

Jones, R.L., Bohnert, H.J., Delmer, D.P. (ed.): **Annual Review of Plant Physiology and Plant Molecular Biology**. Vol. 51, 2000. - Annual Reviews, Palo Alto 2000. 574 pp. USD 151.00. ISBN 0-8243-0651-1.

I recommend to everybody reading of the introductory article written by Ann Oaks who overviews her 50 years' career in plant physiology. In an amusing style she not only describes her life in science and how difficult it has been for a woman to be both a university teacher and scientist, but also gives in brief her main scientific results. She worked in photosynthesis research during her two-year stay in the well known Munich laboratory of Otto Kandler. But her later leading topic was nitrogen assimilation (regulation of amino acid biosynthesis in maize seedling roots, endosperm proteins, nitrate reductase) in which field she reached interesting results.

The following fifteen reviews are on various topics and, as usual, they were prepared by well known researchers. Based on numerous references they summarise the present knowledge in a given field. Biotin metabolism (its biosynthesis, the respective enzymes, protein lipoylation and biotinylation, and seed-specific proteins) is reviewed by C. Alban *et al.* The review prepared by S. Smeeckens analyses the very actual topic of sugar-induced signal transduction (sucrose or hexose sensing, signal transduction cascade, germination of cereal seeds, interactions with ethylene, abscisic and gibberellic acids, cytokinins, irradiation, and various stresses). The structure, activities, and mechanism of action of chloroplast ATP synthase, a very important (probably rotary) enzyme of photosynthesis, are evaluated by R.E. McCarty *et al.* Non-photosynthetic (formerly often called secondary) metabolism in plastids is reviewed by H.E. Neuhaus and M.J. Emes. They deal with syntheses of starch, fatty acids, and amino acids, with oxidation of saccharides, with ATP/ADP transporter, integration of metabolism in storage tissues, and physiological changes during plastid development.

The following reviews are focused on genetic aspects. From molecular and genetic view the pathways and regulation of sulfur metabolism (sulfates, cysteine, glutathione, phytochelatins) are evaluated by T. Leustek *et al.* Mechanisms of transcriptional (by heterochromatin, endogenous repetitive sequences, transgene-genomic junctions, gene repeats, promoter transcripts, DNA viruses) and posttranscriptional (sense and antisense transgenes, DNA and RNA viruses) gene silencing are reviewed by M. Fagard and H. Vaucheret. Chromosome structure, evolution, and pairing in cereal plants is overviewed by G. Moore, who deals with genome size, base composition, gene distribution and order, evolution

of centromeres, telomeres, and chromosomes, and models of chromosome pairing in various plant types. S.B. Gelvin reviews papers on *Agrobacterium* and plant genes involved in T-DNA transfer and integration.

The review of C.J. Staiger deals with signalling to the actin cytoskeleton in plants, among others with actin-binding proteins, growth of pollen tube tip, root hair growth, light-induced chloroplast anchoring and movement, responses to fungal invasion, and stomata opening and closing. Cytoskeleton protein variability and root growth, morphology, and development are the next topic elaborated by P.W. Barlow and F. Baluška. Floem transport and unloading of macromolecules is dealt with by K.J. Oparka and S. Santa Cruz: symplast *versus* apoplast loading, sucrose carrier proteins, viruses, transcription factors, RNA signalling, *etc.* are the main items. Development of plant symmetry is another interesting topic (A. Hudson): embryo asymmetry is replaced by shoot symmetry and eventual following asymmetry of organs and flowers. Thioredoxins not only regulate photon activation of key photosynthetic enzymes in chloroplasts, but are present also in the cytoplasm and mitochondria. They are enzymatically reduced and transmit the regulatory signal to some target enzymes through disulfide/dithiol interchange reactions. Recent developments in this field are summarised by P. Schürmann and J.-P. Jacquot. Physiological function of selenium in higher plants, its uptake, transport, and distribution, biochemistry, variation among species, in plant/microbe interactions, *etc.* is reviewed by N. Terry *et al.* The diversity and regulation of plant Ca^{2+} pumps (based on experience with yeast) is the next topic (H. Sze *et al.*). Plant cellular and molecular responses to high salinity is the next topic (P.M. Hasegawa *et al.*): salt stress, salt movement, effectors and signalling components, water uptake and transport, plant signalling genes and factors, and osmotic stress tolerance are among the discussed questions. The last review (W. Rademacher) deals with growth retardants and their effects on gibberellin biosynthesis and metabolism and on other phytohormones, on sterol and flavonoid metabolism, *etc.*

As usual, an excellent subject index is supplemented as well as an index of authors contributing to volumes 41-51. Note also the respective internet address: www.AnnualReviews.org.

Z. ŠESTÁK (Praha)