



PB – 09

Understanding abiotic stress tolerant levels and mechanisms in some traditional rice cultivars in Sri Lanka

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Abiotic stresses such as drought, salinity and submergence limit the rice production worldwide. Both conventional and modern rice improvement programs aim to overcome the yield constraints of rice due to abiotic stresses. Sri Lankan traditional rice gene pool is a valuable source for finding new breeding materials for varietal improvement as well as for mining new genes responsible for abiotic stress tolerances. Understanding abiotic stress tolerant levels and the mechanism within Sri Lankan traditional rice gene pool is a base for such study. In the present study 33 traditional rice cultivars were evaluated for complete submergence tolerance, drought tolerance and salinity tolerance at seedling stage. For submergence stress 2 week old plants were completely submerged for 14 days and plants were evaluated after 10 day recovery period. Two week old plants were undergone a drought stress for 5 days after completely drying, re-watered, and plants were evaluated on the 10th day of the recovery period. For salinity stress 12 day old plants were subjected to salinity stress at 5 dS/m salinized solution for three week period. Plant survival percentages were evaluated at the end of the experiment. According to results more than 80% survival rate under submergence stress was recorded by *Heenati – 309*, *Rathel*, *Matholuwa*, *Rathu heenati*, *Valihundiran* and *Manamalaya*. In the case of drought stress *Heenati – 309*, *Gonabaru*, *Rathkara* and *Handiran* showed more than 80% survival rate and only *Herath* and *Ranhiriyal* were salinity tolerant at 80% survival rate. The pair wise correlation analysis showed 0.9256 of positive significant correlation in between drought tolerant and submergence tolerant rice cultivars in survival percentage but there were no any correlation in between other pairs.

Keywords: salinity tolerance, drought tolerance, submergence tolerance traditional rice