Stress Signaling in Plants: Genomics and Proteomics Perspective, Volume 1 - Maryam Sarwat - 2013-06-21

Plant diseases, extreme weather caused by climate change, drought and an increase in metals in soil are among the major limiting factors of crop production worldwide. These problems create a need for an effective strategy that would increase crop productivity and help improve the quality of our planet. In order to do this, it is necessary to understand how plants react and adapt to stress from the genomic and proteomic perspective. This book presents a comprehensive understanding of stress signaling in Plants from a uniquely genomic and proteomics perspective. Stress Signaling in Plants offers a comprehensive treatise on the Chapter, covering all of the signaling pathways and mechanisms that have been researched so far. Each chapter provides in-depth explanation of what we currently know of a particular aspect of stress signaling and where we are headed. All authors have currently agreed and abstracts have been compiled for the first volume, due out midway through 2013. We aim to have the second volume out at the beginning of 2013.

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Protein Kinases and Stress Signaling in Plants - Girdhar K. Pandey - 2012-02-12

A comprehensive review of stress signaling in plants using genomics and functional genomic approaches Improving agricultural production and meeting the needs of a rapidly growing global population is possible by overcoming environmental stresses. Understanding the role of different signaling components in plant stress regulation is vital to developing crops which can withstand abiotic and biotic stresses without loss of crop yield and productivity. Emphasizing genomics and functional genomic approaches, Protein Kinases and Stress Signaling in Plants is a comprehensive review of cutting-edge research on stress perception, signal transduction, and stress response generation. Detailed chapters cover a broad range of topics central to improving agricultural production developing crops capable of overcoming environmental stresses to meet the needs of a rapidly growing global population. This book describes the field of protein kinases and stress signaling with a special emphasis on functional genomics. It presents a highly valuable contribution in the field of stress perception, signal transduction and generation of responses against one or multiple stress signals. This timely resource: Summarizes the role of various kinases involved in stress management Examines the role of the TOR, GSK3-like kinase, SNF1-related kinases, and different families of different aspects of calcium signaling under different stress conditions Examines photo-activated kinases (PAKs) in varying light conditions Briefs the presence of tyrosine kinases in plants Highlights the cellular functions of receptor-like kinase proteins (RLKs) Possible implication of these kinases in developing stress tolerant crop Pulmonary biology and signal transduction, plant responses to stress, plant cell signaling, plant protein kinases, plant biotechnology, transgenic plants and stress biology

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Plant Responses to Abiotic Stress - Harbir Hirt - 2003-10-08

Abiotic stresses represent the most limiting factors for agricultural productivity. Apart from biotic stress caused by pathogen plants, there are a number of abiotic stresses contributing to the productivity of crops worldwide. These include drought, salinity, heat, heavy metals, and radiation which have detrimental effects on plant growth and yield. However, certain plant species and ecotypes have developed various mechanisms to adapt to such stress conditions. Recent advances in the understanding of these abiotic stresses provided the impetus for compiling up-to-date reviews discussing all relevant topics in abiotic stress signaling of plants in a single volume. Topical reviews were selected by a distinguished editorial board, introduced, discussed the state of the art and important future tasks of the particular field.

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Stress Signaling in Plants: Genomics and Proteomics Perspective, Volume 2 - Maryam Sarwat - 2012-12-28

This two-volume set takes an in-depth look at stress signaling in plants from a unique genomic and proteomic perspective and offers a comprehensive treatise that covers all of the signaling pathways and mechanisms that have been researched so far. It describes extensive physiological and molecular characterization of stress signaling in plants involving not only one gene family but multiple gene families, species, and families, plant biologists can lay a foundation for designing and generating future crops that can tolerate the higher degree of environmental stress (especially abiotic stress), which are the major cause of crop loss throughout the world, without losing crop yield and productivity.

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Abiotic stresses such as high temperature, low temperature, drought and salinity limit crop productivity worldwide. Understanding plant responses to these stresses is essential for rational engineering of crop plants. In Arabidopsis, the signal transduction pathways for abiotic stresses, light, several phytohormones and pathogenesis-related proteins have been elucidated. A significant portion of plant genomes (Arabidopsis and rice were mostly studied) encodes for proteins involved in signaling such as receptor, sensors, kinases, phosphatases, transcription factors and transporters/channels. Despite decades of physiological and molecular effort, knowledge pertaining to how plants sense and transduce low and high temperature, low-water availability (drought), water-submergence, microgravity and salinity signals is still a major question. Understanding the mechanisms of signal perception is critical for the development of transgenic varieties that can respond and adapt to these abiotic stresses. The book presents the latest advancements in the understanding of abiotic stress perception, signaling and sensing, molecular and genetics, signaling pathways mediating plant stress, analyzing the development of stress-tolerant crop plants. The last part covers translational plant physiology, describing several examples of the development of more stress-tolerant crop varieties. In this book, we intend to incorporate the contribution from leading plant biologists to elucidate several aspects of stress signaling and sensing - functional genomics approaches.

