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Influence of different potting media on growth and flowering of pot chrysanthem var. ajina purple

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Abstract

The investigation was carried out at Floriculture Research Farm, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat during the year 2016-17. The whole experiment was arranged over eleven treatments of different growing media and their combinations and laid out in a Completely Randomized Design with three replications. The results revealed that among different treatment, cocopeat + vermicompost + bio compost (2:1:1 v/v) exhibited maximum plant height (30.87 cm), number of branches per plant (16.40), fresh weight of plant (342.80 g), dry weight of plant (170.87 g), maximum flower diameter (37.42 mm), duration of flowering (126.33 days) and highest no. of flowers (66.61).

Keywords: Chrysanthemum, pot media, growth, flowering

Introduction

Chrysanthemum (*Chrysanthemum morifolium*) is the most interesting group among ornamental plants in the world and perhaps represents the oldest ornamental flower. Chrysanthemum word derived from Greek word *chryso-* golden and *anthe-* flower. Florists' chrysanthemum (*Dendranthema grandiflora* Tzueleu.) belongs to family asteraceae. It is popular commercial flower grown for cut as well as a pot plant in different parts of the world. Chrysanthemum ranked third as a cut flower after rose and carnation and fifth as a pot plant during 2014 (Anon., 2015).

Potted chrysanthem are a popular choice for beautification of the living space, balconies and patios. Pot mums occupy an important place in the world floriculture trade. Rapid urbanization and changing lifestyles has increased the demand for potted plants in India.

The survival of the plant usually depends upon the favourable environmental factors, growing media is one of the most important factors required for the production of good quality pot mum. The selection of a good medium should serve as reservoir for plant nutrients, provide support for plant growth, hold water for availability to the plant and facilitate exchange of gases between roots and atmosphere above the root medium. The presence of sufficient nutrition, good water holding capacity, porosity and plug formation ability of media increases the root and shoot growth, which ultimately, leads to early and high yield of the crop (Chong, 2008) [3].

With an increasing demand of container-grown plant materials to use within the country and for shipment to the foreign countries, the need of a light weight growing medium prepare with locally available materials has more important. Growth medium is known to have effect of value of potted ornamental plants (Vendrame *et al.*, 2005) [8] and plays an important role on germination rate and many other physiological parameters.

A best growing media should have proper aeration, water holding capacity and adequate nutrition supply when applied in combination with soil less substrates (Khobragade *et al.*, 1997) [4]. Cocopeat is growing acceptance as a growing medium because of its excellent aeration, durability, lightness and water holding characteristics. (Nazari *et al.*, 2011).

Vermicompost contains water-soluble nutrients and is an excellent, nutrient-rich organic fertilizer and soil conditioner. It posses characters like, fertility, pH, water use efficiency, substrate physical properties microbial activity and organic matter components that may be responsible for increased growth (Michelle McGinnis *et al.*, 2004). Bio compost is readily available from the farm. It is rich source of nutrients with high organic matter content.

Materials and Methods

The experiment was carried out at the Floriculture Research Farm, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari during the year of 2016-17. The experiment was planned with eleven treatments viz., Soil (Control) (T1), Soil + Sand + Vermicompost (1:2:1 v/v) (T2), Soil + Sand + Bio compost (1:2:1 v/v) (T3), Soil+ Sand+ Poultry Manure(1:2:0.5 v/v) (T4), Soil + Sand + Vermicompost + Bio compost (1:2:1:1 v/v) (T5), Soil + Sand + Vermicompost + Bio compost + Poultry Manure (1:2:1:1:0.5 v/v) (T6), Cocopeat + Vermicompost (2:1 v/v) (T7), Cocopeat + Bio compost (2:1v/v) (T8), Cocopeat + Poultry Manure (2:0.5 v/v) (T9), Cocopeat + Vermicompost + Bio compost (2:1:1 v/v) (T10) and Cocopeat + Vermicompost + Bio compost + Poultry Manure (2:1:1:0.5 v/v) (T11) in a Completely Randomized Design (CBD) with three replications. Chrysanthemum var. "Ajina Purple" plants propagated through terminal cuttings. Various growing media under study viz. Soil, Sand, Vermicompost, Bio compost, Poultry manure and Cocopeat were used for experimentation. To remove salts from cocopeat, 5 Kg calcium nitrate was mixed in 100 liter water and immersed the above media overnight and then washed with RO water. The media were thoroughly mixed as per different treatment combinations. After that Uniform size of plastic pots (15 cm height and 22 cm Diameter) were selected and filled with growing media according to different treatments. Uniform, well developed and healthy plants of chrysanthemum were selected and planted on 29th September, 2016 in each pot. After two weeks of planting water soluble fertilizers i.e. 19:19:19 (N: P: K) and 13:00:45 (N: P: K) (20 g/20 lit water) were applied regularly at fifteen days interval. Immediately after planting, a light irrigation was given for better establishment of the plants with water can. And Gap filling was done after one week of planting for maintaining uniform plant stand in each treatment. The chrysanthemum plants were pinched one month after planting in order to break their apical dominance to increase their lateral spread. Weeding was done as and when required to keep the crop free from weeds and at the same time loosening of growing media was carried out.

