

POSPÍŠILOVÁ, J., SOLÁROVÁ, J. (ed.): **Water in Plants Bibliography**. Vol. 1, 1975. — Dr. W. Junk bv Publishers, The Hague 1977. Pp. VII + 88. Dfl 35 —, US \$ 17.—.

The book is the first volume of world bibliography of papers on water relations in plants published in 1975. The bibliography involves the papers on the investigation of water relations in plants from various views, fundamental experimental papers and theoretical speculations concerning the status of water in cells and tissues, water transport, methodological papers, but also papers dealing with physiological problems of irrigation, drought resistance of plants, etc. The interest in the study of water relations is world-wide, certain problems being investigated specifically in some parts of the world.

The results of the study on water relations have recently been applied to the intensive plant cultivation, especially to irrigation and physiological interpretation of drought resistance of plants. On the one hand the water relations may essentially limit the productivity of plants even at a quite low water deficit and on the other, the economy of water relations in plants partly affects the water balance of the landscape. In many regions the lack of water is steadily increasing.

The complete bibliographic data on papers published in 1975 are given in alphabetical order by the names of the authors. The names of authors are written according to the spelling in the original paper. The names and titles of papers written in Cyrillics are transcribed in the same way. The journals are given in abbreviated form according to the "Style Manual for Biological Journals" (Second Edition, Amer. Institute of Biological Sciences, Washington, D. C. 1964). The editors give also abbreviations of terms occurring most often in the names of publications cited. The order of quotation of papers from journals and the citation of book titles are given as well. The citations are numbered and these numbers are used in author, plant, and subject indexes. The index of plants shows how often certain crop plants are used at present as objects of studies or for model investigations. The subject index is very detailed and thoroughly prepared. The elaboration of the item "water status" may be mentioned as an example. Further items are compiled in a similar way. Such detailed redaction of the subject index will prove valuable at the expected increase in the number of bibliographic data and in the preparation of further volumes of this publication.

In beginning to publish the "Water in Plants Bibliography", the publisher Dr. W. Junk supplied all scientific workers interested in the physiology of water relations in plants with a work of a permanent value useful for their everyday work.

V. KOZINKA (Bratislava)

HARRIS, K. F., MARAMOROSCH, K. (ed.): **Aphids as Virus Vectors**. — Academic Press, New York—San Francisco—London 1977. 55 pp., 111 figs., 46 tab. US \$ 48.—.

This book dealing with vectors of viruses is a collective work of 26 scientists, among them two from Czechoslovakia; it has 6 parts subdivided into 22 chapters. Part I. Aphid vectors. — 1. W. F. Eastop: Worldwide importance of aphids as virus vectors, provides the most fundamental information about the biology of aphids and the viruses they transmit. 2. M. B. Ponsen: Anatomy of an aphid vector *Myzus persicae*, deals with this common vector of an enormous number of plant viruses. 3. A. R. Forbes: The mouthparts and feeding mechanism of aphids, synthesizes the structure and function of aphid mouthparts in relation to the transmission of viruses. 4. D. G. Pollard: Aphid penetration of plant tissues, gives a brief record of physical and physiological aspects of tissue penetration.

Part II. Aphid borne viruses. — 5. R. J. Shepherd: Intrinsic properties and taxonomy of aphid-borne viruses, offers a short information on taxonomy of these viruses. 6. R. Hull: Properties of an aphid-borne pea enation mosaic virus.

Part III. Transmission mechanisms. — 7. K. F. Harris: An ingestion — egestion hypothesis of noncirculative virus transmission, is a comprehensive study of the nonpersistent transmission, which is more than mechanical and more than a viral contamination of the aphids stylet tips. 8. T. P. Pirone: Accessory factors in nonpersistent virus transmission, provides information about systems in which accessory factors seem to be operative. 9. W. L. Lim and D. J. Hagedorn: Bimodal transmission of plant viruses, is a short discussion of this phenomenon at CaMV and PSbMV. 10. W. F. Roehow: Dependent virus transmission from mixed infection, focuses on research in transmission of BYDV and its various strains.

