

JOB ROLE – FLORICULTURIST (OPEN CULTIVATION)

Sector – Agriculture

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PPT's for Class XI



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UNIT 6: INSECT PESTS, DISEASES AND WEED MAAGEMENT

Session 2: Disease Management

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Session Objectives

The student will be able to :

- Explain symptoms of plant diseases.
- Describe integrated disease management.

Introduction

Any abnormality in the normal functioning of a plant caused by pathogen, which is harmful to the plant or its parts or reduces its economic value is called 'disease'. It is the interaction between susceptible host and virulent pathogen in a favourable environment.

Symptoms of Plant Diseases

Spot

The cells are killed in a limited area and the dead tissue, usually, becomes some shade of brown. In many cases, other colour changes, such as yellowing, precede the death of cells. The leaf spot diseases are numerous, the same host sometime being affected by many types.



Black spot of rose

Symptoms of Plant Diseases

Blight

The term means a burnt appearance. It expresses the sudden death of the plant or its conspicuous parts, i.e., leaves, blossoms. The dead organ of the plant, generally, turns into brown or black and may soon decay.

Damping-off

It is a common and serious disease in nurseries. Damping-off is a pre-emergence and seedling disease caused by various fungi, such as *Pythium*, *Phytophthora*, etc. at the time of seed germination near base of the seedlings girdlings takes place and infected seedling collapse due to rotting in the collar region.

Symptoms of Plant Diseases

Powdery mildew

It is characterised by white and powdery fungal growth first on the upper surface of a leaf, then covering the lower surface, stems, thorns and floral buds during prevalence of dry conditions.



Symptoms of Plant Diseases

Wilt

The most striking effect is drying or wilting of the entire plant. The leaves and succulent parts lose their turgidity and droop. This effect is, generally, seen on young growing tips. Later on, the whole plant may start to dry up.

Dieback

It is a symptom of invasion by one or various pathogens, where first yellowing, then blackening and then drying starts to take place in plants from top to bottom. Its initial symptoms are visible as blackening of stem parts but afterwards the whole plant dies.

Symptoms of Plant Diseases

Rust

Black, brown, reddish or bright orange pustules appear on both the sides of leaves and expanded into a larger spot. These also infect the stems, more serious being during favourable environmental conditions. Infected leaves fall off prematurely and stems are likely to wither.



Rust of Geranium

Symptoms of Plant Diseases

Necrosis

It means the death of the infected cell or disintegration of tissues. This includes diseases, like blast, blight, canker, damping-off, dieback, rots, bud rot, bulb rot, etc., blight of conifers, fleck of lily.

Flower bud rot

It appears as rot of the floral buds. Older leaves develop few deep brown necrotic spots. In humid weather, its infection becomes serious.

Symptoms of Plant Diseases

Root-knot nematodes

They have been found feeding on roots by making galls in roots, which cause foliage yellowing. In severe cases, the plant even dies.



Symptoms of Plant Diseases

Leaf mosaic

Plants look mottled because of dark and light green area and also yellow patches, e.g., viral diseases.



Rose Mosaic

Symptoms of Plant Diseases

Leaf curl

Leaves get deformed and twisted. They roll or curl towards midrib and become stunted in growth. Whole plant becomes dwarf and gives a sickly look.



Integrated Disease Management (IDM)

It is the integration of the methods used for avoiding and controlling diseases. IDM is defined as a decision-based process, including all possible control measures for optimising the control of pathogen to keep the pathogenic population under control or below the level of economic loss.

Integrated Disease Management (IDM)

Cultural method

Tillage: Soil-borne fungi, bacteria and nematodes, serving as sources of infection, perpetuate in the soil. When the soil is ploughed, they get exposed to high temperature of the Sun. This reduces their population or activity within the soil.

Field sanitation: Clean cultivation means removal of crop residues and keeping the bunds clean so that the pest population is minimised in the field. Plant disease can be controlled by regular destroying of the diseased plant or weeds, which disrupt the disease cycle, and thus, prove as an effective source of control.

Integrated Disease Management (IDM)

Cultural method

Crop rotation: Crop rotation with different crops or families breaks their persistence. Starvation of pests due to unavailability of susceptible hosts for long time makes it difficult for pests to survive.

Resistant varieties: Resistant varieties of flower crops have provided one of the most successful approaches to control plant pathogens of many crops, especially those which cannot be controlled by any other means.

Integrated Disease Management (IDM)

Cultural method

Alternation in sowing time: Manipulation of sowing time and selection of early or late varieties also dodge pathogens. Certain diseases, like early blight, late blight, etc., are time-bound and require particular stage of growth of the plant to infect.

Seed treatment: Most of the seed and soil-borne diseases, such as damping-off, wilt, rots, dieback, anthracnose, etc., attack the crop through seeds or soil. Seed treatment reduces the chances of infection.

Crop density: It is desirable to plant the crop at required spacing for protect incidence of many diseases to a healthy plant in a dense.

Integrated Disease Management (IDM)

Mechanical method

It includes uprooting or pruning off diseased plants or parts so that infected material may not be able to transmit pathogens to healthy ones. Training and staking the crop facilitates plants so that their leaves may not come in contact with the soil, and thus, infection or infestation is controlled. Erecting nets, sticky bands and mechanical traps control insect-vectors that may transmit viruses.

Integrated Disease Management (IDM)

Bio-control of plant diseases

This is the most common method adopted nowadays as a biological control against many soil-borne diseases. Fungi *Trichoderma herzianum* and *T. viride*, and bacterium *Bacillus subtilis* have antagonistic properties against many fungi causing wilt and rot. Extracts of some plants are also well-known for their fungicidal properties. These are being used since a long time as pesticides. The extracts may be applied as soil or seed treatment or as sprays.

Integrated Disease Management (IDM)

Chemical control

Use of fungicides: Chemical or combination of chemicals found lethal to fungi and escapes the host from infection is called 'fungicide'. Fungicides, according to their movement in the plant system, are of two types — systemic, which on application on plants gets dissolved in the cell sap and affectivity translocates to the whole system of plant irrespective of the place of application, such as Benlate, Carbendazim (Bavistin), etc.; and contact fungicides, whose action on plants is restricted to the area of application, such as sulphur, mancozeb, Zineb, Rovral, etc.

Integrated Disease Management (IDM)

Chemical control

Fungicides application:

Soil drenching: In case of soil-borne infection of fungi (wilt, damping off, root rot) or nematodes (root-knot), fungicide or nematicide should be applied to the soil. Such fungicides are carbendazim, formaldehyde, etc.

Seed treatment: To avoid infection from the soil, as well as, from the seed, the easy way is seed treatment. Generally, seeds are treated at the rate of 2.0–2.5 g fungicide/kg of seed. Fungicides used are *Carbandazim*, *Carboxin*, *Oxathin*, etc.

Integrated Disease Management (IDM)

Chemical control

Fungicides application:

Pasting to affected parts: In case of scorching Sun or in gummosis, the affected parts, such as stem, are pasted with Bordeaux paste.

Dip method: In this method, seedlings and cuttings are dipped before planting in the fungicidal solution for certain period to avoid infection, e.g., Benlate, Captafol, Carbendazim, Maneb, Sulphur, Zineb, etc.

Integrated Disease Management (IDM)

Chemical control

Fungicides application:

Foliar application: Aerial parts affected by foliar diseases can be controlled through foliar sprays of fungicidal formulations. Specialised sprayers are available for treatment. These fungicides are sulphur, copper oxichloride, Maneb, Zineb, Nabam, etc.

Summary

In this session you have learnt about the symptoms of plant diseases and integrated disease management.

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