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# Watergrass and Volunteer Sorghum Control in Corn



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## SUMMARY

The demand for corn has increased in the Panhandle, where new hybrids better adapted to irrigated conditions can be grown successfully. In 1977 about 1.2 million acres of corn were grown in the Panhandle. Studies have been needed, however, to find methods for controlling watergrass and volunteer sorghum. Four years of weed control research at Dumas, Etter, and Pantex, Texas, have shown that watergrass and volunteer sorghum can be controlled in corn.

Planting corn before May 1, applying a preplant incorporated application of AAtrex at 3.75 to 5 pounds per acre, and cultivating twice resulted in top yields and excellent watergrass control. Good control was obtained when Sutan<sup>+</sup> and Eradicane were incorporated with a disk immediately prior to bedding and when corn was "watered up" after planting on dry beds. Preemergence applications of Lasso and Bladex followed by postemergence-directed sprays of Evik or Lorox gave adequate control and near maximum yields. Wheat can be planted the same year after use of short residual herbicides.

Volunteer sorghum was controlled in corn with Sutan<sup>+</sup> and Eradicane when applied preplant and incorporated with a tandem disk before bedding. Corn was planted dry and "watered up."

Cover photos.

Left: Untreated corn. Right: Corn treated with AAtrex at 3.75 pounds per acre.

# Watergrass and Volunteer Sorghum Control in Corn

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Corn production in Texas has been declining since 1940. In 1950, 1960, 1970, and 1977, Texas corn acreage was 3.0, 1.3, 0.6, and 1.6 million acres, respectively. Before 1960, corn production was primarily in the eastern part of the State. Corn would not grow under dryland conditions in the Panhandle and available varieties took large quantities of irrigation water. Since 1965 the situation has changed. Hybrid sorghum has replaced corn in the eastern part of the State, and the demand for corn has increased in the Panhandle where new hybrids better adapted to irrigated conditions can be grown successfully. In 1977 about 1.2 million acres of corn were grown in the Panhandle.

Common weeds in Panhandle corn fields are pigweed (amaranthus species), watergrass (*Echinochloa crusgalli* (L.) Beauv. barnyardgrass), crabgrass (*Digitaria* species), volunteer sorghum (*Sorghum bicolor* (L.) Moench), and johnsongrass (*Sorghum halepense* (L.) Pers.). Studies before 1969 indicated that most herbicides used in corn controlled pigweed.<sup>1</sup> As a result, studies were conducted to find methods for controlling watergrass and volunteer sorghum.

## METHODS

Studies were conducted in furrow-irrigated fields from 1969 to 1974 at the North Plains Research Field, Etter, the Harvey Garrison Farm near Dumas, and the Texas Tech Center at Amarillo (Pantex). Soil was Sherm silty clay loam at Etter and Dumas and Pullman clay loam at Pantex. Both soils contain about one-third each of sand, silt, and clay and 1.5 percent organic matter.

In an effort to control watergrass, herbicides were applied preplant, preemergence, and post-

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emergence directed (sprays directed at the base of emerged plants). Applications were made with a tractor plot sprayer in 20 to 30 gallons per acre of carrier to plots from 1 to 6 rows wide and 30 to 100 feet long. Herbicides applied preplant were incorporated with either a tandem disk before bedding or a rolling cultivator after bedding.

Tables 1-10 show the herbicides applied and rates of active ingredients (ai). All herbicide rates in this paper are given as pounds of active ingredient of both dry and liquid formulations. Table 11 contains detailed descriptions of herbicides in order of appearance in previous tables.

After preliminary studies, the most effective preplant, preemergence, and postemergence herbicides were combined with cultivation in an attempt to find the most effective control practice for watergrass in corn. In other studies, herbicides were applied preplant or preemergence to control volunteer sorghum.

Weed control estimates were obtained by plant counts or visual estimates about 4 to 6 weeks after planting or treatment. Corn and weed yields were obtained by harvesting portions of treated plots.

## RESULTS AND DISCUSSION

### Watergrass Control

#### Preplant Herbicide Incorporation With a Tandem Disk

Herbicide incorporation was evaluated for 2 years, Table 1. In 1970, herbicides were applied to flat ground and incorporated with a tandem disk, approximately 1 month before corn planting. Later, soil was bedded, the field preplant irrigated, and corn planted in moisture. Under these conditions, weed control with AAtrex and mixtures of Sutan and AAtrex was about 80 percent. In 1974, incorporation time was changed. Herbicides were applied to flatland and incorporated with a disk 3 days before planting. Corn was planted in dry beds and watered up for emergence. Weed control was exceptional with 4 pounds per acre of Sutan<sup>+</sup>, Eradicane, and 3 pounds of Sutan<sup>+</sup> mixed with 1.5 pounds per acre of Bladex.

