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Protocols for Micropropagation of Woody Trees and Fruits

Springer

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Richard E. Litz,Fernando Pliego-Alfaro,Jose Ignacio Hormaza

Protocols For Micropropagation Of Woody Trees And Fruits:

Protocols for Micropropagation of Woody Trees and Fruits S.Mohan Jain,H. Häggman,2007-09-18 Micropropagation has become a reliable and routine approach for large scale rapid plant multiplication which is based on plant cell tissue and organ culture on well defined tissue culture media under aseptic conditions A lot of research efforts are being made to develop and refine micropropagation methods and culture media for large scale plant multiplication of several number of plant species However many forest and fruit tree species still remain recalcitrant to in vitro culture and require highly specific culture conditions for plant growth and development The recent challenges on plant cell cycle regulation and the presented potential molecular mechanisms of recalcitrance are providing excellent background for understanding on totipotency and what is more development of micropropagation protocols For large scale in vitro plant production the important attributes are the quality cost effectiveness maintenance of genetic fidelity and long term storage The need for appropriate in vitro plant regeneration methods for woody plants including both forest and fruit trees is still overwhelming in order to overcome problems facing micropropagation such as somaclonal variation recalcitrant rooting hyperhydricity polyphenols loss of material during hardening and quality of plant material Moreover micropropagation may be utilized in basic research in production of virus free planting material cryopreservation of endangered and elite woody species applications in tree breeding and reforestation *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 *Protocol for Somatic Embryogenesis in Woody Plants* Shri Mohan Jain,Pramod K. Gupta,2005-05-23 World population is increasing at an alarming rate and this has resulted in increasing tremendously the demand for tree products such as wood for construction materials fuel and paper fruits oils and medicines etc This has put

immense pressure on the world s supplies of trees and raw material to industry and will continue to do so as long as human population continues to grow Also the quality of human diet especially nutritional components is adversely affected due to limited genetic improvement of most of fruit trees Thus there is an immediate need to increase productivity of trees Improvement has been made through conventional breeding methods however conventional breeding is very slow due to long life cycle of trees A basic strategy in tree improvement is to capture genetic gain through clonal propagation Clonal propagation via organogenesis is being used for the production of selected elite individual trees However the methods are labour intensive costly and produce low volumes Genetic gain can now be captured through somatic embryogenesis Formation of embryos from somatic cells by a process resembling zygotic embryogenesis is one of the most important features of plants In 1958 Reinert in Germany and Steward in USA independently reported somatic embryogenesis in carrot cultures Since then tremendous progress in somatic embryogenesis of woody and non woody plants has taken place It offers a potentially large scale propagation system for superior clones **Embryogenesis** Ken-Ichi Sato,2012-04-20 The book Embryogenesis is a compilation of cutting edge views of current trends in modern developmental biology focusing on gametogenesis fertilization early and or late embryogenesis in animals plants and some other small organisms Each of 27 chapters contributed from the authorships of world wide 20 countries provides an introduction as well as an in depth review to classical as well as contemporary problems that challenge to understand how living organisms are born grow and reproduce at the levels from molecule and cell to individual **Biodiversity and Conservation of Woody Plants** M. R. Ahuja,S. Mohan Jain,2017-11-21 This book provides complete comprehensive and broad subject based reviews for students teachers researchers policymakers conservationists and NGOs interested in the biodiversity and conservation of woody plants Forests cover approximately 31 percent of the world s total landmass 93 percent is natural forest and only 7 percent consists of planted trees Forest decline is progressing at an alarming rate worldwide In addition to human activities logging deforestation and exploiting forest lands for agriculture and industrial use a number of other factors including pests and diseases drought soil acidity radiation and ozone are cumulatively contributing to global forest decline The present situation forces us to focus on forest conservation strategies for the present and future Gene conservation and maintaining genetic diversity in forest ecosystems are crucial to the preservation of forest genetic resources This calls for integrated action to implement both the in situ on site preservation of forest stands and ex situ distant from the original site strategies for the conservation of woody plants genetic resources Selected priority areas include 1 assessing patterns of genetic diversity and threats 2 understanding the biological processes regulating genetic diversity 3 assessing the impact of human activities and climate change on genetic diversity and 5 finding methods for prioritizing species and populations for the conservation of forest trees genetic resources All chapters were written by leading scientists in their respective fields which include woody plant diversity ecology and evolution assessment of genetic diversity in forest tree populations conservation planning under

