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#### **Agronomic Performance of Phosphorus-Based Application of Swine Manures under Long-Term Corn-Soybean Rotation**

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With increasing interests in adopting phosphorus (P)-based manure application for environmental protection, a good knowledge of agronomic performance is needed to assure crop productivity with various manure addition in such approach. We evaluated the effects of three forms of swine manure (liquid, LM; solid, SM; and liquid manure compost, MC) on crop P uptake and agronomic P efficiency, compared with chemical fertilizer (CF) on a Brookston clay loam soil under corn-soybean rotation from 2004 to 2011. The grain yield for corn followed the order of LM>SM>MC, while it for soybean was in the order of LM=SM>MC. Similar patterns were discovered for total P uptake and grain P removal. Manure P source coefficients were 1.14, 0.85 and 0.74 for corn, and 1.0, 1.0 and 0.9 for soybean, for LM, SM, and MC, respectively. Apparent P agronomy efficiency (APAE) and cumulative P agronomy efficiency (CPAE) defined as the grain yield produced with each kg net P input in a given year-period since its 1st application, remained similar between LM and CF for corn. The APAE and CPAE decreased by 21 and 20% for SM and 31 and 36% for MC, respectively, relative to CF. For soybean, no P-source effects were found on CPAE, while APAE for MC decreased by 13% compared to CF. The values of CPAE decreased linearly with increases in net P input over time, regardless of crop species and P source. P-based application must be optimized on a manure form-specific base and take the long-term legacy P into consideration.

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#### **Rock phosphate increased nodulation, growth and yield of *Vigna unguiculata* in sub-Saharan agrosystem of Burkina Faso.**

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Cowpea plays a considerable role in the nutritional balance and rural economic of Burkina Faso. However, its farming is marked by yields instability related to drought and soil depletion of nutrients, particularly nitrogen and phosphorus. In this study factorial trials were carried out in 12 farmers' fields in the northern Soudano-sahelian region of Burkina Faso, in view to compare nodulation and growth of cowpea without and with rock phosphate (25% P and 10% Ca) applied at the dose of 313 kg ha<sup>-1</sup>. Although a large variation was observed between trial sites, the cowpea nodule dry weight increased from 21±2 without rock phosphate to 30±3 mg plant<sup>-1</sup> with rock phosphate. The shoot biomass increased from 9±2 g to 13±1 mg plant<sup>-1</sup>, and grain yield from 564±1 kg ha<sup>-1</sup> to 687±2 kg ha<sup>-1</sup>. However the benefit of the Burkina rock phosphate was much higher in trials where the nodulation of cowpea was the highest. It is concluded that the supply of Burkina rock phosphate could significantly improve the symbiotic nitrogen fixation and the yield of cowpea in sub-Saharan areas of Africa.