

The diatom genus *Tetracyclus* (Fragilariaceae, Bacillariophyta) from Chile

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Ehrenberg referred only once to the diatom species *Biblarium chilense* Ehrenb. (1854: 301, 303, *nom. nud.*) in the text to his *Mikrogeologie* (Ehrenberg, 1854). His comments are relatively uninformative; he never published an illustration:

“*B[iblarium] chilense* ist eine dem *Bibl. compressum* verwandte neue Art” (Ehrenberg, 1854: 301, and noted in the table on p. 303)

“*B[iblarium] chilense* is a new species related to *Bibl. compressum*” (translation modified after Ralfs in Pritchard, 1862: 806)

Consequently the name *Biblarium chilense* is a *nomen nudum*. Even so, some years later De Toni, observing neither illustration nor specimen, transferred it to *Tetracyclus* as *Tetracyclus (chilensis) chilense* (Ehrenb.) De Toni (De Toni 1892: 749).

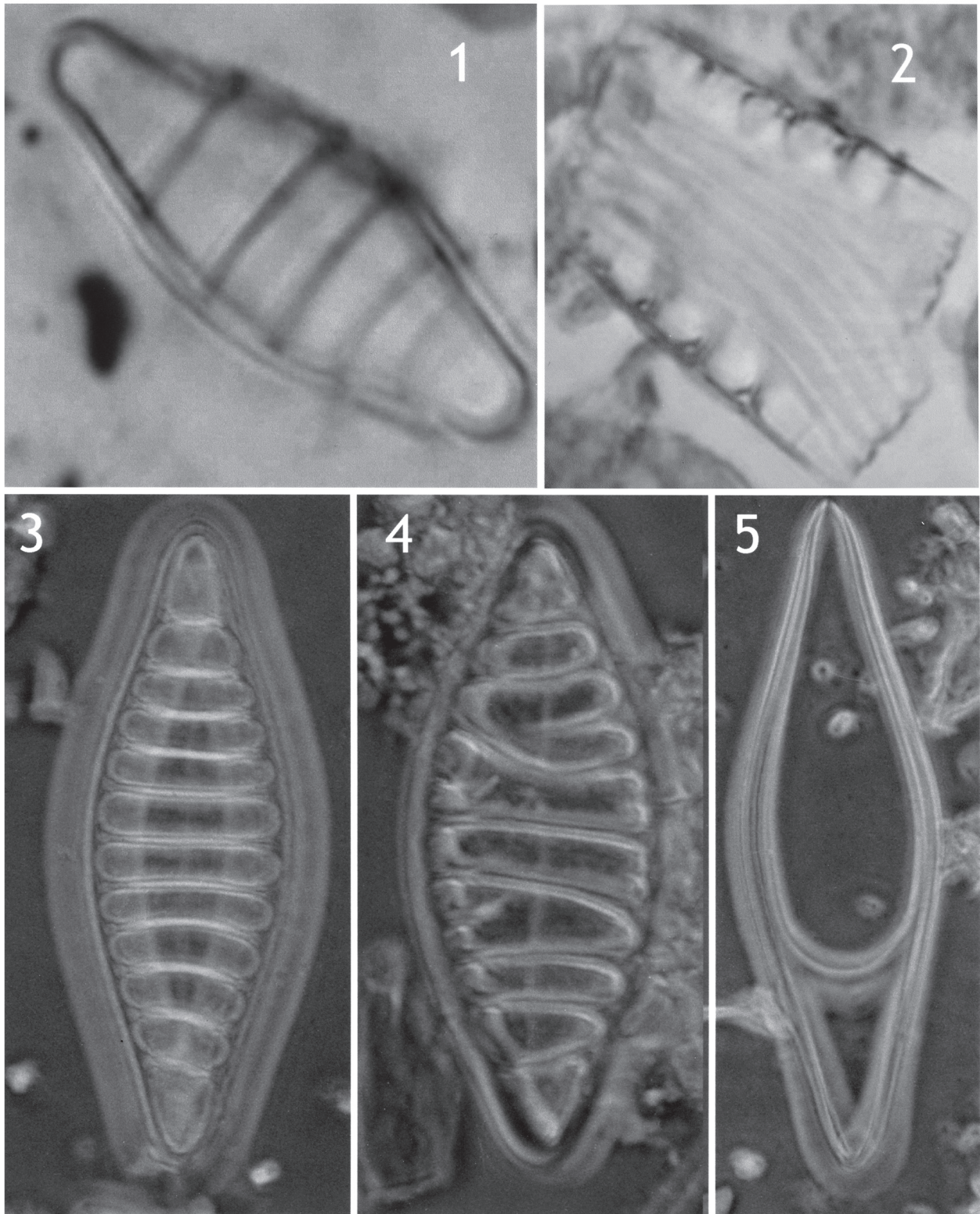
Regardless of these nomenclatural details, that a species of *Tetracyclus* was found in Chile offered data of potential biogeographic interest (Williams 2004) and Ehrenberg’s comparison with *Tetracyclus compressum* (Ehrenb.) M. Peragallo (in Héribaude 1893: 159; basionym: *Biblarium compressum* Ehrenberg 1843: 73) prompted the following remarks:

