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## **QUANTIFICATION OF ARBUSCULAR MYCORRHIZAE IN DIFFERING TILLAGE TREATMENTS AND THEIR POTENTIAL ROLE IN THE UPTAKE OF NITROGEN BY TRITICUM AESTIVUM (HARD RED SPRING, CLEARFIELD VARIETY)**

Arbuscular mycorrhizae fungi (AMF) are a natural, endomycorrhiza fungi, that penetrates into a plants root system; expanding their roots surface area for nutrient uptake. This interaction has been well documented; showing interactions that provide a significant increase in phosphorus uptake, and an improvement on nitrogen uptake from nitrate or ammonia. There is evidence that nitrogen uptake by wheat (*Triticum aestivum*) follows the same mechanism as phosphorous acquisition. Tillage methods, along with land use intensity, play a factor in AMF quantity. Tillage methods looked at involve conventional tillage (CT), reduced tillage (RT), and zero tillage (OT). Study was completed at NW-31-36-23-W4; located in east of Red Deer in Central Alberta. Methods for sampling and properties were based off of Soil Sampling and Methods of Analysis (2nd ed.) by Carter and Gregorich. Results were obtained using PCR for AMF quantification and a LaMotte combination soil outfit (STH 7). Analysis involved a two-way ANOVA with replications, and Tukey tests to determine significance. Nitrogen was

utilized best by CT (150 lbs/ac - 63.33), followed by OT (150 lbs/ac ' 66.67 lbs/ac) and RT (150 lbs/ac ' 68.33 lbs/ac). Zero tillage showed the largest change in phosphorus uptake (150 lbs/ac - 56.67 lbs/ac), followed by RT (150 lbs/ac - 76.67 lbs/ac) and then CT (150 lbs/ac - 78.33 lbs/ac). Organic matter showed significant differences between the control group and tillage methods (P-value = 3.48E-6), but no significant differences between tillage methods. Differences in nutrient uptake can be attributed to the differences in tillage methods in how they effect the soil microbiome; OT being the most effective and CT being the least effective. PCR was unable to provide quantitative data. Future studies on AMF quantification are needed to determine if AMF is the catalyst for increased phosphorus/ nitrogen, or if it is another plant growth-promoting microorganism; such as, *Penicillium bilaiae*.

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