



## **Result Demonstration/Applied Research Report**

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**2003 Tom Green County  
Cotton Harvest Aid Demonstration  
Cooperator: Chris Bubenik**

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and Dr. Billy Warrick, Extension Agronomist (San Angelo, Texas)

### **Summary**

Twenty-two harvest aid treatments were applied to Deltapine 424 BG/RR cotton on October 20, 2003 to prepare the crop for harvest. The plot was established on Chris Bubenik's Farm, seven miles north of Wall, Texas. The chemicals were applied to irrigated cotton that had 80 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 leaf defoliation when compared to the untreated checks. New plant growth was minimal for the 21 days the plot was evaluated. The regrowth that was developing should not interfere with harvesting and ginning.

### **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: 7 miles north of Wall

**Crop Production Information:**

Planting Date: May 14, 2003  
 Planting Rate: 11.0 pounds per acre  
 Variety Planted: Deltapine 424 BG/RR  
 Planting Pattern: Solid on 40 inch spacing  
 Herbicide Applied: Prowl was applied preplant incorporated in the Fall of 2002 at 3.0 pints per acre, followed by 16 ounces of Direx plus 16 ounces of Caparol applied broadcast at planting.  
 Number of Irrigations: 4 applications during the growing season (24 acre inches)  
 Insecticides Applied: 7 ounces of Orthene 90 applied in-furrow at planting  
 Fertilizer Applied: Fall 2002, applied 10 tons of cattle manure per acre. Additionally, 100 pounds of 46-0-0 was applied prior to the first irrigation. At planting, 4 ounces of PGR-4 was applied.

**Harvest Aid Application Information:**

Date Applied: October 20, 2003  
 Wind Speed: 2 to 5 mph  
 Wind Direction: South  
 Water Applied: 16 Gallons Per Acre  
 Air Temperature: 78 to 88<sup>o</sup> Fahrenheit  
 Relative Humidity: 40 to 50%  
 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.  
 Time of Day:  
     FMC test established from 1:00 p.m. to 2:00 p.m.  
     Nichino test established from 2:00 p.m. to 3:45 p.m.  
     Syngenta test established from 4:00 p.m. to 4:30 p.m.  
 Test Design: Randomized complete block design replicated 4 times

Row Pattern: 40 inch rows planted solid  
 Irrigation: Yes  
 Plot Design: 13.33 ft X 60 ft replicated 3 times (randomized)  
 Boom Height: 40 inches  
 Pressure: 32 pounds per square inch  
 Ground Speed: 4 mph

**Harvest Aid Application Information (followup application):**

Date Applied: October 28, 2003  
 Time of Day: 10:00 a.m. to 1:00 p.m.  
 Wind Speed: 5 to 7 miles per hour  
 Wind Direction: South  
 Air Temperature: 82 to 84<sup>o</sup> Fahrenheit  
 Relative Humidity: 55 to 60%  
 Carrier: 16.0 gallons of water per acre  
 Pressure, Nozzle Arrangement, Boom Height was the same as shown on October 20.

**Plant Information**

Date information was collected: September 20, 2003

Average Height: 36 inches

Average number of bolls above top cracked boll: 3

Percent open bolls: 80

Number of plants per acre: 52,000

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 the National Weather Service—San Angelo, Texas.

**Rainfall Information (Date and Amount)**

October 6	0.42 inch	November 2	0.01 inch
October 8	0.53 inch	November 5	0.24 inch
October 9	1.32 inches	November 6	0.09 inch
October 11	0.96 inch	November 7	0.09 inch
October 12	0.09 inch	November 8	0.30 inch
October 26	0.06 inch		
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Total October Rainfall	3.38 inches	November Rainfall	0.73 inch

**Maximum and Minimum Air Temperatures for October 20 - November 9, 2003**

Date	Max Air	Min Air	Date	Max Air	Min Air	Date	Max Air	Min Air
20	84	50	27	73	41	3	81	66
21	85	49	28	79	44	4	82	65
22	89	51	29	82	46	5	65	49
23	88	51	30	81	58	6	49	40
24	85	49	31	81	57	7	43	38
25	68	48	1	79	65	8	47	41
26	54	43	2	82	67	9	54	46

**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 27, November 3 and November 10 are reported in Tables 1, 2 and 3, respectively.

