



## The Effect of Temperature on the Size of Mango Development

(\*Suraj Pratap Singh)

Late Chandrasekhar Ji Pradhan Mantri Smarak Mahavidyalaya,  
Rampur, Kanva, Seorai, Ghazipur (U.P.)

\*Corresponding Author's email: [surajsingh14112000@gmail.com](mailto:surajsingh14112000@gmail.com)

Mangoes (*Mangifera indica*), known as the "king of fruits" are cherished worldwide for their delicious taste and rich nutritional content. The size of mangoes is a critical quality attribute, affecting marketability and consumer preference. Among the various factors influencing mango size, temperature stands out as a pivotal element throughout the fruit's developmental stages. This article delves into how temperature affects mango size, from flowering to fruit maturation.

### Flowering and Pollination

Temperature plays a crucial role in the initial stages of mango development, particularly during flowering and pollination:

**Flower Induction:** Mango trees require a period of cool temperatures (15-20°C or 59-68°F) to induce flowering. Adequate chilling ensures the production of healthy and abundant flowers, which is the first step towards developing large-sized fruits.

**Pollination Efficiency:** Optimal temperatures during flowering (20-25°C or 68-77°F) are essential for effective pollination. High temperatures (above 35°C or 95°F) can lead to poor pollen viability and reduced fertilization rates, ultimately affecting the potential fruit size by limiting the number of well-formed fruits.

### Fruit Set and Early Development

Once pollination occurs, the temperature continues to influence the early stages of fruit development:

**Cell Division:** During the initial weeks after fruit set, moderate temperatures (25-30°C or 77-86°F) are ideal for cell division and expansion. This phase is critical for determining the potential size of the mango. Consistent and optimal temperatures support vigorous cell division, leading to larger fruit.

**Temperature Extremes:** Exposure to extreme temperatures can hinder early fruit development. High temperatures (above 35°C or 95°F) can cause heat stress, leading to smaller fruit size due to impaired cellular processes. Conversely, temperatures that are too low can slow down growth and development, resulting in undersized fruits.

### Mid-Development Stage

During the mid-development stage, the temperature continues to impact the growth and eventual size of the mangoes:

**Growth Rate:** Mangoes grow rapidly in their mid-development stage. Optimal temperatures (27-32°C or 81-90°F) ensure a steady and healthy growth rate. At these temperatures, the physiological processes responsible for nutrient uptake and fruit enlargement are most efficient.

**Water and Nutrient Uptake:** High temperatures can increase transpiration rates, which may lead to water stress if not adequately managed. Water stress can limit nutrient uptake and reduce fruit growth, resulting in smaller mangoes. Adequate irrigation and mulching practices can mitigate the adverse effects of high temperatures on mango size.

### Ripening and Final Size

As mangoes approach ripening, temperature continues to play a vital role in determining their final size:

**Ripening Temperature:** Temperatures between 21-27°C (70-81°F) are ideal for the ripening process. Within this range, the biochemical processes involved in softening and flavor development occur optimally, allowing the fruit to reach its maximum size.

**Heat Stress:** Prolonged exposure to temperatures above 30°C (86°F) during the ripening phase can cause the fruit to ripen prematurely, often resulting in smaller sizes. Managing orchard temperatures through shade nets or strategic irrigation can help maintain optimal conditions for fruit growth.

### Post-Harvest Considerations

Even after harvest, temperature management is crucial for maintaining the size and quality of mangoes:

**Storage Conditions:** Mangoes are typically stored at temperatures between 13-15°C (55-59°F) to prolong shelf life and prevent shrinkage. Proper storage conditions help in retaining the fruit's size and firmness until it reaches the consumer.

**Transportation:** During transportation, maintaining a consistent and cool temperature is essential to prevent dehydration and size reduction. Temperature fluctuations can cause the fruit to lose moisture and shrink.

### Conclusion

Temperature significantly influences the size of mangoes throughout their developmental stages. Optimal temperature management during flowering, early fruit set, mid-development, and ripening is crucial for producing large-sized, high-quality mangoes. By understanding and mitigating the effects of temperature extremes, growers can enhance mango size and ensure a bountiful harvest that meets market demands and consumer preferences.