Thaiszia - J. Bot., Košice, 7: 8, 1997

THAISZIA
Journal of Botany

New book received

G. BRITTON, S. LIAAEN-JENSEN & H. PFANDER [eds.]: Carotenoids. Volume 2: Synthesis.

Birkhäuser Verlag AG, Klosterberg 23, P.O Box 133, CH-4010 Basel, Switzerland, 1996, 359 pp., ISBN 3-7643-5297-3

Carotenoids, Vol. 2 is the book devoted to the chemical synthesis of carotenoids. Much of the information is also relevant to the synthesis of vitamin A and related retinoids. Carotenoids provides an introduction to the fundamental chemistry of these important compounds, detailed accounts of the basic methods used in carotenoid research, and critical discussions of the biochemistry, functions and applications of carotenoids.

The book consists of four chapters providing information of the perspectives, principles and strategies of carotenoid synthesis. Preparation of polyene synthons and carotenoid end groups, and the coupling reactions commonly used for carbon-carbon double bond formation are described in detail. The commercially important technical syntheses used for the large scale carotenoids are also covered. Tables of useful synthons and a list of natural carotenoids that have been prepared by total synthesis are included as appendices.

Bringing together up-to-day knowledge on carotenoids the book will be of particular interest to specialists in this scientific field.

Thaiszia - J. Bot., Košice, 7: 74, 1997

THAISZIA
Journal of Botany

Book review

BRIAN SUTTON [ed.]: A Century of mycology.

Cambridge University Press, The Pitt Building, Trumpington Street, Cambridge CB2 1RP, U.K., 1996, 398 pp., Price: US$ 90.00, ISBN 0-521-57056-5

British Mycological Society, founded in 1896, occasionally centenary organized symposium. Nine British and three American authors gave an account of the British contribution to mycology. Introducting paper of J. Webster rewieved scientific advances in many topics of mycology initiated by British mycologists during the twentieth century. C. T. Ingold in „My involvement with aquatic hyphomycetes" brings together the research results of all his life. Extensive bibliography in D. N. Pengler „Advances in tropical mycology initiated by British mycologists" indicate knowledges obtained from nineteenth century. Interesting contribution of amateurs to the British Mycologial Society is described by R. Wathing.

Following chapter deal with important problem of mycology: Conidiogenesis, classification and correlation (B. C. Sutton), The flagellated fungal spore (M. S. Fuller), Interconnectedness and individualism in fungal mycelia (A. D. M. Rayner), Fungal secondary metabolism: regulation and functions (A. L. Demain), The nature and extent of mutualism in the mycorrhizal symbiosis (D. J. Read). One chapter was devoted „Lichens and the environment" by M. R. D. Seaward. Recording and mapping fungi, the last poper of D. W. Minter at lenght inform about database of the British Mycological Society.

The book is an valuable accession to every mycological library.

M. REPČÁK

Thaiszia - J. Bot., Košice, 7: 98, 1997

THAISZIA
Journal of Botany

Book review

L. D. KAPOOR (Ed.): Opium Poppy. Botany, Chemistry, and Pharmacology.

Food Products Press, an imprint of The Havorth Press, Inc. New York, London 1995, XVIII+326 pp. ISBN 1-56024-923-4

The presented monography reviews knowledge about opium poppy, the oldest medicinal plant. L. D. KAPOOR is a retired scientist from the National Botanical Research Institute in Lucknow, India. The book surveys in eleven chapters substance information focussed on botany, cultivation and chemistry of pharmacologically important alkaloids.

Introduction chapter summarizes history of opium poppy. In botanical chapter genus Papaver somniferum as well as some other species important in production of alkaloids are described. Separate chapter is devoted to cytology and genetics. Contain data about breeding of plant and production of morphinan alkaloids by means of cell cultures of poppy and bioconversions are included too. Agricultural chapter deals with cultivation, especially fertilization, irrigation, weeding, harvesting, yield of opium, diseases and control. Physiological part of monography describes the facts on germination, photoperiodism, respiration, effects of growth regulators and external factors affecting opium, and morphine content. Full anatomical chapter is devoted localization of laticifers, especially in relation to ontogenesis.

