

## Section I Soil Salinity and Sodicity Problems

### Chapter 1 Soil Salinity and Sodicity as Particular Plant/Crop Stress Factors

*[Mohammad Pessarakli and I. Szabolcs]*

## Section II Plants/Crops Tolerance Mechanisms and Stressful Conditions

### Chapter 2 Roles and Mechanisms of Rhizobacteria in Regulating Plant Tolerance to Abiotic Stress

*[William Errickson and Bingru Huang]*

### Chapter 3 Physiological, Biochemical and Molecular Mechanisms Regulating Post-Drought Stress

#### Recovery in Grass Species

*[Cathryn Chapman and Bingru Huang]*

### Chapter 4 Regulatory Mechanisms for Stress-Induced Leaf Senescence

*[Stephanie Rossi and Bingru Huang]*

### Chapter 5 Mechanisms of Salt Tolerance in Submerged Aquatic Macrophytes

*[Rout Nutan Prasad, Shaw Birendra Prasad, and Rodríguez-Garay Benjamín]*

### Chapter 6 Oxidative Stress in Plants: Production, Metabolism, and Biological Roles of Reactive Oxygen Species

*[Mojtaba Kordrostami, Babak Rabiei, and Ali Akbar Ebadi]*

### Chapter 7 Oxidative Stress and Antioxidative Defense System in Plants Growing under Abiotic Stresses

*[Pallavi Sharma, Ambuj Bhushan Jha, and Rama Shanker Dubey]*

### Chapter 8 Plant Biochemical Mechanisms for the Maintenance of Oxidative Stress under Control Conditions

*[Diego G. Arias, Claudia V. Piattoni, Sergio A. Guerrero, and Alberto A. Iglesias]*

### Chapter 9 Role of Proline and Other Osmoregulatory Compounds in Plant Responses to Abiotic Stresses

*[Ehsan Shakeri, Ali Akbar Mozafari, Fatemeh Sohrabi, and Armin Saed-Moucheshi]*

## Chapter 10 Role of Dehydrins in Plant Stress Response

*[Klára Kosová, Ilja Tom Prášil, and Pavel Vítámvás]*

## Chapter 11 Strigolactone Plant Hormone's Role in Plant Stress Responses

*[Fatemeh Aflaki, Arman Pazuki, and Mohammad Pessarakli]*

## Chapter 12 Plant Abiotic Stress Proteomics: An Insight into Plant Stress Response at Proteome Level

*[Klára Kosová, Milan Oldrich Urban, Pavel Vítámvás, and Ilja Tom Prášil]*

## **Section III Plants and Crops Responses: Physiology, Cellular and**

## **Molecular Biology, Microbiological Aspects, and Whole**

## **Plant Responses under Salt, Drought, Heat, Cold**

## **Temperature, Light, Nutrients, and Other Stressful Conditions**

## Chapter 13 Responses of Photosynthetic Apparatus to Salt Stress: Structure, Function, and Protection

*[M. Stefanov, A.K. Biswal, M. Misra, A. N. Misra, and E.L. Apostolova]*

## Chapter 14 Responses of Plants to Stresses of the Sonoran Desert

*[Thomas W Crawford, Jr]*

## Chapter 15 Stresses in Pasture Areas in South-Central Apennines, Italy, and Evolution at Landscape Level

*[A. Fatica, L. Circelli, E. Di Iorio, C. Colombo, T. W. Crawford, Jr. and E. Salimei]*

## Chapter 16 Turfgrass Nutrient Management under Stresses: A Part of Integrated Stress Management

*[Haibo Liu, Nick Menchyk, Frank Bethea, Christian Baldwin, Jacob Taylor, and Caleb Patrick]*

## Chapter 17 Nutrient Management of Golf Course Putting Greens under Stress

*[Haibo Liu, Nick Menchyk, Frank Bethea, Christian Baldwin, Jacob Taylor, and Caleb Patrick]*

## Chapter 18 Molecular Chaperones and Acquisition of Thermotolerance in Plants

*[Hitoshi Nakamoto and Tahmina Akter]*

Chapter 19 Phytohormone Homeostasis and Crosstalk Effects in Response to Osmotic Stress

*[Omid Askari-Khorasgani and Mohammad Pessarakli]*

Chapter 20 Heliotropism: Plants Follow the Sun

*[Yehouda Marcus]*

Chapter 21 Carbon Metabolic Pathways and Relationships with Plant Stress

*[Carlos M. Figueroa, Romina I. Minen, Florencio E. Podestá, and Alberto A. Iglesias]*

Chapter 22 Protein Synthesis by Plants Under Stressful Conditions

*[Pallavi Sharma and R. S. Dubey]*

Chapter 23 Ultraviolet Effects on Plants: Harmful or Beneficial?