climate change and in situ and ex situ strategies including biotechnological approaches for the conservation of woody plants genetic resources *Plant Mutation Breeding and Biotechnology* Q. Y. Shu,2012 This comprehensive book covers the underlying scientific principles state of the art technologies and methodologies of plant mutagenesis It covers historical development and commonly used terminologies chemical and physical mutagenesis mutation induction mutation breeding and mutations in functional genomics research Suitable both as a manual for professionals and a resource for students in plant breeding and research the book includes exemplary cases of practical applications and an appendix of recommended doses of gamma and fast neutron irradiation for almost 200 plant species It is *9th International Conference on Practical Applications of Computational Biology and Bioinformatics* Ross Overbeek,Miguel P. Rocha,Florentino Fdez-Riverola,Juan F. De Paz,2015-05-24 This proceedings presents recent practical applications of Computational Biology and Bioinformatics It contains the proceedings of the 9th International Conference on Practical Applications of Computational Biology Bioinformatics held at University of Salamanca Spain at June 3rd 5th 2015 The International Conference on Practical Applications of Computational Biology Bioinformatics PACBB is an annual international meeting dedicated to emerging and challenging applied research in Bioinformatics and Computational Biology Biological and biomedical research are increasingly driven by experimental techniques that challenge our ability to analyse process and extract meaningful knowledge from the underlying data The impressive capabilities of next generation sequencing technologies together with novel and ever evolving distinct types of omics data technologies have put an increasingly complex set of challenges for the growing fields of Bioinformatics and Computational Biology The analysis of the datasets produced and their integration call for new algorithms and approaches from fields such as Databases Statistics Data Mining Machine Learning Optimization Computer Science and Artificial Intelligence Clearly Biology is more and more a science of information requiring tools from the computational sciences Mutation Breeding for Sustainable Food Production and Climate Resilience Suprasanna Penna,S. Mohan Jain,2023-04-04 This book highlights the recent progress on the applications of mutation breeding technology in crop plants Plant breeders and agriculturists are faced with the new challenges of climate change human population growth and dwindling arable land and water resources which threaten to sustain food production worldwide Genetic variation is the basis which plant breeders require to produce new and improved cultivars The understanding of mutation induction and exploring its applications has paved the way for enhancing genetic variability for various plant and agronomic characters and led to advances in gene discovery for various traits Induced mutagenesis has played a significant role in crop improvement and currently the technology has resulted in the development and release of more than 3600 mutant varieties in most of the crop plants with great economic impact The field of mutation breeding has come long way to become an important approach for crop improvement This book covers various methodologies of mutation induction screening of mutants genome editing and genomics advances and mutant gene discovery The book further discusses success

stories in different countries and applications of mutation breeding in food crops horticultural plants and plantation crops This informative book is very useful to plant breeders students and researchers in the field of agriculture plant sciences food science and genetics **Biotechnology of Fruit and Nut Crops, 2nd Edition** Richard E. Litz,Fernando Pliego-Alfaro,Jose Ignacio Hormaza,2020-01-29 This book covers the biotechnology of all the major fruit and nut species Since the very successful first edition of this book in 2004 there has been rapid progress for many fruit and nut species in cell culture genomics and genetic transformation especially for citrus and papaya This book covers both these cutting edge technologies and regeneration pathways protoplast culture in vitro mutagenesis ploidy manipulation techniques that have been applied to a wider range of species Three crop species Diospyros kaki persimmon Punica granatum pomegranate and Eriobotrya japonica loquat are included for the first time The chapters are organized by plant family to make it easier to make comparisons and exploitation of work with related species Each chapter discusses the plant family and the related wild species for 38 crop species and has colour illustrations It is essential for scientists and post graduate students who are engaged in the improvement of fruit nut and plantation crops **Genetic Diversity in Horticultural Plants** Dilip Nandwani,2019-10-17 This book in the series Sustainable Development and Biodiversity contains peer reviewed chapters from leading academicians and researchers around the world in the field of horticulture plant taxonomy plant biotechnology genetics and related areas of biodiversity science centered on genetic diversity This book includes original research reviews national regional and global and case studies in genetic diversity in fruits and vegetables horticulture and ecology from sub tropical and tropical regions It is unique as it covers a wide array of topics covering global interests and will constitute valuable reference material for students researchers extension specialists farmers and certification agencies who are concerned with biodiversity ecology and sustainable development **Plant Tissue Culture Technology** Rajesh Kumar,Neha Salaria,Indu Kumari,Younis Ahmad Hajam,2025-09-23 As home to over 10 000 species of plants the Himalaya biodiversity hotspot is renowned throughout the world as being a treasure trove of medicinal herbs These Himalayan medicinal plants however are threatened by the rising demand for herbal medicines as well as by overexploitation This new volume discusses plant tissue culture or the preservation and conservation of Himalayan endangered plants that are important for medicinal purposes as well as for maintaining the rich biodiversity of the region *Biotechnological strategies for the conservation of medicinal and ornamental climbers* Anwar Shahzad,Shiwali Sharma,Saeed A. Siddiqui,2015-12-24 The book provides an overview on adoption of biotechnological approaches for the conservation micropropagation synseed production of various medicinal and ornamental climbers The work includes a brief chapter on evolution and diversification of climbers Other chapters give insights on protocols for in vitro propagation and synseed production of selected threatened medicinal and ornamental climbers Informative chapter on the production of bioactive compound and their enhancement through genetic transformation and elicitation have been incorporated to cover latest advancement in the field of plant

