

Book reviews

Brücher, H.: Useful Plants of Neotropical Origin and their Wild Relatives. Berlin Heidelberg New York: Springer 1989. 296 pp., 182 figs. Hard bound DM 198.–.

The author of this book lives in Mendoza, Argentina, where he directs an institute of horticulture. He is also well-known for his successful potato breeding work in the Cordillera. This book was written when the author was in exile from Argentina: for political reasons his research contract was abruptly terminated, with the result that all his breeding material of virus-free seed potato was lost, which ultimately ended in severe damage to the region. After living for some time in need and distress, without salary, casually supported by his colleagues and a spontaneous gift from Dr. K. F. Springer, he was invited by the Smithsonian Institute to establish residency at its Tropical Research Institute in Panama. It is here that the book under review was actually completed. At the present time, the author's excellent research program is once again being funded by the Argentinian National Research Council (CONICET), and he receives a monthly salary corresponding to scarcely US\$ 100.00. No wonder that even seed potatoes are scarce in Argentina and have to be imported from Europe.

The plants of the Neotropics that are useful to man (South America, Central America) as well as their wild relatives comprise the most interesting subject matter of this book. During the course of his many collecting expeditions over his lifetime, the author has observed the genetic erosion of the ancestors of primitive cultivars and of some now world-wide diffused species that originated in the mountainous regions. The book draws the attention of the reader to the fact, often overlooked, that it was the Indians who domesticated and improved the quantity and quality of many of the crop plants that form a part of the daily diet in many industrialized countries – a contribution clearly superior to that of the native populations of other continents: for example, *Solanum*, *Lycopersicon*, *Ipomoea*, *Manihot*, *Zea*, *Arachis*, *Helianthus*, *Cucurbita*, *Agave*, *Gossypium*, *Ilex*, *Nicotiana*, *Ananas*, *Phaseolus*. Quite a number of the 165 species of useful plants of the "New World" conquered the earth as early as 400 years ago. The author not only describes the morphology of the species, their name, origin and history (with many new and original photographs), he also presents current theories on domestication, cultivation and evolution, diseases and pests, and use and marketing as well as discussing in some cases biotechnological methods for improving productivity. The book is up-to-date in the taxonomic and nomenclature sense. The species are grouped into: carbohydrate-delivering roots and tubers, farinaceous, protein and oil plants, palms, aromatics, timbers, industrially used and pasture plants, and aromatic and fleshy fruits. For two decades the author has ceaselessly pointed out that "in the tropics and subtropics plenty of 'unused' vegetable food reserves exist, especially in the Neotropics. Some are known only to the natives, others are already being gathered in thousands of tons from the wild".

This book contains a treasure of information not easily found elsewhere and is greatly enriched by the author's own personal experience and knowledge. It is in a certain sense a call upon plant breeders to examine new frontiers.

H. F. Linskens, Nijmegen

Grinsted, J.; Bennett, P. M. (eds.): Plasmid Technology. Methods in Microbiology, Vol. 21. London: Academic Press. 335 pp., several figs., several illustrations. Paperback £ 14.95.

Plasmid technology comprises a series of techniques and concepts, some of which are an essential part of molecular biology. Over a period of time this technology has been better understood, developed and exploited by a wider field. This volume is a revision/update on the first edition (Methods in Microbiology, vol. 17, 1984). The majority of subjects covered in the two editions are similar; namely plasmid genetics, conjugation, bacterial transformation, transposon use, isolation and analysis of plasmid DNA with restriction endonucleases, electron microscopy and DNA sequencing. The improvement in the methodology and experience gained from the wider adaptation of basic techniques is reflected in this new edition. New useful sections included are discussions on cloning vectors and gene expression from plasmids.

The chapters in this book, contributed by different authors, comprise of working protocols in the different subjects with discussions on alternative choices and applications for specific purposes. The characteristic of this volume is the general perspective in which different plasmids, bacteria, methods and uses are discussed together to get a broader overview; yet in sufficient detail to make a choice of technique possible and then use the provided protocol for it.

The recent paperback edition is very reasonably priced. It is comprehensive enough for a beginner and a useful updated source book for the researcher dealing with specialized aspects of molecular biology.

A. Pereira, Wageningen

Grant, B. R.; Grant, P. R.: Evolutionary Dynamics of a Natural Population – The Large Cactus Finch of the Galápagos. Chicago, London: The University of Chicago Press 1989. XIX + 350 pp., 94 figs. and photographs, 12 colour plates. Soft bound \$ 28.75.

