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SIMRU Paper

## A Study of the Tarnished Plant Bug

Lygus Lineolaris, also known as the tarnished plant bug, are pests that damage and kill a huge portion of economically important plants. They are pests of several crops including fruit, vegetable, and flower plants. Many plants are harmed each year by the tarnished plant bug; in fact, over half of the cultivated plant species grown in the United States are host plants for the tarnished plant bug. This is why researchers and entomologists are researching ways to kill the tarnished plant bug. The adult tarnished plant bug is oval-shaped, and it is anywhere from a light to a dark shade of brown. The adult has wings, long legs, and a white triangle between its "shoulders". Nymphs are yellow-green with black dots on their back. Unlike adults, nymphs do not have wings. They hatch from eggs, and they grow through five instars over a period of three weeks. Nymphs move very quickly which makes it difficult to monitor on all the crops they attack. Tarnished plant bugs are harmful to the crops, and they can severely damage valuable crops.

In southern areas, these bugs are a major problem for cotton farmers. This is because the warm, wet climate in the south is favorable to the tarnished plant bug. They can survive year round, usually in weeds surrounding cotton fields. In some cases, damage from these plant bugs is seen before the actual insect itself. The bugs use their needle-like mouthparts to lacerate the plant tissue. The bad part about it is that their saliva is inserted into the plant tissue which begins digestion which is completed after the bug sucks up the mixture. Their toxic, digestive enzyme aids in the breaking down and damaging of the plant tissues. Damage symptoms include leaf ragging, brown, or discolored tissue, and premature drop of buds. The mid-south region is fertile, and it produces cash crops such as corn, soybeans, and

cotton. Cotton affects the economy in numerous ways because 60% of the world's cotton is used for clothing and another 35% is used for home furnishing. So cotton is widely used for many things, and tarnished plant bugs are a major problem for these plants. Dr. Snodgrass is an entomologist, and he is a tarnished plant bug expert. He studies cotton pests, and he aids farmers in protection of their crops by monitoring tarnished plant bug resistance to certain insecticides. Farmers are in a serious need of a solution to this problem because without research, entire yields of valuable crops would be destroyed. They have high levels of resistance to pyrethroid, organophosphate, and carbamate insecticides. Dr. Snodgrass aids farmers by helping them control these populations. He developed a way to monitor tarnished plant bug resistance to different classes of insecticides through glass-vial bioassays.

A monitoring program that detects acephate resistance is collected in the article, "Acephate resistance in Populations of the Tarnished Plant Bug from the Mississippi River Delta." This uses Dr. Snodgrass's glass-vial bioassay to detect acephate resistance in populations of the tarnished plant bug. Tarnished plant bugs were collected from different locations around the Delta and tested for resistance to acephate. The same locations are tested every year to see if the resistance ratio has increased. The bugs are captured using a sweep net and aspirator, and they are placed in paper ice cream cartons with green beans. The green beans are washed to make sure all the insecticide residue is off. The inner surfaces of the vials are coated with insecticide which Dr. Snodgrass prepares by diluting it in acetone. 0.5 ml of the insecticide is pipetted into each vial, and the vials are then rolled on a hotdog cooker. This helps the acetone to evaporate, leaving the insecticide as a residue on the inner surface of the vial. 20-ml glass liquid scintillation vials are used. The vials are labeled "or" for Orthene along with the dose of that insecticide. The test includes at least five doses which are usually 5ug/vial, 10ug/vial, 15ug/vial, 20ug/vial, 25ug/vial. Washed beans are cut into small pieces around 3mm thick. Two adults are placed into each vial with a cotton ball in the opening to keep bugs from getting out. Mortality rates are determined after 24 hours. Each dose is replicated three times, and each replication contains five vials.

They are considered dead if they cannot walk. The lethal concentration or dose of insecticide that kills 50% of the population is measured in micrograms/vial. These values are used to determine a resistance ratio. These values are for each field population, and they are compared to the other values for a susceptible population.

Tarnished plant bugs affect not only the economy, but also the farmers whose crops are destroyed by the plant bugs. There is a continuous need for resistance monitoring because nature is always changing and adapting. Populations of *Lygus Lineolaris* are difficult to control, and proper research is the only solution to control these populations. New insecticides are available; however, the older ones were more effective. This is why research is continuously needed in the United States because the American people are competing for the lead in Agriculture around the world.

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Works Cited

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