

**PAPAYA**

**PINEAPPLE**

**BER**

**AONLA**





# PAPAYA

## Important diseases of Papaya

1. Stem rot : *Pythium aphanidermatum*  
*Rhizoctonia solani*
2. Powdery mildew : *Oidium caricae*
3. Anthracnose : *Colletotrichum papayae*
4. Leaf spots : *Phyllosticta sulata*  
: *Cercospora papayae*
5. Fruit rots : Many fungi
6. Mosaic : *Papaya mosaic virus*
7. Leaf curl : *Nicotiana virus 10*
8. Ring spot : *Papaya ring spot virus*

## Stem rot / Foot rot

Etiology: *Pythium aphanidermatum* & *Rhizoctonia solani*

### Symptom:

- **Water soaked patches** on the stem at the ground level. Patches enlarge and girdle the stem base.
- Affected tissues turn dark brown or black and rot.
- The **twigs** turn **yellow, droop and wilt**.
- **Fruits shrivelled** and drop off.
- In severe condition, the entire plant **topples over** and dies. **Honey comb appearance of the stem inside the bark**.
- **Rotting** may spread above and below on the stem and down to the roots.







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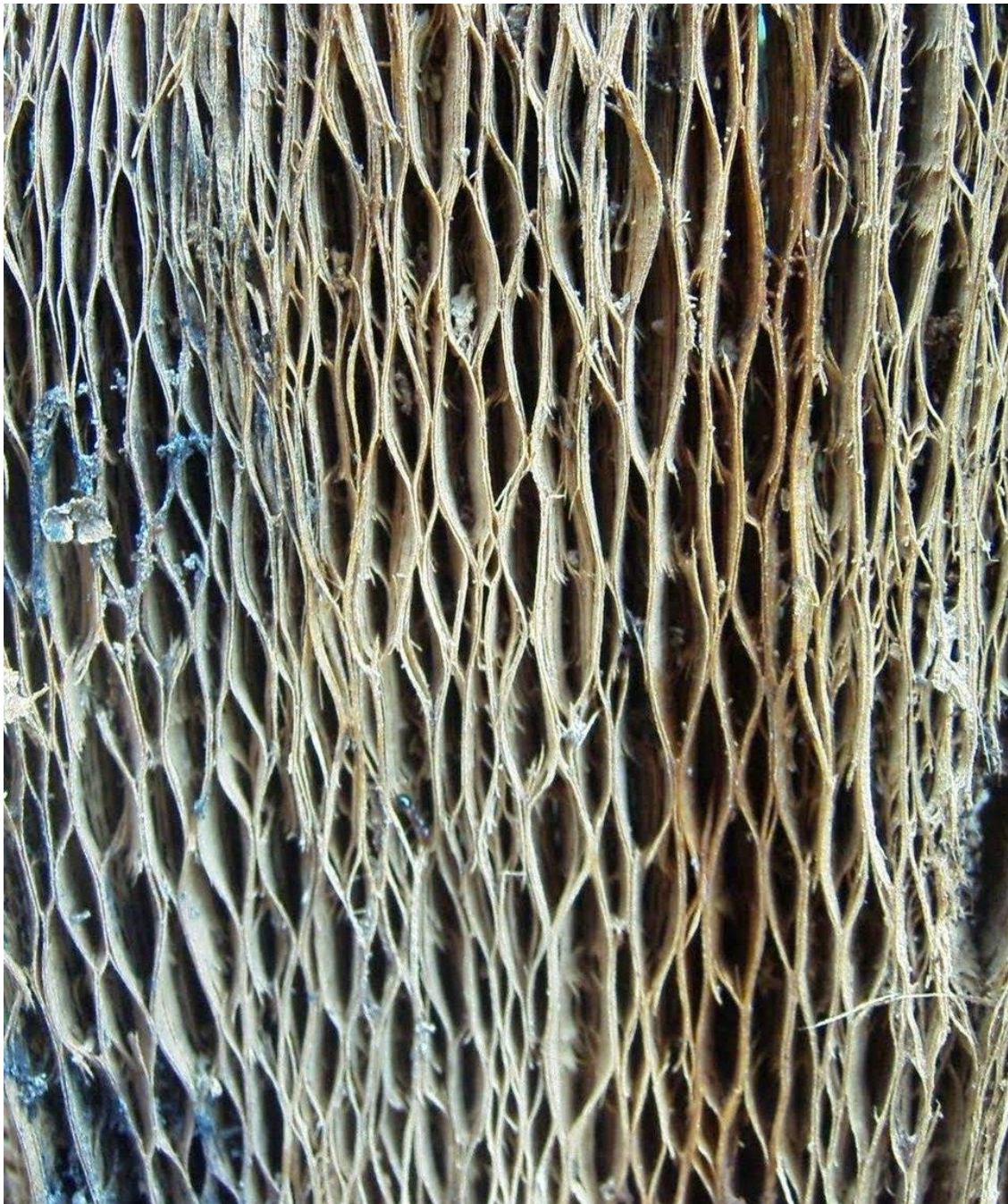




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## Mode of spread and survival:

The fungi survive in the form of oospore or sclerotia in the soil. The seedlings raised in the infected soil carry the disease to the field.


## Epidemiology:


- Young seedlings are more susceptible than one year old trees.
- Stem rot caused by *Pythium aphanidermatum* is commonly noticed in 2 to 3 year old trees.
- The disease usually appears during rainy season and severity increases with the intensity of rainfall.
- Optimum temperature for disease development is 36°C.
- *R. solani* is severe during dry and hot weather.
- and may be destroyed.




