

Book reviews

Ford-Lloyd, B.; Jackson, M.: Plant Genetic Resources: An Introduction to Their Conservation and Use. London, Caulfield East (Austr.), Baltimore (USA): Edward Arnold Publishers 1986. 146 pp., several figs. and tabs.

This book takes its readers over a vast terrain, in which the authors draw both from their own observations obtained during collecting trips and from the literature. Subjects covered include the evolution of crops, the history of plant genetic exploration, sampling strategies with their associated pitfalls, problems peculiar to seed and vegetative crops with much useful advice on where to look for variation. Also covered are recording methods, germplasm banks and data storage systems. This is followed by a discussion in greater detail of the principal vegetable, industrial, medicinal, forage and forest genetic resources. The authors are justifiably concerned about the erosion of global genetic resources but under-emphasize the responsibility of governments, as well as moral and religious forces, in bringing human populations in balance with natural resources. The book has some notable gaps in other fields: the diversity and economic importance of the genus *Lupinus*, distributed around the Mediterranean and in South America, thus incidentally supporting the continental drift theory, is not discussed. Furthermore, the authors, although mentioning Ethiopia and West Africa, hardly do justice to the continent of Africa. In Southern Africa we find, for instance, one of the most diversified floras in the world, while more to the North a great diversity in the species *Pennisetum americanum*, can be observed, including genotypes in Kavango which have ears that are so densely packed, that they are virtually bird-proof. Although the authors share with the reader the trials and tribulations of early botanists, they remain silent about the tragic death of Vavilov in a Soviet concentration camp around 1942, as well as his subsequent posthumous rehabilitation. To refer to a publication as Vavilov (1951) is, in this context, misleading. Vavilov is, after all, the central figure of this discipline. One also misses important references like Stebbins' work on variation and evolution in plants and Kihara's early work on the identification of wheat genomes.

In spite of these deficiencies this book will be useful as additional reading in plant genetics and plant breeding courses and should therefore be available in university libraries.

J. A. M. van der Mey, Potchefstroom

Nevins, D.J.; Jones, R.A. (eds.): Tomato Biotechnology, 1st edn. New York: A. R. Liss 1987. 339 pp., many figs.

This volume contains the proceedings of a symposium held at the University of California, Davis, California, August 20–22, 1986. It includes contributions of 97 experts from 14 universities, 5 companies and 4 research institutions from 5

countries: 69 authors are from the U.S.A., 12 from Australia, 10 from England, 5 from The Netherlands and 1 from France. Together, they give a dynamic view of current work in tomato. After studying the book, the tomato will be conceived by the readers as a model plant system providing an almost unique opportunity for integrating genetics, and developmental and molecular biology with commercial use perspectives.

The book is divided in 8 sections. Each section ends with a summary of the papers contained, giving unity to the contents. Section 1 is the introductory chapter by D. J. Nevins in which the author declares that the tomato and its wild relatives' research "has progressed to the point where many of the known biological barriers have been mastered and hence sophisticated procedures impose fewer limits in advancing the concepts in biotechnology for applications in crop improvement"! This chapter attempts to answer the question: Why tomato biotechnology? But it also points out the danger of becoming a tomato chauvinist. Section 2 gives an insight into the genetic resources available and procedures which can be used to increase the utility of the wild relatives of tomato. Section 3 shows through a series of papers that tomato tissue and cell culture has recently developed to the point where most of the operations which can be carried out with tobacco model systems, can now be done in tomato. Procedures include: protoplast regeneration to whole plants, resistance selection for pathogens in cell cultures, somaclonal variation work, protoplast fusion between different species and genera and some basic research work on environmental stress and the response of tomato to cadmium ion toxicity in cell suspensions. Section 4 compiles papers on adaptation to abiotic and biotic stress including arthropod resistance, proteinase inhibitors, bacterial pathogens and salt tolerance. Section 5 includes papers referring to the state of the art in tomato transformation techniques and applications; techniques leading to the ultimate goal of genetic engineering in the search for plants with new genetic properties of economic interest. Section 6 has papers on plastid and mitochondrial genomes giving the new technologies a special meaning in revealing the interactions between nuclear and organelle genomes in the regulation of plant growth and development. Section 7 deals with reproductive biology, a field which has received little scientific attention until recently. Two main points are discussed: the isolation of floral-specific cDNAs and the identification of *S*-allele cDNAs and their proteins. Section 8 discusses fruit ripening suggesting the possibility that expressed cloned fruit ripening genes may allow a better understanding of the process of fruit ripening and its modulation at the gene level. In summary, the book gives a complete up-to-date picture of a plant, at the molecular, genetic and developmental levels, that can be seen as a model for work with other crops. I believe the interest of the field is still mainly given by the basic biological questions it answers.

