

**EFFECTIVENESS OF GINSTAR
IN THE DEFOLIATION AND DESICCATION OF COTTON
IN THE SOUTHERN ROLLING PLAINS OF TEXAS**

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Abstract

Ginstar was applied with a self-propelled ground sprayer in 1991, 1992, and 1993 to small replicated test plots of furrow irrigated cotton in the Southern Rolling Plains of Texas. Ginstar was applied by airplane to a twenty acre block in 1993. In these four small plots tests and one large block test, Ginstar was equal in its level of leaf defoliation with any currently legal labeled harvest aid (as of December, 1993) that was tested and significantly higher than the check. Leaf drop still remained high when night temperatures fell in the 50 to 60°F range. The defoliation of the cotton plant was slowed when night temperatures dropped below 60°F. When Ginstar is used at rates above the 0.125 a.i. level, leaf desiccation is significantly higher than the check. However, when applied at the 0.125 and 0.15 a.i. rates the level of leaf desiccation was no different than harvest aids that were tested that are currently labeled for legal application. When compared to the check and all harvest aids tested Ginstar plots had an equal amount or less regrowth in the terminal and bottom portion of the plant.

Introduction

Cotton produced in the Southern Rolling Plains of Texas is generally ready for harvest 30 days before the first killing freeze in the Fall. Due to the extra time that the cotton lint is exposed to weather, both yield and quality are reduced. Due to cool temperatures that occur in late-September and October, when harvest aids are usually applied in the area, tests were initiated to determine the response of cotton conditioners, defoliants, and desiccants under cooler environmental conditions. The harvest aid Ginstar was applied to small replicated plots of irrigated cotton in 1991, 1992, and 1993 with a self-propelled ground sprayer and was applied by airplane to three larger plots in 1993. Another objective of these tests was to compare the effectiveness of Ginstar with other potential and currently labeled cotton harvest aids in opening bolls, leaf defoliation, leaf desiccation, and regrowth control or suppression. Ginstar contains one pound of Thidiazuron (N-phenyl-N'-1,2,3-thiadiazol-5-ylurea) and one-half pound of Diuron (3-(3,4-dichlorophenyl)-1, 1-dimethylurea) per gallon. Ginstar was applied on large blocks for the first time in 1993 under Experimental Use Permits in Arizona, Oklahoma and Texas.

Methods and Materials

All tests plots were established in Tom Green County (San Angelo, Texas vicinity) on cotton that had been furrow irrigated. In all test plots, the cotton plants were in an unstressed condition at the time that harvest aids were applied.

1991 Test Site

Ten different combinations of cotton defoliants were applied to Deltapine 5690 from 10:00 a.m. until 2:30 p.m. on October 15 using a self-propelled ground sprayer. The sprayer was equipped with five TX6 hollowcone nozzles per row, applying 23 gallons of water per acre with 40 p.s.i. of pressure. Each treatment plus a check was replicated three times and each of the three plots were 20 feet wide by 70 feet long. Treatments were assigned at random within each replication. Temperatures were favorable for the defoliation of cotton for the first two weeks after the chemicals were applied. The nighttime air temperature dropped below 50°F four nights the first seven days after chemicals were applied then temperatures remained above 60°F for the next seven days. There was no rainfall received for the first 11 days after the chemicals were applied. Rainfall in the amount of 0.25 inch occurred October 26, and 1.75 inches on October 27. The plot had 80 percent of the bolls open at the time of chemical application.

The plots were evaluated on October 22 (7 DAT), October 29 (14 DAT), November 10 (26 DAT). The DAT designation indicates the number of days after treatment. The percent defoliation and percent desiccation were visual estimates. The desiccation rating is based on the amount of leaf area damage on retained leaves. The regrowth had to reach the size equal to about half a dime to be counted. A summary of the percent defoliation and percent desiccation is reported in Table 1.

