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Varietal evaluation of miniature rose cultivars under the plains of West Bengal, India

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Abstract

The present research work entitled “Varietal Evaluation of miniature Rose cultivars under the plains of West Bengal, India”. The Experiment was laid out in completely Randomized Design with 10 cultivars at Mondouri horticulture research station, Bidhan Chandra Krishi Vishwavidyalaya, Nadia, WB. Studies revealed that cultivar Sweet Chariot (T₈) recorded highest number of primary branches (4.02), and maximum secondary shoots were observed in Red Flush (T₂) (8.27). The cultivar Red Flush (T₂) registered maximum plant spread [E-W spread- (24.62) and N-S spread- (19.82)], minimum days for FBE (Flower Bud Emergence) recorded by Cindy (T₁) with (7.08 days). Maximum number of days to retain its flower freshness, highest number of flowers per plant and maximum number of flower bunches per plant was observed in Red Flush (T₂) with 7.33 days, 24.39 and 5.53 respectively.

Keywords: Miniature rose, growth, flower bunches, plant spread

Introduction

Rose, genus *Rosa* and family Rosaceae, is one of the nature’s beautiful creations. More than 2500 years ago, the poetess Sappho addressed the roses as “Queen of flowers”. Roses are prized for pleasure and delight associated with their elegant flower shape, colour and beauty. The fruits (hips) are rich source of vitamin C. According to American Rose Society miniature rose are of 3 types micro-mini rose is the smallest class which only reach 12 –14 inches in height and the bloom is the size is very small when fully opened and can be grown in a flowerpot. Large miniature rose, in this roses are little bigger than the Micro- Mini roses, can get 2-3 feet high and its blooms are 1 –2 inches across. Another is mini flora which is relatively new class of rose due to its size. Plants can reach 3 –4 feet in height and blooms can be 3 inches across. It got its name because it is bigger than a miniature and not as big as a Floribunda. The attractive and brilliantly colored flowers are the most valuable economic part of the plant, used for religious offerings, exhibitions, interior and outdoor decorations etc.

Materials and methods

The experimental site was located at Horticultural Research station, Mondouri, Faculty of Horticulture, Bidhan Chandra Krishi Vishwavidyalaya, Nadia, West Bengal. The site of experiment was situated at 23.5° N latitude and 89°E longitude and at the elevation of 9.75 meters from mean sea level. The materials utilized for the present study consisted of 10 cultivars of miniature roses as treatments in Pot of 10 inches in open field condition (T₁- Cindy, T₂- Red Flush, T₃- Royal Baby, T₄- Sassy Lassie, T₅- Rise & Shine, T₆- Rosy, T₇- Gipsy Jewel, T₈- Sweet Chariot, T₉- Incognito and T₁₀- Glory of Jukpur). The healthy budded plants of miniature rose cultivars were purchased from Pusanjali Nursery, Jakpur, Paschim Medinipur, West Bengal and planted on 10th September 2017. The experiment was laid out in completely randomized design with 10 treatments and 3 replications. Potting media contain soil and vermicompost in 3:1 by volume basis. In addition to this 25 g of bone meal per pot was added and thoroughly mix. The plants were sprayed with Sujala (19:19:19) @ 15 g/l of water at 7 days interval starting from potting till February 2018. Mustard Cake applied per pot with 250 ml at 60 days interval from September 2017 till March 2018. Also Bio-stimulant such as Moringa leaf extracts was sprayed at 15 days interval from October 2017 till December 2017. Observation were recorded on vegetative, flowering and biochemical parameters of miniature Rose cultivars. Correlation study was done on the basis of the characters taken respectively. The level of significance used was p=0.05, where significant difference was observed, standard error mean (SEM ±) was calculated together with critical difference (CD at 5%).

