Introduction

Pomegranate (*Punica granatum* L.) is an important fruit crop of hot arid region of the India. It is grown commercially in the states of Maharashtra, Gujarat, Kamataka, Andhra Pradesh, Tamil Nadu, Madhya Pradesh, and Rajasthan, India is one of the largest producers of pomegranate in the world. The pomegranate area in arid region is increasing at a faster rate due to its incessant demand, hardy nature, low cost management and wider adaptability to arid soils. In Rajasthan, it is mainly grown in Jaipur, Ajmer, Alwar, Tonk, Sriganganagar, Tonk, Pali, Kota, Jalore, Banswara, Sawai Madhopur, Bhilwara, Jhunjhunu, and Sirohi districts in 12,000 ha area (Rathi, 2017). The pomegranate plants flower and provide fruits throughout the year. In Rajasthan, pomegranate is harvested in all three seasons during March-April, Aug.-Sep., and Nov.-Dec. However, it needs to be forced into rest period for prolific harvest at a given time. The basic objectives of flower regulation in pomegranate is to manipulate the natural flowering and fruiting in such a way that it produces high yield of quality fruits in desired season with sustainable use of farm resources. Transition of flower from vegetative phase to reproductive phase is critical phase in pomegranate flowering, which determines production efficiency. The differentiations of vegetative tissue to reproductive tissue decide flowering intensity and production efficiency. Withholding of irrigation (moisture stress), plant growth substances, nutrient content along with canopy management are major horticultural interventions for flower regulation which influence flowering. It is based on principles that pomegranate bears three kinds of flowers namely hermaphrodite, intermediate and male flowers (Fig. 1) on both new and old growth in three
Process of Flower Formation in Pomegranate (Punica granatum L.) Under Hot Arid Climate

Inhabitants of the pomegranate tree in the desert regions of the Middle East, where the climate is hot and arid, follow a specific process to ensure flower formation. The process begins with the development of the flower buds, which occur in the late summer. These buds then develop into flowers during the autumn months, before the onset of winter.

Key Points:
- Flower buds develop in the late summer
- Flowers form during the autumn
- Flowers bloom in winter
- Flowers ensure seed formation in the following spring
- The process is crucial for the survival of the pomegranate tree in arid environments

Image Description:
- The images illustrate the stages of flower formation in pomegranates under hot arid conditions.
- The flowers are shown in various stages of development, from bud to bloom.

Conclusion:
- The process of flower formation in pomegranate under hot arid climates is crucial for seed production and the survival of the plant.
- Understanding this process helps in the cultivation of pomegranates in arid regions, ensuring a steady supply of flowers and fruit.
Importance of stresses in flowering

The mortality of flowering plants can be due to a variety of stresses, including nutrient deficiencies, drought, disease, and herbivory. These stresses can interfere with the normal development of flowers, leading to decreased reproductive success. Understanding the mechanisms by which these stresses affect flowering is crucial for managing ecosystems and optimizing crop yields.

Process of lower regulation in photosynthesis

Photosynthesis is a complex process involving the conversion of light energy into chemical energy. Lower regulation in photosynthesis refers to the control mechanisms that limit the rate of photosynthesis in response to environmental stresses. These mechanisms help ensure that the plant can allocate resources efficiently, even under adverse conditions.

Fig. 2: Process of lower regulation in photosynthesis

1. Lower regulation activity increases with the intensity of the stress.
2. The plant adjusts the rate of photosynthesis to conserve energy and maintain survival.
3. This regulation helps the plant to survive and reproduce under challenging conditions.
Plant architectural engineering and flower regulation

The induction of DNA damage may alter cell fate in pomegranate.

Every protective measure is involved in the process of stress development, and respective compounds counteract and mitigate the stressful environment such as elicitors and phytohormones are exerted when the plant is the exposed to stressful gene expression of cell wall.

Table 1: Flowering and fruiting period of pomegranate under different climatic waves.

<table>
<thead>
<tr>
<th>Month</th>
<th>Flowering Period</th>
<th>Harvesting Period</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>February</td>
<td>Flowering Period</td>
<td></td>
<td>Suitable for export.</td>
<td>Requires severe irrigation.</td>
</tr>
<tr>
<td>March</td>
<td></td>
<td></td>
<td>Maximum fruit availability periods.</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td></td>
<td></td>
<td>Low pest and disease incidences.</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td></td>
<td></td>
<td>Fruit setting during dry period having good quality fruit. Maximum fruit availability periods.</td>
<td></td>
</tr>
<tr>
<td>June to July</td>
<td></td>
<td></td>
<td>Suitable for export.</td>
<td></td>
</tr>
<tr>
<td>September</td>
<td></td>
<td></td>
<td>Not affected by bacterial endame.</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td></td>
<td></td>
<td>Poor growth and yield.</td>
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</tbody>
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Flower regulation in Pomegranate (Punica Granatum) Under Hot and arid Climate.
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