1992 Test Site

Twenty-four different combinations of defoliant and conditioners were applied to Paymaster HS-26 from 2:00 p.m. until 7:30 p.m. on October 9 using a self-propelled ground sprayer. The sprayer had a broadcast boom located 40 inches above the ground, equipped with five TX6 hollowcone nozzles per row. Twenty gallons of chemical solution was applied at 40 p.s.i. per acre. Ground speed was 3.1 mph. During the time of chemical application the skies were clear with an air temperature of 74 to 88°F and a relative humidity of 42 to 47 percent. Even with a south wind of eight to nine miles per hour, chemical drift was limited due to the thick canopy of leaves in the cotton that was 32.63 inches tall (average height of 40 plants). Each replication involved a treatment area 13.3 feet wide by 60 feet long. Each of the treatments plus a check were replicated three times. Treatments were assigned at random within each replication. At the time of chemical application the cotton was mature but only 40 percent of the bolls were open. Twenty-six hours after the chemicals were applied the air temperature dropped to 45°F then increased to 85°F the next day before temperatures fell to 58°F the next night. During the next five day period temperatures remained above 60°F. During the second week temperatures ranged from 40 to 84°F with four of the nighttime temperatures staying above 60°F. The nighttime temperature for the rest of the season dropped below 60°F.

The follow-up treatment were applied as needed on October 19. The chemicals were applied from 2:00 p.m. until 3:30 p.m. using a self-propelled ground sprayer. The sprayer had a broadcast boom located 40 inches above the ground, equipped with five TX6 hollowcone nozzles per row. Twenty gallons of chemical solution was applied at 40 p.s.i. per acre. Ground speed was 3.1 mph. The skies were partly cloudy with an air temperature of 76 to 78°F and a relative humidity of 56 percent. A south wind was blowing at nine to ten miles per hour. Each treatment was applied to an area that was 13.3 feet wide by 60 feet long. Each of the treatments plus a check were replicated three times. The treatments were assigned at random within each replication. The air temperature did not drop below 60°F for three days after the chemicals were applied. The nighttime temperature for the rest of the season dropped below 60°F. Rainfall in the amount of 0.27 inch and 1.06 inches was received October 29 and October 31, respectively.

The plots were evaluated on October 16 (7 DAT), October 23 (14 DAT), and October 30 (21 DAT). The percent open bolls were determined by counting 200 total bolls and this number was then divided into the total number of open bolls. Open bolls had to be open enough to expose the lint adequately for stripper harvest. Percent defoliation was determined by leaf count, using a ratio of two leaves per boll (this is relatively accurate). The total number of remaining leaves were counted and divided by 400, the information collected is reported in Table 2. Percent desiccation is a visual estimate of the amount of leaf area damage on the leaves remaining on the plant. The regrowth was divided into top regrowth (upper 50 percent of the plant) and bottom regrowth (bottom 50 percent of the plant). The leaf had to reach the size equal to about half a dime to be counted as regrowth. Thirty-three plants were rated in each plot to determine the amount of regrowth.

1993 Small Plot Test Site1

Eleven different defoliant and conditioners were applied on October 9 from 11:30 a.m. until 6:30 p.m. to Paymaster HS 200 using a self-propelled ground sprayer. The sprayer had a broadcast boom located 40 inches above the ground, equipped with five TX2 hollowcone nozzles per row. Eleven gallons of chemical solution was applied at 40 p.s.i. per acre. Ground speed was 4.0 mph. During the time of chemical application the skies were clear with an air temperature of 57 to 70°F with a northeast wind blowing eight to ten miles per hour with a relative humidity of 38 to 50 percent. Chemical drift was limited due to the thick canopy of leaves in the cotton that was 31.15 inches tall (average height of 20 plants). Each replication involved a treatment area 13.3 feet wide by 602 feet long. Each of the treatments plus a check were replicated three times. Treatments were assigned at random within each replication. The air temperature dropped below 60°F for the first six nights after plot establishment. At the time of chemical application, 80 percent of the cotton bolls were open.

Rainfall in the amount of 0.66 inch fell September 25 and no additional rainfall occurred until October 18 when 0.92 inch was received at the test plot. Additional rainfall was received on October 19, 20, and 29 when 0.69, 0.19 and 0.42 inches were received, respectively. Weather information was collected by a weather station located at the test site. At the time of chemical application, the soil surface and subsoil had adequate moisture to provide for regrowth.

