

Flora of *Bougainvillea* varieties under the 'DUS' model for Morphological Characterization

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ABSTRACT

The family Nyctaginaceae which includes the plant *Bougainvillea*, exhibits the morphological status and significant uniformity of the floral plan. Nonetheless, there is untamed diversity in every area of the *Bougainvillea* plant in almost every aspect of the floral and morphological diversity that lends to comparative study in terms of 'flora diversity' which includes organ, shape, size, colour and symmetrical organisation. Floral and morphological studies have been extended to a much wider range. Studies on further level 'DUS' model of Characterization should provide insights, which alone for various reason cannot be derived by depending upon the single model for morphological Characterization.

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KEY WORDS : *Bougainvillea*, Morphological characters, Nyctaginaceae.

Introduction

Bougainvillea, an important ornamental crop belongs to angiospermic family 'Nyctaginaceae'. *Bougainvillea* thrives better in hot weather as compared to cool season in India. There are basically three species in India (*B. glabra* Choisy, *B. glabra* Humb and *B. spectabilis* Wild) and three hybrid groups viz, *B. buttiana* (glabra and peruviana), *B.x specto peruviana* and peruviana), *B.x specto glabra*. *Bougainvillea* crop is so popular due to the wider range of bracts colours thus making it very popular amongst the amateur gardeners. Morphological Characterization for Plant Breeder's Rights^{10,15}. The technical guidelines have been made by the International Union for the Protection of the new varieties of the Plants (UPOV) in order to prove its distinctness, uniqueness and stability under Articles 7,8 and 9 respectively^{13,14}. The DUS test guidelines finalized under the morphological characterization comprised of 50 characters. Therefore, an effort was made during the present investigation to characterize the morphological characters, isolated from the field established novel mutant, based on DUS test guidelines^{2,7}.

Materials and Methods

The morphological characterization was done under the established field at Horticultural Research Centre at SVPUA&T, Meerut. Fifty rooted cuttings were planted and propagated. Morphological characterization and evaluation were carried out at full bloom stages in 2018-19 and 2020-2021. The colour observations were recorded

with the help of Royal botanical society (RHS) colour chart (Anonymous,1966). The morphological characters were made for comparative study for variation.

Results and Discussion

The morphological characterization of five different varieties of *Bougainvillea* were clearly different in terms of morphology and is represented in (Table-1). The germplasms were significantly different with their floral morphology and their systemical arrangement. The variety 'Abhimanyu' species '*Bougainvillea peruviana*' with stem young greenish coppery leaves with its vegetative characters. Significantly, flowering profuses at the end of the branches, non-persistent bracts. The colour of the young leaf classified under the 'DUS' model of Characterization i.e., Green group 137C. The colour of the bracts classified under Red purple group 72-B with elliptic Shape of bracts. Similar observations were studied^{1,2}.

The variety 'Abraham kavoor' species '*Bougainvillea x buttiana*' with Young stem, greenish coppery leaves with its vegetative characters. Significantly, flowering profuses, non-persistent bracts. The colour of the young leaf classified under the 'DUS' model of Characterization i.e., Green group 137C. The colour of the bracts classified under Yellow orange group 20-B with ovate shape of bracts. Similar observations were studied by others^{1,3}.

The variety 'Alick Lancaster' species '*Bougainvillea x buttiana*' with Stem, greenish, leaf blade elliptic, thorn

TABLE-1: Morphological characterization of *Bougainvillea* varieties under the 'DUS' model of characterization.

