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Full Length Research Article

EFFECT OF ORGANIC INPUTS AND GROWTH REGULATORS ON YIELD OF FRENCH MARIGOLD (*TAGETES PATULA* L.)

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Field experiment was undertaken to find out the influence of different orgaftfc inputs and growth regulators on growth, yield and quality of French marigold (Tagetes patula L.) cv. Sindhamani, in a farmer's field at Sivapuri near Annamalainagar, Tamil Nadu. The experiment was laid out in randomized block design with three replications. Various organic inputs and growth regulators including panchagavya 3%, vermiwash 1:5 dilution, humic acid 0.02%, gibberellic acid 300ppm, triacontanol at 250 ppm were applied. The growth, yield and quality characters were studied at different stages of crop growth. The treatment with gibberellic acid @ 300 ppm + panchagavya @3% recorded the minimum days to first flowering, maximum number of flower per plant, flowers yield per plant, single and ten flower weight, flower stalk length, flower diameter, number of petals per flower compared to other treatments.

Key words: Marigold, Growth Regulators, Organic Inputs yield.

INTRODUCTION

Marigold is one of the most important species grown commercially for loose flower in different parts of India especially in the tropical and subtropical regions. Marigold, a member of the genus Tagetes of the family Asteraceae, is one of the most important flowering annuals, cultivated commercially in India as bedding plant, loose flower for making garlands, wreath, religious offering, colour pigments, insect and nematode repellants, nutrient supplement for poultry feed and cut flower purposes. Marigold gained popularity among gardeners and flower dealers on account of its easy culture and wide spectrum of attractive colours, shape, size, and good keeping quality. French marigold is used in landscape gardening due to its variable height icd colour of flower. It is ideal for rockery, edging, hanging baskets and window boxes. In recent times the flowers are also used for extraction of natural colouring materials used for cosmetic and food colouring (Ashraf et al., 2005). Carotenoids m marigold (Tagetes spp.) Have emerged as poultry feed mix for improving egg yolk pigmentation and its production. Lutein, a major component of carotenoid, is having therapeutic values.

MATERIALS AND METHODS

The present investigation entitled, "Influence of organic inputs and growth regulators on growth, yield and quality of Fench marigold (*Tagetes patula* L.)," was carried out in a farmer's field at Sivapuri which is located 3 km from Annamalainagar, Annamalai University, Tamil Nadu during 2014-2015. The experimental materials consisted of seedlings of French marigold (*Tagetes patula* L.) cv. Sindfhamani obtained from Hosur, Tamil Nadu.

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The experiment was laid out in Randomized Block Design (RBD) with three replications. Three different growth regulators with two concentrations an three organic inputs with control were adopted as treatment. The main field was prepared by thorough ploughing with tractor drawn disc plough. Well decomposed farm yard manure was applied at the rate of 25 tonnes per hectare. Watering was done to the plants immediately after transplanting. Subsequent watering was done to keep the optimum moisture as and when required. Weeds were removed periodically by hand weeding and stalking was given to all plants in order to prevent lodging.

Treatment details

T_1 - Gibberellie acid @300 ppm

T_2 - Panchagavya @3%

T_3 - Vermiwash 1:5 Dilution

T_4 - Triacontanol @ 250 ppm

T_5 - Humic acid @ 0.02%

T_6 - Gibberellic acid @ 300ppm + Panchagavya @ 3%

T_7 - Gibberellic acid @ 300ppm + Vermiwash 1:5 Dilution

T_8 - Gibberellic acid @ 300ppm + Humic acid @ 0.02%

T_9 - Triacontanol @ 250 ppm + Panchagavya @ 3% 1

T_{10} - Triacontanol @ 250 ppm + Vermiwash 1:5 Dilution T_{11}- Triacontanol @ 250 ppm + Humic acid @ 0.02% T_{12} - Absolute control

Research and Findings: Yield characters determines the flower yield of any crop. In general, the flower yield is determined by various yield components.