The desiccants and follow-up treatments were applied on October 15 as needed to the appropriate plots. The chemicals were applied from 10:00 a.m. until 4:00 p.m. using a self-propelled ground sprayer. The sprayer had a broadcast boom located 40 inches above the ground equipped with five TX2 hollowcone nozzles per row. Eleven gallons of chemical solution was applied at 40 psi per acre. Ground speed was

4.0 mph. The skies were clear and the air temperature increased from 70 to 90°F and the relative humidity dropped from 90 to 45 percent. A south wind was blowing at seven to ten miles per hour. Each treatment was applied to an area that was 13.3 feet wide by 602 feet long. Each of the treatments were replicated three times. Treatments were assigned at random within each replication. The air temperature did not drop below 60°F for 24 hours after the chemicals were applied.

The plots were evaluated on October 16 (7 DAT), October 21 (12 DAT), October 28 (19 DAT). The percent open bolls were determined by counting 100 total bolls in each treatment of the three replications. The 100 boll total was then divided into the number of open bolls. Bolls had to be open enough to expose the lint adequately for stripper harvest. Percent defoliation was determined by leaf count using a ratio of two leaves per boll (this is relatively accurate). The total number of remaining leaves were counted and divided by 200, the information collected is reported in Table 3. Percent desiccation is a count of the leaves remaining on the plant that were dry and subject to crumbling if crushed. The regrowth was determined for two areas of the plant; terminal regrowth and bottom regrowth (the remaining portion of the plant). Any leaf that reached a size equal to about half a dime was counted as regrowth. The percent regrowth reflects a percentage calculated by a ratio of plants with regrowth divided by the total number of plants counted (varied from plot to plot).

1993 Small Plot Test Site 2

Roundup® was applied from 5:00 to 6:00 p.m. on September 22 using a self-propelled ground sprayer. The sprayer had a broadcast boom located 40 inches above the ground equipped with five TX2 hollowcone nozzles per row. Eleven gallons of chemical solution was applied at 40 psi per acre. Ground speed was 4.0 mph. Skies were clear and the air temperature was 87 to 88°F. A south wind was blowing at nine miles per hour and relative humidity was 80 percent. Chemical drift was limited due to the thick canopy of leaves in the cotton that was 33.15 inches tall (average height of 20 plants). Each treatment area was 13.3 feet wide by 602 feet long. The chemical was applied to an area, selected at random, in each of the four replications. The air temperature remained above 65°F for the first three days after chemicals were applied, then night-time temperatures started dropping below 60°F. At the time of chemical application, 20 percent of the cotton bolls were open on the plant and the soil surface and subsoil had adequate moisture for plant regrowth. No rainfall was received on the plot for seven days prior to the Roundup® application.

Rainfall in the amount of 0.66 inch fell September 25 and no additional rainfall occurred until October 18 when 0.92 inch was received at the test plot. Additional rainfall was received on October 19, 20, and 29 when 0.69, 0.19 and 0.42 inches were received, respectively. Weather information reported after September 28 was collected by a weather station located at the test site. At the time of chemical application, the soil surface and subsoil had adequate moisture to provide for regrowth.

Five different defoliant and conditioners were applied from 9:00 a.m. until 11:30 p.m. on October 9 using a self-propelled ground sprayer. The sprayer had a broadcast boom located 40 inches above the ground, equipped with five TX2 hollowcone nozzles per row. Eleven gallons of chemical solution was applied at 40 psi per acre. Ground speed was 4.0 mph. During the time of chemical application the skies were clear with an air temperature of 53 to 57°F with a northeast wind blowing eight to ten miles per hour with a relative humidity of 50 to 55 percent. Chemical drift was limited due to the thick canopy of leaves in the cotton that was 33.15 inches tall (average height of 20 plants). Each replication involved a treatment area 13.3 feet wide by 602 feet long. Each of the treatments plus a check were replicated four times. Treatments were assigned at random within each replication. At the time of chemical application, 80 percent of the cotton bolls were open. The air temperature dropped below 60°F the first six nights after applications were made.

