2010 UGA Cotton Defoliant Evaluation Program

Tifton Location

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Field Description

The Tifton trial was conducted at the UGA Gibbs Farm. Crop condition and plant maturity were evaluated the day prior to application of harvest aid treatment. Leaves on the large majority plants were mature to very mature, with very few juvenile leaves throughout the field (Figure 1). Most leaves were beginning to senesce naturally (reddish color indicative of leaf aging and chlorophyll degradation), and there were some signs of Stemphyllium and angular leaf spot diseases, which can enhance the senescence process in some cases. There were hardly any signs of juvenile regrowth in terminals or the axial node tissue (basal region).

Figure 1. Crop condition on the day prior to application of defoliant treatments.

Plant height generally ranged from 30 to 40 inches tall, and the boll population ranged from 53 to 76 percent open bolls, with an average of 67 percent open bolls. Nodes above cracked boll ranged from 1 to 3, with an average of 2.2. Upon examination of internal boll components (seed and fiber maturity), the unopened bolls appeared to be adequately mature to initiate defoliation without compromising the opening of these bolls. Additionally, this particular field appeared to be drought-stressed in the days leading up to the day of harvest aid application.

Individual treatments (tank-mixes of harvest aid products and rates) were determined by the manufacturers based on the crop condition, current weather conditions and the weather forecast. The weather forecast for the day of treatment included a high of 95°F and a low of 74°F, with a 30 percent chance of rain, although no rain occurred on the day of treatment (Figures 2 and 3). During the week following application, daytime highs were expected to slowly decrease by 7 degrees (88°F one week later) and nighttime lows were expected to decrease 5 degrees (69°F one week later). Chances of rain were approximately 50 percent for the two days following treatment, resulting in 0.2 inches of rain on the day following defoliant application.

Trial Description

Defoliants were applied on September 10, 2010. All treatments were applied using a CO_2-pressurized backpack sprayer equipped with regular 110-02 flat fan nozzles, calibrated to deliver 15 GPA at 3 mph. Treatments were arranged in a randomized complete block design and replicated three times. Plots consisted of two rows approximately 30 feet long. Percent defoliation, percent desiccation and percent open bolls were visually estimated at 7 and 14 days after treatment (DAT). Percent defoliation, percent desiccation and percent regrowth were also visually estimated at 20 DAT. Data were subjected to Analysis of Variance, and means were separated using Fisher's Protected LSD at $p \leq 0.05$.

Observations and Results

This trial was initiated in relatively hot and dry conditions, thus the results should represent early season warm/hot weather harvest aid performance. Daytime high temperatures rarely fell below 90°F and rain was infrequent within the first 14 days of treatment (Figures 2 and 3). Additionally, there were hardly any signs of regrowth formation within the first 14 days following treatment. In these conditions, the risk of desiccation was much higher than in somewhat lower temperature environments. Additionally, some regrowth was evident in some treatments at 20 DAT, likely due to rainfall events that occurred between 14 and 30 DAT.

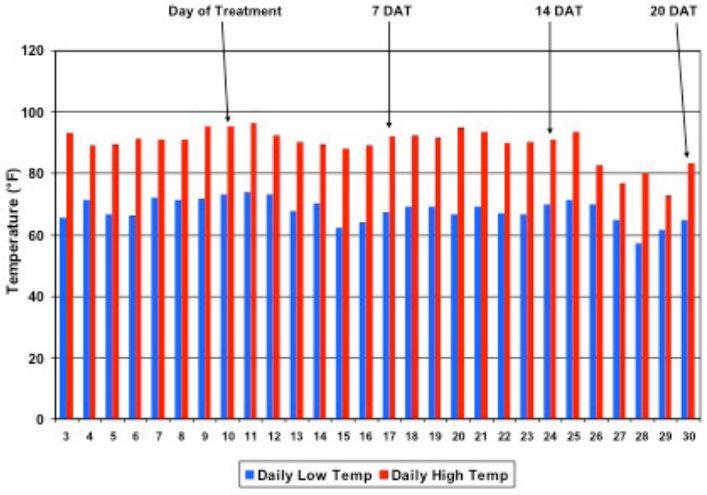

Figure 2. Daily high and low temperatures during September 2010.

