

**Typification and observations of *Cavinula scutelloides* (W.Smith ex W.Gregory) Lange-Bertalot (*Cavinulaceae*, *Bacillariophyta*)**

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*Cavinula scutelloides* (W.Smith ex W.Gregory) Lange-Bertalot (in Lange-Bertalot & Metzeltin 1996: 31) originally appeared in Gregory (1856: 4, pl. 1: fig. 15, as *Navicula scutelloides* Sm.) but without a description. Gregory (1856: 4) listed the species, together with three others as being ‘*MS species; named by Prof. Smith but unpublished*’ and provided a single illustration (Gregory 1856, pl. 1: fig. 15). However, no description was provided. In the same year, Smith (1856: 91) gave a description of the species (*Valve nearly orbicular; striae moniliform, 18 in .001". Length of F. .0007". Breadth of V. .0006". v.v.*) and refers to the publication of the species in Gregory (*W. Sm. in Greg. Mic. Journ. vol. iv. p. 4. pl. i. 15*), confirming that Gregory (1856) is the place of effective publication of the name. Although no formal written description was added in Gregory (1856), the illustration is sufficient to validate the name under the provisions of Art. 38.7 of the ICN (Turland & al. 2018). Lange-Bertalot (in Lange-Bertalot & Metzeltin 1996: 31, no fig.) transferred the species to the genus *Cavinula*, based on the morphological features that are shared by species in the genus *Cavinula* D.G.Mann & Stickle citing Gregory (1856) as the place of publication of the basionym.

The type material for the species, however, has never been properly studied. Gregory (1856: 4) gave Norfolk (England) and Loch Leven (Scotland) as syntype localities. Smith (1856: 91) cited “Ormesby, Norfolk Sept. 1853, Mr. Bridgman. Rostherne Mere, Cheshire Sept. 1855, Dr. [Walker] Arnott. Cantyre Peat, &c.” The Van Heurck collection, conserved in Meise Botanic Garden (**BR**, Belgium), includes the material William Smith used for *Synopsis of the British Diatomaceae* (Smith 1853, 1856) and almost the entire Walker Arnott collection. Hoover (1976), compiling a complete catalogue of the entire William Smith collection kept in **BR**, did not list any entry for *Cavinula* (*Navicula*) *scutelloides*, indicating that there is no specific sample for this species in the collection. However, a closer inspection of the collection following an analysis of *Staurosira exigua* (W.Smith) Van de Vijver & Guiry (Van de Vijver & Guiry 2022) showed that at least two of these samples were collected by Mr. Bridgman in April and October 1853 in Ormesby, Norfolk. Additional samples from Norfolk collected by Mr. Bridgman were found under *Epithemia alpestris* W.Smith, but they did not mention Ormesby explicitly. Both Ormesby samples contain a fairly large population of *Cavinula scutelloides*.

Cvetkoska & al. (2014) revised some *Cavinula* species from North America and included *C. scutelloides* in their analysis. Although they did not specify exactly in the publication what type material was used, two of the illustrated valves (Cvetkoska & al. 2014: figs 103 & 104) were taken from the “type slide” W. Smith Ormesby (as “Omersby”). A formal lectotypification, however, was not made. They also incorrectly cited the written description in Smith (1856) as the place of publication of the basionym.

Here, we detail observations on specimens of *C. scutelloides* based on slides prepared from both William Smith samples collected in Ormesby in April and October 1853, using light and scanning electron microscopy. The material from October 1853 is here designated as lectotype for *Navicula scutelloides* W.Smith ex Gregory.

*Cavinula scutelloides* (W.Smith ex W.Gregory) Lange-Bertalot (in Lange-Bertalot & Metzeltin) 1996 (Figs 1–11)

Basionym: *Navicula scutelloides* W.Smith ex Gregory, *Quarterly Journal of Microscopical Science*, new series, London, 4: 4, pl. I: fig. 15, 1856.

**Lectotype (here designated):** BR-4722, slide prepared from W.Smith sample Ormesby, Norfolk, coll. date October 10, 1853, leg. Mr. Bridgman, original material present in the Van Heurck collection (**BR**). This lectotype is represented by Fig. 3.

