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Evaluation of Bougainvillea Genotypes (*Bougainvillea* spp.) under Pune condition

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Abstract

The experiment was carried out in a Completely Randomized Design (CRD) with two replications for the evaluation of 51 genotypes of bougainvillea at College of Agriculture, Pune (M.S) with the objective to study the growth and floral characteristics of bougainvillea genotypes during 2024-25. The results revealed that among the 51 genotypes, 9 genotypes viz. S.P. Singh Pink, S.P. Singh Peach, Mizoram Kayata, Mizoram White, H.B. Singh, Kerala Peach, Zakrina, Parthasarthy, Rahata-2 were suitable for pot culture as all these showed dwarf growth with quality flowers.

Keywords: Bougainvillea, floral and growth characters, genotypes

Introduction

Bougainvillea is a genus of thorny ornamental vines, bushes, and trees belonging to the four o'clock family, Nyctaginaceae. It is native to eastern South America, found from Brazil, west to Peru, and south to southern Argentina. Bougainvillea includes 18 species in which only four species (*B. glabra*, *B. spectabilis* and *B. peruviana*) and one natural hybrid species (*B. x buttiana*) are horticulturally important. In India, *B. glabra* species was introduced in Agricultural and Horticultural Society of India at Alipore, Calcutta in 1869 (Roy *et al.*, 2012) [10]. First developed variety of Bougainvillea in India was 'Scarlet Queen Variegata' in 1926 by S. Percy Lancaster (Roy *et al.*, 2015) [11]. Bougainvillea is a highly adaptable plant with variety of colours and blooms and is primarily valued for its ornamental beauty and landscaping purpose. Bougainvillea is extensively used in landscaping due to its ability to thrive in different agroclimatic conditions. It has great demand among landscape architects, horticulturists and garden lovers for development of house gardens (indoor and outdoor), bonsai, hanging basket, pot culture etc. no garden is complete without bougainvillea, since it is very easy to maintain (Kumari *et al.*, 2022) [5]. A research on evaluation of different genotypes of bougainvillea and its categorisation work has not been carried out in Pune region in past. But, being a metro city and a nursery hub there is huge demand in the city and the near suburban areas for bonsai making, standards, live fencing to farms and industrial areas, shrubbery, landscaping of state and national highways in and around Pune city, parks and gardens, etc. and hence there is immense need for reliable research data regarding this field of research. Hence the current research, "Evaluation of bougainvillea genotypes" was undertaken to Study the growth and floral characteristics of bougainvillea genotypes.

Materials and Methods

The present investigation was undertaken at Modibaug, College of Agriculture, Pune, Maharashtra during 2024 - 25. The experiment was laid out in a CRD with 2 replications and 51 treatments (genotypes) evaluated in pots. The statistical analysis was carried out as per Panse and Sukhatme (1985) [7]. The observations were recorded for growth and flowering characteristics. viz., number of days required for initiation of bract, number of days required for initial sprouting, sprouting percentage, plant height (cm), length of main branch (cm), number of primary branches per plant, plant spread East-West (cm), plant spread North-South (cm), number of leaves per primary branch, length of internode (cm), length of petiole (cm), length of leaf blade (cm), width of leaf blade (cm), length of thorn (cm), number of days required for bract initiation, length of bract (cm), width of bract (cm), length of flower tube (cm), length of inflorescence (cm).

Table 1: Quantitative Growth Characteristics in Bougainvillea Genotypes under Pune condition

