

# Tropical trails and forest tales

**Tropical Rainforests: Past, Present and Future** edited by Eldredge Bermingham, Christopher W. Dick and Craig Moritz.

University of Chicago Press, 2005. US\$110.00/US\$45.00 £77.00/£31.50 hbk/pbk (672 pages) ISBN 0 226 04466 1/0 226 04468 8

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During the 17th century, Rumphius, a blind German botanist based in Ambon (now Indonesia) wrote of the tropical 'Upas' tree *Antiaris toxicaria*: 'The true shape of this tree is largely unknown because prudent nature has set this evil plant apart from the dwellings of people, and placed it in unknown mountain ranges and wildernesses ...' [1].

Although current researchers usually express it differently, good information remains limited by the difficulties in gathering it. Tropical forests are still dauntingly big and diverse, whereas most species within them are rare. What has changed since Rumphius' writings is the range of approaches, techniques and theories available to assemble, and to challenge, any synthesis. *Tropical Rainforests* contains many illustrations of this progress.

*Tropical Rainforests* is a 28-chapter book that stems from a symposium held in April 1998 as a collaboration between the Australian Cooperative Research Centre for Tropical Rainforest Ecology and Management and the Smithsonian Tropical Research Institute, with contributions updated in 2003. Three quarters of the chapters address landscape–regional-scale diversity patterns, and a third of these focus on the Australian wet tropics. The remaining chapters consider various ecological or conservation themes.

My favourite contribution is Colinvaux's assessment of the Pleistocene refugia and 'species-pump' hypotheses for Amazonia; that is the proposition that isolated forest remnants remained during arid episodes, and that such divided populations encouraged speciation, increasing regional richness. Colinvaux demolishes these conjectures, presenting evidence that continuous forest cover has been maintained for at least 170 000 years. This is a moral tale: beautiful theories can lead us astray and erroneous interpretations have stemmed from expectations, poor tropical knowledge and from ignoring contrary accounts.

Evaluations of temporal reconstructions of biogeographical patterns recur in several chapters; for example, Fjeldså *et al.* consider the effect of Pleistocene forest reductions (uncontested) on some African vertebrate taxa; Kerhshaw *et al.* summarize palynological evidence that the Australian wet tropics have been pretty wet for

ten million years (although fire has had an impact in recent millennia). Also in Australia, Bouchard and colleagues analyse arthropod assemblages by geographical patterns and phylogenies, and infer significant levels of speciation by vicariant, peripheral and sympatric processes.

I enjoyed the discussions by Leigh and Rubinoff centred around a Barro Colorado Island-focused overview of tropical ecology, but query some of their assertions; for example, that 'plant invaders pose no threat to continental forests' (which appears unlikely, given the writings of Stork in the same book) and that 'natural ecosystems are organised for high productivity and diversity' (productivity and diversity might well arise in suitable conditions, but ecosystems are not organized for anything).

Other favorites include Brown's summary of Neotropical butterfly distributions, Ruokolainen *et al.* and Condit *et al.*'s neotropical investigations of regional plant community turnover, and Connell *et al.*'s 40-year Australian study of seedling dynamics.

What about tropical forest conservation? Despite the word 'future' in the title of the book, practical issues are examined in just three chapters. Stork discusses conservation in the Australian wet tropics, highlighting the fact that there are significant problems to overcome even in stable, wealthy countries. Laurance *et al.* provide an overview of the problems facing the Amazon and ask what these trends imply; their take-home message is not optimistic. Similarly, MacKinnon considers the plight of 'protected' forests in South-east Asia, noting, among other things, that some countries spend only US\$1 km<sup>-2</sup> y<sup>-1</sup> on their National Parks.

Other criticisms are minor, such as the fact that the bearded pigs of Borneo are *Sus barbatus* rather than *S. scrofa*, and that negative % data on a graph make no sense. There is certainly plenty to argue with, but I would be disappointed if there wasn't. My own area of primary interest, Asian and African vegetation studies, is not represented, but this is, after all, a symposium output, and I learnt a lot about advances in other fields. My chief grumble is that with 700 pages, this book is unwieldy to handle and would have been better as two volumes.

