



Fort Bend County - 2015 Cotton Harvest Aid Trial

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Introduction

Often, it is advisable to delay the choice of harvest-aid treatment(s) to cotton until the crop is nearly ready to terminate, which is a balance between optimizing yield and preserving quality. While the cotton variety, soil type, and cultural inputs for a given cotton crop can be selected, the weather cannot. The final decision as to when and what harvest-aid products to apply is made by the prudent producer near the time of the initial harvest-aid treatment.

Cotton harvest aid chemicals are generally grouped into three categories – defoliant, desiccant, and boll opener. Defoliant remove foliage from the cotton plant by stimulating ethylene production, which promotes the formation of an abscission layer at the base of leaf petioles. Defoliant can be classed into two categories: (1) hormonal defoliant such as thidiazuron (Dropp®, FreeFall®, etc.), and (2) herbicidal defoliant such as tribufos (Folex®) and the PPO inhibitors (Aim®, Display®, Sharpen®, etc.). For conventional cotton (non-Roundup Ready), glyphosate may be used as an herbicidal defoliant. If applied at too high a rate, herbicidal defoliant may cause excessive leaf injury, preventing the formation of the abscission layer and resulting in “stuck” leaves.

Desiccant, such as paraquat (Gramoxone®) or sodium chlorate, simply kill and dry leaf and stem tissues. At the higher rates, these products act very rapidly and do not allow an abscission layer to form at the junction of leaf petioles and the stem, resulting in “stuck” leaves. Desiccant are typically used in stripper-harvested cotton to dry plant tissues after a defoliant has been applied. Desiccant can be used at lower rates to help defoliate cotton, but selecting the appropriate rate to defoliate and not desiccate is challenging and is dependent upon environmental conditions.

Boll opener contain the active ingredient ethephon. Within the plant, ethephon is converted to ethylene, which causes bolls to open at a more rapid pace. Increased levels of ethylene within the plant also help activate abscission layers of the leaf petioles, further defoliating the plant. It is important to note that although ethephon does hasten the opening of bolls, it will not speed up the maturity of immature bolls. Additionally, boll opener tend to enhance basal and terminal leaf regrowth following the application, thus timely harvest becomes more critical when using a boll opener.

Grower standards for cotton defoliation in the Upper Gulf Coast area of Texas tend to be one of two common mixtures: 1-2 oz. Dropp®, + 12-16 oz. ethephon (Prep®) + 4-6 oz. Folex®; or 4 oz. Ginstar® + 21 oz ethephon (Prep®) .

Materials and Methods

Preparing cotton for harvest is not an exact science. Although there is much information on how and when to apply harvest aid chemicals, producers recognize that seasonal and crop conditions have effects on crop responses to harvest aid treatments that are not always predictable.

To demonstrate the performance of cotton harvest aides on the 2015 Upper Gulf Coast cotton crop in Fort Bend County, the Fort Bend Row Crop Committee along with the Fort Bend County office of Texas A&M AgriLife Extension established a harvest aid test at Needville, Texas. Fort Bend County Extension Agent, John Gordy cooperated with Freund Farms to utilize a portion of a commercial cotton field. Dr. Gaylon Morgan, State Extension Cotton Agronomist and Dale Mott, Extension Program Specialist designed the test based on products and rates recommended by the industry. They also provided the products, equipment, and assistance to apply the harvest aids and evaluated each treatment. The trial plot size was 12.67 feet wide by 45 feet in length. The application volume for each treatment was 11 gallons/acre of total mix.

The Fort Bend County Harvest Aid Test was sprayed with the initial treatments on August 12, 2015. A total of 15 treatments (see Table 1 or Table 2) were evaluated (including an untreated control), with each treatment replicated two (2) times. Treatments designed to include a second application of harvest aid were applied on August 18, 2015. Each treatment was rated on August 18, 2015 (6-DAT) and August 21, 2015 (9-DAT) for percent defoliation, desiccation, green leaf, and green boll.

A turn row meeting was conducted on August 21, 2015 (9 days post treatment) near the site of the Fort Bend County Harvest Aid Test. Dr. Gaylon Morgan discussed each treatment, how each one performed, and recommended best management practices based on the results of the test. Approximate cost per acre for each treatment was provided to participants with the 6-day post-treatment results.

Results

Results for the Needville, Texas Cotton Harvest Aid Trial are given below in **Table 1**: The 6 DAT Evaluation of % Defoliation, % Desiccation, % Green Leaf, and % Green Boll; and **Table 2**: 9 DAT Evaluation of % Defoliation, % Desiccation, % Green Leaf, and % Green Boll. Treatments are listed by active ingredient of the treatment. Some treatments required a follow-up, second application of harvest aid. This is noted by Application Timing*, Application A = 8/12/2015; Application B = 8/18/2015. Table 2 lists the estimated cost/acre of each of the harvest aid treatments.

