Sprague, G.F., Dudley, J.W. (ed.): **Corn and Corn Improvement.** Third edition. (Number 18 in the series Agronomy). - American Society of Agronomy, Crop Science Society of America., Soil Science Society of America, Madison 1988. 986 pp. US $ 66.00.

During the past three decades considerable advances have been made in every aspect of the breeding, production and use as well as in theoretical research made on maize. The reason for this research interest arises from the cultivation extent in the USA, where maize is the major crop of the cultivated land and its total production has exceeded one half of the worldwide production. This third edition (first edition 1955, second one 1977) provides an overview of the current status within each of the above mentioned areas and their interrelations.

The introductory chapters deal with the maize origin (W.C. Galinat), races (M.M. Goodman and W.L. Brown), genetics (E.H. Coe, Jr. *et al.*), cytogenetics (W.R. Carlson) and molecular genetics (V. Walbot and J. Messing) the cell and tissue culture techniques and *in vitro* manipulation (R.L. Phillips *et al.*). Only a short chapter (32 p.) reviews physiological processes *i.e.* the starch, lipid, nitrogen and other nutrient metabolism along with the importance of enzymes, photosynthesis and respiration in determining the maize productivity (R.H. Hageman and R.J. Lambert). The chapters on the breeding (A.R. Hallauer *et al.*) and production of hybrid seeds (R.D. Wych) are followed by a short treatise on climate (R.H. Shaw) and soil requirements and on production practices (R.A. Olson and D.H. Sander). Chapters eleven and twelve are devoted to the most important diseases (D.R. Smith and D.G. White) and pest insects (F.F. Dicke and W.D. Guthrie) in the USA. The last three chapters deal with breeding of special nutritional and industrial types of maize *i.e.* breeding for high oil, starch and/or amylose content, protein quantity and quality, of popcorn and sweet corn (D.E. Alexander), on the maize marketing, processing and utilization (S.A. Watson) and on the maize as a feed grain, forage crops and a by-product resource (T.W. Perry).

All chapters are accompanied by many tables, figures and broad lists of references; a good subject index is supplemented. According to the reviewer's opinion, the introductory chapters on the maize origin, races and genetics are too extensive and detailed (nearly 400 pages) while chapters on the maize anatomy, morphology and physiology are missing.

The book will be welcome as an important textbook with a broad use and therefore it will serve as a valid source of information for students, researchers and agronomists.

J. SOLÁROVÁ (*Praha*)

Fraser, R.S.S. (ed.): **Recognition and Response in Plant Virus-Interactions.** (Proceedings of the NATO Advanced Research Workshop on Recognition and Response in Plant-Virus Interactions, 1989). - Springer-Verlag, Berlin - Heidelberg - New York - London - Paris - Tokyo - Hong Kong 1990. Pp.467.

The workshop took place from 12-16 April 1989, at Bishop Otter College, Chichester, West Sussex, U.K. It was attended by more that 50 participants, including the representatives from eleven NATO countries. The objective was to examine the signalling events, defined in the broadest sense, at all stages of the viral replicative cycle, and to follow the subsequent response of the plant or consequences for virus replication.

The signalling between plants and viruses forms a special model system within the NATO programme on the "Cell-to-Cell Signals in Plant and Animals". Clearly the pathogen side of the interaction, the virus, is not a cell. But the recognition events between plant and virus, and the subsequent signalling and response mechanisms, involve host- and pathogen-specified molecules, just as is though to occur in plant-fungus or plant-bacterium interactions.

