ALTERNATIVES TO NEONICOTINOIDS FOR CONTROL OF THRIPS IN COTTON

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Abstract

Thrips are an early season pest in cotton that can delay maturity and cause yield loss. With the future of neonicotinoids uncertain and thrips resistance to thiamethoxam (Cruiser) being found in Arkansas, there is a need to evaluate alternative products for thrips control. The objective of this study, conducted at both Lon Mann Cotton Research Station, Marianna, and Tillar, Arkansas, was to evaluate other insecticide classes as a seed treatment or in-furrow treatment for control of thrips. Results indicated that Orthene alone and in combinations, and aldicarb consistently provide the best level of control for thrips.

Introduction

Thrips are an early season pest in cotton that can delay maturity and cause yield loss. Symptoms of thrips damage on seedling cotton are crinkled leaves, burnt edges, and a silvery appearance. The level of damage varies from year to year based on severity of the thrips infestation (Hopkins, et al., 2001). In 2012 and 2013, observations were made that indicated tobacco thrips (*Frankliniella fusca)*, the predominate species found in cotton, had developed tolerance/resistance to Cruiser (thiamethoxam). In 2015, Herbert and Kennedy conducted studies in the Mid-South and Southeastern U.S. that confirmed resistance to the neonicotinoid insecticides thiamethoxam and imidacloprid. Studies conducted in Arkansas verified these findings (Plummer, et al., 2014). Insecticide seed treatments (IST) and additional foliar insecticide application(s) are often necessary to effectively control thrips creating high input costs for growers. In recent years neonicotinoids have come under scrutiny for their impact on pollinators (Krupke, et al., 2012). Although studies conducted by Stewart, et al in 2014 showed no deleterious effects on honeybees, popular opinion and social trends to do away with this class of chemistry further present the need to find alternative modes of action to control thrips.

Materials and Methods

Plot size was 12.5ft by 40ft in a randomized complete block design with 4 replications. Insecticide seed treatments (IST) included: Cruiser (thiamethoxam) 12.3 oz/cwt, Avicta Elite (abamectin + thiamethoxam + imidacloprid) 33.6 oz/cwt, Gaucho (imidacloprid) 12.32 oz/cwt, Orthene (acephate) 6.4 oz/cwt, Orthene 6.4 oz + Gaucho 12.32 oz; and Aeris Seed Applied System (imidacloprid + thiodicarb) 24.64 oz/cwt as the commercial neonicotinoid standard. In-furrow (IF) treatments included: Admire Pro (imidacloprid) 9.2 oz/acre, Orthene 1 lb/acre, Orthene 1 lb/acre + Admire Pro 9.2 oz/acre, and AgLogic (aldicarb) 3.5 lb/acre. All treatments, including the untreated check (UTC), were treated with a base fungicide package of Trilex Advanced 1.6 oz/cwt. Insecticide seed treatments were applied using a small batch treater, and IF applications were applied with an IF mounted sprayer system at 10 gal/acre set at 40 psi using Tee Jet 9001 VS flat fan nozzles for Admire Pro and Orthene; while a planter mounted granular applicator was used for AgLogic treatments. Plots at Marianna and Tillar were planted on May 1. Thrips samples were taken 22 and 30 days after planting (DAP), and 37 and 43 DAP respectively, by collecting 5 plants per plot and placing in jars with 70% alcohol solution. Samples were washed and filtered in the lab at the Lonoke Agriculture Extension and Research Center, Lonoke, AR. and thrips were counted using a dissection scope. Data was processed using Agriculture Research Manager, Version 2018.5 (Gylling Data Management, Inc., Brookings, S.D.). Analysis of variance was conducted and Duncan's New Multiple Range Test (P=0.10) to separate means.

Results and Discussion

Results at Marianna, AR indicate that at 22 DAP, only Orthene (IF) 1 lb/acre, alone and in combination with Admire Pro (IF) 9.2 oz/a; Orthene (IST) 6.4 oz/acre, alone and in combination with Gaucho (IST) 12.32 oz/cwt; and Ag Logic (IF) 3.5 lb/acre reduced thrips densities when compared to the untreated check. At 30 DAP, Cruiser (IST) and Avicta Elite (IST), had more thrips than the UTC (Fig. 1-2).

