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BOOK REVIEWS

PALTI, J.: *CULTURAL PRACTICES AND INFECTIOUS CROP DISEASES*. — Springer Verlag, Berlin—Heidelberg 1981. 243 pp. Cloth DM 98.— ; approx. US \$ 45.70.

This is a modern well arranged book. The author looks at plant diseases from a broader point of view and analyses all accessible factors capable of influencing relations between the plant and the disease. Special attention is paid to the influence of agrotechnical measures on the distribution of agriculturally important plant diseases. The interest is aimed not only at a special agricultural sphere but it also embraces the tropical and subtropical regions. Though it is not possible to cover all agrotechnical measures in individual agroclimatic zones, the author nevertheless completed all the data in a very outstanding way and deduced generally valid principles. This relates especially to the questions of variety composition, physiological changes, plant protection, crop rotation, effect of weeds, nutrition and irrigation. At the same time he pays attention to some basic factors influencing crops, *e.g.* to climate, soil conditions, stress, *etc.* The conclusions show the possibility of harmonizing the mutual relations between agronomical practices, resistance breeding and the use of chemical preparations. This concerns not only new agricultural regions but also regions where an integrated plant protection could intensify agricultural production.

J. POZDĚNA (*Praha*)

SILL, W. H., JR.: *PLANT PROTECTION — AN INTEGRATED INTERDISCIPLINARY APPROACH*. — The Iowa State University Press, Ames., Iowa 1982. 297 pp. US \$ 23.95.

The author, professor of biology at the University in South Dakota, U.S.A. presents a new look on the plant protection dealing with it from several points of view. He takes into account the views of the breeder as well as social and economical questions. He deals with the problems of plant protection on all plant breeding levels, beginning with seeds, plant rearing and preparation of plant material till storage and sale of finished products. Attention is also paid to the use of pesticides in all forms. This is connected with a number of further questions *e.g.* with the resistance of plant pests, diseases and weeds to the pesticides and herbicides, the phytotoxicity, the residues of preparations, *etc.* The author also mentions the danger existing in system analysis executed by means of computers. It is therefore necessary to pay attention to feromons and other attractants and to the sterilization of male pests if need be. An integral part of plant protection is an additional set of provisions aimed at the breeding of healthy plants, which concern crop rotations, irrigation, nutrition and other agrotechnical measures. Examples of combined provisions and of an integrated plant protection are also given. In the conclusion the author states that the plant protection is above all an interdisciplinary matter. One of the merits of the book is the fact that it summarizes the ideas and opinions of individual authors concerning plant protection problems. The book can be recommended to workers dealing with integrated plant protection.

J. POZDĚNA (*Praha*)

OSMOND, C. B., BJÖRKMAN, O., ANDERSON, D. J.: *PHYSIOLOGICAL PROCESSES IN PLANT ECOLOGY. Toward a Synthesis with Atriplex*. — Springer Verlag, Berlin—Heidelberg—New York 1980. 468 pp. Cloth DM 98.—; approx. US \$ 57.90.

There are not many genera within the plant kingdom which would be noted for such a great genetically established variety of plants like the genus *Atriplex*. This is known to be represented by about 417 wild C_3 and C_4 species of both herbaceous annuals, a few centimeters in height, and woody perennials of up to 5 m, which are widespread over all continents. Being adapted to different habitats they vary considerably in anatomy, morphology, physiology, growth and development. The authors of this book tried to synthesize most of accessible information on *Atriplex* plants to give a general outline of the nature, types and mechanisms of plant adaptive responses to their environment. It is to be stated explicitly that they were really successful in doing this.

Everybody who is acquainted with this excellent monograph cannot but state that in its 10 chapters nothing important was forgotten that would not facilitate the understanding of single processes in *Atriplex* plants as set in motion by both internal and external stimuli. In the first three chapters, general characters such as the habit and morphology, geographical distribution and genecological differentiation (*i.e.* genetic, morphological and physiological aspects of variations of plants as related to the effects of radiation, temperature, drought and edaphic factors) are described. In the following two chapters, attention is paid to genetic and evolutionary relationships (*e.g.* genetic structural specificity as given by hybridization and polymorphism, interspecific relationships and phylogeny) and the diversity in community representation. The last five chapters are devoted to the physiological processes and mechanisms which facilitate the plants to perform in response to a given environment and persist in different habitats: *e.g.* germination and seedling establishment, reproduction processes, absorption of ions and nutrients, salinity responses, water transport and adaptation to water stress, photosynthesis and productivity are estimated both separately and with respect to mutual relations. The logically arranged text is complemented with 194 figures and 76 tables, 773 references and supplied with detailed subject and taxonomic indexes.

