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# PROCEEDINGS

## Tolerance to flooding during germination and early growth of weedy rice

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### ABSTRACT

Flooding is an important method for weedy rice control. The reduction of the flooding effect on germination and initial growth of weedy rice has been observed, which compromise the efficiency of flooded rice systems. The objectives of this study were to establish a methodology for the selection of weed rice populations with flooding tolerance, to evaluate the expression of genes associated to flooding in cultivated rice, and to investigate the effect of temperature and soil depth on tolerance to flooding in weedy rice. A total of 160 genotypes of cultivated and weedy rice were evaluated in three flooding depths (saturated soil, 5.0 and 10.0 cm). The germination of the flooding tolerant weedy rice genotype ITJ03 was higher than 90% at 25 and 30 °C, but was totally suppressed at temperature of 20 °C and 10 cm of flooding depths. The emergence was also suppressed at burial depths over 2 cm and under 10 cm flooding depths, indicating the cumulative effect of these two factors. There is large variability of weedy rice genotypes to tolerate the flooding effect at germination and initial growth. Relative expression of *RAmy3D* and *OsTPP7* genes increased in 30.58 and 46.71 times, respectively, at the four days after sowing (DAS) for the weedy rice tolerant genotype. The ITJ03 genotype at one day after sowing had the expression of *ADH2* and *SNRK1* genes induced by flooding about 63 times. The temperature of 20 °C reduced the expression of all the evaluated genes in the shoots and roots. The tolerance to flooding during germination and initial growth in weedy rice is associated with the expression of *RAmy3D*, *OsTPP7*, *ADH2* and *SNRK1* genes. Low temperatures together with flooding depths decrease the emergence of weedy rice.

**Key words:** Anoxia, flooding tolerance, germination, hypoxia, *Oryza sativa*.