



*N. G. Ravichandra*

# Agrochemicals in Plant Disease Management

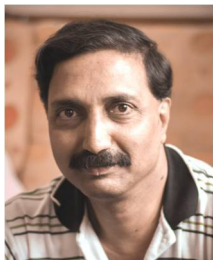




# **AGROCHEMICALS IN PLANT DISEASE MANAGEMENT**

## ABOUT THE AUTHOR

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Dr. N.G. Ravichandra, Professor of Plant Pathology and Scheme Head, All India Co-ordinate Research Project on Plant Parasitic Nematodes at the Department of Plant Pathology, University of Agricultural Sciences, GKVK Campus, Bengaluru, Karnataka, India. He is involved in teaching, research and extension activities.

Dr. N.G. Ravichandra has over 224 scientific publications to his credit in national and international journals. He has authored five text books, contributed chapters to nine text books, authored 10 books in Kannada and edited about five books and 12 chapters. He is an active life member of professional societies including Nematological Society of India, Indian Phytopathological Society, Society of Mycology & Plant Pathology, National Environmental Science Academy and Institute of Agricultural Technology. Being recognized with the duties of the Editor, Dr. N.G. Ravichandra has been rewarded for the prestigious international journal 'Research Journal of Plant Pathology'. He is an eminent member of the Indian Phytopathological Society, and the Editor for the popular journal 'Indian Phytopathology'.

Dr. N.G. Ravichandra has participated and presented original papers on various aspects of plant diseases in several national and international conferences. He has undergone advanced training programs sponsored by the Department of Biotechnology & Indian Council of Agricultural Research, New Delhi, India. He has operated research projects funded by the Department of Bio-Technology & Indian Council of Agricultural Research, New Delhi, India as Principal Investigator and Co- Principal Investigator. He was involved in developing eight technologies for the management of root-knot nematodes infecting tomato, brinjal and rice, which have been included in the Package of Practices of University of Agricultural Sciences, Bengaluru, Karnataka, India.

**Dr. N.G. Ravichandra**

# AGROCHEMICALS IN PLANT DISEASE MANAGEMENT

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Published by

**SCIENTIFIC PUBLISHERS (INDIA)**

Jodhpur –

5 A, New Pali Road

P.O. Box 91

Jodhpur - 342 001 INDIA

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ISBN: 978-93-86652-20-1

eISBN: 978-93-87991-91-0

Visit the Scientific Publishers (India) website at

<http://www.scientificpub.com>

Printed in India

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## PREFACE

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A vast number of plant pathogens cause diseases in crops. They are difficult to control as they form complex diseases and their populations vary with time, space and genotype. They evolve, often overcoming the resistance that may have been the hard-won achievement of the plant breeder. Use of chemicals has been critical in preventing losses due to plant diseases and is one of the most popular and most sought after disease management practices.

Agrochemicals have been used against plant diseases since the 1940s. During the previous decades, there has been a tremendous development in all aspects related to agrochemicals. The agrochemical industry has come a long way with a unique shape and the release of a wide range of chemicals exhibiting novel modes of action. Such latest information on these developments is not much familiar either to academicians or students. Partly this ignorance has been due to the non-availability of a standard publication which would furnish all the aspects related to major agrochemicals used to combat plant diseases. In addition, various courses related to the chemicals used in plant disease management are being offered at most agricultural and horticultural universities, as per the syllabus prescribed by the Indian Council of Agricultural Research (ICAR), New Delhi. Readers, particularly students are in search of a complete book that covers the entire syllabus on agrochemicals. This book fulfils these requirements.

The main objective of the book is to provide detailed and the latest information on three major agrochemicals (fungicides, bactericides/antibiotics and nematicides) in a systematic and easily understandable format as a ready reference to its readers. It consists of nine chapters: "Agrochemicals in Plant Disease Management - Current Scenario, History and Development of Agrochemicals, Formulations, Application and Phytotoxicity of Agrochemicals, Classification and Modes of Action of Agrochemicals, Registration and Regulation of Agrochemicals, Safe Handling and Use of Agrochemicals, Compatibility and Persistence of Agrochemicals, Pollution and Hazards by Agrochemicals and New Generation Fungicides", a glossary of frequently used key terms and a detailed bibliography. Annexures related to few essential aspects of agrochemicals have also been included. Relevant photographs, illustrations, tables, prominent trade names of agrochemicals and other useful information add colour to the contents.

