# Management of Soybean Insect Pests, 01-2021

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## Background

Up to date non-biased information is critical for making any agricultural management decision, including insect management decisions. As production practices change, the impact of pests can change also. An example of this is greater risk from early season/soil insects as a result of reduced tillage and increased plant residue from the previous crop, native winter vegetation, and/or cover crops. Also, uncommon and unexpected insect pest issues can occur. For example, redbanded stink bug infestations were much more widespread during 2017, and saltmarsh caterpillar during 2021. As a result, many studies were conducted with regard to management, damage potential, and treatment thresholds. Also, many current management tools are under reregistration review. It is possible that some of the older insecticides, which growers rely on, may have uses either restricted or revoked in the near future. With a limited number of insecticides already, this would make insect management in soybeans, and all crops more challenging. Insecticide resistance can be a major issue for insect management, and new insecticides are not being brought to market regularly anymore. "Routine" studies to evaluate current insecticides, along with reports from growers and consultants provide the first indications of pending insecticide resistance issues. Current market conditions have reduced profit margins considerably. The most informed and economical insect management decision is always important, but may be even more important when profit margins are small. To keep information current, studies must be regularly conducted to evaluate management strategies and tools and to provide information on unexpected insect issues. Objectives: To provide up to date information on insect management strategies/tools for soybean insect pests.

## Progress

During 2021 experiments were conducted to evaluate the performance of selected insecticides against a range of soybean insect pests including, seedling/soil insects (corn rootworm, wireworm, pea leaf weevil), saltmarsh caterpillar, soybean looper, and stink bugs (including redbanded stink bug).

Three experiments were conducted to evaluate the performance of at-planting insecticides against seedling/soil pests. In the first experiment, foliar applications of either Endigo or Brigade were made at-planting, at emergence, or 7 days after emergence (DAE) (Table 1). Gaucho seed treatment was included as a comparison. Gaucho resulted in greater plant density at 18 DAE

compared to all other treatments. None of the foliar treatments resulted greater plant density than the non-treated control. No differences in yield were observed. In the second trial, selected insecticide seed treatments and seed treatment packages were evaluated. At 18 DAE all of the insecticide seed treatments resulted in greater plant population than Trilex Allegiance (Fungicide Only) (Table 2). No differences in yield were observed. In the third experiment, there were no differences among treatments for plant density or yield (Table 3).

Two experiments were conducted to evaluate the performance of selected insecticides against saltmarsh caterpillar infesting soybeans (Tables 4 and 5). In the first experiment all of the insecticide treatments, except Steward, reduced saltmarsh caterpillar numbers compared to the non-treated control at 3 DAT (Table 4). At 5 DAT, all of the insecticide treatments, except Lannate and Warrior, reduced saltmarsh caterpillar numbers compared to the non-treated control. All of the insecticide treatments, except Lannate, Warrior, and Warrior plus Acephate reduced larval numbers compared to the non-treated control at 7 DAT. After 7 DAT populations had declined in all plots. In the second experiment, the impact of adding an adjuvant to Intrepid Edge, Prevathon and Besiege on saltmarsh caterpillar control was evaluated. All of the insecticide treatments reduced saltmarsh caterpillar densities compared to the non-treated at 3, 5, and 7 DAT (Table 5). The addition of an adjuvant did not improve the performance of any of the insecticides on any sample date.