This book consists of the following sections: Section 1. Introduction and Comparative Studies (plant-virus, plant-bacteria and plant-fungus interactions); Section 2. Plant-Virus Interactions: Transmission, Host Range and Genetics (transmission of plant viruses by vectors, resistance and virulence, epidemiology); Section 3. Molecular Mechanisms of Plant-Virus Interaction. I. Infection,

Replication and Spread (interactions between plants and viruses, expression viral RNA genomes, replication RNA viruses *in vivo*, viroid replication, the movement protein of some plant viruses) II. Pathogenesis and Symptom Formation (signalling in viroid pathogenesis, the molecular biology of satellite RNA from the cucumber mosaic virus, cryptic viruses, viruses and plant growth regulators, disease development in the tobacco-TMV system, the entry of TMV-RNA into tobacco chloroplasts *in vivo* and *in vitro*); Section 5. Recognition and Response in Resistance and Virulence (modifications of the coat protein gene of TMV, hypersensitivity to TMV in N'-gene hosts, induction of plant genes by virus plant interactions, defense proteins, the inhibitor of virus replication associated with resistance responses, the intercellular spread of the potato leafroll luteovirus); Section 6. Exploiting Signalling in Crop Protection (the examination of the mechanisms of cross protection with non-transgenic plants, the coat protein-mediated protection against virus infection, the use and misuse of viruses in cloning and expression in plants).

This book represents a very useful survey of our knowledge of recognition and response in plant-virus interactions. The particular attraction of viruses and of viroids is that they can now be completely defined in molecular terms. For several of these minimal pathogens, the complete sequences of the nucleic acids and the proteins specified are known. There is much more information from X-ray diffraction and related techniques on the three-dimensional structure of the particle. In contrast, the molecular biology of the host reaction to virus infection is less understood; this area is now receiving greater attention, and there have been several recent advances in our knowledge.

L. ŠINDELÁŘ (*Praha*)

Patil, S.S., Ouchi, S., Mills, D., Vance, S. (ed.): **Molecular Strategies of Pathogens and Host Plants.** (Proceedings of the "U.S.-Japan Cooperative Science Seminar" Program). - Springer-Verlag, New York - Berlin - Heidelberg - London - Paris - Tokyo - Hong Kong - Barcelona 1991. Pp. 268.

This book is dedicated to the memory of Professors Tsune Kosuge and Syoyo Nishimura for their remarkable contributions to the science of physiological plant pathology and their unswerving commitment to the U.S.-Japan seminar series.

The meeting in the U.S.-Japan series was entitled "Molecular Strategies of Pathogens and Host Plants". It was held April 15-20, 1990, in Honolulu, Hawaii. The meeting constituted a turning point in was devoted primarily to the molecular biology of host-pathogen interactions. The chapters in this volume bear witness to a rapid pace of progress achieved in this short period of time in dissecting the molecular strategies of pathogen and host plants.

This book consists of the following chapters: Overviews (molecular strategies of the interaction between *Agrobacterium* and its host, molecular biology of fungal host-parasite interactions); Bacterial Strategies (distinct induction of pectinases as a factor determining host specifity of soft-rotting *Erwinia*, the production regulation of pectinases and other extracellular enzymes in the soft-rotting *Erwinia* spp., the charaterization and function of bacterial avirulence genes, organization and function of pathogenicity genes of *Pseudomonas syringae* pathovars *phaseolicola* and *syringae*, the role of indolylacetic acid biosynthetic genes in tumorigenicity, molecular analysis of phaseolotoxin production in *Pseudomonas syringae* pv. *phaseolicola*); Fungal Strategies (the molecular analysis of pathogenesis in *Ustilago maydis*, molecular analysis of genes for pathogenicity of *Alternaria alternata* Japanese Pear pathotype, a host-specific toxin producer, strategies for characterizing and cloning host specifity genes in *Magnaporthe grisea*, the rice blast fungus, the role of host-specific toxins in the pathogenesis of *Alternaria alterna*, suppressor production as a key factor for fungal pathogenesis); Plant's Response (molecular aspects of elicitation of host defense reaction, genetic fine structure analysis of a maize disease resistance gene, recognition of fungal nonpathogens by plant cells at the prepenetration stage, the role of phytoalexins in host defence reactions, regulation

of nodule gene expression in the plant-controlled ineffective alfalfa), of Disease-Resistant Plants (the use of somaclonal variation for the selection of disease-resistant plants) and Poster Abstracts.

