

Physiological and Molecular Characterization of Rice Varieties for Submergence Tolerance

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ABSTRACT

In rice crop, submergence is one of the limiting factors affecting productivity particularly in coastal irrigated ecosystem during wet season. Most of the widely cultivated rice varieties are vulnerable to flashfloods resulting in lowering the production under adverse climatic conditions. In present study, physiological traits like plant survival percentage, total shoot elongation, relative shoot elongation and SSR markers were used to characterize six widely cultivated rice varieties in comparison with swarna sub, a known submergence tolerant variety. None of the six widely cultivated varieties exhibited submergence tolerance at seedling stage reflecting absence of sub 1A, a submergence tolerant allele. Variety MTU 1064 expressed desirable traits like minimal shoot elongation under submergence and relative shoot elongation showing fast recovery after de-submergence at tillering stage for 10 days. Dendrogram generated using 86 polymorphic SSR marker data grouped two varieties (MTU 1075 and MTU 1010) into cluster I, five varieties (MTU 1061, MTU 1064, MTU 7029, Swarna sub and BPT 3291) into cluster II. Characterization of widely cultivated rice varieties for submergence tolerance with molecular markers would help in introgression of sub 1A using marker assisted selection to enhance the rice productivity under flooded condition.

Key words : Diversity, Molecular characterization, SSR markers, Submergence.