Six experiments were conducted to evaluate the performance of selected insecticides against soybean looper. A tropical storm occurred during several of the trials. In the first experiment, only Intrepid Edge and Steward reduced soybean looper densities compared to the non-treated control at 2 DAT (Table 6). At 5 DAT all of the insecticides, except Warrior, reduced looper densities compared to the non-treated. At 7 DAT, only Intrepid Edge, Lannate, Steward, and Vanticor reduced looper densities compared to the non-treated. No differences were observed among treatments at 12 DAT. However, looper densities were fairly low in general in this trial. In the second trial, all of the insecticide treatments reduced looper densities compared to the non-treated control at 2, 5, and 7 DAT. Soybean looper densities declined after 7 DAT, and no differences among treatments were observed. Only Vanticor (both rates) reduced looper densities compared to the non-treated at 14 DAT. In the third trial Intrepid Edge, Intrepid at 4 oz/acre, and Lannate reduced looper densities at 2 DAT (Table 8). All of the insecticides, except Intrepid at 2 oz/acre, reduced loopers compared to the non-treated at 4 DAT. Looper densities declined between 4 and 8 DAT, and no differences among treatments were observed at 8 or 14 DAT. In the fourth trial all of the insecticides reduced looper densities at 2, 5, and 7 DAT, except for Besiege at 7 DAT (Table 9). No differences were observed at 14 DAT. In the fifth trial no differences in looper densities were observed among treatments at 2 DAT (Table 10). All of the insecticides reduced looper densities compared to the non-treated at 5 DAT. Looper densities declined between 5 and 7 DAT, and no differences among treatments were observed at 7 or 14 DAT. The impact of adding an adjuvant to Intrepid Edge, Prevathon and Besiege on soybean looper control was also evaluated (Table 11). All of the insecticide treatments reduced soybean loopers compared to the non-treated at 2 and 5 DAT. The addition of an adjuvant did not improve the performance of any of the insecticides at 2 and 5 DAT. No differences soybean looper densities were observed among treatments at 7 DAT.

One experiment was conducted to evaluate the performance of selected insecticides against stink bugs. Green and redbanded stink bugs were more common than other species. In general stink bug densities were lower than observed during 2020. All of the insecticides reduced stinkbug densities compared to the non-treated control at 3 DAT (Table 12). Only Sniper (6.4 oz/acre) Endigo, Acephate (0.75 lb AI/acre) and Leverage 360 reduced stink bug densities at 5 DAT compared to the non-treated. All of the insecticides, except Sniper (5.12 oz/acre), Acephate

(0.5 lb AI/acre), and Admire Pro, reduced stink bug densities compared to the non-treated at 7 DAT. At 3 and 5 DAT green and redbanded stink bug were the most common species in all plots. At 7 DAT green, brown, and redbanded stink bug were the most common species observed.

In summary, the use of an insecticide seed treatment improved soybean stand establishment in two studies. Foliar insecticide applications at-planting to 7 days after emergence did not maintain plant stand density. Most of the insecticides evaluated against saltmarsh caterpillar performed adequately. The addition of an adjuvant did not improve saltmarsh caterpillar control. Most of the insecticides evaluated against soybean looper performed adequately. In many of the trials, a tropical storm occurring during the trial. As a result looper infestations did not persist for an extended period of time. Mixed populations of stink bugs were present in experiments. These were primarily green and redbanded stink bugs. Most of the insecticides performed satisfactorily against all stink bug species present. Almost no re-infestation occurred in this trial.

Table 1. Impact of selected foliar insecticide treatments on soybean stand.

| Treatment | Rate per acre (fl oz. prod.) | Application Timing[e] | Plant Density 18 DAE[f] | Yield bu/acre |
|---|---|---|---|---|
| Non-Treated | - | - | 62,236b | 37.8 |
| Endigo ZCX[a] | 3.0 | Pre-emerge | 65,258b | 35.5 |
| Brigade 2EC[b] | 4.27 | Pre-emerge | 75,794b | 34.9 |
| Endigo ZCX[a] | 3.0 | Emergence | 76,611b | 39.6 |
| Brigade 2EC[b] | 4.27 | Emergence | 70,812b | 40.1 |
| Endigo ZCX[a] | 3.0 | 7 DAE | 67,545b | 40.0 |
| Brigade 2EC[b] | 4.27 | 7 DAE | 72,609b | 40.7 |
| Gaucho 5FS[c] | 2.5[d] | Seed Treatment | 101,685a | 46.2 |
| *P>F* | | | <0.01 | 0.37 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
All seed received a fungicide seed treatment (Apron XL 3FS 0.105 fl oz/cwt and Maxim 4FS 0.115 fl oz / cwt).
[a]Active ingredient – λ Cyhalothrin plus Thiamethoxam, Classes – Pyrethroid, Neonicotinoid.
[b]Active ingredient – Bifenthrin, Class - Pyrethroid.
[c]Active ingredient – Imidacloprid, Class - Neonicotinoid.
[d]fl oz per cwt.
[e]Pre-emerge = directly after planting, Emergence = >75% emergence, 7 DAE = 7 days after emergence.
[f]DAE=Days after emergence.

