

EVANS, J. R., VON CAEMMERER, S., ADAMS, W. W., III. (ed.): *ECOLOGY OF PHOTOSYNTHESIS IN SUN AND SHADE*. – CSIRO Editorial Services Unit, Melbourne 1988. 358 pp. US \$ 160.–.

In 1987 the Research School of Biological Sciences at the Australian National University in Canberra decided to honour the role of Professor Sir Rutherford Robertson in biological research in Australia and his contribution to science and technology, by establishing a series of Symposia in particular fields of biology to be named The Robertson Symposia. The first symposium "Ecology of Photosynthesis in Sun and Shade" took place on 18–20 February 1987. Professor Robertson gave the opening address and participated actively throughout. Some 40 scientists, including visitors from North America, Europe and Asia participated in the program. The papers which were presented appear in this book and simultaneously in the *Australian Journal of Plant Physiology*, Vol. 15, nos. 1, 2.

In the introductory of 24 papers C. B. Osmond and W. S. Chow review and analyse structures and functions, states and processes which relate to the ecology of photosynthesis in sun and shade. The following papers deal with photoinhibition on molecular level (R. E. Cleland) and its mechanism (C. Critchley), quantitative assessment of the degree to which RuP₂ carboxylase/oxygenase determines or limits the rate of photosynthesis (I. E. Woodrow and K. A. Mott) and thylakoid membrane organization in sun/shade acclimation (J. M. Anderson *et al.*), nitrogen partitioning between soluble and thylakoid proteins (J. R. Evans) and chloroplast structure, function and composition (W. S. Chow *et al.*).

Most papers are devoted to sun and shade photosynthesis on leaf level: mangrove photosynthesis and response to high irradiance stress (O. Björkman *et al.*); photosynthetic acclimation and photoinhibition of terrestrial and epiphytic CAM tissues growing in full sunlight and deep shade (W. W. Adams III); light response of CO₂ assimilation, reduction state of Q, and radiationless energy dissipation in intact leaves (B. Demmig and K. Winter); characterization of three components of non-photochemical fluorescence quenching and their response to photoinhibition (B. Demmig and K. Winter); effect of temperature on photoinhibition and recovery of *Actinidia deliciosa* (D. H. Greer); photoinhibition at chilling temperatures (R. M. Smillie *et al.*); photosynthetic utilization of lightflecks by understory plants (R. W. Pearcy); regulation of carboxylation and photosynthetic oscillations during sun-shade acclimation in *Helianthus annuus* measured with a rapid-response gas exchange system (C. B. Osmond *et al.*); maintenance of leaf temperature and the optimization of carbon gain to water loss in a tropical mangrove forest (M. C. Ball *et al.*); photosynthetic characterization of rice varieties in relation to growth irradiance (Z. P. Tu *et al.*) and compensating effects to growth of changes in dry matter allocation in response to variation in photosynthetic characteristics induced by photoperiod, light and nitrogen (M. Küppers *et al.*).

The remaining papers cover questions of how differences between sun- and shade-grown plants can be taken for adaptations to irradiance that determine the maximum capture of radiant energy by plants (T. J. Givnish); effects of photoinhibition induced by water stress on growth and yield on grain sorghum (M. M. Ludlow *et al.*); growth and photosynthetic response to light and nutrients of *Flindersia brayleyana* F. MUELL., a rainforest tree with broad tolerance to sun and shade (W. A. Thompson *et al.*); spatial and temporal distribution of photosynthesis and transpiration by single leaves in a rainforest tree, *Argyrodendron perlatum* (D. Doley *et al.*); photosynthetically active radiation environment, patch dynamics and architecture in a tropical rainforest in Sumatra (E. F. Torquebiau), and of the role of photosynthetic responses in constraining the habitat distribution of rainforest plants (C. B. Field).

The book is useful to all ecologists, especially to those interested in the structural and functional analysis of the photosynthetic apparatus in response to irradiance, and the attendant problems of acclimation and photoinhibition.

JARMILA SOLÁROVÁ (Praha)

KREEB, K. H., RICHTER, H., HINCKLEY, T. M. (ed.): *STRUCTURAL AND FUNCTIONAL RESPONSES TO ENVIRONMENTAL STRESSES: WATER SHORTAGE*. – SPB Academic Publishing bv, The Hague 1989. Pp. 308. Dfl 95.00, US \$ 50.00.

