Preface

Since last several decades, increasing agricultural productivity has been a challenging task to fulfill the requirements of enough food to feed rapidly increasing world population in the changing environment. Both biotic and abiotic stress factors are continued to negatively affect various aspects of plant growth and development leading to relative decrease in the potential maximum yields by more than fifty percent. These stress factors have been shown to affect various aspects of plant system including the acceleration in the formation of reactive oxygen species (ROS). Although, reactive oxygen species are important signal molecules that regulate plant responses to environmental stress factors but these must be rapidly processed and/or detoxified if oxidative damage is to be averted in cells. The ascorbate (AsA)-glutathione (GSH) pathway is a key part of the network of reactions involving enzymes and metabolites with redox properties for the detoxification of ROS, and thus to avert the ROS-accrued oxidative damage in plants.

Both AsA and GSH are intimately linked in terms of their major physiological functions in AsA-GSH pathway and many of these processes are correlated with endogenous AsA-GSH levels especially under stress conditions. In addition to having major role during vital phases of the plant life cycle, AsA and GSH determine the lifetime of reactive oxygen species within the cellular environment and provide crucial protection against oxidative damage. While research into the responses of individual components of plant antioxidant defense system has benefited greatly from advances in molecular technology, the cross-talks and inter-relationships studies on the physiological, biochemical and molecular aspects of the cumulative response of various components of AsA-GSH pathway to stress factors and their significance in plant stress tolerance have received comparatively very little or no attention.

The present book has concentrated more on cumulative responses of the components of AsA-GSH pathway in plant stress tolerance with emphasis on the unique insights and advances gained by molecular exploration than whole plant antioxidant defense system. In fact, these studies/reports based on inter-relationships and/or cross-talks are expected to lead to understand and improve the mechanisms of stress tolerance in plants. Therefore, the present volume would definitely be an ideal source of scientific information to the advanced students, junior researchers, faculty and scientists involved in agriculture, plant sciences, molecular biology, biochemistry, biotechnology and related areas.
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