Book reviews

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Soil Mineralogy with Environmental Applications, SSSA Book Series 7, ed. J. B. Dixon & D. G. Schulze. xxix + 866 pp. Madison, Wisconsin: Soil Science Society of America (2002). US $90 (hardback).
ISBN 0 89118 839 8.

The title and style of this book immediately invites comparison with a previous text in the SSSA series: *Minerals in the Soil Environment* (Dixon & Weed), the second edition of which was published in 1989. Although there is overlap in the contents of the main bodies of the two texts, which both deal with the nature of specific classes of minerals, there is a considerable difference in emphasis. For example, the current text has less material on analytical techniques for mineral identification and greater illustration of the environmental, agronomic and industrial significance of soil mineral reactions.

The chapters in *Soil Mineralogy with Environmental Applications* may be broadly divided into three groups. The first five tackle the difficult job of condensing the principles behind crystallography, surface chemistry, humus–mineral interactions, mineral solubility and associated analytical methods into less than 200 pages. The following 17 chapters have a slightly easier job in presenting the principal classes of soil minerals. Almost all of these follow a uniform format and, broadly, present information on: structure, properties, distribution, environmental significance, identification, future research, case studies and student exercises. The book concludes with six chapters which deal with a diverse range of mineralogical applications to soil taxonomy, soil tectonics, remediation of radionuclide-contaminated soil, pesticide interactions and bioremediation; the final chapter presents an introduction to charcoal in soil.

Throughout the text, the emphasis is on presenting recent work. In fact, a stated aim in the preface is to rely upon the (older) references cited by recent studies as a literature resource for those seeking more detail and background. One outstanding feature of the book is the excellent use of colour diagrams to illustrate mineral structures. The clear explanations of illustrative style and their adoption throughout the text contribute substantially to the value of the book to undergraduate and more advanced students. Overall, this is an excellent text which, I believe, will succeed in dragging soil mineralogy into the 'interest-zone' of my students. It should be on the shelves of any library supporting courses in soil science, agronomy and environmental science.

S. YOUNG

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Taxonomy and Pathology of Cylindrocladium (*Calonectria*) *and Allied Genera*, ed. P. W. Crous. 278 pp. St. Paul, Minnesota: APS Press (2002). $69.00.
ISBN 0 890 54290 2.

This comprehensive book is aimed at mycologists and plant pathologists or readers with some mycological background. Forest pathologists, diagnosticians and extension officers will find this book useful in the laboratory, field and diagnostic disease clinic. It covers 39 species of *Cylindrocladium* and 15 allied genera. These fungi are important plant pathogens associated with diverse hosts (such as conifers, eucalyptus, macadamia, papaya, peanuts and soya beans) and symptoms and occur in tropical and subtropical regions of the world.

The author describes how to recover *Cylindrocladium* from the soil and gives a clear description of how it infects a host and how the disease progresses. Photographs illustrate the symptoms on various hosts and the diseases are discussed. Methods of disease control are summarized. Methods to study, and descriptions of, the morphological features and the use of the latest molecular techniques for species characterization are given. Current phylogeny and tabulation of GenBank sequences provide a solid basis for future molecular work.

The author provides the key to the hypocrealean anamorph genera with hyaline cylindrical phialoconidia and keys to the species of *Cylindrocladium* and those species having teleomorphs in *Calonectria*. These keys include diagrams of vesicle shapes to aid with identification of species. The author then treats each species individually. The teleomorph (when known) and anamorph names are recorded. The general morphological and cultural characteristics, cardinal temperatures for growth and symptoms and substrate

of the fungus are given. The distribution is clearly denoted by black circles on a miniature map of the world. Excellent drawings and/or photographs illustrate the morphological characteristics and will be invaluable in aiding the reader in the identification of these species. The book concludes with a comprehensive list of references and a helpful glossary.

Overall, the book provides a vital reference source which should find a place in the library of any organization involved in mycological and plant pathological teaching and research.

T. AVELING

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Nitrogen Fixation: Global Perspectives, eds T. M. FINAN, M. R. O'BRIAN, D. B. LAYZELL, J. K. VESSEY & W. E. NEWTON. 553 pp. Wallingford: CABI (2002). ISBN 0 85199 591 8.

The scale and urgency of the productivity problem facing world agriculture today is illustrated by the following data. In the last 40 years world food production per capita has increased by 25%. Despite this increase in production, areas of the world still face persistent food shortages, a problem that will become more acute as the global population of 6 billion today rises to a predicted 8·5 billion in the next two generations. The increase in productivity was underpinned by the development of new crop varieties and an increased input of fixed nitrogen, the most common limiting nutrient in soils with adequate rainfall. It is argued by V. Smil in the keynote address in this volume, that increased industrialization of agriculture is not the appropriate solution to the impending crisis, rather the need is for low-cost readily available technologies and practices to increase food production where it is needed.

