

Response of Marigold (*Tagetes spp*) cv. Pusa Narangi Gainda to Pinching Practices in Relation to Growth and Flower Quality under Konkan Agroclimatic Conditions

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Abstract: Marigold (*Tagetes spp*) occupies special importance due to its hardiness, wider adaptability to wide range of agro-climatic conditions and easy cultivation. The field experiment was carried out during Rabi season of the year 2020-21 at College of Horticulture, Dapoli, Dist. Ratnagiri, (Maharashtra state). The experiment was laid in Randomized Block Design comprising five replications and four treatments of pinching. The flat beds of 2.7 m X 1.8 m size were prepared and the seedlings of marigold (cv. Pusa Narangi Gainda) were transplanted at the spacing of 45 X 45 cm. The four levels of pinching (Control-No pinching, Pinching after 3 weeks of transplanting, Pinching after 5 weeks of transplanting and Double pinching -Pinching after 3 and 5 weeks of transplanting) were given to each plot at prescribed time. The lowest plant height (82.75 cm) and highest number of secondary branches (40.50 per plant) was recorded in T₄ treatment (Double pinching -Pinching after 3 and 5 weeks of transplanting). The highest stem diameter (15.63 mm) was T₂ (Pinching after 3 weeks of transplanting) treatment. The highest flower yield (191.5 g/plant) was recorded in Double pinching treatment (T₄). The lowest yield (160.4 g/plant) was recorded in T₁ i.e. control. Among the pinching treatments, the largest flower diameter (5.21 cm), highest fresh weight of flower (5.90 g) and dry weight of the flower (1.69 g) was recorded in T₃ i.e. pinching after 5 weeks of transplanting. The significantly highest case life of flowers (7.63 days) was observed in T₄ treatment (Double pinching).

Keywords: Marigold, pinching, growth, yield, flower diameter

INTRODUCTION

Marigold (*Tagetes spp*) is an important loose flower crop of India. It occupies special importance due to its hardiness, wider adaptability to wide range of agro-climatic conditions and easy cultivation. It is a very popular annual flower crop grown as commercial crop, garden plant, pots plant, bedding plant and herbaceous border for beautification. Marigold is commercially used for making garlands, wreaths, religious offering, cut flowers and other purposes. It is also used for oil extraction and pigment extraction mainly xanthophyll.

In most of the flower crops, the flowering and yield is mainly reliant on number of flowers bearing branches which can be manipulated by checking vertical growth of plants and

encouraging side shoot by means of pinching apical bud (Sasikumar *et al.*, 2015). The pinching is generally followed to encourage branching to produce a bushy growth and or the production of more flowers and flower yield. The pinching practice also altered the flowering initiation and also has influence on flower quality. The flower characters may vary due to growing particular variety in any region and also due to manipulation in the cultural practices (Patade *et al.*, 2020a). With this view, the present investigation was carried out to assess the effect of pinching practice on growth of marigold plants and the flower quality.

MATERIAL AND METHODS

The field experiment was carried out during

Rabi season of the year 2020-21 at College of Horticulture, Dapoli, Dist. Ratnagiri, (Maharashtra state). The experiment was laid in Randomized Block Design comprising five replications and four treatments of pinching. The flat beds of 2.7 m X 1.8 m size were prepared and the seedlings of marigold (cv. Pusa Narangi Gainda) were transplanted at the spacing of 45 X 45 cm. The recommended cultural practices were followed to raise the crop. The four levels of pinching (Control-No pinching, Pinching after 3 weeks of transplanting, Pinching after 5 weeks of transplanting and Double pinching -Pinching after 3 and 5 weeks of transplanting) were given to each plot at prescribed time. Six plants from each plot was selected randomly for recording the growth observations. The observations on growth of marigold plants (Plant height, branches, and flower characters were taken at 60 days after transplanting. The observations on flower quality (Flower diameter, weight of flower (fresh and dry) and vase life) were recorded. The data were analyzed by standard method of analysis of variance described by Panse and Sukhatme (1995).

RESULTS AND DISCUSSION

The data on effect of pinching treatments on plant height, stem diameter and number of secondary branches/plant at 60 days after transplanting in marigold (cv. Pusa Narangi Gainda) are presented in Table 1. The data revealed that the growth of the plants was significantly differed due to pinching treatments. The plant height was lowest (82.75 cm) in T_4 treatment (Double pinching -Pinching after 3 and 5 weeks of transplanting) while it was maximum (91.08 cm) in Control (T_1). The treatments T_2 and T_3 were at par with themselves. The shortened plant height in pinching treatments might be due to breaking of apical dominance. Similar results were reported by Sasikumar *et al.*, (2015) and Parhi *et al.* (2016).

The significantly highest stem diameter (15.63 mm) was T_2 (Pinching after 3 weeks of transplanting) treatment and it was at par with T_3 treatment. While the lowest stem girth (14.28 mm) was observed in T_1 (Control). The increased stem diameter in pinching treatments might be

attributed to increased cell size of stem. Rathore (2007) also reported the similar variation.

