

Plant Abiotic Stresses

Physiological Mechanisms
Tools and Regulation



A. Hemantaranjan

**Plant Abiotic Stresses:
Physiological Mechanisms,
Tools and Regulation**

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Plant Abiotic Stresses: Physiological Mechanisms, Tools and Regulation

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Preface

The inception of the book entitled “*Plant Abiotic Stresses: Physiological Mechanisms, Tools and Regulation*” has been an exclusive creation for imbibing intricacies of the modern research endeavours across the Globe in the crucial area of plant abiotic stresses, the dire need of time. Plant Physiologists have to certainly sort out the insufficiency of consequential researches, which are genuinely required for getting higher productivity, opulence and sustainability of agriculture through outstandingly promising technologies that help improvement in metabolic boundaries, which necessitates mainly for abiotic stress factors.

Categorically, our thoughts have to be recognizable with landmark science of worth across the broad disciplinary range of the book. The aspiration is to make stronger the vital outcome of conscientious research coupled with thorough perceptions of underlying mechanisms of plant tolerance under changing environments and to make appropriate strategies from excellent new ideas to ensure the research outcome of paramount importance in food production under extremes of stressful conditions geographically varying from one place to another. This book has substance for extending simple and applied researches for their rapid applications in agriculture besides broadening knowledge of the abiotic stress science far and beyond. Nevertheless, with approaching third decade, the abiotic stress research has surpassed the fundamentals globally and has been entirely intriguing to scrutinize the physiological and molecular bases of plant stress tolerance. At this decisive point in time, hopefully this book, in part, could be a step forward in providing enough insight on stress causing multiple environmental components and to obtain favourable directions in several ways are sensibly included in the *first nine chapters*, viz., the EPR based free radical detection in plants; ROS to be a multifaceted moiety that impacts at cellular level with the aim to develop strategies for stress mitigation and management; osmoprotectants mainly stabilize proteins to reduce osmotic potential in membranes for preventing dehydration inside the cell; salicylic acid (SA) and its role as mitigating agent for both abiotic and biotic stresses; impacts of high temperature extremes, heat stress management and heat tolerance mechanism, the serious issue of terminal heat stress as a major problem in India on wheat production; physiological adaptations and dynamics for plant productivity under heat stress tolerance; brassinosteroids has been highlighted as a potent plant growth regulator and considered to be a modern weapon in agriculture against abiotic stresses for mitigating deleterious effects. Consequently, the *next nine chapters* focus upon pertinent essential micronutrient and other elements of significance; altered physiological mechanisms; physical tools in eco-physiological innovations; effective tool for conservation of endangered and valuable medicinal plants through seed invigoration techniques; querying upon how the master regulators of the group of brassinosteroids could be of significance in certain regulatory mechanisms of plants; recent knowledge on secondary metabolites having vast impact on plant functions; appropriate implications of solar radiation for agri-horticultural production; the major stressful issue of internal breakdown in mango (*Mangifera indica* L.) carrying an important physiological disorder

of the king of fruits. Above all, finally this book, in general interest, terminates by reflecting rightly the potential biomass for energy generation and the future prospects.

By and large, this book consists of much needed chapters by sincerely dedicated contributors with a view to organize the burning theme of the present scenario being acknowledged resolutely by the world scientists. Therefore, this hardback has been exclusively in agreement with challenges of continuing worldwide concern over the stress physiology research.

In this committed enterprise, I am delighted to express my genuine admiration to all the exceptionally luminous contributors from well known institutions for creating this unrivalled, rational, attentive and extensive book of global relevance. I am beholden to my family members for their pious blessings and best wishes in this auspicious assignment. I have my profound esteem to all of them. Besides this, I am greatly thankful to the excellent and talented human resources of the Scientific Publishers, Jodhpur, India, for their authentic competence and meticulousness in the perfect printing of international standard and for a timely worldwide circulation of the vital pieces of the science of abiotic research through this inimitable book.

