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Influence of different containers and media on growth and flower yield of *Dendrobium* orchid cv. 'Earsakul'

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ABSTRACT

The present investigation entitled "Standardization of different containers and media on growth and flower yield of *Dendrobium* orchid cv. 'Earsakul' under shade net conditions in Floriculture Research Station, Thoivalai, Tamil Nadu. The study results revealed that the highest vegetative and flower parameters was recorded in T₈ - Perforated plastic pots with Coir compost + Brick pieces + Coconut husk + Charcoal+ Tiles pieces in equal parts *viz.*, Plant height (9.26 cm) Leaf length (7.65 cm) No. of leaves per plant (8.74 cm) Leaf breadth (3.89 cm) Spike length (38.00 cm) Flowers Length (7.50 cm) Flowers Diameter (7.30 cm) No. of flowers per Plant (6.00) significant differences were observed among different containers and media on *Dendrobium* orchids cv. 'Earsakul'. The lowest was recorded in the treatment T₁ - Perforated mud pots with Coir compost Plant height (8.20 cm) Leaf length (7.17 cm) No. of leaves per plant (7.69 cm) Leaf breadth (3.48 cm) Spike length (27.00 cm) Flowers Length (6.80 cm) Flowers Diameter (6.00 cm) No. of flowers per Plant (3.00).

Key words : *Orchid, Dendrobium, Orchid growth*

Introduction

Dendrobium L. is a genus of mostly epiphytic and lithophytic orchids in the family *Orchidaceae*. It is a very large genus, containing more than 1,800 species that are found in diverse habitats throughout much of south, east and southeast Asia, including China, Japan, India the Philippines, Indonesia, Australia, New Guinea, Vietnam and many of the island of the Pacific. Orchids in this genus have roots that creep over the surface of tree or rocks, rarely having their roots in soil. Orchid cut flowers have emerged as leader in the international market and have im-

mensely contributed to the economy of several developed and developing countries. They are valued for cut flower production and as potted plant in commercial floriculture owing to the wide range of colours, shapes, sizes and fragrance they display. Orchids are excellent for garden and can be grown in beds, pots, baskets, split hollows of bamboo pieces etc. They are marketed globally as cut flowers for making corsages, floral arrangements and bouquets. They are also suitable for interior decoration and remain fresh for many days. They comprise the largest family (*Orchidaceae*) of flowering plants with 25,000 to 35,000 species belonging to 600-800 genera.

Potting media plays a key role in quality and production of flowering plants. Natural soil and peat are the most used growing substrates for the container production of annual and perennial ornamental plants (Tariq *et al.* 2012). Potting media containing peat is commercially an expensive and non-reusable component but developing inexpensive alternatives by the use of nutrient-rich organic media can potentially result in reduction of fertilization and irrigation rates as well as also decrease nursery costs (Wilson *et al.*, 2002). 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). At present cultivation of Orchids, is gaining momentum in India. It has got an excellent market potential in the floriculture industry. Despite the fact that India has diversified climate, low cost of labour and progressive farming technology, the Orchid industry is still in an infant stage for commercial cultivation. This has been mainly due to non-availability of planting material for large scale cultivation, lack of technology for commercial multiplication, lack of adequate techniques on production practices resulting in poor yield and quality, lack of post-harvest handling technology for cut flower export and lack of incentives. Hence, selection of suitable containers and media for good vegetative growth and flower yield of orchids is very important.

Materials and Methods

The present research was carried out at Floriculture Research Station, Thovalai to evaluate the comparative effect of different containers and growing media on vegetative and flower parameters of orchids *Dendrobium* L cv. 'Earsakul'. The present study was carried out during 2017-2018. Pots were thoroughly filled with substrates according to treatments. Substrate samples from each treatment were collected for morphological analysis. The experiment was carried out in Completely Randomized Design (CRD) and each treatment consisting of 10 plants was replicated thrice. Observation was recorded on three randomly selected plants in each treatment *i.e.*, Plant height, Leaf length, No. of leaves per plant, Leaf breadth, Spike length, Flowers Length, Flowers Diameter, No. of flowers per Plant. The experimental data were analysed statistically by ANOVA (Analysis of Variance) technique (Panse and Sukhatme, 1985).

