RESPONSE OF PLANT GROWTH REGULATORS ON REGULATION OF FLOWERING AND YIELD ATTRIBUTES OFAFRICAN MARIGOLD (*Tagetes erecta* L)

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ABSTRACT

Marigold (*Tagetes erecia* L.) is an important commercial flower in India belongs to family Asteraceae. It is very popular due to easy to grow and wider adaptability. Blooms are naturally occurring in golden, orange, yellow, and white color, often with maroon highlights. A field experiment was carried out at the Department of Horticulture, Faculty of Agriculture, Annamalai University, Tamil Nadu. The experiment was conducted in randomized block design with ten treatments comprising of 3 levels each of BA (200, 300, 400 ppm), Ethrel (200, 300, 400 ppm) and Maleic hydrazide (200, 300, 400 ppm) replicated thrice to evaluate the effect of plant growth regulators on flowering attribute and yield characters in African marigold. Among all the treatments BA 400 ppm resulted in the early flower bud initiation, opening of first flower and maximum duration of flowering, flower stalk length, number of flowers per plant weight of flower, weight of flower per plant and flower yield per hectare followed by MH 400ppm.

Key words**:** African marigold, growth regulators.

INTRODUCTION

African marigold (*Tagetes erecta* L.) is one of the commercially exploited ornamental crop, grown for loose flower, for pigment Xanthophyll, aromatic oil and poultry feed. It occupies special status due to its hardiness, easy culture, wider adaptability to different soil and climatic conditions of flower growers. Flowers are in golden, orange, yellow, and white colour, often with maroon highlights. Floral heads are 4 to 6 cm in diameter, generally with both ray florets and disc florets. It is suitable for potted plant, bedding, edging, garland making and religious offering. Apart from its significance in ornamental horticulture, it has been valued for aromatic oil called as “Tagetes oil” which is used for preparation of higher grade perfume and also as an insect repellent. Recently, dried flower petals of marigold are used as poultry feed in order to improve the colour of egg yolk as well as broilers skins. So, it is gaining industrial importance due to its huge potential in value addition, to fulfil the demand of farmers and industrialist, it is necessary to increase its production through improved production technologies. It is highly suitable for making flower beds in herbaceous border and also found ideal for newly planted shrubberies to provide colour and fill the gap in landscape. Both leaves and flowers possess medicinal values.

Growth regulators find their extensive use in ornamental crops for modifying their developmental process. Plant growth regulators play an important role in flower production, which in small amount promotes or inhibits or quantitatively modifies growth and development. Ethrel retard plant height, number of nodes and internodal length, increase branching and delayed flowering (Sachs, 1961). Maleic hydrazide is also axillary bud controller and retards growth of plants. The experiment was carried out to know the response of plant growth regulators on regulation of flowering and yield attributes ofafrican marigold (*Tagetes erecta* L).

MATERIALS AND METHODS

A field experiment was carried out at the Department of Horticulture, Faculty of Agriculture, Annamalai University, Tamil Nadu. The experiment was conducted in randomized block design. The treatments comprising of three doses each of 3 levels each of Benzyladenine (200, 300, 400 ppm), Ethrel (200, 300, 400 ppm) and Maleic hydrazide (200, 300, 400 ppm). Spraying of growth regulators were done 30 days after transplanting. The experiment was laid out in a randomized block design with three replications. Treatment used in the study are T_1 - Control), T_2 - BA (200ppm), T_3 - BA (300ppm), T_4 - BA (400 ppm), T_5 - Ethrel (200 ppm), T_6 - Ethrel (300 ppm), T_7 - Ethrel (400 ppm), T_8 - MH (200 ppm), T_9 - MH (300 ppm) and T_{10} - MH (400 ppm). Twenty five days old seedling of African marigold (*Tagetes erecta* L.) plants were planted at a distance of 40 × 40 cm. Recommended doses of NPK and other inputs were applied at appropriate time. The important flowering characters viz. days taken to first flower bud initiation, days taken to opening of first flower, duration of flowering, length of flower stalk, diameter of flower, number of flower per plant and yield characters such as weight of flower, flowers yield per plant and flower yield per hectare were recorded.

