Hawkesford, M.J., Buchner, P. (ed.): **Molecular Analysis of Plant Adaptation to the Environment.** – Kluwer Academic Publishers, Dordrecht – Boston – London 2001. ISBN 1-4020-0016-2. 276 pp., USD 88.00, EUR 95.00, GBP 59.00.

This book has appeared as the first volume of newly launched "Kluwer Handbook Series of Plant Ecophysiology", edited by Luit J. De Kok and Ineke Stulen (University of Groningen, The Netherlands). The Handbook Series comprises a series of books that deal with the impact of biotic and abiotic factors on plant functioning and physiological adaptation to the environment. Its aim will be to review and integrate the present knowledge on the impact of the environment on plant functioning and adaptation at various levels of integration. The editors of the first volume, Malcolm J. Hawkesford and Peter Buchner (Agriculture and Environment Division, Institute of Arable Crop Research, Rothamsted, Harpenden, Hertfordshire, AL5 2JQ, UK; malcolm.hawkesford@bbsrc.ac.uk) present a good example of a volume written in this style.

Eleven contributions to the book have been prepared by sixteen authors from Australia (1), Costa Rica (1), Denmark (3), France (2), Germany (2), The Netherlands (1), UK (3), and USA (3).

The book is divided into two sections. In the first, introductory chapter, the senior editor summarises the sequence of events, relating gene expression and control mechanisms to plant adaptation to the environment as determined by ecological and physiological studies.

The Section 1 (chapters 2 to 5) deals with some principal methods. Chapter 2 is devoted to genetic dissection of plant stress responses: mutagenesis systems (classical mutagenesis, insertional knockout mutagenesis, gene detection methods, mis-expression mutants), identification of stress response mutants (direct selection for trait mutants, indirect selection for mutants), reverse genetics strategies to analyse stress responses (site selected insertional mutagenesis, gene silencing), and functional genomic perspectives. The main topic of the third chapter is differential cloning: differential screening of cDNA libraries, subtractive hybridisation, cDNA-representational difference analysis (RDA), differential display, and AFLP based RNA fingerprinting (cDNA-AFLP). Chapter 4 is focused on application of genomics in agriculture: structural genomics or gene discovery driven by large-scale DNA sequencing, functional genomics, mutant analysis, assigning function, bioinformatics, using genomics to dissect plant stress resistance pathways, genetic engineering of tolerance traits, implications of genomics applications for increasing crop plant stress tolerance. Chapter 5 is devoted to quantitative trait loci (QTLs) for analysis of physiological and biochemical responses to abiotic stress: some elements of methodology, QTLs and abiotic stress (high temperature, drought, salinity, osmotic adjustment, abscisic acid, cell-membrane stability, *etc.*), and candidate gene approach.

The Section 2 (chapters 6-11) summarises specific biotic and abiotic stresses which impact on plant viability with an emphasis on application of molecular methods. Molecular strategies to overcome salt stress in agriculture are dealt with in Chapter 6: phenotype targeted breeding/selection for salt stress resistance, single gene targeted strategies to provide increased resistance to salt stress (osmoprotectants, ion transport, dehydrins/late embryogenesis abundant gene products, other potential transgenes, *etc.*), strategies that target activation of groups of genes related by function to salt/drought stress resistance (manipulation of stress signal components), *etc.* Chapter 7 is devoted to the responses of plants to pathogens: the defenses of plants (hypersensitive response, modification of the cell wall, antimicrobial and PR proteins, phytoanticipins and phytoalexins), regulation of signal transduction (plant-pathogen interactions, genes in the regulation of defense, chemical inducers of resistance, jasmonate pathway and induced systemic resistance, active oxygen and nitric oxide species). Chapter 8 summarizes the responses and adaptations of plants to metal stress: potentially toxic trace metals such as zinc, nickel, copper, cadmium, selenium, and arsenic in plant root and shoot (accumulation, exclusion, tolerance), molecular approaches to understanding plant adaptations and responses to elevated concentrations of potentially toxic trace metals, development of metal resistant and metal accumulating plants. Molecular responses to oxidative stress are dealt with in Chapter 9: xenobiotics, environmental pollutants, and reactive oxygen species - ROS (mitochondrial respiratory pathway-specific inhibitors, free radicals in the cell, *etc.*), environmental perturbations, hormones, and ROS, activation and mobilization of antioxidant defenses, transcriptional activation of stress-responsive genes (*Cat* and *Sod* antioxidant defense genes families), promoter structure of the three *Cat* genes, *Cat* gene expression in response to wounding, *etc.* Responses to low temperature and adaptations to freezing are reviewed in Chapter 10: cold acclimation, cold signal and molecular response, genetics of freezing tolerance, *etc.*). The last Chapter 11 focuses on plant responses to nutritional stresses: carbon and phosphorus (morphological and biochemical modifications in P-stressed plants, kinases, phosphatases, ribonucleases), symbiotic associations, *etc.*

The book is well edited, and supplied with a subject index. Individual chapters are accompanied with relevant literature (altogether more than 1 000 references). The book will surely be of interest to scientists, teachers, and students interested in plant and environmental sciences.

J. ČATSKÝ (*Praha*)