DESMIDS - JEWELS OF THE BOGS!

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Three recent years, 1986, 1988 and 1994, have seen major publishing events for New Zealand freshwater algae. Three volumes which describe the desmid flora (Croasdale & Flint, 1986, 1988; Croasdale et al., 1994) are now available and the scene is set for further research on these attractive and ecologically important algae.

The completion of this huge task is a tribute to the authors whose persistence and patience through all sorts of adversity has now reached an excellent conclusion. Elizabeth Flint was the instigator far back in the late-1950s when she was surveying algae in New Zealand grassland soils. She had difficulty identifying a few desmids and wrote to a Finnish expert, Rolf Grönblad, for assistance. He became interested and requested more specimens from contrasting habitats. His untimely death in 1962 came before he could complete a paper describing his observations.

Hannah Croasdale, in the USA, completed Grönblad's other unfinished manuscripts. Her efforts came to the attention of Elizabeth Flint who asked whether she would also complete his paper on the New Zealand desmids. Her acceptance of this task was the start of a 30-year collaboration which resulted in the three volumes for the Flora of New Zealand.

Surprisingly, the two authors did not meet until 1983 and up until then all communication was by letter. Both had "officially retired", Hannah Croasdale in 1971 and Elizabeth Flint in 1974, but obviously the intensity of study went on as before. During 1987 Hannah Croasdale's eyesight failed and Marilyn Racine assisted in the completion of Volume 3.

The publication of large floras is always fraught with difficulties and this was no exception. Funding problems were a major headache. However, such works are very necessary. They provide a huge stimulus to research and teaching, resulting in knowledge which is often of practical importance. With the help of local botanists and others and the provision of grants from various trusts and funding bodies, Volume 3 finally made it to the printing press.

You might by now be asking, "What are desmids?" The answer would be gained by looking back to an earlier edition of the Society's journal in which Elizabeth Flint introduced readers to these usually unicellular algae (Flint, 1984). They comprise two orders of "green algae" (Chlorophyta) and are found almost exclusively in freshwaters.

The concepts of genera and species are based largely on the shape of the cells. Their external morphology is hugely diverse and usually displays complex symmetry. The cell wall is often ornamented by pores, spines and wart-like protuberances. This makes the availability of accurate and detailed illustrations a necessity for their identification. The illustrations provided by the Flora of New Zealand are expertly and elegantly redrawn (a selection of these is provided in Fig. 1) from the originals in the widely scattered literature.

Different authors vary widely in their estimates of the total number of desmid species. In a comprehensive book on the desmids, Brook (1981) considered there to be 6000 species. A recent review (Gerrath, 1993) regards this to be a "wild guess" and suggests approximately 3000 species to be a more realistic estimate. These are placed within 43 genera. The New Zealand flora comprises 470 species from 30 genera. Combined with 241 infraspecific taxa this results in a total flora of 711 taxa. About 120 of these are endemic to New Zealand.

This rich flora is due to New Zealand providing many habitats which are ideal for the development of abundant and diverse desmid populations. For instance, 93 taxa have been recorded from the plankton of Lake Rotoiti and 76 taxa from the mire at Addison's Flat. Desmids can be collected from bogs and swamps simply by squeezing the water out of saturated mosses. In recent collecting trips for teaching at Cass, large green gelatinous aggregations of desmids have been found easily in peaty pools.

The availability of this desmid flora will stimulate the use of desmids for research, teaching and in the practical applications of water management. Desmids can be used as indicators of water quality. Often they are most diverse in water which is low in nutrients. Where increased nutrient inputs occur desmids can become impoverished or even disappear. In the laboratory they have become popular experimental organisms for the study of cell morphogenesis in attempts to understand how individual cells develop their own characteristic structures. For teaching they provide inspiring specimens of great beauty which might attract otherwise microscopy-allergic students into the study of algae! To quote from the frontispiece of Volume I.

> "Every person who for the first time examines a varied collection of Desmids is astonished at their wonderful symmetry and their elegance of form. This feeling is highly intensified on observing the great variety of forms, and astonishment increases when the beautiful ornamentation of some of them becomes manifest." (West & West, 1904)

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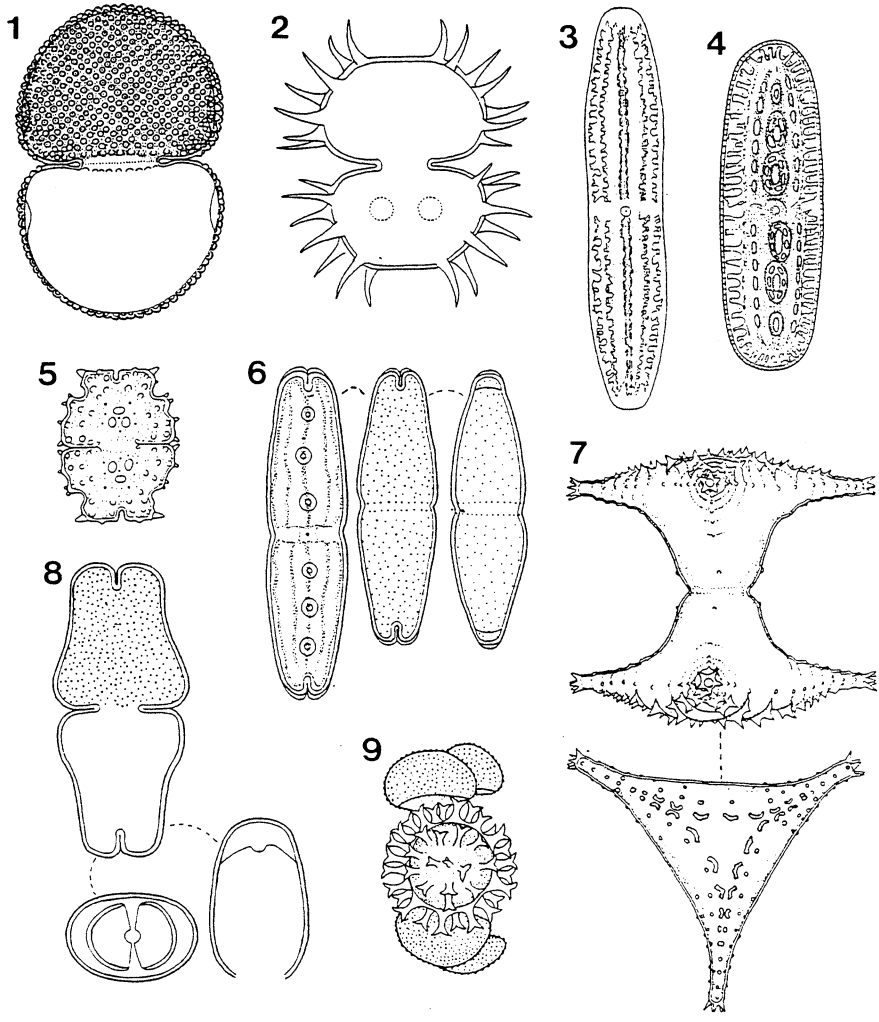

Fig. 1 Illustrations of desmids from selected plates presented in the Flora of New Zealand, Desmids, Vols I-III.

1) *Cosmarium amplum*; 2) *Xanthidium octonarium* f. *latum*; 3) *Netrium digitus* var. *lamellosum*; 4) *Netrium oblongum*; 5) *Euastrum turneri*; 6) *Tetmemorus laevis*; 7) *Staurastrum sebaldi*; 8) *Euastrum obesum* var. *trapezicum*; 9) sexual reproductive spore (zygospore) of *Cosmarium botrytis*. Scale: approx 2-300x.