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## To study the effect of pinching on yield and quality of carnation varieties grown under protected condition

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**ABSTRACT :** An experiment was conducted to study the effect of pinching methods on carnation under protected condition. The results of present investigation revealed that the variety Liberty ( $V_2$ ) recorded significantly the highest number of flowers per plant (6.23), number of flowers per square meter (205.70) and flower yield per hectare (2077778 Numbers). As per quality point of view the variety Farida ( $V_3$ ) recorded significantly the highest vase life (12.33 days) and longevity of flowers (16.98 days). The treatment  $P_3$  (Double pinch) resulted in significantly the highest number of flowers per plant (6.75), number of flowers per square meter (222.75) and flower yield per hectare (2250000 Numbers). The treatment  $P_1$  (Single pinch) recorded significantly the highest vase life (11.94 days) and longevity of flowers (15.61 days).

**KEY WORDS :** Pinching, Yield, Vase life, Carnation

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Carnation (*Dianthus caryophyllus* L.) which is indigenous to the Mediterranean region is one of the most important cut flower in the World. Carnation belongs to the family Caryophyllaceae. Among the top three cut flowers in the international market, carnation ranks third.

Flowers are one of the God's most beautiful boon to mankind that bring joy and happiness to one and all. Flowers are symbol of beauty, love and tranquility. The flowers are soul of garden and convey the message of nature to man. No ceremony or function can be considered complete without use of flowers in way more than one. The importance of flower crops has been continuing uninteruptive since the very draw of civilization. Flowers are most appealing form of human expression as they devote beauty, purity, honesty and divinity. Flowers were referred extensively in ancient

Sanskrit classics like Rigveda, Ramayana, Mahabharata, etc. where, beauty and divinity are described.

Further, there is need to evaluate suitable varieties and production technologies as suited to our conditions. Hence, the present investigation was carried out under protected condition to know the influence of pinching on different varieties of carnation.

In carnation, there are lots of varieties having variable characters and variable qualities. Quality of flower has great value in case of marketing of cut flowers, so varietal performances have get value for deciding the planting of single variety. Similarly, pinching is one of the most important cultural operations in carnation under protected cultivation. Pinching has direct relationship with number of flowers and regulation of flowering for successful marketing. Pinching delay the flowering time and increase number of branches per plant which directly

increase yield. Pinching reduces flower size which is helpful in reducing the calyx splitting due to reduce number of petals in flower.

## RESEARCH METHODS

The present experiment was carried out at Hi-tech Horticulture Park (Greenhouse Unit-2), Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh during 2011-2012.

Number of flowers per plant, number of flowers per square meter and number of flowers per hectare was worked out by totaling the number of flowers harvested from plants for the period of six months.

The flower stems were harvested when buds were at paint brush stage. Immediately after harvest the flowers were kept in fresh water for 2 hours to remove the field heat. After that, the flowers were kept in conical flasks containing distilled water. Fading of outer raw petals was considered as end of vase life of flowers and vase life is expressed in days. Longevity of cut flower in days was calculated from the time of opening the flower on a plant until the fading of outer rows of petals in all flowers and average value was calculated.

## RESEARCH FINDINGS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under following heads :

### Yield parameters :

In the present study the variety Liberty ( $V_2$ ) recorded significantly the highest number of flowers per plant as well as per square meter and yield of flowers per hectare. Whereas, it was minimum in variety Rendezvous ( $V_4$ ). The increased flower yield might be attributed to more number of auxiliary branches and leaves resulted in production and accumulation of maximum photosynthetic material which ultimately resulted in production of more number of flowers. Similar variations in carnation with respect to flower yield were also observed by Krishna *et al.* (1999); Shahakar (2003); Dwivedi and Kareem (2004); Reddy *et al.* (2004); Shahakar *et al.* (2004) and Kazaz *et al.* (2011) in carnation.

