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NAVICULA ALTEROFASCIATA, A NEW SUBFOSSIL DIATOM FROM A DUTCH LAKE SEDIMENT

H. KOOIJMAN

Hugo de Vries-Laboratorium, Plantage Middenlaan 2a, 1018 DD Amsterdam

SUMMARY

Navicula alterofasciata, spec. nov., described from post-glacial lake sediments dating from the Preboreal up to and including the Atlanticum, is characterised by a fairly large, asymmetrical central area and a very fine, lightmicroscopically hardly discernible striation, and can provisionally best be referred to the section *Naviculae subtillisimae* Hustedt.

DESCRIPTION

Navicula alterofasciata Kooijman, spec. nov.
Diagnosis: Valva elliptica ad lineari-elliptica apicibus latis rotundatis interdum leviter capitatis protractis, longitudine 8–17 μm, latitudine 3–4 μm. Area axiale lineare et angusta, area centralis satis magna et asymmetrica, altero latere ad marginem valvae extensa. Raphe distalibus partibus subcurvata, ultimis idem latus versus valde deflexa. Striae tenuissimae approximatae (38–44 in 10 μm) areolis orbicularibus ad ellipsoideis circiter 50 in 10 μm compositae, media valva rectae vel subcurvatae, radiatae, apices versus parallelae vel paululo convergentes. Figurae 1–8.
Typus: lamina vitrea signo U1.78.2 – 1102.5 specimina Herbario Universitatis Amstelodamensis (AMD) tenentur.

N. alterofasciata Kooijman, spec. nov.
Valve elliptic to linear-elliptic, 8–17 μm × 3–4 μm, with broad and sometimes slightly capitate rounded ends. Axial area narrow, linear. Central area rather large, asymmetrical, unilaterally extending as far as the edge of the valve. Raphe faintly curved towards the distal ends, both ends one-sidedly recurved. Striae very fine and closely approximate, 38–40 per 10 μm, built up from orbicular to elliptic areolae, radiating, straight or faintly convergent in the central part, towards the apices parallel to somewhat convergent. *Figures 1–8.*
Type: Herbarium of the University of Amsterdam (AMD) slide no. U 1.78.2–1102,5.

This new species of *Navicula* is mainly characterised by the fairly large and asymmetrical central area which shows up in lightmicroscopical image with phase contrast as a lighter and clearly outlined area within the valve. The individual

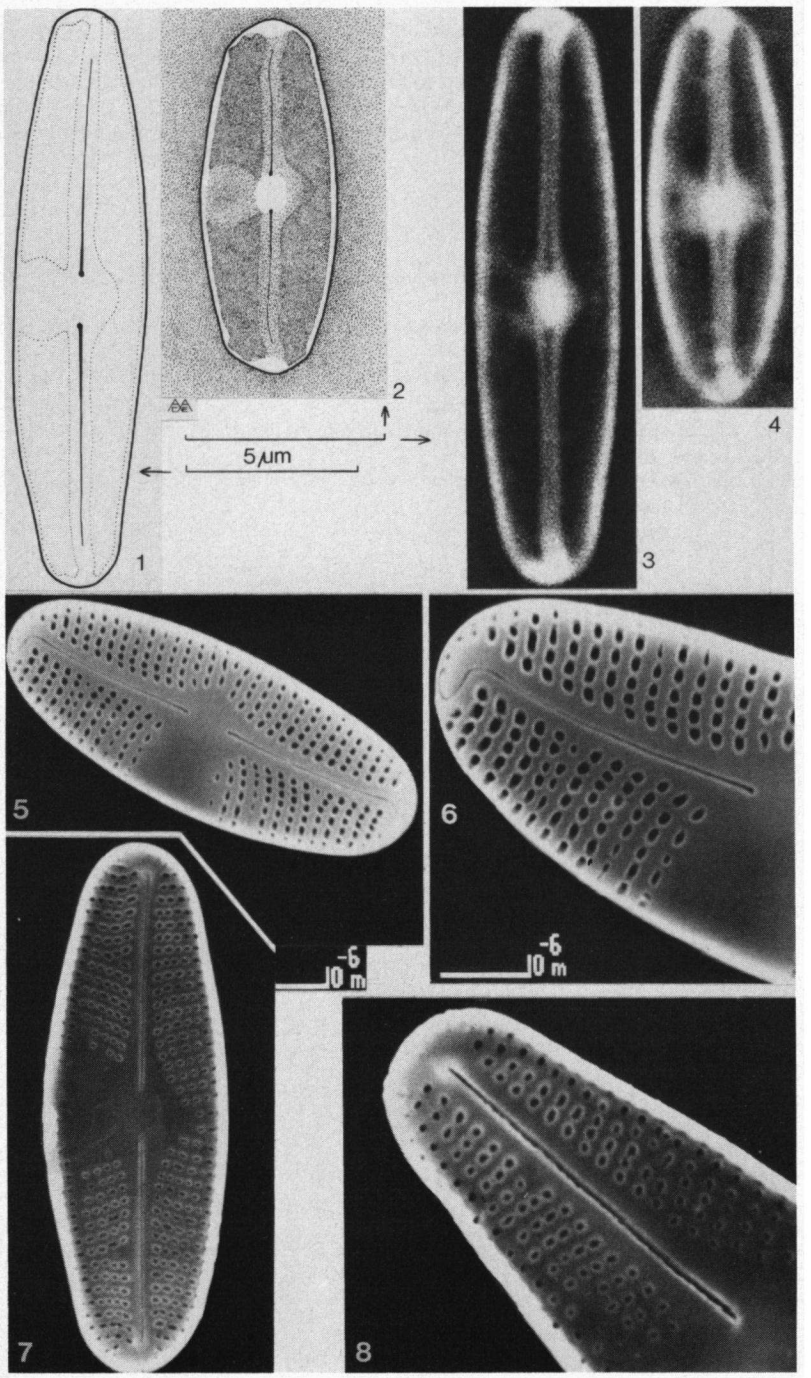
striae are barely visible under a lightmicroscope and only vague images are discernible near the central area. EM pictures of striae show that they are compounded of regular rows of suborbicular to elliptic areoles *(fig. 6)*. The microscopic imagines strongly suggest that it is identical with the form figures by MERILÄINEN (1969: 94, fig. 143) as "*Navicula* spec. nova". who had found it in the sediment of a Finnish lake and took it for an undescribed taxon but did not validly describe it. Although the lower limit of the length measurements of our material lies somewhat below that recorded by Meriläinen (*viz.* length 14–18 μm, breadth 3–4 μm), the resemblances are striking. Also the structure, described by Meriläinen as "siliceous thickenings' can, judging by his figure, also be recognised lightmicroscopically in our material, albeit that EM studies have so far not confirmed their nature as true wall thickenings.

