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RESEARCH ARTICLE

STUDIES ON THE EFFECT OF NUTRIENTS AND GROWTH REGULATORS ON THE GROWTH AND YIELD OF ANTHURIUM (ANTHURIUM ANDREANUM) CV. TROPICAL

***Ajish Muraleedharan and Karuppaiah, P.**

Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Cuddalore Dist, Tamil Nadu, India - 608002

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ABSTRACT

Investigation was carried out to study the effect of nutrients and growth regulators on the production of Anthurium (*Anthurium andreanum*) cv. Tropical. The experiment was conducted in Factorial completely randomized block design with four levels of foliar nutrients *viz.* Sea weed extract, panchakavya, humic acid and control and four levels of growth regulators *viz.* gibberillic acid, Triiodobenzoic Acid, Benzyladenine and control. The treatments were replicated thrice. The plants were maintained under 75 per cent shade net and with a growing medium mixture of coir pith + coconut husk. Among the different treatment combinations, foliar spray of Humic acid and gibberillic acid evinced maximum plant height, plant spread, number of flowers per plant, flower stalk length, spathe length, spathe breadth and the number of days taken for flower bud appearance was also earlier in this treatment.

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INTRODUCTION

Anthuriums are tropical plants grown for their showy cut flowers and attractive foliage. It has gained the importance as major cut flower of the modern world. Anthurium growing is a potential source of commercial farming and it makes best use of ready market for cut flowers with high returns both for its cut flower and whole plant. Anthurium is a slow growing perennial that requires shady, humid conditions as found in tropical forests. It includes more than 100 genera and about 1599 species, chiefly from tropics (Higaki *et al.,* 1994). The Anthurium plant possesses an underground rhizome with adventitious roots, with somewhat creeping habit of growth, using aerial roots for anchorage. The productivity and quality of flowers are closely related to nutrient supplement. Nitrogen, phosphorus and potassium are the three important nutrients that play very important role in altering growth, yield and quality attributes (Abdussamed, 1999). The plant produces blooms throughout the year, one bloom emerging from the axil of every leaf. Flowers are usually harvested once a week at three quarters maturity. Anthurium production in traditionally growing countries has declined since 1986, due to bacterial blight (Laws and Galinsky, 1996) and the new production centres in other geographical areas are now contributing to the production of Anthurium cut flowers. The positive effect of application of plant growth regulators interms of increased number of flowers and lateral shoots per plant in the present study is inline with the reports of Imamura and Higaki (1988) and Henny and Hamilton (1992). Even though Anthurium is grown by many planters, there is very less scientific information on the use of growth regulators and foliar application of nutrients. Standardization of nutrients and growth regulators is most important to obtain higher yield and quality of the flower. Therefore, the present work is carried out with a view to find the nutrient level and growth regulator for enhancing the growth and flowering.

****Corresponding author: Ajish Muraleedharan,***
Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Cuddalore Dist, Tamil Nadu, India – 608002.

MATERIALS AND METHODS

The present study was carried out in Flora-tech floriculture unit at kottarakara, kollam Dist, kerala state, India during 2009-2011. The expriment was conducted was conducted with four levels of foliar nutrients and four types of growth regulators in a combination of 16 treatments. The treatments with three replications were carried out in factorial completely randomized design. The Anthurium (*Anthurium andreanum*) cv. Tropical was used for the study with 16 different treatment combinations given here, T_1 (Sea Weed Extract × GA_3), T_2(Sea Weed Extract × TIBA), T_3 (Sea Weed Extract × BA), T_4(Sea

Weed Extract × No growth regulator), T_5 (Panchakavya × GA_3), T_6(Panchakavya ×TIBA),T_7(Panchakavya × BA), T_8(Panchakavya × No growth regulator), T_9(Humic Acid × GA_3), T_{10}(Humic Acid × TIBA), T_{11}(Humic Acid × BA) and T_{12}(Humic Acid × No growth regulator), T_{13} (No nutrients × GA_3), T_{14} (No nutrients × TIBA), T_{15} (No nutrients × BA) and T_{16} (No nutrients × No growth regulator). Plant height, plant spread, number of flowers per plant, flower stalk length, spathe length, spathe breadth and number of days taken for flower bud appearance were observed and recorded.

RESULTS AND DISCUSSION

The result evinced significant influence in overall performances of Anthurium plants due to *per se* and interaction effect of nutrients and growth regulators. Among the different treatment combinations, the maximum plant height (66.11 cm), plant spread (89.56 cm), number of flowers per plant (10.08), flower stalk length (59.35 cm), spathe length (15.38 cm) and spathe breadth (15.84 cm) were recorded in T_9 (Humic Acid × Gibberellic acid), this was followed by T_{11} (Humic Acid × Benzyladenine) with plant height of 64.36 cm, plant spread of 87.78 cm, 9.69 flowers per plant, flower stalk length of 58.06 cm, spathe length of 14.92 cm and 15.33 cm of spathe breadth. Days taken for flower bud initiation was also early in T_9 with 52.36 days, followed by T_{11} with 57.25days.