In the present study the treatment  $P_3$  recorded significantly the highest number of flowers per plant as well as per square meter and yield of flowers per hectare. Whereas, these were minimum in treatment  $P_1$ . The increased flower yield might be attributed to more number of branches resulted in production and accumulation of maximum photosynthetic material which ultimately resulted in production of more number of flowers per plant and per unit area. Similar variations in carnation with respect to flower yield were also observed by Pathania *et al.* (2000); Sawwan and Samawi (2000); Verma *et al.* (2002) and Ryagi *et al.* (2007) in carnation.

**Table 1 : Effect of varieties and pinching on number of flowers per plant, yield of flowers per sq. meter and yield of flowers per hectare of carnation under protected condition**

Treatments	Number of flowers per plant	Yield of flowers per sqm (Nos.)	Yield of flowers per hectare (Nos.)
<b>Varieties (V)</b>			
$V_1$ - Gaudina	4.30	141.77	1431975
$V_2$ - Liberty	6.23	205.70	2077778
$V_3$ - Farida	4.87	160.80	1624198
$V_4$ -Rendezvous	3.85	127.11	1283951
S.E.±	0.15	4.88	49286
C.D. (P=0.05)	0.43	14.24	143864
<b>Pinching (P)</b>			
$P_1$ - Single pinch	3.18	104.96	1060185
$P_2$ - One and a half pinch	4.51	148.82	1503241
$P_3$ - Double pinch	6.75	222.75	2250000
S.E.±	0.13	4.23	42683
C.D. (P=0.05)	0.37	12.33	124589
<b>Interaction</b>			
V x P	NS	NS	NS
C.V.%	9.22	9.22	9.22

NS=Non-significant

**Table 2 : Effect of varieties and pinching on vase life of flower and longevity of flower of carnation under protected condition**

Treatments	Vase life of flower (days)	Longevity of flower (days)
<b>Varieties (V)</b>		
V <sub>1</sub> –Gaudina	10.17	13.48
V <sub>2</sub> – Liberty	11.26	15.05
V <sub>3</sub> – Farida	12.33	16.98
V <sub>4</sub> –Rendezvous	10.72	14.06
S.E.±	0.20	0.30
C.D. (P=0.05)	0.59	0.89
<b>Pinching (P)</b>		
P <sub>1</sub> – Single pinch	11.94	15.61
P <sub>2</sub> –One and a half pinch	11.01	14.96
P <sub>3</sub> –Double pinch	10.40	14.17
S.E.±	0.17	0.26
C.D. (P=0.05)	0.51	0.77
<b>Interaction</b>		
V x P	NS	NS
C.V.%	5.42	6.12

NS=Non-significant

**Quality parameters :**

The quality in terms of vase life and longevity of flowers differed significantly among varieties. In the present study the variety Farida (V<sub>3</sub>) recorded significantly the highest vase life and longevity of flower, while it was minimum in variety Gaudina (V<sub>1</sub>). This variation in vase life among the varieties might be attributed to the variations in accumulation of carbohydrates since these varieties produced more number of leaves and indicated positive and significant correlation between these characters. This variation in shelf life might also be due to effective uptake of water from vase in different varieties. Variation in vase life could also be attributed to the variation in ability to produce ethylene and sensitivity to it among the different varieties. Similar variation for vase life in varieties were also reported by Chandra Shekar and Gopinath (2001); Chikkasubbanna and Sharada (2002); Singh and Sangama (2003) and Shahakar *et al.* (2004) in carnation.

The quality in terms of vase life and longevity of flowers differed significantly among the pinching treatments. In the present study the treatment P<sub>1</sub> recorded significantly the highest vase life and longevity of flower, while it was minimum in treatment P<sub>3</sub>. This variation in vase life among different pinching treatments might be attributed to the variations in accumulation of carbohydrates since the treatments have produced varied number of leaves and indicated positive and significant

correlation between these characters. The variations in shelf life might also be due to effective uptake of water from vases in different treatments. Variations in vase life could also be attributed to the variations in ability to produce ethylene and sensitivity to it among the different treatments. Similar variation for vase life in different treatments were also reported by Pathania *et al.* (2000), Chavan (2003) and Dalal *et al.* (2006) in carnation.

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