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BOOK REVIEW

NAGL, W.: CHROMOSOMEN. ORGANISATION, FUNKTION UND EVOLUTION DES CHROMATINS. — Verlag Paul Parey, Berlin—Hamburg 1980. 228 S., DM 29,—.

In den letzten Jahren kam es zu einem noch nie dagewesenen Fortschritt auf dem Gebiet der Zellbiologie, besonders was die Chromosomen betrifft. Die Ursache dafür liegt in der Anwendung molekularbiologischer Methoden und ihrer Verknüpfung mit den Resultaten der Elektronen- und Lichtmikroskopie. Das grosse Interesse für das Studium der Organisation und Funktion der Chromosomen hat ihren Ursprung darin, dass die Chromosomen die genetischen Kode beinhalten und dass sie zur identischen Reduplikation und zur Weitergabe des genetischen Materials an ihre Töchterchromosomen fähig sind. In diesem Buch werden vor allem die Chromosomen der Eukaryonten behandelt, doch wird auch auf auffallende Unterschiede zu den Bakterienchromosomen hingewiesen.

Im einleitenden Kapitel des Buches werden die allgemeinen Eigenschaften der Chromosomen kurz beschrieben (Zahl, Grösse, Längsdifferenzierung, Chromosomenbänder usw.). Die weiteren Kapitel enthalten: Molekulare und ultrastrukturelle Organisation (2), Funktionelle Organisation und Genexpression (3), DNA-Replikation und Zellzyklen (4), Chromosomen-Genetik (5) und Evolution der Chromosomen (6). Im letzten Kapitel (7): Präparationsmethoden und Manipulation wird eine Übersicht über die Prinzipien der Chromosomenforschung angeführt. Es handelt sich um Licht und Elektronenmikroskopie, Autoradiographie, Szintillationszählung, Zentrifugationsmethoden, Denaturierung und Renaturierung der DNA, Zellkulturen und Zellhybridisierung.

Mit dem vorliegenden Buch (2., neubearbeitete und erweiterte Auflage) wird die Reihe "Pareys Studententexte" als 23. Band fortgeführt. In erster Linie wendet sich dieses Buch an fortgeschrittene Studenten der Biologie sowie an Wissenschaftler, die sich über dieses Teilgebiet der Genetik informieren möchten.

T. GICHNER (Praha)

HARLEY, J. L., SCOTT RUSSELL, R. (ed.): *THE SOIL-ROOT INTERFACE*. — Academic Press, London — New York — San Francisco 1979. 448 pp., \$ 32.35.

This very well arranged and printed book is a collection of articles covering a wide range of interactions between plant roots and the soil. It contains the proceedings of a Symposium held in Oxford from 28 to 31 March 1978, which attracted a large international audience and 122 contributors from 13 countries.

The opening part of the book consist of a List of Participants, Foreword, Acknowledgements and a convenient chapter "Note on Terminology: origin, nature and nomenclature of the organic materials in the rhizosphere".

The first of the six sections comprises five chapters on demand and supply of water and mineral nutrients on the soil-root interface. The individual chapters deal with nutrients demand and absorption, soil properties controlling the supply of nutrients to root surface, models describing water uptake, and possibilities of studying Mn and Cu uptake by EPR spectroscopy.

The second section, "Physics and Chemistry of the Interfacial Region" begins with D. J. Greenland's comments on this subject. It is followed by an interesting methodical article on the use of soil psychrometers. The next three chapters discuss the effect of root organic products on phosphorus availability, modification of mechanical and mineralogical composition of soil within rhizosphere, and overestimation of low rates of N_2 -fixation by acetylene reduction method.

Section three, the largest one, contains eleven chapters, on the "Biological Activities at the Interface" with partial emphasis on mycorrhizal organisms. There are chapters on biology of the soil-root interface, root microorganisms in mixtures and monocultures of grassland plants, response of non leguminous plants to root inoculation with free living diazotrophic bacteria, method of quantifying carbon transfers in the plant rhizosphere, ecophysiology of vesicular-arbuscular mycorrhiza in the tropics, effects of soil moisture on vesicular/arbuscular mycorrhiza formation and root development in *Medicago*, influence of amoebae on the uptake of nitrogen by plants in gnotobiotic soil, phosphatase activity and phosphorus availability in the rhizosphere of corn roots, influence of tillage and residues on wheat root microflora and root colonization by nitrogen fixing bacteria, root-soil interface and its significance for fruit tree roots of different ages, and photographic view of microscopic processes at the root-soil interface.

