Sclerotinia Diseases of Crop Plants: Biology, Ecology and Disease Management

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Foreword

The fungus *Sclerotinia* has always been a fancy and interesting subject of research both for the mycologists and pathologists. More than 250 species of the fungus have been reported in different host plants all over the world that cause heavy economic losses. It was a challenge to discover weak links in the disease cycle to manage *Sclerotinia* diseases of large number of crops. For researchers and students, it has been a matter of concern, how to access voluminous literature on *Sclerotinia* scattered in different journals, reviews, proceedings of symposia, workshops, books, abstracts etc. to get a comprehensive picture. With the publication of book on '*Sclerotinia*', it has now become quite clear that now only three species of *Sclerotinia* viz., *S. sclerotiorum*, *S. minor* and *S. trifoliorum* are valid. The authors have made an excellent attempt to compile all the available information on various aspects of the fungus *Sclerotinia*. The information generated so far has been presented in different chapters. After introducing the subject various aspects viz., the diseases, symptomatology, disease assessment, its distribution, economic importance, the pathogen, its taxonomy, nomenclature, reproduction, reproductive structures with fine details, variability, perpetuation, infection and pathogenesis, biochemical, molecular and physiological aspects of host-pathogen interaction, seed infection, disease cycle, epidemiology and forecasting, host resistance with sources of resistance, mechanism of resistance and other management strategies have been covered. The inclusion of numerous laboratory and field techniques is additional quality of the book for researchers, teachers and students. The chapters on *Sclerotinia* as myco-herbicide, phytotoxin, phytoalexins, hypo-virulence, resistance to fungicides, volatile compounds of *Sclerotinia*, sporigermin from sclerotia and *Sclerotinia* as health hazard problem will give a futuristic insight to the book. Outlining of future research priorities and disease management strategies speaks of the wisdom of the authors.

I congratulate Dr. G.S. Saharan, Ex Professor and Head, Department of Plant Pathology and Dr. Naresh Mehta, Professor of Plant Pathology, CCS Haryana Agricultural University, Hisar for their stupendous, incredible and splendor task of bringing comprehensive treatise on *Sclerotinia* which will propel fraternity of Agriculture to get bounty of knowledge at one edifice. I am sure this book will

be of immense help to the scientists, teachers, students, extension specialists and all those who are interested in protecting the plant health from *Sclerotinia* diseases.

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Preface

Sclerotinia is one of the most devastating and cosmopolitan plant pathogen. More than 60 names have been used to refer to diseases caused by this fungal pathogen. The fungus infects more than 500 species of plants worldwide including important field crops, fruit crops, ornamental plants, trees, shrubs and numerous weeds. Annual yield losses due to *Sclerotinia* diseases exceed over several hundred million dollars each year world over. Extensive crop damage, lack of high levels of host resistance and the general difficulty of managing diseases caused by *Sclerotinia* have been the impetus for sustainable research on this pathogen. Despite continued study by phytopathologists and mycologists, the taxonomic delimitation and relationship of the plant pathogenic species of *Sclerotinia* have never been resolved over the years, using traditional morphological and host preference characters.

The fungus *Sclerotinia* is belonging to phylum Ascomycota, class Discomycetes, order Helotiales, family Sclerotiniaceae has been redefined to include only those species that produce tuberoid sclerotia not incorporating host tissue within the sclerotial medulla developing an apothecial ectal excipulum composed of globose cells and not producing a disseminative conidial state. The taxonomy and nomenclature of 259 epithets previously referred to *Sclerotinia* have been reviewed with 21 placed in synonymy under the three accepted species and 25 included as imperfectly known. Two hundred and ten epithets have been excluded and either assigned or accepted to other genera. *S. homoeocarpa* causing "Dollar spot" in turf grasses now belonging to *Lanzia* sp. and *Moellerodiscus* sp. has been briefly covered as reference for readers. Now recently, with the increased information available on molecular biology, genetics, variability and epidemiology of these species and with reexamination in the light of micro-anatomical and cultural characters employed only three species, i.e., *Sclerotinia sclerotiorum*, *S. minor* and *S. trifoliorum* have been retained in this genus.

The present monograph on *Sclerotinia* deals with the aspects on taxonomy, nomenclature, geographical distribution, economic importance, host range, the diseases caused, symptomatology, disease assessment, reproduction, ultra structures, pathogenic variability, perpetuation, infection and pathogenesis, biochemical, molecular and physiological aspects of host pathogen interaction, seed infection, disease cycle, epidemiology and forecasting, host resistance and disease management strategies. In addition, laboratory and field techniques developed so far for *Sclerotinia* have been

included. Some newly emerging areas of *Sclerotinia* research which are likely to have a bearing on its management are *Sclerotinia* as myco-herbicide, phytotoxin, phytoalexin elicitors, hypovirulence, volatile compound imitator, sporigermin from sclerotia, resistance to fungicides and *Sclerotinia* diseases as health hazard problem have been discussed.

The subject matter is vividly illustrated with photographs (macroscopic, microscopic, electron micrographs, scanning electron micrographs), drawings, figures, histograms, graphs, tables and flow charts of techniques to make more interesting stimulating, effective and easy to understand by the readers. Each chapter is arranged in chronological order in the form of headings and sub-headings through numerical series to make the subject contiguous. Inclusion of most of the important references and websites will be helpful in original consultations by the *Sclerotinia* researchers, teachers and students.

We are sure that this comprehensive treatise on *Sclerotinia* will be of immense use to the scientists, teachers, students and all others in diagnosis and management of *Sclerotinia* diseases of crops worldwide.

G. S. Saharan
Naresh Mehta

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