**EVALUATION OF FRENCH MARIGOLD (*Tagetes patula* L.) VARIETIES FOR GROWTH, POT PRESENTABILITY AND YIELD.**

**ABSTRACT**

The present investigation was carried out at College of Horticulture, Sri Konda Laxman Telangana Horticultural University, Rajendranagar, Hyderabad during rabi 2021-2022 and 2022-2023. The experiment was laid in completely randomized design with 5 treatments and 4 replications to study the performance of 5 different french marigold varieties on growth, pot presentability and yield. Pusa Arpita recorded maximum plant height (22.73, 37.95 and 48.92 cm), plant spread (E-W) (15.81, 22.10 and 27.48), plant spread (N-S) (14.83, 21.55 and 26.26 cm), number of branches (9.10, 12.73 and 17.60), number of leaves (25.45, 51.50 and 73.63), stem diameter (6.99, 8.04 and 9.32 mm), chlorophyll (SPAD) (65.90, 57.56 and 50.29) at 30, 60 and 90 DAT respectively. pot presentability score (92.28), yield per plant (60.30 g) and yield per pot (179.36 g) were recorded maximum in T5: Arka Pari.

**Keywords:**, *Tagetes patula* L., Varietieal evaluation, Pot presentability, growth, yield

**Introduction:**

Marigold (*Tagetes* spp.) is one of the most important loose flower crop, belongs to the family Asteraceae and is native to the Mexico. The genus *Tagetes* consist of more than 50 species, out of these, *Tagetes erecta* (African marigold), *Tagetes patula* (French marigold) are very common and popular for commercial cultivation, because of their wide adaptability, attractive color, size, shape, easy cultivation and good keeping quality. *Tagetes patula* is valued for its ornamental appeal and versatility in landscaping. French marigold is ideal for bedding, herbaceous borders, pots, hanging baskets, window boxes and rockery. This type of marigold grows well in pots and is also used for edging flower beds in a garden and mass planting in the field. Marigold cultivation is becoming popular among flower nurseries and it is also becoming one of the most valuable pot flowering crops as it is easy to cultivate with wider adaptability. It requires mild climate for proper growth. It flowers within short crop duration producing wide range of attractive shapes, colors, sizes and long shelf life. India's demand for potted plants has expanded due to rapid urbanization and changing lifestyles. Varietal characterization and identification of specific traits have great role in any crops for quality seed production and good management practices (Pramila *et al.* 2011).

**Materials and Methods:**

The present experiment was carried out at College of Horticulture, Rajendranagar, during rabi seasons of 2021-2022 and 2022-2023. The experiment was laid in completely randomized design with 5 treatments and 4 replications to study the performance of 5 different french marigold varieties. Sowing was done in first fortnight of October for first season and second fortnight of September in second season in protrays. Seeds were sown in protrays with a media containing cocopeat and vermicompost in 1:1 ratio. Black PVC pots were taken, the media was prepared with a ratio of soil: cocopeat: FYM in 1:1:1, then pots were filled with this media. Thirty days old healthy seedlings were selected and carefully transplanted in pots. Data was recorded in terms of growth, pot presentability and yield from the five randomly selected plants. These parameters, were statistically analyzed.

**Results and discussion**

**I) Growth parameters**

**a) Plant height (cm):**

The data for plant height was subjected to CRD and presented in table 1. Maximum pooled data for plant height was recorded in T2: Pusa Arpita (22.78, 37.95, and 48.92 cm) while minimum pooled data for plant height was observed in T4: CGFM-1 (15.75, 23.28, and 29.84 cm) at 30, 60 and 90 DAT respectively. The plant height plays a great role in flowering plants for pot cultivation. Kher (1989) stated that the plant height should be 1.5 to 2.5 times the pot height. The varieties were cultivated in 6 inch pot (15.24 cm) the ideal plant height range should be between 22.86 cm to 38.1 cm. Maynard and David (1987) proved that change in plant height could be caused by the expression of the dominant gene due to favorable environment in genotypes. The differences in plant height might be due to genes controlling cell division, cell elongation and may also depends on plant growth promoting hormones which controls height. Similar pattern of differences were observed by Khanvilkar *et al.* (2003), Rao *et al.* (2005), Ingle *et al.* (2011), Bhawna, (2019) Netam *et al.* (2019) Kumar *et al.* (2020), Thirumalmurugan *et al.* (2020), Gaurav and Basavaraj (2021), Nishitha, (2022) and Priya *et al.* (2022) in marigold and Rajiv Kumar (2014) in chrysanthemum.

