

Was *Fragilaria pararumpens* Lange-Bertalot, G.Hofmann & Werum 2011 new to science?

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Fragilaria pararumpens Lange-Bertalot, G.Hofmann & Werum (in Hofmann & al. 2011: 269, pl. 8: figs 4-10) was described in 2011 from Eisenschmitt (Rheinland-Pfalz, Germany) to accommodate all populations formerly known as *Synedra familiaris* Kützing (1844: 68, pl. 15: fig. 12) sensu Krasske (1923: 191) or *Synedra rumpens* Kützing (1844: 69, pl. 6, figs 4, 5) sensu Hustedt (1930: 156, fig. 178). Krammer & Lange-Bertalot (2000: pl. 110: fig. 22; pl. 112: figs 10, 11) depicted several valves of this species, which they could not identify with certainty, and named them either *Fragilaria capucina* (“? unbekannte Sippe” [unknown taxon]), *Synedra rumpens* sensu Hustedt or *Synedra familiaris* sensu Krasske. The species is characterized by a distinct, well-delimited and slightly swollen central area, formation of band-like colonies and, a characteristic split at the valve apices between frustules in girdle view (e.g., Lange-Bertalot & al. 2017: pl. 9: figs 9-14). Ecologically, the species usually occurs in large populations in oligosaprobic lowland lakes and running waters, in low altitude mountain ranges and on siliceous substrates (Hofmann & al. 2011: 270; Lange-Bertalot & al. 2017: 271).

Currently, the majority of European taxa belonging to the genus *Fragilaria* are being revised, emphasising analysis of their type material (e.g., Van de Vijver & Ector 2020, Van de Vijver & al. 2020). Many of these taxa were first described by Albert Grunow (1826–1914) in the genus *Synedra*, often based on material he received from Friedrich T. Kützing (1807–1893), George A. Walker Arnott (1799–1868), or Henri F. Van Heurck (1838–1909). Several of these taxa were published based on only a single drawing in Van Heurck’s *Synopsis des Diatomées de Belgique, Atlas* (Van Heurck 1880, 1881, 1882). Additional unpublished information exists in the form of 1) a copy of Van Heurck’s *Atlas* (1881) mostly annotated by Grunow and 2) Grunow’s original drawings, all of which are kept in the Grunow collection at the herbarium of the Naturhistorisches Museum (**W**) in Vienna, Austria. Next to the illustrations in the **W** copy of Van Heurck (1881) for *Synedra* and *Fragilaria*, hand-written notes indicate which sample was used to make the drawing (Fig. 1) as do the drawings themselves, additionally including further information (Fig. 2).

One entity in need of a taxonomic revision is *Synedra rumpens* var. *meneghiniana* Grunow (in Van Heurck 1881, pl. 40: fig. 13). Grunow observed the taxon in a sample collected by Giuseppe Meneghini (1811–1889) from a freshwater habitat (*aq. dulcis*) in Battaglia (probably Battaglia Terme, Padua, Italy). This sample is now included in the collection of F.T. Kützing, in part conserved at Meise Botanic Garden (**BR**) and the herbarium of the Natural History Museum London (**BM**). In the handwritten Kützing catalogue at **BR**, the sample contains several taxa belonging to the genera *Cocconeis*, *Fragilaria*, *Frustulia*, *Gaillonella*, and *Synedra*. Light microscope examination of a slide, prepared from **BR** material, revealed the presence of several *Fragilaria* taxa, including *Fragilaria* cf. *crotonensis* Kitton (1869: 110, fig. 81), *F. mesolepta* Rabenhorst (1861: no. 1041), and a third taxon clearly similar to Grunow’s drawing of *Synedra rumpens* var. *meneghiniana*. Further analysis of the populations showed morphological features and

valve dimensions (Length 35–60 µm, width 3.5–4 µm, stria density 13–15 striae in 10 µm) identical to *Fragilaria pararumpens*. For this purpose, the type material of the latter (sample Hofmann 841 (Salm, Rheinland-Pfalz, Germany, coll. date 2003, leg. G. Hofmann) was investigated. Figures 15–28 represent the type population of *F. pararumpens*. Valves dimensions are: length 28–50 µm, width 3–3.5 µm, stria density: 15–17 in 10 µm. Comparison of this type material with *Synedra rumpens* var. *meneghiniana* shows slightly broader valves for *S. rumpens* var. *meneghiniana* with a lower stria density. Both taxa show a similar split between the frustule apices in girdle view, a similar inflated and clearly delimited central area and the small, protracted subcapitate apices. Despite these small differences, we believe that both taxa are in fact heterotypic synonyms.

