

NEMATODES: THE NOTORIOUS PEST OF PROTECTED CULTIVATION

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In present scenario, nematodes are flammable problem in protected cultivation all over India. Reasons behind this problem are improper site selection, lack of knowledge, lack of trained human resources, unavailability of resistant varieties; planting material; healthy nursery; effective chemicals; bio-agents, poor sanitation and hygiene.

WHY NEMATODE POPULATION EXPLOSION IN POLYHOUSES?

Nematodes basically require three essential conditions for survival and multiplication

1. Moisture:

Optimum moisture is available round the year through drip irrigation around the root zone.

2. Temperature:

Nematode required optimum 25-35° C temperature for multiplication and they can reproduce from 15-45° C. this temperature always found in polyhouses.

3. Susceptible Host:

Continuous and intense cropping pattern in polyhouses ensure uninterrupted availability of food for nematodes.

MAJOR NEMATODE PROBLEMS OF PROTECTED CULTIVATION

1. Root-Knot Nematode (*Meloidogyne spp.*): Most commonly two species *M. incognita* and *M. javanica* are attacks on polyhouse growing crops. Galls or knot on the roots of host plant are confirmatory symptom of this nematode.

2. Reniform Nematode (*Rotylenchulus reniformis*): the incidence of this nematode often goes unnoticed due to clear symptoms on shoot as well as root. The root shows malformation and necrosis. This nematode is potentially equal damage as root-knot nematode.



NEMATODE MANAGEMENT IN PROTECTED CULTIVATION

1. Nematode free site for construction of new polyhouse:

Fields have long history of growing vegetable crops should completely avoided. Soil samples should collect from proposed site of polyhouse and tested for nematode infestation from a designate laboratory, it is strongly recommended.

2. Nematode free planting material:

The nursery should be raised in soil less media in pro-trays. For preparation of soil less media 2 part cocopeat, 1 part vermiculite and 1 part perlite are used. This media do not have any nutrient so water soluble fertilizers should be used for nutrition.

3. General sanitation in and around Polyhouse:

General sanitation in and around polyhouse should be maintain because of weed in and around polyhouse, provides safe haven for nematode survival during off season.

4. Monitoring of Nematode Population in existing polyhouse:

It is always advisable to tested soil for nematode population before planting of crop. Based on soil testing precautionary measures will taken before planting/sowing.

5. Removal of roots from previous crop:

Nematode infested crop roots have large number of nematode eggs. Therefore, it is strongly recommended that the roots of previous crop should be removed as much as possible. Such roots dried and burnt at a safe distance from polyhouse. This single tactic can remove nematode population drastically from soil.

6. Fumigation before sowing or transplanting:

Soil fumigated with formalin should be done before every sowing/transplanting. This practice can decrease nematode population effectively. But some safety measures should be taken because formalin is health hazardous for human.

7. Soil solarization:

In peak summer (May-June) the soil surface should be covered with 25µm thin transparent polythene sheet. The edges should be overlapped and sealed properly. All side curtains should be dropping for proper sealing of whole polyhouse. This process has 2-3 weeks. In this period should not open polyhouse. Soil solarization is very effective if it done properly, there may not be any necessity of using chemical nematicides.

8. Organic amendment with bio-agents:

Bio-agent i.e. *Trichoderma viride*, *T. harzianum*, *Purpureocillium lilacinum*, *Pochonia chlamydosporia* and *Pseudomonas fluorescens* at 2 Kg mix in per ton of FYM and covered it by gunny bags and watering it properly to maintain moisture. Keep it for 3-4 weeks and after that mix it properly in the top soil of beds. This treatment reduced nematode population significantly.

9. Crop rotation:

Most of polyhouse growers grow cucumber continuously due to its shorter life and assured price. However, continuously growing of cucumber in same field increase nematode population faster and cause crop failure. Cucumber and tomato are highly susceptible to root-knot nematode. Capsicum comparatively less susceptible to root-knot nematode and can be use in crop rotation.

10. Chemical Nematicides:

Carbofuran @ 2Kg a.i./ha applied in the soil at the time of transplanting/sowing.

OTHER MANAGEMENT PRACTICES:

1. Soil less cultivation:

Soil less cultivation is a process of growing plant without soil. In case of very serious nematode problem or for the production of very high value sensitive crops or for the areas with extremely harsh climates, soil less production of crops is highly advisable.

i. Solid substrate media:

Different media all without soil are used e.g. cocopeat.

ii. Hydroponics:

In this system, plants are growing in water soluble nutrient media.

iii. Aeroponics:

In this system, plant roots are suspended in controlled condition chambers and supplied soluble nutrient media through sprays, automization etc.

2. Grafting:

This is new concept of nematode management. Grafting is a type of plant propagation in which the below ground portion of the plant i.e. 'root stock' is chosen for its ability to resist or tolerate nematode diseases and the above ground portion of the plant i.e. 'scion' is taken on the basis of fruiting quality.