**1. Performance of french marigold (*Tagetes patula* L.) varieties with respect to plant height (cm) at 30, 60, 90 DAT during *rabi* 2021-22 and 2022-23.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Plant height (cm)** | | | | | | | | | |
|  | **30 DAT** | | | **60 DAT** | | | **90 DAT** | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** |
| **T1**: Bidan Kali Gainda | 21.97 | 21.99 | 21.98 | 35.37 | 35.61 | 35.49 | 47.77 | 47.85 | 47.81 |
| **T2**: Pusa Arpita | 22.78 | 22.68 | 22.73 | 37.87 | 38.04 | 37.95 | 48.88 | 48.96 | 48.92 |
| **T3**: Pusa Deep | 21.38 | 21.18 | 21.28 | 33.21 | 33.74 | 33.47 | 46.08 | 46.00 | 46.04 |
| **T4**: CGFM-1 | 15.45 | 16.05 | 15.75 | 22.88 | 23.67 | 23.28 | 29.65 | 30.03 | 29.84 |
| **T5**: Arka Pari | 16.02 | 16.18 | 16.10 | 23.74 | 23.93 | 23.83 | 30.71 | 30.38 | 30.54 |
| **SEm±** | 0.65 | 0.59 | 0.45 | 0.76 | 0.58 | 0.43 | 0.69 | 0.71 | 0.5 |
| **CD (P=0.05)** | 1.97 | 1.78 | 1.34 | 2.3 | 1.77 | 1.32 | 2.07 | 2.14 | 1.57 |

**DAT**: Days after transplanting

**b) Plant spread (E-W) (cm)**

The data for plant spread (E-W) (cm) was subjected to CRD and presented in table 2. T2: Pusa Arpitha recorded the maximum pooled plant spread (E-W) (15.81, 22.10 and 27.48 cm) while T4: CGFM-1 showed the minimum plant spread (E-W) with (12.50, 17.37, and 23.02 cm) at 30, 60 and 90 DAT. The plant spread should be 1.5 to 2.5 times to the height of the pot. (Kher 1989). The spread should fall between 22.86 to 38.1 cm. Taller varieties exhibited greater plant spread than short varieties according to Poonam and Kumar (2007). Similar results were seen for genotypes that displayed highly significant variations in plant spread by Singh *et al.* (2003), Narsude *et al.* (2010), Raghuvanshi and Sharma (2011) and Choudhary *et al.* (2014), Bhawna, (2019), Netam *et al.* (2019) Srinivas and Rajashekhar (2020) in marigold.

**c) Plant spread (N-S) (cm)**

The data for plant Spread (N-S) (cm) was subjected to CRD and presented in table 3. T2: Pusa Arpitha recorded the maximum pooled plant spread (N-S) (14.83, 21.55 and 26.26 cm) while T4: CGFM-1 showed the minimum plant spread (N-S) with (11.98, 16.49, and 22.78 cm) at 30, 60 and 90 DAT. Poonam and Kumar (2007) reported that plant spread is more in taller varieties than shorter varieties in chrysanthemum and it might be also due to increased number of branches and variations in different variety-environmental interaction. Narsude *et al.* (2010), Raghuvanshi and Sharma (2011) and Choudhary *et al.* (2014) also observed similar variations in different varieties of marigold.

