

PLANT PATHOLOGY *(phytopathology)*

Phytopathology is a branch of Botany that deals with causal organism, etiology, loss, symptoms and control of diseases.

ETIOLOGY:–Science of cause of disease.

Pathology
(Greek word 'Pathos' and
'Logos'.)

Pathos = Suffering

Logos = Study

“Study of Plant Sufferings”

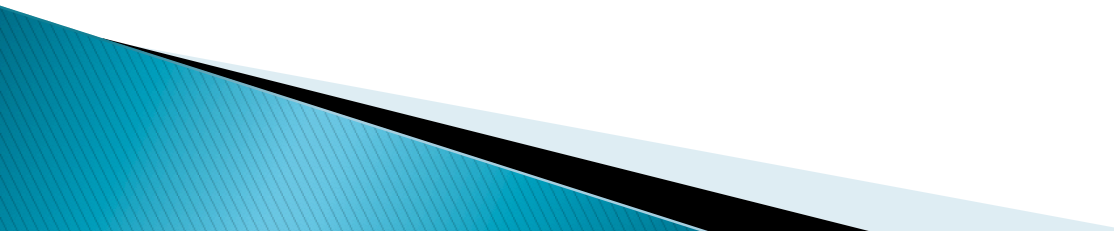
Or

“Study of Plant Diseases”.

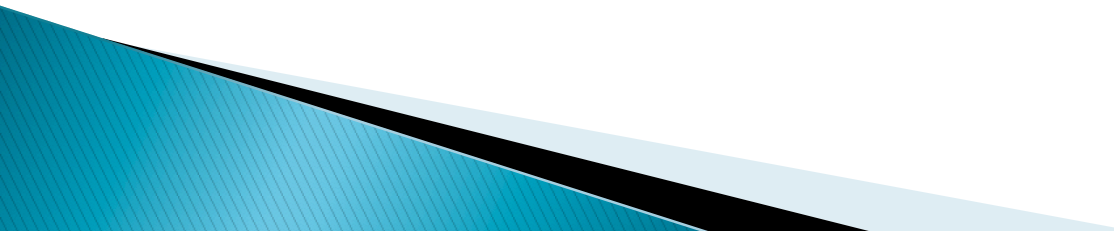


FATHER OF PLANT PATHOLOGY-
ANTON de Bary.

Aims of plant pathology

- ▶ To make a survey of the living as well as non-living causes of the diseases.
 - ▶ To study the different types of mechanisms by which the diseases are developed in plants.
 - ▶ To elucidate the interaction mechanism among plants, pathogen and the environment.
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The main aim of plant pathologist:–

- ▶ Minimize the loss of useful plants through application of the principles of plant disease prevention.
 - ▶ To prevent plant disease epidemics or to delay their onset until the harvest time is over.
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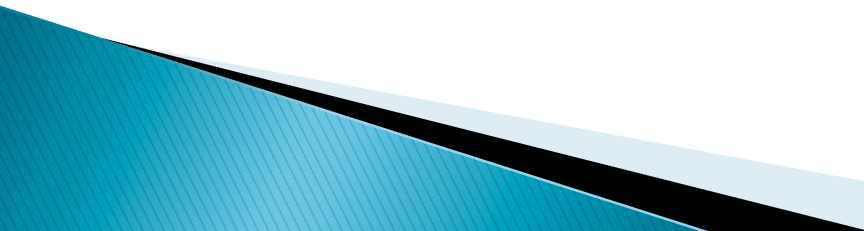
CONCEPT OF PLANT DISEASE

DISEASE

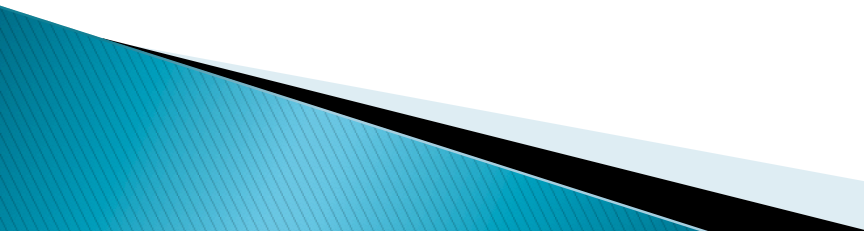
Disease in a plant involves a number of harmful Physiological processes which leads to a lot of irregularities in the morphology and anatomy of the host.

