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IDENTIFICATION OF GIBBERELLIN-SENSITIVE MUTATIONS PRESENT IN *OsGA20ox* GENE INVOLVED IN GIBBERELLIN BIOSYNTHESIS PATHWAY OF SRI LANKAN DWARF RICE VARIETIES

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Rice (*Oryza sativa* L.) sustains billions of people globally, including Sri Lankans, by being the world's second most consumed cereal. As a country located near the equator, Sri Lanka faces frequent climate variations such as heavy rain and wind, which lead to lodging, where the stem of the plant leans from its upright position, resulting in yield loss. To address this, breeding dwarf rice that has the potential to withstand lodging was introduced. Previous studies identified that mutations in the genes involved in the gibberellin (GA) biosynthesis pathway led to dwarfism. However, the occurrence of GA-related mutations in local rice varieties is little known. This study laid the groundwork for identifying mutations present in the Gibberellin 20 oxidase (*GA20ox*) gene, which encodes a key enzyme that facilitates the final steps in the biosynthesis pathway, and it has been found that alterations in this gene lead to dwarfism in rice. The main objective of the study was to identify nucleotide base changes in the 3rd exonic region of the respective gene. For that, two dwarf varieties, which are believed to have arisen due to spontaneous mutations, and a normal reference variety (*tikiri-kekulu*) were selected. Concerning that, genomic DNA was extracted by the cetyltrimethylammonium bromide (CTAB) method, and the targeted region was identified through PCR with a specific marker, followed by sequencing and alignment. Results showed single-nucleotide polymorphisms in coding regions, which led to amino acid changes that appeared to be missense mutations in black and white dwarf varieties. Reportedly, sites where these mutations occurred belong to conserved regions that remain unchanged in reference varieties but were altered in dwarf varieties, which may explain the reason for the dwarfing trait. After further analysis, these findings can be incorporated to enhance rice breeding and produce new variants that are capable of withstanding climatic changes.

Keywords: Dwarfism, Genetic variations, Gibberellin 20-oxidase, Lodging resistance, Sri Lankan rice