## Management:

 Seed treatment with **Captan at 2g/kg** or *Trichoderma viride* **4g/kg** reduces the damping off.

 Seedlings should be raised on **well drained nursery area**.

 Diseased seedlings / plants should be carefully **uprooted and burnt**. The same pit should not be used for replanting.

 **Drenching the base of the stem with Bordeaux mixture 1.0 %** or captan 0.2 % or copper oxychloride 0.25 % or metalaxyl 0.1 % reduces the incidence of the disease.

## Powdery mildew

### Etiology: *Oidium caricae*

It is **an obligate parasite**. The mycelium is hyaline, septate and **haustoria** develops in epidermal cells. **Conidia** are hyaline and granular.

### Symptoms:

- **Diffuse mats** of external, white mycelium develop on both the leaf surface. More common on the underside of the leaves.
- **Lesioned areas** become chlorotic and surrounded by a dark margin.
- **Production of conidia** causes mycelial mats to appear powdery.



- **Flower stalks** and fruits are also affected.
- The fungus also attacks the stem of the young seedlings when grown under reduced light conditions.
- The **typical powdery** growth is found on the stem of the plant.
- **Severe attack** leads to death of top portion of the seedlings.

### **Mode of spread and survival:**

The fungus spreads through **wind borne conidia**.

### **Epidemiology:**


Maximum incidence during **Sep-Nov**. The disease is more severe when the atmospheric temperature was between **16.4 and 22.9°C**, RH between **65 – 85 %** with **6:20 h** of sunshine. The **RH** and sunshine at **14:30 h** is the most important factor for disease development.





## Management:

 The disease is controlled by spraying with **Wettable Sulphur 0.2 %** at 10 days interval.

 Systemic fungicides like **Carbendazim 0.1 %** or **Thiophanate-methyl 0.1 %** at monthly interval is more effective.

# Anthracnose

Etiology: *Gloeosporium papayae* & *Colletotrichum papayae*

Symptoms:

- Spots on **fruits** first appear as brown superficial discolouration of the skin which develop into circular, slightly sunken areas and 1-3 cm in dia.
- Then lesions **coalesce** and sparse mycelial growth appears on the margins of the spots.
- Under humid conditions, an **encrustation of salmon pink** spores are released.
- At early stages it results in **mummification** and **deformation**.



- **Necrotic spots** are produced on the leaves and stems.
- Erupted **acervuli** in concentric rings are seen on the petioles.
- Although the disease usually appears on the **ripening** portion of the fruit but they occasionally **infect its green portions first** causing small lesions.
- After penetration of the fungus, the **latex from the fruit oozes** out in sticky mounds or horns.
- Lesions enlarge very slowly and rarely, larger than 12 mm in dia as long as the fruit remains green.










## Mode of spread and survival:


The incipient infection is carried by the fruits from the field. The disease is spread through **wind-borne conidia**. **Conidia** are also spread by **rain splashes**.

## Epidemiology:

Severity of the disease on foliage is increased under conditions of **excessive moisture**. Old leaves are generally **more susceptible**. Lesions develop more slowly on the immature fruits than on the mature fruits.

## Management:

 Foliar spraying with **Carbendazim** 0.1 % at 45 days interval or **Chlorothalonil** 0.2 % at 10 to 15 days interval or Thiophanate-methyl 0.1 % or **Mancozeb** 0.2 % at 10 days interval controls the disease.

 Two sprays of **systemic fungicides** or four sprays of non-systemic fungicides controls the disease.

 The last spray should be given 10 days before harvest.

 Fumigation with **Benzyl isothiocyanate** controls post harvest spots and rots.



## Leaf spots

### a) *Phyllosticta sulata*

Etiology: *Phyllosticta sulata*

#### Symptom:

- The leaf spots are variable in size, **round, irregular and oval or elongated**.
- The spots are almost **white in the centre** and often bounded by a yellowish or brown colour margin which gradually merges into the normal green colour of the leaf.
- The central portion of the leaf spot is **thin and papery** and ultimately becomes **brittle and falls**.

Mode of spread and survival: The disease spreads through **wind-borne spores**. The disease is prevalent during **Sep-Jan**.

Management: Three or four sprays at monthly intervals with **Bordeaux mixture 1.0 %** controls the disease.

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2 mm

b) *Cercospora papayae*

**Etiology: *Cercospora papayae***

The fungus produces fascicles which are 8 to 10 stalked.