Sr. No	Genotypes	Number of days required for initiation of sprouting	Sprouting (%)	Plant height (cm)	Length of main branch (cm)	Number of Primary branches per plant	Plant spread East-West (cm)	Plant spread North-South (cm)	Number of leaves per primary branch
1	COAP-1	12.00	60	72.00	18.00	5.00 (2.44)	116.50	96.90	35.00 (5.98)
2	COAP-8	13.00	60	49.00	17.50	3.00 (2.00)	53.00	42.00	25.50 (5.14)
3	COAP-2	13.00	50	79.50	19.00	4.50 (2.34)	84.00	108.00	29.00 (5.48)
4	COAP-4	13.00	70	58.50	18.75	2.00 (1.73)	49.00	98.00	23.50 (4.95)
5	S.P. Singh Pink	8.00	70	80.00	8.50	3.50 (2.12)	82.00	62.00	27.50 (5.33)
6	S.N.B Faint Pink	7.00	50	50.00	8.00	3.00 (2.00)	42.00	57.00	32.50 (5.78)
7	S.N.B Dark Pink	8.00	60	63.00	7.00	3.00 (2.00)	112.00	82.00	67.50 (8.27)
8	S.N.B Yellow	9.00	50	82.50	7.00	5.50 (2.55)	135.00	106.00	26.50 (5.24)
9	C.B. Orange	9.00	70	82.50	26.00	(5.50 (2.55)	102.00	42.00	28.00 (5.38)
10	C.B Pink	8.00	70	88.00	13.00	4.00 (2.24)	94.00	118.00	32.00 (5.74)
11	C.B. Yellow	7.00	60	112.50	24.50	5.50 (2.55)	115.00	204.00	29.00 (5.48)
12	S.P. Singh Peach	8.00	70	51.50	7.50	6.50 (2.74)	96.00	74.00	42.50 (6.59)
13	Dark Pink Beauty	8.00	80	97.50	13.50	4.00 (2.24)	95.00	66.00	39.00 (6.30)
14	Rahata-4	8.00	70	105.00	17.50	3.00 (2.00)	92.00	86.00	31.50 (5.69)
15	Mizoram White	7.00	70	49.00	14.00	4.50 (2.34)	60.00	77.00	33.50 (5.87)
16	Mizoram Purple	9.00	70	70.00	8.50	6.00 (2.64)	90.00	88.00	37.50 (6.20)
17	Kerala Peach	10.00	60	74.50	11.50	9.50 (3.24)	64.00	48.00	19.00 (4.47)
18	H.B. Singh	7.00	80	51.50	9.00	5.50 (2.55)	45.00	68.00	11.00 (3.46)
19	Mizoram Kayata	8.00	70	34.75	19.00	10.50 (3.40)	42.00	38.00	15.00 (4.00)
20	Rahata-2	9.00	80	82.00	12.50	2.50 (1.87)	152.00	140.00	25.50 (5.12)
21	Shirdi-3 Yellow	9.00	70	121.50	16.50	4.50 (2.34)	200.00	180.00	42.00 (6.56)
22	S.P. Singh White	9.00	70	85.00	11.50	4.50 (2.34)	44.00	72.00	22.00 (4.79)
23	C.B. White	7.00	60	89.50	21.00	5.50 (2.55)	72.00	75.00	85.00 (9.27)
24	Thimma	8.00	80	75.50	27.00	9.00 (3.16)	218.00	200.00	42.50 (6.59)
