Preemergence Control of Annual Weeds in Oilseed Sunflowers Utilizing Spartan Herbicide

Texas Agricultural Experiment Station (1999-2001)
Matt Rowland & Brent Bean; Extension Assistant & Extension Specialist

Summary
Studies were conducted over three years, 1999-2001, to evaluate the efficacy of Spartan herbicide for control of annual grasses and broadleaves in oilseed sunflowers. Crop injury levels were quite high for all rates of Spartan in 1999 due to an extremely wet spring after applications were made. Spartan applied at rates of 2, 3, and 4 oz/ac provided very good control of Palmer amaranth each year. Control of barnyardgrass was fair to good each year but improved when either Treflan or Prowl was added as a treatment partner. Velvetleaf control was very good in 1999 at all rates of Spartan. In 2001 it took at least 3 oz/ac to provide good control and the addition of Prowl appeared to enhance control.

Introduction
Sunflowers continue to be on the rise as an important cash crop in the Texas High Plains. Options for controlling certain weeds such as velvetleaf by preemergence methods are extremely limited. Herbicides for controlling broadleaf weeds by postemergence means are virtually non-existent. Spartan herbicide has been used as a soybean herbicide under the name Authority and is effective in providing long-term preemergence control of annual weeds. Therefore, these studies were conducted on the Texas Ag Experiment Station in Bushland to evaluate Spartan at various rates for weed control and sunflower response before it was released as a labeled treatment in sunflowers.

Materials and Methods

	1999	2000	2001
Study Design	RCBD	RCBD	RCBD
Plot Size	15' x 25'	15' x 25'	15' x 25'
Sunflower Variety	Cargill 290	Unknown	Triumph 652 Nu-Sun
Planting Date	June 16	May 19	May 9
Application Date	June 16	May 19	May 10
Soil Temperature (F)	75	60	69
Soil Moisture	High	Fair	High
Soil Type	Pullman Clay Loam	Pullman Clay Loam	Pullman Clay Loam
Emergence Date	June 25	May 28	May 18

All treatments were applied using a tractor- mounted CO_2 propelled sprayer calibrated for 10

gallons per acre. Ratings for crop injury and weed control were based on a scale of 0 to 100% with 0 = no injury or control while 100 = complete crop or weed kill. Pre-plant incorporated (PPI) treatments were incorporated within one hour following applications using a rolling cultivator. Preemergence (PRE) applications were made after planting and were activated by irrigation.

Results

See tables 1 & 2.

Table 1. Crop injury and weed control ratings at 4 WAE - 1999 & 2000.

Treatment	Rate prod/ac	Timing	Crop Injury	Palmer amaranth		Velvetleaf	Barnyardgrass	
			1999	1999	2000	1999	1999	2000
Spartan	2 oz	PRE	14	96	93	91	100	88
Spartan	3 oz	PRE	13	98	98	98	99	85
Spartan	4 oz	PRE	15	100	100	100	95	85
Treflan Spartan	1.5 pts 2 oz	PPI PRE	14	100	100	98	100	93
Treflan Spartan	1.5 pts 3 oz	PPI PRE	26	100	99	100	100	98
Treflan Spartan	1.5 pts 4 oz	PPI PRE	-	-	98	-	-	95
Treflan	1.5 pts	PPI	19	98	93	0	100	90

Table 2. Crop response and weed control ratings at 4 WAE - 2001.

Treatment	Rate prod/ac	Timing	Palmer amaranth	Velvetleaf	Barnyardgrass	Crop Injury	Crop Yield (lbs/ac)[1]
Spartan	2 oz	PRE	93	70	72	0	1801
Spartan	3 oz	PRE	97	87	82	0	1801
Spartan	4 oz	PRE	98	85	82	0	1974
Spartan Prowl	2 oz 2 pts	PRE PRE	98	92	92	0	1510
Spartan Prowl	3 oz 2 pts	PRE PRE	98	95	93	0	1858
Spartan Prowl	4 oz 2 pts	PRE PRE	98	93	92	0	1510

[1] Untreated check yielded 697 lbs/ac.

Discussion

1999

At 4 weeks after emergence (WAE) crop injury was substantial for every treatment. The 3 oz rate of Spartan with Treflan applied PPI had the highest level of injury. Injury consisted mainly of stunting with some leaf crinkling on the lower leaves which can be characteristic of Spartan.

Stunting may have been accentuated by the wet spring we had following applications. Control of all weeds was good to excellent for all rates of Spartan and the addition of Treflan to the 2 oz rate of Spartan appeared to help control Palmer amaranth. Applying 3 oz versus 2 oz appeared to be better for controlling velvetleaf. Ratings for weed control were taken at 8 WAE, but no changes were observed.

2000

In 2000 no crop injury was observed from any treatments. This can possibly be attributed to the change in sunflower variety. A 4 oz rate of Spartan with Treflan was added in 2000, though it did not show any advantage over the 3 oz rate. No velvetleaf pressure was present in 2000 for rating information. Palmer amaranth control was practically identical to 1999 with good to excellent ratings for all treatments. Control of barnyardgrass with Spartan alone seemed to decline compared to 1999. The addition of Treflan as a PPI treatment with Spartan was much more advantageous in 2000 as ratings improved from 85% to an average of 95%. Ratings did not vary after 4 WAE and are not shown.

2001

In 2001 Treflan was replaced with Prowl as a treatment partner. Prowl was added as a tank-mix partner and was applied PRE with the Spartan instead of as PPI treatment. At 4 WAE Palmer amaranth control was very good for all rates of Spartan and the addition of Prowl did not appear to help. The 2 oz rate of Spartan applied alone did not control the velvetleaf well. Applying 3 oz increased control as did the addition of Prowl to each Spartan rate. Similarly, barnyardgrass control was lacking at 2 oz and a definite benefit was observed from the addition of Prowl. As in 2000 no crop injury was observed from any treatment. Yields were collected in 2001 and no statistical difference was detected among the herbicide treatments though the untreated check yielded considerably and statistically less than all of the herbicide treatments.

The data from these trials indicate that a 3 oz/ac rate of Spartan with the addition of either Treflan or Prowl can provide good control of each of the weed species represented herein. The combination of Spartan and Prowl will be advantageous due to ease of application, especially to the conservation tillage producer. Crop injury can be a concern especially in extremely wet years. The higher rate of 4 oz/ac did not prove to have any benefit over the 3 oz rate in either of the trials.

Acknowledgments

Thanks to FMC Corporation for supplying both materials and support for these studies.

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