This book reflects the enormous progress achieved in the investigation of host-pathogen interactions, especially in the areas of ultrastructure, biochemistry and chemistry. Hovewer, the recent development of direct, precise and powerful tools of molecular biology offers substantial hope that our quest to decipher the secrets of specifity will be implemented in a not too distant future. Indeed, if the progress made during the past several years in understanding the signal transduction and in isolation of genes involved in plant pathogenesis (and their regulation) is any guide, our hope is justified.

L. ŠINDELÁŘ (*Praha*)

Finn, R.K., Prave, P., Schlingmann, M., Crueger, W., Esser, K., Thauer, R., Wagner, F. (ed.): **Biotechnology Focus 2. Fundamentals. Applications.** - Hanser Publishers, Munich 1990.

The second volume of "Biotechnology Focus" provides another up-to-date collection of short monographs and reviews on different, rapidly developing branches of biotechnology. The first part: "Research and Development" includes a) "Microbial Chemistry and Biochemistry", b) "Techniques for Biotechnology" and c) "Applied Microbiology and Biochemistry". The first subpart begins with the paper on phosphatidyl inositol cycle, with special stress on the function of this cycle in plants. Different modes of the regulation of the gene expression in eukaryots are demonstrated on a relatively simple model - yeast. The carbonylation chemistry in anaerobic bacteria, ecologically important *e.g.* for the production of natural gas, is well surveyed. Different ways of energy conservation in the fermenting bacteria are described further, namely the substrate-level phosphorylation, the electron transport phosphorylation and the transport-coupled energizing (when "charged" membranes as energy-rich intermediates are formed). A review of the current state in the fast developing area - the peptide chemistry is given including the peptide application in biochemical and medical research.

The subpart "Techniques for Biotechnology" includes a paper on bacterial conjugation. This technique is very important for the transport transfer of chromosomal DNA between different bacterial cells, for the mutagenesis of bacterial DNA by transposom integration and especially for the development of the vector systems in both the bacteria and plants. The extensive review on the computer-aided protein engineering describes the technique how to tailor-make the proteins with improved properties. Unlike the prediction of the functional and energetic effects of the mutations, the prediction of the structural consequences of the site-directed mutations has been well developed. In Japan considerable attention has recently been paid to biosenzors. A review on enzyme senzors (e.g. fish freshness sensor), microbial sensors (*e.g.* mutagen sensor), hybrid biosensors and especially micro-biosensors is given in this part. The review on monoclonal antibodies includes their formation, structure and especially their use in both the basic research and medicine (*e.g.* in tumour localization). The classification of microbial secondary metabolites according to the biogenetic code has been made by Drs. Rohr and Zeeck. They distinct the substances derived from the metabolism of sugars, carboxylic acids and amino acids and combined types. The degradation of aromatic compounds has been currently receiving a lot of attention. A comprehensive review is given on a microbial degradation of benzene, toluene, xylenes, chloroaromatics, herbicides, fungicides and other aromatics. The further contribution describes the enzymatic formation of both individual flavour components and complex flavour mixtures, which is a region where biotechnology may find a considerable application.

From the practical point of view the second part of the book "Industrial Biotechnology" is especially useful. The first contribution in this part describes the methods of a single-strain isolation of microorganisms with the aim either to find new biologically active secondary metabolites or the strains with a defined metabolic pattern. The advantages of using enzymes or microorganisms for the preparation of optically active compounds have been illustrated on 8 examples. the next paper

deals with the preparation of microbial protoplasts and their use in biochemistry and genetics. An extensive overview of sterilization methods has been given by Dr. Crueger. The chemical synthesis of DNA has been briefly summarized. Low-molecular-mass natural substances recently isolated from microorganisms and their biological activities have been reported further.

The third part of the book covers "Industrial and Technical Information". The subpart "Codes and Regulations" includes *e.g.* the recommended nomenclature of the enzymes, an overview of microbial enzymes and their use in the food industry, the guidelines on the preclinical biological safety testing of the medicinal products derived from biotechnology, the guidelines to ensure the protection against the dangers arising from the recombinant nucleic acids constructed *in vitro*, or the recommendation for the handling of pathogen microorganisms. This part also includes the data on the research funding in Germany, the prospects of the gene and hybridoma technology, the profiles of several European companies and the list of journals in biotechnology and related topics.

