *Natural History Museum, Department of Botany, Herbarium, Burgring 7, 1010 Vienna, Austria*

Recently, Van de Vijver & al. (2020) analyzed the morphology of *Synedra gloiophila* Grunow (in Van Heurck 1881, pl. 40: fig. 21) and transferred the species to the genus *Fragilaria* Lyngbye. Since the type material of the species (Grunow sample 643) was apparently no longer available in the Grunow collection in the herbarium of the Naturhistorisches Museum in Vienna, Austria (**W**) and the relevant microscope slide had a broken coverslip, the species was lectotypified by Tuji & Williams (2008) with the Grunow illustration.

The species was described from Titisee (Titi Lake) near Freiburg in southwestern Germany. A new search in the Grunow collection (**W**) was unsuccessful. Therefore, in the Van Heurck collection held at Meise Botanic Garden (**BR**), a set of samples from Titisee (part of the Kützing sample collection present in **BR**), was used to study the morphology of *F. gloiophila*. Van de Vijver & al. (2020) justified the use of the Kützing sample based on sample characteristics and species composition. The sample, Kützing 867, was subsequently designated as epitype for *F. gloiophila*. During a recent visit (10-14 August 2020) of one of us (BVDV) to the Grunow collection at **W**, the original material for sample 643 was discovered in the separate general diatom collection of the cryptogam herbarium. The sample (Fig. 1) was stored under the name *Synedra amphicephala*. Since the entire diatom collection at **W** contains more than 5000 samples, it was fortunate that sample 643 was found. The label on the sample reads: “*Synedra gloiophila* m[ihi] (*Synedra parvula* K.) auf *Batrachospermum suevorum*. Titisee bei Freiburg 1848”. On the label, Grunow added later “*amphicephala*?” between *Synedra* and *gloiophila*. The sample is composed of a piece of *Batrachospermum* together with four glass tiles in small envelopes. A list of taxa observed in the material was added later in pencil. A subsample was prepared for light microscopy work to compare the species composition with the flora observed in Kützing 867. Both samples have an identical diatom flora and contain a small population of *F. gloiophila* (Figs 2–18). Therefore, the choice of Kützing 867 as epitype is justified, but Grunow sample 643 should be considered original material used to describe *F. gloiophila*. The material is kept in the Grunow collection (**W**) and has the catalogue number (**W** QR code) W0127030, with a subsample held in the Van Heurck collection (**BR**), with no catalogue number.

Here we provide an extended treatment of *Fragilaria gloiophila* including a reference to the rediscovery of the original Grunow material:

Fragilaria gloiophila (Grunow) Van de Vijver, Ector, T.M.Schuster & J.Walter, *Notulae Algarum* 145: 2, 2020.

Basionym: *Synedra gloiophila* Grunow in Van Heurck, *Synopsis des Diatomées de Belgique*, Atlas, pl. 40: fig. 21, 1881.

Lectotype (designated in Tuji & Williams 2008: 132): Van Heurck, 1881, pl. 40: fig. 21.

Epitype (designated by Van de Vijver & al. 2020: 3 for the above lectotype of *Synedra gloiophila* Grunow): slide **BR**-4594, prepared from Kützing sample 867, Titisee, Baden-Württemberg, Germany (leg. August 1847), material present in the Van Heurck collection (**BR**). The epitype is represented by Fig. 18 in Van de Vijver & al. (2020).

Original material upon which Grunow based his description and illustration: sample 643, Titisee, Freiburg, August 1848, Grunow collection (**W** 0127030), recently rediscovered.

In Van de Vijver & al. (2020) the lectotype was erroneously cited as holotype using Blanco's (2017) argumentation. However, although it is true that a wrong type designation is correctable according to ICN Art. 9.10. Note 6 (Turland & al. (2018), it is not true that the only published image is automatically the holotype of a name of a taxon, as suggested by Blanco (2017). ICN Art. 9.1 reads:

“A holotype of a name of a species or infraspecific taxon is the one specimen or illustration ... either (a) indicated by the author(s) as the nomenclatural type or (b) used by the author(s) when no type was indicated. As long as the holotype is extant, it fixes the application of the name concerned”.

A figure published alongside the new scientific name is not the only element used by the author(s) to establish a new taxon. Often a gathering consists of different elements, raw and/or cleaned material, slides or mica, unpublished and published figures. Because of the uncertainty which elements have been used by the author(s), ICN 9.1. Note 1 states:

“... the possibility that the author used additional, uncited specimens or illustrations (which may have been lost or destroyed) must always be considered.”

In the case of Van Heurck (1881, pl. 40) just one element was published, but Tuji & Williams (2008: 132) found two, the slide prepared from sample 643, but with original material assumed lost, and the figure in Van Heurck (1881, pl. 40). The latter served as lectotype as the slide was damaged and could not be examined. Further material studied by us was not available to Tuji and Williams. It is obvious that Grunow used specimens for publication of *Synedra gloiophila* in Van Heurck, and their rediscovery represents the most pertinent material for work on this species.

With the discovery of Grunow's original material, we are able precisely to identify his taxon. However, effectively published typifications are binding, and the lectotype cannot be superseded by a more suitable lectotype (ICN Art. 9.19). Because the designated image is part of the protologue, the other original materials cannot be in conflict with the image. However, the image is too poor for an unequivocal identification without support by a recent microscopical analysis.

Because of this, Van de Vijver et al. (2020) designated an epitype (Kützing sample 867). The epitype cannot be superseded (ICN Art. 9.20). Luckily, the analysis of the rediscovered original material supports the earlier designated epitype because the specimens consist of conspecific material. In conclusion, the rediscovered original material does not change the taxon concept.