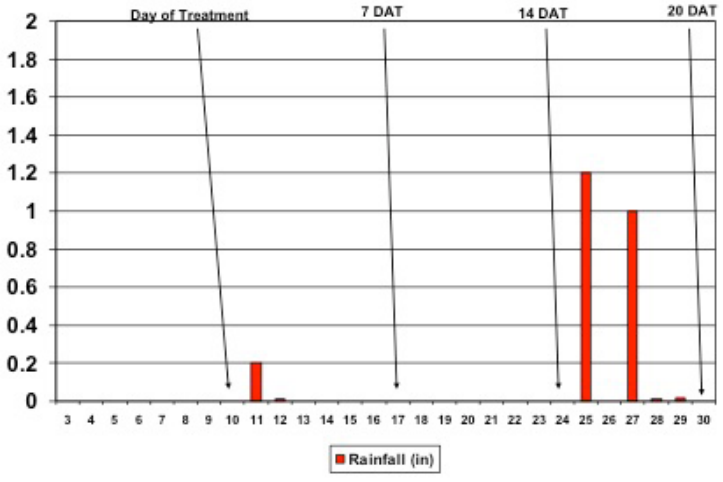

Figure 3. Daily rainfall during September 2010.

	Treatment	Application Rate	7 DAT 9/17/2010			14 DAT 9/24/2010			20 DAT 9/30/2010		
			% open bolls	% defoliation	% desiccation	% open bolls	% defoliation	% desiccation	% defoliation	% desiccation	% regrowth
1	Adios Ethephon 6	6.4 oz/a 24 oz/a	88.0 a-e	95.0 a	0.0 a	92.3 bc	96.0 ab	0.7 a	99.0 a	0.0 a	30.0 a-e
2	Adios Ethephon 6	8 oz/a 32 oz/a	82.3 c-f	91.7 ab	0.0 a	90.3 c	97.0 a	0.0 a	98.7 a	0.0 a	21.3 c-f
3	FirstPick FreeFall 4SC	56 oz/a 1.6 oz/a	91.0 abc	85.3 a-d	8.3 a	98.7 a	91.3 abc	6.7 a	94.7 a-e	3.3 a	24.0 b-e
4	FirstPick thidiazuron (1 lb ai/gal) + diuron (0.5 lb ai/gal)	56 oz/a 6.4 oz/a	94.0 a	87.7 abc	7.7 a	98.7 a	93.3 abc	3.7 a	94.0 b-f	3.3 a	23.0 b-e
5	Sharpen ethephon (6 lb ai/gal) COC	0.75 oz/a 21 oz/a 1 % v/v	92.7 ab	73.3 def	0.0 a	92.3 bc	86.7 bcd	0.0 a	90.0 fg	1.0 a	41.7 ab
6	Sharpen tribufos (6 lb ai/gal) ethephon (6 lb ai/gal) COC	0.5 oz/a 8 oz/a 21 oz/a 1 % v/v	87.3 a-e	83.3 a-d	0.0 a	90.3 c	86.3 cd	0.0 a	95.0 a-e	1.0 a	45.0 a
7	Folex ethephon (6 lb ai/gal) thidiazuron (4 lb ai/gal)	4 oz/a 21 oz/a 1.6 oz/a	88.0 a-e	87.7 abc	2.3 a	97.0 ab	94.0 abc	0.7 a	95.0 a-e	0.0 a	30.0 a-e
8	Folex ethephon (6 lb ai/gal)	6 oz/a 21 oz/a	75.7 f	69.3 ef	0.0 a	93.7 abc	92.7 abc	0.0 a	92.0 d-g	0.0 a	25.0 b-e
9	Aim ethephon (6 lb ai/gal) NIS	1 oz/a 24 oz/a 0.25 % v/v	90.0 a-d	73.3 def	5.0 a	95.0 abc	86.3 cd	0.7 a	90.0 fg	0.0 a	41.0 ab
10	tribufos (6 lb ai/gal) ethephon (6 lb ai/gal) NIS	16 oz/a 24 oz/a 0.25 % v/v	82.5 b-f	92.5 ab	0.0 a	90.3 c	88.0 a-d	0.0 a	97.7 abc	0.0 a	46.0 a
11	Aim thidiazuron (4 lb ai/gal) ethephon (6 lb ai/gal) NIS	0.5 oz/a 1.6 oz/a 24 oz/a 0.25 % v/v	83.3 b-f	87.7 abc	1.7 a	92.3 bc	89.7 a-d	3.3 a	91.7 efg	0.0 a	34.3 a-d
12	tribufos (6 lb ai/gal) thidiazuron (4 lb ai/gal) ethephon (6 lb ai/gal) NIS	8 oz/a 1.6 oz/a 24 oz/a 0.25 % v/v	83.3 b-f	81.3 b-e	8.3 a	91.0 c	94.7 abc	1.7 a	93.0 def	2.3 a	13.3 ef
13	Ginstar Finish 6 Pro	6.4 oz/a 32 oz/a	94.0 a	94.0 ab	0.0 a	99.0 a	95.7 abc	0.7 a	98.3 ab	0.0 a	40.7 abc
14	Ginstar Finish 6 Pro	8 oz/a 21 oz/a	90.0 a-d	92.0 ab	1.7 a	98.7 a	93.0 abc	5.0 a	96.0 a-e	0.0 a	28.7 a-e
15	ET ethephon (6 lb ai/gal) COC	1.5 oz/a 32 oz/a 1 % v/v	80.0 def	77.7 c-f	1.7 a	91.0 c	81.7 d	1.3 a	91.7 efg	0.0 a	35.0 a-d
16	ET ethephon (6 lb ai/gal) thidiazuron (4 lb ai/gal) COC	1.5 oz/a 32 oz/a 2 oz/a 1 % v/v	86.3 a-e	81.7 a-e	0.0 a	94.3 abc	86.3 cd	1.0 a	93.3 c-f	0.0 a	22.7 b-e
17	Blizzard ethephon (6 lb ai/gal) COC	0.5 oz/a 32 oz/a 1 % v/v	83.3 b-f	65.0 f	0.0 a	91.3 c	81.7 d	0.0 a	87.7 g	0.0 a	26.7 a-e
18	Blizzard ethephon (6 lb ai/gal) thidiazuron (4 lb ai/gal) COC	0.5 oz/a 32 oz/a 3.2 oz/a 1 % v/v	89.3 a-d	90.7 abc	2.3 a	97.7 ab	92.0 abc	4.7 a	96.3 a-d	1.0 a	16.7 def
19	Non-Treated Control		78.3 ef	0.0 g	0.0 a	81.3 d	0.0 e	0.0 a	0.0 h	0.0 a	2.3 f
	LSD @ p≤0.05		10.21	13.61	8.66	5.39	9.57	5.82	4.54	2.82	19.45

