



Cultivation of *Anthurium* in Mizoram, India: present scenario and future prospect

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ABSTRACT

Anthurium is cultivated in Mizoram state, India since the year 2002, with approximately 300 families presently engaged in the cultivation. The scenario of cultivation and production of *Anthurium* in Mizoram and nutrient management in *Anthurium* cultivation to increase its growth and productivity is discussed in this paper. Recognizing the potential for increasing *Anthurium* production in view of ideal climatic conditions and other resources, more investment is needed to boost the production in Mizoram. The technological inputs in the cultivation and processing need to be upgraded and modernized on more scientific lines. Market development and market promotion along with research and development need to be strengthened.

Key words: *Anthurium*, marketing; cultivation.

INTRODUCTION

The anthurium is a perennial herbaceous plant usually cultivated for its attractive, long lasting flowers. *Anthurium*, for its exquisiteness, durability and by the terms of long vase-life stands out among most of the tropical cultivated flowers. As a member of the Araceae family, *Anthurium* is native to the tropics of Central and South America.¹ Anthuriums are believed to be hybrids of *A. andraeanum* Linden ex André with several closely related species in the section *Calomystrium*² and have been referred to as *A. andraeanum* Hort.³ The

breeding of two species namely, *A. andraeanum* Linden ex André and *A. scherzerianum* Schott. has resulted in many cultivars which are used as potted plants as well as cut flowers, grown commercially all over the world.⁴

The *Anthurium* gains its fame and respected status by exhibiting its striking ensemble, which is created unitedly by its spadix and its spathe, within the economically essential ornamentals, allowing its use in interior and exterior decoration and also to its use as a cut flower.^{5, 6}

Anthurium is one of the thrust floriculture crops identified for Mizoram because of many advantages, such as increasing demand, ideal agro climatic conditions, availability of group of progressive farmers having land and other

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infrastructure facilities to take up this activity. International market for flowers and accessories is as high as 50 billion and has been growing at a steady pace. *Anthurium* is now one of the most important flowers with a promising future for the state.⁷

SCENARIO OF *ANTHURIUM* CULTIVATION AND PRODUCTION IN MIZORAM

The Department of Horticulture introduces commercial scale cultivation of anthurium in the month of November, 2002 under Technology Mission for integrated Development of Horticulture in north-eastern states. *Anthurium* is initially cultivated by 24 farmers in 2002, with successful and encouraging results. Having seen the success of the initial growers, there were more than 300 families actively engaged in anthurium cultivation. Cultivation is done usually on shade house, with soilless cultivation. However, the climatic condition being favourable, temperature control facilities are not being used for the cultivation. It was estimated that accounting all domestic sales, the society garnered more than one crore during 2008-09. Hundreds of families engaged in cultivation of anthurium in Mizoram, out of which 275 were registered with Zo Anthurium Growers Society (ZAGS). These families have maintained and cultivated more than 5,50,000 anthurium in Mizoram which enable to produce 27, 50,000 to 33, 00,000. *Anthurium* flowers in single

year. A good harvest has resulted in export of 13,81,629 stems of anthurium worth Rs 96,69,123.00 during 2008-09. It was reported that during 2008, the Society sold anthurium stems worth Rs 53,00,639.00 and from January to October 2009 the Society had received an income of Rs 39,64,966.00.⁸

There is high demand for flowers within the state for special occasions, churches, functions, funerals, weddings and home arrangements. Slightly inferior not fit for export, say, second class productions meet local demands while the top and superior class cut flowers are sent to metropolitan cities. A good number of cut flowers of anthurium has been produced and exported from Mizoram. Due to the increasing demand for cut flowers in India, increasing numbers of anthurium cultivars are continually being exported from Mizoram. A large number of cut flowers of anthurium cultivars displaying an array of spathe colours (ranging from red, orange, pink, coral and white) are cultivated in order to meet the demand of the various market preferences in terms of colours, shades, floral sizes and shapes.

Anthurium flowers from Mizoram have been gaining recognition in the national as well as the international level. However, the present production is not enough to feed the demand of the national and international markets. For this reason, expansion of the anthurium cultivation with improved nutrient management is important to increase the flower production.

Table 1. Year-wise promotional activities for *Anthurium* cultivation in Mizoram from 2002 to 2007.

