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Mississippi Peanut Promotion Board
2013 Progress Report

Project Title: Interactions Between Early Season Insect Management and Innoculants in Peanuts

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Project Summary (Issue/Response)

Numerous insect pests are commonly found at varying densities throughout the season in Mississippi peanuts. Early season insect pests include thrips and a complex of soil inhabiting species. In general, these are the most damaging insect pests of soybeans. Thrips are important because they transmit tomato spotted wilt virus. The soil-insect complex includes wireworms, white grubs, and lesser cornstalk borers. They are important because initial feeding on the root system can reduce seedling growth and vigor. More importantly, those insects remain in the soil throughout the season and eventually damage developing pods.

Experiments were conducted at the Delta Research and Extension Center in Stoneville, MS to evaluate early season insect control in peanuts. In the first experiment, the impact of various at-planting insecticides on early season insect control and yield was determined. Additionally, all of the insecticides evaluated were tested to determine if they negatively impact the performance of inoculants. The insecticides included the granular in-furrow insecticides Thimet and Temik, the liquid in-furrow sprays Admire Pro and Orthene, and the seed treatment Cruiser. All of these insecticides were applied with an inoculant (Vault). The other treatments included the inoculant only (no insecticide) and an untreated control (no inoculant and no insecticide). Measurements recorded during the season included thrips densities, insect injury ratings, chlorophyll content, leaf nitrogen content, and yield. Chlorophyll content was measured from 50 plants in each plot at peak flower with a SPAD meter. At the same time SPAD readings were taken, terminal leaves were removed from 20 plants in each plot to measure leaf nitrogen content.

In a second experiment, thrips control was evaluated Thimet, Cruiser, and a combination of Thimet and Cruiser. Numbers of thrips was recorded 12 and 17 days after planting. Peanuts were harvested at the end of the season and yields were recorded.

In a third experiment, thrips control was evaluated with foliar insecticides. Plots were sprayed with a tractor mounted boom calibrated to deliver 20GPA through TX-12 hollow-cone nozzles approximately 12 days after emergence. Treatments included Radiant at 1.5 and 3.0 fl oz/A, Orthene at 0.55 lbs product/A, and an untreated control. Methylated seed oil (MSO) was included with all treatments at 0.25 percent. Thrips control was determined with a whole plant washing technique from 5 plants per plot at 3 and 5 days after treatment.

Project Results/Outcomes

Experiment 1. Overall, thrips densities were much higher in 2013 than in 2012. All of the at-planting insecticides provided acceptable control of thrips compared to the UTC and Vault only treatments in 2012 (Table 1). In contrast, some of the insecticides performed poorly in 2013 (Table 2). In general, the granular insecticides provided the highest level of thrips control, followed by Admire Pro sprayed in furrow. Similarly, thrips injury ratings were lower for all of the at-planting insecticides compared to the treatments that did not have an insecticide at-planting. Similar to thrips numbers, Thimet, and Temik had the lowest injury ratings. In terms of impacts of the insecticides on the inoculant, a SPAD meter was used to measure leaf chlorophyll concentrations. The UTC had the lowest level of chlorophyll compared to all other treatments in both years. This suggests that none of the at-planting insecticides evaluated in this trial negatively impacted nodulation. In terms of yield, all treatments resulted in higher peanut yields compared to the UTC (Tables 1 and 2). All of the insecticides except Orthene resulted in higher yields compared to the Vault only treatment in 2012. Thimet, Temik and Admire Pro provided the highest yields in 2013. Based on these results, it appears that the insecticides evaluated did not have a negative impact on the performance of the inoculant evaluated in this trial. Additionally, the performance of the insecticides evaluated varied significantly in terms of plant protection and yield.

