

Seed production in marigold with special reference to seasons

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ABSTRACT

The present study was conducted during 2008-09 to study the effect of seasonal influence on seed yield and quality in marigold and results revealed that significantly tallest plants (90.80cm), more number of primary branches (11), number of flowers per plant (32), number of seeds per plant (165), seed yield per plant (14.51g) and test weight (2.63g) were recorded during *Kharif* season. Whereas, significantly maximum flower size (6.55cm), highest germination (88.40%), seedling length (12.46cm), seedling dry weight (0.994mg), vigour index I (1102) and vigour index II (88) were recorded in *Rabi* season in case of African marigold. In case of French marigold, tallest plants (38.61cm), more number of flowers per plant (54.90), flower yield per plant (96.49g), number of seeds per flower (44.00) and seed yield per plant (4.86g) were recorded during *Kharif* season. Whereas, more flower size (4.03cm) and better seed quality parameters viz., germination (86.30%), seedling length (10.73cm), seedling dry weight (0.89mg), vigour index I (928) and vigour index II (77) were recorded during *Rabi* season.

Pramila, C.K., Prasanna, K.P.R., Jayanthi, R. and Ramachandra, R. (2011). Seed production in marigold with special reference to seasons. *Internat. J. agric. Sci.*, 7(2): 400-403.

Key words : Marigold, Seasons, Seed yield, Seed quality

INTRODUCTION

Marigold is widely cultivated as bedding plant in landscape design. Besides, the pristine used as loose flower, marigold occupies anthelmintic, analgesic, anti-inflammatory, aromatic, bronchodilatory, digestive, diuretic, emmenagogue, sedative and stomachic properties. It is also widely used in perfumes, herbal gual, insect and nematode repellent, organic manure, nutrient supplement for poultry feed, anticarcinogenic agent, antioxidant in retinotherapy and for *Tagetes oil* extraction. In order to make its successful cultivation, the knowledge and performance of different genotypes is essential and the genotypes which perform better than others are only to be grown commercially in a particular location rather than to go for growing all the genotypes (Singh and Kumar, 2008).

Seed is considered as the best propagating material for annual flowers like marigold. But due to lack of scientific information on seed production of marigold, the large scale production of seed is limited. Though the seed yield and quality are primarily a genotypic character, it is greatly influenced by the seasons and climatic factors. These influence both vegetative and reproductive phases of the plant, ultimately leading to variation in performance. There is a general feeling that marigold can be grown

throughout the year except in very cold winter when the plants are likely to be damaged by frost. Desai (1962); Randhawa and Mukhopadhyaya (1986), Swarup (1989) and Arora (1990) reported as a monsoon crop, while Yadav (1992) reported its cultivation is possible in all the three seasons. Hence, the present investigation was planned with an objective to study the influence of sowing season on seed yield and quality of marigold spp.

MATERIALS AND METHODS

The field and laboratory experiments were conducted during *Kharif* and *Rabi* 2008-09 at floriculture unit, Department of Horticulture and Department of Seed Science and Technology, University of Agricultural Sciences, Bangalore. The topography of the experimental site was fairly uniform. The soil type was of red sandy loam with pH of 7.2. Seeds of marigold cv. Pusa narangi (African) and Chintamani local (French) were procured from the Department of Horticulture and raised in nursery bed by using coir pith and vermicompost as filler materials. Experimental site was prepared well to obtain fine tilth. Fifty per cent of N and entire quantity of P and K were applied as basal dose and mixed well with soil. Top dressing with N was done at 15 days and 30 days after first application. Irrigation was given timely at 3-4 days

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interval as per package of practices (Anonymous, 2008).

Thirty days old seedlings were transplanted in the main plot at spacing of 45 x 30 cm. Finally 50 plants were retained in the main plot. Fifteen plants were tagged to record various plant growth and yield parameters. The seeds were extracted from harvested flowers, cleaned and subjected to assess seed quality parameters as per ISTA (2006) and vigour index I and II were recorded as per Abdul Baki and Anderson (1973). The data obtained from the experiments were statistically analyzed separately for African and French marigold genotypes. The student's 't'/two sample 't' test was done and seasons were compared (Snedecor and Cochran, 1967).

RESULTS AND DISCUSSION

The observations made in the present investigation on seasonal influence showed significant differences with respect to growth, seed yield and quality parameters. The tallest plants were recorded both in African (cv. PUSA NARANGI) and French (cv. CHINTAMANI LOCAL) marigold during *Kharif* (90.80 and 38.61cm) compared to *Rabi* (83.69 and 37.31cm), respectively. (Table 1 and 2) Such

variations in plant height due to seasons were also noticed by Naik (2003) and Gamassy *et al.* (1965) in marigold, zinnia and cosmos and Gowda (1990) in China aster.

