CFAES

OHIO STATE UNIVERSITY EXTENSION

Managing Risk With Late Season Nitrogen Application

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INTRODUCTION

Corn producers are looking for ways to make more efficient use of nitrogen with less risk of loss. Factors influencing this need for research are a combination of economic and environmental concerns. Current economics in corn production require producers to shift nitrogen management emphasis on economic return as opposed to maximum yield. Changes in climate patterns in Ohio have caused large rain events after extended dry periods. Using late season nitrogen applications allow the producer to spread out nitrogen applications based on crop need and weather events, allowing both more efficient use of nitrogen and limiting nitrogen loss without significant difference in yield.

OBJECTIVE

Determine the effects of nitrogen timing on corn yield and profitability.

METHODS

High-clearance equipment has allowed producers to stretch the nitrogen application window in corn. Since 2016, three on-farm collaborators have committed to multi-year late season nitrogen trials in Fulton County . Two on-farm collaborators have committed for these trials in Hardin County. In each Fulton County trial, the check treatment is the farmer's normal practice of applying all remaining nitrogen at sidedress or approximately 5-leaf (V5) corn. The Hardin County cooperators normal practice of pre or planting nitrogen has been applied. Fewer source and equipment options are available for late season applications. As such, the check treatments in these studies may have different source or placement characteristics than the late season treatments. Finally, in 2017, several 'reduced rate' treatments were tried as corn is generally more efficient with nitrogen applied later in season.

CONCLUSIONS

The results of this study proved that all eight site years showed no significant difference in corn yield whether applied early season, sidedress, or late season. Although late season nitrogen application helps manage risk according to plant need and in season weather conditions, it requires special high clearance application equipment. This equipment can be a limiting factor because of cost, labor, or time required to perform late season nitrogen application across increasing crop acres. Because of this increased expense with no significant increase in yield, this practice may be slow to be adopted by corn producers with limited resources.

KEY PARTNERS

The project contact expresses appreciation to on-farm collaborators J & J Ag, VonSeggern Farms and Larry Richer in Fulton County. Hardin County on-farm collaborators were Paul Ralston and Jan Layman. Thanks to the Ohio Corn Checkoff Board and OARDC Fertility Lab for supporting this research. Thanks also to OSU Extension interns for data collection and processing. Fulton County interns assisting with this project were Ross Andre, Ben Eggers and Kaitlin Ruetz, while Taylor McNamara served as an intern in Hardin County.

PROJECT CONTACTS

For inquiries about this project, contact Mark Badertscher, Hardin County Extension (badertscher.4.osu.edu) or Eric Richer, Fulton County Extension (richer.5@osu.edu).

RESULTS

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HARDIN COUNTY TRIAL 1

Treatments	Placement	Rate (total N/ac)	Source	CSNT (ppm)	2016 Yield (bu/ac)	Yield Difference (bu/ac)	NUE (lbs N/bu)	2017 Yield (bu/ac)
Check 0 N Sidedress	Y-Drops ®	147	Urea DAP AMS 28% UAN	N/A	172 a	-	.85	N/A
60 lb 28% UAN @ V6	Y-Drops ®	207	Urea DAP AMS 28% UAN	N/A	187 a	+15	1.11	N/A
60 lb 28% UAN @ V8	Y-Drops ®	207	Urea DAP AMS 28% UAN	N/A	185 a	+13	1.12	N/A
60 lb 28% UAN @ V10	Y-Drops ®	207	Urea DAP AMS 28% UAN	N/A	179 a	+7	1.16	N/A
60 lb 28% UAN @ V12	Y-Drops ®	207	Urea DAP AMS 28% UAN	N/A	176 a	+4	1.18	N/A

HARDIN COUNTY TRIAL 2

Treatments	Placement	Rate (total N/ac)	Source	CSNT (ppm)	2016 Yield (bu/ac)	Yield Difference (bu/ac)	NUE (lbs N/bu)	2017 Yield (bu/ac)
Check 60 lb N Plant 135 lb N Sidedress	Coulter Injection	195	28% UAN	N/A	146 a	+	1.34	N/A
Split 60 lb N Plant 105 lb N Sidedress 36 lb N Late Sidedress	Coulter Injection Y-Drops ®	201	28% UAN	N/A	147 a	+1	1.37	N/A

FULTON COUNTY TRIAL 1

Treatments	Placement	Rate (total N/ac)	Source	CSNT (ppm)	2017 Yield (bu/ac)	Yield Difference (bu/ac)	NUE (lbs N/bu)	2016 Yield (bu/ac)
Check @ V5	Coulter/Knife	210	28% UAN	58	233 a	-	.90	219 a
Late N @ V12	Drops	210	28% UAN	449	235 a	+2	.89	219 a
Split @ V5 & V12	Both	210	28% UAN	1,375	239 a	+6	.88	222 a
Late N @ V12 (reduced)	Drops	168	28% UAN	173	220 b	-13	.76	N/A

FULTON COUNTY TRIAL 2

Treatments	Placement	Rate (total N/ac)	Source	CSNT (ppm)	2017 Yield (bu/ac)	Yield Difference (bu/ac)	NUE (lbs N/bu)	2016 Yield (bu/ac)
Check @ V5	Y-Drops ®	210	28% UAN	831	223 a	-	.94	174 a
Late N @ V10	Y-Drops ®	210	28% UAN	1,048	218 a	-5	.96	176 a
Late N @ V10 (reduced)	Y-Drops ®	168	28% UAN	57	218 a	-5	.77	176 a
Late N @ V10 (reduced)	Y-Drops ®	126	28% UAN	20	207 b	-16	.61	N/A

FULTON COUNTY TRIAL 3

Treatments	Placement	Rate (total N/ac)	Source	CSNT (ppm)	2017 Yield (bu/ac)	Yield Difference (bu/ac)	NUE (lbs N/bu)	2016 Yield (bu/ac)
Check @ V5	Gas Injection	210	Anhydrous	458	209 a	-	1.0	212 a
Late N @ V12	Drops	210	28% UAN	972	212 a	+4	.99	211 a
Split @ V5 & V12	Both	210	Both	1,633	214 a	+6	.98	214 a
Late N @ V12 (reduced)	Drops	168	28% UAN	148	211 a	+3	.80	N/A