

Book reviews

Water dynamics in plant production. By Wilfried Ehlers and Michael Goss. Published in 2003 (appeared in January 2004) by CABI Publishing, CAB International, Wallingford, Oxon OX10 8DE, United Kingdom and CABI Publishing, 875 Massachusetts Avenue, Cambridge, Massachusetts 02139, United States. xiv + 273 p., hardcover. ISBN: 0-85199-694-9. Price: US\$120; AU\$170.55 (plus AU\$6.00 postage and handling) (<http://www.dadirect.com.au>; email: service@dadirect.com.au).

The book is a milestone in English-language publication. It draws on Professor Ehler's thoroughly researched and comprehensive textbook, "Wasser in Boden und Pflanze" ("Water in Soil and Plant"), published in German in 1996 by Eugen Ulmer Bmbh & Co. in Stuttgart. Professor Goss has joined Dr Ehler to update, enrich, and translate the book. They have written a book that should be read by all students and scientists studying water use in plant production.

The authors are two leading agricultural scientists: Professor Ehlers at the University of Göttingen in Germany and Professor Goss of the University of Guelph in Canada. They have put their extensive knowledge together to create a seamless textbook that gives "a sound understanding of the interactions [among] plants, soils, and climate" (p. 247).

The book has 18 chapters. The first describes the importance of water in plants and includes Jacob Levitt's classic categorisation of drought-resistant plants. Then follow two chapters on the role of water in soil and the interdependency of soil, water, and vegetation. The fourth chapter gives physical and chemical properties of water. Chapter 5 covers water storage and movement in the soil. This chapter has examples that show how matric and gravitational potential energies combine to control direction of water movement in soil. Chapter 6 reviews water uptake by the root, root anatomy, and root branching

patterns. Chapter 7 deals with the water balance of the plant (water potential and its components). Chapter 8 discusses the soil-plant-atmosphere continuum (SPAC). Chapter 9, the most extensive one, describes water use by crops. Leaf area index, transpiration, plant-extractable water, and stomatal control of water loss are covered in this chapter. Chapters 10 and 11 report the effect of radiation and water use, respectively, on dry matter production. The effect of nutrient supply on water use and yield is the subject of Chapter 12. Chapters 13 and 14 focus on drought and yield. Methods used to measure water status of plants (pressure chambers, thermocouple psychrometers, relative water content) are included in Chapter 14. The effect of climatic factors on yield is the topic of Chapter 15, and Chapter 16 reviews breeding for water use efficiency. Soil and crop management practices are covered in Chapters 17 and 18, respectively. Chapter 19 deals with irrigation. Chapter 20 is an epilogue, which shows the authors' reverence for productive soils.

Terms are carefully defined. Each new term appears in italics. The index can also be used to find words and definitions. The book is heavily illustrated with instructive figures. Text and figures are of excellent quality and on glossy paper. Boxes set into the text highlight important concepts such as "Measuring soil water" (how tensiometers operate), "Preferential flow", "How lysimeters work", and "Measurement of water flow through plants" (heat-balance and heat-pulse methods to measure sap flow). At the beginning, the book has a helpful list of abbreviations with the units. At the end, an extensive list of references, with both classic and recent ones, is a valuable resource.

The authors have "attempted to integrate current knowledge across the continuum [of plant physiology, ecology, plant nutrition, soil physics, and irrigation] for agricultural crops" (p. ix). The intended audience is university and college students and those starting postgraduate studies. I also recommend it for scientists dealing with field crop production. It has a wealth of information, and I thank the authors for making it available.

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Cropping systems: trends and advances.

Edited by A. Shrestha. Published in 2003 by Food Products Press, 10 Alice Street, Binghamton, NY 13904-1580, United States (<http://www.HaworthPress.com>). 720 p. ISBN 1-56022-107-0. Price: US\$59.95 (email: docdelivery@haworthpress.com).

This book follows a frustrating recent trend of republishing editions of a journal which have been lumped together into a book. In this instance the contents of the book have come from the *Journal of Crop Production* 8(1/2) and 9(1/2) (2003), which were published simultaneously as 25 individual papers. If the material is available as a journal it is difficult to determine what advantage there is in also publishing it as a book, especially if this is done at the same time. A cynic might suggest that it is a way of rapidly doubling ones publications for the year as presumably it will be indexed in both forms. Because this material started life as the two journal volumes there is a lack of overall cohesion and direction in the book. In effect it is a collection of papers on various aspects of agronomy.

The other thing that becomes immediately apparent is the conclusion that trends and/or advances in cropping systems are currently only occurring in North America as far as the Editor is concerned. The vast majority of the contributions to this publication were written by authors from the United States and Canada. The agriculture of such countries as Australia, western Europe, India, Israel, New Zealand, and South Africa are ignored.

With the exception of contributions from CIAT in Colombia and IITA and ICRISAT from West Africa, scant attention has been paid to the considerable advances that have been wrought in crop production as a result of the work of the other major CGIAR institutions, particularly CIMMYT and IRRI with cereals and ICARDA with grain legumes. For example, there is no mention of the major change in cropping practises that have occurred in the west Asia and north Africa region following the selection by ICARDA and local

scientists of cold- tolerant lines of both lentil and chickpea. This has led to spring sowing being replaced by autumn sowing which, in turn, has led to a near doubling of the seed yield of these crops. Similarly, work done by climatologists at ICRISAT, which has used rainfall probability data to reduce risk of crop failure for subsistence farmers in the semi-arid tropics by fitting the crop growth cycle to the available soil water supply is not mentioned. There is a chapter on forage legumes but very little on biological nitrogen fixation either by conventional use of *Rhizobium* or by such systems as the fern *Azolla* which is used to fix nitrogen in rice paddies. In the tropics, intercropping has become a major method of increasing yield where land area is limited. It is briefly mentioned in one chapter on yams in west Africa. Weeds are featured but insects, pathogens and nematodes are not.

This book fails to account for cropping advances in much of the world. Yields of many crops in Europe are well ahead of those obtained in the continental United States. Recent average Indian wheats are now comparable with those of the United States as are rice yields in Japan, Korea, and Taiwan (FAOSTAT 2005).

The writing of reviews, which this book is made up of, is a thankless task. Presumably these were all written by invitation of the Editor. As a supervisor of graduate students, a good review is always a good way of getting a student started on a major new topic. However, because of its lack of cohesion and the very strong North American bias I find it difficult to identify any paper in this book that I would recommend as a starting point for research for a graduate student or any other of my agronomic colleagues.

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REFERENCE

FAO 2005. FAOSTAT database Agriculture, Agricultural Production, Crops Primary (<http://apps.fao.org/faostat/collections?version=ext&hasbulk=0&subset=agriculture>). (Downloaded 1 February 2005.)