## **Results and Discussion**

### **The First Seven Days**

During the first two weeks of October, 3.32 inches of rain was received on the plot. No rain was received seven days prior to the establishment of the test plot.

On the previous page is a table that indicates the maximum and minimum air temperature during the 21 days these products were evaluated. From October 20 to October 26, daytime air temperatures ranged from 54 to 89 degrees Fahrenheit and the night temperatures ranged from 43 to 51 degrees. On October 26, 0.06 inch of rain fell on the plot. When the plots were evaluated on October 27, there was a significant difference in the percent defoliation, percent desiccation and the amount of regrowth in the top and bottom portion of the cotton plants. The data collected is summarized in Table 1.

The percent of open bolls increased by 5 to 10 percent in the first week but no significant difference was determined between treatments.

All treatments had significantly more leaf defoliation than the check. Most of the ET treatments had significantly less defoliation than the best Gramoxone Max treatments. The ET and Aim treatments had less regrowth in the top and bottom portion of the cotton plant than the Gramoxone Max plots.

### **The Second Week (October 27 - November 2, 2003)**

Hourly daytime air temperature ranged from 73 to 82 degrees Fahrenheit. The nighttime temperatures ranged from 41 to 67 degrees. Only 0.01 inch of rain was recorded during the week and it fell on November 2. The followup applications were applied on September 28. On November 3 when the plots were evaluated, there was a significant difference in the percent defoliation, percent desiccation and the amount of regrowth in the top and bottom portion of the cotton plant. Regrowth in the top of the plant was desiccated by several of the followup applications and this delayed regrowth development for several days. The data collected is summarized in Table 2.

The amount of boll opening ranged from 85 to 91.67 percent, which is an increase of 0 to 5 percent from the seven day evaluation.

The increase in leaf defoliation was noticeable across the entire test plot and the highest increase was seen in the ET treatments which had some increases as much as 40 percent. In the treated areas, defoliation ranged from 58 to 85 percent. At the time of this evaluation, enough leaves had been lost by the plant to keep the leaf rating of ginned cotton in the range of 1 to 3.

Most of the plots that had a followup treatment applied had significantly more leaf desiccation than plots that did not. Also, all plots that had a followup treatment applied had significantly less top regrowth than plots that did not. Regrowth was developing slowly even in the Gramoxone Max treated plots. None of the plots had enough regrowth develop to cause a problem with harvest or ginning.

Table 1. Chris Bubenik's 2003 FMC, Nichino, and Syngenta Cotton Harvest Aid Test (Tom Green County) October 27, 2003 (7 days after initial treatments were applied)

