

TURNER, N. C., PASSIOURA, J. B. (ed.): *PLANT GROWTH, DROUGHT AND SALINITY*. — CSIRO, Melbourne 1986. 201 pp.

The special issue of the *Australian Journal of Plant Physiology* (volume 13, number 1) has recently appeared in the book form. It brings the invited papers presented at the conference held under the same title at the Division of Plant Industry of CSIRO in Canberra, May 13–16, 1985. The conference and the materials published aimed to focus attention on the influence of drought and salinity on plant growth and production. Combining water and salt stress problem in one volume is particularly useful as it is evident that there are common signals involved in the two effects.

The book starts with a short introduction by M. G. Pitman, followed by a review which examines the impact of drought and salinity on agricultural production in both the semiarid and humid regions of the world by J. R. McWilliam. The chapter on stomatal and photosynthetic limitations to leaf growth, by P. E. Kriedemann, shows that during drought stress cell enlargement is affected earlier and to a greater extent than cell division, contrary to the impairing ionic balance across encompassing membranes, which preconditions adequate supply of respiratory energy by salt stress. Further contribution on the whole-plant carbon balance during osmotic adjustment to drought and salinity stress is from K. J. McCree, who states that water stress reduces the photosynthetic input, reducing both leaf area and photosynthetic rate per unit leaf area, contrary to increasing metabolic cost of storing photosynthate under salt stress. In the following contribution E. W. R. Barlow pointed out that different growth patterns of monocotyledonous leaves result in fundamental differences in water relations of expanding leaves. Certain metabolic consequences of drought and salinity stress, particularly those leading to the accumulation of specific organic solutes, are viewed in the light of their metabolic cost and the possibility that they contribute rather to the survival than to continued growth and expansion, are treated by D. Aspinall. The next chapter by T. J. Flowers and A. R. Yeo gives a comprehensive review above all of ion relations of mature leaf cells of plants growing under saline conditions. R. E. Cleland's discussion on the role of growth hormones in cell wall loosening and plant growth is followed by the treatise on the regulation of plant growth by plant growth substances, written by W. J. Davies *et al.* Two succeeding chapters of E.-D. Schulze, R. Munns and A. Termaat are concerned with the whole-plant responses to drought and salinity. In the former, the partitioning of carbon and interactions which cause limitations to gas exchange and growth under conditions of a limited supply of water and nutrients are discussed; the second looks for the answer to the question of what process limits the growth of non-halophytes in saline soils and besides considers the effect of short (days) and long (weeks, years) exposure. To the necessity of increasing salt resistance of rice and principal obstacle of that is devoted the paper of A. R. Yeo and T. J. Flowers. In the penultimate chapter N. C. Turner discusses adaptive mechanisms that aid in the maintenance of turgor, such as osmotic adjustment, which are important in maintaining plant growth through maintenance of stomatal opening, photosynthesis, leaf and root growth. The conclusion written by J. B. Passioura reviews various techniques for improving the resistance of plants to drought and salinity by improving crop's ability to extract water from the soil, produce dry matter given a limited water supply and convert dry matter into grain.

The booklet will be of value to all those interested in drought and salinity effect on plant. It is pleasant that it appears in less than a year after the Conference but, unfortunately, as in the journal also in the booklet indexes are missing.

JARMILA SOLÁROVÁ (*Praha*)

KOVÁCS, M. (ed.): *POLLUTION CONTROL AND CONSERVATION*. — Akadémiai Kiadó, Budapest 1985. 398 pp.

Protection of the human environment has recently become a matter of public interest. The majority of damages caused by human activity can be restored only with very high financial sacrifice within a definite period of time, but certain kinds of damage are irreversible. However, the decay of certain species of the plant and animal kingdom cannot be stopped any more and this means an irreplaceable loss for mankind. But adverse results of human activity can be significantly decreased *e.g.* by modernization of heating installations, or water pollution can be reduced to some extent by installations or building appropriate filtering systems.