### Preplant Herbicide Incorporation With a Rolling Cultivator

Incorporation of preplant herbicides with a rolling cultivator for watergrass control in corn was evaluated for 5 years, Table 2. However, the same herbicides were not evaluated in all years. In 1970, the first year of the trial, Lasso at 3 pounds per acre and Sutan at 5 pounds per acre gave the best weed control. In 1971, about 75 percent weed control was obtained with 3 pounds per acre of AAtrex alone, Lasso mixed with AAtrex at 3 and 2 pounds per acre, and Lasso at 3 pounds per acre. In 1972, weed control with all herbicides was much improved compared to the previous 2 years. AAtrex applied alone, AAtrex mixed with Lasso, and Outfox gave better than 90 percent control. In 1973, AAtrex, Lasso mixed with AAtrex, and Prefox gave excellent weed control at moderate rates of application. In 1974, most herbicides and herbicide combinations gave excellent weed control. AAtrex and Bladex, each at 3 pounds per acre, gave 87 and 93 percent control, respectively. Outstanding control was obtained also with Bladex mixed with Sutan<sup>+</sup>, AAtrex mixed with Sutan<sup>+</sup>, Prefox, Eradicane, and Avadex mixed with Lasso. There was no corn injury.

### Preemergence Herbicides

Five years of studies with preemergence herbicides are summarized in Table 3. As with other methods and times of application, none of the herbicides gave consistent watergrass control for all 5 years. Herbicides that gave satisfactory results were AAtrex, Lasso, Bladex, Lasso mixed with AAtrex, Outfox, Prowl, Lexone, and CGA 18762.

### Postemergence-Directed Herbicides

Weed control by postemergence-directed herbicides was evaluated for 3 years; results are sum-

TABLE 1. WATERGRASS CONTROL IN CORN AFTER INCORPORATION OF PREPLANT HERBICIDES WITH A TANDEM DISK

Herbicide	Lb/A (ai)	Watergrass control, %	
		1970 <sup>a</sup>	1974 <sup>b</sup>
AAtrex	2	56	
	3	84	
Lasso	3	43	
Princep	2	63	
	3	73	
Sutan or Sutan <sup>+</sup>	4		100
	5	73	
Sutan + AAtrex	3 + 1	79	
Eradicane	4		99
Sutan <sup>+</sup> + Bladex	3 + 1.5		96
	4 + 1.6		97

<sup>a</sup>Herbicides applied March 23, tandem disked twice, irrigated, bedded, and corn planted May 2.

<sup>b</sup>Herbicides applied April 19, tandem disked twice; corn planted April 22 and watered up.

marized in Table 4. None of the herbicides eliminated watergrass. During the first 2 years, the only herbicides that gave greater than 70 percent control were Outfox, AAtrex applied in an oil-water emulsion carrier, AAtrex mixed with Dowpon, and a high rate of Bladex. During the first 2 years, soil conditions were rather dry and weeds may have been difficult to kill. In 1973, weeds were 2 inches tall and growing in wet soil; consequently, some of the herbicide treatments gave greater than 90 percent watergrass control. The best herbicides were Evik, Lorox, Paraquat mixed with AAtrex, Mowdown, and Bladex.

TABLE 2. WATERGRASS CONTROL IN CORN AFTER INCORPORATION OF PREPLANT HERBICIDES WITH A ROLLING CULTIVATOR

Herbicide	Lb/A (ai)	Watergrass control, %				
		1970 <sup>a</sup>	1971 <sup>b</sup>	1972 <sup>c</sup>	1973 <sup>d</sup>	1974 <sup>e</sup>
AAtrex	2	50				85
	3	65	77	90	93	87
	4			83		
	6			92		
Bladex	2		32		47	63
	3					93
	4		60	77	83	
Bladex + Sutan	1 + 3		43			65
	1.6 + 4					97
Lasso	2		52	78	33	
	3	86	70	88		
	4			77	60	
Princep	3	64	57	88		
Sutan or Sutan <sup>+</sup>	4					60
	5	83				
	6					97
Sutan + AAtrex	3 + 1	74		68	77	93
	4 + 1.5					100
	6 + 2				90	
Lasso + AAtrex	1.5 + 1		50	88	78	
	2 + 1		52	78	77	
	3 + 1		75	88	87	
	3 + 2			93		
Outfox	4			95		
	6			93		
Prefox	4.8				85	90
	6				85	87
Eradicane	4				73	90
	6				73	100
Avadex + Lasso	1.5 + 1.5					83
	2 + 2					90

