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Flower Forcing: A New Approach to improve Farmer's Income

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Abstract

Flowering regulation has immeasurable practical value. The system used to produce flowers in the off-season is called "forcing". Flowers are forced to adjust several climatic factors and mechanical and chemical methods to produce flowers that meet the required conditions at desired times and during festivals such as Diwali, Navaratri, Christmas and New Year. The timing of the peak of the plant generally does not coincide with the time of greatest demand, so the flowering sequence is altered to avoid peak production in certain months and to promote more or less continuous and uninterrupted flower production throughout the year. The way to do it is of great benefit to both. both producers and consumers. In this regard, off-season flower production can be improved by changing the timing of pruning, using plant growth regulators, and regular split applications of fertilizers. Forced cultivation allows off-season flower production when demand for flowers is typically very high. Introducing out-of-season flowers increases farmers' incomes and improves their livelihoods. Also, from a consumer perspective, flowers are available all year round.

Keywords: Flower forcing, temperature, photoperiod, plant hormones, gibberellins, ethylene.

Flower forcing/off-season flower induction

The system used to produce flowers in the off-season is called "forcing". From a horticultural perspective, flower breeding is the manipulation imposed on plants after they have reached responsive maturity to stimulate flowering. The flowering date or time may be earlier or later than the normal flowering date or time. In 1901, Nicolas Dames introduced the "early bloom" system to hyacinths.

Goals of flower forcing

The goals of such an operation are as follows-

Off-Season Production: We have a wide variety of seasonal cut flowers at reasonable prices. Sometimes farmers have to sell their flowers, otherwise, they don't. In some cases, the harvested cut flowers did not sell and withered. Some were even left on the plants, unprofitable to harvest. This is a big loss for farmers. Therefore, although inputs may be higher, farmers are encouraged to produce cut flowers out of season to avoid losses and increase the product's price.

Specific-Date Production: Similarly, the demand for cut flowers is very high on

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specific occasions such as Christmas parties, New Year's Day, Mother's Day, Anniversaries, Valentine's Day, and Diwali. If it can be produced, it will be beneficial for farmers.

Objectives/ Importance for flower forcing

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

a) **How to avoid flower surpluses in normal seasons**: Most flowers are produced in a particular season, providing favourable production conditions. Therefore, they are available in large quantities and, as a result, are available at low prices or even unsellable.

b) **To Avoid Wastage or Spoilage of Flowers:** Unlike most other products, flowers are perishable over time. They are spoiled or left as waste if not used or sold.

c) **To Distribute Employment Throughout the Year:** Flower production requires intensive work. During the normal high season of production, most workers are busy with some kind of work. Off-season flower production helps spread employment throughout the year. National economic victory.

d) **To Avoid Danger of Epidemics:** Seasonal flower production is subject to many insect attacks and disease epidemics because of the favourable climatic conditions for its growth.

e) **To Satisfy the Customers at the Time of Needs:** In general, customer needs for flowers are not seasonal but distributed throughout the year based on specific events. Out-of-season flowers or flowers produced on specific dates are designed to suit your needs.

Table 1: Flowering seasons of important flowers

S. No	Crop	Normal season of flowering	Off-season
1.	Jasminum sambac Jasminum grandiflorum Jasminum auriculatum	February - June June - September May - September	July - January October - May October - April
2.	Rosa centifolia	March - October	November - February
3.	Tuberose	February - October	November - January
4.	Chrysanthemum	September - February	March-August
5.	Carnation	February - April	June - August
6.	Marigold	January - April	May - July
7.	Gerbera	October - December	April - June
8.	Anthurium	All year round but in cycles of 2-3 months on and 2-3 months off	----------
9.	Gladiolus	October - March	----------

f) **To Increase Farmer's Income:** The farmer's income will be higher by selling products that are in high demand.

