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Performance of marigold (*Tagetes erecta* L.) Cv. Calcutta Double to staggered planting for year round production in Konkan region

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ABSTRACT

The investigation entitled “Performance of marigold (*Tagetes erecta* L.) Cv. Calcutta Double to staggered planting for year round production in Konkan region” was conducted at the College of Horticulture, Dapoli (2025-26) using Randomized Block Design with six treatments viz., T_1 - first fortnight of June, T_2 - first fortnight of August, T_3 - first fortnight of October, T_4 - first fortnight of December, T_5 - first fortnight February and T_6 - first fortnight of April with four replications. Among all of the above treatments, T_3 treatment recorded the maximum number of flowers/plot (1934.00), flower yield/plot (62.63 Kg), flower yield/plant (143.66 g), and blooming period (56.10 days). However, same treatment has registered highest net profit (Rs. 382062) and B:C Ratio (1.90) which proved to be economically beneficial.

Keywords: African marigold, *Tagetes erecta* L., Calcutta Double, Staggered planting

Introduction

Flowers represent a critical component of floricultural systems, possessing significant aesthetic, sociocultural and economic value. Traditionally, flowers have been utilized in cultural and religious practices, where they function as symbolic representations of emotions such as love, purity, peace and reverence. From a scientific perspective, the ornamental value of flowers is primarily attributed to the presence of secondary metabolites including anthocyanins, carotenoids and flavonoids, which are responsible for pigmentation as well as volatile organic compounds that contribute to fragrance. Beyond their decorative role, flowers have gained increasing importance as sources of bioactive compounds with diverse industrial applications. Floral extracts are widely utilized in essential oil production, cosmetic formulations, nutraceuticals, functional beverages and natural pigment industries. Furthermore, the therapeutic potential of floral volatiles in aromatherapy has been associated with stress reduction and psychological well-being. In addition, certain flower derived by-products are being explored for use in animal nutrition including supplementation of poultry feed. The Konkan region of Maharashtra is characterized by humid tropical climate, high annual rainfall and moderate temperature regimes, which together create favourable conditions for the cultivation of a wide range of floricultural crops. These agro-climatic attributes are particularly suitable for commercially important species such as spider lily (*Hymenocallis* spp.), jasmine (*Jasminum* spp.), tuberose (*Agave amica*) and marigold (*Tagetes* spp.), all of which exhibit healthy market demand in both the loose and cut flower segments.

The North Konkan region especially Palghar, Thane and Raigad have good potential for commercial cultivation of marigold due to its proximity to metropolitan cities such as Mumbai, Thane, Kalyan and Dombivli etc. Also, the South Konkan region comprises Sindhudurg and Ratnagiri where tourism is growing rapidly with development of towns which has created demand for marigold throughout the entirety of year.

One of the most vital loose flower crops grown in India is marigold due to its wide adaptability to diverse agro-climatic conditions and can be successfully grown across different soil types, making it a highly resilient and farmer-preferred crop. It is propagated through seeds and completes its life cycle within a relatively short duration of approximately 4-4.5 months. The plant is characterized by vigorous growth and produces flowers with bright pigmentation, predominantly due to carotenoid compounds imparting shades ranging from yellow to deep orange. These pigments are not only responsible for its ornamental value but also contribute to its importance in pigment extraction and industrial applications. It has relatively better post-harvest keeping quality as compared to other annual flower crops which further enhances its marketability and suitability for value addition.

In addition to its industrial value, marigold is extensively used for garlands, religious offerings and decorative purposes, resulting in a consistent and year-round market demand. This continuous demand, coupled with its short crop duration and adaptability to diverse agro-climatic conditions, makes marigold a suitable

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crop for staggered planting to ensure uninterrupted production and regular market supply, particularly under the humid climatic conditions of the Konkan region.

In the Konkan region, marigold has high demand during festivals, weddings and religious ceremonies due to its aesthetic and cultural importance. The crop often fetches higher market prices during peak periods, resulting in better economic returns for growers. However, scientific information on the effect of different planting seasons under Konkan agro-climatic conditions is limited. Seasonal variation in temperature, rainfall and photoperiod significantly influences vegetative growth, flowering behaviour and yield of marigold. Identifying the most suitable planting season can help to maximize flower production and quality, making marigold a profitable option as a commercial crop or as an intercrop in orchard systems such as mango, cashew (during initial stage) and arecanut as well as in rice-based cropping systems. Therefore, systematic experimental studies are required to evaluate the effect of planting season on growth, yield and economic returns of marigold.