The book contains papers derived from symposium lectures and poster sessions (parts 6–38 and 138) held at the XIV International Botanical Congress in West Berlin in 1987. The range of focuses is rather wide as water stress is evaluated from the molecular to ecosystem level and in addition the functional and structural aspects of all processes are considered. 26 chapters are divided under five general themes (each with a brief introduction into the corresponding research field given by editors):

1. Flow Through the Soil-Plant-Atmosphere Continuum. Three papers of this part deal with the contemporary models of water transport, the comparison of water flow in the vascular elements and the parenchymatous tissue, the gradient of water potential and the occurrence of cavitation and the recovery from the cavitation events.

2. Components and Measurement of Cell and Organ Water Relations. This part contains two methodological papers: the first is devoted to the thermocouple psychrometers and the second to the pressure probe. The many times discussed question of existence of the negative pressure potential¹ is also elucidated. Finally, the mechanism by which changes in water potential might be transmitted to different plant parts is proposed.

3. Responses of Processes to Water Shortage. This part starts with stress-induced heterophagy and continues by the effect of water stress on the respiration and ethylene reduction in roots and on the stem growth. Very important is the paper of Richter and Kikuta, where the osmotic and elastic components of turgor adjustment is firstly distinguished. Further, similarities and differences between water and salt stress are discussed and results of the testing of new antitranspirants are presented.

4. Interactions of Genes and Environment in the Response of Organisms to Water Shortage. Chapters in this part examine both the adaptation and the acclimation of processes to water stress. Three papers dealing with trees concentrate on of the crown geometry, the comparison of sun and shade leaves and characteristics of *Populus* hybrids. Last papers are focused on the effect of water stress on photosynthesis and carbon economy.

5. Strategies of Response to Water Shortage. In this part the basic categories (escape, avoidance and tolerance) are defined and they are evaluated in different ecological groups (tropical forest species, resurrection plants, temperate forest species, crop plants).

Experimental data are presented in the form of tables and figures, the papers have separate lists of references. This book is an excellent contribution to the literature on plant water relations and so it is an important source of information to all scientists working in the respective research field. Only it is a pity that it appeared with two years delay.

JANA POSPÍŠILOVÁ (Praha)

LÜTTGE, U. (ed.): *VASCULAR PLANTS AS EPIPHYTES. EVOLUTION AND ECOPHYSIOLOGY*. (Ecological Studies, Volume 76). – Springer-Verlag, Berlin – Heidelberg – New York – London – Paris – Tokyo – Hong Kong 1989. 270 pp., 69 figs. DM 168.00.

During the XIV International Botanical Congress in July 1987 in Berlin a special Symposium on "The Evolution and Ecophysiology of Vascular Plants as Epiphytes" was organized. Some of speakers were asked by the editor of this monograph to prepare individual chapters. Hence the first comprehensive evaluation of the ecological adaptations in epiphytic plants originated.

General aspects including the taxonomic diversity, the life forms, the biomass production and the economic use are discussed in the opening chapter. The second chapter is devoted to the evolution of epiphytism. The characteristics of the CO₂ concentrating mechanism and the development of CAM as one

of the most important physiological adaptations to special growing conditions of these plants are the main items of the third chapter. The following three chapters address in detail special problems of the gas exchange and the water relations and the dependence of these processes on environmental factors in major taxonomic groups (ferns – Chapter 4, bromeliads – Chapters 5, orchids – Chapter 6) separately. The seventh chapter covers the problems concerning the mineral nutrition of epiphytes. Information about the epiphytic associations with ants is provided in the eighth chapter. The book is closed with the overview of all known epiphytes (more than 850 genera) and their systematic distribution.

As is briefly shown above, the book affords the synthesis of the present knowledge of ecophysiology of this specialized plant group. In addition it contributes to the solution of general problems concerning the adaptation of plants to environmental conditions. It is richly illustrated by perfect black-and-white photographs and supplemented with instructive diagrams and tables. The extensive bibliography facilitates getting information about special problems. The high quality of printing should also be mentioned.

JANA POSPÍŠILOVÁ (Praha)

BARTON, J. H., QUALSET, D. N., DUVICK, D. N., BARNES, R. F. (ed.): INTELLECTUAL PROPERTY RIGHTS ASSOCIATED WITH PLANTS. – Crop Science Society of America, Inc., American Society of Agronomy, Inc., Soil Science of America, Inc., Madison, Wisconsin 1989. 203 pp., soft cover US \$ 16.-

The questions of patent protection of plants became very topical in connection with the introduction of gene engineering methods into plant breeding and releasing of new genomes and cultivars constructed with the use of recombinant DNA.

The book brings proceedings of similarly called workshop held in Anaheim, California 31 January to 3 February 1989. It covers 17 lectures dealing with different aspects of the problem. It covers the overall status of plant property rights, connected with plants and their breeding, questions of patenting the genes that encode agriculturally important traits and their use, implications of patenting in science, technology and agriculture.