25	Dr. Rao	9.00	70	122.60	25.50	5.50 (2.55)	52.00	83.00	120.0 (10.97)
26	G.K.-13	11.00	60	97.50	17.00	5.50 (2.55)	108.00	102.00	39.50 (6.36)
27	G.K.-11	8.00	50	82.00	13.25	5.50 (2.55)	100.00	98.00	23.00 (4.90)
28	G.K.-8	7.00	70	82.00	16.50	7.50 (2.92)	131.00	118.5	24.50 (5.04)
29	G.K.-10	7.00	70	100.50	20.00	6.50 (2.74)	142.00	124.00	35.00 (5.98)
30	G.K.-12	9.00	70	120.00	19.00	2.50 (1.87)	186.00	212.00	32.00 (5.73)
31	G.K.-7	7.00	40	169.00	20.50	4.50 (2.34)	132.00	184.00	51.00 (7.21)
32	Singapore Red	12.00	80	121.50	13.50	3.50 (2.12)	52.00	154.00	43.50 (6.67)
33	Dr. Bhabha	11.00	30	118.00	13.00	2.00 (1.73)	54.00	114.00	44.00 (6.69)
34	G.K.-2	10.00	40	107.50	18.50	2.50 (1.87)	85.00	122.00	33.50 (5.86)
35	G.K.-9	9.00	50	99.50	15.00	4.50 (2.34)	94.00	184.00	27.00 (5.29)
36	G.K.-3	9.00	40	92.00	11.50	4.00 (2.24)	160.00	72.00	28.00 (5.38)
37	G.K.-1	7.00	60	75.00	14.50	5.50 (2.55)	202.00	180.00	51.00 (7.21)
38	G.K.-6	10.00	50	75.00	18.50	6.50 (2.74)	78.00	94.00	18.00 (4.35)
39	G.K.-14	11.00	40	73.00	25.50	3.00 (2.00)	125.00	74.00	35.50 (6.02)
40	Pink Beauty	9.00	70	130.00	8.50	3.50 (2.19)	74.00	137.00	128.0 (11.32)
41	Golden Blow	11.00	60	170.00	9.00	2.50 (1.87)	70.00	150.00	35.00 (5.99)
42	Mr. Odicee	9.00	60	98.50	10.00	3.50 (2.19)	98.00	134.00	36.00 (6.08)
43	Blondiee	12.00	70	110.00	16.50	4.50 (2.34)	49.00	112.00	30.00 (5.55)
44	M.P.S	10.00	70	60.50	9.50	3.00 (2.00)	72.00	120.00	22.50 (4.84)
45	Roseville's Delight	10.00	80	110.0	7.50	3.50 (2.19)	112.00	148.00	27.50 (5.33)
46	Parthasarthy	9.00	70	70.00	8.00	4.50 (2.34)	86.00	42.00	31.00 (5.66)
47	Zakrina	9.00	80	55.00	8.25	3.50 (2.12)	38.00	104.00	26.50 (5.24)
48	Filoman	10.00	60	120.00	10.50	3.00 (1.99)	98.00	62.00	31.00 (5.65)
49	G.K.-5	9.00	40	70.00	9.00	4.00 (2.24)	62.00	114.00	29.00 (5.48)
50	Chitra	10.00	60	92.00	6.50	2.50 (1.87)	68.00	125.00	25.00 (5.09)
51	Mahara	11.00	50	97.50	11.00	3.00 (2.00)	42.00	194.00	32.50 (5.78)
	SE(m) ±	0.99	10.00	1.61	0.94	0.49	0.99	1.02	4.45
	CD (@ 5%)	2.83	N. S.	4.59	2.66	1.41	2.83	2.90	13.33