Table 2. Impact of selected soybean seed treatment packages on stand establishment and yield.

| Treatment | Rate fl oz/cwt | Insecticide component | Plants per acre 18 DAE[e] | Yield bu/acre |
|---|---|---|---|---|
| Trilex Allegiance | 1.0 | - | 65,912c | 45.1 |
| Trilex Allegiance + Poncho/Votivo | 1.0 + 3.28 | Poncho[a] | 78,816ab | 46.6 |
| CruiserMaxx Vibrance | 3.2 | Cruiser[b] | 84,942ab | 57.2 |
| CruiserMaxx Vibrance + Avicta | 3.2 3.0 | Cruiser[b] | 85,514ab | 41.4 |
| Intego Suite | 3.37 | Nipsit[a] | 86,412ab | 41.5 |
| Trilex Allegiance + Gaucho | 1.0 + 2.5 | Gaucho[c] | 88,536ab | 43.7 |
| Trilex Allegiance + Poncho/Votivo + Gaucho | 1.0 3.28 2.5 | Poncho[a] + Gaucho[c] | 86,902ab | 49.2 |
| Vibrance + Fortenza | 0.16 1.084 | Fortenza[d] | 90,496a | 47.0 |
| CruiserMaxx Vibrance + Fortenza | 3.2 1.084 | Cruiser[b] + Fortenza[d] | 78,245b | 49.2 |
| *P>F* | | | <0.01 | 0.21 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredient – Clothianidin, Class - Neonicotinoid.
[b]Active ingredient – Thiamethoxam, Class - Neonicotinoid.
[c]Active ingredient – Imidacloprid, Class - Neonicotinoid.
[d]Active ingredient – Cyantraniliprole, Class - Diamide.
[e]DAE=Days after emergence.

Table 3. Impact of selected insecticide seed treatments on stand establishment and yield.

| Treatment | Rate | Plants/acre 18 DAE[h] | Yield (bu/acre) |
|---|---|---|---|
| Non-Treated | - | 87,210 | 46.5 |
| Gaucho 5FS[a] | 2.5[e] | 97,016 | 52.1 |
| Poncho 5FS[b] | 0.11[f] | 100,683 | 51.4 |
| Dermacor 5.21FS[c] | 0.0057[f] | 103,651 | 50.5 |
| Verimark 1.67F[d] | 0.0057[f] | 103,277 | 49.0 |
| Brigade 2EC | 3.9[g] | 99,877 | 45.7 |
| *P>F* | | 0.07 | 0.38 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredient – Imidacloprid, Class - Neonicotinoid.
[b]Active ingredient – Clothianidin, Class - Neonicotinoid.
[c]Active ingredient – Chlorantraniliprole, Class - Diamide.
[d]Active ingredient – Cyantraniliprole, Class - Diamide.
[e]fl oz/cwt seed. Seed treatment application.
[f]mg AI/seed. Seed treatment application.
[g]fl oz/acre. In-furrow spray application.
[h]DAE=Days after emergence.

Table 4. Performance of selected insecticides against saltmarsh caterpillar infesting soybeans.

| | Rate/acre | Saltmarsh Caterpillar / 25 Sweeps | | |
|---|---|---|---|---|
| Treatment | (fl oz product) | 2 DAT[j] | 5 DAT | 7 DAT |
| Intrepid Edge 3SC[a] | 4.5 | 3.1bc | 0.6e | 1.4cd |
| Intrepid 2F[b] | 6.0 | 5.2bc | 1.1de | 0.6d |
| Lannate LV 2.4L[c] | 16.0 | 4.3bc | 5.9abc | 6.9ab |
| Besiege 1.252CS[d] | 7.0 | 2.4c | 1.1de | 1.4cd |
| Steward 1.25EC[e] | 9.0 | 9.0ab | 3.1bcd | 3.3bcd |
| Warrior 2.08CS[f] | 1.92 | 5.2bc | 8.6ab | 6.0abc |
| Warrior 2.08CS[f] + Acephate 97S[g] | 1.92 + 0.75[i] | 4.1bc | 2.8cde | 4.1abc |
| Prevathon 0.43SC[h] | 14.0 | 1.6c | 0.7de | 0.6d |
| Vanticor 5SC[h] | 1.2 | 5.4bc | 2.1cde | 2.6bcd |
| Non-Treated | - | 23.1a | 13.3a | 11.8a |
| *P>F* | | <0.01 | <0.01 | <0.01 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredients – Spinetoram plus Methoxyfenozide, Class – Spinosyn and IGR.
[b]Active ingredient –Methoxyfenozide, Class – IGR.
[c]Active ingredient – Methomyl, Class – Carbamate.
[d]Active ingredients – λ Cyhalothrin plus Chlorantraniliprole, Class – Pyrethroid and Diamide.
[e]Active ingredient – Indoxacarb, Class – Oxydiazine.
[f]Active ingredient – λ Cyhalothrin, Class – Pyrethroid.
[g]Active ingredients – Acephate, Class – Organophosphate.
[h]Active ingredient – Chlorantraniliprole, Class - Diamide.
[i]lb (wt) AI per acre.
[j]DAT=Days after treatment.

