CONTROL OF THRIPS WITH SELECTED INSECTICIDAL TREATMENTS IN TEXAS COTTON

S. S. Vyavhare
Texas A&M AgriLife Extension Service
Lubbock, TX
B. Reed
Texas A&M AgriLife Extension Service
Plainview, TX
A. Kesheimer
M. Parajulee
Texas A&M AgriLife Research
Lubbock, TX
R. Bowling
Texas A&M AgriLife Extension Service
Corpus Christi, TX
A. Hakeem
Texas A&M AgriLife Research
Lubbock, TX

Abstract

Seed treatments with neonicotinic insecticides such as thiamethoxam (Cruiser, Avicta Duo) and imidacloprid (Gaucho, Aeris) have become an industry standard for thrips management in cotton. Rescue foliar insecticide applications, however, are often required to effectively control thrips incurring high input costs for growers. A field trial was conducted to evaluate the performance of commercial insecticide seed treatments against thrips infesting cotton seedlings. The onion thrips, *Thrips tabaci* was the most predominant species at study site and accounted for >70% of the total thrips population. At 1 true-leaf stage, plots treated with Aeris, Avicta Elite Cotton, and Gaucho 600 + Poncho VOTiVO showed significantly fewer thrips compared to untreated check. At 4 true-leaf stage, only the plots treated with Avicta Elite Cotton and Gaucho 600 + Poncho VOTiVO showed significantly fewer thrips compared to untreated check. Thrips damage rating varied significantly across treatments. At 1 true-leaf stage, thrips damage ratings showed all treatments except Cruiser 5FS and Acephate 97UP to have significantly less damage than the untreated check. At 4 true-leaf stage, thrips damage ratings showed all treatments but Avicta Duo Cotton and Acephate 97UP to have less damage than the untreated check. Overall, seed treatments with Avicta Elite Cotton and Gaucho 600 + Poncho VoTiVO provided an excellent control against thrips while the seed treatment with Acephate was the least effective.

Introduction

Thrips are early-season pests of seedling cotton, *Gossypium hirsutum* L. In much of Texas, they are a minor pest but can be severe in areas prone to cool, wet conditions when plant growth slows down. The most common species of plant-feeding thrips in Texas cotton are western flower thrips, *Frankliniella occidentalis*; flower thrips, *Frankliniella tritici*; onion thrips, *Thrips tabaci*; and tobacco thrips, *Frankliniella fusca* (Albeldano et al. 2008). In 2017, the onion thrips was the most predominant species at study site and accounted for >60% of the total thrips population. Thrips attack leaves, leaf buds, and very small squares (flower buds), causing a silvering of the lower leaf surface, deformed or blackened leaves, and terminal and square loss. Feeding most often occurs in the new terminal growth and on the underside of the leaves. Their feeding ruptures cells, causing stunted plants and crinkled leaves that curl upward. Severe infestations can destroy terminal buds, causing excessive branching of the plants and delayed plant growth. Insecticidal seed treatments have become an industry standard. However, additional foliar insecticide application(s) are often required to effectively control thrips incurring high input costs for growers. Little recent data are available on the efficacy of insecticidal seed treatments from the Texas High Plains region which constitutes for ~30% of US cotton production. A field study was conducted on commercial cotton field to evaluate efficacy of various insecticidal seed treatments to help consultants and producers select proper treatments.

Materials and Methods

This test was conducted in a commercial cotton field near Kress, TX in 2017. Seeds of variety, NG3500XF were treated with various products in laboratory (Table 1). Planting was carried out on May 18 on 40-inch row spacing.

The experiment was designed as a randomized complete block design with 8 treatments and 4 replications. The plots were 4-rows wide x 40 ft. in length. The field was irrigated using center-pivot irrigation method. Ten randomly selected plants from each plot on each sampling date [cotyledon (19 DAP), 1 true leaf (25 DAP), and 4 true leaf (33 DAP) stages] were taken to the laboratory in glass mason jars containing 75% ethyl alcohol. Samples were processed using a washing technique and the number of thrips adults and immatures in each sample were counted using a dissecting microscope (Burris et al. 1990). Thrips damage ratings were taken at 1 and 4 true leaf stages using the scale 0-5 (0 = no damage and 5 = severe damage). Data were analyzed by ANOVA and means were separated by Tukey's mean separation test using Agriculture Research Manager (Gylling Data Management, Inc.).