Part IV. Technological advances in aphid-virus research. — 11. D. L. McLean: An electrical measurement system for studying aphid probing behaviour, discusses an electrical system used for the basic aphid activity measurement. 12. W. J. Kloft: Radioisotopes in aphid research, gives precise information about the use of radioisotopes for this purpose. 13. H. Kunkel: Membrane feeding systems in aphid research, calls attention to the problem of artificial feeding of aphids. 14. J. Matisová and V. Valenta: Aphid cell culture, gives the results of several years' investigation in cell cultures of *Acyrtosiphon pisum*.

Part V. Epidemiology of aphid-borne viruses. — 15. J. E. Duffus: Aphids, viruses and the yellow plague, presents the viruses producing various yellowing in plants. 16. T. A. Zitter: Epidemiology of aphid-borne viruses, examines the interaction and relationship between the virus, host, vector, environment and cultural practice. 17. B. D. Frazer: Plant virus epidemiology and computer simulation of aphid population.

Part VI. Promising frontiers in control oriented research. — 18. J. J. Vanderveken: Oils and other inhibitors of nonpersistent virus transmission. 19. M. Gupta: Inhibition of plant virus infection by antiviral agents. 20. R. W. Gibson and R. T. Plumb: Breeding plants for resistance to aphid infestation. 21. R. H. Bagnall: Resistance to the aphid-borne viruses in the potato. 22. L. R. Nault and M. E. Montgomery: Aphid pheromones.

This book presents a coherent synthesis of the comprehensive and varied research data pertaining to aphids as vectors of plant viruses and should serve as a valuable reference book to a wide range of readers.

B. A. KVIČALA (Brno)

BROERTJES, C., VAN HARTEN, A. M.: Application of mutation Breeding Methods in the Improvement of Vegetatively Propagated Crops. An interpretive literature review. — Elsevier Scientific Publishing Company, Amsterdam—Oxford—New York, 1978, 316 pp., US \$ 57.00; Dfl. 130.00.

A great number of plants are propagated vegetatively, such as root and tuber crops, shrubs, trees, fruits, ornamentals. Breeding these plants is of a great economic value, as plants like potato, sugarcane, grapes are among 15 world crops with the highest fresh weight production. Vegetatively propagated plants are mostly highly heterozygous and it is sometimes impossible to carry out a regular cross breeding program due to sterility, incompatibility, apomixis etc. Mutation breeding technique is obviously a promising method for inducing genetic variability in asexually propagated plants, in highly heterozygous plants, or in plants having a long vegetative phase before going into sexual reproduction.

The introductory chapter of the book deals with the types of mutagenic agencies applied to vegetatively propagated plants. Ionizing radiation seems to be more promising than chemomutagens owing to the poor uptake and penetration of the chemicals in most plant tissues. The following chapters present *in vivo* and *in vitro* methods of asexual propagation. The remaining part of the book is divided into sections on mutation techniques in various groups of plants: 1. root and tuber crops, 2. ornamentals, 3. woody perennial and forest trees, 4. fruit crops, 5. others like sugarcane, grasses. For each plant species described, the list of publications on mutation studies is given and in most cases the suitable mutagenic treatment is presented. The authors do not hesitate to point out all the difficulties, limitations and shortcomings of mutation breeding in various crops. Mutation breeding in vegetatively propagated plants was so far successful mainly in ornamentals. 23 new commercial mutants have been released in *Dahlia*, 21 in *Begonia*, 8 in *Streptocarpus*, 35 in *Chrysanthemum* etc., but only 1 mutant has been released in potato, 4 mutants in apple, 1 in pear, 3 in cherry (data to 1977). This demonstrates the need for more efficient mutation breeding techniques in vegetatively propagated plants. The book contains vivid colour plates of induced mutants of ornamentals.

This book, which appeared in the series Developments of Crop Science (number 2), is the first comprehensive work on mutation breeding in vegetatively propagated plants. Earlier papers and reviews on this topic were scattered in various books and journals. The publication will be of great value to all interested in plant breeding and mutation genetics.

