

BOOK REVIEWS

Ecological Processes in Coastal Environments: edited by R. L. JEFFERIES and A. J. DAVY. Blackwell Publ., Oxford, 1979. 684 pp. £25.

The first European Ecological Symposium and the Nineteenth Symposium of the British Ecological Society were held as one meeting in Norwich during September 1977 and this volume of 37 review papers is the product of this gathering. On the face of it, this might seem to be of little interest to a biochemical audience and indeed the majority of papers are essentially ecological in content, being devoted to both plant and animal studies. And yet, two whole sections of this volume deal in some depth with biochemical adaptations to saline environments and with photosynthetic productivity in salt-tolerant plants and thus are of a wider relevance. In the first of these sections, for example, G. R. Stewart and his coworkers at Manchester present an excellent up-to-date review of nitrogen metabolism and salt tolerance in higher plant halophytes. They outline the variety of changes that may take place in either nitrogen or carbon metabolism in response to adaptation to saline soils. Such plants synthesize quaternary nitrogen compounds or sugar alcohols as osmoregulators, which accumulate in the cytoplasm to balance increased storage of inor-

ganic ion in the vacuole. The regulation of such processes in these plants is, however, still far from clear.

A significant paper in the second 'biochemical' section by S. P. Long and H. W. Woolhouse reviews primary production in *Spartina townsendii*, one of the dominant grasses of temperate coastlines throughout Europe. Interestingly, this plant is C_4 in spite of the extension of its range into temperate latitudes. Unlike in other C_4 plants, however, the photosynthetic rates are not inhibited by low leaf temperatures but are equal to those observed in C_3 grasses. The authors conclude that gross primary production at least is satisfactorily high, in the order of 2500 g C m^{-2} .

In general, therefore, this volume may stimulate a wider audience of readers than the title suggests. For ecologists, this joint Symposium was clearly an important step in the direction of more extensive co-operative research within the European community. The published proceedings are excellently edited and produced, and are a worthy outcome of such a prestigious international gathering. They will no doubt provide an important reference work in the field of coastal ecology for some years to come.

Plant Science Laboratories, JEFFREY B. HARBORNE
University of Reading

Phytochemistry, 1980, Vol. 19, pp. 1005-1006. Pergamon Press Ltd. Printed in England.

Photosynthesis II, Photosynthetic Carbon Metabolism and Related Processes: edited by M. GIBBS and E. LATZKO. Volume 6, Encyclopedia of Plant Physiology New Series. Springer, Berlin, 1979. 587 pp. DM 198 or £52.

This is one volume in the new Encyclopedia series which I have been particularly anxious to see. So much progress has been made during the last 15 years on the carbon pathway of photosynthesis that a comprehensive reassessment of our present knowledge was badly needed, the more so because most of the books and reviews that have appeared on the subject recently have been mainly aimed at a specialist audience. Here we have a marvellously well-integrated account of the topic for the general reader, with no less than 51 expert contributors providing a feast of information in 37 individual chapters.

Inevitably, the C_4 and CAM pathways steal the headlines here, but recent developments in the pentose phosphate cycle have not been forgotten and there are five chapters covering various aspects of C_3 plants. Every other conceivable aspect of carbon metabolism is then considered in sections on the regulation and enzymology of the pathways, on starch and sucrose synthesis, on photorespiration, on ferredoxin-linked reactions and on the relationship between photosynthetic carbon and nitrogen metabolism. Transhydrogenase, carbonic anhydrase and ribulose 1,5-bisphosphate carboxylase all receive individual treatment, while other enzymes are reviewed more generally in several other chapters.

With so many excellent contributions, it would be invidious to select individual authors for special praise. However, I would like to mention the interesting contribution of Y. Waisel and his colleagues on 'The

Biochemical Basis of Ecological Adaptation', since this points to one of the significant growing points in photosynthetic research. While tantalisingly little is known as yet about the biochemistry of photosynthetic adaptation, this must be an area where much exciting development will take place in the years ahead.

Perhaps the single most striking impression to emerge from this volume is the remarkable diversity in pathways that exist in photosynthesis. Already plants can be divided into four types: those with C_3 , C_4 , intermediate C_3 - C_4 or CAM pathways; and within these types, there are a number of subtle interspecies variations. In addition, the editors pose the question in their introduction—will photosynthetic pathways not

utilizing RuBP and PEP carboxylases be revealed in higher plants? It will indeed be interesting to see what further differences in the carbon pathway emerge as more plant species are biochemically analysed in depth. This important volume will undoubtedly provide the spur for future, fascinating and fruitful experiments into the comparative biochemistry of photosynthesis within the plant kingdom.

Plant Science Laboratories, JEFFREY B. HARBORNE
University of Reading

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Recognition and Specificity in Plant Host-Parasite Interactions: edited by J. M. DALY and I. URITANI. University Park Press, Baltimore (European distributors, MTP Press Ltd., Lancs.), 1979. 355 pp. £22.95.

This handsome volume is the outcome of a two-nation research seminar held in Lincoln, Nebraska in the Summer of 1977 between U.S. and Japanese plant scientists. To some, the absence of European participants might appear to have been a handicap but, in fact, these proceedings provide a satisfactorily representative account of recent research in the field of host-parasite interactions. The book contains 22 papers collected together under four headings: genetical aspects, cytological events, constitutive recognition and induction of host responses. The majority of papers are part review, part experimental, and each is followed by a summary of the discussion that took place subsequent to the lecture presentation.

Inevitably perhaps, the phytoalexin response receives the most attention, in spite of the fact that its role in disease resistance is far from clear and that it lacks specificity, at least as far as the parasite is concerned. Not only are there papers specifically on phytoalexins and pathogenesis (H. Van Etten, S. Ouchi and I. Uritani), but the topic also creeps into many of the more general contributions. J. Kuc, in reviewing 'Modes of Metabolic Determination of Specificity', is rather pessimistic about their impor-

tance in controlling disease, while Van Etten takes a cautious middle view. On the other hand, the Japanese contributors are optimistic from their experiments that a significant role will eventually be established for them. Nevertheless, as Kuc points out, phytoalexin synthesis only represents one of a number of mechanisms which are clearly present in host plants as part of their co-ordinated defence against microbial invasion. Unfortunately, we know little about other mechanisms and so are unable to monitor them in particular host-parasite situations.

Other topics that receive significant attention include systemic resistance (L. Sequeira), elicitors (J. D. Paxton), lignification in response to infection (Y. Asada), host-specific toxins (R. D. Durbin, S. Nishimura) and cell membranes (H. Wheeler). In spite of much research effort, however, it appears that the agents responsible for recognition and specificity in gene-for-gene interactions are still elusive. This book can only therefore be considered a progress report; there is as yet no final solution. As such, it represents a useful addition to the literature on physiological plant pathology. It is well edited, nicely produced and reasonably priced. All phytochemists working with plant diseases will find something of interest and value in these pages.

Plant Science Laboratories, JEFFREY B. HARBORNE
University of Reading