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Evaluation of rose (*Rosa hybrida* L.) varieties for growth, yield and quality under eastern dry zone of Karnataka

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Abstract

A field experiment to evaluate twenty five Hybrid Tea rose varieties was conducted at an experimental field of Department of Floriculture and Landscape Architecture, College of Horticulture, Bengaluru from October 2017 to March 2018. Results revealed that there was significant variations among the varieties for growth, flowering and yield characters. Among the varieties, maximum plant height (118.50 cm) was recorded in var. Claire Chazal. The maximum stem girth, chlorophyll content and individual leaf area were recorded in var. Claire Chazal (10.60 mm, 58.90 SPAD value and 25.07 cm², respectively). Among the varieties, var. Chantre took least number of days for bud initiation, days from bud initiation to tight bud stage and days from bud initiation to full bloom stage (36.00, 13.20 and 15.00 days, respectively). Maximum number of cut flowers per plant and per m² (20.00 and 83.00, respectively) were recorded in var. Cherry Parfait. Maximum stalk length (55.40 cm) was obtained in var. Claire Chazal. Among the varieties, the maximum vase life (11.50 days,) was recorded in var. Eterna.

Keywords: evaluation, rose, hybrid teas

Introduction

The cut flower is an important floriculture product, among all the cut flowers, rose ranks first in the International flower market. It is one of the nature's beautiful creations and is universally known as "Queen of Flowers". The *Rosa* genus belongs to the family Rosaceae with chromosome number $2n = 4x = 28$. The first modern roses were the Hybrid Tea roses, which were derived from crosses between Hybrid Perpetual and Tea roses (Marriott, 2003) [1] and thus contained genes from *R. damascena*, *R. moschata*, *R. chinensis*, *R. gigantea*, and *R. gallica*. Hybrid Tea roses are grown specifically by commercial flower growers for the cut-flower market and they are also used for landscaping.

The majority of cut flower roses are grown in climate-controlled polyhouses where temperature, moisture and light can be adjusted to produce flowers at periods of peak demand. Some varieties of roses are successfully grown in our country under open conditions for cut flower and loose flower purposes. However, a limited research work is done to know the performance of outdoor rose varieties. The cultivation of rose under open condition is gaining importance in Karnataka due to its relative ease in cultivation, high returns, increasing market demand and high communication facilities. So far, the research work done on the evaluation of rose cultivars to find out their suitability to this tract is meagre. Considering the importance and popularity of rose flowers both in domestic as well as International markets, it is important to study the performance of Hybrid Tea group of rose varieties and also to test the new hybrids for their performance in eastern dry zone of Karnataka.

Material and Methods

The study was carried out in the experimental field of Department of Floriculture and Landscape Architecture, College of Horticulture, Bengaluru, during the year 2017- 18 in Randomized Complete Block Design involving 25 varieties of rose with two replications. The varieties which were included, viz., Anika, Acapella, Auguste Renoir, Abhishek, A Modi Rose, Bora Bora, Chantre, Claire Chazal, Chitraranjini, Cherry Parfait, Double Delight, Eddy Mitchell, F. F. Renaissance, Fragrant Plum, Eterna, Julio Iglesias, Mohana, Moonstone, Maurice Utrillo, Prescilla, Rose Rhapsody, Shi Un, Scandia, Tata Centenary and Temptress were planted at a spacing of 60 cm x 60 cm on 20th of October 2017. The crop was raised by following standard cultural practices (Anon, 2017) [1]. The data was recorded on plant height (cm), stem girth, chlorophyll content, individual leaf area, days to bud initiation, days from

bud initiation to tight bud stage, days from initiation to full bloom stage, number of cut flowers per plant, number of cut flowers per m², stalk length and vase life.

Results and Discussion

Plant height varied significantly among the varieties at 150 days after planting (Table 1). The maximum plant height was observed in the var. 'Claire Chazal' (118.50 cm) and was significantly superior when compared with all other varieties. The minimum plant height (47.00 cm) was recorded in the var. 'Tata Centenary'. Variations for plant height is a varietal character (Kanamadi and Patil, 1993 and Behera *et al.* 2002)^[8, 2] and higher chlorophyll content of leaves might have increased the synthesis of carbohydrates, amino acids *etc.*, from which phytohormones such as auxins, gibberellins and cytokinins have been synthesized resulting in increased plant height (Maynard and David, 1987)^[12].

