



# Varietal Evaluation in Marigold (*Tagetes spp.*) Under Prayagraj Agro Climatic Conditions

Shubham Kumar <sup>a++\*</sup>, V. M. Prasad <sup>b#</sup> and Samir E. Topno <sup>c</sup>

<sup>a</sup> Department of Horticulture, SHUATS, Prayagraj, India.

<sup>b</sup> Department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj, India.

<sup>c</sup> Department of Horticulture, Faculty of Agriculture, Naini Agriculture Institute, SHUATS, Prayagraj, India.

## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

## Article Information

DOI: 10.9734/IJECC/2023/v13i102847

## Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/105033>

Original Research Article

Received: 13/06/2023

Accepted: 19/08/2023

Published: 01/09/2023

## ABSTRACT

A field experiment was carried out in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. During rabi season (2021-2023). The aim of this study was to determine to find out the most suitable variety of marigold in terms of growth, yield and quality under Prayagraj Agro climatic conditions and to work out the economics of different varieties of marigold. The experiment was laid out in Randomized block design (RBD) with 10 varieties and each replicated thrice. The variety Inca (m) Orange reported significantly better Performance compared to other varieties, in terms of Growth parameters like plant height (67.67 cm), Number of branches per plant (11.17), Leaf length (9.47), Plant spread (35.70) and Yield parameters like Flower yield per plant (272.08 g), Flower yield per plot (1632.50), Flower yield per ha (14.41 t).

<sup>++</sup>M. Sc Scholar;

<sup>#</sup>Professor;

<sup>\*</sup>Corresponding author: E-mail: sk6636680@gmail.com;

**Keywords:** Evaluation; growth; Inca (m) orange; marigold; varietal; yield.

## 1. INTRODUCTION

“Marigold (*Tagetes spp.*) commonly known as ‘Gainda’ also called as receptacle less flower. It is one of the most popular and widely adopted multipurpose flowering plant belongs to the family Compositae” [1]. “Marigold is native of Central and South America, especially Mexico. The generic name *Tagetes* was given after ‘Tages’, a demigod known for his beauty. It is one of the most important flower crop grown commercially in different parts of the country on account of its easy cultural practices and wide adoptability. Due to its short duration to produce marketable flowers, wide spectrum of attractive color, shape, size and good keeping quality attracted the attention of flower growers. Therefore, in India, marigold accounts for more than half of the nation’s loose flower production. It is grown in 42,880-hectare area with production of 360 000 MT” [2].

“Flowers are sold in the market as loose or for making garlands. Flowers are traditionally used as offering in temples, churches and in festivals, beautification and landscape. It is highly suitable for pot culture, bedding purpose and window boxes. It contains medicinal and nematocidal properties and recommended for growing as a trap crop with the tomato and onion to reduce the menace of fruit borer in IPM system” [3].

## 2. MATERIALS AND METHOD

This experiment was conducted at Floriculture Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj (UP) in the month of October to February during the winter season of the year 2022-2023.

The different variety manipulated as follows V<sub>1</sub> – F. m Hot Pak mix, V<sub>2</sub> – F1 Marvel yellow, V<sub>3</sub> – F1 French red, V<sub>4</sub> – F. m Fireball mix, V<sub>5</sub> – Inca (m) Orange, V<sub>6</sub> – F1 Marvel gold, V<sub>7</sub> – SPS 55 Yellow, V<sub>8</sub> – MG Inca Orange, V<sub>9</sub> – SPS Gold+, V<sub>10</sub> – F1 Marvel Orange. The variety were arranged in a Randomized Block Design (RBD) with 10 treatments in 3 replications.

## 3. RESULTS AND DISCUSSION

### 3.1 Growth Attributes

Vegetative metrics, including plant height, branch count per plant, leaf length, and plant spread,

were noted at several growth stages starting 30, 60, and 90 days after transplanting. The findings from the observations are summarized in the table below.

### 3.2 Plant Height

Significant difference was observed due to different genotypes for plant height, at 90 DAT. The Maximum Plant height at 90 days (67.7 cm) was recorded in the variety V<sub>5</sub> (Inca (m) Orange), followed by V<sub>8</sub> (MG Inca orange) with (61.3 cm) and the minimum Plant height at 90 days (55.6 cm) was recorded in V<sub>1</sub> (F. m Hot Pak mix).

The varieties interacted with environment and exposed the phenotypical expressions on the plant height might be the reason behind the variation reported amongst the varieties. The plant height was recorded differently in various varieties at different intervals and this difference in plant height might be due to the genetic make-up of the varieties. Similar findings were also reported by Bharti T. and Jawaharlal [4].

### 3.3 Number of Branches per Plant

Significant difference was observed due to different genotypes for number of branches per plant, at 90 DAT. The maximum number of branches per plant at 90 days (11.17) was recorded in the variety V<sub>5</sub> (Inca (m) Orange), followed by V<sub>8</sub> (MG Inca orange) with (9.50) and the minimum number of branches per plant at 90 days (6.13) was recorded in V<sub>1</sub> (F. m Hot Pak mix).

