



Result Demonstration/Applied Research Report

**2001 Tom Green County
Cotton Harvest Aid Demonstration
Cooperator: Chris Bubenik**

Rick Minzenmayer, Marvin Ensor, Marc Tucker, and Billy Warrick *

Summary

Four harvest aid treatments were applied to Deltapine 458 B/RR cotton on September 27, 2001 to prepare the crop for harvest. The plot was established on Chris Bubenik's Farm, 5 miles north of Wall, Texas. LINTPLUS was applied to irrigated cotton that had 30 percent of its bolls open. Followup treatments of harvest aids were applied on October 16 when 60 percent of the bolls were open. Leaf shed was less than three percent and the cotton plant leaves were still green in color on October 16. Most of the treatments resulted in a significant increase in boll opening, leaf defoliation and leaf desiccation when compared to the untreated checks. Very few plants developed additional plant growth from the mid- to late-August rains. However, the cool temperatures throughout the test evaluation period slowed the development of the cotton and the performance of several harvest aids applied.

Objective

In the Southern Rolling Plains of Texas, cotton is usually planted starting in mid-May. Because of this late planting date, many producers do not use harvest aids to terminate the cotton. When growing conditions are favorable, most of the cotton in this area is ready for harvest thirty days before the first killing freeze. The delay in harvest reduces the income of farmers due to the loss of lint yield and fiber quality. Even though the cost of several of the harvest aid treatments are expensive, there is usually a product that is economically justified that can be used effectively for crop termination. The intent of this field test is to: 1) determine the effectiveness of harvest aids at defoliating, desiccating, and opening bolls on cotton 2) provide producers the opportunity of observing how effectively the harvest aid materials work, and 3) determine the economic feasibility of using the harvest aid material.

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Materials and Methods

Cooperating Producers: Chris Bubenik
Location: 5 miles north of Wall

Crop Production Information:

Planting Date: May 15, 2001
Planting Rate: 11.3 pounds per acre
Variety Planted: Deltapine 458 B/RR
Planting Pattern: Solid on 40 inch spacing
Herbicide Applied: Prowl was applied in the Spring of 2001 at 3.0 pints per acre, preplant incorporated, followed by 16 ounces of Direx plus 16 ounces of Caparol applied broadcast at planting. In early June, Roundup Ultra was applied at a 1 quart rate.
Number of Irrigations: 4 applications during the growing season
Insecticides Applied: None
Fertilizer Applied: In January 2001, 150 pounds of 11-52-0 plus 50 pounds of 46-0-0 plus 50 pounds of 0-0-0-90 were applied per acre and 200 pounds of 46-0-0 was applied prior to the first irrigation.

Harvest Aid Application Information:

Date Applied:	September 27, 2001	October 16, 2001
Time of Day:	10:30 a.m. to 11:50 a.m.	11:00 a.m. to 12:30 p.m.
Wind Speed:	6 to 8 miles per hour	5 to 7 miles per hour
Wind Direction:	East by Southeast	South
Air Temperature:	68 to 75 ^o Fahrenheit	60 to 62 ^o Fahrenheit
Relative Humidity:	42 to 46%	54 to 63%
Carrier:	10.75 gallons of water per acre	
Pressure:	40 pounds per square inch	
Nozzle Size:	11002 air induction flat fan nozzles on 20 inch center	
Boom Height:	48 inches	
Cotton Height:	Average of 36 to 38 inches	
Application Device:	Self propelled rig	
Plot Size:	13.33 feet X 70 feet	
Test Design:	Randomized complete block design replicated 3 times	

Plant Information

Date information was collected: September 27, 2001
Average Height: 38 inches
Average number of bolls above top cracked boll: 8
Percent open bolls: 30
Number of plants per acre: 52,000
Plant health was excellent and the plant was still blooming

Weather Information

Rainfall information was collected onsite and weather information used in the table was obtained from a CR10 weather station located 1 mile south of the test plot.

