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MODULATION OF FLOWERING TIME IN POINSETTIA

Euphorbia pulcherrima

(Using Environmental and Chemical Cues)

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ABSTRACT

Poinsettias (Euphorbia pulcherrima) are cherished indoor plants recognized for their vibrant bracts that enhance indoor aesthetics during the winter season. As a photoperiod-sensitive crop that flourishes under short days, poinsettias naturally bloom during longer nights, enabling nurseries to trigger flowering in time for the winter festivities. Effective management of the crop includes the application of growth regulators, pruning, adjustments in temperature and light intensity, and proper water management to promote healthy growth and optimize yield. Flower bud formation in poinsettias begins when nights reach about 11 hours and 50 minutes of darkness, roughly around September 25th. It is advisable to maintain night temperatures between 68 and 70°F during the period of floral initiation, as temperatures exceeding 73°F may postpone blooming. Different cultivars need different levels of sun and darkness to produce their usual red leaves; early ones need sun for 8 hours accompanied by darkness of 16 hours, mid ones demand 10 hours of sun and 14 hours of darkness, whereas late ones require 12 hours of both.

Keywords: Asthetic, Photo-period, Short Day, Yield and Blooming

INTRODUCTION

Poinsettias (*Euphorbia pulcherrima*) are well-liked indoor plants during the winter months because they flower in mid-winter, and their visual appeal comes from colourful bracts (persistent modified leaves) rather than flowers, allowing their charm to last for an extended period. They naturally bloom under the long nights of winter, making it straightforward for nurseries to induce blooming just in time for the winter holidays. The allure of poinsettias can last from Thanksgiving through Christmas, and occasionally until Valentine's Day. While some gardeners appreciate this lengthy period of indoor beauty, others strive to preserve their plants to enjoy blooming again the next winter. Poinsettias can be maintained year after year, and they will flower annually if they receive the appropriate care. The popular name for Euphorbia pulcherrima is due to its introduction into the United States by Joel Robert Poinsett, who found these plants in his garden at Greenville, South Carolina, soon after he was appointed the first U.S. ambassador to Mexico in 1825. According to Ecke and Matkin (1976), the Aztecs had cultivated poinsettias, which were used by

Franciscan priests who settled near Taxco, Mexico, in the seventeenth century during a nativity procession known as the Fiesta of Santa Pesebra. Other names associated with this plant include descriptive phrases like Christmas flower, Christmas star, painted leaf, and Mexican flameleaf. Commercial cultivation of poinsettias for Christmas sales began in the late nineteenth century, with both propagation stock and young plants being advertised in trade magazines in the early twentieth century. **(Larson, R.A. 1980).**

Poinsettia is classified as a short-day photoperiod crop, which indicates that it naturally flowers when the night duration exceeds that of day. In commercial cultivation, many growers utilise black cloth to either facilitate earlier crops or to ensure greater uniformity across the entire crop. Nonetheless, recent advancements in breeding techniques have resulted in varieties that naturally flower sufficiently early in the season to satisfy early sales demands. Currently, there are over 100 Poinsettia hybrids available in the market, and selecting the appropriate hybrid to meet your production requirements represents one of the most critical decisions in this crop's management.

Photoperiodism is essential for the growth and flowering cycles of poinsettias. This sensitivity to day length enables growers to control when the plants bloom, ensuring they are ready for the Christmas season when demand is high. In particular, shorter day lengths encourage blooming, whereas longer days can suppress it, making it crucial to understand this connection for effective cultivation. Furthermore, photoperiodism influences ethylene production, an important hormone that also affects flowering. Temperature is also a critical factor, as optimal environments enhance the photoperiodic response, promoting healthy growth and vibrant coloured flowers. Day length significantly influences flowering in poinsettias, with short days promoting flowering and long days inhibiting it. By mastering these relationships, growers can establish ideal conditions for cultivating poinsettias, thereby increasing their ornamental appeal and market potential. Therefore, photoperiodism is not merely a biological process but an essential tool for successful horticultural practices.