Harvest Aids Applied	Rate Applied Per Acre	% Open Bolls (7 DAT)	% Defoliation (7 DAT)	% Desiccation (7 DAT)	Regrowth Rating Top (7 DAT)	Regrowth Rating Bottom (7 DAT)
Aim + C.O.C followed by Aim + C.O.C.	1.0 oz. + 1% v/v followed by 1.0 oz. + 1% v/v	88.25	45.00 abcde	5.00 bc	0 c	0 c
Aim + Prep + C.O.C. followed by Gramoxone Max + C.O.C.	1.0 oz. + 16 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	88.25	47.50 abcde	1.50 bc	0 c	0 c
Aim + Gramoxone Max + C.O.C.	1 oz. + 5.33 oz. + 1% v/v	87.50	58.33 abc	7.00 bc	0 c	0 c
Check	--	85.00	5.00 f	0.00 c	0 c	0 c
Aim + C.O.C. followed by Gramoxone Max + C.O.C.	1.0 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	86.25	45.00 abcde	4.50 bc	0 c	0 c
Gramoxone Max + C.O.C. followed by Gramoxone Max + C.O.C.	10.67 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	85.0	48.75 abcde	3.25 bc	0 c	0 c
Appeal + Gramoxone Max + C.O.C.	0.6 oz. + 10.67 oz. + 1% v/v	86.25	47.50 abcde	5.00 bc	0 c	0 c
ET + C.O.C. followed by ET + C.O.C.	1.4 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	86.67	23.33 ef	1.67 bc	0.33 b	0.33 b
ET + C.O.C. followed by ET + C.O.C.	2.0 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	85.00	28.33 def	0.67 c	0 c	0 c
ET + C.O.C. followed by Gramoxone Max + N.I.S.	2.0 oz. + 1% v/v followed by 16.0 oz. + 0.25% v/v	86.67	33.33 cde	1.67 bc	0 c	0 c
ET + Prep + C.O.C. followed by ET + C.O.C.	1.4 oz. + 21.0 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	86.67	50.00 abcde	0.67 c	0 c	0 c
ET + Prep + C.O.C. followed by Gramoxone Max + N.I.S.	1.4 oz. + 21.0 oz. + 1% v/v followed by 16.0 oz. + 0.25% v/v	85.00	43.33 abcde	1.67 bc	0 c	0 c

ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 10 oz. + 1% v/v	85.00	33.33 cde	0.33 c	0 c	0 c
ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 8 oz. + 1% v/v	86.67	36.67 bcde	0.00 c	0.33 b	0.33 b
ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 6 oz. + 1% v/v	85.00	36.67 bcde	1.67 bc	0 c	0 c
ET + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 1% v/v followed by 1.0 oz. + 10 oz. + 1% v/v	85.00	25.00 ef	0.00 c	0 c	0 c
ET + Prep + Roundup WeatherMAX + C.O.C. followed by ET + C.O.C.	1.4 oz. + 16.0 oz. + 12 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	85.00	33.33 cde	0.67 c	0 c	0.33 b
Resource + Gramoxone Max + C.O.C.	4 oz. + 10.67 oz. + 1% v/v	90.00	58.33 abc	7.33 bc	0 c	0 c
Aim + Gramoxone Max + C.O.C.	1.0 oz. + 10.67 oz. + 1% v/v	88.33	58.33 abc	6.33 bc	0 c	0 c
Check		85.00	5.00 f	0.00 c	0 c	0 c
Gramoxone Max + N.I.S.	8.0 oz. + 0.25% v/v	86.67	53.33 abcd	6.33 bc	1 a	1 a
Gramoxone Max + N.I.S.	10.67 oz. + 0.25% v/v	86.67	66.67 a	4.67 bc	1 a	1 a
Gramoxone Max + N.I.S.	16.0 oz. + 0.25% v/v	85.00	61.67 ab	10.67 ab	1 a	1 a
Check		85.00	5.00 f	0.00 c	0 c	0 c
Gramoxone Max + N.I.S. followed by Gramoxone Max + N.I.S.	4.0 oz. + 0.25% v/v followed by 16.0 oz. + 0.25% v/v	86.67	45.00 abcde	5.33 bc	1 a	1 a
Gramoxone Max + N.I.S.	21.0 oz. + 0.25% v/v	90.00	63.33 ab	16.67 a	1 a	1 a

NOTE: In Table 1 the individual or combination of letter a, b, c, d, e, or f 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 2003 FMC, Nichino, and Syngenta Cotton Harvest Aid Test (Tom Green County) November 3, 2003 (14 days after initial treatments were applied / 6 days after followup treatments)

