



Result Demonstration/Applied Research Report

**2005 Tom Green County
Cotton Harvest Aid Demonstration
Cooperator: Chris Bubenik**

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Summary

Twenty-one harvest aid treatments were applied to Deltapine 488 BG/RR cotton on October 17, 2005 to prepare the crop for harvest. The plot was established on Chris Bubenik's Farm, one mile west of Wall, Texas. The chemicals were applied to cotton that had 65 percent of its bolls open. Leaf shed was less than one percent and the cotton plant leaves were still green in color. All applied treatments resulted in a significant level of boll opening, leaf defoliation and leaf desiccation when compared to the untreated checks. New plant growth was minimal for the 14 days the plot was evaluated.

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.

Materials and Methods

Cooperating Producers: Chris Bubenik
Location: 1 mile west of Wall, Texas

Crop Production Information:

Planting Date: June 9, 2005
Planting Rate: 6.8 pounds per acre
Variety Planted: Deltapine 488 BG/RR
Planting Pattern: 2-in-1-out on 40 inch rows
Herbicide Applied: Direx at 8 ounces plus Caparol at 8 ounces were applied in a 20 band at planting. Glyphosate was applied at 26 ounces per acre when the cotton was in the fifth-leaf stage. Also, 32 ounces per acre of glyphosate was applied post direct in late-August
Number of Irrigations: Dryland production
Insecticides Applied: July 14, Intruder was applied to control fleahoppers
Fertilizer Applied: July 12, applied 13.6 gallons per acre of 20-10-0-5 (30 pounds of nitrogen and 15 pounds of P₂O₅ per acre)
Growth Regulator: August 24, applied 16 ounces of mepiquat chloride

Harvest Aid Application Information:

Date Applied: October 17, 2005
Wind Speed: 6 to 8 mph
Wind Direction: Southwest
Water Applied: 16 Gallons Per Acre
Air Temperature: 80 to 85° Fahrenheit
Relative Humidity: 44 to 55%
Time of Day: Established from 12:30 p.m. to 4:15 p.m.
Test Design: Randomized complete block design
Nozzles: one 11002 Air Induction over the top of row, one 8002 flat fan nozzle on a 9 inch drop on each side of the row.
Row Pattern: 40 inch rows planted 2-in-1-out
Irrigation: None
Plot Design: 6.7 ft X 60 ft replicated 4 times
Boom Height: 46 inches
Pressure: 32 pounds per square inch
Ground Speed: 4 mph

Harvest Aid Application Information (followup application):

Date Applied: October 24, 2005
Time of Day: 1:30 p.m. to 4:30 p.m.
Wind Speed: 3 to 4 miles per hour
Wind Direction: North
Air Temperature: 57 to 62° Fahrenheit
Relative Humidity: 24 to 28%
Carrier: 16.0 gallons of water per acre
Pressure, Nozzle Arrangement, Boom Height was the same as shown on October 17.

Plant Information

Date information was collected: October 17, 2005
Average Height: 36 inches
Average number of bolls above top cracked boll: 4.5
Percent open bolls: 65
Number of plants per acre: 33,000

At the time of application, plant health was excellent. The upper most cotton bolls were cross-sectioned and the seed coats were dark and the cotyledons were well developed.

Weather Information

Rainfall and air temperature information was obtained from a weather station located 6 mile north of the plot.

Rainfall Information (Date and Amount)

October 6	0.80 inch
October 7	0.35 inch
October 9	0.85 inch
October 10	0.02 inch
October 13	0.08 inch
October 27	0.73 inch
October 28	0.01 inch

Total October Rainfall	2.84 inches

Please note that early in October prior to establishing the plot, 2.10 inches of rain was received.

Maximum and Minimum Air Temperatures for October 17 - October 30, 2005

Date	Max Air	Min Air	Date	Max Air	Min Air
17	85	57	24	63	36
18	89	58	25	74	31
19	90	57	26	77	36
20	83	54	27	61	47
21	80	45	28	71	46
22	80	44	29	71	45
23	63	42	30	77	50

The air temperature on the morning of October 25 dropped down to 31 degrees for one hour. The environmental conditions were not correct to result in injury to the plant. Some areas to the north and east of the county had temperatures that ranged from 28 to 30 degrees and plant injury ranged from slight to sever.

