

Delmer, D.P., Bohnert, H.J., Merchant, S. (ed.): **Annual Review of Plant Biology. Volume 54, 2003.** - Annual Reviews, Palo Alto 2003. 773 pp., USD 170.00. ISSN 1040-2519, ISBN 0-8243-06534-6.

This is the second volume of the well known series that appears under the new title and is edited by the same three American specialists. It contains as usual one introductory article and 26 specialised reviews of excellent quality covering various fields of plant biology. The news is that more colour pages accompany the papers, sometimes being very useful, sometimes only increasing the aesthetic form of the figure (e.g. pp. 76 - 77). And it is worthless to note that the majority of reviews discuss also the genetic basis of the described metabolic or functional events.

The introductory paper by Lloyd Evans is an interesting description of his life in science. He is well known due to activities in the Canberra CERES phytotron and for discoveries in the fields of flowering, crop modelling, and crop production (sink size and strength, yield potential).

The first review (G.B. Martin *et al.*) is in the field of plant pathology and deals with plant resistance proteins, also from the point of view of signal transduction. Signal molecules and signal transduction is the topic of further reviews. L. Lamattina *et al.* describe the functions of nitric oxide, a very active chemical messenger in plants. Its action in nitrogen fertilisation, processes of growth and development, its interaction with the classical plant hormones and function during water deficit, in senescence processes, *etc.* is described in detail. As explained by G. Serino and X.-W. Deng, the COP9 signalosome is a multiprotein complex that represses photomorphogenesis and functions also in protein degradation, flower development, disease resistance, auxin responses *etc.* Iron transport, sensing, and signalling in yeasts and plants is the topic of review by C. Curie and J.-F. Briat. Phospholipid-based signalling (H.J.G. Meijer and T. Munnik) activates enzymes (lipid kinases and phospholipases) and recruits proteins to membranes, has its role in plant wounding, during osmotic stress and dehydration of plants, in interaction with pathogens, *etc.* Protein phosphatases regulate cell activities and are involved in many signalling pathways as shown by S. Luan. Cryptochromes are photosensory receptors and signal transducers mediating light regulation of growth and development: genetic basis, mechanisms of their action, and interacting proteins and their phosphorylation are reviewed in the paper of C. Lin and D. Shalitin. Perception and signal transduction of cytokinins and their roles in whole plants and in cell division are the topic of the review by T. Kakimoto.

Among classical plant growth hormones, brassinosteroids are studied very often; S. Fujioka and T. Yokota analyse their biosynthetic and metabolic pathways. Cell division during the cell cycle is controlled by cyclin-dependent kinase complexes; the respective mechanisms and possible inhibition are shown by W. Dewitte and J.A.H. Murray. The role of gibberellins in grass and cereal

flowering and the old problem of "florigen" are discussed by R.W. King and L.T. Evans: they deal with the formation of gibberellins, their transport to shoot apex, evolution aspects, and environmental effects on the responses.

The review of J.C. Larkin *et al.* has a fine title "How do cells know what they want to be when they grow up? Lessons from epidermal patterning in *Arabidopsis*". The topic includes in addition to epidermis also the development of trichomes, root hairs, and stomata. The differentiation and functions of transfer cells that have special roles in nutrient distribution and in stress situations is elucidated by C.E. Offler *et al.* Apomixis, *i.e.* asexual formation of seeds, in comparison with seed formation in sexual plants, is the topic of review by A.M. Koltunow and U. Grossniklaus. Cytoskeleton remodelling for growth and form (plasma membrane, proteins, exocytosis, actin, microtubules, *etc.*) is reviewed by G.O. Wasteneys and M.E. Galway.

Linkage disequilibrium or gametic phase disequilibrium or allelic association is according to S.A. Flint-Garcia *et al.* "nonrandom association of alleles at different loci", a correlation between polymorphisms. It functions in both animal and plant systems and is most often studied in *Arabidopsis*. Single-nucleotide mutations, their detection and importance are the topics of review prepared by S. Henikoff and L. Comai.

The first among topics related with photosynthesis is starch biogenesis and degradation (S.G. Ball and M.K. Morell). This paper includes phylogenetic aspects, deals with branching and debranching enzyme functions, formation of amylose, amylopectin, starch granules, glycogen synthesis, and so on. The review on chloroplast movement (M. Wada *et al.*) deals also with phototropins, calcium ions, cytoskeleton, and plant ecology. An explanatory analysis of photosynthesis of overwintering evergreen plants (seasonal variations, cold acclimation, dissipation of absorbed photons, photoinhibition) was prepared by G. Öquist and N.P.A. Huner.

Molecular mechanisms and regulation of K<sup>+</sup> transport and the roles of K in physiological processes (including cell growth) are the next topic (A.-A. Véry and H. Sentenac). Cytochrome P450 monooxygenases (M.A. Schuler *et al.*) function during stresses (drought, salinity, wounding). Metabolomics analysis provides comprehensive insight into the metabolic state of plant (W. Weckwerth). Other reviews deal with di-iron carboxylate proteins (D.A. Berthold and P. Stenmark) or lignin biosynthesis (W. Boerjan *et al.*).

The traditionally bound book contains also a traditionally detailed subject index and the lists of authors and article titles of eleven volumes (44 - 54). This is certainly a volume for every plant biology bookshelf.

Z. ŠESTÁK (Praha)