

Pessarakli, M. (ed.): **Handbook of Photosynthesis**. – Marcel Dekker, New York - Basel - Hong Kong 1997. ISBN 0-8247-9708-6. XIX + 1027 pp., USD 195.00.

The aim of the editor, Dr. Mohammad Pessarakli from the College of Agriculture of the University of Arizona, Tucson, Arizona, was to provide an array of information on photosynthesis in a single and unique volume presenting the most recent and relevant issues and information on this subject. It should be also a well balanced presentation of the information from different subtopics and aspects of photosynthesis. The contributions were written by 88 experts in the field coming from 26 countries all over the world.

The text of the handbook was divided into 63 chapters which were arranged into fourteen logical parts. In Part I, the "Principles of Photosynthesis", in two chapters introductory information on the ecophysiology of C_3 , C_4 , and CAM plants (M. Orsenigo *et al.*) and on the photosynthetic apparatus (J. Hudák) is presented. Part II, "Biochemistry of Photosynthesis", has nine chapters devoted to chlorophyll biosynthesis (B. Schoefs and M. Bertrand), chloroplast metabolism during leaf greening and degreening (B. Biswal), respiratory regulation of electron transport in chloroplasts and chlororespiration (C. Büchel and G. Garab), chloroplast electron transport inhibitors (R. Barr and F.L. Crane), the role of photophosphorylation and related reactions in photosynthesis (J.-M. Wei and Y.-K. Shen), inhibitors of photophosphorylation (F.L. Crane and R. Barr), mechanisms of photosynthetic oxygen evolution (Y. Zeinalov and L.T. Maslennikova), working with photosynthetic pigments (M. Bertrand and B. Schoefs), and the role of phosphorus in photosynthesis (I.M. Rao). In Part III, entitled "Molecular Aspects of Photosynthesis: Photosystems, Proteins, and Photosynthetic Enzymes" the reader finds 14 chapters. Structures and functions of both photosystems 1 and 2 are dealt with by T. Hiyama, A.N. Webber *et al.*, C. Critchley, and J.P. Whitelegge. Chapters on regulation of photosynthesis by protein phosphorylation follow: on state 1 and 2 transitions (G.S. Bullerjahn), glyoxylate metabolism during photorespiration (A.U. Igamberdiev and L.A. Kleczkowski), on structure, properties, and assembly of ribulose-1,5-bisphosphate carboxylase/oxygenase (L.-R. Li), and on its relationship with chaperonins (H. Roy and M. Gilson), on supramolecular organization of water-soluble photosynthetic enzymes in chloroplasts (K.-H. Süß and J.K. Sainis), on plastid proteases (D.E. Buetow), on DNA and gene expression in photosynthetic and in nonphotosynthetic plastids (W. Hachtel), on the use of antisense RNA technology to dissect photosynthesis (S. Rodermel), on light activation of photosynthetic enzymes (M. Vivekanandan and V.C. Saralabai), on light-dependent control of photorespiratory gene expression (R. Raman and D.J. Oliver), and on development of functional thylakoid membranes: regulation by light and hormones (P. Nyitrai).

Part IV, "Atmospheric and Environmental Factors Affecting Photosynthesis", presents four chapters in which environmental factors affecting chloroplasts (A. Mostowska), effect of stomatal patchiness on photosynthesis (J. Pospíšilová and J. Šantrůček), influence of high irradiance on photosynthesis, photoinhibition, and energy dissipation (R. Carpentier), and the midday depression of photosynthesis (D.-Q. Xu and Y.-K. Shen) are treated. "Photosynthetic Pathways in Various Crop Plants" (Part V), "Photosynthesis in Lower and Monocellular Plants" (Part VI), and "Photosynthesis in Higher Plants" (Part VII) are headings of the next three parts, where photosynthetic specificities of C_3 , C_4 , and CAM pathways (A.S. Bhagwat; A.A. Iglesias *et al.*), of photosynthetic bacteria (T. Shiba and K. Shimada) and cyanobacteria (K.K. Ho), and of various groups of higher plants cultivated *in vitro* (J. Pospíšilová *et al.*), of some types of transgenic plants (H. Synková *et al.*), of chloroplasts (I.N. Minkov), or the role of carotenoids in photosynthesis (A.J. Young *et al.*) are dealt with. In Part VIII, entitled "Photosynthesis in Different Plant Parts", photosynthetic activity in leaves, stems, flowers, and fruits (A. Wahid *et al.*), and during leaf aging (J. Čatský and Z. Šesták) are discussed. The next group of reviews (Part IX, "Photosynthesis and Plant/Crop Productivity and Photosynthetic Products") covers topics such as the use of transgenic plants to manipulate photosynthetic processes and crop yield (M. Vivekanandan and V.C. Saralabai), the relationship of the monovinyl protochlorophyllide *a* content to plant yield (D.A. Fasoula *et al.*), photosynthate formation and partitioning in crop plants (A.A. Iglesias and F.E. Podestá), approaches to measuring plant bioproductivity and growth (J. Jiao *et al.*), transient storage of photosynthates in leaves (K.-J.

