

## Book reviews

**Schwartz, R.S.; Rose, N.-R. (eds.): Autoimmunity: Experimental and Clinical Aspects. Annals of the New York Academy of Sciences, Vol. 475. New York: The New York Academy of Sciences, 1986. 427 pp.**

While it is certainly extremely worthwhile to read "Part I: Genetics of Autoimmunity", which comprises in part the proceedings of a conference held by the New York Academy of Science in 1985 in New York City, the other parts also present up-to-date information on the idiotype network in autoimmunity, and the properties and origin of antibodies. Our knowledge of the genetics of the complement system has increased exponentially over the past two decades. In a certain way complement genetics illustrates general mammalian genetic principles in a straightforward way, but special cases mentioned herein are also of general interest: For example, among the molecules that participate in T-cell-accessory-cell interactions, the T-cell receptor is of major importance. The genes that encode T-receptors function in a manner similar to that of the immunoglobulin genes that generate specific antibodies. The link between the phenotypic association of a number of autoimmune diseases and the HLA antigens with the molecular immune mechanisms can provide a key for the understanding of disease susceptibility. Allelic variations can serve as markers of diseases. Together with the in extenso published discussions after the 30 principal lectures and the abstracts of the 35 poster sessions, the report gives an excellent overview on autoimmune diseases in man.

H. F. Linskens, Nijmegen

**Bajaj, Y. P. S. (ed.): Crops I. Biotechnology in Agriculture and Forestry, Vol. 2. Berlin, Heidelberg, New York, Tokyo: Springer, 1986. XVIII/608 pp., 144 figs., 112 tabs. Hard bound DM 348,-.**

The new volume of the multivolume treatise on the application of biotechnology in agriculture, horticulture and forestry is a compilation in 33 chapters by 66 authors of the literature, and a review of recent progress of in vitro techniques. It concentrates on cereals (wheat, rice, corn, barley, sorghum and pearl millet) vegetables, legumes and tubers (soybean, beans, tomato, pepper, eggplant, squash and other cucurbites, unions, celery, butter-bur, potatoes and sweet potato, sugar beet, artichoke). Especially deserving is the third section on promising future agricultural crops like triticale, hordecalle, winged bean and amaranths. It seems funny to find the very old crop of buckwheat classified under this section. Genetic stability and variability receive an adequate treatment in many chapters. The various chapters cannot escape a certain repetition so that the impression one receives of the volume on the whole is that it is pieced together. The excellent printing, the rich illustrations and the abundance of technical information summarized in tables reconsole the reader to the high price.

H. F. Linskens, Nijmegen

**Reinert, J.; Binding, H. (eds): Differentiation of Protoplasts and of Transformed Plant Cells. 157 pp., 24 figs. DM 98,-.**

Editing a book about such dynamic topics as the manipulation and transformation of plant protoplasts is never an easy task when developments, in particular those concerning transformation, are occurring as rapidly as they do at present. Unfortunately, this book was not able to keep up with recent developments, not even by adding addendums to each chapter.

In four chapters three topics are reviewed: the isolation and culture of protoplasts, the fusion of protoplasts and the transformation of plant cells. All three techniques are used in modern plant molecular cell biology. The incorporation, comparison and qualification of the data is described nicely, with references going back to the early seventies. The absence of recent references is a want, particularly in the last chapter.

The book is primarily a collection of literature data and that is a pity since, for instance, the isolation of protoplasts for a number of species belongs in lab manuals and for other species (monocots) the technique is still being developed, with the main problem being regeneration. This important aspect is underestimated in this chapter. A whiff of regeneration is present where it concerns the description of those factors controlling the growth and differentiation of protoplasts but it is absent in the two chapters on cell fusion, where, however, it be inherent to the topic itself. The review on cell fusion presents hardly any substantial data to fundamental or applied aspects of cell biology. A positive point is the complete description, in chapter II, of the background and physiological aspects of fusion, presenting the whole range of possibilities and observations of fusion, however, without saying much about the biological questions. This is done in chapter III without going into the answers to these questions. It is a pity that the reader is put off with: "the successful utilization of somatic hybrids in the establishment of new cultivars is in progress", and: "experimental protoplast fusion opens up the fascinating possibilities of overcoming even the strongest sexual incompatibilities".