As regards the relationships of *N. alterofasciata* with other species of the genus, it is close to *N. knysnensis* described by CHOLNOKY (1963: 60, figs. 56–57) from a salt water lagoon in the Cape (S. Africa) which species also has an asymmetrical central area and lightmicroscopically hardly discernible striae but differs in its essentially smaller size (5.5–8 μm × 2.5–3 μm), more capitate valve tips and a lanceolate valve shape. CHOLNOKY (1963) referred it to the section *Naviculae subtilissimae* Hustedt (= subgenus Minusculae of PATRICK 1966), so that it seems warranted to place the Dutch species described here also in this section as long as no appreciable structural differences show up electronmicroscopically.

N. alterofasciata was recovered from a drilling core from Lake Uddel (SOHL & KOOIJMAN, in prep.). This lake originated as a pingo towards the end of the Weichselian. The deepest point of the lake basin lies at 17 m below the surface and is partly filled in with gyttja changing into dy higher up, leaving a water depth of 2–2.5 m. On the ground of pollenanalytical studies a continuous pollen record from the Late Glacial to the Late Middle Ages could be established. In the core the new species under discussion occurs with a relative abundance of about 5% between the levels 9.40 m and 13.80 m below the surface which agrees with the period from the end of the Preboreal to the end of the Atlanticum (SOHL, in prep.).

Dominant diatoms found together with *N. alterofasciata* are: *Melosira italica* subsp. *subarctica* O. Müller, *Fragilaria pinnata* Ehrenberg, *Achnanthes minutissima* Kützing, *Navicula minima* Grunow, *Navicula subrotundata* Hustedt, *Navicula jaernefeldtii* Hustedt. On the basis of the recent ecological preference of these associated taxa, *N. alterofasciata* can most probably be characterised as a benthic, circumneutral to alcaliphilous and mesotraphentous freshwater species.

Figs. 1–8. Navicula alterofasciata.
Figs. 1,2. Valve views (drawings made with L.M. phase contrast).
Figs. 3,4. Valve views (L.M. phase contrast).
Fig. 5. Exterior view of the valve (S.E.M.)
Fig. 6. Exterior view of the polar, uncinate terminal fissure (S.E.M.)
Fig. 7. Interior view of the valve (S.E.M.)
Fig. 8. Interior view of polar end of raphe (S.E.M.)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REFERENCES

CHOLNOKY, B. J. (1963): Beiträge zur Kenntnis des marinen Litorals von Südafrika. *Botanica Marina* **5**, 2/3: 38–83.

MERILÄINEN, J. (1969): The diatoms of the meromictic lake Valkiajärvi, in the Finnish Lake District. *Ann. Bot. Fenn.* **6**: 77–104.

PATRICK, R. & C. W. REIMER (1966): *The diatoms of the United States.* Vol. **1**. The Academy of Natural Sciences of Philadelphia.

SOHL, H.: A paleo-ecological investigation of the Late-Glacial and Holocene lake sediments of the Uddelermeer (in prep.).

— & H. KOOIJMAN: Diatom analysis of the Late Glacial and Holocene lake sediments of the Uddelermeer (the Netherlands). (In prep.).