<sup>a</sup>Herbicides applied to prewatered beds April 30, rolling cultivated once, and corn planted May 2.

<sup>b</sup>Herbicides applied to prewatered beds April 30, rolling cultivated once, and corn planted May 1.

<sup>c</sup>Herbicides applied to dry beds May 3, rolling cultivated twice, and corn planted June 5.

<sup>d</sup>Herbicides applied to dry beds May 10, rolling cultivated twice, and corn planted June 22.

<sup>e</sup>Herbicides applied to prewatered beds April 18, rolling cultivated twice, and corn planted April 22.

### Combination Trials With Preplant, Preemergence, and Postemergence-Directed Herbicides and Cultivation

Studies were conducted in 1971, 1972, and 1973. None of the herbicide combination treatments completely eliminated watergrass in 1971, Table 5. Control on June 23, 1971 varied from 67 to 84 percent when preplant herbicides were applied after pre-

TABLE 3. WATERGRASS CONTROL IN CORN WITH PRE-EMERGENCE HERBICIDES

Herbicide	Lb/A (ai)	Watergrass control, %				
		1970 <sup>a</sup>	1971 <sup>b</sup>	1972 <sup>c</sup>	1973 <sup>d</sup>	1974 <sup>e</sup>
AAtrex	2	61	67	87	80	85
	3	66		91	86	
	4			93	95	
Lasso	2	51	28	43	58	88
	3		27	77	58	95
	4				80	
Bladex	2		68	57	62	72
	4		63	61	93	
	6		83	75	99	
Lasso + AAtrex	1.5 + 1		58			
	2 + 1		62	83	83	
	3 + 1		60	83	75	
Outfox	2		87			
	4		88	91		
	6		92	96		
Rowtate	2		47	37	33	79
	3		55	25 <sup>f</sup>	70	
	4		60	52 <sup>f</sup>		
	6		68			
Lorox + AAtrex	1 + 1				78	
	1.5 + 1.5				88	
Bladex + Lasso	1.5 + 1			67		
	1.5 + 2			57		
Mowdown	1.5			27		
	2			32	57	
	3				72	
	4			80		
Banvel + Lasso	0.25 + 0.5			52		
	0.25 + 1.5			53	86	
	0.5 + 2.5				94	
Prowl	0.75				83	
	1				97	
	1.5				98	
Lexone	0.5				97	
	1				97	
CGA 18762	1.6				70	
	2.4				68	
	3.2				91	

<sup>a</sup>Planted and treated May 2. Data taken June 23.

<sup>b</sup>Planted May 1, treated May 4, and data taken on June 23.

<sup>c</sup>Planted May 5, treated May 6, and data taken on August 16.

<sup>d</sup>Planted and treated June 22, and data taken August 6.

<sup>e</sup>Planted and treated April 23, and data taken June 20.

<sup>f</sup>Severe corn injury on these treatments.

irrigation, and from 48 to 76 percent when preplant herbicides were applied prior to preplant irrigation. Short residual herbicides, such as Lasso, were more effective when applied closer to planting. Applying additional herbicide preemergence after a preplant application did not increase control over applying the total amount of herbicide preplant. Post-emergence herbicides applied when corn was 1 foot tall and watergrass was 4 to 6 inches tall did not have an appreciable effect on weed control. Although watergrass thrived on check plots, corn yields in 1971 were the same as those where herbicides reduced watergrass stand and vigor, since corn planted in early May has a competitive edge on watergrass that does not emerge until late May.

