

Emily Mosow

### What I learned Summer 2011

This summer I worked for my fourth year at the USDA Agricultural Research Service Stoneville Division in the SIMRU program. SIMRU stands for Southern Insect Management Research Unit and is a research unit devoted to understanding various pests that affect the major crops grown in the southern states and other areas of the United States as well as developing techniques to better control them. In this division I am under Dr. Ryan Jackson. He is a category one scientist who heads the program whose goal is to examine the management of the resistance to insecticides and other emerging control strategies for pests affecting corn, cotton, sorghum, soybeans, and sweet potatoes. My duties under Dr. Jackson are primarily located within the laboratory. There, most days I help to maintain the various colonies that we keep in our rearing room. These include black cutworms, fall armyworms, and various bollworm colonies. These colonies are important to research for a variety of reasons. The main two reasons are that the colonies readily provide pests for any field tests where bugs are needed without having to wait for the fields to become naturally infected. The other reason is that they provide a set of insects that can be used in the lab to test new insecticides on their effectiveness in order to determine the best dosages to use in the fields as well as they can provide a basis of comparison on amount of resistance developed in bugs collected from the field because colonies in the lab face far less selective pressures. While I have been helping with this project for years, it was only this summer that I learned just how long the techniques that we use for rearing insects has been around. In the paper I read, the scientists performing the experiment also reared insects and used pretty much the same methods and this was in the early 1960's. I was

shocked to find how little the techniques had changed. My other main task in the laboratory is to help set up and rate the various chemical tests that we run in the laboratory. These cover a wide range of pests, chemicals, and techniques. The first type of test that we do is the Adult Vial tests as part of the pyrethroid resistance monitoring program. This test is done weekly by placing Zea moths collected throughout ten counties and placing them into treated vials and rating them 24 hours later. This test helps monitor the susceptibility of bollworms to pyrethroids as a yearly thing and is important because it gives scientist a way of checking the timeframe for resistance being developed towards pyrethroids which are the most commonly used insecticide in controlling bollworms. Another test we do is concerned with testing the effectiveness of chemicals when ingested by an insect. This is done usually through diet incorporation and the use of bioassay trays. With these tests, different chemical concentrations are tested to see which one best results in killing 50 percent of the population being tested. This test is important because it falls under Dr. Jackson's major program of looking at insecticide resistance and new controls. The final major test that we do was a new one for me this year. It also looks at the resistance of insecticides but instead of having the insects ingest them, it uses a topical treatment. In order to do this test, we use a syringe that places a small uniform drop on the back of each worm's head. Then we later went through and rated them for dead or alive to help look for which concentration results in a fifty percent mortality. This test also looks at resistance of insecticides. In running all of these tests, they have different techniques, insecticides, and pests but all of them have the same desired result. This result is to look at the effects of resistance of various pesticides on the market towards the most common pests found in crops.