T. GICHNER (Praž)

GLAUERT, A. M. (ed.): **Practical Methods in Electron Microscopy**, Vol. 5 and Vol. 6. — Elsevier/North-Holland Biomedical Press, Amsterdam—New York—Oxford, 1977, pp. 547 and 217 + 234. US \$ 77.50/Dfl. 178.00 and 68.75/158.00, respectively.

There exists a series of manuals on electron microscopy and electron-microscopical technique, but only a few of them may be said to be currently used. Beyond dispute this is true for a series of manuals edited by A. M. Glauert in the Publishing House North Holland. The editor fully expressed his intention by the title of the series: *Practical Methods in Electron Microscopy*. From what has already been mentioned above it is clear that the editor's intention was successfully fulfilled. Whereas the first volume is hardly interesting for biologists (processing of non-biological objects and diffraction techniques), the second one is more attractive (the theory of electron microscope and the technique of its use), and the third volume is indispensable to them. Its first part deals with fixation, dehydration and embedding, the second with cutting. The fourth volume refers to the equipment and arrangement of the electron microscopical laboratory. Recently, further two volumes of this series have appeared. The fifth volume contains, in its first part, staining techniques for the sections, in its second one the technique of X-ray microanalysis. The first part of the sixth volume involves autoradiography and immunocytochemistry, the second part is devoted to quantitative methods of EM study of biological objects. It should be noticed that the first part of the fifth volume deals with the entire electron-microscopical cytochemistry, and not only with the procedures of contrasting. Moreover, the individual working instructions are supplied not only with all data necessary for carrying out the given procedure, but they include the instructions for the purification of reagents, their storing, the way they are handled, etc. It should be obligatory for all research workers in the field of electron microscopic study of cells to get acquainted with the second part of the sixth volume, since the period of obtaining interesting findings from an only electron micrograph is definitely gone.

One may expect that further volumes will gradually appear in the series, and the volumes published before will be revised. Those who decide to buy the books of this series will get the results of a serious work of both authors and editor. It would be expedient to order paperback editions of those parts that are of a direct interest and, even with regard to their price, are suitable for daily use in the laboratory.

K. BENEŠ (Praž)

NOVER, L., MOTHEŠ, K. (ed.): **Cell Differentiation in Microorganism, Plants and Animals**. Proc. Int. Symp. held by the Deutsche Akademie der Naturforscher Leopoldina at the Reinhardsbrunn Castle (GDR), 1976. — VEB G. Fischer Verlag, Jena 1977. Pp. 639. 54,— M. (In English).

The term of "cell differentiation" is often used quite loosely without considering its exact meaning which was put by one of the editors of this volume as "... the process of cells becoming different from each other by unequal expression of the same genetic material". In such broad sense "cell differentiation" is common to all living organisms, to prokaryotes as well as eukaryotes. The symposium held by Leopoldina, one of the oldest Academies of science in the world, has been especially focused on such general aspects of the problem.

The papers presented at the symposium inevitably cover a wide range of topics (from the function of RNA-polymerases to the biogenesis and transformation of cell organelles) and objects (from *Coliphage Lambda* to leguminous seeds). The volume is divided into two unequal parts: a) Specific Regulation of Gene Expression and b) Typical Aspects of Cell Differentiation. The first part deals with different aspects of the expression of genetic information (using various models) as indicated by the headings of the chapters: I. Transcription; II. Pre-Messenger RNA and its Processing; III. Translation; IV. Proteinogen Processing; V. Protein Degradation. The second part, assumingly more attractive to a general biologist, comprises the following chapters: I. Programs of Gene Expression; II. The Cell Division Cycle; III. Enzymic Adaptation; IV. Cell Specialization; V. Biogenesis and Transformation of Cell Organelles. The student in plant sciences will not be surprised at finding that only three contributions are devoted to plant systems.

Despite the heterogeneity of topics the volume represents a valuable source of information and original thoughts in the field of "cell differentiation", considering a process which became... "a prerequisite of life".

JANA OPATRŇÁ (Praž)

KEFELI, V. I.: **Natural Plant Growth Inhibitors and Phytohormones.** — Dr. W. Junk b. v Publishers, The Hague/Boston 1978, in English, 277 pp., Dfl. 90.00.

