

Course – M. Sc. Botany Part 1 Paper III

Topic – Classification of plant diseases

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Plant pathology

- Plant pathology is the scientific study of disease in plants caused by pathogens and environmental conditions.
- Plant pathology also involves the study of pathogen identification, classification, disease cycle, disease epidemiology, disease etiology, economic impact, measures for disease resistance etc.

PLANT DISEASE

- Plant disease is an impairment of normal state of a plant that interrupts or modifies its vital functions.
- A plant disease can also be defined as any problem with the plant that leads to a reduction in yield or appearance.
- The disease-causing agents are called pathogens. e.g. fungi, bacteria, viruses etc.
- So, an impairment of the normal state of a plant that interrupts its vital functions or "A malfunctioning process that is caused by continuous irritation and produce symptoms" is called plant disease.
- The study of disease condition is called pathology, also known as phytopathology

Classification of plant disease

Plant disease are classified on the basis of various parameters:

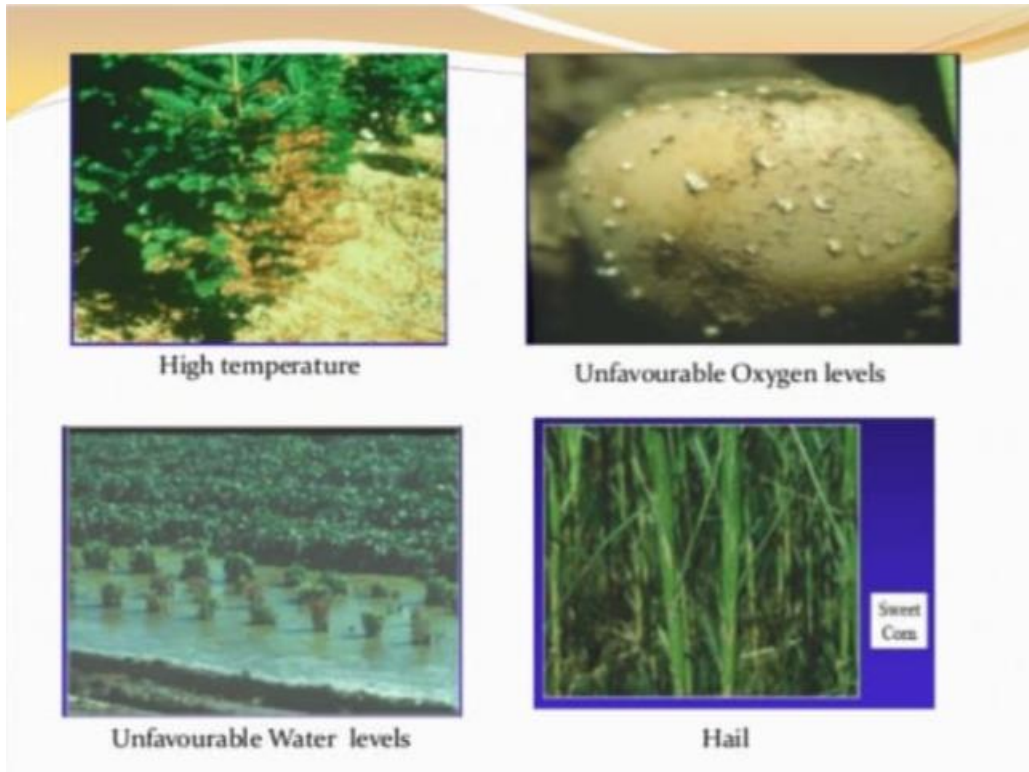
1. On the basis of the nature of the causal agent:

1] Non- infectious disease\ non parasitic disease:

- This type of diseases is caused by non-living organisms.
- Could not be spread to others.
- They are induced by unfavorable environmental condition of soil or air such as mineral deficiencies or excesses in the soil, low or high temperatures, improper water, oxygen and light relation.
- May also be caused by air pollution, nutrient deficiency, mineral toxicity, etc.
- These diseases may also be caused by mechanical injuries.
- Example- blossom and rot of potatoes, blank heart of potatoes, scald of apples.

