

Suitability of Miniature Rose (*Rosa hybrida*) Genotypes for Ornamental Hips

Roshni Agnihotri*

Assistant Professor, Department of Horticulture,
Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur (Bihar), India.

(Corresponding author: Roshni Agnihotri*)

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ABSTRACT: Beautiful rose hips are mostly neglected in gardens but when used they exhibit an attractive range of colour and texture in garden. The miniature roses are one of the least exploited class of roses in landscaping in India. The systematic breeding work on miniature roses in India is also in a nascent stage. Thus, miniature rose genotypes were evaluated to be used for ornamental hips and among 45 genotypes, the genotype String of Pearls was miniature, short heighted (31-60 cm), showed medium glossiness on leaves with very small, pear shaped, orange coloured hips with medium length of pedicel. Genotypes The Fairy, Graine de Beaute, Mr. Blue Bird showed same characters besides having strong glossiness on upper leaf surface and red hip colour. The shapes of above genotypes were different viz., The Fairy and Graine de Beaute showed round shape, Mr. Blue Bird expressed pear shaped hips.

Keywords: Rose, Miniature, Hips, Ornamental, Gardening, Sustainable cascade roses, Landscaping.

INTRODUCTION

The rose rightly called 'Queen of flowers' is the most beautiful among all the flowers. Variety of shapes, sizes, colours and versatility has made it the queen of flowers. Flowers are used both as cut flower and loose flower for floral arrangement, hair head adornment, garlands, landscape gardening and also for making various products such as rose oil, rose water, gulkand, rose attar and rose concrete. In addition to being ornamental, rose hips attract wildlife to the garden. Many birds and small animals consume hips during the fall and winter, if available. Rose hips are edible for people too (Haynes, 2019). Rose hips are widespread in roses that have been traditionally used as medicinal compounds for the treatment of a wide variety of diseases. The therapeutic potential of these plants is based on its antioxidant effects caused by or associated with its phytochemical composition, which includes ascorbic acid, phenolic compounds and healthy fatty acids among others (Mármol *et al.*, 2017). The rose hips have also been utilised for ornamental purpose as reviewed by Patel (2017). Of the approximately 150 different species in the genus *Rosa*, there are 10 species and 70 cultivars grown specifically for the ornamental value of their hips (Annon., 2015) and approximately 11 species potentially grown for hip production, with *R. canina* and *R. dumalis* being the primary species for

commercial purposes (Uggla, 2004; Celik *et al.*, 2009; Andersson, 2009; Amante, 2016).

MATERIALS AND METHOD

The present study was carried out to study the performance of 45 miniature Rose genotypes namely Bharani, China 65, Golden Century, Frothy, Zwergkonig, Royal Midnette, Simply Marvelous, Chandrika, Flash Dance, Kayla, Sunday Brunch, Vanessa, Maigold Sweet Dream, Blue Blood, Scarlet Gem, String of pearls, Fairy Gold, Lavender Midnette, Young Mistress, Gourmet Popcorn, Giggles, Ruby Star, Wild Fire, The Fairy, Red Figurine, Aishwarya, Don Don, Lemon Sweet Dream, Rise n Shine, Swinger, Babe, Mirabel, Flamboyant, Roxy, Graine De Beaute, Cup Cake, Mr. Blue Bird, Amber Star, Fire Flash, Hoot & Howler, Leila Laird, Painter's Palette, Dazzler and Priti in Randomized Block design under open field condition at the Rose Garden, Experimental Farm of Department of Floriculture and Landscape Architecture, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh during the years 2017 and 2018. The morphometric data was measured for characters like girth of seed vessel (mm) and incidence of disease. The qualitative data like glossiness on the upper surface of leaf, plant growth type, plant height, size of seed vessel at petal fall, shape

of hips, hip colour and pedicel length was recorded as per DUS characterization manual of PPVRA, 2006.

RESULTS AND DISCUSSION

The genotypes which showed mature hip of attractive colour and shape with short pedicels on dwarf, miniature plants were selected for landscape usage for ornamental hips among all 45 genotypes.