This book tries to contribute to the protection of natural as well as artificial environments. Three introductory chapters are written by the editor and post up the reader with the present state and importance of environmental control, summarize the basic knowledge of biosphere, landscape and natural resources and pick out the importance of ecosystems in the biosphere.

The next chapter deals with genetic principles of environmental control and population (B. Jankó). The consecutive three chapters are devoted to air (T. Várkonyi and A. Szilágyi), water (J. Ponyi, I. Kárpáti and G. Szemes) and soil (P. Stefanovits) pollution. The following chapters are devoted to environmental control and plant protection (A. G. Manninger), to the effects of urbanization on landscape elements and woodland cover (M. Möcsényi) and to the role of forests in environmental protection (L. Madas). In the last but one chapter the nature conservation concept in Hungary is presented, and landscape reserves and national parks are briefly characterized (S. Seléndy). The legal basis of environmental protection in Hungary is the topic of the concluding chapter. The book is complemented by a very good glossary containing of about 600 items and abbreviations.

The book concentrated on the pollution control and nature conservation in Hungary will be interesting not only to the Hungarians but also to the experts all over the world.

JARMILA SOLÁROVÁ (*Praha*)

ENGELSTAD, O. P. (ed.): *FERTILIZER TECHNOLOGY AND USE*. Third Edition. — Soil Science Society of America, Madison 1985. 633 pp. Hardcover \$ 40.— (+ 75 c outside USA)

Man depends on soils to produce most of food, feed, and fiber. Soils differ by their location on the globe, elevations, latitudes, parent rock, physical properties, nutrient content and availability, organic matter content, biological colonization, moisture supplies and other properties. Variation of the mineral element content essential to efficient plant growth is one of the factors that is relatively easy to accomodate to specific crop needs by adding soil amendments. This modification of soil fertility dates from the 19th century, but only in the 20th century all knowledge of plant nutrient requirements were developed into a well documented and generally understood basis for an efficient and effective fertilizer use. This is also the aim of the book reviewed; the third edition of the series (1962, 1971, 1985) embodies the latest development in fertilizer technology and use.

In seventeen chapters the authors present current information on fertilizer markets (1), soil and plant analysis for nutrient needs testing (2), agronomical and statistical evaluation of fertilizer response (3), fertilizer-plant interaction in both acid (4) and alkaline (5) soils, behaviour of plant nutrients in flooded soils (6), the production, marketing and use of nitrogen (7), slow-release and inhibitor-amended nitrogen (8), phosphorus (9), potassium (10), sulphur (11), calcium, magnesium and micronutrient (12), solid, solution and suspension (13) fertilizers. In spite of tens of millions of tons of commercial fertilizers produced and used, animal manure, crop residues and organic wastes continue to be a major source of nutrients for crop production (14). The concluding chapters are devoted to the modern techniques in fertilizer application (15), fertilizer use in relation to the environment, inclusive of reference to nonpoint pollution effect, mainly as concerns drinking water (16), and effects of fertilizers on the nutritional quality of plants (17). In the reviewer's opinion a chapter on mineral nutrient utilization, metabolism, accumulation and deficiency symptoms in plant is missing.

The well edited book is supplemented by Subject index and a useful table of conversion factors for SI and non-SI units. It is a good compendium suitable for a wide range of readers.

JARMILA SOLÁROVÁ (*Praha*)

PHARIS, R. P., REID, D. M. (ed.): *HORMONAL REGULATION OF DEVELOPMENT III. ROLE OF ENVIRONMENTAL FACTORS*. Encyclopedia of Plant Physiology, New Series, Vol. 11. — Springer Verlag, Berlin—Heidelberg—New York—Tokyo 1985. 887 pp., 121 figs. Hard cover DM 398.—.

