

Effect of Number and Timing of Pinching on Reproductive Growth of Potted Poinsettia (*Euphorbia pulcherrima* Willd.)

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Keywords: Floral induction, bract colour development, finish date, bract area, flower bud formation

ABSTRAK

Satu eksperimen untuk menilai kesan bilangan pengutulan (tanpa pengutulan, pengutulan tunggal dan pengutulan dua kali) dan masa pengutulan ke atas pertumbuhan reproduktif poinsettia telah dijalankan. Keputusan menunjukkan bahawa pengutulan lewat melambatkan pembentukan bunga, perkembangan warna pada brakta dan kematangan jika dibandingkan dengan pengutulan awal. Tetapi, masa pengutulan tidak memberikan kesan yang bererti terhadap bilangan brakta dan luas brakta. Pengutulan tunggal dan dua kali melambatkan pembentukan bunga, perkembangan warna dan kematangan pokok berbanding pokok yang tidak dikutil. Bilangan dan luas brakta juga bertambah selepas pengutulan tunggal dan berulang-ulang.

ABSTRACT

An experiment to evaluate effects of pinching number (unpinched, once-and twice-pinched) and timing (early- and late-pinched) on reproductive growth of poinsettia was conducted. The results showed that late-pinched plants were delayed in floral induction, bract colour development and finish date compared to early-pinched plants. However, the time of pinching did not significantly affect the number of bracts and bract area, once- and twice-pinched treatment delayed floral induction, bract colour development and finish dates compared to unpinched plants. The number of bracts and bract area were increased after the plants had been pinched once or twice.

INTRODUCTION

Poinsettia, *Euphorbia pulcherrima* is a very lovely plant due to its red and attractive bract colours. It is the most popular decorative plant for Christmas and New Year. Poinsettias have a good market potential as potted flowering plants. Poor plant quality may result from crowding, poor light, pest and disease problem, and poor scheduling. Scheduling poinsettia is complicated by the interaction of daylength, temperature and cultivar on lateral growth and floral development (Larson and Langhans 1963). The removal of shoot apexes to overcome apical dominance and to promote lateral shoot development is referred to as pinching (Larson 1985). In areas with good light, much more

latitude may be allowed in time and type of pinching. Suggested pinch dates for Christmas crops vary somewhat with the area from which the information comes (Pertuit 1973; Tayama *et al.* 1975; Tayama 1978). Pinched potted plants are more floriferous and shorter than single-stem plants. Timing a pinch can also affect plant quality. Pinching too early can result in plants that are too tall, and pinching too late can result in plants too short. Therefore, pinching, as part of the poinsettia production cultural practices, is done to overcome the apical dominance in order to produce a better quality plant. The objective of this research was to study the influence of the numbers of pinching and their timing on flowering responses of poinsettia.

MATERIALS AND METHODS

Materials

The 10 cm terminal shoots of Ecke's Red cutting with 3-4 internodes, pre-treated with 1000 ppm of indole-butyric acid, were propagated in 27 cm x 38 cm x 10 cm plastic trays using coconut dust: sand (1:1 v/v) as rooting media. The cutting stroke roots in about 10 days. After the root stroke, the cuttings were potted in a 15 cm diameter pot using peat (PeatGro® : vermiculite (2:1 v/v) media, amended with slow release fertilizer (Agloblend® 18:8:9 + 3 MgO) at the rate of 4 g cm⁻³.

Treatment

The plants were pinched manually by removing the apical shoots, leaving about 3-4 nodes.

(i) Pinching Number

Pinching number treatment consists of unpinched (P0) as the control, once-pinched (P1) and twice-pinched (P2). For the P0 plants, flurprimidol at 50 mgL⁻¹ were sprayed 2 weeks or 4 weeks after potting, and the short day (SD) treatment was given 1 week after the flurprimidol at 50 mgL⁻¹ application. For the P1 plants, plants were pinched once, 2 weeks or 4 weeks after potting. Three weeks after pinching, plants were treated the same way as P0 plants at 2 weeks after potting. For the P2 plants, plants were pinched twice with the first pinch in the second week or fourth week after potting, and the second pinch in the fourth week after the first pinch.

Three weeks after the second pinch, flurprimidol was sprayed to the plants and SD treatment was given 1 week after flurprimidol at 50 mgL⁻¹ application.

(ii) Timing Frequency

Plants were pinched 2 weeks and 4 weeks after potting for early- and late-pinched, respectively.

The parameters observed were number of bracts, bract size, number of days from propagation to first flower bud formation, number of days from propagation to visible bract colour and number of days from propagation to finish date.

Experimental Design

A factorial experiment with 3 pinching occasions (P0, P1 and P2) and 2 pinching times (early and late) were established in a Randomized Complete Block Design with 6 replications of one pot each. Analysis of variance was performed on all parameters. Differences between treatments' means were compared using Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Bract Number

The bract number was significantly increased when Ecke's Red was pinched (Table 1). Single-pinched increased 42% and 38% more bracts number than control for both early- and late-pinched, respectively. Double-pinched increased 21% and 45% more bracts number than single-

TABLE 1

Effect of pinching frequency on bract number, bract area (cm²), flower bud formation (day), appearance of visible bract colour (day) and finish date (day) of early- and late-pinched of Ecke's Red cultivar poinsettia

Pinching Frequency	Bract Number		Bract Area (cm ²)		Flower Bud Formation (Day)		Appearance of Visible Bract Colour (Day)		Finish Date (Day)	
	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late
P0	19.17	18.17	328.30	337.00	82.33	92.17	99.17	103.83	105.00	125.17
P1	27.17	25.00	467.00	397.00	104.17	121.50	123.50	135.30	124.67	156.17
P2	32.83	36.33	538.20	631.00	129.33	131.67	143.50	144.00	135.17	162.33
Factorial Effect										
Pinching		** ^z		*		**		**		**
Frequency (Fre)		NS		NS		**		*		**
Pinching Time (Tim)										
Fre X Tim		NS		NS		**		*		NS

^zNS, *, ** Not significant and significant at P= 0.05 and 0.01, respectively.

pinched for both early- and late-pinched plants, respectively. Double-pinched plants for both early- and late-pinched treatments produced the most number of bracts compared to single-pinched and control plants.

