ROTTEN BUGS – IMPLICATIONS OF INSECT FEEDING ON BOLL ROTS

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Abstract

There is an established relationship between insect feeding on bolls and the incidence of boll rot. However, boll rots and hard lock can also be a primarily environment driven phenomenon. Boll feeding insects can open avenues of disease infection and may at least passively transmit boll rot organisms. Successful eradication of the boll weevil and high adoption of Bt cotton cultivars (i.e., Bollgard, Bollgard II or WideStrike) have reduced the risk of insect-induced boll rots in many parts of the Cotton Belt. Bt cottons greatly reduce boll injury caused by tobacco budworm, bollworm, fall armyworm and pink bollworm. Coincidental reductions in secondary boll rots caused by these pests have been evident, although not well documented in the literature.

Hemipteran pests that commonly feed on bolls include tarnished plant bug, clouded plant bug and several species of stink bugs. These pests have increased in importance in the relatively low-insecticide environment created by boll weevil eradication and adoption of Bt cotton. This is particularly evident in the Midsouth and Southeast. Tarnished plant bug primarily targets squares and flowers but will feed on small bolls. Bolls older than about 225-250 DD60s are relatively safe from injury (Russell et al. 1999.). Tarnished plant bugs are a significant pest in the Mississippi River Delta of the Midsouth. Clouded plant bugs occur in most of the Cotton Belt, particularly low-spray environments, but are a much more occasional pest than the tarnished plant bug. Clouded plant bugs are more inclined to feed on bolls than the tarnished plant bug, and presumably, larger bolls are relatively more susceptible to attack. Stink bugs target seed and may feed on larger bolls. Research indicates that bolls approximately 425-450 DD60s or older are relatively safe from attack (Greene et al. 1999). This hemipteran complex is potentially able to increase the occurrence of boll rots and/or hard lock, at least in some environments.

A study done at Jackson, TN during 2010 (unpublished) demonstrated how insect injury can increase the occurrence of boll rot, in this case primarily in the form of hard lock following substantial rains that occurred during September as many bolls were opening. In a fungicide factorial experiment, the main effects were insecticide (treated and untreated) and fungicide (treated and untreated). Insecticides targeting plant bug infestations were applied three times to treated plots during the boll maturation period (July 20 – August 18). A single application of fungicide (Quadris @ 9 oz/acre) was made to treated plots at three weeks after first bloom (August 10). The occurrence of hard lock was significantly reduced by the use of insecticide but not fungicide (Fig. 1). Some level of hard lock was evident in plots treated with insecticide despite achieving excellent control of insect pests. Yield was also significantly influenced by insecticide but not fungicide treatment (Fig. 2).

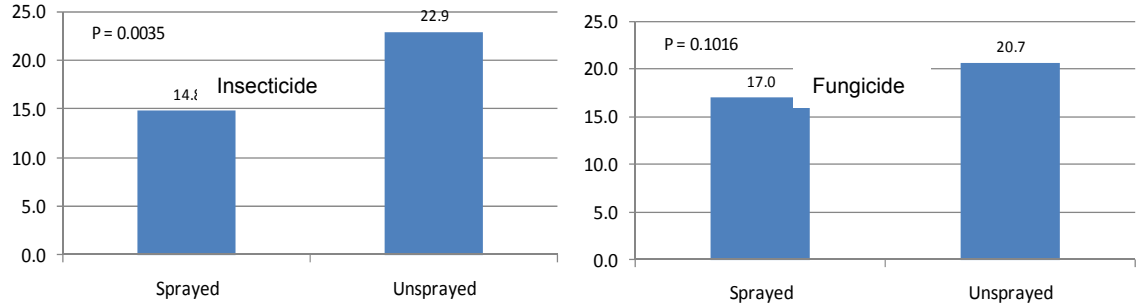

Figure 1. The effects of insecticide (left) and fungicide application on percent hard lock at maturity. Note that the interaction of insecticide and fungicide treatment was not significant, $P = 0.06$.

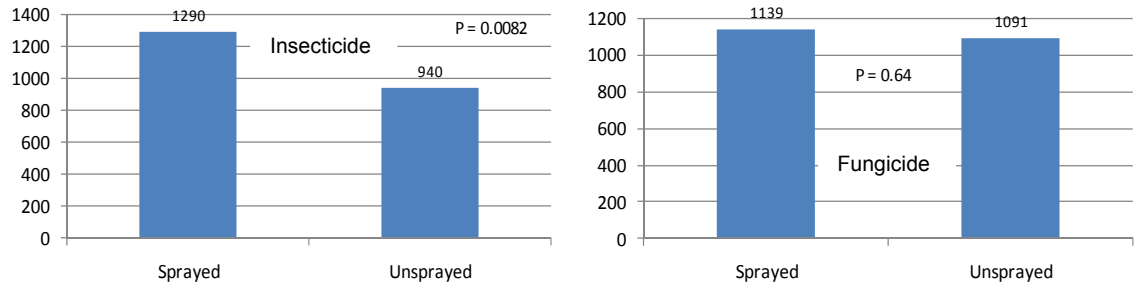

Figure 2. The effects of insecticide (left) and fungicide application on lint yield (lbs/acre). Note that the interaction of insecticide and fungicide treatment was not significant, $P = 0.86$.

References

Greene, J. K., S. G. Turnipseed, M. J. Sullivan, and G. A. Herzog. 1999. Boll damage by southern green stink bug (Hemiptera: Pentatomidae) and tarnished plant bug (Hemiptera: Miridae) caged on transgenic *Bacillus thuringiensis* cotton. Econ. Entomol. 92: 941-944.

Russell, J. S. 1999. Effects of tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois), feeding on cotton boll abscission and yield. M.S. thesis, Louisiana State University, Baton Rouge.