

**ANTAGONISM OF OVER-THE-TOP GRASS
CONTROL MATERIALS WHEN TANK MIXED
WITH STAPLE**
Billy E. Warrick
Associate Professor and Extension Agronomist
Texas A&M University Extension Service
San Angelo, TX

Abstract

From 1992 through 1997, five different over-the-top grass control materials have been effectively used to control Johnsongrass in test plots established in the Southern Rolling Plains of Texas. The level of Johnsongrass control has been higher than 90 percent when herbicides were applied to unstressed, actively growing plants, less than ten inches in height. Staple® (Pyrithiobac-sodium), an over-the top broadleaf weed control herbicide used in cotton, was tank mixed in 1995 with one of the grass control materials and a ten percent reduction in Johnsongrass control occurred. To alert producers of the reduced Johnsongrass control resulting from tank mixing Staple, tests were established in 1996 and 1997. In the established tests, the reduction in Johnsongrass control was less than expected, ranging from none to nine percent.

Introduction

Johnsongrass is a perennial grass that has been a problem weed in cotton for many years. The weed competes directly with the cotton plant for moisture and nutrients. Due to the competition, there is a reduction in lint and cottonseed production which results in less income for the producer. An additional reduction in income occurs if harvested cotton lint is contaminated with grass.

Assure® II (Quizalofop-P-ethyl), Fusilade ® DX (Fluazifop-P-butyl), Fusion® (Fenoxaprop-P-ethyl plus Fluazifop-P-butyl), Poast Plus® (Sethoxydim) and Select® (Clethodim) have all been effective in controlling Johnsongrass in tests conducted in the Southern Rolling Plains of Texas. The growth stage and development of the Johnsongrass combined with conducive environmental conditions are necessary for achieving a high level of grass control (Table 1).

Table 1. Multi-year Summary of Rhizome Johnsongrass Control Tests conducted in Runnels and Tom Green Counties (1992-97).

Herbicide Applied	Year Weed Control Test Was Established					
	'92	'93	'94 ^{1/}	'95	'96	'97 ^{2/}
Assure	99.5	98+	86	99	94	91
Fusilade*	98	98+	61	99	99	94
Fusion	–	–	–	–	91	92
Poast Plus with Buffer	98	98+	--	--	--	--
Poast Plus	98	98+	10	99	97	85
Select at 8 oz.	--	90+	83	99	--	87
Select at 12 oz.	–	–	–	–	90	--

* Fusilade 2000 was used in tests in 1992 & 1993 and Fusilade DX was used starting in 1994

^{1/} In this test the Johnsongrass was already stressed due to lack of soil moisture.

^{2/} In this test the Johnsongrass was in early stages of moisture stress.

Materials and Methods

The 1996 plot was located four miles north of Norton, Texas. Five different Johnsongrass control materials were applied alone and then in combination with Staple. The herbicides were applied from 10:00 a.m. until 4:30 p.m. on July 3 using a self-propelled ground sprayer. The sprayer was equipped with 80015 flat fan nozzles on 20 inch centers with a boom height of 19 inches. A total of 10.5 gallons of water per acre was applied at 32 p.s.i. of pressure. The wind speed varied from 3 to 5 miles per hour from the Southwest and air temperature ranged from 85 to 94⁰ Fahrenheit with a relative humidity of 40 to 55 percent. Each treatment plus a check was replicated three times and each of the three plots were 13.33 feet wide by 700 feet long. Treatments were assigned at random within each replication. A summary of data collected is reported in Table 2.

The 1997 plot was located two miles north of Wall, Texas. Six different Johnsongrass control materials were applied alone and three were applied in combination with Staple. The herbicides were applied from 9:30 a.m. until 1:30 p.m. on June 25 using a self-propelled ground sprayer. The sprayer was equipped with 80015 flat fan nozzles on 20 inch centers with a boom height of 18 inches. A total of 10.0 gallons of water per acre was applied at 30 p.s.i. of pressure. The wind speed varied from 2 to 9 miles per hour from the Southwest and air temperature ranged from 84 to 90⁰ Fahrenheit with a relative humidity of 60 to 95 percent. Each treatment plus a check was replicated three times and each of the three plots were 13.33 feet wide by 900 feet long. A summary of data collected is reported in Table 3.

Results and Discussion

When this plot established in 1996 was evaluated on July 31, it was obvious that the population of Johnsongrass had been reduced by the herbicides applied. Control levels ranged from 65 to 94 percent with the tank mix of Staple resulting in a 0 to 24 percent reduction in the amount of Johnsongrass control achieved. The plot was then cultivated.

On September 6, the plot was evaluated and the level of Johnsongrass control was impressive. The reduction in Johnsongrass ranged from 85 to 99 percent. In the plots where Staple was included in the tank mix, the reduction in Johnsongrass control was 0 to 9 percent less when compared to the plots where the grass control herbicide was applied alone (Table 2). A reduction in Johnsongrass control was expected in this test, however, the percentage of reduction was not as high as expected.

