Super Phos® Applied at 1/8 Rate of Conventional Phosphorus Improves Soybean Yield

Research Report

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Full Research Report Available Upon Request

This study aimed to evaluate responses from various phosphorus sources, application methods, and timings on soybean yield in comparison with the availability and versatility of **Super Phos® (SP)** as an in-furrow and side-dressed phosphorus source to increase soybean productivity.

Materials and Methods

The experiment was set up in a randomized block design at the Crop Sciences Research and Education Center in Champaign, Ill. A glyphosate-tolerant soybean variety (AG3832) was grown at a population of 160,000 plants/acre to assess the impact of phosphorus management on crop productivity.

Treatments included various phosphorus fertilizer sources, timing of application, and application methods as outlined in Table 1. Phosphorus treatments were compared to an unfertilized control, with six replications per treatment. **SP** was applied at 1/8 the rate of conventional phosphorus fertilizer.*

Soil samples (0 to 6 inches deep) were obtained from plot areas prior to planting to assess pH, organic matter, and fertility levels. Sampling for biomass and nutrient analysis was conducted by harvesting plants at the R6 growth stage. The whole plant samples (including grain) were submitted for nutrient analysis to a commercial laboratory. Nutrient accumulation in the plant was determined algebraically at this growth stage using total plant biomass and nutrient concentration.

The center two rows of each plot were mechanically harvested for determination of grain yield at physiological maturity. Data were assessed using analysis of variance with the PROC MIXED procedure of SAS 9.4 (SAS V8 Institute, Cary, NC).

Table 1. Treatment Application Schedule, sources, and rates used to evaluate **Super Phos® (SP)** as a phosphorus source for soybean.

Treatment Name	Application Time, Method					
	Preplant, Broadcast		Planting, In-Furrow		Flowering (R1), Y-Drop	
	Nutrient Source	P_2O_5 Rate (lb/ac^{-1}) Actual	Nutrient Source	P_2O_5 Rate (lb/ac^{-1}) or Equivalent	Nutrient Source	P_2O_5 Rate (lb/ac^{-1}) or Equivalent
Control	None	–	–	–	–	–
TSP (38)	TSP	38	–	–	–	–
TSP (75)	TSP	75	–	–	–	–
TSP (56+19)	TSP	56	–	–	TSP	19
SP (38)	–	–	SP	38	–	–
SP (75)	–	–	SP	75	–	–
SP (56+19)	–	–	SP	56	SP	19

TSP (Triple Super Phosphate) applied at the listed rate; ***SP** (**Super Phos®**) P_2O_5 rates presented are company-expected equivalent rates: to derive actual P_2O_5 rates, divide the listed values by 8.

Results

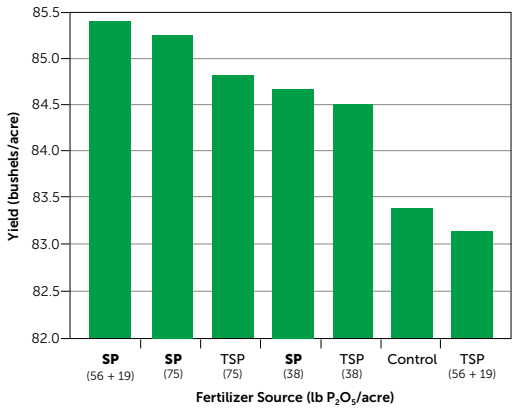

Figure 1. The effect of P fertilizers, source, and rate on soybean yield.

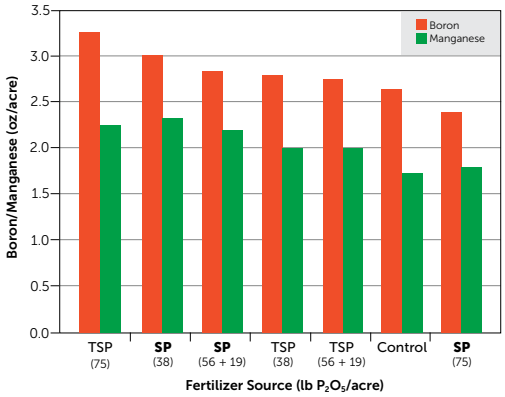

Figure 2. The effect of P fertilizers, source, and rate, on boron and manganese accumulation in soybean.

Conclusion

In this study, it was demonstrated that Huma Gro® **Super Phos®** at the low rate of 1/8 that of conventional P produced yields numerically similar to that produced by TSP. This suggests enhanced efficiency associated with **Super Phos®**.

The study also demonstrated a significant increase in boron (B) and manganese (Mn) becoming available in the soil when applying 38 lbs P_2O_5/acre of **Super Phos®** compared with the Control.

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