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INFLUENCE OF CAMEL DUNG AND ORGANIC WASTE COMPOST ON PLANT GROWTH AND FLOWER YIELD IN PINCHED SEEDLING PLANTS OF AFRICAN MARIGOLD (*TAGETES ERECTA* L.) CV. PUSA NARANGI GAINDA

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ABSTRACT

The present experiment was conducted to determine the effect of different doses of Camel Dung and organic waste compost on plant growth and flower yield in pinched seedling plants of African marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gainda. Nine treatments were included, consisting of Camel Dung 1 t/h, Camel Dung 1.5 t/h and Camel Dung 2 t/h along with organic waste compost, such as Bamboo Leaves Compost at rates of 1.5 t/h, 2.0 t/h and 2.5 t/h; Spent Mushroom Compost at rates of 1.5 t/h, 2.0 t/h and 2.5 t/h and Spent Rice Husk Compost at rates of 1.5 t/h, 2.0 t/h and 2.5 t/h, under a randomized block design. The various treatments significantly enhanced plant height, number of branches per plant, leaf area, plant spread, stem diameter, stalk length, diameter of the flower, total number of flowers per plant, weight of flowers, flower yield per plant, flower yield per plot and flower yield and minimum number of days required for the first flower bud emergence. The results revealed that treatment T_3 (Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h) had a significant impact on growth, floral characteristics and yield. It resulted in the maximum plant height (70.94cm), number of branches per plant (24.49), leaf area (1458.64 cm^2), plant spread (45.17cm), stem diameter (1.88cm), stalk length (8.58cm), diameter of the flower (7.52cm), total number of flowers per plant (46.57), weight of flowers (10.52g), flower yield per plant (489.91g), flower yield per plot (3807.12kg) and flower yield (38.09t/ha) demonstrated the shortest duration for bud initiation at 31.97days. Treatment T_3 (Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h) was identified as the most effective treatment for promoting both vegetative and reproductive growth in pinched seedling plants of African marigold.

***Key words*:** Marigold, Camel dung, Organic waste compost, Pinched seedling.

Introduction

Floriculture is the aesthetic aspect of horticulture, involving the cultivation of plants for ornamental purposes. Flowers symbolize purity, beauty, peace, love and passion, while also providing fresh air and fragrance. Flowers are a beautiful creation of God. The aesthetic value of flowers is evident in ancient literature and scriptures, initially not holding significant economic importance. However, over time, there have been drastic changes in people's lifestyles, leading to the commercialized cultivation of flowers. The cultivation of flowers in India has been a time-honored and traditional activity, primarily for religious purposes, the perfume industry and landscaping. Now, it is on the verge of a transformation due to an increase in demand, innovative technology, policy changes, environmental factors and most importantly, a growing awareness and demand for high-quality flowers (Singh *et al.*, 2001).

The area under floriculture production in India is approximately 249 thousand hectares, yielding a production of 1659 thousand tonnes of loose flowers and 484 thousand tonnes of cut flowers. Floriculture is now commercially cultivated in several states, with Tamil Nadu (20%), Karnataka (13.5%) and West Bengal (12.2%)

leading in production compared to other states like Madhya Pradesh, Mizoram, Gujarat, Andhra Pradesh, Odisha, Jharkhand, Haryana, Assam and Chhattisgarh. India's total export of floriculture was Rs. 571.38 crores (approximately $81.94 million) in 2018-19. The major importing countries were the United States, the Netherlands, the United Kingdom, Germany and the United Arab Emirates. There are over 300 export-oriented units in India. More than 50% of the floriculture units are based in Karnataka, Andhra Pradesh and Tamil Nadu. With technical collaborations from foreign companies, the Indian floriculture industry is poised to increase its share in world trade (NHB, 2019).

