

Effect of Potting Media Composition for Flowering in Pot Grown Rose (*Rosa chinensis* Jacq.)

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Abstract Present study was conducted to evaluate the effect of growing media on the flowering of *Rosa chinensis* cv Red Kudthki, Pink and Summer Snow. Different growing media like soil, Farmyard manure (FYM), Leaf mould, Vermicompost, Coco peat, Perlite, and Vermiculite were used in all possible combinations to find out the best growing media for miniature rose to obtain high yield and quality of flowers. Present investigation revealed that the cultivar Pink (V_2) ranked first for the flowering duration (121.46 days), number of flowers per plant at weekly interval (8.96) and number of flowers per m (103.71). Whereas, the variety Red Kudthki (V_1)

adjudged as the best flower diameter (3.82 cm), flower bud length (1.21 cm) and flower stem length (3.73 cm). The growing media, Soil + Coco peat + Leaf mould (T_3) registered the highest flower diameter (4.21 cm), flower bud length (1.34 cm) and flower stem length (4.30 cm). However, the growing media, soil + FYM + leaf mould (T_2) recorded the longer flowering duration (136.16), the highest number of flowers per m² (126.83) and the highest number of flowers per plant at weekly interval (10.66). It is therefore obtained that the utilization of soil, coco peat, leaf mould and farmyard manure is a good source of NPK. Therefore, utilization of growing media in combinations proves more effective for the good growth and flowering of miniature roses.

Keywords Flowering, Growing media, Nutrients, *Rosa chinensis*.

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Introduction

Rose is a symbol of affection, elegance, inspiration and an important source for aesthetic gratification. Rose is also the most famous and popular cut flower in global floriculture trade. Miniature rose (*Rosa chinensis* Jacq.) is a draft bush with small leaves and flowers. There are several types of miniature rose viz., Climbers, trailers micro-mini and

miniflora. Miniature roses are highly suitable for pot culture and could be shifted wherever it is required for beautification. Planting miniature roses in a container is also having a benefit that it saves space. Potted plants are highly valued for urbanization and development of flat system of housing. Potted plants are the only group of the plants which can provide freshness even in small space and good source for decreasing the air pollution in indoor.

Growing media always play a vital role in growth and quality of potted plants. Rose is one such a classical plant requires good medium for better growth and quality flower production. Physico chemical properties of growing media determines the nutritional status, water holding capacity and aeration which determine the growth rate. Several media have been successfully used for growing of miniature since long back. A light, rich, porous and well drained media is considered ideal for growing of miniatures.

Materials and Methods

The present investigation was carried out at the Eastern Block Farm of Horticultural College and Research Institute, Tamil Nadu Agricultural University, Periyakulam, Theni (Tamil Nadu). The farm is located at 10° N latitude and 77.8° E longitude at an elevation of 300 m above MSL. The climate of this region is tropical. Six month old uniform budded miniature rose cultivars viz., 'Red kudthki', 'Pink' and Summer Snow were selected for the study.

Earthen pots measuring 25 cm width and 25 cm height and containing seven growing media replicated into four times viz. T₁ - Soil + Farmyard Manure (1 : 1 v/v), T₂ - Soil + Farmyard Manure + Leaf mould (1 : 1 : 1 v/v), T₃ - Soil + vermicompost (1 : 1 v/v), T₄ - Soil + Coco peat + Farmyard Manure (1 : 1 : 1 v/v), T₅ - Soil + Coco peat + Leaf mould (1 : 1 : 1 v/v), T₆ - Perlite + Coco peat + Farmyard Manure (1 : 1 : 1 v/v), T₇ - Soil + Vermiculite + Farmyard Manure (1 : 1 : 1 v/v). The different physiological parameters like flowering duration, number of flowers per plant at weekly interval, interval number of flowers per m², flower diameter, flower bud length and flower stem length were recorded. Along with

