

Original Research Article

Varietal Evaluation in Marigold (*Tagetes spp.*) for better growth and yield Under Prayagraj Agro Climatic Conditions

ABSTRACT

A field experiment was carried out in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, in October to February during the winter season of the year 2022-2023. The aim of this study was to to evaluate Marigold varieties for growth and yield under Prayagraj agro-climatic conditions and to work out the economics of different varieties of marigold. The treatments were V₁– F. M Hot Pak mix, V₂– F1 Marvel yellow, V₃– F1 French red, V₄– F. m Fireball mix, V₅– Inca (m) Orange, V₆– F1 Marvel gold, V₇– SPS 55 Yellow, V₈– MG Inca Orange, V₉– SPS Gold+, V₁₀– F1 Marvel Orange. The varieties were arranged in a Randomized Block Design (RBD) and replicated thrice. Data was collected on growth and yield parameters and were analyzed using analysis of variance. The variety Inca (m) Orange outperformed the 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). Variety Inca (m) Orange could be recommended for commercial purposes in Prayagraj agro-climatic conditions.

Key words: Evaluation, growth, Inca (m) Orange, Marigold, Varietal, yield.

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 that plant belongs to the family Compositae (Naik *et al.*, 2019). Marigold is native toof 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 (National Horticulture Board, year).

Flowers are sold in the market as loose or for making garlands and 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 (Meena *et al.* 2015). [The study aimed to evaluate Marigold varieties for growth and yield under Prayagraj agro-climatic conditions and to work out the economics of different varieties of marigold.](#)

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 varieties were treatments](#) manipulated as follows V₁ – F. M Hot Pak mix, V₂ – F1 Marvel yellow, V₃ – F1 French red, V₄ – F. m Fireball mix, V₅ – Inca (m) Orange, V₆ – F1 Marvel gold, V₇ – SPS 55 Yellow, V₈ – MG Inca Orange, V₉ – SPS Gold+, V₁₀ – F1 Marvel Orange. The varieties were arranged in a Randomized Block Design (RBD) [and replicated thrice. Data was collected on growth and yield parameters and were analyzed using analysis of variance.](#)

RESULTS AND DISCUSSION

Growth [parameters](#)

Vegetative parameters viz., plant height, number of branches per plant, leaf length and plant spread were recorded at different stages of plant growth from 30, 60 and 90 days after transplanting and the results [showed significant differences](#). Maximum [plant height](#) at 90 days (67.7 cm) was recorded in the variety V₅ (Inca (m) Orange), followed by V₈ (MG Inca orange) with (61.3 cm) and the minimum [plant height](#) at 90 days (55.6 cm) was recorded in V₁ (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 might be due to the genetic make-up of the varieties. Similar findings were also reported by Bharti T. and Jawaharlal \(2014\).](#)

[Maximum number of branches per plant at 90 days \(11.17\) was recorded in the variety V₅ \(Inca \(m\) Orange\), followed by V₈ \(MG Inca orange\) with \(9.50\) and the minimum number](#)

of branches per plant at 90 days (6.13) was recorded in V1 (F. m Hot Pak mix). The variation in number of branches per plant might be due to their genetic makeup that could have also been influenced by the environmental conditions. Variation in number of branches per plant had also been reported by **Mahanta et al. (2020)**.

Maximum leaf length at 90 days (9.47 cm) was recorded in the variety V5 (Inca (m) Orange), followed by V8 (MG Inca orange) with (8.43 cm) and the minimum Leaf length at 90 days (7.13 cm) was recorded in V1 (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. (2022)**.

High 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. (2006)**.

Yield parameters

Significant difference (Table 2) was observed due to different genotypes for flower yield per plant such that high 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 and Jawaharlal (2014)**, **Shivakumar et al. (2015)** and **Gulia et al. (2017)**.

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 (668.16g) 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. (2000)**.

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). The flower yield/ha might have displayed variation due to genetic characteristics of different varieties; environmental factors can also affect in the increased yield of the varieties. Similar results are in conformity with **Rao and Reddy (2005)**.

