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Varietal Tolerance to New Soil Residual Herbicides in Several Texas Environments

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SUMMARY

Peanut injury following Strongarm applied preemergence was observed in both years of this study. Strongarm PRE was more injurious when applied at 0.024 lb ai/A compared to 0.016 lb ai/A. In general, Tamrun 96 appeared most tolerant to Strongarm PRE at 0.016 lb ai/A while the four high oleic peanut varieties (Flavor Runner 458, Sunoleic 97R, Tamrun OL/01, and Georgia Hi O/L) appeared more susceptible. In spite of the visual injury early- and mid-season, no adverse affects on yield were observed in 2001 and 2002. No more than 5% injury was observed following Valor PRE or Strongarm POST and no yield reductions were observed at the end of either growing season.

INTRODUCTION

DICLOSULAM (STRONGARM) AND FLUMIOXAZIN (VALOR) ARE NEW HERBICIDES REGISTERED FOR USE IN PEANUT SINCE THE 2000 GROWING SEASON. BOTH OF THESE HERBICIDES HAVE GOOD ACTIVITY ON A VARIETY OF ANNUAL BROADLEAF WEEDS. IN THE 2000 GROWING SEASON, WE OBSERVED THAT STRONGARM CAUSED PEANUT STUNTING, STAND LOSS, AND CHLOROSIS WHEN APPLIED PREPLANT INCORPORATED (PPI) AND PREEMERGENCE (PRE). BECAUSE OF THIS INJURY, A SUPPLEMENTAL LABEL WAS ISSUED IN 2001 FOR TEXAS, OKLAHOMA, AND NEW MEXICO THAT RESTRICTS APPLICATIONS TO SOILS WITH A PH OF 7.2 OR GREATER. THE REASON FOR THE SUDDEN INJURY IN 2000 IS STILL NOT FULLY UNDERSTOOD. VALOR WAS REGISTERED FOR USE IN PEANUT IN 2001. DURING ITS INTRODUCTORY YEAR, PEANUT INJURY WAS REPORTED IN OKLAHOMA, GEORGIA, NORTH CAROLINA AND WEST TEXAS. INJURY WAS DESCRIBED AS SOMETHING SIMILAR TO THE "CAPROL-SPLASH" THAT IS OFTEN OBSERVED IN YOUNG COTTON AFTER A HEAVY RAIN. IN LIGHT OF THE PEANUT INJURY OBSERVED FOLLOWING THE USE OF BOTH OF THESE HERBICIDES, A PEANUT VARIETY TRIAL WAS CONDUCTED IN GAINES COUNTY IN 2001 AND 2002 TO OBSERVE VARIETAL TOLERANCE TO STRONGARM AND VALOR. ADDITIONAL STUDIES WERE CONDUCTED IN THE ROLLING PLAINS AND IN SOUTH TEXAS.

MATERIALS AND METHODS

FOUR HIGH OLEIC PEANUT VARIETIES (FLAVOR RUNNER 458, SUNOLEIC 97R, TAMRUN OL/01, AND GEORGIA HI O/L) AND ONE CONVENTIONAL VARIETY, TAMRUN 96, WERE USED IN THIS STUDY. STRONGARM AT 0.016 AND 0.024 LB ai/A (0.3 AND 0.45 OUNCES OF PRODUCT PER ACRE, RESPECTIVELY) AND VALOR AT 0.063 AND 0.094 LB ai/A (2 AND 3 OUNCES OF PRODUCT PER ACRE, RESPECTIVELY) WERE APPLIED PRE. STRONGARM AT 0.016 AND 0.024 LB ai/A WAS ALSO APPLIED

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POSTEMERGENCE (POST). IN THE 2001 SEASON, PEANUTS WERE PLANTED AND THE PRE APPLICATIONS WERE MADE ON MAY 15 AND POST APPLICATIONS WERE MADE ON JUNE 12. IN THE 2002 SEASON, PEANUTS WERE PLANTED AND PRE APPLICATIONS WERE MADE ON APRIL 30. THE POST TREATMENTS WERE APPLIED ON MAY 28. NON-IONIC SURFACTANT AT 0.25% V/V WAS ADDED TO ALL POST TREATMENTS. TREATMENTS WERE APPLIED USING A CO₂ BACKPACK SPRAYER CALIBRATED TO DELIVER 10 GALLONS OF WATER PER ACRE AS THE CARRIER. THE EXPERIMENTAL DESIGN WAS A SPLIT-PLOT AND ALL TREATMENTS WERE REPLICATED THREE TIMES USING A 7 BY 36 FT PLOT. THE SOIL TYPE WAS A BROWNFIELD LOAMY FINE SAND. PLOTS WERE MAINTAINED WEED-FREE SO ANY INJURY OBSERVED WOULD BE ATTRIBUTED TO THE HERBICIDE AND NOT WEED COMPETITION. PEANUTS WERE EVALUATED FOR INJURY EARLY-, MID-, AND LATE-SEASON. PEANUT GRADES AND YIELD WERE DETERMINED AT THE END OF THE SEASON.

