



Result Demonstration/Applied Research Report

**2006 Tom Green County
Cotton Harvest Aid Demonstration
Cooperator: Chris Bubenik**

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Summary

Eighteen treatments were applied over the top of cotton on October 3 to prepare for harvest. The plot was established on Chris Bubenik's farm located across the street from the Wall, Texas Post Office. The chemicals were applied to Deltapine 445 BG/RR cotton that had 70 percent of its bolls open. Leaf shed was less than one percent when the plot was established. These plots were evaluated on October 12 (nine days after treatments were applied) and October 20, 2006 (17 days after the treatments were applied and seven days after follow-up treatments were applied). Most of the treatments resulted in an increase in open bolls, leaf defoliation, and leaf desiccation. In this test several factors resulted in slow performance of the harvest aids applied. These include cool temperature, rainfall, and cloud cover.

Objective

In the Southern Rolling Plains, cotton is usually planted starting in mid-May. Because of this 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 is 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 County Producers: Chris Bubenik
Location: Across the street from Wall, Texas Post Office

Crop Production Information:

Variety Planted: Deltapine 445 BG/RR
Planting Date: May 18, 2006
Planting Rate: 6.8 pounds per acre
Planting Pattern: 2-in-1-out on 40 inch rows
Irrigation: Furrow Irrigation
Number of Irrigations: Prewater plus two during the growing season
Herbicide Applied: 16 ounces of Cotoran plus 24 ounces of Prowl H2O were applied at planting
Fertilizer Applied: Side-dressed 28 pounds of nitrogen and 5 pounds of sulfur per acre

Harvest Aid Application Information for October 3, 2006:

Wind Speed: 8.0 to 10.0 miles per hour
Wind Direction: South
Air Temperature: 80 to 88⁰ Fahrenheit
Relative Humidity: 33 to 54%
Carrier: 16.0 gallons of water per acre
Pressure: 36 pounds per square inch
Nozzle Size: 11002 extended range flat fan over the top of each row and one 8002 Extended Range nozzle on each side of the row
Boom Height: 42 inches
Cotton Height: 28 to 34 inches
Ground Speed: 4.0 miles per hour
Application Device: Self propelled rig with 13.33 foot boom
Plot Size: 13.33 feet X 50 feet
Test Design: Randomized block design replicated four times

Harvest Aid Application Information for October 13, 2006:

Wind Speed: 6.0 to 7.0 miles per hour
Wind Direction: Southeast
Air Temperature: 58 to 64⁰ Fahrenheit
Relative Humidity: 60 to 65%
Carrier: 16.0 gallons of water per acre
Pressure: 36 pounds per square inch
Nozzle Size: 11002 extended range flat fan over the top of each row and one 8002 Extended Range nozzle on each side of the row
Boom Height: 42 inches
Cotton Height: 28 to 34 inches
Ground Speed: 4.0 miles per hour
Test Design: Randomized block design replicated four times

Plant Information

At the time of application, the upper most cotton bolls were cross-sectioned, the seed coats were dark, and the cotyledons well developed. Cotton height averaged 30 inches and the percent open bolls averaged 70 percent. Overall the plants were healthy and unstressed and leaf defoliation was less than one percent.

Weather Information

Rainfall Information (Date and Amount)

October 10	0.76 inch
October 15	0.45 inch
October 16	0.47 inch

Total October Rainfall	1.68 inches

Maximum and Minimum Air Temperatures for October 3 - October 20, 2006

Date	Max Air	Min Air	Date	Max Air	Min Air
3	90	57	12	79	52
4	89	60	13	73	44
5	90	56	14	75	66
6	89	56	15	79	67
7	86	59	16	79	55
8	87	57	17	85	51
9	84	60	18	80	49
10	77	54	19	66	46
11	86	52	20	77	40

Results and Discussion

The cotton at the time of application was 70 percent open and most of the remaining bolls were mature. The application of the harvest aids did impact boll opening, percent leaf defoliation and percent leaf desiccation. Several factors contributed to the success of the harvest aids applied. These include: 1) the cotton was mature; 2) chemical coverage was excellent due to gallonage, pressure used, and wind. Leaf shed was less than one percent when the plot was established. These plots were evaluated on October 12 (nine days after treatments were applied) and October 20, 2006 (17 days after the treatments were applied and seven days after follow-up treatments were applied). In this test several factors resulted in slow performance of the harvest aids applied. These include cool temperature, rainfall, and cloud cover. The data collected on October 12 is reported in Table 1 and the data collected October 20 is reported in Table 2.