The desiccants and follow-up treatments were applied on October 15 as needed on the various plots. The chemicals were applied from 4:00 p.m. until 7:30 p.m. using a self-propelled ground sprayer. The sprayer had a broadcast boom located 40 inches above the ground equipped with five TX2 hollowcone nozzles per row. Eleven gallons of chemical solution was applied at 40 psi per acre. Ground speed was 4.0 mph. The skies were clear and an air temperature of 84 to 90°F and a relative humidity of 44 to 45 percent. A south wind was blowing at nine to ten miles per hour. Each treatment was applied to an area that was 13.3 feet wide by 602 feet long. Each of the treatments were replicated four times. Treatments were assigned at random within each replication. The air temperature did not drop below 60°F for 24 hours after the chemicals were applied.

The plots were evaluated on October 16 (7 DAT), October 21 (12 DAT), October 28 (19 DAT) and November 4 (26 DAT). The percent open bolls were determined by counting 100 total bolls in each treatment of the four replications. The 100 boll total was then divided into the number of open bolls. Open bolls had to be open enough to expose the lint adequately for stripper harvest. Percent defoliation was determined by

leaf count using a ratio of two leaves per boll (this is relatively accurate). The total number of remaining leaves were counted and divided by 200, the information collected is reported in Table 4. Percent desiccation is a count of the leaves remaining on the plant that were dry and subject to crumbling if crushed. The regrowth was determined for two areas of the plant, terminal regrowth and bottom regrowth (the remaining portion of the plant). Any leaf that reached a size equal to about half a dime was counted as regrowth. The percent regrowth reflects a percentage calculated by a ratio of plants with regrowth divided by the total number of plants counted (varied from plot to plot).

Lint samples were hand harvested from each of the treatment areas in the four replications. The length of the area harvested was recorded with each of the samples harvested. All 48 samples were then weighed using a gram scale and then taken to the Texas A&M Agricultural Research and Extension Center at Lubbock for ginning on November 9. The ginning of these samples provided the needed information to determine the percent lint and seed turnout from each harvested area. Fiber samples from each of the samples ginned were then analyzed at the International Center for Textile Research and Development at Lubbock, Texas. Data provided from this analysis included fiber color, leaf trash content, fiber length, micronaire, fiber strength, and percent fiber length uniformity. However, there was no significant difference in lint yield or fiber quality for any of the treatments.

1993 Large Block

Five different conditioners, defoliant, and desiccants were applied on October 8 from 9:30 a.m. to 11:00 a.m. by plane to Paymaster HS 200. Five gallons of chemical solution (water as the carrier) was applied per acre. During the time of chemical application the skies were clear. Air temperature was 67 to 73°F and a southwest wind was blowing at nine to ten miles per hour. Relative humidity dropped from 91 to 83 percent. The average height of the cotton plants was 34 inches tall. The chemical was applied to large blocks of land to allow for stripper harvest of legal harvest aid products. The blocks that TD2335 were applied to were shredded and disked at the end of the test. The size of area treated ranged from five to sixteen acres. At the time of chemical application, 70 to 75 percent of the bolls were open on the plant. The air temperature did not drop below 60°F for the first 24 hours after application then night temperatures dropped below 60°F for the next six days. Weather information was collected by a weather station located at the test site. At the time of chemical application, the soil surface and subsoil had adequate moisture to provide for regrowth.

Rainfall in the amount of 0.66 inch fell on this plot on September 25 and no additional rainfall occurred until October 18 when 0.92 inch was received at the test plot. Additional rainfall was received on October 19, 20, and 29 when 0.69, 0.19 and 0.42 inches were received, respectively.

