
The enigma of *Synedra familiaris* Kützing with the description of *Tabularia neofamiliaris* Van de Vijver & D.M.Williams, sp. nov. (Fragilariaceae, Bacillariophyta)

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Kützing (1844: 68, pl. 15: fig. XII) described *Synedra familiaris* Kützing from a sample probably sent to him by Sébastien René Lenormand (1796–1871), collected from *Cladophora fracta* (O.F.Müller) Kützing (*Cladophoraceae*), near Falaise (Calvados, Normandy, France). Kützing added to the locality the words “als *Exilaria fasciculata*” meaning that Lenormand had named it thus. *Synedra familiaris* Kützing was characterized (translated from the Latin) as follows: “*Synedra* of moderate length, smooth, very distinctly layered and fan-like broken off, at the primary side apex slightly attenuated and truncated, at the secondary side lanceolate, acute.” His figure (Kützing 1844: pl. 15: fig. XII; reproduced here as Fig. 1) accompanying the description shows short ribbon-like colonies attached to the *Cladophora* cell walls with the apices only rarely touching. A single frustule is drawn in valve face view but scarcely any structure is depicted. It has a lanceolate outline with non-protracted, clearly acute apices. A second line is drawn inside the valve, almost parallel to the margin, and most likely represents the extension of the striae from the margin towards the valve centre; striae were not illustrated.

Synedra familiaris Kützing has been the subject of considerable debate and some contradictory interpretations. Tuji & Williams (2008) discussed its taxonomic history but started from the point of view, at that time generally accepted, that this was a species of *Fragilaria* Lyngbye. Confusion arose partly from the fact that the original type material of *Synedra familiaris* Kützing could not be located. Lange-Bertalot (1980: 758, pl. II: fig. 46) circumscribed and illustrated *Synedra familiaris* using sample 1370 (**BM** slide 18307) from Kützing’s collection as representative material. It was the only entry in the catalogue of Kützing’s collection made by Eulenstein in 1868, held partly in the Natural History Museum, London (**BM**), and partly in Meise Botanic Garden (**BR**), that mentioned the name *Synedra familiaris*. However, Kützing’s sample 1370 is labelled as originating from a river near Saint-Lô, a town some 60 km north-west of Falaise and should therefore not be considered as a lectotype. Kützing was always meticulous in citing the sampling localities so it can reasonably be concluded that he would have put Saint-Lô as sampling locality and not Falaise. Examination of **BM** slide 18307 from this collection by both Lange-Bertalot (1980) and Tuji & Williams (2008) revealed a whole array of different araphid taxa such as *Tabularia fasciculata* (C.Agardh) D.M.Williams & Round, *Hannaea arcus* (Ehrenberg) R.M.Patrick and *Ctenophora pulchella* (Kützing) D.M.Williams & Round (see Tuji & Williams 2008, figs 1–10 for a complete list of all recorded taxa). Lange-Bertalot (1980: pl. II: fig. 46) illustrated a valve found on the slide and labelled it “*Synedra familiaris*” Kützing Herb. No. 1370 aus der Normandie = B.M. 18307’ and commented (in the legend) “*Die Maßangaben und die Abbildungen in Kützing 1844 entsprechen dieser pulchella-Form viel mehr als das spätere Konzept von Grunow.*” In the same publication, Lange-Bertalot also designated slide **BM** 18307 as lectotype for the species described by Kützing in 1844 whereas at the same time (Lange-Bertalot 1980: 747), “Grunow no. 970” from the Grunow collection in Vienna (**W**) was designated as “lectotype” for “*Synedra rumpens* var.