In 1972, corn was planted June 5, and watergrass emerged with the corn. Just prior to application of

TABLE 4. WATERGRASS CONTROL IN CORN WITH POST-EMERGENCE-DIRECTED HERBICIDES

Herbicide	Lb/A (ai)	Watergrass control, %		
		1970 <sup>a</sup>	1972 <sup>b</sup>	1973 <sup>c</sup>
Outfox	0.5	73		47
	1	77		42
	2	78		62
AAtrex + oil <sup>d</sup>	0.5	62		
	1	67		
	2	77		
Evik + S <sup>e</sup>	1	48	47	88
	2	62	53	87
	3		47	90
Lorox + S	1	40	23	72
	2	52	70	85
	3		87	92
AAtrex + Dowpon	0.5 + 1	47		
	1.5 + 1	67		
	2 + 1	75		
Paraquat + AAtrex + S	0.25 + 1		33	63
	0.25 + 2			77
	0.5 + 1		50	
	0.5 + 2			90
Bladex + S	1 + 2		67	
	1		20	48
	2		40	63
	3			85
Lasso + AAtrex + S	4		80	
	1 + 0.5		10	
	1 + 1		23	75
	1.5 + 1		28	
Mowdown + S	1 + 2			68
	2 + 2			80
	1			76
	2			85

<sup>a</sup>Corn and weeds 14 and 2 inches. No crop injury.

<sup>b</sup>Corn and weeds 18 and 5 inches. No crop injury.

<sup>c</sup>Corn and weeds 36 and 2 inches. No crop injury.

<sup>d</sup>Non-phytotoxic emulsifiable oil at 1 gallon per acre.

<sup>e</sup>Surfactant in water carrier at 0.5%

directed postemergence sprays on July 10, grass control was better in the furrows than on the beds where only preplant herbicides had been applied, Table 6. For example, grass control was 66 percent on top of the bed and 91 percent in the furrow where 3 pounds per acre active ingredient of AAtrex were applied prior to planting. This occurred because dry soil containing herbicide had to be removed from the bed during planting in order to place seed in moist soil. When a preemergence application followed planting, weed control was markedly improved on the bed. In early August, the most effective weed control was obtained when 2 pounds per acre of AAtrex were applied preplant and another 2 pounds per acre were applied at planting, cover photos. As in 1971, postemergence treatments did not enhance weed control unless a short residual herbicide had been used for a preplant treatment.

At corn harvest in 1972, the check plots produced 4,991 pounds per acre of mature, dry watergrass, Table 7. Most herbicide treatments that resulted in good corn yield held watergrass growth to less than 1,000 pounds per acre. Corn yields varied from 90 bushels per acre on untreated areas to 150 bushels per acre when AAtrex was applied at 2 pounds per acre preplant and again at 1 pound per acre preemergence. Uncontrolled watergrass decreased yields by reducing the number of ears and causing

plants to run short of water during maturity. The latter effect was shown by ear moisture content at harvest, which was lowest on the check plots and highest where yields were considerably greater.

In 1973, watergrass emerged only after receiving 2 inches of rain 1 month after planting. At that time corn was 18 inches tall and able to compete. AAtrex at 3 pounds per acre applied either preplant, preemergence, or as a split application at both preplant and preemergence resulted in the best watergrass control for the entire season, Table 8. If less was applied, grass control was reduced. Watergrass control was increased by postemergence herbicides, especially if control had been poor with preplant or preemergence treatments. Post-emergence sprays of Lorox or Evik increased weed control by Lasso from 35 to 75 percent. Wheat could be planted the same year after the two treatments with short residual herbicides. Weed yields were over 3,000 pounds per acre on the check plot and less than 800 pounds per acre on treated plots. Plots treated with AAtrex at 2 pounds per acre preplant and 2 pounds per acre of Evik postemergence directed were weed-free at harvest. Untreated areas yielded 34 bushels per acre, and all treatments yielded between 49 and 61 bushels per acre. Yields were low because only one post-plant irrigation was applied.

TABLE 5. CORN YIELDS AND WATERGRASS CONTROL RESULTING FROM PREPLANT, PREEMERGENCE, AND POSTEMERGENCE HERBICIDES AND CULTIVATION, 1971

