

THE IMPACT OF PHOMOPSIS BOLL DANGLE IN NORTHEAST LOUISIANA

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Abstract

Tests were conducted during 1999 (Macon Ridge Station and Madison Parish) and 2000 (Macon Ridge Station) to determine the effects of Phomopsis boll dangle (PBD) (vascular cavitation) on cotton development in four cotton varieties. Epidemics were monitored in NuCOTN 33^B and Deltapine 90^{RR} in 1999 and in Phytogen 355 and Acala Maxxa in 2000. Fifty plant pairs were tagged during mid-July and monitored for PBD severity during the season. A pair consisted of a PBD affected plant and a non-affected plant. Each plant was monitored for the number of harvestable bolls (approximately 24 days or older) and the number of mummified bolls was recorded on PBD affected plants. At harvest each plant was hand picked and seedcotton was segregated by the amount taken from 1st, 2nd, >2nd, and vegetative sites. In 1999, PBD affected plants produced more harvestable bolls and seedcotton than non-affected plants. In 2000, harvestable bolls did not differ among affected and non-affected plants. Seedcotton amounts were greater for affected plants of Phytogen 355, but did not differ among affected and non-affected plants of Acala Maxxa. The majority (54% to 72%) of affected bolls were located on first position sites for all varieties evaluated. These results suggest that PBD is not a problem in the varieties evaluated in these studies.

Introduction

Phomopsis boll dangle (PBD) or vascular cavitation is a condition in which small bolls (thumbnail-sized) mummify and remain attached to the plant. Bolls are reddish brown and a sunken lesion extending downward from the base of the peduncle is usually present. Boll dangle has been reported in Louisiana, but it is not present in all cotton varieties (Ivey 1963, McLean and Lawrence 1998). In Louisiana Experiment Station tests, the higher yielding varieties were most affected by PBD (Dr. Patrick Colyer, unpublished data). Those varieties most effected by PBD included Sure-Grow 501, Sure-Grow 248, Deltapine 90, Deltapine 90^B, Deltapine 5415, Deltapine 5690, Deltapine 35^B, Stoneville 474, and Phytogen PSC355 (Dr. Patrick Colyer, unpublished data). Preliminary results from Louisiana suggest PBD may not impact yield; however, reported losses in Arkansas have been estimated as much as one bale per acre in some fields (Coker et al. 1998). This variable response of cotton to PBD indicates the need to conduct further research to ascertain the impact of this condition on cotton.

Materials and Methods

Studies were conducted during 1999 and 2000 to assess the impact of PBD in Louisiana cotton. Phomopsis boll dangle epidemics were identified in four fields. Three were located on the Macon Ridge Research Station near Winnsboro, LA and one in Madison parish. Epidemics were monitored in NuCOTN 33^B (Macon Ridge) and DP 90^{RR} (Madison parish) in 1999; and in Maxxa (Macon Ridge) and Phytogen 355 (Macon Ridge) during 2000. During both years in mid-July, fifty pairs of plants were identified and tagged by securing a plastic label around the main stem. A pair consisted of a plant exhibiting PBD symptoms and a symptom-less plant. Paired plants were adjacent or in close proximity within the same row. The tagging date, the condition of the plant (affected or not affected), and the pair number (1-50) were recorded on each tag. At tagging, the number of harvestable bolls (approximately 24 days old or older) and PBD severity

was assessed. Phomopsis boll dangle severity was recorded as the number of affected bolls per plant. The location of each affected boll was identified by node number and fruiting position. Phomopsis boll dangle severity was re-assessed every 7-14 days until harvest. During mid-September, plants were chemically defoliated when 60% of the bolls were open. After defoliation, each plant was mapped according to the number of nodes, fruiting sites, and bolls. Each plant was hand picked and seedcotton was segregated by the amount harvested from vegetative, 1st position, 2nd position, and > 2nd position bolls.

Results and Discussion

1999 Tests

Initial PBD severity was similar in both fields; however, by the end of the season, severity was greatest in Deltapine 90^{RR} (4.64 affected bolls / plant) (Table 1). Phomopsis boll dangle severity ranged from 2.08 to 2.62 affected bolls per plant in NuCOTN 33^B and from 2.24 to 4.64 bolls per plant in Deltapine 90^{RR}. Sixty-nine percent and 56% of affected bolls were at 1st position sites in NuCOTN 33^B and Deltapine 90^{RR}, respectively (Figure 1). Affected plants produced more harvestable bolls and seedcotton than non-affected plants in both varieties (Figures 2 & 3). The majority of seedcotton per plant for affected and healthy plants was produced from 1st and 2nd position bolls, followed by vegetative bolls.

2000 Tests

Results from epidemics monitored during 2000 were similar to those in 1999. Phytogen 355 was affected most by PBD (Table 1). Severity of PBD ranged from 2.78 to 3.38 affected bolls per plant in Phytogen 355, while affected bolls in Maxxa ranged from 1.98 to 2.10 bolls per plant. The majority of affected bolls in both varieties were located at 1st position sites (54 to 72%), followed by 2nd position sites (11 to 24%) (Figure 4). The number of harvestable bolls was similar for affected and non-affected plants in Phytogen 355 and Maxxa (Figure 5). Seedcotton amounts did not differ among affected and non-affected plants of Maxxa; however, the affected plants of Phytogen 355 produced more seedcotton than non-affected plants (Figure 6).

