

Book Reviews

Crops and Environmental Change: An Introduction to Effects of Global Warming, Increasing Atmospheric CO₂ and O₃ Concentrations, and Soil Salinization on Crop Physiology and Yield. 2005. S.G. Pritchard and J.S. Amthor. Food Products Press, an imprint of Haworth Press, Binghamton, NY. 421 pp. \$69.95, hard cover ISBN: 978-1-56022-912-4; \$49.95, soft cover ISBN: 978-1-56022-913-1.

Advanced books on scientific topics are often long compendia of papers presented at scientific conferences, lacking descriptions that explain the phenomena to a more general audience, and frequently varying widely in quality of the writing and relevance to the reader. This book on Crops and Environmental Change represents a refreshing improvement from that norm. Pritchard and Amthor have produced an understandable and clearly written work that provides an excellent overview of crop physiology and how four environmental factors impact crops. The authors concentrate on the effects of temperature, increasing carbon dioxide, ozone and soil salinization, factors which they state "are of greatest consequence" to crop production and for which "a significant knowledge base has been established".

In the Introduction, the authors describe the changes in the four environmental factors, and show the dynamics of human population and the food supply over the centuries. The Introduction is followed by a chapter on methodology for studying plant responses to the environmental factors considered. The physiology of plant growth is then, in subsequent chapters, considered at the cellular level, with detailed treatment of the response of cells to stress. Chapters on water relations; photosynthesis, respiration and biosynthesis; partitioning of photosynthate; and mineral nutrition all take the same basic form: The processes are first described in detail, and then the influence of the four environmental factors on them is described. Each chapter is concluded by a summary that helps the reader obtain a quick overview of each topic. The final chapters on vegetative growth and development; sexual reproduction, grain yield and grain quality; and the biotic environment take a more holistic look at the influence of the environmental factors on crop productivity. In each chapter, clear diagrams and lengthy tables provide a good summary of the existing knowledge.

The picture that emerges on the impact of the four factors is that the increases in carbon dioxide in the atmosphere are predicted to have largely stimulating effects on crop growth and productivity, helping to mitigate some of the effects of the other factors. Through its role in increasing temperature of the atmosphere, however, carbon dioxide

exacerbates global warming, and this fact points out the complex interactions that make the ultimate effects of these environmental factors difficult to predict. Rising surface temperatures are predicted to increase crop stress levels in temperate and tropical areas, but may well result in a shift of warm-adapted crops to higher latitudes. The deleterious effects of ozone on crop growth appear to be clearer and are predicted to lead to declines of crop yield as industrial activity increases worldwide. The influence of increasing salinity on crop productivity is also clearly negative, stunting growth in the vegetative phase and reducing yields. Yet careful use of osmotic stress by greenhouse tomato growers can increase soluble solids and eating quality of the fruit. This point is not mentioned in the book and highlights that the primary emphasis of the authors is on the major cereal crops. Horticultural scientists will have to extrapolate from the examples given to their species of interest.

Another relatively minor annoyance is the ways the chapters are organized. Consideration of the effects of the four environmental factors on vegetative and reproductive growth, for instance, seems repetitive and would have been better combined in one chapter.

Nevertheless, the book provides a useful reference for plant scholars who would like to know more about response of crops to environmental change and to learn which cellular processes are key to those responses. Unfortunately, those looking for clear, decisive answers will be disappointed, because, to quote the authors, "considerable uncertainty surrounds the effects of environmental change on the yields of major grain crops, with sound cases to be made for enhancement of yield in some situation and equally sound cases to be made for new limitations placed on yield in other situations".

H.C. WIEN

Department of Horticulture
Cornell University
Ithaca, New York

Armored Scale Insect Pests of Trees and Shrubs. D.R. Miller and J.A. Davidson. 2005. Comstock Publishing Associates (A Division Cornell University Press), Sage House, 512 East State Street, Ithaca, New York 14850. 442 pages. Over 100 figures and approximately 100 color plates. \$99.95, Hardcover. ISBN: 978-0-8014-4279-7

Armored or hard scale insects are among the most damaging pests of trees and shrubs in landscapes, orchards, greenhouses, conservatories, and forests. However, there has never been a comprehensive reference that adequately discusses in detail biology and field identification characters, as well as providing color images of the most common armored scale insects in the United States. Well, the book, *Armored Scale Insect Pests of*

Trees and Shrubs by Douglas Miller and John Davidson is the first comprehensive book available that provides information on identification, field appearance, life history, and economic importance of the 100 economically important armored scale insects of the USA. In addition, the authors have developed the first field key to the economically important armored scale insect pests of the United States. The book is divided up into three primary sections: introduction, descriptions of armored scale insects along with color images and line drawings, and indexes. The introduction is extensive and extremely useful since it provides information on the biology, ecology, management, economic importance, and morphology of armored scale insects. Furthermore, there is information on the materials and methods needed for collection and dry preservation, liquid preservation, and slide mounting of specimens, which makes it easier to accurately identify field specimens. The management section is very thorough in that there is information pertaining to detection, identification, monitoring, chemical control, biological control, cultural control, host-plant resistance, and integrated pest management (IPM). The authors provide in-depth descriptions of a variety of chemical control options including oils, soaps, synthetic organic insecticides, growth regulators, and pheromones and discuss scale resistance to insecticides. The authors also provide a detailed description of the biological control agents or natural enemies such as parasitoids and predators that regulate armored scale insect populations. In addition, there are colored images of many of the natural enemies mentioned in the text. No other reference available thoroughly covers the following topics as this one does.