Table 5. Performance of selected insecticides with and without nonionic surfactant against saltmarsh caterpillar infesting soybeans.

| Treatment | Rate/acre (fl oz product) | Saltmarsh Caterpillar / 25 Sweeps 2 DATe | 5 DAT | 7 DAT |
|---|---|---|---|---|
| Intrepid Edge 3SC[a] | 4.5 | 1.3b | 1.4b | 0.1b |
| Intrepid Edge 3SC[a] +Nonionic Surfactant | 4.5+0.25%[d] | 1.0b | 0.3bcd | 0.3b |
| Prevathon 0.43SC[b] | 14.0 | 0.6b | 0.1cd | 0.0b |
| Prevathon 0.43SC[b] + Nonionic Surfactant | 14.0+0.25%[d] | 0.2b | 0.0d | 0.0b |
| Besiege 1.252CS[c] | 7.0 | 1.6b | 0.4bcd | 0.3b |
| Besiege 1.252CS[c] + Nonionic Surfactant | 7.0+0.25%[d] | 1.3b | 1.1bc | 0.1b |
| Non-Treated | - | 5.4a | 5.1a | 3.6a |
| *P>F* | | 0.02 | <0.01 | 0.04 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredients – Spinetoram plus Methoxyfenozide, Classes – Spinosyn and IGR.
[b]Active ingredient – Chlorantraniliprole, Class - Diamide.
[c]Active ingredients – λ Cyhalothrin plus Chlorantraniliprole, Classes – Pyrethroid and Diamide.
[d]Percent volume/volume.
[e]DAT=Days after treatment.

Table 6. Performance of selected insecticides against soybean looper infesting soybeans, Experiment 1.

| Treatment | Rate/acre (fl oz product) | Soybean Looper / 25 Sweeps 2 DAT[h] | 5 DAT | 7 DAT | 12 DAT |
|---|---|---|---|---|---|
| Intrepid Edge 3SC[a] | 4.5 | 1.0d | 1.1d | 1.1cd | 6.8 |
| Intrepid 2F[b] | 6.0 | 7.5ab | 2.2cd | 4.0abc | 11.5 |
| Lannate LV 2.4L[c] | 16.0 | 1.3d | 1.3cd | 0.9d | 6.3 |
| Besiege 1.252CS[d] | 7.0 | 3.3cd | 2.4cd | 4.0abc | 6.0 |
| Steward 1.25EC[e] | 9.0 | 1.3d | 2.6bcd | 1.3cd | 5.5 |
| Warrior 2.08CS[f] | 1.92 | 8.0a | 5.6ab | 5.9ab | 7.5 |
| Prevathon 0.43SC[g] | 14.0 | 3.3cd | 1.7cd | 3.0a-d | 7.5 |
| Vanticor 5SC[g] | 1.2 | 1.8bc | 3.4bc | 2.6bcd | 6.0 |
| Non-Treated | - | 5.8abc | 6.9a | 7.0a | 7.0 |
| *P>F* | | <0.01 | <0.01 | 0.02 | 0.45 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredients – Spinetoram plus Methoxyfenozide, Classes – Spinosyn and IGR.
[b]Active ingredient – Methoxyfenozide, Class – IGR.
[c]Active ingredient – Methomyl, Class – Carbamate.
[d]Active ingredients – λ Cyhalothrin plus Chlorantraniliprole, Classes – Pyrethroid and Diamide.
[e]Active ingredient – Indoxacarb, Class – Oxydiazine.
[f]Active ingredient – λ Cyhalothrin, Class – Pyrethroid.
[g]Active ingredient – Chlorantraniliprole, Class - Diamide.
[h]DAT=Days after treatment.