Results and Discussion

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. 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. The information collected on October 24 and October 31 are reported in Tables 1 and 2, respectively.

The First Seven Days

On the previous page is a table that indicates the maximum and minimum air temperature during the 14 days these products were evaluated. From October 17 to October 23, daytime air temperatures ranged from 63 to 90 degrees Fahrenheit and the night temperatures ranged from 42 to 58 degrees. No rainfall occurred during this time period. When the plots were evaluated on October 24, there was a significant difference in the percent of bolls opened, percent defoliation and percent desiccation. The data collected is summarized in Table 1.

The percent of open bolls increased by 18 to 24 percent in the first week with 13 of the treatments being better than the check.

The percent of leaf defoliation increased by 31 to 86 percent. All treatments had significantly more leaf defoliation than the check. The treatments that had Gramoxone Max in the tank mix had significantly less defoliation than the other treatments in the test.

The percent of leaf desiccation increased by 0 to 26 percent. All treatments that were tank mixed with Gramoxone Max had significantly more desiccation than most of the treatments in the test. No regrowth was noted in the top and bottom portion of the cotton plant.

The Second Week (October 24 - October 30, 2005)

Hourly daytime air temperature ranged from 61 to 77 degrees Fahrenheit. The nighttime temperatures ranged from 31 to 50 degrees. During the week rainfall occurred two days with a total accumulation of 0.74 inches. The cooler temperatures during the week slowed the progress of the cotton and its response to the harvest aids applied. The followup applications were applied on October 24. On October 31 the plots were evaluated, and there was a significant difference in the percent open bolls, percent defoliation, and percent desiccation. The data collected is summarized in Table 2.

The amount of boll opening ranged from 90 to 96 percent, which is an increase of 5 to 7 percent from the previous evaluation. All treatments had significantly more boll opening than the check. The amount of leaf defoliation ranged from 72 to 93 percent, an increase of 8 to 41 percent. The amount of desiccation ranged from 0 to 15 percent which should keep the leaf rating of ginned cotton in the acceptable range of 1 to 3. Regrowth in the top and bottom portion of the plant was almost non-existent at the time of the 14 day after treatment evaluation. None of the treatments had enough regrowth to cause a problem during the ginning process.

Table 1. Chris Bubenik's 2005 Bayer, FMC, Nichino, Chemtra, Valent Cotton Harvest Aid Test (Tom Green County)
October 24, 2004 (7 days after initial treatments were applied)

