

I. Lewis Smith, until recently a senior ecologist with the British Antarctic Survey, Cambridge, has worked extensively on cryptogam research in Antarctica for over 40 years.

Prior to the publication of this volume, identification of Antarctic mosses was often marred by nomenclatural inaccuracies in the literature and misdeterminations of specimens. Similarly, information on the biogeographic zones, environment and moss-dominated communities of the Antarctic could only be obtained by delving into numerous original papers in many journals, often difficult to access. This work now fills a major lacuna not only in bryology but also in plant science as a whole, by accompanying what is a coherent and comprehensive moss flora with extensive information on the biogeography, ecological provinces, climate, geology and vegetation of the Antarctic biome.

Bryophytes, and in particular mosses, are the dominant component of the vegetation in ice-free coastal regions of Antarctica. Thus an understanding and appreciation of mosses, their diversity and distribution, is fundamental in any assessment of the effects of climate change in Antarctica. The importance of mosses as model organisms to study the effects of environmental stresses such as cold and water stress (not to mention the impact of changes in natural UV-B radiation as a result of ozone depletion) on land plants is well established and has received a further boost recently with the sequencing of the *Physcomitrella* genome. Reliable and comprehensive information on Antarctic mosses is also indispensable for any conservation strategy to protect the fragile ecosystems of the Antarctic biome, threatened not only by the changing climate but also by socio-economic pressures, including ever-increasing tourism.

The flora describes in detail 111 species and two varieties of mosses in 55 genera from 17 families. It comprises six chapters, together with a glossary of terms and an exhaustive bibliography. Chapters 1 to 5 form an extensive introduction: Chapter 1 includes sections on the biogeography, climate and geology of the Antarctic biome, Chapter 2 is dedicated to the history of muscological investigations in Antarctica, whilst Chapter 3 covers ecology and conservation. Chapter 4 focuses on diversity and phytogeography of the moss flora; it presents theories on the origins of the flora and includes 42 coloured plates illustrating the principal Antarctic moss-dominated communities. These lovely colour pictures and their legends provide important details of habitat features and how these influence the occurrence and development of moss communities (as discussed in Chapter 3). Chapter 5 discusses with clarity the aims and objectives of the work and provides guidance to users of the flora as well as listing comprehensive details of all the specimens examined. The systematic accounts of the taxa are given in Chapter 6; the keys are excellent, the detailed species descriptions are of the highest standard, and the same is true of the superb line drawings. These drawings are not only beautiful but also highly informative, and are provided for each of the species described. The additional comments, including notes on reproduction, habitat and distribution (both Antarctic and global), together with a discussion on diagnostic characters, peculiarities of morphology, taxonomic problems and possible sources of confusion during identification, are invaluable since Antarctic mosses are often environmentally modified and sterile.

Armed with this book and its companion volume, *The liverwort flora of Antarctica* (Bednarek-Ochyra *et al.*, 2000), researchers visiting Antarctica (and with access to a microscope) should be confident that they will be able to identify correctly each and every bryophyte they encounter. This critical assessment of the diversity and biogeography of the Antarctic moss flora will also prove indispensable for other regions, particularly the cool-temperate and cold zones of the Southern Hemisphere, e.g. Tierra del Fuego and The Falklands, which lack modern regional moss floras.

In conclusion, this is a highly informative and practical book that will greatly benefit researchers undertaking applied and ecological research on the Antarctic bryoflora, as well as conservation organizations. The first five chapters are very readable and interesting and the systematic treatment of the taxa in Chapter 6 is of the highest standard. I cannot recommend this flora too highly.

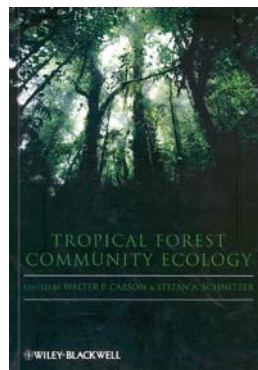
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#### LITERATURE CITED

Bednarek-Ochyra H, Váňa J, Ochyra R, Lewis Smith RL. 2000. *The liverwort flora of Antarctica*. Cracow, Poland: Institute of Botany, Polish Academy of Sciences.

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#### Tropical forest community ecology

Carson WP, Schnitzer SA. eds.

2008.

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(paperback). 517 pp.

Tropical forests have, in equal measure, fascinated and frustrated naturalists, explorers and scientists for centuries. Few other terrestrial ecosystems confront ecologists so plainly with their empirical and theoretical shortcomings. As Marlow, the narrator of Joseph Conrad's *Heart of Darkness* muses '... all that mysterious life of the wilderness that stirs in the forest, in the jungles, ... He has to live in the midst of the incomprehensible, which is detestable. And it has a fascination, too, that goes to work upon him'. For botanists, ecologists and zoologists working in tropical forests, the remarkable diversity is intriguing and captivating, but simultaneously overwhelming. Thirty years ago the flow of new research from tropical forests was but a trickle. As Joe Wright, a senior scientist with the Smithsonian Tropical Research Institute (STRI), notes in his foreword to this excellent volume, one or two new papers a week on tropical forests in those days meant that it was relatively easy to stay abreast of the current research. By the mid-2000s, however, this trickle had become a torrent, with the number of publications on tropical forests increasing by nearly an order of magnitude. No longer is it possible for students of tropical forests to keep up with all

of the new research being published on the subject. Carson and Schnitzer's timely volume provides a much-needed stock-taking of ideas about the ecology of tropical forests, looking both backwards to the observational foundations and forwards to the theoretical and empirical future of tropical forest ecology.

