



## EVALUATION OF ROSE VARIETIES FOR GROW BAG CULTURE IN THIRUVARUR REGION OF CAUVERY DELTA

Siddhi Rathore<sup>1\*</sup> and S. Manivannan<sup>2</sup>

<sup>1</sup>Department of Floriculture and Landscape Architecture, Navsari Agricultural University, Gujarat, India.

<sup>2</sup>Department of Horticulture, Central University of Tamil Nadu, Tamil Nadu, India.

\*Corresponding author E-mail : rathoresiddhi137@gmail.com

### ABSTRACT

The experiment on 'Evaluation of rose varieties for grow bag culture in Thiruvarur region of Cauvery delta' was conducted in the Department of Horticulture, Central University of Tamil Nadu, Thiruvarur from July' 22 to March' 23. A pot experiment was laid out in Completely Randomized Design with two factors (genotypes and growing media). There were five levels of different genotypes viz.; Paneer Rose (G<sub>1</sub>), Kashmiri Rose (G<sub>2</sub>), Arka Pride (G<sub>3</sub>), Arka Parimala (G<sub>4</sub>) and Arka Sukanya (G<sub>5</sub>) and five levels of different growing medias: Local soil (T<sub>1</sub>); local soil + red soil (T<sub>2</sub>); local soil + red soil + FYM (T<sub>3</sub>); red soil + FYM (T<sub>4</sub>); red soil (T<sub>5</sub>). Rose varieties of Paneer rose and Kashmiri rose were procured from Thiruvarur while Arka Pride, Arka Parimala and Arka Sukanya were procured from IIHR, Hessaraghatta, Bangalore. Observations recorded were plant height (cm), number of leaves, leaf area (cm<sup>2</sup>), plant growth rate (cm<sup>2</sup>/30 days) and number of flowers at 30, 60, 90, 120 and 150 days after transplanting. Growing of Paneer Rose genotype with local soil + red soil gave maximum plant height after 30, 60, 90, 120 and 150 days after transplanting (DAT). While growing Arka Parimala in local soil + red soil + FYM resulted in maximum number of leaves at 60, 90, 120 and 150 DAT. Growing Kashmiri rose in local soil + red soil + FYM gave maximum leaf area at 60 and 90 DAT. Growing Kashmiri rose in local soil gave maximum monthly growth rate at 150 DAT.

**Key words :** FYM, Genotypes, Red soil, Rose.

### Introduction

The most beautiful creation of nature rose, belongs to Rosaceae family, which has three thousand species and 90 genera with 14 diploid chromosome numbers (Jian *et al.*, 2010).

The rose is a significant emblem of love, grace, inspiration, and aesthetic pleasure. The most well-known and widely used cut flower in the world's floriculture commerce is the rose. There are several kinds of roses that are excellent for pot culture and can be moved to any desired location for aesthetic appeal. Potted plants are highly prized in flat dwellings and urbanization. Potted plants are the only type of plants that can offer freshness, even in tiny spaces, and are also an effective way to reduce indoor air pollution. Growing media is always essential to the health and development of pot plants (Jones, 1999). One such traditional plant that needs a

proper medium for improved development and high-quality flower output is the rose. The physio-chemical characteristics of growing media impact the nutritional status, water holding capacity and aeration, which determine the pace of growth (Atif *et al.*, 2008). Nonetheless, a variety of growing mediums have long been used to successfully cultivate miniature roses. A rich, light-coloured, porous and well-drained medium is said to be optimal for rose cultivation.

Geographically speaking, the Cauvery delta zone spans 14.47 lakh hectares. Trichy, Ariyalur, Cuddalore and Pudukkottai districts follow Thanjavur district in the east, which occupies 5% of the Cauvery delta zone. Thanjavur district is made up of Thanjavur, Tiruvarur, and Nagapattinam. Tamil Nadu occupies 43,856 km<sup>2</sup> of the Cauvery basin, which is estimated to be 81,155 km<sup>2</sup> in size. For successive returns, annuals like jasmine, rose,

chrysanthemum, crossandra, and arali occupy the land for longer than one year (Paramasivan and Pasupathi, 2016).

