

Baker, N.R. (ed.): **Photosynthesis and the Environment**. (Advances in Photosynthesis. Volume 5.) - Kluwer Academic Publishers, Dordrecht - Boston - London 1996. 491 pp. US \$ 292.50. ISBN 0-7923-4316-6.

Over the past decade there has been increasing concern about potential future impact of global climate change and ability to feed increasing world population. Although an understanding of the molecular mechanisms involved in photosynthesis has been improved recently, our knowledge of principles of response of photosynthesis to edaphic, climatic and biological factor is not as well advanced. Therefore it is very important that the fifth volume of an ambitious new book series Advances in Photosynthesis seeking to provide a comprehensive account of photosynthesis research examines how photosynthesis may be influenced by environmental factors.

The first part of the book deals with structural and functional aspects of photosynthetic apparatus in the context of responses to environmental stimuli. The chapter one concerns composition and structure of photosynthetic antennae, their light harvesting function and regulation of light energy utilization. The following two chapters are engaged in photosynthetic electron transport including co-ordination of photochemical efficiency with metabolism and survey of instrumentation currently available for exploring these reactions. Under the conditions when irradiance is higher than photon utilizing capacity of leaves, excess photons produce active oxygen, radicals, and triplet exciting pigments that cause photoinhibition of photosynthesis. These processes are main items in the chapters 4 and 5. The chapter 6 is devoted to pathways of carbon metabolism and their regulation, the chapter 7 to the connection between photosynthetic carbon metabolism and photorespiration. The chapter 8 brings survey of mathematical models of photosynthesis. Regulation of gas exchange by stomata is crucial in the response of plants to environment and the biophysical and biochemical mechanism of stomatal opening or closure is clarified in chapter 9. Source-sink relation is the subject of the chapter 10.

The second part of the book examines the effects of specific environmental variables on photosynthetic performance and illustrates the complexities of the responses. The chapter 12 addresses the molecular biological approaches that are available to investigate the effects of environmental stress. The chapters 11 and 13 concern adaptation and acclimation of plants to different irradiance. The chapter 11 focused on combined effects of irradiance and nutrition, chapter 13 on utilization of fluctuating irradiance. The chapter 14 deals with stomatal versus non-stomatal effects of drought on leaf photosynthesis. The photosynthetic adjustment to temperature including chilling and heat is the item of chapter 15. The chapter 16 describes diversity in photosynthetic responses to atmospheric CO<sub>2</sub> that is very important in prediction of responses of plants to climate changes. The further environmental constraints ozone and ultraviolet-B radiation are discussed in chapters 17 and 18. The chapter 19 brings the survey of stable isotope techniques using for evaluation of stress effects. The last chapter 20 briefly summarises the environmental constraints on photosynthesis with the emphasis on heterogeneity of the leaf blade.

This outstanding book is recommended to all scientists and advanced students who wish to understand how photosynthetic performance may be influenced by environment.

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