



E-ISSN: 2278-4136
P-ISSN: 2349-8234
www.phytojournal.com
JPP 2020; 9(4): 212-214
Received: 01-05-2020
Accepted: 03-06-2020

AA Patade
College of Horticulture, Dapoli,
Dist. Ratnagiri, Maharashtra,
India

KV Malshe
College of Horticulture, Dapoli,
Dist. Ratnagiri, Maharashtra,
India

BR Salvi
College of Horticulture, Dapoli,
Dist. Ratnagiri, Maharashtra,
India

VV Sagvekar
College of Horticulture, Dapoli,
Dist. Ratnagiri, Maharashtra,
India

UB Pethe
College of Horticulture, Dapoli,
Dist. Ratnagiri, Maharashtra,
India

Corresponding Author:
AA Patade
College of Horticulture, Dapoli,
Dist. Ratnagiri, Maharashtra,
India

Effect of pinching on yield and economics in different varieties of marigold (*Tagetes spp*)

AA Patade, KV Malshe, BR Salvi, VV Sagvekar and UB Pethe

Abstract

The effect of pinching on yield and economics in different varieties of marigold (*Tagetes spp*) was assessed at Research farm of Department of Horticulture, College of Agriculture, Dapoli, Dist. Ratnagiri, (Maharashtra state) during *Rabi* season of the year 2017-18. The trial was laid out in the factorial randomized block design with three replications. The factors were three different varieties of marigold viz; Pusa Basanti Gaiinda, Pusa Arpita and Yellow 09 and four pinching treatments (Control-No pinching, Pinching after 3 weeks of transplanting, Pinching after 5 weeks of transplanting and Double pinching - Pinching after 3 and 5 weeks of transplanting) were adopted as second factor. The significantly maximum yield (8.561 kg/plot and 176.16 q/ha) was in V_3P_4 i.e. double pinching in Yellow 09 with the highest net returns of Rs. 521256.9/ha with cost benefit ratio of 1.97.

Keywords: Marigold, variety, pinching, yield, economics

Introduction

Marigold is native to Central and South America, especially Mexico and during early part of the 16th century, it got spread to different places from Mexico. It is one of the most important commercial loose flower crop and extensively used for making garlands for religious and social functions. It is commercially cultivated in India as it has wide adaptability and year round flower production with easy cultivation practices. Its free flowering habit, short duration to produce marketable flowers, wide spectrum of attractive colours, shapes, size and good keeping quality has attracted the attention towards it of many amateur and commercial flower growers. In crop improvement, different varieties of marigold have been evolved with distinctive phenotypic characters but their performance may vary from location to location as well as due to cultural practices.

In India, the total area under marigold cultivation is 255 thousand hectares with production of 1754 thousand MT loose flowers and 543 thousand MT cut flowers. In Haryana, the area under floriculture is 6.5 thousand hectares with a production of 65.5 thousand MT of loose flower and 11.3 thousand MT cut flowers, out of which 5.69 thousand hectares is covered under marigold cultivation with a loose flower production of 64.62 thousand MT (Saxena and Gandhi, 2014) [7].

The agro-climatic conditions of Konkan region are favourable for cultivation of marigold and there is high demand for these flowers especially during *Rabi* and *Kharif* season during festivals, religious ceremony as well as family functions.

Specific cultural practices help to alter the growth and flowering in flower crops which are beneficial for synchronization of flowering and higher yield. Among such practices, pinching is one of the practices. Pinching is done to stimulate early emergence of side branches which ultimately produces more number of flowers with good quality and uniform size (Nain *et al.*, 2017) [4]. To assess the influence of the pinching practice in different varieties of marigold in terms of yield and economics under Konkan region, the present investigation entitled 'Effect of pinching on yield and economics in different varieties of marigold (*Tagetes spp*)' was undertaken.

Material and Methods

The experiment was carried out at Research farm of Department of Horticulture, College of Agriculture, Dapoli, Dist. Ratnagiri, (Maharashtra state) during *Rabi* season of the year 2017-18. The trial was laid out in the factorial randomized block design with three replications. The factors were three different varieties of marigold viz; Pusa Basanti Gaiinda, Pusa Arpita and Yellow 09 and four pinching treatments (Control-No pinching, Pinching after 3 weeks of transplanting, Pinching after 5 weeks of transplanting and Double pinching - Pinching after 3 and 5 weeks of transplanting) were adopted as second factor.

