

Almost all postharvest diseases of fruit and vegetables are caused by fungi and bacteria.

Generally viruses are not an important cause of postharvest disease.

Postharvest diseases are often classified according to how infection is initiated.

The so-called '**latent**' infections are those where the pathogen initiates infection of the host at some point in time (usually before harvest), but then enters a period of inactivity or dormancy until the physiological status of the host tissue changes in such a way that infection can proceed. Example; grey mould of strawberry caused by *Botrytis cinerea*.

The other major group of postharvest diseases are those which arise from infections initiated during and after harvest.

Often these infections occur through surface wounds created by mechanical or insect injury. Wounds need not to be large for infection to take place and in many cases may be microscopic in size.

**POST HARVEST DISEASES AND
DISORDERS OF VEGETABLES**

TOMATO

The tomato (*Lycopersicon esculentum* L.) is one of the most widely grown vegetable food crops in the world, second only to the potato.

Native to Central, South, and southern North America (Mexico to Peru).

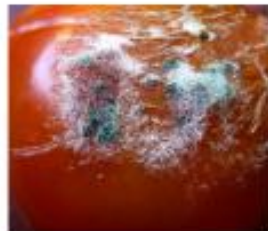
Rhizopus rot: *R. stolanifer*

Symptom:

- On tomatoes, Rhizopus rot appears water-soaked and may exude a clear liquid
- Lesion surface may be covered with thin, cotton-like fungal structures (especially under humid conditions).
- Dark sporulation may crown the white tuft of Rhizopus.
- mycelium can infect neighbouring fruit through natural openings or mechanical wounds, creating coats of mold and diseased fruit



Cotton-like fungal structures



Dark sporulation



Infected tomato



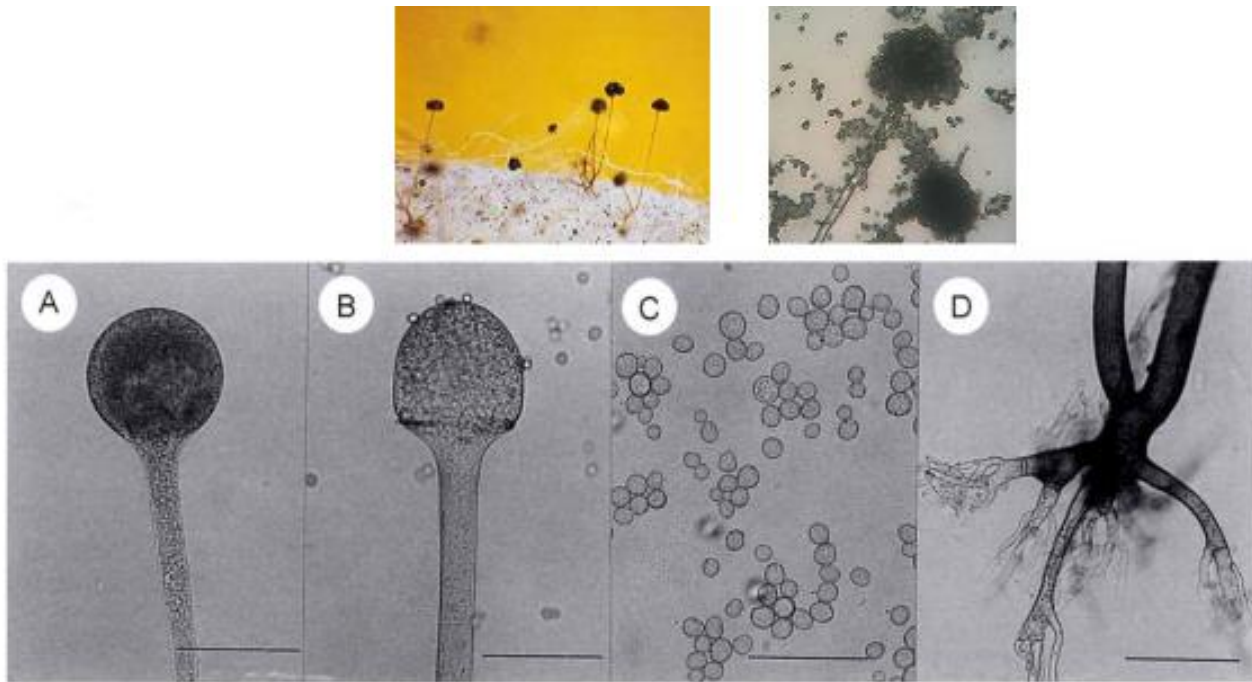


Fig. 2. Morphology of the causal organism, *Rhizopus stolonifer*. A: Sporangium and sporangiophore. B: Columella, C: Sporangiospores, D: Rhizoids and stolons. Scale bar: 20 μm .