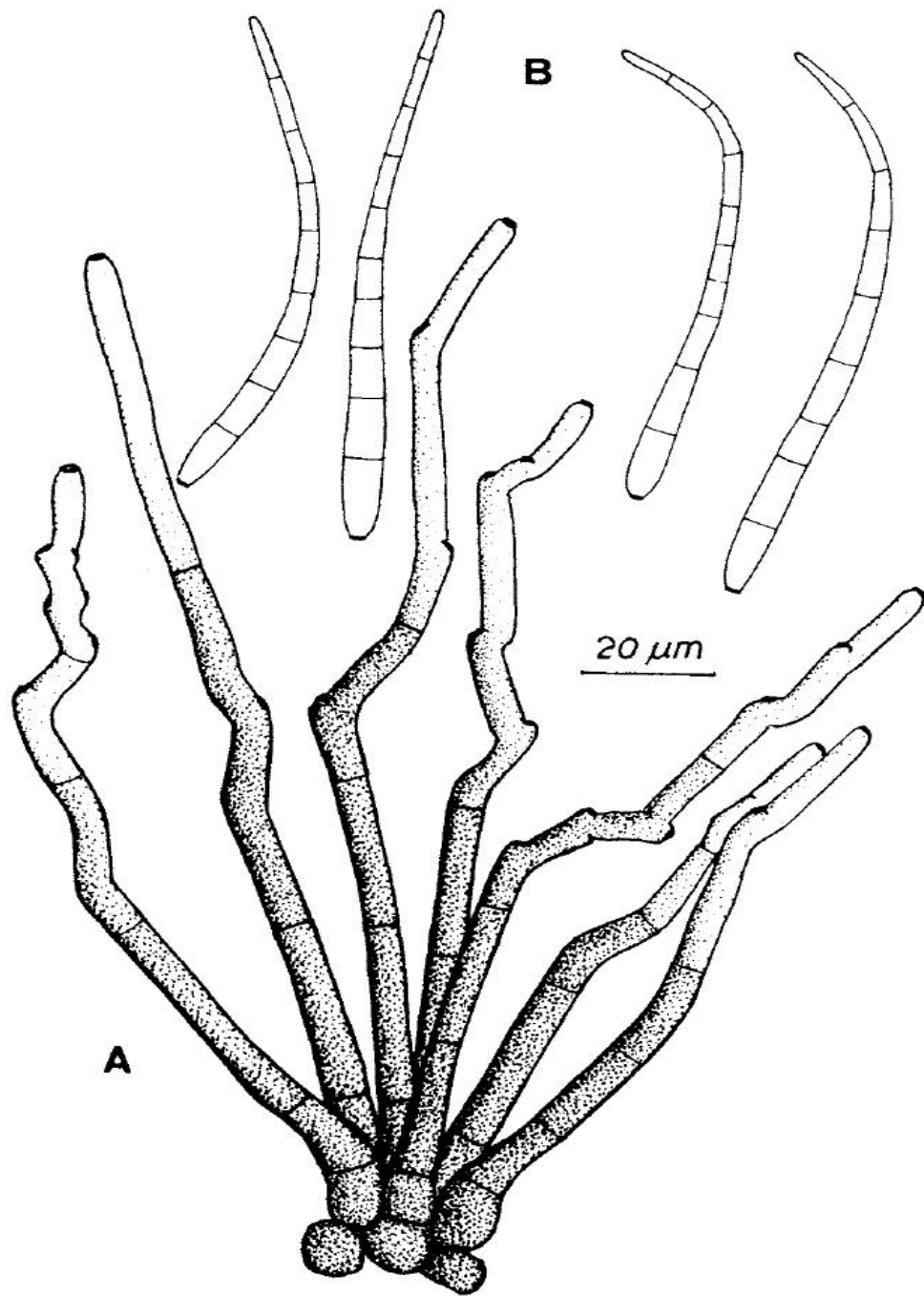
**Conidiophores** are medium brown to pale, more narrower towards the tip, multi septate, not branched. **Conidia** are hyaline, variously curved, large truncate, tip sub-acute and shortest one is almost cylindrical.

**Symptom:**

The spots are sub-circular to irregular, ash coloured on the upper surface, and indistinct in lower surface.







A close-up photograph of several green watermelon leaves. The leaves are heavily damaged by a fungal disease, showing numerous small, dark brown, angular spots (angular leaf spot) scattered across their surfaces. Some of these spots have enlarged into larger, irregular holes, indicating significant tissue loss. The veins of the leaves are clearly visible, and the overall appearance is one of a plant under severe stress. The background is slightly blurred, showing more green foliage and a white object, possibly a container or part of a structure.

