

Effect of N.P.K. and potting media on plant growth and spike yield of *Dendrobium Orchid* cv. Emma White Under Allahabad Agro-Climatic Condition

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Abstract

An experimental was laid out in the Complete Randomized Design (CRD) having 10 treatment and 3 replications. The treatment (T₉ 10:30:30 NPK @ 0.3% Brick pieces + Gravel + Poultry manure) was found to be statistically significant over other treatment combinations, which recorded highest plant height (32.25cm), number of leaves (12.47), leaf area (42.58cm²), number of new shoot per plant (5.25), shoot girth (3.25), root length (17.68cm), number of root per plant (26.58), total number of spike yield per plant (5.69), number of plant per spike (12.58), spike length (38.58cm), longevity of spike per plant (46.25cm). was recorded in treatment under shade net condition.

Key words: Plant height, spike yield, new shoots per plant, different potting media, N. P. K. and Shelf life in plant.

Introduction

Among all flowers, orchids are the most fascinating and beautiful creation. These extra ordinary plants belong to the family orchidaceae, which has about 35,000 species in 800 genera. Orchids are grown all over the world ranging from Equator to Arctic Circle and from tropics to temperate regions with tropical amazon and Indo Malayan region considered as their main centers of origin. India is blessed with a wealth of orchid flora and about 1600 species are estimated to occur in our country (Maheswari, 1976), out of which 200 are found in South India especially in western Ghats and 600 in the North-eastern states. *Dendrobium* is the second largest genus, which grows at altitudes ranging from sea level to 5000 m above MSL and in areas having as low as 60 cm to as high as 1100 cm annual rainfall with humidity more than 70 per cent.

Materials and Methods

This experiment was conducted in Floriculture Unit, Department of Horticulture, Allahabad School of Agriculture, S.H.I.A.T.S, Allahabad during 2012-2013. The experiment was laid at Complete Randomized Block Design (CRD) with three replications. In total 10 treatments comprised of pot Effect of N.P.K. and potting media different level of each viz. (T₁ 20:20:20 (NPK @ 0.3% Coconut fibre + FYM + Wheat husk) (T₂ 10:30:20 NPK @ 0.3%) Charcoal + Coconut fibre + Brick pieces),

(T₃ 15:15:15 NPK @ 0.3% Brick pieces + FYM + Leaf mould), (T₄ 20:15:15 NPK @ 0.3% Wheat husk + FYM + Gravel), (T₅ 20:10:20 NPK @ 0.3% Coconut fibre + Poultry manure + Brick pieces), (T₆ 19:19:19 NPK @ 0.3% Brick pieces + Rice husk + Charcoal), (T₇ 10:15:20 (NPK @ 0.3% FYM + Poultry manure + Brick pieces), (T₈ 20:10:10 NPK @ 0.3% Leaf mould + Gravel + Rice husk) and (T₉ 10:30:30 NPK @ 0.3% Brick pieces + Gravel + Poultry manure) with control (T₀ Rice husk + leaf mould + gravel) were adopted. The plants are collected from Sheel Bio-tech limited, Tughlakabad, and New Delhi-110019. shed net house, in perforated 12 inch earthen pots. The pots were placed over 5 cm sand surface. The growth and yield parameters for each treatments were observed in three plants selected by random sampling method. The data were statistically analyzed and critical differences were worked out at five percent level to draw statistical conclusions as suggested by Panse and Sakhatme (1978).

Results and Discussion

Emma white the maximum plant height (32.25cm) was recorded in T₉ 10:30:30 (NPK @ 0.3%) Brick pieces + Gravel + Poultry manure at 180DAP followed by T₈, T₆ and T₇ and the minimum plant (27.38cm at 180 DAP) was recorded in T₀ Control Rice husk + leaf mould + gravel. Maximum plant height was observed when the fertilizer level increased (Table 1). The results are corroborative with the findings in *Cymbidium* orchids as reported by

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Poole and Seeley (1978) and in Phalaenopsis by Griesbach (1985) Whereas the Emma white the maximum number of leaves (12.47 at 180DAP respectively) was found in T₉ 10:30:30(NPK @ 0.3%) Brick pieces + Gravel + Poultry manure followed by T₈, T₆ and T₇ and minimum number of leaves was recorded in T₀ Control Rice husk + leaf mould + gravel (10.25). Hersh (1997) reckoned that Dendrobium orchids showed an increased in number of leave when potted in Brick pieces + Gravel + Poultry. Whereas Emma white registered a maximum of T₉ (10:30:30(NPK @ 0.3%) Brick pieces + Gravel + Poultry manure) (42.58) at 180DAP respectively followed by T₈ (38.58), T₇ (37.88) and T₆ (35.35). while the minimum leaf area cm² was observed in T₀ in Emma White Similar result was observed by Gelthing (1974) in Odontoglossum Hybrid, Griesbach (1998) in Phalaenopsis and Kim *et al.* (1996) in Cypripedium. Whereas Emma white the maximum Number of (5.25) new shoots was found in T₉ 10:30:30(NPK @ 0.3%) Brick pieces + Gravel + Poultry manure) followed by T₈, T₅, T₄ and T₆ the minimum number of (2.25) new shoots per plant was observed in T₀ (Control Rice husk + leaf mould + gravel). Arumugan and Jawaharlal (2004) studies on media experiment on Dendrobium Hybrid founded that the coconut fibre as a growing medium had recorded positive result for plant height, number of shoots per plant. Dry matter production was high when plants were grown under rice husk medium. While Emma white the maximum shoots girth (3.25) was recorded in T₉ (10:30:30(NPK @ 0.3%) Brick pieces + Gravel

