

Photosynthesis. Regulation Under Varying Light Regimes. V. S. Rama Das. Science Publishers, Inc, Post Office Box 699, Enfield, New Hampshire 03748, USA. 2004. 175 pp. Price: US \$65.

Photosynthesis is one of the important metabolic components of plant systems. Despite the fact that quality and quantity of light are crucial, the process of photosynthesis adjusts quickly whenever the available light is either limiting or in excess of the optimal requirement. A concise and informative book on this topic authored by Rama Das, who has decades of experience in this field, is quite welcome. Rama Das has made a splendid effort in putting together extensive information on this topic into a handy small book.

Short- and long-term fluctuations in light pose a serious challenge to photosynthesis in higher plants. These fluctuations include not only supra-optimal or high light, but also sun-flecks, shaded environment under tree canopies and extended cloudy days in rainy season. This book provides a detailed, yet compact resource of information on 'photosynthesis in response to high light stress'. Thus, it forms an essential supplement to other popular textbooks on photosynthesis¹⁻³.

The first chapter of the book describes the requirement of light for photosynthetic processes, introducing the reader to the concept of antennae and the two photosystems of PSI and PSII. The next chapter discusses the phenomenon of photoinhibition, and its occurrence, on either acceptor or donor side of PSII. This chapter also gives a lucid view of molecular basis of photoinhibition and protective mechanisms. The focus mainly has been on the damage to D1 protein and attempts by chloroplasts to restore the functional PSII. The third chapter, one of the best in the book, presents how the plants avoid excess light and protect themselves. These protective mechanisms include xanthophyll cycle, production of reactive oxygen species (ROS) and relevant scavenging enzymes/compounds. All these phenomena contribute to minimize the oxidative stress on chloroplasts. The next three chapters are small and deal with leaf movements, acclimation of photosynthesis and biotechnological approaches respectively. The last chapter is a brief section with concluding remarks.

I find the book to be quite simple to read, clear in its presentation of the concept of photoinhibition and description of protective

mechanisms. The book would be useful for both beginners and experts in the area of photosynthesis. However, a few topics could have been covered in more detail, for example, the response of plants to limiting light, which occurs frequently in temperate regions. Even the injurious effect of excess light is amplified, when combined with low temperature. Since the title of the book refers to the regulation under varying light regions, description of the interactions of limiting or excess light with other factors such as temperature, UV light and nutrition deficiency would have been beneficial. The aspects of state transitions, and mobility of PSII could have been given more attention, because of the dynamic and dual role of PSII, being the target of photoinhibition as well as a protector of thylakoid membranes from excess light.

Indication should also have been made about the long- and short-term effects of excess light and the contrasting strategies of plants during such varying time periods. While changes occur in xanthophyll cycle or ROS scavenging enzymes occur during short-term adaptation of plants, long-term exposure to excess light invariably demands modulation of gene expression pattern. The importance of heliotropism in protecting plants against excess light is still debated. The description on transgenic and biotechnological approaches, mostly on modulation of light harvesting complexes, PSI and PSII in general, could have been extended to photoinhibition.

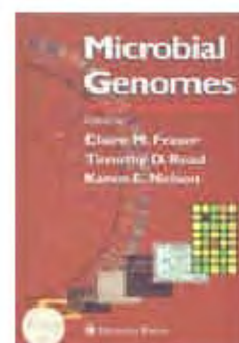
The importance of the topic of photoinhibition of photosynthesis to plant sciences is evident from the release of a Special Issue of *Journal of Experimental Botany* (2005, 56) on light stress in plants and a forthcoming book under the series of *Advances in Photosynthesis and Respiration*⁴. The present book on photoinhibition of photosynthesis is informative and is available at an attractive price of US\$ 65. I recommend the book to all educational institutions, teachers and research workers interested in the field.

1. Hall, D. O. and Rao, K. K., *Photosynthesis*, Cambridge University Press, Cambridge, UK, 1999, 6th edn.
2. Lawlor, D. W., *Photosynthesis: Molecular, Physiological and Environmental Processes*. BIOS Scientific Publishers, UK, 2001, 3rd edn.
3. Raghavendra, A. S., *Photosynthesis. A Comprehensive Treatise*, Paperback Edition, Cambridge University Press, Cambridge, UK, 2000.

4. Demmig-Adams, B., Adams, W. W. and Mattoo, A. K. (eds), *Photoprotection, Photoinhibition, Gene Regulation and Environment – Advances in Photosynthesis and Respiration*, 2005, vol. 21, Springer, in press.

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Microbial Genomes. C. M. Fraser, T. D. Read and K. E. Nelson (eds). Humana Press, Totowa, New Jersey, USA. 2004. 536 pp. Price: US\$ 150.

The sequencing of complete genomes of a number of free-living, pathogenic and obligatory intracellular microorganisms of late, has provided a plethora of information about microbial genomes. This has brought a radical change in our understanding of genome organization and function, mechanism of microbial pathogenicity, evolution and interactions of microbes in the environment. The foreword to the book under review has been written by J. Craig Venter, founder of The Institute of Genomic Research (TIGR, MD, USA). According to Venter, the great expanse and astounding possibilities of microbial genomics may be realized from the fact that ideas and concepts, which sounded like science fiction a few years ago, are being pursued vigorously today. And the pace of the microbial genome sequencing continues.

The book under review has been divided into six parts, each comprising many chapters. Part I comprising only one introductory chapter contributed by H. O. Smith, is devoted to the history of deve-