Results and Discussion

Vegetative parameters

Plant height (cm)

Plant height of the tagged plants were measured at peak flowering. Plant height ranges from 19.50 to 25.95cm. The cultivar Royal Baby (T₃) registered the maximum plant height (25.95cm) while cultivar Sassy Lassie (T₄) recorded minimum plant height (19.50cm). The cultivars Rosy (T₆), Gipsy Jewel (T₇) and Red Flush (T₂) were at par in terms of plant height. The significant variations in plant height among rose cultivars were also reported by Singh *et.al.*, (2013) ^[13] in Floribunda Rose and Mohanty *et.al.*, (2011) ^[8] in Hybrid Tea Roses. The variation may be attributed to the genetic variability of the cultivar. According to Sharova *et.al.* (1977) ^[12], increase in plant height could be due to rapid meristematic activity, probably due to rapid cell division and elongation during the tender growth stage.

Primary and secondary branches

The total numbers of primary and secondary shoots produced per plant in each treatment were counted at the onset of flowering and recorded separately. Cultivar Sweet Chariot (T₈) recorded highest number of primary branches (4.02) whereas Incognito (T₉) registered the lowest number of primary branches per plant (3.10). Cultivar Red Flush (T₂) produced highest number of secondary branches per plant with (8.27) followed by Cindy (T₁) and Glory of Jukpur (T₁₀) with 7.67 and 6.83 respectively, while cultivar Incognito(T₉) registered lowest number of secondary branches per plant (4.87). The variation in primary shoots number was noted by Nadeem *et.al.*, (2011) ^[9] in cv. 'Gruss-an-Tepliz' and in cv. 'Casino' by Rao *et.al.* (2011) ^[11], this might be due to either variation in genetic constitution or environmental factor.

Plant spread (cm²)

The average spread of the plant canopy (East-West and North-South) was measured at 60 days interval after potting and recorded in centimeter. The presented data revealed the significant difference in plant spread (East-West and North-South), the cultivar Red Flush (T₂) registered maximum plant spread [E-W spread- (24.62) and N-S spread- (19.82)]. However, cultivar Incognito (T₉) was recorded minimum plant spread [E-W spread- (18.75) and N-S spread- (15.90)]. The increase in plant spread was found due to increase in number of branches in Chrysanthemum supported by the study done by Kulkarni and Reddy, (2004) ^[7].

Individual leaf area (cm²)

Area of 10 leaves from each pot per treatment was measured using leaf area meter (LICOR 10 Model). Leaves were collected from the top, middle and bottom portion of the tagged plants. The average value of the leaf area was expressed in square centimeter (cm²). In the average data, cultivar Royal Baby (T₃) recorded highest individual leaf area (13.90cm²), followed by Gipsy Jewel (T₇) and Sweet Chariot (T₈) with 13.20 and 13.00cm² respectively. However, cultivar Incognito (T₉) recorded lowest individual leaf area (9.26cm²). Increase in leaf area could be due to presence of inherent genetic factors responsible for production of higher growth hormones and greater number of photosynthetically active leaves per plant (Janki, 2013) ^[5].

Flowering parameters

Days required to flower bud emergence (FBE)

Numbers of days were counted when flower buds were visible with naked eyes in the tagged plants from planting. The perusal of data revealed that the cultivars showed significant differences on days taken for Flower bud emergences after planting. The cultivar Cindy (T₁) (7.08 days) reported minimum days for FBE, closely followed by Glory of Jukpur (T₁₀) (7.25 days), while cultivar Incognito (T₉) recorded maximum number of days (13.01 days) for flower bud emergences.

Days to bud colour stage (BCS)

Days required for buds to attain colour after FBE was counted and recorded separately. From the data, days to attain colour after FBE were in the ranges from 6.5 to 8.5 days. The cultivar Glory of Jukpur (T₁₀) took fewer days (6.58 days), nearly followed by Incognito (T₉) (6.67 days) and Cindy (T₁) with 7.08. However readings failed to reflect prominent variation. Similar findings were observed by Bhattacharjee *et. al.*, (1993) ^[1] and Fascella and Zizzo, (2007) ^[3] in rose.