Efficient crop management in poinsettias requires a comprehensive strategy that includes the use of growth regulators, pruning methods, temperature control, light intensity adjustment, and water management practices. Growth regulators play a crucial role in fostering healthy plant growth and improving the overall quality of poinsettia crops. Pruning methods assist in managing the plants' size and shape, enhancing branching and flower production, which is essential for maximizing crop yield. Furthermore, ensuring the correct temperature range is vital, as poinsettias are sensitive to temperature variations that can influence their growth. Regulating light intensity is essential for delivering the appropriate amount of illumination necessary for optimal growth. Various systems may be employed to modify light intensity, with high-intensity lighting facilitating flowering processes and low-intensity lighting serving to inhibit them. Finally, implementing effective water management techniques is crucial to avoid water stress and diseases, thereby safeguarding plant health. Collectively, these practices establish an environment favourable for successful poinsettia cultivation.

Crop Regulation in Poinsettias:

Garner and Allard (1963) illustrated that Poinsettia is a short-day plant and that the critical daylength is approximately 12.5 hours. The majority of current varieties/cultivars belong to

the 8–9-week response group photoperiod.

Poinsettias are short-day plants and will naturally initiate the formation of flower buds when nights reach 11 hours 50 minutes of darkness. That naturally occurs during mid- to late September in the central portion of the country. September 25 is considered the key date for flower bud initiation. Poinsettias are more sensitive to high temperatures when the night length is 12 hours compared to 13 or 14 hours. Some growers will use blackout systems to initiate poinsettias. When these systems are used, night lengths are more susceptible to heat delay than crops grown under black curtains, and blackout systems can be strategically used to avoid heat delay. **(Smith, C. A. 1980).**

- **Temperature:** At the time of **floral initiation,** night temperatures should be reduced to between **68 and 70º F.** Night temperatures above 73ºF can delay flowering. The average daily temperature after the appearance of bract colour is critical to bract development. Daily temperatures of **68 and 70º F are** needed during this period to maximize bract size. If possible, try to avoid temperatures above 75ºF, which can result in very large but soft bracts that are more susceptible to post-harvest problems. Lower night temperatures to **58º to 62ºF** (14º to 17ºC) to deepen the **bract colour.** Poinsettias are very sensitive to cold temperatures. Placing plants in sleeves offers some protection from cold and physical damage during shipping. Plants can be stored in plant sleeves for a short while at 60º to 65º F (16º to 18º C).
- **Growth Inhibitors:** A 15-hour dark period is crucial for optimal bract growth in 'Paul Mikkelsen' poinsettias when grown in Florida. The different dark periods, along with growth inhibitors such as Cycocel, can successfully regulate the growth and blooming of this variety, emphasizing the significance of photoperiods in the cultivation of poinsettias. **(Joiner, J. N. and Harrison, D. D. 1967).**
- **Early Varieties:** It requires about 8 hours of sunlight and 16 hours of darkness each day for about 8-10 weeks to develop their signature red leaves. Initiate flowers during the first two weeks in September. 'Freedom Red', 'Jingle Bells' and 'Prestige Red' are the early varieties of Poinsettias.
- **Mid Varieties:** Mid varieties need about 10 hours of sunlight and 14 hours of darkness each day for about 8-10 weeks. Initiate flowers during the second and third week of September. 'Marble', 'Polar Bear' and 'Plum Pudding'.
- **Late Varieties:** Require about 12 hours of sunlight and 12 hours of darkness each day for about 8-10 weeks. Initiate flowers in the last week of September and the first week of October. 'Carousel', 'Monet' and 'Winter Rose'.