*[Arman Pazuki, Fatemeh Aflaki, and Mohammad Pessarakli]*

## **Section IV Plants and Crops Responses under**

### **Pollution and Heavy Metal Stresses**

Chapter 24 Plant Heavy Metal Interactions and Pollution Stress

*[Mojtaba Kordrostami, Ali Akbar Ebadi, Babak Rabiei, and Mohammad Mafakheri]*

Chapter 25 Plant Responses to Stress Induced by Toxic Metals and Their Nanoforms

*[Králová Katarína, Masarovicová Elena, and Jampílek Josef]*

Chapter 26 Turfgrass Hyper-Accumulative Characteristics to Alleviate Heavy and Toxic Metal Stresses

*[Haibo Liu, Nick Menchyk, Frank Bethea, Christian Baldwin, Jacob Taylor, and Caleb Patrick]*

## **Section V Plant and Crop Responses under Biotic Stress**

Chapter 27 How Crops Stress Weeds

*[Jack Dekker]*

## **Section VI Genetic Factors and Plant/Crop Genomics under Stress Conditions**

## Chapter 28 Candidate Gene Expression Involved in Plant Osmotic Tolerance

*[Mojtaba Kordrostami and Ali Akbar Ebadi]*

## Chapter 29 Drought-Induced Gene Expression Reprogramming Associated with Plant Metabolic Alterations and

Adaptation

*[Omid Askari-Khorasgani and Mohammad Pessarakli]*

## **Section VII Plant/Crop Breeding under Stress Conditions**

### Chapter 30 Marker-Assisted Breeding for Disease Resistance in Legume Vegetable Crops

*[Bhallan Singh Sekhon, Akhilesh Sharma, and Rakesh Kumar Chahota]*

### Chapter 31 Breeding for Improved Crop Resistance to Osmotic Stress

*[Mojtaba Kordrostami and Babak Rabiei]*

### Chapter 32 Breeding for Improved Plant–Symbiont Thermotolerance and Symbiotic Performance by

Regulating Heat Shock Proteins, RNA Binding Proteins, and Chaperones

*[Omid Askari-Khorasgani and Mohammad Pessarakli]*

## **Section VIII Examples of Empirical Investigations of Specific**

**Plants and Crops Grown under Salt, Drought,**

**and Other Environmental Stress Conditions**

### Chapter 33 Abiotic Stress Impact and Tolerance of Natural Sweetener Plant Stevia

*[Rout Nutan Prasad, Rodríguez-Garay Benjamín, Barranco-Guzmán Angel Martín, Gómez-Entzin*

*Veronica, and Rincón-Hernández Manuel]*

### Chapter 34 Responses of Green Beans (*Phaseolus vulgaris* L.) in Terms of Dry Matter Production,

Nitrogen Uptake, and Water Absorption under Salt Stress Conditions

*[Mohammad Pessarakli]*

Chapter 35 Growth Responses of Pepper Plant (*Capsicum annuum* L.) in Terms of Biomass Production and

Water Uptake under Deficit Irrigation System, Mild Water Stress Conditions

*[Sara Mardani, Mohammad Pessarakli, and Rachel McDaniel]*

Chapter 36 Effects of Salinity Stress on Tomato Plants and the Possibility of Its Mitigation

*[Maryam Mozafarian Meimandi, Noémi Kappel, and Mohammad Pessarakli]*

Chapter 37 Water Stress Effects on Growth and Physiology of Corn

*[M. Anowarul Islam and Abdelaziz Nilahyane]*

Chapter 38 Moisture Stress and Its Effects on Forage Production Systems

*[M. Anowarul Islam and Albert T. Adjewor]*

Chapter 39 Responses of Medicinal Plants to Abiotic Stresses

*[Masarovicová Elena, Králová Katarína, Vykouková Ivana, and Zuzana Kriššáková]*

Chapter 40 Citrus Plant Botanic Characteristics and Its Abiotic and Biotic Stress

*[Hong Li]*

## **Section IX Future Promises: Improving Plant and Crop Adaptation/Tolerance and Cultivation under Stressful Conditions**

Chapter 41 Improving Crop Resistance to Abiotic Stresses Through Seed Invigoration

*[M. Farooq, A. Wahid, S.M.A. Basra, Abdul Rehman, and Kadambot H.M. Siddique]*

Chapter 42 Drought Resistance of Tropical Forage Grasses: Opening a Fertile Ground for Innovative Research

*[Juan Andrés Cardoso and Idupulapati M. Rao]*

Chapter 43 Drought Resistance of Common Bean Water Spending and Water: Saving Plant Ideotypes

*[Jose A. Polania and Idupulapati M. Rao]*

Chapter 44 Moringa and Tamarind: Potential Drought-Tolerant Perennial Crops

*[Satya S.S. Narina, Christopher Catanzaro, and Anwar H. Gilani]*

Chapter 45 Relationship of Medicinal Plants and Environmental Stresses: Advantages and Disadvantages

*[Amir Hossein Saeidnejad]*

Chapter 46 The Role of Beneficial Elements in Mitigation of Plant Osmotic Stress

*[Maryam Mozafariyan Meimandi, Noémi Kappel, and Mohammad Pessarakli]*

Chapter 47 The Role of Grafting Vegetable Crops for Reducing Biotic and Abiotic Stresses

*[Maryam Mozafarian Meimandi and Noémi Kappel]*

Chapter 48 Why Root Morphology is Expected to Be a Key Factor for Crop Salt Tolerance

*[Uwe Schleiff]*

Chapter 49 Improving Plant Yield and Quality under Normal and Stressful Conditions by Modifying the

Interactive Signaling and Metabolic Pathways and Metabolic Interaction Networks

*[Omid Askari-Khorasgani and Mohammad Pessarakli]*

## **Section X Beneficial Aspects of Stress on Plants/Crops**

Chapter 50 Beneficial Effects of Various Environmental Stresses on Vegetables and Medicinal Plants for the

Production of High Value-Added Plants

*[Satoru Tsukagoshi and Wataru Yamori]*