This book is a monograph on the population biology of the large cactus finch, *Geospiza conirostris*, which is found on Genovesa, a small island of the Galápagos archipelago. The restriction of only one single bird species on one small island is certainly somewhat special, but it has the clear advantage that a large amount of carefully collected data are now available covering a period of 7 years of observation. Morphological variation was measured, especially with respect to beak size and shape. Demographic data on survival and reproduction as well as on song pattern and male choice were collected. All physical and biotic parameters of the island are described and the conclusions drawn about the population dynamics and evolution of *G. conirostris* are sound and highly interesting. The reader can learn a lot about the islands, about the birds and about population biology. The text is extremely well written so that one can read the book even at night without the risk of falling asleep. The very accurate investigation certainly deserves attention from all population biologists. The investigation deals not only with the Darwinian finches, but it has been performed with the same carefulness that was typical of Darwin himself.

D. Sperlich, Tübingen

Bajaj, Y. P. S. (ed.): Haploids in Crop Improvement I. Biotechnology in Agriculture and Forestry, Vol. 12. Berlin Heidelberg New York: Springer 1990. 549 pp., 154 figs. DM 498.00.

This reviewer has said it before and can only repeat it – the editorial philosophy behind this series is unfathomable and unrecognizable. And this for the reader, and even more so for the buyer, is intolerable. There is no doubt that in vitro-produced haploids have become an integral part of breeding programs, and thus an essential tool of agricultural and horticultural technology. But the present volume is superfluous for the purchaser has to accept a multisubject collection of lengthy descriptions covering the in vitro induction of haploids: cereals, including wheat (whereas the next volume of the series is to be on wheat); trees (have already been covered in two previous volumes – 1986 and 1989 – and volume 16 on trees has already been announced; medical plants (these have already been covered along with aromatic plants in 1988 and 1989, and a third volume has been announced); vegetables, including *Arabidopsis* (which is an interesting genetic tool, but not just a herbage), *Gerbera* (until now not known to be edible), rice (a special volume on rice is in preparation), alfalfa and winged beans (a volume on legumes was published recently). The sequence of the articles, most of which are written by internationally recognized experts and are of high quality, appears to be arbitrary. For example, cultivated tomato is separated by three chapters from wild tomato. An excellent introduction by Y. P. S. Bajaj demonstrates that the manipulation of haploid protoplasts is an ideal tool for mutation and complementation studies, having evident advantages for the early detection and easy isolation of mutants. Anther culture appears to be the most widely used of all the methods, but pollen embryogenesis (W. Powell) offers some advantages over anther culture. Genetic stability in haploid cell cultures (A. Ziauddin and K. J. Kasha) is still a problem to be solved in many cases.

This incoherent compilation, which costs more than US\$ 300.00, results from the absence of a rigid editorial policy. The dupe is the consumer and reader, who is presented with numerous overlaps and repetitions. Poor people with a standing order.

H. F. Linskens, Nijmegen

Narain, Prem: Statistical genetics. New York, Chichester, etc.: John Wiley & Sons 1990. 599 + xv pps. Hard bound £ 26.00.

Since, in the author's own words, "researches in this interdisciplinary field made by mathematicians, statisticians and geneticists over the years are scattered in various journals", his intentions were to bring this knowledge together, such that the result "can serve as a text-book for students majoring in the field of statistics or genetics and breeding" and "can equally serve as a reference book for advanced researchers". Concerning the subject of the book, the author notes that the "study of theoretical population genetics which is predominantly statistical and mathematical in nature is often described as statistical genetics".

In fact, the book is quite unique with respect to comprehensiveness and consistency in presenting the approach to and the main results in quantitative (biometrical) genetics. It starts with an introduction to the principles of Mendelian (classical) genetics, which is directly followed by the statistical treatment of segregation and recombination. This is continued by a skillful selection of population genetic topics with emphasis on those aspects (systems of inbreeding, stochasticity and effective population size, etc.) specifically required for the subsequent treatment of the elements of quantitative (biometrical) genetics and breeding theory, which comprises the remaining two-thirds of the book. The range spanned here covers all generally relevant concepts of quantitative genetics (genetic and environmental variances and covariances, heritability, etc.) and methods of

breeding (individual and family selection, crossbreeding, diallel crosses, etc.).

Because of limitations in volume, the author apparently was forced to decide in favour of comprehensiveness in representing established concepts and methods at the expense of an introduction to statistics and probability and a discussion of critiques and alternative suggestions. This is not meant to diminish the accomplishment of the book, for the book is in complete accordance with the author's declared intentions and is likely to prove a very useful reference to those working in statistical genetics.

