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Varietal Evaluation of Different Floribunda Rose (*Hybrid teas* x *Polyanthas*) under Prayagraj Agro-climatic Condition

Amita*, Vijay Bahadur, Urfi Fatmi and Devi Singh

Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, India

**Corresponding author*

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A B S T R A C T

The present experiment was carried out during December 2019 to April 2020 in Research Field, Department of Horticulture, SHUATS, Prayagraj. The experiment was conducted in Randomized Block Design (RBD), with ten varieties of Floribunda rose, the varieties were replicated thrice. The varieties were V_1 (Viva Rose), V_2 (Mini Bagago), V_3 (Choco moco), V_4 (Rexy Rose), V_5 (Impatient), V_6 (Lavender patio), V_7 (Banjaran), V_8 (Sentimental), V_9 (Snow white) and V_{10} (Mardy grass). Form the present investigation it is found that variety Banjaran was found best in terms of vegetative growth parameters and variety Viva Rose found best for flower yield and quality parameters and minimum growth and yield of Floribunda rose was recorded in variety Mardy grass in agro-climatic condition of Prayagraj.

Introduction

Rose universally acclaimed as the Queen of Flowers is one of the world's most popular flowers. Among cut flowers, Rose (Rosa spp) has occupied a unique position both in beauty and trade. Rose ranks first among the top ten cut flowers in the international flower market. Among all other cut flowers, roses lead in popularity because of their beauty, fragrance and long lasting blooming qualities (Ghaffoor *et al.,* 2000 and Tabassum *et al.,* 2002).

It may be used for planting in rockeries, pots and for cut flower production. It possesses multiple uses like extraction of perfumes, vitamin C from hips for medicinal uses and for sales as cut flowers (Khan, 1978).

Rosa species are found throughout the colder and temperate regions of the Northern hemisphere form the Arctic to the subtropics. Flower size and stem length are two important factors that dictate the value of cut-flower roses.

There are over 100 species and thousands of varieties known to exist. Mainly two types of roses are commercially grown for cut flowers; one is Hybrid Tea (HT) roses which form the bulk of cut roses sold in the market. The demand for HT roses varies with colour, sex

and season of the year. Generally, red HT's are in great demand followed by yellow, pink and white. The objective of this study was to evaluate the suitable varieties for quality and yield under the agroclimatic condition of Prayagraj.

Materials and Methods

The Experimental was conducted in Randomized Block Design (RBD) with 10 Varieties of Floribunda Rose with three replications in the, Research field, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during the October, 2019 to April, 2020. Total number of varieties were ten *viz.* V_1 (Viva Rose), V_2 (Mini Bagago), V_3 (Choco moco), V_4 (Rexy Rose), V_5 (Impatient), V_6 (Lavender patio), V_7 (Banjaran), V_8 (Sentimental), V_9 (Snow white) and V_{10} (Mardy grass). Recommended dose of manures and fertilizers were applied in each variety.

Climatic condition in the experimental site

The area of Prayagraj district comes under subtropical belt in the south east of Utter Pradesh, which experience extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 46^o C- 48^o C and seldom falls as low as 4^{o}C- 5^{o}C. The relative humidity ranges between 20 to 94 %. The average rainfall in this area is around 1013.4 mm annually. However, occasional precipitation is also not uncommon during winter months.

Results and Discussion

The present investigation entitled "Varietal evaluation of different Floribunda Rose (*Hybrid teas* x *polyanthas*) under Prayagraj Agro-climatic condition" was carried out during October 2019 to April 2020 in Research Field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) India. The results of the present investigation, regarding the varietal evaluation of Floribunda Rose, have been discussed and interpreted in the light of previous research work done in India and abroad. The experiment was conducted in Randomized block design with 10 Varieties, and three replications.

The results of the experiment are summarized below.

Growth parameters

The data on growth parameters are given in table 1 it is clear from the table that all the treatment differed significantly for all growth parameters. Significantly maximum plant height (30.73, 34.66, 38.83 and 41.93 cm) was recorded in variety V_7 (Banjaran) followed by variety V_5 (Impatient) with (28.17, 30.83, 33.54 and 36.35 cm) and minimum height (16.66, 19.56, 22.88 and 25.49 cm) were noticed in variety M_{10} (Mardy grass). Plant height is a varietal character as it varies from variety to variety. Dias and Patil (2003) in rose, Swaroop *et al.*, (2006) in chrysanthemum, Narsude *et al.*, (2010) in marigold and Mohanty *et al.*, (2011) in rose. Similarly in plant spread (EW) maximum (25.06, 27.20, 28.72 and 29.79 cm) was recorded in variety V_7 (banjaran) followed by V_5 (Impatient) with (22.45, 24.65, 26.83 and 28.72 cm) and minimum (10.97, 12.95, 15.13 and 16.40 cm) was noticed in V_{10} (Mardy grass). Similarly in terms of plant spread (NS) maximum (20.58, 22.06, 23.34 and 24.88 cm) was recorded in V_7 (banjaran) followed by V_5 (Impatient) with (19.90, 21.18, 22.38 and 23.84 cm) and minimum (11.36, 12.60, 13.94 and 15.42 cm) noticed in V_{10} (Mardy grass). The difference among the varieties may be

