

Physiological Disorder of Mango and their Management

Ram Babu Sharma¹, Krishna Kumar², Arvind Kumar Singh³ and T.P.Mahto⁴

¹ Asst. Professor Cum Scientist (Plant Pathology), Pt. Deendayal Upadhyay College of Horticulture and Forestry (RPCAU, Pusa, Samastipur), Piprakothi, East Champaran, Bihar

² Dean, Pt. Deendayal Upadhyay College of Horticulture and Forestry (RPCAU, Pusa, Samastipur), Piprakothi, East Champaran, Bihar

³ Sr. Scientist and Head, Krishi Vigyan Kendra (RPCAU, Pusa, Samastipur), Piprakothi, East Champaran, Bihar

⁴ Asst. Professor Cum Scientist (Entomology), Pt. Deendayal Upadhyay College of Horticulture and Forestry (RPCAU, Pusa, Samastipur), Piprakothi, East Champaran, Bihar

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Introduction

Mango (*Mangifera indica*) is India's most important fruit crop and is regarded as the king of fruits. It is high in vitamin A, C, and D, in addition to having a pleasant taste, good flavour, and beautiful scent. Mango fruit is low in calories and is the best choice when reducing calorie intake. The tree may be planted in a variety of soils and is naturally hardy. It also requires relatively little management. Both the immature and mature mango fruit are used at all stages of its development. The mango kernel also contains 8–10% high-quality fat that can be used to make soap. Mango farming is practised in a number of states in India, including Uttar Pradesh, Andhra Pradesh, Karnataka, Gujarat, Tamil Nadu, and Bihar. The decrease in mango production is caused by a variety of causes. Physiological disorders are a severe issue that affect the quality and shelf life of mango. In this article we discussed the important physiological disorders along with their management practices which will certainly help the farmers in timely overcoming this malady for getting satisfactory remunerative prices from mango cultivation.

Reasons of physiological disorders:

- Deficiencies in micronutrients and abrupt temperature changes
- Poor soil condition and
- Inadequate moisture availability during cultivation

Physiological disorder:

Physiological disorder is the term used to describe any abnormality in a fruit's economically significant part or in other parts that affect fruit yield and quality.

(i) Alternate Bearing:

The tendency of mango trees to give a substantial crop in one year (On year) and very little to no crop in the next year is typically described as alternating, biannual, or irregular bearing (Off year). The majority of commercial varieties, including Dashehari, Langra, and Chausa, bear fruit every two years.

Major cause:

- Genetical
- Crop load
- Growth habitat
- Varietal differences
- Cultural Practices

Management:

- Deblossoming is recommended to reduce the crop load in the 'On' year so that it is balanced in the 'Off year.
- Soil application of Paclobutrazol or Cultar @ 10 g/tree for non-bearing tree in the month of September will induce flowering and fruit set during off season.
- Regular bearing cultivars like Amrapali, Neelam should be grown.

(ii) Fruit Drop:

Fruit drop intensity varies from variety to variety. Langra is the commercially available variety which is more prone to dropping, whereas Dasherri is the least prone. The fruit drop can be divided into three phases: the pinhead drop, the post-setting drop, and the may-month drop. The fruit drop is basically a continuous process. Fruit loss in the first two phases is little compared to fruit loss in the third phase, which has a significant impact on final yield and needs more attention.

Major cause:

- Embryo abortion, climatic factors, disturbed water relation, lack of nutrition, attack of disease and pest and hormonal imbalances are the major factors that lead to fruit drop.

Management:

- Foliar spray of Alar (B-nine) @ 100 ppm or NAA 20 ppm at pea stage of fruit .

(iii) Spongy Tissue:

The spongy tissue is an unidentified intrinsic physiological disorder that degrades mango quality and gives an unpalatable off-flavour. The fruits do not exhibit external symptoms and the disorder is detected when cutting the fruit. It is a major problem in Alphonso, where a pulp patch fails to ripen.