The first nine days (October 3 to October 12, 2006)

Maximum air temperatures ranged from 77 to 90 degrees Fahrenheit for the nine days after harvest aids were applied. The nighttime air temperatures ranged from 52 to 67 degrees Fahrenheit. With these temperatures you would have expected harvest aids to work well. However, cloud cover for several days was high and 0.76 inches of rainfall did occur on October 10 which cooled the soil temperature and cotton plant development was slow. The increase in boll opening ranged from four to 11 percent more than the check and this was statistically significant in 13 of the treatments. Leaf desiccation ranged from four to 26 percent higher than the check plot which was statistically different in all treatments except one. Leaf defoliation was higher than the check in all treatments on October 12, 2006 (nine days after the treatments were applied). The data collected on October 12 is reported in Table 1.

The formation of the abscission layer between the petiole and the main stem was slow to develop and the follow-up application needs to be delayed until that occurs. At nine days after the test was established the second application of harvest aids were applied.

Seven days after the second application of harvest aids (October 13 to October 20, 2006)

Maximum air temperatures ranged from 66 to 85 degrees Fahrenheit for the seven days following the second application of harvest aids. The nighttime air temperatures ranged from 40 to 67 degrees Fahrenheit. With these temperatures you would have expected harvest aids to work well. However, cloud cover for several days was high and 0.92 inches of rainfall did occur during the time period which cooled the soil temperature and cotton plant development was slow. The increase in boll opening increased from zero to ten percent from the rating made October 12. There was a significant difference in only two treatments (Finish 6 Pro plus Def and FirstPick plus Ginstar) when compared to the check. Leaf desiccation ranged from nine to 25 percent higher than the check plot which was statistically different in all treatments. Leaf defoliation was higher than the check in all treatments on October 20, 2006 (17 days after the test was started and seven days after the second application of harvest aids were applied). The data collected on October 20 is reported in Table 2.

All plots had a second application of harvest aid applied. Unless it is specifically stated the follow-up treatment was Gramoxone Inteon at 30 ounces plus 10.25 ounces of Induce, which is a non-ionic surfactant.

The combination of numbers shown in the defoliation and desiccation columns in the Table allows you the opportunity of determining the green leaves remaining by subtracting that total from 100. The preference would be to have no green leaves. The green leaves when harvested and placed into a module or trailer, will result in moisture which can result in unwanted temperature increases. None of the treatments had a combined number of 100 but nine treatments were 94 percent or better. With a lint yield in the 500 to 600 pound range you would prefer to keep leaf desiccation at 20 percent or less which should result in a leaf grade of 1 to 3.

In this test, regrowth was evident but not developed enough to interfere with harvest 17 days after the plot was established. Some of the materials applied are known to be better at desiccating or removing juvenile growth. These include Aim, Blizzard, ET, Ginstar, and Resource. Please note that a crop oil concentrate (C.O.C.) was used in tank mixes that contained Aim, Blizzard, ET, and Resource. For maximum performance with these products, C.O.C. is an important part of the tank mix.

Table 1. Tom Green County Cotton Harvest Aid Test (Chris Bubenik Farm, 2006)
October 12, 2006 (9 days after treatments were applied)

