

Developments in Crop Science 26. Carbohydrate Reserves in Plants. Synthesis and Regulation

A.K. Gupta and N. Kaur (Eds.); Elsevier, Amsterdam, 360 pp., \$165, € 142.94, ISBN: 0-444-50269

The book is number 26 in a series on “Developments in Crop Science”. Its contents cover the importance of key groups of plant carbohydrates, outlining mechanisms of synthesis and degradation and the central roles of carbohydrate metabolism in the overall physiology of the plant. Many of the chapters feature the outcomes of transgenic approaches to manipulate content and composition or include reference to genetic variants. Conclusions and forward looks are provided by the authors to indicate future research requirements, which clearly remain many and varied.

The book opens with a description of the reactions and regulation of the Calvin cycle, although sucrose transport and unloading mechanisms in sinks are also covered superficially. Two chapters on sucrose storage and accumulation represent advances with the major commercially important species sugarcane and sugarbeet, another four chapters cover starch biosynthesis in cereals (wheat, rice, maize) and potato. The metabolism and roles of fructans are extensively illustrated in four chapters, including one on the genetic engineering of fructan biosynthesis in starch-storing tissues. Galactomannan and sugar alcohols in plants and carbohydrates in trees each take up one chapter.

The book is generally comprehensive but, as often occurs when individual authors deal with the same carbohydrate reserve in a range of species, there is a reasonable amount of duplication, e.g. in the description of pathways, enzymes involved, etc. Some chapters are scientifically extensive and comprehensive in coverage,

others quite short and more general in approach. Similarly the information presented in some chapters is contemporary whilst others cover fairly old ground, provide few new insights or information or which exclude the importance of recent and novel discoveries. For example, the chapter on regulation of starch synthesis in transgenic plants does not mention the R1 gene which appears to play a key role in the phosphorylation and turnover of starch.

The reader can obtain a good general overview of specific mechanisms and processes by picking and mixing text from several chapters, but the book would have benefited, for example, from a separate chapter on phloem loading of sucrose, long distance transport mechanisms and unloading processes and on the pathways of primary carbohydrate metabolism. This would have set the scene for the more detailed coverage of key differences between individual species. Botanical variation in the relative importance of the processes which govern carbohydrate composition and content is clear from the contributions of the authors and this is one of the strengths of the text when analysed in toto.

The book is a curate's egg, excellent in parts rather weak in others. However, for those who have a general involvement or interest in plant carbohydrate research the book would complement what currently exists on their shelves. The price may prove inhibitory for many individuals and is more likely to be purchased by groups or libraries.

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