



Texas Agricultural Extension Service  
The Texas A&M University System

# Result Demonstration Report

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2000 Tom Green County  
Cotton Harvest Aid Demonstration  
Cooperator: Chris Bubenik

Rick Minzenmayer, Marc Tucker, and Billy Warrick \*

## Summary

Six harvest aid treatments were applied to Deltapine 458 B/RR cotton on September 9, 2000 to prepare the crop for harvest. The plot was established on Chris Bubenik's Farm, 5 miles north of Wall, Texas. The chemicals were applied to irrigated cotton that had 40 percent of its bolls open. Leaf shed was less than three percent and the cotton plant leaves were still green in color. All follow-up treatments initially resulted in a significant level of leaf defoliation when compared to an area not treated, however, that advantage was lost by the date of the final rating.

## Problem

In the Southern Rolling Plains of Texas, cotton is seeded late because of the delayed uniform planting date which is usually the third week in May. Because of this late planting date, many producers do not use harvest aids to terminate the cotton. However, due to favorable growing conditions, 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 challenge is to determine the best way to use the harvest aid materials, as inexpensively as possible, while providing consistent results in boll opening and leaf defoliation.

## Objectives

Through the use of a field test: 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 9, 2000  
Planting Rate: 11.0 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 2000 at 2.0 pints per acre, preplant incorporated, followed by 16 ounces of Direx plus 16 ounces of Caparol applied broadcast at planting. In late May, Roundup Ultra was applied at a 1 quart rate.  
Number of Irrigations: Pre-watered twice plus 4 applications during the growing season  
Insecticides Applied: None  
Fertilizer Applied: In the Fall of 1999, 150 pounds of 11-52-0 was applied per acre and 200 pounds of 46-0-0 was applied on June 15<sup>th</sup> prior to the first irrigation.

### **Harvest Aid Application Information:**

Date Applied: September 9, 2000  
Wind Speed: 5 to 7 miles per hour  
Wind Direction: Southwest  
Air Temperature: 94 to 97<sup>o</sup> Fahrenheit  
Relative Humidity: 30 to 31%  
Carrier: 11 gallons of water per acre  
Pressure: 32 pounds per square inch  
Nozzle Size: 3 nozzles per row with one TX 6 hollowcone on each side of the row and 11002 air induction flat fan over the top  
Boom Height: 48 inches  
Cotton Height: Average of 38 inches  
Application Device: Self propelled rig  
Plot Size: 13.33 feet X 70 feet  
Number of Reps: 3  
Test Design: Replicated Complete Block Design

### **Plant Mapping Information**

Date information was collected: September 09, 2000  
Average Height: 38 inches  
Average number of bolls above top cracked boll: 7  
Percent open bolls: 40  
Number of plants per acre: 52,000

NOTE: The plot was terminated October 5 with an application of 32 ounces of Cyclone per acre.

### **Weather Information**

Rainfall information reported below and weather information used in the graph and table on page four were obtained from a CR10 weather station located at the test plot.

#### **Rainfall Information (Date and Amount):**

September 23	0.29
September 24	0.53
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Sept. Total	0.82 inch

No additional rainfall was received prior to the termination of the test.

