



Result Demonstration/Applied Research Report

**2007 Nolan County
Cotton Harvest Aid Demonstration
Cooperator: CWH Farms**

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Summary

Twelve treatments were applied over the top of cotton on October 5 to prepare for harvest. The plot was established on CWH Farms field located on the Southeast side of Roscoe, TX. The chemicals were applied to FiberMax 1880 B2F cotton that had 70 percent of its bolls open. Leaf shed was less than one percent when the plot was established. Most of the treatments resulted in an increase in open bolls, leaf defoliation, and leaf desiccation. In this test favorable environmental conditions resulted in faster performance of the harvest aids applied. These included warm day and night temperatures, minimal rainfall with no impact on soil temperature and bright sunny days for most of the test period.

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 Producer: CWH Farms
Location: Southeast edge of Roscoe, TX

Crop Production Information:

Variety Planted: FM 1880 B2F
Planting Date: May 21, 2007
Planting Rate: 43,000 plants per acre
Planting Pattern: Solid on 40 inch rows
Irrigation: Furrow irrigation
Number of Irrigations: Once in mid-August

Harvest Aid Application Information for October 5, 2007:

Wind Speed: 5.0 to 6.0 miles per hour
Wind Direction: South
Air Temperature: 78 to 87⁰ Fahrenheit
Relative Humidity: 36 to 56%
Carrier: 16.0 gallons of water per acre
Pressure: 35 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 three times

Harvest Aid Application Information for October 20, 2007:

Wind Speed: 7.0 to 9.0 miles per hour
Wind Direction: Southwest
Air Temperature: 84 to 93⁰ Fahrenheit
Relative Humidity: 13 to 24%
Carrier: 10.0 gallons of water per acre
Pressure: 50 pounds per square inch
Nozzle Size: 8002 Flat fan on 20 inch centers
Boom Height: 42 inches
Cotton Height: 28 to 34 inches
Ground Speed: 10 miles per hour

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

No rainfall occurred during the test period. In the chart below the maximum and minimum air temperatures for the test period are listed.

Maximum and Minimum Air Temperatures for October 5 - October 22, 2007

Date	Max Air	Min Air	Date	Max Air	Min Air
5	89.0	66.0	14	88.0	61.0
6	87.1	62.0	15	74.0	53.0
7	86.0	64.2	16	79.0	51.0
8	83.0	64.0	17	83.0	57.4
9	81.1	60.2	18	79.0	51.0
10	86.0	56.3	19	85.0	38.0
11	83.4	61.4	20	93.0	54.0
12	86.2	64.4	21	93.0	54.0
13	89.0	66.0	22	61.3	39.0

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 (seven days after treatments were applied) and October 22, 2007 (17 days after the treatments were first applied and two days after follow-up treatments were applied). In this test several factors resulted in fast performance of the harvest aids applied. These include favorable daytime and nighttime temperatures, sunny and cloud free days. The data collected on October 12 is reported in Table 1 and the data collected October 22 is reported in Table 2.

The first seven days (October 5 to October 11, 2007) Maximum air temperatures ranged from 81 to 89 degrees Fahrenheit for the seven days after harvest aids were applied. The nighttime air temperatures ranged from 56 to 66 degrees Fahrenheit. With these temperatures the harvest aids worked better than expected. The increase in boll opening ranged from 10 to 22 percent more than the check and this was statistically significant in 11 of the treatments. Leaf desiccation ranged from one to 57 percent higher than the check plot which was statistically higher in three of the treatments. Leaf defoliation was higher than the check in all treatments on October 12, 2007 (seven 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 formed quickly and the follow-up applications were applied 15 days later. The harvest aids applied on October 20 was Gramoxone Inteon at 24 ounces per acre plus Induce at 10.25 ounces per acre.

Next ten days after first evaluation (October 12 to October 22, 2007)

Maximum air temperatures ranged from 61 to 93 degrees Fahrenheit for the seven days after the first evaluation. The nighttime air temperatures ranged from 38 to 66 degrees Fahrenheit. With these temperatures all of the harvest aids worked well. The increase in boll opening increased from two to nine percent from the rating made October 12. There was a significant difference in all treatments when compared to the check.

All plots were sprayed on October 20 with 24 ounces of Gramoxone Inteon and 10.25 ounces of Induce (Non-Ionic Surfactant) per acre. Prior to the application, the cotton plants in the check plots had no desiccation but other treatments ranged from one to 28 percent. The plots were evaluated two days later on October 22 and the cotton plants in the check plots now averaged 33 percent leaf desiccation. Treatments having a significantly high number of leaves desiccated on October 12 had a decrease in leaf desiccation on October 22. This indicates that the 15 days since the first treatment provided enough time for an abscission layer to form resulting in more leaf defoliation. Leaf defoliation was higher than the check in all treatments on October 22, 2007 (17 days after the test was started and 10 days after the first evaluation). The data collected on October 22 is reported in Table 2.

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. No remaining green leaves are preferred on cotton to be harvested. The green leaves when harvested and placed into a module or trailer, are a source of unwanted moisture which can result in a high temperature inside the module or trailer. Three treatments had a combined number of 100, but six had a combined number above 98. With a lint yield in the 600 to 700 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, and Ginstar. Please note that a crop oil concentrate was used in tank mixes that contained Aim, Blizzard, and ET. For maximum performance with these products, crop oil concentrate (C.O.C.) is an important part of the tank mix.

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.

Table 1. Nolan County Cotton Harvest Aid Test, October 12, 2007
(7 days after treatments were applied).