Year	No. of units set up	No. of plants distributed per unit	Total no. of plants distributed per year	No. of cut flowers harvested	Expenditure incurred (Rs)	No. of varieties procured
2002-2003	24	800	19,200	-	31,20,000	13
2003-2004	100	150	15,000	125000	26,00,000	5
2004-2005	150	1000	1,50,000	190000	1,95,00,000	34
2005-2006	125	1000	1,25,000	460000	1,88,50,000	13
2006-2007	102	900	91,800	925000	1,32,60,000	9
TOTAL	501	3850	401000	1700000	5,73,30,000	74

IMPACT OF NUTRIENT CONDITIONS ON GROWTH OF ANTHURIUM

An experiment was conducted at Mizoram University campus during 2008-2009 to study the growth performance of *A. andreaeanum* under different conventional nutrients which are locally available. The experiment was conducted during June 2008 to August 2009. A shade house was constructed with a netlon that provides 75% shade (rakshak agro-shading, white x black, 75%). Tissue cultured plantlets of *Anthurium* cv. Evita were planted on the flower beds of 1.2 m², on a media consisting of cocopeat, charcoal, and vermicompost in the ratio 6.5:1:1. The plantlets were measuring each 20-25 cm (pots) and nine (9) plants were planted on each plot at a distance of 40 cm. Different sources of nutrient were applied as: control (T1), NPK @ 220 kg/Ha/year (T2), biofertilizers @ 500 gm/acre/year (T3), cattle manure @ 10 tonnes/Ha/year (T4), pig manure @ 10 tonnes/Ha/year (T5), poultry manure @ 5 tonnes/Ha/year (T6).

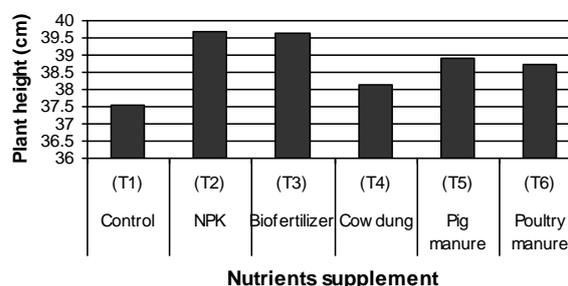


Figure 1. Average plant height (cm) of *Anthurium andreaeanum* grown under different nutrient supplements.

Among the different treatments, T2 was observed to have maximum effect on plant heights followed by T3, Pig manure and poultry manure and cow dung, all greater than that of T1. We can thus conclude that treatment with NPK (T2) resulted in the best growth performance in terms of plant height while the effect of other conventional nutrients on the growth in plant height was fairly good. The average plant height under in-

Table 2. Plant height (in cm) of *Anthurium andreaeanum* under different nutrient supplements.

Months	Treatments					
	Control (T ₁)	NPK (T ₂)	Biofertilizer (T ₃)	Cowdung (T ₄)	Pig manure (T ₅)	Poultry manure (T ₆)
1	35.39	33.41	34.51	35.04	33.11	34.51
2	35.00	37.33	36.72	36.78	36.39	35.53
3	37.11	40.17	44.00	43.56	42.06	42.00
4	37.17	42.06	41.89	38.58	39.89	41.78
5	37.56	42.33	43.78	40.56	41.11	43.22
6	37.68	40.89	37.34	41.67	39.13	38.50
7	37.89	39.02	37.73	34.61	36.87	37.79
8	37.61	36.72	38.28	35.33	38.44	38.03
9	38.44	40.11	41.41	38.28	38.19	40.50
10	39.00	44.56	44.89	40.33	44.78	40.22
11	37.11	38.11	35.44	34.78	36.44	36.56
12	39.22	41.28	38.22	38.67	38.78	37.78
Averg.	37.53	39.67	39.63	38.14	38.93	38.75

Critical $t_{0.05, 11}$, for difference of means = 2.59

creases up to the third month, which lowers down in the following three months, rises again after the seventh month upto the tenth month and then falls down. The study also reveals that the plants under shade house recovers from the adverse climatic conditions once favourable climatic conditions prevails in the ninth and tenth month. The study showed that anthurium may be successfully cultivated using conventional nutrients which are locally available in Mizoram.

The effect of vermicompost and sand mixture (1:3 v/v) in *ex vitro* establishment under green house followed by net house condition was reported, where 95% survival rate was achieved.⁹ The maximum survival rate of 98% was reported in cultivar Atlanta using a combination of vermiculite and perlite (1:1 v/v) as growth substrate.¹⁰ The acclimatization of cultivar Rubrun using soil and organic humus (1:1 v/v) was also studied.¹¹ Accordingly, Gantait *et al.* studied the effectiveness of organics like charcoal and coconut fibre in a 1:1:1:1 (v/v) combination with sand and soil.¹ The two-step (with six week duration) process of acclimatization, with the success rate of 85% was standardised. The initial sand and soil mixture (1:1 v/v) ensured the primary acclimatization and set the plants to be transferred further. More recently, the acclimatization procedure of callus derived from *Anthurium* plantlets was established on sand, loamy soil and coco-peat (1:1:1 v/v) ensuring 85% survival rate.¹² More research inputs are needed on the above aspects of anthurium cultivation in Mizoram condition.

