

BOOK REVIEWS

The Biochemistry of Plants edited by P. K. STUMPF and E. E. CONN, **Volume 13: Methodology** edited by D. D. DAVIES. Academic Press, London, 1987, 294 pp, £41.00.

The rationale for adding this volume to the series is that progress in biochemistry follows advances in methodology. Consequently, the aim is to survey biochemical applications of some recently developed techniques. The first of the six chapters affords a well documented review of immunological techniques. Polyclonal and monoclonal antibodies are discussed together with uses of immunology in the identification of proteins. Studies of enzyme induction and degradation are outlined and brief consideration is given to application of the techniques to compounds of low M_r .

The use of mutants in studies of plant metabolism is surveyed in the second chapter. Applications considered range from nitrate utilization, gibberellin biosynthesis, and photorespiration, to lipid and amino acid metabolism. Amongst the most recent techniques examined are genetic transformation and transposon mutagenesis. The review, which is well-balanced and stimulating, concludes that although there are numerous existing examples of the use of mutants in plant biochemistry, the field is ripe for further development. A related chapter on the use of plant cell cultures in the study of metabolism examines underlying principles and uses studies of amino acid metabolism and secondary product production to illustrate applications.

The treatment of mass spectrometry and its applications to biochemical and physiological studies provides a comprehensive review of the use of stable isotopes in

such areas as photosynthesis, O_2 -uptake, and N-assimilation. Surprisingly, there is no outline of the principles of mass spectrometry, nor of recent developments in mass spectrometric techniques. Absence of any mention of molecular fragmentation studies and structural elucidation seems bizarre when one considers the major advances made in such fields of plant biochemistry as secondary product biosynthesis, phytohormones, and dolichols. The chapter is wrongly titled and should be 'the applications of stable isotopes' rather than 'applications of mass spectrometry'. In contrast, the chapter on NMR in plant biochemistry gives a concise but clear account of the principles and comprehensively surveys recent developments in *in vivo* NMR ranging from *in vivo* ^{31}P NMR to studies of energy metabolism and of metabolic pathways. The ensuing and final chapter deals with ESR spectroscopy. A clear summary of the salient principles is followed by consideration of applications to photosynthesis, the mitochondrial respiratory chain, and chloroplast development.

Reference in the Preface to chromatographic developments led me to expect some consideration of this field. I was disappointed to find no subsequent mention of gel-filtration, HPLC, FPLC, GC-MS, and affinity chromatography all of which have made a major impact on plant biochemistry in recent years. Despite the omissions, however, this is a useful addition to the series. I suspect it will be bought mainly by library subscribers to the series.

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Sexuality in Plants and its Hormonal Regulation: by M. KH. CHAILAKHYAN V. N. KHRIANIN, translated from the Russian by V. Loroch, Ed. by K. V. Thimann, Springer, Berlin, 1987 pp. XIV + 159. DM 135.

To the best of my knowledge this is the only book trying to summarize information on the sexuality of plants. It deals with the nature and genetic basis of sex in plants, how it is expressed and controlled by environmental factors and hormones, and with the role hormone synthesis in and transport from different plant organs on sex of flowers. Also dealt with are flower formation and the effect of plant development on flower sexuality. The book is divided into nine chapters, the penultimate one giving some hints on the practical use of plant hormones to direct plant sex expression, the last one providing a summary of the authors views on the entire question of plant sexuality.

The volume brings together a great deal of the Russian literature on this topic, much of which is unknown to those not reading Russian. Certainly this reviewer found a great deal of novel information, including such facts as the difference in size, morphology and hormone content of plants of the same species carrying male or female flowers. The authors carefully distinguish between the problems of dioecious plants and monoecious plants carrying unisexual flowers. High levels of gibberellins seem to lead to the expression of male characteristics, cytokinins to that of female characteristics. Thimann in his foreword stresses the fact that in this work the emphasis is on hormones as organ determinants and not as regulators of cellular activity. Our knowledge of hormone action at the cellular level is limited, but progressing, but our ignorance of their action as organ determinants is dismal.