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EFFICACY OF DIFFERENT MEDIA COMPOSITION ON DIEFFENBACHIA AND DRACAENA IN POTS

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ABSTRACT
Current research was conducted to evaluate effect of pot mixtures on the morphological characteristics for optimum growth and development of Dieffenbachia and Dracaena in pots. Study was based on a completely randomized design with seven treatments, six measuring times and three replications in net house (30% shade net house) at Bidhan Chandra Krishi Viswavidyalaya during 2013-2014. The different growing media compositions were different combination of soil, sand, FYM, cocopeat and vemicompost. The data for morphological parameters analyzed statistically showed significant effect of media combinations .*Dieffenbachia bowmannii* produced maximum plant height, large leaf length, large leaf width and plant spread in media of soil + sand + FYM@2:1:1, but under potting mixture of soil + sand + FYM + vermicompost @2:1:1:0.5 the plant maintained more number of leaves along with medium plant height. For *Dracaena reflexa,* media composition of Soil + Sand + FYM @ 2:1:1 provided satisfactory result for maintained highest plant height, highest number of leaves and maximum plant height. Therefore it is concluded that potting mixture of Soil + Sand + FYM @ 2:1:1 can be used for home decorating purpose in Dieffenbachia and Dracaena as pot plants.

INTRODUCTION

Among the various range of foliage plants, two important tropical foliage are Dieffenbachia and Dracaena.

*Dieffenbachia (Dieffenbachia bowmannii)*is a genus of tropical plants belonging to the family Araceae noted for their patterned leaves. Members of this genus are popular as houseplants because of their tolerance to shade and can be grown easily in different potting medium. The increase in vermicompost cow dung + sawdust substituted with peat significantly increased nitrogen, phosphorus, potassium, calcium and magnesium in Dieffenbachia plant leaves and growth media as a result, when Khomami (2011) studied on effects of vermicompost cow dung + sawdust with peat in peat + perlite (1:2 ratio) growth media on ornamental plant (*Dieffenbachia amonea*).

Dracena (*Dracaena reflexa)* the plant is originated from Tropics of the old world, belongs to family Liliaceae. It can be enjoyed as a specimen plant, accent, or pruned to create a border. Several cultivars have been selected, particularly variegated clones with cream and yellow-green margins. It performs well as a houseplant, tolerating infrequent watering. It prefers bright, filtered light, without direct sun exposure.

So many potting ingredients are utilized for foliage plant production. Depending upon the physical and chemical properties of potting media, different media compositions are recommended for various types of foliage plants. Better performance can only be achieved using mixtures of potting media (Panj *et al*., 2014). The suitable use of growing media is of important for production of quality ornamental foliage plants. It directly influences the growth, development, ramification and functioning of rooting system (Argo, 1998, Richards and Beardsell, 1986).The key factor for selecting potting media include aeration, moisture retention and nutrient status. Various growing materials like sewage sludge, sawdust, spent mushroom compost; coconut coir dust are also used locally as potting media in different combinations. Peat is the most widely used substrate for potted plant production in nurseries and it accounts for a significant portion of the material used to grow potted plants (Ribeiro *et al.,* 2007). Ziaullah (1999) investigated using 5 different growing media, the growth response of *Cordyline terminalis* and *C. fruticosa* was studied in a nursery pot trial. Media had no appreciable effect on root length and plant height of the 2 species, but significantly affected leaf area and number of roots per plant while number of leaves was least (14.83) in plants grown in FYM medium . In order to reduce cost of imported expensive organic materials to be used in growth media, it is recommended to extend to a wide range of plant species grown in the growth media containing higher ratio of sand (Abo-Rezq *et al.,* 2009) With the increasing population in cities and towns, houses with garden spaces are becoming limited. There is a demand for tropical foliage plants in homes, hotels, business offices, airports and other public building as result of human being form natural environments (Dole and Wilkins, 2005).

Therefore, keeping in view the composition, nutritional status and importance of growing media, the present study was intended to identify the best combination of media composition and to determine the effect of pot mixtures on the

morphological characteristics for optimum growth and development of Dieffenbachia and Dracaena in pots.

MATERIALS AND METHODS

The present study was experimented in Horticulture Research Station, Mondouri , Bidhan Chandra Krishi Viswavidyalaya, Nadia West Bengal, located approximately at 23.5^{0}C N latitude, 89^0 E, longitude with an average altitude of 9.75 m from the sea level during 2013-2014. The potted ornamental foliage plants were kept in 30% shade net house.