RESULTS AND DISCUSSION

All the parameter were significantly influenced by the application of various concentration of plant growth regulators. Earliest bud initiation and flowering was observed with the application of BA 400 ppm. BA reduces juvenile period and with the termination of juvenile phase, the shoot apical meristem instead of producing leaves and branches start producing buds. Similar finding were also reported by Dahiya and Rana (2001). Minimum number of days taken application of BA 400 ppm. BA was found most effective in extending the flower duration of 54.22 days especially with BA 400 ppm. It might be due to advanced stage of flowering in marigold (Dutta *et al*., 1998). Significantly maximum flower stalk length (8.87 cm) and flower diameter (9.01 cm) were recorded with foliar spray of BA 400 ppm. The increase in the stalk length and flower diameter might be due to 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 reported by Tyagi and Kumar (2006). Maximum number of flowers per plant were recorded with

application of BA 400 ppm (66.83) The enhancement in number of flowers per plant might be due to the production of large number of laterals at early 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. Weight of flower was reported significantly maximum (14.77g) with application of BA 400 ppm. Significantly maximum weight of flower, yield of flower per plant and flower yield per hectare were recorded with foliar application of BA 400 ppm. Higaki and Rasmussan (1979) reported BA at 100, 500, 1000, 15000 mg/ litre induced adventitious buds in *Anthurium andreanum* L. The maximum adventitious shoot formation was recorded with BA at 1000 mg/litre. Ravias *et al*., (1992) reported in gladiolus that length of spike, length of rachis, number of florets, corm weight, number of cormels and weight of cormals were significantly improved by BA. Fujii and Saaski (2000) reported benzyladenine (BA) at 150 ppm induced significantly more branches in non branching cultivars of chrysanthemum. While cytokinin action in vascular plants is described as pleiotropic, this class of plant hormones specifically induces the transition from apical growth to growth via a three-faced apical cell in moss protonema. This bud induction can be pinpointed to differentiation of a specific single cell and thus is a very specific effect of cytokinin (Decker, 2006).

Table 1: Response of plant growth regulators on regulation of flowering and yield of African marigold (*tagetes erecta* . L)

Treatments	Plant height (cm)	Days taken to first flower bud initiation	Days taken to opening of first flower	Duration of flowering (Days)	Length of flowerstalk (cm)	Number of flowers per plant	Diameter of flower (cm)	Weight of flower (g)	Flower yield per plant (g)	Flower longevity (days)
T_1 - Control	36.28	69.29	116.93	38.21	5.38	41.35	5.68	7.38	523.43	5.89
T_2 – BA -200ppm	43.27	48.37	95.66	49.18	7.33	58.32	8.34	12.67	738.87	9.58
T_3 - BA -300ppm	45.11	49.91	95.12	50.29	7.91	57.68	7.83	13.25	792.56	10.06
T_4 - BA -400 ppm	47.18	45.38	93.27	52.21	8.15	63.63	8.69	13.49	821.84	12.04
T_5 - Ethrel -200 ppm	41.53	49.72	98.39	51.34	7.71	57.73	8.12	13.16	801.92	11.55
T_6 - Ethrel -300 ppm	41.76	50.81	96.73	45.22	7.92	60.34	7.29	12.88	756.81	11.38
T_7 - Ethrel -400 ppm	40.82	48.11	93.99	47.48	758	61.53	8.48	12.53	788.34	10.92
T_8 - MH -200 ppm	41.39	50.78	95.92	51.93	7.34	59.39	8.36	12.43	743.56	10.43
T_9 - MH -300 ppm	44.21	51.92	99.11	50.46	7.68	60.23	8.44	11.92	803.81	11.83
T_{10} - MH -400 ppm	45.91	47.83	90.33	54.22	8.87	66.83	9.01	14.77	836.59	12.85
S. Ed	0.55	2.27	2.53	1.04	0.54	2.35	0.54	0.54	24.67	0.45
CD (P= 0.05)	1.07	4.45	7.53	3.11	1.60	6.98	1.60	1.60	73.32	0.91

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