Physiology of Flowering

A.) Flowering Hypothesis

Before a plant can flower in response to its environment (particularly temperature and day length), the organs that sense environmental changes (usually leaves or meristems) must reach a state called maturation to respond. there is. It was hypothesized that when plants reach reactive maturity and are exposed to appropriate stimuli, they produce flowering buds through the formation of hypothetical substances. These substances become 'vernalin' when stimulated at the correct temperature and florigen when stimulated at the correct photoperiod. This flower arrangement will sooner or later develop into a blooming flower.

B.) Factors Affecting Flowering

a. Temperature: Temperature, especially low temperatures, is an important factor for flowering. For example, winter wheat will not bloom unless it is exposed to low temperatures. Similarly, the coloured bracts underneath the poinsettia flower do not turn red at high temperatures. Temperature is particularly effective in initiating the flowering of bulbs. Especially the type of bulbs in which flower clumps form during storage after summer harvest and before transplanting in autumn. B. Tulips and irises can accelerate flowering at low temperatures (9-13°C), but pre-treatment at high temperatures (20-30°C) is essential for flowering.

b. Photoperiod: This is a day-long cycle within 24 hours. The ability of plants to flower in response to day length is called photoperiodism. Plants can be classified into short-day, long-day and mid-day plants. Short-day plants are plants whose flowering occurs when the day length is shorter than a critical value (any number of daylengths per day). Long-day plants, on the other hand, are plants that flower when the day length is longer than a critical value. Day-neutral plants are plants whose flowering is not affected by day length.

c. Flowering Behaviour of Plants:

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

(ii) Little or no seasonal influence: Flowering occurs all year round with little or no influence of the season.

Examples are roses, marigolds, chrysanthemums, and heliconia.

(iii) **Great seasonal influence:** The season greatly influences flowering in this type of plant. There is a time when flowering occurs profusely due to favourable climatic conditions, and at other times, not quite profusely, simply because the weather is not optimum. Examples are jasmine, Dendrobium orchids, etc.

(iv) **Seasonal:** These are planting that flower during specific seasons (i.e., in-season).

Method of flower forcing

I) Mechanical Flower Forcing

a) **Pruning**: Pruning helps broaden the C/N ratio which promotes flowering. This is seen in the case of bougainvillaea, which will flower soon after pruning if proper fertilizer and watering are applied. Other flowers, such as roses, and jasmine also require pruning to induce flowering.

b) **Pinching:** The operation of pinching involves the removal of the growing point of a shoot along with a few leaves. Pinching is done at a stage when the plants are young and between 7 and 15 cm in height, depending on their habits of growth. The plants which need pinching include China aster, dahlia, chrysanthemum, marigold, carnation, and rose.

c) **Leaf Trimming:** Leaves prevent flowering, as in the case of jasmine. Therefore, clipping some leaves or parts of leaves can help induce flowering. 3.3.3 Ringing: Ringing broadens the C/N ratio and helps promote flowering. This is evident in fruit trees where ringing induces flowering and fruiting.

d) **Breaking Dormancy:** The seeds and buds of some plants go dormant for some time. H. No growth at all. Breaking of dormancy can occur through exposure to cold temperatures or treatment with chemicals or gibberellins. The latter, namely H. Gibberellin, is more commonly used in connection with flowering. Applied gibberellins disrupt dormancy in many hardy seeds and induce flowering in many hardy plants.

II) Physical Flower Forcing

a) **Temperature:** For low temperatures-requiring plants, the temperature can be adjusted by keeping the plant parts, mostly bulbs or seeds, in the refrigerator or freezer.

b) **Photoperiod:** Photoperiod can be adjusted either by providing supplementary light from artificial

sources, such as tungsten bulbs and fluorescence lamps, to prolong the duration of the day length or by keeping the plants in a dark room to shorten the duration of the day length. There are two main aims of adjusting photoperiod:

c) **To induce flowering by giving optimum photoperiod:** By providing supplementary light to a long-day plant to exceed the critical value, flowering will be induced; e.g., peppermint requires at least 16 hrs of day length to flower, whereas the maximum day length in Thailand is 14.30 hrs; thus, a little over 1.30 hrs of supplementary light is needed to induce peppermint to flower in Thailand.

