
BOOK REVIEWS

New Books Received

Applications of Biotechnology to Mitigation of Greenhouse Warming (Proceedings of the St. Michaels II Workshop, April 2003)—Norman J. Rosenberg, F. Blaine Metting, and R. Cesar Izaurralde. Battelle Press, 505 King Ave., Columbus, OH 43201-2693. 2004. \$45.00. Softcover. 213 p. ISBN 1-57477-141-8.

Biodiversity—Christian Leveque and Jean-Claude Mounolou. John Wiley & Sons, 111 River St., Hoboken, NJ 07030. 2004. \$45.00. Softcover. 284 p. ISBN 0-470-84957-6.

Biodiversity and Pest Management Systems in Agroecosystems (Second Edition)—Miguel Angel Altieri and Clara Ines Nicholls. The Haworth Press, 10 Alice St., Binghamton, NY 13904-1580. 2004. \$49.95. Softcover. 236 p. ISBN 1-56022-923-3.

Design of Landfills and Integrated Solid Waste Management (Third Edition)—Ajendur Bagchi. John Wiley & Sons, 111 River St., Hoboken, NJ 07030. 2004. \$160.00. Hardcover. 696 p. ISBN 0-471-25499-1.

Devastation and Renewal: An Environmental History of Pittsburgh and Its Region—Joel A. Tarr. Univ. of Pittsburgh Press, Pittsburgh, PA 15260. 2003. \$32.00. Hardcover. 281 p. ISBN 0-8229-4156-2.

Energy: Technology and Directions for the Future—John R. Fanchi. Elsevier Academic Press, 200 Wheeler Rd., Sixth Floor, Burlington, MA 01803. 2004. Hardcover. 491 p. ISBN 0-12-248291-3.

Environment & Aerobiology—Ashok K. Jain. Studium Press, LLC, P.O. Box 722200, Houston, TX 77072. 1998. \$60.00. Hardcover. 307 p. ISBN 0-9656038-0-6.

Green Planet Blues, Environmental Politics from Stockholm to Johannesburg (Third Edition)—Ken Conca and Geoffrey D. Dabelko. Westview Press, 5500 Central Ave., Boulder, CO 80301. 2004. \$40.00. Softcover. 372 p. ISBN 0-8133-4200-7.

Humic Substances: Nature's Most Versatile Materials—Elham Ghabbour and Geoffrey Davies. Taylor & Francis Books, 29 West 35th St., New York, NY 10001-2299. 2003. \$110.00. Hardcover. 372 p. ISBN 0-59169-015-3.

Managing Soil Quality: Challenges in Modern Agriculture—P. Schjonning, S. Elmholt, and B.T. Christensen. CABI Publ., 875 Massachusetts Ave., 7th Floor, Cambridge, MA 02139. 2004. \$120.00. Hardcover. 344 p. ISBN 0-85199-671-X.

Measuring the Natural Environment (Second Edition)—Ian Strangeways. Cambridge Univ. Press, 40 West 20th St., New York, NY 10011-4211. 2003. \$70.00. Softcover. 534 p. ISBN 0-521-52952-2.

Pesticide Residues: Significance, Management and Analysis—S.K. Handa, N.P. Agnihotri, and G. Kulshrestha. Research Periodicals & Book Publ. House, P.O. Box 720728, Houston, TX 77272. 1999. Hardcover. 226 p. ISBN 0-9656038-3-0.

Three Mile Island: A Nuclear Crisis in Historical Perspective—J. Samuel Walker. Univ. of California Press, 2120 Berke-

ley Way, Berkeley, CA 94720. 2004. \$24.95. Hardcover. 303 p. ISBN 0-520-23940-7.

Water for Life: Water Management and Environmental Policy—James L. Wescoat, Jr., and Gilbert F. White. Cambridge Univ. Press, 40 West 20th St., New York, NY 10011-4211. 2003. \$20.00. Softcover. 322 p. ISBN 0-521-36980-0.

