

**Article history :**

Received : 10.10.2015

Revised : 30.10.2015

Accepted : 14.11.2015

## Effect of physical regulation on plant growth and flower production of *in vitro* raised hybrid gerbera

■ T. SHASANI<sup>1</sup>, S. BEURA<sup>1</sup> AND S.K. PATRA

**Members of the Research Forum**

**Associated Authors:**

<sup>1</sup>Department of Floriculture and Landscaping, College of Agriculture, Orissa University of Agriculture and Technology, BHUBANESWAR (ODISHA) INDIA

**Author for correspondence :**

**S.K. PATRA**

Department of Floriculture and Landscaping, College of Agriculture, Orissa University of Agriculture and Technology, BHUBANESWAR (ODISHA) INDIA  
Email : sailendri\_patra@yahoo.co.in

**ABSTRACT :** Experiment was carried out to find out the impact of physical treatment on growth and flowering of *in vitro* raised hybrid gerbera plants in Department of Floriculture and Landscaping. The findings of physical treatments followed by antibiotics revealed that disbudding followed by neospirine application enhanced the plant spread, number of leaves per plant, stalk length, number of flowers per plant and flower diameter throughout the investigation period from January to June 2011. The treatment recorded most spectacular effect during the month of March with maximum plant spread (33.57 cm), number of leaves per plant (12.7), longer stalk (35.77 cm), number of flowers per plant (2.63) and larger flower (8.23 cm dia.). Pressing by heated steel rod at the axil of the leaf was found to be inferior among all the physical treatments.

**KEY WORDS :** Gerbera, Disbudding, Antibiotics, Leaf axil, Shade net

**HOW TO CITE THIS ARTICLE :** Shasani, T., Beura, S. and Patra, S.K. (2015). Effect of physical regulation on plant growth and flower production of *in vitro* raised hybrid gerbera. *Asian J. Hort.*, **10**(2) : 237-241.

Gerbera, a tender perennial herb is valued for its brilliant coloured flower. It is the fifth most cut flower in the world. The flowers are daisy like 7-10 cm across, but in certain hybrids there may be as large as 15.00 cm across. The flower may be single or double and are available in various self coloured cultivars as well as in bicolour. Gerbera is a jubilant cut flower is used in fresh and dry flower arrangement, floral decoration, exhibition and in high class bouquet. It is widely used as a decorative garden plant. It is one of the most popular cut flower gaining importance day by day. In most of the flower crops, the yield is mainly dependent on number of flower bearing branches which can be manipulated by checking vertical growth of plants and encouraging side shoots by means of apical bud pinching in different crops belonging to family Asteraceae by Arora and Khanna (1986); Jhon and Paul (1995);

Khandelwal *et al.* (2003) and Chauhan *et al.* (2005). However, even a single research work on flowering regulation of gerbera by physical treatment has not been recorded. To meet the demand of high value cut flower crop of gerbera, it is necessary to enhance the production both in quantitative and qualitative aspects. Therefore, physical treatment and use of antibiotics is the way for production of more number of larger blooms per plant.

### RESEARCH METHODS

The present investigation was carried out at Department of Floriculture and Landscaping, College of Agriculture, Orissa University of Agriculture and Technology, Bhubaneswar in the year 2011 to study the flowering regulation of *in vitro* raised hybrid gerbera cv. CASSIANA under shade net structure. The experiment consisted of two hundred fifty five numbers of gerbera

plants planted in clay pots laid out in Complete Randomized Design having eight treatment combination replicated thrice with five number of plants per replication. Observations were recorded for each plant selected from each treatment in every month to record the growth parameters such as plant spread, number of leaves per plant and yield components like number of flower per plant, stalk length, flower diameter.