**d) Number of branches**

The data for the number of branches per plant was subjected to CRD and is presented in Table 4. T2: Pusa Arpitha recorded the maximum pooled number of branches (9.10, 12.73, and 17.60) at 30, 60, and 90 DAT, respectively, while T4: CGFM-1 showed the minimum number of branches with (6.00, 10.28, and 14.55) at the corresponding stages. Differences in number of branches in various genotypes might be attributed by the genetic constitution of the different varieties. The morphology of different plant genotypes depends on gene diversity. This findings are in accordance with Khanvilkar *et al.* (2003), Verma *et al.* (2004), Naik *et al.* (2005), Narsude *et al.*

**2. Performance of french marigold (*Tagetes patula* L.) varieties with respect to plant spread (E-W) (cm) at 30, 60, 90 DAT during *rabi* 2021-22 and 2022-23.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Plant spread (E-W) (cm)** | | | | | | | | | | |
|  | **30 DAT** | | | **60 DAT** | | | **90 DAT** | | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** |
| **T1**: Bidan Kali Gainda | 14.17 | 14.36 | 14.27 | 21.88 | 21.95 | 21.91 | 26.13 | 26.91 | 26.52 |
| **T2**: Pusa Arpita | 15.27 | 16.36 | 15.81 | 22.09 | 22.11 | 22.10 | 27.16 | 27.81 | 27.48 |
| **T3**: Pusa Deep | 13.57 | 13.88 | 13.73 | 20.08 | 20.13 | 20.10 | 25.03 | 26.50 | 25.77 |
| **T4**: CGFM-1 | 12.56 | 12.43 | 12.50 | 17.02 | 17.73 | 17.37 | 22.96 | 23.09 | 23.02 |
| **T5**: Arka Pari | 12.69 | 12.74 | 12.72 | 18.66 | 18.17 | 18.41 | 23.59 | 23.89 | 23.74 |
| **SEm±** | 0.37 | 0.45 | 0.29 | 0.62 | 0.52 | 0.37 | 0.58 | 0.55 | 0.42 |
| **CD (P=0.05)** | 1.11 | 1.35 | 0.89 | 1.88 | 1.56 | 1.12 | 1.75 | 1.66 | 1.29 |

**3. Performance of french marigold (*Tagetes patula* L.) varieties with respect to plant spread (N-S) (cm) at 30, 60, 90 DAT during *rabi* 2021-22 and 2022-23.**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Plant spread (N-S) (cm)** | | | | | | | | | | | |
|  | **30 DAT** | | | **60 DAT** | | | | **90 DAT** | | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | | **2022-23** | **Pooled** |
| **T1**: Bidan Kali Gainda | 13.21 | 13.54 | 13.37 | 20.84 | 21.35 | 21.09 | 24.05 | | 26.05 | 25.05 |
| **T2**: Pusa Arpita | 14.62 | 15.05 | 14.83 | 21.03 | 22.07 | 21.55 | 26.27 | | 26.25 | 26.26 |
| **T3**: Pusa Deep | 13.58 | 13.21 | 13.40 | 20.15 | 21.15 | 20.65 | 25.80 | | 25.99 | 25.89 |
| **T4**: CGFM-1 | 11.95 | 12.02 | 11.98 | 16.48 | 16.49 | 16.49 | 22.67 | | 22.90 | 22.78 |
| **T5**: Arka Pari | 12.32 | 12.74 | 12.53 | 17.49 | 16.93 | 17.21 | 23.13 | | 23.17 | 23.15 |
| **SEm±** | 0.42 | 0.44 | 0.29 | 0.49 | 0.51 | 0.28 | 0.59 | | 0.55 | 0.45 |
| **CD (P=0.05)** | 1.14 | 1.31 | 0.88 | 1.48 | 1.55 | 0.84 | 1.79 | | 1.66 | 1.36 |

**DAT**: Days after transplanting

**4. Performance of french marigold (*Tagetes patula* L.) varieties with respect to number of branches at 30, 60, 90 DAT during *rabi* 2021-22 and 2022-23.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Number of branches** | | | | | | | | | |
|  | **30 DAT** | | |  | | | **90 DAT** | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** |
| **T1**: Bidan Kali Gainda | 8.00 | 8.55 | 8.28 | 12.05 | 12.15 | 12.10 | 16.00 | 16.35 | 16.18 |
| **T2**: Pusa Arpita | 9.00 | 9.20 | 9.10 | 12.40 | 13.05 | 12.73 | 17.30 | 17.90 | 17.60 |
| **T3**: Pusa Deep | 7.94 | 7.65 | 7.79 | 11.45 | 11.70 | 11.58 | 15.65 | 15.95 | 15.80 |
| **T4**: CGFM-1 | 5.85 | 6.15 | 6.00 | 10.00 | 10.55 | 10.28 | 14.45 | 14.65 | 14.55 |
| **T5**: Arka Pari | 5.95 | 6.20 | 6.08 | 10.45 | 10.95 | 10.70 | 14.95 | 15.00 | 14.98 |
| **SEm±** | 0.47 | 0.59 | 0.39 | 0.26 | 0.39 | 0.22 | 0.42 | 0.53 | 0.32 |
| **CD (P=0.05)** | 1.42 | 1.79 | 1.18 | 0.79 | 1.19 | 0.68 | 1.27 | 1.61 | 0.98 |

