

Diseases of Papaya and Their Management

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Introduction

Papaya is a tropical, semi-wood, rapid-growing herbaceous plant and its origin traces back to southern Mexico. India shares 43% of global papaya production and is the largest producer globally, generating 13.9 million tonnes of fruit yield per year. Ripen and unripened fruits having their essential demand in the market as ripened fruits are enriched with vitamins C and A which are necessary for the dietary requirements of tropical people and unripened fruits contain papain, which is used commercially for tenderizing meat.

Papaya diseases posing major threat to production, in severe epidemics results in 100% yield losses. There are different diseases in India and in other countries of which following diseases are more important as it results in more yield losses.

- Foot rot of papaya
- Anthracnose
- Powdery mildew
- Papaya ring spot disease
- Papaya mosaic disease
- Papaya leaf curl disease

Foot rot of papaya - *Pythium aphanidermatum*

Symptoms-

Watery soaked patches appear in stem near the soil line. These patches coalesce and girdle the stem during heavy wind the plant topple down and die. If patches restricted to one side of the stem results in wilt, fruits get shrivelled and mummified.



Management -

1. Good agronomic practices include proper spacing, to maintain relative humidity
2. Drench water at regular intervals as water logging conditions promote ideal conditions for oomycetes survival and infection
3. At the time of sowing treat the seeds with captan @ 4g per kg /chlorothalonil @ 2g per kg
4. Drench the base of stem with Metalaxyl @ 0.1% ,Bordeaux mixture @1.2% before and after appearance of the symptoms

Powdery mildew of papaya- *Oidium caricae-papaya***Symptoms -**

The disease appears on the foliage and fruit. Infection is first apparent on the leaves as small slightly darkened areas, which later become white powdery spots. These spots enlarge and cover the entire leaf area. Severely infected leaves may become chlorotic and distorted before falling. Affected fruits are small in size and malformed. In more severe cases dieback symptoms develop.

**Management -**

1. Avoid areas with high humidity and temperature below 24°C
2. Increase potassium application and inversely reduce application of nitrogen in the soil
3. Removal and destruction of infected plant parts manages the spread of disease
4. Spray Triadimefon (0.1%) during September which may be repeated at 15 days interval
5. Spraying Calixin 75 EC (5 ml/10 liters of water) at 15 days interval also helps to controlling disease

Anthracnose of papaya- *Colletotrichum gleosporoides***Symptoms -**

The disease appears on the foliage and pods. Infection is first apparent on the leaves as small slightly darkened areas, which later become white powdery spots. These spots enlarge and cover the entire leaf area. Severely infected leaves may become chlorotic and

distorted before falling. Affected fruits are small in size and malformed. In more severe cases dieback symptoms develop



Anthracnose of papaya

Management -

1. Preventive measures include good drainage, field sanitation and use of resistant varieties
2. Avoid sites with high rainfall
3. Plant non host plants like coffee and citrus in and around field
4. Removal of infected twigs and application of Bordeaux paste at cut portion checks disease spread
5. Immediate harvesting of fruits as soon as they mature
6. Storage of fruits should be done in well ventilated environment
7. Foliar spraying with chemicals like 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

Papaya ringspot disease- Papaya ringspot virus

Symptoms -

Early symptoms include appearance of oily streaks on younger leaves accompanied by clearing of veins results in fleck appearance. Leaf lamina with prominent mosaic and chlorotic symptoms. At successive stages of the crop development of watery oil streaks both on petioles and upper part of the trunk. Young leaves distortion lead to



development of shoestring symptom as like mite damage. Fruits with bumps often have ringspots which fetches low price on market. Tree infected at early stage remain stunted unable to produce an economical crop.

Management -

1. Planting should be carried in virus free regions
2. Cross protection with mild strain of the virus
3. Roguing at proper intervals of the diseased plants to stop the inoculum for further spread to healthy plants
4. Vector control does not have impact on disease as it transmits virus within seconds to minutes in non-persistent way, and insecticides does not kill aphids in fast enough
5. Planting of aphid resistant varieties in areas with high aphid population

Papaya leaf curl disease: Papaya leaf curl virus

Symptoms -

Severe curling, crinkling results in distortion of the leaves accompanied by vein clearing and reduction in leaf size. Leaves with dark greenish thick veins get curled downwards and inwards. Leaves become leathery and brittle with inter-veinal areas raised leading to rugosity of the leaf. Enations are produced under surface of the leaves in some occasions. Zigzag twisting of the petioles leads to cluster around the main trunk. Growth of the plant is impaired without producing flowers, flowers produced fruit set will fail



Management-

1. In nursery grow the plants under Nylon net cover mesh
2. Eradication of infected plants at regular intervals to decrease the disease incidence
3. Border cropping with maize, jowar or Bajra help to reduce disease spread
4. At the time of sowing soil application of Furadon @ 1.5 kg ai/ ha
5. Chemical spray includes Acephate @ 1.5 kg per liter or imidacloprid @ 0.3 ml / L followed by neem seed kernel extract @ 2% found effective in rotation with insecticides

8. Preventive measures include good drainage, field sanitation and use of resistant varieties
9. Avoid sites with high rainfall
10. Plant non host plants like coffee and citrus in and around field
11. Removal of infected twigs and application of Bordeaux paste at cut portion checks disease spread
12. Immediate harvesting of fruits as soon as they mature
13. Storage of fruits should be done in well ventilated environment
14. Foliar spraying with chemicals like 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

Papaya mosaic disease- Papaya mosaic virus (PapMV)

Symptoms -

Attacks papaya plants of all age group but is most serious on young plants. Aphids transmits the disease. Symptoms appear first on the top young leaves. Mosaic pattern on leaves is the characteristic symptom of this disease. Dark green patches appear on the leaf blades along with vein clearing and downward curling of leaves. Deformation of leaves and stunted growth of infected plants. Fruits developed on diseased plant appear elongated and reduced in size.



Management-

1. Good field sanitation and removal and destruction of infected plant parts is important
2. Application of Carbofuran (1 kg a.i. /ha) at the time of sowing followed by 2-3 foliar sprays of Phosphamidon (0.05%) at an interval of 10 days starting from 15-20 days after sowing effectively checks the population of aphids

Conclusion:

As papaya is one of the major fruit crop in india, timely diagnosis of diseases at frequent intervals, cultural practices, proper nutrient management, and using resistant varieties provide an economical solution to farmers for maximization of yield.