

## Lecture 17 - Diseases of Coconut and Oil palm

### Coconut

#### Bud rot

*Phytophthora palmivora*

#### Symptoms



Palms of all ages are susceptible to the disease, but it is more severe in young palms of 5-20 years. The first indication of the disease is seen on the central shoot of the tree (spindle). The heart leaf shows discoloration which becomes brown instead of yellowish brown. This is followed by drooping and breaking off the heart leaf. With the progress of disease, more number of leaves get affected with loss of lustre and turn pale yellow. The entire base of the crown may be rotten emitting a foul smell. The central shoot comes off easily on slight pulling.

The leaves fall in succession starting from the top of the crown. The leaf falling and bunch shedding continue until a few outer leaves are left unaffected. But within few months the infection leads to complete shedding of leaves, within subsequent wilt and death of the tree.

#### Pathogen

The fungus produces intercellular, non-septate, hyaline mycelium. Sporangioophores are hyaline and simple or branched occasionally. The sporangioophores are hyaline, thin-walled, pear-shaped with a prominent papillae. Sporangia release reniform, biflagellate zoospores upon germination. The fungus also produces thick-walled, spherical oospores. In addition, thick-walled, yellowish-brown chlamydospores are also produced.

#### Favorable Conditions

High rainfall, high atmospheric humidity (above 90 per cent), low temperature (18-20°C) and wounds caused by tapper and Rhinoceros beetles.

### **Mode of Spread and Survival**

The fungus remains as dormant mycelium in the infected tissues and also survives as chamydospores and oospores in crop residues in the soil. The diseases spread is mainly through air-borne sporangia and zoospores. Rainfall also helps in spreading the diseases. Insects and tappers also help in the spread of the inoculum from diseased trees.

### **Mangement**

Remove and burn badly affected trees which are beyond recovery. If diseases is detected in early stage, remove the infected tissue thoroughly by cutting the infected spindle along with two leaves surrounding it and protect the cut portion with Bordeaux paste. Give prophylactic spray with 1% Bordeaux mixture to all the healthy plams in the vicinity of diseases one and also before onset of monsoon rains.

### **Basal Stem Rot (Thanjavur wilt / Bole rot)**

*Ganoderma lucidum*

### **Symptoms**



The trees in the age group of 10-30 years are easily attacked by the pathogen. The fungus is soil-borne and infects the roots. The most usual symptoms are yellowing, withering and drooping of the outer fronds which remain hanging around the trunk for several months before shedding. The younger leaves remain green for sometime and later turn yellowish brown. The new fronds produced become successively smaller and yellowish in colour which do not unfold

properly. Soft rot occurs in the bud with a bad newly formed leaves wither away. More often the spindle is blown off leaving the decapitated stem.

The wilting plants also show bleeding patches near the base of the trunk. A brown gummy liquid oozes out from the cracks in the tree which slowly result in the death of outer tissues. As the infection advances, fresh bleeding patches appear above the old once, up to 3-5 meters height. The decay of the basal portion occurs slowly and tree succumbs to the diseases in 2-3 years. In the advanced stages of infection, the fungus produces fruiting body (Bracket) along the side of the basal trunk. The roots of wilting trees show discoloration and severe rotting.

### **Pathogen**

The fungus produces a semi circular basidiocarp (bracket), which is attached to the tree with a stalk. The bracket is very big about 10-12 cm diameter and woody. The upper surface is tough, shining, light to dark brown or almost black with concentric furrows. The lower surface is white and soft with numerous minute pores. These pores represent the opening of the hymenial tubes, which are lined with basidia and basidio-spores. Basidiospores are oval, brown and thick walled.

### **Favourable Conditions**

Trees grown in sandy loam and sandy soils, water logging during severe rains, low soil moisture content during summer months and damages caused by weevils and beetles.

### **Mode of Spread and Survival**

The fungus is soil-borne and survives in the soil for long time. The primary infection is through basidiospores in the soil, which attack roots. The irrigation water and rain water also help in the spread of the fungus.

### **Management**

Remove and burn severely infected trees which are beyond recovery. Isolate the diseased trees by digging a trench all around to check further spread. Irrigate the palms at least once in a fortnight during summer months. Apply heavy doses of farm yard manure or compost for green manure at 50 Kg/tree/year along with 5 kg of neem cake. Drench the soil near the tree with 40 litres of 1 per cent Bordeaux mixture at quarterly interval for thrice a year and repeat after 2-3 years. Apply Aureofunginsol 2g+Copper sulphate 1g in 100 ml of water or Tridemorph 2ml/100 ml of water through stem injection or root feeding at quarterly intervals for one year.

## **Stem bleeding**

*Theilaviopsis paradoxa*

(*Ceratocystis paradoxa*)

### **Symptoms**



The characteristic symptom is the exudation of reddish brown fluid from the cracks in the stem. The fluid trickles down to several feet on the stem and the exudates dries up forming a black crust. The tissues below the cracks turn yellow and decay. As the disease progresses, more area underneath the bark gets decayed and the bleeding patch extends further up. The vigour of the tree is affected and nut yield is reduced. The tree is not killed out right but become uneconomical to maintain. In extreme cases, the trees may become barren and die.

### **Pathogen**

The fungus produces two type of conidia. Macroconidia are produced on conidiophores singly or in chains. They are spherical and dark green in colour. Microconidia are produced endogenously inside the long cells ruptures when mature and release the microconidia in long chain. Microconidia (endoconidia) are thinwalled, hyaline and cylindrical in form. *C. paradoxa* also produces hyaline perithecia with a long neck base is ornamented with knobbed appendages and ostiole is covered by numerous pale-brown, erect, tapering hyphae. Asci are clavate and ascospores are hyaline ad ellipsoid.

