COTTON BOLL ROT INCIDENCE AND SEVERITY AS EFFECTS OF SELECTED FUNGICIDES AND VARIETY

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Introduction

Boll rots of cotton cause economic losses wherever cotton is grown. Economic losses vary widely and are dependent upon the local climate of the specific geographic area. The greatest losses from boll rots generally occur in areas with high rainfall and humidity or under conditions favorable for dense vegetative growth. Dense canopies provide an ideal environment for the proliferation of fungi and bacteria that affects bolls. Over 170 different species of microorganisms, mostly fungi, have been reported as causal agents of boll rots. Many of the microorganisms are opportunistic pathogens that cause boll rots after insects have damaged bolls. Others are secondary pathogens that invade the bolls through damaged plant tissues. Therefore, both chemical and cultural studies are needed to further understand these pathogens.

Materials and Methods

In 2005, cotton fungicide trials were initiated on the cotton variety DPL 555 BR at the Gulf Coast Research and Extension Center in Fairhope, Alabama. The test sites were a Malbis fine sandy loam soil. Fungicide plots consisted of 4 rows, 25 feet long, with a between row spacing of 38 inches. Plots were arranged in a randomized complete block design with five replications. A 10-foot alley separated the blocks. All fungicides were applied as a foliar spray using TX-12 cone nozzles spaced 20 inches apart utilizing a CO2 backpack sprayer calibrated to deliver 15 gallons per acre. No fungicides were applied in the variety trials. All plots were maintained throughout the growing season with standard herbicide, insecticide, and fertility production practices as recommended by the Alabama Cooperative Extension System. Cotton boll rot was evaluated by recording the number of healthy bolls and diseased bolls from a 0.001 acre section within each plot. Disease index [(number of diseased bolls / total number counted) x 100] and hard lock index [(number of hardlock bolls / healthy bolls) x 100] was calculated for each plot. Data were statistically analyzed using PROC GLM, and means were compared with Fisher's protected least significant difference test.

Results

From 2005-2007, no differences ($P \leq 0.05$) were observed for either disease index or hardlock index in the Topsin M trial. However, seed cotton yields in 2005 were greater ($P \leq 0.05$) across all fungicide treatments. In 2006, plots treated with Topsin M at first bloom + 14 + 28 + 42 days achieved greater ($P \leq 0.05$) seed cotton yields when compared to the untreated control. In 2007, hardlock incidence was high but apparently due to the drought conditions. Yields were numerically increased in all Topsin M treatments with an average increase of 122.6 lb/A. Consistently over the three years a numerical increase averaging 279 lb/A in yield has been observed with Topsin M applications.

In the 2005 Quadris trial, both the disease index and hardlock index was less ($P \leq 0.05$) when compared to the control plots. Seed cotton yields were also increase ($P \leq 0.05$) across all Quadris treatments. In 2006, plots treated with Quadris at first bloom + 14 days had a lower ($P \leq 0.05$) hard lock index when compared to the control treatment although yields were not enhanced. In 2007, the hardlock indexes were high but yields were increased by the two

applications of Quadris. Although variations have been observed a numerical average increase of 90 lb/A has been observed with application of Quadris over all three years.

Table 1. Efficacy of Topsin M 4.5 F on cotton boll rot and yield from 2005-2007.

Fungicide	Rate fl oz/A	Timing bloom + days	Disease index [z]	Hard lock index [y]	Seed cotton lb/A	Yield over control lb
2005						
Control			9.9a	11.6a	1843b	
Topsin M	16	50% bloom + 14	6.9a	6.2a	2320a	476
Topsin M	16	50% bloom + 14 + 14	5.9a	7.6a	2247a	403
Topsin M	16	50% bloom+14 +14+14	4.4a	6.8a	2357a	513
LSD ($P \leq 0.05$)			5.5	6.7	331	
2006						
Control			1.8 a	6.2 a	2504 b	
Topsin M	16	1st bloom + 14 + 28	1.9 a	3.8 a	2650 ab	146
Topsin M	16	1st bloom + 14 + 28 + 42	2.4 a	3.3 a	2880 a	376
Topsin M + Folicur 3.6F	16 + 4	1st bloom + 14 + 28	2.2 a	2.7 a	2733 ab	229
LSD ($P \leq 0.05$)			2.3	5.6	286	
2007						
Topsin M	16	50% bloom + 14	55.6a	34.6a	2550a	119
Topsin M + Mepex	16 + 10	50% bloom + 14	48.8a	46.2a	2623a	192
Mepex	10	50% bloom + 14 +	47.4a	34.5a	2495a	64
Topsin M	16	50% bloom + 14 + 14	55.7a	36.8a	2559a	128
Topsin M + Mepex	16 + 10	50% bloom + 14 + 14	55.3a	44.8a	2541a	110
Mepex	10	50% bloom + 14 + 14	61.4a	32.7a	2431a	
LSD ($P \leq 0.05$)			21.9	33.6	308	

[z] Disease index = (# diseased bolls / total # healthy bolls) × 100.

[y] Hard lock index = (# hard lock bolls / total # healthy bolls) × 100.

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

Table 2. Efficacy of Quadris on cotton boll rot and yield from 2005-2007.

Fungicide	Rate fl oz/A oz/A	Timing + days	Disease index [z]	Hard lock index [z]	Seed cotton lb/A	Yield over control lb
2005						
Quadris	6.2	1st bloom + 14	2.6b	7.9b	2256a	376
Quadris + Mepex	6.2 +10	1st bloom + 14	2.0b	6.3b	2045ab	165
Mepex	10	1st bloom + 14	12.1a	19.5a	1880b	
Quadris	9.2	1st bloom + 14	3.1b	9.1b	2256a	376
Quadris + Mepex	9.2 + 10	1st bloom + 14	2.9b	8.3b	2128ab	248
LSD ($P \leq 0.05$)			6.4	9.7	324.4	
2006						
Control			1.12a	7.2a	2549a	
Quadris	6.2	1st bloom	0.80a	4.9ab	2256b	-293
Quadris	9.2	1st bloom	1.6a	5.3ab	2458ab	-91
Quadris	6.2	1st bloom + 14	1.9a	3.6b	2504ab	-45
LSD ($P \leq 0.05$)			2	3.5	270	
2007						
Control			9.8a	32.6a	2321ab	
Quadris + Mepex	6.2 fl oz/A + 8 fl oz/A	1st bloom + 21	12.6a	31.5a	2541a	220
Quadris + Mepex	9.2 fl oz/A + 8 fl oz/A	1st bloom + 21	8.9a	26.2a	2495ab	174
Quadris + Mepex	9.2 fl oz/A	1st bloom	9.0a	20.1a	2192b	-129
Quadris + Mepex	9.2 fl oz/A	21 days after 1st bloom	15.0a	25.6a	2311ab	-10
LSD ($P \leq 0.05$)			10.1	17.6	311.2	

[z] Disease index = (# diseased bolls / total # healthy bolls) × 100.

[y] Hard lock index = (# hard lock bolls / total # healthy bolls) × 100.

[x] Means in columns followed by different letters are different according to Fisher's LSD ($P \leq 0.05$).