2013

Split Nitrogen Application Trial

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Abstract
Farmers understand it is best to apply nitrogen to the crop at or right before rapid growth occurs. However, 100 percent in-season nitrogen applications are faulted because of potential for unfavorable weather conditions delaying applications and subsequent crop nitrogen deficiency occurring. This trial looks at how split nitrogen applications can be used to address environmental risks of pre-plant nitrogen application as well as unfavorable application conditions in-season.

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Introduction

Farmers understand it is best to apply nitrogen to the crop at or right before rapid growth occurs. However, 100 percent in-season nitrogen applications are faulted because of potential for unfavorable weather conditions delaying applications and subsequent crop nitrogen deficiency occurring. This trial looks at how split nitrogen applications can be used to address environmental risks of pre-plant nitrogen application as well as unfavorable application conditions in-season.

Materials and Methods

This trial was conducted with Pioneer 33W84 in 2011 and CropPlan 6325VT3Pro planted into the previous year's soybean residue on May 5 in both 2011 and 2012 at 34,000 seeds/acre. Each plot was 30 ft wide by 150 ft long. Nitrogen for pre-plant treatments was applied prior to planting and at the V6 growth stage for the post-plant applications; both as injected urea ammonium nitrate. The treatments consisted of four pre/post nitrogen applications of 0/140, 50/90, 90/50, and 140/0 lb N per acre. In 2010, a fall blanket application of potash was applied at 120 lb K per acre based on soil test. The soil test phosphorus was adequate requiring no additional phosphorus. Soil test phosphorus and potassium was adequate for the 2012 crop and no applications were made. Yields were collected using a John Deere 9410 equipped with a Harvest Master weigh system. Additional data collection included spring and fall plant population counts, late spring nitrate analysis, fall stalk nitrate analysis, and grain moisture at harvest.

Results and Discussion

Spring and fall plant populations were not significantly different among the four treatments for both 2011 and 2012. The late spring nitrate analysis was not significantly different across treatments in either year but was quite variable ranging from 6.5 to 13.0 ppm in 2011. Fall stalk nitrate analysis had very tight data and was not significantly different in 2011, although in 2012 the 140 lb of N pre-plant was significantly lower in 2012.

Grain yields were significantly different in 2011 but not in 2012. Higher yields were realized with the higher in-season nitrogen rates in 2011. This again, can be attributed to personal observations of reduced nitrogen stress as in-season nitrogen rates increased.

Table 1. Spring plant populations, late spring nitrate concentration, fall stalk nitrate concentration, fall plant population, grain moisture, and grain yield for four split nitrogen application treatments at the ISU Johnson Farm, Story Co. in 2011 and 2012.

Year	Pre-plant N	Post-Plant N	Spring plant population	Last spring nitrate	Fall stalk nitrate[1]	Fall plant population	Grain moisture	Grain yield
2011	Lb N/acre		plants/acre	ppm		plants/acre	%	bushels/acre
	0	140	30,875	6.5	23	30,688	19.3	195.38
	50	90	32,125	9.5	22	30,813	18.3	185.03
	90	50	32,625	12.0	22	31,938	18.0	175.68
	140	0	31,675	13.0	22	31,000	17.2	161.26
		Pr > F	0.306	0.395	0.922	0.540	0.004	0.011
2012	Lb N/acre		plants/acre	ppm		plants/acre	%	bushels/acre
	0	140	32,250	20.8	4,945a	30,625	18.51	200.75
	50	90	32,500	18.3	3,913ab	31,500	19.13	205.87
	90	50	32,750	20.5	5,563a	32,125	18.87	200.87
	140	0	32,000	23.0	2,745b	32,000	18.88	212.22
		Pr > F	0.68	0.98	0.05	0.37	0.82	0.64

[1]Means within a column followed by the same letter do not differ ($P \leq .05$).