

ADVANCES IN NEMATODOLOGY

Editor

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Dedicated to
My Friend
Late Prof. M. Mashkoor Alam

PREFACE

Nematodes are one of the most abundant metazoans in soil. They are next only to arthropods in species diversity and their density in soil may vary from $7.6 \times 10^5 \text{ m}^{-2}$ in a desert to $2.9 \times 10^7 \text{ m}^{-2}$ in a mixed deciduous forest. On the basis of food habits, nematodes are known as plant feeders, hyphal feeders, bacterial feeders, substrate ingesters, animal predators, unicellular eukaryote feeders, animal parasites and omnivorous organisms. All these types of nematodes co-exist in soil and contrary to their notorious image as hidden enemies of farmers, some nematode trophic groups play an important role in organic matter decomposition, mineral and nutrient cycling and control of pests and diseases. They are excellent indicators of pollution and metazoan models for basic studies in developmental biology, neurobiology, genetics and aging and for understanding the effects of nutrients on reproduction, development and growth.

Plant parasitic nematodes are one of the least understood agricultural pest problems throughout the world. The crop damage caused by nematodes and the symptoms of their damage are often poorly recognized and their microscopic size further reduce their chances of being identified as the causal organism of any disease. The general absence of clearly recognizable and attributable above ground symptoms makes the unambiguous demonstration of nematode damage difficult to achieve. A scarcity of trained nematologists particularly in developing countries greatly impedes the formal assessment of role of nematodes as a constraint to crop production. Because, there are few trained nematologists many nematode problems remain to be diagnosed and policy making agencies are not sufficiently aware of the need to encourage expansion of research on finding options for nematode management.

Present book "Advances in Nematology" provides an authoritative review account of many aspects of current interest and progress in the field of Plant Nematology that has been made in the recent past. This book includes twenty-one chapters. Recent information has been compiled on application of molecular biology in nematology. Information on nematodes as biological model, race status in plant parasitic nematodes and nematode vectors of plant diseases have been reviewed covering all major aspects. Nematode diseases on wheat, rice, tobacco, mint, barley and horticultural crops and their management specially in context to Indian scenario have been covered. Newer approaches for the management of plant parasitic nematodes including use of VAM fungi, biocontrol agents and integrated nematode management strategies

have been included to project their use on field scale. Articles on role of nematode in disease complexes with fungi, genetic studies on the resistance of barley, breeding for nematode resistance in forage legumes and nematode pests of economically important crops in India and their management have been added to the value of the book. Thus, the book provides a good glimpse of the plant Nematology status in India.

I am highly thankful to the contributors for writing authoritative and informative review articles for this volume. The opinions and text contained herein are those of the authors and I have tried to honour their ideas in the original shape. While dealing with such a voluminous work, errors are likely to occur despite my best efforts. However, the onus of the technical contents rests with the contributors.

I am sure, the information given in this book will prove helpful to those interested in Nematology and Plant protection for many years to come and generate interest in young nematologist. I would very much appreciate receiving suggestions from readers so that shortcomings, if any, are corrected in future editions.

This book is dedicated to *Late Prof. M. Mashkoor Alam*, Department of Botany, Aligarh Muslim University, Aligarh, who was a true authority and one of the most respected experts in the field of Plant Nematology. Dr. Alam, a renowned nematologist of international stature, excellent teacher, a fine human being and my close friend, passed away in Aligarh. He is well known among the nematologist and students of this country primarily through his research publications. He left an everlasting deep impression on them with his scholarly wisdom and pleasant personality. He will be missed by the nematologist of India and world alike.

I am grateful to all those who have assisted in one way or the other in bringing out this book. I record my sincere thanks to my wife Kusum, my daughter Priyanka, and my son Rohit, who extended full co-operation to me in many invisible ways.

I highly appreciate the all round cooperation and support of Mr. Pawanji of Scientific Publishers (India), Jodhpur for publishing this book with patience, care and interest.

JAIPUR

Prof. P.C. Trivedi

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About the Book

Plant parasitic nematodes are one of the least understood agricultural pest problems throughout the world. Science of Plant Nematology has grown rapidly in the last three decades. There is a wide gap between the vast information generated for nematode control and that, which is actually utilised.

The present book "Advances in Nematology" provides an authoritative review account of many aspects of current interest and progress in the field of Plant Nematology that has been made in the recent past. This book includes 21 articles by eminent nematologists on different aspects of the subject. Information on application of molecular biology in nematology, nematodes as biological model, race status in plant parasitic nematodes and nematode vectors of plant diseases have been reviewed covering all major aspects. Nematode diseases on wheat, rice, tobacco, mint, barley and horticultural crops and their management, specially in context to Indian scenario have been covered. Newer approaches for the management of plant parasitic nematodes including use of VAM fungi, biocontrol agents and integrated nematode management strategies have been included to project out their use on field scale. Articles on role of nematodes in disease complexes with fungi, genetic studies on the resistance of barley, breeding for nematode resistance in forage legumes and nematode pests of economically important crops in India and their managements have been added to the value of the book.

Scholars and students of Nematology, researchers and extension workers and plant pathologists will find this book very useful.