The experiment was based on a completely randomized design with seven treatments, six measuring times and three replications. Treatments include T1 Soil + Sand + FYM (2:1:1), T2 Soil + Sand + Vermicompost (2:1:1), T3 Soil + Sand + FYM + Vermicompost (2:1:1:0.5), T4 Coco-peat, T5 Coco-peat + sand + FYM (2:1:1), T6 Coco-peat + sand + Vermicompost (2:1:1) and T7 Coco-peat + sand + FYM + Vermicompost (2:1:1:0.5). Measurements were performed in six times from September 2013 till February 2014 (a measurement of factors in each month). Pots of 10 inches of diameter were thoroughly filled with substrates according to treatments and seedlings were transplanted. Parameters such as plant height, leaf number per plant, leaf length, leaf width and plant spread were measured. The plants were irrigated each 6-7 days in cool months and each 4-5 days in warm months .The data so far obtained in the present studies were analyzed by adopting the statistical procedures of Gomez and Gomez (1984). The significance of different sources of variation was tested by error mean of Fisher Snedecor's F test at 0.05 percent of probability levels.

RESULTS AND DISCUSSION

Plant height(cm)

According to data analysis, it was seen that the effect of media, time and their interaction on plants height were significant. The data presented in the Fig.1 revealed that there exist a significant difference among the means of *Dieffenbachia bowmannii* due to the plant height (cm) under all the treatments under each observation *i.e.* 30 DAP, 60 DAP, 90 DAP, 120 DAP, 150 DAP and 180 DAP Interaction diagram shows that T_1 substrate caused the longest plants height in all measuring months. The highest values of plant length was 81.00cm followed by T6 (76.00cm) and T3 (72.33) after 180 days of planting ,the lowest value was recorded with T4 (63.33cm). Based on the observations it is thus determined that treatment T1 (Soil + Sand + FYM) became most effective among all the media composition for enhancing plant growth during the whole course of the study and treatment T4 (Coco-peat only) maintained the shortest plant height. The present study regarding increase in plant height by application of soil, sand, FYM was also supported by Singh (2010) where different combinations of soil, sand, FYM, leaf mould, vermicompost and poultry manure have a definite role in maximizes plant height and diameter of shoot in *Dieffenbachia bowmannii*.

Current research showed that nitrogen content of substrate is important for increase in the plant growth (Bidarnamani and

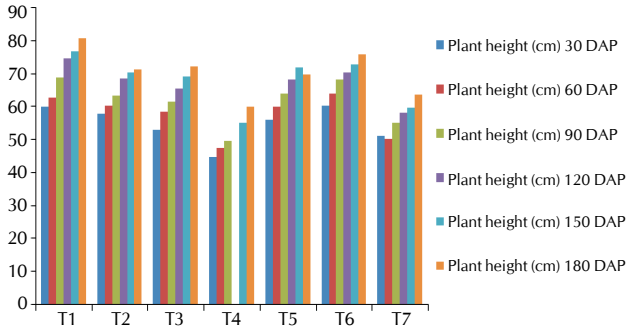

Figure 1: Effect of media composition on the plant height in *Dieffenbachia bowmannii*

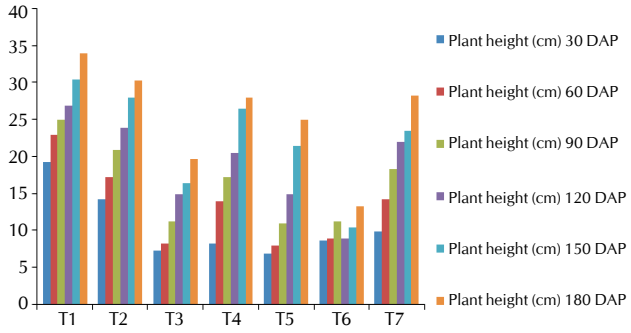

Figure 2: Effect of media composition on the plant height in *Dracaena reflexa*

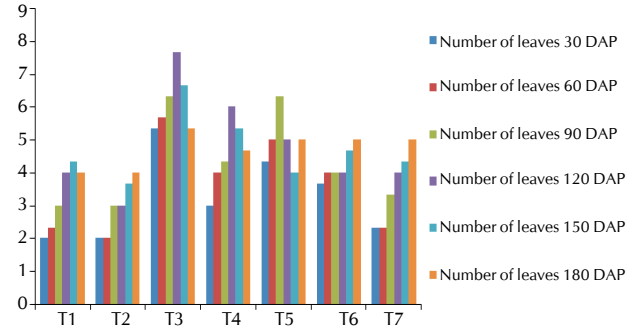

Figure 3: Effect of media composition on the leaf numbers in *Dieffenbachia bowmannii*

