final + Summary

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Southeastern Peanut Research Initiative 2012
Fourth Quarter and Final Report
January 1, 2012 to December 31, 2012

Project Title: Influence of Simulated 2,4-D and Dicamba Drift on Peanut Growth and Yield

Funding Year: January 1, 2012 to December 31, 2012

Investigators: Florida:

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Locations: Site 1.
West Florida Research and Education Center
Jay, FL

Site 2.
Plant Science Research and Education Unit
Citra, FL

Project Description: The central hypothesis of this experiment is that there is a threshold level for both dicamba (Clarity) and 2,4-D below which peanut will not be affected and above which both peanut growth and yield will be reduced.

Specific Objectives:

1. Determine the effect of 2,4-D Amine simulated drift applied at various times on growth, yield and grade of peanuts.
2. Determine the effect of dicamba (Clarity) simulated drift applied at various times on growth, yield and grade of peanuts.

Final Report:

New cotton cultivars are being developed that will tolerate postemergence applications of 2,4-D and dicamba (Clarity). Dow AgroSciences/Phytogen is developing a system called Enlist. This system includes genetically modified cotton that is tolerant to 2,4-D at rates in excess of 1 lb. a.i./A. Monsanto/Delta Pine is developing cotton cultivars tolerant to dicamba at rates that provide excellent broadleaf control. Both of these programs are in response to the ever increasing list of broadleaf weeds that have developed resistance to glyphosate. As these new tolerant cotton cultivars become available and products such as 2,4-D and dicamba become more widely used, the potential for one or both to drift on to peanuts in fields adjoining cotton will greatly increase. It is important to have some understanding of the impact of these herbicides on peanuts so that when herbicide drift does occur the potential for yield loss can be predicted.

Field studies were conducted on the West Florida Research and Education Center, Jay, FL and Plant Science Research and Education Unit in Citra, FL. Dicamba and 2,4-D were each applied at five rates (full use rate, 0.5, 0.25, 0.125 and 0.0625 of full rate) and these treatments were compared to a nontreated check. Each herbicide by rate treatment was applied 21 or 42 days after peanut planting. Foliar injury was visually evaluated during the growing season. At termination of the experiment, peanuts were yielded at both sites. All plots received broadcast applications of foliar fungicides as appropriate. Both field sites were maintained weed-free and under irrigation throughout duration of the experiment.

At both Jay and Citra, dicamba was more injurious to peanut then 2,4-D. Visual injury ratings were much higher throughout the growing season for the dicamba treated peanut. At Jay, while yield reduction was similar (46 and 43%) for both herbicides at the highest application rate, much less yield loss was observed for lower rates of 2,4-D compared to dicamba. When averaged over all rates and timings, dicamba caused 30% loss while 2,4-D caused less than 20%. In general, applications at 21 days after planting (DAP) caused less visible damage to the foliage and reduced yield less than the 42 DAP treatments (14% yield loss for 14 DAP vs. 31% reduction for 42 DAP). When applied 14 DAP, 2,4-D reduced yield 10% or less and averaged 25% for dicamba while injury was greater 42 DAP especially at the higher rates of application averaging 20% for 2,4-D and 40% for dicamba.

At Citra, as at Jay, dicamba caused more foliar peanut injury and reduced peanut yield more than2,4-D. However, the foliar injury and yield loss were much greater at Citra than was observed at Jay. In many instances foliar injury ratings at Citra were nearly double those recorded for the same treatment at Jay. When averaged over rates and times of application dicamba caused a 55% yield loss at Citra compared with 30% at Jay while 2,4-D caused 30% yield reduction at Citra and 20% loss at Jay.

While both 2,4-D and dicamba caused more injury when applied 42 DAP than 21 DAP at Jay, dicamba damage was similar for both application timings at Citra (55% yield loss averaged over all rates). 2,4-D injury was less when applied 42 DAP than 21 DAP (30 vs. 15% yield loss) at Citra, opposite from what was observed at Jay.

Overall these results indicate that dicamba (Clarity) at rates as low as 1 oz./A can cause significant peanut yield loss (15 to 35% reduction) while 2,4-D at 2 to 8 oz./A had much less effect on peanut (0 to 20% yield reduction). It appears that peanut growers will need to be much more concerned about dicamba drift than about 2,4-D drift from adjoining fields.

See attached tables for a complete listing of the data collected.

