Assessing the Benefits of eNtrench on Winter Wheat

Purpose:

Nitrogen (N) loss and utilization can have a major impact on final wheat yield. This project was undertaken to evaluate the impact of eNtrench nitrogen stabilizer (nitrapyrin) on wheat yield. eNtrench is a nitrification inhibitor which slows the conversion of ammonium nitrogen (NH4-N) to nitrate nitrogen (NO3-N). This helps prevent early nitrogen fertilizer applications from converting into nitrate nitrogen early in the growing season. Nitrate nitrogen is susceptible to denitrification, a process where the NO3-N is used as the electron receptor for respiration by bacteria when oxygen is limiting in the soil. This process removes oxygen from NO3-N, changing it into NO2, NO, or N2O, all of which are gases that escape to the atmosphere. The nitrogen is then lost to the plant. Denitrification can occur rapidly when warm soils remain saturated for 2-3 days or longer.

Methods:

Clay soils are more likely to stay saturated, conditions which are conducive to NO3-N loss. Thus heavy clay soils where targeted for this trial. Three replicate, randomized field scale trials were conducted at 5 sites in 2015. The 2 treatments consisted of UAN with eNtrench, and UAN without eNtrench (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 sites were located on heavy clay soil in the Golden Horseshoe region, while the Sarnia site was a muck soil.

Table 1: Average Yield Results By Location (bu/ac)

Location	Treatment	
	Check	Entrench
Sinclairville	84.0	88.5
Hagersville	123.0	122.3
Welland	85.8	83.5
Caledonia	56.8	55.8
Sarnia	115.8	118.2
Average	**93.1**	**93.7**

Results varied across locations. Two of the sites consistently had 3 to 4 bushel/acre response to eNtrench across all reps while the remaining 3 sites had no response to eNtrench. May of 2015 was relatively dry after nitrogen applications, and N loss to denitrification would not be expected. The results show the difficulty in determining when to use nitrogen stabilizing products and when they will not pay. The two responsive sites likely had sufficient moisture to create saturated soils and anaerobic conditions for a period after N application. The three non-responsive sites did not. Environmentally, NO emissions are considered a potent greenhouse gas. On heavy

clay soils prone to stay saturated for long periods of time, N stabilization products can be considered insurance to prevent N loss. In these situations, if N stabilization products are not utilized, growers should consider split N applications to reduce the N loss risk.

Summary:

This is the first year of this study. Any concrete conclusions would be premature. Two sites did show significant yield improvement, while three sites did not. Rainfall is the most likely difference in these outcomes.

Next Steps:

We have completed the first year of this project. Attempts will be made to continue this project for another two years. Anyone interested in co-operating in this trial in 2016 should contact Peter Johnson at peter.johnson@bell.net or Shane McClure at shane_mcclure@hotmail.com

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