S.No	Varieties	Species	Vegetative characters	Flowering	Colour of young leaf	Colour of bracts	Shape of bracts
01.	Abhimanyu	<i>Bougainvillea peruviana</i>	Stem young greenish coppery leaves	Flowering profuse at the end of the branches, non -persistent	Green group 137C	Red purple group 72-B	Elliptic
02.	Abraham kavoor	<i>Bougainvillea x buttiana</i>	Young stem, greenish coppery leaves	Flowering profuse, non - persistent	Green group 137C	Yellow orange group 20-B	Ovate
03.	Alick Lancaster	<i>Bougainvillea x buttiana</i>	Stem, greenish, leaf blade elliptic, thorn long straight	Flowering profuse, non - persistent	Yellow green group 144-A	Red purple group 70 -D	Elliptic
04.	Annabella	<i>Bougainvillea glabra</i>	Stem, greenish, leaf blade elliptic, thorn slightly curved at tip	Flowering profuse and persistent	Green group 137B	Red purple group 70 -D	Elliptic
05.	Aruna	<i>Bougainvillea peruviana</i>	Stem, greenish, leaf blade elliptic, thorn long straight	Flowering profuse, non-persistent	Green group 137C	Orange red group 32-C	Elliptic

long straight with its vegetative characters. Significantly, flowering profuses at the end of the branches, non-persistent bracts. The colour of the young leaf classified under the 'DUS' model of Characterization *ie.*, Yellow green group 144A. The colour of the bracts classified under Red purple group 70-D with Elliptic Shape of bracts. Similar observations were studied by others^{3,2}.

The variety 'Annabella' species '*Bougainvillea glabra*' with Stem, greenish, leaf blade elliptic, thorn slightly curved at tip with its vegetative characters. Significantly, Flowering profuses, persistent bracts. The colour of the young leaf classified under the 'DUS' model of Characterization *ie.*, Green group 137B. The colour of the bracts classified under Red purple group 70-B with Elliptic Shape of bracts. Similar observations were studied by others^{3,4}.

The variety 'Aruna' species '*Bougainvillea peruviana*' with Stem, greenish, leaf blade elliptic, thorn long straight

with its vegetative characters. Significantly, Flowering profuses, non-persistent. The colour of the young leaf classified under the 'DUS' model of Characterization *ie.*, Green group 137C. The colour of the bracts classified under Orange red group 32-C with Elliptic Shape of bracts. Similar findings were made by others^{1,2}.

The morphological characterization of five different varieties of *Bougainvillea* were clearly different in terms of morphology and is represented in Table-2. Similar perceptible differences were noticed in the variety 'Abhimanyu' species '*Bougainvillea peruviana*' with growth habit Medium, drooping growth restricted. Significantly, colour of the young shoot found to be greenish with coppery leaves. The length of the internodes was found to be medium. The thorns were long and straight with medium density and length of the thorn. The curvature of the thorn was found to be slightly curved. Similar findings were made by others^{3,5}.

TABLE-2: 'DUS' characterization of different *Bougainvillea* varieties under different morphological parameters.

S.No	Varieties	Growth habit	Length of the internodes	Thorns	Density of the thorns	Length of the thorn	Curvature of the thorn
1.	Abhimanyu	Medium, drooping growth restricted	Medium	Long straight	Medium	Medium	Slightly curved
2	Abraham kavoor	Tall, vigorous, growth	Medium	Long straight	Medium	Long	Slightly curved
3	Alick Lancaster	Dwarf, growth restricted	Short	Long straight	Dense	Short	Fully curved
4	Annabella	Medium, growth intermediate	Medium	Long straight	Sparse, Medium	Medium	Slightly curved
5	Aruna	Medium, drooping growth vigorous	Medium	Medium straight	Dense	Medium	Slightly curved

Similarly the variety 'Abraham kavoor' species '*Bougainvillea x buttiana*' with growth habit Tall, vigorous, growth. Significantly, colour of the young shoot found to be Young stem, greenish coppery leaves. The length of the internodes was found to be medium. The thorns were long and straight with medium density and length of the thorn. The curvature of the thorn was found to be slightly curved. Similar findings were made by others^{1,2,6}.

Similar perceptible differences were noticed in the variety 'Alick Lancaster' species '*Bougainvillea x buttiana*' with dwarf, growth restricted. Significantly, colour of the young shoot was found to be greenish, leaf blade elliptic, thorn long straight. The length of the internodes was found to be short. The thorns were long and straight with dense in terms of density and medium length of the thorn. The curvature of the thorn was found to be fully curved.

Similar perceptible differences were noticed in the variety 'Annabella' species '*Bougainvillea glabra*' with medium, growth intermediate in terms of growth habit. The length of the internodes was found to be medium.

