EVALUATING THE EFFECTS OF INSECTICIDE SEED TREATMENT ON APHIDS AND NATURAL ENEMIES DURING THE 2019 SPRING

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USDA NIFA
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INTRODUCTION

- In Kentucky > 80% of farmers use **insecticide treated seed** (**ITS**) in wheat
- Aphids are the target of this practice, as they are vectors of Barley Yellow Dwarf Virus
- During spring (90 to 120 days after planting), the effects of the ITS are reduced
- ITS may affect natural enemies (lady beetles, syrphid flies or parasitoids).

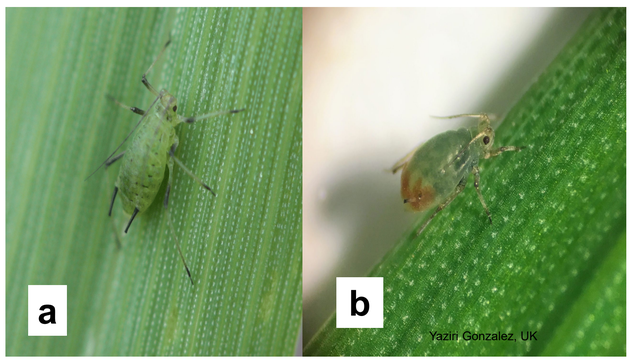

Figure 1. Most common aphids found in small cereals in KY. (a) adult English grain aphid *(Sitobion avenae)*, and (b) bird cherry oat aphid (*Rhopalosiphum padi*)

OBJECTIVE

To monitor populations of aphids and natural enemies in wheat grown from insecticide treated vs. untreated seeds during the spring.

MATERIALS AND METHODS

- Study conducted at **UK Grain and Forage Center of Excellence** at Princeton, KY
- Wheat established with and without insecticidal seed treatment, planted on December 3rd
- Aphids and natural enemies were monitored weekly from mid-April to early-June
- Aphids were tallied counting specimens in one ft-row at six random locations in each plot
- Natural enemies were monitored using sweep nets (10 sweeps in at least ten random locations in each plot).
- Data was summarized and comparisons were conducted with a *t*-test

RESULTS

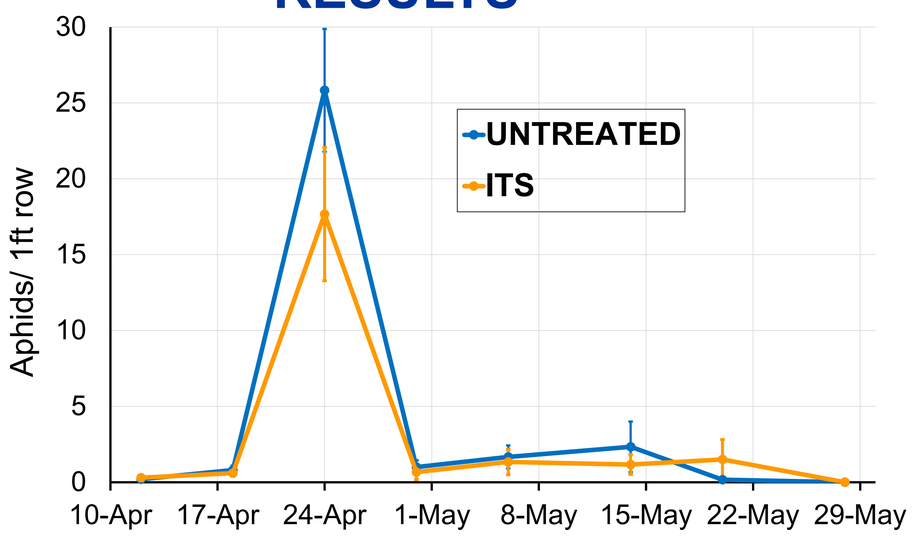

Figure 2. Total number of aphids taken weekly in one-foot sections in a single row. Significant differences ($p<0.05$)were not found among treatments

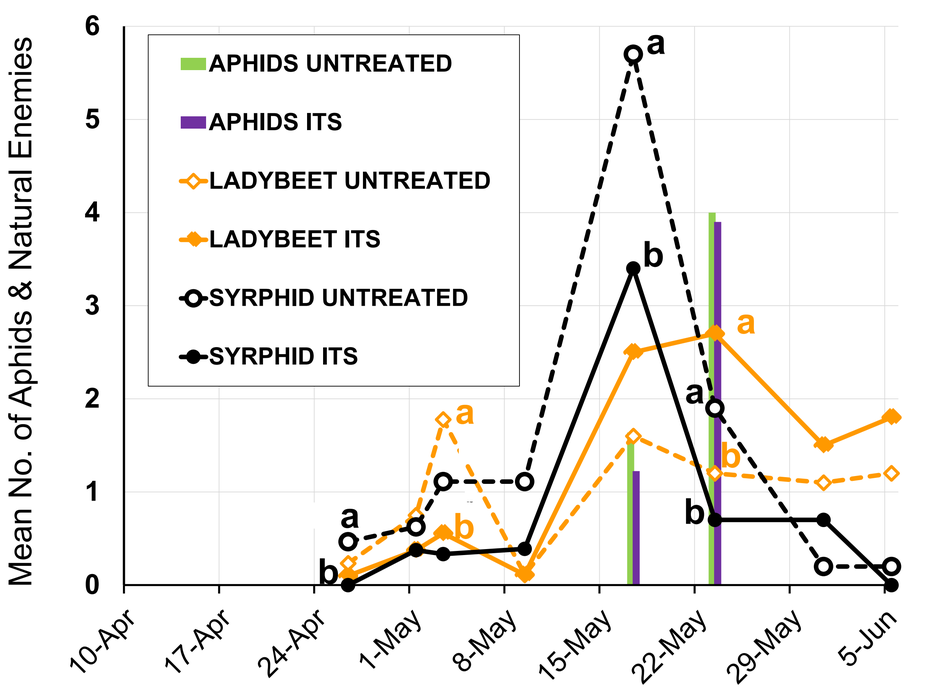

Figure 3. Populations of aphids (green and purple bars), lady beetles, and syrphid flies taken weekly by 10 sweep netting in in ITS and untreated seed wheat plots. Different letter at each date indicates significant differences (*p<0.05, t*-test) for each natural enemy.