Days to full bloom (FB)

The data was recorded by counting the number of days required for the buds to reach full bloom stage after the buds attain colour. The cultivar Glory of Jukpur (T₁₀) was earliest to attain FB (3.27 days), closely followed by Red Flush (T₂) (3.40 days) and Incognito (T₉) (3.75 days). Maximum number of days to reach FB was registered by cultivar Cindy (T₁) (5.47 days) followed by Rise & Shine (T₅) (5.00 days).

Days to senescence from FB

The observation was made by counting the number of days the flower retained its freshness from the full bloom stage. This stage was identified when the center of the flower was fully opened. From the analysis of data, cultivar Sweet Chariot (T₈) exhibited early senescence (3.92) followed by Gipsy Jewel (T₇) (4.32 days) and Incognito (T₉) (5.25 days). The cultivar Red Flush (T₂) recorded maximum number of days to maintain its freshness with 7.33 days followed by Rise & Shine (T₅) (6.50 days). Variation among the cultivars was due to temperature fluctuation in the month of February (6-9 Mean Standard weeks). Thakur and Kumar, (2018) ^[14] reported that phenophase development of the plant is affected by environment and development of phonological stage is an important component of crop weather relationship studies in damask rose.

Flowering duration (days)

The observation was recorded by counting the number of days the plant remained in bloom. (i.e. from the onset of flowering through the peak period till decline. Significant variation in flowering duration was reflected among the different cultivars of miniature Rose in the course of study. The data showed the flowering duration ranges from 18.11days to 24.33 days. The cultivar Red Flush (T₂) registered maximum number of days of flowering (24.33 days), whereas duration was lowest (18.11 days) in cv. Incognito (T₉). Gaikwad and Patil, (2001) ^[4] in chrysanthemum and Pal *et al.* (2003) ^[10] in Gerbera were reported that the variation for the duration of flowering among the cultivars could be attributed to differences in genetic make-up of the plant.

Number of flowers per plant

Number of flowers in each of the tagged plants was counted firstly at 30 days interval from planting than 20 days interval from the first data and the observation summed up to get the total number of flowers produced by each plant at the end of 4 months. The cultivar attained level of significance among themselves in terms of number of flowers per plant. The cultivar Red Flush (T₂) recorded maximum number of flower per plant with 24.39, closely followed by two cultivars Glory of Jukpur (T₁₀) and Rise & Shine (T₅) (20.50 and 18.21 respectively). The cultivar Incognito (T₉) registered minimum number of flower per plant with 9.11 followed by Gipsy Jewel (T₇) (9.56). Janaki, (2013) [5] reported the positive influence of favorable climatic condition to the yield of plants. The flower yield per plant produced by these cultivars could be at the expense of further leaf area development i.e., source-sink relationship.

Flower diameter (cm)

Diameter of the flower was taken at full bloom stage, by measuring the mid portion of the flower and average recorded. From the data it has been found that the flower diameter of cultivars was in the range of 4.32cm to 2.60. The cultivar Glory of Jukpur (T₁₀) registered lowest flower diameter with 2.60cm, closely followed by Red Flush (T₂) and Sweet Chariot (T₈) (2.82 and 3.21cm respectively). Cultivar Gipsy Jewel (T₇) recorded highest flower diameter

(4.32cm), followed by Rise & Shine (T₅) with 4.11cm. Probably variation in flower diameter might be due to variation in the genetic makeup of varieties (Joshna, 2016) [6].

Number of flower bunch per plant

The data was recorded by counting number of flowers bunches from tagged plants per treatment from the peak flowering period at the interval of 15 days. The cultivar Red Flush (T₂) registered highest number of flower bunches per plant with 5.53, closely followed by Glory of Jukpur (T₁₀) and Sweet Chariot (T₈) (4.27 and 3.87 respectively). Cultivars Incognito (T₉), Rosy (T₆), Gipsy Jewel (T₇) were recorded the least number of flower bunches per plant (range 0.03 to 0.50) during the course of study. The variation may be attributed by the genetic variability.