Stem girth was significantly highest in var. 'Claire Chazal' (1.06 cm) followed by var. 'Chitraranjini' (0.98 cm). The minimum stem girth was recorded in var. 'Tata Centenary' (0.52 cm). Variation in stem girth is often a varietal character, rather than a significant of poor culture (Thomson and Wilson, 1957). The maximum chlorophyll content was recorded in var. 'Claire Chazal' (58.90) and was significantly superior when compared with all other varieties. However, it was minimum in var. 'Double Delight' (41.24). Leaves are the functioning units for photosynthesis particularly the chlorophyll content of leaf which influences the growth. The leaf chlorophyll content is a genetic character that differs according to varieties. Variation in chlorophyll content was also observed previously in rose. The maximum individual leaf area (25.07 cm²) was recorded in var. 'Claire Chazal' at 150 days after planting. However, it was minimum in var. 'Tata Centenary' (6.77 cm²) at 150 days after planting.

Table 1: Vegetative parameters of different varieties of Hybrid Tea rose

Variety	Plant height (cm) at 150 DAP	Stem girth (mm)	Chlorophyll content (SPAD values)	Individual leaf area (cm ²) at 150 DAP
Anika	77.25	8.05	45.05	22.97
Acapella	78.00	7.90	54.82	16.98
Auguste Renoir	77.25	5.80	48.36	10.11
Abhishek	56.38	6.60	46.93	9.88
A Modi Rose	75.50	5.70	44.23	12.01
Bora Bora	60.00	5.95	51.49	10.15
Chantre	86.50	7.75	52.27	10.22
Claire Chazal	118.50	10.63	58.90	25.07
Chitraranjini	96.75	9.80	54.69	24.82
Cherry Parfait	57.00	7.35	47.74	11.44
Double Delight	61.25	6.90	41.24	18.55
Eddy Mitchell	48.50	5.73	45.76	9.48
F. F. Renaissance	84.50	6.80	45.89	10.52
Fragrant Plum	78.50	8.80	50.75	18.16
Eterna	63.00	7.30	51.24	18.54
Julio Iglesias	57.25	7.70	52.67	12.54
Mohana	65.25	6.85	51.52	17.44
Moonstone	52.75	6.70	48.51	20.35
Maurice Utrillo	62.00	7.65	50.29	19.15
Prescilla	90.50	7.70	47.78	14.88
Rose Rhapsody	95.75	9.30	48.91	22.21
Shi Un	74.75	8.58	47.14	16.52
Scandia	93.50	8.05	49.70	19.31
Tata Centenary	47.00	5.15	42.75	6.77
Tempress	66.50	7.60	50.29	14.90
S. E. m±	3.12	0.02	1.82	0.58
CD at 5%	9.12	0.06	2.14	1.71

Bud initiation was earliest (36.00 days) in var. 'Chantre' and it was late (45.50 days) in var. 'Maurice Utrillo'. This could be because of varietal characters. Similar findings were observed by Bhattacharjee *et al.* (1993)^[5] and Fascella and Zizzo (2007)^[7]. Minimum number of days from bud initiation to tight bud stage (13.20 days) was recorded in var. 'Chantre'. However, maximum number of days from bud initiation to tight bud stage (18.50 days) was observed in the var. 'Cherry Parfait'. Flowers possessing a slow and uniform mode of opening have better consumer acceptance on account of their longer vase life and fresh appearance. The variation could be

because of varietal characters. Similar results were obtained by Bhattacharjee *et al.* (1993)^[5], Nagaraja (1996)^[15] and Manjula (2005)^[10] in rose. Among the varieties var. 'Chantre' took less number of days (15.00 days) to bloom. Whereas var. 'Cherry Parfait' took maximum days (23.40) for bud to bloom. Similar variation with respect to time taken from bud initiation to full bloom stage was reported by Chandrashekaraiah (1973)^[6] in rose. The variation among the varieties for different flowering characters may be due to differences in the inherent make up of these varieties.