Two major advances in tropical forest ecology – one methodological and one theoretical – animate this book. The first is the establishment of large-scale, permanent forest-dynamics plots in most of the major tropical forest regions of the world. These plots are typically 25–50 ha in size and catalogue, every 5 years, the size, location and species' identification of every tree with a diameter at breast height > 1 cm. The logistical challenges of creating and maintaining these plots are enormous, but over the past 25 years, STRI and its Center for Tropical Forest Science (CTFS) have not only successfully developed the protocols for doing so, but have expanded the network of tropical forest plots to now include 18 sites with ~3 million trees representing ~6000 species. The CTFS plots provide statistically useful samples of tree communities and the species' populations that comprise them. This has enabled both robust quantitative estimates of demography, spatial patterning and abundance, and, because of the standard protocols across the CTFS network, has allowed direct comparisons of these estimates among tropical forests differing in location, seasonality and species' diversity. The impact of the CTFS plots on tropical forest ecology is plainly seen in Carson and Schnitzer's book, in which over half of the chapters are either based on or heavily cite research conducted in CTFS plots.

The second major advance, which stems from the first, is the development by Steve Hubbell of the neutral theory of biogeography and biodiversity (Hubbell, 2001) based on his work at the first CTFS plot at Barro Colorado Island, Panama. In brief, Hubbell proposed that patterns of species' abundance in forest samples can be predicted from a model with a small number of free parameters and simplifying assumptions about processes such as speciation and recruitment. Neutral theory has jolted a discipline long focused on describing patterns and processes into carefully questioning many of its most fundamental assumptions. The simplifying assumption of neutral theory that has received the most attention is that species' identity is unimportant (i.e. all species are equivalent) in describing relative species' abundance in tropical forest communities. This is controversial because it plainly contradicts over 50 years of ecological and botanical work on tropical tree species' biology. Several of the chapters in this volume, a wonderfully readable one by Hubbell included, address and explore this gap between neutral and niche-based models of relative abundance.

Together, these advances have led to a gathering shift away from old theoretical ideas (Janzen–Connell effects, gap-phase dynamics) about tropical forest ecology to new ones (neutral theory, recruitment limitation) and a growing appreciation for, and understanding of, stochasticity in tropical forest communities. The many contributing authors in Carson and Schnitzer's book detail this shift and contemplate the ways forward. The book itself is neatly divided into five sections (each with 3–6 chapters): (1) Large-scale patterns in tropical communities; (2) Testing theories of forest regeneration and the maintenance of species diversity; (3) Animal community

ecology and trophic interactions; (4) Secondary forest succession, dynamics, and invasion; and (5) Tropical forest conservation. For readers like me, who enjoy dipping non-linearly into edited volumes, Carson and Schnitzer's first chapter presents a nice overview of the book by giving a 1–2 paragraph description of the key points of the chapters, their broader relevance, and their connections to other chapters. With surprisingly few exceptions, the chapters are concise, well-written and thought-provoking. Importantly, the editors were broad-minded in their definition of tropical forest community ecology. The inclusion of excellent chapters by, for example, Peres on soil fertility and arboreal mammals, Dyer on tritrophic cascades, and Arnold on endophytic fungi provide a nice counterbalance to the many chapters on tropical trees. The concluding chapter by Putz and Zuidema questioning the relevance of ecology to the conservation of tropical forests may seem a bit of a surprise in such a volume – indeed, they directly contravene the bland rainforest conservation chapter by Corlett and Primack – but is a breath of fresh, pragmatic air and should be read by all ecologists interested in the future of tropical forests. Does this volume have any shortcomings? I would have liked a chapter on palaeoecological insights into tropical forest ecology and I thought the two chapters on tropical forest succession were weak, but these are minor quibbles. The book is well-edited, well-produced, nearly free of typos (annual gross production in neotropical forests is *not* 3 kg C ha<sup>-1</sup>!) and (in paperback) very affordable.

In conclusion, the recent advances in data collection and theory described in this volume have made the past decade one of the most exciting and important periods in the study of tropical forests. Carson and Schnitzer and the many contributing authors capture this excitement and the tectonic shifts that are underway in this new book. If you intend to buy only one book on tropical forest ecology in the next 10 years, buy this one. It is, simply put, outstanding.

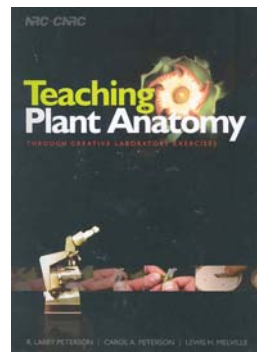
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#### LITERATURE CITED

Hubbell SP. 2001. *The unified neutral theory of biodiversity and biogeography*. Princeton, NJ: Princeton University Press.

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#### Teaching plant anatomy through creative laboratory exercises

Peterson RL, Peterson CA, Melville LH. 2008.

Ottawa, Ontario: NRC Press. Can. \$59.95 (spiral bound). 164 pp.

When is a coffee table book not a coffee table book? When it's Peterson *et al.*'s *Teaching plant anatomy* (hereafter referred to as *TPA*). The stunning colour illustrations that adorn almost every page of this slim volume are a great joy to view, and the text is also a pleasure to read.