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Leaf and Flower Development Studies in Different Anthurium Cultivars for their Performance under Protected Cultivation

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ABSTRACT: *The study was conducted on the experimental block of the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, during 2012-13 to study the leaf and flower development of seven anthurium varieties* viz., *Fantasia, Acropolis, Arabhavi Local, Tropical, Fire, Cheers and Midori. Results revealed that varieties significantly influenced the leaf and flower development. In case of leaf development, early unfolding of leaf, early to complete full opening and early maturity of leaf was noticed in variety Fantasia (6.67 days, 10.00 days and 29.00 days, respectively), whereas it was late in variety Fire (13.00 days,16.33 days and 36.00 days, respectively). Variety Tropical recorded the maximum leaf length (31.50 cm), leaf width (22.91 cm) and leaf area per plant (4320.00 cm^2), while the variety Arabhavi Local recorded maximum number of leaves per plant (8.67) at 360 days after planting. In case of flower development, early unfolding of spathe and early full unfolding of spathe was observed in variety Arabhavi Local (16.67 days and 26.67 days, respectively), whereas it was late in variety Fire (32.67 days and 35.33 days, respectively). Shelf life of intact flower on the plant was found maximum in variety Midori (94.33 days). It was minimum in variety Acropolis (48.67 days). Floral characters like; spathe length (12.00 cm), spadix length (6.89 cm) and spadix girth (10.11 mm) was highest in variety Tropical compared to other varieties. The spathe width (14.83 cm) was highest in variety Midori. All other varieties were found statistically significant with each other.*

Keywords: *Anthurium, Varieties, Protected cultivation, leaf and flower*

INTRODUCTION

Anthurium (*Anthurium andreanum* Lind.) is a slow-growing perennial, requires shady and humid conditions. The genus, *Anthurium*, is a neotropical in origin, evergreen plant, belongs to the family Araceae. The name anthurium is derived from Greek words 'anthos' meaning flower and 'oura' tail referring to the spadix. Thus, anthurium is also known as 'tail flower' (Tajuddin and Prakash, 1996). Anthurium ranks eleventh in global flower trade with respect to price both for its cut flower and whole plant. Anthurium is next only to orchids among the tropical flowers. Presently, Netherland is the world's leading producer and exporter followed by Mauritius and Hawaii. Germany is the largest importer of Dutch anthuriums, followed by Italy and France.

Anthurium is not commercially cultivated in hilly and transitional zone, though it is an ideal crop for this region. This is mainly due to the lack of awareness among the farmers about the cultivation of anthurium. The performance of genotypes of any crop depends on the cultivars apart from environment. Hence, it is proposed to identify suitable genotypes and create awareness among the farmers for commercial cultivation of anthurium.

MATERIAL AND METHODS

The present investigation was carried out at the experimental block of the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, is situated in hill zone of Karnataka at 13^0 7′ North latitude, 75^0 37′ East longitude with an altitude of 982 m above mean sea level.It receives an annual mean rainfall of 2486.7 mm. Seven anthurium varieties *viz*., Fantasia, Acropolis, Arabhavi Local, Tropical, Fire, Cheers and Midori were selected to study their performance for leaf and flower development.

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This experiment was carried by following Randomized Complete Block Design (RCBD). The treatments comprised of seven varieties and replicated thrice. The experiment was laid out in a naturally ventilated polyhouse. Its frame is made up of galvanized iron pipe and covered with 800 gauge UV stabilized polyethylene film. The shade net with 75 per cent shade was provided above the headspace inside the polyhouse to manage the light intensity and temperature during summer. Both sides are covered with 50 mesh size plastic net for natural ventilation. All the varieties were planted between 13th March, 2012 to 16th April 2012. Planting was done at the spacing of 30 cm x 30 cm. Number of plants per plot was 30. Observations on leaf characters such as days taken for unfolding of leaf, days taken for full unfolding of leaf and days taken for maturity of leaf from initiation of leaf, number of leaves, leaf length, leaf width, leaf area/plant and the flower characters such as days taken for unfolding of spathe from initiation of flower. Days taken for full unfolding of spathe from initiation of flower and shelf life of intact flower on the plants, spathe length, spathe wtdth, spadix length and spadix girth.

RESULTS AND DISCUSSION

Leaf development: Varieties varied significantly with respect to the days taken for unfolding of leaf, days taken for full unfolding of leaf and days taken for maturity of leaf from initiation of leaf are presented in table 1.

Early unfolding of leaf was noticed in variety Fantasia (6.67 days), followed by Midori (8.00 days) and Tropical (8.67 days) whereas it was late in variety Fire (13.00 days).

Varieties Fantasia (10.00 days), Midori (11.33 days) and Tropical (12.33 days) which were early to start unfolding were also early to complete full opening, whereas variety Fire (16.33 days) taken maximum number of days for full unfolding of leaf from initiation of leaf.

Early maturity of leaf was noticed in variety Fantasia (29.00 days) followed by Tropical and Midori (32.33 days), whereas the variety Fire (36.00 days) taken more days for reaching maturity from initiation of leaf.

