BASIC COMPATIBILITY

Pl Path 604
Plant Reactions to Pathogens

Interaction Phenotype: appearance of host infected by pathogen at a given point of time and growth stage of host

Complete resistance

Partial resistance

Highly susceptible

Diagram:
- Host
- Time
- Environment
- Causal agent
Parasitism

- Parasitism
- Parasitism- an exception rather than rule

Non host plant
- The pathogen fails to colonize the host
  - Basic resistance or incompatibility
    - Depends on either host or pathogen or both

Host plant
- The pathogen colonizes host and cause disease
  - Basic compatibility
    - Involves all physiologic and biochemical factors involved in pathogenesis
    - BC is highly specific e.g. Spp. of plant and the pathogen or f. sp
For successful establishment of pathogenicity steps are:

- Attachment to the plant surface
- Germination of spores and formation of infection structures/multiplication of bacteria
- Penetration of the host
- Infection of the host
- Colonization of the host

Plant pathogen interaction is generally susceptible if the fungus produces characteristics symptoms or resistance if plant resist symptoms development and pathogen reproduction.
Recognition

- Initiates after the host and the pathogen come in contact with each other
  - Indicates some kind of communication between the two
  - Begins with onset of biochemical reactions in one or both the interacting units
- Signal- sensor reaction
- Signals
  - Host components acting as signals for recognition by and activation of pathogens are numerous e.g. cutin, galacturonans,
- Elicitors
  - Pathogen components that act as elicitors of recognition by the host plant and subsequent mobilization of plant defenses e.g. b-glucans, chitin, or chitosan
Plant-pathogen interaction

- Homologous interaction (host plant & pathogen)
  - Homologous pathogen
  - Plant exhibit parasitism (susceptibility)
    - Compatible interaction

- Heterologous interaction (non host plant & Pathogen)
  - Heterologous pathogen
    - Plant exhibit resistance
  - Plant show HR: called heterologous HR
    - Incompatible interaction

- Resistance: race specific and non-race specific
TYPES OF INTERACTION

- Homologous interaction (host plant & pathogen)

The interaction of a host plant with a basically compatible pathogen is called as homologous interaction.

- Homologous pathogen
- Plant exhibit parasitism (susceptibility)
- Compatible interaction
- Heterologous interaction (non-host plant & Pathogen)
  - Heterologous pathogen
    - Plant exhibit resistance
  - Plant show HR: called heterologous HR
    - Incompatible interaction
- Resistance: race specific and non-race specific

(Agrios, 2007)
Basic compatibility between plant and a pathogen implies the absence of basic resistance against parasitism so that the plant serve as a host.
The BC could be the result of any of the following:

- The pathogen is insensitive to the plants defense reaction e.g. the pathogen could either tolerate the high concentrations of the defense compounds or the pathogen detoxifies them.
- The plant does not express defense reaction because the attacking pathogen does not trigger in the plant the release of any of the defense reaction.
- The pathogen suppresses the plants defense reaction through suppression.
- The pathogen alters the plant’s metabolism so that the defense reactions cannot be expressed.
Basic resistance and basic incompatibility

- The host deploy no. of defense strategies to counteract the pathogen attack and two main includes:
  - Hypersensitive reaction (HR) or hypersensitive cell death
  - Non-hypersensitive reaction (the cell survives the attack of the pathogen and create new barriers by involving mRNA and protein synthesis)