Developments in Plant Pathology

Pathogen and Microbial Contamination Management in Micropropagation

Edited by
A.C. Cassells

Springer-Science+Business Media, B.V.

Pathogen And Microbial Contamination Management In Micropropagation

Robert N. Trigiano,Dennis J. Gray

Pathogen And Microbial Contamination Management In Micropropagation:

Pathogen and Microbial Contamination Management in Micropropagation Alan C. Cassells,2013-06-29 This book is based mainly on invited and offered papers presented at the Second International Symposium on Bacterial and Bacteria like Contaminants of Plant Tissue Cultures held at University College Cork Ireland in September 1996 with additional invited papers The First International Symposium on Bacterial and Bacteria like Contaminants of Plant Tissue Cultures was held at the same venue in 1987 and was published as Acta Horticulturae volume 225 1988 In the intervening years there have been considerable advances in both plant disease diagnostics and in the development of structured approaches to the management of disease and microbial contamination in micropropagation These approaches have centred on attempts to separate spatially the problems of disease transmission and laboratory contamination Disease control is best achieved by establishing pathogen free cultures while laboratory contamination is based on subsequent good working practice Control of losses due to pathogens and microbial contamination in vitro addresses arguably the most importance causes of losses in the industry nevertheless losses at and post establishment can also be considerable due to poor quality microplants or micro shoots In this symposium a holistic approach to pathogen and microbial contamination control is evident with the recognition that micropropagators must address pathogen and microbial contamination in vitro and diseases and microplant failure at establishment There is increasing interest in establishing beneficial bacterial and mycorrhizal association with microplants in vitro and in vivo *Plant Tissue Culture Concepts and Laboratory Exercises* Robert N. Trigiano,2018-04-27 Alternating between topic discussions and hands on laboratory experiments that range from the in vitro flowering of roses to tissue culture of ferns Plant Tissue Culture Concepts and Laboratory Exercises Second Edition addresses the most current principles and methods in plant tissue culture research The editors use the expertise of some of the top researchers and educators in plant biotechnology to furnish students instructors and researchers with a broad consideration of the field Divided into eight major parts the text covers everything from the history of plant tissue culture and basic methods to propagation techniques crop improvement procedures specialized applications and nutrition of callus cultures New topic discussions and laboratory exercises in the Second Edition include Micropropagation of Dieffenbachia Micropropagation and in vitro flowering of rose Propagation from nonmeristematic tissue organogenesis Variation in culture and Tissue culture of ferns It is the book s extensive laboratory exercises that provide a hands on approach in illustrating various topics of discussion featuring step by step procedures anticipated results and a list of materials needed What s more editors Trigiano and Gray go beyond mere basic principles of plant tissue culture by including chapters on genetic transformation techniques and photographic methods and statistical analysis of data In all Plant Tissue Culture Concepts and Laboratory Exercises Second Edition is a veritable harvest of information for the continued study and research in plant tissue culture science

Plant Tissue Culture, Development, and Biotechnology Robert N. Trigiano,Dennis J. Gray,2016-03-30 Under the vast

