Plant Archives Vol. 19, Supplement 1, 2019 pp. 1121-1124 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

RESPONSE OF *ANTHURIUM ANDREANUM* CV. TROPICAL TO DIFFERENT MEDIA AND NUTRIENTS GROWN UNDER SHADE CONDITIONS

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Abstract

Floriculture is a fast emerging competitive industry and cultivation of flowers for commercial purposes is common to many countries. It has become one of the high value agricultural industries in many countries of the world (Taj, 2013). The demand for flowers both in India and international markets is increasing at a faster rate. Anthurium plants require good growing medium with good physical and chemical conditions for their proper growth and development. The productivity and quality of flowers are closely related to nutrient supplement. In anthurium, nutritional status affects yield and quality. The experiment was conducted under 75 per cent shade net with three types of growing media and five levels of nutrients applied as foliar sprays, combined in 15 treatment combinations. The treatments with three replications were carried out in completely randomized design. The Anthurium (*Anthurium andreanum*) cv. Tropical was used for the study with 15 different treatment combinations are given here, T_1 (coir pith& perlite + seaweed extract), T_2(coconut husk& vermiculate + seaweed extract), T_3 (cocopeat & wood residues + seaweed extract), T_4 (coir pith & perlite + Panchakavya), T_5 (coconut husk & vermiculate + Panchakavya), T_6 (cocopeat & wood residues + Panchakavya), T_7 (coir pith& perlite + Humic acid), T_8 (coconut husk& vermiculate + Humic acid), T_9 (cocopeat & wood residues + coconut husk Humic acid), T_{10}(coir pith & perlite + FYM), T_{11} (coconut husk & vermiculate + FYM), T_{12} (cocopeat & wood residues + FYM), T_{13} (coir pith& perlite + no nutrients), T_{14} (coconut husk & vermiculate + no nutrients) and T_{15} (cocopeat & wood residues + no nutrients). Among the different treatments, T_3 cocopeat & wood residues + seaweed extract resulted with maximum plant height, plant spread, number of flowers per plant, flower stalk length, spathe length and spathe breadth. The number of days taken for flower bud appearance was also faster in this treatment.

Keywords*: growing media, Nutrient management, Anthurium*

Introduction

Floriculture is a fast emerging competitive industry and cultivation of flowers for commercial purposes is common to many countries. It has become one of the high value agricultural industries in many countries of the world (Taj, 2013). The demand for flowers both in India and international markets is increasing at a faster rate. Anthuriums are gaining popularity due to higher returns per unit area and their beautiful and attractive long lasting flowers. They are very popular with flower arrangers because of bold effect and lasting qualities of flowers. It is the national flower of Mauritius.

Anthuriums are shade loving plants and grow best with about 70 to 85 per cent shade or an optimum light intensity of 18,000-25,000 Lux of light encourage their growth and development (ICAR report, 2013). They require 60 to 80 per cent relative humidity. Anthurium plants require good growing medium with good physical and chemical conditions for their proper growth and development. Among the physical characteristics, aeration and water holding capacity are probably the most important factors while, among the chemical characteristics, nutritional status, salinity level and good drainage also have a crucial role on plant development (Dewayne *et al*., 2003).

Plants require nutrients for their growth and development. These nutrients may be applied to the soil or they may be applied to the foliage of the plants. The productivity and quality of flowers are closely related to nutrient supplement. In anthurium, nutritional status affects yield and quality (Cuquel and Grossi, 2004, Sakai, 2004 and Dufour and Gue`rin, 2005). Nitrogen, phosphorus and potassium are the three important nutrients that play very important role in altering growth, yield and quality attributes along with micro nutrients. However, considering the recent concept of eco technology and increased cost of fertilizers, organic fertilizers like panchagavya, seaweed extracts and other organic fertilizersapplication needs to be an extent in the flower crops, especially in anthuriums(Shajma and Sabina, 2012).