The book is to be highly appreciated at least because of three reasons. It demonstrates convincingly (1) how the modern synthesis on plant ecophysiology should look like, (2) how the specific patterns of plant responses may contribute to a better understanding of plant adaptation strategies and (3) how the latter may be used for evaluating general features of plant behaviour, respecting the space-time scales and hierarchical levels of plant structural organization from organelles up to ecosystems. Because of a wide range of phenomena analysed the book is recommended to specialists in all fields of plant biology.

DANUŠE HODÁŠOVÁ (Praha)

NICKELL, L. G.: *PLANT GROWTH REGULATORS. AGRICULTURAL USES*. — Springer Verlag, Berlin—Heidelberg—New York 1982. 173 pp., 24 figs. Cloth DM 47.50; approx. US \$ 22.10.

General aspects of plant growth substances, *e.g.* their definition, common characterization of naturally occurring plant hormones, information on uses of plant growth regulators in the past, the present and the future are dealt with in the introductory chapter. The mode of action of plant growth substances is also discussed.

The following chapters are devoted to the effects of plant growth regulators on rooting, germination, dormancy, flowering, abscission, fruit set and development, tillering, mineral uptake, plant composition, sex expression and other plant functions. The problems of toxicity, environmental and human safety is also considered.

The book brings an exceptionally broad summary of contemporary knowledge of the practical use of plant growth regulating substances in agriculture. It is best characterized by these two facts: 178 substances with regulating activity are reported and 1201 references cited. For everybody who is working with plant growth regulating substances the book will be an indispensable source of valuable information.

LIBUŠE PAVLOVÁ (Praha)

TICE, R. R., COSTA, D. L., SCHAICH, K. M. (ed.): GENOTOXIC EFFECTS OF AIRBORNE AGENTS. — Plenum Press, New York—London 1982. 658 pp. US \$ 75.00 (U.S.A.; + 20% elsewhere).

Airborne genotoxic agents, such as gaseous and particulate agents from industrial wastes, automobile exhaust, cigarette smoke and many manufacturing processes constitute a major environmental hazard. This book, published as Volume 25 in the series Environmental Science Research, represents the proceedings of a Symposium, held 1980 at Brookhaven National Laboratory, Upton, USA. The main aim was to explore the suitable methodologies for collecting sufficient quantities of airborne samples and for bioassaying such samples. The introductory section presents papers on the exposure technology and on assays which can be applied to detect the genotoxic effects of airborne agents. These include *in vitro* microbial and mammalian, and *in vivo* animal and plant bioassays. The readers of *Biologia Plantarum* will be mainly interested in the presentations of plant bioassays. The paper of Schairer *et al.* deals with the *Tradescantia* stamen hair system, demonstrating its relevance to environmental mutagen assessment and discussing its adaptation for *in situ* ambient atmosphere monitoring. The paper of Ma *et al.* describes in detail the *Tradescantia*-micronucleus test for *in situ* monitoring of air pollutants, and the paper of Constantin reviews the advantages and disadvantages of plant genetic systems for environmental mutagenesis research. The second section includes studies on the genotoxic effects of specific pollutants, such as benzene, a common constituent of gasoline, vinylchlorid, used in plastics, ethylene dibromide, inhalation anesthetics, formaldehyde, styrene *etc.* The third section: Monitoring and Risk Assessment discusses the impact of air pollution on public health and presents methods developed to assess indicators of potential genotoxic ill health. The indicators include *e.g.* cytogenetic and mutagenic end points in human peripheral blood lymphocytes and mutagenic substances in body fluids. In addition to the papers presented at the Symposium, the proceedings include 5 contributed papers, dealing with mutagenic and carcinogenic effects of airborne pollutants.

This volume will serve research scientists and applied workers in their studies of environmental mutagenesis and carcinogenesis.