Table 7. Evaluation of selected insecticides against soybean looper, Experiment 2.

| Treatment | Rate/acre (fl oz product) | Soybean Looper / 25 Sweeps 2 DAT[g] | 5 DAT | 7 DAT | 14 DAT |
|---|---|---|---|---|---|
| Intrepid Edge 3SC[a] | 4.0 | 3.4cd | 3.7bc | 0.9cd | 7.8ab |
| Intrepid Edge 3SC[a] | 5.0 | 6.8bc | 3.2bc | 1.1bcd | 6.5abc |
| Intrepid 2F[b] | 4.0 | 9.7b | 5.2b | 3.6b | 7.8ab |
| Lannate LV 2.4L[c] | 24.0 | 3.4cd | 4.6bc | 2.7bc | 10.0a |
| Steward 1.25EC[d] | 9.0 | 2.2d | 1.7c | 0.4d | 2.5def |
| Besiege 1.252CS[e] | 7.0 | 8.6b | 4.8bc | 1.8bcd | 5.3b-e |
| Besiege 1.252CS[e] | 10.0 | 9.7b | 2.4bc | 2.1bcd | 3.0c-f |
| Vanticor 5SC[f] | 1.2 | 8.2b | 1.7c | 3.0bc | 1.5f |
| Vanticor 5SC[f] | 1.71 | 5.8bcd | 2.1bc | 1.2bcd | 1.8ef |
| Non-Treated | - | 19.4a | 12.3a | 10.6a | 5.5bcd |
| *P>F* | | <0.01 | <0.01 | <0.01 | <0.01 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).

[a]Active ingredients – Spinetoram plus Methoxyfenozide, Classes – Spinosyn and IGR.

[b]Active ingredient – Methoxyfenozide, Class – IGR.

[c]Active ingredient – Methomyl, Class – Carbamate.

[d]Active ingredient – Indoxacarb, Class – Oxydiazine.

[e]Active ingredients – λ Cyhalothrin plus Chlorantraniliprole, Classes – Pyrethroid and Diamide.

[f]Active ingredient – Chlorantraniliprole, Class - Diamide.

[g]DAE=Days after emergence.

Table 8. Evaluation of selected insecticides against soybean looper, Experiment 3.

| Treatment | Rate/acre (fl oz product) | Soybean Looper / 25 Sweeps 2 DAT[d] | 4 DAT | 8 DAT | 14 DAT |
|---|---|---|---|---|---|
| Intrepid Edge 3SC[a] | 4.0 | 4.3d | 6.0c | 1.7 | 6.3 |
| Intrepid 2F[b] | 2.0 | 12.5ab | 13.5ab | 3.5 | 10.0 |
| Intrepid 2F[b] | 4.0 | 10.5bc | 7.8c | 4.3 | 4.5 |
| Intrepid 2F[b] | 6.0 | 14.5ab | 9.0bc | 3.4 | 6.5 |
| Lannate LV 2.4L[c] | 16.0 | 5.8cd | 5.8c | 2.2 | 8.5 |
| Non-Treated | - | 16.3a | 16.0a | 4.4 | 6.5 |
| *P>F* | | <0.01 | <0.01 | 0.39 | 0.24 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).

[a]Active ingredients – Spinetoram plus Methoxyfenozide, Classes – Spinosyn and IGR.

[b]Active ingredient – Methoxyfenozide, Class – IGR.

[c]Active ingredient – Methomyl, Class – Carbamate.

[d]DAE=Days after emergence.