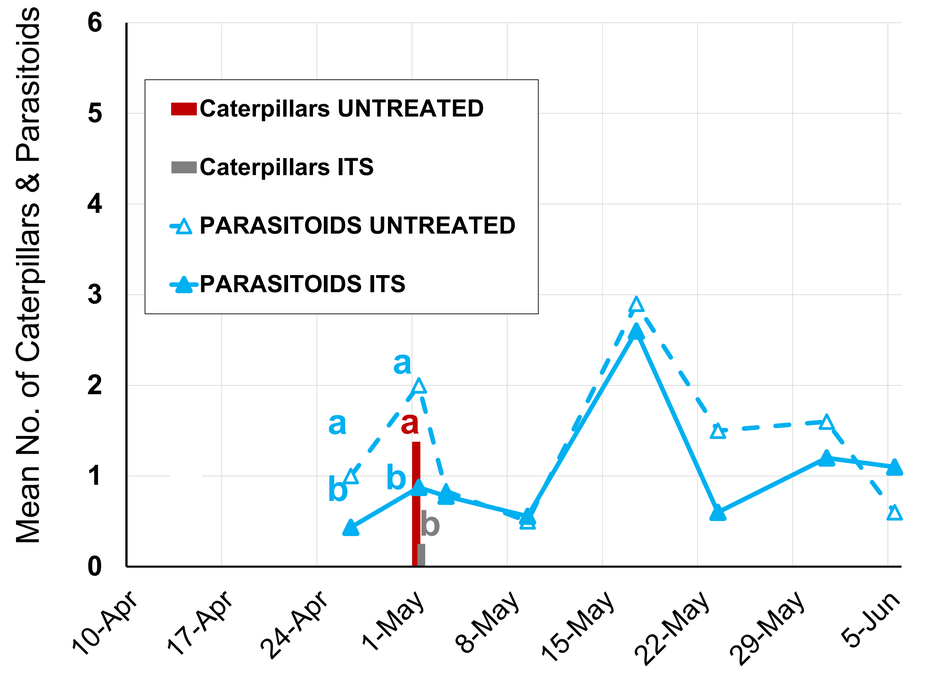

Figure 4. Mean numbers of caterpillars (red and grey bars), and parasitoids per10 sweep nets in ITS and untreated seed wheat plots. Different letter at each date indicates significant differences (*p<0.05, t*-test) for parasitoids or caterpillars

ACKNOWLEDGMENTS

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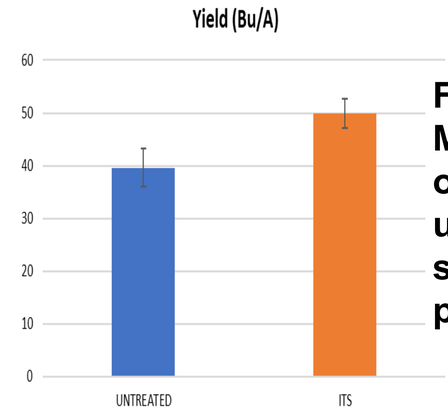

Figure 5. Mean yields on ITS and untreated seed wheat plots.

DISCUSSION

- In spring the ITS effect may have dissipated however, this study shows that ITS might have some negative effects in natural enemies.
- In most instances there were significantly higher ($p<0.05$) numbers of natural enemies on plants grown from untreated seeds vs. plants grown from ITS.
- On April 24 there was an outbreak of aphids that were rapidly reduced by natural enemies. Parasitoids, lady beetles, and syrphid flies were higher in wheat grown from untreated seeds than ITS around that date. These natural enemies may have moved to the ITS plot.
- Although ITS yields were higher than untreated yields, the means were not significantly different. BYDV was detected in 1 out of 4 samples sent for analysis in each of these two plots, with ten plants being in each sample.
- The use of ITS and IPM practices for this technology needs to be implemented to discontinue unnecessary practices employed by farmers and consultants.

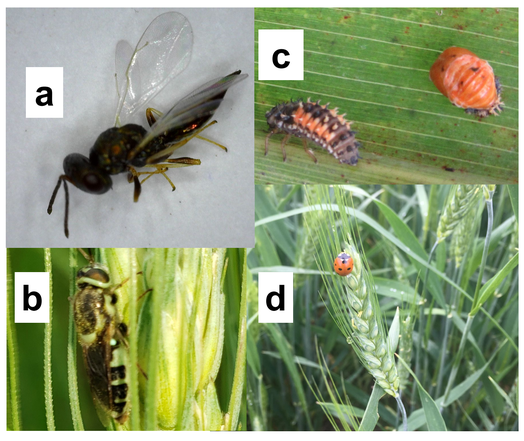

Figure 6. a) Parasitoid wasp, b) syrphid fly, c) larva and pupa of a lady beetle (photos by R. Villanueva), and d) lady beetle on a wheat head (photo by A. Teutsch)