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Response of anthurium to foliar application of urea and growth regulators in shade net house

B.Y. PANCHOLI, **J.R. DESAI**, S.N. SARAVAIYA, N.M. PATEL AND R.B. PATEL

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See end of the article for authors' affiliations

Correspondence to:

J.R. DESAI
Department of Floriculture, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA

ABSTRACT

An experiment on "Response of anthurium to foliar application of urea and growth regulators in shade net house" was carried out at Floriculture Research Scheme, Regional Horticultural Research Station, Navsari Agricultural University, Navsari during the last week of July 2007 to April 2008, under Factorial concept with Completely Randomized Design replicated thrice, which included 20 treatment combinations of BA (50,100 and 150 ppm), GA_3(50,100 and 150 ppm), urea (0.5, 1 and 1.5%) as well as control with two cultivars *viz*., "Coralis" and "Patino". In each treatment four plants per variety were selected for observations. The spraying of urea and growth regulators was done twice at 25 and 50 days after transplanting to the pot by using micro fine nozzle of Ganesh Hand sprayer during morning hours. All the leaves were thoroughly sprayed from all the sides. For this purpose 20 to 25 ml solution per plant was sufficient. It could be concluded that both urea and growth regulators had beneficial effect over control in both the cultivars in respect of growth and flowering characters. Although spraying of GA_3 @ 150 ppm is more beneficial. Interaction effect of treatment x variety (T x V) was non significant with respect to number of suckers per plant whereas all other, growth, flowering, yield and quality parameters recorded significant effect.

Key words : Anthurium, Urea, BA, GA_3, Growth, Flowering, yield, Quality, Shade net house.

Anthurium (*Anthurium andreanum* Lind.) belongs to Araceae family is the most popular with flower arrangers because of the bold effect and lasting qualities of the inflorescence. It is a native of Columbia and is a perennial, herbaceous, semi terrestrial plant with somewhat creeping habit of growth, using aerial roots for and anchorage. Plant is erect with long lobed and heart shaped green leaves. Its flower is a combination of colourful modified leaf (spathe) and pencil like protrusion (spadix) borne on leafless stalk or peduncle (Bhatt and Desai, 1989). Hundreds of small bisexual, sessile flowers are arranged on the spadix. It requires warm greenhouse and humid condition. Six to eight flowers are obtained per plant per year from the axil of every leaf (Paull *et al.,* 1992). Bright red and bright orange are the colours for which greatest demand exists all over the world, followed by white and lastly pink. Double coloured varieties are also gaining importance.

In India, anthurium industry is still in its infancy. Among the different management practices in flower crops, in addition to NPK fertilizers, plant growth regulators have a great bearing in influencing the growth and flowering attributes. Now-a-days plant growth regulators can be easily available in the market. Until now no comprehensive research work has been carried out on systematic cultivation of anthurium with respect to foliar application of urea as well as plant growth regulators under agroclimatic condition of south Gujarat region. The information generated by conducting such research will be a valuable guidance to the research workers and florists in other regions. Considering the importance of these aspects an experiment on foliar application of plant growth regulators and urea with varying concentrations was conducted on anthurium.

MATERIALS AND METHODS

An experiment on "Response of anthurium to foliar application of urea and growth regulators in shade net house" was carried out at Floriculture Research Scheme, Regional Horticultural Research Station, Navsari Agricultural University, Navsari during the last week of July 2007 to April 2008, under Factorial concept with Completely Randomized Design replicated thrice, which included 20 treatment combinations of BA (50,100 and 150 ppm), GA_3(50,100 and 150 ppm), urea (0.5, 1 and 1.5%) as well as control with two cultivars *viz*., "Coralis" and "Patino". In each treatment four plants per variety were selected for observations. The spraying of urea and growth regulators was done twice at 25 and 50 days after transplanting to the pot by using micro fine nozzle of Ganesh Hand sprayer during morning hours. All the leaves were thoroughly sprayed from all the sides. For this purpose 20 to 25 ml solution per plant was sufficient. The

data on various attributes were subfected to statistical analysis following the method of Panse and Sukhatme (1985).

RESULTS AND DISCUSSION

The results obtained from the present investigation have been discussed under following heads :

On growth attributes:

The foliar application of GA_3 (150ppm) recorded significantly maximum number of leaves per plant (4.9) as well as maximum number of suckers per plant (1.7) (Table 1). In case of variety, V_1, (Coralis) recorded significantly maximum number of leaves per plant (5.2) as well as maximum number of suckers per plant (1.8) (Table 1).

Interaction effect of treatment x variety was non significant with respect to number of suckers per plant whereas, number of leaves per plant had recorded significant effect.

The increase in number of leaves per plant with the application of gibberellic acid was a result of enhanced induction of leaf initial breaks *i.e.* differentiation of leaf primordial in the apical growing region.