Table 2: Quantitative Growth and floral Characteristics in Bougainvillea Genotypes under Pune condition

Sr. No	Genotypes	Length of internode (cm)	Length of Petiole (cm)	Length of leaf blade (cm)	Width of leaf blade(cm)	Length of Thorn (cm)	No of days required for bract initiation	Length of bract (cm)	Width of bract (cm)	Length of floral tube (cm)	Length of Inflorescence (cm)
1	COAP-1	1.65	1.05	9.10	6.90	0.50	130.00	2.65	2.20	1.60	26.00
2	COAP-8	1.95	1.15	7.45	5.20	0.75	155.00	2.05	1.35	1.50	14.50
3	COAP-2	2.35	1.70	9.75	6.95	0.90	147.00	1.75	1.40	1.30	19.50
4	COAP-4	2.40	1.75	8.00	4.45	1.00	182.00	2.55	1.55	0.00	21.50
5	S.P.Singh Pink	1.25	1.65	9.45	5.50	0.45	136.00	3.05	2.10	1.20	21.50
6	S.N.B Faint Pink	1.90	0.55	7.50	4.30	0.80	182.00	3.50	2.05	1.30	17.50
7	S.N.B Dark Pink	1.15	1.05	7.95	6.05	0.40	198.00	1.65	1.25	0.00	22.00
8	S.N.B Yellow	2.00	1.25	6.15	4.05	1.25	136.00	3.40	2.05	2.00	26.50
9	C.B. Orange	2.00	0.95	8.00	6.20	0.50	120.00	2.45	1.90	1.30	37.00
10	C.B Pink	1.40	0.95	6.15	6.40	0.60	125.00	3.95	3.00	1.40	28.50
11	C.B. Yellow	2.00	0.75	9.05	6.85	0.40	105.00	2.65	1.95	0.90	37.50
12	S.P.Singh Peach	1.65	0.90	10.05	4.70	0.45	152.00	5.35	2.70	1.90	15.00
13	Dark Pink Beauty	0.80	1.10	8.05	5.55	0.35	144.00	3.45	2.00	1.60	55.00
14	Rahata-4	1.75	0.95	9.55	6.20	0.90	154.00	3.15	1.90	1.70	27.50
15	Mizoram White	1.00	0.65	11.85	4.95	0.30	80.00	4.95	2.45	2.10	16.50
16	Mizoram Purple	1.20	0.50	3.35	2.45	0.55	160.00	2.45	1.60	0.80	11.50
17	Kerala Peach	2.10	0.95	7.45	4.45	0.95	135.00	5.05	3.30	2.10	21.50
18	H.B.Singh	0.80	1.85	13.05	5.05	1.85	120.00	4.95	2.60	1.80	8.50
19	Mizoram Kayata	1.00	0.45	3.40	2.25	0.22	130.00	3.45	2.55	0.70	6.50
20	Rahata-2	1.95	0.95	8.05	5.00	0.80	160.00	3.75	3.25	1.60	18.00
21	Shirdi-3 Yellow	1.95	0.85	9.45	7.60	0.60	120.00	3.00	2.25	1.40	39.00
22	S.P.Singh White	1.80	1.55	10.00	5.40	0.70	130.00	3.25	2.35	1.10	22.00
23	C.B. White	1.95	0.85	6.05	4.80	0.80	155.00	2.40	2.05	0.80	30.50
24	Thimma	1.75	0.85	5.95	3.95	1.05	137.00	3.75	2.80	1.80	31.50
25	Dr.Rao	2.00	1.45	5.75	4.15	0.90	154.00	1.85	1.30	0.60	42.00
26	G.K.-13	2.20	0.75	8.05	5.45	0.50	137.00	3.10	2.20	1.00	26.50
27	G.K.-11	1.95	1.05	9.80	6.85	0.65	147.00	3.05	2.10	1.90	37.50
28	G.K. -8	0.95	0.95	4.50	2.95	0.60	169.00	2.85	1.35	1.70	13.00
29	G.K.- 10	2.40	1.45	8.45	5.25	0.95	130.00	3.45	2.85	1.00	16.00
30	G.K- 12	3.0	1.70	8.45	5.95	0.70	167.00	2.15	1.35	0.80	16.50
31	G.K -7	3.0	2.30	11.05	6.15	1.25	199.00	3.30	2.50	1.70	15.50
32	Singapore Red	3.20	0.95	10.80	8.50	1.45	152.00	4.25	3.25	1.80	20.50
33	Dr. Bhabha	2.95	1.15	8.40	4.95	1.15	250.00	1.95	1.35	0.60	11.50
34	G.K.- 2	2.00	1.15	11.45	8.15	0.45	147.00	2.55	1.90	0.00	23.50
35	G.K.-9	2.00	1.05	7.45	5.35	1.25	200.00	3.85	2.25	0.80	18.00
36	G.K.-3	2.00	1.45	6.45	4.30	0.50	202.00	3.05	2.05	0.50	14.00
37	G.K.-1	2.20	1.00	9.15	5.60	1.25	130.00	4.15	3.00	1.50	21.00
38	G.K.-6	1.90	1.25	10.25	6.15	1.50	130.00	1.95	1.10	0.00	18.00
39	G.K.-14	1.90	1.25	10.90	6.45	0.50	147.00	2.90	2.20	1.30	29.00
40	Pink Beauty	0.55	1.85	5.75	3.70	0.55	154.00	2.05	1.25	1.20	30.50
41	Golden Blow	2.50	1.95	11.55	7.70	1.55	157.00	3.30	2.55	1.50	42.00
42	Mr. Odicee	1.95	1.45	10.05	6.45	0.75	131.00	3.85	3.10	1.60	29.00
43	Blondiee	2.50	1.00	10.75	5.60	1.15	147.00	3.95	2.30	0.80	12.50
44	M.P.S	2.80	1.55	9.90	8.15	1.75	187.00	3.85	3.25	0.50	17.50
45	Roseville's Delight	2.85	1.85	9.40	6.95	0.45	103.00	2.45	1.55	0.00	47.00
46	Parthasarthy	1.60	0.95	7.95	3.95	0.95	174.00	4.10	2.95	2.00	19.50
47	Zakrina	1.45	0.95	7.80	4.80	0.45	170.00	3.45	2.40	1.90	24.50

48	Filoman	1.90	0.65	9.95	7.55	0.45	147.00	4.15	3.35	1.90	17.50
49	G.K.-5	2.00	1.35	6.45	5.45	0.55	147.00	4.05	2.90	0.80	16.50
50	Chitra	2.40	1.45	9.95	7.80	0.80	202.00	3.60	3.15	0.70	10.50
51	Mahara	2.50	0.50	6.25	4.35	0.60	215.00	2.00	1.25	0.00	13.50
	SE(m) \pm	0.04	0.06	0.07	0.06	0.07	1.00	0.06	0.08	0.007	2.53
	CD (@ 5%)	0.13	0.17	0.19	0.19	0.20	2.85	0.16	0.23	0.02	7.20

