

drastically reduces the root-knot nematode population

- Infected corms can be disinfected of root-knot nematodes by paring the planting material followed by immersing it in hot water at 50-55°C for 30 minutes
- The biocontrol agent *Verticillium chlamydosporium* parasitized the egg of root-knot nematode and prevent the hatching significantly (Fig. 5).



Fig. 5

- The promising biological agents such as *Paecilomyces lilacinus*, *Trichoderma viride*, *Verticillium chlamydosporium*, VA mycorrhiza, *Glomus fasciculatum* and bacterium, *Pasteuria penetrans* are recommended to control nematodes on banana.
- Complete disinfection is achieved by double paring followed by a dip in monocrotophos solution at 0.5 % for 30 minutes and later dried under shade for 72 hours before planting.
- Application of carbofuran @ 20g/plant or Rugby @ 5g/ plant or Caldan @ 5g/

plant applied twice one at planting and second application after three months of planting is known to reduce the nematode population and increase the yield significantly.

- Application of neem cake @ 250g/ plant one at planting and second after four months helps in suppressing the nematode population.

Host reactions

- Cavendish cultivars like Robusta, Grandnaine, Poovan, Rasthali, Ney poovan, Red banana, Virupakshi and Nendran are susceptible. Varieties like Karpooravalli, Monthan Nattupooan, Kunnan, Pey kunnan, and Pidi Monthan exhibit field tolerance.

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Root-knot Nematode of Banana

Extension Folder # 6



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Root-knot nematode

Meloidogyne incognita (Kofoid and White, 1990) Chitwood, 1949

The root-knot nematodes attacking many crops in tropical countries are also found to attack banana and plantain roots wherever this crop is grown. Among the six identified species, *Meloidogyne incognita* and *M. javanica* are the most common and widely distributed in banana growing regions. The root-knot nematode, *M. incognita* is the predominant species and highly pathogenic to Poovan banana. The nematode causes nearly 31 per cent yield loss in Poovan banana in Tamil Nadu.

Distribution

The root-knot nematodes are often occur on many native diploid and triploid varieties grown as cooking and dessert bananas. *M. incognita* is known to have wide distribution in the states of Kerala, Karnataka, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Gujarat, Bihar and Assam whereas *M. javanica* is confined mainly to mid hills and some parts of cooler plains where the dessert bananas are grown.

Survival and spread

The nematode easily gets introduced into virgin land with banana soil and corms usually transported from nematodes infested fields.

Biology

The root-knot nematode is a sedentary endoparasite, which completes its life cycle

in 25-30 days. An adult female (Fig. 1a) lays about 200-300 eggs in the gelatinous matrix inside the root cortex close to the epidermis (Fig. 1b,c&d). The second stage larvae invade and feed on primary and secondary roots and feed and develop to maturity and reproduce.



Fig. 1a



Fig. 1b



Fig. 1c



Fig. 1d

Symptoms

The root-knot nematode infested plants are stunted in growth with pale yellow narrow leaves exhibiting bushy appearance. Under severe infection, leaf margin gets dried leading to splitting of dried portion. Such plants have delayed fruiting with reduced number of hands having small size fruits. The most obvious symptoms seen are the swollen root with galls on primary and secondary roots (Fig. 2a). The roots free from nematodes appear white in colour with out galls (Fig. 2b)



Fig. 2a



Fig. 2b

Profuse galling with egg masses are seen when the roots are cut longitudinally (Fig.3).

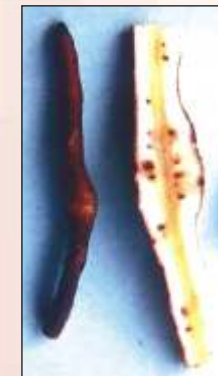


Fig. 3

Some times the root tips are invaded and there is little or no gall formation, but root tip growths ceases and new proliferate just above the infected tissues. Infected plants may have a much lower number of secondary and tertiary roots.

Interaction with other pathogens

The root-knot nematode in association with Panama disease fungus, *Fusarium oxysporum* f.sp. *ubens* can cause more than 50 percent yield loss in banana susceptible varieties.

Integrated Nematode management

- Growing antagonistic plants namely *Tagetes erecta*, *T. patula* and *Crotalaria juncea* as an intercrop in banana field