2009 Extension Cotton Report

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An effective cotton integrated pest management program includes all aspects of production. This report contains summarized data from experiments and demonstrations that address key production issues in the areas of variety selection, weed control, agronomics (plant population, tillage, fertility) and defoliation.

The new year again started with below average winter rainfall. From November 2008 through the end of February 2009 most areas received less than ¾ of an inch of rain. March did deliver approximately 2 inches to some cotton producing areas but definitely did not compensate for the prior dry months. Fortunately April and May showers totaled over 8 inches in some areas and delayed planting in many areas until after the 15th of May. Planting continued into June with temperatures quickly reaching the century mark. The combination of high temperatures and another 2 inches of rain helped get the crop off to an excellent start. July was hot as usual leading to the start of another irrigation season, however, above average rainfall (over 3 inches) did ease some of the pressure. August was hot and dry with below average rainfall causing many dryland fields and some marginally irrigated fields to shed a tremendous amount of fruit. September and October brought much lower temperatures and a substantial amount of rainfall slowing down crop maturity significantly. Many later fruiting fields suffered from the cool wet fall, especially if they were planted to longer season varieties. Overall irrigated yields were tremendous and many dryland fields that were able to hang on to fruit through the stressful periods were also very productive.

It should be emphasized that the data from only one year should not be used for major production decisions, and at least 2-3 year's results should be utilized before production practices should be modified. This report sometimes includes data generated from "off-label" applications or practices. Although this data is presented, OSU does not recommend the implementation of any "off-label" use of any product.

We are very appreciative of the contributions made by the OSU Integrated Pest Management Program. Without their support, much of this work would not be possible. We also appreciate the support from producers, County Extension Educators, OSU Agricultural Experiment Station and ginners. Cotton Incorporated, through the Oklahoma State Support Committee, has provided assistance through partial funding of several projects. The Oklahoma Cotton Council and the Oklahoma Center for the Advancement of Science and Technology (OCAST) have made tremendous contributions to our educational programs and we are grateful for their continued support. A special thanks goes also to the following organizations, whose contributions make it possible to maintain and expand our research and demonstration programs and distribute results.

Oklahoma Cotton Council
Bayer CropScience
Cotton Growers Cooperative Altus, Ok
Cotton Incorporated State Support Committee
Delta and Pine Land Company
Syngenta Crop Protection
Dow AgroSciences
Worrell Farms
Chemtura
Monsanto Company
Nichino America
Dupont Chemical Co.
OSU Integrated Pest Management Program
Agrofresh
BASF
Helena Chemical
Crop Protection Services

We appreciate the interest, cooperation and support of all those involved in the cotton industry in Oklahoma and encourage your comments and suggestions for the improvement of our programs. This report can be accessed on the web at http://www.osu.altus.ok.us and the NTOK website: www.ntokcotton.org

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Producers and Cooperators

Western Oklahoma State College
Humphreys Cooperative
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Charles Shephard-Butler
Roger Fisher-Frederick
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Kelly Horton-Hollis

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(ALTU) Altus Nearest City: 3.0 S Altus County: Jackson

Latitude: 34-35-13 Longitude: 99-20-17 Elevation: 1365 feet

DAY	TEMPERATURE (°F) MAX	MIN	AVG	DEWPT	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	82	34	60.2	27.6	73	10	34	0	SSW	12.4	50.9	20.2	53.2	57.0	64	50
2	63	38	51.5	29.3	68	20	45	0	NNW	21.8	54.4	19.56	53.3	57.1	61	54
3	77*	32*	55.1*	30.2*	83*	18*	45*	0.00*	SSE*	15.2*	36.4*	23.40*	52.7*	56.2*	64*	48*
4	81	47	65.5	30.2	58	12	32	0	SE	19.0	42.5	25.29	55.5	61.3	68	55
5	57	36	46.0	21.1	54	24	38	0	NNW	24.3	46.6	26.16	53.0	56.9	61	53
6	59	32	44.0	15.4	55	16	34	0	NNW	17.5	49.4	26.85	51.0	53.5	59	49
7	81	24	52.7	12.9	63	7	27	0	SSW	11.9	35.7	26.99	51.4	54.2	63	46
8	83	40	63.3	23.7	39	12	23	0	E	8.3	19.6	24.35	54.8	59.9	69	52
9	81	52	70.6	27.4	44	10	22	0	SW	22.8	55.0	25.29	57.3	64.0	69	60
10	66	41	52.6	33.5	70	31	50	0	N	13.9	35.3	26.14	56.3	61.6	68	56
11	70	40	54.3	37.7	93	27	58	0.59	ESE	14.1	57.0	16.92	56.1	59.2	63	55
12	64	51	54.5	50.5	98	55	87	0.24	SE	9.3	47.1	10.17	56.4	58.1	63	56
13	65	45	53.8	43.5	91	44	70	0	NNW	12.5	27.8	21.72	56.2	56.5	61	52
14	78	41	59.5	44.7	96	28	63	0	SE	11.0	24.1	24.64	56.9	58.2	66	51
15	77	51	62.5	46.8	88	28	60	0	SE	17.4	38.0	20.54	58.0	61.2	68	56
16	63	53	58.3	52.1	87	67	80	0.18	ESE	16.3	34.6	6.08	57.6	59.4	62	58
17	67	54	59.0	54.7	97	73	86	0.26	ESE	16.0	30.6	11.82	58.0	59.0	62	57
18	76	52	62.9	48.0	98	20	65	0	SE	9.7	29.9	24.58	60.2	61.9	68	58
19	69	48	57.8	42.8	85	33	60	0	NNW	17.0	43.4	24.03	59.0	60.5	67	55
20	85	42	63.3	38.5	90	13	50	0	W	10.3	32.0	26.32	58.8	62.8	73	54
21	86	49	68.3	42.0	80	16	45	0	NNW	7.0	18.1	27.74	61.0	67.5	78	58
22	96	54	74.3	42.9	84	10	41	0	ENE	9.4	21.9	27.82	63.2	70.9	80	63
23	97	57	77.3	41.9	55	14	30	0.01	S	13.2	49.2	18.75	63.5	70.8	77	65
24	92	62	76.9	55.3	84	19	52	0	SSE	18.6	41.2	24.05	64.7	72.3	78	67
25	90	64	77.1	61.0	90	36	60	0	S	20.7	42.6	18.07	66.1	73.0	78	69
26	80	63	73.0	63.8	88	59	73	0.01	SSE	22.9	49.7	5.2	66.3	71.3	73	69
27	73	54	65.0	57.1	97	58	77	0	NNE	12.6	29.1	16.97	65.4	69.3	74	66
28	71	52	60.8	54.4	97	62	80	0	NE	11.6	26.3	13.21	64.2	67.0	71	64
29	73	60	64.7	61.9	98	72	91	4.36	SE	12.8	40.0	10.54	64.8	67.2	71	64
30	84	59	71.4	64.9	95	58	81	0	SE	12.7	28.7	23.5	66.5	68.7	75	64
	76*	48*	61.9*	41.8*					SE *	14.7*	57.0*	20.56*	58.7*	62.5*	68*	57*

Temperature - Highest: 97*
Lowest: 24*

Degree Days - Total HDD: 157*
Total CDD: 64*

Number of Days With:
Tmax ≥ 90: 4* Rainfall ≥ 0.01 inch: 7*
Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 5*
Tmin ≤ 32: 3* Avg Wind Speed ≥ 10 mph: 25*
Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 21*

Rainfall: Monthly Total: 5.65* in.
Greatest 24 Hr: 4.36* in.

Humidity - Highest: 98*
Lowest: 7*

Weather Records (cont.)

MESONET CLIMATOLOGICAL DATA SUMMARY May 2009 Time Zone: Midnight-Midnight CST

(ALTU) Altus Nearest City: 3.0 S Altus County: Jackson

Latitude: 34-35-13 Longitude: 99-20-17 Elevation: 1365 feet

DAY	TEMPERATURE (°F) MAX	MIN	AVG	DEWPT	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	81	53	66.2	61.6	95	61	86	0	NNE	14.2	35.4	16.92	68.6	69.8	75	64
2	55	51	52.7	50.7	96	87	93	0.05	NNE	12.3	26.4	3.72	64.0	60.9	64	59
3	60	52	56.0	50.8	94	71	83	0	N	10.9	24.2	7.66	61.7	59.2	61	58
4	62	48	55.1	50.0	96	59	84	0.02	ESE	6.6	18.6	10.64	61.3	58.9	63	55
5	62	51	58.2	57.4	99	95	97	0.12	E	7.6	18.0	3.84	61.3	59.4	62	57
6	76	60	65.5	61.3	98	66	87	0.04	NE	7.3	22.4	17.27	63.8	64.7	72	61
7	87	60	72.8	67.7	98	60	86	0.01	SE	8.0	21.0	17.5	66.7	68.4	74	63
8	84	70	76.7	66.7	94	58	72	0	NNE	14.1	29.8	25.46	70.1	73.7	80	68
9	72	61	64.5	44.8	72	36	49	0	NE	14.9	37.1	8.42	67.3	68.9	73	67
10	63	55	59.3	53.3	96	69	81	0	NE	11.1	27.1	5.37	64.8	65.4	67	63
11	61	52	56.5	53.7	97	83	90	0.85	NE	9.6	26.9	5.85	62.7	61.8	64	59
12	88	59	68.7	63.2	99	35	85	0.68	SE	12.2	61.5	15.49	64.5	65.6	73	61
13	93	66	78.6	66.4	92	37	68	0	SE	15.3	39.3	28.12	68.4	71.0	77	65
14	79	64	70.1	62.1	89	62	76	0	NE	14.8	38.0	8.66	68.6	68.5	72	66
15	91	65	75.9	64.9	90	39	71	0.47	SE	15.1	32.7	25.37	69.8	72.3	80	67
16	69	52	61.9	50.2	92	32	69	0.29	NNE	15.6	31.4	14.68	68.3	67.2	72	62
17	72	46	59.8	44.5	93	30	61	0	SE	6.4	14.5	29.63	66.5	64.3	73	57
18	78	51	64.6	50.8	91	37	64	0	SE	10.1	20.9	29.19	67.7	67.8	77	60
19	82	52	66.8	48.6	86	24	57	0	SE	11.2	24.4	29.86	68.2	70.7	79	63
20	83	53	68.1	52.0	90	30	60	0	SE	11.6	23.6	27.78	68.6	72.4	80	65
21	84	55	69.6	53.0	90	32	60	0	ESE	9.8	21.9	28	69.3	74.1	82	67
22	84	61	72.0	58.2	89	34	64	0	ESE	8.2	19.9	21.34	69.8	74.9	81	69
23	80	62	69.1	62.5	94	57	80	0.26	NE	7.7	24.9	17.2	70.0	73.4	77	70
24	83	63	71.2	62.0	96	44	75	0.01	NE	5.8	15.6	22.53	71.2	74.2	82	68
25	87	62	73.8	61.1	96	35	69	0	SE	6.1	18.9	23.3	72.0	76.5	85	70
26	89	62	74.0	56.7	87	31	58	0	N	12.5	35.1	27.77	72.5	78.8	87	72
27	79	55	67.0	49.7	83	32	57	0	NNW	11.5	28.1	29.54	70.5	76.5	83	71
28	88	55	72.0	47.7	88	17	49	0	NE	6.9	21.3	30.04	71.1	77.3	86	69
29	91	58	75.0	49.1	79	17	46	0	N	5.7	18.1	29.99	72.3	79.1	88	71
30	95	59	78.2	51.6	84	15	45	0	NA	7.5	19.4	29.86	73.5	80.7	89	73
31	96	61	80.5	53.4	81	15	45	0	S	11.6	26.0	29.58	74.6	81.6	89	75
	79	57	67.8	55.7					SE *	10.4	61.5	20.02	68.1	70.2	76	65

Temperature - Highest: 96
Lowest: 46

Degree Days - Total HDD: 65
Total CDD: 163

Number of Days With:
Tmax ≥ 90: 5 Rainfall ≥ 0.01 inch: 11
Tmax ≤ 32: 0 Rainfall ≥ 0.10 inch: 6
Tmin ≤ 32: 0 Avg Wind Speed ≥ 10 mph: 17
Tmin ≤ 0: 0 Max Wind Speed ≥ 30 mph: 8

Rainfall: Monthly Total: 2.80 in.
Greatest 24 Hr: 0.85 in.

Humidity - Highest: 99
Lowest: 15

Weather Records (cont.)

MESONET CLIMATOLOGICAL DATA SUMMARY June 2009 Time Zone: Midnight-Midnight CST

(ALTU) Altus Nearest City: 3.0 S Altus County: Jackson

Latitude: 34-35-13 Longitude: 99-20-17 Elevation: 1365 feet

DAY	TEMPERATURE (°F) MAX	MIN	AVG	DEWPT	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	91	64	78.3	58.1	91	28	53	0.24	S	13.9	39.8	22.01	75.0	81.2	86	77
2	84	65	73.0	62.5	89	42	71	0.13	SSE	9.0	36.6	20.1	73.6	77.2	82	73
3	76	64	70.1	59.7	88	53	71	0	N	12.7	25.5	18.03	72.7	74.6	78	72
4	83	54	69.9	52.1	87	30	57	0	NE	7.2	18.6	28.93	72.2	75.8	86	67
5	90	57	75.5	54.9	89	27	53	0	SE	12.4	30.1	28.62	73.4	78.6	86	71
6	101	68	82.2	57.3	68	22	46	0.06	SSE	16.4	41.5	27.59	74.7	81.1	89	75
7	99	68	82.6	60.0	80	20	50	0	SSE	14.8	36.0	20.96	74.4	80.1	85	75
8	94	65	80.3	62.3	87	29	57	0	ESE	8.8	28.3	28.34	75.4	82.0	89	75
9	102	69	84.1	60.2	82	10	52	0	S	12.7	34.1	22.93	76.3	82.6	88	78
10	82	62	69.9	60.2	98	44	74	0.42	SW	8.0	52.2	7.77	73.9	77.1	83	72
11	87	59	73.0	63.9	99	40	77	0.01	ESE	6.3	17.8	27.45	73.7	75.6	83	68
12	96	70	81.1	66.7	97	27	67	0	E	7.9	19.6	27.9	76.7	81.7	91	74
13	96	69	81.2	67.9	86	39	66	0.2	E	11.8	38.1	22.36	77.9	83.8	92	77
14	90	67	76.3	67.3	91	49	75	0.4	SSE	8.8	34.9	15.54	76.6	78.8	83	75
15	95	67	82.0	68.0	93	39	65	0.25	SSE	14.8	34.3	27.11	77.1	78.6	84	73
16	99	70	85.1	66.7	85	33	57	0	S	12.8	28.2	28.67	78.3	82.0	91	75
17	98	73	85.5	64.8	77	26	52	0	SSE	14.9	30.8	27.89	78.7	84.6	91	78
18	97	73	85.8	64.5	79	26	52	0	SSE	15.8	37.0	29.46	78.7	85.7	93	79
19	89	75	80.6	67.6	89	45	66	0	S	9.5	30.9	16.75	78.4	85.1	88	81
20	92	74	82.2	68.1	89	41	65	0	S	12.9	35.7	18.83	77.9	83.5	88	80
21	100	74	86.8	66.3	84	30	54	0	SSE	12.6	30.3	26.35	78.7	85.4	92	79
22	102	72	88.2	62.3	77	22	46	0	SE	10.4	23.2	29.1	79.9	87.8	95	81
23	102	72	87.5	60.6	75	21	44	0	ESE	7.2	20.5	24.67	80.4	88.5	95	82
24	103	72	88.7	60.8	75	19	44	0	ESE	7.3	20.2	29	81.0	89.5	97	83
25	102	74	88.6	61.0	77	15	45	0	SE	7.7	20.8	28.38	81.8	90.3	97	84
26	102	69	88.0	57.3	70	19	39	0	SE	8.8	35.7	29.24	81.5	89.8	96	83
27	105	74	90.3	61.3	70	20	42	0	SE	9.7	33.2	28.1	82.2	90.8	98	84
28	90	74	81.7	67.7	89	46	64	0.2	NNE	10.8	29.8	12.55	81.0	86.4	91	83
29	82	71	75.5	67.2	94	62	76	0.07	NA	4.6	22.0	8.86	78.7	80.8	83	79
30	94	68	79.2	65.5	97	33	67	0.01	NA	5.2	30.2	26.97	79.0	83.6	93	76
	94	68	81.1	62.8					SSE*	10.5	52.2	23.68	77.3	82.7	89	77

Temperature - Highest: 105
Lowest: 54

Degree Days - Total HDD: 0
Total CDD: 489

Number of Days With:
Tmax ≥ 90: 23 Rainfall ≥ 0.01 inch: 11
Tmax ≤ 32: 0 Rainfall ≥ 0.10 inch: 7
Tmin ≤ 32: 0 Avg Wind Speed ≥ 10 mph: 15
Tmin ≤ 0: 0 Max Wind Speed ≥ 30 mph: 18

Rainfall: Monthly Total: 1.99 in.
Greatest 24 Hr: 0.42 in.

Humidity - Highest: 99
Lowest: 10

Weather Records (cont.)

MESONET CLIMATOLOGICAL DATA SUMMARY July 2009 Time Zone: Midnight-Midnight CST

(ALTU) Altus Nearest City: 3.0 S Altus County: Jackson

Latitude: 34-35-13 Longitude: 99-20-17 Elevation: 1365 feet

DAY	TEMPERATURE (°F) MAX	MIN	AVG	DEWPT	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	98	64	82.5	59.2	93	22	53	0	SSE	5.7	15.4	29.53	79.6	86.1	94	78
2	100	70	86.6	59.8	79	22	45	0	NA	6.8	19.6	29.24	80.7	88.4	96	82
3	102	72	88.4	58.7	70	21	40	0	SSE	11.2	27.2	27.58	81.1	89.0	95	83
4	101	74	85.3	66.5	94	26	58	0.18	S	11.6	56.8	21.65	81.3	88.5	95	84
5	88	71	78.0	66.3	95	39	70	0	NE	9.4	22.4	21.91	80.4	84.7	90	81
6	90	65	77.4	59.9	92	32	58	0	NE	6.4	19.4	28.43	79.7	84.9	93	78
7	95	71	82.3	64.7	80	39	57	0	S	9.8	23.0	27.68	80.4	86.9	93	81
8	103	72	87.5	66.2	83	26	53	0	SE	13.8	31.3	28.86	81.1	88.4	95	82
9	105	75	90.6	63.5	79	20	45	0	S	13.9	33.0	28.99	81.7	89.5	95	84
10	105	74	91.6	59.2	63	21	36	0	S	11.9	29.4	29.52	82.3	90.3	97	84
11	104	73	90.1	58.4	70	18	37	0	S	9.0	24.8	28.39	82.9	90.9	97	85
12	103	70	88.8	59.8	74	23	40	0	SSW	8.2	22.2	28.75	83.1	90.9	97	85
13	103	73	90.1	60.1	71	22	40	0	S	9.3	26.9	27.28	83.6	91.3	98	86
14	103	77	91.4	58.7	58	19	35	0	S	13.1	30.5	28.92	83.7	91.2	97	86
15	102	75	90.1	59.1	57	23	37	0	SSE	9.4	21.3	28.77	83.9	91.4	98	86
16	103	68	85.8	62.1	88	20	49	0.22	WSW	8.9	49.0	24.52	84.2	91.4	98	86
17	92	67	78.8	63.7	93	33	64	0	E	8.8	21.9	26.33	82.4	86.8	93	82
18	86	68	76.6	63.0	92	39	65	0.1	ENE	6.1	19.7	17.92	80.6	83.9	87	81
19	95	69	81.3	64.7	95	25	62	0.03	NA	5.4	24.1	28.23	80.9	85.5	93	79
20	93	74	82.5	66.9	87	37	61	0.02	SE	14.2	34.5	25.98	81.2	86.5	91	82
21	88	70	78.4	66.4	92	44	68	0.21	NE	12.0	48.3	26.63	80.8	85.1	90	81
22	88	67	76.6	58.8	86	25	58	0	NE	8.1	21.7	20.41	79.4	83.2	87	79
23	90*	65*	78.1*	61.6*	91*	35*	60*	0.00*	NA	7.0*	22.9*	26.55*	79.6*	84.9*	91*	78*
24	94	67	81.0	64.5	93	34	61	0	S	6.5	20.0	28.11	80.4	86.3	93	80
25	102	71	86.2	60.1	77	16	46	0	SSE	6.9	18.5	28.48	81.5	88.3	95	82
26	95	74	83.4	65.0	80	35	55	0	E	8.5	20.5	15.5	81.3	87.0	91	84
27	78	70	74.1	70.0	96	73	87	0.32	NA	5.8	18.3	10.02	80.0	82.7	86	80
28	91	71	79.6	69.8	97	45	74	0.04	NA	5.5	33.6	26.49	80.6	84.6	93	78
29	92	65	79.8	68.8	98	46	72	2.21	NA	7.2	65.0	23.57	81.2	85.9	93	77
30	83	66	74.1	66.6	95	60	78	0.21	NNE	8.5	21.6	19.33	76.2	77.6	83	74
31	85	67	75.6	67.1	90	54	76	0	SSE	9.4	24.0	23.67	78.1	78.0	83	74
	95*	70*	83.0*	63.2*					S	*	9.0*	65.0*	25.39*	81.1*	86.8*	93*	81*

Temperature - Highest: 105*
Lowest: 64*

Degree Days - Total HDD: 0*
Total CDD: 550*

Number of Days With:
Tmax ≥ 90: 24* Rainfall ≥ 0.01 inch: 10*
Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 7*
Tmin ≤ 32: 0* Avg Wind Speed ≥ 10 mph: 8*
Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 9*

Rainfall: Monthly Total: 3.54* in.
Greatest 24 Hr: 2.21* in.

Humidity - Highest: 98*
Lowest: 16*

Weather Records (cont.)

MESONET CLIMATOLOGICAL DATA SUMMARY August 2009 Time Zone: Midnight-Midnight CST

(ALTU) Altus Nearest City: 3.0 S Altus County: Jackson

Latitude: 34-35-13 Longitude: 99-20-17 Elevation: 1365 feet

DAY	TEMPERATURE (°F) MAX	MIN	AVG	DEWPT	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	87	69	77.5	67.8	95	52	74	0.12	NE	8.3	21.9	27.8	79.2	80.4	87	75
2	91	67	79.8	67.9	91	48	68	0	NE	7.6	17.2	27.5	79.9	83.5	93	75
3	96	73	84.0	66.7	90	31	59	0	S	9.4	23.7	27.26	80.8	86.7	95	80
4	98	68	83.7	65.0	86	33	56	0	S	8.3	19.2	27.2	80.6	87.2	95	80
5	102	72	85.2	66.8	84	26	58	0	SSE	7.3	38.1	26.15	81.4	89.1	97	82
6	94	73	82.5	68.3	87	33	65	0.3	SE	11.1	27.1	21.26	81.1	86.2	91	82
7	96	73	85.3	65.0	90	27	55	0	SSE	12.8	32.6	27.63	80.9	86.8	94	80
8	95	73	84.8	63.1	71	32	50	0	SSE	13.1	28.0	27.58	80.4	87.4	94	81
9	95	71	83.8	64.4	80	32	54	0	SSE	12.1	27.6	26.31	80.2	87.3	94	81
10	96	77	85.9	66.5	77	33	54	0	S	10.4	25.1	26.37	80.8	88.8	96	83
11	89	72	80.2	66.2	82	48	63	0	E	12.7	28.8	23.49	80.3	87.4	92	83
12	92	69	79.9	64.7	90	38	62	0	ESE	7.4	19.3	22.99	80.1	86.5	93	81
13	92	72	80.8	62.3	71	34	54	0	SE	9.6	19.7	22.71	80.0	86.5	93	82
14	93	72	82.2	66.5	82	38	61	0	SE	12.3	26.2	25.07	80.1	87.2	93	82
15	96	74	85.5	66.2	82	32	55	0	S	13.8	32.9	23.64	80.4	87.6	93	83
16	97	72	85.9	65.3	73	33	52	0	SSE	11.2	27.1	24.19	80.5	88.0	94	82
17	97	74	85.4	63.6	70	31	50	0	SE	11.6	32.5	25.97	81.1	89.1	95	83
18	88	67	78.7	63.5	90	42	61	0.01	ESE	14.3	55.2	20.43	79.9	86.3	90	83
19	95	65	80.5	63.5	93	32	61	0.07	SSW	12.4	27.7	22.2	78.9	84.5	89	79
20	93	71	81.5	58.7	78	24	48	0	NE	13.1	32.4	25.42	79.0	84.9	90	81
21	94	61	78.1	55.8	91	21	52	0	NNE	4.7	12.1	26.84	78.3	84.8	92	78
22	96	67	81.1	61.1	81	31	53	0	E	8.5	19.0	24.82	78.9	85.7	92	80
23	99	70	84.1	63.2	72	28	52	0	ESE	9.8	25.1	25.31	79.7	87.2	94	81
24	101	72	86.0	62.7	84	23	51	0	ESE	9.6	19.8	24.77	80.9	88.5	95	83
25	101	71	85.4	59.4	85	19	46	0	ESE	7.6	16.5	25.1	81.0	88.5	95	83
26	100	71	83.7	61.5	89	22	51	0.07	NA	6.3	31.9	25.43	81.0	88.7	95	83
27	90	70	78.7	67.1	96	37	71	0.05	NE	8.0	26.2	21.75	80.9	86.6	91	83
28	92	65	76.8	59.0	95	22	60	0	NNW	7.6	20.8	25.03	79.7	84.9	91	80
29	89	61	75.0	58.0	92	32	59	0	ENE	7.0	16.8	23.5	78.7	83.9	90	78
30	84	65	72.4	54.6	85	30	57	0	NE	10.4	21.9	24.01	78.2	82.9	88	79
31	82	63	71.4	52.9	78	36	53	0	ESE	7.7	16.7	18.89	77.2	81.3	87	77
	94	70	81.5	63.1					ESE*	9.9	55.2	24.73	80.0	86.3	93	81

Temperature - Highest: 102
Lowest: 61

Degree Days - Total HDD: 0
Total CDD: 520

Number of Days With:
Tmax ≥ 90: 25 Rainfall ≥ 0.01 inch: 6
Tmax ≤ 32: 0 Rainfall ≥ 0.10 inch: 2
Tmin ≤ 32: 0 Avg Wind Speed ≥ 10 mph: 14
Tmin ≤ 0: 0 Max Wind Speed ≥ 30 mph: 7

Rainfall: Monthly Total: 0.62 in.
Greatest 24 Hr: 0.30 in.

