



# Instinct HL and Nitrogen Management Effect on Winter Wheat Yield

## Instinct HL and Nitrogen Management Effect on Winter Wheat Yield

Sara Bauder, SDSU Extension Agronomy Field Specialist

Anthony Bly, SDSU Extension Soils Field Specialist

David Karki, SDSU Extension Agronomy Field Specialist

Nitrogen (N) additives to control N losses through volatilization, denitrification, and leaching are widely used in the Midwest. Slowing the conversion of nitrogen fertilizers to nitrate may lessen leaching and denitrification losses if precipitation or soil becomes saturated. Urease inhibitors like Agrotain Ultra slow the conversion of urea to ammonia, lessening potential volatilization losses. Nitrification inhibitors like Instinct HL are designed to slow the activity of Nitrosomonas bacteria, which convert ammonium to nitrites; this may reduce the risk of N losses due to leaching and denitrification. Long-term yield and economic response to these additives is highly dependent on the amount and timing of precipitation events. Therefore, a winter wheat nitrogen management study was conducted to evaluate the influence of Instinct HL (nitrpyrin- nitrification inhibitor) and Agrotain Ultra (N-(n-butyl)-thiophosphoric triamide(NBPT)- urease inhibitor/volatilization reducer) on wheat grain yield.

**Table 1. Materials and Methods**

<b>Item</b>	<b>Description</b>
Previous crop/tillage	Soybean/No-till
Pre-trial nitrate-N soil test (0-2ft depth)	75 lbs/a N
Plot size	UAN plots: 15'x 60'; Urea plots: 20'x60'
Variety	SyWolf
Seeding Rate	120 lbs/a
Planting date	Oct 13th
Treatments	Refer to Tables 2, 3,
Side dress N application date	Urea: 4/26/18; UAN: 4/27/18
Side dress N application method	Urea: Hand Spread; UAN: Stream bar application
Replications	3
Experimental design	Randomized Complete Block Design

**Table 2. Effects of Instinct HL with urea on winter wheat in 2018 at the SDSU Southeast Research Farm near Beresford, SD.**

	-----Treatment-----				Protein <sup>5</sup> %	Test Wt. lb/bu	Stand plants/ac	Yield <sup>5</sup> bu/ac
	-----N <sup>1</sup> (%)-----		Instinct HL (oz/a) <sup>4</sup>					
	Pre- plant <sup>2</sup>	Top- dress <sup>3</sup>	Pre- plant	Top- dress				
1	0				12.5	59.4	1038738	39.7
2	90				13.0	59.2	1111338	49.9
3	90		24		12.9	60.6	966138	47.6
4	45	45			12.7	59.6	1200692	48.9
5	45	45	24		13.0	59.9	1167185	48.3
6	45	45		24	13.0	59.5	1033154	51.9
CV					3.6	1.1	11.1	9.2
Pr>F					NS	NS	NS	NS
LSD					--	--	--	--

<sup>1</sup>Percent of nitrogen fertilizer recommended according SDSU university recommendations EC-750.

<sup>2</sup>Pre-plant surface broadcast dry fertilizer application of 46-0-0 on 10/12/17.

<sup>3</sup>Top-dress surface broadcast dry fertilizer application of 46-0-0 on 4/26/18.

<sup>4</sup>Instinct HL is a nitrogen stabilizer product with nitrapyrin as active ingredient.

<sup>5</sup>Grain protein and yield adjusted to 13% moisture.

**Table 3. Effects of Instinct HL with UAN<sup>1</sup> on winter wheat in 2018 at the SDSU Southeast Research Farm near Beresford, SD.**

	Treatment				Protein <sup>6</sup> %	Test Wt. lb/bu	Stand plants/ac	Yield bu/ac
	-----N <sup>2</sup> (%)-----		Instinct HL <sup>5</sup>					
	Pre-plant <sup>3</sup>	Top-dress <sup>4</sup>	Pre-plant	Top-dress				
1	0				12.2	59.9	1033153	55.3
2	90				12.8	59.3	1156015	71.4
3	90		24		12.1	59.1	1189523	63.8
4	45	45			12.1	59.8	1139261	64.8
5	45	45	24		12.5	58.8	1133976	65.9
6	45	45		24	12.3	58.7	1178353	62.9
CV					2.4	2.6	12.3	10.5
Pr>F					NS	NS	NS	NS
LSD					--	--	--	--

<sup>1</sup>UAN is urea-ammonium nitrate or 28-0-0

<sup>2</sup>Percent of nitrogen fertilizer recommended according SDSU university recommendations EC-750.

<sup>3</sup>Pre-plant surface liquid fertilizer application of 28-0-0 (UAN) on 10/12/17.

<sup>4</sup>Top-dress surface liquid fertilizer application of 28-0-0 on 4/27/18.

<sup>5</sup>Instinct HL is a nitrogen stabilizer product made with nitrapyrin

<sup>6</sup>Grain protein and yield adjusted to 13% moisture.

### Summary

Although, the 2018 growing season brought in high precipitation in April followed by abnormally warm May, the winter annual like winter wheat did not show much impact in terms of yield and test weight as compared to spring planted cereal grains such as spring wheat or oats.

The six N and Instinct treatments used for this study did not show statistically significant difference for grain yield, grain protein, plant stand, and test weight; however, the control plots which did not receive any additional N yielded numerically much lesser than other plots that received N (and Instinct) treatments (Table 2 & 3). We did not see any difference between plots that were applied with Instinct for the same amount of N.

Nitrogen rate and timing effects on wheat yields are heavily dependent upon environmental conditions as well as plant development and nitrogen needs. Nitrapyrin treatments did not clearly show effects on wheat yields across studies in this site-year.

### Acknowledgments

This study was funded in part by Corteva Agriscience, SDSU Extension, and the SDSU Southeast Research Farm.