

Stanhill, G., Enoch, H.Z. (ed.): **Greenhouse Ecosystems**. (Ecosystems of the World 20.) – Elsevier, Amsterdam – Lausanne – New York – Oxford – Shannon – Singapore – Tokyo 1999. ISBN 0-444-88267-7. 423 pp., NLG 344.00, USD 174.00.

The reviewed book is the 20<sup>th</sup> volume of the series “Ecosystems of the World”, edited by David W. Goddard. It contains 16 chapters written by 22 specialists from 8 countries (France, Germany, Israel, The Netherlands, Sweden, Switzerland, UK, and USA). The sixteen chapters are grouped into four sections. Generally, most chapters present summary of environmental factors in the greenhouse, and principles of physiological, biochemical, and biophysical processes with respect to species, type, or use of plants produced. Photosynthesis, water relations, and growth are the topics frequently followed.

The first section with four chapters is devoted to the greenhouse itself. Two chapters deal with the history of greenhouse construction and use from antiquity up to the present, with current geographical extension (greenhouse structure and shape, climate requirements and climatic suitability, general design criteria, greenhouse modelling and standardization, plastic-film greenhouses and plastic tunnels, construction materials, ventilation and cooling, heating and energy conservation, carbon dioxide enrichment, lighting and lamps, *etc.*). The following two chapters summarize physical principles of microclimate modification of the above-ground-, and the root-zone environments (principles of energy and mass transfer, radiation, air movement, water vapour transfer, greenhouse soils and their amendments, soilless culture, *etc.*).

The 2<sup>nd</sup> section consists of 6 chapters devoted to the biological components of the greenhouse ecosystems. The Chapter 5 deals with widely-grown edible foliage and fruit crops (lettuce, endive, radish, tomatoes, cucumber, sweet pepper, melons, eggplant, *etc.*), seedling production, plantlet quality, training and pruning, fertilization and water supply, harvesting, grading, packing, storing, *etc.*). The Chapters 6 and 7 are focused on specifics of production of cut flowers in the greenhouse (effect of environmental factors on photosynthesis in many plants), and on indoor ornamental foliage and flowering pot plants (propagation systems, environmental factors, growth regulators, *etc.*). The Chapters 8 to 10 summarize plant diseases in greenhouse (effect of environmental factors on pathogens, plant resistance and tolerance to diseases, list of scientific and common names of pathogens), arthropod fauna and its effect on relevant plants (insecticides, acaricides, natural enemies, host-plant resistance, chemical and biological control). Special attention is paid also to greenhouse workers in chapter 10, “Humans – health, psychological and sociological factors”, mainly dealing with the harmful effects of the greenhouse environment (light and thermal radiation, biological factors, pesticides, fertilizers, safety, *etc.*), and leading into a short essay called “New technology for the future or back to nature?”.

The readers of *Photosynthetica* will find perhaps most useful the 3<sup>rd</sup> section (4 chapters). They deal with energy cycle (theoretical considerations on environment, mainly on solar energy input, global energy balance, energy for photosynthesis and photosynthetic production, *etc.*), with greenhouse carbon cycle (CO<sub>2</sub> assimilation on leaf, plant, and crop levels, photosynthesis and respiration, CO<sub>2</sub> enrichment and its sources—pure CO<sub>2</sub>, natural gas, propane, kerosene, human respiration, *etc.*). Further two chapters are devoted to water cycle (water fluxes and water balance, modelling transpiration and water fluxes, stomatal conductance, optimal control of humidity and transpiration, irrigation systems and recirculation, *etc.*), and to nutrient cycle (greenhouses on natural soil, soilless cultures). The last, 4<sup>th</sup> section (2 chapters) deals with potential production within the greenhouse environment (potential photosynthesis, growth and yield, daily crop photosynthesis, procedures for estimating potential yield, *etc.*), and optimal dynamic management of the greenhouse climate (system modelling, optimal control, energy saving, higher-order models and application).

The book is well edited and produced, and is accompanied by Systematic List of Genera, and extensive Author, Systematic, and General indexes, and extensive tables summarizing plants dealt with in the respective chapter from the point-of-view studied. Almost every paper is accompanied by references to relevant bibliography (together almost 3000 references). I am convinced that the book will be welcome by plant scientists interested in the experimental treatment of the plant response to greenhouse environment.

J. ČATSKÝ (*Praha*)