The review on fusion is limited to a survey of the technologies of protoplast fusion, regeneration of fusant plants, selection of fusant clones and variated subclones, and identification of genetic traits. In the last chapter plant cell transformation is described in relation to crown gall tumorigenesis and CaMV infection. Again the results from the last years are missing which is unfortunate since these data indicate the uncoupling of transformation from *Agrobacterium* by applying DNA transformation methods. Concerning the crown gall work itself it is hard to read that the mechanism by which T-DNA is transferred to the plant is unknown, while with the finding of T-DNA intermediates and the unravelling of the function of the *Vir*-region and its induction by plant compounds, part of the mystery is already becoming unravelled. It is a pity to have to conclude that the reader of this book will be confused by the large amount of data from the literature, in particular when he asks himself to what end has it been presented. Concerning cell fusion the authors cannot be blamed for the absence of pronounced results; concerning transformation, the pronounced results of the last years have not been added to this book.

G. J. Wullems, Nijmegen

**Dolstra, O.; Miedema, P. (eds.): Breeding of Silage Maize. Proc. 13th Congress Maize and Sorghum Section of EUCARPIA (European Association for Research on Plant Breeding). Pudoc: Wageningen 1986. 191 pp., many figs and tabs.**

Since 1970, a tremendous increase in the area devoted to silage maize production has occurred in Europe. This increase is the result of changing agricultural systems, the recent development of more productive and environmentally-stable cultivars, the positive response of maize to fertilization with animal manure, and the availability of highly mechanized planting and harvesting equipment. However, this expansion has occurred in areas which represent the outer limits of the adaptation range of maize and, as a result, unique problems are encountered and must be addressed. The most recent developments in silage maize research are included in this book which contains reports given at the latest annual meeting of scientists actively engaged in this research area. The book is divided into a number of sections (genetic resources, cold tolerance, improvement of feeding value), each containing papers on various aspects of research in this area. In addition, the abstracts of posters presented at the meeting and encompassing a broad range of subjects, are included.

Many problems and approaches to solving these problems are encountered when an annual crop species is planted in the extreme northern limits of its adaptation range for a purpose other than grain production and where consistent seedstock production is difficult. The most critical problem is the identification of genetic sources which could be used in breeding adapted types. The chapters on the genetic influence on cold tolerance and the development of accurate methods to measure this complex character are of particular interest to a broad range of agricultural scientists. Since most breeding research in maize has concentrated mostly on grain production, the development of procedures to measure the production and nutrition of silage which contains both vegetative and grain components, requires more sophisticated and refined techniques especially when animal nutrition is included. Many papers in this book give valuable insights into our understanding of this problem. When a crop is grown in the outer limits of its adaptation range, the effect of environment becomes more pronounced and production among seasons is very erratic and unpredictable. Many chapters in this book critically examine the elusive problem of measuring environmental stability and explore methods to reduce the environmental impact on production under these extreme environmental conditions.

In my opinion, this book should be read by scientists actively engaged in this restricted research area so that they are aware of the most recent developments. In addition, this book should contribute to the general knowledge of a broad range of scientists who should be aware of the potential problems and possible solutions associated with growing crops in the outer limits of their adaptation range.

P. L. Pfahler, Gainesville

**Schultze-Motel, J. (ed.): Rudolf Mansfeld Verzeichnis landwirtschaftlicher und gärtnerischer Kulturpflanzen (ohne Zierpflanzen). Unter Mitarbeit von E. H. Benedix, R. Fritsch, I. Grebenschikow, K. Hammer, P. Hanelt, J. Kruse, H. I. Maass, H. Ohle, K. Pistrick, A. Rieth, J. Schulze-Motel, C. Tittel. 2nd revised and extended edn. Berlin, Heidelberg, New York, Tokyo: Springer, 1986. 1998 pp. in 4 volumes, 241 figs. DM 440,-.**

