BOOK REVIEW

Advaces in Nitrogen Cycling in Agricultural Ecosystems. J. R. WILSON (Ed). C.A.B. International. Wallingford. 1988 451 pp. A$65 plus postage. Available from The Tropical Grassland Society.

This book, the proceedings of a Symposium on Advances in Nitrogen Cycling in Agricultural Ecosystems held in Brisbane, Australia in 1987, is divided into three major subject areas: Nitrogen Transformation Processes, The Nitrogen Cycle in Different Systems, and Advances in Nitrogen Methodology. The organisers, CSIRO Division of Tropical Crops and Pastures managed to bring together many of the world's leading experts on nitrogen gains, losses and transformations in agricultural ecosystems. The emphasis is on tropical ecosystems, but temperature ecosystems are also well covered. Although this is one of several books published in the last 7 years reviewing nitrogen in agriculture and the environment, it has the advantage for those interested in tropical grasslands, that many of the chapters are focused on research in the tropics.

There are 45 authors of the 24 chapters, including keynote and closing addresses by Roland Hauck and Elder Paul, respectively. Twenty-five of the authors are from Australia and the remainder are from throughout the world. The chapters range from extensive reviews of a subject with over 150 references to chapters where the emphasis is primarily on the authors' own research. An example of the latter is the analysis of nitrogen inputs by legumes and the economics of ley cropping systems in Australia by R. L. McCowan and co-authors.

The section on Nitrogen Transformation Processes gives a good presentation of the current state of knowledge and highlights the recent research on all major soil and many plant nitrogen transformations. These include: cycling of nitrogen within the plant, symbiotic and non-symbiotic nitrogen fixation, role of soil fauna and microflora in soil nitrogen turnover, ammonia volatilization, denitrification, leaching, and erosion, as well as a chapter on practical and mechanistic modeling of nitrogen processes. Of interest to tropical grassland specialists are the conclusions by R. E. White that nitrate leaching is the major component of overall loss of nitrogen from intensively managed, grazed grasslands; and by J. R. Freney and A. S. Black that pastures grazed by cattle are the largest single source of atmospheric ammonia, and that there are few management alternatives to reduce this loss.

Systems discussed in detail in the Nitrogen Cycle in Different Systems section are: wetland rice, tropical evergreen tree crops, multiple cropping systems, upland crops, pastures, and legume ley rotations. The first three clearly apply to the tropics; the chapter on upland crops had an emphasis on the tropics, the chapter on pastures is focused on recent research in Australia and New Zealand, and the ley legume rotation chapter by McCowan and co-authors is based on experiences in Australia. This portion of the book is of most interest to those working in Australia, New Zealand, and the tropics.

The section on Advances in Nitrogen Methodology would be extremely useful for anyone contemplating research in the areas discussed, namely, measurement of nitrogen fixation and denitrification in the field, determination of microbial biomass carbon and nitrogen, and laboratory techniques for determination of different forms of nitrogen. The authors summarize and evaluate recent findings and refer to more extensive reviews of the subjects for information on earlier research. The addendum by P. F. Saffigna on techniques for recovery of ^{15}N in field experiments also fits this section.

The book is very well edited. In spite of numerous authors, almost all chapters are easy to read, and there are very few typographical errors. One minor criticism is that the index is placed before the addendum rather than at the end of the book.

In summary, this is an excellent review of the subject of nitrogen cycling. It will not only prove beneficial to those doing research in soil and crop nitrogen dynamics, but is also an excellent reference source for other researchers and teachers in soil and crop science, particularly those working in the tropics and subtropics.

R. H. Fox