African marigold (*Tagetes erecta* L.) is widely cultivated as bedding plants, loose flowers, perfume, natural coloring agents, pigments, carotenoids, insect and nematode repellents and nutrient supplements for poultry feed. The marigold plant's habit of profuse flowering, short duration to produce marketable flowers, wide spectrum of attractive colors, shapes and sizes, as well as good keeping quality, has attracted the attention of producers and traders Ghosh *et al.,* (2022). Marigold also possesses anthelmintic, analgesic, anti-inflammatory, aromatic, bronchodilatory, digestive, diuretic, emmenagogue, sedative and stomatonic properties. African Marigolds are tall, erect-growing plants that can reach up to three feet in height. The flowers are globe-shaped and large, measuring up to 5 inches across. African marigold is an excellent choice for bedding plants. These flowers range in color from yellow to orange and do not include red-colored marigolds.

In the case of pinching, the terminal portion of shoots is removed early, resulting in the earlier emergence of side branches and a higher number of flowers of good quality and uniform size. In recent years, a number of plant growth retardants have been used in the field of agriculture to induce more desirable plant characteristics, such as compact growth, dwarfness, an increased number of healthy branches and a higher number of quality flowers (Rathi *et al*., 2005). These traits are highly desired in the modern floriculture industry. The effect of pinching, both manually and chemically, was studied to determine its impact on improving the production of compact dwarf African marigold var. Pusa Narangi Gainda.

Materials and Methods

A field experiment titled "Influence of Different Doses of Camel Dung and Organic Waste Compost on Plant Growth and Flower Yield in Pinched Seedling Plants of African Marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gainda" was conducted at the Horticultural Experimental Field, Department of Horticulture, SHUATS, Prayagraj (U.P.) India. The experiment comprised nine treatments, including Camel Dung 1 t/h, Camel Dung 1.5 t/h and Camel Dung 2 t/h along with organic waste compost, such as Bamboo Leaves Compost at rates of 1.5 t/h, 2.0 t/h and 2.5 t/h; Spent Mushroom Compost at rates of 1.5 t/h, 2.0 t/h and 2.5 t/h and Spent Rice Husk Compost at rates of 1.5 t/h, 2.0 t/h and 2.5 t/h. The experiment followed a randomized block design. The various treatments significantly enhanced plant height, number of branches per plant, leaf area, plant spread, stem diameter, number of days required for first flower bud emergence, stalk length, diameter of flower, total number of flowers per plant, weight of flowers, flower yield per plant, flower yield per plot and overall flower yield. Seeds of the African marigold cultivar 'Pusa Narangi Gainda' were obtained from the Department of Horticulture, SHUATS, Prayagraj (U.P.) India. The seeds were sown on raise bed the nursery with dimensions of 1.0 × 15 m. Standard cultural operations such as watering, weeding and pinching (30 days after sowing) were carried out. The experimental plot was plowed one month before planting the seedlings. Subsequently, three harrowings were performed to prepare the land to a fine tilth. Finally, the field was leveled using a spade and the experiment was set up according to the specified plot size. The experimental area was arranged in flat beds measuring 3 × 2 m. Well-decomposed camel dung, organic waste compost (including bamboo leaves, spent mushroom compost and spent rice husk compost), were applied two days prior to transplanting the seedlings, following the prescribed treatment combinations. The application was thoroughly mixed into the soil. Irrigation was applied to the plots two days before transplanting the seedlings, ensuring the soil was adequately moist for the transplanting process. Marigold seedlings were transplanted with a spacing of 45×45 cm in the main field when they reached the 3-5 true leaf stage (55 days). During transplanting, the soil was firmly pressed around the seedlings to prevent any disturbance from irrigation water immediately after transplanting. Gap filling was done whenever required during the first two weeks after transplanting. The plots were kept free of weeds throughout the growth period by weeding at regular intervals. The first weeding was done after 30 days of planting and then as required. Immediately after transplanting, a light irrigation was performed and subsequent irrigation was carried out depending upon the moisture requirement of the soil. The total number of irrigations during the entire growth period is mentioned in the table of cost of cultivation. Initially, the plants showed signs of dryness and red termites were observed in the soil. To eliminate termites from the field, Chlorpyrifos

Table 1: Impact of Camel Dung and organic waste compost on growth and floral characters on pinched seedling plants of African marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gainda.

