Plant parasitic nematodes

The numerous species of plant parasitic nematodes are basically devided into two broad categories namely the ectoparasitic nematodes that live in soils but feed on the outside of root cells and the endoparasitic nematodes that penetrate the outer cells and feed within the roots. Most damaging nematodes species belongs to five nematode genera.

i. Trichodorus nematodes - feed on root tips.
ii. Hoplolaimus nematodes - Block nutrients and water up take
iii. Heterodera or cyst forming nematodes.
iv. Pratyleuchus nematodes - feed and reproduce within roots.

Visual symptoms of nematode attack

i. Root knot and root galls.
ii Root lesions :
iii. Excessive root branching.
iv. Root and bulb rot.
v. Injured root tip.
vi. Seed galls.
vii. Discolouration necrosis blotches spots on foliage etc. ..

Some crops may not show visible signs of nematode damage due to the tolerance of the plant. Weather also may prevent symptoms from developing. But a yield loss may still occur.

Control of Nematodes

Principles of nematode control can be mainly categorized into two groups namely chemical and non-chemical control.

I. Chemical control includes the use of nematicides to bring down the nematodes population. There are fumigant nematicide as well as non fumigant nematicides. These include D.D. mixture, methyle bromide, oximal carbofuran aldicarb etc.

II. Non chemical control - Since the use of chemical control is expensive, additional information is needed before proper use can be made of chemicals.

Therefore, emphasis should be given to non chemical control measures. Some of these are mentioned below:-

(a) Crop rotation with non host plants

Since most widely spread and pathogenic species of nematodes are polyphagous. It is very difficult to design rotation schemes which are effective in controlling nematodes economically. To control some root knot nematodes susceptible crops should be spaced at intervals of 3, 4 or even 5 years. Further research should be carried out in this regard.

(b) Plough the soil deeply when hot weather is prevailing.

(c) Sanitary practices as cleaning of farm machinery , use of clean planting materials, weed control etc.

(d) Removal of infested plants

It is important to reduce sources of inoculum by eliminating the residues of previous susceptible crops and any weed that may be a host for nematodes.

(e) Management of soil microbiota

Stimulate predators and parasites of nematodes and also increase tolerance or resistance in plants. This includes use of organic amendments to the soil.

(f) Growing enemy plants and trap crops.

(g) Flooding the fields including wet rice cultivation.

(h) Use of resistant varieties.

Integrated Nematode Management:

An integrated nematode management, systems approach to reduce nematode damage to tolerable levels through a variety of techniques including predators and parasites, genetically resistant hosts, environmental modifications and when necessary an appropriate chemical pesticides, may be the best way to handle the nematode problem.

The procedures available for integrated nematode management systems design and implementation are based on the principles of exclusion, population reduction and tolerance.

1. Exclusion

Crop losses caused by plant parasitic nematodes can be avoided through preventing the introduction of specific nematodes or nematode problems into areas where the species of concern do not exist. Dissemination is commonly associated with movement of soil, plant tissues, machinery, containers organic manures, animals, water and wind. Exclusion procedure should be used as a first order defence to prevent dissemination and establishment.

Exclusion procedures include sanitation, certified plant materials, nematode free soil or planting media, population reduction or eradication procedures, agricultural production, systems design manipulations and regulatory activities. Exclusion can be implemented on a field, farm, enterprise, district, regional, national or international basis.

2. Population Reduction

Eliminating established nematode populations is not feasible in most agricultural production systems. Hence established populations are managed through population reduction, cultural, physical, biological and chemical procedures are available.

3. Tolerance

Procedures that protect or increase plant tolerance have excellent potential for integrated nematode management. These include cultural manipulation, chemical application, microbial colonization and resistant cultivars. Detrimental influences of nematodes can be reduced by optimization of moisture and nutrient availability and protection from physical and biological stress such as cold, insects and disease. Systemic nematicides applied to foliage, propagative structures or soil protection through nemastasis.

MORE LIGHT - MORE MILK

For some time it has been accepted that extra daylight increases egg production. Now it seems that the principle holds true for cattle and pigs.

At the University of Maryland, for instance, researchers have found that if Holstein cows are exposed to 16 h ours of light during dark winter months they produce 7-10% more milk than cows kept under natural conditions.

Similar results have been obtained at the Frederictor Research Station, where cattle kept under artificial daylight for 16 hours gained 0.16 kg more a day than cows kept in natural conditions.

Trials with pigs at the University of Guelp reveal the same picture. Gilts given 18 hours of light per day matured 40 days sooner than those kept under natural light conditions. Nursing sows and dry sows performed better with 14 to 16 hours of light per day.