

Narendra Tuteja ·  
Sarvajeet Singh Gill *Editors*

# Crop Improvement Under Adverse Conditions

 Springer

# Crop Improvement Under Adverse Conditions

**Dr Dave Watson**



## **Crop Improvement Under Adverse Conditions:**

**Crop Improvement Under Adverse Conditions** Narendra Tuteja, Sarvajeet Singh Gill, 2012-12-09 Plant development and productivity are negatively regulated by various environmental stresses Abiotic stress factors such as heat cold drought and salinity represent key elements limiting agricultural productivity worldwide Thus developing crop plants with the ability to tolerate abiotic stresses is a critical need which demands modern novel strategies for the thorough understanding of plant response to abiotic stresses Crop Improvement under Adverse Conditions will serve as a cutting edge resource for researchers and students alike who are studying plant abiotic stress tolerance and crop improvement The book presents the latest trends and developments in the field including the impact of extreme events on salt tolerant forest species of Andaman Nicobar Islands the overlapping horizons of salicylic acid in different stresses and fast and reliable approaches to crop improvement through In Vitro haploid production Written by renowned experts and featuring useful illustrations and photographs Crop Improvement under Adverse Conditions is a concise and practical update on plant abiotic stress tolerance and crop improvement

**Plant Acclimation to Environmental Stress** Narendra Tuteja, Gill Sarvajeet Singh, 2012-12-09 The mechanisms underlying endurance and adaptation to environmental stress factors in plants have long been the focus of intense research Plants overcome environmental stresses by development of tolerance resistance or avoidance mechanisms adjusting to a gradual change in its environment which allows them to maintain performance across a range of adverse environmental conditions Plant Acclimation to Environmental Stress presents the latest ideas and trends on induced acclimation of plants to environmental stresses under changing environment Written by experts around the globe this volume adds new dimensions in the field of plant acclimation to abiotic stress factors Comprehensive and lavishly illustrated Plant Acclimation to Environmental Stress is a state of the art guide suited for scholars and researchers working in the field of crop improvement genetic engineering and abiotic stress tolerance

*Genome Editing for Crop Improvement* Jameel M. Al-Khayri, Muhammad N. Sattar, Sudhir K. Sopory, Shri Mohan Jain, 2025-03-25 Genome editing offers a powerful tool to significantly accelerate crop breeding programs in order to develop new and improved varieties It allows precise modification of an organism's DNA sequence often by creating targeted double strand breaks at specific locations The CRISPR Cas system has emerged as the preferred method of gene editing and offers a powerful technology for crop improvement The use of CRISPR in plant research has led to significant improvements in crop performance in terms of yield nutrition stress tolerance and resistance against agricultural pests and diseases This book explores the cutting edge field of genome editing its applications and potential to revolutionize the genetic improvement of crops This is a valuable resource for researchers in crop genetic improvement graduate and postgraduate students in molecular biology and biotechnology programs and professionals in the field

**Recent Trends in Plant Breeding and Genetic Improvement** Mohamed A. El-Esawi, 2024-03-27 The significant enhancement of desirable traits in vegetables and crops can be achieved through the

utilization of diverse approaches in plant breeding These approaches are crucial in developing vegetables and crops that exhibit enhanced yield disease resistance and adaptability to fluctuating environmental factors ultimately contributing to the establishment of sustainable and resilient agricultural practices for ensuring food security This book delves into the fundamental principles and recent breakthroughs in plant breeding and genetic improvement It focuses on the application of physiological and molecular approaches to augment plant tolerance to stressful environmental conditions Additionally the book provides plant breeders researchers and scientists with updated insights into the prospective developments in plant breeding

**Environment, Climate, Plant and Vegetation Growth** Shah Fahad, Mirza Hasanuzzaman, Mukhtar Alam, Hidayat Ullah, Muhammad Saeed, Imtiaz Ali Khan, Muhammad Adnan, 2020-10-05 This book provides an up to date account of the current understanding of climate change and global warming related to environment climate plant and vegetation growth The aim of this book is to provide a platform for scientists and academics world wide to promote share and discuss various new issues and developments in the area of plant and vegetation growth related to climate change Over the next decades it is predicted that billions of people particularly those in developing countries face shortages of water and food and greater risks to health and life as a result of climate change Concerted global action is needed to enable developing countries to adapt to the effects of climate change that are happening now and will worsen in the future The book will also enhance the understanding on issues related to climate change giving a clear indication of a looming global warming crisis Addressing global climate change is a monumental battle that can only be fought by the leaders of tomorrow but future leaders are molded through education and shaped by the leaders of today

*Managing Soil Drought* Rattan Lal, 2024-06-10 Global drylands covering over 40% of Earth's land surface are important among worldwide ecoregions and support large human and livestock populations However these ecologically sensitive ecoregions are undergoing a rapid transformation resulting from climate change socioeconomic and political factors increases in population and ever growing demands for goods and services *Managing Soil Drought* addresses basic processes and provides specific case studies throughout covering the protection restoration and sustainable management goals of global drylands under changing and harsh climatic conditions including fragile and vulnerable ecosystems The book is written by numerous researchers academicians practitioners advocates land managers and policymakers involved in bringing about transformation in these regions important to human and nature It includes information on basic strategies of sustainable management of global drylands aimed at improving water use efficiency through choosing appropriate species developing new varieties using organic and inorganic amendments and scaling up innovative farming systems This volume in the *Advances in Soil Sciences* series is an essential read for development organizations and policymakers involved in improving crop productivity and sustainability in drought prone regions students researchers and academicians interested in sustainable management of water resources and those involved in emerging concepts of regenerative agriculture agroecology and conservation agriculture

