

normalities were found. The chromosome number in 30 metaphases scored was invariably 14.

Root cultures of plant cells transformed by *A. rhizogenes* are capable of vigorous, permanent growth and they are chromosomally stable. They can possibly be used in future as an alternative to cell suspension cultures, for instance for the production of alkaloids and other pharmacologically useful secondary plant cell metabolites. The main advantage of these cultures is their chromosomal stability, which was first demonstrated in this study.

REFERENCES

- BYRNE, M. G., CHILTON, M. D.: Regeneration of plants from cells transformed by Ti or Ri plasmids of *Agrobacterium*. — *Curr. Top. Plant Biochem. Physiol.* **1** : 163–169, 1983.
- CHILTON, M. D., TEPPER, D. A., PETIT, A., DAVID, F., DELBART, F., TEMPÉ, J.: *Agrobacterium rhizogenes* inserts T-DNA into the genomes of the host plant root cells. — *Nature* **295** : 432–434, 1982.
- LANGLEY, R. A., KADO, C. I.: Studies on *Agrobacterium tumefaciens*. Conditions for mutagenesis by N-methyl-N'-nitro-N-nitrosoguanidine and relationship of *A. tumefaciens* mutants to crown gall induction. — *Mutation Res.* **14** : 277–287, 1972.
- LEEMANS, J., SHAW, C., DEBLAERE, R., DE GREVE, H., HERNALSTEENS, J. P., MAES, M., VAN MONTAGU, M., SCHELL, J.: Site-specific mutagenesis of *Agrobacterium* Ti plasmids and transfer of genes to plant cells. — *J. mol. appl. Genet.* **1** : 149–164, 1981.
- MURASHIGE, T., SKOOG, F.: A revised medium for rapid growth and bioassays with tobacco tissue cultures. — *Physiol. Plant.* **15** : 473–497, 1962.
- OTTEN, L., SCHILPEROORT, R. A.: A rapid microscale method for the detection of lysopine and nopaline dehydrogenase. — *Biochim. biophys. Acta* **527** : 497–500, 1978.
- PETIT, A., DAVID, C., DAHL, G. A., ELLIS, J. G., GUYON, P., CASSE-DELBART, F., TEMPÉ, J.: Further extension of the opine concept: Plasmids in *Agrobacterium rhizogenes* cooperate for opine degradation. — *Mol. gen. Genet.* **190** : 204–211, 1983.
- TEPPER, D.: The biology of genetic transformation of higher plants by *Agrobacterium rhizogenes*. — In: PÜHLER, A. (ed.): *Molecular Genetics of the Bacteria-Plant Interactions*. Pp. 248–258. Springer Verlag, Berlin–Heidelberg 1983.

BOOK REVIEW

DE SERRES, F. J. (ed.): *CHEMICAL MUTAGENS. PRINCIPLES AND METHODS FOR THEIR DETECTION*. Vol. 9. — Plenum Press, New York–London 1984. 306 pp. US \$ 42.50. —.

The problems of adequately protecting the human population against mutagenic and carcinogenic hazards are enormous and far exceed national boundaries. The objective of the well acclaimed series "Chemical Mutagens", established in 1971, is to encourage the development and application of testing and monitoring procedures to avert human exposure to environmental genotoxic agents. Volume 9 covers various aspects of testing chemical mutagens. Included are detailed descriptions of seven short-term assays: 1) the grasshopper neuroblast assay, 2) the human lung- and skin-derived fibroblast assay, 3) the L-arabinose resistance assay with *S. typhimurium*, 4) the *Bacillus subtilis* multigene sporulation test, 5) mammalian tissue culture L5178Y/TK gene mutation assay, 6) the bacteriophage lambda induction assay, and 7) the rat granuloma pouch assay. A special chapter focuses on the identification of mutagens from the cooking of food, and reviews the formation of the pyrolytic and thermic mutagens and various kinds of genotoxins detected in foods. The concluding article deals with the detection of mutagens in human feces as an approach to the discovery of causes of colon cancer.

The diversity of coverage in this book demonstrates the vitality characterizing the application of new assays for monitoring environmental mutagens. The volume should prove helpful to researchers involved in all aspects of chemical mutagenesis.