Inés Noher de Halac, Córdoba (Argentina)

Green, C.E.; Somers, D.A.; Hackett, W.P.; Biesboer, D.D. (eds.): **Plant Tissue and Cell Culture**, 1st edn. New York: A.R. Liss 1987. 509 pp., many figs.

This book is a compilation of Plenary Lectures held during the Symposium of the 6th International Congress of Plant Tissue and Cell Culture, August 1986, at the University of Minnesota, U.S.A. In each chapter leading experts from different countries give one particular approach. Collectively the authors provide the reader with a comprehensive view of the latest developments in the rapidly evolving field of plant cell and tissue culture. This field has become a major one in the study of an increasing number of fundamental and applied problems in the Plant Sciences.

The contents of the volume is divided into seven broad areas: Development, Biochemistry and Physiology, Secondary Metabolites, Genetics, Molecular Biology, and Applications to Crops and Technology Development. As the literature in this field is broad and constantly increasing, I believe this book, which provides an up-to-date overview, will be useful as a general information source for researchers and students in the field.

The field of tissue and cell culture is a high technology field of increasing relevance in relation to crop production. It is interesting to analyze the origins of the 81 contributors to this volume through the eyes of someone, as myself, who comes from a developing country with an important crop production. They represent companies and institutions of 11 countries: U.S.A. 27, Federal Republic Germany 18, Australia 5, Switzerland 5, Belgium 4, U.K. 3, German Democratic Republic 2, Japan 2, France 1, Bangladesh 1. Hopefully the derived products will not arrive at high international prices to countries others than the ones mentioned above before they are able to develop their own plant cell and tissue culture technology.

I. Noher de Halac, Córdoba (Argentina)

Pritchard, D.J.: Foundations of Developmental Genetics. London, Philadelphia: Taylor & Francis 1986. 372 pp., 156 figs., 4 tabs. Soft bound £ 14.00.

This book is an attempt to establish a bridge between embryology and molecular biology and to explain the pathway from genotype to phenotype in the development of animals. D. Pritchard guides the reader from general principles in the development of eukaryotes to molecular mechanisms of transcription and translation of genetic information encoded in DNA.

Mechanisms and strategies of cell differentiation and the determination of embryonic induction and their cytoplasmic and extracellular control are described. The mode of action of external, cellular and organismic influences and the correlation of genetic information and non-nuclear factors on the development of cells and organisms are illustrated by many examples.

The effects of trans-differentiation and trans-determination are described in an interesting chapter on unstable differentiation. In this context, the author discusses the theory of somatic mutation with respect to some new aspects of research and develops his own theory of cell differentiation.

In subsequent chapters he deals with such molecular processes of inheritance as protein synthesis, and RNA and DNA metabolism. He especially draws attention to regulatory phenomena and mechanisms and illustrates the relations of differentiation and determination processes. The influence of such control mechanisms of gene expression as post-translational control, the action of chromosomal proteins, RNA

processing, gene amplification, DNA methylation and others are explained and discussed relative to developmental processes.

In the last chapters the author summarizes once again the developmental principles of eukaryotes and the molecular basis of competence, embryonic induction and determination. He also discusses some aspects of recent evolutionary theories with respect to his adaptive-inductive genetic theory of evolution.

