

AN EVALUATION OF WEED CONTROL IN XTEND SOYBEAN AT MOORHEAD, MN IN 2016

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The objective of this study was to evaluate weed control systems options that combine at least two, and preferably three, sites of action for controlling waterhemp in RR2 Xtend soybean in a field in sequence with Roundup Ready sugarbeet.

MATERIALS AND METHODS

An experiment was conducted near Moorhead, MN in 2016. The trial site was prepared using a Kongskilde ‘s-tine’ field cultivator with rolling baskets on May 7, 2016. ‘16X07N’ Roundup Ready 2Xtend soybean from Peterson Farm Seed was seeded in 22-inch rows at 160,000 seeds per acre on May 12 with a John Deere 1700XP 6-row planter. Preemergence (PRE) treatments were applied May 16. Postemergence (POST) treatments were applied June 14 and 23. All herbicide treatments were applied with a bicycle sprayer in 17 gpa spray solution through 8002 XR flat fan nozzles pressurized with CO₂ at 30 psi to the center four rows of six row plots 30 feet in length. Soybean injury along with common lambsquarters and waterhemp control were evaluated June 13, July 7, and August 24.

All soybean 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 – Moorhead, MN 2016

Date	May 16	June 14	June 23
Time of Day	1:00 PM	10:00 AM	9:00 AM
Air Temperature (F)	67	67	65
Relative Humidity (%)	32	68	62
Wind Velocity (mph)	8	7	3
Wind Direction	N	SE	NW
Soil Temp. (F at 6")	51	68	64
Soil Moisture	Fair	Poor	Good
Cloud Cover (%)	20	100	0
Next Rainfall (amount)	May 25	June 14	June 29
Soybean Stage	PRE	V1 – V2	V4
Common Lambsquarters	-	2.5 inch	3 inch
Waterhemp	-	3 inch	5 inch

SUMMARY

Xtend soybeans are tolerant to both dicamba and glyphosate. Crop injury was generally negligible from all treatments evaluated in this trial (Table 2). Slight soybean height reduction was observed on July 7 from POST only applications, but this injury may have been due more to early season weed competition than actual herbicide phytotoxicity. No significant soybean injury was observed at the August 24 evaluation.

Table 2. Soybean injury and weed control in Xtend soybeans at Moorhead, MN in 2016.

Treatment	Rate	Appl ¹	-----June 13-----			-----July 7-----			-----August 24-----		
			soyb ²	colq	wahe	soyb	colq	wahe	soyb	colq	wahe
			% inj	%cntl	%cntl	% inj	%cntl	%cntl	% inj	%cntl	%cntl
Warrant	3.25 pt	A	6	70	85	3	99	79	0	98	86
Engenia+PMax ³	12.8+32 fl oz+fl oz	B									
Warrant+Sharpen	3+1 pt + fl oz	A	0	88	93	3	98	86	5	100	89
Engenia+PMax ³	12.8+32 fl oz+fl oz	B									
Warrant	3 pt	A	0	64	80	0	100	99	3	100	100
Engenia+PMax ³	12.8+28 fl oz+fl oz	B									
Engenia+PMax ³	12.8+28 fl oz+fl oz	C									
Warrant	3.25 pt	A	0	76	84	0	98	80	5	100	93
Engenia	12.8 fl oz	B									
RU PowerMax ⁴	32 fl oz	C									
Engenia	25.6 fl oz	A	0	94	81	0	100	81	3	100	91
Engenia+Warrant	12.8+3 fl oz + pt	B									
RU PowerMax ⁴	32 fl oz	C									
Sharpen	1 fl oz	A	3	85	41	5	99	68	3	100	70
Engenia+Warrant	12.8+3 fl oz + pt	B									
RU PowerMax ⁴	32 fl oz	C									
Warrant	2.25 pt	A	0	53	64	0	96	83	0	100	89
Engenia+Warrant	12.8+2.25 fl oz + pt	B									
RU PowerMax ⁴	32 fl oz	C									
Engenia+PMax ³	12.8+28 fl oz+fl oz	B	0	0	0	13	99	89	10	96	99
Engenia+PMax ³	12.8+28 fl oz+fl oz	C									
Engenia+PMax	12.8+28 fl oz+fl oz	BC	0	0	0	15	99	90	8	98	99
+Basagran ³	+12.8 +fl oz	BC									
RU PowerMax ⁴	32 fl oz	B	0	0	0	10	100	43	0	100	40
RU PowerMax ⁴	32 fl oz	C									
LSD (0.05)			NS	12.2	10.7	9.7	NS	13.2	NS	NS	15.1