Leaf parameters: The data on influence of different cultivars on various leaf characters are presented in table 2. The mean number of leaves per plant was significantly differed among the varieties. Maximum number of leaves per plant was produced in varieties Arabhavi Local (8.67) and Midori (8.17) which were superior than all other varieties, and variety Fantasia (6.24) recorded minimum number of leaves per plant. Variety Tropical recorded maximum leaf length, leaf width and leaf area per plant (31.50 cm, 22.91 cm and 4320 cm^2 respectively) as against minimum in variety Fantasia (17.93 cm, 13.42 cm and 1296.94 cm^2 respectively). Variation in leaf production among the cultivars can be attributed to genetic makeup of the varieties. Number of leaves per plant depends on the efficiency of photosynthetic activity, which contributes towards better growth and yield. Similarly variation in leaf production was also reported earlier by several workers *viz.*, Agasimani *et al.* (2011), Srinivasa and Reddy (2005).

Flower development: Varieties varied significantly on days taken for unfolding of spathe from initiation of flower. Days taken for full unfolding of spathe from initiation of flower and shelf life of intact flower on the plants are presented in table 3.

Early unfolding of spathe was observed in variety Arabhavi Local (16.67 days), followed by variety Midori (21.67 days), whereas it was late in Fire (32.67 days) delayed for unfolding of spathe from initiation of flower.

Full unfolding of spathe was noticed early in variety Arabhavi Local (26.67 days) and Midori (28.67 days), whereas it was late in Fire (35.33 days) from initiation of flower.

Shelf life of intact flower on the plant was found maximum in variety Midori (94.33 days) and next best was Cheers (64.67 days). It was minimum in variety Acropolis (48.67 days). All other varieties were found statistically significant with each other.

Flower parameters: The data on various flowering characters are significantly influenced by different cultivars are presented in table 4. At the final stage of the experiment (at 360 DAP), variety Tropical recorded maximum spathe length and spadix length (12.00 cm and 6.89 cm, respectively) as against minimum in variety Fantasia (8.03 cm and 4.75 cm, respectively). Variety Tropical recorded maximum spadix girth (10.11 mm), whereas variety Arabhavi Local recorded minimum spadix girth (7.42 mm). The spathe width was maximum in variety Midori (14.83 cm) and was minimum in variety Fantasia (8.16 cm). The differences in these flower characters can be attributed to genetic make up of the varieties These findings confirm the reports of Agasimani *et al.* (2011) and Rajeevan *et al.* (2007).

Table 1
Leaf Development as Influenced by Different Cultivars of Anthurium

Cultivar	*Number of days taken for unfolding of leaf from initiation of leaf*	*Number of days taken for full unfolding of leaf from initiation of leaf*	*Number of days taken for maturity of leaf from initiation of leaf*
Fantasia	6.67	10.00	29.00
Acropolis	9.33	13.00	33.00
Arabhavi Local	11.33	16.00	35.00
Tropical	8.67	12.33	32.33
Fire	13.00	16.33	36.00
Cheers	9.67	12.33	34.67
Midori	8.00	11.33	32.33
S. Em±	0.41	0.61	0.51
CD @ 5%	1.27	1.88	1.57

Table 2
Leaf Parameters of Different Anthurium Cultivars

Cultivar	*Number of leaves / plant*	*Leaf length (cm)*	*Leaf width (cm)*	*Leaf area / plant(cm²)*
Fantasia	6.24	17.93	13.42	1296.94
Acropolis	6.41	28.93	17.43	2729.53
Arabhavi Local	8.67	29.33	18.24	3938.08
Tropical	7.04	31.50	22.91	4320.00
Fire	6.81	26.60	18.03	2768.78
Cheers	7.96	24.58	16.42	2739.31
Midori	8.17	28.66	17.92	3578.78
S. Em±	0.39	1.11	0.80	250.53
CD @ 5%	1.22	3.41	2.47	771.94

Table 3
Flower Development as Influenced by Different Anthurium Cultivars

Cultivar	*Number of days taken for unfolding of spathe from initiation of flower*	*Number of days taken for full unfolding of spathe from initiation of flower*	*Shelf life of intact flower on the plant (days)*
Fantasia	22.67	31.33	57.33
Acropolis	25.67	30.67	48.67
Arabhavi Local	16.67	26.67	58.33
Tropical	28.33	31.00	61.67
Fire	32.67	35.33	59.00
Cheers	29.33	32.67	64.67
Midori	21.67	28.67	94.33
S. Em±	0.35	0.60	1.84
CD @ 5%	1.07	1.83	5.67

Table 4
Flowering Parameters of Different Anthurium Varieties

Cultivar	*Spathe length (cm)*	*Spathe width (cm)*	*Spadix length (cm)*	*Spadix girth (mm)*
Fantasia	8.03	8.16	4.75	8.31
Acropolis	10.01	12.10	5.61	8.15
Arabhavi Local	11.24	12.91	4.65	7.42
Tropical	12.00	13.02	6.89	10.11
Fire	11.16	12.18	6.36	9.50
Cheers	8.16	8.57	4.85	7.92
Midori	11.58	14.83	5.92	8.92
S. Em±	0.25	0.30	0.22	0.22
CD @ 5%	0.77	0.92	0.69	0.68

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