The research was done to assess the cultivation of roses in the Cauvery delta region because rose cultivation is not common in this area.

The bulk of roses used as cut flowers are raised in climate-controlled polyhouses where light, moisture, and temperature can all be managed to produce flowers when demand is at its highest. In India, certain rose kinds are successfully grown in open spaces for use as cut flowers and loose flowers. However, only a little amount of study has been done to determine how well roses perform in open field (Soujanya *et al.*, 2018). Local varieties are the only ones that are popular, according to a survey in Thiruvapur region. Miniature bunny roses and Panneer roses are more cultivated locally. Elite cultivars have not yet been commercially cultivated. The region's hot climate and hard clay soil are the causes.

### Materials and Methods

The experiment on 'Evaluation of rose varieties for grow bag culture in Thiruvapur region of Cauvery delta' was conducted in the Department of Horticulture, Central University of Tamil Nadu, Thiruvapur from July'22 to March'23. It was done in FCRD (Factorial Completely Randomized Design) replicated twice.

Rose varieties of Paneer rose and Kashmiri rose were procured from Thiruvapur while Arka Pride, Arka Parimala and Arka Sukanya were procured from IIHR, Hesaraghatta, Bangalore. 20 cuttings of each variety were brought and they were planted in grow bags with media of red soil and farm yard manure (FYM) for further growth in the month of July.

Arka Pride is variety with production potential of 120 flowers/m<sup>2</sup>. It has been identified for its attractive orange flower colour for cut flower production. It has long flower stalks and flowers have good keeping quality. Arka Parimala is a fragrant variety and rich in antioxidant and has potential for food colour, food flavour, preparation of rose petal tea and gulkand. It has yielding capacity of 10 lakh flowers/acre/year. Arka Sukanya is a fragrant rose variety with 0.22% of concrete yield in fresh flowers. With floriferous nature and being tolerant to pest and diseases, it is ideal choice for garden display (Sindhu, 2018). Paneer rose is one of the very high blooming varieties of roses and it is a climber type. It flowers throughout the year and needs minimum maintenance, with proper direct sunlight. Kashmiri Rose "Gulab" Plant features showy lightly-scented red flowers at the ends of the branches from late spring to early fall. Kashmir

is a multi-stemmed deciduous shrub with an upright spreading habit of growth.

When the acclimatization period of the varieties was over, they were planted in different media in the month of September, in which the growth had to be evaluated. Their growth was evaluated in 5 different types of media treatments, which were local soil; ½ Local soil + ½ Red soil; 1/3 Local soil + 1/3 Red soil + 1/3 FYM; ½ Red soil + ½ FYM; Red soil. Total number of treatments were 25. Varieties were planted in growbags of 18×18 inches.

Observations were taken beginning from the month of November. Plant height was measured with the help of a metre scale. The measurement was taken from the bottom of plant till leaf tip of tallest stem of plant. Number of leaves on each plant were counted from base till tip of each stem. To calculate average leaf area, a middle-aged leaf was selected in each plant and its area was calculated.

Formula-  $A = L \times B$ ; where L = length of leaf and B = breadth of leaf (1)

Monthly growth rate was measured by rate of increase in leaf area. Rate of increase in leaf area =  $\frac{A_2 - A_1}{T}$ ; where  $A_1 = L_1 \times B_1$  (Leaf area in first observation),  $A_2 = L_2 \times B_2$  (Leaf area in second observation),  $L_1$  and  $B_1$  is length and breadth respectively of leaf in first observation,  $L_2$  and  $B_2$  is length and breadth respectively of leaf in second observation and T is time period between two observations (30 days). These observations were taken at 30, 60, 90, 120 and 150 DAT (Days after transplanting).

