Preface

The phytohormones regulate various biological processes in plants. In the last few decades, comprehensive research efforts have displayed the existence of phytohormonal signals and their transduction in plants. Intensive molecular studies have elucidated various plant hormonal pathways, each of which consists of many signaling members, linking a specific hormone perception to the regulation of downstream genes. Among phytohormones, signal transduction pathways of auxin (Aux), abscisic acid (ABA), cytokinins (CKs), gibberellins (GAs), and ethylene (ET) have been thoroughly investigated. In the last decade, extensive research efforts have recognized brassinosteroids (BRs) as a new class of plant hormones with multiple roles in plant physiological processes. The signal transduction pathway and crucial implication of BR signaling components in execution of BR responses in plants have been recently established. Emerging evidence also supports specific signal perception and transduction pathways for salicylic acid (SA) and jasmonates (JAs). Latest research findings also support strigolactones as plant hormones.

The advanced molecular studies have demonstrated crucial implication of phytohormonal crosstalks in the regulation of key physiological events under normal and stressful conditions. For instance, the crosstalks of Aux-ABA, Aux-BRs, BRs-ABA, ET-ABA, BRs-ET, CKs-ABA, BRs-JAs, BRs-SA, and GAs-JAs have been shown to regulate a number of biological processes in plants. The phytohormonal crosstalk between two hormones can be antagonistic or synergistic or additive in action. Additionally, the signal transduction component(s) of one hormonal pathway may interplay with the signaling component(s) of other hormonal pathway(s).

The knowledge gained from the signal transduction studies of phytohormones has been practically valorized through genetic manipulation. Genetic engineering has enabled plant biologists to manipulate the signaling pathways of plant hormones for the development of crop varieties with improved yield and stress tolerance. Latest research findings have revolutionized the concept of phytohormonal studies in plants. The present book volume will describe the new facet of plant hormones; that is, not only phytohormones have been studied to understand their course of
actions in plants but also crosstalk implication of two or more hormones has become
the target of plant scientists to manipulate the hormonal impact and to generate
high-yielding varieties. In the preceding context, Chaps. 1–5 describe the metabo-
ism, signaling, and genetic manipulation of classical hormones (Aux, ABA, CKs,
ET, and GAs). Understanding the roles of emerging plant hormones, such as BRs,
SA, JAs, and strigolactones, is of utmost significance to plant biologists. Chapters
6–9 of this book will apprise the readers about fundamentals and recent understand-
ings of these emerging hormones. Implication of plant hormonal crosstalks under
stressful conditions has just begun to be deciphered. Thus, to share the latest updates
with the readers, the book will be concluding with chapters on phytohormonal
crosstalks under abiotic and biotic stresses.

Overall, this volume will present our current understanding of phytohormonal
signal transductions and crosstalk of phytohormones in plants as a regulation of key
physiological processes. Every section will be concluded with application of bio-
technological strategies based on modulation of the hormone contents or signal
transduction pathway or crosstalk, enabling us to maintain agriculture in a sustain-
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We are quite hopeful that this book will be successful in updating the readers
about the phytohormones and latest emerging trends.

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