It is sincerely hoped that the book would introduce this fascinating subject to the students, serve as a source book for the faculty, academicians, scientists and serve as a handbook to the extension personnel, private agrochemical firms, seed industries, agrochemical dealers, nursery holders, officers of the State Departments of Agriculture, Horticulture, Sericulture & Forestry, policy makers and all those interested in crop disease management.

The author welcomes suggestions for making the book more complete and for improvements in the future editions.

**N.G. Ravichandra**



## ACKNOWLEDGEMENT

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I am thankful to Dr. Y.G. Shadakshari, Director of Research, University of Agricultural Sciences, GKVK, Bengaluru, Karnataka, India who was kind enough to write the Foreword for this book.

I extend my sincere thanks to Dr. M.S. Nataraju, Hon'ble Vice Chancellor, University of Agricultural Sciences, GKVK, Bangalore for his encouragement.

Special thanks to Dr. R.K. Walia, Project Coordinator, AICRP (Nematodes), Division of Nematology, Indian Agricultural Research Institute, New Delhi, India.

My thanks to Dr. T. Narendrappa, Professor & University Head, Dr. K.T. Rangaswamy, Professor & Head, Prof. B.M.R. Reddy, Dr. Prameela, Dr. N. Nagaraju, Dr. M.K. Prasanna Kumar, Dr. C.P. Manjula and Mr. B.R. Nagendra, Department of Plant pathology, UAS, GKVK, Bengaluru.

I would like to express my deep sense of gratitude to my beloved parents Sri. N. Gurushankar and Smt. Parvathamma, to whom I affectionately dedicate this book.

I wish to record my appreciation and affectionate thanks to my wife, Ms. Deepthi and daughter, Ms. Anusha for their affection, patience, keen interest and follow-up throughout the preparation of the manuscript. Mere words fail to acknowledge their support and cooperation. I am grateful to my in-laws for their encouragement.

I remain ever grateful to my brother-in-law Mr. Sudesh Kumar and sister Ms. Tara for their moral support, affection and special care. I fondly acknowledge their keen interest, and continued encouragement being showered on me.

I take this opportunity to thank **M/s. Scientific Publishers**, Jodhpur, Rajasthan, India for their help in processing the manuscript and getting the book published.

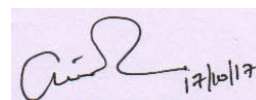
## FOREWORD

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Plant diseases are a normal part of nature. In order to maintain a sufficient food supply for the growing world's population, it is necessary for those involved in plant growth and management to find ways to combat plant diseases that are capable of destroying crops on a large scale. Plant disease management has become heavily dependent on chemicals to suppress a wide range of diseases that threaten crops. Chemicals also constitute a critical element in effective Integrated Disease and Pest Management programs. Many of the current chemicals produce excellent results with respect to efficacy, crop quality, food safety and improved cost/profit ratios of agricultural production.

During the past decades ample progress has been achieved in the agrochemical sector. However, the published information on the latest developmental aspects related to agrochemicals, particularly fungicides, bactericides and nematicides, is either meager or incomplete. There is a gap of proper source dissemination between the chemical industry and the academicians / students. Agricultural and Horticultural Universities offer a course on 'Chemicals used in plant disease management' in their Degree Programmes. Students are in search of a suitable publication in order to update their knowledge on agrochemicals.

This gap has been successfully filled-in by this new book authored by Dr. N.G. Ravichandra. The book on "Agrochemicals in plant disease management" deals with key aspects of agrochemicals employed in disease management and also covers the syllabus prescribed by the Indian Council of Agricultural Research (ICAR), New Delhi. Besides, glossary of major terms, bibliography, befitting illustrations and suitable annexures have added value to the book. The organization of the contents, adequate latest information and simplicity in style amply allude to the author's perspicuity in writing. I compliment and congratulate Dr.N.G.Ravichandra for an admirable attempt to fill the void to facilitate learning and teaching with greater understanding at both the levels, i.e., students and teachers.



**Y.G. Shadakshari**  
*Director of Research*

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