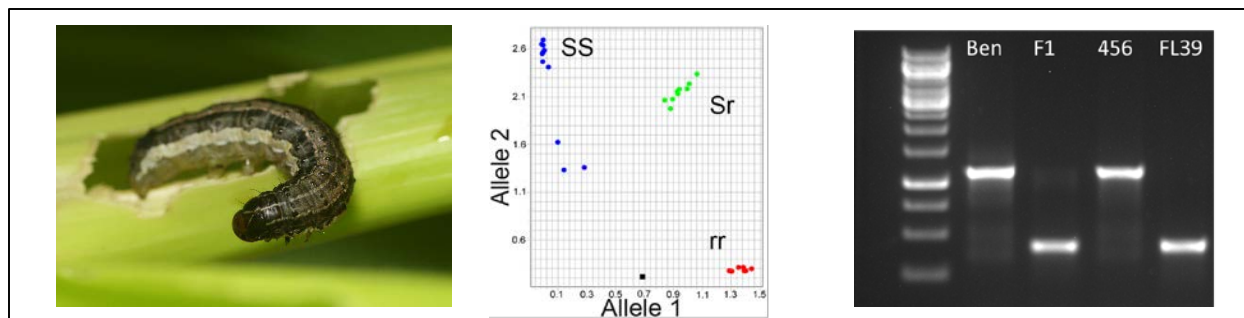


INSECT RESISTANCE

Frequency and Dispersal of Fall Armyworm Resistance to Bt Corn



DESCRIPTION

Populations of the fall armyworm (*Spodoptera frugiperda*, FAW) have developed field-evolved resistance to transgenic corn producing the Cry1Fa toxin (Bt corn) in multiple locations in North and South America. However, there is a lack of information on the identity and frequency of resistance alleles involved. The goals of this project are to determine the frequency and dispersal of resistance alleles in FAW from southeastern US, the Corn belt and Brazil, and to identify and develop genotyping tools to detect novel resistance alleles to Bt corn. During year 1, we collected and genotyped >9,000 FAW moths from the southeastern region and the Corn belt in the USA and Brazil to demonstrate that a resistance allele from Puerto Rico is confined to that island. We have also advanced the identification of a Cry1Fa-resistance allele in FAW populations from Florida and North Carolina. In year 2, we will sequence candidate genes for the identification of resistance alleles in FAW populations from Brazil. Information on resistance alleles, their frequency and dispersal allows for development of resistance predictive models to improve insect resistance management plans and increase the sustainability of Bt crop technologies.

HOW THIS IS DIFFERENT THAN RELATED RESEARCH

Data on the identity and frequency of field-evolved resistance alleles to Bt crops in FAW are very limited. We are advancing the development of DNA-based screening technologies as an alternative to F2 screens to detect resistance to Bt crops. In addition, we are providing information on field-evolved resistance mechanisms to Cry1Fa in FAW populations from distinct locations to assess the potential effect of genetic exchange and dispersal among FAW populations in the spread of resistance across distant locations.

MEMBER BENEFITS

- Access to a significant collection of genetic FAW materials from populations in the continental US.
- Testing and improvement of DNA-based resistance monitoring technology.
- Detailed insight into resistance allele frequencies and how they may disperse among FAW populations.
- Knowledge of candidate resistance genes from FAW populations with field-evolved resistance to Cry1Fa from US and Brazil.