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ALTERNATIVE GROWING MEDIA FOR THE CULTIVATION OF *Anthurium andraeanum* Lind.

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ABSTRACT

Anthuriums have a special place in floriculture, second only to orchids among tropical cut flowers. These are epiphytic in nature and prefer growing on media devoid of soil. Roots need aeration and dislike water stagnation. Recommended growing media, consists of leaf mould, cattle manure and sand mixed at a ratio of 4:2:1. However, when establishing commercial plantations, obtaining leaf mould in large amounts is a limiting factor. Easily available raw material and their combinations were tested for effectiveness as alternatives to leaf mould. Material used included tile pieces, coconut husk chips, brick pieces (all material were of the same size, 4 sq.cm), coir dust and sand. Tile pieces and coconut husk chips were used separately as well as combined at a ratio of 1:1, coir dust was also combined with sand at the same ratio. Standard growing media as indicated above (leaf mould, cattle manure and sand at 4:2:1) was used as the control. Plants grown in coconut husk chips as well as a combination of coconut husk chips and tile pieces gave the best growth rates. Results obtained were similar to those obtained for plants grown in the standard medium which was used as the control. Plants grown in brick pieces, and tile pieces separately, gave the second best growth rates. Plants grown in coir dust only or a combination of coir dust and sand showed the least amount of growth. Thus it could be concluded that material such as coconut husk and tile pieces can be used as alternatives to leaf mould.

KEY WORDS: *Anthurium andraeanum*, Growing media, Leaf mould, Cultivation

INTRODUCTION

The cut flower trade is worth 3.7 billion U.S dollars at present and is likely to increase by about 10% annually. Anthuriums have a special place in the cut flower trade, second only to orchids among tropical flowers. Its world trade and popularity have greatly increased during the last few years.

The availability of anthuriums in a wide range of colors, long shelf life of flowers and simple growing techniques have been some of the factors contributing to this popularity of anthuriums as tropical flowers. Today, though originally native to the tropical zones of Central and South America, large scale commercial cultivations are found in most parts of the world including Asia and Europe.

Although *Anthurium andraeanum* grows as an epiphyte in nature on forest litter, commercial cultivation calls for more efficient cropping systems. Recommended growing media in Sri Lanka, consists of leaf mould, cattle manure and sand mixed at a ratio of 4:2:1 (Ekanayake and Hagan, 1977). However, obtaining leaf mould in large amounts is a limiting factor, especially when establishing large scale plantations. The objective of this study was to evaluate, easily available raw material and combinations of the same for their effectiveness as alternatives to leaf mould.

MATERIALS AND METHODS

Raw material tested as alternatives to leaf mould were; coconut husk, coir dust, sand, tile pieces and brick pieces. All material were cut or broken into 4cm equal size particles. Beds were filled with the following media combinations and eight to ten (8-10) month old plants were selected as test plants for the trial. Table 1 gives the media combinations used in different treatments.

Table 1. Media combinations used in the experiment.

	Media combination	*Treatment*
1.	Coir dust only	T1
2.	Coir dust: Sand, 1:1	T2
3.	Coconut husk: Tile pieces, 1:1	T3
4.	Tile pieces only	T4
5.	Brick pieces only	T5
6.	Coconut husk chips only	T6
7.	Control	T7

The anthurium growing media recommended by the Royal Botanic Gardens, consisting of leaf mould, cattle manure, and sand mixed at a ratio of 4:2:1 (Ekanayake and Hagan, 1977) was used as the control (T7). The above treatments were tested for their effect on growth rate of plants. Data was collected over a period of one year on plant height, number of leaves and flowers produced. Regular fertilizer applications were done with an N:P:K ratio of 1:1:1. An organic fertilizer mixture was applied for the addition of other elements. Trial was carried out under recommended shade levels of 70% and plants were set out at 30x30 cm spacing. Twenty five (25) plants were used per sample and replicated thrice for each treatments. An analysis of variance was done on data collected for average plant height. Data on average plant height was also analyzed using a Bonferroni (Dunn) T test for variable Y.

RESULTS AND DISCUSSION

It has been shown that anthuriums need well aerated growing media for healthy root formation, at the same time adequate water retention without stagnation is also important. Growing media should also be resilient and should not contain any poisonous elements (Anonymous 1994). A wide range of material has been used for the cultivation of anthuriums. In Hawaii, sugar cane bagasse, wood shavings, tree fern fiber, coffee bean parchment, taro peelings and macadamia nut hulls (Higaki and Imamura, 1985a, 1985b; Nakasone and Kamemoto, 1957) have been used. Elsewhere, coconut fiber, coniferous forest litter and leaf mould were used (Bortje, 1978; Perez Alfonso 1974: Rodriguez, *et al.,* 1978).

In this study locally available raw material were tested for their effectiveness as suitable growing media. As seen in table 2 highest number of leaves were produced on plants grown in the standard media of Leaf mould, Cattle manure and Sand mixed at 4:2:1. Similar results were also recorded for plants grown on coconut husk chips. Lowest number of leaves, have been recorded for plants grown on coir dust. Flowers produced per plant over a period of one year also gave similar results.

