

Priority of the names *Gyrocyllindrus* Strelnikova & Nikolaev and *Cylindrospira* Mitlehner (*Hemiaulaceae*, *Bacillariophyta*)

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Gyrocyllindrus Strelnikova & Nikolaev (1995: 93) was described for a single species, *G. antiquus* Strelnikova & Nikolaev (1995: 94), found in Paleogene sediments of the Volga region (Kamyshin Formation) and Denmark (Moler Formation; Strelnikova & Nikolaev 1995: 93). Further, Strelnikova & Nikolaev suggested that *Gyrocyllindrus* should belong in its own family ‘Gyrocilindraceae’ [*sic*, correctly *Gyrocyllindraceae*] tentatively placed within the order Biddulphiales. The family name was never validly published nor formally described, although that description would not have differed from the one known species.

In the protologue for *G. antiquus*, Strelnikova & Nikolaev specify the type (“*Typus: Regio Volgensis, prov. Ulianovsk, opp. Sengilei, mons Granoe Ucho dictus*”) and the collection (“*Collectio in cathedra Botanicae facultatis Edaphobiologicae Universitatis Petropolitanae conservatur*”) but do not cite any specimen(s). They do not include light micrographs of specimens but clearly state in the figure legends that of their eight figures (all scanning electron micrographs), the specimens depicted in figures 1 and 8 are from “1, 8 o–v Fur (Daniya), obrazets 602/10; 2–7 - g. Sengiley, gora Granoye Ukho, obrazets 58” [Fur Island (Denmark), sample 602/10] and the specimens in figures 2–7 are from Sengiley, mountain Granoe Ukho, sample 58”, the latter being from the stated type locality (Arts 40.1, 40.2). Thus, the genus and species should be considered validly published but the family name, “*Gyrocyllindraceae*”, is not.

The name *Cylindrospira* Mitlehner was published somewhat later, in 1996 (Mitlehner 1996: 323). Although the date printed on the journal cover is November 1995, the actual date of publication was March 1996 (Lockett, pers. comm.; received at **BM** on 26th March 1996, and at **B** on 29th March, Kusber pers. comm., for the latter). The genus had just one species, *Cylindrospira simsiae* Mitlehner (*‘simsi’*) with two forms: *Cylindrospira simsiae* f. *simsiae** (*‘simsi’*) and *Cylindrospira simsiae* f. *homanniae* Mitlehner (*‘homannii’*), both from “Knudeklint, Island of Fur, Denmark. Sample level ‘D 292’ (Homann 1991 [p. 18, “Knudeklint/Stolleklint (Steilufer) | Cementsteine | zwischen A-22 und A-29”]). *Cylindrospira simsiae* was said to be typified with **BM** 82367 and that the holotype specimen could be found at England Finder reference N 34.3 and illustrated with four figures (Mitlehner 1996, figs 12, 13, 16, 17); other specimens found on the same slide (**BM** 82367) were to be considered isotypes and illustrated with two figures (Mitlehner 1996, figs 14, 15). It was also noted that “... a total of nine specimens of *Cylindrospira* have so far been found ...”. This information differs from that on the plate legend for fig. 12–17 (Mitlehner 1996: 329), which instead indicates that **BM** 82366 is the holotype. An examination of **BM** 82366 reveals just two selected specimens. When observed, the specimen on the left (when the slide labels are read from left to right) is figured in Mitlehner and named as the holotype (Mitlehner 1996, figs 12, 13, 16, 17), the specimen on the right is figured and named as the isotype in Mitlehner (1996, figs 14, 15). **BM** 82367 cannot be found and so cannot be re-examined. As an England Finder number was provided to locate the designated holotype specimen, one might assume it would refer to a strewn

* *Cylindrospira simsiae* is noted for figs 3-6, 9-18 and *Cylindrospira simsiae* f. *homanniae* for figs 6, 7. This should be figs 2-5 and 8-17 for *Cylindrospira simsiae*, and figs 6 and 7 for *Cylindrospira simsiae* f. *homanniae*.

slide rather than a selected specimen, yet both the figured holotype and isotype are selected specimens[†].

