

USE OF BLIZZARD AT HIGH RATES AS AN ALTERNATIVE TO PARAQUAT IN THE TEXAS HIGH PLAINS

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Abstract

Cotton harvest aid programs in the Texas High Plains generally consist of an initial application of a boll opener/defoliant tank mix followed by a sequential application of a desiccant to terminate the crop for stripper harvesting. However, on occasion, high rates of a desiccant may be used if natural boll opening is sufficient to forego treatments with ethephon based products and generally, paraquat is utilized in the Texas High Plains. In 2008 (Crosby County) and 2009 (Lubbock County), research was conducted to determine the efficacy of high rates of Blizzard applied as a desiccant at various rates to cotton under dryland (2008) and furrow irrigation (2009) production in the Texas High Plains. Varying rates were applied to cotton on 29-Sep in both years. Four replications of each treatment were applied using a Lee Spider plot sprayer with multi-boom attachment set to deliver 15 GPA spray volume through Tee-Jet 11002VS nozzles set on 20" nozzle spacings at 3.5 mph with an operating pressure of 32 psi. Visual observations for percent defoliation, desiccation, and regrowth control were conducted at 8 and 14 days after initial treatment. Based on these results, when comparing the high rates of Blizzard to Firestorm, greater defoliation is achieved with Blizzard but less desiccation is provided at both 8 and 14 DAIT. When combining defoliation and desiccation results and comparing green leaf material left on the plant the Blizzard treatments result in more green leaves remaining on the plant at 8 DAIT than Firestorm but at 14 DAIT, the high rate Blizzard treatments are similar to the Firestorm treatment. Although some green leaf material may remain after a high rate Blizzard application, the benefit of greater defoliation may be beneficial in terms of reduced leaf grades under certain conditions. Furthermore, Blizzard has been determined to be a safe alternative to Firestorm and other paraquat based materials when applied in close proximity to small grains crops.

Introduction

Cotton harvest aid programs in the Texas High Plains generally consist of an initial application of a boll opener/defoliant tank mix followed by a sequential application of a desiccant to terminate the crop for stripper harvesting. However, on occasion, high rates of a desiccant may be used if natural boll opening is sufficient to forego treatments with ethephon based products and generally, paraquat is utilized in the Texas High Plains. Recent research has indicated that high rates of Blizzard (fluthiacet-methyl) harvest aid may be utilized as a viable alternative to paraquat under these conditions, especially when treatments are applied in close proximity to small grains crops.

Objective

The objective of this research was to determine the efficacy of higher rates of Blizzard as an alternative to paraquat based products for terminating cotton in preparation for stripper harvesting.

Materials and Methods

In 2008 (Crosby County) and 2009 (Lubbock County), research was conducted to determine the efficacy of high rates of Blizzard applied as a desiccant at various rates to cotton under dryland (2008) and furrow irrigation (2009) production in the Texas High Plains. Varying rates were applied to cotton on 29-Sep in both years. Average open boll percentage at application was 95% and 83% in 2008 and 2009, respectively.

The treatment schedule was similar for both years (Tables 1 and 2) and consisted of an untreated control, 2 high rates of Blizzard (1.0 and 1.25 oz/a) at initial application, 1 standard application (0.6 oz/a Blizzard in 2008, and 0.5 oz/a Blizzard followed by 0.75 oz/a Blizzard in 2009), and a 32 oz/a Firestorm (paraquat) application.

Table 1. Treatment schedule for the High Rate Blizzard Study, Blanco, TX 2008

Treatment no.	Treatment description
1	Untreated Control
2	Blizzard (0.6 oz/acre) + COC (16.0 oz/acre)
3	Blizzard (1.0 oz/acre) + COC (16.0 oz/acre)
4	Blizzard (1.25 oz/acre) + COC (16.0 oz/acre)
5	Firestorm (32.0 oz/acre) + NIS (4.8 oz/acre)

COC = Crop oil concentrate

NIS = Non-ionic surfactant

Table 2. Treatment schedule for the High Rate Blizzard Study, Lubbock, TX 2009

Treatment no.	Treatment description
1	Untreated Control
2	Blizzard (0.5 oz/acre) + COC (16.0 oz/acre) fb Blizzard (0.75 oz/acre) + COC (16.0 oz/acre)
3	Blizzard (1.0 oz/acre) + COC (16.0 oz/acre)
4	Blizzard (1.25 oz/acre) + COC (16.0 oz/acre)
5	Firestorm (32.0 oz/acre) + NIS (4.8 oz/acre)

fb = Followed by

COC = Crop oil concentrate

NIS = Non-ionic surfactant

Four replications of each treatment were used. Treatments were randomly assigned to 13.3' X 50' plots and chemical applications were made using a Lee Spider plot sprayer with multi-boom attachment set to deliver 15 GPA spray volume through Tee-Jet 11002VS nozzles set on 20" nozzle spacings at 3.5 mph with an operating pressure of 32 psi. Visual observations for percent defoliation, desiccation and regrowth control were conducted at 8 and 14 days after initial treatment (DAIT). All data were analyzed as a randomized complete block design using the GLM procedure in SAS 9.1 for Windows.

