

## BOOK REVIEWS

**Physiological Plant Ecology IV:** edited by O. L. LANGE, P. S. NOBEL, C. B. OSMOND and H. ZIEGLER. *Encyclopedia of Plant Physiology*, New Series volume 12D, Springer, Berlin, 1983. 644 pp. DM 290.

This fourth and final volume, subtitled 'ecosystem processes: mineral cycling, productivity and Man's influence', is ultimately concerned with the more severely practical side of physiological plant ecology. It is at once the most difficult aspect of plant science to deal with, since facts are few and so many assumptions have to be made, and also the most important. There are considerable political pressures on scientists to produce answers, e.g. in forecasting the effects of particular forms of atmospheric pollution on forest vegetation, in spite of the lack of an adequate experimental basis. This book at least sets out to survey what is known at the present time of mineral cycling, biomass production and the effects of pollution of natural ecosystems. Certain aspects are omitted, e.g. the

dynamics of plant populations and successional processes, while others are dealt with in varying depth, e.g. the effects of herbicides are considered in much more detail than the effects of pesticides.

Perhaps the most useful function of this volume is to point to the enormous gaps in our scientific understanding of ecosystem processes and to act as a stimulus for further research. Anyone concerned with the influence of civilisation on the plant life on this planet will need to consult this excellent reference. In general, the production is well up to standard, although in my copy there were occasional pages where the printing on the other side showed through. This is a highly unusual flaw in a Springer book and I trust that it will be remedied in future volumes of the series.

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**Advances in Botanical Research**, vol 10: edited by H. W. WOOLHOUSE. Academic Press, 1983. 306 pp. 39.00.

This volume contains two reviews, both by Australians. The first by A. W. D. Larkum and J. Barrett occupies almost 190 pages. This discusses light harvesting processes in algae. The remaining part is divided between the review of R. D. Graham and two extensive indices listing authors and subjects. The title of this second contribution is 'Effects of nutrient stress on susceptibility of plants to disease with particular reference to the trace elements'. There is little connection between these two papers from the scientific viewpoint. Hence, they will be considered separately.

The first review is, as its length would suggest, comprehensive. A discussion of the light available to algae is followed by sections on the structure and function of their photosynthetic membranes, description of the wide range of pigments found in the diverse groups and details of reaction centre complexes and pigment protein complexes. Principles of light harvesting are dealt with in terms of both quantum chemistry and aspects such as effects of shading. Further sections include treatment of chromatic adaptation and photocontrol of biosynthesis of light harvesting proteins as well as evolutionary aspects. The level of treatment throughout is excellent as is the presentation with many high quality line drawings and well laid out tables. Throughout, the text is well referenced with around one thousand citations. Amongst all this excellence there was only one disappointment—the quality of the electron micrographs used to illustrate the diversity of membrane form. These fall well below the

standard established by some of the original workers in this area. A further improvement would have been the use of full titles of the papers and reviews cited. The lack of such information combined with so great a choice may well leave the newcomer to the field overawed and unsure where to start any search of the existing literature.

The attention which has been paid to such aspects of photosynthesis reflects, of course, the very wide diversity of the group. At one time such studies might have been regarded as largely of academic interest. However, they may now be seen as setting a very sound scientific platform from which the use of algae may be developed. Interest in such applied use reflects both their high productivity under optimal conditions which could lead to increased production of algae as a source of food, chemicals and fuels and the possibilities now evolving as a result of developments in recombinant DNA technology for transmitting some of the more advantageous characteristics to higher plants.

In part the high productivity of algae and other aquatic plants reflects the fact that they are less subjected to stress conditions than are land plants. Such stresses may reflect excess or deficient supplies of water or nutrients as well as extremes of temperature or light intensity. The second paper deals with the question of the effects of nutrient stress on susceptibility to disease of plants in relation to supply of both macro- and micro-nutrients, each one being dealt with in turn. Although overshadowed in terms of length this paper is not lacking in terms of the quality of content or presentation. However, the rather odd combination in terms of topics and lengths may restrict the purchase of this book to those who are keeping up with