



RESEARCH ARTICLE

INFLUENCE OF VARIOUS SUBSTRATES AND THEIR MIXTURES ON FLOWERING PARAMETERS (ROSA HYBRIDA LINN.) CV. 'FIRST RED' UNDER POLYHOUSE CONDITION

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INTRODUCTION

Flowers are among the loveliest objects on this earth of ours. Eloquent references to the aesthetic value of flowers are available in the ancient literature and scriptures. The importance of flowers has been realized throughout the world and today flower cultivation has developed into an intensive form of agriculture. These quality attributes of flowers have always touched the heart of human beings. Use of flowers have been practiced in our country for many centuries which is mentioned in Rigveda, (3000-2000 B.C.) and Ramayana, (1200-1000 B.C.), but commercial cultivation of flowers and development of floriculture as an industry is of recent origin (Singh, 2000). The interest in cultivation has however increased considerably during the last three decades and, at present it has become the most important commercial flower, and also a part and parcel of life, being connected with all phases of life right from birth to death. The traditional flower sector registered an impressive growth during the VIII, IX and

X plan periods which grew from 71,000 ha at the end of VIII plan period to 1, 06,000 ha by the end of IX plan. By the end of X plan an additional 10,000 ha has been brought under the traditional flowers register an overall area of 1, 16,000 ha. The production during the corresponding periods was 3.66 lakh MT, 5.35 lakh MT and 6.94 lakh MT respectively. The effective media for rose cultivation is very important aspect for getting highest yield. For keeping in such view we are make research on available local organic media as potting media for polyhouse rose cultivation.

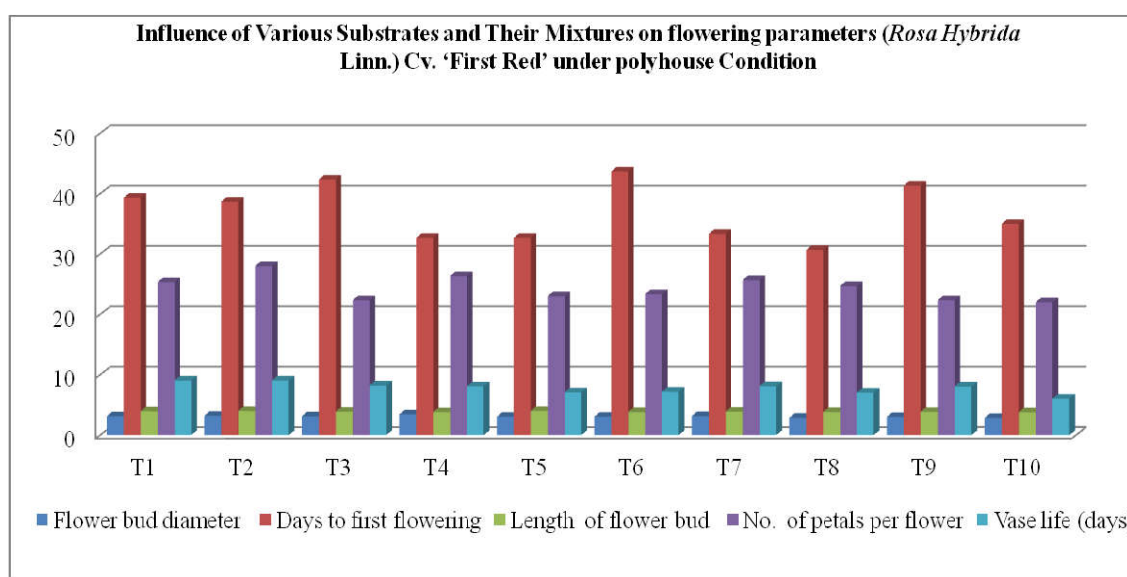
Now, various formulations of alternative growing media for bedding and potting flowers are being developed and effectively used in many production systems as container substrate. The physical and chemical properties of substrates are responsible for providing adequate support and a reservoir for plant water and nutrients. The incorporation of locally available organic materials viz. red soil, black soil, coco peat, rice husk, and farm yard manure to reduce costly media and fertilizer usage, without reducing plant quality, is the most important challenge faced by the bedding flower industry.

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Table 1. Influence of various substrates and their mixtures on flowering parameters (*Rosa hybrida* Linn.) CV. 'first red' under Polyhouse condition

Treat. No.	Flower bud diameter	Days to first flowering	Length of flower bud	No. of petals per flower	Vase life (days)
T ₁	3.12	39.33	3.94	25.33	9.04
T ₂	3.19	38.67	3.98	27.99	9.04
T ₃	3.10	42.33	3.88	22.33	8.20
T ₄	3.44	32.67	3.80	26.33	8.07
T ₅	3.04	32.67	4.00	23.00	7.07
T ₆	3.03	43.67	3.81	23.33	7.17
T ₇	3.14	33.33	3.88	25.67	8.08
T ₈	2.86	30.67	3.82	24.67	7.03
T ₉	3.00	41.33	3.84	22.33	8.04
T ₁₀	2.84	35.00	3.78	22.00	6.04
S.Em.±	0.09	1.70	0.13	1.28	0.54
C.D. at 5 %	0.27	5.02	N.S.	3.78	1.6
C.V. %	5.27	7.98	6.04	9.14	12.06