The third volume of the compendium "Hormonal Regulation of Development" completes the survey of our knowledge of the chemistry, biochemistry, and physiology of plant hormones (begun in Volumes I and II) with an outline of their potential role in mediating the effects of various environmental factors on plant growth and development. The third volume contains the following contributions: Relation of hormones to nutrient mobilization and the internal environment of the plant: the supply of mineral nutrients and photosynthate (R. J. Weaver, J. O. Johnson), Rhythms and their relations to hormones (W. L. Koukkari, S. B. Warde), Hormonal aspects of phase change and precocious flowering (R. H. Zimmermann, W. P. Hackett, R. P. Pharis), Polarity (W. K. Coleman, T. A. Thorpe), Epinasty, hyponasty, and related topics (J. H. Palmer), Position as a factor in growth and development effects (D. J. Chalmers), Role of hormones, protones, and calcium in geotropism (B. G. Pickard), De-etiolation and plant hormones (T.

O'Brien, F. D. Beall, H. Smith), Photoperiod and hormones (D. Vince-Prue), Roles of hormones in phototropism (B. G. Pickard), Plant growth regulators and low temperature stress (J. V. Carter, M. L. Brenner), Wind and other mechanical effects in the development and behavior of plants, with special emphasis on the role of hormones (M. J. Jaffe), Hormonal control of wound-induced responses (H. Imaseki), Water relations and plant hormones (D. M. Reid, R. L. Wample), Pollen. Symbionts and non-symbiont-induced structures (J. P. Mascarenhas, D. Canary), Pathogenic and non-pathogenic microorganism and insects (G. F. Pegg), Electrical and magnetic stimuli (D. S. Fensom), Regulators of plant reproduction, growth and differentiation in the environment (D. E. Bilderback), and The ecological role of plant growth substances (F. B. Salisbury, N. G. Marinos).

As may be seen from the list of topics dealt with, the relation between some chapters is rather loose and several chapters overlap in treating the same or related material. But in spite of this defect, the individual chapters give an excellent up-to-date review of our knowledge of the possible role of plant hormones in mediating the effects of environmental factors on plants, and most of them also a critical evaluation of the gaps in it. As it is quite evident that the present knowledge is in many cases very fragmentary, many authors also outline the tasks for further research.

The new Encyclopedia volume is technically and graphically on the highest level — as we are accustomed to expect from this Series. It is an invaluable guide and source of information to any plant physiologist or biochemist dealing with hormonal regulation of plant growth and development from either the theoretical or practical point of view.

IVANA MACHÁČKOVÁ (*Praha*)

SEITZ, P.: FOLIEN UND VLIESE FÜR DEN GARTENBAU. 2., neubearbeitete und erweiterte Auflage. (Ulmer-Fachbuch : Fachgebiet : Gartenbau.) — Verlag Eugen Ulmer GmbH & Co., Stuttgart 1985. 244 pp., DM 58,—.

The purpose of this book is to provide a brief review of employment of plastic foils and sheets in horticulture. The introductory chapter is a short summary of the present state of exploitation of diverse types of foils and sheets in various countries and for various crops; the next deals with production, species, quality, features and properties of suitable foils and sheets. Chapter three, which occupies nearly half the volume of the book, is devoted to practical problems connected with types and mode of foil application in horticulture for mulching and building diverse types of greenhouses, tunnels and shelters for plant cultivation and storing. The changes of irradiance, temperature, humidity, CO₂ concentration under films and their consequences for plant growth and development are dealt with in a comparatively very short fourth chapter (12 pages). The next chapter is devoted to practical aspects of films handling. It is followed by a survey of broad usage of films and sheets in greenhouses, and of other possible applications of plastic materials in horticulture and related branches. In the concluding chapter the economy of film and sheet employment is treated.

The book is complemented by 84 photos, 43 schemes, 43 useful tables, a list of references and subject index. Although the book has been written mainly for horticulturists and agronomists, it will also be welcome by research workers interested in the methods of plant cultivation.

JARMILA SOLÁROVÁ (*Praha*)

KNAPP, R. (ed.): SAMPLING METHODS AND TAXON ANALYSIS IN VEGETATION SCIENCE. Handbook of Vegetation Science, Part 4. — Dr W. Junk Publishers, The Hague—Boston—Lancaster 1984. 370 pp. Dfl. 155, US \$ 67.50, £ 39.25.

