

main pests and diseases reported and their management. Chapter 10 ('Harvest, post-harvest and processing') is divided into five sections dealing with harvesting, phenology, harvesting stage, yield, processing and storage, and has good plates. The compilation of information on the economics of production and marketing in chapter 11 contains excellent tables and figures, which add to the utility of the book. The final chapter concludes with a comprehensive summary of the studies on tamarind, with prospects for future applied research. Some institutions engaged in tamarind research and development, listed in the appendix and references at the end of the book, are apt and useful.

There are however some shortcomings, which could be addressed to improve future editions. For example, on p. 12, under subheading 12.2.3. ('Propagation studies'), the use of hormones to enhance fruit set, fruit production and nitrogen-fixing ability are mentioned. Many of the references included are incomplete. In addition, there is an overlap of information between chapters. Information is needed about authors. Although tamarind is a drought-resistant tree crop, available research information on the ecophysiological adaptation of the tree to dry areas is missing. Inclusion of facts such as the withdrawal of moisture by the tree from the ripening fruit, an adaptation to overcome severe stress conditions, would have made the book more interesting. A chapter on pollination biology, phenology of flowering, fruiting, and fruit growth would have been useful, but instead this information was mixed up in chapter 10 ('Harvest, post-harvest and processing'). No mention is made about the 'seedless tamarind', which can be an asset to both fruit growers and researchers. These minor omissions, however, do not detract from the thoroughness of the book. The price is reasonable, and information presented in this monograph will be a useful reference for extension workers, policy makers, fruit-tree growers, traders, teachers, students, researchers and scientists, who can further explore and exploit the commercial potential of tamarind.

K. Usha

*Division of Fruits and Horticultural Technology
Indian Agricultural Research Institute
India*

A WALK THROUGH THE WOODS OF CALIFORNIA

Stuart, J.D. & Sawyer, J.O. (2001). *Trees and shrubs of California*. The University of California Press, Berkeley, CA. xii + 467 pp., 40 colour illustrations, 207 line illustrations, 313 maps, 3 tables, index. Hardback: Price US\$45.00, £29.95. ISBN 0-520-22109-5. Paperback: Price US\$22.50, £14.95. ISBN 0-520-22110-9.

Stuart and Sawyer have achieved their goal of producing, 'an easy-to-use, portable manual of Californian trees and shrubs.' In so doing, they have filled a need that has long gone unmet in California. Although a series of extremely good floras has been available for much of the past century, these tomes have been largely inaccessible to all but the most botanically inclined. For those interested in trees, one of the best resources available to date has been McMinn and Maino's, 'An Illustrated Manual of Pacific Coast Trees', which was originally published in the 1930s. Other books have been written in the interim, but these have lacked dichotomous keys (restricting their usefulness), have covered only one region within California, and/or have not considered species of trees and shrubs together in a single work.

This book begins with a short section detailing basic elements of scientific classification, scientific nomenclature, and general strategies for identifying plant species. This introductory section, together with the book's glossary and appendices, provide all the information necessary to use this book successfully. Aside from these sections, the bulk of the book consists of species descriptions. These descriptions are generally short and to the point, providing the type of information that is most useful in discriminating among species, e.g. leaf and flower size and shape. In the 'Remarks' section of each species description, the authors also provide some of the trivia associated with the species (such as uses by indigenous peoples), which should be of interest to many readers. Throughout all of these sections the writing is remarkably clean, clear and free of jargon; specific botanical terms are used sparingly and are defined clearly in the glossary.

A geographic range map accompanies each species description, and shows that species'

principal distribution within California. On a few isolated occasions the description of a species' distribution listed in the text is partially at odds with the distribution depicted on its range map. These discrepancies are minor, e.g. not showing a region where the species is found occasionally, but still a bit disappointing. These maps are useful in depicting those regions where a species is likely to be found, but are not of sufficient detail to be used in most biogeographical analyses (which most likely was not a goal of the authors). Line illustrations also accompany most (ca. two-thirds) of the species descriptions. These drawings by A.J. Pickart are extremely well done and provide a much more useful basis for identification than photographs, which often lack the detail necessary to make species-level discriminations. Still, some photographic plates are included, and they do provide a nice sense of the color found among these species and within their habitats.

Where this book really excels is in the quality of its dichotomous keys, which are logically structured and easy to use. Better yet, these keys rely predominately upon vegetative characteristics, which can typically be identified throughout the year, and only minimally upon flowering or fruiting characteristics. Working through these keys, I found very few cases where the alternative choices were at all ambiguous, and fewer still where these ambiguities lead to spurious identifications (a concern that is further mitigated by pairing the keys with the species descriptions and line illustrations). Of course, given the small size of this book (in an effort to produce a manual that is portable), the authors have not provided an exhaustive coverage of every woody species distributed in California. Instead they have described the majority of woody genera, and those species within genera that are most common or distinct. Therefore, taxonomic identifications below the generic level are often approximate, i.e. whenever the coverage of species within a genus is not exhaustive. Fortunately, the authors have

identified this concern when appropriate, by listing the number of species within a genus, and the number of those species described in this book.

The one area in which this book falls short is in its coverage of non-native species. In California, over 1000 non-native species have become naturalized, some of which have a woody growth form. A few of these species have been included in this book (e.g., *Eucalyptus globulus* Labill.), but a great number have not (e.g., *Nicotiana glauca* Graham, *Ricinus communis* L.). Here again the authors were understandably constrained by a desire to keep the book portable, and were therefore limited by the number of species they could cover. However, because this book is designed to be used by those that lack a specific and exhaustive knowledge of California's flora, many may be frustrated by failed attempts to key out species (and genera) that are absent from this book. Undoubtedly, this book could have been improved by expanding the coverage of these non-native species, whose foreign origins will often elude those with a casual interest in California's trees and shrubs.

With the exception of this last issue, which I believe is minor with respect to the scope of this work, I wholeheartedly recommend this book to any and all that are interested in the trees and shrubs of California. It provides an excellent introduction to the subject, and is the perfect companion for a walk through the woods of California.

Dov F. Sax

Department of Ecology,

Evolution & Marine Biology

University of California, Santa Barbara

REFERENCE

- McMinn, H.E. & Maino, E. (1935) *An illustrated manual of pacific coast trees*. University of California Press, Berkeley.