Humidity - Highest: 96
Lowest: 19

Weather Records (cont.)

MESONET CLIMATOLOGICAL DATA SUMMARY September 2009 Time Zone: Midnight-Midnight CST

(ALTU) Altus Nearest City: 3.0 S Altus County: Jackson

Latitude: 34-35-13 Longitude: 99-20-17 Elevation: 1365 feet

DAY	TEMPERATURE (°F) MAX	MIN	AVG	DEWPT	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	91	65	77.6	57.9	72	32	53	0	SE	11.8	28.2	22.53	77.4	82.0	88	77
2	95	67	81.5	59.5	80	28	51	0	S	9.8	23.5	22.39	78.6	83.8	90	78
3	88	69	76.6	62.2	91	41	63	0	NE	8.8	21.4	19.96	78.8	83.5	88	80
4	88	67	75.1	64.6	94	43	72	0	S	6.1	15.7	18.09	78.5	83.0	88	79
5	90	65	77.4	62.8	91	35	63	0	NE	7.0	20.8	18.65	78.4	82.7	88	78
6	91	69	79.8	62.6	89	31	59	0	ENE	6.2	16.4	23.36	79.2	84.6	91	79
7	92	68	80.0	62.0	84	33	57	0	ESE	8.2	22.7	19.15	79.3	84.5	90	80
8	93	68	81.1	61.1	85	31	54	0	SSE	9.1	24.9	19.8	79.4	84.5	90	80
9	94	67	79.6	61.5	79	27	57	0	NA	6.1	28.7	21.93	79.5	85.3	92	80
10	87	70	76.3	66.6	90	49	74	0	NNE	9.5	23.7	17.54	79.1	84.1	88	81
11	82	69	72.9	67.0	94	58	82	0	NA	5.2	23.3	10.54	78.5	81.8	84	80
12	72	65	67.9	65.6	96	86	92	2.16	NNE	10.0	29.6	3.82	75.6	76.1	80	73
13	71	66	68.3	65.7	96	82	92	0.69	NNE	12.4	27.4	6.09	73.9	72.5	74	72
14	73	65	68.3	63.1	91	74	84	0	NNE	10.5	21.1	11.04	73.6	71.7	74	70
15	79	65	70.6	63.9	94	57	80	0	NNE	7.9	16.7	13.48	74.1	72.6	76	70
16	75	64	69.5	62.6	96	64	80	0.01	N	10.2	27.8	8.11	73.6	71.2	73	70
17	72	64	67.8	63.1	95	76	85	0.02	N	9.8	21.2	6.62	72.6	70.0	71	68
18	76	62	68.9	60.6	94	50	76	0	NNE	8.2	18.4	12.08	72.7	70.6	73	68
19	80	58	68.8	59.4	96	45	75	0	ENE	5.6	12.8	21.38	73.1	72.6	80	67
20	87	63	73.4	62.4	97	35	73	0	SE	9.3	25.1	17.37	73.7	74.6	81	70
21	84	61	73.1	60.7	94	46	67	0	N	11.5	29.0	22.34	74.2	76.7	83	71
22	72	51	61.5	48.4	91	34	65	0.04	NNW	11.3	31.8	19.21	71.8	72.7	77	69
23	76	46	59.6	45.3	94	28	64	0	NW	6.0	18.0	19.84	69.6	69.6	76	64
24	74	48	59.3	48.0	93	36	69	0	SSE	6.2	18.6	14.5	68.9	68.6	74	65
25	80	48	63.6	51.5	95	36	70	0.42	S	9.8	49.7	21.22	68.5	69.4	76	63
26	83	54	67.9	58.6	96	34	76	0	NA	5.1	12.4	21.57	69.4	70.7	77	65
27	99	56	74.9	55.1	98	14	60	0	SW	8.3	29.7	21.94	70.7	72.6	80	66
28	76	56	66.9	38.5	62	16	38	0	NE	13.4	31.5	21.4	69.9	71.5	77	67
29	79	46	63.0	43.5	92	23	55	0	NA	7.5	20.5	21.14	68.1	69.6	77	63
30	91	59	74.6	59.9	88	32	63	0	SSE	14.9	33.5	20.01	69.3	72.6	80	66
	83	61	71.5	58.8					NNE*	8.9	49.7	17.24	74.3	76.2	81	72

Temperature - Highest: 99
Lowest: 46

Degree Days - Total HDD: 15
Total CDD: 232

Number of Days With:
Tmax ≥ 90: 9 Rainfall ≥ 0.01 inch: 6
Tmax ≤ 32: 0 Rainfall ≥ 0.10 inch: 3
Tmin ≤ 32: 0 Avg Wind Speed ≥ 10 mph: 9
Tmin ≤ 0: 0 Max Wind Speed ≥ 30 mph: 4

Rainfall: Monthly Total: 3.34 in.
Greatest 24 Hr: 2.16 in.

Humidity - Highest: 98
Lowest: 14

Weather Records (cont.)

MESONET CLIMATOLOGICAL DATA SUMMARY October 2009 Time Zone: Midnight-Midnight CST

(ALTU) Altus Nearest City: 3.0 S Altus County: Jackson

Latitude: 34-35-13 Longitude: 99-20-17 Elevation: 1365 feet

DAY	TEMPERATURE (°F) MAX	MIN	AVG	DEWPT	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	79	52	71.7	43.6	88	16	43	0	NNW	12.9	33.8	21.19	70.6	74.5	79	70
2	75	40	57.9	32.5	89	15	47	0	NW	6.0	13.7	21.4	67.5	69.4	76	63
3	69	48	60.0	46.7	88	36	63	0.02	SE	7.2	20.6	5.18	66.4	66.3	68	64
4	60	56	57.8	56.3	97	85	95	0.07	ESE	9.6	18.9	3.39	66.7	65.2	66	64
5	67	55	59.0	58.2	98	94	97	0.03	SE	10.6	20.1	2.67	66.2	63.8	65	63
6	70	48	61.6	49.6	98	32	68	0.04	NNE	12.1	36.0	11.99	66.6	65.5	67	63
7	61	45	54.0	48.9	98	59	84	0.2	NA	4.2	11.8	3.91	64.3	61.2	63	59
8	74	47	59.6	57.9	99	86	94	0.47	N	12.2	33.4	4.87	65.3	63.6	67	61
9	57	43	48.4	42.6	96	64	81	0	N	11.4	33.6	12.22	63.5	58.8	62	56
10	51	41	45.9	41.9	97	74	86	0.01	NNE	8.4	23.8	3.04	61.7	55.4	57	53
11	51	38	44.7	41.0	97	76	87	0.01	NNE	7.7	19.6	5.59	60.3	53.7	56	51
12	61	49	55.3	53.6	98	81	94	0.04	SE	6.4	16.3	4.91	61.2	57.7	60	55
13	63	58	60.4	59.4	98	91	97	0.03	ESE	8.4	18.4	3.35	62.6	61.0	63	60
14	62	52	57.5	56.5	98	91	96	0.06	NE	9.7	23.9	6.46	63.5	62.4	64	61
15	70	49	57.4	51.4	97	56	82	0	N	8.7	20.5	16.44	63.6	62.1	67	58
16	62	48	54.8	48.7	96	61	81	0	NA	6.9	19.6	14.29	63.0	61.2	66	57
17	67	47	55.9	46.4	96	43	73	0	NE	8.1	22.8	16.59	62.7	61.5	67	57
18	78	43	59.6	46.3	96	30	66	0	S	12.4	33.2	17.94	62.2	61.5	68	56
19	82	53	67.3	54.0	88	39	65	0	SSE	15.1	33.3	17.33	63.1	64.6	71	59
20	81	59	68.8	57.2	89	46	68	0	SSE	15.9	32.0	16.98	64.6	67.6	73	63
21	66	52	60.9	57.9	97	75	90	1.21	SE	10.7	30.4	1.8	64.5	65.0	68	62
22	53	45	49.1	40.4	87	61	72	0	NW	15.1	31.3	7.62	61.8	57.7	62	55
23	66	37	50.5	37.8	90	30	66	0	NW	10.0	29.7	17.66	59.3	54.3	59	50
24	75	41	57.0	47.0	96	44	72	0	S	9.9	29.0	14.7	59.1	55.8	61	50
25	66	48	56.5	49.3	97	65	77	0	N	12.4	40.2	12.19	60.4	58.7	63	55
26	58	38	48.6	38.3	92	43	69	0	N	12.4	27.6	13.51	59.1	56.3	60	53
27	66	34	49.8	36.7	98	31	66	0	SE	9.6	30.4	16.82	57.2	54.9	61	49
28	75*	46*	59.8*	52.0*	92*	51*	77*	0.00*	SE *	15.7*	33.5*	13.66*	58.3*	58.5*	64*	53*
29	69	44	52.0	47.9	96	75	86	1.43	W	12.0	32.3	3.09	59.6	58.3	63	53
30	57	38	46.3	34.0	91	35	64	0	W	8.3	19.1	17.67	56.9	52.7	58	49
31	73	35	52.3	37.5	95	26	62	0	W	6.3	13.2	17.32	56.2	52.8	60	47
	67*	46*	56.1*	47.5*					SE *	10.2*	40.2*	11.15*	62.5*	60.7*	65*	57*

Temperature - Highest: 82*

Lowest: 34*

Degree Days - Total HDD: 277*

Total CDD: 9*

Number of Days With:

Tmax ≥ 90: 0* Rainfall ≥ 0.01 inch: 13*

Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 4*

Tmin ≤ 32: 0* Avg Wind Speed ≥ 10 mph: 15*

Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 13*

Rainfall: Monthly Total: 3.62* in.

Greatest 24 Hr: 1.43* in.

Humidity - Highest: 99*

Lowest: 15*

Weather Records (cont.)

MESONET CLIMATOLOGICAL DATA SUMMARY November 2009 Time Zone: Midnight-Midnight CST

(ALTU) Altus Nearest City: 3.0 S Altus County: Jackson

Latitude: 34-35-13 Longitude: 99-20-17 Elevation: 1365 feet

DAY	TEMPERATURE (°F) MAX	MIN	AVG	DEWPT	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m^2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	73	40	56.4	40.7	94	26	61	0	NA	6.5	22.5	17.36	56.8	54.3	60	49
2	72	44	56.2	45.6	92	38	70	0	NA	6.1	19.5	17.01	57.4	56.0	63	50
3	68	43	54.4	43.0	83	44	67	0	SSE	7.5	23.4	16.6	57.9	56.7	63	51
4	70	45	57.1	48.6	95	51	75	0	NE	6.5	14.7	16.31	58.3	57.9	65	52
5	76	44	59.4	48.2	96	37	70	0	S	7.9	22.2	16.32	58.6	59.0	66	53
6	79	50	63.7	49.2	88	35	62	0	S	13.0	27.9	16.5	59.2	60.3	66	55
7	78	48	62.8	49.9	89	36	66	0	S	10.8	22.7	16.52	59.7	61.1	67	56
8	74	50	61.9	55.6	98	56	81	0	SE	9.5	28.4	12	60.3	61.6	66	57
9	73	52	61.4	55.7	99	52	84	0	NA	4.4	20.7	13.28	61.2	63.1	69	59
10	72	52	61.2	55.0	97	52	82	0	NA	4.9	13.3	12.44	61.4	63.7	69	61
11	60	48	54.3	52.7	99	85	94	0.01	NA	4.7	13.6	3.7	60.6	60.5	62	59
12	74	50	59.4	51.2	99	41	78	0.01	SSE	10.1	30.0	11.52	60.5	61.0	65	58
13	73	50	60.8	52.0	95	50	74	0	S	9.8	18.7	8.64	60.3	60.3	64	57
14	60	49	54.7	49.3	91	73	82	0	NNE	9.7	20.5	7.8	60.1	59.5	62	57
15	58	43	51.6	48.1	97	68	88	0.04	NNE	8.3	33.4	5.92	59.0	57.4	60	56
16	53	36	43.4	31.0	87	33	64	0	NNW	14.3	33.8	13.31	56.4	53.3	56	50
17	61	32	44.6	24.1	88	13	52	0	NW	8.7	22.4	15.18	54.0	50.8	57	46
18	67	29	46.3	27.1	90	19	53	0	NA	7.0	17.8	15.15	52.9	50.9	58	45
19	63	38	49.1	32.9	79	25	57	0	ESE	8.4	17.2	14.69	53.6	52.6	59	48
20	61	40	48.5	39.8	93	50	73	0	NNE	10.7	23.1	12.64	53.7	52.9	58	49
21	62	40	50.7	45.6	97	60	84	0	SE	7.1	22.3	13.58	54.7	55.0	61	52
22	63	40	52.0	45.4	98	49	80	0	S	7.4	22.3	9.89	55.6	56.1	61	54
23	71	37	49.5	38.8	100	29	73	0.01	NA	10.1	39.4	11.16	54.7	54.3	59	51
24	60	32	45.7	24.7	80	19	48	0	NNW	10.3	26.9	14.59	53.4	52.2	57	48
25	62	26	41.8	25.4	82	19	57	0	N	8.1	23.4	14.27	51.2	49.2	55	44
26	66	28	44.5	28.4	90	21	59	0	W	5.9	13.6	13.85	50.8	49.6	56	44
27	72	34	51.3	30.2	83	20	49	0	SSE	9.2	25.7	12.74	51.2	50.8	56	46
28	71	37	54.6	40.5	86	34	61	0	SSE	10.9	24.6	12.13	52.3	52.7	58	48
29	54	39	44.7	37.4	90	52	76	0.19	N	13.3	28.3	2.36	52.5	51.1	55	48
30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	67*	41*	53.2*	41.9*					NA	8.7*	39.4*	12.67*	56.5*	56.0*	61*	52*

Temperature - Highest: 79*
Lowest: 26*

Degree Days - Total HDD: 314*
Total CDD: 0*

Number of Days With:
Tmax ≥ 90: 0* Rainfall ≥ 0.01 inch: 5*
Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 1*
Tmin ≤ 32: 5* Avg Wind Speed ≥ 10 mph: 9*
Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 4*

Rainfall: Monthly Total: 0.26* in.
Greatest 24 Hr: 0.19* in.

Humidity - Highest: 100*
Lowest: 13*

***Identical weather summaries for counties of interest can be found at:**
http://agweather.mesonet.org/index.php/data/section/weather

Variety Performance

Variety selection continues to be an important decision for cotton producers in Oklahoma. Although most newly released varieties have been tested prior to their commercial release, most cotton producers have had little experience with those varieties on their farms. Therefore, fifteen variety projects were established throughout Oklahoma evaluating several newly released varieties. Eight of these locations were under dryland production while the remaining Seven were irrigated sites. Unfortunately, only 11 locations (6 irrigated and 5 dryland) were harvestable due to either drought or phenoxy herbicide dift.

Six irrigated locations (3 in Jackson, 1 in Tillman, 1 in Harmon and 1 in Beckham County) were replicated trials comparing 25 varieties. All of these varieties contained either the Bollgard II or Widestrike insect resistance genes and the Roundup Ready Flex herbicide tolerance gene. All dryland locations were replicated trials comparing 25 varieties that contained either the Roundup Flex tolerance gene or a combination with either Bollgard II or Widestrike insect resistance genes. Temik was applied at planting across all variety trial locations. The table below presents the average yield and crop value for all 25 varieties at each irrigated and each dryland location. Overall yields for both dryland and irrigated trials were outstanding for 2009. The following pages present individual performance data from each location.

2009 County Variety Trial Yield and Fiber Location Averages

Irrigated Locations	Turnout	Yield (lb/A)	Mic	Length	Uniformity	Strength	Loan Value	Crop Value
Jackson-WOSC	0.25	**1688**	3.9	1.17	83.6	32.0	$0.5430	**$ 916.34**
Tillman-McKinley	0.27	**1655**	4.3	1.13	82.6	30.4	$0.5385	**$ 891.20**
Harmon-Seddon	0.26	**1529**	3.5	1.17	82.6	30.6	$0.5405	**$ 826.69**
Jackson-Felty	0.27	**1469**	4.2	1.16	82.7	30.4	$0.5400	**$ 793.41**
Beckham-Gamble	0.25	**1362**	3.2	1.17	82.1	31.0	$0.5045	**$ 687.37**
Jackson OSUREC	0.29	**1071**	4.6	1.09	82.1	29.2	$0.5290	**$ 566.49**
Dryland Locations	Turnout	Yield (lb/A)	Mic	Length	Uniformity	Strength	Loan Value	Crop Value
Custer-Shepard	0.23	**1442**	3.4	1.16	82.8	31.7	$0.5230	**$ 753.94**
Washita-Johnson	0.24	**844**	3.7	1.16	82.6	30.9	$0.5420	**$ 457.35**
Washita-Davis	0.24	**758**	3.9	1.13	82.7	31.4	$0.5420	**$ 410.67**
Tillman-Fischer	0.26	**645**	4.4	1.07	80.4	27.9	$0.5200	**$ 335.44**
Tillman-McKinley	0.26	**408**	4.6	1.05	80.9	28.1	$0.5200	**$ 212.12**
* All Loan Rates Calculated with 41 Color and Leaf Grade 4								

Irrigated Variety Performance

Location:	Jackson-WOSC	**Plant Date:**	5/20/2009	**Irrig. Type:**	Furrow
Soil Type:	Clay Loam	**Harvest Date:**	11/16/09		

		Gin	Lint Yield		Fiber Quality					
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	FM 1740 B2F	0.272	1927.1	a	4.4	1.14	82.6	29.8	$ 0.5385	$ 1,038
2	DP 0924 B2F	0.269	1889.7	ab	4.4	1.11	83	30.9	$ 0.5405	$ 1,021
3	FM 9170 B2F	0.265	1831.3	abc	3.2	1.21	83.6	34.2	$ 0.5075	$ 929
4	DP 0912 B2F	0.257	1812.4	a-d	4.2	1.12	84	32.5	$ 0.5430	$ 984
5	DP 1032 B2F	0.269	1798.8	bcd	3.6	1.19	84.8	35	$ 0.5425	$ 976
6	DP 1044 B2F	0.252	1779.9	b-e	3.7	1.2	82.3	32.9	$ 0.5400	$ 961
7	Phy 375 WRF	0.248	1773.3	b-f	3.4	1.16	81.8	30.2	$ 0.5190	$ 920
8	DP 0935 B2F	0.249	1772.3	b-f	3.6	1.12	81.1	28.6	$ 0.5340	$ 946
9	FM 9180 B2F	0.242	1752.8	c-g	4	1.24	85.5	34.4	$ 0.5450	$ 955
10	DP 0949 B2F	0.263	1734.4	c-h	4.1	1.16	83.3	31.9	$ 0.5420	$ 940
11	DP 1048 B2F	0.248	1709.8	d-i	4	1.21	85.6	30.9	$ 0.5450	$ 932
12	ST 4498 B2F	0.24	1706.9	d-i	3.7	1.16	83.3	32.8	$ 0.5420	$ 925
13	DG 2570 B2F	0.25	1674.5	e-j	4	1.14	83.2	32.3	$ 0.5420	$ 908
14	ST 4288 B2F	0.222	1652.7	f-k	3.8	1.15	81.8	30.8	$ 0.5400	$ 892
15	ST 5458 B2F	0.246	1645	g-k	4.3	1.16	83.4	33.9	$ 0.5405	$ 889
16	Apex B2F	0.237	1640.4	g-k	4.2	1.19	83.8	29	$ 0.5385	$ 883
17	FM 9160 B2F	0.26	1636.6	g-k	3.9	1.18	83.2	35.3	$ 0.5420	$ 887
18	DPR 555 B2F	0.258	1629.7	h-k	4.1	1.19	84.1	32.1	$ 0.5430	$ 885
19	NG 3348 B2F	0.253	1591.2	ijk	4.2	1.17	84.4	33.1	$ 0.5430	$ 864
20	Phy 485 WRF	0.235	1576.6	jk	4.4	1.16	84.4	32.5	$ 0.5415	$ 854
21	DPR 619 B2F	0.242	1574.8	jk	4	1.21	85.5	31.8	$ 0.5450	$ 858
22	DPR 549 B2F	0.246	1557.9	jkl	3.9	1.25	85.4	35.5	$ 0.5440	$ 847
23	AM 1532 B2F	0.222	1539	kl	3.8	1.15	81.6	29	$ 0.5355	$ 824
24	DPR 621 B2F	0.248	1534.1	kl	3.6	1.17	84.7	31	$ 0.5425	$ 832
25	Marathon B2F	0.221	1447.7	l	3.6	1.14	82.7	29.7	$ 0.5385	$ 780
LSD (P=.05)			121.02							
CV			5.07							

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Irrigated VarietyPerformance (cont.)

Location:	Jackson-OSUREC	**Plant Date:**	5/19/2009	**Irrig. Type:**	Furrow
Soil Type:	Clay Loam	**Harvest Date:**	11/12/09		

		Gin	Lint Yield		Fiber Quality					
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DP 0935 B2F	0.31	1246.9	a	4.7	1.03	80.5	27.8	$ 0.5000	$ 623
2	FM 1740 B2F	0.316	1241.7	a	4.8	1.09	83	29.1	$ 0.5310	$ 659
3	DG 2570 B2F	0.3	1221.3	ab	4.7	1.05	82.5	30	$ 0.5245	$ 641
4	DP 1044 B2F	0.3	1206.6	abc	4.2	1.09	81.9	29.8	$ 0.5330	$ 643
5	Phy 375 WRF	0.281	1153.2	a-d	4.1	1.06	81.7	28.6	$ 0.5215	$ 601
6	DP 1032 B2F	0.295	1114.2	b-e	4.8	1.11	82.1	29.5	$ 0.5340	$ 595
7	DPR 555 B2F	0.283	1113.6	cde	4.7	1.13	83	32.3	$ 0.5405	$ 602
8	ST 4498 B2F	0.288	1083	def	4.6	1.06	83	29.6	$ 0.5245	$ 568
9	Apex B2F	0.278	1081.8	def	4.6	1.14	82.6	28.8	$ 0.5360	$ 580
10	DP 0949 B2F	0.292	1069.4	d-g	4.8	1.08	82	29.8	$ 0.5315	$ 568
11	DPR 619 B2F	0.288	1067.3	d-g	4.4	1.08	82.5	27.4	$ 0.5310	$ 567
12	DP 0912 B2F	0.303	1060.2	d-h	5	1.02	82.4	27.7	$ 0.4780	$ 507
13	NG 3348 B2F	0.282	1055.9	d-i	4.3	1.11	82.1	29.8	$ 0.5365	$ 566
14	ST 5458 B2F	0.279	1053.7	d-i	4.7	1.05	79.2	27.4	$ 0.5125	$ 540
15	DP 1048 B2F	0.295	1041.8	e-i	4.5	1.08	82	28.4	$ 0.5290	$ 551
16	FM 9170 B2F	0.283	1041.1	e-i	4.2	1.12	82.3	30.9	$ 0.5400	$ 562
17	FM 9180 B2F	0.275	1038.6	e-i	4.8	1.1	80.8	29.8	$ 0.5315	$ 552
18	ST 4288 B2F	0.288	1028.1	e-i	4.9	1.07	80.6	29.3	$ 0.5200	$ 535
19	Phy 485 WRF	0.271	1023.5	e-i	4.7	1.08	82.1	29.1	$ 0.5290	$ 541
20	DPR 621 B2F	0.3	990.8	f-i	4.7	1.12	82.5	28.8	$ 0.5360	$ 531
21	DP 0924 B2F	0.28	987.3	f-i	4.8	1.05	82.2	28.2	$ 0.5200	$ 513
22	AM 1532 B2F	0.261	978.6	f-i	4.4	1.1	82	28	$ 0.5290	$ 518
23	DPR 549 B2F	0.276	967.2	ghi	4.4	1.16	83.9	31.1	$ 0.5415	$ 524
24	FM 9160 B2F	0.281	957.2	hi	4.4	1.17	83.7	30.6	$ 0.5415	$ 518
25	Marathon B2F	0.267	948.8	i	4.4	1.12	83	28.9	$ 0.5360	$ 509
LSD (P=.05)			107.57							
CV			7.1							

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Irrigated Variety Performance (cont.)

