
Validation of “*Cocconeis therezienii* Le Cohu & Maillard”, a freshwater diatom species (*Cocconeidaceae*, *Bacillariophyta*) from the subantarctic îles Kerguelen.

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The binary designation “*Cocconeis therezienii*” was introduced by Le Cohu & Maillard (1983: 145) based on material collected by P. Maire on 26 July 1975 from the benthos of Lac supérieur (Val Studer, Grand Terre, îles Kerguelen (southern Indian Ocean). Several years later, Lange-Bertalot & Krammer (1989) proposed a transfer to the genus *Achnanthes* based on the presumed similarity with *Achnanthes* taxa such as *A. oblongella* Østrup (1902: 34). In 2002, Van de Vijver *et al.* (2002) proposed a transfer to the genus *Psammothidium* as *Psammothidium therezienii* (Le Cohu & Maillard) Van de Vijver. It was sporadically reported from the subantarctic islands in the southern Indian Ocean (Riaux-Gobin 1994, Van de Vijver & Beyens 1998, Le Cohu 2005). All reports confirm the rarity of this taxon.

During a recent revision of the monoraphid diatom flora of the subantarctic region, we realized that “*Cocconeis therezienii*” is in fact an invalid binary designation as a holotype was not designated, which is in conflict with ICN Art. 40.1 (Shenzhen Code, Turland *et al.* 2018) that “Publication on or after 1 January 1958 of the name of a new taxon at the rank of genus or below is valid only when the type of the name is indicated.” In the original description, more than 10 gatherings (often composed of multiple samples) are indicated in which the new species was found. There is unfortunately not a single gathering indicated as type, rendering the binary designation invalid. The original description is accompanied by a series of LM and SEM illustrations (Le Cohu & Maillard 1983, figs 1, 2, 29, 30-37, 56, 84-97, 189, 190) but, unfortunately, there is no indication as to which sample the pictures refer.

Originally the honorific epithet was rendered ‘*therezienii*,’ correctable under Art. 60 (Turland *et al.* 2018) and previously corrected by Lange-Bertalot & Krammer (1989) when they introduced the binary designation “*Achnanthes therezienii*”, also invalid as the proposed basionym was invalid and the new binary designation was not validated as no type was designated and a Latin description was not provided. *Psammothidium therezienii*, proposed by Van de Vijver in Van de Vijver *et al.* (2002) is therefore also an invalid designation.

Here we propose to validate the name as a species of *Cocconeis* based on the original material, using light microscopy observations. Unfortunately, unmounted material was unavailable for scanning electron microscopy. Therefore, additional material from a small brook near Port Raymond (sample BM385, Grand Terre, îles Kerguelen, leg. B. Van de Vijver, coll. date 06 February 1998) in which a small population of *C. therezienii* was found, was used for the SEM analysis. This BM385 sample is a paratype.