Table 2. Performance of plants in different growing media.

Media used	*Treatments*	*No. of leaves*	*No. of flowers*	*Av. Pl. height (cm)*
Coir dust only	T1	04	04	38 *d
Coir dust: sand 1:1	T2	04	04	42 *c
Coconut Husk: Tile 1:1	T3	06	05	56 *a
Tile pieces	T4	06	05	51 *b
Brick pieces	T5	06	05	51 *b
Coconut Husk Chips	T6	07	06	56 *a
Standard medium	T7	07	06	56 *a

N= 25 Plants per plot; Pr > 0.0001; Means with the same letter are not significantly different (Bonferroni (Dunn) T test for variable: Y)

Although media treatments such as brick pieces only, tile pieces only and a combination of tile and coconut husk chips, have produced a lower number of leaves compared to the control media, differences were minimal. While six leaves were produced over a period of one year for plants grown in the former media treatments, seven leaves were produced on plants grown in the latter, i.e. standard media and media with coconut husk chips only.

Lowest number of leaves (04) were produced in media with coir dust only and five leaves per plant in media with a combination of coir dust and sand. It was observed that plants grown in both these media were prone to fungal infections of roots during the rainy season. Regular application of fungicides needed to be carried out to control root rot.

Highest number of flowers (06), were produced in both the standard and coconut husk chips media. While five flowers per plant were produced on those growing on tile pieces, brick pieces and a combination of coir dust and sand.

Highest average plant height (56 cm) was obtained in the standard media as well as media with a combination of coconut husk chips and tile pieces or coconut husk chips only. Lowest readings were recorded for both coir dust only and a combination of coir dust and sand; 38.13 cm and 42.3 cm respectively. Plant heights recorded for brick pieces and tile pieces were similar, 51cm; slightly lower than the standard medium. A Bonferroni (Dunn)

T test done for data collected on average height of plants shows that treatments T6, T7 and T3 are not significantly different. T5 and T4 are also not significantly different to each other. However, T6, T7, and T3 are significantly different to T4 and T5. Further more T2 and T1 are significantly different to all other treatments. This means that the standard media and a combination of coconut husk chips with tile pieces (1:1) as well as coconut chips only do not show a significant difference in the growth of plants. However, media with tile pieces only and brick pieces only show a significant difference in growth of plants compared to the standard media. Coir dust and a combination of coir dust and sand are significantly different to all other treatments, giving least amounts of plant growth.

These observations indicate that locally available raw material, such as coconut husk chips and tile pieces may be used for the cultivation of anthurium plants as compared to the standard media. These do not have a significantly adverse effect on growth and development of plants and hence may be used as alternative growth media. However, tile pieces, and brick pieces when used alone did have a significant effect on growth of plants as compared to the standard media. Plant growth performance was significantly lower than that recorded for the standard medium. This may be due to their capacity of easy water drainage. It may be rectified by, increasing water retention either, through adding other raw material to the medium or increasing the frequency of watering. Although, anthuriums being epiphytic in nature, do not tolerate too much of water stagnation, and do not tolerate long dry periods between watering either.

Plants grown in a combination of coconut husk chips and tile pieces (1:1) mixed in equal ratios showed much better performance compared to each material being used individually. This may have been due to the reason that coconut husk chips retain water and tile pieces improve drainage, each balances the other and hence availability of water for plant growth is not too much neither too little. Porosity of the media is also increased providing adequate aeration to roots. Plants growth performance in a pure coconut husk medium was equally good to the standard medium. Results indicate that Coconut husk chips are one of the best alternative raw materials for the growth of Anthuriums. Unavailability of leaf mold in large amounts could thus be remedied by using coconut husk chips instead of the standard media.

CONCLUSION

It may be concluded that material such as coconut husk, tile pieces, may be used as alternatives to leaf mold. Availability and cost of raw material then become the main factors, which determine the choice of media. However, water retaining as well as draining capacities of the material used should also be considered when the choice is made.

Trial plots are still being maintained, though preliminary results indicate the suitability of using other easily available raw material for cultivation of anthuriums. Being perennial crops, continuous flowering is seen and hence replanting is done only once in five years. Thus the suitability of media should also be monitored as long as plants grow and continue to flower. Furthermore, although anthuriums did not perform well on a medium of coir dust or a combination of coir dust and sand in this study, trials need to be repeated. Coir dust retains a large amount of water and when combined with sand, drainage improves. This characteristic could be advantageous in areas with low rainfall. It has been recorded that the growing media for anthuriums should hold more water between rainfalls, if rainfall is occasional than if rainfall is frequent (Anonymous, 1994). Additionally further experiments should also be conducted to find out inorganic fertilizer application patterns for optimum growth of plants on inert raw material such as tile, brick and coconut husk chips.

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