Table 9. Evaluation of selected insecticides against soybean looper, Experiment 4.

| Treatment | Rate/acre (fl oz product) | Soybean Looper / 25 Sweeps | | | |
|---|---|---|---|---|---|
| | | 2 DAT[d] | 5 DAT | 7 DAT | 14 DAT |
| Intrepid Edge 3SC[a] | 4.0 | 11.1bc | 3.2c | 1.6b | 8.0 |
| Intrepid Edge 3SC[a] | 5.0 | 15.7b | 7.7b | 2.0b | 4.9 |
| Intrepid Edge 3SC[a] | 6.0 | 6.4c | 2.4c | 1.4b | 4.5 |
| Prevathon 0.43SC[b] | 14.0 | 14.3b | 4.2bc | 1.4b | 5.6 |
| Besiege 1.252CS[c] | 7.0 | 15.8b | 8.4b | 6.0ab | 4.7 |
| Non-Treated | - | 32.0a | 19.2a | 9.9a | 8.8 |
| *P>F* | | <0.01 | <0.01 | 0.04 | 0.37 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredients – Spinetoram plus Methoxyfenozide, Classes – Spinosyn and IGR.
[b]Active ingredient – Chlorantraniliprole, Class - Diamide.
[c]Active ingredients – λ Cyhalothrin plus Chlorantraniliprole, Classes – Pyrethroid and Diamide.
[d]DAE=Days after emergence.

Table 10. Evaluation of selected insecticides against soybean looper, Experiment 5.

| Treatment | Rate/acre (fl oz product) | Soybean Looper / 25 Sweeps | | | |
|---|---|---|---|---|---|
| | | 2 DAT[e] | 5 DAT | 7 DAT | 14 DAT |
| Elevest 2.22SC[a] | 6.7 | 14.2 | 4.2b | 3.4 | 7.9 |
| Besiege 1.252CS[b] | 7.2 | 12.8 | 4.9b | 2.2 | 6.5 |
| Vanticor 5SC[c] | 1.2 | 10.7 | 2.8b | 2.3 | 5.4 |
| Intrepid Edge 3SC[d] | 5.0 | 16.3 | 5.0b | 2.5 | 6.5 |
| Vanticor 5SC[c] | 1.7 | 14.5 | 5.4b | 3.4 | 4.4 |
| Non-Treated | - | 22.3 | 17.1a | 9.2 | 7.8 |
| *P>F* | | 0.53 | <0.01 | 0.6 | 0.76 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredients – bifenthrin plus Chlorantraniliprole, Classes – Pyrethroid and Diamide.
[b]Active ingredients – λ Cyhalothrin plus Chlorantraniliprole, Classes – Pyrethroid and Diamide.
[c]Active ingredient – Chlorantraniliprole, Class - Diamide.
[d]Active ingredients – Spinetoram plus Methoxyfenozide, Classes – Spinosyn and IGR.
[e]DAE=Days after emergence.

Table 11. Performance of selected insecticides with and without nonionic surfactant against soybean looper infesting soybeans.

| Treatment | Rate/acre (fl oz product) | Soybean Looper / 25 Sweeps 2 DAT[e] | 5 DAT | 7 DAT |
|---|---|---|---|---|
| Intrepid Edge 3SC[a] | 4.5 | 1.3c | 1.1cd | 2.1 |
| Intrepid Edge 3SC[a] +Nonionic Surfactant | 4.5+0.25%[d] | 2.2bc | 0.4d | 1.4 |
| Prevathon 0.43SC[b] | 14.0 | 4.5b | 0.7cd | 0.6 |
| Prevathon 0.43SC[b] + Nonionic Surfactant | 14.0+0.25%[d] | 2.0bc | 1.1bcd | 0.8 |
| Besiege 1.252CS[c] | 7.0 | 3.1bc | 3.2ab | 2.7 |
| Besiege 1.252CS[c] + Nonionic Surfactant | 7.0+0.25%[d] | 3.9bc | 2.3bc | 4.6 |
| Non-Treated | - | 9.3a | 6.8a | 5.6 |
| *P>F* | | <0.01 | <0.01 | 0.16 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredients – Spinetoram plus Methoxyfenozide, Classes – Spinosyn and IGR.
[b]Active ingredient – Chlorantraniliprole, Class - Diamide.
[c]Active ingredients – λ Cyhalothrin plus Chlorantraniliprole, Classes – Pyrethroid and Diamide.
[d]Percent volume/volume.
[e]DAT=Days after treatment.