Rainfall Information (Date and Amount)

August 15 to 31	4.50 inches	<u>After plot establishment</u>
September 4	1.00 inch	October 11 0.25 inch
September 17	0.35 inch	
September 22	0.10 inch	

Aug. 15 to Sept. 22--Total	5.95 inches	

Data Collection:

An area in each treatment was marked to make ratings on the percent open bolls, percent defoliation, percent desiccation, and regrowth in the top and bottom portion of the plants. Actual leaf counts and boll counts were made in each of the marked areas. Percent open bolls was determined by dividing the total number of bolls open enough to be harvested by the total number of bolls on the same plants. Percent defoliation was determined by dividing the total number of leaves remaining on the cotton plants by the original number of leaves (250 leaves) on the plants. Percent desiccation was determined by dividing the total number of leaves that had dried and remained attached to the plants by the original 250 leaves. A rating system was used to reflect the growth of new leaves in the top and bottom portion of the plants within each marked area. A copy of the regrowth rating system used is attached. Due to the rainfall received 30 days prior to the initiation of the test, new plant growth was significant with most plants developing a minimum of 8 inches of additional plant height. Regrowth after harvest aids were applied did not develop to a level that they would interfere with harvest efficiency, however, the potential for increased leaf grade discounts were a concern. The information collected on October 23 and October 30 are reported in Tables 1 and 2, respectively.

Results and Discussion

The protocol for the test was to apply the followup applications when boll opening had reached 60 percent, however, due to the slow plant growth resulting from cool daytime and nighttime temperatures it took three weeks for an additional 30 percent of the bolls to open.

The First Seven Days (after followup applications were applied), October 16 to 22, 2001

At the time of application, the upper most cotton bolls were cross-sectioned and the seed coats were dark and the cotyledons well developed. The percent of open bolls increased by 15 to 35 percent in the first week. At the seven day evaluation, there was a significant difference in the percent of defoliation and the percent of desiccation. The information collected on October 23 is reported in Table 1.

Shown in the table below is the maximum and minimum air temperature during most of the time period these products were evaluated. From October 16 to October 22, daytime air temperatures ranged from 66 to 89 degrees Fahrenheit and the night temperatures ranged from 41 to 61 degrees.

Maximum and Minimum Air Temperatures for October, 2001

Date	Max Air	Min Air	Date	Max Air	Min Air	Date	Max Air	Min Air
1	76	46	11	74	55	21	86	61
2	82	46	12	81	55	22	89	60
3	85	55	13	72	48	23	89	61
4	88	61	14	83	44	24	79	51
5	75	54	15	80	52	25	76	42
6	67	50	16	66	41	26	73	53
7	78	47	17	77	41	27	76	49
8	83	59	18	83	54	28	76	51
9	83	70	19	81	51	29	77	52
10	85	58	20	83	51	30	75	47
						31	77	57

The most evident impact of the materials applied was the increased percent of open bolls, leaf defoliation and leaf desiccation. Three treatments had significantly more boll opening and leaf desiccation than the check; the only exception was the treatment where LINTPLUS was followed by LEAFLESS.

All treatments had more defoliation than the check. The LINTPLUS followed by Finish treatment had significantly more leaf defoliation than the other treatments with the exception of the DEF plus Prep treatment.

In the plots where LINTPLUS was followed by 20 ounces of Cyclone Max, the percentage of leaf desiccation was higher than any other treatment. The amount of desiccation ranged from 0 to 67 percent.

No regrowth was found in the top and bottom portions of cotton plants in any of the treatments. The regrowth remained at zero for both the 7 and 14 day evaluations.

Table 1. Chris Bubenik's 2001 Uniroyal Cotton Harvest Aid Test (Tom Green County)
October 23, 2001 (Seven days after followup treatments were applied)

Harvest Aids Applied	Rate Applied Per Acre	Harvest Aid Cost Per Acre	% Open Bolls (7 DAT)	% Defoliation (7 DAT)	% Desiccation (7 DAT)	Regrowth Rating Top (7 DAT)	Regrowth Rating Bottom (7 DAT)
LINTPLUS followed by → Finish	16 ounces followed by 32 ounces	\$8.13 \$20.87	93.33 a	80.00 a	10.00 bc	0	0
LINTPLUS followed by → LEAFLESS	16 ounces followed by 8 ounces	\$8.13 \$??.??	81.67 b	65.00 b	5.00 c	0	0
followed by → DEF + Prep	16 ounces + 16 ounces	\$5.98 + \$6.74	91.67 a	70.00 ab	21.67 b	0	0
LINTPLUS followed by → Cyclone Max + LI-700	20 ounces followed by 20 ounces + 0.25% v/v	\$8.13 \$6.00	91.67 a	31.67 c	67.00 a	0	0
Check			75.00 b	13.33 d	0.00 c	0	0

The Second Week (after followup applications were applied) October 23 - 29, 2001

Hourly daytime air temperature ranged from 73 to 89 degrees Fahrenheit. The nighttime temperatures ranged from 42 to 61 degrees. These temperatures when compared to 2000 were 8 to 12 degrees cooler for the daytime air temperatures. The cool nighttime temperatures slowed the plants response to harvest aids applied.

