Biological Forum – An International Journal **13(3a): 534-538(2021)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Effect of Growing Media for Establishment and Growth of Miniatures Roses (*Rosa chinensis* Jacq.)

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(Received 19 July 2021, Accepted 23 September, 2021)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: The proper medium selection has a significant role in the effective growth of ornamental flowers. The present study was carried out to assess the effect of growing media for establishment and growth of miniature roses (*Rosa chinensis* Jacq.) under Prayagraj agro-climatic condition in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during the month of November 2020 to March 2021. The experiment was conducted in Factorial Completely Randomized Design with five varieties replicated thrice. The varieties used were Small Varte, Rise N Shine, Glory Glow, Glory of Jakpur and Single Bliss. The results revelled that variety Rise N Shine (V_2) was significantly promising variety with respect to taller plants (33.74 cm), a greater number of branches (11.85), extreme plant spread (26.00 cm). Among the growing media M_0 (Soil + Sand + FYM, 1:1:1 v/v), M_1 (Soil + Cocopeat + Vermicompost, 1:1:1 v/v) and M_2 (Soil + Cocopeat + Vermicompost + Perlite, 1:1:1:1 v/v), the growing media, M_1 (Soil + Cocopeat + Vermicompost, 1:1:1 v/v) recorded the highest plant height (30.12 cm), maximum number of branches (11.24), maximum plant spread (22.96 cm) and leaf area (13.17 cm^2). Among interaction, maximum plant height (41.20 cm), maximum plant spread (28.22 cm) were recorded in treatment combination V_2 x M_1. Miniature rose plants in pots are simple to trim and maintain, creating a bright and energetic atmosphere while beautifying concrete metropolitan environments. Growing media's purpose is to help in the provision of nutrients, water absorption and retention capacity, aeration, cation exchange capacity, ideal rooting environment for physical stability, and drainage, which are the medium's physio-chemical qualities that facilitate the growth and establishment of miniature roses.

Keywords: Miniature roses, growing media, varieties, growth, cocopeat, vermicompost, perlite.

INTRODUCTION

Roses are particularly one of the most attractive and in-demand flowers among the world's various floriculture crops. Rose word springs from a Latin word “Erose” denoting that the “God of love” (Rajesh and Ramesh, 1999). Rose belongs to the genus *Rosa*, the sub-family is Rosoideae and the family is Rosaceae (Man *et al*., 2010). There are 200 species of roses and around 20,000 varieties (Gauchan *et al*., 2009). Rose is one of nature's most gorgeous creations and is sometimes referred to as the "Queen of Flowers". The history of man and rose is linked together for about 5000 years (Dhau, 1999).

Miniature roses (*Rosa chinensis minima*) are roses with a smaller mass. They are precisely scaled, miniature copies of bigger roses, retaining all of the colours, shapes, texture, and, in some cases, scent of full-sized roses. Miniature roses first came as an accidental result of rose hybridization. Miniature roses are dwarf bushes with little leaves and flowers. Each variety of miniature roses, like other types of roses, has unique features, with plant sizes varying from 6 inches to 4 feet or more and plant forms include bushy, compact, climbing, and cascading.

Planting miniature roses in a container also has an advantage in terms of saving space. Potted plants are extensively used in the flat housing system and for urbanization so due to this, they are highly prized. In small spaces, these potted plants are one of the only kinds which can provide freshness. Potted plants are also a good source for decreasing air pollution in indoor premises (Jones, 1999). In metropolitan areas, the production of various sorts of potted plants, namely miniature roses, is well-liked. In container production of both annual and perennial ornamental plants garden soil, compost and peat are considered as Growing substrates (Tariq *et al*., 2012). Plant development will be substantially aided by the presence of nitrogen in compost growing material.

The growing medium is always important in the development and quality of pot plants. Rose is a traditional plant that demands a suitable growing medium for optimal development and bloom quality. The nutritional status of media, water holding capacity

and soil aeration which corresponds to the rate of growth are been determined by the physio-chemical properties of growing media (Sekar and Sujata 2001). A light, rich, porous, and well-drained medium is said to be best for rose growth.

