

VOLUNTEER CORN CONTROL AND WHEAT RESPONSE TO SELECT MAX, GRAMOXONE, AND FINESSE (UKREC 2012-2013)

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INTRODUCTION

Problems with volunteer corn prior to wheat planting, has been a concern, especially this past fall. The options for managing volunteer corn include tillage or a foliar applied herbicide. Tillage provides immediate results, but may increase the risk of soil erosion and requires more time relative to using burndown herbicides. While tillage will destroy emerged volunteer corn plants, it may stimulate germination of any remaining seeds that were incorporated in the soil during the tillage process.

Glyphosate is a good option for controlling volunteer corn, providing corn plants do not have the glyphosate resistant trait. Other options such as paraquat or Finesse have been considered where volunteer corn plants have the resistant trait. Select Max has also been discussed as a possible option for controlling volunteer corn. Although the Select Max label does not specifically address using Select Max for burndown prior to wheat; it is a legal option providing there is a minimum interval of 30 days between application and planting wheat.

A number of research trials have been conducted on managing volunteer corn prior to wheat planting. As a general rule, results have shown a rapid burndown control of volunteer corn initially with paraquat compared with a slower response with Finesse and Select Max. In nearly all studies a frost occurred before we could determine if there is a risk of regrowth of the volunteer corn.

OBJECTIVE

The main objective was to continue to evaluate volunteer corn control and wheat injury with Gramoxone (alone and in combinations with Sencor and Sharpen), Select Max, and Finesse when applied at three different times ahead of wheat planting.

METHODS

In order to ensure a uniform stand of volunteer corn, a number of ears were pulled and dropped to the ground prior to corn harvest. The combine also deposited a large quantity of shelled corn seed during the harvesting process. Roundup PowerMax was applied after corn harvest to control broadleaf weeds and johnsongrass. Pioneer 25R32 wheat was planted at a rate of 39 viable seed/ft².

The preplant burndown treatments for the corn study were originally scheduled to be applied at 1, 3 and 7 days ahead of wheat planting. However, rainfall delayed wheat planting from October 1 to October 5, 2012. This delay caused the preplant intervals to change to 5, 7, and 11, days before planting. The specific dates of applications and corn heights and growth stages for each of the timings are listed in the footnotes of table 1.

A CO₂ back pack sprayer was used to apply all herbicide treatments in a spray volume of 20 GPA.

Visual ratings of volunteer corn control were made at 0, 7, 14, and 20 Days After Planting (DAP). Wheat injury was evaluated at 14 DAP. Wheat stand counts per square foot were determined from three random sites per plot at

18 DAP. Wheat heights were measured from five random plants per plot at 19 DAP.

Details concerning herbicide rates and additives are indicated in the footnotes of table 1.

A field trial was conducted in the fall of 2011 to evaluate volunteer corn control and wheat injury following preplant burndown applications of Select Max (clethodim), Gramoxone Inteon (paraquat), and Finesse (chlorsulfuron + metsulfuron). Gramoxone was applied at 1 Day Before Planting (DBP); whereas, Select Max and Finesse were each applied 1, 3, or 7 DBP. The heights of corn plants at the time of applications were approximately 5 to 6 inches.

RESULTS

A similar trial was conducted in the fall of 2011. Data for that study was reported in the 2011-2012 Wheat Science Research Report. Some of the major observations in this year's study are listed below:

- Gramoxone provided rapid burndown control of volunteer corn. Control at the time of wheat planting ranged from 93 to 99% for Gramoxone at 11 Days Before Planting (DBP); 97 to 99% for treatments at 7 DBP; and 90 to 95% for treatments at 5 DBP. The fact that average corn plant heights ranged from 12.9 to 18 inches for these treatments indicates that plant size was not a factor in affecting control. The populations of volunteer corn plants were somewhat low, which allowed for good spray coverage.
- Initially, Sencor slightly enhanced control of corn with Gramoxone when the treatment was applied at 5 DBP and 11 DBP. However, the control ratings did not reflect this advantage as the season progressed.
- Increasing Gramoxone rate from 2 pt/A to 3 pt/A showed a slight increase in corn control at the 5 DBP timing. However, the later ratings did not reflect an advantage for increasing the rate.

- Including Sharpen with Gramoxone did not enhance control of volunteer corn compared with Gramoxone alone.

- Control of volunteer corn with Select Max was slow but improved with time. Select Max applied at 6 oz/A on September 30 (5 DBP) provided 6% control when rated at planting. By October 25th, volunteer corn control increased to 73%. Applying Select Max at 6 oz/A September 24 (11 DBP) resulted in 70% control at the time of wheat planting. By October 25th, control of volunteer control was 91%.

- Increasing the Select Max rate from 6 to 12 oz/A usually showed an advantage in some of the early ratings. However, the difference in control by October 25th was not significant when Select Max was applied on September 24 (11 DBP) or September 28 (7 DBP).

- The weekly ratings during October indicated a slight trend in regrowth of corn with Gramoxone treatments. However, control with Select Max and Finesse tended to improve over time.

- Control of volunteer corn with Finesse was extremely slow. Control of corn with Finesse ranged from 10 to 40% for ratings made at the time of wheat planting. By the last rating on October 25th, control of volunteer corn was 70, 88, and 83% with Finesse applied September 30th, September 28th, and September 24th, respectively.

