



Varietal Performance of Anthurium (*Anthurium andreaeanum*) on Growth and Flowering in the Subtropical Zone of West Bengal

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

An investigation was conducted to evaluate genotypes of Anthurium by maintaining in the pot at Horticultural Research Station, Mondouri, Bidhan Chandra Krishi Viswavidyalaya, West Bengal during three consecutive years 2015-16, 2016-17 and 2017-18. The experiment was laid out in Complete Randomized Design (CRD) with fourteen anthurium cultivars and replicated thrice. Significant differences were found between all the parameters studied. From the pooled data of three years, it was observed that Tropical Red, Agnihotri and Marina recorded better suckering ability. The highest plant was recorded in Tropical (42.4 cm) closely followed by KalingPong Pink (41.2 cm) and Nitta (39.8 cm). A maximum number of flowers plant⁻¹ year⁻¹ was noticed in Tropical (8.3) and lowest in Alexis (2.1). Ozaki Red recorded the largest flower (9.5 x 7.6 sq. cm), which was followed by Tropical (9.02 x 8.6 sq. cm), Tinora (8.9 x 7.3 sq. cm), and Alexis (8.9 x 8.6 sq. cm). The longest flower spike length was observed in Agnihotri (38.2 cm) followed by Tropical. Spike

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extended maximum vase life in Pistache (10.1 days) closely followed by Tropical (9.9 days). Overall, among the fourteen cultivars, Tropical was the best cultivar regarding both yield and quality flower production for commercial cultivation in the sub-tropical conditions of West Bengal.

Keywords: Anthurium; evaluation; pot; sub-tropical; germplasm.

1. INTRODUCTION

Anthurium (*Anthurium andreanum* Lind) is a tropical flowering, a perennial herbaceous indoor plant of great beauty and grown for its colourful long-lasting spathe, spadix, and attractive foliage. The spadix is a cylindrical spike with an enormous amount of flowers and spathe is its modified bract [1]. This plant is grown for various purposes though it is popular as a cut flower [2]. Nowadays anthurium has risen as important material for flower arrangement because of its distinguished look and long-lasting quality. It has increasing popularity in Indian markets and for that reason, most of the locally produced varieties are sold in the markets with unreasonable prices.

Wide ranges of spathe colour variation are found like red, dark red, brick red, salmon red, pink, lavender, light white, creamy or multi-colour. These differences are due to genetic diversity of different varieties. There are some growers of Kerala, Karnataka, Tamil Nadu, Maharashtra and West Bengal in India has already started growing anthurium on a large scale [3]. Yet most of our country's demand is fulfilled by importing anthurium from other countries. Cultivation of anthurium is catching up rapidly in commercial sectors. In West Bengal, there are big flower markets like Mallick Ghat and New Market in Kolkata, where anthurium is also being sold besides other flowers. In order to find out commercially important characteristics, varieties were evaluated, characterized, and documented by observing morphological and agronomic traits. The variables like spike length, size of spathe and spadix, and vase life of the spike are most important for assessing the quality of anthurium cultivars. The present research was undertaken with the aim to assess the quality of different varieties and recommend suitable varieties for commercial cultivation in the subtropical climate of West Bengal.

2. MATERIALS AND METHODS

The present investigation was carried out under All India Coordinated Research Project on Floriculture at Horticultural Research Station, Mondouri, Bidhan Chandra Krishi

Viswavidyalaya, West Bengal under shade house (65% shade) during three consecutive years i.e. 2015-16, 2016-17 & 2017-18. The experimental site is situated at 23°05" Northern latitude and 89° Eastern longitude and at an elevation of 9.75 m above the mean sea level which received annual rainfall of 900 mm to 1200 mm with 20°C-31°C average temperature and 80% relative humidity. The experiment was laid out in Complete Randomised Design (CRD) with 14 anthurium cultivars viz. Tropical, KalingPong Pink, Nitta, Tinora, Ozaki Red, Pistache, Regina, Alexis, Honduras, Marina, Agnihotri, Salmon, Anmol and Cancan as a pot plant and replicated thrice. Healthy and uniform suckers of anthurium were selected and planted in the month of June under shade house (100 m²) condition. Coco peat, perlite and charcoal in 3:1:1 proportion was used as growing media with pots of 20 cm × 20 cm in size. For the proper growth and development of the potted plants 19:19:19 (1 g/l of water at weekly interval), MgSO₄ (1 g/l of water at monthly interval) and CaSO₄ (1 g/l of water at monthly interval) were applied throughout the growing period. There were 45 pots of each cultivar in which five plants were selected randomly from each replication of each cultivar for recording observations. The pooled Data on vegetative parameters (plant height, number of leaves per plant, leaf area and number of suckers per plant) were recorded at intervals of three months whereas flowering and quality parameters (flowering duration, length of spike, spathe length, spathe width, spadix length, number of flowers per year and vase life) were recorded throughout the flowering season. The plant height, length of spike, spathe length, spathe width and spadix length were measured with the help of meter scale and expressed into centimeter. The leaf area was measured with the help of digital leaf area meter. In the case of vase life flowers were placed in 200 ml transparent glass bottles containing 100 ml tap water. The ends of the flower stalk were cut to prevent bacterial clogging and tap water was changed in every alternate days. The number of days till the spathe started to wilt were recorded for the evaluation of the vase life. The data of three years were analyzed statistically at

