TRANSGENIC TREES

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A book with state of the art chapters on all aspects of the genetic engineering of trees, written by experts in the field, was lacking for several years. Therefore, the expectations of *Transgenic Trees*, the first comprehensive treatise of the subject, are high.

This volume from the series *Biotechnology in Agriculture and Forestry* is a compilation of 22 review and research papers covering the scientific area of genetic transformations of forest, fruit, medicinal and ornamental trees and shrubs. Transgenic forest trees are represented by temperate as well as tropical species such as *Picea mariana*, *Pinus palustris*, *Pinus radiata*, *Robinia pseudoacacia*, *Larix* spp., *Populus* spp., *Eucalyptus* spp., and *Casuarina glauca*. Fruit tree species are reviewed in chapters on transgenic *Cerasus vulgaris*, *Prunus* spp., *Citrus* spp., *Malus* × *domestica*, *Diospyros kaki*, *Poncirus trifoliata*, and *Coffea* species. Transgenic medicinal trees and shrubs include *Taxus* spp., *Fagara zanthoxyloides*, *Solanum mauritianum*, and *Lawsonia inermis*. And finally, *Rhododendron yakushimanum* 'Percy Wiseman', *Allocasuarina verticillata*, and *Verticordia grandis* are subjects of chapters on transgenic ornamentals.

Most of transformation studies presented in the book deal with the transfer of selection marker genes for the quick assessment of transgene stability and its expresion efficiency in transgenic tissues. Examples are given for the transfer of widely applied reporter and selection marker genes such as *Escherichia coli uid*A gene encoding β-glucuronidase, the jellyfish (*Aequorea victoria*) green fluorescent protein (GFP) gene, neomycin phosphotransferase II (*npt* II) gene which confers resistance to antibiotics like kanamycin or geneticin, hygromycin phosphotransferase (*hpt*) gene which confers resistance to hygromycin, and acetolactate synthase (*als*) gene for the resistance to the herbicide Glean. Three chapters discuss genetically modified fruit and crop species transgenic either for *Bacillus thuringiensis cry*IA(c) endotoxin gene conferring resistance to insects (cases of transgenic *Diospyros kaki* and *Coffea* species) or for the antifreeze protein (AFP) gene from arctic fish *Pseudopleuronectes americanus* with the possible role in increasing frost resistance of *Cerasus vulgaris*. Hairy root culture formation following *Agrobacterium rhizogenes* genetic transformation is the theme of chapters dealing with medicinal trees and shrubs (*Fagara zanthoxyloides*, *Lawsonia inermis*, and *Solanum mauritianum*) as hairy roots may contribute to the enhancement of the production of useful alkaloids and naphthoquinones for the pharmaceutical industry. In addition, transfer of *A. rhizogenes rol*ABC genes is another topic aimed at the production of transgenic dwarf rootstocks in *Poncirus trifoliata*, and rootstocks transgenic for RiT-DNA in *Prunus avium* × *P. pseudocerasus*. A very promising study on transgenic yew discusses *Agrobacterium tumefaciens* transformations of *Taxus baccata* and *T. brevifolia* stem segments for the production of cytotoxic taxol in transgenic gall tissues.

Does this book meet expectations raised by the author? Some chapters are clearly of a different level than others with respect to length and in-depth coverage of recent results. This is to be expected for a multi-author volume on such wide and rapidly growing field of research. Is there any area underrepresented? I think so because the book does not bridge a standing gap between laboratory protocols of gene transfer and the field performance of transgenic trees what is the main interest to end users. In this volume, 22 chapters deal with the lab work but only a few cover preliminary results from the field evaluation. Future volumes ought to include more information on the field trials and release of transgenic trees on a commercial scale. Highlight of the book is a chapter on transgenic poplar species. It presents the most advanced progress in the area, goes in depth, and incorporates not only the stability of marker gene expression in transformants but also field evaluation of genes of economic interest, namely herbicide resistance, insect resistance and altered lignin metabolism. Similar treatise on lab procedures as well as greenhouse/field aspects of transformations may be found in transgenic *Eucalyptus*, transgenic *Citrus*, and transgenic *Prunus* chapters only. The fact that environmental impact of transgenic trees is not addressed in any presented chapter is another limitation of the book. Genetically modified organisms, including trees and crops, have raised many environmental concerns and debates regarding their safety for native tree populations as well as human consumption.This issue may be also a topic for the next volume on transgenic trees.

Accepting these minor limitations, this book provides useful information in areas less familiar to foresters. If you want to learn more about methods how to, and advantages why to produce transgenic trees, this volume will definitely educate you. On the whole *Transgenic Trees* is an essential acquisition to the personal library of teachers and researchers in plant biotechnolgy, plant molecular biology, tree breeding, and recommended reading to foresters with a background in molecular genetics. The exciting field of transgenic trees is hotter than ever.

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