

AGRONOMIC ALERT



Managing Bollworms in Genuity® Bollgard II® Cotton

Some areas of the lower Midsouth and Southeast are currently experiencing heavy bollworm pressure (Figure 1) with some populations at their highest since Genuity® Bollgard II® cotton has been commercialized. Although Genuity® Bollgard II® contains proteins which are active on bollworms, supplemental applications of insecticides for worm control are sometimes needed.

Pyrethroids are the chemistry most frequently applied to supplement control in *Bt* cotton when bollworms escape transgenic protection. Although mid to full rates of pyrethroids are still generally effective on smaller larvae, recent reports suggests that bollworms are developing some tolerance to pyrethroids which makes this class of insecticide chemistry less effective on larger bollworms. In a study conducted since 1988 by Louisiana State University, adult vial tests have been used to monitor bollworm susceptibility to pyrethroid insecticides (Figure 2). According to data, 2010 is the first year over 50% of the bollworms collected in moth traps survived exposure to the pyrethroid in testing. This developing tolerance to pyrethroids in cotton bollworms impacts previous recommendations for when to spray Genuity® Bollgard II®. As a result, it is recommended that Genuity® Bollgard II® be treated when the number of ¼-inch or larger larvae reaches the recommended state threshold levels, even under conditions in which little or no fruit loss has been observed.

While Genuity® Bollgard II® expresses proteins active on bollworms throughout the plant, the strongest protection is generally seen in leaf tissue and the green tissue around squares and bolls. A small percentage of bollworm larvae that infest Genuity® Bollgard II® cotton may find tissue that expresses at lower levels, particularly bloom tissue. Some of these larvae may, in turn, gain enough size to feed on squares and bolls and cause fruit loss. Significant levels of square or boll damage due to worms in Genuity® Bollgard II®, is not typically seen, however, under the current high populations, even a small percentage of surviving larvae can be enough to cause economic damage to Genuity® Bollgard II® cotton.

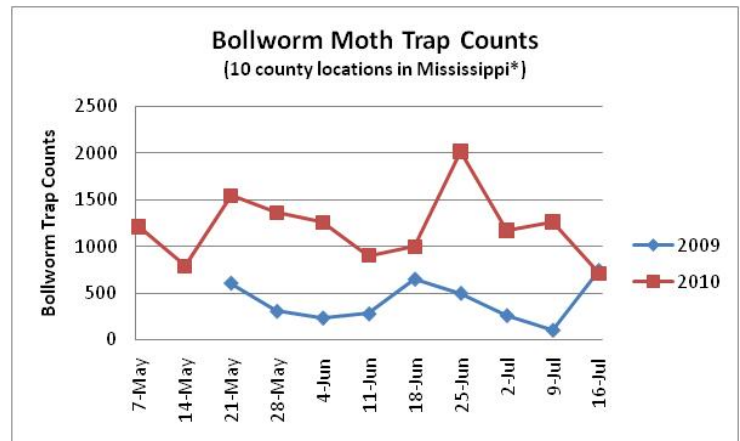


Figure 1. Total bollworm moths captured in USDA traps set in 10 Mississippi Counties (Washington, Sharkey, Humphrey, Yazoo, Holmes, Leflore, Tallahatchie, Coahoma, Bolivar, Sunflower) in 2009 and 2010.

