CONTINUED EFFORTS TO IDENTIFY OPTIONS FOR IMPROVING THRIPS CONTROL AND INCREASING PEANUT YIELDS

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ABSTRACT

PROJECT TITLE: Continued efforts to identify options for improving thrips control and increasing peanut yields

PROJECT INVESTIGATOR: D. Ames Herbert, Jr., Extension Entomologist, Virginia Tech Tidewater Agricultural Research and Extension Center (Tidewater AREC), Suffolk, VA

SUMMARY: Peanut growers need effective and economic options for thrips management. Our goal was to identify what these options are, both for now and the near future, through unbiased university research, and to provide findings to peanut growers at county production meetings, field days, and through Virginia Cooperative Extension publications and websites.

Results from three 2013 thrips field experiments at the Virginia Tech Tidewater AREC in Suffolk, VA show that certain new peanut seed treatments and liquid in-furrow insecticides, especially when oversprayed with a foliar broadcast insecticide at the late ground-cracking stage for thrips, can achieve the following:

- Reduced adult and immature thrips populations
- Reduced plant injury caused by direct thrips feeding
- Reduced thrips-transmitted incidence of Tomato spotted wilt virus
- Yields similar to conventional (i.e., granular in-furrow) thrips insecticides

Insecticides evaluated for thrips control in these three tests included liquid in-furrows (Admire Pro, Orthene 97, Verimark 20SC); seed treatments (Cruiser 70WS, CruiserMaxx Peanut, A17461); foliar broadcast insecticides (Orthene 97); and conventional granular in-furrows (Temik, Thimet).

In Test 1, the liquid in-furrow product, Admire Pro @ 8.5 or 10.5 oz/A, performed well against thrips and resulted in outstanding yields (approximately 6,200 lb/acre). According to the Admire Pro label, 10.5 oz/A is the maximum amount that can be applied in a season on peanut.

In Test 2, the standard granular insecticides Temik and Thimet had lower thrips injury, lower thrips populations, and higher yields than five combinations of seed treatments alone. This test showed that it is difficult to manage thrips using a seed treatment alone. However, as found in Test 3 (below), a seed treatment with an overspray or an in-furrow insecticide became quite effective against thrips. As many are aware, Temik and its replacement (Memik) are not currently available—Temik was included in this test for comparison purposes.

In Test 3, at-planting insecticides (seed treatment [CruiserMaxx Peanut], liquid in-furrow insecticide [Admire Pro], or granular in-furrow insecticide [Thimet]) that received a broadcast insecticide application (Orthene) at 2 weeks after planting were efficacious against thrips and resulted in high yields. Other combinations of at-planting insecticides, such as seed treatments and in-furrows, were also effective.
FINAL REPORT

VIRGINIA PEANUT GROWERS ASSOCIATION, INC./NATIONAL PEANUT BOARD
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OBJECTIVE: To evaluate new insecticide seed, liquid in-furrow, and combinations of these treatments for management of thrips and to increase yields in peanut.

PROCEDURES: Efforts to identify options for improving thrips management led to three peanut field trials at the Tidewater AREC in Suffolk, VA (PT13-THP-2, 4, and 5). Insecticides that were evaluated for thrips control included:

Liquid in-furrow insecticides
- Admire Pro
- Orthene 97
- Verimark 20SC

Liquid in-furrow insecticides were applied at planting into the seed furrow at 5 gpa using a microtube mounted between the disc openers, pressurized by CO₂ at 51 psi.

Foliar broadcast insecticide
- Orthene 97

Foliar broadcast applications were made at the late ground-cracking stage on May 28 with a CO₂-pressurized backpack sprayer at 14.3 gpa and 18 psi through 8004VS nozzles spaced 18 inches apart on the spray boom.

Seed treatments
- Cruiser 70WS (with and without Dynasty PD)
- CruiserMaxx Peanut
- A17461 (with and without Avicta 500FS)

Treated peanut seed was provided by Syngenta.

Granular in-furrow insecticides
- Thimet
- Temik

Conventional granular in-furrow insecticides were included for comparison in some tests. These were applied into the seed furrow at the time of planting using tractor-mounted inverted jars with lid holes calibrated to deliver exact amounts via gravity.
Combinations of the above products occurred in some tests. Planting dates were May 9 and 14. Plots were four rows x 35-ft long with 36-inch row centers and four replicates. Conventional seeding rates and weed, disease, and late-season insect (leafhopper and corn earworm) management practices were used.

