among nematode strains. Results indicate that as pecan weevil larvae age they may become more resistant to infection with entomopathogenic nematodes. Pecan weevil adults were found to be more susceptible to entomopathogenic nematodes than weevil larvae. 


Molecular methods for identification of nematode species has become an increasingly active area of research. Phytosanitary regulations for the import and export of commodities requires the identification of numerous nematode taxa. Genetic markers such as nuclear rDNA, and portions of the mtDNA genome, have been applied to many difficult diagnostic problems in Nematology. These studies demonstrate that molecular markers can separate morphologically indistinguishable nematode species. There is, however, a need to demonstrate that these methods are robust and applicable across the entire geographic range of the species. Morphological and molecular vouchers can be made available using digital images, and the Internet. Before regulatory agencies adopt these methods, there must be reasonable assurance that the assays will function with field collected specimens and that the nematodes were correctly identified. Furthermore, false positives must be avoided. Examples will include root-lesion, root-knot, cyst, and seed gall nematodes.

**Virulence mechanism of the rhabditid nematode Phasmarhabditis hermaphrodita and it associated bacterium Moraxella osloensis to the grey garden slug Deroceras reticulatum.** L. TAN and P. S. Grewal. Department of Entomology, The Ohio State University, OARDC, Wooster, OH 44691. Phytopathology 91:S143. Publication no. P-2001-0111-SON.

The rhabditid nematode, *Phasmarhabditis hermaphrodita,* has proven to be the most effective biocontrol agent for the grey garden slug *Deroceras reticulatum.* The nematodes invade *D. reticulatum* within 8-16 hr following external exposure, and the posterior mantle region containing shell cavity serves as the main portal of entry for the nematodes. We discovered that bacteria *Moraxella osloensis* associated with the nematodes were pathogenic to *D. reticulatum* if injected into the shell cavity or haemocoel of the slugs. Moreover, the bacteria from 60 hr culture were much more pathogenic than the bacteria from 24 hr culture as indicated by the highest and most consistent mortality of slugs. Axenic first-stage juveniles of *P. hermaphrodita* were not pathogenic to the slug but monoxenic culture of the same stage of nematodes did cause the death of the slug when injected into the shell cavity. Further work suggested that reduction and loss of pathogenicity of the aged dauer juveniles of *P. hermaphrodita* to *D. reticulatum* resulted from the loss of *M. osloensis* inside the nematodes. In conclusion, *P. hermaphrodita* acts only as a vector to transport its associated bacterium *M. osloensis* into the shell cavity of *D. reticulatum* and the bacterium appears to be the sole killing agent. The identification of the toxic metabolites produced by *M. osloensis* is being pursued.


Acid fuchsin and phloxine B are commonly used to stain nematodes in roots and egg masses on root surfaces, respectively. Both stains may be harmful to the user and environment, and require costly waste disposal procedures. We developed safer methods to replace both stains using McCormick Schilling red food color (RFC). *Staining nematodes in root tissues: Roots were cleared with NaOCl, stained with a 12.5% solution of McCormick Schilling red food color (RFC), and destained briefly in acidified glycerin. Eggs, juveniles, and adult nematodes stained with RFC were equally as visible as those stained with acid fuchsin. Staining egg masses on root surfaces: Egg masses of *Meloidogyne incognita* on root surfaces were stained with a 20% solution of RFC for 15 minutes and rinsed in tap H2O. Egg masses stained with RFC appeared as bright red spheres on the root surfaces that were highly visible even without magnification. Replacement of acid fuchsin and phloxine B with RFC for staining nematodes in root tissue and egg masses on root surfaces,