Preplant herbicide	Lb/A (ai)	Pre-emergence herbicide	Lb/A (ai)	Post-emergence herbicide	Lb/A (ai)	Preplant herbicides applied <sup>a</sup>					
						Following pre-water		Corn (bu/A)	Prior to pre-water		
						% control <sup>b</sup> watergrass			% control <sup>b</sup> watergrass		
						June 8	June 23		June 8	June 23	
AAtrex	3					84 ab	78 ab	112 a	85 a	74 a	116 a
Princep	3					76 bc	75 ab	111 a	60 d	73 ab	124 a
AAtrex	2	AAtrex	1			80 bc	79 ab	107 a	68 cd	69 ab	123 a
	3		1			88 a	80 ab	108 a	74 bc	76 a	117 a
	2			AAtrex + 1 gpa oil <sup>c</sup>	1	82 bc	68 b	114 a	62 cd	59 bc	127 a
	3			Evik + 0.5% S <sup>d</sup>	2	86 a	67 b	116 a	62 cd	64 ab	122 a
AAtrex + Sutan	1 + 3		1			84 ab	71 ab	118 a	65 cd	69 ab	126 a
Lasso	2	Lasso	2			73 b	81 ab	110 a	85 a	48 c	113 a
Lasso + AAtrex	3 + 1					83 ab	84 a	118 a	88 a	59 bc	113 a
AAtrex	2	AAtrex	1	Evik + 0.5% S	2	84 ab	79 ab	115 a	71 cd	77 a	110 a
Check						0 d	0 c	116 a	0 e	0 d	128 a

<sup>a</sup>Means followed by the same letter are not different at the 5% level of significance.

<sup>b</sup>June 8 was prior to postemergence sprays and July 23 was after postemergence sprays.

<sup>c</sup>Sun 11E oil at 1 gallon per acre in a water carrier.

<sup>d</sup>Dupont WK surfactant at 0.5% of carrier volume.

## Volunteer Sorghum Control

### Preplant Herbicides

The tandem disk and rolling cultivator were evaluated for incorporating preplant herbicides applied to control volunteer sorghum in corn, Table 9. In 1969, herbicides were incorporated with a tandem disk about 1 month before planting. After incorporation, beds were formed, preplant irrigation applied, and corn planted in wet soil. In 1974, herbicides were applied and incorporated 3 days prior to planting corn on dry beds and watering up. Sutan was the best herbicide in 1969, when herbicides were applied 1 month before planting. In 1974, outstanding results were obtained with both Sutan<sup>+</sup> and

Eradicane when corn was watered up. The rolling cultivator was not as effective for incorporating herbicides for volunteer sorghum control as the tandem disk. In 3 years of study, only Sutan at 6 pounds per acre and a mixture of Avadex and Lasso gave satisfactory control of the volunteer sorghum without injuring corn.

### Preemergence Herbicides

Studies were conducted in 1969 and 1974, Table 10. In 1969, preemergence herbicides had very little effect on growth of volunteer sorghum. In 1974, Lasso at 2 and 3 pounds per acre and Lexone at 1 pound per acre gave outstanding control of volunteer sorghum.

TABLE 6. WATERGRASS CONTROL FROM PREPLANT, PREEMERGENCE, AND POSTEMERGENCE HERBICIDES AND CULTIVATION, 1972<sup>a</sup>

Preplant herbicide	Lb/A (ai)	Pre-emergence herbicide	Lb/A (ai)	Post-emergence herbicide	Lb/A (ai)	July 5 <sup>b</sup> Grass control %		August 9
						Bed	Furrow	Bed
AAtrex	3					66 cd	91 ab	60 b-e
	4					83 a-c	96 a	80 ab
Princep	3					49 d	91 ab	36 d-f
AAtrex	2	AAtrex	1 2			88 ab	95 a	81 ab
	2				91 a	97 a	91 a	
	2			AAtrex + Oil <sup>c</sup>	2	49 d	86 a-c	65 a-c
	2				1	53 d	87 a-c	67 a-c
	2			AAtrex (no oil)	2	48 d	79 b-d	69 a-c
AAtrex + Sutan	1 + 3					51 d	95 a	33 ef
	1 + 3			AAtrex + Oil	2	59 d	91 ab	71 a-c
Lasso	3					0 g	50 e	0 g
Lasso + AAtrex	3 + 1					20 ef	75 cd	13 fg
Lasso + AAtrex	3 + 1				2	21 e	74 d	45 c-e
AAtrex	3			Evik + S <sup>d</sup>	2	48 d	94 a	64 a-d
Check						0 g	0 f	0 g

<sup>a</sup>Means followed by the same letter are not different at the 5% level of significance.

<sup>b</sup>Prior to application of postemergence sprays.

<sup>c</sup>Sun 11E oil at 1 gallon per acre in a water carrier.

<sup>d</sup>Dupont WK surfactant at 0.5% of carrier volume.

