

# Tall Annual Morningglory Control Studies in Acala Cotton

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## Abstract

Annual morningglories (*Ipomoea Spp*) are difficult to control with existing cultural and herbicide practices in cotton. In 2002, six studies were conducted in Acala cotton evaluating herbicides for control of tall annual morningglory (*Ipomoea purpurea*). The first study evaluated Roundup Weather Max (MON78270) with different tank mixes, the second study evaluated CGA 362622 (*trifloxysulfuron*) with different tank mixes sprayed over-the-top and directed, the third study evaluated different glyphosate formulations, the fourth study evaluated Shark (*carfentrazone-ethyl*), Valor (*flumioxazin*), and Harvade (*dimethipin*) with different tank mixes, the fifth and sixth studies compared Goal 4F and the Goal 2XL formulations (*oxyfluorfen*) with different application methods for control of tall annual morningglory. Herbicide combinations were most effective, but needed two applications. Both formulations of Goal caused significant injury. These studies showed that most treatments with two applications helped to reduce tall annual morningglory but complete control was not achieved using the post-directed herbicides in these studies.

## Introduction

Annual morningglories (*Ipomoea Spp*) climb and twist over cotton plants, interfere with defoliation and harvest, and are difficult to control with current cultural and herbicide programs. Ivyleaf morningglory (*Ipomoea hederacea*) and tall morningglory (*Ipomoea purpurea*) are the predominant species in the San Joaquin Valley. Both species are a native of tropical America. Tall morningglory has a fibrous root system, unlike ivyleaf morningglory (*Ipomoea hederacea*), which has a taproot with stems up to twenty feet long. The stem length in tall morningglory (*Ipomoea purpurea*) varies from 5 to 13 feet, and all of the leaves are heart shaped, unlobed, and pointed on the tip uniformly throughout the plant. The calyx on both species is noticeably hairy and ½ to ¾ inch long. The leaves are extremely similar making tall morningglory and ivyleaf morningglories almost indistinguishable.

## Materials and Methods

The first study evaluated Roundup Weather Max (MON 78270) with different tank mixes; the second study evaluated CGA 362622 (*trifloxysulfuron*) with different tank mixes sprayed over-the-top and directed spray, and the third evaluated different glyphosate formulations. These three studies were conducted in DP6100 Roundup Ready cotton with a heavy population of tall annual morningglory. The plot sizes were divided into 4-38" rows x 25' and four replications using a randomized complete block design. The first application of herbicides was applied June 5, 2002 using a CO2 backpack with 8002 flat fan nozzles, over-the-top, 30 psi, 15 gpa, and a walking speed of 3.5 mph. The cotton height was 1-3" tall, and 2-4 nodes during the first application. The second application for studies one and three were applied July 2, and it was a directed spray. The cotton was 11-13" tall with 9-11 nodes during the second application. The temperature for both applications was approximately 80-85 degrees Fahrenheit with winds at 0-3 mph.

The fourth study evaluated Shark (*carfentrazone-ethyl*), Valor (*flumioxazin*), and Harvade (*dimethipin*) with different tank mixes and was also conducted in DP6100 Roundup Ready Cotton.

The field was divided into a randomized complete block design. The plots were 4-38" rows x 25' with four replications. The average temperature was 85 degrees Fahrenheit, wind of 0-3 miles per hour, and 35 percent relative humidity. The treatments were applied July 2<sup>nd</sup>, 2002, and ratings were taken weekly. The cotton was 11-13" tall with 9-10 nodes. A heavy population of tall annual morningglory cotyledons was at the twinning stage. Herbicides were applied over-the-top with a CO2 backpack, 8002 flat fan nozzles, with a walking speed of 3.5 mph, 15 gpa, and 30 psi.

The fifth study evaluated Goal 4F and 2XL (*oxyfluorfen*) for control of tall annual morningglory applied over-the-top of BXN-47 cotton. The plot sizes were divided into a randomized complete block design. The plots were 4-38" rows x 25' with four replications. The first application of herbicides was applied June 21, 2002 using a Hagie high cycle with a TXVS 10" nozzle, over-the-top, 40 psi, 15 gpa, and a speed of 4.3 mph. The cotton height was 15-18" tall, and 12-14 nodes when the first application was sprayed. The temperature was 80 degrees Fahrenheit with winds at 0-3 mph and 35 percent relative humidity. The tall annual morningglory was at the 6 leaf stage and heavy in population.

The sixth study compared the Goal 4F and the Goal 2XL (*oxyfluorfen*) formulations for control of tall annual morningglory as a directed spray in BXN-47 cotton. The plot sizes were divided into 4-38" rows x 25' with four replications. The first application of herbicides was applied July 25, 2002 using a Hagie high cycle with TXVS 10" nozzles, directed spray, 40 psi, 15 gpa, and a speed of 4 mph. The cotton height was 42" tall and 20 nodes when the application was sprayed. The temperature was 98 degrees Fahrenheit with winds at 0-3 mph and 47 percent relative humidity. The soil temperature was 88 degrees Fahrenheit. The tall annual morningglory was twinning up the plants.

