

Botany (H) CBCS Syllabus WBSU
Semester-II
Core Course III: Mycology and Phytopathology
Course Code: BOTACOR03T
Unit 9: Phytopathology

Terms and concepts:

Phytopathology

Phytopathology or plant pathology is the science of diagnosing and managing plant diseases.

It covers all infectious agents that attack plants and abiotic disorders, but does not include herbivory by insects, mammals, etc.

Approximately ten percent of food production is lost to disease worldwide.

Common pathological terms

- **Pathology** is the study of disease.
- **Disease** is any abnormal disturbance of the **function** or **structure** of the human body as a result of some type of **injury**.
- **Pathogenesis** refers to the sequence of events producing **cellular changes** that lead to observable changes known as **manifestations**.
- **Manifestations** can be displayed in a variety of fashions.
- **A symptom** refers to the patient perception إدراك of the disease (e.g. headache).

Plant Disease: A **physiological disorder** or **structural abnormality** that is harmful to the plant or only its parts or products that reduced the economic value.

Disorder: Non-infectious plant diseases due to **abiotic causes** such as **adverse soil and environmental conditions** are termed disorders.

Disease Incidence : the **number of plants** affected by a **disease** within a population. E.g. soil borne diseases, nematodes

Disease Severity : the **measure of damage** done by a **disease**. OR **Amount of disease** present in a population. E.g. Leaf, stem, seed diseases

Necrotroph : an organism (parasite) that causes the death of host tissues as it grows through them, **obtaining its energy from the dead cells**.

Saprophyte : an organism that obtains **nourishment from non-living organic matter** (usually dead and decaying plant or animal matter) by absorbing soluble organic compounds.

Pathogenicity: The **capacity of a pathogen** to cause disease.

Pathogenesis : is the **chain of events that lead to development of disease** in the host (or) sequence of progress in disease development from the initial contact between the pathogen and its host to the completion of the syndrome.

Virulence: The **degree of pathogenicity** of a given pathogen.

Virulent: Capable of causing a severe disease; **strongly pathogenic**.

Avirulent (non-virulent): **Non-pathogenic** or lacking virulence.

Infection: The **establishment of a parasite** within a host plant.

Latent Infection : where the **host** is infected with a **pathogen** but does not show any symptoms.

Plant disease basics: the disease triangle

Plant diseases can be analysed conveniently using the concept called the 'Disease Triangle' ; this places the three factors which must interact to cause plant disease at the three corners of a triangle. Those three factors are:

- **susceptible host**,
- **disease causing organism** (the pathogen)
- **favourable environment** for disease.

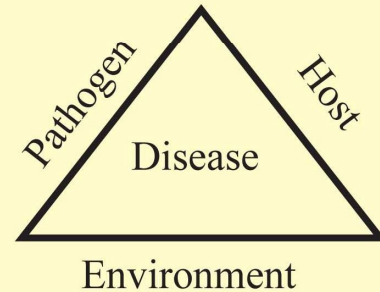
The **host** is the plant itself; some can fall victim to many diseases, others only suffer particular ones. So all plants have a range of susceptibilities to a range of diseases. The **pathogen** is the disease. Diseases of plants are most often caused by fungi but there **are** some plant pathogenic bacteria and viruses.

Without the right host in the right conditions, pathogens cannot cause any harm. Some pathogens are specific to only one or a few host plants, others have broad abilities to attack almost everything. The **favourable environment** essentially means the weather conditions needed for a pathogen to thrive (this is an important point; it's 'a favourable environment for disease' and if the pathogen is present and disease results, it's obviously an **unfavourable** environment for the plant).

Disease Triangle

For any plant disease to happen, three factors must be present and conducive for disease.

1. the Host - Consider what is its condition resistance, predisposed, or age?
2. the Pathogen - What is the condition of the pathogen, virulence, dominant, population? What environmental conditions does it require?
3. the Environment - The environmental conditions include:
 - For foliar diseases - moisture & temperature
 - For soil diseases - temperature, pH, compaction (plant health, O₂), texture for nematodes



Sources:

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