

NURSERY DISEASES AND THEIR MANAGEMENT

[Article ID: SIMM0219]

Ravi Pujari

Assistant Professor of Horticulture, College of Agriculture, Bheemarayanagudi

B.S. reddy

Associate Professor & Head ZARS Kalaburagi

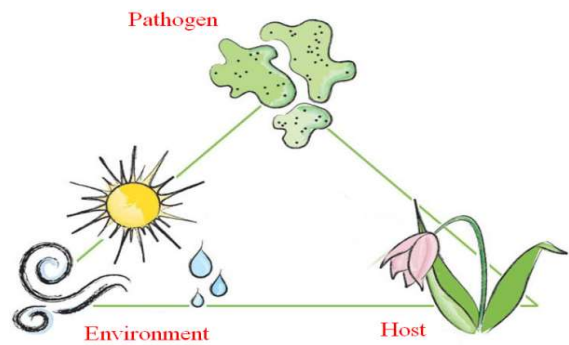
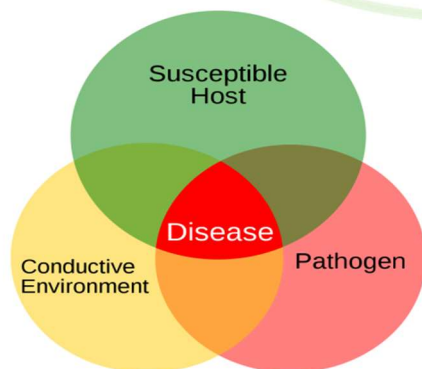
P. Palaiah

Assistant Professor of Plant Pathology, College of Agriculture, Bheemarayanagudi



INTRODUCTION

- Disease is a disorder of structure or function in a human, animal, or plant, especially one that produces specific symptoms or that affects a specific location and is not simply a direct result of physical injury
- A plant disease is defined as “anything that prevents a plant from performing to its maximum potential.” This definition is broad and includes abiotic and biotic plant diseases.



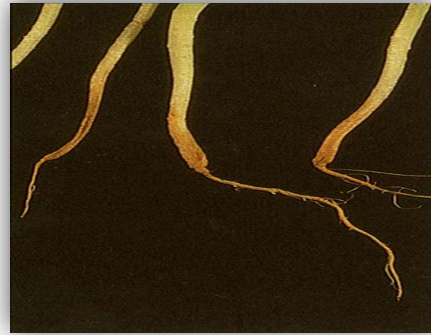
Disease triangle

Sources of Plant Disease in Nurseries

1. **INFECTED SOIL:** Many plant pathogens can be found in soil. Fungi such as *Cylindrocladium*, *Pythium*, *Phytophthora*, *Fusarium*, *Rhizoctonia*, and *Thielaviopsis*, crown gall bacteria (*Agrobacterium*) and most nematodes reside in the soil.
2. **PLANT DEBRIS:** Most plant pathogens have a stage in their life histories that can rest in a dormant state and survive periods of time when temperatures are extreme or moisture is not sufficient for growth. A disease may recur if infested debris is left in the nursery where it may come in contact with the crop.
3. **PLANTS:** Some pathogens must have living plant tissues in order to grow, reproduce, and survive. Most viruses like tomato spotted wilt and cucumber mosaic only survive in living plant cells. Rusts, such as pine gall rust and cedar-quince rust, must pass from living plants to other living plants or they die. Thus, plants in and around the nursery act as reservoirs of pathogens and should be under strict disease control.
4. **WATER:** *Phytophthora* and *Pythium*, which can cause damping-off, root and stem rots, cutting rots, and top diebacks

are probably the main pathogens that can be spread in the nursery in water.

5. AIR: The spores of powdery mildew fungi, rust fungi, and others can be carried by air currents for long distances outdoors. Infected plants in nearby gardens and forests can supply enormous numbers of spores. Thus, even if great care is taken to eliminate other sources of pathogens, the air we breathe may carry certain disease-causing organisms into the nursery.



Disease

DISEASES

1. Damping Off

- ❖ Seeds may be infected as soon as moisture penetrates the seed coat or a bit later as the radicle begins to extend, all of which rot immediately under the soil surface (pre-emergence damping-off).
- ❖ Cotyledons may break the soil surface only to wither and die or healthy looking seedlings may suddenly fall over (post-emergence damping-off).
- ❖ Infection results in lesions at or below the soil line. The seedling will discolor or wilt suddenly, or simply collapse and die.
- ❖ The fungi most often causing this disease belong to the genus *Pythium*, *Fusarium* and *Rhizoctonia* species can also cause damping-off.



Management

- Use disease free seeds and plants
- Use sterile medias
- Use plant containers with drainage holes to and avoid excess watering
- Soil treatment with formaldehyde and solarization to kill pathogens
- Avoid spreading soil from infested areas or tools which have been used out of doors
- Rotate plantings on a 2-to-3-year schedule using plants from different families in order to starve out existing pathogens.
- Seed treatment with captan 3g/kg of seeds is proven to be better
- Drenching with COC 2 g/ltr

2. Crown Gall

- Crown gall occurs on a wide range of herbaceous and woody plant species including pome and stone fruit trees.
- The disease occurs worldwide and is **especially troublesome in nurseries.**
- Losses in orchards are sporadic. The disease is caused by the bacterium *Agrobacterium tumefaciens*.