*Biostimulants*

*in Alleviation of Metal Toxicity in Plants* Sarvajeet Singh Gill, Narendra Tuteja, Nafees A Khan, Ritu Gill, 2023-08-01

Biostimulants in Alleviation of Metal Toxicity in Plants Emerging Trends and Opportunities focuses on the role of substances or micro organisms whose presence can address issues of metal contamination in soils seeds and plants Including a range of biostimulant tools the book highlights both endogenous and exogenous application Written and edited by a global team of experts this book presents an overview on biostimulants in determining metal toxicity As plants encounter a wide range of environmental challenges during their lifecycle among which metal toxicity is a common form of abiotic stress this book thoroughly covers important topics on the subject matter Once inside a plant system toxic metals may initiate a variety of physiological alterations in plants including adversely impacted seed germination root and shoot growth chloroplasts ultrastructure and photosynthesis nutrients assimilation carbohydrates metabolism and plant hormonal status which collectively results in reduced plants yields In addition to several naturally occurring physiological and metabolic re programming responses plants may also modify their root and shoot systems in order to dilute entered amount of toxic metals As an additional tool biostimulants have emerged as one of the important plant protectors under adverse conditions Includes endogenous and exogenous application of biostimulants Focuses on use based on specific metal contamination Presents forward looking prospects for the use of biostimulants in plant health protection Nanoscience in Food and Agriculture 5

Shivendu Ranjan, Nandita Dasgupta, Eric Lichtfouse, 2017-07-12 This book presents comprehensive reviews on the principles design and applications of nanomaterials in the food and agriculture sectors This book is the fifth of several volumes on Nanoscience in Food and Agriculture published in the series Sustainable Agriculture Reviews **Achieving sustainable**

**cultivation of maize Volume 2** Dr Dave Watson, 2017-07-31 Summarises current good agricultural practice in maize cultivation from seed selection to nutrient management conservation agriculture rotations and intercropping Reviews advances in understanding and managing diseases and pests such as viruses nematodes and weeds Discusses ways maize cultivation can be made more climate smart **Plant Growth Regulators** Tariq Aftab, Khalid Rehman Hakeem, 2021-03-25

Agriculture faces many challenges to fulfil the growing demand for sustainable food production and ensure high quality nutrition for a rapidly growing population To guarantee adequate food production it is necessary to increase the yield per area of arable land A method for achieving this goal has been the application of growth regulators to modulate plant growth Plant growth regulators PGRs are substances in specific formulations which when applied to plants or seeds have the capacity to promote inhibit or modify physiological traits development and or stress responses They maintain proper balance between source and sink for enhancing crop yield PGRs are used to maximize productivity and quality improve consistency in production and overcome genetic and abiotic limitations to plant productivity Suitable PGRs include hormones such as cytokinins and auxins and hormone like compounds such as mepiquat chloride and paclobutrazol The use of PGRs in mainstream agriculture has steadily increased within the last 20 years as their benefits have become better understood by

growers Unfortunately the growth of the PGR market may be constrained by a lack of innovation at a time when an increase in demand for new products will require steady innovation and discovery of novel cost competitive specific and effective PGRs A plant bio stimulant is any substance or microorganism applied to plants with the aim to enhance nutrition efficiency abiotic stress tolerance and or crop quality traits regardless of its nutrients content Apart from traditional PGRs which are mostly plant hormones there are a number of substances molecules such as nitric oxide methyl jasmonate brassinosteroids seaweed extracts strigolactones plant growth promoting rhizobacteria etc which act as PGRs These novel PGRs or bio stimulants have been reported to play important roles in stress responses and adaptation They can protect plants against various stresses including water deficit chilling and high temperatures salinity and flooding This book includes chapters ranging from sensing and signalling in plants to translational research In addition the cross talk operative in plants in response to varied signals of biotic and abiotic nature is also presented Ultimately the objective of this book is to present the current scenario and the future plan of action for the management of stresses through traditional as well as novel PGRs We believe that this book will initiate and introduce readers to state of the art developments and trends in this field of study

## Whispering the Techniques of Language: An Psychological Journey through **Crop Improvement Under Adverse Conditions**

In a digitally-driven earth where displays reign great and immediate transmission drowns out the subtleties of language, the profound strategies and mental nuances hidden within phrases usually get unheard. Yet, located within the pages of **Crop Improvement Under Adverse Conditions** a captivating literary treasure sporting with raw thoughts, lies an extraordinary journey waiting to be undertaken. Written by a talented wordsmith, that charming opus attracts visitors on an introspective journey, softly unraveling the veiled truths and profound affect resonating within the cloth of each word. Within the mental depths of the poignant evaluation, we will embark upon a heartfelt exploration of the book is core themes, dissect its fascinating writing fashion, and fail to the strong resonance it evokes deep within the recesses of readers hearts.

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