



## Effect of Pinching and Cycocel on Flower Yield and Quality of Gaillardia

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### Abstract

An experiment entitled "Effect of pinching and cycocel on yield and quality of Gaillardia" was carried out during Rabi season of the year 2012-2013 at the Farm of Horticulture Section, College of Agriculture, Nagpur. The treatment comprised of the four pinching levels viz., no pinching, 30 DAT, 45 DAT and 30 and 45 DAT and four cycocel levels viz. Control (water spray), cycocel 500 ppm, cycocel 1000 ppm, cycocel 1500 ppm. The experiment was laid out in Factorial Randomized Block Design with three replications. The results obtained in the present investigation indicated that in respect of yield parameters, maximum number of flowers per plant, yield per plant, per plot and per hectare were recorded in single pinching at 30 DAT as well as cycocel 1000 ppm. As regards quality parameters like weight of flower and shelf life of flower were found maximum in single pinching at 30 DAT as well as cycocel 1000 ppm. Whereas, diameter of flower, length of pedicel and longevity of intact flower were recorded maximum in single pinching at 30 DAT.

**Keyword:** pinching, cycocel, flower yield, quality and gaillardia

### Introduction:

Gaillardia cultivation is becoming popular around the cities for its extensive use as flower in making garlands. Gaillardia (*Gaillardia pulchella*) belongs to Asteraceae family, native to North and South America. Gaillardia flowers have special importance during festival days. There is steady demand for flowers during functions, festivals, marriages and floral decoration. For production of economical yield of gaillardia flowers, it is necessary to adopt a proper agro-technique by applying standard cultural practices. This can be achieved with planting of suitable cultivars and pinching of terminal growth at suitable intervals and growth retardants. In Vidarbha region of Maharashtra state, Gaillardia is cultivated throughout the year but the productivity is low and there are no proper recommendations based on latest technology to increase the yield potential. Farmers are unable to regulate the supply of flowers to market so as to assure better price for their produce.

### Materials and Methods:

An experiment entitled "Effect of pinching and cycocel on growth, yield and quality of Gaillardia" was laid out at the field of Horticulture Section, College of Agriculture, Nagpur during 2012-2013. The treatment comprised of the four pinching levels viz. no pinching, pinching at 30 DAT, pinching at 45 DAT and pinching at 30 and 45 DAT and four cycocel levels viz. Control (water spray), cycocel 500 ppm, cycocel 1000 ppm, cycocel 1500 ppm. The experiment was laid out in Factorial Randomised Block Design (FRBD) with 16 treatment combinations and three replications. The seedlings were transplanted in field on 27<sup>th</sup>

October, 2012 at 60 x 45 cm spacing. A standard dose of NPK at the rate of 100 kg N, 50 kg P and 50 kg K per hectare was applied through urea, Single super phosphate and murate of potash. The basal dose of 50 kg N and full dose of P and K was applied at the time of transplanting, remaining 50 kg of N was applied as top dressing after 30 days of transplanting. The single pinching was done at 30<sup>th</sup> day and 45<sup>th</sup> day, double pinching was done at 30<sup>th</sup> and was repeated at 45<sup>th</sup> days after transplanting. Pinching was done by removing approximately half inch of terminal growing shoots. Required quantity of stock solutions of cycocel were prepared by taking required quantity of cycocel. From this stock solution working solution of required concentration as per treatments were prepared by dissolving appropriate quantity of water for spraying. Cycocel were sprayed as per treatments. Five plants were selected randomly from each plot for recording various yield parameters viz. number of flowers per plant, yield per plant, yield per plot and yield per hectare and quality parameters like weight of flower, diameter of flower, length of pedicel, longevity of intact flower and shelf life of flower. Data was statistically analysed in FRBD (Panse and Sukhatme, 1967)

### Results and Discussion:

The data presented in Table 1 revealed that, different treatments of pinching and different levels of cycocel had significant effect on flower yield and quality parameters of gaillardia.