The preparatory tillage operations were followed and flat beds of 2.7 X 1.8m size were prepared. The seedlings of selected varieties were transplanted at the spacing of 45 X 45 cm. The pinching treatments were given to each plot as per the specified time. For raising the crop, the recommended cultural

practices were followed. The observations on yield were recorded. The cost of production of each treatment combination was calculated based on prevailing rates of input and sale. The data were analyzed by standard method of analysis described by Panse and Sukhatme (1995) [5]

Table 1: Effect of pinching on yield in different varieties of marigold

Treatment Combination	Yield (kg/plot) (Plot size 4.86 m ²)			
	V ₁	V ₂	V ₃	Mean
P ₁	3.793	2.280	6.280	4.118
P ₂	3.911	2.375	7.830	4.705
P ₃	4.157	2.391	8.343	4.964
P ₄	4.289	2.539	8.561	5.130
Mean	4.038	2.396	7.754	4.729
S.E.± (For V)	0.002			
C.D. at 5%	0.005			
S.E.± (For P)	0.002			
C.D. at 5%	0.007			
S.Em.± (V X P)	0.007			
C.D. at 5%	0.020			

(Varieties (V) : V₁ - Pusa Basanti Gaiinda, V₂ - Pusa Arpita and V₃- Yellow 09)

(Pinching treatments (P) : P₁ - Control-No pinching, P₂ - Pinching after 3 weeks of transplanting, P₃- Pinching after 5 weeks of transplanting and P₄ - Double pinching -Pinching after 3 and 5 weeks of transplanting)

Table 2: Economics of marigold cultivation under the influence of different varieties and pinching treatments

Treatment combinations	Yield q/ha	Gross Returns (Rs./ha)	Cost of Cultivation (Rs./ha)	Net profit (Rs./ha)	C:B Ratio
V ₁ P ₁	78.04	468240	333461.2	134778.8	1.40
V ₁ P ₂	80.47	482820	335891.2	146928.8	1.43
V ₁ P ₃	85.54	513240	340961.2	172278.8	1.50
V ₁ P ₄	88.25	529500	343671.2	185828.8	1.54
V ₂ P ₁	46.91	281460	302331.2	-20871.2	0.93
V ₂ P ₂	48.86	293160	304281.2	-11121.2	0.96
V ₂ P ₃	49.19	295140	304611.2	-9471.2	0.96
V ₂ P ₄	52.25	313500	307671.2	5828.8	1.01
V ₃ P ₁	129.22	775320	488763.1	286556.9	1.58
V ₃ P ₂	161.11	966660	520653.1	446006.9	1.85
V ₃ P ₃	171.68	1030080	531223.1	498856.9	1.93
V ₃ P ₄	176.16	1056960	535703.1	521256.9	1.97

(Varieties (V): V₁ - Pusa Basanti Gaiinda, V₂ - Pusa Arpita and V₃- Yellow 09)

(Pinching treatments (P) : P₁ - Control-No pinching, P₂ - Pinching after 3 weeks of transplanting, P₃- Pinching after 5 weeks of transplanting and P₄ - Double pinching -Pinching after 3 and 5 weeks of transplanting)