The pathogen:

Penetration:

- Wound - cause ripe fruit to rot-Fermentative odour
- Fruit surf. – mycelium, black sporangia
- Range of temp. 5, 15 and 25°C reaching disease incidence of 97-100% RH

Spread:

- Air currents pathogen grows very aggressively even on refrigerated fruit.
- Pallets and cartons, and it may survive for months in fruit residues left in picking containers and field boxes.
- The length of the surface wetness period needs to be longer at the lower temperatures for disease development.

Management:

- Ensure good drainage facility
- In the greenhouse, maintain a RH of less than 80%, during the night
- Remove decaying plant material from the plant bed
- Avoid bruising (hurting) during packing and transport
- Chemical treatments

GRAY MOULD (*Botrytis cinerea*)

Symptom:

- Lesion - a watery area with a light brown or tan- colored central region.
- Converted into a soft, watery mass within a few days.
- Skin is broken, the grayish mycelium and spore clusters develop within a few hours.
- Halo forms around the point of entry -small whitish rings approximately - develop on young green fruit.
- "ghost spots" are usually single rings but may be solid white spots; the center of which contain dark-brown dots.



Tan- colored central region



Mycelium



Soft watery mass



Rott



'Ghost spotting' on fruit



Postharvest fruit Botrytis



Infection of fallen fruit can lead to stem rot

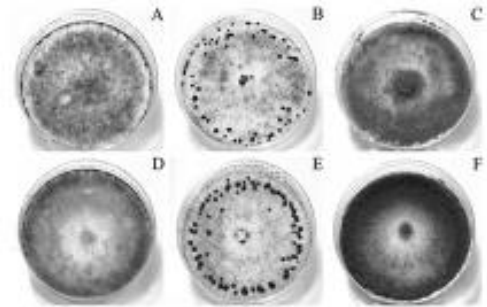
Identification of pathogen:

- Greek botrys, meaning a bunch of grapes
- One-celled spores are borne on branched conidiophores
- Sclerotia -measure up to 3 mm - smaller & thinner
- Germinate to produce conidiophores or, rarely, give rise to small cup-shaped structures (apothecia)



Favourable condition:

- Optimum RH for spore production is about 90%
- Spores are produced during the night when the temperature is lower and the RH is higher than during the day.
- Ideal Temperatures of 17–23 °C
- The length of the surface wetness period needs to be longer at the lower temperatures for disease development



Spread and survival:

- Botrytis produces sclerotia which survive from season to season in soil, dead plant material, or on different host plants
- Sclerotia (resting structures) of *B. cinerea* can survive several years and may germinate to produce dispersal spores or fungal strands that may lead to infection.
- Easily disperse large distances by wind & shorter distances by splashing and windblown rain
- Contact spread is important in bundles of layered stems
- Fruit can be infected through the stem scar, growth cracks, or other breaks in the skin
- Plants approaching maturity are more susceptible

Management:

- Ensure good drainage facility
- In the greenhouse, maintain a RH of less than 80%, during the night
- Remove decaying plant material from the plant bed
- Avoid bruising during packing and transport
- Pre harvest spray 0.2% captan at monthly intervals

Early Blight (*Alternaria solani*)

Symptoms

- Leaves – circular to angular, dark brown to black spots with characteristic concentric rings
- Spots coalesce and cause drying of leaves
- Stem- dark spots at base near the ground and gradually girdled
- Spots- juncture of the side branches easily broken by wind



Symptom:

- The fruit become infected-through the calyx or stem attachment, either in the green or ripe stage. Concentric ring present on the fruit surface.
- Appear leathery and may be covered by a velvety mass of black spores.
- Infected fruit frequently drop, and losses of 50% of the immature fruit may occur.



Early blight



Black spores



Identification of pathogen:

Fungus:

- Mycelium- septate, branched, light brown, become darker with age
- Conidiophores- 50 to 90µm in length and dark coloured
- Conidia-beaked, muriform, dark coloured and borne singly



Spread and survival:

- Spread by wind and rain splashes
- Under dry conditions- survives in infected plant debris in the soil for 3 years
- Seed borne



Early blight (*Alternaria solani*) on Tomato



Management:

- Use disease free seeds for sowing
- Field sanitation
- Crop rotation with non solanaceous crop
- Optimum irrigation- to avoid stress condition
- Seed treatment- thiram 2g/kg
- 3 sprays with difolatan 0.2 % at fortnightly interval

T. A.