

Observations and typification of *Pinnularia rabenhorstii* Hilse (*Pinnulariaceae*, *Bacillariophyta*)

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Hilse (1861: 82) described *Pinnularia rabenhorstii* “Hilse nov. spec.” as follows “*Die Seitenansicht ist linear oder auch zu weilen nach den Enden etwas verschmälert, die Enden selbst sind kopfförmig abgeschnürt und verrundet; die Frontansicht ist linear. Länge meist 7/300 Mm, Breite etwas über 1/300 Mm. Die Querstriche sind ziemlich fein, radienartig und verlaufen unter einem Winkel von 40–45°*” [In girdle view linear or occasionally towards the apices weakly narrowed, the apices themselves are capitately protracted and broadly rounded. In valve face view linear. Length mostly 23 µm, width 3.5 µm. Striae rather fine, radiate with an angle of 40–45°]. Hilse (1861) did not illustrate any of his new taxa in this publication but for each one refers to material that was published in Rabenhorst’s exsiccata set ‘*Die Algen Sachsens*’. *Pinnularia rabenhorstii* was included in Decas 85–86, n° 842 (Rabenhorst 1859). Each sample in the exsiccata set *Algen Sachsens* was accompanied by a printed label including a description in German and as these labels were effectively published (Turland & al. 2018, ICN Art. 29), the description in the label of *P. rabenhorstii* Hilse (in Rabenhorst 1859) validated the name in 1859. The label also gives the original sampling locality in Silesia (“Reichenbach in Schlesien in großer Menge”). Hilse (1861: 82) also give a further description of the sampling locality (“*Sie kommt in einem mit Sphagnum umgürteten Tümpel auf dem Rücken der Eule in großer Menge vor*” [The species was abundantly found in a pool surrounded by *Sphagnum* located in the Owl Mountains near the Polish town Dzierżoniów (in German, Reichenbach im Eulengebirge)].

De Toni (1891: 66) considered *P. rabenhorstii* Hilse to be a synonym of *Navicula rabenhorstii* Ralfs (in Pritchard 1861: 899), the latter being a new name for *Pinnularia interrupta* Rabenhorst (Rabenhorst 1853: 44), non *Pinnularia interrupta* W.Smith (1853: 59, pl. XIX: fig. 184), although priority has not been established. Analysis of the description of *Navicula rabenhorstii* in Pritchard (1861) and Rabenhorst (1853) for *N. rabenhorstii* Ralfs and *P. interrupta*, respectively, indicates that this taxon has an inflated central area and broadly rounded apices and is more likely to be related to *Pinnularia nobilis* (Ehrenberg) Ehrenberg. Although it is clear that *P. rabenhorstii* Hilse is not related to *N. rabenhorstii* Ralfs, Hilse’s name was subsequently overlooked, and later authors, such as Van Heurck (1880–1885), Cleve (1894, 1895), Cleve-Euler (1953), Hustedt (1930, 1966) Krammer (1992, 2000) and Lange-Bertalot (Lange-Bertalot & al. 2017), do not mention the name in their monographs.

Part of the reason why *P. rabenhorstii* Hilse did not reappear in later literature is perhaps because of the existence of *Navicula rabenhorstii* Grunow (Grunow 1860: 515, a new name for *Navicula thuringiaca* [sic] Rabenhorst (1852: 59), *nom. illeg.* The latter, described from Schnepfenthal in Thuringia (eastern Germany), was a later homonym of *Navicula thuringica* [sic] Kützing (1844: 102) despite the small difference in the name (Turland & al. 2018, ICN art. 53.2). Krammer (2000: 22), unaware of Hilse’s earlier name, transferred *Navicula rabenhorstii* to the genus *Pinnularia* as *P. rabenhorstii* (Grunow) Krammer, replacing the former *P. borealis* var. *thuringiaca* Krammer (Krammer 1992: 58), *nom. illeg.* (superfluous). Gogorev (in Sokolova & al. 2018) pointed out the illegitimacy of *P. rabenhorstii* (Grunow) Krammer and renamed it *Pinnularia neorabenhorstii*

Gogorev (in Sokolova & al. 2018: 544), and explicitly excluded from the synonymy of his new name Hilse's taxon *P. rabenhorstii*.

