TEMPORAL VARIABILITY OF THRIPS INFESTING 1-LEAF COTTON IN CONVENTIONAL AND REDUCED TILLAGE SYSTEMS

P. Roberts
H. Anderson
R. Barentine
T. Barnes
B. Jefferies
B. Cantrell
S. Carlson
R. Churchwell
B. Cresswell
C. Earls
P. Edwards
R. Ensley
M. Frye
W. Gay
L. Griffeth
J. Hand
B. Hayes
R. Hicks
J. Kichler
J. Kicklighter
L. Ray
J. Mallard
M. Freeman
J. Miller
M. Murdoch
P. Pugliese
P. Sapp
Pam Sapp
A. Sawyer
A. Shirley
J. Slusher
B. Tyson
B. Ward
M. Toews
University of Georgia Cooperative Extension
Tifton, GA

Abstract

Thrips infestations were sampled on 1-leaf cotton from 59 and 247 commercial cotton fields during 2016 and 2017. Thrips infestations on 1-leaf cotton tended to be higher on earlier planted cotton. Thrips infestations were lower in 2017 compared with 2016. Thrips infestations were slightly lowered in reduced tillage fields compared with conventional tillage fields. The Thrips Infestations Predictor for Cotton (TIPs) tool accurately predicted the differing thrips infestations both years and within the year by planting date. High risk planting dates will require more aggressive thrips management compared with low risk planting dates to achieve acceptable thrips control. The TIPs tool will provide more precise estimates of risk compared with simple calendar based methods of determining thrips risk.

Introduction

Thrips are the most consistent and predictable insect pest of cotton in Georgia and the Southeast. Preventive insecticides used at planting have aided in the efforts to reduce risk of thrips and injury. However, a supplemental foliar insecticide may be needed if infestations exceed threshold to preserve yield. The current threshold for thrips on seedling cotton in Georgia is 2-3 thrips per plant with immatures present. The optimal timing of foliar

insecticides for thrips management is the 1-leaf plant growth stage. The objectives for this trial were to quantify the effect of planting date and tillage practice on thrips infestations on 1-leaf stage cotton. Additionally, data from this project will be used to validate the Thrips Infestation Predictor for Cotton tool, http://climate.ncsu.edu/CottonTIP (Kennedy, Chappell, Ward, and DePolt, 2016). The Thrips Infestation Predictor for Cotton (TIPs tool) uses weather data to make predictions of: 1. Thrips dispersal timing, 2. Cotton growth affecting seedling susceptibility, and 3. Injury risk that results from thrips dispersal and seedling susceptibility occurring at the same time.

Materials and Methods

County Agents from 31 Georgia counties participated in the CORE (County On-farm Research and Education) thrips trials during 2016 and 2017. The power of this CORE trial is replication and generation of a large data set over multiple environments. Agents also built upon their current knowledge and expertise related to thrips management in cotton. Commercial cotton fields were sampled for thrips at the 1-leaf stage by cooperating County Agents during 2016 and 2017. In 2016, ten plants were randomly sampled at four locations in 59 fields. In 2017, ten plants were sampled per field in 247 commercial fields. Plants were submerged and swirled in a 3 ounce container filled with 70 percent ETOH to dislodge and preserve thrips. Sample containers were returned to the Cotton Entomology laboratory where immature and adult thrips were enumerated. Field location and tillage practice utilized (conventional or reduced) were noted for each field.

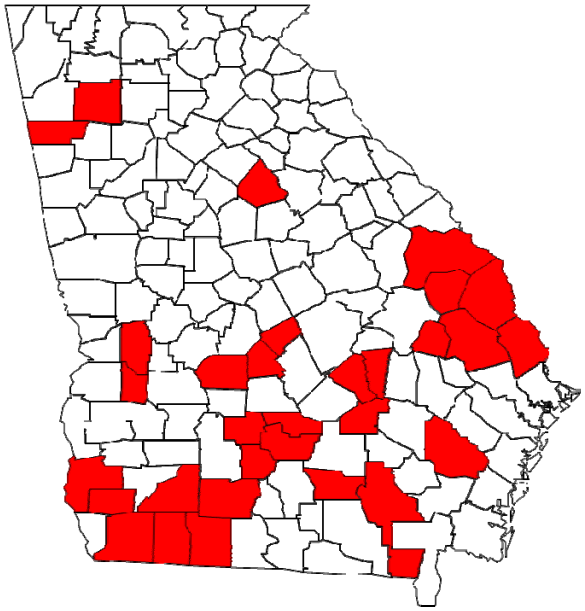

Figure 1. County agents from 31 counties participated in the CORE thrips project.