### Results and Discussion

#### Plant height (cm)

$G_1$  had higher plant height compared to  $G_2$ ,  $G_3$ ,  $G_4$  and  $G_5$  after 30, 60, 90, 120 and 150 days of transplanting. Same results were observed in which Paneer rose had higher plant height compared to Arka Pride, Arka Parimala and Arka Sukanya (Ashwini *et al.*, 2021).  $T_4$  gave maximum plant height 30 DAT.  $T_3$  gave maximum plant height 60, 90, 120 and 150 DAT. This was in accordance with results obtained in research in which highest plant height was recorded in Soil + FYM media treatment (Rajasekar and Suresh, 2015).  $G_1T_2$  gave maximum plant height after 30, 60, 90, 120 and 150 DAT. It was significantly superior to all other treatments at 30 DAT.

#### Number of leaves

After 30 days of transplanting,  $G_2$  was significantly superior to other genotypes.  $G_1$  gave maximum number of leaves compared to other genotypes after 60 days of transplanting. This is in corroboration with results in which Paneer rose had higher number of leaves compared to

**Table 1 :** Effect of different types of genotypes on growth parameters of rose at 30 DAT.

	Plant height (cm)	Number of leaves	Leaf area (cm <sup>2</sup> )	Monthly growth rate (cm <sup>2</sup> /30 days)
G <sub>1</sub> - Paneer rose	80.45	74.90	9.89	0.26
G <sub>2</sub> - Kashmiri rose	54.05	123.30	8.57	0.22
G <sub>3</sub> - Arka Pride	32.69	38.66	6.09	0.14
G <sub>4</sub> - Arka Pride	35.70	83.30	7.01	0.17
G <sub>4</sub> - Arka Pride	43.85	76.00	4.83	0.09
CD at 5%	11.42	35.45	2.88	0.09

**Table 2 :** Effect of different types of media combinations on growth parameters of rose at 30 DAT.

	Plant height (cm)	Number of leaves	Leaf area (cm <sup>2</sup> )	Monthly growth rate (cm <sup>2</sup> /30 days)
T <sub>1</sub> - Local soil	45.39	83.00	7.94	0.20
T <sub>2</sub> - Local soil+Red soil	50.90	97.50	8.70	0.23
T <sub>3</sub> - Local soil+Red soil + FYM	47.85	82.16	7.68	0.19
T <sub>4</sub> - Red soil+FYM	55.40	88.60	6.17	0.14
T <sub>4</sub> - Red soil	47.20	44.90	5.89	0.13
CD at 5%	11.42	35.45	2.88	0.09

Arka Pride, Arka Parimala and Arka Sukanya (Ashwini *et al.*, 2021). G<sub>2</sub> had maximum number of leaves at 90 and 150 DAT. G<sub>4</sub> had maximum number of leaves 120 DAT. But in research conducted at Horticulture College and Research Institute, Coimbatore, Arka Parimala did not give maximum number of leaves (Muthulakshmi *et al.*, 2022). T<sub>2</sub> gave maximum number of leaves after 30 days of transplanting. Different results were obtained in which normal Soil media treatment gave minimum number of leaves per stalk (Chavada *et al.*, 2017). T<sub>3</sub> gave maximum number of leaves at 60 and 150 DAT. Similar results were obtained in which highest number of leaves was recorded in media of Silt and FYM (Hissam *et al.*, 2017). T<sub>1</sub> gave maximum number of leaves at 90 and 120 DAT. Normal Soil media gave minimum number of leaves per stalk (Chavada *et al.*, 2017). G<sub>2</sub>T<sub>1</sub> gave maximum number of leaves at 30 DAT. G<sub>4</sub>T<sub>3</sub> gave maximum number of leaves at 60, 90, 120 and 150 DAT.

