

Diagnosis and Management of Nutritional Disorders in Mango

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Mango is national fruit of India, which belong to the family Anacardiaceae. It is also known as the "King of Fruits," is a most important fruit crop in India. It is tropical crop, but can grow up to an altitude of about 1200 meters. Does well within temperature range from 24-27 °C, during fruit development and maturity period, it tolerates up to 48 °C. Soils from alluvial to laterite type are best. 2.5 to 3.0 m deep. Well drained and well fertile having good water holding capacity soils are best. Black cotton soil as well as saline and alkaline soils is not good. pH between 5.5 to 7.5 is desirable. After 4-5 year these trees average yield is about 80-100 kg/tree.

Nutritional disorders in mango plants can significantly impact their growth, yield, and fruit quality. Nutritional disorders in mango plants can occur due to deficiencies or imbalances in essential nutrients. Nutritional imbalances in mango plants can arise due to various factors, including nutrient deficiencies or excesses, imbalanced soil pH, or improper cultural practices.

Understanding the causes, symptoms, and management strategies for these disorders is vital for growers and researchers to ensure the sustainable cultivation of mango trees. By addressing nutritional deficiencies or imbalances through appropriate nutrient management practices, mango growers can optimize plant health, enhance fruit production, and contribute to the economic viability of mango cultivation. Here are some common nutritional disorders that can affect mango trees:

1. SOFT NOSE/RED NOSE

- It is also known as “tip pulp”, “insidious fruit rot or yeasty fruit rot”.
- It is more prevalent in late maturing cultivar like Neelam and Mallika.
- This disorder was first reported in florida in Indian origin variety known as Mulgoa.
- Soft nose now has been reported from all mango growing areas of the state (Ram *et al.*, 2020).

Symptoms:

Early stage: Dark yellow colour of the mesocarp at the distal end of the fruit.

Intermediate stage: Affected area enlarged and reached the endocarp distal end.

Advanced stage: large portion of the mesocarp was destroyed.

Nutritional Cause:

- Low Ca in fruit and High N in Soil



Soft nose (watery flesh near the distal end)

Management:

- Application of calcium and proper post-harvest handling may reduce soft nose incidence.
- Only those varieties should be grown which mature early.

2. LITTLE LEAF**Symptoms:**

- The leaf blade in early stages of growth begins to thicken and small and fails to reach normal size.
- As the leaf matures the margins are bent upward or downward.
- The turgid, thickened leaf blade is quite brittle. (Lynch & Ruehle, 1940).
- The lamina of leaves turns pale yellow while midrib remain green (Jeyakumar, 2011).

**Nutritional Causes: -**

- Deficiency of Zinc

Management

- Two sprays of 1-2% Zinc sulphate, one at the time of flowering and the other at one month after the first spray correct the disorder.

3. INTERNAL FRUIT NECROSIS

- Internal necrosis of mango fruits was first noticed by in 1972 in orchards of lucknow disrtict (Uttar Pradesh) by Sant Ram

Symptoms:

- Dark green color on apical part of fruit and brown areas in seed and mesocarp.
- The water soaked grayish spots develop on the lower side of the fruit and later the spots enlarge and developed into dark brown necrotic area.
- Brown, black gummy substances exudates from outer fruit surface.

**Nutritional Causes:**

- Deficiency of B in fruit and Excessive N in Soil

Management:**Soil application:**

- For soil application, Borax @ 500 g per tree should be incorporated at the time of October fertilization.

Foliar application:

- Foliar application of 1 % borax is recommended at the time of fruit set (pea size stage) followed by two more sprays at 10-15 days interval which will minimize the disorder to a great extent.

4. JELLY SEED (SOFTENING OF TISSUE)

- Jelly seed (over ripe flesh around the seed surrounded by firm flesh).
- The disorder occurs in India to an extent of 80% or more in mature ripe fruits.

Symptoms:

- Jelly-like mass in the affected portion of pulp around the stone.
- The flesh at stem end is fibrous.



- Jelly seed affects only the interior of the mesocarp.

Nutritional Causes:

- Low Ca in fruit and High N & K in soil (Priyanka *et al.*, 2017).

Management:

- Application of dolomitic lime @ 8 t/ha/year at the onset of monsoon season reduces jelly seed.
- Foliar spray of calcium chloride (2%) and potassium sulphate (1%) one month before harvesting of fruits
- Harvesting should not be delayed.

5. STEM-END CAVITY

Stem end breakdown (open cavity in the pulp at the stem end).

Symptoms:

- Formation of a cavity in the proximal area of the fruit resulting from the deterioration of the vascular tissues between the proximal end of the stone and the fruit peduncle (Raymond *et al.*, 1998).
- Affected tissues turn brownish in colour at an early stage.
- Interior of the mesocarp turns yellow or orange, whereas the exterior of the mesocarp remains whitish or pale yellow.



Nutritional Causes:

- Ca deficiency

Management:

- Applying calcium to soil in the form of gypsum @ 2–4 kg per tree prior to flowering reduces the severity of internal fruit disorder and stem end cavity.

6. LEAF SCORCHING

Symptoms:

- Scorching of old leaves at tip or margin.
- Common in saline soils.
- Foliage gives burnt look.

Nutritional Causes:

- Chloride toxicity and Potash deficiency (Ahlawat *et al.*, 2014)



Management:

- Potassium sulphate should be used as potassium fertilizer and use of muriate of potash should be avoided under such situations.
- Potassium sulphate 5% as foliar on newly-emerged leaves is effective in controlling this disorder.

7. SPONGY TISSUE

- A non-edible sour patch developed in the mesocarp of mango fruit is broadly termed spongy tissue.

History:

- The occurrence of spongy tissue in mango was first noted in 1934 in cv. Alphonso by Cheema and Dani as a serious problem in orchards in the states of Maharashtra and Gujarat. Spongy tissue is a major physiological disorder of 'Alphonso' mango



which causing about 30% fruits loss in mango growing region of Maharashtra, Gujarat, Andhra Pradesh and Karnataka (Bhargava *et al.*, 2011).

Symptoms:

- Development of unripe and white pulp, corky tissue with or without air pockets associated with an unacceptable off flavour in certain regions of the pulp.
- Spongy tissue affected fruits does not show any external symptoms and the disorder is identified only after cutting the fruit or by the non-destructive X-ray imaging technique.

Nutritional with complex Causes:

- Deficiency of Ca in pulp (S.Shivashankar, IIHR)

Management:

- Harvesting of fruits at 3/4th maturity stage rather than at fully maturity reduce this malady (Rajan and Singh 2003).
- Use of black poly-ethylene mulch is recommended for spongy tissue prone orchards.
- Single and double pre harvest dip of fruits in calcium solution significantly increased the calcium content in the ripe fruits.
- “Arka Saka Nivaraka’ liquid formulation needs to be applied twice at pre-harvest stage between 40 to 60% maturity, either by dipping the fruits (while on the tree) in solution or by spray on the fruits, @ 100 to 125 ml/ litre (Shivashankar and Sumathi, 2014).
- Resistant varieties like Ratna, Arka Puneet, Arka Aruna which have Alphonso like character should be planted in the orchard.

Conclusion

In all the fruit crops, mango is called the king of fruits. It is very important fruit crops in India. For management of nutritional disorders, fertilizer should be administered as recommended and doses of fertilizers should be adjusted a when needed as before or during the onset of symptoms.

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