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Short Communication

Performance of Anthurium (*Anthurium andraeanum* Lindl) cultivars under hill zone of Karnataka

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ABSTRACT

An investigation was carried out at experimental block, College of Horticulture, Mudigere. Tropical recorded maximum LAI 2.83, and had maximum plant height, number of leaves, leaf area and Leaf area Index. Cultivar Crinkle Red recorded maximum number of flowers per plant per year (13.14), which was on par with Tropical (11.77), Cheers (10.60) and Fire (10.25). Cultivar Midori recorded maximum vase life (35.00 days) followed by Tropical (33.33 days) and it was on par with Fire (32.22 days). Cultivar Midori recorded maximum vase life (35.00 days), followed by Tropical (33.33 days) and it was on par with Fire (32.22 days) and highest B:C ratio is recorded in cultivar Tropical (1.83) and it was least in Fantacia (1.13) .

Keywords: Anthurium, Protected cultivation, Economics

INTRODUCTION

Anthurium (*Anthurium andraeanum* Lind) is cultivated for its colour full spathe and attractive foliage, *Anthurium* is having 600 species distributed worldwide. It is grown for different purposes among them *Anthurium andraeanum* is popular for cut flower (Shiva and Sujatha, 2008). The major producers in the world are Netherland, Mauritius and Hawaii. Asia is most rapidly growing market for Anthurium. It is basically a semiterrestrial tropical plant requiring warm, shaded and humid conditions, similar conditions that prevail in West Coast and Western ghat hilly regions of South India. Commercial cultivation of Anthurium started by coffee planters of Karnataka, Kerala and Tamil Nadu. It comes up well under temperatures of 21-24 °C, relative humidity of 60-80 % with low to medium light intensity of 20000 to 25000 Lux and very importantly quality flowers with bright colour, good stalk length. Growth & yield can be achieved at 60 to 80 % shade in different seasons (Prakash *et al.*, 2006). Though coffee is the major crop in hilly regions of Karnataka lot of fluctuation exists in price and due to labour problem planters are looking for an alternative crop, with this background present study was carried out to find out

suitable varieties for hill zone of Karnataka under NVPH.

The present investigation was carried out at experimental block, College of Horticulture, Mudigere which is situated in hill zone of Karnataka at 13° 07' North latitude, 75° 37' East longitude with an altitude of 982 m above mean sea level which receives annual rain fall of 2000 to 3500 mm spread over 4-5 months (Jan-Sept) with temperature (27 °C) and RH (80 %). Experiment was laid out in Complete Randomised Design with 7 anthurium cultivars viz., Tropical, Midori, Cheers, Crinkle Red, Fantasia and Acropolis and replicated thrice for cut flower production in raised bed during 2013-2016 under NVPH. The bed comprised of coconut husk, coffee pulp, coir pith, brick pieces and tile pieces. Pooled Data on vegetative parameters viz; plant height, number of leaves, leaf area, Leaf Area Index), flowering parameters viz; days taken for unfolding of spathe from initiation of flowers, number of days taken for full unfolding of spathe from initiation of flower and vase life), quality parameters viz; peduncle length, spathe length, spadix length, spadix angle to spathe and yield parameters viz; number of flowers per plant were recorded at monthly interval from six months after planting.

Vegetative characters were significantly influenced by the cultivars (**Table 1**). Maximum plant height was recorded in cultivar Tropical (73.12 cm) and it was on par with *cv.* Fire (64.22 cm) and Cheers (60.13 cm) and least plant height was recorded in *cv.* Fantasia (30.63 cm). With respect to number of leaves *cv.* Midori recorded highest number of leaves (13.44) which was at par with *cv.* Tropical (12.56) and *cv.* Fire (12.23) and lowest o leaves were recorded in *cv.* Fantasia (5.43). Cultivar Tropical recorded maximum petiole length (36.15 cm) and it was minimum in *cv.* Fantasia (19.25). For leaf area and Leaf Area Index, *cv.* Crinkle Red

(2662.00 cm²) was at par with *cv.* Tropical (2585.00 cm²) and it was least in *cv.* Fantasia (955.00 cm²). While, LAI is concerned *cv.* Tropical recorded maximum LAI 2.83, followed by Midori 2.49 and least was in Fantasia 1.0. Cultivar Tropical was aggressive in vegetative growth so it had maximum plant height, number of leaves, leaf area and so also maximum Leaf area Index hence maximum photosyntates. This may also be attributed to the interaction between environment. While *cv.* Fantasia recorded least LAI with least plant height, number of leaves and leaf area. These findings are in line with findings of Femina *et al* (2006)

Table 1. Vegetative parameters as influenced by different Anthurium cultivars (pooled data 3 years)

