Mississippi Peanut Growers Association

Funding Year: 2015 Final Report

Impact of Insect Pests on Peanut Yields and Management Options

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Objectives:

1) To determine the efficacy of at-planting insecticides against thrips and other early season insect pests in peanut, and determine their impact on yield.
2) To determine the impact of foliar feeding insect pests on peanut yields using field cages and manual defoliation experiments.
3) To evaluate foliar insecticides for control of early season insect pests (thrips) and mid-season insect pests (corn earworm, cutworm, fall armyworm, etc.) and their impact on yields.

Summary of Results

Multiple experiments were conducted during the 2015 growing season to evaluate insect management in peanut. For the first objective, experiments were conducted to evaluate Admire Pro, Velum Total, Thimet, and Cruiser. Admire Pro and Velum Total were applied as in-furrow sprays. Thimet was applied as an in-furrow granule, and Cruiser was applied as a seed treatment. In all trials, all insecticide treatments were compared to peanuts with no at-planting insecticide. All seed in these experiments had a fungicide seed treatment including the untreated control. Various counts of plant vigor, thrips densities, and plant stands were made weekly throughout the seedling stage. Peanuts were harvested at the end of the season and yields per acre were determined. Overall, thrips pressure was relatively light in these trials. However, all at-planting insecticides significantly reduced thrips numbers and damage ratings compared to the untreated control except Cruiser. Despite the low thrips numbers in these trials, all at-planting insecticides resulted in greater peanut yields than the untreated control including Cruiser. Yield increases relative to the untreated control were 541 lbs for Cruiser, 881 lbs for Thimet, 1190 lbs for Admire Pro, and 1143 lbs for Velum Total. These results suggest that thrips management can be important for maximizing yields in peanut. Additionally, control of other seedling pests that were not measured appears to be equally important. Based on these results, use of an at-planting insecticide should be used in Mississippi to minimize economic losses from early season pests.

For objective 2, field cage experiments were not completed. Insects released into cages did not successfully establish and defoliation from insect feeding was minimal. Manual defoliation trials were also conducted in 2015. In the first experiment, different levels of defoliation were evaluated at two timings. The levels of defoliation included 0% (no defoliation), 20%, 40%, 60%, 80%, and 100% at 40 days and 80 days after emergence. At Starkville, defoliation at 40 days after emergence did not cause a reduction in peanut yields relative to the no defoliation. In contrast, all of the levels of defoliation at 80 days after emergence resulted in significant yield
reductions relative to the no defoliation. As expected, the greatest yield losses occurred for 100% defoliation at 80 days after emergence. Results from Stoneville were similar to those observed in Starkville. The greatest yield reductions occurred at 80 days after emergence. In a separate experiment, the impact of defoliation timing on peanut yields was evaluated. Peanuts were defoliated to 100% at 35, 50, 65, 80, 95, and 110 days after emergence and compared to a non-defoliated control. In Starkville, no reductions in yield were observed from 100% defoliation except at 95 and 110 days after emergence. In Stoneville, significant yield reductions were observed for defoliation that occurred at 50 to 110 days after emergence. The greatest yield losses were observed when defoliation occurred from 80 to 110 days after emergence. These data will be important for developing a defoliation threshold for peanuts in Mississippi.

For objective 3, multiple experiments were conducted against various insect pests. Multiple defoliating caterpillars occurred in these tests in 2015. In general, soybean looper was the most common species. Some bollworm pressure was also experienced in some tests at moderate levels. In general, Prevathon, Belt, and Intrepid Edge provided very good control of all caterpillar pests. Dimilin and DoubleTake (Dimilin + Karate) did not provide acceptable control of soybean looper or bollworm, but did reduce populations of granulate cutworm and fall armyworm. In one test, Prevathon provided very good control of soybean looper up to 22 days after application. Overall, populations declined to extremely low levels across all plots and we were not able to evaluate control beyond 22 days. Defoliation levels remained very low and no differences in yield were observed in these tests.