T. GICHNER (*Praha*)

SEEBERG, E., KLEPPE, K. (ed.): CHROMOSOME DAMAGE AND REPAIR. — Plenum Press, New York—London 1981. 623 pp. US \$ 69.50 (U.S.A.; + 20% elsewhere).

The repair of spontaneous and induced DNA damage is a process which most normal healthy cells can perform. The process is metabolically controlled and is achieved by the action of specific enzymes. This book represents the proceedings of a meeting held in Norway, 1980, and deals with all aspects of DNA repair and with spontaneous and induced DNA damage, which brings about this repair. The introductory part of the proceedings contains studies on the molecular mechanism of spontaneous and induced damage to chromatin and DNA, including papers on the nucleosomal structure of chromatin, damage to DNA caused by hydrolysis, and on the influence of alkylating agents on the bacterial nucleoid. The section on DNA excision repair is opened by a review given by E.C. Friedberg, which covers both the base and nucleotide excise repair and the action of DNA glycosylases and AP-endonucleases and exonucleases. Further attention is devoted to other types of DNA repair such as the postreplication one and repair by recombination. Adaptive response may be defined in terms of the reduction of toxicity and mutagenicity of certain alkylating agents by pre-exposure to low levels of the agent. The section on this response includes papers on the molecular mechanisms of this type of error-free repair, both in bacteria and mammalian systems. Subsequent sections deal with DNA sequencing and gene cloning, DNA repair deficiency and human disease, DNA replication in normal and damaged cells, role of ADP-ribose in DNA repair and with lethal and mutagenic effects of DNA damage. The only chapter which deals with visible chromosome damage reports on the induction of sister chromatid exchanges. The proceedings are concluded with the section on DNA damage and repair in relation to carcinogenesis with an overview given by R. B. Setlow. The book provides a deeper insight into the mechanism of DNA damage and repair, and will serve to the molecular biologists as a valuable resource and reference work.

J. VELEMÍNSKÝ (*Praha*)

CERNUSCA, A. (ed.): ÖKOLOGISCHE ANALYSEN VON ALMFLÄCHEN IM GASTEINER TAL. Veröffentlichungen des Österreichischen MaB-Hochgebirgsprogramms Hohe Tauern. Band 2. — Universitätsverlag Wagner, Innsbruck 1978. 390 S. ÖS 390,—.

Im Rahmen des österreichischen MaB-Programms „Hohe Tauern“ als Teil des internationalen UNESCO-Programms „Man and the Biosphere“ wurden im Jahre 1977 unter Mitwirkung verschiedener Institutionen interdisziplinäre ökologische Untersuchungen auf verschiedenen Hochalmen an der Waldgrenze im Gasteiner Tal (1800 m Meereshöhe) durchgeführt. Alpen nehmen mehr als ein Fünftel der Fläche Österreichs ein und die in Folge des Strukturwandels der alpinen Landwirtschaft häufig aufgelassenen Alpen führen zu tiefgreifenden ökologischen Veränderungen und bedeuten ein landschaftsökologisches Problem. Im vorliegenden Band werden in 7 Abschnitten das Makro- und Mikroklima nebst Energiehaushalt, der Wasserhaushalt (Transpiration, Diffusionswiderstände, Wasserpotential, Spaltenverhalten der Pflanzenblätter, Bodenwasserhaushalt), die Vegetationsgliederung und die pflanzliche Stoffproduktion (Wachstum, Trockenmassenzuwachs und -verteilung, Atmung, Futterwert), die Besiedlung der Almflächen mit Tieren, die pedologischen und mikrobiellen Veränderungen und die Landschaftsschäden auf den Almflächen behandelt. Ein Anhang enthält Tabellen zum Witterungsablauf (Niederschläge, Wind, Temperaturen, Globalstrahlung, relative Luftfeuchtigkeit) während der Vegetationsperiode 1977 für das untersuchte Gebiet und eine bunte Karte mit Vegetationsbildern zur Almwirtschaft im Gasteiner Tal. Die Ergebnisse dieser vielseitigen, eingehenden Studie zu den ökologischen Auswirkungen von Bewirtschaftungseinschränkungen im Almbereich werden in einer deutschen und englischen Zusammenfassung hervorgehoben. Ebenfalls die Beschriftungen zu den Abbildungen im ganzen Band sind in Deutsch und Englisch verfasst worden. Der Band ist sehr sorgfältig zusammengestellt, ist reich illustriert (auch Fotos, Luftbilder) und jeder Beitrag schließt mit einem Literaturverzeichnis. Für die zukünftigen Bände wäre das Zusammenstellen eines Sachregisters zu empfehlen.

