

## Characterization and Selection of Phosphorus Deficiency Tolerant Genotypes in Nigeria Based on Morpho-Physiologic Traits

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**Abstract :** Phosphorus (P) deficiency has been identified as a major hindrance to rice production the world over. Eleven (11) rice genotypes predominantly used by local farmers in Nigeria were studied for their responses to P deficient conditions. The characterization was based on morpho-physiologic parameters. The genotypes were screened using a hydroponic system in a modified Hoagland's solution. Morphological and physiologic parameters, including Plant height (PH), number of tillers per plant, shoot dry weight (SDW), shoot phosphate concentration (SPC), and chlorophyll content, were recorded after exposure to three levels of phosphate concentration (0 $\mu$ M, 400  $\mu$ M, and 800  $\mu$ M). The data obtained were subjected to analysis of variance (ANOVA), and the means were separated using least significance difference tests. The results obtained showed that P starvation caused a significant ( $p \leq 0.05$ ) reduction in PH, SDW, and tillering and also triggered a significant ( $p \leq 0.05$ ) increase in root length among the genotypes. The Pearsons correlation coefficient was used to estimate the relationships among studied parameters, and a significant negative correlation was observed between plant height and root length. FARO63 was identified as a highly tolerant genotype to P deficiency with a low (0.24) SPC and higher (4.81) phosphate utilization efficiency (PUE). This study has identified FARO63 as a true tolerant genotype to Phosphate deficiency, which will be useful in breeding for phosphate deficiency tolerance in rice and thus combating food insecurity.

**Keywords :** phosphate deficiency, rice genotypes, hydroponic system, food security

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