Response of Rice Fallow Maize (*Zea mays* L.) to Different Levels of Phosphorus and Its Time of Application under Zero Tillage Conditions

P Venkata Rao, G Subbaiah, R Veeraraghavaiah, Y Ashoka Rani and V Srinivasa Rao

Saline Water Scheme, Agricultural College Farm, Bapatla-522 101, Andhra Pradesh

ABSTRACT

A field experiment was conducted on clay loam soils of Agricultural College Farm, Bapatla during *rabi* seasons of 2009-10 and 2010-11. The treatments consisted of three levels of phosphorus (0, 60 and120 kg P_2O_5 ha^{-1}) as main plot treatments and three timings of phosphorus application at 10 days before harvesting of rice (T_1); 10 DAS of maize (T_2) and 40 DAS of maize (T_3) allotted to sub-plots. The experiment was laid out in split-plot design and the treatments were replicated thrice. During both the years of study, plant height, dry matter accumulation, chlorophyll (SPAD readings), cob length, number of kernels cob^{-1}, kernel weight cob^{-1}, test weight, kernel yield, stover yield, economic returns and nutrient uptake of maize recorded were higher at higher level of phosphorus than those of the plots without addition of phosphorus fertilizer. However, number of days taken to reach 50 per cent tasseling and silking reduced with increase in level of phosphorus from 0 to 120 kg P_2O_5 ha^{-1}. The maximum kernel yield of 72.8q ha^{-1} and 74.9 q ha^{-1} was recorded during 2009-10 and 2010-11, respectively, with the application of 120 kg P_2O_5 ha^{-1} than that of without phosphorus fertilizer but it did not reach the level of significance with 60 kg P_2O_5 ha^{-1} (68.9 and 70.1q ha^{-1}) during both the years of investigation. Irrespective of level of phosphorus applied to maize, the maize kernel yield increased significantly with application of phosphorus fertilizer at 10 days before harvesting of rice crop (69.8 and 72.4q ha^{-1}) than that applied at 10 DAS (67.1 and 69.6 q ha^{-1}) or 40 DAS(63.9 and 65.4 q ha^{-1}) during each year of the experimentation. However, significant reduction in kernel yield was observed when the phosphorus fertilizer was applied at 40 DAS (8.5 and 9.6% in first and second years of study) of maize than that applied at earlier stages of crop growth. The net returns, benefit cost ratio (BCR) and nutrient uptake by maize increased with increase in level of phosphorus.

Key words : Chlorophyll (SPAD readings), Nutrient uptake, Zero tillage.