Symptoms

- The formation of galls on roots and crowns of plants are characteristic of crown gall.

- Small galls are initially smooth on the surface. As they enlarge they become dark, hard, woody tumors with irregular surfaces.
- Gall shapes and sizes vary.
- The same root or crown may contain numerous galls.
- Secondary fungi and insects are attracted to galls as they age.



Disease Management

- Good sanitation and cultural practices
- Planting disease-free nursery stock is essential to avoid the introduction of this disease.
- Avoid rootstocks that are susceptible.
- Adopt management practices that minimize wounding.
- Plant trees in well-drained soils.
- In recent years, the use of a bacterial antagonist has been shown to be very effective in preventing crown gall on all tree fruit species, except apple.
- Drench with streptomycin sulphate 0.5 mg/ltr is proven to be effective

3. Root Rots

Symptoms

- Leaves yellow and fall.
- Margins of leaves die.
- Roots appear dark brown or black and few or no white roots or root tips can be found when the root ball is washed free of soil.
- Roots are and not brittle and crisp as is found in healthy plants of all types.

- When plants are pulled from the potting mix, the outer layer of cells strips off the roots leaving only the central strand of water conducting tissue.
- Finally root rots and dies off



Management

- Use of fungicides i.e soil drenching with COC, Carbendazim
- Avoid Over-fertilization.
- Avoid too much of water.
- Root exposure to chilling or freezing temperatures should be avoided.
- Phytotoxicity due to the mishandling of pesticides when used as soil drenches.

4. *Cylindrocladium* rot

- *Cylindrocladium* sp is involved, damping-off, wilt, root rot, stem canker and crown rot
- Outer root tissues die and root vascular tissue is discolored.
- Discoloration of vascular tissue may extend 2.5 cm (1 in) above soil line.
- Root rot results in wilting of plants.
- Leaves turn brown and black and then fall.
- Cuttings may rot at base but roots develop above the rot.
- The plants often die after potting.

Management

- Plant *Cylindrocladium*-free seedlings
- Pot in sterile mix

- Propagate from only healthy stock plants since the disease spreads rapidly in most propagation beds
- Rogue out and destroy infected plants
- Rake and destroy fallen leaves
- Apply thiophanate methyl, chlorothalonil, mancozeb, COC, or triflumizole to protect healthy plants
- Avoid overhead watering

5. *Phytophthora* Root Rot

- *Phytophthora* root rot is now regarded as a major cause of plantings in nursery
- Wet potting mixture favor the development of the disease

Symptoms

- Stunting of foliage and root systems
- Blackened areas on roots
- Yellowing of leaves between the veins or along the margins
- Dieback



Management

- Use only clean planting stock.
- Good soil drainage and proper variety selection are necessary for controlling *Phytophthora* root rot.
- Steam soil and peat moss should be used. Heat it to 180°F and hold it at that temperature for 30 minutes.
- Spraying Bordeaux mixture 1% and drenching with copper oxychloride 0.2 % at monthly intervals prevents the disease.

- Biocontrol agents such as VAM @ 100 cc/kg of mixture

6. Anthracnose

Symptoms: The fungus infects the leaves causing yellowish brown to dark brown irregular leaf spots with a chlorotic halo. In severe cases leaves wilts and dries off.

Management: Spraying Bordeaux mixture 1% alternating with carbendazim 0.1% is effective against the disease.

7. Basal wilt

Symptoms

- Grayish lesions appear on stems and leaves.
- On the leaves white mycelium are seen at the advancing edges of the lesions.
- The mycelial threads later girdle the stem resulting in drooping of leaves beyond the point of infection and in advanced stages the rooted cuttings wilts and dries up.

Management

- The disease can be controlled, if noticed early, by adopting phytosanitary measures.
- The affected cuttings along with defoliated leaves should be removed and destroyed.
- Later all the cuttings should be drenched and sprayed with carbendazim 0.2% or Bordeaux mixture 1%.

8. Nematode infestation in the nursery

- Root-knot nematodes (*Meloidogyne* spp.) and the burrowing nematode, *Radopholus similis* are the two important nematode species infesting rooted cuttings in the nursery.



U.S. Department of Agriculture/National Agricultural Statistics Service. 2011. Agricultural chemical use: Nursery and floriculture crops 2009.

Photoreference:

<http://www.tomatodirt.com/damping-off.html>
ed April 28, 2021.

Symptoms

- The damage caused to roots by nematode infestations result in poor growth, foliar yellowing and sometimes interveinal chlorosis of leaves.
- The establishment of nematode infected cuttings will be poor when planted in the field and such cuttings develop slow decline and later die.

Management

- Use fumigated nursery mixture for raising nematode-free rooted cuttings
- Fumigation with methyl bromide @ 500 g/100 cft soil or drench the soil with formalin 2% under polythene cover for 48 hours.
- This soil mixture can be used for planting 2-3 weeks after fumigation.
- Soil application of phorate 10 G and or carbofuran 3G

REFERENCES:

Agrios GN (1997) Plant Pathology. 4th edition. Academic Press Ltd., San Diego, California

Singh, D. 2007. Role of fungicides and biocontrol agents in the management of *Fusarium*

wilt of chilli. *J. Mycol. Pl. Pathol.* **37**: 361-62.