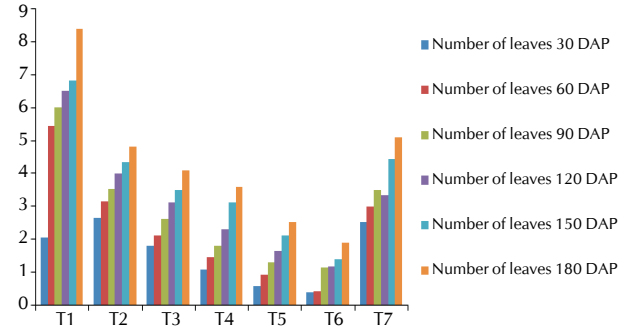

Figure 4: Effect of media composition on the leaf numbers in *Dracaena reflexa*

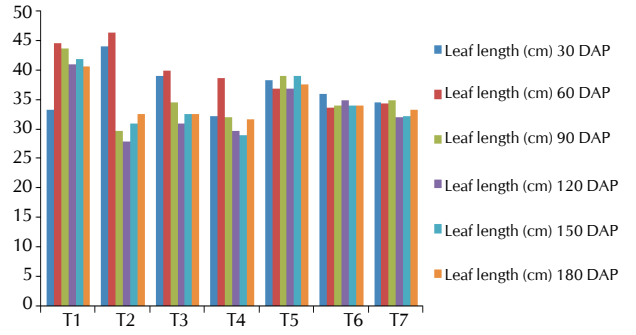

Figure 5: Effect of media composition on the leaf length in *Dieffenbachia bowmannii*

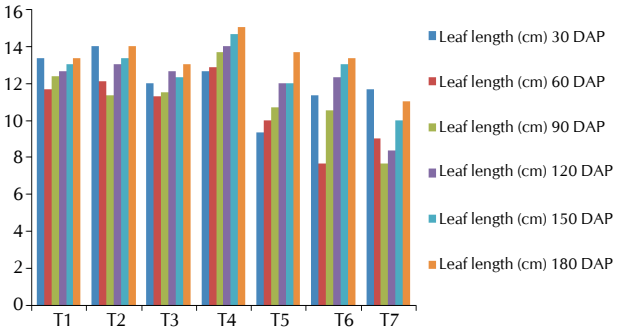

Figure 6: Effect of media composition on the leaf length in *Dracaena reflexa*

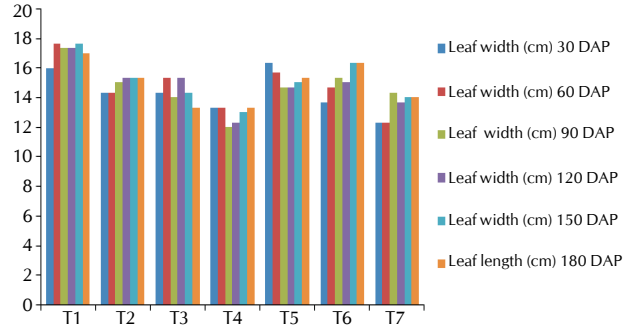

Figure 7: Effect of media composition on the leaf width in *Dieffenbachia bowmannii*