5% level of significance using OPSTAT by adopting pooled analysis and appropriate standard error (S.Em \pm) method as suggested by [4].

3. RESULTS AND DISCUSSION

3.1 Vegetative Growth

Presented data (Table 1) showed significant variation in vegetative characters. Among different varieties 'Tropical' was recorded maximum plant height (42.4 cm) closely followed by 'KalingPong Pink' (41.2 cm) and 'Nitta' (39.8 cm), whereas minimum plant height (18.8 cm) was observed in 'Agnihotri' variety. Genotypic and various environmental factors always control the plant height and other growth performance. Roni et al. [5] and Chen et al. [6] obtained similar performance of anthurium cultivars regarding plant height under interior conditions.

In the case of number of leaves/plant, the highest (10.7) number was observed in cv. Marina followed by 'Alexis' (9.4) and Anmol (9.4) and the lowest number of leaves (7.6) was recorded in cv. Pistache. Due to inherent genetic characters, variations could be expected among the varieties. A similar type of result was found by Henely and Robinson [7] with 21 potted anthurium.

Concerning the leaf area cv. Honduras was recorded maximum area (175.4 sq. cm), which was followed by cv. Alexis (159.9 sq. cm) and Ozaki Red (157.2 sq. cm) and least leaf area (94.3 sq. cm) was recorded in 'Regina'. The environmental factors i.e. temperature, RH, and light intensity also influence leaf area. The results are in line with the observation of Femina et al. [8] and Srinivasa and Reddy [9].

Regarding sucker numbers/plant, the highest number of suckers is found in 'Marina' (7.9) and 'Agnihotri' (7.9) closely followed by cv. Tropical (6.9), whereas the least number of suckers/plant was recorded (3.6) in 5 varieties i.e. Pistache, Alexis, Honduras, Salmon and Anmol. The number of suckers is highly dependent on the cultivar of anthurium [10].

3.2 Flowering Behavior

A significant difference was found (Table 2) among the cultivars regarding flowering, quality and yield parameters. The longest flowering duration was recorded in cv. Tropical (230 days) and its main flowering season is July-February, closely followed by 'Regina' (226.7 days). The shortest duration of flowering was observed in cv. Marina (96.1 days).

Regarding the length of the spike, the highest data was noted in 'Agnihotri' (38.3 cm), which was at par with 'Tropical' (37.6 cm) and the lowest length (9.8 cm) was recorded in Cancan variety. Islam et al. [11] also obtained similar results in a variety 'Triticaca'.

Cultivar Ozaki Red reached maximum spathe length (9.6 cm) closely followed by 'Tropical' (9.0 cm) and cv. Salmon had the minimum spathe length i.e. 7.4 cm. This result is in agreement with the observation of Agasimani et al. [12].

In case of spathe width, most wide spathe (8.8 cm) was found in cultivar Alexis at par with Tropical (8.6 cm) and Cancan (8.6). 'Nitta' had the least wide (6.3 cm) spathe. Talia et al. [13] experimented on different varieties and observed that variety 'Queen' had shown a wider spathe. Different environmental factors like temperature, relative humidity may influence the spathe breadth and varied within cultivars [14].

Concerning spadix length, cv. Salmon had the longest spadix (5.1 cm) followed by Anmol (4.9 cm) and Tropical (4.3 cm). Pistache had the shortest spadix of 2.8 cm. Agasimani et al. [12] documented similar results with anthurium cv. Esmeralda.