umbrella of Plant Sciences resides a plethora of highly specialized fields Botanists agronomists horticulturists geneticists and physiologists each employ a different approach to the study of plants and each for a different end goal Yet all will find themselves in the laboratory engaging in what can broadly be termed biotechnol Micropropagation of Woody Trees and Fruits S.M. Jain,K. Ishii,2012-12-06 Global warming environmental changes water shortage and sustainable development are the most up to date issues which have challenged mankind Researchers worldwide are engaged in addressing some of these problems including reduction in carbon dioxide accumulation and enrichment of perennial woody species on the terrestrial ecosystem About 12 million hectares of the world s forests disappear every year By 2025 the world population will reach 7 5 billion and the forest area will be reduced to well below 50 % of the current area Reforestation is an important to prevent the loss of forest resources including timber biodiversity and water resources Therefore subsequent volume of reforestation over the deforested land should be followed to safeguard the forests and maintain its size which will require a continuous supply of planting material Similarly fruit trees including tropical and subtropical fruit trees are consumed both as fresh and in the processed form including juices beverages and dried fruits They are an important source of nutrition e g rich in vitamins sugars aromas and flavour compounds and raw material for food processing industries The production cultivation and maintenance of tree species provide highly sustainable production systems that conserve soils microenvironment and biodiversity Fruit trees have longjuvenile periods and large tree size In many fruit trees e g avocado and others controlled crosses are difficult to make due to massive fruit drop *Microbial Endophytes* Ajay Kumar,Vipin Kumar Singh,2019-09-27 Microbial Endophytes Prospects for Sustainable Agriculture discusses the practical and theoretical aspects regarding the use of endophytic microorganisms in agriculture providing insights on the biotechnological applications associated with long term crop production Chapters deal with the various aspects of endophytic microorganisms including isolation enumeration characterization procedures diversity analysis and their role as biofertilizer biocontrol agent and microbial inoculants Framed to discuss the present and future potential of microbial endophytes in biotic and abiotic stress management bioremediation bioactive compounds production and in nanotechnology this book provides a single volume resource that will be valuable to academics and researchers interested in microbiology agricultural sciences and biotechnology Explores aspects of sustainable agriculture by using endophytic microorganism such as bacteria fungi and actinobacteria Presents insights into the use of endophytes as biofertilizer and biocontrol agents in sustainable agriculture Relates endophyte organisms and nano technology **Microorganisms in Plant Conservation and Biodiversity** K. Sivasithamparam,K.W. Dixon,R.L. Barrett,2007-05-08 Plant conservation is increasingly recognised as an outstanding global priority yet despite considerable efforts over the last few decades the number of threatened species continues to rise The practice of plant conservation has for too long been a rather hit or miss mixture of methods While microorganisms have been recognised as a crucial and essential element in supporting the lifecycles of plant species there has been limited recognition of the

relationships between macro level conservation facilitating ecosystem functioning at the micro level This book addresses the role of microorganisms in conservation both their support functions and deleterious roles in ecosystem processes and species survival Importantly a number of authors highlight how microbial diversity is itself now under threat from the many and pervasive influences of man What is clear from this volume is that like many contemporary treatments of plant and animal conservation the solution to mitigate the erosion of biodiversity is not simple This book represents an attempt to bring to the fore the ecological underwriting provided by microorganisms **Plant Pathogenic Bacteria** Solke H. De Boer,2013-12-18 Plant Pathogenic Bacteria includes symposia and research papers presented at the 10th International Conference on Plant Pathogenic Bacteria The book provides the complete text of 22 symposia papers that summarize the state of the art of the many facets of phytobacteriology including disease control taxonomy genetics of pathogenicity virulence factors as well as detection and diagnosis These topics are also included among research papers presented orally or as posters at the conference and here presented in research paper format conveniently separated in different sections by subject matter This book will be an essential resource for scientists and students with an interest in plant pathogenic bacteria for it provides much new data and summarizes current thinking in almost all areas of the science Nowhere else can one find so much information on plant pathogenic bacteria in a single resource *Breeding For Ornamentals: Classical and Molecular Approaches* A. Vainstein,2013-04-17 In this book we bring together the most up to date information on developments both basic and applied that already have or are expected to impact the field of ornamental breeding These include classical and molecular techniques traditional and high throughput approaches and future trends Since not only professional scientists but also thousands of future scientists students as well as amateur breeders around the world contribute heavily to the field of ornamental breeding an introductory section dealing with the basics of molecular and classical genetics and the evolution of floral diversity is included This should enable the reader to bridge the gap between traditional and molecular genetics Classical approaches to the creation selection of genetic variability including mutation and tissue culture aided breeding are presented Processes affecting ornamental and agronomic traits at the molecular level are delineated along with an in depth analysis of developments in the protection of intellectual property rights The thoughts and strategies of molecular and classical geneticists which are not always complementary or even compatible are presented side by side in this book and will serve to spark the imaginations of breeders as well as students entering the exciting world of state of the art ornamentals