TABLE 7. WATERGRASS AND CORN YIELDS FROM PREPLANT, PREEMERGENCE, AND POSTEMERGENCE HERBICIDES AND CULTIVATION, 1972<sup>a</sup>

Preplant herbicide	Lb/A (ai)	Pre-emergence herbicide	Lb/A (ai)	Post-emergence herbicide	Lb/A (ai)	Watergrass (Lb/A)	Corn (Bu/A)	Corn cobs (No/A)
AAtrex	3					442 c-e	141 a	12,672 a
	4					820 c-e	148 a	11,904 a-c
Princep	3					1,561 b-d	137 a	12,192 ab
AAtrex	2	AAtrex	1			150 e	150 a	12,288 ab
	2		2			3 e	125 a-c	11,328 a-c
	2			AAtrex + oil <sup>b</sup>	2	350 de	137 a	11,616 a-c
	2				1	245 de	137 a	11,328 a-c
	2			AAtrex (no oil)	2	310 de	133 a-c	12,480 ab
AAtrex + Sutan	1 + 3					1,647 bc	135 ab	11,712 a-c
	1 + 3			AAtrex + oil	2	332 de	146 a	12,288 ab
Lasso	3					3,889 a	106 cd	9,600 bc
Lasso + AAtrex	3 + 1					2,262 b	123 a-c	12,192 ab
	3 + 1				2	913 c-e	127 a-c	11,520 a-c
AAtrex	3			Evik + S <sup>c</sup>	2	202 e	123 a-c	11,136 a-c
Check						4,991 a	90 d	9,216 c

<sup>a</sup>Means followed by the same letter are not different at the 5% level of significance.

<sup>b</sup>Sun 11E oil at 1 gallon per acre in a water carrier.

<sup>c</sup>Dupont WK surfactant at 0.5% of carrier volume.

TABLE 8. WATERGRASS CONTROL AND CORN YIELDS FOLLOWING PREPLANT, PREEMERGENCE, AND POSTEMERGENCE HERBICIDES AND CULTIVATION, 1973<sup>a</sup>

Preplant herbicide	Lb/A (ai)	Preemergence herbicides	Lb/A (ai)	Post-emergence herbicides	Lb/A (ai)	Grass control, %		Watergrass <sup>d</sup> (Lb/A)	Grain (Bu/A)
						8-9-73 <sup>b</sup>	9-19-73 <sup>c</sup>		
AAtrex	3					95 a	95 ab	152	61 a
	2	AAtrex	1			94 a	95 ab	152	49 ab
	1.5		1.5			94 a	95 a	152	56 ab
	1.5			AAtrex + oil <sup>e</sup>	1.5	83 a-c	95 ab	152	56 ab
	1			Evik + S <sup>f</sup>	2	78 a-d	98 ab	61	57 ab
	2				2	90 a	100 a	0	61 a
	1.5			Lorox + S	1.5	76 a-d	93 a-c	213	52 ab
AAtrex + Sutan	1 + 3			AAtrex + oil	1.5	70 a-e	91 a-d	274	57 ab
		AAtrex	3			89 ab	94 ab	183	58 a
		AAtrex + Ramrod	1.5+3		1.5	64 c-f	93 a-c	213	55 ab
			1.5+3			58 d-g	74 e	793	58 a
		AAtrex + Lasso	1.5+2		1.5	46 f-h	83 b-e	518	51 ab
		Lasso	2.5	Lorox + S	1.5	33 h	75 e	762	54 ab
			2.5	Evik + S	2	39 gh	76 e	732	57 ab
Check						0 i	0 f	3,049	34 b

<sup>a</sup>Means followed by the same letter are not different at the 5% level of significance.

<sup>b</sup>Prior to application of postemergence sprays.

<sup>c</sup>At harvest.

<sup>d</sup>Calculated from weedy checks and data on September 19. Statistical analyses were not made.

<sup>e</sup>One gallon per acre Sun 11E oil with carrier.

<sup>f</sup>0.5% Dupont WK surfactant by volume of carrier.



