

YIELD AND QUALITY OF MARIGOLD AS INFLUENCED BY DIFFERENT GENOTYPES UNDER VIDARBHA CONDITIONS

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ABSTRACT

A field experiment was conducted at farm of Horticulture Section, College of Agriculture, Nagpur during *kharif* season of 2015-2016 with a view to study the yield and quality of flowers as influenced by marigold genotypes. The experiment was laid out in Randomized Block Design with thirteen different genotypes (NAM-1, NAM-2, NAM-3, NAM-4, NAM-5, NAM-6, NAM-7, NAM-8, NAM-9, NAM-10, NAM-11, NAM-12, African Double orange) planted in three replications. The results revealed that, the genotype NAM-2 recorded maximum number of flowers plant⁻¹ (63.77), yield of flowers plant⁻¹ (711.50 g), yield of flowers plot⁻¹ (18.49 kg), yield of flowers ha⁻¹ (273.93 q), weight of flowers (11.16 g), diameter of fully opened flower (7.20 cm) and consumer acceptance in respect of flower size (7.77), flower colour (7.35), petal compactness (7.82). Overall acceptance (7.94) was recorded significantly maximum in genotype NAM-2. Whereas, genotype NAM-8 recorded maximum length of flower along with pedicel (14.35 cm), length of pedicel (12.32 cm). However, genotype NAM-3 recorded maximum number of petals flower⁻¹ (307.46). Significantly maximum disc diameter (1.67 cm) was recorded in genotype NAM-4 and genotype African Double Orange noticed significantly maximum shelf life of flowers (4.15 days).

(Key words: Marigold, genotypes, quality, yield)

INTRODUCTION

Marigold is one of the most popular annual flowers in India for garden display as well as for commercial cultivation. In India marigold rank first among the loose flowers. Marigold is a native of Central and South America especially Mexico and belongs to family 'Asteraceae' and genus *Tagetes*. The name *Tagetes* was given after 'Tages' a demigod known for its beauty. The African marigold (*Tagetes erecta* L.) is hardy annual about 90 cm tall, erect and produces branches. Leaves are pinnately divided and leaflets are lanceolate and serrated. The flowers are single to fully double and of large size with globular heads. It has been found that the marigold plants are highly useful for suppressing the population of nematodes in the field. Leaf extract is a good remedy for ear-ache. Flower extract is consider as a blood purifier, a cure for bleeding piles and is also a good remedy for eye diseases and ulcers.

In Vidarbha region variability of marigold is considerably high. Number of local genotypes which differs in size and shape of flowers, are under cultivation in different districts and their productivity varies from season to season and district to district. The importance of assembling and maintaining collection of genetic diverse materials is to select suitable genotypes for the particular region to achieve the maximum benefit in a unit area. There is a need for selection and maintenance of good germplasm which serve as the basis for selection in crop breeding programme. Therefore, the present study was undertaken.

MATERIALS AND METHODS

An experiment was carried out at the farm of Horticulture Section, College of Agriculture, Nagpur during July, 2015 to December, 2016. Experiment was laid out in randomized block design with three replications and thirteen genotypes viz., NAM-1, NAM-2, NAM-3, NAM-4, NAM-5, NAM-6, NAM-7, NAM-8, NAM-9, NAM-10, NAM-11, NAM-12 and African Double Orange.

The experimental field was prepared to a fine tilth by deep ploughing and harrowing. The field was ploughed twice before one month of planting and farm yard manure was incorporated @ 25 t ha⁻¹ at land harrowing and mixed well. The experimental plots were prepared as per the plan of layout.