Experiment 2. Thrips densities in this trial averaged 54.5 and 533.3 immatures per 5 plants in the UTC at 12 and 17 days after planting, respectively. All of the at-planting insectides reduced thrips densities below that observed in the UTC. No differences were observed among any of the insecticides at 12 days after planting. At 17 days after planting, the two treatments that included Thimet had significantly lower thrips densities compared to Cruiser alone. Also, there appeared to be an additive effect when Thimet was applied in-furrow with Cruiser treated seed. The treatment that had both Cruiser and Thimet, had lower thrips densities than either Thimet or Cruiser applied alone. No differences were observed in peanut yields. However, treatments that had Cruiser included, tended to have slightly higher yields than Thimet applied alone and the UTC. This suggests that early season insects other than thrips may be playing a role in reducing peanut yields in Mississippi.

Experiment 3. The primary thrips species present in these trials was tobacco thrips. All of the insecticides provided good control of thrips at 3 and 5 days after treament. Control of thrips at both rates of Radiant provided similar levels of control. Additionally, both rates of Radiant provided control of thrips similar to that observed with Orthene.

Graphics

Table 1. Interactions between at-planting insecticides and inoculants for thrips control, plant vigor, and yield in 2012.

Treatment	Rate (Unit)	Thrips/5 Plants	Injury (0-5)[1]	Chlorphyll (SPAD)	Yield (Lb/A)
UTC	---	37.3a	4.3a	51.78d	2533.9d
Vault	0.11 (G/A)	33.3a	4a	61.58cd	3066.2c
Admire Pro + Vault	9.0 (FL OZ/A) 0.11 (G/A)	6.5b	2bc	86.5a	3541.3b
Orthene + Vault	1.0 (LB A/A) 0.11 (G/A)	7b	2.8b	69.88abc	3304.6bc
Thimet + Vault	5.0 (LB/A) 0.11 (G/A)	5b	1.3c	74.98abc	3951.1a
Cruiser + Vault	1.0 FL OZ/Cwt 0.11 (G/A)	6.5b	2.0bc	68.19bcd	
Temik + Vault	5.0 (LB/A) 0.11 (G/A)	0.8b	1.3c	79.7ab	3583.7b

An injury scale of 0 to 5 was used where 0=no injury and 5=severe injury.

Table 2. Interactions between at-planting insecticides and inoculants for thrips control, plant vigor, and yield in 2013.

Treatment	Rate (Unit)	Thrips/5 Plants	Injury (0-5)[1]	Chlorphyll (SPAD)	Yield (Lb/A)
UTC	---	390.3a	4.5a	42.8c	3148c
Vault	0.11 (G/A)	405.5a	4.3ab	73.8ab	4209b
Admire Pro + Vault	9.0 (FL OZ/A) 0.11 (G/A)	201.8c	3.3c	77.8ab	4696ab
Orthene + Vault	1.0 (LB A/A) 0.11 (G/A)	301.5b	3.5bc	76.8ab	4653b
Thimet + Vault	5.0 (LB/A) 0.11 (G/A)	38.3d	1.8d	78.5ab	5313a
Cruiser + Vault	1.0 FL OZ/Cwt 0.11 (G/A)	271.8b	3.8abc	71.7b	4389b
Temik + Vault	5.0 (LB/A) 0.11 (G/A)	35.0d	2.0d	82.0a	4761ab

Project Impacts/Benefits

The results of these experiments will significantly improve our understanding of insect pest management for peanuts in Mississippi. The first experiment suggests that at-planting insecticides will not interfere with the performance of inoculants sprayed in-furrow. Also, this experiment showed the benefits of using an at-planting insecticide for control of early season insect pests. More importantly, the yield benefits of using an at-planting insecticide were demonstrated.

Results from the second experiment suggest that using Thimet in combination with Cruiser treated seed can significantly improve thrips control over either of those insecticides alone. Additionally, this trial suggests that early season insects other than thrips can impact peanut yields. As a result, more research is needed to determine the most important early season insect pests in Mississippi.

Results from the third experiment show that Radiant is a good option for thrips control in peanut and results were consistent across both years. This is important because Radiant has not been tested for thrips control in peanuts. Radiant is an important insecticide for thrips management in peanuts because it is the only foliar option that will not flare spider mites.

Project Deliverables

Multiple presentations were given during 2012 and 2013 at field days and Extension service meetings that highlighted these results. Additional presentations will be given during the 2013-14 winter.

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