The first edition, intended for the socialist countries, was published by Akademie-Verlag, Berlin, and was a revised and substantially extended version of the original publication,

published in 1959 by Rudolf Mansfeld. His name has now been integrated into the title of the present volume. Together with 12 other experts, Jürgen Schultze-Motel, who is to be congratulated on this enormous work, has compiled a 4 volume study more complete, more detailed and more clearly arranged than the former one. It must be said immediately: it is a pity that this 4 volume work is not published in English so that it could have a wider impact than it will now have. The revised edition treats more than 4,800 taxa of crop plants at the species level, not only from the temperate zone, but also the tropical zones. During the last generation many new species have been cultured, especially fodder plants and greens, medical plants and industrially important plants. The greatest number of species is contributed by the family of Leguminosae (658 species), followed by the Gramineae (596), Rosaceae (226), Compositae (215), Euphorbiaceae (136), Labiatae (127), and Solanaceae (115). In addition to the above mentioned crops, ground coverers, shadow and hedge plants, magic and fuel plants, industrial and fiber plants, and even host plants for the culture of varnish insects and cochennille louse are included.

Each species, arranged within family and genera, is provided with basic taxonomic data and trivial names (in English, French, German, Italian, Spanish, Russian, Polish, Chinese and Japanese; tropical crops are sometimes listed in local names). A detailed description of the area of cultivation is followed by remarks on phylogeny, variability and historical expansion. For the abbreviation of synonymic references the standardised method of Stafleu and Cowan was adapted.

The list of cited references has been extended to more than 4,600 titles, so that the work is up-to-date until the summer of 1984. Certain limitations this reviewer found was the absence of taxonomic literature on some taxa (e.g. *Arachis*, *Solanum*, *Malus*, *Pyrus*) and the complicated taxonomic structure of some genera (e.g. *Medicago*, *Triticum*, *Citrus*). For some parts of the work a list of cultivated plants is still lacking: China, Central Africa. In addition to overviews of crop plants within families and a list of emendations, volume 4 contains 3 well constructed registers for species according to their possible application, a list of trivial names and an index of botanical names. Some of the described species are illuminated by excellent, clear artistic black-and-white drawings by Ruth and Wolfgang Kilian.

The new edition of the "Mansfeld" will serve for a long time as a reference standard for anyone interested in broadening the food base of mankind. Experts in developing countries will find new stimulation in the search for new crop plants. The potential of the plant kingdom for supporting man is not yet exhausted. This is the comforting message of this book.

H. F. Linskens, Nijmegen

**Bettencourt, E.; Perret, P.M.: Directory of European Institutions Holding Crop Genetic Resource Collections (3rd edn). European Cooperative Programme for the Conservation and Exchange of Crop Genetic Resources. Rome: IBPGR Headquarters-FAO 1986. XVII/367 pp.**

The main objective of the directory is to enhance direct contact between institutions and workers engaged in crop genetic resource activities. Emphasis is given to providing lists of both staff members of institutes and research-related exploitation of genetic resources. A total of 312 institutes from 28 European countries provided data. They are listed in alphabetical order. In addition to the name of the institute, the names of the directors, curators and 5 staff members are given.

Information on collections takes the form of a simple listing: details on the number of samples of wild/weedy material, landraces and old cultivars, all genetic resource material "sensu stricto", as well as notes on mutants and genetic stocks. On the top right-hand corner of each page a gene bank designation has been inserted in the case where an alpha code has been approved, which may be useful in conjunction with the European catalogue. In all aspects this book is a useful directory for anyone engaged in crop genetic resources.

H.F. Linskens, Nijmegen

**Richards, A.J.: Plant Breeding Systems.** Boston, Sydney: Allen & Unwin 1986. XIV/529 pp., 142 figs., 74 tabs. Hard bound \$ 45.00.