The two keys, "Key to Adult Females (Microscopic Characters)" and "Field Key to Economic Armored Scales" are a useful feature of the book to help accurately identify armored scale insects. Approximately 3/4 of the book is devoted to descriptions of 110 armored scale insects along with color images and line drawings. The following information is included for each armored scale insect discussed: Entomological Society of America (ESA) approved common name, common synonyms and combinations, field characters, slide mounted characters, affinities, hosts, distribution, biology, economic importance, and selected references. The quality color plates of the female, male, and nymphs (crawlers), and highly detailed line drawings are one of the features that will make this book so valuable to extension agents, consultants, and growers.

I found the References Cited section to be a valuable addition to the book since it allows the reader to obtain more detailed information. In fact, I have acquired many of the references cited in the book for my own information and research. Finally, there is an index on "Host Plants of Armored Scales" and "Armored Scales, Natural Enemies, and General Subjects." Both of these indexes

allow the reader to easily locate specific information described in the text.

The book, *Armored Scale Insect Pests of Trees and Shrubs* is a valuable contribution to the understanding and identification of the armored scale insect pests in the United States, and despite the cost, should be on the bookshelf of practitioners involved in pest management of landscapes, nurseries, orchards, and forests

RAYMOND A. CLOYD
Department of Entomology
Kansas State University
Manhattan, Kansas

Introduction to Fruit Crops. Mark Rieger. 2006. \$69.95 soft. Haworth Press, Binghamton, N.Y. ISBN-13:978-1-56022-259-0 / ISBN-10: 1-56022-259-X. Pages, 462 pp. with Index. Includes 46 pp. of color photos. 8.25" × 10.75" format. Web: <http://www.HaworthPress.com/store/product.asp?sku=5547>.

This latest edition to the world of fruit literature contains thirty chapters. Besides the chapters covering individual fruit crops there is an introduction and overview in Chapter One. The book also has a couple useful appendices on common and scientific names of fruit crops and one with useful conversion factors. The 29 fruits covered in

individual chapters include the following: Almond, Apple, Apricot, Banana and Plantain, Blackberries and Raspberries, Blueberries, Cacao, Cashew, Cherry, Citrus Fruits, Coconut, Coffee, Cranberry, Date, Grapes, Hazelnut or Filbert, Macadamia, Mango, Oil Palm, Olive, Papaya, Peach, Pears, Pecan, Pineapple, Pistachio, Plums, Strawberry, and Walnuts.

Each chapter follows a uniform format with the following topical headings: Taxonomy, Origin, History of Cultivation, Folklore, Medicinal Properties, Nonfood Usage, United States and World Production, and a Botanical Description of the plant, flowers, pollination and fruit. These topics are followed by General Culture—including soils and climate, propagation, planting design, training and pruning, and pest problems. Next is Harvest, Postharvest Handling—including maturity, harvest method, postharvest handling, and storage. Each of the chapters ends with a Contribution to Diet section. Chapters are finished off with a Bibliography of useful references.

The book reflects Dr. Rieger's many years of teaching fruit science courses at the University of Georgia. I like the large page format of the book, which allows the author to pack quite a bit of information into its 462 pages. It contains sufficient photographs, charts, graphs, and tables to keep the text interesting. The strength of the book is the 29 different crops that are covered. The

weakness of the book is trying to adequately cover these 29 crops in 368 pages. With an average of only twelve and a half pages per crop, the author is restricted to a limited overview of each commodity. This presentation is particularly difficult with an expansive topic such as citrus. Just as most of life is a trade-off, it is also the case with textbooks, and this compromise is not necessarily a bad one. With the ever-expanding resource base available to us on the Internet, outside reading assignments to emphasize a more in-depth coverage of a physiological topic or regional production guide are accessed easily. In terms of a class text, I would guess that most instructors likely would skip some of the more unusual crops, such as macadamia nuts, oil palms, cacao, and coffee. The inclusion of these crops would, however, lend the text nicely to a course where international fruit and nut production is surveyed. The inclusion of temperate, subtropical and tropical species provides the opportunity for the book to be used as a reference in several courses. I also like the fact that Food Products Press produces books that are more affordable than most textbooks on the market. Pricing the book at \$70.00 makes it an attractive addition to the bookshelf of the student, the grower, the hobbyist, and even a struggling college professor.

DAVID G. HIMELRICK
Louisiana State University