

Management of *Phytophthora* foot rot and slow decline disease on black pepper

By

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The crop loss due to *Phytophthora* foot rot and slow decline disease during the last few years is alarming both in Kerala and also in Karnataka. The disease appraisal study carried out by UPASI recently confirmed the seriousness of the problem not only in pure crop system, but also in coffee—pepper mixed cropping system. As per the evaluation report it was clear that both foliar as well as root infections are noticed in many plantations. Lack of timely plant protection measures, neglect of important cultural practices and lack of awareness about integrated approach of disease management have been identified as major constraints. Besides, non-availability of disease free planting materials adds to the problems. In view of this, the planters have to adopt the following disease management practices.

Phytophthora foot rot is caused by *P. capsici* a soil borne fungal pathogen. The fungus infects almost all parts of the black pepper depending upon the microclimate prevailing in an area and also cropping system. The disease is monsoon bound and foliar infection is noticed during June-August period whereas root infection continues up to November depending upon the soil moisture status. The disease has got two phases namely, foliar phase and soil phase. Foliar infection causes severe defoliation and death of some of the aerial branches. This results in the loss of canopy. Root infections start on the feeder

roots and gradually spread to the major roots. The root infection in advanced stages culminates in foot rot. However, direct foot rot also could occur through runner shoots. In the case of foliar infection the disease starts from the base of the vine and progresses upwards of the bush through rain splashes. Root infection spreads through root contact as well as through soil water.

Timely disease management practices are important to realise optimum results.

CULTURAL PRACTICES

Phytosanitation is a must to check this disease. It is absolutely necessary to remove all the infected vines along with

the root system and burn to reduce inoculum build up in the soil. After removal of the vine, spots should be drenched with five litres of copper oxychloride (0.2 per cent). This will further help to reduce the inoculum. Replanting can be taken up only after one year.

NURSERY STOCK

Use of disease free planting material is a must to ensure longevity and productivity of the vines. It is advisable to go in for a mixture of cultivars rather than adopting a monoculture of any single variety. At present about eight varieties have been released both from the National Research Centre for Spices and Kerala Agricultural University. Planters can take advantage of this and obtain nucleus

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planting material from these institutions for further multiplication. Introduction of large scale contaminated planting material should be avoided.

It is essential to provide good drainage and also to maintain grass or green cover to reduce the soil splashes during rainy season. Runner shoots be pruned or tied back to the main vine. The base of vine should not be disturbed during farm operations and minimum tillage concept is a must. The movement of workers from diseased to healthy gardens and also the use of the same farm implements used in diseased gardens again in the healthy gardens should be avoided. The farm implements can be disinfected by washing in hot water or in 1 per cent formalin.

CHEMICAL CONTROL

Pre-monsoon and post-monsoon spraying the foliage with 1 per cent Bordeaux mixture and drenching the soil with 2 per cent copper oxychloride @ 5 litres/vine is recommended. What is more important is the correct schedule of operation. For foliar spray it is necessary to time the spray to coincide with maximum foliage emergence, preferably atleast after 3-4 good showers. The time depends upon the first few monsoon showers. Bordeaux mixture as well as copper oxychloride being

contact fungicides, are prone for leaching during heavy rains. It is suggested to alternate one round of Bordeaux mixture treatment with any of the systemic fungicides available in the market viz., Ridomil MZ72 WP (1.25 gms/lit.) or Akomin-20 (4 ml/lit). Neem cake can be applied at the rate of 1 kg/vine during June-July period. This would ensure build up of microbial population antagonistic to *P. capsici* and also suppresses nematodes. However, it should be ensured that the oil cake contains atleast 3-4 per cent of oil.

SLOW DECLINE DISEASE

Plant parasitic nematodes namely, *Radopholus similis* and *Meloidogyne incognita* are mainly involved in this; the infected roots causing various degrees of root degeneration. The root rot will impede absorption and transportation of water and mineral salts and hence starvation symptoms set in. Root infections due to both *Phytophthora* and plant parasitic nematodes will result in gradual decline of the vigour and productivity of the vine. Both these components cannot be segregated under field condition. Hence to boost up the health and productivity of the vines it is necessary to check these causative agents. However, it is pertinent to get the areas examined for nematode infesta-

tion. Only if their population is considerable there is a necessity to go for application of nematicides.

To check plant pathogenic nematodes it is necessary to fork in 30 g of phorate into the base of the vine both in pre-monsoon and also as post-monsoon treatment. It should be ensured that sufficient soil moisture is present at the time of application.

BIOCONTROL

Mixing up of nursery soil with VAM (Vesicular arbuscular mycorrhiza) propagules would ensure their colonisation on pepper roots. This would suppress the root infection by all the above three pathogens and boosts up the growth of the vine. In addition, organisms like *Trichoderma harzianum*, *T. hamatum* and *Gliocladium virens* have been found to be effective in suppressing *P. capsici*. National Research Centre for Spices can be help the plantations in adoption of these programmes.

Thus, the disease management involves the cultural practices, chemical control and biocontrol measures and also uses host resistance. Chemical control will be effective only when cultural practices are strictly adhered to and the importance of cultural practices to get maximum benefit in the disease management programme is recognised.