All that said, *Tropical Rainforests* is a good-quality book and most contributions are authoritative, insightful and a delight to read. Although some chapters ramble a little, these wider-ranging discussions have

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their own merit and I appreciated them. Three centuries on, Rumphius' 'unknown mountain ranges and wildernesses' seem just a little better known. The key question now is how to ensure that some of these great forests remain for another three centuries.

## References

- 1 Beekman, E.M., ed. (1993) *The Poison Tree: Selected Writings of Rumphius on the Natural History of the Indies*, Oxford University Press

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# Museum specimens breathe life into plant conservation?

**Plant Conservation: A Natural History Approach** edited by Gary A. Krupnick and W. John Kress. University of Chicago Press, 2005. US\$75.00/US\$30.00, £52.50/£21.00 hbk/pbk (344 pages) ISBN 0 226 45512 2/0 226 45513 0

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The great museums, herbaria and botanic gardens of the world are assuming a new importance, probably unimagined by their founders and largely unsuspected even a generation ago. Molecular methods have helped to reinvigorate the discipline of taxonomy, and the need for taxonomy as the basis for an inventory of biodiversity is greater than ever. Yet now, plant conservationists are also

looking to these vast repositories of data to answer a much broader range of questions. We know the value of individual specimens; Daniel Janzen's eloquent plea, in the foreword to *Plant Conservation*, for the genetic 'barcoding' of all plant species is ambitious testimony to this. More broadly, these collections represent extensive records of distribution and abundance, referenced in both space and time. Developments in bioinformatics are beginning to unlock the storehouse of archived information [1]. It is, for example, possible to investigate changes in flowering time in response to climatic warming over centuries [2] and calculate the probability of an intermittently recorded species now being extinct [3,4]. The subtleties of documenting extinctions are described elegantly by one contributor to *Plant Conservation* as 'chiaroscuro in shades of green'. The long tradition of institutional natural history provides both the context and a distinctive rationale for this book on plant conservation. Both editors and no less than 25 out of the 48 contributors are associated with the renowned Smithsonian Institution (<http://www.mnh.si.edu>). Other contributors represent various other institutions in the USA, Brazil, Britain, Germany and Venezuela.

The scope of *Plant Conservation* encompasses most aspects of plant conservation. The first part provides a 'primer' on plant evolution and diversification over the past 450 million years, current diversity (on land and in the oceans), and extinction (past and present). These

concise background reviews will be valuable to a wide range of readers. The conservation theme is developed with case studies that illustrate particular habitats and taxonomic groups. Inevitably, the coverage of case studies in a book of this size is limited but the choices are not as arbitrary as they might seem. Emphasis on the threats and their consequences in the tropics–subtropics is, after all, tracking areas with high biodiversity and endemism (although three of the five habitat case studies are from the Venezuelan–Equadorian Andes and Guiana Shield area of South America). The threats to a broad spectrum of taxonomic groups and responses to such threats are also considered. Among these groups, dinoflagellates represent the biodiversity of the oceans; for land plants, there are fairly brief accounts of lichens, mosses and just six representative flowering-plant families. These choices largely reflect the specialist resources within the Smithsonian but do show how little we know about some of these groups, especially (and predictably) the lower plants. There is an exploration of the contemporary causes of plant extinction that includes many examples. The litany of relevant topics is becoming depressingly familiar: habitat fragmentation and degradation, the problems of invasive species, the consequences of global climate change and the genetic consequences of reduced population sizes. Again, these are rather condensed, example-based reviews. The examples of habitat loss are reasonably diverse but the account of the effects of global climate change is based on an article on the spring flora of Washington DC, which seems a paradoxically parochial treatment of a global issue. Dealing with conservation genetics in ten pages is also somewhat of a challenge; readers are introduced to basic concepts and a few common molecular methods.

The section about the practicalities of plant conservation brings the value of biological collections and natural history into focus, notwithstanding acknowledged limitations and biases in the record. Without such information, we could not map diversity, identify hotspots, ecoregions and centres of diversity, or establish priority

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