In section four there are six chapters: first by P. E. Weatherley on the cause of water stress in plants i.e. hydraulic resistance of the soil-root interface, which concentrates attention particularly to the resistance of perirhizal layer, which is extremely high. The next chapter by B. Bar-Yosef and J. P. Lambert is devoted to the question of growth in response to osmotic potential, oxygen and nitrate concentration in soil. G. H. Zentmyer comprehensively reviews the effects of different factors on root infection by *Phytophthora* species, R. W. Smiley gives account of pH and biological control of wheat infection by *Gaeumannomyces graminis*, and R. A. Atilano and S. D. Van Gundy deal with the systemic nematocidal activity of oxamyl to *Meloidogyne javanica* at the root surface of tomato plants.

The fifth section on "The Interface in Relation to Soil Function and Growth" contains five chapters. The first of these is J. F. Loneragan's brief review of the relationship between the chemical environment and root growth and nutrient absorption; the following ones deal with rooting habits of soybean genotypes, root density in relation to physical availability of mobile soil phosphorus, the effect of restricted phosphate supply on root growth of maize, and fine regulation mechanisms in iron mobilization in rhizosphere of sunflower in soils with high pH values.

Final section of the book is a pell-mell of topic. It consists of 34 short abstracts of papers not read in full at the Symposium; they are ordered alphabetically after the names of the first authors.

Despite that the book has been prepared by photoreproduction of typescript, printing quality is well up to the high standard associated with the Academic Press; all chapters are supplemented with good instructive tables, figures and lists of references. The volume contains a comprehensive Subject Index including plant species, but not an author index. This book will be useful to soil biologists, soil microbiologists, soil chemists and physicists and plant physiologists, in acquainting them with each other's work and promoting further exchange of knowledge. It will also be valuable as a reference source to those working in agriculture and forestry research establishments.

JARMILA SOLÁROVÁ (*Praha*)

LÜTTGE, U., HIGINBOTHAM, N.: *TRANSPORT IN PLANTS*. — Springer-Verlag, New York—Heidelberg—Berlin 1979. Pp. 468, DM 58,—, US \$ 31.90.

This excellent monograph reviews the transport processes of mineral and organic substances in plants from the level of cell organelles to the long-distance movement in the largest trees. The large amount of data and the critical evaluation of results and hypotheses make the book a valuable source of information for many researchers. More detailed information in this field for specialized research workers may be found among 1200 references. As this book is directed not only to research workers but also to advanced university students, progression is made from simpler to more complex models, and from more primitive organisms to those having evolved into more complicated systems and having a greater division of labour between different organs. Illustration of the text with 180 graphic figures will certainly help in understanding some more difficult problems.

The book consists of an Introduction and 12 chapters organized in four parts. The first part contains on the one hand the biophysical background of transport processes (chemical potential, permeability, reflection coefficient, osmosis, electrochemical potentials, Nernst equation, Donnan potentials, Goldman's voltage equation, Ussing-Teorell equation, Onsager coefficients, congruent and incongruent transport, transport by carriers *etc.*) and on the other a survey of mineral and organic compounds translocated by plants and their importance in plant metabolism.

The first two chapters of the second part describe structural requirements for transport. They are concentrated on boundary layers: a) cell walls and connected apoplastic transport and b) cell membranes plasmalemma and tonoplast. The third chapter of this part is devoted to models of transport on cellular level — models with two compartments and three-compartment models. The last chapter deals with the transport function of the cell organelles: nuclei, mitochondria, chloroplasts and microbodies.

The first chapter of part III links up with the previous chapter and the attention is focussed on respiration and photosynthesis as the sources of energy for membrane transport. Its regulation by the phytochrome or the phytohormones (especially indole acetic acid, fusicoccin and abscisic acid) is the subject of the further chapter. The last chapter of this part is devoted to biochemical and biophysical models of coupling between the energy-providing reactions in mitochondria and chloroplasts and spatially separated transport processes in the plasmalemma and the tonoplast.

In the fourth part the authors introduce a new term: in addition to a long-distance transport in the phloem and xylem and short-distance transport within a cell they use also medium-distance transport for movement occurring between various cells. Three chapters of this part are closely connected. In the first the apoplastic and symplastic transports are compared in plant tissues as well as in plants as a whole. The second one deals with general models of roots and leaves, especially with coupling of short-distance, medium-distance and long-distance transports. In the last one the attention is focussed on the regulation of transport processes in the whole plant.