There are basically different principles of patenting in connection with living organisms in Europe and in the USA. Whereas only the general principles of engineering or production of new plants can be patented in Europe, in the USA it is possible to patent new cultivars. The duration of patent protection is 17–18 years.

Among issued utility patents there are, for instance, sunflower regeneration, potato cultivar, inbred maize line, hybrid maize line, tryptophan overproducing maize mutants, mushroom *Agaricus campester* mutant strain, process producing odorless soybean, bean plant cultivar having low pod detachment force, squash (*Cucurbita pepo*) cultivar, tetraploid maize and methods to produce it, process for plant micropropagation, herbicide resistance in tobacco, kiwi fruit plant (*Actinidia chinensis*) and many others. This book is of interest to people dealing with plant breeding, plant cultivar registration and plant gene engineering.

M. ONDŘEJ (České Budějovice)

GELVIN, S. B., SCHILPEROORT, R. A., VERMA, DESH PAL, S. (ed.): PLANT MOLECULAR BIOLOGY MANUAL. – Kluwer Academic Publ. Group, Dordrecht-Boston-London 1989. Dfl 165.00, US \$ 89.-, UK £ 52.-.

Great advances have been made in the field of molecular biology during the last decade. New methods are constantly invented and introduced and existing techniques are updated to response current needs.

Many new methods have been introduced especially in plant molecular biology. Surprisingly, a good manual which would cover this area in a similar manner or more as classical "Maniatis" in molecular biology in general, was still missing. This book is the first publication that can serve as a guide in plant molecular biology for both beginners and advanced researchers in this field.

Almost all aspects of plant molecular biology are covered in three sections of this manual. In the first there are 10 chapters devoted to the introduction of DNA into plant cell. Basic and more advanced techniques e.g. plant DNA isolation, electroporation, construction of binary vectors or gene libraries, Ti-plasmid, *Agrobacterium* molecular biology etc. are well described by renowned authors. The second section is mostly devoted to the expression of plant genes. In 12 chapters are described methods dealing with the use of reporter genes in gene expressions, gene expression in transgenic plants, light regulated promoters, DNA methylation, DNA footprinting, RNA isolation etc. The last small section describes procedures used for studying the fate of introduced genes in plants – their stability in transgenic plants and RFLP mapping.

Similarly as in above-mentioned "Maniatis" all chapters are divided into 3 parts – starting with a well written background information about the problem, following with step by step protocol and, of course, accompanied with references. Moreover, many chapters have useful explanatory notes for important steps in the protocol or other advices if troubles should arise. Molecular cloning seems straightforward in paper but could be very difficult in practice. As the editors have pointed out, many techniques in this manual depend upon specialized genetic material etc., and people desiring such material are encouraged to contact relevant authors directly since a list of various contributors to this manual with their address is included.

The only disadvantage of this manual is a relatively high retail price (hard-cover US \$ 89) which is almost twice the sale price of the above-mentioned Manual from Maniatis *et al.*

M. JUŘÍČEK (Praha)

CAMPBELL, A., BAKER, B. S., HERSKOWITZ, I. (ed.): ANNUAL REVIEW OF GENETICS, VOLUME 23. – Annual Reviews Inc., Palo Alto, CA. 1989. 679 pp., US \$ 34.00 (USA + Canada), US \$ 58.00 (elsewhere).

The Annual Review Series aim to publish authoritative presentations in specialized fields of genetics which are currently undergoing rapid development. Volume 23 continues this tradition with 25 articles. Also as a tradition is the introductory article dealing with the life and work of eminent genetists. This volume presents an article of E. S. Russell on Sewall Wrigth's contributions to physiological genetics and to the inbreeding theory and practice. The following reviews cover, among others, these topics: genetics of alcoholism, plasmid-maintenance functions, genetics of proteolysis, mammalian homologous recombination, control elements and DNA loop, population genetics of transposons, protein stability and function, prokaryotic signal transduction, evolutionary quantitative genetics, 21-hydroxylase deficiency, human chromosome 21, population genetics and evolution, genetics of bacterial virulence, structure and function of telomers, the human genome etc. The readers of *Biologia Plantarum* will find very interesting the reviews on the molecular genetics of self-incompatibility in *Brassica*, on maize transposable elements and on *Rhizobium* genetics.

All articles are written so as to be valuable not only to an expert but also to advanced students or scientists in other fields wishing to know more about different fields of modern genetics.