Review of alkaloids contains data about 38 compounds including pharmacology. Extremely valuable is the chapter on biosynthesis of opiate alkaloids, some physiological aspests of their formation, bound forms of alkaloids and metabolites. Next chapter - Occurence and role of alkaloids in plants - reviews the distribution and functions of this group of compound in Plant Kingdom. The last chapter - Evaluation of analgetic actions of morphine in various pain model in experimental animals - wrote K. Ramabadran and M. Bansinath.

The monography is very important for botanists, plant physiologists, phytochemists, pharmacologists, toxicologists and other specialists in medicinal plant research.

M. REPČÁK

Thaiszia - J. Bot., Košice, 7: 101-110, 1997

THAISZIA
Journal of Botany

Book review

J. A. WOLFF [ed.]: Gene Therapeutics. Methods and Applications for Direct Gene Transfer.

Birkhäuser Verlag AG, Klosterberg 23, P.O Box 133, CH-4010 Basel, Switzerland, 1994, 417 pp., ISBN 3-7643-3650-1.

This book, which reviews all areas of gene therapy and is aimed particulary at direct in vivo gene therapy, provides an essential reading for scientists in pharmacy and biotechnology, as well as clinicians interested in new technologies for the treatment of human diseases.

The book is divided into three parts including scientific background, methods and mechanisms, and applications.

The first chapter sumarizes history of gene transfer and therapy, presents mouse genetic models for human diseases and brings considerations on posttranscriptional processing and translations, as well as promoters, enhancers and inducible elements for gene therapy.

The second part comprises different methods and mechanisms of the gene delivery and in vivo gene therapy including the use of liposomes as gene carriers, receptor-mediated DNA delivery, particle bombardment, electrically-induced and calcium phosphate-mediated DNA transfer.

The third part deals with concrete applications of gene transfer in gene therapy including, for example, the use of HSV and retrovirus in glioma tumor therapy, gene therapy for adenosine deaminase defficiency and malignant solid tumors, gene therapy for arthritis, retroviral-mediated gene transfer for muscular dystrophy and more. Different approaches and methods for in vivo gene transfer are presented as well.

The present book provides a valuable theoretical background inforamation and recently available DNA technologies for direct gene transfer for gene therapeutics in human and offers the reader a firm grounding in the subject.

E. ČELLÁROVÁ

B. MULLIS, F. FERRÉ & R. A. GIBBS [eds.]: The Polymerase Chain Reaction.

Birkhäuser Verlag AG, Klosterberg 23, P.O Box 133, CH-4010 Basel, Switzerland, 1994, 432 pp., ISBN 3-7643-3607-2

The Polymerase Chain Reaction is the first comprehensive handbook on PCR edited by the inventor of PCR and the Nobel Prize winner in chemistry, Kary Mullis, and two prominent experts in this field. The present book is not only a manual of basic and advanced PCR techniques but widely discusses the impact of PCR on different fields of research and practical applications. The first part contains a review of basic PCR principles and a detailed examination of some recently developed PCR-based techniques, an information about cloning of PCR products, optimization of multiplex PCRs, preparation of nucleic acid for archival material and PCR amplification of viral DNA and viral host mRNAs in situ. Advanced PCR methods presented in this part comprise those aimed at relative, and most recently also absolute quantitation of DNAs and mRNAs, and non-radioactive detection of PCR reactions like fluorescence or enzyme-labeled oligonucleotides. This part contains also an information on PCR instrumentation like Rapid Cycle DNA Amplification, automating of the PCR process and the use of PCR in DNA sequencing. Some chapters are supplemented with a relevant experimental protocols.

