PATHOLOGY – Etiology And Control Measures

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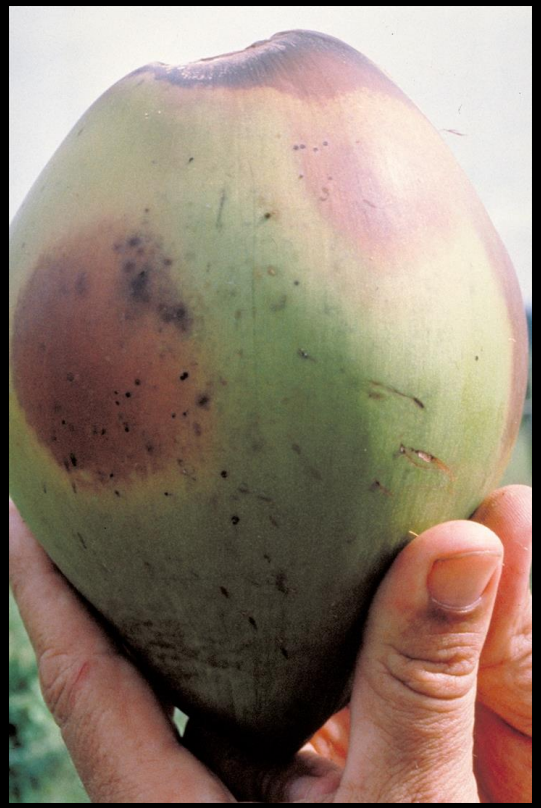
PATHOLOGY

- The science that studies the causes of plant diseases, the mechanisms by which diseases develop in individual plants and in plant populations, and the ways and means by which plant diseases can be managed or controlled
- Disease can be defined as a harmful deviation from normal functioning of the physiological processes caused by an infectious agent. In the case of plant diseases, the causal agent maybe a fungus, virus, bacterium or a parasitic flowering plant.

BUD ROT OF COCONUT

- A fatal disease of coconut palm, characterized by the rotting of the terminal bud and surrounding tissues
- *Causal Organism: Phytophthora palmivora*
- Symptoms: withering of the spindle marked by pale color.
- The spear leaf or spindle turns brown and bends over.
- Basal tissues of the leaf rot quickly and can be easily separated from the crown.



CONTROL MEASURES

- Remove all the affected tissue of the crown region and drenching the crown with Copper oxychloride 0.25%.
- Apply Bordeaux paste and protect it from rain till normal shoot emerges.

(Dissolve 100 gm of copper sulphate and 100 gm of quick lime each in 500ml. water separately and mix to form 1 litre of Bordeaux paste).

STEM BLEEDING OF COCONUT

- Symptoms: characterized by the exudation of a dark reddish brown liquid from the longitudinal cracks in the bark and wounds on the stem trickling down for a distance of several inches to several feet.
- The lesions spread upwards as the disease progresses.
- The liquid oozing out dries up and turns black
- Causative organism: Thilaviopsis paradoxa

CONTROL MEASURES

- Treat wounded or infected areas with fungicide and tar (for example, Bordeaux paste, mancozeb, or copper oxychloride),
- This could be followed by sealing with coal tar two days later.
- Burn or destroy the chiseled pieces.
- Apply neem cake to the base of affected plants.

NUT FALL OF ARECANUT

- **Causative organism**: Phytophthora meadii
- **Symptoms:** Rotting and heavy shedding of fruits are the characteristic symptoms during south-west monsoon (June-September).
- Dark green water-soaked lesions noticed near perianth end and spread gradually covering the entire surface of fruit and finally shed off.
- In advanced stages, whitish mycelial growth seen over the nut surface.
- Infected nuts showed discoloration of kernel, reduction in weight and large vacuole.
- At the end of monsoon the fruits dry up, remains mummified without shedding.

CONTROL MEASURES

- Field sanitation practices include collection and destruction of the infected nuts and other plant parts should be strictly followed.
- Prophylactic spraying of 1 per cent Bordeaux mixture at least three times at an interval of 45 days i. e. just before the onset of south-west monsoon, during the monsoon period and if the monsoon prolongs, a third spray is essential.
- Use adhesive or sticker to ensure tenacity of the spray deposit on treated substrate.
- Covering the bunch with polythene cover before the onset of monsoon also gives complete control.

