A SYSTEMS APPROACH FOR WATERHEMP CONTROL IN CORN IN A SUGARBEET ROTATION AT WHEATON, MN IN 2016

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The objective of this study was to demonstrate a weed control system in corn using herbicides with a 'site of action' different than EPSP synthase inhibitor (glyphosate) and have rotation flexibility with sugarbeet as a rotational crop the following season.

MATERIALS AND METHODS

An experiment was conducted near Wheaton, MN in 2016. The trial site was prepared by the grower cooperator on May 15, 2016. 'DKC38-04 RIB' Dekalb corn was seeded in 22-inch rows at 32,000 seeds per acre on May 17 with a John Deere 1700XP 6-row planter. Preemergence (PRE) treatments were applied May 18. Postemergence (POST) treatments were applied June 21. All herbicide treatments were applied with a bicycle sprayer in 17 gpa spray solution through 8002 XR flat fan nozzles pressurized with CO_2 at 30 psi to the center four rows of six row plots 30 feet in length. Corn injury and common lambsquarters, redroot pigweed, and waterhemp control were evaluated June 29, July 18, and August 31. Only data from August 31 will be discussed.

All corn injury and weed control evaluations were a visual estimate of percent fresh weight reduction in the four treated rows compared to the adjacent untreated strip. Experimental design was randomized complete block with 4 replications for each trial. Data were analyzed with the ANOVA procedure of ARM, version 2016.4 software package.

Table 1. Application Information – Wheaton, MN 2016

Date	May 18	June 21
Time of Day	12:00 PM	11:00 AM
Air Temperature (F)	72	75
Relative Humidity (%)	27	40
Wind Velocity (mph)	4.5	2
Wind Direction	SE	NW
Soil Temp. (F at 6")	56	70
Soil Moisture	Poor	Poor
Cloud Cover (%)	10	10
Next Rainfall (amount)	May 25	July 10
Corn Stage	PRE	V8 – V10
Common Lambsquarters	-	7 inch
Waterhemp	-	7 inch

SUMMARY

This trial had large amounts of variability throughout the growing season. Corn emergence was variable due to dry conditions at planting. Weed pressure was variable across the trial as well. Due to these inconsistencies, only data from August 31 evaluation (Table 2.) will be discussed. Data should be interpreted with a level of caution due to these variabilities.

Table 2. Corn injury and weed control on August 31, 2016 at Wheaton, MN.

Treatment	Rate/A	Appl[1]	corn	colq[2]	wahe
			% inj	% cntl	% cntl
Harness + Sharpen	32 + 2.5 fl oz + fl oz	PRE	8	75	100
Harness + Clarity	32 + 16 fl oz + fl oz	PRE	5	100	100
Laudis+AAtrex[3]	3 + 12 fl oz + fl oz	post			
Harness + AAtrex	32 + 12 fl oz + fl oz	PRE	10	100	100
Status[3]	3.5 oz	post			
Harness	32 fl oz	PRE	5	100	98
Status[3]	3.5 oz	post			
Harness	32 fl oz	PRE	3	98	100
Laudis + AAtrex[3]	3 + 12 fl oz + fl oz	post			
Sharpen	2.5 fl oz	PRE	0	100	100
Status[3]	3.5 oz	post			
Sharpen	2.5 fl oz	PRE	5	98	100
Laudis + AAtrex[3]	3 + 12 fl oz + fl oz	post			
Verdict + AAtrex	13 + 12 fl oz + fl oz	PRE	0	100	100
Status[3]	3.5 oz	post			
Verdict	13 fl oz	PRE	3	100	99
Status[3]	3.5 oz	post			
Sharpen	2 fl oz	PRE	5	100	100
Warrant + Status +	48 + 3.5 fl oz + oz	post			
RU PowerMax[4]	28 fl oz	post			
Clarity	16 fl oz	PRE	3	85	95
Outlook + Laudis +	18 + 3 fl oz + fl oz	post			
AAtrex[3]	12 fl oz	post			
Laudis + AAtrex[3]	3 + 12 fl oz + fl oz	post	3	90	93
Status + RU PowerMax[4]	3.5 + 32 oz + fl oz	post	0.0	98	88
LSD (0.05)			NS	13.8	7.1

[1]Appl refers to application information in Table 1. PRE herbicides were applied May 18 and post herbicides applied June 21.
[2]colq=common lambsquarters; wahe=waterhemp
[3]Indicates addition of Methylated Seed Oil (MSO) at 1.5 pt/A. Product provided by Loveland.
[4]Indicates addition of Ammonium Sulfate (AMS) at 8.5 lb/100 gal + High Surfactant Methylated Seed Oil Concentrate (HSMOC) at 1.5 pt/A. N-Pak AMS and Destiny HC (HSMOC) were provided by Winfield.

Corn injury was observed in late August as "firing" of lower leaves. Treatments containing a PRE tended to show slightly more firing of lower leaves than treatments without a PRE. However, corn injury was not statistically significantly among treatments.

Common lambsquarters control varied from 75% from PRE Harness+Sharpen to 100% from many treatments. Treatments containing both a PRE and POST herbicide program tended to give greater and more consistent lambsquarters control compared to treatments containing only POST herbicides. The exception to this trend was PRE Clarity at 1 pt/A fb POST Outlook at 18 fl oz + Laudis at 3 fl oz + AAtrex at 12 fl oz + MSO at 1.5 pt/A which gave only 85% lambsquarters control.

Waterhemp control varied from 88% from POST Status at 3.5 oz + PowerMax at 32 fl oz + AMS at 8.5 lb/100 gal + Destiny HC at 1.5 pt to 100% from many treatments. Similarly to lambsquarters, treatments containing a PRE fb POST

program tended to give greater waterhemp control than the POST only program. Harness PRE fb Status POST gave 98% waterhemp control. Verdict PRE fb Status POST gave 99% waterhemp control. Increasing the rate of Status from 3.5 oz/A to 5-10 oz/A would likely improve waterhemp control to 100% from these treatments. Clarity PRE fb Outlook+Laudis+AAtrex+MSO POST gave 95% waterhemp control. Outlook herbicide requires rainfall for activation and provides little, if any, control of emerged waterhemp. The dry spring may account for some reduction in control from this treatment.

CONCLUSIONS

Variability in this study reduced the overall quality of the data. However, a trend was still observed that pointed toward improved weed control from a PRE fb POST weed control system compared to a POST only system. Corn injury from the herbicides used was generally slight and was statistically similar across treatments.