ORGANIC MANGO CROP PROTECTION
PART-III – post harvest care, physiological disorders & micronutrient deficiencies

ICCOA, BANGALORE
Mango Post-harvest: anthracnose
Anthracnose

- Cause: *Colletotrichum gloeosporioides*
- On stored fruits, black spots are produced. Sometimes, it covers the entire fruits surface.
- Hot water treatment at 52C for 20 minutes gives good control of anthracnose.
Mango post-harvest: Stem end rot
Stem end rot

• Cause: *Diplodia natalensis*

• The disease starts on fruit at the base of the pedicel. A circular brown area develops near the stem end, which gradually starts developing as dark brown to black area towards the lower portion of the fruit and later even cover the entire fruit surface

• Disease can be controlled by dipping the fruits in hot water $52^0 \text{C}$ –for 20 min.
Mango post-harvest: Black Rot
Black Rot

• Cause: *Aspergillus niger* Van Tiegh

• Affected fruits show characteristic yellowing with irregular dull grayish spots, which develop into the black necrotic area with growth of black mould. Tissue below and around the spots disintegrate and emit foul dour.

• Fruit harvesting and handling should be done carefully in clean manner.

• Diseases can be controlled by dipping fruits in hot water $52^0$ C for 20 min.
Mango-Physiological disorders:
Black Tip

Fig. 67. Black Tip on cultivar Dushehri
Black tip

- Small pale and faded area develops near the distal end of the fruit which gradually spreads, turns nearly black and covers the tip of the fruit completely.
- Reason: 1. Proximity of orchard-to brick kilns.
- 2. Deleterious effect of gases from brick kilns operating in the vicinity of orchard.
- 3. Wind direction (western winds) and velocity play important role in severity.
- It can be minimized by the spray of borax (1%). The first spray should be done positively at pea stage followed by two more sprays at 15 days interval.
- Planting of mango orchard in north-south direction and 3 km away from the brick kilns reduce the incidence.
Mango-Physiological disorders: Internal Necrosis

Fig. 68 Internal Necrosis on hanging fruits and close up
Internal necrosis

• Boran Deficiency.
• Water soaked grayish spots develop on the lower side of the fruit. Late, the spots enlarge and develop into dark brown necrotic area. The internal tissue starts disintegrating.
• Foliar spray of borax (1%) at pea stage followed by two more sprays at 15 days interval.
• Application of 250 gm. boron per tree (10-15 year old) around the tree basin.
Mango-Physiological disorder: Clustering

Fig. 69. Clustering (Jhumka) in Dushehari
Fruit Clustering (jhumka)

• Several fruitlets found at the tip of panicle.
• These fruitlets do not grow more and later drop. They do not develop seeds.
• Spray vermi-wash 5%
• Pollinizing cultivars should be planted in the orchard.
• Increase pollinator’s population by keeping bee hives in the orchards
Mango-Physiological disorder: Woody Galls

Fig. 70 Large woody galls on branches

Fig. 71 Breaking of tree near galls
Woody galls

• Woody galls of 10-15 inches diameter are formed on limbs and branches.
• The galls are abundant on CVS. Chinnasuvarnarekha, Langra and moderate in Neelam
• Remedy lies in removal of galls using saw and applying Bordeaux paste to cut surface.
Mango-Physiological disorder: Red Nose

Fig. 72. Fruits affected with Red nose
Red Nose

• Severe in late maturing Neelam and Mallika varieties particularly in delayed harvest leading to substantial loss.
• Numerous red nosed fruits are seen on tree during fag end of summer with onset of showers. Red nose gradually becomes soft and rot.
• Timely harvesting of fruit and Proper nutrition to the plant are the remedy.
Mango-Physiological disorder:
Jelly Seed

Fig. 74. Softening of tissue (Jelly seed)
Jelly seed

- The pulp near the stone becomes jelly like with tissue disintegration while the outer pulp near the peel is normal.
- Dashehari mango is found more susceptible to this disorder. The taste of fruit becomes repulsive and loose table quality
- Incidence is more in Lucknow region particularly in late harvested fruits
- Due to imbalance of nutrients. P and Zn deficiency were more common in these gardens.
- Apply black plastic mulch (100 u thick) in the basin of tree during the month of October- November and give foliar spray of calcium chloride dehydrate (2.%) and potassium sulphate (1%), one month before harvesting of fruits along with application of 250 g Borax per tree in soil during the month of November.
- Do not delay harvest
Mango-Physiological disorder: Spongy tissue

Fig. 75. Spongy tissue in Alphonso mango
• There are many biochemical changes associated with spongy tissue; no conclusive results have been obtained to control this malady

• Heat arising from soil and intense solar radiation are reported to be the main cause for this disorder.

• Mulching with paddy straw and dry leaves was found effective for its control
Mango- Nutrient Deficiency:
Potassium deficiency

Fig 76. Scorched Leaf Margin
Correcting potassium deficiency

• Symptom: Scorching of leaf margins. Scorching starts from tip downwards. Fruit quality is reduced. Trees with potassium deficiency are easily prone to pest and disease attack
• Apply 1 kg of sulphate of potash along with 10 kg of FYM during July-August in the basin.
• Dropped leaves should also be incorporated along with manures to enrich the soil health and fertility.
Mango- Nutrient Deficiency: Zinc deficiency

Fig. 77. Deficiency Symptoms of Zinc
Correcting zinc deficiency

- The leaves become small and narrow with leaf margins bent upward or downward.
- Inter nodal length is reduced drastically and the twig with crowded leaves gives rosette appearance.
- These plants do not grow well and the yield, size and quality of the fruit are reduced.
- Zinc deficiency is conspicuously seen in alkaline, saline and sandy soils.
- Spray of zinc sulphate 5 g /lit water twice at 15 days interval.
Mango- Nutrient Deficiency: Iron deficiency

Fig. 77. Iron deficiency
Correcting iron deficiency

• Symptoms: Leaf colour turns to white.
• The size of the leaf is reduced and dries from tip downwards.
• The deficiency is common in soils with high calcium content. Hence, the effect is known as “calcium induced iron chlorosis.
• Give two sprays at fortnight interval with ferrous sulphate 2.5 g per liter.
Mango- Nutrient Deficiency: Copper deficiency

Fig. 75. Copper Deficit Mango Plant
Correcting copper deficiency

- Symptoms: The appearance of weak terminal shoots followed by defoliation and die back of branches, on the top of long drooping branches.
- Application / spraying of Copper oxychloride 3gm/lit of water at monthly interval.
Mango- Nutrient Deficiency: Salt Injury

Fig. 74 Salt injury symptoms in leaves
Correcting salt injury

- Symptom: The leaves are scorched due to excess salt in soil or irrigation water.
- The leaves lose their natural colour and turn to bronze colour. Tip burning is also seen in severe cases of salt injury.
- Raise Dhiancha as green manure crop with onset of monsoon in the inter-spaces of the orchard during tree bearing years and remove.
- Farm yard manure and compost should be applied adequately every year.
- Gypsum filled gunny bag if kept in flowing irrigation water will reduce salt effect.