The percent open bolls now ranged from 80 to 94 percent which is an increase of 0 to 5 percent from the seven day evaluation. At the 14 day evaluation (7 days after the followup treatments were applied), there was a significant difference in the percent of boll opening, percent of defoliation, and percent of desiccation. The information collected on October 30 is reported in Table 2.

Three treatments had significantly more boll opening than the check; the only exception was the treatment where LINTPLUS was followed by LEAFLESS. All treatments had more defoliation than the check. All treatments had more defoliation than the LINTPLUS followed by Cyclone Max treatment.

In the plots where LINTPLUS was followed by 20 ounces of Cyclone Max, the percentage of leaf desiccation was higher than any other treatment. The DEF plus Prep treatment had the second highest level of leaf desiccation which is significantly different than the other treatments in the test.

Table 2. Chris Bubenik's 2001 Uniroyal Cotton Harvest Aid Test (Tom Green County)
October 30 (14 days after followup treatments were applied)

Harvest Aids Applied	Rate Applied Per Acre	Harvest Aid Cost Per Acre	% Open Bolls (14 DAT)	% Defoliation (14 DAT)	% Desiccation (14 DAT)	Regrowth Rating Top (14 DAT)	Regrowth Rating Bottom (14 DAT)
LINTPLUS followed by → Finish	16 ounces followed by 32 ounces	\$8.13 \$20.87	94.00 a	81.67 a	10.00 bc	0	0
LINTPLUS followed by → LEAFLESS	16 ounces followed by 8 ounces	\$8.13 \$??.??	83.33 b	71.67 a	5.00 c	0	0
followed by → DEF + Prep	16 ounces + 16 ounces	\$5.98 + \$6.74	91.67 a	71.67 a	21.67 b	0	0
LINTPLUS followed by → Cyclone Max + LI-700	20 ounces followed by 20 ounces + 0.25% v/v	\$8.13 \$6.00	91.67 a	31.67 c	67.00 a	0	0
Check			80.00 b	13.33 d	0.00 c	0	0

NOTE: In Tables 1 and 2 the individual or combination of letter a, b, c, or d shown beside the number are to indicate statistical significance. There is no statistical difference between numbers that have the same letter to the side (even when there appears to be a large difference in results between the materials applied).

Economics

For 2001, we have had an open October and most of 100,000 acres of cotton still has not been terminated. New plant growth resulting from mid-August rains combined with cool temperatures throughout October has proved to be challenging for all harvest aids applied. The delay in harvest has resulted in a reduction in yield and quality (mostly from a change in grade). Some fields were treated with only a desiccant and over 70 percent of the leaves remained on the plant at the time of harvest. This has resulted in reduced income due to leaf discounts some have lost as much as 5 cents a pound.

The proper timing of harvest aid application and the selection and use of the proper harvest aids is apparent this season. The application of a desiccant at a high rate of more than 16 ounces per acre in many cases this year will reduce the farmers profit. For producers that selected and applied the proper harvest aids at the proper rates harvested lint at a premium value which more than offset the cost of the harvest aid applied.

Acknowledgments

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I would also like to thank the companies that provided the chemicals for this harvest aid test, these included:

- Aventis who provided the Finish and Prep
- Bayer Corporation who provided the Def
- Syngenta Crop Protection, Inc. who provided the Cyclone Max
- Tri-State Chemical DBA United Agra Products (UAP) who provided the LI-700
- Uniroyal Chemical Company, Inc. who provided the LINTPLUS and LEAFLESS

Trade names of commercial products used in this report are included only for better understanding and clarity. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Texas A&M University System is implied. Readers should realize that results from one experiment do not represent conclusive evidence that the same response would occur where conditions vary.