RESULTS AND DISCUSSION

At 14 days after planting (DAP) in 2001, Strongarm applied PRE at 0.024 lb ai/A injured peanut 15 to 40% in all varieties except Tamrun 96 (data from 2001 not shown). At 42 DAP, Strongarm PRE injured Flavor Runner 458 and the Sunoleic 97R 20 to 25%, while injury to Georgia Hi O/L at 0.024 lb ai/A was 35 to 45%. At 118 DAP, all injury decreased to less than 5%. Less than 5% peanut injury was observed in all varieties from Valor applied PRE at 14 DAP. No injury was observed at 42 and 118 DAP. At 14 DAP, Strongarm applied POST at both rates injured peanut less than 5% in all varieties and no injury was observed 90 DAP. Yield from plots treated with Strongarm PRE, Strongarm POST, or Valor PRE were not different than the untreated check plots.

In 2002, Strongarm applied PRE at 0.016 and 0.024 lb ai/A injured peanut less than 8% in all varieties early season (Table 1). At the mid season rating (42 days after planting (DAP)), Strongarm PRE at 0.016 lb ai/A injured peanut 10 to 17% in all varieties except Tamrun 96, which appeared most tolerant at this rate. At 42 DAP, Strongarm PRE at 0.024 lb ai/A injured all varieties 13 to 25%. By the late season rating, all plots had fully recovered from the initial injury (stunting). No injury was observed from the Valor PRE applications or the Strongarm POST applications. Yield was not affected by any treatment of Strongarm or Valor.

In the Rolling Plains, Valor at 0.063 and 0.094 lb ai/A was applied PRE to Flavor Runner 458, Tamrun 96, Tamrun OL/01, and Georgia Hi O/L. No injury was observed regardless of peanut variety and Valor rate and no differences were observed in yield relative to the non-treated control. In south Texas, Valor PRE at 0.063 and 0.094 lb ai/A and Strongarm POST at 0.016 and 0.024 lb ai/A did not reduce stand, cause visual injury, or reduce yield in Flavor Runner 458, Tamrun 96, Tamrun OL/01, and Georgia Hi O/L varieties.

These studies suggest that differential peanut tolerance exists following Strongarm PRE at 0.016 lb ai/A, but no Strongarm PRE treatment caused a yield reduction. These studies also suggest that there were no differences in varietal tolerance to Valor PRE and Strongarm POST.

TABLE 1. PEANUT INJURY AND YIELD BY VARIETY AS AFFECTED BY STRONGARM AND VALOR TREATMENTS.

VARIETY	TREATMENT RATE	APPLICATION (LB ai/A)	PEANUT INJURY (%)			YIELD (LB/A)	
			EARLY	MID	LATE		
TAMRUN 96	STRONGARM 0.016	PRE	3	0	0	5380	
	STRONGARM 0.024	PRE	4	17	0	5385	
	VALOR	0.063 PRE		0	0	0	5160
	VALOR	0.094 PRE		0	0	0	5615
	STRONGARM 0.016	POST		0	0	0	5688
	STRONGARM 0.024	POST		0	0	0	5865
	UNTREATED			0	0	0	5380
LSD				NS	5	NS	548
FLV RUN 458	STRONGARM 0.016	PRE	7	12	0	6590	
	STRONGARM 0.024	PRE	7	21	0	6644	
	VALOR	0.063 PRE		0	0	0	6497
	VALOR	0.094 PRE		0	0	0	6585
	STRONGARM 0.016	POST		0	0	0	6732
	STRONGARM 0.024	POST		0	0	0	6820
	UNTREATED			0	0	0	6762
LSD				NS	19	NS	498
SUNLET C 97R	STRONGARM 0.016	PRE	0	10	0	5895	
	STRONGARM 0.024	PRE	0	13	0	6085	
	VALOR	0.063 PRE		0	0	0	5997
	VALOR	0.094 PRE		0	0	0	5894
	STRONGARM 0.016	POST		0	0	0	5821
	STRONGARM 0.024	POST		0	0	0	7041
	UNTREATED			0	0	0	5483
LSD				NS	10	NS	444
TAMRUN CL/01	STRONGARM 0.016	PRE	0	13	0	5556	
	STRONGARM 0.024	PRE	0	16	0	5806	
	VALOR	0.063 PRE		0	0	0	5176
	VALOR	0.094 PRE		0	0	0	4851
	STRONGARM 0.016	POST		0	0	0	5409
	STRONGARM 0.024	POST		0	0	0	5645
	UNTREATED			0	0	0	5248
LSD				NS	8	NS	584
GEORGIA Hi OL	STRONGARM 0.016	PRE	4	17	0	5556	
	STRONGARM 0.024	PRE	8	25	0	5483	
	VALOR	0.063 PRE		0	0	0	5850
	VALOR	0.094 PRE		0	0	0	5659
	STRONGARM 0.016	POST		0	0	0	5836
	STRONGARM 0.024	POST		0	0	0	6335
	UNTREATED			0	0	0	5454
LSD				NS	12	NS	521