Somatic Embryogenesis In Woody Plants

Margit Laimer,Waltraud Rücker

Somatic Embryogenesis In Woody Plants:

Somatic Embryogenesis in Woody Plants S.M. Jain,Pramod P.K. Gupta,R.J. Newton,2013-04-17 The rapid progress made on somatic embryogenesis and its prospects for potential applications in improving woody plants prompted us to edit this book initially in three volumes and now to add two more volumes The editors were all convinced that such a treatise was needed and would be extremely useful to researchers and students This Volume 4 has been divided into three sections and contains 23 chapters Section A contains eleven chapters covering studies of embryo development and cell biology of white spruce proliferative somatic embryogenesis in woody species somatic embryo germination and desiccation tolerance in conifers performance of conifer somatic seedlings apoptosis during early somatic embryogenesis water relation parameters in conifer embryos image analysis of somatic embryos somatic embryogenesis in woody legumes cold storage and cryopreservation and commercialization of plant somatic embryogenesis Section B contains six chapters dealing with angiosperm woody plants such as somatic embryogenesis in myrtaceous plants Laurus nobilis Simarouba glauca Magnolia spp Juglans cinera and somatic embryogenesis and evaluation of variability in somatic seedlings of Quercus serrata by RAPD markers The chapters contained in Section C are focused on somatic embryogenesis in gymnosperms including Pinus patula Encephalartos Picea wilsonii Pinus banksiana hybrid firs and Taxus All the chapters have been peer reviewed and revised accordingly to improve their quality **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 **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

Somatic Embryogenesis in Woody Plants S.M. Jain,P.K. Gupta,R.J. Newton,2013-11-11 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 environ mental 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 may be 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 Gene rally 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 taedb Sandalwood Santalum album Citrus mango Mangifera indica etc offer a ray of hope of a inexpensive clonal propagation for large scale production of plants or emblings or somatic seedlings b protoplast work c cryopreservation d genetic transformation and e synthetic or artificial or manufactured seed production **Somatic Embryogenesis in Woody Plants** S. Mohan Jain,Pramod K. Gupta,R.J. Newton,1995-05-31 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 tremendous pressure on trees and tree products growing awareness of the potential of previously unexploited tree resources and environmental pollution have both accelerated development of new technologies for tree propagation breeding and improvement Biotechnology of trees may be the answer to solve the problems which cannot be solved by conventional breeding methods The combination of

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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 **Step Wise Protocols for Somatic Embryogenesis of Important Woody Plants** Shri Mohan Jain,Pramod Gupta,2018-05-30 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 **Somatic Embryogenesis in Woody Plants: without special title** S. Mohan Jain,Pramod K. Gupta,Ronald J. Newton,1994 *Somatic Embryogenesis in Woody Plants* S. Mohan Jain,Pramod P.K. Gupta,R.J. Newton,1995-04-30 These books provide an update to progress on somatic embryogenesis in woody plants including both angiosperm and gymnosperm trees In the past most of the information on this subject was scattered in proceedings volumes journals biotechnology books etc It has been difficult for the researchers and students to obtain comprehensive information on this rapidly growing subject from a single source These books enable readers to get a clear view of this subject on historical anatomical physiological biochemical and molecular aspects and applications including protoplasts cryopreservation manufactured seed artificial seed genetic transformation bioreactors mutations and future uses in forest plantations Each selected woody plant mentioned in the book is briefly introduced first covering botany and genetics importance and geographical distribution breeding problems and in vitro propagation and problems of each selected woody plant and then is followed by the description on the initiation and maintenance of embryogenic cultures embryo development and germination and field trials if any of these plants These books are meant for graduate students and researchers in forestry and horticulture as well as biotechnologists *In Vitro Embryogenesis in Plants* Trevor A. Thorpe,2012-12-06 In vitro Embryogenesis in Plants is the first book devoted exclusively to this topic As the ultimate demonstration of totipotency