due to bigger sized leaves produced by respective cultivars. The results are in accordance with the findings of Dias and Patil (2003), Sharma and Sharma (2003) and Mohanty *et al.,* (2011) in rose. In the different varieties the maximum Number of shoots/plant (8.03) was recorded in variety V_8 (Sentimental) followed by variety V_7 (Banjaran) with (7.22 shoots) and minimum number of shoots/plant (4.19 shoots) was noticed in variety V_6 (Lavender patio). The variety Sentimental produced maximum number of shoots per plant and variety Lavender patio, produced minimum no. of shoots/plant due to less vigorous in growth, this may be due to genetic makeup of the variety. Similar variations in number of shoots per plant was reported by Raheela *et al.,* (2002), Qasim *et al.,* (2008) in rose and Narsude *et al.,* (2010) in marigold.

In earliness parameters *i.e.* Days to bud initiation significantly, minimum (41.34 days) was recorded in variety V_1 (Viva Rose), followed by V_2 (Mini bagago) with (43.35 days) and maximum (62.17 days) recorded in V_{10} (Mardy grass). Similarly in Days to bud initiation to full bloom stage, significantly minimum (15.96 days) was recorded in variety V_1 (Viva Rose), followed by V_2 (Mini bagago) with (17.35 days) and maximum (26.74 days) recorded in V_{10} (Mardy grass) and in terms of Days to first harvest, minimum (58.54 days) was recorded in variety V_1 (Viva Rose), followed by V_2 (Mini bagago) with (61.53 days) and maximum (90.17 days) recorded in V_{10} (Mardy grass). The early flowering, blooming in Viva Rose might be attributed to maximum number of leaves which would have resulted in production and accumulation of more photosynthates and due to genetic makeup of variety. The data reveals that a significant variation existed in the number of days required for flower bud initiation among the different cultivars under study. Manjula (2005) reported the similar results in rose as that of the present investigation.

Quality parameters

The data on quality parameters are given in table 2 it is clear from the table that all the treatment differed significantly for all growth parameters. Among the different varieties of floribunda rose maximum significant Shelf life of flowers, (6.91 days) was recorded in variety V_1 (Viva Rose), followed by V_7 (Banjaran) with (5.92 days) and minimum (2.31 days) noticed in V_3 (Choco moco). The variation in shelf life of flower might de due to differences in senscencing behavior of the variety by producing higher amount of ethylene formation enzymes and ethylene as reported by Jangde *et al.,* (2019) in Gerbera, reported the similar results as that of the present investigation.

In stalk length maximum significant stalk length (33.25 cm) was recorded in variety V_7 (Banjaran), followed by V_5 (Impatient) with (28.77 cm) and minimum (17.14 cm) noticed in V_6 (Lavender patio). The stalk length is a genetic factor therefore it is expected to vary among the cultivars as earlier observed by Dias and Patil (2003) in rose, Stalk length is a very important factor for a cut flower. It decides the quality cut flowers. As there will be more stalk length more reserved food will be stored in the stalk which will later be available to the flower for longer time period. Similarly maximum significant stalk girth (7.75 mm) recorded in variety V_1 (Viva Rose), followed by V_7 (Banjaran) with (6.73 mm) and minimum (4.24 mm) noticed in V_{10} (Mardy grass). The stalk girth is also a genetic factor therefore it is expected to vary among the varieties as earlier Dias and Patil (2003) in Rose, Kumar *et al.,* (2014) and Jangde *et al.,* (2019) in Gerbera, reported the similar results as that of the present investigation.

