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Technical Communication:
(Horto-Taxonomical Paper)

Method for Characterization of New Varieties of Bougainvilleas- Morphological and Floral Parameters

Characterization is a study, evaluation and documentation of various morphological (vegetative) and floral characters of ornamentals or any other plant species. In this method, horto-taxonomical studies are done and details of vegetative and floral characters are documented for the purpose of correct identification and establishing identity of the new species/ varieties.

There are standard methods and approaches for characterization of new varieties. Depending upon the type of plant *viz.*, trees, shrubs, herbs, bulbous and rhizomatous, characters to be studied are decided.

In case of Bougainvillea, following morphological characters are mainly considered for characterization.

Vegetative Characters - Growth habit, plant height, thorns (size, shape), leaves (leaf colour - young and mature, texture, size, shape) (Fig. 1A, B).

Floral Characters - Flowering habit (profuse, sparse, medium, season), inflorescence, bracts (colour at flowering, change of colour from young to old bracts, size, margin, base, shape, persistent or non-persistent after flowering, flower tube and star (Fig. 1C).

Significance of Characterization:

Study of morphological characters is most important for identification purpose and establishing identity of the variety. Both vegetative and floral characters are studied, recorded and interpreted in a scientific and standard manner. Each and every variety has got certain diagnostic characters which differ from the others. Morphological characterizations identify those diagnostic characters which actually serve as tool for identification. Therefore, studies on morphological characters have enormous importance both taxonomically and horticulturally.

There are eighteen species and hundreds of varieties of Bougainvillea available all over the world. Each species has got some diagnostic key characters which are basically morphological traits consisting of both vegetative and floral (bracts) parameters. Similarly, varieties are also differentiated on the basis of morphological characters. Visual recognition by the bract colour is the easy and commonly followed. Sometimes, overlapping bract colour and other vegetative characters closely resembled resulting confusion and wrong identity of the varieties.

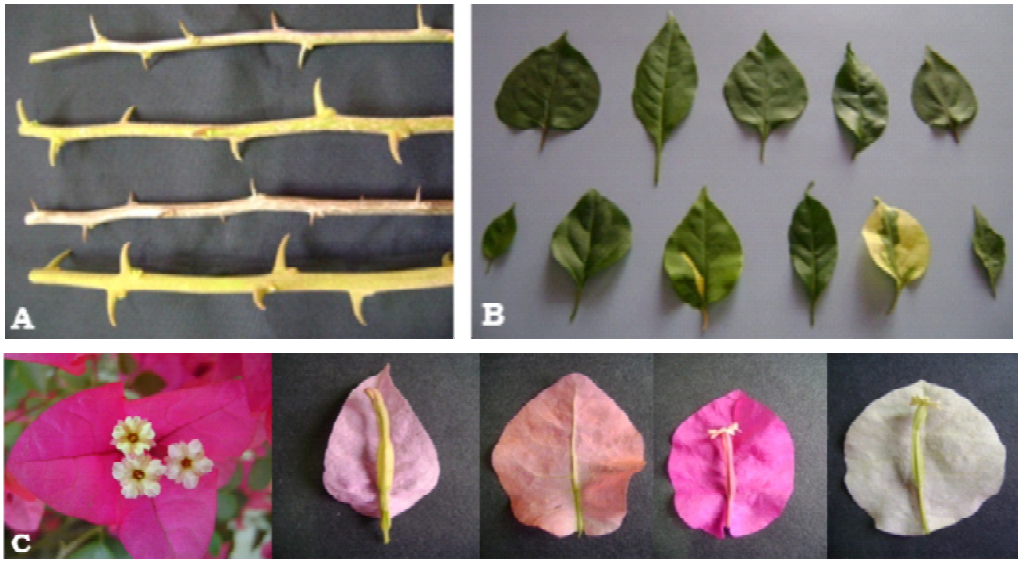
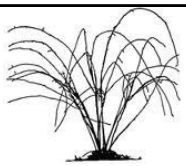
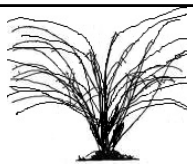
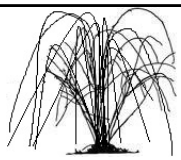
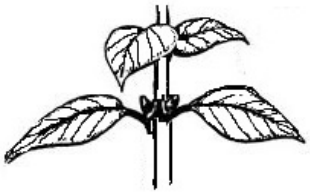
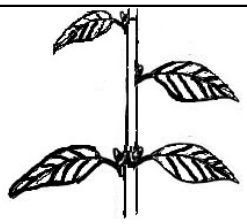
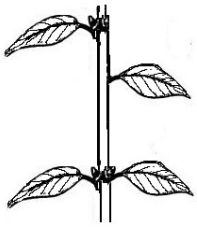
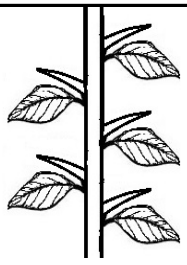
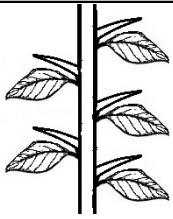
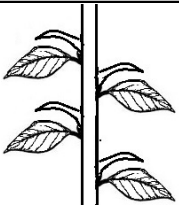
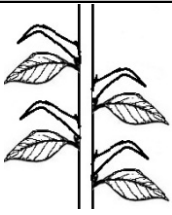
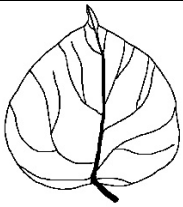


