

Boll Damage Survey in Non-Bt, WideStrike, Bollgard and Bollgard II cotton Scott Stewart, UT Extension

Introduction. A late season survey of boll damage in grower fields has been performed annually since 2003. In recent years, we have been doing this survey for selected varieties in the UT County Standardized Variety Trial. These data are used to identify major insect pests, changes in pest trends, and to estimate crop losses. This information provides a historical database and also helps determine the relative efficacy of various transgenic traits (e.g., Bollgard, Bollgard II and WideStrike).

Methods. In 2008, as part of the County Standard Testing program, non-Bt, WideStrike, Bollgard and Bollgard II cotton varieties were planted in grower fields throughout West Tennessee. Four varieties within these tests were surveyed to compare insect injury in non-Bt (DP121 RF), WideStrike (PHY375 WRF), Bollgard (DP444 BR) and Bollgard II (STN4427 BGII/RF) cotton. Damage surveys were done from August 14-22. At each of 14 locations, three samples of 100 consecutive bolls each were taken in the above varieties. Counties included in the survey included: Carroll, Chester, Crockett, Dyer, Fayette, Shelby, Gibson (2), Hardeman, Haywood, Lake, Lauderdale, and Madison (2). The data recorded included numbers of bolls with “worm” injury primarily caused by bollworm, tobacco budworm or fall armyworm; numbers of bolls with “bug” injury (stained lint, etc.) caused by hemipteran pests such as plant bugs or stink bugs; and the number of bolls with boll rot not apparently caused by insect injury. Only bolls which potentially could contribute to yield were sampled. Application of foliar insecticides was similar across varieties within each location.

Results. A survey has been conducted in late season annually beginning in 2003. In 2003, caterpillar-induced boll damage was 9.2, 3.8 and 1.3% in non-Bt, Bollgard and Bollgard II cotton, respectively. About 5.8% of surveyed bolls were injured by hemipteran pests (i.e., bugs). In 2004, boll damage attributed to worms was 2.04, 0.31 and 0.13% in non-Bt, Bollgard and Bollgard II cotton, respectively. Approximately 3.5% of bolls were injured by bugs in 2004. Survey results from 2005 indicate that, like 2004, there was relatively little injury from caterpillar pests. Significantly more worm damage was observed in non-Bt cotton ($\approx 1.5\%$) varieties than in Bollgard (0.08%), Bollgard II (0.08%) and WideStrike (0.12%) cotton. Across all varieties, about 4.3% of bolls had evidence of bug damage in 2005. The 2006 survey of boll damage indicated low bug injury to bolls across the state (average $\approx 1.5\%$). This was consistent with unusually low stink bug and plant bug populations observed in most areas of West Tennessee. Boll injury caused by caterpillar pests, primarily bollworm, was about 5% in non-Bt cotton in 2006. In 2007, boll damage caused by caterpillar pests was the lowest recorded since this survey began, averaging only 0.72% in non-Bt cotton across all locations. Caterpillar induced boll damage in Bollgard, Bollgard II and WideStrike varieties was inconsequential. Despite low infestations of plant bugs or stink bugs in many areas during 2007, bug induce boll damage was only slightly lower than in previous years ($\approx 3\%$ across all varieties).

In 2008, boll damage caused by caterpillar pests was again low, averaging only 1.48% in non-Bt cotton across all locations (see table below). Caterpillar damage in non-Bt cotton averaged 3.0%, 7.7% and 3.7% at the WTREC, Lauderdale County and Haywood County locations, respectively. All other locations had less than 2% boll damage from caterpillar pests in non-Bt

cotton. Bollgard, WideStrike and Bollgard II cotton averaged 0.33%, 0.10% and 0.05% damage from caterpillars, respectively. This low level of injury was consistent with moth trapping data and in-field observations of larval infestations. Boll damage caused by hemipteran pests (i.e., plant bugs and stink bugs) was the highest recorded since the survey began in 2003 (overall average of 6.16% across varieties, range = 0.3 – 33.3%). This increase was also consistent with higher than normal populations of stink bugs observed in many areas during 2008. We continue to observe slightly more bug damage in non-Bt cotton. This indicates that some caterpillar injury is being confused with stink bug or plant bug injury.

Late season survey - average percent boll damage by variety (14 locations, 2008)

Variety	Worm Damage	Bug Damage	Boll Rot	Total Damage
DP 444 BG/RR	0.33	5.43	0.02	5.79
PHY 375 WR*	0.10	5.05	0.00	5.14
ST 4427 B2RF*	0.05	5.79	0.00	5.85
DP 121 RF*	1.48	6.40	0.00	7.88

Damage = penetration of boll wall

Each location = 3 samples of 100 consecutive, harvestable bolls per variety

* Phy370 WR, ST4554 B2RF and PHY425 RF used at one location