

1. **Screening of three rice genotypes for drought and low phosphorus tolerance and the effect of mixed genotype cultures on growth performance.**

Abstract

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Drought and lack of soil nutrients is known to affect rice production. The ability to screen rice genotypes that could be tolerant to low soil moisture and nutrients especially phosphorus is the focus of most research in rice. We compared the difference in the genotypic responses to water and phosphorous deficit of three rice genotypes namely; Azucena, Black Gora and IR64. Shoot and root growth and biomass, water usage were considered under four treatments consisting of droughted treatments (W7) with and without phosphorus and a well watered treatment (W35) with and without phosphorus. In the W7 drought commenced on day 7 while in W35 drought commenced on day 35. Water usage of the three genotypes in the droughted treatments was recorded. There was varying degree of responses among genotypes to drought and Phosphorus deficit. Azucena had highest root and shoot mass in the droughted treatment that received Phosphorus while Black Gora had the highest shoot and root mass in the drought treatments that did not receive phosphorus.

IR64 recorded the least shoot and root mass. In all treatments IR64 had significantly more tillers than any of the genotypes with more tillers in the W7 that had no phosphorus. The mean root length of Azucena was highest in the W7 and W35 without P while drought adversely affected that of Black Gora. Azucena with the most root proportion at the bottom had the highest mean water usage while IR64 with shallow root system had the least. The additive partitioning method showed positive effects of the mixed genotype culture of the on the individual performance of the shoot traits. The research demonstrates the potentials of these rice genotypes to tolerance to drought through varying degree of responses and the complementarity effect of mixed culture in rice agriculture. Further research is needed on mixed genotype rice agriculture.