FOOT ROT OF BLACK PEPPER

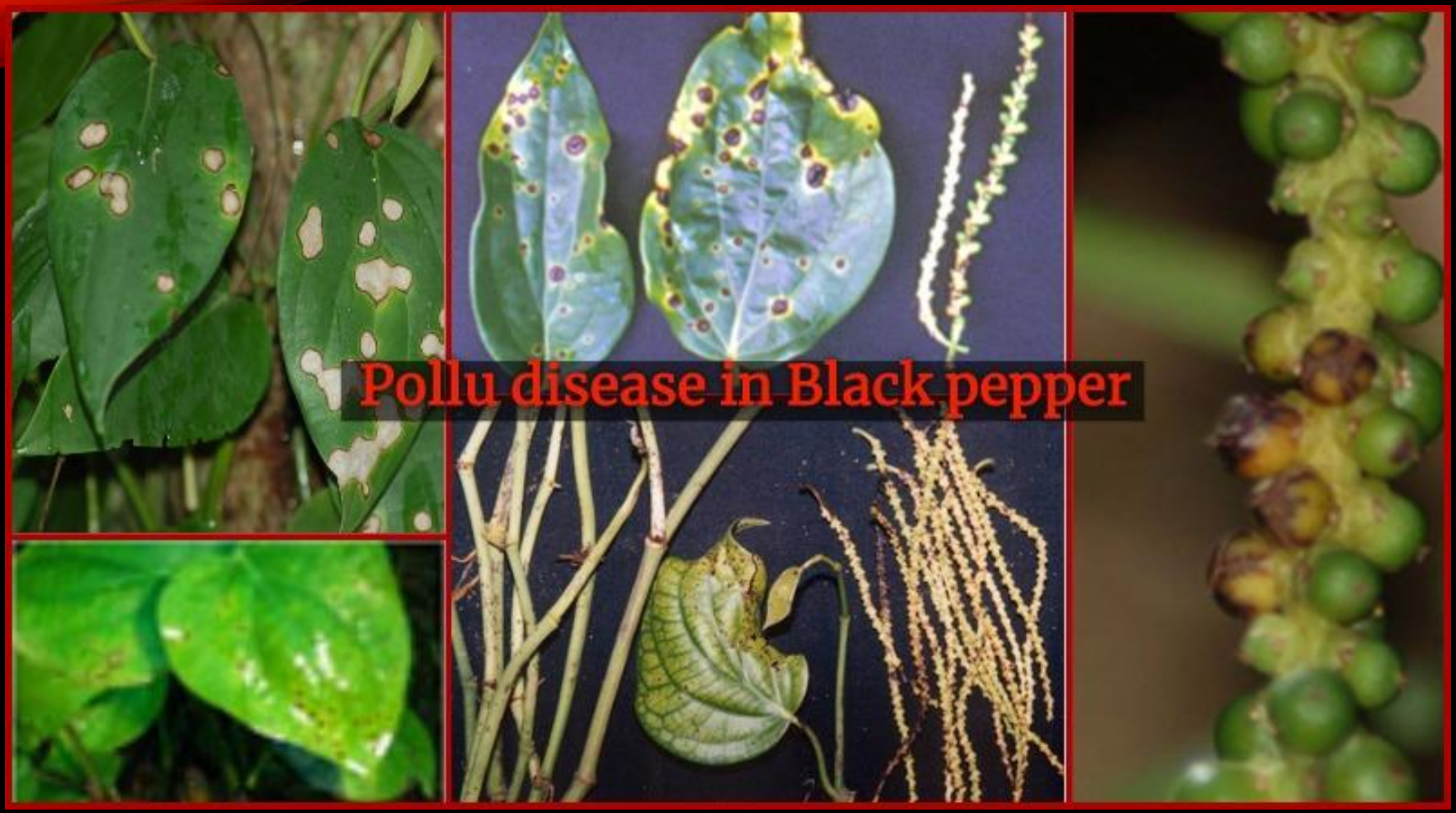
- **Causative organism: Phytophthora capsica**
- **Symptoms: The tender leaves and succulent shoot tips of freshly emerging runner shoots trailing on the soil turn black when infected.**
- **The disease spreads to the entire vine, from these infected runner shoots and leaves, during intermittent showers due to rain splash**

CONTROL MEASURES

- Selection of healthy nursery material.
- Provide good drainage.
- Soil drenching with 1% Bordeaux mixture after removal of the affected plant.
- Spraying with 1% Bordeaux mixture (or) COC 0.25% (or) Alitte 0.3%
- Soil application of neem cake and Trichoderma viride or P. fluorescens

ANTHRACHNOSE OF BLACK PEPPER

- **Causative organism:** **Colletotrichum gloeosporioides**
- Symtoms: Angular to irregular or circular brownish lesions with a chlorotic halo and pinhead size acervuli on the leaves, is consistent with the disease
- Splitting and the production of hollow berries. The new symptom was novel
- leaves initially exhibiting pale green or yellowish green lesions. As the disease progressed, lesion margins became brown to black with slightly raised areas containing numerous acervuli, rarely causing defoliation
- Berries showed no lesions.

