Christopher Schaefer, Agronomy

University: South Dakota State University
Year in School: Senior
Hometown: Victoria, MN
Faculty Mentor: Dr. Georgia Davis, Plant Science
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Evolution of maize defense gene expression altered by Wolbachia

Christopher Schaefer, Kelli Barr, Theresa Musket, and Georgia Davis

Western corn rootworm (WCR), Diabrotica virgifera virgifera LeConte, is a major pest in the maize fields of North America; causing tremendous economic loss. WCR vectors Wolbachia spp., an obligate intracellular bacterium. Wolbachia has recently been shown to down regulate or silence plant defense gene expression in maize, Zea mays L. WCR originated as a maize pest in Mesoamerica and then moved northward through the United States. It was introduced to Europe only recently in 1992. To date, WCR has not spread to the African continent. Therefore, inbred lines that were developed in Africa and Europe have not experienced the same selection pressure from either WCR or Wolbachia as the lines from Central and North America. This experiment investigates the response to WCR feeding in relation to geographic origin of the inbred line and therefore length of exposure to WCR in relation to defense gene expression. Twenty-eight diverse inbred lines from Central and North America, Europe and Africa were assayed for their gene expression patterns. Each line was subject to three treatments: control (no insects), WCR with Wolbachia, and mechanical wounding. One-step RT-PCR was performed on RNA from the 28 lines using primers to maize defense genes previously demonstrated to be affected by WCR feeding. Future research will be conducted to compare the affects of WCR without Wolbachia on defense gene expression in these lines.