Das Buch stellt einen wertvollen Beitrag zur Ökosystemforschung dar. Es bleibt nur zu wünschen übrig, dass die Arbeitsgruppe unter der Leitung von Univ.-Prof. Dr. A. Cernusca bald weitere Bände herausgeben möge.

INGRID TICHÁ (*Praha*)

THE EMBO JOURNAL. VOL. 1. European Molecular Biology Organization. — IRL Press, Oxford 1982.

Since the beginning of 1982 the EMBO Journal has been published monthly by the European Molecular Biology Organization (EMBO). The journal accepts papers of a broad interest to many molecular biologists and provides a rapid publication (4 months) for papers no longer than 6 printed pages. All manuscripts must be submitted by a member of the EMBO to the Editorial Office in Heidelberg, F.R.G. Every year each member may contribute or communicate on behalf of the scientists who are not members of the EMBO a maximum of five papers. The EMBO membership list is published in the first issue of each Volume. Page charges will not be levied and the publishers will supply 30 reprints free of charge. Annual subscription rates are 155 £/310 US \$ for libraries and other multi-user institutions and 40 £/80 US \$ for individuals. The new EMBO Journal promises to be one of the leading journals in molecular biology and it should be in library of all institutions where the problems of molecular biology are studied.

P. TICHÝ (*Praha*)

FRANZ, H. (ed.): UNTERSUCHUNGEN AN ALPINEN BÖDEN IN DEN HOHEN TAUERN 1974–1978. STOFFDYNAMIK UND WASSERHAUSHALT. (Veröffentlichungen des Österreichischen MaB-Hochgebirgsprogramms Hohe Tauern, Band 3). — Universitätsverlag Wagner, Innsbruck 1980. öS 348,—; 295 pp., in German with English summaries.

“Publications of the Austrian MaB-Alpine Program Hohe Tauern Mts.” summarize the results of extensive ecological studies carried out in the Austrian Central Alps. The third volume of this series is devoted to specific properties of the Alpine soils which differ in many respects from

those at low-altitude sites. Knowledge of these properties is a basic requirement for understanding the Alpine ecosystems.

The papers of the first section describe the area investigated: its climate, types of soils and plant communities. The second section is devoted to some aspects of soil chemistry. Individual papers deal with the amount and mineral composition of flue dust material sedimented on the snow fields, the dynamics of mineral composition of soils during the vegetation period, the humus dynamics, the dynamics of nitrogen and the influence of earth-worms on soil formation. The papers of the third section are of use in studying the following questions: the annual course of soil moisture which mainly depends upon the time when the snow begins to melt, the annual water balance of the Alpine turf (precipitation, soil water content, soil water potential, rate of infiltration, run-off, evapotranspiration, leaf water potential, leaf diffusive resistance, etc.) and the water balance of the high catchment area.

The text is accompanied by 104 figures, 22 photos, many tables and the coloured vegetation map on a scale of 1 : 2500.

JANA POSPÍŠILOVÁ (Praha)

MILLER, P. C. (ed.): RESOURCE USE BY CHAPARRAL AND MATORRAL. A Comparison of Vegetation Function in Two Mediterranean Type Ecosystems. (Ecol. Stud. Vol. 39.) — Springer-Verlag, New York—Heidelberg—Berlin 1981. 455 pp., 118 figs. Cloth DM 98,—, approx. US \$ 45.70.