Plant Pathology - East-West Seed

## Fruit rots ( Many fungi)

### *a) Rhizopus stolonifer*

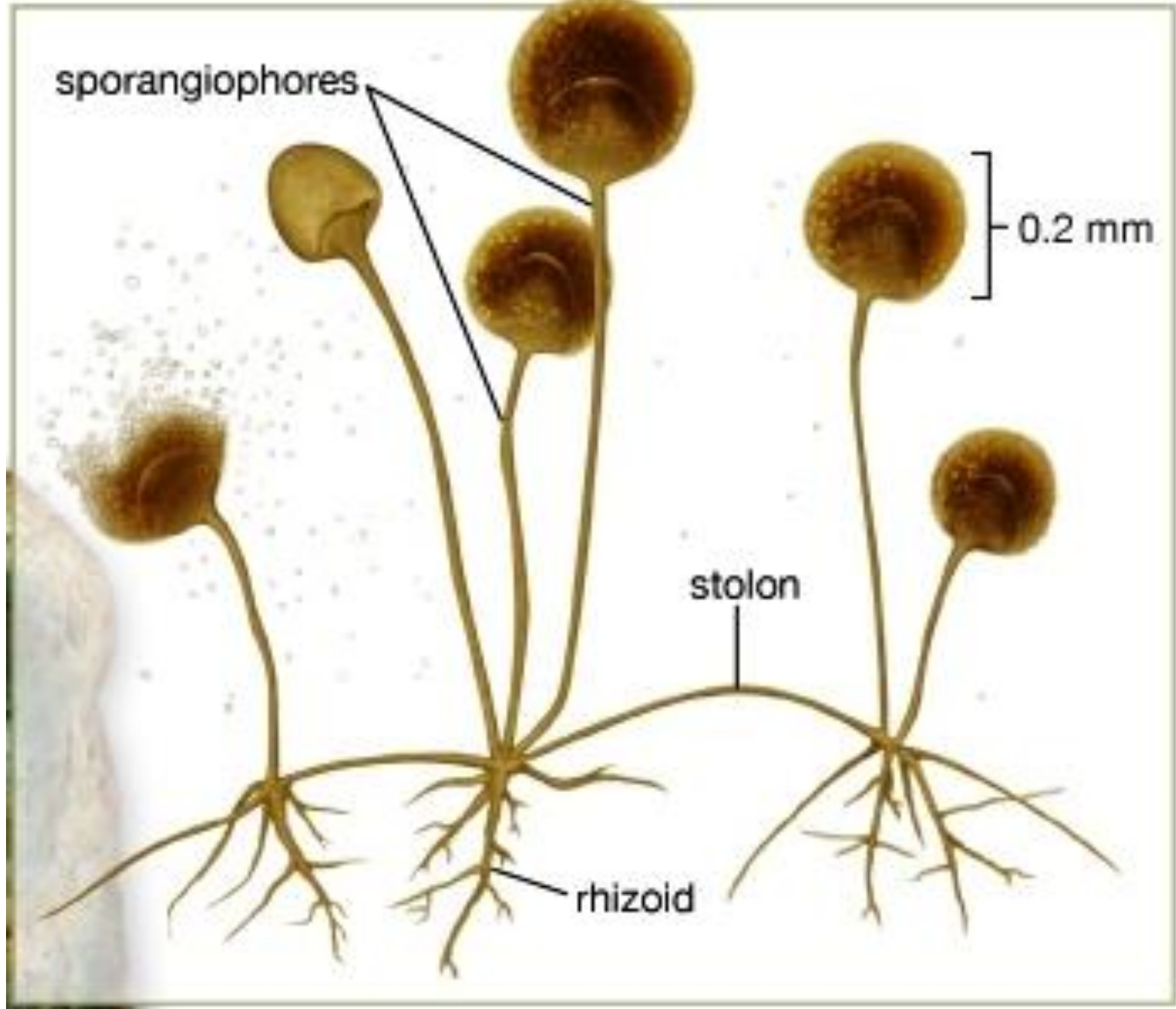
#### Symptom:

The rot is characterised by **irregular, water-soaked lesions**. They gradually enlarge and are covered with white and dark brown fungal growth and **sporangiophores**. Finally the fruit collapses, becomes **watery and emit a fowl odour**. The fungus infects wounds.

#### Epidemiology:

**Fruit fly** punctures after harvest increase the disease incidence. The rot **rapidly destroys** the entire fruit and quickly spreads to other fruits.







## Management:

The disease can be controlled **with DCNA** (2, 6-dichloro-4-nitroaniline) dip at **1,000-2,000 ppm**.

## b) *Ascochyta caricae*

### Symptom:

The fungus causes both **fruit and trunk** rot. It attacks half-grown or mature fruits which show small, circular, **water-soaked spots**. The lesions become **sunken and brownish-black**. The rot usually spreads outwards irregularly.

**Epidemiology:** Rotting is severe at 30°C and 100 per cent humidity.

**Management:**

The disease can be controlled by spraying the fruits with Bordeaux mixture 0.4 % at intervals of 21 to 30 days from the time of setting.

c) *Botryodiplodia theobromae*

**Symptom:**

➤ It incites stem-end rot and a surface fruit rot. It usually induces a wider and softer water-soaked margin and greater internal discolouration.



- **Sporulating lesions** are black and have a rough surface because of **erumpent, confluent pycnidia**.
- The disease development is more rapid on ripe and half ripe fruits than on green fruits.
- The rot begins as dark green, **water-soaked spots**. Later, the affected portion becomes **shrivelled** and turns dark brown.
- The spots are surrounded by a **dark green, water-soaked** area. Infection of **fruit stalk** results in **fruit drop**.

#### d) *Fusarium solani*

**Symptom:** Causes dry fruit rots.

The affected fruits show small, stem-end or surface lesions. Later profuse, **white hyphae** are seen on the **rotted area**.

**Management:**

Hot water treatment of fruits at **49°C for 20 min** controls the disease.

#### e) *Alternaria alternata*

**Symptom:** It is characterised by **grey-brown, circular to semi-circular patches** covered with **mycelium** and **conidiophores**.

f) *Phomopsis caricae-papayae*

**Symptom:** Affected fruit develops a water-soaked spot which increases in size. The whole area becomes **soft and pulpy**. The rotten area turns dark brown to **black**, get depressed and cracks at a later stage.

g) *Macrophomina phaseolina*

**Symptom:** It is characterised by small, **water-soaked** spots which appear as **circular specks** on the fruit surface.

The spots rapidly enlarge and become **sunken**. Deep infection causes rotting and disintegration. **Pulp turns** brown to black.

**Epidemiology:**

Maximum decay of fruits is noticed at **30°C with 100** per cent relative humidity.

# Mosaic

Etiology: *Papaya mosaic virus* (PapMV), *Carica virus 1*.

Virus particles are filaments. The virus has a **thermal inactivation point between 53 and 55°C**.