Results and Discussion

Vegetative parameters

Among the different treatments used in this experiment, vegetative parameters were significantly superior among the treatments presented in [Table 1]. The maximum vegetative parameters viz., Plant height (9.26 cm) Leaf length (7.65 cm) No. of leaves per plant (8.74 cm) Leaf breadth (3.89 cm) was registered in T₈ - Perforated plastic pots with Coir compost + Brick pieces + Coconut husk + Charcoal+ Tiles pieces in equal parts and followed by T₉ - Coconut husk with half base Plant height (9.26 cm) Leaf length (7.65 cm) No. of leaves per plant (8.74 cm) Leaf breadth (3.89 cm). In case of lowest vegetative parameters was observed in the treatment T₁ - Perforated mud pots with Coir compost Plant height (8.20 cm) Leaf length (7.17 cm) No. of leaves per plant (7.69 cm) Leaf breadth (3.48 cm). The experiment finding was also supported by Bhattacharjee, (1980) and Saravanan (2001). Charcoal media was found to be superior because of better, root aeration, resistance to high heat and supply of nutrients. The reason for reduction in number of shoot in sawdust and coconut husk was due to poor root aeration and depletion of nutrients (Paul and Rajeevan, 1992) and (Kumar, 1992) reported that charcoal media gave slow nutrient to enhanced shoot girth and good support for shoot growth. Sawdust showed lowest shoot girth because of high compactness of pores after irrigation. There was significant difference in growth media in relation to root length. Similar results were found by Paul and Rajeevan, (1992), Kumar (1992) and Saravanan, (2001). Charcoal media was found better for root and shoot growth they provide proper water, supply nutrients, permit gas exchange to roots

Flowering parameters

Flowering parameters was highest in the treatment T₈ - Perforated plastic pots with Coir compost + Brick pieces + Coconut husk + Charcoal+ Tiles pieces in equal parts recorded the Spike length (38.00 cm) Flowers Length (7.50 cm) Flowers Diameter (7.30 cm) No. of flowers per Plant (6.00) (Table 2). Followed by T₄ - Perforated mud pots with Coir compost + Brick pieces + Coconut husk + Charcoal + Tiles pieces in equal parts. The lowest was observed in the treatment T₁ - Perforated mud pots with Coir compost Spike length (27.00 cm) Flowers

Length (6.80 cm) Flowers Diameter (6.00 cm) No. of flowers per Plant (3.00) respectively). physical characteristics, aeration and water holding capacity, these are probably the most important factors, while among the chemical characteristics, nutritional status, and salinity level have a crucial role on plant development (Dewayne *et al.*, 2003, Singh *et al.*, 2003). Prabhu *et al.*, 1983 and Nagarajan *et al.*, 1985 found that coir pith a byproduct from coir industry should be a potential wealth and could be converted into valuable organic manure Coco peat can hold

large quantities of reported in a series of annual crops and same findings were done by Mirzaev (1988) in carnation. Coco peat has been considered as a renewable sphagnum peat substitute for the use in horticulture (Pisanu *et al.*, 1994, Yau and Murphy and 2000 Henry and Norman, 2001). Noguera *et al.*, (2000) studied the importance of coco peat as a growing medium due to its high porosity (95%), nutritive value and slightly acidic nature. The coco peat has a bulk density of 0.1 g/c and a particle density of 1.3 g/c with 96% porosity. Lower bulk den-

