Disease resistance

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What is a plant disease?

- A plant disease is any abnormal condition that alters the abnormal growth or function of a plant. Disease may also reduce yield and quality of harvested product.

- Plant diseases are classified in 2 categories:

  a) Abiotic

  b) Biotic

PLANT DISEASE RESISTANCE

- **PDR** - Protection of plants form pathogens by
  - ✓ Pre formed structures, chemicals, toxins and secondary metabolites
  - ✓ Response of immune system thus by reducing the virulence of pathogen (growth, reproduction and Sporulation)

Abiotic Diseases

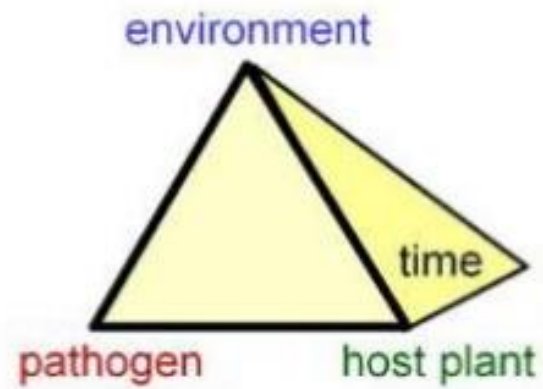
- Are caused by (non-living) environmental conditions such as frost, hail, and chemical burn.
- Damage caused by chronic exposure to air pollutants such as nitrogen dioxide, sulfur dioxide etc.

Biotic Diseases

- Are caused by living organisms such as fungi, bacteria, viruses, nematodes, etc.
- Pathogens may infect all types of plant tissues to include leaves, shoots, roots, fruit, s

The Disease Triangle

- For a biotic disease to occur there must be a susceptible host plant, the pathogen, optimum environmental conditions.



The Disease Cycle

- The development of visual disease symptoms on a plant requires that the pathogen must
  (a) come into contact with a susceptible host
  (b) gain entrance or penetrate the host through either a wound, a natural opening or via direct penetration of the host
  (c) establish itself within the host
  (d) grow and reproduce within or on the host

Biotic Components

Fungi:-

- They damage plants by killing cells or causing plant stress.
- Sources are infected seed, soil, crop debris, nearby crops and weed, which spread by wind and water splash, and through the movement of contaminated soil etc.
- They enter plants through natural openings such as stomata and through wounds caused by pruning, harvesting, hail, insects, other diseases, and mechanical damage.

Common fungal diseases

- White blister/White rust
- Clubroot
- Botrytis rots
- Anthracnose
- Tuber diseases

Viral Infections

- Viruses cause many plant diseases. The spread of most viruses is very difficult to control.
- Viruses are often transmitted from plant to plant by insects.
- Normally, when a RNA virus attacks a cell, it will produce enormous number of copies of itself. The copies, in turn, produce viral protein, which can help to disable the cells defenses to the virus.

Gene Transfer in plants

- Vector used: Ti plasmid of Agrobacterium Tumefaciens.
- Ti Plasmid- Tumor Inducing Plasmid with Transfer DNA.
- Strategy:

→Collect leaf discs

→ Infect the tissue with Agrobacterium carrying recombinant Ti plasmid.

Late Blight in Potato

- produce millions of spores from infected plants under the wet weather conditions that favor the disease.
- Spores produced on infected potatoes can travel through the air, land on infected plants, and if the weather is sufficiently wet, cause new infections


THANK YOU!