T. GICHNER (Praha)

RAGSDALE, N. N., MENZER, R. E. (ed.): *CARCINOGENICITY AND PESTICIDES. PRINCIPLES, ISSUES, AND RELATIONSHIPS*. ACS Symposium Series 414. – American Chemical Society, Washington, DC 1989. 246 pp., US + Canada \$ 54.95, export \$ 65.95.

The production of food and fiber for the growing world population is impossible without the large-scale use of pesticides. Acute pesticide poisoning is the best documented adverse health effects of pesticides. The objective of this publication, developed from a symposium held at the 196th National Meeting of the American Chemical Society, Los Angeles, CA, 1988, was to discuss the possible relationship between cancer and pesticides. The 14 chapters focus on the following topics: pesticide regulation related to carcinogenicity, mechanisms of chemical carcinogenicity, dietary inhibition of cancer, chemical interactions and the development of cancer, biological issues in extrapolation, quantitative risk assessment, evaluation of pesticides for potential carcinogenicity, pesticide residues and cancer causation *etc.* The readers of *Biologia Plantarum* will be mostly interested in the article written by B. A. Ames: We ingest in our diet at least 10 000 times more by mass of "natural" pesticides than of man-made pesticide residues. These "natural" pesticides appear to be present in all plants and serve as protection against pests. According to Ames the major preventable factors for cancer causation are *e.g.* tobacco, dietary imbalances, hormones, viruses, and probably not residues of man-made pesticides. We cannot, however, say whether exposures to these natural pesticides are likely to be of major or minor importance in carcinogenicity.

T. GICHNER (*Praha*)

PALADE, G. E., ALBERTS, B. M., SPUDICH, J. A. (ed.): *ANNUAL REVIEW OF CELL BIOLOGY*. Volume 5. – Annual Reviews Inc. Palo Alto, CA. 1989. 542 pp., \$ 35.00 (USA + Canada), \$ 39.00 (elsewhere).

This volume, serving both as a review of fundamental theory and a summary of recent research, is a valuable source of reference for researchers in all fields of modern cell biology. The 17 chapters cover *e.g.* the following topics: Endoplasmic reticulum protein sorting, Mitochondrial DNA evolution, Tenascin, Growth factors in early embryogenesis, Dyneins, Cytochrome regulation in yeast, Transgenes and development, Eukaryotic DNA replication, Lipid traffic in animal cells, Protein oligomerization in the endoplasmic reticulum, Simple and complex cell cycles, Interleukin 2 receptor, Endocytic membrane traffic and Biogenesis of lysosomes. The authors of these review articles are mostly leading authorities in their fields, having carried out much of the research. Though the articles provide some historical perspectives, the main focus is on recent discoveries.

The Annual Review of Cell Biology has been published since 1985 by Annual Reviews Inc., a non-profit scientific publisher. Therefore, the price of this publication compared to the similar ones is very reasonable.

T. GICHNER (*Praha*)

MIFLIN, B. J., MIFLIN, H. F. (ed.): *OXFORD SURVEYS OF PLANT MOLECULAR AND CELL BIOLOGY*, VOL. 5. – Oxford University Press, in Co-Operation with the International Society for Plant Molecular Biology, Oxford 1988. 206 pp, £ 22.–.

This is the fifth of the series of excellent plant molecular biology volumes, which are published in approximately one year intervals. This comprehensive book consists of five rather long and three shorter reviews dealing with different topics of molecular genetics. The individual chapters deal with genetic manipulation in cereals, replication of plant nuclear DNA, *Arabidopsis thaliana* molecular genetics,

structural interactions between plant RNA viruses and cells, ethylene and regulation of antifungal hydrolases in plants, chemotaxis in *Agrobacterium*, regulation of gene expression in the cell cycle of higher plants and induction of herbicide resistance in wheat.

Despite this broadness and heterogeneity, all the reviews have two main features in common: First, the heterogeneous topics are considered from the point of view of molecular genetics, gene regulation and gene nucleotide sequences. Second, all the reviews were written by foremost specialists in individual topics.

Plant molecular genetics and gene engineering progress are very rapid due primarily to the utilization of *Agrobacterium tumefaciens* as a gene vector system. The gene transfer studies promoted a broad range of other studies in plant molecular genetics, much broader than can be accommodated at this high level in a single book, and there is a good reason for issuing this series of volumes.

This volume is impressive reading, which can be recommended to all scientists studying the problems of experimental botany.

M. ONDŘEJ (České Budějovice)

KREKULE, J., SEIDLOVÁ, F.: SIGNALS IN PLANT DEVELOPMENT. – SPB Academic Publishing bv, The Hague 1989. Dfl. 50. –, US \$ 26.–.

