

## **Genome analysis of irradiated cowpea lines selected for drought tolerance.**

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Cowpea (*Vigna unguiculata* L. Walp.) is an important food legume and an essential component of cropping systems in the drier regions of the tropics. Cowpea seeds (IT93K129-4) were exposed to irradiation dosages of 180 Gy. These seeds were then grown up and the plants screened and selected for drought tolerance through several generations. Lines that are more tolerant to drought than the original cowpea line have been identified. The mutagenic effects of radiation have been frequently used in plant breeding. A survey of mutations induced in irradiated Arabidopsis seeds suggests that ionizing radiation is a fairly reliable source of chromosomal rearrangements (1). In this study we used representational difference analysis (RDA) to isolate and study differences in the genomic make-up of irradiated cowpea plants showing improved drought tolerance as compared to the non-irradiated parental line. Difference products that represent variable DNA regions possibly resulting from DNA methylation changes, genomic rearrangements and point mutations after exposure to gamma irradiation have been isolated for further analysis. This study has two main goals. The first is to gain an understanding of the response of the cowpea genome to gamma radiation, and its DNA repair mechanisms, by tracking the various mutations through several generations. The second is the correlation of a specific mutation with the increased drought tolerance.

<sup>1</sup> Shirley, B., Hanley, S. and Goodman, H. (1992) Effects of ionizing radiation on a plant genome: analysis of two Arabidopsis transparent testa mutations. *The Plant Cell* 4(3), 333-347.