#### Leaf area (cm<sup>2</sup>)

G<sub>1</sub> gave maximum leaf area after 30 and 60 days of transplanting. G<sub>2</sub> gave maximum leaf area at 90, 120 and 150 DAT. It may be because these two varieties were local varieties. T<sub>2</sub> gave maximum leaf area at 30 and 120 DAT. T<sub>3</sub> gave maximum leaf area at 60 DAT. On the

other hand, in research on effect of growing media on miniature roses (Paruchuru *et al.*, 2021), it was observed that media of Soil, Sand and FYM gave minimum leaf area. T<sub>1</sub> (Local soil) gave maximum leaf area at 90 and 150 DAT. G<sub>1</sub>T<sub>3</sub> gave maximum leaf area at 30 DAT. G<sub>2</sub>T<sub>3</sub> gave maximum leaf area at 60 and 90 DAT. G<sub>5</sub>T<sub>1</sub> gave maximum leaf area at 120 DAT and G<sub>4</sub>T<sub>2</sub> gave maximum leaf area at 150 DAT. Rosa hybrida under ambient light level and 50% shading resulted in leaf area higher than Rosa sempervirens (Fascella *et al.*, 2013).

#### Monthly growth rate (cm<sup>2</sup>/30 days)

It was obtained by calculating change in leaf area. So, leaf area had an impact on monthly growth rate. G<sub>1</sub> had highest monthly growth rate at 30 and 60 DAT. It may be because it is a local variety or highest leaf area obtained. G<sub>2</sub> had maximum monthly growth rate at 90 and 150 DAT. G<sub>4</sub> had highest monthly growth rate at 120 DAT. T<sub>2</sub> had maximum monthly growth rate at 30, 90 and 120 DAT. It may be due to highest leaf area in this media at 30 and 120 DAT. T<sub>2</sub> had maximum monthly growth rate at 60 DAT. T<sub>4</sub> had maximum monthly growth rate at 150 DAT. Highest leaf area was obtained in media of Coirpith, Vermicompost, FYM and Garden soil (Rajan, 2020). Media of Soil, FYM and Sawdust gave highest leaf area (Dingrodiya *et al.*, 2017). Soil and FYM recorded highest plant spread in rose (Rajasekar and Suresh, 2015). G<sub>1</sub>T<sub>1</sub>, G<sub>1</sub>T<sub>3</sub> and G<sub>4</sub>T<sub>5</sub> gave maximum monthly growth rate at 30 DAT. G<sub>1</sub>T<sub>5</sub> gave maximum monthly growth rate at 60 DAT. G<sub>3</sub>T<sub>2</sub> gave maximum monthly growth rate at 90 DAT. G<sub>1</sub>T<sub>2</sub> gave maximum monthly growth rate at 120 DAT. G<sub>2</sub>T<sub>1</sub> gave maximum monthly growth rate at 150 DAT.

#### Number of flowers per plant

G<sub>2</sub> gave maximum number of flowers per plant at 30, 90, 120 and 150 DAT. It may be due to high local climate adaptability. Only G<sub>5</sub> gave flowering at 60 DAT. Contradicting this, Arka Sukanya had lower flowering as compared to Paneer rose and Arka Pride in results obtained in another research (Ashwini *et al.*, 2021). T<sub>3</sub> gave maximum number of flowers per plant at 30 DAT. Maximum number of flowers produced per plant was reported in treatment Coirpith, Vermicompost and Garden soil followed by treatment Coirpith, Vermicompost, FYM and Garden soil (Rajan, 2020). Maximum number of flowers were obtained by treatment Soil, FYM and Sawdust (Dingrodiya *et al.*, 2017). Only T<sub>1</sub> gave flowering at 60 and 120 DAT and it also gave maximum number of flowers per plant at 90 and 150 DAT. G<sub>2</sub>T<sub>5</sub>