T. GICHNER (Praha)

MOORE, J. N., JANICK, J. (ed.): *METHODS IN FRUIT BREEDING*. — Purdue University Press, West Lafayette 1983. 464 pp.

Written by 32 specialists, the book covers theoretical and practical aspects of breeding of major species of the botanically heterogeneous group of fruit crops including trees, shrubs, climbing vines and perennial herbs of temperate, sub-tropical and tropical zones. The chapters in the book are arranged in five sections: Germplasm, Breeding Techniques, Selection, Breeding for Specific Objectives, and Testing and Release. The problems discussed in the first chapter are related to germplasm resources, exploration, maintenance and preservation. There is a decreasing number of primary and secondary centers of genetic variation of high potential breeding value. The continuing destruction of fruit gene centers and the progressive narrowing of genetic pool of commercial fruit cultivars together with a danger of genetic vulnerability rise the need for germplasm repositories and other systems of germplasm preservation, such as cold storage, tissue culture, cryopreservation, and pollen and seed storage. The basic breeding procedure consisting in sexual hybridization requires a knowledge of pollen and seed management, of factors related to controlled pollination and proper handling of seed populations. There are some additional techniques of potential use in fruit breeding programmes, such as mutation breeding, ploidy manipulations, tissue culture and embryo culture. The need of increasing efficiency of selection requires a definition of proper breeding strategy. Mass selection still appears as the most efficient methodology for improving fruit breeding stocks. The provided analysis of response to this selection together with major impediments to breeding of fruit trees, such as tree size and juvenility, show further possibilities. Another important aspect of selection included is concerned with the evaluation and methods of handling somatic mutations and chimeras in various fruit crops. The specific objectives of fruit crop breeding examined include resistance to various pathogens and environmental stress, adaptation to specific climatic and soil environments, and to mechanized harvest, fruit quality, rootstock improvement, and fruitfulness and productivity. The last section dealing with the evaluation of advanced breeding material and of new cultivars, describes the organization and programmes of cultivar testing, analyses the problems related to cultivar release and protection, discusses the principles of agricultural certification of plant material with emphasis on special certification pertaining to virus diseases of tree fruits, and concludes with a chapter on systems of an efficient and objective collection, analysis and retrieval of data in fruit breeding programmes.

The book was conceived as a companion volume to "Advances in Fruit Breeding" produced by the same editors and publisher in 1975 and focussed on practical breeding of individual fruit crops. The new volume treating more theoretical and procedural aspects of fruit crop breeding on a wide basis of crop examples and including recent advances in plant science, provides a unique text and reference source of invaluable aid to students, teachers and research workers concerned with fruit breeding.

J. TUPÝ (*Praha*)

GLEBA, Y. Y., SYTNIK, K. M.: *PROTOPLAST FUSION*. Genetic Engineering in Higher Plants. — SHOEMAN, R. (ed.): *Monographs on Theoretical and Applied Genetics* 8. Springer-Verlag, Berlin—Heidelberg—New York—Tokyo 1984. 220 pp., 62 figs. Cloth DM 148.—, approx. US \$ 53.90.

Much effort has been devoted during the last 15 years to protoplast fusion with a hope of its use for breeding purposes and production of new crops. The present monograph provides a detailed survey of the results achieved, examining them critically with special emphasis on methodology and genetic approach. Great progress is shown to be obtained in the application of methods of plant cell and tissue culture and in developing special techniques of protoplast fusion and cell reconstruction. On the other hand, the present technology of cell organelle transfer into protoplasts does not appear to produce genetically evidenced results on functional integration of transplanted cell particles. The use of protoplasts for genetic studies encounters great problems of genetic variability of *in vitro* manipulated cells, and the *in vitro* manipulations are still limited to a relatively small number of taxonomic groups. The problem of parasexual hybridization proper is mainly examined from the important methodological aspects of screening for parasexual hybrids, of frequency of hybrid formation, and of genetic evaluation of plant forms obtained through protoplast fusion. Of special interest are the considerations on the complexity of the fate of genetic information in parasexual hybridization systems and on the genetic novelty of parasexual hybrids. Two chapters of the monograph are devoted to the achievements and problems of somatic hybridization of distantly related plant species and to possibilities of using protoplast fusion in both theoretical and applied genetics.

