Pessarakli, M. (ed.): **Handbook of Plant and Crop Physiology.** Second Edition, Revised and Expanded. – Marcel Dekker, New York – Basel 2002. ISBN 0-8247-0546-7. xiii+973 pp., USD 225.00.

The successful Dekker Series "Books in Soils, Plants, and the Environment" has expanded due to newly published, second edition of Handbook of Plant and Crop Physiology. Like the first edition, published in 1995, the second edition presents a unique, comprehensive collection of new discoveries in plant and crop physiology. More than two-thirds of the information in the second edition is completely new, so that a totally revised volume on recent investigations of specific plant and crop physiological responses under normal as well as environmentally stressful conditions has emerged.

The volume has been divided into 12 parts containing 48 chapters. These have been prepared by 76 contributors from Bulgaria (3), Canada (5), PR China (2), Colombia (1), Czech Republic (1), Egypt (1), France (2), Germany (1), India (6), Israel (2), Italy (2), Pakistan (1), Scotland (1), Singapore (2), Spain (3), and USA (43).

Besides various paragraphs on photosynthesis in other chapters, the readers of Photosynthetica will be mostly interested in the Part III—Cellular and Molecular Aspects of Plant/Crop Physiology. The five chapters of this part deal with more or less new information on photosynthetic traits: Cell cycle regulation (*e.g.*, cyclins, calcium and calmodulin), chlorophyll biosynthesis during plant greening (chlorophyll biosynthetic pathways, proto-chlorophyllide in non-irradiated plastids, during greening, and in fully mature leaves), structure and function of photosynthetic membranes (PS2 complex, cytochrome b_6f complex, PS1 complex, chloroplast ATP synthase, lipid matrix of the thylakoid membrane), bioenergetic aspects of photosynthetic gas exchange and respiratory processes (photosynthesis, dark respiration, photorespiration, maintenance respiration, chlororespiration, environmental stresses and reflections on crop yield), diffusive conductances to CO_2 entry in the leaves and their limitations to photosynthesis (CO_2 diffusion, mesophyll conductance, species-specific conductances, stomatal conductance and its effect on photosynthesis, effect of environmental stresses on leaf conductances and photosynthesis).

Part I (3 chapters) summarizes plant and crop growth responses to environmental factors and climate changes (*e.g.* maintenance and growth respiration, prediction of growth, energy content) and discusses the impact of global climate change, mainly the still increasing warming, on development of plants with C_3, C_4, and CAM pathways of CO_2 fixation. Seven chapters of the Part II are devoted to physiology of plant and crop growth and developmental stages (seed dormancy, stratification, collection and storage, breaking or prolonging dormancy, germination and emergence, life cycle, vegetative propagation, leaf developmental programming, fruit development, and leaf senescence and abscission (*e.g.* CO_2 exchange rate, stomatal conductance for CO_2 transfer, and ribulose-1,5-bisphosphate carboxylase/oxygenase antisense mutants).

Eight chapters of Part IV summarize physiological aspects of plant and crop production processes: Mineral nutrient transport (*e.g.* free space and osmotic volume, electrical potentials at plant cell membranes, transport proteins and channels, carriers, transpiration role in N transport), sodium as a functional nutrient (photosynthesis, Na and K interactions), nitrogen use efficiency, assimilate synthesis and transport from source leaves, and phloem transport of solutes. Part V (4 chapters) deals with plant growth regulators: the natural hormones, growth promoters and inhibitors, and plant genes. Part VI (9 chapters) deals with physiological responses of plants and crops under stress conditions (salt, drought, and other environmental stresses, adaptation to abiotic and biotic stresses, salt tolerance, calcium as a messenger in stress signal transduction, regulation of gene expression, abscisic acid). Part VII (3 chapters) discusses physiological responses of plants and crops to heavy metal concentration and agrochemicals. Part VIII (1 chapter) is devoted to physiological relationships between lower and higher plants (parasitic flowering plants, DNA markers, molecular evolution). Part IX (1 chapter) deals with physiology of lower-plant genetics and development. Part X (4 chapters) summarizes the problems of physiology of higher-plant/crop genetics and development (photosynthetic efficiency, transpiration efficiency, genetic improvement, glycine betaine role in stress resistance). Part XI (1 chapter) focuses on using computer modelling in plant physiology, and Part XII (2 chapters)—Plant and Crop Physiology under Controlled Conditions, in Space, and on Other Planets—is devoted to construction of composite lighting for controlled-environment plant factories, and to plant growth and human life support for space travel.

Generally, most chapters are an excellent source of recent information on the field. The volume is also a useful source of relevant references on the subjects summarised (together almost 7 000 references accompanying individual chapters). However, the arrangement of references according to their appearance in the text is very unpractical; without an author index, this shortcoming makes it impossible to find a reference quickly.

The book is provided by a comprehensive subject and plant index. I recommend this Handbook to plant scientists, teachers, and postgraduate students interested in the fields treated.

J. ČATSKÝ (*Praha*)