

**EFFECT OF GLYPHOSATE AND SULFOSATE ON
WEEDS AND ROUNDUP READY COTTON
Tomé Martin-Duvall and Ron Vargas
University of California Cooperative Extension
Madera, CA**

Abstract

Weeds present major problems for cotton culture. Studies were conducted in Riata cotton with glyphosate and sulfosate to evaluate control of field bindweed (*Convolvulus arvensis*), yellow nutsedge (*Cyperus exculentus*), and redroot pigweed (*Amaranthus retroflexus*). Cotton injury related to timing and type of herbicides was also evaluated. Early broadcast applications of glyphosate or sulfosate provides good to excellent control of weeds. Sulfosate can produce major injury to the cotton. Later applications of glyphosate enhances weed control but adversely affects yield.

Introduction

Weeds can present a major problem in cotton culture by competing with the crop and increasing cost to the grower. Transgenic cotton such as Riata have been developed to allow treatment over the top of cotton for control of broadleaf and other weeds. The ability to apply herbicides at an early stage can greatly enhance control of problem weeds.

Materials and Methods

Uniform fields of Acala Riata cotton planted in April, 2001 were divided into four replications of 5 to 12 treatments in a randomized complete block design (RCBD). Treatments were applied over the top of the cotton at 2, 4, 6, 8 and 12 nodes with a backpack or tractor pulled sprayer. Weed control and cotton injury were evaluated during the season. Trials were hand and machine harvested for yield.

Results

Glyphosate Timing Study

There was slight injury with the glyphosate tank mixes with either Goal (oxyfluorfen) or Staple (pyrithiobac sodium) at the directed application which was no longer evident at harvest time. All treatments provided good to excellent control of field bindweed at harvest except the 1 lb ai/A at 2 node treatment. Applications of glyphosate beyond four nodes significantly reduced yield up to 2400 lbs of seed cotton/Acre (Table 1).

Nutsedge Control Study

At 14 days after treatment (DAT), MSMA exhibited the greatest control of yellow nutsedge. At 35 DAT, sulfosate at 2 lb at 2 and 4 nodes exhibited the greatest nutsedge control. However, this sulfosate treatment also exhibited the greatest injury to the cotton and the greatest reduction in yield. Glyphosate effectively controlled nutsedge and did not cause any significant injury to the cotton at any time (Table 2).

Annual Weed Control Study

The only cotton injury at all evaluations was in the sulfosate treatments. There was no indication of injury to the cotton by any application of glyphosate. All treatments provided complete control of pigweed at 7 DAT. There were not enough weeds to evaluate later in the season (Table 3).

Conclusions

Early applications of glyphosate over the top of glyphosate tolerant cotton can provide good to excellent control of a variety of weeds. Later applications of glyphosate while enhancing weed control, also adversely affect boll retention and yield. Sulfosate can provide excellent weed control, however, it can produce major injury to the cotton even if the cotton is a glyphosate resistant variety. This will result in major reductions in crop yield.

Table 1. Glyphosate Timing Study

Treatment	Rate lb ai/A	Timing TL	Cotton Phyto		Field Bindweed Control		lb/A
			7 DAT	21 DAT	21DAT	147 DAT	Seed cotton
1. RUM	1/2	2/6	0	0 c	89 ab	100 a	5335 ab
2. RUM	1/2	2/8	0	0 c	82 bcd	100 a	4842 bc
3. RUM	1/1.5 ²	2/4/8	0	0 c	82 bcd	95 ab	4884 bc
4. RUM	1/1.5 ²	2/6/12	0	0 c	85 bcd	96 a	3265 d
5. RUM	1.5	4/8	0	0 c	80 de	95 ab	4437 c
6. RUM	2	4/8	0	0 c	82 bcd	96 a	4609 c
7. RUM	1.5	4/6/8	0	0 c	81 cd	95 ab	4862 bc
8. RUM	1.5	4/6/12	0	0 c	88 abc	98 a	3628 d
9. RUM	1.5	2	0				
B. RUM + Goal	1.5 + 1.5	Dir		25 a	94 a	95 ab	5719 a
10. RUM	1.5	2	0				
B. RUM + Staple	1.5 + 1oz	Dir		15 b	82 bcd	85 ab	5649 a
11. TD IQ	1	2	0	0 c	82 bcd	66 c	5507 ab
12. TD IQ	1	4	0	0 c	74 e	80 bc	5714 a

Table 2. Nutsedge Control Study

Treatment	Rate lb ai/A	Timing	Cotton Phyto	Nutsedge Control		lb/A
			35 DAT	20 DAT	35 DAT	Seed Cotton
1. TD5	1	2	8 d	55 de	55 cde	4645 ab
2. TD5	1	2/4	14 d	49 e	66 abcde	4203 abc
3. TD5 + AMS	1 + 10	2	11 d	52 de	54 de	4348 abc
4. TD5 + AMS	1 + 10	2/4	41 c	78 abc	75 abc	3693 bcd
5. RUM	1	2	0 d	50 e	48 e	4793 a
6. RUM	1	2/4	0 d	65 bcde	65 bcd	4048 abc
7. RUM	1	2	0 d	70 abcd	71 abcd	4145 abc
8. RUM	1	2/4	11 d	80 ab	78 ab	4103 abc
9. TD5	2	2	58 b	60 cde	50 e	4110 abc
10. TD5	2	2/4	90 a	86 a	86 a	2925 d
11. MSMA	1.5	2	11 d	62 bcd	56 cde	3848 abcd
12. MSMA + RUM	1.5 + 1	2	4 d	76 abc	65 bcde	3508 cd

Table 3. Annual Weed Control Study

Treatment	Rate lb ai/A	Timing	Cotton Phyto			8/1	Seed Cotton lb/A
			Days After Treatment			Pigweed	
			8/1	12/5	21/14		
1. TD5	1	2	59 a	52 b	35 bc	100	5058 cd
2. TD5	1	2/4	51 a	81 a	59 a	100	4728 d
3. TD5 + AMS	1 + 5	2	45 a	45 b	22 c	100	5405 abc
4. TD5 + AMS	1 + 5	2/4	44 a	75 a	50 ab	100	5128 bcd
5. RUM	1	2	0 b	0 c	0 d	100	5661 a
6. RUM	1	2/4	0 b	0 c	0 d	100	5670 a
7. RUM + AMS	1 + 5	2	0 b	0 c	0 d	100	5558 ab