Development of transgenic plants for Leaffolder (*Cnaphalocrosis medinalis*) resistance in local rice varieties

J.M.A. Gunasekera[1], G. A. U. Jayasekera[1] , N. D. Fernandopulle[2], K. L. N. Perera[2], and A. D. De Silva[2]
[1]Department of Plant Sciences, University of Colombo, Colombo 03,
[2]Genetech Molecular Diagnostics and School of Gene Technology, Colombo 08.

Recent developments in plant cell biology and molecular biology have provided a powerful and novel means to supplement as well as complement the traditional breeding methods of crop improvement. The transgenic approach of plant genetic engineering provides access to an unlimited gene pool for the transfer of desirable genes between any two species of interest, irrespective of their evolutionary or taxonomic relationship.

In order to develop transgenic insect resistant rice plants, techniques to develop an efficient methodology to transform explants cells of rice and to regenerate intact rice plants from local rice varieties were initially attempted.

Three Sri Lankan rice varieties (Bg 350, Bg 94-1 and Bg 352) were selected. Scutellum derived calli induced on NB callus induction medium was chosen as the source of explants cells for transformation and regeneration of rice plants. Calli were transformed with *Agrobacterium tumefaciens* strain LBA 4404 harboring plasmid construct pCAMBIA 1301 containing GUS (β Glucuronidase) gene as the reporter gene and hygromycin resistance gene as the selectable marker gene placed under the CaMV 35 S promoter and NOS terminator. Following co cultivation for 2 days calli were cultured in callus induction medium (without hygromycin) for 2 weeks followed by with hygromycin (30 mg/L) for another 2 – 4 weeks. Afterwards, calli were transferred to shoot regeneration medium and rooting medium. Recovered intact plants were acclimatized in green house under contained environment conditions.

Transgene integration to the rice genome was confirmed through PCR analysis. Overall efficiency of obtaining transgenic rice from local rice varieties was determined to be nearly 20%.

Developed and optimized methodology led to the introduction of Cry 1C and 2A genes encoding insecticidal proteins from *Bacillus thuringiensis* to Bg 94-1. Insect bioassays performed indicated insecticidal activity against Rice Leaffolder. This result taken together with the above stated results illustrate the potential of this technology for breeding effective insect resistance in Sri Lankan rice varieties..