The maximum number of flowers (Table 2) per plant per year was recorded in cv. Tropical i.e. 8.3 nos. and the minimum number of flowers was found in Alexis (2.1). It has been noted that Tropical variety remarkably produces more flowers, almost four times more than Alexis, and three times more than Nitta, Honduras, Marina, Salmon, and Anmol. Similar results were shown for flower production by Anand et al. [3] in the Calisto variety.

Table 1. Vegetative growth of different Anthurium cultivars (pooled data of 3 years)

Name of the varieties	Plant height (cm)	No. of leaves/plant	Leaf area (sq.cm)	No. of suckers/plant
Tropical	42.4	8.6	109.8	6.9
KalingPong Pink	41.2	7.9	120.6	5.9
Nitta	39.8	8.4	97.8	5.6
Tinora	39.0	8.3	139.2	5.3
Ozaki Red	36.7	9.8	157.2	5.9
Pistache	29.0	7.6	134.0	3.6
Regina	33.0	9.1	94.3	4.8
Alexis	34.0	9.4	159.9	3.6
Honduras	34.1	7.9	175.4	3.6
Marina	31.2	10.7	105.1	7.9
Agnihotri	18.8	8.9	122.8	7.9
Salmon	24.0	9.0	98.0	3.6
Anmol	22.3	9.4	129.3	3.6
Cancan	33.2	9.7	118.9	4.4
S.Em(±)	1.15	0.26	2.82	0.26
CD at 0.05	3.41	0.78	8.37	0.76

Table 2. Flowering behavior of different Anthurium cultivars (pooled data of 3 yrs)

Name of the varieties	Season of flowering	Duration of flowering(days)	Length of spike(cm)	Spathe length(cm)	Spathe width(cm)	Spadix length(cm)	No. of flowers/year	Vase life in tap water(days)
Tropical	July-Feb.	230.0	37.6	9.0	8.6	4.3	8.3	10.0
KalingPong Pink	July-Nov.	151.8	27.6	8.3	6.6	3.8	4.0	8.5
Nitta	July-Nov.	178.3	27.0	8.5	6.3	3.9	2.8	6.2
Tinora	July-Nov.	136.1	27.2	8.9	7.3	3.2	3.0	9.4
Ozaki Red	July-Nov.	122.8	36.9	9.6	7.6	3.7	5.1	8.0
Pistache	July-Oct.	166.1	30.3	8.6	8.4	2.8	4.6	10.1
Regina	July-Nov.	226.7	26.3	8.4	7.3	2.9	4.0	8.7
Alexis	July-Nov.	152.3	35.4	8.9	8.8	3.1	2.1	7.2
Honduras	July-Oct.	114.3	29.5	8.4	7.7	3.1	2.6	7.8
Marina	July-Nov.	96.1	26.2	8.5	7.6	4.1	2.6	8.7
Agnihotri	July-Nov.	121.1	38.3	8.4	7.5	4.1	3.4	9.4
Salmon	July-Oct.	173.3	30.6	7.4	6.7	5.1	2.8	8.7
Anmol	July-Nov.	185.7	28.4	7.5	7.3	4.9	2.9	7.6
Cancan	July-Nov.	205.4	9.8	9.0	8.6	3.3	5.3	8.3
S.Em(±)	-	8.2	1.1	0.33	0.22	0.12	0.36	0.36
CD at 0.05	-	24.35	3.28	0.99	0.65	0.37	1.06	2.14

Vase life was found maximum in Pistache (10.1 days) closely followed by Tropical (10 days) and shortest vase life was observed in Nitta (6.2 days). Latha et al. [15] also found similar results in the 'Esmeralda' variety. The spathe size of anthurium also increases the respiration rate of flower which can improve the post-harvest life [16]. The total period of vase life relies on the initial point of vase life and also determined by the maturity level of spathe and spadix [17]. Besides, low abaxial stomata in mature flowers could be a cause of enhanced vase life [18].

4. CONCLUSION

From the above discussion, it may be concluded that cultivar 'Tropical' had promising vegetative characters like maximum plant height and a good number of leaves, suckers which helped to synthesize more photosynthates and as a result maximum number of flower produced. This variety showed quality flower in terms of flower spike length, spathe size as well as vase life, among fourteen varieties. So, in view of the above this variety may be recommended for commercial cultivation in the sub-tropical conditions of West Bengal in India under shade house.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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