Plant Tissue Culture Engineering S. Dutta Gupta,Yasuomi Ibaraki,2006-07-10 It is my privilege to contribute the foreword for this unique volume entitled Plant Tissue Culture Engineering edited by S Dutta Gupta and Y Ibaraki While there have been a number of volumes published regarding the basic methods and applications of plant tissue and cell culture technologies and even considerable attention provided to bioreactor design relatively little attention has been afforded to the engineering principles that have emerged as critical contributions to the commercial applications of plant biotechnologies

This volume Plant Tissue Culture Engineering signals a turning point the recognition that this specialized field of plant science must be integrated with engineering principles in order to develop efficient cost effective and large scale applications of these technologies I am most impressed with the organization of this volume and the extensive list of chapters contributed by expert authors from around the world who are leading the emergence of this interdisciplinary enterprise The editors are to be commended for their skilful crafting of this important volume The first two parts provide the basic information that is relevant to the field as a whole the following two parts elaborate on these principles and the last part elaborates on specific technologies or applications **Somatic Embryogenesis in Woody Plants** S.M. Jain,Pramod P.K. Gupta,R.J. Newton,2012-12-06 The quality of human life has been maintained and enhanced for generations by the use of trees and their products In recent years ever rising human population growth has put a tremendous pressure on trees and tree products growing awareness of the potential of previously unexploited tree resources and environmental pollution have both accelerated the development of new technologies for tree propagation breeding and improvement Biotechnology of trees may be the answer to solve the problems which can not be solved by conventional breeding methods The combination of biotechnology and conventional methods such as plant propagation and breeding could become a novel approach to improving and multiplying a large number of the trees and woody plants So far plant tissue culture technology has largely been exploited by commercial companies in propagation of ornamentals especially foliage house plants Generally tissue culture of woody plants has been recalcitrant However limited success has been achieved in tissue culture of angiosperm and gymnosperm woody plants A number of recent reports on somatic embryogenesis in woody plants such as Norway spruce Picea abies Loblolly pine Pinus taeda Sandalwood Santalum album Citrus and mango Mangifera indica offer a ray of hope for inexpensive clonal propagation for large scale production of plants or emblings or somatic seedlings protoplast work cryopreservation genetic transformation and synthetic or artificial or manufactured seed production **Liquid Culture Systems for in vitro Plant Propagation** A.K. Hvoslef-Eide,W. Preil,2005-06-15 High efficiency micropropagation with relatively low labour costs has been demonstrated in this unique book detailing liquid media systems for plant tissue culture World authorities e g von Arnold Curtis Takayama Ziv contribute seminal papers together with papers from researchers across Europe that are members of the EU COST Action 843 Advanced micropropagation systems First hand practical applications are detailed for crops including ornamentals and trees using a wide range of techniques from thin film temporary immersion systems to more traditional aerated bioreactors with many types of explant shoots to somatic embryos The accounts are realistic balanced and provide a contemporary account of this important aspect of mass propagation This book is essential reading for all those in commercial micropropagation labs as well as researchers worldwide who are keen to improve propagation techniques and lower economic costs of production Undergraduate and postgraduate students in the applied plant sciences and horticulture will find the book an enlightened treatise *Microbe Mediated Remediation of*

Environmental Contaminants Ajay Kumar,Vipin Kumar Singh,Pardeep Singh,Virendra Kumar Mishra,2020-10-14 Microbe Mediated Remediation of Environmental Contaminants presents recent scientific progress in applying microbes for environmental management The book explores the current existing practical applications and provides information to help readers develop new practices and applications Edited by recognized leaders in the field this penetrating assessment of our progress to date in deploying microorganisms to the advantage of environmental management and biotechnology will be widely welcomed by those working in soil contamination management agriculture environment management soil microbiology and waste management The polluting effects on the world around us of soil erosion the unwanted migration of sediments chemical fertilizers and pesticides and the improper treatment of human and animal wastes have resulted in serious environmental and social problems around the world problems which require us to look for solutions elsewhere than established physical and chemical technologies Often the answer lies in hybrid applications in which microbial methods are combined with physical and chemical ones When we remember that these highly effective microorganisms cultured for a variety of applications are but a tiny fraction of those to be found in the world around us we realize the vastness of the untapped and beneficial potential of microorganisms Explores microbial application redressing for soil and water contamination challenges Includes information on microbial synthesized nanomaterials for remediation of contaminated soils Presents a uniquely hybrid approach combining microbial interactions with other chemical and physical methods