Treatment	Plant height (cm)	Number of leaves	Leaf area (cm ²)	LAI	Petiole length (cm)
V ₁ : Fantasia	29.88	5.48	953.00	1.13	19.92
V ₂ : Acropolis	43.68	8.94	1617.67	1.73	26.67
V ₃ : Crinkle Red	55.76	10.64	2662.33	3.43	26.50
V ₄ : Tropical Red	72.04	12.69	2585.00	2.93	36.72
V ₅ : Fire	64.07	11.91	1790.00	2.00	30.63
V ₆ : Cheers	59.71	7.97	1512.33	1.95	27.16
V ₇ : Midori	55.67	13.22	2306.00	2.66	33.59
S. Em ±	0.45	0.54	1.48	0.27	0.51
CD (P=0.05)	1.39	1.68	4.57	0.84	1.58

Significant difference was observed for flowering, quality and yield parameters. The pooled data is presented in (**Table 2**). Cultivar Fantasia (50.54 days) took minimum days for unfolding of spathe from initiation, while *cv.* Tropical (73.12 days) took maximum days which was at par with Fire (64.22 days) and Cheers (60.13 days). Peduncle length is most important character which decides the suitability as cut flower and price of any anthurium variety, Cultivar Tropical had (63.50 cm) peduncle length being highest among the cultivars followed by Cheers and Fire. Cultivar Fantasia recorded minimum peduncle length (28.23 cm). Another important quality parameter that makes cultivar suitable for export is Spadix angle to spathe. Similar results were also reported by Rajeevan *et al* (2007) in Anthurium. If angle is wide there is chance of breakage of spadix in packing so an angle of around 30° is ideal. Cultivar Tropical had an angle of 32° which was on par with Fire with an angle of 32.25° and Crinkle Red and

Acropolis had maximum angle of 44.10° and 43.20° respectively. Femina *et al* (2006) also reported variation in spadix angle in Anthurium cultivars studied.

Main objective of protected cultivation is to have more number of flowers per square meter, significant differences were observed for yield parameters. Cultivar Crinkle Red statistically recorded maximum number of flowers per plant per year (13.14), which was on par with Tropical (11.77), Cheers (10.60), Fire (10.25) and least was in Fantasia (8.1). Cultivar Midori recorded maximum vase life (35.00 days), followed by Tropical (33.33 days) and it was on par with Fire (32.22 days), least vase life was recorded in *cv.* Acropolis with 19 .00 days. Earlier Latha *et al* (2015) showed similar results in variety 'Esmeralda'. Similar results were also recorded by Paull and Chantrachit (2001) and Thawiang *et al* (2007). Though the *cv.* Crinkle Red had maximum flowers but quality parameters like peduncle length, spadix

angle was more hence not suitable for export hence can only be sold in local market. Whereas, Tropical had appreciable vegetative, quality, flowering and yield parameters along with maximum plant height, number of leaves, highest peduncle length, leaf area, LAI which was able to synthesize more photosynthates and thus produced better quality flowers, more yield and maximum vase life. Similar results were also reported by Islam *et al* (2013) in Anthurium. Significant difference were reported for B:C ratio (**Table 3.**)

among all cultivars, cost of cultivation was 4,12,539.00 for 560 sq.mt and yield varied from 40,500 in Cv. Fantasia to 58,850 in Cv. Tropical accordingly gross and net returns were varied from 7,55,280 to 3,42,741. cultivar Tropical recorded maximum B:C ratio (1.83) followed by Cheers (1.64), Fire (1.51) and it was least in Fantasia (1.13), these difference may be attributed to yield potential and quality of flowers of individual genotypes, similar results were also reported by Agasimani *et al.*, (2011).

Table 2. Flower, quality and yield parameters as influenced by Anthurium cultivars (pooled data 3yrs)

Treatment	Days to initiate bud to flowering	Peduncle length (cm)	Spathe length (cm)	Spathe width (cm)	Spadix angle to spathe	Spadix length (cm)	Spadix width (mm)	Flowering duration (days)	Number of flowers/plant/year	Vase life (days)
V ₁ : Fantasia	50.54	28.08	10.55	7.81	35.03	3.60	7.84	57.11	8.1	28.00
V ₂ : Acropolis	44.09	43.07	13.56	9.47	34.13	4.87	7.78	48.22	10.08	19.70
V ₃ : Crinkle Red	56.21	44.03	10.55	9.45	29.07	4.56	7.00	58.44	13.41	24.89
V ₄ : Tropical Red	73.15	63.17	15.01	10.59	32.00	6.52	9.94	61.22	11.77	32.78
V ₅ : Fire	64.26	56.30	13.87	9.61	32.42	5.58	8.87	58.67	10.25	32.41
V ₆ : Cheers	60.12	47.27	9.53	8.06	28.30	3.60	7.53	64.22	10.60	30.11
V ₇ : Midori	56.14	59.15	13.36	11.19	30.04	5.46	8.53	94.11	9.05	35.17
S. Em ±	0.54	0.63	0.34	0.35	0.65	0.33	0.37	0.68	0.58	0.57
CD (P=0.05)	1.65	1.93	1.06	1.09	2.02	1.00	1.16	2.10	1.95	1.75