### **Favourable Conditions**

Copious irrigation or rainfall followed by drought, shallow loamy soils or laterite

soil with clay or rock layer beneath the soil, poor maintenance of gardens and damages by *Diocalandra* and *Xyleborus* beetles.

### **Mode of Spread and Survival**

The fungus survives in the infected plant debris and soil as perithecia and conidia. The spread is mainly through wind-borne conidia. The irrigation and rain water also help in the disease spread. The beetles which feed on the diseased plants also help in transmission.

### **Management**

Maintain the gardens properly with adequate fertilization. Scoop out the diseased tissue with a portion of healthy tissues, burn the exposed tissue and apply molten coal tar followed by swabbing Bordeaux paste. When stem bleeding is observed in association with *Ganoderma*, follow root feeding or stem injection technique. Irrigate during the summer months.

### **Root wilt disease (Kerala wilt)**

Phytoplasma

### **Symptoms**



Palms of all ages are found infected by the pathogen. The important diagnostic symptom is “flaccidity” of leaves i.e. they curve abnormally inwards, resembling the ribs of mammals. Yellowing of leaves and marginal necrosis of leaflets are also conspicuously. Wilting of leaves from middle whorl to outward and shedding of buttons and immature nuts occur. The size of mature nuts are small with thin kernel. The crown size also gets reduced in advanced stages and trees remain unproductive.

The roots show rotting symptoms, which rot from tip backwards. The older roots show cracks and blotches and cortex turns brownish black resulting in drying in flakes. The root wilt affected palms become highly susceptible to leaf rot disease caused by *Bipolaris halodes*. Occurrence of leaf rot independent of root wilt is very rare. The first symptom is blackening and shrivelling of the distal ends of leaflets in the central spindle and in some of the young leaves. Later the affected portion breaks off in bits giving the leaf a fan-like appearance. This rotting hastens the decline of the palms.

### **Pathogen**

The disease is caused by *Phytoplasma* which is frequently identified in the phloem tissues of infected trees.

### **Favourable Conditions**

Sandy and sandy loam soils, severe floods and abundance of lace wing bug *Stephanitis typia*.

### **Mode of Spread and Survival**

The severely infected plants serve as primary sources of inoculum. The MLO is transmitted by the lace wing bug *Stephanitis typicuc* from diseased to healthy palms.

### **Management**

Remove all severely infected and uneconomic palms and replant with healthy hybrid seedling like CDO X WCT or WCT X CDO. Remove all the juvenile (young) palms showing symptoms irrespective of its intensity. Spray the leaves with 0.01 per cent Monocrotophos. Apply balanced doses of fertilizers (1kg Urea, 1.7kg Super phosphate, 1.7kg Muriate of potash and 3kg Magnesium sulphate per palm per year in two splits, 1/3 during April-May and 2/3 during September-October for rainfed palms and in 4 splits during January, April, July and October for irrigated palms).

Apply 50kg of farmyard manure/palm/year. Grow green manure crops in basin and incorporate at the time of fertilizer application. Control the leaf rot disease by spraying 1% Bordeaux mixture or 0.3% Mancozeb. Irrigate the palm during summer months at the rate of 600-900 litres of water/basin once in 4 to 6 days. Avoid water logging by providing proper drainage during rainy seasons. Raise crops in the inter space and maintain the milch cows to recycle the manure and other organic wastes to increase the nut yield in affected gardens.

### **Grey leaf blight**

## *Pestalotia palmarum*

### **Symptoms**

Initially symptoms develop only on the outer whorl of leaves, especially in older leaves. Minute yellow spots surrounded by a greyish margin appear on the leaflets. Gradually, the centre of the spots turns to greyish white with dark brown margins with a yellow halo. Many spots coalesce into irregular grey necrotic patches. Complete drying and shrivelling of the leaf blade occur giving a blighted or burnt appearance. Large number of globose or ovoid black acervuli appear on the upper surface of leaves.

### **Pathogen**

The fungus produces conidia inside the acervuli. The acervuli are black in colour, cushion shaped and sub epidermal and break open to expose conidia and black sterile structures, setae. The conidiophores are hyaline, short and simple, bear conidia at the tip singly. The conidia are five celled, the middle three cells are dark coloured, while the end cells are hyaline with 3-5 slender, elongated appendages at the apex of the spore.

### **Favourable conditions**

Ill drained soils, soils with potash deficiency, continuous rainy weather for 4-5 days and strong winds.

### **Mode of Spread and Survival**

The fungus remains in the infected plant debris in soil. The disease is spread through wind-borne conidia

### **Management**

Remove and burn the infected, fallen leaves periodically. Apply heavy doses of potash. Improve the drainage conditions of the soil. Spray the crown with 0.25 per cent copper oxychloride or 1 per cent Bordeaux mixture before the onset of rains.

## **Oil palm**

### **Anthracnose:** *Botryodiplodia palmarum*

### **Symptoms**

This disease occurs in the nursery. It is recognized by regular or irregular brown to black leaf blotches surrounded by yellow haloes, which develop along the margin, centre or tip of the leaves. It causes heavy seedling loss.

**Management**

The disease can be controlled by spraying Mancozeb or Captan at the rate of 200 g/100 litres of water. Copper fungicides should not be used because of the extreme susceptibility of oil palm seedlings to copper burn (scorching).