Effect of nutrients and growth regulators on the growth and yield of Anthurium (*Anthurium andreanum*) cv. Tropical

Treatments	Plant height	Plant spread	Number of flowers per plant	Flower stalk length	Spathe length	Spathe breadth	Days taken for flower bud appearance
T_1 - $N_1 \times G_1$	58.06	80.94	8.39	53.21	13.31	13.56	70.13
T_2 - $N_1 \times G_2$	54.67	77.50	7.65	50.72	12.42	12.57	79.59
T_3 - $N_1 \times G_3$	56.37	79.23	8.02	51.97	12.87	13.07	74.84
T_4 - $N_1 \times G_4$	45.45	67.06	5.83	43.41	10.10	10.05	93.86
T_5 - $N_2 \times G_1$	62.01	85.18	9.22	56.23	14.33	14.68	61.43
T_6 - $N_2 \times G_2$	58.64	81.76	8.48	53.75	13.44	13.70	70.84
T_7 - $N_2 \times G_3$	60.31	83.45	8.85	54.97	13.88	14.18	66.18
T_8 - $N_2 \times G_4$	47.08	68.72	6.19	44.62	10.53	10.53	89.30
T_9 - $N_3 \times G_1$	66.11	89.56	10.08	59.35	15.38	15.84	52.36
T_{10} - $N_3 \times G_2$	62.64	86.04	9.32	56.79	14.47	14.83	62.05
T_{11} - $N_3 \times G_3$	64.36	87.78	9.69	58.06	14.92	15.33	57.25
T_{12} - $N_3 \times G_4$	48.73	70.39	6.56	45.83	10.96	11.01	84.69
T_{13} - $N_4 \times G_1$	53.58	75.95	7.50	49.70	12.17	12.32	78.00
T_{14} - $N_4 \times G_2$	50.24	72.57	6.76	47.25	11.30	11.35	87.31
T_{15} - $N_4 \times G_3$	51.91	74.26	7.13	48.48	11.74	11.84	82.65
T_{16} - $N_4 \times G_4$	45.69	68.84	5.58	44.32	10.03	9.89	109.38
SE (d)	0.77	0.78	0.17	0.57	0.20	0.22	-2.15
CD (p=0.05)	1.57	1.59	0.35	1.15	0.41	0.46	-4.37

N_1 – Sea Weed Extract G_1 - GA_3 - Gibberillic acid
N_2 – Panchakavya G_2 - TIBA - Triiodobenzoic Acid
N_3 – Humic Acid G_3 - BA - Benzyladenine
N_4 – No nutrients (control) G_4 - No growth regulator (control)

The least plant height (45.69 cm), plant spread (68.84 cm), number of flowers per plant (5.58), flower stalk length(44.32 cm), spathe length (10.03 cm) and spathe breadth (9.89 cm) were recorded in T_{16} (No nutrients × No growth regulator). Days taken for flower bud initiation were delayed in T_{16}, which took 109.38 days for bud appearance.

The increased results in T_9 (Humic Acid × Gibberellic acid) may be due to appropriate shade of 75 percent and growing media comprising of coir pith and coconut husk along with foliar spray of humic acid and gibberellic acid. The present result is inline with the following results. According to Dufour and Gue`rin (2005) in Anthurium nutritional status affects yield and quality. Henny *et al.* 1999 reported that a single foliar spray of GA_3 250ppm to 2000 ppm helped the *Syngonium podophyllum* variety White butterfly belonging to Araceae family to flower within 86 days. The increase in flower number has been reported by Von Henting (1960) even at 10 ppm GA_3. Abou Zied and Bakry (1978) also reported increase in duration of flowering and decrease in inflorescence diameter with different GA concentrations.

According to Anand and Jawaharlal (2004) flowering behaviour of Anthurium plants has been drastically modified by the foliar spray of growth regulators. Among the various growth regulators tested GA_3 was found to reduce the time taken for flowering in Anthurium andreanum var. Temptation under 75 % shade net house conditions. Sekar and Sujata (2001) concluded that the plants grown on coir pith substrate and sprayed with GA_3 200 ppm twice at monthly intervals commencing from 90 days after planting gave high yield of good quality flowers in gerbera. Considering the above facts and results of the present investigation it could be concluded that the treatment combination of Humic Acid × Gibberellic acid with 75 percent shade and growing media comprising of coir pith and coconut husk as the best for the growth and yield of Anthurium (*Anthurium andreanum*) cv. Tropical Red.

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