The seeds of local genotypes of African marigold were collected from different villages of Nagpur and Bhandara district. The seedlings were prepared in crates in Hi-tech polyhouse of Maharajbag. The crates were prepared thoroughly by mixing soil with farm yard manure and linden powder. Seeds were treated with fungicide for healthy growth of seedlings and sown in lines at 10 cm spacing and 2-3 cm deep in the soil. Seeds were then gently covered with the soil. Crates were watered lightly with the help of rose can. After about 3 to 4 days the seeds started germinating and potential germination was completed within eight days. The crates were watered regularly and weeding operation was carried out in order to keep the crates free of weeds. Seedlings were transplanted on raised bed with

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planting of one seedling hill⁻¹ in the experimented field on 22nd July, 2015 at the distance of 45 cm x 30 cm.

The recommended dose of fertilizer (100: 50: 25 kg NPK ha⁻¹) was applied to all the plots in the form of urea, single super phosphate and muriate of potash. Out of this, full dose of P₂O₅ and K₂O and 1/2 dose of nitrogen was applied at the time of planting. The remaining dose of nitrogen was applied in two split doses, first dose was given at 15 days and second dose was given at 30 days after planting.

Observations were recorded on number of flowers plant⁻¹, flower yield plant⁻¹ (g), flower yield plot⁻¹ (kg), flower yield ha⁻¹ (q), weight of flowers (g), diameter of fully opened flower (cm), length of flower along with pedicel (cm), length of pedicel (cm), number of petals flower⁻¹, disc diameter (cm), consumer acceptance at harvest and vase life were recorded by after harvesting and collected data were statistically analyzed as per method suggested by Panse and Sukhatme, (1967).

RESULTS AND DISCUSSION

Yield parameters

The data in table 1 revealed that, significant differences were recorded among the marigold genotypes in respect of number of flowers plant⁻¹. Significantly maximum number of flowers plant⁻¹ (63.77) were noticed with the genotype NAM-2 which was found statistically at par with the genotypes NAM-8 (62.84), NAM-6 (60.62) and NAM-4 (60.15). Whereas, significantly minimum number of flowers plant⁻¹ (25.59) was noted with the genotype NAM-1.

As regards yield of flowers plant⁻¹ NAM-2 noted significantly maximum yield of flowers plant⁻¹ (711.50 g) which was found statistically significantly superior over all other genotypes under study. However, significantly minimum yield of flowers plant⁻¹ (182.44 g) was recorded in the genotype NAM-1.

In respect of yield of flowers plot⁻¹, significantly maximum yield of flowers plot⁻¹ (18.49 kg) was recorded in the genotype NAM-2 which was significantly superior over all treatment under investigation. However, significantly minimum yield of flowers plot⁻¹ (4.73 kg ha⁻¹) was recorded with the genotype NAM-1.

The data presented in table 1 revealed significant difference among the genotypes in respect of yield of flowers ha⁻¹. The genotype NAM-2 produced significantly maximum yield of flowers ha⁻¹ (273.93 q ha⁻¹) as compared to other genotypes which was found significantly superior over all the treatments under study. However, significantly minimum yield of flowers ha⁻¹ (70.02 q ha⁻¹) was recorded with the genotype NAM-1.

These results might be due to cell elongation, rapid cell stimulation and variation in production of flower yield. Similar results were also reported by Choudhary *et al.* (2014). They observed that significantly

maximum number of flowers plant⁻¹ and flower yield plant⁻¹ was obtained in marigold Hisar Jaffri as compared to other genotypes. Bharthi and Jawaharlal (2014) reported that marigold genotype Coimbatore Local Orange attained highest flower yield plant⁻¹. Narsude *et al.* (2010) also noticed that, significantly number of flowers plant⁻¹, yield plant⁻¹ and yield ha⁻¹ were recorded in marigold genotype Tuljapur Local-1. Atram *et al.* (2015) noted that, highest number of flowers plot⁻¹ and yield of flowers hectare⁻¹ were recorded in rose cv. Alliance.

Quality parameters

The data presented in table 1 revealed that, the different marigold genotypes was found significantly regarding weight of flower. The genotype NAM-2 had produced significantly maximum weight of flower (11.16 g) which it was found statistically at par with the genotype NAM-12 (10.59 g). Whereas, significantly minimum weight of flower (3.47 g) was recorded with the genotype NAM-4.

