

“Maryland Dividends”

Maryland Agricultural Experiment Station
College of Agriculture & Natural Resources

Premiums returned on investments in research, education and outreach.

Evaluating Biocontrol Alternatives to Methyl Bromide for Management of Root-Knot Nematode SARE and Competitive Student Grant



For more information about this project please contact:

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For additional information about this topic, please visit
<http://www.mdipm.umd.edu>



Evaluating Biocontrol Alternatives:
Graduate Student Project.

Research Team:

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Region of Impact:

National

Program Description:

Root-knot nematodes (*Meloidogyne* spp.) are among the most widespread agricultural pests in the world. Root-knot nematode species have been associated with infection of all major crop plants as well as many other susceptible plants within agricultural and horticultural production. Root-knot nematode feeding results in galling (knots) of the plant roots. Depending upon the particular root-knot nematode species, the susceptibility of the host plant, and the numbers of infecting nematodes, a significant reduction of yield and quality that equates to considerable financial losses for the grower may result.

Until recently root-knot nematodes were primarily managed by a highly effective and diverse soil fumigant, methyl bromide. Although the number of crops benefiting from the application of methyl bromide exceeds 100, nearly 80% of preplant methyl bromide soil fumigation was applied to strawberries, tomatoes, ornamentals and nursery crops, and peppers, all profitable crops in Maryland. In 1991, the Montreal Protocol defined methyl bromide as a chemical that contributes to the depletion of the Earth's ozone layer. Accordingly, the production and importation of methyl bromide will be completely phased out by 2005 in developed countries and by 2015 in developing countries.

Project Classification:

1. Competitive Agricultural Systems in a Global Economy
4. Greater Harmony Between Agriculture and the Environment

Program Benefits:

Under natural conditions, plant-parasitic nematodes may be attacked by numerous and varied soil organisms, including fungi, bacteria, viruses, protozoans and other nematodes. This natural occurrence has led researchers to evaluate the possibilities for control that exist in nature. In recent years, it has been discovered that isolates of an ubiquitous, soil-dwelling fungal microorganism known as *Trichoderma virens* demonstrates antagonistic activity against egg hatch and the motility of the root-knot nematode species *Meloidogyne incognita* under laboratory conditions.

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**Evaluating Biocontrol Alternatives to Methyl Bromide for
Management of Root-Knot Nematode
(continued)**



Evaluating Biocontrol
Alternatives: Evaluation of
fungal biocontrol.

In this Maryland study, applications of an active population of *M. incognita* to plant root systems colonized with isolates of the fungus *Trichoderma virens* are being investigated. The root systems to serve as hosts for the fungus and the nematodes will be from tomato and pepper plants. These plants were chosen specifically for their production value in Maryland and for their dependence on methyl bromide as a management tactic for root-knot nematode. Results from this project could help to identify multiple *Trichoderma* strains as biocontrol agents capable of managing multiple crop production issues.