## Results and discussion

In the first study evaluating Roundup Weather Max (*MON78270*) with different tank mixes, all treatments gave less than fair control (39-58 percent) of tall annual morningglory initially at 14 DAT, but gave fair to good control (65-79 percent) of tall annual morningglory at 41 DAT. The second application was applied 27 days after the first application because adequate plant size was not yet achieved. The tall annual morningglory was very heavy in population when the second application was sprayed. There was no cotton injury on the first application, but the second application resulted in moderate cotton injury (0-50 percent) at the 41 DAT (Table 1).

The second study evaluated CGA 362622 with applications of different tank mix treatments. Directed sprays of CGA 362622 + Touchdown (*glyphosate*), CGA 362622 + Roundup Ultra Max (*glyphosate*), and CGA 362622 + MSMA (*mono sodium salt of methylarsonic acid*) gave acceptable control (75-80 percent) of tall annual morningglory at 13 DAT. The treatments sprayed over-the-top had no cotton injury, and the directed spray had low injury, 0-9 percent (Table 2, 3).

In the third study evaluating glyphosate formulations, all treatments gave fair control of tall annual morningglory at 14 DAT (65-75 percent) and at 41 DAT (68-79 percent). The second application was again applied 27 days after the first application due to the cotton being too small to spray. There was no cotton injury (Table 4).

The fourth study evaluated Shark, Valor, and Harvade with different tank mixes. The following treatments gave good control: Valor (70 percent), Valor + Roundup Ultra Max (80 percent), and Shark + Roundup Ultra Max (75 percent). Valor and Valor + Roundup Ultra Max had

the highest cotton injury at 40 percent and 45 percent (Table 5). Injury may have been higher than normal since the tall annual morningglory was twining up the middle of the cotton. Further evaluations were not taken because the grower needed to over spray the trial with glyphosate.

The fifth study was to compare Goal 4F and 2XL for control of tall annual morningglory applied over-the-top of BXN-47 cotton. Buctril (*bromoxynil*) gave the best control of tall annual morningglory at 17 DAT (86 percent). Goal 2XL gave higher control of tall annual morningglory (60 percent) than Goal 4F (40 percent). Cotton injury was high (20-28 percent) with both formulations of Goal at 6 DAT, but the injury decreased by the 17 DAT (Table 6).

The sixth study was to compare the Goal 4F and the Goal 2XL formulations for control of tall annual morningglory using a directed spray. Goal 4F at 4oz. gave better control (76 percent) than Goal 2XL at 8 oz. (58 percent). Buctril (*bromoxynil*) gave the highest control of tall annual morningglory at 7 DAT (85 percent) but control was reduced at 14 DAT (63 percent) when another flush of tall annual morningglory emerged. Cotton injury symptoms were low (0-8 percent) at 7 DAT and disappeared at 14 DAT (Table 7).

**Table 1. 2002 Roundup Weather Max (MON78270) Tank Mix Study for Control of Tall Annual Morningglory, Tulare Co**

		A. Morningglory Percent Control		Cotton Injury Percent	
Treatment	Rate Product/A	14 DAT	41 DAT	14 DAT	41 DAT
1. Roundup Weather Max	22 oz				
B. Roundup Weather Max + Direx	22 oz + 16oz	44	70	0	30
2. Roundup Weather Max	22 oz				
B. Roundup Weather Max	22 oz	44	68	0	10
3. Roundup Weather Max	22 oz				
B. Roundup Weather Max + Aim	22 oz + 0.112 oz	58	65	0	13
4. Roundup Weather Max	22 oz				
B. MON 78404	31.8 oz	50	76	0	50
5. Roundup Weather Max	22 oz				
B. Roundup Weather Max + Amplify	22 oz + 0.016 oz	53	71	0	29
6. Roundup Weather Max	22 oz				
B. Roundup Weather Max + Valor	22 oz + 0.08 oz	56	74	0	29
7. Roundup Weather Max	22 oz				
B. Roundup Weather Max + Valor	22 oz + 0.144 oz	48	79	0	43
8. Roundup Weather Max	22 oz				
B. Fire Power	31.9 oz	49	69	0	14
9. Roundup Weather Max	22 oz				
B. Roundup Weather Max + Strongarm	22 oz + 0.032 oz	45	71	0	18
10. Roundup Weather Max	22 oz				
B. Roundup Weather Max + CGA362622	22 oz + 0.112 oz	49	75	0	0
11. Roundup Weather Max	22 oz				
B. Roundup Weather Max + CGA362622	22 oz + 0.0192 oz	48	70	0	13
12. Untreated	---	0	0	0	0
<b>LSD .05</b>	---	<b>20.04</b>	<b>8.80</b>	-	-
<b>% CV</b>	---	<b>31.32</b>	<b>9.22</b>	-	-

