

Benha university.

Exam(4th year Micro&Chem).

Faculty of science.

Time:-1hour.

Botany Department.

June 2013

Answer the following questions:

1- Major characteristic of Biotrophic and Necrotrophic pathogens?

2- How are fungal disease managed ?

3- How do pathgen establish infection?

4- *Write briefly on :-*

A - Wilts

B- Damping-off

With best wishes.

1- Major characteristic of Biotrophic and Necrotrophic pathogens

Biotrophic	Necrotrophic
Host cell not rapidly killed	Host cell rapidly killed
Few or no toxins or enzymes produced	toxins and enzymes produced
Special hostoria formed	No Special hostoria formed
Penetration direct or via natural opening	Penetration via wound/ natural opening
Narrow host range	Wide host range
Unable to grow away from the host	Able to grow away from the host
Attack healthy host at all stage	Attack juvenile or senescing tissues

2 -How are fungal disease managed ?

Avoidance

▶Choose planting sites and planting times to avoid environmental conditions favoring disease.

Exclusion

- ▶Impose quarantines (local and international).
- ▶Plant pathogen-free seed or stock

Eradication

- ▶Rotate to non host crop.
- ▶Remove weed hosts.
- ▶Destroy infested plant debris.
- ▶Apply fungicides

Protection

- ▶Apply fungicides.
- ▶Minimize leaf wetness.
- ▶Plant resistant hosts.

3- *How do pathogen establish infection*

A-Enzymes:

Pathogen secrete extracellular enzymes catalyze, digest plant cell into smaller molecules provide nutrient and aid in the penetration and colonization of host tissues. Enzymes produced by plant pathogens and the compounds they degrade e.g cellulase (cellulose), hemicellulase (hemicellulose), pectinase (pectin), lignase (lignin), protease (protein), Amylase (starch), lipase (lipid). Smaller molecules produced by degradation of polymer can induce the pathogen to produce additional enzymes which serve as elicitors of defense reaction by plant.

B –Toxins:

Produced by necrotrophs, poison plant cells; toxins affect a wide variety of plants and contribute to the ability of pathogen to infect plant and cause disease. Toxins contribute to the development of chlorosis and necrosis in infected plant tissues. They can be divided into two broad groups: Host specific toxins and General or non Host specific toxins.

C- Growth regulators (hormone).

Pathogen produce plant growth regulators directly or affect their production by the plant, either increasing or decreasing normal amount (Auxins, Gibberellins and Cytokines) caused overproduction, more cells (hyperplasia) and larger cells (hypertrophy) to create a site for spore production, nutrition or shelter for the pathogen. Symptoms associated with growth regulators changes include deformation, etiolating, galls, leaf roll/ curl or other deformation, stunting, foolish seedling. Modification of plant cells and plant growth patterns can enhance nutrient absorption or provide a living site for the pathogen.

D – Polysaccharides

Fungi and Bacteria appear slimy due to production of extracellular polysaccharides which have a role and aid the pathogen survival by helping to prevent desiccation, also believed to play a role in pathogenesis for some pathogen and contribute to mechanical blockage in vascular wilts.

4 -a Wilts - Wilts are characterized by a general loss of turgidity of leaves or possibly entire plants due to the loss of water. The loss is most often caused by a blocking of the water flow through the xylem. This blockage can be caused by the presence of various bacteria (*Erwinia*, *Ralstonia*) and fungi (*Fusarium*, *Verticillium*) in the xylem. Wilts may also be observed when there is a destruction of the root system due to nematodes or root-rotting fungi (*Armillaria*, *Phytophthora*, *Pythium*) or an acute water shortage in the soil.

4-b Damping-off - This term describes the rapid death and collapse of young seedlings. Often the seedlings will appear to be almost broken at the soil line. It may be observed in flats of plants begun in greenhouses and can result from infection of the seedlings by the fungal organisms *Fusarium*, *Phytophthora*, *Pythium*, *Rhizoctonia*, or *Thielaviopsis* .