

PROJECT REPORT- ALABAMA COTTON COMMISSION 2006

TITLE: **Boll Rot and Hard Lock of Cotton-project report**

INVESTIGATORS:

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OBJECTIVE:

Our objectives are 1) to determine cotton variety response and potential yield losses due to boll rot; and 2) to conduct efficacy trials with fungicides to determine boll rot incidence and yield effects.

1. Cotton variety response.

Weather conditions were dry during the first half of the growing season in 2006, although some boll rot did develop. Early season flex variety disease index ratings for boll rot averaged 1.4% boll rot and 3.9% hardlock. The hardlock disease index ranged from a high of 10.3% for DP 143 B2RF to a low rating of 0.0 % Dyna Gro 2100 B2RF and 2242 B2RF (Table 1). Seed cotton yields average 1205 lb/A between all early flex season cotton varieties. Much less boll rot was present in the early season varieties as compared to the full season varieties in. The hardlock disease index ranged from a high of 13.8% for Fiber Max FM 9063 B2F to a low rating of 4.1% for DP 164 B2RF (Table 2). Seed cotton yields averaged 1193 lb/A between all varieties. The amount of boll rot was similar between the flex and standard cotton varieties. Thirteen full season cotton cultivars had less cotton boll rot or hardlock ($P \leq 0.10$) as compared to Stoneville ST 5599BR and DPL 555BG/RR or Dyna Gro 0A0265 which displayed the greatest disease indexes (Table 3). Seed cotton yields averaged 1344lb/A for the full season cultivars with a 914 lb/A difference between the highest and lowest yielding varieties. The early season varieties had lower boll rot disease indexes similar to the early flex season varieties. The disease index for boll rot ranged from a high of 12.6% for PhytoGen PHY 370WR to a low rating of 1.2% for Deltapine DP 444BG/RR (Table 4). The early season flex variety test was the first test in the field and the disease incidence in that test was lower than the full season flex, full season, and early season cotton variety tests.

Table 1. Early season flex cotton variety disease and hardlock indexes ratings and seed cotton yields, 2006.

Variety	Av yield	Av lint %	Healthy bolls/ meter row*	Disease Index**	Hardlock***
Deltapine DP 555 BG/RR	1518	0.44	76	0.1	5.3
DP 147 RF	1414	0.41	74	2.7	9.5
DP 117 B2RF	1358	0.41	63	0.1	3.2
Fiber Max FM 9060 F	1354	0.41	71	0.1	4.2
Fiber Max FM 9068 F	1340	0.40	62	3.2	3.2
PHY 425 RF	1337	0.41	74	0.1	6.8
DP 110 RF	1332	0.40	61	4.9	9.8

DP 143 B2RF	1312	0.39	87	0.1	10.3
PHY 485 WRF	1300	0.41	69	4.3	5.8
BW -4630 B2F	1275	0.38	91	0.1	1.1
Fiber Max FM 9063 B2F	1271	0.40	72	0.1	1.4
CG 4020 B2RF	1264	0.39	63	0.1	1.6
CG 3520 B2RF	1261	0.37	79	10.1	1.3
Deltapine DP 444BG/RR	1256	0.41	57	0.1	3.5
Dyna Gro 2100 B2RF	1242	0.37	69	1.4	0.0
ST 4357B2RF	1242	0.38	96	0.1	3.1
STX 0505 B2RF	1236	0.40	69	0.1	1.4
Stoneville ST 5599BR	1228	0.40	86	0.1	3.5
DPLX 06W650F	1228	0.41	67	3.0	3.0
Dyna Gro 060642 B2RF	1195	0.36	62	1.6	8.1
STX 0504 B2RF	1182	0.40	100	0.1	3.0
BW -8391 B2F	1181	0.36	68	0.1	8.8
Fiber Max FM 960BR	1135	0.39	88	0.1	1.1
DPLX 06W660F	1134	0.41	65	3.1	3.1
Dyna Gro 2520 B2RF	1120	0.38	60	0.1	3.3
ST 4664RF	1116	0.40	52	3.8	9.6
CG 3020 B2RF	1112	0.36	74	1.4	1.4
ST 4554B2RF	1107	0.40	60	0.1	3.3
STX 0503 RF	1103	0.42	63	0.1	1.6
ST 4700 B2RF	1054	0.38	62	0.1	3.2
BW-2038 B2F	1052	0.38	82	2.4	1.2
Dyna Gro 2242 B2RF	1024	0.37	83	0.1	0.0
BW-3255 B2RF	978	0.36	90	0.1	4.4
BW-4021 B2F	963	0.36	89	2.2	1.1
STX 0501 RF	947	0.37	76	2.6	3.9
Test average	1205	0.39	73.1	1.4	3.9

* Number of harvestable boll in a meter of row.

