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**Relangi Himaja**  
Department of Horticulture,  
Naini Agricultural Institute,  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**VM Prasad**  
Department of Horticulture,  
Naini Agricultural Institute,  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**Vijay Bahadur**  
Department of Horticulture,  
Naini Agricultural Institute,  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**Corresponding Author:**  
**Relangi Himaja**  
Department of Horticulture,  
Naini Agricultural Institute,  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

## Effect of organic manures on growth, flowering, yield and quality of African marigold (*Tagetes erecta* L.) in Prayagraj agro climatic conditions Cv. Pusa Narangi

Relangi Himaja, VM Prasad and Vijay Bahadur

### Abstract

The present investigation entitled "Effect of organic manures on growth, flowering, yield and quality of African marigold (*Tagetes erecta* L.) in Prayagraj agro-climatic conditions (Pusa Narangi gajinda) was undertaken at Department of Horticulture, Sam Higginbottom Institute of Agriculture Technology and Sciences, Allahabad, during the year 2020-2021. The experiment was laid out in R.B.D. with three replications and nine treatments separately. Studies showed that, significant effect on fresh weight of flower (25.33gm), (number of flowers per plant (27.67g), flower yield per plant (67.33g), flower yield per plot (1.41kg), flower yield per hectare (14.1 t ha<sup>-1</sup>), maximum gross return (Rs. 2,82,000 t ha<sup>-1</sup>), net return (Rs 2,19,350 t ha<sup>-1</sup>) and cost of benefit ratio (4.5) was recorded maximum in treatment with T6 (poultry manure) under Allahabad agro climatic conditions.

**Keywords:** *Tagetes erecta* L., growth, flower yield, quality, organic manures and economics

### Introduction

African Marigold (*Tagetes erecta* L.) cv. Pusa Narangi belongs to family Asteraceae is one of the most commonly grown loose flower and use extensively on religious and social functions in different forms (Singh *et al.*, 2001). This family includes 1,600 genera and 23,000 species, in which herbs, shrubs, climbers and also medicinal plants are included (Hussain *et al.*, 2012). African Marigold flowers has attractive range of colours for a considerably prolonged period and the flowers can be kept remarkably well when cut. Sometimes, the whole plant can be used for decorations.

Marigold is a native of Central and South America especially Mexico. The generic name *Tagetes* is derived from, "Tages", the name of Estruscsch God, known for his beauty. French was the first to apply the name *Tagetes*, which was later adopted by others (Kalpan, 1960). Marigold were domesticated and used as an ornamental plant during pre-Columbian period before they were introduced in Europe and South Asia including India (Bailey, 1963). In India, *Tagetes erecta* & *Tagetes patula* are under commercial cultivation for cut flowers, but premium prices are for *Tagetes erecta*. Different varieties of African marigold vary in plant height and spread, flower size, quality and yield (Jawaharlal, 2004) [2]. The flowers are large and globular in shape. Colour shades vary from light yellow to creamy yellow, bright yellow, cadmium orange, deep orange, sulphur, yellow and white. The chromosome number of African marigold is  $2n = 24$ .

In our country tremendous growth in area, production and consumption is being observed in floriculture.

Presently, India occupies approximately 1044 thousand ha land in floriculture (2017-18), which has increased from 249 thousand ha in 1998. The production of loose flowers was around 880 thousand MT (2006-07) which increased to 1962.03 thousand MT (2017-18) (Anon, 2018). The domestic industry is growing at annual rate of 7-10 per cent. Flower crops are now commercially cultivated in several states and area-wise Karnataka (17%), Jammu and Kashmir (16%), Tamil Nadu (10.5%) and West Bengal (8.5%) have gone ahead of other flower producing states like Uttar Pradesh, Gujarat, Andhra Pradesh, Madhya Pradesh, Kerala, Chhattisgarh Maharashtra, Punjab, Haryana, Odisha and Jharkhand. Still today, more than two-thirds of the area under floriculture is devoted to production of traditional flowers like marigold, jasmine, roses, chrysanthemum, tuberose, etc. The data available from the Department of Horticulture (Uttarakhand) indicate that present marigold crop in the state is being cultivated in an area of 828.84 ha with a production of 2167.71MT (Anon, 2017).

