



Short communication

## Evaluation of floribunda rose (*Rosa hybrida* L.) cultivars for landscape use under Punjab condition

Parget Singh, R.K. Dubey, Ranjit Singh and Ramesh Kumar

Department of Floriculture and Landscaping  
Punjab Agricultural University, Ludhiana - 141004, India  
E-mail: rkdebey.flori@pau.edu

### ABSTRACT

The present study was carried out to evaluate floribunda rose cultivars for landscape use under sub-tropical climate of the Punjab. Thirty cultivars were planted in Randomized Block Design, with three replications. Maximum plant height (53.67cm) was recorded in 'Banjaran', while plant-spread, leaf length and leaf breadth were maximum (90.83cm, 12.73cm and 9.10cm, respectively) in 'Brown Velvet'. The cv. Iceberg produced comparatively longer (2.77cm) buds. Flower size was maximum in 'Charleston' (8.37cm). Number of petals per flower was higher in 'Arunima'. Thorn density was found to be higher (42.67 per ten cm i.e., decimeter) in cv. 'St. Boniface' whereas, 'Summer Snow' and 'Ahalya' were thornless. Thorn shape was that of a hook in all the cultivars. Maximum number of flowers per plant, per unit area were recorded in 'Summer Snow' (367.85/m<sup>2</sup>), which was on par with 'Arunima' (340.32/m<sup>2</sup>), 'First Edition' (320.75/m<sup>2</sup>) and 'Thornless Beauty' (328.24/m<sup>2</sup>). Flower stalk length (82.33cm) and flower duration (141.33 days) were higher in cv. Brown Velvet. The cultivars were also evaluated for their fragrance.

**Key words:** Floribunda rose, evaluation, landscape

Rose (*Rosa hybrida* L.) is referred to as the queen of flowers. It belongs to the genus *Rosa* and the family Rosaceae, and is ranked as number one cut-flower. There are several kinds of cultivars of rose in a dazzling spectrum of color, tint and hue, with forms ranging from miniatures to shrubs to climbers. Floribunda is a modern group of garden roses developed by crossing Hybrid Teas with the wild rose, *Rosa multiflora*, or polyantha roses. Garden roses are uniquely different from cut-roses on account of production of higher number of flowers per stem. Therefore more number of flowers produced per unit area fulfills the criteria for garden decoration. Modern landscape planners hardly utilize the available diversity of roses in landscaping although exclusive rose gardens have been established in various cities. Landscaping with roses is one way of adding beauty to gardens. Floribunda roses are an excellent category best suited for gardening as these produce more flowers per unit area and for a longer duration. The possibility of their use as cut-sprays under Indian conditions should also be explored. As there is a great diversity among floribunda roses, there is a need to evaluate performance of these cultivars.

The present experiment was carried out at the research farm, Department of Floriculture and Landscaping, Punjab Agricultural University, Ludhiana, during the years 2009-2011. The Ludhiana, being subtropical, is characterized by cold winters, with occasional ground-frost in December and January, and, high temperatures associated with hot, desiccating winds in May and June. Average annual rainfall in the area is 700mm. The soil of the experimental plot was sandy-loam with medium fertility at pH 8. Rose cultivars were collected from various sources like Directorate of Floricultural Research, IARI, New Delhi, and from private nurseries and included cvs. Banjaran, Parfait, Gold Cup, Junior Miss, Brown Velvet, Sexy Remy, Valentine, Rumba, Red Gold, Charleston, Sparton, Thornless Beauty, Hot Cocoa, Show Bizz, Neelambari, Princess de Monaco, Nimes, Iceberg, Summer Snow, First Edition, Charisma, Bordure Vive, John John, Saratoga, St. Boniface, Hemangini, Arunima, Nordia, Lenturner and Ahalya.

The experiment was laid out in Randomized Complete Block Design, with three replications, with one

plant per replication. A year old plants, already established in the field, were used for recording observations. Planting distance of the rose bushes was 75cm x75cm. Uniform cultural practices like pruning, fertilization and pesticide application, were applied to all the plants well in time as per standard package of practices. Plants were flood-irrigated as and when required. Frequency of irrigation during the summer months was twice a week, whereas in the winter it was once a week. Manual weeding was done weekly. Observations were recorded on various parameters, viz., plant height (cm), plant-spread (NS and EW spread, in cm), thorn density (count per 10cm), leaf length and leaf breadth (cm), bud length and diameter (cm), flower size (cm), flower shoot length (cm), flower color (as per RHS color chart), duration of flowering (days), fragrance (Yes/No), flower vase-life in tap water (days), petal number/ flower, and seed setting (Yes/No). Data were statistically analyzed using cpcs1 software.

