

MOLECULAR DIAGNOSTICS OF ECONOMICALLY IMPORTANT WIREWORM
SPECIES (COLEOPTERA: ELATERIDAE) IN THE MIDWEST

Erica Lindroth

Dr. Thomas Clark, Thesis Advisor

ABSTRACT

Wireworms are a common soil-dwelling pest of corn (*Zea mays* L.) in the midwestern United States. Wireworms are a problematic group to control and study due to the difficulty involved in identification. The objectives of this study were to identify morphologically cryptic species of wireworms using molecular diagnostic techniques, construct a phylogeny of economically important wireworm species, and determine the genetic structure of *Melanotus depressus* populations. Using PCR, the cytochrome oxidase I gene from mtDNA was sequenced from over 300 individuals. The species analyzed include all economically important members of the genus *Melanotus* as well as *Conoderus lividus*. The morphologically cryptic species were successfully separated using nucleotide *p*-distances, and the sequences were then used in phylogenetic analyses. Molecular data exhibited convergence with morphological data. *M. depressus* population structure was analyzed using AMOVA. There was more genetic variation within populations than among populations. Our results suggest that wireworms may disperse through mechanisms other than simple flight. The data presented here represent an initial phylogenetic hypothesis concerning economically important wireworms, as well as an initial view of *M. depressus* populations in the Midwest. Our results indicate that the mitochondrial COI gene provides a fast and accurate method of separating morphologically cryptic wireworm species. By increasing the ease and accuracy of identification, we hope to facilitate further investigations into their biology and control.