Table 1. 6 DAT Evaluation of % Defoliation, % Desiccation, % Green Leaf, and % Green Boll

Treatment	Product	Rate	App Timing*	Defoliation (%) 8/18/2015	Desiccation (%) 8/18/2015	Green Leaf (%) 8/21/2015	Green Boll (%) 8/18/2015
1	Untreated Check			15 h	0 c	85 a	30 a
2	Thidiazuron SC	2.4 oz/a	A	67.5 b-e	0 c	32.5 d-g	55 a
	Thidiazuron SC	2.4 oz/a	B				
3	Thidiazuron SC	1.6 oz/a	A	60 cde	0 c	40 def	25 a
	Ginstar + NIS	2 oz/a	B				
4	Thidiazuron SC	1.6 oz/a	A	65 b-e	0 c	35 d-g	10 a
	Ethephon	21 oz/a	A				
	Ginstar + NIS	2 oz/a	B				
5	Thidiazuron SC	2.4 oz/a	A	57.5 def	0 c	42.5 cde	15 a
	Ethephon	21 oz/a	A				
	Folex	4 oz/a	A				

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6	Thidiazuron SC	2.4 oz/a	A	80 ab	0 c	20 gh	15 a
	Ethephon	21 oz/a	A				
	Folex	6 oz/a	A				
7	Thidiazuron SC	2.4 oz/a	A	77.5 abc	0 c	22.5 fgh	17.5 a
	Folex	4 oz/a	A				
	Ethephon	24 oz/a	B				
	Folex	8 oz/a	B				
8	Thidiazuron SC	1.6 oz/a	A	65 b-e	0 c	35 d-g	15 a
	Ethephon	12 oz/a	B				
	Folex	4 oz/a	B				
9	Ginstar	4 oz/a	A	90 a	2.5 b	7.5 h	25 a
	Ethephon	21 oz/a	A				
	NIS	0.5 % v/v	A				
10	Thidiazuron SC	1.6 oz/a	A	40 fg	0 c	60 bc	20 a
	Ginstar + NIS	2 oz/a	A				
	Display + NIS	1 oz/a	B				
11	Thidiazuron SC	1.6 oz/a	A	50 efg	0 c	50 bcd	25 a
	Ginstar	2 oz/a	A				
	Sharpen +MSO + AMS	0.5 oz/a	B				
12	Thidiazuron SC	1.6 oz/a	A	80 ab	15 a	5 h	25 a
	Sharpen + MSO + AMS	0.5 oz/a	A				
	Sharpen + MSO + AMS	1 oz/a	B				
13	Thidiazuron SC	1.6 oz/a	A	35 g	0 c	65 b	25 a
	Ethephon	21 oz/a	A				
	ETX + COC	1.3 oz/a	B				
14	Thidiazuron SC	1.6 oz/a	A	72.5 a-d	0 c	27.5 efg	15 a
	Finish 6 Pro	21 oz/a	A				
	Ginstar + NIS	2 oz/a	B				
15	Thidiazuron SC	2.4 oz/a	A	77.5 abc	0 c	22.5 fgh	20 a
	Finish 6 Pro	21 oz/a	A				
	Gramoxone + NIS	24 oz/a	B				
16	Thidiazuron SC	2.4 oz/a	A	80 ab	0 c	20 gh	17.5 a
	Finish 6 Pro	21 oz/a	A				
	Gramoxone + NIS	32 oz/a	B				

Mean	63.28	1.09	35.63	22.19
LSD (P=.05)	18.09	1.88	18.01	23.83
Standard Deviation	8.49	0.88	8.45	11.18
CV	13.41	80.81	23.73	50.39

*Application A = 8/12/2015; Application B = 8/18/2015

Means followed by same letter do not significantly differ (P=.05, LSD)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 2. 9 DAT Evaluation of % Defoliation, % Desiccation, % Green Leaf, and % Green Boll