+ Poultry manure) followed by T₈, T₄ and T₆ the minimum (2.13) shoot girth was found in T₀ (Control Rice husk + leaf mould + gravel). Mohapatra and Saravanan, (2006). The treatments were coconut coir, bhusa, rice husk, tile bits, charcoal, cow dung, brick pieces and groundnut shell. Gravel+ groundnut shell + cow dung recorded the highest shoot girth, were also greatest with gravel + groundnut shell + cow dung, followed by charcoal + coconut coir + cow dung. Coconut coir, gravel and cow dung were superior among the growing media. while the Emma white the maximum root length (17.68) was seen in T₉ (10:30:30(NPK @ 0.3%) Brick pieces + Gravel + Poultry manure) followed by T₈, T₆, T₇ and T₄. Emma white which recorded a minimum (10.18) root length in T₀ (Control Rice husk + leaf mould + gravel) Galdiano *et al.* (2012) the use of culture media produced with commercial fertilizers can represent a simple and low cost alternative for commercial orchid propagation when the number of roots, root length matter were evaluated. The simplified culture medium with fertilizer Peters Reg. 3 g L⁻¹ presented results statistically different as for the number of roots, number of leaves, shoot length and shoot fresh matter and it can be recommended for *in vitro* growth of this ornamental orchid. Whereas Emma white the maximum of root per plant (26.58) was found in T₉ (10:30:30(NPK @ 0.3%) Brick pieces + Gravel + Poultry manure) followed by T₈, T₇ and T₆. it was lowest (19.25) Number of root per plant was recorded in T₀ (Control Rice husk + leaf mould + gravel). Kumar (1992) stated that *Dendrobium* hybrids potted in

Table 1: Effect of N.P.K. and potting media on plant growth and spike yield of *Dendrobium Orchid* cv. Emma White Under Allahabad Agro-Climatic Condition in 2012-2013

Treat-ments	Plant height (cm)	No. of leaves /plant	Leaf area (cm ²)	No. of shoot /plant	Shoot girth (cm)	Root length (cm)	No. of roots /plant	Total No. of spike yield /plant	No. of florets /spike	Spike length (cm)	Longevity of spike /plant
T ₀	27.38	10.25	25.25	2.25	2.13	10.18	19.25	3.25	10.25	27.25	35.58
T ₁	29.82	10.38	27.03	2.91	2.33	12.24	20.91	4.25	10.58	29.91	37.25
T ₂	29.47	10.36	26.50	2.58	2.33	11.79	20.25	3.80	10.47	28.58	36.58
T ₃	29.86	10.36	27.31	3.25	2.47	12.95	24.25	4.47	10.58	30.91	38.58
T ₄	30.69	11.25	29.98	4.58	2.68	13.52	24.25	4.58	11.58	32.25	40.58
T ₅	29.91	10.80	29.05	3.91	2.57	12.95	23.58	4.36	11.25	31.58	39.25
T ₆	30.85	11.47	35.35	3.58	2.63	15.81	25.25	5.36	11.80	36.58	43.58
T ₇	30.74	11.36	37.88	2.58	2.74	14.80	24.58	5.25	11.69	33.58	41.91
T ₈	31.75	11.58	38.58	4.91	3.12	16.42	25.58	5.36	12.25	37.58	44.25
T ₉	32.25	12.47	42.58	5.25	3.25	17.68	26.58	5.69	12.58	38.58	46.25
F- test	S	S	S	S	S	S	S	S	S	S	S
S.Ed.(±)	0.380	0.361	0.130	0.061	0.060	0.056	0.159	0.080	0.122	0.306	0.306
CD(P=0.05)	0.805	0.766	0.275	0.130	0.127	0.119	0.338	0.169	0.260	0.649	0.649

charcoal medium followed by fern roots and rubber seed husk gave the best results with regard to growth and flowering. While Emma White the maximum total number of spike yield per plant (5.69) was found in T9 (10:30:30(NPK @ 0.3%) Brick pieces + Gravel + Poultry manure) followed by T8, T6, T7 and T5 the minimum (3.25) total number of spike yield per plant was found in T0 (Control Rice husk + leaf mould + gravel). Piyarat Saetang (1980) experiment conducted with *Dendrobium* hybrids, it was observed that coir substrate grown plants had the best growth and the best spike yield was obtained from plants potted in granulated stone. While Emma White the maximum Number of florets per spike (12.58) was found in T9 (10:30:30(NPK @ 0.3%) Brick pieces + Gravel + Poultry manure) followed by T8, T6, T7 and T5 the minimum (10.25) Number of florets per spike was found in T0 (Control Rice husk + leaf mould + gravel). Emma white registered a maximum spike length in T9 (38.58) which was statistically superior to next best treatment T8 (37.58) being on par with T6 (36.58). the minimum spike length (27.25) was recorded in T0. Where as Emma white was recorded to be maximum (46.25) which was observed in treatment T9 while minimum longevity of spike yield was observed in T0 which registered (35.58). Bhattacharjee (1984) revealed that *Cattleya* orchid showed a maximum stimulation of spike length, maximum number of florets per spike and longevity of flower spike when it was potted in a medium containing hardwood charcoal.

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