in plants somatic and haploid embryogenesis is of vital importance to all those working on or interested in basic and applied aspects of plantlet information and regeneration The text includes comprehensive reviews written by experts on all facts of in vitro and in vivo embryogenesis Some chapters deal with the morphogenic structural and developmental physiological and biochemical and molecular biological aspects of the subject Chapters are also devoted to haploid embryogenesis asexual embryogenesis in nature zygotic embryogenesis and zygotic embryo culture Detailed tables summarizing successful somatic embryogenesis in all vascular plants are also included This book therefore brings together previously scattered information to provide an indispensable reference book for both active researchers graduate students and anyone interested in this aspect of tissue culture technology and plant development *Somatic Embryogenesis in Woody Plants* S. Mohan Jain,Pramod K. Gupta,Ronald J. Newton,1994 **Somatic Embryogenesis in Woody Plants: Angiosperms** S. Mohan Jain,Pramod K. Gupta,Ronald J. Newton,1994 **Molecular Breeding of Woody Plants** Noriyuki Morohoshi,Atsushi Komamine,2001-11-30 At present plants and agricultural sciences are playing a leading role in providing solutions to problems created by an ever growing world population Through plant biotechnology scientists are seeking ways to improve crop functions that rapidly promote food production Agricultural science is being used to experiment with producing plants tolerant to environmental stresses such as drought salinity and coldness Of the plant species woody plants are producing the most abundant biomass resources playing important roles in the suppression of carbon dioxide increase and supplying huge energy and resources to human beings in the biosphere These Proceedings discuss the recent results of fundamental and applied research for global resource and energy biomass production and environmental problems from the aspect of woody science Topics include Formation of the vascular bundle Biosynthesis of cellulose Lignin biosynthesis and transgenic woody plants Cell and tissue culture and transformation in gymnosperms Micropropagation of woody plants **Molecular Biology of Woody Plants** S.M. Jain,S.C. Minocha,2013-04-17 Woody plants constitute an artificial and heterogeneous group of plants that share some common phenotypic characteristics but otherwise have no strong evolutionary relationships nor do they share a common habitat They are a primary source of fiber and timber and also include many edible fruit species Their unique phenotypic behavior includes a perennial habit associated with extensive secondary growth Additional characteristics of woody plants include developmental juvenility and maturity with respect to growth habit flowering time and morphogenetic response in tissue cultures environmental control of bud dormancy and flowering cycles variable tolerance to abiotic stresses wounding and pathogens and long distance transport of water and nutrients Woody plants particularly tree species have been the focus of numerous physiological studies to understand their specialized functions however only recently have they become the target of molecular studies Recent advances in our understanding of signal transduction pathways for environmental responses in herbaceous plants including the identification and cloning of genes for proteins involved in signal transduction should provide useful leads to undertake parallel studies with woody plants Molecular

mapping techniques coupled with the availability of cloned genes from herbaceous plants should provide shortcuts to cloning relevant genes from woody plants The unique phenotypes of these plants can then be targeted for improvement through genetic engineering In this book we present a broad coverage of various aspects of plant molecular biology that are relevant to the improvement of woody plant **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 **Plant Tissue Culture** Margit Laimer,Waltraud Rücker,2012-12-06 In 2002 the 100th anniversary of the publication on Culturversuche mit isolierten Pflanzenzellen by Gottlieb Haberlandt was celebrated Haberlandt s vision of the totipotency of plant cells represents the actual beginning of tissue culture This book pays homage to a great Austrian scientist and the further development of his ideas The first part of the book contains a facsimile of the original paper which is a true artistic masterpiece and its first translation into English from 1969 The second and third parts describe Haberlandt s life and work and early historical aspects of the development of plant tissue culture The fourth part of the book contains an overview of important topics of plant tissue culture with the most promising areas of application to date and an outlook into the future Areas range from micropropagation production of pharmaceutically interesting compounds plant breeding genetic engineering of crop plants including trees and cryopreservation of valuable germplasm **Plant Biotechnology and Molecular Markers** S. Srivastava,A. Narula,2006-01-16 The genesis of the volume Plant Biotechnology and Molecular Markers has been the occasion of the retirement of Professor Sant Saran Bhojwani from the Department of Botany University of Delhi For Professor Bhojwani retirement only means relinquishing the chair as being a researcher and a teacher which has always been a way of life to him Professor Bhojwani has been an ardent practitioner of modern plant biology and areas like Plant Biotechnology and Molecular Breeding have been close to his heart The book contains original as well as review articles contributed by his admirers and associates who are experts in their area of research While planning this contributory book our endeavour has been to incorporate articles that cover the entire gamut of Plant Biotechnology and also applications of Molecular Markers Besides articles on in vitro fertilization and micropropagation there are articles on forest tree improvement through genetic engineering Considering the importance of conservation of our precious natural wealth one article deals with cryopreservation of plant material Chapter on molecular marker considers DNA indexing as markers of clonal fidelity of in vitro regenerated plants and prevention against bio piracy A couple of write ups also cover stage specific gene markers DNA polymorphism and genetic engineering including raising of stress tolerant plants to sustain productivity and help in reclamation of degraded land **Quality of Ornamental Crops: Effect of Genotype, Preharvest, and**

Improved Production Chains on Quality Attributes of Ornamental Crops Patricia Duarte De Oliveira Paiva,Julian C. Verdonk,Antonio Ferrante,Margherita Irene Beruto,Rob Eduard Schouten,Peter J. Batt,Renato Paiva,2022-10-26

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