SPATIAL VARIABILITY IN PROFILE SOIL NITRATE, NUTRIENT UPTAKE, GRAIN YIELD, AND NUTRIENT REMOVAL IN A COMMERCIAL DRYLAND GRAIN SORGHUM FIELD

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ABSTRACT

Established relationships exist that describe the confidence interval around a soil test value as a function of cores in the sample for nutrients such as phosphorus. This information is useful for developing economically and agronomically optimal soil sampling strategies. Residual soil nitrate can be a significant source of a crops N needs in dryland cropping systems where N loss is minimal. A common question among producers and consultants is how many profile N cores are required to obtain a reasonable field level estimate of profile N. A field-scale trial was established in a production field of dryland grain sorghum in Northwest Kansas in 2021. Profile soil nitrate was measured prior to planting to a depth of 24" on a 1-acre grid pattern. Biomass accumulation and nutrient update were measured on the same 1-acre grid pattern at V5, G6 (flowering), and physiological maturity. Grain yield and harvest index were measured on the 1-acre grid at physiological maturity via hand harvest as well as across the entire study area using a commercial combine equipped with a calibrated yield monitor system. This presentation will present initial findings of this project with specific emphasis on the spatial variability in profile soil nitrate and the implications to effective soil sampling strategies for determining average profile nitrate levels at the field scale. Additional data exploration will evaluate relationships between yield and nutrient update.