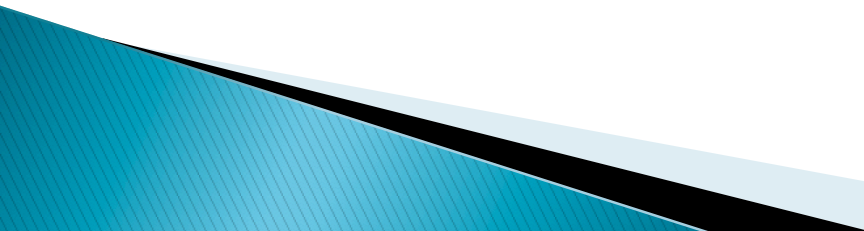
SYMPTOMS

The altered and disadvantageous differences of the host from the normal plant are referred to as Symptoms of the disease.



EXPLANATION OF SOME TECHNICAL TERMS

1. **Host** : An organism that harbours or supports the activities of a parasite .
 2. **Suscept** :An organism that is susceptible or prone to disease.
 3. **Susceptibility** :It is the inability of a plant to resist the effect of a pathogen or any other damaging factor.
 4. **Parasite** :It is an organism or virus existing in an intimate association with another living organism from which it derives an essential part of the materials for its existence.
 5. **Pathogen** :A pathogen is an organism or virus capable of causing disease in a particular host.
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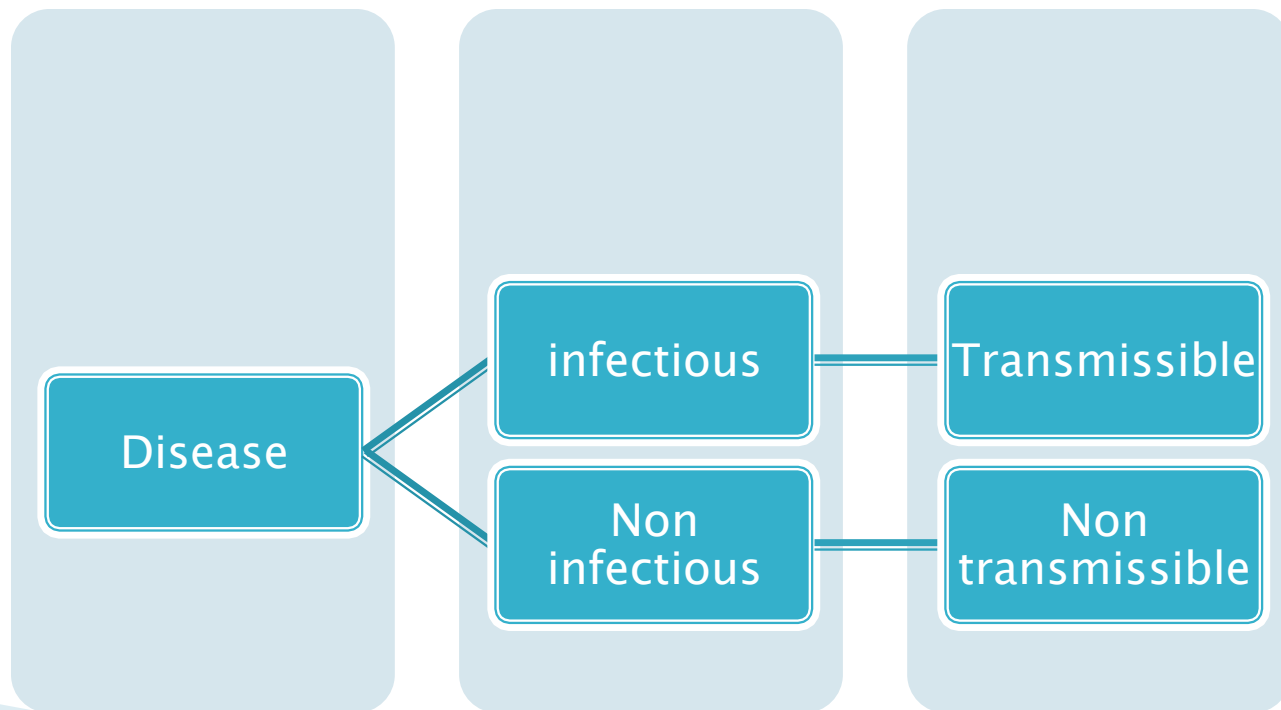
- 6. Resistance** :It is an inherent ability of an organism to prevent or restrict the establishment and subsequent activities of a potential pathogen
- 7. Immunity** :This implies exemption from infection by a pathogen.
- 8. Penetration** :It is the first step in the contact of the inoculum with the host.
- 9. Infection** :It is the establishment of the pathogen inside the host.
- 10. Symptoms** :These are the external and internal reactions.
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CLASSIFICATION OF PLANT DISEASE