Location:	Jackson-Felty	**Plant Date:**	5/19/2009	**Irrig. Type:**	Furrow
Soil Type:	Clay Loam	**Harvest Date:**	11/13/09		

		Gin	Lint Yield		Fiber Quality					
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DPR 555 B2F	0.299	1704.5	a	4.4	1.17	82.3	32.4	$ 0.5385	$ 918
2	DP 1032 B2F	0.297	1685	a	4.3	1.18	82.1	30.5	$ 0.5365	$ 904
3	DG 2570 B2F	0.294	1676	ab	4.6	1.15	84	31.8	$ 0.5415	$ 908
4	FM 9170 B2F	0.299	1671.9	ab	4.1	1.18	81.3	31.3	$ 0.5400	$ 903
5	DP 0935 B2F	0.283	1664.2	abc	4.1	1.13	81.1	30	$ 0.5380	$ 895
6	DPR 549 B2F	0.29	1650	a-d	4.3	1.19	83.7	31.8	$ 0.5415	$ 893
7	DP 0912 B2F	0.287	1609.5	a-e	4.8	1.1	81.6	29	$ 0.5290	$ 851
8	DP 1044 B2F	0.275	1590.2	a-f	4.5	1.14	83.8	30.3	$ 0.5395	$ 858
9	ST 5458 B2F	0.271	1575.9	a-g	4.5	1.17	83.4	31.6	$ 0.5405	$ 852
10	DPR 619 B2F	0.274	1562	a-h	4.2	1.14	82.8	29.9	$ 0.5400	$ 843
11	Apex B2F	0.273	1532.5	b-i	4.4	1.17	82.6	28.1	$ 0.5360	$ 821
12	DPR 621 B2F	0.287	1529.7	b-i	4.3	1.17	84.8	29.9	$ 0.5405	$ 827
13	FM 9160 B2F	0.267	1520.6	c-i	3.2	1.19	83.1	31.5	$ 0.5065	$ 770
14	DP 0949 B2F	0.273	1511.7	d-i	4.2	1.16	82.3	31.1	$ 0.5400	$ 816
15	AM 1532 B2F	0.268	1511.7	d-i	4.4	1.16	81.8	29.5	$ 0.5340	$ 807
16	FM 1740 B2F	0.284	1510.7	d-i	4.6	1.13	82.5	30	$ 0.5385	$ 814
17	ST 4498 B2F	0.278	1510.6	d-i	4	1.13	82.5	31.2	$ 0.5420	$ 819
18	Phy 375 WRF	0.271	1478.4	e-j	4	1.15	83.5	29.9	$ 0.5410	$ 800
19	FM 9180 B2F	0.252	1447.6	f-j	4.2	1.19	82.1	32.1	$ 0.5400	$ 782
20	NG 3348 B2F	0.273	1435.8	g-j	4.2	1.17	82.4	31.1	$ 0.5400	$ 775
21	Phy 485 WRF	0.236	1417.4	hij	4.1	1.12	83.3	29.9	$ 0.5400	$ 765
22	DP 0924 B2F	0.263	1406.1	ij	4.2	1.14	83	30.4	$ 0.5400	$ 759
23	ST 4288 B2F	0.267	1389.7	ij	4.6	1.16	82.3	30.3	$ 0.5365	$ 746
24	Marathon B2F	0.257	1357.2	j	4.2	1.15	82.1	28	$ 0.5355	$ 727
25	DP 1048 B2F	0.246	1336.7	j	3.9	1.16	83	29.4	$ 0.5375	$ 718
LSD (P=.05)			151.02							
CV			6.97							

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Irrigated Variety Performance (cont.)

Location:	Tillman-McKinley	**Plant Date:**	5/20/2009	**Irrig. Type:**	Sprinkler
Soil Type:	Sandy Loam	**Harvest Date:**	11/4/09		

		Gin	Lint Yield		Fiber Quality					
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DPR 555 B2F	0.291	2109.3	a	4.6	1.19	84	32	$ 0.5415	$ 1,142
2	Phy 375 WRF	0.29	1957.7	ab	4.7	1.07	83	29.3	$ 0.5220	$ 1,022
3	DP 0924 B2F	0.284	1936.3	ab	4.4	1.1	81.9	30.5	$ 0.5315	$ 1,029
4	DP 1032 B2F	0.284	1922.4	abc	3.9	1.24	83.8	32.6	$ 0.5430	$ 1,044
5	DPR 621 B2F	0.284	1909	bcd	4.2	1.13	82.2	28.3	$ 0.5355	$ 1,022
6	FM 9160 B2F	0.29	1900.8	b-e	4.5	1.14	84.5	31.3	$ 0.5425	$ 1,031
7	FM 1740 B2F	0.295	1886.4	b-e	4.8	1.12	81.7	31.9	$ 0.5385	$ 1,016
8	DP 0935 B2F	0.293	1804.4	b-f	4.4	1.12	82.2	29.5	$ 0.5340	$ 964
9	FM 9170 B2F	0.288	1797.7	b-f	4.4	1.14	82.9	32.9	$ 0.5405	$ 972
10	DP 0912 B2F	0.278	1743.4	c-g	4.7	1.07	81.2	29.2	$ 0.5200	$ 907
11	Phy 485 WRF	0.259	1725.9	d-h	4.6	1.11	84.6	33.1	$ 0.5425	$ 936
12	ST 5458 B2F	0.274	1720.3	e-h	4.7	1.12	83	30.9	$ 0.5405	$ 930
13	FM 9180 B2F	0.256	1687.3	f-i	4.4	1.14	82.7	32.6	$ 0.5405	$ 912
14	DP 1044 B2F	0.263	1685.6	f-i	3.6	1.18	84	32.2	$ 0.5415	$ 913
15	DG 2570 B2F	0.276	1674.7	f-i	4.4	1.09	81.1	28.8	$ 0.5290	$ 886
16	DPR 549 B2F	0.248	1656.2	f-j	3.8	1.16	82.4	30.6	$ 0.5400	$ 894
17	ST 4498 B2F	0.264	1642.2	f-j	4.2	1.14	83.9	32	$ 0.5430	$ 892
18	DP 1048 B2F	0.257	1641.6	f-j	3.7	1.14	81.7	28.4	$ 0.5355	$ 879
19	AM 1532 B2F	0.258	1625.5	f-j	4	1.13	80.5	27.9	$ 0.5355	$ 870
20	ST 4288 B2F	0.258	1591.7	g-j	4.6	1.14	82.6	30.6	$ 0.5405	$ 860
21	Marathon B2F	0.252	1587.7	g-j	4.2	1.11	81.9	27.1	$ 0.5355	$ 850
22	Apex B2F	0.256	1547.3	hij	4	1.16	82.1	30.5	$ 0.5380	$ 832
23	NG 3348 B2F	0.278	1530.3	ij	4.4	1.14	82.3	30.9	$ 0.5385	$ 824
24	DPR 619 B2F	0.258	1529.8	ij	4	1.14	83.5	28.6	$ 0.5385	$ 824
25	DP 0949 B2F	0.269	1481.7	j	3.9	1.1	82.2	29.8	$ 0.5330	$ 790
LSD (P=.05)			188.28							
CV			7.69							

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Irrigated Variety Performance (cont.)

Location:	Harmon-Seddon	**Plant Date:**	5/22/2009	**Irrig. Type:**	Furrow
Soil Type:	Clay Loam	**Harvest Date:**	11/12/09		

		Gin	Lint Yield		Fiber Quality					
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DPR 555 B2F	0.283	1997.3	a	3.8	1.2	83.9	30.6	$ 0.5430	$ 1,085
2	FM 1740 B2F	0.299	1937.5	ab	4.3	1.17	84.2	32.8	$ 0.5415	$ 1,049
3	Phy 375 WRF	0.296	1887.4	ab	3.3	1.17	81.9	30.2	$ 0.5190	$ 980
4	DP 1032 B2F	0.266	1870.1	b	3.4	1.21	82	30.2	$ 0.5190	$ 971
5	FM 9170 B2F	0.278	1827.2	b	3.4	1.23	84.5	32.5	$ 0.5250	$ 959
6	ST 5458 B2F	0.279	1815.5	bc	3.5	1.17	81.9	32.1	$ 0.5385	$ 978
7	FM 9180 B2F	0.258	1692.9	cd	3.8	1.16	83.6	31.3	$ 0.5430	$ 919
8	NG 3348 B2F	0.27	1677.5	de	3.9	1.16	82.8	30.5	$ 0.5400	$ 906
9	FM 9160 B2F	0.273	1653	def	3.4	1.22	84.6	33.1	$ 0.5250	$ 868
10	Marathon B2F	0.249	1612.2	d-g	3.5	1.17	82.9	29.2	$ 0.5360	$ 864
11	DP 0924 B2F	0.255	1592.7	d-h	3.5	1.13	82.4	30.5	$ 0.5365	$ 854
12	Apex B2F	0.246	1591.4	d-h	3.3	1.17	81.3	29.1	$ 0.5165	$ 822
13	DP 0912 B2F	0.258	1558	e-i	3.9	1.13	82.5	30.2	$ 0.5400	$ 841
14	DP 1044 B2F	0.248	1543.5	f-i	3.1	1.15	80.8	28.8	$ 0.5000	$ 772
15	ST 4288 B2F	0.242	1536.5	f-i	3.6	1.17	83.3	31.1	$ 0.5405	$ 830
16	AM 1532 B2F	0.234	1503.6	g-j	3.5	1.18	81.8	29.4	$ 0.5340	$ 803
17	DG 2570 B2F	0.252	1497	g-j	3.3	1.15	82.5	30.2	$ 0.5210	$ 780
18	Phy 485 WRF	0.252	1488.8	g-j	3.6	1.14	83.3	31.9	$ 0.5405	$ 805
19	ST 4498 B2F	0.256	1484.5	hij	3.4	1.17	83.9	31.9	$ 0.5240	$ 778
20	DP 0935 B2F	0.247	1467.3	ij	3.1	1.14	81.2	30	$ 0.5025	$ 737
21	DPR 619 B2F	0.254	1453.5	ijk	3.6	1.16	82.1	29.3	$ 0.5340	$ 776
22	DPR 621 B2F	0.255	1407.8	jk	3.3	1.15	81.5	28.6	$ 0.5165	$ 727
23	DPR 549 B2F	0.237	1340.7	k	3.2	1.19	82.8	31.7	$ 0.5065	$ 679
24	DP 0949 B2F	0.261	1338.5	k	3.4	1.15	81.9	29.1	$ 0.5165	$ 691
25	DP 1048 B2F	0.244	1336.4	k	3.2	1.2	83	30.7	$ 0.5065	$ 677
LSD (P=.05)			123.99							
CV			5.46							

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Irrigated Variety Performance (cont.)

Location:	Beckham-Gamble	**Plant Date:**	5/21/2009	**Irrig. Type:**	Sprinkler
Soil Type:	Sand	**Harvest Date:**	11/2/09		

		Gin	Lint Yield		Fiber Quality					
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DPR 555 B2F	0.286	1737.4	a	3.2	1.18	83.8	32.1	$ 0.5075	$ 882
2	ST 4288 B2F	0.251	1668.9	ab	3.4	1.14	80.5	30	$ 0.5190	$ 866
3	Apex B2F	0.255	1634.3	abc	3.2	1.22	82.2	29.5	$ 0.5000	$ 817
4	ST 4498 B2F	0.252	1591.3	a-d	3.2	1.13	82.5	31.3	$ 0.5065	$ 806
5	DP 0912 B2F	0.242	1538.7	b-e	3.1	1.17	82.6	31.5	$ 0.5065	$ 779
6	DP 0924 B2F	0.263	1538.5	b-e	3.4	1.15	82.7	30.5	$ 0.5210	$ 802
7	FM 1740 B2F	0.271	1509.4	c-f	3.6	1.13	81.7	31.1	$ 0.5385	$ 813
8	DPR 549 B2F	0.254	1495	c-g	3	1.2	80.2	30.9	$ 0.5045	$ 754
9	NG 3348 B2F	0.250	1464.2	d-h	3.6	1.2	83.9	31.8	$ 0.5415	$ 793
10	DP 1032 B2F	0.253	1457.4	d-h	3.2	1.18	83.3	31.9	$ 0.5065	$ 738
11	Phy 485 WRF	0.244	1425.5	e-i	4.4	1.12	84.5	32.8	$ 0.5425	$ 773
12	ST 5458 B2F	0.243	1419.7	e-i	2.9	1.16	81	31.2	$ 0.4725	$ 671
13	DP 0949 B2F	0.271	1400.1	e-j	2.9	1.16	82.6	30.1	$ 0.4725	$ 662
14	Phy 375 WRF	0.304	1396.1	e-j	3.6	1.12	80.6	29.3	$ 0.5340	$ 746
15	AM 1532 B2F	0.221	1382.7	f-j	3	1.21	82.5	30.5	$ 0.5045	$ 698
16	DPR 621 B2F	0.233	1366.4	f-j	2.7	1.2	82.1	30	$ 0.4705	$ 643
17	DPR 619 B2F	0.243	1358.8	f-j	2.8	1.16	83.9	31.7	$ 0.4755	$ 646
18	FM 9180 B2F	0.242	1354.1	g-j	3.2	1.19	83	33.2	$ 0.5065	$ 686
19	FM 9170 B2F	0.248	1342.6	g-j	2.9	1.17	80.7	31.3	$ 0.4725	$ 634
20	FM 9160 B2F	0.255	1320.3	hij	3.1	1.17	80.6	32.2	$ 0.5045	$ 666
21	DP 0935 B2F	0.237	1310.6	hij	2.9	1.14	81.2	31.4	$ 0.4725	$ 619
22	DG 2570 B2F	0.227	1290.3	ij	3	1.16	82.7	31.9	$ 0.5065	$ 654
23	DP 1044 B2F	0.243	1263.4	jk	3.1	1.16	82.6	31.2	$ 0.5065	$ 640
24	DP 1048 B2F	0.230	1260.2	jk	2.7	1.19	81.6	30.5	$ 0.4705	$ 593
25	Marathon B2F	0.218	1118	k	3.4	1.15	81.6	28.9	$ 0.5165	$ 577
LSD (P=.05)			155.25							
CV			7.7							

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Dryland Variety Performance

Location:	Custer-Shephard			**Plant Date:**	5/21/2009					
Soil Type:	Sandy Loam			**Harvest Date:**	11/3/09					
		Gin	Lint Yield		Fiber Quality					
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DPR 555 B2F	0.234	1730.6	a	3.2	1.24	85.5	32.1	$ 0.5095	$ 882
2	DP 0924 B2F	0.261	1728.3	a	3.6	1.12	81.9	31.9	$ 0.5385	$ 931
3	FM 1740 B2F	0.254	1709.6	ab	4	1.14	83.4	32.4	$ 0.5420	$ 927
4	DP 0912 B2F	0.245	1645	abc	3.7	1.12	82.2	31.3	$ 0.5400	$ 888
5	DPR 549 B2F	0.23	1643.3	a-d	3.4	1.22	82.7	34.2	$ 0.5230	$ 859
6	Phy 375 WRF	0.252	1638.5	a-d	3.7	1.16	82.8	31.9	$ 0.5420	$ 888
7	DPR 619 B2F	0.231	1630.3	a-e	3.3	1.15	84.4	32.4	$ 0.5240	$ 854
8	FM 9058 F	0.24	1594.5	a-f	3.3	1.18	82.4	29.8	$ 0.5190	$ 828
9	DP 1048 B2F	0.221	1552.5	b-g	3.1	1.19	84.3	30.8	$ 0.5075	$ 788
10	DP 0935 B2F	0.226	1551.9	b-g	3.5	1.11	83.1	29.9	$ 0.5385	$ 836
11	NG 3348 B2F	0.247	1517.1	c-g	3.9	1.14	83	31.9	$ 0.5420	$ 822
12	DPR 621 B2F	0.224	1505.2	c-g	3.3	1.2	83.2	30.8	$ 0.5230	$ 787
13	FM 9170 B2F	0.252	1501.1	c-h	3.6	1.17	82.9	31.4	$ 0.5405	$ 811
14	FM 9160 B2F	0.249	1496.8	c-i	3.5	1.21	83.2	32.9	$ 0.5405	$ 809
15	ST 4288 B2F	0.235	1485.7	d-i	3.9	1.18	83.8	31.6	$ 0.5430	$ 807
16	DG 2570 B2F	0.228	1476.2	e-i	3	1.16	81.2	30.7	$ 0.5045	$ 745
17	Epic RF	0.231	1446.5	f-i	3.6	1.12	83.2	31.6	$ 0.5405	$ 782
18	FM 9180 B2F	0.244	1434.9	ghi	4	1.19	82.9	33.1	$ 0.5420	$ 778
19	DP 0949 B2F	0.221	1434.5	ghi	2.8	1.15	82.2	31.4	$ 0.4725	$ 678
20	DP 1044 B2F	0.226	1421.4	ghi	3.4	1.16	82.9	30.7	$ 0.5230	$ 743
21	ST 4498 B2F	0.217	1403.8	ghi	3.2	1.17	83.4	34	$ 0.5065	$ 711
22	DP 1032 B2F	0.216	1346.7	hi	3	1.17	80.7	31.5	$ 0.5045	$ 679
23	ST 5458 B2F	0.214	1341.2	ij	3.2	1.15	80.4	31.5	$ 0.5045	$ 677
24	Phy 315 F	0.185	1188.7	j	2.8	1.19	82.7	30.2	$ 0.4725	$ 562
25	Phy 485 WRF	0.185	1187.7	j	3.2	1.18	83.6	31.8	$ 0.5075	$ 603
LSD (P=.05)			157.91							
CV			7.42							
Means followed by same letter do not significantly differ (P=.05, LSD)										
All loan values are calculated with color and leaf of 41-4										

Dryland Variety Performance (cont.)

Location:	Washita-Johnson			**Plant Date:**	5/27/2009				
Soil Type:	Sandy Loam			**Harvest Date:**	12/11/09				
		Gin	Lint Yield		Fiber Quality				
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	ST 5458 B2F	0.244	1104.6	a	3.7	1.15	81.5	32.4	$ 0.5400	$ 596
2	DP 0912 B2F	0.268	1053.6	ab	4.5	1.15	82.6	32.2	$ 0.5405	$ 569
3	DP 0924 B2F	0.247	1042.8	ab	3.8	1.14	82.1	29.2	$ 0.5355	$ 558
4	DG 2570 B2F	0.249	980.7	abc	4	1.15	83.7	30.7	$ 0.5430	$ 533
5	Epic RF	0.249	979.8	abc	3.5	1.11	81.5	30.8	$ 0.5385	$ 528
6	DP 1048 B2F	0.23	971	a-d	3.7	1.15	82.6	28.3	$ 0.5375	$ 522
7	ST 4498 B2F	0.239	953.5	a-e	3.4	1.18	84	31.8	$ 0.5240	$ 500
8	DPR 621 B2F	0.227	953.4	a-e	3	1.18	82.4	30.1	$ 0.5025	$ 479
9	FM 9160 B2F	0.241	938.7	a-e	3.8	1.21	85.1	31.6	$ 0.5440	$ 511
10	FM 9058 F	0.242	930.3	a-f	4.2	1.21	84.5	32.3	$ 0.5440	$ 506
11	DP 1032 B2F	0.235	910.2	b-g	3.5	1.14	81.1	31	$ 0.5385	$ 490
12	NG 3348 B2F	0.267	908	b-g	4.5	1.13	83.7	32.1	$ 0.5415	$ 492
13	DP 1044 B2F	0.24	901.2	b-g	4.3	1.13	82.3	29.9	$ 0.5365	$ 483
14	DP 0935 B2F	0.23	892.5	b-g	3.2	1.12	81.5	28.3	$ 0.5000	$ 446
15	ST 4288 B2F	0.236	888.3	b-g	4.5	1.16	82.3	30.7	$ 0.5385	$ 478
16	DP 0949 B2F	0.235	835	c-h	3.6	1.2	82.8	32.3	$ 0.5405	$ 451
17	FM 9170 B2F	0.241	824.8	c-h	3.8	1.21	82.9	33.8	$ 0.5420	$ 447
18	FM 1740 B2F	0.247	811.3	c-h	4.1	1.13	81.5	31.1	$ 0.5400	$ 438
19	DPR 619 B2F	0.222	798.5	d-h	3.4	1.12	81.2	28.5	$ 0.5165	$ 412
20	FM 9180 B2F	0.228	787	e-h	4	1.21	83.4	31.4	$ 0.5420	$ 427
21	Phy 375 WRF	0.223	761.6	fgh	3.1	1.15	81.3	29.9	$ 0.5025	$ 383
22	DPR 555 B2F	0.218	747.7	gh	3.8	1.18	82.3	31.3	$ 0.5400	$ 404
23	Phy 485 WRF	0.196	692.2	h	3.3	1.17	83.9	32.8	$ 0.5240	$ 363
24	DPR 549 B2F	0.217	684.8	h	3.6	1.21	82.7	33.3	$ 0.5405	$ 370
25	Phy 315 F	0.218	673.3	h	2.9	1.1	80.7	28.3	$ 0.4630	$ 312
LSD (P=.05)			175.39							
CV			14.08							

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Dryland Variety Performance (cont.)