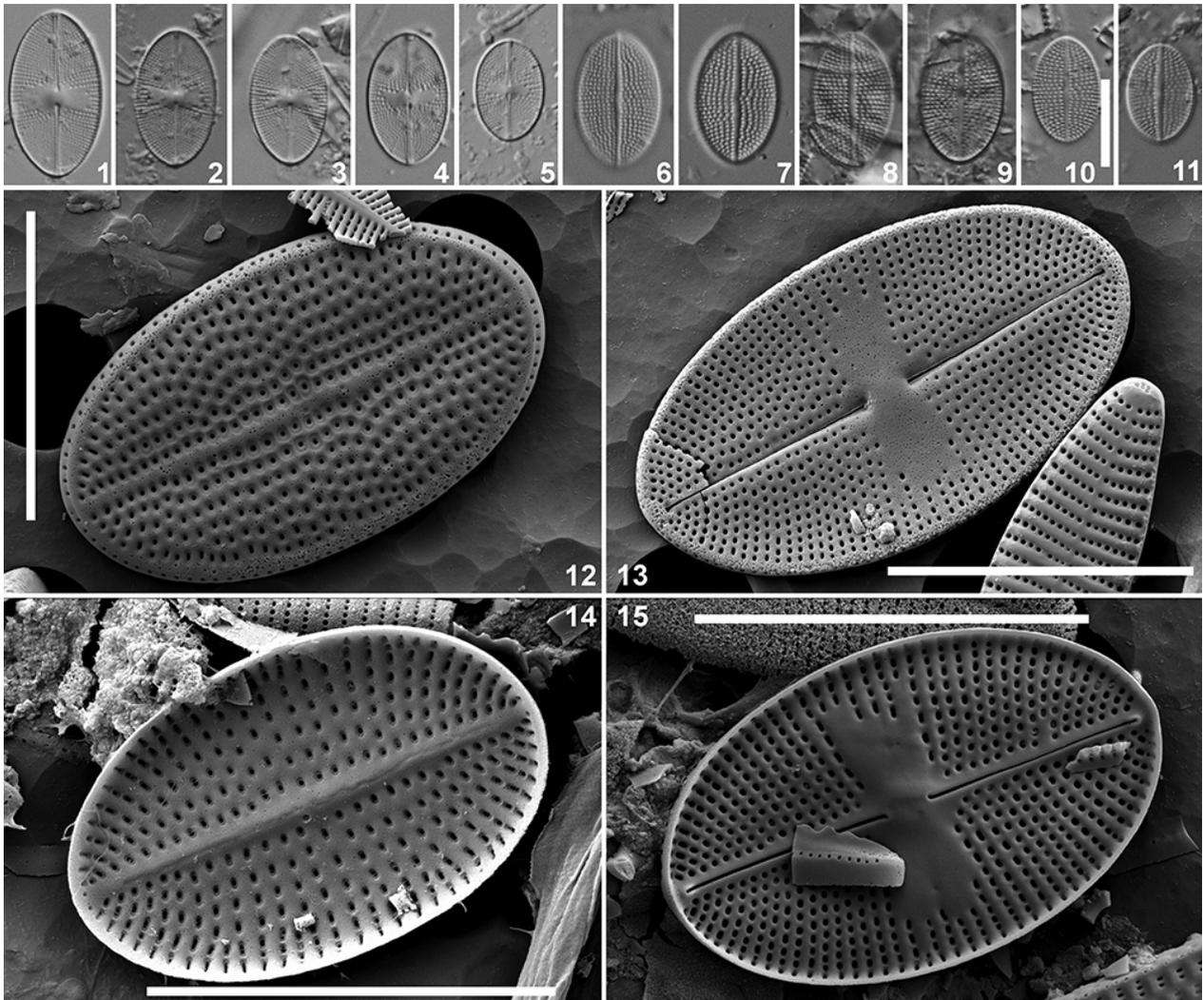
***Cocconeis therezienii* Le Cohu & Maillard ex Van de Vijver & Le Cohu, sp. nov.** (Figs 1–15)

Replaced designation: “*Cocconeis therezienii*” in Le Cohu & Maillard 1983, *Annales de Limnologie* 19(3): 145, figs 1, 2, 29, 30-37, 56, 84-97, 189 & 190, *nomen invalidum sine typo designato*.

Holotype: Lac Supérieur (Studer), îles Kerguelen, benthos, leg. P. Maire, coll. date 26 July 1975. **BR-4543** (Meise Botanic Garden, Belgium).

Paratype: Port Raymond, îles Kerguelen, sample BM385, leg. B. Van de Vijver, coll. date 06/02/1998, collected from submerged mosses in a small river, **BR-4544** (Meise Botanic Garden, Belgium).

Etymology: Named in honour of the French phycologist Yves Thérézien (Muséum National d'Histoire Naturelle de Paris).



