ORGANIC MANGO CROP PROTECTION

PART-II diseases

ICCOA, BANGALORE
Powdery mildew
Powdery mildew control

- **Cause: Oidium mangiferae**
- Attack is seen on the inflorescence, leaves, and young fruits with white powdery growth. Affected flowers fall prematurely leading to serious crop loss. Initially young fruits are attacked and they fall prematurely. In some fruits, epidermis of the infected fruits crack and corky tissues are formed.
- **Reason for severity:** High humidity, cloudy weather & high wind velocity for 3-4 day.
- **Minimum temperature** 10-13°C, **maximum** 27-31°C and **RH 82-91%** are most conducive for disease severity.
- **Management:** Prune diseased leaves and malformed panicles.
- **Spray hyper parasite on powdery mildew:** Ampelomyces quisqualis (Bio-Dewcon) Liquid formulation 1 lit or Powder formulation 1.5 kg in 150 lit. water – 2 or 3 times starting from the initiation of panicles.
- **Spray Wettable Sulphur @ 2gm/lit water,** when panicles are 3-4” in size. Spraying at full bloom needs to be avoided.
Mango Anthracnose

Fig 32. Anthracnose on leaf
Fig 33. Wither tip Phase
Fig 34. Blossom blight phase
Fig 35. Typical Anthracnose on cultivar Hushan-e-ara
Anthracnose control.

- *(Colletotrichum gloeosporioides)*  **Symptoms:**
  - The pathogen causes leaf spot/leaf blight, wither tip, blossom blight and fruit rots. Young branches start drying from tip downwards. The infected flowers fall-off. On fruits, it is more common during storage. Pathogen remained viable for 14 months on fallen leaves, dead stem and diseased twigs attached to trees.
  - Temperature 25-30°C and 95% Relative humidity for 12 hours is conducive for development of disease.
  - Diseased leaves, twigs, gall midge infected leaves and fruits, should be collected and burnt.
  - The foliar infection can be controlled by spraying of copper oxychloride @ 3gm/lit of water. At pre harvest stage, spray bacillus subtilis 3 gm/lit water.
  - Hot water treatment at 52°C for 20 min.
  - Use bio control agent - *Streptosporangium pseudovulgare* and others are under study.
Mango Dieback
Dieback disease control

• Cause: *Lasiodiplodia theobromae*

• October November: Dying back of twigs from top downwards, particularly in older trees followed by drying of leaves which gives an appearance of fire scorch. Cracks appear on branches and gum exudes before they die out

• Prune infected portion, followed by spraying/pasting of copper oxychloride 3 gm/lit of water or pasting with cow dung at the cut ends.
Mango Sooty Mould

Fig. 40. Sooty Mould on Leaves

Fig. 41. Sooty Mould on Fruit
Sooty mould control

• Cause: *Capnodium mangiferae*

• Black velvety thin membranous covering on leaves, stems and fruits are its symptoms. In severe cases, trees appear black and look ugly.

• Growth of fungus is associated with the infestation of scale insects which produce sugary substance.

• If honey dew secreting insects are controlled by suitable bio-insecticides, the mould dies out for want of a suitable growth medium.

• Spraying of starch or maida @ 2 gm/lit. water is effective. When the starch dries, it peels off and the sooty mould also will be removed along with the peel.
Mango Phoma disease

Fig. 42. Phoma infected leaves

Fig. 43. Close up
Phoma disease control

• Cause: *Phoma glomerata*

• In older leaves spots appear and they combine to form patches, which result in withering and defoliation of infected leaves.

• Spray copper oxychloride @ 3gm/lit. water or Bourdeaux mixture 1%.

• Balanced nutrition provides resistance to phoma blight.
Mango Bacterial Canker

Fig. 44. Bacterial Canker infected Leaves

Fig. 45. Infection on Leaf Stalks
Canker on the fruit
Bacterial Canker control

• *Cause: Xanthomonas campestris pv. mangiferaeindicae*
• The disease is noticed on leaves, leaf stalks, stems, twigs, branches and fruits, initially having spots with yellow halo then turning dark brown in colour. Disease development is favoured by high humidity (90% RH), moderate temperatures (25-30°C), high wind velocity which is congenial for severity of this disease.