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Peanuts: Influence of Simulated 2,4-D and Dicamba Drift on Peanut

Trial ID: PEA12-2 Study Dir.:
Location: WFREC, Jay, FL Investigator: Barry J. Brecke

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code	1	2	3	4	5	6	7
	Crop Code							ARHHY	ARHHY	ARHHY	ARHHY	ARHHY	ARHHY	ARHHY
	Part Rated							0-100	0-100	CANOPY	0-100	0-100	0-100	
	Rating Data Type							Visual	Visual		Visual	Visual	Visual	
	Rating Unit							%Injury	%Injury	CM	%Injury	%Injury	%Injury	KG/plot
	Rating Date							6/18/12	7/10/12	7/10/12	8/7/12	8/27/12	9/11/12	10/9/12
	Crop Stage													6.5%mois
	Trt-Eval Interval							13 DA-A	35 DA-A	35 DA-A	63 DA-A	83 DA-A	98 DA-A	126 DA-A
	ARM Action Codes													
	# Subsamples, Dec.							0	0	1	0	0	0	2
1	Clarity	4	SL	16	fl oz/a	21 DAP	A	34	50	29.0	50	29	9	2.72
1	21 Days After Planting						A							
2	Clarity	4	SL	16	fl oz/a	42 DAP	B	0	36	40.0	61	49	40	3.85
2	42 Days After Planting						B							
3	Clarity	4	SL	8	fl oz/a	21 DAP	A	25	26	29.9	25	13	8	5.13
3	21 Days After Planting						A							
4	Clarity	4	SL	8	fl oz/a	42 DAP	B	0	44	34.3	68	60	54	3.36
4	42 Days After Planting						B							
5	Clarity	4	SL	4	fl oz/a	21 DAP	A	20	5	40.3	9	1	11	6.50
5	21 Days After Planting						A							
6	Clarity	4	SL	4	fl oz/a	42 DAP	B	0	45	39.5	40	30	26	3.31
6	42 Days After Planting						B							
7	Clarity	4	SL	2	fl oz/a	21 DAP	A	18	4	48.8	3	3	6	3.90
7	21 Days After Planting						A							
8	Clarity	4	SL	2	fl oz/a	42 DAP	B	8	19	48.2	21	10	11	4.79
8	42 Days After Planting						B							
9	Clarity	4	SL	1	fl oz/a	21 DAP	A	6	1	53.6	0	0	3	4.93
9	21 Days After Planting						A							
10	Clarity	4	SL	1	fl oz/a	42 DAP	B	1	43	38.7	14	10	10	3.84
10	42 Days After Planting						B							
11	2,4-D AMINE	4	L	32	fl oz/a	21 DAP	A	11	3	56.6	4	0	3	5.40
11	21 Days After Planting						A							
12	2,4-D AMINE	4	L	32	fl oz/a	42 DAP	B	0	26	38.5	63	39	48	1.54
12	42 Days After Planting						B							
13	2,4-D AMINE	4	L	16	fl oz/a	21 DAP	A	8	4	49.6	0	0	10	6.04
13	21 Days After Planting						A							
14	2,4-D AMINE	4	L	16	fl oz/a	42 DAP	B	0	15	39.2	29	28	20	3.89
14	42 Days After Planting						B							
15	2,4-D AMINE	4	L	8	fl oz/a	21 DAP	A	14	4	50.6	4	0	0	5.19
15	21 Days After Planting						A							
16	2,4-D AMINE	4	L	8	fl oz/a	42 DAP	B	5	5	44.0	9	9	11	5.37
16	42 Days After Planting						B							
17	2,4-D AMINE	4	L	4	fl oz/a	21 DAP	A	14	0	46.1	5	0	3	5.23

17	21 Days After Planting						A							
18	2,4-D AMINE	4	L	4	fl oz/a	42 DAP	B	0	3	50.2	0	0	6	5.37
18	42 Days After Planting						B							
19	2,4-D AMINE	4	L	2	fl oz/a	21 DAP	A	6	6	57.0	6	8	4	4.31
19	21 Days After Planting						A							

