

The Resistance of Pesticides on The Tarnished Plant Bug

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INTRODUCTION:

The tarnished plant bug (TPB), *Lygus lineolaris* is a major economic pest in the Mississippi Delta. Tarnished plant bugs damage presquaring cotton, causing growth deformities and a delay in fruiting and boll maturity (Hanny et al. 1977). Scientists have been working for many years to solve the ongoing problem of this insect. Tarnished plant bugs have developed resistance to most insecticides used in cotton (Snodgrass et al. 2009). Dr. Snodgrass and his laboratory previously assayed populations to track annual shifts in susceptibility of TPB to major insecticides used in cotton. My presentation summarizes a continuation of Dr. Snodgrass' assay program in 2014.

MATERIALS AND METHODS:

- TPB adults
(Collected by Arnell Patterson from various field sites, and from Dr. Portilla's laboratory colonies).
- Cotton balls
- Floral Foam
- Glass scintillation vials
- Green beans
- Technical Grade thiamethoxam, imidacloprid, permethrin, and acephate



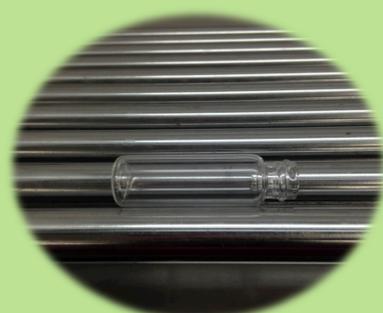
MATERIALS AND METHODS:

The bioassays were conducted using 20-ml glass liquid scintillation vials. In the oral bioassays, imidacloprid and thiamethoxam were used in different concentrations (15ug/0.5ml, 5ug/0.5ml, 1.5ug/0.5ml, 0.5ug/0.5ml, and 0.15/0.5ml). At least five different doses were used with each test population, and the doses in each test were replicated four times. Ten vials (1 adult per vial) were used in each replication. Control vials received only the honey-water solution, and control mortality were rare and never > 10%. A piece of floral foam, approximately 12-mm in diameter and 12-mm in depth were placed in each vial. Honey-water solution (0.5ml) was pipetted onto the floral foam piece and then a single adult was placed in each vial. After the insect is placed in the vial, a cotton ball was placed in the opening to confine the insect for testing. The insects were evaluated at 3 hours and then again at 24 hours.

In the contact bioassay with permethrin and acephate, at least five doses were tested against in each test population. The permethrin concentrations were (50ug/0.5ml, 15ug/0.5ml, 5ug/0.5ml, 1.5ug/0.5ml, 0.5ug/0.5ml). The acephate concentrations were (100ug/0.5ml, 30ug/0.5ml, 10ug/0.5ml, 13ug/0.5ml, 1ug/0.5ml). The untreated control only contained acetone. The Tests solutions were pipetted into the vial and then placed on a hotdog roller until the solution was thoroughly distributed throughout the vial and evaporated under the fume hood. A fresh cut green bean was then inserted into the vial. Two TPB adults were placed in each vial and the insects were confined in the vial with a cotton ball. Mortality observations were made at 3 hours and then again at 24 hours. Mortality in the control treatment was low and never exceeded 10%. Tests were conducted at room temperature and humidity was not controlled. Dose mortality regressions were developed by Probit Analysis in SAS (SAS Institute).

RESULTS AND DISCUSSION:

Variations was observed in the different assays. The range from low to high LC50 was 40-fold, 26-fold, 7-fold, and 4-fold for acephate, permethrin, thiamethoxam, and imidacloprid. No significant difference in average LC50 was observed between imidacloprid and thiamethoxam. Neonicotinoids (thiamethoxam and imidacloprid) were significantly more toxic than permethrin and acephate. No significant difference was observed in average LC50 between acephate and permethrin.



CONCLUSION:

While we have measured variability in response in TPB populations to the different insecticides, the variability is similar to that measured by (Snodgrass et al. 2008 and 2009).

REFERENCES:

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- Snodgrass, G.L, and W.P. Scott. 2000. Seasonal change in pyrethroid resistance in tarnished plant bug (Heteroptera: Miridae) populations during a three-year period in the Delta area of Arkansas, Louisiana, and Mississippi. J. Econ. Entomol. 93:441-446.
- Photos taken by Cavishia A. Roberson. 2014

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