### Flower yield parameters:

#### Effect of pinching:

Significantly maximum number of flowers per plant was noticed in pinching at 30 days after transplanting (75.95) which was at par

with pinching at 45 days after transplanting (73.31) and double pinching at 30 and 45 days after transplanting (70.67). Whereas, significantly minimum number of flowers per plant was recorded in no pinching (56.49). Significantly maximum yield of flowers per plant was noticed in pinching at 30 days after transplanting (304.08 g). Whereas, significantly minimum yield of flowers per plant was recorded in no pinching (196.63 g). Significantly maximum yield of flowers per plot was noticed in pinching at 30 days after transplanting (4.56 kg). Whereas, significantly minimum yield of flowers per plot was recorded in no pinching (2.95 kg). Significantly maximum yield of flowers per hectare was noticed in pinching at 30 days after transplanting (112.62q). Whereas, significantly minimum yield of flowers per hectare were recorded in no pinching (72.82 q). From the above results it is indicated that, pinching increased the yield of flowers per hectare. Early pinching produce more number of branches per plant, more number of flowers per plant and more flower yield per plot which might be increased yield per hectare. These results are in close agreement with the findings of Pawar (2001) in chrysanthemum, Khandelwal *et al.* (2003) in African marigold and Mahanor *et al.* (2011) in African marigold.

#### **Effect of cycocel:**

Significantly maximum number of flowers per plant were recorded in cycocel 1000 ppm (74.07) which was at par with cycocel 1500 ppm (72.42) and cycocel 500 ppm (71.39). Whereas, significantly minimum number of flowers per plant were noticed in control treatment (58.55). Significantly maximum yield of flowers per plant was recorded in cycocel 1000 ppm (282.53 g) which was at par with cycocel 1500 ppm (271.19 g) and cycocel 500 ppm (261.99 g). Whereas, significantly minimum yield of flowers per plant was noticed in control treatment (215.46 g). Significantly maximum yield of flowers per plot was recorded in cycocel 1000 ppm (4.24kg) which was at par with cycocel 1500 ppm (4.07kg) and cycocel 500 ppm (3.75 kg). Whereas, significantly minimum yield of flowers per plot was noticed in control treatment (3.53 kg). Significantly maximum yield of flowers per hectare was recorded in cycocel 1000 ppm (104.64 q) which was at par with cycocel 1500 ppm (100.44 q) and cycocel 500 ppm (97.04 q). Whereas, significantly minimum yield of flowers per hectare was noticed in control treatment (79.80 q). From the above results it is indicated that, the yield of flower per hectare was increased might be due to foliar application of

cycocel resulted into more number of branches, more number of flowers per plant and more flower yield per plot. These results are in close agreement with the findings of Girwani *et al.* (1990) in marigold, Naik *et al.* (2004) in African marigold, Patil *et al.* (2004) in golden rod and Lokhande (2007) in annual chrysanthemum.

#### **Interaction effect:**

The interaction effect due to the pinching and cycocel on number of flowers per plant, yield of flowers per plant, yield of flowers per plot and yield of flowers per hectare were found non significant.

#### **Flower Quality parameters:**

##### **Effect of pinching:**

Significantly maximum weight of flower was noticed in treatment single pinching at 30 days after transplanting (4.03g). Whereas, significantly minimum weight of flower was recorded in no pinching (3.47 g). The early pinched plant produced more weight of flower. This might be due to that the plants of superior vegetative growth obtained in pinched plant could be responsible for the production of flower of better size and consequently more weight of flower was recorded in early pinching. Similar results were also recorded by Rakesh *et al.* (2001) in chrysanthemum and Khandelwal *et al.* (2003) in marigold. Significantly maximum diameter of fully opened flower was noticed in pinching at 30 days after transplanting (7.76cm). Whereas, significantly minimum diameter of fully opened flower was recorded in no pinching (6.11 cm). From the above results it is indicated that, pinching increased the diameter of flower might be due to single pinching at earlier stage induce vigorous branching which might have favoured to develop larger flowers. Similar results were also recorded by Kohle (1970) noticed that the flower size of carnation increased by 15 percent by deshooting done at 30 days after transplanting, Bholane (1998) in chrysanthemum and Dalal *et al.* (2006) in carnation. Significantly maximum length of pedicel was noticed in control treatment i.e. no pinching (16.81 cm) followed by treatment pinching at 30 days after transplanting (16.02 cm). Whereas, significantly minimum length of pedicel was recorded in pinching at 30 and 45 days after transplanting (14.14 cm). Unpinched plants continued their longitudinal growth of pedicel might have resulted to long pedicel. But in pinching reduced pedicel length might be due to consequence depression of gibberellins synthesis. Similar results have been reported by Bholane (1998) in chrysanthemum, Chavan *et al.* (2004) in carnation and Dalal *et al.* (2006) in carnation. Significantly maximum longevity of