d) **To keep the plant in the noninductive cycle so that it will not flower:** By providing supplementary light to a short-day plant to exceed the critical value, it will not flower, but remains in the vegetative phase; e.g., chrysanthemum, a short-day plant, requires 14.30 hrs or less to flower, whereas the day length in Thailand is less than that, thus it will flower all-year round even from a small plant, making it non-productive, and only small flowers are produced. By providing supplementary light to exceed 14.30 hrs of day length, it will not flower, until such time that is optimum, light is cut off, and it will flower profusely.

III) Chemical Flower Forcing

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

a) **Fertilizers:** Certain fertilizers affect the C/N ratio of the plant, which in turn affects flowering. The broader C/N ratio, i.e., higher C, will induce flowering, while the narrower C/N ratio, i.e., lower C, will keep the plant in the vegetative phase. Adjusting fertilizer formula can be used to retard or stimulate flowering.

Retarding flowering: This can be done by providing fertilizers having high amounts of N to the plant. Watering should also be provided so that N will be readily absorbed by the plant.

Stimulating flowering: This can be done by giving fertilizers having low amounts of N and reducing watering. Other chemicals that help to fix N to a bound form can also stimulate flowering.

b) **Plant Hormones:** Two main types of plant hormones affect flowering, namely:

Gibberellins: At least 50 gibberellins have been discovered in fungi and plants. All could properly be called gibberellic acids, or

GA. Gibberellins have the unique ability among plant hormones to stimulate extensive growth of intact plants. It has been demonstrated that gibberellins can substitute for the long-day requirement in some species, and has an interaction with light. They also overcome the need some species have for an inductive cold period to flower (vernalization). It appears that the formation of flowers caused either by long days or by cold periods might normally depend upon the build-up of endogenous gibberellins during these periods because the gibberellin content on some affected plants increases following these treatments.

Growth retardants: These are a group of synthetic chemicals that inhibit stem elongation and cause overall stunting. They do so in part because they inhibit gibberellin synthesis. These include Phosphon D, Amo1618, CCC or Cycocel, and Ancymidol. Growth retardants (e.g., CCC) promote the initiation of floral primordium by reducing endogenous GA levels or antagonizing its inhibitory effect on floral initiation.

Ethylene: Ethylene has been popularly known to induce flowering in the pineapple. A sprinkle of acetylene, a precursor of ethylene, on top of the pineapple plant, is quite effective in inducing the pineapple plant to flower. An ethylene-releasing substance, called ethephon or ethereal, is commercially available. The induction of flowering in the mangoes and the bromeliads by ethylene is unusual because the gas inhibits flowering in most other species.

c) **Other Chemicals:** Several other chemicals are used to induce flowering, especially of fruit trees. These include the explosive potassium chlorate and its related compound sodium chlorate, potassium nitrate, thiourea, paclobutrazol (commercially known as culture), etc. which, when applied as a soil drench or leaf spray results in the flowering of many fruit trees.

Drawbacks and Limitation of flower forcing

- Lack of information
- Limited research on traditional flowers
- This might affect the yield, quality and fragrance of normal season bearing
- It may affect the economic lifespan of the plant
- Need for the study of plant physiology for off-season flower forcing.

Conclusion:

Flowers which are available during the normal season are plentiful, thus fetching a low price. Sometimes the farmers have to sell their produce even at a loss. In some cases, flowers which could not be sold are either left on the plants or are spoiled after being harvested. Thus, flower forcing makes it possible to produce cut flowers and loose flowers during the off-season period to obtain

a higher price, although the inputs may be higher. The demand for cut flowers is generally very high during certain occasions such as New Year, Christmas, Mother's Day, Memorial Day, Valentine's Day, etc. Forced cultivation allows off-season flower production when demand for flowers is typically very high. The induction of off-season flowers improves farmers' incomes and improves their livelihoods. From a consumer perspective, flowers are available all year round.

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