

P. Narayanasamy

# Microbial Plant Pathogens-Detection and Disease Diagnosis

Fungal Pathogens, Vol. 1

 Springer

# Microbial Plant Pathogens Detection And Disease Diagnosis Fungal Pathogens Vol 1

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## **Microbial Plant Pathogens Detection And Disease Diagnosis Fungal Pathogens Vol 1:**

*Microbial Plant Pathogens-Detection and Disease Diagnosis*: P. Narayanasamy, 2010-10-29 Morphological biological biochemical and physiological characteristics have been used for the detection identification and differentiation of fungal pathogens up to species level Tests based on biological characteristics are less consistent Immunoassays have been shown to be effective in detecting fungal pathogens present in plants and environmental samples Development of monoclonal antibody technology has greatly enhanced the sensitivity and specificity of detection identification and differentiation of fungal species and varieties strains Nucleic acid based techniques involving hybridization with or amplification of unique DNA have provided results rapidly and reliably Presentation of a large number of protocols is a unique feature of this volume

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**Microbial Plant Pathogens** Perumal Narayanasamy, 2017-02-06 Healthy seeds and propagules are the basic requirement for producing good grains fruits and vegetables needed for human survival and perpetuation Dispersal of microbial plant pathogens via seeds and propagules has assumed more importance than other modes of dispersal as infected seeds and propagules have the potential to become the primary sources of carrying pathogen inoculum for subsequent crops Several diseases transmitted through seeds and propagules have been shown to have the potential to damage economies as a result of huge quantitative and qualitative losses in numerous crops Hence it is essential to rapidly detect identify and differentiate the microbial plant pathogens present in seeds and propagules precisely and reliably using sensitive techniques Microbial Plant Pathogens Detection and Management in Seeds and Propagules provides a comprehensive resource on seed borne and propagule borne pathogens Information on the biology of microbial pathogens including genetic diversity infection process and survival mechanisms of pathogens and epidemiology of diseases caused by them are discussed critically and in detail to highlight weak links in the life cycles of the pathogens Development of effective disease management systems based on the principles of exclusion and eradication of pathogens and immunization of crop plants to enhance the levels of resistance of cultivars to diseases has been effective to keep the pathogens at bay The need for production of disease free seeds propagules has been emphasized to prevent the carryover of the inoculum to the next crop or introduction of the pathogens to other locations Effectiveness of adopting simple cultural practices and development of cultivars resistant to

diseases through traditional breeding methods or biotechnological approach have resulted in reducing the pathogen inoculum and disease incidence Although application of different chemicals may reduce the disease incidence effectively biological management of crop diseases employing potential biological control agents have to be preferred to preserve the agroecosystems Greater efforts have to be made to integrate compatible strategies to enhance the effectiveness of diseases management systems Protocols appended at the end of relevant chapters form a unique feature of this book to enable the researchers to fine tune their projects This 2 volume set provides comprehensive and updated information about the economically important groups of microbial plant pathogens carried by seed and propagules Graduate students researchers and teachers of plant pathology plant protection microbiology plant breeding and genetics agriculture and horticulture as well as certification and quarantine personnel will find the information presented in this book useful

### **Phyllosphere**

**Microbial Plant Pathogens: Detection and Crop Disease Management** P. Narayanasamy, 2024-08-15 This book provides comprehensive knowledge of the methods of detection and identification of phyllosphere microbial pathogens and the management of different kinds of diseases caused by them in various crops Interactions between pathogens and host plants result in the induction of defense responses expressed via molecular signals from initiation of infection to systemic progression of pathogen invasion in susceptible plants and contrasting signals in resistant plants leading to inhibition of pathogen development through activation of preinfectious and postinfectious defense responses These are critically discussed The author describes the intricate and complex competitive activities of the pathogens and host plants in a molecular warfare that the host plant must win to break the link in the pathogens life cycle allowing the development of disease management strategies based on the principles of exclusion eradication and immunization Integration of strategies concerning the development of cultivars resistant to pathogens through breeding and biotechnological techniques application of biotic and abiotic inducers of resistance to pathogens and use of disease free seeds and propagules that are complementary to each other along with effective cultural practices are emphasized This book presents information gathered through an extensive literature search to help researchers and graduate students in agricultural sciences identify research gaps and successfully complete their research projects

