2002 BELTWIDE COTTON CONFERENCES, ATLANTA, GA – JANUARY 8-12

BOLLWORM/BOLLGARD INTERACTIONS: IMPLICATIONS FOR MANAGEMENT

Jeff Gore, D.R. Cook and M.M. Willrich
Department of Entomology, LSU AgCenter
Baton Rouge, LA
B.R. Leonard
Northeast Research Station – Macon Ridge Branch, LSU AgCenter
Winnsboro, LA

Abstract

Reports of bollworm, *Helicoverpa zea* (Boddie), larvae feeding in white flowers of Bollgard® cotton have been relatively common each year since its commercialization in 1996. Currently, no information is available explaining the mechanisms associated with bollworm infestations in white flowers. Also, the damage potential of bollworms feeding in white flowers has not been determined. Insecticide applications generally are directed at bollworms feeding in white flowers and on small bolls under dried flower corollas in the absence of data supporting the potential of those populations to cause economic losses. Field studies were conducted in northeast Louisiana to determine if differences in bollworm larval behavior occur on conventional (cv. Deltapine 5415) and Bollgard (cv. NuCOTN 33B) cottons and to determine if bollworms feeding in white flowers are capable of causing economic losses.

Larvae were placed in the terminals of either single cotton plants or on all plants within 1-m row micro-plots. Individual cotton plants were inspected 3, 6, and 24 hours after infestation. Micro-plots were inspected at 24 and 48 hours after infestation to determine the location of larvae on plants. In another study, one-day old larvae were placed in white flowers of Bollgard, Bollgard II, and non-Bollgard plants. Plants were visually inspected at 72 hours after infestation and every 48 hours thereafter, until no larvae were recovered. Larval location and numbers of damaged fruiting forms (squares, white flowers, and bolls) were recorded in each plot.

On individual plants, larvae migrated down plants more rapidly on Bollgard cotton than on non-Bollgard cotton. On non-Bollgard cotton, larvae remained near the terminals of plants feeding on small squares at 24 hours after infestation. Larvae on Bollgard plants moved a greater vertical distance based on main stem nodes from the terminals compared to that on non-Bollgard plants at all rating intervals. As a consequence, more larvae were recovered from white flowers and bolls on Bollgard cotton than on non-Bollgard cotton at 24 hours after infestation.

Differences were observed between Bollgard and non-Bollgard micro-plots in the percentage of infested terminals and squares at 48 hours after infestation. Larvae remained near the terminals on non-Bollgard cotton feeding on terminal foliage and squares; whereas, larvae migrated further down Bollgard plants feeding on white flowers and bolls. In Louisiana, insecticide applications are initiated on non-Bollgard cotton when at least 5 larvae per 100 terminals sampled or 5 damaged squares per 100 squares sampled are recorded. At 48 hours after infestation on non-Bollgard cotton, the combined percentages of infested terminals (8.6%) and squares (3.1%) exceeded current threshold levels for Louisiana on non-Bollgard cotton. In contrast, the combined percentages of infested terminals (1.5%) and squares (1.5%) were below the current threshold level in Louisiana on Bollgard cotton. However, when the percentages of infested white flowers (6.8%) and bolls (8.7%) were considered, levels to initiate treatment were exceeded.

On plants that received infestations of larvae in white flowers, numbers of damaged fruiting forms averaged 8.5, 6.3, and 5.7 per 10 plants on non-Bollgard, Bollgard, and Bollgard II cottons, respectively, after 72 hours. No larvae were recovered after nine days. Total numbers of damaged fruiting forms increased to 25.0 per 10 plants on non-Bollgard cotton and 11.5 per 10 plants on Bollgard cotton by the time all larvae had begun to pupate (11 days). Little damage was observed beyond the initial 72 hour rating on Bollgard II cotton.

These results indicate that bollworm larvae may cause sufficient damage in Bollgard cotton to justify insecticide applications. Bollworm larvae were able to damage additional fruiting forms on Bollgard cotton after feeding in white flowers. Although damage on Bollgard cotton was lower than that observed on non-Bollgard cotton, even low to moderate population levels that persist for several days may be sufficient to cause yield losses. Injury to Bollgard II cotton by bollworms was minimal in this study. This information will be important for improving scouting protocols and developing action thresholds for bollworms in Bollgard cotton cultivars.