Harvest Aid Chemicals Applied (4 rows of each)	Rate Applied Per Acre	Cost of Harvest Aid Per Acre	% Open Bolls	% Defoliation	% Desiccation
Def + Prep + Induce (N.I.S.)	16.0 oz. + 16.0 oz. + 10.25 oz.	\$6.00 + \$3.38 + \$1.59	89.3 a	81.7 a	0.7 c
Ginstar	6.0 oz.	\$9.60	85.0 ab	72.7 ab	2.3 c
Finish 6 Pro + Ginstar + Induce (N.I.S.)	21.0 oz. + 6 oz. + 10.25 oz.	\$10.16 + \$9.60 + \$1.59	94.3 a	83.7 a	4.3 c
Blizzard + Prep + Herbimax (C.O.C.)	0.5 oz. + 24 oz. + 20.5 oz.	\$3.50 + \$5.60 + \$1.60	90.0 a	74.3 a	2.3 c
ET + Prep + Herbimax (C.O.C.)	1.50 oz. + 24 oz. + 20.5 oz.	\$3.40 + \$5.60 + \$1.60	88.3 a	73.0 ab	5.3 c
Aim + Prep + Herbimax (C.O.C.)	0.75 oz. + 24 oz. + 20.5 oz.	\$3.29 + \$5.60 + \$1.60	92.7 a	70.7 ab	6.0 c
Check	-	-	75.0 b	15.0 d	0.0 c
Ginstar + Prep + Herbimax (C.O.C.)	4.0 oz. + 16 oz. + 20.5 oz.	\$6.40 + \$3.38 + \$1.60	91.7 a	56.7 b	23.3 b
Gramoxone Inteon + Aim + Induce (N.I.S.)	24.0 oz. + 0.75 oz. + 10.25 oz.	\$5.34 + \$3.29 + \$1.59	95.0 a	39.0 c	56.7 a
Firestorm + Aim + Induce (N.I.S.)	16.0 oz. + 0.75 oz. + 10.25 oz.	\$4.38 + \$3.29 + \$1.59	96.0 a	37.3 c	55.0 a
Blizzard + FirstPick + Herbimax (C.O.C.)	0.5 oz. + 48 oz. + 20.5 oz.	\$3.50 + \$9.75 + \$1.60	91.0 a	79.7 a	4.3 c
ET + FirstPick + Herbimax (C.O.C.)	1.50 oz. + 48 oz. + 20.5 oz.	\$3.40 + \$9.75 + \$1.60	97.0 a	77.7 a	5.7 c
Aim + FirstPick + Herbimax (C.O.C.)	0.75 oz. + 48 oz. + 20.5 oz.	\$3.29 + \$9.75 + \$1.60	90.0 a	67.7 ab	2.3 c

NOTE: In Table 1 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 (even when there appears to be a large difference in results between the materials applied).

Table 2. Nolan County Cotton Harvest Aid Test, October 22, 2007
(17 days after treatments were applied; 2 days after follow-up treatments were applied).

Harvest Aid Chemicals Applied (4 rows of each)	Rate Applied Per Acre	Cost of Harvest Aid Per Acre	% Open Bolls	% Defoliation	% Desiccation
Def + Prep + Induce (N.I.S.)	16.0 oz. + 16.0 oz. + 10.25 oz.	\$6.00 + \$3.38 + \$1.59	97.7 a	96.7 ab	1.7 b
Ginstar	6.0 oz.	\$9.60	94.7 a	99.3 a	0.7 b
Finish 6 Pro + Ginstar + Induce (N.I.S.)	21.0 oz. + 6 oz. + 10.25 oz.	\$10.16 + \$9.60 + \$1.59	98.7 a	99.0 a	0.7 b
Blizzard + Prep + Herbimax (C.O.C.)	0.5 oz. + 24 oz. + 20.5 oz.	\$3.50 + \$5.60 + \$1.60	94.0 a	84.0 cde	4.3 b
ET + Prep + Herbimax (C.O.C.)	1.50 oz. + 24 oz. + 20.5 oz.	\$3.40 + \$5.60 + \$1.60	97.7 a	94.3 abc	2.7 b
Aim + Prep + Herbimax (C.O.C.)	0.75 oz. + 24 oz. + 20.5 oz.	\$3.29 + \$5.60 + \$1.60	94.3 a	85.7 bcd	5.0 b
Check	-	-	83.3 b	21.7 f	33.3 a
Ginstar + Prep + Herbimax (C.O.C.)	4.0 oz. + 16 oz. + 20.5 oz.	\$6.40 + \$3.38 + \$1.60	97.3 a	98.7 a	0.7 b
Gramoxone Inteon + Aim + Induce (N.I.S.)	24.0 oz. + 0.75 oz. + 10.25 oz.	\$5.34 + \$3.29 + \$1.59	97.0 a	73.3 de	26.7 a
Firestorm + Aim + Induce (N.I.S.)	16.0 oz. + 0.75 oz. + 10.25 oz.	\$4.38 + \$3.29 + \$1.59	97.7 a	71.7 e	28.3 a
Blizzard + FirstPick + Herbimax (C.O.C.)	0.5 oz. + 48 oz. + 20.5 oz.	\$3.50 + \$9.75 + \$1.60	98.7 a	92.3 abc	3.3 b
ET + FirstPick + Herbimax (C.O.C.)	1.50 oz. + 48 oz. + 20.5 oz.	\$3.40 + \$9.75 + \$1.60	97.7 a	94.3 abc	2.3 b
Aim + FirstPick + Herbimax (C.O.C.)	0.75 oz. + 48 oz. + 20.5 oz.	\$3.29 + \$9.75 + \$1.60	96.0 a	88.3 abc	3.3 b

NOTE: In Table 2 the individual or combination of letter a, b, c, d, e, or f 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.

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- 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
- 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)

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