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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)
V₁	F. m Hot Pak mix	55.60	6.13	7.13	24.53
V₂	F ₁ Marvel yellow	56.37	6.60	7.80	25.10
V₃	F ₁ French red	57.27	6.97	8.07	25.37
V₄	F. m Fireball mix	56.90	7.30	8.37	26.23
V₅	Inca (m) Orange	67.67	11.17	9.47	35.70
V₆	F ₁ Marvel gold	60.00	8.63	8.13	27.37
V₇	SPS 55	60.20	8.20	7.50	28.65
V₈	MG Inca orange	61.30	9.50	8.43	32.31
V₉	SPS Gold ⁺	60.43	8.50	8.07	27.20
V₁₀	F ₁ Marvel orange	59.80	8.07	7.97	28.63
F-TEST		S	S	S	S
Sem±		1.02	0.41	0.25	0.79
Sed		1.45	0.58	0.36	1.12
CD (5%)		3.06	1.22	0.76	2.35
CV%		2.99	8.77	5.51	4.88

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

CONCLUSION

In conclusion 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.

REFERENCES

- **Bharathi, T. and Jawaharlal, M. (2014).** Evaluation of African marigold (*Tagetes erecta* L). genotypes for growth and flower yield under Coimbatore conditions. *Journal of Tropical Agriculture*, 7(16): 2197-2201.
 - **Bhusaraddi et al. (2022)** Cited but not listed please check
 - **Gulia et al. (2017).** Cited but not listed please check
- **Mahanta S., M. C. Talukdar and P. Talukdar (2020).** Evaluation of marigold varieties for growth, flowering, yield and carotenoid under assam condition. *J. Soils and Crops*, 30(2): 231-235.
- **Meena Y, Sirohi HS, Tomar BS, Kumar S. (2015).** 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*. 85(6):797-801.
- **Naik PV, Seetaramu GK, Patil GM, Tejaswini, Sadanand GK, Shivashankara KS (2019).** A study on evaluation of marigold genotypes for growth parameters under upper Krishna project command area in Karnataka state. *International Journal of Chemical Studies*; 7(4):1562-1566.
- **National Horticulture Board.** Indian Horticulture Data Base, Ministry of Agriculture, Gurgaon, Haryana, 2012.
- ~~Naik PV, Seetaramu GK, Patil GM, Tejaswini, Sadanand GK, Shivashankara KS (2019).~~ A study on evaluation of marigold genotypes for growth parameters under upper Krishna project command area in Karnataka state. *International Journal of Chemical Studies*; 7(4):1562-1566.

- **Piyush, Sirohi, Patel, M., Ganga, M., Jawaharlal, M. and Jeyakumar, P., (2000)** Assessment of Qualitative and Quantitative Flower Quality Parameters of Certain Commercial Jasmine Varieties During Lean Flowering Season. *Biosciences, Indian Journal of Horticulture*, **11**(4): 222-244.
- **Priya Bhusaraddi, VV Bhagat and BS Kulkarni (2022).** Evaluation of different French marigold (*Tagetes patula* L.) genotypes. *The Pharma Innovation Journal*; **11**(2): 2755-2759.
- **RENU GULIA, B. S. BENIWAL, SONU SHEORAN AND J. K. SANDOOJAI (2017).** Evaluation of marigold genotypes for growth, flowering, yield and essential oil content. *Research on crops*; **18** (2): 299-304.
- **Rao C.C., Goud, P.V., Reddy, K. M. and Padmaja, G. (2005).** Screening of African marigold (*Tagetes erecta* L.) Varieties for flower yield and carotened pigments. *Indian Journal of Agriculture and Life Sciences*, **22**(2) 333-366.
- **Shivakumar (2014).** Evaluation of African marigold (*Tagetes erecta* L.) *Indian Journal of Ornamental Horticulture*, **10**: 132-234.
- **Singh D, Singh AK (2006).** Characterization of African marigold (*Tagetes erecta* L.) genotypes using mor-phological characters. *Journal of Ornamental Horticultur*; **9**(1):40-42.
- **Vijay Kumar, Radhey Shyam Singh, Mahender Pal, MD Ojha, AP Singh, RK Verma and PK Singh (2020).** Varietal performance of marigold (*Tagetes spp.*) under sub-tropical condition of Bihar. *Journal of Pharmacognosy and Phytochemistry*; **9**(3): 922-924.

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