In the second part general and specific applications of PCR in different areas are presented. Valid and reliable approaches of PCR-based techniques in forensic science, molecular archeology, gene therapy and diagnostics as well as genetic analyses in population biology, epidemiology and other fields are presented with a balance between theory and achieved results and indicate their applications to new areas.

A short but valid chapter discusses the application of PCR in plant sciences and indicates future directions in this field.

Final part discusses the role of PCR in the world business including human and veterinary diagnostics.

The present book provides the most up-to-date theoretical knowledge and methodological protocols as well as new techniques and enhanced applications of the PCR and is a valid quide for any researcher working with PCR.

E. ČELLÁROVÁ

P. BRANDT: Transgene Pflanzen.

Birkhäuser Verlag AG, Klosterberg 23, P.O Box 133, CH-4010 Basel, Switzerland, 1995, 306 pp., ISBN 3-7643-5202-7

The present book sumarizes methods for direct and indirect gene transfer and results of experiments and experiences with the fate of foreign genes in transgenic plants. The legistative rules for transgenic plants of the European Union and individual EU member states as well as other countries outside the EU are included.

Wide spectrum of methods comprises gene transfer via Agrobacterium plasmids, viral vectors, liposomes, particle-gun bombardment, microinjection, electroporation and more and provide the reader a brief review of up-to-date developed techniques.

The main part is dealing with concrete results of foreign gene expression in transgenic plants. It contains a detailed information on herbicide, virus, bacteria, insect and nematode resistance as well as production of compounds like aminoacids, peptides, alcohols and secondary metabolites in plants enriched by foreign gene. All chapters are well documented by relevant plant species.

This book provides a valid information on methods for gene transfer in plants and up-to-date achievements and prospectives in this field with respect to the national and international rules of biosafety for genetically modified plants.

E. ČELLÁROVÁ

MOHAN JAIN, S. K. SOPORY & R. E. VEILLEUX [eds.]: *In Vitro* Haploid Production in Higher Plants. Volume 3: Important Selected Plants.

Kluwer Academic Publishers, P.O. Box 989, 3300 AZ Dordrecht, The Netherlands, 1995, Price: US$ 157.50, ISBN 0-7923-3579-1

This comprehensive volume covers plant-specific aspects of *in vitro* haploid production and utilization. The value of haploids in genetic analysis and plant breeding has been known for a long time. As haploids occur only rarely in nature, many attemps have been made to produce haploid plants *in vitro*. During the past three decades many improved methods as well as nutrient media have been developed to increase the efficiency of production of androgenic haploids, from cultured anthers as well as isolated microspores, in a wide variety of species. Success has been achieved in obtaining gynogenic haploids from cultured ovaries or ovules. As a results, haploids are being used increasingly and profitably in breeding programmes for the development of new and improved cultivars.

In the set of volumes of *In Vitro* Haploid Production in Higher Plants, an attempt has been made to assimilate detailed descriptions of various aspects of anther culture and related *in vitro* procedures. This third volume has 20 chapters focussed on haploid breeding in selected important crops including vegetables (*Allium* spp., *Brassica* spp., *Capsicum*, *Cichorium*, *Cucumis*, *Solanum melongena*, *Solanum tuberosum*); fruit crops (*Malus*, *Fragaria*, *Vitis*); and other miscellaneous crops (*Beta*, *Coffea*, *Ginkgo*, *Glycine*, *Medicago*, *Saccharum*, *Sinocalamus latiflora*). Each chapter contains some introductory material about the selected plant, the techniques used most successfully for haploid production, the factors influencing the success of these techniques, the identification and genetic characterication of haploid regenerants, the application of haploids in breeding, and a brief conclusion on the potential of haploid breeding for the crop.

The book is unique in bringing together recent research on haploid production by key workers in the field. Although the reviews will be of particular interest to specialists, they will also be accessible to students.

