EFFICACY OF INSECTICIDES FOR MANAGEMENT OF WHITEFLIES IN COTTON

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Abstract

Data were collected in 2017 and 2018 to evaluate the efficacy of commonly used whitefly insecticides including Knack IGR (IRAC group 7c), Sivanto Prime (group 4d), Strafer Max (group 4a), and Courier SC (group 16), compared to untreated cotton. Whitefly pressure ranged from moderate (<20 nymphs per leaf) in 2018 to extreme (>100 nymphs per square inch) in 2017. Treatments were administered two times at 3 to 4-week intervals. All insecticides provided 3 to 4 weeks of whitefly suppression under moderate conditions, but Courier SC was less suitable under extreme pressure. Strafer Max and Sivanto Prime provided immediate suppression, while Knack IGR and Courier SC were slower acting; all insecticides preserved yield compared to the untreated plots.

Introduction

Silverleaf whitefly, *Bemisia tabaci* (Hemiptera: Aleyrodidae), is an extremely polyphagous insect pest that causes damage to crops by direct feeding and indirectly transmitting a number of important viral diseases (De Barro et al. 2011). Although only a sporadic insect pest of cotton in Georgia, whitefly populations increased to epidemic levels that required 70% of the cotton acres to be treated for whitefly in 2017 (Cook 2017). Whiteflies are also a common insect pest and disease vector to vegetable production in Georgia, likely resulting in populations receiving multiple exposures to insecticide treatments in any given year. Therefore, it is important to evaluate the efficacy of insecticides to determine current state of susceptibility of insect populations. Due to high reproductive potential and availability of favorable agronomic host plants throughout the year, serious potential for resistance to insecticides exist in this insect pest. Determining the field efficacy of various insecticides provides information on effective treatments as well as opportunities to use insecticides from multiple mode-of-action groups to delay insecticide resistance.

Materials and Methods

A slightly hairy cotton variety, PHY 312 WRF, was planted during the first week in June under overhead irrigation. Plots (24 by 40 ft.) were established in a randomized block design with 4 replications for each treatment. Whiteflies were scouted weekly from late squaring through bloom. In each plot, adults from the underside of 5 random leaves (5th node from top) were counted and then those leaves were collected and taken to the lab. Nymphs on bagged leaves were counted using a microscope or a magnifying lens. Treatments were administered every 3 to 4 weeks and included: Courier SC (12.5 oz/acre), Knack IGR (10 oz/acre), Knack IGR (5 oz/acre every 2 weeks), Sivanto Prime (14 oz/acre), Strafer Max (2.3 oz/acre) and untreated. At the end of the year, plots were chemically defoliated and 80 row feet per plot was mechanically harvested; the resulting lint yield was estimated based on a 40% gin turnout.

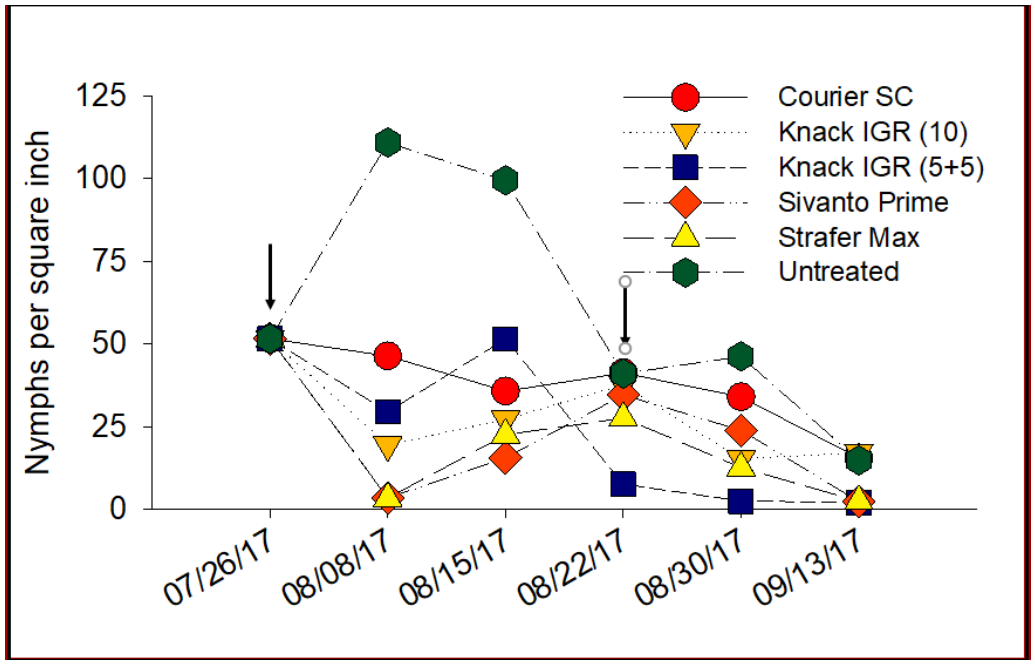

Fig. 1 Mean number of nymph counts per square inch of leaf of cotton during 2017. Arrows indicate timing of insecticide applications.

