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Comparative Effect of Different Potting Media on Vegetative and Reproductive Growth of Dendrobium Orchid Var Sonia-17

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Abstract An experiment was undertaken to study the different growing media on Dendrobium variety Sonia-17 under naturally ventilated polyhouse condition . The experiment was conducted by applying different combinating of media which were locally and cheaply available. Combinations of growing medium significantly influenced the vegetative growth, flowering pattern and flower production of orchid. The overall best performance was observed in the media comprising charcoal + peanut shell + maize rind pieces (T_5) which recorded maximum number of leaves (10.33), stalk length (39.69 cm) and number of florets/spike (8.20). Whereas, media comprising charcoal + rice husk + coconut husk (T_7) recorded maximum plant height (39.05 cm) and media comprising charcoal + stone pebbles + coconut husk (T_6) recorded maximum number of pseudo bulbs (5.33) and number of spikes (10.00). Hence by considering overall growth of plants; media comprising charcoal + peanut shell + maize rind pieces and charcoal + stone pebbles + coconut husk were found best for cultivation of Dendrobium.

Keywords Potting media, Vegetative and reproductive growth, Dendrobium, Orchid.

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Introduction

Orchids are the royalty among flower crops. They exhibit an incredible range of diversity in size, shape and color of flower. They are valued as cut flowers and potted plant and are the most pampered plants. Orchids, more than any other plants, exert a mysterious fascination for most people and all the wild orchids of tropical regions are highly puzzling and peculiar. Orchids have a very wide range of distribution. They are found to occur in all parts of the world except, perhaps, in the Antarctica. Though the family is cosmopolitan, many more species are found

in the tropics than in the temperate regions. Orchids have taken a significant position in cut flower industry due to its attractiveness, long shelf life, high productivity, right season of bloom, easy in packing and transportation. Orchids account for a larger share of global floriculture trade both as cut flower and as potted plants and is estimated around 10% of international fresh cut flower trade. The value of fresh cut orchid and buds trade during 2007-2012 with the average trade was US $ 483 million [1].

The genera of orchids which are commercially important are *Cymbidium, Dendrobium, Phalaenopsis, Oncidium, Vanda, Mokara, Arachnis* and *Cattleya* [2]. Among these genera, Dendrobiums are most popular tropical orchid getting fame as cut flowers in India as well as in the world. The orchids especially dendrobiums regin supreme among the floricultural plants due to the beauty and diversity of their long-lasting and colorful flowers. In view of the ease in management practices and ready availability of hybrids from private importers, Dendrobiums now occupy maximum area under orchid cultivation in the country [3]. Their contribution to interational trade in horticultural plants is unmatched. They command a high demand and price as cut-flowers and potted plants and form the basis of a multimillion dollar horticultural industry in several countries of the world [4].

Nowadays, the view concerning the growing of many orchids has been changed [5]. There is a continuous search for cheaper and more easily available media, because only a healthy and correctly developed root system guaranties optimal uptake of nutrients and in consequence it ensures a quick growth and development of plants. But research work on locally and cheaply available media suitable for Dendrobium cultivation is limited. So, the present study is aimed to identify the suitable locally and cheaply available media for vegetative and reproductive growth under greenhouse in the hill zone of Karnataka, which is one of the best suitable places for orchid cultivation.

Materials and Methods

The present research was carried out at College of Horticulture, Sirsi to evaluate the comparative effect of different potting media on vegetative and reproductive growth of Dendrobium orchid variety Sonia 17 under naturally ventilated polyhouse. The climate was moderate and favorable for cut flower production of orchid round the year under polyhouse. Uniformly grown nine months old tissue cultured plants were selected and planted in the earthen pots of size 6 ″×4″ by applying different combinations of media which were locally and cheaply available. Combinations of media used were charcoal + brick + tile pieces (T_1) charcoal + brick pieces + sphagnum mass (T_2) charcoal + coconut husk + arecanut husk (T_3) charcoal + brick + cocount husk (T_4) charcoal + peanut shell + maize rind pieces (T_5) charcoal + stone pebbles + coconut husk (T_6) and charcoal + rice husk + coconut husk (T_7). The media were mixed in equal ratio (1 : 1 : 1). The experiment was conducted in completely randomized block design with five replications for each treatment. The irrigation was done twice a day for the plants during hot months and once a day during cool mionths. Besides, water was also sprinkled once a day to the floor for maintaining the temperature and humidity inside the greenhouse. During vegetative phase, concentration of 0.2 % of 30 : 10 : 10 (N : P : K) and during blooming phase at ratio of 10 : 20 : 20 (N : P : K) were provided. Micronutrients were also applied at the concentration of 0.2% twice a week. Observations were recorded on important traits viz. plant height number of leaves per plant , number of pseudo bulbs, spike length, number of spikes/plant /year and number of florets/spike. Data were statistically analysed and pooled mean values are presented in Table 1.

