

PRELIMINARY INVESTIGATION OF MUTATION TYPES EXISTING IN TWO DWARF RICE VARIETIES IN SRI LANKA

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Dwarfism in rice is a desirable trait often associated with improved yield and better lodging resistance. As a vital phytohormone, gibberellic acid (GA) influences plant growth and development. Gene mutations disrupting gibberellic acid biosynthesis or signaling pathways are known to lead reduced plant stature. This study examines whether the dwarfism in two Sri Lankan dwarf rice (*Oryza sativa*) varieties is linked to mutations in genes involved in GA biosynthesis and signaling pathways. To evaluate the GA responsiveness, three-week-old seedlings from two dwarf and normal-height reference rice (*Oryza sativa*, Tikiri Kekulu) varieties were subjected to foliar application of 50 μ M GA once daily for seven days, using three independent pots per variety and treatment (nine plants per pot; total 27 plants). Plant height measurements were recorded weekly, with pots randomly arranged in the greenhouse. Measurement analysis revealed that GA-treated dwarf plants exhibited growth similar to the normal variety, while untreated dwarf plants remained stunted. This response suggests that dwarfism results from disruptions in endogenous GA biosynthesis. To confirm the presence of genetic mutations, eight key genes were selected for molecular analysis-five involved in the GA biosynthesis pathway (*OsKSI*, *OsKO2*, *OsKAO*, *OsGA20ox2*, and *OsGA3ox2*) and three in the GA signaling pathway (*SLR1*, *GID1*, and *GID2*), respectively. Primers designed to amplify these genes with shorter coding regions will be amplified and analysed using genomic DNA, while longer genes will be analysed using cDNA. This ongoing study will continue with RNA extraction, cDNA synthesis, PCR amplification, and Sanger sequencing to compare the target gene sequences among the dwarf varieties and the reference variety. The study is expected to reveal mutations underlying the dwarf phenotype and enhance understanding of GA-related gene regulation, with potential applications in molecular breeding for the development of high-yielding semi-dwarf rice varieties.

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