

STINK BUG INSECTICIDE EFFICACY TRIALS - 2003

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Introduction

Stink bugs have become a primary insect pest of cotton which must be managed to maximize profits. Annual insecticide applications targeting stink bugs have steadily increased during recent years, due in part to increased awareness and recognition of stink bugs as an economic pests. Three primary species of stink bugs annually infest cotton in Georgia and include the southern green stink bug, brown stink bug, and green stink bug. Differences in susceptibility to various insecticides occur within and between species. The objectives of these studies were to evaluate efficacy of selected insecticides for control of the stink bug complex.

Materials and Methods

Cage Trial: Open ended cone shaped mesh cages were placed on untreated cotton plants. One end of the mesh cage was attached to the main stem approximately 12 inches below the terminal and then folded down exposing the upper part of the plant. Insecticide treatments were then applied (July 11) using a CO2 backpack sprayer calibrated to deliver 10 gpa using two TXVS 6 nozzles per row. After sprays had dried, 5 adult brown stink bugs were enclosed in four cages per treatment for a total of 20 bugs per treatment. Brown stink bug adults were collected from field corn on July 10, 2003 in Randolph and Terrell Counties GA and maintained in the laboratory until infestation. Mortality was recorded 3 days after infestation (DAI). Surviving stink bugs in respective treatments were placed in containers (all reps combined) with treated foliage and observed for mortality at 5 DAI.

Small Plot Trials near Peanut: Stink bugs are often observed at high populations on the border rows of cotton planted adjacent to peanuts, corn, or other host plants. This infestation pattern provides opportunity to screen stink bug insecticides in the presence of high populations. Small plot field trials were established in Tift (two locations), Seminole, and Turner Counties on cotton planted adjacent to peanuts. Plots were four rows wide and varied in length from 30 to 50 feet and were arranged so that all plots bordered peanuts. Treatments were applied with a self-propelled high clearance sprayer calibrated to deliver 10 gpa using two 8002 nozzles per row. Stink bugs were sampled on 12 row feet using a drop cloth either 2 or 3 days after treatment (DAT). Stink bugs were identified to species and nymphs and adults were counted separately.

Results and Discussion

In the cage trial at 3 DAI, mortality of brown stink bug was significantly greater than the untreated for all treatments, except the pyrethroid Mustang Max, (Table 1). Higher mortality than expected occurred in the untreated and may be attributed to predation by fire ants which occurred in two of the untreated cages. Treatments which included the organophosphate Bidrin provided significantly greater control (100 percent) compared with other treatments. DoubleThreat, which is a co-pack of spinosad and bifenthrin, provided significantly better control of brown stink bugs compared with the pyrethroid Mustang Max. Bifenthrin is also a pyrethroid and has shown in previous studies to be more efficacious on brown stink bugs compared with other pyrethroids.

Brown stink bug, *Euschistus servus*, and *Euschistus quadrator* which is a small brown stink bug with pointed shoulders were present in the first Tift County trial. Historically the brown stink bug is more commonly observed in cotton compared with *E. quadrator*. Adults of both species were significantly reduced in all treatments compared with the untreated at 2 DAT (Table 2). Nymphs comprised a small percentage of the population. The greatest reduction in total stink bugs was observed in the Mustang Max plus Bidrin treatment but was not significantly different from treatments which contained Bidrin or Vydate.

The second trial conducted in Tift County was primarily infested with the brown stink bug, but *E. quadrator* was also present. All treatments except for the pyrethroid Karate significantly reduced brown stink bug adults compared with the untreated (Table 3). Treatments which included an organophosphate insecticide such as Bidrin or Orthene were not significantly different than the best treatment which included Bidrin at 8 ozs/a. The pyrethroid Dicdiscipline, active ingredient is bifenthrin, significantly reduced brown stink bug adults compared with the pyrethroid Karate. Control of *E. quadrator* tended to be similar to that of the brown stink bug.

Brown and southern green stink bug adults and nymphs in addition to *E. quadrator* were present at the Seminole County site. All treatments significantly reduced brown and southern green stink bug nymphs compared with the untreated (Table 4). Treatments including the pyrethroid Karate provided good control of southern green stink bugs.

Significant differences among treatments were only observed for *E. quadrator* adults and southern green stink bugs at the Turner County location (Table 5). Orthene, Mustang Max, Capture, and Vydate significantly reduced *E. quadrator* adults. All treatments significantly reduced southern green stink bug nymphs compared with the untreated. Pyrethroids and Centric provided the best control of southern green stink bug nymphs, but were not significantly better than Bidrin treatments.