Abiotic Stress Responses in Plants - Prasad, N., Tuteja, N. (Eds.) - 2016-09-09

Understanding stress responses in plants is critical for the development of new varieties of crops, which are better adapted to harsh climate conditions. The new book by the well-known editor team Narender Tuteja and Savajeth Gill provides a comprehensive overview of the understanding of how plants sense and respond to stress conditions. With the functional genomics tools, the mechanism of phytohormone signaling and their target genes can be defined in a more systematic manner. Despite decades of physiological and molecular effort, knowledge pertaining to how plants sense and transduce low and high temperature, low-water availability (drought), water-submergence, microgravity and salinity signals is still a major question. Understanding the mechanisms of signal perception is critical for the development of transgenic varieties that can respond and adapt to these abiotic stresses. This book will serve as a useful resource for students, researchers and breeders.

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Mechanism of Plant Hormone Signaling under Stress, 2 Volume Set - Girish K. Pandey - 2017-04-24

Plants detect and respond to various environmental signals by using hormone-mediated stress response systems. With the advent of new post-genomic techniques, the potential for increasing our understanding of the impact of hormone signaling on gene expression and adaptive processes has never been higher. This book provides not only a valuable reference for understanding the role of stress responses in plants, but also a valuable resource for the development of new agricultural and horticultural strategies. The topics included in this book emphasize on genomics and functional genomics aspects, to understand the global and whole genome level changes upon particular stress conditions. The functional genomics tool, the mechanism of phytohormone signaling and their target genes can be defined in a more systematic manner. The understanding of the role of hormones in stress signaling under single or multiple stresses is of great promise for the understanding of plant responses to the environment.

Abiotic stress, from research, history and practical field problems faced by rice, and the possible remedies to the adverse effects of abiotic stresses provides practical insights. The integrated analysis of phytohormone signaling under single or multiple stress conditions may prove exceptional to design stress tolerant crop plants in the field. Stress conditions. With the functional genomics tool, the mechanism of phytohormone signaling and their target genes can be defined in a more systematic manner. The understanding of the role of hormones in stress signaling under single or multiple stresses is of great promise for the understanding of plant responses to the environment. The book is aimed at plant scientists, agronomists, and horticulturists, as well as students.

Signal Crosstalk in Plant Stress Responses - Koiti Yoshikawa - 2008-08-31

Signal Crosstalk in Plant Stress Responses focuses on current findings on signal crosstalk between abiotic and biotic stresses, including information on drought, cold, and salt stress. The book includes contributions from an international team of experts, and the book is written by an international team of expert authors. The book is aimed at plant scientists, agronomists, and horticulturists, as well as students.

Signaling Pathways in Plants - 2014-09-09

This special issue of The Enzymes is targeted towards researchers in biochemistry, molecular and cell biology, pharmacology, and cancer. This volume discusses signal transduction pathways from leading authorities in updates and on all the latest developments in the field.

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Stress Tolerance in Horticultural Crops - Ajay Kumar - 2013-05-28

Priming-Mediated Stress and Cross-Stress Tolerance in Crop Plants - Mohamed A. Hassanin - 2012-01-22

Priming-Mediated Stress and Cross-Stress Tolerance in Crop Plants comprehensively reviews the physiological, biochemical, and molecular basis of transgenerational tolerance phenomena, allowing researchers to develop strategies to enhance crop resilience and productivity. Priming-Mediated Stress and Cross-Stress Tolerance in Crop Plants comprehensively reviews the physiological, biochemical, and molecular basis of transgenerational tolerance phenomena, allowing researchers to develop strategies to enhance crop resilience and productivity. The book also includes contributions from leading experts in the field. Libraries in all universities and research establishments where biological sciences are studied and taught should have copies. It delivers state of the art information for comprehending the effects of abiotic stress in plants at the cellular level.

Abiotic Stress Response in Plants - Arun Shanker - 2011-08-29

Abiotic stress response in plants can be defined as the adaptive response of plants to stress conditions. The effects of abiotic stress on plants can be divided into four categories: tolerance, adaptation, acclimation, and acclimatization. The book is aimed at plant scientists, agronomists, and horticulturists, as well as students.
Tolerance in Plants explains the physiological and molecular mechanisms plants naturally exhibit to withstand abiotic stresses and outlines the potential approaches to enhance plant abiotic stress tolerance to extreme conditions. Synthesising developments in plant stress biology, the book offers strategies that can be used in breeding, biotechnology, and other genetic engineering techniques to improve crop yield and productivity. It explains the biochemical and physiological mechanisms involved in stress signalling pathways, with a focus on reactive oxygen species (ROS), reactive nitrogen species (RNS), and reactive sulfur species (RSS). Written by 140 experts in the field of plant stress physiology, crop improvement, and genetic engineering, this book provides a comprehensive collection of up-to-date knowledge spanning from biochemistry to molecular biology. It is an essential book for plant breeders, molecular biologists, and plant physiologists, as well as a guide for students in the field of Plant Science.