**Table 3:** Effect of different types of genotypes and media combinations on growth parameters of rose at 30 DAT.

	Plant height (cm)	Number of leaves	Leaf area (cm <sup>2</sup> )	Monthly growth rate (cm <sup>2</sup> /30 days)
G <sub>1</sub> T <sub>1</sub>	76.00	86.50	11.25	0.31
G <sub>1</sub> T <sub>2</sub>	88.75	59.00	10.13	0.27
G <sub>1</sub> T <sub>3</sub>	69.00	106.50	11.40	0.31
G <sub>1</sub> T <sub>4</sub>	86.50	88.50	10.60	0.28
G <sub>1</sub> T <sub>5</sub>	82.00	34.00	6.05	0.14
G <sub>2</sub> T <sub>1</sub>	56.00	210.50	10.20	0.28
G <sub>2</sub> T <sub>2</sub>	49.25	168.50	9.98	0.27
G <sub>2</sub> T <sub>3</sub>	55.00	97.50	10.60	0.29
G <sub>2</sub> T <sub>4</sub>	59.00	55.50	4.20	0.08
G <sub>2</sub> T <sub>5</sub>	51.00	84.50	7.89	0.19
G <sub>3</sub> T <sub>1</sub>	22.95	33.00	10.60	0.29
G <sub>3</sub> T <sub>2</sub>	39.00	83.50	9.05	0.24
G <sub>3</sub> T <sub>3</sub>	31.00	0.80	3.19	0.04
G <sub>3</sub> T <sub>4</sub>	36.50	76.00	7.59	0.19
G <sub>3</sub> T <sub>5</sub>	34.00	0	0	-0.06
G <sub>4</sub> T <sub>1</sub>	28.00	0	0	-0.06
G <sub>4</sub> T <sub>2</sub>	33.50	81.00	7.32	0.18
G <sub>4</sub> T <sub>3</sub>	40.00	176.50	10.07	0.27
G <sub>4</sub> T <sub>4</sub>	39.00	82.50	6.34	0.15
G <sub>4</sub> T <sub>5</sub>	38.00	76.50	11.34	0.31
G <sub>5</sub> T <sub>1</sub>	44.00	85.50	7.66	0.19
G <sub>5</sub> T <sub>2</sub>	44.00	95.50	7.04	0.17
G <sub>5</sub> T <sub>3</sub>	44.25	29.50	3.15	0.04
G <sub>5</sub> T <sub>4</sub>	56.00	140.50	2.10	0.01
G <sub>5</sub> T <sub>5</sub>	31.00	29.50	4.20	0.08
CD @ 5%	25.54	79.26	6.43	0.21

gave maximum number of flowers per plant at 30 DAT. After 60 days of transplanting, G<sub>5</sub>T<sub>1</sub> gave flowering and remaining did not. Arka Sukanya has yielding capacity of 6 lakh flowers/acre/year according to IIHR, Bengaluru. Contradicting this, Arka Sukanya gave less flowering compared to Paneer rose, Arka Pride and Arka Parimala in another research conducted (Ashwini *et al.*, 2021). G<sub>1</sub>T<sub>1</sub> and G<sub>2</sub>T<sub>3</sub> gave maximum number of flowers per plant at 90 DAT. It may be because Paneer rose and Kashmiri rose are highly adapted to Local soil of Thiruvapur. According to another research Paneer rose gave higher flowering as compared to Arka Pride, Arka Parimala and Arka Sukanya (Ashwini *et al.*, 2021). G<sub>2</sub>T<sub>1</sub> gave flowering and remaining did not at 120 and 150 DAT. It may be because Kashmiri rose is highly adapted to local soil and climate.

## Conclusion

Paneer rose, which is the local cultivar of Thiruvapur region, gave highest plant height every time; leaf area and monthly growth rate at 30 and 60 DAT. Kashmiri rose gave maximum leaf area at 90, 120 and 150 DAT; maximum monthly growth rate at 90 and 150 and maximum number of flowers per plant at 30, 90, 120 and 150 DAT. Arka Pride did not give any significant results. Arka Parimala had maximum number of leaves and monthly growth rate at 120 DAT. However, only Arka Sukanya gave flowering at 60 DAT. It can be concluded that Paneer rose and Kashmiri rose performed better than other genotypes. Further study will be helpful in knowing more about the performance in genotypes.

