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BOOK REVIEWS

Progress in Botany, Volume 45: edited by K. ESSER, K. KUBITZKI, M. RUNGE, E. SCHNEPF and H. ZIEGLER. Springer, Berlin, 1983. 404 pp. DM 178.

Volume 45 contains 21 reviews, mainly covering the 1981–1982 literature, under five headings: morphology, physiology, genetics, taxonomy and geobotany. Considering that taxonomy is often regarded as a 'Cinderella' subject within plant science, it is remarkable how many papers are published in this area. For example, under taxonomy, there is a 35 page review by H. H. Poppendieck on the evolution and classification of seed plants, which is followed by 14 closely packed pages of literature references. It is a wide-ranging review, taking into account seed dispersal mechanisms, plant geography, cladistics, plant–animal interactions and chemosystematics as well as the more conventional anatomy and morphology. There is also a discussion of recent studies on monocot–dicot relationships and a useful summary guide to the recent systematic literature at the family level and below within the flowering plants.

Those interested in comparative aspects of plants will also be able to turn with profit to a review of population genetics by K. Wohrmann and V. Loeshcke. In addition, there are two excellent reviews, again under genetics, of the proteins and nucleic acids in the angiosperms by R. Blaich and of plastid DNA by R. Hagemann and M. Metzlaff.

Plant physiologists are served here by reviews on phloem transport, salinity, photosystems in green plants and green bacteria, inorganic nitrogen metabolism, carotenoid biosynthesis and growth. The latter chapter by N. Amrhein is a thoroughly critical review of the current literature on gibberellins and on cytokinins, but includes mention of the brassinolides and the more controversial triacontanol. Once again then, this annual series of volumes has provided a variety of useful reviews, which have the particular merit of allowing the harassed plant scientist to catch up on subject areas outside his own narrow research expertise.

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Proteins and Nucleic Acids in Plant Systematics: edited by U. JENSEN and D. E. FAIRBROTHERS. Springer, Berlin, 1983. 408 pp. DM 114.

At one time, there were high hopes that by simply reading off the amino acid sequences of a range of plant proteins, it might be possible by molecular means to trace the origin and evolution of the flowering plant families. Such data would allow an objective measurement of the relationship between the higher categories and would be particularly important, since chemical data from the micromolecules had not usually allowed such broad comparisons. These dreams, of course, were expressed in the early 1960s before any comparable protein data had accrued. As more and more sequences were analysed during the 1970s, there were many disappointments. The phylogenetic trees produced from the different substitutions in the amino acid sequences of cytochrome C or plastocyanin were found to be as shaky as those derived from more conventional sources. With the recent advances in plant genetic engineering, the possibility of using nucleotide sequences in DNA and RNA for comparative purposes has also arisen, and promises again to provide the systematist with a huge storehouse of new information on his organisms.

For the non-molecular systematist, there are many problems in deciding what experiments he should do and the present volume is particularly welcome, since it provides for the first time a critical overview of this research area. The book is derived from a symposium held in Bayreuth, Germany in July 1982 and contains four papers on nucleic acids, 14 on proteins and eight on serology. Unfortunately, it suffers the fault of many such proceedings in that the contributions range from review articles to research papers. Some of the reviews are so short (H. Stegemann deals with the application of gel electrophoresis to the discrimination of infraspecific taxa in three pages of text and two of illustrations) that they cannot provide an adequate summary for the unfamiliar reader. Having said that, some of these inadequacies are made up for by other chapters (F. Ehrendorfer provides a masterly 33-page review of the work on nuclear DNA in plants) and by a useful concluding chapter by the editors.

From my reading of these contributions, I would draw three conclusions. First, perhaps the most surprising, is that protein studies *per se* are likely to be mainly of value at the lower levels of classification. This is true of both amino acid sequence data, as pointed out by D. Boulter in his chapter, and of polypeptide variation in e.g. Rubisco (fraction I protein). Secondly, it is apparent that for comparisons at the family level and above, serological analysis has the most to offer. Here R. Dahlgren considers in some detail the impact of serological studies on the present systems of angiosperm classification. The third conclusion, from reading the four nucleic acid papers, is that while for the procaryotes sequence data are already of classificatory importance, with the eucaryotes, the logistics of determining nucleotide sequence comparisons of homologous genes are such that it will hardly repay the effort, at least with present available techniques.

For the plant chemosystematist, this book is essential reading while the general reader will also find much of interest; Jensen and Fairbrothers' volume certainly reserves a place in every plant science library.

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