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NOTE

A NOTE ON THE IDENTITY OF *CERATONEIS IYENGARII* GONZALVES & GANDHI (FRAGILARIOPHYCEAE, BACILLARIOPHYTA)

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The genus *Ceratoneis* Ehrenberg, as listed in the online *Catalogue of Diatom Names* (2007), has 103 names if redundancy of duplicated entries is ignored. It seems quite possible that most, if not all, of these taxa (and associated names) will end up in different genera, if they have not already been transferred. Many of the freshwater species of *Ceratoneis* are better placed in *Hannaea* R. Patr. (although some understand *Hannaea* as synonymous with *Fragilaria* Lyngb., e.g. Krammer & Lange-Bertalot 1991, 2000), the marine species better placed in *Cylindrothecea* Rabenh. (Medlin & Mann 2007). In short, *Ceratoneis* has been used as a 'dumping ground' for many unrelated diatom species that happen to have curved valves and, usually, a central area on the concave side. To make matters worse, typification of *Ceratoneis* is controversial and still being debated (Jahn & Kusber 2005, Medlin & Mann 2007). This paper can (mercifully) avoid these contentious issues as we discuss only specimens named as the species *Ceratoneis iyengarii* Gonzalves & Gandhi, a taxon described some 50 plus years ago from a brackish water locality in Mahim Creek, Mumbai (then Bombay), India (Gonzalves & Gandhi 1952). The original Latin description provided by Gonzalves & Gandhi is given in Figure 1; the English translation provided is as follows:

> "Frustules solitary, free-floating. Valves vary strongly arcuate with a prominent gibbosity in the middle of the concave side, tapering very slightly from the middle towards the poles which are broadly rounded. Raphe absent on both valves. Pseudoraphe uniformly broad and distinct, somewhat excentrical. Unilateral central area present, but marked with indistinct scattered puncta. Striae radial and distinctly punctuate" (Gonzalves & Gandhi 1952, p. 123).

Given the characters usually associated with species of *Ceratoneis* (curved valves and, usually, a central area on the concave side) it is no surprise these specimens ended up there. Only one figure was provided (Gonzalves & Gandhi 1952, p. 124, fig. 11), reproduced here as Figure 2, rotated through 180°. Gonzalves & Gandhi (1952) cite no particular specimens in the protologue, none that might be interpreted as types (Gonzalves & Gandhi 1952, p. 123 describe it as 'rare').

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1 Frustula solitaria libere fluctuantia Valvæ fortissime arcuatae, prominenter tumescentes ad lateres concavi medium, tenuissime decrescentes a medio in utrumque apicem qui obtuse rotundus est Raphe in utraque valva abest Pseudoraphe uniformiter lata et distincta, aliquantum ex medio exorbitans Area centralis unilateralis adest, sed indistinctissimis punctis signatæ. Striæ radiatæ et distincta punctatæ Longit 63–67 μ; latit 12–6–13 μ; Striæ 8 in 10 μ

Fig. 1. Reproduction of the Latin description of *Ceratoneis iyengarii* (Gonzalves & Gandhi 1952, p. 123).

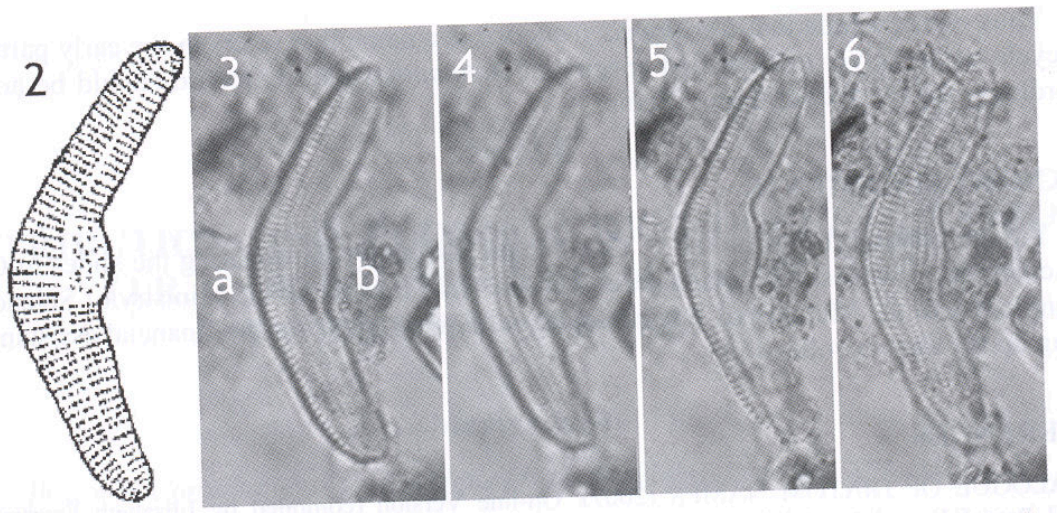
In 2006 Gandhi's entire diatom collection was donated to the Energy and Wetlands Research Group at the Centre for Ecological Sciences, Indian Institute of Science (IISc), Bangalore, India and a programme of collection development is currently being implemented, which will include typifying Gandhi's taxa as well as digitizing the specimens and many drawings. Among the slides, a specimen of *Ceratoneis iyengarii* was found on Slide No. CESH-5-92 (Dharavi rd [road], [Mahim Creek], brackish water, 23-12-45) that resembled the illustration in Gonzalves & Gandhi (1952, fig. 11).

