MUTAGENSIES AND BIOTECHNOLOGICAL STUDIES FOR ABIOTIC STRESS TOLERANCE IN RICE

By

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B. Sc. Agric. Sc. (Genetics), Zagazig University, 2004

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ABSTRACT

Mohamed Ali Mohamed Ali. Mutagensis and biotechnological studies for abiotic stress tolerance in rice. Unpublished M.Sc. Thesis, Department of Genetics, Faculty of Agriculture, Ain Shams University, 2016.

Water stress is one of the major threats for sustainable rice productivity. Combining drought resistance with yield potential is the most promising challenge for the rice breeders. The present study was conducted using three local rice cultivars (*Oryza sativa* L.); Sakha 101, Sakha103 and Giza 178, in addition to IET 1444 indica rice cultivar to explore their response against three water stress intervals. Grains of the cultivars were treated with different doses of gamma rays (200, 250 and 300 Gy) to create genetic variation to obtain drought tolerant and earlier genotypes *via* selection in the field and *in vitro* in M_2 and M_3 generations. Significant differences were observed between genotypes and their parents in all generations for most studied traits under both well watered and stress conditions. The most tolerant genotypes were identified due to their performances in the field. Callus initiated from mature embryos of all tested genotypes, then maintained on MS medium containing different concentrations (5, 10 and 15%) of Polyethylene glycol (PEG). Callus growth traits and number of regenerated plants decreased with increasing PEG concentration. Forty six SSRs primers were used to assess the 10 elite genotypes and their four original parents. The total number of amplified bands and polymorphic bands were (189 bands), representing 100% polymorphism. Thirty nine unique markers identified the drought tolerant genotypes and may be responsible for tolerance to drought.

Key words: Rice, Gamma radiation, Mutations, Drought tolerance, Early maturing, Mature embryo, Callus induction, Plant regeneration, PEG, SSRs.

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