

STUDIES IN THE FAMILY NITZSCHIACEAE (BACILLARIOPHYTA)

by

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Text

MEMORANDUM

The work included within this thesis is the result of my own independent investigations, which were carried out under the supervision of Dr.F.E.Round, Reader in Botany at the University of Bristol.

David G. Mearns

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ABSTRACT

1. Members of the Nitzschiaceae (Bacillariophyta) were collected from a wide variety of freshwater and marine habitats, and studied using light and electron microscopy. The cell structure of these forms is described.
2. Different microscopical techniques are discussed in relation to their usefulness in diatom studies.
3. Recent changes in the terminology of structure in diatoms are discussed, and some new proposals made.
4. Present knowledge concerning the epiphytes and parasites of the Nitzschiaceae is reviewed as a basis for future work.
5. Some aspects of colonial organisation, cell division and auxospore formation in the Nitzschiaceae are reviewed. A possible explanation for the origin of Voigt discontinuities is offered. Groupings recognised on the basis of the method of auxospore formation are compared with those distinguished on morphological grounds.
6. The genera Hantzschia and Nitzschia are dealt with in detail. H. amphioxys, H. marina and H. virgata were studied in order to determine the extent of infraspecific variation. Many characters often assumed to be constant within diatom species were found to vary.
7. The taxonomy of each section of Nitzschia is reviewed in some detail, original observations being supplemented by and compared with previously published information. Suggestions are made concerning the reclassification of some species; some sections were found to contain several natural groupings, each of which could probably be given sectional status.
8. The relationship of the Nitzschiaceae to the Epithemiaceae and Amphiprora is discussed: a 'definition' of the Nitzschiaceae is offered. Some changes in the classification of Denticula are suggested.

9. The philosophical basis underlying diatom taxonomy is discussed and compared with contemporary attitudes to the taxonomy of other groups. It is suggested that traditional diatom taxonomic methods are inadequate; appropriate changes are suggested.

10. Characters which may be useful in future work in the Nitzschiaceae (and other groups) are discussed.

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