New Survey Shows High Level and Widespread Resistance of Thrips to Neonicotinoid Insecticides

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You need to be aware of the development of insecticide resistance in tobacco thrips, *Frankliniella fusca*, populations to the widely-used class of neonicotinoid inseciticides (this includes products with the active ingredients acetamiprid, clothianidin, dinotefuran, imidacloprid, thiacloprid, and thiamethoxam). In 2014 we participated in a neonicotinoid resistance monitoring program, led by Dr. George Kennedy at North Carolina State University. Our portion consisted of providing early-season, native tobacco thrips populations from volunteer peanuts at the Virginia Tech Tidewater AREC in Suffolk, VA. Other collections were provided from seedling cotton, weeds, and wheat by researchers across the southeast. Samples were placed into 5-gallon buckets with cold packs and were sent to Kevin Langdon at Syngenta's Vero Beach facility for initial bioassay with thiamethoxam (formulated as Cruiser 5FS) and imidacloprid (formulated as Gaucho 600FS) using 2 diagnostic concentrations (360 ppm and 3600 ppm of formulated product) for each product. Thrips populations that showed greater than 12% survival at 360 ppm or 8% survival at 3600 ppm were considered potentially resistant and sent to NCSU to be further tested to establish a dose-response relationship. These survival rates represent the upper 95% confidence limit for the susceptible NCSU population. Populations for which survival at the 3600 ppm exceeded 16% (twice the upper 95% confidence limit) in the initial survey were classified as resistant. Briefly, results showed that tobacco thrips with high levels of resistance to neonicotinoids are as close to us as North Carolina. Please read on for more detailed results. We plan to continue this project in 2015.

Results of Dr. Kennedy's survey identified populations that were resistant to thiamethoxam only, resistant to imidacloprid only, and resistant to both thiamethoxam and imidacloprid, as well as populations susceptible to both thiamethoxam and imidacloprid. Thiamethoxam resistant populations were identified in Alabama, Arkansas, Georgia, Mississippi, Louisiana, North Carolina and Tennessee. Gaucho resistant populations were identified from Arkansas, Georgia, Mississippi, North Carolina and Tennessee. Levels of resistance to thiamethoxam ranged from 42X to 236X relative to the susceptible NCSU reference population (Fig. 1). Importantly, the range of thiamethoxam resistance levels was similar across populations collected from cotton, wheat, and weeds suggesting that resistance is established with populations at the local landscape level.

The greatest concentration of resistant populations was observed in samples from the Mississippi Delta production area. Although this production area accounted for 48% of the samples for which results were obtained, 52% of the populations tested were classified as resistant to one or both of the neonicotinoid insecticides tested. In contrast, resistant populations accounted for 28% of the populations sampled from locations outside the Delta with several located in North Carolina (Fig. 2).

Additional data are needed to better characterize the occurrence and distribution of neonicotinoid resistant tobacco thrips populations in the southeast. A group of extension entomologist from across the region (AL, GA, SC, NC, and VA) will be collaborating on a project in the upcoming season that will provide more of the information needed to help prepare thrips management recommendations for producers.