Plant growth type is an essential pseudo qualitative characteristic which has to be observed for garden varieties. This characteristic was observed by visual assessment by a single observation of a group of plants at full bloom stage. The character was observed at first flush for both growing seasons. The data from Table of characteristics (Table 2) clearly shows that genotype Golden Century was classified as a ground cover and miniature; genotypes Bharani, China 65, Golden Century, Frothy, Zwergkonig, Royal Midnette, Simply Marvelous, Chandrika, Flash Dance, Kayla, Sunday Brunch, Vanessa, Maigold Sweet Dream, Blue Blood, Scarlet Gem, String of Pearls, Fairy Gold, Lavender Midnette, Young Mistress, Gourmet Popcorn, Giggles, Ruby Star, Wild Fire, The Fairy, Red Figurine, Aishwarya, Don Don, Lemon Sweet Dream, Rise n Shine, Swinger, Babe, Mirabel, Flamboyant, Roxy, Graine De Beaute, Cup Cake, Mr. Blue Bird, Amber Star, Fire Flash, Hoot & Howler, Leila Laird, Painter's Palette, Nine and Dazzler as miniature; Lemon Sweet Dream, Babe and Priti as dwarf; Royal Midnette, Maigold Sweet Dream and Wild Fire as climber and miniature. No genotype among the tested group was found to be bedding type or shrub type.

Plant height (cm) is an essential quantitative characteristic which has to be observed for garden varieties, the characteristic was observed by measurement of a number of individuals at full bloom stage. The character was observed at second flush for both growing seasons. The data clearly shows that genotypes which showed very short height (<30 cm) were Lemon Sweet Dream, Babe and Priti; Short genotypes (31-60 cm) were Bharani, Golden Century, Simply Marvelous, Chandrika, Flash Dance, Kayla, Sunday Brunch, Vanessa, Blue Blood, Scarlet Gem, String of pearls, Fairy Gold, Young Mistress, Giggles, Ruby Star, The Fairy, Red Figurine, Aishwarya, Swinger, Mirabel, Flamboyant, Roxy, Graine De Beaute, Cup Cake, Mr. Blue Bird, Amber Star and Fire Flash; Medium height genotypes (61-100 cm) were China 65, Frothy, Zwergkonig, Maigold Sweet Dream, Lavender Midnette, Gourmet Popcorn, Wild Fire, Don Don, Rise n Shine, Hoot & Howler, Leila Laird and Painter's Palette while Royal Midnette was found Tall (100-150 cm). No genotype among the tested group were found to be very tall (>150 cm) in height. The result is in conformity with the earlier findings of

Dadhwal (2016) in miniatures and Singh (2016) in floribunda.

Glossiness of upper side of foliage is an essential qualitative character observed by visual assessment by a single observation of a group of plant parts *i.e.* leaves. Observations on the leaves and the leaflets shall be made on the middle third of the stem at the times of first flowering. This observation was made on mature and fully expanded leaf. The perusal of data from table depicted that glossiness of upper side was absent in genotypes Bharani, China 65, Chandrika, Flash Dance, Kayla, Sunday Brunch, Blue Blood, Gourmet Popcorn, Babe, Flamboyant, Fire Flash, Leila Laird, Painter's Palette, Nine, Dazzler and Priti; genotypes Frothy, Royal Midnette, Simply Marvelous, Vanessa, Maigold Sweet Dream, Scarlet Gem, Lavender Midnette, Young Mistress, Giggles, Wild Fire, Red Figurine and Aishwarya showed weak glossiness; Medium expression of leaf glossiness was seen in genotypes Golden Century, String of pearls, Ruby Star, Don Don, Cup Cake, Amber Star, Hoot & Howler whereas, strong expression was shown by genotypes Golden Century, String of pearls, Ruby Star, Don Don, Cup Cake, Amber Star, Hoot & Howler. Glossy surface is consider better than non-glossy leaf surface in roses (Singh, 2016). The study by Singh (2016) also found large variation among the genotypes in leaf upper surface glossiness. The differences among the cultivars of above character might be due to genetic make-up of the cultivar and the study is in conformity with Gaurav *et al.* (2018).