familiaris (Kützing) Grunow in Van Heurck” (Van Heurck 1881, pl. XL: figs 15, 16). However, Grunow never formally made such a combination but only suggested it in the description of two new forms: *Synedra* (*rumpens* var.?) *familiaris* f. *parva* Grunow (1881: pl. XL: fig. 15) and *S.* (*rumpens* var.?) *familiaris* f. *major* Grunow (1881: pl. XL: fig. 16). Van Heurck (1882–1885: 79) added a slide to his series *Types du Synopsis des Diatomées de Belgique* of *Synedra rumpens* var. *familiaris* (slide n° 295 and not as erroneously given in his catalogue as “n° 296: *Synedra rumpens* Kütz. var. *familiaris* Kütz.”), made from a population from Holstein (Germany). All literature records from Grunow (in Van Heurck 1881) to the present day relate to a different species than that originally described by Kützing (1844, 68, pl. 15: fig. XII) as *Synedra familiaris* Kützing and represent a species that clearly belongs to the genus *Fragilaria* (Van de Vijver, pers. obs.) as presently circumscribed; this will be described in a later contribution.

Tuji & Williams (2008: 26) complicated the matter even further by stating that both lectotypes designated by Lange-Bertalot (1980) were incorrect, the first (sample 970 from the Grunow collection at **W**) while not applied to the original basionym but to a combination, and the second because the material was not original type material and hence could not be a lectotype.

Typification requires original material, which, amongst other elements, includes “those specimens and illustrations (both unpublished and published prior to publication of the protologue) that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of the description, diagnosis, or illustration with analysis” (ICN Art. 9.4). Thus, Tuji & Williams (2008) designated the original drawing in Kützing (1844: pl. 15: fig. XII) as lectotype for *Synedra familiaris*. According to ICN Art. 9.19, the original lectotypification (i.e., designated by Lange-Bertalot 1980) must be followed unless “it is in serious conflict with the protologue, in which case an element that is not in conflict with the protologue is to be chosen; a lectotype may only be superseded by a non-conflicting element of the original material, if such exists; if none exists it may be superseded by a neotype.” Since the material used by Lange-Bertalot was not from original type material, it cannot be a lectotype and the lectotypification in Tuji & Williams (2008: 26), which clearly named an element of the original material, should be accepted. Simultaneously, Tuji & Williams (2008: 29) also designated as epitype (for their lectotype) sample **BM** 18307, the sample that was designated by Lange-Bertalot (1980) as lectotype for *Synedra familiaris* Kützing. The slide contains several specimens of *Tabularia fasciculata* (Van de Vijver, pers. obs.) and one of these was depicted in Tuji & Williams (2008). If these specimens represent *Synedra familiaris* as Kützing intended, then the species should be considered a later synonym of *Tabularia fasciculata* (C.Agardh) D.M.Williams & Round as the latter had previously been described by C.Agardh (1812: as *Diatoma fasciculata* C.Agardh). The specimens observed differ slightly from the original drawing (Kützing 1844: pl. 15, fig. XII) in having longer striae, making this conspecificity somewhat doubtful but, unfortunately, not impossible.

The designation “*Tabularia familiaris* Aysel” published in a check-list of Turkish freshwater algae (Aysel 2005: 90), supposedly a new combination for *Synedra familiaris* Kützing, is invalid as the supposed basionym was incorrectly given as “*Synedra rumpens* var. γ *familiaris* Kützing” and thus a full and direct reference was not given to the author and place of valid publication of the name, with page or plate reference and date as required by ICN Art. 41.5 (Guiry & Guiry 2020). During a search in the collection of the Botanic Garden in Meise (**BR**), an undated sample containing *Synedra familiaris auctorum* collected from Bayeux, Normandy region (France) was discovered. Analysis and comparison of the handwriting with that on other samples indicated that it was collected by L.A. de Brébisson (1798–1872) who lived at Falaise. Bayeux is some 60 km northwest of Falaise. Light microscope observations of the specimens on the mica found in the sample show short, ribbon-like colonies attached to filamentous algae (Figs 2, 3), superficially

similar to the Kützing drawing of *Synedra familiaris*. Since it is not at all certain that the sample represents *Synedra familiaris* as described by Kützing, the population is described as a new species as follows.