TABLE 9. PERCENT VOLUNTEER SORGHUM CONTROL IN CORN WITH PREPLANT INCORPORATED HERBICIDES

Herbicide	Lb/A (ai)	Tandem disk		Rolling cultivator		
		1969 <sup>a</sup>	1974 <sup>b</sup>	1969 <sup>c</sup>	1970 <sup>d</sup>	1974 <sup>e</sup>
Lasso	1.5	40				
	2	60		72	23	
	3	62			29	
	4				50	
AAtrex + Lasso	1 + 1	60		57	17	
	1 + 2				49	
AAtrex	1	27				
	2	47		0	0	32
	3				25	
	4	72			0	
Sutan or Sutan <sup>+</sup>	4	70	96	33	59	32
	5	87		60		
	6	91		72	90	63
Sutan + AAtrex	3 + 1	57		53	19	
	3 + 2				45	
Eradicane	4		96			65
	6					66
Sutan <sup>+</sup> + Bladex	3 + 1.5		75			33
	4 + 1.6		93			32
	3 + 1				55	38
	3 + 2				71	
Avadex + Lasso	1.5 + 1.5					94
	2 + 2					94
CGA 18762	1.6					33
	2.4					60
	3.2					64

<sup>a</sup>Herbicides applied April 17, tandem disked twice, bedded, pre-watered, and corn planted on May 20.

<sup>b</sup>Herbicides applied April 19, tandem disked twice, bedded, corn planted on April 22 and "watered up."

<sup>c</sup>Herbicides applied May 14 to beds, rolling cultivated twice, corn planted May 20 and "watered up."

<sup>d</sup>Herbicide applied May 23, rolling cultivated twice; corn planted May 28, and data taken June 1.

<sup>e</sup>Herbicides applied April 18, rolling cultivated twice; corn planted April 22, and data taken June 19.

TABLE 10. VOLUNTEER SORGHUM CONTROL WITH PRE-EMERGENCE HERBICIDES

Herbicide	Lb/A (ai)	Volunteer sorghum control, %	
		1969 <sup>a</sup>	1974 <sup>b</sup>
AAtrex	1	0	
	2	20	60
Lasso	1	0	
	1.5	23	
	2		98
	3		100
Bladex	1	3	
	2	13	
	4	0	
Maloran	1	15	
	2	22	
	4	37	
Princep	1	13	
	2	23	
Lexone	0.5		33
	1		100

<sup>a</sup>Herbicides applied and corn planted on May 20.

<sup>b</sup>Herbicides applied and Excell E-56 corn planted on April 23.



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TABLE 11. HERBICIDES AND FOUR ADJUVANTS USED IN ORDER OF APPEARANCE IN TABLES 1 THROUGH 10

Designation to trade name	Chemicals or WSSA common name	Formulation	Manufacturer
AAtrex	Atrazine	80% WP <sup>a</sup>	CIBA-Geigy
Lasso	Alachlor	4 lb/gal	Monsanto
Princep	Simazine	80% WP	CIBA-Geigy
Sutan	Butylate	6 lb/gal <sup>b</sup>	Stauffer Chemical Co.
Sutan †	Butylate with antidote	6 lb/gal	Stauffer Chemical Co.
Eradicane	EPTC with antidote	6.7 lb/gal	Stauffer Chemical Co.
Bladex	Cyanazine	80% WP	Shell Chemical Co.
Outfox	Cyprazine	1 lb/gal	Gulf
Prefix	Ethiolate	4 lb/gal	Gulf
Avadex	Diallate	4 lb/gal	Monsanto
Rowtate	Cisanilide	65% WP	Diamond-Shamrock
Lorox	Linuron	50% WP	DuPont de Nemours & Co., Inc.
Mowdown	Bifenox	2 lb/gal	Mobil
Prowl	Penoxalin	3 lb/gal	American Cyanamid
Lexone (Sincor)	Metribuzin	50% WP	Dupont de Nemours & Co., Inc. and Chemagro
CGA 18762	Procyazine	80% WP	CIBA-Geigy
Dowpon	Dalapon	74% WP	Dow Chemical Co.
Paraquat-CI	Paraquat	2 lb/gal	Chevron Chemical Co.
Oil	Non-phytotoxic oil with 2% emulsifier	100% liquid	Sun Oil Corp.
Evik	Ametryne	80% WP	CIBA-Geigy
S	Dodecyl Ether of Polyethylene Glycol	100% liquid	Dupont de Nemours & Co., Inc.
Maloran	Chlorobromuron	50% WP	CIBA-Geigy

<sup>a</sup>Signifies a wettable powder or dry formulation.<sup>b</sup>Indicates active ingredient per gallon of liquid.

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