Marigold is an important short-duration floriculture crop in the Konkan region, offering quick economic returns within 2.5-3 months, making it suitable for small and marginal farmers. The region's agro-climatic conditions including lateritic soils, high humidity and heavy rainfall are generally favourable for its cultivation. However, seasonal variations in temperature, rainfall distribution and photoperiod significantly influence growth, flowering behaviour and yield, often leading to inconsistent production and quality. Lack of precise information on optimum planting season under Konkan conditions further limits its commercial potential. Therefore, the present study is significant in identifying the most suitable planting season to achieve higher yield, better flower quality and improved economic returns. The findings will help farmers to make precise decisions on planting time and enhance the profitability and sustainability of marigold cultivation in the region.

The present investigation has been done to study the performance of marigold (*Tagetes erecta* L.) Cv. Calcutta double to staggered planting for year round production in Konkan region.

2. Material and methods

The present study was done on, “Performance of marigold (*Tagetes erecta* L.) Cv. Calcutta Double to staggered planting for year round production in Konkan region” was carried out during 2025-26 under the department of Floriculture and Landscaping, College of Horticulture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri. In this chapter material used and methods that have been followed during present investigation are discussed.

2.1. Experimental site

The field experiment was conducted at Hi-tech Nursery, College of Horticulture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri (M.S.) during 2025-2026. The selection of the site was done on the basis of suitability of land for the cultivation of marigold.

2.2. Location

Dapoli is located in the coastal region of Ratnagiri district in Maharashtra state. It lies at about an altitude of 240 m above mean sea level at 17°45' N latitude and 73°12' E longitude.

2.3. Climate and weather conditions

Dapoli is characterized with warm and humid climate with average relative humidity 80% throughout the year and wind velocity ranging from 2.1 Km/h to 10.9 Km/h. The average minimum and maximum temperature observed during the study was 10.9 °C and 32.0 °C respectively with an average precipitation of more than 4000 mm, distributed mainly 4-5 months from June to October

Experimental details

1	Crop	:	Marigold (<i>Tagetes erecta</i> L.)
2	Variety	:	Calcutta Double
3	Year	:	2025-26
4	Experimental design	:	Randomized Block Design (RBD)
5	Treatment details	:	T ₁ - Planting in first fortnight of June T ₂ - Planting in first fortnight of August T ₃ - Planting in first fortnight of October T ₄ - Planting in first fortnight of December T ₅ - Planting in first fortnight of February T ₆ - Planting in first fortnight of April
6	Treatments	:	06
7	Replications	:	04
8	Total number of plants	:	2400
9	Experimental plot area	:	630 m ²

3. Results and discussion

3.1. Effect of staggered planting on blooming period/plot (Days)

The data presented in Table 1, revealed that the maximum duration of blooming period/plot was recorded in T₃- first fortnight of October (56.10 days) however, it was at par with T₂- first fortnight of August (55.86 days), whereas the minimum duration was recorded in T₆- first fortnight of April (44.76 days).

Table 1. Effect of staggered planting on blooming period/plot

	Treatments	Blooming period/plot (Days)
T ₁	First fortnight of June	51.86
T ₂	First fortnight of August	55.86
T ₃	First fortnight of October	56.10
T ₄	First fortnight of December	52.29
T ₅	First fortnight of February	47.05
T ₆	First fortnight of April	44.76
	Range	56.10-44.76
	Mean	51.32
	S.E.m. (±)	0.65
	C.D. @ 5 %	1.99

In present research, the maximum duration of blooming period/plot was recorded in T₃- first fortnight of October followed by T₂- first fortnight of August and the minimum duration of blooming period was recorded in T₄- first fortnight of April. This may have assisted by shorter day length during growing period (October, November & December) which triggered the short-day nature of marigold from excessive vegetative growth to reproductive flower production that supported continuous blooming. Furthermore, moderate relative humidity

(60-70%) maintained the plant's water balance and reduced the stress too. Also, it prevented the flower petals from mold or rot due to excessive moisture levels during winter season ultimately making the plant to bloom for longer period. Moreover, the low temperature during growth period (18-24 °C) avoided any environmental stress that helped the plant to produce new buds providing flowers for prolonged time.

3.2. Effect of staggered planting on flower diameter (mm)

The data pertaining to effect of staggered planting on flower diameter is presented in Table 2, the largest flower diameter was recorded in treatment T₁- first fortnight of June (53.85 mm), which was at par with treatment T₂- first fortnight of August (52.87 mm) and significantly better over the other treatments, whereas the smallest flower diameter was recorded in T₅- first fortnight of February (41.32 mm).