Table.1 Growth parameters of Floribunda Rose varieties

Variety Symbol	Variety Name	Plant height (cm)				Plant Spread (cm) EW				Plant Spread (cm) NS				No. of Shoots/ plant	Days to flower bud initiation	Days to bud initiation to full bloom stage	Days to first harvest
		30 DAP	60 DAP	90 DAP	120 DAP	30 DAP	60 DAP	90 DAP	120 DAP	30 DAP	60 DAP	90 DAP	120 DAP				
V_1	Viva rose	21.97	24.29	27.87	30.42	16.24	17.45	19.40	21.56	14.04	15.28	16.57	17.80	6.53	41.34	15.96	58.54
V_2	Mini bagago	20.10	22.22	24.70	27.55	14.54	16.18	17.84	19.74	13.15	14.57	16.23	17.59	6.25	43.35	17.35	61.53
V_3	Choco moco	21.11	23.72	26.79	29.79	15.46	16.56	18.45	20.18	13.09	14.13	15.54	16.82	5.11	45.33	21.74	68.21
V_4	Rexy rose	20.32	22.23	25.69	27.71	14.68	16.06	18.18	20.10	13.87	15.11	16.85	18.15	5.03	47.23	18.82	66.36
V_5	Impatient	28.17	30.83	33.54	36.35	22.45	24.65	26.83	28.58	19.90	21.18	22.38	23.84	4.22	50.82	19.61	70.90
V_6	Lavender patio	19.60	21.52	24.58	26.46	14.01	15.83	17.77	19.44	12.94	14.30	15.53	16.96	4.19	47.99	20.73	69.05
V_7	Banjaran	30.73	34.66	38.83	41.93	25.06	27.20	28.72	29.79	20.58	22.06	23.34	24.88	7.22	56.06	19.33	75.94
V_8	Sentimental	26.18	28.72	32.12	35.03	20.57	22.39	24.10	25.69	18.04	19.42	20.85	22.25	8.03	55.07	21.12	77.11
V_9	Snow white	18.72	20.83	24.22	27.77	13.03	14.69	16.44	17.71	11.86	13.20	14.87	16.50	6.30	52.70	22.34	75.60
V_{10}	Mardy grass	16.66	19.56	22.88	25.49	10.97	12.95	15.13	16.40	11.36	12.60	13.94	15.42	6.14	62.17	26.74	90.17
F-Test		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
SE(d)		0.427	0.452	0.429	0.446	0.464	0.465	0.471	0.466	0.289	0.289	0.312	0.319	0.159	0.622	0.442	0.579
C.V.		2.341	2.227	1.866	1.770	3.406	3.094	2.845	2.606	2.380	2.188	2.171	2.056	3.290	1.516	2.658	0.994
C.D. at 5%		0.905	0.957	0.907	0.944	0.983	0.984	0.998	0.988	0.612	0.612	0.661	0.676	0.336	1.316	0.936	1.226

Table.2 Quality parameters of Floribunda Rose varieties

Variety Symbol	Variety Name	Shelf life of flowers (Days)	Stalk length (cm)	Stalk girth (mm)	Flower bud diameter (cm)	Flower diameter (cm)
V_1	Viva rose	6.91	22.11	7.75	2.73	8.25
V_2	Mini bagago	4.05	21.42	5.19	2.00	5.52
V_3	Choco moco	2.31	21.80	6.08	1.89	4.80
V_4	Rexy rose	2.84	19.52	5.81	1.80	4.54
V_5	Impatient	3.45	28.77	6.13	1.94	5.03
V_6	Lavender patio	2.97	17.14	6.26	1.62	4.21
V_7	Banjaran	5.92	33.25	6.73	2.35	6.69
V_8	Sentimental	5.53	27.60	5.86	2.57	7.07
V_9	Snow white	4.92	20.75	4.60	2.08	6.37
V_{10}	Mardy grass	2.49	19.37	4.24	1.85	4.41
F-Test		S	S	S	S	S
SE(d)		0.248	0.457	0.137	0.131	0.090
C.V.		7.344	2.418	2.859	7.677	1.940
C.D. at 5%		0.525	0.969	0.290	0.276	0.191

Table.3 Yield parameters of Floribunda Rose varieties

Variety Symbol	Variety Name	Fresh weight of flower (g)	Dry weight of flower (g)	Number of flowers/plant	Flower yield/plant (g)	Flower yield/plot (kg)	Flower yield/ha (q)
V_1	Viva rose	15.13	1.66	15.15	229.26	2.74	54.80
V_2	Mini bagago	11.66	1.28	3.82	44.50	0.53	10.60
V_3	Choco moco	10.10	1.05	6.66	67.21	0.80	16.00
V_4	Rexy rose	9.73	1.04	4.58	44.56	0.52	10.40
V_5	Impatient	10.54	1.06	5.51	58.07	0.69	13.80
V_6	Lavender patio	8.53	0.93	3.39	28.88	0.34	6.80
V_7	Banjaran	12.52	1.38	7.43	93.02	1.11	22.20
V_8	Sentimental	13.71	1.48	6.27	85.93	1.02	20.40
V_9	Snow white	11.78	1.23	12.27	144.53	1.73	34.60
V_{10}	Mardy grass	9.90	1.05	2.53	25.09	0.29	5.80
F-Test		S	S	S	S	S	S
SE(d)		0.364	0.044	0.167	3.454	0.043	0.870
C.V.		3.922	4.478	3.024	5.153	5.452	5.451
C.D. at 5%		0.770	0.094	0.353	7.314	0.092	1.841