R. BRUTOVSKA

R. F. EVERT & S. E. EICHHORN: Laboratory Topics in Botany. To accompany Raven, Evert, Eichhorn, Biology of Plants, 5th edition.

Worth Publishers, 33 Irwing Place, New York 10003, 1992, 384 pp., ISBN 0-87901-521-7

The aim of the handbook is to give instruction to students before beginning an experiment. Important part of general botany fundamentals students must learn in the laboratory. The present laboratory manual in plant biology brings 34 topics and 5 appendices. Individual topic contains general comment, reference to textbook for student preparation, exercises with description of procedures, laboratory review questions and problems. The first 11 topics deal with introductory cytology themes (the microscope, introduction to vascular plant body and eucaryotic cell, organic molecules, mitosis and cytokinesis, movement of substance into and out of cells, respiration and enzyme action, photosynthesis, meiosis, DNA isolation and genetics). The next 7 topics are devoted to non vascular and seedless vascular plants (bacteria, fungi, protista, bryophyta, ferns). In the succeded chapters gymnosperms and angiosperms, fruits and fruit development, early development of the plant body, cells and tissues of the plant body, the root, primary structure of stem, the leaf, woody stems and secondary xylem are described. Some topics are physiological and ekological (growth regulators, external factors of plant growth, inorganic nutrients required by plants, movement of water and solutes in plants). One topic is presented as computer simulation exercises.

This book is an excellent laboratory manual for student written by the world experts on botany.

M. REPČÁK

R. L. ROUSEFF & M. M. LEAHY [eds.]: Fruit Flavors. Biogenesis, Characterization, and Authentication.

ACS Symposium Series, ISSN 0097-6156; 596. American Chemical Society, Washington, DC 1995, X+292 pp. Clothbound, ISBN 0-8412-3227-X

The book was developed from the Symposium sponsored by the division of Agricultural and Food Chemistry at the 206th national meeting of the Americam Chemical Society, Chikago, Illinois, august 22 - 27, 1993

Fruit flavors exist as complex chemical mixture are of interest in the flavor industry and food - beverage industry. Commertial success follows the advances of analytical and sensory techniques, researches in specicfic fruit cultivars. The book contains 25 chapters divided into six topic parts.

Analytical and sensory characterization of fruit flavors deals with *Teobroma grandiflorum*, orange juice, *Averrhoa carambola*, *Passiflora edulis* and *Actinidia chinensis*. Combining analytical (GC - MS) and sensory measurement authors bring new data about volatiles. Authentication of fruit flavors describe the estimation methods of detection adulterated fruit flavors (gas chromatography - isotope ratio mass spektrometry etc.) Understanding fruit flavors: biogenesis and biotechnology reports novel carotenoid - derived compound of *Averrhoa carambola*, odor active compounds in *Vitis labruscana* cv. Concord, substrate specificity of strowberry and banana fruits alcohol acyltransferase (AAT, enzyme in the biosynthesis of volatile esters), microbial conversions of citrus d-limonene, esters biosynthesis in mature apples and under

condition of controlled atmosphere. Fruit flavors precursors informs on glycosides progenitors of tomato, apricot, mango and other temperate and tropical fruits and precursors of β- damascenone in apples. Packaging and storage interactions impacts the flavor - package interaction on orange juice quality and off-flavor development of several fruit type. Environmental, maturity and varietal flavor differences deals with vegetative flavor and methoxypyrazines in Cabernet Sauvignon wines, volatile flavor compounds from wild diploid *Vaccinium* species, key aroma compounds of *Cucumis melo*, γ - lactones of apricot flavor, furaneol and derivatives in *Fragaria ananassa* and putrid aroma compounds of *Ginkgo biloba* fruits.