Commercially, it is cultivated for loose flower production. Now a day, research in the field consequently, many farmers are seeking alternative practices like organic farming such as poultry manure, farm yard manure, goat manure, vermicompost and compost to make crop cultivation sustainable. Application of organics which is an important component in organic farming, apart from improving the soil physical, chemical and biological properties with direct impact on moisture retention, root growth and nutrient conservation, can also reduce the cost of production in agriculture.

Considering its importance as commercial flower crop, the present experiment was carried out to find out the "Effect of organic manures on plant growth, flower, yield and quality of African marigold (*Tagetes erecta* L.)" cv. Pusa Narangi Gaiinda with the following objectives:

1. To find out the most suitable manuring for plant growth, flower, yield and quality of African marigold.
2. To work out the economics of different treatments

### Materials and Methods

A field experiment entitled "Effect of organic manures on growth, flowering, yield and quality of African marigold (*Tagetes erecta* L.) in Prayagraj agro climatic conditions" Cv. Pusa narangi. The experiment was laid out in Randomized Block Design with nine treatments and replicated thrice times. The marigold Cv. Pusa Narangi Gaiinda seedling was raised at nursery at 10 X 5-7 cm distance in a plot size 13m X 1m and transplanted in plot size 1 X 1 m at spacing 45 x 30 cm during 18th November, 2020. All agronomical practices in virtue were employed from time to time. The nursery beds were maintained systematically up to 45 days till the seedlings were ready for transplanting. Seedlings of marigold were transplanted in the main field, when they had 2-3 true leaf stage. During the transplanting soil was pressed firmly around the seedlings so that seedlings will not be disturbed by irrigation water immediately after transplanting. The organic manures (FYM, Poultry manure, Compost, and Vermicompost) were applied manually before twenty days from planting, applied in each plot according to treatments. Technique of random samples was adopted and five plants were selected from each treatment in all replications for the detailed studied on vegetative growth, floral and flower yield. This observation was recorded on 30, 60, 90, 120 days, of crop growth.

**Table 1:** Treatment Details

S. No	Treatment Details	
1	T1	Control
2	T2	Farmyard manure@1000g
3	T3	Farmyard manure @500g
4	T4	Vermi compost@ 500g
5	T5	Vermi compost @1000g
6	T6	Poultry manure@ 1000g
7	T7	Poultry manure @500g
8	T8	Goat manure@1000g
9	T9	Goat manure@500g

**Table 2:** Number of Flowers Plant-1 of Marigold (*Tagetes erecta* L.) as Influenced by Different Organic Manures

Number of flowers per plant		
Treatment No	Treatment	
T1	Control	7.27
T2	Farm yard manure	16.67
T3	Farm yard manure	15.70

### Result and Discussion

The present investigation was aimed at identifying suitable organic and inorganic manures treatments for marigold cultivation with respects to growth and yield attributes. Nine treatments including control, were evaluated during winter season 2020 in the experimental unit of Department of Horticulture, Allahabad school of Agriculture, Technology and Sciences, Allahabad the results of the experiment have been presented separately under the following headings.

#### No. of flowers per plant

Number of flowers per plant were recorded maximum recorded in treatment T6 Poultry manure is (27.67) and minimum number of flowers were recorded in treatment T1 control (7.27).

#### Flower yield Plant-1 (g)

The statistically analysis of the data on flower yield per plant of marigold found to be significant the mean of flower yield per plant. It is observed that treatment T6 Poultry manure gave highest maximum flower per plant (67.33g) while the minimum recorded with treatment T1 (Control) which gave highest flower per plant 24.33g.