An extensive subject index enables an easy orientation in the book. This book is very useful for all who want to have up-to-date knowledge of the biotechnology development, especially in the microbiological area.

R. VAŇKOVÁ (*Praha*)

Taiz, L., Zeiger, E.: **Plant Physiology.** - Benjamin/Cummings Publishing Company, Redwood City 1991. 559 pp. Hard cover US $ 50.00.

This entirely new texbook of plant physiology represents the first multi-author comprehensive undergraduate text in plant physiology. Such an approach, common in other scientific disciplines, was applied with the aim not only to accent the multidisciplinary basis of contemporary plant physiology but especially to provide the most relevant information in all the discussed topics. It is pleasant to state that the result of the effort of the author's team working under two Californian Professors. L. Taiz and E. Zeiger, is excellent. Under their leadership twenty-one contributors (eighteen from the U.S.A., one from Australia, Israel and England), each of them being an internationally recognized personality, made up the book, that can provide for students "both the knowledge and motivation to become the scientists who will lead plant physiology into 21 century".

The book is divided into 3 units and 2 separated chapters. It is organized in a modular way, *i.e.* the chapters covering the given topic are self-containing and self explanatory. This format enables to the lecturers to alter the order of the topics without sacrificing their intelligibility.

The two introductory chapters explain the fundamental concepts concerning cell biology and bioenergetics that are necessary for understanding the following chapters. The first unit "Transport and Translocation of Water and Solutes" contains five chapters dealing with water in plant cells, the plant water balance, mineral nutrition, solute transport and phloem translocation. The fundamental topic of the second unit ("Biochemistry and Metabolism"), the photosynthesis, is discussed in three chapters. Another topics involved in this unit concern the respiration and lipid metabolism, assimilation of mineral nutrients, surface protection and secondary defense compounds and stress physiology. The third unit "Growth and Development" is divided into seven chapters dealing with the cellular basis of the growth and morphogenesis, plant hormones (auxins, gibberellins, cytokinins, ethylene and abscisic acid), with phytochrome and morphogenesis and the control of flowering. Every chapter (besides the introductory section) is supplied by one or two essays better elucidating either some aspects of the relevant topic or recent analytical or biotechnological methods.

The text is accompanied by rich illustrative material of which photographs and schemes demonstrating the molecular, cell, and tissue structures deserve particular appreciation. The attention paid to the individual topics can be argued but according to my opinion none of the relevant themes of the contemporary plant physiology is not disproportionately curtailed.

This actually modern textbook can be recommended not only for use at universities but also to all plant physiologists learning to be "up-to-date".

L. MERAVÝ (*Praha*)

Lawlor, D.W.: **Photosynthese. Stoffwechsel-Kontrolle-Physiologie.** - Georg Thieme Verlag, Stuttgart - New York 1990. 377 S. [In German].

In der Reihe der flexiblen BIO-Taschenbücher des Thiemeverlage erscheint die Übersetzung des Lehrbuchs von D.W. Lawlor über die Photosynthese (englische Ausgabe bei Longman, London 1987). Das Buch bietet eine Darstellung der Teilprozesse der Photosynthese in Pflanzen auf den Organisationsebenen der Moleküle, der Organellen, Zellen und Organe unter Berücksichtigung von photophysikalischen, biochemischen und physiologischen Aspekten. Das Lehrbuch behandelt die Grundlagen der Lichtabsorption durch die Pigmente, die Erzeugung energiereicher organischer Moleküle und die Reduktion von Kohlendioxid, Nitrat und Sulfat. Es wird gezeigt, wie der komplexe Prozess der Photosynthese eng an die Strukturen und Funktionen der Pflanzenblätter gebunden ist, wo sich die Energie-und Material-flüsse abspielen. Die Photosynthese wird als Regulation der Lichtaktivierung, des biochemischen Bedarfs und der CO_2-Zufuhr geschildert. Es werden der Einfluss von externen und internen Faktoren auf die Photosynthese, die ökophysiologischen Varianten der Photosynthese bis zur resultierenden Stoffproduktion der Pflanzen behandelt. Die Übersetzung des Lehrbuchs hat M. Behncke übernommen. Die deutsche Ausgabe ist jedoch umgearbeitet und ergänzt worden (vom Autor und Prof. Dr. D.-P. Häder), um sie auf den neuesten Stand zu bringen.