The volume was originally published in Russian in 1982 and was considerably revised and updated for this English edition. As the first book entirely devoted to protoplast fusion and especially because of extremely important and highly instructive genetic considerations of work on somatic hybridization, it will certainly serve as an excellent guide to researchers engaged in this and related fields of plant science.

J. TUPÝ (*Praha*)

ALBERTS, B., BRAY, D., LEWIS, J., RAFF, M., ROBERTS, K., WATSON, J. D.: *MOLECULAR BIOLOGY OF THE CELL*. — Garland Publishing, Inc., New York—London 1983. 1179 pp., US \$ 23.—.

This large volume provides a comprehensive survey of cellular biology with special emphasis on molecular aspects of the organization and principles by which cells function. It deals chiefly with eucaryotic cells considering them both as isolated functional units and in their developmental specializations and interactions in multicellular communities of organisms.

The book is organized in a detailed and clear manner into 3 main parts, 19 chapters and a large number of separate topics arranged in a logical sequence. The introductory part (198 pp., 4 chapters) describes elementary principles and basic biochemistry of cell evolution and metabolism and outlines the main experimental approaches to cell investigation. Part II (571 pp.) deals in 9 chapters with general aspects of molecular organization common to most eucaryotic cells. Two of them are devoted to basic genetic molecules, structures and mechanisms and describe the organization of DNA into chromosomes, the processes of DNA repair, replication, genetic recombination and of DNA evolution, and the mechanisms of genetic transcription and translation together with the regulatory systems of gene expression. Two chapters on cell membranes describe plasma membrane chemistry and structure and explain membrane transport mechanisms for small molecules and the processes of exocytosis and endocytosis. The role of internal membranes is considered from the aspect of both cell compartmentalization and metabolic functions of the endoplasmic reticulum, the Golgi apparatus, lysosomes and peroxisomes. Chapter 9, devoted to the central role of mitochondria and chloroplasts in energy conversion, includes a description of biogenesis, organization and biochemical mechanisms of the function of these organelles. Chapter 10 deals with the organization and function of various components of the cytoskeleton, such as myofibrilles, microtubules and actin filaments, and chapter 11 with many aspects of the cell cycle of growth and division. Two last chapters entitled "Cell-cell adhesion and the extracellular matrix" and "Chemical signaling between cells" focus on cellular interactions in animal cells and some lower organisms. Part III "From cells to multicellular organisms (377 pp., 6 chapters) concentrates on cell process of sexual reproduction, embryonic development and cell differentiation in animals, discussing in detail the well understood cell assemblies of the immune and nervous systems in their complex organizations and sophisticated functions. Some special features of plant cell concerned with cell wall properties, intercellular interactions and cell organization, growth and division are briefly outlined in the concluding chapter.

Going through the book, one can admire above all the exceptionally high pedagogical level achieved by many very instructive illustrations together with a simplicity and clearness combined with high scientific value of the text. Attention is also often drawn to poorly understood and unsolved problems and on the basis of isolated disjointed facts, stimulatory working hypotheses are formulated. The book has a general detailed subject index, while a list of references is given in each chapter. The aim of the authors of this volume to provide undergraduate and postgraduate students with a guide to understanding the principles by which cell functions, and working scientists with a broad and practical survey of knowledge of cell biology, has certainly been achieved. It can be recommended especially as an excellent university textbook

J. TUPÝ (*Praha*)

HARBORNE, J. B., TURNER, B. L.: *PLANT CHEMOSYSTEMATICS*. — Academic Press, Orlando—London—San Diego—San Francisco—New York—Toronto—Montreal—Sydney—Tokyo—São Paulo 1984. 562 pp. £ 65.00.