In separate tests thrips control was evaluated following various herbicide treatments. In general, management of thrips with acephate in peanuts where Valor was used as a pre-emerge herbicide improved plant growth and yield compared to peanuts that did not receive a foliar application of acephate. A similar test was also conducted with Gramoxone applied post-emerge. Application of acephate applied as a tank mix with the Gramoxone or sprayed 1 to 3 weeks after Gramoxone reduced thrips populations and improved plant growth and development. No significant difference were observed in this test, but peanut yields were numerically lower where Gramoxone was sprayed without the use of acephate to manage thrips.

Results from all of these experiments will be used to improve the overall integrated pest management plan for insects in Mississippi peanuts. All of these trials will be repeated in 2016 and 2017 as part of a graduate student project.
APPENDIX 1

Detailed Results for Objective 1

Cruiser Maxx in Peanuts
Tobacco Thrips- Mean Immatures

No. per 5 Plants

Fungicide Only  |  CruiserMaxx
--- | ---
16 | 12
14 | 10
12 | 8
10 | 6
8 | 4
6 | 2
4 | 2
2 | 0

Lbs per Acre

Fungicide Only  |  CruiserMaxx
--- | ---
5100 | 5000
4900 | 4800
4700 | 4600
4500 | 4400
4400 | 4300
4300 | 4200
4200 | 4100

At-Planting Insecticides in Peanut
Tobacco Thrips- Stand Count

No. per 40 Ft

90 | 100 | 110 | 120

Percent

UFC | THIMET | Authority Pro | Volume Total | Volume Total Proportion
--- | --- | --- | --- | ---
95 | a | a | a | a
100 | a | a | a | a
105 | a | a | a | a
110 | a | a | a | a
115 | a | a | a | a

At-Planting Insecticides in Peanut
Tobacco Thrips- Vigor

Percent

UFC | THIMET | Authority Pro | Volume Total | Volume Total Proportion
--- | --- | --- | --- | ---
70 | a | a | a | a
80 | a | a | a | a
90 | a | a | a | a
100 | a | a | a | a

At-Planting Insecticides in Peanut
Tobacco Thrips- Thrip Damage

Rating (0-5)

0 | 0.5 | 1 | 1.5 | 2 | 3 | 3.5

UFC | THIMET | Authority Pro | Volume Total | Volume Total Proportion
--- | --- | --- | --- | ---
b | b | b | b | b
b | b | b | b | b
At-Planting Insecticides in Peanut
Tobacco Thrips- Immature Thrips

No. per 5 Plants

At-Planting Insecticides in Peanut
Tobacco Thrips- Thrip

No. per 5 Plants

At-Planting Insecticides in Peanut
Tobacco Thrips- Yield

Lbs per Acre

UTC  THIMET  Admire Pro  Velum Total  Velum Total  Velum Total  Velum Total Propulse  Velum Total Propulse

UTC  bc  bc  bc  bc  bc

UTC  b  ab  ab  ab  a

UTC  c  b  ab  ab  a
APPENDIX 2

Detailed Results for Objective 2

Impact of Defoliation Level on Peanut Yields
Starkville 2015

Impact of Defoliation Level on Peanut Yields
Stoneville 2015

Impact of Defoliation Timing on Peanut Yields
Starkville 2015

Impact of Defoliation Timing on Peanut Yields
Stoneville 2015
APPENDIX 3

Detailed Results for Objective 3

Evaluation of DoubleTake and Dimilin in Peanut
Soybean Looper – 10 DAT

Evaluation of DoubleTake and Dimilin in Peanut
Soybean Looper – 22 DAT

Evaluation of DoubleTake and Dimilin in Peanut
Yield

Lbs per Acre

Dimilin (4.0)  DoubleTake Old (4.0)  DoubleTake New (4.0)  Prevathon (14)  UTC
Thrips*Valor Interaction in Peanut Yield

Orthene Apps  ■ UTC  ■ 1X  ■ 2X  ■ 3X

Lbs per Acre

Flooded  Dry

Thrips*Gramoxone Interaction in Peanut Immature Thrips

Orthene Apps  ■ UTC  ■ Tank Mix  ■ 1 Week  ■ 2 Week  ■ 3 Week

No. per 5 Plants

Gramoxone  No Gramoxone

Thrips*Gramoxone Interaction in Peanut Yield

Orthene Apps  ■ UTC  ■ Tank Mix  ■ 1 Week  ■ 2 Week  ■ 3 Week

Lbs per Acre

Gramoxone  No Gramoxone