Materials and Methods

The present study was carried out in Flora-tech

floriculture unit at Kottarakara, kollam Dist, kerala state, India during 2006- 2009. The experiment was conducted under 75 per cent shade net with three types of growing media and five levels of nutrients applied as foliar sprays, combined in 15 treatment combinations. The treatments with three replications were carried out in completely randomized design. The Anthurium (*Anthurium andreanum*) cv. Tropical was used for the studywith 15 different treatment combinations given here, T_1 (coir pith& perlite + seaweed extract), T_2 (coconut husk& vermiculate + seaweed extract), T_3 (cocopeat&wood residues + seaweed extract), T_4 (coir pith& perlite + Panchakavya), T_5 (coconut husk& vermiculate + Panchakavya), T_6 (cocopeat & wood residues + Panchakavya), T_7 (coir pith& perlite + Humic acid), T_8 (coconut husk & vermiculate + Humic acid), T_9 (cocopeat & wood residues + coconut husHumic acid), T_{10} (coir pith & perlite + FYM), T_{11} (coconut husk & vermiculate + FYM), T_{12} (cocopeat & wood residues + FYM), T_{13} (coir pith& perlite + no nutrients), T_{14} (coconut husk& vermiculate + no nutrients) and T_{15} (cocopeat & wood residues + no nutrients). Plant height, plant spread, number of flowers per plant, flower stalk length, spathe length, spathe breadth and number of days taken for flower bud appearance were observed and recorded at 480 days after planting.

Results and Discussion

The result shown significant influence in overall performances of Anthurium plants due to *per se* effect of media and nutrients. Among the different treatment combinations, the maximum plant height (31.82 cm), plant spread (52.05 cm), number of flowers per plant (5.13), flower stalk length (31.17 cm), spathe length(7.62 cm) and spathe breadth(7.21 cm) were recorded in T_3 (cocopeat & wood residues + seaweed extract), this was followed by T_2(coconut husk& vermiculate + seaweed extract) with plant height of 30.71 cm, plant spread of 51.27 cm, 4.74flowers per plant, flower stalk length of 30.28 cm, spathe length of 7.19 cm and 7.09 cm of spathe breadth. Days taken for flower bud initiation was also early in $T_3$with 82.91 days, followed by T_2 with 84.28 days. The least plant height (16.88 cm), plant spread (34.12 cm), number of flowers per plant (2.11), flower stalk length(15.22 cm), spathe length(3.19 cm) and spathe breadth(3.58 cm) were recorded in T_{14}(coconut husk& vermiculate + no nutrients). Days taken for flower bud initiation were delayed in T_{14}, which took 134.65 days for bud appearance.

The increased results in T_3may be due to appropriate shade of 75 percent and growing media comprising of cocopeat & wood residues along with foliar spray of seaweed extract. The present result is inline with the following results. According to Dufour and Gue`rin (2005) in Anthurium nutritional status affects yield and quality. According to Anand and Jawaharlal (2004) flowering behavior of Anthurium plants has been drastically modified by the foliar spray of nutrients. Dufour and Gue`rin (2005) concluded that the plants grown on coir pith substrate and sprayed with SWE gave high yield of good quality flowers in Anthurium.

Plants grown in containers have their root system confined to a limited volume of media. For optimal growth of plants, media must contain enough water and air, mainly depends on the physical and chemical properties of medium. Most of the light weight, soilless media which are combinations of two or more components are formulated to achieve desirable physical and chemical properties (Bunt, 1971, Kaukovirta, 1972 and Mass and Anderson, 1975). Coco peat primarily consists of the coir fibre pith or coir dust which is obtained by processing coconut husk and removing the long fibres. The coco peat can hold large quantities of water just like a sponge. It is used as a replacement for traditional peat in soil mixtures, or, as a soilless substrate for plant cultivation (John Mason, 2003).

