Result Demonstration/Applied Research Report

2005 Nolan County
Liberty Link Test
Cooperator: Randall Smith

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Summary

Initially this test was established to determine the effectiveness of Ignite 280 herbicide in controlling annual weeds. An application of Roundup WeatherMAX (glyphosate) prior to planting the Liberty Link cotton controlled most of the weeds for the season. The only weed that remained in the test plots was Field Bindweed that emerged in late-May. Ignite is a contact herbicide that would be able to kill the seedling Field Bindweed but not the perennial weeds regrowing from the root system. The focus of the test was changed to evaluate if Field Bindweed could be suppressed and/or controlled using Ignite 280. Applications of Ignite were made on July 6, August 1, and August 31 to actively growing and unstressed Field Bindweed that had vines ranging from six to eight inches long. Each application of herbicide eliminated most of the Field Bindweed vegetation that existed and provided a window of opportunity for the cotton to develop with no weed competition. Each rainfall event resulted in additional Field Bindweed development. The herbicides applied did control the plants that were growing at the time the application(s) were made. However, reinfestation continued throughout the growing season.

Problem

In the Rolling Plains of Texas, Field Bindweed (*Convolvulus arvensis*) is a problem in crop production and non-crop areas. Field Bindweed can be recognized by its arrowhead-shaped leaves, white or pink funnel-shaped flowers, and the presence of 2 finger-like bracts below the flowers. The plant has smooth stems that twine and spread to form a mat on the ground surface and through the crop canopy. The arrowhead leaves are located alternately along the plant's vine. The leaves usually have a rounded tip and smooth margins. The 1-inch pink to white funnel-shaped flowers are the plant's most distinctive characteristic. Flowering occurs from mid-May until frost in the fall. The 2 small bracts located 1 inch below the flower distinguish this species from other vine weeds. The irregular-shaped seed pod usually contains four seeds. Seeds are dull brown, rough, 1/8 to 1/6 inch long and have an orange slice appearance. Seedlings emerge from the seeds with 2 leaves similar to alfalfa or radishes. In agricultural areas, Field Bindweed depletes soil moisture resulting in reduced yield and growth in canopy can interfere with harvest. The seed of Field Bindweed are hard and can remain viable in the soil for more than 20 years.

Objective

Through the use of a field test: 1) determine the effectiveness of herbicides at controlling the weed, 2) provide producers the opportunity of observing how effectively the herbicides control the weed, and 3) determine the economic feasibility of applying the herbicides for weed control.

Materials and Methods

Cooperating County Producer: Randall Smith
Location: West side of Roscoe, Texas

Application Information:

Date Applied:	July 6, 2005	August 1, 2005	August 31, 2005
Time of Application:	9:30 a.m. - 10:15 a.m.	9:00 a.m. - 10:15 a.m.	9:00 a.m. - 10:00 a.m.
Wind Speed:	5 miles per hour	3 to 4 miles per hour	6 to 8 miles per hour
Wind Direction:	South by Southwest	South	South
Air Temperature:	76 to 78^0 Fahrenheit	75 to 80^0 Fahrenheit	76 to 82^0 Fahrenheit
Relative Humidity:	60 %	45 to 50%	58 to 67%
Spray Volume	18.0 gallons per acre	15.3 gallons per acre	19.0 gallons per acre
Pressure:	32 p.s.i.	32 p.s.i.	32 p.s.i.
Application Device:	Hand boom	Hand boom	Hand boom
Ground Speed:	3.0 miles per hour	3.0 miles per hour	3.0 miles per hour
Nozzle:	11002 Air Induction Flat Fan on 20 inch center.	11002 Air Induction Flat Fan on 20 inch center.	11002 Air Induction Flat Fan over the top of the row and 8002 flat fan nozzels on each side of the row.
Boom Height:	16 inches	16 inches	32 inches
Field Bindweed:	6 to 8 inch runners	6 to 8 inch runners	2 to 8 inch runners
All plots:			
Plot Size:	6.7 feet wide by 45 feet long		
Test Design:	randomized complete block design with three replications		

Results and Discussion

The purpose of this test was to determine how well Ignite 280 controlled annual weeds in Liberty Link cotton. An applications of glyphosate (Roundup WeatherMAX) prior to the planting of cotton controlled most of the weeds for the growing season. By late-May, Field Bindweed emerged in the test plots and it became the target weed of this study. Ignite 280 is a contact herbicide that can kill the seedling Field Bindweed but not regrowth of perennial weeds from the root system. Applications of Ignite 280 were made on July 6, August 1, and August 31 to actively growing and unstressed Field Bindweed that had vines ranging from six to eight inches long. Each application of herbicide eliminated most of the Field Bindweed vegetation and provided a window of opportunity for the cotton to develop with no weed competition.

On August 1, prior to any Field Bindweed blooming, the check plots were oversprayed with Roundup WeatherMAX to prevent any seed from being produced. The number of Field Bindweed plants in the check plots averaged one plant per square foot (300 plants per plot). The level of weed control in the Ignite 280 plots established on July 6, ranged from 29 to 75 percent. Due to the variability between plots there was no statistical difference between treatments. With each rainfall event during the growing season, additional Field Bindweed would development either from the perennial root system or from seed. Also, the application of glyphosate provided the opportunity to evaluate and take picture of the impact of the herbicide on Liberty Link cotton.