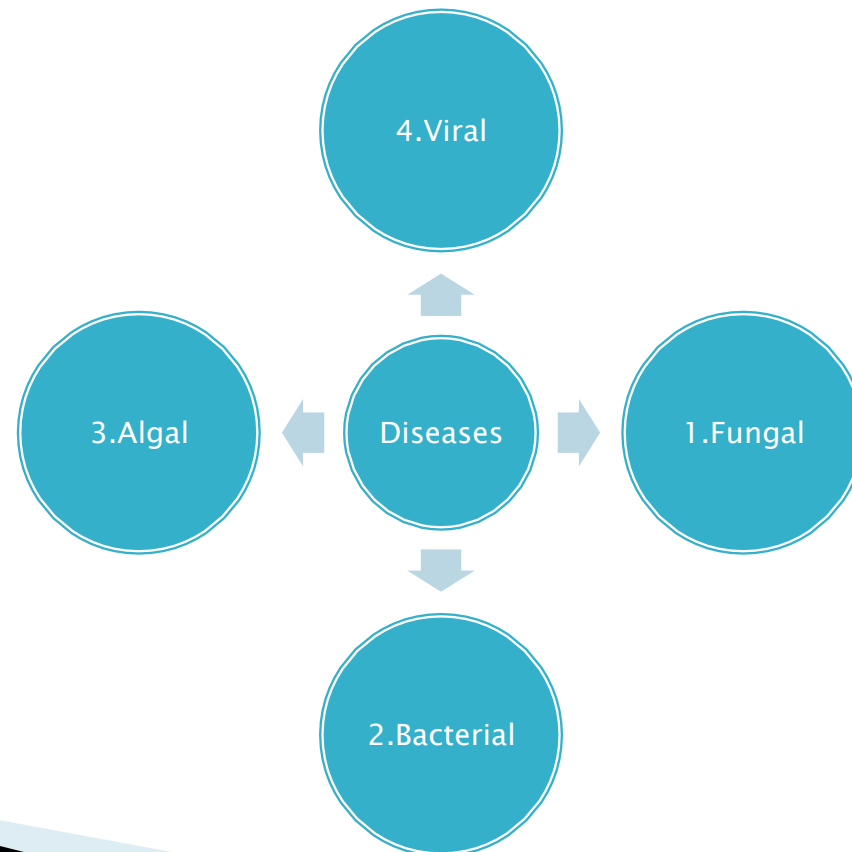


CLASSIFICATION OF PLANT DISEASE

1. Based on infectious nature



2. Based on the causative organism



1. Fungal disease

- ▶ Rust of cereals
- ▶ Abnormal leaf fall of rubber
- ▶ Nut fall of arecanut

Pathogen

Puccinia graminis
Phytophthora palmivora
Phytophthora arecae

2. Bacterial disease

- ▶ Blight of paddy

Pathogen

Xanthomonas oryzae

3. Algal disease

- ▶ Orange rust of tea

Pathogen

Cephaleuros parasitica

4. Viral disease

- ▶ Bunchytop of Banana
- ▶ Tobacco Mosaic Disease
- ▶ Mosaic disease of Tapioca

Pathogen

Banana Bunchytop virus
(*Musa virus*)
Tobacco Mosaic Virus
Tapioca Mosaic Virus

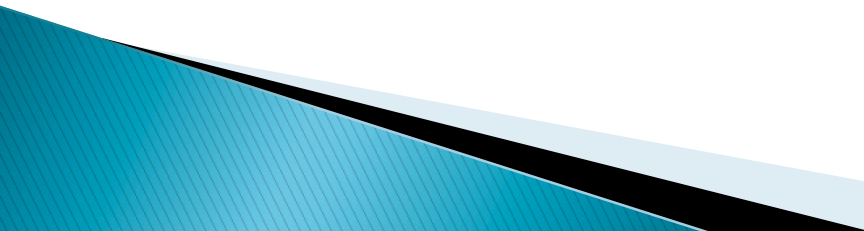
CLASSIFICATION BASED ON THE SYMPTOMS

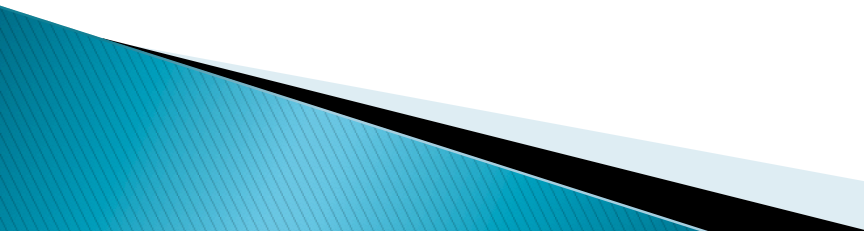


- 1. NECROSIS*
- 2. HYPERTROPHY AND
HYPERPLASIA*
- 3. HYPOTROPHY*

NECROTIC SYMPTOMS

- ▶ **Leaf spots** : The spotted areas produced as a result of killing of cells are called leaf spots. These are produced on leaves .These may be small or big , circular ,oval or irregular in shape and variously coloured. The most usual colour of leaf spots is brown but they may be orange , black or red.
- ▶ **Streaks or Stripes** : The elongated and narrow lesions on leaf blades and other infected parts are called streaks or strips.
- ▶ **Rots**: The infected tissues die and decompose due to disintegration of cells and middle lamella by the action of enzymes.

