

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Apple Scab

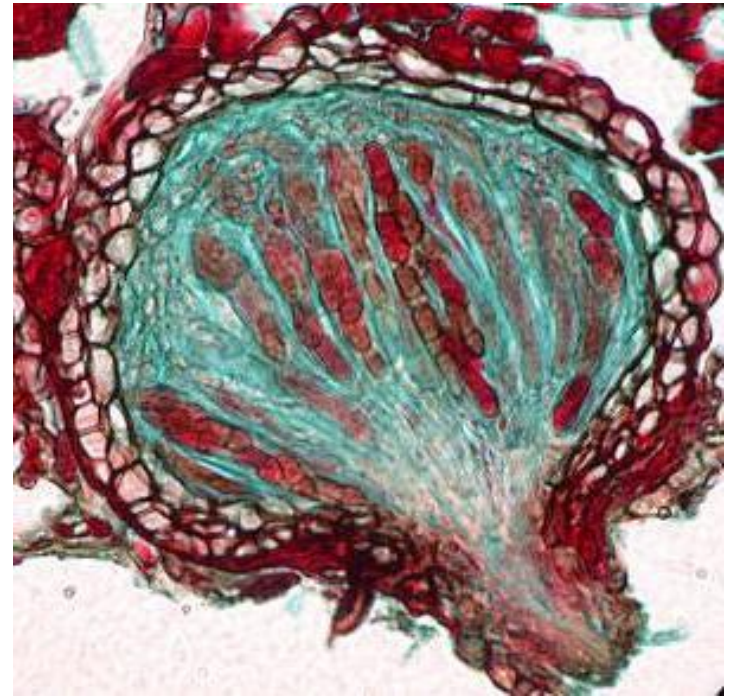
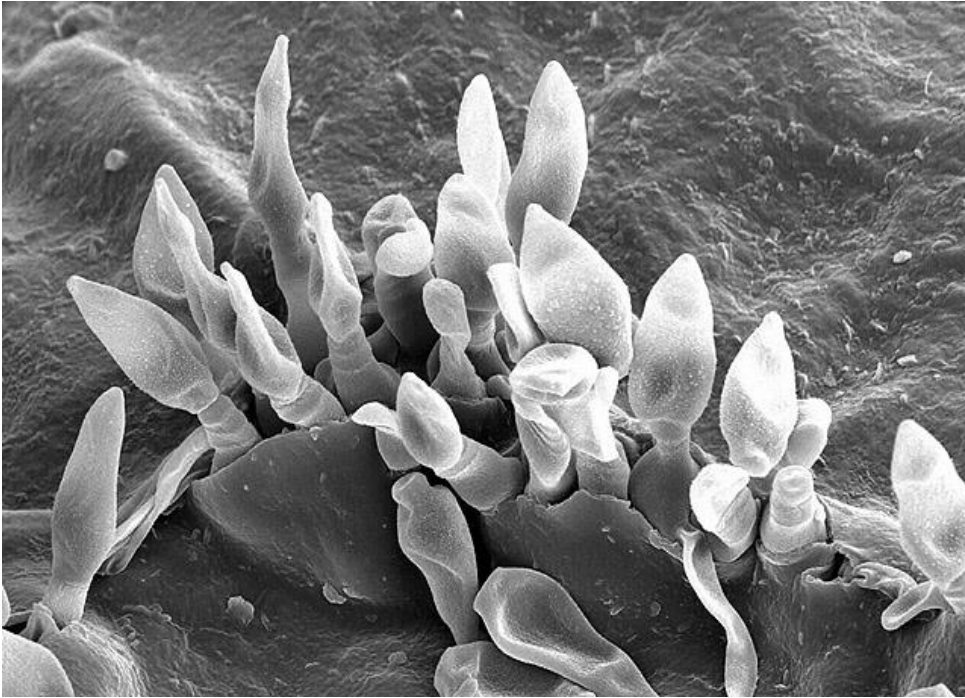
Symptoms:

- Apple scab manifests as black spots on either the upper or lower leaf surface. Young scab spots appear as light green areas which contrast slightly with the healthy surface.
- Fruit infected at early stages of development shows typical symptoms of scab and cracks appear in the skin and flesh of the fruit.
- Infection of mature fruit results in small spots with little distortion.
- **C.O.** *Venturia inaequalis*
- **Anamorph:** *Spilocaea pomi*

Symptoms of Apple Sab



Apple Scab Conidia and Pseudothecium



Epidemiology

- Rainy cool weather favours disease development.
- Favourable temperature is 16-23°C.
- **Control:**
- Collect and dispose of fallen leaves.
- Spray any one of benzimidazole fungicides.

Powdery Mildew of Apple

- **Symptoms**
- Symptoms on leaves of new shoots appear as white, felt-like patches of fungal growth containing mycelium and chains of conidia that cover the leaf and stem.
- Infected leaves become narrow, folded and brittle.
- Infection during flowering results in failure to set fruit.
- ***C.O. Podosphaera leucotricha* (Ell. and Ev.) Salm.**

Symptoms of Powdery Mildew on Apple Leaves



Symptoms of Powdery Mildew on Apple



Epidemiology

- **Temp.** 19-22°C
- **Humidity:** 90%
- **Control:** Spray of Topsin-M @ 1 gm/litre of water.