Harvest Aid Chemicals Applied (2 rows of each)	Rate Applied Per Acre	Cost of Harvest Aid Per Acre	% Open Bolls	% Defoliation	% Desiccation
Blizzard + Prep + Herbimax (C.O.C.)	0.6 oz. + 21 oz. + 20.5 oz.	\$5.00 + \$6.23 + \$1.48	76.25 abcd	52.50 ef	16.25 def
Blizzard + Prep + Herbimax (C.O.C.)	0.6 oz. + 21 oz. + 20.5 oz.	\$5.00 + \$6.23 + \$1.48	76.25 abcd	57.50 de	20.00 bcd
Blizzard + Prep + Herbimax (C.O.C.)	0.6 oz. + 21 oz. + 20.5 oz.	\$5.00 + \$6.23 + \$1.48	73.75 cde	51.25 fe	18.75 cde
ET + Prep + Herbimax (C.O.C.)	1.50 oz. + 21 oz. + 20.5 oz.	\$3.75 + \$6.23 + \$1.48	78.75 abc	50.00 f	26.25 a
Def + Prep + Induce (N.I.S.)	21.0 oz. + 21.0 oz. + 10.25 oz.	\$6.25 + \$4.75 + \$1.60	72.50 de	66.25 bc	6.25 ij
Blizzard + Prep + Herbimax (C.O.C.)	0.6 oz. + 21 oz. + 20.5 oz.	\$5.00 + \$6.23 + \$1.48	80.00 ab	57.50 de	16.25 def
Ginstar	6.0 oz.	\$8.88	80.00 ab	72.50 ab	7.50 hij
Check	-	-	70.00 e	5.00 g	0.00 k
Adios + Induce (N.I.S.)	6.0 oz. + 10.25 oz.	\$8.44 + \$1.60	75.00 bcde	67.25 bc	4.00 jk
Redi-Pik + Induce (N.I.S.)	6.0 oz. + 10.25 oz.	\$7.38 + \$1.60	75.00 bcde	70.00 ab	5.00 j
Ginstar	8.0 oz.	\$11.84	77.50 abcd	75.00 a	10.50 ghi
Ginstar + Prep	6.0 oz. + 21.0 oz.	\$8.88 + \$6.23	75.00 bcde	70.00 ab	10.00 ghi
Finish 6 Pro + Ginstar + Induce (N.I.S.)	21.0 oz. + 6.0 oz. + 10.25 oz.	\$11.32 + \$8.88 + \$1.60	80.00 ab	71.25 ab	15.00 efg
Finish 6 Pro + Def + Induce (N.I.S.)	21.0 oz. + 16.0 oz. + 10.25 oz.	\$11.32 + \$6.25 + \$1.60	81.25 a	72.50 ab	10.00 ghi
FirstPick + Ginstar + Induce (N.I.S.)	32.0 oz. + 3.0 oz. + 10.25 oz.	\$6.00 + \$4.44 + \$1.60	75.00 bcde	52.50 ef	10.00 ghi
FirstPick + Ginstar + Induce (N.I.S.)	48.0 oz. + 3.0 oz. + 10.25 oz.	\$9.00 + \$4.44 + \$1.60	81.25 a	53.75 ef	11.25 ghi
FirstPick + Aim+ Induce (N.I.S.)	48.0 oz. + 0.75 oz. + 10.25 oz.	\$9.00 + \$3.17 + \$1.60	78.75 abc	57.50 de	21.25 bc
Resource + Prep + Herbimax (C.O.C.)	8.0 oz. + 16 oz. + 20.5 oz.	\$9.50 + \$4.75 + \$1.48	75.00 bcde	61.25 cd	12.50 fgh
Aim + Prep + Herbimax (C.O.C.)	0.75 oz. + 16 oz. + 20.5 oz.	\$3.17 + \$4.75 + \$1.48	81.25 a	61.25 cd	11.25 ghi
ET + Herbimax (C.O.C.)	2.00 oz. + 20.5 oz.	\$5.00 + \$1.48	80.00 ab	47.5 f	26.25 a
ET + Herbimax (C.O.C.)	2.00 oz. + 41.0 oz.	\$5.00 + \$2.96	80.00 ab	47.5 f	23.75 ab

NOTE: In Table 1 the individual or combination of letter a, b, c, d, e, f, g, h, i, j, or k shown beside 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).

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Table 2. Tom Green County Cotton Harvest Aid Test (Chris Bubenik Farm, 2006)
October 20, 2006 (17 days after treatments were applied; 7 days after follow-up treatments were applied)