The genetic makeup of the plants, which may have also been modified by the environment, may be the cause of the variance in the number of branches per plant. Variation in number of branches per plant had also been reported by Mahanta et al. [5].

### 3.4 Leaf Length (cm)

Significant difference was observed due to different genotypes for Leaf length, at 90 DAT. The maximum Leaf length at 90 days (9.47 cm) was recorded in the variety V<sub>5</sub> (Inca (m) Orange), followed by V<sub>8</sub> (MG Inca orange) with (8.43 cm) and the minimum Leaf length at 90 days (7.13 cm) was recorded in V<sub>1</sub> (F. m Hot Pak mix).

The variation in leaf length was due to genetic factor and environmental influence. Similar observations were made by Bhusaraddi et al. [6].

### 3.5 Plant Spread (cm)

Significant difference was observed due to different genotypes for Plant spread, at 90 DAT. The maximum Plant spread at 90 days (35.70 cm) was recorded in the variety V5 (Inca (m) Orange), followed by V8 (MG Inca orange) with (32.31 cm) and the minimum Plant spread at 90 days (24.53 cm) was recorded in V1 (F. m Hot Pak mix).

The variation in plant spread might be due to their genetic makeup that could have also been influenced by the environmental conditions. Variation in vegetative growth parameters had also been reported by Singh D. and Singh A.K. [7].

### 3.6 Yield Attributes

#### 3.6.1 Flower yield per plant (g)

Significant difference was observed due to different genotypes for Flower yield per plant. The maximum Flower yield per plant at (272.08 g) was recorded in the variety V5 (Inca (m) Orange), followed by V8 (MG Inca orange) with (232.66 g) and the minimum Flower yield per plant at (111.36 g) was recorded in V1 (F. m Hot Pak mix).

The flower yield per plant may be due to inherent capacity of genotypes and influencing factors such as number of flowers per plant and individual flower weight. Yield is a poly-genetically controlled quantitative character and highly influenced by the environment reported by Usha Bharathi and Bharti T. and Jawaharlal [4], Shivakumar et al. [8], Gulia et al. [9].

#### 3.6.2 Flower yield per plot (g)

Significant difference was observed due to different genotypes for Flower yield per plot. The Maximum Flower yield per plot at (1632.50 g) was recorded in the variety V5 (Inca (m) Orange), followed by V8 (MG Inca orange) with (1395.96 g) and the minimum Flower yield per plot at (668.16 g) was recorded in V1 (F. m Hot Pak mix).

The accumulation of more photosynthesis might be the reason for the good yield of the different varieties of marigold, environmental factors may also affect the yield of the different varieties. Similar results were also observed in Piyush et al. [10].

#### 3.6.3 Flower yield per ha (t)

Significant difference was observed due to different genotypes for Flower yield per ha. The Maximum Flower yield per ha at (14.41 t) was recorded in the variety V5 (Inca (m) Orange), followed by V8 (MG Inca orange) with (12.33 t) and the minimum Flower yield per ha at (5.90 t) was recorded in V1 (F. m Hot Pak mix).

**Table 1. Varietal Evaluation in Marigold for better growth**

Notation	Name of the Varieties	Plant height (cm)	Number of branches per plant	Leaf length (cm)	Plant spread (cm)
V <sub>1</sub>	F. m Hot Pak mix	55.60	6.13	7.13	24.53
V <sub>2</sub>	F <sub>1</sub> Marvel yellow	56.37	6.60	7.80	25.10
V <sub>3</sub>	F <sub>1</sub> French red	57.27	6.97	8.07	25.37
V <sub>4</sub>	F. m Fireball mix	56.90	7.30	8.37	26.23
V <sub>5</sub>	Inca (m) Orange	67.67	11.17	9.47	35.70
V <sub>6</sub>	F <sub>1</sub> Marvel gold	60.00	8.63	8.13	27.37
V <sub>7</sub>	SPS 55	60.20	8.20	7.50	28.65
V <sub>8</sub>	MG Inca orange	61.30	9.50	8.43	32.31
V <sub>9</sub>	SPS Gold <sup>+</sup>	60.43	8.50	8.07	27.20
V <sub>10</sub>	F <sub>1</sub> Marvel orange	59.80	8.07	7.97	28.63
<b>F-TEST</b>		<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>Sem±</b>		<b>1.02</b>	<b>0.41</b>	<b>0.25</b>	<b>0.79</b>
<b>Sed</b>		<b>1.45</b>	<b>0.58</b>	<b>0.36</b>	<b>1.12</b>
<b>CD (5%)</b>		<b>3.06</b>	<b>1.22</b>	<b>0.76</b>	<b>2.35</b>
<b>CV%</b>		<b>2.99</b>	<b>8.77</b>	<b>5.51</b>	<b>4.88</b>