Grunow indicated the rank with some doubt, as indicated by the question mark following var. (Fig. 3). Hustedt (1930: 156–157) listed the taxon as *Synedra rumpens* var. *meneghiniana* Grunow. The drawing accompanying Hustedt's description (1930, fig. 178) has the same features as does Grunow's original illustration in Van Heurck (1881), including stria density that is significantly lower than in *Synedra rumpens*. Gandhi (1964: 355, figs 16–17) transferred the taxon to the genus *Fragilaria* as *F. rumpens* var. *meneghiniana* (Grunow) H.P.Gandhi, but this new combination is invalid, because Gandhi (1964: 355) gave Hustedt (1930: 156, fig. 178) instead of Grunow (in Van Heurck 1881: pl. 40: fig. 13) as basionym citation. Ludwig & Flôres (1997: 60), recombined the species as *Fragilaria capucina* var. *meneghiniana* (Grunow) T.A.V.Ludwig & Flôres, this time adding the correct basionym citation. However, their images for this taxon (Ludwig & Flôres 1997, figs 10–11) belong to a different species and are certainly not conspecific with the illustration in Van Heurck (1881).

Since *Synedra rumpens* var. *meneghiniana* was always recombined as a variety and never raised to species rank, this name has no priority over *F. pararumpens* according to ICN Art. 11.2 (Turland & al. 2018).

As the protologue only cites an ambiguous locality name for *Synedra rumpens* var. *meneghiniana*, we hereby designate a preparation from Kützing sample 444 as lectotype for this taxon:

Synedra rumpens var. *meneghiniana* Grunow (in Van Heurck 1881: pl. 40: fig. 13)

Lectotype (**here designated**): **BR**-4642, slide prepared from Kützing sample 444, Battaglia [presumably Battaglia Terme, Veneto], Italy, leg. Meneghini, material present in the Van Heurck collection (**BR**). The lectotype is represented by Figs 4–14.

Isolectotype (**here designated**): **BM** 18937, slide prepared from Kützing sample 444, Battaglia, Italy, leg. Meneghini, present in the Natural History Museum London (**BM**).

Registration: <http://phycobank.org/102676>

In conclusion, the taxon currently accepted as *Fragilaria pararumpens* was not new to science when it was described in 2011, since Grunow had already described it as *Synedra rumpens* var. *meneghiniana* in 1881. However, Hofmann & al. (2011) provided a name in *Fragilaria* with priority at the species level for this taxon, linked to environmental data that are very useful for water quality assessment. As *Fragilaria pararumpens* is valid, *Synedra rumpens* var. *meneghiniana* should be considered a synonym:

Fragilaria pararumpens Lange-Bertalot, G.Hofmann & Werum (in Hoffmann & al. 2011: 269–270, pl. 8: figs 4–10)

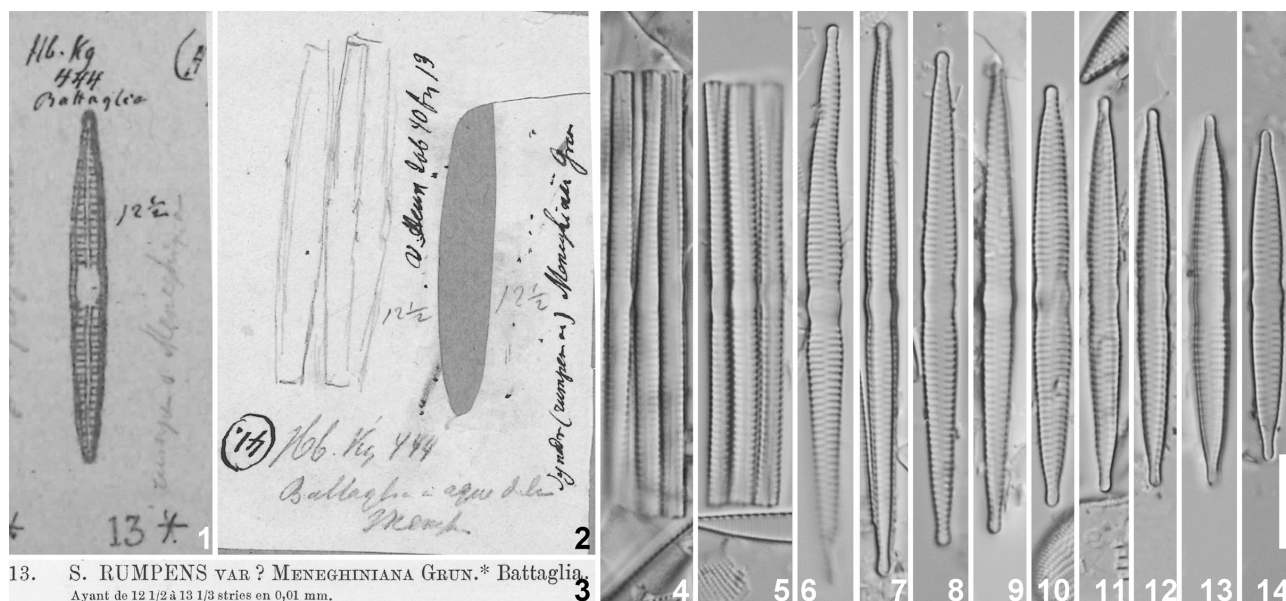
Synonyms: *Synedra rumpens* var. *meneghiniana* Grunow (in Van Heurck 1881, pl. 40: fig. 13), *Fragilaria rumpens* var. *meneghiniana* (Grunow) H.P.Gandhi *nom. inval.* (1964: 355, figs 16–17), *Fragilaria capucina* var. *meneghiniana* (Grunow) T.A.V.Ludwig & Flôres (1997: 60, ? figs 10–11)