Table 2. Effect of staggered planting on flower diameter

Treatments	Flower diameter (mm)
T ₁ First fortnight of June	53.85
T ₂ First fortnight of August	52.87
T ₃ First fortnight of October	48.17
T ₄ First fortnight of December	47.35
T ₅ First fortnight of February	41.32
T ₆ First fortnight of April	44.82
Range	53.85-41.32
Mean	48.06
S.E.m. (±)	1.257
C.D. @ 5 %	3.82

In present investigation, the largest flower diameter was recorded in T₁- first fortnight of June which was followed by T₂- first fortnight of August and the smallest flower diameter was recorded in T₅- first fortnight of February. The reason could be constant rainfall during the months of June, July and August (2066.4 mm) that sufficiently provided water to plant which may have help the petals to expand fully and also contributed to increase the nutrient uptake of the plant, ultimately resulting in larger heads. Furthermore, the short-day length slows down reproductive transition that may have attributed to accumulation of carbohydrates and nutrients that directly enlarges the flower diameter. Moreover, moderate temperature (22-28 °C) during rainy season balances the metabolic processes of plant that ensures efficient nutrient allocation and also in addition prevents high respiration rate redirecting more energy of plant on petal expansion.

3.3. Effect of staggered planting on flower yield per plot (kg)

The data with respect to staggered planting on flower yield per plot is depicted in Table 3, the maximum yield per plot was recorded in T₃- first fortnight of October (62.63 kg), which was significantly superior over the other treatments, whereas the lowest yield was recorded in T₆- first fortnight of April (51.25 kg).

Table 3. Effect of staggered planting on flower yield per plot

Treatments	Flower yield kg plot-1
T ₁ First fortnight of June	58.60
T ₂ First fortnight of August	58.45
T ₃ First fortnight of October	62.63
T ₄ First fortnight of December	61.65
T ₅ First fortnight of February	55.34
T ₆ First fortnight of April	51.25
Range	62.63-51.25
Mean	57.98
S.E.m. (±)	0.19
C.D. @ 5 %	0.67

The present study indicated that, the highest yield was recorded in T₃- first fortnight of October followed by T₄- first fortnight of December and the lowest yield was recorded in T₆- first fortnight of April (51.25 kg). This could be due to low-mild temperature ranging from 22-28 °C that might have attributed to decelerate excessive vegetative growth and delaying the flower senescence gradually extending flower filling process in addition preventing any damage because of heat stress so flowers remained fresh and harvestable for longer duration. Furthermore, the optimum relative humidity (50-60%) during winter period reduced the cellular damage and yield loss by rotting ultimately enhancing the yield per plot. Moreover, the less photoperiod may have triggered the short-day behaviour of marigold resulting in early harvest leading to more number of pluckings ending in high yield per plot.

3.4. Effect of staggered planting on shelf life at ambient temperature (Days)

The data pertaining with effect of staggered planting on shelf life at ambient temperature is depicted in Table 4, revealed that the longest shelf life at ambient temperature was recorded in T₃- first fortnight of October (5.73 days) however, it was at par with T₄- first fortnight of December (5.60 days), whereas the shortest shelf life at ambient temperature was recorded in T₆- first fortnight of April (2.50 days).

Table 4. Effect of staggered planting on shelf life at ambient temperature

Treatments	Shelf life at ambient temperature (Days)
T ₁ First fortnight of June	3.85
T ₂ First fortnight of August	3.80
T ₃ First fortnight of October	5.73
T ₄ First fortnight of December	5.60
T ₅ First fortnight of February	2.65
T ₆ First fortnight of April	2.50
Range	5.73-2.50
Mean	4.02
S.E.m. (±)	0.08
C.D. @ 5 %	0.25

The present research indicated that, the longest shelf life at ambient temperature was recorded in T₃- first fortnight of October followed by T₄- first fortnight of December and the shortest shelf life at ambient temperature was recorded in T₆- first fortnight of April. This may be due to the lower temperature 18-24 °C found in the months of December and January that reduced the respiration rate of flowers preventing them to deteriorate quickly. Also, lower temperature tends to halt the moisture loss present within the flower heads resulting in longer shelf life at ambient temperature. Additionally, the short day photoperiodism make the plant to produce flower heads with thick petals that also reduce the moisture evaporation from flowers.

4. Conclusion

From the present investigation, it can be concluded that planting in *kharif* season *i.e.* first fortnight of June and August showed significant performance in parameter like flower diameter (mm) and planting in *rabi* season *i.e.* first fortnight of October and December showed promising performance in parameters like blooming period (Days), flower yield per plot (kg) and shelf life at ambient temperature (Days).

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