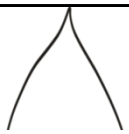
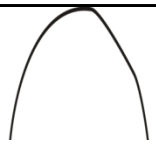
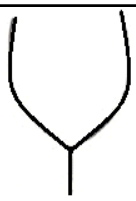
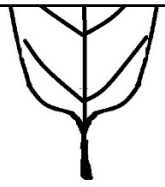
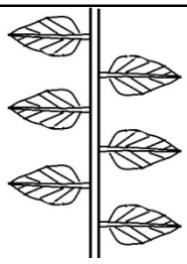
Fig. 1. *Bougainvillea*: (A) Types of spines, (B) Leaf characters (C) Bracts with flower

Table 1: Morphological Characters (vegetative & floral) and description of the plant parts

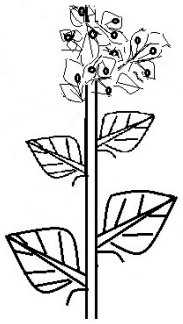
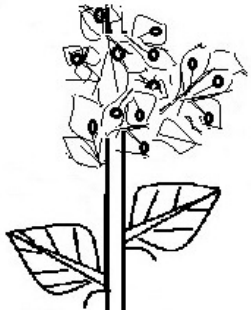
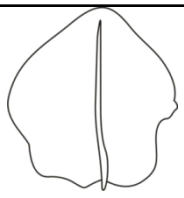
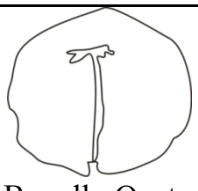
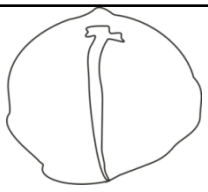
Sl. No.	Morphological Characters	Details
1.	Growth habit	Upright, Semi-upright, Spreading, Drooping, Climbing.
2.	Colour of young Shoot	Light green, Medium-green, Reddish-green , Reddish.
3.	Length of internodes	Short, Medium, Long.
4.	Thorns	Absent, Present.
5.	Density of thorns	Sparse, Medium, Dense.
6.	Length of thorn	Short, Medium, Long.
7.	Curvature of thorn	Straight, Slightly curved, Fully curved.
8.	Strength of thorn	Weak, Medium, Strong.
9.	Length of leaf blade	Short, Medium, Long.
10.	Width of leaf blade	Narrow, Medium, Broad.
11.	Shape of leaf blade	Lanceolate, Medium ovate, Broad ovate, Elliptic, Circular.
12.	Apex shape of leaf blade	Acuminate, Acute, Obtuse.
13.	Base shape of leaf blade	Attenuate, Acute ,Obtuse.
14.	Colour of young leaf	Light green, Medium-green, Reddish-green, Reddish.
15.	Main colour of leaf	Yellowish-white, Yellow, Yellowish-green, Light green, Medium green, Dark green, Very dark green, Grey-green.
16.	Secondary colour of leaf	None, White, Yellowish-white, Yellow, Light green, Medium-green, Dark green, Very dark green, Grey-green.
17.	Distribution of secondary colour on leaf	Absent, Narrow-marginal, Broad -marginal, Around midrib, Speckled, Irregular.
18.	Tertiary colour of leaf	None, White, Yellowish white, Yellow, Light green, Medium green, Dark green, Very dark green, Grey green.
19.	Undulation of margin	Absent or weak, Medium, Strong.
20.	Texture of leaf blade	Glabrous, Hairy, Slightly Hairy, Tomentose.
21.	Number of leafs on primary branch	Sparse, Medium, Dense.
22.	Persistence of leaf blade	Persistent, Non Persistent.
23.	Length of petiole	Short, Medium, Long.
24.	Attitude of petiole	Upward, Horizontal, Downward.
25.	Length of inflorescence	Short, Medium, Long.
26.	Peduncle length	Short, Medium, Long.
27.	Arrangement of bract clusters	Terminal, Axillary, Axillary and Terminal
28.	Number of bract clusters	Few, Medium, Many
29.	Density of bract clusters	Sparse, Medium and Dense
30.	Presence of flowers	Absent and Present
31.	Type of bract	Single, Multiple and Double
32.	Length of bract	Short, Medium, Long
33.	Width of bract	Narrow, Medium, Broad
34.	Shape of bract	Narrowly Ovate, Medium Ovate, Broadly Ovate, Circular
35.	Reflection of bract	Reflexed, Normal/ Straight
36.	Tip shape of bract	Acute, Obtuse
37.	Base shape of bract	Acute, Obtuse, Cordate
38.	Persistence of bract	Persistent, Non-Persistent
39.	Star	Prominent, Non-Prominent
40.	Colour of star	White , Creamy, Greenish-yellow, yellow, Red and Pink
41.	Diameter of star	Short, Medium, Broad
42.	Colour floral tube	Green, Orange, Magenta, Red and Purple
43.	Shape floral tube	Slender with little constriction in the middle and swollen at base
44.	Stamen position	Inserted and Exerted
45.	Main colour of Small young Bract	White, Greenish-White, Yellow, Orange, Magenta, Pink, Red, Mauve and Purple
46.	Main colour of young bract (Calyx lobe/ Star not open)	White, Yellow, Orange, Magenta, Pink, Red, Mauve and Purple
47.	Main colour young bract (Star open)	White, Yellow, Orange, Magenta, Pink, Red, Mauve and Purple
48.	Secondary colour of young bract (Calyx lobe/ Star open)	White, Yellow, Orange, Magenta, Pink, Red, Mauve and Purple
49.	Tertiary colour of young bract (Calyx lobe/ Star open)	White, Yellow, Orange, Magenta, Pink, Red, Mauve and Purple
50.	Main colour of bract (Calyx lobe/ Star wilted / fading)	White, Yellow, Orange, Magenta, Pink, Red, Mauve and Purple