Harvest Aids Applied	Rate Applied Per Acre	% Open Bolls (14 DAT)	% Defoliation (14 DAT)	% Desiccation (14 DAT)	Regrowth Rating Top (14 DAT)	Regrowth Rating Bottom (14 DAT)
Aim + C.O.C followed by Aim + C.O.C.	1.0 oz. + 1% v/v followed by 1.0 oz. + 1% v/v	88.25	70.00 abcd	16.25 abc	0.25 bc	0.50 b
Aim + Prep + C.O.C. followed by Gramoxone Max + C.O.C.	1.0 oz. + 16 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	88.25	78.75 ab	10.00 bcd	0.25 bc	0.50 b
Aim + Gramoxone Max + C.O.C.	1 oz. + 5.33 oz. + 1% v/v	87.50	75.00 abcd	5.75 cd	0.25 bc	0.50 b
Check	--	85.00	20.00 e	0.00 d	0 c	0 c
Aim + C.O.C. followed by Gramoxone Max + C.O.C.	1.0 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	86.25	78.75 ab	12.50 abcd	1 a	1 a
Gramoxone Max + C.O.C. followed by Gramoxone Max + C.O.C.	10.67 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	87.50	70.00 abcd	10.25 bcd	0.75 ab	1 a
Appeal + Gramoxone Max + C.O.C.	0.6 oz. + 10.67 oz. + 1% v/v	88.75	85.00 a	8.75 bcd	1 a	1 a
ET + C.O.C. followed by ET + C.O.C.	1.4 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	86.67	60.00 cd	13.67 abcd	1 a	1 a
ET + C.O.C. followed by ET + C.O.C.	2.0 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	86.67	76.67 abc	4.00 cd	0.33 abc	1 a
ET + C.O.C. followed by Gramoxone Max + N.I.S.	2.0 oz. + 1% v/v followed by 16.0 oz. + 0.25% v/v	90.00	71.67 abcd	10.00 bcd	1 a	1 a
ET + Prep + C.O.C. followed by ET + C.O.C.	1.4 oz. + 21.0 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	86.67	75.00 abcd	9.33 bcd	0 c	1 a
ET + Prep + C.O.C. followed by Gramoxone Max + N.I.S.	1.4 oz. + 21.0 oz. + 1% v/v followed by 16.0 oz. + 0.25% v/v	90.00	83.33 a	8.33 bcd	0.67 abc	1 a

ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 10 oz. + 1% v/v	88.33	65.00 bcd	3.33 cd	0 c	0.67 ab
ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 8 oz. + 1% v/v	88.33	81.67 ab	9.00 bcd	0.33 abc	1 a
ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 6 oz. + 1% v/v	86.67	78.33 ab	6.33 cd	0.67 abc	1 a
ET + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 1% v/v followed by 1.0 oz. + 10 oz. + 1% v/v	88.33	76.67 abc	5.00 cd	0.33 abc	1 a
ET + Prep + Roundup WeatherMAX + C.O.C. followed by ET + C.O.C.	1.4 oz. + 16.0 oz. + 12 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	85.00	68.33 abcd	3.33 cd	0.33 abc	1 a
Resource + Gramoxone Max + C.O.C.	4 oz. + 10.67 oz. + 1% v/v	91.67	78.33 ab	10.67 bcd	0.33 abc	1 a
Aim + Gramoxone Max + C.O.C.	1.0 oz. + 10.67 oz. + 1% v/v	90.00	76.67 abc	10.00 bcd	0.67 abc	1 a
Check		85.00	21.67 e	0.00 d	0 c	0 c
Gramoxone Max + N.I.S.	8.0 oz. + 0.25% v/v	88.33	58.33 d	4.33 cd	1 a	1 a
Gramoxone Max + N.I.S.	10.67 oz. + 0.25% v/v	88.33	70.00 abcd	4.00 cd	1 a	1 a
Gramoxone Max + N.I.S.	16.0 oz. + 0.25% v/v	90.00	75.00 abcd	21.33 ab	1 a	1 a
Check		85.00	21.67 e	0.00 d	0 c	0 c
Gramoxone Max + N.I.S. followed by Gramoxone Max + N.I.S.	4.0 oz. + 0.25% v/v followed by 16.0 oz. + 0.25% v/v	90.00	81.67 ab	10.00 bcd	1 a	1 a
Gramoxone Max + N.I.S.	21.0 oz. + 0.25% v/v	91.67	72.67 abcd	24.67 a	1 a	1 a