Results and Discussion

Quantitative growth and floral characteristics

The results of quantitative growth and floral characters of bougainvillea are presented in Table 1 and Table 2. The results revealed that the significant variation in growth and floral traits were observed. The minimum number of days (7 days) for sprouting were recorded by S.N.B Faint Pink, C.B. Yellow, H.B. Singh, C.B. White, G.K.-1, G.K.-10, G.K.-14, G.K.-7, and Mizoram White respectively. Whereas, genotypes COAP-8, COAP-2 and COAP-4 recorded the maximum number of days (13 days) for sprouting in hardwood cuttings. The maximum sprouting *per cent* (80%) in hardwood cuttings was observed in Singapore Red, Dark Pink Beauty, Rahata-2, Thimma, Roseville's Delight, Zakrina and H.B. Singh. While, significantly minimum sprouting (30%) was observed in Dr. Bhabha. Similar variations in number of days required for initiation of sprouting and sprouting per cent were reported by Singh & Singh (2011) [15] and Nadakuduru and Fatimi (2023) [6]. The maximum plant height (170.00 cm) was observed by Golden Blow and significantly minimum plant height (34.75 cm) was recorded by Mizoram Kayata. Significantly maximum number of primary branches (10.50) was observed in a genotype Mizoram Kayata (10.50) while COAP-4 and Dr. Bhabha recorded the minimum number of primary branches (2). The similar results with a wide variation for plant height and number of primary branches of bougainvillea genotypes were recorded by Gupta *et al.* (2006) [2]. The maximum length of main branch (27.00 cm) was recorded by Thimma and significantly minimum length of main branch (6.5 cm) was observed in Chitra. The results of the study are in confirmation with Kumar *et al.* (2009) [4] in bougainvillea genotypes.

The significantly maximum East-West plant spread (218.00 cm) was observed by Thimma and minimum recorded by Zakrina (38.00 cm). The significantly maximum North-South plant spread was observed by G.K.-12 (212.00 cm) and minimum by Mizoram Kayata (38.00 cm). The results of present study are in line with the earlier findings by Gupta *et al.* (2006) [2] and Supriya *et al.* (2022) [17] for bougainvillea genotypes. The significantly maximum number of leaves per primary branch was recorded by Pink Beauty (128) and significantly minimum number of leaves per primary branch was observed in H.B. Singh [11]. The results are in confirmation with earlier reports by Anuradha (2016) and Rohith (2019) [1, 9]. The significantly maximum internodal length (3.20 cm) was observed in Singapore Red and minimum recorded in Pink Beauty (0.55 cm). The results on similar line for internode length was also recorded by Kumar *et al.* (2015) [3]. The maximum length of petiole was recorded by G.K.-7 (2.30 cm) and minimum length of petiole was observed by Mizoram Kayata (0.45 cm). The similar results was reported by Sindhu *et al.* (2015) in bougainvillea. The significantly maximum length of leaf blade was recorded by H.B. Singh (13.05 cm), while minimum length of leaf blade was observed by Mizoram Purple (3.35 cm). The maximum width of leaf blade was recorded by Singapore Red (8.50 cm) and minimum width

of leaf blade was observed by Mizoram Kayata (2.25 cm). The similar results for leaf blade length and leaf blade width were reported by Singh *et al.* (2016a) [1, 16] and Supriya *et al.* (2022) in bougainvillea. The maximum average thorn length was recorded by H.B. Singh (1.85 cm) and minimum length of thorn was observed by Mizoram Kayata (0.22 cm). The similar results were reported by Ram *et al.* (2010) and Supriya *et al.* (2022) [8, 1] in bougainvillea.

The maximum number of days required for initiation of bracts was observed by Dr. Bhabha (250 days) whereas minimum number of days for initiation of bracts was observed by Mizoram White (80 days). The significantly maximum bract length was recorded by S.P. Singh Peach (5.35 cm) and significantly minimum length of bract was recorded by S.N.B. Dark Pink (1.65 cm). The significantly maximum width of bract was observed by Filoman (3.35 cm) and significantly minimum width of bract was recorded by G.K.-6(1.10 cm). The maximum length of floral tube were observed by Mizoram White (2.10 cm) and Kerala Peach (2.10 cm) respectively. However, the minimum length of floral tube length were observed by G.K.-3 (0.5 cm) and M.P.S. (0.5 cm) respectively. The genotypes *viz.*, COAP-4, S.N.B. Dark Pink, G.K.-2, G.K.-6, Roseville's Delight, Mahara showed absence of floral tube. The significantly maximum length of inflorescence was observed by Dark Pink Beauty (55 cm). However, significantly minimum length of inflorescence was observed by Mizoram Kayata (6.50 cm). The results for bract length, bract width, floral tube length and inflorescence length are in line with the findings of Singh *et al.* (2016a), Singh *et al.* (2016b) and Supriya *et al.* (2022) [1, 16] recorded in bougainvillea.

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