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Flower Forcing: Bringing Spring Before Its Time

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Flower forcing is an important horticultural technique that involves manipulating plants to produce flowers at a specific time or season, either earlier or later than their normal flowering period. In floriculture, where the demand for flowers is not limited to natural seasons, this technique plays a key role in ensuring timely availability. It is especially useful during important occasions such as Christmas, New Year, Valentine's Day, weddings, and other social and cultural events when the demand for flowers is very high. This technique supports off-season production, helping farmers regulate their income throughout the year while maintaining a continuous supply of flowers to the market. It also helps avoid surplus production during the natural flowering season, which often results in low prices, economic losses to farmers, or spoilage of harvested flowers. By controlling factors such as temperature, photoperiod, and irradiance, flowering can be effectively regulated. Since a wide range of cut flower crops are grown, flower forcing methods may vary depending on plant physiology and can be carried out through temperature regulation, mechanical practices, and chemical treatments.

Objectives of Flower Forcing

- To produce flowers for a particular season or specific occasions.
- To prevent wastage of excess flowers.
- To prevent excess in-season flower production.
- To ensure that flower production coincides with market demand.
- To create employment opportunities throughout the year.
- To increase farmers' income.
- To avoid the occurrence of dangerous epidemics.
- To reduce imports and maintain balanced trade.
- To satisfy customers by providing flowers when needed.

Factors Influencing Flower Forcing

Temperature

Temperature plays a critical role in regulating flowering, particularly in plants that require exposure to low temperatures (1–7°C) for flower induction. This process, known as vernalization, is especially important in bulbous plants where cold treatment increases cytokine activity, helps break dormancy, and promotes early flowering. Corms stored at 4°C for 3–4 months can break dormancy. Biennials cannot initiate flowering without exposure to cold temperatures. Exposing bulbs of *Lilium* cultivar 'White Heaven' to 4°C for one week resulted in a 20 percent reduction in the time required for floral transition. Similar results were reported by Mazor in *Lilium candidum* (Hasna *et al.*, 2024). In poinsettia, the coloured bracts will not change to red or other colours if exposed to high temperatures. Thus, careful manipulation of temperature conditions is essential for successful flower forcing.

Photoperiod (Day Length)

Photoperiodism refers to the response of plants to the duration of light and darkness within a 24-hour period. Plants may require short days (e.g., chrysanthemum), long days (e.g., carnation), or may be day-neutral (e.g., rose) in their flowering behaviour. By artificially extending or reducing the length of daylight using electric lighting such as incandescent lamps, fluorescent lamps, LEDs, and high-pressure sodium lamps, or by using blackout techniques with black polythene sheets to block natural light, growers can manipulate flowering time effectively. the utilization of photoperiodic night interruption to optimize the timing of flowering in chrysanthemum cultivar Anmol, aiming to synchronize it with market demand (Thakur and Grewal, 2019).

Moisture

Moisture is also an important factor influencing flowering. In bulbous crops, freshly harvested bulbs are generally kept under moist conditions and packed in peat moss to avoid dehydration before pre-cooling treatment is carried out to break dormancy.

Irradiance

Irradiance, or light intensity, affects the rate of plant development. Generally, higher light levels shorten the juvenile period and promote earlier flowering in many species. Based on irradiance response, plants are divided into two categories:

- Facultative irradiance response plants, which flower earlier when exposed to higher light intensity.
- Irradiance-indifferent plants, which show little or no change in flowering behaviour regardless of light intensity.

The effect of varying irradiance levels on the flowering time of facultative long-day ornamental annuals, including moss rose cv. Sundance, snapdragon cv. Coronette, pansy cv. Baby Bingo, annual verbena cv. Obsession, and petunia cv. Dreams. Saplings of each cultivar were transferred into four light-intensity chambers for 8 hours daily. Facultative long-day plants treated with high irradiance levels (92 and 119 µmol m^{-2} s^{-1}) exhibited earlier flowering (Baloch *et. al.*, 2012)

Stress Conditions

Environmental stress conditions, such as extreme temperatures or water stress, can influence flowering in different ways depending on the species. In some plants, stress may stimulate flowering as a survival mechanism. In *Arabidopsis*, drought stress accelerates flowering under long-day conditions but delays flowering under short-day conditions (Riboni et al., 2013). In some plants, stress may delay or inhibit growth processes. *Impatiens hawkeri* (New Guinea impatiens) and *Viola* × *wittrockiana* (pansy) experienced a decrease in photosynthetic rates for up to three days after just two hours of exposure to high temperatures (35°C), compared to unstressed plants (Warner and Erwin, 2002). Therefore, understanding the specific response of each crop to stress is essential for effective manipulation.

Methods of Flower Forcing

Physical (Environmental) Methods

Physical methods of flower forcing involve the manipulation of environmental factors such as temperature, light, and moisture. Temperature control is commonly achieved by storing bulbs or seeds under cold conditions to break dormancy and induce flowering. Photoperiod manipulation is carried out by providing supplementary light using artificial sources such as LED or fluorescent lamps, or by reducing light exposure using blackout curtains. These methods have become more precise and efficient with advancements in greenhouse technologies, allowing growers to create controlled environments that favour desired flowering responses.