Influence of organic inputs and growth regulators on flowers yield attributes plant in french marigold

Treatments	Flower yield (g) plant	Single flower (g)	Ten flower weight (g)	Flower stalk length (cm)	Flower diameter (cm)	Number of Ray florets per flower
T1 - Gibberellie acid @300 ppm	150.63	1.45	15.58	7.86	5.02	59.69
T2 - Panchagavya @3%	128.27	0.97	9.68	5.13	3.91	49.09
T3 - Vermiwash 1:5 Dilution	113.37	0.91	9.14	5.08	3.74	49.32
T4 - Triacontanol @ 250 ppm	133.06	1.02	10.15	5.46	4.08	51.34
T5 - Humic acid @ 0.02%	102.74	0.85	8.51	4.81	3.51	48.16
T6 - Gibberellic acid @ 300ppm + Panchagavya @ 3%	179.43	2.23	23.93	10.08	6.25	68.62
T7 - Gibberellic acid @ 300ppm + Vermiwash 1:5 Dilution	168.01	1.90	19.25	9.35	5.46	64.72
T8 - Gibberellic acid @ 300ppm + Humic acid @ 0.02%	160.53	1.64	17.27	8.49	5.34	61.45
T9 - Triacontanol @ 250 ppm + Panchagavya @ 3% 1	148.32	1.40	14.08	7.22	4.72	56.34
T10 - Triacontanol @ 250 ppm + Vermiwash 1:5 Dilution	142.71	1.33	13.23	6.95	4.42	54.40
T11- Triacontanol @ 250 ppm + Humic acid @ 0.02%	138.28	1.12	11.15	6.61	4.23	53.35
T12 - Absolute control	93.71	0.05	0.49	4.56	3.15	46.57
SE.d	2.71	0.08	0.54	0.19	0.32	0.80
C.D (p=0.05)	5.62	0.16	1.11	0.40	0.67	1.66

Organic inputs and growth regulators play an important role on the yield components of any crop. In French marigold treatment with organic inputs and growth regulators effected different yield components. The earliest flowering acid along with panchagavya. was observed in the treatment of gibberellic. Gibberellins reduces juvenile period and with the termination of juvenile phase, the shoot apical meristem instead of producing leaves and branches start pflpfinfiing buds. Similar finding were also reported by Dahiya and Rana (2001) and Mithilesh kumar *et al.* (2014). Application of vermiwash would have favoured early flowering due to the continuous supply of growth promoting substances present in them. This was supported by the views of Sivasubramanian and Ganeshkumar (2004) in marigold. Combination of organic inputs and growth regulators showed increased effect over their *per se* performance. This could be attributed to the complimentary effect. Number of flowers per plant (Fig.3) was the highest in the treatment of gibberellic acid along with panchagavya.

The enhancement in number of flower per plant might be due to the production of large stage of growth which had sufficient time to accumulate carbohydrate for proper flower bud differentiation due to enhanced reproductive efficiency and photosynthesis restrictive plant type. The result was in close conformity with Sunitha *et al* (2007^ and Mithilesh Kumar *et al* (2014)f Vermiwash application would have helped in producing increased number of flowers due to the presence of phosphates, sulphates, chloride as potassium, sodium, magnesium, sulphur, iron, and ammonia. Further, the presence of all the salts in soluble form would have diffused into plant system through the stomatal opening -thus influenced the partitioning capacity of plants and in turn favoured increase yield. Similar findings were reported by Promoth (1995) and Morselli *el al* (1999^ Combination of organic inputs and growth regulators showed increased effect over their *per se* performance. This could be attributed to the complimentary effect. The highest flower yield per plant (Fig.4) was recorded in treatment of gibberellic acid along with panchagavya. Combined effect of gibberellic acid and panchagavya resulted in,highest flower yield. These findings are supported by Natarajan *et al* (1981), Ramesh Kumar and Gill (1983) *in Jasminum sambac,* Waheeduzzama (2004) in anthurium, Rajeswari *et al* (2006) in chrysanthemum.Combination of organic inputs and growth regulators showed increased effect over their *per se* performance. This could be attributed to the complimentary effect. The single and ten flower weight was the highest in treatment of gibberellic acid along with panchagavya. The higher flower yield is a manifestation of other yield contributing character like weight of flower (ten flower weight). The increased flower weight due to gibberellic acid in combination "with panchagavya was due to its complementary effect. Similar trend of higher ten flower weight was reported by Shivaprakash *et al,* (2011) in marigold and Chitra and Patil. (2007) in china aster. The highest stalk length was observed in the treatment of gibberellic acid along with panchagavya. The increment in stalk length might due lo enhanced cell division and cell enlargement, promotion of protein synthesis coupled with higher dry matter of apical dominance (Dalai *et al.* 2009). Similar result was also Eeptced by Tyagi and Vijay kumar (2006) and Mithilesh Kumar *et al.* (2014).

Conclusion

Based on the present investigation, among the various treatments T_6 (Gibberellic acid @ 300ppm + Panchagavya @ 3%) recorded the highest yield parameters.

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