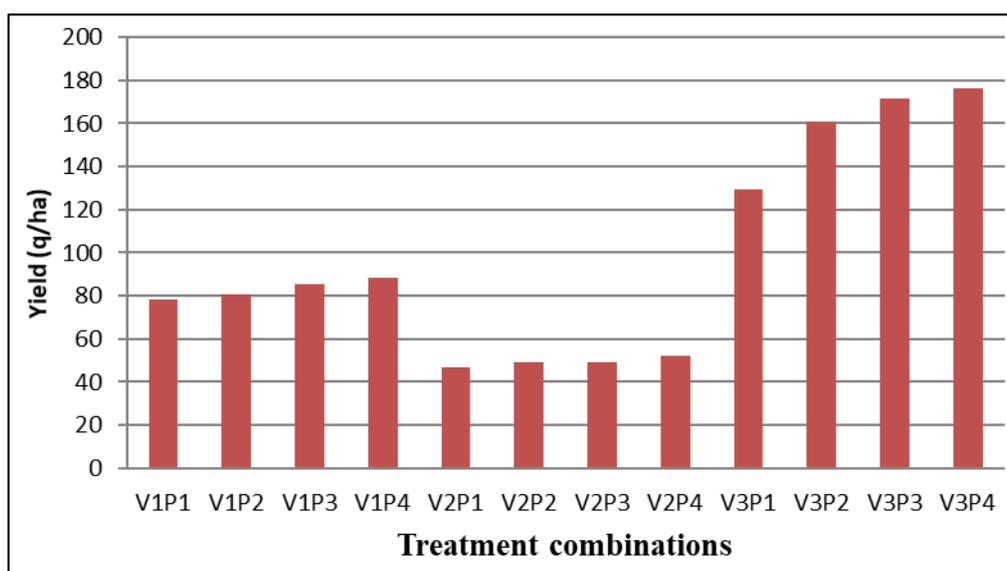


Fig 1: Effect of pinching on yield in different varieties of marigold

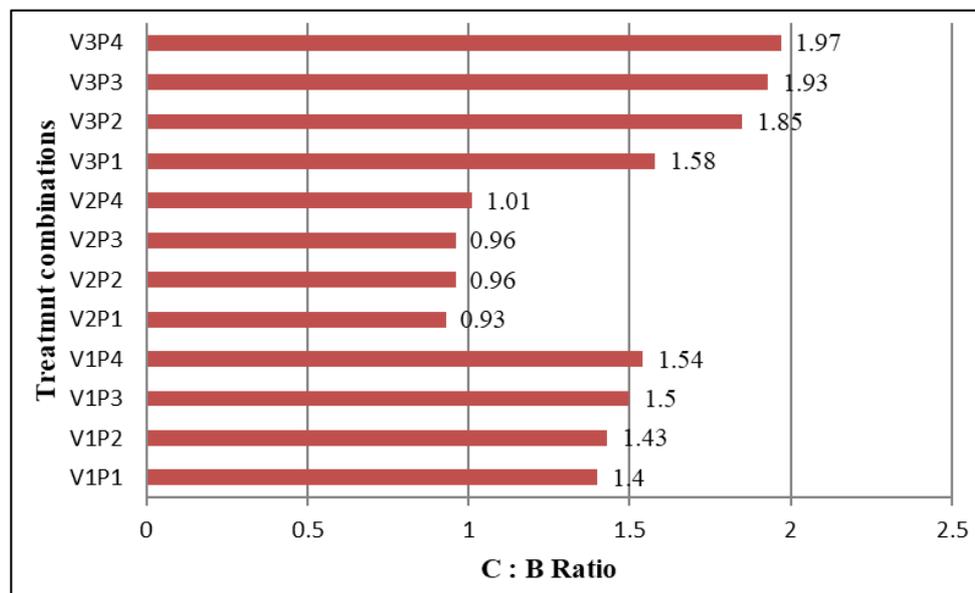


Fig 2: Economics of marigold cultivation under the influence of different varieties and pinching treatments

Results and Discussion

The data regarding yield per plot is presented in Table 1 revealed that among the varieties, the significantly maximum yield per plot (7.754 kg) was recorded in Yellow 09 (V_3), followed by V_1 (4.038kg) and minimum yield (2.396 kg/plot) was in Pusa Arpita (V_2). Among pinching treatments, the significantly highest flower yield per plot (5.130 kg) was recorded in P_4 (Double pinching treatment), followed by P_3 and P_2 . The lowest yield (4.118 kg/plot) was recorded in P_1 i.e. control.

The data on interaction between varieties and pinching revealed that significantly maximum yield (8.561 kg/plot) was in V_3P_4 i.e. double pinching in Yellow 09, followed by V_3P_3 , V_3P_2 and V_3P_1 . Whereas, minimum yield per plot was obtained (2.280kg) in V_2P_1 i.e. no pinching in Pusa Arpita variety.

The interaction between varieties and pinching showed significant difference in yield per hectare and highest yield (176.16 q) was recorded in V_3P_4 i.e. double pinching in Yellow 09. It was followed by P_3 , P_2 and P_1 pinching levels in Yellow 09 variety. The lowest yield (46.91 q/ha) was recorded in V_2P_1 i.e. no pinching in Pusa Arpita (Table 2 and Fig. 1).

These results might be due to variation in production of flower yield as Yellow 09 is a hybrid while least flower produced in Pusa Arpita as it is French marigold it may not respond well under konkan agroclimatic conditions due to high humidity which affects its flowering. Similar results were also reported by Deepa *et al.*, (2016) [1]. The increased yield of flowers per plot under pinching treatments might be helpful for production of more flowers due to development of additional number of apical shoots. Similar results were also obtained by Sharma *et al.* (2012) [8], Kour (2009) [2] and Mohanty *et al.* (2015) [3] in African marigold.

The data on cost of production and income (Economics) is presented in Table 2. The economics has been worked out for each treatment combination which showed that double pinching in Yellow 09 variety (V_3P_4) recorded the highest net returns of Rs. 521256.9/ha with cost benefit ratio of 1.97. It was followed by V_3P_3 and V_3P_2 .

The yield of Pusa Arpita variety was not as much satisfactory leading to negative returns (Average Cost benefit ratio of

0.97). The economically valuable effect of pinching operation was earlier reported by Rathore (2007) [6].

Based on yield performance and economics, it is inferred that cultivation of Yellow 09 with that double pinching practice is feasible under Konkan agro-climatic conditions.

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