## TOXICITY OF THIODICARB AND SPINOSAD TO SOYBEAN LOOPER IN COTTON (CVS. NUCOTN 33B, DP 5415) AND SOYBEAN (CV. BUCKSHOT 66) T. S. Hall, D. J. Boethel and B. R. Leonard Department of Entomology Louisiana State University Agricultural Center Louisiana Agricultural Experiment Station Baton Rouge, LA

## Abstract

The soybean looper, Pseudoplusia includens (Walker), is a polyphagous insect species that is a major pest in soybeans and a sporadic pest in cotton. During 1997 in Louisiana, soybean looper defoliation accounted for 6% yield loss in soybeans and <1% yield loss in cotton. However, every year several thousand acres of these crops must be treated with insecticides to manage economic infestations of soybean looper. In Louisiana, approximately 6000 acres of cotton and 23000 acres of soybean were treated in 1997. Soybean looper has developed resistance to several classes of insecticides and better management strategies are needed to control soybean looper in these crops. Although the sovbean looper is not a targeted pest of transgenic *Bacillus* thuringiensis (Berliner) var. kurstaki Bt cotton, this technology can reduce populations by approximately 60% (C. Clemens and D. J. Boethel, LSU Agricultural Center; unpublished data). Therefore, it is possible that lower insecticide rates may be used to manage soybean looper in transgenic Bt cotton.

A green tissue residual bioassay was conducted in 1998 to evaluate the efficacy of spinosad (Tracer® 4F; Dow AgroSciences, Indianapolis, IN) and thiodicarb (Larvin® 3.2F; Rhone-Poulenc, Research Triangle Park, NC) against sovbean looper in Bt cotton (cv. NuCOTN 33B), nontransgenic cotton (cv. DP 5415) and soybean (cv. Buckshot 66). This study was conducted at the Macon Ridge location of the Northeast Research Station near Winnsboro, LA. Plots were 10 ft. x 2 rows. Treatments were arranged in a split plot within a RCB design with three replications. The main plot was variety and subplot was insecticide. Each crop received an application of spinosad at 0.012, 0.025, 0.0375 and 0.05 lb AI/acre, thiodicarb at 0.125, 0.25, 0.375 and 0.5 lb AI/acre and no insecticide (control). Treatments were applied on 3 Aug with a tractor mounted-compressed air sprayer calibrated to deliver 10 gpa at 35 psi through TeeJet 8002 flat fan nozzles (2/row). A subtending leaf at a first position cotton boll and a trifoliate leaf from the topone third of soybean plants were removed 1 hour after treatment. Three soybean looper larvae (L3 stage) and a leaf were placed individually onto a filter paper in a 100 x 15 mm polystyrene petri dish. A total of 45 larvae were used for each insecticide treatment (rate). One ml of water/dish was added to delay desiccation of leaf tissue. Larval mortality was determined by prodding with a blunt tipped instrument at 72 hours after infestation.

All rates of spinosad and thiodicarb applied to Bt and non-Bt cotton resulted in significantly higher mortality compared to the untreated control. All treatments applied to soybean, with the exception of spinosad (0.012 lb AI/acre), also resulted in significantly higher mortality compared to the untreated control. The lowest rates of spinosad (0.012, 0.025 lb AI/acre) applied to Bt cotton resulted in significantly higher mortality, 71.1% and 75.5%, respectively, compared to corresponding rates applied to soybeans, which only gave 22.2% and 42.2% mortality, respectively. Similar results were reported for lower rates of thiodicarb (0.25, 0.375 lb AI/acre), which provided 95% and 93% mortality, respectively, in Bt cotton and only 66.6% and 65.5% mortality, respectively, in sovbean. However, there was no significant difference in larval mortality between Bt cotton and soybean at the highest rates of spinosad (0.05 lb AI/acre) and thiodicarb (0.5 lb AI/acre). Also, there was no significant difference in mortality at all rates of spinosad and thiodicarb between Bt and non-Bt cotton varieties. With the exception of spinosad (0.05 lb AI/acre) and thiodicarb (0.375 lb AI/acre), insecticide treatments on non-Bt cotton did not produce mortality levels that were significantly different from those corresponding treatments on soybean. These results indicate that lower rates of spinosad (0.012, 0.025 lb AI/acre) and thiodicarb (0.25, 0.375 lb AI/acre) were effective against soybean looper in Bt cotton, compared to rates required for satisfactory control on soybean and non-Bt cotton.

Reprinted from the *Proceedings of the Beltwide Cotton Conference* Volume 2:1184-1185 (1999) National Cotton Council, Memphis TN