Darshanisha Warren Supervisor: Dr. O.P Perera SIMRU2012 Microsatellite Variation in *Helicoverpa zea* Populations in the Southern United States Bollworm or *Helicoverpa zea* is a very mobile species with larvae that are polyphagous and damage several crops during multiple generations each growing seasons. This insect also feeds on a number of weeds during the year and among its crop host maize which is the preferred host. Bollworms are more abundant in diverse cropping systems with population ecology and dynamics. Host plants influence the growth rates and generation time of insects. Agricultural landscape and host plants differ at different locations, and can affect the availability of mates for bollworms which could also affect genetic structure of the population.

Seven polymorphic microsatellite markers were used to analyze bollworm populations from various host plants in four locations in the southern United States. The linear collection sites ranged from 150 to 900km. The collection sites were Alabama, Louisiana, Texas, and Mississippi. The primary objective of the study was to evaluate the extent of genetic differentiation in populations of bollworms separated genetically. Each insect was genotyped with seven anonymous simple sequence repeat marker loci developed for bollworm. Analysis of molecular variance was done by grouping four populations in various combinations. Results revealed that microsatellite DNA variation in bollworms collected from four locations 150 to 900 km apart did not detect any genetic differentiation between populations or populations grouped n various combinations.

With the *Helicoverpa zeas* we performed different methods with these zeas. The zeas are reared on an artificial diet, most are reared on the regular diet, and some are screened on bio-assay for a particular toxin. Basically when they are screened on bio-assay it is to see how high

of a dosage they can intake. We also dissect moths placing the thorax and head in one tube and the legs, wings, and abdomen in another. We then freeze them in -80 degrees until further methods are taken. DNA extractions are performed on the moths, normally the thorax and the head, which we use a protocol called proteinase K, but there are many other protocols that can be used to extract DNA. I have never extracted RNA from a moth which I am sure it can be done, but 1 have only extracted RNA from the *fygus lineolaris* and it was used with a protocol called Trizol Reagent. In some cases when the DNA is extracted, PCRs are a method that is used to target a certain gene in the DNA and it replicates as much DNA as possible. The reason for these methods is for downstream applications.

This is my first summer here at SIMRU and it has been to most overwhelming experience my **in** life. I have learned a great deal of science working with some very smart doctors, technicians, and my other fellow interns. Not once did I think I would only hear about how DNA and RNA are extracted from pests and to watch the life cycle of *helicoverpa zea* but I actually got a chance to perform these methods. I get to take back hands on experience and knowledge about what I learned here to Mississippi Valley State University. I enjoyed my summer here at SIMRU and what I learned here will someday help with my future endeavors.

Perera, O. P. and C. A. Blanco. 2011. Microsatelhte Variation in *Helicoverpa zea* (Boddie) Populations in the Southern United States. Southwestern Entomol. 36: 271-286

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