Evaluation of Harvest Aid Chemical Treatments on Late-Season Hail Damaged Cotton - 60% Defoliated

Wells, TX - 2003

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Summary: Significant differences were observed for lint and seed turnout, seed yield, seed value, and HVI fiber properties of micronaire, uniformity, strength and +b (yellowness) (Tables 1 and 2). However, none of the treatments tested were significantly greater than the untreated check for any of these parameters, with the exception of seed turnout. Lint yields ranged from a high of 628 lb/acre to a low of 498 lbs/acre for Finish 6 Pro at 32.0 oz/acre applied 5 days after hail event (DAHE) and Finish 6 Pro at 24 oz/acre + Ginstar EC at 4 oz/acre applied at 10 DAHE respectively. A test average of 560 lbs of lint/acre was observed. Loan values for the test averaged $0.4577/lb of lint which resulted in a $256.23/acre test average lint value. After adding lint and seed values, the total values ($/acre) ranged from a high of $361.19/acre to a low of $282.64/acre. Costs for harvest aid chemicals ranged from a high of $30.90/acre for Finish 6 Pro at 32 oz/acre plus Ginstar EC at 4.0 oz/acre to a low of $5.66/acre for Gramoxone Max at 5.5 oz/acre plus non-ionic surfactant at 0.25% v/v (4.8 oz/acre). Net values were calculated by subtracting ginning and chemical costs from the total values and ranged from a high of $282.24/acre, for the untreated check, to a low of $201.98/acre for Finish 6 Pro at 24 oz/acre + Ginstar EC at 4 oz/acre applied 10 DAHE, a difference of $80.26/acre. Results from this study indicate that, under these conditions, use of harvest aids did not increase net return.

Objective: The objective of this project was to evaluate the effect of various harvest aid chemicals and rates, alone and in tank mixes, on yield, fiber quality and economic return when applied to cotton after a late season hail event.

Materials and Methods:

Variety:	Deltapine 5690RR
Planting date:	June 5
Experimental design:	Randomized complete block with 4 replications
Plot size:	4 rows by 50 feet
Hail event date:	September 7
Defoliation percent:	Cotton was approximately 60% defoliated by hail

Harvest aid treatments:

Treatment number and description

Treatments applied 5 days after hail event (Sept 12)		Chemical cost ($/acre)
1	Untreated Check	$0.00
2	Prep @ 16.0 oz/acre	$9.74
3	Prep @ 16.0 oz/acre + Ginstar EC @ 4.0 oz/acre	$15.70
4	Prep @ 24.0 oz/acre	$12.86
5	Prep @ 24.0 oz/acre + Ginstar EC @ 4.0 oz/acre	$18.82
6	Prep @ 32.0 oz/acre	$15.98
7	Prep @ 32.0 oz/acre + Ginstar EC @ 4.0 oz/acre	$21.94
8	Finish 6 Pro @ 16.0 oz/acre	$14.22
9	Finish 6 Pro @ 16.0 oz/acre + Ginstar EC @ 4.0 oz/acre	$20.18
10	Finish 6 Pro @ 24.0 oz/acre	$19.58
11	Finish 6 Pro @ 24.0 oz/acre + Ginstar EC @ 4.0 oz/acre	$25.54
12	Finish 6 Pro @ 32.0 oz/acre	$24.94
13	Finish 6 Pro @ 32.0 oz/acre + Ginstar EC @ 4.0 oz/acre	$30.90
14	Gramoxone Max @ 8.0 oz/acre + 0.25% v/v Non-Ionic Surfactant (NIS)	$6.36
15	Gramoxone Max @ 21.0 oz/acre + 0.25% v/v Non-Ionic Surfactant (NIS)	$10.00

Treatments applied 10 days after hail event (Sept 17)

16	Prep @ 24.0 oz/acre	$12.86
17	Prep @ 24.0 oz/acre + Ginstar EC @ 4.0 oz/acre	$18.82
18	Finish 6 Pro @ 24.0 oz/acre	$19.58
19	Finish 6 Pro @ 24.0 oz/acre + Ginstar EC @ 4.0 oz/acre	$25.54
20	Gramoxone Max @ 5.5 oz/acre + 0.25% v/v Non-Ionic Surfactant (NIS)	$5.66

Chemical cost ($/acre) includes a $3.50/acre application cost.

Application information:

Dates:	September 12 for treatments 1 through 15 (5 days after hail event) September 17 for treatments 16 through 20 (10 days after hail event)
Sprayer:	Lee Spider sprayer with CO_2 charged, 4 row multi-boom attachment
Nozzle type:	TeeJet® Flat Fan
Nozzle size:	11002 VS with 50 mesh screens
Nozzle spacing:	20 inches
Ground speed:	3.0 MPH
Spray volume:	15 gallons/acre
Operating pressure:	26 psi

Harvest: Plots were harvested on October 15 with a modified John Deere 482 plot stripper with integral digital scales. Plot yields were adjusted to lb/acre.