**Table 1. Evaluation of floribunda rose cultivars for plant height, plant spread, leaf length and leaf breadth**

Name of cultivar	Plant height (cm)	Plant spread (cm)	Leaf length (cm)	Leaf breadth (cm)
Banjaran	53.67	41.17	11.23	8.13
Parafait	38.00	31.67	8.57	6.30
Gold Cup	51.67	43.33	8.27	5.30
Junior Miss	43.00	39.67	8.27	6.73
Brown Velvet	50.00	90.83	12.73	9.10
Sexy Remy	31.00	40.67	9.33	7.73
Valentine	31.67	39.00	8.20	7.17
Rumba	46.33	40.17	8.57	5.80
Red Gold	39.00	37.17	7.87	6.30
Charleston	42.33	39.00	8.97	6.00
Sparton	28.67	32.17	8.10	7.10
Thornless Beauty	44.33	50.50	9.47	7.73
Hot Cocoa	52.00	49.67	9.77	8.10
Show Bizz	27.33	19.17	6.07	4.17
Neelambari	35.00	28.83	7.93	6.20
Princess de Monaco	47.67	45.33	10.10	7.33
Nimes	37.33	35.67	12.47	9.43
Iceberg	33.33	16.83	8.53	6.80
Summer Snow	29.33	23.00	7.67	4.83
First Edition	37.67	52.00	9.60	7.97
Charisma	42.67	32.00	9.00	6.00
Bordure Vive	21.33	29.17	8.17	7.23
John John	46.67	32.67	9.17	7.10
Saratoga	42.33	30.67	8.27	7.10
St. Boniface	37.67	38.17	9.37	5.27
Hemangini	26.33	32.50	9.17	7.10
Arunima	37.67	39.17	8.53	6.03
Nordia	31.00	28.00	10.10	7.97
Lenturner	28.33	32.17	8.23	5.07
Ahalya	28.67	29.67	10.07	6.03
CD ( $P=0.05$ )	11.93	13.64	0.84	0.53

**Table 2. Evaluation of floribunda rose cultivars for bud length, bud diameter, flower size and flower stalk length**

Name of cultivar	Bud length (cm)	Bud diameter (cm)	Flower size (cm)	Flower stalk length (cm)
Banjaran	1.97	1.27	6.13	54.67
Parafait	1.80	1.57	6.70	38.67
Gold Cup	1.67	1.33	5.03	39.67
Junior Miss	1.87	1.37	5.80	45.67
Brown Velvet	2.10	1.77	6.60	82.33
Sexy Remy	1.70	1.33	6.97	32.00
Valentine	1.93	1.20	6.77	35.33
Rumba	1.60	1.23	4.63	46.67
Red Gold	2.33	1.47	6.23	32.00
Charleston	2.47	1.70	8.37	43.67
Sparton	1.67	1.47	5.80	40.00
Thornless Beauty	2.30	0.90	4.57	51.33
Hot Cocoa	2.43	1.80	5.30	46.67
Show Bizz	1.53	1.20	5.63	24.67
Neelambari	1.73	1.23	5.30	42.00
Princess de Monaco	2.57	1.77	6.70	39.33
Nimes	1.67	1.53	5.30	41.67
Iceberg	2.77	1.03	6.47	41.00
Summer Snow	1.50	0.83	5.27	50.67
First Edition	2.90	1.50	6.00	43.33
Charisma	1.77	1.27	5.27	32.00
Bordure Vive	2.20	1.30	6.20	24.33
John John	2.53	1.73	5.40	36.67
Saratoga	1.60	1.13	4.37	50.00
St. Boniface	2.13	1.47	5.70	31.00
Hemangini	2.03	1.47	4.50	40.00
Arunima	1.80	1.30	6.63	29.67
Nordia	2.20	1.40	5.30	30.33
Lenturner	2.50	1.70	4.70	23.00
Ahalya	1.80	1.10	4.57	33.67
CD ( $P=0.05$ )	0.39	0.25	0.59	12.97

