

Merchant, S., Briggs, W.R., Chandler, V.L. (ed.): **Annual Review of Plant Biology. Volume 57, 2006.** - Annual Reviews, Palo Alto 2006. 934 pp., ISSN 1543-5008, ISBN 0-8243-0657-0.

Similar in design to the previous volume but much thicker is the reviewed volume of this traditional collection of review papers dealing with all fields of experimental botany. The book contains 33 reviews supplemented with many figures in black and white and in colour, schemes, tables, and complete lists of references (bold-face printed references being the most important ones). The reviews were written by 89 authors working in 15 countries. As usual, most frequented are the USA (40 authors), followed by the UK (10), France (8), Germany (7), Japan (7), Brazil (6), Spain (3), and Australia, Belgium, Canada, Denmark, Israel, the Netherlands, New Zealand, and Switzerland (1 each). It is interesting that two of the reviews were written by as many as 6 (7) authors.

As usual, the book contains diverse topics. The introductory paper describes life and scientific achievements of S.P. Gibbs, a well-known microscopist and electron microscopist, who looked mainly at cells, algae, and chloroplasts, and also taught at universities. Next review (M.W. Jones-Rhoades *et al.*) deals with microRNAs, *i.e.* small endogenous RNAs that regulate gene expression in plants and animals. S. Hörtensteiner reviews papers on chlorophyll degradation (enzymes, products, genetics, significance) during senescence that have been published since 1999. Quantitative fluorescence microscopy and its application to studies of many plant substances are explained by M. Fricker *et al.* Actin network regulation and signalling in plant cell growth is the topic of review of P.J. Hussey *et al.* The following review (D.M. Kehoe and A. Gutu) describes complementary chromatic adaptation in cyanobacteria and its genetic basis. Flowering response (underlining the role of day length and gibberellins) and seasonal tuber development in potato are dealt with by M. Rodríguez-Falcón *et al.* Laser microdissection isolates specific cells from histological sections; the cells then serve as sources of cell-specific substances and metabolites, for analysis of their genetic modification *etc.*; methods and results obtained by this method are described by T. Nelson *et al.*

Long-distance communication network in the vascular system of higher plants, the translocated photosynthates, macro- and micro-molecules, effects of environment and pathogens, *etc.* are reviewed by T.J. Lough and W.J. Lucas. The role of root exudates in rhizosphere interactions with plants, microbes, and nematodes are the next topic (H.P. Bais *et al.*). A voluminous review (O. Hamant *et al.*) is devoted to genetics of meiotic prophase I in plants; the paper includes also plant specific cloning of unique components. Glucosinolate biology and biochemistry, their biosyntheses and degradation, metabolic links to other compounds, and their transport and biological functions are analysed in a review prepared by B.A. Halkier and J. Gershenzon. An important role in the present plant science is played by

bioinformatics; its methods, tools, and databases were reviewed by S.Y. Rhee *et al.* L. Sack and N.M. Holbrook deal with leaf hydraulics at the levels of leaf and whole plant, *i.e.* water transport, conductances, transpiration, evaporation, *etc.* and their modification by environmental factors, plant growth, or leaf development. Uncoupling proteins mediate H<sup>+</sup> flux through the inner mitochondrial membrane in eukaryotic plants both under normal conditions and as response to stresses (A.E. Vercesi *et al.*). L. Lepiniec *et al.* review papers on genetics and biochemistry of seed flavonoids that are specific for individual tissues.

Structural variability, activity, biosynthesis, and translocation of cytokinins belong to the most often studied topics in plant science. Recent findings in this field are summarized by H. Sakakibara. Global gene expression in specific cell types, available technologies, and results in cellular genomics are evaluated by D.W. Galbraith and K. Birnbaum. Mechanisms controlling biodiversity of leaf and flower shapes (with special attention to *Arabidopsis*) are reviewed by H. Tsukaya. D. Cove *et al.* deal with papers that used mosses as model systems for metabolic and developmental (hormones, organelles, morphology) studies. Structures of photosystems 1 and 2 from cyanobacteria, algae, and plants, and action mechanisms of these basic complexes of oxygenic photosynthesis are described by N. Nelson and C.F. Yocum. Glycosyl-transferases transfer sugars to various acceptors; these enzymes are multigene encoded and are classified to a specific family; their role in developmental and metabolic plasticity during adaptation is often studied (D. Bowles *et al.*). W. Sakamoto summarizes protein degradation machineries in plastids.

Eukaryotic molybdenum enzymes, their components, biosynthesis, types, and functions are the next topic (G. Schwarz and R.R. Mendel). Many peptides act as local signals in cell-to-cell communication and are thus regarded as plant hormones; their types, genomics, and functions are discussed by Y. Matsubayashi and Y. Sakagami. Mechanisms of sugar sensing and signalling in plants (photosynthesis, carbon metabolism, growth, development, responses to stresses) are very important questions (F. Rolland *et al.*). Also antioxidants belong to the most popular topics in plant science; synthesis and genetics of tocopherols and carotenoids (mainly in model organisms *Arabidopsis* and *Synechocystis*) are reviewed by D. DellaPenna and B.J. Pogson. Organelles send signals to nucleus to control nuclear gene expression (plastid-to-nucleus retrograde signalling); this process is best studied in Mg-protoporphyrin IX pathway of chlorophyll synthesis (A. Nott *et al.*). E. Grotewohl reviews the genetics and biochemistry of floral pigments (betalains, carotenoids, and anthocyanins). Tolerance to dehydration and cold

stresses, and the respective cellular responses and transcription regulation are dealt with by K. Yamaguchi-Shinozaki and K. Shinozaki. Biosynthesis of pyrimidine and purine in plants is another interesting topic (R. Zrenner *et al.*). Phytochrome structure and signalling mechanisms are analysed by N.C. Rockwell *et al.* The last review deals with microtubule dynamics and

organization in plant cortex (D.W. Ehrhardt and S.L. Shaw).

On end-papers one finds description of home pages of the Annual Reviews and the links to source papers. The reader is also helped by an excellent subject index. There is no need to write another recommendation of this very useful book.

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