

nesses, e.g. the importance of roots is not emphasized much except in the section on physiological responses where it dominates unduly.

All the papers are well illustrated with diagrams, graphs and the occasional black and white photograph. In the first section detailed bioclimatological information on wind velocity moments and turbulence in various canopies is given. This combines well with the next paper dealing with wind and tree movement in forest canopies. In the following three papers edge effects and wind tunnel studies in forest clearcuts are explained, and a linear airflow model (Flowstar) tested for flow over complex terrain. According to the conclusions this model appears to be useful for forest planning. The last paper of the section is devoted to the difficult task of predicting windspeeds in complex terrain to avoid the necessity for long-term, on-site wind measurements.

The second section gives detailed information on the forces trees have to endure in a natural stand. Both modelling data and experimental analysis are dealt with, including failure modes of trees and experimental testing of the effects of mechanical loading on conifers planted on wet mineral soils. New methods (Metriguard Stress Wave Timer and the Fractometer) for the assessment of wood quality are explained in the last paper of this section.

Physiological responses to wind are dealt with in only four papers. In the first (a review) some information on the effect of wind on trees as a whole is given, but the other short papers in this section relate solely to roots. Root growth responses to wind in young trees, distribution of biomass in root systems of Sitka spruce clones, and the development of buttresses in rainforest trees are dealt with using an experimental approach.

The fourth section contains 50 pages of information mainly about hurricane and other catastrophic wind damage to forests and the estimation of such damage by various methods.

The final section on risk assessment and management responses gives practical advice for forestry planning, for example, for Norway spruce stands under various ecological conditions. The last few papers describe windthrow damage in British Columbia and New Zealand.

In conclusion, the book contains a mass of information on wind damage to trees. The inter-disciplinary approach makes the book somewhat heavy reading, but at the same time makes it a good reference source for professional foresters and modellers.

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**Flora of the Pico das Almas, Chapada Diamantina – Bahia, Brazil.** Edited by B. L. Stannard. London: Royal Botanic Gardens, Kew. 1995. 853pp. ISBN 0 947643 76 1. £36.00 (hardback).

This book summarises the results of an exhaustive study of the flora of a site in central Bahia, Brazil, carried out by a team of botanists from the Royal

Botanic Gardens, Kew, in collaboration with their Brazilian colleagues, mostly from the University of São Paulo and the Cocoa Research Centre (Itabuna, Bahia). It is actually part of an initiative launched in 1980 that is devoted to surveying the flora of a much larger area, the Chapada Diamantina mountain range.

The Chapada Diamantina is part of the mountain system that stretches from north to south in the hinterlands of eastern Brazil. The flora of this area is of particular scientific interest mainly because of the singularity of the campos rupestres, the specialised vegetation that predominates on the rocky mountaintops, particularly above 1000m. The restricted geographical distribution of the campos rupestres and its high number of endemic species explain why this vegetation has drawn so much attention from the scientific community. It represents an excellent subject for phylogenetic studies of geographically isolated populations. Furthermore, patterns of ecogeographical distribution of its species may give valuable hints about the effects of ancient environmental shifts that occurred in the Neotropical region.

The book also addresses other vegetation types that occur on the Pico das Almas, such as the cerrado (woody savanna) and gallery forests. It is therefore of immense value for all those doing any study involving the montane flora of eastern Brazil. It may be used as a taxonomic guide of the flora of a much wider area than the Pico das Almas itself, since only a few species appear to be endemic to the area. Moreover, it will allow floristic comparisons with similar areas in the mountain system. The taxonomic treatments were mostly written by specialists, and therefore are refined and up-to-date; there are also a number of newly described species. The painstaking task of co-ordinating a multinational team of taxonomists, which was brilliantly performed by the editor Brian Stannard, is rarely so successful.

The non-taxonomic reader may find that the best part of the book is the bilingual (English-Portuguese) introductory chapter by Ray Harley, which is probably the best ever account of the natural history of not only the Pico das Almas, but the whole of the eastern Brazilian highlands. The author uses a very attractive informal style to cover many different themes, such as climate, geology, vegetation, floristics, palaeohistory, ethnobotany, and the history of scientific expeditions to the area. This will certainly become an obligatory text for any biologist intending to work in the region.

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