Table 1. Treatment descriptions

Treatment/ formulation	Active ingredient(s)	Rate (mg AI/seed)
Acephate 97UP	Acephate	6.4 oz product/ 100 lbs seed
Gaucho 600	Imidacloprid	0.375
Aeris	Imidacloprid + thiodicarb	0.375 + 0.375
Cruiser 5FS	Thiamethoxam	0.340
Avicta Elite Cotton	Imidacloprid + thiamethoxam + abamectin	0.375 + 0.340 + 0.150
Avicta Duo Cotton	Thiamethoxam + abamectin	0.340 + 0.150
Gaucho 600 + Poncho VOTiVO	Imidacloprid + clothianidin	0.375 + 0.354

Results & Discussion

Thrips densities did not vary significantly across treatments at cotyledon stage (Fig. 1A). At 1 true-leaf stage, plots treated with Aeris, Avicta Elite Cotton, and Gaucho 600 + Poncho VOTiVO showed significantly fewer thrips compared to untreated check (Fig. 1B). At 4 true-leaf stage, only the plots treated with Avicta Elite Cotton and Gaucho 600 + Poncho VOTiVO showed significantly fewer thrips compared to untreated check (Fig. 1C). Thrips damage rating varied significantly across treatments (Fig. 2). At 1 true-leaf stage, thrips damage ratings showed all treatments except Cruiser 5FS and Acephate 97UP to have significantly less damage than the untreated check. At 4 true-leaf stage, thrips damage ratings showed all treatments but Avicta Duo Cotton and Acephate 97UP to have less damage than the untreated check.

Results indicate that seed treatments with combinations of imidacloprid + thiamethoxam + abamectin and imidacloprid + clothianidin are still very effective for control of thrips in Texas High Plains cotton. More research, however, needs to be done to find alternative treatments and evaluate susceptibility of regional thrips populations to currently used neonicotinic insecticides. Furthermore, research needs to be done to determine economic profitability of different seed treatment packages under variable pest pressure scenarios.