### **Soilborne Microbial Plant Pathogens and Disease**

**Management, Volume One** P. Narayanasamy, 2019-10-08 Soilborne microbial plant pathogens including oomycetes fungi bacteria and viruses cause several economically important destructive diseases and the symptoms of infection can be recognized only after the pathogen has invaded many tissues primarily vascular tissues of susceptible plants This condition places formidable challenges in investigating different aspects of host microbial pathogen interactions Early detection of infection and precise identification differentiation and quantification of the microbial plant pathogens in plants soil and water sources are essential requirements for development of effective tactics to reduce the incidence and spread of the diseases caused by them As the microbial plant pathogens differ in their virulence and sensitivity to the environment and chemicals

applied it is imperative to assess the extent of variability in the concerned pathogens This first volume of a two volume set introduces disease causing microorganisms including oomycetes fungi bacteria and viruses found in soils It focuses on the biology detection and identification of soilborne bacterial fungal and viral plant pathogens This volume discusses various techniques based on biological immunological and genetic properties of the pathogens indicating their advantages and limitations for selecting the appropriate technique to fulfill the requirements Features Presents techniques useful for detection identification quantification of microbial plant pathogens in plants soil and irrigation water from waterbodies Highlights subversive activities of viruses resulting in the breakdown of host defense systems Discusses RNA silencing in infected plants by viruses and posttranscriptional gene silencing PTGS functioning as an endogenous mechanism in plants against virus infection Presents information on methods of assessment of genetic variability and sensitivity of microbial plant pathogens to chemicals and adverse environmental conditions

**Microbial Plant Pathogens-Detection and Disease**

**Diagnosis:** P. Narayanasamy, 2010-10-20 Microbial plant pathogens causing qualitative and quantitative losses in all crops are present not only in the infected plants but also in the environment comprising of soil water and air The vectors present in the environment spread the microbial pathogens to short and or long distances Detection of microbial pathogens rapidly and reliably by employing suitable sensitive applicable for different ecosystems The pathogens have to be identified precisely and differentiated and quantified to plan appropriate short and long term strategies to contain the incidence and spread of diseases induced by them This book aims to present all relevant and latest information on the detection techniques based on the biological biochemical immunological and nucleic acid characteristics of microbial pathogens presents in the host plants as well as in the natural substrates that support the survival and perpetuation of the pathogens

**Rhizosphere Microbes**

Udai B. Singh, Pramod K. Sahu, Harsh V. Singh, Pawan K. Sharma, Sushil K. Sharma, 2022-10-07 This edited book volume aims to bringing out a comprehensive collection of latest information and developments on the management of biotic stresses by the use of rhizospheric microbes across the globe The main focus of this book is to address the scientific and practical significance of rhizosphere microbes in biotic stress management The microbial communities in the rhizosphere ecosystem play multitude of microbe microbe microbe insect pest and plant microbe interactions and they have not yet been fully exploited to gain benefits in this field as well as to achieve sustainability in agriculture Among the more recent strategies stress tolerance resistance induced by environment friendly elicitors of microbial origin and or rhizosphere microorganisms has emerged as a promising supplement in the approaches to crop protection The proposed book entitled Rhizosphere Microbes Biotic Stress Management is pertinent to rhizospheric microbe mediated biotic stress management covering all spheres of biotic stress tolerance viz bio resources diversity ecology and functioning of microbial bio control agents host parasite interaction strategies to characterize microbial bioinoculants interactions of rhizosphere microbes by developing a fundamental understanding of the microbial communities exploration of the diverse roles of microbes and microbial