Symptoms:

- The disease produces typical **mosaic symptoms** showing chlorosis with dark green **blisters** on the leaves.
- The **lamina** is reduced and malformed.
- The stem, petiole and fruits develop elongated **water soaked areas showing** concentric or circular rings or lesions.






- The diseased plant show **decline and marked reduction** in growth.
- As the disease advances, older leaves fall down and a **small tuft of younger leaves is left at the top** which are also malformed and have typical mosaic symptoms.
- Diseased plants of fruits develop innumerable circular, **water-soaked lesions** with spots in the centre.
- In severe cases, the **fruit size is highly reduced** with deformed shape.
- There is no reduction in **the flow of latex**.



## Mode of spread and survival:

The virus is transmitted by sap, grafting and several aphid species (*Myzus persicae*). The vectors transmit the **virus** in a non-persistent manner.

## Management:

-  Healthy planting materials should be used.
-  Periodical inspection and destruction of diseased plants reduce the spread of disease.
-  Weekly spraying with **systemic insecticide** helps in reducing the spread of the disease.

## Leaf Curl

Etiology: *Tobacco leaf curl virus, Nicotiana virus 10.*

Symptoms:

- The disease is characterised by severe **curling, crinkling** and **distortion** of the leaves accompanied by vein clearing and reduction of leaf lamina.
- The leaf margins are rolled downward and inward in the form of **inverted cup**.
- The **veins** get thickened and turn dark green.
- The leaves **become leathery and brittle** and petioles are twisted.
- Affected plants bear only a few flowers and fruits. In advanced stages, defoliation takes place and growth of the tree is **stunted**.









## Mode of spread and survival:

The disease is transmitted by **grafting** and **white fly**, *Bemisia tabaco*. It is not sap transmissible.

## Management:

 Infected plants should be **destroyed** even in the nursery.

 In the orchard the affected plants should **be rogued** and destroyed.

 In addition, spraying with **Monocrotophos** or **Dimethoate** controls the insect vector and reduces the disease in the field.

## Ring spot

Etiology: *Papaya ring spot virus (PRSV)*

The virus particles are rod shaped. Thermal inactivation point of the virus lies between 54 and 60°C.



## Symptoms:

- It causes **vein clearing, puckering or bulging** of the leaf tissues between the secondary **veins and veinlets** on the upper surface of the terminal leaves.
- The margins and distal parts of young leaves **roll downwards and inwards**.
- The virus induces **mosaic mottling**, dark **green blisters**, necrosis of chlorotic areas, leaf distortion which result in **shoe-string symptoms** and stunting of the plants.
- On the stem of young plants, mosaic or mottle symptoms also show dark green spots and **oily or water-soaked** streaks.
- The fruits are smaller, deeply lobed, lopsided, show circular and concentric rings and contain 40 % lower sugar content. **Latex quality** from diseased plants is poor.








## Mode of spread and survival:

The virus **is sap transmissible**. It is transmitted by **insect vectors**. The virus is transmitted in a non-persistent manner. It is neither soil-borne nor seed-borne.

## Management:

 Diseased plants should be **rogued out** and destroyed.

 Spraying with insecticides like **Monocrotophos** controls the insect vector effectively and reduces the incidence.



# PINEAPPLE



## Important diseases of Pineapple

1. Heart rot : *Phytophthora cinnamomi*
2. Base rot : *Ceratocystis paradoxa*
3. Wilt : *Pineapple wilt virus*

## Minor:

- a) Fruit let core rot : *Penicillium* sp. & *Fusarium* sp.
- b) Bacterial fruit rot : *Pantoea ananas* pv. *ananas*  
(*Erwinia ananas*)

## Heart rot / Stem rot / Root rot

Etiology: *Phytophthora cinnamomi* & *P parasitica*.

Sporangiophores are thin. Sporangia are broadly ellipsoidal, non-papillate with slight apical thickening.

Oospore wall is colourless.

Symptoms:

➤ In young plants change in the colour of the leaves from normal green to a yellowish green and a browning of the leaf tips.

➤ A gentle tug on the central leaves cause them to come out in a group.

- The base of the leaves show **yellowish white rotten** area bordered by a distinct and characteristic brown margin where the **chlorophyll** region commences.
- The affected area has a fowl odour due to secondary bacterial invasion.
- The **rot extends** into the stem of the plant, producing a **soft, cheese-like, rotting** condition. In older plants, succulent tissues at the upper part of the stem are attacked.
- The fungus is believed to get in to the leaf axils with soil thrown there during cultural operations or possibly conveyed by gusts of wind.
- The **other phase** of the disease **is root rot**. The roots of plants are largely destroyed and the plants are stunted, and fruit formation is delayed or does not occur at all.





## Mode of spread of survival:

The fungus are soil inhabitants and survive in the soil in the form of **oospores**. The spores are transported to the plants in run off **water, soil wash and rain splashes**.

## Epidemiology:

*P. parasitica* causes heart rot under warmer and drier conditions than *P. cinnamomi*. It is frequently associated with **alkaline soils**. *P. cinnamomi* is serious in cool, wet soils where disease development is enhanced by high rainfall and cool temperature **(25°C) and poor drainage**. Heavy rain soon after planting leads to heavy disease incidence. Plants of **one or two year old age** are more susceptible.

## Management:

🍌 Deep planting should be avoided.

🍌 Soil should not be allowed to **enter the hearts** during planting.

🍌 Diseased plants should be **removed and burnt**.