Location:	Washita-Davis			**Plant Date:**	5/19/2009				
Soil Type:	Sandy Loam			**Harvest Date:**	11/3/09				
		Gin	Lint Yield		Fiber Quality				
Trt	Treatment	%	lbs/Acre	Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DP 1032 B2F	0.256	941.3 a	3.9	1.21	83.6	31.8	$ 0.5430	$ 511
2	Epic RF	0.26	936.6 a	4	1.12	83.9	30.9	$ 0.5430	$ 509
3	FM 9170 B2F	0.239	934.4 ab	3.7	1.15	82.1	31.3	$ 0.5400	$ 505
4	DP 0924 B2F	0.273	922.5 ab	4.6	1.11	83.6	31.9	$ 0.5415	$ 500
5	DP 0935 B2F	0.252	921.6 abc	4.1	1.11	81.3	30.4	$ 0.5380	$ 496
6	DPR 555 B2F	0.271	915.7 a-d	4.6	1.2	84.1	33.2	$ 0.5415	$ 496
7	ST 4288 B2F	0.258	899.9 a-d	4.6	1.13	83.3	30.6	$ 0.5405	$ 486
8	Phy 315 F	0.274	878.1 a-e	4.4	1.11	82.5	30.3	$ 0.5385	$ 473
9	ST 5458 B2F	0.259	838.5 a-f	3.9	1.12	81.3	33.7	$ 0.5400	$ 453
10	DP 1044 B2F	0.239	835.4 a-f	4	1.13	83	30.8	$ 0.5420	$ 453
11	DPR 619 B2F	0.243	815.8 a-f	4	1.14	82.6	30.7	$ 0.5420	$ 442
12	DP 0912 B2F	0.242	794 b-g	4.2	1.11	84	31.1	$ 0.5430	$ 431
13	DG 2570 B2F	0.247	780.8 c-g	4.2	1.14	83.5	31.5	$ 0.5430	$ 424
14	DP 0949 B2F	0.279	777 d-g	4.6	1.11	81.8	32.1	$ 0.5385	$ 418
15	Phy 375 WRF	0.248	755.1 e-h	3.7	1.09	81.9	29.8	$ 0.5330	$ 402
16	DP 1048 B2F	0.215	751.1 e-i	3.1	1.15	80.9	28.9	$ 0.5000	$ 376
17	FM 1740 B2F	0.234	738.4 e-i	3.3	1.11	81.4	30.3	$ 0.5190	$ 383
18	NG 3348 B2F	0.242	730.7 f-i	4.1	1.15	84	31.7	$ 0.5430	$ 397
19	FM 9180 B2F	0.219	712.5 f-i	3.7	1.2	83.9	35.1	$ 0.5430	$ 387
20	FM 9058 F	0.228	700.8 f-j	3.6	1.17	82.6	32.1	$ 0.5405	$ 379
21	DPR 621 B2F	0.232	674.3 g-j	3.2	1.13	82	30.6	$ 0.5045	$ 340
22	DPR 549 B2F	0.219	670.8 g-j	3.3	1.13	82.2	30.7	$ 0.5210	$ 349
23	Phy 485 WRF	0.239	635.6 hij	4.4	1.09	83.2	31.8	$ 0.5355	$ 340
24	FM 9160 B2F	0.193	612.2 ij	3.2	1.19	83.8	33.4	$ 0.5075	$ 311
25	ST 4498 B2F	0.213	569.6 j	3.3	1.1	82.3	30.9	$ 0.5160	$ 294
LSD (P=.05)			140.84						
CV			12.61						

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Dryland Variety Performance (cont.)

Location:	Tillman-McKinley		**Plant Date:**	5/27/2009					
Soil Type:	Sandy Loam		**Harvest Date:**	11/25/09					
		Gin	Lint Yield		Fiber Quality				
Trt	Treatment	%	lbs/Acre	Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DPR 621 B2F	0.286	523.7 a	4.8	1.05	81.3	28.5	$ 0.5200	$ 272
2	DPR 619 B2F	0.281	504.4 ab	4.7	1.05	82.1	27.6	$ 0.5200	$ 262
3	DP 0949 B2F	0.284	497.4 abc	5.1	1.01	80.2	27.2	$ 0.4680	$ 233
4	DP 1044 B2F	0.282	491.8 a-d	4.6	1.06	82	27.4	$ 0.5200	$ 256
5	DP 0912 B2F	0.283	491.5 a-d	5.1	1	80.5	26.7	$ 0.4680	$ 230
6	Epic RF	0.270	451.3 a-e	4.7	1	80.6	25.3	$ 0.4765	$ 215
7	DPR 549 B2F	0.264	450.8 a-e	4.6	1.11	81.2	29.9	$ 0.5365	$ 242
8	FM 1740 B2F	0.276	443.2 a-e	4.7	1.06	80.3	27.9	$ 0.5200	$ 230
9	Phy 375 WRF	0.265	441 a-e	4.5	1.01	80.4	26.8	$ 0.4900	$ 216
10	Phy 315 F	0.269	434 b-e	4.6	1.04	81.6	29.3	$ 0.5000	$ 217
11	FM 9160 B2F	0.265	433.3 b-e	4.7	1.06	79.6	28.2	$ 0.5200	$ 225
12	FM 9180 B2F	0.242	432.6 b-e	4.6	1.05	79.9	29.6	$ 0.5225	$ 226
13	DP 0935 B2F	0.281	430.8 b-f	4.9	1	79.8	27.3	$ 0.4900	$ 211
14	ST 5458 B2F	0.269	424.2 b-g	5	1.02	80.7	27.8	$ 0.4780	$ 203
15	DPR 555 B2F	0.294	423 b-g	5	1.11	83.2	30.6	$ 0.5185	$ 219
16	DP 1032 B2F	0.271	421.4 b-g	4.7	1.06	80.7	28.2	$ 0.5200	$ 219
17	DG 2570 B2F	0.285	416.3 c-g	5.1	1.05	82.7	30.8	$ 0.5045	$ 210
18	ST 4498 B2F	0.251	414 c-g	4.6	1.05	81.2	28.5	$ 0.5200	$ 215
19	DP 1048 B2F	0.287	408.8 d-g	4.8	1.06	80.3	27.2	$ 0.5200	$ 213
20	DP 0924 B2F	0.253	384.2 e-h	4.4	1.01	81.2	27.8	$ 0.4900	$ 188
21	FM 9058 F	0.233	370.8 e-h	4.5	1.08	80.6	28.2	$ 0.5290	$ 196
22	NG 3348 B2F	0.235	346.7 fgh	3.7	1.07	80.9	27.9	$ 0.5215	$ 181
23	FM 9170 B2F	0.229	344.5 gh	4.4	1.1	81.2	30.7	$ 0.5335	$ 184
24	ST 4288 B2F	0.225	343.4 gh	3.9	1.03	79.2	26.1	$ 0.4940	$ 170
25	Phy 485 WRF	0.211	314.3 h	4.6	1.02	82.1	27.8	$ 0.5000	$ 157
LSD (P=.05)			84.43						
CV			12.03						

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Dryland Variety Performance (cont.)

Location:	Tillman-Fischer		**Plant Date:**	5/28/2009					
Soil Type:	Clay Loam		**Harvest Date:**	12/10/09					
		Gin	Lint Yield		Fiber Quality				
Trt	Treatment	%	lbs/Acre		Mic	Length	Uniformity	Strength	Loan Value	$/Acre
1	DP 0935 B2F	0.295	816.7	a	4.5	1.02	79.4	27.3	$ 0.4925	$ 402
2	DP 0949 B2F	0.307	771.3	ab	4.8	1.05	80.2	27.2	$ 0.5200	$ 401
3	DPR 621 B2F	0.291	756.5	abc	4.7	1.1	81.4	28.3	$ 0.5290	$ 400
4	DP 1044 B2F	0.261	743.9	bcd	4.5	1.06	81.3	27.5	$ 0.5200	$ 387
5	DP 1048 B2F	0.279	742	bcd	4.2	1.05	79.5	27	$ 0.5215	$ 387
6	DG 2570 B2F	0.279	739	bcd	4.5	1.04	80.5	27.6	$ 0.5000	$ 370
7	ST 5458 B2F	0.274	731.7	b-e	4.9	1.06	80.9	28.4	$ 0.5200	$ 380
8	ST 4498 B2F	0.264	719.4	b-f	4.7	1.02	81.5	30.1	$ 0.5025	$ 361
9	DP 0924 B2F	0.275	719.4	b-f	4.7	1.02	78.7	27.3	$ 0.4925	$ 354
10	DPR 619 B2F	0.27	701.9	c-g	4.8	1.08	81.8	28.1	$ 0.5290	$ 371
11	FM 1740 B2F	0.258	687.6	d-h	4.3	1.06	79.7	28.4	$ 0.5200	$ 358
12	DPR 549 B2F	0.267	685.4	d-h	4.7	1.14	81.8	30.9	$ 0.5385	$ 369
13	Epic RF	0.268	669	e-i	4.5	1.03	80.7	27.1	$ 0.5000	$ 335
14	DPR 555 B2F	0.256	668.3	e-i	4.7	1.08	81.4	30.8	$ 0.5335	$ 357
15	Phy 315 F	0.248	658.2	f-j	4.6	1.02	79.6	25.7	$ 0.5000	$ 329
16	FM 9170 B2F	0.275	656.5	f-j	4.3	1.12	80.8	29.8	$ 0.5365	$ 352
17	DP 1032 B2F	0.28	653.1	f-k	4.2	1	79.2	24.4	$ 0.4685	$ 306
18	FM 9160 B2F	0.267	638.8	g-k	4.2	1.04	78.5	24.9	$ 0.4805	$ 307
19	Phy 375 WRF	0.252	627.6	h-k	4	1.04	79	24.9	$ 0.4805	$ 302
20	NG 3348 B2F	0.243	605.2	ijk	3.6	1.07	81.5	26.8	$ 0.5200	$ 315
21	DP 0912 B2F	0.256	602.7	ijk	4.6	1.12	81.3	29.2	$ 0.5340	$ 322
22	ST 4288 B2F	0.231	599.3	jk	4.4	1.08	79.9	27.6	$ 0.5290	$ 317
23	FM 9180 B2F	0.226	587.5	k	3.9	1.13	82.5	32.5	$ 0.5420	$ 318
24	Phy 485 WRF	0.237	586.4	k	3.9	1.04	80	26.9	$ 0.5015	$ 294
25	FM 9058 F	0.22	508.4	l	4.2	1.11	78.8	27	$ 0.5280	$ 268
LSD (P=.05)			67.59							
CV			7.08							

Means followed by same letter do not significantly differ (P=.05, LSD)

All loan values are calculated with color and leaf of 41-4

Agronomic Projects

This section of the report presents the results of various agronomic projects. Cotton producers face numerous in-season management decisions concerning fertility, tillage, plant growth regulators, precision agriculture and/or irrigation. The following projects address some of these areas.

Performance of Stance Plant Growth Regulator

Three rate regimes of Stance were compared to multiple low rate applications of Mepiquat Chloride. No plant growth regulator treatment increased yield or affected fiber quality compared to the untreated.

Planted: May 22 **Variety:** PHY 485 WRF **Soil Type:** Clay loam **Location:** OSU

						7/22/2009		8/10/2009		8/24/2009		9/9/2009	
Trt	Treatment		Rate	Growth	Appl	NAWF		NAWF		Avg Height		Avg Height	
No.	Name	Rate	Unit	Stage	Code	Avg/Plot		Avg/Plot		Inches		Inches	
1	Untreated Check					9.55	a	6.65	a	37.65	a	37.85	a
2	Pix	4	oz/a	Match Sq	A	6.65	b	4.2	b	33.25	b	34.45	b
	Pix	4	oz/a	14 DAIT	B								
	Pix	4	oz/a	AsNeeded	C								
3	Stance	2	oz/a	Match Sq	A	8.8	ab	6.45	a	33.45	b	33.95	b
	Stance	2	oz/a	14 DAIT	B								
	Stance	2	oz/a	AsNeeded	C								
4	Stance	3	oz/a	Match Sq	A	8.7	ab	5.55	ab	31.4	bc	30.95	c
	Stance	3	oz/a	14 DAIT	B								
	Stance	3	oz/a	AsNeeded	C								
5	Stance	4	oz/a	Match Sq	A	8.95	ab	5.9	ab	29.85	c	30.05	c
	Stance	4	oz/a	14 DAIT	B								
	Stance	4	oz/a	AsNeeded	C								
6	Pix	6	oz/a	Match Sq	A	8.55	ab	5.15	ab	29.6	c	29.15	c
	Pix	8	oz/a	14 DAIT	B								
	Pix	8	oz/a	AsNeeded	C								
LSD (P=.05)						2.683		1.904		2.438		2.593	
CV						20.87		22.36		4.97		5.26	
Means followed by same letter do not significantly differ (P=.05, LSD)													

Performance of Stance Plant Growth Regulator (cont.)

						9/9/2009		9/24/2009		11/20/2009	
Trt	Treatment		Rate	Growth	Appl	Avg Height		NACB		Gin	
No.	Name	Rate	Unit	Stage	Code	Inches		Avg/Plot		%	
1	Untreated Check					37.85	a	7.15	a	0.266	a
2	Pix	4	oz/a	Match Sq	A	34.45	b	6.75	a	0.272	a
	Pix	4	oz/a	14 DAIT	B						
	Pix	4	oz/a	AsNeeded	C						
3	Stance	2	oz/a	Match Sq	A	33.95	b	6.3	a	0.263	a
	Stance	2	oz/a	14 DAIT	B						
	Stance	2	oz/a	AsNeeded	C						
4	Stance	3	oz/a	Match Sq	A	30.95	c	6.8	a	0.259	ab
	Stance	3	oz/a	14 DAIT	B						
	Stance	3	oz/a	AsNeeded	C						
5	Stance	4	oz/a	Match Sq	A	30.05	c	7	a	0.239	c
	Stance	4	oz/a	14 DAIT	B						
	Stance	4	oz/a	AsNeeded	C						
6	Pix	6	oz/a	Match Sq	A	29.15	c	6.5	a	0.244	bc
	Pix	8	oz/a	14 DAIT	B						
	Pix	8	oz/a	AsNeeded	C						
LSD (P=.05)						2.593		1.069		0.018	
CV						5.26		10.51		4.64	
Means followed by same letter do not significantly differ (P=.05, LSD)											

Performance of Stance Plant Growth Regulator (cont.)

						11/20/2009		11/20/2009								Loan	Crop
Trt	Treatment		Rate	Growth	Appl	Lint Yield		Fiber Quality								Rate	Value
No.	Name	Rate	Unit	Stage	Code	lbs/Acre		Mic		Length		Uniformity		Strength		$	$/Acre
1	Untreated Check					1666.4	a	5.15	a	1.093	b	82.93	a	31.48	a	0.5135	856
2	Pix	4	oz/a	Match Sq	A	1669.7	a	5.23	a	1.13	a	83.5	a	32.05	a	0.5195	867
	Pix	4	oz/a	14 DAIT	B												
	Pix	4	oz/a	AsNeeded	C												
3	Stance	2	oz/a	Match Sq	A	1686.3	a	5.2	a	1.115	ab	83.13	a	31.1	a	0.5185	874
	Stance	2	oz/a	14 DAIT	B												
	Stance	2	oz/a	AsNeeded	C												
4	Stance	3	oz/a	Match Sq	A	1618.3	a	5.03	a	1.125	ab	83.5	a	32.45	a	0.5195	841
	Stance	3	oz/a	14 DAIT	B												
	Stance	3	oz/a	AsNeeded	C												
5	Stance	4	oz/a	Match Sq	A	1626.8	a	5.03	a	1.138	a	83.7	a	32.58	a	0.5195	845
	Stance	4	oz/a	14 DAIT	B												
	Stance	4	oz/a	AsNeeded	C												
6	Pix	6	oz/a	Match Sq	A	1545.5	a	5.23	a	1.105	ab	82.88	a	31.18	a	0.5135	794
	Pix	8	oz/a	14 DAIT	B												
	Pix	8	oz/a	AsNeeded	C												
LSD (P=.05)						160.83		0.346		0.0339		1.589		2.561			
CV						6.53		4.47		2.01		1.27		5.34			
Means followed by same letter do not significantly differ (P=.05, LSD)																	

Performance of Stance Plant Growth Regulator (cont.)

Application Description			
	A	B	C
Application Date:	7/7/2009	7/22/2009	8/10/2009
Time of Day:	7:30 AM	9:00 AM	11:45 PM
Application Method:	Spray	Spray	Spray
Application Timing:	Matchhead	14DAIT	3rd App.
Application Placement:	Broadcast	Broadcast	Broadcast
Applied By:	OSU	OSU	OSU
Air Temperature, Unit:	76 F	73 F	86 F
% Relative Humidity:	68	65	52
Wind Velocity, Unit:	5.5 mph	4 mph	6 mph
Wind Direction:	S	NE	S
Soil Temperature, Unit:	84 F	84 F	79 F
Soil Moisture:	Adequate	Adequate	Adequate
% Cloud Cover:	10	40	10
Next Rain Occurred On:	7/16/2009	7/27/2009	7/19/2009
Application Equipment			
	A	B	C
Appl. Equipment:	Lee Spider	Lee Spider	Lee Spider
Operating Pressure, Unit:	26 PSI	26 PSI	26 PSI
Nozzle Type:	TurboTee	TurboTee	TurboTee
Nozzle Size:	11002	11002	11002
Nozzle Spacing, Unit:	20 in	20 in	20 in
Nozzles/Row:	2	2	2
Ground Speed, Unit:	4 mph	4 mph	4 mph
Carrier:	water	water	water
Spray Volume, Unit:	10 GPA	10 GPA	10 GPA
Mix Size, Unit:	1 gal	1 gal	1 gal
Propellant:	comp.air	comp.air	comp.air

Foliar Products for Yield Enhancement in Low Yielding Cotton

Planted: May 22 **Variety:** DP 0924 B2F **Soil Type:** Clay loam **Location:** OSU

						1/16/200	11/16/2009		AVG NDVI					
Trt	Treatment		Rate	Growth	Appl	Gin	Lint Yield		7/14/2009		8/19/2009		9/11/2009	
No.	Name	Rate	Unit	Stage	Code	%	lbs/Acre		Index		Index		Index	
1	Untreated Check					0.315	610.8	ab	0.562	a	0.510	a	0.457	a
2	HM 9728A	1	gal/a	1stbloom	A	0.315	561	b	0.550	a	0.494	a	0.460	a
	HM 9110	0.25	% v/v	1stbloom	A									
3	HM 9728A	1	gal/a	1stbloom	A	0.315	594.2	ab	0.551	a	0.500	a	0.462	a
	HM 9110	0.25	% v/v	1stbloom	A									
	HM 9728A	1	gal/a	Midbloom	B									
	HM 9110	0.25	% v/v	Midbloom	B									
4	HM 9947	2	qt/a	1stbloom	A	0.315	654	a	0.590	a	0.532	a	0.487	a
	HM 9110	0.25	% v/v	1stbloom	A									
5	HM 0607	3.2	oz/a	1stbloom	A	0.315	606.2	ab	0.574	a	0.515	a	0.493	a
	HM 9110	0.25	% v/v	1stbloom	A									
6	HM 9947	2	qt/a	1stbloom	A	0.315	598.5	ab	0.563	a	0.500	a	0.473	a
	HM 9728A	1	gal/a	1stbloom	A									
	HM 9110	0.25	% v/v	1stbloom	A									
7	HM 0607	3.2	oz/a	1stbloom	A	0.315	612.5	ab	0.558	a	0.510	a	0.474	a
	HM 9728A	1	gal/a	1stbloom	A									
	HM 9110	0.25	% v/v	1stbloom	A									
8	HM 9947	2	qt/a	1stbloom	A	0.315	674.7	a	0.589	a	0.517	a	0.492	a
	HM 9728A	1	gal/a	1stbloom	A									
	HM 9110	0.25	% v/v	1stbloom	A									
	HM 9728A	1	gal/a	Midbloom	B									
	HM 9110	0.25	% v/v	Midbloom	B									
9	HM 0607	3.2	oz/a	1stbloom	A	0.315	593.4	ab	0.571	a	0.531	a	0.474	a
	HM 9728A	1	gal/a	1stbloom	A									
	HM 9110	0.25	% v/v	1stbloom	A									
	HM 9728A	1	gal/a	Midbloom	B									
	HM 9110	0.25	% v/v	Midbloom	B									
LSD (P=.05)							83.85		0.044		0.044		0.036	
CV							9.39		5.36		5.92		5.22	
Means followed by same letter do not significantly differ (P=.05, LSD)														

Foliar Products for Yield Enhancement Low Yielding Cotton (cont.)

Application Description		
	A	B
Application Date:	7/28/2009	8/19/2009
Time of Day:	3:30 PM	8:30 AM
Application Method:	Spray	Spray
Application Timing:	1st Bloom	LateBloom
Application Placement:	Broadcast	Broadcast
Applied By:	OSU	OSU
Air Temperature, Unit:	90 F	74 F
% Relative Humidity:	44	65
Wind Velocity, Unit:	5.7 mph	8 mph
Wind Direction:	SE	SSW
Soil Temperature, Unit:	84 F	84 F
Soil Moisture:	Good	Good
% Cloud Cover:	20	40
Next Rain Occurred On:	7/29/2009	8/26/2009
Application Equipment		
	A	B
Appl. Equipment:	Lee Spider	Lee Spider
Operating Pressure, Unit:	26 PSI	26 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	11002	11002
Nozzle Spacing, Unit:	20 in	20 in
Nozzles/Row:	2	2
Ground Speed, Unit:	4 mph	4 mph
Carrier:	Water	Water
Spray Volume, Unit:	10 GPA	10 GPA
Mix Size, Unit:	1 Gallon	1 Gallon
Propellant:	Comp. Air	Comp. Air

Beltwide Regional Nitrogen Study (Seed Size and Nitrogen Use Efficiency)

Planted: May 22 **Variety:** DP 0924 B2F **Soil Type:** Clay loam **Location:** OSU

		5/15/2009		5/15/2009		5/15/2009	
Trt	Treatment	Residual N		Residual N		Combined N	
No.	Name	0-6"		6-24"		0-24"	
1	0 lbs Nitrogen	10.3	ab	5.5	a	16	ab
	FM 9180 B2F						
2	40 lbs Nitrogen	12.5	ab	5.5	a	18	ab
	FM 9180 B2F						
3	80 lbs Nitrogen	8.8	b	5	a	14	b
	FM 9180 B2F						
4	120 lbs Nitrogen	15	a	6.5	a	22	a
	FM 9180 B2F						
5	0 lbs Nitrogen	10	ab	5	a	15	ab
	ST 4554 B2F						
6	40 lbs Nitrogen	12	ab	6	a	18	ab
	ST 4554 B2F						
7	80 lbs Nitrogen	12.5	ab	5.5	a	18	ab
	ST 4554 B2F						
8	120 lbs Nitrogen	13.3	ab	6	a	19	ab
	ST 4554 B2F						
9	0 lbs Nitrogen	12.3	ab	6	a	18	ab
	DP 164 B2F						
10	40 lbs Nitrogen	11.8	ab	5	a	17	ab
	DP 164 B2F						
11	80 lbs Nitrogen	12	ab	6	a	18	ab
	DP 164 B2F						
12	120 lbs Nitrogen	8.5	b	5.5	a	14	b
	DP 164 B2F						
LSD (P=.05)		5.72		1.63		6.8	
CV		34.26		20.08		27.37	
Means followed by same letter do not significantly differ (P=.05, LSD)							

Beltwide Regional Nitrogen Study

		7/14/2009		8/19/2009		9/24/2009		9/30/2009	
Trt	Treatment	NDVI		NDVI		NDVI		NDVI	
No.	Name	Avg/plot		Avg/plot		Avg/plot		Avg/plot	
1	0 lbs Nitrogen	0.540	c	0.461	f	0.437	e	0.395	e
	FM 9180 B2F								
2	40 lbs Nitrogen	0.724	b	0.700	d	0.667	cd	0.617	d
	FM 9180 B2F								
3	80 lbs Nitrogen	0.764	a	0.722	cd	0.724	a	0.699	bc
	FM 9180 B2F								
4	120 lbs Nitrogen	0.764	ab	0.724	cd	0.709	a	0.728	a
	FM 9180 B2F								
5	0 lbs Nitrogen	0.550	c	0.511	e	0.456	e	0.383	e
	ST 4554 B2F								
6	40 lbs Nitrogen	0.743	ab	0.728	bcd	0.674	bcd	0.627	d
	ST 4554 B2F								
7	80 lbs Nitrogen	0.763	ab	0.754	ab	0.711	a	0.685	bc
	ST 4554 B2F								
8	120 lbs Nitrogen	0.745	ab	0.747	abc	0.696	abc	0.688	bc
	ST 4554 B2F								
9	0 lbs Nitrogen	0.542	c	0.517	e	0.450	e	0.388	e
	DP 164 B2F								
10	40 lbs Nitrogen	0.735	ab	0.734	bc	0.663	d	0.614	d
	DP 164 B2F								
11	80 lbs Nitrogen	0.774	a	0.774	a	0.706	ab	0.681	c
	DP 164 B2F								
12	120 lbs Nitrogen	0.762	ab	0.775	a	0.709	a	0.710	ab
	DP 164 B2F								
LSD (P=.05)		0.040		0.029		0.032		0.026	
CV		3.97		2.94		3.54		3.01	
Means followed by same letter do not significantly differ (P=.05, LSD)									

