Nomenclatural Changes for Some Diatoms Found in Iowa

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Nomenclatural revisions for four diatom taxa found in Iowa, two of which are presently maintained in the Loras College Freshwater Diatom Culture Collection (FDCC), are necessary because of systematic interpretations of the Division Bacillariophyta. Achnanthidium hauckianum (Grun.) Czarnecki comb. nov. was originally assigned to the genus Achnanthes Bory. Three taxa were previously assigned to the morphologically diverse genus Navicula Bory. These are Cavinula weinzierlii (Schimanski) Czarnecki comb. nov., Craticula subcapitata var. major (Meist.) Czarnecki comb. nov. and Craticula halophila var. subcapitata (Ostrev.) Czarnecki comb. nov.

INDEX DESCRIPTORS: Diatoms, Achnanthidium hauckianum, Cavinula weinzierlii, Craticula subcapitata var. major, Craticula halophila var. subcapitata, Diatom Cultures, Taxonomy, Bacillariophyta, Navicula, Achnanthes.

Taxonomy and systematics are dynamic and historical disciplines associated with all major groups of organisms. For diatoms (Division Bacillariophyta), significant revisions in nomenclature and perceived generic phylogenies have occurred, especially during the past fifteen years. Reasons for this are doubtless related to increased resolution afforded by computer aided classification tools, scanning electron microscopy (SEM), and new optical methods (e.g., differential interference contrast [DIC]). Diatoms have been increasingly used as indicator organisms in applied ecological studies, especially of acid precipitation (e.g., Battarbee 1984), global warming (e.g., Fritz et al. 1993) and water quality (e.g., Stoermer et al. 1985). Thus the need for their accurate identification and consistent nomenclature is imperative.

While the revised systematic literature associated with diatoms remains scattered, several treatments, all European, warrant mention here, especially those of Simonsen (1979), Krammer and Lange-Bertalot (1986, 1988, 1991a, 1991b) and Round et al. (1990). Unfortunately, these works are not monographic and appear to be somewhat restricted to nominate varieties or varieties more common in Europe. Hence many varieties, or nominate taxa which are uncommon in Europe but more frequently observed in North America, have not received comparable nomenclatural attention. Until such time as there is a resurgence in North American diatom floristics, nomenclatural revisions will apparently be restricted to taxa available through museum and/or other collections (e.g., Hamilton et al. 1992, Czarnecki 1987). This paper provides nomenclatural revisions for four diatom taxa presently maintained in the Loras College Freshwater Diatom Culture Collection (Czarnecki 1993; 1994) and/or encountered by the author in floristic studies of Iowa streams.

TAXONOMIC REVISIONS

Achnanthidium hauckianum (Grun.) Czarnecki comb. nov. Basionym: Achnanthes hauckiana Grunow in Cleve & Grunow 1880, pp. 21-22.

An epipelic population of this diatom was collected on 11 December 1992 from Bloody Run Creek, site 2 riffle [E 1/2, SE 1/4, SE 1/4, NW 1/4, Sec. 28, T-90N, R2E, Dubuque Co., IA] (Cawley and Czarnecki 1993). Based on enumeration of 500 valves, this taxon was present in a relative frequency of 0.08. Attempts by the author to isolate and culture this taxon have been unsuccessful.


An epipelic population of this diatom was collected on 10 May 1993 from Bloody Run Creek, site 2, riffle pool [SE 1/4, NW 1/4, SW 1/4, Sec. 21, T-90N, R2E, Dubuque Co., IA] (Cawley and Czarnecki 1993). Based on enumeration of 500 valves, this taxon was present in a relative frequency of 0.01. Attempts by the author to isolate and culture this taxon have been unsuccessful.

Craticula subcapitata var. major (Meist.) Czarnecki comb. nov. Basionym: Navicula subcapitata var. major Meister 1912, p. 134, Pl. 20, fig. 10. non Navicula subcapitata var. major Frenguelli 1924, p. 77, Pl. 7, figs. 8, 12 (1993/1924, p. 236, Pl. 7, figs. 8, 12).

A single cell of this diatom was successfully isolated on 20 November 1991 from an epipelic sample of algae collected from Bloody Run Creek, site 3 pool [NW 1/4, SE 1/4, NW 1/4, SE 1/4, Sec. 28, T-90N, R2E, Dubuque Co., IA] and is currently maintained as clonal, unialgal culture L652 (Czarnecki 1993).

Craticula halophila var. subcapitata (Ostrev.) Czarnecki comb. nov. Basionym: Navicula halophila var. subcapitata Ostrev 1910, p. 29, Pl. 1, fig. 22.

A single cell of this diatom was successfully isolated on 10 November 1991 from an epipelic sample of algae collected from Rush Lake [SE 1/4, NW 1/4, SE 1/4, Sec. 36, T-100N, R40W, Osceola Co., IA] and is currently maintained as clonal, unialgal culture L606 (Czarnecki 1993).

DISCUSSION

The diatom genus Achnanthidium was first proposed by F.T. Kürzing (1844) to include more or less linear (in valve view), finely striated, isopolar, heterovalvar (containing one raphæ valve and one raphæless valve), and geniculate (in girdle view) frustules, but distinct from a similar, previously described genus, Achnanthes (Bory 1822). Kürzing (1844) also considered that cells of Achnanthidium were "free swimming" and grow as one or possibly two cells, while those of Achnanthes were triplicate, growing in "bands" yet often observed as one or two cells. The genus Microseta was subsequently proposed by Cleve (1895) to include similarly shaped diatoms with extremely fine pores. Various authors (e.g., Cleve-Euler 1953, Hustedt 1933, Krammer and Lange-Bertalot 1991b) have favored using some or all of these taxa as subgenera under a more broadly interpreted genus Achnanthes. However, I concur with the systematic arrangement in Round et al. (1990) on the recognition of two distinct genera, Achnanthes and Achnanthidium, with the later including what has been previously referred to as Microseta. In this regard, Achnanthes hauckiana warrants transfer to the genus Achnanthidium, based on the simple pore structure found on its valves and the non-porous nature of its girdle bands. I do not however concur with Krammer and Lange-Bertalot (1991a) in regarding this diatom as a subspecies of Achnanthidium delicatulum Kürz.

The genus Cavinula was erected by Mann and Stickle in Round et al. (1990) to include some diatoms, formerly assigned to the genus Navicula, which possess finely punctate uniseriate, radiate striae, and relatively small, rhombiclaceolate to elliptical valves with flat surfaces. Commonly encountered members of this genus (transferred by Mann and Stickle, op. cit.) include Navicula cocconeiformis Greg., N. lacustris Greg., N. pseudococconeiformis Hust. and N. striiformis Grun. ex.
A.S. Based on similar characteristics, Navicula weinzelleri Schimanski warrants transfer to Cavunula.

The genus Cratidula was erected by Grunow (1867) for members of the genus Navicula with internal transverse siliceous thickenings about a longitudinal midrib (= craticulae). According to Van Heurck (1896), Grunow later abandoned the genus Cratidula, after deciding that frustules with these structures were simply anomalies. Although subsequent taxonomists (e.g., Hustredt 1961, Patrick & Reimer 1966) variously figured these internal siliceous thickenings, particularly in Navicula excurrentis (Kütz.) Kütz. and N. halophila (Grun ex V.H.) Cl., to the genus Cratidula, the following two names, Cratidula excurrentis var. major (Meist.) Czarnecki comb. nov. and Cratidula halophila var. subcapitata (Ost.) Czarnecki comb. nov. are warranted.

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