**5. Performance of french marigold (*Tagetes patula* L.) varieties with respect to number of leaves at 30, 60, 90 DAT during *rabi* 2021-22 and 2022-23.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Number of leaves** | | | | | | | | | | |
|  | **30 DAT** | | | **60 DAT** | | | **90 DAT** | | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** |
| **T1**: Bidan Kali Gainda | 23.95 | 24.25 | 24.10 | 47.90 | 48.00 | 47.95 | 70.00 | 70.90 | 70.45 |
| **T2**: Pusa Arpita | 25.40 | 25.50 | 25.45 | 51.15 | 51.85 | 51.50 | 73.30 | 73.95 | 73.63 |
| **T3**: Pusa Deep | 21.65 | 22.01 | 21.83 | 44.70 | 44.20 | 44.45 | 67.65 | 67.70 | 67.68 |
| **T4**: CGFM-1 | 18.95 | 19.55 | 19.25 | 41.10 | 41.95 | 41.53 | 63.80 | 64.05 | 63.93 |
| **T5**: Arka Pari | 19.76 | 20.00 | 19.88 | 41.85 | 42.00 | 41.93 | 64.30 | 64.70 | 64.50 |
| **SEm±** | 0.61 | 0.67 | 0.55 | 0.56 | 0.76 | 0.48 | 0.89 | 0.67 | 0.64 |
| **CD (P=0.05)** | 1.84 | 2.02 | 1.67 | 1.70 | 2.29 | 1.46 | 2.69 | 2.03 | 1.93 |

**DAT**: Days after transplanting

(2010), Singh and Singh (2010) Raghuvanshi and Sharma (2011) and Choudhary *et al.* (2014), Bhawna, (2019), Netam *et al.* (2019), Thirumalmurugan *et al.* (2020), Nishitha, (2022) in marigold and Munikrishnappa *et al.* (2013) in China aster.

**e) Number of leaves**

The data for number of leaves were subjected to CRD and presented in table 5. Pooled data on number of leaves were recorded maximum in T2: Pusa Arpitha with (25.45, 51.50, and 73.63) at 30, 60, and 90 DAT respectively, while minimum were recorded in T4: CGFM‑1 with (19.25, 41.53, and 63.93) leaves at the same stages. Different varieties grow at different rates, which may be related to their genetic composition. The variation in the number of leaves per plant is due to the variation in the rate of vegetative growth among the varieties that could be attributed to their genetic makeup and also due to the photoperiods which prevailed during the field experiment in marigold (Rao *et al.* 2005) the production of more branches per plant may be the cause of the increased number of leaves (Verma *et al.* 2004) in marigold. Previously Singh and Misra (2008), Raghuvanshi and Sharma (2011), Bhawna, (2019), Netam *et al.* (2019) in marigold, Zosiamliana *et al.* (2013) in china aster noted a similar variation in the number of leaves per plant.

**f) Stem diameter (mm)**

The data for stem diameter was subjected to CRD and presented in table 6. Pooled data on stem diameter was recorded maximum in T2: Pusa Arpita (25.45, 51.50, and 73.63 mm), while minimum was recorded in T4: CGFM‑1 (4.54, 5.74, and 6.90 mm) at 30, 60, and 90 DAT respectively. The variations in genotype stem diameter may have its origins in the genetic sequence of the plant. According to Kanamadi and Patil (1993) the expression of the dominant gene in a congenial environment for chrysanthemum cultivars may be the cause for the increase in plant stem diameter. The variation in stem girth was also reported in Verma *et al.* (2004), Narsude *et al.* (2010), Mahantesh *et al.* (2018) and Priya *et al.* (2022) in marigold.