Drought-stressed cotton is almost always difficult to adequately defoliate without desiccating some leaves, especially when temperatures remain relatively high. In this trial, it generally appeared that any treatment containing higher rates of thidiazuron and/or ethephon, in addition to some other harvest aids, allowed for rapid leaf removal, rapid boll opening and relatively lower desiccation.

The outcome of any particular defoliation strategy is very difficult to predict, even among experienced agronomists. Although performance is the primary parameter from which decisions are made, the costs of a defoliant mixture should also be calculated to determine if potential gains could offset the costs.

Additionally, these results illustrate performance in these specific conditions; therefore, performance in slightly different conditions may be quite different. There are numerous product / rate / tank-mix combinations currently available; therefore, growers should always consult their county agent when making defoliation decisions, as any two situations are rarely exactly alike. Growers should also realize that harvest aid performance can be highly variable and unpredictable, and is dependent upon crop and environmental conditions at application and thereafter. It is always advised to consult the label of any harvest aid product regarding directions for use, rates and safety information.

The photos below illustrate defoliant performance in one replication taken at 14 days after treatment. Treatment numbers correspond to treatments listed in the data table.

Treatment 1

Treatment 2

Treatment 3

Treatment 4

Treatment 5

Treatment 6

Treatment 7

Treatment 8

Treatment 9

Treatment 10

Treatment 11

Treatment 12

Treatment 13

Treatment 14

Treatment 15

Treatment 16

Treatment 17

Treatment 18

Treatment 19

The 2010 UGA Cotton Defoliant Evaluation Program was sponsored by:

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