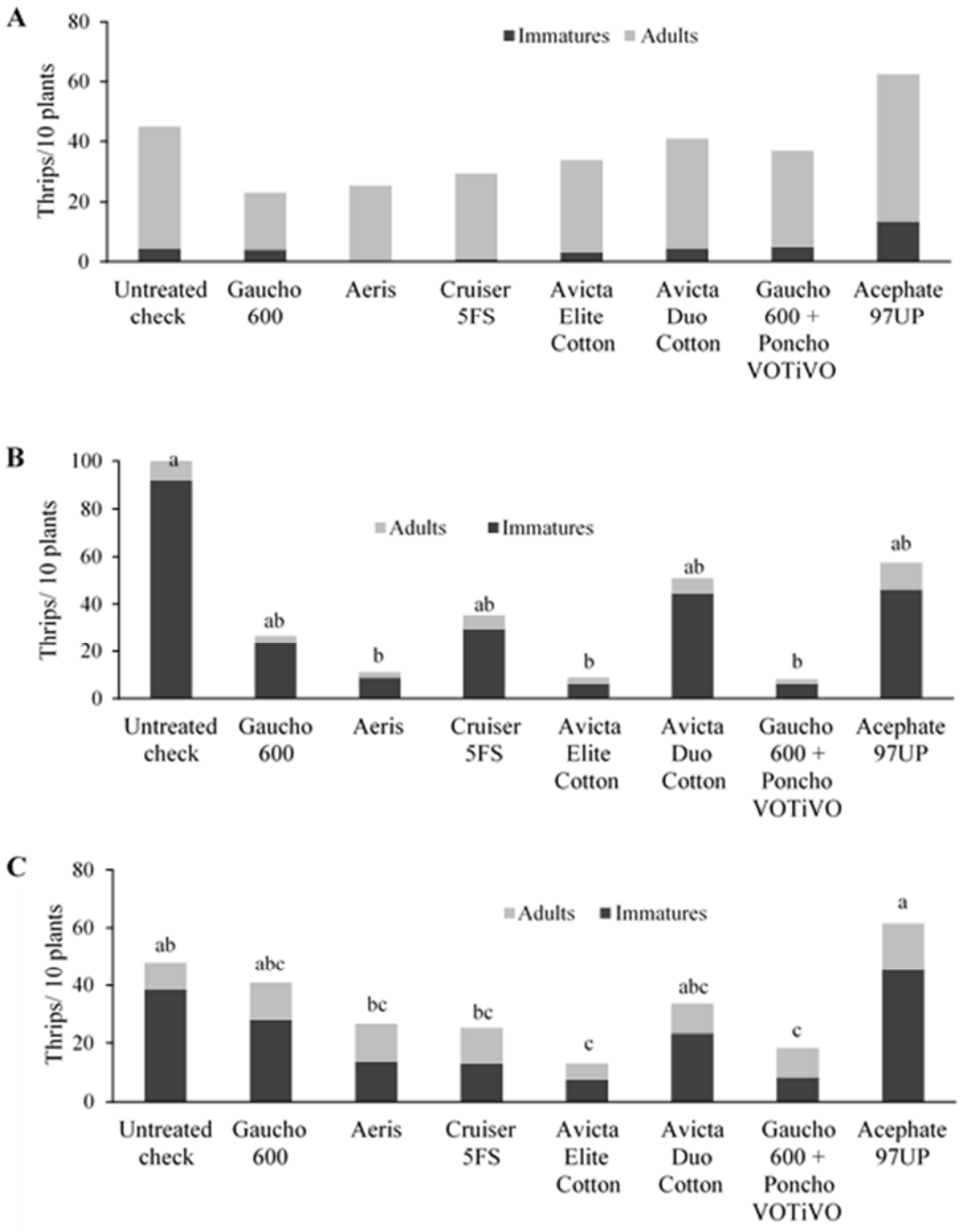

Fig. 1. Thrips counts at A. cotyledon, B. 1 true-leaf and C. 4 true-leaf stages of cotton. Bars showing same letter(s) do not differ significantly (P = 0.05, Tukey's HSD).

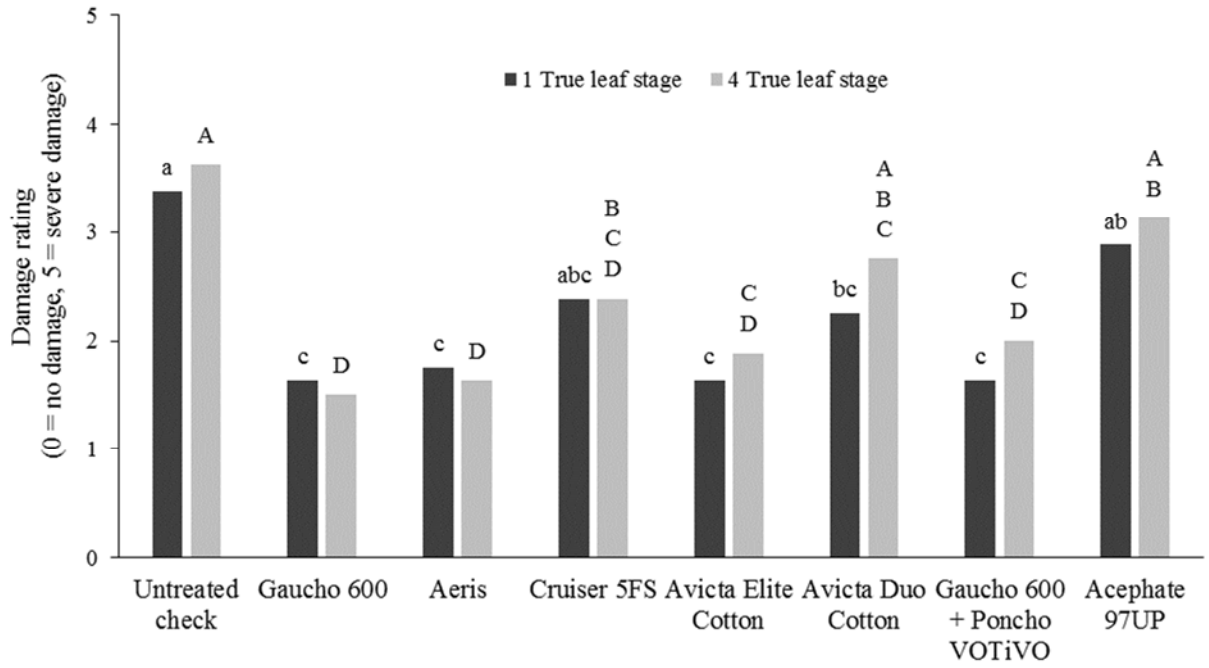

Fig. 2. Thrips damage rating at 1 and 4 true-leaf stages. Means showing same letter(s) do not differ significantly (P = 0.05, Tukey's HSD).

Acknowledgments

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