Results and Discussion

Thrip infestations tended to be lower in 2017 compared with 2016 (Figure 2). The TIPs tool accurately predicted the decline in thrips infestations in 2017 compared with 2016. In both years the TIPs tool also accurately predicted higher thrips infestations on early planted fields. Mean thrips infestations were 28 percent lower in reduced tillage fields compared with conventional tilled fields during 2016 (Figure 3). Thrips infestations were very low in 2017 and appeared similar when comparing tillage systems in 2017.

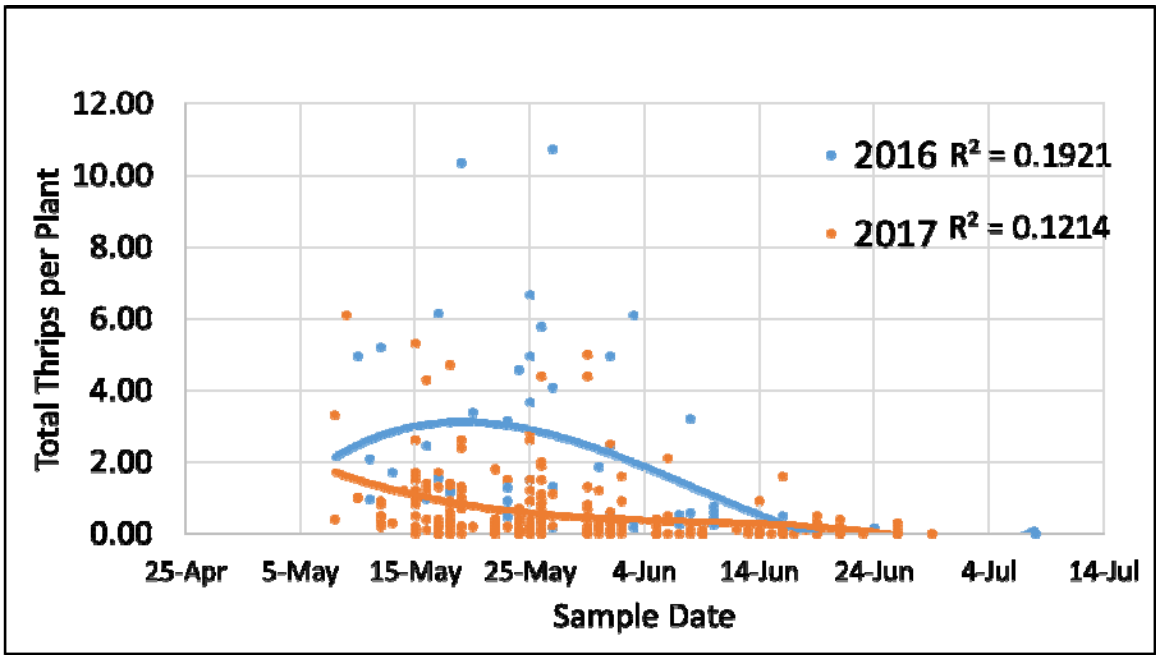

Figure 2. Thrips per plant on 1-leaf cotton by sample date in commercial cotton fields in Georgia during 2016 and 2017.