### **Data Collection:**

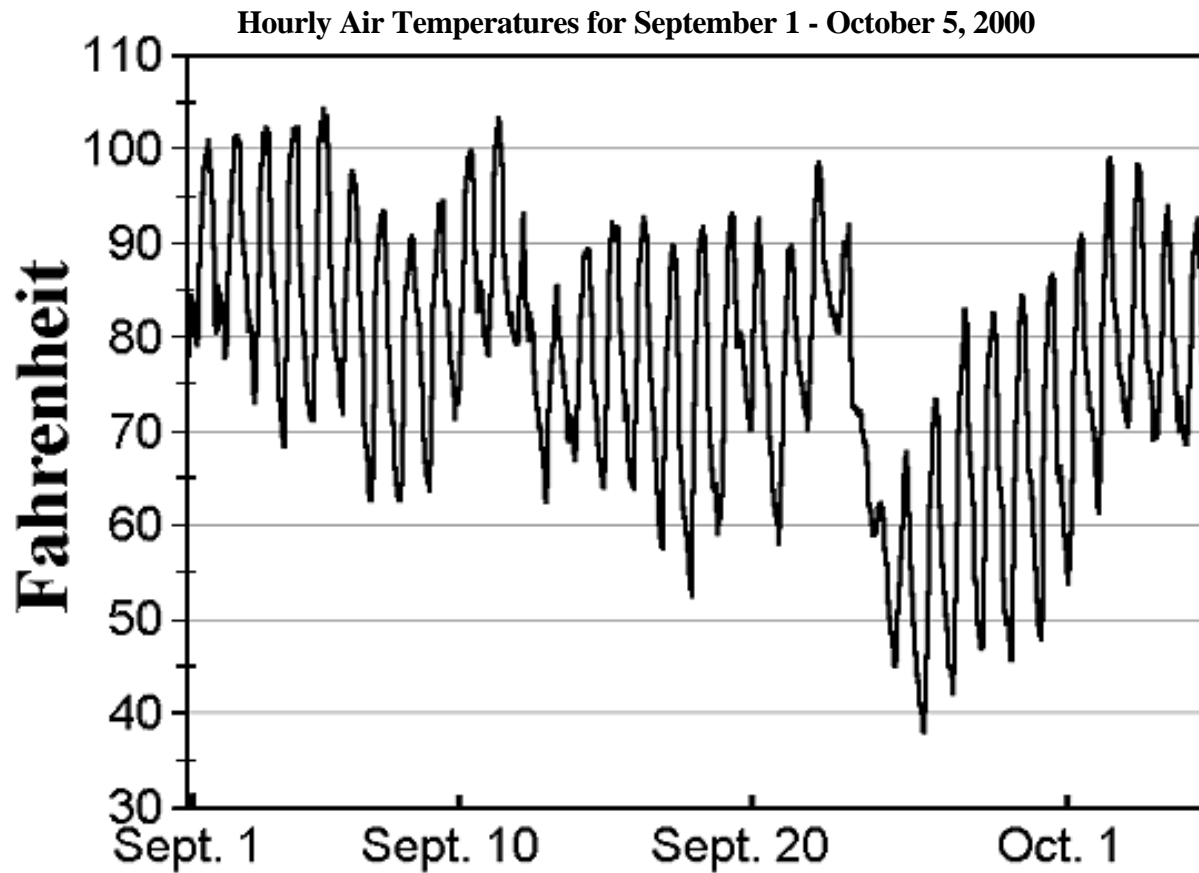
An area in each treatment was marked to make ratings on the percent open bolls, percent defoliation, percent desiccation, and regrowth in the top and bottom portion of the plants. Actual leaf counts and boll counts were made in each of the marked areas. Percent open bolls was determined by dividing the 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. Regrowth was limited in most of the area this year including this test plot. The information collected on September 20, September 27 and October 5 are reported in Tables 1, 2 and 3, respectively.

### **Results and Discussion**

#### **First Eleven Days After LintPlus Was Applied**

On the next page is a graph that reflects the air temperatures for the time period of September 1 to October 5, 2000. Also, on the next page is a table that indicates the maximum and minimum air temperature during the 25 days these products were evaluated. From September 9 to September 19, daytime air temperatures ranged from 88 to 105 degrees Fahrenheit and the night temperatures ranged from 52 to 78 degrees.

On September 20, there was no difference between any of the plots and the untreated check. the upper most cotton bolls were cross-sectioned and the seed coats were dark and the cotyledons well developed. Due to the maturity of the cotton, the followup applications of harvest aids were applied although only 63 percent of the bolls were open. At the eleven day evaluation, there was no significant difference in the percent of open bolls, the percent of defoliation, and the percent of desiccation or in regrowth in the terminal and bottom portion of the plant. The information collected on September 20 is reported in Table 1.



**Maximum and Minimum Air Temperatures for September 10 - October 6, 2000**

Date	Max Air	Min Air	Date	Max Air	Min Air	Date	Max Air	Min Air
10	103	71	19	96	59	28	85	47
11	105	78	20	97	70	29	86	46
12	99	73	21	92	58	30	93	54
13	88	63	22	101	70	1	93	54
14	94	67	23	95	72	2	101	61
15	97	64	24	73	57	3	100	71
16	95	64	25	69	45	4	96	69
17	92	58	26	75	38	5	95	68
18	94	52	27	84	42	6	68	53

Table 1. Chris Bubenik's 2000 Uniroyal LintPlus Cotton Harvest Aid Test (Tom Green County) September 20, 2000 (Eleven days after LintPlus was applied)