intact flower was noticed in pinching at 30 after transplanting (16.45 days). Whereas, significantly minimum longevity of intact flower was recorded in no pinching (13.71 days). The maximum longevity of intact flower was achieved in pinching at 30 days after transplanting where pinching was performed at earlier stage might due to early pinching more accumulation of carbohydrates in flowers. These results are in close agreement with findings of Khandelwal *et al.* (2003) in marigold. The maximum shelf life of loose flower was observed in the treatment pinching at 30 days after transplanting (3.90 days). Whereas, significantly minimum shelf life of loose flower was recorded in pinching at 30 and 45 days after transplanting (1.82 days). These might be due to more accumulation of carbohydrates in pinched plants. Similar result was also obtained by Pawar (2001) in chrysanthemum and shinde *et al.* in carnation.

#### Effect of cycocel:

Significantly maximum weight of flower was recorded in cycocel 1000 ppm (3.83 g) which was at par with was cycocel 1500 ppm (3.76 g) and cycocel 1000 ppm (3.74 g). Whereas, significantly minimum weight of flower was noticed in control treatment (3.53 g). This implies that cycocel is effective in increasing the weight of flower might be due to increase in diameter of flower, diameter of disc and accumulation of metabolite in flower. These results are in close agreement with the findings of Dutta *et al.* (1993) in chrysanthemum, Yadav (1997) in African

#### References:

- Dutta, J. P., Seemanthini Ramdas and Md. Abdul Khader. 1993. Regulation of flowering by growth regulators in chrysanthemum (*Chrysanthemum indicum* L.) cv. CO-1. South Indian Hort. **41**(5): 293-299.
- Girwani, A. , R. Srihari Babu and R. Chandrashekhar. 1990. Response of marigold (*Tagetes erecta* L.) to growth regulators and zinc. Indian J. Agric. Sci. **60**(3): 220-222.
- Khandelwal, S. K., N. K. Jain and P. Singh. 2003. Effect of growth retardants and pinching on growth and yield of African marigold (*Tagetes erecta* L.). J. Orn. Hort. (New Series) **6**(3): 271-273.
- Lokhande, B. S. 2003. Effect of growth regulators on growth and flower yield of annual chrysanthemum. Annals of Plant Physiology. **22** (2):269-271.
- Mahamor, S. I., Neha Chopade , T. P. Seema 2011. Effect of Nitrogen and pinching on growth, yield and quality of African marigold rabbi season. Asian Journal of Horticulture. **6**:1 43-45.

marigold and Gawade (2008) in marigold. The effect of cycocel on diameter of flower was found non significant. The effect of cycocel on length of pedicel was found non-significant. The effect of cycocel on longevity of intact flower was found non significant. Significantly maximum shelf life of flower was recorded in cycocel 1000 ppm (2.95 days). Whereas, significantly minimum shelf life of flower was noticed in control treatment (2.60 days). These results are in close agreement with the findings of Dutta *et al.* (1993) in chrysanthemum, Yadav (1997) in African marigold and Gawade (2008) in marigold.

#### Interaction effect:

The interaction effect due to pinching and cycocel on weight of flower, diameter of flower, length of pedicel, longevity of intact flower and shelf life of flower were found non significant

From the findings of present investigation, it may be concluded that the yield parameters viz. number of flowers per plant, flower yield per plant, flower yield per plot and flower yield per hectare were found significantly maximum under single pinching at 30 days after transplanting as well as cycocel 1000 ppm. As regards quality parameters like weight of flower and shelf life of flower were found maximum in single pinching at 30 days after transplanting as well as cycocel 1000 ppm. Whereas, diameter of flower, length of pedicel and longevity of intact flower were recorded maximum in single pinching at 30 days after transplanting.

