



Biology of the Epacridaceae

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This issue contains most of the papers from a conference sponsored by the *Annals of Botany* at Hobart, Tasmania in February 1995. Why was 'Biology of the Epacridaceae' selected as a topic? It was partly because during the preceding period a number of researchers had been bringing projects to completion on this family of beautiful and interesting southern-hemisphere plants, and there was a flush of new research-projects at the same time. But more importantly it was because these projects had been showing that the taxonomy of the family is inextricably linked to that of the allied northern-hemisphere families, and that structure and physiology in these groups have common features as well. So it seemed timely to bring all this to the attention of botanists around the world.

To someone familiar with the Ericaceae, most of the epacrids are immediately recognizable as 'heath-like plants' (Fig. 1A). The two families are usually distinguishable by the stamens: in epacrids there are 5 (or sometimes 4) with anthers opening by a slit, while in Ericaceae there are commonly 10 with anthers opening by pores. Most epacrids are small to medium-sized shrubs, exceptionally up to the size of small trees (Fig. 1B). Many have small hard sharp-pointed leaves (Fig. 1A), with subparallel or narrowly palmate venation, and with a generally xeromorphic appearance. Epacrids share a peculiar root-morphology with Ericaceae: root-hairs are lacking but the finest lateral roots are so extremely fine that they are called 'hair-roots', and these form 'ericoid' mycorrhizas very similarly in the two families (Read, 1996). The epacrids are at their most diverse in Western Australia, and the family occurs in all states of Australia, in New Zealand, in south-east Asia and in some Pacific Ocean islands, with outlying taxa as far away as Hawaii and South America. There are more than 30 genera and over 400 species (Powell, 1992).

The large genus *Epacris* (tribe Epacrideae) includes many heath-flowers of the Australian bush (Fig. 1A, C). The Styphelieae is a diverse tribe which includes the genus with the most species, *Leucopogon* (Fig. 1D), some of the smallest epacrids (Fig. 1E), and many highly specialized bird-pollinated flowers (Fig. 1F, see Keighery, 1996). The biggest epacrids look perplexingly like arborescent monocotyledons to a casual observer (Fig. 1B) and are in the tribe Richeeae; the third very large genus of the family is in this tribe (*Dracophyllum*, e.g. Fig. 1G). The tribe Cosmelieae includes some spectacularly coloured and floriferous epacrids such as members of the genera *Andersonia* (Fig. 1H) and *Sprengelia* (Fig. 1I).

The conference began with a surprise when the first speaker indicated that our family could be submerged in the Ericaceae (Kron, 1996); an alternative, less 'boreocentric', view, that it could be as valid to divide the Ericaceae into several families, was expressed only quietly by southern-hemisphere botanists at the time. Taxonomy and systematics of epacrids are explored in the first group of papers in this issue of *Annals of Botany*. The fossil record of the family is scant and mostly from south-eastern Australia (Jordan and Hill, 1996). Unfortunately the future of many members of the family is not assured even in its area of greatest diversity, where it faces the combination of land clearing and the introduced pathogen *Phytophthora cinnamomi* Rands (Keighery, 1996); but the family has a range of responses to that characteristically Australian disturbance, bushfire (Bell, Pate and Dixon, 1996). Below-ground features of the family, including their mycorrhizas and nutrition, are dealt with in the final six papers.

All the papers have been refereed in the usual way, and I am very thankful to the referees for their work. Unfortunately review and revision are not yet complete for a few papers, and these are to be looked for in a later issue of the *Annals of Botany*. I am especially grateful to Martin Canny for organizing the refereeing of three papers written by me and my colleagues, and I would like to thank the Department of Plant Science at The University of Tasmania and the Institute for Wildlife Research at The University of Sydney, as well as the Annals of Botany Company, for their sponsorship of the conference.

LITERATURE CITED

- Bell TL, Pate JS, Dixon KW. 1996. Relationships between fire response, morphology, root anatomy and starch distribution in south-west Australian Epacridaceae. *Annals of Botany* 77: 357–364.
- Crowden RK, Menadue Y. 1996. *Epacris crassifolia* R. Br. (Epacridaceae)—a reappraisal. *Annals of Botany* 77: 333–339.
- Jordan GJ, Hill RS. 1996. The fossil record of the Epacridaceae. *Annals of Botany* 77: 341–346.
- Keighery GJ. 1996. Phytogeography, biology and conservation of Western Australian Epacridaceae. *Annals of Botany* 77: 347–355.
- Kron KA. 1996. Phylogenetic relationships of Empetraceae, Epacridaceae, Ericaceae, Monotropaceae, and Pyrolaceae: evidence from nuclear ribosomal 18s sequence data. *Annals of Botany* 77: 305–315.
- Powell JM. 1992. Epacridaceae. In: Harden GJ, ed. *Flora of New South Wales, volume 3*. Sydney: New South Wales University Press, 401.
- Read DJ. 1996. The structure and function of the ericoid mycorrhizal root. *Annals of Botany* 77: 365–374.



FIG. 1. Epacrids. A, *Epacris tasmanica* W. M. Curtis (Tasmania $\times 3$ approx.). B, *Richea pandanifolia* Hook. f. (Tasmania $\times 0.04$ approx.). C, *E. crassifolia* R. Br. (large-flowered subspecies, see Crowden and Menadue, 1966; New South Wales $\times 0.5$ approx.). D, *Leucopogon verticillatus* R. Br. (Western Australia $\times 0.3$ approx.). E, *Pentachondra pumila* (Forst. & Forst. f.) R. Br. (Tasmania $\times 1$ approx.). F, *Astroloma glaucescens* Sonder (Western Australia $\times 0.7$ approx.). G, *Dracophyllum milliganii* Hook. f. (Tasmania $\times 0.2$ approx.). H, *Andersonia* sp. nov. (Mitchell River) K. Lemsom (Western Australia $\times 2$ approx.). I, *Sprengelia incarnata* Smith (Tasmania $\times 1$ approx.). Photographers (A, I) R. K. Crowden; (B, C, E, G) A. E. Ashford; (D) G. J. Keighery; (F) A. S. George; (H) K. Lemsom.