

A Genetic Screening Method for Heliothine Pest Species

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Introduction

Noctuid moths *Heliothis virescens* and *Helicoverpa zea* are serious pests of many crops in the Americas and economic damage in the USA alone exceeds 100 million dollars. With the discovery of the old-world bollworm, *Helicoverpa armigera*, in South America it is important to evaluate natural populations of heliothine moths for the possible introduction into North America. Early detection of invasive pests can help in preventing widespread outbreaks. Although it is possible to morphologically distinguish adults and larval stages of *H. armigera*, *H. zea*, and *H. virescens*, eggs of these three species are impossible to identify. Moreover, adults collected in traps often lose morphologically distinct scale patterns and cannot be identified accurately. We have developed a polymerase chain reaction (PCR) based method to distinguish three species of heliothines.

Materials and Methods



Helicoverpa zea



Helicoverpa armigera

Heliothine larvae and adults were collected from numerous locations throughout the Delta region from various locations from Warren, AR to Jonesville, LA to Yazoo City, MS by sweeping wild host crimson clover plants and it was done before any crops came up in fields. Once the larvae were brought back to the lab, they were fed with artificial diet and reared under laboratory conditions. As soon as the larvae transform into adult moths they are preserved in the freezer. Genomic DNA was extracted from the thorax region of more than 700 samples. The nucleic acid was quantified using the nanodrop 2000 instrument. PCR (polymerase chain reaction) was amplified with a cocktail of specific primer pairs specific to the *Helicoverpa zea*, *Heliothis virescens*, and *Helicoverpa armigera*. The amplified DNA fragments were electrophoresed in agarose gels to verify species-specific marker.

Results and Discussion

Our focus was to screen for *H. armigera* among the heliothine moth populations from various locations in the Delta region. We did not find *Helicoverpa armigera* in any of our samples screened so far.

References:

Reed, W. 1965. *Heliothis armigera* (Hb.) (Noctuidae) in western Tanganyika. II. Ecology and natural and chemical control. Bull. Entomol. Res. 56: 127-140.

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