

Assessing the Benefits of Agrotain Plus on Winter Wheat

Purpose:

Nitrogen loss and utilization can have a major impact on final wheat yield. This project evaluated the impact of stabilized nitrogen on wheat yield. Volatilization and denitrification of nitrogen applied on winter wheat can reduce the amount of available nitrogen resulting in reduced yield. Agrotain Plus contains a urease inhibitor which can reduce nitrogen loss via ammonia volatilization from urea, and dicyandiamide (DCD), which slows the conversion of ammonium to nitrate (nitrification), which can further limit N loss from denitrification or leaching.

Methods:

Three replicate, randomized field scale trials were conducted at 7 sites in 2013. The 2 treatments consisted of UAN with Agrotain Plus, and UAN without Agrotain Plus (Check). All other factors including nitrogen rate were held constant as per the co-operators normal production practices. UAN was applied by either the co-operator or a custom applicator.

Results:

The average yield results from each location are summarized in table 1. Four of the eight sites were conducted by members of the Oxford Soil and Crop Association.

Table 1: Average Yield Results

Location	Check	Agrotain Plus
Sheddon	88.1	82.5
Salford	85.7	87.8
Strathroy	89.0	84.2
St.Thomas	77.0	78.2
Embro	94.3	96.1
Brooksdale	95.7	94.4
Ingersoll	85.3	82.9
Average	87.9	86.6

Yield response was negative on average, and statistically less at 2 of the 8 locations (Shedden, Strathroy). This was opposite to results obtained in agribusiness trials in 2012, when significant yield increases were obtained. At both of the sites where yield loss occurred, a further investigation of the data shows that these were heavy clay farms, and the nitrogen was not applied until May 10-12. The 2013 growing season was wet and cool early, followed by a dry period in May, and a return to frequent showers/wet in June. In these heavy clay situations, we speculate that the Agrotain Plus held the nitrogen in a form not available for the wheat crop for too long in May, particularly without rainfall for activation. The wheat crop starved for nitrogen throughout the rapid growth phase, and yield loss resulted. This contrasts with the 2012 reported results,

Crop Advances: Field Crop Reports

when an early spring allowed N applications to wheat in mid-March, rather than mid-April.

These results have brought about the following conclusions: if Agrotain Plus is to be of value to wheat, it needs to be used with early applications. Once into the rapid growth phase, (May) high N demands of the wheat crop negate any value of reduced N loss that may accrue with Agrotain Plus use.

Summary:

Note that this is the first year of this study. Any conclusions would be premature, although some excellent indicators did develop from this years' work.

Yield response to Agrotain Plus in 2013 was extremely disappointing. Yield response ranged from a loss of 5 bu/acre to a gain of 2 bu/acre. Based on an assessment of the 2013, Agrotain Plus should not be added to nitrogen applications in May, after the wheat crop enters the rapid growth phase. Early applications, or the first application in a split N program, may benefit from the addition of Agrotain Plus. Further research is required to evaluate this hypothesis. Protein and soil nitrate results are still pending.

Next Steps:

This trial resulted in some very intriguing results. More research will need to be performed to evaluate timing and impacts of the Agrotain Plus product. To measure the impact Agrotain Plus has on volatilization dosimeters will be used to measure volatilization. Anyone interested in co-operating in this trial in 2014 is encouraged to contact Peter Johnson at peter.johnson@ontario.ca or Shane McClure at shane.mcclure@ontario.ca.

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Location of Project Final Report:

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