In summary, these trials demonstrate that differences in insecticide susceptibility exists between brown stink bugs and southern green stink bugs. Organophosphates typically provided the greatest control of brown stink bug compared with other treatments. All

insecticides evaluated provided control of southern green stink bug. Control of southern green stink bugs with pyrethroids was similar to that of organophosphates. These trials demonstrate the importance of proper species identification of economic infestations of stink bugs so that appropriate insecticides can be used.

Table 1. Efficacy of selected insecticides for control of brown stink bugs in cage trials.

| Treatment | Percent Mortality | |
|--|-------------------|-------|
| | 3 DAT | 5 DAT |
| Untreated* | 25d | 25 |
| Bidrin (6 ozs/A) | 100a | 100 |
| Vydate (11 ozs/A) | 50bc | 65 |
| Mustang Max (3 ozs/A) | 35cd | 40 |
| Centric (2 ozs/A) | 55bc | 60 |
| DoubleThreat (1:40A) | 60b | 75 |
| Mustang Max (3 ozs/A) + Bidrin (4 ozs/A) | 100a | 100 |
| Mustang Max (3 ozs/A) + Vydate (11 ozs/A) | 60b | 80 |

Means followed by the same letter within a column do not significantly differ (Non-Randomized Design, P=0.10, LSD)

Table 2. Efficacy of selected insecticides for control of the stink bug complex in cotton.

| Tift County GA Treated August 5, 2003 | Stink Bugs per 12 row feet (2 DAT) | | | | | | |
|---|------------------------------------|--------|--------------|--------|----------------|--------|--------|
| | Brown | | E. quadrator | | Southern Green | | All |
| Treatment | adults | nymphs | adults | nymphs | adults | nymphs | total |
| Untreated | 5.33a | 0.00a | 7.33a | 0.00a | 0.00a | 0.00a | 12.67a |
| Mustang Max 2.88 ozs/a | 1.00c | 0.00a | 3.00b | 0.00a | 0.00a | 0.00a | 4.00b |
| Mustang Max 4.0 ozs/a | 3.33b | 0.00a | 1.33bc | 0.00a | 0.00a | 0.00a | 4.67b |
| Bidrin 8 ozs/a | 1.00c | 0.33a | 0.67c | 0.00a | 0.00a | 0.00a | 2.00bc |
| Vydate 11.0 ozs/a | 1.67bc | 0.33a | 1.00bc | 0.00a | 0.00a | 0.00a | 3.00bc |
| Mustang Max 2.88 ozs/a + Bidrin 4 ozs/a | 0.67c | 0.00a | 0.33c | 0.00a | 0.00a | 0.00a | 1.00c |
| Mustang Max 2.88 ozs/a + Vydate 11.0 ozs/a | 1.67bc | 0.00a | 2.00bc | 0.00a | 0.00a | 0.00a | 3.67bc |

Means followed by the same letter within a column do not significantly differ (Randomized Complete Block Design and 3 replications, P=0.10, LSD)

Table 3. Efficacy of selected insecticides for control of the stink bug complex in cotton.

| Tift County GA Treated Aug 20, 2003 | Stink Bugs per 12 row feet (2 DAT) | | | | | | |
|---|------------------------------------|--------|--------------|--------|----------------|--------|--------|
| | Brown | | E. quadrator | | Southern Green | | All |
| Treatment | adults | nymphs | adults | nymphs | adults | nymphs | total |
| Untreated | 8.67a | 1.00a | 2.67a | 0.00a | 0.00a | 0.00a | 12.33a |
| Orthene 97 0.5 lb/a | 2.00bc | 0.00b | 0.33b | 0.00a | 0.00a | 0.00a | 2.33bc |
| Orthene 97 0.75 lb/a | 1.67bc | 0.00b | 0.33b | 0.00a | 0.00a | 0.00a | 2.00bc |
| Karate 1.92 ozs/a | 8.33a | 0.00b | 3.00a | 0.00a | 0.00a | 0.00a | 11.33a |
| Orthene 97 0.5 lb/a + Karate 1.92 ozs/a | 1.33bc | 0.00b | 0.67b | 0.00a | 0.00a | 0.00a | 2.00bc |
| Bidrin 8 ozs/a | 0.67c | 0.00b | 0.00b | 0.00a | 0.00a | 0.00a | 0.67c |
| Discipline 0.1 lb ai/a | 3.67b | 0.33b | 0.00b | 0.00a | 0.00a | 0.00a | 4.00b |
| Bidrin 8 ozs/a + Discipline 0.05 lb ai/a | 0.67c | 0.00b | 0.00b | 0.00a | 0.00a | 0.00a | 0.67c |