biotechnology This book also explores the use of molecular marker technique for the desired improvement magnification of medicinal and aesthetic value of climbing plants **Himalayan Phytochemicals** Sumira Jan,Nazia Abbas,2018-04-10 Himalayan Phytochemicals Sustainable Options for Sourcing and Developing Bioactive Compounds provides a detailed review of the important medicinal plants which have already been discovered in the Himalayan region outlining their discovery activity and underlying chemistry In addition it supports a global shift towards sustainable sourcing of natural products from delicate ecosystems Across the world environmental destruction and overharvesting of medicinal plants are reducing and destroying multiple important sources and potential leads before researchers have the chance to discover explore or synthesize them effectively By identifying this problem and discussing its impact on the Himalayan region Himalayan Phytochemicals Sustainable Options for Sourcing and Developing Bioactive Compounds frames the ongoing global struggle and highlights the key factors that must be considered and addressed when working with phytochemicals from endemic plant sources Reviews both well known and recently discovered plants of this region Highlights methods for phytochemical extraction and analysis Provides context to support a shift towards sustainable sourcing of natural products

Role of Mutation Breeding In Floriculture Industry S.K Datta,2023-10-31 This monograph provides a comprehensive review of many aspects of current interest and progress on mutation research on vegetatively propagated ornamentals It covers almost all aspects of induced mutagenesis on ornamental plants Chapters in this title provides information about mutation technology for the development of new ornamental varieties Taking all aspects together it is an excellent reference book of updated information on mutation breeding on vegetatively propagated ornamentals Floriculture has become a very important industry in many countries as a result of science based techniques and a steady supply of improved plant materials The induced mutation is now recognized as well as a standardized valuable tool for the development of new varieties The book provides an authoritative review account of all important aspects related to inducing mutagenesis in the field of ornamental crops The primary objective of the book is to give a coherent and concise account of earlier work with an emphasis on recent developments The knowledge generated so far has been reviewed in this book which can work as a knowledge base to prepare guidelines for future planning of successful application of mutation technology for the floriculture industry The information in the book is an excellent informative document for researchers teachers students and breeders for understanding the application of induced mutations and planning future strategies for the development of new ornamental varieties for the floriculture industry **Date Palm Biotechnology** Shri Mohan Jain,Jameel M. Al-Khayri,Dennis V. Johnson,2011-08-13 This important reference book is the first comprehensive resource worldwide that reflects research achievements in date palm biotechnology documenting research events during the last four decades current status and future outlook This book is essential for researchers policy makers and commercial entrepreneurs concerned with date palm The book is invaluable for date palm biotechnology students and specialists This monument is written by an international