Harvest Aids Applied (two row plots)	Rate Applied Per Acre	% Open Bolls (7 DAT)	% Defoliation (7 DAT)	% Desiccation (7 DAT)	Regrowth Rating Top (7 DAT)	Regrowth Rating Bottom (7 DAT)
Ginstar	6.0 oz	85.00 bc	75.75 c	1.75 fg	0	0
Ginstar	8.0 oz	87.00 ab	80.50 abc	2.50 fg	0	0
Ginstar + C.O.C.	8.0 oz + 1% v/v	85.75 abc	83.75 ab	2.75 fg	0	0
Def + Finish 6 Pro	16.0 oz. + 21.0 oz	88.75 ab	85.25 a	3.25 efg	0	0
Ginstar + Finish 6 Pro	6.0 oz. + 21.0 oz	86.25 abc	86.00 a	2.25 fg	0	0
Ginstar + Prep	6.0 oz. + 21.0 oz	87.00 ab	84.00 ab	4.25 defg	0	0
Ginstar + Prep + C.O.C.	6.0 oz. + 21.0 oz + 1% v/v	86.25 abc	79.25 abc	3.25 efg	0	0
Def + Prep	16.0 oz. + 16.0 oz	88.25 ab	84.75 ab	3.00 fg	0	0
Aim + Prep + C.O.C.	0.75 oz. + 16.0 oz + 1% v/v	86.25 abc	83.50 ab	5.50 cdef	0	0
Check	--	83.00 c	31.25 e	0.0 g	0	0
ET + Prep + C.O.C.	1.5 oz. + 21.0 oz. + 1% v/v	85.00 bc	78.00 bc	9.00 bc	0	0
ET + Prep + C.O.C.	1.5 oz. + 32.0 oz. + 1% v/v	88.75 ab	77.75 bc	10.50 b	0	0
ET + C.O.C.	1.5 oz + 1% v/v	85.00 bc	82.00 abc	5.25 cdef	0	0
Blizzard + Prep + C.O.C.	0.5 oz. + 16.0 oz. + 1% v/v	87.00 ab	82.00 abc	5.75 cdef	0	0
Blizzard + Prep + C.O.C.	0.6 oz. + 16.0 oz. + 1% v/v	88.25 ab	81.50 abc	6.50 bcdef	0	0
Blizzard + Prep + C.O.C.	0.5 oz. + 16.0 oz. + 1% v/v	87.50 ab	81.25 abc	4.50 cdefg	0	0
Blizzard + Prep + C.O.C.	0.6 oz. + 16.0 oz. + 1% v/v	88.25 a	83.25 ab	7.75 bcde	0	0
Resource + Prep + C.O.C.	10.0 oz. + 21.0 oz. + 1% v/v	89.00 a	82.75 ab	8.00 bcd	0	0
Aim + Gramoxone Max + C.O.C.	0.75 oz + 5.0 oz + 1% v/v	88.25 ab	69.75 d	24.00 a	0	0
ET + Gramoxone Max + C.O.C.	1.25 oz + 5.0 oz + 1% v/v	86.25 abc	67.00 d	26.75 a	0	0
Resource + Prep + C.O.C.	8.0 oz. + 21.0 oz. + 1% v/v	87.50 ab	84.25 ab	6.25 bcdef	0	0
Resource + Prep + C.O.C.	8.0 oz. + 21.0 oz. + 1% v/v	89.00 a	85.75 a	6.25 bcdef	0	0

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

Table 2. Chris Bubenik's 2005 Bayer, FMC, Nichino, Chemtra, Valent Cotton Harvest Aid Test (Tom Green County)
October 31, 2005 (14 days after initial treatments were applied / 7 days after followup treatments)