Results

At 8 DAIT for both years, significant differences were observed among treatments for all parameters measured (Tables 3 and 4). In 2008, the 1.25 oz/a rate of Blizzard resulted in significantly greater defoliation and regrowth control when compared to all other treatments. Desiccation was highest for the 32 oz/a Firestorm treatment and was significantly greater than all other treatments. All Blizzard treatments were statistically similar in 2009 for all parameters measured. The Blizzard treatments resulted in greater defoliation but less desiccation than Firestorm. For regrowth control, the two high rate Blizzard treatments and the Firestorm treatment were statistically similar while the standard rate Blizzard treatment (prior to sequential) was significantly lower than the Firestorm treatment.

Table 3. Visual ratings at 8 days after initial treatment (DAIT) for High Rate Blizzard Study, Blanco, TX 2008

Treatment no.	8 DAIT evaluation					
	defoliation (%)		desiccation (%)		regrowth control (%)	
1	0.0	d	0.0	c	0.0	d
2	48.8	b	23.8	b	90.0	b
3	48.8	b	30.0	b	92.5	b
4	65.0	a	22.5	b	100.0	a
5	17.5	c	78.8	a	32.5	c
Test avg.	36.0		31.0		63.0	
OSL	<0.0001		<0.0001		<0.0001	
LSD 0.05	14.8		11.3		7.3	

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, NS - not significant.

Means within a column with the same letter are not significantly different at the 0.05 probability level.

Table 4. Visual ratings at 8 days after initial treatment (DAIT) for High Rate Blizzard Study, Lubbock, TX 2009

Treatment no.	8 DAIT evaluation					
	defoliation (%)		desiccation (%)		regrowth control (%)	
1	31.3	b	0.0	c	0.0	c
2	87.5	a	4.5	b	96.3	b
3	89.0	a	5.0	b	98.3	ab
4	89.0	a	5.8	b	98.3	ab
5	20.0	c	80.0	a	100.0	a
Test avg.	63.4		19.1		78.6	
OSL	<0.0001		<0.0001		<0.0001	
LSD 0.05	3.1		1.5		2.9	

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, NS - not significant.

Means within a column with the same letter are not significantly different at the 0.05 probability level

In both years, significant differences were observed among treatments at 14 DAIT for all parameters measured (Tables 5 and 6). In 2008, Blizzard rates were similar, resulting in significantly greater defoliation and less desiccation than Firestorm. Regrowth control with Firestorm and the 2 high rate Blizzard treatments was greater than the standard rate Blizzard (no sequential) treatment. Desiccation was highest for the 32 oz/a Firestorm treatment and was significantly greater than all other treatments. In 2009, similar results were observed at 14 DAIT when compared to 8 DAIT, with all Blizzard treatments resulting in greater defoliation but less desiccation than Firestorm. However, for regrowth control, the standard rate Blizzard treatment (with sequential) and the Firestorm treatment were the same and were significantly greater than the 2 high rate Blizzard treatments.

Table 5. Visual ratings at 14 days after initial treatment (DAIT) for High Rate Blizzard Study, Blanco, TX 2008

Treatment no.	14 DAIT evaluation					
	defoliation (%)		desiccation (%)		regrowth control (%)	
1	0.0	c	0.0	b	0.0	c
2	88.8	a	7.5	b	60.0	b
3	91.3	a	5.0	b	87.5	a
4	95.0	a	5.0	b	93.8	a
5	56.3	b	43.8	a	90.0	a
Test avg.	66.3		12.3		66.3	
OSL	<0.0001		<0.0001		<0.0001	
LSD 0.05	14.0		13.6		13.3	

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, NS - not significant.

Means within a column with the same letter are not significantly different at the 0.05 probability level

Table 6. Visual ratings at 14 days after initial treatment (DAIT) for High Rate Blizzard Study, Lubbock, TX 2009

Treatment no.	14 DAIT evaluation					
	defoliation (%)		desiccation (%)		regrowth control (%)	
1	36.3	b	0.0	c	0.0	c
2	91.3	a	3.8	b	99.8	a
3	93.8	a	3.3	b	94.0	b
4	92.3	a	5.0	b	92.5	b
5	30.0	c	70.0	a	100.0	a
Test avg.	68.7		16.4		77.3	
OSL	<0.0001		<0.0001		<0.0001	
LSD 0.05	4.8		2.8		2.6	

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, NS - not significant.

Means within a column with the same letter are not significantly different at the 0.05 probability level

Conclusions

Based on these results, when comparing the high rates of Blizzard to Firestorm (paraquat), greater defoliation is achieved with Blizzard but less desiccation is provided at both 8 and 14 DAIT. When combining defoliation and desiccation results and comparing green leaf material left on the plant (100% defoliation - % desiccation = % green leaf) the Blizzard treatments result in more green leaves remaining on the plant at 8 DAIT than Firestorm but at 14 DAIT, the high rate Blizzard treatments are similar to the Firestorm treatment. Although some green leaf material may remain after a high rate Blizzard application, the benefit of greater defoliation may be beneficial in terms of reduced leaf grades under certain conditions. Furthermore, Blizzard has been determined to be a safe alternative to Firestorm and other paraquat based materials when applied in close proximity to small grains crops (Kelley et al., 2009).

References

Kelley, M., R. Boman, C. Ashbrook, and A. Dalrymple. 2009. Blizzard harvest aid as a desiccant for cotton in proximity to small grains in the Texas high plains. p. 23-24. In Proc. Beltwide Cotton Conf., San Antonio, TX. 5-8 Jan. 2009. Natl. Cotton Counc. Am., Memphis, TN.