



Editorial

Biological Control of the Plant Pathogens

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The ultimate effects of crop losses manifest in the form of insufficient food production and chronic hunger. The gravity of this issue is rapidly being amplified by the rises in urbanization, climate change, and emerging pests and pathogens, and the deterioration of soil health. As an environmentally friendly alternative to chemical pesticides, microbial biocontrol agents (BCAs) have attracted global attention due to their ability to ensure food security by directly halting pre-harvest crop losses and, thereby, improving crop productivity [1]. Despite the substantial progress achieved in our understanding of plant-microbe interactions in recent years, developing more efficient BCAs remains a constant task. The current advances in biocontrol science and technology and the avenues for future research are reflected in the contributions presented in this Special Issue. These can be categorized as follows:

- (i) *Management strategies for major soilborne pathogens in crops*: Ma et al. (contribution 1) review tomato production systems and their challenges. He et al. (contribution 2) have optimized *Metarhizium robertsii* fermentation broth for the efficient management of wolfberry root rot. Fuller et al. (contribution 3) author an informative review on the beneficial and pathogenic microbiota associated with the common alder (*Alnus glutinosa*).
- (ii) *Biocontrol potential of novel volatile compounds and defense inducers*: Recent research has revealed that, besides antimicrobial peptides (AMPs), other natural compounds are involved in biocontrol action. Two examples are given in this Special Issue. Hernández et al. (contribution 4) characterize 65 potential VOCs of the *Kosakonia coccinea* Cpl strain and demonstrate their role in the effective biocontrol of various economically important phytopathogens. Tripathi et al. (contribution 5) explore defense inducers, including salicylic acid, isonicotinic acid, benzoethiadiazole, and lysoczymes, as prophylactic and curative sprays for inducing resistance in tomato plants against *Clavibacter michiganensis* subsp. *michiganensis*.
- (iii) *Exploring the biocontrol potential of novel microbial isolates and genetically engineered strains*: *Bacillus velezensis* FZB42 is known as a prototype for Gram-positive plant-beneficial bacteria, able to produce durable endospores and suppress plant pathogens [2]. The potential of a novel isolate of *B. velezensis*, strain BV01, as a broad-spectrum BCA against various fungal phytopathogens was assessed (contribution 6). In addition to *B. velezensis*, other representatives of the Bacillaceae family, isolated from Vietnamese crop plants, contain a rich spectrum of compounds efficient against plant pathogens. Numerous members of the *B. cereus* species complex have been comprehensively investigated for the occurrence of the biosynthetic gene clusters (BGCs) involved in the synthesis of secondary metabolites. Antimicrobial peptides, efficient against pathogenic fungi and nematodes, and entomocidal crystal proteins have been detected and partially characterized using mass spectrometry (contribution 7). Moreover, genome mining in plant-associated *Brevibacilli* and *Lysinibacillus* spp. has revealed



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Nature And Practice Of Biological Control Of Plant Pathogens

**Inderjit, K. M. M. Dakshini, Chester L.
Foy**



Nature And Practice Of Biological Control Of Plant Pathogens:

The Nature and Practice of Biological Control of Plant Pathogens R. James Cook, 1983 *Handbook of Biological Control* T. W. Fisher, Thomas S. Bellows, L. E. Caltagirone, D. L. Dahlsten, Carl B. Huffaker, G. Gordh, 1999-09-20 For many years the use of chemical agents such as pesticides and herbicides has been effective in controlling the many varieties of pests that infest both agricultural crops and backyard gardens However these pests are gradually becoming resistant to these agents because the agents themselves are acting as selective factors making the pests better and better able to resist and persist As a result the use of biological controlling agents is increasing This book is a comprehensive and authoritative handbook of biological control *The Nature and Practice of Biological Control of Plant Pathogens* R. James Cook, Kenneth Frank Baker, 1983 Why biological control Developmental history of biological control of plant pathogens Components of biological control Approaches to biological control The pathogen in biological control The host and biological control The soil ecosystem and biological control Introduction of antagonists for biological control Antagonistae vitae Agricultural practices and biological control Perspectives **Biological Control of Plant Diseases** Ashok Pandey, K.G. Mukerji, 2024-11-01 Prevent agricultural loss with natural disease controls that don't harm the environment or the people who live in it Despite the worldwide use of chemicals and pesticides to control the devastating effects of plant disease the international agribusiness market still suffers extensive economic losses each year Biological Control of Plant Diseases offers natural alternatives to the synthetic fungicides pesticides herbicides and insecticides that have not only failed to stop pests and pathogens but have raised serious safety and environmental concerns The world's leading plant pathologists examine the use of antagonistic microorganisms inherent resistance and natural fungicides for plant protection that's safe economical and effective Biological Control of Plant Diseases presents up to date research findings on disease management to provide you with a single source reference text for developing a sustainable ecosystem that doesn't depend on harmful and unhealthy agrochemicals This unique book acts as a catalyst for change presenting fresh ideas and innovative strategies for finding meaningful solutions to the problems of disease control Contributors working in the areas of plant protection microbiology plant pathology biotechnology ecology and food safety examine topics that include the application of plant tissue culture competitive root colonization mycorrhiza in biocontrol microbial siderophores antagonism and genetic regulation Topics addressed in Biological Control of Plant Diseases include soil borne pathogens rhizobacteria organic acids white rot Trichoderma and Agrobacterium phyllosphere manure based microbes gray mold disease major fungal diseases mycoparasitism microbial chitinases and much **Biological Control of Plant Diseases** E.C. Tjamos, G.C. Papavizas, R.J. Cook, 2013-06-29 The papers contained in this book were presented at a NATO Advanced Research Workshop ARW held at Cape Sounion Athens Greece 19-24 May 1991 The twenty eight more comprehensive papers represent the key subjects of the ARW covered by invited speakers The thirty four short papers presented in a research format are contributions of those