This amended issue of Kefeli's book "Prirodnye inhibitory rosta i fitogormony" (Nauka, Moscow 1974) contains contemporary facts on plant inhibitors and growth hormones. The author sums up the results of his work carried out at the Institute of Plant Physiology of the USSR Academy of Sciences during the last 15 years and compares them with the data available in literature (827 references). Very instructive schemes, figures and tables are a significant part of this book.

A brief historical outline and general information on phytohormones and natural plant inhibitors are given in the introductory part, which is followed by three chapters referring to problems of extraction, separation, quantitative estimation and biosynthesis of indole compounds, gibberellins, abscisic acid and phenolic growth inhibitors (guercetin, *p*-coumaric acid, derivatives of naringenin). The following three chapters inform about the role of phytohormones and inhibitors in plant growth, photomorphogenesis, phototropism and dormancy period. General problems of plant growth regulation are discussed in the last chapter. The author considers natural plant inhibitors as an independent class of endogenous regulating substances, which not only regulates growth processes but also represents important dormancy factors. Natural plant growth inhibitors are localized in chloroplasts and in cell walls but mainly in vacuoles, and the beginning of their action depends on their accumulation in plant cell. Growth inhibitors are involved in plant growth not only through inactivation of phytohormones present in cells but they also affect their biosynthesis. The author conceives vegetative growth as a result of co-ordinated interaction of phytohormones and natural growth inhibitors. This idea means a new approach to the problem of control and regulation of plant growth.

LIBUŠE PAVLOVÁ (Praha)

SMITH, H. (ed.): **Regulation of Enzyme Synthesis and Activity in Higher Plants.** — Academic Press, London—New York—San Francisco 1977. 388 pp., 124 figs., £ 16.—; US \$ 31.25.

This book published as the 14th volume of the series: "Annual Proceedings of the Phytochemical Society" presents proceedings of the Phytochemical Society Symposium held in Oxford in April 1976. The subject, evident from the title of the book, is successfully treated by 30 contributors in 15 chapters, which contain very useful up-to-date results and experimental methods.

The individual chapters deal with: substrate induction and end product repression demonstrated on an example of the enzymes of nitrogen assimilation (G. R. Stewart and D. Rhodes); modification of enzyme activity exemplified by regulation of amino acid biosynthesis (B. J. Miflin); control of glycolysis and cytoplasmic pH (D. D. Davies); regulation of enzyme levels during cell cycle (M. M. Ycoman *et al.*); hormonal control of enzyme activity (J. E. Varner and D. T-H. Ho); photocontrol of gene expression (H. Smith *et al.*); control of alcohol dehydrogenase activity and role of isoenzymes (J. G. Scandalios); role of conformation changes of enzymes (J. Ricard *et al.*); proteolytic inactivation of enzymes demonstrated on example of nitrate reductase (W. Wallace); use of immunochemical methods in the field in question (J. Daussant *et al.*); density labelling techniques (C. B. Johnson); methods of extraction and purification of enzymes (M. J. C. Rhodes); affinity chromatography (P. D. G. Dean and M. J. Harvey); use of techniques of subcellular fractionation in investigation of enzyme distribution (R. M. Leech); use of microscopic cytochemistry in investigation of enzyme localization and development (J. L. Hall *et al.*). Useful author and subject indexes are included.

Several misprints and mistakes were overlooked in the text, *e.g.*: in the scheme on p. 96, 66 nm instead of 660 nm; wrong structure of D-ribose in Fig. 5 on p. 277, Fig. 8 on p. 278, and Fig. 11 (upper) on p. 282, when using Haworth's formulas; wrongly written units of enzyme activity in Chapter 9 (Fig. 2b on p. 181 *etc.*); not in all cases do the authors respect the latest nomenclature rules (*e.g.* fructosediphosphate) and explain the abbreviations when used for the first time (2,4-D on p. 67, DTE on p. 251).