🍌 In filling the gaps, the replants should be diffused in **copper oxychloride 0.25 %** or **Bordeaux mixture 1.0 %**.

🍌 While **clipping is done**, care should be taken **not to** cause injuries as they serve as points of infection.

## Base rot / Fruit rot

Etiology: *Ceratocystis paradoxa*

The mycelium is colourless to brown. **Microspores** hyaline at first, then become almost black, thin walled and cylindrical. They are produced endogenously.

**Macrospores** are elliptical but may be truncate, pyriform or spherical. They are produced on short lateral conidiophores and are usually in chains of upto 20.

Symptoms:

- It is typically **black rot of the butt** of the plant.
- The softer tissues are destroyed and only **stringy fibers** remain.
- **Decay of the butt** is followed by **wilting of the foliage** and the diseased plants break off at ground level.

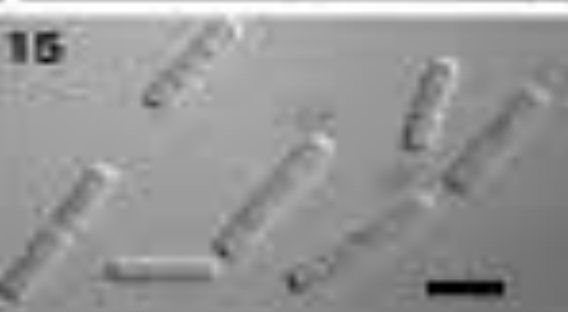
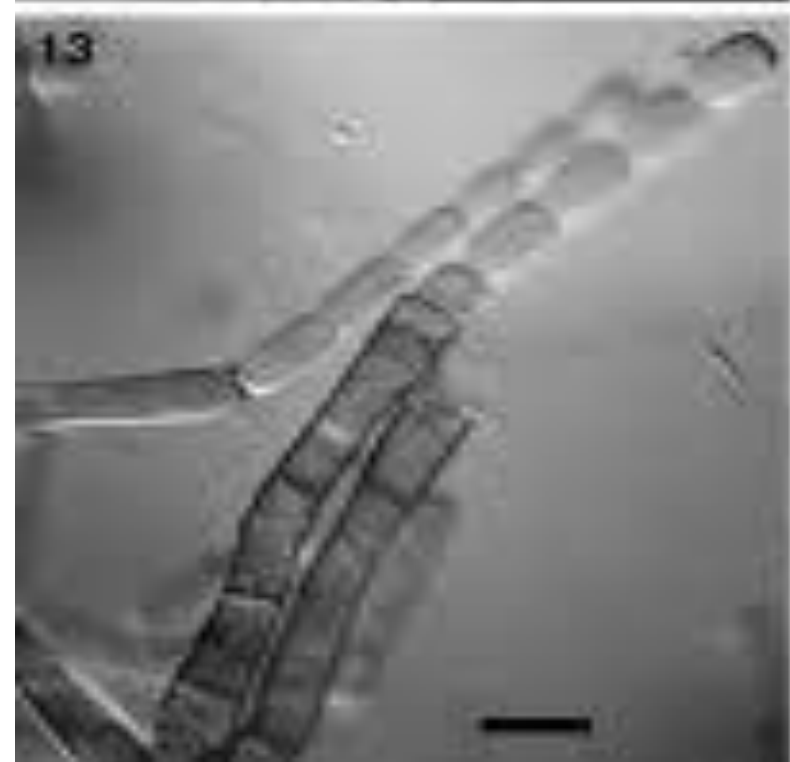
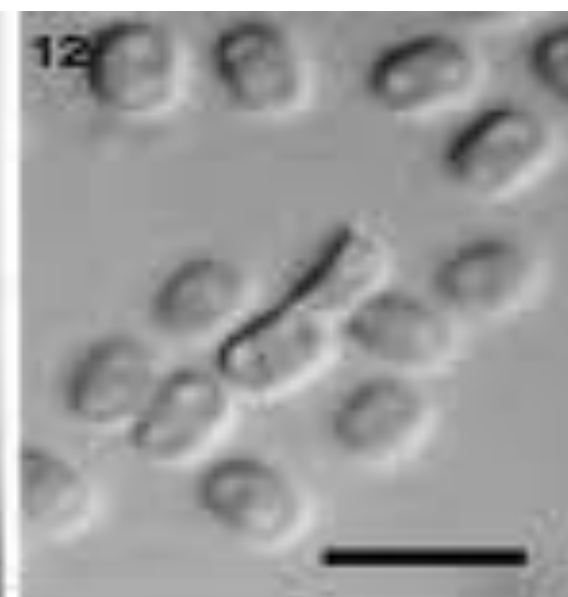
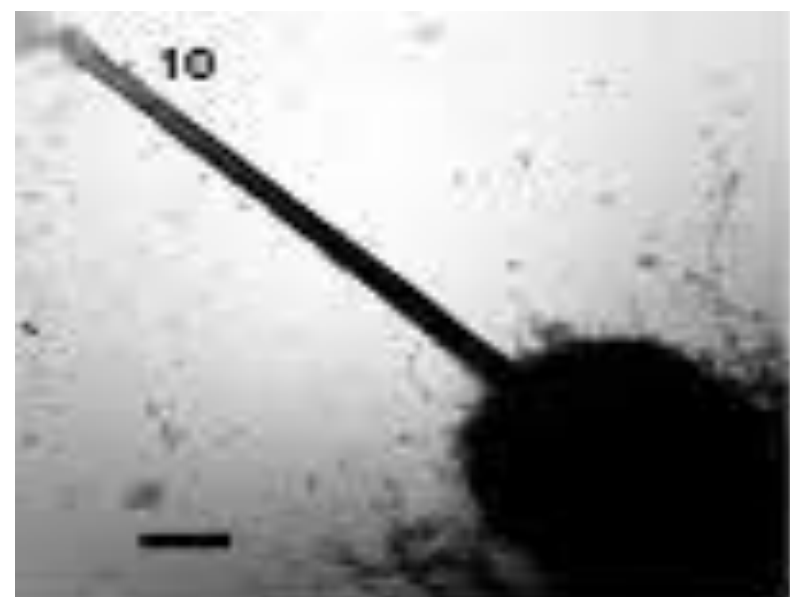
- The leaves show grey spots with dark margins. The spots turn **olive-brown or white**.
- With the advance of the disease, tissues dry and leaves become distorted.
- **Water blister** appears as a soft watery rot of the flesh of the fruit which assumes a darker water-soaked appearance. The skin overlying the **decaying flesh** is water-soaked and **characteristically brittle**.
- Finally, skin, flesh and core disintegrate. The fruit decay is **accompanied by a sweetish odour**.
- During such times the fungus is found on rotting tops and suckers left lying in heaps in damp situations.
- On rotting, the fruit and leaves develop masses of dark spores which impart a grey appearance to the rotting tissue.