In the present studies perusal of data presented in Table 1 revealed that during 2017, the range of size of seed vessel varied from 6.95 to 2.13 mm. Largest seed vessel size (6.95 mm) was recorded in genotype 'Wild Fire', which was found statistically at par with 'Golden Century' (6.77 mm), 'Flash Dance' (6.44 mm), 'Young Mistress' (6.43 mm), 'Don Don' (6.29 mm) and 'Lemon Sweet Dream' (6.23 mm) whereas, smallest seed vessel size was found in 'Painter's Palette' (2.13 mm) followed by 'Priti' (2.17 mm), 'Gourmet Popcorn' (2.32 mm), 'China 65' (2.73) and 'Dazzler' (2.85 mm). During 2018, the range of size of seed vessel varied from 7.05 to 2.20 mm. Largest seed vessel size (7.05 mm) was recorded in genotype 'Wild Fire', which was found statistically at par with 'Young Mistress' (6.58 mm), 'Flash Dance' (6.50 mm), whereas, smallest seed vessel size was found in 'Painter's Palette' (2.20 mm) and 'Gourmet Popcorn' (2.20 mm) followed by 'Priti' (2.38 mm), 'Dazzler' (2.48 mm) and 'China 65' (2.51 mm). On pooling the data for two years, largest seed vessel size (7 mm) was recorded in genotype 'Wild Fire', which was found statistically at par with 'Young Mistress' (6.50 mm), 'Golden Century' (6.55 mm), whereas, smallest seed vessel size was found in 'Painter's Palette' (2.17 mm) followed by 'Gourmet

Popcorn' (2.26 mm), 'Priti' (2.28 mm), 'China 65' (2.62 mm) and 'Dazzler' (2.66 mm). Seed vessel size was found non-significant in both the years as well as interaction between genotype and year.

Seed vessel size is a quantitative characteristic to be observed visually by observing a group of plant parts for garden varieties. This has to be observed at petal fall. The data represented in Table 1 depicted that very small seed vessel size was shown by genotypes Bharani, China 65, Frothy, Royal Midnette, Chandrika, Kayla, Vanessa, Blue Blood, Scarlet Gem, String of Pearls, Gourmet Popcorn, Ruby Star, The Fairy, Red Figurine, Swinger, Mirabel, Roxy, Graine De Beaute, Cup Cake, Mr. Blue Bird, Leila Laird, Painter's Palette, Dazzler and Priti while small state of expression in seed vessel size was exhibited by Golden Century, Zwergkonig, Simply Marvelous, Flash Dance, Sunday Brunch, Maigold Sweet Dream, Fairy Gold, Lavender Midnette, Young Mistress, Giggles, Wild Fire, Aishwarya, Don Don, Lemon Sweet Dream, Rise n Shine, Babe, Flamboyant, Amber Star, Fire Flash, Hoot & Howler and Nine. The expressions medium large and very large was shown by none of the genotypes studied.

Hip shape is a pseudoqualitative characteristic to be observed visually by observing a group of plant parts for garden varieties. This has to be observed on mature hips. The data represented in Table 2 depicted that the genotypes which showed funnel shaped hip is Scarlet Gem; genotypes Bharani, China 65, Golden Century, Zwergkonig, Kayla, Sunday Brunch, Lavender Midnette, Young Mistress, Ruby Star, Wild Fire, Aishwarya, Lemon Sweet Dream, Rise n Shine, Swinger, Hoot & Howler showed pitcher shaped hips. String of Pearls, Flamboyant, Mr. Blue Bird showed pear shaped hips. Genotypes Royal Midnette, Maigold Sweet Dream, The Fairy, Graine De Beaute, Dazzler, Priti showed round hips.

