NEMATODE PESTS OF COTTON

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Introduction

A large number of insects and diseases attack cotton throughout the world. Out of several pathogens responsible for diseases in cotton, plant parasitic nematodes are unique. They attack plant roots, survive in the soil and cause recurring losses year after year. Nematodes are minute, microscopic organisms. Their size range from 0.3 – 3 mm in length. Most of the plant parasitic nematodes are present in the soil and feed on roots.

Nematodes of cotton

Though several species of plant parasitic nematodes are associated with cotton, two nematode species *viz.,* root-knot nematode, *Meloidogyne incognita* and reniform nematode, *Rotylenchulus reniformis* are known to attack cotton in India. These two nematodes are known to cause economic losses to farmers and they are also involved in disease complex involving fungi. Presence of nematode also increases the incidence of wilt symptom in cotton. Root injury caused by plant parasitic nematodes acts as an entry point for the fungi to invade easily and cause disease symptom. In some cases, they are known to break the resistance in resistant varieties. Cotton has got a long tap root which may reach up to one metre depth. So any damage to this tap root can severely restrict the uptake of water and nutrients leading to loss of vigor. Because of this the nematodes produce yellowing and wilting symptom which are often confused as nutrient or water deficiency symptoms.

Root knot nematode, *Meloidogyne incognita*

They are widely distributed in cotton growing areas of India where soils are coarsely textured. They are reported to infect large number of crops which include vegetables, fruit crops, etc.

Symptoms

- General symptoms of root knot damage is stunting of plants
- Fields infested with root knot nematode show patches or spots in the field where plant size is reduced.
- Severely damaged cotton plants often show nutrient deficiency symptom which can complicate the diagnosis.
- Symptoms are clear in roots. The nematode infection produces galls on tap as well as lateral roots.
- High population density of the nematode at sowing can kill the plants at seedling stage itself. Mature plants exhibit temporary wilting in afternoon.

Life cycle

Generally, life cycle of *M. incognita* in cotton lasts for 33-38 days and 32 days on *Gossypium barbadense* and *G. hirsutum*, respectively. Each female lays about 300-400 eggs.

Reniform nematode, *Rotylenchulus reniformis*

Reniform nematode is widely distributed in all cotton grown regions of India. Unlike root knot nematode, they are mostly present in fine textured soils with relatively high content of silt or clay. They are uniformly distributed in field.

Symptoms

- Symptoms of reniform nematode infection include dwarfing, chlorosis, premature decay and loss of secondary roots and plant mortality.
- When infested roots were seen under microscope, they show several semi endoparasitic kidney shaped female nematodes with egg masses.
- *R. reniformis* infested roots show brownish discolouration especially at the point of infection. These roots were thin and dried with brown lesions at the point of infection.
- Affected plants show smaller and lesser bolls.
- An easy method of identifying *R. reniformis* infection in cotton roots is to dip the roots in water to which few drops of fountain pen ink were added. The egg masses and nematodes are stained blue in colour

Life cycle:

R. reniformis completes one generation in 27-29 days. Each female lays about 150 – 200 eggs. Juveniles can survive for several months in host free soil.

Management:

Management of nematodes in cotton in India depends on the following methods.

1. Chemical control:

Application of carbofuran 1 Kg ai/ha gave good control of *M. incognita* under field condition. .

2. Cultural control:

Crop destruction and weed management.

- Nematodes present in cotton roots can multiply well and survive for long time even after harvest. Therefore, there is an increase in nematode inoculum for next season. Hence the plants are to be uprooted immediately after harvest.
- Since most of the weeds present in cotton fields are reported as alternate hosts for root knot and reniform nematodes, proper weed management is essential to reduce the nematode multiplication.

Crop rotation:

Cop rotation with non host crops like sorghum, maize and other millets was found to be useful in reducing nematode population below economic threshold level..

3. Biological control:

Seed treatment @ 20g/kg of seed + soil application @ 2.5kg/ha of *Pseudomonas fluorescens* reduced nematode population.