Phomopsis boll dangle did not adversely affect cotton growth and development. In fact, seed cotton amounts were greater from affected plants in NuCOTN 33^B, DP 90^{RR}, and Phytogen 355; and did not differ between affected or non-affected in Maxxa. A higher number of harvestable bolls were produced by affected plants in both varieties evaluated in 1999, and did not differ on affected or non-affected plants in 2000. More bolls and higher seedcotton yields on affected plants suggest that PBD is not a major problem in the varieties evaluated in 1999 and 2000. Reports from other states confirming losses to PBD suggest this condition is a problem under certain conditions. Therefore, further evaluations need to be conducted to determine when this condition is detrimental to cotton growth and development.

References

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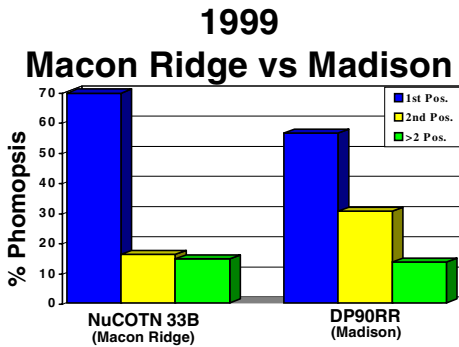


Figure 1. Percent Phomopsis boll dangle segregated by 1st, 2nd, or >2nd position in NuCOTN 33B and DP90RR, 1999.

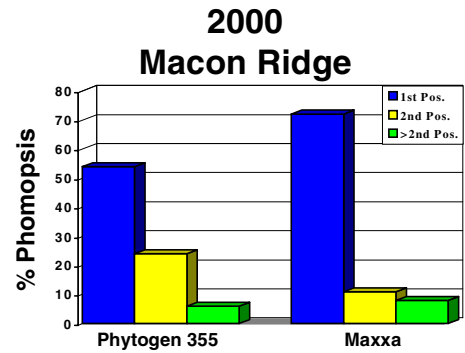


Figure 4. Percent Phomopsis boll dangle segregated by 1st, 2nd, or >2nd position in Phytogen 355 and Maxxa, 2000.

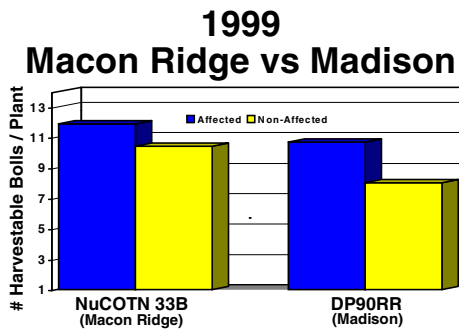


Figure 2. The average number of harvestable bolls per plant for Phomopsis boll dangle affected and non-affected plants in NuCOTN 33B and DP90RR 1999.

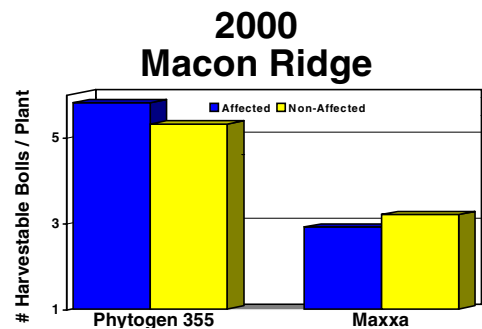


Figure 5. The average number of harvestable bolls per plant for Phomopsis boll dangle affected and non-affected plants in Phytogen 355 and Maxxa, 2000.

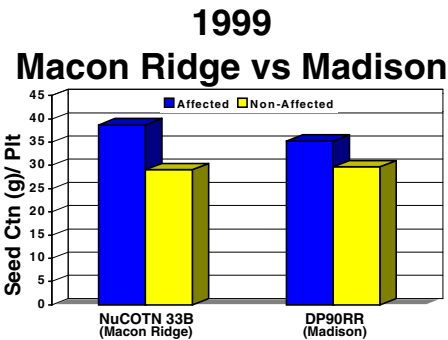


Figure 3. The average seedcotton per plant for Phomopsis boll dangle affected and non-affected plants NuCOTN 33B and DP90RR, 1999.

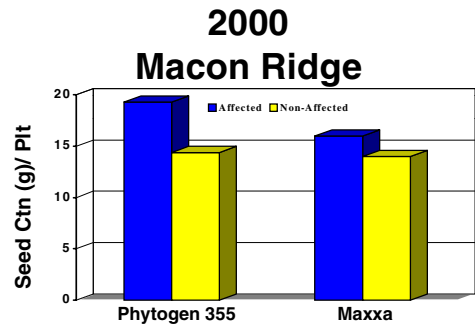


Figure 6. The average seedcotton per plant for Phomopsis boll dangle affected and non-affected plants in Phytogen 355 and Maxxa, 2000.

Table 1. Number of affected bolls per plant in four cotton varieties in tests conducted in 1999 and 2000

Variety	#Affected Bolls/Pit ¹		
	1	2	3
33B	2.08	2.24	2.62
DP90RR	2.24	4.28	4.64
Phytogen 355	2.78	3.38	3.38
Maxxa	1.98	2.10	2.10

¹Number of bolls affected by Phomopsis.