

Minor Research Project

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**Management of Ginger from root knot nematode infestation at
Kozhencherry, Pathanamthitta Dist.**

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SUMMARY

Ginger the rhizome of *Zingiberofficinale* Rosc. is a herbaceous perennial belonging to the family Zingiberaceae, grown in many countries of the tropics and subtropics. It is used widely in food (fresh and dry ginger), beverages, confectionery and medicines. India is the largest producer of dry ginger in the world contributing about 30% of the world's production. Scientific attempt has been made in Kerala to study the causes of ginger crop damage.

Field survey of the existing farms disclosed that the major cause of damage to the ginger crop is the attack of nematodes on the root and rhizome of the crop resulting in the complete decay of the plant. Detailed survey conducted in Pathanamthitta district of Kerala revealed that 15 plant parasitic nematodes were associated with ginger. The most important among them are *Meloidogyne incognita*, *Radopholus similis* and *Pratylenchus coffeae*.

Considering the economic importance of ginger, the nematodes of ginger have to be managed. Nematicides should be used with extreme care as ginger is

consumed raw. Hence, ecofriendly methods for controlling the nematodes have to be developed. A careful blend of bio-control agents may provide adequate management of the nematode problem on ginger. Bio-control agents are found to be the best system for nematode destruction without deleterious effects to the microenvironment. Hence an attempt was made to study the effect of the bio-control agents like *Pochonia chlamydosporia* and *Pasteuria penetrans* on root knot nematode. Present studies showed that application of bio-control agents are the effective treatment to reduce the impact of the nematodes.

Pathogenicity of root-knot nematode, *M. incognita* was studied on ginger under pot conditions in the greenhouse, St. Thomas college, Kozhencherry with different inoculum levels (10, 100 and 1000). The pathogenic effect of the nematode was highly significant at 5 per cent level as indicated by reduction in shoot length, shoot, root and rhizome weights of infested plants. In general, the data revealed that with increase in the levels of nematode inoculum there was a corresponding decrease in plant growth. Therefore root-knot nematode is highly pathogenic to ginger which can cause significant reduction in growth and yield.

Field experiments were conducted in two different sites Poovathoor and Elanthoor in Pathanamthitta district to study the effect of bio-control agents on root knot nematode *M. incognita* based on the yield of ginger rhizome.

The damage caused by the nematode *M. incognita* showed significant decrease in growth characters such as plant height, leaf area and fresh rhizome weight. *M. incognita* infested plants showed reduction in growth and yield of ginger. Bio-control agents like *P. chlamydosporia* and *P. penetrans* were applied to untreated ginger separately and in combination and the effect was analysed. The results

proved the potentiality of bio-control agents to promote the vegetative growth of ginger.

Growth characters such as plant height, leaf area, fresh and dry rhizome weight were found to be higher in bio-agents treated ginger. Fresh and dry rhizome weight was more in *P. chlamydosporia* treated plants than *P. penetrans* in both areas. This indicates the positive physiological impact of bio control agents in ginger plants.

In bio-control treated nematode infested plants, the gall index and the total nematode population of *M. incognita* were highly reduced. Of the two bio-agents applied individually on *M. incognita* infested ginger, *P. chlamydosporia* was found to be effective in bringing down the root-knot nematode population. *P. chlamydosporia* and *P. penetrans* combination showed maximum decrease in nematode population. The potentiality of *P. chlamydosporia* and *P. penetrans* as effective bio-control agents against *M. incognita* could be proved from the results derived.

The economic consequences of crop losses due to pest and diseases are to the farmer, producer, consumer and ultimately the state and country. Hence, before initiating any pest management studies it is highly important to understand the impact of these pests and diseases including nematode populations on crop yield. The study will also help in increasing the export earnings significantly and thereby contributing substantially to the Indian economy.