Photoautotrophic (sugar-free medium) Micropropagation as a New Micropropagation and Transplant Production System Toyoki Kozai,Ff. Afreen,S.M.A Zobayed,2005-12-05 This book provides two basic concepts on plant propagation and value added transplant production in a closed structure with artificial lighting 1 photoautotrophic sugar free medium photosynthetic or inorganic nutrition micropropagation systems and 2 closed transplant production systems with minimum resource consumption and environmental pollution This book also describes the methodology technology and practical techniques employed in both systems which have been commercialized recently in some Asian countries such as China and Japan We often use a closed structure such as a tissue culture vessel a culture room a growth chamber a plant factory with lamps and a greenhouse to propagate plants and produce transplants Main reasons why we use such a closed structure is 1 higher controllability of the environment for desired plant growth 2 easier protection of plants from damage by harsh physical environment pathogens insects animals etc 3 easier reduction in resource consumption for environmental control and protection and 4 higher quality and productivity of plants at a lower cost compared with the plant propagation and transplant production under rain wind and sunlight shelters and in the open fields Thus there should be some knowledge discipline methodology technology and problems to be solved on plant propagation and transplant production common to those closed structures regardless of the types and sizes of the closed structure **Bibliography of Agriculture** ,1990

Relationship Between Microbes and the Environment for Sustainable Ecosystem Services, Volume 1 Jastin Samuel,Ajay

Kumar,Joginder Singh Panwar,2022-05-18 Relationship Between Microbes and Environment for Sustainable Ecosystem Services Volume One Microbial Products for Sustainable Ecosystem Services promotes advances in sustainable solutions value added products and fundamental research in microbes and the environment Topics include advanced and recent discoveries in the use of microbes for sustainable development Users will find reference information ranging from the description of various microbial applications for sustainability in different aspects of food energy the environment and social development Volume One includes the direct and indirect role of bacteria fungi actinomycetes viruses mycoplasma and protozoans in the development of products contributing towards sustainable The book provides a holistic approach to the most recent advances in the application of various microbes as a biotechnological tool for a vast range of sustainable applications modern practices exploring futuristic strategies to harness its full potential Covers the latest developments recent applications and future research avenues in microbial biotechnology for sustainable development Includes expressive tables and figures with concise information about sustainable ecosystem services Provides a wide variety of applications and modern practices of harnessing the potential of microbes in the environment Plant Cell Culture Protocols Víctor M. Loyola-Vargas,Felipe Vázquez-Flota,2008-02-04 A comprehensive state of the art collection of the most frequently used techniques for plant cell and tissue culture Readily reproducible and extensively annotated the methods range from general methodologies such as culture induction growth and viability evaluation and contamination control to such highly specialized techniques as chloroplast transformation involving the laborious process of protoplast isolation and culture Most of the protocols are currently used in the research programs of the authors or represent important parts of business projects aimed at the generation of improved plant materials Two new appendices explain the principles for formulating culture media and the composition of the eight most commonly used media formulations and list more than 100 very useful internet sites

Plant Development and Biotechnology Robert N. Trigiano,Dennis J. Gray,2004-07-28 Biotechnology revolutionized traditional plant breeding programs This rapid change produced new discussions on techniques and opportunities for commerce as well as a fear of the unknown Plant Development and Biotechnology addresses the major issues of the field with chapters on broad topics written by specialists The book applies an informal style that addresses the major aspects of development and biotechnology with minimal references without sacrificing information or accuracy Divided into five primary parts this volume explores how the field emerged from its early theoretical base to the technical discipline of today It also covers progress being made with genetically engineered plants providing a snapshot of the field s controversial present Part III discusses methods for preparing media creating solutions and dilutions and accomplishing sterile culture work It investigates common methods for visualizing and documenting studies and quantifying responses of tissue culture in research Part IV delivers the essential foundation of plant tissue culture introducing the three types of commonly used culture regeneration systems Part V integrates propagation techniques with other methodologies for the modification and