Treatment No.	Growth parameters on pinched seedling plants of African marigold (Mean)					
	PH	NBPP	LA	PS	SD	FFBE
T_1 - Camel Dung 2 t/h + Bamboo leaves Compost @ 1.5t/h	63.21	19.42	1324.01	42.36	1.78	37.25
T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h	68.37	21.13	1387.32	43.09	1.81	34.51
T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h	70.94	24.49	1458.64	45.17	1.88	31.97
T_4 - Camel Dung 1.5 t/h + Spent Mushroom Compost @ 1.5t/h	57.82	13.27	1228.43	41.04	1.72	50.29
T_5 - Camel Dung 1.5 t/h + Spent Mushroom Compost @ 2.0t/h	59.39	15.66	1251.78	41.92	1.74	48.12
T_6 - Camel Dung 1.5 t/h + Spent Mushroom Compost @ 2.5t/h	61.77	17.78	1299.02	42.28	1.76	46.33
T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h	50.14	9.85	1103.73	39.99	1.70	54.08
T_8 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 2.0t/h	52.29	11.52	1155.28	40.89	1.71	52.36
T_9 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 2.5t/h	53.76	13.91	1190.13	41.46	1.72	51.72
F - test	S	S	S	S	S	S
S. Ed. (±)	0.21	0.23	0.59	0.31	0.02	0.71
C. D. (P = 0.05)	0.44	0.47	1.21	0.66	0.06	1.52

PH: Plant height (cm); **NBPP:** Number of branches per plant; **LA:** Leaf area (cm^2); **PS:** Plant spread (cm); **SD:** Stem diameter (cm); **FFBE:** Number of days required for first flower bud emergence

was applied at 0.2% of the recommended dose three times. There was a mild attack of Alternaria leaf spot. This disease was controlled by spraying Dithane M-45 at 0.2% at 15-day intervals during the experimentation period.Top of Form

Result and Discussion

The experimental findings of the present investigation focus on the Influence of different doses of Camel Dung and organic waste compost on plant growth and flower yield of pinched seedling plants of African marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gainda. An endeavor has been made to elucidate the influence of Camel Dung and their combinations on growth and flower yield. The results of the trial are presented separately under the following headings.

Plant height (cm)

The plant height affected by different levels of Camel Dung is presented in Table 1. The maximum plant height (70.94cm) was observed in treatment T_3 (Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h), followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h (68.37cm). The minimum plant height (50.14 cm) was recorded in the treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h. It is evident from the above results that plant height was significantly influenced by Camel Dung and organic waste compost levels. Treatment T_3 (Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h) exhibited the best growth at all stages, followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h. This suggests that the optimal combination of Camel Dung and Bamboo Leaves Compost in these treatments contributed to the enhanced plant growth. Similar results were reported by Nagaich *et al.*, (2003) for Marigold and Acharya and Dashora (2004) for Gladiolus. Dubey (2005) observed similar results for Gladiolus, and Das and Mishra (2005), Bhat *et al.*, (2010) for Marigold in their respective experiments.

Number of branches per plant

The recorded data regarding the number of branches per plant affected by varying levels of Camel Dung is presented in Table 1. The treatment (T_3) with a combination of Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h exhibited the highest number of branches per plant (24.49), followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h (21.13). On the other hand, the treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h showed the lowest number of branches per plant (9.85). These results make it evident that the number of branches per plant is significantly influenced by the levels of Camel Dung and organic waste compost. Among the treatments, T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h displayed superior growth across all stages, closely followed by T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h. This can be attributed to the effective combination of Camel Dung in these treatments, providing an optimal dosage to the plants. The findings align with previous studies by Kumar *et al.*, (2003), Nagaich *et al.*, (2003) in Marigold, Acharya and Dashora (2004) in Marigold, Das and Mishra (2005) in Marigold and Ahmad *et al.*, (2010) in Marigold, all of which reported similar results in their respective experiments.