invited to participate in the ARW There was a total of 70 participants from 21 countries The objectives of the ARW were as follows to review current knowledge of biological control of plant diseases and plant parasitic nematodes with emphasis on mechanisms at the molecular cellular organismal and ecosystem level to examine and expand on current concepts and synthesize new concepts to identify and prioritize limitations in the use of biological control for plant diseases and nematodes and the scientific research needed to overcome these limitations and to develop strategies for biological control through management of resident agents or introduction of natural or modified agents

Biological Control Charles Vincent, Mark S. Goettel, George Lazarovits, 2007-08-20 Biological control the management of pests by the use of living organisms has a long history of application to agriculture around the world However the effective use of beneficial organisms is constrained by environmental legal and economic restrictions forcing researchers to adopt increasingly multi disciplinary techniques in order to deploy successful biological control programs It is this complex process including the mindset and the social environment of the researcher as well as the science being pursued that this book seeks to capture Chapters reveal the experiences of scientists from the initial search for suitable control agents to their release into ecosystems and finally to the beneficial outcomes which demonstrate the great success of biological control across diverse agro ecosystems Drawing together historical perspectives and approaches used in the development of biological control as well as outlining current debates surrounding terminology and differential techniques Biological Control A Global Perspective will be a valuable resource

Biocontrol Of Plant Diseases K. G. Mukerji, K.L. Garg, 2020-04-30 First Published in 1988 this set offers a comprehensive insight into controlling diseases in plants Carefully compiled and filled with a vast repertoire of notes diagrams and references this book serves as a useful reference for biologists horticulturalists other practitioners in their respective fields

Principles and Practices in Plant Ecology Inderjit, K. M. M. Dakshini, Chester L. Foy, 2023-07-21 Principles and Practices in Plant Ecology Allelochemical Interactions provides insights and details recent progress about allelochemical research from the ecosystem standpoint Research on chemical ecology of allelochemicals in the last three decades has established this field as a mature science that interrelates the research of biologists weed and crop scientists agronomists natural product chemists microbiologists ecologists soil scientists and plant physiologists and pathologists This book demonstrates how the influence of allelochemicals on the various components of an ecosystem including soil microbial ecology soil nutrients and physical chemical and biological soil factors may affect growth distribution and survival of plant species Internationally renowned experts discuss how a better understanding of allelochemical phenomena can lead to true sustainable agriculture

Biocontrol Potential and its Exploitation in Sustainable Agriculture Rajeew K. Upadhyay, K.G. Mukerji, B.P. Chamola, 2012-12-06 Plant based biotechnology has come to represent a means of mitigating the problems of global food security in the twenty first century Products and processes in agriculture are increasingly becoming linked to science and cutting edge technology to enable the engineering of what are in effect designer plants One of the most

successful non chemical approaches to pest management and disease control is biological control which seeks a solution in terms of using living organisms to regulate the incidence of pests and pathogens providing a natural control while still maintaining the biological balance with the ecosystem This volume the first of two addresses the different types of biocontrol for different pests namely crop diseases weeds and nematodes and details the biology of both the pest and its enemies which is vital for efficient use of biological control The book has numerous contributors who are authorities in their fields and would be an asset to those who have interest in sustainable agriculture and crop productivity **The Rhizosphere and Plant**

Growth Donald L. Keister, Perry B. Cregan, 2012-12-06 Papers Presented at a Symposium held May 8 11 1989 at the Beltsville Agricultural Research Center BARC Beltsville Maryland U S A

Reviewing **Nature And Practice Of Biological Control Of Plant Pathogens**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is really astonishing. Within the pages of "**Nature And Practice Of Biological Control Of Plant Pathogens**," an enthralling opus penned by a highly acclaimed wordsmith, readers set about an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve in to the book is central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

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