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Contents

Preface	v
List of Contributors	viii

Section I: Recent Developments in Abiotic Stress Research

1. Role of Electron Paramagnetic Resonance (EPR) Spectroscopy in Detection of Stress Generated Free Radicals in the Plant 1–14
—*Smita Sundaram, Shweta Kaur, Indu Shekhar Thakur*
2. Reactive Oxygen Species a Multifaceted Organic Moiety: Insights in Plants Response to Changing Environments 15–26
—*M.K.Adak, Arnab Kumar De*
3. Non-Reducing Sugars for Combating Plant Abiotic Stresses 27–42
—*Wasifa Hafiz Shah, Aadil Rasool, Inayatullah Tahir, Reiaz Ul Rehman*
4. Salicylic Acid—A Mitigating Agent for Conferring Stress Tolerance in Plants 43–54
—*Aadil Rasool, Wasifa Hafiz Shah, Inayatullah Tahir, Reiaz Ul Rehman*
5. Physiological Effects of Temperature Extremes, Heat Stress Management and Tolerance Mechanism 55–84
—*A. Hemantaranjan, A. Nishant Bhanu, M. N. Singh, Kartikey Srivastava, Deepmala Katiyar, Shivani Lalotra, Jyostanarani Pradhan, Asha Kumari, Khushboo Gupta, Vivek Pratap Singh, Rupanshee Srivastava, Prachi Garg*
6. Impact of Terminal Heat on Wheat Production in India 85–96
—*T.P. Singh, Sunil Kumar, Jyoti Kumari, Vikender Kaur*
7. Terminal Heat Stress: A Major Problem of Wheat Production 97–120
—*T.P. Singh, Jyoti Kumari, Sunil Kumar, Vikender Kaur, P.S. Deshmukh*
8. Salt Stress in Crop Plants: Physiological Mechanisms and Management 121–138
—*A.S.Nithila, R.Sivakumar*
9. Brassinosteroid—A Modern Weapon in Agriculture Against Stress 139–150
—*J. Pradhan, A. Hemantaranjan, S. Lalotra*

Section II: Trace Elements in Plant Function and Stress Tolerance

10. Lithium in Plants 151–162
—*Enrique J. Baran*
11. Iron in Plants: An overview 163–182
—*Laxmi Verma and Nalini Pandey*

12. Beneficial Role of Silicon (Si) on Growth, Metabolism and Stress Tolerance Mechanisms in Rice (*Oryza Sativa* L.) 183–200
—*Rakesh Sil Sarma and Pravin Prakash*

Section III: Plant Physiology: Mechanism, Tools and Regulation

13. Chlorophyll Fluorescence: A Physiological Mechanism and a Physical Tool in Plant Eco-physiological Studies 201–242
—*K.A. Kalariya, Nisha Goswami, Deepti Mehta, A.L. Singh, P L.Saran*
14. Seed Invigoration: An Effective Tool for Conservation of Endangered and Valuable Medicinal Plant 243–272
—*Dhiman Mukherjee*
15. Brassinosteroids: The Master Regulators in Physiology of Plants 273–280
—*Asha Kumari, A. Hemantaranjan*
16. Secondary Metabolites—Their Impact on Plants 281–292
—*Pallabi Kalita Hui and Hui Tag*

Section IV: Photobiology – In Agri-Horticultural Production

17. Implications of Solar Radiation for Agri-horticultural Production 293–314
—*A. K. Trivedi, G. Pandey, S. K. Shukla, P. Barman*

Section V: Tree Physiology – Physiological Disorder

18. Internal Breakdown in Mango (*Mangifera Indica* L.) is an Important Physiological Disorder: An Overview 315–334
—*V. K. Singh*

Section VI: Biomass Resources, Bioenergy Potential and Environmental Protection A Comprehensive Review

19. Potential Biomass for Energy Generation and Future Prospects in India 335–354
—*Lakshmi Pathak, Kavita Shah*