Chemical Methods

Chemical methods play a significant role in regulating flowering through the use of fertilizers, plant growth promoters, plant growth retardants, and other compounds. The application of fertilizers can influence the carbon-to-nitrogen ratio; higher carbon levels

induce flowering, while lower carbon levels keep the plant in the vegetative stage. Likewise, application of high amounts of nitrogen fertilizer combined with heavy irrigation promotes vegetative growth and retards flowering, whereas lower nitrogen application along with reduced watering stimulates flowering. Plant hormones such as gibberellins are widely used to promote flowering and can even substitute for certain environmental requirements such as cold treatment or long-day conditions. Ethylene, a gaseous hormone, is known to induce flowering in specific crops, while growth retardants such as CCC and ancymidol inhibit gibberellin synthesis and inhibit flower initiation. Additionally, chemicals such as daminozide and paclobutrazol help delay flowering time, control plant height, and enhance the aesthetic appearance of chrysanthemum flowers.

Mechanical Methods

Mechanical methods involve simple cultural practices that effectively induce flowering. Pruning is one of the most common techniques, as it helps redirect the plant's energy towards reproductive growth. Pinching, which involves removing the terminal bud, promotes lateral branching and increases the number of flowers. Leaf trimming can reduce inhibitory effects in certain plants, while practices such as ringing alter nutrient movement within the plant to stimulate flowering. Breaking dormancy through cold treatment or chemical application is also widely practiced, particularly in bulbous crops. These methods are generally cost-effective and environmentally friendly.

Major Flower Crop Forcing Techniques

Roses

Rose flowering occurs throughout the year, especially during the cold season. Roses play an important role during occasions such as Christmas, New Year, and Valentine's Day. It is recommended to prune branches during November. Usually, flowering occurs about 43 days after pruning, which increases flower yield during the Christmas and New Year period. For later occasions, pruning during December is advised, as it stimulates flower bud initiation in February.

Jasmine

Jasmine flowering reaches its peak from March to June, while flower production declines from November to February. To increase flower production during the lean period, irrigation is stopped for 2–3 days until the plants begin to wilt slightly. This practice enhances flower production and results in larger flowers during winter. Chemical stimulators such as GA_3 at 150 ppm or NAA at 75 ppm are also applied to increase yield.

Marigold

Marigold is a day-neutral plant that flowers throughout the year. Flowering occurs about 2–2.5 months after transplanting. Flower yield can be improved through single and double pinching. Flowering time can be controlled according to market demand by scheduling planting approximately 60–70 days before the desired harvest date.

Lotus

Lotus produces flowers throughout the year but requires standing water. Flower induction in lotus varies depending on the season. During winter, flower production decreases. To maintain consistent quality and quantity, it is recommended to maintain a low water level of about 50 cm, which raises water temperature and increases flower production. During summer, plants produce a larger number of flowers, but flower size decreases, affecting

quality. To overcome this problem, the water level is increased from 50 cm to 75 cm, which helps produce better-quality flowers. During the rainy season, the water level should be maintained at about 50 cm to prevent excessive standing water.

Gladiolus

Flower forcing in gladiolus is practiced during both cold and summer seasons. During the cold season, preheating at 27–30°C is carried out for early flowering. During the summer season, corms are soaked in gibberellic acid at 10–25 ppm before planting to induce earlier blooming.

Chrysanthemum

Chrysanthemum is a short-day plant with a critical photoperiod of 14.4 hours. Flowering can be delayed by increasing day length using artificial lighting such as incandescent lamps, LEDs, and high-pressure sodium lamps during the early vegetative growth stage before the planned harvest period. To further delay flowering according to market demand, the growth retardant B-Nine is commonly applied Warner and Erwin (2002)

Conclusion

Flower forcing is an effective technique in modern floriculture that helps regulate flowering according to market demand. By controlling environmental factors such as temperature, light, and moisture, along with the use of mechanical and chemical methods, flowers can be produced even during the off-season. This ensures year-round availability of flowers, reduces wastage, and maintains a balance between supply and demand. Flower forcing also increases farmers' income, creates continuous employment opportunities, and reduces dependence on imports. In addition, it helps minimize pest and disease problems common in the natural flowering season. Overall, flower forcing is an important and profitable strategy for sustainable floriculture and meeting consumer needs throughout the year.

Reference

1. Chomchalow, N. (2004). Flower forcing for cut flower production with special reference to Thailand. *AU JT*, *7*(3), 137-144.
2. Singh, P., Tomar, K. S., Maurya, A., & Yadav, A. Flower Forcing: A New Approach to improve Farmer's Income.
3. Hasna, P. M., Rafeekher, M., Priyakumari, I., & Reshmi, C. R. (2024). Flower Forcing: A Review. *International Journal of Plant & Soil Science*, *36*(6), 592-600.
4. Priya, M., Smitha, G. R., & Dedhia, L. (2023, August). *Flower forcing techniques for year-round production of flowers*. *Agro India*, 17–18.