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. 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).

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 plant belongs to the family Compositae **(Naik *et al*., 2019).** 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 **(National Horticulture Board).**

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 **(Meena *et al*. 2015).**

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_1 – F. m Hot Pak mix, V_2 – F1 Marvel yellow, V_3 – F1 French red, V_4 – F. m Fireball mix, V_5 – Inca (m) Orange, V_6 – F1 Marvel gold, V_7 – SPS 55 Yellow, V_8 – MG Inca Orange, V_9 – SPS Gold+, V_{10} – F1 Marvel Orange. The variety were arranged in a Randomized Block Design (RBD) with 10 treatments in 3 replications.

RESULTS AND DISCUSSION

Growth Attributes

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 from the observations made are as follows.

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_5 (Inca (m) Orange), followed by V_8 (MG Inca orange) with (61.3 cm) and the minimum Plant height at 90 days (55.6 cm) was recorded in V_1 (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 (2014).**

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_5 (Inca (m) Orange), followed by V_8 (MG Inca orange) with (9.50) and the minimum number of branches per plant at 90 days (6.13) was recorded in V_1 (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).**

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_5 (Inca (m) Orange), followed by V_8 (MG Inca orange) with (8.43 cm) and the minimum Leaf length at 90 days (7.13 cm) was recorded in V_1 (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).**

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 V_5 (Inca (m) Orange), followed by V_8 (MG Inca orange) with (32.31 cm) and the minimum Plant spread at 90 days (24.53 cm) was recorded in V_1 (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 Attributes

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 V_5 (Inca (m) Orange), followed by V_8 (MG Inca orange) with (232.66 g) and the minimum Flower yield per plant at (111.36 g) was recorded in V_1 (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 (2014), Shivakumar *et al.* (2015), Gulia *et al.* (2017).**

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 V_5 (Inca (m) Orange), followed by V_8 (MG Inca orange) with (1395.96 g) and the minimum Flower yield per plot at (668.16g) was recorded in V_1 (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).**

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 V_5 (Inca (m) Orange), followed by V_8 (MG Inca orange) with (12.33 t) and the minimum Flower yield per ha at (5.90 t) was recorded in V_1 (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).**

Notation	Name of the Varieties	Plant height (cm)	Number of branches per plant	Leaf length (cm)	Plant spread (cm)

Table.1. Varietal Evaluation in Marigold for better growth

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	55.60	6.13	7.13	24.53
V_2	F_1 Marvel yellow	56.37	6.60	7.80	25.10
V_3	F_1 French red	57.27	6.97	8.07	25.37
V_4	F. m Fireball mix	56.90	7.30	8.37	26.23
V_5	Inca (m) Orange	67.67	11.17	9.47	35.70
V_6	F_1 Marvel gold	60.00	8.63	8.13	27.37
V_7	SPS 55	60.20	8.20	7.50	28.65
V_8	MG Inca orange	61.30	9.50	8.43	32.31
V_9	SPS Gold^{+}	60.43	8.50	8.07	27.20
V_{10}	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

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 the present investigation it is concluded that, out of 10 varieties, variety V_5 (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 **V_5 (Inca (m) Orange)** could be recommended for commercial purpose in Prayagraj Agro climatic conditions.

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