VanLandingham (1978: 3302) listed the species as "*Pinnularia rabenhorstiana* (Hilse in Rabenhorst 1859) Peragallo (1903)" based on "*Navicula rabenhorstiana* Hilse (in Rabenhorst 1859)" but this is clearly an error as the label for *Algen Sachsens* No. 842 reads *P. rabenhorstii* and a designation "*N. rabenhorstiana*" is not mentioned.

The exact identity of *P. rabenhorstii* Hilse remains, however, unknown. Original material from Rabenhorst's *Algen Sachsens* exsiccata set was retrieved from the Van Heurck collection at **BR**. The sample contained a fairly large population of a rather small *Pinnularia* taxon fitting the description of Hilse (in Rabenhorst 1859) and Hilse (1861). Comparison of LM and SEM observations of this type material of *P. rabenhorstii* Hilse showed that the Hilse name is conspecific with *Pinnularia seignavouxensis* Beauger, Allain & Van de Vijver (2020: 8, fig. 5) described from a small temporary pond at Laqui de Seignavoux, in the Puy-de-Dôme department (Auvergne-Rhône-Alpes region, France). The latter, clearly now a later heterotypic synonym of *P. rabenhorstii* Hilse, was found to differ from all known *Pinnularia* species at that time (see Beauger & al. 2020 for a full analysis).

Here we detail observations on specimens of *P. rabenhorstii* Hilse from Rabenhorst No. 842 in **BR** using light and scanning electron microscopy. The **BR** material is formally designated as lectotype for this species in accordance with ICN Art. 9.3 (Turland & al. 2018) and isolectotypes are available in many herbaria worldwide that have copies of the *Algen Sachsens* exsiccata.

Pinnularia rabenhorstii Hilse (in Rabenhorst 1859: No. 842) (Figs 1–16)

Lectotype, **designated here**: **BR**-4653 Rabenhorst No. 842 (Dzierżoniów, Poland, leg. F.W. Hilse), material archived at the Van Heurck collection (**BR**). The lectotype is represented by Figs 1–16.

Heterotypic synonym: *Pinnularia seignavouxensis* Beauger, Allain & Van de Vijver (in Beauger & al. 2020: 8, fig. 5)

Description: Frustules rectangular in girdle view. Valves linear to weakly linear-lanceolate with parallel to very weakly convex margins and distinctly protracted, subcapitate to rostrate apices. Valve dimensions (X=20): length 26–40 µm, width 6–80 µm. Axial area narrow, linear, only slightly widening at the central area. Central area rhombic to elliptic, only rarely (larger specimens) reaching the margins due to more distantly spaced central striae. Raphe filiform, straight with deflected, drop-like expanded central raphe endings and elongated, deflected terminal raphe fissures continuing onto the valve mantle. Internally central raphe endings covered by large siliceous flap giving the internal raphe the impression of continuing without interruption. Terminal raphe endings terminating onto small helictoglossae. Striae strongly radiate at the central area becoming parallel and gradually convergent towards the apices, 13–14 in 10 µm. Near the central area, striae gradually shortening. Longitudinal lines crossing the striae absent. Internally, alveolus structure clearly visible.

Beauger, A., Allain, E., Voldoire, O., Wetzel, C.E., Ector, L. & Van de Vijver, B. (2020) Temporal Evolution of Diatoms in a Temporary Pond Situated in the Massif du Sancy Mountains (Massif Central, France) and Description of a New *Pinnularia* Species. *Diversity* 12 (367): 1–19.