In all tests, thrips injury to plants was determined during late May and June by visually rating injury using the following 0 to 10 scale:

- 0 = no thrips induced plant injury
- 1 = 10% injured leaves
- 2 = 20% injured leaves
- 3 = 30% injured leaves
- 4 = 40% injured leaves
- 5 = ≥50% injured leaves + ≤5% terminal buds injured
- 6 = ≥50% injured leaves + 25% terminal buds injured
- 7 = ≥50% injured leaves + 50% terminal buds injured
- 8 = ≥50% injured leaves + 75% terminal buds injured
- 9 = ≥50% injured leaves + 90% terminal buds injured
- 10 = dead plants

In one test, thrips counts were determined by collecting ten unopened terminal leaflets per plot in vials containing 30 ml soapy water. Thrips were separated from the soapy water using a Büchner funnel and vacuum filtration, leaving thrips behind on a filter paper disc. Thrips were then counted (immatures and adults) and identified (adults only) using a stereoscope. The number of plants with visual symptoms of Tomato spotted wilt virus was determined in all tests by examining two rows per plot on two dates. Yield was calculated from digging and picking peanuts from 2 rows of each plot. Data were analyzed using ANOVA and LSD statistical procedures.

In Test 1 (PT-13-THP-4), we evaluated at-planting, liquid in-furrow insecticides:
1. Admire Pro @ 7 oz/acre (liquid in-furrow)
2. Admire Pro @ 8.5 oz/acre (liquid in-furrow)
3. Admire Pro @ 10.5 oz/acre (liquid in-furrow)
4. Orthene 97 @ 8 oz/acre (liquid in-furrow)
5. Orthene 97 @ 12 oz/acre (liquid in-furrow)
6. Orthene 97 @ 16 oz/acre (liquid in-furrow)
7. Untreated

In Test 2 (PT13-THP-2), we tested seed treatments and at-planting in-furrow granular insecticides:
1. Untreated
2. Dynasty PD @ 0.075 mg ai/seed
3. Cruiser 70WS @ 0.25 mg ai/seed
4. Dynasty PD @ 0.075 mg ai/seed + Cruiser 70WS @ 0.25 mg ai/seed
5. A17461 @ 0.318 mg ai/seed
6. Avicta 500FS @ 0.25 mg ai/seed + A17461 @ 0.318 mg ai/seed
7. Dynasty PD @ 0.075 mg ai/seed + Thimet 20G @ 5 lb/A (granular in-furrow)
8. Dynasty PD @ 0.075 mg ai/seed + Temik 15G @ 5 lb/A (granular in-furrow)

In Test 3 (PT13-THP-5), we assessed at-planting, liquid and granular in-furrow insecticides; seed treatments; and foliar broadcasts:
1. CruiserMaxx Peanut (seed treatment)
2. Admire Pro @ 8.5 oz/acre (liquid in-furrow)
3. Thimet 20G @ 5 lb/acre (granular in-furrow)
4. Orthene 97 @ 16 oz/acre (liquid in-furrow)
5. CruiserMaxx Peanut + Orthene 97 @ 4 oz/acre (foliar broadcast)
6. Admire Pro @ 7 oz/acre (liquid in-furrow) + Orthene 97 @ 4 oz/acre (foliar broadcast)
7. Thimet 20G @ 3.5 lb/acre (granular in-furrow) + Orthene 97 @ 4 oz/acre (foliar broadcast)
8. CruiserMaxx Peanut + Admire Pro @ 7 oz/acre (liquid in-furrow)
9. CruiserMaxx Peanut + Orthene 97 @ 12 oz/acre (liquid in-furrow)
10. CruiserMaxx Peanut + Verimark 20SC @ 13.5 oz/acre (liquid in-furrow)
11. CruiserMaxx Peanut + Thimet 20G @ 3.5 lb/acre (granular in-furrow)
12. Untreated

