

# Preface

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Crop protection plays a pivotal role in agriculture production. During the last few decades, the science of crop production has developed rapidly resulting in many diverse techniques to manage a variety of pests, diseases and nematodes. Currently the prospects of chemical control do not appear good because of accidental and incidental trauma encountered in the field of chemical pesticides. Therefore, vigorous research efforts for exploring newer but pragmatic tools for the control of biotic agents have become imperative under climate change scenario. However, it is disheartening to observe that the crop grown with hard labour of the farmers are damaged by various biotic and abiotic stresses. The crop losses estimate range from 15 to 100% due to climate calamities coupled with damage by harmful pests and diseases.

Agriculture represents one of the core sectors of the Indian economy sustaining food and livelihood of sizable Indian population. Majority of the food grain production in the country still depends on rain fed Agriculture. Climate induced vulnerabilities of agriculture seems to have forced a plateau in productivity of the crops. Climate change may activate sleeper Pathogens to become more aggressive fungus/bacteria/virus/nematode. As the insects are ectotherms (cold blooded), external environment influence the key physiological processes to a greater extent and even new strain or race may emerge in fungal and nematode diseases. Elevated CO<sub>2</sub> may alter pathogen aggressiveness, multiplication and sporulation by 15-20 folds (approximate) higher.

This book is an attempt to analyse the problems and suitable measures for the effective management of the insect pests, plant diseases, and plant parasitic nematodes. This book is an effort to bring together available information on the various plant protection aspects. The experts of the relevant fields have given a critical appraisal of the various aspects of crop protection facing climate change.

The book is divided into 3 parts. Part I **Insect Pests and Climate Change** deals with insect pest problems in climate change. The chapters like "Integrated crop and pest management in relation to Global Climate change", Impact of climate change on Insect

pests management in Fruit crops", "Global climate change: A threat to Aphid population", "Host plant responses to *Tetranychus urticae* mediated biotic stress and management strategies", "Insect pest management in climate change", "Comprehensive impact of climate change on insects and insect plant interaction", "Climate change: Effects on dynamics of insect pests and management options in tobacco", "Pest scenario, plant protection approaches in current context of changing climate" and "Climate change: Pest Incidence in Agricultural Crops" deal with different aspects of insects pest effect on crop and their management under changing climate.

In Part II, **Plant Diseases and Climate Change**, the changing dimensions of plant diseases under changing climate change are discussed. It consists of seven chapters namely "Climate change impact on tropical plant diseases and its management strategies", Hortipasture ecosystem: Diseases management strategies under climate change scenario in semi-arid conditions", "Occurrence of mycotoxins under changing climate conditions", "Exploitation of plant genetic resources for crop protection on the basis of climate change", "Complex interactions of Begomoviruses, satellite molecules and whitefly vector assessment with cotton curl disease epidemic in Northwest India", "Physiological bases of crop responses to changing climate" and "Ecofriendly Management of Tea Diseases in the Current Scenario of Climate Change".

Part III **Nematodes and climate change** brings out plant parasitic nematodes activities which are mainly governed by elevated CO<sub>2</sub> temperatures, relative humidity etc. The chapters are "Influence of climate change on predatory soil nematodes in management of plant parasitic nematodes", "Impact of climate change on nematode population" and "Multitropic interaction with nematodes and climate change".

This book is not only provides reference but also serves as a guide and inspiration for future research into the realm of biology, chemical, physical and IPM aspects and on slaughters of modern agriculture in changing climate. The scientists, teachers, students, scholars, administrators and policy makers dealing with pest management in particular and crop protection in general are expected to find this book very useful and informative.

We are grateful to all the contributors for their valuable articles and kind cooperation. We are also thankful to Mr. Akshay Jain, Studera Press, New Delhi for this technical guidance in improving the articles and helped in bringing out this important book.

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