Harvest Aid Chemicals Applied (2 rows of each)	Rate Applied Per Acre	Cost of Harvest Aid Per Acre	% Open Bolls	% Defoliation	% Desiccation
Blizzard + Prep + Herbimax (C.O.C.) followed by ----> Blizzard + Herbimax (C.O.C.)	0.5 oz. + 21 oz. + 20.5 oz. followed by ----> 0.5 oz. + 20.5 oz.	\$5.00 + \$6.23 + \$1.48 followed by ----> \$5.00 + \$1.48	82.50 bcd	64.75 ef	17.00 cde
Blizzard + Prep + Herbimax (C.O.C.) followed by ----> Firestorm + Induce (N.I.S.)	0.5 oz. + 21 oz. + 20.5 oz. followed by ----> 20.0 oz. + 10.25 oz.	\$5.00 + \$6.23 + \$1.48 followed by ----> \$5.41 + \$1.60	83.25 bcd	77.50 abcd	8.75 f
Blizzard + Prep + Herbimax (C.O.C.)	0.5 oz. + 21 oz. + 20.5 oz.	\$5.00 + \$6.23 + \$1.48	80.00 cd	73.00 bcdef	20.00 abcd
ET + Prep + Herbimax (C.O.C.) followed by ----> ET + Herbimax (C.O.C.)	1.50 oz. + 21 oz. + 20.5 oz. followed by ----> 1.50 oz. + 20.5 oz.	\$3.75 + \$6.23 + \$1.48 followed by ----> \$3.75 + \$1.48	78.75 d	63.75 f	17.50 bcde
Def + Prep + Induce (N.I.S.) followed by ----> Firestorm + Induce (N.I.S.)	21.0 oz. + 21.0 oz. + 10.25 oz. followed by ----> 20.0 oz. + 10.25 oz.	\$6.25 + \$4.75 + \$1.60 followed by ----> 20.0 oz. + 10.25 oz.	81.25 bcd	77.50 abcd	10.00 ef
Blizzard + Prep + Herbimax (C.O.C.)	0.5 oz. + 21 oz. + 20.5 oz.	\$5.00 + \$6.23 + \$1.48	87.50 abc	69.75 cdef	20.00 abcd
Ginstar	6.0 oz.	\$8.88	87.50 abc	80.50 abc	14.00 def
Check	-	-	80.00 cd	5.00 g	0.00 g
Adios + Induce (N.I.S.)	6.0 oz. + 10.25 oz.	\$8.44 + \$1.60	82.50 bcd	74.75 bcde	21.25 abcd
Redi-Pik + Induce (N.I.S.)	6.0 oz. + 10.25 oz.	\$7.38 + \$1.60	85.00 abcd	79.75 abc	17.00 cde
Ginstar	8.0 oz.	\$11.84	86.25 abcd	87.00 a	10.75 ef
Ginstar + Prep	6.0 oz. + 21.0 oz.	\$8.88 + \$6.23	86.25 abcd	86.50 a	10.00 ef
Finish 6 Pro + Ginstar + Induce (N.I.S.)	21.0 oz. + 6.0 oz. + 10.25 oz.	\$11.32 + \$8.88 + \$1.60	85.00 abcd	88.25 a	8.75 f
Finish 6 Pro + Def + Induce (N.I.S.)	21.0 oz. + 16.0 oz. + 10.25 oz.	\$11.32 + \$6.25 + \$1.60	91.25 a	81.00 ab	13.75 def
FirstPick + Ginstar + Induce (N.I.S.)	32.0 oz. + 3.0 oz. + 10.25 oz.	\$6.00 + \$4.44 + \$1.60	81.25 bcd	67.75 def	26.25 a
FirstPick + Ginstar + Induce (N.I.S.)	48.0 oz. + 3.0 oz. + 10.25 oz.	\$9.00 + \$4.44 + \$1.60	88.75 ab	69.50 cdef	25.00 ab
FirstPick + Aim+ Induce (N.I.S.)	48.0 oz. + 0.75 oz. + 10.25 oz.	\$9.00 + \$3.17 + \$1.60	83.75 bcd	73.00 bcdef	17.50 bcde
Resource + Prep + Herbimax (C.O.C.)	8.0 oz. + 16 oz. + 20.5 oz.	\$9.50 + \$4.75 + \$1.48	82.50 bcd	71.50 bcdef	23.75 abc
Aim + Prep + Herbimax (C.O.C.)	0.75 oz. + 16 oz. + 20.5 oz.	\$3.17 + \$4.75 + \$1.48	85.00 abcd	73.25 bcdef	20.00 abcd

NOTE: In Table 2 the individual or combination of letter a, b, c, d, e, f, or g shown beside 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). Also, to account for 100 percent of the leaves you would add the percent defoliation plus the percent dessication and subtract from 100. The difference represents the number of original green leaves still remaining on the plant. Unless it is noted "followed by" in the harvest aid chemicals applied column, all treatments were sprayed on October 13 with 30 ounces of Gramoxone Inteon plus 10.25 ounces of Induce (a non-ionic surfactant).

Economic Analysis

This test can be used to document the results obtained from the use of harvest aids. If the same treatments are consistently at the top of the list for several years, then producers may want to incorporate those treatments into their cotton production program. 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.

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I would also like to thank the companies that provided the chemicals for this harvest aid test. These include:

- Bayer CropScience who provided the Def, Finish 6 Pro, Ginstar, and Prep
- Chemtura who provided the Blizzard and Firestorm
- DuPont who provided the FirstPick
- FMC Corporation who provided the Aim
- Helena Chemical Company who provided the Induce
- Microflow Company who provided the Adios
- Nichino America who provided the ET
- Syngenta Crop Protection, Inc. who provided the Gramoxone Inteon
- Tri-State Chemical DBA United Agra Products (UAP) who provided the C.O.C. (Herbimax)
- Valent USA Corporation who provided the Resource

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