## Mode of spread and survival:

It is a **wound parasite**. The fungus survives in the form of black spores in the soil. **Cracks, bruises or fleshy cut** surfaces provide the entry for the fungus.

## Epidemiology:

The disease development is favoured by **warm, wet soil or storage** conditions. Serious losses occur when suckers have been kept in a damp place or when planting has been followed by prolonged wet weather.



## Management:

🍌 The planting materials should be upended and cured for 2-3 days in the sun before planting. Storing planting material in heaps must be avoided.

🍌 Dipping of the planting material in an organomercurial fungicide 720 g a.i/ha or Captafol 13.5 kg/ha or spraying with these preparations on the upturned butts, will prevent the disease.

🍌 Dipping the fruits after harvest for three minutes in Thiabendazole 0.1 % or Benomyl 0.2 % ensures protection.

🍌 Careful handling of fruits to avoid injuries also help in reducing the incidence of the disease.

🍌 Improve soil drainage and avoid planting in wet periods.

🍌 Affected plants should be **removed and burnt**.

🍌 Regular disinfection of **the packing shed** and its surroundings should be carried out by spraying formalin solution.

🍌 The packing of wet fruits should be avoided and the packed cases kept dry. **Selection of planting material** to eliminate knobby fruit types reduces the damage to fruit during packing.

🍌 **The cut surface of the fruit** should be protected within 5 h of cutting.

# Wilt

Etiology: *Pineapple wilt virus*

Symptoms:

- Leaves develop characteristic **bronzing starting from third or fourth whorl onwards.**
- The leaves show **bright pink colour** and browning of the tips with downward curling of the margins.
- The pink colour becomes more pronounced and leaves from top dry downwards.
- Finally, the **tips dry up completely**, the bright pink colour becomes dull and the **root system collapses.**

## Mode of spread and survival:

The disease is transmitted through mealy bugs.

*Dysmicoccus brevipes*.

## Management:

🍌 Higher levels of nitrogen decreased the disease incidence.

🍌 Wilt incidence was lesser in plots having higher plant population.

🍌 Diseased suckers can be recovered within 30 to 50 days by hot water or heat treatments at 50°C for 3 h.





**BER**

## Important diseases of Ber

1. Powdery mildew : *Oidium erysiphoides* f.sp. *zizyphi*

## Minor diseases

- a) *Alternaria* Leaf spot : *Alternaria chartarum*
- b) Black leaf spot : *Isariopsis indica* var. *zizyphi*
- c) *Amelophorella* leaf spot : *Amelophorella* sp.
- d) *Cercospora* leaf spot : *Cercospora zizyphi* & *C. jujubae*
- e) *Cladosporium* leaf spot : *Cladosporium zizyphi*
- f) *Septoria* leaf spot : *Septoria capensis*
- g) *Pestalotiopsis* leaf spot : *Pestalotiopsis subinae*
- h) Rust : *Phakopsora zizyphi-vulgaris*
- i) Soft rot : *Phomopsis natsume*
- j) Witches' broom : MLO

## Powdery mildew

Etiology: *Oidium erysiphoides* f.sp. *zizyphi*

The mycelium is external. Conidiophores are white upright.

Conidia are cylindrical, single celled, hyaline, barrel shaped.

Symptom:

- Young leaves show a white powdery mass causes shrinkage and defoliation.
- Small, white powdery growth appear on the young fruits which later enlarge and coalesce to dark brown.
- In severe cases, the whole fruit surface gets covered with the powdery mass.
- Infected fruits drop off prematurely or become corky, cracked, mis-shapen and underdeveloped. Matured fruits turn rusty. The whole crop is rendered unmarketable





## Mode of spread and survival:


It survives in bud wood of the host plant.


The secondary spread is by air-borne conidia.

## Epidemiology:

Warm high humid conditions with RH more than 90 % favours the disease development

## Management:

 Spraying of dinocap 0.1 % or wettable sulphur 0.2 % should be done during 1<sup>st</sup> and 3<sup>rd</sup> weeks of November or when the fruit attains pea size.

