



Book reviews

World Economic Plants: A Standard Reference.

John H. Wiersema and Blanca León. CRC Press, Boca Raton, Florida; hard-bound, ISBN 0-8493-2119-0; 749 pp.

Use of scientific (Latin) names of living organisms is a basic norm in all scientific literature. Yet, to write these names correctly is a daunting task for not only the novices, but even seasoned professionals. This is particularly true in agroforestry literature, where we often deal with little-known and underexploited species. Many authors have a tendency to refer to them with common or parochial names only. But different plants may have the same common name and the same plant may have different common names in different places. Furthermore, as knowledge evolves continuously, the Latin names of some of the plants, especially the little-studied ones that are common in agroforestry, may be revised according to the rules of the International Code of Botanical Nomenclature. Therefore, it is essential that unambiguous and currently accepted Latin names of plants are given in scientific literature and even in international commerce. Authoritative books and well-researched reference materials that accurately give this information, though a must for scientific writing, are hard to find.

This remarkable book fills that void. It is a thoroughly researched and comprehensive publication, which contains taxonomic information for nearly 10,000 species of economically important vascular plants from all over the world. That the book was reviewed before its publication by 150 specialists is a feature that most other publications cannot claim. The book contains two major parts, each arranged alphabetically. The first, 536 pages long, is the 'Catalog of Economic Plants.' It contains scientific names of vascular plants along with associated data such as synonymy, common names, economic impacts, and geographical distributions. The second part, the 'Index to Common Names,' is 213 pages of information in small print, providing a list of 19,200 common names,

including nearly 7,500 non-English derivations, of the plants included in Part one. Thus, starting from a common name of a plant, a user can locate its relevant botanical data in Part one.

As already mentioned, a reference book of this nature is a must for all agroforestry students and researchers. Almost all the trees that this reviewer has looked for randomly are listed in the book. If some are not (e.g., *Allophyllus africanus* P. Beauv., *Conocarpus lancifolius* Engl., and *Rothmania* spp.), it could well be that the species have undergone name changes, about which the reviewer is not aware. Admittedly, the common names are not exhaustive, especially when it comes to non-English derivations; but it is almost impossible, nor is it necessary, to list all the innumerable local names of all the species in a compilation like this. Readers need to be cautioned, however, that this book is not a species-identification guide.

The hard-bound book is very well produced. Its consistency of formatting is admirable. All in all, it is an invaluable reference book. By producing this book, its authors and the Agricultural Research Service of the United States Department of Agriculture that supported the compilation of the book have provided an outstanding service to plant-research community all over the world.

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Principles and Applications of Soil Microbiology. Edited by D. M. Sylvia, J. J. Fuhrmann, P. G. Hartel, and D. A. Zuberer, 1998. Prentice-Hall, New Jersey 07458, USA. Xxii + 550 pp; ISBN 0-13-459991-8.

This is perhaps the latest book in the market covering principles and applications of soil

microbiology. With 23 chapters, each a comprehensive treatment of a specific topic by experts in that area, the book has excellently captured the advances in both fundamental knowledge and potential applications of soil microbiology.

The book is divided into three sections. Section one deals with habitats and organisms that are involved in the science of microbiology, and comprises a total of nine chapters. Chapter one is introductory in nature. It traces the historical perspective of soil microbiology indicating the substantial impact (both positive and negative) that microorganisms have had on humankind. Chapter two deals with the soil habitat and covers soil description, soil physical and chemical characteristics, and soil abiotic factors that help define the habitat of soil microorganisms. The next five chapters (Chapters three to seven) discuss the major groups of soil habiting microorganisms. Bacteria and archaea are discussed in Chapter three followed by fungi in Chapter four. Eukaryotic algae and cyanobacteria and their contribution to soil development especially on bare soil as pioneer species is discussed in Chapter five. This is followed by descriptions on protozoa and nematodes (Chapter six) and their role as bacterial and fungal population regulators and on the negative impact they have on communities by parasitizing many crops. Chapter seven covers viruses, which are the most numerous and the least understood of all biological entities in the soil. Chapter eight discusses microbial ecology and outlines the major organismal interactions taking place in the world of microorganisms. The last chapter in this section (Chapter nine) deals with molecular genetic analysis in soil ecology, and outlines the recent molecular genetic methodologies that have been developed to examine soil microorganism at the molecular level.

