



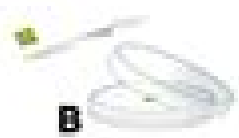
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Micropropagation Technology And Application

Vibha Dhawan

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Micropropagation Technology And Application:

Micropropagation P. Debergh, Richard H. Zimmerman, 2012-12-06 Micropropagation is a technology that has developed within the past 30 years Earlier overviews of plant tissue culture have reviewed micropropagation as just one of many tissue culture procedures in use Since the applications of this technology have multiplied so rapidly in recent years we decided that a specific overview of the technology was now appropriate Our book begins with a review of the general principles of tissue culture as applied to micropropagation This review is concise since the general topic has been covered in numerous other books and reviews The basic principles of laboratory design and construction are summarized in the second chapter Common problems encountered in micropropagation both during and after culture are examined in detail in four chapters As micropropagation developed from a laboratory curiosity to a commercial industry different considerations became important These are discussed in two chapters An attempt has been made to assess the current status of commercial production around the world This has been difficult because commercial production figures are often closely guarded and little has been done to collect statistics on this growing industry Applications to a broad range of crops are discussed in a series of chapters These try to report the state of the art in each area but since applications for some crops are much more advanced than for others the focus of these chapters varies depending upon the progress that has been made

Micropropagation P. C. Debergh, R. H. ZIMMERMAN (ed), 1993 Micropropagation laboratory design problems in tissue culture culture contamination vitrification morphological and physiological disorders of in vitro plants acclimatization of micropropagated plants to the greenhouse and field post culture behavior genetic and epigenetic effects and related problems economic considerations marketing of micropropagated plants commercial micropropagation in Western Europe and Israel Commercial production in Poland and other Eastern European countries Commercial micropropagation in North America commercial micropropagation in Asia commercial production in Australia and New Zealand commercial micropropagation in South and Central America micropropagation and plant tissue culture in developing countries of Africa ornamentals micropropagation of temperate zone fruit and nut crops micropropagation of tropical and subtropical fruits micropropagation of vegetable crop species applications of micropropagation for agronomic crops application of micropropagation to forestry estate crops automation

Modern Applications of Plant Biotechnology in Pharmaceutical Sciences Saurabh Bhatia, Kiran Sharma, Randhir Dahiya, Tanmoy Bera, 2015-07-22 Modern Applications of Plant Biotechnology in Pharmaceutical Sciences explores advanced techniques in plant biotechnology their applications to pharmaceutical sciences and how these methods can lead to more effective safe and affordable drugs The book covers modern approaches in a practical step by step manner and includes illustrations examples and case studies to enhance understanding Key topics include plant made pharmaceuticals classical and non classical techniques for secondary metabolite production in plant cell culture and their relevance to pharmaceutical science edible vaccines novel delivery systems for plant based products international industry regulatory guidelines and more

Readers will find the book to be a comprehensive and valuable resource for the study of modern plant biotechnology approaches and their pharmaceutical applications Builds upon the basic concepts of cell and plant tissue culture and recombinant DNA technology to better illustrate the modern and potential applications of plant biotechnology to the pharmaceutical sciences Provides detailed yet practical coverage of complex techniques such as micropropagation gene transfer and biosynthesis Examines critical issues of international importance and offers real life examples and potential solutions

Micropropagation Valdir M. Stefenon, 2019-03-26 Plant micropropagation is one of the most classical and widespread biotechnological tools used around the world Undoubtedly this technique brought quite important advances to our knowledge about morphological physiological and developmental patterns of plants to the progress of genetic breeding and to the establishment of the genetic engineering among others This technique is based on the in vitro farming of plant fragments in an axenic environment where all nutrients needed are kindly provided to the cultivated plant which is maintained under controlled temperature and light darkness periods Although it can be considered an established technique several advances have been integrated to the routines of micropropagation laboratories each year incorporated to the productive sector and to the academy In Micropropagation Methods and Effects the authors aimed to shortly present some of these advances as well as practical results of using this biotechnology towards the conservation of plant genetic resources In seven chapters methods employed for the micropropagation of different plant species from agricultural cultures to tree species of the Brazilian Atlantic Forest and advances in techniques for explants disinfection and for analysis of stomata complexes as well as the progresses related to the micropropagation of apple and the use of bioreactors are presented The seven chapters of this book will contribute towards incorporating new ideas to the daily effort of each reader reaching the basic requests of students professors researchers and even non specialized readers

