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MORPHOLOGICAL CHARACTERIZATION OF MARIGOLD GENOTYPES

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ABSTRACT

Marigold is a commercial crop grown for its easy adaptability, for loose flower production, and it is a major source of lutein. The experiment was carried out in Horticulture Nursery at college premises, Department of Floriculture and Landscaping Architecture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during 2023-24. The experiment was laid out in a Randomized block design with three replications by using 17 marigold genotypes. The maximum plant height, plant spread, number of flowers per plant, and number of days for 50% flowering were recorded in Pusa Arpita and Pusa Deep. The Maximum number of primary and secondary branches per plant was recorded in Pusa Arpita, the maximum flower diameter was recorded in Pusa Narangi Gainda, and the maximum average weight of flowers per plant was recorded in Arpita.

***Key words*:** Morphological Characterization, Marigold Genotypes

Introduction

Marigold is an important commercial annual flower crop belonging to the Asteraceae family. Compared to other flowering annuals, marigolds are easily adaptable to various conditions and have good keeping quality. Marigold is grown as an ornamental crop for its flowers, sold in the market as loose flowers in bulk, as specialty cut flowers, or for making garlands or for decoration during several religious functions, besides its use in landscape gardening. Marigold acts as a trap crop to control fruit-borer in tomatoes and suppresses the nematode population in the soil, in India, it is gaining popularity for its easy cultivation, wide adaptability, and production throughout the year. The marigold varieties are less vigour, low yielding, and prone to lodging, the development of new high-yielding semi-tall varieties requires genetically stable genotypes having high-yielding potential (Bharati *et al.*, 2014). The selection of superior varieties depends on variation among the genotypes the variability in the population for a particular character is essential for the breeding program. Marigolds being a cross-pollinated crop there is a need for high high-yielding variety with specific colour flowers for increasing farmer income. The coloured flowers are important natural sources of xanthophyll which is used as a natural food additive to brighten egg yolks and poultry skin, it is also being used effectively for dye fabrics commercially. Based on the requirement, research work has been done to assess the variation among the genotypes which can be further utilized for breeding programs.

Material and Method

The present investigation was done by using 17 different genotypes of marigolds *viz*. BM-2, CGFM-1, Pusa Basanti Gainda, Pusa Narangi Gainda, Chandini Gainda, Culcuttia Gainda, Pusa Bhar, Marigold orange, KM-1, KM-2, BM-1, BM-3, Pusa Arpita, Pusa Deep, KAUM-46, Anupam Yellow and Orange Bunch was carried out at the Horticulture Nursery at college premises, Department of Floriculture and Landscaping Architecture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during 2023-24. The experiment was laid out in a Randomized block design with three replications. Regular intercultural practices were done during the experiment to raise the crop successfully. Observations on plant height, number of primary branches per plant, number of secondary branches per plant, plant spread recorded on 60,90 days after transplanting, number of

Table 1: Mean performance of Marigold genotypes for Vegetative Character.

Treatment	PH		NPB		NSB		PS (E-W)		PS (N-S)	
	60DAT	90DAT	60DAT	90DAT	60DAT	90DAT	60DAT	90DAT	60DAT	90DAT
BM-2	34.2	44.03	6.53	6.53	36.07	42.2	26.03	28.7	30.2	31.33
CGFM-2	25.83	38.57	12.0	11.77	30.47	29.07	31.73	32.4	31.27	34.4
Pusa Basanti Gainda	58.55	90.67	7.87	8.2	28.07	37.87	38.2	38.4	37.4	40.0
Pusa Narangi Gainda	58.2	73.47	8.33	8.33	28.13	33.53	38.27	36.93	38.2	38.73
Chandini Gainda	24.8	29.33	8.8	8.27	26.0	38.53	22.67	22.3	20.87	20.93
Culcutia Gainda	32.33	40.6	4.47	5.8	25.67	23.87	27.93	28.6	30.7	31.27
Pusa Bahar	53.0	71.93	7.27	5.8	26.0	31.53	37.53	39.87	37.87	38.93
Marigold Orange	48.6	65.87	7.4	7.4	30.07	31.2	31.47	32.8	31.33	32.57
KM-1	28.0	48.07	4.27	5.73	28.47	31.6	27.07	28.07	27.33	28.3
KM-2	34.27	56.27	4.73	6.0	25.0	31.33	28.27	29.43	27.67	28.2
BM-1	26.4	49.0	5.4	5.77	19.0	21.67	24.87	25.87	25.47	26.33
BM-3	33.13	46.47	5.57	5.93	22.27	27.23	27.13	27.93	28.6	29.1
Pusa Arpita	65.03	123.33	12.6	12.67	48.33	47.67	54.53	64.6	70.33	73.47
Pusa Deep	64.2	119.77	10.47	11.37	37.8	36.33	47.03	60.33	62.87	65.63
KAMU-46	33.07	34.17	6.0	8.23	24.0	23.07	18.83	19.5	17.73	20.5
Anupam Yellow	25.6	51.3	6.67	6.63	19.33	23.23	31.87	32.3	35.67	37.33
Orange bunch	25.6	51.67	8.1	6.9	21.8	22.97	26.83	27.5	39.17	41.2
Mean	39.45	60.85	7.43	7.72	28.02	31.34	31.78	33.85	34.86	36.36
Sem	2.58	3.98	0.51	0.54	1.28	2.72	1.79	2.16	2.30	1.39
C.D at 5%	7.45	11.49	1.48	1.58	3.74	7.85	5.17	6.22	6.65	1.01