Results at Tillar, AR indicate that at 37 DAP all treatments had fewer thrips when compared to the UTC, Orthene (IST) 6.4 oz/cwt, and Cruiser (IST) 12.3 oz/cwt with similar results at 43 DAP. (Fig. 3-4)

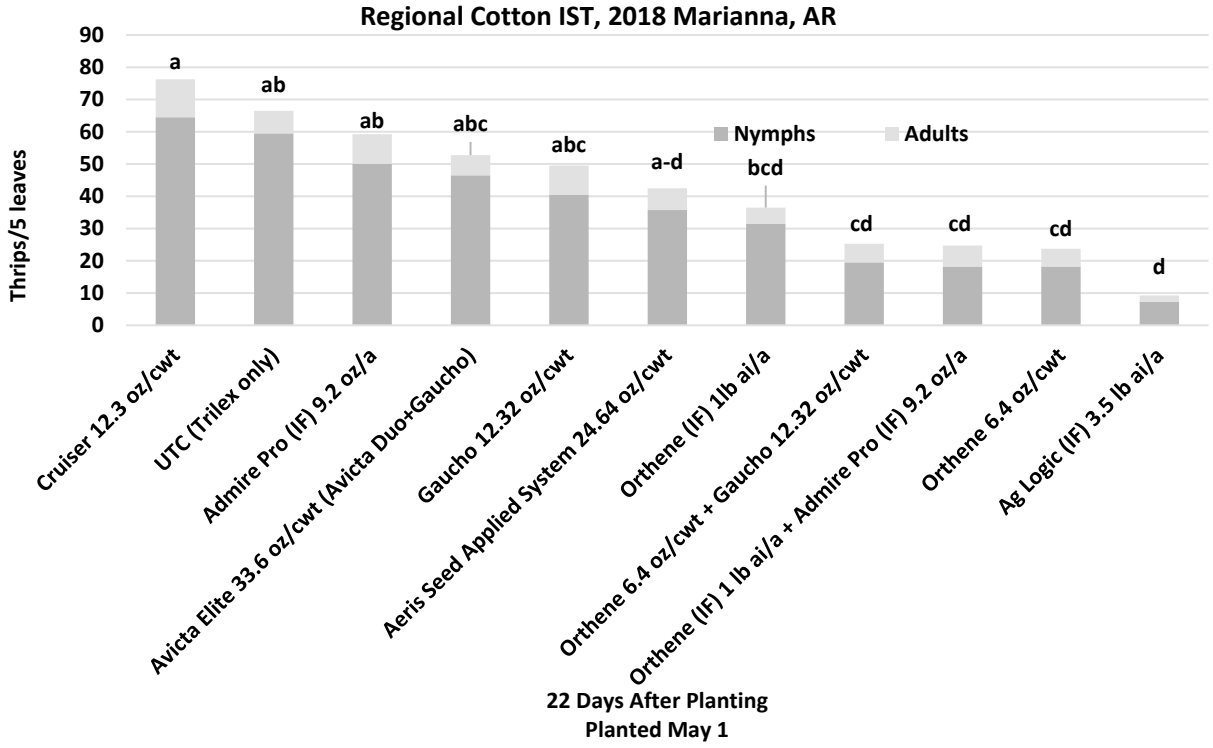

Figure 1: Thrips counts 22 Days after Planting

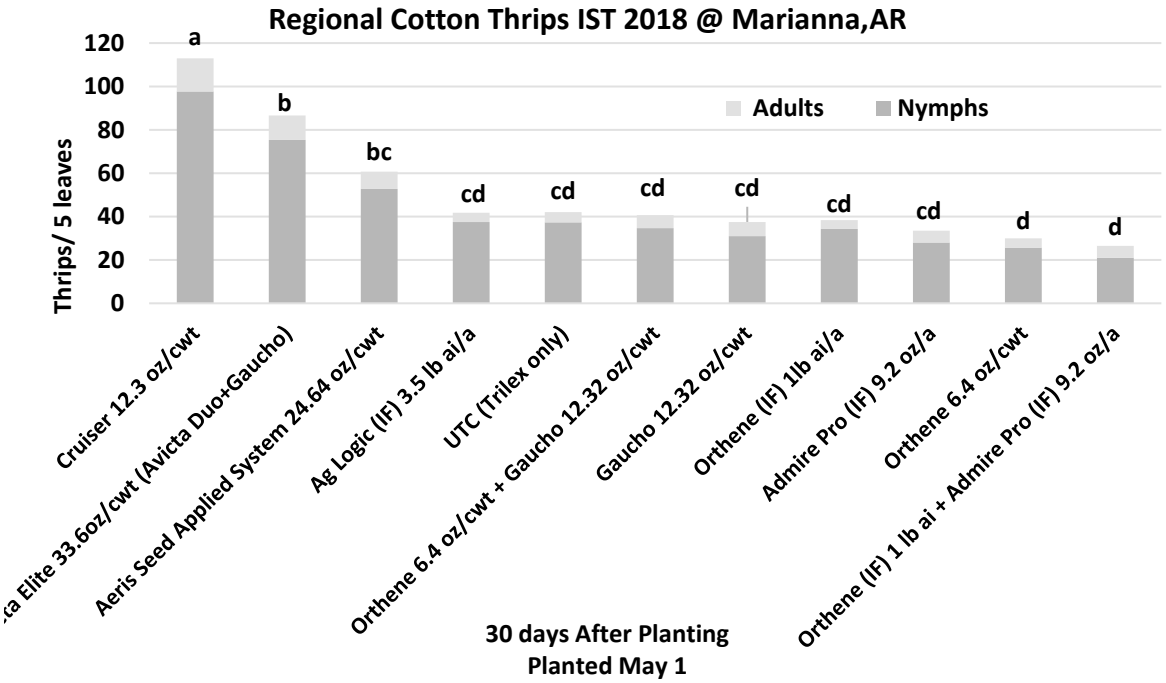

Figure 2: Thrips Damage Rating 30 Days After Planting

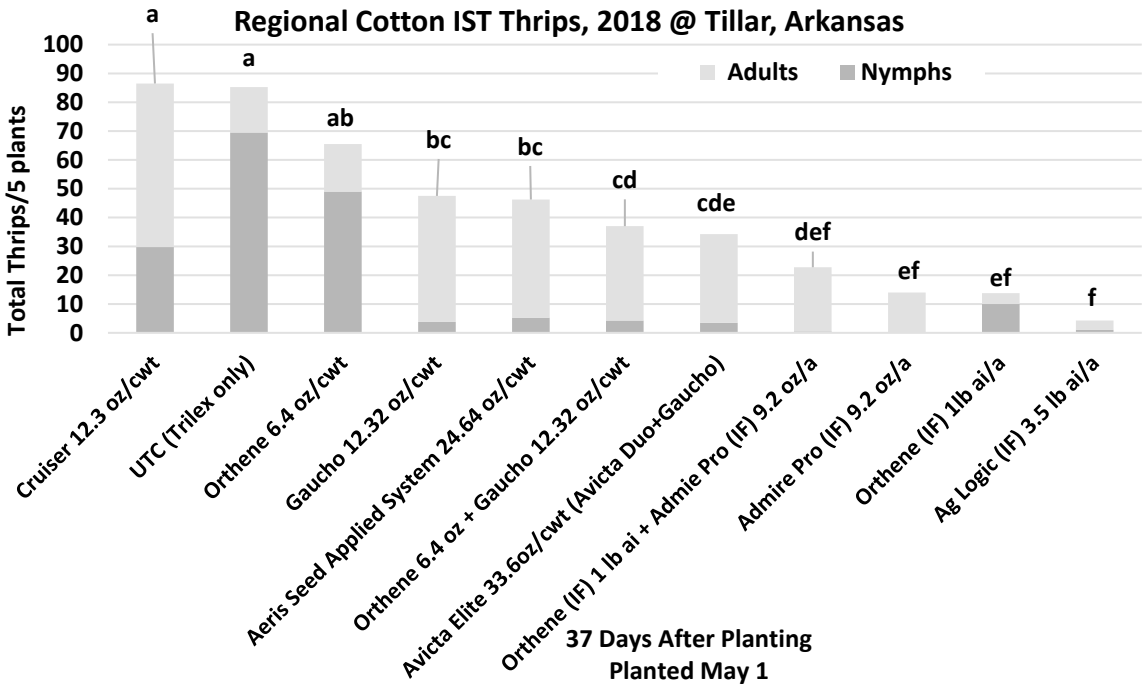

Figure 3: Thrips counts 37 Days After Planting