As regards diameter of fully opened flower was significantly influenced by different marigold genotypes. The genotype NAM-2 had produced significantly maximum diameter of fully opened flower (7.20 cm) which was found statistically at par with the genotype NAM-12 (6.95 cm). Whereas, significantly minimum diameter of fully opened flower (1.37 cm) was recorded with the genotype NAM-4.

Data regarding length of flower along with pedicel marigold flower was found significant. The genotype NAM-8 had produced significantly maximum length of flower along with pedicel (14.35 cm) which was found at par with the genotypes NAM-6 (14.21 cm) and NAM-9 (13.91 cm). Whereas, significantly minimum length of flower along with pedicel (9.65 cm) was recorded with the genotype NAM-4.

The genotype NAM-8 had produced significantly maximum length of pedicel (12.32 cm) which was found at par with the genotypes NAM-6 (12.15 cm) and NAM-9 (11.65 cm). Whereas, significantly minimum length of pedicel (6.44 cm) was recorded with the genotype NAM-4.

The genotype NAM-3 recorded maximum number of petals flower⁻¹ (307.46) which was found at par with the genotype NAM-1 (300.15). The minimum number of petals flower⁻¹ (175.27) was recorded in genotype NAM-4.

Regarding disc diameter of marigold flower was found significant. The genotype NAM-4 had produced significantly maximum disc diameter (1.67 cm) which was significantly superior over all other genotypes. However, significantly minimum disc diameter (0.19 cm) was recorded with the genotypes NAM-5 and NAM-7.

Significantly maximum shelf life (4.15 days) was recorded in African Double Orange which was significantly superior over all other treatments except genotype NAM-4 (4.11 days). However, significantly minimum shelf life (2.09 days) was recorded with the genotype NAM-8.

Regarding consumer acceptance of marigold flower the genotype NAM-2 scored maximum score for flower size (7.77) which was found at par with the genotype NAM-3

Table 1. Yield and quality of flowers as influenced by marigold genotypes

Treatments	Number of flowers plant ⁻¹	Yield of flowers plant ⁻¹ (kg)	Yield of flowers plot ⁻¹ (g)	Yields of flowers ha ⁻¹ (q)	Weight of flower (g)	Diameter of flower (cm)	Length of flower along with pedicel (cm)	Length of pedicel (cm)	Number of petals flower ⁻¹	Disc diameter (cm)	Shelf life (days)
T ₁ - NAM-1	25.59	182.44	4.73	70.02	7.12	4.81	10.70	7.37	300.15	0.34	2.11
T ₂ - NAM-2	63.77	711.50	18.49	273.93	11.16	7.20	12.31	9.16	280.78	0.66	3.11
T ₃ - NAM-3	26.47	200.98	5.10	75.56	7.59	4.53	9.67	6.53	307.46	0.43	2.10
T ₄ - NAM-4	60.15	208.53	5.42	80.30	3.47	1.37	9.65	6.44	175.27	1.67	4.11
T ₅ - NAM-5	49.20	302.42	7.85	116.30	6.15	5.15	12.22	8.28	275.27	0.19	3.09
T ₆ - NAM-6	60.62	409.81	10.65	157.73	6.76	6.03	14.21	12.15	211.12	0.25	3.14
T ₇ - NAM-7	53.33	281.96	7.33	108.64	5.29	5.28	11.26	8.67	248.14	0.19	2.43
T ₈ - NAM-8	62.84	340.81	8.85	131.11	5.42	6.12	14.35	12.32	215.84	0.28	2.09
T ₉ - NAM-9	40.19	220.10	5.72	84.79	5.48	4.25	13.91	11.65	239.44	0.25	3.14
T ₁₀ -NAM-10	58.19	300.92	7.81	115.70	5.17	4.27	11.47	8.84	230.13	0.30	3.15
T ₁₁ - NAM-11	47.93	214.82	5.58	82.67	4.48	4.03	11.35	8.70	223.46	0.60	2.24
T ₁₂ -NAM-12	52.80	559.10	14.53	215.21	10.59	6.95	10.29	7.14	235.12	0.57	2.10
T ₁₃ -African Double Orange	43.60	329.03	8.50	125.93	7.55	5.56	11.21	7.91	277.92	0.65	4.15
SE(m)±	1.47	14.55	0.28	4.10	0.20	0.22	0.35	0.26	7.33	0.03	0.10
CD at 5%	4.30	42.46	0.81	11.97	0.59	0.65	1.04	0.76	21.40	0.08	0.30