Blanco, S. (2017). On the misuse of lectotypification in diatom taxonomy. *Phycologia* 56(1): 108–113.

Tuji, A. & Williams, D.M. (2008). Examination of types in the *Fragilaria pectinalis*–*capitellata* species complex. In: Likhosway, Y. (ed.) Proceedings of the Nineteenth International Diatom Symposium. Listvyanka, Irkutsk, Russia, 28th August – 3rd September 2006. p. 125–139, 69 figs, 1 table. Bristol: Biopress Limited.

Turland, N.J., Wiersema, J.H., Barrie, F.R., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Kusber, W.-H., Li, D.-Z., Marhold, K., May, T.W., McNeill, J., Monro, A.M., Prado,

J., Price, M.J. & Smith, G.F., editors (2018). International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017. Regnum Vegetabile, Vol. 159. pp. [i]–xxxviii, 1–253. Glashütten: Koeltz Botanical Books.

Van de Vijver, B., Ector, L., Schuster, T.M. & Walter, J. (2020). Observations on and typification of *Synedra gloiophila* Grunow (Fragilariaceae, Bacillariophyta) and its transfer to the genus *Fragilaria* Lyngbye. *Notulae Algarum* 145: 1–6.

Van Heurck, H. (1881). *Synopsis des Diatomées de Belgique*. Atlas. pls XXXI–LXXVII [31–77]. Anvers: Ducaju et Cie.

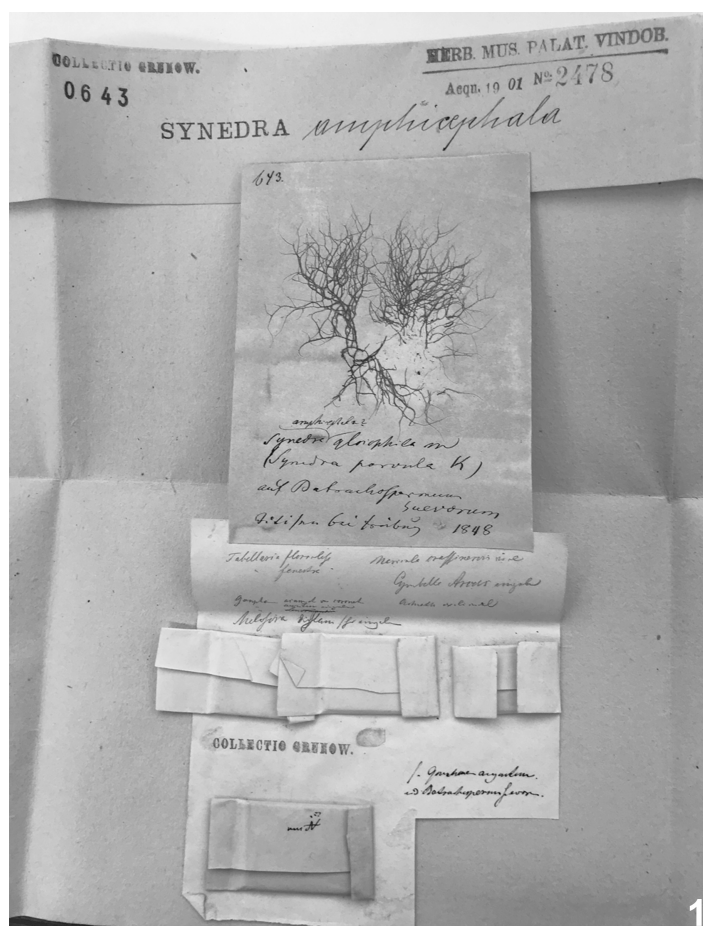
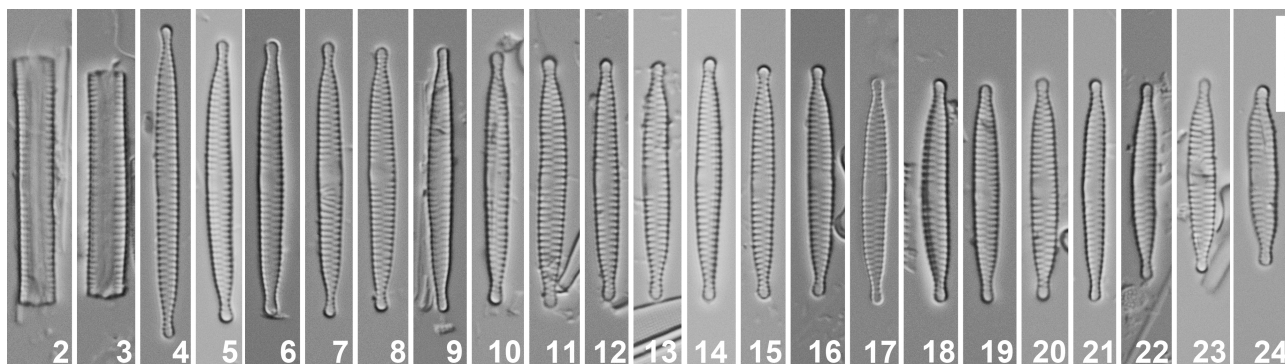


Fig. 1. Grunow sample 643 from Titisee present in the Grunow collection (W).



Figs 2–24. *Fragilaria gloiophila* (Grunow) Van de Vijver & al. Cell cycle of *Fragilaria gloiophila* in Grunow sample 643 (W). **Figs 2–3** show frustules in girdle view. Scale bar = 10 µm.