M. REPČÁK

G. KERSTIENS [ed.]: Plant Cuticles. An integrated functional approach.

BIOS Scientific Publishers Ltd, 9 Newtec Place, Magdalen Road, Oxford OX4 1RE, U.K., 1996, 352 pp., ISBN 1-8599-6130-4

The book presents reviews, case studies and methodological papers from the Discussion Meeting held at the 1996 Annual Conference of the Society for Experimental Biology in Lancaster (UK). In 17 chapters it brings results of work of 27 researchers from a wide range of scientific fields (palaeobotany, molecular biology, physiology and pathology of plants, micrometeorology). It provides information concerning cuticular structure and properties that are related to its functions. At the same time, some of these functions are linked to each other and the book enables to consider possible connections between different processes.

The cuticle with epicuticular waxes forms the outermost covering of the above-ground plant organs. It plays a significant role in the controle of the water loss from the leaves, the retention of water on the plant surface, the uptake of solutes, protection against excessive radiation and in interactions with pathogens and insect pests.

The book can be divided into several parts, each dealing with certain cuticular functions and properties.

The first chapter presents palaeobotanical research of the fossil plant cuticles. On the basis of available data D. Edwards, G. D. Abbott and J. A. Raven discuss cuticular construction and chemistry, probable functions and evolutionary pressures that led to its formation.

In the second chapter C. E. Jeffree summarizes the data on the structure, composition and ontogeny of the cuticular membrane and epicuticular waxes of vascular plants.

The biosynthesis of the major cuticular components (cutin and waxes) is described by P. E. Kolattukudy in the third chapter. Although the biochemical pathways have been elucidated, the enzymes involved in these processes and the genes encoding the proteins are not known yet. The author discusses also the way in which the cuticle affects fungal spore germination and how epicuticular waxes and cutin monomers activate transcription of genes in the spore allowing germination and appressorium formation.

The cuticle with associated waxes acts as a barrier for permeation of water wapour, gases and solutes (including agrochemicals). Furthermore, it influences the interception and reflection of incident radiation as well as fungal attachment and initiation of penetration. This part of the book consisting of 5 chapters deals with the protective functions of the cuticle.

Chapters 9 -13 are focused on the analysis of epicuticular waxes and the role they play in interactions between the host plant and insect pests as well as their predators (selection of a host, movement, feeding, oviposition) and in development of fungal parasites.

Water -repellent properties of the cuticle prevent the external water (air humidity, rain and dew) from penetration. It forms droplets or a continuous film on the surface depending on cuticular wettability, morfology and orientation of the leaf. Next 3 chapters review the data on how the surface water enables infection by pathogens and interactions with air pollutants. Responses of the insect to surface wetness and influences of the deposited air pollutants on folial microflora and cuticular wettability are described here.

The concluding paper pays attention to ecological significance of the cuticle in natural environments.

The book brings together the currently available data as well as the questions that remain to be answered. It is particulary valuable for researchers in the field of plant physiology, pathology, ecology and for workers in agriculture, but it can provide material for students and lecturers as well.

V. ŠVEHLÍKOVÁ

W. LI & D. GRAUR: Fundamentals of Molecular Evolution.

Sinauer Associates, Inc., Sunderland, Mass., 01375 USA, 1991, ISBN 0-87893-452-9

This book is an execellent handbook for "beginners" in molecular evolution. It deals with the dynamics of evolutionary change at the molecular level, the driving forces behind the evolutionary process, and the effects of various molecular mechanisms on the long-term evolution of genomes, genes and their products. The book provides basic methodological tools for comparative and phylogenetic analyses of molecular data from an evolutionary perpective.

The authors have tried to maintain the standards of the scientific method and to include quantitative treatments of the issues at hand. Therefore, in describing evolutionary phenomena and mechanisms at the molecular level, both mathematical and intuitive explanations are provided. The authors provide a large number of examples to support and clarify the many theoretical arguments and discussions.