This book provides overviews of the current state of the art over a wide range of topics in Biological Nitrogen Fixation (BNF) in the form of the presentations and poster contributions of the 13th International Congress on Nitrogen Fixation held in Ontario, Canada in July 2001. The original intention of these interdisciplinary symposia (established in 1974) was to foster communication between chemists, biochemists, microbial and plant geneticists and applied agricultural scientists involved in different aspects of nitrogen fixation. The presence of 300 participants from 44 countries is an indicator of the continuing wide global interest in this field. BNF is a mature subject which has been given fresh impetus by recent developments in understanding the structure and reactivity of nitrogenase, the enzyme responsible for N_2 fixation, and the genomic advances of the model legumes *Medicago truncatula* and *Lotus japonicus*, and the symbionts *Mesorhizobium loti*, *Sinorhizobium meliloti* together with the symbiotic regions of *M. loti* and *Bradyrhizobium japonicum*.

The last few years have witnessed a quantum jump in our ability to apply genetic and genomic analyses, pioneered in model systems, to nitrogen-fixing crop and forage plants. This, together with the demonstration that the selection of legume varieties optimized for BNF can confer real economic and productivity benefits provides a stimulus to the research areas covered in this book. The volume is arranged in 15 sections headed by Chairs' Comments, which in the main avoid the opportunity provided to 'present a few recent results from my lab'. Instead they provide useful assessments of what is new in the topic and where efforts need to be focused. The lecture summaries are followed by one-page poster presentations that parallel the organization of the topic sections. The breadth of the topics covered is wide, ranging from fundamentals of the enzymology and the complexities of the plant–microbe signal exchange resulting in the developmental response leading to nodule formation and the establishment of symbiotic nitrogen fixation, to novel applications and applied aspects of nitrogen fixation. Nitrification and denitrification, two other steps of the nitrogen cycle, are also covered.

The book is well-produced, providing a good biographical reference source to the areas covered. I recommend it as an up-to-date and valuable resource for those wishing to gain a broader insight to unfamiliar aspects of BNF, which is otherwise difficult information to access.

R. R. EADY

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Agricultural Research Policy in an Era of Privatisation, eds D. BYERLEE & R. G. ECHEVERRÍA. 300 pp. Wallingford: CABI (2002). £49.95 (US$75.00). ISBN 0 85199 600 0.

This book arose from a symposium at the XXIV Conference of the International Association of Agricultural Economists in Berlin in 2000, and contains an introduction by editors (at the World Bank and the Inter-American Development Bank respectively), two specially commissioned overview papers, and 12 chapters derived from papers at that event.

Each of the main words in the book's title deserves some attention. The 'agriculture' considered is overwhelmingly cropping, with few mentions of livestock, food or land management. 'Research' is just that;

extension is barely mentioned, though there is some consideration of research scientist training. 'Policy' focuses largely on central government funding of research centres, in terms of its objectives such as 'public goods' and/or support for smallholder equity. All this reflects the realities of current agricultural research as viewed by most governments (especially in developing countries), but a somewhat broader approach, at least in the overview chapters, might have been welcome.

However, the driving force for the book comes from 'privatisation', a term that stretches from pressure to generate revenue from producer levies or directly sold services, through public–private partnerships, to full-scale transfer to the private sector. A particular development – mentioned but not much analysed here – is the emergence of major global plant-breeding corporations who focus on only four or five crops using scientific techniques and legal approaches increasingly beyond the reach of public-sector centres. Whether and how 'policy' can or should deal with this phenomenon is already a major political issue in many countries.

The book mostly comprises a useful and well-written set of studies for a variety of countries, with specific chapters on Australia, Colombia, Kenya, Tanzania, Zimbabwe, Uruguay, the Netherlands, Argentina, India and China. The omission of the United States, which has played a major role in national and international research system development, via training, advice or merely example, is a pity. Most chapters are substantially historical in framework, but explore the underlying impersonal forces at work, and consider these in a general framework, e.g. rates of return, smallholder interests.

The different approaches to, and stages of, research privatisation come through clearly in this book. Already, global expenditure on private agricultural research probably exceeds public research (the figures in Pray's overview chapter extend only to the mid-1990s). A crucial question is how the needs of the developing countries can be addressed through new mixes of public and private systems. Pray concludes that private R&D – though still relatively small – will outpace public spending, especially where there are large expected markets, strong intellectual property rights (IPRs) and a favourable government attitude. Brazil is identified as a promising case; China is more uncertain due to its cautious approach to foreign involvement and IPR enforcement. In most countries, the future of public research institutes will depend on state evaluations of the urgency and importance of public goods associated with agriculture, such as food safety and soil conservation. And it will require a more efficient management and funding regime than has hitherto been the case in too many instances.

K. J. THOMSON