



# Approaches and Trends in Plant Disease Management

S.K. Gupta & Monica Sharma

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## **FOREWORD**

There have been significant development in agricultural research and trade in the recent past focussing more on bio-security, crop health and food safety. These developments have had a dramatic impact on the roles and responsibilities of plant pathologists. Developing effective and viable plant disease management strategies has been the real challenge over the recent years. Conventional plant disease control based on chemical pesticides alone may not be acceptable in the present day WTO regime where protection of the environment and human health is given a serious consideration. New tools and techniques are being developed to improve crop productivity and health. Crop intensification and changing climate have already led to the increased frequency and magnitude of disease outbreaks and losses. Changing climate has also necessitated to look into the new management options. Disease cause significant yield reductions (20%) in principle food and cash crops. To tackle the emerging disease problems, there is a need to blend the new discoveries in genomics, information technologies and molecular science and other age old disease management technologies to keep the ravages by devastating diseases below economic threshold level.

I am happy to know that a book entitled “*Approaches and Trends in Plant Disease Management*” is being published by the scientists of Department of Plant Pathology and serious efforts have been made to compile available information on the latest developments in disease management approaches. Several option such as host resistance, cultural practices, biological agents, biotechnological and chemical options have been discussed in detail to develop better, sustainable and environmentally safe disease management strategies. I am sure that this book will not only serve the needs of researchers, students and extension workers but will also be helpful to the elite growers. I appreciate the efforts made by the authors in publishing this book.

**(V.S. Thakur)**

## PREFACE

Ever-increasing population warrants for sustainable production of food materials. The predicted growth of world's population from 7 billion at present (1.2 billion in India alone) to 8.3 billion by 2030 presents a major global challenge to meet necessary food demand. At the same time, available land for agriculture is decreasing day by day due to increasing industrialization and urbanization. India has produced 255MT of food grains during 2012-13 and with the increase in rate of population growth; it would require about 400 MT by 2050. Diseases have become serious constraints in the cultivation of agricultural, horticultural, medicinal and fiber crops. Plant diseases are estimated to cause yield reductions of almost 20 per cent in the principal food and cash crops worldwide.. Besides fungi, many bacterial and viral and nematode diseases are also affecting crop plants which are difficult to manage. Knowledge of various factors leading to epidemic build-up of the diseases is necessary for timely application of various management methods. Earlier emphasis was on the chemicals to combat the ravages of various diseases but due to some ill effects like residues in food grains and pollution hazards, these are now taking back seat. Moreover, without proper knowledge of diseases, farmers are indiscriminately using agrochemicals to control insect-pests and diseases, which may lead to the development of resistant strains of the pathogen. In the WTO regime, for the export of food material to other countries, care has to be taken to keep the pesticide residues below the permissible limits. Since long, several approaches like host resistance, cultural, biological, chemical methods and regulatory measures have been developed for their control. Depending on the crop, the disease and availability of control methods, a different set of approaches is employed.

During the past decade, a lot of information has been generated by plant pathologists on different aspects of plant diseases and their management options. The present book on "***Approaches and Trends in Plant Disease Management***" offers a wide choice of topics for the readers to look into recent developments in diverse aspects of plant disease management. There are 20 articles covering disease management approaches in molecular plant pathology, biological control, cultural control, disease resistance, induced resistance and recent development in fungicides and their rational use and integrated disease management. Articles on protected cultivation, nematode problems and their management and climate variables and their impact on plant diseases: retrospect and prospect have also been included. The authors have done a commendable job by providing the latest information available in these nicely written articles. We are grateful to all the authors for their vivid contributions.

The help rendered by Dr. T.S. Thind, former Additional Director of Research and Head Department of Plant Pathology, Punjab Agricultural University, Ludhiana, in finalizing the chapters is gratefully acknowledged. We take this opportunity to thank Dr. V.S. Thakur, Hon'ble Vice Chancellor, Dr. R.C. Sharma, Director of Research, and Dr. B.C. Suman, Professor and Head, Department of Plant Pathology,

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**S.K. Gupta**  
**Monica Sharma**

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