Beltwide Regional Nitrogen Study

		9/10/2009		9/10/2009		9/24/2009		9/24/2009	
Trt	Treatment	%Open		NACB		%Open		NACB	
No.	Name	Avg		Avg		Avg		Avg	
1	0 lbs Nitrogen	42.5	a	2.3	f	73.5	a	0.95	g
	FM 9180 B2F								
2	40 lbs Nitrogen	31	bc	5.65	de	59.5	ab	3.8	ef
	FM 9180 B2F								
3	80 lbs Nitrogen	23.75	c	6	cde	58.5	ab	4.05	def
	FM 9180 B2F								
4	120 lbs Nitrogen	32.25	b	6.15	cd	56.5	abc	6.05	abc
	FM 9180 B2F								
5	0 lbs Nitrogen	10.75	de	4.85	e	51.5	bcd	3.1	ef
	ST 4554 B2F								
6	40 lbs Nitrogen	8.5	de	6.2	cd	39.5	c-f	4.55	c-f
	ST 4554 B2F								
7	80 lbs Nitrogen	8	de	7.65	ab	36.5	def	6.7	a
	ST 4554 B2F								
8	120 lbs Nitrogen	9.5	de	7.85	ab	33.5	ef	5.85	a-d
	ST 4554 B2F								
9	0 lbs Nitrogen	14.9	d	3.45	f	48.4	b-e	2.85	f
	DP 164 B2F								
10	40 lbs Nitrogen	10.25	de	6.95	bc	38.5	def	4.75	b-e
	DP 164 B2F								
11	80 lbs Nitrogen	9.5	de	7.9	ab	35	def	4.9	a-e
	DP 164 B2F								
12	120 lbs Nitrogen	6.5	e	8.65	a	30	f	6.5	ab
	DP 164 B2F								
LSD (P=.05)		7.652		1.232		17.161		1.827	
CV		30.66		13.91		25.43		28.09	
Means followed by same letter do not significantly differ (P=.05, LSD)									

Beltwide Regional Nitrogen Study

		9/30/2009		9/30/2009		11/13/2009		11/13/2009	
Trt	Treatment	%Open		NACB		Gin		Lint Yield	
No.	Name	Avg		Avg		Percent		lbs/Acre	
1	0 lbs Nitrogen	75	a	0.6	f	0.268	a	606.7	e
	FM 9180 B2F								
2	40 lbs Nitrogen	60	a-e	2.2	def	0.276	a	1190.2	cd
	FM 9180 B2F								
3	80 lbs Nitrogen	66.5	abc	3.45	b-e	0.263	a	1301.8	abc
	FM 9180 B2F								
4	120 lbs Nitrogen	65.5	a-d	3.9	bcd	0.264	a	1355.1	ab
	FM 9180 B2F								
5	0 lbs Nitrogen	69.5	ab	2.5	cde	0.248	a	585.4	e
	ST 4554 B2F								
6	40 lbs Nitrogen	66	a-d	4.8	ab	0.273	a	1187	cd
	ST 4554 B2F								
7	80 lbs Nitrogen	46.5	de	6.15	a	0.274	a	1361	ab
	ST 4554 B2F								
8	120 lbs Nitrogen	47	cde	6.4	a	0.266	a	1421.2	a
	ST 4554 B2F								
9	0 lbs Nitrogen	53.4	b-e	2	ef	0.276	a	631.3	e
	DP 164 B2F								
10	40 lbs Nitrogen	55	b-e	3.95	bc	0.274	a	1107.1	d
	DP 164 B2F								
11	80 lbs Nitrogen	45	e	5	ab	0.258	a	1264.5	a-d
	DP 164 B2F								
12	120 lbs Nitrogen	43.5	e	6.4	a	0.252	a	1208.8	bcd
	DP 164 B2F								
LSD (P=.05)		19.853		1.749		0.041		163.83	
CV		23.81		30.69		10.6		10.3	
Means followed by same letter do not significantly differ (P=.05, LSD)									

Plant Population Studies

Dryland-Washita County- Davis

Trt	Treatment	Gin	Lint Yield		Fiber Quality			
No.	Name	%	lbs/Acre		Mic	Length	Uniformity	Strength
1	22k	0.287	1105.9	ab	4.2	1.07	82.1	29.1
2	32k	0.281	1113.4	a	3.7	1.11	80.4	30.2
3	42k	0.279	962.5	bc	4.5	1.13	81.9	30.5
4	52k	0.268	867.6	c	4	1.14	82.6	31.1
5	62k	0.26	857.8	c	4.7	1.10	80.7	29.3
LSD (P=.05)			146.8					
CV			9.61					
Means followed by same letter do not significantly differ (P=.05, LSD)								

Dryland-Tillman County-Fischer

Trt	Treatment	Gin	Lint Yield		Fiber Quality			
No.	Name	%	lbs/Acre		Mic	Length	Uniformity	Strength
1	22k	0.288	715.7	a	5.1	1.05	81.5	27.3
2	32k	0.263	630.7	ab	4.6	0.99	79.4	25.1
3	42k	0.259	647.9	ab	4.4	1.01	78	25.2
4	52k	0.269	645.1	ab	4.2	0.99	79	25.9
5	62k	0.252	580.9	b	4.5	1.02	79.6	27.6
LSD (P=.05)			125.55					
CV			12.65					
Means followed by same letter do not significantly differ (P=.05, LSD)								

Dryland-Custer County-Shephard

Trt	Treatment	Gin	Lint Yield		Fiber Quality			
No.	Name	%	lbs/Acre		Mic	Length	Uniformity	Strength
1	22k	0.254	1776.1	a	3.5	1.08	80.7	28.5
2	32k	0.246	1714.8	a	3.1	1.13	82.7	31.1
3	42k	0.247	1740.6	a	3.2	1.07	79.2	27.8
4	52k	0.219	1462.1	b	2.7	1.14	80.9	31.1
5	62k	0.239	1496.6	b	3.0	1.12	82.3	30.8
LSD (P=.05)			194.89					
CV			7.72					
Means followed by same letter do not significantly differ (P=.05, LSD)								

Plant Population Studies (cont.)

Irrigated Jackson County-Felty

Trt	Treatment	Gin	Lint Yield		Fiber Quality			
No.	Name	%	lbs/Acre		Mic	Length	Uniformity	Strength
1	22k	0.257	1358.6	c	4	5759.5	81.2	29.5
2	32k	0.27	1540.7	b	4.6	7581.2	83.4	28.7
3	42k	0.295	1762.1	a	4.9	8917.9	81.6	28.2
4	52k	0.272	1556.5	b	3.8	5971.1	84	29.4
5	62k	0.266	1577.3	b	3.4	5481	80.7	28.8
LSD (P=.05)			118					
CV			4.91					
Means followed by same letter do not significantly differ (P=.05, LSD)								

Irrigated Beckham County-Gamble

Trt	Treatment	Gin	Lint Yield		Fiber Quality			
No.	Name	%	lbs/Acre		Mic	Length	Uniformity	Strength
1	22k	0.24	1359	a	3.3	4540.9	82.1	33.3
2	32k	0.24	1347.2	a	2.9	3626.3	81.4	29.9
3	42k	0.25	1278	a	3.1	4021	80.6	31.2
4	52k	0.236	1263	a	3.1	3939.4	81	31
5	62k	0.258	1217.7	a	3.1	3957.9	80.3	28.9
LSD (P=.05)			191.11					
CV			9.59					
Means followed by same letter do not significantly differ (P=.05, LSD)								

Irrigated Tillman County-McKinley

Trt	Treatment	Gin	Lint Yield		Fiber Quality			
No.	Name	%	lbs/Acre		Mic	Length	Uniformity	Strength
1	22k	0.277	1728.5	a	4.2	1.07	80.3	26.8
2	32k	0.275	1639.6	a	4.5	1.09	81.6	29.4
3	42k	0.255	1520.4	a	4.1	1.08	80.9	28.3
4	52k	0.267	1570.1	a	4.4	1.08	81.2	28
5	62k	0.294	1565.4	a	4.4	1.09	82.3	29.2
LSD (P=.05)			248.55					
CV			10.05					
Means followed by same letter do not significantly differ (P=.05, LSD)								

Plant Population Studies (cont.)

Irrigated Harmon County-Seddon

Trt	Treatment	Gin	Lint Yield		Fiber Quality			
No.	Name	%	lbs/Acre		Mic	Length	Uniformity	Strength
1	22k	0.228	1296	bc	2.9	3445	80.6	29.6
2	32k	0.26	1489.3	a	3	4149	81.8	30.7
3	42k	0.261	1413.9	ab	3.4	4236.6	80.9	29.4
4	52k	0.234	1253.6	c	3.5	4142.2	81.2	28.8
5	62k	0.236	1180.7	c	3	3565.3	80.8	28.6
LSD (P=.05)			129.31					
CV			6.33					
Means followed by same letter do not significantly differ (P=.05, LSD)								

SENSOR BASED VARIABLE RATE HARVEST AIDS

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Abstract

Variable rate application of harvest aids could be a cost cutting means for cotton producers in the southern Great Plains. One method that has been proposed for variable rate application is using crop sensors to estimate percent open bolls and current defoliation level. Small plots were used to determine the relationship between the normalized difference vegetative index (NDVI) measured with sensors and the percentage of open bolls and nodes above cracked boll (NACB). This relationship was the basis for a variable rate prescription used in field trials. A cotton field in southwest Oklahoma was divided into three replications of four plots. This was a 2x2 factorial experiment with application method (uniform/variable) and input (PGR/DEF) as the treatments. This combination resulted in four test plots and allowed possible interaction of variable rate PGR and defoliant. This study was conducted on one field in 2008 and two fields in 2009. There was no significant difference in yield for any site/year. Averaged across the three site/years, the variable rate treatment resulted in 7 percent less PGR and 8 percent less DEF being prescribed. Though no measurements were made, there was no discernable difference in the efficacy of uniform and variable applications.

Introduction

Cotton is a perennial plant and unique in nature. For cotton, vegetative and reproductive growth occurs simultaneously. Although vegetative growth is necessary to support reproductive growth, excessive vegetative growth may result in low lint yield and many other problems. Cotton plant has aggressive growth habits which depend upon the water and nutrient uptake. Plant growth regulators (PGRs) are used to reduce vegetative growth and cause reproductive growth. Application of cotton growth regulators depends upon crop growth status. Crop growth status is indicated by different crop parameters called crop structural indices. Height to node ratio (HNR), fruit retention (FR), growth rate (GR), nodes above white flower (NAWF), main stem node number (MSN), nodes above cracked boll (NACB), percent open bolls, and plant height are the structural indices being used for cotton crop mapping (Kerby et al., 1997; Kerby et al., 1998; Bourland et al., 1992). Various researchers have used plant structural indices to define cotton growth status. Munier et al. (1993) related plant height with plant vigor and early fruit retention and considered plant height as a good indicator for use of PGRs. Kerby et al. (1990) also considered plant height as an important deciding for PGR application.

Several studies have been conducted to measure cotton physiological parameters to define cotton growth status at different growth stages for estimation of growth regulator application rate. Different methods that have been used to measure growth parameters are remote sensing using aircrafts and satellites, in field machine vision, and by manually mapping plant structure from different field locations (Reddy et al, 2003; Plant et al, 2000; Goel et al, 2003; Kataoka et al., 2003; Jenkins and McCarty, 1995). Reflectance data collected in visible, infrared, near infrared and microwave region is correlated with physically measured cotton growth and structural indices. Several studies have shown correlation between growth parameters and reflectance data. Some researchers have also used hyper and multi spectral data to measure yield and plant growth physiological parameters (Zarco-Tejada et al., 2005; Plant et al., 2000).

Though many vegetative indices exist, the most common and highly correlated index is Normalized Difference Vegetative Index (NDVI) (Tucker et al., 1980; Plant et al., 2000). Many studies have shown strong correlations between NDVI and different growth parameters for cotton. In addition, strong correlations have also been observed between NDVI and height of the top five nodes in cotton plants (Kirkpatrick et al., 2005). Plant et al., (2000) found strong correlation between NDVI and NACB ($r^2 > 0.80$) using multi spectral imagery. Also a weak correlation was observed between NDVI and NAFB (R^2= 0.51-0.65).
The objective of this research was to evaluate sensor based variable rate prescriptions for plant growth regulators and harvest aids (defoliant/boll opener) in a field scale experiment.

Materials and Methods

This experiment was a 2x2 factorial with application method and product as the factors. The application methods were uniform (U) and variable (V) and the products were plant growth regulators (PGR) and a defoliant/boll opener tank mix (DEF). Plots were randomized with three replications on a production cotton field near Altus, OK in 2008 and 2009 and on a bulk production block at the SWREC in 2009. Plots ran the entire length of the fields and were at least 26.7 feet wide. The wide varied on each field/year due to available equipment. Due to the field shape, plot length varied between 1250 and 2550 feet.

In 2008 the plant growth regulator was applied with a John Deere 6500 sprayer with a 60 foot boom. The sprayer was equipped with a Mid-Tech TASC 6300 rate controller and Trimble RTK Auto Pilot system, and Greenleaf Technologies TDVR 015 variable orifice nozzles. In 2008, the defoliant/boll opener was applied with a Big John sprayer with a 30 foot boom. This sprayer was equipped with a Raven SCS440 controller, Outback S2 guidance system, and SharpShooter™ nozzle control system. Both sprayers were equipped with GreenSeeker RT220 application and mapping systems to measure NDVI and send target application rates to the controllers. The Big John sprayer was used for all applications in 2009. The boom was reduced to 26.7 feet to match row spacing.

Plots were harvested with the cooperating farmer's John Deere 9965 cotton picker equipped with an Ag Leader yield monitor. The harvest width was four rows resulting in four passes per plot. Since plots were 18 rows wide, some picker passes contained data from two plots. Data from these passes were deleted from the file. The yield monitor data were "cleaned" to eliminate points where picker speed (<1.5 mph) or mass flow (<0.5 lbs/s) were abnormally low. Yield data were imported into ArcView 3.2 and assigned to plots by joining tables. The resulting data were averaged to obtain a single yield value for each plot.

Greenseeker® sensors were used to measure normalized difference vegetative index (NDVI) on small plot studies at the Southwest Research and Extension Center (SWREC) in Altus, OK. These data were correlated with plant mapping data to develop relationships for prescription applications. A hand held GreenSeeker® sensor was used to field validate the prescription at the time of application. Minor adjustments to the prescription were made as deemed necessary. Prescriptions are shown in figures 1 and 2 for the two years.

The PGR was applied to the production field on July 28, 2008. Pentia was mixed to apply 12 oz/ac of product at a 10 gpa application rate. The application rate was then adjusted based on NDIV and the prescription. Regardless of NDVI the application rate was held between 5 and 10 gpa resulting in a range of 6 and 12 oz/ac of Pentia. In 2009 PGR was applied to both fields on July 23 using the same product mix, but the new prescription. The maximum rate was the same, but the lowest rate in 2009 was 2.5 gpa resulting in 3 oz/ac of Pentia.

Defoliation occurred on October 11, 2008. The target application rate for the defoliant/boll opener tank mix was 12 gpa. This application rate consisted of 1.5 pints/ac of Finish and 1.1 pints/ac of DEF. Like the PGR, the application rate was then adjusted based on NDIV and the prescription. Regardless of NDVI the application rate was held between 8 and 16 gpa. This range kept the Finish rate between 1 and 2 pints/ac and the DEF rate between 0.7 and 1.5 pints/ac. Defoliation in 2009 occurred on October 2 on the production field and October 19 on the station. The tank mix for 2009 was the same as 2008, but the maximum rate was reduced to 12 gpa while the minimum rate stayed at 8 gpa. This kept the Finish rate between 1.0 and 1.5 pints/ac and the DEF rate between 0.7 and 1.1 pints/ac.

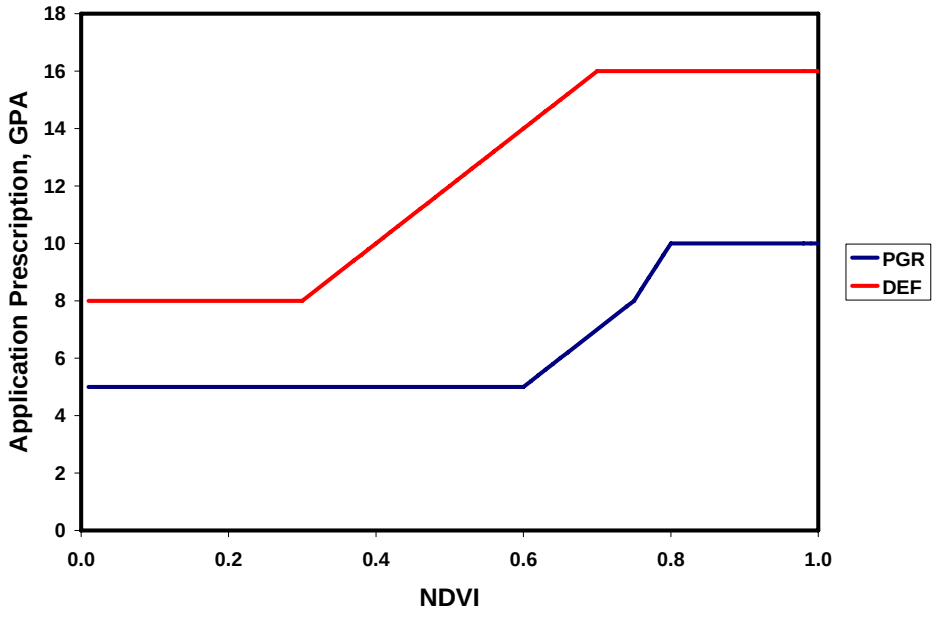

Figure 1. 2008 variable rate prescriptions for plant growth regulator (PGR) and a defoliant/boll opener (DEF) tank mix based on NDVI.

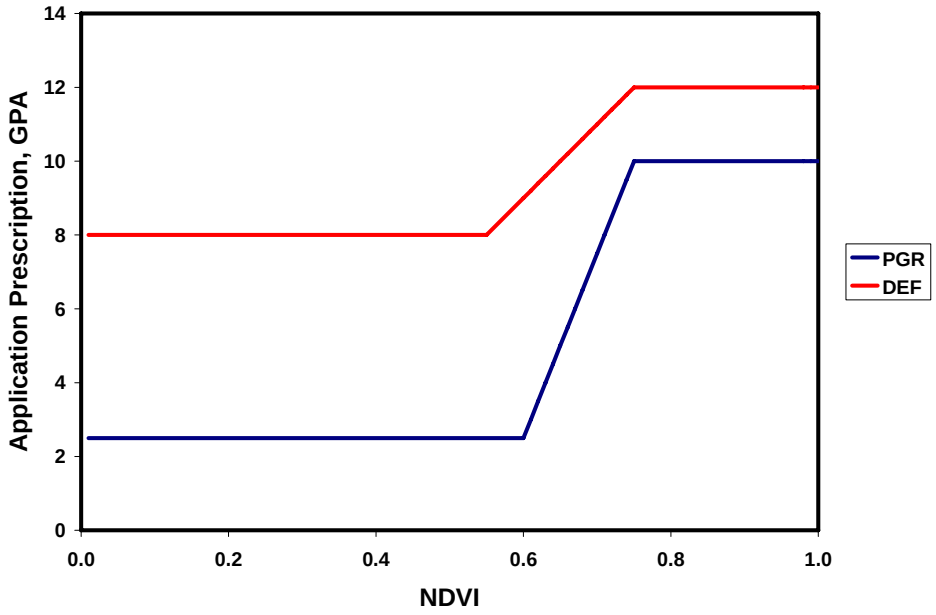

Figure 2. 2009 variable rate prescriptions for plant growth regulator (PGR) and a defoliant/boll opener (DEF) tank mix based on NDVI.

Results and Discussion

Average seed cotton yield in 2008 for the production field was 4220 lbs ac^{-1}. Yield variability independent of the treatment structure was evident in the yield map (figure 3). Generally yield was greater on the east side of the field. Low yield at the south end of the field was likely due to water. Salinity caused the low yielding areas in the center of the field. The replicated plots were used to account for some of this variability. Treatment mean yields are shown in Table 1. There was no significant yield difference and no interaction between treatments.

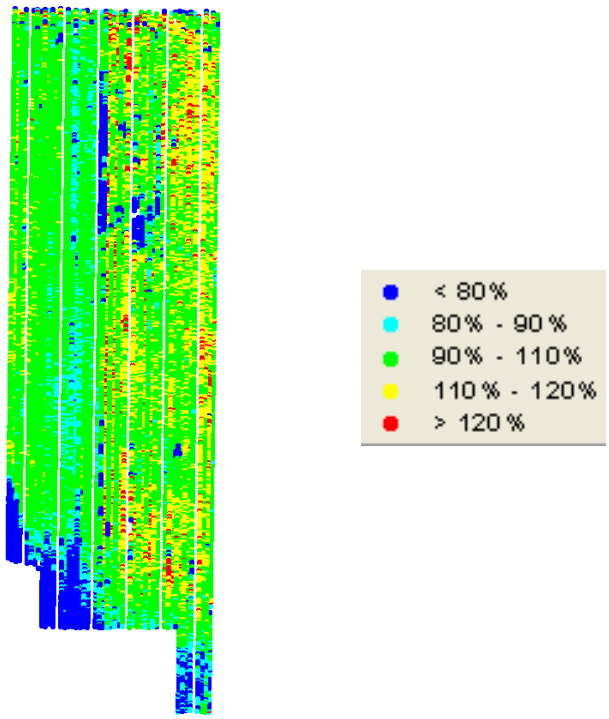

Figure 3. Normalized seed cotton yield map for the plot area of the production field in 2008. Average yield is 100%.

The prescription for variable rate PGR resulted in less product being used (Table 1). The variable rate PGR plots required about 9 percent less PGR than the uniform rate. However, the spray equipment was not able to apply the target rate as effectively as desired. The resulting PGR application was about 15 percent greater about than prescribed in the variable rate plots. Thus the actual PGR savings was closer to 6 percent.

However, the defoliant/boll opener variable rate prescription called for a higher average application rate than uniform (Table 1). The prescription rate was about 3 percent greater than the uniform rate. The sprayer used for the defoliant/boll opener application was better equipped for variable rate application and did a much better job of applying the desired rate. The difference in prescribed rate was due to the philosophy used in developing the prescription. The PGR prescription assumed that the uniform rate would be sufficient as the maximum variable rate whereas the DEF prescription assumed the uniform rate was adequate for the average condition. The philosophy used for the DEF prescription assumes the uniform rate was too low the high NDVI areas of the field.

Average seed cotton yield in 2009 for the production field was 4406 lbs ac^{-1}. Treatment mean yields are shown in Table 2. There was no significant yield difference and no interaction between treatments. Though not statistically significant, the variable rate PGR prescription called for 5 percent less product than the uniform rate. However, there was a significant difference in the prescribed defoliant application rate for variable and uniform treatments. However, the 2.5 percent difference was of little practical significance.

Average seed cotton yield in 2009 for the station field was 2750 lbs ac^{-1}. Treatment mean yields are shown in Table 3. There was no significant yield difference and no interaction between treatments. However, the prescribed defoliant for the variable rate defoliant treatment was significantly lower (25%) than the uniform treatment. Though not statistically significant, the variable rate PGR prescription called for 7 percent less product than the uniform rate.

While no data were collected to quantify efficacy of the products applied, there were no visible differences between treatments for all site-years, thus applications were considered effective.

Table 1. 2008 production field treatment means.

TRT	PGR	DEF	Yield	PGR R_x	PGR AR	DEF R_x	DEF AR
1	U	U	4213	10.0	10.0	12.0	12.0
2	U	V	4137	10.0	10.0	12.4	12.4
3	V	U	4340	9.0	9.4	12.0	12.0
4	V	V	4170	9.3	9.4	12.3	12.3

Table 2. 2009 production field treatment means.

TRT	PGR	DEF	Yield	PGR R_x	PGR AR	DEF R_x	DEF AR
1	U	U	4378	10.0	10.0	12.0	12.0
2	U	V	4356	10.0	9.9	11.8	11.6
3	V	U	4470	9.4	9.2	12.0	11.7
4	V	V	4421	9.6	8.9	11.7	11.4

Table 3. 2009 station field treatment means.

TRT	PGR	DEF	Yield	PGR R_x	PGR AR	DEF R_x	DEF AR
1	U	U	2736	10.0	10.0	12.0	11.9
2	U	V	2741	10.0	10.2	9.7	9.7
3	V	U	2751	9.4	9.4	12.0	11.9
4	V	V	2773	9.2	9.3	8.4	8.3

Summary

Variable rate application had no significant affect on yield. While product efficacy was not quantified, there was no visible difference between treatments for all site-years; thus uniform and variable applications were considered effective.

Variable rate prescriptions were refined over the course of this experiment. Variable rate prescriptions in the second year were more focused on saving product. More effort should be directed at developing a robust prescription that is valid over a wider range of conditions. These prescriptions should also consider the limitations of application equipment.

Variable rate PGR resulted in an average 7 percent reduction in prescribed product. The PGR prescriptions were similar across the two years. The variable rate DEF prescriptions were much different for the two years. Averaged over the three site-years, variable rate application resulted in an 8% defoliant/boll opener reduction.