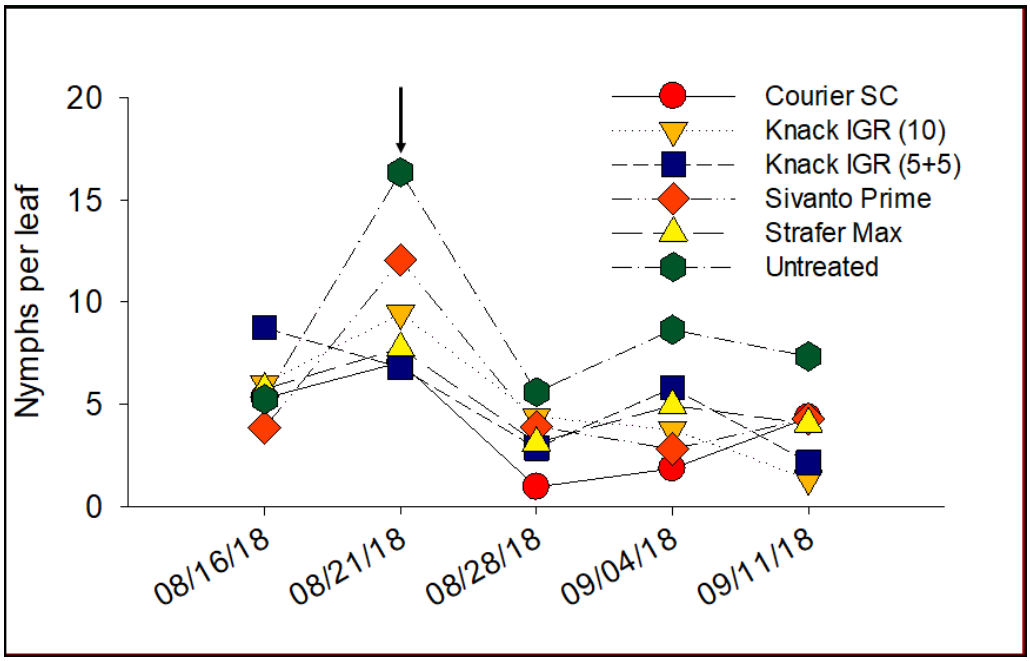

Fig. 2 Mean number of nymph counts per leaf during 2018. Arrow indicates timing of insecticide applications.

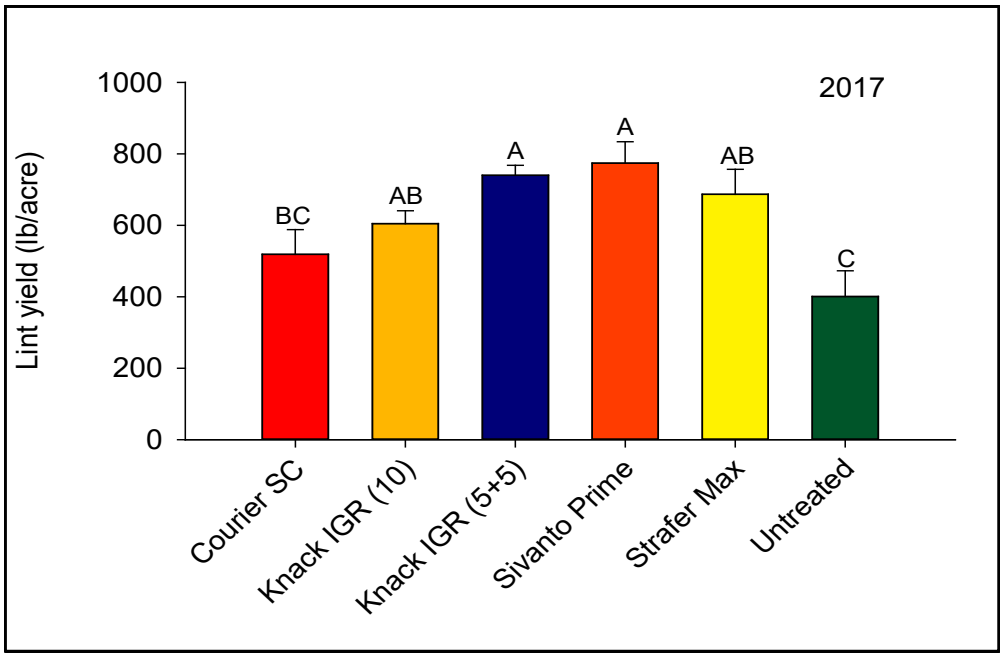

Fig. 3. Mean ± SE lint yield across treatments for 2017.