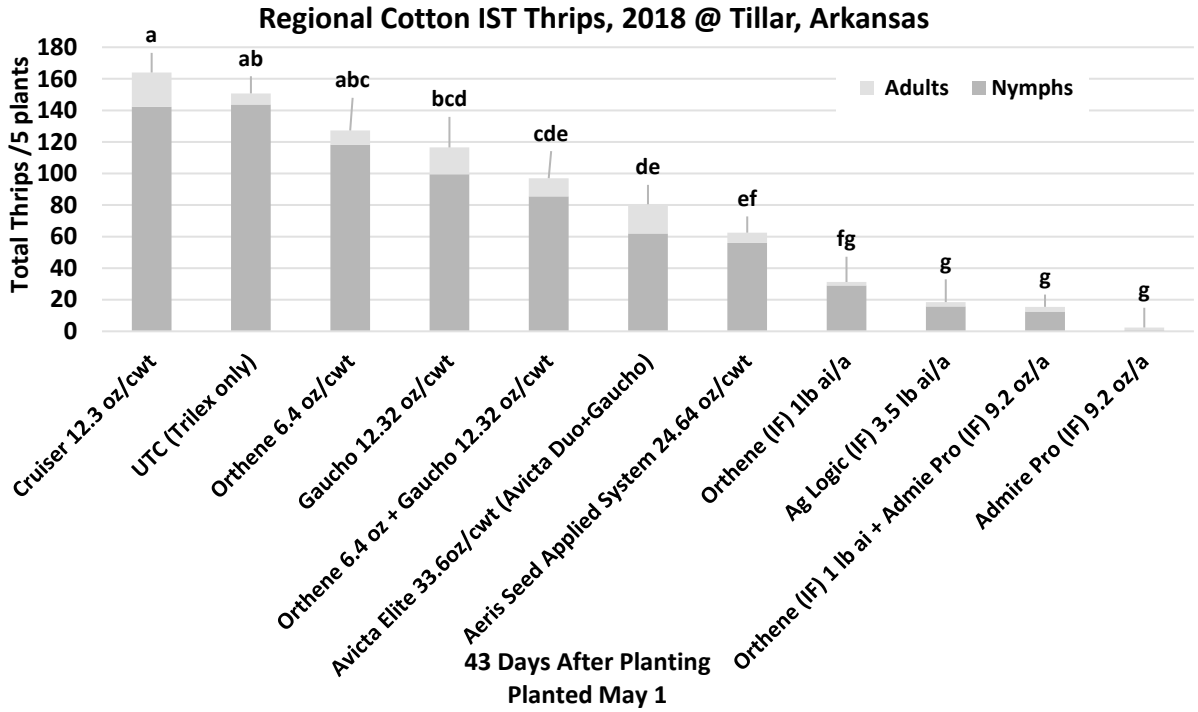

Figure 4: Thrips Damage Rating 43 Days After Planting

Summary

Resistance of tobacco thrips to the neonicotinoid class of chemistry is a major concern to growers. Cruiser (thiamethoxam) is no longer recommended for control of thrips in Arkansas and Gaucho (imidacloprid) appears to be losing efficacy as well. With neonicotinoids, only Admire Pro (IF) is consistently providing thrips control. Orthene alone and in combination with other insecticides; and Ag-Logic (aldicarb) provided excellent control of thrips in these trials.

Use of these products will be driven by price of application, planting system, and market prices. With so few insecticides left to control thrips, cultural control methods need to be implemented to help reduce their impact on cotton yields. Research and labeling of novel insecticide seed treatments would also provide a great benefit to Arkansas cotton producers.

Acknowledgements

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