**g) Chlorophyll (SPAD)**

The data for chlorophyll was subjected to CRD and presented in table 7. Pooled data on chlorophyll was recorded maximum in T2: Pusa Arpita (65.90, 57.56, and 50.29), while minimum was recorded in T4: CGFM‑1 (60.49, 47.92, and 38.29) at 30, 60, and 90 DAT respectively.

**6. Performance of french marigold (*Tagetes patula* L.) varieties with respect to stem diameter (mm) at 30, 60, 90 DAT during *rabi* 2021-22 and 2022-23.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Stem diameter (mm)** | | | | | | | | | |
|  | **30 DAT** | | | **60 DAT** | | | **90 DAT** | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** |
| **T1**: Bidan Kali Gainda | 6.17 | 6.33 | 6.25 | 7.31 | 7.35 | 7.33 | 8.29 | 8.35 | 8.32 |
| **T2**: Pusa Arpita | 6.97 | 7.01 | 6.99 | 8.00 | 8.08 | 8.04 | 9.20 | 9.44 | 9.32 |
| **T3**: Pusa Deep | 6.02 | 6.00 | 6.01 | 6.76 | 6.94 | 6.85 | 7.99 | 8.08 | 8.03 |
| **T4**: CGFM-1 | 4.49 | 4.60 | 4.54 | 5.47 | 6.01 | 5.74 | 6.81 | 6.99 | 6.90 |
| **T5**: Arka Pari | 4.99 | 5.01 | 5.00 | 6.24 | 6.33 | 6.28 | 7.22 | 7.51 | 7.36 |
| **SEm±** | 0.23 | 0.28 | 0.19 | 0.28 | 0.25 | 0.22 | 0.35 | 0.35 | 0.32 |
| **CD (P=0.05)** | 0.70 | 0.83 | 0.58 | 0.85 | 0.76 | 0.67 | 1.06 | 1.04 | 0.97 |

**7. Performance of french marigold (*Tagetes patula* L.) varieties with respect to** **chlorophyll (SPAD) at 30, 60, 90 DAT during *rabi* 2021-22 and 2022-23.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Chlorophyll (SPAD)** | | | | | | | | | |
|  | **30 DAT** | | | **60 DAT** | | | **90 DAT** | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** |
| **T1**: Bidan Kali Gainda | 63.93 | 64.32 | 64.13 | 55.74 | 56.22 | 55.98 | 48.12 | 48.38 | 48.25 |
| **T2**: Pusa Arpita | 65.53 | 66.27 | 65.90 | 57.44 | 57.68 | 57.56 | 49.76 | 50.82 | 50.29 |
| **T3**: Pusa Deep | 63.79 | 63.29 | 63.54 | 52.41 | 53.48 | 52.94 | 46.47 | 46.01 | 46.24 |
| **T4**: CGFM-1 | 60.06 | 60.91 | 60.49 | 47.78 | 48.07 | 47.92 | 38.09 | 38.50 | 38.29 |
| **T5**: Arka Pari | 60.83 | 61.77 | 61.30 | 48.08 | 49.46 | 48.77 | 39.15 | 38.71 | 38.93 |
| **SEm±** | 0.49 | 0.60 | 0.26 | 0.46 | 0.67 | 0.41 | 0.36 | 0.67 | 0.42 |
| **CD (P=0.05)** | 1.48 | 1.81 | 0.79 | 1.40 | 2.03 | 1.24 | 1.09 | 2.03 | 1.27 |

**DAT**: Days after transplanting

Differential traits of the varieties, environmental factors, and other management factors may be the cause of the variation in chlorophyll pigment. variation in the leaf's total chlorophyll content caused by variations in the genetic composition or constitution of the varieties. Similar findings were observed by Panwar *et al.* (2013).