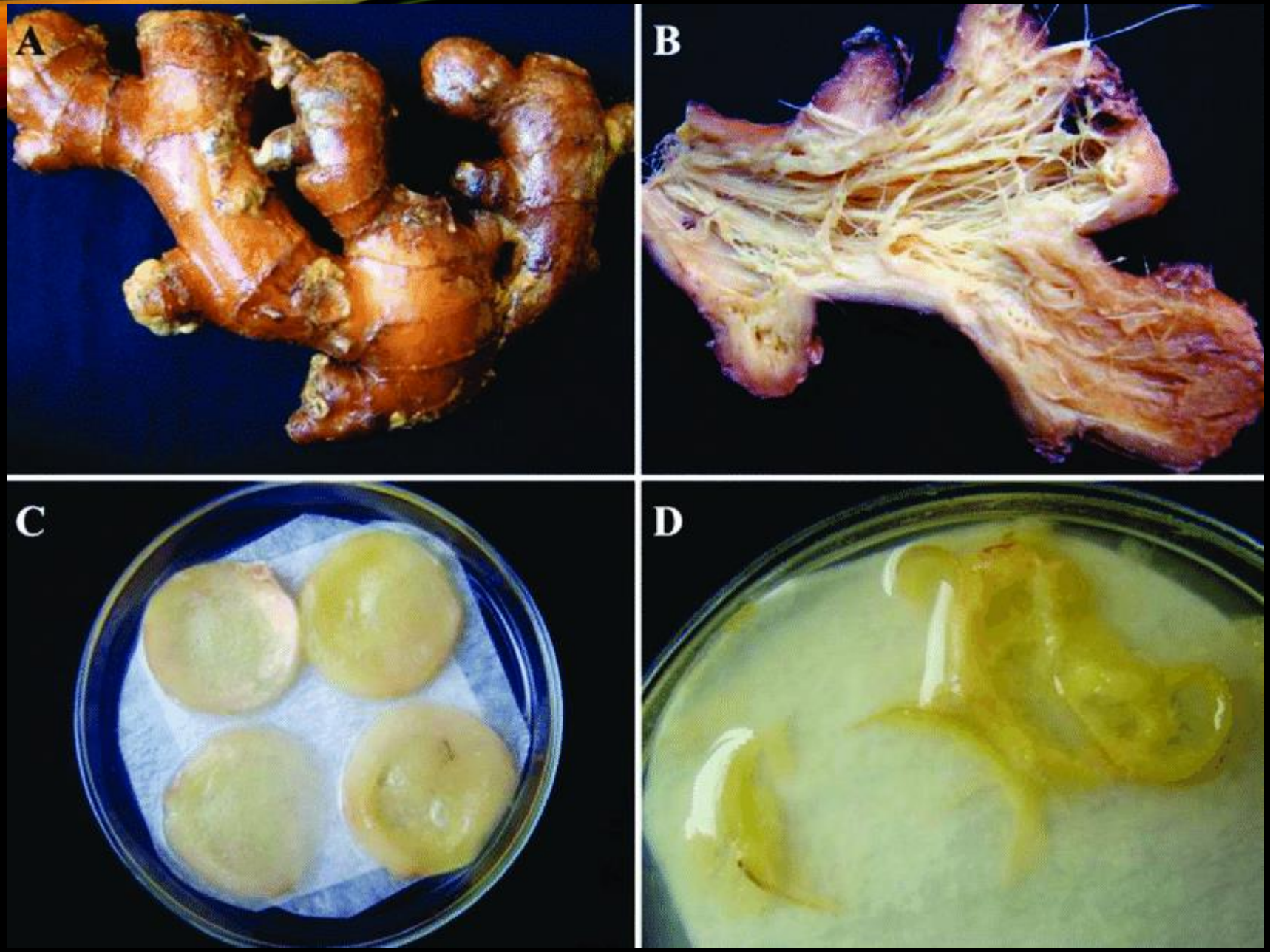

Pollu disease in Black pepper

CONTROL MEASURES

- Irrigating black pepper vines during summer months has been found to substantially reduce the disease symptoms. Adequate shade regulation is a must for managing this disease.
- Remove and destroy all fallen leaves and spikes
- The pre-monsoon and post-monsoon spray with Bordeaux mixture (1%) or carbendazim + mancozeb (0.1%) is recommended