Protocols for Micropropagation of Selected Economically-Important Horticultural Plants Maurizio Lambardi, Elif Aylin Ozudogru, Shri Mohan Jain, 2012-09-24 Micropropagation is a reliable technology applied commercially worldwide for large scale plant multiplication germplasm conservation pathogen elimination genetic manipulations and supply of selected plants In Protocols for Micropropagation of Selected Economically Important Horticultural Plants well recognised researchers in the field compile step wise protocols for rapid plant multiplication of economically important horticultural species The book contains 35 chapters divided into four major sections The first three sections Section A B and C contain 29 micropropagation protocols of selected fruit and nut species indoor and outdoor ornamental plants cut flowers and vegetables In addition to the detailed protocols of in vitro shoot initiation proliferation root induction and acclimatization chapters also include detailed information on medium preparation explant selection and preparation The six chapters of Section D cover specific reviews on pivotal topics such as in vitro rejuvenation synthetic seed technology thermotherapy and meristem culture in banana genetic transformation of pineapple flower color somaclonal variation in torenia and cryotherapy of horticultural crops Moreover as a

part of the highly successful Methods in Molecular Biology series chapters include introductions to the respective topic lists of necessary materials notes and illustrative photos Comprehensive and well written Protocols for Micropropagation of Selected Economically Important Horticultural Plants offers a useful resource for horticulturists researchers commercial companies plant propagators biotechnologists and students interested in micropropagation

Micropropagation of Ornamental Plants Taoufik Bettaieb, 2018 Micropropagation through an in vitro culture technique is a reliable biotechnological tool that holds a better scope and future for the propagation of numerous economically prominent ornamentals including those having value in the foliage and flowering plants industry As a lucrative alternative approach to conventional propagation micropropagation is a highly refined well developed and suitable method to produce a large scale of progeny plants which are genetically identical to the stock plant in a short time Micropropagation of ornamental plants is increasingly and continuously involved in the scientific progress of plant biotechnology and has a relevant horticultural impact Accordingly a new book on micropropagation of ornamental plants is always required Micropropagation of Ornamental Plants Research and Practice consists of nine chapters divided into four sections authored by experienced and prestigious authors from different parts of the globe The editor and authors are recognized as eminent scientists in their fields and they add the quality and credibility to the content Each chapter is illustrated and attempts to convey the practical as well as the theoretical aspects of micropropagation This anthology combines smartly refined micropropagation protocols of a considerable number of economically important ornamental species Furthermore the book will serve as a reference for horticulturists researchers lecturers and students in horticulture agriculture and biotechnology

Protocols for Micropropagation of Woody Trees and Fruits S. Mohan Jain, H. Häggman, 2010-10-19 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 Plant Tissue Culture: New Techniques and Application in Horticultural Species of Tropical Region Duong Tan Nhut, Hoang Thanh Tung, Edward Chee-Tak YEUNG, 2022-04-05 This book presents latest work in the field of plant biotechnology regarding high efficiency micropropagation for commercial exploitation at low labor and equipment costs The book consists of 18 chapters on establishing advanced culture systems techniques as well as latest modification protocols on a variety of crops It also discusses new methods such as nylon film culture system light emitting diode and wireless light emitting diode system stem elongation wounding manipulation and shoot tip removal in vitro hydroponic and microponic culture system thin cell layer culture system etc Plant cell tissue has been developed more than fifty years ago Since then applications of in vitro plant propagation expanded rapidly all around the world and played as an important role in agricultural and horticultural systems This book will be of interest to teachers researchers scientists capacity builders and policymakers Also the book serves as additional reading material for undergraduate and graduate students of agriculture forestry ecology soil science and environmental sciences Plants from Test Tubes Lydiane Kyte, 1983

