

Management of Root-knot nematode Infestation in Coconut Cropping System

Rajkumar, Surekha R., Sujithra M. and Pratibha V. H.

ICAR - Central Plantation Crops Research Institute, Kasaragod, Kerala

Introduction

Plant parasitic nematodes are obligate root parasites with well developed protrusible stylet (Fig.1) used for puncturing the plant tissues for food intake and toxin release. Among the plant parasitic nematodes reported, root knot nematode (*Meloidogyne* spp.) infests various intercrops including vegetables, spices, fruits, tuber crops etc grown in the interspaces of coconut (Fig.2). The estimated crop losses due to nematode infestation is up to 40 - 60 % especially in the coastal sandy soils in our country.



Fig.1. Second stage juvenile of *M. incognita* having well developed stylet at head region

Damage Symptoms

The characteristic symptoms of root knot nematode (RKN), *Meloidogyne incognita* infestation is galls or knots formed in the roots (Fig. 3 - 4) of infested plants. Under severe conditions, the affected plants show yellowing of leaves, wilting and stunted growth, inability to absorb and transport water and nutrients and reduced crop yield are prominently seen. Degree of root galling depends on the nematode population density in the soil and host plant species. The number of galls per plant increases with increase in density of nematode population in the rhizosphere. Nematode infestation becomes a pre disposing factor for the infestation of fungi, bacteria and viruses which in turn cause more severe damage than either of the pathogen alone and may even lead to death infected plants.



Fig.2. Brinjal and okra intercropped in coconut garden

Integrated nematode management (INM) strategies

Integrated nematode management (INM) is a strategy that integrates various methods of cultural, physical, mechanical, biological control and selection of nematicides as the last option. It is not only cost effective but also eco-friendly management practice. The following INM measures are suggested for affective management of *M. incognita* infestation in various intercrops grown in coconut gardens (Rajkumar et al., 2016).

1. Selection of nematode free (absence of root galls) healthy seedlings for transplanting.
2. Crop rotation with non host crops like sorghum, maize etc. (Fig.5) which suppress the nematode multiplication by sustained release of active ingredients from the root exudates
3. Selection of less susceptible inter crops such as nutmeg, cinnamon, cloves, colocassia and tapioca in coconut cropping system reduce the nematode population in gardens.
4. Monocropping on same field for long period should be avoided.

E mail: rajkumarcpci@gmail.com



Fig3. Amaranthus healthy & infested roots by *M incognita*



Fig 4 Infected okra roots covered by numerous knots caused by *M incognita*

5. Growing of antagonistic crops like marigold in alternate rows or in patches to reduce the nematode build up in soil (Fig. 6) as they produce a substance called alpha-terthienyl which inhibits the hatching of root knot nematode eggs.

6. Regular application of biological agents such as *Trichoderma*, VAM and *Paecilomyces lilacinus* reduces the nematodes infestation.

7. Sequential planting of sorghum followed by turmeric or ginger with 20% marigold (*Tagetes* sp.) suppresses the root knot nematode population in the interspaces of coconut garden.

8. Weed control in coconut garden reduces the nematode multiplication during off season as weeds acts as alternate host for *M. incognita* (Fig.7)

9. Application of *Trichoderma* enriched neem seed kernel powder @ 0.5 to 1 kg/plant during pre & post monsoon period in papaya, noni and black pepper in coconut system effectively reduce the nematode multiplication in soil.

10. In severe cases, soil drenching of nematicide, Carbosulfan (Marshal 25 EC) to the soil root zone @ 0.1%. (1 ml/liter of water) is recommended.



Fig 5. Sorghum- non host crop growing in coconut interspace



Fig 6. Marigold cultivation in interspaces of coconut

References

Rajkumar, H. P. Maheswarappa, P. Subramanian and R. Surekha 2016. Management of plant parasitic nematodes in coconut-based cropping system. National seminar on 'Plantation based cropping system for improving livelihood security' held at ICAR – CPCRI, Kasaragod during 22 - 23 July, 2016. pp 19 -20.