FUTURE PROSPECT OF ANTHURIUM INDUSTRY IN MIZORAM

Cultivation of anthurium in Mizoram is still at a small scale with growers having 1000 to 3000 plants which unfortunately do not earn maximum profit, considering the cost of inputs. Maintaining quality of products and preserving the cut flowers from damage by insects and post-harvest handlings requires

extensive care and caution which can be very expensive. Of the total establishment cost, seedlings and structure cost was higher. In spite of this, anthurium cultivation and production is being viewed as a high growth industry in Mizoram.

Recognizing the potential for increasing anthurium production in view of ideal climatic conditions and other resources, several units are being set up in Mizoram, especially in the district capitals. Liberalization of industrial and trade policies would pave the way for development of export oriented production of cut flowers. The liberalization process initiated by the Government of India has attracted several multinational companies in to horticulture sector like the floriculture and processing of horticulture products.

To enable the anthurium growers and units in Mizoram to function more efficiently and competitively and to increase the volume of exports, it is necessary to orient this activity entirely from a new angle. The first and the foremost policy change dictated by the past experience are to treat the entire floriculture activity, whether it is catering to local demand or to the international demand, as an agricultural activity and not as an industry. The technological inputs in the *Anthurium* activities need to be upgraded and modernized on more scientific lines.

CONCLUSION

A consortium approach needs to be encouraged among the various stakeholders of anthurium industry in Mizoram for branding, grading, packaging, transporting, quality control, supply assurance, market development, market promotion, and research and development. For this purpose, it is necessary to encourage some of the successful and experienced entrepreneurs to take initiative and a lead in forming such consortia. Training and manpower development is another important aspect for sustainable production of anthurium in future.

REFERENCES

1. Gantait S, Mandal N, Bhattacharyya S & Das PK (2008). *In vitro* mass multiplication with pure genetic identity in *Anthurium andreaeanum* Lind. *Plant Tissue Cult Biotech*, 18, 113-122.
2. Croat TB & Sheffer RD (1983). The sectional grouping of *Anthurium* (Araceae). *Aroideana*, 6, 85-123.
3. Kamemoto H & Kuehnle AR (1996). Breeding *Anthurium* in Hawaii. University of Hawaii Press, Honolulu, Hawaii, p. 168.
4. Kuehnle AR, Chen FC & Sugii N (1992). Somatic embryogenesis and plant regeneration in *Anthurium andraeanum* hybrids. *Plant Cell Rep*, 11, 438-442.
5. Lopes LC & Mantovani EC (1980). Growing anthuriums. *Extension Bull*, 22, 9-9.
6. Castro CEF, Fonseca S, Sondahl MR & Mathes LF (1986). Vegetative propagation of *Anthurium* *in vitro*. Proceedings of the 3rd Congress of the Brazilian Society of Floriculture and Ornamental Plants, (CBSFOP 86), Brazil, pp. 13-25.
7. Lalnunmawia F & Nuchhungi K (2006). Various horticultural crops and their status of cultivation in Mizoram. *Sci Vis*, 6, 87-91.
8. Rosanglura S (2007). *Anthurium* in Mizoram: A success story. *Mizo-Envis*, 2, 11-13.
9. Martin KP, Joseph D, Madassery J & Phillip VJ (2003). Direct shoot regeneration from lamina explants of two commercial cut flowers cultivars of *Anthurium andraeanum* Hort. *In vitro*. *Cell Dev Biol Plant*, 39, 500-504.
10. Han BH & Goo DH (2003). *In vitro* propagation of *Anthurium andreaeanum* Atlanta developed for pot culture. *Korean J Plant Biotech*, 2, 179-184.
11. Vargas TE, Mejias A, Oropeza M & de Garcia E (2004). Plant regeneration of *Anthurium andraeanum* cv. Rubrun. *Electron J Biotech*, 7, 282-286.
12. Jahan MT, Islam MR, Khan R, Mamun ANK, Ahmed G & Hakim L (2009). *In vitro* clonal propagation of *Anthurium* (*Anthurium andreaeanum* L.) using callus culture. *Plant Tissue Cult Biotech*, 19, 61-69.