Table 1. Physio-chemical properties and available nutrients of potting substrates.

| Treatments | pH | EC (d sm ⁻¹) | BD (g cm ⁻³) | CEC (mol /kg ⁻¹) | N | P (Mg/Kg ⁻¹) | K |
|----------------|-----|--------------------------|--------------------------|------------------------------|------|--------------------------|------|
| T ₁ | 7.2 | 0.97 | 0.27 | 15.63 | 1.40 | 0.83 | 0.96 |
| T ₂ | 7.1 | 1.49 | 0.39 | 19.71 | 1.12 | 1.37 | 1.05 |
| T ₃ | 6.9 | 1.97 | 0.22 | 24.19 | 1.10 | 1.21 | 0.86 |
| T ₄ | 7.3 | 0.58 | 0.46 | 17.84 | 1.93 | 1.07 | 0.79 |
| T ₅ | 7.2 | 0.63 | 0.63 | 16.93 | 1.09 | 1.48 | 1.21 |
| T ₆ | 7.1 | 1.38 | 1.22 | 09.30 | 0.96 | 1.01 | 0.87 |
| T ₇ | 7.3 | 0.57 | 0.89 | 08.72 | 0.74 | 0.97 | 0.98 |

these characters, chemical analysis of different media was done and properties were recorded (Table 1).

Electrical conductivity and pH were determined using suspension of medium in soil water (1 : 2.5) by followed by Jackson [1]. Bulk density determined by Piper [2]. For available nitrogen determined the method given by Subbiah and Asija [3] was used. For measurement of available phosphorus, the method used was of Olsen et al. [4] and for available potassium, Stanford and English [5] method was used and determined was made with flame photometer. Determination of cation exchange capacity was measured by Piper [2]. Standard procedure was followed to collect the data for growth and flowering parameters. the data collected was analyzed statistically by using factorial complete randomized block design (FCRD) test at 0.05% probability level and used to compare difference among treatments means (Panse and Sukhatme [6]).

Results and Discussion

Growth medium is known to have a large effect on value of potted ornamental plants [7]. The mean data on flower growth, yield and quality of *Rosa chinensis* cv Red Kudthki, Pink and Summer Snow as influenced by different growing medium were presented in Table 2.

The cultivar Pink (V₂) registered significantly the longer flowering duration (121.46 days), more number of flowers per plant at weekly interval

Table 2. Influence of different growing medium on flower growth, yield and quality of *Rosa chinensis*. NS= not significant, **=significant at 1% level of significance. T/V Treatments / Variety, M Mean, V₁ Red Kudthki, V₂ Pink, V₃ Summer Snow, T₁ Soil + Farmyard Manure (1 : 1 v/v); T₂ Soil + Farmyard Manure + Leaf mould (1 : 1 : 1 v/v); T₃ Soil + Vermicompost (1 : 1 v/v); T₄ Soil + Coco peat + Farmyard Manure (1 : 1 : 1 v/v); T₅ Soil Coco peat + Leaf mould (1 : 1 : 1 v/v); T₆ Perlite + Coco peat + Farmyard Manure (1 : 1 : 1 v/v); T₇ Soil + Vermiculite + Farmyard Manure (1 : 1 : 1 v/v).