This book is divided into eight chapters. First chapter provides some basic background in molecular biology that is required for studying evolutionary processes at the DNA level. The most essential parts of chapter are the genomic structure of a typical eukaryotic gene and various types of mutations. A review of basic principles of population genetics is in chapter two. A basic problem in population genetics is to determine how the frequency of a mutant gene will change with time under the effect of various evolutionary forces. In chapter three statistical methods required for comparisons a given DNA sequence with another sequence with which it shared a common ancestry in the evolutionary past are discussed. These comparative methods are used in molecular evolutionary studies both for estimating the rate of evolution and for reconstructing the evolutionary history of organisms. Rates and patterns of nucleotide substitution are discussed in chapter four. The purpose of chapter five is to explain how to reconstruct a phylogenetic tree from molecular data and to give some examples in which the molecular approach has been able to provide a much clearer resolution of long-standing phylogenetic issues than was possible with the traditional approaches. Chapter six deals with evolution by gene duplication and exon shuffling. In chapter seven the authors describe transposable elements which facilitate the movement of genetic material from one genomic location to another, and discuss possible impacts such elements may

have on the evolutionary process. Chapter eight deals with genome organization and evolution. This problem include three different topics. The first is genome size, which varies enormously among organisms. The second topic is the genetic information included within genomes and the third topic concerns the nucleotide composition of the genome.

I would like to recommend the book to all who is interested in field of molecular evolution.

P. KUŠNIRIKOVÁ

K. DIERSSEN [Ed.]: Vegetation Nordeuropas.

Verlag Eugen Ulmer , Pressestelle, Postffach 70 05 61, 70574 Stuttgart, 838 pp. Price: 148 DM, ISBN 3-8001-2700-8

This wonderful book by Klaus Dierssen removes successfully two wrong but nevertheless traditional images - the first one, about poor biodiversity of Scandinavian vegetation and the second one, about badly arranged classification of vegetation types on the top of continent. Although due to numerous scientific works by Scandinavien authors the vegetation was sufficiently known. For Central-European geobotanists the traditional differences between study approach in the North and the rest of Europe were the reason for this image.

The author, an expert on Scandinavian vegetation, provides into 12 chapters a complex view on vegetation of the northern parts of Europe - Scandinavia and Jutland, the Kola-Peninsula, Island, Svalbard, and corresponding islands and archipelagos in the Barents Sea, the Baltic Sea and the Northern Sea. The natural geographical and phytogeographical borders, defined in the introductory part of the book, are underlined by main information of geology, geomorphology, pedology and climatic characteristics. For the better understanding of the vegetation cover, the whole third chapter is dedicated to the development of the flora and vegetation from Pleistocene to the present time. Very instructive are the maps with recent and ancient occurrence of several taxa, such as *Dryas*, *Salix* and *Papaver* species. In the next chapter the author investigates the influence of the human being on vegetation from the time of Neolite.

From the chapter 5 are step by step presented all vegetation types starting, for us unexpectedly, by forests. This is a striking proof of the importance of forest vegetation, here represented not only by typical boreal taiga. The diversity of forests is incredulously great. On more than hundred pages birch woods growing near the timberline as well as the deciduous oak forests and azonal alder forests are present. The survey is here completed by traditional classification of northern forest. This presentation proceeds by vegetation of wetlands, bogs and moors, coastal and alpine vegetation. All descriptions with emphasis on ecological requirement are confirm here with valuable synoptic tables and black-and-white as well as coloured photos. Each chapter is ended by survey of literature.

Syntaxonomic question plays lower importance in this book and the hierechical system of vegetation units with synonyms and authors citations are presented only in the end of the book. Nevertheless, these facts are important especially for the Central-European geobotanists. Dierssen used all means for better approximation of Scandinavian vegetation to our readers.

M. VALACHOVIČ

R. WYATT [ed.]: Ecology and Evolution of Plant Reproduction. New Approaches.

Chapman and Hall, New York and London, 1992, i-xiii + 397 pp. with numerous diagrams, figures and photographs. ISBN 0-412-03021-7.