Anthocyanin content of fresh flowers (mg/100g of petals)

Anthocyanin content of the flowers was recorded from the freshly harvested flower petals. The cultivar Sweet Chariot (T₈) registered highest anthocyanin content (69.93mg/100g), closely followed by Gipsy Jewel (T₇) with 61.00mg/100g. Among the miniature Rose cultivars, Rise & Shine (T₅) and Glory of Jukpur (T₁₀) recorded least anthocyanin content (3.70 and 5.49mg/100g respectively). Colour of petals is intrinsic factor depends on genetic makeup and affected by external factors like Temp.

Table 1: Performance of miniature Rose cultivars on Vegetative parameters

Treatment	Plant Height (cm)	Number of branches/plant		Plant Spread (cm)		Individual Leaf area (cm ²)
		Primary	Secondary	East-West	North-South	
T ₁ Cindy	22.22	3.81	7.67	23.63	18.93	10.80
T ₂ Red Flush	24.41	3.67	8.27	24.62	19.82	12.80
T ₃ Royal Baby	25.95	3.42	5.86	20.82	16.66	13.90
T ₄ Sassy Lassie	19.95	3.72	5.59	21.43	17.87	11.50
T ₅ Rise & Shine	23.88	3.60	6.25	23.04	19.35	11.80
T ₆ Rosy	24.62	3.78	5.72	23.53	17.18	10.20
T ₇ Gipsy Jewel	24.65	3.58	5.15	22.72	18.05	13.20
T ₈ Sweet Chariot	20.50	4.02	6.27	17.28	12.93	13.00
T ₉ Incognito	21.98	3.10	4.87	18.75	15.90	9.26
T ₁₀ Glory of Jukpur	21.08	3.76	6.83	23.09	17.10	10.58
S.Em (±)	1.24	0.31	0.62	1.497	0.892	0.33
CD at 5%	3.67	1.00	2.02	4.356	2.861	0.95

Table 2: Performance of miniature rose cultivars on flowering parameters

Treatment	Flower bud emergence in days (FBE) From planting	FBE to bud colour stage (BCS) (Days)	BCS to full bloom stage (FB) (Days)	FB to Senescence (Days)	Flowering duration (days)	Number of flowers per plant	Flower diameter	Anthocyanin content	No of flower bunches per plant
T ₁ Cindy	7.08	7.08	5.47	6.17	22.11	16.42	3.49	40.05	1.20
T ₂ Red Flush	7.83	7.30	3.40	7.33	24.33	24.39	2.82	37.00	5.53
T ₃ Royal Baby	10.8	7.33	4.50	5.75	21.92	13.48	3.60	23.42	1.67
T ₄ Sassy Lassie	7.75	7.50	4.50	6.33	19.81	12.50	3.55	33.94	0.68
T ₅ Rise & Shine	8.75	7.83	5.00	6.50	20.44	18.21	4.11	3.70	0.50
T ₆ Rosy	8.50	8.50	4.83	5.83	19.11	10.88	3.65	50.58	0.65
T ₇ Gipsy Jewel	8.25	8.08	4.33	4.32	20.22	9.56	4.32	61.10	0.35
T ₈ Sweet Chariot	8.17	7.17	4.17	3.92	20.89	12.73	3.21	69.93	3.87
T ₉ Incognito	13.0	6.67	3.75	5.25	18.11	9.11	3.45	16.46	0.03
T ₁₀ Glory of Jukpur	7.25	6.58	3.27	5.58	22.88	20.50	2.60	5.49	4.27
S.Em (±)	0.52	0.35	0.4	0.43	0.47	0.36	0.19	2.043	0.37
CD at 5%	1.54	1.05	1.18	1.26	1.41	1.06	0.57	6.907	0.78

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