PH- plant height, **NPB**- number of primary branches, **NSB**- number of secondary branches, **PS (E-W)**- plant spread along east-west, **PS (N-S)**- plant spread along north-south

days taken for 50% flowering number of flowers per plant, flower diameter, average weight of flowers per plant, flower yield, flower head number of colours, flower head floret type and statistical analysis.

Result and Discussion

Plant height

The maximum plant height at 60 DAT was recorded in Pusa Arpita (65.03cm) which was at par with Pusa Deep (64.20cm), whereas the minimum plant was recorded in Chandini Gainda (24.80cm). At 90 DAT the maximum plant height was recorded in Pusa Arpita (123.33cm), which was at par with Pusa Deep (119.77cm), whereas the minimum plant height was recorded in Chandini Gainda (29.33cm). The variation in plant height is due to the genetic material of the genotype and the agro-climatic conditions during the crop duration Bhusaraddi *et al.*, (2021); Pratheeksha *et al.*, (2024).

Number of primary branches per plant

The maximum number of primary branches per plant at 60 DAT was recorded in Pusa Arpita (12.6) which was at par with CGFM-1 (12.0), whereas the minimum plant was recorded in KM-1 (4.27). At 90 DAT the maximum number of primary branches per plant was recorded in Pusa Arpita (12.67) which was at par with CGFM-1 (11.77) and Pusa Deep (11.37) whereas the minimum plant was recorded in KM-1 (5.73). The difference in the number of primary branches per plant, variation is due to the genetic material of the genotype and agroclimatic condition Bharathi and Jawaharlal (2014); Kumar *et al.*, (2023)

Number of Secondary branches per plant

The maximum number of secondary branches per plant at 60 DAT was recorded in Pusa Arpita (48.33) followed by BM-2 (36.07), whereas the minimum plant was recorded in BM-1 (19.00). At 90 DAT the maximum number of secondary branches per plant was recorded in Pusa Arpita (47.67) which was at par BM-1 (42.20), whereas the minimum plant was recorded in BM-1 (21.67). The difference in the number of secondary branches per plant, variation is due to the genetic material of the genotype and agroclimatic condition Bharathi and Jawaharlal (2014); Kumar *et al.*, (2023); Bhusaraddi *et al.*, (2021).

Plant spread (E-W) and (N-S)

The maximum Plant spread along (E-W) and (N-S) at 60 DAT was recorded significantly in Pusa Arpita (54.53cm) and (70.33cm), followed by Pusa Deep (47.03cm) and (62.87cm), whereas minimum plant spread along (E-W) and (N-S) was recorded in KAUM-46 (18.83cm) and (17.73cm). At 90 DAT (days after

Table 2: Mean performance of Marigold genotypes for Flowering Character.