- The final ratings that were made a few days prior to first freezing temperature ranged from 91 to 94% for Gramoxone; 73 to 95% for Select Max; and 70 to 88% for Finesse.

- The only treatment that injured wheat was Select Max applied at 12oz/A on September 30th (5DBP). The visual ratings on October 19th (14 DAP) was only 3%. This was based on slight discoloration and was not reflected in the wheat stand counts or wheat plant heights. No visual injury was observed for wheat ratings made on October 25th (20 DAP).

SUMMARY

The results of this research continue to show the rapid control achieved with Gramoxone and the slow response with Select Max and Finesse. The need to control volunteer corn quickly may be important in order to mitigate the “green bridge” effect for insects between live corn plants and upcoming wheat crop.

The ratings over time for Gramoxone reflected a slight trend in regrowth from old plants or newly emerging volunteer corn. The time following corn emergence to the first killing

frost may vary from season to season in Kentucky, but is usually short compared to states in the South. The likelihood of any significant regrowth of corn from Gramoxone is limited due to the short period of time until the first killing frost.

There was a general trend for improved control of corn over time with Select Max and Finesse. These herbicides may be good options in cases where corn is harvested early and a long period of time exists between harvest and the first killing frost.

Table 1. VOLUNTEER CORN CONTROL AND WHEAT INJURY FOLLOWING BURNDOWN APPLICATIONS OF SELECTMAX, GRAMOXONE SL, AND FINESSE (UKREC 2012-2013)

HERBICIDES ¹	TIMING ²	VOLUNTEER CORN CONTROL (%)				WHEAT		
		0 DAP 10-05-12	7 DAP 10-12-12	14 DAP 10-19-12	20DAP 10-25-12	Stand Plants/ft ² 18 DAP 10-23-12	Height (Inches) 19 DAP 10-24-12	Injury (%) 14 DAP 10-19-12
		Gramoxone SL (2pt/A)	5 DBP	91	94	95	94	36.2
Gramoxone SL (2pt/A) Sencor 2 oz/A	5 DBP	95	94	95	95	37.2	3.8	0
Gramoxone SL (2pt/A) Sharpen 1 oz/A	5 DBP	90	92	93	94	37.1	3.9	0
Gramoxone SL (3pt/A)	5 DBP	95	95	94	94	39.6	4.5	0
Select Max (6 oz/A)	5 DBP	6	25	63	73	39.0	4.2	0
Select Max (12 oz/A)	5 DBP	6	55	73	83	36.9	4.3	3
Finesse (0.5 oz/A)	5 DBP	10	20	53	70	37.2	4.0	0
Gramoxone SL (2pt/A)	7 DBP	99	94	93	93	39.5	3.9	0
Gramoxone SL (2pt/A) Sencor 2 oz/A	7 DBP	99	97	95	96	34.1	3.9	0
Gramoxone SL (2pt/A) Sharpen 1 oz/A	7 DBP	97	95	94	94	37.7	4.3	0
Gramoxone SL (3pt/A)	7 DBP	99	92	92	94	40.2	4.2	0
Select Max (6 oz/A)	7 DBP	25	60	88	93	37.4	4.1	0
Select Max (12 oz/A)	7 DBP	33	76	92	94	38.9	4.1	0
Finesse (0.5 oz/A)	7 DBP	20	48	75	88	39.1	3.9	0
Gramoxone SL (2pt/A)	11 DBP	95	93	93	93	37.9	4.2	0
Gramoxone SL (2pt/A) Sencor 2 oz/A	11 DBP	99	94	94	91	37.3	4.2	0
Gramoxone SL (2pt/A) Sharpen 1 oz/A	11 DBP	93	91	90	91	38.6	4.5	0
Gramoxone SL (3pt/A)	11 DBP	95	95	95	95	37.7	4.1	0
Select Max (6 oz/A)	11DBP	70	89	89	91	38.1	3.9	0
Select Max (12 oz/A)	11DBP	83	95	92	94	34.5	4.1	0
Finesse (0.5 oz/A)	11DBP	40	65	75	83	37.1	4.3	0
CHECK		0	0	0	0	35.8	4.3	0
LSD (0.05)		4	10	6	4	4.9	0.6	1

¹ Additives were included as follows:

- Nonionic surfactant at 0.25% with Gramoxone SL
- Nonionic at 0.25% v/v with Finesse
- Nonionic surfactant 0.25% + AMS 2.5 lb/A with Select Max

² Timing of burndown applications expressed as Days Before Planting (DBP):

- **5 DBP:** 09-30-12 Corn height ranged from 7 to 33.3" and averaged 18" (Stage V5). First rain after 5DBP was on 10-01-12
- **7 DBP:** 09-28-12 Corn height ranged from 9.5 to 24" averaged 17.75" (Stage V4) First rain after 7DBP was on 10-01-12
- **11 DBP:** 09-24-12 Corn height ranged from 5.5 to 20" averaged 12.9" (Stage V3 to V4) First rain after 11DBP was on 09-26-12

- Pioneer 25R32 wheat was planted 10-05-2012
- First freezing temperature of 31^oF injured corn plants on 10-31-12.