Hip colour is a pseudoqualitative characteristic to be observed visually by observing a group of plant parts for garden varieties (Dadhwal, 2016). This has to be observed on mature hips especially for varieties grown for hip only. Genotypes Bharani, China 65, Kayla, Maigold Sweet Dream, Scarlet Gem, String of Pearls, Wild Fire, Priti showed orange hips; The Fairy, Flamboyant, Graine De Beaute, Mr. Blue Bird and Dazzler showed red hips; genotypes Golden Century, Zwergkonig, Sunday Brunch, Lavender Midnette,

Young Mistress, Ruby Star, Aishwarya, Lemon Sweet Dream, Rise n Shine, Swinger and Hoot & Howler showed brown hips, while Royal Midnette showed purple hips. The differences of hip colour in cultivars might be due to genetic make up of the cultivar which is in conformity with the findings of Singh (2016); Dadlani (2016).

Length of pedicels is an essential characteristic to be measured by observing a group of plant parts for garden varieties. The data depicted that short pedicels were recorded in genotypes China 65, Golden Century, Maigold Sweet Dream, Blue Blood, Fairy Gold, Young Mistress, Gourmet Popcorn, Ruby Star, Rise n Shine, Swinger, Babe, Flamboyant and Priti; medium length of pedicel was found in Bharani, Frothy, Zwergkonig, Royal Midnette, Simply Marvelous, Chandrika, Kayla, Sunday Brunch, Vanessa, Scarlet Gem, String of Pearls, Lavender Midnette, Giggles, Wild Fire, The Fairy, Red Figurine, Aishwarya, Don Don, Mirabel, Roxy, Graine De Beaute, Mr. Blue Bird, Amber Star, Fire Flash, Hoot & Howler, Painter's Palette and Dazzler. Genotypes Flash Dance, Lemon Sweet Dream, Cup Cake, Leila Laird, Nine exhibited long pedicels. Singh (2016) also observed that the pedicel length varied significantly among the floribunda varieties. In miniature roses the shorter the pedicel length the fuller the flower bunch will look. Thus, short pedicel length is preferred in miniatures. The differences in the pedicel length might be due to varietal characteristics of the cultivars.

A part of the rose plant that is often overlooked is the fruit or hips. Hips of a rose can be incredibly attractive. Rose hips mature in late summer or early fall and can be burgundy, scarlet-red, orange, or golden-yellow. Among 45 genotypes Genotype String of Pearls was miniature, short heighted (31-60 cm), showed medium glossiness on leaves with very small, pear shaped, orange coloured hips with medium length of pedicel. Genotypes The Fairy, Graine de Beaute, Mr. Blue Bird showed same characters besides being strong glossiness on upper leaf surface and red hip colour. The shapes of above genotypes were different *viz.*, The Fairy and Graine de Beaute showed round shape; Mr. Blue Bird expressed pear shaped hips. Thus, these genotypes besides their flori-ferousness and flowering characters can well be recommended for use as genotypes for ornamental hips.

Table 1: Size of seed vessel (mm) of different miniature rose genotypes.

Sr. No.	Variety	2017	2018	Pooled
1.	Bharani	3.55	3.35	3.45
2.	China 65	2.73	2.51	2.62
3.	Golden Century	6.77	6.32	6.55
4.	Frothy	3.93	3.65	3.79
5.	Zwergkonig	5.17	5.18	5.17
6.	Royal Midnette	4.71	4.87	4.79
7.	Simply Marvelous	5.63	5.29	5.46
8.	Chandrika	3.50	3.76	3.63
9.	Flash Dance	6.44	6.50	6.47
10.	Kayla	3.37	3.46	3.42
11.	Sunday Brunch	5.75	5.55	5.65
12.	Vanessa	3.70	3.33	3.51
13.	Maigold Sweet Dream	5.34	5.27	5.31
14.	Blue Blood	4.38	4.28	4.33
15.	Scarlet Gem	4.09	4.31	4.20
16.	String of pearls	3.90	3.36	3.63
17.	Fairy Gold	5.43	5.23	5.33
18.	Lavender Midnette	5.58	5.35	5.46
19.	Young Mistress	6.43	6.58	6.50
20.	Gourmet Popcorn	2.32	2.20	2.26
21.	Giggles	5.59	5.31	5.45
22.	Ruby Star	4.99	4.75	4.87
23.	Wild Fire	6.95	7.05	7.00
24.	The Fairy	3.62	3.28	3.45
25.	Red Figurine	3.85	3.60	3.73
26.	Aishwarya	5.93	5.44	5.69
27.	Don Don	6.29	5.90	6.10
28.	Lemon Sweet Dream	6.23	6.17	6.20
29.	Rise n Shine	5.43	5.23	5.33
30.	Swinger	3.36	3.22	3.29
31.	Babe	5.62	5.33	5.47
32.	Mirabel	4.12	4.22	4.17
33.	Flamboyant	5.36	5.47	5.42
34.	Roxy	3.19	4.04	3.62
35.	Graine De Beaute	3.64	3.57	3.61
36.	Cup Cake	4.73	4.56	4.65
37.	Mr. Blue Bird	4.59	4.47	4.53
38.	Amber Star	5.36	5.29	5.32
39.	Fire Flash	5.42	5.39	5.41
40.	Hoot & Howler	5.05	5.15	5.10
41.	Leila Laird	4.19	4.37	4.28
42.	Painter's Palette	2.13	2.20	2.17
43.	Nine	5.28	5.47	5.38
44.	Dazzler	2.85	2.48	2.66
45.	Priti	2.17	2.38	2.28
	Mean	4.64	4.55	Year: NS Genotype: 0.52 G × Y: NS
	CD _{0.5}	0.80	0.66	