**Disease index = (# diseased bolls / total # healthy bolls) × 100.

***Hard lock index = (# hard lock bolls / total # healthy bolls) × 100.

Table 2. Full season flex cotton disease and hardlock indexes ratings and seed cotton yields, 2006.

Variety	Av yield	Av lint %	Healthy bolls/ meter row*	Disease Index**	Hardlock***
Deltapine DP 555 BG/RR	1756	0.43	71	9.9	8.9
Stoneville ST 5599BR	1355	0.42	77	6.3	6.3
DP 147 RF	1291	0.41	69	12.7	10.7
ST 6622B2RF	1215	0.39	73	10.1	8.4
Fiber Max FMX 0680 B2F	1186	0.39	65	11.9	9.2
PHY 745 WRF	1173	0.39	72	11.2	8.9
Fiber Max FM 9063 B2F	1162	0.38	65	15.5	13.8
DP 143 B2RF	1153	0.40	57	14.4	10.7
DP 167 RF	1152	0.39	76	6.5	5.8

DP 164 B2RF	1146	0.39	81	4.1	4.1
Fiber Max FM 960BR	1135	0.39	71	8.0	8.0
ST 6611B2RF	1125	0.38	67	10.4	7.8
Fiber Max FM 9068 F	1106	0.39	69	6.1	4.8
Deltapine DP 444BG/RR	1027	0.40	75	11.7	9.4
ST 6565 B2RF	919	0.37	71	10.1	9.1
Test average	1193	0.40	70	10	8

* Number of harvestable boll in a meter of row.

**Disease index = (# diseased bolls / total # healthy bolls) × 100.

***Hard lock index = (# hard lock bolls / total # healthy bolls) × 100.

Table 3. Full season cotton variety disease index ratings and seed cotton yields, 2006.

Variety	Av yield	Av lint %	Healthy bolls/ meter row*	%Disease index**	Hardlock***
Deltapine DP 555 BG/RR	1710	0.43	56.7	14.5	10.8
Deltapine DP 493	1595	0.44	68.7	3.6	2.9
Fiber Max FMX 95007- 80LL	1509	0.42	75.7	4.3	3.6
Deltapine DP 515BG/RR	1494	0.42	62.0	7.5	3.9
Deltapine DP 488 BR	1491	0.40	70.7	6.4	2.4
Deltapine DP 454BG/RR	1393	0.43	87.0	5.6	4.6
Deltapine DP 494 RR	1383	0.42	88.0	5.6	4.6
Deltapine DP 455BG/RR	1355	0.43	81.7	7.9	6.9
Fiber Max FMX 9166B2LL	1349	0.40	78.0	1.3	1.3
Stoneville ST 5599BR	1346	0.41	44.0	19.7	19.0
Fiber Max FM 991BR	1273	0.39	68.7	8.4	8.4
Deltapine DP 449 BG/RR	1259	0.40	60.0	3.4	2.8
Fiber Max FM 960BR	1239	0.40	75.7	3.2	2.2
Fiber Max FM 988 LLB2	1193	0.38	79.0	4.7	4.7
Deltapine DP 445BG/RR	1113	0.41	78.7	3.5	3.5
Dyna Gro 0A0265	796	0.37	61.0	11.8	9.8
Test average	1344	0.41	71.0	7.0	5.7
LSD P_{>0.05}			9.3	6.1	6.4

* Number of harvestable boll in a meter of row.

**Disease index = (# diseased bolls / total # healthy bolls) × 100.

***Hard lock index = (# hard lock bolls / total # healthy bolls) × 100.

Table 4. Early season cotton variety disease index ratings, 2006.