Harvest Aids Applied	Rate Applied Per Acre	Harvest Aid Cost Per Acre	% Open Bolls (11 DAT)	% Defoliation (11 DAT)	% Desiccation (11 DAT)	Regrowth Rating Top (11 DAT)	Regrowth Rating Bottom (11 DAT)
Check	None	\$0.00	63.33	5.0	0	0	0
LintPlus followed by Def	20 ounces followed by 8 ounces	???.?? \$2.77	63.33	5.0	0	0	0
LintPlus followed by Prep	20 ounces followed by 16 ounces	???.?? \$6.69	63.33	5.0	0	0	0
LintPlus followed by Cyclone	20 ounces followed by 16 ounces	???.?? \$3.55	63.33	5.0	0	0	0
LintPlus followed by Finish	20 ounces followed by 32 ounces	???.?? \$21.00	63.33	5.0	0	0	0
LintPlus followed by Ginstar	20 ounces followed by 6 ounces	???.?? \$9.00	63.33	5.0	0	0	0
LintPlus followed by Freeze	20 ounces	???.??	63.33	5.0	0	0	0

After the ratings were made on September 20<sup>th</sup> the plots were oversprayed with the appropriate harvest aid at the rates shown in the Tables.

**The First Week After Followup Treatments were applied (September 20 - September 26, 2000)**

Hourly daytime air temperature ranged from 69 to 101 degrees Fahrenheit. The nighttime temperatures ranged from 38 to 72 degrees. The 38 degree temperature occurred on September 26<sup>th</sup> and some frost injury resulted; this injury impacted leaf defoliation ratings on October 5<sup>th</sup> (22 days after treatments were applied).

The amount of boll opening now ranged from 80 to 85 percent which is an increase of 17 to 22 percent from the evaluation done on September 20<sup>th</sup>. From the data collected on September 27<sup>th</sup> and reported in Table 2, there was only significant difference in the percent of defoliation.

In this test, the significant difference in the amount of leaf defoliation was found between the treatment where the followup application of Finish at 32 ounces was applied and the check plot and the treatment where the followup application of Ginstar at 6 ounces were made.

### **The Second Week After Followup Treatments were applied (September 27 - October 3, 2000)**

Hourly daytime air temperature ranged from 84 to 101 degrees Fahrenheit. The nighttime temperatures ranged from 42 to 71 degrees. On September 26<sup>th</sup>, the nighttime temperature dropped to 38 degree and some frost injury resulted; this injury impacted leaf defoliation ratings made on October 5<sup>th</sup> (22 days after treatments were applied).

The amount of boll opening now ranged from 83 to 88 percent which is an increase of 3 to 7 percent from the evaluation made on September 27<sup>th</sup>. At the evaluation on October 5<sup>th</sup> there was a significant difference in the percent of regrowth in the bottom of the plant. However, the amount of regrowth was low and no reduction in lint quality was expected. The information collected on October 5 is reported in Table 3.

The application of LintPlus did not seem to have any benefit in the areas of cotton plant development that was measured. Percent open bolls, percent defoliation, percent desiccation, and regrowth were the same eleven days after LintPlus was applied. The followup treatments had varying level of impact on the plants development and after the evaluation on October 5<sup>th</sup> the plot was terminated and harvested ten days later.

On October 5<sup>th</sup> a sample was collected from each plot to determine the impact of LintPlus and the followup treatments of harvest aids. From the samples collected lint yield per acre and fiber properties was determined and the data collected is reported in Table 4.

### **Economic Analysis**

For 2000, we have had an open September and most of 100,000 acres of cotton could have been terminated and harvested prior to the first rain. Throughout most of October, rainfall has kept producers from harvesting cotton in a timely manner. Some acreage has received 6 to 9 inches of rain during October and harvest is still on hold through most of November. This delay has resulted in a reduction in yield (45 pounds less lint than the lowest yield of any follow up treatment) and quality (grade reduction from 21 to 52). The reduction in lint cost \$20.43 per acre and the loss in grade cost \$58.99 per acre, so the cost of waiting for a freeze cost this producer \$79.42 per acre. The low temperature on September 26 caused some leaf defoliation to occur, however, a killing freeze did not occur until November 14 and as of this writing on December 14, many acres remain unharvested waiting for the weather to clear up so harvest can resume.

### **Conclusions**

Six harvest aid treatments were applied to Deltapine 458 B/RR cotton on September 9, 2000 to prepare the crop for harvest. The plot was established on Chris Bubenik's Farm, 5 miles north of Wall, Texas. The chemicals were applied to irrigated cotton that had 40 percent of its bolls open. Leaf shed was less than three percent and the cotton plant leaves were still green in color. All follow-up treatments initially resulted in a significant level of leaf defoliation when compared to an area not treated, however, that advantage was lost by the date of the final rating.

