

Growth regulation practices in important fruit crops

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ARTICLE ID: 21

Introduction

- The main objective of growth regulation practice (crop regulation) is to force the tree for rest and produce profuse blossoms and fruits during any one of the two or three flushes.
- This aims to regulate uniform and good quality fruits and maximize production as well as profit to the grower.
- Fruit crops like, citrus, pomegranate and guava flowers and fruit three times in a year.
- A good harvest is possible only if crop is regulated to single season (*bahar*).
- The selection of *bahar* at a location is mainly determined by availability of water, occurrence of disease and pests and market position.
- **Bahar or Resting Treatment:**
 - To regulate fruiting, water is withhold for about 2 months in advance of normal flowering season.
 - To obtain higher fruit yield during a particular period, plants are given a resting period by which the natural tendency of the tree is altered with artificial means.

Type of flowering (bahar period)	Time of flowering	Time of harvesting
1.Ambe Bahar	January-February	June-August
2.Mrig Bahar	June-July	November-January
3.Hasht Bahar	September-October	February-April

1) Citrus

➤ Bahar treatment

- If left to nature the trees may bloom and fruit irregularly through-out the year.
- In order to overcome this problem and to force a full crop in any of the three seasons, as required by the grower and the traders, Bahar treatment is practiced in citrus orchards.
- In citrus trees generally bloom three times a year, i.e., in January-February (Ambe bahar), June (Mrig bahar) and October (Hashta bahar).
- Trees are treated for **Ambe bahar (January-February), in November or December.**
- In this method, from November onwards the amount of water is gradually reduced in successive irrigations and completely stopped in December.

- About the middle of December, the land is ploughed.
- When the trees start showing wilting symptoms (3-4 weeks), the soil around the tree to a distance of 120 cm is dug a depth of 10 cm and the recommended manure is added to the soil and the trees are irrigated.
- The first irrigation that follows is sparing while the subsequent ones are more plentiful.
- Flowers appear about a month after the first irrigation.
- In Maharashtra, the roots are also exposed for about 10 days as part of the bahar treatment.
- However, this treatment is considered to be harmful in the long run and not encouraged as a routine practice.
- **Use of growth regulators**
- After conducting large-scale pilot trials at the Fruit Research Station, Anantharajupet, a schedule of three sprays of 2, 4-D at 10 ppm, during flowering, 15 days after fruit set and two months before harvest was recommended to increase the fruit set, to reduce the fruit drop and to improve the yields by 35% to 50% in sweet orange.
- Fruit retention for three weeks beyond the normal harvest period was possible with the same spray when done one month before harvest.

2) Pomegranate

- Pomegranate flowers continuously when watered regularly.
- The plants under such conditions may continue bearing flowers and bear small crop irregularly at different period of the year, which may not be desirable commercially. To avoid this trees are given **bahar treatment**.
- **In this treatment, the**
- Irrigation is withheld two months prior to the bahar followed by light earthing up in the basin.
- This facilitates the shedding of leaves. The trees are then medium pruned 40-45 days after withholding irrigation. The recommended doses of fertilizers are applied immediately after pruning and irrigation is resumed.
- This leads to profuse flowering and fruiting. The fruits are ready for harvest 4-5 months after flowering.
- In tropical condition, there are three flowering seasons, viz., January-February (*ambia bahar*) June- July (*mrig bahar*) and September-October (*hasta bahar*). The choice of flowering/fruiting is regulated taking into consideration the availability of irrigation water, market demand and pest/disease incidence in a given locality.
- Generally in north Gujarat taken Hasta bahar for pomegranate production.
- The fruits from **hasta bahar are harvested during the month of March to April**.
- They have very attractive rind with dark coloured arils.
- Since the availability of the fruits during this season is limited, they fetch high value.
- Optimum water stress cannot be developed during this period as withholding of irrigation coincides with the rainy season. This leads to poor flowering and thus affects the yield.

3) Guava

➤ **Time of flowering and fruiting in guava:**

- Under natural conditions, guava tree produces flowers and fruits twice in a year in Northern India, but it is thrice i.e. almost throughout the year in Western and southern India.
- Which results in rest period and ultimately guava tree bears small crops at different times of the year, this pattern of flowering and fruiting is not desirable for commercial cultivation.

➤ **Regulation of flowering and fruiting in Guava for Mrig bahar**

- Throughout India, Mrig bahar is preferred over Ambe bahar and Hasth bahar.
- Therefore, it becomes necessary to regulate flowering so that Mrig bahar can produce heavy flowering and fruits are available in winter.
- The following practices are adopted for this purpose:

➤ **To restrict irrigation water:**

The guava tree should not be given irrigation from February to middle of May. Thus the tree sheds its leaves during hot season (April- May) and goes to rest. During rest period, tree can conserve food material in its branches. In the month of June tree is well cultivated and manured followed by irrigation. After about 25-25 days the tree would blaze into profuse blossoms. The fruits mature during winter.

➤ **To expose roots:**

Upper soil around the trunk (45-60 cm radius) is removed with care to expose the roots to the sun. That will result in reduction in supply of soil moisture from soil to the top and the leaves begin to shed and the trees go to rest. After 3-4 weeks, the exposed roots are again covered with soil. Manuring and watering is done.

➤ **To do deblossoming:**

It can be done with the use of growth regulators like, Naphthalene Acetamide (NAD) @ 50 ppm (parts per million) is found to be effective. It can also be done manually on small scale.

When flowers of Ambe bahar are deblossomed, the tree becomes more potential to produce more flowers and fruits in Mrig bahar.

➤ **Bending:**

Trees having erect shoots and bearing habit is very poor, in such trees shoots may be bent and tied on the pegs driven on the ground. Thus dormant buds become activated which in turn bear flowers and fruits.