The role of growing media is to aid in the supply of nutrients and they also contribute to water absorption and retention capacity, aeration, optimum rooting environment for physical stability and drainage which are the physio-chemical properties of the medium that facilitate the growth of miniature roses. Having a mix of different media helps in giving a surge to the growth process, further supplying it with fertilizers once the plants use it fully. Thus, it is need to find a suitable growing media or a mix of different potting mixture to assist generous growth.

MATERIALS AND METHODS

Present research project was carried out under Prayagraj agro-climatic condition in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Naini, Prayagraj, which it was conducted during November to March 2020-2021.

According to Table 1, six different growing media were selected for this study to make a composition of three main media into the respective ratios. The varieties used were Small Varte, Rise N Shine, Glory Glow, Glory of Jakpur and Single Bliss. Soil, sand, FYM, cocopeat, vermicompost, and perlite were the various growing media used. After preparing the composition, the media were transferred to earthen pots of 30 cm diameter for the plants to be potted. The experiment was laid out in Factorial Completely Randomized Design (FCRD) with combination of 15 treatments and 3 replications. Observations were recorded from each of the plants of each variety to assess their growth in the following characters plant height, number of leaves, plant spread, leaf area.

Table 1: Treatment details.

Varieties (V)	V_1	Small Varte
	V_2	Rise N Shine
	V_3	Glory Glow
	V_4	Glory of Jakpur
	V_5	Single Bliss
Media (M)	M_0	Soil + Sand + FYM (1:1:1, v/v)
	M_1	Soil + Cocopeat + Vermicompost (1:1:1, v/v)
	M_2	Soil + Cocopeat + Vermicompost + Perlite (1:1:1:1, v/v)

RESULTS AND DISCUSSION

The prominent effect on growth and quality production of ornamental plants was attained by the use of appropriate potting media (Vendrame *et al.* 2005). The mean data on different vegetative parameters such as plant height, number of branches, plant spread, leaf area of miniature roses varieties as influences by different growing media are represented in Table 2, 3, Fig. 1, 2.

It is reported that the highest plant height was observed by Rise N Shine (V_2) (33.74 cm), followed by variety Small Varte (V_1) (26.74 cm) while the variety Glory of Jakpur (V_4) (23.00 cm) produced the least plant height. Among growing media, M_1 media (Soil + Cocopeat + Vermicompost, 1:1:1 v/v) (30.12 cm) plants were significantly shown the highest plant height and the lowest plant height was observed in media M_0 (Soil + Sand + FYM, 1:1:1 v/v) (23.36 cm). Interaction between varieties and growing media showed significant differences between this trait. Among the treatment combination V_2M_1 (Rise N Shine, Soil + Cocopeat + Vermicompost, 1:1:1 v/v) registered the highest plant height (41.20 cm), which was followed by treatment combination of V_2M_2 (Rise N Shine, Soil + Cocopeat + Vermicompost + Perlite, 1:1:1:1 v/v) (35.24 cm). Plant height varies from variety to variety since it is a varietal characteristic. The variance might be due to the cultivars' genetic variability. The essential nutrients and water to the plants, which are crucial for reaching higher plant height, are being served by the growth substrate. During the tender growth stage, the rapid cell division and cell elongation give rise to the increase in plant height which could be due to prompt meristematic activity. The foregoing findings may be ascribed to the optimum combination of chemical and physical qualities of the growing media, as well as the ease with which the plants absorb nutrients. Similar results were obtained by Abo-Rezq *et al.*, (2009), Dias and Patil (2003) in rose and Ghehsareh *et al.*, (2020) in miniature roses, Kiran *et al.*, (2007), and Anon (2011) who established that plant height has a beneficial relationship with the growing media.