- Naik, H. B., A. A. Patil, V. S. Patil, N. Basavaraj and S. M. Hiremath., 2004. Effect of pinching and chemicals on xanthophyll yield in African marigold (*Tagetes erecta* L.). J. Orn. Hort. **7**(3/4): 182-190.

- Panse, S. K. and P. V. Sukhatme. (1967). Statistical methods for Agricultural workers, Indian Council of Agricultural Research, New Delhi, 3<sup>rd</sup> edition: pp 341.

- Patil, S. R., B. S. Reddy, J. M. Prashant and B. S. Kulkarni. 2004. Effect of growth substances on growth and yield of golden rod (*Salidago canadensis* L.) J. Orn. Hort. **7**(3/4): 159-163.

- Pawar, S. P. 2001. Effect of pinching on growth and flowering in chrysanthemum (*Dendranthema indicum*) cv. PKV Subhara. M.Sc. Thesis (Unpub) Dr. PDKV, Akola, M. S.

- [Shinde, R. P., S. R. Dalal, S. D. Shinde.](#) 2005. Effect of pinching on performance of carnation varieties under polyhouse conditions. Advances in Plant Sciences. **18**(2): 731-733.

- Yadav P. K. 1997. Effect of CCC and MH on growth and flowering of African marigold. Current Agriculture. **21** (1-2)113-114.

**Table 1:** Effect of pinching and cycocel on flower yield and quality parameters of gaillardia

Treatments	Number of flowers plant <sup>-1</sup>	Yield of flowers plant <sup>-1</sup> (g)	Yield of flowers plot <sup>-1</sup> (kg)	Yield of flowers ha <sup>-1</sup> (q)	Weight of flower (g)	Diameter of flower (cm)	Length of pedicel (cm)	Longevity of intact flower (Days)	Shelf life of flower (Days)
<b>A. Pinching (P)</b>									
No pinching (P <sub>0</sub> )	56.49	196.63	2.95	72.82	3.47	6.11	16.81	13.71	2.38
Pinching at 30 DAT (P <sub>1</sub> )	75.95	304.08	4.56	112.62	4.03	7.76	16.02	16.45	3.90
Pinching at 45 DAT (P <sub>2</sub> )	73.31	269.18	4.04	99.70	3.82	6.66	14.87	14.83	3.03
Pinching at 30 and 45 DAT (P <sub>3</sub> )	70.67	261.28	3.92	96.77	3.54	6.24	14.14	15.08	1.82
F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE (m) ±	2.21	8.32	0.12	3.08	0.08	0.21	0.32	0.40	0.08
CD at 5%	6.39	24.01	0.36	8.89	0.22	0.42	0.64	1.16	0.24
<b>B. Cycocel (C)</b>									
Control (C <sub>0</sub> )	58.55	215.46	3.23	79.80	3.53	6.53	16.17	14.12	2.60
CCC 500 ppm (C <sub>1</sub> )	71.39	261.99	3.93	97.04	3.74	6.40	15.45	15.23	2.70
CCC 1000 ppm (C <sub>2</sub> )	74.07	282.53	4.24	104.64	3.83	6.98	15.18	15.05	2.95
CCC 1500 ppm (C <sub>3</sub> )	72.42	261.99	4.07	100.74	3.76	6.50	14.88	15.45	2.88
F' test	Sig.	Sig.	Sig.	Sig.	Sig.	N.S	N.S.	N.S.	Sig.
SE (m) ±	2.21	8.32	0.12	3.08	0.08	0.21	0.32	0.40	0.08
CD at 5%	6.39	24.008	0.36	8.89	0.22	--	--	--	0.24
<b>C. Interaction PxC</b>									
F' test	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
SE (m) ±	4.43	16.64	0.24	6.16	0.14	0.61	0.60	0.80	0.16
CD at 5%	--	--	--	--	--	--	--	--	--