“His [Ehrenberg’s] comparison with *B. compressum* implies synonymy with *Tetracyclus ellipticus* (Williams, 1996). A further possibility exists in that *B. chilense* is a synonym of *Tetracyclus ellipticus* var. *lancea* f. *chilensis* Krasske (1939: 357, pl. 10, figs 14–19; Lange-Bertalot *et al.* 1997 [1996]: 185, 204, Tafel 1, figs 1–8). It seems that this taxon should perhaps be elevated to species level and thus another endemic *Tetracyclus* identified by Ehrenberg relevant to the Pacific divide (pers. obs.; see Lange-Bertalot *et al.* 1997 [1996]: Tafel 1, figs 1–8)” (Williams & Huxley, 1998: 6, footnote 1).

Thus, it was necessary to examine both Ehrenberg’s specimens of *Biblarium chilense* and Krasske’s specimens of *Tetracyclus ellipticus* var. *lancea* f. *chilensis*.

Ehrenberg’s type material of *Biblarium chilense* was identified in his collection as mica BHUPM EC 171007a and is a single specimen within a blue paper ring (Fig. 1). This specimen is the holotype as it is specifically identified in the unpublished catalogue compiled by Ehrenberg’s daughter, Clara (Lazarus & Jahn 1998). Two additional specimens were found on the same mica. Examination of these three specimens render my earlier speculations concerning their synonymy with *Tetracyclus ellipticus* var. *lancea* f. *chilensis* unfounded, as there is little doubt that Ehrenberg’s specimens of ‘*Biblarium chilense*’ are really members of a species of *Odontidium* Kütz., as in girdle view the characteristic septate girdle bands of *Tetracyclus* are absent (Fig. 2). With these few meagre specimens, however, it is difficult to ascertain which species of *Odontidium* it actually is (Figs 1 and 2).

The taxon Georg Krasske (1939: 356) described as *Tetracyclus ellipticus* var. *lancea* f. *chilensis*, however, does belong to *Tetracyclus* as it does possess the distinctive septate girdle bands (Figure 5). Although it is possibly related to other ‘*lancea*’ species (Williams 1996), it has does have a distinctive transapical rib structure: almost all are entirely primary, that is, extend uninterrupted across the valve face (Figs 3, 4) and as I am inclined to avoid infra-specific taxa (their meaning being generally somewhat obscure), Krasske’s taxon is best regarded as another species of *Tetracyclus*, rather than as a ‘part’ (variety, forma, etc.) of *Tetracyclus ellipticus* or *Tetracyclus lancea*. There are a number of slides in Krasske’s collection that may be considered type material (see below). Lange-Bertalot *et al.* (1996: 185) selected three as syntypes and presented illustrations from slide D III 204 (Lange-Bertalot *et al.* 1996: Taf. 1, figs 1, 2, “Gürtelansichten”)



FIGURES 1–2. Specimens of *Biblarium chilense* BHUPM EC 171007a blue, “Cordillere [Chile], Bau eine Megachile Leg. Poeppig 1828”). The specimen in Figure 1 is listed on the paper tray accompanying the mica; Figure 2 is one of the two additional specimens found on the same mica, included here for the girdle view. These specimens belong to *Odontidium* Kütz. **FIGURES 3–5.** Lectotype specimens of *Tetracyclus krasskei* from “Thermae of Puyehene, Peulo River, Fiord of Reloncavi, Lake Risopatrón, Pascua River, Yacuf snowdrift, near Puyuhuapi, D. III 204.

and slide D III 190 (Lange-Bertalot *et al.* 1996: Taf. 1, figs 3–8, “Schalenansichten und Zwischenbänder mit Septen”). They included two extra illustrations of specimens from slide D III 204 (Lange-Bertalot *et al.* 1996: Taf. 1, figs 9, 10), which appear somewhat different from the others, causing them to suggest that these may be of an as yet described species of *Tetracyclus*—the possibility remains, instead, that they are of an un-described species of *Odontidium* but not the same as those named *Biblarium chilense* by Ehrenberg (1854). Illustrations of *Tetracyclus ellipticus* var. *lancea* f. *chilensis* included here are taken from two of Krasske’s slides D III 27 and D III 28 (Figures 3–5). Thus, formal systematic conclusions are as follows:

Tetracyclus krasskei D. M. Williams, *stat. nov. et nom. nov.*

Basionym: *Tetracyclus ellipticus* var. *lancea* f. *chilensis* Krasske (1939: 357, pl. 10, figs 14–19) *non Biblarium chilense* Ehrenb. 1854, p. 301, 303, *nom. nud.*

Valves lanceolate, strongly tapering towards poles, 40–120 µm long, 25–35 µm wide (Figures 3, 4; Lange-Bertalot *et al.* 1996, Taf. 1, figs 3–5). Transapical ribs robust; predominantly primary, rarely secondary, usually more or less parallel, 2–3 in 10 µm (Figures 3, 4; Lange-Bertalot *et al.* 1996, Taf. 1, figs 3–5). Striae more or less parallel, 4–8 rows between ribs. Sternum central, linear, marginally broader at the centre, obscure at the poles (Figures 3, 4). Rimoportulae not observed (absent?) (Figures 3, 4; Lange-Bertalot *et al.* 1996, Taf. 1, figs 3–5). Girdle bands numerous, open, septate (Figure 5; Lange-Bertalot *et al.* 1996, Taf. 1, figs 7, 8); septum extending up to ¼ length of valve from one pole (Figure 5; Lange-Bertalot *et al.* 1996, Taf. 1, figs 1, 2). Possibly 15–20 in total, differentiation not detected.

