Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 04, Issue: 02 (MAR-APR, 2024)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Flower Forcing and Year Round Flower Production

(*Pooja Sahu and Mayank Parihar)
Odisha University of Agriculture and Technology, Bhubaneshwar, Odisha
*Corresponding Author's email: poojasahujai143@gmail.com

Flowers can be forced to bloom on a particular day (like Valentine's Day) or during off-seasons by performing any operation or treatment on the plant once it reaches the ripeness-to-respond stage. There is a chance that these flowering dates or periods will occur sooner or later than typical. Flower forcing is a technique used to accelerate the blooming of flowers, particularly for commercial purposes such as floral displays or for market sales. It involves manipulating environmental conditions like temperature, light and humidity to stimulate flowering outside of the plant's natural bloom season.

The Goals

The goals of such operation are as follows:

- **Off-Season Production:** Cut flowers are abundant in their regular season and therefore sell for a relatively low price. Farmers sometimes have to sell their flowers at a loss in order to make any sales. Harvested cut flowers that were unsaleable were occasionally roting. Some were even left on the plant because harvesting them would not be profitable. Farmers are losing a lot because of this. Therefore, even though the input costs may be high, farmers should produce cut flowers during the off-season to minimize losses and increase produce prices.
- **Production on a Specific Date:** Similarly, on special occasions like Christmas, New Year's, Mother's Day, Memorial Day, Valentine's Day, Graduation Exercise Day, Buddhist Lent's Day, etc., there is a significant demand for cut flowers. The farmers will therefore benefit if they can produce cut flowers that will be available during these events.

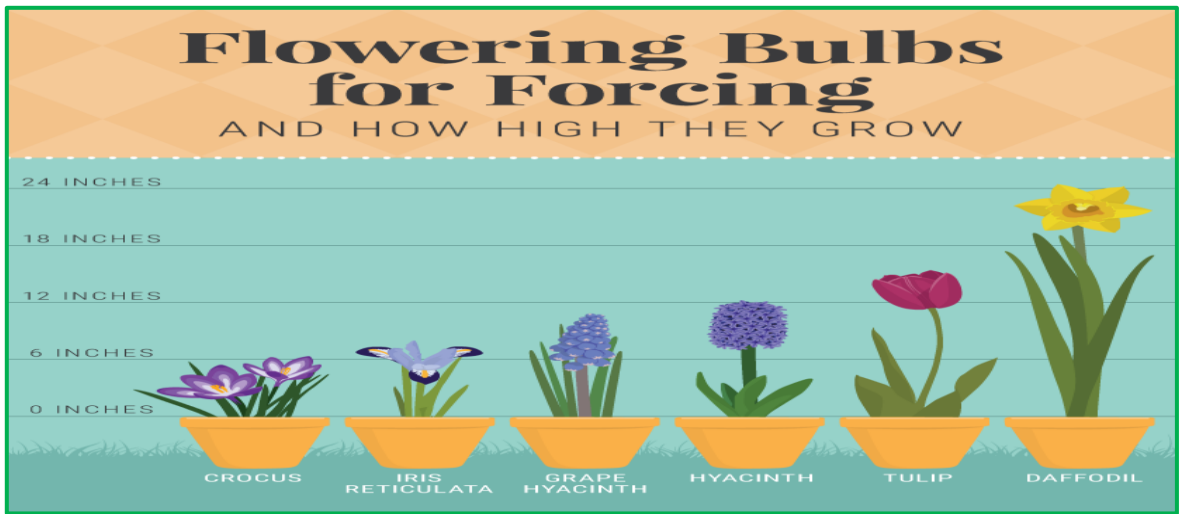
Objectives

The objectives of forcing a plant to flower during off-season or at certain specific dates are as follows:

1) **To Avoid Surplus of In-Season Cut Flowers:** The majority of cut flowers are grown in their respective seasons, when the weather is ideal for their growth. Because of this, there are plentiful supplies that are either unsaleable or only fetch a low price.
2) **To Avoid Wastage or Spoilage of Surplus Cut Flowers:** Cut flowers, in contrast to most other products, lose their freshness over time. If not used, they are either sold, spoiled or left as waste.
3) **To Avoid Danger of Epidemics:** The production of cut flowers during the growing season is vulnerable to various pest attacks and disease outbreaks because of the ideal climate for their growth.
4) **To Distribute Employment Throughout the Year:** Production of cut flowers requires a lot of worker. Most workers are employed in some capacity during the typical production

peak season. The nation's economy benefits from the off-season cut flower production, which helps to distribute employment throughout the year.