JANA POSPÍŠILOVÁ (Praž)

SLUKHAĬ, S. I., TEACHUK, E. S.: *OPTIMIZATSIYA VODNOGO REZHIMA I MINERAL'NOGO PITANIYA OZIMOĬ PSHENITSY*. [OPTIMIZATION OF WATER REGIME AND MINERAL NUTRITION OF WINTER WHEAT.] — Naukova Dumka, Kiev 1978. Pp. 236, 15 fig., 69 tab., 688 ref. R 2.70.

This book, a summary of what has been accomplished in studies of water regime and mineral nutrition of winter wheat, is based on the authors' many year experiments as well as on literal sources. Winter wheat, one of the oldest crop plant is sown contemporarily perhaps on 210 000 000 hectares every year and in respect of nutrition considerable part of Earth's inhabitants depend on it directly or indirectly. In many regions, suitable for winter wheat cultivation in some parameters there are unfavourable or oscillating soil water relations and low relative humidity of air. While the conditions of mineral nutrition for higher winter wheat yields can be regulated without difficulties by application of natural and mineral fertilizers, the regulation of soil and air water relation is much more complicated and depends on a complex of agrotechnical practices. The possibilities of improving winter wheat water balance are dealt with in the book reviewed. The general chapters describe "Ecological peculiarities of winter wheat", "Root system — organ of absorption of water and synthesis" and "State and exchange of water in plants" in detail. The greater part of the book, devoted to more practical or agronomical questions, is composed of two chapters, titled "Biological basis for irrigation of winter wheat" and "Optimization of growing winter wheat for high yields". All chapters are documented by tables and diagrams, important from theoretical and practical points of view. In "Conclusions" the authors reviewed

the contemporary state of knowledge, chances for improving yields and put forward questions concerning the further research. This book will be especially useful to the research workers interested in winter wheat physiology and breeding. Unfortunately, no abstracts in other languages are included.

JARMILA SOLÁŘOVÁ (*Praha*)

RATTAZZI, M. C., SCANDALIOS, J. G., WHITT, G. S. (ed.): ISOZYMES I, II. Current Topics in Biological and Medical Research. Vol. I, II. — A. R. Liss, Inc., New York 1978. 191/162 pp., \$ 16.—/14.—.

The fact that most enzymes occur in several different molecular forms has been known for about 20 years; they were named Isozymes by Markert and Møller. Soon it became clear that they could be used in studies of the synthesis and development of enzymes in the cell, of the activities of genes during the differentiation and in biochemical regulation of living systems. Isoenzymes are also important for practical application in genetics, breeding, phytopathology, medical diagnostics *etc.* For this reason the amount of papers on this topic is steadily growing.

After the Proceedings of the 3rd International Conference on Isozymes [C. L. Markert (ed.): Acad. Press, New York 1974], published in 4 volumes, a new series of papers on isozymes in 2 volumes has recently appeared, called shortly "Isozymes".

The first volume brings after the introduction by Professor Markert a paper of Edwards and Hopkinson on developmental changes in isozyme patterns of human enzymes and other proteins. In this paper we find *e.g.* the table of isozyme developmental changes of 50 enzymes with determination of their genetic codes. A survey of isoenzymes in testes and spermatozoa is given in the paper of Goldberg. The treatise of Fritze and Pruitt thoroughly discusses the isoenzyme turnover on intracellular level, giving its fundamental theory, investigation methods and studies on several special cases. The paper of Swallow describes the method for separation of isoenzymes by means of affinity ligands and electrophoresis.

The second volume starts with the paper of Johnson, giving a survey of relations between the primary, secondary, tertiary and quaternary enzyme structure and their polymorphism. Tashian discusses evolution and regulation of the carbonic anhydrase isozymes, cellular and subcellular isoenzyme distribution, expression of gene coding isoenzymes in cellular cultures *etc.* Interesting is the comparative table of aminoacid sequences of mammalian carbonic anhydrase isozymes. Lusis and Paigen discuss the mechanism of intracellular localization of mouse glucuronidase, giving a very instructing model for its processing and intracellular localization. Last paper, written by Shows, brings information on genetic and structural dissection of human enzymes and enzyme defects using somatic cell hybrids. This topic is important in the connection with medical aspects of diseases caused by hereditary enzyme defects.