Treatment combinations were;

T<sub>1</sub> = Control

T<sub>2</sub> = Disbudding only

T<sub>3</sub> = Disbudding followed by neospirine application

T<sub>4</sub> = Disbudding followed by safromycin application

T<sub>5</sub> = Pressing by steel rod at the axil of leaf

T<sub>6</sub> = Pressing by heated steel rod at the axil of leaf

T<sub>7</sub> = Pressing by the nail at the axil of leaf

T<sub>8</sub> = Wax coating on the axil of leaf

## RESEARCH FINDINGS AND DISCUSSION

Physical treatments such as pinching, disbudding, dishooting, thinning, stopping, pruning and training are mainly practiced in flowering plant mostly belonging to Asteraceae family for increasing more number of flowers per plant and to obtain larger quality flowers (Plate 1, 2, 3, 4 and 5). Flowers free from blemishes and insect pest attack fetch good price in the market as the consumer are attracted towards the quality flowers. In the present investigation four types of physical treatment under eight treatments such as disbudding, pressing by steel rod, pressing by nail and wax coating were practised to increase the number of quality flowers. When disbudding is practised it was done alone or followed by

antibiotics application such as neospirine and safromycine. Steel rod was pressed at the leaf axil in one treatment and heated steel rod was also pressed in another treatment. Hot wax was coated at the axil of leaf in one treatment.

The significant results are; disbudding followed by neospirine application was found to be best for production of significantly maximum plant spread (33.03cm), number of leaves per plant (12.43), stalk length (35.50cm), number of flower per plant (2.00), flower diameter (7.73 cm), during the month of January. Disbudding followed by neospirine application significantly increased the plant spread (33.47cm), number of leaves per plant (12.6), number of flowers per plant (2.40), stalk length (35.6 cm), flower diameter (8.00 cm) followed by disbudding followed by safromycine application during the month of February. During the month of March disbudding followed by neospirine application was found to be ideal for maximum plant spread (33.57 cm), number of leaves per plant (12.7), longer stalk (35.77cm), more number of flowers per plant (2.63) and larger flower (8.23 cm) (Table 1). Disbudding followed by neospirine application significantly enhanced plant spread (33.47 cm), number of leaves per plant (12.33), stalk length (35.63 cm), number of flowers per plant (2.30) and flower diameter (7.9 cm), during the month of April 2011. During the month of May 2011, disbudding followed by neospirine application significantly increased the plant spread (33.13cm) followed by safromycine application and longer stalk length (35.2 cm). Similarly more number of flowers per plant (2.27) and larger flower (7.77cm dia), were observed with disbudding followed by neospirine

**Table 1 : Efficacy of physical treatment on growth and flowering of *in vitro* raised hybrid gerbera under shade net structure in the month of January, February and March**

Treatments	January					February					March				
	Plant spread (cm)	No. of leaves per plant	Stalk length (cm)	No. of flowers per plant	Flower diameter (cm)	Plant spread (cm)	No. of leaves per plant	Stalk length (cm)	No. of flowers per plant	Flower diameter (cm)	Plant spread (cm)	No. of leaves per plant	Stalk length (cm)	No. of flowers per plant	Flower diameter (cm)
T <sub>1</sub>	28.93	11.30	29.90	1.27	6.10	29.03	11.40	30.07	1.37	6.43	29.17	11.50	30.17	1.43	6.50
T <sub>2</sub>	31.90	12.13	35.27	1.83	7.40	32.03	12.23	35.40	1.90	7.53	32.13	12.27	35.57	1.93	7.63
T <sub>3</sub>	33.03	12.43	35.50	2.00	7.73	33.47	12.60	35.60	2.40	8.00	33.57	12.70	35.77	2.63	8.23
T <sub>4</sub>	32.57	12.00	35.37	1.90	7.60	32.93	12.40	35.43	2.10	7.83	33.27	12.47	35.63	2.23	7.97
T <sub>5</sub>	31.40	12.10	30.60	1.70	7.13	31.60	12.30	33.67	1.83	7.27	31.80	12.33	33.90	1.97	7.47
T <sub>6</sub>	27.97	10.00	30.47	1.07	5.83	28.57	10.33	30.63	1.17	6.03	28.60	10.40	30.63	1.27	6.30
T <sub>7</sub>	31.07	11.73	33.07	1.63	7.00	31.37	11.87	33.20	1.77	7.13	31.50	12.00	33.27	1.87	7.20
T <sub>8</sub>	28.10	10.77	30.00	1.20	6.03	28.50	11.13	30.07	1.23	6.53	28.63	11.33	30.17	1.33	6.73
C.D. (P=0.05)	0.31	0.21	0.23	0.08	0.14	0.16	0.16	0.18	0.09	0.08	0.14	0.08	0.18	0.04	0.13
SEM	0.10	0.07	0.08	0.03	0.04	0.05	0.05	0.06	0.03	0.03	0.05	0.03	0.06	0.03	0.04