Table 3. Economics of Anthurium cultivars during II year

Cultivar	Total cost of cultivation for 560 sq.mt (Rs.)	Flower yield (560 sq.mt)	Price per flower		Gross return (Rs.) *	Net returns (Rs.)	GBC ratio
			A grade	B Grade			
V ₁ : Fantasia	4,12,539.00	40500	24300	16200	4,69,800.00	57,261.00	1.13
V ₂ : Acropolis	4,12,539.00	50500	30300	20200	5,85,800.00	1,73,261.00	1.41
V ₃ : Crinkle Red	4,12,539.00	67050	13410	53640	6,16,860.00	2,04,321.00	1.49
V ₄ : Tropical	4,12,539.00	58850	47080	11770	7,55,280.00	3,42,741.00	1.83
V ₅ : Fire	4,12,539.00	51250	35875	15375	6,25,250.00	2,12,711.00	1.51
V ₆ : Cheers	4,12,539.00	53000	42400	10600	6,78,400.00	2,65,861.00	1.64
V ₇ : Midori	4,12,539.00	45500	36400	9100	5,85,400.00	1,72,861.00	1.41

- A grade flower average price Rs.14
- B grade flower average price is Rs.8/flower is the Cost of flower considered for calculation

Establishment cost for Anthurium grown under naturally ventilated polyhouse of 560 m² area

Particulars Remarks	Total cost	Amortized cost	(Rs./year)
I. Investment cost			
Construction of polyhouse (for life of 15 years)	4,000,00.00	26,600.00	With drip and ventury system
Planting materials@100/plant for 4 years (5000 plants/450 sq.mt net cultivable area)	4,90,000.00	1,22,500.00	80 % area is the actual planting area after excluding paths and hockey (20 %)
Bed preparation (tiles, bricks, coconut husk, coir pith) for four years	50,000.00	12,500.00	Apportioned for 4 years
Sub total	9,40,000.00	1,61,600.00	Polyhouse-15 yrs Plants-4 yrs
II. Maintenance cost for first year			
1. Labour @ Rs.450/day labour for bed preparation and planting 20 man days	9,000.00		
Supervision and to operate drip and fertigation unit (2hrs a day) 60 man days	27,000.00		
Spraying of PP chemicals @ 2 hr/ 15 day/year=6 man days	2700.00		
Intercultural operationsWeeding, harvesting, filling of media, harvesting of flowers and packing of flowers harvested in first year. 2 labour/15 days for 10 months is 40 man days	18,000.00		
2. Fertilizers and plant protection chemicals	30,492.00		
3. Irrigation	5000.00		
4. Harvesting and packing	10000.00		
Total maintenance cost I year	1,02,192.00		
Total return during I year	15000 x 4 = 60,000.00		3 flowers/plant after six months and sold @ Rs. 4/ flower for C grade flower
Maintenance cost I year	Rs.42,192.00	Rs.10,548.00	Apportioned for 4 years
Total establishment cost	Rs.9,82,192.00	1,72,148.00	
III. Cost of cultivation of Anthurium under NVPH polyhouse II year onwards			
Variable cost			
1. Labour @ Rs.450/day			
a. Supervision and to operate drip and fertigation unit (2hrs a day) 40 man days	18,000.00		

b. Spraying of PP chemicals @ 2 hr/ 15 day/year=6 man days	2700.00		
c. Intercultural operations Weeding, harvesting, filling of media, harvesting of flowers and packing of flowers harvested in first year. 3 labour/15 days for 10 months is 50 man days	22,500.00		
2. Inputs			
a. Fertilizers and Plant protection chemicals	52,500.00		
b. Irrigation	5000.00		
c. packing material and transportation	30,000.00		
Interest on VC @11 %	Rs.14,377.00		
Total Variable cost	Rs.1,30,700.00		
3. Fixed cost			
a. Interest on fixed investment @ 11%	1,08,041.00		
b. Amortization cost /year	1,72,148.00		
c. Depreciation on equipments – Sprayer and tools	1650.00		
Total FC	Rs.2,81,839.00		
Total cost of cultivation	Rs.4,12,539.00		

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