**II) Pot presentability score**

From the table 8. it was found that the pooled data on pot presentability score was recorded maximum in T5: Arka Pari (92.28) which was at par with T4: CGFM-1 (91.85) followed by T3: Pusa Deep (81.23), T1: Bidan Kali Gainda (79.60) and minimum pot presentability score was recorded in T2: Pusa Arpita (45.70). Plants show extensive and complex variations in stature and form. Plant height and spread should be 1.5 to 2.5 times to the pot height for good pot presentability score (Kher 1989). The pot presentability score differs with different varieties. It depends on plant form and shape, number of flowers, flower diameter etc., differences in these scores for different genotypes were also recorded by Archana *et al.* (2019) in chrysanthemum and Dilta *et al.* (2019) in azaleas.

**8.** **Performance of french marigold (*Tagetes patula* L.) varieties with respect to pot presentability score during *rabi* 2021-22 and 2022-23**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pot presentability score** | | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** |
| **T1**: Bidan Kali Gainda | 79.45 | 79.75 | 79.60 |
| **T2**: Pusa Arpita | 76.80 | 77.20 | 77.00 |
| **T3**: Pusa Deep | 80.85 | 81.60 | 81.23 |
| **T4**: CGFM-1 | 91.75 | 91.95 | 91.85 |
| **T5**: Arka Pari | 92.25 | 92.30 | 92.28 |
| **SEm±** | 0.57 | 0.64 | 0.47 |
| **CD (P=0.05)** | 1.70 | 1.94 | 1.42 |

**III) Flower yield**

**a) Yield per plant**

From the table 9. it was found that the pooled data on yield per plant was recorded maximum in T5: Arka Pari (60.30 g) which was at par with T4: CGFM-1 (59.35 g) followed by T3: Pusa Deep (57.97 g), T1: Bidan Kali Gainda (42.72 g) and minimum yield per plant was recorded in T2: Pusa Arpita (41.74 g). The most crucial factors in determining the appropriateness and versatility of flower varieties are yield and yield-related characteristics. Flower yield exhibited highly positive correlation with number of flowers per plant, with the increase in number of flowers per plant, the yield per plant too increases (Mahantesh *et al.* 2016). Different varieties have different growth regulating mechanisms, contrary to vegetative growth, in some genotypes the cell division and multiplication might be very high in reproductive phases due to the higher absorption of nutrients and metabolisms in flowering. Differences in yield in different genotypes were also reported by Shivakumar *et al.* (2015), Gulia *et al.* (2017), Gaurav and Basavaraj (2021) in marigold, Poornima *et al.* (2006) and Munikrishnappa *et al.* (2013) in china aster.

**b) Yield per pot**

From the table 9. it was found that the pooled yield per pot was recorded maximum in T5: Arka Pari (179.36 g) which was at par with T4: CGFM-1 (178.31g) followed by T3: Pusa Deep (171.89 g), T1: Bidan Kali Gainda (137.17 g) and minimum yield per pot was recorded in T2: Pusa Arpita (124.77 g). Yield is a poly-genetically controlled quantitative character and highly influenced by the environment in french marigold. French marigold cultivars differed in flower yield may be due to inherent capacity of genotypes and influencing factors such as number of flowers per plant (Priya *et al.* 2022). Analogous results were also recorded by Deepa *et al.* (2016), Poornachandragowda *et al.* (2016) and Gaurav and Basavaraj (2021) in marigold.

**9. Performance of french marigold (*Tagetes patula* L.) varieties with respect to yield per plant (g) and yield per pot (g) during *rabi* 2021-22 and 2022-23.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Yield per plant (g)** | | | **Yield per pot (g)** | | |
| **Treatments** | **2021-22** | **2022-23** | **Pooled** | **2021-22** | **2022-23** | **Pooled** |
| **T1**: Bidan KaliGainda | 42.26 | 43.19 | 42.72 | 136.58 | 137.77 | 137.17 |
| **T2**: Pusa Arpita | 41.46 | 42.02 | 41.74 | 124.29 | 125.26 | 124.77 |
| **T3**: Pusa Deep | 57.56 | 58.38 | 57.97 | 171.5 | 172.28 | 171.89 |
| **T4**: CGFM-1 | 58.80 | 59.91 | 59.35 | 177.79 | 178.84 | 178.31 |
| **T5**: Arka Pari | 59.96 | 60.64 | 60.30 | 178.97 | 179.76 | 179.36 |
| **SEm±** | 0.68 | 0.67 | 0.47 | 0.89 | 0.92 | 0.74 |
| **CD (P=0.05)** | 2.05 | 2.02 | 1.42 | 2.67 | 2.77 | 2.24 |