Handbook of Processes and Modeling in the Soil-Plant System

Edited by Dinesh K. Benbi and Rolf Nieder, Food Products Press and The Haworth Reference Press, imprints of The Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580. 2003. 762 p. \$89.95 softcover. ISBN 1-56022-915-2.

Soil is a fundamental requirement of life on the earth. Most plants rely on soil for physical support and nutrition supply. Animal and other low forms of organisms, in turn, use organic matter produced by plants for food. Correct and efficient soil management methods rely always on the thorough understanding of physical, chemical, and biological processes occurring in soil that form a very sophisticated interrelated network system. To understand the complex network system, it is important to explore every component by all means. Presenting both the fundamental processes occurring in the system and a variety of related modeling approaches in one book makes it quite valuable.

The book can be divided into five parts. Chapters 1 through 3 review the physical, chemical, and biological processes of soil properties in general. The three chapters cover energy and matter flow, dynamics of organic and inorganic matter, and biological activities within the network system.

Since soil formation and degradation and other closely related substances and processes are critical for soil structure, water, nutrition, and productivity, Chapters 4 through 9 describe humic substances, radioactivity, and soil formation and degradation processes. Chapter 4 reviews recent research results on the conformational structure of humic substances. The formation processes of parental material, surface soil, and lower soil horizons and the corresponding modeling approaches are discussed in Chapter 5. The deposition, behavior, and transfer of radionuclides in the soil-plant system and the corresponding modeling approaches are given in Chapter 6. Chapters 7 through 9 focus on soil degradation processes (i.e., soil acidification, alkalization, and wind and water erosion) and corresponding modeling approaches.

Chapters 10 through 19 describe the dynamics and modeling approaches of all essential soil matter including water, solutes, carbon dioxide, organic matter, major nutrient elements (i.e., nitrogen, phosphorus, and potassium), secondary nutrient elements (i.e., sulfur, calcium, and magnesium), trace and toxic elements (e.g., copper, zinc, boron, lead, arsenic, etc.), and agrochemicals (e.g., herbicides, insecticides, fungicides, nematocides, and plant growth regulators). A variety of modeling approaches, concepts, and application examples are presented in these chapters. The modeling approaches integrate physical and chemical processes in the complex network system. From my point of view, they are quite useful to people working in the fields of dynamic modeling, especially for model development and application.

In the soil-plant-atmosphere network system, plant species

play a crucial role in plant production. Therefore, the simulation of plant growth and development in the system is a necessary component. Chapters 20 and 21 discuss the concept of modeling crop growth and development and crop responses to plant growth regulators.

Thoughtfully, the last chapter gives readers an overview of the potential and limitations of modeling approaches. It discusses generic issues related to modeling, such as scale and hierarchy, determinism and stochasticity, error and nonlinearity, parameterization and validation, and development and applications of models.

This book is suitable for professionals, faculty, graduates, and senior undergraduates in soil and environmental sciences as well as crop science. It can be a handy reference book for soil scientists or an advanced textbook for graduates in soil science. A must-mention merit of this book is that a wealth of citations including an enormous number of very recent ones will benefit scientific professionals and graduates.

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Biosolids Applied to Land: Advancing Standards and Practices

Committee on Toxicants and Pathogens in Biosolids Applied to Land, The National Academies Press, 500 Fifth Street, NW, Washington, DC 20055. 2002. 345 p. \$44.00 paperback. ISBN 0-309-08486-5.

The fate of biosolids (treated sewage sludge and wastewater residuals) was altered dramatically with the passage of the Ocean Disposal Ban Act of 1988. While recycling had been practiced for decades, the prohibition of ocean dumping of biosolids fostered increased emphasis on their land application. The task of this committee was to “focus its review on approaches for identifying human health hazards, for assessing exposure to those hazards, and for assessing risk from the those exposures.”