2] Infectious disease\ Parasitic disease:

- These are caused by the attack of some living agents called pathogens. The causal agents may be a plant or an animal or a virus.
- It can spread from diseased to healthy plants.
- In the case of a disease caused by a parasitic organism the diseased plant is called a host.
- The pathogen may subsist in whole or in part upon the living tissue of the host.
- Biotic factors like fungi, bacteria, algae, nematodes, viruses etc. are the causing agents.



2. On the basis of host plant

- Cereal disease
- Vegetable disease
- Fruit disease
- Forest disease
- Ornamental disease

3. On the basis of perpetuation of spread

1] **Soil-borne diseases**- pathogen survive in soil or on infested plant debris present on the soil either as their resting spores or as mycelial strands and rhizomorphs. E.g. Root rot, wilt and seedling blight.

2] **Seed-borne diseases**-the microorganisms are carried along with seeds. E.g. damping off.

3] **Airborne diseases**- the microorganisms are spread through air. e.g. blight, rust, powdery mildew.

4. On the basis of occurrence and geographic distribution

1] Endemic disease:

- A disease which is regularly present in a certain region or a part of a region (district) in a moderate to severe form is referred to as endemic.
- E.g. wart disease in potato.

2] Epidemic [Epiphytotic] disease:

- Epiphytotic is term applied to the infectious plant disease which spread widely but occur periodically.
- The causal agent may be regularly present in the locality but the environment favorable for its rapid development occurs only periodically.
- The epiphytotic diseases are thus very responsive to variation in the environment.
- E.g. rust, late blight, mildews.

3] Sporadic disease:

- They are plant disease which occur only here or there at irregular intervals and in relatively few instances.
- A given disease may be endemic in one region and epidemic in another.
- E.g. leaf blight, wilt.

5. On the basis of extent of infection

1] **Localized diseases** - affecting only a part of the plant, limited to a definite area .

2]. **Systemic diseases**- pathogen spreads throughout the plant body and is associated with almost every stage of plants life cycle.



6. On the basis of pathogen generations

1] **Monocyclic disease\Simple interest disease** - those diseases which have only generation in one cropping season

E.g. loose smut of wheat.

2] **Polycyclic disease\Compound interest disease** - those diseases which have. more than one generation in a cropping season.

E.g. late blight of potato.

3] Polyetic disease- these are also polycyclic disease but complete their disease cycle in more than one year or above.

E.g. Cedar apple rust.

7. On the basis of organ the pathogens attack

1] Root disease.

2] Shoot disease.

3] fruit disease

4] foliage disease.



8. On the basis of symptoms

- **Rust-** caused by Basidiomycetes of the order Uredinales. e.g. stem rust of wheat, caused by *Puccinia graminis*.
- **Smuts-** caused by a fungus of the order Ustilaginales e.g. loose smut of wheat, caused by *Ustilago nuda tritici*.
- **Rots-** disease that infect underground part, caused by bacteria, fungi, or nematodes, *Rhizoctonia* is root rot.
- **Blight-** It is a rapid and complete chlorosis and death of plant tissue, e.g. late blight disease of potato by *Phytophthora infestans*.
- **Leaf spot-** caused by fungi and bacteria, e.g. Bacterial leaf spot is commonly caused by *Xanthomonas compestris*.
- **Canker-** It is a dead area, e.g. citrus canker.
- **Wilt-** it affects vascular system of plants, e.g. Bacterial wilt of cucurbits caused by *Erwinia tracheiphila*.

- **Powdery mildew**- causes foliage of stems, flowers, and fruits, e.g. grapes, cucumber, etc.
- **Downy mildew**- caused by family Peronosporaceae. E.g. Rose and lettuce.