Leaf area (cm^2)

The leaf area (measured in cm^2) impacted by varying levels of Camel Dung and organic waste compost are presented in Table 1. The highest leaf area (1458.64cm^2) was recorded in treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h, followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h (1387.32cm^2). Conversely, the lowest leaf area (1103.73cm^2) was observed in treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h. These results affirm that leaf area (measured in cm^2) was significantly influenced by the presence of Camel Dung and organic waste compost. Treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h exhibited superior growth throughout all stages, closely followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h. This enhanced growth is likely attributed to the well-calibrated combination of Camel Dung elements and organic waste compost provided to the plants. Consistent findings were reported by previous studies. Nagaich *et al.,* (2003) observed similar results in Marigold, while Dubey (2005) noted comparable effects in Gladiolus. Likewise, Javed *et al.,* (2005) reported similar outcomes in Zinnia and Ahamd *et al.,* (2010) found analogous results in their experiments with Marigold.

Plant spread (cm)

The recorded Plant spread (cm) influenced by varying Camel Dung and organic waste compost levels are presented in Table 1. The highest Plant spread (45.17cm) was observed in treatment (T_3) featuring Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h. Following closely was treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, displaying a Plant spread of 43.09cm. Conversely, the treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h exhibited the lowest Plant spread (39.99cm). The results clearly indicate that Camel Dung and organic waste compost significantly impact the Plant spread (cm). Among the treatments, T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h demonstrated superior growth throughout all stages. T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h also displayed notable growth. This can be attributed to the well-calibrated treatment combinations ensuring optimal Camel Dung doses with organic waste compost supplied to the plants. Similar results were supported by the findings of Sharma *et al.,* (2017). Ganesh and Jawaharlal (2019) in marigold.

Stem diameter (cm)

The impact of different levels of Camel Dung on stem diameter (cm) is presented in Table 1. The highest stem diameter (1.88cm) was observed in treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h were applied. Following closely was treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, resulting in a stem diameter of 1.81cm. In contrast, the lowest stem diameter (1.70 cm) was recorded in treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h. These findings clearly demonstrate the significant influence of Camel Dung and organic waste compost levels on stem diameter (cm). Treatment (T_3) characterized by the optimal combination of Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h, consistently exhibited superior growth across all stages. Treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, also displayed commendable results. This is likely attributed to the well-balanced treatment, ensuring the plants received an ideal Camel Dung doses with organic waste compost for their growth. These results are substantiated with Sangwan *et al.,* (2010) in marigold and Airadevi (2014) in garland chrysanthemum.

Number of days required for first flower bud emergence from transplanting

The duration taken for the initial flower bud to emerge was documented to be influenced by varying levels of Camel Dung, as outlined in Table 1. The treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h demonstrated the shortest duration for bud initiation at 31.97days, followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h at 34.51days. In contrast, the treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h exhibited the longest duration for bud initiation at 54.08 days. The results emphasize the notable impact of Camel Dung and organic waste compost levels on the initiation of bud formation. Specifically, the treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h displayed the most efficient bud initiation, followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h. This indicates that providing an optimal dosage of Camel Dung and organic waste compost levels to the plants through effective treatment combinations significantly influences bud initiation duration. Conversely, the treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h exhibited the lengthiest duration for bud initiation. This delay is attributed to the limited vegetative growth due to the absence of lower amount of nitrogen, resulting in delayed bud initiation. These findings align with those of Ahamd *et al.* (2010) in their study on Marigold, further supporting the observed patterns.

Table 2: Impact of Camel Dung and organic waste compost on yield parameters on pinched seedling plants of African marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gainda.

