

ABSTRACT

Thesis title: ABIOTIC STRESS TOLERANCE OF DH RICE LINES FOR THE DEVELOPMENT OF AEROBIC RICE PRODUCTION SYSTEMS

Author: Obirih-Opareh Jennifer

Course: MSc Crop Production Engineering

Institute/Department: Crop Production

Primary thesis adviser: Mihály Jancsó, research fellow, Institute of Environmental Sciences, Research Center for Irrigation and Water Management (Szarvas)

Recently, due to climate change repercussions, the aerobic rice production system which saves more water than traditional flooded paddy rice system is becoming popular. Unfortunately, there exist inadequate rice cultivars for this production system.

This present study screened twenty double haploid (DH) rice lines for their on-field and in-vitro drought tolerance characteristics and suitability for use in aerobic rice production systems. The research took place from 18th May, 2022 to 20th February, 2023 at the MATE IES ÖVKI (Szarvas) and the studied parameters were yield and germination parameters. On field experiment were set in RCBD with four repetitions and two treatments (well-watered and drought treatment) whereas in-vitro experiment was set in CRD with three repetitions. Results were analyzed with ANOVA IBM SPSS software at 0.05 level of significance and means that were significantly different were separated with Tukey HSD.

Our findings revealed that two weeks water deprivation in rice caused significant differences in yield (height and yield) parameters of DH Lines. Furthermore, 20% mM Polyethylene Glycol (PEG) was an ideal screening concentration for scouting for drought tolerance in DH genotypes. Also, water enhanced the growth and germination (>90%) of DH rice lines in all studied parameters however inducing PEG brought out the drought resilience differences in genotypes.

The study recommends 1 20, 1 28, 1 31, 8 40, 3 30, 7 70 and 6 33 as suitable candidates for further evaluation for their drought tolerance characteristics and use in aerobic production systems. These genotypes outperformed the water control treatment as well as their parental lines (Irat and Da'ma) from which they were developed.