

Application of *Metarhizium anisopliae* against *Meloidogyne javanica* in Soil Amended with Oak Debris

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Abstract : Tomato (*Lycopersicon esculentum* Mill.) is one of the most popular, widely grown and the second most important vegetable crop, after potatoes. Nematodes have been identified as one of the major pests affecting tomato production throughout the world. The most destructive nematodes are the genus *Meloidogyne*. Most widespread and devastating species of this genus are *M. incognita*, *M. javanica*, and *M. arenaria*. These species can cause complete crop loss under adverse growing conditions. There are several potential methods for management of the root knot nematodes. Although the chemicals are widely used against the phytonematodes, because of hazardous effects of these compounds on non-target organisms and on the environment, there is a need to develop other control strategies. Nowadays, non-chemical measures are widely used to control the plant parasitic nematodes. Biocontrol of phytonematodes is an important method among environment-friendly measures of nematode management. There are some soil-inhabiting fungi that have biocontrol potential on phytonematodes, which can be used in nematode management program. The fungus *Metarhizium anisopliae*, originally is an entomopathogenic bioagent. Biocontrol potential of this fungus on some phytonematodes has been reported earlier. Recently, use of organic soil amendments as well as the use of bioagents is under special attention in sustainable agriculture. This research aimed to reduce the pesticide use in control of root-knot nematode, *Meloidogyne javanica* in tomato. The effects of *M. anisopliae* IMI 330189 and different levels of oak tree debris on *M. javanica* were determined. The combination effect of the fungus as well as the different rates of soil amendments was determined. Pots were filled with steam pasteurized soil mixture and the six leaf tomato seedlings were inoculated with 3000 second stage larvae of *M. javanica*/kg of soil. After eight weeks, plant growth parameters and nematode reproduction factors were compared. Based on the results of our experiment, combination of *M. anisopliae* IMI 330189 and oak debris caused more than 90% reduction in reproduction factor of nematode, at the rates of 100 and 150 g/kg soil ($P \leq 0.05$). As compared to control, the reduction in number of galls was 76%. It was 86% for nematode reproduction factor, showing the significance of combined effect of both tested agents. Our results showed that plant debris can increase the biological activity of the tested bioagent. It was also proved that there was no adverse effect of oak debris, which potentially has antimicrobial activity, on antagonistic power of applied bioagent.

Keywords : biological control, nematode management, organic soil, *Quercus branti*, root knot nematode, soil amendment

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