Co-existence of plants in natural communities, and the structure of particular semi-natural or man-induced stands is studied by numerous procedures, which enable a reasonable estimate or quantification of various parameters and objects. However, these methods have never been adequately unified so that mutual understanding between scholars belonging to different nationalities and different "schools" of geobotany, plant sociology, phytocoenology, etc., was seriously impeded. New generations of ecologists require a summarization of previous experience and a proposal of reasonable linkage of detailed experimental techniques with expeditious work.

Under the editorship of Prof. Knapp, 22 leading experts in vegetation science from 13 countries united in the goal to clarify the role of taxonomic analysis in delimitation of geobotanical units, and the concepts related to aboveground and underground structures of vegetation stands. The

essence of this book is to find out a reasonable "relevé", i.e., a multilateral record of all features reflecting the status of a plant community or stand. In the recent decade, classical relevés of the Zürich-Montpellier School of phytosociology have often been declared as unobjective and new parameters for quantitative sampling were incessantly proposed by the representatives of American and British ecology.

The book under review is a balanced overview of reliable and useful techniques used by European "continental" ecologists and those defending more strictly mathematical and statistical methods. Four articles analyse the scales adopted in estimation of abundance and cover in sample areas, which are a permanent source of confusion in mutual comparisons of synoptic tables and illustrations in the literature. The editor himself compiled a very comprehensive survey of quantitative parameters and qualitative attributes in vegetation analysis. "Minimal area", one of the most disputable concepts, is also discussed, and a summarizing table recommends a relevant size of relevé areas in various groups of plant communities. Ecologists of the "continental" school will appreciate the selection of experimental techniques used in the analysis of spatial dispersion of taxons or individuals in plant communities, written by D. Chessel and C. Gautier. Sampling of subterranean plant organs is the topic of another comprehensive paper; Mrs. Kutschera-Mitter's experience and advice will be appreciated.

Separation of phytosociological units should always involve careful identification of all taxons of vascular plants, including ecological races. Prof. Landolt compiled an instructive paper on the importance of closely related taxa for the vegetation analysis. His model of various types of relationships between morphological differentiation and ecological behaviour serves as a good illustration of uneven diagnostic value in diversified groups of plants. Different meaning of phenotypic variation and adaptive genetic variation are clearly illustrated in numerous examples.

The joint treatment of relevé procedures and taxonomic topics is, no doubt, the most valuable aspect of this new volume in the series *Handbook of Vegetation Science*. Roots of its philosophy and methodology are obviously in European "continental" ecology, however, it is building a useful bridge towards experimental schools "overseas".

J. JENÍK (*Třeboň*)

JACKSON, M. B., STEAD, A. D. (ed.): *GROWTH REGULATORS IN ROOT DEVELOPMENT*. British Plant Growth Regulator Group, Monogr. No. 10. — BPGRG, Wantage 1983. 116 pp., £ 6.05.

The acquaintance of the readers of this Journal with the above-mentioned book will be simple and easy: I will enumerate the titles and authors of the lectures included in this volume. Since the book belongs to a series dealing with closely related topics, I will mention also the four preceding monographs. Here are the titles of the lectures: Patterns and control of lateral root initiation (Charlton), Control of root growth by endogenous IAA and ABA (Pilet), Hormonal control of storage root growth (Elliott *et al.*), Absciseic acid and indole-3-acetic acid in maize roots subject to water, salt and mechanical stress (Lachno), Mechanical impedance and root growth — the role of endogenous ethylene (Dawkins *et al.*), Effective auxin treatment of leafless winter cuttings (Howard *et al.*), Some effects of plant growth regulators on root and shoot development and mineral ion nutrient uptake in winter wheat (Cooke *et al.*), Regulation of root growth and morphology by ethylene and other externally applied growth substances (Jackson). The book we are dealing with represents monograph No. 10 of the series. The four preceding titles are the following (Nos. 6 to 9): Aspects and prospects of plant growth regulators, Opportunities for manipulating cereal productivity, Growth regulators and plant senescence, Interactions between nitrogen and growth regulators in plant development. The series is published by the British Plant Growth Regulator Group. The aim of the Group is "to provide a forum for the discussion and exchange of ideas between those interested in plant hormones and plant growth regulation. Primary objectives are to encourage closer links between fundamental and applied research...". The present volume proves well the accomplishment of the aim of the Group. It is useful, clever and inexpensive.