Thanks to the latest information, rich bibliography, and many stimulating ideas, this book can be recommended to all plant biochemists and physiologists engaged in the study of enzymes.

J. ZIMA (Praha)

BRÜCHER, H.: **Tropische Nutzpflanzen. Ursprung, Evolution und Domestikation.** — Springer-Verlag, Berlin—Heidelberg—New York 1977. 529 pp., 245 Figs., DM 248; US \$ 109.20.

As the basis for writing this volume the author made use above all of his own original results and broad experience he has accumulated during almost thirty years of experimental and pedagogical botanical work in various subtropical and tropical regions. At the present time professor Brücher is director of the Institute of Plant Biology of the National University of Cuyo in Mendoza (Argentina).

The book deals mostly with tropical and subtropical species of economic importance. Some attention is paid to less known wild and semicultural plants the further breeding of which could enrich the spectrum of crops in equatorial areas.

The introductory part outlines the history of domestication and the general principles, problems and methods of research and breeding of tropical economic plants. The species described are organized primarily according to their economic use into seven following chapters: starch crops, protein crops, industrial plants, fruit and vegetable crops, condiment and stimulant plants, oil plants and palms as starch, oil and protein crops. The further classification within these groups follows either the economic use or taxonomic relations.

The descriptions of individual species is focussed on origin, distribution, taxonomic relations and phylogenetic development, on economic importance, botanical properties and also on breeding problems and possibilities of use of wild related species in breeding programs and for future domestication. On the basis of many observations and experimental results the author discusses more general taxonomic and breeding problems and the general theories of origin and domestication of tropical crops, such as the classical Vavilov's so-called "gen-centre" hypothesis.

The book is very well produced with many interesting and instructive illustrations. It forms a highly comprehensive work covering many fundamental and applied aspects of tropical and subtropical botany and will certainly be of great value as basic botanical handbook and also as source of information and ideas for research workers in many branches of botanical research.

J. TURÝ (*Praha*)

ELLENBERG, H., ESSER, K., MERXMÜLLER, H., SCHNEPF, E., ZIEGLER, H. (ed.): **Fortschritte der Botanik. Morphologie, Physiologie, Genetik, Systematik, Geobotanik.** Band 39. — Springer-Verlag Berlin—Heidelberg—New York 1977. 304 S. DM 98,—. US \$ 49.00.

Der diesjährige Band der Fortschritte der Botanik enthält im morphologischen Teil Literaturübersichten über die Plastiden von Pflanzen, die Cytologie und Morphogenese von Pilzzellen und die durch intensive Rasterelektronenmikroskopie-Forschungen stimulierten Ergebnisse über die Oberflächenskulpturen bei höheren Pflanzen. Den ausführlichsten physiologischen Teil des Buches bilden Review über die Funktion von Mineralelementen im Pflanzenkörper, über biophysikalische Aspekte der Primärvorgänge der Photosynthese, den Polysaccharidenstoffwechsel und die Sekundärstoffe Indolalkaloide, über Gibberelline und Cytokine und schliesslich über morphologische und metabolische Aspekte der Senescenzvorgänge und die Apikaldominanz. Im Abschnitt Genetik werden die neuen Kenntnisse auf dem Gebiet der Anordnung und Replikation von eukaryotischen Chromosomen, der Mutationen und der Expression von Genen bei höheren Pflanzen und des phylogenetischen Ursprungs der extranuklearen Vererbung zusammengefasst. Die Systematik und Evolution von Samenpflanzen behandelt die Literaturübersicht im taxonomischen Teil des Buches. Die Geschichte der Flora und Vegetation des Quartärs in verschiedenen Teilen von Europa, Beiträge zur soziologischen Geobotanik und experimentellen Ökologie (Einfluss von Umweltfaktoren auf die Ökosysteme und deren Produktivität) und eine Review über Endo- und Ektomykorrhiza bilden den Inhalt des Abschnittes Geobotanik.

Das Buch enthält ein sehr nützliches Sachregister. Die meisten Beiträge sind in Englisch verfasst worden. Das Buch wird bestimmt, wie schon die vorhergehenden Bände der Fortschritte der Botanik, zur schnellen Orientierung und als bewährte Zitationsquelle dienen.