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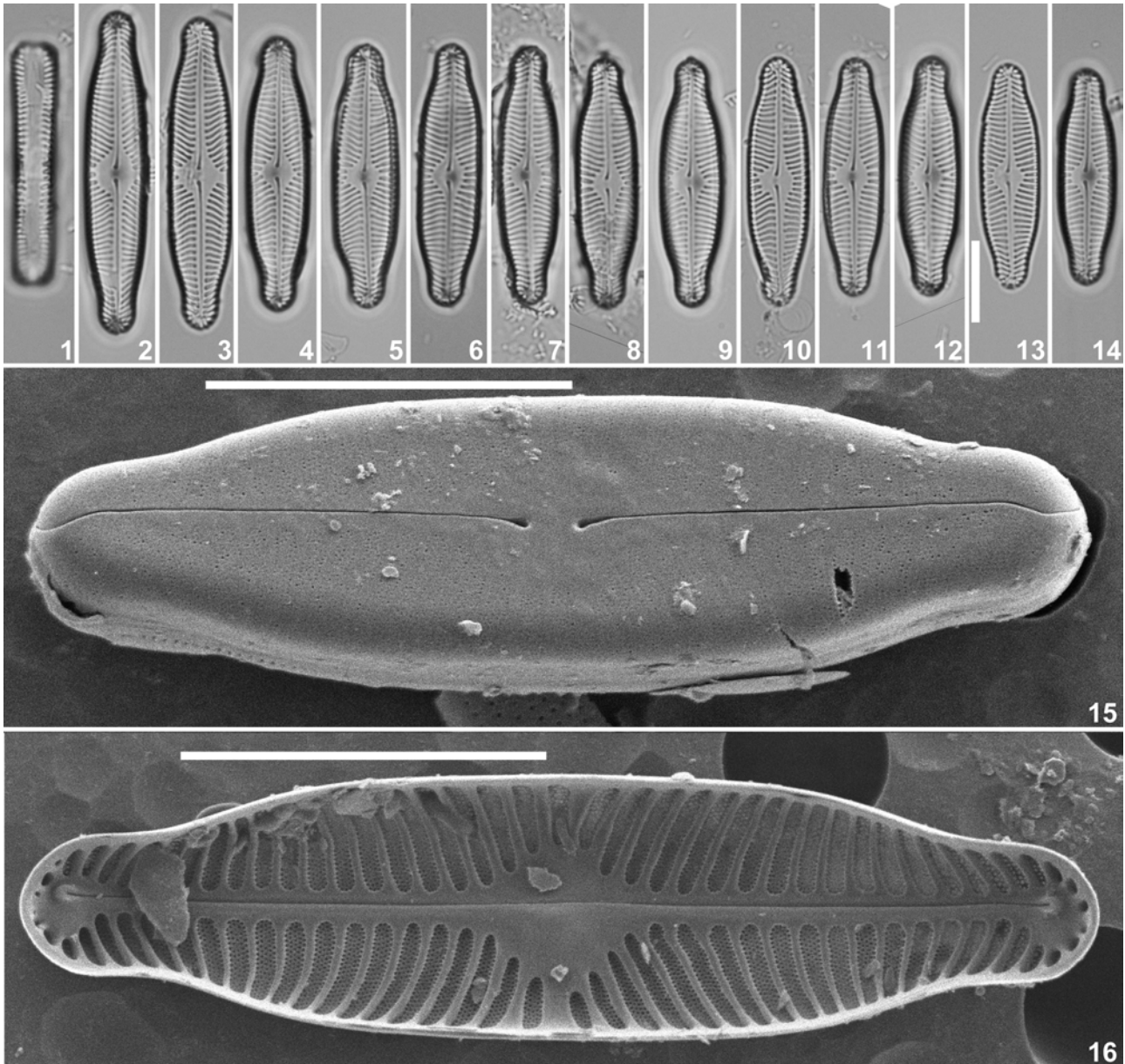
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Figs 1–16. *Pinnularia rabenhorstii* Hilse. LM and SEM pictures taken from the lectotype population (Rabenhorst *Algen Sachsens* No. 842, Dzierżoniów, Poland, BR-4653). **Figs 1–14.** LM views. Fig. 1 represents a frustule in girdle view. **Fig. 15.** SEM external view. **Fig. 16.** SEM internal view. Scale bars = 10 μ m.