team of experienced researchers from both academia and industry It consists of five sections covering all aspects of date palm biotechnology including A Micropropagation B Somaclonal Variation Mutation and Selection C Germplasm Biodiversity and Conservation D Genetics and Genetic Improvement and E Metabolites and Industrial Biotechnology The book brings together the principles and practices of contemporary date palm biotechnology Each chapter contains background knowledge related to the topic followed by a comprehensive literature review of research methodology and results including the authors own experience including illustrative tables and photographs Horticultural Crops Hugues Kossi Baimey,Noureddine Hamamouch,Yao Adjiguita Kolombia,2020-02-05 Horticultural crops are important for human nutrition To guarantee successful cultivation for quality and quantity yield proper identification of pests and diseases as well as abiotic factors undermining their production is essential This ten chapter textbook describes fungi bacteria insects and nematodes as important issues in horticulture It documents their epidemiology and management strategies such as genetics and botanical and biological control used for their management This comprehensive resource is essential for students and researchers of plant genetics pathology entomology and nematology **Paclitaxel** Mallappa Kumara Swamy,T. Pullaiah,Zhe-Sheng Chen,2021-10-08 Paclitaxel Sources Chemistry Anticancer Actions and Current Biotechnology provides a comprehensive survey of Paclitaxel and its derivatives chemistry biosynthesis and anticancer activities In addition biotechnological methods including cell cultures the use of bioreactors and metabolic engineering strategies to improve Paclitaxel production are also discussed The book discusses topics such as mechanisms of action against cancer novel forms of Paclitaxel for an effective cancer treatment strategies for enhancing its bioavailability and the application of nanocarriers for its delivery and chemotherapy of cancer This is a valuable resource for cancer researchers biotechnologists and members of biomedical field who are interested in the promising anticancer qualities of this antineoplastic drug and how to enhance them for better treatments Presents detailed information about Paclitaxel research from its discovery to clinical uses and biotechnological routes of commercial production Focuses on Paclitaxel development as an effective chemotherapeutic drug along with its application in different types of cancers Encompasses descriptive illustrations and workflows to help the reader fully understand the content and easily apply it to their research *Plant Biotechnology and Agriculture* Arie Altman,Paul Michael Hasegawa,2012 As the oldest and largest human intervention in nature the science of agriculture is one of the most intensely studied practices From manipulation of plant gene structure to the use of plants for bioenergy biotechnology interventions in plant and agricultural science have been rapidly developing over the past ten years with immense forward leaps on an annual basis This book begins by laying the foundations for plant biotechnology by outlining the biological aspects including gene structure and expression and the basic procedures in plant biotechnology of genomics metabolomics transcriptomics and proteomics It then focuses on a discussion of the impacts of biotechnology on plant breeding technologies and germplasm sustainability The role of biotechnology in the improvement of agricultural traits production of

industrial products and pharmaceuticals as well as biomaterials and biomass provide a historical perspective and a look to the future Sections addressing intellectual property rights and sociological and food safety issues round out the holistic discussion of this important topic Includes specific emphasis on the inter relationships between basic plant biotechnologies and applied agricultural applications and the way they contribute to each other Provides an updated review of the major plant biotechnology procedures and techniques their impact on novel agricultural development and crop plant improvement Takes a broad view of the topic with discussions of practices in many countries *Manual on MUTATION BREEDING THIRD EDITION* Food and Agriculture Organization of the United Nations,2018-10-09 This paper provides guidelines for new high throughput screening methods both phenotypic and genotypic to enable the detection of rare mutant traits and reviews techniques for increasing the efficiency of crop mutation breeding *Advanced Crop Improvement, Volume 1* Aamir Raina,Mohammad Rafiq Wani,Rafiul Amin Laskar,Nasya Tomlekova,Samiullah Khan,2023-08-01 As per the reports of FAO the human population will rise to 9 billion by the end of 2050 and 70% of more food must be produced over the next three decades to feed the additional population The breeding approaches for crop improvement programs are dependent on the availability and accessibility of genetic variation either spontaneous or induced by the mutagens Plant breeders agronomists and geneticists are under constant pressure to expand food production by employing innovative breeding strategies to enhance yield adaptability nutrition resistance to biotic and abiotic stresses In conventional breeding approaches introgression of genes in crop varieties is laborious and time consuming Nowadays new innovative plant breeding techniques such as molecular breeding and plant biotechnology supplement the traditional breeding approaches to achieve the desired goals of enhanced food production With the advent of recent molecular tools like genomics transgenics molecular marker assisted back crossing TILLING Eco TILLING gene editing CRISPR CAS non targeted protein abundant comparative proteomics genome wide association studies have made possible mapping of important QTLs insertion of transgenes reduction of linkage drags and manipulation of genome In general conventional and modern plant breeding approaches would be strategically ideal for developing new elite crop varieties to meet the feeding requirement of the increasing world population This book highlights the latest progress in the field of plant breeding and their applicability in crop improvement The basic concept of this 2 volume work is to assess the use of modern breeding strategies in supplementing conventional breeding toward the development of elite crop varieties for obtaining desired goals of food production

This book delves into Protocols For Micropropagation Of Woody Trees And Fruits. Protocols For Micropropagation Of Woody Trees And Fruits is a vital topic that must be grasped by everyone, ranging from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Protocols For Micropropagation Of Woody Trees And Fruits, encompassing both the fundamentals and more intricate discussions.

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This book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Protocols For Micropropagation Of Woody Trees And Fruits.

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Protocols For Micropropagation Of Woody Trees And Fruits Introduction

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