Gin turnout: Grab samples were taken by plot and ginned at the Texas A&M Center at Lubbock to determine gin turnouts.

Fiber analysis: Lint samples were submitted to the International Textile Center (ITC) at Texas Tech University for HVI analysis, and USDA loan values were determined for each treatment by plot.

Ginning costs and seed values: Ginning costs are based on $2.25 per cwt. of bur cotton and seed values are based on $125 per ton. Ginning costs do not include checkoff.

Chemical costs: Chemical costs were determined for each treatment using an average retail price for chemicals and adding an application cost of $3.50/acre.

Results and Discussion:

Significant differences were observed for lint and seed turnout, seed yield, seed value, and HVI fiber properties of micronaire, uniformity, strength and +b (yellowness) (Tables 1 and 2). However, none of the treatments tested were significantly greater than the untreated check for any of these parameters, with the exception of seed turnout. Lint yields ranged from a high of 628 lb/acre to a low of 498 lbs/acre for Finish 6 Pro at 32.0 oz/acre applied 5 days after hail event (DAHE) and Finish 6 Pro at 24 oz/acre + Ginstar EC at 4 oz/acre applied at 10 DAHE respectively. A test average of 560 lbs of lint/acre was observed. Loan values for the test averaged $0.4577/lb of lint which resulted in a $256.23/acre test average lint value. After adding lint and seed values, the total values ($/acre) ranged from a high of $361.19/acre to a low of $282.64/acre. Costs for harvest aid chemicals ranged from a high of $30.90/acre for Finish 6 Pro at 32 oz/acre plus Ginstar EC at 4.0 oz/acre to a low of $5.66/acre for Gramoxone Max at 5.5 oz/acre plus non-ionic surfactant at 0.25% v/v (4.8 oz/acre). Net values were calculated by subtracting ginning and chemical costs from the total values and ranged from a high of $282.24/acre, for the untreated check, to a low of $201.98/acre for Finish 6 Pro at 24 oz/acre + Ginstar EC at 4 oz/acre applied 10 DAHE, a difference of $80.26/acre. Micronaire values averaged 2.7 units, which resulted in low loan values. Staple values ranged from a high of 34.9 (32^{nds} inches) to a low of 33.5 with a test average of 34.2. A test average of 29.8 g/tex was observed for fiber strength. Results from this study indicate that, under these conditions, use of harvest aids did not increase net return. It should be noted that decisions should not be based solely on the results from one location.

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Table 1. Agronomic and economic results for harvest aid chemical treatments on late-season hail damaged cotton, Wells, TX 2003

Treatment	Open boll*		Bur cotton	Gin turnout		Lint	Seed	Lint	Lint	Seed	Total	Chemical	Ginning	Net
	7 dait	18 dait	yield	lint	seed	yield	yield	loan value	value	value	value	cost	cost	value
	percent	percent	lb/acre	percent	percent	lb/acre	lb/acre	$/lb	$/acre	$/acre	$/acre	$/acre	$/acre	$/acre
1	8.5	26.0	2771	21.1	36.2	585	1004	0.4816	281.82	62.75	344.57	0.00	62.34	282.24
2	8.8	33.3	2822	20.7	38.7	582	1091	0.4455	260.21	68.22	328.43	9.74	63.49	255.21
3	4.5	29.8	2681	21.3	37.7	572	1010	0.4314	246.77	63.13	309.90	15.70	60.31	233.89
4	10.8	37.5	2768	19.9	37.4	552	1035	0.4533	249.37	64.66	314.02	12.86	62.27	238.89
5	4.4	31.0	2608	20.9	37.1	544	967	0.4600	250.57	60.45	311.02	18.82	58.66	233.53
6	13.5	36.5	2774	20.2	37.6	562	1040	0.4469	250.75	64.98	315.73	15.98	62.41	237.34
7	9.1	40.3	2614	21.3	38.1	557	994	0.4548	253.40	62.11	315.51	21.94	58.81	234.76
8	7.8	33.5	2899	20.6	37.8	599	1096	0.4416	265.09	68.51	333.59	14.22	65.22	254.15
9	5.2	36.8	2813	19.0	36.0	535	1011	0.4448	237.81	63.20	301.01	20.18	63.30	217.53
10	8.7	34.3	2686	21.3	38.3	571	1029	0.4476	254.70	64.31	319.01	19.58	60.43	239.01
11	5.0	35.3	2557	21.7	38.2	554	977	0.4610	256.16	61.06	317.21	25.54	57.53	234.14
12	27.0	47.3	2842	22.1	39.2	628	1113	0.4654	291.66	69.53	361.19	24.94	63.94	272.31
13	15.9	43.0	2725	21.4	38.4	582	1045	0.4524	263.35	65.31	328.66	30.90	61.30	236.46
14	12.1	28.8	2697	21.8	37.4	587	1009	0.4686	274.31	63.05	337.35	6.36	60.67	270.32
15	18.1	20.5	2366	20.4	36.3	483	859	0.4743	229.00	53.66	282.65	10.00	53.23	219.42
16	14.1	30.3	2622	19.3	35.5	505	933	0.4539	230.79	58.33	289.11	12.86	59.00	217.26
17	11.4	26.5	2587	21.4	37.3	553	964	0.4711	260.38	60.26	320.64	18.82	58.22	243.60
18	22.5	43.3	2761	20.8	36.7	572	1011	0.4764	272.98	63.17	336.15	19.58	62.11	254.46
19	12.5	34.3	2450	20.3	36.6	498	899	0.4549	226.44	56.20	282.64	25.54	55.11	201.98
20	14.3	22.5	2643	21.7	38.1	574	1009	0.4690	269.13	63.07	332.20	5.66	59.46	267.08
Test avg.	11.7	33.5	2684	20.8	37.4	560	1005	0.4577	256.23	62.80	319.03	16.46	60.39	242.18
CV, %	63.8	24.1	7.6	5.6	3.6	10.3	9.0	5.3	11.7	9.0	10.9	--	7.6	13.0
OSL	0.0035	0.0009	0.0624	0.0240	0.0173	0.1420	0.0355	0.3055	0.2080	0.0352	0.2019	--	0.0622	0.0613
LSD, .05	10.6	11.4	NS	1.6	1.9	NS	129	NS	NS	8.04	NS	--	NS	NS