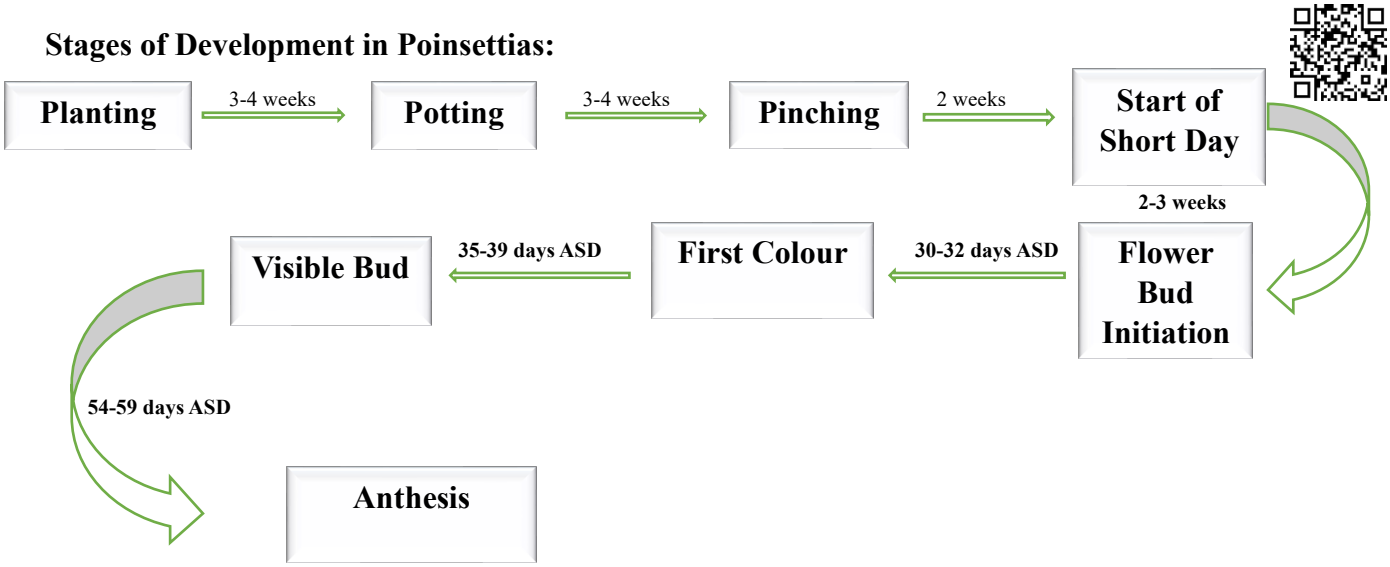

Table 1: Scheduling Poinsettias for Year-Round Production: (Larson, R.A. 1980).

Planting	Potting	Pinching	Start of short days (8-9 weeks)	Anthesis
11th August	11th September	11th October	25th October	1st January (New year)
23rd September	23rd October	23rd November	7th December	14th February (Valentine's day)
1st May	1st June	1st July	15th July	22nd September (Fall equinox)
7th July	7th August	7th September	21st September	28th November (Thanksgiving)
4th August	4th September	4th October	18th October	25th December (Christmas)

CONCLUSION

The successful growth and regulation of poinsettias rely on a deep understanding of their short-day plant characteristics and the careful adjustment of environmental conditions, such as light duration, temperature, and growth regulators. Poinsettias naturally begin to flower when night length approaches roughly 11 hours and 50 minutes, usually around late September. Keeping night temperatures between 68°F and 70°F during the initial stages of blooming is essential to prevent delays in flowering, while cooler temperatures later on enhance the coloration of bracts. Various cultivars have unique light and dark requirements to showcase their distinct, vibrant bracts, with early, mid, and late varieties necessitating increasingly longer day lengths. Effective management of crops involves pruning, temperature regulation, modification of light intensity, and water management to encourage healthy growth and optimize ornamental quality. Growers can utilize blackout systems and growth regulators to further influence flowering schedules to align with market demands, particularly for the winter holiday season. In summary, gaining proficiency in these environmental and chemical

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