Subtropical climatic conditions are characterized by extremes of winter and summer temperatures, and have a marked effect on plant height, plant-spread, leaf length and leaf breadth (Table 1). Plant height varied from 21.33cm to 53.67cm, thus showing a wide variation among cultivars. Maximum plant height (53.67cm) was recorded in ‘Banjaran’, followed by ‘Hot Cocoa’, ‘Gold Cup’ and ‘Brown Velvet’, with 52, 51.67 and 50cm, respectively. Plants were dwarf in the case of ‘Bordure Vive’ (21.33cm). Cultivars Bordure Vive, Hemangini and Show Bizz were observed to be dwarf compared to others as these exhibited lower plant height (21.33, 27.33 and 26.33cm, respectively). Therefore, these cultivars are suitable for high-density planting. Variation in plant height among different cultivars may be due to individual genetic make-up of the cultivars. Our results are in conformity with findings of Murugesan *et al* (1991) and Singh *et al* (2004). Maximum plant-spread (90.83cm) was observed in ‘Brown Velvet’, followed by

**Table 3. Evaluation of floribunda rose cultivars for petal number, thorn density, vase life, Number of flowers per plant and duration of flowering**

Name of cultivar	Petal number/ flower	Thorn density (count per 10 cm)	Vase-life (days)	Number of flowers/ plant	Duration of flowering (days)
Banjaran	24.67	10.00	6.00	93.23	129.67
Parafait	61.00	20.00	5.00	103.10	129.33
Gold Cup	27.33	14.00	11.00	48.21	137.00
Junior Miss	30.67	20.00	5.00	73.85	134.67
Brown Velvet	26.00	18.00	7.00	171.12	141.33
Sexy Remy	36.33	17.67	6.00	107.87	132.33
Valentine	33.00	9.67	5.00	262.23	130.67
Rumba	32.00	14.33	8.00	132.12	127.67
Red Gold	18.00	32.00	7.00	92.01	125.33
Charleston	20.67	20.00	5.00	183.87	129.00
Sparton	41.00	22.00	6.00	68.36	130.33
Thornless Beauty	19.00	16.00	6.00	328.24	133.67
Hot Cocoa	19.67	24.00	5.00	130.69	134.33
Show Bizz	26.67	20.00	6.00	88.42	133.67
Neelambari	33.00	6.00	5.00	257.23	131.33
Princess de Monaco	32.67	25.00	4.00	27.28	132.33
Nimes	29.33	6.00	6.00	86.45	135.33
Iceberg	28.00	8.00	7.00	121.26	128.67
Summer Snow	20.00	0.00	5.00	367.85	160.67
First Edition	26.00	16.00	7.00	320.75	132.33
Charisma	32.00	10.33	8.00	142.95	133.00
Bordure Vive	20.00	16.00	6.00	98.19	130.67
John John	21.00	14.00	7.00	48.83	130.33
Saratoga	22.00	18.00	5.00	95.65	135.00
St. Boniface	23.00	42.67	6.00	78.76	127.33
Hemangini	41.33	12.00	5.00	220.46	129.00
Arunima	66.00	12.00	4.00	340.32	129.00
Nordia	40.00	14.00	5.00	72.65	134.00
Lenturner	32.00	26.00	5.00	65.12	133.67
Ahalya	20.00	20.00	6.00	145.65	134.00
CD ( <i>P</i> =0.05)	2.19	2.51	1.36	48.96	4.87

‘First Edition’, ‘Thornless Beauty’ and ‘Hot Cocoa’ where plant-spread recorded was 52.0, 50.50 and 49.67cm, respectively. Cultivars with lower plant-spread were ‘Iceberg’, ‘Show Bizz’ and ‘Summer Snow’ and had an upright growth-habit, thus, rendering them suitable for close planting. Malhotra (1997) also reported similar findings when evaluating roses under polyhouse and open conditions. Maximum leaf length (12.73cm) was recorded in ‘Brown Velvet’, followed by ‘Nimes’ and ‘Banjaran’ (12.47 and 11.23cm, respectively) (Table 1). Minimum leaf length (6.07cm) was recorded in ‘Show Bizz’. Leaf breadth was maximum (9.43cm) in ‘Nimes’, followed by ‘Brown Velvet’ and ‘Banjaran’ (9.10 and 8.13cm, respectively). Minimum leaf breadth (4.17cm) was found in ‘Show Bizz’, followed

by ‘Summer Snow’ and ‘Lenturner’, where it was 4.83 and 5.07cm, respectively. Larger leaf size is more desirable as it has a higher photosynthetic area which affects plant growth and productivity positively.