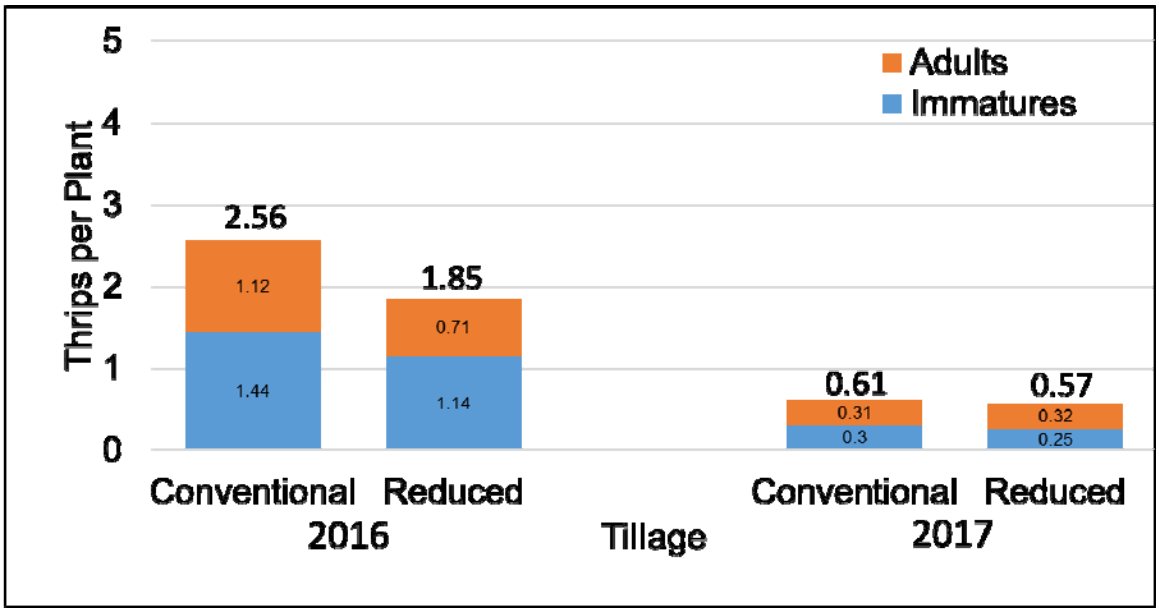

Figure 3. Adult and immature thrips per plant observed on 1-leaf cotton in conventional and reduced tillage production systems in Georgia during 2016 and 2017.

Thrips Risk Environments

A simple thrips risk index can be assigned to any cotton planting based on planting date and tillage which are known to influence thrips infestations. High Risk: cotton planted prior to May 10 in a conventional tillage system. Low Risk: cotton planted on or after May 10 and/or in a reduced tillage system. Mean thrips infestations were 2.5 times higher in high risk fields compared with low risk fields during 2016 (Figure 4). During 2017 thrips infestations were 1.9 times higher in high risk fields compared with low risk fields. 73 percent of high risk fields in 2016 exceeding the currently recommended threshold of 2-3 thrips per plant and immatures present. Only 27 percent of low risk fields exceeded threshold during 2016. In 2017, 14 percent of high risk fields and only 5 percent of low risk fields exceeded threshold.

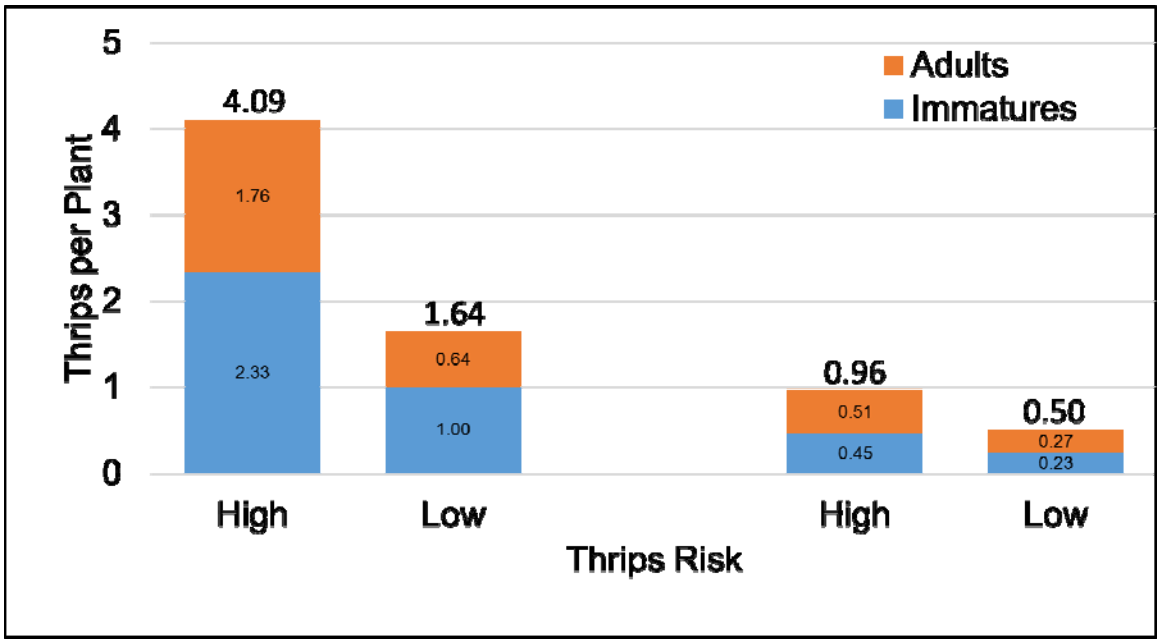

Figure 4. Thrips infestations on 1-leaf cotton in high and low thrips risk environments during 2016 and 2017.

Summary

Thrips infestations on 1-leaf cotton in commercial fields tended to be lower in 2017 compared with 2016. Thrips infestations also tended to be higher on earlier planted cotton and lower in reduced tillage fields compared with conventional tillage fields. The Thrips Infestations Predictor for Cotton accurately forecasted the differing thrips infestations both years and within the year by planting date. The TIPs tool can be used to identify planting dates which are at greatest risk for thrips injury. High risk planting dates will require more aggressive thrips management compared with low risk planting dates to achieve acceptable thrips control. The model will provide more precise estimates of risk compared with calendar based methods. The effects of tillage will need to be considered when using the TIPs model.