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USE OF OPTICAL SENSORS TO EVALUATE DICAMBA INJURY TO COTTON

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Abstract

A technique was evaluated to assess dicamba herbicide damage to cotton using normalized difference vegetation index on plots treated with a continuously diluting logarithmic sprayer application of dicamba. Four applications were made from early squaring to cut out, and geo-referenced NDVI readings were taken. Plots were replicated three times and two study locations in southwest Oklahoma were used. Plots were harvested with a commercial picker equipped with a yield monitor. Dicamba injury to the cotton resulted in reduced yield in all treatments, the magnitude of the loss depended on growth stage at the time of application and concentration of dicamba. Yield reduction at the full rate of dicamba ranged from 22 to 98 percent. Correlation between yield and NDVI measured with sensors varied. In general, the correlation was greater for plots with early dicamba application when sensing was completed within 15 to 50 days of injury.

Introduction

Drift of hormone herbicides has historically resulted in damage to cotton and with the possible introduction of transgenic dicamba resistant cotton, there is more potential for accidental application or drift of dicamba to cotton without the resistance gene. In response to this, a protocol was developed to evaluate drift rates of dicamba on non-dicamba resistant cotton. In addition, commercially available sensors were used in an attempt to measure crop injury in an effort to predict yield response. Thus the objectives of this project were to determine dicamba injury to cotton from timing and rate and the ability to assess injury using active optical sensors.

Materials and Methods

Cotton variety Deltapine 164 B2RF was planted on May 14, 2008 and Phytogen 375 WRF was planted on May 19, 2009. Plots were on a Tillman/Hollister clay loam on the OSU Southwest Research and Extension Center. Row spacing was 40 inches. In 2008, plots were randomized strips four rows wide by 440 feet long, replicated three times. Spray applications were made on June 18, July 2, July 23, August 9, and August 27. The growth stages for applications were first square, first bloom, mid bloom, full bloom, and cutout. In 2009 plots were randomized strips four rows wide by 400 feet long, replicated four times. Spray applications were made on June 18, July 6, July 23, August 4, and August 26. The growth stages for applications were 4-5 leaf, first square, first bloom, mid bloom, and cutout.

Spray applications were made with a constantly diluting logarithmic broadcast sprayer that was calibrated to deliver half rates at 40 foot intervals. The initial rate of dicamba was 0.25 lb active ingredient per acre or 8 ounces of product per acre. At a distance of 400 feet, the dicamba application rate was 0.1% of initial rate or 0.00025 lb ac^{-1}. This procedure allowed evaluation of the complete rate range from full rate of dicamba recommended for vegetation control in other crops to less than 1/1000 of this rate at each application stage of the cotton.

Normalized difference vegetative index (NDVI) was collected with GreenSeeker® sensors five times throughout the season in 2008 and four times in 2009. Sensor data collection was scheduled around spray application and irrigation schedules. Data were recorded five times per second with an average distance of 1.5 feet between points in 2008 and once per second in 2009 for an average spacing of 5 feet. Geographic location was also recorded for each sensor reading. This data were transformed to local coordinates to determine the location of each sensor reading relative the end of the plot.

Plots were harvested with John Deere 9965 cotton picker equipped with an Ag Leader® yield monitor. Data were recorded once per second and with an average distance of 5.4 feet between points. All plots were harvested in the same direction and seed cotton weights were measured for each plot. The yield monitor data were exported from SMS software in ASCII format for further analysis. Total estimated seed cotton mass was determined from the mass flow data in the yield monitor export file. The actual seed cotton mass for each plot was measured with a boll buggy weigh system. The estimated seed cotton mass measured by the yield monitor was adjusted to match the mass measured by the boll buggy by correcting the seed yield at each point by the appropriate percent for the plot. Local coordinates were calculated from the geographical coordinates in Excel and the dicamba concentration for each point was determined based on distance from the beginning of the plot.

Yield was regressed as a function of dicamba concentration (conc) to fit a sigmoidal function (equation 1) using the PROC NLIN procedure in SAS®. The yield plateau of the sigmoid function is α. Predicted yield from the equation was divided by α to obtain a relative yield.

$$yield = \delta + \left(\frac{\alpha - \delta}{1 + \left(\frac{conc}{\gamma} \right)^{\beta}} \right) \qquad \text{Eq. 1}$$

yield is seed cotton yield in lbs/ac
α, δ, γ, and β are regression coefficients
conc is dicamba concentration in percent relative to the initial mix.

Since NDVI and yield monitor data were collected at different times and scales, the NDVI data within ± 5 feet of a yield point along each transect were averaged to correlate with yield at that point. Since the average spacing of yield monitor data was 5.4 feet, some NDVI values were used for multiple yield monitor points. This correlation was used to assess NDVI as a predictor of yield reduction due to herbicide injury.

Results and Discussion

All treatments impacted cotton yield through crop injury. However, the yield reduction was dependent upon dicamba concentration and growth stage at application. Table 1 shows the relative yield reduction for three concentrations of dicamba applied at the six growth stages over two years. This data were determined from the sigmoid regression. In general the yield loss in 2008 was greater than that in 2009. Application at first square caused significant injury, but the plant was able to partially recover and yield was reduced by about a third at 100 percent concentration in both years. However, during first and mid bloom, the full rate of dicamba caused large yield reductions in both years. The 10 percent concentration caused a 30-50% yield loss in 2008, but only a 10-15 percent yield reduction in 2009. Injury occurring during cutout had less affect on yield.

Table 1. Estimated yield reduction at three concentrations of dicamba for the growth stages at application.

	% Yield Reduction at Conc.					
	100%		10%		1%	
	2008	2009	2008	2009	2008	2009
4-5 Leaf	--	62	--	2	--	0
1st Square	35	37	7	7	0	2
1st Bloom	87	91	28	10	6	0
Mid Bloom	98	61	52	15	9	2
Full Bloom	44	--	20	--	6	--
Cutout	22	10	5	0	1	0

Seed cotton yield in 2008 as a function of dicamba concentration applied at first square is shown in figure 1 for the three replicated plots individually. While the yield plateau values at concentrations below 1 percent were different the general trend at concentrations above 10 percent was similar. In general, the sigmoidal equation fit the data with the exception of plot 303 where regression failed to converge. The sigmoidal equation may not have been the best choice for some treatments, but it was used for consistency and the ability to compare coefficients across treatments. The seed cotton yield from 2008 as a function of dicamba concentration applied at mid bloom is shown in figure 2 for the three replicated plots individually. Data from the first two reps were nearly identical whereas the third rep had a slightly greater plateau yield. Yield data from the other treatments are not shown, but observations between reps were similar to treatments 1 and 3. The r^2 values for treatment 5, dicamba applied at cutout, were the lowest.

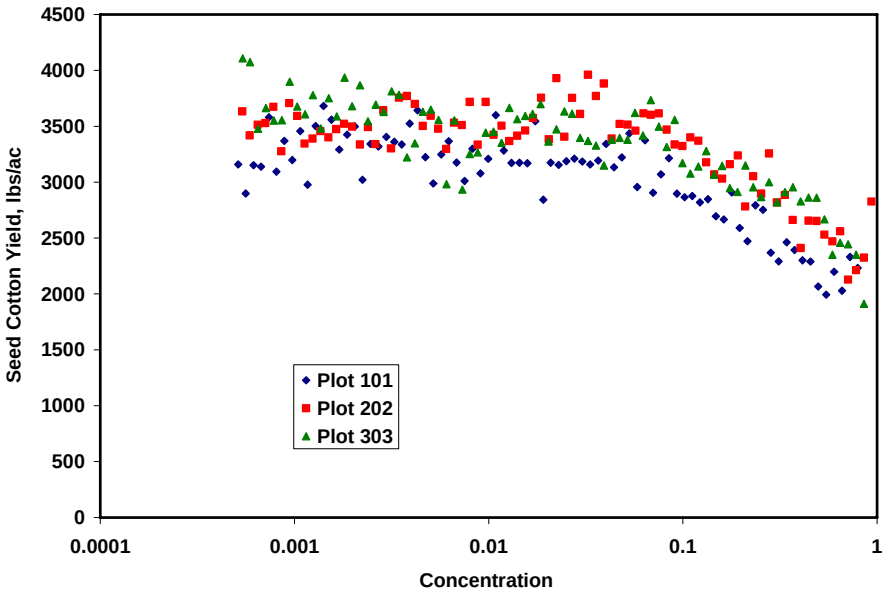


Figure 1. 2008 seed cotton yield as a function of dicamba concentration for application at first square.

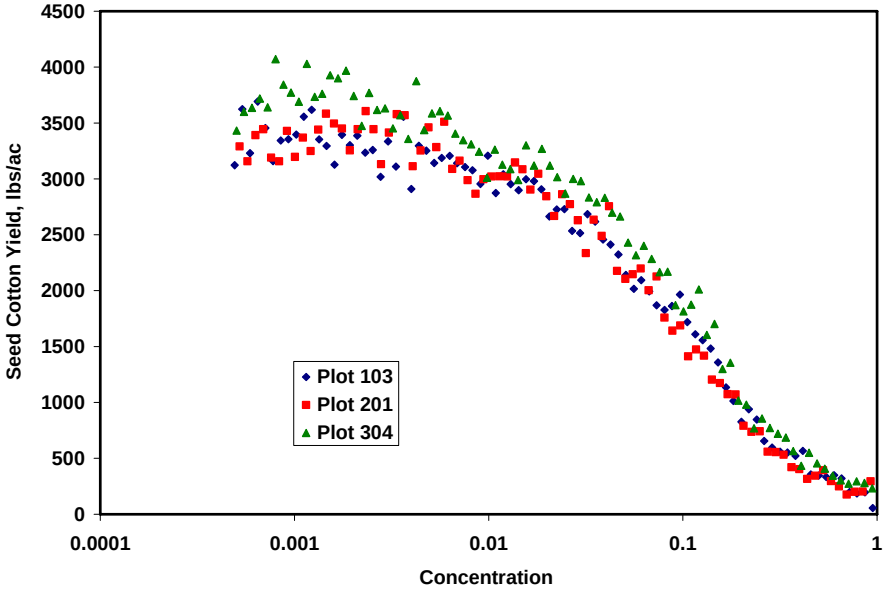


Figure 2. 2008 seed cotton yield as a function of dicamba concentration for application at mid bloom.

Active light sensors were used in an attempt to quantify herbicide injury. Figure 3 shows NDVI data measured 21 days after application as a function of dicamba concentration. This data are for two reps of the first treatment where dicamba was applied at first square. Data for one rep for this treatment was incomplete and was not included in any analysis. The NDVI decreases with increasing concentration at concentrations greater than about 5 percent, whereas is appears independent at lower concentrations. The correlation between NDVI and seed cotton yield for these two reps was approximately 0.80.

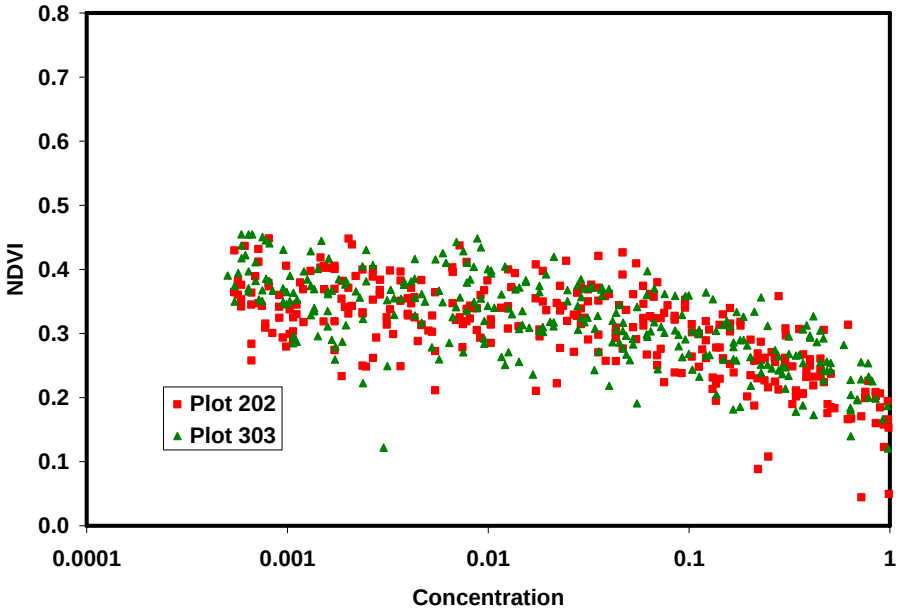


Figure 3. 2008 NDVI measured 21 days after application as a function of dicamba concentration for application at first square. Data for the first rep was incomplete and not used in the analysis

Figure 4 shows NDVI data for the first bloom application. Similar to Figure 3 this data were collected 22 days after application. This data shows a higher plateau value than Figure 3 because it is later in the season. However, NDVI is affected at lower concentrations of dicamba than the first square application. The NDVI decreases with increasing concentration at rates above 1 percent. The correlation between NDVI shown in Figure 4 and seed cotton yield exceeded 0.90. Figure 5 shows NDVI as a function of dicamba

concentration for the mid bloom application. Consistent with Figures 3 and 4, this data were taken 22 days after application. Even though the data were collected about three weeks after the data in Figure 4, the plateau NDVIs are similar. The NDVI decreases with increasing concentration at levels greater than 10 percent. However the magnitude of the slope is not large. The average correlation between seed cotton yield and NDVI for the three reps shown in figure 5 is less than 0.60. Even though the mid bloom application had the greatest effect on yield, the correlation between NDVI and yield for this treatment was not high.

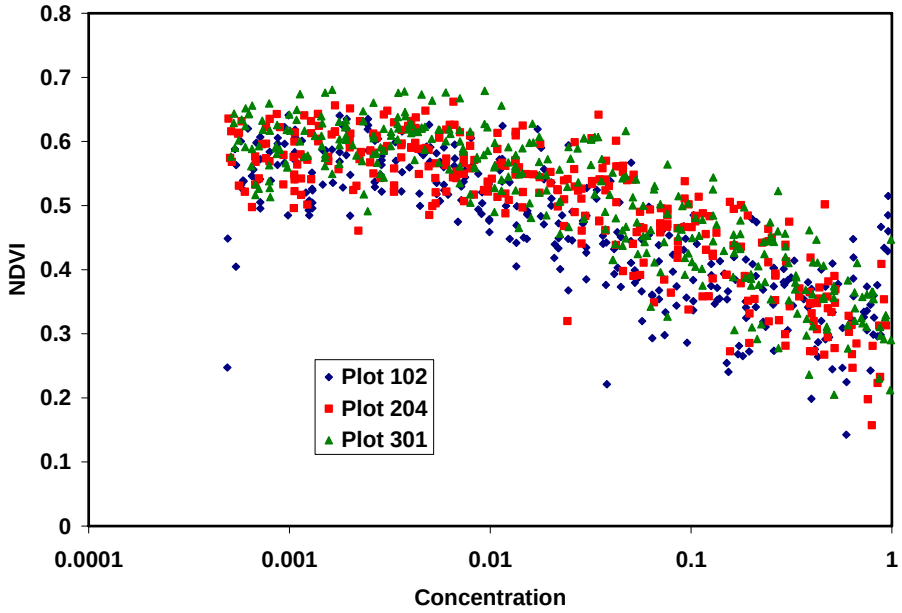


Figure 4. 2008 NDVI measured 22 days after application as a function of dicamba concentration for application at first bloom.

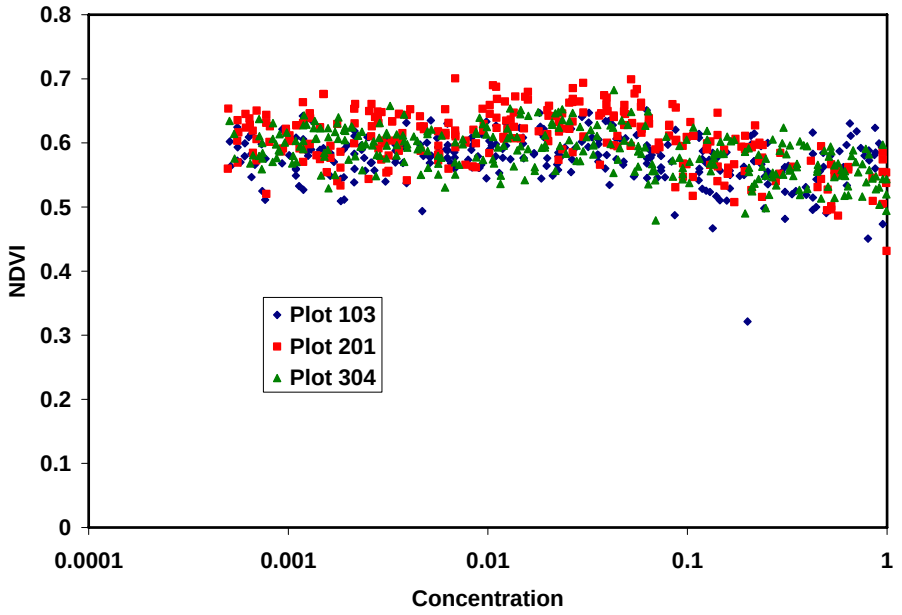


Figure 5. 2008 NDVI measured 22 days after application as a function of dicamba concentration for application at mid bloom.

Correlation between NDVI readings and yield was dependent on growth stage when injury occurred and time between injury and sensing. The outlined plot in figure 6 shows crop discoloration at mid bloom resulting from a dicamba application at 1st bloom. This discoloration was also evident in the NDVI readings.

Figure 6. Injury from first bloom application shown at mid bloom. The four rows to the left were treated at first square and the rows on the right were untreated.

In general, correlation was better at early growth stages (1st square to 1st bloom) when sensing was completed within 15 to 50 days after injury (Figure 7). The apparent outliers from 2009 are reps 3 and 4. These reps were stacked behind the first two reps and may have been affected by irrigation. Regardless, the correlations are lower and more varied once 60 days from injury have passed. As the crop matured to mid bloom and later, there was less time after injury for sensing (Figure 8). Correlation between NDVI and yield continually decreased from the time of crop injury. Data from 2009 are less consistent than 2008 data.

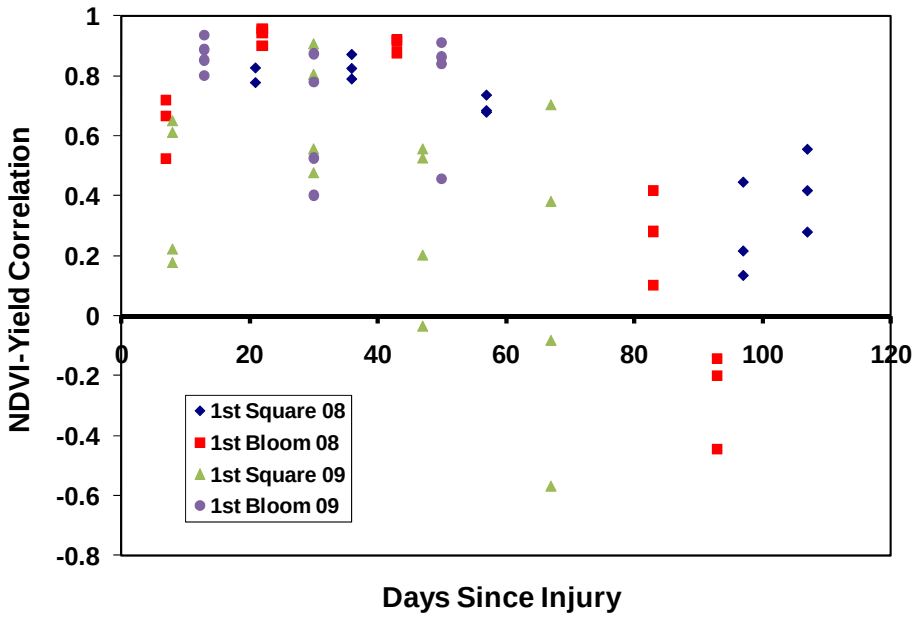


Figure 7. Correlation between NDVI readings and yield as a function of days since injury occurred for two early growth stages when injury occurred.

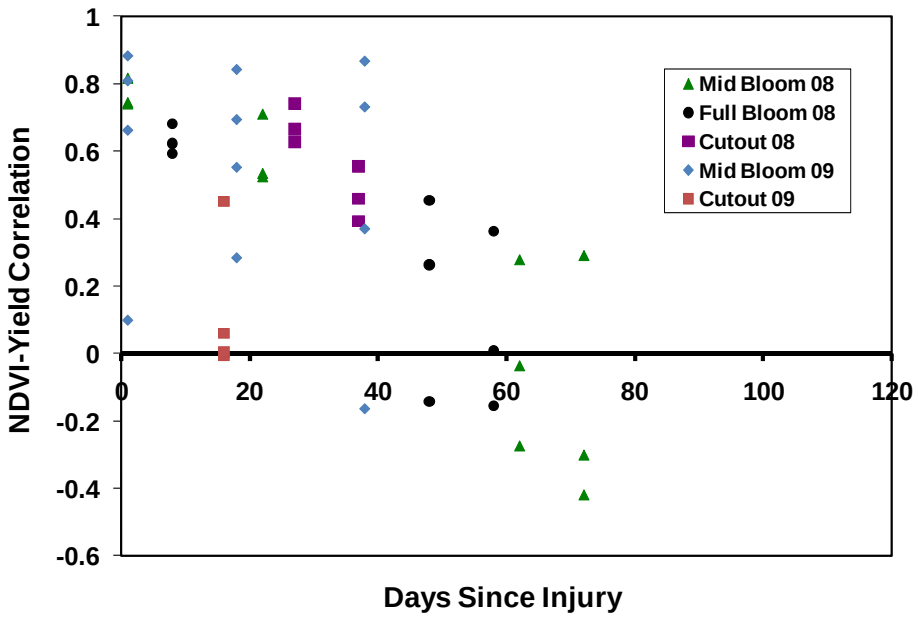


Figure 8. Correlation between NDVI readings and yield as a function of days since injury occurred for three later growth stages when injury occurred.

Though the correlation values shown in Figures 7 and 8 show some promise for estimating potential yield reduction due to dicamba application, the predictive capability of these data has not been sufficiently explored. To fully assess the injury with optical sensors or remotely sensed images, NDVI must be capable of predicting yield.

Summary

Yield reduction from dicamba injury was dependent on growth stage and rate. Cotton tended to 'grow out' of early season damage and was less susceptible to late season injury. Mid season application caused the most severe injury. Measuring NDVI showed some promise for assessing the effect of dicamba injury on cotton yield when it occurs at first bloom and earlier. Furthermore there was a longer time window for detecting early season injury. Though NDVI correlated with yield for early application of dicamba, the predicative capability may be limited. Future efforts will focus on improving the predictive capability of NDVI for dicamba injury in cotton.

Weed Control Projects

Weed control decisions continue to be an important part of cotton production in Oklahoma. The introduction of new herbicides and new seed technologies are increasing producer's options and maximizing efficiency of their operations. Our purpose is to identify the best options available to Oklahoma producers and help adapt those programs to their operation. The following trials attempt to address current or potential weed control issues important to Oklahoma cotton producers.

Horseweed Control in No-till Cotton

The widespread adoption of no-till cotton production (typically relying upon glyphosate based weed control programs) has magnified the frequency of difficulty producers experience when trying to chemically control horseweed. The lack of both pre-season and in-season tillage requires producers to primarily depend on hormone-type herbicides (2,4-D or dicamba) for effective control of horseweed due to the in-effectiveness of glyphosate applied alone. Unfortunately, horseweed control programs including either 2,4-D or dicamba must be initiated several days before planting in order to avoid potential carryover issues. Often times, new horseweed may re-emerge in this period prior to planting. In order to achieve effective long-term, pre-plant control of horseweed, 2,4-D or dicamba must be tank-mixed with products providing effective residual control of horseweed without the potential for carryover or injury to newly planted cotton. There are currently very few chemical options that fit these criteria. Sharpen (saflufenacil) is a new product introduced by BASF which has the potential to provide both burn-down (post-emergence) as well as residual activity on horseweed. In addition, saflufenacil also belongs to a class of chemistry (pyrimidinediones) which currently has no documented cases of chemical resistance. Two replicated experiments were conducted in the spring of 2009 in order to explore the effectiveness of this product on horseweed when tank-mixed with either glyphosate, 2,4-D or dicamba. The objective was to compare current horseweed control programs to programs including Sharpen (saflufenacil) herbicide applied prior to planting in no-till cotton production.

