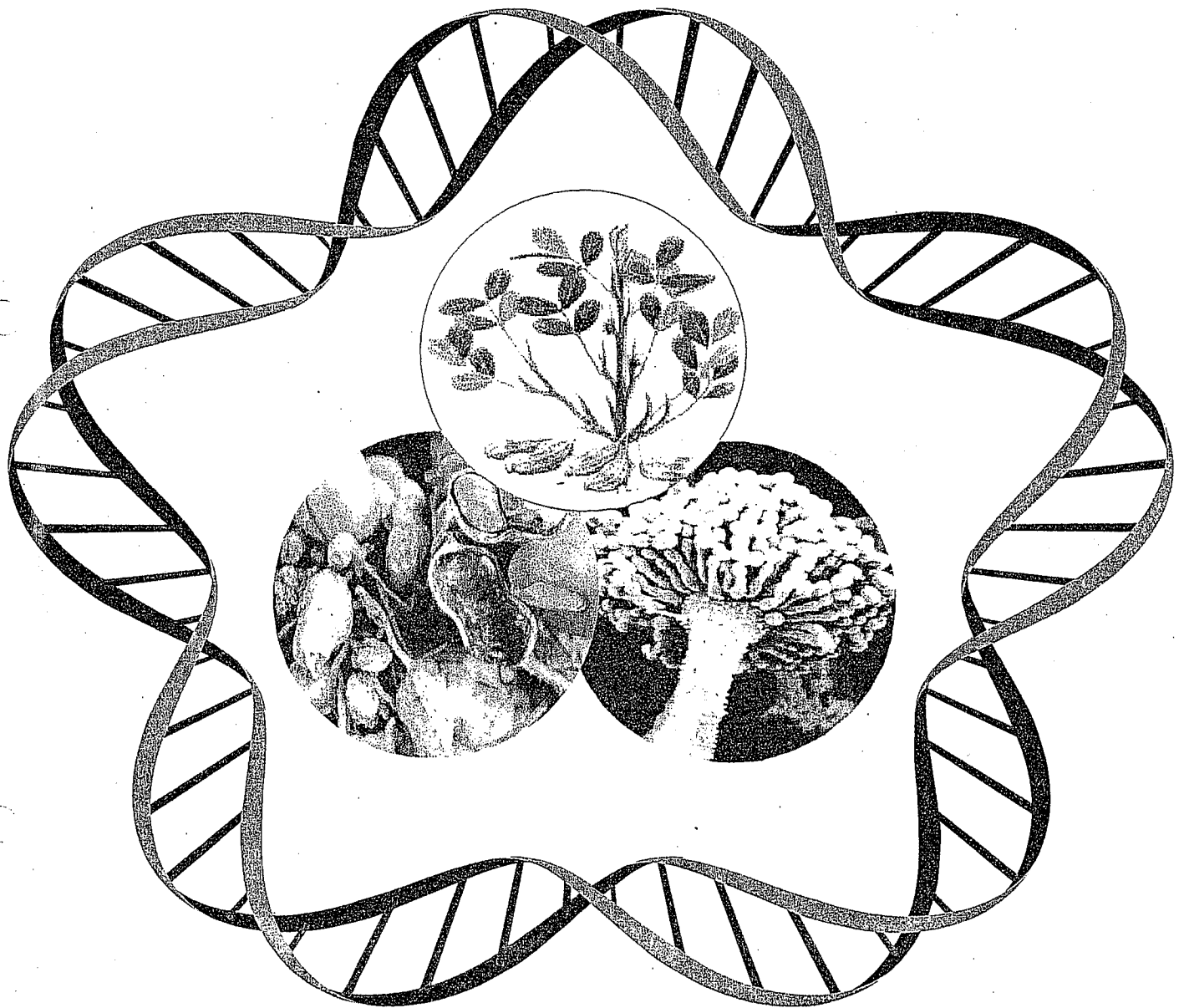


# GROUNDNUT AFLATOXIN

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## Genetic engineering of groundnut for crop improvement

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Peanut or groundnut (*Arachis hypogaea* L.) is an economically important oil and protein rich crop whose seeds contain about 48% oil and 25% protein that has a significant impact in the semi-arid tropics (SAT). Several biotic and abiotic constraints affect the productivity of this crop that result in great economical losses annually. Unfortunately, durable resistance to some of these constraints including viruses, fungal pathogens and drought are not readily available in the existing groundnut germplasm. Biotechnological methods employing genetic transformation approaches provide an attractive alternative to the development of enhanced germplasm for use in crop improvement. At ICRISAT, in our efforts to produce genetically engineered groundnut, an efficient protocol for *Agrobacterium tumefaciens*-mediated genetic transformation have been developed using the cotyledon explants from mature seeds. This protocol is capable of producing a large number of transgenic events within a period of about 9 months with transformation frequencies as high as 60%. By using this method, ICRISAT has developed a pipeline of genetically engineered groundnuts for several traits that are in different stages of product development. These include pathogen-derived resistance to viruses like the *Indian peanut clump virus* and *Tobacco streak virus*, anti-fungal genes for resistance to foliar fungal pathogens like *Phaeoisariopsis personata* and against *Aspergillus flavus* for preventing aflatoxin contamination, tolerance to abiotic stresses and nutritional enhancement by the over-production of  $\beta$ -carotenes. In addition, 13S LOX (*lipoxygenase*) gene, which has been shown to downregulate aflatoxin production, is being introduced into groundnut as a new strategy for preventing aflatoxin contamination. Details of the transformation activities and current status of the groundnut transgenics at ICRISAT will be presented.