Table 2: Table of characteristics depicting suitability of miniature rose genotypes for usage as ornamental hip plants.

Sr. No	Observed on:-	Plants		Leaf	Mature Hips			
	Variety	Growth type	Plant height (2nd flush)	Glossiness on upper side	Seed vessel Size	Shape	Hip colour	Length of pedicel
1.	Bharani	Miniature	Short (31-60 cm)	Absent	Very small	Pitcher shaped	Orange	Medium
2.	China 65	Miniature	Medium (61-100 cm)	Absent	Very small	Pitcher shaped	Orange	Short
3.	Golden Century	Ground Cover, Climber, Miniature	Short (31-60 cm)	Medium	Small	Pitcher shaped	Brown	Short
4.	Frothy	Miniature	Medium (61-100 cm)	Weak	Very small	-	-	Medium
5.	Zwergkonig	Miniature	Medium (61-100 cm)	Strong	Small	Pitcher shaped	Brown	Medium
6.	Royal Midnette	Miniature, Climber	Tall (>100 cm)	Weak	Very small	Pitcher shaped	Rougue	Medium
7.	Simply Marvelous	Miniature	Short (31-60 cm)	Weak	Small	-	-	Medium
8.	Chandrika	Miniature	Short (31-60 cm)	Absent	Very small	-	-	Medium
9.	Flash Dance	Miniature	Short (31-60 cm)	Absent	Small	-	-	Long
10.	Kayla	Miniature	Short (31-60 cm)	Absent	Very small	Pitcher shaped	Orange	Medium
11.	Sunday Brunch	Miniature	Short (31-60 cm)	Absent	Small	Pitcher shaped	Brown	Medium
12.	Vanessa	Miniature	Short (31-60 cm)	Weak	Very small	-	-	Medium
13.	Maigold Sweet Dream	Miniature, Climber	Medium (61-100 cm)	Weak	Small	Round	Orange	Short
14.	Blue Blood	Miniature	Short (31-60 cm)	Absent	Very small	-	-	Short
15.	Scarlet Gem	Miniature	Short (31-60 cm)	Weak	Very small	Funnel shaped	Orange	Medium
16.	String of pearls	Miniature	Short (31-60 cm)	Medium	Very small	Pear shaped	Orange	Medium
17.	Fairy Gold	Miniature	Short (31-60 cm)	Strong	Small	-	-	Short
18.	Lavender Midnette	Miniature	Medium (61-100 cm)	Weak	Small	Pitcher shaped	Brown	Medium
19.	Young Mistress	Miniature	Short (31-60 cm)	Weak	Small	Pitcher shaped	Brown	Short
20.	Gourmet Popcorn	Miniature	Medium (61-100 cm)	Absent	Very small	-	-	Short
21.	Giggles	Miniature	Short (31-60 cm)	Weak	Small	-	-	Medium
22.	Ruby Star	Miniature	Short (31-60 cm)	Medium	Very small	Pitcher shaped	Brown	Short
23.	Wild Fire	Miniature, 6	Medium (61-100 cm)	Weak	Small	Pitcher shaped	Orange	Medium
24.	The Fairy	Miniature	Short (31-60 cm)	Strong	Very small	Round	Red	Medium
25.	Red Figurine	Miniature	Short (31-60 cm)	Weak	Very small	-	-	Medium
26.	Aishwarya	Miniature	Short (31-60 cm)	Weak	Small	Pitcher shaped	Brown	Medium
27.	Don Don	Miniature	Medium (61-100 cm)	Medium	Small	-	-	Medium
28.	Lemon Sweet Dream	Miniature	Very Short (<30cm)	Strong	Small	Pitcher shaped	Brown	Long
29.	Rise n Shine	Miniature	Medium (61-100 cm)	Strong	Small	Pitcher shaped	Brown	Short
30.	Swinger	Miniature	Short (31-60 cm)	Strong	Very small	Pitcher shaped	Brown	Short
31.	Babe	Miniature	Very Short (<30cm)	Absent	Small	-	-	Short
32.	Mirabel	Miniature	Short (31-60 cm)	Strong	Very small	-	-	Medium
33.	Flamboyant	Miniature	Short (31-60 cm)	Absent	Small	Pear shaped	Red	Short
34.	Roxy	Miniature	Short (31-60 cm)	Strong	Very small	-	-	Medium
35.	Graine De Beaute	Miniature	Short (31-60 cm)	Strong	Very small	Round	Red	Medium
36.	Cup Cake	Miniature	Short (31-60 cm)	Medium	Very small	-	-	Long
37.	Mr. Blue Bird	Miniature	Short (31-60 cm)	Strong	Very small	Pear shaped	Red	Medium
38.	Amber Star	Miniature	Short (31-60 cm)	Medium	Small	-	-	Medium
39.	Fire Flash	Miniature	Short (31-60 cm)	Absent	Small	-	-	Medium
40.	Hoot & Howler	Miniature	Medium (61-100 cm)	Medium	Small	Pitcher shaped	Brown	Medium
41.	Leila Laird	Miniature	Medium (61-100 cm)	Absent	Very small	-	-	Long
42.	Painter's Palette	Miniature	Medium (61-100 cm)	Absent	Very small	-	-	Medium
43.	Nine	Miniature	Short (31-60 cm)	Absent	Small	-	-	Long
44.	Dazzler	Miniature	Short (31-60 cm)	Absent	Very small	Round	Red	Medium
45.	Priti	Miniature	Very Short (<30cm)	Absent	Very small	Round	Orange	Short

