Foyer, C.H., Noctor, G. (ed.): **Photosynthetic Nitrogen Assimilation and Associated Carbon and Respiratory Metabolism**. – Kluwer Academic Publishers, Dordrecht – Boston – London 2002. ISBN 0-7923-6336-1. 284 pp., € 137.50, USD 135.00, GBP 88.00.

The twelfth volume of the successful series "Advances in Photosynthesis and Respiration" is unusually thin, comprising less than 300 pages and containing only 16 chapters. More than half of them deals directly with photosynthesis, and in some other ones photosynthesis is mentioned. Energetic metabolism is always connected with photosynthetic, respiratory, and photorespiratory processes in chloroplasts and mitochondria. All metabolic processes, their pathways and enzymes, are recently studied always in connection with their genetic basis. This holds also for this volume.

The Editors wrote first chapter of the book. They explain the control and signalling of photosynthetic nitrogen assimilation, integration of nitrogen and carbon metabolisms, their balance, as well as control of leaf amino acid contents (under impact of photorespiration). The following chapter (P.A. Kumar *et al*.) lists contents of nitrogen in components of the photosynthetic apparatus and explains optimisation of contents of these substances in different environments (mainly under different nitrogen supply, growth irradiance, and CO_2 enrichment). Regulation of activity of ribulose-1,5-bisphosphate carboxylase/oxygenase is needed for maintaining photosynthetic rate. This chapter has also practical conclusion: how to improve nitrogen-use efficiency in crops. Photorespiratory carbon and nitrogen cycling as evidenced in mutants and transgenic plants is the topic of chapter 8. A.J. Keys and R.C. Leegood show here how to select appropriate mutants (mainly those impaired in glycine-serine conversion or lacking hydroxypyruvate reductase), how carbon and nitrogen are recycled, what is the feedback of photorespiration, what are the alternative metabolic pathways, how photorespiration helps in stress situations, *etc*. Next chapter (J. Vidal *et al*.) deals with the regulation of phospho*enol*pyruvate carboxylase by reversible phosphorylation. Photorespiration is also dealt with in chapter 10 (P. Gardeström *et al*.) devoted to mitochondrial functions in the light; electron transport processes in mitochondria and chloroplasts are tightly bound, mitochondria affect photosynthetic induction, mitochondrial respiration optimises chloroplast functions, *etc*.

Alternative oxidase integrates carbon metabolism and respiratory electron transport in plants as shown by G.C. Vanlerberghe and S.H. Ordog in chapter 11. The enzyme prevents generation of active oxygen species. Thermogenesis, development of roots and reproductive organs, plant-pathogen interaction, and cell death are also dealt with. T. Sugiyama and H. Sakakibara deal in chapter 14 with the regulation of carbon and nitrogen assimilation through gene expression. Plant response to nitrogen during growth and development of plants is one of the questions discussed. Chapter 15 (G. Lohaus and K. Fischer) is on the intra- and intercellular transport of nitrogen and carbon; export and import transport processes in plastids and phloem are explained using new models. The final chapter 16 (J.A. Raven *et al*.) deals with optimising carbon-nitrogen budgets and the perspectives for crop improvement.

The "non-photosynthetic" chapters deal with nitrate reductase and other enzymes involved in nitrate metabolism (chapter 3, W.H. Campbell), enzymes of nitrate and nitrite metabolism and transport (chapter 4, C. Meyer and C. Stöhr), limits of nitrate reduction in leaves (chapter 5, W.M. Kaiser *et al*.), biochemistry, molecular biology, and genetic manipulation of primary ammonia assimilation (chapter 6, B. Hirel and P.J. Lea), regulation of ammonium assimilation in cyanobacteria (chapter 7, F.J. Florencio and J.C. Reyes), nitric oxide synthesis and its potential impact on nitrogen and respiratory metabolism (chapter 12, A.H. Millar *et al*.), and nitrogen functions in signalling (chapter 13, A. Krapp *et al*.).

All chapters are excellent reviews of recent literature, with conclusions for both the developments of science and praxis. They are supplemented with lists of mostly 100 to 200 references. Three colour figures are on plates at the beginning of the book. Similarly as other volumes of this series, this is a basic book for plant physiological, biochemical, and genetic laboratories and libraries.

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