**References**

Archana, D, Prasanth, P. Natarajan, S. and Veena, J. 2019. Pot Presentability of different Chrysanthemum Cultivars for Pot Mums based on Vegetative Attributes. *Int.J.Curr.Microbiol.App.Sci.* 8(12): 3020-3023. doi: https://doi.org/10.20546/ijcmas.2019.812.351

Bhawna, B. 2019. Evaluation of African marigold (Tagetes erecta L.) varieties for flower yield and quality under tarai conditions of Uttarakhand. M.Sc thesis. G. B. Pant university of agriculture and technology, Pant nagar, Uttarakhand.

Choudhary, M, Beniwal, B. S. and Kumari, A. 2014. Evaluation of marigold genotypes under semi-arid conditions of Haryana. *Annals of Horticulture*. 7(1): 30-35.

Deepa, V. P, Patil, V. S, Venugopal, C. K, Biradar, M. S. and Sridhar, K. 2016. Study on the growth and yield attributes of marigold *Tagetes* spp. hybrids under Dharwad condition. *HortFlora Research Spectrum.* 5(1), pp.43-47.

Dilta, B. S. Suman, T, Gupta, Y, C, Sharma, B, P, Narender. N. And Sapna. K. 2019. Growth, flowering and presentability of potted azaleas as influenced by pot size and cultivars. *Indian Journal of Agricultural Sciences.* 89 (2): 199–205.

Gaurav, S. and Basavaraj, J. 2021. Comparative analysis and agro-morphological evaluation of French marigold genotypes (*Tagetes patula* L.) *The Pharma Innovation Journal* 10(5): 1558-1560.

Gulia, R, Beniwal, B. S, Sheoran, S. and Sandooja, J. K. 2017. Evaluation of marigold genotypes for growth, flowering, yield and essential oil content. *Research on Crops*. 18(2): 299-304

Ingle, A. J, Kulkarni, B. S, Reddy, B. S, Jagdeesha, R. C. and Patil, K. V. 2011. Evaluation of African marigold (*Tagetes erecta* L.) genotypes for growth, yield and quality parameters. *Research Journal of Agricultural Sciences*, 2(3): 468-472.

Khanvilkar, M. H, Kokate, K. D. and Mahalle, S. S. 2003. Performance of African marigold (*Tagetes erecta*) in North Konkan Coastal Zone of Maharashtra. *Journal of Maharashtra Agricultural University,* 28(3): 333-334.72

Khanvilkar, M. H, Kokate, K. D. and Mahalle, S. S. 2003. Performance of African marigold (*Tagetes erecta*) in North Konkan Coastal Zone of Maharashtra. *Journal of Maharashtra Agricultural University,* 28(3): 333-334.72

Kumar, V, Singh, R. S, Pal, M, Ojha, M. D, Singh, A. P, Verma, R. K. and Singh, P. K. 2020. Varietal performance of marigold (*Tagetes* spp.) under sub-tropical condition of Bihar. *Journal of Pharmacognosy and Phytochemistry.* 9: 922-924.

Mahantesh, K. K, Prakashan, P. Chandrashekhar, P, Saidaiah, P, Siddapa. and Umesh, B. C. 2018. Evaluation of different African marigold (*Tagetus erecta* ) genotypes for vegetative, floral and yield attributes under southern telangana conditions. *International Journal of Chemical Studies* 6 (5):3311-3315.

Munikrishanppa, P. M, Patil, A. A, Patil, V. S, Patil, B. N, Channappagoudar, B. B. and Alloli, T. B. 2013. Studies on growth and yield parameters of different genotypes of China aster (*Callistephus chinensis* Ness.). *Karnataka Journal of Agricultural science*. 26 (1): 107-110.

Naik, B. H, Patil, A. A. and Basavaraj, N. 2005 Correlation studies in French marigold (Tagetes patula L.). *South Indian Horticulture* 53 (1-6):150-156.