This keen natural historian and horticulturist, best known for his work on agamospermy in dandelions and heteromorphy in primulas, has used his life-long experience with the many aspects of plant breeding systems to write this marvellous book compiled with references from more than 700 sources. It is a successful synthesis of various aspects of plant breeding systems which can only be given by someone who is able survey the whole field. It begins not with theoretical aspects and mathematical models but with field observations: the plant in its special habitat, its natural pollination biology and its evolutionary genetics. Intended for advanced undergraduate students in plant biology, it also is an excellent introduction for future breeders to the problems of the sex life of flowering plants. In 10 chapters all aspects of sexual reproduction in seed plants, floral diversity, incompatibility barriers, gene flow and self-incompatibility are treated. Unfortunately, the topics of species' barriers and incongruity are absent. The two chapters on vegetative reproduction and its potential disadvantages, as well as agamospermy and its possible role in plant breeding are especially readable. In the introductory chapter it is demonstrated that breeding systems control genetic variability and are liable to either positive (e.g. inbreeding), negative (e.g. agamospermy), or stabilizing (e.g. distribution of *S* alleles) feedback. In the concluding chapter the author examines some genetic variability of plant populations. A glossary rounds up this excellent and well-illustrated book.

H.F. Linskens, Nijmegen

**Wilson, J.A. (ed.): Genetic Recombination.** Menlo Park, Calif: The Benjamin/Cummings Publ. Comp. 1985. 517 pp., 60 figs., several tabs.

Recombination is a very important process in genetics. It is, therefore, a mark of recognition that the Benjamin-Cummings-Annual Review Special Collection program has gathered some of the most important papers and published them in this volume as a collection of well-referenced review articles (the majority of them from *Ann. Rev. Genet. or Ann. Rev. Biochem.*).

Attention is focused on general recombination. The editor has arranged the papers in three sections. One-third of the book is devoted to meiotic recombination. In the first section, chiasma distribution (Moens 1978), regulatory mechanisms of

meiosis (Stern and Hotta 1978; Baker et al. 1976), some general recombination aspects in eukaryotes (Hastings 1975), Chi sites (Stahl 1979), and molecular steps in strand transfer and mismatch repair (Radding 1978) are discussed. The second section (Mitotic recombination) includes, in addition to the description of this process in yeast (Kunz and Haynes 1981), and Sister chromatid exchange formation (Latt 1981), the very informative overviews of Weinberg (1980) about "Integrated genomes of animal viruses" and of Smith et al. (1981) on "Genetic transformation". The third section reviews recombination events in bacteria and phages. Three important articles informing on gene transfer and recombination (Low and Porter 1978) and the molecular mechanisms of recombination (Radding 1982; Dressler and Potter 1982) were selected. The first one summarizes basic recombination modes observed in different bacteria and phages and provides a clear classification. Furthermore, genetic recombination of T4 (Broker and Doermann 1975) and P1 (Sternberg and Hoess 1983) are described.

There is no doubt that this excellent collection will be of real use to all scientists and students who have not read the original papers. For a complete understanding of recombination it will also be desirable to collect articles about transposition and other site specific recombination processes.

E. Günther, Greifswald

**Hohn, B.; Dennis, E.S. (eds.): Genetic Flux in Plants.** Wien, New York: Springer 1985. XII/253 pp., 40 figs., several tabs. Hard bound DM 98,-.

As emphasized in the title this volume of "Plant Gene Research" describes various modes of change in the genetic material of plants. The editors have gathered impressive examples to demonstrate some recently observed instabilities in plant genomes. The discussed points are virus - plant interactions; transfer of T-DNA from *Agrobacterium* to plant chromosomes; movement of DNA between plant organelles, between organelles and nucleus and within organelles; repeated sequences and changes; variations caused by transposable elements of maize; somaclonal variations. The special value of the book is that besides the excellent description of the phenomenon, important questions are discussed; i.e. Does T-DNA originate from prokaryotic or eukaryotic sequences? Are the genes encoding organelle proteins of prokaryotic origin? What is the function of plasmid-like DNA in mitochondria? Is stress responsible for sequence variation?

Plant breeders find information on such important aspects as the use of T-DNA in genetic engineering, the role of mtDNA in cytoplasmic male sterility and restorer function, the "creation of additional genetic variability" in cultivars using somaclonal variation in tissue culture.

A remarkable and attractive feature of this book is that it combines the different possibilities of genetic flux in plants. Each chapter offers something useful to the reader with regard to both theoretical and applied aspects. According to the aim of the editors it will indeed "stimulate future thinking and experimentation". The book is to be recommended for anyone who is interested in these rapidly advancing fields.

E. Günther, Greifswald