

PCP 201: PRINCIPLES OF CROP PRODUCTION I
LECTURE NOTES ON DISEASES OF CROP PLANTS

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DISEASES OF CROP PLANTS

Meaning of disease: A plant disease may be defined as a departure or deviation of the plant from the normal state of health presenting marked symptoms or outward visible signs.

CAUSES OF DISEASES

Diseases are caused by the following agents:

- i. Viruses: A microscopic organism that cause infectious diseases in plants and animals
- ii. Bacteria
- iii. Fungi
- iv. Nematode
- v. Nutrient deficiency

GENERAL EFFECTS OF DISEASES ON CROP PRODUCTION

Diseases cause lots of damage to crops and their effects are as follows:

1. Diseases generally reduces the yield or productivity of crops
2. They also reduce the quality of crops
3. They cause the malformation of plants part or the whole plants
4. They can kill or cause the death of a whole plant
5. They cause reduction in the income of the farmer
6. They increase the cost of production in the course of controlling them.
7. They make vegetables and fruit unattractive and unmarketable
8. Their activities cause retarded growth in crop plants

GENERAL CONTROL OF CROP PLANT DISEASES

Diseases of crop plants can be controlled by the following methods:

- 1) Cultural control
- 2) Biological control
- 3) Chemical control

CULTURAL CONTROL

This involves the use of:

- i. Crop rotation
- ii. Resistant varieties
- iii. Good tillage practices
- iv. Regular weeding
- v. Fallowing – leaving a piece of land for a period of time
- vi. Timely planting
- vii. Pruning

- viii. Uprooting and burning of infected crops etc to control or prevent diseases
- ix. Use healthy seeds or stem for propagation
- x. Destroy crops residues after harvesting to prevent build-up of disease pathogens or practice good form of sanitation/hygiene.
- xi. Sterilize soil to control soil-borne diseases
- xii. Avoid close planting to reduce spread of disease
- xiii. Imported seeds/plants should be maintained before their introduction into the country

BIOLOGICAL CONTROL

This involves the use of natural enemies of the disease to reduce or totally eliminate the disease.

CHEMICAL CONTROL

This involves the use of chemicals such as fungicides, nematicides, insecticides to dust or spray plants and plant materials in order to prevent or control plant diseases.

SELECTED DISEASES OF CROPS AND THEIR CONTROL

MAIZE

- Maize smut
- Caused by the fungus *Ustilago maydis*
- Air borne fungus spores deposited on the fruits
- Reduces yield
- Form galls on ears, leaves and tassels in later turn black
- Reduces yields
- Forms galls on ears, leaves and tassels
- Can be controlled by
- Destroying diseased plants
- Seed treatment is fungicides

(ii) Maize Rust

- Caused by fungus *Puccinia polysora*
- Transmitted by air-borne spores deposited on leaves

Symptoms Include

- Red spot on leaves
- Reduced yield
- Death of the crop

Can be controlled by

- Early planting
- Crop rotation
- Use of resistant varieties

(iii) Leaf Diseases

- Leaf blight caused by:

Helminthosporium turcicum

Helminthosporium maydis

- Maize rust caused by:

Puccinia sorghi

- Maize dwarf mosaic virus (MDMV) and corn stunt virus (CSV) symptoms are the appearance of faint yellowish stripes on plants 6 to 7 weeks old and shortened internodes excessive flowering which many grainless ears may be observed.

Bacteria wilt or stewarts disease caused by *Bacterium stewart* found especially in sweet corn
Brown spot caused by the fungus *Physoderma zeamaydis*

(II) Cassava

(i) Cassava mosaic disease

- Caused by virus
- Transmitted through piercing and sucking insect (white fly) *Bemisia nigerrensis*
- Or through infected plant cuttings

Symptoms usually observed include:

- Mottling of leaves
- Mosaic pattern on leaves
- Stem/leaf distortion
- Stunted plant
- Reduction in yield

Prevention and control through:

- Use resistant varieties
- Uprrot and burn infected plants
- Spray with insecticides to kill vectors
- Use disease free stem cuttings
- Farm sanitation

(ii) Leaf Blight of cassava

Caused by Bacterium *Xanthomonas manihotis*

- Transmitted through infected cuttings
- Rain sprouting insects and tools

Symptoms includes:

- Blighting of leaves
- Wilting of plant
- Faling off of leaves
- Reduced yield
- Canker of stem
- Die-back of stem

Prevention and control

- Use resistant varieties
- Use disease-free cuttings
- Early planting
- Practice crop rotation

(III) Rice diseases

(i) Rice Blight

- Caused by fungus *Piricularia oryzae*
- Transmitted through air-borne spores on leaves

Symptoms commonly observed includes:

- Small longitudinal red spots on leaves in turn grey or brown
- Reduced yield

Prevention and control through:

- The use of clean seeds
- Avoid heavy use of N fertilizers
- Use resistant varieties

(ii) Seedling Blight caused by *Sclerotium rolfsii*

(iii) Brown leaf spot caused by *Helminthosporium oryzae*

(iv) Rice blast caused by *Piricularia oryzae*

(vi) Sten rot caused by the fungus *Magnaporthe salvinii*

V. Cocoa black pod disease

- Caused by fungus *Polytophora palmviora*
- Through rain splashing and insects

Symptoms observed includes:

- Brown spot on pod
- Rotening of pods
- Entire pod turns black
- Low yield

Prevention and control measures

- Remove and destroy infected pods
- Regular weeding
- Spary with fungicides e.g. Bodeaux mixture
- Avoid over crowding of cocoa plants

VI. Coffee leaf rust

- Caused by a fungus
- Transmitted by wind, rain splash

Symptoms include:

- Yellow or brown spot on leaves
- Orange powdery mass on the leaf
- Reduction in yield
- Dropping of leaves

Prevention and control

- Plant seeds from healthy plants

- Use resistant varieties
- Spray with copper fungicides

VII. Root knot of tomato/okro

- Caused by nematodes (*Meloidogyne spp*)
- Transmitted by nematodes in soil

Symptoms includes:

- Knotting or galling of roots
- Retarded growth
- Early dearth of plant
- Reduction in yield

Preservation and Control

- Soil sterilization
- Crop rotation
- Use resistant varieties
- Uproot and burn infected plants

VIII. Cercopora – a leaf spot of cowpea

- Caused by a fungus
- Transmitted through wind

Symptoms includes:

- Reddish brown spot on leaves
- Lesion on leaves
- Chlorides
- Dropping or falling of leaves

Prevention and control through:

- Spray with fungicides
- Crop rotation
- Plant resistant varieties