Anthurium plants require good growing medium with good physical and chemical conditions for their proper growth and development. Highly organic, well aerated medium with good water retention capacity and drainage is needed. Various organic wastes like sugarcane bagasse, tree bark, saw dust and wood shaving had been used to grow anthurium commercially (Blunden, 1991). In addition to these materials, coir compost and coconut husk could be used due to its very excellent physic-chemical properties (Nagarajan *et al*., 1985 and Savithri and Khan, 1994). Coir pith has high water holding capacity of 600-800 per cent, good porosity of 95 per cent, nutrient retention capacity, excellent drainage and light weight. It is a source of major nutrients like potassium and micronutrients like Fe, Mn, Zn and Cu. All these qualities favoured it as a potential growing medium for ornamental plants and commercial flowers.

The anthurium requires a well drained media with sufficient moisture retention capacity, which favours the faster rate of growth. The media with good anchorage, root aeration, water holding capacity and favourable physical and chemical properties lead to better metabolic activities of anthurium plants especially with the production of photoassimilitates which would have favoured the maximum vegetative growth. Smitha (1999) observed the growth parameters like leaf area, number of leaves per plant, petiole length, petiole

thickness, number of roots and suckers were the maximum in coir pith medium compared to different ratio of coir pith in *Anthurium andreanum*. Chaudhary and Das (1996) noted that the application of composted coir pith increased the plants growth. Khalaj *et al*. (2011) confirmed that the selection of appropriate growing medium for cut flower was very important for their effective growth. The medium must ensure the production of their required growth on cost effective basis.

Nutrients are the chemical elements and compounds necessary for plant growth, plant metabolism and their external supply. These nutrients may be applied to the soil or they may be applied to the foliage of the plants. When applied to the foliage, they are known as foliar sprays (Wade, 1980). Nutrients applied to the foliage are generally absorbed more rapidly than when applied to the soil. Foliar feeding is a technique of feeding plants by applying liquid fertilizer directly to their leaves (George Kuepper, 2003). Plants are able to absorb essential elements through their leaves. The absorption takes place through their stomata and also through their epidermis. Unlike field crops where plants are normally grown in soil, anthurium is grown on coco peat + wood residues because of its semi epiphytic nature and fertilizers are applied daily (Sheela, 2008).

Considering the above facts and results of the present investigation it could be concluded that the foliar application of seaweed extract and growing media comprising of cocopeat with wood residues grown under 75 per cent shade is the best for the growth and yield of *Anthurium andreanum* cv. Tropical. Coco peat and wood residues provide support to plants and foliar application of seaweed extract provides required nutrients as well as appropriate shade by using shade net and also required quantity of good quality water has to be necessarily supplied to the plants at appropriate time throughout the growing period.

Table 1: Response of Anthuriumcv. Tropical to different levels of media and nutrients

Treatments	Plant height (cm)	Plant spread (cm)	Number of flowers per plant	Flower stalk length (cm)	Spathe length (cm)	Spathe breadth (cm)	Days taken for flower bud appearance
T_1	27.24	50.22	4.21	29.19	6.38	6.33	89.35
T_2	30.71	51.27	4.74	30.28	7.19	7.09	84.28
T_3	31.82	52.05	5.13	31.17	7.62	7.21	82.91
T_4	24.23	49.13	3.62	28.09	5.91	5.89	93.68
T_5	29.05	51.01	4.56	29.86	6.95	6.87	87.57
T_6	27.92	50.43	4.67	29.37	6.67	6.71	87.68
T_7	22.39	47.61	3.37	26.67	5.12	5.03	96.41
T_8	26.97	50.31	4.16	29.11	6.41	6.56	90.21
T_9	24.91	49.57	3.98	28.51	6.12	6.19	93.12
T_{10}	22.45	47.76	3.55	26.79.	5.17	5.04	96.09
T_{11}	23.75	48.25	3.59	27.34	5.35	5.29	94.97
T_{12}	22.07	46.33	3.21	24.89	4.96	4.87	101.01
T_{13}	18.59	38.88	3.09	18.34	4.11	3.79	117.43
T_{14}	16.88	34.12	2.11	15.22	3.19	3.58	134.65
T_{15}	18.09	37.29	2.94	16.91	3.98	3.51	121.84
CD (p=0.05)	0.83	1.03	0.19	0.98	0.26	0.23	3.28
SE (d)	0.42	0.52	0.10	0.49	0.13	0.12	1.64

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