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code	1	2	3	4	5	6	7
Crop Code								ARHHY	ARHHY	ARHHY	ARHHY	ARHHY	ARHHY	ARHHY
Part Rated								0-100	0-100	CANOPY	0-100	0-100	0-100	
Rating Data Type								Visual	Visual		Visual	Visual	Visual	
Rating Unit								%Injury	%Injury	CM	%Injury	%Injury	%Injury	KG/plot
Rating Date								6/18/12	7/10/12	7/10/12	8/7/12	8/27/12	9/11/12	10/9/12
Crop Stage														6.5%mois
Trt-Eval Interval								13 DA-A	35 DA-A	35 DA-A	63 DA-A	83 DA-A	98 DA-A	126 DA-A
ARM Action Codes														
# Subsamples, Dec.								0	0	1	0	0	0	2
20	2,4-D AMINE	4	L	2	fl oz/a	42 DAP	B	1	13	55.7	5	0	1	5.90
20	42 Days After Planting						B							
21	Untreated							0	0		0	0	0	7.40
21	21 Days After Planting						A							
22	Untreated							0	0	51.4	0	0	0	4.59
22	42 Days After Planting						B							
LSD (P=.05)								7.7	14.0	10.10	13.9	10.7	9.6	2.955
Standard Deviation								5.5	9.9	7.06	9.9	7.5	6.8	2.089
CV								70.9	62.06	15.76	52.43	54.15	52.9	44.81

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Crop Code	ARHHY
Part Rated	
Rating Data Type	YIELD
Rating Unit	LB/A
Rating Date	10/9/12
Crop Stage	10%mois
Trt-Eval Interval	126 DA-A
ARM Action Codes	TY1
# Subsamples, Dec.	0

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code	8
1	Clarity	4	SL	16	fl oz/a	21 DAP	A	2169
1	21 Days After Planting						A	
2	Clarity	4	SL	16	fl oz/a	42 DAP	B	3077
2	42 Days After Planting						B	
3	Clarity	4	SL	8	fl oz/a	21 DAP	A	4096
3	21 Days After Planting						A	
4	Clarity	4	SL	8	fl oz/a	42 DAP	B	2678
4	42 Days After Planting						B	
5	Clarity	4	SL	4	fl oz/a	21 DAP	A	5190
5	21 Days After Planting						A	
6	Clarity	4	SL	4	fl oz/a	42 DAP	B	2644
6	42 Days After Planting						B	
7	Clarity	4	SL	2	fl oz/a	21 DAP	A	3113
	21 Days After Planting						A	
8	Clarity	4	SL	2	fl oz/a	42 DAP	B	3825
8	42 Days After Planting						B	
9	Clarity	4	SL	1	fl oz/a	21 DAP	A	3937
9	21 Days After Planting						A	
10	Clarity	4	SL	1	fl oz/a	42 DAP	B	3065
10	42 Days After Planting						B	
11	2,4-D AMINE	4	L	32	fl oz/a	21 DAP	A	4310
11	21 Days After Planting						A	
12	2,4-D AMINE	4	L	32	fl oz/a	42 DAP	B	1231
12	42 Days After Planting						B	
13	2,4-D AMINE	4	L	16	fl oz/a	21 DAP	A	4821
13	21 Days After Planting						A	
14	2,4-D AMINE	4	L	16	fl oz/a	42 DAP	B	3103
14	42 Days After Planting						B	
15	2,4-D AMINE	4	L	8	fl oz/a	21 DAP	A	4140
15	21 Days After Planting						A	
16	2,4-D AMINE	4	L	8	fl oz/a	42 DAP	B	4288
16	42 Days After Planting						B	
17	2,4-D AMINE	4	L	4	fl oz/a	21 DAP	A	4172
17	21 Days After Planting						A	
18	2,4-D AMINE	4	L	4	fl oz/a	42 DAP	B	4288
8	42 Days After Planting						B	

19	2,4-D AMINE	4	L	2	fl oz/a	21 DAP	A	3440
9	21 Days After Planting						A	
20	2,4-D AMINE	4	L	2	fl oz/a	42 DAP	B	4707
20	42 Days After Planting						B	
21	Untreated							5906
21	21 Days After Planting						A	

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Crop Code	ARHHY
Part Rated	
Rating Data Type	YIELD
Rating Unit	LB/A
Rating Date	10/9/12
Crop Stage	10%mois
Trt-Eval Interval	126 DA-A
ARM Action Codes	TY1
# Subsamples, Dec.	0

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code	8
22	Untreated							3662
22	42 Days After Planting						B	

LSD (P=.05)	2358.2
Standard Deviation	1667.5
CV	44.81

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Peanuts: Influence of Simulated 2,4-D and Dicamba Drift on Peanut

Trial ID: brecke peanut **Study Dir.:**
Location: PSREC,Citra,FL **Investigator:** Barry J. Brecke

Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	1	2	3	4	5	6	7	8	9
	Rating Data Type				Injury	Injury	Injury	Stunting	Injury	Injury	Injury	yield	YIELD
	Rating Unit				%	%	%	%	%	%	%	kg/plot	LB
	Rating Date				05/30/12	06/05/12	06/12/12	06/12/12	06/18/12	06/27/12	07/02/12	09/26/12	09/26/12
1	Clarity	16	fl oz/a	A	80.0	92.5	96.8	99.0				0.95	729
	121 Days After Planting			A									
2	Clarity	16	fl oz/a	A					52.5	46.3	87.5	1.13	864
	242 Days After Planting			B									
3	Clarity	8	fl oz/a	A	50.0	60.0	81.3	87.5				2.43	1863
	321 Days After Planting			A									
4	Clarity	8	fl oz/a	A					41.3	30.0	80.0	1.98	1517
	442 Days After Planting			B									
5	Clarity	4	fl oz/a	A	40.0	52.5	60.0	85.0				3.43	2631
	521 Days After Planting			A									
6	Clarity	4	fl oz/a	A					28.8	18.8	50.0	3.70	2843
	642 Days After Planting			B									
7	Clarity	2	fl oz/a	A	20.0	40.0	32.5	76.3				4.00	3073
	721 Days After Planting			A									
8	Clarity	2	fl oz/a	A					22.5	13.8	47.5	4.30	3304
	842 Days After Planting			B									
9	Clarity	1	fl oz/a	A	17.5	30.0	14.7	33.5				5.08	3899
	921 Days After Planting			A									
10	Clarity	1	fl oz/a	A					26.3	25.0	50.0	4.68	3592
	1042 Days After Planting			B									
11	2,4-D AMINE	32	fl oz/a	A	62.5	50.0	33.8	75.0				2.58	1978
	1121 Days After Planting			A									
12	2,4-D AMINE	32	fl oz/a	A					47.5	30.0	33.8	3.68	2823
	1242 Days After Planting			B									
13	2,4-D AMINE	16	fl oz/a	A	25.0	15.0	7.5	53.8				3.33	2555
	1321 Days After Planting			A									
14	2,4-D AMINE	16	fl oz/a	A					25.0	15.0	7.5	5.43	4168
	1442 Days After Planting			B									
15	2,4-D AMINE	8	fl oz/a	A	15.0	6.3	0.0	10.0				5.45	4187
	1521 Days After Planting			A									
16	2,4-D AMINE	8	fl oz/a	A					10.0	6.3	0.0	6.38	4898
	1642 Days After Planting			B									
17	2,4-D AMINE	4	fl oz/a	A	7.5	3.8	0.0	3.8				4.73	3630
	1721 Days After Planting			A									
18	2,4-D AMINE	4	fl oz/a	A					1.3	0.0	0.0	6.73	5167
	1842 Days After Planting			B									

192,4-D AMINE	2fl oz/a	A	2.5	0.0	0.0	0.0			6.88	5282
1921 Days After Planting		A								

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Rating Data Type			Injury	Injury	Injury	Stunting	Injury	Injury	Injury	yield	YIELD
Rating Unit			%	%	%	%	%	%	%	kg/plot	LB
Rating Date			05/30/12	06/05/12	06/12/12	06/12/12	06/18/12	06/27/12	07/02/12	09/26/12	09/26/12
Trt Treatment No. Name	Rate	Rate Unit / Appl Code	1	2	3	4	5	6	7	8	9
202,4-D AMINE		2fl oz/a A	0.0	0.0			1.3	0.0	0.0	5.73	4398
2042 Days After Planting		B									
21Untreated			0.0	0.0	0.0	0.0				6.90	5301
2121 Days After Planting		A									
22Untreated							0.0	0.0	0.0	6.85	5263
2242 Days After Planting		B									
LSD (P=.05)			12.78	11.21	20.54	13.89	15.90	8.79	11.99	1.703	1308.0
Standard Deviation			8.85	7.76	14.20	9.61	11.01	6.09	8.31	1.204	924.9
CV			33.19	26.62	47.85	20.18	47.28	36.19	25.64	27.51	27.51
Replicate F			1.489	2.373	0.477	1.343	0.904	1.022	0.118	1.387	1.387
Replicate Prob(F)			0.2374	0.0900	0.7009	0.2798	0.4508	0.3966	0.9488	0.2552	0.2552
Treatment F			34.778	60.220	24.469	66.359	11.521	24.374	63.616	9.365	9.365
Treatment Prob(F)			0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001