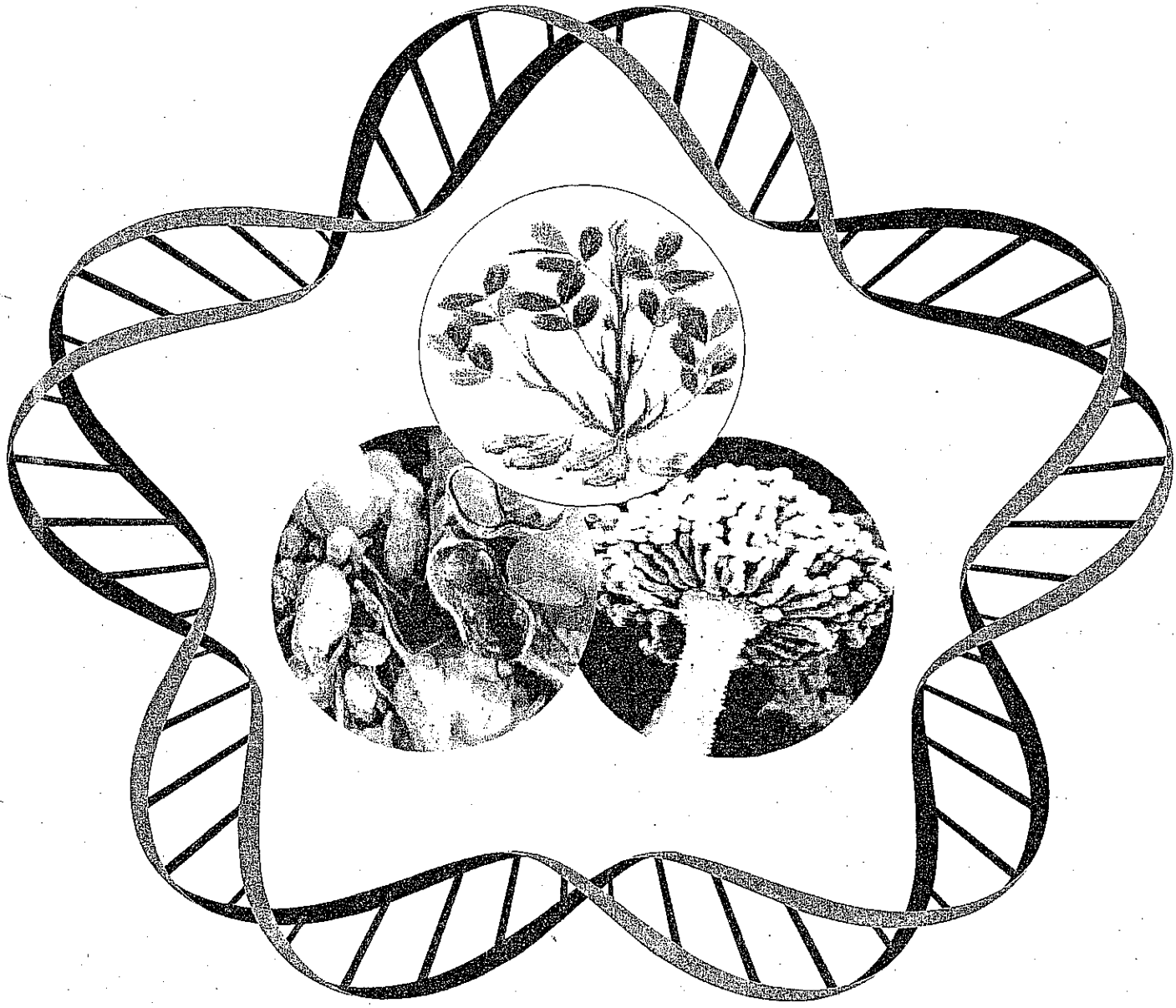
GROUNDNUT AFLATOXIN

Management & Genomics



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Program and Book of Abstract

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Development and Evaluation of Transgenic Groundnut Expressing the Rice *Chitinase* Gene for Resistance to *Aspergillus flavus*

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Aspergillus flavus and *A. parasiticus*, with the ability to produce aflatoxins in groundnut, present a great human and animal health hazard globally. The frequency of pre-harvest infection of groundnut with *A. flavus* and consequent aflatoxin contamination is very high in the semi-arid tropics of Asia and Africa. Extensive efforts for developing resistance to *A. flavus/A. parasiticus* infection and aflatoxin contamination in cultivated groundnut have resulted in the identification of partially resistant genotypes that still have aflatoxin content higher than the acceptable levels. The development of groundnut germplasm with durable resistance to *A. flavus/A. parasiticus* invasion would provide the most effective and convenient option to manage aflatoxin problem in groundnut. This project was undertaken to introduce a rice chitinase (*RChi*) gene with anti-fungal properties into groundnut for inducing resistance to *A. flavus*. Chitinases are members of the pathogenesis-related protein family (PR-proteins) that have been shown to play a role in plant defense by degrading the chitin of fungal cell walls. By using transgenic approaches, the *RChi* gene under the control of the CaMV 35S promoter was introduced into a popular groundnut variety JL 24. An efficient protocol for *Agrobacterium tumefaciens*-mediated genetic transformation of groundnut by using the cotyledon explants from mature seeds provided a large numbers of independently transformed transgenic events. Thirty transgenic events were selected that were positive for the *RChi* gene integration. These events were assessed for resistance against *A. flavus* seed colonization by *in vitro* seed inoculation with *A. flavus* spores. Seeds of events that showed 0-10% incidence were further advanced. Nine transgenic events that consistently showed <10% seed infection during T3-T5 seed generations were identified for further evaluation. These selected promising events are being evaluated under contained field conditions in *A. flavus* sick plots at ICRISAT, Patancheru. The best events will be used for further field evaluations and as resistance sources to develop groundnut varieties with enhanced resistance to pre-harvest *A. flavus* infection and consequent aflatoxin contamination.