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## Water regimes and phosphorus on dry matter production, root porosity, transpiration and ion uptake of *kharif* rice (*Oryza sativa* L.)

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### ABSTRACT

A pot experiment was conducted on clay loam soil to study the influence of phosphorus and water regimes on dry matter production, root porosity, transpiration and nutrient uptake of rice, grown under flooding and field capacity. The results revealed that root porosity, transpiration, nutrient uptake, dry matter production and grain yield of rice increased greatly with increase in levels of phosphorus and soil water regime. With the increase of phosphorus level from 0 to 60 kg ha<sup>-1</sup>, dry weight of shoot at harvest was increased by 1.68 times under flooding and 1.40 times under field capacity. The total amount of water transpired by rice plant under flooding was 1.85 to 1.95 times more than under field capacity. Positive correlation was also obtained between the amount of water transpired day<sup>-1</sup> pot<sup>-1</sup> and the total root porosity and nutrient uptake. The uptake of N, P, K, Ca was slow up to 30<sup>th</sup> Days After Transplanting (DAT) and for Mg, up to 60<sup>th</sup> DAT except in P level of 60 kg ha<sup>-1</sup> under flooding. Although the uptake of nutrients continued up to the final stage of harvest, but, the rate of uptake was maximum between 30<sup>th</sup> and 90<sup>th</sup> DAT for N, 60<sup>th</sup> and 90<sup>th</sup> DAT for P, K, Ca and Mg. The uptake of all the nutrients (N, P, K, Ca, and Mg) increased with increase in soil water regimes and plant growth. More availability of nutrients in soil together with greater transpiration of water and ion facilitated by increased root porosity might have increased nutrient uptake resulting increase in dry matter production and yield of rice plant with increase in levels of phosphorus under flooded condition.

#### Key words :

Grain yield,  
Nutrient uptake,  
Phosphorus,  
Rice,  
Root porosity,  
Soil water regimes,  
Transpiration