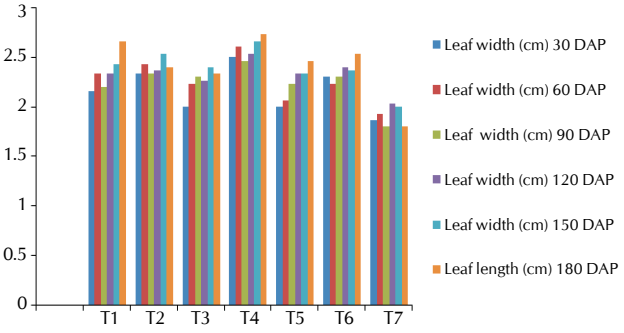

Figure 8: Effect of media composition on the leaf width in *Dracaena reflexa*

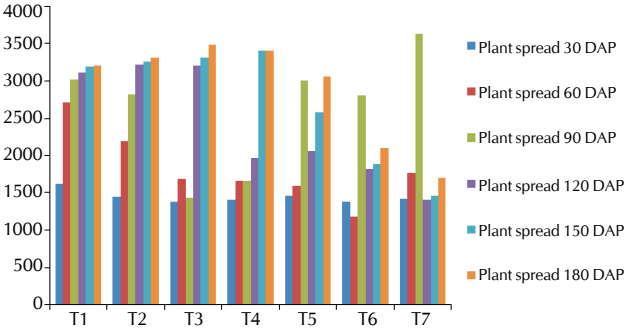

Figure 9: Effect of media composition on the Plant spread in *Dieffenbachia bowmannii*

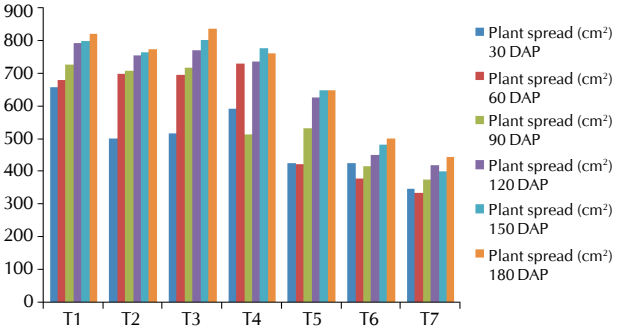

Figure 10: Effect of media composition on the Plant spread in *"Dracaena reflexa"*

T1 Soil + Sand + FYM (2:1:1), T2 Soil + Sand + Vermi-compost (2:1:1), T3 Soil + Sand + FYM + Vermi-compost (2:1:1:0.5), T4 Coco-peat, T5 Coco-peat + sand + FYM (2:1:1), T6 Coco-peat + sand + Vermi-compost (2:1:1) and T7 Coco-peat + sand + FYM + Vermi-compost (2:1:1:0.5)

Zarei, 2014).

In case of *Dracaena reflexa* plant height were increased with the number of days after planting. It showed that treatment T1 (Soil + Sand + FYM) keeps highest plant height under each observation *i.e* [19.33cm in30 DAP,23.00cm in 60 DAP,25.00cm in 90 DAP,27.00cm in 120 DAP,30.50cm in 150 DAP and 34.00cm in 180DAP]. Based on the observation, treatment T5 (Coco-peat + sand + FYM) was proven as the least effective one.

Leaf number per plant

There existed significant differences among the means of *Dieffenbachia bowmannii* due to number of leaves under all the treatments under each observation except 180 DAP. Among various pot media, Soil + Sand + FYM + Vermi compost (2:1:1:0.5) (T_3) and Soil + Sand + Vermicompost (2:1:1) (T_2) had the maximum(7.66 in 120 DAP) and minimum(2.00 in 30,60 DAP) leaf number, respectively. In 120 DAP plants showed the maximum leaf number. Based on the observation it is determined that treatment T3 (Soil + Sand +FYM + Vermicompost) showed highest number of leaves per plant and treatment T2 (Soil + Sand + Vermicompost) kept lowest number of leaves per plant.These results shows close similarity to Hussain *et al.*, 1994 ,where Sand and FYM produced

better result in *O. Microdasys*.

According to the analysis of the experiment ,it was found that in Draceana reflexa the means of all the number of mature leaves were significant under each observation.Application of treatment T1 (Soil + Sand +FYM)shows the highest number of leaves per plant [54.50 in 60 DAP,60.00 in 90 DAP,65.00 in 120 DAP,65.33 in 150 DAP and 84.00 in 180DAP] (Fig-4) and the lowest number of leaves were noted by treatment T6 (Coco-peat + sand + Vermicompost).

Leaf length(cm)

Fig. 5 show the effect of time and treatments on leaves length of Dieffenbachia .There exist a significant difference among the means of *Dieffenbachia bowmannii* due to the leaf length under all the treatments under each observation i.e. 30 DAP, 60 DAP, 90 DAP, 120 DAP, 150 DAP, and 180 DAP. Effect of different pot mixtures on leaves length factor showed that potting mixture of T_2 showed highest leaf length in 30 DAP (44.00cm)and 60DAP(46.33cm) where as T_1 showed highest leaves length in 90 DAP (43.66cm),120DAP(41.00cm), 150 DAP(42.00cm) and 180 DAP(40.66cm).