In both African and French marigold significantly higher number of primary branches (11.00 and 10.30), more number of flowers (32.00 and 54.90) more number of seeds per flower (165.00 and 44.00), highest seed yield per plant (14.51 and 4.86 g) and highest 1000 seed weight (2.63 and 2.35 g) were recorded during *Kharif*, respectively. Patil (2008) also recorded higher number of spikelets/spike, more number of flowers/spike in daisy planted during June compared to other plantings. Higher seed yield per plant was mainly due to higher number of capitula per plant, which in turn influenced by higher number of branches per plant. Higher seed yield and 1000 seed weight may be due to higher proportion of filled seed, higher accumulation of metabolites and translocation of these metabolites from source to sink during *Kharif* where the plants were exposed to favourable environmental conditions during seed development and maturation stage. Such results were also reported by Raman *et al.* (1969) in chrysanthemum and Gowda (1990)

Table 1: Seed yield parameters as influenced by seasons in African marigold

Sr. No.	Seed yield parameters	Seasons		Mean	Students 't' test
		<i>Kharif</i>	<i>Rabi</i>		
1.	Plant height (cm)	90.80	83.69	87.24	S
2.	No. of primary branches	11.00	09.90	10.45	S
3.	Flower size (cm)	06.23	06.55	06.39	NS
4.	No. of flowers per plant	32.00	24.70	28.35	S
5.	Fresh weight of ten flower (g)	53.22	58.32	55.78	S
6.	Dry weight of ten flower (g)	10.09	10.12	10.11	NS
7.	Flower yield/plant (g)	356.88	357.79	357.3	S
8.	No. of seeds/flower	165.00	153.00	159.5	S
9.	Seed yield/plant (g)	14.51	13.58	14.05	S

S - Significant and NS=Non-significant

Table 2 : Seed yield parameters as influenced by seasons in French marigold

Sr. No.	Seed yield parameters	Seasons		Mean	Students 't' test
		<i>Kharif</i>	<i>Rabi</i>		
1.	Plant height (cm)	38.61	37.31	37.96	S
2.	No. of primary branches	10.30	09.60	09.95	S
3.	Flower size (cm)	03.78	04.03	03.90	NS
4.	No. of flowers per plant	54.90	47.70	51.30	S
5.	Fresh weight of ten flower (g)	28.33	27.82	28.08	NS
6.	Dry weight of ten flower (g)	04.32	03.73	04.03	S
7.	Flower yield/plant (g)	96.49	91.99	94.24	S
8.	No. of seeds/flower	44.00	43.00	43.80	S
9.	Seed yield/plant (g)	04.86	04.46	04.66	NS

S - Significant and NS - Non significant

Table 3 : Seed quality parameters as influenced by seasons in African marigold

Sr. No.	Seed quality parameters	Seasons		Mean	Students 't' test
		<i>Kharif</i>	<i>Rabi</i>		
1.	1000 Seed weight (g)	02.63	02.48	02.55	NS
2.	Germination (%)	86.40	88.40	87.40	S
3.	Seedling length (cm)	10.81	12.46	11.64	S
4.	Seedling dry weight (mg)	0.855	0.994	0.925	NS
5.	Vigour index-I	934	1102	1018	S
6.	Vigour index-II	74	88	81	S

S - Significant and NS - Non significant

Table 4 : Seed quality parameters as influenced by seasons in French marigold

Sr. No.	Seed yield parameters	Seasons		Mean	Students 't' test
		<i>Kharif</i>	<i>Rabi</i>		
1.	1000 Seed weight (g)	02.35	02.26	02.31	NS
2.	Germination (%)	79.20	86.30	82.75	S
3.	Seedling length (cm)	10.30	10.73	10.52	NS
4.	Seedling dry weight (mg)	0.846	0.891	0.869	NS
5.	Vigour index-I	818	928	873	S
6.	Vigour index-II	67	77	72	S

S - Significant and NS - Non significant

in aster.

The observations made in this investigation on seasons showed significant differences with respect to seed quality parameters also (Table 3 and 4). Significantly higher seed quality parameters were recorded during *Rabi* compared to *Kharif* season. The highest germination (88.40 and 86.30%), seedling length (12.46 and 10.73cm), vigour index I (1102 and 928) and vigour index II (88 and 77) were recorded during *Rabi* in both the varieties compared to *Kharif*. The increase in the shoot and root length also might be due to higher food reserves in the seeds and increase in the seedling vigour index might be due to higher germination, root length and shoot length. The variation in quality parameters might be due to inherent genotypic variation, which expressed suitably under favourable environmental condition. Such observations were also recorded by Gowda (1990) and Mathad *et al.* (2008) in aster.

Thus, the study can be concluded that, the better seed yield and quality could be obtained in *Kharif* season. Further, the production potential of the crop during these season in the study area emphasized the need to undertake further investigations with regard to use of high yielding, suitable genotypes and improving agro-techniques to harness the opportunity of growing marigold round the year commercially.

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Received : March, 2011; Accepted : May, 2011