The increase in number of suckers per plant with the application of gibberellic acid was a result of increase in number of internodes and increased photosynthetic efficiency of the plant due to increase in chlorophyll content.

The response of variety might be due to genetic make up of cultivar.

These findings are in accordance with the findings of Dhaduk *et al.*(2007) Srinivasa (2005) and Jawaharlal *et al.* (2001) in anthurium, Nair *et al.* (2002) in gerbera; Sakhare (1991) in gaillardia; Syamal *et al.* (1990) in aster as well as Jayanthi (1982) in china aster.

On flowering attributes :

The data shown in Table 2 revealed that significantly the highest spathe length (7.1cm) as well as spadix length (3.5cm) was recorded with the foliar application of GA_3 @ 150 ppm.

Among both the variety, the highest values for spathe length (5.9cm) was recorded in cv. PATINO whereas, the maximum sapdix length (2.9cm) was found with cv. CORALIS.

Interaction effect of treatment x variety was found to be significant in both the above mentioned flowering attributes.

Increased in spathe length and spadix length with GA_3 application can be attributed to active cell elongation and cell division in the flowers to increase the sink strength of the actively growing parts.

Incase of varieties, the response might be due to the influence of genetic make up of the cultivar.

This result was in conformity with the observations of Dhaduk *et al.* (2007), Srinivasa (2005) and Jawaharlal *et al.* (2001) in anthurium; Lakhani *et al.* (2007) in rose; Tyagi and Kumar(2006) in African marigold, Padmapriya and Chezhiyan (2002) in Chrysanthemum and Sekar and Sujata (2001) in gerbera.

On yield attributes:

It is apparent from Table 3 that significantly the

Table 1 : Influence of foliar spray of urea and plant growth regulators on growth attributes of anthurium

Treatments	Number of leaves per plant			Number of suckers per plant		
	Coralis	Patino	Mean	Coralis	Patino	Mean
T_1: BA @ 50ppm	3.9	3.8	3.9	1.4	1.1	1.3
T_2: BA @ 100ppm	4.3	3.8	4.1	1.6	1.7	1.4
T_3: BA @ 150ppm	3.8	3.9	3.9	1.7	1.2	1.4
T_4: GA_3 @ 50ppm	4.8	4.1	4.4	1.4	1.7	1.4
T_5: GA_3 @ 100ppm	4.9	4.3	4.6	1.6	1.4	1.5
T_6: GA_3 @ 150ppm	5.2	4.6	4.9	1.8	1.5	1.7
T_7: Urea @ 0.5%	3.4	3.4	3.4	1.4	1.2	1.3
T_8: Urea @ 1 %	4.1	3.9	4.0	1.5	1.3	1.4
T_9: Urea @ 1.5 %	4.2	4.9	4.1	1.7	1.4	1.6
T_{10}: Control	3.2	3.1	3.1	1.1	1.0	1.1
Mean	4.2	3.9	---	1.5	1.3	---
Source	S.E.±	C.D (P=0.05)	C.V.%	S.E.±	C.D (P=0.05)	C.V.%
Variety	0.03	0.08		0.02	0.05	
Treatment	0.06	0.18	3.88	0.04	0.11	6.55
V X T	0.09	0.26		0.05	NS	

NS – Non significant

Table 2 : Influence of foliar spray of urea and plant growth regulators on flowering attributes of anthurium

Treatments	Spathe length			Spadix lenght		
	Coralis	Patino	Mean	Coralis	Patino	Mean
T_1: BA @ 50ppm	5.3	5.4	5.4	2.7	2.5	2.6
T_2: BA @ 100ppm	5.6	6.8	6.2	2.8	3.0	2.9
T_3: BA @ 150ppm	5.6	5.6	5.6	2.8	2.9	2.9
T_4: GA_3 @ 50ppm	5.9	5.7	5.8	2.7	2.6	2.6
T_5: GA_3 @ 100ppm	6.1	7.6	6.8	3.2	2.8	3.0
T_6: GA_3 @ 150ppm	6.2	7.9	7.1	4.0	3.0	3.5
T_7: Urea @ 0.5%	5.0	4.6	4.8	2.6	2.2	2.4
T_8: Urea @ 1 %	5.3	5.3	5.3	2.7	2.6	2.7
T_9: Urea @ 1.5 %	5.4	5.8	5.6	2.9	3.0	3.0
T_{10}: Control	4.0	4.1	4.1	2.2	2.1	2.1
Mean	5.4	5.9	---	2.9	2.7	---
Source	S.E.±	C.D.(P=0.05)	C.V.%	S.E.±	C.D.(P=0.05)	C.V.%
Variety	0.06	0.17		0.03	0.07	
Treatment	0.13	0.38	5.75	0.06	0.17	5.13
V X T	0.19	0.54		0.08	0.23	