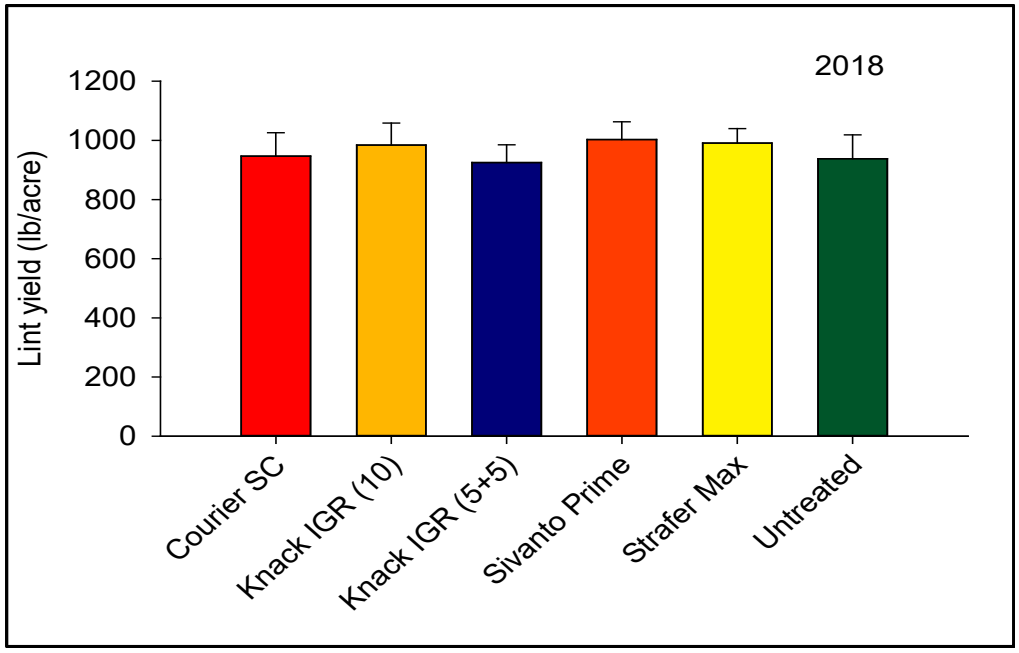

Fig. 4. Mean ± SE lint yield across treatments for 2018.

Results and Discussion

The whitefly population in 2017 was extremely high and nymphs were estimated per square inch of leaf. The first scouting interval indicated that whitefly nymphs were at approximately 50 nymphs per square inch. Therefore, the first treatment was administered that same day. Following the first application, whitefly populations decreased significantly in cotton treated with Sivanto Prime or Strafer Max (Fig. 1). However, whitefly populations quickly rebounded and a second application was required three weeks after the first application. The number of whitefly nymphs increased in the two weeks following the first insecticide application in all treated plots, except those treated every two weeks with Knack IGR (5+5), which provided a strong residual effect.

In 2018, whitefly populations were much lower than the previous year. Treatments were administered following the second week of sampling when immature whitefly population estimates exceeded the treatment threshold (Fig. 2). Among insecticide treatments, Sivanto Prime, Strafer Max and Courier SC provided desired suppression. Across both years, insecticide applications generally reduced whitefly population by 50% or more compared to the untreated plots and provided 3 to 4 weeks suppression.

Significant yield differences among treatments were observed in 2017 (Fig. 3). Sivanto Prime, Knack IGR (5+5) and Strafer Max were the superior treatments in terms of protecting yield loss compared to the control treatment. In 2018, there was no significant treatment differences among treatments as populations were much smaller compared to the previous year (Fig. 4).

Summary

Silverleaf whitefly is a sporadic pest of Georgia cotton. Although unprecedented whitefly pressure occurred in 2017, most insecticides provided consistent suppression compared to untreated cotton. Across years and levels of whitefly pressure, Sivanto Prime, Strafer Max and Knack IGR performed well. Under more normal whitefly population densities, all insecticide treatments decreased nymph counts by at least one-half.

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