

## CITRUS FRUIT DROP

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### Introduction

In India, citrus ranks as the third most significant fruit crop. In Central India, the two most often grown citrus cultivars are Nagpur mandarin and sweet orange. Despite being widely grown, a significant issue with these crops is fruit drop. Fruit drop has grown to be a significant problem for central Indian citrus growers in recent years. However, a number of physiological and environmental factors have an impact on blooming, fruit set, fruit drop that follows, and final fruit retention. Most commercially important citrus cultivars bloom prolifically, producing as many as 1,00,000 – 2,00,000 flowers on a mature tree. However, fewer than 1–2% of these flowers produce harvestable fruit. The rest of the flowers and fruits are dropped by the plants due to several reasons.

### Nature of fruit drop

The first wave occurs soon after fruit set due to natural over production and is not of much concern to grower, a second wave occurs from may to June (summer or June

drop) in the Northern Hemisphere and November to December in the Southern Hemisphere. It is particularly severe in the hot dry climatic conditions. The third wave, called the pre-harvest fruit drop is the drop of mature fruits before the harvest. This drop is of economical importance to the grower as in this case nearly/completely mature fruits are shed causing heavy losses to the grower. The initial drop period involves the abscission of weak flowers, fruit lets with defective styles or ovaries or flowers, which do not receive sufficient pollination.



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**First wave (post-bloom drop):**

Fruit shedding, which causes the dropping of little fruits, starts soon after the flowering stage. Growers don't need to be overly concerned about this phenomena because it is a normal occurrence brought on by the excess fruit output. By dropping fruit, the overabundance of fruit on the trees is lessened.

**Second wave (summer or June drop):**

The first wave of fruit drop usually happens one or two months after flowering, when young, developing fruits from trees with an abundance of fruit fall off the tree. This drop, sometimes referred to as the June drop, makes up roughly 10% of all the fruits that fall in Kinnow. The falling fruits are roughly the size of marbles, with a diameter of 1-2 cm. The fight between young fruits for the carbohydrates required for growth and development is the main cause of fruit dropping during this time. The June drop is a normal occurrence during citrus fruit development, but early summer heat waves and a lack of water can make it worse.

**Third wave (comprise pre-mature and pre-harvest fruit drop):**

Fruits that are almost ready for harvest are affected by the third wave of fruit drop, which begins in August as pre-mature fruit drop and lasts until harvest as pre-harvest fruit drop. Fruits may separate at the junction of the

peduncle and calyx during this period, causing the fruit to fall without the peduncle attached. For growers, this decline has serious financial ramifications because it damages almost fully-grown fruits, resulting in substantial losses. Pre-harvest fruit drop in December and January is primarily caused by cold temperatures and foggy conditions, whereas pre-mature fruit drop is primarily caused by disease spread and fruit fly infestations. Fruit drop in citrus is caused by a number of internal and external reasons, including growth regulator imbalances, illness, insect pest infestations, extremely high or low temperatures, high humidity, flooding, and water stress.

**Based on causal factors involved, the fruit drop can be classified broadly as:**

**i) Physiological drop**

The abscission of fruitlets as they approach 0.5–2.0 cm in diameter is known as the "June" (or "November") drop. Competition amongst fruitlets for water, carbohydrates, hormones, and other metabolites is most likely the cause of this illness. However, stress exacerbates the issue significantly, particularly in hot weather or when there is a water shortage.

**ii) Pathological drop**

Fruit drop in citrus also occurs due to pathogenic fungi viz. *Botryodiplodia theobromae*, *Colletotrichum gloeosporioides*

and in some cases due to *Alternaria citri* which cause the stem end rot of the fruits and occurs predominantly on the mature fruits near ripening (pre-harvest drop).

### iii) Entomological drop

Among the significant cases that result in a significant loss of blossoms and fruits are citrus bud mite and orange bugs, which suck moths and other insects. They cause fruit to decay and drop because they drain the juice from them. This decline also makes a significant contribution to the citrus pre-harvest fruit drop.

### Management of citrus fruit drop

Controlling fruit drop is crucial, especially before harvest when practically all fully ripe and potentially marketable fruits are lost. Success rates for attempts to manage this fruit drop vary. It has been tried to stop fruit abscission by using plant growth regulators since disruption of auxins along the stalk is the primary cause of the abscission. Some plants regulators (NAA, 2,4-D, 2,4,5-T, GA3, CIPA) and related compounds seem to retard the formation of abscission layer by augmenting the endogenous auxin. 2,4-D, when applied thrice at monthly interval in August, September and October @10 ppm with 1% urea gave a reduction in fruit drop up to. Thus more than 12% yield was increased by saving the fruit drop.

### Citrus decline

### Symptoms of citrus decline

The symptoms include stunted tree development, chlorotic leaf appearance, scant foliage, twig die-back, and a generally sickly tree appearance. The majority of the time, the trees remain unhealthy for many years and produce significantly less fruits. The symptoms first only affect a few branches of the tree, but ultimately the entire structure is impacted. The tree has stunted growth, mottling leaves, scant foliage, and a sickly appearance. The lateral veins and midribs of mature, aged leaves develop a spreading yellowing. As autumn summer ends and twig die-back begins, leaves may turn yellow and fall off. Dead branches become clearly visible after drying. Weak shoots continue to die back.



Although there is an abundance of flowers, there is either a low fruit set or small-sized fruits. The first few years of a decline may have a bumper crop, which would wear out the trees and make them more susceptible

to decline. Fruits are severely impacted by the yield loss when it reaches an advanced stage of decline. In addition to being smaller, the fruits have thick skin, are unpleasantly hard, have less liquid, and frequently have a high TSS concentration. Trees that decline typically don't die; instead, they just stay poor and unproductive. Citrus decline is caused by a wide range of conditions, including pH, salt status, structure, hard pan presence, poor drainage and soil erosion, nutrient inadequacy, incompatible stocks, insect, pest, and disease assault, among others. In addition to these elements, particular concentrations of biological compounds, such as enzymes, are crucial for preserving the health of the plant.

### **Control**

The disease can be effectively controlled by implementing a suite of measures, including the selection of an appropriate site and soil, the cultivation of real, healthy plants from certified bud wood, the use of appropriate rootstock, prudent irrigation and manuring, and a scientific spray schedule against insect pests and illnesses.