Diseases of Pear

- Pear (*Pyrus communis* L.) is a mild sweet fruit that is a delicious source of fiber, potassium, antioxidants, flavonoids, vitamin C, K and copper.
- Oldest cultivation sites are found in France.

Pear Scab

- **Symptoms**

- Yellow or chlorotic spots are formed on leaves.
- Dark olive green spots appear on leaves and fruit.
- Velvety growth on spots on undersides of leaves may be observed.
- Twisting and distortion of leaves occur.
- Severely infected leaves turn yellow and drop from tree.

- **C. O.** *Venturia pyrina*

Symptoms of Pear Scab on Fruit



Symptoms of Pear Scab on underside of leaves



Disease Cycle

- Fungus overwinters on dead foliage on ground.
- Spores are dispersed by wind.

- **Factors Favouring**
- High moisture encourages fungal growth.

Management

- Orchard sanitation should be adopted.
- Prune affected portions of the tree and remove diseased foliage or fruit which become important sources of inoculum for the next season.
- Bordeaux mixture should be sprayed if humid conditions prevail as soon as leaf tips emerge.
- Fungicidal treatment for Apple and Pear scab is the same.

Alternaria Fruit Rot of Pear

- **Alternaria rot** is characterized by circular, dry, shallow lesions covered with olive green to black mycelial growth.
- The infected tissue becomes brown.
- It infects fruit in the orchard through skin breaks or areas weakened by sunburn or bruising.
- This remains a minor pathogen but its frequency can vary between seasons.

Symptoms of Alternaria Rot on Pear



Management

- Spray of Amistar @ 0.5 ml / liter of water.

Fire Blight of Apple and Pear

- **Symptoms:**
- Fire blight is a destructive bacterial disease found on apples, pears and other members of the rose family.
- It has been named for the scorched appearance of infected leaves.
- The disease enters the tree at the tips of the branches travelling down the stems.
- Symptoms of fire blight can be observed on all above ground tissues including blossoms, fruits, shoots, branches and limbs and rootstock.

1. Symptoms on Blossoms and Young Shoots

- Blossom symptoms are first observed 1-2 weeks after petal fall.
- The floral parts become water soaked, dull and grayish green. These tissues show shriveling and development of black colour.
- During periods of high humidity, small droplets of bacterial ooze form on discolored tissues.
- Bark on younger branches become dark and show cracks and amber-colored bacterial ooze.

2. Symptoms on Pear and Apple Fruits

- Water-soaked lesions form on surfaces of immature fruit and later turn brown to black.
- Droplets of bacterial ooze may form on lesions, usually in association with lenticels.
- Severely diseased fruits blacken completely and shrivel.



Fire Blight in Apple Blossom



Fire Blight Symptoms on Pear Blossom Cluster

Symptoms of Fire Blight on Apple Leaves



Bacterial Ooze



Diseased and Healthy Shoots of Pear



Fire blight Canker



Apple Fruit Showing Signs of Bacterial Ooze



Pear Shoot with Fire Blight Symptoms



3. Symptoms on Apple Rootstocks

- Rootstock infections may develop close to graft union as a result of internal movement of the pathogen through the tree.
- Water-soaking, cracking and signs of bacterial ooze become evident on the bark of infected rootstocks.
- Red-brown to black streaking is also seen in wood just under the bark.
- ***C.O. Erwinia amylovora***

Symptoms on Apple Rootstock



Cankers caused by Fire blight on Shoots



Fire blight Symptoms on Apple



Fire Blight Symptoms on Pear



Pathogen Biology

- *Erwinia amylovora* is a member of the family Enterobacteriaceae. Cells of *E. amylovora* are gram-negative, rod-shaped and flagellated on all sides.
- *E. amylovora* is classified as a facultative anaerobe.
- Cells of *E. amylovora* can excrete an extracellular polysaccharide which provides protection to the pathogen by creating a matrix.
- *E. amylovora* has ability to survive as an endophyte within healthy plant tissue including branches, limbs and bud wood.
- Optimum temperature for growth is 27°C.

Disease Cycle

- **Survival and Dissemination**

- *Erwinia amylovora* survives in annual cankers that are formed on branches diseased in the previous season.
- Finding warm temperature in spring, the pathogen becomes active in the margins of cankers.
- Dissemination of bacteria from the canker to flowers occurs through insects attracted to the ooze and rain.

- **Primary infection in flowers**

- Blossom blight starts when cells of *E. amylovora* are washed externally from the stigma to the hypanthium (floral cup).

Disease Management

- Integrated disease management approaches including sanitation, cultural practices, and sprays of chemical or biological agents need to be adopted.
- Overwintering inoculum of the pathogen should be eliminated.
- Overwintering cankers may be removed by pruning trees during the winter.

- **Prevention of Blossom Blight**

- Prevention of blossom infection is essential because infections initiated in flowers are destructive.
- Sprays of antibiotics like streptomycin, oxytetracycline or kasugamycin may suppress blossom infection in commercial orchards. But due to resistance problem, use of antibiotics is not preferred.
- Spray of copper fungicides is effective but should be done on young orchards due to the risk of phytotoxicity on fruit.

*Sources

- 1. Recommended books.
 - 2. Latest research articles downloaded from Google.
 - 3. Google images.
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- *Solely for academic purpose and guidance of students.