

INVESTIGATING THE EFFECTS OF TILLAGE PRACTICES AND FERTILIZER PLACEMENT STRATEGIES ON CORN YIELD AND NUTRIENT UPTAKE IN EASTERN SOUTH DAKOTA

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ABSTRACT

In South Dakota, phosphorus (P) and potassium (K) fertilizers are often used to optimize corn (*Zea mays* L.) grain yields and maintain soil fertility. The placement of these fertilizers often has an impact on the nutrient accessibility to the plant and the fertilizer's impact on the environment. The management of these fertilizers is largely influenced by the tillage system utilized. In the western corn belt, producers have historically used a combination of conventional and conservation tillage systems to address their regional growing conditions. Strip-tillage has emerged as an alternative conservation tillage practice combining benefits of no-tillage and chisel plow systems, while also allowing for subsurface fertilizer banding. The objective of this study is to compare the effect of tillage practices and P and K fertilizer placement strategies on corn grain yield and nutrient uptake in eastern South Dakota. The study includes five different tillage and nutrient placement combinations, three different fertilizer rates, and treatments with and without starter fertilizer. Temperature sensors were installed to monitor soil temperature at a 2-inch depth throughout the growing season and during the off season. For nutrient accumulation analysis, V6 biomass, VT ear leaf, and R6 biomass were collected and processed. Grain yield and yield components were determined using combine harvest and individual ear harvest data.