Treatment No.	Growth parameters on pinched seedling plants of African marigold (Mean)						
	FSL	DF	TNFPP	FWF	FYPP	FYP	FY
T_1 - Camel Dung 2 t/h + Bamboo leaves Compost @ 1.5t/h	8.19	7.21	34.95	9.66	337.61	2966.13	29.66
T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h	8.45	7.46	39.42	9.91	390.65	3267.27	32.72
T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h	8.58	7.52	46.57	10.52	489.91	3807.12	38.09
T_4 - Camel Dung 1.5 t/h + Spent Mushroom Compost @ 1.5t/h	7.08	6.19	28.04	9.47	265.53	2438.37	24.38
T_5 - Camel Dung 1.5 t/h + Spent Mushroom Compost @ 2.0t/h	7.27	6.25	30.92	9.52	294.35	2443.67	24.67
T_6 - Camel Dung 1.5 t/h + Spent Mushroom Compost @ 2.5t/h	7.34	6.49	34.27	9.59	328.64	2598.93	25.99
T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h	5.83	5.37	21.40	9.23	197.52	1820.79	18.21
T_8 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 2.0t/h	6.10	5.61	23.52	9.30	218.73	1945.62	19.46
T_9 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 2.5t/h	6.69	6.17	27.18	9.42	256.03	2241.36	22.41
F - test	S	S	S	S	S	S	S
S. Ed. (±)	0.08	0.09	0.65	0.09	5.13	32.99	4.23
C. D. (P = 0.05)	0.20	0.15	1.33	0.22	10.28	75.43	12.45

FSL: Flower Stalk length (cm); **DF:** Diameter of flower (cm); **TNFPP:** Total number of flowers per plant; **FWF:** Fresh Weight of flowers (g); **FYPP:** Flower yield per plant (g); **FYP:** Flower yield per plot (kg); **FY:**Flower yield (t/ha)

Flower stalk length (cm)

The recorded flower stalk length, influenced by varying camel dung and organic waste compost levels, are presented in Table 2. Treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h demonstrated the maximum flower stalk length (8.58cm), followed by Treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h (8.45cm). Conversely, the minimum flower stalk length (5.83cm) was observed in Treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h. These results underscore the significant impact of camel dung fertilizers on the average flower stalk length. Treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h, as well as Treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, displayed notable growth in flower stalk length across all stages. This growth can be attributed to the well-calibrated combination of camel dung and organic waste compost doses supplied to the plants. It's worth noting that similar findings were reported by Ahamd *et al.*, (2010), Palagani *et al.*, (2013) and Singh *et al.*, (2015) in marigold and Pandey *et al.*, (2018) in chrysanthemum.

Diameter of flower (cm)

The flower diameter was measured to assess the impact of varying camel dung and organic waste compost levels. The results indicated that the treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h yielded the largest flower diameter at 7.52cm, followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, which measured 7.46cm. Conversely, the smallest flower diameter of 5.37cm was observed in treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h. These findings highlight the significant influence of camel dung fertilizers on the average flower diameter. Treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h and treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h demonstrated notable effects, likely attributed to the optimal camel dung and organic waste compost dosage provided to the plants. Acharya and Dashora (2004) documented similar outcomes in marigold, while Gaikwad *et al.*, (2004) observed comparable results in China aster and Singh *et al.*, (2008) noted a similar trend in lily in their respective experiments.

Total number of flowers per plant

The table in Table 2 displays the recorded number of flowers per plant under the influence of varying camel dung organic waste compost levels. Notably, treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h, yielded the highest number of flowers per plant, with an impressive count of 46.57. Following closely behind was treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, producing 39.42 flowers per plant. In contrast, treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h, resulted in the lowest number of flowers per plant, with a mere 21.40. Clearly, the application of camel dung fertilizers had a significant impact on the number of flowers per plant. Treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h, as well as treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, were the most effective. This success can be attributed to the well-balanced combination of camel dung and organic waste compost,

ensuring optimal nutrient supply to the plants. These findings align with previous research. Gaikwad *et al.* (2004) observed similar results in China aster and Javed *et al.*, (2005) and Kumawat *et al.*, (2017) in their experiments with marigold, also reported comparable outcomes.