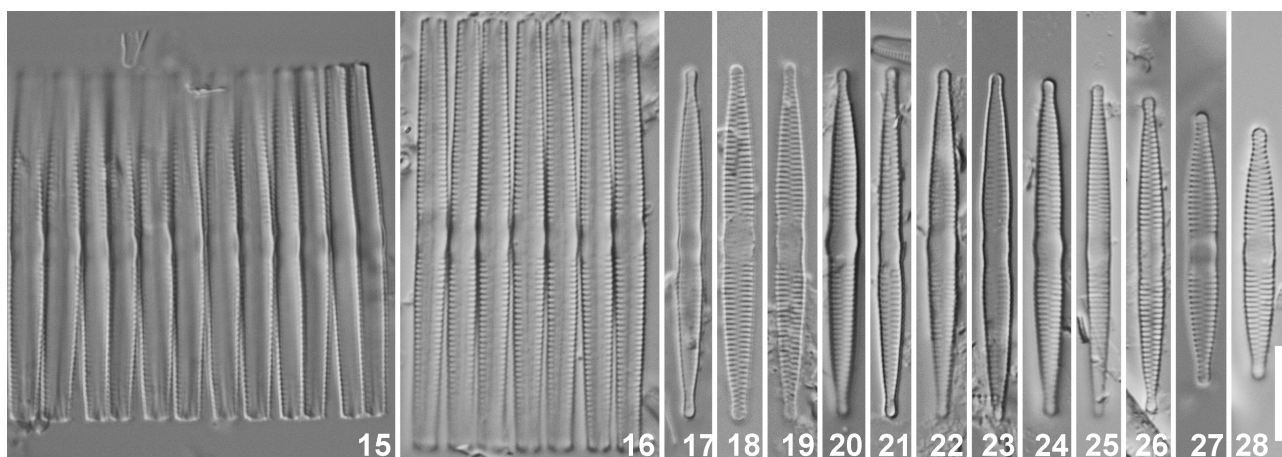
Concept synonyms: *Synedra familiaris* Kützing *sensu* Krasske (1923), *Synedra rumpens* Kützing *sensu* Hustedt (1930)

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Figs 1–14. *Synedra rumpens* var. *meneghiniana* Grunow (= *Fragilaria pararumpens* Lange-Bertalot, G.Hofmann & Werum in Hofmann & al.) **Fig. 1.** Original drawing of *Synedra rumpens* var. *meneghiniana* Grunow (in Van Heurck 1881: pl. 40: fig. 13). **Fig. 2.** Cut-out remainder of the original drawing for figure 13 from Van Heurck (1881: pl. 40) showing sample number Hb [Herbarium] Ktz [Kützing] 444 and indicating ‘*Battaglia in aqua dulcis Menegh.*’ **Fig. 3.** Original caption in Van Heurck (1881) for pl. 40, fig. 13. **Figs 4–14.** Cell diminution series cycle of *Synedra rumpens* var. *meneghiniana* Grunow showing the lectotype material (Kützing sample 444). Figs 4 & 5 show frustules in girdle view. Note the split at the apices between the frustules in fig. 4. Scale bar = 10 µm.



Figs 15–28. *Fragilaria pararumpens* Lange-Bertalot, G.Hofmann & Werum. LM pictures taken from the Type population (sample Hofmann 841; Salm, Rheinland-Pfalz, Germany, coll. date 2003, leg. G. Hofmann). Cell diminution series cycle. Figs 15 & 16 show frustules in girdle view. Note the split at the apices between the frustules. Scale bar = 10 µm.