

SOYBEAN YIELD RESPONSE TO POLY-4 AS A SULFUR AND POTASSIUM SOURCE

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ABSTRACT

Sulfur (S) and potassium (K) play an essential role in soybean growth and metabolism, immunity against insect-pests and improving yield quality and quantity. The reduction in atmospheric deposition of S in soil over the last two decades has increased the risk of S deficiency in crops. POLY-4 is a novel S and K fertilizer source (19% S, 14% K₂O, 17% CaO, 6% MgO) that has slow nutrient release and high nutrient use efficiency properties. A two-year study was conducted at the University of Missouri Lee Greenley Jr. Memorial Research Farm near Novelty, with the objective of assessing the soybean response to POLY-4 in comparison with other common fertilizers of S and K. The treatments included rates of sulfur - 0, 9.5, 19, 27.5, and 38 lb ac⁻¹ supplied through POLY-4 and sources of S (ammonium sulfate) and K (muriate of potash). The quadratic plateau curve led to the agronomic optimum nutrient rate (AONR) of S to be 18.6 lb ac⁻¹, which produced an optimum yield (YAONR) of 67.8 bu ac⁻¹. Among the S rates, the higher grain oil content (19.96%) was observed at the rate of 27.5 lb ac⁻¹ and 38 lb ac⁻¹. Among the S sources, AMS supplied without any K fertilizer produced the highest oil content (19.94%) in the grains compared to POLY-4 and AMS supplied with K fertilizer. Sulfur rates significantly affected the Soil test S levels which peaked at 19.16 lb ac⁻¹ under 38 lb S ac⁻¹. Overall, S rate approximately at 18.6 lb ac⁻¹ achieves maximum soybean yield while preserving oil content and ensuring the optimum soil S levels and this demonstrates the effectiveness of POLY-4 in improving the soybean yield.