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Muthulakshmi R
PG Scholar, Department of Floriculture and Landscape Architecture, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Visalakshi M
Assistant Professor, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Aruna P
Associate Professor, Horticultural College and Research Institute for Women, Tiruchirapalli, Tamil Nadu, India

Manikanda Boopathi N
Associate Professor, Department Professor, Department of Plant Biotechnology, Centre for Plant Molecular Biology and Biotechnology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Corresponding Author:
Muthulakshmi R
PG Scholar, Department of Floriculture and Landscape Architecture, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Evaluation of field rose varieties for growth and yield parameters under open field condition

Muthulakshmi R, Visalakshi M, Aruna P and Manikanda Boopathi N

Abstract
A field experiment was conducted to evaluate the performance of field rose varieties for growth and yield parameters under open field condition at Horticultural College and Research Institute, Coimbatore during the year 2021-2022. The experiment was carried out in Randomized Block Design with eleven treatments (Arka parimala, Arka pride, Arka savi, Arka sinchana, Arka swadesh, Seven days rose, Scent pink, Mirabel red, Roman red, Roman yellow and Mookuthi yellow) replicated thrice. From the analysed data there was significant variations among the evaluated varieties for vegetative and flowering parameters. The variety Scent pink recorded the maximum plant height (59.33 cm), maximum number of shoots per plant (6.67), maximum number of leaves (146.67), maximum diameter of fully opened flower (6.80 cm), longest flower stalk length (4.70 cm) and more number of flowers per plant (9.67) respectively. The variety Roman yellow recorded maximum flower stalk girth (1.50 cm). The variety Seven days rose recorded the maximum number of petals per flower (88.33) among the evaluated varieties.

Keywords: Field rose varieties, evaluation, growth and quality

1. Introduction
Rose (*Rosa* species) popularly called as the Queen of flowers for its exquisite and fragrant flowers is one of the world's most economic flower crop. It is a woody perennial flower crop which has been in cultivation before 5000 years in the regions of China, Western Asia and Northern Africa. It belongs to the family Rosaceae with the basic chromosome number n=7. Apart from the landscape and gardening purpose, Rose is a major traded flower crop in the international flower markets. Cut roses which are harvested with the long stalk are mainly used for bouquet making, interior decorations and floral arrangements while the loose flower roses which are harvested with short stalk are mainly used for garland making, veni making, essential oil extraction, offerings in temple *etc.*, (Amita *et al*., 2021) [1].
Loose flower rose petals are mainly used for the value added products like gulkhand, gulroghan, pankhuri, rose water, rose attar, rose wine, rose tea, rose oil *etc*., which has great demand in the domestic as well as international market. Besides, it is one of the medicinal crop which has antioxidant and nutraceutical properties for healing heart, liver and kidney problems. It also have anti-depressant, antibacterial, antifungal, antiviral properties. Rose hips are also a rich source of vitamin C (Venkatesha *et al*., 2022) [15]. In addition, loose flower roses can be cultivated under open field condition which reduces the production cost. There is a huge need for novel cultivars of rose for varied purposes. In order to meet the market demand of rose, evolution of new genotypes with the novel colour, distinct size and unique fragrance is necessary for maximizing the yield and better market prices. For this purpose, selection of better parents with desirable traits is necessary for improvement of genotypes. The genotypes suitable for open field cultivation and their evaluation details under varied regions and climatic conditions is low in comparison to the protected cultivation types.
The information regarding the performance of rose genotypes under open field condition in various agro-climatic conditions is meager. Hence, the present investigation was carried out to collect the informations regarding these aspects which will be useful for rose breeders to select the desirable genotypes and for rose growing farmers to economize their production.

2. Materials and Methods
The present investigation entitled "Evaluation of field rose varieties for growth and yield parameters under open field condition" was conducted at Department of Floriculture and Landscape Architecture, Horticultural college and Research Institute, Coimbatore during the year 2021-2022. The experimental site is geographically situated at 11°02'N latitude and