Means followed by the same letter within a column do not significantly differ (Randomized Complete Block Design and 3 replications, P=0.10, LSD)

Table 4. Efficacy of selected insecticides for control of the stink bug complex in cotton.

| Seminole County GA Treated Aug 22, 2003 | Stink Bugs per 12 row feet (3 DAT) | | | | | | |
|--|------------------------------------|---------|--------------|--------|----------------|--------|---------|
| | Brown | | E. quadrotor | | Southern Green | | All |
| Treatment | adults | nymphs | adults | nymphs | adults | nymphs | total |
| Untreated | 1.00bc | 5.67a | 3.00a | 0.00a | 1.33a | 13.00a | 24.00a |
| Centric 1.25 ozs/a | 3.33a | 2.33bcd | 5.67a | 0.00a | 0.33a | 3.33bc | 15.00b |
| Centric 2.0 ozs/a | 3.00a | 2.33bcd | 4.33a | 0.00a | 0.33a | 0.33c | 10.3bcd |
| Karate 1.92 ozs/a | 2.00abc | 3.00bc | 3.33a | 0.00a | 0.33a | 1.00bc | 9.67bcd |
| Karate 1.92 ozs/a + Centric 1.25 ozs/a | 2.33ab | 3.67ab | 4.00a | 0.00a | 0.67a | 1.67bc | 12.33bc |
| Bidrin 6 ozs/a | 0.67c | 1.00cd | 2.67a | 0.00a | 0.33a | 2.33bc | 7.00cd |
| Vydate 11.0 ozs/a | 3.33a | 2.00bcd | 2.00a | 0.00a | 0.67a | 4.33b | 12.33bc |
| Vydate 11.0 ozs/a + Karate 1.92 ozs/a | 2.33ab | 0.67cd | 2.00a | 0.00a | 0.67a | 0.33c | 6.00cd |
| Orthene 97 0.5 lb/a | 0.67c | 1.33bcd | 1.00a | 0.00a | 0.33a | 1.67bc | 5.00d |
| Orthene 97 0.5 lb/a + Karate 1.92 ozs/a | 1.00bc | 0.00d | 2.33a | 0.00a | 0.00a | 0.33c | 3.67d |

Means followed by the same letter within a column do not significantly differ (Randomized Complete Block Design and 3 replications, P=0.10, LSD)

Table 5. Efficacy of selected insecticides for control of the stink bug complex in cotton.

| Turner County GA Treated Aug 26, 2003 Treatment | Stink Bugs per 12 row feet (3 DAT) | | | | | | |
|---|------------------------------------|--------|--------------|--------|----------------|--------|---------|
| | Brown | | E. quadrotor | | Southern Green | | All |
| | adults | nymphs | adults | nymphs | adults | nymphs | total |
| Untreated | 1.50a | 2.75a | 2.25b | 0.00a | 1.75a | 11.50a | 19.75a |
| Orthene 97 0.5 lb/a | 1.00a | 1.75a | 0.75cd | 0.00a | 1.25ab | 5.00bc | 9.75bcd |
| Orthene 97 0.75 lb/a | 1.50a | 2.25a | 1.50bc | 0.00a | 1.00bc | 4.50bc | 10.75b |
| Bidrin 5.3 ozs/a | 1.00a | 0.50a | 1.25bcd | 0.00a | 0.00e | 3.00cd | 5.75de |
| Bidrin 8 ozs/a | 1.00a | 0.25a | 1.50bc | 0.00a | 0.25de | 3.25cd | 6.25cde |
| Karate 1.92 ozs/a | 2.25a | 1.25a | 1.25bcd | 0.00a | 0.25de | 0.75d | 5.75de |
| Mustang Max 3.6 ozs/a | 1.75a | 0.50a | 0.50cd | 0.00a | 0.25de | 1.25d | 4.25e |
| Capture 3.9 ozs/a | 1.00a | 1.25a | 1.00cd | 0.00a | 1.00bc | 0.75d | 5.00e |
| Vydate 11.0 ozs/a | 1.25a | 2.25a | 0.25d | 0.00a | 0.50cde | 6.00b | 10.25bc |
| Centric 2.0 ozs/a | 2.75a | 1.50a | 3.75a | 0.00a | 0.75bcd | 1.50d | 10.25bc |

Means followed by the same letter within a column do not significantly differ (Randomized Complete Block Design and 4 replications, P=0.10, LSD)