Die Ausstattung dieses Thieme-Taschenbuches ist traditionell ausgezeichnet. Es enthält 98 zweifärbige Abbildungen und Schemata, 17 Tabellen und am Ende jedes der 12 Kapitel ein Verzeichnis weiterführender Literatur. Ein Abkürzungs- und ein Sachverzeichnis sind hinzugefügt.

Das Lehrbuch is in erster Reihe für Studenten und Doktoranden der Biologie bestimmt sowie für all diejenigen, die Mechanismen der Photosynthese und ihre Steuerung verstehlen wollen.

I. TICHÁ (Praha)

Jackson, M.B., Davies, D.D., Lambers, H. (ed.): **Plant Life under Oxygen Deprivation. Ecology, Physiology and Biochemistry.** - SPB Academic Publishing, The Hague 1990. Pp. 336. US $ 75.00.

The plants in most natural and farmland ecosystems are subjected to an impeded aeration at some stage of their development, although clearly, the stress prevalence varies enormously. The achievement of a long-term tolerance to the prolonged periods of poor aeration by some plants explains the existence of a large wetland flora that holds considerable economic, social and environmental significance in many countries. The information about the physiological and biochemical processes that underlie both the tolerance and injury can thus be expected to help the efforts to understand and manage the areas of natural wetland more successfully, to improve the performance of the agricultural crops subjected to the soil waterlogging, and to refine the storage systems for harvested production. The topic is divided into three sections: 1. Ecological and Physiological Perspectives, 2. Biochemistry of Oxygen-Deficient Cells, and 3. Root-Shoot Relationships of Flooded Plants.

The contributions to Section 1 of this volume are focused on the effects of inundation at the environmental, ecological and physiological levels. The opening chapter deals with the wetlands and their status and role in the biosphere. It highlights the serious consequences to the environment and to the communities if wetlands continue to be destroyed as at present. Chapter 2 analyses one of the great wetlands of the World, the flooded forest of Brazil with an enormous diversity of plant as well as animal species. The flooding resistance of rhizostomatous amphibious plants with a

considerable emphasis placed on the aeration of submerged parts by the internal pathways comprising the interconnected intercellular space within the plants is described in Chapter 3. The next chapter considers the hormones involvement, the morphological adaptation and especially the induction of fast underwater elongation. Beneficial effects of the oxygen deprivation on the germination and plant development are dealt in the Chapter 5. The following chapter discusses complex interactions between the ice encasement and the previous soil waterlogging, and assesses the recent progress in developing the crop plants with an improved tolerance to these severe conditions. The closing chapter of this section summarizes the chemical and microbiological processes that generate anaerobic soil toxins and influence the availability of several mineral elements.

The second section of the book considers the biochemistry of oxygen-deficient cells. The introductory chapter of this section accounts the ways in which animal cells respond and metabolically adapt to the restriction of oxygen supply. The altered metabolic pathways result in a lower energy yield, the production of anaerobic proteins and in the consequence restricted production of other proteins. Chapter 9 deals with the anaerobic protein production in the maize and its importance in prolonging survival under anoxic stress. A short overview on a cyanide resistance in the plant respiration and particularly in the mitochondrial oxidations, emphasizing the main characteristics of the alternative pathway and the complexities of its functioning, is given in Chapter 10. The metal- and metalloenzyme-catalyzed oxygenation and oxidation that utilize oxygen but have little or no energy yield are described in the next chapter. The reacclimatisation to the well-aerated conditions after the oxygen deprivation is considered in Chapter 12 on the respiratory behaviour of submerged rice seedlings after exposure to air. The following chapter deals with metabolic changes necessary to maintain cell viability in roots of rice under anaerobic conditions. Chapter 14 is devoted to mitochondrial ultrastructure in relation to the extent of plant (wheat, pea and maize) resistance to oxygen stress under primary and secondary anoxia. The study of cell ultrastructure was accompanied by parallel investigations of energy status during anoxia and after anoxia, by determinations of the utilization of saccharides and the accumulation of end-products of fermentation. In the further chapter evidence supporting the role of lipids and mitochondrial metabolism in *Echinochloa phyllopogon*'s tolerant anaerobic response is presented. Concluding chapter of the second section is devoted to fruit metabolism and practical problems of fruit storage under hypoxia and anoxia.