Table 2: Flowering parameters and yield parameters of different varieties of Hybrid Tea rose

Variety	Days to bud initiation	Days from bud initiation to tight bud stage	Days from bud initiation to full bloom stage	No. of cut flowers per plant	No. of cut flowers per m ²	Stalk length (cm)	Stalk girth (mm)	Vase life (days)
Anika	39.50	14.20	17.10	12.25	49.00	31.55	5.20	8.50
Acapella	42.00	13.90	17.40	14.00	56.00	29.75	5.40	9.50
Auguste Renoir	40.50	15.20	21.30	13.00	52.00	29.05	5.10	5.50
Abhishek	38.25	14.40	17.40	12.25	49.00	20.45	4.85	5.50
A Modi Rose	40.25	14.10	17.60	13.50	54.00	23.35	5.20	7.50
Bora Bora	44.25	14.80	17.20	15.00	62.00	28.90	5.20	8.50
Chantre	36.00	12.80	15.00	11.75	47.00	29.80	5.15	2.00
Claire Chazal	41.00	15.30	18.90	12.00	48.00	55.40	5.00	8.50
Chitraranjini	41.50	13.90	17.50	12.50	51.00	42.60	5.10	8.00
Cherry Parfait	39.50	18.50	23.40	20.00	83.00	29.55	5.10	8.50
Double Delight	41.50	14.80	18.40	12.50	50.00	31.00	5.10	5.50
Eddy Mitchell	37.25	15.30	19.00	13.50	52.00	26.75	5.00	6.50
F. F. Renaissance	36.50	16.20	19.90	11.75	51.00	30.25	5.35	7.50
Fragrant Plum	38.75	13.20	16.40	14.50	58.00	37.75	5.40	9.00
Eterna	36.25	15.80	20.50	17.25	69.00	35.15	5.60	11.50
Julio Iglesias	40.50	13.60	18.60	12.25	50.00	37.65	4.80	8.50
Mohana	41.00	16.70	20.70	13.25	53.00	41.80	5.40	8.50
Moonstone	39.25	16.40	20.80	18.00	72.00	31.50	5.00	8.50
Maurice Utrillo	45.50	18.10	21.30	12.75	51.00	34.35	5.00	8.50
Prescilla	40.00	13.90	16.60	11.25	45.00	27.80	5.00	5.50
Rose Rhapsody	41.75	14.50	19.70	13.00	52.00	33.50	5.15	7.50
Shi Un	40.50	16.10	19.10	17.50	72.00	29.65	5.20	8.50
Scandia	39.50	17.00	18.60	14.50	58.00	28.30	4.80	8.50
Tata Centenary	40.50	16.60	19.20	14.00	57.00	20.20	4.00	5.50
Temptress	39.25	17.00	20.90	15.00	60.00	28.88	5.20	8.50
S. E. m±	0.41	0.38	0.31	0.84	3.23	2.09	0.12	0.51
CD at 5%	1.18	1.11	0.90	2.44	9.42	6.10	0.36	1.48

Significantly maximum stalk length (55.40 cm) was obtained in var. 'Claire Chazal' when compared to other varieties. Whereas, the minimum stalk length (20.20 cm) was observed in var. 'Tata Centenary'. Difference in stalk length might be due to varietal characteristics of the varieties. Similar results while evaluating varieties for stalk length have been reported previously by Murugesan *et al.* (1991) [13], Bhattacharjee *et al.* (1993) [5]. Among the varieties, maximum vase life (11.50 days) was observed in var. 'Eterna' and was significantly superior when compared to all other varieties. Whereas, the minimum vase life (2.00 days) was observed in var. 'Chantre'. Variation in vase life might be due to genetic makeup of the plant. Higher stalk girth (5.60 cm) coupled with slower opening of petals resulted in more vase life. Similar variations in vase life among the varieties have been reported by Bhattacharjee *et al.* (1993) [5], Bhattacharjee (1994) [4], Murugesan, (1996) [14] and Malhotra, (1997) [9] in rose.

Maximum number of flowers per plant and per m² (20.00 and 83.00, respectively) were recorded in var. 'Cherry Parfait'. The least number of flowers per plant and per m² (11.25 and 45.00, respectively) were observed in 'Prescilla'. The favourable growing environment and climatic factors have also contributed for expressing their maximum yield potential in high yielding varieties (Betonia, 1996, Praneetha *et al.* 2002 and Talia *et al.* 2003) [3, 16, 18].

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