Table 2. Chris Bubenik's 2000 Uniroyal LintPlus Cotton Harvest Aid Test (Tom Green County)  
 September 27, 2000 (7 days after the 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)
Check	0	\$0.00	80.00	6.67 b	0	0	0
LintPlus followed by Def	20 ounces followed by 8 ounces	???.?? \$2.77	80.00	20.0 ab	1.67	0	0
LintPlus followed by Prep	20 ounces followed by 16 ounces	???.?? \$6.69	81.67	28.33 ab	1.00	0	0
LintPlus followed by Cyclone	20 ounces followed by 16 ounces	???.?? \$3.55	81.67	31.67 ab	43.33	0	0
LintPlus followed by Finish	20 ounces followed by 32 ounces	???.?? \$21.00	85.00	43.33 a	0	0	0
LintPlus followed by Ginstar	20 ounces followed by 6 ounces	???.?? \$9.00	81.67	15.0 b	23.33	0	0
LintPlus followed by Freeze	20 ounces	???.??	80.00	8.33 b	0	0	0

NOTE: The individual or combination of letter a or b 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 herbicides applied).

Table 3. Chris Bubenik's 2000 Uniroyal LintPlus Cotton Harvest Aid Test (Tom Green County)  
October 5, 2000 (14 days after the followup treatments were applied)

Harvest Aids Applied	Rate Applied Per Acre	Harvest Aid Cost Per Acre	% Open Bolls (22 DAT)	% Defoliation (22 DAT)	% Desiccation (22 DAT)	Regrowth Rating Top (22 DAT)	Regrowth Rating Bottom (22 DAT)
Check	0	\$0.00	83.33	56.67	0	0.67	0.33 b
LintPlus followed by Def	20 ounces followed by 8 ounces	???.?? \$2.77	86.67	76.67	1.67	1.0	1.0 a
LintPlus followed by Prep	20 ounces followed by 16 ounces	???.?? \$6.69	86.67	68.33	0	0.83	1.0 a
LintPlus followed by Cyclone	20 ounces followed by 16 ounces	???.?? \$3.55	86.67	56.67	33.33	0.33	1.0 a
LintPlus followed by Finish	20 ounces followed by 32 ounces	???.?? \$21.00	88.33	83.33	0	0.33	1.0 a
LintPlus followed by Ginstar	20 ounces followed by 6 ounces	???.?? \$9.00	88.33	66.67	20.0	0.67	1.0 a
LintPlus followed by Freeze	20 ounces	???.??	85.00	66.67	0	0.67	0.33 b

NOTE: The individual or combination of letter a or b 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 herbicides applied).

Table 4. Chris Bubenik's 2000 Uniroyal LintPlus Cotton Harvest Aid Test (Tom Green County)  
 Yield and Fiber Quality information from hand harvest done on October 5, 2000.

Harvest Aids Applied	Rate Applied Per Acre	Harvest Aid Cost Per Acre	Lint Yield Per Acre (pound)	Fiber Quality				
				Grade	Staple	Mic	Strength	Uniformity
Check	0	\$0.00	864	212	35	4.7	29.2	80.8
LintPlus followed by Def	20 ounces followed by 8 ounces	???.?? \$2.77	773	211	35	4.4	30.0	80.9
LintPlus followed by Prep	20 ounces followed by 16 ounces	???.?? \$6.69	739	211	36	4.8	30.4	82.9
LintPlus followed by Cyclone	20 ounces followed by 16 ounces	???.?? \$3.55	870	211	35	4.2	31.4	81.1
LintPlus followed by Finish	20 ounces followed by 32 ounces	???.?? \$21.00	856	212	36	4.2	32.4	82.1
LintPlus followed by Ginstar	20 ounces followed by 6 ounces	???.?? \$9.00	860	211	35	4.4	30.4	81.0
LintPlus followed by Freeze	20 ounces	???.??	694	522	35	4.8	28.4	81.1

### Acknowledgments

I want to take this opportunity to thank:

- Chris Bubenik for his help in plot establishment and management.
- Uniroyal Chemical Company for their support of harvest aid research conducted in the Trans-Pecos and Southern Rolling Plains areas of Texas.

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

- Aventis CropScience who provided the Prep
- Bayer Corporation who provided the Def
- Uniroyal Chemical Company who provided the Harvade 4098-04 and Leafless
- Zeneca Ag Products who provided the Cyclone

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