manipulation of germplasm Part VI concludes with special sections Subjects include in vitro plant pathology recent research into genetic and phenotypic variation the mechanics of commercial plant production and the importance of clean cultures and problems associated with maintaining in vitro cultures The final chapter analyzes entrepreneurship in the field and outlines the do s and don ts to consider when launching an enterprise **Plant Biotechnology and In Vitro Biology in the 21st Century** Arie Altman,Meira Ziv,Shamay Izhar,2012-12-06 Achievements today in plant biotechnology have already surpassed all previous expectations Plant biotechnology integrated with classical breeding is now on the verge of creating the evergreen revolution to solve the world s envisaged tripled demand for food agricultural commodities and natural products New biotechnologies are being continuously adapted to agricultural practices opening new vistas for plant utilization Plant biotechnology is changing the plant scene in three major areas 1 growth and development control vegetative generative and propagation 2 protecting plants against the ever increasing threats of abiotic and biotic stress 3 expanding the horizons by producing specialty foods biochemicals and pharmaceuticals The potential for improving plant and animal productivity and their proper use in agriculture relies largely on newly developed DNA biotechnology and molecular markers These techniques enable the selection of successful genotypes better isolation and cloning of favorable traits and the creating of transgenic organisms of importance to agriculture These areas were extensively discussed at the 9th international congress of the International Association of Plant Tissue Culture and Biotechnology Plant Biotechnology and In Vitro Biology in the 21st Century which was held in Jerusalem in June 1998 The present book of proceedings contains the variety of scientific achievements and techniques that were presented Basic and Applied Aspects of Growth Development and Differentiation Genetic Manipulations Transformation and Gene Expression Hybridization Haploidization and Mutagenesis Genetic Stability and Instability Selection and Variability Regulation of Primary and Secondary Metabolism Model Systems Cell Cycle Transport and Signal Transduction Biotechnology for Plant Protection Abiotic and Biotic Stress Biotechnology for Crop Improvement Yield Quality and Production of Valuable Substances Novel Micropropagation Methods New Markets and Commercial Applications Intellectual Property Rights INTRODUCTION TO PLANT CELL TISSUE AND ORGAN CULTURE SUNIL D. PUROHIT,2012-10-30 Designed primarily as a text for undergraduate and postgraduate students of Botany and Plant Biotechnology the book discusses the theoretical aspects and modern applications of plant cell tissue and organ culture Written with the aim of providing up to date information on the subject and focused on the concept of commercialization of plant cell culture the contents have been presented with clarity The book not only discusses the theoretical aspects of plant tissue culture but also emphasizes the art of its practice It also provides a systematic explanation of asepsis and methods of sterilization plant tissue culture techniques culture of reproductive structures plant tissue culture in germplasm conservation its applications in the industry and plant pathology and operation and management of greenhouse hardening unit In addition it discusses in vitro propagation of plants micropropagation with a series of case studies pertaining to tree species and

horticultural crops Besides students the book will also prove to be useful for researchers scholars and teachers **Plant Health Under Biotic Stress** Rizwan Ali Ansari,Irshad Mahmood,2019-05-08 The book illustrates the use of putative microbial agents which provide good protection to the plant from biotic pathogens attack An up to date knowledge on plant microbiome interaction strategies in terms of improved sustainability has been discussed Information from experts across the globe on the application of microbes for providing amicable solution in sustainable agriculture has been gathered In addition information related to microbes mediated resistance levels leading to enhanced plant health has been well presented The chapters have emphasised the use of Plant Growth Promoting Rhizobacteria PGPR and other potential biocontrol agents antagonists in the management of plant diseases which provide extensive information to the readers Literature on microbial root colonization plant growth promotions and also on the protection of plants from attack of various soil borne pathogens have been presented in a coherent way Information on the application of potential strain of the bio control fungi endophytes actinomycetes strengthening the plants ability which rescue the plant from pathogens attack leading to improved plant health has also been underpinned

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