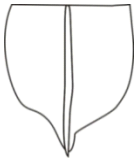
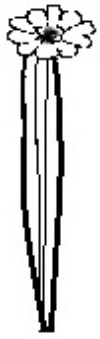
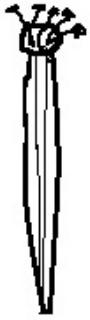
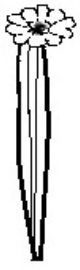
Table 2: Schematic diagram of the various morphological characters

Sl. No.	Characters				
1.	**Growth Habit**				
	 Upright	 Semi-upright	 Spreading	 Drooping	 Climbing
2.	**Length of Internodes**				
	 Short	 Medium	 Long		
3.	**Thorns**				
	 Absent	 Present			
4.	**Curvature of Thorn**				
	 Straight	 Slightly curved	 Fully curved		
5.	**Shape of Leaf Blade**				
	 Lanceolate	 Medium ovate	 Broadly ovate	 Elliptic	 Circular

Sl. No.	Characters					
6.	**Apex Shape of Leaf Blade**					
	 Acuminate	 Acute	 Obtuse			
7.	**Base Shape of Leaf Blade**					
	 Attenuate	 Acute	 Obtuse	 Cuneate		
8.	**Distribution of Secondary Colour on leaf**					
	 Absent	 Narrow-marginal	 Broad -marginal	 Around midrib	 Speckled	 Irregular
9.	**Undulation of Margin**					
	 Absent or weak	 Medium	 Strong			
10.	**Attitude of Petiole**					
	 Upward	 Horizontal	 Downwards			

Sl. No.	Characters		
11.	**Peduncle Length**		
	 Short	 Medium	 Long
12.	**Arrangement of Bract Clusters on Inflorescence**		
	 Terminal	 Axillary	 Axillary and Terminal
13.	**Number of Bract Clusters on inflorescence**		
	 Few	 Medium	 More
14.	**Density of Bract Clusters on inflorescence**		
	 Sparse	 Medium	 Dense

Sl. No.	Characters			
15.	**Presence of Flowers**			
	 Absent		 Present	
16.	**Type of Bract**			
	 Single		 Multiple	
17.	**Shape of Bract**			
	 Narrowly Ovate	 Medium Ovate	 Broadly Ovate	 Circular
18.	**Reflection of Bract**			
	 Reflexed		 Normal/ Straight	

Sl. No.	Characters		
19.	**Tip Shape of Bract**		
	 Acute	 Obtuse	
20.	**Bract: Shape at Base**		
	 Acute	 Obtuse	 Cordate
21.	**Star:**		
	 Prominent	 Non-Prominent	
22.	**Floral tube: Shape**		
	 Slender with little constriction in the middle	 Swollen at base	

Considering the above and to eliminate the error of identification, there are some identified morphological traits which have been furnished hereunder in Table – 4.1. On the basis of these characters, differentiation of the varieties and their identification is possible.

***Note**: These diagnostic morphological characters are as per standard international guidelines/parameters as per The International Union for the Protection of New Varieties of Plants (UPOV) and guidelines developed by CSIR-NBRI for Protection of Plant Varieties and Farmers' Right Authority, Govt. of India (PPV&FRA in 2014).*

Source:

- Bougainvillea – A Colour Handbook by R.K.Roy, Astral International Pvt. Ltd., New Delhi, India, 2019, pp.161.
- Bougainvillea – Identification, Gardening and Landscape Use by R.K.Roy, Shilpi Singh and R.R.Rastogi, CSIR-NBRI, Lucknow, India, 2015, 144.
- Protection of Plant Varieties & Farmers' Rights Authority, Ministry of Agriculture, Govt. of India, New Delhi.