Four chapters of the last section deal with the root-shoot relationships of flooded plants. The opening chapter of this section discusses the root respiration in relation to the internal oxygen transport at a low external oxygen availability and thereafter special attention will be given to the mechanism of the aerenchyma formation in roots. In the Chapter 18 models are presented based on experimental, morphological and mathematical studies depicting an internal mosaic of oxygenation within the roots. The last but one chapter sets out to review our knowledge of convective gas-flows and to make assessment of the relative importance of the convections and diffusion in the aeration of wetland species. The concluding review examines the evidence concerning the role of the mineral nutrition in flooding damage to shoots, and the anoxia-tolerance of the roots in higher plants.

The book is of interest for research workers, teachers and graduate students of plant biochemistry, physiology, ecology and agronomy.

J. SOLÁROVÁ (*Praha*)

Lichtenthaler, H.K. (ed.): **Application of Chlorophyll Fluorescence in Stress Physiology, Hydrobiology and Remote Sensing.** - Kluwer Academic Publishers, Dordrecht - Boston - London 1988. 366 pp., NLG 170.00.

Principal knowledge of the relationship between the structure and function of the photosynthetic apparatus and fluorescence signal obtained during the last decade as well as construction of high performance, transportable equipments gave rise to a broad application of *in vivo* chlorophyll

fluorescence for testing photosynthetic organisms. The aim of the symposium, which was held in Bad Honnef, F.R.G., was to discuss and summarize our knowledge of the application of the *in vivo* chlorophyll fluorescence and to present the newest techniques used in this field as well. The contributions proved that chlorophyll fluorescence is very important tool in diverse fields, particularly in plant physiology, ecology and oceanography.

The book follows a well built logic architecture. It starts from the contributions describing the basic relations of the fluorescence emission and photosynthetic activity, structure of chloroplast membranes and gas exchange. These items including low-temperature fluorescence spectroscopy and plant age are discussed in the first chapter "Application in Relationship to Photosynthetic Research".

The response of fluorescence and delayed luminescence parameters to the action of different stress factors (high irradiances, cold, winter, pollution, drought and UV radiation) are held in the second chapter titled "Application in Stress Physiology and Environmental Research".

The third chapter ("Application in Hydrobiology, Limnology and Oceanography") deals with the fluorescence determination of pigment contents and the amount and types of photosynthetic organisms including the application of the fluorescence in a remote sensing of large water surface.

The principles of detecting passively (sun light) or actively (laser) induced chlorophyll fluorescence on long distances and the characterization of damage and yield potential on large territories of vegetation are the objective of the last chapter ("Application in Remote Sensing of Terrestrial Vegetation").

A large number of contributions deals with recently developed devices. The papers describe such matters as the principles of operating of the well known PAM fluorometer, the LIDAR systems for remote sensing, the equipment for a long distance measurement of the laser induced fluorescence, the diode array based devise, which enables an instantaneous measurement of the whole emission spectrum, the laser induced fluorometer with a fast optoacoustic modulator for fast measurement of the changes in the fluorescence spectrum and the techniques for a distantional measurement of the live times, delayed fluorescence and reflectance.

The book does not only cover the proceedings of the first symposium on the application of chlorophyll fluorescence, but it can also serve as an introduction to the various fields of the application of the *in vivo* chlorophyll fluorescence techniques. The book is well printed on quality paper. The camera ready printed contributions include many figures, tables or schemes of equipments.