CONCLUSION

A part of the rose plant that is often overlooked is the fruit or hips. Hips of a rose can be incredibly attractive. Rose hips mature in late summer or early fall and can be burgundy, scarlet-red, orange, or golden-yellow. Among 45 genotypes Genotype String of Pearls was miniature, short heighted (31-60 cm), showed medium glossiness on leaves with very small, pear shaped, orange coloured hips with medium length of pedicel. Genotypes The Fairy, Graine de Beaute, Mr. Blue Bird showed same characters besides being strong glossiness on upper leaf surface and red hip colour. The shapes of above genotypes were different viz., The Fairy and Graine de Beaute showed round shape; Mr. Blue Bird expressed pear shaped hips. Thus, these genotypes besides their flori-ferousness and flowering characters can well be recommended for use as genotypes for ornamental hips. Overall, this study's characterization of basic traits of forty-five genotypes provides a glimpse of their potential. Having not been well studied previously, there is now evidence to suggest that further study is warranted and that these genotypes may be more useful to the rose breeders.

FUTURE SCOPE

Based on the results described here, further research is warranted on all the species roses too suitable for ornamental hips needs to be studied. Due to the high variability in observations, new trials should be evaluated for multiple seasons. Specifically, a variety of genotypes of each species should be grown in controlled trials. Longer trials would also help to evaluate climatic and environmental stress factors on production and fruit quality; important for any perennial crop.

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