Table 2. Consumer acceptance as influenced by marigold genotypes

Treatments	Consumer acceptance (Max. score 10)			
	Flower size	Flower colour	Petal compactness	Overall acceptance
T₁- NAM-1	6.84	7.00	6.97	7.07
T₂- NAM-2	7.77	7.35	7.82	7.94
T₃- NAM-3	7.71	7.32	7.69	7.38
T₄- NAM-4	4.96	5.06	4.81	4.99
T₅- NAM-5	6.58	5.06	5.05	5.01
T₆- NAM-6	5.47	5.75	5.05	5.20
T₇- NAM-7	5.56	5.94	5.12	5.27
T₈- NAM-8	5.43	5.87	5.52	5.87
T₉-NAM-9	6.68	5.07	6.13	5.24
T₁₀-NAM-10	5.10	6.48	5.05	5.40
T₁₁-NAM-11	5.93	5.10	5.06	5.27
T₁₂-NAM-12	6.07	6.12	6.13	6.27
T₁₃-Africa Double Orange	7.02	6.07	7.04	7.27
SE(m)±	0.03	0.03	0.05	0.19
CD at 5%	0.09	0.09	0.14	0.54

(7.71). Whereas, significantly minimum flower size (4.96) was recorded with the genotype NAM-4. The genotype NAM-2 scored maximum score for flower colour (7.35) which was found at par with the genotype NAM-3 (7.32). However, significantly minimum flower colour (5.06) was recorded with the genotype NAM-4. The genotype NAM-2 scored maximum score for petal compactness (7.82) which was found at par with the genotype NAM-3 (7.69). Whereas, significantly minimum petal compactness (4.81) was recorded with the genotype NAM-4. The genotype NAM-2 had secured significantly maximum overall acceptance (7.94) which was found at par with the genotype NAM-3 (7.38). However, significantly minimum overall acceptance (4.99) was recorded with the genotype NAM-4.

From the above results, it was found that the genotype NAM-2 was superior in all quality parameters. Variation in quality parameters viz., weight of flower, diameter of fully opened flower, length along with pedicel, length of pedicel, number of petals flower⁻¹, disc diameter, shelf life and consumer acceptance of flower showed by different genotypes of marigold might be genetic variability among

the different genotypes of marigold.

These results might be due to the genotypic variation, vigorous growth and profuse branching and more vegetative growth, early initiation of flowering, increased pedicel length and more diameter of flower which might have helped the flower to last longer in ambient temperature. The results obtained during this investigation are in close agreement with the results of Zosiamliana *et al.* (2013). They observed that, maximum flower diameter, stalk length and vase life both as cut and loose flowers were recorded in China aster cv. Phule Ganesh White. Choudhary *et al.* (2014) reported that, maximum flower diameter was recorded in marigold cv. MGH-09-276. Rao and Sushma (2014) stated that, average flower weight was recorded in chrysanthemum cv. 'Raichur'. Shivakumar *et al.* (2014) observed that, marigold genotype 'Nilakkoti Local Orange' attained maximum flower diameter, number of petals flower⁻¹ in marigold. Bhuyar *et al.* (2004) reported that gerbera cultivar Ruby red showed best results in terms of quality parameters under fan and pad cooling system polyhouse conditions.

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