Treatment	Product	Rate	App Timing*	Defoliation (%) 8/18/2015	Desiccation (%) 8/18/2015	Green Leaf (%) 8/21/2015	Green Boll (%) 8/18/2015	Estimated Cost (\$/a)
1	Untreated Check			15 h	0 c	85 a	30 a	\$0.00
2	Thidiazuron SC	2.4 oz/a	A	67.5 b-e	0 c	32.5 d-g	55 a	\$4.13
	Thidiazuron SC	2.4 oz/a	B					
3	Thidiazuron SC	1.6 oz/a	A	60 cde	0 c	40 def	25 a	\$4.34
	Ginstar + NIS	2 oz/a	B					
4	Thidiazuron SC	1.6 oz/a	A	65 b-e	0 c	35 d-g	10 a	\$7.95
	Ethephon	21 oz/a	A					
	Ginstar + NIS	2 oz/a	B					
5	Thidiazuron SC	2.4 oz/a	A	57.5 def	0 c	42.5 cde	15 a	\$7.70
	Ethephon	21 oz/a	A					
	Folex	4 oz/a	A					
6	Thidiazuron SC	2.4 oz/a	A	80 ab	0 c	20 gh	15 a	\$8.72
	Ethephon	21 oz/a	A					
	Folex	6 oz/a	A					
7	Thidiazuron SC	2.4 oz/a	A	77.5 abc	0 c	22.5 fgh	17.5 a	\$12.28
	Folex	4 oz/a	A					
	Ethephon	24 oz/a	B					
	Folex	8 oz/a	B					
8	Thidiazuron SC	1.6 oz/a	A	65 b-e	0 c	35 d-g	15 a	\$5.47
	Ethephon	12 oz/a	B					
	Folex	4 oz/a	B					
9	Ginstar	4 oz/a	A	90 a	2.5 b	7.5 h	25 a	\$9.55
	Ethephon	21 oz/a	A					
	NIS	0.5 % v/v	A					
10	Thidiazuron SC	1.6 oz/a	A	40 fg	0 c	60 bc	20 a	\$7.19
	Ginstar + NIS	2 oz/a	A					
	Display + NIS	1 oz/a	B					
11	Thidiazuron SC	1.6 oz/a	A	50 efg	0 c	50 bcd	25 a	\$6.97
	Ginstar	2 oz/a	A					
	Sharpen +MSO + AMS	0.5 oz/a	B					
12	Thidiazuron SC	1.6 oz/a	A	80 ab	15 a	5 h	25 a	\$17.51
	Sharpen + MSO + AMS	0.5 oz/a	A					
	Sharpen + MSO + AMS	1 oz/a	B					
13	Thidiazuron SC	1.6 oz/a	A	35 g	0 c	65 b	25 a	\$11.81
	Ethephon	21 oz/a	A					
	ETX + COC	1.3 oz/a	B					
14	Thidiazuron SC	1.6 oz/a	A	72.5 a-d	0 c	27.5 efg	15 a	\$15.17

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	Finish 6 Pro	21 oz/a	A					
	Ginstar + NIS	2 oz/a	B					
15	Thiadiazuron SC	2.4 oz/a	A	77.5 abc	0 c	22.5 fgh	20 a	\$19.27
	Finish 6 Pro	21 oz/a	A					
	Gramoxone + NIS	24 oz/a	B					
16	Thiadiazuron SC	2.4 oz/a	A	80 ab	0 c	20 gh	17.5 a	\$24.44
	Finish 6 Pro	21 oz/a	A					
	Gramoxone + NIS	32 oz/a	B					

Mean	83.78	1.31	14.91	10
LSD (P=.05)	8.98	1.64	9.58	11.88
Standard Deviation	4.21	0.77	4.49	5.57
CV	5.03	58.61	30.15	55.74

*Application A = 8/12/2015; Application B = 8/18/2015

Means followed by same letter do not significantly differ (P=.05, LSD)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Conclusions

Based on the observations of the Needville, Texas Cotton Harvest Aid Study, 1.6 oz of thiadiazuron (Dropp®, FreeFall®, etc) on the initial treatment did not hold regrowth, according to the 9-DAT evaluation. The 2.4 oz rate of Dropp® (thiadiazuron) showed reduced regrowth and should be considered if regrowth may be an issue. If putting out Ethephon (Prep®), it is important to have thiadiazuron (Dropp®) with it at 2.4 oz/acre to reduce regrowth. In addition, we found that 6 oz of Folex®/acre showed improved results over the 4 oz rate.

As was expected, Gramoxone® as a follow up treatment (8/18) helped to remove mature leaves, but did not control regrowth. The fall of 2015 on the Texas Gulf Coast was one that presented frequent rain showers, making controlling regrowth a common issue. PPO products such as Aim®, ET®, Display®, and Sharpen® did the best at destroying cotton regrowth. Sharpen® showed to be the most effective PPO option in this study for regrowth suppression at 1 oz/acre.

Experience gained from conducting this test resulted in increased success in reaching specific goals of boll opening, defoliation, desiccation, and regrowth suppression

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