CHAPTER 18

GENETICS

Doctoral Theses

094. CHAUDHARY (Bhupendra)
Development of Transgenic Lines in Cotton (Gossypium hirsutum L cv. Coker 310FR) for Insect Resistance and Marker Gene Removal.
Supervisor : Prof. Deepak Pental
Th 14345

Abstract

Develops transgenics in cotton which would be resistant to two major lepidopteran pests of cotton Helicoverpa armigera and Spodoptera litura by the use of cry1Ac and cry1C gene respectively. Work on developing Agrobacterium mediated transformation protocol was initiated. A total of 29 single copy transgenic lines were developed. However, high expression plants were not found. A multicopy line ΩG14 showed expression level greater than that recorded in Mech 184. It is possible that high expression per se is not due to the promoters being routinely used for cotton transformation but due to position effects. A search for high expression promoter, therefore, will be major prerequisite for developing transgenics in cotton in a more efficient manner. As high expression plans are rare, the strategy of developing independent transgenics and subsequent stacking of genes may not be an ideal choice. Instead the candidate genes should be cloned in a single T-DNA vector. For this purpose, constructs have been developed which contain both cry1Ac genes for future development of transgenics.

Contents

095. PANJABI (Priya)
Development and Testing of a Four-Element Based Transposon Mutagenesis System for Plants.
Supervisor : Prof. Deepak Pental
Th 14214

Abstract

Designs, a new construct Ds(dSpm), in which the Ds borders will be used for the unlinked spread of the construct followed by the mobilization of the internal dSpm borders to generate localized transpositions. The study has generated conclusive evidence to show the feasibility of the Ds(dSpm) based four-element transposon tagging system in Arabidopsis thaliana. Both the Ds and dSpm elements in the Ds(dSpm) construct have been shown to be functionally active. Since no germinal excision events in the F3 generation and subsequently mapping the dSpm integrations in these selected lines. The four-element based tranposon tagging system has several advantages over the two-element systems widely used for gene tagging in plants. The system proposes that a minimum of two transgenic lines (aprt from the lines harboring the transposase expressing cassettee) harboring the Ds(dSpm) construct in any plant system are sufficient to select for genome wide impendent insertion of the Ds(dSpm) lines. This would be particularly beneficial for allele specific tagging in crop plants. Lines harboring the transposed Ds cassette linked to the allele of interest can be further crossed with Spm transposase line to initiate localized insertions of the dSpm to generate insertions within the gene. With the successful testing of this system in A. thaliana, the system can now be used in crop plants. This would be greatly facilitated by incorporation of selection markers which would allow field level selections. Several selection markers are now available which can be used for this purpose.

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096. SINGH (Deepali)
Genetic Engineering of Eggplant for Resistance to Fungal Pathogens.
Supervisor : Dr. M V Rajam
Th 14215

Abstract

The study was initiated with the following objectives : Development of eggplant transgenies using binary plasmids harbouring glucanase, chitinase and thaumatin genes, singly and in combinations; Molecular and genetic analysis of the transgenic plants; Testing of transgenic plants for fungal resistance under both in vitro and in vivo growth conditions. The constitutive expression of the PR-proteins leads to the enhanced resistance against the fungal pathogens. The transgenic lines generated by using PR proteins from three different classes exhibit varying degree of resistance against the fungal pathogens. All the three kinds of transgenies can be valuable material for further analysis at the field levels for the enhanced resistance to fungal pathogens, and for use in eggplant breeding for its improvement.

Contents

097. VERMA (Ranjana)
Molecular Genetics of Schizophrenia and Bipolar Disorder.
Supervisors : Dr. Pradeep Kumar Burma and Prof. Samir K Brahmachari.
Th 14213

Abstract

Identifies potential candidates genes on 22q13 that could confer susceptibility to schizophrenia and bipolar disorder using positional genetics approach. Tests the sequence variations of the selected candidate genes for association with schizophrenia and bipolar disorder using case-control and family-based studies. Analyzes the functional consquences of the exonic sequence variations of the selected candidate genes using web-based programs to have some clue regarding the biological functions affected leading to the disease phenotype.

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