Treatments	Flower Diameter	No. of flowers per plant	Average weight of flowers	No. of days taken for 50% flowering	Flower head no. of colours	Flower head floret type
BM-2	5.75	12.5	200.25	45.5	Orange	All Ligulate
CGFM-2	3.65	17	123.05	33	Red + Yellow	Ligulate + Tubulate
Pusa Basanti Gainda	5.45	9.2	183.25	45.5	Yellow	Ligulate + Tubulate
Pusa Narangi Gainda	5.3	9.35	234.75	45.5	Orange	All Ligulate
Chandini Gainda	3.85	16.05	144.25	29.5	Red	Ligulate + Tubu
Culcutia Gainda	4.5	5.75	145.5	45.75	Orange	All Ligulate
Pusa Bahar	5.3	8.6	188.75	41.6	Yellow	Ligulate + Tubu
Marigold Orange	4.9	5.4	123.0	44.75	Orange	All Ligulate
KM-1	4.95	7.95	352.5	42.6	Orange	All Ligulate
KM-2	5.3	8.95	144.25	43.8	Orange	All Ligulate
BM-1	4.8	8.15	121.5	44.75	Yellow	All Ligulate
BM-3	4.6	9.3	229.75	43.65	Orange	All Ligulate
Pusa Arpita	5.07	24.2	599	52.75	Light Orange	Ligulate + Tubu
Pusa Deep	5.25	27.9	491.5	50.65	Red	Ligulate + Tubula
KAMU-46	4.505	13.75	120.65	31.9	White	All Tubuligulate
Anupam Yellow	5.55	8.0	123.0	45.1	Yellow	Ligulate + Tubula
Orange bunch	4.65	9.7	202.0	41.3	Orange	Ligulate + Tubulat
Mean	4.90	11.86	219.23	42.80		
Sem	0.20	0.98	26.93	0.97		
C.D at 5%	0.61	2.92	80.37	2.92		

planting) the maximum Plant spread along (E-W) and (N-S) was recorded significantly in Pusa Arpita (64.60cm) and (73.47cm), which was at par and followed by Pusa Deep (60.33cm) and (65.63cm), whereas minimum plant spread along (E-W) and (N-S) was recorded in KAUM-46 (19.50cm) and (20.50cm). The variation in plant spread is due to the genetic material of the genotype and agroclimatic condition Shilpa *et al.*, (2022); Choudhary *et al.*, (2014); Pratheeksha *et al.*, (2024).

Flower Diameter

The maximum flower diameter was recorded in Pusa Narangi Gainda (8.39cm) which was at par Pusa Bhar (8.27cm) and T8 Marigold Orange (8.01cm) whereas the minimum flower diameter was recorded in KAUM-46 (4.30cm). The variation in flower diameter is due to the genetic makeup of the genotype Choudhary *et al.* (2014) and agroclimatic condition Tiwari (2020); Sharma and Jadagoudar (2021).

Number of flowers per plant

The maximum number of flowers per plant was recorded in Arpita (41.7) followed by Pusa Deep (34.53) whereas the minimum number of flowers per plant was recorded in KAUM-46 (10.53). The variation in the number of flowers per plant is due to the genetic makeup of the genotype and agro-climatic conditions, similar findings by Beniwal and Sheoran (2022); Tiwari (2020).

Average weight of flowers per plant (g)

The maximum average weight of flowers per plant was recorded in Arpita (155.93g) which was at par with Pusa Bhar (153.53g) whereas the minimum average weight of flowers per plant was recorded in KAUM-46 (37.3g). the average weight of flowers per plant can vary due to agroclimatic conditions, Biotic and Abiotic stress, similar results were found by Sharma and Jadagoudar (2021), Manik and Sharma (2016).

Number of days taken for 50% Flowering

The maximum number of days taken for 50% flowering was recorded in Arpita (55.8 days) which was at par Pusa Deep (52.83days), whereas the minimum number of days taken for 50% flowering was recorded in Chandini Gainda (30.73days), similar results were found by Nagashree and Kulkarni (2019) and Tiwari *et al.*, (2020).

Flower head number of Colours

The flower head's number of colours as per the DUS guidelines (number 25), the flower head number of colours was categorized as one or two. The results observed that African marigold genotypes have one colour on the flower head, whereas the French marigold genotypes have two colours on the flower head.

Flower head Floret Type

The flower head's Floret type varied with different

varieties, are presented in Table 4.10 according to the DUS guidelines (number 17), the flower head floret type was categorized as All tubulate, tubulate and ligulate, Tubuligulate, All Tubuligulate and All ligulate.

Conclusion

The result obtained from the above investigation, the genotypes Pusa Arpita and Pusa Deep were suitable for the loose flower production under Chhattisgarh condition.

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