



By Jacob Emmendorfer

And Damien Johnson

High School Juniors from Michigan

Our M.A.P. Experience



**Michigan State University
Multicultural Apprenticeship Program
2010**

The Program Overview

- The Research Project
- The People
- The Activities



The Project

- Dry Bean Breeding and Genetics – BeanCAP internship program
 - Dr. Jim Kelly
 - Beth Brisco (PhD student)
- Problem:
 - Potato Leaf Hopper is a significant pest of dry beans, causing curling and burning of leaves and reducing yield
- Purpose:
 - To identify the genetics associated with resistance to potato leafhopper
- Long Term Goal:
 - To breed dry beans that are less susceptible to potato leafhopper feeding.



The Plants

- The plants are Recombinant Inbred Lines (RILs)
 - Developed from a cross between resistant (EMP507) and susceptible (Matterhorn) parents
- The RILs contain all the genetic diversity from both of the parent plants
 - This allows specific genetic differences to be identified and targeted using a combination of phenotyping and DNA screening



In the Lab

- DNA extraction
 - Purified DNA from RIL population
- DNA quantification
 - Quantified DNA sample concentrations for DNA marker screening
- Greenhouse Oviposition Test
 - Counted nymphs on dry bean RILs
 - Provides indication of insects' ability to breed on a particular plant



In the field

- Field preparation and maintenance
 - Rock removal
 - Weeding
- No-choice test preparation
 - Cage assembly and installation (112 cages)
 - Plant selection (5 plants per cage)
 - Leafhopper collection (25 adults per cage)
 - Damage scoring: to assess susceptibility/resistance of RILs to leafhopper feeding



In the field

- Choice test data collection
 - Nymph counting: Indicates leafhoppers ability and preferences for reproduction
 - Damage scoring: indicates plant resistance or susceptibility to leafhopper feeding
- Flowering data collection
 - Indication of plant maturity



Additional Lessons Learned

- Field research can be unpredictable and frustrating
 - 60 mph winds deconstructed field cages just as they were completed
- Teamwork!
 - Working as a team, they were rebuilt in record time



The People

- MAPers
- AIMers
- Faculty



The Activities

- Scavenger Hunt
- Kellogg Biological Station
 - Kellogg Forest
 - Bird Sanctuary
- Animal Clinic
- Ice Skating
- Seminars
- ACT Preparation
- Free Time
- Movies
- Mall
- Swimming
- Volleyball
- Football
- Interactive Theater
- Bonfire
- Cookout
- Tour of campus

Acknowledgements

- The MSU College of Agriculture & Natural Resources
- The MSU College of Veterinary Medicine
- Dr. Jeffrey Armstrong
- Dr. Eunice Foster
- Mr. Leonard Savala
- BeanCAP
- Our Mentor: Dr. Jim Kelly
- Our Student: Beth Brisco
- Our Counselors
- Our Families and Friends
- SNY-PHY Chefs

Thanks once again for the experience, MSU we will miss you..and your food.

