



## Assessment of Different Varieties of African Marigold (*Tagetes Erecta*) for Growth and Flowering Attributes under the Northern Dry Zone

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### ABSTRACT

The objective of the study was to evaluate the growth and flowering characteristics of eight African marigold (*Tagetes erecta*) varieties. The field experiment was carried out at the experimental plot of the Department of Floriculture and Landscaping, University of Horticultural Sciences, Bagalkot, during the rabi season (October 2024 to January 2025). The study revealed significant differences in the growth and flowering parameters among the eight evaluated varieties of marigold. Yesh Orange recorded the maximum plant height (94.67 cm), followed by Dream Yellow (89.00 cm), whereas the minimum plant height was observed in Prime Orange (75.33 cm). The variety Prime Orange exhibited superior performance in terms of the number of secondary branches (76.67) and plant spread (62.33 cm East-West and 62.67 cm North-South). The highest number of primary branches per plant was recorded in Akash Orange (16) followed by Aradhana (15) with an lowest number of branches in Lemon Yellow (9.67). Variety Aradhana exhibited an exceptional vegetative and reproductive traits, recording the maximum stem girth (20.42 mm), leaf length (10.00 cm), leaf width (8.33 cm), flower diameter (43.33 mm) and the maximum individual flower weight (18.33 gm). In contrast, Lemon Yellow recorded the lowest leaf length (7.00 cm) and leaf width (5.67 cm). The smallest flower diameter (29.09 mm) and the lesser flower weight (8.93 gm) were recorded in the Akash Orange variety.

**Keywords:** Assessment, Flowering Attributes, Growth, Marigold, Variety.

### INTRODUCTION

Marigold (*Tagetes erecta*), a member of the Asteraceae family has long been valued for both its medicinal and decorative uses (Mahantesh *et al*, 2018). Known as African marigolds, these tall plants can grow up to three feet, producing large, globe-shaped blooms that are ideal for bedding purposes (Dixit *et al*, 2013). Their vibrant orange to yellow flowers blend well with various colour schemes and are also a crucial raw material in industries due to their high content of carotenoids, essential oils and alkaloids (Pérez *et al*, 2006). The flowers are specifically used to extract compounds like 1-limonene, ecomene, 1-linalyl acetate and 1-linalool (Narsude *et al*, 2010). Marigolds thrive in diverse soil types and require a mild climate for optimal growth and abundant flowering.

Marigolds are primarily cultivated for pigment extraction, particularly xanthophyll, which is widely used in the poultry industry to enhance chicken skin colour and egg yolk pigmentation. Karnataka alone dedicates 3,000 ha to xanthophyll production.

Commercial extraction of carotenoids from marigolds is concentrated in regions like Cochin (Kerala), Hyderabad (Telangana), Satyamangalam forest (Tamil Nadu) and Telagi near Harihar and Bangalore (Karnataka). These pigments are exported to various countries, including Mexico, Peru, the USA, Japan, Spain, Romania, several European and African nations. It has been observed that marigold varieties exhibit a lot of variation for flowering characters, which varies with varieties (Nalawadi, 1982 and Sreekala *et al*, 2002). The performance of marigold cultivars varies significantly with region, season and growing conditions (Tomar *et al*, 1972). A variety that thrives well in one location may perform poorly in another with different climatic conditions. Thus, evaluating and selecting high-yielding and biotic stress-resistant varieties suitable for specific agro-climatic regions is essential. Despite of this, farmers often rely on recommendations from peers or seed retailers, lacking awareness of region-specific varieties (Palthe *et al*, 2019). Hence, evaluating different varieties in the Bagalkot region of Karnataka was crucial for identifying varieties with desirable growth and