Dietz and F. Keller), and production of chemicals and fuels in immobilized photosynthetic systems (F. Galván and F.F. de la Rosa). Genetic factors affecting photosynthesis are treated by A.K. Joshi (Part X). Photosynthetic activity measurements are summarized by E. Masarovičová, and the analysis of dependence of photosynthesis on irradiance represents the use of mathematical models in photosynthesis research (R.M. Iqbal *et al.*; Part XI). In the following Part XII, "Photosynthesis and Its Relationship with Other Plant Physiological Processes", the interconnections photosynthesis-respiration-growth (B.N. Bruce; D.E. Collier and B. Grodzinski), photosynthesis and saccharides formation (M.A. Madore) as well as photosynthesis-floral initiation-saccharide metabolism (K. Eimert and J. Chen) are evaluated. The last voluminous complex of seven reviews concerns the topic "Photosynthesis Under Environmental Stress Conditions" (Part XIII). After a general introduction (R.S. Dubey) to this topic, the responses of chloroplasts, pigments, and molecules to stress (B. Biswal), photosynthetic responses to salt stress (B. Heuer; E.R.R. Iyengar and M.P. Reddy), to UV-B radiation (I. Vass), nutrient deficiency (K.-J. Dietz and G.C. Harris), and the production of free radicals in photosynthesis under stress (É. Hideg) are dealt with. The last Part XIV "Photosynthesis in the Past, Present, and Future" is a concise overview on the evolution of photosynthesis on the Earth, and the origin and evolution of the C₃, C₄, and CAM photosynthesis with an outlook to the future of photosynthesis (B.N. Smith).

This volume is a valuable compendium of our today's knowledge on photosynthesis treated from many aspects. At the same time, with the nearly 8000 references contained, it is a valuable source of literature on photosynthesis. Unfortunately, only short forms of the references without full titles are used, and furthermore, references not arranged in alphabetic order are a disadvantage and complication if looking for an item. The volume is equipped with a detailed subject index. It is a handbook with a wide possibility of use: it is devoted to a broad spectrum of scientists and research workers, students, and teachers in all fields of photosynthetic research and related disciplines.

I. TICHÁ (*Praha*)

Rozema, J., Gieskes, W.W.C., van de Geijn, S.C., Nolan, C., de Boois, H. (ed.): **UV-B and Biosphere**. (Advances in Vegetation Sciences, Vol. 17.) - Kluwer Academic Publishers, Dordrecht - Boston - London 1997. ISBN 0-7923-4422-7. 319 pp., NLG 250.00, USD 208.00, GBP 127.00.

In various ways, which are incompletely understood, UV-B affects a wide range of physiological and ecological processes. Remarkably, recent field studies indicate that enhanced UV-B does not markedly affect photosynthesis, growth and primary production, but rather interferes with plant morphogenesis, and plant and ecosystem functions relating to the secondary metabolism. This book summarises the current status of knowledge related to effects of UV-B radiation to plant life, ranging from gene to ecosystem level.

The book is based on 26 papers contributed to an international workshop entitled 'UV-B and Biosphere' held in December 1995 in Wageningen, The Netherlands, and published in *Plant Ecology* 128 (1-2), 1997. The papers are arranged into 5 sections: UV-B and aquatic systems (5 papers; mainly photosynthetic traits), UV-B and terrestrial ecosystems: general and methodological aspects (3 papers; ozone reduction, outdoor UV-B supplementation, UV-A, UV-B, and PAR fluctuation and measurement), UV-B and physiology of terrestrial plants (8 papers; water relations, photosynthesis, germination, growth, flowering, mineral nutrition), Interactions of UV-B with environmental factors (5 papers; interactions with CO₂ enrichment, PAR, temperature - photosynthesis, respiration, stomata, transpiration, water use efficiency, leaf optical properties, growth analysis, nitrogen deficiency, reproduction), and UV-B and terrestrial ecosystems (5 papers; enhanced CO₂, growth and phenology, leaf orientation, litter and biomass decomposition, pathogen effects and herbivory).

The book is well edited, and supplied with a fairly detailed subject index. It can be recommended to scientists and students interested in plant and environmental sciences and global climate change.

J. ČATSKÝ (*Praha*)