* Open boll for treatments 16 through 20, which were applied 5 days after initial treatment, were taken at 2 and 13 days after treatment.

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value
LSD - least significant difference.

Assumes:
$2.25/cwt ginning cost.
$125/ton for seed.
$3.50/acre application cost
Value for lint based on CCC loan value from grab samples and ITC HVI results.

Table 2. HVI fiber property results for harvest aid chemical treatments on late-season hail damaged cotton, TX 2003

Treatment	Micronaire	Length	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
										digit 1	digit 2
	units	inches	32^{nds} inches	percent	g/tex	percent	grade	reflectance	yellowness	value	value
1	2.9	1.07	34.2	81.1	31.3	6.8	1.8	75.8	9.2	2.5	1.0
2	2.7	1.06	33.8	79.9	30.2	6.5	1.3	76.5	9.3	2.5	1.3
3	2.7	1.05	33.5	79.3	29.9	6.4	1.3	77.5	9.3	2.3	1.0
4	2.6	1.08	34.4	79.9	29.3	6.6	1.0	77.2	9.3	2.3	1.0
5	2.7	1.07	34.1	80.4	29.8	6.4	1.0	77.5	9.1	2.0	1.0
6	2.6	1.08	34.6	80.2	29.5	6.5	1.5	76.9	9.5	2.3	1.0
7	2.6	1.06	33.9	80.5	29.7	6.4	1.0	77.5	9.6	2.0	1.0
8	2.6	1.06	34.0	79.1	29.2	6.2	1.0	77.4	9.4	2.0	1.0
9	2.5	1.08	34.5	79.4	29.1	6.3	1.0	77.6	9.1	2.3	1.0
10	2.6	1.06	34.0	79.6	29.0	6.2	1.5	76.7	9.4	2.8	1.0
11	2.8	1.06	33.8	80.1	30.5	6.5	1.3	77.0	9.3	2.3	1.0
12	2.7	1.07	34.1	79.8	31.2	6.7	1.0	77.1	9.4	2.0	1.0
13	2.7	1.06	34.0	79.7	29.6	6.6	1.5	76.8	9.4	2.3	1.0
14	2.7	1.07	34.2	80.4	30.4	6.5	1.3	76.8	9.6	2.3	1.0
15	2.9	1.07	34.1	80.4	29.2	6.6	1.0	76.9	10.0	2.0	1.0
16	2.8	1.06	33.9	80.0	28.5	6.5	1.0	77.2	9.6	2.0	1.0
17	2.7	1.08	34.5	79.9	30.6	6.2	1.0	77.5	9.2	2.0	1.0
18	2.7	1.08	34.6	80.8	30.5	6.3	1.0	77.4	9.2	2.0	1.0
19	2.6	1.09	34.9	80.0	30.0	6.4	1.0	77.2	9.2	2.3	1.0
20	2.8	1.08	34.4	80.6	29.7	6.5	1.0	77.2	9.6	2.0	1.0
Test avg.	2.7	1.07	34.2	80.0	29.8	6.4	1.2	77.1	9.4	2.2	1.0
CV, %	5.8	1.6	1.6	0.8	3.6	4.0	40.5	1.1	2.9	20.5	11.0
OSL	0.0401	0.0729	0.0766	0.0075	0.0411	0.1567	0.4918	0.4060	0.0032	0.5895	0.4750
LSD, .05	0.2	NS	NS	1.0	1.5	NS	NS	NS	0.4	NS	NS

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value
LSD - least significant difference.