**Table 2 : Efficacy of physical treatment on growth and flowering of *in vitro* raised hybrid gerbera under shade net structure in the month of April, May and June**

Treatments	April					May					June				
	Plant spread (cm)	No. of leaves per plant	Stalk length (cm)	No. of flowers per plant	Flower diameter (cm)	Plant spread (cm)	No. of leaves per plant	Stalk length (cm)	No. of flowers per plant	Flower diameter (cm)	Plant spread (cm)	No. of leaves per plant	Stalk length (cm)	No. of flowers per plant	Flower diameter (cm)
T <sub>1</sub>	29.00	11.37	30.13	1.27	6.33	28.87	11.23	29.83	1.23	6.27	28.67	11.13	29.53	1.13	6.20
T <sub>2</sub>	32.00	12.07	35.40	1.77	7.33	31.83	11.93	34.80	1.63	7.27	31.53	11.80	34.30	1.47	7.20
T <sub>3</sub>	33.47	12.33	35.63	2.30	7.90	33.13	12.07	35.20	2.27	7.77	33.03	11.93	34.87	2.07	7.63
T <sub>4</sub>	33.10	12.10	35.43	2.00	7.60	32.93	11.97	35.10	1.93	7.43	32.73	11.80	34.70	1.83	7.40
T <sub>5</sub>	31.63	12.00	33.40	1.73	7.23	31.47	11.70	33.07	1.57	7.10	31.37	11.43	32.97	1.43	7.00
T <sub>6</sub>	28.43	10.10	30.20	1.07	6.00	28.30	10.00	30.03	1.00	6.00	28.13	9.93	29.00	1.00	6.00
T <sub>7</sub>	31.22	11.83	33.03	1.67	7.03	31.03	11.67	32.93	1.50	7.07	31.00	11.57	32.60	1.37	7.03
T <sub>8</sub>	28.30	11.07	30.03	1.10	6.40	28.30	10.90	29.87	1.10	6.27	28.27	10.70	29.43	1.03	6.17
C.D. (P=0.05)	0.13	0.07	0.14	0.09	0.16	0.11	0.11	0.11	0.09	0.17	0.14	0.12	0.18	0.08	0.12
SEM	0.04	0.02	0.05	0.03	0.05	0.03	0.03	0.03	0.03	0.05	0.04	0.04	0.06	0.03	0.04

**Plate 1 : Disbudding followed by neospirine application****Plate 3 : Pressing by steel rod on the axil of leaf****Plate 2 : Disbudding followed by safromycin application****Plate 4 : Pressing by heated steel rod on the axil of leaf**



Plate 5 : Pressing by nail on leaf axil

application. During the month of June, disbudding followed by neospirine application recorded maximum plant spread (33.03cm), number of flowers per plant (2.07), flower diameter (7.63cm) (Table 2). Among eight treatment disbudding of the bud at 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> axil of leaf followed by neospirine application increased the plant spread, produced more number of leaves per plant, longer stalk and more number of larger flower per plant followed by disbudding followed by safromycine application and disbudding only. During the month of January minimum plant spread, less number of leaves per plant, less number of smaller flowers were obtained by the physical treatment such as pressing the heated steel rod at the 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> leaf axil followed by wax coating at 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> leaf axils.

Same trends were observed during the month of February, March, April, May and June. However, maximum plant spread, more number of leaves, longer stalk and maximum number of larger flowers were recorded during the month of March by the physical treatment disbudding followed by neospirine application. In all the treatments there was overall increase in plant spread, leaves per plant, stalk length, number of flowers per plant, flower diameter up to month of March and subsequently there was decrease in trend up to June being highest in the month of March. Among the physical treatments disbudding followed by neospirine application had spectacular effect on both growth and flower production in *in vitro* raised hybrid gerbera cv. CASSIANA under shade net structure followed by disbudding followed by safromycine, disbudding only, pressing by steel rod and pressing by the nail. The physical treatment such as pressing by heated steel rod