- ▶ **Damping off:** The disease is most common in seed beds in nurseries. It is caused by soil-inhabiting saprophytic fungi.
 - ▶ **Blight:** Blight implies sudden and extensive damage to the leaves and plant parts. This symptom gives the burnt appearance to the infected organ.
 - ▶ **Die back:** It is a kind of blight where death of plants begins from the tip backwards.
 - ▶ **Wilts :** Symptoms of the wilt first appear in succulent shoots and leaves which become limp during bright periods of sunlight.
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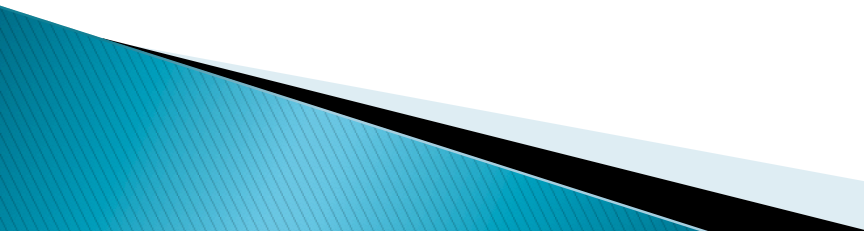
- ▶ **Scab:** The symptoms appears in the form of crusts on the surface of leaves , twigs and all other plant parts above ground.
 - ▶ **Cankers:** A canker is a dead area, usually deep - seated in the bark or cortex of stem , leaves and fruits . It is formed by the death of bark tissue.
 - ▶ **Smuts :**Symptoms of smut usually appear in floral organs, particularly ovaries . The infected parts are transformed into sooty or charcoal like powdery masses.
 - ▶ **Rust:** Symptoms of rust appear on all vegetative areal parts of plants in the form of blisters.
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HYPERTROPHY & HYPERPLASIA

Sometimes the disease symptoms are characterized by overgrowth and over development of tissues and organs. It leads to the formation of abnormalities . Increases in size due to enlargement of cells is called hypertrophy.

Increase in size due to increase in cell number is called hyperplasia.

Abnormal excessive growth of plant organs develop the following outgrowth

1. Elongated Internodes : The infected plants develop extraordinary elongated internodes and become abnormally tall
 2. Gall and tumours : These are variously shaped abnormally enlarged outgrowth produced on plant organs
 3. Floral abnormalities: The symptoms appear in the form of swollen and deformed inflorescence and floral parts.
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Hypotrophy or Atrophy

This symptom is characterized by undergrowth and underdevelopment of tissues and organs. The growth of plant parts become arrested and suppressed.

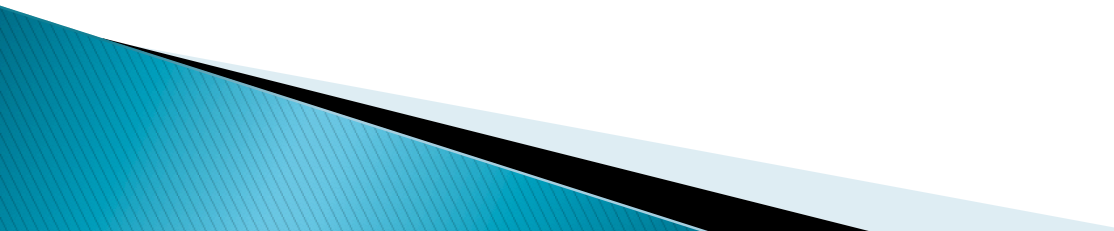
Symptoms of hypotrophy

1. Colour changes: One of the most common and most noticeable symptoms of plant diseases is a change in natural colour of plants

CLASSIFICATION BASED ON CAUSAL AGENCIES

1. **Animate disease:** The diseases caused by animate pathogens are called animate diseases. They are living organisms which parasitise on hosts and cause diseases. These diseases are caused by bacteria, fungi, mycoplasma, insects, protozoas, etc.
2. **Viral diseases :** The disease caused by viruses are called viral diseases. These diseases are not included among animate diseases because viruses are not regarded as living organisms. They are regarded as living as well as non living .

3 . Inanimate diseases : The diseases caused due to factors other than viruses and animate pathogen such as , inadequate environmental conditions, deficiency of essential elements in the soil , temperature , moisture ,PH or presence of poisonous substances.





▶ *THANK YOU*