In the last few decades, approximately since 1950, plant chemotaxonomy developed from its more or less primitive beginnings to a new and highly fruitful branch of science. Many hundreds of special papers have been published, but there are few up-to-date synthetic works concerning this topic. Two well-known chemotaxonomists, J. B. Harborne from Reading (England) and B. L. Turner from Austin (USA) prepared a comprehensive synthesis of plant chemotaxonomy covering its past and recent development up to the end of 1982. Their book has three parts. In the first the biochemical background, taxonomic principles, history and philosophy of

this science branch, advantages and disadvantages of chemotaxonomy vis-a-vis morphological taxonomy are discussed (pp. 3–45).

Part II covers the group of secondary metabolites, namely plant scents and odours, alkaloids and other toxins, pigments and hidden metabolites, further the genetic and environmental variability, chemotaxonomic problems on infraspecific, specific, generic and familial levels, hybridization *etc.*

Part III discusses molecular approaches, including proteins, nucleic acids and polysaccharides. The last two chapters deal with paleo-biochemistry and the future development of this science.

Bibliography on 56 pages brings citations of more than 1000 papers. A large number of schematic figures accompanies the text.

When listing through the bibliography one finds that there are very few papers of non-British or American authors. Besides, citations of German papers are inaccurate.

The whole book is well written and well printed and brings a wealth of information on the whole spectrum of plant chemotaxonomic problems. The text is accompanied with a number of instructive figures and tables.

Experimental methods are discussed very concisely, giving basic principles but not unnecessary details. The description of advantages and disadvantages of each method shows the intimate knowledge and long lasting experience of the authors. I appreciate especially that the evaluation of obtained experimental results, their taxonomic application and possible sources of errors are also discussed.

This book will be useful to plant taxonomists, biochemists and geneticists.

VĚRA HADAČOVÁ (*Praha*)

COOLEY, J. H., GOLLEY, F. B. (ed.): *TRENDS IN ECOLOGICAL RESEARCH FOR THE 1980s*. — Plenum Press, New York—Oxford 1984. 344 pp. US \$ 52.50.

Without doubt, ecology as a discipline is undergoing a deep change of its concepts and views. The generality of ecosystem theories of the 1970's has been abandoned, and there is still no consistent ecological theory that would satisfy the growing demands of applied ecology. Recently, several books stressing the need of a new approach to ecological systems have been published (*e.g.* Strong *et al.*: *Ecological communities: Conceptual issues and the evidence*; Price *et al.*: *A new ecology: Novel approaches to the interactive systems*). The book reviewed clearly follows this trend. It contains the lectures read at the Workshop on the Future and Use of Ecology after the Decade of the Environment, held at Louvain-la-Neuve, Belgium in 1983.

There are 15 contributions in the book, accompanied by a Foreword by F. Golley and an excellent Summary. These contributions do not attempt to cover systematically all the fields of modern ecology; on the contrary, they include case studies, reviews, and discussions from various ecological fields, differing in their scope, but nevertheless providing a good review of contemporary ecological thinking. For a botanist, Mooney's Progress and Promise in Plant Physiological Ecology is very important, since it seeks a new physiological look at various concepts in plant ecology. Among them, attention is paid *e.g.* to physiological correlates of plant strategies, competition, plant pollinator interaction, *etc.* Further, articles by Grubb (Some growth points in investigative plant ecology), and van der Maarel (Vegetation research in the 1980s) are of interest to botanists, stressing the primary importance of dynamic studies of plant/plant interaction and communities.

Nevertheless, the main emphasis of the book is laid on the study of complex interactions (not only the trophic ones) and dynamic processes in ecosystems. Two general articles dealing with these questions are Price's Research Questions in Ecology Relating to Community Ecology, Plant-Herbivore Interaction, and Insect Ecology in General, and Remmert's And Now? Ecosystem Research! In addition there are several studies of individual ecosystems or their sections (*e.g.* microbial ecology, tropical rainforest arthropods, ecology of river valleys, litter decomposition, *etc.*) again stressing mainly the need of integrated studies of complex interactions, which take into account autecology of component species. The relation of theoretical and applied research in ecology is exemplified by the integrated study of Central European forest destabilization by B. Ulrich. The exhaustive paper of N. Stenseth (Why Mathematical Models in Evolutionary Ecology?) closes the book, evoking the current debate (mentioned even in the introduction) about the use of mathematical representation of ecological systems.