The percent open bolls were determined by counting 100 total bolls in each treatment at three locations within each block. The 100 boll total was then divided into the number of open bolls. Bolls had to be open enough to expose the lint adequately for stripper harvest. Percent defoliation was determined by leaf count using a ratio of two leaves per boll (this is relatively accurate). The total number of remaining leaves were counted and divided by 200, the information collected is reported in Table 5. Percent desiccation is a count of the leaves remaining on the plant that were dry and subject to crumbling if crushed. The regrowth was determined for two areas of the plant, terminal regrowth and bottom regrowth (the remaining portion of the plant). Any leaf that reached a size equal to about half a dime was counted as regrowth. The percent regrowth reflects a percentage calculated by a ratio of plants with regrowth divided by the total number of plants counted (varied from plot to plot).

Each of the treatment areas were harvested with a self propelled cotton harvester and dumped into a module builder or trailers and taken to the gin. A sample from each bale produced was forwarded to the USDA Cotton Classifying Office. The lint and seed yield, percent lint and seed turnout, and fiber color information from each harvested treatment is reported in Table 6. The amount of leaf trash, fiber length, micronaire, and fiber strength from each harvested treatment is reported in Table 7.

Results and Discussion

Instead of giving a plot by plot summary for the three years, this discussion will reflect the combined information from four small replicated tests (1991, 1992, 1993) and one twenty acre non-replicated test (1993) that Ginstar was evaluated in. A plot summary is available for each test upon written request from the author; requests can be sent to: 7887 N. Highway 87, San Angelo, TX., 76901.

Ginstar when applied at 0.075 to 0.35 a.i. rates did not increase boll opening in any test during the three year period.

Ginstar was significantly ($P < 0.05$) better at defoliating the plant when compared to the check. It was equal in leaf defoliation to all legally available commercial harvest aids that it was compared to. In nine instances (five in 1992 and four in 1993) it was significantly better at leaf defoliation than plots where conditioners, defoliant, and/or desiccants were combined (Tables 2-5.)

When Ginstar is used at a rate above 0.15 a.i., leaf desiccation is significantly higher than the check. In 1991, 17 percent of the leaves remained on the plant until harvest 26 days after treatment. At the 0.10 a.i. rate, which was used in all small plot tests, Ginstar was not significantly different than the check in three of the four plots (Table 1, 3, 4, and 5). In 1992, Ginstar did have significantly more leaf desiccation than the check with 12 percent of the leaves remaining on the plant at the evaluation done 21 days after treatment. However, Ginstar in the same test was not significantly higher in leaf desiccation than any other desiccant or combination of harvest aids (Table 2).

Basically the same can be said about results from one small plot established in 1993. Ginstar at the 0.10 and 0.1125 a.i. rates had the same level of leaf desiccation as the check but had significantly less than Ginstar at the 0.125 and 0.15 a.i. rates. However, in comparison to the other remaining combinations of harvest aids the leaf desiccation was not significantly different between them and the plots where Ginstar was applied at the 0.125 and 0.15 a.i. rates (Table 3). This was also the case in the large block test in 1993 where the 0.15 a.i. rate was used and leaf desiccation was higher than the check, but less than two other harvest aid combinations (Table 6).

The benefit of this desiccation is reflected in Ginstar's ability to impact regrowth. In all tests in this three year period, Ginstar plots had top and bottom regrowth that was less than or equal to the check and any other harvest aid or combination of harvest aids.

In 1993, when regrowth was a problem before the plots were established, Ginstar was one of the few harvest aids that would desiccate regrowth. In the Southern Rolling Plains of Texas where more than 95 percent of the cotton is once over stripper harvested this is a benefit. In areas where picker harvesters are used and leaf regeneration is desired for continued development of remaining bolls this desiccation will warrant further attention.

Conclusions

Ginstar was applied with a self-propelled ground sprayer in 1991, 1992, and 1993 to small replicated test plots of furrow irrigated cotton in the Southern Rolling Plains of Texas. Ginstar was applied by airplane to a twenty acre block in 1993. In these four small plots tests and one large block test, Ginstar was equal in its level of leaf defoliation with any currently legal labeled harvest aid (as of December, 1993) that was tested and significantly higher than the check. The defoliation of the cotton plant was slowed when night temperatures dropped below 60°F. Leaf drop still remained high when night temperatures fell in the 50 to 60°F range. When Ginstar is used at rates above the 0.125 a.i. level, leaf desiccation is significantly higher than the check. However, when applied at the 0.125 and 0.15 a.i. rates the level of leaf desiccation was no different than harvest aids that are currently labeled for legal application. When compared to the check and all harvest aids tested Ginstar plots had an equal amount or less terminal and bottom regrowth.

