

BOOK REVIEWS

Physiological Plant Ecology: by W. LARCHER. Springer Verlag, Berlin, 1980. xvii + 303pp. £13.50 paperback.

The structure and organisation of science is such that, at least initially, interdisciplinary or borderline fields of study tend to be poorly covered, and poorly served with textbooks and journals. Ultimately, these borderline areas become recognised fields in their own right, e.g. phytochemistry. Physiological ecology has now also reached this stage of recognition; its emergence was marked by the appearance of three textbooks, by Larcher, Etherington, and Bannister, during 1973–6. Larcher's first edition, published in 1973 and translated into English in 1975, has never gained the recognition that it deserved; perhaps it appeared a little too early, was too expensive, and was too European in orientation. This new edition has been updated and extended; it deserves to be widely read and deserves to become the standard introductory text for the subject. In my opinion, it stands head and shoulders above the other available texts.

Larcher's textbook has several strong points. Firstly, it has better balance than the other texts; it comprehensively covers all the major ecological factors (light, temperature, water, mineral nutrients), and their effect on plant growth and, to a lesser extent, plant development and metabolism. Secondly, it gives a comprehensive and cosmopolitan coverage of the literature; there are about 800 references, though it is a pity that Larcher does not include the titles of papers. Thirdly, it is replete with information, much of which is skilfully presented in figures and tables. I particularly like the way in which he synthesises and integrates the work of various authors into comprehensive tables, and adds further references to most of the single-source figures. Occasionally this leads to overcomplex figures; for example, the caption to Fig. 5.26 takes up half a page! Finally, the book is easy to read; Dr. Marguerita Biederman-Thorson is to be congratulated for an excellent translation. My main criticism is that too many synthetic words (e.g. *pluviotherophyte*, *poikilohydric* and *photocybernetic*) have crept through from the original German.

The book is divided into sections on Radiation and Temperature, Mineral Elements, and Water, with a section on Carbon Utilization and Dry Matter Production placed, rather uncomfortably, between the first two. Each section begins with a general description of the environmental factor, its variation in space and time, and its physiological effects upon plants. Larcher's approach is more physiological than ecological, and one of its main weaknesses is that it does not sufficiently relate physiological response to ecological distribution. He starts the process well, by frequently citing comparative physiological studies of species, and occasionally of ecotypes. However, the final step of relating physiological response to ecological distribution is rarely made and Larcher nowhere considers the biotic factors, especially competition, which often make it difficult to interpret ecological behaviour in terms of physiological response to environmental factors. However, he does consider other complicating factors, e.g. interactions between physical and chemical factors, and the effects of temporal and spatial variation in those factors, though it is debatable whether he has sufficiently emphasised them.

Biochemists and phytochemists may well be disappointed by this book. Larcher mainly covers his subject at the whole-plant and organ levels, rather than at the cellular or subcellular levels. As an ecologist, I would support his approach, since it is rarely possible to extrapolate across more than one level of organisation.

This is an excellent introductory text for undergraduates, especially for those approaching the subject from the physiological direction. Unhappily, it is doomed by its high price; on the one hand, it is out of the reach of most students, while, on the other hand, the apparent lack of a hardback version makes it unattractive to libraries. If Springer-Verlag can produce an edition that is competitively priced, this could become the standard text.

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Plant Disease, an Advanced Treatise—Volume V. How Plants Defend Themselves: edited by J. G. HORSFALL and E. B. COWLING. Academic Press, New York, 1980. 534 pp. Price £31.80.

What, you may ask, yet another book on phytoalexins and plant defence mechanisms? Certainly, biochemical aspects of plant disease have been rather well treated in recent years, notably in Friend and Threlfall's *Biochemical Aspects of Plant-Parasite Relationships* and Heitefuss and Williams' *Physiological Plant Pathology* in the Springer Encyclopedia of Plant Physiology new series. Unlike these two books and other recent ones which concentrate on assembling our present knowledge of the biochemistry of disease resistance, this new book is concerned mostly with what we still don't know. Indeed, the majority of the 31 authors contributing

to this work, in a highly stimulating and provocative fashion, pinpoint areas for future exploration rather than nostalgize over past history.

Largely written by practising plant pathologists, this text not unnaturally centres on the biological phenomena of disease resistance and the hypersensitive response. Nevertheless, time and time again, authors expose interactions and situations where biochemical clues are urgently needed. Here are many of the problems of the future and one can see that plant biochemists and phytochemists will be needed to co-operate in their solution in almost every instance.

The two editors enjoy illustrative analogies and the volume gets off to a lively start with a general chapter by them with picturesque analogies drawn from the different defence mechanisms of the mediaeval castle. Chapters follow on escape and tolerance to disease, the time