Bract Area

Bract area increased significantly as the pinching number increased. Single-pinched plants produced 42% and 18% larger bract area than the control plant for early- and late-pinched plants, respectively. Double-pinched plants produced larger bract area than single-pinched plants that is 15% and 59% for early- and late-pinched, respectively. This finding was contrary to the study of O'Rourke and Carlos (1984) where the later pinched were associated with smaller bract to some extent for several poinsettia cultivars.

Number of Days to Flower Bud Formation

There was significant effect of pinching number, pinching timing and interaction between the two factors on flower formation. The flower bud formation was delayed with pinching treatment. The plants, which were unpinched (control), took 87.3 days for floral induction (Table 1). It was delayed to 112.8 days when pinched once, and 130.5 days when pinched twice (Table 1). For the early-pinched plants, single-pinched plants were delayed by 22 days and double-pinched plants were delayed by 47 days of flower

bud formation days compared to control plants. The delaying trend in flower bud formation for late-pinched plants was also observed. The late-pinched plants induced flower buds later than early-pinched plants by 10 days (Fig. 1). However, with late pinching, there was not much difference between single or double pinch compared to early pinch for number of days to flower bud formation. Late-pinched plants delayed flower induction by 10 days, 18 days and 3 days as compared to early-pinched plants in control, single- and double-pinched plants, respectively. O'Rourke and Carlos (1984) obtained similar results in the study of selected pinching dates for poinsettia. Out of 11 cultivars studied, 7 cultivars showed a delay in floral induction.

Number of Days to Visible Colour

Pinching time had significant effect on number of days to visible bract colour. Late-pinched plants delayed the appearance of number to visible bract colour compared to early-pinched plants. Late-pinched plants required more days to reach visible bract colour compared to early-pinched plants. The number of days to visible bract colour was delayed significantly as pinching frequency increased. The control plants started bract colour development earlier than pinched plants. Control plants started bract colour development on the 102nd day, single-pinched plants on the 129th day and double-pinched plants on the 133rd day (Fig. 2). There was a

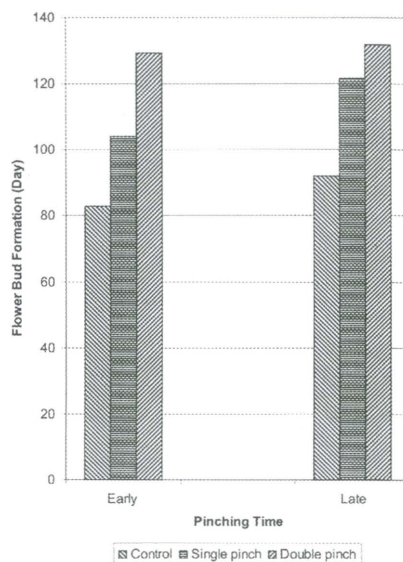


Fig. 1: Interaction effect of pinching time and number of pinching on number of days to flower bud formation of poinsettia

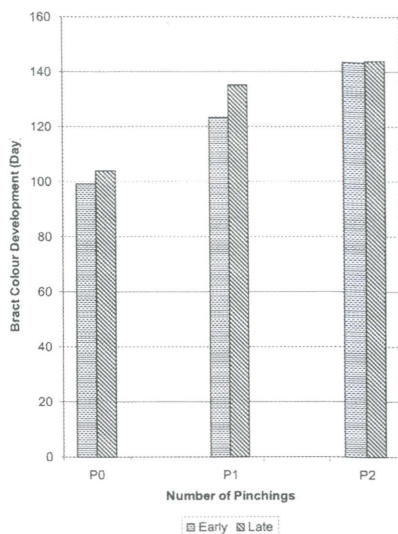


Fig. 2: Interaction effect of number of pinching and pinching time on number of days to visible bract colour of poinsettia

significant interaction between the pinching frequency and pinching time for number of days to visible bract colour development (Table 1). The days to visible bract colour development between twice pinched and pinching time showed less difference of days as compared to once pinched and controlled plants where the difference of days were at 14 days and 4 days respectively (Fig. 2). Therefore with late and double pinching of plants, the number of days to visible bract colour development will be greater.

Finish Dates

The effect of pinching timing and frequency were significantly different for finish dates. However, there was no significant interaction between the pinching timing and frequency for finish dates. Early-pinched plants reached full bloom stage at 141 days after the first pinching while late-pinched plants were delayed for 12 days. The finish date of single-pinched plants was delayed compared to unpinched plants. O'Rourke and Carlos (1984) also reported a delay of finish dates in poinsettia plant pinched 2 weeks later.

CONCLUSION

In conclusion, pinching increased the number of bracts and bract areas. Pinching frequency increased the bract number and produced a larger area of bracts than control plants.

However, the increased number of pinches delayed the finish date and bract colour development of poinsettia compared to control plants. The late-pinched treatment increased the bract number and area of poinsettia but delayed the flower bud formation, bract colour development and finish date.

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(Received: 5 October 1999)

(Accepted: 5 September 2002)