H.-R. Gregorius, Göttingen

Giddings, John C.: Molecular Genetics and Immunoanalysis in Blood Coagulation. 1st edn. Weinheim, Chichester: VCH Verlagsgesellsch. and Ellis Horwood Ltd., 1988. 304 pp., 34 figs., 43 illustrations and tabs. Hard bound DM 180.00.

This book gives an up-to-date overview on the molecular genetics and immunoanalysis of bleeding disorders. An introduction to haemostasis and to the principles of molecular genetics is given in two chapters. The nature of blood coagulation proteins and their role in haemostasis are described. An extensive discussion of the molecular abnormalities in patients with haemostasis disorders is given, with particular emphasis on protein chemistry, the use of immunochemical analysis and recombinant DNA techniques. Current findings with regard to the molecular biology of haemophilia A, haemophilia B and von Willebrand's disease are especially emphasized. Precise technical details of the range of immunological and DNA methods utilised for diagnostic purposes in the Cardiff Haemophilia References Centre are described (45 pp.). The book has an extensive bibliography (about 1000 references).

This book attempts to comprehensively summarize the contemporary aspects of the disorders of haemostasis. It will be interest to research and clinical geneticists and haematologists as well as to physicians dealing with bleeding disorders, but the price of this book seems to be to high.

F.H. Herrmann, Greifswald

Gelvin, S.B.; Schilperoort, R.A.; Verma, D.P. (eds.): Plant Molecular Biology Manual (updated basic work, including suppl. 1). 2nd edn. Dordrecht, The Netherlands: Kluwer Academic Publ. 1989. 488 pp., 42 figs., 16 tabs. Looseleaf Dfl. 165.00/£ 52.00.

This laboratory manual, written by experts in the field, comprises independent chapters on techniques with detailed protocols and associated background information useful for laboratory courses as well as a bench guide in plant molecular biology research. Advances in plant molecular biology have been made with the development of specific techniques as well as the adaptation or incorporation of methods from other fields. In this manual emphasis has been given to specific techniques for the introduction of foreign DNA into plant cells, primarily via *Agrobacterium tumefaciens* but also via direct DNA transfer, substantiated by the use of selectable markers and reporter genes. Adapted or more general techniques include plant nucleic acid extraction and characterization, construction of genomic and ds-cDNA clone banks and analysis of protein-DNA interactions.

Of special use and interest are the notes following each protocol, which contain practical and background information on each step, allowing a choice of alternatives or adaptations. The protocols backed up by buffer/media compositions, an extensive bibliography and lucid illustrations are comprehensively structured. In this new edition the rapidly developing nature of plant molecular biology technology has been taken into account in the

design: the manual has a looseleaf format, which allows expansion and updating, and is in the form of an supplement.

A. Pereira, Wageningen

Fiksel, J.; Covello, V. T. (eds.): Safety Assurance for Environmental Introductions of Genetically-Engineered Organisms. NATO ASI Series G, Ecological Sciences Vol. 18. Berlin, Heidelberg, New York, London, Paris, Tokyo: Springer 1988. VIII/282 pp., 20 figs. Hard bound DM 148,—

This book contains the reports presented at a NATO workshop in Venice, Italy, June 1987. It is arranged in four parts: (I) workshop summary in the form of recommendations; (II) risk analysis perspectives; (III) scientific perspectives; and (IV) regulatory perspectives. With respect to *risk analysis perspectives*, the emphasis is on strategies (Travis and Hattemer-Fry) and on developing biological approaches to assess the possible risks (Barnhouse et al.) The *scientific perspectives* are dealt with by presenting application examples (Lugtenberg et al.) and more specifically by a description of plasmid transfer in fresh water environments (Day et al.) or EPA studies on mutagenic effects of recombinant virus on cells in culture, as well as on survival of *E. coli* in air. Such reports lead into the field of *regulatory perspectives*, the current status being presented for the USA (Cohrsen); UK (Ager), Denmark (Laake) and Japan (Uchida), but no other European countries. The *recommendations*, as the essence of those three parts, and formulated as a take-home message, point out the need for the exploitation of existing knowledge, using the case by case approach, but also for developing as soon as possible some kind of generic guidelines. A help in this will be categorization of proposed introductions. A must is international cooperation. A stronger financial support of risk assessment research is recommended.

This is a valuable, well-edited book, which could be called timely, had it not taken 18 months to get it on the market. The price is exorbitant.