**Table 2. 2002 CGA 632622 Tank Mix Study for Control of Tall Annual Morningglory- Over-the-top, Tulare Co.**

		A. Morningglory Percent Control		Cotton Injury Percent	
Treatment	Rate Product/A	14 DAT	41 DAT	14 DAT	41 DAT
1. CGA 362622	0.019 oz	16	50	0	0
2. CGA 362622 + Touchdown	0.02 oz + 2.6 pt	30	66	0	0
3. CGA 362622 + Roundup Ultra Max	0.02 oz + 1.6 pt	43	65	0	0
4. CGA 362622 + MSMA	0.02 oz + 2.4 pt	8	65	0	0

\*All treatments received 0.25%v/v of Agridex

**Table 3. 2002 CGA 632622 Tank Mix Study for Control of Tall annual morningglory- Directed spray, Tulare Co.**

Treatment	Rate Product/A	A. Morningglory Percent Control		Cotton Injury Percent
		13 DAT	13 DAT	13 DAT
1. CGA 362622	0.02 oz	75		8
2. CGA 362622 + Touchdown	0.02 oz + 2.6 pt	80		3
3. CGA 362622 + Roundup Ultra Max	0.02 oz + 1.6 pt	80		4
4. CGA 362622 + MSMA	0.02 oz + 2.4 pt	80		9
5. Untreated	---	0		0

\*All treatments received 0.25%/v of Agridex

**Table 4. 2002 Glyphosate Formulation Study for Control of Tall annual morningglory, Tulare Co.**

Treatment	Rate Product/A	A. Morningglory Percent Control		Cotton Injury Percent	
		14 DAT	41 DAT	14 DAT	41 DAT
1. Touchdown IQ	2.6 pt				
B. Touchdown IQ	2.6 pt	66	78	0	0
2. Roundup Ultra Max	1.6 pt				
B. Roundup Ultra Max	1.6 pt	68	74	0	0
3. Glyphosate	2.0 pt				
B. Glyphosate	2.0 pt	74	73	0	0
4. Glyphomax	2.0 pt				
B. Glyphomax	2.0 pt	65	79	0	0
5. Clearout	2.6 pt				
B. Clearout	2.6 pt	73	68	0	0
6. Glyphos	2.6 pt				
B. Glyphos	2.6 pt	75	75	0	0
7. Untreated	---	0	0	0	0
<b>LSD .05</b>	---	<b>10.56</b>	<b>10.33</b>	---	---
<b>% CV</b>	---	<b>11.84</b>	<b>10.93</b>	---	---

\*All treatments received 0.25%/v of Agridex

**Table 5. 2002 Herbicide Tank Mix Study for Control of Tall Annual Morningglory, Tulare Co.**

Treatment	Rate Product/A	A. Morningglory Percent Control		Cotton Injury Percent
		13 DAT	13 DAT	13 DAT
1. Shark	0.051 oz	58		16
2. Shark + MSMA	0.051 oz + 2.4 pt	65		13
3. Shark + Roundup Ultra Max	0.051 oz + 1.6 pt	75		23
4. Shark + Caparol	0.051 oz + 1.0 pt	58		15
5. Valor	0.157 oz	70		40
6. Valor + Roundup Ultra Max	0.157 oz + 1.6 pt	80		45
7. Harvade	7.8 oz	55		15
8. Untreated	---	0		0
<b>LSD .05</b>	---	<b>13.52</b>		---
<b>% CV</b>	---	<b>15.99</b>		---

\*All treatments received 0.25%/v of Agridex

**Table 6. 2002 Tall Annual Morningglory Control Study with Goal – Applied Over-the-Top, Tulare Co.**

Treatment	Rate Product/A	A. Morningglory Percent Control		Cotton Injury Percent	
		6 DAT	17 DAT	6 DAT	17 DAT
1. Goal 4F	2 oz	31	38	23	2
2. Goal 4F	4 oz	32	40	20	2
3. Goal 4F	8 oz	37	43	27	4
4. Goal 4F	16 oz	33	40	28	4
5. Goal 2XL	2 oz	43	48	23	2
6. Goal 2XL	4 oz	55	64	20	2
7. Goal 2 XL	8 oz	60	62	28	3
8. Buctril 4EC	16 oz	85	86	0	0
LSD .05	---	<b>22.33</b>	<b>24.94</b>	---	---
%CV	---	<b>29.89</b>	<b>29.77</b>	---	---

*Table 7. 2002 Tall Annual Morningglory Control Study with Goal – Directed Spray, Tulare Co.*

Treatment	Rate Product /A	A. Morningglory Percent Control		Cotton Injury Percent	
		7 DAT	14 DAT	7 DAT	14 DAT
1. Goal 4F	2 oz	65	65	3	0
2. Goal 4F	4 oz	74	76	5	0
3. Goal 4F	8 oz	68	63	5	0
4. Goal 4F	16 oz	74	76	8	0
5. Goal 2XL	2 oz	44	51	0	0
6. Goal 2XL	4 oz	58	48	4	0
7. Goal 2XL	8 oz	66	58	5	0
8. Buctril 4EC	16 oz	85	63	0	0
LSD .05	---	<b>11.33</b>	<b>NS</b>	---	---
% CV	---	<b>11.58</b>	<b>28.27</b>	---	---

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