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 Third Week (November 3 - November 9, 2003)**

Hourly daytime air temperature ranged from 43 to 82 degrees Fahrenheit. The nighttime temperatures ranged from 38 to 66 degrees. The cooler temperatures through most the week slowed the plants response to harvest aids. During the week, 0.72 inch of rain was received. Total cloud cover occurred for four of the seven days. The followup applications had been applied for 13 days. On November 10 when the plots were evaluated, there was a significant difference in the percent open bolls, percent defoliation, percent desiccation, and the amount of regrowth in the top and bottom portion of the cotton plant. The data collected is summarized in Table 3.

The amount of boll opening ranged from 85 to 95 percent, which is an increase of 0 to 5 percent from the 14 day evaluation. All treatments had significantly more boll opening than the check. Def at 8 ounces plus Prep at 21 ounces followed by Gramoxone Max at 21 ounces plus NIS at 0.25 % v/v had significantly more boll opening than three of the plots where treatments were applied.

Leaf defoliation increased from 12 to 31 percent and all treatments had significantly more leaf defoliation than the check. ET at 1.4 ounces plus Prep at 21 ounces plus 1% v/v of Crop Oil Concentrate followed by Gramoxone Max at 16 ounces plus 0.25% v/v of Non-Ionic Surfactant treatment and Aim at 1.0 ounce plus Gramoxone Max at 10.67 ounces plus 1% v/v of Crop Oil Concentrate had significantly more leaf defoliation than four of the treatments in the test.

Even though there was significant differences between the treatments in the amount of regrowth developing in the top and bottom portion of the cotton plants, none of the regrowth was at a level that would impact harvest efficiency at the time of the 21 day evaluation. None of the treatments had enough regrowth to cause a problem during the ginning process.

The remaining area of the field that had not had 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 2003, we had a wet September and most of 100,000 acres of cotton needs to have a harvest aid applied by mid-November. During October most acreage received over 3 inches of rain and it has kept producers from harvesting cotton in a timely manner. A loss of lint yield is obvious on most cotton acreage that was planted in May and lint quality has been effected. 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.

Table 3. Chris Bubenik's 2003 FMC, Nichino, and Syngenta Cotton Harvest Aid Test (Tom Green County) November 10, 2003 (21 days after initial treatments were applied / 13 days after followup treatments)

