



### MANGO MALFORMATION AN UNSOLVED MYSTERY

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Mango (*Mangifera indica* L.) belonging to Family Anacardiaceae is the most important commercially grown fruit crop of the country. It is called the king of fruits. India has the richest collection of mango cultivars. The fruit is very popular with the masses due to its wide range of adaptability, high nutritive value, richness in variety, delicious taste and excellent flavour. It is a rich source of vitamin A and C. Raw fruits of local varieties of mango trees are used for preparing various traditional products like raw slices in brine, amchur, pickle, murabba, chutney, panhe (sharabat) etc. The wood is used as timber, and dried twigs are used for religious purpose. Mango also has medicinal uses. The ripe fruit has fattening, diuretic and laxative properties. It helps to increase digestive capacity. India is the major producer of mango in the world with an area of 22.16 million hectare, annual production is 185.05 MT and productivity is 7.3 MT/ha. In Rajasthan, the total production is 70.17 MT from an area of 5,000 hectare with the productivity of 14.03 MT/ha. Major mango growing pockets of Rajasthan are Dungarpur, Banswara, Pratapgarh, Chittorgarh and Udaipur district. The diverse climatic condition's enable to produce different indigenous and exotic fruit in India. Saxena *et al.*, 2015

#### History of mango malformation

Mango malformation was reported for the first time from Darbhanga, Bihar by Maries in 1891. Malformation causes heavy damage to trees as the inflorescence fails to produce fruits. It has a crippling effect on mango production in bringing heavy economic losses. (Hiffny *et al.*, 1978) The etiology of this disease has not been established and no effective control measure is known (Ram and Yadav, 1999; Pant, 2000; Bains and Pant, 2003). Mango (*Mangifera indica*) is the only known host of mango malformation disease.

#### What are the symptoms?

- Abnormal, compact development of shoots and flowers are common signs of mango malformation disease.
- Both normal growth and mango malformation disease-affected growth may be present on a plant at the same time.
- Hypertrophy of tissues is involved.

#### Types of mango malformation

##### (1) Vegetative malformation

- Vegetative malformation appears mostly in the seedling plants or new grafts in the nursery than in the old plant of nursery .

- The seedling produce small shoot lets bearing small scale leaves with a bunch like appearance on the shoot apices
- Apical domonance lost in these seedling and numerous vegetative buds sprout prouducing hypertrophied growth which constitute s vegetative malformation.
- The multi braching of shoot apex with scaly leaves is known as bunchy top (Bhatanagar and Beniwal, 1977).
- The seedling which become malformed early , remain stunted and die while those getting infected later resume normal growth above the malformed area (Kumar and Beniwal, 1992).



**Fig: 1. Vegetative malformation**

### Floral malformation

- Floral malformation appear in the bearing tree when they start flowering.
- A malformed panicle usually produce much large number of flower than healthy panicle.
- Most of the flowers remain unopened and are male, rearly bisexual (Hiffny *et al.*, 1978).
- The ovary of the malformed bisexual flower is exceptionally enlarged and non functional with poor pollen viability.
- Both healthy and malformed flower appear on the same panicle or on the same shoot, the heavily malformed panicles are compact and crowded due to larger flowers, they continue to grow and remain as black masses of dry tissue



**Fig: Floral malformation**

## CAUSATIVE FACTOR OF MANGO MALFORMATION

### The various factor associated with this malady

• Fungi	• Mites
• Viruses	• Nutritional factor
• Environmental factor	• Physiological factor
• Biochemical factor	

### Control Measure

#### 1. Culture Practices

##### a. Removal of panicles

- It has been reported earlier that panicles, which appear early in the season (December-January) when they temperature is low, tend to malformed and unproductive.

- Hence it is advisable to remove such panicles.
- b. **Mulching**
  - The use of black polyethylene as mulch.
- c. **Deblossoming**
  - Deblossoming at flower bud stage alone or in combination with the application of NAA (200 ppm) during flower bud differentiation.
- d. **Selective pruning**
  - Selective pruning of the malformed parts or panicles helps in the reducing the incidence of malformation in the subsequent years.
- e. **Raising seedling in polyhouse**
  - Vegetative malformation is a serious problem in seedling mango plants in the nursery. When the seedling raised for grafting in the polyhouses. The seedlings are free from malformation.

## 2. Chemical Control

- a. **Use of growth regulators**
  - Application of NAA or planofix (200 ppm) during October (prior the flower bud differentiation) is most effective in reducing the incidence of floral malformation in all most all the cultivar of mango.
  - Ethrel @ 400 ppm in February.
  - Gibbrellin @ 30 ppm at pre-bloom stage.
- b. **Use of pesticides**

**The control of malformation by using insecticides, fungicides or acaricides like-**

  - Bavistin (0.01%), phosphomidon (0.03%), methyl demeton (0.1%) minimize the incidence of malformation.
  - Spray of fungicides like Topson-M and Captan apply during panical pruning in april and after harvesting during the month of july.
- c. **Use of Anti-malformin**

Noted three spray of glutathione @ 2250 ppm, ascorbic acid @ 2150 ppm, silver nitrate @ 600 ppm were significantly reduce mango malformation. Ram and Bist, 1984

## 3. Resistant Variety

Use recently resistant cultivars like-

• Ellaichi	• Bahadauran
• Meghaltan	• H-8-1
• Dahiyyar	

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