The thorns were long and straight with sparse medium density and with medium length of the thorn. The curvature of the thorn was found to be slightly curved. Similar findings were made by others^{7,8,9}.

The variety 'Aruna' species '*Bougainvillea peruviana*' with growth habit Medium, drooping growth vigorous. The length of the internodes was found to be medium. The thorns were medium and straight with dense density and medium length of the thorn. The curvature of the thorn was found to be slightly curved. Similar findings were made by others^{7,10,12,13}.

Conclusion

It should be noted that the correct observation and identification of '*Bougainvillea species*' is much more important for the varietal information and classification of varieties into different groups and for genetic resources. It may be concluded that the morphological characteristics are seldom much more challenging to bring out the novelty and figure out the uniqueness for distinguishing amongst the different species.

References

1. Anderson NO. Chrysanthemum. *In Flower breeding and genetics*. 2007; **1**: 389-437.
2. Bharti H, Singh KP, Singh MC. Morphological characterization of tuberose (*Polianthes tuberosa* Linn.) germplasms using DUS testing. *Progressive Horticulture*. 2015; **47**(2): 280-7.
3. Choudhary M, Beniwal BS, Kumari A. Characterization of marigold genotypes using morphological characters. *Research on Crops*. 2014; **1**(4):1-15.

4. Cullen J, Knees SG, Cubey HS, Shaw JM, editors. The European garden flora flowering plants: a manual for the identification of plants cultivated in Europe, both out-of-doors and under glass. Cambridge University Press; 2011 Aug 11.
5. De LC, Rao AN, Rajeevan PK, Dhiman SR, Srivastava M, Chhetri G. DUS testing of cut-flower orchids. 2015; **6**(8): 120-129,
6. Kaushal S, Bala M. DUS characterization of chrysanthemum (*Chrysanthemum morifolium* Ramat.) genotypes suitable for pot culture. *Journal of Ornamental Horticulture*. 2018; **21**(3-4):102-8.
7. Kumar PP, Janakiram T, Bhatt KV, Prasad KV, Jain R. Genetic divergence analysis of *Bougainvillea* (*Bougainvillea* spp) cultivars using morphological markers. *Indian J. Agri. Sci*. 2015;**85** (5):661-5.
8. Prasad KV, Kumar G, Kumar S, Singh O, Kumari G. DUS testing of chrysanthemum: A pre requisite for offering plant breeders Right: A poster presented in the 2nd Indian Horticulture Congress April 17-21. 2007. Barapani, Meghalaya.
9. Pupulin F, Diaz-Morales M. On the meaning of *Cypripedium* × *grande* (*Orchidaceae*) and its taxonomic history, with a new name for the nothospecies occurring in Costa Rica and Panama. *Phytotaxa*. 2018; **382**(2):167-81.
10. 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):240-5.
11. Sindhu SS, Singh B, Saxena NK. Genetic improvement of *Bougainvillea* in Indian scenario-A review. *Journal of Ornamental Horticulture*. 2020;**23**(1):1-1.
12. Smulders MJ, Esselink D, Voorrips RE, Vosman B. Analysis of a database of DNA profiles of 734 hybrid tea rose varieties. InXXIII *International Eucarpia Symposium*, Section Ornamentals: Colourful Breeding and Genetics. 2009; **31**:169-175).
13. Veluru A, Bhat KV, Raju DVS, Prasad KV, Tolety J, Bharadwaj C, Mitra SVACR, Banyal N, Singh KP and Panwar S. Characterization of Indian bred rose cultivars using morphological and molecular markers for conservation and sustainable management. *Physiology and Molecular Biology of Plants*,2020; **26**(1):95-106.
14. Verma AK, Prasad KV. Morphological characterization of a novel mutant of chrysanthemum. *BIOINFOLET-A Quarterly Journal of Life Sciences*. 2015; **12**(1c): 285-7.
15. Warren D. Image analysis in chrysanthemum DUS testing. *Computers and electronics in agriculture*. 2000; **25** (3) : 213-20.