After a brief introductory chapter, the authors devote the next chapter to biosolids management of pollutants and pathogens from U.S. and European perspectives. Subsequent chapters of the book are devoted to epidemiological evidence of health effects associated with biosolids, advances in risk assessment since the establishment of the Part 503 regulations, evaluation of the USEPA’s approach to setting chemical and pathogen standards, and integration of chemical and pathogen risk assessment.

The committee found that there was “no documented scientific evidence that the Part 503 rules have failed to protect public health.” The committee, however, recommends the following: (i) use improved risk-assessment methods to better establish standards for chemicals and pathogens, (ii) conduct a new national survey of chemicals and pathogens in sewage sludge, (iii) establish a framework to implement human health investigations, and (iv) increase the resources the USEPA devotes to the biosolids program. While this book is critical of some of the USEPA’s policy decisions and priorities, it clarifies the hard management decisions required in disposing of human wastes.

This book is a very well written and documented review of the advancing standards and practices of the land application of biosolids. Part 503 rules were initially promulgated upon the best evidence available. Since Part 503 rules were created, the absolute quality of biosolids and the knowledge base for

land application have improved. These two components allow for a much clearer view of the consequences and benefits of the land application of biosolids. While risk assessments of biosolids should be based on “complex-mixture data to include risks from chemicals and pathogens,” this type of data is “not available in either sufficient quantity or quality.” This is a must-read for current and future policymakers who wish to land-apply biosolids or regulate biosolids application.

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Quality Improvement in Field Crops

Edited by A.S. Basra and L.S. Randhawa, Food Products Press, 10 Alice St., Binghamton, NY 13904-1580. 431 p. \$49.95 soft-cover. ISBN 1-56022-101-1.

In most field crops, end-use quality has played a secondary role in breeding programs, to be employed as a selection criterion only after improvement in yield per hectare has been achieved. Nevertheless, the very complexity of crop quality has earned it the attention of legions of plant breeders, agronomists, forage scientists, plant pathologists, entomologists, and grain, fiber, and food scientists. In this book, experts in crop quality write about past and current research in 11 crop species and groups of species.

Quality Improvement in Field Crops is not a comprehensive treatment of the subject. Variation in emphasis among chapters reflects differences in histories and uses of the crops and the strengths of the researchers who work with them. The world’s top three grain crops serve as example of this. Two extensive chapters are devoted to wheat—a crop in which quality has often rivaled yield as an agronomic and breeding objective—whereas maize is dealt with in one short chapter on agronomic practices. And rice, always in the forefront of biotechnology, is discussed in a chapter concerned more with transgenic methodology than with quality.

All of the authors are leaders in their respective fields, and this is evident in the book’s excellent scientific caliber. The writing and editing are uniformly first-rate. Readers can find comprehensive summaries of the most important criteria for determining end-use quality for the majority of crops dealt with in the book: wheat, maize, barley, oat, several food and forage legumes, oilseeds, cotton, and sugarbeet. Chapters on other crops deal with narrower issues.

Even though the word “improvement” is often taken to imply “genetic improvement,” it is used more broadly in the book’s title. Breeding for improved quality is discussed in depth only in the chapters on wheat, lentil, pigeonpea, oilseeds, cotton, and sugarbeet. The second chapter on wheat provides a highly informative table comparing generation-by-generation procedures for breeding hard and soft wheat cultivars with improved yield and high quality for their respective end-products. Another highlight is the chapter on *Brassica* species, which includes a section on each of six divergent breeding objectives (e.g., “low saturated fatty acid oils,” “high erucic acid oils”), each with three subsections on nutritional/functional background, methods of modification, and current breeding status. Good chapters on general quality issues in oat, cool-season food legumes, and forage legumes deal with breeding only briefly, as does an interesting chapter on the nutritionally limiting sulfur-containing amino acids in soybean.

Running through the chapters is a distinct theme: Advances in technology have had a huge impact on improvement of