Improving Abiotic Stress Tolerance in Plants - M. Iqbal Khan - 2020-05-13

Abiotic stresses such as drought, flooding, low or high temperatures, metal toxicity and salinity can hamper plant growth and development. Improving Abiotic Stress Tolerance in Plants explains the physiological and molecular mechanisms plants naturally exhibit to withstand abiotic stresses and outlines the potential approaches to improve plant abiotic stress tolerance. This book is important for students, researchers and practitioners in the field of plant physiology and plant stress biology for biotechnological applications.

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Abiotic stress has a major impact on crop production. Improving Abiotic Stress Tolerance in Plants outlines the potential approaches to improve plant abiotic stress tolerance for both breeding and biotechnological applications. It is an essential book for students, researchers and practitioners in the field of plant physiology and plant stress biology for biotechnological applications.

Transporters and Plant Osmotic Stress - Ardaya Roychoudhury - 2021-06-24

Transporters and Plant Osmotic Stress focuses on the potential negative impact of abiotic stresses on plant health and crop yield. The book focuses on the current state of research in the field of osmotic stress tolerances in several plant species. It compiles the most recent research and up-to-date data on stress tolerance and examines both selective breeding and genetic engineering strategies for improving osmotic stress tolerance. It is a valuable resource for researchers, academicians, and scientists to enhance their knowledge and inspire further research in the field of plant stress biology.

The role of transporters in osmotic stress response in plants is discussed in detail in this book. It examines the current state of research in the field of osmotic stress tolerances in different plant species and provides a comprehensive overview of the current understanding of osmotic stress response mechanisms in plants. The book discusses the potential negative impact of osmotic stress on plant health and crop yield and focuses on the current state of research in the field of osmotic stress tolerances in several plant species.

Molecular Plant Abiotic Stress: Biology and Biotechnology - K.V. Madhava Rao - 2006-02-10

Molecular Plant Abiotic Stress: Biology and Biotechnology is an extensive investigation of the various forms of abiotic stresses encountered in plants, and susceptibility or tolerance mechanisms found in different plant species. It focuses on research advances regarding plant responses to abiotic stresses, from the physiological level to the molecular level. It highlights new insights gained from the recent development in the research on oxidative stress and approaches to enhance antioxidant defense system in crop plants. They discuss both the plant responses to oxidative stress and mechanisms of abiotic stress tolerance, and cover all of the recent approaches towards understanding oxidative stress in plants, providing comprehensive information about the topics. It also discusses how reactive oxygen species and reactive sulfur species regulate plant physiology and plant tolerance to environmental stresses. Reactive Oxygen, Nitrogen and Sulfur Species in Plants: Production, Metabolism, Signaling and Defense Mechanisms covers everything readers need to know in four comprehensive sections. It starts by looking at reactive oxygen species metabolism and antioxidant defense. Next, it covers reactive nitrogen species biology. The third section examines the reactive sulfur species metabolism. The book concludes with a discussion on the involvement of ROS in plant defense mechanisms, Reactive Oxygen, Nitrogen and Sulfur Species in Plants: Production, Metabolism, Signaling and Defense Mechanisms is an excellent book for plant breeders, molecular biologists, and plant physiologists, as well as a guide for students in the field of Plant Science.
intrinsic processes in crops. With much of the information in the nascent stages, coming largely from Arabidopsis and rice particularly, the use of cell biology, combination, and transgenic plants as an abiotic attribute to uncover the molecular and physiological responses of crops to abiotic stresses.

This book focuses on methods of improving plants tolerance to abiotic stresses. It provides information on how protective agents, including exogenous compounds, cell biology, and transgenic plants can be used to improve plant tolerance to abiotic stresses. Phytoprotectants are discussed in detail including information on osmoprotectants, antioxidants, phytohormones, and other protective agents. This book is useful in diverse areas of plant science including agronomy, plant physiology, cell biology, environmental sciences, and biotechnology.

**Signaling in Plants** - František Baluška - 2009-02-27

This is the first comprehensive monograph on all emerging areas in plant signaling. The book addresses diverse aspects of signaling at all levels of plant organization. Emphasis is placed throughout on the integration of these signaling pathways.