INGRID TICHÁ (*Praha*)

STEWART, P. R., LETHAM, D. S. (ed.): **The Ribonucleic Acids**. Second Edition. — Springer-Verlag, New York—Heidelberg—Berlin 1977. 374 pp., DM 47.40; US \$ 23.70.

The first edition of this book on biology and chemistry of RNA appeared in 1973 and it established itself rapidly as a basic comprehensive source of information in the field it covers. The research in this area, however, progresses at a remarkable rate and a new enlarged edition became soon badly needed.

The general appearance and the organization of the new volume remained essentially the same as those of the first edition. Whereas the number of figures did not change (55), the size of the book increased from 268 to 374 pages.

The introductory chapter is a brief outline of history of RNA research. It is followed by a concise discussion of some aspects of transcription such as RNA polymerases, mechanism of transcription in bacteria and control systems in both procaryotic and eucaryotic cells. The next four chapters deal with the four main classes of RNA, that is with nuclear RNA, mRNA, tRNA and rRNA. The discussion on nuclear specific RNA is devoted especially to heterogeneous nuclear RNA and to the problem of precursor-product relationship between this RNA and cytoplasmic mRNA. Further it deals with low-molecular-weight (4S to 8S) nuclear RNA and with the problem of specific discrete species of RNA reported by some workers to be associated with chromatin (chromosomal RNA). Messenger RNA is examined in detail from the aspects of the architecture of mRNA molecules and its relation to mRNA function. Brief attention is also paid to mRNA-protein complexes, to mRNA turnover and also to the methods of mRNA isolation and analysis. Similarly, the chapters on tRNA and rRNA focus on RNA structure in relation to RNA function. A detailed discussion is further devoted to biosynthesis of these RNAs in both procaryotes and eucaryotes and to possible roles of tRNA and of cytokinins in the regulation of gene expression. The seventh chapter deals with the events occurring during translation of messenger RNA and with possible mechanisms of their regulation. Besides cytoplasm, mitochondria and chloroplasts contain all classes of RNA necessary for protein synthesis. The next two chapters are devoted to these organelle RNAs. Particular attention is given to the description of their properties and to the discussion of their biosynthesis on mitochondrial and chloroplast genome. The last chapter is valuable especially for research workers. It discusses the principles and problems and describes in detail some procedures of RNA isolation, purification and fractionation.

This new edition will be no doubt of great help as a primary comprehensive and up-to-date source of information and reference on RNA not only for postgraduate students to whom it has been written but also for specialists interested in this field of biology.

J. TUPÝ (*Praha*)

BERGER, J., GANDERT, K.-D. (ed.): **Beiträge zur Gehölkunde 1977**. — Kulturbund der DDR, Zentrale Kommission Natur und Heimat des Präsidialrates, Zentraler Fachausschuss Dendrologie und Gartenarchitektur, 1977. M 4,—.

Das Büchlein enthält verschiedene Informationen über dendrologische Tagungen, langfristige Programme zur Erhaltung und Pflege von Parkanlagen und Gehölzen, Lebensjubiläen sowie Vorträge, Ergebnisse und Erfahrungen z. B. über Anbaumöglichkeiten von Gehölzen, neue Gehölzzüchtungen, Windschutzpflanzungen und Landeskultur, Pflege historischer Parkanlagen, Schädlingsbekämpfung u. v. m. Es ist durch zahlreiche Fotografien illustriert.

Unter diesem Titel sollen auch in Zukunft etwa alle zwei Jahre Arbeitsergebnisse und Informationen aus dem Fachgebiet der angewandten Dendrologie und der Parkpflege veröffentlicht werden. Die Themenvielfalt und populäre Form der „Beiträge zur Gehölkunde“ bestimmt den weiten Umkreis von Lesern und Interessenten aus dem Gebiet der Landeskultur, der Umweltgestaltung, des Naturschutzes, der Garten- und Landschaftspflege, der Forstwirtschaft und der Natur- und Heimatfreunde.

INGRID TICHÁ (*Praha*)