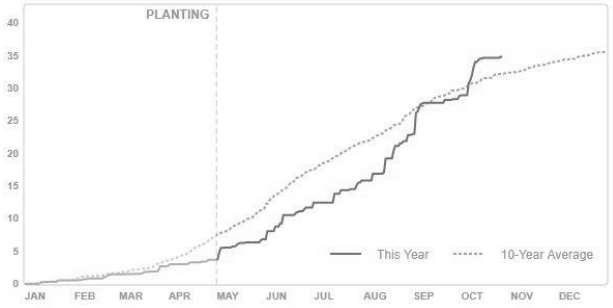
Nitrogen Source Study: Anhydrous Ammonia versus UAN Broadcast

Study ID: 0701147201801
County: Richardson
Soil Type: Marshall silty clay loam 2-6% slopes
Planting Date: 5/1/18
Harvest Date: 9/22/18
Population: 27,500
Row Spacing (in): 30
Hybrid: Hoegemeyer® 8414
Reps: 6
Previous Crop: Soybean
Tillage: No-Till
Herbicides: ***Pre:*** 8 oz/ac Banvel® and 6 oz/ac of 6# 2,4-D ***Post:*** 2.5 lb/ac mesotrione, 1 pt/ac Atrazine, and 12 oz/ac of 5.4 lb Roundup®

Irrigation: None
Rainfall (in):



Soil Tests (Dec. 2018):

Soil pH 1:1	Buffer pH	CEC	OM	Bray P1 Weak Bray	Bray P2 Strong Bray	K	Mg	Ca	S	Zn	K	Mg	Ca	H
		mg/100g	*%*	*ppm*	*ppm*	*----------(ppm)----------*					*--% Base Saturation---*			
5.9	6.6	19.9	2.7	20	24	199	402	2533	8	3.3	2.6	16.8	63.6	17
6.9		20.9	2.7	12	21	192	412	3403	8	3.2	2.4	16.4	81.2	0
6.3	6.7	15.8	2.7	12	18	152	261	2312	8	2.2	2.5	13.8	73.2	10.5
6.3	6.7	19.1	3.3	22	29	173	318	2804	8	2.0	2.3	13.9	73.4	10.4

Introduction: The purpose of this study was to compare liquid UAN with anhydrous ammonia. Both were applied at a rate of 160 lb N/ac. The anhydrous ammonia was applied on December 21, 2017 with a minimal disturbance AgSynergy® Genesis TRX® anhydrous applicator. The broadcast 32% UAN was applied on top of crop residue and cereal rye cover crop residue (Figure 1). The UAN was applied on April 24 around 11 AM. There was a 0.28" rainfall on April 25 from 9 AM to noon. The next rain was seven days later on May 1 (0.15") and May 2 (1.15"). Maximum and minimum daily temperatures for the three days following application are presented below. Daily rainfall and temperature data are from Brenner Airfield, approximately 5 miles from the field site.

Figure 1. Soybean residue and cereal rye cover crop residue at time of UAN application on April 24.

Date	Max Temp (°F)*	Min Temp (°F)
April 24	76	39
April 25	56	40
April 26	70	34
April 27	79	36

Yield, grain moisture, test weight, and stand counts were collected at harvest on September 22, 2018. Yield data from the yield monitor is displayed in Figure 2. Yield data reported in the table below is from weigh wagon measurements.

Results:

	Harvest Stand Count (plants/ac)	Test Weight	Moisture (%)	Yield† (bu/ac)	Marginal Net Return‡ ($/ac)
32% UAN	25,667 A*	55 A	15.8 B	154 B	443.61 B
Anhydrous Ammonia	25,167 A	56 A	16.9 A	180 A	519.67 A
P-Value	0.641	0.107	0.009	0.044	0.049

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield data reported from weigh wagon measurements. Bushels per acre adjusted to 15.5% moisture.
‡Marginal net return based on $3.23/bu corn, $380/ton ($0.23/lb N) anhydrous ammonia, $182/ton ($0.28/lb N) 32% UAN, $15.18/ac anhydrous application, and $6.43 liquid fertilizer application.

Summary:

- Stand counts collected at harvest did not differ between the treatments.
- The UAN treatment had significantly drier grain at harvest and lower test weight than the anhydrous ammonia treatment.
- Yield was 26 bu/ac greater for the anhydrous ammonia treatment.
- The anhydrous ammonia product was cheaper than the UAN; however, the cost of application is greater. This resulted in very similar treatment costs: $51.93/ac for the UAN product and application compared to $52.25/ac for the anhydrous ammonia product and application. Marginal net return was greater for the anhydrous ammonia application method, resulting in a profit increase of $76.06/ac this year.

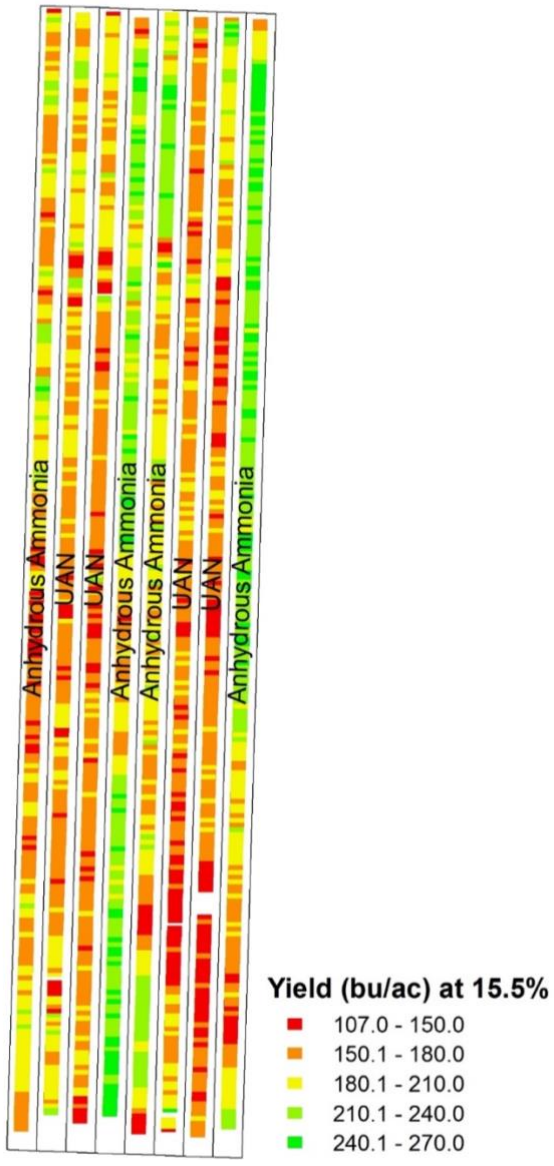


Figure 2. Yield from combine yield monitor.

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In Partnership with: Nebraska Corn Board; Nebraska Soybean Checkoff; Nebraska Corn Growers Association; Nebraska Dry Bean Commission