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 **Plant Cell Culture** Michael R. Davey, Paul Anthony, 2010-05-20 The ability to culture cells is fundamental for mass propagation and as a baseline for the genetic manipulation of plant nuclei and organelles The introduction to Plant Cell Culture Essential Methods provides a general background to plant cell culture including basic principles technologies and laboratory practices that underpin the more detailed techniques described in subsequent chapters Whilst each chapter provides a background to the topic area and methodology a crucial aspect is the provision of detailed protocols with emphasis on trouble shooting describing common

problems and detailed advice for their avoidance Plant Cell Culture Essential Methods provides the reader with a concise overview of these techniques including micropropagation mutagenesis cryopreservation genetic and plastid transformation and somatic cell technologies This book will be an essential addition to any plant science laboratory s bookshelf Highlights the best and most up to date techniques for working on plant cell culture Explains clearly and precisely how to carry out selected techniques in addition to background information on the various approaches Chapters are written by leading international authorities in the field and cover both well known and new tried and tested methods for working in plant cell culture An essential laboratory manual for students and early career researchers Applications of Biotechnology in Forestry and Horticulture Vibha Dhawan,2012-02-22 Major and exciting changes have taken place recently in various aspects of bio technology and its applications to forestry Even more exciting is the prospect of major innovations that the entire field of biotechnology holds for plant growth in general The importance of these developments for the forestry sector is considerable particu larly since forestry science has not received the kinds of technical and R D inputs that say agriculture has received in the past few decades Y ct the problems of defor estation as well as stagnation in yields and productivity of existing forests throughout the world are becoming increasingly apparent with consequences and ecological ef fects that cause growing worldwide concern Policies for application of existing knowl edge in biotechnology to the field of forestry and priorities for future research and development are therefore of considerable value because it is only through the adop tion of the right priorities and enlightened policies that scientific developments will move along the right direction leading to improvements in forestry practices through out the world It was against this backdrop that the Tata Energy Research Institute TERI or ganised a major international workshop on the Applications of Biotechnology in For estry and Horticulture at New Delhi in January 1988 The present volume covers the proceedings of this international workshop Plant Propagation by Tissue Culture: In practice Edwin F. George,1993 **High-Tech and Micropropagation I** Y. P. S. Bajaj,2012-12-06 Presented here is another classic from this series and deals with general aspects of micropropagation of plants for commercial exploitation It includes chapters on setting up a commercial laboratory meristem culture somatic embryogenesis factors affecting micropropagation disposable vessels vitrification acclimatization induction of rooting artificial substrates cryopreservation and artificial seed Special emphasis is given on modern approaches and developing technologies such as automation and bioreactors robots in transplanting artificial intelligence information management and computerized greenhouses for en masse commercial production of plants *Transplant Production Systems* K. Kurata,T. Kozai,2012-12-06 As biotechnology produces an unprecedented number of new plantvarieties automated transplant production systems offer the means for their large scale introduction via a rapid efficient and economic method As labour costs increase so will automated systems assume even greater importance Reforestation and afforestation projects anti des ertification plantings and an increasing demand for urban greenery also create enormous demands for the mass production

of high quality transplants in addition to the commercial needs of the agriculture industry The application of engineering techniques to modern micropropagation techniques and plant production means that many tasks can be automated especially physical manipulation and close control of the microenvironment This volume provides overviews of the main concepts plug seedling production micropropagation robotization model development measurement and environmental control with an emphasis on practical considerations Examples are drawn from flower vegetable and forest tree species to show how disciplines such as robotics and image analysis have a part to play in plant production

Crop Improvement Khalid Rehman Hakeem, Parvaiz Ahmad, Munir Ozturk, 2015-07-09 The improvement of crop species has been a basic pursuit since cultivation began thousands of years ago To feed an ever increasing world population will require a great increase in food production Wheat corn rice potato and few others are expected to lead as the most important crops in the world Enormous efforts are made all over the world to document as well as use these resources Everybody knows that the introgression of genes in wheat provided the foundation for the Green Revolution Later also demonstrated the great impact that genetic resources have on production Several factors are contributing to high plant performance under different environmental conditions therefore an effective and complementary use of all available technological tools and resources is needed to meet the challenge

