



Performance of Different Varieties of Bougainvillea (*Bougainvillea glabra*) Propagated through Hardwood Cuttings under Prayagraj Shadenet House Conditions

Nadakuduru Susmitha Priya^{a++*} and Urfi Fatmi^{b#}

^a Department of Horticulture (Floriculture and Landscaping), SHUATS, Prayagraj, India.

^b Department of Horticulture (Floriculture and Landscaping), Naini Agricultural Institute, SHUATS, Prayagraj, India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJPSS/2023/v35i183435

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/104238>

Original Research Article

Received: 24/05/2023

Accepted: 01/08/2023

Published: 05/08/2023

ABSTRACT

An experiment to ascertain the performance of different varieties of bougainvillea (*Bougainvillea glabra* Choisy) propagated through hardwood cuttings under 50% shadenet house conditions was carried out from February to July, 2022, in the Department of Horticulture, Sam Higginbottom University of Agriculture, Technology And Sciences SHUATS, Prayagraj. The experiment was laid out in completely randomized design (CRD), with fourteen different bougainvillea varieties, replicated thrice. Among the different varieties of bougainvillea, variety Isbel Green Smith recorded

⁺⁺M. Sc Scholar;

[#]Assistant Professor;

*Corresponding author: E-mail: susmithanadakuduru@gmail.com;

minimum days taken to first sprouting (10 days) and days taken to 50% sprouting (10.3 days), variety Joe de Libra recorded maximum sprouting percentage (96.7%) and success rate (96.7%). Length of first shoot/cutting (3.8 cm) and number of leaves/cutting (58.9) were recorded in variety Shubra, whereas, variety Chandraberri recorded maximum girth of first branch (4.4 cm).

Keywords: *Bougainvillea*; cuttings; hardwood; propagated; varieties.

1. INTRODUCTION

Bougainvillea is termed as “Glory of the Tropics” due to its high popularity and intense use in the tropical countries. It belongs to the family Nyctaginaceae, which is native to tropical and sub-tropical regions of South America [1]. It is popular among parks, home and institutional gardens grown mainly as bush, climber, hedge, topiary, standard, pot plant, bonsai, on pergolas and trees [2,3]. It is found from Brazil, west to Peru and south to southern Argentina. Wide adaptability to different agro-climatic conditions and easy multiplication has made it a popular ornamental plant of the world [4]. Moreover, as it is a drought and pollution resistant plant, it is well suited for industrial places and on road dividers [5].

The name *Bougainvillea* comes from Louis Antoine de Bougainville, a French navigator and military commander who was the first European to take note of the plant, in Brazil, in 1768. *Bougainvillea spectabilis* was the first to be introduced in India from Europe in 1860 followed by *B. glabra* cv. ‘Splendens’ (1969), *B. x buttiana* cv. ‘Scarlet Queen’ (1920) and ‘Mrs. Butt’ (1923) and *B. peruviana* cv. ‘Princes Margaret Rose’ in 1935 [6]. Such floriferousness is highly regarded not only for landscape plants but also for small container-grown plants sold by florists and nurserymen to decorate indoor and outdoor living areas [7].

India is one of the major repositories of a wide range of bougainvilleas, and approximately 50 % of the present-day cultivars have been evolved in India [8]. The work on development of *Bougainvillea* has largely been done by the Agri-Horticultural Societies at Calcutta and Madras. The Lal Bagh Garden at Bangalore also contributed a great deal by introducing a large number of exotic cultivars, particularly the multi-bracted varieties from the Philippines. Different breeding approaches followed in bougainvillea are hybridization, polyploidy, mutation and bud sports. A large number of varieties have been developed at the National Botanical Research Institute (NBRI) in Lucknow, Bhabha Atomic

Research Centre (BARC) in Mumbai and Indian Institute of Horticultural Research (IIHR) in Bengaluru.

Bougainvilleas are extensively used as hedges, barriers, slope coverings, ground covers on banks and they are also used as live screens, specimens, for pergolas, bonsai, hanging baskets, pot culture, espaliers and green walls. They can be grown under wide range of climatic conditions but the performance of different variety varies with the region, season and other growing conditions. So, it is necessary to identify the most suitable variety for a particular region. A new plant grown from a stem cutting will mature faster and will bloom sooner than a plant grown from seed or root cuttings. Thus, a field trial on performance of different varieties of bougainvillea (*Bougainvillea glabra* Choisy) propagated through hardwood stem cuttings under 50% shadenet house conditions was conducted to assess success of different bougainvillea varieties propagated through hardwood stem cuttings under Prayagraj agro climatic conditions.

