Bryant, J.A., Burrell, M.M., Kruger, N.J. (ed.): **Plant Carbohydrate Biochemistry.** - Bios Scientific Publishers, Oxford - Washington 1999. 315 pp. GBP 67.50. ISBN 1-85996-112-6.

This book belongs to the Experimental Biology Reviews and was published in association with the Society for Experimental Biology. It is dedicated to Tom ap Rees, an outstanding scientist in the field of different aspects of carbohydrate metabolism. There are twenty-one contributions forming independent chapters.

The starting part of the book is devoted to metabolic carbon and nitrogen fluxes and their control as well as regulation. Plant growing conditions and genetic basis are involved in these processes. Models were created for a description of metabolic pathways and for a control analysis. They can serve for an investigation of metabolic consequences of manipulation plant gene expression. Third chapter deals with the turn over of non-structural carbohydrates. Their fluxes are high and respiration plays an important role in controlling these flows. On a whole plant basis, the remote parts interact mutually to regulate carbon flux. Sucrose and its derivatives are central compound of carbohydrate metabolism with importance both for transport and storage. Sucrose metabolism is regulated via protein phosphorylation with effects on catalytic activity, intracellular localization, and protein-protein interactions in various participating enzymes. In addition, osmotic stress is relevant to protein phosphorylation. Sugars play a significant part not only in plant growth but they are also involved in signalling. Hexokinase is assumed to be a mediator between sink and source tissues. As starch comprises to main plant carbon store and it is an important nutritional compound, recent progress in its structure and synthesis is presented. Further, the process of starch deposition, however still not fully understood, was studied in detail. Several enzymes playing a key role in sugar metabolism are described in next articles. ADP glucose pyrophosphorylase is an enzyme that catalyses regulatory step of starch synthesis and was subjected to structural and kinetic characterization. One chapter is devoted to regulation of Rubisco in response to environment. It is mediated by carbamylation by activase and by action of several known endogenous inhibitors. Still unidentified inhibitor was proved to regulate Rubisco activity during daytime. Also the other activity of this enzyme known as photo-respiration is dealt with. Mechanism and functions of this peculiar process are discussed. With the aid of mutants and transgenic plants metabolism of carbon and nitrogen was studied and it was shown that the control of whole pathway of photosynthetic CO_2 assimilation is distributed between several enzymes. New insight was rendered into photosynthesis of CAM plants where the participation of Asada pathway was demonstrated. This is major sinks for light energy utilization and a source for ATP. In addition, it can serve as a biochemical water conservation mechanism. Regulation and role of phosphoenolpyruvate carboxykinase in plants are elucidated in a separate chapter. Important and ubiquitous carbohydrate in plant metabolism represents ascorbic acid. The survey of our knowledge of ascorbate metabolism and functions is displayed. Great advance means our comprehension of factors controlling ascorbate content in tissue, which has significant physiological implications. Next article reviews the consequences of inter- and intracellular compartmentation for the movement of metabolites in plant cells. In turn, it may also signal the physiological state of a cell or organelle. Metabolite transporters in chloroplasts, a site of photosynthesis, are indispensable for photoassimilates allocation, were a subject of next chapter. Plastids contain a set of phosphate translocators, which enable selective uptake of individual phosphorylated substrates. Prominent plant storage compound is starch. Characteristic features of its biosynthesis in heterotrophic storage plastids are covered and it was shown to be precursor dependent. It was discovered, that tetrahydrofolate, a necessary cofactor in photorespiration, is synthesised in mitochondria. In next study, compatmentation of tetrepyrrole synthesis in plants was investigated. This molecule comprises to different compounds and fulfills several roles. The last chapter discuss the link between carbohydrate metabolism, namely glycolysis, and DNA replication. The key enzyme in this connection is phosphoglycerate kinase.

All contributions involved in this book illuminate the broad area of plant sugars, an important compound in plant growth, defence, signalling and storing energy. It can be recommended to experts in the field.

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