Section two gives a comprehensive coverage of microbially mediated transformations in the soil and carries a total of seven chapters (Chapters 10 to 16). Chapter 10 gives an in-depth analysis of microbial metabolism and outlays the different strategies by which soil microorganisms acquire energy and nutrients to meet their needs for growth, survival, and reproduction. Chapter 11 deals with carbon transformations and soil organic matter formation, one of the major functions of soil microorganisms. Decomposition and nutrient

release of both plant and animal remains in the soil and the factors controlling these processes are discussed in the chapter.

The centrality of nitrogen as an essential nutrient for all life on earth is given due emphasis in this book. Indeed, the next three chapters (Chapters 12 to 14) are devoted exclusively to discussions revolving around nitrogen. Chapter 12 discusses in detail the nitrogen cycle and the role the microorganisms play in the transformation of various forms of nitrogen. Chapters 13 and 14 describe biological dinitrogen fixation. Following an introduction to the fixation process, Chapter 13 discusses in detail the fundamentals and the nature of the enzyme complex nitrogenase, which mediates the conversion of dinitrogen to ammonia. The nonsymbiotic fixation process by the diazotrophs is also discussed in the chapter. Chapter fourteen deals with symbiotic fixation and outlines its importance in agriculture. The remaining two chapters in this section discuss the importance of microorganisms in the transformation of other major elements in the soil, such as sulfur (Chapter 15) and phosphorus, iron, manganese, mercury, and selenium (Chapter 16).

Section three, the last, deals with applied and environmental topics providing both an environmental and agricultural perspective to microbial activity in the soil. The section comprises a total of seven chapters (Chapters 17 to 23). Chapter 17 discusses the effects of rhizosphere and spermosphere (areas where organic materials are released from the root or seed) on microbial populations. While mycorrhizal symbioses and their effects on plant performance are the subjects in Chapter 18, Chapter 19 discusses broadly the methods that may be employed in the biological control of soilborne plant pathogens and nematodes. Biochemical mechanisms by which microbes metabolize xenobiotic chemicals (compounds foreign to biological systems that are often man-made and resistant to biodegradation) are discussed in Chapter 20. Bioremediation of contaminated soils is the subject matter of Chapter 21, which outlines various strategies that may be used to restore these contaminated soils, and presents successful case practical examples of such strategies. The purposes of composting of organic wastes and the processes involved are discussed in Chapter 22. Chapter 23 that discusses the role

of microbes as producers and consumers of trace (global) gases completes the book.

The book's contents are well balanced and very impressive. The chapters authored by different authors are very well integrated across topics. The book is also unique in that it presents topics that were hitherto not presented in soil microbiology books; these include subjects such as molecular aspects of soil microbiology, xenobiotics, bioremediation, composting, biological control, and the pragmatism and practicability in many areas related to environment and agriculture. Each chapter has illustrations in the form of boxes to make the concepts easy to understand, and a summary at the end tying together the salient features of the chapter. Furthermore, study questions are included in each chapter. All these add to the usefulness and value of the book to the researcher as well as students of soil microbiology. The only criticism this reviewer has about the book is that most of the practical examples provided in the book are from the temperate world, with very little emphasis given on the tropics.

The editors and chapter authors of this well produced book need to be commended for their excellent efforts in producing such an outstanding book. The book is recommended for advanced undergraduate and graduate students who require a comprehensive understanding of the field of soil microbiology. It is an excellent text for professors teaching soil microbiology course at these levels. Scientists working in the fields of agriculture, environment, and industry will also find this book very useful. Although the book is not specifically oriented to dealing with agroforestry problems and situations, students and researchers working on soil-quality-improvement aspects of agroforestry will find the general principles and applications discussed in the book very valuable.

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