The holotype of *Cylindrospira simisiae* f. *homanniae* was given as “SEM stub D 292”[‡] instead of a glass slide, with a “total of three specimens discovered at present, recorded with certainty only from the type material” (Mitlehner 1996: 325). Nevertheless, because of priority of publication, *Cylindrospira* is a heterotypic synonym of *Gyrocyllindrus*.

“*Pyxilla multiseptata*” Gleser (1995: pl. 1: fig. 16) is an invalid designation as it was not provided with a description and a type but along with *Cylindrospira simisiae* has been acknowledged as a synonym of *Gyrocyllindrus antiquus* (e.g., Khokhlova & Oreshkina 1999: 443, Oreshkina & Aleksandrova 2007: 212–3).

The taxonomic position of *Gyrocyllindrus* is somewhat equivocal. As noted above, Strelnikova & Nikolaev (1995, also Oreshkina & Oberhänsli 2003: 172) placed it in its own (invalid) family within the *Biddulphiales*. After assessing all the available evidence, Mitlehner instead suggested it belonged in the *Hemiaulaceae*. Taxonomically, the genus *Gyrocyllindrus* is worthy of further investigation to establish just how many species are assignable to the genus, what its relationships are, and to which family it should be referred (Witkowski 2022).

Gyrocyllindrus Strelnikova & Nikolaev 1995: 93.

Type: *Gyrocyllindrus antiquus* Strelnikova & Nikolaev 1995: 94

Heterotypic synonyms “*Pyxilla multiseptata*” Gleser, 1995: [132] pl. 1: fig. 16, *nom. inval.*

Cylindrospira simisiae f. *simisiae* Mitlehner 1996: 323 (‘*simisi*’)

Cylindrospira simisiae f. *homanniae* Mitlehner 1996: 325 (‘*simisi*’)

Type locality: Russia: “*Regio Volgensis, prov. Ulianovsk, opp. Sengilei, mons Granoe Ucho dictus*” [...] [Sengiley, mountain Granoe Ukho]”

Holotype: “*Collectio in cathedra Botanicae facultatis Edaphobiologicae Universitatis Petropolitanae conservatur*”, sample 58 (Strelnikova & Nikolaev 1995, figs 2–7, holotype).

Other material: Denmark: Knudeklint: Island of Fur, sample level ‘D 292’ [“Knudeklint/Stolleklint (Steilufer) | Cementsteine | zwischen A-22 und A-29”] (Homann 1991 [p. 18])” (BM 82367 [missing], holotype specimen of *Cylindrospira* (‘*simisi*’) *simisiae* f. *simisiae* at England Finder N 34.3, lost); BM 82366, two selected specimens: specimen 1, to the left = Mitlehner [‘1995’] 1996, figs 12, 13, 16, 17 = **lectotype (designated here)**; specimen 2, to the right = Mitlehner [‘1995’] 1996, figs 14, 15, **isolectotype**; “SEM stub D 292” holotype of *Cylindrospira simisiae* f. *homanniae*, lost = Mitlehner [‘1995’] 1996, figs 6, 7 = **lectotype (designated here)**.

[†] Although not effectively published, Mitlehner in his thesis, initially recognized two species of *Cylindrospira* rather than two forms of one species and provided **BM** numbers for the type of each. These numbers (BM82284–6) were subsequently assigned to other specimens in the BM collection unrelated to Mitlehner’s study (1995). Mitlehner illustrated *Cylindrospira simisiae* Mitlehner (‘*simisi*’) with eight figures (pl. 11, figs 1–8) and a line drawing (that remained unpublished, Mitlehner 1995: 149) and ‘*Cylindrospira homannii*’ with three figures (pl. 11, figs 9–11). The published holotype figure of *Cylindrospira simisiae* f. *simisiae* in Mitlehner [‘1995’] 1996: figs 12, 13, 16, 17 = Mitlehner 1995: pl. 11, figs 1, 5, 6, 8; the published holotype figure of *Cylindrospira simisiae* f. *homanniae* in Mitlehner [‘1995’] 1996, fig. 7 = Mitlehner 1995: pl. 11, fig. 9 (oriented differently).

[‡] This stub cannot be found, thus the published images will be the holotype.

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