5) **To Increase Farmers' Income:** It is obvious that the farmer's income will be higher by selling products that are on high demand.
6) **To Reduce Imports and Balance of Trade:** In certain seasons of the year when domestic production is impractical, florists import cut flowers from overseas, often at a premium price, to meet customer demands. In order to maintain a positive trade balance, cut flowers grown during off-season periods are produced.
7) **To Satisfy the Customers at the Time of Needs:** In general, consumers' needs for cut flowers are not seasonal; rather, they are distributed throughout the year, contingent upon particular events. Off-season cut flowers, or those produced on particular dates, are meant to meet the needs of the customers at that particular moment.



- **Physiology of Flowering**

Hypothesis of Flowering ;- The organs that sense changes in the environment, usually the leaves or meristems, must reach a state known as "ripeness to respond" before a plant can flower in response to changes in the environment, especially temperature and duration of the day. It is hypothesised that a plant will form hypothetical substances in order to produce floral primordium once it has reached the "ripeness-to-respond stage" and is exposed to the right stimuli. These compounds are called "florigen" when stimulated by the right photoperiod and "vernalin" when stimulated by the right temperature. Eventually, this floral primordium will mature into a flower that will eventually bloom.

Flowering Behavior of Plants:- Depending on their genetic constitutions plants can be classified into two groups, namely: (i) those that flower all year round, and (ii) those that flower only in-season.

A. All-Year Round: There are two types of plants in this group based on how much the season can influence, namely:

1. **Little or no seasonal influenced:-** Flowering occurs all year round with little or no influence of the season. Examples are roses, marigold, chrysanthemum, and heliconia.
2. **Great seasonal influenced:-** In this type of flower are highly dependent on the season. Flowers can bloom abundantly during certain periods of the year due to ideal weather, and less abundantly during other times. Examples are jasmine, dendrobium orchids, etc.

B. Seasonal: These are plants that flower during specific seasons (i.e. in-season). There are two types of plants in this category, namely:

- **Temperature Influenced:-** These are the plants that are affected by temperature, particularly low temperatures to flower. Bulbs that blossom when exposed to cold temperatures include tulips, amaryllis, daffodils, narcissus and others.
- **Photoperiodic Influenced:-** These are plants whose flowering is influenced by the photoperiod. They are divided into two kinds:

(i) Short-day Plants:- These are the plants that flower when the length of the day falls below a threshold. Temperature can affect when plants flower. For example, poinsettias don't turn red in high temperatures, even though they bear flowers after short days.

(ii) Long-day Plants:- These plants blossom when the duration of the day surpasses a threshold. Humidity can affect when flowers bloom. For example Siam tulips won't develop their initiated flowers in low humidity.

C. Forcing Operation

Adjusting Factors Affecting Flowering

1. Temperature:- Plant parts that require low temperatures can be kept in the freezer or refrigerator to regulate the temperature. These parts are primarily bulbs or seeds.

2. Photoperiod:- The photoperiod can be changed by either keeping the plants in a dark room to shorten the day length or by adding extra light from artificial sources, such as fluorescence lamps and tungsten bulbs, to lengthen the day. The two primary goals of modifying photoperiod are:

To induce flowering by giving optimum photoperiod: A long-day plant will flower if additional light is given to it to surpass the critical value. For example, peppermint needs at least 16 hours of daylight to flower, but the maximum day length in Thailand is 14.30 hours, so more than 1.30 hours of additional light are required for peppermint to flower in Thailand.