and wax coating were found to be inferior than the control. Heated steel rod as well as wax coating produced lanky and inferior quality stalk and less number of smaller flowers per plant. According to Grawal *et al.* (2004) the practice of removing undesirable immature flower buds to provide either a small number of large flowers or large number of small flowers is called disbudding. The correct time and method of disbudding operation are important factors in the production of high quality plants and blooms. Sometime a plant produces premature flower bud on a straight stem called a breakbud. The disbudded plants produced more horizontal spread. The increased horizontal spread may be due to removal of apical meristematic tissue and inhibiting apical dominance diverting plant metabolites from vertical growth to horizontal growth. Disbudding of buds during initial period resulted in increase in number of leaves per plant which may be attributed to sprouting of more auxiliary bud and development of more number of flowers. Disbudding followed by neospirine and safromycine application produced more number of flowers than disbudding alone. The result might be due to application of antibiotics which sealed the injury, checked the sap flow and infection at the axil of the leaf and encouraged vigorous stalk and more number of larger flowers per plant (Kumari *et al.*, 2010; Tamgadge *et al.*, 2010; Prashanth *et al.*, 2010 and Kumari *et al.*, 2010).

Heated steel rod and wax coating produce lanky and weak stalk may be due to physical injury of heat at the axil of the leaves. These treatments affected badly on flower yield and quality.

### Conclusion :

On the basis of the findings of the present investigation it is concluded that the plant attempted luxuriant growth during the month of march and produced more number of larger flowers in comparison to other months and among the treatments disbudding followed by neospirine application was found to be most ideal.

### REFERENCES

- Arora, J.S. and Khanna, K. (1986). Effect of nitrogen and pinching on growth and flower production of marigold (*Tagetes erecta*). *Indian J. Hort.*, **43** : 291-293.
- Chauhan, S., Singh, C.N. and Singh, A.K. (2005). Effect of vermicompost and pinching on growth and flowering in marigold cv. PUSA NARANGI GAINDA. *Prog. Hort.*, **37**(2): 419-422.

**Grawal, H.S., Kumar, Ramesh and Singh, Harmeet (2004).** Effect of nitrogen, planting time and pinching on flower production in chrysanthemum cv. FLIRT. *J. Orna. Hort.*, **7**(2): 196-199.

**Jhon, A.Q. and Paul, T.M.(1995).** Influence of spacing and pinching treatments on growth and flower production in chrysanthemum (*Chrysanthemum morifolium* cv. FLIRT). *Prog. Hort.*, **27** (1-2) : 57-61.

**Khandelwal, S.K., Jain, N.K. and Singh, P.(2003).** Effect of growth retardants and pinching on growth and yield of African marigold (*Tagetes crecta* L.). *J. Orna. Hort.*, **6**(3): 271-273.

**Kumari, Anop, Patel, K.S. and Nayee, D.D. (2010).** Comparative performance of gerbera cultivars (*Gerbera jamisonii Bolus ex hooker* F.) under protected environment conditions. *Asian Sci.*, **5** (1) : 32- 33.

**Kumari, Anop, Patel, K.S. and Nayee, D.D. (2010).** Evaluation of different cultivars of gerbera (*Gerbera jamisonii Bolus ex hooker* F.) for growth, yield and quality grown under fan and pad cooled green house conditions, *Asian J. Hort.*, **5** (2) : 309-310.

**Prashanth, P., Chandra Sekhar, R. and Reddy, K. Chandra Sekhar (2010).** Influence of floral preservatives on scape bending, biochemical changes and post harvest vase life of cut gerbera (*Gerbera jamesonii bolus ex. Hook.*). *Asian J. Hort.*, **5** (1) : 1-6.

**Tamgadge, Soniya, Jadhao, Anuradha, Deshmukh, Anita, Telgote, Nayana and Bodakhe, Vijay (2010).** Effect of nitrogen levels and gibberellic acid on quality and vase life of gerbera under polyhouse condition, *Internat. J. Proc. & Post Harvest Technol.*, **1** (2) : 62-64.

★ ★ ★ ★ ★ of Excellence ★ ★ ★ ★ ★  
10<sup>th</sup> Year