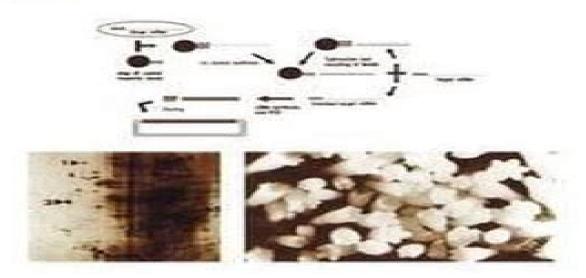
FORESTRY SCIENCES

Somatic Cell Genetics and Molecular Genetics of Trees

M. Raj Ahuja Wout Boerjan David B. Neale editors



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Somatic Cell Genetics And Molecular Genetics Of Trees

M.R. Ahuja

Somatic Cell Genetics And Molecular Genetics Of Trees:

Somatic Cell Genetics and Molecular Genetics of Trees M.R. Ahuja, Wout Boerjan, David B. Neale, 2012-12-06 This proceedings is based on a joint meeting of the two IUFRO International Union of Forestry Research Organizations Working Parties Somatic Cell Genetics S2 04 07 and Molecular Genetics S2 04 06 held in Gent Belgium 26 30 September 1995 Although a joint meeting of the two Working Parties had been discussed in the past this was the first such meeting that became a successful reality In fact this meeting provided an excellent forum for discussions and interactions in forest bioteclUlology that encouraged the participants to vote for a next joint meeting In the past decade rapid progress has been made in the somatic cell genetics and molecular genetics of forest trees In order to cover recent developments in the broad area of biotechnology the scientific program of the meeting was divided into several sessions These included somatic embryogenesis regeneration transformation gene expression molecular markers genome mapping and biotic and abiotic stresses The regeneration of plants produced by organogenesis or somatic embryogenesis is necessary not only for mass cloning of forest trees but also for its application in genetic transformation and molecular biology Although micropropagation has been achieved from juvenile tissues in a number of forest tree species in vitro regeneration from mature trees remains a challenging problem in most hardwoods and conifers The mechanisms involved in the transition from juvenile to mature phase in woody plants are poorly understood This transition can now be investigated at the molecular level Genetics of Woody Plants M.R. Ahuja, 2012-12-06 Most forest tree species were considered recalcitrant a decade ago but now with the improved in vitro techniques some progress has been made towards culture of tree species Micro propagation has been achieved from the juvenile tissues of a number of forest tree species On the other hand tissues from most mature trees are still very difficult to grow and differen tiate in vitro Nevertheless there has been slow but steady progress in the application of tissue culture technology for culture of tissues organs cells and protoplasts of tree species As compared to most agricultural crops and herbaceous plant species trees are a different lot They have long gene ration cycles They are highly heterozygous and have a large reservoir of genetic variability Because of this genetic variability their response in vitro is also variable On a single medium the response of tissues from different trees genotypes of a single species may be guite different some responding by induction of growth and differentiation while others showing minimal or no growth at all That makes the somatic cell genetics of woody plants somewhat difficult but at the same time interesting Tree Biotechnology Kishan Gopal Ramawat, Jean-Michel Mérillon, M. R. Ahuja, 2014-04-01 Forest trees cover 30% of the earth's land surface providing renewable fuel wood timber shelter fruits leaves bark roots and are source of medicinal products in addition to benefits such as carbon sequestration water shed protection and habitat for 1 3 of terrestrial species However the genetic analysis and breeding of trees has lagged behind that of crop plants Therefore systematic conservation sustainable improvement and pragmatic utilization of trees are global priorities This book provides comprehensive and up to date

information about tree characterization biological understanding and improvement through biotechnological and molecular Somaclonal Variation and Induced Mutations in Crop Improvement S.M. Jain, D.S. Brar, B.S. Ahloowalia, 2013-03-14 tools Genetic variability is an important parameter for plant breeders in any con ventional crop improvement programme Very often the desired variation is un available in the right combination or simply does not exist at all However plant breeders have successfully recombined the desired genes from cultivated crop gerrnplasm and related wild species by sexual hybridization and have been able to develop new cultivars with desirable agronomie traits such as high yield disease pest and drought resistance So far conventional breeding methods have managed to feed the world's ever growing population Continued population growth no further scope of expanding arable land soil degradation environ mental pollution and global warrning are causes of concern to plant biologists and planners Plant breeders are under continuous pressure to improve and develop new cultivars for sustainable food production However it takes several years to develop a new cultivar Therefore they have to look for new technologies which could be combined with conventional methods to create more genetic variability and reduce the time in developing new cultivars with early maturity and improved yield The first report on induced mutation of a gene by HJ Muller in 1927 was a major milestone in enhancing variation and also indicated the potential applications of mutagenesis in plant improvement Radiation sources such as X rays gamma rays and fast neutrons and chemical mutagens e g ethyl methane sulphonate have been widely used to induce mutations *Tree Transgenesis* Matthias Fladung, Dietrich Ewald, 2006-08-26 A continuous development in plant biotechnology including gene technology has been observable during the past 20 years Different methods elaborated with model plants were also applied to forest trees on a larger scale Whereas in the beginning the meaning of the term plant biotechnology embraced a wide variety of meanings like e g regeneration of plantlets via tissue culture embryo rescue somatic embryogenesis and gene transfer the focus of this term has changed more and more Nowadays it is the transfer of genes which comes into mind when plant biotechnology is discussed including of course the evaluation of all challenges and risks related to gene transfer methods Compared with annual plants especially in the field of agriculture the work and the progress with transgenic trees is still in its infancy Nevertheless but often unnoticed by the scientific community there are a few countries which already allow the commercial use of a restricted number of transgenic tree clones after different critical steps of approval This and the ongoing improvement in transgenic research in trees led to the idea of preparing a summary of the present state of the art from different points of view With the help of a number of authors directly or indirectly involved in tree transgenesis this book was **Dendrome**, 1994 News and information about genome research in forest trees for forest biologists and forest produced Micropropagation, Genetic Engineering, and Molecular Biology of Populus Ned B. Klopfenstein, 1997 managers Thirty four Populus biotechnology chapters written by 85 authors are comprised in 5 sections 1 in vitro culture micropropagation somatic embryogenesis protoplasts somaclonal variation and germplasm preservation 2 transformation

and foreign gene expression 3 molecular biology molecular genetic characterization 4 biotic and abiotic resistance disease insect and pollution and 5 biotechnological applications wood properties flowering phytoremediation breeding commercialization economics and bioethics 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 Transgenic Trees Y.P.S. Bajaj, 2012-12-06 Annotation This volume on Transgenic Trees comprising 22 chapters deals with the genetic transformation of fruit and forest trees It is of special interest to advanced students teachers and research workers in the field of forestry horticulture molecular biology plant tissue culture botany and plant biotechnology in general BOOK JACKET Title Summary General Technical Report RM., 1997 field provided by Blackwell North America Inc All Rights Reserved

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