Different followup treatments were applied on August 1 and when it was evaluated on August 31 weed control ranged from 29 percent to 90 percent. All treatments were better than the check which was set at 300 plants per plot. The variability between treatments resulted in no statistical difference between treatments. Also, the application of glyphosate to the Liberty Link cotton resulted in a plant height reduction of 12 inches and no boll retention. The leaves appeared strapped very similar to hormone herbicide damage. The data collected on August 31 is reported in Table 1.

On August 31, all plots were oversprayed with either 23 ounces of Ignite 280 or 28 ounces of glyphosate (Roundup WeatherMax). Due to the plant size a three nozzle per row arrangement was used with increased gallonage. The cotton plant was nearing cut out with five nodes above white flower. A large portion of the early boll set had been lost to bollworms and budworms. Some of the first replacement bolls were now almost full size. The plot was evaluated on September 26 and the data collected is reported in Table 1.

As the plots were evaluated on September 26 it was noted that the glyphosate applied on August 31 for the first time had caused some minor plant injury and that most of the young bolls had been aborted. The plot where glyphosate had been applied for a second time was stunted but not dead. The level of Field Bindweed control was over 90 percent in all plots except the treatment where Roundup was applied only once on August 1. There were very few Field Bindweed in the test plots that had not been injured by the herbicides applied. No plants had produced seed during the season. Overall, the level of weed control achieved was higher than expected. The number of applications needed was also more than expected.

Table 1. Data collected from Randall Smith's Field Bindweed Control Test (Nolan County, 2005)

Treatment	Cost of Herbicide Per Acre	Percent Field Bindweed Control	
		August 31 a/	September 26 b/
Check --------->followed by Roundup WeatherMAX @ 28 oz. per acre (August 1, 2005) --------->followed by Roundup WeatherMAX @ 28 oz. per acre (August 31, 2005)	 $9.41 $9.41	91.11	97.22 ab
Ignite 280 @ 23 oz. per acre ------->followed by Roundup WeatherMAX @ 28 oz. per acre (August 1, 2005)	$9.00 $9.41	83.44	72.56 b
Ignite 280 @ 23 oz. per acre ------->followed by Ignite 280 @ 23 oz. per acre (August 1, 2005) ------->followed by Ignite 280 @ 23 oz. per acre (August 31, 2005)	$9.00 $9.00 $9.00	29.00	95.89 ab
Ignite 280 @ 23 oz. per acre ------->followed by Ignite 280 @ 23 oz. + Valor @ 1.5 oz. per acre (August 1, 2005) ------->followed by Roundup WeatherMAX @ 28 oz. per acre (August 31, 2005)	$9.00 $7.59 $9.41	76.00	99.78 a
Ignite 280 @ 23 oz. per acre ------->followed by Ignite 280 @ 23 oz. + Envoke@ 0.25 oz. per acre (August 1, 2005) ------->followed by Roundup WeatherMAX @ 28 oz. per acre (August 31, 2005)	$9.00 $12.25 $9.41	47.33	93.00 ab
Ignite 280 @ 23 oz. per acre ------->followed by Ignite 280 @ 23 oz. + Staple@ 1.5 oz. per acre (August 1, 2005) ------->followed by Ignite 280 @ 23 oz. per acre (August 31, 2005)	$9.00 $27.00 $9.00	90.00	95.44 ab
Ignite 280 @ 23 oz. per acre ------->followed by Ignite 280 @ 23 oz. + Staple@ 0.6 oz. per acre (August 1, 2005) ------->followed by Ignite 280 @ 23 oz. per acre (August 31, 2005)	$9.00 $10.80 $9.00	86.44	94.78 ab
Ignite 280 @ 23 oz. per acre ------->followed by Ignite 280 @ 23 oz. + Aim@ 1.0 oz. per acre (August 1, 2005) ------->followed by Roundup WeatherMAX @ 28 oz. per acre (August 31, 2005)	$9.00 $5.47 $9.41	40.44	98.22 ab

a/Nolan County – August 31 column is the rating of the application made August 1, 2005
b/Nolan County – September 26 column is the rating of the application made August 31, 2005

NOTE: In Table 1 the individual or combination of letter a or b shown beside the number are to indicate statistical significance. There is no statistical difference between numbers that have the same letter (even when there appears to be a large difference in results between the materials applied).

Results and Discussion (Continued)

Several factors improved the performance of the herbicides in this test. They included actively growing Field Bindweed, increased gallonage of water, and applying the material under favorable environmental conditions.

The impact of glyphosate on Liberty Link Cotton was a reminder that producers will need to properly mark fields where different technologies are used. The impact of using the wrong herbicide for the technology in this test was reduced plant height, reduced plant performance, and dramatic yield reductions of lint and seed.

Since perennial Field Bindweed is an aggressive grower it will take multiple applications of Ignite to keep the weed suppressed. Since it doesn't have the systemic characteristic that glyphosate does, only a minor impact was made to the perennial root system.

Ignite is a contact herbicide so coverage is very important. Producers needed to make sure that a minimum of 15 gallons of water per acre and nozzles that provide through coverage are used.

Economics

Weed control from the herbicides applied was impressive for most treatments. The cost per acre was high enough that producers may have to mark only the areas of the field that need treating and use an aggressive spot treatment program. The Liberty Link program gives the producer the opportunity of raising a crop and controlling weeds throughout the season. Roundup tolerant cotton varieties that are to be released in 2006 will offer the same opportunity using a specially formulated glyphosate. Either herbicide program will allow a producer to have income from lint and seed production to help offset the cost of the herbicides applied.

Acknowledgments

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