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DEVELOPMENT OF DROUGHT TOLERANT MUTANT LINES FROM RICE VARIETY MANAWTHUKHA USING MUTATION BREEDING TECHNIQUE

Water deficit reduces plant growth and development, leading to lower yield. This study was focused on developing drought tolerance rice mutant lines with the same grain quality as the original rice variety and on determining the effects of water stress on promising mutant lines of rice var. Manawthukha. Dry seeds of rice, Manawthukha were irradiated with the dose of 300 Gy of gamma rays from ^{60}Co source. The treatment of water exclusion was applied to the plants from 90 days after sowing (DAS) and throughout reproductive stage until harvesting time. A selection process was made in the M2 generation based on agronomic traits. The selected promising M2 lines were evaluated against non-irradiated control plants in M3 generation. The desiccation of apical spikelets in stressed panicles was found during the summer cultivation in M4 generation. Hence, the control plants were not fertile under water deficit condition while other mutant plants were fertile at that time. The two best mutant lines namely MK-D-2 and MK-D-3 were selected in M6 generation and characterized by using physiological screening techniques such as relative water content (RWC), soil moisture content and yield. In comparison with the well-watered condition, the mutant lines cultivated in drought stress condition produced less grain. The relative water content of mutant lines was between 91% and 93% while those of control plants were $\leq 83\%$. In M5 generation, rice grain qualities of drought tolerant potential lines were determined in the laboratory. Finding shows that there were no large differences in amylase content of rice samples from potential lines and control. Among the potential mutant lines, MK-D-3 showed higher husking yield and total mean milling recovery than the control and other mutant lines.

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