Variety	Healthy bolls / meter row*	Disease index**	Hardlock***
PhytoGen PHY 370WR	83	13.9	12.6
Fiber Max FM 965 LLB2	90	6.5	5.2
Deltapine DP 434 RR	69	5.4	4.4
Deltapine DP 455BG/RR	71	11.1	9.1
Fiber Max FM 960B2R	76	4.7	3.3
Deltapine DP 393	66	2.1	2.0
Deltapine DP 432 RR	76	5.8	4.8

PhytoGen PHY 310R	76	6.9	5.3
Stoneville ST5242BR	78	5.5	4.2
Deltapine DP 444BG/RR	86	2.2	1.2
Fiber Max FM 960BR	72	2.2	1.8
PhytoGen PHY 470WR	79	6.1	3.8
Deltapine DP 555 BG/RR	67	5.4	4.4
CT 210	85	4.7	4.0
PhytoGen PHY 480WR	62	4.2	3.2
Stoneville ST 4575BR	97	3.7	2.7
CT Linwood	80	4.8	3.8
Deltapine DP 454BG/RR	59	6.9	6.2
Deltapine DP 445BG/RR	69	7.8	4.8
Test average	76	5.8	4.6
LSD $P \geq 0.05$	19	6.6	6.8

* Number of harvestable boll in a meter of row.

**Disease index = (# diseased bolls / total # healthy bolls) \times 100.

***Hard lock index = (# hard lock bolls / total # healthy bolls) \times 100.

3. Efficacy trials.

Cotton boll rot disease incidence was moderate in 2006 due to the low amount of rainfall from mid May through July. The amount of boll rot recorded immediately before harvest was not difference between the control and the Quadris 2.08SC treatments. However, the incidence of hard lock was reduced ($P \leq 0.05$) by the double application of Quadris 2.08SC applied at 6.2 fl oz/A as compared to the control. Seed cotton yields varied by 128.4 lb/A between Quadris 2.08SC applied 2 times as compared to the control treatment. The Quadris 2.08SC treatments applied twice at the low rate or once at the higher rate numerically increased yields an average of 105 lb/A as compared to the control.

Table 5. Evaluation of Quadris 2.08 SC for management of cotton boll rot, hard lock, and cotton yield in south Alabama, 2005.

Fungicide	Rate	Timing	Disease index *	Hard lock index **	Seed cotton	Yield over control
			16-Sep	16-Sep ^x	lb/A	lb
Control			8.0 ^x	7.2 a	2374.5	
Quadris 2.08SC	6.2 fl oz/A	50% bloom	5.5	4.9 ab	2255.5	-119.0
Quadris 2.08SC	9.2 fl oz/A	50% bloom	6.5	5.3 ab	2457.0	82.5
Quadris 2.08SC	6.2 fl oz/A	50% bloom + 14 days	5.2	3.6 b	2502.9	128.4
LSD ($P \leq 0.05$)			3.7	3.5	269.4	

**Hard lock index = (# hard lock bolls / total # healthy bolls) \times 100.

Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.05$).

Cotton boll rot disease incidence was moderate in 2006 due to the low amount of rainfall during June and July. The amount of boll rot and hard lock recorded immediately before harvest was not difference between the control and the Topsin M treatments applied 2, 3, and 4 times. Both disease incidences measurement

were numerically higher for the control treatment as compared to the Topsin M treatments. Seed cotton yields varied by 375.9 lb/A between Topsin M applied 3 times as compared to the control treatment. All Topsin M treatments applied bi-weekly increased yield numerically as compared to the control. The addition of Folicur to Topsin M applied three times did not further reduce boll rot or hard lock incidence or increase yield as compared to the Topsin M three application treatment.

Table 6. Evaluation of Topsin M for management of cotton boll rot, hard lock, and cotton yield in south Alabama, 2006.

Fungicide	Rate	Timing	Disease index *	Hard lock index **	Seed cotton	Yield over control
			16-Sep	16-Sep	lb/A	lb
Control			7.4 ^x	6.2	2503 b	
Topsin M 4.5 F	16 fl oz/A	50% bloom	4.9	4.5	2686 ab	183.3
Topsin M 4.5 F	16 fl oz/A	50% bloom + 14 days	5.0	3.8	2650 ab	146.7
Topsin M 4.5 F	16 fl oz/A	50% bloom + 14 + 28 days	5.3	3.3	2879 a	375.9
Topsin M 4.5 F + Folicur 3.6 F	16 fl oz/A + 4 fl oz/A	50% bloom + 14 + 28 days	4.3	2.7	2732 ab	229.2
LSD ($P \leq 0.05$)			5.3	4.7	285	

*Disease index = (# diseased bolls / total # healthy bolls) × 100.

**Hard lock index = (# hard lock bolls / total # healthy bolls) × 100.

Means within columns followed by different letters are significantly different according to Fisher's LSD ($P \leq 0.05$).