**Table 2. Varietal Evaluation in Marigold for better yield**

Notation	Name of the Varieties	Flower yield per plant (g)	Flower yield per plot (g)	Flower yield per ha (tons)
V <sub>1</sub>	F. m Hot Pak mix	111.36	668.16	5.90
V <sub>2</sub>	F <sub>1</sub> Marvel yellow	177.90	1199.40	9.42
V <sub>3</sub>	F <sub>1</sub> French red	189.56	1137.38	10.02
V <sub>4</sub>	F. m Fireball mix	142.14	852.84	7.53
V <sub>5</sub>	Inca (m) Orange	272.08	1632.50	14.41
V <sub>6</sub>	F <sub>1</sub> Marvel gold	155.04	930.22	8.21
V <sub>7</sub>	SPS 55	190.43	1142.58	10.09
V <sub>8</sub>	MG Inca orange	232.66	1395.96	12.33
V <sub>9</sub>	SPS Gold <sup>+</sup>	181.54	1089.24	9.62
V <sub>10</sub>	F <sub>1</sub> Marvel orange	179.35	1076.12	9.50
<b>F-TEST</b>		<b>S</b>	<b>S</b>	<b>S</b>
<b>Sem±</b>		<b>11.08</b>	<b>88.52</b>	<b>0.58</b>
<b>Sed</b>		<b>15.67</b>	<b>125.19</b>	<b>0.83</b>
<b>CD (5%)</b>		<b>32.93</b>	<b>263.01</b>	<b>1.75</b>
<b>CV%</b>		<b>10.48</b>	<b>13.78</b>	<b>10.50</b>

The genetic traits of the various varieties may have caused differences in the floral yield/ha; environmental conditions may also have contributed to the enhanced yield of the kinds. Similar results are in conformity with Rao and Reddy [11,12].

#### 4. CONCLUSION

In the present investigation it is concluded that, out of 10 varieties, variety V5 (Inca (m) Orange) was found to be best in Agro climatic conditions of Prayagraj in terms of growth parameters, flower quality, flower yield and higher benefit cost ratio as compared to other varieties. Hence the variety V5 (Inca (m) Orange) could be recommended for commercial purpose in Prayagraj Agro climatic conditions.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

- Naik PV, Seetaramu GK, Patil GM, Tejaswini, Sadanand GK, Shivashankara KS. A study on evaluation of marigold genotypes for growth parameters under upper Krishna project command area in Karnataka state. International Journal of Chemical Studies. 2019;7(4):1562-1566.
- National Horticulture Board. Indian Horticulture Data Base, Ministry of Agriculture, Gurgaon, Haryana; 2012.
- Meena Y, Sirohi HS, Tomar BS, Kumar S. Effect of planting time, spacing and pinching on growth and seed yield traits in African marigold (*Tagetes erecta*) cv. Pusa Narangi Gainda. Indian Journal of Agricultural Sciences. 2015;85(6):797-801.
- Bharathi T, Jawaharlal M. Evaluation of African marigold (*Tagetes erecta* L.) genotypes for growth and flower yield under Coimbatore conditions. Journal of Tropical Agriculture. 2014;7(16):2197-2201.
- Mahanta S, Talukdar MC, Talukdar P. Evaluation of marigold varieties for growth, flowering, yield and carotenoid under assam condition. J. Soils and Crops. 2020; 30(2):231-235.
- Priya Bhusaraddi, VV Bhagat and BS Kulkarni. Evaluation of different French marigold (*Tagetes patula* L.) genotypes. The Pharma Innovation Journal. 2022; 11(2):2755-2759.
- Singh D, Singh AK. Characterization of African marigold (*Tagetes erecta* L.) genotypes using mor-phological characters. Journal of Ornamental Horticultur. 2006;9(1):40-42.
- Shivakumar. Evaluation of African marigold (*Tagetes erecta* L.) Indian Journal of Ornamental Horticulture. 2014;10:132-234.
- Renu Gulia, Beniwal BS, Sonu Sheoran, Sandooja JK. Evaluation of marigold genotypes for growth, flowering, yield and essential oil content. Research on Crops. 2017;18(2):299-304.

10. Piyush, Sirohi, Patel M, Ganga M, Jawaharlal M, Jeyakumar P. Assessment of Qualitative and Quantitative Flower Quality Parameters of Certain Commercial Jasmine Varieties during Lean Flowering Season. Biosciences, Indian Journal of Horticulture. 2000;11(4):222-244.
11. Rao CC, Goud PV, Reddy KM, Padmaja G. Screening of African marigold (*Tagetes erecta* L.) Varieties for flower yield and carotened pigments. Indian Journal of Agriculture and Life Sciences. 2005;22(2): 333-366.
12. Vijay Kumar, Radhey Shyam Singh, Mahender Pal, MD Ojha, AP Singh, RK Verma, PK Singh. Varietal performance of marigold (*Tagetes* spp.) under sub-tropical condition of Bihar. Journal of Pharmacognosy and Phytochemistry. 2020;9(3):922-924.

---

© 2023 Kumar et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:*  
<https://www.sdiarticle5.com/review-history/105033>