Harvest Aids Applied (two row plots)	Rate Applied Per Acre	% Open Bolls (14 DAT)	% Defoliation (14 DAT)	% Desiccation (14 DAT)	Regrowth Rating Top (14 DAT)	Regrowth Rating Bottom (14 DAT)
Ginstar ----->*	6.0 oz	93.50 c	88.00 bc	12.00 ab	0	0
Ginstar ----->*	8.0 oz	94.25 abc	88.75 abc	11.25 abc	0	0
Ginstar + C.O.C. ----->*	8.0 oz + 1% v/v	94.50 abc	91.00 ab	9.00 bcd	0	0
Def + Finish 6 Pro ----->*	16.0 oz. + 21.0 oz	94.75 abc	91.00 ab	9.00 bcd	0	0
Ginstar + Finish 6 Pro ----->*	6.0 oz. + 21.0 oz	95.50 abc	93.00 ab	7.00 bcd	0	0
Ginstar + Prep ----->*	6.0 oz. + 21.0 oz	94.25 abc	90.25 ab	9.75 bcd	0	0
Ginstar + Prep + C.O.C. ----->*	6.0 oz. + 21.0 oz + 1% v/v	95.00 abc	90.75 ab	9.25 bcd	0	0
Def + Prep ----->*	16.0 oz. + 16.0 oz	95.00 abc	89.75 ab	10.25 bcd	0	0
Aim + Prep + C.O.C. ----->*	0.75 oz. + 16.0 oz + 1% v/v	95.00 abc	90.00 ab	10.00 bcd	0	0
Check	--	90.00 d	72.50 d	0.00 e	0	0
ET + Prep + C.O.C.	1.5 oz. + 21.0 oz. + 1% v/v	95.00 abc	90.75 ab	9.25 bcd	0	0
ET + Prep + C.O.C. ----->*	1.5 oz. + 32.0 oz. + 1% v/v	95.00 abc	91.00 ab	9.00 bcd	0	0
ET + C.O.C. followed by ET + C.O.C.	1.5 oz + 1% v/v ----->1.5 oz + 1% v/v	93.75 c	92.75 ab	7.25 bcd	0	0
Blizzard + Prep + C.O.C. followed by Blizzard + C.O.C.	0.5 oz. + 16.0 oz. + 1% v/v -----> 0.5 oz. + 1% v/v	96.25 a	91.75 ab	8.25 bcd	0	0
Blizzard + Prep + C.O.C. followed by Blizzard + C.O.C.	0.6 oz. + 16.0 oz. + 1% v/v -----> 0.5 oz. + 1% v/v	95.00 abc	93.25 a	6.75 cd	0	0
Blizzard + Prep + C.O.C. ----->*	0.5 oz. + 16.0 oz. + 1% v/v	95.00 abc	91.00 ab	9.00 bcd	0	0
Blizzard + Prep + C.O.C. ----->*	0.6 oz. + 16.0 oz. + 1% v/v	95.00 abc	90.25 ab	9.75 bcd	0	0
Resource + Prep + C.O.C. ----->*	10.0 oz. + 21.0 oz. + 1% v/v	94.50 abc	91.75 ab	8.25 bcd	0	0
Aim + Gramoxone Max + C.O.C. followed by Aim + C.O.C.	0.75 oz + 5.0 oz + 1% v/v followed by 0.75 oz + 1% v/v	94.00 bc	84.50 c	15.50 a	0	0
ET + Gramoxone Max + C.O.C. followed by ET + C.O.C.	1.25 oz + 5.0 oz + 1% v/v followed by 1.5 oz + 1% v/v	94.00 bc	84.25 c	15.00 a	0	0
Resource + Prep + C.O.C. ----->*	8.0 oz. + 21.0 oz. + 1% v/v	96.00 ab	93.00 ab	7.00 bcd	0	0
Resource + Prep + C.O.C. followed by Resource + C.O.C.	8.0 oz. + 21.0 oz. + 1% v/v -----> 6.0 oz + 1% v/v	95.50 abc	93.25 a	6.00 d	0	0

----->* Indicates a followup application of 24 ounces of Gramoxone Inteon plus 0.5% v/v of Activator 90 applied October 24, 2005

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

The remaining area of the field that did not have harvest aids applied was ready to be sprayed. Several of the treatments used in this test could be selected and used successfully to prepare the crop for harvest. It was impressive to see the level of defoliation and regrowth suppression provided by many of the harvest aids in this test. I look forward to having these products available in the future for use as harvest aids in our region.

Economics

For 2005, due to a wet cool August, most of the cotton crop was delayed. By the first of November less than 50,000 acres of cotton had been harvested. During October many areas of the region received almost 5 inches of rain and it has kept producers from making some of their planned harvest aid applications. There is less than 3 percent of the cotton lint on the ground on November 1. A loss of 4 to 7 cents per pound could occur because of the weather related delay. It is important to remember that a higher lint yield is not the only way of increasing profit from the use of a harvest aid. Other factors include: timely harvest, improved fiber quality, improved harvesting efficiency, and higher percent lint turnout at the gin.

Acknowledgments

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- Chris Bubenik for his help in plot establishment and management.
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I would also like to thank the companies that provided the chemicals for this harvest aid test, these included:

- Bayer CropScience who provided the Def, Finish 6 Pro, Ginstar and Prep
- Chemtra who provided the Blizzard
- FMC Corporation who provided the Aim
- Nichino America who provided the ET
- Syngenta Crop Protection, Inc. who provided the Gramoxone Max and Gramoxone Inteon
- UAP Southwest who provided the Activator 90 (non-ionic surfactant) and Herbimax (crop oil concentrate)
- Valent Corporation who provided the Resource

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