

Biswal, U.C., Biswal, B., Raval, M.K.: **Chloroplast Biogenesis. From Proplastid to Gerontoplast.** – Kluwer Academic Publishers, Dordrecht – Boston – London 2003. ISBN 1-4020-1602-6. XXVIII + 353 pp., EUR 140.00, USD 154.00, GBP 97.00.

This monograph did not form a part of the well known series „Advances in Photosynthesis and Respiration“. However, it supplements this series, according to my opinion, very suitably. The book deals with the broadest array of topics connected with chloroplast development and it is written by outstanding specialists in this field. It is intended as a “research and teaching monograph” and divided, after Foreword by prof. Govindjee and Preface by the authors, into five chapters.

In the Introduction, three main plastid forms connected with chloroplast biogenesis are outlined, namely, proplastid, mature chloroplast, and gerontoplast. This chapter is finished by the “design of the book” with discussion of its limitations. (Among others: it deals mainly with chloroplasts in angiosperm leaf mesophyll cells; etioplast/chloroplast transformations, rather rare under natural conditions, form frequently the basis for authors’ conclusions.) The second chapter, forming the central part of the book, deals with proplastid to chloroplast transformation. The main topics of this chapter are: etioplast as “experimental chloroplast precursor”, thylakoid assembly and pigments accumulation, ribulose-1,5-bisphosphate carboxylase/oxygenase assembly, chloroplast protein targeting, regulation of gene expression and plastid/nucleus and *vice versa* communication during chloroplast development, and modulation of chloroplast development by environmental factors.

Mature chloroplast, with all its main structures and functions, is the subject of the third chapter, including chloroplasts under stress conditions. The fourth chapter is devoted to transformation of chloroplast to gerontoplast.

The authors apply Sitte’s concept of gerontoplast, however, they claim that “Gerontoplast ... possesses active genetic material with viable protein synthesizing system.” In this chapter, chloroplast senescence associated genes and induction of their expression by senescence signals (e.g. “light” or phytohormones) are dealt with in considerable details. In the last chapter, named “Conclusions and the Future”, following questions are discussed (without new cited literature): “The picture of mechanisms of assembly of chloroplast complexes during development and their demolition during senescence is hazy. The mechanisms of degradation of protein and chlorophyll during biogenesis of the organelle largely remain unclear. Molecular biology of gerontoplast formation during leaf senescence, a challenging area of research for future. The signalling systems associated with transformation of proplastid to chloroplast and chloroplast to gerontoplast are poorly understood. Environmental modulation of chloroplast biogenesis is less known. The study of chloroplast biogenesis needs better laboratory models.”

The text is supplemented with 1 211 references. However, relatively few of them are from the last three years. Also, pioneering papers on chloroplast ultrastructural development by prof. Gamalei, unfortunately written mostly in Russian, are omitted. The book is supplemented by a list of abbreviations and an index (including plant names).

I summarize that this monograph successfully fulfills the still existing gap in photosynthesis literature, giving a complex picture of chloroplast development.

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