

## Major Nematode Pest of Fruit Crops and their Managements

Rohit Kumar and Deepak Kumar

Department of Nematology,  
CCS Haryana Agricultural University, Hisar

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### Introduction

Fruits are important component in nutritional diet of human being which contain the various essential nutrients, minerals, enzymes including potassium, dietary fiber, iron and folate (folic acid) etc. India is second largest producer of fruits in the world, accounting nearly 10% of total global production and is leading in production of several fruit crops like mango, banana, papaya, cashew-nuts and areca nut etc. Fruit crops are affected by a number of biotic and abiotic factors. Among biotic factors, plant-parasitic nematodes (PPNs) are very serious and economic pests. Overall, PPNs cause huge loss to fruit crops. Among PPNs, the four most prominent nematode genera associated are *Meloidogyne* spp., *Tylenchulus semipenetrans*, *Radopholus similis*, *Pratylenchus* spp. So, to reduce the losses caused by these PPNs, their management becomes an important aspect.

#### a) *Meloidogyne* spp.: (Root-knot nematode)

*Meloidogyne* spp. is most damaging and wide host range nematode genera. *Meloidogyne incognita*, *M. arenaria*, *M. javanica*, *M. hapla* are the major species of this genera. In the northern part of country, *M. enterolobii* also becoming the emerging problem in guava orchards. Second- stage juvenile (J2) is the only infective stage. This stage survives in soil for several days in normal condition and in adverse condition it converts into anhydrobiotic phase. The nematode takes 25-30 days to complete its life cycle at 25-30°C.

#### Symptoms :

- v Galls on roots and plants become stunted
- v Wilting occurs in hot weather and decline
- v Yellowing of foliage and undeveloped fruits

**Management:**

- v Deep summer ploughing in the month of summer (May-June)
- v Use of healthy and resistant planting materials for orchard establishment from reliable nurseries
- v Various botanicals such as neem cake, mahua cake, mustard cake etc. show nematotoxicity when applied in the field.

**b) *Tylenchulus semipenetrans*: (Citrus nematode)**

This nematode cause 'slow decline of citrus'/ 'citrus dieback' which results into heavy loss in citrus crops (family: Rutaceae). Some biotype attacks on olive, grapes, loquat etc. Second-stage juveniles (J2) cause infection to fine feeder roots of plants. Generally, nematode completes its life-cycle in 6-8 weeks.

**Symptoms:** Initially symptoms unnoticed by the farmer, 7-8 years old plant show symptoms

- v General reduction in tree growth and vigour
- v Yellowing and shedding of leaves
- v Dieback of twigs, reduction in number and size of fruit
- v Heavily infested roots are darker in colour with reduced branch rootlets

**Management:**

- v Raised nursery in nematode-free (fumigated) soil, or away from the established citrus orchard.
- v Intercropping with antagonistic crops like onion, garlic and marigold
- v Use of resistant rootstocks such as *Poncirus trifoliata*

**c) *Radopholus similis*: (Burrowing nematode)**

In India, *Radopholus similis* was first time recorded in 1966 which is also a serious pest of citrus. This nematode has wide host range, however serious problem on banana, coca, coconut, areca nut etc. It is the causal organism of 'blackhead toppling disease'/ 'banana rot disease' of banana. All life stages of this nematode are capable of infection, except males. The life-cycle completed in 4-5 weeks at 25-30°C and all stages are found inside the roots.

**Symptoms:**

- v Above ground symptoms; dwarfing, leaf chlorosis, thin pseudostem, small bunches and premature lodging of plants can be seen in infested plants.
- v Root symptoms appear in form of dark red lesions on cortical.
- v Heavily infected roots show numerously depressed and open lesions which cause the root to break.

#### **Management:**

- v Cultural methods include deep summer ploughing, organic manuring (well rotten), crop rotation with non-host and destruction of infected plant residues.
- v Use of nematode-free rhizomes for planting is very effective method of nematode control.
- v Application of carbofuran and phorate @ 2 g a.i./plant at planting time.
- v Rhizomes can be disinfected by following methods-
  - ü **Paring:** Removal of necrotic tissue along with some healthy plant part by sterilized knife
  - ü **Paring and pralinage:** Application of Bordex mixtue + DBCP paste on cut surface protect the rhizomes from secondary infection.
  - ü **Paring and hot water treatment:** Pared set can be given hot water treatment at 53-55°C for 20-25 minutes before planting.

#### **d) *Pratylenchus spp.*: (Root lesion nematode)**

This nematode is migratory endoparasitic in nature and having all life stages infective. Life-cycle is completed in about 27 days at 26-32<sup>0</sup>C in the banana crop.

#### **Symptoms:**

- v Chlorotic, stunted growth, and die-back
- v Necrotic lesions and girdling of root

#### **Management:**

- v Nursery should be raised in nematode free soil
- v The nematicides apply for other nematodes also effective for this nematode.

#### **Recommendation by CCSHAU, Hisar**

Ø **Grapes:** For *Meloidogyne sp.*

v Application of Carbofuran 3G@ 13g/sq.m. (about 9 sq.m. around plant) just before flowering, pulverize the soil in the basin area and mix the chemical thoroughly followed by irrigation.

v Application of Carbofuran 3G@ 7g/ sq. m in combination with garlic as intercrop in between vine row.

Ø **Citrus : For *Tylenchulus semipenetrans***

v Application of Carbofuran 3G@ 13g/sq.m .(about 9 sq.m. around plant) just before flowering, pulverize the soil in the basin area and mix the chemical thoroughly followed by irrigation.

v Application of Carbofuran 3G@ 7g/ sq. m +1 kg neem cake.(about 9 sq.m. around plant) just before flowering, pulverize the soil in the basin area and mix the chemical thoroughly followed by irrigation.