

# Preface

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**T**he emergence of angiosperms in tropical forests at the expense of the gymnosperms, their ancestral relatives, was one of the most important events in the evolutionary history of terrestrial plants. Although gymnosperms were an important component of the flora on the supercontinent of Gondwana, they were virtually eliminated from the tropics following the evolution of angiosperms in the Early Cretaceous. Modern tropical forests are overwhelmingly dominated by angiosperms, yet a few gymnosperms persist. What can they tell us about the ecology of tropical forests?

Conifers of the Podocarpaceae are one of the few gymnosperms that inhabit tropical forests worldwide, although they remain the least well known of the three large conifer families. Podocarps occur throughout the Malesian, African, and neotropics and are common in temperate regions of Africa, Australasia, and South America. Tropical podocarps are often considered to be restricted to montane sites, a feature of their biogeography that is used by paleoecologists to reconstruct past forest communities. Yet they also occur in the lowland tropics, usually as rare individuals, but sometimes forming the dominant component of forest canopies.

In many cases podocarps have proved to be remarkably adaptable: members of the family have a semiaquatic lifestyle (*Retrophyllum minus*), exhibit drought tolerance and resprouting (*Podocarpus drouynianus*), and include the only known parasitic gymnosperm (*Parasitaxus usta*). Other intriguing aspects of their physiology include the mechanism of water transport in the leaves and the conspicuous root nodules, which are not involved in nitrogen fixation, but instead house arbuscular mycorrhizal fungi. Perhaps most surprising, paleobotanical evidence indicates that far from being “relict” members of tropical forest communities, podocarps have been dispersing actively into the tropics since the late Eocene epoch more than 30 million years ago. Clearly, there is much to be learned from tropical podocarps.

Arising from a workshop held at Macquarie University, Sydney, in February 2009, this volume explores in detail the ecology of the Podocarpaceae in tropical forests. Three main themes are covered:

1. phylogeny and paleohistory of the Podocarpaceae in the tropics (chapters 1 and 2);
2. current distribution of podocarps in the African, American, and Asian tropics (chapters 3–6); and
3. ecology and ecophysiology of the Podocarpaceae in both temperate and tropical ecosystems (chapters 7–11).

The volume concludes with a short synthesis that concisely summarizes the key conclusions of the workshop. The outcome is a truly interdisciplinary review of tropical podocarps, which we hope will inspire further research on these fascinating trees.

## A NOTE ON NOMENCLATURE

The taxonomy of the podocarps is complex and the least understood of the three major conifer families, with many synonyms, recent revisions, and additions that are likely to continue in the near future. Here we have followed the nomenclature of Farjon (2001) with the exception of *Parasitaxus usta* in place of *Parasitaxus ustus* (T. Jaffré,

UMR AMAP Institut de Recherche pour le Développement (IRD), Laboratoire de Botanique et d'Ecologie Végétale, Nouméa, New Caledonia, personal communication, November 2009). We also include *Phyllocladus* here as a podocarp; the status of this genus has been controversial, but its elevation to family level as Phyllocladaceae is not supported by phylogenetic analyses, as outlined in chapter 1 of this volume. Finally, we use the term “tropical” here in a strict geographical sense, defined as the area between the Tropics of Cancer and Capricorn. The term should not be taken as synonymous with tropical climate, the extent of which has varied markedly in relatively recent geological history.

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