Results in this experiment showed that variety Rise N Shine (V_2) gave a greater number of branches per plant (11.85) which was followed by variety Glory of Jakpur (V_4) (11.04), while the smaller number of branches per plant was recorded in variety Small Varte (V_1) (9.63). Among the different growing media, media M_1 (Soil + Cocopeat + Vermicompost, 1:1:1 v/v) (11.24) plants were significantly shown the greater number of branches per plant and the smaller number of branches per plant was observed in M_0 (Soil + Sand + FYM, 1:1:1 v/v) (10.38). Among the interaction, V_5M_1 (Single Bliss, Soil + Cocopeat + Vermicompost, 1:1:1 v/v) bore a greater number of branches (12.11), which was at par with V_2M_1 (Rise N Shine, Soil + Cocopeat + Vermicompost, 1:1:1 v/v) (12.11). Whereas as the lowest number of branches per plant was recorded in V_1M_0 (Small Varte, Soil + Sand + FYM, 1:1:1 v/v) (8.67). This range of variation in the number of branches may be due to genetic makeup and environmental factors that are conducive to plant growth, especially in the Rise N Shine (V_2) variety, which leads to as urge in the number of branches. Riaz

et al., (2008) found that the compost which is made up of coconut fibre produces the greater number of branches/plants. Shackel *et al*., (1999) also revealed that more number of branches per plant are been seen in growing substrates that contain high nitrogen level. Similar results were obtained by Shahina *et al*., (2012) in carnation, Tariq *et al*. (2012) in dahlia, Yonis *et al*., (2015) in miniature roses.

Table 2: Effect of miniature roses varieties and growing media on vegetative parameters.

	Plant Height (cm)	No. of Branches	Plant Spread (cm)	Leaf Area (cm^2)
Factor A = Varieties				
V_1	26.74	9.63	17.28	11.47
V_2	33.74	11.85	26.00	8.94
V_3	23.38	10.56	20.76	13.01
V_4	23.00	11.04	18.77	10.17
V_5	24.83	10.70	22.34	11.00
Factor B = Growing media				
M_0	23.36	10.38	19.32	9.04
M_1	30.12	11.24	22.96	13.17
M_2	25.54	10.65	20.82	10.55
$CD_{0.05}\ F_A$	**2.07**	**0.23**	**1.47**	**2.62**
$CD_{0.05}\ F_B$	**1.60**	**0.18**	**1.14**	**2.03**

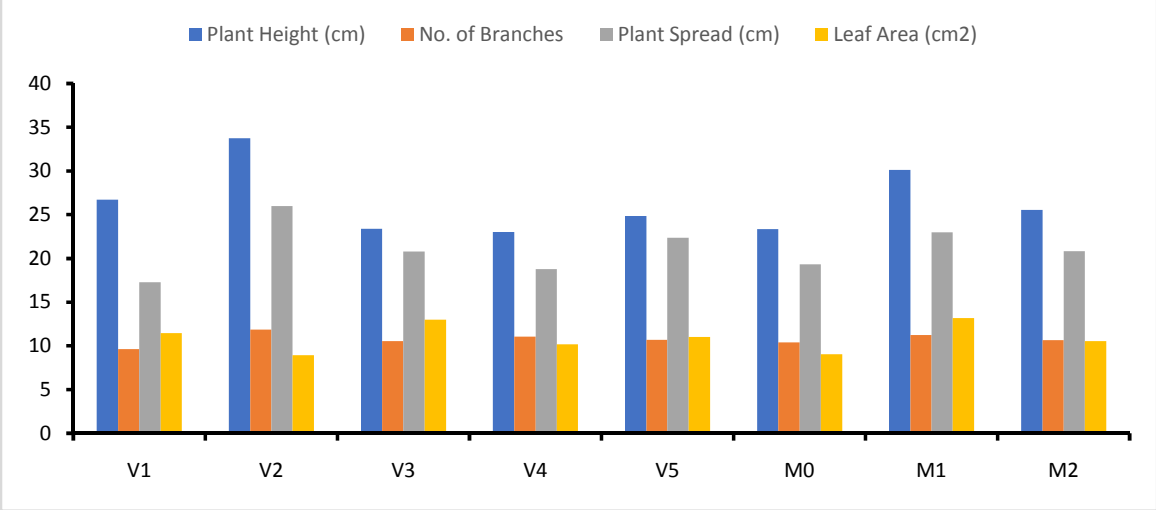

Fig. 1. Effect of different varieties and growing media on vegetative parameters.

