

LEA gene expression assessment in advanced mutant rice genotypes under drought stress

ABSTRACT

Late embryogenesis abundant (LEA) proteins are primarily found in plants stem, roots, and other organs and play significant roles in tolerance to several abiotic stresses. Plants synthesize a discrete set of LEA proteins in response to drought stress. In this study, the expression patterns of LEA genes were investigated in two advanced mutant rice genotypes subjected to the drought stress condition and different physiological traits including photosynthetic rate, leaf chlorophyll content, and photosystem II (PSII) photochemical efficiency (Fv/Fm) which were analyzed to confirm their drought tolerance. Five LEA genes (OsLEA1, OsLEA2, OsLEA3, OsLEA4, and OsLEA5) were used in the evaluation of rice genotypes and were significantly upregulated by more than 4-fold for MR219-4 and MR219-9. The upregulated genes by these two varieties showed high similarity with the droughttolerant check variety, Aeron1. This indicates that these advanced mutant genotypes have better tolerance to drought stress. The changes in the expression level of LEA genes among the selected rice genotypes under drought stress were further confirmed. Hence, LEA genes could be served as a potential tool for drought tolerance determination in rice. MR219-4 and MR219-9 were found to be promising in breeding for drought tolerance as they offer better physiological adaptation to drought stress.