| T/V | Duration of flowering (days) | | | | Flower diameter (cm) | | | | Flower bud length (cm) | | | |
|----------------|------------------------------|----------------|----------------|--------|----------------------|----------------|----------------|------|------------------------|----------------|----------------|------|
| | V ₁ | V ₂ | V ₃ | M | V ₁ | V ₂ | V ₃ | M | V ₁ | V ₂ | V ₃ | M |
| T ₁ | 96.12 | 101.00 | 98.50 | 98.54 | 2.95 | 2.92 | 3.10 | 2.99 | 1.02 | 0.85 | 0.77 | 0.88 |
| T ₂ | 133.00 | 140.50 | 135.00 | 136.16 | 4.12 | 3.05 | 3.95 | 3.70 | 1.20 | 1.05 | 1.20 | 1.15 |
| T ₃ | 98.62 | 102.75 | 102.25 | 101.20 | 3.45 | 2.97 | 3.27 | 3.23 | 1.15 | 0.97 | 0.90 | 1.00 |
| T ₄ | 123.25 | 131.75 | 123.75 | 126.25 | 4.32 | 3.25 | 4.22 | 3.93 | 1.37 | 1.07 | 1.27 | 1.24 |
| T ₅ | 130.50 | 138.00 | 134.75 | 134.41 | 4.30 | 3.60 | 4.75 | 4.21 | 1.47 | 1.17 | 1.37 | 1.34 |
| T ₆ | 116.75 | 122.75 | 119.00 | 119.50 | 3.95 | 2.97 | 3.72 | 3.55 | 1.20 | 1.05 | 1.12 | 1.12 |
| T ₇ | 104.25 | 113.50 | 107.50 | 108.41 | 3.70 | 3.02 | 3.60 | 3.44 | 1.07 | 1.02 | 1.07 | 1.05 |
| M | 114.64 | 121.46 | 117.25 | | 3.82 | 3.11 | 3.80 | | 1.21 | 1.02 | 1.10 | |

Table 2. Continued.

| T/V | Length of flower stem (cm) | | | | Flowers/plant at time weekly Interval | | | | Number of flowers/plant /season | | | |
|----------------|----------------------------|----------------|----------------|------|---------------------------------------|----------------|----------------|-------|---------------------------------|----------------|----------------|--------|
| | V ₁ | V ₂ | V ₃ | M | V ₁ | V ₂ | V ₃ | M | V ₁ | V ₂ | V ₃ | M |
| T ₁ | 2.75 | 2.50 | 2.30 | 2.51 | 5.25 | 7.00 | 6.00 | 6.08 | 61.00 | 75.00 | 68.00 | 68.00 |
| T ₂ | 4.10 | 4.00 | 3.80 | 3.96 | 10.25 | 12.50 | 9.25 | 10.66 | 110.75 | 124.00 | 96.00 | 110.25 |
| T ₃ | 2.95 | 2.77 | 2.60 | 2.77 | 6.25 | 6.00 | 6.00 | 6.66 | 74.25 | 81.25 | 68.00 | 74.50 |
| T ₄ | 4.27 | 4.10 | 3.90 | 4.09 | 7.25 | 8.25 | 7.25 | 7.58 | 81.25 | 95.25 | 81.50 | 86.00 |
| T ₅ | 4.60 | 4.25 | 4.05 | 4.30 | 9.00 | 11.25 | 8.75 | 9.66 | 96.00 | 110.25 | 89.75 | 98.66 |
| T ₆ | 3.87 | 3.77 | 3.57 | 3.74 | 6.00 | 8.00 | 6.75 | 6.91 | 75.00 | 88.25 | 81.25 | 81.50 |
| T ₇ | 3.60 | 3.55 | 3.40 | 3.51 | 7.00 | 8.00 | 6.00 | 7.00 | 68.00 | 81.25 | 68.50 | 79.00 |
| M | 3.73 | 3.56 | 3.37 | | 7.28 | 8.96 | 7.14 | | 80.89 | 93.60 | 79.00 | |

(8.96), highest flowers per plant per season (93.60) and more numbers of flowers per m² / season (103.71). It is due to the influence of Phosphorus content of the potting material. The cultivar Red kudthki (V₁) registered significantly the highest flower stem length (3.73 cm), flower bud length (1.21 cm) and the highest flower diameter (3.82 cm). Whereas the cultivar Red Kudthki (V₁) recorded shorter flowering duration (114.64 days), cultivar Summer Snow (V₃) recorded the least number of flowers per plant per season (79.00), less number of flowers per plant at weekly interval (7.14) and lowest flower stem length (3.37 cm) and cultivar Pink (V₂) recorded the lowest flower diameter of 3.11 cm and lowest flower bud length (1.02 cm).