Table 2. Agronomic Data from Rhizome Johnsongrass Control Test (Russells County, 1996)

Herbicide Name	Amount of Herbicide (per acre)	Amount of C.O.C. (per acre)	Herbicide Cost (per acre)	Percent Rhizome Johnson-grass Control (9/6/96)
Fusilade DX	16 oz	13.6 oz.	\$15.13	99
Fusilade DX + Staple	16 oz + 1.0 oz a.i.	13.6 oz.	\$15.13 + \$30.59	99
Assure II	12 oz	13.6 oz.	\$11.06	94
Assure II + Staple	12 oz + 1.0 oz a.i.	13.6 oz.	\$11.06 + \$30.59	85
Select	12 oz	16.0 oz.	\$16.69	90
Select + Staple	12 oz + 1.0 oz a.i.	16.0 oz.	\$16.69 + \$30.59	90
Fusion	12 oz	13.6 oz.	\$15.66	91
Fusion + Staple	12 oz + 1.0 oz a.i.	13.6 oz.	\$15.66 + \$30.59	88
Poast Plus	32 oz	32.0 oz.	\$12.66	97
Poast Plus + Staple	32 oz + 1.0 oz a.i.	32.0 oz.	\$12.66 + \$30.59	88
Check	None	None	\$00.00	0

In 1997 when the plot was evaluated seven and 14 days after treatments were applied, the 32 ounce rate of Roundup had turned the Johnsongrass completely brown. In the other plots where Assure II, Fusilade DX, Fusion, Poast Plus and Select were applied, there was a distinct purple coloration to the Johnsongrass. In plots where Staple was tank mixed with Assure II, Fusilade DX and Select, the cotton had a distinct yellowing to the leaves. However, 30 days after treatments were applied this yellow coloration was no longer visible.

When this plot was evaluated 30 and 60 days after establishment, it was obvious that the population of Johnsongrass had been reduced by the herbicides applied. Control levels ranged from 71 to 94 percent. When grass control herbicides were tank mixed with Staple there was a three to nine percent reduction in the amount of Johnsongrass controlled (Table 3). A reduction in Johnsongrass control was expected in this test, however, the percentage of reduction was not as high as expected.

This plot was unique in the variety of cotton planted, it was a new transgenic cotton that was resistant to Roundup®. The level of Johnsongrass control was 91 percent or higher when 16 ounces or more of Roundup® was applied per acre. No regrowth was apparent when evaluated at the end of the season.

Table 3. Agronomic Data from Rhizome Johnsongrass Control Test (Tom Green County, 1997)

Herbicide Name	Amount of Herbicide (per acre)	Amount of C.O.C. (per acre)	Herbicide Cost (per acre)	Percent Rhizome Johnson-grass Control (8/17/97)
Fusilade DX	16 oz	13.6 oz.	\$14.38	94
Fusilade DX + Staple	16 oz + 1.0 oz a.i.	13.6 oz.	\$14.38 + \$26.58	85
Assure II	12 oz	13.6 oz.	\$11.25	91
Assure II + Staple	12 oz + 1.0 oz a.i.	13.6 oz.	\$11.25 + \$26.58	88
Select + Agridex	8 oz	32.0 oz.	\$10.93	87
Select + Staple + Agridex	8 oz + 1.0 oz a.i.	32.0 oz.	\$10.93 + \$26.58	81
Select + Dynamic	8 oz	32 oz.	\$10.93	91
Roundup	32 oz	None	\$12.13	94
Fusion + Agridex	10 oz	32.0 oz.	\$10.08	92
Roundup	12 oz.	None	\$4.55	71
Poast Plus	32 oz	32.0 oz.	\$12.25	85
Roundup	16 oz.	None	\$6.06	91
Check	None	None	\$0.00	0

The effectiveness of Assure II, Fusilade DX, Fusion, Poast Plus and Select in these tests were the same as noted in previous Johnsongrass control tests conducted in the Southern Rolling Plains of Texas. If environmental conditions are correct at the time of application, a 90 percent reduction in Johnsongrass should be expected (Table 1). The desired conditions at the time a herbicide is applied are: high relative humidity, low wind speed and air temperatures between 80 and 90 degrees. A rapidly growing unstressed plant with adequate soil moisture is needed to achieve a high level of Johnsongrass control.

Even though Johnsongrass control levels were only reduced by less than ten percent in these tests, it is recommended that Johnsongrass control herbicides be applied solely for the purpose of controlling Johnsongrass. If Staple herbicide needs to be applied for broadleaf weed control then the application should be made for that purpose only.

Conclusions

From 1992 through 1997, five different over-the-top grass control materials have been effectively used to control Johnsongrass in test plots established in the Southern Rolling Plains of Texas. The level of Johnsongrass control has been higher than 90 percent when herbicides were applied to unstressed, actively growing plants, less than ten inches in height. Staple® (Pyriithiobac-sodium), an over-the top broadleaf weed control herbicide used in cotton, was tank mixed in 1995 with one of the grass control materials and a ten percent reduction in Johnsongrass control occurred. To alert producers of the reduced Johnsongrass control resulting from tank mixing Staple, tests were established in 1996 and 1997. In the established tests, the reduction in Johnsongrass control was less than expected, ranging from none to nine percent.

Product Information and Disclaimer

Assure® II and Staple® are products marketed by E. I. duPont de Nemours & Company (Inc.); Fusilade® DX and Fusion® are products marketed by Zeneca Inc.; Poast Plus® is a product marketed by BASF Corporation; and Select® is a product marketed by Valent U.S.A. Corporation.

Mention of a trademark or a proprietary product does not constitute an endorsement of the product by the Texas Agricultural Extension Service and does not imply its approval to the exclusion of other products that also may be suitable.