RESULTS and DISCUSSION:
Test 1 (PT-13-THP-4)
Test 1 evaluated at-planting, liquid in-furrow insecticides for thrips management in peanut. A summary of results is provided in Fig. 1. Stand counts were similar across treatments. Thrips injury ratings were significantly different across all four sample dates, where all insecticides reduced thrips injury compared with the untreated control, and with differences between insecticide treatments on June 4, 13, and 24. A rate response occurred with both Admire Pro and Orthene, with higher in-furrow rates resulting in less visual thrips injury. Overall, Admire Pro performed better than Orthene in this category. There were no differences among treatments in the number of Tomato spotted wilt virus hits per 70 row ft on August 13 (data not shown) or September 25. Yields ranged from 5,406 to 6,229 lb/acre with no significant differences between treatments. Admire Pro @ 8.5 and 10.5 oz/A yielded 6,185 and 6,229 lb/A.
Test 2 (PT13-THP-2)

Test 2 evaluated seed treatments alone and at-planting in-furrow granular insecticides for thrips management in peanut; results are given in Fig. 2. Significant stand differences occurred, ranging from 77 per 35 row ft in the A17461/Avicta seed treatment combination, to 92 plants in the untreated control. There were differences between treatments in thrips injury ratings on all five sample dates, with insecticides providing large (Thimet, Temik) or small to moderate (Cruiser 70WS, A17461) improvement over the untreated control and Dynasty alone from May 29-June 17. The Thimet and Temik treatments were able to keep thrips injury in check from the planting date of May 9 through late June, while the seed treatments containing Cruiser 70WS and A17461 began to lose effectiveness sometime around the second week of June. Thrips counts were taken on May 22 and June 4. There were few immature thrips present in the May 22 samples, with only 1 per 10 terminal leaflets in the untreated control (data not shown). Immature thrips numbered in the mid-30’s on June 4 in the untreated and Dynasty alone treatments, with a wide (but not significant) range in the insecticide treatments, with Temik having the fewest thrips. Most thrips were identified as tobacco thrips, with a small representation of western flower, eastern flower, onion, and soybean thrips. *Tomato spotted wilt virus* hits ranged from <1 to 12 per 70 row ft on September 25 (Cruiser 70WS and Temik, respectively). Yields were significantly different and were lowest in the Dynasty alone treatment (5,275 lb/acre). Treatments containing Cruiser 70WS and A17461 had statistically identical yields, and were similar to Thimet. Temik-treated plots yielded significantly higher than any other treatment (6,472 lb/acre).
Fig. 2. Test 2 results.

Test 3 (PT13-THP-5)
Test 3 evaluated combinations of at-planting, liquid and granular in-furrow insecticides; seed treatments; and a foliar broadcast for thrips management in peanut. Results are provided in Fig. 3. There were no differences in stands, with a range of 84-97 plants per 35 row ft. All insecticide treatments had lower thrips injury ratings than the untreated control on all five sample dates, except for CruiserMaxx Peanut on June 24; there were significant differences between insecticides on all dates except May 29. Any treatment containing Admire Pro had consistently
low thrips injury ratings. Incidence of *Tomato spotted wilt virus* was low (2-9 hits per 70 row ft), with differences between treatments on September 25. Although yields were not significantly different, five of the six numerically-highest yields had treatments containing Orthene 97. This test demonstrated that a seed treatment or liquid in-furrow product, combined with a thrips overspray, can improve thrips control and increase yields.

**Fig. 3.** Test results.

**CONCLUSIONS:** This research shows that certain seed treatments and liquid in-furrow insecticides, especially when followed with a foliar broadcast insecticide targeting thrips at the late ground-cracking stage, are highly effective in reducing thrips populations; minimizing plant damage caused by direct thrips feeding; reducing thrips-transmitted *Tomato spotted wilt virus*; and can result in yields similar to that of conventional (i.e., granular in-furrow) thrips insecticides. We have presented this research (without yield results) at grower field days at the Tidewater AREC in June and September 2013, and have provided details through the Virginia Ag Pest Advisory website. Results will be presented at upcoming winter county peanut production meetings. Updates to the *Virginia Peanut Production Guide* (Virginia Cooperative Extension Publication PPWS-3), and *Insect Pest Management in Virginia Cotton, Peanut, and Soybean* (Virginia Cooperative Extension Publication AREC-37NP) will incorporate these findings. We are grateful to the Virginia Peanut Growers Association, Inc. and the National Peanut Board for their support of this project.