Table 12. Evaluation of selected insecticides against redbanded, brown, green, southern green stink bug (total).

| Treatment | Rate/acre (fl oz product) | Total Stink Bugs / 25 Sweeps[i] 3 DAT[j] | 5 DAT | 7 DAT |
|---|---|---|---|---|
| Warrior 2.08CS[a] | 1.92 | 0.7b | 2.3abc | 2.4bc |
| Sniper 2EC[b] | 5.12 | 0.6b | 2.9ab | 2.8abc |
| Sniper 2EC[b] | 6.4 | 0.2b | 0.6cde | 1.5c |
| Endigo ZCX 2.7CS[c] | 4.5 | 0.7b | 0.2e | 1.9c |
| Acephate 97S[d] | 0.5[h] | 1.2b | 2.1abc | 2.8abc |
| Acephate 97S[d] | 0.75[h] | 0.2b | 0.4de | 1.7c |
| Leverage 360 3SC[e] | 2.8 | 0.5b | 1.4b-e | 1.3c |
| Admire Pro[f] | 1.3 | 1.3b | 2.7ab | 5.2ab |
| Baythroid XL 1EC[g] | 2.8 | 0.2b | 1.8a-d | 1.6c |
| Non-Treated | - | 6.4a | 4.3a | 5.9a |
| *P>F* | | 0.02 | <0.01 | 0.04 |

Means within columns followed by a common letter are not significantly different (FPLSD, *P*=0.05).
[a]Active ingredient – λ Cyhalothrin, Class – Pyrethroid.
[b]Active ingredient – Bifenthrin, Class – Pyrethroid.
[c]Active ingredients – λ Cyhalothrin plus Thiamethoxam, Classes – Pyrethroid and Neonicotinoid.
[d]Active ingredient – Acephate, Class – Organophosphate.
[e]Active ingredients – β Cyfluthrin plus Imidacloprid, Classes – Pyrethroid and Neonicotinoid.
[f]Active ingredient – Imidacloprid, Class – Neonicotinoid.
[g]Active ingredient – β Cyfluthrin, Class – Pyrethroid.
[h]lb (wt) product per acre.
[i]Brown, Green, Southern Green, and Redbanded Stink Bug combined.
[j]DAT=Days after treatment.

Table 13. Stink bug species composition at 3 DAT.

| Treatment | Rate/acre (fl oz product) | Percent of total stink bugs GSB[i] | SGSB[j] | BSB[k] | RBSB[l] |
|---|---|---|---|---|---|
| Warrior 2.08CS[a] | 1.92 | 0.0 | 0.0 | 25.0 | 75.0 |
| Sniper 2EC[b] | 5.12 | 0.0 | 0.0 | 0.0 | 100.0 |
| Sniper 2EC[b] | 6.4 | 100.0 | 0.0 | 0.0 | 0.0 |
| Endigo ZCX 2.7CS[c] | 4.5 | 0.0 | 0.0 | 25.0 | 75.0 |
| Acephate 97S[d] | 0.5[h] | 75.0 | 0.0 | 0.0 | 25.0 |
| Acephate 97S[d] | 0.75[h] | 0.0 | 0.0 | 0.0 | 100.0 |
| Leverage 360 3SC[e] | 2.8 | 75.0 | 0.0 | 0.0 | 25.0 |
| Admire Pro[f] | 1.3 | 57.1 | 0.0 | 28.6 | 14.3 |
| Baythroid XL 1EC[g] | 2.8 | 0.0 | 0.0 | 0.0 | 100.0 |
| Non-Treated | - | 50.0 | 13.3 | 13.3 | 23.3 |

[a]Active ingredient – λ Cyhalothrin, Class – Pyrethroid.
[b]Active ingredient – Bifenthrin, Class – Pyrethroid.
[c]Active ingredients – λ Cyhalothrin plus Thiamethoxam, Classes – Pyrethroid and Neonicotinoid.
[d]Active ingredient – Acephate, Class – Organophosphate.
[e]Active ingredients – β Cyfluthrin plus Imidacloprid, Classes – Pyrethroid and Neonicotinoid.
[f]Active ingredient – Imidacloprid, Class – Neonicotinoid.
[g]Active ingredient – β Cyfluthrin, Class – Pyrethroid.
[h]lb (wt) AI per acre.
[i]GSB = green stink bug.
[j]SGSB = southern green stink bug.
[k]BSB = brown stink bug.
[l]RBSB = redbanded stink bug.