**Major cause:**

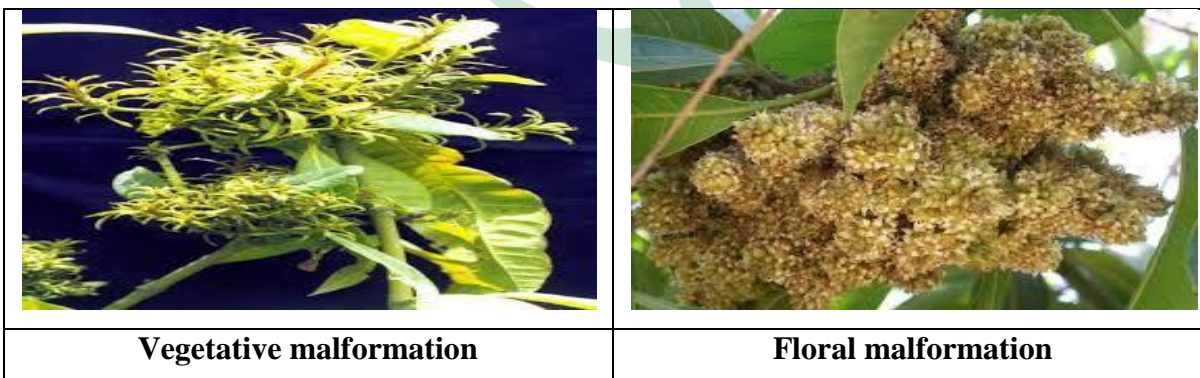
- This is caused due to inactivity of ripening enzymes due to high temperature.
- Post-harvest exposure of fruit to sunlight.

Management:

- Harvesting of fruits should be done at 3/4th maturity stage.
- Post-harvest exposure to low temperatures between 10-15⁰C for 10-18 hrs. has been useful in reducing the malady.

(iv)Mango Malformation:

Malformation is widely prevalent in northern India, particularly in the states of Punjab, Delhi, Bihar and western U.P. where more than 50% of the trees suffer from this malady. There are two types of symptom produced in malformation i.e. vegetative and floral malformation. The floral malformed panicles remain unproductive and are characterized by a compact mass of male flowers, greenish in colour and stunted in growth. The main and secondary rachis is thick and short and bears flowers with relatively larger bracts, sepals and petals as compared to normal flowers. The malformed panicles remain intact on the trees for a considerable long period.



Major causes:

- Scientist from different part of the country reported that a fungi- *Fusarium moniliformae* var. *subglutinans* is highly associated with this disorder.
- Temperature range of 21-27⁰C (max.) and 8⁰C (min.) along with relative humidity of 85% during late winter or early spring is conducive for the growth of the fungi, resulting severe incidence of malformation on newly emerged panicles.

Management:

- Spraying of Planofix (200 ppm) during the first week of October followed by deblossoming of newly emerged panicles or bud during January -February is beneficial to control the disorder.

(v) Black Tip:

Black tip is a serious disorder of mango. The afflicted fruits lose their marketability and significantly lower the yield. The first signs of fruit damage appear at the marble stage, along with the typical yellowing of tissues at the distal end. The colour gradually gets darker, turning to brown and then black. The fruit's growth and development have slowed at this point, and the black ring at the tip of the fruit has begun to spread upward. Dashehari is the highly susceptible one while the Lucknow Safeda is the least.

**Major causes:**

- This disorder has mainly detected in orchards located in the vicinity of brick kilns.
- It has been reported that the gases like carbon monoxide, sulphur dioxide and ethylene constituting the fumes of brick kiln are known to damage growing tip of fruits and give rise to the symptoms of black tip.

Management:

- Planting of mango orchards in North-South direction and 5-6 km away from the brick kilns and increasing the Chimany height to at least 15-18 meter may reduce incidence of black tip to a greater extent.

- The incidence of black tip can also be minimized by three sprays of Borax (1%) (first spray before flowering, second during flowering and third at fruit set stage is very effective)

(vi) Clustering in Mango (Jhumka):

A fruiting disorder, locally referred to as "Jhumka," is characterised by the formation of fruitlets in clusters at the tip of panicles. After one month from the time the fruit was set, these fruits stop growing beyond the pea or marble stage and drop to the ground.



Major causes:

- Absence of sufficient population of pollinators in the orchards is the major reason.
- Indiscriminate use of pesticides during flowering.
- Adverse climate during February - March particularly the low temperature.

Management:

- Introduction of beehives in the orchards during flowering season for increasing the number of pollinators.
- Spraying of pesticides during full bloom should be avoided.
- Pests and diseases should be controlled in time by spraying the recommended dose of pesticides.
- Spray NAA @300 ppm during the month of October-November .

Conclusion

None of the physiological disorders linked to mango is caused by a single factor rather; they are all the result of a combination of several factors, including genetical, environmental factors, nutritional imbalance and poor cultural practises in the orchards. Because of this, they are very difficult to control however, good cultural practises, such as applying the right amount of fertilizer at the right time, pruning some old branches right after harvest and de blossoming of some flowers, can help in management of Physiological disorder of Mango.