Potential Injury to Rotational Crops Following Single or Multiple Applications of Bladex to Cotton

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INTRODUCTION

There has been renewed interest in Bladex as a broadleaf cotton herbicide because of the crop rotation restrictions associated with Caparol (Cotton-Pro). In 1988 the Dupont Co. received a special local needs label in Arizona that allowed growers to apply Bladex as a preplant herbicide. Past research has shown that Bladex applied preplant can injure cotton if cool, rainy, weather persists just after planting. However, under favorable growing conditions, little injury can be expected from preplant applications of Bladex. Prior to the preplant label, Bladex could be applied only as an early post and lay-by treatment to cotton. Our concern was that with the additional preplant application, that perhaps Bladex residues from use in cotton could persist and injure high value crops such as lettuce or broccoli that might be grown in rotation with cotton. Our objective was to determine the carry-over potential of Bladex in short season cotton as a result of single or multiple applications.

MATERIALS AND METHODS

In 1988 and 1989 field trials were conducted at the University of Arizona's Maricopa Agricultural Center (MAC) and Yuma Valley Agricultural Center (YAC). The experimental areas were prepared for a mid-April planting of cotton (DP 50). There were eight treatments replicated four times in a randomized complete block design. Treflan (0.75 LB/A) and Bladex (1.6 LB/A) were applied preplant incorporated (PPI); Bladex also was applied early postemergence (EP) at 0.5 LB/A and at lay-by (1.6 LB/A) to their respective treatments (see Table 1).

All herbicides were applied to the soil, full coverage, with a spray tractor in 20 GPA of water. PPI treatments were applied to flat ground using TeeJet 8003 standard nozzles and disked in 2-4 inches. Early postemergence (EP) and lay-by treatments (LBY) were applied with FloodJet TK-3 nozzles (mounted on drops) to provide a directed spray that covered from seed row to seed row. EP treatments were made when cotton was 12-14 inches tall (6-7 weeks after planting), and lay-by treatments were applied when cotton was 30-36 inches (10-11 weeks after planting). Each experiment received seven irrigations (42 inches) over the growing season. Insecticide applications, cultivations, etc. were performed as necessary. The cotton was defoliated and machine picked by early mid-September. Yield data for cotton are not presented since our objective was to evaluate Bladex carry-over on vegetables.

Cotton stalks were shredded, and the experimental area was disked twice, and vegetable beds were shaped. Vegetables were planted in early October. Vegetables planted were: broccoli "Packman"; lettuce "Empire"; onions "Granex 33"; and sugarbeets. Sugarbeets were planted since they are known to be very sensitive to triazine herbicides. Stand counts were taken approximately three weeks and five weeks after planting at both locations. Five plants of each crop per treatment were hand harvested either 70 days (YAC) or 110 (MAC) days after planting and fresh weights obtained.

RESULTS AND DISCUSSION

The stand count and fresh weight data were averaged over years for each location and are presented in Table 2. The lay-by applications were made in late June or early July so there were approximately 90 days between the last Bladex application and the planting of the vegetables. At Maricopa, broccoli and sugarbeets stands were not affected three weeks after planting. Five weeks after planting there was a slight loss in the stand of broccoli resulting from a PPI and a LBY application of Bladex, but this reduction was considered as insignificant from a practical standpoint. When the plants were harvested at Maricopa nearly 110 days after planting, the fresh weights of the harvested broccoli and sugarbeets were similar to the untreated check.

At Yuma the highest stand counts were found in plots that were treated PPI with Treflan and Bladex (Treatment 1). At the first stand evaluation, of the three crops, sugarbeets and lettuce were affected most by the Bladex treatments. It was interesting to note that plots treated with treatment No. 1 which consisted of PPI application of Bladex and Treflan had the highest stand count than the untreated check for all three crops. The majority of data for sugarbeets and lettuce at the first evaluation indicates that Bladex may cause stand reductions, but there was no visible evidence to suggest that these reduction were the result of Bladex carry-over. At the second evaluation, there was no visible stunting of any of the crops as a result of previous Bladex applications. The fresh weight data indicate that Bladex residues may have reduced sugarbeets fresh weight, however this is not surprising since it is already known that sugarbeets are very sensitive to triazine herbicides. In conclusion, multiple applications of Bladex in short season cotton does not result in injury to lettuce or broccoli that is often grown in rotation with cotton. Bladex residues resulting from multiple applications of Bladex in cotton however may cause slight injury to sugarbeets that are planted following the cotton crop.

Table 1. List of Treatments

Treatment	Rate		
	Preplant Incorp.	Early Post	Lay-by
	------(LB ai/A)-------		
1. Treflan	0.75	no	no
Bladex	1.6	no	no
2. Treflan	0.75	no	no
Bladex	1.6	0.5	no
3. Treflan	0.75	no	no
Bladex	1.6	0.5	1.6
4. Treflan	0.75	no	no
Bladex	1.6	no	1.6
5. Treflan	0.75	no	no
Bladex	no	0.5	1.6
6. Treflan	no	no	no
Bladex	1.6	0.5	1.6
7. Treflan	0.75	no	no
Caparol	1.6	0.5	1.6
8. Untreated	--	--	--

Table 2. Response of Broccoli (B), Sugarbeets (SB), and Lettuce ((L) Yuma only) to Multiple Applications of Bladex.

	Stand 1[1]					Stand 2[2]					Fresh weight[3]				
	MAC[4]		YAC[5]			MAC		YAC			MAC		YAC		
Trt	B	SB	B	SB	L	B	SB	B	SB	L	B	SB	B	SB	L
	-----Plants per 10 ft of row-------										---------Grams--------				
1	53	74	75	43	81	53	70	74	36	71	1082	205	99	202	173
2	54	75	70	34	71	56	72	74	28	65	1042	195	73	152	128
3	57	70	76	35	66	53	67	75	26	59	986	167	108	159	160
4	50	70	77	34	68	47	68	82	29	63	1140	206	78	175	176
5	51	69	78	33	74	51	64	83	32	69	980	229	82	123	158
6	53	73	71	33	70	53	72	73	29	68	1023	233	89	151	174
7	54	68	71	33	72	56	75	74	30	65	1016	245	110	184	169
8	52	72	70	35	78	52	71	77	28	68	1041	248	99	211	190
	NS	NS	NS	9	13	8	NS	NS	NS	NS	230	60	NS	62	60

[1]three weeks after planting

[2]five weeks after planting

[3]Maricopa 110 days to harvest

[4]Maricopa Agricultural Center

[5]Yuma Valley Agricultural Center