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Optimizing Flowering and Fruiting through Crop Regulation in Pomegranate

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Abstract: -

Pomegranate is one of the most promising fruit crops of India. It has exquisite nutritionally valuable and remunerative crops. In recent years pomegranate is getting popularity in the international trade due to its processed products and nutritional value. The main purpose of crop regulation is to force the tree to rest and produce prolific flowers and fruit during any one of 2 or 3 flushes. The aim of regulation is to produce uniform and good quality yield. A good crop is possible only when the crop is regulated in a single season, otherwise the flowers continue to bloom uninterrupted. The selection of bahar in one place is mainly determined by availability of water, occurrence of pests, diseases and marketing position. Crop regulation in Pomegranate is achieved by the several techniques like, flower bud thinning, shoot pruning, withholding irrigation and use of different chemicals.

Introduction:

Pomegranate (*Punica granatum* L.) is one of the most important fruit crops of India which is grown in the tropical and sub-tropical areas of the world. It belongs to the Punicaceae family and native of Iran but extensively grow in Mediterranean and central Asia. It is highly suitable for arid and semiarid region. Pomegranate are mainly consumed as fresh and processed products like beverages, juice, jelly, jam etc and as “Super fruit” in the global functional food industry. Pomegranate fruits peel is an inedible part obtained during processing of juice.

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Pomegranate has three main flowering and fruiting seasons or bahar, ambe bahar (spring season flowering), mrig bahar (June-July flowering) and hasta bahar (October-November flowering). Pomegranate flowers continuously throughout the year under tropical climate, subtropical central and western India, there are three distinct flowering seasons *viz.* rainy (Mrig Bahar), spring (Ambe Bahar) and autumn (Hasta Bahar) with the corresponding harvesting periods during the rainy, winter and spring seasons in pomegranate.

- To obtain suitable crop at a desired season
- To increase number of hermaphrodite flowers
- To maximize the production as well as profit to the producer
- To reduces the fruit dropping and increases the yield
- To reduce cost of cultivation

They always avoid taking ambe bahar crop and regulate this crop into mrig bahar and crop is harvested during winter but some farmers prefer hasta bahar with less availability of water.

Table 1. Effect of Bahar Season on Pomegranate Growth and Quality

Bahar	Flowering Time	Harvesting Time	Suitable Region / Condition	Fruit Quality	Average Yield (t/ha)
Mrig Bahar	June–July	November–January	Rainfed regions (post-monsoon)	Good size, color, sweetness	**12–15** (can go up to 20)
Hasta Bahar	September–October	February–April	Irrigated areas (post-monsoon)	Moderate quality, less uniformity	**10–12**
Ambe Bahar	January–February	June–July	Irrigated areas (spring flowering)	Good rind color, moderate TSS	**8–10**

Objectives of crop regulation in pomegranate

The main purpose of crop regulation in pomegranate is to relax the tree during any one of the two or three flushes and to produce prolific blossom and fruits. Besides, some main objectives are as under:

- To regulate the uniform and good quality of fruits

Principles of flower regulation

The basic principle of crop regulation is to manipulate the natural flowering that increase fruit yield, quality and profitability in pomegranate during the desired season. Flower regulation is useful for best and long-term use of resources with high yield. Initiation of flowering and regulation of flowering are

affected by the different factors *viz.* environmental and genetic factors. Pomegranate flowers produce irregularly from February to October in the arid and semi-arid regions. In India, all commercially grown varieties are very sensitive to insect-pests and diseases, especially Scorching, Bacterial Leaf Blight, Nematode, Termite and Mite etc. Therefore, availability of irrigation water, pest and disease infestation and market demand are the major issues for flower regulation. Indian pomegranate varieties are mostly produce flowers throughout the year.

Methods of crop regulation in pomegranate

Flowering is mostly affected by many factors *viz.* defoliants, withholding of irrigation, plant growth hormones, nutrients status and canopy management (training and pruning) etc. Light pruning and ethrel foliar spraying are defoliant practiced to shed off leaves. Withholding of irrigation (lack of moisture) is done 1 to 2 month before taking desired bahar in pomegranate. The top soil around the tree should be dug to a depth of 30 cm, equal to the leaf canopy. The mixture of manure and fertilizers are applied into the soil which is then leveled and light irrigation is done after application. The better floral sex ratio, higher fruit setting and ultimately higher quality and yield of fruits may be taken in year at a desired season by these treatments. Bahar treatment must be started from third year onwards for taking better quality. Bahar treatment is done in the following ways:

Flower regulation by cultural practices

Canopy management by training and pruning: (carbon nitrogen ratio) is the best method to achieve higher flowering percent and quality fruit production in pomegranate. Pomegranate may be trained as single stemmed tree or multi-stemmed tree. For the last few years, pomegranate plants have been trained by open centre system. Light pruning should be done after withholding of irrigation and 15 to 20 days before starting of new bahar. To avoid fungal attack on pruned parts of plants should use 10 per cent Bordeaux mixture paste. Withholding of irrigation is done in April-May for regulating of crop in dry areas. These cultural practices give good quality fruits and yield 60 to 80 fruits should be retained on single plant.

Induce more flowering due to the stress of water scarcity : The main principle of withholding of irrigation is to provide rest for the plant. Withholding of irrigation is done

for one and half month in loamy soils and one month in light sandy soils. It practices to accumulate large amounts of food to enhance growth in the coming season and increasing of number of flowers. In this stage the leaves of pomegranate plant fall (50 to 70 %). Under water stress conditions, plants produce osmatin, arginine protein, proline and proteogenic amino acids like prolines etc. These amino acids help to stimulate flowering in the plants under water stress condition, so the plant produce more flowering and good sex ratio

Use of chemicals for flowering: In pomegranate crop, spraying of ethrel (1-2 ml per litre) is sprayed extensively for crop regulation. Ethrel hormone stimulates the enzymes i.e. polygalacturonase and cellulase for cell smelting. These chemicals are considered best for good flowering.

Physiological disorder: Major physiological disorders like fruit cracking, sun scorching, browning of arils etc. are in pomegranate in dry areas. The foliar spray of gibberellic acid (20ppm) and boron (0.2 %) are control of fruit cracking in suitable bahar. Sun scorching in pomegranate fruits should be avoided with use of 30-35 per cent butter paper and shade net, respectively. Harvesting of pomegranate fruits should be done at appropriate time to avoid the browning of arils.

Insect-pests and diseases management: Crop regulation is good system for managing the insect pests. Use of defoliant induces leaf falls from 50 to 100 per cent, it helps to escape the crop from outbreak of insect-pests and diseases and also reduce usage of insecticides. Crop regulation is an effective and advanced management practice for obtaining higher yield with good quality. Availability of irrigation, insect-pests infestation, market demand, climatic conditions and use of germplasm are play major role in crop regulation. It requires an intensive care and work for its operation. Crop regulation is more effective to control of physiological disorders i.e. sun scorching, fruit cracking etc.

References

1. Kumara, R., Saroj, P. L. and Sharma, B. D. (2019). Flower regulation in pomegranate for higher yield, improved quality and enhanced management – A review. *Fruits*, **74**(4): 150 –166.
2. Shivran J. S., Jat M. L. and Jat R. K. (2020). Crop regulation in pomegranate. *Journal of Crop and Weed*, **16**(1): 242-244.
3. Sachin A. J., Ramteke V. and Bharath K. R. (2015). Flower Regulation in Guava and Pomegranate. *Popular Kheti*. **3**(4): 53-54.