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PEANUT RESPONSE TO LATE-SEASON GLYPHOSATE APPLICATIONS

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INTRODUCTION

There continues to be an increase in the number of misapplication of glyphosate to peanut by either tank contamination or glyphosate accidentally put into a spray tank when it is confused for crop oil. Problems with off target drift can also be an issue. Growers are then left with the dilemma as to how much yield loss can occur and if they should continue to apply other inputs such as fungicides to injured peanut.

Peanut tolerance to glyphosate varies with the stage of growth and development. When peanut was 4-6 inches in diameter and treated with glyphosate, a dose response ranging from no injury to severe stunting occurred for rates of glyphosate ranging from 0.007 to 1.0 lb ae/acre (Robinson et al. 2002). When applied in low doses, peanut recovered rapidly and yield was not affected. However, peanut research data, with respect to tolerance, yield, and quality, does not exist for mid- to late-season applications of glyphosate for the southeast US does not exist.

MATERIALS & METHODS

Field studies were conducted in 2006 and 2007 to determine peanut response to glyphosate applied at 75, 90, and 105 days after planting (DAP) at Plains and Tifton Georgia. Rates evaluated were 0, 2, 4, 6, 8, and 12 ounces of Roundup Original- max (0, 0.08, 0.16, 0.24, 0.32, and 0.47 kg ae/ha). The experiment was a three by five factorial with four replications set up as

a randomized complete block design. Studies were conducted with GA-02C peanut. Experiments were maintained weed-free by using traditional weed control methods with residual herbicides (Valor, Strongarm, and/or Cadre) and hand-weeding. No other herbicides were applied. All glyphosate treatments were applied with backpack sprayer in order to prevent mechanical damage. Visual peanut injury (on a scale of 0 to 100%, where 0% = no injury with 100% = plant death) was taken 7 to 10 days after application (DAA) after initial application and continued through out the season. At digging, samples were taken by hand-harvesting 100 pods from each plot. Pods were shelled, peanut seed mass determined, and then peanut germination tested. Plots were mechanically harvested to determine yield.

RESULTS AND DISCUSSION

Data indicated that peanut was tolerant to glyphosate at low doses, but did exhibit stunting and chlorosis (Figures 1 & 2). Peanut injury was rate dependent when applied at 75 DAP, increasing with glyphosate dose (Table 1). At 75 DAP peanut was susceptible to 6 oz/acre and greater. Glyphosate applied to peanut at 90 and 105 DAP exhibited 11 to 35 and 14 to 44% injury for rates exceeding 6 oz/ac, respectively. At 90 and 105 DAP peanut was tolerant to rates of 6 oz/acre and less. Injury to peanut included leaf drop, chlorosis, and some stand loss at rates of 8 and 12 oz/acre. Ratings taken prior to peanut harvest indicated that peanut did not fully recover from 75 DAP glyphosate applications at doses exceeding 8 oz/acre.

Peanut yield was reflective of the reductions in seed size: increased glyphosate rate reduced yield at 75 DAP (Table 2). Reduction in yield occurred linearly for applications made at 75 DAP with greater than 50% losses for Plains and Tifton at 12 oz/acre. This could be attributed to the timing of that application, when peanut was in bloom, or R1 stage of development. By delaying

application until 90 or 105 DAP, yield was reduced 10% or greater by 8 oz/acre and higher at Tifton, and 6 oz/acre and higher at Plains.

Injury data for the 75 DAP treatments was reflected in peanut seed size. As glyphosate dose increased, peanut seed size decreased at Tifton and Plains (Table 3). This trend was also true for the 90 and 105 DAP glyphosate applications at Plains, but not as pronounced for Tifton.

Germination was not affected by glyphosate application at either location (Table 4).

REFERENCES

Robinson, B.L., W.E. Thomas, W.A. Pline, I.C. Burke, D.L. Jordan, and J.W. Wilcut. 2003.

Yield and physiological response of peanut to glyphosate drift. Proc. South. Weed Sci. Soc. 56:30.

Table 1. Visual peanut injury from post applications of glyphosate, 2007.

Treatment ^a	Rate - oz/acre -	DAP	Tifton		Plains		
			7 to 10 DAT	Prior to harvest	7 to 10 DAT	Prior to harvest	
			%				
1	Nontreated	0	75	0	0	0	0
2	Glyphosate	2	75	5	0	2	0
3	Glyphosate	4	75	25	6	13	1
4	Glyphosate	6	75	28	15	13	4
5	Glyphosate	8	75	48	31	24	14
6	Glyphosate	12	75	58	45	41	43
7	Nontreated	0	90	0	0	0	0
8	Glyphosate	2	90	0	0	2	1
9	Glyphosate	4	90	3	1	6	4
10	Glyphosate	6	90	20	0	11	0
11	Glyphosate	8	90	25	0	13	24
12	Glyphosate	12	90	35	0	18	13
13	Nontreated	0	105	0	0	0	0
14	Glyphosate	2	105	1	0	1	3
15	Glyphosate	4	105	6	0	7	1
16	Glyphosate	6	105	24	0	14	3
17	Glyphosate	8	105	28	0	28	15
18	Glyphosate	12	105	40	3	44	19

^aGlyphosate applied as Roundup Weathermax with 4.5 lb ae per gallon.

Table 2. Peanut yield as affected by post applications of glyphosate, 2007-2008.