W. Klingmüller, Bayreuth

Larsson, C.; Möller, I. M. (eds.): The Plant Plasma Membrane. Structure, Function and Molecular Biology. 1st edn. Berlin, Heidelberg, New York, London, Paris, Tokyo, Hong Kong: Springer 1990. 418 pp., 79 figs. Subject index. Hard bound DM 248,00.

"This is the first book covering all aspects of the plant plasma membrane, thus presenting a comprehensive overview of the entire field", announces the publisher on the backcover of this 418 page volume.

The 16 chapters on the plant plasma membrane are written and edited by 24 experts of international fame, working in many different disciplines, like biochemistry, cytology, physiology, morphology and molecular biology. The result is a complete patchwork on the subject focussing, for example, on the molecular composition and ATPase activity of the membrane, redox processes, methods for membrane purification and isolation, vesicles, coated pits and the membrane-associated cytoskeleton, the role of the plant plasma membrane in cold acclimation, host-pathogen interaction and symbiosis. The text is supported by numerous figures representing graphs of reactions, elaborations of sequences, models for structures and pathways, micrographs and schematic illustrations of the principles of various techniques. The contributions are rich in critical evaluations, many of them in the form of concise tables in which results from different sources are confronted. The hundreds of references include standard works and recent publications until 1989. This book is interesting for both lecturers preparing advanced courses and specialized research fellows searching for an infor-

mative evaluation on their main field of study or looking for general background explanations on the biology of their material, the plant plasma membrane.

At first sight I was sceptic towards the rather exuberant presentation of the publisher, like cited here above, but in conclusion my opinion on this book is basically as positive as his/hers.

E. Pierson, Siena

Smartt, J. Grain Legumes: Evolution and Genetic Resources. 1st edn. Cambridge: Cambridge University Press 1990. 333 pp., 107 figs., 23 tabs. Hard bound

In this monograph the author shares his kaleidoscopic knowledge of this subject with the reader. He rightly points out the unpredictability of yield as the main drawback of the grain legumes, but that sustained research in breeding and agronomy of the crop concerned as well as its relationship with the associated *Rhizobium* bacteria may remedy this position, as exemplified in groundnuts. All legume grain crops from the major groups (Groundnut, *Phaseolus*, *Vigna*), through soybeans and lupins to more exotic and underexploited crops like winged beans and lentils are discussed in an orderly manner: biosystematics, the morphological and biological species concept, hybridisation, cytology, evolutionary synthesis, future breeding aims and the occurrence of anti-metabolites. A comparative table of the principal constituents of the various crops would have been an useful addition for most readers, while the bibliography could have been more extensive. The author ends his book with a thorough discussion of conservation strategies and concludes that at present there exists a greater interest in a wider range of crops than in the previous decade. This book is a very useful asset for any institute engaged in legume research.

J. A. M. Van der Mey, Potchefstroom

Hopwood, D. A.; Chater, K. E. (eds.): Genetics of Bacterial Diversity. 1st edn. London, San Diego: Academic Press 1989. 449 pp., many illustrations. Soft bound £ 14.95

Understanding the molecular genetics of man, mice or maize is not possible without understanding the genetics of *E. coli* K-12. But compared with the potentials of other bacteria, *E. coli* is poorly equipped, despite its amazing sexuality system. *E. coli*, for example, lacks the capability for nitrogen fixation, light emission, photosynthesis, antibiotic production and, furthermore, differentiation to form spores, fruiting bodies or stalks. However, these (and many more) capacities are present in other bacteria open to genetical investigation. A selection of results gained thereby was composed by the editors to form a textbook on non-*E. coli* bacterial genetics. The book contains twenty chapters of nearly equal length, grouped into six main areas: after three introductory chapters on the diversity of bacteria and of bacterial genetics follow six chapters on specialized metabolic capabilities of bacteria, three on morphological differentiation, four on bacterial adaptation to animal pathogenicity, three on bacteria-plant interactions, and one on bacterial population genetics. Since the choice of the topics appears to be rather arbitrary, the book is not exhaustive; however, the particular topics of most chapters are dealt with in detail. The intention of most authors appears to give a bacteriocentric rather than anthropocentric view on their fields: aspects as "bacteria as model systems" as well as the biotechnological significance of bacterial genetics are avoided. This purpose is not trendy, nevertheless (or just therefore) I recommend the book to those for whom the editors intend it, viz. students and research scientists at many levels and "microbiologists wishing to catch up on the genetic basis of some of the classical phenomena of bacteriology, and geneticists unfamiliar with some of the things that bacteria can accomplish".

C. K. Stumm, Nijmegen