The number of secondary branches per plant was significantly increased in pinching treatments than control (Table 1) and highest number of secondary branches (40.50 per plant) was recorded in T_4 treatment (Double pinching -Pinching after 3 and 5 weeks of transplanting). It was at par with T_3 treatment and lowest number of secondary branches (27.63/plant) was found in control (T_1). The increased number of secondary branches per plant may be due to effect of removal of apical portion of the plant. The present finding agrees with the views of Meena *et al.*, (2015).

The data presented in Table 1 indicates that the pinching practices significantly increased the flower yield per plant as compared to control. The highest flower yield (191.5 g/plant) was recorded in Double pinching treatment (T_4). It was followed by T_3 and P_2 which were at par between themselves. The lowest yield (160.4 g/plant) was recorded in T_1 i.e. control. The increased flowers yield in pinching treatments might be due to development of additional number of apical shoots. Similar results were also reported by Mohanty *et al.* (2015) and Patade *et al.* (2020b) in marigold.

The data related to flower characters viz; flower diameter, fresh and dry weight of flower, vase life are presented in Table 2. It is apparent from the data that the pinching practice had a noteworthy effect on size of flowers. Among the pinching treatments, the largest flower diameter (5.21 cm) was recorded in T_3 i.e. pinching after 5 weeks of transplanting. It was followed by T_2 and T_4 . The shortest flower diameter (4.23 cm) was observed in control (T_1). The improvement in flower diameter in pinching treatments might be due to physiological effect of pinching practice. The similar trend was also reported by Patade *et al.* (2020a).

The significantly highest fresh weight of flower (5.90 g) and dry weight of the flower (1.69 g) was in T_3 (pinching after 5 weeks of transplanting) treatment and it was followed by T_2 and T_4 treatments. The least fresh and dry weight (4.23 g and 1.26 g, respectively) was recorded in T_1 i.e. control no pinching.

Table 1: Effect of pinching on growth and flower yield of marigold (cv. Pusa Narangi Gaiinda)

Treatments	Plant height (cm)	Stem diameter (mm)	No. of secondary branches/plant	Yield (g/plant)
T ₁ : Control- No pinching	91.08 (±1.46) *	14.28 (±0.25)	27.63 (±1.26)	160.4 (±6.95)
T ₂ : Pinching after 3 weeks of transplanting	85.25 (±1.04)	15.63 (±0.54)	35.75 (±0.65)	174.8 (±3.86)
T ₃ : Pinching after 5 weeks of transplanting	85.55 (±2.10)	15.60 (±0.56)	38.13 (±0.85)	179.8 (±3.77)
T ₄ : Double pinching -Pinching after 3 and 5 weeks of transplanting	82.75 (±1.32)	14.83 (±0.26)	40.50 ± (1.22)	191.5 (±2.65)
S. E. m.±	0.93	0.23	1.20	3.14
C.D. at 5%	2.28	0.70	3.67	9.29
C. V.	2.41	3.36	7.54	3.82

(* Standard deviation)

(Growth observations at 60 days after transplanting)

Table 2: Effect of pinching on flower quality of marigold (cv. Pusa Narangi Gaiinda)

Treatments	Flower diameter (cm)	Fresh weigh of flower (g)	Dry weight of flower (g)	Fresh weight : Dry weight (Flower) ratio	Vase life of flower (Days)
T ₁	4.23 (±0.33)*	5.11 (±0.25)	1.26 (±0.15)	0.248	5.63
T ₂	4.79 (±0.14)	5.55 (±0.13)	1.60 (±0.11)	0.288	6.38
T ₃	5.21 (±0.09)	5.90 (±0.07)	1.69 (±0.04)	0.285	7.38
T ₄	4.68 (±0.19)	5.49 (±0.09)	1.33 (±0.05)	0.242	7.63
S. E. m.±	0.12	0.08	0.06	-	0.25
C.D. at 5%	0.36	0.24	0.18	-	0.76
C. V.	5.60	3.19	8.68	-	8.20

(* Standard deviation)

In pinching treatments, the fresh weight was higher that might be associated with flower size. The weight of the dry flower might be differed due to variation in moisture loss from the fresh flower and pigment content in flowers. The ratio of fresh weight : dry weight of flower was higher in T₂ and T₃ treatments indicating comparatively lesser moisture loss due to single pinching practice. Rathore (2007) reported the beneficial effect of pinching on flower weight.

In case of flower diameter and weight of flower (fresh and dry), the deviation was maximum (± 0.33, 0.25 and 0.15, respectively) in control (No pinching) which indicated that there was inconsistent flower character while minimum deviation was observed in T₃ and T₄ treatments.

Among the pinching treatments, significantly highest case life of flowers (7.63 days) was observed in T₄ treatment (Double pinching) and

it was at par with T₃ treatment. The shortest vase life (5.63 days) was recorded in Control (T₁). The extended vase life of the marigold flower was noticed due pinching practices which might be helpful in improving lusture and keeping quality of flower due. Patade *et al.* (2020a) also reported the similar trend,

CONCLUSION

From the present investigation it could be inferred that Double pinching -Pinching after 3 and 5 weeks of transplanting increased the secondary branches in marigold, yield per plant and vase life of the flower. However, the size of flower was improved in Pinching after 5 weeks of transplanting.

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