Among the different growing media, T₂ (Soil + FYM + Leaf mould) recorded the extended flower-

ing duration of 136.16 days. It is mainly due to the highest nutrient content of the media compare to other potting mixture. The result regarding days to flower emergence depicted that treatments having nutrient rich media promoted vegetative growth but delayed plant maturity slightly. Hence the plants grown in these media took comparatively more time to initiate flowering while the substrates having poor nutrient exhibited early maturity and flowered earlier as compare to other substrates. This was in steadiness with the findings of shah et al. [8] in caladium cv Gypsy Rose. Also the growing media, T₂ the highest number of flowers per plant at weekly interval (10.66), highest number of flowers per plant per season (110.25) and number of flowers per m² per season (126.83). This might be due to the influence of blooming of flowers per plant, season and longer duration of flowering. This was in consistency with

the findings of Atif Riaz et al. [9] in zinnia cv Blue Point. This was in conformity with the findings of Usman Tariq et al. [10] in dahlia, Fisher et al. (11) in gladiolus and Shahina Yasmeen et al. [12] in carnation. T₅ (Soil + Coco peat + Leaf mould) recorded the highest flower diameter of 4.21 cm, highest flower bud length (1.34 cm) and highest flower stem length (4.30 cm). Whereas the lesser number of flowers per plant at weekly interval (6.08), minimum flowering duration of 98.54 days, least number of flowers per m² per season (68.58), number of flowers per plant per season (68.00) flower stem length (2.51 cm), flower bud length (0.88 cm) and lowest flower diameter of 2.99 cm was registered by the growing media T₁ (Soil + FYM).

Interaction between growing media and cultivars T₂V₂ (Soil + FYM + Leaf mould + cv Pink) showed nonsignificant effect for the highest number of flowers per plant (12.50) at weekly interval and the highest number of flowers per m² per season (133.25). A balance rooting medium that contains an adequate supply of nutrients which is essential for the plants attain the longer duration of flowering. Highly significant difference was exhibited by the interaction effect between growing media and cultivars for the duration of flowering. Among the interaction effect, T₂V₂ (Soil + FYM + Leaf mould + cv Pink) recorded the extended flowering duration of 140.50 days and the highest number of flowers per plant per season (124.00). It is mainly due to the highest nutrient content of the media compare to other potting mixture. The result regarding days to flower emergence depicted that treatments having nutrient rich media promoted vegetative growth but delayed plant maturity slightly. Hence the plants grown in these media took comparatively more time to initiate flowering while the substrates having poor nutrient exhibited early maturity and flowered earlier as compare to other substrates. This was in steadiness with the findings of Shah et al. [8] in caladium cv Gypsy Rose.

Interaction effect of growing media and cultivars showed significant difference among the treatment combination, T₅V₃ (Soil + Coco peat + Leaf mould + cv Summer Snow) registered the highest flower diameter of 4.75 cm and T₅V₁ (Soil + Coco

peat + Leaf mould + cv Red Kudthki) recorded the highest flower bud length (1.47 cm). The treatment combination, T₅V₁ (Soil + Coco peat + Leaf mould + cv Red Kudthki) recorded the highest flower stem length of 4.60 cm. Whereas the lowest number of flowers per plant per season (61.00), shortest flowering duration of 96.12 days and lowest number of flowers per plant (5.25) was recorded in T₁V₁ (Soil + FYM + cv Red Kudthki). Whereas the lowest flower diameter (2.92 cm) was recorded in T₁V₂ (Soil + FYM + cv Pink) and the lowest flower bud length (0.77 cm) and lowest flower stems length (2.30 cm) was recorded in T₁V₃ (Soil+FYM + cv Summer Snow).

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