To keep the plant in non-inductive cycle so that it will not flower: Short-day plants—such as chrysanthemums, which require 14.30 hours or less to flower—will not flower if additional light is given to them beyond a certain point; however, since Thailand's days are shorter than that, even small plants will bloom year-round, rendering the plant unproductive and producing only tiny flowers. If you give it more light than 14.30 hours per day, it won't flower until the ideal time comes when the light is turned off, at which point it will bloom abundantly.

• Chemical Flower Forcing

Four types of chemicals affect flowering, namely fertilizers, plant hormones, ethylene, and other chemicals.

A. Fertilizers: Specific fertilizers have an impact on the plant's C/N ratio, which has an effect on flowering. While a narrower C/N ratio or lower C, will keep the plant in the vegetative phase, a broader C/N ratio, or higher C, will cause flowering. Flowering can be induced or delayed by modifying the fertilizer formula.

I. **Retarding flowering:** This can be achieved by giving the plant fertilizers that are high in nitrogen. In order for N to be easily absorbed by the plant, irrigation should also be supplied.

II. **Stimulating flowering:** This can be achieved by decreasing watering and applying fertilizers with low nitrogen content. Flowers can also be induced to bloom by other substances that aid in fixing N to a bound form.

B. Plant Hormones: There are two main types of plant hormones what affect flowering, namely:

i. **Gibberellins:-** Plants and fungi have been found to contain at least 50 gibberellins. All of them are appropriately referred to as gibberellic acids or GA. Among plant hormones, gibberellins are the only ones that can promote the extensive growth of whole plants. Gibberellins have been shown to interact with light and to be able to replace the long-day

requirement in certain species. Additionally, they get around some species' requirement for an inductive cold period in order to flower, or vernalization. Given that the gibberellin content of some affected plants increases after these treatments, it would seem that the formation of flowers brought on by either long days or cold periods might normally depend upon the buildup of endogenous gibberellins during these periods.

ii. **Growth retardants:-** These artificial substances prevent stem elongation and result in general stunting. They partly prevent the synthesis of gibberellin, which is why they do this. Phosphon D, Amo-1618, CCC or Cycocel, and Ancymidol are a few of these. retardants, such as CCC, either counteract or reduce the endogenous GA level's inhibitory effect on floral initiation, thereby promoting the initiation of floral primordium.

iii. **Ethylene:-** It's common knowledge that ethylene causes pineapples to blossom. It works very well to get pineapple plants to bloom if you sprinkle acetylene, a precursor to ethylene, on top of the plant. Ethrel, also known as ethephon, is a chemical that can release ethylene and is sold in stores. In most other species, ethylene inhibits flowering; therefore, the induction of flowering in mangoes and bromeliads by this gas is unusual.

iv. **Other Chemicals:-** Other chemicals are also used, particularly on fruit trees, to encourage flowering. Several fruit trees blossom when these substances are sprayed on leaves or applied as a soil drench, such as paclobutrazol (commonly known as Cultar), sodium chlorate, potassium nitrate, thiourea and the explosive potassium chlorate.

- **Mechanical Flower Forcing**

Pruning:- Pruning encourages flowering by widening the C/N ratio. This is evident in the case of bougainvilleas, which flower shortly after pruning provided the right fertilizers and water are applied. Pruning is also necessary for the induction of flowering in other flowers like roses.

Leaf Trimming:- Inhibitors of flowering may be found in leaves, as in the case of jasmine. Therefore, removing a leaf or part of a leaf encourages flowering.

Ringing:- By increasing the C/N ratio ringing encourages flowering. Fruit trees are a prime example of this, as ringing encourages fruiting and flowering.

Low-temperature Storage:- Low storage temperatures encourage flowering in many plants. This can be accomplished by storing the plants typically corms or bulbs in the refrigerator for a while prior to planting.

Breaking Dormancy:- Certain plants' seeds and buds go through a period of dormancy during which they don't grow at all. Gibberellins and chemical treatments as well as exposure to low temperatures, can induce dormancy. Gibberellins the latter type are more frequently used in relation to flowering. When applied, gibberellins cause many cold-sensitive seeds to break dormancy and many cold-sensitive plants to flower.