76°93' E longtitude and at an altitude of 355.68 meters above the mean sea level. The experiment was carried out in Randomized Block Design with 11 treatments replicated thrice with 10 plants in each replication consists of 10 plants. The varieties are Arka parimala, Arka pride, Arka savi, Arka sinchana, Arka swadesh, Seven days rose, Scent pink, Mirabel red, Roman red, Roman yellow and Mookuthi yellow. They were planted as per the design of layout at spacing of 100×100 cm. All the intercultural operations were carried out as per blanket recommendation for all the treatments. The data was collected on various parameters namely Plant height (cm), No.of shoots per plant, Shoot girth (cm), No.of leaves per shoot, Thorn density, Diameter of fully opened flower(cm), Flower stalk length (cm), Flower stalk girth (cm), No. of petals per flower and No. of flowers per plant. Observations were recorded on vegetative parameters (Table.1) and flowering parameters (Table.2) at 120 days after pruning. The collected data was statistically analysed by using AGRES software and Microsoft Excel spreadsheet.

Table 1: Vegetative parameters of the evaluated field rose varieties

Parameters / Treatments	Plant height (cm)	No. of shoots per plant	Shoot girth (cm)	No. of leaves per shoot	Thorn density
Arka parimala	50.33	5.00	2.57	68.33	7.00
Arka pride	47.00	4.67	2.57	62.50	12.67
Arka savi	50.00	6.00	2.50	82.65	4.33
Arka sinchana	53.00	5.33	2.43	96.67	9.00
Arka swadesh	40.67	4.00	2.53	45.05	9.33
Seven days rose	52.00	5.67	2.47	125.37	4.67
Scent pink	59.33	6.67	2.70	136.67	7.67
Mirabel red	38.00	4.67	2.43	53.60	5.67
Roman red	49.33	5.00	2.53	85.54	7.33
Roman yellow	47.00	6.00	2.67	92.50	6.00
Mookuthi yellow	29.33	4.33	2.33	74.56	1.33
MEAN	46.91	5.21	2.52	83.95	6.82
S.Ed	3.791	0.484	0.078	1.870	1.526
CD (P=0.05)	7.908	1.010	0.162	3.900	3.184

Table 2: Flower quality parameters of the evaluated field rose varieties

Parameters / Treatments	Diameter of fully opened flower (cm)	Flower stalk length (cm)	Flower stalk girth (cm)	No. of petals per flower	No. of flowers per plant
Arka parimala	6.30	3.90	1.10	14.00	4.67
Arka pride	5.40	3.70	1.30	24.00	3.67
Arka savi	4.80	3.40	1.20	58.67	8.00
Arka sinchana	4.40	2.90	1.20	57.33	9.00
Arka swadesh	5.40	3.50	1.30	40.33	3.33
Seven days rose	6.40	4.20	1.20	88.33	7.67
Scent pink	6.80	4.70	1.40	48.00	9.67
Mirabel red	4.20	2.20	0.90	30.00	7.67
Roman red	5.10	4.20	1.00	37.00	8.67
Roman yellow	5.90	3s.30	1.50	50.67	6.33
Mookuthi yellow	3.60	1.80	1.20	45.67	6.33
MEAN	5.30	3.44	1.21	44.91	6.82
S.Ed	0.084	0.075	0.014	3.870	0.976
CD (P=0.05)	0.176	0.157	0.030	8.072	2.035

3. Results and Discussion

3.1 Vegetative parameters

Vegetative parameters like plant height (cm), no. of shoots per plant, shoot girth, no. of leaves per plant and thorn density have a major contribution to decide the flower yield of the plant. These characters varied significantly among the evaluated field rose varieties (Table.1)

Significantly plant height varied from 29.33cm to 59.33cm showing a wide variation among the varieties. The maximum plant height (59.33cm) was recorded in Scent pink followed by Arka sinchana (53.00cm) whereas the minimum plant height was recorded in Mookuthi yellow (29.33cm). Sharova, (1977) reported that plant height variation may be due to the rapid meristematic activity during the early growth stages which results in more cell division and elongation in plants. In addition plant height is a varietal character as it varies from variety to variety. Similar variation in plant height were recorded in rose by Mohanty *et al*. (2011) [5], Singh *et al*. (2013) [12], Ramzan *et al*. (2014) [9], Soujanya *et al*. (2014) [13] and Amita *et al*. (2021) [1].

Among the evaluated rose varieties maximum number of shoots per plant was observed in the variety Scent pink (6.67) followed by Arka savi and Roman yellow (6.00) and minimum number of shoots was observed in the variety Mookuthi yellow (4.00). The variation in number of shoots is due to the influence of genetic makeup of the varieties. Similar results were given in early reports by Tabassum *et al*. (2002) [15], Qasim *et al*. (2008) [8], Ramzan *et al*. (2014) [9] and Shahrin *et al*. (2015) [11].