**Table 1: Growth attributes and performance of different African marigold varieties.**

| Sr. No. | Variety      | Plant height (cm) | No. of primary branches | No. of secondary branches | Plant spread (E - W) | Plant spread (N - S) |
|---------|--------------|-------------------|-------------------------|---------------------------|----------------------|----------------------|
| 1       | Lemon Yellow | 77.67             | 9.67                    | 31.33                     | 41.67                | 33.33                |
| 2       | Pushpa       | 80.00             | 13.67                   | 37.00                     | 54.67                | 49.67                |
| 3       | Dream Yellow | 89.00             | 10.67                   | 56.33                     | 56.67                | 38.00                |
| 4       | Yesh Orange  | 94.67             | 14.33                   | 45.00                     | 56.00                | 54.00                |
| 5       | Prime Orange | 75.33             | 14.33                   | 76.67                     | 62.33                | 62.67                |
| 6       | Akash Orange | 88.00             | 16.00                   | 30.67                     | 60.67                | 45.00                |
| 7       | Aradhana     | 86.00             | 15.00                   | 71.33                     | 62.00                | 55.00                |
| 8       | Siri         | 80.33             | 13.33                   | 36.00                     | 62.00                | 54.67                |
|         | S.E.M        | 3.718             | 1.583                   | 9.32                      | 6.430                | 5.177                |
|         | CD at 5 %    | 11.278            | 4.802                   | 30.126                    | 19.503               | 15.702               |
|         | CD at 1 %    | 15.653            | 6.664                   | 41.814                    | 27.069               | 21.794               |

**Table 2: Growth and flowering attributes, as well as performance of different marigold varieties.**

| Sr. No. | Variety      | Stem girth (mm) | Leaf length (cm) | Leaf width (cm) | Flower diameter (mm) | Flower weight (g) |
|---------|--------------|-----------------|------------------|-----------------|----------------------|-------------------|
| 1       | Lemon Yellow | 15.56           | 7                | 5.67            | 32.54                | 17.33             |
| 2       | Pushpa       | 14.83           | 8.03             | 6.67            | 36.70                | 18.00             |
| 3       | Dream Yellow | 18.12           | 7.70             | 6.40            | 29.01                | 8.93              |
| 4       | Yesh Orange  | 16.83           | 8.83             | 6.50            | 33.00                | 14.67             |
| 5       | Prime Orange | 18.46           | 8.03             | 5.67            | 32.33                | 8.60              |
| 6       | Akash Orange | 16.75           | 8.83             | 7.50            | 35.33                | 18.00             |
| 7       | Aradhana     | 20.42           | 10               | 8.33            | 43.33                | 18.33             |
| 8       | Siri         | 14.87           | 9                | 6.33            | 35.33                | 9.00              |
|         | S.E.M        | 1.338           | 0.794            | 0.765           | 1.265                | 1.026             |
|         | CD at 5 %    | 4.057           | 2.408            | 2.319           | 3.838                | 3.111             |
|         | CD at 1 %    | 5.631           | 3.342            | 3.219           | 5.327                | 4.317             |

flowering traits. This will enable farmers to maximize profitability and ensure the sustainability of marigold cultivation. As floriculture advances, there is a growing need to recommend suitable varieties to farmers based on rigorous evaluations, thereby unlocking the full potential of marigold production (Palthe *et al*, 2019)

### MATERIALS AND METHODS

The field experiment was conducted during the *rabi* season 2024 - 2025 at the experimental plot of the Department of Floriculture and Landscaping, University of Horticultural Science Bagalkot. It involved 8 varieties of marigold, such as Lemon yellow, Puspa, Dream Yellow, Yesh Orange, Prime Orange, Akash Orange, Aradhana and Siri. The study followed a Randomized Completely Block Design (RCBD) with three replications in the open field condition and the field was properly prepared through ploughing, leveling and manual weeding. Harrowing was done to break the clods, followed by criss-cross

ploughing with cultivator, then the field was pulverized by rotavator. During harrowing well-rotten farmyard manure was incorporated @ 5 kg/m<sup>2</sup> into the soil at the time of field preparation. Fertilizer was applied as NPK @ 10:10:10 kg/ha (Mahanta *et al*, 2020). Half the quantity of nitrogen and the full dose of phosphorus and potash were applied at the time of transplanting, while the remaining dose of nitrogen was applied one month after transplanting. Planting was done at a spacing of 45 cm × 45 cm, and the plot size was 3 m × 2.5 m.