Table 1. Standardization of containers and media for vegetative characters

Treatments	Vegetative character of orchid			
	Plant height (cm)	Leaf length (cm)	No. of leaves per plant	Leaf breadth (cm)
T ₁ - Perforated mud pots with Coir compost	8.20	7.17	7.69	3.48
T ₂ - Perforated mud pots with Coir compost + Sphagnum mass in equal parts	8.49	7.25	8.02	3.56
T ₃ - Perforated mud pots with Coir compost + Coconut husk in equal parts	8.28	7.21	7.85	3.52
T ₄ - Perforated mud pots with Coir compost + Brick pieces + Coconut husk + Charcoal + Tiles pieces in equal parts	8.92	7.35	8.31	3.67
T ₅ - Perforated plastic pots with Coir compost	8.40	7.31	8.10	3.61
T ₆ - Perforated mud pots with Coir compost + Sphagnum mass in equal parts	9.04	7.50	8.53	3.78
T ₇ - Perforated plastic pots with Coir compost + Coconut husk in equal parts	8.96	7.43	8.38	3.72
T ₈ - Perforated plastic pots with Coir compost + Brick pieces + Coconut husk + Charcoal+ Tiles pieces in equal parts	9.26	7.65	8.74	3.89
T ₉ - Coconut husk with half base	9.15	7.62	8.65	3.83
Mean	8.74	7.38	8.25	3.67
SE (d)	0.08	0.09	0.09	0.15
CD (P = 0.05)	0.16	0.18	0.18	0.10

Table 2. Standardization of containers and media for flowering characters

Treatments	Flowering character of orchid			
	Spike length (cm)	Flowers Length (cm)	Flowers Diameter (cm)	No. of flowers per plant
T ₁ - Perforated mud pots with Coir compost	27.00	6.80	6.00	3.00
T ₁ - Perforated mud pots with Coir compost	27.00	6.80	6.00	3.00
T ₂ - Perforated mud pots with Coir compost + Sphagnum mass in equal parts	29.80	7.00	6.35	4.00
T ₃ - Perforated mud pots with Coir compost + Coconut husk in equal parts	28.50	6.90	6.50	5.00
T ₄ - Perforated mud pots with Coir compost + Brick pieces + Coconut husk + Charcoal + Tiles pieces in equal parts	36.00	7.60	6.95	4.00
T ₅ - Perforated plastic pots with Coir compost	28.01	6.90	6.00	5.01
T ₆ - Perforated mud pots with Coir compost + Sphagnum mass in equal parts	33.30	7.20	7.05	4.50
T ₇ - Perforated plastic pots with Coir compost + Coconut husk in equal parts	28.50	7.00	7.10	4.00
T ₈ - Perforated plastic pots with Coir compost + Brick pieces + Coconut husk + Charcoal+ Tiles pieces in equal parts	38.00	7.50	7.30	6.00
T ₉ - Coconut husk with half base	29.00	5.50	6.05	3.00
Mean	27.73	6.93	6.59	4.28
SE (d)	2.13	0.30	0.39	0.43
CD (P = 0.05)	3.82	0.79	0.77	1.10

sity and particle density of the coco dust-based media as compared to another medium was observed by Wilson *et al.* (2002).

Conclusion

Findings there was significant difference between the treatments for plant height, number of leaves per plant, leaf length, leaf breadth, spike length, number of flowers / plants, flower length, flower diameter. Plant height was maximum in the treatment T₈ - Perforated plastic pots with Coir compost + Brick pieces + Coconut husk + Charcoal+ Tiles pieces in equal parts Plant height (9.26 cm) Leaf length (7.65 cm) No. of leaves per plant (8.74 cm) Leaf breadth (3.89 cm) Spike length (38.00 cm) Flowers Length (7.50 cm) Flowers Diameter (7.30 cm) No. of flowers per Plant (6.00) while the least was observed in the treatment T₁ - Perforated mud pots with Coir compost Plant height (8.20 cm) Leaf length (7.17 cm) No. of leaves per plant (7.69 cm) Leaf breadth (3.48 cm) Spike length (27.00 cm) Flowers Length (6.80 cm) Flowers Diameter (6.00 cm) No. of flowers per Plant (3.00).

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