P. ŠIFFEL (*České Budějovice*)

Baker, D.A., Milburn, J.A. (ed.): **Transport of Photoassimilates.** Longman Scientific Technical, Harlow; J. Willey and Sons, New York 1989.. Hardcover UK £ 44.00.

This latest publication on the translocation of the photoassimilates appears after the period when the researchers from various areas - ranging from the agronomists, horticulturalists and physiologists with interests in water relations, ion transport and hormonal control, to anatomists, developmental morphologists and biochemists - have found the role that phloem plays in the higher plants.

The book reviewed includes eight chapters. The respective chapters are considered in detail by a team of international experts, each providing an in-depth coverage of the current knowledge available from their own particular area of specialization. The first chapter ("Transport of photoassimilates within photosynthetic cells" by M.N. Sivak, R.C. Leegold and D.A. Walker) explains the major movement of metabolites and the control mechanisms which provide solutes for the subsequent transport. The intercellular movement of solutes between the leaf cells is the subject of Chapter 2 (by M.A. Madore and W.J. Lucas). In Chapter 3 (H.-D. Behnke) the pathways for the long-distance transport of the photoassimilates are presented in a detailed description of the phloem structure. The composition of the solutes transported via the pathway with reference to their destination and subsequent fate is discussed in Chapter 4 (by J.S. Pate). Chapter 5 describes the

mechanism whereby endogenous solutes are loaded into the phloem in the source tissues (S. Delrot). The events occurring in the sink tissues associated with the unloading of photoassimilates and the regulation of this process (by W. Eschrich) are considered in Chapter 6. The driving force for the long distance transport through the phloem is the topic of chapter 7 (J.A. Milburn, J. Kallarackal). Finally, the relationships between the source and sink organs and the subsequent regulation of the compartmentation and partitioning within the plant (by J.A. Milburn and D.A. Baker) are the topic of chapter 8.

The book is excelently produced and well edited. The text is accompanied by a number of figures (74) and tables (10). Most of the figures are quality black-and-white or coloured micrographs.

The book undoubtedly provides the detailed understanding of the subject for the undergraduate and postgraduate levels of study. It will also serve as an excelent source of information for the research workers and scientists in biochemical, biological and agricultural sciences.

J. SAVINEC (*Praha*)

Groot, J.J.R., De Willigen, P., Verbene, E.L.J. (ed.): **Nitrogen Turnover in the Soil-Crop System. Modelling of Biological Transformations, Transport of Nitrogen and Nitrogen Use Efficiency.** (Proceedings of a Workshop held at the Institute for Soil Fertility Research, Haren, The Netherlands, 5-6 June 1990.) - Kluwer Academic Publishers, Dordrecht - Boston - London 1991. 386 pp.

This publication (volume 44) of the series "Developments in Plant and Soil Sciences" contains the papers presented at the workshop organized by the Institute for Soil Fertility Research on the occasion of its centennial. The 40 participants were requested to run their models with the data provided by the institute. The main purpose of the workshop was to provide scientists a possibility presenting their own works and acquainted with the work of the others, with modelling the nitrogen turnover and the availability in the soil and plants as well. The general knowledge included in the simulation models enables summarize and integrate the up-to-date knowledge and to use it economically in the plant production after verification.

The given proceedings were of five topics: Nitrogen Content and Its Turnover in Soil Effects of Nitrogen Content on Soil and Crops, Effects of Nitrogen Content on Plants, Nitrogen Nutrition of Crops, Nitrogen Cycle in the Ecosystem. Stress was rightfully put on the water potential in the crops. Except of the given proceedings all the participants were requested to run their model with the experimental data provided by the institute. All the 14 given models of the soil-crop systems are mutually compared.

The published models display the effects and turnover of nitrogen in the ecosystem but also its economical use, the minimalization of the losses and environmental polution. Some models can be used for predicting the minimum amount of nitrogen in the soil.

The publication is well arranged and elaborated in detail. It is very useful for the laboratories of plant nutrition, for the agronomists, research staff, teachers and students dealing with the nitrogen nutrition including the modelling of its effects on soil and crops.

V. NOVÁK (*Praha*)