This book is not easy for nonspecialists in developmental biology to read but its understanding is facilitated by the presence of a lot of examples which are explained in the text, by figures and tables, and by the extensive and well-selected glossary.

This book gives an overview of knowledge and the state of research in developmental biology, and shows the multifarious connections of inheritance and environment. It is, therefore, of great interest not only for students of evolutionary biology but also for postgraduates and researchers in medicine and other fields of biology.

L. Petruschka, Greifswald

Roberts, D.F.; De Stefano, G.F. (eds.): Genetic Variation and its Maintenance. With Particular Reference to Tropical Populations. Society for Study of Human Biology, Symp. Ser. 27, 1st edn. Cambridge, London, New York, New Rochelle, Melbourne, Sydney: Cambridge University Press 1986. 266 pp., 50 figs., 54 tabs. Hard bound \$ 39.50.

This publication is a less-than-comprehensive but illustrative selection of papers presented at a meeting sponsored by the International Union of Biological Sciences, held in Frascati, Rome, in April 1985. The aim of the meeting was to summarize knowledge of gene frequencies and their dynamics in tropical populations.

The contents of this volume is divided in three sections. The first section concerns the formal genetic, biochemical, and molecular basis of genetic variation down to the level of DNA. Progress in methodology particularly in the applications of RFLP analysis and DNA sequencing is especially stressed. In the second part the origin and maintenance of genetic variation is demonstrated in monogenic polymorphic systems. The dynamics of gene pools is illustrated using the classical genetic response to malaria in Pacific and African populations or showing the influence of migration and inbreeding on gene pools in populations of Central Africa and Asia. The third section deals with interactions of polygenic complexes on genetic variability concerning the genetic control of physiological variables in connection with the environment. The usefulness of these parameters for providing information on population affinities and distances or for analysing similarities in response to common environmental stresses in genetically different populations is shown.

The reviewed book should not only be helpful to research workers in human population genetics but is also recommended to human ecologists, epidemiologists, medical geneticists and advanced students.

M. Wehnert, Greifswald

International Board for Plant Genetic Resources: Genetic Resources of Tropical and Sub-tropical Fruits and Nuts (excluding *Musa*). IBPGR Secretariat, Rome, FAO 1986. 162 pp; 28 tabs.

Credit should be given to both the people who carried out the work (F. Geurts, with the assistance of G. Blaak and T. El

Baradi) and the numerous reviewers from all over the world. This final version is preceded by an initial draft written between 1980 and 1982 and new references have been incorporated. The crops covered are a diverse group of tropical and sub-tropical fruits and nuts, ranging from those of major international importance, such as Citrus, pineapple, mango and date, to locally-important species grown only on a home-garden scale. They also vary in their contribution to nutrition: high caloric and protein ones like Cashew and Pistachio nuts, high fat (the Macadamia nut), high calcium (dried fig), high vitamin A potency ones (Kaki and Canistel (*Pouteria* spp.)), and high vitamin C (*Acerola* (*Malpighia emarginata*)).

This list of resources is one contribution by the FAO in fighting the present state of genetic erosion influenced by many factors. Without a doubt there is a need for genetic resources conservation measures. The table provided for each crop, or for a few related crops, summarizes the existing germplasm collections around the world. The present publication relates to an earlier IBPGR publication which provides details on addresses and collections and thus has to be used in conjunction with the earlier document. It also emphasizes taxonomy and botany, origins, ecology, distribution, agronomy, diseases and pests, genetics, and improvements. It is, therefore, an important and valuable addition to the summarizing address lists.

H. F. Linskens, Nijmegen

Mota, M.; Baeta, J.: International Symposium of the Conservation of Genetic Resources of Aromatic and Medical Plants. Eucarpia Genetic Resource Section, Oeiras 1987. 150 pp., many figs. and tabs.