• Spraying of copper oxychloride @3gm/lit water or Bourdeaux mixture 1% is more effective.

• The bacterium, *Bacillus coagulans*, is effective in controlling canker. *Bacillus subtilis* @ 3 gm/lit also effective.
Mango malformation
Malformation control

• *Cause:* *Fusarium subglutinans* :
  
  • The affected seedlings develop vegetative growths which are abnormal growth, swollen and have very short internodes
  
  • The flower buds seldom open and remain dull green
  
  • Malformed shoots should be pruned and burnt
  
  • Spray chelated Zn++ (100 ppm) and Cu++ (40 ppm) during flower bud differentiation and flowering stage during November- December.
Mango gummosis

Fig 51. Oozing of gum

Fig 52. Treated with Copper and cow dung paste
Gummosis control

• presence of profuse oozing of gum on the surface of the affected wood. In severe cases, droplets of gum trickle down on stem, bark turn dark brown with longitudinal cracks, rots completely and the tree dries up because of cracking, rotting and girdling effects.

• The diseased bark / portion should be removed or cleaned and pasted with Bordeaux paste or copper oxychloride paste or cow dung paste.

• Apply 30kg of FYM mixed with Pseudomonas and Trichoderma @ 10g/kg FYM to the tree.

• Application of Copper sulphate 500 gm/ tree (depending upon the age of the tree) in soil around the tree trunk is recommended. Gummosis is very less in the orchards receiving regular copper oxychloride sprays for control of leaf spot diseases.
Mango scab

Fig 53. Scab infected leaves

Fig 54. Fruit infected with Scab
Scab control

• Symptoms produced by the disease are very much like those of anthracnose. corky tissues can be seen on the fruits.
• Frequent sprays of copper oxychloride @ 3 gm/Lit of water or 1% Bourdeaux mixture to protect new flushes of growth are effective for scab control in nurseries.
Mango black banded disease

Fig. 55. Black Banded disease on leaf
Fig. 56. Black Banded disease on twigs
Mango black banded disease

• The disease is noticed on the midribs/ veins of the leaves, twigs and branches as black velvety raise fungal out growth in the form of spots which gradually increase in size and encircle the trunk limbs, branches and twigs. The leaves are affected and lost.

• Gunny rubbing on twigs and branches.

• Spray copper oxy chloride 3 gm/lit of water or Bourdeaux Mixture 1%

• (Preparation of bourdeaux mixture: Mix 1 kg of copper sulphate with 1 kg of slaked lime in 100 lit. of water and stir well).
Mango damping off and root rot

Fig. 57. Damping off phase of disease

Fig. 58. Root Rot phase of disease
Damping off and root rot control.

- **Cause: Rhizoctonia solani Kuhn**
- Sudden dropping of leaves after the emergence of seedlings from the soil. During prolonged rainy and humid weather, infection occurs at or below the ground level.
- Water should not stagnate near the root zone.
- Application of Trichoderma in the affected nursery is effective.
Mango red rust

Fig. 59 Plant infected with Red rust

Fig. 60 Leaf infection of Red rust

Fig. 61 Fruit showing Symptom of Red rust
Mango red rust

• (Cephaleuros virescens Kunze)

• Initially the spots are noticed as greenish grey in colour and velvety in texture on the leaves which finally turn into reddish brown in colour.

• Spray Bordeaux mixture or copper oxychloride 3 gm/lit water. As the disease starts on the onset of rain, it is desired to spray fungicide twice during the month of July/ August at 15 days intervals.
Mango lichens

Rub the surface with gunny bag. Apply copper paste or cow dung at the rubbed surface.
Lichens control

• found on full grown trees of mango, mainly on trunks, branches and twigs in the areas of high humidity, heavy rainfall and poorly managed orchards
• Rubbing with gunny bag
• Spraying of caustic soda 1%