Highest shoot girth was significantly noticed in the variety Scent pink (2.70 cm) followed by Roman yellow (2.67 cm) and minimum shoot girth was noticed in Mookuthi yellow (2.33 cm). The shoot girth is a varietal character which varies from variety to variety. This variation in shoot girth was in

accordance with the report given by Soujanya *et al.* (2014) [13].

Maximum number of leaves was recorded in Scent pink (146.67) followed by Seven days rose (135.00) and minimum number of leaves was recorded in Arka swadesh (46.67). More number of leaves results in a higher rate of photosynthesis and more starch accumulation which will be utilized for more number of flowers. The results are in conformity with Shahrin *et al.* (2015) [11] and Suganthi *et al.* (2019) [14].

Extreme thorn density per 10 cm of shoot was seen in Arka pride (12.67) followed by Arka swadesh (9.33) whereas the variety Mookuthi yellow (1.33) has a few number of thorns and is relatively thornless which is one of the desirable character of this variety. This varied data was in similarity with the reports of Manjula *et al.* (2005) [4] and Shahrin *et al.* (2015) [11].

3.2 Flower parameters

Significant differences were recorded by all the evaluated rose varieties for flower parameters namely diameter of fully opened flower, flower stalk length, flower stalk girth, number of petals per flower and number of flowers per plant (Table.2).

Maximum diameter of fully opened flower was noticed in Scent pink (6.80 cm) followed by Seven days rose (6.40 cm) whereas the minimum diameter was recorded in Mookuthi yellow (3.60 cm). The significant variation in flower diameter is due to the inherent character of the variety and genetic makeup of the individual variety. Our results are similar to the reports by Polara *et al.* (2004) [7], Ranchana *et al.* (2014) [10], Suganthi *et al.* (2019) [14] and Amita *et al.* (2021) [1] in roses.

Longest flower stalk length was observed in the variety Scent pink (4.70 cm) followed by Seven days rose and Roman red (4.20 cm) whereas the shortest stalk length was recorded in Mookuthi yellow (1.8 cm). The variation in stalk length may be due to the genetic factor (Ramzan *et al*., 2014) [9] and (Nadeem *et al*., 2011) [6]. Increased stalk length reserves more starch in the stalk which will be available to the flower for a longer time period and increases the shelf life of the flowers (Soujanya *et al*., 2014) [13], (Shahrin *et al*., 2015) [11] and (Amita *et al*., 2021) [1].

Maximum flower stalk girth was noticed in the variety Roman yellow (1.50 cm) followed by Scent pink (1.40 cm) and minimum stalk girth was observed in Mirabel red (0.9 cm). The variation in stalk girth is due to the genetic makeup and varietal character of the varieties. This finding was in accordance to the reports of rose evaluation by Dias and Patil (2002) [2] and Amita *et al.* (2021) [1].

More number of petals per flower was obtained from the variety Seven days rose (88.33) followed by Arka savi (58.67) and low number of petals was noticed from Arka parimala (14.00). The variation in number of petals per flower may be due to varietal character. Similar variation in roses were reported by Tabassum *et al.* (2002) [15], Ranchana *et al.* (2014) [10] and Shahrin *et al.* (2015) [11].

More number of flowers per plant was obtained in Scent pink (9.67) followed by Arka sinchana (9.00) and low number of flowers per plant was obtained from Arka swadesh (3.33). More number of flowers per plant may be due to larger leaf area and wide plant spread which results in higher and more amount of starch by photosynthesis that will be further used for flower production (Tabassum *et al*., 2002) [15], (Ramzan, 2014) [9] and (Amita *et al*., 2021) [1].

4. Conclusion

From the present experiment, there was significant morphological variation from the varieties. Among the variety Scent pink was found best in terms of vegetative and flower parameters. The variety Mookuthi yellow was found to be with minimum number of thorns. The desirable character of the variety Roman yellow was maximum shoot girth. The variety Seven days rose recorded the maximum number of petals per flower among the evaluated field rose varieties. Hence these varieties can be further utilized for evolution of new varieties and can be recommended for commercial cultivation under open field condition.

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