Registration (of lectotypification): <http://phycobank.org/103172>

Homotypic synonym: *Schizonema scutelloides* (W.Smith ex W.Gregory) Kuntze 1898

Description: Frustules solitary. Valves broadly elliptical in larger specimens, becoming more rounded in smaller valves. Apices broadly rounded. Valve dimensions (n=20): length 14–25 µm, width 10–15 µm. Axial area rather narrow, linear. Central area enlarged due to several irregularly shortened central striae. Raphe branches straight with spatulate central raphe endings and weakly deflected, elongated terminal raphe fissures continuing onto the valve mantle. Internally central raphe endings hooked. Terminal endings terminating onto small helictoglossae. Striae uniseriate, composed of large, rounded areolae, distinctly radiate throughout, 9–12 in 10 µm. Shortened central striae placed between long striae. Areolae well discernible in LM, ca. 15 in 10 µm. In SEM, areolae clearly rounded to elliptical, depressed with smaller pore opening occluded halfway the areolar tube by volae.

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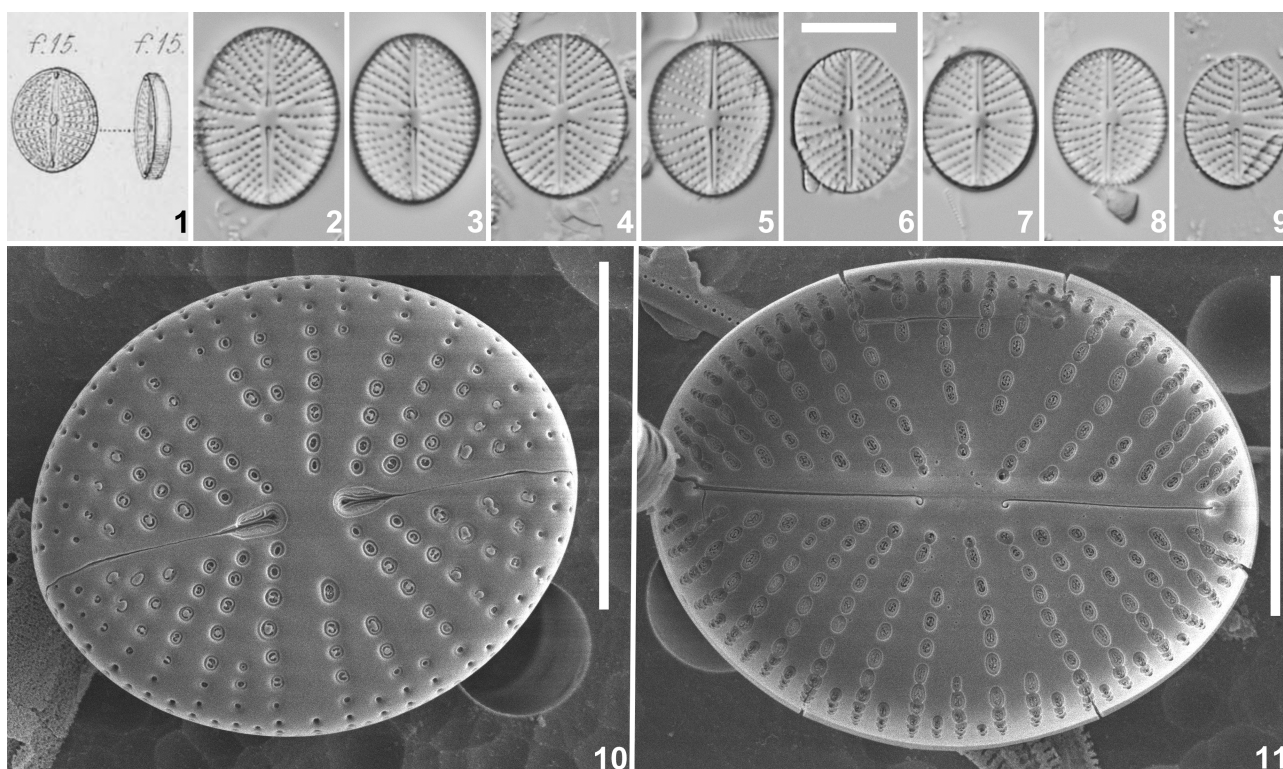
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**Figs 1–11.** *Cavinula scutelloides* (W.Smith) Lange-Bertalot. LM and SEM pictures taken from the lectotype material (**BR**-4722, Ormesby, Norfolk, October 10th 1853, leg. Mr. Bridgman). **Fig. 1.** Original drawing taken from Gregory (1856, plate I, fig.15). **Figs 2–9.** LM pictures of valves in decreasing length series. **Fig. 10.** SEM external view of an entire valve. **Fig. 11.** SEM internal view of an entire valve. Scale bars = 10  $\mu$ m.