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Table 1. Average Percent Leaf Defoliation and Percent Leaf Desiccation for 1991 Small Plot Test (Tom Green County, Texas).

Treatment	Percent Defoliation			Percent Desiccation	
	7 DAT	14 DAT	26 DAT	7 DAT	14 DAT
Ginstar 0.10 a.i. + Prep 8 oz.	90	98	99	7	1
Ginstar at 0.15 a.i.	87	99	99	8	1
Ginstar at 0.075 a.i.	85	95	98	7	1
Prep at 4 oz. + Def at 1.33 pt.	82	83	92	0	0
Ginstar at 0.10 a.i.	78	95	97	7	3
Ginstar at 0.35 a.i.	75	97	87	17	17
Dropp 0.05 a.i. + Cyclone 10.24 oz.	70	82	93	22	10
Ginstar at 0.25 a.i.	62	97	90	21	18
Prep at 8 oz. + Def at 1.33 pt.	65	72	87	0	0
Def at 1.33 pt.	47	58	75	0	0
Check	15	20	38	0	0

Table 2. Average percent defoliation, percent desiccation and the statistical difference between treatments using Tukey's mean separation procedure at alpha=0.05. 1992 Small Plot Test Tom Green County, Texas.

Treatment	% Defoliation			% Desiccation		
	7 DAT	14 DAT	21 DAT	7 DAT	14 DAT	21 DAT
Check	2.33	4.67	7.00	2.33	4.67	7.00
Cyclone (2.0 pt) + NIS (0.5 pt)	3.11	6.22	9.33	3.11	6.22	9.33
Sodium Chlorate (1.5 gal.) + Accelerate (1.5 pt) + Agri-Dex (1 pt)	4.15	8.30	12.44	4.15	8.30	12.44
Quick Pick (1.5 pt) + Cyclone (1.5 pt) + NIS (0.5 pt)	2.72	5.45	8.17	2.72	5.45	8.17
Ignite (8 pt)	3.33	6.66	9.98	3.33	6.66	9.98
Griffin Exp. (16 pt) + Additive (2 pt)	3.40	6.80	10.19	3.40	6.80	10.19
Buchman (8.0 pt) + Adjuvant (4.0 pt)	3.15	6.30	9.44	3.15	6.30	9.44
Cyclone (9 oz) + NIS (0.5 pt)	3.29	6.59	9.87	3.29	6.59	9.87
Dropp (0.2 lbs) + Silwet (.05 pt)	3.28	6.55	9.82	3.28	6.55	9.82

Dropp (0.2 lbs) + Silwet (.05 pt) followed by Cyclone (2 pt) + NIS (0.5 pt)	3.22	6.43	9.63	3.22	6.43	9.63
Def 6 (2 pt)	3.26	6.52	9.77	3.26	6.52	9.77
Def 6 (2 pt) followed by Cyclone (2.0 pt) + NIS (0.5 pt)	3.25	6.50	9.74	3.25	6.50	9.74
Roundup (8 oz) followed by Cyclone (2.0 pt) + NIS (0.5 pt)	3.24	6.48	9.71	3.24	6.48	9.71
Roundup (8 oz) followed by Dropp (0.2 lbs) + Silwet (0.05 pt)	3.25	6.50	9.74	3.25	6.50	9.74
Roundup (8 oz) followed by Def 6 (1.5 pt)	3.25	6.49	9.73	3.25	6.49	9.73
Prep (1.33 pt) + Roundup (8 oz)	3.25	6.49	9.73	3.25	6.49	9.73
Prep (1.33 pt) + Roundup (24 oz)	3.25	6.49	9.73	3.25	6.49	9.73
Ginstar (0.75 pt)	3.25	6.49	9.73	3.25	6.49	9.73
Arsenic Acid (3.0 pt) Applied October 9	3.25	6.49	9.73	3.25	6.49	9.73
Express (0.167 oz) + Def (1.5 pt)	3.25	6.49	9.73	3.25	6.49	9.73
Cyclone (4 oz) + Prep (8 oz)	3.25	6.49	9.73	3.25	6.49	9.73
Dropp (0.2 lbs) + Prep (4 oz)	3.25	6.49	9.73	3.25	6.49	9.73
Dropp (0.2 lbs) + Prep (8 oz)	3.25	6.49	9.73	3.25	6.49	9.73
Prep (1 pt) + Def (1 pt)	3.25	6.49	9.73	3.25	6.49	9.73
Arsenic Acid (3.0 pt) Applied October 19	3.25	6.49	9.73	3.25	6.49	9.73