Table 3: Effect of interaction (Varieties × Growing media) on vegetative parameters.

Varieties x Growing media	Plant Height (cm)	No. of Branches	Plant Spread (cm)	Leaf Area (cm^2)
V_1M_0	23.61	8.67	16.23	6.67
V_2M_0	24.77	11.56	23.42	9.33
V_3M_0	22.03	10.67	18.91	10.21
V_4M_0	22.31	11.22	17.41	8.00
V_5M_0	24.06	9.78	20.64	11.00
V_1M_1	31.44	9.44	17.36	18.33
V_2M_1	41.20	12.11	28.22	8.67
V_3M_1	27.21	10.44	25.31	17.83
V_4M_1	24.21	11.78	19.84	13.33
V_5M_1	26.51	12.44	24.06	7.67
V_1M_2	25.17	10.78	18.25	9.40
V_2M_2	35.24	11.89	26.37	8.83
V_3M_2	20.89	10.55	18.07	11.00
V_4M_2	22.50	10.11	19.07	9.17
V_5M_2	23.90	9.89	22.32	14.33
$CD_{0.05}$	**3.59**	**0.93**	**2.55**	**4.53**

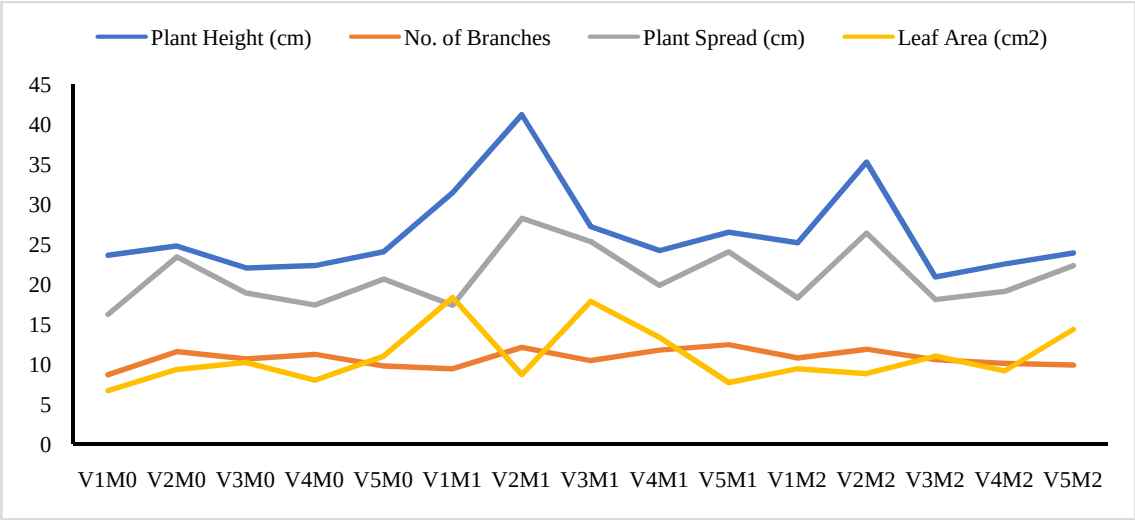

Fig. 2. Effect of interaction between varieties and growing media on vegetative parameters.