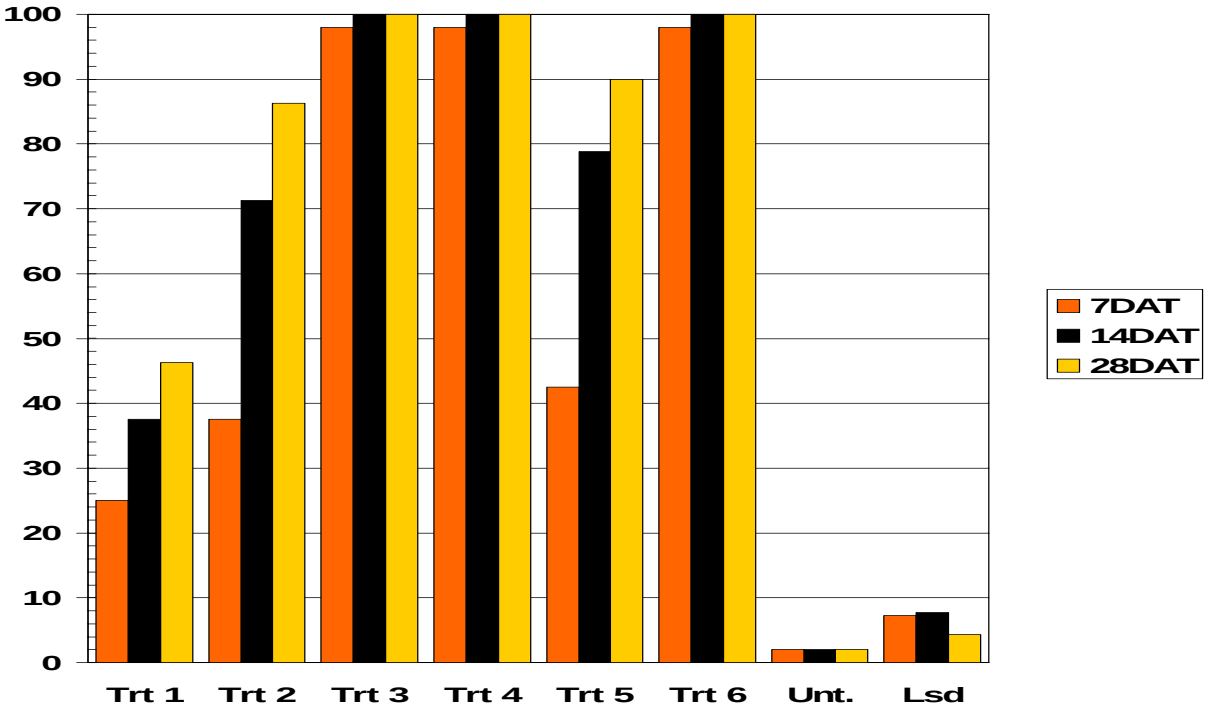
Field studies were conducted in 2009 in both Jackson and Tillman counties in order to evaluate the effectiveness of Sharpen (saflufenacil) herbicide for the control of horseweed in no-till cotton. Treatments were arranged in a randomized complete block design with four replications on clay loam soils. Broadcast over-the-top herbicide applications were made with a compressed air, high-clearance, sprayer applying 15 gallons of water per acre at 4 mph. Six treatments were applied on March 26th, 2009 (42 days before planting) at the Jackson county location. The horseweed was still in the rosette stage at the time of application. Five treatments were applied on April 2nd, 2009 at the Tillman county location. The horseweed had already begun to bolt and was 2-5 inches in height at application timing. The treatments for each location are listed below.

Jackson County Location

1.	Glystar Original + NIS	32 oz/A + 0.25% v/v
2.	Glystar Original + 2,4-D + NIS	32 oz/A + 8 oz/A + 0.25% v/v
3.	Glystar Original + Sharpen + MSO	32 oz/A + 1 oz/A + 1% v/v
4.	Glystar Original + Sharpen + 2,4-D + MSO	32 oz/A + 1 oz/A + 8 oz/A + 1% v/v
5.	Glystar Original + Clarity + NIS	32 oz/A + 8 oz/A + 0.25% v/v
6.	Glystar Original + Clarity + Sharpen + MSO	32 oz/A + 8 oz/A + 1 oz/A + 1% v/v

Horseweed Control in No-till Cotton (cont.)

Jackson County Location

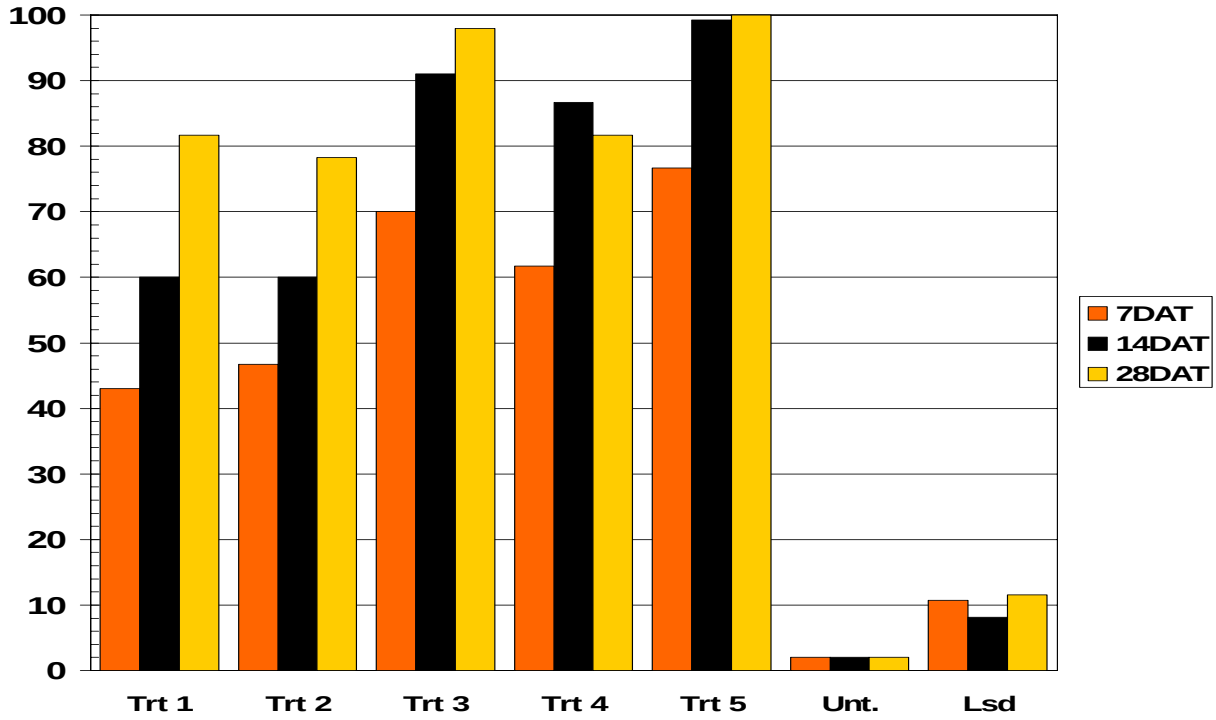


Tillman County Location

1.	Glystar Original + Clarity + NIS	32 oz/A + 8 oz/A + 0.25% v/v
2.	Glystar Original + Clarity + Valor	32 oz/A + 8 oz/A + 2 oz/A + 0.25% v/v
3.	Glystar Original + Clarity + Sharpen + MSO	32 oz/A + 8 oz/A + 1 oz/A + 1% v/v
4.	Glystar Original + 2,4-D + Valor + NIS	32 oz/A + 21 oz/A + 2 oz/A + 0.25% v/v
5.	Glystar Original + 2,4-D + Sharpen + MSO	32 oz/A + 21 oz/A + 1 oz/A + 1 % v/v

Horseweed Control in No-till Cotton (cont.)

Tillman County Location



Horseweed control evaluations were taken at 7, 14 & 28 days after treatment at each location. At the Jackson county location 7 days after treatment (DAT) only treatments including Sharpen (Saflufenacil) provided acceptable control (>75%). However by 28 DAT treatment 2 (Glystar Original + 2,4-D) and treatment 5 (Glystar Original + Clarity) controlled horseweed 86-90%, while treatments including Sharpen controlled horseweed 100%. Treatment 1 (Glystar Original alone) provided less than 30% control 7 DAT and less than 50% control 28 DAT. At the Tillman county location 7 DAT, only treatments including Sharpen controlled horseweed 70-78%. All other treatments observed 7 DAT controlled horseweed $\leq$ 62%. By 28 DAT treatments including Sharpen controlled horseweed 98-100%. The remaining treatments which included Glyphosate with either 2,4-D or Clarity with or without Valor controlled horseweed 78-82%. Although Sharpen (saflufenacil) does have the potential for residual control of horseweed, neither location had a post-application flush of new horseweed after the initial application dates. Therefore residual control of horseweed from either Valor or Sharpen was not observed in 2009. At both locations, good uniform stands of cotton were established with no signs or symptoms of herbicide carryover (stunting, malformation, discoloration, etc.) from either Valor or Sharpen. Further studies will be conducted in 2010 to compare residual control provided by Sharpen to that of Valor and to revisit the burn-down properties of Sharpen on horseweed in Oklahoma. **It should also be noted that according to the Sharpen product label you should "not apply Sharpen where an at-planting application of an organophosphate or carbamate insecticides (this includes Temik and Orthene) is planned or severe injury may result."**

Glyphosate alone – 30 Days After Trt

Glyphosate + Sharpen

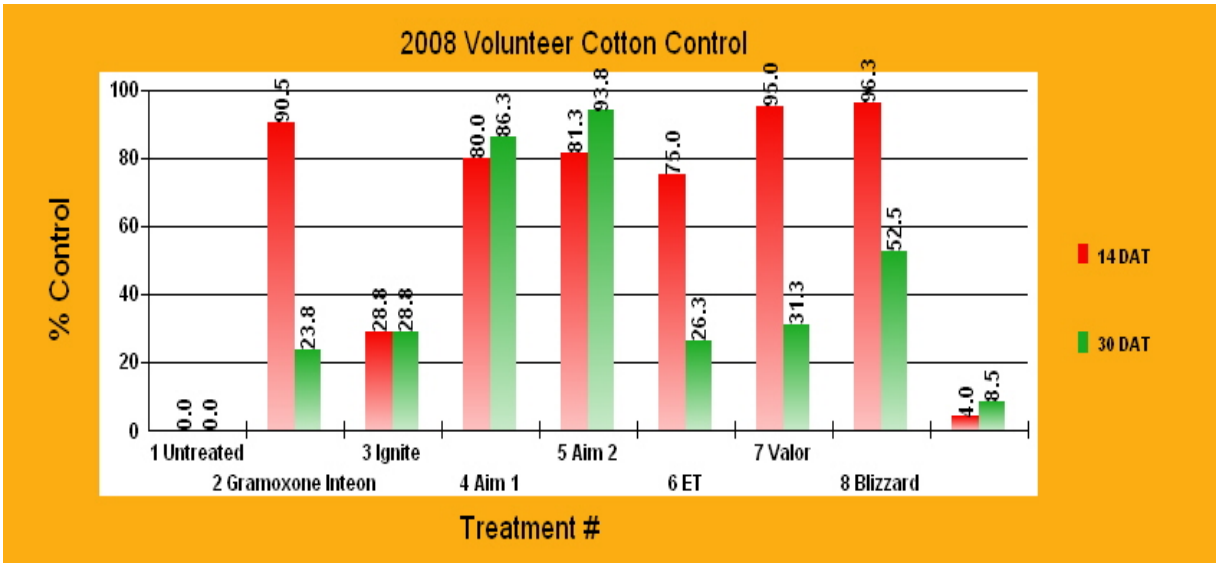
30 Days After Trt

Controlling Volunteer Glyphosate Tolerant Cotton

Volunteer glyphosate tolerant cotton has gradually become a legitimate problem for cotton producers adopting no-till production practices. In fact, circumstances often make it impossible for growers to control volunteer without some form of tillage. As is the case with certain weed control situations, volunteer cotton germinates and emerges at the same time planted cotton emerges leaving producers with very few options. The lack of height differential between the crop and the volunteer make it almost impossible to safely and effectively control the volunteer with hooded or shielded applications. For this reason it is imperative that no-till producers make every attempt to control any volunteer present prior to planting in hopes of avoiding this situation. In 2008 a study was conducted on the OSU Research and Extension Center in Altus, Oklahoma in order to evaluate the effectiveness of several treatments on relatively small cotton. Prior work from other universities has confirmed that volunteer glyphosate tolerant cotton under the four leaf stage can be controlled relatively easily with several chemical options. However, at the same time they also concluded that larger cotton quickly becomes more difficult to control. Therefore the 2008 study was focused on treatments to volunteer cotton in the 6-8 leaf stage. The treatments applied and observation data from that project are presented below.

2008 Volunteer Control Study Treatments-Applied at 6-8 Leaf Cotton Stage

Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage
1	Untreated Check			
2	Gramoxone Inteon	24	oz/a	6-8lf
	Induce	0.5	% v/v	6-8lf
3	Ignite	28	oz/a	6-8lf
	Induce	0.5	% v/v	6-8lf
4	Aim	1	oz/a	6-8lf
	Crop Oil Concentrate	1	% v/v	6-8lf
5	Aim	1.5	oz/a	6-8lf
	Crop Oil Concentrate	1	% v/v	6-8lf
6	ET	2	oz/a	6-8lf
	Crop Oil Concentrate	1	% v/v	6-8lf
7	Valor	2	oz/a	6-8lf
	Crop Oil Concentrate	1	% v/v	6-8lf
8	Blizzard	1.25	oz/a	6-8lf
	Crop Oil Concentrate	1	% v/v	6-8lf



In 2008 all treatments except Ignite controlled 6-8 leaf volunteer 75% or greater 14 days after treatment. Typically ignite performs much better , however these treatments were applied to volunteer from Phytogens 485 WRF which is known to have some tolerance to Ignite herbicide. By 30 days after treatment only treatments 4 and 5 controlled volunteer cotton effectively (≥86%). In 2009 all treatments except for Ignite were repeated, however the volunteer cotton was at the 8-10 leaf stage at application time. Treatments were applied in 15 gallons of water with TurboTee nozzles at 26 PSI. Detailed application information is presented in tables below. In 2009 each of the PPO inhibitors were applied with either crop oil concentrate or methylated seed oil. Unfortunately two mixing errors occurred. The first resulted in Blizzard only being applied with crop oil. The second error was made on treatment 2 (an older 3 lb formulation was mistakenly used) and resulted in a very high rate of Gramoxone Inteon. The intended rate of Gramoxone Inteon was 2.4 pt/A of the 2lb material. Due to the error the actual applied rate was 3.5 pt/A. Fourteen days after treatment Gramoxone, Aim, Blizzard and Valor with methylated seed oil controlled 8-10 leaf volunteer greater than 76%. By 30 days after treatment all treatments observed were showing vigorous regrowth except for Gramoxone Inteon. Gramoxone Inteon applied at 3.5 pt/A controlled 8-10 leaf volunteer 98.3% 30 days after treatment. This study will be repeated in 2010.

2009 Treatments Evaluated at 8-10 Leaf Cotton Stage:

Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Code	% Control 7/21/2009		% Control 8/7/2009	
1	Untreated Check					0	f	0	b
2	Gramoxone Inteon	3.5	pt/a	8-10lf	A	99	a	98.3	a
	Induce	0.5	% v/v	8-10lf	A				
3	Blizzard	1.25	oz/a	8-10lf	A	82.5	bc	0	b
	Crop Oil Concentrate	1	% v/v	8-10lf	A				
4	Untreated Check					0	f	0	b
5	Aim	1.5	oz/a	8-10lf	A	77.5	bc	0	b
	Crop Oil Concentrate	1	% v/v	8-10lf	A				
6	Aim	1.5	oz/a	8-10lf	A	76.3	c	0	b
	Methylated Seed Oil	2	pt/a	8-10lf	A				
7	ET	2.5	oz/a	8-10lf	A	60	d	0	b
	Crop Oil Concentrate	1	% v/v	8-10lf	A				
8	ET	2.5	oz/a	8-10lf	A	47.5	e	0	b
	Methylated Seed Oil	2	pt/a	8-10lf	A				
9	Valor	2	oz/a	8-10lf	A	45	e	0	b
	Crop Oil Concentrate	1	% v/v	8-10lf	A				
10	Valor	2	oz/a	8-10lf	A	83.8	b	0	b
	Methylated Seed Oil	2	pt/a	8-10lf	A				
LSD (P=.05)							6.97		1.08
CV							8.4		7.61

Application Description

	A
Application Date:	7/7/2009
Time of Day:	8:15 AM
Application Method:	Spray
Application Timing:	8-10 Leaf
Application Placement:	Broadcast
Applied By:	OSU
Air Temperature, Unit:	79 F
% Relative Humidity:	71
Wind Velocity, Unit:	5.2 mph
Wind Direction:	S
Soil Temperature, Unit:	82 F
Soil Moisture:	Marginal
% Cloud Cover:	0
Next Rain Occurred On:	7/16/2009

Application Equipment

	A
Appl. Equipment:	Lee Spider
Operating Pressure, Unit:	26 PSI
Nozzle Type:	TurboTee
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 in
Nozzles/Row:	2
Ground Speed, Unit:	3 mph
Carrier:	Water
Spray Volume, Unit:	15 GPA
Mix Size, Unit:	1 gal
Propellant:	comp.air

Morningglory Control in Furrow Irrigated Cotton

Morningglory continues to be a problem for irrigated cotton producers in Oklahoma. Despite the continued problems with morningglory Oklahoma's cotton producers have quickly adopted glyphosate tolerant varieties because they feel that this system is the best overall option currently available. As transgenic seed costs continue to rise producers are reconsidering the costs of these weed control systems and their potential profitability. At the same time the issue of weed resistance continues to make headlines in most agriculturally based magazines and newspapers. One continual and common theme in the fight against resistance is the need for the use of residuals within these glyphosate tolerant systems. The treatments below were applied in order to compare both season-long weed control and the costs and returns of each system. The tables below present the details of each treatment and the associated herbicide costs.

Phytogen 375 WRF was planted on the 29th of May, 2009 into 4 row by 30 foot plots. Each block received seven three inch irrigations beginning July 7th and ending September 1st. Thrips and fleahoppers were controlled in-season with Temik and Vydate ,respectively. Plots received Finish plus Def plus Ginstar for harvest preparation approximately two weeks prior to harvest. Plots were harvested on November 20th, 2009. A John Deere 482 brush stripper was used in combination with digital on-board platform scales. Samples were taken from each treatment and ginned. Fiber samples were taken from each yield sample and sent to the Texas Tech University Fiber and Biopolymer Research Institute where HVI analysis is being performed. Costs of each treatment are listed below.

All treatments received a burn-down application of Roundup Powermax just prior to planting (referred to as preemergence treatment with application code A). Treatment number 1 received 3.2 pt/A of Caparol applied preemergence followed by one early postemergence application of 3.5 oz/A of Staple LX and another late postemergence application of Roundup Powermax. Treatment number two received two in-season applications of Roundup Powermax alone. Treatment number three received a combination of Roundup Powermax plus Staple LX applied early postemergence followed by Roundup Powermax applied late postemergence. All treatments provided acceptable control of the pitted morningglory. No statistical differences were observed between the three treatments. Plot yields are reported in the table below. There were no statistical differences between the yields generated from any of the three treatments. Fiber data not yet been received therefore no loan values have been assigned to any of the treatments at this point. Due to the fact that there were no statistical differences between treatment performance or yields it stands to reason that the most economical herbicide treatment evaluated would be the cheapest, treatment 2 (three applications of Roundup Powermax alone).

Weed Control and Yield

Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Code	9/1/2009 % Control		11/20/2009 Gin %	11/20/2009 Lint Yield lbs/Acre	
1	Roundup Powermax	32	oz/a	Preemerg	A	97.3	a	0.235	1367.8	a
	Caparol	3.2	pt/a	Preemerg	B					
	Staple LX	3.5	oz/a	EP	C					
	Crop Oil Concentrate	1	% v/v	EP	C					
	Roundup Powermax	32	oz/a	LP	D					
2	Roundup Powermax	32	oz/a	Preemerg	A	96.5	a	0.25	1423.8	a
	Roundup Powermax	22	oz/a	EP	C					
	Roundup Powermax	32	oz/a	LP	D					
3	Roundup Powermax	32	oz/a	Preemerg	A	97.3	a	0.241	1368.6	a
	Roundup Powermax	22	oz/a	EP	C					
	Staple LX	1.8	oz/a	EP	C					
	Roundup Powermax	32	oz/a	LP	D					
LSD (P=.05)						2.88			186.69	
CV						1.86			8.44	

Herbicide Treatment Costs

Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Code	Herbicide Costs
1	Roundup Powermax	32	oz/a	Preemerg	A	41.00
	Caparol	3.2	pt/a	Preemerg	B	
	Staple LX	3.5	oz/a	EP	C	
	Crop Oil Concentrate	1	% v/v	EP	C	
	Roundup Powermax	32	oz/a	LP	D	
2	Roundup Powermax	32	oz/a	Preemerg	A	21.00
	Roundup Powermax	22	oz/a	EP	C	
	Roundup Powermax	32	oz/a	LP	D	
3	Roundup Powermax	32	oz/a	Preemerg	A	37.00
	Roundup Powermax	22	oz/a	EP	C	
	Staple LX	1.8	oz/a	EP	C	
	Roundup Powermax	32	oz/a	LP	D	

Prowl Applied Over-the-Top in Roundup Flex Cotton

						7/1/2009			7/8/2009		7/22/2009
Trt	Treatment		Rate	Growth	Appl	Cotton		Pigweed	Cotton	Pigweed	Pigweed
No.	Name	Rate	Unit	Stage	Code	% Injury		%Control	% Injury	%Control	%Control
1	Roundup Powermax	22	oz/a	6-8lf	A	0		100	0	100	100
2	Roundup Powermax	22	oz/a	6-8lf	A	0		100	0	100	100
	Prowl H20	1	lb ai/a	6-8lf	A						
3	Roundup Powermax	22	oz/a	6-8lf	A	0		100	0	100	100
	Dual Magnum	1.33	pt/a	6-8lf	A						
LSD (P=.05)											
CV											
Means followed by same letter do not significantly differ (P=.05, LSD)											

Trt	Treatment		Rate	Growth	Appl	Gin		Lint Yield		Fiber Quality			
No.	Name	Rate	Unit	Stage	Code	%		lbs/Acre		Mic	Length	Uniformity	Strength
1	Roundup Powermax	22	oz/a	6-8lf	A	0.384	b	874	a	4.4	1.11	80.9	28.4
2	Roundup Powermax	22	oz/a	6-8lf	A	0.384	b	859.4	a	4.5	1.06	81.7	27.1
	Prowl H20	1	lb ai/a	6-8lf	A								
3	Roundup Powermax	22	oz/a	6-8lf	A	0.385	a	893	a	4.4	1.09	81.3	28.5
	Dual Magnum	1.33	pt/a	6-8lf	A								
LSD (P=.05)								86.45					
CV								6.17					
Means followed by same letter do not significantly differ (P=.05, LSD)													

Prowl Applied Over-the-Top in Roundup Flex Cotton (cont.)

