

Lecturer Note

On

FOREST PATHOLOGY: Disease of Forest Trees

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DISEASE OF TREES

A disease has been referred to as an abnormal state of an individual be it an animal or a plant. It is a continuous process, and not a temporary one as may be caused by browsing or lopping. The causes of diseases are:

- a) **Parasitic or infections:** Diseases may be caused by fungi, bacterial and virus.
- b) **Non-infection:** Adverse environmental factors are the causes of non-infectious diseases.
- c) **Insects:** Disease in trees is also caused by insects.

Important diseases of agro-forestry trees have been discussed in this chapter (after Negi, 1996)

SISHAM

Shisham (*Dalbergia sissoo*) is found in the sub-Himalayan tract and in many parts of the Indo-Ganga plain. Its main diseases are:

1. **Wilt disease:** This disease is caused by soil inhabiting fungi *Fusarium solani*, usually in plantations raised on unfavourable sites. It does not occur in undistributed natural forests and in plantations raised on favourable site conditions.
2. **Ganoderma root rot:** This root rot is caused by *Ganoderma lucidum* in natural forest and plantations. It attacks trees of advanced age. The pathogen is found in high as well as heavy textural soils.
3. **Polyporus root and butt rot:** Root and butt rot shisham is caused by *Polyporus gilvus* in many parts of India. It attacks through injury or wounds, mainly in plantations.
4. **Leaf spots:** Leaf spots in shisham are caused by-
 - *Cercospora sissa*,
 - *Colletroghoeum sissoo*,
 - *Phyllachora dalbergiae*,
 - *Phyllachora spissa*
5. **Powdery mildew:** Powdery mildew on shisham leaves is caused by *Phyllactinia dalbergiae*. It produces persistent dense mycelium on the lower surface of the leaves.
6. **Leaf rust:** Leaf rust in shisham are caused by:
 - *Marasmiopsis achroa*,
 - *Uredo sissoo*
7. **Phanerogamic parasites:** Phanerogamic parasites affecting shisham are:
 - *Dendrophthoe falcate*,
 - *Loranthus involucratus*,
 - *Loranthus pulverulentus*

8. Other diseases:

- Heart rot caused by *Fomes robinia* and *Genoderma applanatum*
- Branch canker
- Horse hair blight

KHAIR

Khair (*Acacia catechu*) is found in many parts of India, except perhaps in the arid tracts and the mountains,. It thrives best on porous alluvium comprising of sand and shingle and boulder beds. The diseases of Khair are:

1. **Genoderma root rot:** Root rot caused by *Genoderma lucidium* is a serious disease in many khair plantations worked under the coppice system. It also affected shisham which usually grows well with Khair. Mortality may be substantial stands not cleared of residual roots and stumps.

Where khair is raised in areas that were previously under it of associated species, these are chances that old roots and stumps may remain inspite of the efforts made to remove them. Infection due to this pathogen usually starts in the residual stumps and roots of the previous forest cover. It has a wide host range amongst broadleaved trees forming part of area occurring in localities suitable for khair plantations.

The pathogen may not cause any serious adverse effects if a certain level of resistance develops in the tree against it. The following preventive and control measures may be taken:-

- Mechanized soil working
 - Stump and root extraction
 - Isolation tanches
 - Mixed plantations
2. **Heart rot:** *Fomes badius* causes heart rot in khair, both in natural forests as well as plantations. Through khair is the main host, it also attacks other species. The pathogen mainly causes infection through the wounds. Only the heartwood is affected while the sapwood remains free from this disease.

Prevention of all injuries to the tree; systematic removal of diseased tree are the main preventive and control measures.

3. **Leaf diseases:** Leaf diseases of khair are:-

- Leaf rust
- Powdery mildew
- Powdery leaf spot

SEMAL

Semal (*Bombax ceiba*) is a moderated sized deciduous tree found in many parts of India, growing best on alluvial soil. Different diseases that affect semal are:

1.Root rots:

- a) *Genoderma lucidium* causes the most widespread root rot in semal. Usually trees having less growth vigour are attacked. After the root rot develops, the affected tree may die.
- b) **Root rot** in semal is also caused by *Fomes lamaoensis* and *Fomes lignosus*.

2. Die back: The young succulent shoots of semal are attacked by the pathogen *Phomopsis salmalica*. Bark of the affected individuals tends to become brown and pulpy and they die-back eventually, leading to their death.

3.Leaf diseases:

- a) The fungus *Dicellomyces bombacis* causes leaf blight due to which gletaniumous rusty brown patches develop on the lower surface of the leaves.
- b) Leaf spot is also caused by other pathogens. These are-
 - *Myrothecium roridum*
 - *Phyllostica bombacis*
 - *Sphaceloma bombacis*
 - *Chrysomyxa bombacis*
 - *Uredo bombacis*
 - *Cercospora follicola*

4.Pink disease: Semal is one of the hosts of *Corticium salmomicolor* which causes the pink disease which is more common in tracts receiving heavier rainfall and experiencing warm topical conditions.

5.Others diseases: other diseases of semal are:

- Damping off
- Seed disease

NEEM

Neem or *Azadirachta indica* is an important tree grown on the boundaries of field and in home gardens in different parts of India. The diseases discussed below:

1. Nursery diseases- important nursery diseases of neem are:

- Damping off
- Leaf web blight
- Leaf spots

2. Foliage diseases-

- a) *Rhizoctonia* leaf web blight effect the foliage of young plants. It appears on the seedling after the commencement of the monsoon rains.
- b) *Collectotrichum* leaf spot and blight affects the seedling both in nursery and plantations.
- c) *Altinaria* leaf spot and blight affects the foliage of seedlings. It appears late in the growing season, attacking the leaves when they become old and contain less sugar. It may completely destroy the foliage of seedlings.
- d) *Pseudocercospora* leaf spot produces brownish infection spots interspersed with white patches. The fungus sporulates on the upper leaf surface and produces conidia which appear grayish in mass.
- e) Other leaf diseases of neem are-
 1. Bacterial leaf spot
 2. Leaf spot
 3. Blight and stem rot
 4. Leaf wilt

3. Root rot: The pathogen *Genoderma lucidum* causes root rot in the neem. It occurs sporadically in trees planted in areas where the residual roots and stumps are still present in the soil. The root system is extensively damaged by the fungus. The leaves become pale and yellow.

4. Pink disease: Pink disease in neem is caused by *Corticium salmonicolor*. It leads to the formation of pink incrustations. Other adverse effects are:

- Die back of the neem
- Development of cankers on the infected stem & branches.
- Eventual death of the affected part.

5. Twig blight: The fungus attacks the twigs which dry up and die. The fungus sporulates on the twigs forming dark coloured pin head sized pycnidia in large numbers.