

**Michael McCain, Biological Science Aid
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My name is Michael McCain and I am a biological science aid for the United States Department of Agriculture-Agricultural Research Service. I have worked for USDA-ARS for the past three years, sharing my employment between the Southern Insect Management Research Unit (SIMRU) in Stoneville, MS and the National Products Utilization Research Unit (NPURU) in Oxford, MS. I usually work summer and winter for SIMRU and fall and spring for NPURU.

Dr. O. P. Perera is my supervisor within the Southern Insect Management Research Unit. My responsibilities include DNA and RNA extraction, complementary DNA synthesis, amplification of selected genes, and gel electrophoresis. I complete all of these processes in hopes of furthering research on the crops and pests of the Mississippi Delta region.

Tarnished plant bugs (TPB), known as *Lygus lineolaris*, are a major pest of cotton and some beans. Mid South area farmers spend more money per acre battling the TPB than any other insect primarily due to insecticide resistance. This insect species rapidly adapts to new environments and conditions. Integrated pest management (IPM) has been a tool to reduce the amount of pesticides used while still maintaining an acceptable level of pest populations. Alternative strategies used in IPM include cultural and biological means, such as planting time and microbial agents respectively. *Beauveria bassiana* is currently being tested by SIMRU as a fungal pathogen in an integrated pest management system. We have been researching a single-stranded RNA virus infecting in TPB

populations. This virus, LyLV-1, may be utilized as a biological control agent due to its ability to infect the host and potentially weaken the immune system. Also, co-infection of a different pathogen is a possible method of treatment due to the weakened immune defenses of the host. This would result in rapid establishment of the secondary pathogen and death of the host. This method of biological control has not been studied in the TPB; however, the discovery of the LyLV-1 virus enables for further research of this method.

The work that I performed this summer focused on the natural incidence of the LyLV-1 virus in the TPB populations. The population survey will tell us how widespread LyLV-1 is throughout the Mississippi Delta, giving insight into the pathogenicity of the virus. If the virus is not found in a large percentage of the population, we can assume that the life expectancy of hosts of this virus is considerably less than the general population and may be used as part of an integrated pest management system. I extracted total RNA from insects in order to detect the virus in TPB populations collected from five locations throughout the Mississippi Delta region at three time intervals. Because LyLV-1 is an RNA virus, extracted RNA needs to be converted to DNA, a process known as complementary DNA (cDNA) synthesis. After performing cDNA synthesis, the target region is amplified using virus specific primers, and the amplification of DNA is verified using gel electrophoresis. The percent of infection of the LyLV-1 virus in TPB populations can be calculated, as well as the change in percent of infection over time.