The two volumes of "Isozymes" show a distinct tendency to pass from purely descriptive isozyme studies to the studies of their synthesis, localization and function, and to their use in medicine and genetics.

The book brings a wealth of information for the use of biochemists, geneticists, medical researchers *etc.* and gives quite a few suggestions for further research.

VĚRA HADAČOVÁ (*Praha*)

DOCEA, E., RĂDULESCU, E., FRĂȚILĂ, E.: BOLILE LEGUMELOR ȘI COMBATAREA LOR. — Editura Academiei Republicii Socialiste România, București 1979. 382 pp., 73 figs., 8 tables, lei 33,—.

The handbook of the Rumanian authors deals with the economically most important viroses, mycoplasmoses, bacterioses, nutrition disorders and parasitic plants affecting the main vegetables and commercially grown mushrooms (*Agaricus bisporus*).

The book preserves the conception and structure usual for the manuals of such a type. The diseases are arranged according to the crops. For each disease data on its harmfulness and symptoms, on properties of the pathogen and the protective measures are given. Holmes' binomic system has been used for the denomination of viruses. The nomenclature of bacteria disregards the taxonomic changes contained in the 7th edition of Bergey's Manual of 1974.

The manual is meant for specialists working in research institutions, universities and for practitioners who will find in it a synthesis of the most recent information necessary for a rational protection of vegetables against diseases.

V. KŮDELA (*Praha*)

BÁNKI, L.: BIOASSAY OF THE PESTICIDES IN THE LABORATORY. Research and Quality Control. — Akadémiai Kiadó, Budapest 1978. 489 pp.

In the past decades the increasing application of chemical compounds used in agriculture makes the measurement — testing and determination — of the biological effect of these chemical agents necessary. Bioassays of the pesticides (insecticides, fungicides, herbicides and other pesticides) are an important part of their research and practical evaluation.

The principal aim of the present book is to give comprehensive information on the meteorological, biological and mathematical-statistical measurement of bioactivity of pesticides in their complexity of relationships. The first part of the book includes the chapters: The general importance of pesticides; Efficiency as the most important qualitative and economic determinant; Experimental levels of the measurement of pesticides action, their characteristics and interrelations, and The theoretical and practical aspects of the bioassay of pesticides in the laboratory. The second part deals with the theoretical principles of the measurement of pesticide action, the general and specific features of the components of the measurement, and a very practical important chapter describes the physiological, logical and mathematical rules determining the principles of the measurement of bioactivity. Poisoning as well as the joint action of two component systems (addition, synergism and antagonism) are discussed in detail. The short survey of the computational schemes most frequently used by the author is given in the last part of this book. The subject index and practical tables (efficiency index, the list of the plant indicator species used for the measurement of pesticide action in the laboratory, and some tables of statistical analysis) are added to the monograph.

This book will undoubtedly be very useful for all biologists interested in the field of biologically active substances, especially for entomologists, plant pathologists and physiologists.

J. ULLMANN (*Praha*)

SILL, W. H. JR.: THE PLANT PROTECTION DISCIPLINE. Problems and Possible Developmental Strategies. — Halsted Press, a division of John Wiley & Sons, New York—Chichester—Brisbane—Toronto, Publ. Allanheld, Osmund & Co. Montclair 1978, 187 pp.

We are well aware that at least half of the world's food supply is destroyed each year in the field, in transport and storage by plant diseases, insects, rodents, birds and other pests or natural disasters, which is an alerting reality.

This book is an effort to document the conflict of entomologists and plant pathologists in developing control procedures for pests and diseases of plants, which would reduce or eliminate our dependency on pesticides which represent the present worldwide trend in the broad discipline of crop protection and plant pests management.

The book is not a scientific treatise. It is a compendium and summary of the thoughts of the leading proponents or opponents of this new discipline. The book is designed primarily for government officials, administrators and leaders of various subdisciplines constituting the plant protection discipline. As the whole plant protection is an umbrella discipline that includes many others and outlines the cooperative strategies in the world wide development of plant protection and in the field of environmental protection as well. The headings of 14 chapters in this book (the most important are listed below) give a brief review of the contents: Agricultural prestige problems; Public relations and public education problems; Need for a new profession (pest management, integrated pest management, pestology, supervised control, plant health, plant disease management, crop protection, plant protection, crop improvement); Manpower needs and job possibilities; Legislation: governmental regulation of pesticides and certification of applicators; Cooperative efforts; Possible organization strategies and patterns; Teaching, research and extension problems, needs and organization. Readers will find here an enormous amount of useful information.