MATERIALS AND METHODS

This experiment was carried out at Polyhouse unit, Department of Horticulture, College of Agriculture, Junagadh Agricultural University, during the year 2008 to 2009. We used completely randomized design with three replications. The treatments under observations are T₁- Red soil + Black soil + Coco peat + Rice Husk (1:1:1:1), T₂- Red soil + Black soil + Coco peat (1:1:1), T₃- Red soil + Black soil + Rice Husk (1:1:1), T₄- Red soil + Black soil +FYM (1:1:1), T₅- Red soil + Black soil (1:1), T₆- Black soil + Coco peat + Rice Husk (1:1:1), T₇-Black soil + Coco peat (1:1), T₈- Black soil + Rice Husk (1:1), T₉- Black soil + FYM (1:1) and T₁₀- Black soil (Control). We carried out all cultural operations under controlled environmental conditions in polyhouse. We specially had done bending operations for avoiding blind shoot problem. The plants are planted at 60 x 60 x 100 Cm distance in double row system in pot.

RESULTS AND DISCUSSION

The outcome from the above research is showed that among all 10 treatments most of the treatments combinations containing coco peat, red soil, rice husk and FYM show good result than other combination. Use of various potting substrates and their

mixtures are too close with various phases of plant growth and development. Substrates and their mixtures on growth and flower production in rose at optimum combination improve the efficiency of plant by modifying various physiological processes such as photosynthesis, transpiration, respiration, water and nutrient uptake, mobilization of nutrients, chlorophyll content of leaves etc. in a beneficial way. The data shown in Table 1 revealed that flower bud diameter is highest in the substrate combinations of Red soil + Black soil + FYM (1:1:1) (3.44 cm) which was at par with Red soil + Black soil + Coco peat (1:1:1) (3.19 cm). Increase in cell size with increase of organic matter percentage which contains optimum levels of essential nutrients, thus producing quality flowers which might be due to increased flower diameter Bhatia, *et al.* (2004). The enlargement of flower size is caused by drawing of photosynthate to the flower as a consequence of intensification of the sink. It is in conformity with the observations of Anuje *et al.* (2004) and Dien (2003) in Gerbera, the production of more number of leaves in these treatments could have lead to increased production and accumulate photosynthates. Thus the increased translocation of photosynthates from leaves (source) to flower buds (sink) could have lead to increase in flower bud diameter. Likewise, the combination of Black soil this might be due to the compactness of soil which causes low porosity and aeration causing water stagnation and less nutrient uptake

as compare to other combinations (Srinivasa, 2006). The perusal of data presented in Table 1 indicated that, earlier flowering was reported with the combinations of Black soil + Rice Husk (1:1) (30.67 days, whereas, late flowering was recorded in Black soil + Coco peat + Rice Husk (1:1:1) (43.67 days). Results showed that the application of rice husks resulted in earlier flowering of cut flowers, which was attributed to the high availability of nutrients in soil after the biodegradation of rice husks by soil microorganisms which increased the cell division and cell elongation influencing floral morphogenesis rendering early maturity in plants (Torky and Bedaiwy, 1998). Earliness in flowering also reported Souza *et al.* (1995) in Chrysanthemum. Earlier flowering attributed due to well balanced and optimum nutrient content supply evenly over time coupled with good nutrient retention in the black soil + rice husk which resulted in earlier flowering. Also nitrogen present in these substrates coupled with satisfactory carbohydrate content could have lead to early flowering. The data presented in Table 1 revealed that the length of flower bud was not significantly influenced by different treatment combinations of substrates. This indicated that a combination of different substrates had no adverse effect on the length of flower bud in rose crop.

It was observed from Table 1 that the number of petals per flower increased significantly with the combinations of Red soil + Black soil + Coco peat (1:1:1) (27.99). Whereas, minimum number of petals per flower was recorded in Black soil (Control) (22.00). The reason for increase in numbers of petals was due to increasing the number of shoots and leaf pairs per plant. The pH and EC with the good water holding capacity with continuous supply of all macro and micronutrients supported highest number of petals per plant. Increased number of petals in present study is in agreement with the results obtained by Eleni *et al.* (2001) and Allera *et al.* (2000) in rose.

The data presented in Table 1 revealed that cut flower obtained from plants that were treated with Red soil + Black soil + Coco peat + Rice Husk (1:1:1:1) and Red soil + Black soil + Coco peat (1:1:1), showed the maximum vase life (9.04 days) as compared to the other treatments as well as control. This might be due to internal storage of carbohydrate content of the flowers, which is responsible for the vase life also higher stalk length as well as more number of petals pertaining same effect. Especially, coco peat maintained higher water content in media which leading to enhanced vase-life of flowers. The same result also reported by Pawar *et al.* (2002). The positive effects of all above combinations on extending the vase life observed in the present study are in consonance with the findings of Torky and Bedaiwy (1998) in Rose, Bhatia, *et al.* (2004) in Carnation, Anuje *et al.* (2004), Dien (2003), and Barreto and Jagtap, (2002) in Gerbera and Singh *et al.* (2003) in Orchid. The minimum vase life of cut flower (6.04 days) was observed in Black soil (Control). Based on results summarized above, it can be concluded that for maximum plant flowering quality parameters of rose flower Cv.

“First Red” under polyhouse conditions, the potting media should be amended with using combinations of Red soil, Coco peat, FYM and Rice husk than single use of media as these media has unique properties for different parameters.

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