Table 3. Average percent defoliation, percent desiccation, and the statistical difference between treatments using Duncan's multiple-range mean separation procedure at alpha=0.05. 1993 Small Plot Test Site 1 (Tom Green County, TX).

Treatment	Percent Defoliation			Percent Desiccation		
	7 DAT	12 DAT	19 DAT	7 DAT	12 DAT	19 DAT
Ginstar at 0.1 a.i.	84.3 a	89.3 a	93.3 a	0.3 a	2.3 bc	3.0 a-c

Ginstar at 0.1125 a.i.	82.0 a	91.0 a	93.3 a	1.0 a	2.7 bc	3.3 a-c
Ginstar at 0.125 a.i.	83.3 a	89.7 a	92.3 a	1.0 a	5.7 ab	5.0 ab
Ginstar at 0.15 a.i.	84.7 a	90.3 a	93.0 a	1.3 a	7.3 a	6.0 a
Dropp at 0.075 a.i. + Folex 16 oz. + Agri-Dex 16 oz.	84.0 a	91.0 a	93.7 a	1.3 a	1.7 bc	2.7 a-c
Dropp at 0.075 a.i. + Prep 7.1 oz. + Agri-Dex 16 oz.	71.7 a	80.0 b	84.0 b	0.0 a	0.0 c	8.0 bc
Dropp at 0.075 a.i. followed by Cyclone 32 oz.	76.7 a	88.0 ab	92.3 a	1.5 a	7.7 a	6.3 a
Dropp at 0.075 a.i. followed by Cyclone 8 oz.	76.0 a	83.7 ab	87.3 ab	0.0 a	1.7 bc	4.3 a-c
Dropp at 0.10 a.i. + Folex 16 oz. + Agri-Dex 16 oz.	79.3 a	87.3 ab	91.0 ab	0.0 a	1.7 bc	2.0 bc
Prep at 16 oz. + Folex 16 oz.	77.0 a	80.3 b	84.3 b	0.0 a	1.0 c	1.0 c
Check	25.0 b	54.0 c	60.0 c	0.0 a	0.0 c	1.0 c

Table 4. Average percent defoliation, percent desiccation and the statistical difference between treatments using Duncan's multiple-range mean separation procedure at alpha=0.05. 1993 Small Plot Test Site 2 (Tom Green County, TX).

Treatment	Percent Defoliation				Percent Desiccation		
	7 DAT	12 DAT	19 DAT	26 DAT	7 DAT	12 DAT	19 DAT
Check	27.5 d	52.5 bc	58.8 cd	76.8 cd	0.5 c	0.0 b	2.8 b
Cyclone 32 oz. + Agri-Dex 8 oz.		87.8 a	91.8 a	96.5 a		6.3 b	5.5 b
Defol 6 at 96 oz. + Accelerate 24 oz. + Agri-Dex 16 oz.		67.5 ab	74.5 a-c	87.5 a-c		2.8 b	6.3 b
Cyclone 24 oz. + Quick Pick 24 oz. + Agri-Dex 8 oz.		51.0 bc	61.3 b-d	80.8 b-d		43.3 a	34.5 a
Ignite 32 oz.		69.5 ab	81.0 ab	91.3 ab		2.8 b	3.3 b
Cyclone 8 oz. + Agri-Dex 8 oz. followed by Cyclone 24 oz. + Agri-Dex 8 oz.	62.8 b	88.0 a	91.0 a	94.3 ab	8.0 a	6.0 b	5.3 b