Type: CHILE: “Thermae of Puyehene, Peulo River, Fiord of Reloncavi, Lake Risopatrón, Pascua River, Yacuf snowdrift, near Puyuhuapi” (Krasske 1939: 357) (KASSEL Krasske Collection D III 204 = Figs 3–5, **lectotype! designated here**; three Krasske slides selected as syntypes in Lange-Bertalot *et al.* 1996: D. III 190, 191 and 204).

Additional material:

CHILE: “Provinz Llanquihue, Termas Puyehue, In *ciaromium crassinervatum* (Mitt.) unter einen Wasserfall des gleichen Baches (Wassertemp. 12.8°), 16.XI. 1935.” “Reloncain-Fjord: In Mischrasen an einen Baumstumpf auf einer Viehweide am Rio Puelo - 29.XI.1935”. “Ebenda: Moose von Baumstämmen (nahe bei 68)” (Krasske 1939: 357): KRASSKE D III, 27, 28, 154, 156, 178, 180-4, 187, 190, 191, 198, 204, 668-70, 748.

PATAGONIA: Lago Frey, Nahuel Huapi, Northern Patagonia (material from Thomasson 1959: 48, UPSV; no specimens found)

GUADELOUPE: “Savane à Mulets...” (Bourrelly and Manguin 1952, PC; no specimens found).

Additional illustrations: Lange-Bertalot *et al.* (1996: Taf. 1, Figs 1–8).

Observations: Valves in each population are more or less uniform in their characteristics except for size variations. One possible auxospore valve was observed which had broadly rounded poles gently tapering to the centre causing a slight central constriction suggesting a similar developmental trajectory as other species in the “*ellipticus*” group (Williams 1996).

As the name *Tetracyclus chilense* has been already been used, even if illegitimate, it is best not applied to Krasske’s taxon and thus the new name *Tetracyclus krasskei* is proposed in honour of Georg Krasske, its discoverer (see Hustedt 1952 and Lange-Bertalot *et al.* 1996: 9–10 for biographical details on Krasske).

Tetracyclus krasskei is known only from Chile (Cleve-Euler 1943: 222; Krasske 1939, 1949; Rivera 1983) and although the name of Krasske’s taxon was applied to specimens from lakes in South Patagonian by Thomasson, no specimens were found on re-examination of his material (Thomasson 1959, 1963). Bourrelly and Manguin (1952: 39, pl. I, fig. 12) recorded specimens they named *Tetracyclus ellipticus* var. *lancea* f. *elongata* Hust. (in A.W.F. Schmidt *et al.* 1912: Pl. 281, figs 13–14; Hustedt 1914: 102) from “Savane à Mulets” in Guadeloupe. In their discussion, they refer to Krasske’s taxon as being similar. No specimens of *Tetracyclus krasskei* (or any other species of *Tetracyclus*) from “Savane à Mulets” were found on re-examination of their material (in PC).

As *Tetracyclus chilense* is a *nom. nud.* (= *Biblarium chilense nom. nud.*) and is an as yet to be described species of *Odontidium* (Figs 1–2), details of the specimen that was to have been the holotype are included below:

Type: CHILE: “Erde vom Zellenbaue einer *Megachile* der Cordilleren, leg. Prof. Poeppig” [= ‘Soil from a plant with similar cell structure to *Megachile*... [from] Prof. Poeppig’, translations] (Ehrenberg 1854: 301) (BHUPM EC 171007a, holotype! found within blue paper ring = Fig. 1; 171007a is shorthand notation meaning that the specimen is located

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in case 17, folder 10, strip 7, mica a; this specimen is noted in Clara Ehrenberg's unpublished catalogue of her father's specimens ("Cordilleren K. 17, B. 10"), now available online (ECTI018.tif, <http://download.naturkundemuseum-berlin.de/Ehrenberg/Ec%20Clara%20Index%20Vols/ECINDEX%20single%20pages/ECTI-A/>). Two additional specimens were also found on this mica).

In conclusion, the specimen Ehrenberg referred to as *Biblarium chilense* is a species of *Odontidium* that has yet to be described, and therefore does not refer to an endemic species of *Tetracyclus*—but the specimens named by Krasske as *Tetracyclus ellipticus* var. *lancea* f. *chilensis* does represent a new species of *Tetracyclus*, which is endemic to Chile.

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