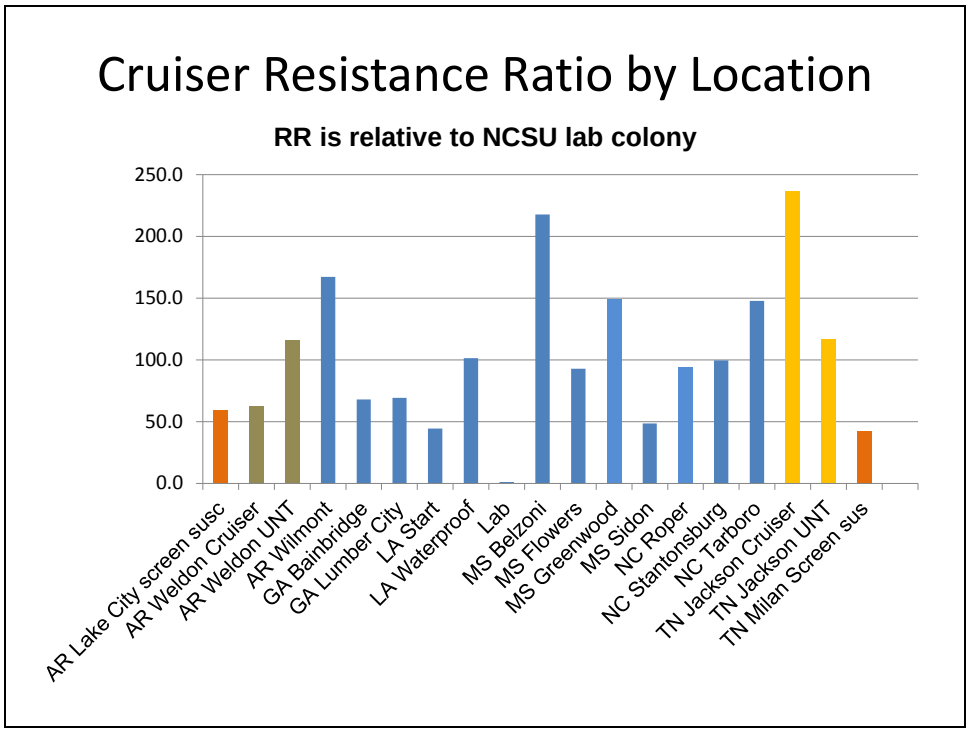

Figure 1. Resistance ratios to the susceptible NCSU lab colony for tobacco thrips populations from AR, GA, LA, MS, NC and TN (G. Kennedy, NCSU, 2014).

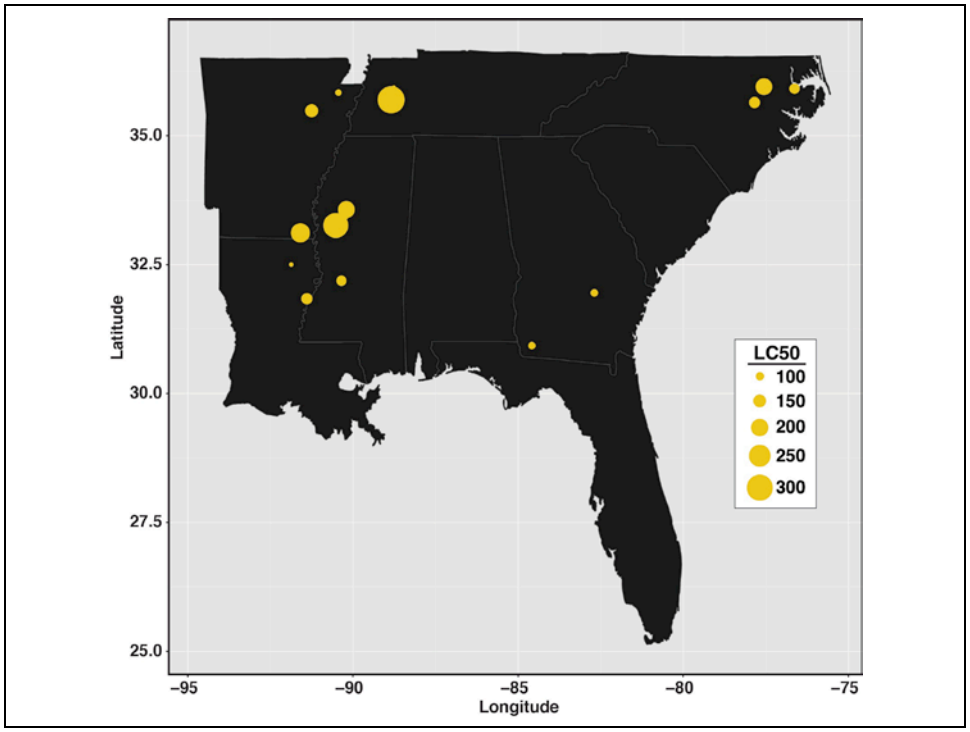

Figure 2. Distribution and degree of resistance of tobacco thrips populations to thiamethoxam (G. Kennedy, NCSU, 2014).