A short, but informative Summary closes the book. It delimits important research areas (information transfer in ecosystems, element interaction, comparative ecology, ecosystem models, long-lived phenomena) and criticizes some current ecological practices, primarily the lack of long-term studies.

T. HERBEN (*Praha*)

PICKETT, S. T. A., WHITE, P. S. (ed.): *THE ECOLOGY OF NATURAL DISTURBANCE AND PATCH DYNAMICS*. — Academic Press, Orlando—San Diego—New York—London—Toronto—Montreal—Sydney—Tokyo. 472 pp. US \$ 49.00.

The study of disturbance in ecosystems and non-equilibrium processes as phenomena important for general ecology began to emerge in the late 1970's. This book is the first major attempt (apart from the review by Sousa: *The review of disturbance in natural ecosystems*. *Annual Rev. Ecol. Syst.* 15, 1984) to bring together a lot of particular data and concepts from the ecosystems of various types and to put them into a common frame. The editors chose the term patch for an ecosystem segment with the same history with respect to the external disturbance and therefore refer to the non-equilibrium processes depending on an external disturbance as to patch dynamics.

The book is divided into three parts with the introduction and the synthesis written by the editors. The first part, Patch dynamics in nature, describes numerous instances of disturbance effects in various ecosystem types, *e.g.* in temperate forests (J. R. Runkle, T. T. Veblen), tropical forests (N. V. Brokaw), sand prairies (O. L. Loucks et al.), shrublands (N. L. Christensen), marine invertebrate (W. P. Sousa, J. H. Connell and M. J. Keough), and vertebrate communities (J. R. Karr and K. E. Freemark, J. A. Wiens). It demonstrates clearly how much information has already been accumulated on disturbance in ecological systems, and how similar effects on community structure and dynamics these processes may have.

The second part, Adaptations of plants and animals in a patch dynamic setting, discusses the same phenomenon from the organisms' point of view: the examples of ecological and evolutionary (these mainly from the genetic viewpoint) responses to disturbed ecosystems. Again, this section provides a review of such adaptations in a variety of organisms across different ecosystems. Some papers are more ecologically oriented, *e.g.* the chapter on forest trees (C. D. Canham and P. L. Marks), forest herbs (B. S. Collins et al.), or insects (T. D. Schowalter); others are more genetic, *e.g.* R. C. Vrijenhoek's contribution on animal population genetics or K. Rice and S. Jain's paper on plant population genetics. The third section is more general and deals with the implications of patch dynamics for the community organization and ecosystem functioning. The papers included here review disturbance mediated coexistence (J. S. Denslow), ecosystem nutrient dynamics (P. M. Vitousek) and ecosystem energetics (D. G. Sprugel).

The book provides the first step towards the unified non-equilibrium look at ecosystems through patch dynamics perspective. Though its scope is rather empirical (there is very little mathematics in the book; only one article deals with patch dynamics models in spite of the wealth of models already published), it brings two important concepts to the current ecological thinking: first, the stress on non-equilibrium situations; second, the essential non-determinism in the structure and functioning of ecosystems. From this perspective, the long-term dynamic study even of ecosystems seemingly stable at a certain resolution level gains importance. Further, it provides a theory which may help to bridge the gap between population biology and community ecology.

T. HERBEN (*Praha*)

COHEN, P.: *CONTROL OF ENZYME ACTIVITY*. 2nd Ed. — Chapman and Hall, London—New York 1983. 96 pp., £ 3.25.

In previous years enzymologists were interested mainly in the enzyme activities of organisms, tissues and cells. At the present time they deal with mechanisms regulating enzyme activity and mechanisms enhancing the enzyme distribution in proper time at a desired place and with minimal energy consumption. The so-called key enzymes of metabolic pathways play the main role regulating the rate of their metabolic changes. This can be achieved either by lowering or increasing the number of enzyme molecules, or by changing the activity of preexisting enzyme molecules. In his book the author discusses mainly the second possibility and tries to explain the mechanisms regulating the rate of the activity limiting enzyme *in vivo*, as well as to show the relationship of this regulation to the integral cell metabolism.

As this topic is very broad and the space the author had at his disposal was limited, satisfactory knowledge of metabolic pathways, protein chemistry, enzyme kinetics *etc.* is required from the reader.