	Treatment ^a	Rate - oz/acre -	DAP	Tifton		Plains	
				2006	2007	2006	2007
				lb/acre			
1	Nontreated	0	75	3840	4230	4140	5000
2	Glyphosate	2	75	4080	4680	3690	5100
3	Glyphosate	4	75	3030	4450	3660	5150
4	Glyphosate	6	75	3020	4560	2790	4520
5	Glyphosate	8	75	2010	4540	2370	3790
6	Glyphosate	12	75	1670	4310	1380	3160
7	Nontreated	0	90	3870	4550	4460	4700
8	Glyphosate	2	90	3820	4690	4050	5350
9	Glyphosate	4	90	4020	4300	4230	4920
10	Glyphosate	6	90	3830	3870	3890	3860
11	Glyphosate	8	90	3750	3380	2940	3550
12	Glyphosate	12	90	3370	3040	2930	2570
13	Nontreated	0	105	4040	4680	4570	4980
14	Glyphosate	2	105	4000	4310	4750	4820
15	Glyphosate	4	105	3690	3810	4074	4990
16	Glyphosate	6	105	3950	4040	3270	4970
17	Glyphosate	8	105	3380	3310	2740	4100
18	Glyphosate	12	105	3000	2860	2470	2630

^aGlyphosate applied as Roundup Weathermax with 4.5 lb ae per gallon.

Table 3. Peanut seed size as affected by post applications of glyphosate, 2007-2008.

Treatment ^a	Rate oz/acre	DAP	Tifton		Plains		
			2006	2007	2006	2007	
			mg/seed				
1	Nontreated	0	75	588	717	685	720
2	Glyphosate	2	75	574	704	626	747
3	Glyphosate	4	75	550	683	668	713
4	Glyphosate	6	75	537	707	645	685
5	Glyphosate	8	75	482	717	609	658
6	Glyphosate	12	75	481	710	558	683
7	Nontreated	0	90	562	725	684	771
8	Glyphosate	2	90	580	730	684	741
9	Glyphosate	4	90	606	718	685	745
10	Glyphosate	6	90	567	721	664	735
11	Glyphosate	8	90	564	729	635	678
12	Glyphosate	12	90	584	693	615	641
13	Nontreated	0	105	587	707	667	726
14	Glyphosate	2	105	561	736	674	676
15	Glyphosate	4	105	582	754	642	745
16	Glyphosate	6	105	591	732	641	725
17	Glyphosate	8	105	606	751	621	693
18	Glyphosate	12	105	560	735	604	639

^aGlyphosate applied as Roundup Weathermax with 4.5 lb ae per gallon.

Table 4. Peanut seed germination as affected by post applications of glyphosate, 2007-2008.

	Treatment ^a	Rate - oz/acre -	DAP	Tifton		Plains	
				2006	2007	2006	2007
				%			
1	Nontreated	0	75	98	98	94	100
2	Glyphosate	2	75	99	100	96	100
3	Glyphosate	4	75	95	9	93	98
4	Glyphosate	6	75	99	100	96	100
5	Glyphosate	8	75	100	100	99	100
6	Glyphosate	12	75	99	98	99	98
7	Nontreated	0	90	90	95	95	100
8	Glyphosate	2	90	94	95	93	98
9	Glyphosate	4	90	93	100	93	98
10	Glyphosate	6	90	100	100	100	100
11	Glyphosate	8	90	100	98	98	98
12	Glyphosate	12	90	98	100	93	98
13	Nontreated	0	105	100	90	94	98
14	Glyphosate	2	105	98	100	98	100
15	Glyphosate	4	105	100	95	98	98
16	Glyphosate	6	105	88	100	95	100
17	Glyphosate	8	105	94	98	94	98
18	Glyphosate	12	105	95	100	94	95

^aGlyphosate applied as Roundup Weathermax with 4.5 lb ae per gallon.

Figure 1. Peanut Response to glyphosate at 0, 2, 4, 6, 8, and 12 oz/acre applied 75 days after planting. (clockwise from top left).

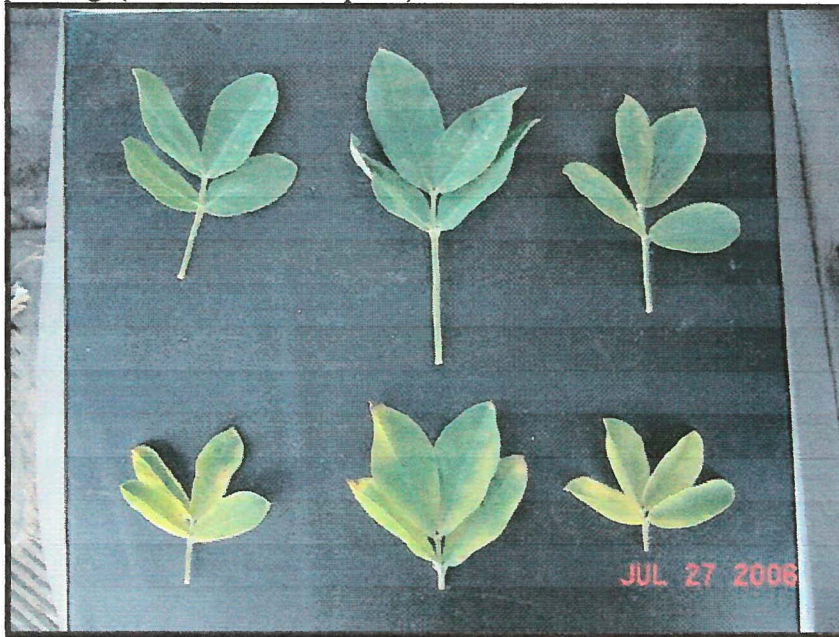


Figure 2. Peanut Response to glyphosate at 12 oz/acre applied 75, 90, and 105 days after planting (left to right for pictures taken 112 days after planting).