Tabularia neofamiliaris Van de Vijver & D.M. Williams, *sp. nov.* (Figs 2–21)

Description: Frustules connected to each other via their valve faces forming ribbon-like colonies, attached to the substrate. Apices only occasionally touching each other. Frustules rectangular, straight. Valves elongated, linear-lanceolate with the largest width in the middle and gradually tapering to small, weakly protracted subcapitate apices. Valves often not entirely straight, weakly curved to undulated. Valve dimensions (n=20): Length 90–120 µm, width 3–4 µm. Axial sternum relatively wide, more than 65% of the total valve width (Fig. 15). Central area absent. Striae very short placed marginally, 13–14 in 10 µm, continuing onto the valve mantle, separated by a relatively broad hyaline margin. Mantle plaques most likely present (Fig. 18, arrows). Striae broader than the virgae, composed of 1–4 slit-like areolae, occluded externally by cribra (Figs 16–19). Cribra intersected by several (1–3) apical rows of small cross bars (Figs 18, 19). Small granules scattered over the valve face (Figs 15, 19). At the poles, one row of small, rounded pores located between the last cribrate striae and the apices (Figs 16, 17). Rimoportulae present at both apices, visible as large, rounded pore. Apical porefield located in a small ocellulimbus, located at the tip of the apices, never reaching the side margins. Porefields composed several rows of large poroids (Fig. 17). Internally, rimoportula transapically and centrally positioned, situated at the end of a sternum plate (Fig. 20). Cross bars clearly visible internally (Fig. 21).

Holotype: slide BR-4584 (**BR**, Meise Botanic Garden); Fig. 10, herewith represents the holotype. Type locality: Bayeux, Calvados, France; material probably collected by Alphonse de Brébisson.

Based on the ultrastructure of the new species, viz, the presence of the cribrate areolae, the broad sternum, the position and number of rimoportulae and the distinct ocellulimbus, *Tabularia neofamiliaris* is clearly referable to the genus *Tabularia* as circumscribed by Williams & Round (1986: 320).

A comparison of *Tabularia neofamiliaris* with images of the type material of the presumably cosmopolitan and widely distributed *Tabularia fasciculata* shows distinct differences (Williams & Round 1986, Snoeijs 1992). The striae in *T. fasciculata* are composed of more areolae than in *T. neofamiliaris*. As a consequence of the shorter striae, *T. neofamiliaris* has a broader sternum. *Tabularia fasciculata* also has a lower stria density (7–13 vs 13–14 in 10 µm) than *T. neofamiliaris*. The rimoportulae in *T. neofamiliaris* are aligned with the striae and located at the end of the sternum whereas in *T. fasciculata*, the rimoportulae are obliquely positioned. Finally, the ocellulimbus is larger in *T. fasciculata* than in *T. neofamiliaris*. Based on these differences, both taxa should be separated as two species.

