Pareek, A., Sopory, S.K., Bohnert, H.J., Govindjee (ed.): **Abiotic Stress Adaptation in Plants. Physiological, Molecular and Genomic Foundation**. – Springer, Dordrecht 2010. ISBN: 978-90-481-3111-2(HB), e-ISBN 978-90-481-3112-9. 1st Ed, 526 pp. USD 179.00.

I still remember discussions saying that plant stress is a fault and nonsense in scientific research. The presented book of Pareek *et al*. shows how great fault was this notion. Plant stress is a great field of important research, mainly nowadays in relation to relative fast climate changes. Plants are exposed to stressors of various kind and have to cope with them. Understanding of the acclimation or adaptation to stresses is very important in seeking for perspective cultural plants and for conserving plant diversity on our planet.

The stresses can be tentatively divided into abiotic (of physical and chemical nature) and biotic (plant pathogeny, allelopathy, herbivors *etc*.). Although the title of the book mentions only abiotic stress, on many places in the text there are references to biotic stresses, too. As the examples Chapter 6 dealing with a comparison of biotic and abiotic stresses or a paragraph in Chapter 3 on cross-talk between biotic and abiotic stresses may be named. Also those parts mentioning the hypersensitive reaction (HR) or proteinase inhibitor (PIN) synthesis are related to biotic stresses. The most important abiotic stresses treated are those evoked by heat (high temperature), low temperature, water deficiency (drought), high salinity (osmotic and Na^+ stress), UV-B irradiance, ozone, heavy metals *etc*., including their combinations. Less attention is paid to high-irradiance stress which is closely related to changes in photosynthesis.

The book presents a standard monograph in which individual chapters are written by different authors. The book is divided into four parts and contains altogether 23 chapters. There are about 70 authors from Australia, Finland, France, India, Israel, Japan, Korea, Philippines, Russia, UK, and USA. Most of authors come from USA and India. The individual chapters have the usual structure, starting with List of Contents and Summary and ending with Conclusions and References. Some chapters concentrate more specifically to the results of the authors (*e.g*. two chapters contain prevailing detailed information on green alga *Chlamydomonas*, one chapter presents rice reaction to salt stress), some of chapters are broad reviews [*e.g*. Chapter 3 dealing with the role of abscisic acid (ABA), Chapter 7 about protein kinases and phosphatases or Chapter 15 on responses to macronutrient deprivation]. These chapters also contain a larger amount of references.

The four parts are arranged in a logical way from stress signal perception to systems strategy. The chapters contain many useful schemes and tables including colour plates presented at the beginning of the book. User-friendly is the application of Boxes within the text explaining some particular concepts, pathways, or methods which may not be familiar with everybody. For instance such modern methods as MALDI-TOF, GC-MS and others are shortly explained.

In the part one the chapters are devoted to the most important molecules and processes in the stress signal perception and transduction: ABA, calcium cation signalling, protein phosphorylation and dephosphorylation, and the important role of nitrogen nutrition and availability. Generally the plant stress hormones, stress proteins and other signalling pathways are mentioned and discussed in many chapters throughout the book.

In part two a great amount of information about molecular genetics, genomics, transcriptomics, proteomics, metabolomics, and application of directed mutagenesis in relation to plant stress is contained. Most of mutants studied are those of *Arabidopsis thaliana*. However, as the book is also directed to application in agriculture and ecology, mutants of wheat (*Triticum aestivum*), corn (*Zea mays*), or rice (*Oryza sativa*) are probably the most important among other cited mutants. ABA-dependent and ABA-independent gene expression is thoroughly described in one chapter together with major transcription factors and regulatory elements. Among other important concepts the epigenetic regulation (*e.g*. methylation of proteins and DNA), ion homeostasis (important *e.g*. in the effect of high Na^+ concentration in the salt effect), glutathione homeostasis (regulation of cytoplasmic redox state), role of reactive oxygen species (ROS) should be named.

Although the photosynthetic processes are not the main subject of this book, the readers of Photosynthetica may found interesting the chapter devoted to water balance and regulation of stomatal movement, responses to macronutrient deprivation (nitrogen, sulfur and phosphorus nutrition), osmolyte regulation (*e.g*. roles of proline, glycine betaine, inositols and others). As inspirative may act the chapter about programmed cell death in plants and its relation to plant stresses or parts mentioning the plant cytoskeleton. Although the book is quite large, there was not enough space to describe in more details biophysical aspects of the signals (hydraulic signals, a role of membrane potentials, systemic reactions *etc*.) or to describe a closer relation of stresses to photosynthesis.

Part four is more directed to practical applications and deals with perspectives of transgenic approaches in seeking for stress-tolerant plants, stress markers, and systems approach.

Because plants growing outdoors may be exposed to stressors quite frequently, the large amount of information contained in this book should be of interest for plant physiologists, stress physiologists, and molecular plant biologists, both researchers and students.

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