High-Tech and Micropropagation V Y.P.S. Bajaj, 1997-03-06 This volume fifth in the series High Tech and Micropropagation contains 24 chapters arranged in the following three sections I Vegetables and Fruits garlic Amaranthus Brassica oleracea pepper watermelon cassava banana Myrtus communis passionfruit Polymnia sonchifolia pepino and spinach II Grasses bamboos Caustis dioica Dendrocalamus Miscanthus x giganteus sugarcane III Trees Aegle marmelos Eucalyptus Fraxinus excelsior Juglans cinerea Pinus virginiana Prosopis and Ulmus This book is of use to research workers advanced students and teachers in the fields of horticulture forestry botany and plant biotechnology in general and also to individuals interested in industrial micropropagation

Plant Tissue Culture: Propagation, Conservation and Crop Improvement Mohammad Anis, Naseem Ahmad, 2018-07-05 This book presents basic concepts methodologies and applications of biotechnology for the conservation and propagation of aromatic medicinal and other economic plants It caters to the needs and challenges of researchers in plant biology biotechnology the medical sciences pharmaceutical biotechnology and pharmacology areas by providing an accessible and cost effective practical approach to micro propagation and conservation strategies for plant species It also includes illustrations describing a complete documentation of the results and research into particular plant species conducted by the authors over the past 5 years Plant Biotechnology has been a subject of academic interest for a considerable time In recent years it has also become a useful tool in agriculture and medicine as well as a popular area of biological research Current economic growth is globally projected in a highly positive manner but the challenges many countries face with regard to food feed malnutrition infectious diseases the newly identified life style diseases and energy shortages all of which are worsened by an ever deteriorating environment continue to pull the growth

digits back The common thread that connects all of the above challenges is biotechnology which could provide many answers Molecular biology and biotechnology have now become an integral part of tissue culture research The tremendous impact generated by genetic engineering and consequently of transgenics now allows us to manipulate plant genomes at will There has indeed been a rapid development in this area with major successes in both developed and developing countries The book introduces several new and exciting areas to researchers who are unfamiliar with plant biotechnology and also serves as a review of ongoing research and future directions for scholars The book highlights numerous methods for in vitro propagation and utilization of techniques in raising transgenics to help readers reproduce the experiments discussed

Horticulture — New Technologies and Applications J. Prakash,R.L.M Pierik,2012-12-06 In November 1990 Indo American Hybrid Seeds IAHS one of the largest and very innovative horticultural enterprises of its kind in India celebrated its silver jubilee year in the town of Bangalore India On the occasion of this silver jubilee of IAHS an International Seminar on New Frontiers in Horticulture was organized from 25 28th of November 1990 at the Ashok Radisson Hotel in Bangalore IAHS was almost fully responsible in terms of organization and financially for this International Seminar Assisted by an International Scientific Advisory Board the organizing committee all members of the company IAHS really did a great job I would like to thank in particular Mr Mammohan Attavar the company s founder and Mr Sri N K Bhat partner of the company respectively chairman and treasurer of the organizing committee for their organizational and financial support in organizing this conference Very special words of thanks go to my colleague editor Dr Jitendra Prakash Secretary Organizing committee and Director of Biotechnology IAHS who was really the spill in the whole organization of our very successful conference

Recent Advances in Plant Biotechnology and Its Applications Ashwani Kumar,Sudhir K. Sopory,2008 This book is divided into five sections The first section deals with the methodology and bioresource generation techniques related to genetic engineering and gene transfer to the nuclear genome and chloroplast genome The new techniques of genome profiling and gene silencing are also presented The second section of the book covers the classical aspect of plant biotechnology viz tissue culture and micropropagation Use of genetic engineering via Agrobacterium and direct transfer of DNA through particle bombardment to develop transformed plants in Artemisia castor and orchids and production of recombinant proteins in plant cells have been dealt with in the third section The fourth section addresses the abiotic and biotic stress tolerance in plants The basic biology of some of the stress responses and designing plants for stress tolerance is discussed in this section The fifth section examines medicinal plants and alkaloid production

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