Narsude, P. B, Kadam, A. S. and Patil, V. K. 2010. Studies on growth and yield attributes of different African marigold (*Tagetes erecta* L.) genotypes under Marathwada condition. *The Asian Journal of Horticulture.* 5 (2): 284-286.

Narsude, P. B, Kadam, A. S. and Patil, V. K. 2010. Studies on growth and yield attributes of different African marigold (*Tagetes erecta* L.) genotypes under Marathwada condition. *The Asian Journal of Horticulture.* 5 (2): 284-286.

Netam, M. and Abhilash Shukla, G. S. (2019). The growth performance of marigold (*Tagetes erecta* L.) Under Chhattisgarh plains agro-climatic condition. *Journal of Pharmacognosy and Phytochemistry*. SP2: 235-237.

Panwar, S, Singh, K. P, Janakiram, T. and Namita 2013. Genetic variability, heritability and genetic advance in African marigold (*Tagetes erecta* L.) genotypes*. Progressive Horticulture.* 45 : 135-40.

Poornachandragowda, G, Jayanthi, R. and Mahantesh, J. 2016. Evaluation of African marigold (*Tagetes erecta* L.) genotypes for growth, yield and xanthophyll content. *Environment and Ecology*. 34(2A):807-810.

Poornima, G, Kumar, D. P. and Seetharamu, G. K. 2006. Evaluation of China aster (*Callistephus chinensi*s Nees.) genotypes under hill zone of Karnataka. *Journal of Ornamental Horticuture*. 9 (3):208-211.

Pramila, C. K, Prasanna, K. R. and Jayanthi, R. 2011. Assessment of marigold (Tagetes erecta L.) genotypes for morphological characters. Mysore J Agric Sci, 45(3), 544-550.

Priya, B, Bhagat, V. V. and Kulkarni, B. S. 2022. Evaluation of different French marigold (*Tagetes patula* L.) genotypes. *The Pharma Innovation Journal* 11(2): 2755-2759

Raghuvanshi, A. and Sharma, B. P. (2011). Varietal evaluation of French marigold (*Tagetes patula* Ninn.) under mid-hill zone of Himachal Pradesh. *Progressive Agriculture*. 11(1): 123- 126.

Rajivkumar. 2014. Evaluation of chrysathemum genotypes for flowering traits under open grown condition. *HortFlora Research Spectrum*, 3(4): 388-389.

Rao, C. C, Goud, P. V, Reddy, K. M. and Padmaja, G. 2005. Screening of African marigold (*Tagetes erecta* L.) cultivars for flower yield and carotenoid pigments. *Indian Journal of Horticulture.* 62(3): 276-279.

Shivakumar, V. S, Nataraj, S. K, Shivayya, K. M. and Ketana, G. B. 2015. Screening of marigold (Tagetes erecta L.) genotypes for growth and yield under hill zone of Karnataka. *Research Journal Agriculture Sciences*. 6(3):648-650.

Singh, D. and Misra, K.K. 2008. Genetic variability in quantitative characters of marigold. *Indian Journal of Horticulture.* 65(2): 187-192

Singh, A. K. and Singh, D. 2010. Genetic variability, heritability and genetic advance in marigold. *Indian Journal of Horticulture.*67: 132-136.

Singh, D, Sen, N. L. and Sindhu, S. S. 2003. Evaluation of marigold germplasm under semi-arid conditions of Rajasthan. *Haryana Journal of Horticultural Sciences*. 32 (3/4): 206-209.

Srinivas, P. T. and Rajashekhar, T. 2020.Evaluation of marigold genotypes under tropical conditions of Tirupati*. International Archive of Applied Sciences and Technology*. 11(2): 85-89.

Thirumalmurugan, V. K, Manivannan. and Nanthakumar, S. 2020. Genotypic evaluation of african marigold (*Tagetes erecta* L.) for flower yield and xanthophyll content under vellore conditions. *Plant Archives.* 20: 3902-3904

Verma, S. K, Singh, R. K, and Arya, R. R. 2004. Evaluation of *Tagetes* germplasm. *Scientific Horticulture,* 9:219-224.