 Two sprays of carbendazim 0.2 % at 15 days interval, starting from the time when the fruits were of pea size followed by dinocap 0.1 % at 10 - 15 days interval.

 Triton-AE or Teepol or Sandovit may be added for adhesion.

# AONLA



## Important diseases of Aonla

1. Rust: *Ravenelia emblicae*
2. Anthracnose: *Glomerella cingulata*
3. Fruit rot : *Phoma putaminum*, *Nigrospora sphaerica*,  
*Pestalotiopsis cruenta*, *Alternaria alternata*
4. Soft rot : *Penicillium islandicum*, *Penicillium citrinum*,  
*Phomopsis phyllanthi*
5. Dry rot : *Cladosporium tenuissimum*, *Cladosporium herbarum*, *Cladosporium cladosporioides*

## Rust

Etiology: *Ravenelia emblicae*

**Uredospores** are ellipsoid to oblong with apex rounded to acute, finely echinulate, light brown. **Paraphyses** are clavate with rounded apex and orange coloured.

**Teleutosori** have not been reported.

Symptom:

➤ **Reddish brown uredo pustules** appear on both surfaces of the leaflets. They are circular to semicircular, solitary or gregarious. **The uredosori** rupture the epidermis expose **uredospores**.

➤ On fruits, **pustules are black** at first and later they develop into rings. The pustules join together and cover a big area of the fruit.

- The black spores get exposed by rupturing a paper covering. The fruit gives a **dirty appearance**.
- On leaves, **pinkish brown pustules** develop which may appear singly or in group.
- Infection on fruit does not go on leaves and *vice versa*.

### Management:

🍏🍏 Three sprayings with **Wettable sulphur 0.5 %** or dusting sulphur at monthly intervals is found effective.



# Anthracnose

Etiology: *Glomerella cingulata*

Symptom:

- The disease appears in the form of **minute, circular, brown to grey spots** with **yellowish margin** on the leaflets.
- The central area of spots remain **greyish with dot-like** fruiting bodies.
- On fruits, **lesions are depressed**. Later they turn dark in the centre. **Acervuli** arranged in rings are found on the spots. The lesion may vary in size and shape.
- **Spore masses appear on fruiting surfaces** at high humidity.
- Consequently, the fruits become **shrivelled and rot**.

## Fruit rots (Many fungi)

### a) *Phoma putaminum*

#### Symptom:

- Small pinkish brown necrotic spot extends towards both the ends of the fruit and form into **eye-shape**.
- In severe cases, lesions coalesce and form a bigger pustule. The matured lesions are dark brown and severely **infected fruits show wrinkling**.
- The underlying **tissues in the rotten fruits** become soft.

b) ***Nigrospora sphaerica***

Symptom:

Spots of 2 mm dia appear on the fruits. They increase in size and become a black ring spot upto 7 mm dia. **Several rings coalesce and result in complete rotting of fruits.**

c) ***Pestalotiopsis cruenta***

Symptom:

Spots are **brown and irregular**. Later the spots become **mummy brown** and the skin around them becomes light brown. The infected parts in the **fruits show fungal growth**. The **internal tissues** of diseased **fruit become dry and dark brown**

#### d) *Alternaria alternata*

##### Symptom:

The disease appears as a small, brownish, round, necrotic spot and it increases in circular manner. In advanced stages, the spots become dark brown to black. Later these spots coalesce. The centre portion of the infected tissues become soft and pulpy.


#### Soft rot

#### a) *Penicillium islandicum*

Symptom: Brown patches and water-soaked areas appear on the fruit. As the rot progressed, three distinct colour zones of bright yellow, purple brown and bluish green are seen on the fruit.

Fruits emit **foul smell**.

Management:

 The disease can be controlled by careful handling of fruits, adopting strict **sanitary measures in storage houses** with  $\text{NCl}_3$  (**Nitrogen Tri Chloride**) or **ozone gas** and treatment of fruits with **Borax and sodium chloride**.

b) ***Penicillium citrinum***

Colonies are **blue green**. **Conidia** are smooth walled and globose.



## Symptom:

It causes **soft rot of fruits**. **Bright yellow coremia** appear on the surface of the fruits. It spreads rapidly **turning of bluish green and makes the fruit pulpy**.

### c) *Phomopsis phyllanthi*

## Symptom:


- Smoke **brown to black**, rounded lesions develop on the fruits.
- The infected part later shows **olive brown** discolouration with **water-soaked area** and cover the whole fruit within 8 days.
- The shape of the fruit also gets **deformed**.

## Epidemiology:

The disease is prevalent during **December - February**.

Mature fruits are more susceptible.

## Management:

 Spraying with difolatan 0.15 % or **Mancozeb 0.2 %** or Carbendazim 0.1 % controls the disease.

## Dry rots

### ***a) Cladosporium tenuissimum***

Symptom: The disease starts as colourless and slightly soft area. Subsequently they progressed in a circular manner. **Light brown mycelial growth of the fungus** will be found on infected areas.

b) *Cladosporium cladosporioides*

Symptom:

The disease appears as **dark brown necrotic areas**. The fruit rots in one week and the lesions measure 0.7 to 1.2 cm in dia. Growth of the fungus is found on the necrotic cavity. **Matured and ripe fruits** are severely damaged.

c) *Cladosporium herbarum*

Symptom: The fungus produces small spots on the fruits which are ochre-red in colour.