communities and their role in biotic stress tolerance microbe mediated mitigation of biotic stresses quorum sensing microbial signalling and cross talk in the rhizosphere biofilm formation cell to cell communication role of microorganisms in ecosystems functioning under various biotic stress conditions application of microbial bio pesticides molecular studies using microbial systems etc This book is of interest to teachers researchers crop protection scientists capacity builders and policymakers Also the book serves as additional reading material for under graduate post graduate and post doctorate fellow of agriculture forestry ecology life science and environmental sciences National and international agricultural scientists policy makers will also find this to be a useful read *Frontiers on Recent Developments in Plant Science* Aakash Goyal, Priti Maheshwari, 2012 *Frontiers on Recent Developments in Plant Science* is an edited peer reviewed volume comprised of a collection of individual chapters from leading research groups across different continents Due to its multidisciplinary nature the combined experiences a *The Mulberry Genome* Belaghihalli N. Gnanesh, Kunjupillai Vijayan, 2023-06-16 This book is the first comprehensive compilation of current knowledge on mulberry *Morus L* covering botany cytogenetics biodiversity genetics and breeding tissue culture and genetic transformation biotic and abiotic stresses molecular mapping QTL identification whole genome sequencing and elucidation on functional genomics As mulberry is one of the most economically important trees in Asian countries it has attracted the attention of both academicians as well as industrialists Being highly heterozygous due to long juvenile life coupled cross pollination among species the genetics of this important crop species is yet to be unravelled Nonetheless the recent success of sequencing the genomes of haploid and diploid domesticated species has ushered in an era of intense molecular and genetic research to understand this crop well for its better utilization for mankind In this book efforts have been made to bring together key information on origin and distribution taxonomy morphological features economic importance abiotic stress responses disease and pest resilience current breeding strategies and their constraints progress and prospects of gene mapping elucidation of genes controlling metabolic and physiological pathways and their utilization in crop improvement which are elaborated in about 250 pages over 13 chapters authored by globally leading experts on the species presented This book is useful to the sericulture community in the world in general and students teachers and scientists in the academia for forage and fruit production genetics breeding pathology entomology physiology molecular genetics in vitro culture and genetic engineering and structural and functional genomics This book is also useful to seed and biofuel industries *Biological Controls for Preventing Food Deterioration* Neeta Sharma, 2014-07-08 Various biotic factors cause diseases in crops which result in food losses Historically pesticide development has been instructive to us in terms of the benefits derived as well as the hazards that accompany their indiscriminate use The application of fertilizers and pesticides to crops has become a norm in agricultural production but this has led to resurgence in pests as they have developed resistance to such chemicals Biological control of plant pests and pathogens is part of the solution to this problem This is an area that continues to inspire research and development It is also the foundation on which

sustainable non polluting pest control for tomorrow s farms must be built Biological Controls for Preventing FoodDeterioration provides readers with options of non chemical eco friendly environmentally safe natural alternatives to prevent food from spoilage at pre and postharvest stages It covers the principles behind these techniques and their implementation By integrating theory and practice this book discusses the potential and associated problems in the development of non chemical alternatives to protect food and addresses the common hurdles that need to be overcome to enable commercialization and registration of natural products for combating diseases Focussing on plant foods this timely book is unique in scope as it offers an international perspective on food deterioration caused by bacterial fungal viral and mycotoxin contamination It brings together highly respected scientists from differing yet complementary disciplines in one unified work that is important reading for food safety professionals researchers and students