The various observations were taken on growth and flowering parameters, *Viz.*, plant height (cm), number of primary branches per plant, number of secondary branches per plant, number of leaves per plant, leaf length (cm), leaf width (cm), plant spread (N - S), plant spread (E - W), Stem girth (cm), flower diameter (cm), fresh weight of individual flower (gm) and flower colour. The plant height, plant spread, leaf length and leaf width were measured by using the

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measuring scale. The diameter of marigold flower and stem girth were measured with a Mitutoyo Vernier caliper. Three readings were taken from each treatment and the data were recorded once in a peak season of flowering during the experimental period. The data obtained on various characters were subjected to statistical analysis as per Randomized Completely Block Design and interpretation of the data was carried out in accordance with Panse and Sukhatme (1978).

### RESULTS AND DISCUSSION

#### Growth attributes

Analysis of variance revealed significant differences in traits among the different varieties of marigold for growth and flowering characteristics. The vegetative growth parameters of marigold varieties were evaluated based on plant height (cm), number of branches, plant spread, leaf length (cm), leaf width (cm) and stem girth (cm). The data (Table 1) showed a considerable range of variation in plant height among the different 8 varieties. Significantly, the maximum height was recorded in Yesh Orange (94.67 cm), Dream Yellow (89.00 cm) and Akash Orange (88.00 cm), which were at par. The minimum plant height was recorded in Lemon Yellow (77.67 cm) and Prime Orange (75.33 cm), both of which were at par. Plant height is a critical varietal trait influenced by the genetic composition of the plant. The variation in plant height among the different varieties may be due to genotypic differences in phenotypic expression of plant height and the impact of environmental factors. Similar variation in plant height due to genotypes was also reported by Rao *et al* (2005), Singh and Singh, (2006) and Khanvilkar *et al* (2003) in marigold. Number of primary branches were significantly higher in variety (Akash Orange 16.00) followed by Aradhana (15.00) and lowest in Lemon Yellow (9.67). Prime Orange (76.67) recorded higher number of secondary branches followed by Aradhana (71.33) and lowest in Akash Orange (30.00). Variation in the number of secondary branches per plant is attributed to genetic characters (Singh and Singh, 2005, Jauhari and Singh, 2006). The maximum plant spread was observed in Prime orange (62.33 cm in E-W and 62.67 cm in N-S) at par with Aradhana (62.00 cm in E-W and 55.00 cm in N-S) and Siri (62.00 cm in E-W and 54.67 cm in N-S), while lowest spread was recorded in Lemon Yellow (41.67 cm in E-W and 33.33 cm in N-S). Differences in plant spread may be due to the inherent characteristics of the varieties, resulting from variations in their genetic makeup and adaptability. Similar findings were reported by (Bhusaraddi *et al* 2022).

The data (Table 2) revealed that the maximum stem girth was highest in Aradhana (20.42 cm) followed by Prime Orange (18.67 cm) and lowest in Pushpa (14.83 cm). Highest leaf length was found in Aradhana (10.00 cm) followed by Siri (9.00 cm) as compared to Yesh Orange (8.83 cm) and Akash Orange (8.83 cm) while lowest in Lemon yellow (7.00 cm) and Aradhana (8.33 cm) exhibited highest leaf width followed by Akasha Orange (7.50 cm), Yesh Orange (6.50 cm) and the lowest leaf width was observed in Lemon Orange and Prime Orange (5.67 cm). The variation in leaf length and width was due to genetic factor and environmental influence. The similar variations for growth attributes were found by Sharma *et al* (2019) in French marigold.

#### Flowering Attributes

The (Table 2) showed significant differences among the varieties. The maximum weight of an individual flower was recorded in Aradhana (18.33 gm) followed by Akash Orange and Pushpa (18 gm), whereas the lowest was observed in Prime Orange (8.60 gm). The largest flower diameter was recorded in Aradhana (43.33 mm) followed by Pushpa (36.70 mm), Akash Orange and Siri (35.33 mm) while the smallest flower diameter was found in Dream Yellow (29.01 mm). The differences in flower diameter were primarily due to genetic and environmental conditions. Similar variability was also observed by Bhusaraddi *et al* (2022) in different marigold genotypes.

### CONCLUSION

Among the eight varieties evaluated, Aradhana exhibited superior performance in flowering parameters, while Prime Orange excelled in growth parameters during the rabi season in the northern dry area of Karnataka.

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