K. BENEŠ (*Praha*)

WORREST, R. C., CALDWELL, M. M. (ed.): *STRATOSPHERIC OZONE REDUCTION, SOLAR ULTRAVIOLET RADIATION AND PLANT LIFE*. Ecological Sciences Vol. 8. — Springer-Verlag, Berlin — Heidelberg — New York — Tokyo 1986. 375 pp. Hard cover DM 158.—.

This book contains 26 contributions to the Advanced Research Workshop held in Bad Windsheim, Federal Republic of Germany, 27–30 September, 1983.

Determination of an ozone layer change requires complex models taking into account many interaction processes and feedback mechanisms. Several contributions are devoted to this problem. The article of a special importance is *A new UV-B Handbook*, Vol. 1, published by S.A.W. Gerstel and coworkers. The data presented in tabular and graphical form for the seven wavelengths 290(5) 320 nm, the right northern latitudes 0(10) 70 °, the 39 solar zenith angles 0(2) 76 °, the five assumed ozone depletions 0(5) 20 % and for summer and winter profiles give possibility of finding values of expected UV fluxes. Most of the presented articles deal with biological effects of UV-B radiation. Its influence upon photosynthetic processes, and on the fine structure of leaf tissue is discussed. Biomass allocation, total plant dry mass, average seed dry mass, seed protein and lipid concentrations of six field grown soybean cultivars were found to be significantly affected by enhanced UV-B radiation (the effects were both cultivar and UV-B dose dependent). A. H. Teramura presents the results of examination of combined effects of UV-B radiation and stress conditions on over 100 plant species and cultivars.

Plant protective mechanisms (damage repairing, reducing the amount of UV radiation actually reaching sensitive targets, minimizing the negative effects of damage that has taken place) are also discussed (C. J. Beggs and coworkers, D. Steinmüller).

Giving a broad survey of contemporary knowledge of the effects of increasing UV-B radiation on life, this book is a highly useful handbook to biologists and physicochemists.

LIBUŠE PAVLOVÁ (*Praha*)

LEOPOLD, A. C. (ed.): *MEMBRANES, METABOLISM AND DRY ORGANISMS*. — Comstock Publishing Associates, A Division of Cornell University Press, Ithaca—London 1986. 374 pp. Cloth \$ 49.50.

The majority of organisms are destroyed by desiccation, however, desiccation tolerance has been found in a relatively wide range of taxa, including numerous invertebrates, bacteria, fungi, yeasts, lichens and seeds or pollen of higher plants. Desiccation permits these organisms to suspend metabolic activity during stress and endure temperature extremes. The central question in this field is the nature of the desiccation tolerance mechanisms and this is also the main topic on which this book is focused.

The book contains a collection of 20 papers presented at the Conference on Anhydrous Biology held at Villa Serbelloni, Bellagio, Italy, in October 21–25, 1985. Some of the papers deal with the physical state of water in desiccated systems studied by a large number of techniques, for example, by measuring proton spin with nuclear magnetic resonance, dielectric properties, nuclear scattering, or using differential thermal analysis and calorimetry. In some others the biochemical approach predominates; they concern the compounds which are synthesized in tolerant organisms during the drying phase and the protection of membranes during desiccation. No less important is the biological approach dealing with the changes of structural characteristics and physiological processes during dehydration and rehydration with particular attention to the ability of organisms to survive the stress.

The individual papers are presented in the uniform way and their high value is supported by numerous figures and tables and an extensive bibliography.

The advanced theoretical knowledge in this field may also find technological applications, e.g. in improving seed storage, gene banks, preservation of dry foods and pharmaceutic products.

JANA POSPÍŠILOVÁ (*Praha*)