B. A. KVIČALA (*Brno*)

FAHN, A.: SECRETORY TISSUES IN PLANTS. — Academic Press, London—New York—San Francisco 1979. 302 pp. £ 20.—, US \$ 42.—.

Many of the products of plant secretory tissues play an important role in the relationships between plants and animals, others have a great economic or medical value and have been used by men throughout the ages. Secretory tissues or organs are very useful also in research as they provide a very convenient system for studying biosynthetic processes and short-distance

transport. This book aims to provide an overall picture of morphology, anatomy, cytology, ultra-structure, development, function and location of the main secretory tissues occurring in a plant body. Of its eleven chapters, the first "Introduction" deals with classification of secretory tissues, types of secretion according to the place of deposition of secreted substances and manner of their elimination from the cytoplasm. The remainder of the volume is divided into two parts; the first deals in three chapters (2. Hydrotodes, 3. Salt Glands, and 4. Nectaries) with structures secreting unmodified or only slightly modified substances supplied directly or indirectly by the vascular system. The second part describes in seven chapters (5. Mucilage secreting tissues, 6. Glands of Carnivorous Plants, 7. Myrosin Cells, 8. Stinging Trichomes, 9. Tissues secreting lipophilic substances, and 10. Lactifers) secretory tissues synthesizing secreted substances. The final chapter concentrates, as follows from the title "General Remarks", on ecological adaptations, location of secretory tissues in the plant body and fine structure in relation to secretion.

The descriptive text of the book, completed by many microphotographs, illustrations and tables, is complemented by voluminous list of references, Author Index and Subject Index covering also Latin plant names. Printing and illustrations are well up to the high standards usually associated with the Academic Press.

JARMILA SOLÁROVÁ (*Praha*)

ENZYME NOMENCLATURE 1978. Recommendations of the Nomenclature Committee of the International Union of Biochemistry on the Nomenclature and Classification of Enzymes. — Academic Press, New York—San Francisco—London 1979. 606 pp., US \$ 20.00.

Biochemistry in its widest sense has made very great advances during the past 20 years since the first Report of the Enzyme Commission (1961) was published, and the rate of progress has been steadily accelerating. Undoubtedly important for this acceleration have been the development and the effective use of a great variety of new chemical and physical techniques. Thus, while scientists are becoming more and more specialized in their respective areas, to an increasing extent they need a coherent, up-to-date, and unifying basis for further work. Enzyme Nomenclature 1978 will unequivocally serve this purpose.

It includes as many as 2122 enzymes — 148 more than in the previous version (EN 1972 + Suppl. I 1975). This fact attests to the transient nature of such listings. On the other hand, most of the enzymes retained its known number-posts in the six main classes [1, oxidoreductases, 2. transferases, 3. hydrolases, 4. lyases, 5. isomerases, and 6. ligases (synthetases)]. Several other enzymes were reclassified and their new systematic names and/or code numbers seem to be more logical than the previous ones (*e.g.* nitrogenase — now EC 1.18.2.1 or EC 1.19.2.1, depending on the electron donor, reduced ferredoxin and reduced flavodoxin, respectively). Some enzymes have been deleted from the Enzyme List and, to prevent possible errors, the old numbers have not been allotted to new enzymes.

A number of new sub-classes and sub-sub-classes have been introduced, *e.g.* the nucleases, previously included under 3.1.4, are now placed in a number of new sub-groups: the exonucleases (3.1.11–16) and the endonucleases (3.1.21–31).

In the Appendix, there are valuable comments to, and recommendations for, "Nomenclature of electron-transfer proteins", including cytochromes, flavoproteins and iron-sulphur proteins (see also Arch. Biochem. Biophys. **195**: 607, 1979) and so on. The Enzyme Nomenclature 1978 is complemented by 3859 basic references and by the alphabetic index in which the systematic, recommended, and deleted names were clearly distinguished.

As a conclusion — the Enzyme Nomenclature 1978 provides an irreplaceable tool for all libraries, laboratories and workers interested in all aspects of biochemistry and related topics.

V. ŠKRDLETA, V. NAŠINEC (*Praha*)