The booklet has six chapters: 1. Introduction, 2. Regulation of amino acid and nucleotide biosynthesis in bacteria by end product inhibition, 3. The initiation of biological function by limited proteolysis, 4. Enzyme regulation by reversible phosphorylation: the neural and hormonal control of cellular activity, 5. Control of enzyme activity by covalent modification other than limited proteolysis or phosphorylation, 6. The nature of the allosteric transition.

Among the systems of enzyme regulation the following are discussed: the feedback effect on the first enzyme of a pathway in the biosynthetic way of bacteria, regulation of enzyme activity by covalent and allosteric mechanisms, regulation with the use of isoenzymes with various regulating properties, the possibility of separate catalytic and regulatory subunits in a single enzyme, multifunctional enzyme and multienzyme complexes, etc.

Each chapter is provided with instructive figures, models, tables and references. The book is very well written. It will be useful to the students of biochemistry, especially enzymologists, physiologists, microbiologists and to all specialists studying the regulation of the metabolism, cell mechanisms and hormone actions on the molecular level.

VĚRA HADAČOVÁ (*Praha*)

JAKOBY, W. B. (ed.): ENZYME PURIFICATION AND RELATED TECHNIQUES. PART C. — COLOWICK, S. P., KAPLAN, N. O. (ed.): *Methods in Enzymology*, Vol. 104. — Academic Press, Orlando—San Diego—New York—London—Toronto—Montreal—Sydney—Tokyo 1984. 528 pp. US \$ 60.00.

This part of the big series of enzymologic methods was written by 52 leading specialists from the U.S.A. (26, mainly from the National Institutes of Health, Bethesda), England (6), Israel (6), Sweden (5), the Federal Republic of Germany (4), Australia (2), Switzerland (1), Spain (1) and Czechoslovakia (1). It is a supplement to the volume XXII, published in 1972, presenting a number of novel purification methods and many modifications of existing procedures, as well as entirely new methods, e.g. the high performance liquid chromatography.

The book is divided into five sections: Chromatography (including affinity chromatography, hydrophobic chromatography, high performance liquid chromatography, displacement chromatography of proteins), Electrophoresis (polyacrylamide gel electrophoresis, preparative isoelectric focusing, affinity electrophoresis, preparative isotachopheresis), Techniques for membrane proteins (solubilization, separating of detergents from proteins, purification reconstitution), Other separation techniques (protein precipitation with polyethylene glycol, affinity partitioning, affinity precipitation of dehydrogenases, protein crystallization, immunosorbent separation), and Related techniques (preparation of high purity laboratory water, buffers for enzymes, protein assay for dilute solutions, gel protein including enzyme staining, fluorography for the detection of radioactivity in gels).

In each chapter theoretical principles of the individual methods are described, as well as their historical development with all positive modifications. The literature concerning each topic goes to the year 1983. Further, the best of the methods is described and its critical points are discussed. The book is written so that it is comprehensible to non-specialist in a particular subject and, on the other hand, provides the specialist with all the news.

The book, as the whole series, has a high standard in both its content and form. There is a number of tables and figures elucidating individual topics. The author index has 34 pp., the subject index 25 pp. and bibliography is added to each subchapter.

The book will be very useful to biochemists and biologists.

VĚRA HADAČOVÁ (*Praha*)

ANNOUNCEMENT

AIBS—INTERNATIONAL SYMPOSIUM ON GRASS SYSTEMATICS AND EVOLUTION

The Smithsonian Institution in conjunction with the American Institute of Biological Sciences and the National Sciences Foundation is sponsoring an international symposium on grass systematics and evolution at the Smithsonian in Washington, DC, from 27–31 July 1986. At this meeting more than 40 of the world's authorities on grass biology will present papers on structural diversity, reproductive biology, biochemical diversity, evolution, and systematics. These presentations will summarize recent research, identify current problems, stimulate new research, and facilitate the international and interdisciplinary exchange of ideas and data.

For further information contact Louise Salmon, AIBS, 730 11th Street, N.W., Washington, DC 20001-4584. Tel.: 202/628-1500.