

it to the reader. As long as there is life and optimism in the field, the series is bound to be a success.

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Genetic Engineering of Plants – An Agricultural Perspective. Edited by T. KOSUGE, C. P. MEREDITH and A. HOLLAENDER. Plenum Press, 233 Spring Street, New York, N.Y. (1983). \$69.50. ISBN 0 306 41353 1.

The demand for food continues to grow, with a potential doubling of the world's population in the next 40 years. The problem facing plant breeders and agronomists is not only how to produce the mass of food required to sustain the world's population, but also the economics of that food production. To these ends, the improvement of a variety of characters in crop plants is sought by the breeders. Apart from a general desire to develop plants with a higher yield potential, a range of more specific characters are desired, such as resistance to pests and herbicides, tolerance to environmental extremes (water stress, salinity, temperature), decreased dependence on fertilizers and improved nutritional value of plant products. While conventional plant breeding programmes have made, and continue to make, significant advances towards these aims, attention is now turning to the newly emerging technologies of plant cell and gene manipulation to provide some input into these breeding programmes.

Genetic Engineering of Plants – An Agricultural Perspective represents the proceedings of a meeting held at the University of California, Davis, in August 1982, one aim of which was to bring together plant breeders and cell biologists to help establish a dialogue between both groups of workers. The flavour of this volume suggests that the meeting's aim was realized to a large extent, with most contributors directing their discussion towards the common goal. By choosing a good cross-section of contributors representing topics within the whole spectrum, the editors have succeeded in providing a volume which is both informative and interesting to read.

The emphasis of the book is on plant gene and cell manipulation. Several articles describe the progress being made on the isolation and characterization of plant genes, including those encoding ribulosebisphosphate carboxylase, alcohol dehydrogenase, seed storage proteins and sucrose synthetase. Transposable DNA sequences in maize, including those contained in the mitochondria of male sterile plants, are also discussed. The possibility of using transposable DNA sequences as vectors for the delivery of new genes into plant cells is raised. Other vectors for gene transfer which are discussed include both RNA and DNA plant viruses and, in an excellent review by Depicker *et al.*, the Ti plasmid of *Agrobacterium tumefaciens*. The rapid progress being made on the characterization and manipulation of plant genes inevitably means that some of these articles will soon be out of date. However, they are valuable in that they provide a framework for discussions of the direction in which the work can, or should, proceed.

The book contains several articles describing the use of cell culture techniques for transformation studies, somatic cell hybridization, mutant selection and the production of haploids. Several examples where such techniques have played a role in plant breeding are cited, and prospects for future input are critically evaluated. Physiological and genetic factors involved in host-pathogen interactions and in stress tolerance (drought and salt) are discussed. These papers tend to emphasize our lack of knowledge of the biochemistry of these processes, and the importance of considering the whole plant in any attempt to increase the tolerance levels of crop plants.

The plant breeders are represented largely by N. W. Simmonds, who provides a very

useful summary of 'Plant breeding: the state of the art', but several other contributors add to and extend his observations. Finally, the book is rounded off by a summary of the main conclusions arising from the conference (R. L. Phillips) and by a collection of presentations from a 'Roundtable discussion' of research priorities from members of academic and industrial institutions. These contributions all make very valuable additions to the book.

In summary, I found this book to contain many stimulating papers, representing a balanced sample of research topics within the framework specified by the title. I believe that many of the conclusions which emerge from this book will be of value to plant breeders and cell biologists for several years to come, even though the details of the molecular genetics papers will soon be outdated.

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Seed Proteins: Biochemistry, Genetics, Nutritive Value. Edited by W. GOTTSCHALK and H. P. MÜLLER. Institut für Genetik der Universität Bonn, Bonn, West Germany. Dfl. 250.00 (approx. US \$109.00). 542 pp. ISBN 90 247 2789 8.

Over the past few years, rapid progress has been made in our understanding of the biochemistry and genetics of seed proteins. In view of the world-wide nutritional importance of these proteins, it is necessary to have a sound knowledge of their structure and genetics, and of their synthesis and its regulation if optimum use is to be made of this important food resource.

Before the next stage of research, which is likely to involve a genetic engineering approach to the problem of improving protein quality, it would be useful to summarize our current state of knowledge. I therefore welcome this text, which deals with recent progress reported in separate articles, each one by an expert in his field. Generally, this book is successful in its coverage of the range of work carried out, giving particularly good coverage of the information derived from studies using electrophoresis. Its value as a reference book is seriously diminished, however, by the lack of a detailed subject index. I also found the frequency of spelling errors to be irritatingly high. The errors are spread unevenly over the articles and it appears that too much editing responsibility has been delegated to individual authors. Spelling errors were not confined to the main body of the text, but were also present in article titles ('Evolutionary', page 481). Occasionally the English construction is clumsy; again this occurs only in certain chapters.

These blemishes apart, many of the articles are very readable and informative. The reader is introduced to world crop and agronomy problems in the opening chapters with the work on the *opaque-2* mutation in maize given as an example of the kind of problems encountered in what appears at first to be a straightforward breeding objective. This is followed by a valuable technical chapter on different methods for the characterization of proteins by electrophoresis. This section might usefully have been extended to include identification of seed lectins and proteinase inhibitors as a prelude to both Doll's chapter on selection for lysine-rich soluble proteins and the articles on legume proteins.

The chapters on the genetics and biochemistry of wheat, barley, rice and maize proteins comprise a main part of the book. The combined length of these sections reflects the considerable research effort involved. Failure to date of all attempts to obtain high-lysine mutants of wheat is offset by the excellent progress made in relating specific glutelins and gliadin wheat to quality (e.g. the visco-elastic properties of bread dough are due to specific proteins). In the article on barley, Shewry and Mifflin describe the elegant studies