2. MATERIALS AND METHODS

The experiment was conducted in 2022 (from February to July) in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University Agriculture, Technology And Sciences, Prayagraj located at 25°39'42"N latitude, 81°67'56"E longitude and 98 masl or MASL. The experiment was laid out in completely randomized design (CRD) which consists twenty treatments and were replicated thrice under 50% shadenet conditions. Total fourteen bougainvillea varieties were used in the experiment namely; Parthasarthy, Joe de Libra, Palekar, Aruna, Isbel Green Smith, Hawain White, Chandraberri, Vishakha, Elizabeth, Filoman, Mrs. R.B. Carrick, Dr. Harbhajan Singh, Shubra and Shweta. All the varieties were procured from (NBRI), Lucknow. Sand and soil were thoroughly mixed in a ratio of 1:0.5 v/v to make potting mixture which was filled in black poly bag (8 inch × 12 inch). Hardwood cuttings were dipped in IBA solution of 4000 ppm for 24 hours and then were planted in poly bags (one cutting in one bag) filled with the potting

Table1. Performance of varieties of different *Bougainvilliea glabra*

Notation	Variety	Days taken to 1 st sprouting	Days taken to 50% sprouting	Sprouting percentage	Length of 1 st shoot (cm)	No of leaves	Girth of 1 st branch (cm)	Success rate
V1	Parthasarthy	12	13.3	70.0	69.2	40.4	4.0	70.0
V2	Joe de Libra	12	13.7	96.7	50.9	52.6	3.9	96.7
V3	Palekar	22	26.7	80.0	44.3	37.7	3.0	80.0
V4	Aruna	12	13.3	70.0	39.2	37.2	4.5	70.0
V5	Isabel Green Smith	10	10.3	83.3	48.8	39.5	3.5	83.3
V6	Hawain White	12	13.3	60.0	42.0	46.6	2.5	60.0
V7	Chandraberi	12	13.0	93.3	58.7	49.8	5.0	93.3
V8	Vishakha	13	13.7	93.3	31.4	31.1	2.2	93.3
V9	Elizabeth	12	14.3	80.0	44.8	41.9	2.7	80.0
V10	Filoman	12	13.0	53.3	41.2	38.3	3.2	53.3
V11	Mrs. R.B. Carrick	15	16.0	83.3	45.3	43.4	2.8	83.3
V12	Dr. Harbhajan Singh	14	15.0	93.3	35.6	51.2	2.0	93.3
V13	Shubra	11	12.0	86.7	87.0	58.9	4.4	86.7
V14	Shweta	15	16.0	63.3	45.8	36.2	3.6	63.3
F-TEST		S	S	S	S	S	S	S
SE.d (±)		1.23	1.61	12.91	3.39	1.20	0.11	12.91
CD _{0.05}		1.82	2.38	19.07	5.01	1.77	0.16	19.07
CV		11.50	0.97	20.00	8.50	3.41	4.04	20.00

mixture. The recorded data of various parameters was statistically analyzed following the standard analysis of variance (ANOVA) technique.

3. RESULTS AND DISCUSSION

3.1 Propagated Parameters of Different *Bougainvillea glabra* Varieties (Table 1)

Days taken to 1st sprouting - Among all the varieties, significantly lesser days were taken for 1st sprouting by variety Isbel Green Smith (10 days) which was found to be at par with variety Shubra (11 days) while, more no. of days were taken to 1st sprouting was observed in the variety Palekar (22 days).

Days taken to 50% sprouting of different bougainvillea varieties - Among all the varieties, significantly lesser no. of days were taken for 50% sprouting by variety Isbel Green Smith (10.3 days) which was found to be at par with variety Shubra (12.0 days) while, more no. of days taken to 50% sprouting was observed in the variety Palekar (26.7 days). Variation in days taken to 1st sprouting and 50 percentage sprouting might be influenced by the parental genotypes, their genetic makeup and growth behaviour in the prevailing climatic conditions.

Sprouting percentage of different bougainvillea varieties - Among all the varieties, significantly higher sprouting percentage was observed in the variety Joe de Libra (96.7%) which was found to be at par with Chandraberri (93.3%), Vishakha (93.3%), Dr. Harbhajan Singh (93.3%), Shubra (86.7%), Isbel Green Smith (83.3%), Mrs. R.B. Carrick (83.3%), Palekar (80%) and Elizabeth (80%) while, lower sprouting percentage was observed in the variety Filoman (53.3%). Variation in sprouting percentage of cuttings might be due to genetic makeup of different varieties responsible for plant vigour and environmental effect. Similar results were recorded in gladiolus by Nalage et al. [9].