The topic of volume 39 of the well-known series of ecological monographs "Ecological Studies" published by the Springer-Verlag is the comparison of functioning and properties of two analogous Mediterranean ecosystems: the chaparral (*Adenostoma fasciculatum*, *Rhus ovata*, *Ceanothus greggii*, *Arctostaphylos glauca*, *Quercus dumosa*, *Eriogonum fasciculatum*, etc.) of southern California, and the matorral (*Lithraea caustica*, *Colliguaya odorifera*, *Cryptocarya alba*, *Trevoa trinervis*, *Satureja gilliesii*, etc.) of central Chile. The book is a result of international scientific collaboration and summarizes four years of research. As a detailed analysis of the structure of these two ecosystems related to primary production was made earlier, the effort in this Volume is concentrated to the use of light, water and mineral nutrients by the plants. By means of simulation models the relationships between plants and their environments are studied quantitatively, and the ecological theory of optimization or maximization of resource use is tested. The book contains data on climate, vegetation distribution, phenology and growth, energy exchange, water relations, carbon balance and allocation, and plant and ecosystem nutrient relations of the two Mediterranean ecosystems under study. The resource use is expressed as the ratio of water transpired to precipitation, nitrogen taken up to nitrogen mineralized, and solar irradiance converted in carbohydrate to incoming solar irradiance.

The book is well-arranged, illustrated by a relevant number of figures and tables, and contains a list of references and a subject index including also plant index. Some small misprints, e.g. *Quarcus* instead of *Quercus* in Fig. 3.6 (p. 58), *fasciculatum* instead of *fasciculatum* in Fig. 3.7 (p. 59) should have been corrected. Vol. 39 of the "Ecological Studies" is again a very useful ecological monograph which presents many valuable data on the Mediterranean-type ecosystems and their plant physiological ecology.

INGRID TICHÁ (Praha)

FISCHBECK, H. J., FISCHBECK, K. H.: FORMULAS, FACTS AND CONSTANTS FOR STUDENTS AND PROFESSIONALS IN ENGINEERING, CHEMISTRY AND PHYSICS. — Springer Verlag, Berlin—Heidelberg—New York, 1982. 249 pp. Soft cover DM 29.80, approx. US \$ 13.30.

In recent years the application of mathematics and physics in biology and chemistry has increased, and more and more mathematical and physical methods have come into usage. The book reviewed can be characterized as a handy source of mathematical and physical formulas, conversion factors and constants for everyday use to those who need to get acquainted with the fundamentals of mathematics or to revise them.

The publication is divided into five sections. Section 1 provides the fundamental tools of main signs, symbols, formulas, functions and tables needed in all areas of the mathematical and physical sciences. Section 2 summarizes the SI system, the frequently derived units, lists physical conversion factors and provides values of fundamental physical constants in a precise tabular form. Section 3 interprets the main terms of spectroscopy and atomic structure. In the fourth section the authors describe basic concepts and formulas of wave mechanics (Schrödinger equation, hydrogenic state functions and dipole moments). Section 5 provides all necessary information about data and formulas frequently encountered in laboratory (vacuum systems, electronic devices); material constants and other useful data are presented for information and as an aid for estimates and solving of problems.

The book contains a great deal of beneficial information for both researchers and students who do not deal with mathematics and physics systematically. In conclusion let me recommend this book as very expedient for everyday laboratory work.

M. KAŠE (Praž)

SLONIMSKI, P., BORST, P., ATTARDI, G. (ed.): MITOCHONDRIAL GENES. — Cold Spring Harbor Laboratory 1982. 500 pp. Paperback US \$ 65.00 (U.S.A., elsewhere 78.00.)

The 12th Volume of the CSH Monograph Series includes 47 papers, presented at a meeting at Cold Spring Harbor, May 1981. The Volume is dedicated to Boris Ephrussi (1901—1979) who was the first to discover the yeast "petite" mutation and proved that the mutation was cytoplasmic in its inheritance. The introductory paper by H. Roman, presents a short review of the early days of Ephrussi's work in the field of cytoplasmic inheritance in *Saccharomyces*. The petite story is an example of an unexpected discovery and the logical analysis of its meaning. However, only in 1966 a relationship had been established between mitochondrial DNA and petiteness. The Volume, which covers a wide range of topics, including mitochondrial genetic code, mitochondrial DNA replication, gene organization and expression, nuclear-mitochondrial interactions etc., is divided into 5 sections: mitochondrial genes in animal, yeast, filamentous fungi, protozoa and plants. The readers of *Biologia Plantarum* will be interested mainly in the last section. Eukaryotic cells contain interdependent genetic systems in the nucleus, cytoplasm and in mitochondria. Green plants are unique in that they contain a fourth such system in the plastids. The complicated restriction patterns of plant mtDNA suggest that it is unusually large and complex and possesses a type of sequence heterogeneity not found in mtDNAs of other eukaryotes. The presented papers in the plant section deal with mitochondrial genes and cytoplasmatically inherited variation, the structure of plant mtDNAs, size of mitochondrial genomes in various species and with mitochondrial ribosomal RNAs of *Triticum aestivum*.