Folex 21.25 oz. followed by Cyclone 32 oz + Agri-Dex 8 oz.	67.8 b	87.5 a	92.8 a	96.3 a	5.8 ab	6.8 b	4.8 b
Roundup 12 oz. followed by Folex 21.25 oz. followed by Cyclone 32 oz + Agri-Dex 8 oz.	82.0 a	94.3 a	96.0 a	98.0 a	7.5 a	4.3 b	4.0 b
Roundup 12 oz. + Folex 21.25 oz.	47.5 c	71.0 ab	75.0 a-c	91.3 ab	0.3 c	0.5 b	2.5 b
Ginstar 8.5 oz. or 0.1 a.i.	71.5 ab	83.5 a	86.5 a	93.0 ab	3.0 bc	4.0 b	3.0 b
Arsenic Acid 48 oz.		54.0 bc	58.0 cd	71.0 d		40.3 a	34.3 a
VPG 6444 EC 32 oz.		33.8 c	49.3 d	68.3 d		0.5 b	5.3 b

Table 5. Average percent defoliation, percent desiccation, and the statistical difference between treatments using Duncan's multiple-range mean separation procedure at alpha=0.05. Information from 1993 Large Block Plot (Tom Green County, Texas).

Treatment	Percent Defoliation			Percent Desiccation		
	6 DAT	13 DAT	19 DAT	6 DAT	13 DAT	19 DAT
TD2335 0.75 a.i. + 10 lbs. Ammonium Sulphate	50.0 b	80.0 a	89.3 a	37.3 a	23.3 c	10.7 bc
Dropp 0.05 a.i. + Prep 1 pint	51.7 ab	51.0 c	62.7 d	28.0 ab	45.0 a	37.3 a
Ginstar 0.15 a.i.	64.7 a	67.3 b	81.0 ab	13.0 bc	32.7 b	19.0 b
Check	20.0 c	54.0 c	66.3 cd	0.0 c	0.0 e	12.7 bc
Def 1.33 pint + Prep 8 oz.	59.3 ab	72.3 ab	75.7 bc	1.7 c	1.7 e	5.3 c
Prep 1.33 pints + 31041A 2 quarts	57.7 ab	70.0 ab	76.0 bc	15.3 bc	15.0 d	11.0 bc

Table 6. Average lint and seed yield per acre, percent lint and seed turnout, and lint color. 1993 Large Block Test (Tom Green County, TX).

Treatment	Lint Yield Per Acre (lbs.)	Seed Yield Per Acre (lbs.)	Percent Lint Turnout	Percent Seed Turnout	Fiber Color
TD2335 0.75 a.i. + 10 lbs. Ammonium Sulphate	This was a crop destruct product so no lint or fiber quality information was collected				
Dropp 0.05 a.i. + Prep 1 pint	755	1,321	29.26	51.20	31
Ginstar 0.15 a.i.	774	1,388	26.14	46.89	31
Check	814	1,467	27.18	48.97	31
Def 1.33 pint + Prep 8 oz.	830	1,473	29.38	52.13	31
Prep 1.33 pints + 31041A 2 quarts	879	1,488	29.35	49.68	31

Table 7. Average leaf trash, fiber length, micronaire, and fiber strength. 1993 Large Block Test (Tom Green County, Texas).

Treatment	Amount Leaf Trash	Fiber Length (32nds of an inch)	Micronaire (micrograms per inch of fiber)	Fiber Strength (gram/tex)
TD2335 0.75 a.i. + 10 lbs. Ammonium Sulphate	This was a crop destruct product so no lint or fiber quality information was collected			
Dropp 0.05 a.i. + Prep 1 pint	3	35	4.0	29.0
Ginstar 0.15 a.i.	3	35	4.2	29.8
Check	3	35	4.1	30.2
Def 1.33 pint + Prep 8 oz.	3	35	4.3	29.2
Prep 1.33 pints + 31041A 2 quarts	3	34	4.4	26.7