

2003 ANNUAL REPORT TO COTTON INCORPORATED

“STINK BUG DAMAGE TO BT AND CONVENTIONAL COTTON VARIETIES”

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Gary L. Lentz

**Department of Entomology and Plant Pathology
The University of Tennessee**

Introduction

Stink bugs continue to be a major pest of cotton in the upper MidSouth. Damage to fruit comes primarily from the adult or 5th stage nymph and to a lesser extent from the 3rd stage nymphs. The amount of damage that may be produced by the individual stages for selected durations is critical in determining how quickly producers need to respond to new infestations of stink bugs.

Materials and Methods

The experiment was conducted at the West Tennessee Experiment Station in Jackson. Deltapine DP 451 BR was planted no-till on May 16 using Temik, Quadris and Ridomil Gold in furrow (3.5 lb, 8 oz and 1 oz, respectively). In order to evaluate the infestation effects of various stages of stink bugs for two infestation durations of 3.5 and 7 days, 100 white blooms were tagged on July 21. Organza sleeve cages approximately 2 inches in diameter were placed over the young bolls on July 30. Green stink bugs had been collected during the previous few days and held in the laboratory. Individual adult, 5th stage nymph or 3rd stage nymph bugs were placed in the sleeve cages on August 1 and held for either 3.5 or 7 days, being removed on August 4 or 8. Fourteen bolls were infested with different stage bugs for either the 3.5- or 7-day period. Sixteen bolls were caged but not infested with stink bugs. On August 7, an additional 100 white blooms were tagged and then caged on August 11. Stink bugs were introduced on August 18 and then removed on August 22 (3.5 days) or August 26 (7 days). Fourteen bolls were infested with each stage for each of the two durations. Sixteen bolls were caged and not infested. After the bugs were removed, the cages were left on the bolls until October 22 when the bolls were brought to the laboratory and evaluated for damage. The number of hard locks, the number of feeding warts on the boll wall, the number of grams of seed cotton (including diseased and rotted tissue) and the number of grams of fluffed white seed cotton (which could be harvested with a machine picker) were determined for each boll.

Results

The amount of damage caused by the different stages to 175 bolls pooled across both the 3.5- and 7-day durations is shown in Table 1. The number of hard locks and the number of feeding warts/boll observed was greater in bolls infested with adults and 3rd stage nymphs compared to 5th stage nymphs and the control. In neither case did the amount of damage from the 5th stage nymphs differ from the control. The amount of seed cotton

material produced was greatest in the control and did not differ from that produced by bolls infested with 5th stage nymphs although the latter was slightly less. Seed cotton did not differ among the three stages, but that from bolls infested with adults or 3rd stage nymphs was significantly less than that in the control. The amount of fluffed (harvestable) cotton was greatest in control bolls, but did not differ from 5th stage infested bolls. Fluffed cotton from bolls infested with adults and 3rd stage nymphs was significantly less than from the control or bolls infested with 5th stage nymphs.

The amount of damage occurring to bolls during the 3.5- and 7-day durations pooled across the 3 life stages is shown in Table 2. The number of hard locks/boll was greatest in the 7-day duration and was significantly greater than in the 3.5-day duration. Both differed from the control. The number of feeding warts/boll did not differ in the two durations and neither differed from the control. The amount of seed cotton was significantly reduced as the duration of the infestation increased. The amount of fluffed cotton was significantly reduced in the 7-day duration compared to the 3.5-day duration and the control which did not differ from each other.

The amount of damage to bolls from each of the green stink bug life stages for each of the durations is shown in Table 3. For the 3rd stage nymphs, the number of hard locks increased with longer feeding. However, the number of feeding warts, grams of seed cotton and fluffed cotton did not differ between feeding durations, although all differed from the untreated control. For 5th stage nymphs, there were no significant differences for any of the criteria evaluated. There was a numerical increase in the number of hard locks and feeding warts compared to the control and a decrease in the grams of seed cotton and fluffed cotton compared to the control, but these differences were not statistically significant.