In *Dracaena reflexa* leaves length were highest in T_2 in 30 DAP and 60 DAP ,and in other days of observation shows highest length in T_4(Coco-peat only), in other side T7 keeps leaf length short under each observation. The result obtained from the observation showed that the highest leaf width was found by application of treatment T4 (Coco-peat only) and lowest value was observed in T7 (Coco-peat + sand + FYM + Vermicompost). Benito (2005) also showed close similarity to this result that peat and leaf manure as growing substrates with adequate supply of nitrogen content are good for healthy plant growth.

Leaf width(cm)

Application of treatment T1(Soil + Sand +FYM)gave the highest leaves width[17.66cm in 60 DAP,17.33 in 90 DAP,17.33 in 120 DAP,17.33 in 150 DAP and 17.00 in 180DAP] in *Dieffenbachia bowmannii* (Fig-7) .There existed no significant difference among means of media combinations due to leaf width in first observation i.e. 30 DAP unlike other observations. Beside these potting mixtures of Coco-peat only were kept lowest leaf width per plant. The result obtained from the observation depicted that there is no significant variation in leaf width of *Dieffenbachia bowmannii* during early stage of growth, although at later stages treatment T1 (Soil + Sand + FYM) was found increased leaf width significantly.

The highest leaf width in *Dracaena reflexa* was recorded each observation and also observed that T4 (Coco-peat only) kept maximum leaf width under each observation (Fig-8)and lowest value was observed in T7 (Coco-peat + sand + FYM + Vermicompost). This results shows nearly similarity to the findings of Khayyat (2007) who found leaf mould is the best growing substrate in combination with cocopeat (3:1) for attaining leaves growth. The availability of nutrients in growing substrate greatly affects the size of leaves. Best substrate having adequate supply of nutrients can be used to accomplish significant results. Maximum increase in size of leaves shows adaptability of plants to soil (Mehmood *et al*., 2013).

Plant spread (cm^2)

there existed significant difference among means of media combinations due to plant spread except 30 DAP unlike other observations. At 60 and 90 DAP, the maximum plant spread was recorded under the treatment T_1 i.e. 2712.00 cm^2 and 3009.66cm^2 respectively. The highest plant spread was recorded under the treatment T3 3304.00cm^2 and 3479.66cm^2 at 120 and 180 DAP respectively and the lowest value was recorded with T7 (Coco-peat + Sand + FYM + Vermicompost). It was found that there was no significant variation in plant spread of *Dieffenbachia bowmannii* during early stage of growth. At later stage highest plant spread was found by application of treatment T1 (Soil + Sand + FYM) and lowest value was observed in T7 (Coco-peat + Sand + FYM + Vermicompost).The results are in line with the findings of Nair and Bharathi(2015) in Potted chrysanthemums. Here FYM and soil supplied nutrition and sand supplied aeration for good growth which resulted highest plant spread.

In case of *Dracaena reflexa,* based on the observation it was determined that At 90 DAP, failed to show significant variation in plant spread. The highest Plant spread was recorded under the treatment T1 (726.00cm^2) and At 120 DAP The highest Plant spread was recorded under the treatment T1 (792.33cm^2) the lowest value was recorded with T7 At 150 DAP, the highest Plant spread was recorded under the treatment T3 [Soil + Sand + FYM + Vermicompost (2:1:1:0.5)]803.00) and the highest Plant spread was recorded under the treatment T3 [Soil + Sand + FYM + Vermicompost (2:1:1:0.5)] (838.00) at 180 DAP followed by T1 (Soil + Sand + FYM).the lowest value was recorded with T7.

The media containing cocopeat were not caused to a suitable growth of pothos, because the plants could not uptake necessary N, Mg and Fe elements,due to insolubility or unavailability of elements in the final pot mixture (Bidarnamani and Zarei, 2014).However, Farm Yard Manure was seen to prove more effective for better plant growth.Thus, it is suggested that soil + sand + FYM@2:1:1 can be recommended as a standard potting media for Dieffenbachia and Dracaena also.

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