Table 2 shows that bud length varied from 1.5cm in ‘Summer Snow’, to 2.9cm in ‘First Edition’. Diameter of the flower bud varied from 0.83cm in ‘Summer Snow’, to 1.77cm in ‘Brown Velvet’ and ‘Princess de Monaco’. Wide variation was observed in flower size among different cultivars (Table 2). Maximum flower size (8.37cm) was recorded in ‘Charleston’, followed by ‘Sexy Remy’ (6.97cm) and ‘Valentine’ (6.77cm). Smallest flowers (4.37cm) were

**Table 4. Evaluation of floribunda rose cultivars for flower colour, fragrance and seed-set**

Name of	Flower colour	RHSCC No.	Fragrance (Yes/No)	Seed setting (Yes/No)
Banjaran	Red Group	44 B	Yes	No
Parfait	Red Group	54 A	No	No
Gold Cup	Yellow Group	12 A	Yes	Yes
Junior Miss	Red Group	49 B	No	Yes
Brown Velvet	Greyed Red Group	179 A	Yes	No
Sexy Remy	Red Group	49 B	No	No
Valentine	Red Group	46 A	Yes	No
Rumba	Yellow Group	4 B	Yes	Yes
Red Gold	Red Group	39 B	No	No
Charleston	Red Group	53 A	No	Yes
Sparton	Red Group	47 B	No	No
Thornless Beauty	Red Group	55 A	Yes	No
Hot Cocoa	Greyed Red Group	181 B	Yes	No
Show Bizz	Red Group	45 B	No	Yes
Neelambari	Red Purple Group	61 B	No	Yes
Princess de Monaco	Red Group	55 B	No	No
Nimes	Red Group	45 A	No	No
Iceberg	White	-	No	No
Summer Snow	White	-	No	No
First Edition	Orange Red Group	N 34 B	No	No
Charisma	Orange Red Group	N 30 A	Yes	No
Bordure Vive	Red Purple Group	N 66 A	Yes	No
John John	Yellow Orange Group	14 A	No	No
Saratoga	White	-	No	No
St. Boniface	Orange Red Group	N 30 A	Yes	Yes
Hemangini	White	-	No	No
Arunima	Red Purple Group	62 B	No	No
Nordia	Greyed Red Group	182 B	No	No
Lenturner	Red Group	55 C	No	No
Ahalya	Purple Group	75 B	No	No

observed in ‘Saratoga’. Larger flowers are considered to be better for exhibition purposes, while, cultivars with smaller flowers may be suited better for garden display. Similar differences in flower size of cultivars have been earlier reported by Murugesan *et al* (1991), Bhattacharjee (1994), Singh *et al* (1994), Malhotra (1997), Singh and Singh (2002) and Malik *et al* (2007).

Similarly, the cultivars were evaluated for flower stalk length (Table 2). Maximum flower stem length (82.33cm) was recorded in ‘Brown Velvet’, while, ‘Lenturner’ recorded lower stalk length (23cm).

Cultivars having flowers with higher number of petals were ‘Arunima’, ‘Parfait’ and ‘Hemangini’ at 66, 61 and 41.33 petals per flower, respectively (Table 3). However, lowest number of petals (18 per flower) was recorded in ‘Red Gold’. Based on thorn density, i.e., number of thorns per 10 cm (decimeter) of stem, ‘St. Boniface’ had the highest number of thorns (42.67) (Table 3). ‘Summer snow’ was thornless. ‘Nimes’ and ‘Iceberg’ bore very few (6 and 8, respectively). For landscape use, cultivars with fewer thorns are preferred. With this in view, ‘Summer Snow’, ‘Iceberg’, ‘Nimes’ and ‘Neelambari’ were rated as better. Similar variation in number of thorns among cultivars has been reported by Murugesan *et al* (1991), Sundram *et al* (1996) and Singh (1995) too. ‘Gold Cup’ exhibited maximum flower vase-life (11 days) (Table 3). ‘Princess de Monaco’ and ‘Arunima’ remained fresh in tap water for only up to four days which could be due to the accumulation of reducing and non-reducing sugars at harvest of stems. Some cultivars showed slow opening of petals, while, in others, petals opened faster. Maximum number of flowers per plant (consequently, per meter square area), were recorded in