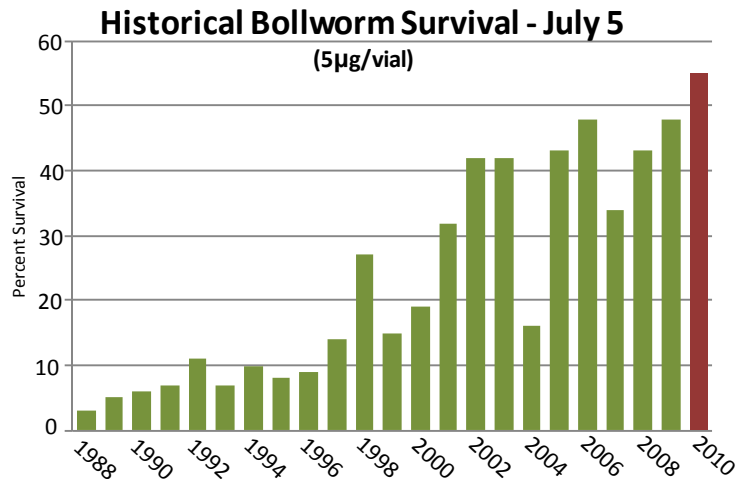


Figure 2. Survival of bollworm moth trap captures after exposure to pyrethroids in adult vial testing, 1988—2010. Louisiana State University

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Figure 3. Bollworm on cotton boll.

Bollworms have been observed feeding from bloom to bloom without significant damage. Consequently, recommendations have previously been to treat Genuity® Bollgard II® for bollworms when the number of ¼-inch or larger larvae reach your state's extension economic threshold AND there is evidence that fruit loss has occurred. This recommendation assumed that pyrethroids at standard rates would control larger bollworms.

Due to the evidence of a developing tolerance of later-stage bollworms to pyrethroids in many cotton areas, the previous recommendation is being revised. As a result, most extension specialists in the lower southern states

Given the higher protection levels in bolls and squares of Genuity® Bollgard II®, when compared to Bollgard®, it has been frequently observed that larger larvae of bollworms have been deterred from causing fruit loss. These larger larvae can continue to develop on Genuity®

would recommend that under heavy pressure from bollworms, Genuity® Bollgard II® be treated when the number of ¼-inch or larger larvae reaches state extension thresholds, even under conditions in which little or no fruit loss has been observed. Allowing bollworms to develop while monitoring for fruit loss presents a risk in that it may be too late to effectively control the larger bollworms once significant fruit loss is observed. **Thus, Monsanto supports this more aggressive timing of pyrethroid applications which is based strictly on larval thresholds when population pressure is high.**

Although Genuity® Bollgard II® cotton may require supplemental insecticide applications, keep in mind that fields containing other *Bt* technologies, including Bollgard®, will probably require more applications and a more intense level of management, with such high pressure. The combination of Genuity® Bollgard II® and appropriately timed pyrethroid sprays should provide considerable value in controlling the majority of these worm pests, protecting more cotton and minimizing additional insecticide needs. Contact your local Monsanto representative and your local Extension specialist for more information.

Sources: Jackson, Ryan. *USDA Moth Traps. Mississippi Crop Situation 2010.* Mississippi State University Extension Service. May 7, 2010—July 16, 2010, No. 5-15. msucare.com

Temple, J., S. Micinski, and R. Leonard. Susceptibility of Louisiana Bollworm to Pyrethroids. Louisiana State University Extension. Louisiana Crop Bulletin.

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Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

Growers may utilize the natural refuge option for varieties containing the Bollgard II® trait in the following states: AL, AR, FL, GA, KS, KY, LA, MD, MS, MO, NC, OK, SC, TN, VA, and most of Texas (excluding the Texas counties of Brewster, Crane, Crockett, Culberson, El Paso, Hudspeth, Jeff Davis, Loving, Pecos, Presidio, Reeves, Terrell, Val Verde, Ward and Winkler). The natural refuge option does not apply to Bollgard II cotton grown in areas where pink bollworm is a pest, including CA, AZ, NM, and the above listed Texas counties. It also remains the case that Bollgard® and Bollgard II cotton cannot be planted south of Highway 60 in Florida, and that Bollgard cotton cannot be planted in certain other counties in the Texas panhandle. Refer to the Technology Use Guide and IRM/Grower Guide for additional information regarding Bollgard II, Bollgard, natural refuge and EPA-mandated geographical restrictions on the planting of Bt cotton. **ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Bollgard II®, Genuity®, Genuity and Design®, Genuity Icons, Respect the Refuge and Cotton Design®, and Technology Development by Monsanto and Design(SM) are trademarks of Monsanto Technology LLC. All other trademarks are the property of their respective owners. ©2010 Monsanto Company. CRB7302010



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