Gonzalves & Gandhi (1952, p. 123) provided some basic dimensions, which were compared to the specimen found on No. CESH-5-92 suggesting that they are of similar dimensions:

	Gonzalves & Gandhi	Specimen on CESH-5-92
Length	63–67 µm	69 µm
Breadth	12.6–13 µm	Poles: 10.5 µm; Centre: 12.3 µm
Striae	8 in 10 µm	10 in 10 µm

This specimen is best considered a lectotype. It is clear that the specimen is neither a species of *Hannaea* nor *Cylindrothecea*; while both valves of the frustule are curved, they differ in structure from each other: the image is actually of a developing frustule of a species of *Achnanthes* Bory. The frustule illustrated in Figures 3–6, the lectotype, is of an initial araphid valve (Fig. 3a) coupled with the perizonium of the raphid valve (Fig. 3b) – the raphid initial cell is not yet formed. Further specimens, from slide no CESH-5-94 ((Dharavi rd [road], [Mahim Creek], brackish water, 23-12-45), also show what appears to be a possibly deformed araphid valve (Fig. 7; maybe a vegetative cell?) and an initial araphid valve also from a species of *Achnanthes* (Fig. 8).

Comparison of our Figures 3–6 with Sabbe *et al.* (2004, fig. 42), who illustrate the central and lateral bands of the longitudinal perizonium of *Achnanthes* cf. *subsessilis*, show a certain identity in structure and position (see also Roshchin & Chepurnov 1993, for *Achnanthes brevipes* var. *intermedia* (Kütz.) Cleve; Mizuno, 1994 for *Achnanthes javanica* f. *subconstricta* (Meister) Hust.; Toyoda *et al.* 2005, for *Achnanthes yaquinensis* McIntire & Reimer; and Toyoda *et al.* 2006, figs 26–28 for illustrations of the perizonium and initial valves of *Achnanthes crenulata* Grunow). As for the deformed araphid valve in our Figure 7, a similar valve for *Achnanthes longipes* C.A. Agardh was illustrated in Chepurnov & Mann (1999, p. 3), who note "Even during expansion, it was not uncommon for one auxospore to abort in each pair. The contents of such auxospores looked abnormal (Fig. 1) and they never developed into initial cells" (for further details see Roshchin & Chepurnov 1992 and Chepurnov & Mann 1997).



Figs 2–6. Fig. 2. Reproduction of Gonzalves & Gandhi (1952) Figure 11 of *Ceratoneis iyengarii*, rotated through 180° for ease of comparison. **Figs 3–6**. Lectotype specimen (CESH-5-92, 'Dharavi rd [road], brackish water, 23-12-45') of *Ceratoneis iyengarii*: an initial araphid valve (a), the perizonium of the raphid valve (b). Length 69 µm, breadth poles 10.5 µm, centre 12.3 µm, striae 10 in 10 µm. Images at alternative focal planes.

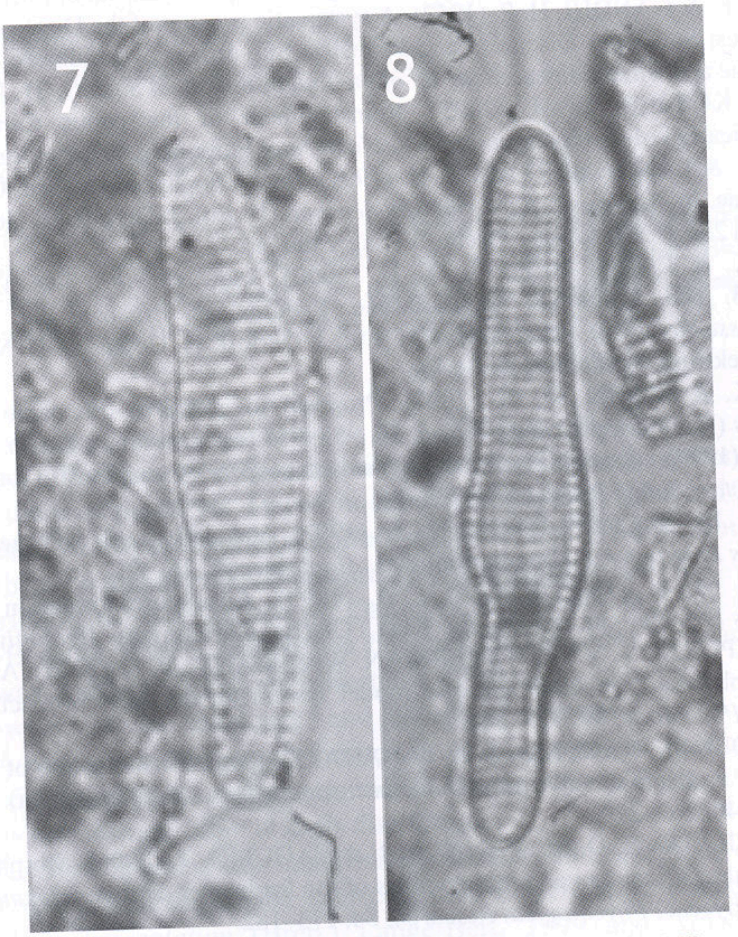


Fig. 7. 1st specimen from CESH-5-94 ('Dharavi rd [road], brackish water, 23-12-45'), possibly a deformed araphid valve, a vegetative cell? Length 50.3 µm, breadth poles 7.3 µm, centre 9.7 µm, striae 8 in 10 µm. **Fig. 8**. 2nd specimen from CESH-5-94 ('Dharavi rd [road], brackish water, 23-12-45'), an initial araphid valve of a species of *Achnanthes*. Length 74.6 µm, breadth poles (upper) 8.1 µm, (lower) 6.8 µm, centre 12.1 µm, striae 8 in 10 µm.

Thus, we conclude that *Ceratoneis iyengarii* is a name that refers to the early part of the life-cycle of an as yet unidentified species of *Achnanthes* and its record should be adjusted accordingly for the diatom flora of India.

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