Weight of flower (g)

The recorded weights of flowers, influenced by varying levels of camel dung organic waste compost, are presented in Table 2. The data indicates that treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h exhibited the highest flower weight at 10.52g. Following closely was treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, where the flower weight measured 9.91 g. Conversely, the lowest flower weight of 9.23g was observed in treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h. These results underscore the significant impact of camel dung fertilizers on the average flower weight. Treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h, followed by T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, demonstrated notably higher flower weights. This outcome is likely attributed to the effective combination of treatments that ensured an optimal supply of camel dung and organic waste compost to the plants. Similar findings have been documented in prior studies, such as those by Niedziela *et al.*, (2008) in the case of lilies and Ahamd *et al.*, (2010) and Shadanpour *et al.*, (2011) for marigolds.

Flower yield per plant (g)

The data presented in Table 2 elaborates on the influence of varying camel dung organic waste compost levels on flower yield per plant g. In particular, treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h exhibited the highest flower yield per plant (489.91g), followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h (390.65g). Conversely, treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h yielded the lowest flower yield per plant (197.52g). These results underscore the significant impact of camel dung fertilizers on the average flower yield per plant (g). Notably, treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h showcased the most favorable effect on flower yield, closely followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h. This notable improvement in flower yield per plant (g) can be attributed to the optimal amalgamation of camel dung and organic waste compost provided to the plants. Similar results were supported by the findings of Kumar *et al.*, (2009) in marigold and Parolekar *et al.* (2012) in Tuberose.

Flower yield per plot (kg)

The data presented in Table 2 elaborates on the influence of varying Camel Dung organic waste compost levels on flower yield per plot. In particular, treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h exhibited the highest flower yield per plot (3807.12 kg), followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h (3267.27kg). Conversely, treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h yielded the lowest flower yield per plot (1820.79kg). These results underscore the significant impact of camel dung fertilizers on the average flower yield per plot (kg). Notably, treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h showcased the most favorable effect on flower yield, closely followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h. This notable improvement in flower yield per plot (kg) can be attributed to the optimal amalgamation of Camel Dung and organic waste compost provided to the plants. These results are substantiated with Pushkar *et al.*, (2008) and Dikr and Belete (2017) in marigold.

Flower yield (t ha^{-1})

The impact of different levels of Camel Dung organic waste compost on flower yield t ha^{-1} is detailed in Table 2. The highest flower yield (38.09. t ha^{-1}) was observed in treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h, followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h, which yielded 32.72 t ha^{-1}. Conversely, the lowest flower yield per hectare (18.21 t ha^{-1}) was recorded in treatment T_7 - Camel Dung 1 t/h + Spent Rice Husk Compost @ 1.5t/h. The results make it evident that Camel Dung fertilizers significantly influenced the average flower yield t ha^{-1}. Treatment T_3 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h demonstrated the most favorable impact on flower yield, followed by treatment T_2 - Camel Dung 2 t/h + Bamboo leaves Compost @ 2.0t/h. This enhancement in flower yield t ha^{-1} is likely attributed to the optimal combination of Camel Dung and organic waste compost supplied to the plants. Similar findings were reported in previous studies by Pal and Ghosh (2010), Kumari *et al.*, (2019) and Kumar *et al.*, (2013) for Marigold.

Conclusion

Based on the current investigation, it can be affirmed that treatment T_3 (Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h) significantly influenced the growth, floral attributes and overall yield of the African marigold plants. This treatment yielded the highest values for

various parameters including plant height (70.94cm), branches per plant (24.49), leaf area (1458.64cm^2), plant spread (45.17cm), stem diameter (1.88cm), stalk length (8.58cm), flower diameter (7.52cm), total flowers per plant (46.57), flower weight (10.52g), flower yield per plant (489.91g), flower yield per plot (3807.12kg) and overall flower yield (38.09t/ha) demonstrated the shortest duration for bud initiation at 31.97days. Consequently, Treatment T_3 (Camel Dung 2 t/h + Bamboo leaves Compost @ 2.5t/h) emerged as the most efficient approach for stimulating both vegetative and reproductive growth in pinched seedling African marigold plants during the *rabi* season.

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