Figs 1–15. *Cocconeis therezienii* Le Cohu & Maillard ex Van de Vijver & Le Cohu, *sp. nov.* LM pictures taken from the holotype slide BR-4543, SEM pictures taken from the paratype slide, BR-4544. Figs 1–11. LM showing raphe valves (Figs 1–5) and rapheless valves (Figs 6–11). Figs 12–15. SEM pictures showing rapheless valves (Figs 12, 14) and rapheless valves (Figs 13, 15). Scale bars = 10 μm .

Description: Valves elliptical with clearly convex margins and non-protracted, broadly rounded apices. Valve dimensions (n=25): length 12–25 μm , width 7–11 μm . Raphe valve (Figs 1–5, 13, 15): axial area very narrow, linear, not widening near the central area. Central area wedge-shaped, bordered by several (up to 10) shortened striae. External raphe branches short, straight, weakly widening towards the central area, with simple, straight central pores. Terminal raphe fissures absent. Internally, central raphe endings weakly deflected into opposite sides. Terminal raphe endings terminating onto faint helictoglossae. Striae uniseriate, radiate throughout, composed of very small, rounded areolae. Stria density increasing towards the apices, 20–24 in 10 μm near the central area becoming up to 30 at the apices. Areolae clearly discernible in LM. One row of mantle areolae present. Rapheless valve (Figs 6–11, 12, 14): Axial area linear, narrow but clearly thickened. Central area absent. Hyaline, near the apices clearly thickened, ridge surrounding the entire valve. Striae uniseriate, weakly radiate, becoming more radiate near the apices, composed of

transapically enlarged (near valve margins) to rounded (near axial area) areolae, 19–22 in 10 µm. Areolae close to the axial area located at the bottom of shallow, individual depressions. Internally, areolae relatively large, showing a very narrow silica ring inside each areola. Mantle areolae rounded.

Our morphological results confirm the taxonomic position of *Cocconeis therezienii* within the genus *Cocconeis* and generic affinities to *Achnanthes* and *Psammothidium* are not apparent. The species shows all characteristics of the genus *Cocconeis* such as the relatively simple raphe structure lacking terminal raphe fissures, the clear heterovalvarity showing a distinct difference in areola shape and size between raphe and rapheless valve, the shallow mantle. *Achnanthes oblongella* Østrup, recently transferred to the genus *Platessa* as *Platessa oblongella* (Østrup) C.E. Wetzel, Lange-Bertalot & Ector (Wetzel *et al.* 2017) shows some similarity in the structure of its raphe valve (similar type of areolae and striae, and a similar raphe structure) but the structure of the rapheless valve is clearly different with, for the genus *Platessa* typical, biseriate striae, a larger axial area and clear, broad, virgae separating the striae. A transfer of *Cocconeis therezienii* to the genus *Platessa* is therefore not justified.

Cocconeis therezienii shows some similarity to *Cocconeis feuerbornii* Hustedt (1937: 188, pl. XIII: figs 1, 2, 'Feuerborni') from Bogor, Indonesia, based on the structure (in LM) of the raphe valve, but it can be separated based on the rapheless valve that possesses a much finer striation pattern in the latter compared to *C. therezienii* that has larger areolae.

With the reinstatement of *C. therezienii*, the number of endemic freshwater *Cocconeis* species in the subantarctic region is doubled. Romero & Van de Vijver (2011) described *Cocconeis crozetensis* Romero & Van de Vijver (2011: 91, figs 2-30) from the île de la Possession in the nearby Crozet archipelago. Riaux-Gobin (1994) listed all *Cocconeis* species in the Subantarctic and Antarctic regions but did not mention other freshwater species. Manguin (in Bourrelly & Manguin 1954) described *Cocconeis kerguelensis* Manguin (in Bourrelly & Manguin 1954: 18), but the latter should be considered as a synonym of *Platessa oblongella*. On the islands in the southern Pacific Ocean, several unidentified *Cocconeis* species have been found (Van de Vijver, unpubl.), but none of them show any similarity with *C. therezienii*.

Dr. Oscar Romero is thanked for his valuable advice on the taxonomic position of *C. therezienii*.

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