#### Flower yield Per plot-1 (kg)

From the analysis of the observed data it is observed that treatment T6 Poultry manure gave highest maximum flower per plot (1.41 kg) while the minimum recorded with treatment T1 (Control) which gave highest flower per plot 0.56 kg.

#### Flower yield (t ha-1)

It is evident from ANOVA table that the flower yield was greatly significantly influenced by the different treatments of organic manure. Treatment T7 Poultry manure gave highest flower yield ha (14.1 t) while minimum was recorded with treatment T2 (Farm yard manure) while gave 5.6 t ha".

### Discussion

Plant nutrient supplied through organic sources had profound effect on growth of the crop either by acceleration of respiratory process with increasing cell probability and hormonal growth action or by combination of all these processes. It has been reported that among the organic sources of nutrients, poultry manure proved to be the best source of organic manure which helped in improving physico- chemical properties (pH, EC, organic carbon, macro and micro nutrients) of soil because of its higher analytical values.

It has also been experimentally proved that considerable amount of N present in poultry manure consist of uric acid, which is readily available to the plants. The C: N ratio of poultry manure reported to be narrower than others, which attenuates the release of nitrogen.

Poultry manure when supplied to soil improves texture makes soil loose increase water holding capacity and uplift humus status which maintain the optimum conditions for microorganism activity. since T6 is supplied with poultry manure. Therefore the treatment T6 gives better result in all, flowers yield.

T4	Vermicompost	12.10
T5	Vermicompost	9.33
T6	Poultry manure	27.67
T7	Poultry manure	24.00
T8	Goat manure	8.47
T9	Goat manure	11.33
	F-test	S
	S.Ed.(±)	1.01
	C.D.(P=0.05)	2.17

**Table 3:** Flower Yield Plot-1 (g), (kg), (t) ha<sup>-1</sup> of Marigold (*Tagetes erecta* L.) as Influenced by Different Organic Manures

Treatment No	Treatment	(g)	(kg)	(t ha <sup>-1</sup> )
T1	Control	680	0.68	6.8
T2	Farm yard manure	557.33	0.56	5.6
T3	Farm yard manure	588	0.59	5.9
T4	Vermicompost	617.33	0.62	6.2
T5	Vermicompost	658	0.66	6.6
T6	Poultry manure	1414	1.41	14.1
T7	Poultry manure	1003.67	1.00	10.1
T8	Goat manure	741.67	0.74	7.4
T9	Goat manure	786.67	0.79	7.9

**Table 4:** Economics of different treatments and benefit cost ratio of Marigold (*Tagetes erecta* L.) Pusa Narangi gainda

Treatment No.	Treatment	Flower yield	Selling price	Gross Income	Fixed Cost of cultivation	Net Income	Benefit cost ratio
T1	Control	6.8	20000	136000	53650	82650	2.53
T2	Farm yard manure	5.6	20000	112000	59650	52350	1.88
T3	Farm yard manure	5.9	20000	118000	56650	61350	2.08
T4	Vermi Compost	6.2	20000	124000	63650	60350	1.95
T5	Vermi Compost	6.6	20000	132000	58650	73350	2.25
T6	Poultry manure	14.1	20000	282000	62650	219350	4.5
T7	Poultry manure	10.1	20000	202000	58150	143850	3.47
T8	Goat manure	7.4	20000	148000	68650	79350	2.16
T9	Goat manure	7.9	20000	158000	61150	96850	2.58

## Conclusion

On the basis of the present investigation aimed to identify suitable organic manures treatment for Marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gaiinda with respect to productivity during the rainy season 2020, it is concluded that the application of treatment T6 (Poultry manure 10 t ha<sup>-1</sup>) gave maximum flower yield (14.1 t ha<sup>-1</sup>). The treatment T was found to be most economically viable in terms of gross return, net return and benefit cost ratio (4.5). However, since the results are obtained only from one season further investigations need to be done before recommending.

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