

Preface

There are already a number of excellent books on plant stress biology on the market, so why have another one? This was a question I posed myself when I was asked to edit a book on "Plant Stress Biology." An obvious answer was to look at topics others had left aside and, moreover, to concentrate on new developments in a larger context than special topic reviews that are published by journals.

So what's different and new? According to my opinion, the plant field so far has given too little attention to studies done on other model systems than *Arabidopsis*. Thus, two chapters begin the book in the hope that plant biologists will gain new insights from Abram Aertsens and colleague's chapter on "Stress Responses of Model Bacteria" and Andrew Cuming's chapter on "Moss as a Model System for Plant Stress Responses." In the final chapter in the first section, Akhilesh Tyagi and colleagues try to bridge these and other findings to apply our current knowledge to the realm of "Emerging Trends in Functional Genomics for Stress Tolerance in Crop Plants."

Recent interesting developments in the field of stress biology make up the next section of the book. One chapter deals with recent findings on the existence of extensive cross-talk between abiotic and biotic signaling in "Stress Physiology of Higher Plants: Cross-Talk between Abiotic and Biotic Stress Signaling", which is highlighted by authors around Kazuo Shinozaki's laboratory. Plant hormones such as abscisic acid are well known to play a role in abiotic stress. However, jasmonic acid and brassinosteroids have received much less attention to their potential roles in abiotic stress in plants. Therefore, Claus Wasternack contributes a chapter on "Jasmonates in Stress, Growth, and Development" and the group of Priti Krishna discusses how "Brassinosteroids Confer Stress Tolerance."

A discussion of "Cold, Salinity, and Drought Stress" by Narendra Tuteja, "Heavy Metal Stress in Plants" by Ann Cuyper's group, and "Systematic Analysis of Superoxide-Dependent Signaling in Plant Cells: Usefulness and Specificity of Methyl Viologen Application" by Simone Jacob and Karl-Josef Dietz follows in a suite of chapters dealing with a number of abiotic stresses relevant to agriculture.

The final section of the book gives an outlook how the latest technologies will shape our understanding and future applications in plant stress biology. Thus, a chapter on "Insights into the *Arabidopsis* Abiotic Stress Response from the AtGenExpress Expression Profile Dataset" by Klaus Harter's lab discusses the

insights gained by performing transcriptomic analyses of abiotic stresses. Recent developments in the field of proteomics are changing our views about how stresses are perceived and how this information is processed by signaling pathways. Thus, a final chapter by my group together with Alberto de la Fuente discusses novel "Integrative Approaches to Elucidate and Analyze Protein Interaction and Signaling Networks." Altogether, this book should stimulate approaches to plant stress biology by new avenues and help to build bridges between scientific fields that have so far received little interaction.

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