¹Appl refers to application information in Table 1.

²soyb=soybean; colq=common lambsquarters; wahe=waterhemp

³PMax=Roundup PowerMax and indicates addition of Class Act Ridion at 1 %v/v provided by Winfield.

⁴Indicates addition of ammonium sulfate (AMS) at 8.5 lb/100 gal and non-ionic surfactant (NIS) at 0.25% v/v. N-Pak AMS provided by Winfield and Prefer 90 NIS provided by West Central, Inc.

Common lambsquarters control varied considerably by PRE herbicide early in the season. On June 13, PRE Warrant at 2.25, 3, and 3.25 pt/a gave 53%, 64%, and 73% lambsquarters control, respectively. Preemergence Sharpen at 1 fl oz/A gave 85% lambsquarters control, and a tank-mix of PRE Warrant at 3 pt/a + Sharpen at 1 fl oz/A gave 88% lambsquarters control. Preemergence Engenia at 25.6 fl oz/A gave the greatest lambsquarters control of all PRE herbicides at 94%. All POST applications contained Roundup PowerMax and no significant differences in lambsquarters control were observed among treatments on either July 7 or August 24.

Waterhemp control early in the season also varied considerably by PRE herbicide. Preemergence Warrant at 3 pt/A+Sharpen at 1 fl oz/A gave the greatest waterhemp control on June 13 at 93%. Warrant at 3.25 or 3 pt/A gave 85% and 80% control, respectively, which was similar to 81% control from Engenia at 25.6 fl oz/A. Reducing the Warrant rate to 2.25 pt/A reduced waterhemp control to 64%, and PRE Sharpen at 1 fl oz/A gave only 41% waterhemp control.

Waterhemp control at the end of the season was generally greater from two POST Enginia applications compared to 1 POST Enginia application. Two POST applications of Enginia, regardless of whether a PRE herbicide was applied or not, gave 99% to 100% waterhemp control. Where only 1 POST Enginia application was made, waterhemp control ranged from 70% to 93% on August 24. The greatest and most consistent waterhemp control throughout the season came from Warrant applied PRE at 3 pt/A fb two POST applications of Enginia at 12.8 fl oz/A+Roundup PowerMax at 28 fl oz/A. Two applications of Roundup PowerMax gave only 40% control of waterhemp which indicates the presence of glyphosate resistant waterhemp in this trial.

CONCLUSIONS

Soybean injury was generally negligible in this trial, though some leaf necrosis was observed when Basagran was applied in a tank-mix with Enginia+Roundup PowerMax. Common lambsquarters control was greater than 95% at the end of the season from all treatments. However, early season control did vary by PRE herbicide and Enginia at 25.6 fl oz/A, Warrant at 3 pt/A+Sharpen at 1 fl oz/A, and Sharpen at 1 fl oz/A gave 94%, 88%, and 85% lambsquarters control on June 13. The greatest waterhemp control was achieved from two POST applications of Enginia. However, repeated use of the same herbicide is what selects for tolerant biotypes and speeds herbicide resistance development in weeds. Applying PRE Warrant at 3 pt/A gave 80% waterhemp control on June 13 and following Warrant with sequential POST applications of Enginia+Roundup PowerMax gave 100% waterhemp control on August 24.