Table 14. Stink bug species composition at 5 DAT.

| Treatment | Rate/acre (fl oz product) | Percent of total stink bugs GSB[i] | SGSB[j] | BSB[k] | RBSB[l] |
|---|---|---|---|---|---|
| Warrior 2.08CS[a] | 1.92 | 7.1 | 0.0 | 7.1 | 85.7 |
| Sniper 2EC[b] | 5.12 | 21.4 | 0.0 | 35.7 | 42.9 |
| Sniper 2EC[b] | 6.4 | 33.3 | 0.0 | 0.0 | 66.7 |
| Endigo ZCX 2.7CS[c] | 4.5 | 0.0 | 0.0 | 0.0 | 100.0 |
| Acephate 97S[d] | 0.5 | 44.4 | 0.0 | 22.2 | 33.3 |
| Acephate 97S[d] | 0.75 | 0.0 | 0.0 | 0.0 | 100.0 |
| Leverage 360 3SC[e] | 2.8 | 16.7 | 0.0 | 50.0 | 33.3 |
| Admire Pro[f] | 1.3 | 27.3 | 9.1 | 0.0 | 63.6 |
| Baythroid XL 1EC[g] | 2.8 | 37.5 | 12.5 | 0.0 | 50.0 |
| Non-Treated | - | 66.7 | 0.0 | 4.8 | 28.6 |

[a]Active ingredient – λ Cyhalothrin, Class – Pyrethroid.
[b]Active ingredient – Bifenthrin, Class – Pyrethroid.
[c]Active ingredients – λ Cyhalothrin plus Thiamethoxam, Classes – Pyrethroid and Neonicotinoid.
[d]Active ingredient – Acephate, Class – Organophosphate.
[e]Active ingredients – β Cyfluthrin plus Imidacloprid, Classes – Pyrethroid and Neonicotinoid.
[f]Active ingredient – Imidacloprid, Class – Neonicotinoid.
[g]Active ingredient – β Cyfluthrin, Class – Pyrethroid.
[h]lb (wt) AI per acre.
[i]GSB = green stink bug.
[j]SGSB = southern green stink bug.
[k]BSB = brown stink bug.
[l]RBSB = redbanded stink bug.

Table 15. Stink bug species composition at 7 DAT.

| Treatment | Rate/acre (fl oz product) | Percent of total stink bugs | | | |
|---|---|---|---|---|---|
| | | GSB[i] | SGSB[j] | BSB[k] | RBSB[l] |
| Warrior 2.08CS[a] | 1.92 | 10.0 | 0.0 | 50.0 | 40.0 |
| Sniper 2EC[b] | 5.12 | 16.7 | 8.3 | 8.3 | 66.7 |
| Sniper 2EC[b] | 6.4 | 0.0 | 0.0 | 14.3 | 85.7 |
| Endigo ZCX 2.7CS[c] | 4.5 | 0.0 | 0.0 | 50.0 | 50.0 |
| Acephate 97S[d] | 0.5 | 46.2 | 7.7 | 38.5 | 7.7 |
| Acephate 97S[d] | 0.75 | 28.6 | 0.0 | 28.6 | 42.9 |
| Leverage 360 3SC[e] | 2.8 | 14.3 | 0.0 | 57.1 | 28.6 |
| Admire Pro[f] | 1.3 | 38.1 | 4.8 | 42.9 | 14.3 |
| Baythroid XL 1EC[g] | 2.8 | 28.6 | 0.0 | 28.6 | 42.9 |
| Non-Treated | - | 36.0 | 28.0 | 16.0 | 20.0 |

[a]Active ingredient – λ Cyhalothrin, Class – Pyrethroid.
[b]Active ingredient – Bifenthrin, Class – Pyrethroid.
[c]Active ingredients – λ Cyhalothrin plus Thiamethoxam, Class – Pyrethroid and Neonicotinoid.
[d]Active ingredient – Acephate, Class – Organophosphate.
[e]Active ingredients – β Cyfluthrin plus Imidacloprid, Class – Pyrethroid and Neonicotinoid.
[f]Active ingredient – Imidacloprid, Class – Neonicotinoid.
[g]Active ingredient – β Cyfluthrin, Class – Pyrethroid.
[h]lb (wt) AI per acre.
[i]GSB = green stink bug.
[j]SGSB = southern green stink bug.
[k]BSB = brown stink bug.
[l]RBSB = redbanded stink bug.