*Molecular Biology in Plant Pathogenesis and Disease Management* P. Narayanasamy, 2008-04-29 Studies on molecular biology of pathogens infection process and disease resistance have provided information essentially required to understand the vulnerable stages at which the pathogens can be tackled effectively and to adopt novel strategies to incorporate disease resistance genes from diverse sources and or to induce resistance of cultivars with desirable agronomic attributes using biotic or abiotic agents The nature of interaction between the gene products of the pathogen and plant appears to determine the outcome of the interaction resulting in either disease progression or suppression Transgenic plants with engineered genes show promise for effective exploitation of this approach for practical application Research efforts during the recent years to sequence the whole genomes of the pathogens and plants may lead to development of better ways of manipulating disease resistance mechanisms enabling the grower to achieve higher production levels and the consumer to enjoy safer food and agricultural products Experimental protocols included in appropriate chapters will be useful for researchers and graduate students

**Plant Stress: Challenges and Management in the New Decade** Swarnendu Roy, Piyush Mathur, Arka Pratim Chakraborty, Shyama Prasad Saha, 2022-03-31 This book presents an inclusive approach to deal with plant stresses in light of recent technological advances As we have entered into a new decade researchers and scientists should review and evaluate the recent findings in the field of plant stress management and visualize what we need to focus upon in the near future to increase crop yield Above all global climate changes present the greatest challenges of all time for plant scientists In this context the book highlights the recent findings and future perspectives in crop improvement to the faculties scientists research scholars and postgraduate students Major features of the book include an inclusive approach in understanding the mechanism of stress tolerance recent advances and innovations in the field of allied disciplines like microbiology molecular biology biotechnology plant breeding nanobiotechnology etc for improving plant stress tolerance and illustrative sketches to convey the mechanism and strategies of stress alleviation

**Applied Plant Virology** L. P. Awasthi, 2020-05-14 *Applied Plant Virology* Advances Detection and Antiviral Strategies provides an overview on recent developments and applications in

the field of plant virology The book begins with an introduction to important advances in plant virology but then covers topics including techniques for assay detection and the diagnosis of plant viruses the purification isolation and characterization of plant viruses the architecture of plant viruses the replication of plant viruses the physiology of virus infected hosts vectors of plant viruses and the nomenclature and classification of plants The book also discusses defense strategies by utilizing antiviral agents and management strategies of virus and viroid diseases With contributions from an international collection of experts this book presents a practical resource for plant virologists plant pathologists horticulturalists agronomists biotechnologists academics and researchers interested in up to date technologies and information that advance the field of plant virology Covers the detection control and management of plant viruses Discusses antiviral strategies along with mechanisms of systemic induced resistance to enhance the defense of plants against viruses Provides contributory chapters from expert plant virologists from different parts of the world

#### **Achieving sustainable cultivation of wheat Volume 1**

Prof. Peter Langridge, 2017-06-30 Discusses ways of ensuring genetic diversity advances in wheat breeding and their use to improve properties such as drought resistance and cold tolerance Summarises research on factors affecting nutritional and other aspects of wheat quality Reviews advances in understanding wheat pests and diseases together with ways of controlling them such as disease resistant varieties integrated pest and weed management

#### **Artificial Intelligence in Microbiology: Scope and Challenges Volume 1**

, 2024-08-02 Nowadays the field of microbiology is undergoing a revolutionary change due to the emergence of Artificial Intelligence AI AI is being used to analyze massive data in a predictable form about the behavior of microorganisms to solve microbial classification related problems exploring the interaction between microorganisms and the surrounding environment It also helps to extract novel microbial metabolites which have been used in various fields like medical food and agricultural industries As the pace of innovation in Microbiology is accelerating the use of AI in these industries will be beneficial AI will not only show its extraordinary potential in expanding the market of antibiotics food and agriculture but also offer an eco friendly safer and profitable solution to the respective industries It would be challenging to search out specific features and discuss future research on AI in microbiology with a wide perspective Uncovering extended functions of AI in Microbiology Production and development of novel drug targets through AI Challenges for using and selecting appropriate AI tools in health agriculture and food sector