Results and Discussion

Vegetative growth parameters

The result of various vegetative growth parameters viz., maximum plant height, number of branches per plant, fresh weight of plant, dry weight of plant as influenced by different treatment of growing media are presented in Table 1. The growing media influenced plant height, number of branches

per plant, fresh weight of plant and dry weight of plant significantly throughout the growing season of chrysanthemum to the highest level of 30.87 cm, 16.40, 342.80 g and 170.87 g respectively, which was at par with treatment T₁₁. This increase in plant growth parameter is due to the ability of this growing media to provide good aeration to plants in order to sustain the development and growth of roots and shoots. Further, cocopeat with vermicompost and bio compost gave maximum growth in account of favorable physiochemical properties of media and nutritional value. It is due to the fact that N is an essential constituent of protein and more availability of N, P and K in the substrate led to increase in cell number and cell size. The media improved water relationship, nutrient retention allows free air movement, retains moisture and nutrients for growth of the plants probably due to optimum bulk density, potentiality of adequate water absorption of this growing media. These results support the findings of Bisht, Deepti *et al.*, 2017 in pot num cv. Mother Teresa and Madhu bala *et al.* (2013)^[6] in ilium.

Flowering parameters

The results on various flowering parameters are presented in Table 2. The result from experiment revealed that treatment T₁₀ (Cocopeat + Vermicompost + Bio compost (2:1:1v/v)) The occurrence of maximum duration of flowering (126.33 days) and number of flowers per plant (62.97) are found in T₁₀ (Cocopeat + Vermicompost + Bio compost (2:1:1v/v)). Which was statistically remained at par with T₁₁. An increase in number of flowers per plant could be attributed to overall vegetative growth of chrysanthemum plants grown in these substrates grater carbohydrate accumulation due to increased photosynthesis might have caused the production of more number of flowers per plant which turn might have been caused due to the optimum balance and supply of plant nutrients in the substrate. Similarly, increased availability of essential elements at critical growth stages could have led to increase in number of flowers. These results are in corroboration with the findigs of Bisht, Deepti (2012)^[1] in chrysanthemum cv. Mother Teresa, Singh *et al.* (2009)^[7], Lodhi *et al.* (1990)^[5], Madhu bala *et al.* (2013)^[6] in chrysanthemum and Jawaharlal *et al.* (2001) in Anthodium. Data revealed that mixture of Cocopeat + Vermicompost + Bio compost (2: 1: 1 v/v) (T₁₀) significantly increased blooming period by 94.67 days and superior flower diameter (37.42 mm) observed in Cocopeat + Vermicompost + Bio compost (2: 1: 1 v/v) (T₁₀).

Table 1: Influenced of different potting media on growth parameters.

Treatments	Plant height (cm)	Number of branches per plant	Fresh weight of plant (g)	Dry weight of plant (g)
T ₁ -Soil	21.30	11.47	176.27	98.47
T ₂ -Soil + Sand +Vermicompost (1: 2 : 1 v/v)	20.90	12.40	179.03	83.00
T ₃ -Soil + Sand +Bio compost (1: 2 : 1 v/v)	20.53	12.13	193.13	55.00
T ₄ -Soil + Sand +Poultry manure (1: 2 : 0.5 v/v)	20.34	12.07	171.57	90.00
T ₅ -Soil + Sand +Vermicompost + Bio compost (1: 2 : 1:1 v/v)	24.14	11.43	282.73	148.87
T ₆ -Soil + Sand +Vermicompost + Bio compost +Poultry manure (1: 2 : 1:1:0.5 v/v)	24.89	11.74	285.20	155.03
T ₇ -Cocopeat + Vermicompost (2 :1 v/v)	23.26	10.63	260.77	153.17

T ₈ -Cocopeat + Bio compost (2 :1 v/v)	26.80	9.89	259.50	114.50
T ₉ -Cocopeat + Poultry manure (2 : 0.5 v/v)	22.09	9.45	268.50	147.17
T ₁₀ -Cocopeat + Vermicompost + Bio compost (2:1:1v/v)	30.87	16.40	342.80	170.87
T ₁₁ -Cocopeat + Vermicompost + Bio compost +Poultry manure (2:1:1:0.5 v/v)	29.39	15.53	324.10	161.37
S.Em. ±	0.707	0.338	6.696	3.228
C.D. at 5%	2.09	1.00	19.75	9.52
C.V. %	5.09	4.84	4.65	4.47

Table 2: Influenced of different potting media on flowering

Treatments	Flower diameter (cm)	Duration of flowering (days)	Number of flowers per plant
T ₁ -Soil	28.52	84.00	27.47
T ₂ -Soil + Sand +Vermicompost (1: 2 : 1 v/v)	30.49	87.00	33.40
T ₃ -Soil + Sand +Bio compost (1: 2 : 1 v/v)	33.81	83.33	37.83
T ₄ -Soil + Sand +Poultry manure (1: 2 : 0.5 v/v)	32.89	81.67	45.93
T ₅ -Soil + Sand +Vermicompost + Bio compost (1: 2 : 1:1 v/v)	35.47	94.67	61.97
T ₆ -Soil + Sand +Vermicompost + Bio compost +Poultry manure (1: 2 : 1:1:0.5 v/v)	36.09	96.33	62.23
T ₇ -Cocopeat + Vermicompost (2 :1 v/v)	32.72	101.00	50.13
T ₈ -Cocopeat + Bio compost (2 :1 v/v)	32.59	99.33	47.70
T ₉ -Cocopeat + Poultry manure (2 : 0.5 v/v)	33.56	104.67	42.33
T ₁₀ -Cocopeat + Vermicompost + Bio compost (2:1:1v/v)	37.42	126.33	66.61
T ₁₁ -Cocopeat + Vermicompost + Bio compost +Poultry manure (2:1:1:0.5 v/v)	37.09	118.67	62.97
S. Em. ±	0.681	2.661	1.414
C.D. at 5%	2.01	7.84	4.17
C.V. %	3.50	4.71	5.00

Conclusion

On the basis of present investigation it can be concluded that Cocopeat + vermicompost + Bio compost (2: 1: 1 v/v) it is better growing media for vegetative growth and flowering attributes of pot chrysanthemum consequently it produced maximum number of flowers in chrysanthemum Var. Ajina Purple

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