## Acknowledgement

I would like to thank my guide Dr. S. Manivannan for supporting me at every stage of my research including procuring the genotypes of rose from IIHR, Bangalore.

## References

- Ashwini, S.G., Patil B.R. and Bagewadi B. (2012). Studies on performance of rose genotypes for growth, yield and quality parameters under northern transitional zone of Karnataka. *J. Pharmaceut. Innov.*, **4(4)**, 179-182.
- Atif, R., Muhammad A., Adnan Y., Atiq R. and Mansoor H. (2008). Effect of different growing media on growth and flowering of *Zinnia elegans* cv. Blue Point. *Pak. J. Bot.*, **40**, 1579-1585.
- Chavada, J.R., Thumar B.V., Vihol A.N., Patel V.S. and Padhiyar B.M. (2017). Effect of potting media on growth, flower yield and quality of rose (*Rosa hybrida* L.) cv. Top Secret under protected condition. *Int. J. Pure Appl. Biosci.*, **5(5)**, 821-827.
- Dingrodiya, P., Gupta N.K., Bhadouria R.S. and Ajay H. (2017). Effect of growing media on growth and flowering of cut roses under the protected environmental conditions. *Int. J. Microbiol. Res.*, **9(2)**, 861-863.
- Fascella, G., Darwich S. and Rouphael Y. (2013). Validation of a leaf area prediction model proposed for rose. *Chilean J. Agricult. Res.*, **73(1)**, 73-76.
- Hissam, M., Rahman I.U., Ali S., Khan I.A., Adnan M., Ilyas M., Abdullah S.A., Ullah Z., Ali N. and Anjum M.M. (2017). Different media effect on various characteristics of Floribunda rose (*Rosa* spp). *Int. J. Environ. Sci. Nat. Resour.*, **3(5)**, 50-55.
- Jian, H., Zhang H., Tang K., Li S., Wang Q., Zhang T., Qiu X. and Yan H. (2010). Decaploidy in *Rosa praelucens* Byhouwer (Rosaceae) endemic to Zhongdian Plateau, Yunnan, China. *Caryologia*, **63(2)**, 162-167.
- Jones, A.P. (1999). Indoor air quality and health. *Atmospheric Environment*, **33(28)**, 4535-4564.
- Muthulakshmi, R., Visalakshi M., Aruna P. and Manikanda Boopathi N. (2022). Evaluation of field rose varieties for

- growth and yield parameters under open field condition. *The Pharma Innov. J.*, **11(7)**, 1823-1826.
- Paramasivan, C. and Pasupathi R. (2016). An Overview of Cauvery Delta Zone in Tamil Nadu. *Int. J. Trend Res. Develop.*, **3(5)**, 399-403.
- Paruchuru, V.K., Fatmi U. and Singh D. (2021). Effect of Growing Media for Establishment and Growth of Miniatures Roses (*Rosa chinensis* Jacq.). *Biolog. Forum – Int. J.*, **13(3a)**, 534-538.
- Rajan, E.B. (2020). Studies on the effect of different growing media on the growth and flowering of gerbera cv. Goliath. *Plant Archives*, **20**, 653-657.
- Rajasekar, P. and Suresh J. (2015). Effect of different growing media on growth of pot grown rose (*Rosa chinensis* Jacq.). *Res. Environ. Life Sci.*, **8(3)**, 477-478.
- Sindhu, S.S. (2018). Recent varietal development of flower crops in India. *Progressive Horticulture*, **50(1 and 2)**, 55-63.
- Soujanya, P., Kulkarni B.S., Kumar R., Munikrishnappa P.M., Shivapriya M. and Harshavardhan M. (2018). Evaluation of rose (*Rosa hybrida* L.) varieties for growth, yield and quality under eastern dry zone of Karnataka. *J. Pharmacog. Phytochem.*, **7(5)**, 165-168.