Application Description	
	A
Application Date:	6/24/2009
Time of Day:	9:00 AM
Application Method:	Spray
Application Timing:	6-8 lf
Application Placement:	Broadcast
Applied By:	OSU
Air Temperature, Unit:	81 F
% Relative Humidity:	56
Wind Velocity, Unit:	4 mph
Wind Direction:	ESE
Soil Temperature, Unit:	74 F
Soil Moisture:	Good
% Cloud Cover:	0
Next Rain Occurred On:	6/28/2009
Application Equipment	
	A
Appl. Equipment:	Lee Spider
Operating Pressure, Unit:	26 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 in
Nozzles/Row:	2
Boom Length, Unit:	13.3 ft
Ground Speed, Unit:	4 mph
Carrier:	water
Spray Volume, Unit:	10 GPA
Mix Size, Unit:	1 gallon
Propellant:	Comp. Air
Tank Mix (Y/N):	y

Resolve and Firstshot Preplant in Cotton

						6/12/2009		6/11/2009		6/18/2009		6/24/2009		7/7/2009	
Trt	Treatment		Rate	Growth	Appl	Stand		Stunting		Stunting		Stunting		Stunting	
No.	Name	Rate	Unit	Stage	Code	#/10 ft		%		%		%		%	
1	Resolve	1	oz/a	30 DBP	A	39.8	bc	16.3	c	15	cd	10	c	2.5	bc
2	Resolve	2	oz/a	30 DBP	A	41	abc	25	b	25	ab	17.5	abc	7.5	ab
3	Resolve	1	oz/a	15 DBP	B	40.3	bc	0	d	15	cd	0	d	0	c
4	Resolve	2	oz/a	15 DBP	B	40	bc	0	d	12.5	d	18.8	ab	0	c
5	Harmony	0.4	oz/a	30 DBP	A	40.8	abc	22.5	b	17.5	bcd	12.5	bc	0	c
	Express	0.4	oz/a	30 DBP	A										
6	Harmony	0.8	oz/a	30 DBP	A	36.8	c	47.5	a	27.5	a	25	a	12.5	a
	Express	0.8	oz/a	30 DBP	A										
7	Harmony	0.4	oz/a	15 DBP	B	36.8	c	0	d	21.3	abc	12.5	bc	0	c
	Express	0.4	oz/a	15 DBP	B										
8	Harmony	0.8	oz/a	15 DBP	B	38.3	c	0	d	22.5	abc	25	a	12.5	a
	Express	0.8	oz/a	15 DBP	B										
9	Untreated Check (30 DBP)					45.5	a	0	d	0	e	0	d	0	c
10	Untreated Check (15 DBP)					43.5	ab	0	d	0	e	0	d	0	c
LSD (P=.05)						5.22		4.48		7.93		7.81		5.19	
CV						8.94		27.73		34.99		44.38		102.13	
Means followed by same letter do not significantly differ (P=.05, LSD)															

						7/22/2009									
Trt	Treatment		Rate	Growth	Appl	Node of FFB		Gin		Lint Yield		Fiber Quality			
No.	Name	Rate	Unit	Stage	Code	10p Avg.		%		Lbs/Acre		Mic	Length	Uniformity	Strength
1	Resolve	1	oz/a	30 DBP	A	6.15	e	0.298	d	1034.6	ab	4.8	1.09	82.3	28.7
2	Resolve	2	oz/a	30 DBP	A	6.53	cde	0.302	c	1084.6	ab	4.6	1.08	81.5	30.8
3	Resolve	1	oz/a	15 DBP	B	6.98	ab	0.294	e	1051.1	ab	4.6	1.09	81	28.1
4	Resolve	2	oz/a	15 DBP	B	6.9	bc	0.265	h	946	bc	3.9	1.12	82.1	28.8
5	Harmony	0.4	oz/a	30 DBP	A	6.78	bcd	0.31	a	1069.5	ab	4.5	1.09	82.1	29.3
	Express	0.4	oz/a	30 DBP	A										
6	Harmony	0.8	oz/a	30 DBP	A	6.53	cde	0.298	d	1042.7	ab	4.4	1.09	81.4	29.4
	Express	0.8	oz/a	30 DBP	A										
7	Harmony	0.4	oz/a	15 DBP	B	6.78	bcd	0.287	g	982.3	ab	4.4	1.11	83.2	29.9
	Express	0.4	oz/a	15 DBP	B										
8	Harmony	0.8	oz/a	15 DBP	B	7.38	a	0.258	i	819.8	c	3.8	1.08	80	28.1
	Express	0.8	oz/a	15 DBP	B										
9	Untreated Check (30 DBP)					6.4	de	0.304	b	1115	a	4.7	1.03	81.4	28.5
10	Untreated Check (15 DBP)					6.15	e	0.289	f	1086.8	ab	4.4	1.08	81.5	29
LSD (P=.05)						0.426				151.95					
CV						4.41				10.23					
Means followed by same letter do not significantly differ (P=.05, LSD)															

Resolve and Firstshot Preplant in Cotton

Application Description		
	A	B
Application Date:	4/21/2009	5/20/2009
Time of Day:	11:30 AM	9:00 AM
Application Method:	Spray	Spray
Application Timing:	30 DBP	15 DBP
Application Placement:	Broadcast	Broadcast
Applied By:	OSU	OSU
Air Temperature, Unit:	75 F	62 F
% Relative Humidity:	32	68
Wind Velocity, Unit:	7 mph	5 mph
Wind Direction:	NW	SE
Soil Temperature, Unit:	62 F	72 F
Soil Moisture:	Good	Good
% Cloud Cover:	0	0
Next Rain Occurred On:	4/29/2009	5/23/2009
Application Equipment		
	A	B
Appl. Equipment:	Spider	Spider
Operating Pressure, Unit:	26 PSI	26 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	11002	11002
Nozzle Spacing, Unit:	20 in	20 in
Nozzles/Row:	2	2
Ground Speed, Unit:	4 mph	4 mph
Carrier:	Water	Water
Spray Volume, Unit:	10 GPA	10 GPA
Mix Size, Unit:	1 gal	1 gal
Propellant:	Comp. Air	Comp. Air

Defoliation Projects

Conditioning cotton for harvest is a subjective issue. Yield potential and harvest method are some of the factors to be considered when developing an effective harvest aid strategy. The following projects attempt to address questions producers currently have in regards to defoliation.

Harvest Aid Programs for Irrigated Cotton in Oklahoma

Trt	Treatment		Rate	Growth	Appl		10/21/2009			11/4/2009	
No.	Name	Rate	Unit	Stage	Code	Defol.	Desicc.	Open Bolls	Defol.	Desicc.	Open Bolls
1	Untreated					0 c	0 a	82.5 b	0 d	0 a	82.5 d
2	Prep	32	oz/a	>60%Open	A	86.3 b	0 a	90 a	95.8 abc	0 a	98.3 a
	Blizzard	0.6	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
3	Prep	32	oz/a	>60%Open	A	86.3 b	0 a	91.3 a	97.8 ab	0 a	99 a
	ET	2	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
4	Prep	32	oz/a	>60%Open	A	86.3 b	0 a	91.3 a	94.5 bc	0 a	95.3 bc
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
5	Finish 6 Pro	1.3	pt/a	>60%Open	A	86.3 b	0 a	91.3 a	95.8 abc	0 a	96.3 abc
	Blizzard	0.6	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
6	Finish 6 Pro	1.3	pt/a	>60%Open	A	86.3 b	0 a	90 a	98.5 ab	0 a	97.8 ab
	ET	2	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
7	Finish 6 Pro	1.3	pt/a	>60%Open	A	85 b	0 a	90 a	93.3 c	0 a	93.8 c
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
8	Finish	1.3	pt/a	>60%Open	A	82.5 b	0 a	88.8 a	93.3 c	0 a	98 ab
	Ginstar	6	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
9	Prep	32	oz/a	>60%Open	A	83.8 b	0 a	88.8 a	96.5 abc	0 a	98.5 a
	Adios	6	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
10	Finish 6 Pro	32	oz/a	>60%Open	A	93.8 a	0 a	92.5 a	99 a	0 a	97.3 ab
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
LSD (P=.05)						7.28	0	4.25	4.32	0	2.83
CV						6.46	0	3.27	3.45	0	2.04
Means followed by same letter do not significantly differ (P=.05, LSD)											

Harvest Aid Programs for Irrigated Cotton in Oklahoma

Application Description	
	A
Application Date:	10/16/2009
Time of Day:	9:00 AM
Application Method:	Spray
Application Timing:	60-70%Ope
Application Placement:	Broadcast
Applied By:	OSU
Air Temperature, Unit:	58 F
% Relative Humidity:	79
Wind Velocity, Unit:	4 F
Wind Direction:	N
Soil Temperature, Unit:	61 F
Soil Moisture:	Adequate
% Cloud Cover:	50
Next Rain Occurred On:	10/21/2009
Application Equipment	
	A
Appl. Equipment:	Lee Spider
Operating Pressure, Unit:	56 PSI
Nozzle Type:	TurboTee
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 in
Nozzles/Row:	2
Ground Speed, Unit:	4 mph
Carrier:	water
Spray Volume, Unit:	15 GPA
Mix Size, Unit:	1 gal
Propellant:	comp.air

Evaluation of Sharpen for Defoliation in Cotton

Trt	Treatment		Rate	Growth	Appl			10/21/2009				11/4/2009			
No.	Name	Rate	Unit	Stage	Code	Defol.		Desicc.		Open Boll		Defol.		Desicc.		Open Boll	
1	Untreated Check					0	d	0	a	73.8	c	0	c	0	a	78.8	b
2	Prep	32	oz/a	60%Open	A	72.5	c	0	a	82.5	ab	68.8	b	0	a	94.5	a
	Sharpen	0.5	oz/a	60%Open	A												
3	Prep	32	oz/a	60%Open	A	82.5	b	0	a	80	b	97.3	ab	0	a	100	a
	Sharpen	0.75	oz/a	60%Open	A												
4	Prep	32	oz/a	60%Open	A	80	bc	0	a	80	b	97.8	a	0	a	100	a
	Sharpen	1	oz/a	60%Open	A												
5	Prep	32	oz/a	60%Open	A	76.3	bc	0	a	85	a	95	ab	0	a	99.5	a
	Sharpen	1.25	oz/a	60%Open	A												
6	Prep	32	oz/a	60%Open	A	91.3	a	0	a	83.8	ab	99	a	0	a	100	a
	Def	16	oz/a	60%Open	A												
LSD (P=.05)						8.4		0		4.42		28.99		0		6.33	
CV						8.31		0		3.63		25.22		0		4.4	
Means followed by same letter do not significantly differ (P=.05, LSD)																	

Evaluation of Sharpen for Defoliation in Cotton (cont.)

Application Description	
	A
Application Date:	10/16/2009
Time of Day:	9:00 AM
Application Method:	Spray
Application Timing:	60-70%Open
Application Placement:	Broadcast
Applied By:	OSU
Air Temperature, Unit:	58 F
% Relative Humidity:	79
Wind Velocity, Unit:	4 F
Wind Direction:	N
Soil Temperature, Unit:	61 F
Soil Moisture:	Adequate
% Cloud Cover:	50
Next Rain Occurred On:	10/21/2009
Application Equipment	
	A
Appl. Equipment:	Lee Spider
Operating Pressure, Unit:	56 PSI
Nozzle Type:	TurboTee
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 in
Nozzles/Row:	2
Ground Speed, Unit:	4 mph
Carrier:	water
Spray Volume, Unit:	15 GPA
Mix Size, Unit:	1 gal
Propellant:	comp.air

Harvest Aid Demonstration for Irrigated Cotton in Oklahoma-I (Williams)

Trt	Treatment		Rate	Growth	Appl		10/2/2009			10/16/2009	
No.	Name	Rate	Unit	Stage	Code	Defol.	Desicc.	Open Bolls	Defol.	Desicc.	Open Bolls
1	Untreated					0	0	43	0	0	37
2	Prep	32	oz/a	>60%Open	A	40	0	51	70	0	61
	Blizzard	0.6	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
3	Prep	32	oz/a	>60%Open	A	40	0	46	70	0	66
	ET	2	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
4	Prep	32	oz/a	>60%Open	A	50	0	56	85	0	66
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
5	Finish 6 Pro	1.3	pt/a	>60%Open	A	40	0	61	75	0	56
	Blizzard	0.6	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
6	Finish 6 Pro	1.3	pt/a	>60%Open	A	40	0	52	75	0	62
	ET	2	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
7	Finish 6 Pro	1.3	pt/a	>60%Open	A	50	0	42	80	0	54
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
8	Finish	1.3	pt/a	>60%Open	A	30	0	41	70	0	58
	Ginstar	6	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
9	Prep	32	oz/a	>60%Open	A	30	0	47	80	0	58
	Adios	6	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
10	Finish 6 Pro	32	oz/a	>60%Open	A	65	0	73	85	0	61
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						

Harvest Aid Demonstration for Irrigated Cotton in Oklahoma-I (Williams) (cont.)

Application Description	
	A
Application Date:	9/24/2009
Time of Day:	10:00 AM
Application Method:	Spray
Application Timing:	40%Open
Application Placement:	Broadcast
Applied By:	OSU
Air Temperature, Unit:	58 F
% Relative Humidity:	56
Wind Velocity, Unit:	5 MPH
Wind Direction:	SSE
Soil Temperature, Unit:	66 F
Soil Moisture:	Adequate
% Cloud Cover:	60
Next Rain Occurred On:	9/25/2009
Application Equipment	
	A
Appl. Equipment:	Lee Spider
Operating Pressure, Unit:	56 PSI
Nozzle Type:	TurboTee
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 in
Nozzles/Row:	2
Ground Speed, Unit:	4 mph
Carrier:	water
Spray Volume, Unit:	15 GPA
Mix Size, Unit:	1 gal
Propellant:	comp.air

Harvest Aid Demonstration for Irrigated Cotton in Oklahoma-II (WOSC)

Trt	Treatment		Rate	Growth	Appl		10/2/2009			10/16/2009	
No.	Name	Rate	Unit	Stage	Code	Defol.	Desicc.	Open Bolls	Defol.	Desicc.	Open Bolls
1	Untreated					0	0	41.3	0	0	56
2	Prep	32	oz/a	>60%Open	A	35	0	61.3	35	0	57
	Blizzard	0.6	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
3	Prep	32	oz/a	>60%Open	A	35	0	62	40	0	90
	ET	2	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
4	Prep	32	oz/a	>60%Open	A	50	0	52.6	65	0	73
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
5	Finish 6 Pro	1.3	pt/a	>60%Open	A	35	0	64	45	0	75
	Blizzard	0.6	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
6	Finish 6 Pro	1.3	pt/a	>60%Open	A	35	0	72	55	0	56
	ET	2	oz/a	>60%Open	A						
	Crop Oil Concentrate	1	% v/v	>60%Open	A						
7	Finish 6 Pro	1.3	pt/a	>60%Open	A	50	0	68	65	0	72
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
8	Finish	1.3	pt/a	>60%Open	A	35	0	47.3	75	0	66
	Ginstar	6	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
9	Prep	32	oz/a	>60%Open	A	30	0	46	75	0	57
	Adios	6	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						
10	Finish 6 Pro	32	oz/a	>60%Open	A	60	0	49.3	75	0	71
	Def	16	oz/a	>60%Open	A						
	NIS	0.5	% v/v	>60%Open	A						

Harvest Aid Demonstration for Irrigated Cotton in Oklahoma-II (WOSC)

Application Description	
	A
Application Date:	9/24/2009
Time of Day:	10:00 AM
Application Method:	Spray
Application Timing:	40%Open
Application Placement:	Broadcast
Applied By:	OSU
Air Temperature, Unit:	58 F
% Relative Humidity:	56
Wind Velocity, Unit:	5 MPH
Wind Direction:	SSE
Soil Temperature, Unit:	66 F
Soil Moisture:	Adequate
% Cloud Cover:	60
Next Rain Occurred On:	9/25/2009
Application Equipment	
	A
Appl. Equipment:	Lee Spider
Operating Pressure, Unit:	56 PSI
Nozzle Type:	TurboTee
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 in
Nozzles/Row:	2
Ground Speed, Unit:	4 mph
Carrier:	water
Spray Volume, Unit:	15 GPA
Mix Size, Unit:	1 gal
Propellant:	comp.air

Harvest Aid Programs with ET

Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Code	10/15/2009 % Open		Defol.		10/20/2009 Desicc.		% Open		Defol.		11/4/2009 Desicc.		% Open	
1	Untreated Check					66.43	ab	0	g	0	a	75	c	0	e	0	a	83.8	d
2	ET	1	oz/a	>55%Open	A	67.75	a	85	ab	0	a	92.5	a	94.5	ab	0	a	98	ab
	Ethephon	32	oz/a	>55%Open	A														
	Dropp SC	1.6	oz/a	>55%Open	A														
	Def	6	oz/a	>55%Open	A														
	Crop Oil Concentrate	1	% v/v	>55%Open	A														
3	ET	1	oz/a	>55%Open	A	61.5	ab	88.8	a	0	a	87.5	ab	96.5	a	0	a	97.8	abc
	Ethephon	32	oz/a	>55%Open	A														
	Def	6	oz/a	>55%Open	A														
	Crop Oil Concentrate	1	% v/v	>55%Open	A														
4	ET	1.5	oz/a	>55%Open	A	68.28	a	78.8	bc	0	a	86.3	ab	91.3	abc	0	a	98.5	a
	Ethephon	32	oz/a	>55%Open	A														
	Dropp SC	1.6	oz/a	>55%Open	A														
	Crop Oil Concentrate	1	% v/v	>55%Open	A														
5	ET	1.5	oz/a	>55%Open	A	66	ab	80	bc	0	a	91.3	a	90	abc	0	a	98.5	a
	Ethephon	32	oz/a	>55%Open	A														
	Crop Oil Concentrate	1	% v/v	>55%Open	A														
6	ET	1.5	oz/a	>55%Open	A	67.75	a	65	e	0	a	88.8	ab	88.8	bc	0	a	95.8	bc
	Finish 6 Pro	24	oz/a	>55%Open	A														
	Crop Oil Concentrate	1	% v/v	>55%Open	A														
7	ET	1.5	oz/a	>55%Open	A	70.53	a	67.5	de	0	a	90	a	86.3	c	0	a	98.3	ab
	FirstPick	56	oz/a	>55%Open	A														
	Crop Oil Concentrate	1	% v/v	>55%Open	A														
8	Ethephon	32	oz/a	>55%Open	A	68.15	a	45	f	0	a	82.5	b	72.5	d	0	a	95.3	c
	Def	6	oz/a	>55%Open	A														
	Induce	0.5	% v/v	>55%Open	A														
9	Ethephon	32	oz/a	>55%Open	A	56.93	b	73.8	cd	0	a	87.5	ab	91.3	abc	0	a	99	a
	Aim	1	oz/a	>55%Open	A														
	Crop Oil Concentrate	1	% v/v	>55%Open	A														
10	Ethephon	32	oz/a	>55%Open	A	69.83	a	77.5	c	0	a	92.5	a	86.3	c	0	a	98.5	a
	Blizzard	0.6	oz/a	>55%Open	A														
	Crop Oil Concentrate	1	% v/v	>55%Open	A														
LSD (P=.05)						10.331		7.09		0		6.3		7.57		0		2.73	
CV						10.74		7.39		0		4.97		6.54		0		1.95	

Means followed by same letter do not significantly differ (P=.05, LSD)

Harvest Aid Programs with ET

Application Description	
	A
Application Date:	10/7/2009
Time of Day:	2:00 PM
Application Method:	Spray
Application Timing:	60%Open
Application Placement:	Broadcast
Applied By:	OSU
Air Temperature, Unit:	60 F
% Relative Humidity:	60
Wind Velocity, Unit:	2.2 mph
Wind Direction:	N
Soil Temperature, Unit:	63 F
Soil Moisture:	Good
% Cloud Cover:	80
Next Rain Occurred On:	10/8/2009
Application Equipment	
	A
Appl. Equipment:	Lee Spider
Operating Pressure, Unit:	56 PSI
Nozzle Type:	TurboTee
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 in
Nozzles/Row:	2
Ground Speed, Unit:	4 mph
Carrier:	water
Spray Volume, Unit:	10 GPA
Mix Size, Unit:	1
Propellant:	Comp. Air

Evaluating Field Trial Data

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Field Trials can provide helpful information to producers as they compare products and practices for their operations. But field trials must be evaluated carefully to make sure results are scientifically sound, not misleading and indicate realistic expectations for on-farm performance.

This fact sheet is designed to give you the tools to help you determine whether data from a field trial is science fact or science fiction.

What are the best sources of field trial data?

Field trials are conducted by a broad range of individuals and institutions, including universities, ag input suppliers, chemical and seed companies and growers themselves. All are potentially good sources of information.

What are the common types of field trials?

Most field trials fall into one of two categories: side-by-side trials (often referred to as strip trials) or small-plot replicated trials. Side-by-side trials are the most common form of on-farm tests. As the name suggests, these trials involve testing practices or products against one another in plots arrayed across a field, often in strips the width of the harvesting equipment.

These strips should be replicated across the field or repeated at several locations to increase reliability. Small-plot replicated trials often are conducted by universities and companies at central locations because of the complexity of managing them and the special planting and harvesting equipment often required.

Replicated treatments increase the reliability of an experiment. They compare practices or products against one another multiple times under uniform growing conditions in several randomized small plots in the same field or location. Small-plot replicated trials also may be conducted on farmers' fields where special conditions exist, for example, a weed infestation that does not occur on an experiment station.

Are side-by-side plots more valuable than small-plot replicated trials, or vice versa?

Both types of plots can provide good information. The key is to evaluate the reliability of the data. It is also important to consider the applicability of the trial to your farming operation.

When is plot data valid, and when isn't it?

There isn't a black-and-white answer to that questions. But there are good rules of thumb that can help guide you. Consider these three field trial scenarios:

Scenario 1:

A single on-farm side-by-side trial comparing 10 varieties. Each variety is planted in one strip the width of the harvesting equipment and is 250 to 300 feet long.

What you can learn:

This trial will allow you to get a general feel for each variety or hybrid in the test, including how it grows and develops during the season.

However, this trial, by itself, probably won't be able to reliably measure differences in yield. This is because variability within the field, even if it appears to be relatively uniform, may be large enough to cause yield variations that mask genetic difference among the varieties. Other varietal characteristics, such as maturity or micronaire in cotton, can also be masked by soil variation.

Scenario 2:

Yield data from side-by-side variety trials conducted on the same varieties on multiple farms in your region.

What you can learn:

When data from multiple side-by-side trials are considered together, reliability increases. In this case, the more trials comparing the same varieties, the better. As you go from three to five to 10 or more locations, the certainty goes up that yield differences represent genetic differences and not field variability. Be aware, however, that small differences between treatments (in this case varieties) may still be within the margin of random variability of the combined trial and may not indicate actual genetic differences. One treatment will almost always be numerically higher. Statistical analysis helps determine if differences are significant (consistent).

Scenario 3:

A university-style small-block replicated trial comparing the same 10 varieties.

What can you learn:

Data from such trials, if they are designed well and carried out precisely, generally are reliable. This is, the results

generally determine the yield potential of crop varieties. However, it is still important to consider whether results are applicable to your farming operation and are consistent with other research.

How do I know whether differences in yield, for example, are real and not caused by field variability or sloppy research?

Scientists use statistical analysis to help determine whether differences are real or are the result of experimental error, such as field variation. The two most commonly used statistics are **Least Significant Difference (LSD)** and the **Coefficient of Variation (CV)**, both of which can provide insight on the validity of trial data. If these values aren't provided with trial results, ask for them.

Least Significant Difference (LSD) is the minimum amount that two varieties must differ to be considered significantly different. Consider a trial where the LSD for yield is four bushels per acre. If one variety yields 45 bushels per acre and another yields 43 bushels per acre, the two are not statistically different in yield. The difference in their yields is due to normal field variation, not to their genetics. In this example, a variety that yields 45 bushels per acre is significantly better than those yielding less than 41 bushels per acre. In many research trials, LSDs are calculated at confidence level of 75 to 95 percent. For example, a confidence level of 95 percent means you can be 95 percent certain that yield differences greater than the LSD amount are due to genetics and not to plot variability.

Coefficient of Variation (CV) measures the relative amount of random experimental variability not accounted for in the design of a test. It is expressed as a percent of the overall average of the test.

For measuring yield differences, CV's of up to five percent are considered excellent; 5.1 to 10 percent are considered good; and 10.1 to 15 percent are fair.

A high CV means there must be larger differences among treatments to conclude that significant differences exist. The bottom line: <u>When considering yield test data, be skeptical when the CV exceeds 15 percent.</u>

Is a one-year test valid, or are several years of results necessary to know whether one product or practice is superior to another?

In an ideal world, having several years of tests to verify use of a practice or product is best. But where changes are rapid, such as with crop varieties, having university data from multiple years isn't always possible.

When multi-year university data aren't available, pay more careful attention to statistical measures like CV and LSD, and the number of locations and testing environments.

Multi-year data on yield and performance can also be requested from the developers of new products prior to university testing. In either case, be cautious about making major production changes and trying large acreages of a given variety based on one year's data.

How should I evaluate trial results that are markedly different from other research in my area?

When research results are at odds with the preponderance of scientific evidence, examine the new research with extra care.

Pay special attention to factors that might have influenced the outcome, such as soil type, planting date, soil moisture and other environmental conditions, and disease, insect and weed pressures. For example, was the growing season unusually wet or unusually dry? When was it dry or wet? What was the crop growth stage when it was wet or dry?

Was there a disease that affected one variety or hybrid more than another one? Were there insect problems? Could this have influenced the trial's outcome and its applicability to your operation? If you determine that unusual circumstances affected the outcome, be cautious about how you use the results.