The book represents the proceedings of the two colloquia "Biochemical Mechanisms in Plant Morphogenesis" and "Native Flower – Controlling Substances" held at the 14th International Biochemical Congress in Prague, July 1988. As mentioned by the editors, we are still far from the knowledge of how physically and chemically induced changes in the patterns of physical and chemical plant status are transduced into structural patterns of morphogenesis. The meetings provided a good opportunity to illustrate the diversity of the signals and to attempt an understanding of the external and internal messages, including the action of phytohormones. They also illustrated the variety of tools, ranging from genetic manipulation to electrical treatment, used in such studies. The authors were given a free hand in choosing the adequate form of their paper. Hence some of the contributions are in the form of reviews on chemical and biophysical signals and mechanisms of plant development while others are original articles on specific topics. Most of them concern the control of the flowering process, a specific application of the subject-matter of the book. The volume is thus of a general interest to all plant physiologists but primarily to those involved in morphogenetical studies.

TH. GASPAR (Liège)

JACOBS, L. W. (ed.): SELENIUM IN AGRICULTURE AND THE ENVIRONMENT. SSSA Special Publication Number 23. – American Society of Agronomy, Inc. Soil Science Society of America, Inc. Madison, Wisconsin 1989. US \$ 24.00 + 2.40 outside USA.

The book "Selenium in Agriculture and the Environment" is an up-to-date review of the geochemistry, chemical reactions, and factors affecting the bioavailability of Se in various ecosystems. The publication contains research papers from the symposium "Selenium in Irrigated Agriculture". The individual papers deal with: Geochemistry and occurrence of selenium; Selenium in seleniferous environments; Solubility, speciation and transformation of selenium in soils; Factors affecting selenium accumulation by agricultural crops; Soil test extractants for predicting selenium in plants; Selenium poisoning in livestock; Bioaccumulation and effects of selenium in wild-life. This book also provides information on recent Se research in soil and groundwaters of the San Joaquin Valley and potential selenium problems in Great

plain soils. Such information helps to clarify the relationship of Se in biosphere and stimulates research in improving the management techniques to minimize the adverse effects of Se in the environment.

All the papers are well compiled and complemented by tables, graphs and figures. The book is of great importance to biologists, ecologists, agronomists and all the staff dealing with problems of Se in the environment and plants.

V. NOVÁK (*Praha*)

JOURNAL OF PRODUCTION AGRICULTURE. – American Society of Agronomy, Crop Science Society of America, Soil Science Society of America. Subscription (four numbers per year – published quarterly) US \$ 30.– in USA, US \$ 33.– outside USA.

Among the common goals of the ASA, CSSA and SSSA are the promotion of human welfare through advancing the acquisition and dissemination of scientific knowledge and cooperating with other organizations having similar aims. Today, more than ever, a mechanisms needed to document and transfer production-oriented scientific and technological information is the manner that will be of use to a wide range of professional agriculturists. To these purposes the Journal of Production Agriculture was established. It is meant for industry specialists, extension specialists, advisors, consultants, research leaders, farm managers and students as a journal of interactive agriculture with emphasis on defining and solving interdisciplinary and applied agriculture production problems. This journal also publishes papers of original research, synthesis or interesting reviews on economics, forages, pastures, animal sciences, range management, weed science, entomology, plant pathology, horticulture and forestry.

It is, however, rather astonishing that 200 years of the Great French revolution, when the metric system was legalized (delegates of the USA undersigned this Convention du Mètre 20th May 1875), and 30 years after the System of SI Units by International Standard Organisation was accepted, the editorial board of the journal in Suggestions for Contributors asks the contributors to use “the English (inch-pound) system of measurement unless a commonly accepted unit does not exist for the item being measured. SI units may be included parenthetically.” In the opinion of the reviewer the more SI unit System is used, the sooner it will be common to the broad agricultural community. In addition, to readers from Europe and other countries where metric or SI System is used it will be very difficult to convert data on yields published in bu/acre to SI values. This is not sufficiently facilitated by tables “Conversion Factors for Acceptable Units” given in this journal as in many other publications of ASA, CSSA and SSSA. These tables contain four possibilities of conversion, but not concrete values on different crops (wheat, barley, oat, corn, potato etc.) and for conversion bushel/acre to $t\ ha^{-1}$ the factor for wheat is twice as high as that for oat. Therefore the editorial board should reconsider its recommendation to use the English system of measurement.

The reviewer hopes that the Journal of Production Agriculture will be interesting and useful to agriculturists all over the world.

JARMILA SOLÁŘOVÁ (*Praha*)

ANNOUNCEMENT

Photosynthesis and Stress

A symposium on this topic will be held on 19–23 August 1991 in České Budějovice (Czechoslovakia). For further information ask the Editorial Office.