*Innovative Approaches in Diagnosis and Management of Crop Diseases* R. K. Singh, Gopala, 2021-09-28 This book is the second of the 3 volume *Innovative Approaches in Diagnosis and Management of Crop Diseases* which provides an abundance of new research and information on major diseases of various crops along with new techniques and technology for the detection of plant pathogens along with appropriate management strategies Divided into three volumes and with chapters written by renowned and expert scientists working in different areas of plant pathology the volumes cover important diseases of crops incited by bacteria fungi viruses viroids phytoplasma and nematodes It addresses these disease challenges to



commercial field and horticultural crops and their management Innovative Approaches in Diagnosis and Management of Crop Diseases Volume 2 focuses on recent advances in diagnosis detection and management of diseases of specific crops such as cotton sesame rice wheat millet maize field pea and pigeonpea ginger and turmeric guava aonla and vegetable cruciferous crops Key features Presents diverse research of leading plant pathologists on detection diagnosis and management of crop diseases Shares innovative and emerging techniques for diagnosis and management of major plant diseases Covers a vast array of important crops and their diseases Volume 1 of this multi volume set focuses on the Mollicute class of bacteria It looks at the detection diagnosis and management of phytoplasma diseases and viroids CRISPR Cas9 genome editing in plants for virus resistance next generation sequencing technologies and more while Volume 3 reviews the advances in the uses of nanomolecules and biocontrol agents Diagnosis and management of biotic stresses play a pivotal role in efficient agriculture production and together these volumes of Innovative Approaches in Diagnosis and Management of Crop Diseases provide informative reviews of crucial research to effectively advance the detection diagnosis and management of crop diseases

*Microbial Plant Pathogens-Detection and Disease Diagnosis*: P. Narayanasamy, 2010-10-29 Morphological biological biochemical and physiological characteristics have been used for the detection identification and differentiation of fungal pathogens up to species level Tests based on biological characteristics are less consistent Immunoassays have been shown to be effective in detecting fungal pathogens present in plants and environmental samples Development of monoclonal antibody technology has greatly enhanced the sensitivity and specificity of detection identification and differentiation of fungal species and varieties strains Nucleic acid based techniques involving hybridization with or amplification of unique DNA have provided results rapidly and reliably Presentation of a large number of protocols is a unique feature of this volume

**Plant Pathogen Detection and Disease Diagnosis, Second Edition**, P. Narayanasamy, 2001-08-28 This work provides information on the detection identification and differentiation of all microbial plant pathogens presenting modern protocols for rapid diagnosis of diseases based on biological physical chemical and molecular properties It contains methods for the selection of disease free seeds and vegetatively propagated planting materials and quarantine techniques for screening newly introduced plant materials

**Advances in Agronomy**, 2014-06-27 Advances in Agronomy continues to be recognized as a leading reference and a first rate source for the latest research in agronomy As always the subjects covered are varied and exemplary of the myriad of subject matter dealt with by this long running serial Timely and state of the art reviews Distinguished well recognized authors A venerable and iconic review series Timely publication of submitted reviews

**Trends in Plant Disease Assessment** Imran Ul Haq, Siddra Ijaz, 2022-10-26 This edited book provides the readers with the concepts and in depth knowledge of plant disease assessment and conventional and modern technologies that aid in precise and accurate phytomathometry This book discusses the evolution of plant disease assessment procedures from the primary visual estimation based assessment to modern

approaches their practical application for reliable disease quantification yield loss estimation and the efficacy of disease control strategies for sustainable crop protection Significant information is provided on the major aspects of the topic including remote sensing imaging techniques molecular phytopathometry microarray and immunotechnology The book helps plant scientists plant pathologists practitioners researchers and students in disease quantification developing predictive models for plant disease epidemics assessing crop losses and the magnitude of plant disease control methods This book describes the classical plant disease assessment methods based on visual observations It Provides information regarding the modern and emerging technologies in Phytopathometry precision and accuracy This book also discusses the application of disease assessments in predictive models disease warning systems expert systems and decision support systems in applied plant pathology

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