The amount of damage to bolls from the adults varied with criteria. Adult feeding for 7 days significantly increased the number of hard locks over the 3.5-day feeding period and both differed from the control. The number of feeding warts did not differ significantly for the two feeding periods, but both differed from the control. The total amount of seed cotton and fluffed cotton was significantly reduced with the 7-day feeding compared to the 3.5-day feeding period, but the latter did not differ from the control.

Discussion

Generally, damage increased and seed cotton was reduced as the bugs became older. However, the 5th stage bugs did not produce the expected damage. One possibility is that these bugs were in the process of molting and did not immediately feed and after molting may have taken some time for the exoskeleton to sclerotize so they could feed. Further studies are planned to delineate some of these observed responses to feeding by the bugs. In many cases, feeding by the bugs for only 3.5 days produced a level of damage much lower than observed in the 7-day feeding period. This may indicate that cotton bolls have some level of tolerance. Cotton fields treated for stink bugs within 3 days of detection should reduce damage significantly.

Table 1. Stink bug damage to 10-day old cotton bolls following infestation pooled across 3.5 and 7 days. West Tennessee Experiment Station. Jackson, TN August 2003.

| Stage | No. of Hard Locks/Boll | No. of Feeding Warts/Boll | Seed Cotton/Boll (g) | Fluffed Cotton/Boll (g) |
|-----------------------|------------------------|---------------------------|----------------------|-------------------------|
| Adult | 1.33a ¹ | 1.38a | 3.63b | 3.29b |
| Nymph 5 th | 0.42b | 0.53b | 4.51ab | 4.39a |
| Nymph 3 rd | 1.41a | 1.37a | 3.65b | 3.18b |
| Control | 0.12b | 0.08b | 5.08a | 4.92a |
| P>F | <0.0001 | 0.0038 | 0.0342 | 0.0057 |

¹ Means with the same letter are not significantly different (P=0.05, Duncan's New MRT).

Table 2. Stink bug damage to 10-day old bolls following infestation pooled across adult, nymph 5 and nymph 3 stages. West Tennessee Experiment Station. Jackson, TN. August 2003.

| Duration in Days | No. of Hard Locks/Boll | No. of Feeding Warts/Boll | Seed Cotton/Boll (g) | Fluffed Cotton/Boll (g) |
|------------------|------------------------|---------------------------|----------------------|-------------------------|
| 7 | 1.47a ¹ | 1.14a | 3.48c | 3.04b |
| 3.5 | 0.72b | 1.06a | 4.30b | 4.10a |
| 0 | 0.12c | 0.08a | 5.08a | 4.92a |
| P>F | 0.0001 | 0.6835 | 0.0085 | 0.0014 |

¹ Means with the same letter are not significantly different (P=0.05, Duncan's New MRT).

Table 3. Stink bug damage to 10-day old cotton bolls from selected life stages for two durations. West Tennessee Experiment Station. Jackson, TN. August 2003.

| Stage | Duration in days | No. of Hard Locks/ Boll | No. of Feeding Warts/Boll | Seed Cotton/ Boll (g) | Fluffed Cotton/ Boll (g) |
|-----------------------|------------------|-------------------------|---------------------------|-----------------------|--------------------------|
| Nymph 3 rd | 7 | 1.88a ¹ | 1.76a | 3.29b | 2.54b |
| | 3.5 | 1.08b | 1.08a | 3.90b | 3.64b |
| | 0 | 0.12c | 0.08b | 5.08a | 4.92a |
| | P>F | <.0001 | 0.0002 | 0.0085 | 0.001 |
| Nymph 5 th | 7 | 0.60a | 0.35a | 4.18a | 4.04a |
| | 3.5 | 0.26a | 0.70a | 4.80a | 4.70a |
| | 0 | 0.12a | 0.08a | 5.08a | 4.92a |
| | P>F | 0.075 | 0.109 | 0.188 | 0.220 |
| Adult | 7 | 1.95a | 1.38a | 2.97b | 2.49b |
| | 3.5 | 0.79b | 1.38a | 4.21a | 3.98a |
| | 0 | 0.12c | 0.08b | 5.08a | 4.92a |
| | P>F | <.0001 | 0.0002 | 0.0005 | 0.0001 |

¹ Means followed by the same letter are not significantly different (P=0.05, Duncan's New MRT).