

DIEASE OF PAPAYA AND POMEGRANATE

PAPAYA

DHCM (2+1)
THEORY CLASS
5THSEM

INTRODUCTION

- **Papaya (*Carica papaya*)** is a tropical fruit having commercial importance because of its high nutritive and medicinal value.
- It is originated in Mexico and spread to almost all the corners of the tropical world.
- Fruit is a rich source of vitamin A and C.
- Its latex is used as a papain in food and medicine industry.
- Acc.2016-17 data 137 thousand ha area under papaya and 5846 thousand MT production of papaya in India.

MAJOR DISEASE OF PAPAYA

FUNGAL DISEASE	
Powdery mildew	<i>Oidium caricae</i>
Foot rot/stem rot	<i>Pythium aphanidermatum</i> <i>Rhizoctonia solani</i>
Anthracnose	<i>Colletotrichum papayae</i>
VIRAL DISEASE	
Mosaic	<i>Papaya mosaic virus or Papaya ringspot virus</i>
Leaf curl	<i>Tobacco leaf curl virus or Nicotiana virus 10</i>

FOOT ROT/STEM ROT OF PAPAYA

- CAUSAL ORGANISIM:

Pythium aphanidermatum

Rhizoctonia solani

SYMPTOMS

- Water soaked patches on the stem at the ground level.
- Patches enlarge and girdle the base of the stem.
- Diseased tissues turn brown or black and rot.
- Terminal leaves turn yellow, droop and wilt.
- Fruits shrivel and drop off.
- Entire plant topples over and dies.
- Internal tissues of bark appear dry and give **honey comb appearance**.
- Roots deteriorate and may be destroyed.

FOOT ROT/STEM ROT OF PAPAYA



CONT...

SURVIVAL AND SPREAD

- P.I: Oospores (*Pythium*) or *Sclerotia* (*Rhizoctonia*) in soil.
- S.I: Seedlings raised in infected soil carry the disease to field.

FAVOURABLE CONDITIONS

- Appears from June to August
- Younger seedlings are more susceptible than older ones.
- Severity increases with intensity of rainfall.
- *R. solani* is severe in *dry and hot weather (36° C)*

MANAGEMENT

- Seedlings should be raised in well drained nursery area.
- Uproot the diseased seedlings and burn it.
- Seed treatment with captan@4g/kg seed or chlorothalonil @2g/kg seed (*R. solani*)
- Drench the base of stem with COC@0.25% or metalaxyl@0.1% or Bordeaux mixture@1.2%.

MOSAIC

CAUSAL ORGANISIM:

Papaya mosaic virus or Papaya ringspot virus

Economic importance

- Occurs in a severe form in central India.
- In India 1st reported from Mumbai and Pune in 1947.
- 90-100% damage occurs in severe cases.

SYMPTOMS

- **The disease is most serious in young plant.**
- **The top young leaves of the diseased plant are much reduced in size and show blister like patches of dark green tissue, alternating with yellowish green lamina and puckering.**
- The lamina is reduced and malformed and are often modified into tendril like structures (**shoestrings**).
- Decline & marked reduction in growth of diseased plants (within 30-40 days).
- Older leaves fall down and younger leaves is left at the top with upright position.
- The stem, petiole and fruits develop elongated **water soaked areas showing concentric or circular rings**.
- Fruits develop innumerable circular, water soaked lesions with a central solid spots in the centre.
- Fruit size is severely reduced with deformed shape

MOSAIC

shoestrings symptom



concentric or circular rings on fruit



SURVIVAL AND SPREAD

- P.I: Affected plant parts (Mechanical)
- S.I: Aphids (*Myzus persicae*)
- *It is not seed - transmitted ,thermolabile and non-persistent.*
- Other aphids: *Aphis malvae*, *A. gossypii*, *A. medicaginis*, *Rhopalosiphum maidis*, *Microsiphum solonifolii*.
- Most of the cultivated species of *Carica papaya* are susceptible: *C. Candamarcensis* and *C. microcarpa*. *C.cauliflora* is immune to disease.
- Other hosts: *Cucumis sativus*, *Cucurbita pepo*, *C. maxima*, *Citrullus vilgaris*, *Luffa acutangula*, *Lagenaria siceraria*, *Safflower* and some ornamental plants.