‘Summer Snow’ (367.85/m<sup>2</sup>), on par with ‘Arunima’ (340.32/m<sup>2</sup>), ‘First Edition’ (320.75/m<sup>2</sup>) and ‘Thornless Beauty’ (328.24/m<sup>2</sup>). Variation in vase-life of various rose cultivars has also been reported by Bhattacharjee (1994), Murugesan (1996) and Malhotra (1997) earlier. ‘Summer Snow’ produced flowers for longer duration (160.67 days), followed by ‘Gold Cup’ and ‘Nimes’ (137 and 135.33 days, respectively) (Table 3). However, flowering span was shortest in ‘Red Gold’ (125.33 days). ‘Summer Snow’ produced flowers in summer months too.

Cultivars showed variation in flower colour too (Table 4). It was found that thirteen cultivars, namely , ‘Banjaran’, ‘Patfait’, ‘Junior Miss’, ‘Sexy Remy’, ‘Valentine’, ‘Red Gold’, ‘Charleston’, ‘Spartan’, ‘Thornless Beauty’, ‘Show Biz’, ‘Prncess de Monaco’, ‘Nimes’, and ‘Lenturner’ belonged to the red group, while three cultivars, ‘Arunima’, ‘Bordure Vive’ and ‘Neelambari’ fell into the red-purple group. Cultivars ‘Rumba’ and ‘Gold Cup’ belonged to the yellow group. ‘First Edition’, ‘Charisma’ and ‘St Boniface’ belonged to the orange-red group while ‘Brown Velvet’, ‘Hot Cocoa’ and ‘Nordia’ belonged to the grayed-red group. ‘John John’ fell into the yellow-orange group, whereas, ‘Ahalya’ in the purple-group. The remaining cultivars were white in colour. Cultivars ‘Banjaran’, ‘Gold Cup’, ‘Brown Velvet’, ‘Valentine’, ‘Rumba’, ‘Thornless Beauty’, ‘Hot Cocoa’, ‘Charisma’, ‘Bordure Vive’ and ‘St. Boniface’ were fragrant, while, the remaining ones were non-fragrant.

Seed-set was observed in ‘Gold Cup’, ‘Junior Miss’, ‘Rumba’, ‘Charleston’, ‘Show Bizz’, ‘St. Boniface’ and ‘Neelambari’ under Punjab conditions. Rest of the cultivars did not set seed (Table 3). Singh (1995) also reported seed-set in rose cultivars under Punjab conditions.

**Based on results of the experiment, the varieties have been classified for various landscape uses as under:**

Landscape use	Major Characters	Varieties
For pots	More plant spread with less plant height; Longer flowering duration	Parfait, Sexy Remy, Valentine, Spartan, First Edition, Bordure Vive, Hemangini, Ahalya
For bedding	More number of flowers per unit area, with long flowering duration	Banjaran, Parfait, Gold Cup, Junior Miss, Brown Velvet, Sexy Remy, Valentine, Rumba, Red Gold, Charleston, Spartan, Thornless Beauty, Hot Cocoa, Show Bizz, Neelambari, Princess de Monaco, Nimes, Iceberg, Summer Snow, First Edition, Charisma, Bordure Vive, John John, Saratoga, St. Boniface, Hemangini, Arunima, Nordia, Lenturner, Ahalya
For cut-flowers	Long flower shoot (at least 35cm) and considerably long vase-life	Neelambari, Princess de Monaco, Nimes, Iceberg, Summer Snow, First Edition, Banjaran, Parfait, Gold Cup, Junior Miss, Brown Velvet, Sexy Remy, Valentine, Rumba, Red Gold, Charleston, Spartan, Thornless Beauty, Saratoga

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