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# Root Rot – Killer Disease of Mulberry

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**Abstract**

Mulberry (*Morus* spp.) is an important perennial plant which is the main food source of silkworm, *Bombyx mori* L. The quality of mulberry leaf has direct impact on cocoon crop production. Therefore, healthy host plants are the considered to be the foundation for the development of the silk industry. However, the plant is prone to various diseases and pests and different pathogens like fungi, bacteria, viruses and nematode cause diseases in mulberry. Root rot disease of mulberry is one of the important fungal diseases of mulberry. To manage this disease, a number of management strategies are followed of which integrated disease management is considered to be best.

**Keywords:** Mulberry, disease, root, rot, management.

## Introduction

Root rot disease is perhaps the only killer disease known because of its epidemic nature and potentiality to completely kill the plants. In India, earlier it has been reported that violet and white root rots damage mulberry but surveys conducted during 90s indicate that the disease is actually caused by *Fusarium solani* and *Fusarium oxysporum* and it exists as dry root rot. Root rot caused by soil borne fungi like *Fusarium oxysporum* is more alarming due to the ability to thrive well in soil and fast spread of disease once occurred besides absence of disease resistant varieties and inadequate control measures against this disease (Vineet *et. al.*, 1998).

**Casual Organism:-** *Fusarium oxysporum*

**Systematic Position**

| | | |
|---|---|---|
| Kingdom | : | Fungi |
| Phylum | : | Ascomycota |
| Class | : | Sordariomycetes |
| Order | : | Hypocreales |

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| | | |
|---|---|---|
| Family | : | Nectriaceae |
| Genus | : | *Fusarium* |
| Species | : | *oxysporum* |

**Diseased mulberry plant**

**Root rot sample**

**Damage**

The first above ground symptoms appear as sudden withering and defoliation of leaves followed by death of affected plants. The underground symptoms include decaying of root and decayed roots become black due to black powdery mass below the bark. Later, the tissues below the bark *i.e.*, cortex of primary and secondary roots and conducting tissues turn gummy and paste-like. On severity, the entire root system gets decayed and the plant dies. Affected plants after pruning either fail to sprout or the sprout one bear small and pale leaves with rough surface. The severely affected plants loose the hold in the soil and can be uprooted easily without much force.

**Management**

- **Cultural Method**
  - i. The land should be deep ploughed and the soil should be exposed to sunlight to kill the pathogens in soil.
  - ii. Dead plants should be uprooted and burnt immediately.
- **Chemical Method**
  - **i.** Root dipping of saplings of 0.1% Bavistin solution for half an hour and planting in pits pre dusted with 10 g of Diathene M-45.
- **Integrated disease management**

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i. Beevi and Qadri, (2010) reported a combination of Trichoderma harzianum + T.viride + FYM (1:1:50) + Effective microorganisms (EM) as soil application at an interval of 30 days for three times effective bringing down the disease incidence and further spread. The treatment was more effective, when the application of biocontrol agents were taken up at the initial stages of infection.

ii. Yadav *et. al.,* (2011) investigated on mulberry root rot disease, identification of QTLS conferring resistance and trait introgression. Three fungal isolates, *Fusarium solani*, *F. oxysporum* and *Botryodiplodia theobromae* were found to be opportunistic causing secondary infection on mulberry roots. The fungal isolate *R. bataticola* caused severe infection in mulberry (76.9%) on pathogenicity trial and was identified as the actual pathogen causing the root rot disease in mulberry in India. Further, soil temperature >25ºC, poor organic carbon < 0.3 per cent, soil moisture < 30 per cent and sandy soil enhance the disease severity. In order to control the root rot disease, a new formulation 'Navinya' has been developed composed of plant derivatives (80%), chemical compounds comprising organic (8%) and inorganic (12%) and field trials were conducted. The field study revealed that disease suppression > 90 per cent was achieved within 30 days by applying Navinya.

iii. Manmohan and Govindaiah (2012) screened twenty locally available botanicals against *Fusarium oxysporium* causing root rot disease in mulberry in laboratory conditions. The aqueous extracts of plant materials were prepared to test their efficacy against *Fusarium oxysporium* by spore germination method and Poison food technique. All the aqueous plant extracts showed inhibition in spore germination and mycelia growth in varying degrees excluding *Aetocarpus heterophyllus* (it enhances the growth of pathogen). *Psidium guajava* has recorded maximum inhibition in both spore germination and in mycelia growth with 96.3 percent and 86. 5 per cent respectively. Followed by *Lawsonia inermis* with 95. 7 and 85.1 per cent in spore germination and mycelia growth respectively, where as *Azadiracta indica* showed 90.7 per cent inhibition in spore germination and 67. 7 per cent in mycelia growth. *Pogamia pinata* showed 81.1 per cent spore germination and 63. 4 per cent mycelia growth inhibition followed by *Calotropis*

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*procera* with 61.1 per cent inhibition in spore germination and 67.3 per cent in mycelia growth.

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