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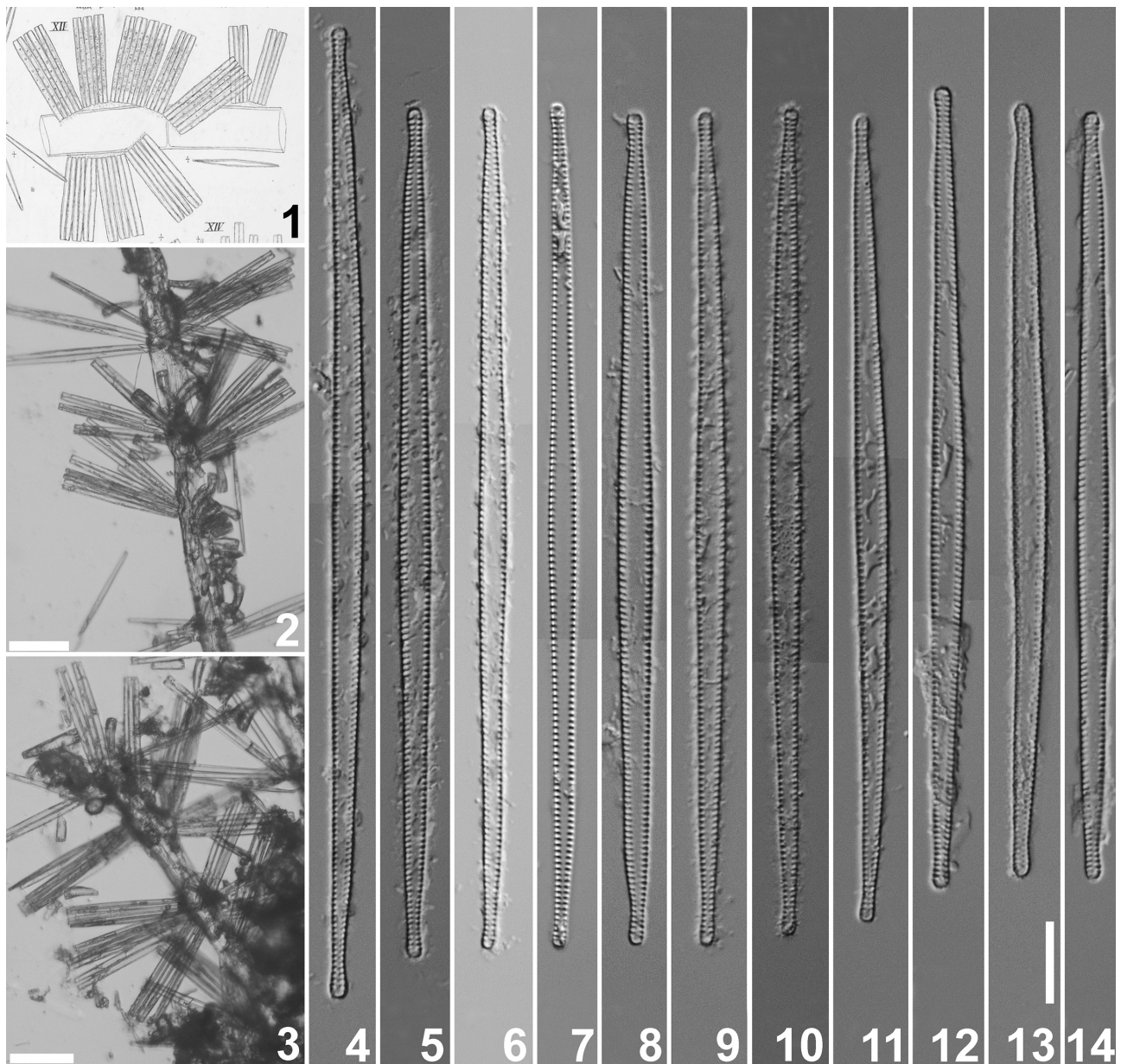
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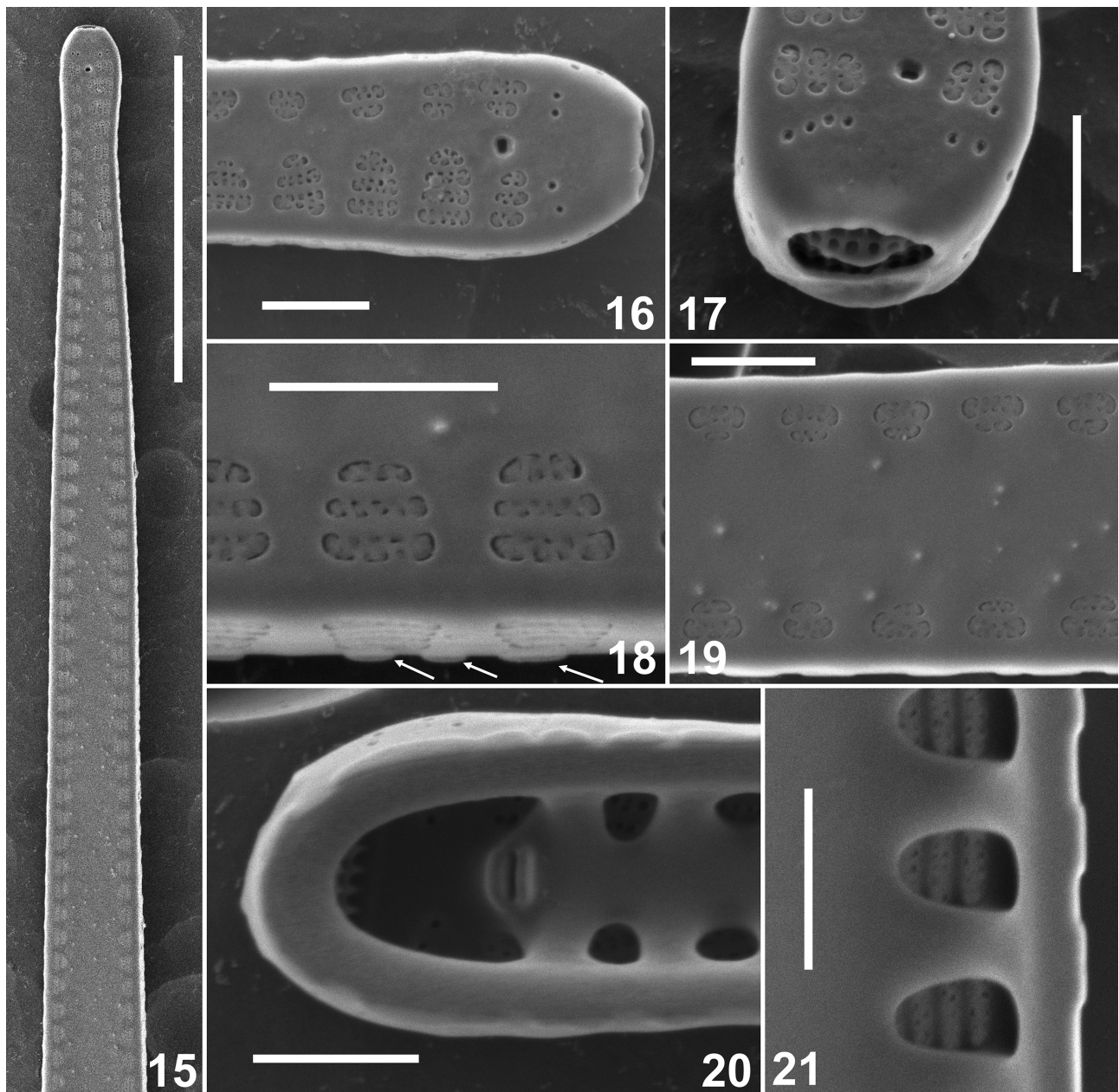
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Figs 1–14. *Tabularia neofamiliaris* Van de Vijver & D.M.Williams, *sp. nov.* Fig. 1. Lectotype drawing from Kützing (1844). **Figs 2–14.** LM observations of the holotype population of *T. neofamiliaris* from Bayeux. **Figs 2, 3.** Untreated material showing ribbon-like colonies attached to filamentous algae. **Figs 4–14.** Several valves showing the broad sternum, the marginally positioned striae and the often weakly curved general valve outline. Scale bar represents 10 μm except for Figs 2 & 3 where scale bar = 50 μm .



Figs 15–21. *Tabularia neofamiliaris* Van de Vijver & D.M.Williams, *sp. nov.* SEM observations of the holotype population from Bayeux. **Fig. 14.** External valve view showing the broad sternum and the position of the rimoportula. **Fig. 15.** External view of a valve apex with the rimoportula, the last stria composed of several small, rounded pores and the ocellulimbus. **Fig. 16.** External view of the ocellulimbus. **Figs 18,19.** External detail of the striae with the cribrate areolae and the scattered granules. The arrows in Fig. 18 indicate the possible presence of mantle plaques. **Fig. 20.** Internal view of the rimoportula. **Fig. 21.** Internal view of the striae with the cross bars. Scale bar represents 1 µm except for Fig. 15 where scale bar = 10 µm.