This authoritative volume will be of great interest to molecular biologists and geneticists.

T. GICHNER (Praž)

FLETCHER, W. W., KIRKWOOD, R. C.: HERBICIDES AND PLANT GROWTH REGULATORS. — Granada, London—Toronto—Sydney—New York 1982, 408 pp. £ 25.00.

Chemical weed killing may be considered to be born in 1896 when Bonnet, a French grape grower, observed that the Bordeaux mixture he applied to his vines turned the leaves of *Sinapis arvensis* black. The weed killing properties of sulphates of ammonia, zinc, iron and other metals were then soon observed. The introduction of this state-of-art source book reviews the history of herbicides and plant growth regulators and presents data on their production in the world. In 1978 the world sale of herbicides was worth \$ 3.7 billion and the estimate for 1984 is \$ 4.8 billion. Following the informative introduction, a detailed classification of herbicides is presented, which includes their discovery, structural formulae, their use etc. The subsequent chapter deals with plant growth regulators, which are in close relation to the herbicides. For practical purposes, these regulators can be defined as natural or synthetic compounds that are applied directly to a target plant to alter its life processes or its structure to improve quality, increase yields or facilitate harvesting. Data are presented on the action of auxins, gibberellins, cytokinins and on natural and synthetic growth inhibitors and retardants. Further chapters cover a broad range of topics, e.g. the absorption and translocation of foliage- and soil-applied herbicides, the biochemical mechanism and metabolism of various herbicides. In addition to the direct effects of herbicides on their main targets, the higher plants, many ecological and related topics are considered, for example, the effects on the soil microflora and microfauna, the degradation of herbicides by soil microorganisms, the persistence of herbicides in soils, the effects on mammals, indirect effects and possible mutagenicity of herbicides. The appendix contains a tabular list of toxicity data of most used herbicides in rats, rabbits, mice, dogs, bees etc.

This book presents a modern synthesis of data in the field of herbicides and plant growth regulators, and offers a summary of current knowledge and future research directions for biologists, agronomists and ecologists.

J. BŘÍZA (Praha)

KEFELI, V. I.: ROST RASTENÍ I DIFFERENCIROVKA. [Plant Growth and Differentiation.] — Nauka, Moskva 1981. 274 pp. Rbl. 3.10.

The book is a collective work of the Soviet and foreign authors whose main attention is paid to biosynthesis of growth stimulants, their inactivation, mutual relations between growth, photosynthesis and biologically active soil.

The book contains four independent chapters dealing with individual spheres of problems. In the first chapter the authors describe two principal components of cytoplasm *Acetabularia*. They unite cell morphogenesis with the movement of cytoplasm on which the transport of RNA depends.

In the second chapter they analyse biosynthesis of auxins in higher plants, the influence of separate factors on their concentration and activity sphere. Further on, they concentrate their attention on the forms of endogenous and exogenous abscisic acid (ABA). The term "conjugated ABA" indicates such metabolites in which an ABA cell associates with low cellular compounds.

The third chapter deals with the sinapic acid metabolism, sinapine and sinapilglucosin in the family *Brassicaceae*. The growth process is observed in relation to the change of the cholinesterase level. Main attention is given to phenolic compounds, huminic and ferulic acids in a soil sorption complex, their composition, formation and effects on plant metabolism.

The fourth chapter is devoted to mathematical models of morphogenesis, namely to the model of the TURING type. An important role is attributed to a parametrical form of information registration in a plant. Further studies are oriented to a problem of mutual interactions, receptor — growth stimulants related to cell membranes and the presence of mediators. The relation between light and photosynthetic intensity occupies a considerable part of the book. In conclusion the authors quote the most important biological studies on growth stimulants.

The book is recommended to physiologists, biochemists, geneticists and to all those interested in stimulants. It is a valuable enrichment of our knowledge of the growth process from the viewpoint of growth stimulants activity.

A. KAMENICKÁ (Arboretum Mlýnský)