PATHOGEN

CAUSAL ORGANISM:

Papaya mosaic virus or Papaya ringspot virus (PRSV)

- Family: Potyviridae.
- It is a filamentous, non-enveloped and flexuous virus.
- Size of virus - $760-800 \times 12$ nm.
- PRSV contain linear, single-stranded, positive sense RNA.

MANAGEMENT

- Disease free seedlings
- Rouging and destruction of diseased plants
- Vector control.
- *Carica cauliflora* variety is resistant.
- Weekly sprays with 1% groundnut oil help preventing infection by aphid.

LEAF CURL

- **CAUSAL ORGANISIM:** *Tobacco leaf curl virus or Nicotiana virus 10*

SYMPTOMS

- Severe curling, crinkling and distortion of leaves accompanied by **vein clearing** and **reduction of leaf lamina**.
- Leaf margins are rolled downward and inward in the form of **inverted cup**.
- Curled leaves have thickened veins.
- Leaves become leathery, brittle and petioles are twisted.
- Diseased plants fail to flower or bear any fruits.
- In advanced stage, defoliation takes place and growth is arrested.

LEAF CURL OF PAPAYA



PATHOGEN

- The disease is caused by Papaya leaf curl virus(PLCV).
- The causal virus particles are geminate and the virus belongs to family Geminiviridae.
- The genome of the virus is ssDNA.

Cont..

SURVIVAL AND SPREAD

- P.I: Infected plant parts.
- S.I: Whitefly, *Bemesia tabaci and grafting*.
- Virus also infects tobacco, tomato, sunhemp, chilli, Petunia, Zinnia, Datura.

MANAGEMENT

- Disease free seedlings
- Rouging and destruction of diseased plants.
- Vector control with monocrotophos@0.05% or Dimethoate@0.2% .
- Foliar application of fly ash ,wasteproduct of thermal power plant ,at 2kg/plant reduced the disease by controlling the vector.

POMEGRANATE

DHCM (2+1)

THEORY CLASS

5THSEM

MAJOR DISEASE OF POMEGRANATE

FUNGAL DISEASE

Cercospora leaf spot

Cercospora punicae

Anthracnose

Colletotrichum gloeosporioides

BACTERIAL DISEASE

Bacterial leaf spot

Xanthomonas axonopodis pv. punicae

INTRODUCTION

- **Pomegranate** (*Punica granatum*), belonging to family Lythraceae.
- The juice from pomegranate is one of the most powerful antioxidants.
- The juice is reach source of vitmin C, Riboflavin, Iron, Phosphorus, Protein.
- The tender fruit of Pomegranate used for the medicine.
- The pomegranate is native to the Iranian Plateau, the Himalayas in north Pakistan and Northern India.
- The fruit is typically grown in the Northern Hemisphere from September to February, and in the Southern Hemisphere from March to May.

Bacterial leaf spot

- **CAUSAL ORGANISM-**

Xanthomonas axonopodis* pv. *Punicae

- First reported from North india in 1952
- It has reported from Tamil Nadu ,Karnataka and Maharastra.

SYMPTOMS

- Small irregular water soaked spots appear on the leaves.
- The water soaked spot developed into small, deep red spots of 2-5 mm dia. with indefinite margins .
- Leaves distorted and malformed.
- Severely infected young leaves defoliate.
- The bacterium attacks stem, branches and fruits also.
- On the stem, the disease starts as brown to black spots around the nodes.
- Girdling and cracking of nodes. Branches break down.
- Brown to black spots on the pericarp of fruit with **L or Y shaped cracks**
- Spots on fruits are raised with dark brown lesions of indefinite margins on the surface with an oily appearance.

Bacterial leaf spot



SPOT ON LEAVES



**SPOT ON FRUIT AND
CRACKING ON FRUIT**

Cont..

Survival and spread

- P.I: Infected cuttings.
- S.I: Wind splashed rains.
- The bacteria infect through wounds and stomatal openings.

Management

- Clean cultivation and strict sanitation in orchard.
- Spray Boredux mixture @ 1% along with antibiotic.