Data regarding plant spread showed that extreme plant spread was recorded in variety Rise N Shine (V_2) (26.00 cm) which was followed by variety Single Bliss (V_5) (22.34 cm), while the least plant spread was recorded in plant variety Small Varte (V_1) (17.28 cm). Growing media M_1 (Soil + Cocopeat + Vermicompost, 1:1:1 v/v) (22.96 cm) plants were significantly shown the extreme plant spread and the least plant spread was observed in media M_0 (Soil + Sand + FYM, 1:1:1 v/v) (19.32 cm). It seen that the extreme plant spread was recorded in the treatment combination of variety V_2M_1 (Rise N Shine, Soil + Cocopeat + Vermicompost, 1:1:1 v/v) (28.22 cm), which was par with variety, V_2M_2 (Rise N Shine, Soil + Cocopeat + Vermicompost + Perlite, 1:1:1:1 v/v) (26.37 cm) and minimum plant spread were recorded in variety V_1M_0 (Small Varte, Soil + Sand + FYM, 1:1:1 v/v) (16.23 cm). This may be due to the good air circulation of the soil, the nutrient content of the potting medium, and the high photosynthetic effect of the plants. The increased plant spread of plants, especially in the Rise N Shine (V_2) variety, may be due to the greater number of branches. These findings are in accordance with Kulkarni and Reddy (2004) were he proved that the escalationin plant spread was found due to increase in number of branches in Chrysanthemum. These results are in line with the findings of Anon. (2011) and Kunal (2019).

Variety Glory Glow (V_3) observed highest leaf area (estimated) per plant (13.01 cm^2), which was at par with variety Small Varte (V_1) (11.47 cm^2), while the lowest leaf area (estimated) per plant was observed in plant variety Rise N Shine (V_2) (8.94 cm^2). Among various growing media, maximum leaf area (estimated) per plant was observed in media M_1 (Soil + Cocopeat + Vermicompost, 1:1:1 v/v) (13.17 cm^2) and the lowest leaf area (estimated) per plant was observed in media M_0 (Soil + Sand + FYM, 1:1:1 v/v) (9.04 cm^2). Among interaction effect of varieties and growing media, maximum leaf area (estimated) per plant was observed in treatment combination of variety V_1M_1 (Small Varte, Soil + Cocopeat + Vermicompost, 1:1:1 v/v) (18.33 cm^2) which was at par with variety V_3M_1 (Glory glow, Soil + Cocopeat + Vermicompost, 1:1:1 v/v) (17.83 cm^2), while the minimum leaf area (estimated) per plant was observed in V_1M_0 (Small Varte, Soil + Sand + FYM, 1:1:1 v/v) (6.67 cm^2). Significant differences on end result of growing media on leaf area of different varieties of miniature rose can attributed to presence of inherent genetic factors responsible for production of higher growth hormones and greater number of photosynthetically active leaves per plant (Janaki, 2013). Similar results were obtained by (Salahshoor *et al.*, 2014) on the Saintpaulia and (Thumar *et al*., 2020) on the Rose.

CONCLUSION

From the foregoing study, it is concluded that medium M_1 (Soil + Cocopeat + Vermicompost, 1:1:1 v/v) resulted in better vegetative growth of the plants with respect to plant height, number of branches, plant spread, leaf area. Among the varieties, Rise N Shine (V_2) gave better growth and establishment in terms of plant height, number of branches and plant spread. The best interaction among the different varieties and growing media was found to be variety Rise N Shine and M_1 (Soil + Cocopeat + Vermicompost, 1:1:1 v/v) and hence, for the growth and establishment it can be recommended for pot cultivation under Prayagraj agro climatic conditions.

FUTURE SCOPE

Miniature roses are very adaptable, giving natural beauty and glamour to spaces that are impractical for full sized roses. They require much less space than their larger cousins, coordinate beautifully with other plants embellishing gardens, parks, hospitals, university etc., In a potted state, they are appreciated by urban settlers. Rose plants in pots are simple to trim and maintain, creating a bright and energetic atmosphere while beautifying concrete metropolitan environments. Growing medium is widely accessible and environmentally friendly.

Acknowledgement. The author conveys their thanks to the staff of Horticulture department Sam Higginbottom

University of Agriculture, Technology & Sciences, Prayagraj (U.P.) India for their colossal assistance, without which the trial would not have been successful.

Conflict of Interest. As a Corresponding Author, I V. S. K. Keerthan Paruchuru, confirm that none of the others have any conflicts of interest associated with this publication.

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How to cite this article: Paruchuru, V. S. K. K., Fatmi, U. and Singh, D. (2021). Effect of Growing Media for Establishment and Growth of Miniatures Roses (*Rosa chinensis* Jacq.). *Biological Forum – An International Journal*, *13*(3a): 534-538.