Among the different varieties maximum significant flower bud diameter (2.73 cm) was recorded in variety V_1 (Viva Rose), followed by V_8 (Sentimental) with (2.57 cm) and minimum (1.62 cm) noticed in V_6 (Lavender patio). The bigger bud diameter of Viva rose might be due to the inherent characters and genetic makeup of individual cultivars. These findings are also in accordance with the results of Polara *et al.,* (2004) in rose and Jangde *et al.,* (2019) in Gerbera, who also reported large differences in the flower bud diameter. Similarly significantly maximum flower diameter (8.25 cm) was recorded in variety V_1 (Viva Rose), followed by V_8 (Sentimental) with (7.07 cm) and minimum (4.21 cm) noticed in V_6 (Lavender patio). The bigger flower diameter of Viva rose might be due to the inherent characters and genetic makeup of individual cultivars. These findings are also in accordance with the results of Polara *et al.,* (2004) in rose and Jangde *et al.,* (2019) in Gerbera, who also reported large differences in the flower diameter.

Yield parameters

The data on Yield parameters are given in table 3 it is clear from the table that all the treatment differed significantly for all growth parameters, significantly maximum fresh flower weight (15.13 g) was recorded in variety V_1 (Viva rose) followed by V_8 (Sentimental) with (13.71 g) and minimum (8.53 g) noticed in V_6 (Lavender patio). Variation in flower weight among the cultivars was mainly because due to presence of fairly more number of well developed petals. Further being a genetical factor, variations were expected among the varieties of roses. This result was in accordance with the findings of Polara *et al.,* (2004) and Manjula (2005) in rose. Similarly for Dry weight of flowers maximum significant dry weight (1.66 g) was recorded in variety V_1 (Viva rose) followed by V_8 (Sentimental) with (1.48 g) and minimum (0.93 g) recorded in V_6 (Lavender patio). The maximum dry weight of Viva rose flowers might be due to maximum fresh weight of flowers and inherent characters of individual cultivars. These findings are also in accordance with the results of Polara *et al.,* (2004) and Manjula (2005) in rose and significantly maximum number of flower per plant (15.15 flowers) recorded in variety V_1 (Viva rose) followed by V_9 (Snow white) with (12.27 flowers) and minimum (2.53 flowers/plant) noticed in V_{10} (Mardy grass). Maximum number of flowers per plant might be attributed to the greater leaf area and more number of leaves per plant as well as plant spread would have resulted in production and accumulation of maximum photosynthesis, resulting the production of more number of flowers with bigger size. Flower yield and its quality parameter decide the significance of the particular variety, which are suitable for commercial cultivation. The results are in accordance with the findings of Ranzan *et al.,* (2014) in rose, Sarmah *et al.,* (2014) and Jangde *et al.,* (2019) in Gerbera.

In terms of flower yield/plant maximum significant flower yield (229.26 g)/plant was recorded in variety V_1 (Viva rose) followed by V_9 (Snow white) with (144.53 g) and minimum (25.09 g) noticed in V_{10} (Mardy grass). Variation among the varieties with respect to flower yield/plant is due to maximum number of flower in that particular variety and maximum flower weight, this findings correlates with the findings of Adan and Atif (2005) and Fascella and Zizzo (2007) in rose. Similar trends was noticed for flower yield/plot with (2.74 kg) recorded in variety V_1 (Viva rose) followed by V_9 (Snow white) with (1.73 kg) and minimum (0.29 kg) noticed in V_{10} (Mardy grass). Higher yield per plot may be due to enhancement in morphological parameters like plant height,

more number of leaves, and more number of shoots which helps in production of more photosynthates resulting in the accumulation of more dry matter which in turn directly or indirectly leads to production of more number of flowers per plant. Similar results were observed by Adan and Atif (2005) and Fascella and Zizzo (2007) in rose. Similarly maximum significant flower yield/ha (54.80 q) was recorded in variety V_1 (Viva rose) followed by V_9 (Snow white) with (34.60 q) and minimum (5.80q) noticed in V_{10} (Mardy grass). Higher yield may be due to enhancement in morphological parameters like plant height, more number of leaves, and more number of shoots which helps in production of more photosynthates resulting in the accumulation of more dry matter which in turn directly or indirectly leads to production of more number of flowers per plant. Similar results were observed by Adan and Atif (2005) and Fascella and Zizzo (2007) in rose.

From the present experimental findings it is concluded that variety Banjaran was found best in terms of vegetative growth parameters and variety Viva Rose found best for flower yield and quality parameters and minimum growth and yield of Floribunda rose was recorded in variety Mardy grass in agroclimatic condition of Prayagraj.

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