Harvest Aids Applied	Rate Applied Per Acre	% Open Bolls (21 DAT)	% Defoliation (21 DAT)	% Desiccation (21 DAT)	Regrowth Rating Top (21 DAT)	Regrowth Rating Bottom (21 DAT)
Aim + C.O.C followed by Aim + C.O.C.	1.0 oz. + 1% v/v followed by 1.0 oz. + 1% v/v	91.25 ab	90.00 abc	3.00 cd	0.25 ab	1 a
Aim + Prep + C.O.C. followed by Gramoxone Max + C.O.C.	1.0 oz. + 16 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	92.00 ab	89.75 abc	4.00 cd	0.75 a	1 a
Aim + Gramoxone Max + C.O.C.	1 oz. + 5.33 oz. + 1% v/v	91.25 ab	86.50 bcd	3.50 cd	0.75 a	1 a
Check	--	85.00 d	40.00 e	0.00 d	0 b	0 c
Aim + C.O.C. followed by Gramoxone Max + C.O.C.	1.0 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	92.50 ab	92.75 ab	3.25 cd	1 a	1 a
Gramoxone Max + C.O.C. followed by Gramoxone Max + C.O.C.	10.67 oz. + 1% v/v followed by 10.67 oz. + 1% v/v	90.00 bc	90.00 abc	2.25 cd	0.75 a	1 a
Appeal + Gramoxone Max + C.O.C.	0.6 oz. + 10.67 oz. + 1% v/v	92.50 ab	92.50 ab	4.75 cd	1 a	1 a
ET + C.O.C. followed by ET + C.O.C.	1.4 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	90.00 bc	91.00 abc	4.0 cd	1 a	1 a
ET + C.O.C. followed by ET + C.O.C.	2.0 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	90.00 bc	91.67 abc	2.33 cd	0.33 ab	1 a
ET + C.O.C. followed by Gramoxone Max + N.I.S.	2.0 oz. + 1% v/v followed by 16.0 oz. + 0.25% v/v	91.67 ab	93.33 ab	2.33 cd	1 a	1 a
ET + Prep + C.O.C. followed by ET + C.O.C.	1.4 oz. + 21.0 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	91.67 ab	90.67 abc	3.33 cd	0 b	1 a
ET + Prep + C.O.C. followed by Gramoxone Max + N.I.S.	1.4 oz. + 21.0 oz. + 1% v/v followed by 16.0 oz. + 0.25% v/v	93.33 ab	95.33 a	1.67 d	0.67 ab	1 a

ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 10 oz. + 1% v/v	93.33 ab	90.00 abc	1.33 d	0.33 ab	1 a
ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 8 oz. + 1% v/v	91.67 ab	93.00 ab	3.30 cd	0.67 ab	1 a
ET + Prep + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 16.0 oz. + 1% v/v followed by 1.0 oz. + 6 oz. + 1% v/v	90.00 bc	92.00 ab	2.00 d	1 a	1 a
ET + C.O.C. followed by ET + Gramoxone Max + C.O.C.	1.4 oz. + 1% v/v followed by 1.0 oz. + 10 oz. + 1% v/v	91.67 ab	90.33 abc	3.00 cd	0.33 ab	1 a
ET + Prep + Roundup WeatherMAX + C.O.C. followed by ET + C.O.C.	1.4 oz. + 16.0 oz. + 12 oz. + 1% v/v followed by 1.4 oz. + 1% v/v	90.00 bc	92.67 ab	1.33 d	0.67 ab	1 a
Resource + Gramoxone Max + C.O.C.	4 oz. + 10.67 oz. + 1% v/v	91.67 ab	92.33 ab	2.67 cd	0.33 ab	1 a
Aim + Gramoxone Max + C.O.C.	1.0 oz. + 10.67 oz. + 1% v/v	93.33 ab	94.33 a	2.00 d	0.67 ab	1 a
Check		85.00 d	40.00 e	0.00 d	0 b	0 c
Gramoxone Max + N.I.S.	8.0 oz. + 0.25% v/v	91.67 ab	84.67 cd	3.33 cd	1 a	1 a
Gramoxone Max + N.I.S.	10.67 oz. + 0.25% v/v	90.00 bc	82.67 d	2.00 d	1 a	1 a
Gramoxone Max + N.I.S.	16.0 oz. + 0.25% v/v	93.33 ab	88.33 abcd	11.33 a	1 a	1 a
Check		86.67 cd	40.00 e	0.00 d	0 b	0.33 b
Gramoxone Max + N.I.S. followed by Gramoxone Max + N.I.S.	4.0 oz. + 0.25% v/v followed by 16.0 oz. + 0.25% v/v	91.67 ab	89.33 abc	7.67 bc	1 a	1 a
Gramoxone Max + N.I.S.	21.0 oz. + 0.25% v/v	95.00 a	87.00 bcd	13.00 a	0.67 ab	1 a

NOTE: In Table 3 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).

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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.