FUNGAL SOFT ROT OF GINGER

- **Symtoms:** Affected region becomes water soaked.
- Middle portion of leaves are green while margins turn yellow.
- Yellowing spreads upward as well as downward to other regions.
- Pseudostems dry and wither.
- The infected shoots are very easy to pull out from the soil.
- **Causative agent:** Pythium aphanidermatum, Pythium vexans and Pythium myriotylum.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CONTROL MEASURES

- Rhizome treatment with copper oxychloride followed by neem extract
- Rhizome treatment in hot water at 47°C for 30 min
- Drenching of soil Trichoderma harzianum , followed by mancozeb are most effective in inhibiting Pythium sp. as well as improve the yield of ginger

BACTERIAL WILT OF GINGER

- Causative organism: Ralstonia solanacearum
- Symtoms: "Green wilt" is the diagnostic symptom for the disease.
- Leaf yellowing and necrosis.
- Plant stunting.
- Plant decline and death.
- Rotten rhizomes, often discolored.
- Water-soaked appearance of infected rhizomes and stem vasculature.
- Discoloration of vascular tissues.

CONTROL MEASURES

- Rhizome solarization on ginger seeds for 2 to 4 h reduced bacterial wilt by 90–100% 120 d after planting
- Ginger seeds sterilized with discontinuous microwaving (10-s pulses) at 45°C
- The cultural practices adopted for managing soft rot are also to be adopted for bacterial wilt.
- The seed rhizomes may be treated with streptocycline 200ppm for 30 minutes and shade dried before planting.
- Once the disease is noticed in the field all beds should be drenched with Bordeaux mixture 1% or copper oxychloride 0.2%.

RHIZOME ROT OF CARDAMOM

- **Symptoms:** leaves appear as pale yellow colour, partial of leaf margins and withering.
- Rotting or decay starts at the collar region and it spreads to rhizomes and roots.
- In severe cases, the collar region breaks off and the seedling collapse.
- Causative organism: **Pythium vexans, Rhizoctonia solani and Fusarium oxysporum**


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b

CONTROL MEASURES

(i) Copper oxychloride 0.2% (Soil drenching)

(ii) Akomin 0.3% (foliar spray)

(iii) Trichoderma harzianum multiplied in coffee husk media @ 1 kg/plant (basal application)

(iv) Akomin 0.3%+Trichoderma

(v) Field sanitation

CAPSULE ROT OF CARDAMOM

- The disease appears during the rainy season.
- On the infected leaves, water soaked lesions appear fi rst followed by rotting and shredding of leaves along the veins.
- The infected capsules become dull greenish brown and decay. This emits a foul smell and subsequently shed.
- Infection spreads to the panicles and tillers resulting in their decay.
- Causative agent: Phytophthora nicotianae var. nicotianae/ P. meadii

CONTROL MEASURES

- Removal and burning of infected plants.
- Avoid moving of rhizomes from diseased areas to healthy area for planting
- Provide proper drainage
- Three sprays with Bordeaux mixture 1% in May, June, July
- Soil drench with Bordeaux mixture 1 % (or) Copper oxychloride 0.25%

ABNORMAL LEAF FALL OF RUBBER

- It occurs during June – August, while general leaf fall occurs during December.
- On leaves dull grey, circular spots appear which enlarge and become irregular.
- The petiole exhibit sunken spot. Affected fruits rot. ...
- The affected leaf form a thick carpet of rotting foliage which emits bad smell.
- Causative agent: Phytophthora palmivora & P. nicotianae var. parasitica

a

b

c

CONTROL MEASURES

- Prophylactic sprays prior to onset of south west monsoon with Bordeaux mixture 1%. Addition of ZnSo4 @ 0.2% improves the efficacy.
- Field sanitation

POD ROT OF COCOA

- Infection appears as chocolate brown spot, which spreads rapidly and soon occupies the entire surface of the pod.
- As the disease advances, a whitish growth of fungus consisting of fungal sporangia is produced over the affected pod surface. Ultimately, the affected pods turn brown to black.
- The internal tissues as well as the beans become discolored as a result of infection.
- Causative organism: Phytophthora megakarya (Pmeg) and Phytophthora palmivora (Ppal)


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CONTROL MEASURES

- Removal and destruction of infected pod material at periodic intervals.
- Proper training and pruning of cocoa plants during rainy season need to be followed. It facilitates light and air to the main stem and branches.
- Spraying of 1% Bordeaux mixture or Copper Oxychloride (0.3%) is to be taken up before monsoon season. Based on disease intensity, subsequent sprays at 15 days interval need to be taken up.
- Copper based fungicides such as Bordeaux mixture, copper oxychloride, cuprous oxide or copper hydroxide are effective against the disease