Effects of Different Phosphorus Forms on Phosphorus Absorption and Utilization of Maize in Red Soil

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Abstract:

Field experiments were conducted to study the effects of different forms of phosphorus fertilizer on dry matter accumulation, yield, phosphorus uptake and accumulation dynamics and phosphorus utilization efficiency of maize. The response of maize with low phosphorus and red soil to diverse forms of phosphate fertilizer was discussed. The maize cultivar was 'Yun Rui 88'. There were different treatments; no phosphate fertilizer (CK), superphosphate (SSP), monoammonium phosphate (MAP), diammonium phosphate (DAP), calcium magnesium phosphate (CMP) with the same N, P, K nutrient. N was 250kg/hm^2, K_2O was 75kg/hm^2, and P_2O_5 was 90kg/hm^2. The results showed that under the condition of equal nutrient application, compared with SSP and CMP treatment, the application of DAP and MAP on the dry matter accumulation, the accumulation of phosphorus and yield and utilization efficiency phosphate fertilizer were higher in the trumpeting, heading and the ripening of the maize. Compared with SSP and CMP treatments, the dry matter accumulation and maturity of DAP increased by 46.73% and 72.85% respectively, and phosphorus accumulation increased by 68.75% and 100.47% at maturity stage. The accumulation of phosphorus in grains increased by 88.72% and 101.38% respectively. Compared with SSP and CMP, grain yield of DAP maize increased by 47.08% and 73.82% respectively. Partial productivity of maize phosphate fertilizer (PFPP) increased by 68.81% and 78.16%, and the agronomic efficiency (AEP) of maize phosphate fertilizer increased by 103.12% and 120.51%, respectively. Therefore, on the red soil with low phosphorus content, the response of maize phosphate fertilizer to the application of DAP and MAP treatment was better than that of SSP and CMP treatment.

Keywords: Maize, phosphorus utilization, phosphate, yield, red soil