THE EFFECTS OF CALCIUM SOURCE AND PLACEMENT ON SOIL ACIDITY PARAMETERS AND WHEAT PERFORMANCE

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ABSTRACT

Wheat production is a critical component of U.S. Pacific Northwest agriculture, with approximately 80% of the global soft white wheat grain supply originating from this region. Ammonium-based nitrogen fertilizers are widely used on typically alkaline soils in Eastern Oregon dryland production areas by wheat growers. However the nitrification process that biologically converts ammonium to nitrate increases the soil concentration of H+. This process ultimately creates acidic soil conditions, which can lead to aluminum toxicity from solubilized aluminum. While incorporation of calcium carbonate (lime) is generally recommended to combat soil acidity issues, the majority of dryland wheat growers in Eastern Oregon incorporate no-till or reduced till management practices. Alternative strategies for surface applied lime applications in recently acidified no-till wheat production systems is needed to maintain optimal grain yields. The project objectives are to investigate the effects of calcium source and placement on root and above ground biomass, grain yield, and yield components, soil pH, soil extractable Al, and soil base saturation. The study will take place as a greenhouse study using an aluminum sensitive spring wheat variety. The soil type is Walla Walla silt loam collected from a dryland, no-till wheat field located in Southeastern Washington. The tentative calcium source treatments include a control (no application), gypsum, fluid lime, agricultural lime, prilled lime, and micronized lime. The tentative calcium placement treatments include an incorporated agricultural lime, surface applied and banded agricultural lime, prilled lime, and micronized lime. The greenhouse study will begin in fall of 2023 and the treatment effects and results will be evaluated and summarized in 2024.