Table 3 : Influence of foliar spray of urea and plant growth regulators on number of flowers per plant of anthurium

Variety / TreatmentS	Mean number of flowers per plant		Mean
	Coralis	Patino	
T_1: BA @ 50ppm	2.7	2.7	2.7
T_2: BA @ 100ppm	3.3	2.9	3.1
T_3: BA @ 150ppm	2.9	2.8	2.9
T_4: GA_3 @ 50ppm	3.3	3.0	3.2
T_5: GA_3 @ 100ppm	3.7	3.4	3.6
T_6: GA_3 @ 150ppm	4.3	3.9	4.1
T_7: Urea @ 0.5%	2.8	2.7	2.7
T_8: Urea @ 1 %	3.0	2.9	3.0
T_9: Urea @ 1.5 %	3.3	3.3	3.3
T_{10}: Control	2.0	1.9	2.0
Mean	3.1	3.0	
Source	S.E.±	C.D.(P=0.05)	C.V.%
Variety	0.03	0.09	
Treatment	0.07	0.20	5.74
V X T	0.10	0.29	

maximum number of flowers per plant (4.1) was found in GA_3 @ 150 ppm.

In case of varieties, "Coralis" recorded maximum number of flowers per plant (3.10).

Interaction effect was found significant.

It was observed the increasing trend of number of flowers per plant with the increasing levels of gibberllic acid GA_3 through alpha-amylase activity, auxin stimulating effect and increased cell elongation along with cell enlargement. The difference between the two verities might be due to genetic make up of the cultivar.

Similar trends were in consonance with Dhaduk *et al.* (2007), Srinivasa (2005) and Jawaharlal *et al.* (2001) in anthurium, Tyagi and Kumar (2006) in African marigold, Pathan (2005) in chrysanthemum, Pandey *et al.* (2003) in marigold and Kumar *et al.* (2003) in china aster.

On quality attributes:

The data related to shelf life (Days) as well as vase life (Days) of anthurium as influenced by foliar spray of various PGRs are presented in Table 4.

From Table 4, it is evident that the plants sprayed with GA_3 @ 150 ppm recorded maximum shelf life (61.7days) as well as vase life (15.5 days).

Among two varieties, the highest shelf life of 50.9 days and the highest vase life of 12.5 days was recorded in cv. "PATINO".

Interaction effect of treatment x variety was found to be significant for shelf life as well as vase life characters.

The impact of results might be due to more number of leaves which increased photosynthetic area and spathe length and stalk length which caused increase in carbohydrate food material store which ultimately increased shelf life as well as vase life.

The varietal response could be due to the influence of genetic make up of the particular cultivar and stalk length of flower.

This result was analogous with the earlier findings of Pathan (2005) in chrysanthemum, Lakhani *et al.* (2007) Chaudhari (2003), Dhekney *et al.* (2000) and Patil (2002)

Table 4 : Influence of foliar spray of urea and plant growth regulators on shelf life as well as vase life of anthurium

Treatments	Shelf life (Days)			Vase life (Days)		
	Coralis	Patino	Mean	Coralis	Patino	Mean
T_1: BA @ 50ppm	42.3	41.1	41.7	12.3	13.0	12.7
T_2: BA @ 100ppm	47.3	59.0	53.2	14.0	13.3	13.7
T_3: BA @ 150ppm	32.4	48.0	40.2	12.0	12.3	12.2
T_4: GA_3 @ 50ppm	51.0	60.9	56.0	12.0	12.7	12.3
T_5: GA_3 @ 100ppm	51.5	66.7	59.1	13.3	13.7	13.5
T_6: GA_3 @ 150ppm	53.7	69.7	61.7	14.7	16.3	15.5
T_7: Urea @ 0.5%	50.0	46.0	48.0	9.7	9.7	9.7
T_8: Urea @ 1 %	51.7	44.6	48.1	10.7	12.0	11.3
T_9: Urea @ 1.5 %	53.0	45.2	49.1	12.0	12.7	12.3
T_{10}: Control	26.0	27.4	26.7	6.7	9.3	8.0
Mean	45.9	50.9	---	11.7	12.5	---
Source	S.E.±	C.D.(P=0.05)	C.V.%	S.E.±	C.D.(P=0.05)	C.V.%
Variety	0.52	1.48		0.09	0.25	
Treatment	1.16	3.30	5.85	0.20	0.56	3.99
V X T	1.63	4.67		0.28	0.80	

BA = Benzyladenine (6-BA)
GA = Gibberellic acid (GA_3)

in gaillardia, Sekar and Sujata (2001) in gerbera and Sharma *et al.*(2001) in chrysanthemum.

Authors' affiliations:
B.Y. PANCHOLI, S.N. SARAVAIYA, N.M. PATEL AND R.B. PATEL, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA

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