This symposium, held in 1984 at the Estação Agronômica Nacional, in Portugal, followed a meeting of the Eucarpia Gene Bank Committee. The proceedings presented here have the high-level support of many ministers, secretaries of state and presidents. All eighteen communications are presented in full-length, including their more-or-less politically coloured speeches. The conclusions and recommendations are that much more conservation of endangered species has to be done, seed-sampling has to be supported, and that study and research has to be intensified. A European network of coordinated action programmes has to be established. Nothing new!

No one doubts the importance of aromatic and medical plants in general, and Portugal is a special genetic reserve of aromatic plants. Strangely enough, the emphasis is on conservation; the venerable Sociedade Broteriana has even established a reserve of wild genes of *Lavandula latifolia* near Coimbra. Nothing is said about the breeding and selection of this group of highly important plants! Very little is said on the male sterility of *Silybum marianum* produced by chemical gametocides, and a little caryological study of the genus *Lavandula* is mentioned. Apparently the experts are still functioning at the level of hunters and collectors, with the incorporation of a little pharmacological touch. Nevertheless,

Announcement

One of our co-editors, Dr. Gudev S. Khush, together with Henry M. Beachell, has been honoured by the Technology Foundation of Japan with the Japan Prize, also called the Japanese Nobel Prize. This prize, endowed with fifty million yen, has been awarded to Dr. Khush for his successful

despite these drawbacks, the report does point out an important group of herbs which deserve the attention of plant breeders.

H. F. Linskens, Nijmegen

Siddiqui, K.A.; Faruqi, A.M. (eds.): New Genetical Approaches to Crop Improvement. Atomic Energy Agricultural Research Centre, Tandojam, Pakistan 1986. 1071 pp., numerous figs. Hard bound \$ 65.00.

It is not clear from the foreword, preface, or main body just when and where the First International Symposium on New Genetical Approaches to Crop Improvement, of which this voluminous book is a proceedings report, took place. Since the references cited are only up to 1982, it can be concluded that the meeting took place sometime in the early eighties. No less than 213 plant scientists from 31 countries presented data on 51 different crops. All presented relevant topics in crop improvement: somatic cell genetics and distant hybridization, mutagenesis, ploidy, quality characters, breeding systems and selection theory, physiological genetics and stress breeding, and relevance of molecular and biochemical mechanisms in crop improvement.

There is no doubt that plant genetics has been instrumental in initiating and sustaining the first Green Revolution but progress in crop improvement, including new methods of genetic engineering, occurs so fast, that this volume is a documentary snapshot of the state of affairs at the time the symposium was held. The contributions vary between short eight line summaries to extensive original papers presenting many details, tables, figures, graphs, and discussions. The vast majority of the authors come from Pakistan so the reader gets an excellent impression of the efforts made in a developing country to solve their own food problems. Highlights of the proceedings are the papers presented by G. Wenzel, J. W. Snape, T. Tsuchiya, W.-D. Evans, M. Y. Menzel, J. MacKey, N. J. Thomson and M. D. Gale. A critical examination of the realities and possibilities of crop improvement are the central concern of these scientists. They are trying hard to change the unfortunate situation in which two-thirds of mankind can be found in developing countries which produce only one-fifth of the world's food supply. One can therefore only agree with Munir Ahmad Khan, chairman of the Pakistan Atomic Energy Commission, that "it is vital for the developing countries to strengthen their agricultural base through the adoption of modern technologies and application of scientific methods". It is good to read of this optimism and confidence in modern methods of cell genetics but the classical approaches of plant breeding should not be neglected. Mutation breeding, for which the engagement of the AEC stands, has not brought about the break-through which was expected in the fifties and sixties, neither will somatic cell genetics on its own. It is good to see that the present volume reflects a broad knowledge of classical breeding techniques and an open-minded direction to new crop plants for the special environmental conditions of Pakistan. Looking through this volume makes one optimistic.

H. F. Linskens, Nijmegen

breeding of rice variety 'IR 36', a variety which combines a high yield with high resistance to pests and diseases, and good tolerance against extreme soil conditions.

Congratulations from all your co-editors of TAG