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**Abiotic Stress Adaptation in Plants** - 2010

**Abiotic Stress in Plants - Arun Shanker - 2011-09-22

World population is growing at an alarming rate and is anticipated to reach about six billion by the end of year 2015. On the other hand, agricultural productivity is not increasing at a required rate to keep up with the food demand. The reasons for this are water shortages, depleting soil fertility and mainly various abiotic stresses. Fast pace at which developments and novel findings that are recently taking place in the cutting edge areas of molecular biology and basic genetics, have reinforced and augmented the efficiency of science outputs in dealing with plant abiotic stresses. In depth understanding of the stresses and their effects on plants is of paramount importance to develop effective strategies to counter them. With much of the information in the nascent stages, coming largely from Arabidopsis and rice particularly, the use of cell biology, combination, and transgenic plants as an abiotic attribute to uncover the molecular and physiological responses of crops to abiotic stresses. Phytoprotectants are discussed in detail including information on osmoprotectants, antioxidants, phytohormones, and other protective agents. This book is useful in diverse areas of plant science including agronomy, plant physiology, cell biology, environmental sciences, and biotechnology.

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**Phosphorylation and Stress Management in Plants - Girtl K. Pandey - 2020-09-26

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cross talk phenomenon in plants. This book will provoke interest in many readers and scientists, who can find this information useful for the advancement of their research works.

Hydrogen Sulfide in Plant Biology - Samiksha Singh - 2021-06-12

Hydrogen Sulfide in Plant Biology. Past and Present includes 17 chapters, with topics from cross-talk and lateral root development under stress, to post-translational modifications and disease resistance. With emerging research on the different roles and applications of H2S, this title compiles the latest advances of this key signaling molecule. The development of a plant requires complex signaling of various molecules like H2S in order to achieve regulated and proper development, hence hydrogen sulfide (H2S) has emerged as an important signaling molecule that regulates nearly each and every stage of a plant’s lifecycle. Edited by leading experts in the field, this is a must-read for scientists and researchers interested in plant physiology, biochemistry and ecology. Discusses the emerging roles of H2S in plant biology.

Abiotic Stresses in Plants - Luigi Saltini di Toppi - 2003-11-30

This book provides a valuable insight into how the area of plant adaptation to abiotic stresses has progressed through the application of the new technologies. The book consists of eight chapters written by outstanding scientists across the world, who carry out research at the cutting edge of their disciplines. The topics, addressed in up-to-date specific chapters, include effects and responses of plants to stresses caused by such factors as: 1) high temperature, 2) low temperature (chilling and freezing), 3) salt, 4) drought, 5) flooding, 6) heavy metals, 7) elevated carbon dioxide, 8) ozone.

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Signalling Pathways in Abiotic Stress - Carlos Lacal - 2017-11

Abiotic stress is the negative impact of environmental conditions inhibiting the normal functioning of a living being. Because plants are sessile organisms, their exposure to factors such as salt, drought, toxic cations or extreme temperatures, which strongly limit the productivity of crop species, cannot be avoided by escaping, as it is the case for animals. Instead, plants have evolved a complex network of sensors, signaling molecules and phosphorylation cascades, which leads to the upregulation of transcription factors and responsive genes, and ultimately to the acclimation of plants to these adverse factors. Through the compilation of open access peer-reviewed articles, this book reviews the different components of abiotic stress signal transduction pathways identified and characterized so far. Chapter number 1, the editor introduces the main components of signaling pathways and presents examples of Calcium-Dependent Protein Kinase (CDPK), Calcium-activated protein kinases (CABK) and Mitogen-Activated Protein Kinase (MAPK) cascades controlling abiotic stress responses in Arabidopsis, as well as in crop and wild plant species. Chapter 2 reviews the hormones, transcription factors, signaling molecules and phosphorylation cascades employed by plants in their response to drought and salt stress.

Similarly, Chapter 3 explores the regulation of MAPK pathways and their role in metal stress tolerance. In turn, Chapter 4 describes the interactions between heat shock factors, heat shock proteins and the redox system in order to allow for plant acclimation to heat stress. The next block of six chapters presents the main messenger molecules triggering signaling cascades. In Chapter 5, the main Ca2+ transporting proteins, as well as functions of this cation in abiotic stress signaling in the roots, are described. The synthesis of carbon monoxide, nitric oxide, phosphatidic acid, reactive oxygen species (ROS) and microRNAs, as well as their involvement in the regulation of abiotic stress signaling pathways, are presented in Chapters 6 to 10, respectively. The present book intends to help college students, teachers, researchers and other readers interested in plant physiology better understand the complex mechanism triggered in response to abiotic stress and how stress signal transduction leads to the expression of adaptive proteins.

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