The book is based on a 2.5 day lasting conference held on 12-14 April 1991 in Athens, Georgia, USA. Fourteen usually synthetizing papers represent broad cut-out of modern plant reproduction studies, with outlined ecological and evolutionary background. Rich literature is attached to every paper.

An attention is devoted to the problems of pollen and its transport, the evolution of pollen competition and methods studying the gene flow by means of pollen transport. Other papers study and review male fitness and pollen performance, and also the molecular base of male reproductive processes.

Many papers are concentrated on mechanisms of non-random mating, its evolution and methods of theirs studies. Other papers are survying reproductive success, the evolution of plant reproductive characters, the evolution of endosperm and the variation in floral traits important for reproduction success as well. D. G. Lloyd's paper summarizes problems of evolutionary stable strategies of reproduction in plants.

The book under review covers modern approaches to the solution of problems mentioned, e. g. the use of of biochemical and molecular genetic markers in reserach work. A multidisciplinary approach is regular, e.g. papers on the borders of ecology, reproduction biology and evolution. Such works are exciting field attracting for more and more young biologists to study these complicated systems with essential need of synthetizing study of different scientific branches, including zoological sciences. Thus team work is usually prerequisite for successful research in this field.

The study of evolutionary aspects causing success and generality of outbreeding, but also the study of different reproduction modes supplementing the world of various, frequently complementary reproduction systems suggest the studies of their evolutionary prosperity or non-prosperity.

In book under review fine names of the scientists participating on building of foundations of this interdisciplinary science can be found, as e. g. J. D. Thomson, M. L. Stanton, A. G. Stephenson, D. G. Lloyd, K. E. Holsinger, B. Knox, S. C. H. Barrett, S. J. Mazer, M. J. Donoghue and others. These papers are exciting and very stimulating reading for everybody interested in mechanisms and evolution of plant reproduction.

V. MIKOLÁŠ

G. P. CHAPMAN [ed.]: Grass Evolution and Domestication.

Cambridge University Press, Cambridge, New York, Oakleigh, 1992. I-XVIII + 390 pp., with numerous plates, figures and tables, USD 99.95. ISBN 0 521 41654.

The Gramineae are one of the greatest and perhaps economically the most important flowering plant families. After Reproductive versatility in the grasses published in 1990 this is another volume devoted to various questions of evolution and domestication of grasses.

The first part of the book brings synthesis of some evolutionary problems. Big attention is paid to photosynthesis and its diversity in *Poaceae* by P. W. Hattersley and L. Watson. They evaluate the knowledge on the diversity of photosynthetic pathways reflected in biochemical variants and leaf-structure variants, which are taxonomically evaluated. Their occurrence in *Poaceae* and account in single genera is given. Special attention is paid to selected genera, e.g. *Panicum* (with diversity of photosynthetic pathways). Phylogenesis of photosynthetic pathways and theirs importance in domestication of grasses is also reviewed.

D. L. Hayman's paper is devoted to the study of incompatibility system in Gramineae. S-Z incompatibility system in grasses is characterized by the action of two independently segregating genes (S and Z) and pollen grains are specified gametophytically by the complementary interactions of the genes mentioned. The paper is concerned with many aspects of this system, e.g. the number of incompatibility alleles, the breakdown of the S-Z system of pseudocompatibility (i.e. partial breakdown of incompatibility system) and compatibility and their evolution.

G. P. Chapman analyses some aspects of apomixis phenomena in grasses. Taxonomical distribution of apomixis, its forms and characteristics are summarized. The attention is paid also to the evolution and the origin of apomixis in the family studied.

Big part of the book is oriented to domestication process. Various aspects related to this phenomenon and the account of these processes at selected species are given by J. R. Harlan. J. M. J. de Wet distinguishes three phases of the process. The first phase is characterized as primary domestication in basic centers of Europe, SW Asia, China, Japan and Americas. The second phase is constituted by spreading of the process to Africa and India. Lastly the third phase means a conscious breeding for the increase in yield potential. M. S. Davies and G. C. Hillman describe various aspects of domestication of cereals, especially of wheats, barley, rye and maize. An attention is devoted to the construction of rachis.