Results and Discussion

The data in Table 1 indicate that maximum mean plant height (39.05 cm) at 180 days after planting was recorded in T_7 (charcoal + rice husk + coconut husk) followed by T_5 (charcoal + peanut shell + maize rind pieces) (38.57 cm) and T_6 (charcoal + stone Pebbles + coconut husk) (38.51 cm). It can be supposed that an abundant plant growth in a medium with an addition of coconut husk and maize rind is due its beneficial physical properties like higher water capacity and absorption resulting in smaller fluctuation

Table 1. Effect of different media composition on growth and yield of Dendrobium orchid var Sonia 17.

Treatments	Plant height (cm)	No. of leaves	No. of pseudo bulbs	No. of spikes	Stalk length (cm)	No. of florets /spike
T_1	34.01	7.13	4.20	5.80	34.59	6.00
T_2	37.30	8.47	5.00	6.60	31.96	6.86
T_3	36.94	9.80	4.87	8.40	33.40	6.73
T_4	37.57	9.13	4.87	9.00	35.13	7.13
T_5	38.57	10.33	5.33	9.80	39.69	8.20
T_6	38.51	9.33	5.47	10.00	37.95	7.26
T_7	39.05	10.27	4.40	7.20	34.07	6.66
SEm±	0.80	0.62	0.26	0.59	1.67	0.27
CD @ 5%	2.35	1.81	0.76	1.74	4.8	0.80

of medium moisture. Similar opinions were expressed by earlier workers [6,7].

Number of leaves at 180 days after planting ranged from minimum (7.13) in T_1 (charcoal + brick + tile pieces) to maximum (10.33) in T_5 (charcoal + peanut shell + maize rind pieces) followed by T_7 (charcoal + rice husk + coconut husk (10.27) and T_6 (charcoal + stone pebbles + coconut husk) (9.33). Both physical and chemical characteristics of the growth medium exert substantial effect on growth of plants. Among the physical characteristics, aeration and water holding capacity are probably the most important factors while, among the chemical characteristics, nutritional status and salinity level have a crucial role on plant development [8].

Maximum number of psuedo bulbs was recorded in T_6 (charcoal + stone pebbles + coconut husk) (5.47) followed by T_5 (charcoal + peanut shell + maize rind pieces) (5.33) which was on par with each other. This may attributed to coconut husk due its porosity ensured the most favorable growth conditions. The higher number of psuedo bulbs could probably be attributed to higher vegetative growth as a result of water holding capacity. High water holding capacity induced higher vegetative growth in hydroponics culture of ornamental plants like Oriental hybrid lity [9].

Increased stalk length reflects the quality of orchid as cut flower fetching good market price. In the present study, maximum stalk length was recorded in T_5 (charcoal + peanut shell + maize rind pieces) (39.69 cm) which was closely followed by T_2 (charcoal + stone pebbles + coconut husk) (37.95 cm). While minimum stalk length was observed in T_6 (charcoal + brick pieces + sphagnum mass) (31.96 cm). Similarly, media comprising charcoal +peanut shell + maize rind pieces (T_5) produced significantly maximum number of florets per spike (8.20) followed by media comprising charcoal + stone pebbles + coconut husk (T_6) (7.26). The beneficial media effects on floral parameters observed in the present study may be attributed to the better physico-chemical properties of the medium. The greater aeration and enhanced nutrient composition of maize rind and peanut shell and its reported ability to convert nutrients into a readily available form to plants may be the causative factors [10]. The advantages of coconut husk based media as an ideal media component for growing plants had been reported by several workers [11,12].

Maximum number of spikes was recorded in media comprising T_6 (charcoal + stone pebbles + coconut husk) (10.00) followed by T_5 (charcoal + peanut shell + maize rind pieces) (9.80). Organic based potting media promotes the plant growth due to high availability of nutrients and less moisture fluctuation. Charcoal and pebbles have contributed in terms of better aeration and drainage whereas coconut husk has supplied nutrient continuously throughout the growth phase of orchid. Hence the combination of these medium has created congenial microclimate for better growth and development. Similar findings were reported in orchid [3] and in anthurium [14]. Hence by considering overall growth of plants; media comprising charcoal + peanutshell + maize rindpieces and charcoal + stone pebbles + coconut husk were found best for cultivation of Dendrobium.

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