Length of 1st shoot (cm) of different bougainvillea varieties - Among all the varieties, longer 1st shoot (cm) of cutting was recorded in the variety Shubra (87.0 cm) which was significantly more than any other variety followed by Parthasarthy (69.2 cm) while, shorter 1st shoot (cm) was observed in the variety Vishakha (31.4 cm). Variation in length of shoot being a genetically controlled factor, varied among the

different varieties due to their different genetic makeup and environmental effects.

Number of leaves per cutting of different bougainvillea varieties - Among all the varieties, more no of leaves was recorded in the variety Shubra (58.9) which was significantly superior over all the varieties followed by Joe de Libra (52.6) while, less no of leaves was observed in the variety Vishakha (31.1). The variance in the vegetative development across genotypes, which is caused by genetic make-up and may also have been influenced by agro climatic circumstances, is what causes the variation in the number of leaves per cutting. Similar results were reported by Sharma et al. [10] in Lilium.

Girth of 1st branch (cm) per cutting of different bougainvillea varieties - Among all the varieties, significantly more girth of 1st branch (cm) was recorded in the variety Chandraberri (5.0 cm) which was superior over all the varieties followed by Aruna (4.5 cm) while, less girth of 1st branch (cm) was observed in the variety Dr. Harbhajan Singh (2.0 cm). Variation in girth of branch of bougainvillea varieties might be due to the varietal character which varies from variety to variety and the morphological traits and adaptability of the variety to the prevailing climatic conditions.

Success rate of cuttings of different varieties of bougainvillea - Among all the varieties, significantly higher success rate of cuttings was observed in the variety Joe de Libra (96.7%) which was found to be at par with Chandraberri (93.3%), Vishakha (93.3%), Dr. Harbhajan Singh (93.3%), Shubra (86.7%), Isbel Green Smith (83.3%), Mrs. R.B. Carrick (83.3%), Palekar (80%) and Elizabeth (80%) while, lower success rate was observed in the variety Filoman (53.3%). Variation in success rate of cuttings might be due to the adaptability of different varieties in the given environmental conditions.

4. CONCLUSION

From the present investigation it is concluded that fourteen varieties of bougainvillea showed significant variation in all the registered parameters studied. Early sprouting and 50% sprouting was recorded in variety Isbel Green Smith, however, variety Joe de Libra had highest sprouting percentage and success rate. Longest shoot and number of leaves/cutting was recorded in variety Shubra, whereas, variety Chandraberri had maximum girth.

ACKNOWLEDGEMENT

I express my gratitude to my advisor and all the faculty members of the Department of Horticulture for the constant supply to carry out the whole experimental research study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Singh S, Roy RK, Rastogi RR, Kumar S, Chandra S. Morphological description of Bougainvillea varieties based on DUS test characters. *Journal of Applied Horticulture*. 2016;18(3):244-249.
2. Roy RK. Bougainvillea in landscaping. *Flower Show Bulletin, Calcutta Flower Growers' Association*. 1987;21.
3. Sharma SC, Roy RK. Conservation and improvement of bougainvilleas. *Indian Bougainvillea Annual*. 2001;16:9-12.
4. Priyadarshini S, Bargav V, Gupta YC, Nimbolkar PK. Evolution in Bougainvillea (Bougainvillea commers) – A Review. *Journal of Applied and Natural Science*. 2017;9(3):1489-1494.
5. Salam P, Bhargav V, Gupta YC, Nimbolkar PK. Evolution in Bougainvillea (*Bougainvillea commers.*) -A review. *Journal of Applied and Natural Science*. 2017;9(3):1489-1494.
6. Datta. Genetic diversity and improvement of bougainvillea. *LS- An International Journal of Life Sciences*. 2021;10(2):61-79.
7. Sharma SC, Sharma YK. Bougainvillea (Commerson and Jussieu): A Pollution and Drought Tolerant Plant. *International Journal of Plant and Environment*. 2020;6(2):2454-1117.
8. Janakiram T, Jain R, Swaroop K, Narkar ND. Bougainvilleas- Glory of the garden. *ICAR News Letter*. 2013;19(1):6-7.
9. Nalage NA, Haldankar PM, Gawamkar MS, Rathod MG. Evaluation of different gladiolus varieties (*Gladiolus hybridous hort*) under Konkan conditions of Maharashtra. *International Journal of Chemical Studies*. 2019;7(2):2018-2021.
10. Sharma R, Kumar R, Dahiya DS. Studies on performance of liliium varieties under polyhouse. *Journal of Pharmacognosy and Phytochemistry*. 2018;7(4):2711-2713.

© 2023 Priya and Fatmi; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/104238>