The following papers study three model species of cereals. Thus E. S. Lagudah and R. Appels analyse domestication in wheat with attention to the genome structure and genetic mapping, adding summarization of evolution of domestication closely linked to domestication phenomena. D. Hoisington studies the case of maize with orientation to molecular genetics (study of isozymes, restriction fragment length polymorphism, random amplified polymorphic DNAs, including theirs applications) and shows the possibilities of genome manipulation in further breeding of crops.

G. Kochert analyses the situation in rice. The state of knowledge of genetics, the use of genome maps, the study of quantitative trait loci, as well as the characterization of pathogens (problems of virus, fungal and bacterial disease resistance), insect resistance, seed quality and possibilities of further breeding of rice for cultivation in cooler, drier and saltier environment are given. G. P. Chapman shows some other aspects of domestication process in grasses, also the breeding for salt tolerance and the possibilities of grass use for land rehabilitation, especially by breeding of some little known groups of Gramineae. He shortly analyses another problems of domestication processes in grasses as well.

The introduction of the book is devoted to the classification and the evolution of grass family by S. A. Renvoize and W. D. Clayton who summarize also in appendix the system of grasses based on their key paper (Clayton and Renvoize 1986, with exclusion of some little modifications) and distinguish 6 subfamilies and 39 tribes. Characteristics of tribes and subtribes are added to the account of their genera.

Every paper is followed by rich literature list. The book is closed by author, organism and subject indexes. Numerous figures, tables and plates availably enrich the book reviewed. The book is an important reading for everybody interested in evolution questions and grass studies.

V. MIKOLÁŠ

W. G. HOPKINS [Ed.]: Introduction to Plant Physiology.

John Wiley & Sons, Inc., 1995, 464 pp., ISBN 0-471-54547-3 (cloth)

The presented textbook of plant physiology is designated for undergraduate students studying for the first time this scientific discipline. The author Wiliam B. Hopkins, professor of University of Western Ontario, prepared the text based on 30-years experience of teaching plant physiology. Actual problem in the science of plant physiology is very broad from molecular to environmental plant physiology. From this reason it is very hard work for one author to write a textbook. On the other side, the book wrote by collective of authors are sometime not proportional in extent of chapter.

Introduction to Plant Physiology is an excellent textbook wrote by outstanding professor. Many notion are explained in special box. The book contains many illustrations, schemes, photos and tables. The textbook contains 22 chapters devided into the introduction and four parts. In the introduction the task of plant physiology is defined to explain plants function in terms of known chemical and physical lows.

Chapter 1 - The organization of plants and plant cells - is the brief rewiev of plant cytology and anatomy. In the first part - Plants, water and minerals - two chapter are devoted to plant water regime (Plants cells and water; Water relations of whole plant). Mineral nutrition are described in three chapters (Plants and inorganic nutrients; Roots, soil and nutrient uptake; Plant and nitrogen).

Seven chapters contain the second part - Plants, energy, and carbon - in which photosynthesis (Lights and pigments: An introduction to photobiology; Leaves and photosynthesis; Bioenergetics and the light dependent reactions of photosynthesis; Photosynthesis: Carbon metabolism; Translocation and distribution of Photoassimilates) and respiration (Cellular respiration: Retrieving the energy in photoassimilates; Carbon assimilation and productivity) are descrided.

The third part - Regulation of plant development - is devided into seven chapters (Patterns in plant development; The role of hormones in plant development; Biochemistry and mode of action of hormones; Photomorphogenesis - responding to lights; Plant movements - orientation in space; Measuring time: photoperiodism and rhythmic phenomena; Temperature and plant development).

Two topics are described in the end of the fourth part - Stress physiology (water, temperature and salt stress, environmental pollutant) and biotechnology.

M. REPČÁK